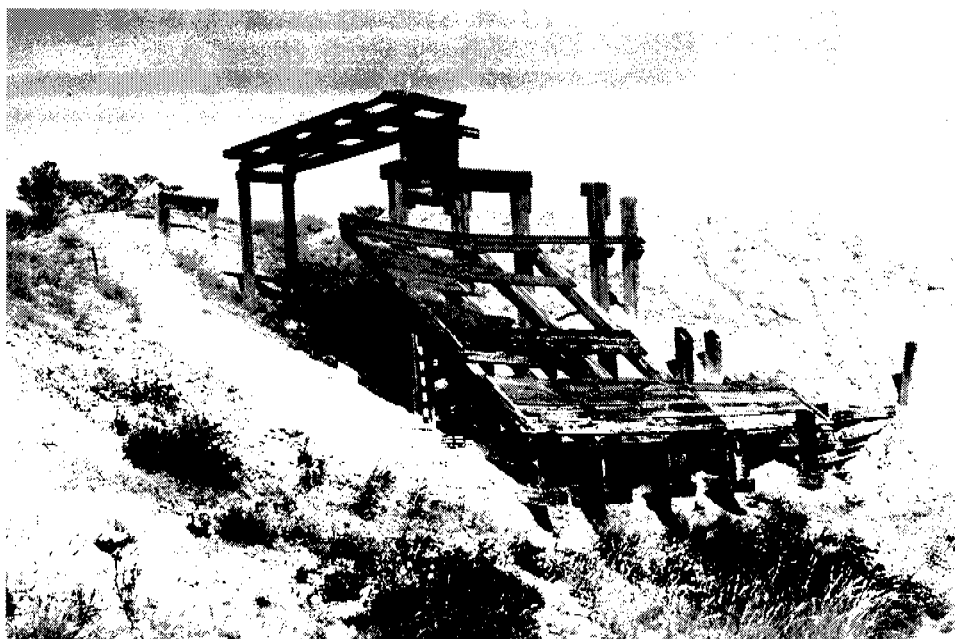


The Fluorite Ridge Fluorspar Mines, Luna County, New Mexico

**Jeffrey L. Boyer
John T. Zachman
Guadalupe Martinez**



Museum of New Mexico

**Office of Archaeological Studies
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OFFICE OF ARCHAEOLOGICAL STUDIES

THE FLUORITE RIDGE FLUORSPAR MINES, LUNA COUNTY, NEW MEXICO

by
Jeffrey L. Boyer
John T. Zachman
Guadalupe Martinez

Submitted by
Yvonne R. Oakes, M.A.
Principal Investigator

ARCHAEOLOGY NOTES 215

ADMINISTRATIVE SUMMARY

Between September 16 and October 23, 1996, the Office of Archaeological Studies (OAS), Museum of New Mexico, recorded six historic fluorspar mine sites at the southeast end of Fluorite Ridge in north-central Luna County, New Mexico. Five of the sites (LA 115360, LA 115361, LA 115362, LA 115363, and LA 115579) are on land administered by the USDI Bureau of Land Management (BLM) Las Cruces District, Mimbres Resource Area. The sixth site, LA 115364, is on the patented Greenleaf Nos. 1 and 2 mining claims (Mineral Survey No. 2226). The sites on BLM land total 101.63 acres (41.13 ha) while the private land site covers 52.51 acres (21.25 ha). None of the sites are currently listed on the *National Register of Historic Places* or the *New Mexico State Register of Cultural Properties*.

The OAS field crew consisted of John T. Zachman and Guadalupe A. Martinez, archaeologists, and Jeffrey L. Boyer, project director. Yvonne R. Oakes, OAS assistant director, acted as principal investigator for the project. A total of 38 person-days were spent in field work.

The sites were recorded at the request of Mr. Homer Milford of the Abandoned Mine Lands Bureau (AML), New Mexico Energy, Minerals, and Natural Resources Department. AML plans to close 39 open shafts, trenches, and stopes and to modify one open adit at these sites because they present potential health and safety hazards. In addition to these features, OAS archaeologists recorded four other features that resemble those planned for closure and may be included in AML's activities at these sites.

Fluorspar mining in the district began in the early 1900s and was active through World War II. At some mines, mining continued into the 1950s and two sites, the Valley Mine (LA 115360) and the Greenleaf No. 1 Mine (LA 115364), were the scenes of considerable development in the 1960s. Each of the six sites reflects aspects of the development of the business of fluorspar mining in the region and the economic interaction of the region with national industrial development. Five sites (LA 115360, LA 115361, LA 115362, LA 115363, and LA 115364) are mining locations and include mining and structural features. The sixth site (LA 115579, the Williams Brothers Prospect site) was the location of prospecting activities. Two of the sites (LA 115361, the Lucky Mine, and LA 115364, the Greenleaf Mine) also clearly reflect the importance of fluorspar mining to national military interests and activities during World War II, while the other sites may reflect these activities. Consequently, the sites should be considered significant under criterion (a) of 36CFR60.4. Further, since the sites have prehistoric components that include scatters of chipped stone artifacts and, in some cases, quarry locations, the sites should also be considered significant under criterion (d) of 36CFR60.4, since they can be expected to provide information on prehistoric chipped stone material procurement and reduction strategies.

The development of mining activities and features through time had different effects on the various sites. However, in most cases the design and development of the sites is clearly definable and examination of aspects of site integrity reveals that the sites are generally in good condition with regard to their integrity. Only at LA 115360 (the Valley Mine) and 115364 (the Greenleaf Mine) did recent activities obscure or significantly alter earlier features. LA 115360 is considered to be in poor condition, while the earlier components and features of the Greenleaf No. 1 Mine area of LA 115364 have been destroyed.

Cultural resources clearance is recommended for AML's proposed activities at each of the six sites. Given the potential significance of each site, in terms of both prehistoric and historic components and features, suggested provisions for granting clearance are recommended in this report. These provisions usually focus on activities at specific features, although some general provisions are also recommended. At each site, AML's proposed activities are limited to those features identified in this report with AML feature numbers. Other features, including mining features, structures and structural remains, and artifact scatter areas, will be avoided and preserved except as discussed in the report.

MNM Project No. 41.615 (Fluorite)

USDI Bureau of Land Management Cultural Resource Use Permit No. 21-2920-96-U, expires July 31, 1997

This report is submitted under between the New Mexico Energy, Minerals, Joint Powers Agreement No. 96-521.06-097 between the New Mexico Energy, Minerals and Natural Resources Department and the Museum of New Mexico.

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INTRODUCTION

Jeffrey L. Boyer

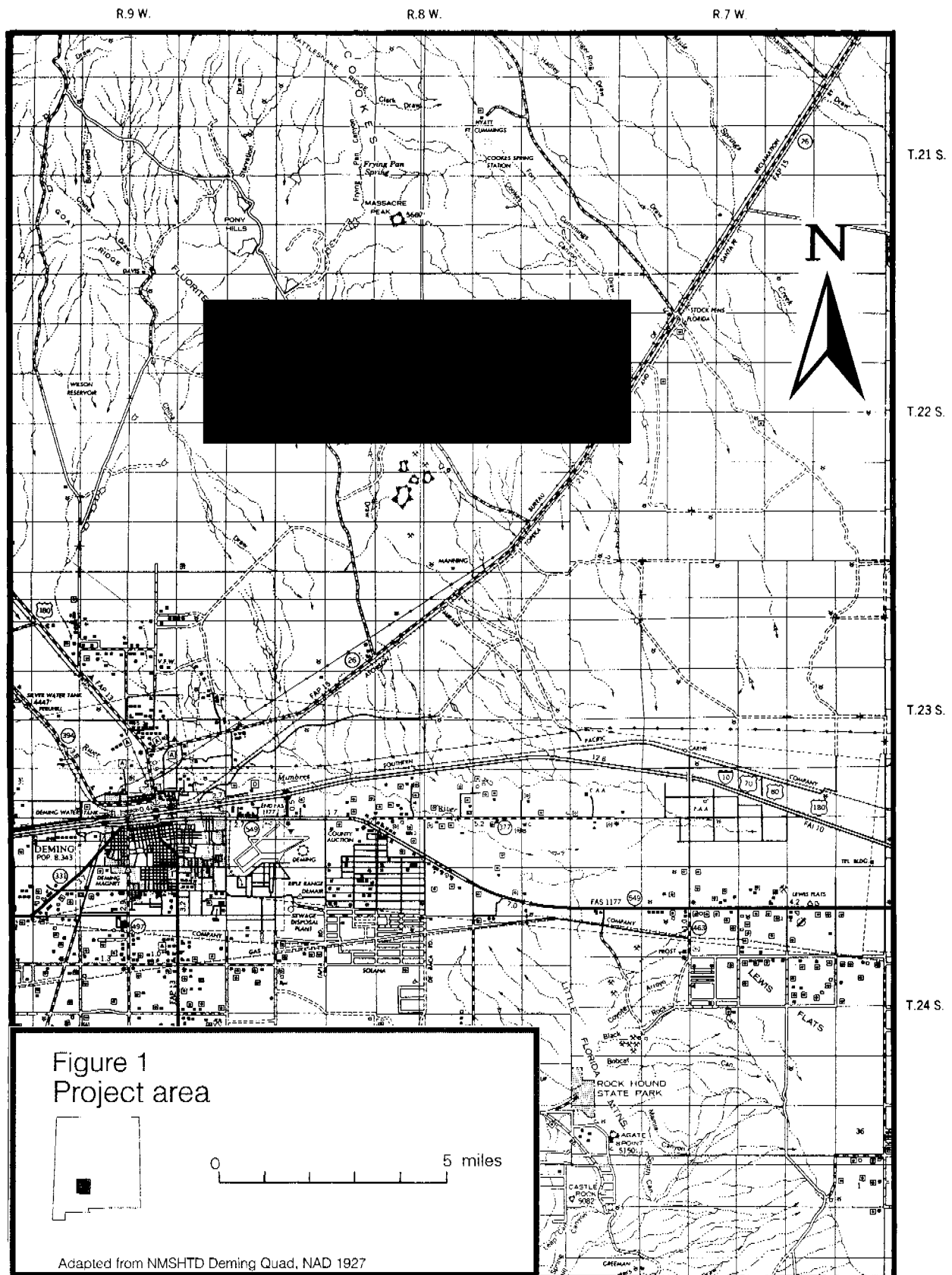
Between September 16 and October 23, 1996, the Office of Archaeological Studies (OAS), Museum of New Mexico, recorded six historic fluorspar mine sites at the southeast end of Fluorite Ridge in north-central Luna County, New Mexico (Fig. 1). The sites were recorded at the request of Mr. Homer Milford of the Abandoned Mine Lands Bureau (AML), New Mexico Energy, Minerals, and Natural Resources Department. AML plans to close 39 open shafts, trenches, and stopes and to modify one open adit at these sites because they present potential health and safety hazards. In addition to these features, OAS archaeologists recorded four other features that resemble those planned for closure and may be included in AML's activities at these sites. Specific descriptions of proposed actions at each site are included with the site descriptions later in this report.

The OAS field crew consisted of John T. Zachman and Guadalupe A. Martinez, archaeologists, and Jeffrey L. Boyer, project director. A total of 38 person-days were spent in the field. Yvonne R. Oakes, OAS assistant director, acted as principal investigator for the project.

The Fluorite Ridge mines are located about 18 km (11 miles) northeast of Deming. Appendix 1 lists their legal and UTM locations. Figure 2 shows their locations on the USGS Massacre Peak, New Mexico 7.5' quadrangle. The Greenleaf Mine Group, LA 115363, is located on a series of private, patented claims (Mineral Survey 2226). The remaining five sites are on land administered by the USDI Bureau of Land Management, Las Cruces District, Mimbres Resource Area. Table 1 lists the six sites by land ownership and size.

Table 1. Fluorite Ridge Mine Sites: Land Ownership and Size

SITE NO.	SITE NAME	OWNERSHIP	SIZE	
			Acres	Hectares
LA 115360	Valley Mine	BLM	9.03	3.65
LA 115361	Lucky Mine	BLM	4.93	1.99
LA 115362	Sadler Mine	BLM	10.00	4.05
LA 115363	Greenleaf Mine Group	Private; M.S. 2226	52.51	21.25
LA 115364	San Juan Mine Group	BLM	60.00	24.30
LA 115579	William Bros. Prospects	BLM	17.67	7.15
Total		BLM	101.63	41.13
Total		Private	52.51	21.25



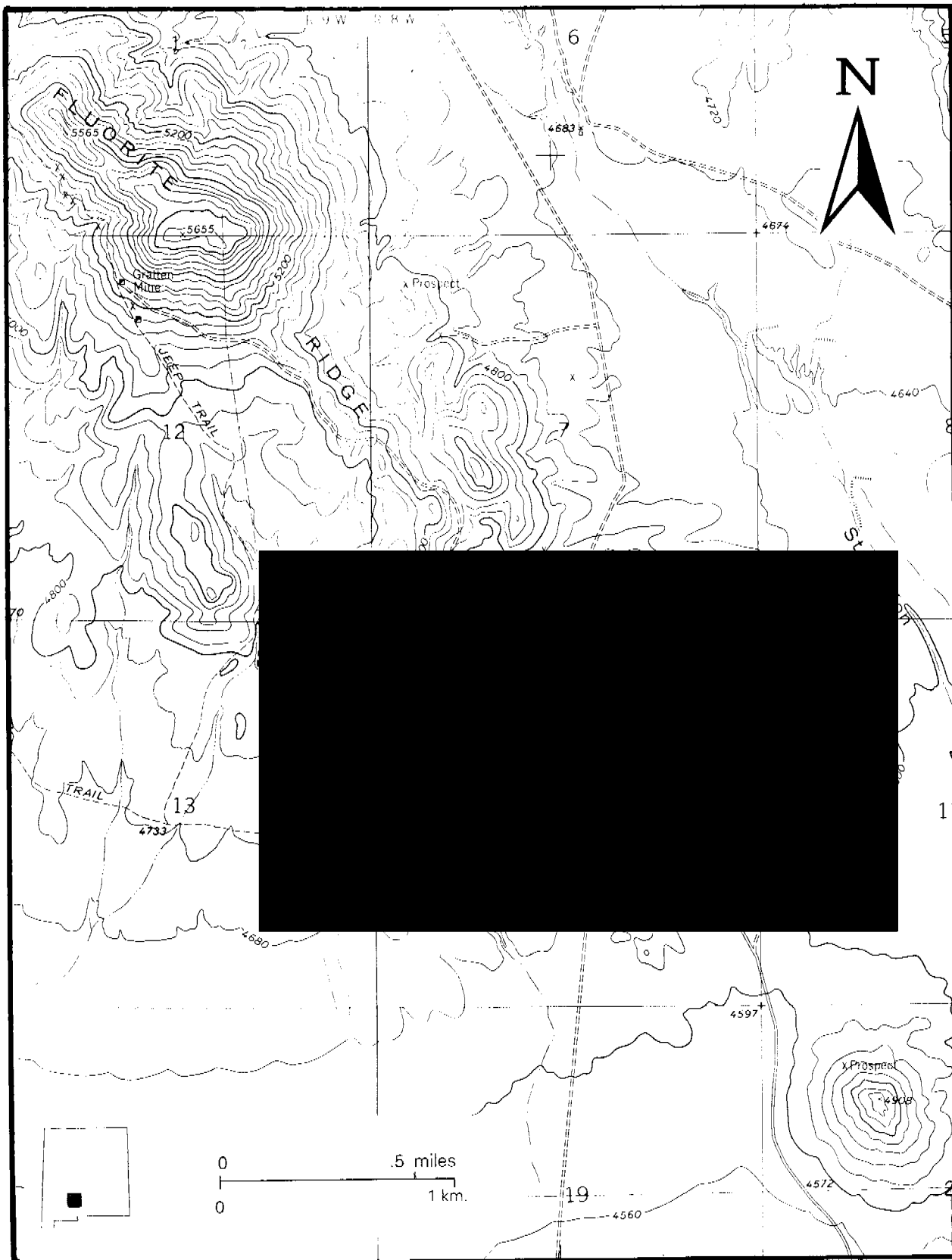


Figure 2. Fluorite Ridge project area and sites, USGS Massacre Peak, New Mexico 7.5' quadrangle.

THE NATURAL ENVIRONMENT

Jeffrey L. Boyer

Regional Vegetation and Climate

The Fluorite Ridge project area is in the Basin-and-Range Desert physiographic zone. Lekson (1992:25) places it in an extension of the Chihuahuan Desertscrub subdivision of the Chihuahuan Desert biotic zone. This area, the Deming Plain stretching north and west around Cooke's Peak (Lekson 1992, fig. 2.2), protrudes northward into the Semidesert Grassland subdivision of the same biotic zone. These subdivisions are created by elevational differences within the biotic zone, with higher elevations being grasslands and lower elevations, the desertscrub areas, "marked by the ubiquitous creosotebush" (Lekson 1992:25). This characterizes the Fluorite area today. Interestingly, Brown's (1892) survey notes from a century ago refer consistently to mesquite and grasses as the dominant vegetation north of, south of, and on Fluorite Ridge, suggesting significant changes in the region's vegetative community. Lekson (1992:27) suggests that the changes may be the results of modern impacts to the desert environment, but does not develop this idea.

In any case, the desertscrub vegetation is supported by the region's distinctly desertic climate. Average annual precipitation in Deming is only 233.7 mm (9.2 inches). Average seasonal precipitation is as follows: winter (December through February), 38.1 mm (1.5 inches); spring (March through May), 24.1 mm (0.95 inches); summer (June through August), 96.8 mm (3.8 inches); fall (September through November), 68.8 mm (2.7 inches) (Tuan et al. 1973:18, 30-33).

The average January temperature in Deming is 6.1 degrees C (43 degrees F), while the average July temperature is 26.7 degrees C (80 degrees F). There are an average of 220 days each year without a killing frost (Tuan et al. 1973:67, 87). These conditions result in an average annual potential evapotranspiration rate of 762 mm (30 inches), creating an annual moisture deficit of 528.3 mm (20.8 inches). Most of that deficit, about 508 mm (20 inches), is during the long frost-free season, since the soil moisture recharge period is only the months of December and January, while the heaviest soil moisture utilization period is the months of March through May (Tuan et al. 1973:123, 127-128; see also Gabin and Lesperance 1977:200).

Geology

The descriptions of Fluorite Ridge geology by Rothrock and others (1946:128-131) and Griswold (1961:97-105) are lengthy and detailed. The reader is referred to these reports for descriptions and generalized stratigraphic profiles. Griswold (1961:104-105) provides the following summary of the formation and structure of Fluorite Ridge:

The overall structural picture of Fluorite Ridge is complex. Fortunately, the major structures were formed prior to the formation of the fluorspar veins. This fact was helpful not only to the mine operators but to the writer as well, because it eliminated the necessity for unraveling the complex pattern of preore faults present in the southeastern part of the district.

Pregranodiorite porphyry structures. The formation of the monolithic conglomerate prior to the intrusion of the granodiorite porphyry indicates considerable structural deformation during late-Cretaceous or early-Tertiary time. The mechanics of this early deformation can only be assumed, but it is likely that a large northwest-striking fault traversed the center of Fluorite Ridge. Evidence of the fault is given by the contrast in attitude of the steeply dipping block of Paleozoic rocks in the southeastern part of the district as compared with the much more gentle dips prevalent in the Sarten sandstone of the northwest.

Structures formed by intrusion of granodiorite porphyry. The assumed northwest-striking fault just mentioned provided the axis for the invasion of granodiorite porphyry. The granodiorite spread laterally along the Permian-Cretaceous sedimentary contact, thus forming an elongated domal structure. Evidence of this shape is clearly shown in the western part of the district by a bleached plunging anticline.

The granodiorite was emplaced at relatively shallow depths because only the Sarten sandstone, Colorado shale, and possibly some early-Tertiary volcanic rocks formed the roof over the granodiorite. In the vicinity of the Hilltop Spar mine, the granodiorite intruded the monolithic conglomerate; thus, early-Tertiary volcanic rocks must have provided the sole cover over the granodiorite.

Postgranodiorite porphyry structures. Extensive faulting occurred after the emplacement of the granodiorite porphyry pluton, causing the general area of Fluorite Ridge to be uplifted. Subsequent erosion exposed the upper portion of the pluton, leaving only a few isolated remnants of the original roof. Faulting continued throughout the remainder of Tertiary time, as indicated by offsets in the basalt dikes.

The postgranodiorite porphyry dikes fall into three strike-direction groups, north, northwest, and northeast, which probably are controlled by faults of the same trends. The north-striking fault group is the most prominent. Several such faults pass along the east end of the range, causing granodiorite porphyry overlain by a thin mantle of Gila conglomerate to be downthrown on the east against Paleozoic sediments on the west. Another north-trending fault forms the east boundary of a Sarten sandstone outcrop in the north-central part of the district. This fault is readily traceable into the Pony Hills 2 miles farther north.

Northwest-striking faults are evident along the flanks of Fluorite Ridge. It is probable that many similarly oriented faults pass through the central part of the ridge, but offsets are difficult to detect there because granodiorite porphyry is the only rock type that crops out. Northeast-striking faults are limited to the south-central part of the district, and the offsets are minor in comparison to the other fault groups.

Figure 3 shows the geology of the southeast end of Fluorite Ridge, as defined by Rothrock and others (1946). With regard to characteristics of the fluorspar deposits, Griswold (1961:105-106), provides the following description:

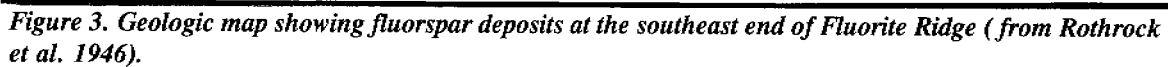


Figure 3

Except for the Hilltop Spar mine, the fluorspar deposits are limited to simple fissure veins. Very little wall-rock replacement is evident. The dominant trend of the veins is north, but a few east-striking crossveins are known, and the vein at the Grattan mine follows a northwest-striking basalt dike. The vein mineralogy is also simple. Fluorite is the only ore mineral, accompanied by abundant quartz, minor calcite, and rare barite. Pyrite has been reported in the deeper levels of the Sadler mine, but sulfide minerals are absent elsewhere. The fluorite occurs in a variety of colors: transparent, white, pale green, pale red, and faint purple. Although large masses of pure fluorite are common, well-developed crystal faces are rare. The quartz occurs mostly in the cryptocrystalline masses, but occasional vugs are found containing well-developed crystals.

The veins are definitely controlled by faults. They occur, however, mostly in faults of small displacement; many of the faults of large displacement apparently were not favorable zones for ore deposition. This tendency is well demonstrated at the Sadler mine, where the large north-striking fault located immediately west of the mine is barren, whereas several parallel but minor fractures contain abundant ore. The veins are much more regular in strike direction and width in the volcanic conglomerate and Gila(?) conglomerate than in the granodiorite porphyry. . . most of the fluorspar mined in the district has come from veins in the granodiorite porphyry.

Vein widths range from the vanishing point to as much as 20 feet, but the average width of the minable portions is about 3 feet. Vein splits and offsets are common and caused considerable dilution of the ore during mining. Fortunately, neither the quartz nor wall-rock interfered with the concentration of the ore by flotation methods. Also, the veined nature of the deposits made handsorting an easy and efficient method of upgrading ore diluting by mining.

THE CULTURAL ENVIRONMENT

Jeffrey L. Boyer

Because this project deals with historic mining sites, the following discussion focuses on the mining history of Fluorite Ridge and the Cooke's Peak region. It is drawn from a number of primary and secondary sources and is intended to provide a context within which to describe and evaluate the six mining sites recorded during the project. The reader is referred to Couchman (1990) and Staski (1995) for synthetic overviews of the history of the Cooke's Peak region and the archaeology of one of its more famous historic sites.

It is important to note that each of the six mining sites recorded here has a probable prehistoric component. In each case, that component consists of a scatter of chipped-stone artifacts, mostly chert tested cobbles, cores, core fragments, and core flakes. In each case, the presence of these artifacts reflects primary lithic material quarrying activities as well as core reduction. Because no temporally diagnostic tools were observed (indeed, very few recognizable tools were observed at all), we cannot assign the prehistoric components to temporal periods. We have, therefore, chosen not to present a full discussion of regional prehistory in order to provide a context for these components. The reader is referred to Lekson (1992) for a synthesis of regional prehistory. Instead, in discussing the results of nearby archaeological projects, we will include portions of Lekson's synthesis of Deming-area survey projects bearing on the prehistoric components.

A Brief History of Mining in Luna County

The Cooke's Peak Mining District

Griswold (1961:31) states, "It is almost a certainty that Spanish explorers prospected the major mountain ranges in Luna County in the late 1700's and early 1800's, but their searches must have failed, for there was no evidence of large-scale mining when Americans began to settle the area in 1850." Couchman (1990:210-211) agrees: "It remained until 1876 for the seed to be planted that would germinate into the Cooke's Peak Mining District and later flower into the most valuable lead producing area in New Mexico."

The earliest mining in the region appears to have centered on the activities of Edward Orr and Lon Irington, ranchers who lived north of Cooke's Peak. Orr is credited with finding the first recoverable ore on Cooke's Peak. Orr and Irington opened the Blackhawk (silver) Mine in 1877 and the Montezuma Mine in 1880. The production of these mines was severely hampered, however, by Apaches who raided both ranches and mines in the area. Consequently, Orr and Irington joined miners from the Piños Altos area to prospect in the Florida Mountains, leaving only one miner in the camp on Cooke's Peak from 1881 to 1882 (Couchman 1990:212).

The Atchison, Topeka, and Santa Fe Railroad (AT&SF) entered New Mexico in December 1878. Construction of AT&SF rail lines in New Mexico, not including lines owned by AT&SF subsidiaries, ended in Deming in March 1881, where the southern branch of the AT&SF joined the Southern Pacific (SP) Railroad (Myrick 1990:4, 15). The SP, built to connect California with

the Gulf of Mexico, entered New Mexico west of Lordsburg in September 1880. Rail service to Deming began in December 1880 and the line reached El Paso in May 1881 (Myrick 1990:59-60). With the joining of the two railroads at Deming, economically feasible mining in what was then southern Grant County was a real possibility because ore could be shipped to smelters in El Paso (Couchman 1990:212).

Railroads not only enable ore shipment but also brought more miners to the region. These two factors, along with greater control of the Apache threat by soldiers from nearby Fort Cummings, resulted in the birth, from the Cooke's Peak mining camp, of three towns: Cooks (*not* Cooke's), Jose, and Hadley. Ore from the mines averaged 30 percent lead with 80 ounces of silver per ton. By the spring of 1890, encouraged by federal legislation imposing import duties on Mexican lead coupled with increased demand from U.S. manufacturers, the Cooke's Peak camp became the Cooke's Peak Mining District, "one of the most productive lead producing regions in the Southwest" (Couchman 1990:212). After Fort Cummings was completely abandoned in 1891, following a steady decline in the number of troops since 1884, mining around Cooke's Peak was the only economically significant activity in the region (Staski 1995:231-232; Couchman 1990:227). "This district immediately flourished, producing a total of about \$3 million by the turn of the century. . ." (Griswold 1961:31). However, production from the Cooke's Peak District mines, which had focused on ores containing lead, zinc, and silver, declined after 1900 because of a "failure to develop new ore" (Griswold 1961:31).

Mining at Fluorite Ridge

Fortunately for the economy of the newly formed Luna County, which was separated from Grant County in March 1901, "about the time that the older mines were being worked out, discoveries were made of important deposits of fluorspar and manganese: (Griswold 1961:34). Rothrock and others (1946:15) report that fluorspar mining may have begun in the 1880s, the work of Apolonio Ogas and Pedro Caraval at the Foster Mine near Gila. Apparently, however, their production was relatively insignificant, since official records show fluorspar mining in southwestern New Mexico beginning at Fluorite Ridge in either 1907 (Reinhart 1953:3) or 1909 (Burchard 1911:75; Rothrock et al. 1946:15; Griswold 1961:34). Prior to this time, there was evidently no activity on Fluorite Ridge. Brown (1892), in the notes of his survey of the line separating Ranges 8 and 9 West, made no mention of mines or mining activity as he proceeded north along the western edge of Sections 18 and 7 (T22S, R8W), within which most of the Fluorite Ridge mines are located (see Fig. 2). In fact, he describes the ridge but does not mention its name, probably because it was not known as Fluorite Ridge until the early 1900s. Burchard's (1911:74) use of this name may be the first such use in print, coming shortly after mining began there.

Reinhart (1953) provides no evidence to support his contention that mining at Fluorite Ridge began in 1907. Other researchers cite 1909 as the first year, based apparently on the fact that 1909 is the first year in which ore shipments are recorded (Rothrock et al. 1946:14; Griswold 1961:32). As Griswold (1961:107) notes, the Fluorite Ridge mines have been known by various names and descriptions through time, a fact that compounds problems of defining the mining history of the district. Following a visit to the district in 1910, Burchard (1911:74) states:

The American Fireman's Co. of Kansas City, Missouri, in prospecting for metallic ore on property situated 10 miles northeast of Deming, Luna County, New Mexico, has opened a number of veins of fluorspar, which give promise of

containing nearly, if not quite, sufficient spar to supply the Western market for several years.

He later states that the American Fireman's Company began work at Fluorite Ridge in 1909. In 1910, G. M. Sadler of Deming acquired the American Fireman's Company's holding and continued to work the "lower camp" mines at the southeast end of the ridge as well as to develop mines higher on the ridge to the northwest (Burchard 1911:75; Johnston 1928:100; Griswold 1961:69). The mines were apparently not named at the time of Burchard's visit in 1910, although most later researchers associate the "lower camp" mines operated first by the American Fireman's Company and later by Sadler with the Sadler Mine on the steep hillslope. As will be seen later, this association may be spurious and the "lower camp" may well not have been the Sadler Mine. Burchard (1911:756) also mentions two other "promising" nearby prospect areas, one less than 100 yards north of the "lower camp" and the other about one-quarter mile north of the "lower camp." Griswold (1961:96) identifies the "lower camp" mine area as what would become known as the Sadler Mine, the mine area high on the ridge to the northwest as what would be the Grattan Mine (also sometimes known as the Sadler No. 2 Mine), and the area one-quarter mile north of the "lower camp" as what would be the Lucky Mine. Apparently, all were being operated under the direction, first, of the American Fireman's Company and, then, by Sadler. Griswold does not identify the prospect area less than 100 yards north of the "lower camp." In 1928, Johnston identified three prospect areas in addition to the "lower camp" area (Johnston 1928:96). One was about 200 feet northwest of the "main shaft." The identity of this location is not known. The second was a deep shaft one-quarter mile southeast of the camp buildings at the "lower camp." This appears to be the first mention of what would be the Greenleaf Mine. The third was an inclined shaft about 200 ft north of the camp buildings, probably the same location mentioned by Burchard but not identified by Griswold. About 25 ft northeast of this shaft was an open cut. These may be the first mention of what would become the San Juan Mine. Johnston (1928:97) then mentions the mine area one-quarter mile north of the camp buildings, probably the Lucky Mine. More specific information on the history of the mines is presented with the descriptions of the individual sites.

Griswold (1961:96-97) notes that the Fluorite Ridge District produced "sporadically" until 1955, but that the most productive period was probably between 1932 and 1944. This apparently had to do with increased demand for fluorite in steel production prior to and especially during the early years of World War II:

The investigation of fluorspar deposits in New Mexico by the Geological Survey of the United States Department of the Interior was undertaken to stimulate output of fluorspar for war purposes, to determine the available resources, and to supply geological information to war agencies and operators. (Rothrock et al. 1946:11)

Rothrock and others (1946:11) state:

In the attempt to encourage new development, priority was given to newly discovered or unproved deposits; thus, some of the larger operating properties were not completely investigated. Descriptions of some of these larger properties, therefore, are less detailed than their importance as sources for fluorspar justifies.

In this regard, it is interesting that of the Fluorite Ridge mines, the descriptions of the Sadler and Greenleaf Mines are much more detailed and lengthy than are those of the San Juan and Lucky

Mines. This may suggest that the Sadler and Greenleaf Mines were less developed than the San Juan and Lucky Mines at the beginning of World War II. The significance of this in the history of the Sadler Mine is discussed in the description of that site. Rothrock and others (1946:126) list and show the mining claims on Fluorite Ridge at the time of their study in the 1940s. There are eighteen claims listed in the southeast group, none of which were patented at that time. Figure 4 shows those claims, taken from Rothrock and others and placed on the USGS quadrangle.

In the summer and early fall of 1943, the USDI Bureau of Mines undertook a program of exploratory trenching focusing on the Greenleaf and Lucky claims occasioned by the recommendations of the Geological Survey, with the objective of seeing that the "resources" at these mines made "the greatest possible contribution to national security and economy" (Russell 1947:1-2). Russell's report provides the nonclassified, publishable results of the exploration. He provides no explanation for why trenching was limited to the Greenleaf and Lucky claims. He does show mine claims at the southeast end of Fluorite Ridge (Russell 1947, fig. 1). Sixteen are included on the map, all still unpatented.

In 1953, Reinhart (1953) reported to the American Smelting and Refining Company on both the structural and geological features of the district and on the economic potential of the mines. Although he mentions the "Saddler" [sic] and San Juan mines at the southeast end of Fluorite Ridge and the Greenspar Mine high on the ridge, Reinhart focuses on the Greenleaf and Lucky mines. The San Juan Mine, about which he provides no other information, the Greenleaf Mine, and the Lucky Mine were "equipt [sic] to service the current operations" (Reinhart 1953:4). The Greenleaf Mine was not in operation at that time but the owners were considering reopening the mine and building a mill on-site. Reinhart (1953:8) recommended testing and acquisition of the Lucky Mine. It is not clear from his report whether the Sadler and San Juan mines were in operation.

Fluorspar mining at the Fluorite Ridge mines ceased in 1954 due to a "flooding of the fluorspar market with cheaply produced foreign ore " (Griswold 1961:34). As is discussed in detail in the description of the Greenleaf Mine, some work was performed there in the 1960s, but the extent of production is unknown. A patent for the Greenleaf No. 1 and 2 claims was issued in 1963.

In 1911, mine operators used "Mexican" laborers as miners, paying them about \$1.50 per day. Small store buildings and machine shops had been built at the mine areas. The laborers lived in tents near the mines (Burchard 1911:76). By the early 1940s, "Underground labor was scarce, but an adequate supply of unskilled surface labor was obtainable in Deming. The wage scale in this district at that time ranged from \$0.50 to \$0.75 an hour" (Russell 1947:3). Four or five men could live at the Greenleaf Mine, but most workers lived in Deming and were brought to the mines in company trucks.

Also in 1911, Burchard (1911:74-75) reported that spar from the mines was hauled by wagons 5.5 miles to Mirage, a station on the AT&SF line north of Deming. The ruins of Mirage can still be seen along the west side of NM 26. At a point about a mile from the mines was a platform scale on which all ore shipments were weighed. The exact location of the scale is not recorded. Since there was no fluorspar mill in Deming, the ore must have been shipped to El Paso for processing. In 1932, the La Purissima Fluorspar Company of Deming constructed a flotation mill to process ore from the Fluorite Ridge mines. The mill's original capacity was 20 to 30 tons of ore per day. It was acquired by the General Chemical Company in 1937 (Griswold 1961:97)

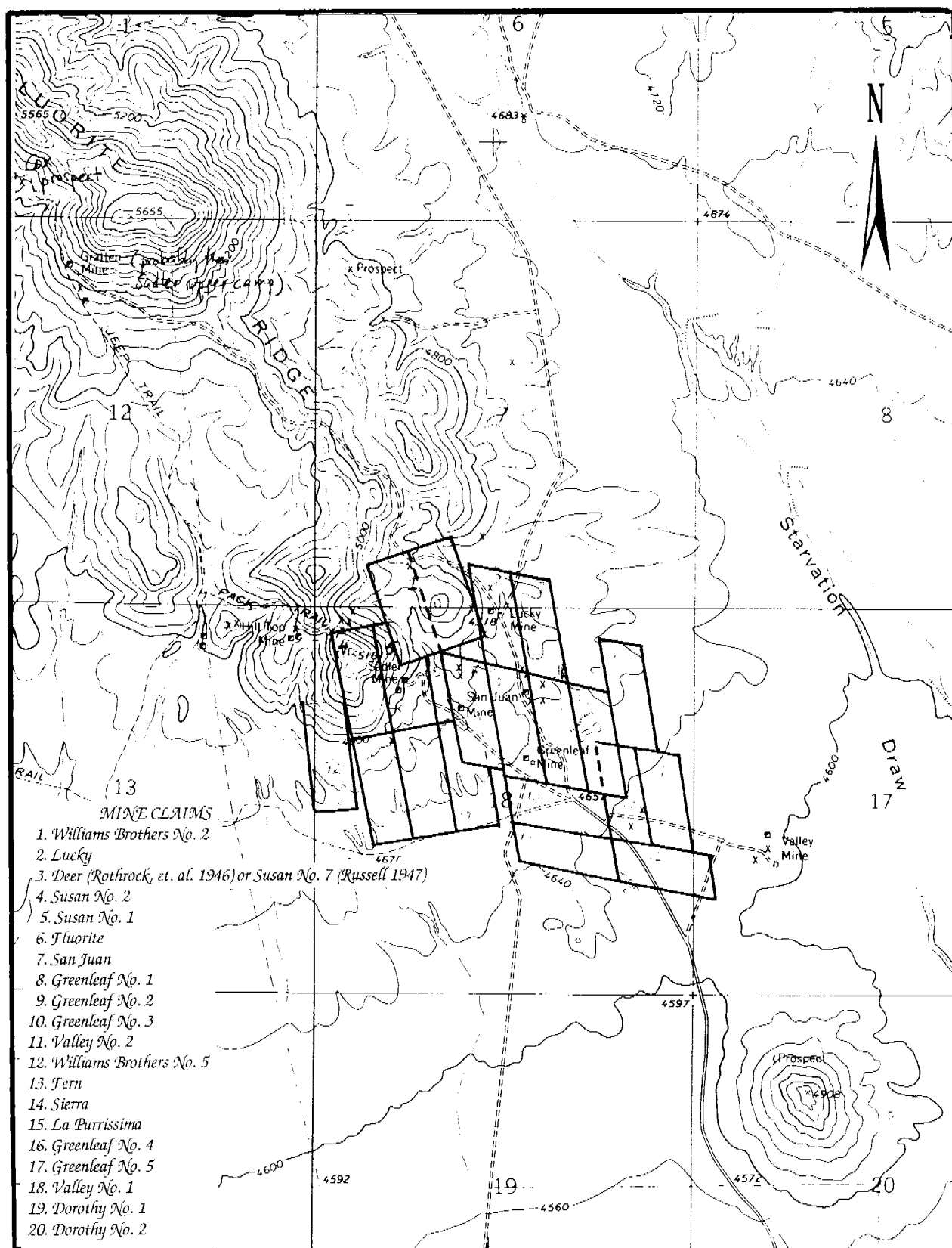


Figure 4. Fluorite Ridge mining claims in the 1940s, shown on the USGS Massacre Peak, New Mexico 7.5' quadrangle (from Rothrock et al. 1946).

or 1938 (Russell 1947:4) and its capacity was increased to 100 tons per day. The mill operated continuously from 1932 to 1954, when it ceased operation as mining stopped when fluor spar prices dropped. During World War II, another mill in Deming was operated by P. L. Grattan. In 1943, as part of the federal mine-access road program, a new road was built to the mines (Russell 1947:3). That road is now County Road A-016, which provides access to the sites.

Nearby Projects

No sites currently listed on the *National Register of Historic Places* or the *New Mexico State Register of Cultural Properties* are found within or near the project area.

A search of the Historic Preservation Division's New Mexico Cultural Resource Information System (NMCRIIS) and the BLM Las Cruces District's site and project files reveal only three projects that have been conducted in the vicinity of the Fluorite Ridge mines. In 1981, New Mexico State University's Cultural Resource Management Division (CRMD) performed a survey of 45 geothermal drill-pad locations near Las Cruces and Deming (Sudar-Laumbach 1981). Two of those locations were on the southwest flank of Fluorite Ridge and a site was recorded at both locations. LA 32599, located about 1 km west of the Sadler Mine, consists of two components. The first is a lithic quarry of unknown temporal designation. The second is a historic road, a portion of the road leading up to the Grattan Mine. LA 32600, located about 2.9 km northwest of the Sadler Mine, is also a two-component site. Again, the first component is a lithic quarry while the second is a historic road, this time a portion of the road leading up to the Greenspar Mine.

In 1983, a survey was conducted for Teledyne's explorations line 34, running northeast-southwest through the Fluorite Ridge project area (Leftwich and Taylor 1983). Although the line passed immediately north of the Valley Mine and through the Duke of Luxembourg Mine, neither site was recorded.

Finally, in 1986, BLM archaeologists surveyed a windmill location about 650 m south of the Greenleaf Mine (Mallouf 1986). No sites were recorded.

Both the NMCRIIS and BLM files show an unrecorded site area following a low ridge immediately east of the Lucky Mine. In the NMCRIIS record, this area is circled, with the notation "site #?" In the BLM record, the area is circled, with the notation "lithic scatters." Because the Fluorite Ridge project was concerned with the historic mines, we did not inspect this ridge except along the east side of County Road A-016 across from the Lucky Mine. It is our opinion, however, that this area represents a continuation of the probably prehistoric chipped stone quarry component that is found within and between each of the six sites recorded during this project. That is, the "lithic scatters" observed on this ridge are probably part of a continuous scatter of chipped stone artifacts observed throughout the project area that undoubtedly extends well beyond the project area. Note that the other two sites recorded nearby, LA 32599 and LA 32600, also consist of chipped stone quarries with historic components. We suspect that the perimeter of Fluorite Ridge, extending from the hillslopes out for an unknown distance into the surrounding bolson plains, is one massive "lithic scatter" resulting from centuries of chert, limestone, mudstone, sandstone, and quartzite quarrying. Material samples (*not* artifacts) from the Fluorite Ridge project area were collected for the OAS lithic material type collection to aid in identification of materials from sites

in southwestern New Mexico.

In his review of large-scale survey projects in the Deming area, Lekson (1992:110) states, "The Deming Plain Survey recorded sites from Cochise Archaic through Salado. About half of the sites were lithic or brown ware sherd and lithic scatters." He goes on to say:

[T]he surface record of the Deming Plain Survey shows major use of the Mimbres River bottom during the Mimbres, Animas, and Salado phases. About one-fifth of the sites of these periods were pueblos located along the Mimbres. . . . A range of non-architectural site types included artifact scatters, stone circles, rock piles, pictographs, mortars and a quarry. (Lekson 1992:110; emphasis mine)

Comparing these results with those of the Grant-Luna Survey, Lekson (1992:111) notes, "Both surveys recorded a very high proportion (90-95%) of non-architectural sites, most of which were non-specific lithic or brown ware and lithic scatters." Further, "Both surveys indicate that architectural sites are rare in the desert zone. . ." Based on these results, we would not expect to find prehistoric architectural sites in or near the Fluorite Ridge project area. Further, given that the overall recorded site density within the Deming Plain Survey area, which includes Fluorite Ridge, is only 1.8 sites per square mile, we might not expect to find many, if any, artifact scatter sites in the project area: "The Deming Plain . . . was notably devoid of sites" (Lekson 1992:111). Consequently, the ubiquitous presence of chipped stone artifacts within the project area is very unusual for this region and can only be explained by the presence of lithic material sources, both outcropping on the ridge itself and as cobbles on the pediment, low ridges, and alluvial fans surrounding Fluorite Ridge.

FIELD PROCEDURES

Jeffrey L. Boyer

Prior to beginning field work, we were provided with historical information by Mr. Homer Milford of AMLB. Mr. Robert Eveleth, senior mining engineer with the New Mexico Bureau of Mines and Mineral Resources, provided us with a wealth of historical information on the mines. The HPD's NMCRIS files and the BLM Las Cruces District's site and project files were consulted for sites and projects near the project area.

The field crew was accompanied in the field for the first day by Mr. John Kretzmann and Mr. Raymond Rodarte, both of AML, who showed us the sites and discussed AML's planned activities at each feature. Mr. Rodarte stayed with us for most of the second day while we worked at the Valley Mine (LA 115360). Mr. Kretzmann later provided us with UTM locations for each feature, derived from GPS data he collected while in the field. These data were invaluable for mapping the San Juan Mine Group site (LA 115364) and for defining the locations and extent of the Greenleaf Mine Group site (LA 115363) and the William Brothers Prospect site (LA 115579).

Each of the mine sites, consisting of a group of mining and other features, was recorded as an *archaeological site*. An archaeological site presents types and quantities of artifacts or features that may have the potential to yield information on the activities that took place there. These artifacts or features are associated with some assumed or demonstrable integrity. In this case, sites were initially defined on the basis of association of mine features as determined by AML staff. Subsequent review of historic documents led us to redefine sites through identification and re-association of features. For instance, AML Features 2 and 16 were thought to be part of the San Juan Mine Group and were recorded as part of LA 115364. We then discovered that they are on the Greenleaf No. 1 Mine claim; they are now included in LA 115363. Similarly, AML Features 6E and 6F were initially recorded as part of LA 115364, the San Juan Mine group. They are actually on the unpatented William Brothers No. 2 claim and so were rerecorded as a separate site, LA 115579.

Each site was recorded on a Laboratory of Anthropology Site Record form. We recorded written descriptions for all features planned for modification and for all other features in the vicinity of those planned for modification. All features planned for modification were photographed, as were most others. The Sadler Mine, LA 115362, was mapped using a Brunton compass and pacing. Two series of elevation points at the Sadler Mine were recorded using a transit and stadia rod, for the purpose of showing on the site map the steepness of the hillslope on which the site is located. The Williams Brothers Prospect site, LA 115579, was mapped using a Brunton compass and a 50-m tape. The other sites were mapped using a combination of transit-and-rod and Brunton-and-pacing. Because of the large sizes of the sites, this combination of mapping methods was very effective, allowing us to accurately locate site features using the transit and rod and to fill in site details using the Brunton and pacing. Because there was concern that use of the transit and rod to map the sites was slower than Brunton-and-pace mapping, the Sadler Mine was used as a test in which we mapped the site using only Brunton-and-pacing. No savings in time resulted from not using the transit and rod and the site map was found to be somewhat less accurate.

THE FLUORITE RIDGE FLUORSPAR MINES

Jeffrey L. Boyer, John T. Zachman, and Guadalupe A. Martinez

Introduction

In this chapter, we provide descriptions of the sites and features recorded during this project. We also examine, for each site, the aspects of site integrity and condition as defined by Noble and Spude (1992). This examination is important for determining the significance of each site with regard to its potential for inclusion on the *National Register of Historic Places*. We also provide brief descriptions of AML's proposed activities at each site. Descriptions of the first three sites, LA 115360, LA 115361, and LA 115362, are written by Boyer and Zachman, who recorded those sites. Descriptions of the last three sites, LA 115363, LA 115364, and LA 115579, are written by Boyer and Martinez, who recorded those sites.

LA 115360: THE VALLEY MINE

Historical Descriptions of the Valley Mine

The only description of the Valley Mine is provided by Griswold (1961:116):

The Valley mine is located in the extreme eastern part of the district, about three-quarters of a mile southeast of the Sadler mine. The deposit was worked during the early 1950's by H. E. McCray, the current owner. The mine area actually is covered by Quaternary silt and gravel, but the mine workings have exposed granodiorite porphyry bedrock at a very shallow depth. Trenches have exposed a vein that strikes N.14°W., dips 85°E, and is traceable for 800 feet.

A vertical shaft, estimated to be 75 feet deep, was sunk at the northern end of the vein. The amount of ore produced must have been small, in view of the little amount of work done on the property.

Rothrock and others (1946) show two Valley claims, the Valley No. 1 and Valley No. 2. Both were unpatented. Russell (1947) shows the Valley No. 2 claim but not the Valley No. 1 claim. Figure 4 shows that the Valley Mine is not found in either of these claims. Whether there were other Valley claims is not known.

Site Description

LA 115360, the Valley Mine site, is the easternmost of the six sites recorded during this project (Fig. 2). Its UTM and legal locations are listed in the appendix. The site as recorded covers 9.0 acres (3.6 ha) (Fig. 5). However, the site extends an unrecorded distance north and south of the recorded features. At least two large blade-cut trenches are present north of the recorded area, while at least three shallow bladed areas are south of the recorded area. The site's actual north-

south length is probably about 400 m and the site size is probably about 16.8 acres (6.8 ha). LA 115360 has two components, one prehistoric and one historic. Site boundaries are defined by the distribution of recorded historic features.

Prehistoric Component

The prehistoric component at this site consists of two small chipped stone artifact concentrations and a very low-frequency scatter of chert core flakes that extends across the site. One of the concentrations contains basalt core and core-flake fragments in an area 6-by-4 m on the south side of the site (Fig. 5). This feature is associated with basalt outcrops on the site. The second concentration contains chert core fragments and flakes in an area 2 m in diameter, also on the south side of the site. No temporally diagnostic artifacts were observed. The prehistoric component undoubtedly extends well beyond the site boundaries as defined during this project.

Historic Component

The historic component consists of a series of mining and other features. They include two open shafts and associated features, blade-cut trenches and shallow trenches with waste piles, a long series of tailings piles, and a scatter of cans and glass artifacts. The features are all shown in Figure 5. The features identified by an AML number (AML 8 through 8D) are planned for modification and are given the most detailed descriptions. Other features are described in less detail.

AML 8 consists of an open shaft and a headframe structure (Fig. 5). The shaft is the northern shaft mentioned by Griswold (1961).

The Shaft

Dimensions: 5-by-7-by-49 ft deep (1.5-by-2.1-by-14.9 m deep) (Plate 1).

Description: The open shaft has a framed collar of six-by-six wood beams and two-by-twelve planks held in place with wire nails and, in some of the upper-most beams, by threaded bolts. The planks are jumbled at the top, but two side beams, one on the south side of the shaft and one on the north side, are still in place with planks nailed to them. Framing is visible within the shaft and may continue to the bottom. The collar and framing are approximately 6 to 8 ft (2 to 2.5 m) below the modern ground surface within the shaft. Corrugated sheet steel is protruding from the edges of the shaft immediately below ground surface on the south, east, and north sides. It may have covered the open shaft at one time.

A small tailings pile is present on the north side of the shaft.

The Headframe

Dimensions: When upright, 13 ft tall by 9 ft wide (4 m tall by 2.75 m wide).

Description: The headframe is approximately 6 ft (2 m) east of the shaft and is lying on its "front" or ore chute side, which is to say it is no longer upright (Plate 2). John Kretzmann (pers. comm.

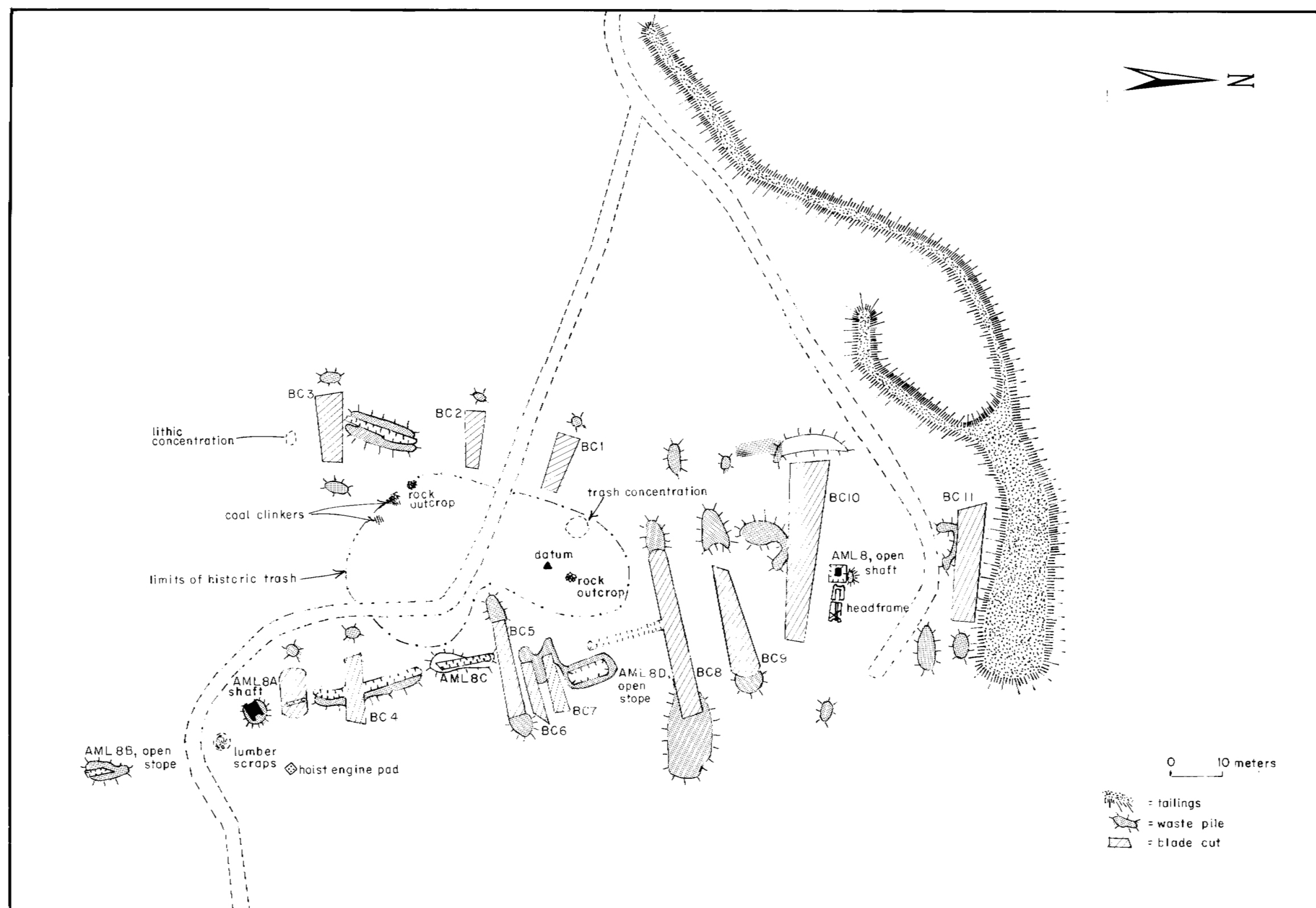


Figure 5. LA 115360, the Valley Mine: site map.

1996) states that a few months prior to field work for this project, the headframe was standing upright. Presumably, it was pulled over recently by visitors to the site. The headframe was constructed using twelve-by-twelve wooden beams to frame the structure (upright supports, center beam, top beams). Eight-by-eight and four-by-four beams were used to brace and support the ore hopper, while two-by-twelve planks were used to create the sides and sloping bottom of the hopper and the two ore chutes located on the east side of the hopper when the structure was upright. The twelve-by-twelve beams in the structure's frame were bolted together using $\frac{3}{4}$ -inch threaded steel rods and thick steel plates. Wire nails were used to frame the hopper and the supporting eight-by-eight and four-by-four beams. Two-by-four boards were nailed at an angle on the north and south exteriors of the hopper. The twelve-by-twelve beam headframe base is on the ground at the east side of the shaft and apparently broke from the structure itself when the structure was pulled over. When upright, the headframe was oriented with the high side of the hopper to the west near the shaft with the two ore chutes facing east.

AML 8A consists of an open shaft, a concrete hoist engine pad, and a pile of building debris.

The Shaft

Dimensions: 6-by-7-by-23 ft deep (1.8-by-2.1-by-7 m deep).

Description: The vertical shaft is cut into the native soil and rock, narrowing at the bottom (Plate 3). Part of a broken ladder is present at the bottom. The shaft is framed with a wooden collar extending down 7 ft (2.3 m). The collar is constructed of six-by-ten beams with one-by-twelve boards held in place by wire nails, except on the east side, where it is made of four six-by-six beams nailed together. On the north side of the collar, the boards extend down into the shaft approximately 10 ft (3 m) to another six-by-ten beam that appears to be bolted to the shaft's rock wall. On the south, west, and east sides, the collar extends down only about 3 ft (1 m).

At the top of the shaft 2 ft (62 cm) due east of the top of the collar, two six-by-six beams are embedded upright in the ground.

Hoist Engine Pad

Dimensions: 6 ft 3 inches square by 6 inches tall (1.92 m sq by 15 cm tall).

Description: This concrete pad is 39 ft (12 m) east of the open shaft and was poured on the modern ground surface (Plate 4). Four upright $\frac{3}{4}$ -inch bolts, 8 inches (20 cm) tall, are set inside 2-inch (5 cm) upright pipes near the corners of the pad. The eastern bolts are bent, the southern one to the south and the northern one to the north.

Building debris: Twenty-three feet (7 m) south of the shaft is a small pile of rotten wood board fragments, nails, scraps of rubber, and a small piece of barbed wire (Fig. 5).

AML 8B is an open stope located 92 ft (28 m) south of AML 8A (Fig. 5). It was apparently used to explore the vein revealed in the shallow trench and features AML 8A and 8C.

Dimensions: 5-by-14-by-22 ft deep (1.5-by-4.2-by-6.7 m deep).

Description: AML 8B is an open stope with an inclined shaft on the north end (Plate 5). It is surrounded by a low waste pile.

AML 8C is an open stope located 111 ft (34 m) north of AML 8A (Fig. 5). It was used to explore the vein revealed by the shallow trenches.

Dimensions: 5-by-36-by-6 ft deep (1.5-by-10.9-by-1.8 m deep).

Description: AML 8C is an open stope. Three six-by-six beams supporting the walls were placed across the stope near the south end (Plate 6).

AML 8D is an open stope located about 52 ft (16 m) northeast of AML 8C (Fig. 5). It was apparently used to explore a vein paralleling the primary vein that runs through the site.

Dimensions: 7-by-8-by-32 ft deep (2.1-by-2.4-by-9.7 m deep).

Description: AML 8D is an open stope with a deep shaft on its south end, separated from the shallower north end by a "bridge" of native rock and waste material (Plate 7).

Blade-cut trenches are listed in Table 2, with their dimensions and descriptions. See Figure 5 for their locations.

In the approximate center of the site is a scatter of artifacts measuring 203 ft (62 m) long by 72 to 121 ft (22 to 36 m) wide. The artifacts appear to represent domestic trash. They include milk cans and fragments, food cans and fragments, lard cans and fragments, undecorated white ware sherds, at least one medicine bottle fragment, and a possible milk bottle finish fragment, as well as other bottle fragments. The cans and can fragments have machine-soldered seams. The glass artifacts are mostly aqua and amethyst in color. No selenium ("honey") glass or "sanitary" (interlocking seam) cans were observed. These characteristics of the artifacts indicate that the assemblage dates prior to about 1920.

On the northwest side of the scatter is a concentration of cans and can fragments (Fig. 5). On the south side of the concentration are two small concentrations of coal clinker.

Discussion

The archaeology of LA 115360 points to activities at the Valley Mine site both before and after the work described by Griswold (1961). Although Griswold states that the mine was worked in the early 1950s, artifacts at the site show that the site has a pre-1920 occupation. Since mining did not start in the Fluorite Ridge District until about 1909, this occupation dates between 1909 and 1920, if it is associated with fluorite mining. Further, the assemblage points to residential use of the site at this time, approximately contemporaneous with the development and occupation of the "lower camp" area. The artifact scatter is relatively small and surface artifact frequency is generally low, suggesting that the pre-1920 occupation was not extensive or lengthy. Whether it is directly related to any of the mining features is not known.

Table 2. LA 115360, the Valley Mine: Blade-Cut Trenches

TRENCH NO.	DIMENSIONS	DESCRIPTION
1	10-by-33-by-2 ft deep (3-by-10-by -0.6 m deep)	Shallow trench with waste pile at north end.
2	8-by-33-by-2 ft deep (2.5-by -10-by-0.6 m deep)	Shallow trench with waste pile at west end.
3	10-by-39-by-2 ft deep (3-by-12-by -0.6 m deep)	Shallow trench with waste pile at west end.
4	6-by-39-by-2 ft deep (2-by-12-by-0.6 m deep)	Shallow trench with waste pile at west end.
5	10-by-69-by-2.5 ft deep (3-by-21-by-0.75 ft deep)	Shallow trench with waste piles at east and west ends. Deepest point is at east end.
6	10-by-39-by-1 ft deep (3-by-12-by-0.3 m deep)	Very shallow trench with waste pile at west end.
7	10-by-33-by-2.5 ft deep (3-by-10-by-0.75 m deep)	Shallow trench with waste pile at east end.
8	16-by-108-by-4 ft deep (5-by-33-by-1.2 m deep)	Relatively deep trench with waste piles at east and west ends.
9	10-by-82-by-2 ft deep (3-by-25-by-0.6 m deep)	Shallow trench with a waste pile at the west end.
10	13-by-108-by-6 ft deep (4-by-33-by-2 m deep)	Deep trench with waste pile at west end.
11	13-by-52-by-4-ft deep (4-by-16-by-1.2 m deep)	Relatively deep trench with waste pile at east end. Deepest point is in center.

Regarding evidence of mining at the site, Griswold (1961:116) observed trenches following a vein for 800 ft (244 m) and a single 75-ft-deep (23 m) shaft at the north end of the vein. The trenches are seen in Figure 5 as a series of shallow trenches between features AML 8A and AML 8. Included in this series is Feature AML 8C, a shallow open stope. The single shaft is Feature AML 8. Griswold also states that only a small amount of work had been done at the mine.

If we assume, from Griswold's description, that the shallow trenches and the shaft were the only features present in 1961, then we can conclude the Features AML 8 and AML 8C are the pre-1960 features at the site. In turn, this implies that the other features--AML 8A, 8B, and 8D, as well as the blade-cut trenches and the linear tailings piles--are post-1960 features. This conclusion, particularly with regard to the tailings piles, is consistent with Griswold's observation that there was little evidence of substantial work at the mine prior to 1961. The size of the tailings piles along the north side of the site suggests considerable work at the site, which must have taken place after 1961. Noble and Spude (1992:18) state that National Register eligibility for sites or features younger than 50 years is predicated on an association with "important recent themes or developments (such as World War II)." One such theme since 1961 might be the Vietnam War, during which military use of steel might have encourage increased fluorspar mining. However, we are not able to associate the post-1961 development at the Valley Mine with such a theme at this time.

The pre-1960 features--AML 8 and the shallow trenches--are associated by Griswold with McCray's activities in the 1950s. If these features do not predate McCray's work, then they are also less than 50 years old. With the possible but untested exception of the Korean conflict in the 1950s, we cannot specify an "important recent theme or development" with which McCray's work at the mine and any attendant features would be clearly associated. As we observed earlier, we cannot clearly associate the pre-1920 artifacts with any of the mining features. However, the presence of the pre-1920 artifact scatter in the midst of the mining features certainly argues for an association at a time when considerable development was taking place in the Fluorite Ridge Mining District. Consequently, we cannot state with any confidence that the pre-1961 features are actually less than 50 years old and, since they appear to be the oldest features at the site, we may assume some association with the pre-1920 occupation of the site.

Aspects of Site Integrity

Location: There has been no obvious relocation of features or facilities, although the headframe at AML 8 was overturned during the summer or fall of 1996. However, any features associated with the pre-1920 occupation are no longer distinguishable. Also, the headframe and hoist engine at AML 8A are no longer present and other features have undoubtedly been removed, as well. The fact that structures such as headframes are generally missing from other mine sites in the district adds significance to the existing headframe at the Valley Mine, since it is one of only two standing headframe structures at these sites.

Design: The development of the site through time is definable by comparing archaeological and historical records. Earlier features have been altered somewhat by later features, but the degree of alteration is not always clear.

Setting: Post-1960 activities have intruded upon older features. There are few recent intrusions.

Materials: Most materials probably in use at the mine are gone, but those that are present are consistent across the site.

Workmanship: Although most materials used at the site are no longer present, those that are present show consistency in workmanship.

Feeling: The proximity of the mines at the southeast end of Fluorite Ridge suggests that individual mines should not have a feeling of isolation from each other, although the mining district should, by virtue of its distance from Deming, have an overall feeling of isolation. This situation is maintained at the Valley Mine, since the other mines are all visible from the Valley Mine, while the district remains largely isolated from modern development in the region.

Association: The overall mining system at the Valley Mine is discernable, if less than intact due to removal of some facilities and alteration of some features. Association of features within the mine is largely definable, with the exception of clear associations between the pre-1920 artifacts and mine features.

Based on these considerations, LA 115360, the Valley Mine site, is in poor condition, having relatively low integrity, particularly in the effects of recent (post-1950) activities at the site.

AML Proposed Activities at LA 115360

Table 3 lists AML's proposed activities at LA 115360. They are limited to the features identified by AML feature numbers. The other features will not be included.

Table 3. LA 115360, the Valley Mine: AML's Proposed Activities

FEATURE NO.	PROPOSED ACTIVITY
AML 8	Remove framing timbers from shaft. Backfill shaft. Preserve headframe.
AML 8A	Backfill shaft. Preserve timber collar.
AML 8B	Backfill.
AML 8C	Backfill.
AML 8D	Backfill.

LA 115361: THE LUCKY MINE

Historical Descriptions of the Lucky Mine

The first mention of the Lucky Mine seems to be Burchard's (1911:75) comment that "at a point about $\frac{1}{4}$ mile north of the company store. . . a good vein of spar has been developed by a series of trenches, pits, and a shaft." These features were being developed by the American Fireman's Company, whose holdings were acquired by G. M. Sadler in 1910. In 1927, when Johnston visited the Fluorite Ridge mines, he observed "a cut 75 feet long [having] open stopes excavated to a depth of 50 feet" at the same location. He also observed that, "The stopes are badly caved. . ." (Johnston 1928:97), suggesting that the cut feature was no longer being mined. Johnston does not mention the shaft or other features listed by Burchard and the identification of the cut feature with Burchard's features or those recorded during this project is not clear. Further, the identification of the features described by both Burchard and Johnston as located about 0.25 mile (0.4 km) north of the "lower camp" area with what would become the Lucky Mine depends on our determination of the location of the "lower camp," an issue that we deal with later in the history of the Sadler Mine. Rothrock and others (1946:124) also identify Burchard's and Johnston's northern features as the Lucky Mine.

Rothrock and others (1946:137), whose study was conducted by the U.S. Geological Survey, state that some prospecting was carried out at the Lucky Mine before 1910 but that most of the work focused on a vein opened during or just after World War I. They also state that, in addition to the stoped cut feature described by Johnston, a shaft had been sunk to 90 ft (27 m) by the late 1920s, with several exploratory stopes extending from the shaft.

In 1942, the property was acquired by the Western Mining Corporation, which extended the shaft to a depth of 310 feet, excavated drifts 120 feet long on the 174-foot level (vertical distance) and 210 feet long on the 253-foot level, and did a small amount of stoping before abandoning the property in December 1943. (Rothrock and others 1946:137)

By the early 1940s, several of the stopes had been filled. The shaft and its associated features are identified in this report as the Lucky No. 1 Mine (AML 3), associated with a standing headframe and remains of a loadout structure.

Rothrock and others (1946:138) state that, "A shaft about 40 feet deep was dug during the early years of development at the intersection of the east and west veins in the north end of the deposit." This is probably the feature recorded here as the Lucky No. 2 Mine (AML 4).

As a result of the field work conducted by Rothrock and others beginning in 1942, the USDI Bureau of Mines conducted a program of exploratory trenching for fluorspar deposits in 1943. This program focused on the Greenleaf and Lucky mines. At that time, the Lucky Mine was in production, operated, according to Russell (1947:1), by Basic Minerals, Inc. rather than by the Western Mining Corporation, which was developing the Greenleaf Mine. Later, however, Russell (1947:4) states:

The Western Mining Corp. obtained a lease on the Greenleaf No. 2, 3, 4 and Lucky claims from W. D. Howard in October 1942. Operations were

confined to the Lucky claim, where the old shaft was sunk from 200 feet to a total depth of 300 feet.

Howard had apparently obtained the claims in 1938. Figure 6 shows a profile and composite plan view of the Lucky Mine in 1943 (Russell 1947, fig. 5). Russell (1947:4) goes on to say:

Much of the work was financed by means of a loan obtained from the Reconstruction Finance Corporation. Production by the Western Mining Corp. is estimated by the owners to have amounted to 200 tons. The company ceased operations in October 1943 and sold its surface plant and equipment.

Concerning the equipment present at the Lucky Mine, Russell (1947:6) says:

Equipment at the Lucky mine of the Western Mining Corp. consisted of a 220-cubic foot Gardner-Deaver portable compressor, a gasoline-driven hoist, necessary rock drills, stopers, air lines, mine cars, and hose. The surface plant included a hoist house, a tool shop and change room, a 3,000-gallon concrete water-storage tank, two 50-ton ore bins, and two frame buildings suitable for residences.

All equipment at the Lucky mine was reported to be for sale following cessation of activities in October 1943.

Either the equipment was not sold or the mine was re-equipped, however, since Reinhart (1953:4) notes that the Lucky Mine, along with the Greenleaf, San Juan, and Greenspar mines, was, "equipt [sic] to service current operations" in 1953. In fact, production at the Lucky Mine had resumed because the mine is listed as 425 ft (129 m) deep, with 600 ft (183 m) of drifts, 50 ft (15 m) of cross-cuts, and 150 ft (46 m) of raises and winzes. Reinhart recommended that the American Refining and Smelting Company consider acquiring the Lucky Mine because the ore "potentialities" within 50 ft (15 m) of the bottom of the shaft "should be an attractive target" (Reinhart 1953:7). Figure 7 shows a profile and composite plan view of the mine in 1952 (Reinhart 1953, maps 1142 and 1143). Although Reinhart does not mention it, his profile shows another shaft about 35 ft (10.6 m) east of the main shaft. That feature was not relocated during this project and would be beneath the large tailings pile east of the main shaft (Fig. 8).

In 1961, Griswold (1961:114-115) provided the following information on the Lucky Mine:

The mine was one of the first discovered in the district, but in spite of considerable underground development, only a few thousand tons of fluorspar have been mined.

The main vein was stoped from the surface to a depth of 50 feet over a strike length of 100 feet by the early day miners. The Great Western Mining Co. sank an inclined shaft on the main vein in 1942-1943. The shaft was inclined 57°S. and was 310 feet in length (260 feet deep vertically). Other work consisted of 120 feet of drifting on the 200-foot level (vertical depth), and 210 feet of drifting on the 250-foot level. Although the drifts apparently were driven on the vein exposed on the surface, very little minable ore was found, and the mine was shut down.

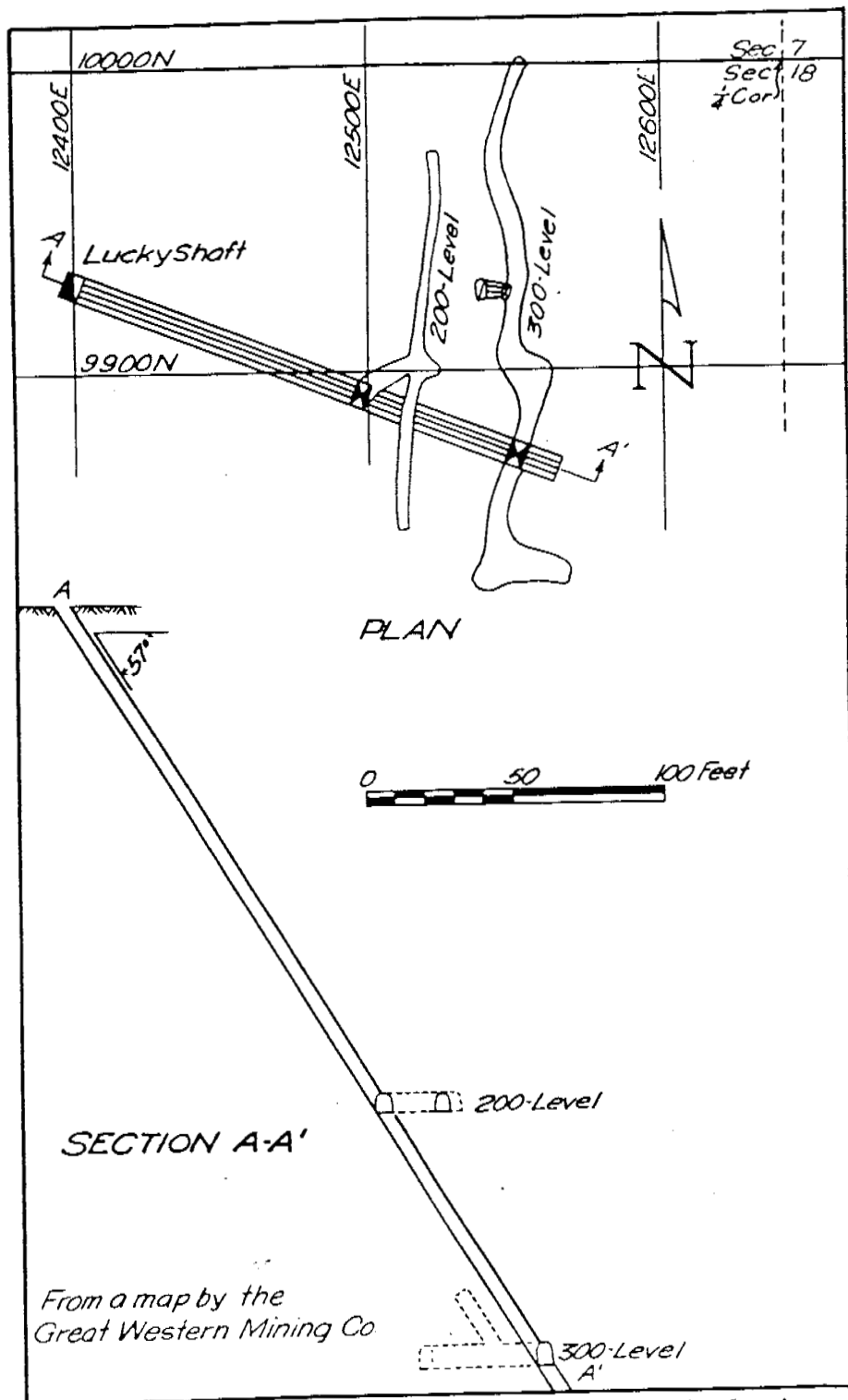


FIGURE 6. LA 115361, the Lucky Mine: 1943 profile and composite plan view (from Russell 1947).

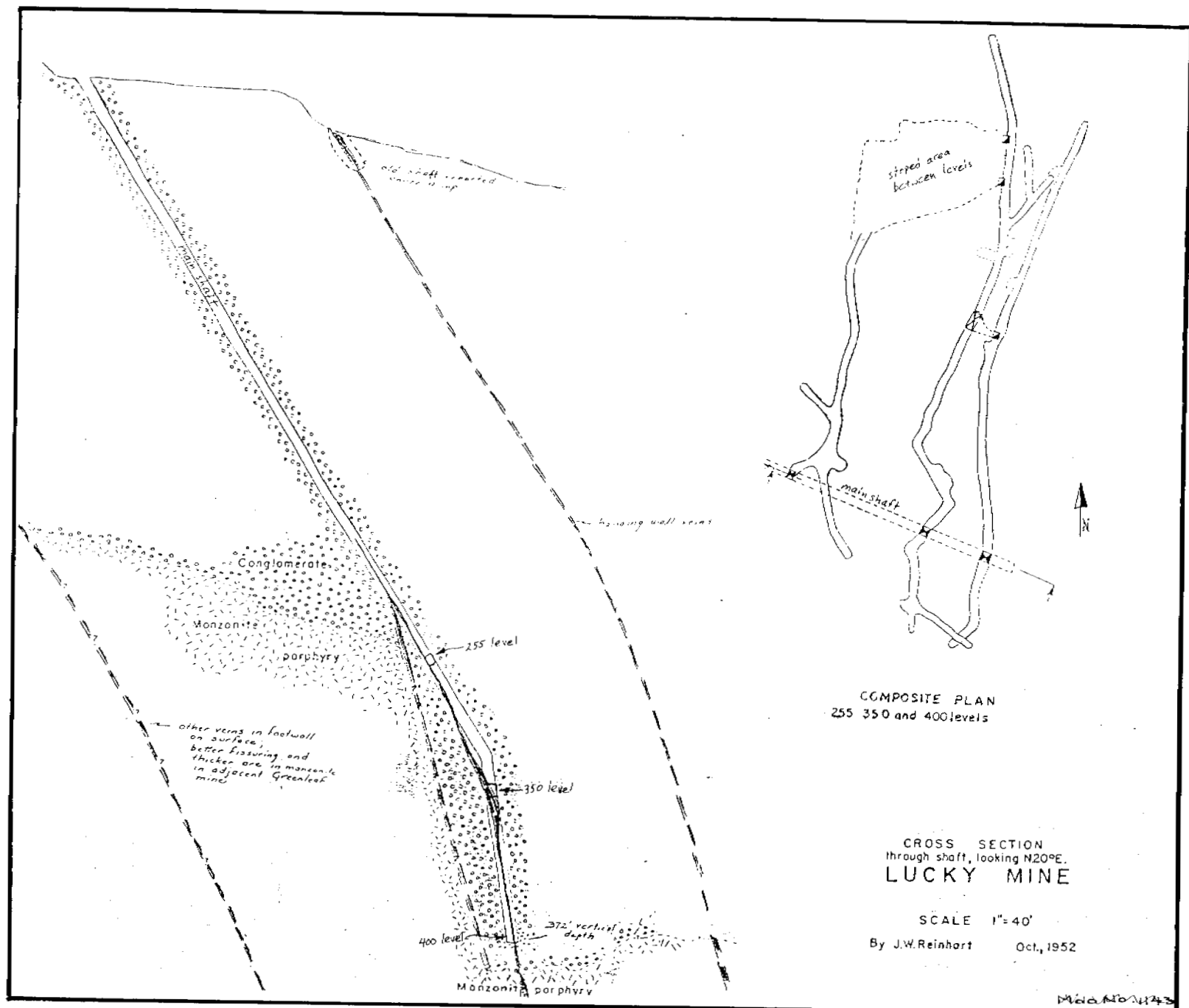


Figure 7. LA 115361, the Lucky Mine: 1952 profile and composite plan view (from Reinhart 1953).

The mine was reopened in 1952 by the Sierra Mining Co. The shaft was sunk an additional 90 feet (inclined at 80°S), bringing the total shaft length to 400 feet, or 350 feet below the collar elevation. Drifts were cut at the 290-foot and 350-foot levels, and a small ore shoot was stoped north of the shaft at the 250-foot and 200-foot levels. The vein as exposed on the two bottom levels (290-foot and 350-foot) was not wide enough to be mined.

Although Griswold is not specific, mining at the Lucky Mine probably stopped in 1954, along with the rest of the district, in response to sharply decreased fluorspar prices. The fate of the equipment and most of the plant facilities is not known.

Figure 4 shows that the Lucky Mine is located on the Lucky Claim (Rothrock et al. 1946; Russell 1947).

Site Description

LA 11361, the Lucky Mine site, is the northernmost of the sites recorded during this project (Fig. 2). Its UTM and legal locations are listed in the appendix. The site as recorded covers 4.9 acres (2.0 ha) (Fig. 8). However, the site extends an unrecorded distance north and south of the recorded features and may extend east of the recorded features. At least one blade-cut trench is present well north of the recorded area. The area across County Road A-016 immediately east of the recorded area appears to have been bladed and may be associated with the mine. The site has both a prehistoric and historic component. Site boundaries are defined by the distribution of recorded historic features.

Prehistoric Component

The prehistoric component at LA 115361 consists of two small chert chipped stone concentrations and a scatter of chert and limestone tested cobbles, core fragments, and core flakes extending across the site. Both concentrations are about 2.5 m in diameter and are found on the northeast-facing slope of the ridge on whose slope and base the site is located (Fig. 8). They consist of chert core fragments and large core flakes and suggest initial cobble testing and reduction. The surface of the site has a very high frequency of limestone and chert cobbles and large rocks. Many have been tested by removal of a few flakes. Cores and core flakes are frequent and core flakes, both cortical and noncortical, are very common, particularly on the less-disturbed slopes north and south of the main mine area. Additionally, a brief reconnaissance of the low ridge east of the mine revealed tested cobbles, cores and core fragments, and core flakes. This ridge is the area marked on the USGS quadrangle, in both the ARMS and BLM site files, as the location of unrecorded lithic artifact scatter sites. Because it is beyond the site boundaries as defined by the historic features, the ridge and its numerous chipped stone artifacts were not recorded during this project. The prehistoric component of LA 115361 undoubtedly extends well beyond the site boundaries as defined by this project, and the low eastern ridge is probably part of that extended area.

Historic Component

The site's historic component consists of a series of mining and other features. They include an open shaft with associated headframe structure, an open adit, an open stope, the remains of a loadout structure, a water tank, a concrete hoist engine pad and a second pad that may have held a compressor, a concrete building pad, a half dug-out structure, blade-cut areas, disturbed areas that may have been structural locations, and artifact concentrations. The features are shown in Figure 8. The following discussion groups the features within two areas. The Lucky No. 1 Mine area was the primary mine area that saw the majority of the mining activity. The Lucky No. 2 Mine area is north of the No. 1 area. Features identified by AML numbers 3 and 4 are planned for modification. Feature number AML 20 was assigned in the field by OAS personnel on the assumption that its similarity to other AML feature might mean that it will also be planned for modification. These features are given the most detailed descriptions. Other features are described in less detail.

Lucky No. 1 Mine

AML 3 consists of an open shaft with an associated headframe structure. The shaft seems to be that mentioned by Burchard in 1911, which was deepened to 425 ft (130 m) by the 1950s.

The Shaft

Dimensions: 5-by-7 ft by unknown depth (1.5-by-2.1 m by unknown depth). The eroded shaft opening is 13-by-13 ft (4-by-4 m).

Description: The remains of the shaft's wooden collar are one four-by-four beam on the north side of the shaft with two-by-eight planks held to the beam with wire nails. The rest of the collar is a jumble of planks and a single four-by-four beam. The collar is seen in Plates 8 and 9. On the north side of the shaft, the planking continues down into the shaft for an unknown depth.

Descending into the shaft in its northwest corner are two steel pipes, one 1.25 inches (3.1 cm) in diameter and the other 0.75 inches (1.9 cm) in diameter. The smaller pipe ends in a valve about 3 ft (1 m) below modern ground surface. The larger pipe ends at the surface in a T-fitting, with the upper end open and the third side fit to a pipe that runs into the ground to the north (Plate 9). We speculate, without supporting evidence, that this pipe led from a compressor into the mine and was used to power the drills and other tools.

On the west side of the shaft two parallel series of what appear to be modified four-by-four beams protrude from the shaft and are connected to the headframe structure (Plates 8 and 10). They rise along the east side of the headframe almost to its top, are bolted to the headframe with ¼-inch bolts, and are connected end-to-end. They represent rail tracks for the ore cars. Portions of a wooden ladder are visible running down the west side of the shaft between the tracks.

The Headframe

Dimensions: 13 ft east-west by 23 ft north-south by 24 ft tall (4-by-7-by-7.4 m tall)

Description: The headframe is composed of two parts: an A-frame external support structure and the ore hopper-chute complex (Fig. 10). The A-frame is constructed in two sections: the east side of the structure and the west side. The bases of the upright legs of the west side are anchored to the hillslope. The bases of the legs of the east side are anchored to a twelve-by-twelve beam that is part of the collar on the west side of the shaft opening. Above the twelve-by-twelve beam are two two-by-eight planks that appear to have functioned as a shield to keep loose material from falling back down into the shaft. The legs of the sides are built of six-by-six beams coupled with two-by-six planks bolted together with $\frac{3}{4}$ -inch bolts. At 10-ft (3 m) intervals, the legs, which converge with height, are braced horizontally by four-by-four beams. The top of the east side consists of one two-by-twelve plank bolted horizontally to the tops of the legs and another bolted horizontally about 1.5 ft (50 cm) below the top. The planks are joined by two vertical members made of two-by-four boards bolted to six-by-six beams. Long threaded steel rods also join the tops of the legs, one beneath each of the horizontal two-by-twelve planks. The top of the east side rests on and is bolted to the top of the west side, with about 1.5 ft (50 cm) of the east side extending above the top of the west side. The east and west sides were also connected by horizontal four-by-six beams placed just above the ore hopper. The beam on the south side is in place; the beam on the north side is broken and rests against the hopper (Plates 11, 12).

The four-by-four beams comprising the ore car rail track extend up from the shaft to the lower horizontal two-by-twelve at the top of the east side (Plate 10). The upper section of track has narrow steel plate nailed to the four-by-four beams. Just above the middle horizontal leg brace about 20 ft (6 m) above modern ground surface is the ore car dumping point on the tracks. The dumping point is a platform or shelf constructed of four-by-four beams and two-by-twelve planks extending west from the track over the ore hopper (Plate 11).

The ore hopper is comprised of two ore chutes, one that emptied to the south and one that emptied to the north. The hopper is supported by a frame of four-by-four beams and two-by-twelve planks resting on the hillslope. The sides and bottom of the hopper and the chutes are built of two-by-twelve planks. The hopper, which is directly beneath the track dumping platform or shelf, has two steel doors making up the bottom of the hopper (Plate 11). The doors are hinged to the wooden sides of the hopper frame and open down. When closed, the ore would slide down the southern chute (Plate 11). When opened, ore would fall down into the northern chute (Plate 12). Besides the steel doors, the bottom of the hopper and the southern chute is lined with sheet metal, as is the bottom of the northern chute. Each chute has two slots made of two-by-four boards made to hold plank sections that would control the flow of ore from the chute.

The hillslope on which the hopper is built has been cut on the north and south sides of the headframe. These crescent-shaped cuts provided access to the ore chutes. On the south side, a wooden platform is present. The platform is 5.25 ft (1.6 m) wide by 14.5 ft (4.4 m) long by 4.5 ft (1.4 m) high and is built into the cut in the hillslope. It is constructed of one four-by-four vertical center beam supporting a four-by-six horizontal beam on the front (east) side. The platform consists of nine two-by-four boards and six two-by-twelve boards nailed to the horizontal beam.

AML 20 is an open adit located 50 ft (15 m) north of the AML 3 shaft. The feature was not assigned a number by AML staff, but because of its nature, we suspect that AML may wish to fill it and, therefore, we assigned it an AML number.

Dimensions: 5-by-7 ft by unknown length (1.5-by-2.1 m by unknown length)

Description: This open adit was excavated into the native rock at the north end of a slope cut on the north side of the AML 3 shaft/headframe complex (Fig. 8). It slopes down to the northeast at an estimated 25 to 30 degree angle. No collar or internal framing is present (Plate 13).

A *small concrete pad* is present at the mouth of AML 20. It resembles an engine pad and we speculate that it supported the portable compressor mentioned by Russell (1947:6).

Dimensions: 4-by-10-by-4 inches tall (1.2-by-3-by-14 cm tall)

Description: This pad is about 3 ft (1 m) from the mouth of AML 20. It was poured in three events. The southern section is 3 ft (0.9 m) square. The central section is 4 ft (1.2 m) square and has two linear indentations, each containing three upright $\frac{3}{4}$ -inch bolts, in the south half of the section. These bolts resemble those in the hoist engine pad, suggesting that they held machinery (Plate 14). The north section was poured around the north and east sides of the middle section.

A depression probably representing a *collapsed adit* is located immediately northeast of AML 20 (Fig. 8). Along with an adjacent small depression, it may show the direction of the AML 20 adit.

Dimensions: 10-by-39-by-5 ft deep (3-by-12-by-1.5 m deep)

Description: This trenchlike feature runs northeast-southwest (Plate 15). One long eight-by-eight beam is present near the center of the depression. At the north end are one twelve-by-twelve beam, one four-by-four beam with a two-by-twelve plank, two two-by-eight planks, and a plank fragment.

The *loadout chute* is located 115 ft (35 m) east of the AML 3 shaft at the edge and slope of a large, complex tailings pile. It consists of the remains of a rail trestle, the remains of the loadout chute, and a tailings pile support wall.

The Rail Trestle

Dimensions: 39.75 inches wide by 36 ft long by 0 to 11 feet tall (1.0 m wide by 11 m long by 0 to 3.3 m tall).

Description: The rail trestle leads from the top of the tailings pile to the loadout chute. Plate 16 shows the east end of the trestle as it attaches to the loadout chute. The remains of the trestle are in three sections. The eastern section is the portion attached to the loadout chute. This section is supported on the west by two upright 6x6 beams. From the modern ground surface, the beams are 7.5 feet (2.3 m) tall. The uprights are 28.25 inches (72 cm) apart. At the top, they are joined by a six-by-six beam bolted between them and two horizontal two-by-six planks on the outsides. The two-by-six planks are 39.75 inches (1.0 m) long. On the east end, this section of the trestle is supported by two six-by-six beams bolted upright to the top of upright eight-by-eight beams that are the western supports of the loadout chute structure. From the modern ground surface, the eight-by-eight supports are 11 ft (3.3 m) tall. The trestle supports are 4.5 ft (1.4 m) tall above the eight-by-eight supports and are joined at the top by the same six-by-six beam and two-by-six plank configuration seen at the western end. Spanning the eastern and western trestle supports are two 14.75-ft (4.5 m) long six-by-six beams. Across these beams are five 5.25-ft (1.6 m) long six-by-six

beams that supported ore car rail tracks. One of these still has a rail spike, showing where the rail was placed, although the rails have been removed. Between the track locations were two 14.75-ft (4.5 m) long two-by-six planks. A third ran along the north side of the rail supports, while three were placed along the south side.

The second section of the trestle is 9 ft (2.75 m) west of the first (Fig. 8). It consists of a single pair of upright six-by-six beams joined at the top by another six-by-six beam and two two-by-six planks. From modern ground surface, the uprights are 26 inches (65 cm) tall.

The third section of trestle is actually the end of the rail bed leading from the headframe to the loadout chute, located 3.5 ft (1.0 m) west of the second section. At this point, two six-by-six beams protrude from the rock and earth of the rail bed and support one remaining six-by-six beam that held the rail tracks.

The Loadout Chute

Dimensions: 19.7 ft north-south by 37.7 ft east-west by 17.2 ft tall, estimated (6 m north-south by 11.5 m east-west by 5.25 m tall, estimated)

Description: The remains of the loadout chute (Plate 16), which is built on the side of the large tailings pile, consist principally of its support structure, a series of six roughly triangular arrangements of eight-by-eight beams bolted and nailed together. The "triangles" range from 28 to 49 inches (71 to 124 cm) apart, on centers. As noted earlier, the west side of the structure is 11 ft (3.35 m) tall above modern ground surface, although the actual height is estimated to be closer to 17 ft (5.2 m). The base of the west side is obscured by tailings. The west side of each "triangle" forms a right angle with two eight-by-eight beams that form the base of the "triangle." These base beams are estimated to be 12.5 ft (3.8 m) long and protrude from the tailings pile at the lower (east) side of the structure (Plate 16). The "hypotenuses" of the triangles that provides the slope of the loadout structure are long eight-by-eight beams attached to the west side upright beams about 31 inches (79 cm) from the top of the uprights. Covering these sloping beams are the remains of 18 two-by-twelve planks nailed to the beams horizontally north-south. The planks are of two lengths: 8.3 ft (2.5 m) and 12.4 ft (3.8 m). The lengths are used alternatively so that seams between planks are not continuous down the slope. The planks were apparently covered by thin sheets of metal.

As Plate 16 shows, there are no remains of the actual chute or chutes. We speculate that the size of the loadout structure suggests that there were multiple chutes. This would account for the size of the structure and the placement of the rail trestle toward the south side of the loadout structure. That is, given that there were two ore chutes at the headframe/hopper, there may have been two sets of rail tracks leading to the loadout, one from each side of the headframe.

The Tailings Pile Support

Dimension: 8 ft long by 32 inches tall (2.5 m long by 81.3 cm tall)

Description: On the north side of the loadout structure is a wall used to support a portion of the tailings pile. It can be seen in Plate 16 at the immediate right of the base of the loadout. The wall

consists of four horizontal eight-by-eight beams laid on top of each other between an upright eight-by-eight beam on the north end and the northeast corner of the loadout.

A concrete building pad is located about 65 ft (20 m) south of the AML 3 shaft. It probably represents the structure described by Russell (1947:6) as "a tool shop and change room."

Dimensions: 10-by-13 ft by 3 inches tall (3-by-4 m by 10 cm tall)

Description: This concrete pad (Plate 17) was poured in two halves, east and west. A drain is present in the southwest corner of the east half and a drain pipe protrudes from the pad immediately south of the drain (Fig. 8). Wire nails protrude from the north and south sides of the pad, perhaps representing the bottom of a wooden frame structure. The pad is badly cracked, with large pieces broken from the east side and the northwest corner. A concentration of window glass is present at the southwest corner of the pad.

The hoist engine pad is located 26 ft (8 m) northwest of the AML 3 headframe. This is all that remains of Russell's (1947:6) "hoist house."

Dimensions: 6-by-9 ft by 6 inches tall (1.8-by-2.8 m by 16 cm tall)

Description: The pad (Plate 18) was poured in two sections. The southern section has four upright $\frac{3}{4}$ -inch bolts and six other bolts cut off at the surface of the pad. The northern section has two upright $\frac{3}{4}$ -inch bolts along the north side. The bolts are set in 2-inch pipes filled with concrete.

A concrete water tank is located 33 ft (10 m) north of the hoist engine pad. Russell (1947:6) describes it as "a 3,000 gallon concrete water storage tank."

Dimensions: 10-by-10-by-5 ft tall (3-by-3-by-1.5 m tall)

Description: The water tank is a square structure constructed of four poured concrete courses (Plate 19). Two-by-four boards are bolted to the tops of the walls and two-by-four boards are nailed to the boards on the wall tops. About 3 ft (1 m) downslope from the tank, a 2 $\frac{1}{4}$ -inch pipe protrudes from the hillslope.

On the steep hillslope above (west) the AML 3 mine area are two large blade-cut areas (Fig. 8). Between them is a small shallow depression 13 ft (4 m) in diameter with wooden beams lying across it. It may represent a collapsed shaft or a prospect hole. Several smaller blade-cut areas are present on the hillslope north of the AML 3 area (Fig. 8).

In addition to these mining features, the Lucky No. 1 Mine area is dominated visually by a large, complex tailings pile (Fig. 8). The pile covers almost 17,000 sq ft (1,580 sq m) and is, at its east end, over 17 ft (5.2 m) tall. In a small arroyo on the north side of the tailings pile is a concentration of motor oil cans, one-pound coffee cans, food cans, and "safety" (laminated, double-thickness) glass. A concentration of window glass is present on top of the tailings pile southeast of the AML 3 shaft.

The Lucky No. 2 Mine

AML 4 is an open stope located 360 ft (110) north of the AML 3 shaft (Fig. 8). This may be the feature described by Rothrock and others (1946:138) as a 40-ft (12 m) deep shaft excavated "during the early years of development at the intersection of the east and west veins in the north end of the deposit." Figure 8 shows that AML 4 is located in an abandoned road. The road leads from the AML 3 area across a large arroyo immediately north of AML 4 to a prospect area on a hillslope some distance to the north. The road, and probably the prospect area, must predate AML 4.

Dimensions: 7-by-28-by-15 ft deep (2.1-by-8.5-by-4.5 m deep)

Description: AML 4 is an open stope running north-south. An eight-by-eight beam is lodged between the side walls at the bottom near the north end.

A **half dug-out structure** is located about 100 ft (30 m) northeast of AML 4. It is not mentioned in the historic documents and its function is not known.

Dimensions: 13-by-15-by-6.5 ft tall (3.9-by-4.6-by-2 m tall)

Description: This structure is built into the south side of a large arroyo on the north side of the site (Fig. 8). It has a rock and concrete superstructure whose north, east, and west walls are 13 inches (32 cm) thick (Plate 21). The south wall is the side of the arroyo. The floor appears to have been dirt. A door with a sill is present in the center of the north wall (Plate 21). Imprints of wooden beams are visible on top of the north wall. Within the structure are beam (probably roof) fragments. Sheet metal fragments suggest the roof material.

Possible Structural Areas

In addition to the two mine areas, two possible structural areas were recorded (Fig. 8). One is located east of the Lucky No. 1 Mine area along the west side of County Road A-016. The area, which is on a low rise between two small drainages, appears to have been cleared of natural vegetation and bladed. Modern vegetation consists of grasses and weedy annuals, in contrast to the grasses, ocotillo, creosotebush, and cacti that characterize the surrounding desert. Within this area of 4,840 sq ft (450 sq m) is a low-frequency concentration of window glass, wire nails, white ware sherds, and white glass fragments. The window glass and nails point to the presence of a structure. About 16 ft (5 m) north along a small drainage is a concentration of post-1930 domestic trash, including "sanitary" (interlocking seam) food cans, milk cans, canning jar lids, Clorox bottle fragments, decorated and undecorated white ware sherds, white glass fragments, and clear drinking glass fragments. The concentration stretches along the small drainage for 43 ft (13 m) and is 20 ft (6 m) wide. Highest artifact frequency is in a small area at the west end of the concentration (Fig. 8).

The second possible structural area covers the top of a low ridge bounded on the south by a shallow drainage running southeast from the AML 4 area and on the north by the large arroyo into whose southern bank the half dug-out is built (Fig. 8). This ridge-top area has also been cleared and appears to have been bladed, resulting in a disturbed-ground plant community like that

seen in the other possible structural locations. The area is about 200 ft (60 m) long northwest-southeast by 130 ft (40 m) wide. Very few artifacts are present in the area, although small numbers of cans were observed along the south side of the large arroyo. A small concentration of cans was observed in a small side drainage near the half dug-out. A small concrete water tank is present near the county road at the east end of this area.

Russell (1947:6) observed "two frame buildings suitable for residence" at the site. We speculate that the smaller possible structural area near the Lucky No. 1 Mine might represent one of these buildings. Whether both buildings were there or the second was on the low ridge to the north is not known.

Discussion

The archaeology of LA 115361 is generally consistent with historical descriptions of the site. Some features used to explore the fluorspar veins during the "lower camp" years can be identified. The modern condition of the site in terms of its features reflects the development of the site through time, particularly showing that most of the development of the mine took place in the 1940s and 1950s, with no evidence of post-1954 development. Historic documents suggest that the 1950s development consisted primarily of work within the mine. Features identified during this project can be ascribed to operations from the early 1940s or before. It seems clear, therefore, that the features are older than 50 years.

Aspects of Site Integrity

Location: There have been no discernable relocation of facilities or features at this site. Buildings such as the hoist engine house, the tool shop-change room, and the frame residence buildings have been removed, as have equipment such as the hoist engine and the compressor, but their locations are definable. The fact that structures such as headframes are generally missing from other mine sites in the district adds significance to the existing headframe at the Lucky No. 1 Mine, since it is one of only two standing headframe structures at these sites.

Design: The development of the mine site through time is definable by comparing the archaeological and historical records. Features listed and described in historic documents can be defined on the ground. Two early features, Johnston's stoped cut and Reinhart's second shaft, cannot be relocated and may have been altered or covered by later activities and features. However, it is possible to discern the early work at the mine and, particularly, the extensive development that took place in the 1940s. Relationships between features are evident.

Setting: The setting of the Lucky Mine is largely unchanged from the period of its major development. Activities and features from the 1940s intruded upon or changed earlier features, as expected at a developing site. There have been few modern intrusions and no recent mining at the site.

Materials: Materials present are consistent across the site. The activities of the 1950s are not evident in changes in materials.

Workmanship: Because of the remaining structures, workmanship is consistent across the site. The activities of the 1950s are not evident in changes in workmanship.

Feeling: The proximity of the mines at the southeast end of Fluorite Ridge suggests that individual mines should not have a feeling of isolation from each other, although the mining district should, by virtue of its distance from Deming, have an overall feeling of isolation. This situation is maintained at the Lucky Mine, since the other mines are all visible from the Lucky Mine, while the district remains largely isolated from modern development in the region.

Association: The overall mining system at the Lucky Mine is clearly definable, even in the face of the removal of some structural features. Association of features is clearly discernable.

Based on these considerations, LA 115361, the Lucky Mine site, is in good condition, having a high degree of site integrity.

AML Proposed Activities at LA 115361

Table 4 lists AML's proposed activities at LA 115361. They are limited to the features identified by AML feature numbers. The other features will not be included.

Table 4. LA 115361, the Lucky Mine: AML's Proposed Activities

FEATURE NO.	PROPOSED ACTIVITY
AML 3	Remove framing timbers from shaft. Backfill shaft or fill shaft opening with inverted concrete cone. Cut the shaft rail timbers at modern ground level and preserve headframe.
AML 4	Backfill.
AML 20	Backfill.

LA 115362: THE SADLER MINE

Historical Descriptions of the Sadler Mine

The identification of the Sadler Mine is intricately linked with a location known in the early documents as the "lower camp." Apparent confusion about the association of the "lower camp" with the Sadler Mine has resulted. This situation, once resolved, can provide us with useful information needed to identify other mine locations described in the early documents.

The Lower Camp

In 1911, Burchard reported that two fluor spar prospect areas were being developed on Fluorite Ridge. One was high on the south slope of the ridge, the other on a "gentle rise" at the "extreme southwestern base" of the ridge (Burchard 1911:74). Apparently, Burchard meant the southeastern base of the ridge, since there has been no mining development at the western end of Fluorite Ridge. Referring to the lower mining area, Burchard (1911:75) states:

At the place first described the American Fireman's Mining Co. opened in 1909 a number of veins by means of shallow cuts, and has sunk several test pits to depths of 6 to 12 feet, and two shafts to depths of about 80 ft. In all about 20 openings had been made up to August 1910. A triangular area about one-fourth mile wide at base from northwest to southeast and about one-third mile from northeast to southwest has been shown to carry productive veins of fluor spar. The surface of the area slopes gently toward the southeast.

One of the shafts was apparently located near the southern end of this triangular area. In that shaft, "The spar is mined from several levels and milled down through chutes to the lowest level, from which it is hoisted in buckets up to the surface. A steam hoist was being installed in 1910" (Burchard 1911:75). Relative to that "principal shaft," Burchard (1911:75) briefly describes three other prospect areas. One was "less than 100 yards north of the shaft" (less than 30 m), where an open-cut feature and a shallow burrow showed promising ore. The second was 250 to 350 yards west of and lower than the shaft, where several shallow trenches and one 30-ft test pit had been excavated. The third was "about ¼ mile north of the company store, where a good vein of spar has been developed. . ." Regarding equipment and facilities, Burchard (1911:76; parentheses ours) states:

The equipment for mining the spar is simple, the largest item of expense being a small steam-hoist stationed at the deepest workings (i.e., the "principal shaft"). Several teams are necessary to haul the output. Small store buildings and machine shops have been constructed at both places where the spar is being developed (meaning the high ridge-slope area and the lower ridge-base area). The laborers live in tents, and the work can be carried on year round. From the opening of these deposits in the summer of 1909 to the close of 1910, nearly 5000 tons of fluor spar have been shipped. . .

Johnston (1928:92) seems to be the first to use the term "lower camp" to refer to the mine area at the southeast end of Fluorite ridge: ". . . in 1910 approximately 20 openings on veins in the

lower camp had been made and much good ore was in sight," and "In the summer of 1927, 17 years later, all of the visible ore in the veins in the lower camp had been mined. . . ." This "lower camp" included the southern shaft described by Burchard: "The vein described by Burchard. . . has been developed to a depth of 185 feet, a hundred feet deeper than when he saw it. . . ." (Johnston 1928:93). Johnston (1928:99-100) discusses the history of mining at the lower camp, noting that G. M. Sadler of Deming obtained the American Fireman's Company's holdings in 1910 and took over production and development of the mines. "After a few years the lower veins (in the lower ridge-base area) were exhausted, and as the upper veins (in the high ridge-slope area) had not proved as rich as first supposed, the property was shut down" (Johnston 1928:100; parentheses mine). Figure 9 shows Johnston's (1928:93) geological map of Fluorite Ridge. It shows the "Sadler Lower Camp" but no named mines, since none had been named at that time. Comparison of Figure 9 with Figures 2, 3, and 4 suggests that the lower camp was probably located at the base of the ridge between the features identified in Figures 2 and 4 as the Sadler Mine and the San Juan Mine, a location presented in Figure 10.

By the 1940s, the Fluorite Ridge mines had been named and the term "lower camp" was apparently no longer in use. Rothrock and others (1946:124) provide a list of fluorspar mines and prospects in Luna County. The "Fluorite Ridge area (Southeast group)" included the Sadler Mine, which the researchers correlate with the "Opening No. 1" (probably from Burchard) and the "lower camp." This is the first published reference that correlates the Sadler Mine with the lower camp. Rothrock and others (1946:131) state:

The Sadler mine, on the Susan No. 1 claim, is the oldest fluorspar mine in the Fluorite Ridge area. It was opened by the American Fireman's Mining Company in the summer of 1909, and since then has been operated intermittently by G. M. Sadler, Hayner and Manasee, La Purissima Fluorspar Company, and the General Chemical Company, which acquired it in 1942.

As we have seen, the earliest mine workings at the southeast end of Fluorite Ridge were in the area that came to be known as the "lower camp." Rothrock and others, by identifying the Sadler Mine as the location of the 1909 workings, are correlating the Sadler Mine with the lower camp. This correlation is continued by Russell (1947:4), Reinhart (1953:3), and Griswold (1961:96, 107).

Several factors argue against correlating the Sadler Mine and the lower camp. The Sadler Mine is located on the steep hillslope of Fluorite Ridge overlooking the other mines to the north and east (Fig. 2). This location does not match the descriptions of the lower camp. Johnston (1928:95) states that an open cut was present "up the hillside approximately 100 feet N.15°E" from the shaft in the lower camp. However, N15°E. from the main shaft at the Sadler Mine (Sadler No. 1 Mine; AML 7) is *not* uphill (see Fig. 12). Burchard (1911:74, 75) states that the area was on a gentle rise above the nearby plain and that the area "slopes gently toward the southeast." This does not describe the setting of the Sadler Mine. Burchard (1911:75) then states, "The other veins that have been opened here lie 250 to 350 yards west of and at a lower level than the principal shaft." Given that the Sadler Mine is located on the steep, southeast-facing hillslope, excavations 250 to 350 yards west of the mine would be higher (uphill) rather than lower than the mine. Figure 10 shows, on the other hand, at least one prospect location west of our postulated location of the lower camp. Together, these discrepancies strongly suggest that the Sadler Mine as described in documents from Rothrock and others to Griswold and as recorded during this project is not the lower camp. Interestingly, although Rothrock and others correlate the Sadler Mine with the lower

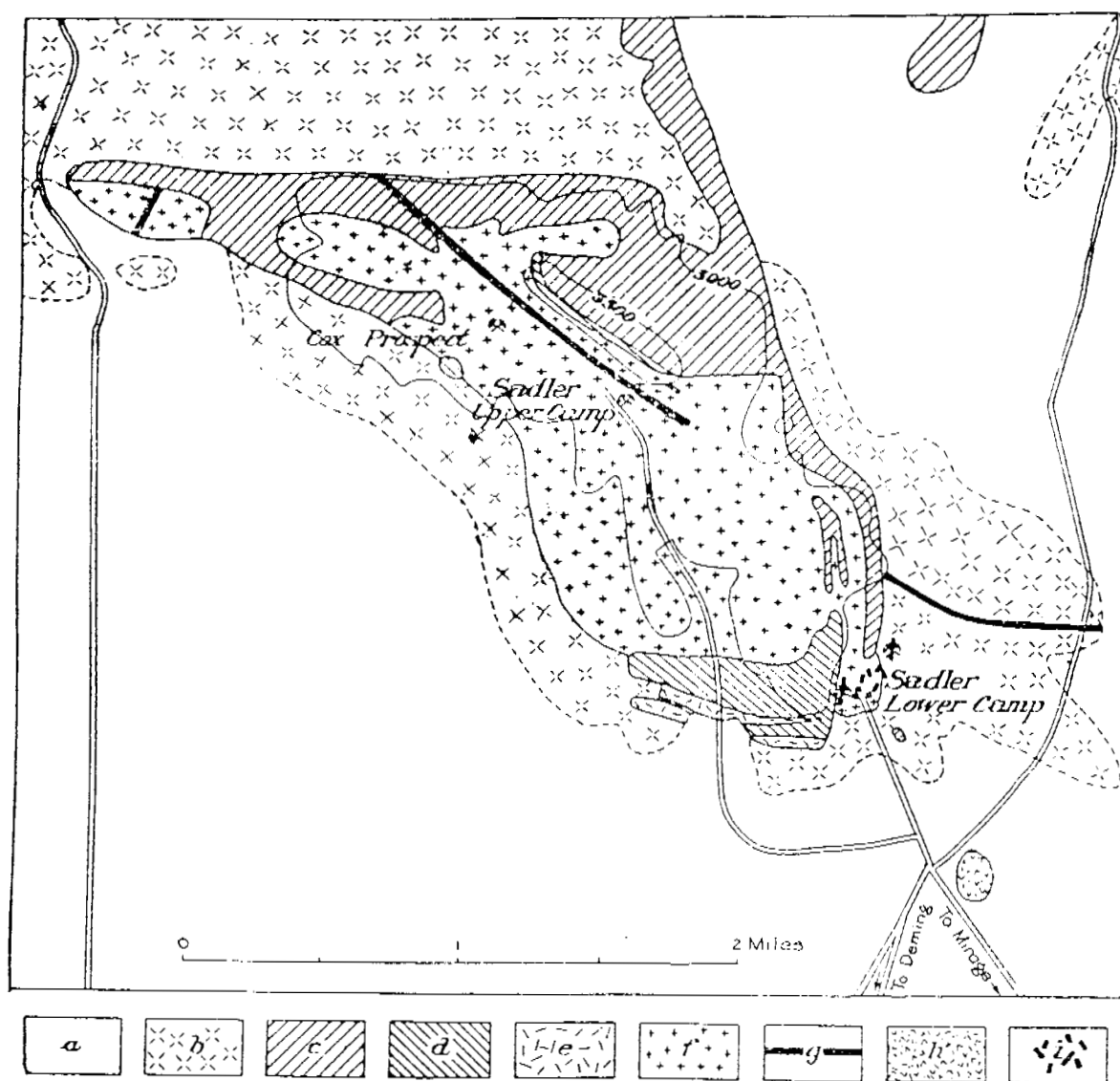


Figure 9. Johnston's (1928) geologic map of Fluorite Ridge, showing the "Sadler Lower Camp;" (a) desert hill; (b) andesitic agglomerate; (c) sandstone (early Cretaceous); (d) limestone, sandstone and slate (Paleozoic); (e) intrusive granite; (f) monzonite porphyry; (g) basalt dike; (h) rhyolite; (i) fluorite veins.

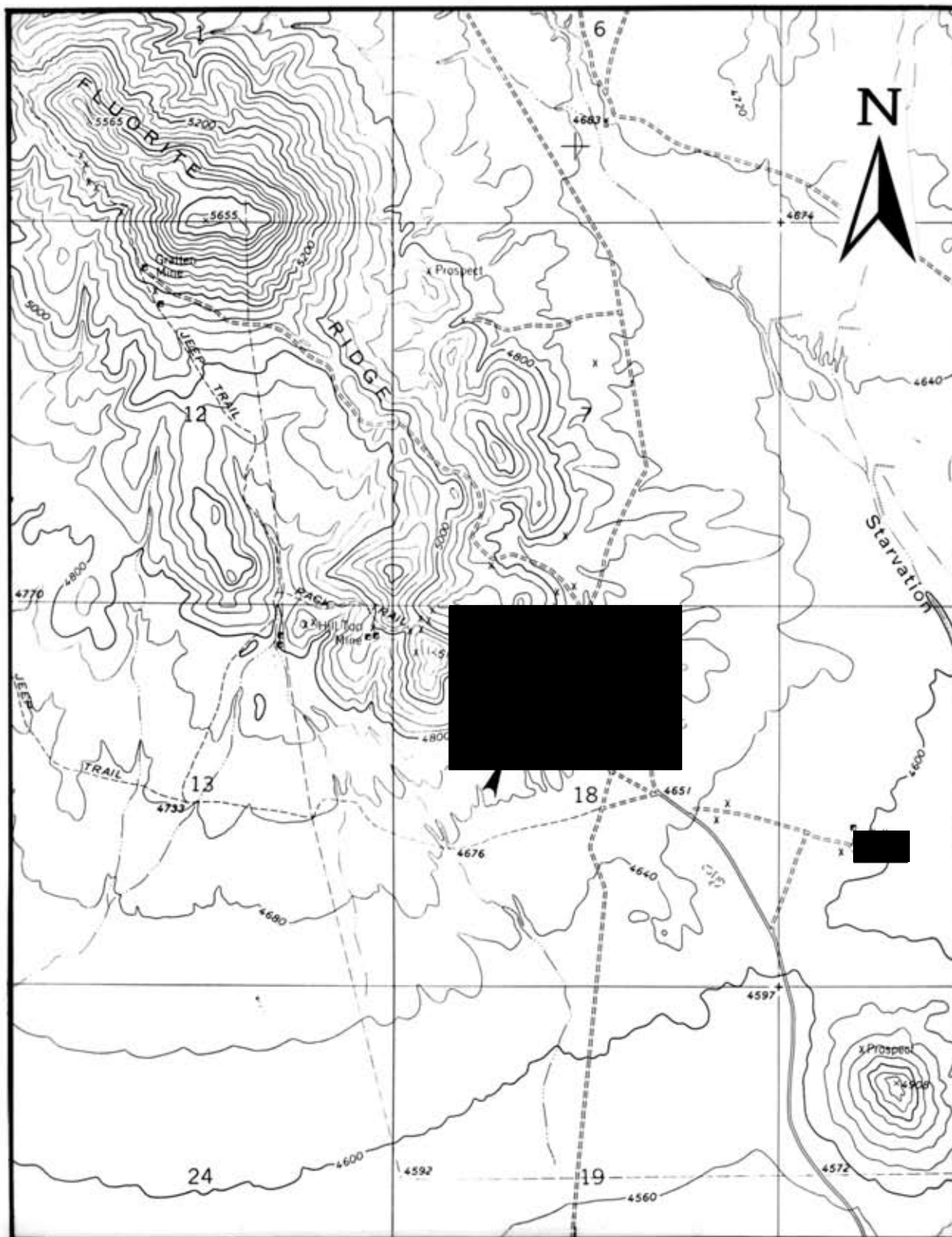


Figure 10. Postulated location of the "lower camp," USGS Massacre Peak, New Mexico 7.5' quadrangle.

camp, they use Burchard's and Johnston's descriptions of prospect locations to identify the San Juan and Lucky mines (Rothrock et al. 1946:124). As we discussed in the description of the Lucky Mine (LA 115361) and will discuss again in the descriptions of the San Juan (LA 115363) and Greenleaf (LA 115364) mines, using Burchard's and Johnston's information to locate these mines relies on distances and directions from the lower camp. If the lower camp was the Sadler Mine, as assumed in the post-1928 documents, those distances and directions would not describe features that became the Lucky, San Juan, and Greenleaf mines.

The Sadler Mine

Although the Sadler Mine is apparently not the same as the lower camp, we can say that G. M. Sadler became associated with the Fluorite Ridge mines in 1910, when he took over operation of the American Fireman's Mining Company's mines. The pre-1946 documents do not include descriptions of features on the steep hillslope where the Sadler Mine is located. This strongly suggests that, at least as late as 1927 when Johnston visited the mines, there was no substantial development on the hillslope. Johnston (1928:100) says that "a few years" after Sadler acquired the fluorspar mines, deposits in the lower camp area were exhausted and Sadler shut down his mines. Sometime prior to 1927, Sadler sold out to "Manasee and Hayner of Las Cruces, who now own the property" (Johnston 1928:100). The fact that Sadler sold his mines before 1927 and the evidence that there was little or no mining development on the steep hillslope before 1927 suggest that G. M. Sadler did not actually establish or operate the mine named for him. That LA 115362 is identified as the Sadler Mine is probably due to the confusion regarding the lower camp and its association with the Sadler Mine.

Given this situation, it is not possible for us to determine whether the ownership history of the mine as detailed by Rothrock and others (1946:131) actually refers to the Sadler Mine, to the lower camp area, or to both. They list the owners, in order from earliest, as the American Fireman's Company, G. M. Sadler, Hayner and Manasee, La Purissima Fluorspar Company, and the General Chemical Company, which acquired its holdings in 1942. We have shown that the first three of these were owners of the lower camp area, not of what became known as the Sadler Mine. The area shown in Figure 10 as the postulated location of the lower camp is within four claims. One is the Susan No. 1 claim, in which the Sadler Mine is located. Interestingly, another is the La Purissima claim. Whether this suggests that the La Purissima Fluorspar Company acquired the lower camp area rather than the Sadler Mine is not known. In the section, The Cultural Environment, we noted that the La Purissima Fluorspar Company built a flotation mill in Deming in 1932. That mill was purchased by the General Chemical Company in 1937, five years before it purchased the La Purissima Fluorspar Company's mining interests at Fluorite Ridge. This does not clarify the situation at the mine, but does show the relationships between the two companies. Apparently, the General Chemical Company operated the mine until 1946. Little work was done after 1946 and by 1961, all mining machinery had been removed (Griswold 1961:108).

Rothrock and others (1946:131-133) provide the first description of the Sadler Mine:

The mine workings consist of trenches, pits, shafts, stopes, and levels made in a group of fluorspar veins that crop out on the southeastern end of Fluorite Ridge. The principal workings are on the two most easterly veins of the group. In the fall of 1943 exploratory levels had been made at depths as great as

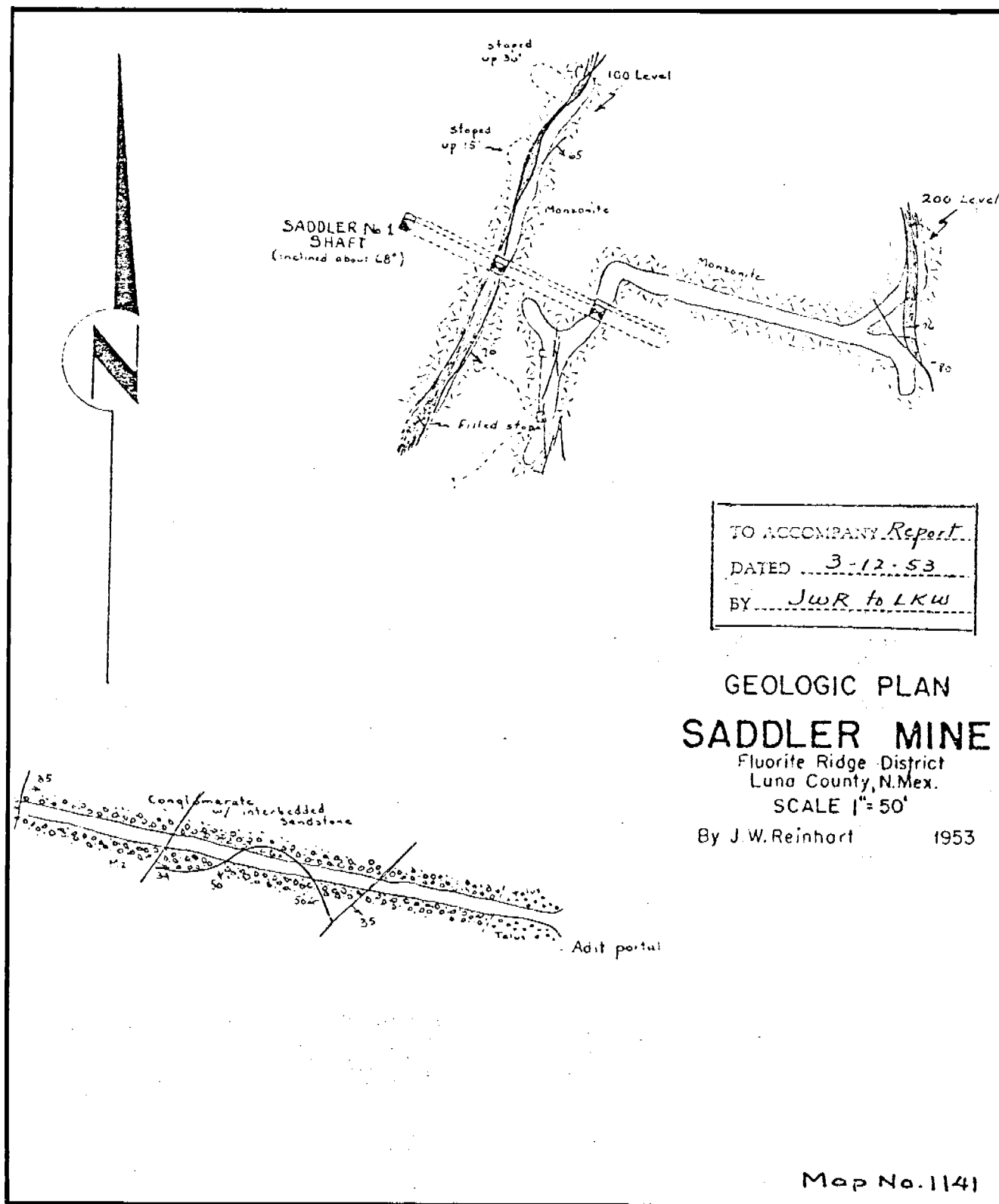


Figure 11. LA 115362, the Saddle Mine; 1952 composite plan view (from Reinhart 1953).

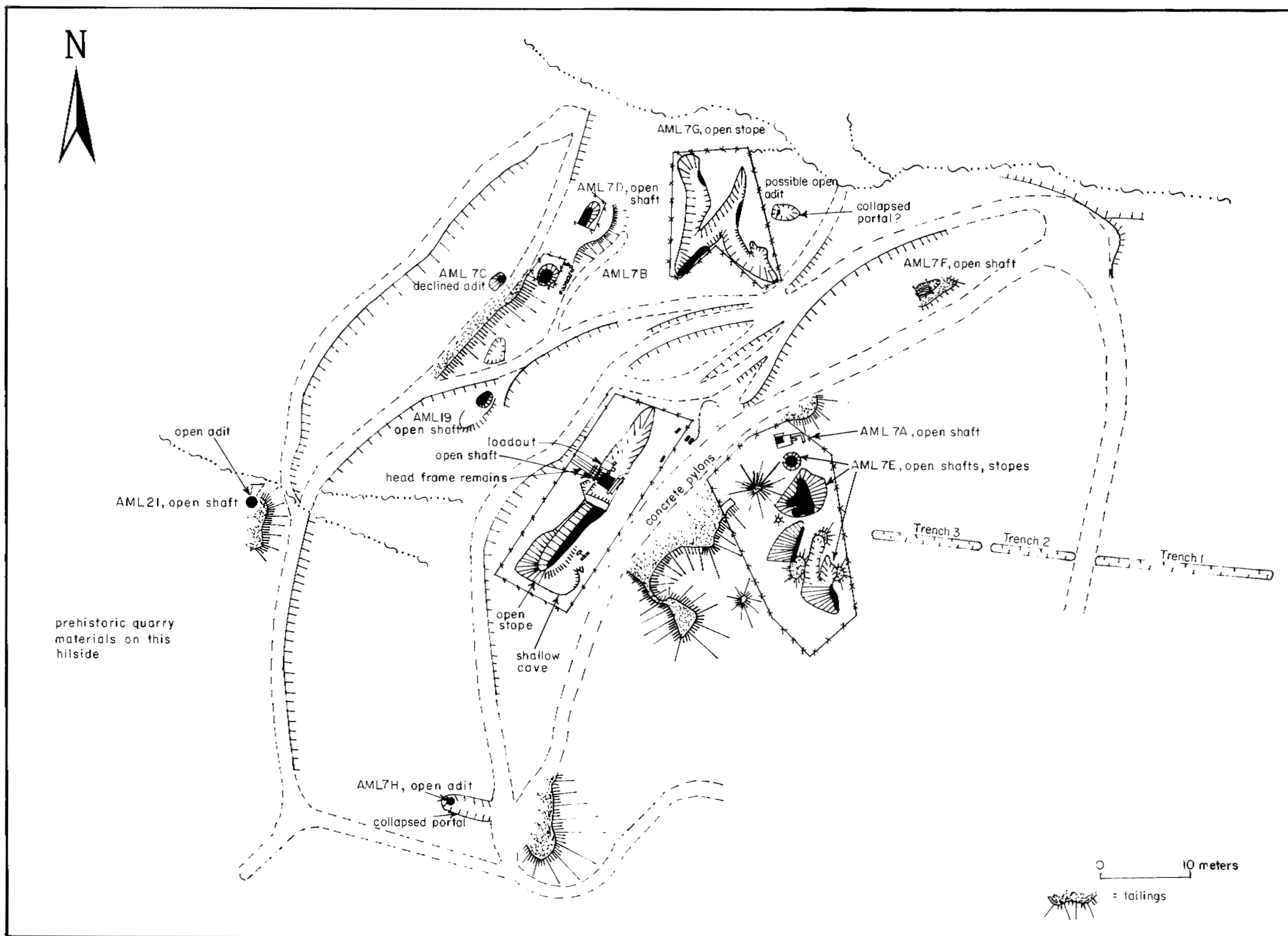


Figure 12. LA 115362, the Sadler Mine: site map.

180 feet. Mining was done from two shafts. Shaft No. 1 is on a sinuous vein that strikes N.25°E. and is called No. 1 vein; and Shaft No. 2 is 115 feet to the east, on a cross vein called No. 2 vein.

These two shafts are features AML 7 (Shaft No. 1) and AML 7A (Shaft No. 2). Following the identification of the two principal shafts, Rothrock and others (1946:132) describe in detail the depth, levels, and stopes in Shaft No. 1 as of the fall of 1943. They then discuss other workings at the mine (Rothrock et al. 1946:133):

About 150 feet northeast of Shaft No. 1 a vein, thought to be vein No. 2, joins vein No. 1. The junction is exposed in a deep Y-shaped trench which contains only narrow fluor spar veins.

This is probably the complex feature designated AML 7G. They go on to mention several pits and trenches uphill from Shaft No. 1 and a "large burrow" west of Shaft No. 1. These probably refer to Features AML 7B, 7C, 7D, 19, and 21.

By 1953, the "Saddler [sic] No. 1" mine had shafts totaling 300 ft deep, 300 ft of drifts, 300+ ft of cross-cuts, and 100 ft of raises and winzes (Reinhart 1953:4). Figure 11 shows a composite plan view of the mine in 1952 (Reinhart 1953, map no. 1141). Note that it shows the No. 1 shaft (AML 7) and the southern adit (AML 7H), but not the No. 2 shaft (AML 7A).

Griswold (1961:108-109) provided the following information as of the early 1960s:

The mine has been developed by two vertical shafts sunk on separate veins. Shaft No. 1 is located on the westernmost vein and is reported to be 180 feet deep, with levels cut at depths of 100, 160, and 180 feet. Shaft No. 2 is located 115 feet to the east of Shaft No. 1 and is reported to be 110 feet deep, with a winze extending from the 110-foot level to the 170-foot level. A cross-cut connects the bottom levels of the two shafts. An exploratory adit was driven to the west from a point approximately 200 feet south of Shaft No. 1.

The vein (No. 2 vein) that passes through Shaft No. 2 is not so regular as the No. 1 vein. At the shaft, the strike of the No. 2 vein is approximately parallel to the No. 1 vein, but it then bends to a due north direction and apparently joins the No. 1 vein approximately 200 feet north of the shafts. The Y-shaped vein junction was trenched on the surface, but the amount of ore extracted was not great.

The exploratory adit south of Shaft No. 1 is 250 feet long and was driven in a N.80° W. direction.

Once again, Shaft No. 1 is Feature AML 7, while Shaft No. 2 is AML 7A and probably the AML 7E features, as well. The trench at the Y-shaped junction of the two veins is Feature AML 7G. The exploratory adit south of Shaft No. 1 is AML 7H. This feature is not mentioned by Rothrock and others, suggesting that it dates between 1943, when they conducted their field work, and 1946, when the mine ceased operation.

Taken together, the historical information regarding the Sadler Mine suggests several

conclusions. First, the mine may not have actually been developed by G. M. Sadler, whose interests in the Fluorite Ridge mines apparently ceased prior to 1927. There is evidence, on the other hand, that the Sadler Mine was not actually developed until after 1927. This would *not* make the mine, contrary to the contentions of several researchers, one of or the oldest mine in the district. This is consistent with our observations at the mine, in that we observed no clearly pre-1930 artifacts (for example, amethyst glass, "honey" glass, or solder-seam cans) at the site. This is also consistent with the description of Rothrock and others. As we noted in *The Cultural Environment*, Rothrock and others (1946:11) intentionally put more effort into describing those mines that were "newly discovered or unproved" than the "larger operating properties." We observed that, in this regard, the Sadler Mine receives much more attention and detail than do the San Juan and Lucky mines, suggesting that the Sadler Mine was, in fact, not one of the older mines in the district. Second, most of the mine features recorded during this project date prior to 1943, since we are able to correlate most of the recorded features with descriptions by Rothrock and others. Exceptions are Features AML 7F, a shaft which does not seem to be mentioned by Rothrock and others or by Griswold, and AML 7H, the adit south of the main shaft, which probably dates between 1943 and 1946. Finally, the mine may have ceased operation by 1946 but certainly by 1954.

Site Description

LA 115362, the Sadler Mine, is the westernmost of the sites recorded during this project (Fig. 2). Its UTM and legal locations are listed in the appendix. The site as recorded covers 10 acres (4.0 ha) (Fig. 12). However, the site extends an unrecorded distance south of the recorded area, as at least one blade-cut area was observed south of Feature AML 7H. LA 115362 has both a probably prehistoric component and a historic component. Site boundaries are defined by the distribution of recorded historic features.

Probable Prehistoric Component

The probable prehistoric component at LA 115362 consists of tested cobbles, cores and core fragments, and core flakes on the relatively undisturbed hillslope above (west), north, and south of the mine area. Materials include chert, the dominant material observed, limestone, a very fine-grained siltstone or mudstone, and quartzite. No specific concentrations of artifacts were observed. Given that with the exception of quartzite, the materials outcrop on-site and around the site, the artifacts appear to represent informal quarrying and initial core testing and reduction. No specific quarry locations were observed, although such may well be present, especially above the site's uppermost road (Fig. 12) where chert outcrops are numerous. Chert and limestone are ubiquitous in and around the site. The siltstone or mudstone is found primarily within the highly disturbed mining area between Feature AML 7 and Features AML 7B, 7C, 7D, 7G, and 19. The disturbance probably removed any evidence of quarrying that may have been present.

Historic Component

The site's historic component consists of a series of mining features. They include open shafts, open stopes, adits, a series of shallow trenches, the remains of a headframe/ore hopper structure, and tailings piles. The features are shown in Figure 12. The following discussion groups the

features according to association with the Sadler No. 1 Mine, the Sadler No. 2 Mine, and other features. Features identified by AML numbers 7 through 7H are planned for modification. Feature numbers AML 19 and 21 were assigned by OAS personnel in the field on the assumption that their similarity to the other AML features might mean that they will also be planned for modification. Features with AML numbers are given the most detailed descriptions. Other features are described in less detail.

Sadler No. 1 Mine

AML 7 consists of an open shaft, an open stope, and an associated headframe/ore hopper structure. The shaft is the feature described by Rothrock and others (1946) and Griswold (1961) as "Shaft No. 1." The features are fenced.

The Shaft

Dimensions: 4.5-by-8-by-92 ft deep (1.3-by-2.4-by-28 m deep).

Description: Plate 22 shows the view into the shaft from the headframe. Plate 23 shows the shaft's wooden frame in the lower foreground, looking to the south. The shaft was excavated in a long north-south-trending stoped trench (Fig. 12). Immediately south of the shaft is a rock "bridge" about 5 ft (1.5 m) wide spanning the trench and separating the upper shaft from the open stope to the south. The shaft was framed with horizontal two-by-twelve planks whose ends are actually mortised rather than simply nailed together. Therefore, there seem to be no large beams with the planks attached as seen at other mines. The frame rests against and may be attached to the west side of the trench. It also abuts the rock bridge on the south. The north and east sides and part of the south side of the frame are exposed for an unknown depth, presumably by erosion that carried the surrounding matrix down into the mine. This has created an opening under the rock bridge between the space around the shaft frame and the open stope to the south. A length of 2-inch (5 cm) pipe extends out of the west side of the shaft. No ladder is visible in the shaft.

The Open Stope

Dimensions: 6-by-90 ft total length by unknown depth (1.8-by-27 m total length by unknown depth). The open stope is 14.75-by-59 ft by unknown depth (4.5-by-18 m by unknown depth).

Description: Plate 23 shows the open stope in the background beyond the shaft frame and the rock bridge. Unlike the northern end of the trench, north of the shaft, the southern open end is narrow and has very steep sides, as it is cut into the hillslope on its west side and south end. This has created a rock wall on the south end, into which three relatively shallow areas have been excavated. The central area has a wooden frame wall across its northern "front," comprised of four-by-four beams and two-by-twelve planks. A door was left in the wall, creating a small room. The function of this room and the adjacent small areas is not known. They are separated from the open stope by a narrow ledge of rock.

On the east side of the stope about 65 ft (20 m) north of the south wall and the "rooms" is the remains of a wooden-frame feature of unknown function. It was constructed of two-by-four and two-by-eight boards, one four-by-four beam, and a piece of corrugated steel, which was placed along the east side.

The Headframe/Ore Hopper

Dimensions: 10-by-13-by-16 ft tall (3-by-4-by-5 m tall). Dimensions are estimated due to the location of the structure and the dangers involved in obtaining accurate measurements.

Description: Plate 24 shows the structure from the east. The remains of the headframe are on the left, while the ore hopper and chute are on the right. The remains of the headframe consist of eight-by-eight beams set into the hillslope directly above the shaft. Two 26-ft (8 m) long eight-by-eight beams are anchored into the hillslope with two-by-eight planks and extend out over the shaft. They are supported by two horizontal eight-by-eight beams joined by three short, vertical beams. This arrangement rests on a ledge cut into the rock of the trench wall. A vertical eight-by-eight beam present at the southwest corner of the shaft may have been part of the structure, as well. Next to the shaft frame is a frame of twelve-by-twelve and eight-by-eight beams that appears to have been part of the headframe now fallen into the trench. This frame is seen to the left of the shaft frame in Plate 23.

The ore hopper is constructed of a frame of vertical and horizontal eight-by-eight beams. Plate 24 shows that vertical beams supported the hopper at the edge of the trench. Vertical beams also formed the corners of the hopper, with walls of two-by-twelve planks nailed to the upright beams. The floor of the hopper is constructed of two-by-four boards sloping to the east. They extend about 5 ft (1.5 m) beyond the east wall of the hopper and form the floor of the single ore chute place in the center of the hopper's east wall. The chute walls are constructed of two-by-twelve planks anchored to the two-by-four floor and the east wall of the hopper.

The hopper is anchored to the hillslope by twisted 1-inch (2.5 cm) steel cables attached to the north and south sides of the hopper (Plate 25). On the west ends, the cables are attached to 1-inch (2.5 cm) bolts on steel posts set into the hillslope. The east ends are attached to the upper and lower corners of the north and south walls of the hopper.

Twelve-by-twelve and eight-by-eight beams and steel cable in the trench below the hopper suggest the presence of a structure spanning the trench between the hopper and the access road on the east side of the trench. Such a structure would have been necessary for ore to have been loaded from the chute into ore cars, wagons, or trucks. Without it, ore from the hopper would simply have poured back into the trench.

Four concrete pylons are located 50 to 65 ft (15 to 20 m) southeast of the AML 7 shaft. Because we found no obvious hoist engine pad, we suspect that these pylons may represent the hoist engine location. Their placement, however, does not match the locations of the hoist engine pads at other sites and our identification may be incorrect.

Dimensions: Each pylon is 3-by-1-by-2 ft tall (1-by-0.3-by-0.6 m tall).

Description: Three of these pylons are placed in an east-west line, while the fourth is to the south of the others (Figs. 12 and Plate 26). Of the three in the line, the two easternmost are 27.5 inches (70 cm) apart at the base. Third is 7 ft (2.15 m) from the middle at the base. Each of the three has upright two 1-inch (2.5 cm) steel rods 4.3 inches (11 cm) from the ends of the top. The southern pylon has two 1-inch (2.5 cm) bolts embedded in 2-inch (5 cm) pipes in the centers of the east and west sides. Twisted rebar protrudes from the corners of this pylon about 6 inches (15 cm) above

modern ground surface.

A blade-cut trench is located 82 ft (25 m) northeast of the AML 7 shaft.

Dimensions: 13-by-23-by-5.5 ft deep (4-by-7-by-1.7 m deep).

Description: This blade-cut trench into the hillslope is immediately south of the concrete pylons (Plate 27).

In addition to these features, a large, complex tailings pile is located southeast of AML 7 (Fig. 12). At its eastern edge, it is approximately 10 ft (3 m) tall.

Sadler No. 2 Mine

AML7A is an open shaft 130 ft (40 m) east of the AML 7 shaft. This closely matches the description of "Shaft No. 2" provided by Rothrock and others (1946) and Griswold (1961). This feature, along with AML 7E, is fenced.

Dimensions: 6-by-7-by-70 ft deep? (1.8-by-2.1-by-21 m deep?).

Description: The shaft is partially covered by a wooden platform on the modern ground surface (Plate 28). Three long eight-by-eight beams are laid on the ground running northeast-southwest. At the northeast and southwest ends, shorter eight-by-eight beams are laid on the ground and buried into the slope. Across the beams are two-by-twelve planks, creating the platform. In the southwest corner of the platform is a square hole 4 ft (1.25 m) on a side over the shaft. The top of a ladder made of two-by-eight and two-by-four boards protrudes from the hole.

AML 7E consists of an open shaft and three open stopes in a line south of AML 7A (Fig. 12).

The Shaft

Dimensions: 11.5-by-13 ft by unknown depth (3.5-by-4 m by unknown depth).

Description: This shaft (Plate 29) appears to be connected to the AML 7A shaft, which is only 16 ft (5 m) to the northwest, and to the northern stope, 16 ft (5 m) to the southeast. A large beam lies across its top.

The Northern Stope

Dimensions: 33-by-39 ft by unknown depth (10-by-12 m by unknown depth).

Description: This stope is complex in shape (Fig. 12); the dimensions represent the opening at modern ground surface rather than the interior shape. It is connected to the AML 7E shaft. It is also apparently connected to the middle stope to the south. In the upper south wall of the northern stope, about 10 ft (3 m) below modern ground surface, is an oval opening an estimated 6 ft (2 m) high and 3 ft (1 m) wide (Plate 30). About three-quarters of the opening has been filled with rocks.

The opening seems to be the north end of a tunnel connecting to the north wall of the middle stope.

The Middle Stope

Dimensions: 20-by-33 ft by unknown depth (6-by-10 m by unknown depth).

Description: This stope is narrower than the northern stope (Plate 31). In its north wall about 10 ft (3 m) below modern ground surface is an opening, about 6 ft (2 m) square. This opening contains a wooden frame constructed of an eight-by-eight beam at the top with two-by-four boards for the frame. It appears to be the southern opening of a tunnel connecting this stope with the northern stope.

The Southern Stope

Dimensions: 111-by-52.5 ft by unknown depth (34-by-16 m by unknown depth).

Description: This stope is long and narrow and has a more complex shape than the northern and middle stopes (Fig. 12). It runs north-south and its north end is shallow. Two two-by-twelve planks are present in the north end (Plate 32). The south end is of unknown depth. A horizontal four-by-four beam is present near the top of the south end (Plate 33).

Other Features

AML 7B is an open shaft and a rock wall located on the hillslope 148 ft (45 m) northwest of the *AML 7* shaft (Fig. 12).

The Shaft

Dimensions: 8-by-10-by-23 ft deep (2.4-by-3-by-7 m deep).

Description: This shaft, which was excavated straight down into the hillslope, has no collar or other framing (Plate 34). It is presently surrounded by a barbed-wire fence.

The Rock Wall

Dimensions: 2 ft wide by 20 ft long by 4 ft tall (0.6 m wide by 6 m long by 1.2 m tall).

Description: The rock wall is about 6 ft (2 m) east of the shaft (Plate 35). A portion of its northern end is collapsed. The wall may have been a retaining feature for the shaft opening or it may have held back the hillslope along the uphill side of a short road running along the slope beneath Features *AML 7B* and *7D* (Fig. 12).

AML 7C is a declined adit 33 ft (10 m) west of *AML 7B*.

Dimensions: 6-by-5-by-13 ft long (1.8-by-1.5-by-4 m long).

Description: The adit declines to the north for a short distance before turning to the east and continuing under a road that runs along the east side of the adit opening (Plate 36).

AML 7D is a shaft 50 ft (15 m) north of AML7B.

Dimensions: 4-by-10-by-25 ft deep (1.2-by-3-by-7.6 m deep).

Description: This shaft (Plate 37) is declined to the north and seems to become an adit, as its bottom is visible and appears to rise or level off. The feature is partially fenced.

AML 7F is a shaft 148 ft (45 m) northeast of AML 7A.

Dimensions: 4-by-7-by-24 ft deep (1.2-by-2.1-by-7.3 m deep).

Description: The actual shaft is not visible due to a wooden cover (Plate 38). The cover is a pile of eight-by-eight beams with two-by-twelve planks and two-by-four boards. A steel cover is present on the east side. The shaft has been fenced; the fence is now fallen.

AML 7G is a large, complex, linear series of four stopes on the hillslope north of AML 7 (Fig. 12). The stopes are connected in a rough, backward Z-shape.

Dimensions: 190 ft total length by 13 ft average width by unknown depth (58 m total length by 4 m average width by unknown depth).

Description: This feature has a central north-south open stope with at least three deep openings. This stope is seen in the foreground in Plate 39 and in the background in Plate 40. In Figure 12, it is the stope forming the east side of a "V" at the southwest corner of the feature. From this stope, a second stope runs northeast, seen in the background in Plate 39 and the foreground in Plate 40. It appears to have two deep openings. A third stope runs to the southeast and a fourth to the northwest. The entire complex is fenced.

AML 7H is an open adit at the south end of the site (Fig. 12). As discussed earlier, this feature probably dates between 1943 and 1946.

Dimensions: Opening: 0.9-by-2.6 ft (30-by-80 cm); Collapsed portal: 36-by-15 ft (11-by-4.5 m).

Description: This adit runs west into the hillslope (Plate 41), with the opening at the west end of the collapsed portal trench. An upright post is present on the south side of the adit opening (Plate 42). A crushed steel trough and barrel are present near the adit opening.

AML 19 is a shaft and adit on the steep hillslope west of AML 7. This number was not assigned by AML staff, but, because of the nature of the feature, we suspect that AML may wish to fill it.

Dimensions: Shaft: 8.2-by-10-by-16.4 ft deep (2.5-by-3-by-5 m deep); Adit (estimated): 6-by-10 ft tall by 23 ft long (2-by-3 m by 7 m long).

Description: This feature is located along the south side of a road climbing the hillslope. The shaft is excavated down into the native rock (Plate 43), while the adit extends to the southwest from the shaft (Plate 44).

AML 21 is a shallow shaft and adit high on the hillslope above the AML 7 mine area (Fig. 12). This number was not assigned by AML staff, but, because of the nature of the feature, we suspect

that AML may wish to fill it.

Dimensions: Shaft: 5-by-8-by-13 ft deep (1.5-by-2.5-by-4 m deep); Adit: 6-by-3-by-5 ft long (2-by-1-by-1.5 m long).

Description: This feature consists of a shallow shaft dug into the hillslope (Plate 45), connected to an adit opening in the south side of a small drainage (Plate 46). A small tailings pile south of the shaft suggests that ore was removed from the shaft rather than from the adit.

A possible collapsed adit is located immediately east of AML 7G (Fig. 12).

Dimensions: 10-by-20 ft (3-by-6 m).

Description: This feature is a shallow depression that may represent a collapsed adit portal. At the west end of the depression is a small hole that may represent an adit opening.

A series of shallow trenches extends east of the Sadler No. 2 Mine (AML 7A and 7E) (Fig. 12). They were probably used to search for evidence of fluor spar veins at the foot of the ridge.

Dimensions: Trench 1: 4-by-131-by-2 ft deep (1.2-by-40-by-0.6 m deep); Trench 2: 5-by-59-by-4 ft deep (1.5-by-18-by-1.2 m deep); Trench 3: 5-by-75-by-4 ft deep (1.5-by-23-by-1.2 m deep).

Description: These trenches may have originally been one long trench that was segmented by roads.

Discussion

The archaeology of LA 115362 is generally consistent with historical descriptions of the site, once we determine that the Sadler Mine was not the "lower camp" area and was probably not mined prior to 1927. As we have shown, descriptions of the lower camp do not match the Sadler Mine and our observations in the field did not include the presence of clearly pre-1930 artifacts at the site. On the other hand, the archaeological record does correlate well with the pre-1946 conditions in that we can identify features described by Rothrock and others (1946) and by Griswold (1961). There is no evidence, historical or archaeological, that any features date after 1946. This indicates that the site features recorded during this project are older than 50 years.

Aspects of Site Integrity

Location: There has been no discernable relocation of features or facilities at this site, with the obvious exception of the removal of equipment such as hoist engines. The remains of the headframe/ore hopper structure at the Sadler No. 1 Mine have added significance since, with the exceptions of the Valley Mine headframe and the Lucky No. 1 Mine headframe, such structures are missing at sites in the district.

Design: The development of the site through time is definable by comparing the archaeological and historical records. Features listed and described in historic documents can be defined on the

ground.

Setting: The setting of the Sadler Mine is largely unchanged from the period of major development. Recent intrusions appear to be limited to barbed-wire fencing with metal posts around the AML 7 features, the AML 7A-7E features, and Features AML 7B, 7D, 7F, and 7G.

Materials: With the exception of the fencing and metal posts, materials are consistent across the site.

Workmanship: Workmanship is consistent across the site.

Feeling: The proximity of the mines at the southeast end of Fluorite Ridge suggests that individual mines should not have a feeling of isolation from each other, although the mining district should, by virtue of its distance from Deming, have an overall feeling of isolation. This situation is maintained at the Sadler Mine, since the other mines are all visible from the Sadler Mine, while the district remains largely isolated from modern development in the region.

Association: The overall mining system at the Sadler Mine is clearly definable, even in the face of the removal of some structural features. Association of features is clearly discernable.

Based on these considerations, LA 115362, the Sadler Mine site, is in good condition, having a high degree of site integrity.

Table 5. LA 115362, the Sadler Mine: AML's Proposed Activities

FEATURE NO.	PROPOSED ACTIVITY
AML 7	Remove fence. Remove framing timbers from shaft. Backfill shaft and stope. Blast hanging wall as necessary to backfill. Preserve headframe/loadout structure if possible.
AML 7A	Remove fence. Remove wooden cover and other timbers. Backfill.
AML 7B	Remove fence. Backfill, preserving rock wall.
AML 7C	Backfill.
AML 7D	Backfill.
AML 7E	Remove fence. Backfill.
AML 7F	Remove fence and wooden cover. Backfill.
AML 7G	Remove fence. Backfill.
AML 7H	Muck open. Construct bat closure with culvert entry.
AML 19	Backfill.
AML 21	Backfill.

AML Proposed Activities at LA 115362

Table 5 lists AML's proposed activities at LA 115362. They are limited to the features identified by AML feature numbers. The other features will not be included.

LA 115363: THE GREENLEAF MINE

Historical Descriptions of the Greenleaf Mine

The first reference to the Greenleaf Mine is from Johnston (1928:96), who states, "Approximately one-fourth of a mile S.70° E from the camp buildings is a shaft 87 feet deep. . ." As we discussed with the Lucky and Sadler mines, determining this location depends on our identification of the "lower camp" area. Figure 6 shows that if our postulated location of the lower camp is reasonable accurate, Johnston's description places this shaft at the Greenleaf Mine.

This appears to contradict Rothrock and others (1946:133), who state, "The [Greenleaf] deposit was first worked in 1939 by W. D. Howard of Deming, but from 1940 to the fall of 1944, it was operated by D. F. McCabe of Lordsburg, and since then for a short period by E. J. Marston of Colorado Springs, Colorado." Production ranged from 10 to 50 tons of ore per day, one-third of which was shipped as metallurgical ore and the rest as milling-grade ore (Rothrock et al. 1946:201).

Rothrock and others (1946:201-202) provide the following description:

A shaft inclined at 70° to 80° has been sunk on the vein to a depth of 397 feet. The most important mining level is the lowest or 350-foot level. This extends almost 300 feet north of the shaft and 145 feet south of it. Stopes have also been developed from the 213-, 167-, 113-, and 76-foot levels, but work from below has removed the floors of most of the upper level drifts. Efforts to sink the shaft deeper in the summer of 1943 were blocked by a flow of water that exceeded the capacity of the small pumps and electric generator then available.

Ore is mined from a number of closely spaced parallel or branching veins, so that in many places the stopes overlap. Individual stopes are 25 to 100 feet in length, and from 25 to 160 feet in height. Stopping widths differ greatly from place to place, ranging up to 15 feet but averaging about 4 feet.

No backfilling is done except as a convenient method of disposing of waste from development work or from sorting at the shaft collar.

Tramming from stope chutes and drift faces to the shaft is done in 1200-pound buckets in dollies. . . Relatively little cross-cutting is done, but a "long-hole" drill is used to good advantage to test the walls for parallel ore-shoots.

Chief items of surface equipment at the Greenleaf are a 315-cubic-foot skid-mounted Diesel compressor, a gasoline-engine-driven electric generator of about 10 horsepower, and a single-drum hoist driven through a low-gear transmission by a gasoline truck engine. An electric triplex pump is installed at a sump on the 367-foot level near the shaft.

Deeper development of the Greenleaf mine was halted in 1943 because of the difficulty of sinking the shaft below the water level, which is just below the

350-foot level. Although the shaft was sunk about 30 feet lower, the pumps and generator proved inadequate, and in addition ground conditions were found much worse than above the water level. Whereas the shaft to 350 feet had required no supporting timber, it was found that under the water the walls of the vein were loose, and that regular square-set shaft timbering would be necessary.

Following this description, Rothrock and others (1946:203) provide a photograph of the Greenleaf shaft surface plant. The photo and another on the same page are mislabeled: the Greenleaf Mine photo is identified as the Clum Mine in Grant County and vice-versa. Nonetheless, once the correct photo is identified, it shows a headframe, an ore hopper and chute, a square water tank, a hoist house, and other features, all in a view to the south.

Following the U.S. Geological Survey's study of the fluorspar mines in 1942 and 1943 (Rothrock et al. 1946), the USDI Bureau of Mines undertook a program of exploratory trenching focusing on the Greenleaf and Lucky mines (Russell 1947). At that time, the Lucky Mine was in operation by Basic Minerals, Inc., while the Greenleaf was being developed by the Western Mining Corporation. According to Russell (1947:3-4):

The Greenleaf No. 1 is a full-size, unpatented mining claim, purchased by D. F. McCabe of Basic Minerals, Inc., through royalty payments from W. D. Howard of Deming, N. Mex. Trenching was conducted on the Greenleaf No. 2 of the Western Mining Corp. These likewise were full-size, unpatented claims, located by W. D. Howard in 1937. The Western Mining Corp. obtained a lease from Howard and began operations in 1942, assisted by a development loan from the Reconstruction Finance Corporation.

The claims now known as the Greenleaf group were located by Joe (?) Baca before 1938. Following a lawsuit, ownership was awarded to W. D. Howard. Howard also obtained at about the same time the Greenleaf No. 2, 3, and 4 and the Lucky claim.

In July 1940 E. C. Curry obtained a lease, with option to buy, on the Greenleaf No. 1. Curry, it is understood, was financed by D. F. McCabe and Forbes. Curry was killed in an accident in 1941, and in July of that year McCabe purchased full control of the lease.

The Western Mining Corp. obtained a lease on the Greenleaf No. 2, 3, 4, and Lucky claims from W. D. Howard in October 1942. Operations were confined to the Lucky claim. . .

Figure 13 shows a plan view and vertical profiles of the Greenleaf Mine in 1943 (Russell 1947, fig. 6). Russell's information on the early history seems to be contradictory. He says the Greenleaf claims were located by W. D. Howard in 1937 and then that they were located by Joe Baca before 1938, after which they were obtained by Howard in a lawsuit settlement. Likewise, it is not entirely clear how D. F. McCabe and Basic Minerals, Inc. obtained an interest in the Greenleaf claims.

In any case,

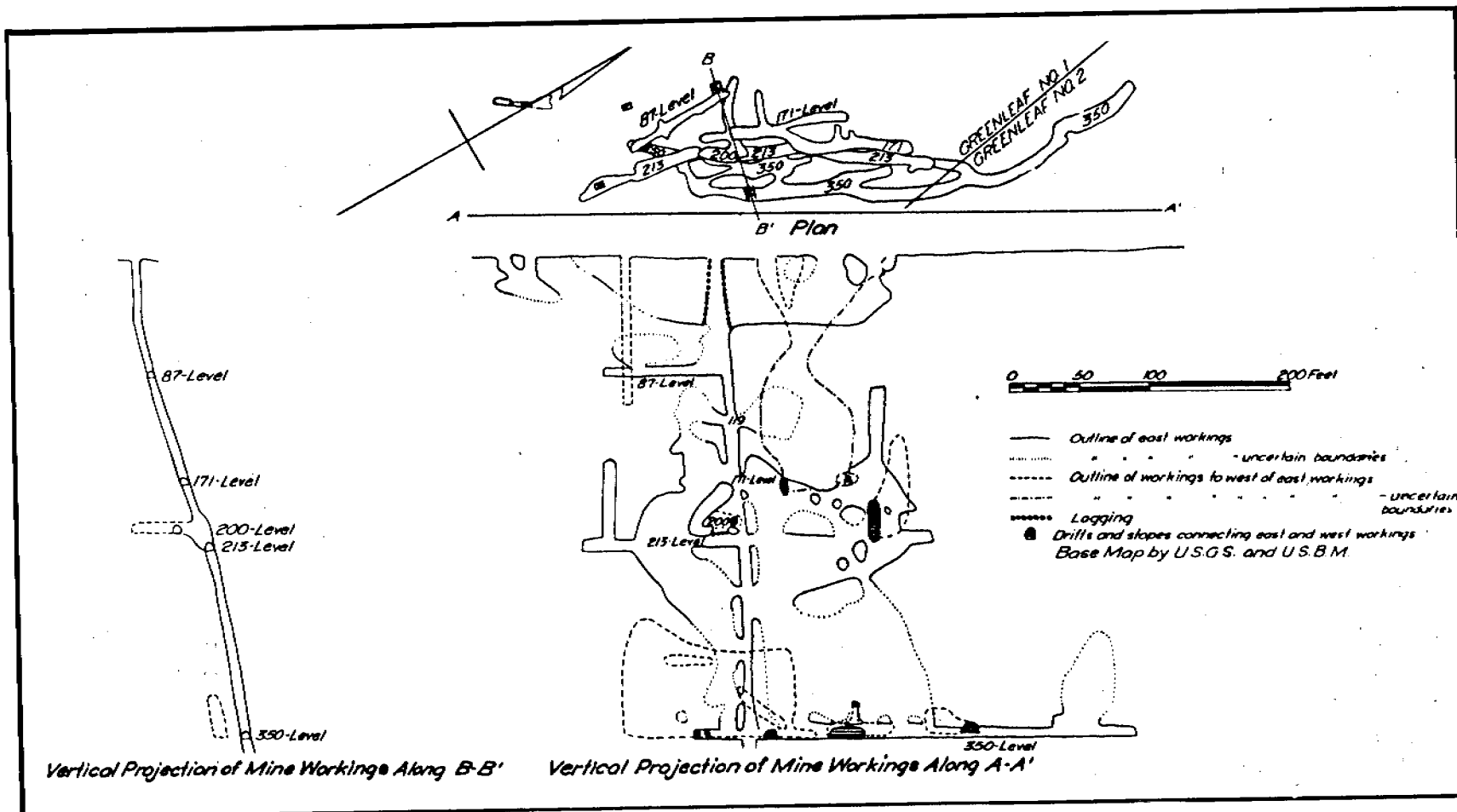


Figure 13. LA 115363, the Greenleaf Mine: 1943 composite plan and profiles (from Russell 1947).

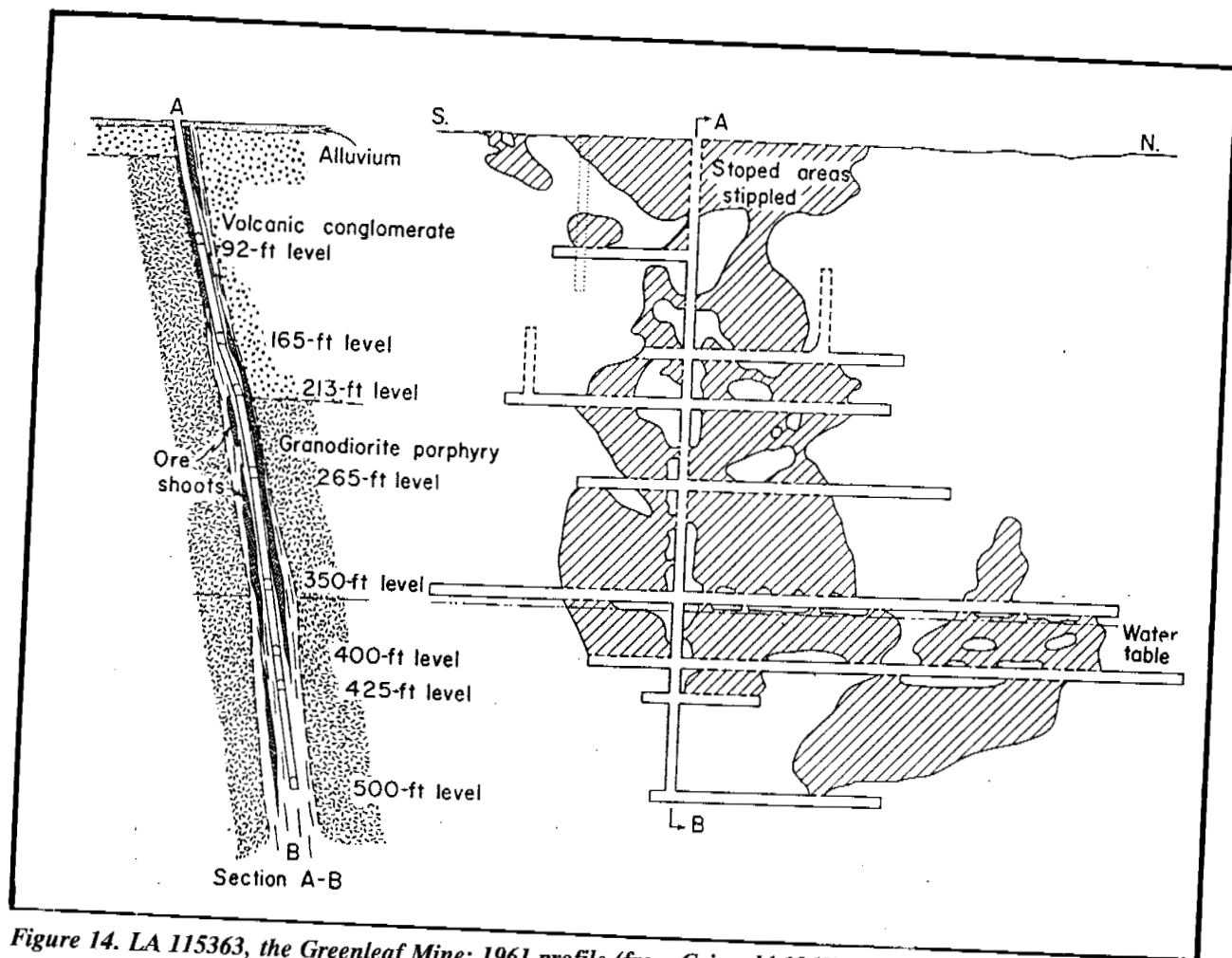


Figure 14. LA 115363, the Greenleaf Mine: 1961 profile (from Griswold 1961).

Equipment on the Greenleaf No. 1 consisted of a 310-cubic foot Diesel-powered Chicago Pneumatic compressor, a 105-Cubic foot Ingersoll-Rand portable compressor, a gasoline-driven hoist, a portable 220-volt electric power plant, several buildings and living quarters, cars, pumps, and accessory equipment in order to handle the increased pumping load of 150 gallons or more a minute, which was encountered below the bottom level. (Russell 1947:6)

Living quarters at the mine could accommodate four or five men (Russell 1947:3).

During its exploratory program, the Bureau of Mines excavated 14 trenches north of the Greenleaf No. 1 shaft on the Greenleaf No. 1 claim and 17 trenches on the Greenleaf No. 2 claim (Russell 1947, figs. 3 and 4). The program was hindered by the "excessive depth" of the overburden, which increased to 10 to 12 ft as the program moved north. The southern trenches exposed narrow fluorspar veins, which dropped and disappeared to the north.

In 1953, Reinhart reported that H. E. McCray had deepened the Greenleaf No. 1 shaft from the 365 to the 400-ft level, resulting in much-increased production:

The best ore extracted from the mine was obtained between these levels. The 400 level was abandoned by Mr. McCray when his pumps failed, and the water level is about 20 feet above that level. The mine is now being unwatered by Mathis and White. A churn drill hole is being drilled to 500 feet and a bottom-hole pump is to be placed in the hole to unwater ahead of shaft deepening. (Reinhart 1953:7)

Mathis and White were considering construction of a mill at the Greenleaf Mine in 1953 (Reinhart 1953:8). The mill was apparently never built, although Mathis and White continued development in 1955, when they sunk an inclined shaft "about a quarter of a mile north of the Greenleaf mine on what was believed to be an extension of the same vein system" (Griswold 1961:111). This was probably the feature recorded here as AML 2. The shaft was 105 ft deep. In addition, "A shallow shaft and several trenches expose another vein about a quarter of a mile east of the Greenleaf mine, but the vein is weak, and the amount of ore removed must have been small" (Griswold 1961:111-112). This is the Greenleaf No. 4, recorded here as feature AML 5.

Griswold's (1961:111) description of the Greenleaf Mine shows that little had changed at the mine since the 1940s. The exception was the additional depth explored by McCray in the 1950s: "The Greenleaf mine development consists of an inclined shaft 500 feet deep, with levels at 90, 165, 213, 265, 350, 400, 425, and 500 feet" (Griswold 1961:111). This observation and Figure 14, taken from Griswold (1961:110), show that McCray's drill hole to 500 ft had been expanded by Mathis and White to a north-south drift at that bottom level.

Otherwise, Griswold's (1961:111) description is very similar to that of Rothrock and others (1946):

Mining was by shrinkage stoping, and stopes were backfilled only as a convenient method of waste disposal. Ore was hoisted out of the sinuous inclined shaft in 1,200-pound-capacity buckets, which were loaded directly at the working place and then hand trammed to the shaft on dollies.

Water was encountered in the shaft at a depth of 367 feet. The inflow was

considerable (as much as 650 gallons per minute) during the latter part of the life of the mine, when mining had opened up considerable ground between the water table and the 500-foot level. The water was troublesome because it weakened the stope walls and required the use of large pumps.

In March 1960, a mineral survey (Mineral Survey No. 2226) was conducted of the Greenleaf Group for the Greenleaf Corporation. The Greenleaf Group consisted of the Greenleaf No. 1, No. 2, No. 3, No. 4, and No. 5 Mine lode claims. Bard's (1960) field notes for the survey may lend explanation to the apparent discrepancies between the early descriptions of the lower camp that point to prospecting in the Greenleaf Mine area and later documents that say that the mine dates from the late 1930s. The field notes state that the Greenleaf No. 1 Mine lode claim was located November 22, 1938, the Greenleaf Nos. 2 and 3 Mine lode claims were located on January 15, 1939, the Greenleaf No. 4 Mine lode claim was located on January 25, 1939, and the Greenleaf No. 5 Mine lode claim was located on January 25, 1941. Bard does not state the names of the original claimants. Although Bard's dates do not strictly support Russell's (1947) contention that the Greenleaf claims were located in 1937, they would seem to negate Rothrock and others (1946), who state that the Greenleaf Mine was first worked in 1940. Of the five claims in the survey, the Greenleaf No. 1 and No. 2 Mine lode claims were patented in March 1963, the only patented claims in the Fluorite Ridge District.

The mineral survey field notes provide locations and descriptions of mining features and facilities in the five claims. This information is important for identifying features recorded during this project and will be discussed in the descriptions of the features.

Site Description

LA 115363, the Greenleaf Mine site, is located in the approximate center of this project area (Fig. 2). Its UTM and legal locations are listed in the appendix. The site as recorded covers 52.5 acres (21.25 ha; Fig. 15). However, this area does not include the exploratory trenches from the 1940s, which are north and northeast of the Greenleaf No. 1 Mine area. There are, undoubtedly, other features associated with the Greenleaf claims that were not recorded during this project (see Bard 1960; Mineral Survey No. 2226). The site has both a probably prehistoric and a historic component. Site boundaries are defined by the distribution of recorded historic features.

Prehistoric Component

The prehistoric component at LA 115363 consists of a scatter of chert, limestone, quartzite, and mudstone core fragments and core flakes extending across the site. The artifacts are most common in the relatively undisturbed portions of the site, particularly on the low ridges in the northeastern portion of the site. No concentrations of artifacts were observed, although concentrations may be present in the areas where chipped stone artifacts are more common. The prehistoric component of LA 115363 undoubtedly extends well beyond the site boundaries as defined by this project. For instance, we know that prehistoric artifacts are common on the low ridges north and west of the northern portion of the site.

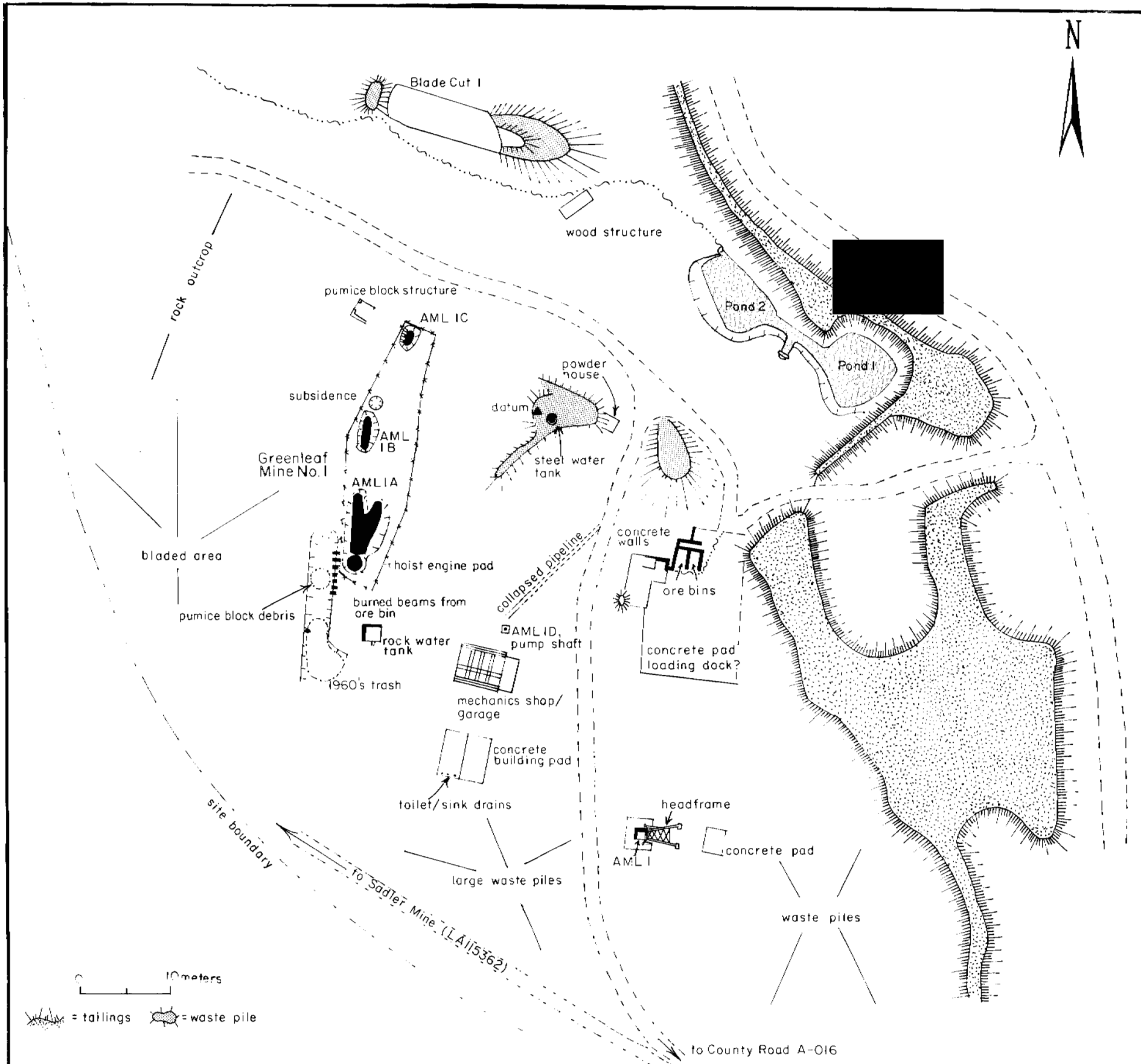


Figure 15. LA 115363, the Greenleaf Mine: No. 1 Mine area map.

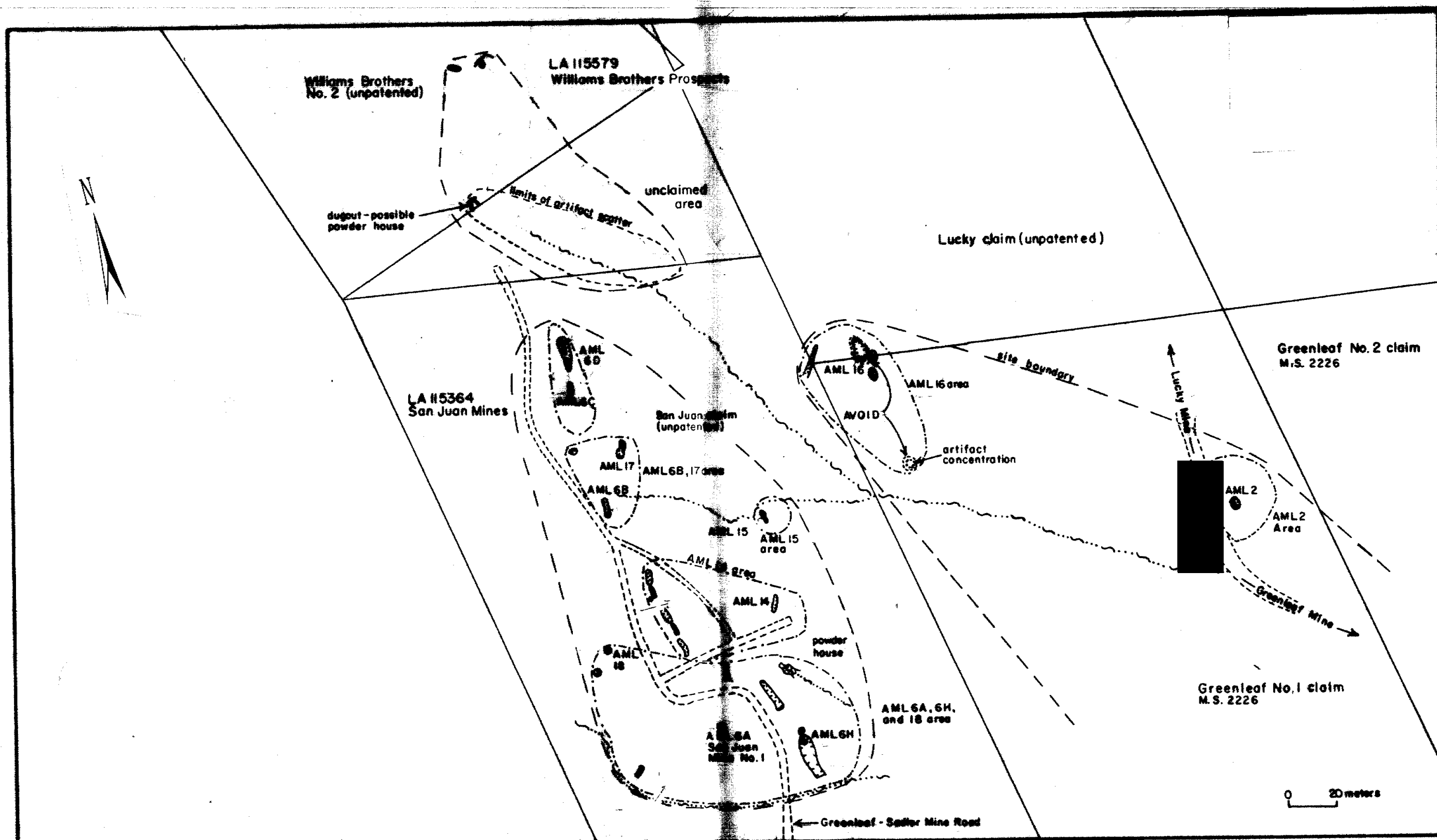


Figure 16. Map of Greenleaf No. 1 claim (north end), Lucky claim (south end), San Juan claim (north end), and Williams Brothers Prospect No. 2 claim, showing relationships of features in the claims.

Historic Component

The site's historic component consists of a series of mining and other features. They include seven open shafts, three open stopes, a steel headframe, concrete building pads, a probable powderhouse, a concrete and steel structure, a square, rock-walled water tank and a circular steel water tank, a wooden box structure of unknown function, two water retention ponds, hoist engine pads, at least one blade-cut trench, and many tailings piles. The following discussion groups the features into four areas. The Greenleaf No. 1 Mine area was the primary mine area and saw most of the mining activity. Features AML 1, 1A, 1B, and 1C are found in this area, with a variety of associated features and facilities (Fig. 15). The AML 16 area is found in the northwest corner of the Greenleaf No. 1 claim (Fig. 16) and includes five features. The AML 2 area is near the northeast corner of the Greenleaf No. 1 claim (Fig. 16) and includes three features. The AML 2 and AML 16 areas are at the northern end of the site as defined by this project. Finally, the Greenleaf No. 4 Mine area is near the northeast corner of the Greenleaf No. 4 claim at the southeast end of the site and includes Feature AML 5 and associated features. Features identified by an AML number are planned for modification and are given the most detailed descriptions. Other features are described in less detail.

The Greenleaf No. 1 Mine Area

AML 1 is a steel headframe structure (Plates 47 and 48) standing over a shallow shaft surrounded by a concrete pad, with a nearby concrete building slab (Plate 49). These features are not included in Griswold's (1961) description or in the patent record for Mineral Survey No. 2226 (Bard 1960), and are younger than 1961.

The Shaft

Dimensions: 6.5-by-9.5-by-9.5 ft deep (2-by-2.9-by-2.9 m deep) (Plate 47).

Description: The shallow shaft was first identified by AML as a possible airshaft. However, the current landowner reported it to be a shaft abandoned shortly after excavation began (J. Kretzmann, pers. comm. 1997). It is lined by poured courses of concrete. The slab surrounding the opening is 18.2-by-23.3 ft (5.5-by-7.1 m) and also supports the front (west) legs of the headframe.

The Headframe

Dimensions: 16-by-47.5 ft by estimated 50 ft tall (5-by-14.5 m by estimated 15 m tall) (Plates 47 and 48).

Description: This structure is constructed of steel beams, with four large upright beams for the "legs" connected by smaller diagonal and horizontal crossbeams. The front (west) legs are anchored to the concrete pad that surrounds the shaft opening. The rear (east) legs are set on small concrete pads, 4-by-4 ft (1.2-by-1.2 m). A ladder is present at the northwest corner. A small platform is found at the top, overlooking the shaft opening.

The Building Pad

Dimensions: 14-by-20 ft (4.3-by-6.1 m) (Plate 49).

Description: This feature is a concrete slab with the remains of a pumice-block wall. This wall may have been a footer for a wooden frame wall, since the number of block fragments does not appear to be high enough to indicate a full-height wall. Scraps of roofing paper and wooden board fragments indicate that the structure was roofed. Threaded anchor bolts are set into the south half of the slab. Both Rothrock and others (1946) and Russell (1947) list two different compressors at the mine, which would be necessary to maintain a constant air supply to lower levels of the mine. However, since the AML 1 features are not listed by Bard (1960) or Griswold (1961), they probably date after 1961. Nonetheless, if the AML 1 shaft were indeed an airshaft, as proposed by AMI., then the building may have been a compressor location.

AML 1A is a shaft and open stope (Fig. 15), with an associated hoist engine pad, trench, and rock-walled water tank. The shaft is the Greenleaf No. 1 Mine, while the stope may represent subsidence at upper levels within the stoped mine. A small subsidence depression 1.6 ft (.5 m) in diameter is located about 11.5 ft (3.5 m) north of the open stope. During the course of this project, the depression grew in diameter and depth, suggesting continued subsidence within the mine.

The Shaft

Dimensions: 11.5 ft in diameter by unknown depth (3.5 m in diameter by unknown depth) (Plate 50).

Description: The Greenleaf No. 1 Mine shaft is an open, unlined shaft separated from the adjacent open stope by a bridge of soil and rock at the surface. Plate 50 shows that the bridge is less than 3 ft wide and tall. Three wooden cross-beams are present within the shaft. Although the photograph in Rothrock and others (1946:203) shows a wooden headframe at the shaft, no evidence of a headframe was observed during this project.

The Stope

Dimensions: 28 ft wide by 43 ft long by an estimated 187 ft deep (8.5 m wide by 13 m long by estimated 57 m deep) (Plate 51).

Description: The open stope is roughly Y or V-shaped, with the arms to the north.

The Hoist Engine Pad

Dimensions: 5.25-by-5.25 ft (1.6-by-1.6 m) (Plate 52).

Description: This square concrete pad is located 13 ft (4 m) east of the AML 1A shaft. Threaded bolts are present in the southwest and northwest corners of the pad. Both Rothrock and others (1946) and Russell (1947) list a gasoline-driven hoist among the mine's equipment. The mine photograph in Rothrock and others (1946) shows the shaft location marked by a wooden headframe. Immediately east of the headframe is a small wood-frame structure that was probably housed the hoist engine. The patent record (Bard 1960) lists a hoist house whose location actually

encompasses the No. 1 shaft (AML 1A shaft). No structural evidence of the hoist house was observed during this project.

A trench is located immediately west of AML 1A (Fig. 15). It represents the location at which ore from the hopper was placed in wagons or trucks to be hauled to the mill or the railroad. The photograph in Rothrock and others (1946:203) shows a hopper/bin structure on the west side of the headframe. It also shows that the hopper emptied on its west side into a trench.

Dimensions: 16.4-by-82-by-5 ft deep (5-by-25-by-1.5 m deep).

Description: The trench is cut into the soil and rock west of Feature AML 1A. It opens to the south. Figure 15 shows that a series of ten burned six-by-six and eight-by-eight beams protrude from the east side of the trench. These beams are the remnant of the frame and base of the ore hopper and are shown in Rothrock and others (1946:203).

A pile of pumice-block debris is present in the trench, while a trash area containing 1960s artifacts is present at the mouth of the trench (Fig. 15).

The rock-walled water tank is located 33 ft (10 m) south of the AML 1A shaft (Fig. 15). It is shown in the photo in Rothrock and others (1946:203) and is listed by Bard (1960).

Dimensions: 10.8-by-12-by-2.8 ft tall (3.3-by-3.65-by-0.85 m tall) (Plate 53).

Description: The tank is constructed of native rock and cement mortar. Its interior is plastered with concrete. The following inscription is found on top of the western wall: "CON-H.J. GARD 10-26-48." The following inscription is found on top of the southern wall: "H.J. GARD CONR TOR." Since the feature is present in the photograph in Rothrock and others (1946), the October 26, 1948, date from the concrete plaster probably refers to a remodeling or repair episode.

AML 1B is an open stope located about 26 ft (8 m) north of AML 1A (Fig. 15). It may represent subsidence at upper levels within the mine. A subsidence depression 5 ft (1.5 m) in diameter is present about 1.6 ft (0.5 m) north of the open stope. During the course of this project, the depression grew in diameter and depth, suggesting continued subsidence within the mine.

Dimensions: 13-by-28-by-46 ft deep (4-by-8.5-by-14 m deep) (Plate 54).

Description: AML 1B is an open stope. No wooden cross-beams or other structures are visible.

AML 1C is a shaft located 49 ft (15 m) north of AML 1B, with an associated concrete slab with pumice-block wall remnants (Plate 55). Neither the shaft nor the slab (and the building it presumably represents) are specifically mentioned by Griswold (1961) or in the Mineral Survey No. 2226 patent record, suggesting that they are younger than 1961. However, the patent record does list an airshaft that was near the location of the AML 1C shaft (Bard 1960). The patent record describes the airshaft opening as 5-by-6 ft (1.5-by-1.8 m) in 1963. The record also states that the shaft "connects through the several levels and stopes to the 500 ft. level of the mine. . ." (Bard

1960:7). Further, "It is also used as a manway." Although the description does not match the size of the feature recorded during this project, the proximity of the AML 1C shaft to the airshaft location suggests that the two features may be the same, particularly since no other evidence of the airshaft was observed. This information suggests that the shaft may date to the 1950s, when the mine was deepened to the 500-ft level. Its modern size and the associated building slab may date to the 1960s or later, contemporaneous with the shaft, headframe, and building slab at AML 1.

The Shaft

Dimensions: 10-by-13.8 ft by unknown depth (3.1-by-4.2 m by unknown depth) (Plate 55).

Description: The shaft is unlined. Two large wooden beams or logs, about 20 inches (50 cm) in diameter, protrude from the western side of the shaft near the surface. One is cut, both are burned, and one has two upright bolts in its upper side. They appear to have once crossed the shaft opening.

The Building Slab

Dimensions: 13.5-by-14.5 ft (4.1-by-4.2 m).

Description: This slab, which is located 24.6 ft (7.5 m) west of the AML 1C shaft, may represent a building that housed equipment associated with the AML 1C shaft. Both Rothrock and others (1946) and Russell (1947) mention two different compressors among the mine's equipment. Compressors would be necessary to provide a constant air supply to the lower levels of the mine and would be located near an airshaft. However, Bard (1960) does not mention a structure near the airshaft.

The slab has a single course of pumice blocks around its perimeter. Like the building slab at AML 1, the number of blocks and block fragments do not indicate a full-height block wall; the blocks may have been a footer for a wooden frame wall. Two doors are indicated by openings in the block wall, one at the south end of the east wall and the other in the center of the west wall.

AML 1D is a pump shaft located 105 ft (32 m) southeast of the AML 1A shaft (Fig. 15). Rothrock and others (1946) state that water pumping began in 1943, when mining went below 350 ft (106 m). An electric pump was installed in a sump at 367 ft (112 m), but water inflow was considerable (up to 150 gallons per minute), pumping was unsuccessful, and the lower level was abandoned. In 1953, the mine was deepened to 400 ft (122 m), but that level was also abandoned due to unsuccessful pumping (Reinhart 1953). However, it was "unwatered" again in the same year by new operators, who sunk a drill hole to 500 ft (152 m) and installed a new pump at that level. This attempt must have been more successful, since the mine was stoped at the 500-ft level in the 1950s (Griswold 1961). Water inflow exceeding 650 gallons per minute required installation of much larger pumps, as well as supporting timbers to hold the water-softened walls. We cannot securely identify Feature AML 1D with any of the episodes of increasing mine depth, water inflow, and pumping. We can speculate, however, that AML 1D dates to the significant expansion of mining below the water table in the 1950s. Interestingly, Bard's (1960) notes for the patent record list a "well" whose location is 39 ft (12 m) north of the location of AML 1D. No evidence of a feature was observed at that location and the difference in location is almost identical to the difference between the locations of Bard's airshaft and feature AML 1C. This strongly suggests that Bard's

well is AML 1D.

Dimensions: 4.8-by-4.8 ft (1.47-by-1.46 m) (Plate 56).

Description: A concrete slab surrounds a steel casing 24 inches (60 cm) in diameter. A 12-inch (30 cm) steel pipe runs northeast beneath the slab and underground for an estimated 16 ft (5 m) (Fig. 15). For approximately 72 ft (22 m) in the same direction, the pipeline location can be defined by a shallow linear depression, probably representing a collapsed trench, perhaps because the pipe was removed. Figure 15 shows that the pipeline probably ran northeast about 254 ft (77.5 m) to an outlet between two water retention ponds.

Other Features

A large wooden-frame structure is located in a small arroyo 125 ft (38 m) northeast of Feature AML 1C (Fig. 15). Its function is unknown.

Dimensions: 16.4 ft long by 5.9 ft wide by 8.2 ft deep (5 m long by 1.8 m wide by 2.5 m deep) (Plates 57 and 58).

Description: The structure, which appears to be on its side, is constructed of two-by-four boards nailed and bolted together, overlapping at the corners to form a massive and solid rectangle. The interior of this rectangle is divided into ten bins. The upper bins, in the structure's current position (the top row in Plates 57 and 58), have steel screening, suggesting that the bins were used to sift fine soil. Screen sizes are graduated, with the bins to the west having larger screen openings and those to the east having smaller openings. This suggests screening to remove progressively smaller particles. The lower bins (the bottom row in Plates 57 and 58) do not contain screens, but are lined with wooden planks. The westernmost lower bin (on the right in Plate 57 and the left in Plate 58) contains what appears to be a plunger rod with an iron or steel plate. A 2-inch pipe with an elbow protrudes from the upper side of this bin (Plate 58).

A blade-cut trench is located immediately northwest of the wooden structure.

Dimensions: 26-by-82 ft (8-by-25 m).

Description: This trench, which was probably used to explore to fluorspar veins, may have been excavated during the Bureau of Mines' trenching program in the early 1940s. A large waste pile is present at the east end of the trench, while a smaller pile is present at the west end.

A concrete building pad is present 75 ft (23 m) southeast of the rock-walled water tank (Fig. 15). This structure is not mentioned in any historic documents, including the patent record, suggesting that it dates after 1961.

Dimensions: 28-by-28 ft (8.55-by-8.55 m) (Plate 59).

Description: The concrete building pad has a north-south expansion joint that separates it into two halves. Along the south side of the west half are two toilet drains and a sink drain, indicating the presence of a bathroom. There is no other evidence of internal room division. Remnants of pumice

blocks are present around the perimeter of the pad, pointing to wall construction.

A concrete and steel pipe building that may have been a mechanic shop or garage is present north of the concrete building pad and east of the rock-walled water tank (Fig. 15). It is not mentioned in historic documents, suggesting that it dates after 1960. Bard (1960) lists a "sheet iron power house" in approximately the same location. No evidence of that structure was observed.

Dimensions: Building: 20-by-30 ft by 7.8 ft tall (walls) (6.15-by-9.2-by-2.4 m [walls]) (Plate 59 and 60); East porch: 10-by-20 ft (3.1-by-6.15 m).

Description: The building is constructed of poured courses of concrete (Plate 60). The courses appear to have been poured around a from a 4-inch (10 cm) steel pipe. Windows are present in the north and south walls. Window lintels, sashes, and sills are two-by-eight boards. A small door is present in the east wall and a larger door resembling a bay door is in the west wall. The large door opening is 7.8-by-7.8 ft (2.4-by-2.4 m). The roof frame is made of 4-inch steel pipe joists, with the centerline offset to the south. On the east side of the building is a thin concrete-slab porch.

A concrete ore bin and loading dock (?) area is present north of AML 1 and east of the mechanic shop/garage building (Fig. 15 and Plate 61).

Dimensions: Maximum length along the east side: 92.8 ft (28.3 m). Maximum width of concrete slab: 60.7 ft (18.5 m); Maximum length and width of small concrete pad: 24.6-by-34.4 ft (7.5-by-10.5 m); small bins on pad: 8.2-by-8.2 ft (2.5-by-2.5 m); large bins on slab: 8.2-by-14.7 ft (2.5-by-4 m).

Description: The large slab was poured in sections separated by expansion joints. Its east edge is partially obscured by sand and plant growth. A very shallow drainage channel was created on the north side of the slab, apparently to lead water away from the front of the bins. At its northwest corner is a small, L-shaped concrete pad that is slightly thicker than the slab. Two small bins are present on its north side; their walls are poured concrete reinforced with rebar. Two larger bins are present on the north side of the large slab. Their walls are also poured concrete reinforced with rebar. North of these bins is a poured concrete support wall; the area between this wall and the north walls of the bins is filled with dirt.

A probable powderhouse is located 147 ft (48 m) northeast of Feature AML 1D (Fig. 15).

Dimensions: Building: 7.2-by-9.8-by-6.5 ft tall (2.2-by-3.0-by-2.0 m tall) (Plate 62); Roof: 8.8-by-11.5 ft (2.7-by-3.5 m).

Description: The probable powderhouse is a pumice-block building that was either built into the southeast side of a small tailings pile or was partially covered by tailings. Tailings cover the roof and obscure the outside of the western wall and most of the northern and southern walls. The walls are built on a concrete slab. The roof is constructed of two-by-ten joists set on edge covered by plywood and tar paper. The east end and side of the roof joists are covered by boards. A door opening is present in the east wall. Its lintel is a steel bar. No frame or door is present.

A steel water tank is located on top of the small tailings pile that covers the probably powderhouse (Fig. 15).

Dimensions: 8.5 ft in diameter by 5.9 ft tall (2.6 m in diameter by 1.8 m tall) (Plate 63).

Description: The water tank is constructed of galvanized steel panels riveted together. It is riddled with bullet holes.

Two water retention ponds are located northeast of the ore bin/loading dock feature (Fig. 15).

Dimensions: Western pond: 29.5-by-82 ft (9-by-25 m) (foreground in Plate 64); eastern pond: 33-by-36 ft (10-by-11 m) (background in Plate 64).

Description: The shallow ponds are built along the small drainage within which the wooden box structure is found (Fig. 15). The depressions were formed by blading into native soil and rock. Their northeast sides are defined by a long, linear tailings pile (actually a linear series of small tailings piles) that parallels County Road A-016. The southeast side of the eastern pond is defined by a southwest-trending finger of the same linear pile. Small tailings piles are present along the southwest side of the eastern pond.

The two ponds are separated by a short channel. On the southwest side of the channel, at its approximate center, is a short side-channel (Fig. 15). A short board crosses this side-channel. As discussed with regard to feature AML 1D, this side-channel appears to be the outlet for the pipeline that ran northeast from AML 1D. It seems likely, then, that the ponds were intended to hold water pumped up from the mine. This association suggests that the ponds, like AML 1D, date to the 1950s.

Tailings piles are common within the Greenleaf No. 1 Mine area. Most are small and occur singly or in small groups. However, two large tailings pile complexes are present along the east side of the area (Fig. 15). They are separated by an access road leading from County Road A-016 to the loading dock area. North of this access road is a long, linear series of tailings piles that runs along the west side of the county road for 0.15 mile (0.24 km) north of the access road-county road intersection. For most of this length, the piles are about 6 ft (2 m) in height. However, at the southern end by the road intersection, the pile is 13 ft (4 m) or more in height. South of the road intersection is a large complex of piles some 213-by-246 ft in size (65-by-75 m) and 13 ft (4 m) or more in height; this complex has been mined for gravel. The complex becomes a long, linear series of piles that follows the west side of the county road for 0.1 mile (0.16 km).

The AML 16 Area

The AML 16 area is located at the northwestern corner of the Greenleaf No. 1 Mine claim (Figs. 16 and 17). The two mine features are mentioned in Bard's (1960) notes.

AML 16 consists of an open stope and an open shaft located on the south slope of a low ridge. They are associated with a shallow trench in which a structure was built. The shaft, stope, and structure are mistakenly identified in Plates 65-68 as being features of the San Juan Mine.

The Shaft

Dimensions: 10-by-11.5-by-14 ft deep (3-by-3.5-by-4.25 m deep) (Plate 65).

Description: The shaft is the northern of the two AML 16 mine features. A tailings pile runs along its eastern side and forms a ridge between the shaft and the stope.

The Stope

Dimensions: 6.5-by-13-by-15 ft deep (2-by-4-by-4.5 m deep) (Plate 66).

Description: The stope is the southern of the two AML 16 mine features. A tailings pile runs along its eastern and southern sides and a linear pile curves to the southwest from its southeast corner.

The Structure

Dimensions: 10.5-by-19 ft (3.2-by-5.8 m) (Plates 67 and 68).

Description: This structure was built in a shallow trench. Whether the trench was a mine feature or was excavated for the structure is not known. The trench is deepest at its northern end, which is in the ridge, while it opens to the south.

The structure consists of the remains of a roof and a southern wall; the northern, eastern, and western walls are the sides of the trench. A 2-inch galvanized pipe provided the center support for the roof. Its north end rests in the soil at the top of the trench, while its south end rests on top of the south wall just east of the door. One or more long boards also span the length of the structure on its west side. At the rear (north) of the structure, shorter boards span between the pipe and the eastern and western trench walls, forming the remains of the roof (Plate 68). On the west side, they are covered by remnants of corrugated steel roofing, dirt, and rocks.

The southern wall is constructed of a wooden frame covered in boards (Plate 67). A door is present, which is built of boards hinged to an upright six-by-six beam. The portion of the wall east of the door consists of two tin-covered doors with wood-reinforced sides and window openings. These were obviously salvaged, but their origin is unknown.

A small concentration of Japanese white ware rice bowl sherds, from a single vessel, is present near the southern end of the shallow trench.

A small artifact scatter is present about 177 ft (54 m) southeast of the structure near an arroyo bottom (Fig. 17). Included in the scatter are tobacco, milk, food (sanitary), baking powder, and coffee (Folgers), and lard cans and can fragments. Sherds from two porcelain cups are present, as are decalcomania white ware sherds from two or three bowls. Also observed were fragments of a green pressed-glass bowl, a green tumbler, a Boyd's cap glass liner, and a brown glass pint wine bottle, as well as clear bottle fragments, several pieces of rolled tin, a small aluminum pot with a spout, and a cigarette rolling device. The artifacts appear to represent domestic trash dating between World War I and World War II.

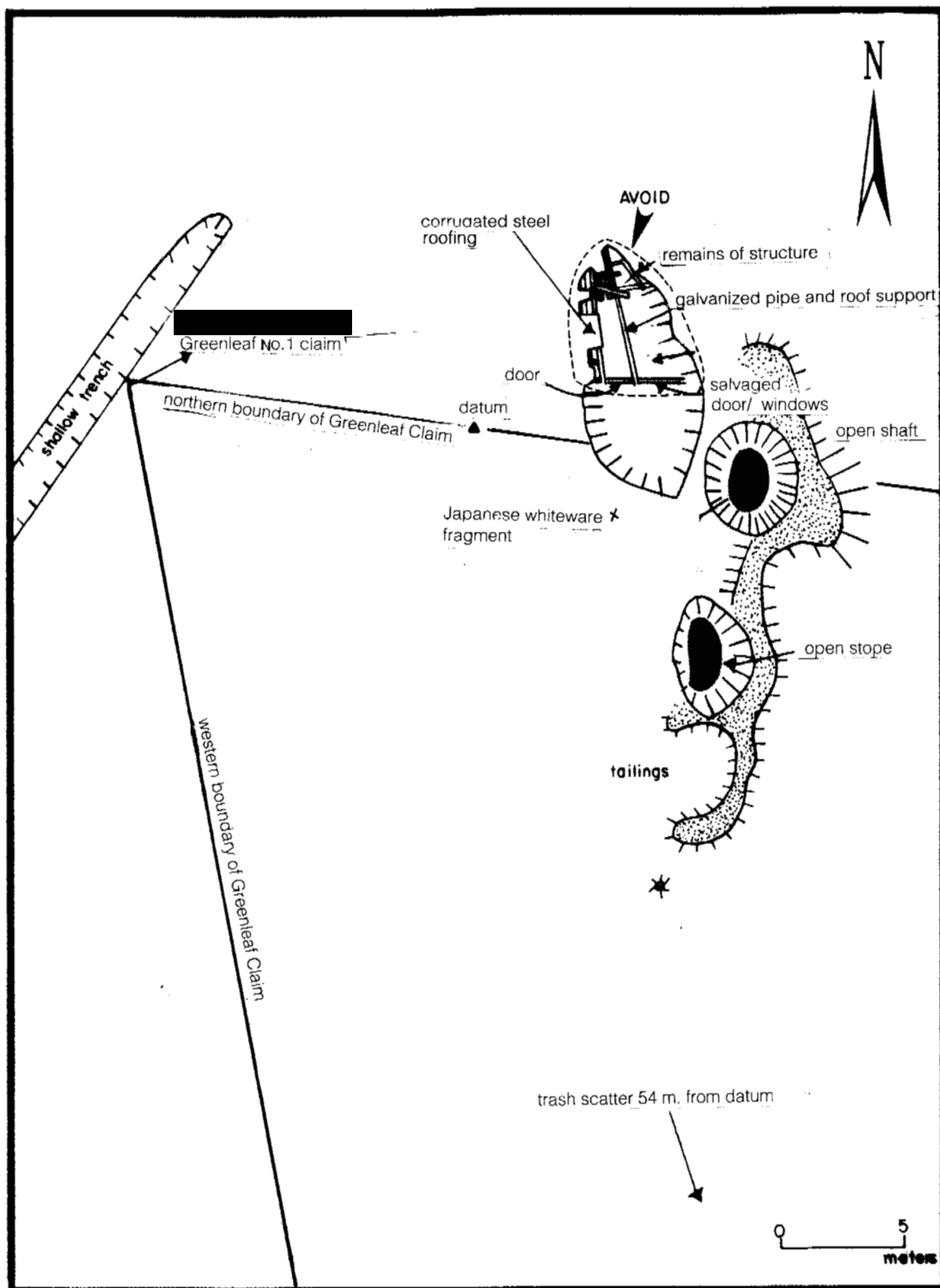


Figure 17. LA 115363, the Greenleaf Mine: AML 16 area map.

The AML 2 Area

The AML 2 area is located near the northeastern corner of the Greenleaf No. 1 Mine claim (Fig. 16).

AML 2 consists of a shaft with the remains of a headframe and a series of four beams that may have been the base of a structure (Fig. 18). The shaft is listed in Bard's (1960) notes.

The Shaft

Dimensions: 9-by-15.5-by-91 ft deep (2.8-by-4.75-by-27.7 m deep) (Plate 69).

Description: The shaft, which is excavated into native soil and rock, is lined with vertical two-by-twelve boards. These boards and the shaft wall are collapsing on the east side. Two upright six-by-six beams protruding from the west side of the shaft (Plate 69) represent the remains of the headframe. They are attached at the top by a horizontal board. Tailings piles surround the shaft.

The possible structure base consists of four parallel beams laid on the ground about 39 ft (12 m) east of the shaft (Plate 69).

Dimensions: 10-by-16.4 ft (3-by-5 m) (Plate 70).

Description: This feature consists of one six-by-six beam and three eight-by-eight beams laid parallel to each other in an area cut into the gentle slope at the base of a low ridge. The ends of the beams are covered by soil. The northern beam, a six-by-six beam, is at least 10 ft (3 m) long, as its western end is exposed. Exposed portions of the second and fourth beams, both eight-by-eight beams, are 6 ft (2 m) long. The third beam, also an eight-by-eight beam, is also exposed for about 6 ft (2 m). Its western end protrudes from the side of a small depression (Fig. 18), showing that it is at least 16.4 ft (5 m) long.

Tar paper scraps and 6-penny nails are scattered about the area, suggesting the presence of a building. We speculate that the beams are the base or floor joists of a hoist engine building, although it does not resemble the hoist engine pads recorded at the other mines.

The Greenleaf No. 4 Mine Area

The Greenleaf No. 4 Mine area includes Feature AML 5, an open shaft, with two concrete pads (Fig. 19). One is probably a hoist engine pad, while the function of the other is not known. The mine area, which is identified by Bard's (1960) notes, is at the southeast corner of the site as identified by this project. However, our reconnaissance of the vicinity of the Greenleaf No. 4 Mine showed other features that were not recorded during this survey.

The Shaft

Dimensions: 6.5-by-9.8-by-58+ ft deep (2-by-3-by 17.7+m deep) (Plates 71 and 72).

Description: The upper shaft, which is collapsing on the north and south sides, is lined with upright two-by-twelve boards that extend about 5 ft (1.5 m) into the shaft. It is surrounded by a low

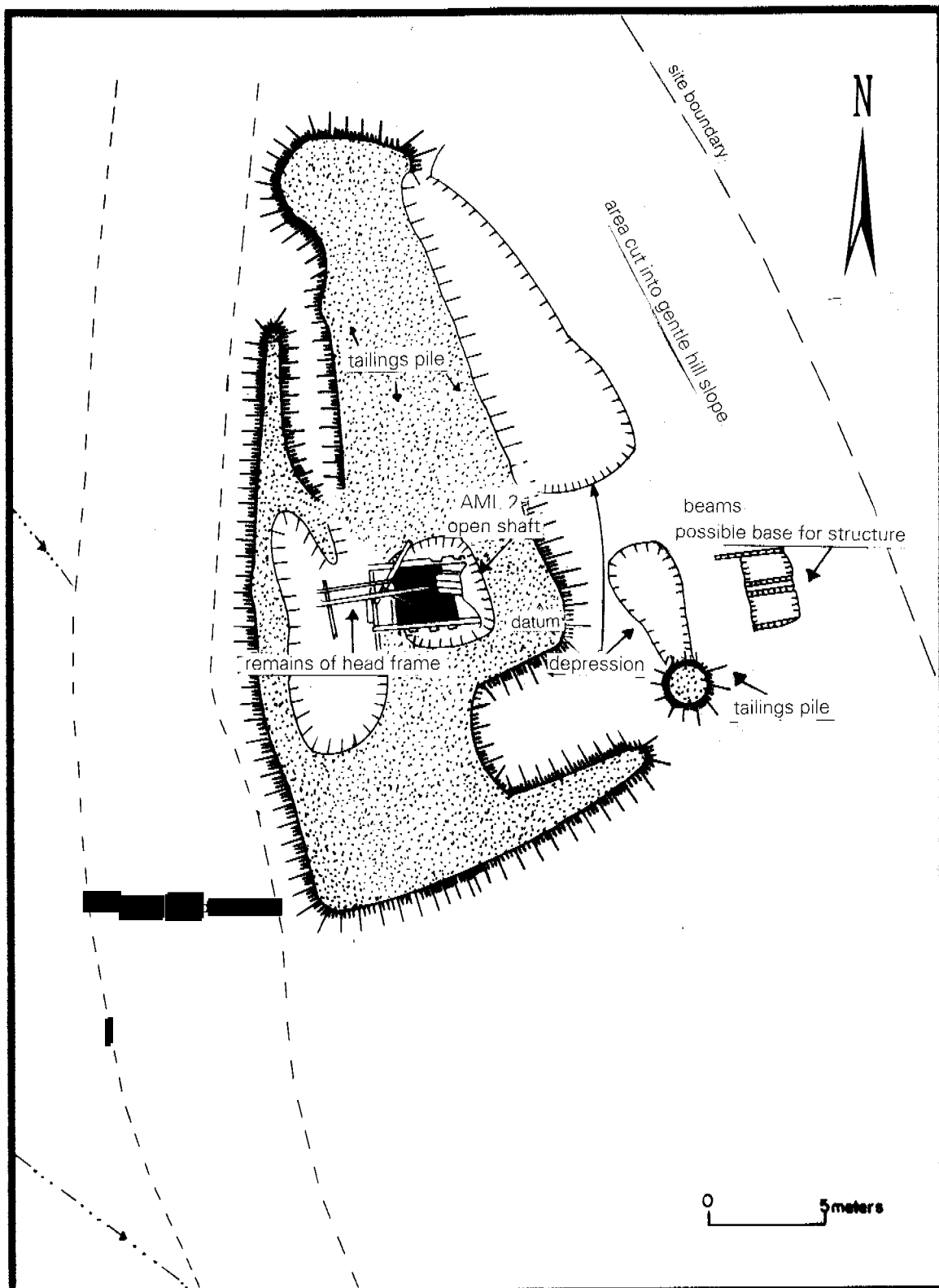


Figure 18. LA 115363, the Greenleaf Mine: AML 2 area map.

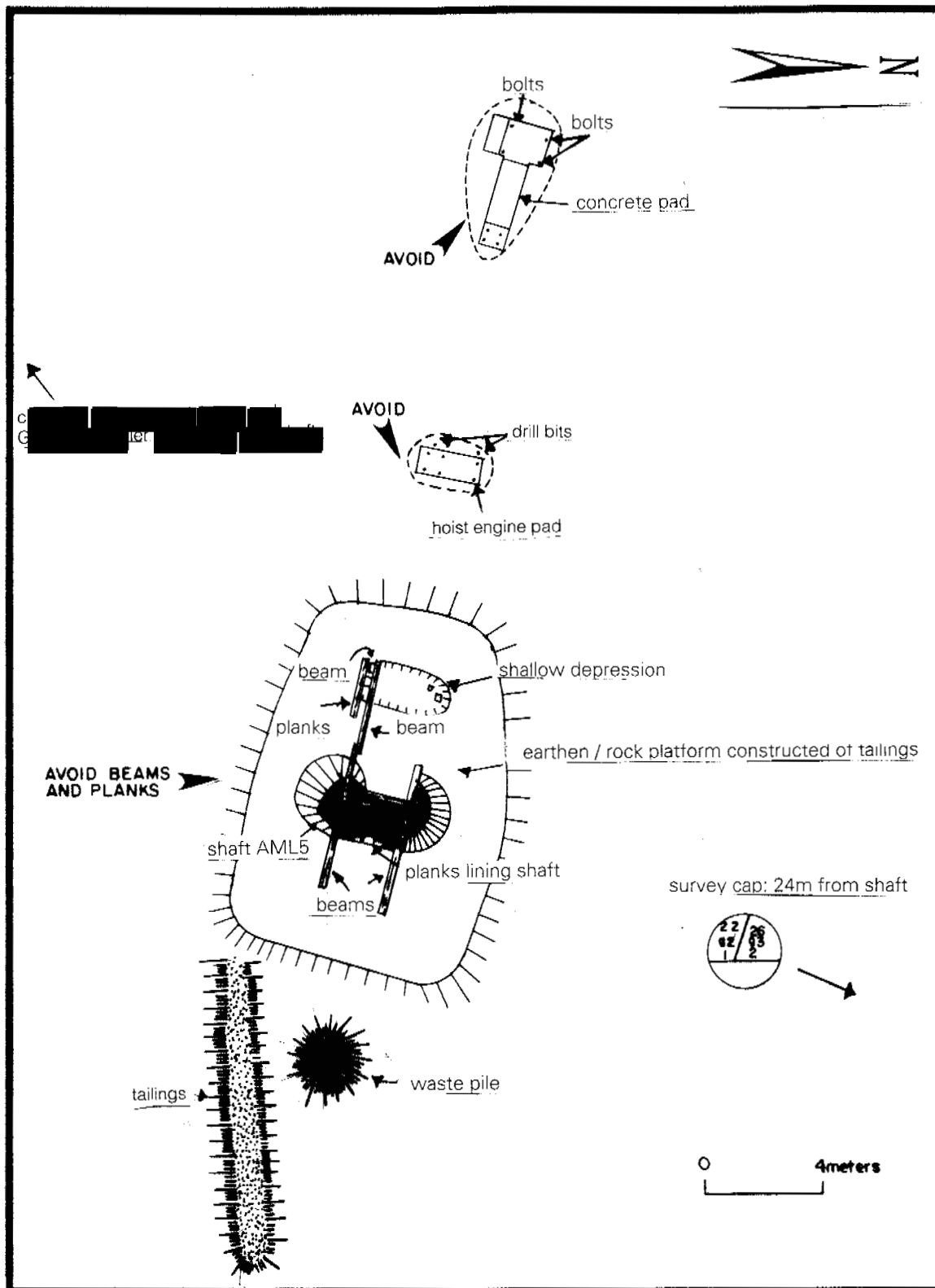


Figure 19. LA 115363, the Greenleaf Mine: Greenleaf No. 4 Mine (AML 5) area map.

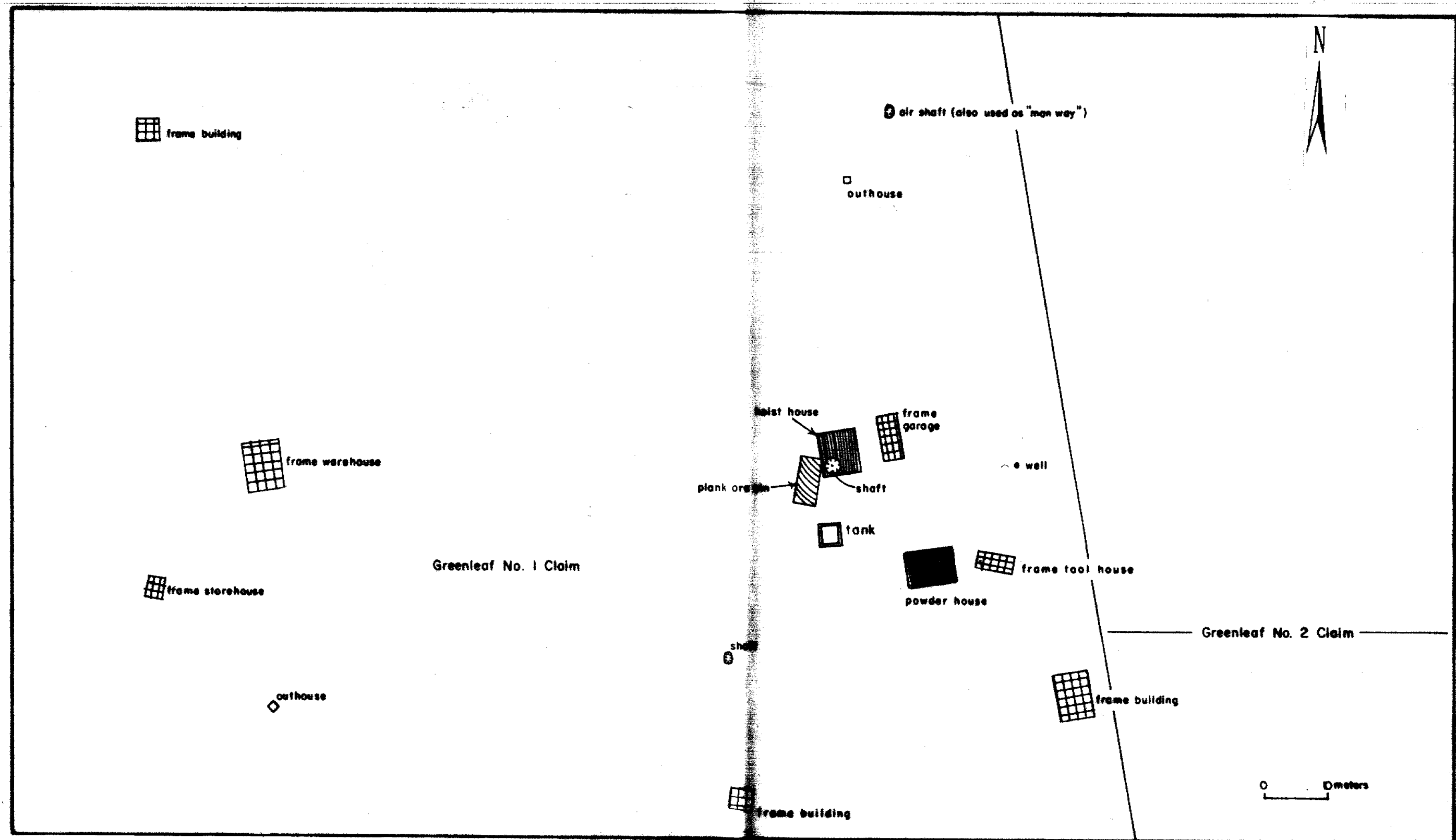


Figure 20. Improvements to the Greenleaf No. 1 Mine area as listed in the Mineral Survey No. 2226 records (Bard 1960).

earthen platform made from tailings. Two 24.6-ft (7.5 m) eight-by-eight beams are laid across the shaft from east to west. They are attached by two-by-twelve boards above the north side of the shaft.

About 6 ft (2 m) west of the shaft is a shallow depression in the earthen platform. A 10-ft (3 m) eight-by-eight beam crosses the south end of the depression, as does a 6-ft (2 m) two-by-twelve board set on edge. Two short, upright eight-by-eight beams are set in the north and south ends of the depression and a short, upright two-by-four board. These beams and those crossing the shaft are the remains of the headframe.

The Hoist Engine Pad

Dimensions: 3.6-by-8.5 ft (1.1-by-2.6 m) (Plate 73).

Description: This thin concrete slab has six upright ½-inch upright bolts, four set in the southern half of the slab and two set near the northern edge. Two upright drill bits are set in the ground near the west side of the slab.

Concrete Pad

Dimensions: 7.2 ft maximum width by 13.9 ft total length (2.2 m maximum width by 4.25 m total length) (Plate 74).

Description: This T-shaped concrete slab was poured in four episodes (Fig. 19). The western cross-piece of the T was poured in two episodes: a large slab and a smaller addition on the south side. In the large slab are four upright bolts: ½-inch bolts in the southern corners and 3/8-inch bolts in the northern corners. The east-west piece of the T was also poured in two episodes. At the eastern end is a small, square slab with upright ½-inch bolts in the corners. Connecting this slab with the cross-piece is a long slab that is thinner than the others.

The T-shaped slab does not line up with the hoist engine pad and the headframe. Although the upright bolts suggest that machinery was mounted on the slab, we do not know the actual function of the feature.

A can dump is located about 275 ft (84 m) northeast of the AML 5 shaft (Fig.19). It consists largely of post-World War II, pre-1960 food, food preparation, and beverage cans, although oil cans and stove pipe sections are present. The artifacts probably date to the period of intense mining activity at the site in the 1950s.

Discussion

The archaeology of LA 115363 points to mining activities at the Greenleaf Mine site during and after the work described in the historic documents. The exception to this statement is the prospecting and development alluded to by Johnston (1928). However, Johnston only references an 87-ft deep shaft, which may well be the shaft that became the Greenleaf No. 1 Mine; in that case, we would not expect to find specific evidence of the feature relating to its earliest history, since it would have been modified by later work.

The modern condition of LA 115363 shows that the site has undergone considerable alteration since about 1960, particularly in the Greenleaf No. 1 Mine area. Figure 20 shows the improvements to the Greenleaf No. 1 Mine area listed in Bard's (1960) patent record notes. If we compare Figure 20 with Figure 15, an interesting situation is revealed. Of the features recorded in Figure 20, only the mine shaft (AML 1A), the square (rock-walled) water tank, the airshaft (AML 1C shaft), and the well (AML 1D pump shaft) are shown in Figure 15. None of the other Figure 20 features were observed or recorded during this project. Similarly, most of the features shown in Figure 15 were apparently not present at the time of the 1960 mineral survey prior to the patent being granted. Specifically, Feature AML 1, including the shaft, concrete pad, headframe, and compressor building, the loading dock area with ore bins, the concrete building pad with bathroom features, the mechanic shop/garage building, the probable powderhouse, the steel water tank, and the building remains west of Feature AML 1C all apparently date after 1960. Since none of them are mentioned by Griswold, we can assume that they also date after 1961. The only features that we can date prior to 1960 are feature AML 1A, including the shaft, the hoist engine pad, the burned remains of the ore hopper structure, and the open stope (although it probably represents deterioration of the mine rather than a mining feature, and so may well date after 1960), the rock-walled water tank, Feature AML 1C, although it was probably enlarged significantly in the 1960s, Feature AML 1D, and perhaps the water-retention ponds. The wooden box structure probably also dates prior to 1960, but appears not to be in its original location, since it is lying on its side in an arroyo. Feature AML 1B, which also probably represents deterioration of the mine, is probably related to the pre-1960 mine but its own age cannot be determined. The tailings piles probably represent all periods of mining at the site and we cannot distinguish between earlier and later additions to the piles. We speculate but cannot demonstrate that some of the piles, particularly the pile on which the steel water tank is located and the large pile immediately north of the loading dock area, as well as numerous smaller piles on the southern side of the site, are later features and may have been moved from their original locations.

Features at the Greenleaf No. 1 Mine described or shown in documents older than 50 years (Rothrock and others 1946; Russell 1947) include the main shaft, a headframe, ore hopper, the square water tank, the trench beneath the ore hopper, a hoist house, buildings and living quarters, and, by assumption, the pump shaft. All of these and others are listed in Bard's (1960) notes and shown in Figure 20. Only the shaft, the water tank, the trench, the hoist engine pad, and the pump shaft are present today (Fig. 15). Clearly, there has been considerable alteration of the older features at the site.

Features recorded in the AML 16, AML 2, and Greenleaf No. 4 Mine (AML 5) areas show much less alteration than those in the Greenleaf No. 1 Mine area. Historical records of the features in these records do not seem to exist prior to 1960, when they were recorded for the mineral survey. Consequently, we cannot be sure of their actual ages, although the artifacts near AML 16 seem to date prior to World War II, while the can dump near AML 5 dates after World War II and before 1960. However, with the exception of dismantling and removal of machinery and structures, which we would expect at or after abandonment, there have been few recent intrusions on these features.

Aspects of Site Integrity

Location: There is obvious evidence of relocation, removal, and destruction of pre-1960 features in the Greenleaf No. 1 Mine area. Many earlier features listed or shown in historic documents are

no longer present. Much of the modern structure of the site seems to relate to post-1960 activities at the site.

There is less evidence of relocation, removal, and destruction of earlier features at the other mine areas within site LA 115363, particularly with regard to the effects of post-1960 activities.

Design: The development of the site through time is definable by comparison of archaeological and historical records. However, some earlier features have been significantly altered or removed.

Setting: Post-1960 activities have significantly intruded upon earlier features at the Greenleaf No. 1 Mine. Later activities have modified the structure of the site and probably changed the locations of features such as tailings piles.

In contrast, there have been few modern intrusions and no evidence of recent mining in the other mine areas within the site.

Materials: In the Greenleaf No.1 Mine area, the recent, post-1960 intrusions are apparent in changes in materials. The pumice-block buildings seem to date to this period, as does the poured concrete machine shop/garage. The steel headframe at AML 1 is also an example of differences in materials.

Workmanship: Influenced by major differences in materials are differences in workmanship associated with modern activities at the Greenleaf No. 1 Mine area. Differences in materials and workmanship clearly distinguish earlier and later periods of activity at the mine area. Such differences are not clearly evident at the AML16, AML 2, and the Greenleaf No. 4 Mine areas.

Feeling: The proximity of the mines at the southeast end of Fluorite Ridge suggests that individual mines should not have a feeling of isolation from each other, although the mining district should, by virtue of its distance from Deming, have an overall feeling of isolation. This situation is maintained at the Greenleaf Mine, since the other mines are all visible from the Greenleaf Mine, while the district remains largely isolated from modern development in the region. However, the visible differences in materials and workmanship between the Greenleaf No. 1 Mine area and other mines within the site and at other sites and the apparent removal or alteration of features at the Greenleaf No. 1 Mine has altered the feeling of that portion of the site, leaving it with a feeling of modern intrusion on the site. In contrast, the AML 16, AML 2, and Greenleaf No. 4 Mine areas maintain their feelings of regional isolation while being visible from other mines in the district.

Association: Association of features in the AML 16, AML 2, and Greenleaf No. 4 Mine areas is discernable and generally points to the interrelated functions of the features. In the Greenleaf No. 1 Mine area, association of post-1960 features points out the significant alterations made to the area after 1960. Because many earlier features have been altered or removed, their association is less clear and the overall mining system, particularly from the years before 1960, is not easily definable.

Based on these considerations, the integrity of the Greenleaf No. 1 Mine area has been destroyed by later, particularly post-1960, activities. Few remains of historic components, features, materials, and workmanship are present and the modern structure of this portion of the site is conditioned by later activities. In contrast, the AML 16, AML 2, and Greenleaf No. 4 Mine areas are in good condition, having high degrees of component, feature, material, and workmanship

integrity.

AML Proposed Activities at LA 115363

Table 6 lists AML's proposed activities at LA 115363. They are limited to the features identified by AML feature numbers. The other features will not be included.

Table 6. LA 115363, the Greenleaf Mine: AML's Proposed Activities

FEATURE NO.	PROPOSED ACTIVITY
AML 1	Remove lower 12 ft (3.6 m) of headframe ladder or block access to ladder. Backfill shaft.
AML 1A	Remove fence. Backfill shaft and open stope. Blast hanging wall as necessary to backfill. Preserve nearby structure if possible.
AML 1B	Remove fence. Backfill.
AML 1C	Remove fence. Backfill.
AML 1D	Remove debris plug 9 ft (2.7 m) below top of shaft. Close with locking cap.
AML 2	Remove lining timbers as directed to prevent bridging of fill. Remove or preserve upright timbers at collar. Backfill or fill with inverted concrete cone.
AML 5	Remove timbers as directed. Backfill.
AML 16	Avoid small dugout structure. Backfill.

LA 115364: THE SAN JUAN MINE

Historical Descriptions of the San Juan Mine

The first reference to the San Juan Mine appears to be from Burchard (1911:75), who states that "less than 100 yards north of the [lower camp] shaft, an open-cut and shallow burrow showing a promising vein. . ." were being explored. In 1928, Johnston (1928:96) mentioned a vein some 200 ft north of the lower camp buildings where miners had opened a shaft 54 ft deep. Like the Greenleaf and Lucky mines, identification of these early features rests on accurate determination of the location of the lower camp. If our postulated location of the lower camp is correct, then Burchard and Johnston are probably describing early workings at what would become the San Juan Mine, which developed from "an open-cut and a shallow burrow" to a 54-ft deep shaft by 1928.

By 1943, the mine was owned by D. F. McCabe, who also owned the Greenleaf Mine. "In 1944 the workings consisted of No. 1 shaft, 260 feet deep, near the south end of the deposit; No. 2 shaft, 620 feet north of No. 1, and at least 24 other excavations, including four pits from 20 to 50 feet deep and shallow cuts and trenches" (Rothrock et al. 1946:136). Their No. 1 shaft is the feature recorded here as AML 6A, while their No. 2 shaft corresponds to Features AML 6C and AML 6D. As we discussed earlier, the length and detail of description provided by Rothrock and others is related to the amount of development at a mine. Their short description of the San Juan Mine, particularly when compared to those of the Sadler and Greenleaf mines, suggests that the San Juan is one of the district's older mines. However, it may not have been particularly productive: "As most of the work on this deposit has been exploratory or for development, only a small tonnage of the ore has been marketed" (Rothrock et al. 1946:137). Reinhart (1953:4) states that, like the Greenleaf, Lucky, and Greenspar mines, the San Juan Mine was "equipt [sic] to service the current operations," although he provides no specifics regarding facilities or equipment.

Concerning the condition of the mine in 1961, Griswold (1961:114) states:

The San Juan unpatented mining claim on which the mine is located is owned by Cooper Shapely. The mine has not been worked since World War II, and the underground openings could not be entered; therefore, the description that follows is based solely on observations made at the surface. The total amount of ore removed was probably less than 5,000 tons.

Griswold (1961:114) describes the main No. 1 shaft, Feature AML 6A, as "A vertical shaft, 320 feet deep according to the mine owner, [that] was sunk on the south end of the vein, where the best ore crops out." He does not mention the No. 2 shaft or the other workings listed by Rothrock and others, but does note that "Another north-trending fluorspar vein was prospected approximately 100 feet east of the first vein" (Griswold 1961:114). This appears to be a reference to the feature recorded here as AML 6H.

Site Description

LA 115364, the San Juan Mine site, is located near the western side of this project area (Fig. 2). Its UTM and legal locations are listed in the appendix. The site as recorded covers 60 acres (24.3 ha; Fig. 21). The site has both a probable prehistoric and a historic component. Site boundaries

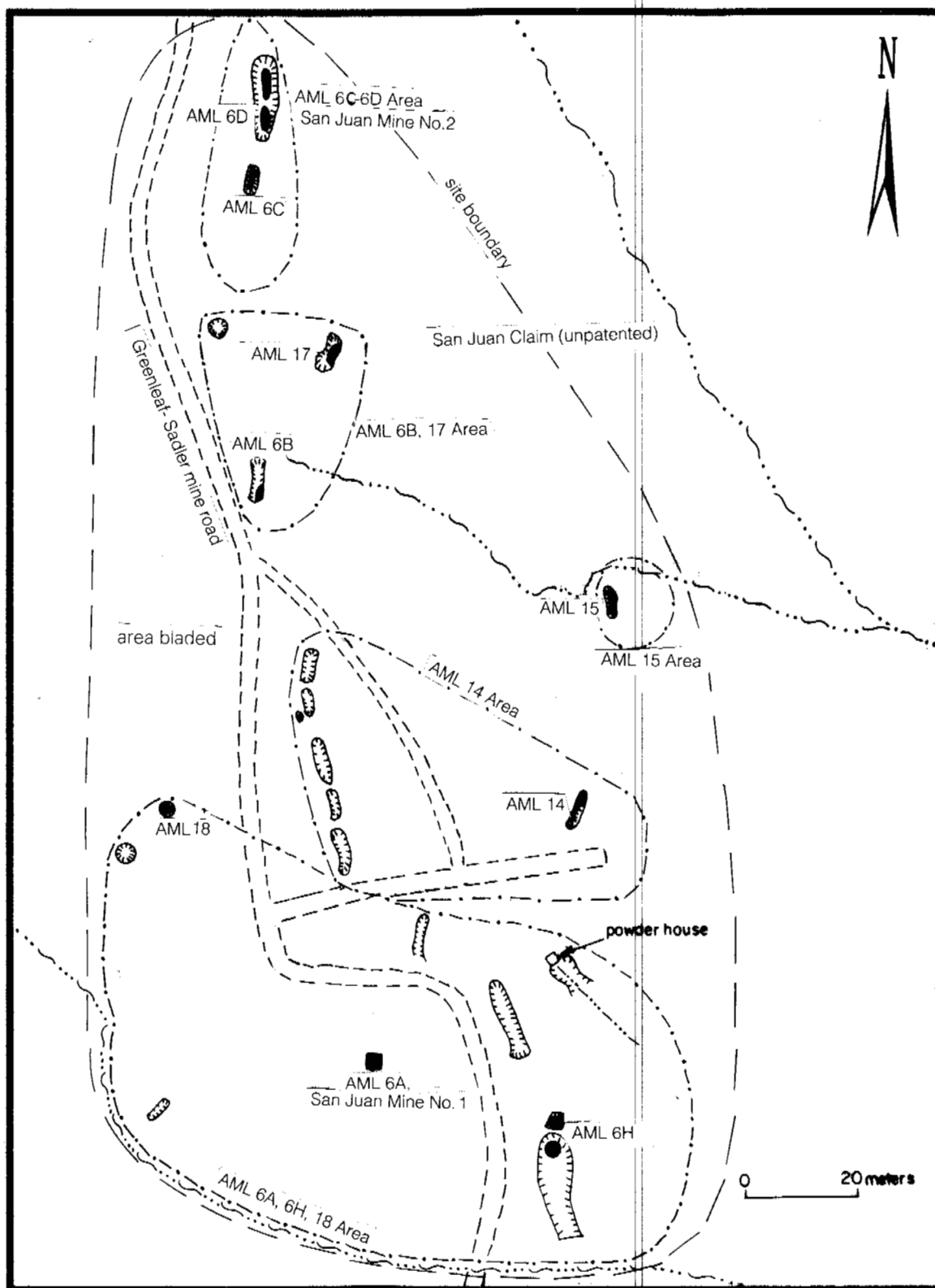


Figure 21. LA 115364, the San Juan Mine: site map.

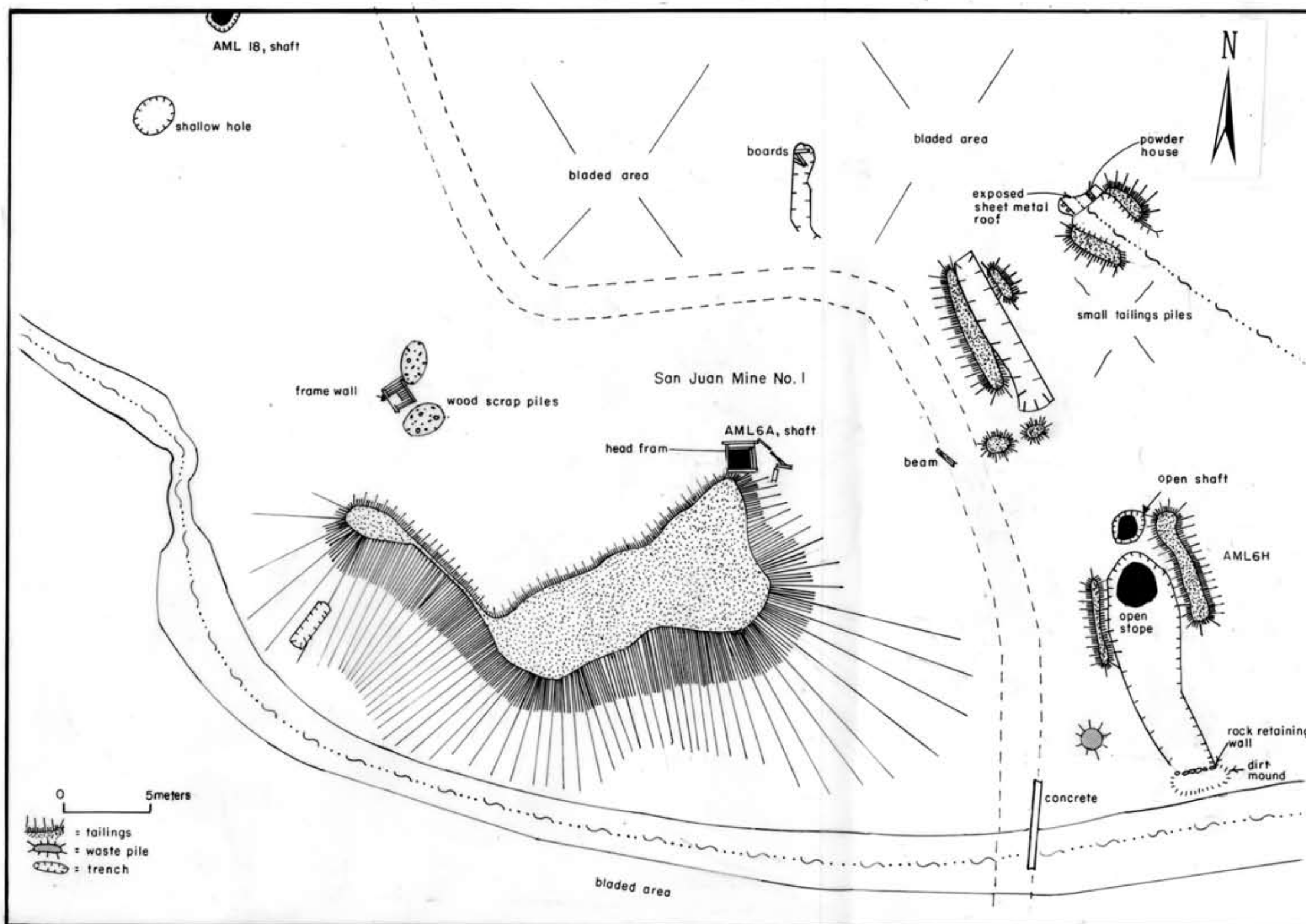


Figure 22. LA 115364, the San Juan Mine: San Juan No. 1 Mine area map.

are defined by the distribution of recorded historic features.

Prehistoric Component

The prehistoric component at LA 115364 consists of a scatter of chert core fragments and core flakes extending across the site. The artifacts are most common in the relatively undisturbed portions of the site, particularly on the ridges in the eastern portion of the site around feature AML 15 and northeast of the site. On the ridge between Features AML 6A and 6C, the locations of chipped stone artifacts has been affected by considerable ground disturbance, including mining and blading of large areas. On the ridges near Feature AML 15 and northeast of the site, the ground is much less disturbed. However, no concentrations of artifacts were observed. The prehistoric component of LA 115364 undoubtedly extends well beyond the site boundaries as defined by this project. For instance, we know that prehistoric artifacts are common on the low ridges east and northeast of the site.

Historic Component

The site's historic component consists of a series of mining and other features. They include three open shafts, six stoped holes, eight shallow trenches, two prospect holes, one artifact concentration, over 20 tailings piles, and the remains of at least one structure. The features are shown in Figures 16 and 21. The San Juan No. 1 Mine was the primary mine area that saw the majority of mining activity. The San Juan No. 2 Mine is north of the No. 1 area. The following discussion clusters the site features into groups, based largely on proximity and field mapping. Features identified by an AML number (AML 6A through 6H, 14, 15, and 18) are planned for modification and are given the most detailed descriptions. Other features are described in less detail.

San Juan No. 1 Mine

Included in this group of features is the San Juan No. 1 Mine shaft (AML 6A). Associated with the shaft are an open shaft and stoped hole and trench (AML 6H), an open shaft (AML 18), three shallow trenches, a shallow hole, a powderhouse structure, and the remains of a wooden structure, as well as small tailings piles and a large tailings pile complex (Fig. 22).

AML 6A consists of an open shaft with the remains of a headframe.

Dimensions: 7-by-7 ft by unknown depth (2.15-by-2.15 m by unknown depth) (Plate 75).

Description: The frame of the lined shaft is four-by-six and six-by-six beams connected by 20-penny and larger spikes. The shaft is lined with vertical two-by-twelve boards. Although the headframe is missing, two parallel six-by-six beams descend into the shaft on the west side, probably representing the railtracks for ore cars (see description and photos of the Lucky Mine). A wooden ladder descends parallel to the six-by-six beams. Collapsed cross-beams and other wooden debris are present within the shaft.

AML 6H is an open shaft and a large stoped hole and trench located 111.5 ft (34 m) southeast of AML 6A (Fig. 22).

The Shaft

Dimensions: 6-by-6-by-9 ft deep (2.0-by-2.0-by-2.75 m deep) (Plate 76).

Description: The shallow, unlined shaft is separated from the open stoped hole and trench by a bridge of soil and rock about 3 ft (1 m) in width. The shaft is connected to the open hole in the adjacent trench beneath the bridge.

The Stoped Hole and Trench

Dimensions: 18-by-65.6-by-8 ft deep (5.5-by-20-by-2.4 m deep) (Plate 77).

Description: The large north-south trench increases in depth from less than 2 ft (.5 m) at the southern end to about 8 ft (2.4 m) in the hole at the north end. The open hole, which is connected to the adjacent shaft, is unlined. At the south end of the trench, a rock retaining wall and a low dirt-and-rock berm separate the trench from a large arroyo that runs east-west along the southern side of the site (Fig. 22). Small tailings piles are present along the east and west sides of the north end of the trench. Near the southern end of the trench is a pile of mine waste and building debris; the original location of the building is unknown.

AML 18 is a shallow shaft located on the ridge above (northwest) AML 6A (Fig. 22).

Dimensions: 6-by-8.2 ft by estimated 10 ft deep (2-by-2.5 m by estimated 3 m deep) (Plate 78).

Description: The shallow shaft was excavated into rock outcropping on the low ridge top.

A shallow prospect hole is located (7.5 m) southwest of AML 18 (Fig. 22).

Dimensions: 8-by-10-by-6 ft deep (2.5-by-3-by-2 m deep) (Plate 79).

Description: The hole, which is excavated into the top of the low ridge top, has on its south side a wall of dry-laid rock. The reason and function of this wall are not known.

A shallow trench is located 65.6 ft (20 m) north of the AML 6A shaft (Fig. 22).

Dimensions: 5-by-14.75 ft (1.5-by-4.5 m) (Plate 80).

Description: The shallow trench was excavated into the ridge-slope north of the No. 1 shaft. Boards were apparently laid on edge across the north end of the trench and along its east and west side. They may have formed the walls of a makeshift structure in the trench.

A powderhouse was built into the slope of the ridge 85 ft (26 m) north of the AML 6H shaft (Fig. 22).

Dimensions: 6.7-by-7.9 ft by 4 ft tall (2.05-by-2.4 m by 1.2 m tall) (Plate 81).

Description: The structure was built into the slope, creating a half-dugout. The structure's frame

is upright four-by-six beams at the corners, while its walls and pitched roof are two-by-twelve boards, attached with 10 to 16-penny wire nails. The remains of a small door are present in the southeast-facing wall of the structure.

The roof is partially covered by tailings. Tailings also fill the sides of the small trench between the trench and the structure walls. Two small tailings piles, probably from the excavation into the slope, are present along both sides of the opening to the structure. They direct the flow of surface water and have created a small drainage that now flows southeast.

A concentration of lumber is located 100 ft (30 m) west of the AML 6A shaft (Fig. 22). The concentration, which is about 16-by-26 ft (5-by-8 m) in size, includes two piles of boards and board scraps with wire nails and scraps of tar paper. Between them is a wooden-frame wall section 7.4 ft long by 6.5 ft tall (2.25 m long by 2 m tall) with a window opening. The wall section and board piles are probably the remains of a small structure associated with the AML 6A shaft. The condition of the boards suggests that the structure was dismantled and the remains discarded in their present location. Some features of the structure, such as a door, were apparently removed.

A shallow stoped trench is present north of the AML 6H shaft and west of the powderhouse. A second shallow trench was excavated into the southern side of the large tailings pile (Fig. 22).

In addition to the mining features, the San Juan No. 1 Mine area is dominated by a large, complex tailings pile (Fig. 22). The pile covers almost 10,750 sq ft (1,000 sq m) and is over 13 ft (4 m) in height above the large arroyo that runs east-west along the southern side of the No. 1 Mine area. Much of its southern side is, in fact, bounded by the arroyo.

To the west of the San Juan No. 1 Mine area, on the banks of the large arroyo, several concentrations of pre-1920 artifacts were observed. The concentrations are more frequent and contain more artifacts on the west side of the arroyo. They included amethyst, aqua, and clear bottles and bottle fragments and solder-seam cans and can fragments as well as white ware sherds and other items and probably represent domestic trash. The concentrations appear to represent dumping locations and seem to be largely undisturbed. On the south side of the large arroyo, south of the No. 1 Mine area, we observed many pre-1920 artifacts in the area between the arroyo and the road leading to the Sadler Mine. This area has been severely disturbed by blading and the artifacts are found in and near dirt and rock piles as well as scattered about the area. It is our opinion that these artifacts, in the concentrations and in the bladed area, reflect the location of the "lower camp" referred to in the earliest historical documents. Because we did not know of the significance of the lower camp location until after field work was complete, we did not record the artifact locations systematically, nor did we search for evidence of mining features, structural remains, or other features associated with the lower camp. However, we argue that their presence lends considerable support for our identification of the lower camp location and, consequently, for our conclusions regarding early mine identifications based on that location. A systematic and intensive survey of the area immediately west and south of the San Juan No. 1 Mine area could be expected to help resolve the issues surrounding the lower camp location.

The San Juan No. 2 Mine

Included this area, which is at the north end of the site (Fig. 21), are an open shaft (AML 6C), two open stoped holes (AML 6D), and a small tailings pile (Fig. 23).

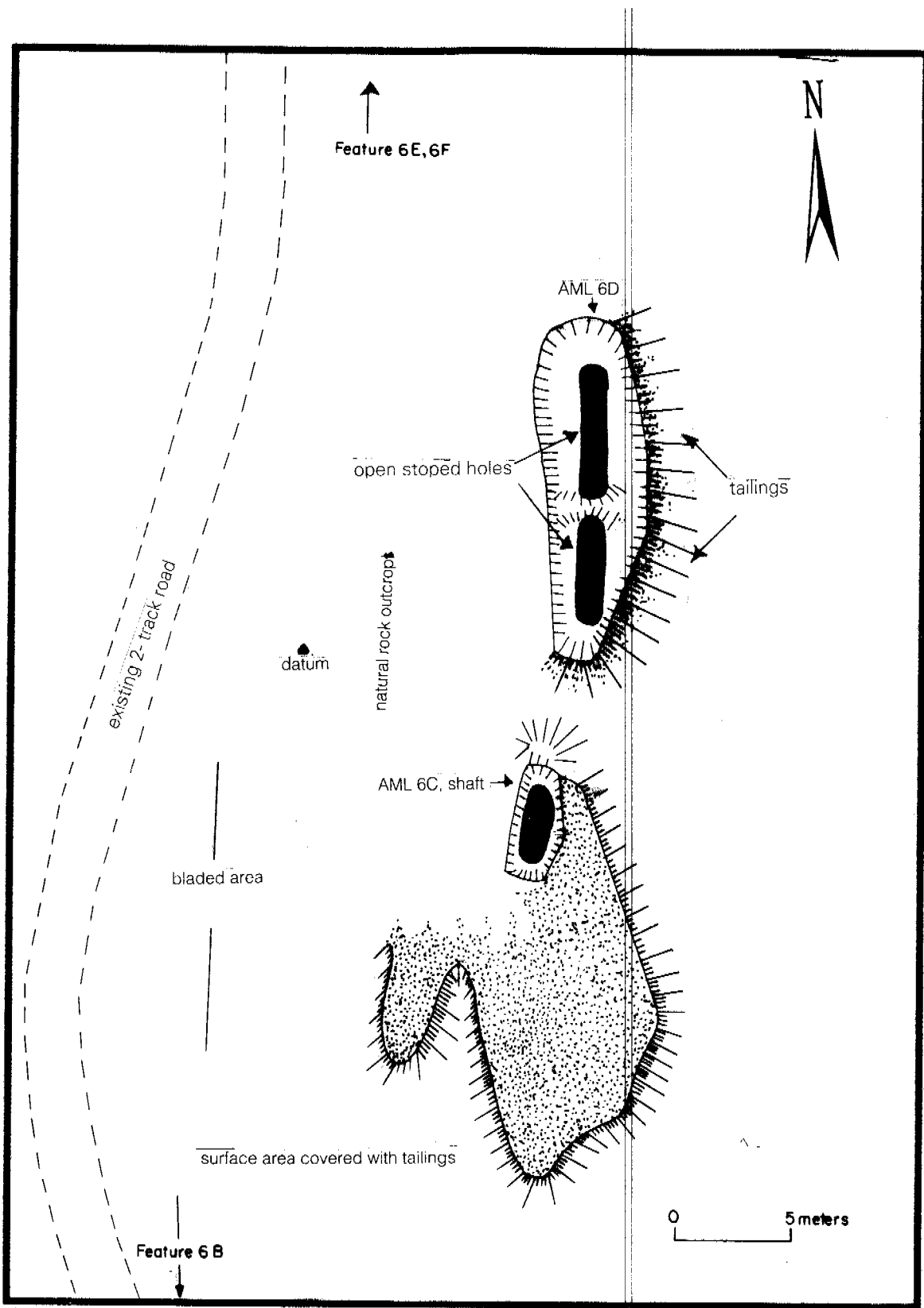


Figure 23. LA 115364, the San Juan Mine: San Juan No. 2 Mine area map.

AML 6C is an open shaft on the top of a long north-south ridge. The alignment of features suggests that it was used to explore the same vein examined in AML 6A, 6B, and a series of trenches between those two features (Fig. 21).

Dimensions: 6.2-by-10-by-49 ft deep (1.9-by-5.8-by-15 m deep) (Plate 82).

Description: The shaft is not lined, but wooden cross-beams are visible in the shaft. A small tailings pile is present on the south side of the shaft.

AML 6D consists of an open stoped hole immediately north of AML 6C. It was apparently used to explore the same long north-south vein (Fig. 21).

Dimensions: 6.9-by-42.6-by-16 ft deep (2.1-by-13.0-by-4.8 m deep) (Plate 83).

Description: The open stoped hole is divided near the modern ground surface by a narrow soil and rock bridge that creates two holes in a north-south line. The two are connected beneath the bridge. A low pile of tailings is present along the feature's southeast side, showing that it was not the result of subsidence within a stoped shaft, as was seen at the Greenleaf No. 1 Mine (AML 1A and 1B).

The AML 6B-AML 17 Area

This group of features includes two open stoped holes (AML 6B and AML 17) and a prospect hole, all located near the north end of the site (Fig. 21).

AML 6B is an open stoped hole that was apparently used to examine the same vein as that explored in AML 6A, 6C, and 6D, as it is found on a north-south line connecting AML 6A with AML 6C and 6D (Fig. 21).

Dimensions: 7.4-by-26.25-by-39 ft deep (2.25-by-8.0-by-11.9 m deep) (Plate 84).

Description: The hole is actually at the southern end of a long trench. A small tailings pile is present along the east and south sides of the trench and hole. In a small drainage at the northern base of the pile, we observed an bottle base with a distinctive AB maker's mark. Toulouse (1971) identifies this as the mark of the Adolphus Busch Glass Manufacturing Co. and dates it between 1904 and 1907. Hull-Walski and Ayers (1989) state that it is the mark of the American Bottle Co. and dates between 1905 and 1929. This is consistent with the dates of the earliest mining activities in the region, although it does not date AML 6B to that time period.

AML 17 is an open stoped hole located 59 ft (18 m) northeast of AML 6B (Fig. 24). The hole is near the top of an east-facing ridge slope.

Dimensions: 6.9-by-19 ft by unknown depth (2.1-by-5.8 m by unknown depth) (Plate 85).

Description: The stoped hole is bounded on the east by a small tailings pile. An eight-by-eight crossbeam is visible within the hole and appears to support a rock overhang on the east side of the hole. Several long boards are present over and protruding from the hole (Fig. 24, Plate 85). They do not appear to be part of a structure and may have been placed to partially cover the opening.

A shallow prospect hole is present northwest of AML 6B and AML 17 (Fig. 24).

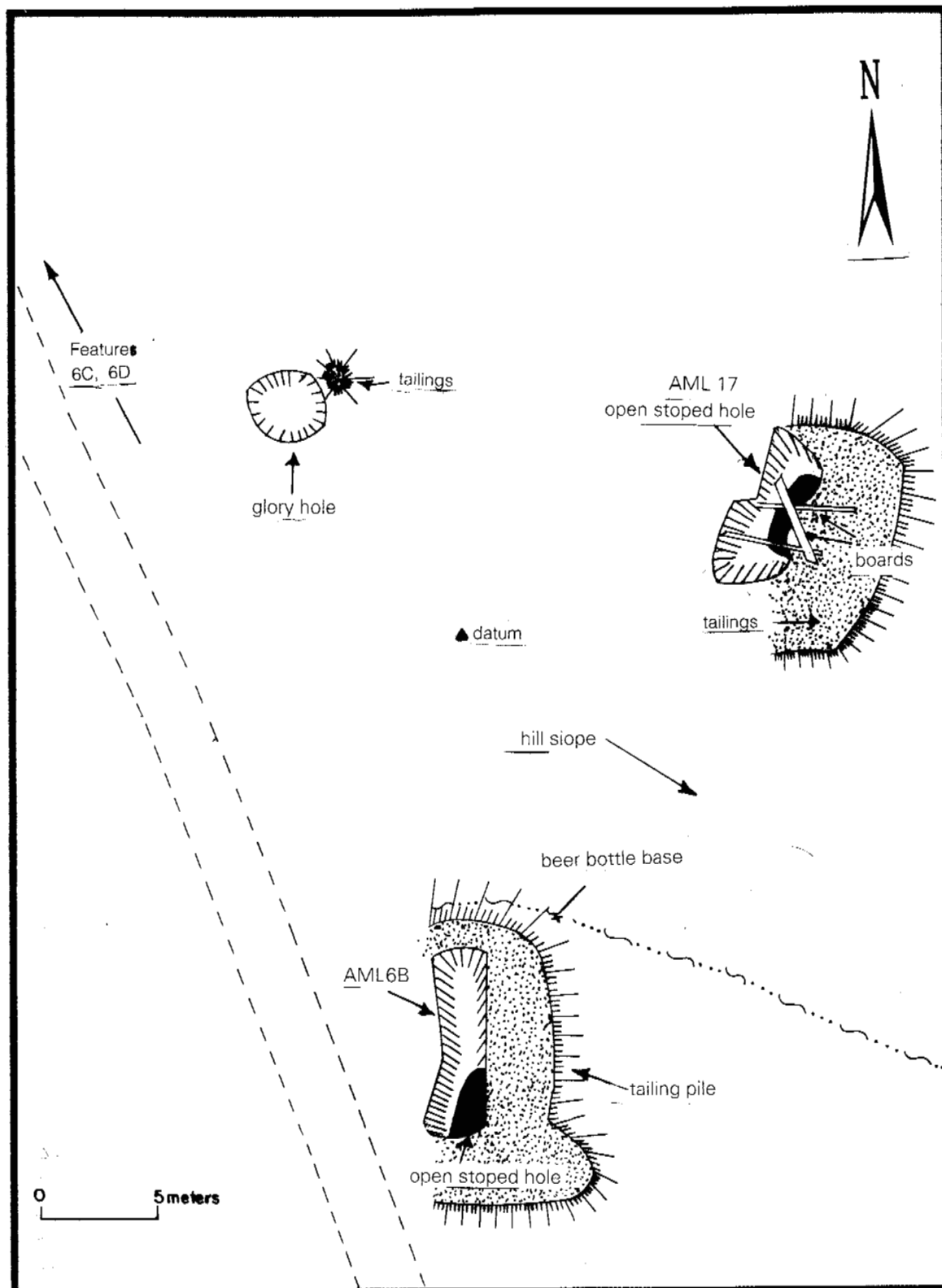


Figure 24. LA 115364, the San Juan Mine: AML 6B-AML 17 area map.

The AML 14 Area

This group of features is located on top of a low, east-west trending ridge overlooking the San Juan No. 1 Mine area to the south (Fig. 21). It includes an open stoped hole (AML 14) and a series of shallow trenches (Fig. 25).

AML 14 is an open stoped hole. Its location suggests that it was used to explore a vein also examined in AML 15 and, perhaps, in AML 6H (Fig. 21).

Dimensions: 5-by-23-by-13 ft deep (1.5-by-7.0-by-4 m deep) (Plate 86).

Description: This shallow open stoped hole is on a low ridge. The ridge top west of AML 14 has been bladed. A small tailings-pile platform with a linear extension is present on the southeast side of the feature. This pile marks the east end of a two-track road.

A series of five shallow trenches is located in a north-south line about 148 ft (45 m) west of AML 14 (Fig. 25). Two tailings piles are present along the east sides of the trenches. On one of them, we observed a post-1948 internal-hinge tobacco tin. This does not, of course, necessarily date the feature, particularly since Griswold (1961) states that the San Juan Mine was not worked after World War II. The placement of the trenches suggests that they were intended to examine the same vein explored in Features AML 6A, 6B, 6C, and 6D (Fig. 21).

AML 15

AML 15 is a small, open stoped hole located about 115 ft (35 m) north of AML 14 (Figs. 15 and 26). The feature is on the south side of a small arroyo that heads at the base of AML 6B; it is in this arroyo that we observed the American Bottle Company bottle base discussed above. The location of AML 15 suggests that it was used to examine the same vein explored in AML 14 and, perhaps, in AML 6H.

Dimensions: 6-by-16.4-by-15 ft deep (1.8-by-5.0-by-4.5 m deep) (Plate 87).

Description: The stoped hole is at the base of a north-facing ridge slope. A small tailings-pile platform is present on its east side. The hole and pile may have changed the flow of the small arroyo.

Discussion

The archaeology of LA 115364 is generally consistent with historical descriptions of the mine. We are able to identify AML 6A as the probable location of the earliest shaft at the site, dating to the "lower camp" days. By the early 1940s, the mine consisted of the No. 1 shaft (AML 6A), the No. 2 shaft (AML 6C and 6D?), and at least 24 other excavations, including "four pits" ranging from 20 to 50 ft (6 to 15 m) deep, and shallow cuts and trenches (Rothrock et al. 1946:136). During this project, we observed and recorded 17 features in addition to AML 6A and AML 6C-6D. We speculate that the four deep pits recorded by Rothrock and others were AML 6B, AML 6H, AML 15, and AML 17, although we have no clear evidence to support those identifications. The alignment of nine features follows Griswold's (1961:114) observation that the vein explored at the San Juan Mine was "traceable through a series of trenches and shallow shafts" for some distance

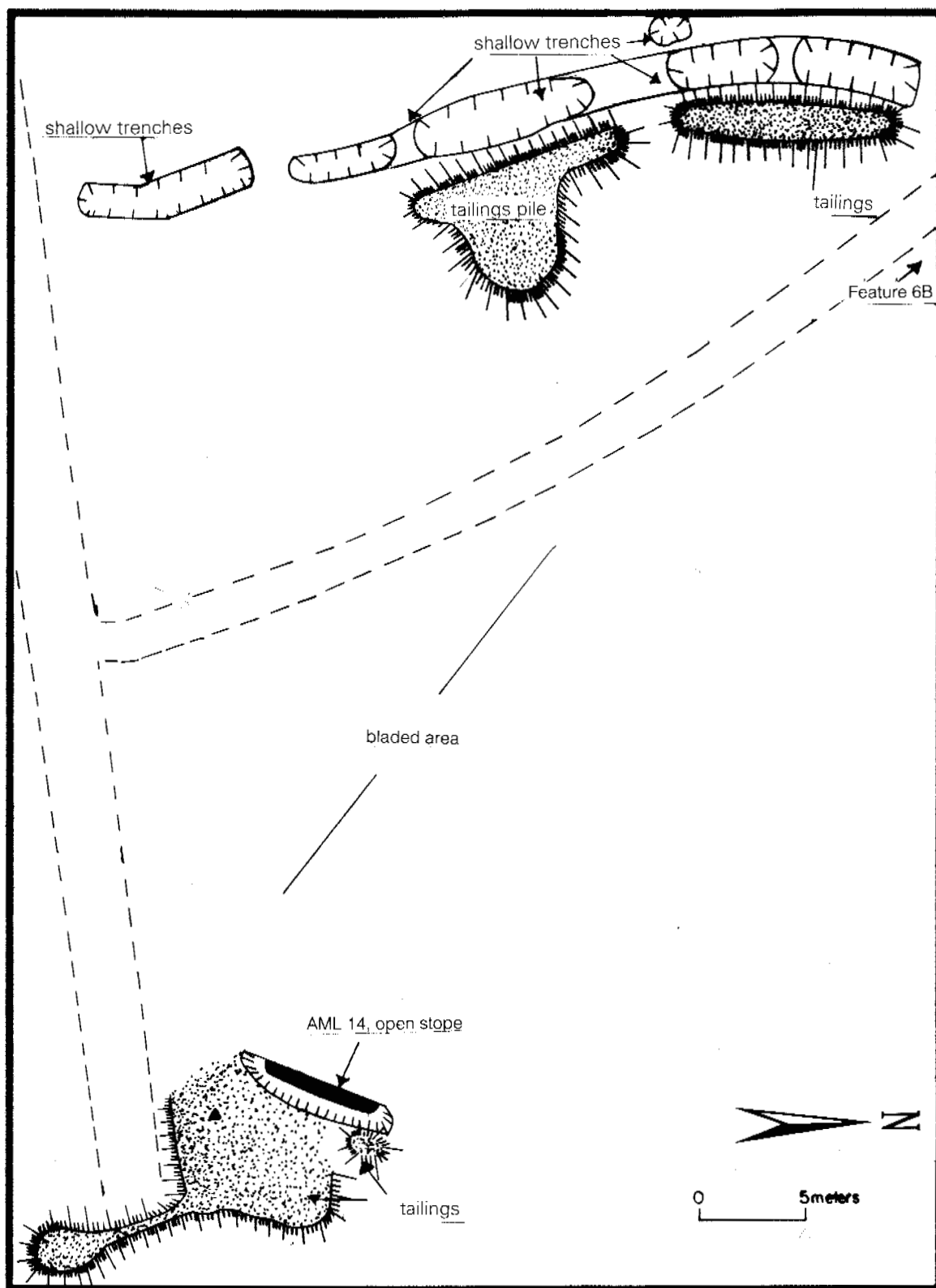


Figure 25. LA 115364, the San Juan Mine: AML 14 area map.

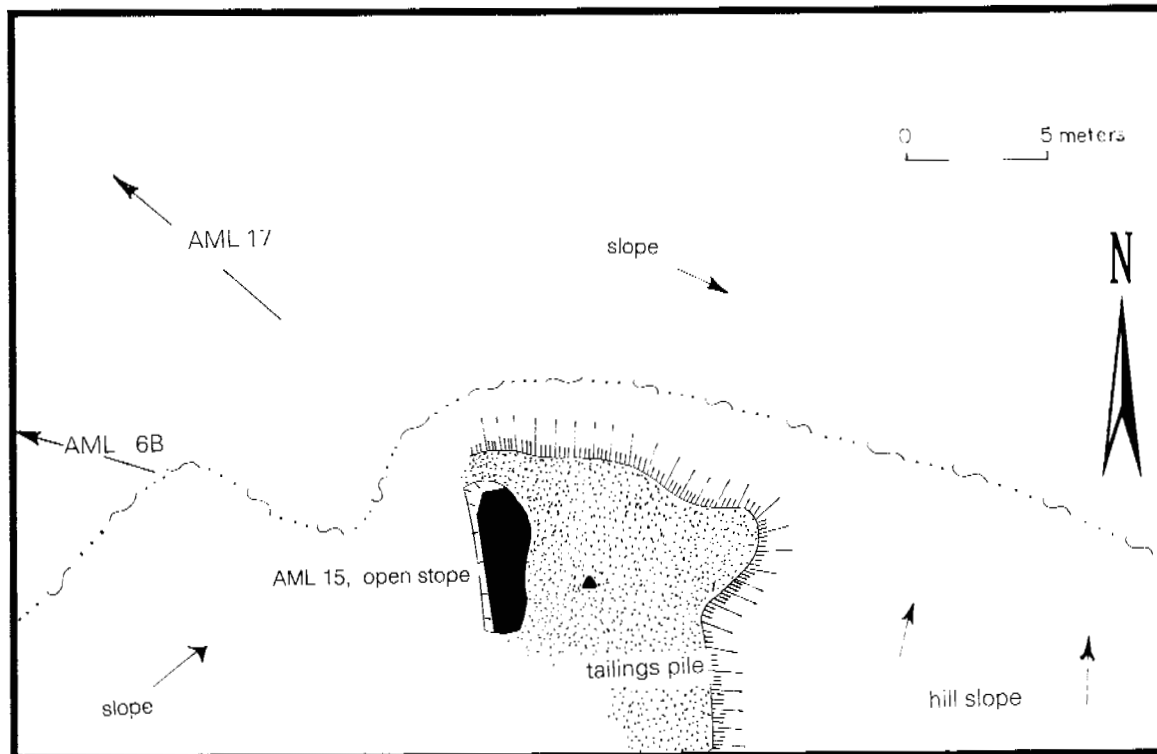


Figure 26. LA 115364, the San Juan Mine: AML 15 map.

north of the main shaft (AML 6A). Apparently, several other veins were also searched for and explored, mostly to the east of the primary vein. Since we can identify features that could match those observed in the early 1940s, and since the number of mining features recorded in this project is not larger than that recorded in the early 1940s, the site structure matches Griswold's (1961) statement that the mine was not worked after World War II. Consequently, the mine as recorded is probably older than 50 years.

Aspects of Site Integrity

Location: Evidence in the San Juan No. 1 Mine area suggests the dismantling and removal of a structure or structures associated with AML 6A. Portions of a small wooden frame structure are present near the shaft, but little remains of a headframe. Still, this is consistent with other sites in the district in that remains of structures at or near shafts are generally missing.

Design: The development of the site through time is definable by comparing historical and archaeological records. Features listed and described in historical documents can be identified on the ground. It is possible to discern locations of early work at the site, as well as the more extensive development that took place later, probably in the 1930s and early 1940s. Further, the San Juan Mine is unique in the placement of features relative to the primary and secondary fluor spar veins being explored. The alignment of features clearly shows the intent of the miners to locate and explore one long vein across the site. Comparison of historical and archaeological records supports Griswold's observation that the vein, which was thick and deep at the southern end of the site, was shallower and thinner and, consequently of less economic value, at the north end.

Setting: The setting of the San Juan Mine is largely unchanged from the period of its major development. Further, there is little evidence of intrusion of later activities and features upon earlier features, although we do not know when the AML 6A structures were dismantled. There is little evidence of modern intrusions or recent mining at the site.

Materials: While not plentiful, materials present are consistent across the site and there is no evidence of changing locations or levels of activities as reflected in materials.

Workmanship: Evidence of workmanship, while limited, is consistent across the site.

Feeling: The proximity of the mines at the southeast end of Fluorite Ridge suggests that individual mines should not have a feeling of isolation from each other, although the mining district should, by virtue of its distance from Deming, have an overall feeling of isolation. This situation is maintained at the San Juan Mine, since the other mines are all visible from the San Juan Mine, while the district remains largely isolated from modern development in the region.

Association: The overall mining system at the San Juan Mine is clearly definable. Association of features with each other and with the fluorspar veins being explored is discernable.

Based on these considerations, LA 115364, the San Juan Mine, is in good condition, having a high degree of site integrity.

AML Proposed Activities at LA 115364

Table 7 lists AML's proposed activities at LA 115364. They are limited to the features identified by AML feature numbers. The other features will not be included.

Table 7. LA 115364, the San Juan Mine: AML's Proposed Activities

FEATURE NO.	PROPOSED ACTIVITY
AML 6A	Remove timbers at shaft as directed. Backfill shaft or plug shaft with concrete plug.
AML 6B	Backfill.
AML 6C	Backfill.
AML 6D	Backfill.
AML 6H	Backfill.
AML 14	Backfill.
AML 15	Backfill.
AML 17	Backfill.
AML 18	Backfill.

LA 115579: THE WILLIAMS BROTHERS PROSPECTS

Historical Descriptions of the Williams Brothers Prospects

The only reference to mining activities on the hillslope on which LA 115579 is located is from Griswold (1961:114). Discussing the San Juan Mine, Griswold observes, "The vein is traceable through a series of trenches and shallow shafts for approximately 1,000 feet north of the main shaft. . ." Figure 16 shows that this is almost exactly the distance from AML 6A to AML 6E and AML 6F, the Williams Brothers Prospects features, and that AML 6E and 6F are in the same north-south line that connects most of the San Juan Mine features. This should not be construed to mean that Griswold is linking Features AML 6E and AML 6F to the San Juan Mine, but only that these features explored the same vein as that being examined in the San Juan Mine features. Apparently, the economic value of the vein diminished with distance to the north: "the northern part of the vein contains only thin stringers of fluor spar, which finally grade into a simple quartz vein" (Griswold 1961:114). Figure 16 shows that the features are well beyond the northern boundary of the San Juan Mine claim. Russell (1947) shows this area within the Williams Brothers No. 2 claim. Rothrock and others (1946) shows the Williams Brothers No. 2 claim as the 40-acre parcel immediately west of this claim. Since it is not clear whether the Williams Brothers No. 2 claim includes this area, we have included this area in the claim, following Russell, and use the claim to identify Features AML 6E and AML 6F as a site separate from the San Juan Mine.

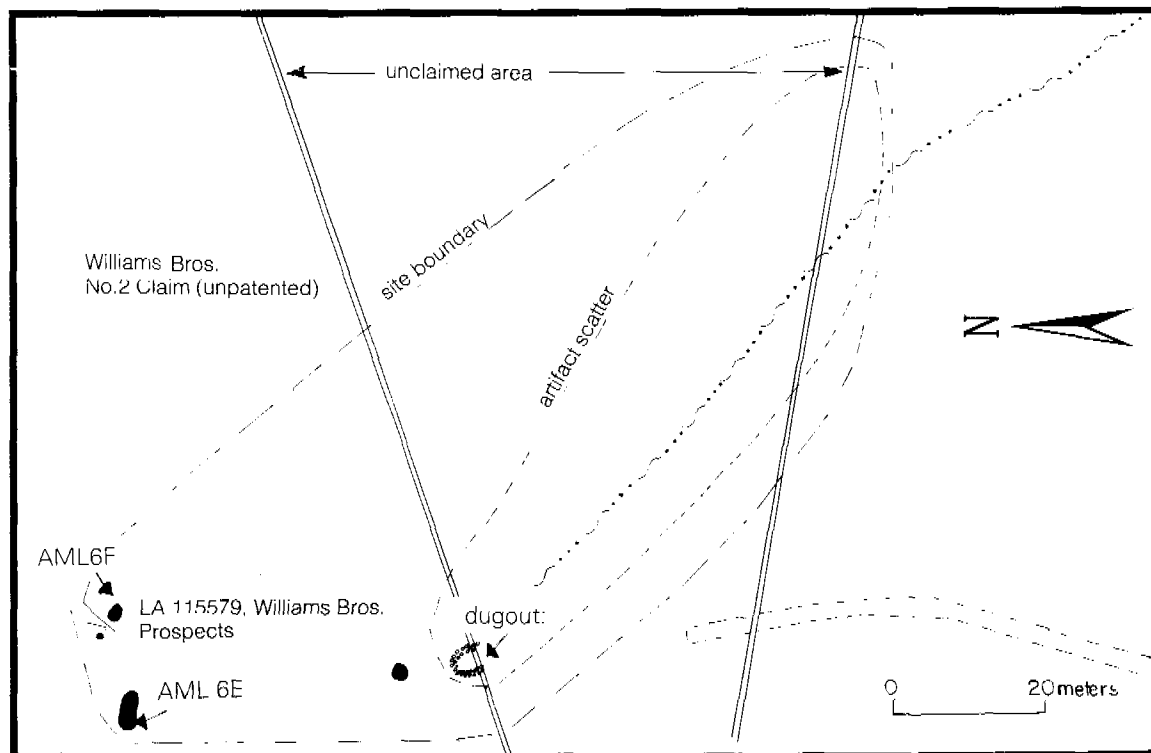


Figure 27. LA 115579, the Williams Brothers Prospect site: site map.

Site Description

LA 115579, the Williams Brothers Prospects site, is located at the northwest corner of this project area (Fig. 2). Its UTM and legal locations are listed in the appendix. The site as recorded covers 17.5 acres (7.1 ha; Fig. 27). The site has both a probable prehistoric and a historic component. Site boundaries are defined by the distribution of recorded historic features.

Prehistoric Component

The prehistoric component at LA 115579 consists of a scatter of chert core fragments and core flakes extending across the site. The artifacts are most common in the relatively undisturbed portions of the site, particularly on the less steep hillslopes in the southern portion of the site. No concentrations of artifacts were observed. The prehistoric component of LA 115579 undoubtedly extends well beyond the site boundaries as defined by this project. For instance, we know that prehistoric artifacts are common on the low ridges south and east of the site.

Historic Component

The site's historic component consists of a series of mining and other features. They include two shallow shafts, two prospect holes, a rock pile that may be a claim marker, the remains of a dugout structure that may have been a domestic structure or a powderhouse, and an elongated artifact scatter extending southeast from the structure (Fig. 28). The mining features are located on a relatively steep, south-facing hillslope, while the structure is located at the transition point between the slope and the foothills. The artifacts are scattered along a small arroyo that separates the ridge on which the San Juan Mine features are located and the ridge on which the Greenleaf Mine AML 16 features are located (Fig. 16). Features identified by an AML number are planned for modification and are given the most detailed descriptions. Other features are described in less detail. Note that in Plates 88-90 the features are incorrectly identified as features of the San Juan Mine.

AML 6E consists of a shallow shaft and an adjacent prospect hole.

The Shaft

Dimensions: 4.25-by-8.2-by-9 ft deep (1.3-by-2.5-by-2.7 m deep) (Plate 88).

Description: The shaft is separated from the adjacent prospect hole by a thin bridge of rock. A small platform of tailings is present on the downhill (south) side of the shaft and the prospect hole.

The Prospect Hole

Dimensions: 5 ft diameter by 3 ft deep (1.5 m diameter by 1 m deep) (Plate 88).

Description: Whether this hole represents an attempt to expand the adjacent shaft or to move the exploration area is not known.

AML 6F is a shallow shaft with associated tailings piles and a rock alignment.

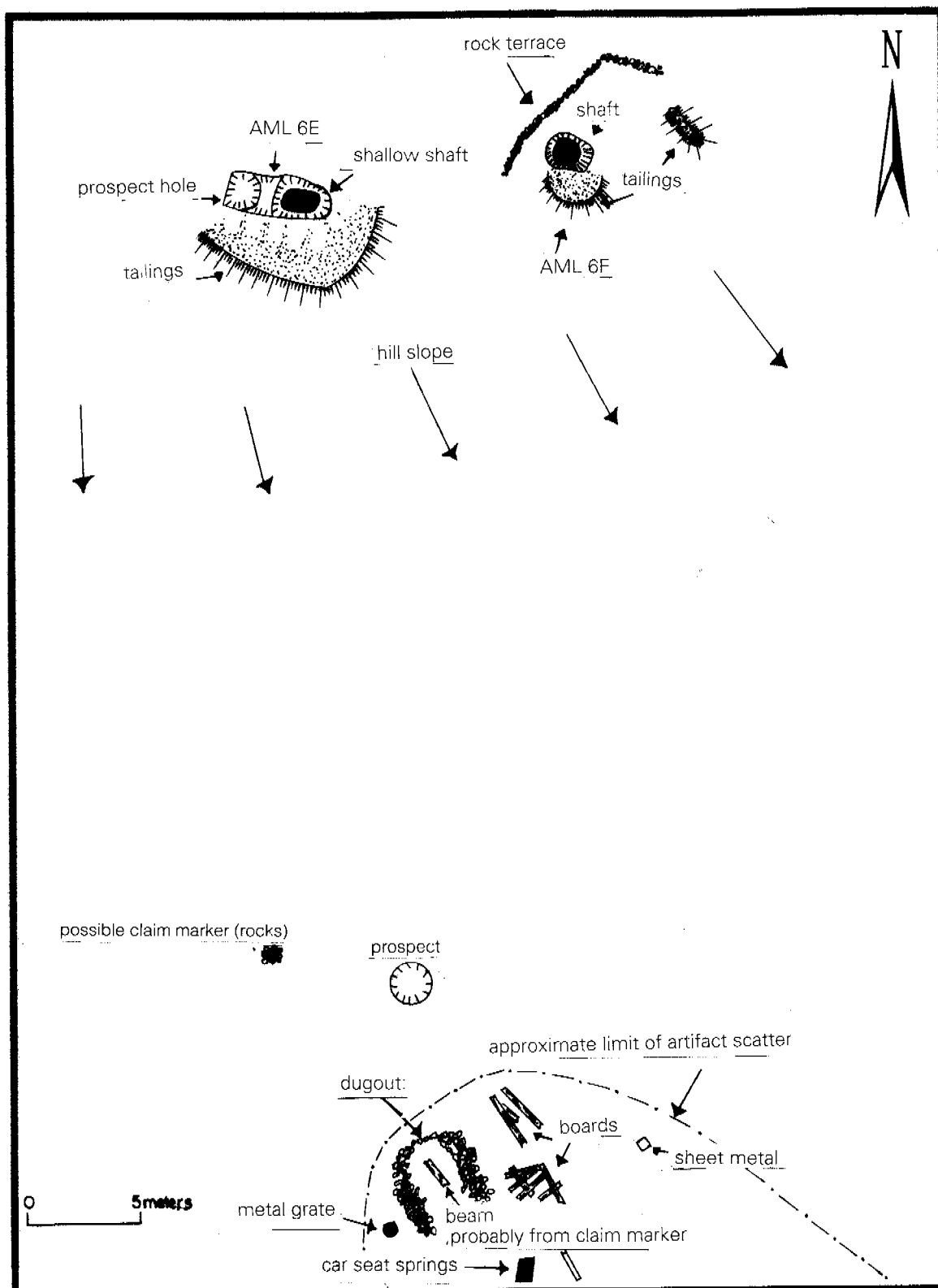
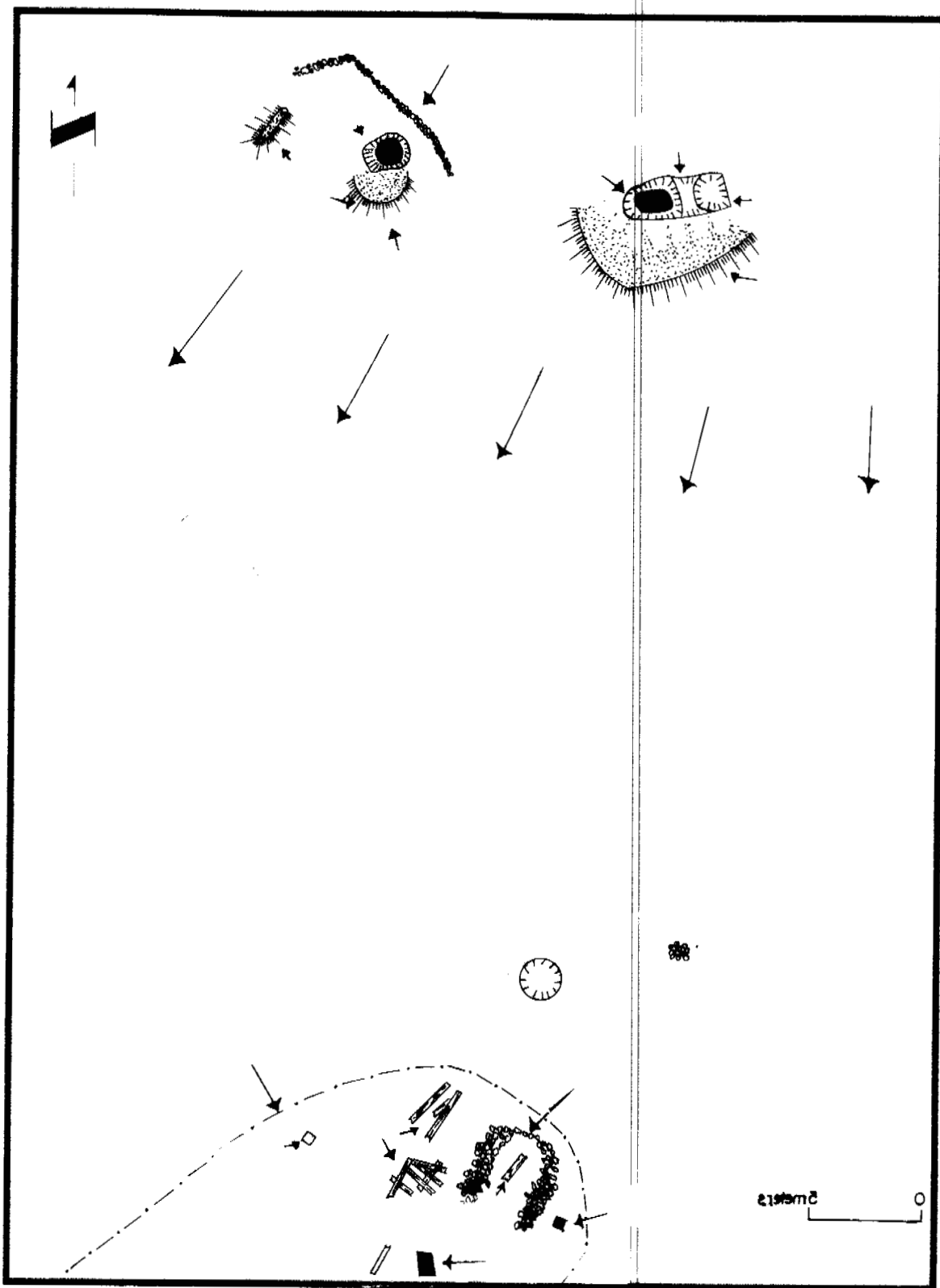


Figure 28. LA 115579, the Williams Brothers Prospect site: mine features map.



Dimensions: 5-by-7.2-by-7 ft deep (1.5-by-2.2-by-2.1 m deep) (Plate 89)

Description: A tailings platform is present along the downhill (south) side of the shaft. A second small tailings pile is located immediately east of the shaft.

The rock alignment is located on the uphill (north) side of the shaft (Fig. 28). It is L-shaped, with the long arm running northeast-southwest and the short arm running northwest-southeast. The long arm is 25 ft (7.6 m) long, while the short arm is 8.5 ft (2.6 m) long. Both arms consist of single courses of cobbles from the surrounding hillside. The alignment probably served to divert surface water from running into the shaft.

The dugout structure is located about 141 ft (43 m) south of the two shafts (Fig. 28).

Dimensions: Interior: 5-by-6 ft (1.5-by-2.0 m); exterior: 13-by-13.8 ft (4.0-by-4.2 m) (Plate 90).

Description: The structure was apparently dug into the hillslope, with rocks piled to form dry-laid walls on the north, west, and east sides. No wall is present on the south side and we assume this was the location of a door. The walls have since collapsed, leaving a shallow depression with low rock piles on the east and west sides. Milled one-by-six, one-by-twelve, and two-by-four boards are strewn about and probably represent the remains of a roof, as does a piece of sheet steel. Within the depression is a four-by-four post that may represent a claim marker once associated with a small rock pile 34.5 ft (10.5 m) northwest of the structure.

Although the structure was first thought to be a powderhouse, the presence of domestic trash near the structure and scattered downslope for about 330 ft (100 m; Fig. 16) suggests that the structure had a domestic function. Most artifacts in the scatter are food cans, primarily meat and milk. Rubber shoe heels and cast iron stove parts are present near the structure, as is a metal grate. A set of car-seat springs are near the structure's south side. Most of the artifacts date after 1920 and may date before World War II.

Figure 16 shows that the structure is just within the Williams Brothers No. 2 claim, while the artifact scatter extends beyond that claim and into the San Juan claim.

Discussion

Unlike the other sites recorded during this project, LA 115579 represents prospecting activities rather than full-scale mining. The shafts are small, as are associated tailings piles, showing that production was minimal. This reflects the observations of Griswold (1961), who notes that the large veins explored in the San Juan Mine features to the south were reduced to small, non-economic stringers of fluorspar and, finally, of quartz on the hillslope. Since we found no historical descriptions for these features or of the workings in the Williams Brothers No. 2 claim, we cannot know how the archaeology of LA 115579 reflects the history of the site. Artifacts at the site date after World War I and probably before World War II, suggesting that the prospecting activities at LA 115579 date to one of the periods of most intense mining throughout the district. With the interest in fluorspar mining during World War II, we would not be surprised to find considerable evidence of prospecting from that period. Finally, we note Griswold's (1961) association of the Williams Brothers Prospect features with the primary vein explored in the San Juan Mine. Earlier, we compared the historical and archaeological records for the San Juan Mine and determined that the San Juan Mine features are all older than 50 years. On the bases of

Griswold's historical association and the apparent archaeological association (Fig. 16), as well as the dates of the artifacts in the LA 115579 artifact scatter, we suggest that the Williams Brothers Prospects features are older than 50 years and probably date to the 1930s or early 1940s.

Aspects of Site Integrity

Location: There has been no obvious relocation of features or facilities at LA 115579. The dugout structure has been dismantled but remnants are present.

Design: Relatively little development of this site through time is evident because the site seems to represent a much shorter time frame than seen at the other sites. Consequently, earlier features have not been altered by later activities. However, the intent to use the mine features to explore the same veins being exploited at the San Juan Mine is clear.

Setting: There are no obvious late historical or modern intrusions on the site or its features.

Materials: Most materials in use at the site are probably gone. However, those that are present are consistent across the site and are similar to materials from other sites from the same time period.

Workmanship: Consistency in workmanship is shown at the site.

Feeling: The proximity of the mines at the southeast end of Fluorite Ridge suggests that individual mines should not have a feeling of isolation from each other, although the mining district should, by virtue of its distance from Deming, have an overall feeling of isolation. This situation is maintained at the Williams Brothers Prospects, since the other mines are all visible from the prospects, while the district remains largely isolated from modern development in the region.

Association: The association of the features at LA 115579 is clear and is not diminished by deterioration of the features. Since few modern intrusions are evident, alteration of features by later activities has not affected the definition of feature association.

Based on these considerations, LA 115579, the Williams Brothers Prospects site, is in good condition, having relatively high integrity.

AML Proposed Activities at LA 115579

Table 8 lists AML's proposed activities at LA 115579. They are limited to the features with AML feature numbers. The other features will not be included.

Table 8. LA 115579, the Williams Brothers Prospects Site: AML's Proposed Activities

FEATURE NO.	PROPOSED ACTIVITY
AML 6E	Backfill.
AML 6F	Backfill.

SIGNIFICANCE AND RECOMMENDATIONS

Jeffrey L. Boyer

Introduction

This section addresses the significance, on a site-by-site basis, of the six archaeological sites recorded during this project. Recommendations are then presented concerning cultural resources clearance for AML's proposed activities at each site and suggested provisions for granting clearance.

Assessment of significance of cultural resources is important for assuring proper management. Archaeological significance is strictly defined in 36CFR60.4 as the potential for inclusion on the *National Register of Historic Places*. Noble and Spude (1992) provide a detailed discussion of the four criteria for inclusion and their relationships to mining properties.

Only features identified in this report by AML numbers will be affected by AML's proposed activities at the six sites. All other features, including mining features, structures, and structural remains, will be avoided, except as discussed below. Access to features will follow existing roads and disturbed areas except as discussed below.

LA 115360: The Valley Mine

LA 115360 is in poor condition, having relatively low integrity, particularly in the effects of post-1960 activities at the site. Two earlier features are present and definable and the development of the site through time is discernable from the archaeological record. Still, those features have been altered by later activities. Based on those factors, the site would probably not be eligible for inclusion on the *National Register*. We must consider, however, the pre-1920 artifact scatter in the center of the site. Assuming that the scatter, which seems to represent domestic refuse and which seems to be relatively undisturbed, is associated with the earliest mining activities in the Fluorite Ridge District, then LA 115360 has an early component that may inform on domestic aspects of early mining in the district. Although we cannot say with certainty that the mining features at LA 115360 are older than 50 years, the artifact scatter clearly meets the 50-year requirement and we cannot discount the possibility that the earlier mining features, AML 8 and AML 8C, are associated with the pre-1920 component. LA 115360 should be considered significant under criterion (a) of 36CFR60.4 because it reflects the development of the business of fluorspar mining in the region and the economic interaction of the region with national industrial development. Further, since LA 115360 has a prehistoric component that includes two quarry locations, the site should be considered significant under criterion (d) of 36CFR60.4, since it can be expected to provide information on prehistoric chipped stone material procurement and reduction strategies.

Cultural resources clearance for AML's proposed activities as listed in Table 3 is recommended, with the following provisions:

AML 8: The headframe will be avoided and preserved.

AML 8A: The timber collar will be preserved.

Access to Features AML 8A, 8B, 8C, and 8D for backfilling will be from the west. The existing road through the site will be used but the pre-1920 artifact scatter area in the center of the site will be avoided except for travel on the road.

The prehistoric quarry locations, shown on Figure 5, will be avoided.

The large, linear tailings pile complex on the west side of the site apparently dates after 1960. It will be used as a source for backfill material.

LA 115361: The Lucky Mine

LA 115361 is in good condition, having a high degree of site integrity. Comparison of the historical and archaeological records suggests that most of the features recorded during this project date to the early 1940s or earlier. Review of the history of the district shows that the development during the 1940s was related to the need for fluorspar for steel production during World War II. LA 115361 should be considered significant under criterion (a) of 36CFR60.4. It reflects the development of the business of fluorspar mining in the region and the economic interaction of the region with national industrial development. It also reflects the importance of fluorspar mining to national military interests and activities. Further, since LA 115361 has a prehistoric component that includes at least two chipped stone artifact concentrations and a scatter of chipped stone artifacts, the site should be considered significant under criterion (d) of 36CFR60.4, since it can be expected to provide information on prehistoric chipped stone material procurement and reduction strategies.

Cultural resources clearance for AML's proposed activities as listed in Table 4 is recommended with the following provisions:

AML 3: The headframe will be preserved, including the above-ground portions of the rail timbers.

AML 20: The concrete pad will be avoided.

The loadout chute structure and rail trestle remains will be avoided and preserved. The large tailings pile on which the loadout chute and rail trestle remains are located is an important site feature. It will be avoided and will not be used as a source for backfill material.

Access to AML 3 and AML 20 will be restricted to existing disturbed areas around the features and the large tailings pile to avoid disturbance to chipped stone artifacts in undisturbed areas surrounding the feature area.

LA 115362: The Sadler Mine

LA 115362 is in good condition, having a relatively high degree of site integrity. Once the issue of the site's identification is resolved, it is apparent that the site dates between 1927 and 1946, with most of the development of the mine taking place before 1943. Review of the history

of the district shows that the development during the 1940s was related to the need for fluorspar for steel production during World War II. LA 115362 should be considered significant under criterion (a) of 36CFR60.4. It reflects the development of the business of fluorspar mining in the region and the economic interaction of the region with national industrial development. It also reflects the importance of fluorspar mining to national military interests and activities. Further, since LA 115362 has a prehistoric component that includes a scatter of chipped stone artifacts that is particularly evident on the hillslopes west, north, and south of the mining features, the site should be considered significant under criterion (d) of 36CFR60.4, because it can be expected to provide information on prehistoric chipped stone material procurement and reduction strategies.

Cultural resources clearance for AML's proposed activities as listed in Table 5 is recommended, with the following provisions:

AML 7: The headframe/ore hopper structure will be preserved, if possible, during the backfilling and/or blasting of AML 7.

AML 7B: The rock wall will be avoided and preserved.

LA 115363: The Greenleaf Mine

The integrity of the Greenleaf No. 1 Mine area of LA 115363 has been destroyed by later, particularly post-1960, activities. While the locations of some early features can be identified, they have been severely altered by later activities and many early features cannot be identified. In contrast, the AML 16, AML 2, and Greenleaf No. 4 Mine (AML 5) areas are in good condition, having high degrees of component, feature, material, and workmanship integrity. The ages of these features are unclear, since they are not found in historical documents until the early 1960s. However, artifacts recorded near AML 16 date before World War II. The historical record shows that most work in the Greenleaf claims took place in the late 1930s and early 1940s, including private development and governmental exploration, while most work in the 1950s focused on deepening the No. 1 Mine. Features present in the 1940s were also present as late as the early 1960s. Dissimilarities in materials and workmanship between these features and most of those recorded in the No. 1 Mine area confirm the historical record in showing that the AML 16, AML 2, and AML 5 features date before 1960. Further, there is considerable similarity between the AML 16, AML 2, and AML 5 features and features recorded at the mines that are older than 50 years and we cannot discount the possibility that some or all of these features are older than 50 years. For instance, it is possible that these features are associated with the trenching exploration sponsored by the USDI Bureau of Mines in the early 1940s. Consequently, LA 115363 should be considered significant under criterion (a) of 36CFR60.4. It reflects the development of the business of fluorspar mining in the region and the economic interaction of the region with national industrial development. It may also reflect the importance of fluorspar mining to national military interests and activities. Further, since LA 115363 has a prehistoric component that includes a scatter of chipped stone artifacts, particularly on the low ridges around Features AML 16 and AML 2, the site should be considered significant under criterion (d) of 36CFR60.4, because it can be expected to provide information on prehistoric chipped stone material procurement and reduction strategies.

It should be clear, however, that these recommendations concerning significance apply to the site as a whole and, most specifically, to the AML 16, AML 2, and Greenleaf No. 4 Mine (AML 5) areas, where recent intrusions have caused the least effects on older mining features.

Alteration to the older Greenleaf No. 1 Mine area features has been severe and this portion of the site has little additional information potential.

Cultural resources clearance for AML's proposed activities as listed in Table 6 is recommended with the following provisions:

AML 16: The dugout structure and the artifact concentration will be avoided and preserved. Access to AML 16 will be restricted to rubber-tired vehicles to avoid disturbance to chipped stone artifacts in the undisturbed areas surrounding the feature area. Activities at AML 16 will be limited to the immediate feature area, also to avoid disturbance to chipped stone artifacts in the undisturbed areas surrounding the feature area.

AML 2: The upright rail timbers will be preserved if possible. The structural base timbers will be avoided and preserved.

AML 5: The headframe base timbers will be preserved. The hoist engine pad and the other concrete pad will be avoided.

LA 115364: The San Juan Mine

LA 115364 is in good condition, having a relatively high degree of site integrity. The site, which includes at least one of the earliest features in the district, is older than 50 years, with most development in the 1930s and early 1940s. Review of the history of the district shows that the development during the 1940s was related to the need for fluorspar for steel production during World War II. LA 115364 should be considered significant under criterion (a) of 36CFR60.4. It reflects the development of the business of fluorspar mining in the region and the economic interaction of the region with national industrial development. It may also reflect the importance of fluorspar mining to national military interests and activities. Further, since LA 115364 has a prehistoric component that includes a scatter of chipped stone artifacts, particularly on the low ridges near Feature AML 15, the site should be considered significant under criterion (d) of 36CFR60.4, because it can be expected to provide information on prehistoric chipped stone material procurement and reduction strategies.

Cultural resources clearance for AML's proposed activities as listed in Table 7 is recommended, with the following provisions. Access to AML 15 will be restricted to rubber-tired vehicles to avoid disturbance to chipped stone artifacts in the undisturbed areas surrounding the feature area. Activities at AML 16 will be limited to the immediate feature area, also to avoid disturbance to chipped stone artifacts in the undisturbed areas surrounding the feature area.

LA 115579: The Williams Brothers Prospects

LA 115579 is in good condition, having a relatively high degree of site integrity. Although we do not know the dates for the site, artifacts observed seem to point to the years between the World Wars. This coincides with the years of most intense mining development in the district and compares favorably with historical associations, showing that LA 115579 is probably older than 50 years. Although LA 115579 is not a mining site in the same sense as the other sites recorded

during this project, it is not surprising to find evidence of prospecting. LA 115364 should be considered significant under criterion (a) of 36CFR60.4. It reflects the development of the business of fluorspar mining in the region and the economic interaction of the region with national industrial development. Further, since LA 115364 has a prehistoric component that includes a scatter of chipped stone artifacts, particularly on the low ridges in the southern portion of the site, the site should be considered significant under criterion (d) of 36CFR60.4, because it can be expected to provide information on prehistoric chipped stone material procurement and reduction strategies.

Cultural resources clearance for AML's proposed activities as listed in Table 8 is recommended, with the provision that backfilling be conducted by hand.

PLATES



Plate 1. LA 115360, the Valley Mine: AML 8, shaft.

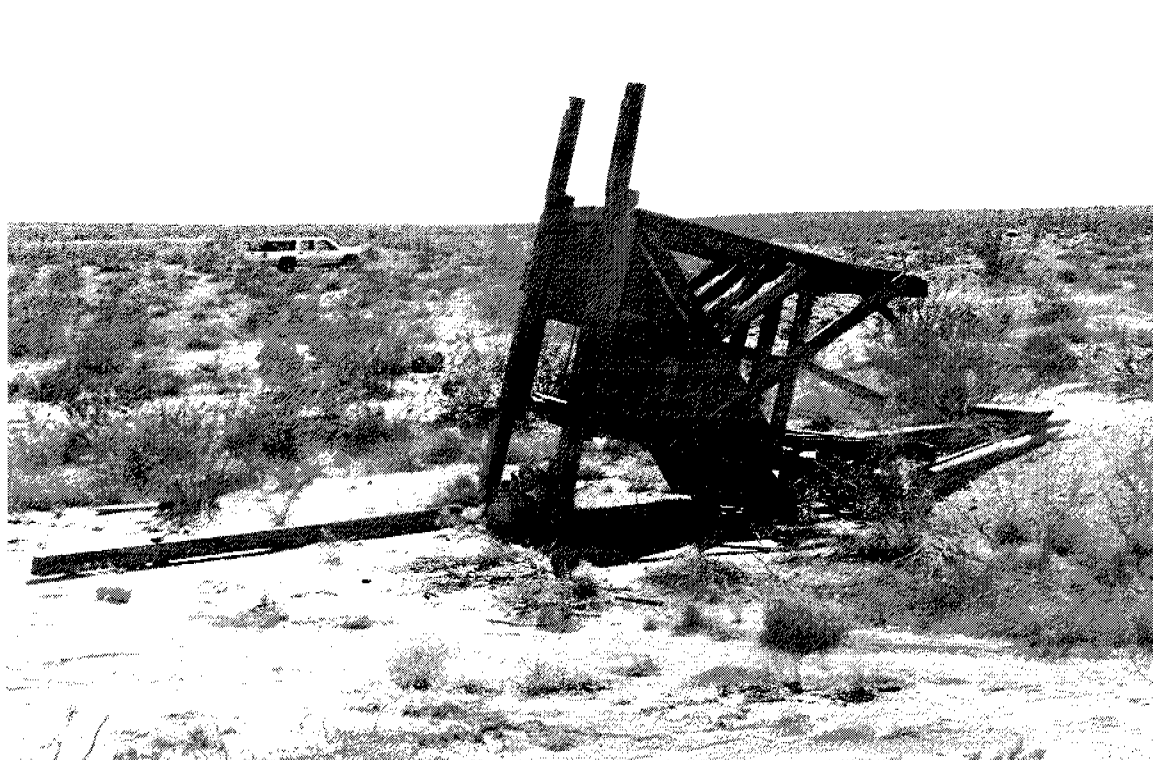


Plate 2. LA 115360, the Valley Mine: AML 8, headframe.



Plate 3. LA 115360, the Valley Mine: AML 8A, shaft.



Plate 4. LA 115360, the Valley Mine: AML 8A, hoist engine pad.

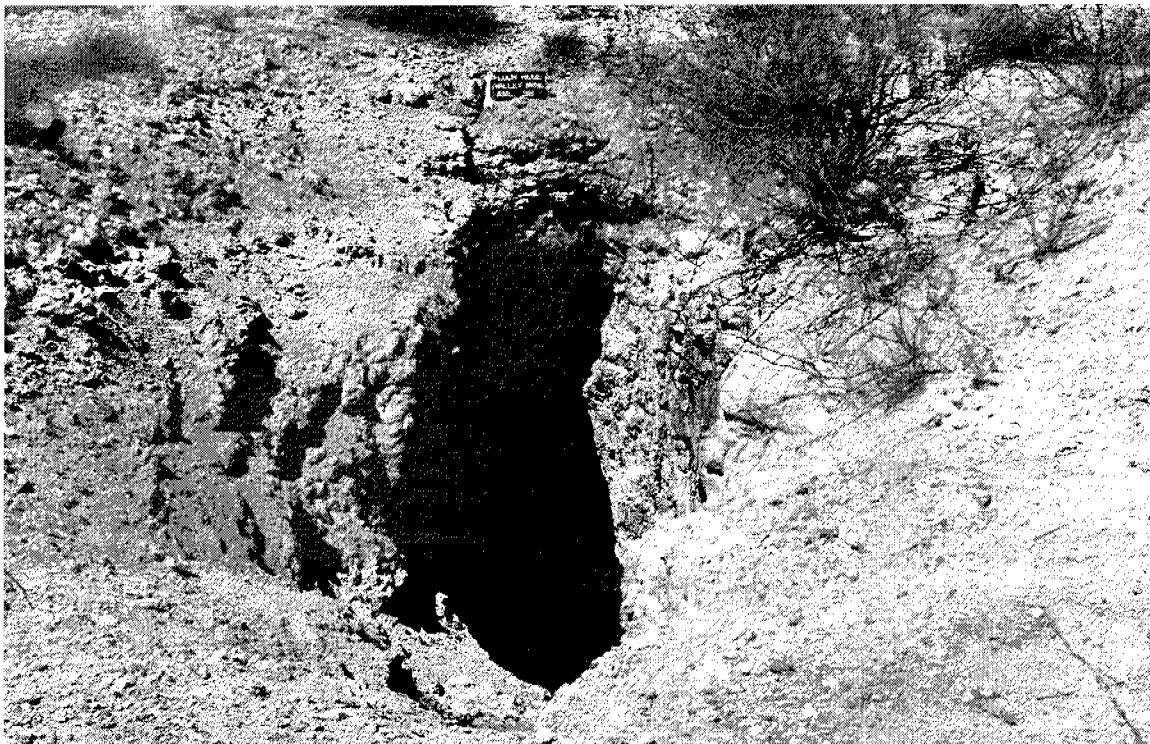


Plate 5. LA 115360, the Valley Mine: AML 8B, open stope.

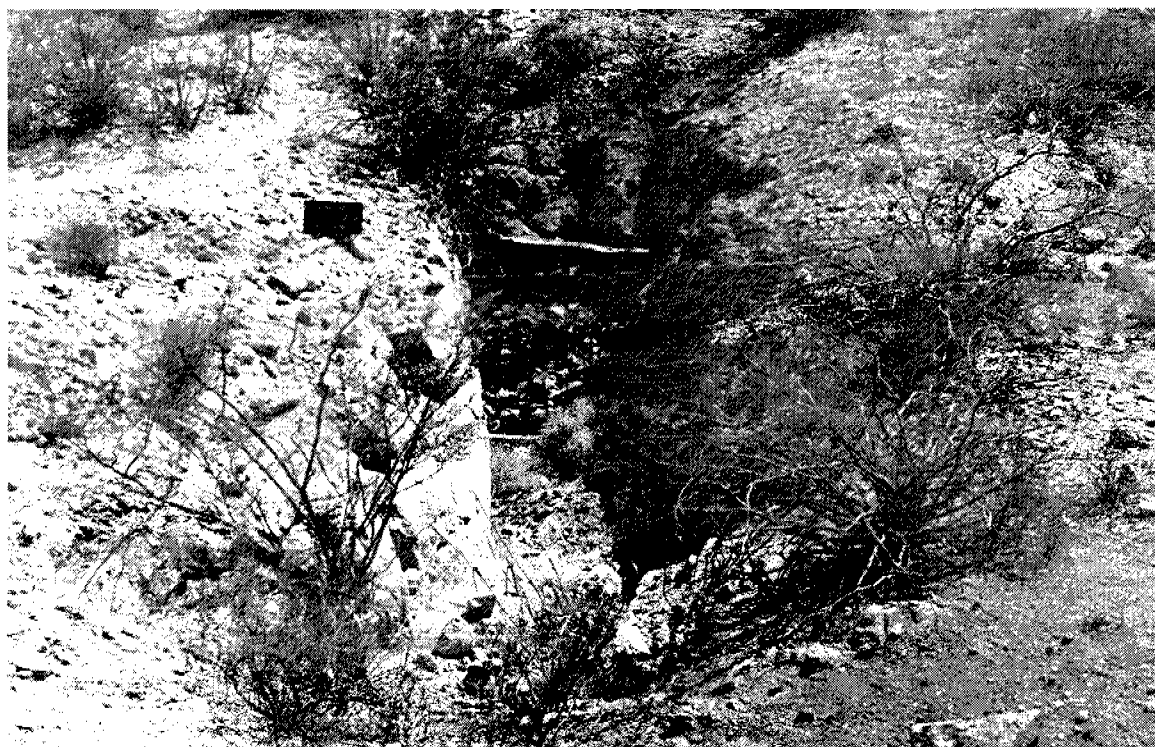


Plate 6. LA 115360, the Valley Mine: AML 8B, open stope.



Plate 7. LA 115360, the Valley Mine: AML 8D, open stope.



Plate 8. LA 115361, the Lucky Mine: AML 3, shaft, view to west.

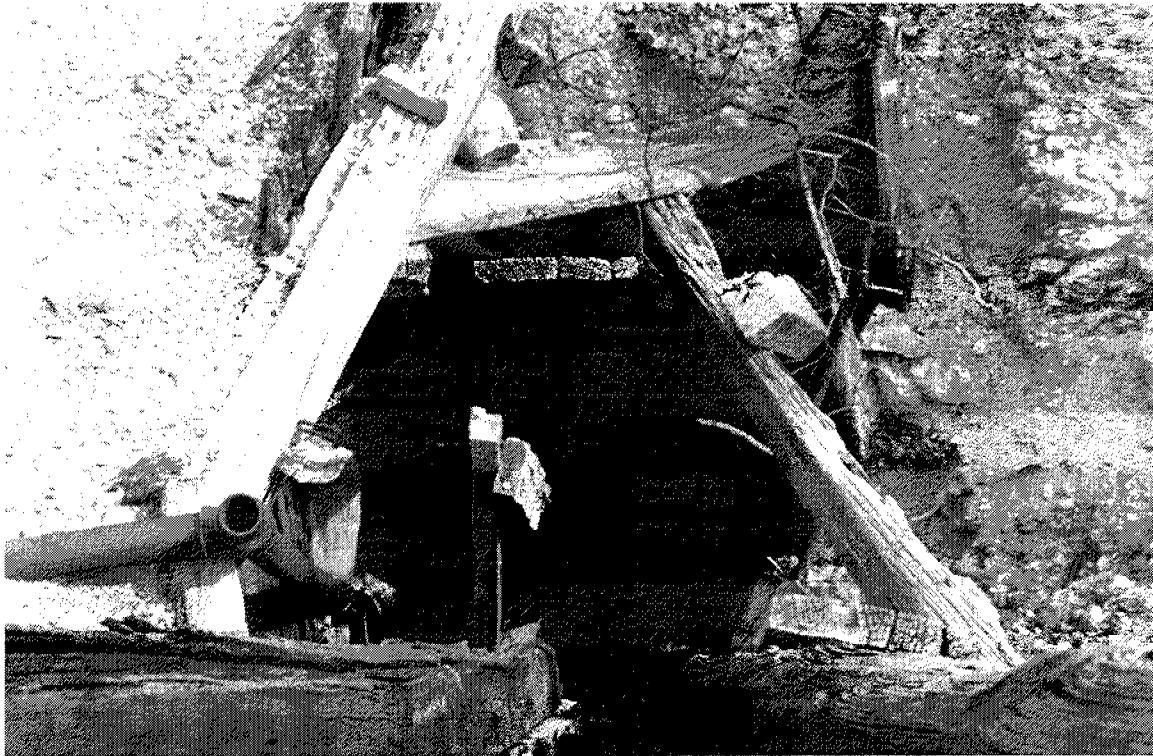


Plate 9. LA 115361, the Lucky Mine: AML 3, shaft, view into shaft.



Plate 10. LA 115361, the Lucky Mine: AML 3, headframe, view to west.

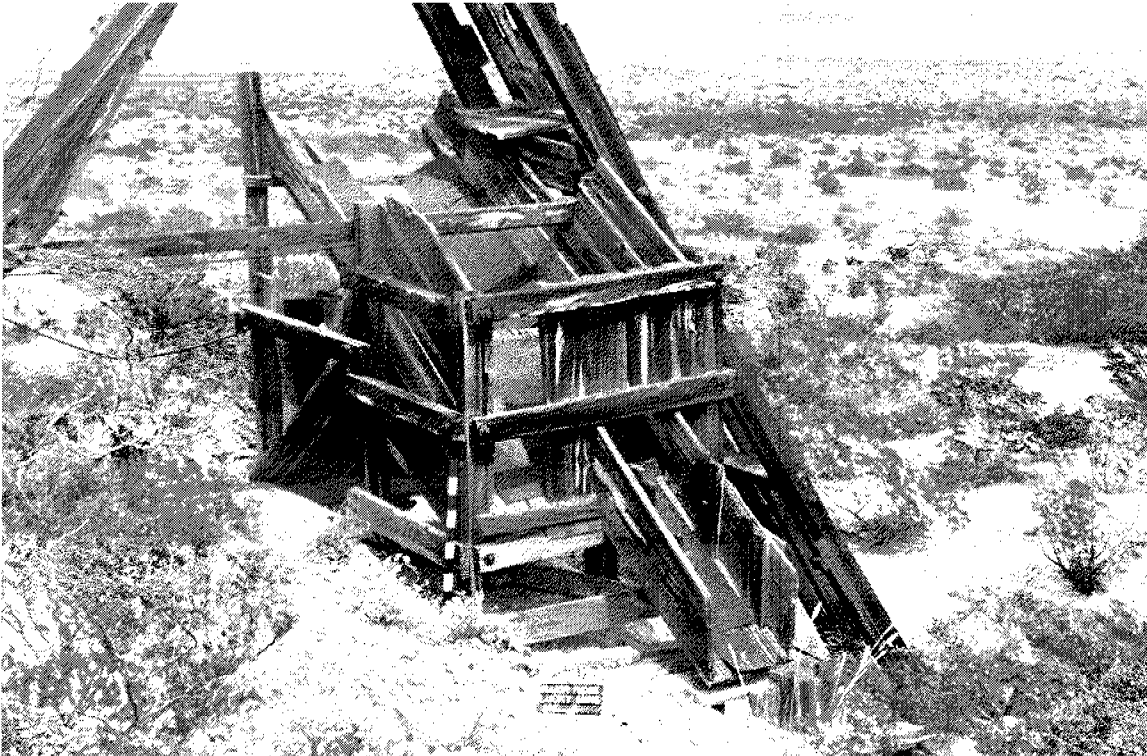


Plate 11. LA 115361, the Lucky Mine: AML 3, headframe, south ore chute.



Plate 12. LA 115361, the Lucky Mine: AML 3, headframe, north ore chute.

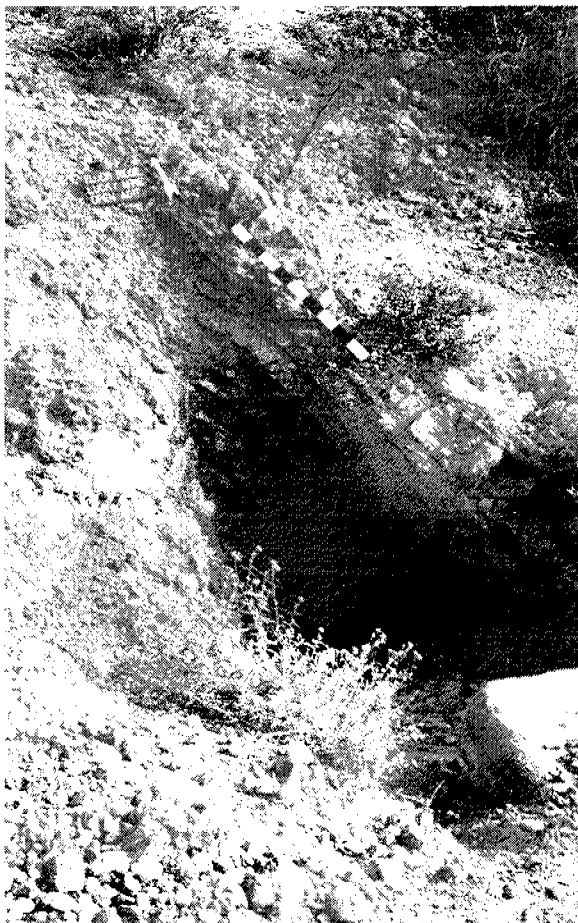


Plate 13. LA 115361, the Lucky Mine: AML 20, adit, view to north.

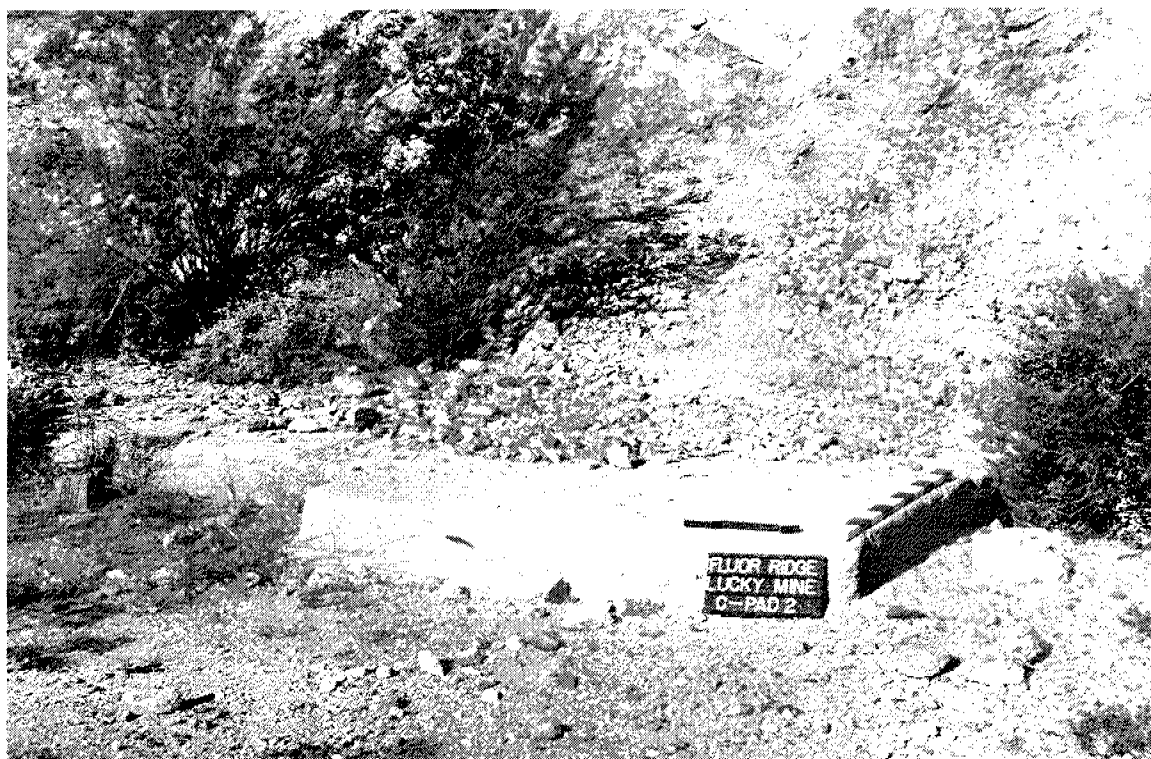


Plate 14. LA 115361, the Lucky Mine: concrete pad near AML 20, view to west.



Plate 15. LA 115361, the Lucky Mine: collapsed pad near AML 20, view to west.

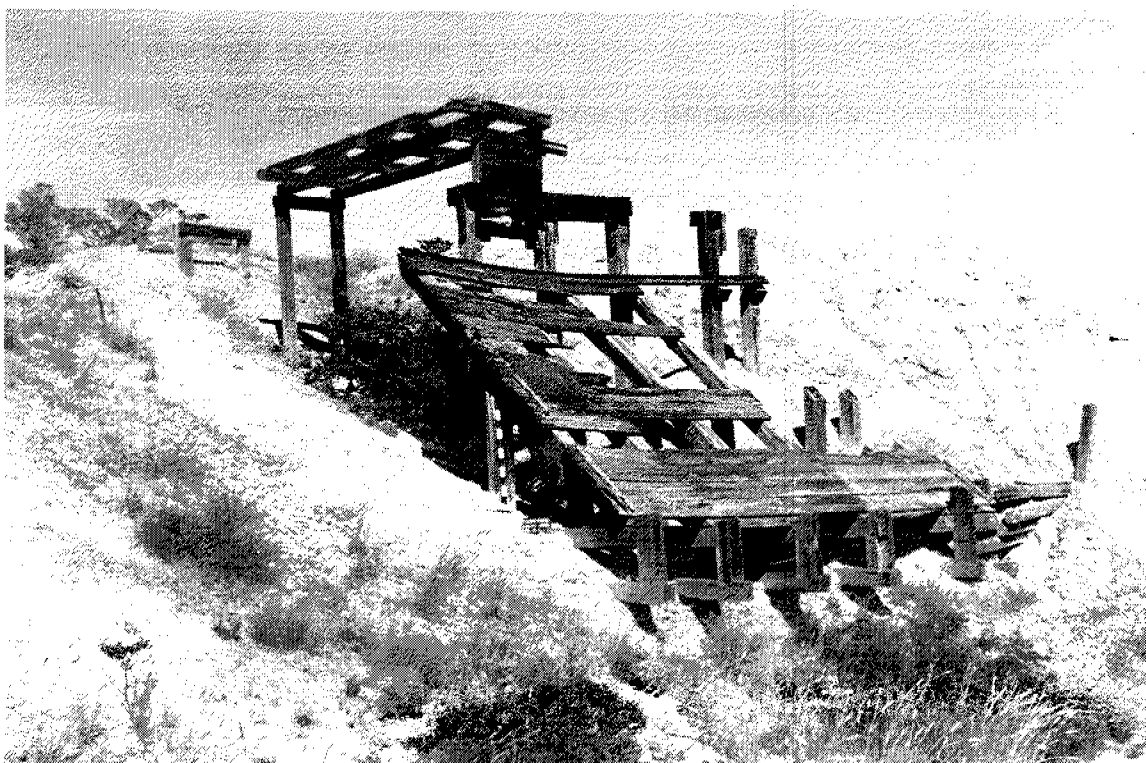


Plate 16. LA 115361, the Lucky Mine: loadout chute, view to northwest.

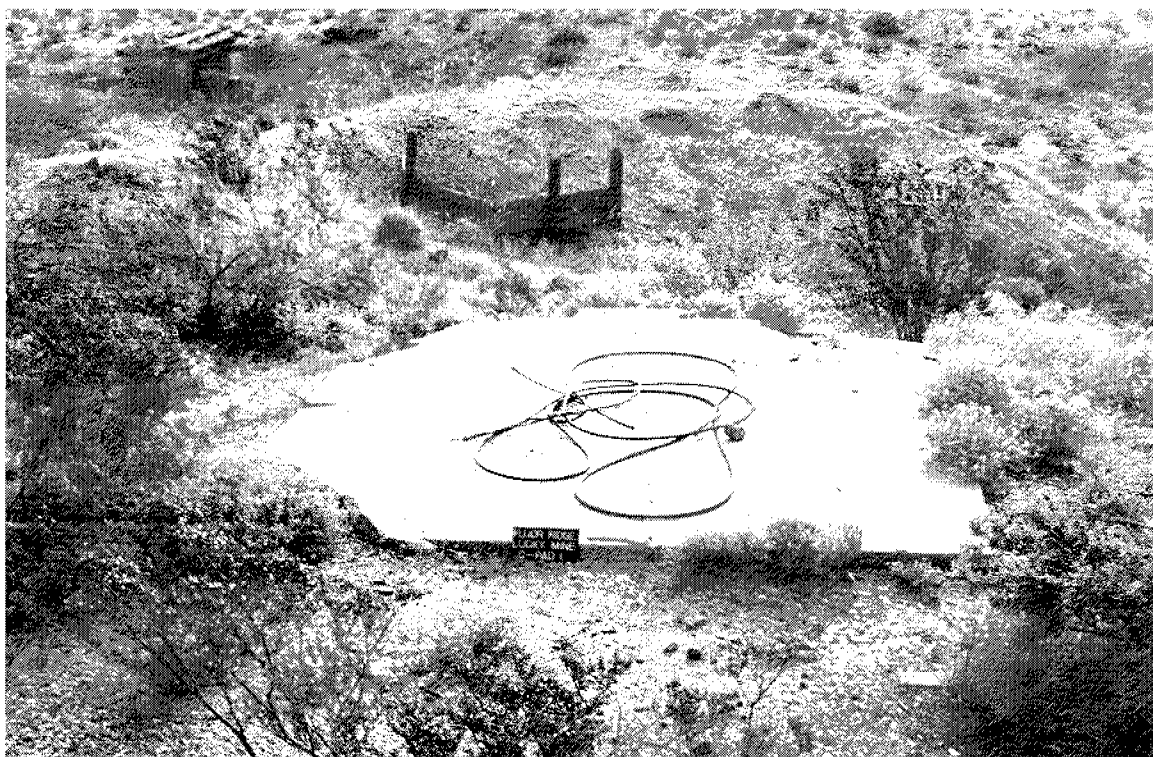


Plate 17. LA 115361, the Lucky Mine: concrete building pad, view to east.



Plate 18. LA 115361, the Lucky Mine: hoist engine pad, view to south.

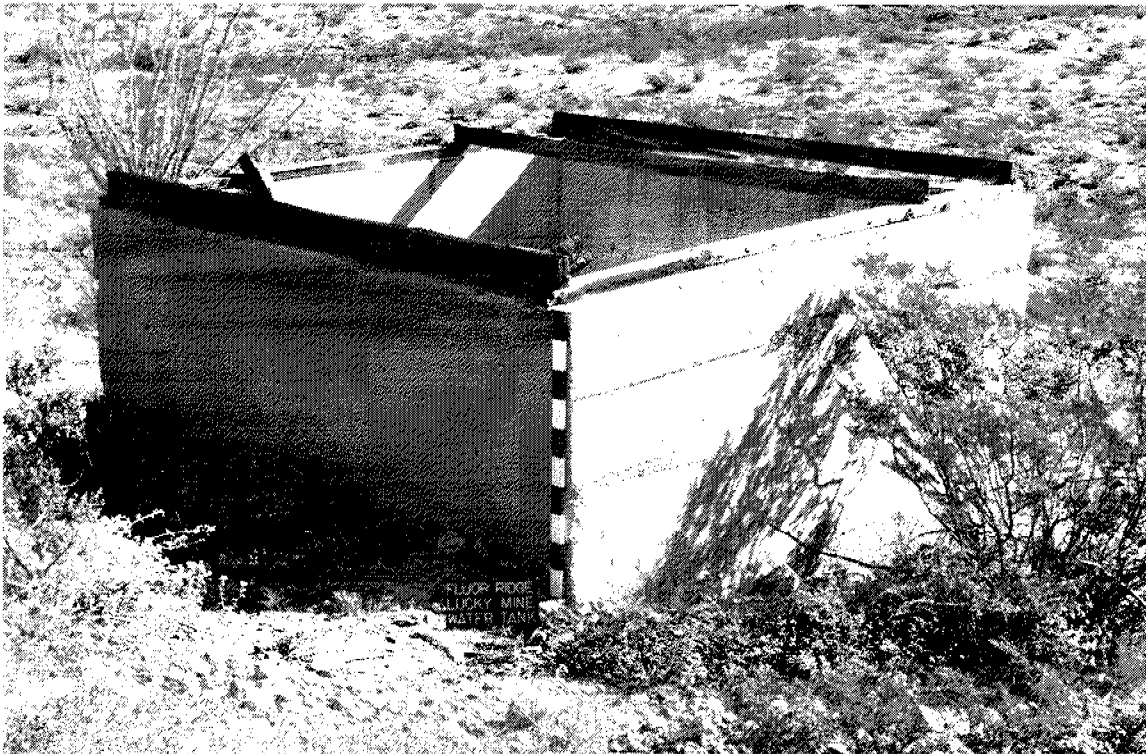


Plate 19. LA 115361, the Lucky Mine: concrete water tank, view to northeast.



Plate 20. LA 115361, the Lucky Mine: AML 4, open stope, view to south.



Plate 21. LA 115361, the Lucky Mine: half dug-out building, view to north.



Plate 22. LA 1135362, the Sadler Mine: AML 7 shaft, view into shaft from west.

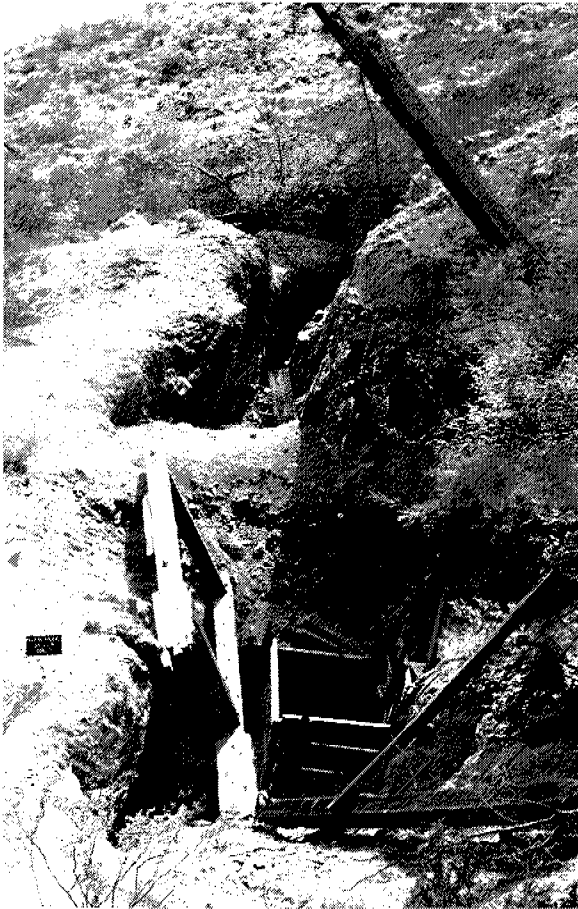


Plate 23. LA 115362, the Sadler Mine: AML 7, shaft, view to south.

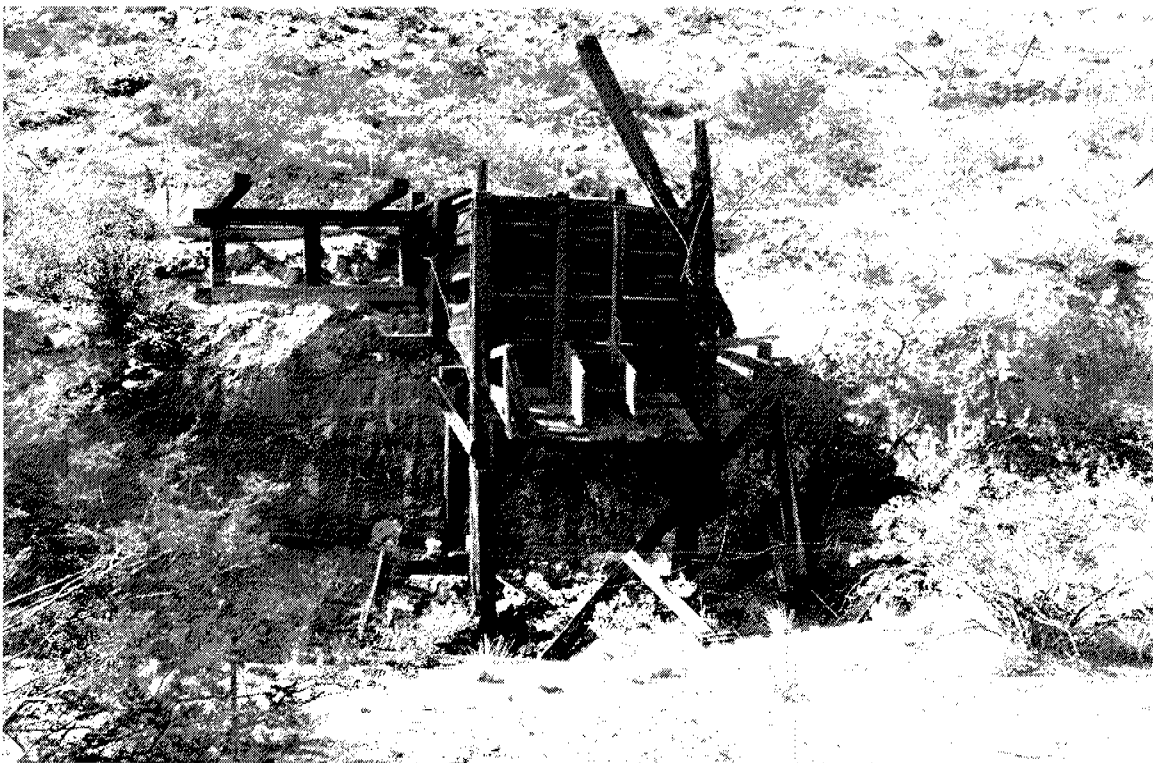


Plate 24. LA 115362, the Sadler Mine: AML 7 headframe/loadout structure, view to west.



Plate 25. LA 115362, the Sadler Mine: AML 7 headframe/loadout structure, view to east showing twisted steel cable.

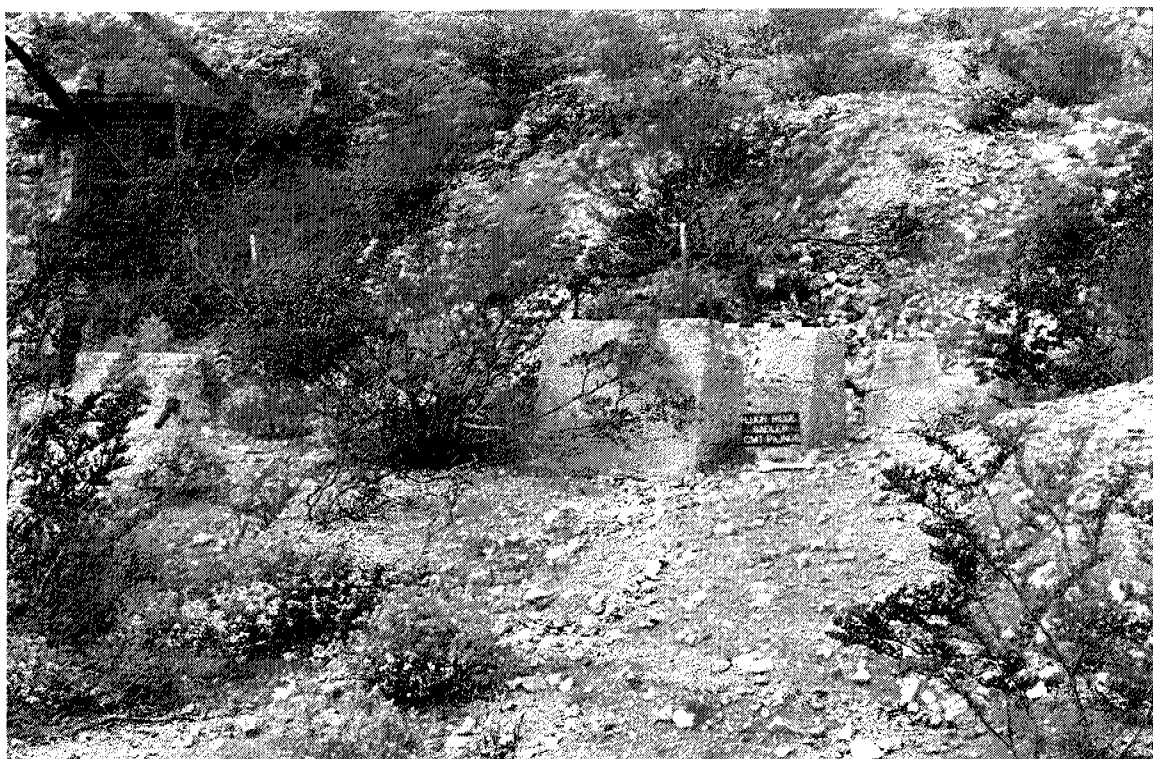


Plate 26. LA 115362, the Sadler Mine: concrete pylons, view to southwest.



Plate 27. LA 115362, the Sadler Mine: blade-cut trench, view to northwest.



Plate 28. LA 115362, the Sadler Mine: AML 7A, shaft, view to northeast.



Plate 29. LA 115362, the Sadler Mine: AML 7E, shaft, view to east.



Plate 30. LA 115362, the Sadler Mine: AML 7E, northern stope, view to south.

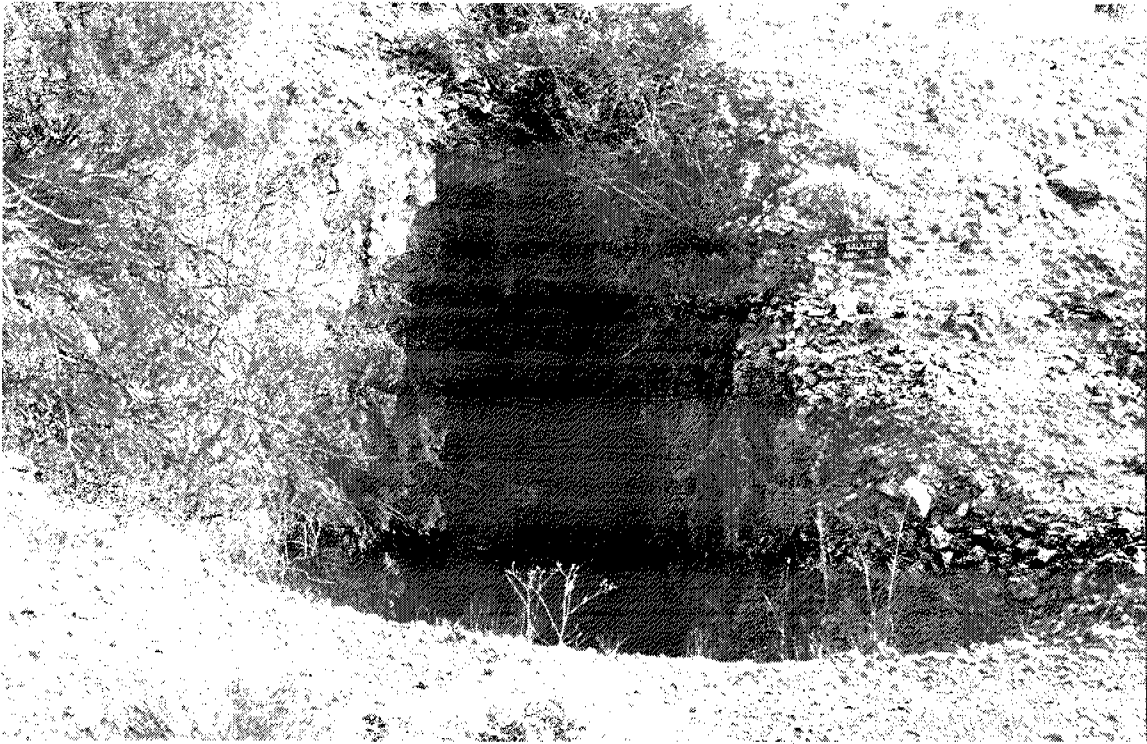


Plate 31. LA 115362, the Sadler Mine: AML 7E, middle stope, view to north.



Plate 32. LA 115362, the Sadler Mine: AML 7E, southern stope, view to south.



Plate 33. LA 115362, the Sadler Mine: AML 7E southern stope, view to south.

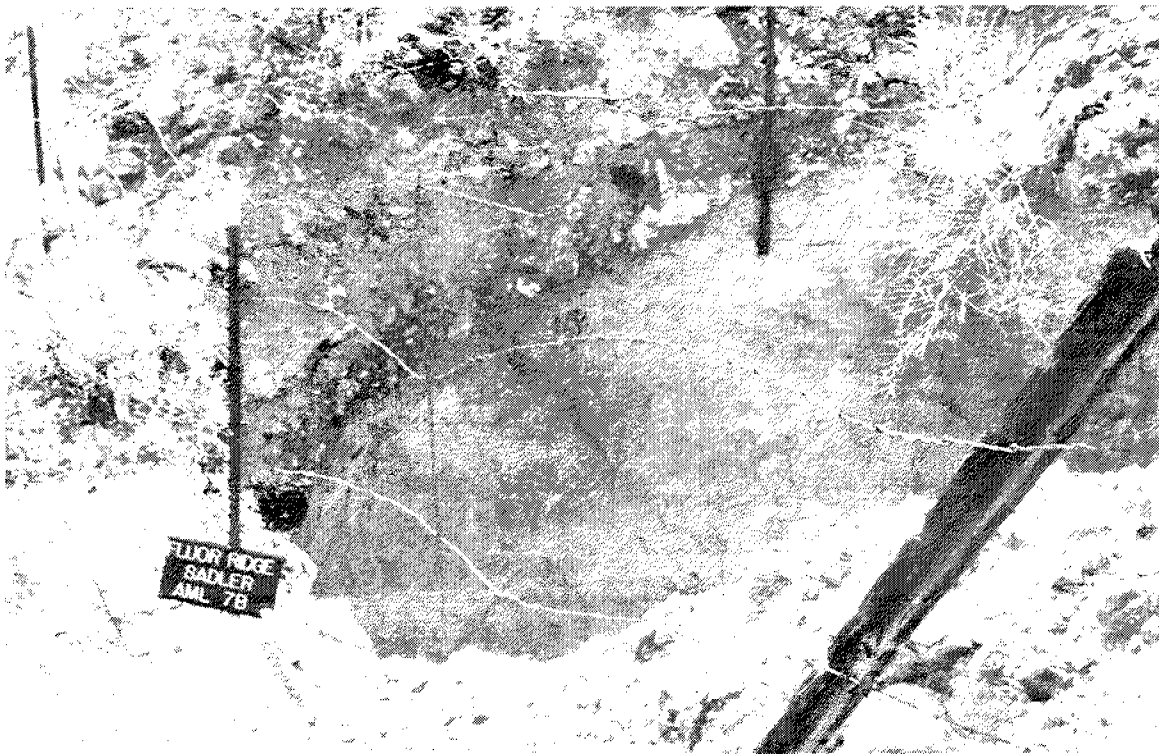


Plate 34. LA 115362, the Sadler Mine: AML 7B, shaft, view to west.



Plate 35. LA 115362, the Sadler Mine: AML 7B, rock wall, view to northwest.



Plate 36. LA 115362, the Sadler Mine: AML 7C, adit, view to north.



Plate 37. LA 115362, the Sadler Mine: AML 7D, shaft, view to north.



Plate 38. LA 115362, the Sadler Mine: AML 7F, shaft, view to east.



Plate 39. LA 115362, the Sadler Mine: AML 7G, open stopes, view to north.

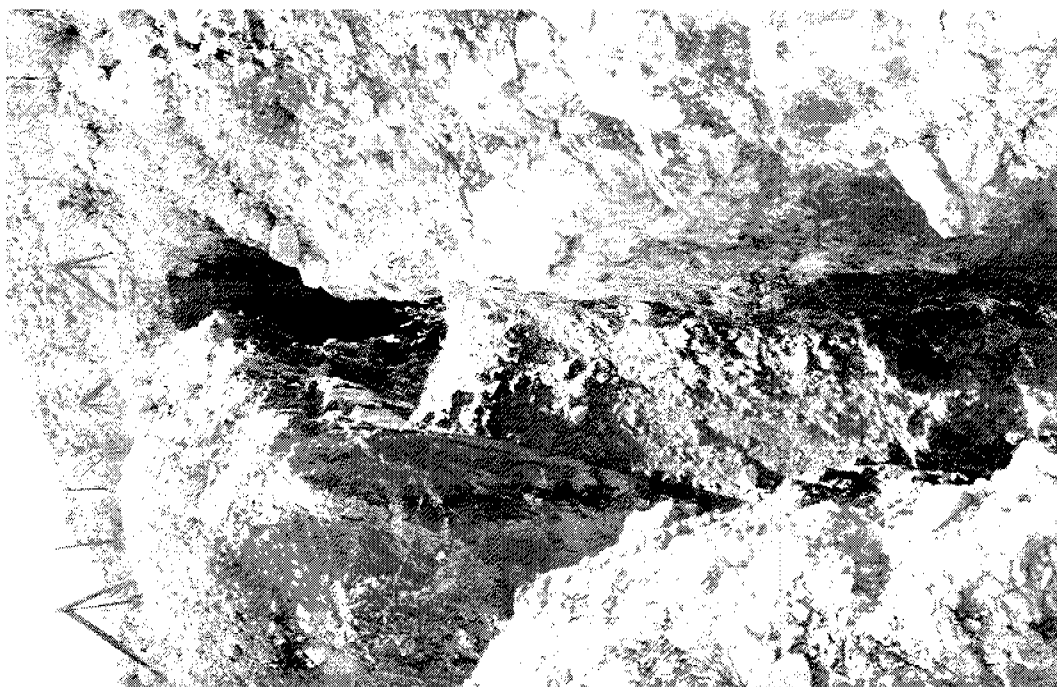


Plate 40. LA 115362, the Sadler Mine: AML 7G, open stopes, view to south.



Plate 41. LA 115362, the Sadler Mine: AML 7H, collapsed portal, view to west.

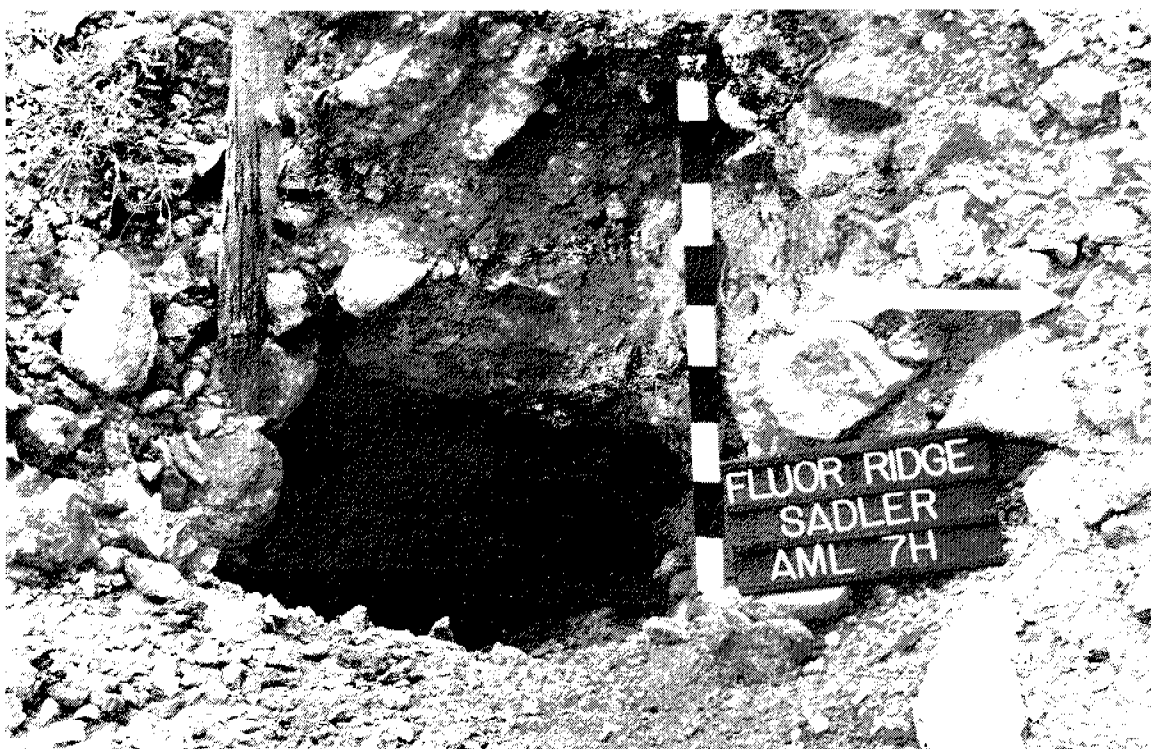


Plate 42. LA 115362, the Sadler Mine: AML 7H, adit opening, view to west.



Plate 43. LA 115362, the Sadler Mine: AML 19, shaft, view to southwest.

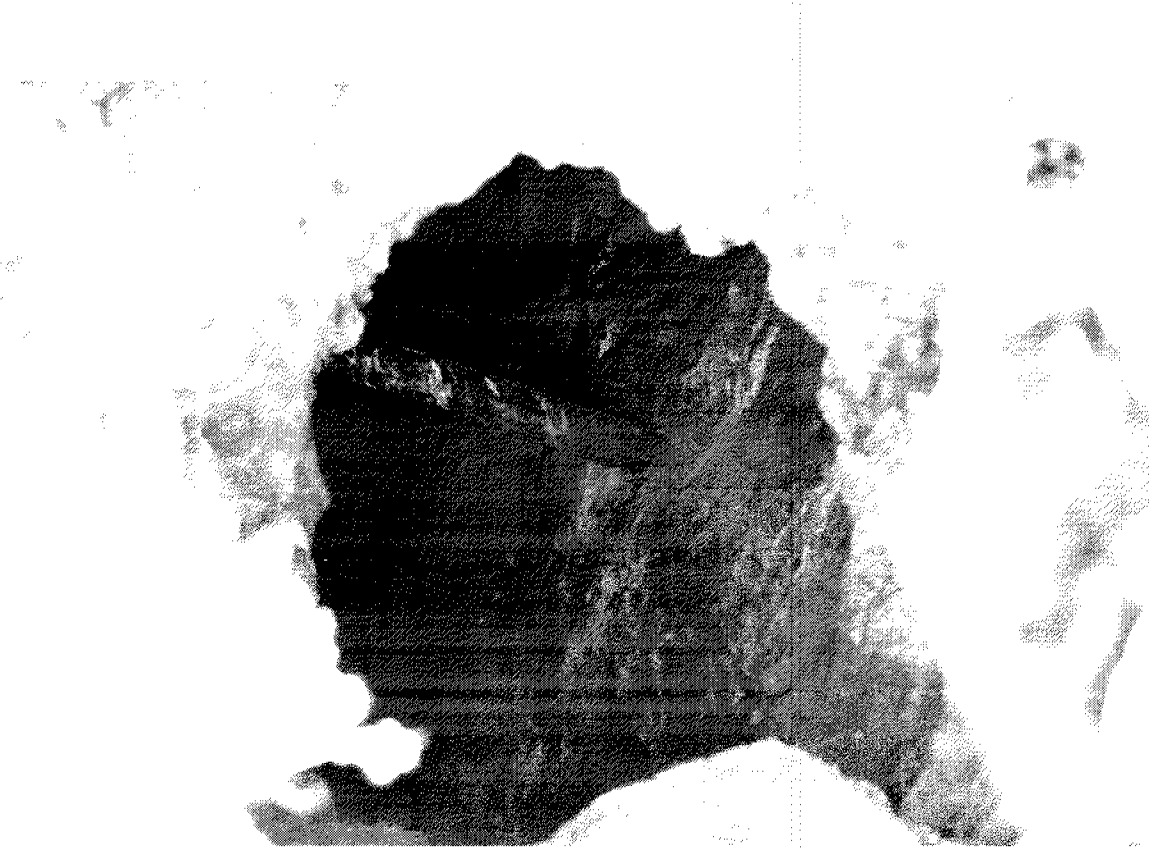


Plate 44. LA 115362, the Sadler Mine: AML 19, adit, view to south.

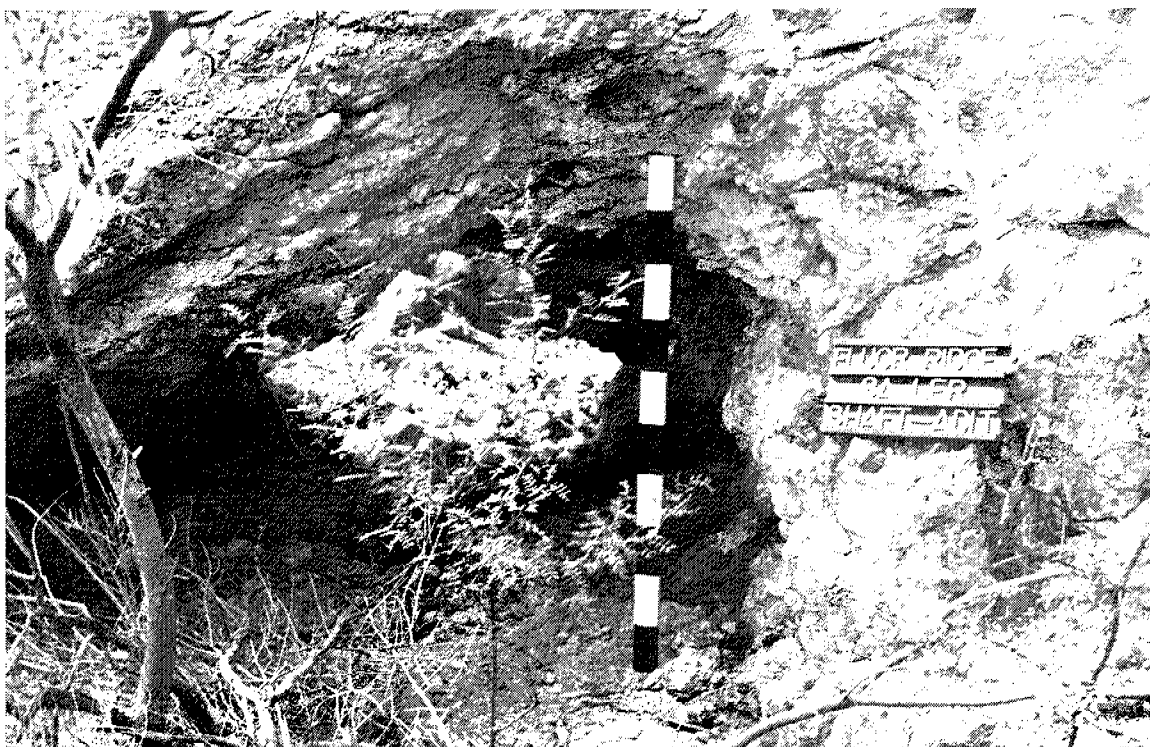


Plate 45. LA 115362, the Sadler Mine: AML 21, shaft, view to west.

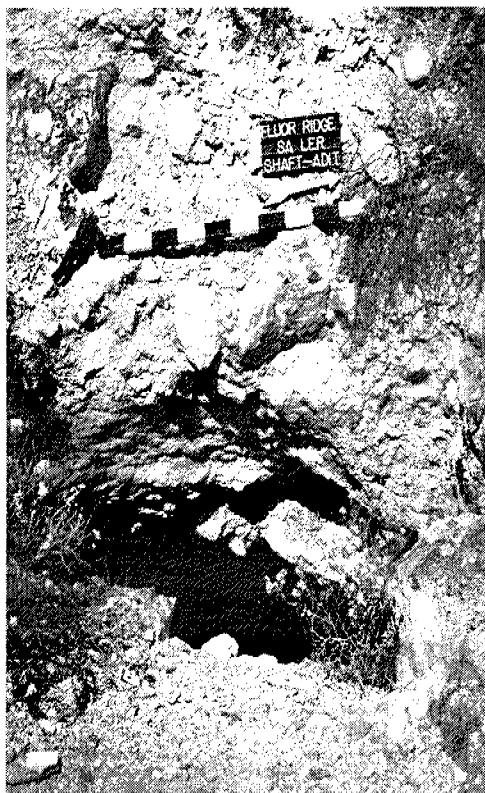


Plate 46. LA 115362, the Sadler Mine: AML 21, adit, view to south.

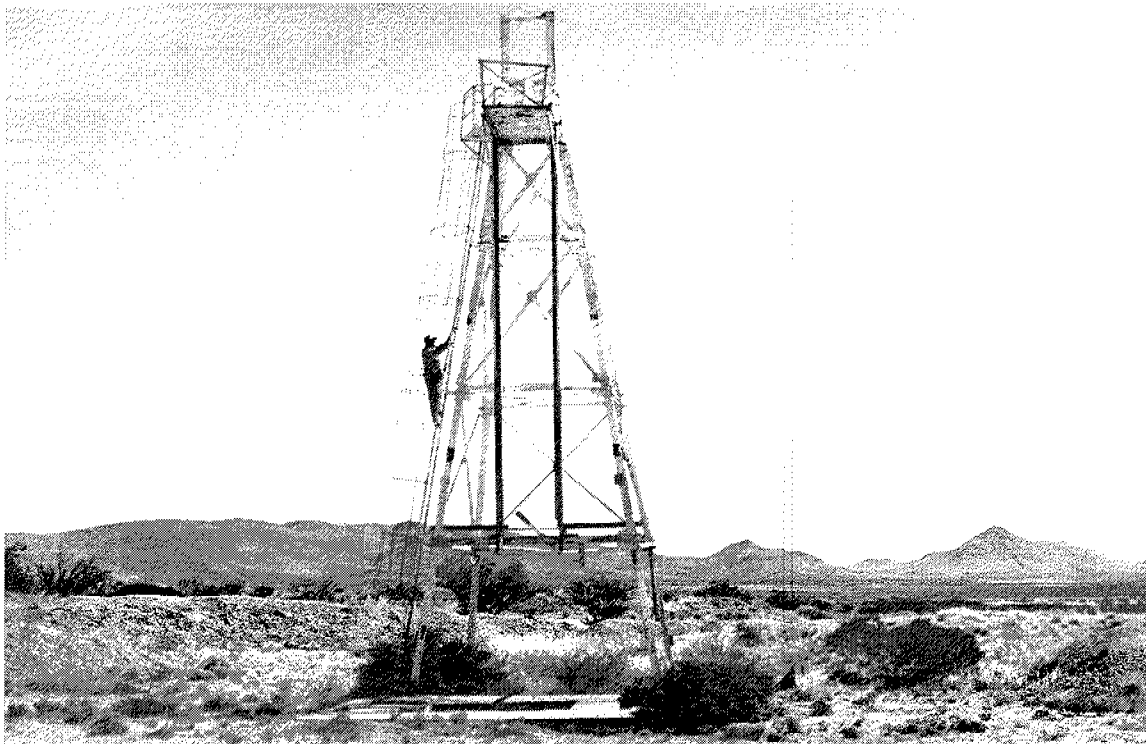


Plate 47. LA 115363, the Greenleaf Mine: AML 1, headframe, view to east.

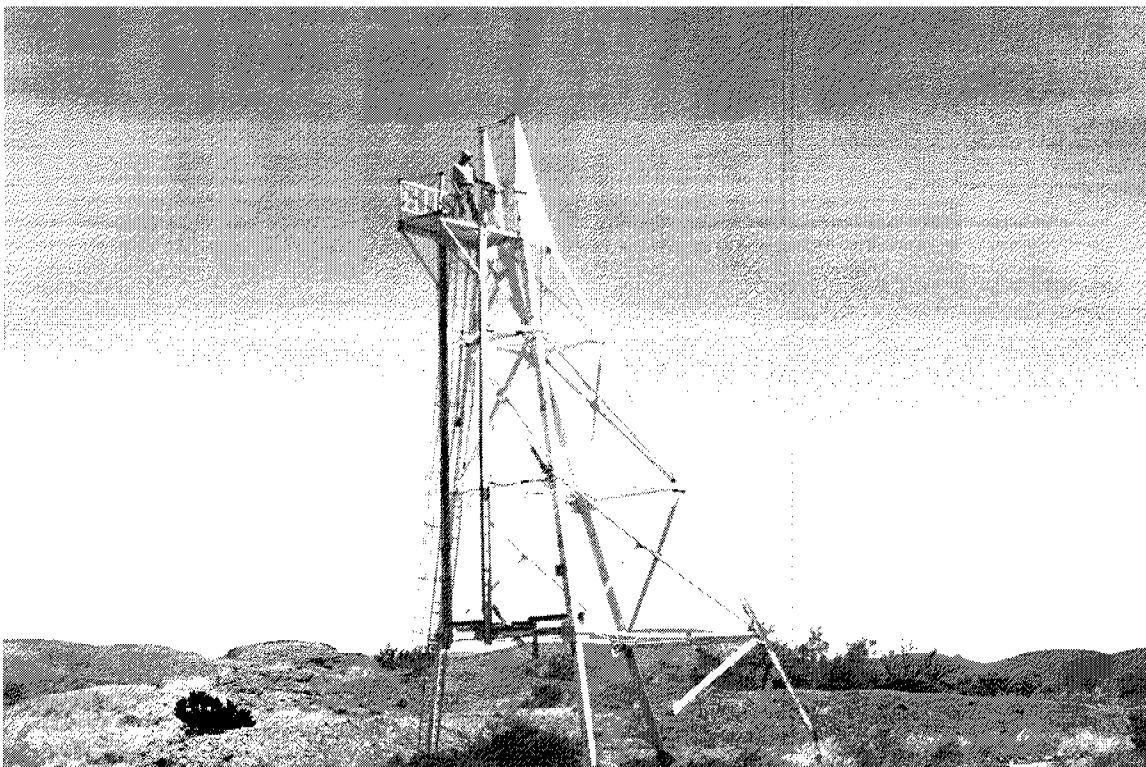


Plate 48. LA 115363, the Greenleaf Mine: AML 1, headframe, view to northeast.



Plate 49. LA 115363, the Greenleaf Mine: AML 1, building pad, view to northeast.



Plate 50. LA 115363, the Greenleaf Mine: AML 1A, shaft, in foreground.



Plate 51. LA 115363, the Greenleaf Mine: AML 1A, open stope, view to north.

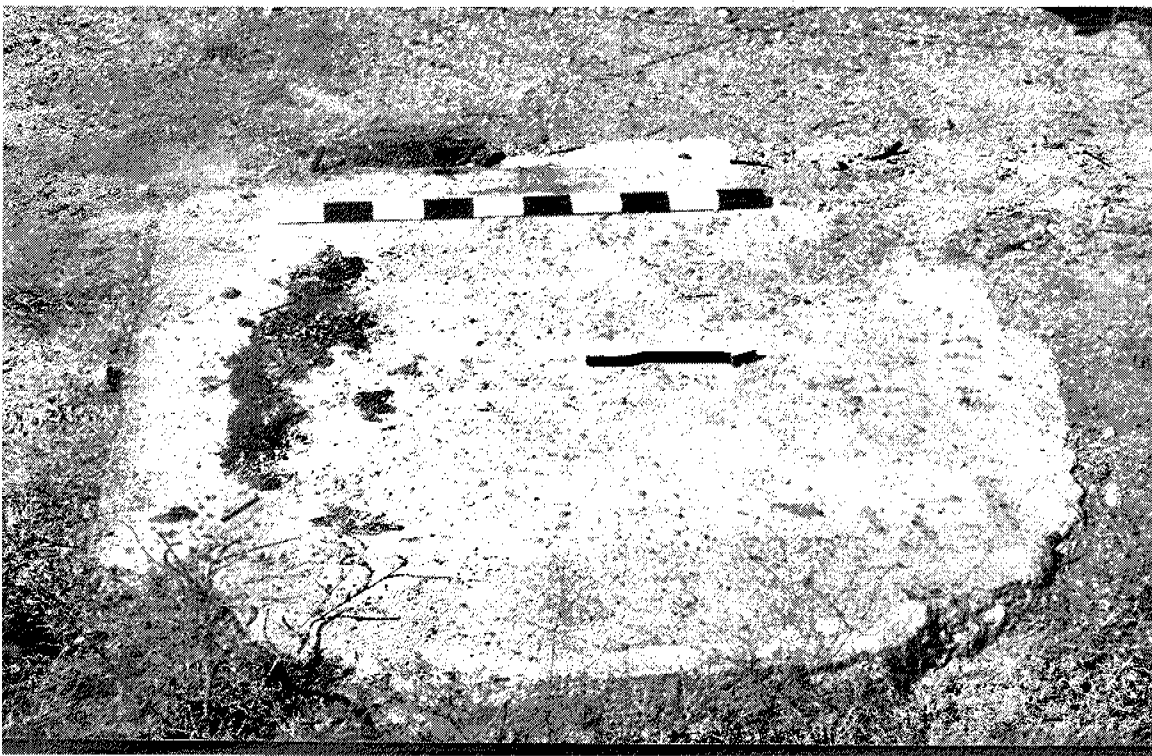


Plate 52. LA 115363, the Greenleaf Mine: AML 1A, hoist engine pad, view to west.



Plate 53. LA 115363, the Greenleaf Mine: rock-walled water tank, view to west.

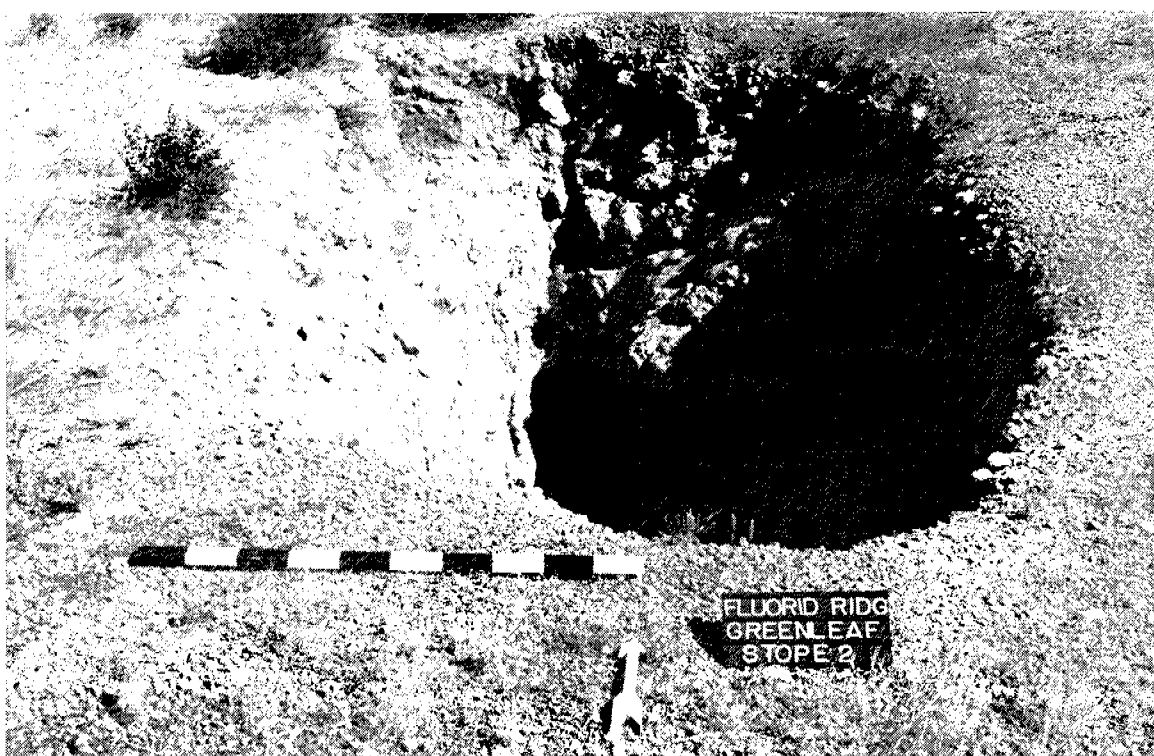


Plate 54. LA 115363, the Greenleaf Mine: AML 1B, open stope, view to north.



Plate 55. LA 115363, the Greenleaf Mine: AML 1C, shaft, view to north.

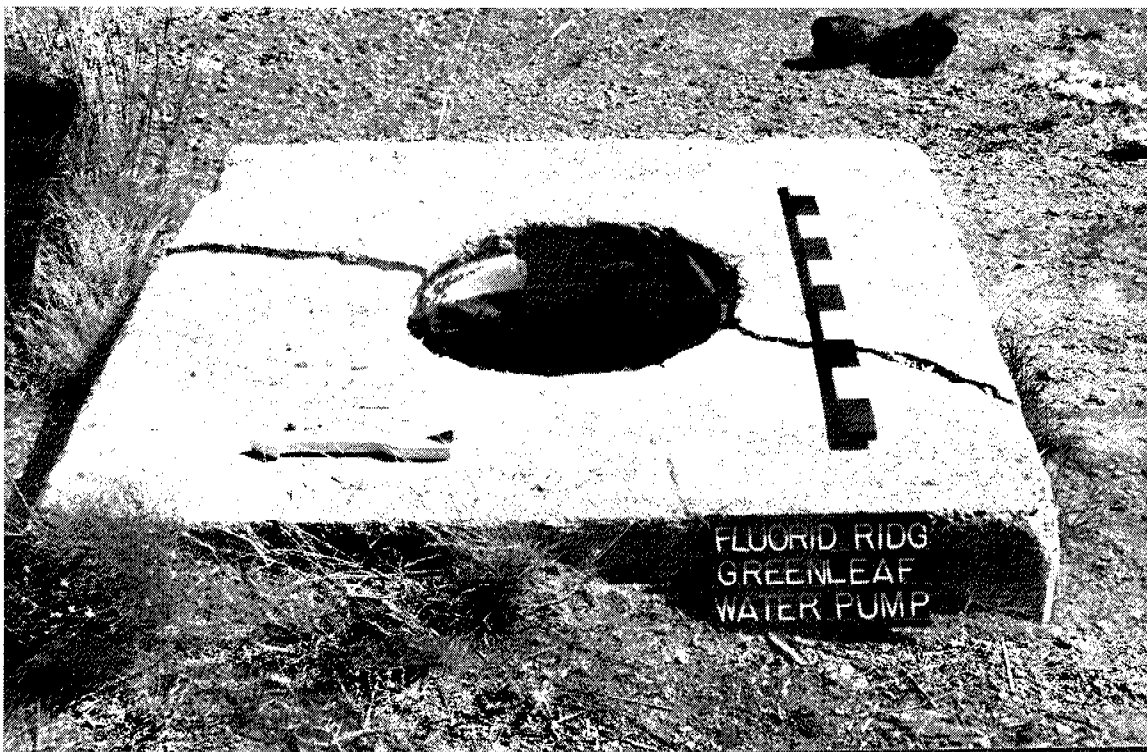


Plate 56. LA 115363, the Greenleaf Mine: AML 1D, pump shaft, view to east.



Plate 57. LA 115363, the Greenleaf Mine: wooden box structure, view to southeast.



Plate 58. LA 115363, the Greenleaf Mine: wooden box structure, view to northeast.

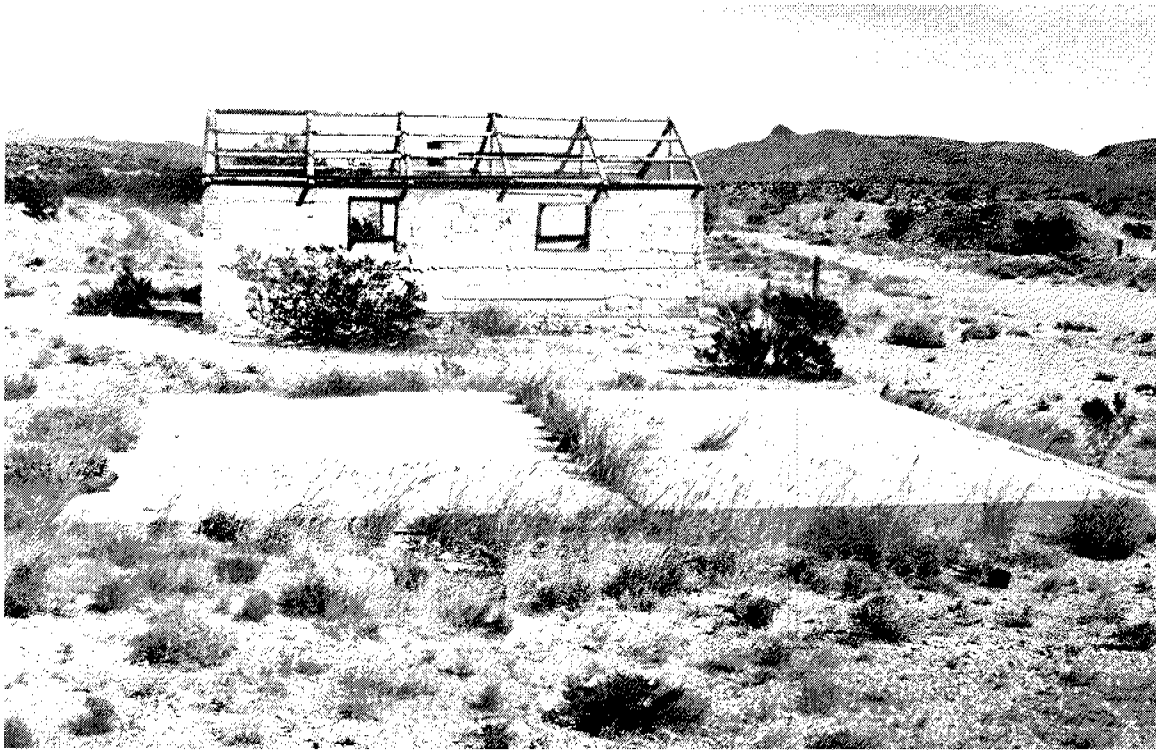


Plate 59. LA 115363, the Greenleaf Mine: concrete building pad, view to north. Note mechanic shop/garage in background.

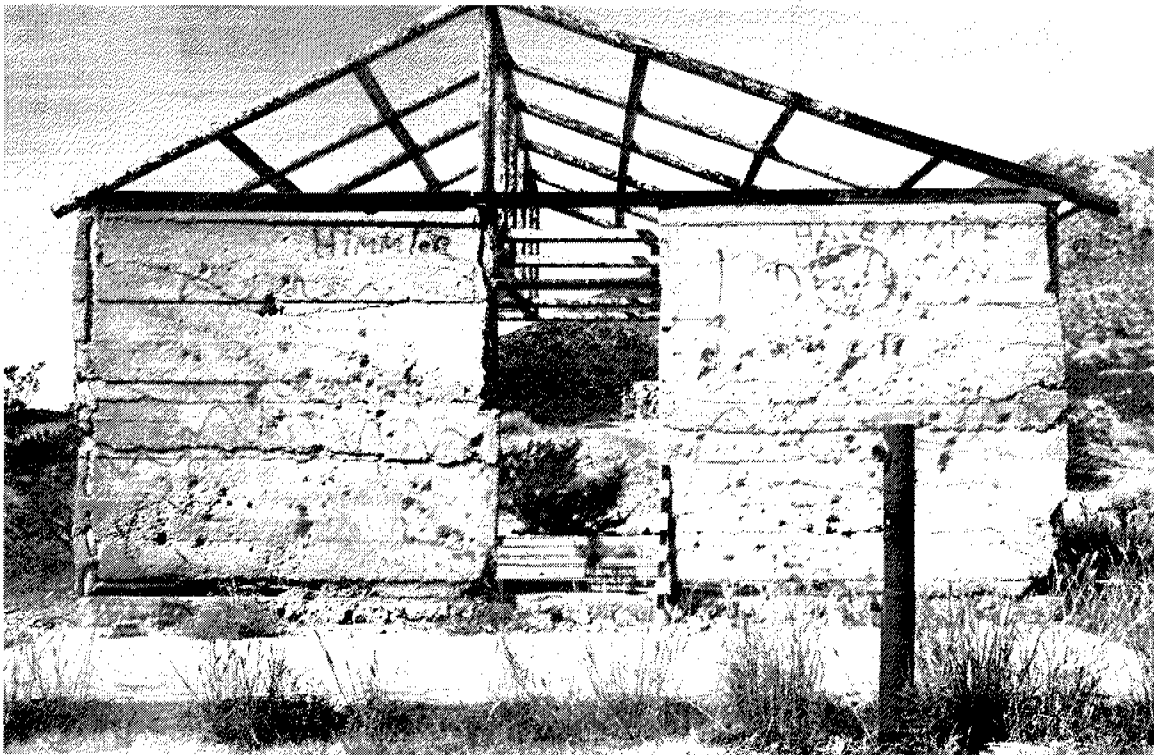


Plate 60. LA 115363, the Greenleaf Mine: mechanic shop/garage, view to west.



Plate 61. LA 115363, the Greenleaf Mine: concrete ore bin and loading dock area, view to north.

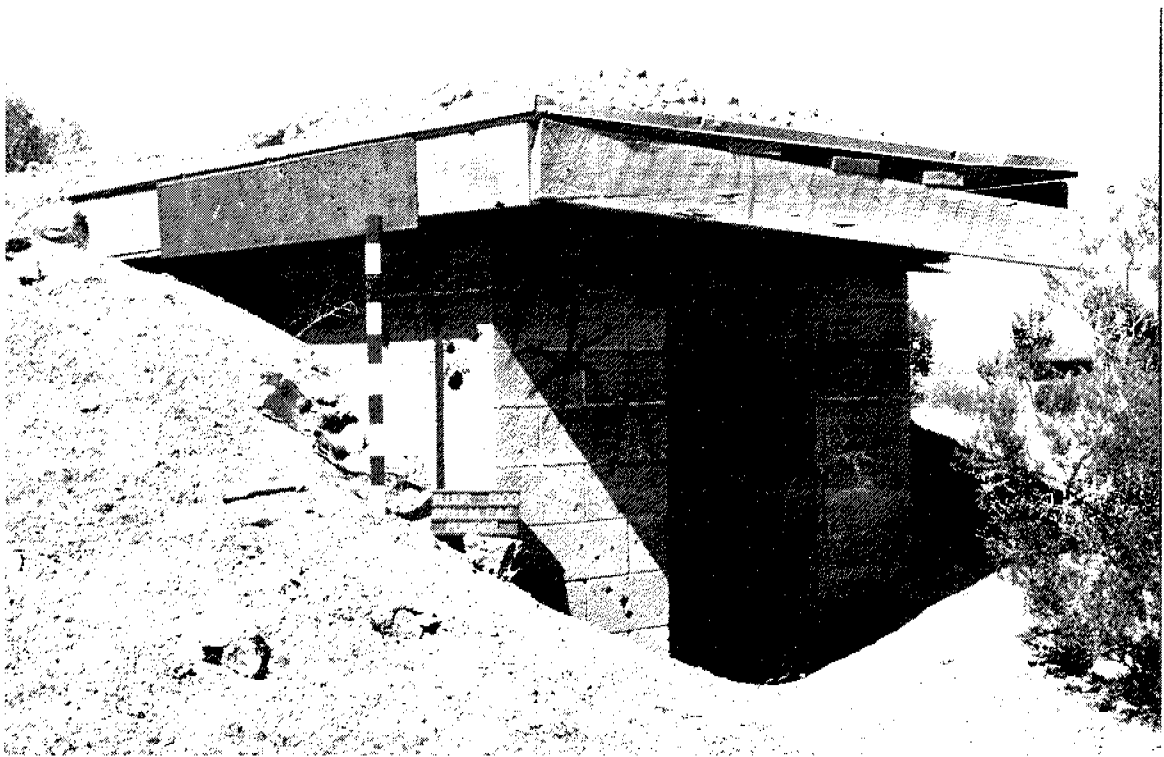


Plate 62. LA 115363, the Greenleaf Mine: probable powderhouse, view to northwest.

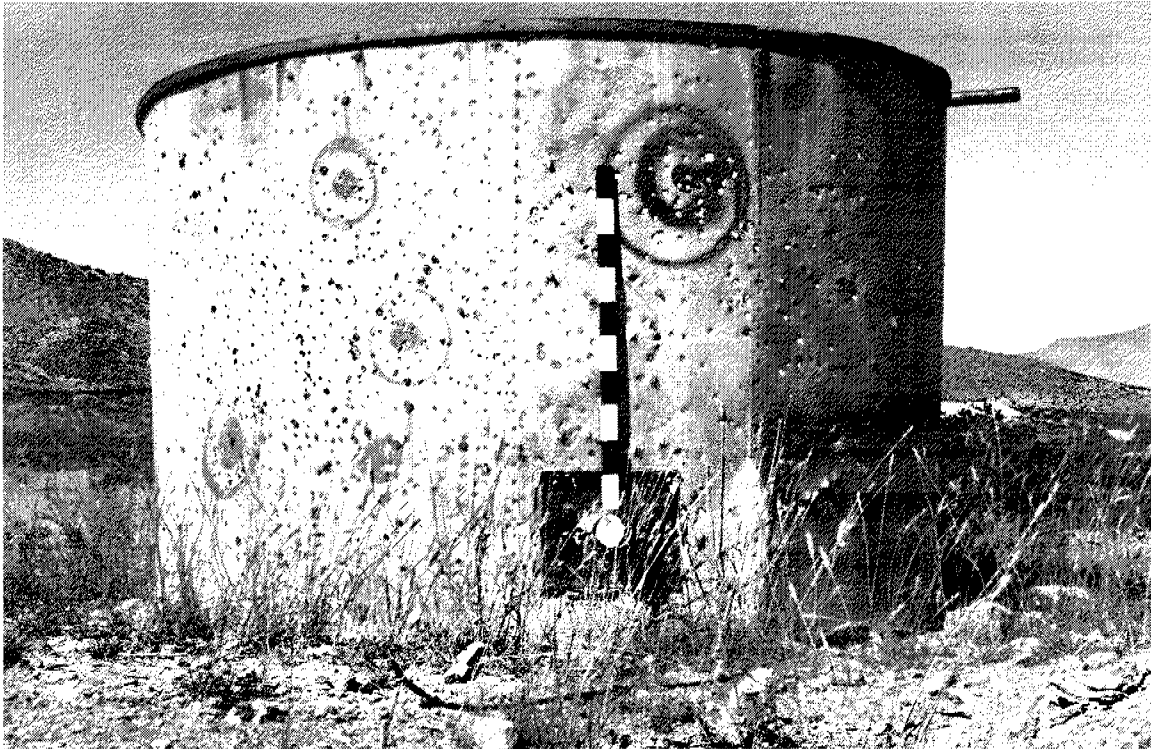


Plate 63. LA 115363, the Greenleaf Mine: steel water tank, view to north.

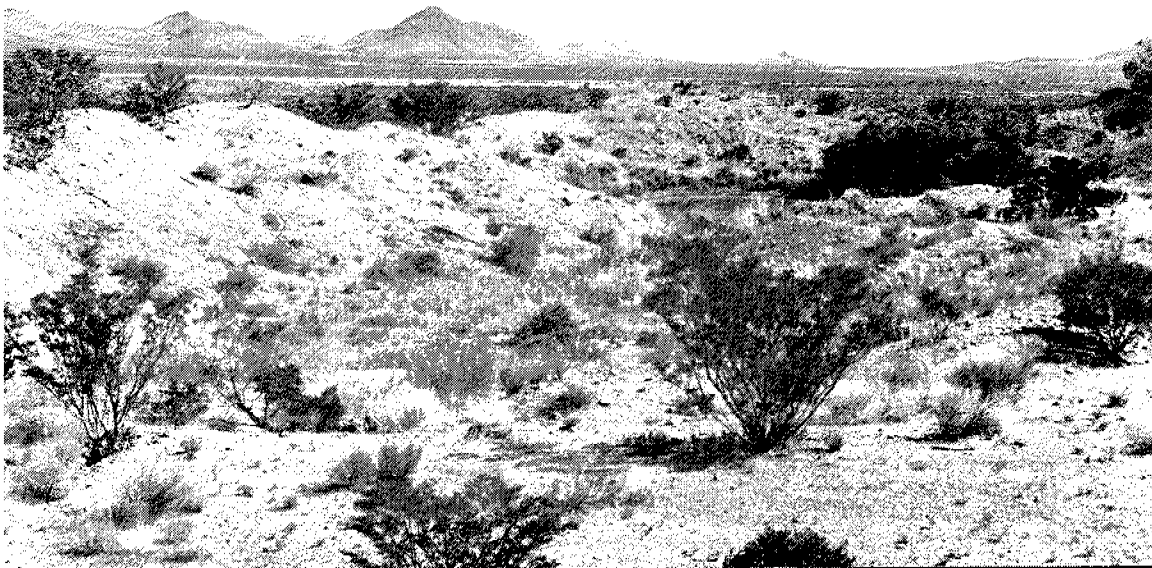


Plate 64. LA 115363, the Greenleaf Mine: water retention ponds. View to east: western pond in foreground, eastern pond in background. Outlet for pipeline from pump shaft is seen in middle ground as a clump of dense, dark brush.



Plate 65. LA 115363, Greenleaf Mine: AML 16 shaft, view to southeast. Feature mistakenly identified as San Juan Mine feature.

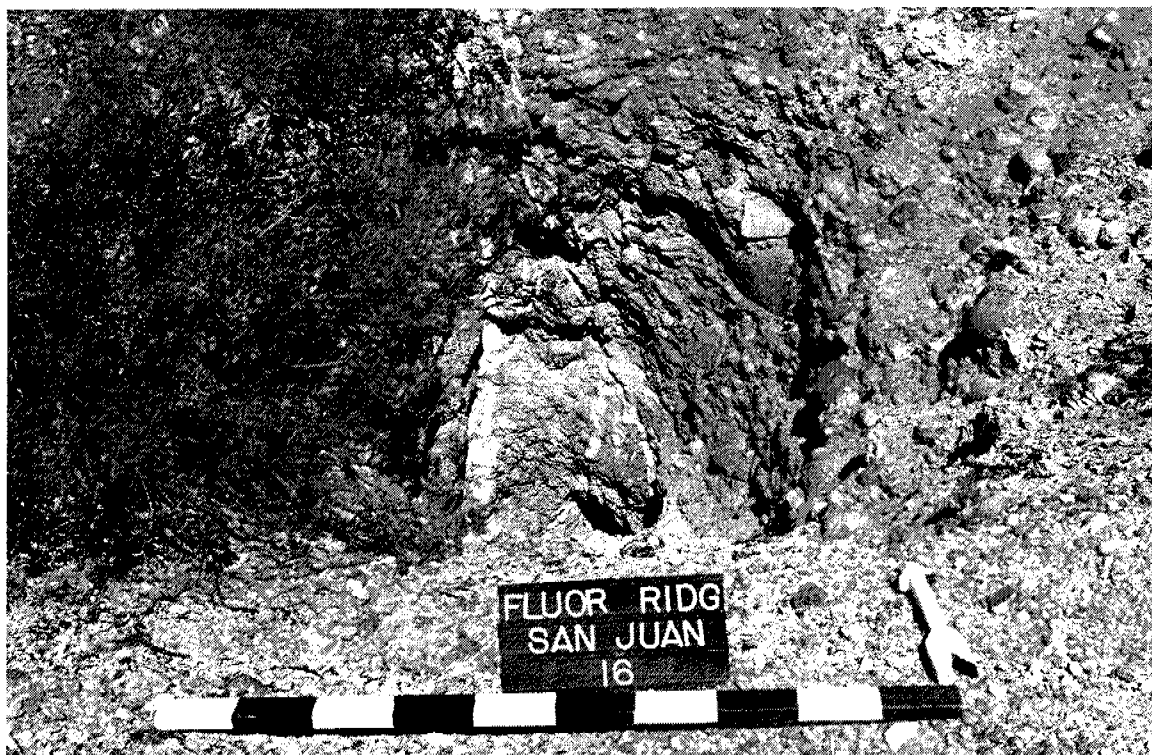


Plate 66. LA 115363, the Greenleaf Mine: AML 16, stope, view to north. Feature mistakenly identified as a San Juan Mine feature.



Plate 67. LA 115363, the Greenleaf Mine: AML 16, dugout structure, view to north.



Plate 68. LA 115363, the Greenleaf Mine: AML 16 dugout structure, view to southwest.



Plate 69. LA 115363, the Greenleaf Mine: AML 2, shaft, view of southwest.



Plate 70. LA 115363, the Greenleaf Mine: AML 2, structure base, view to southwest.



Plate 71. LA 115363, the Greenleaf Mine: AML 5, shaft, view to west.



Plate 72. LA 115363, the Greenleaf Mine: AML 5, shaft, view to north.

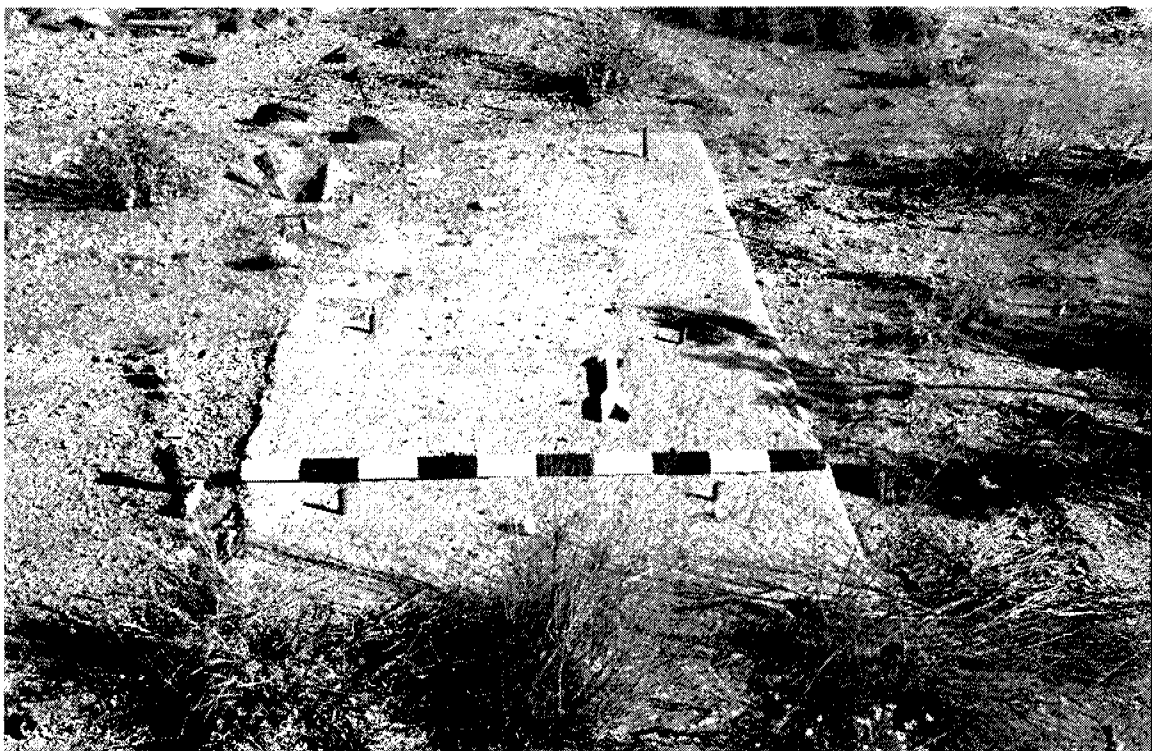


Plate 73. LA 115363, the Greenleaf Mine: AML 5, hoist engine pad, view to north.



Plate 74. LA 115363, the Greenleaf Mine: AML 5, concrete pad, view to west.



Plate 75. LA 115363, the San Juan Mine: AML 6A, shaft, view to north.



Plate 76. LA 115364, the San Juan Mine: AML 6H, shaft, view to north.



Plate 77. LA 115364, the San Juan Mine: AML 6H, stoped hole at north end of trench.

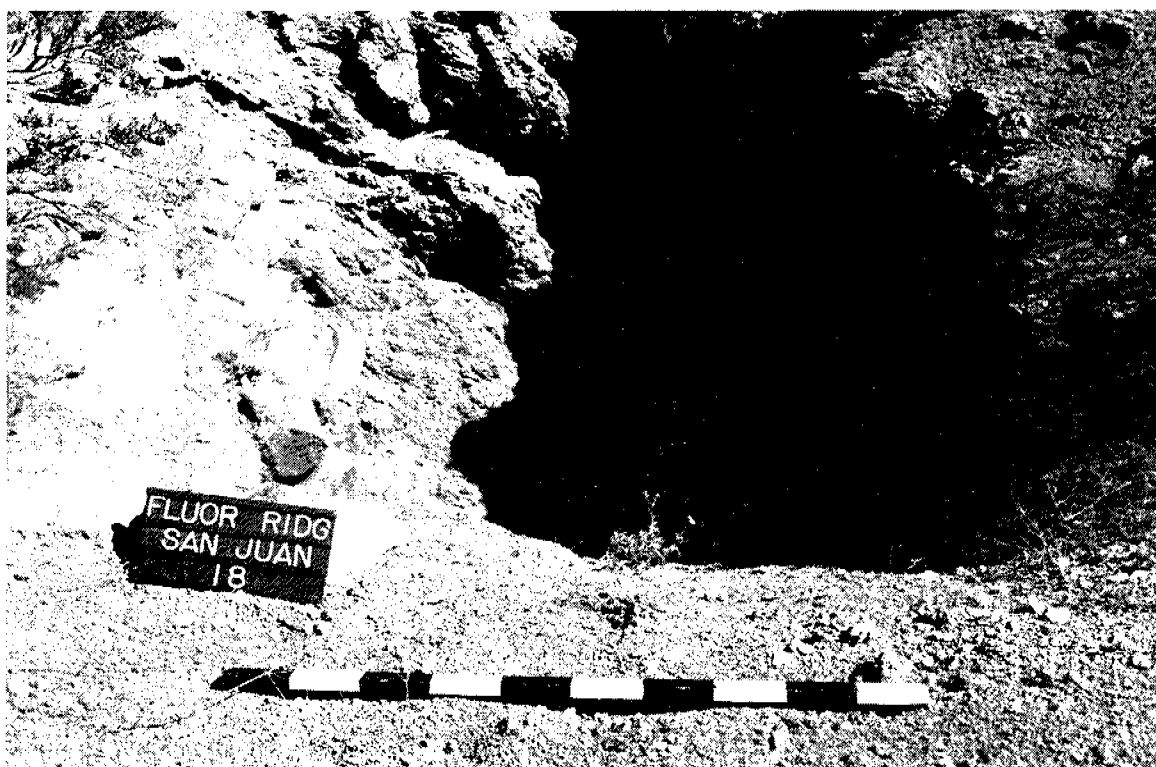


Plate 78. LA 115364, the San Juan Mine: AML 18, shaft, view to northeast.



Plate 79. LA 115364, the San Juan Mine: prospect hole with rock wall, view to southwest.



Plate 80. LA 115364, the San Juan Mine: shallow trench with structural remains, view to north.



Plate 81. LA 115364, the San Juan Mine: powderhouse, view to northwest.



Plate 82. LA 115364, the San Juan Mine: AML 6C, shaft, view to northeast.



Plate 83. LA 115364, the San Juan Mine: AML 6D, stoped hole, view to north.



Plate 84. LA 115364, the San Juan Mine: AML 6B, stoped hole, view to south.

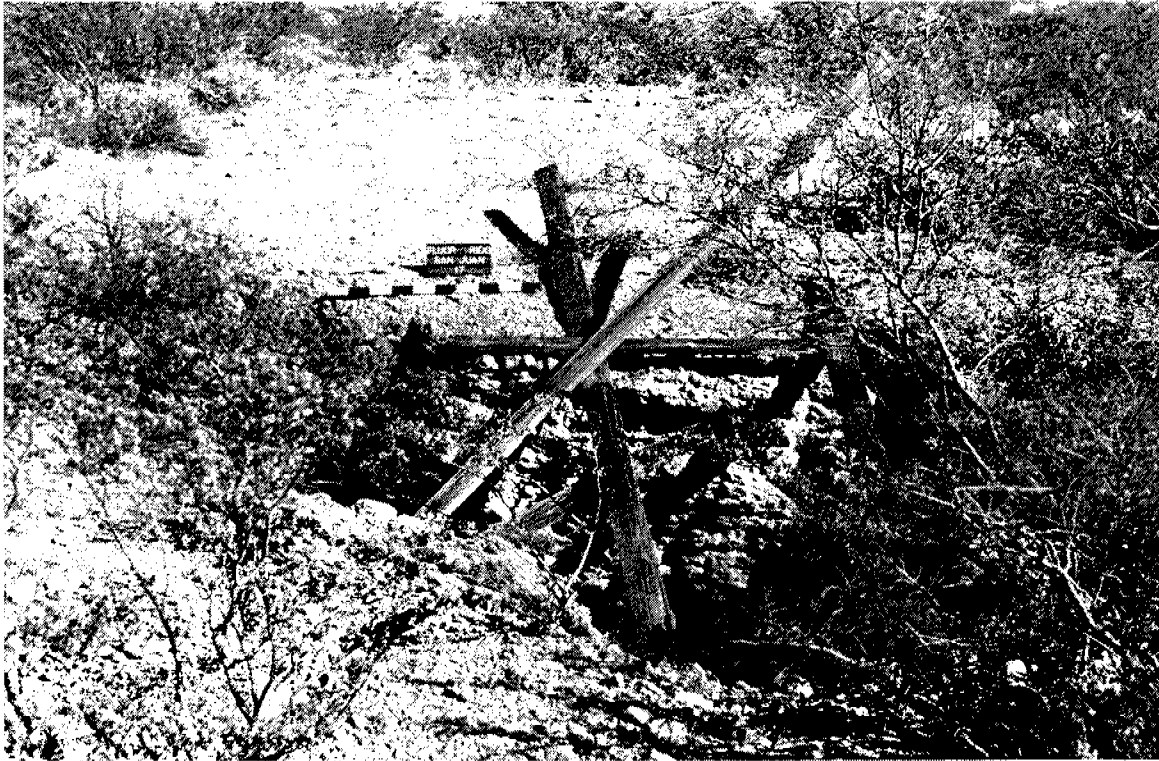


Plate 85. LA 115364, the San Juan Mine: AML 17, stopped hole, view to east.



Plate 86. LA 115364, the San Juan Mine: AML 14, open stopped hole, view to north.



Plate 87. LA 115364, the San Juan Mine: AML 15, open stoped hole, view to southeast.

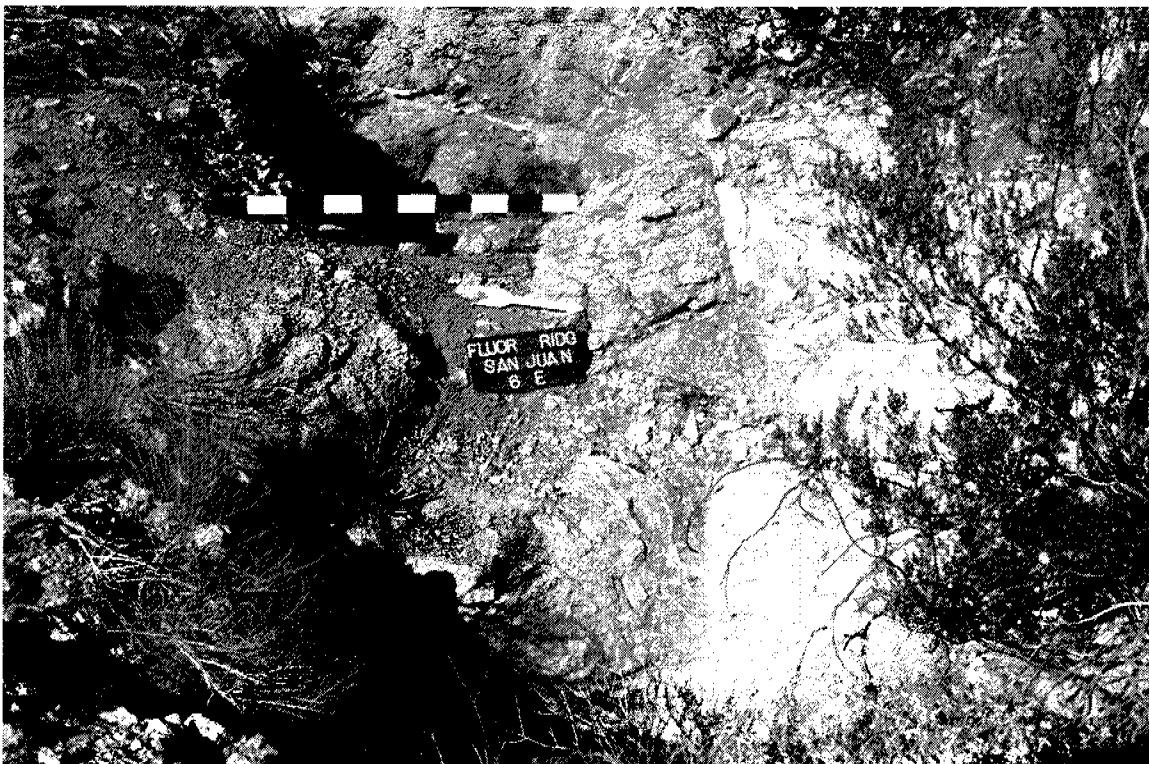


Plate 88. LA 115579, the Williams Brothers Prospect site: AML 6E shaft and prospect hole, view to southeast.



Plate 89. LA 115579, the Williams Brothers Prospect site: AML 6F, shaft, view to southwest.

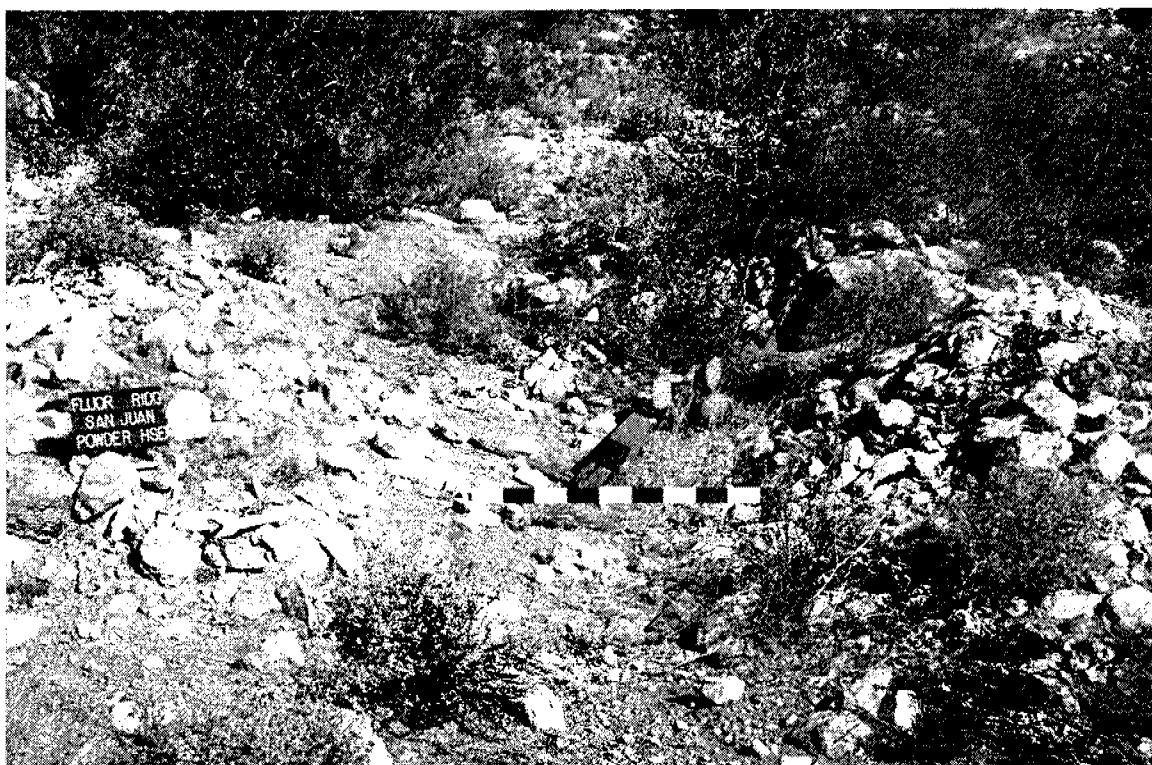


Plate 90. LA 115579, the Williams Brothers Prospect site: dugout structure, view to northwest.

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