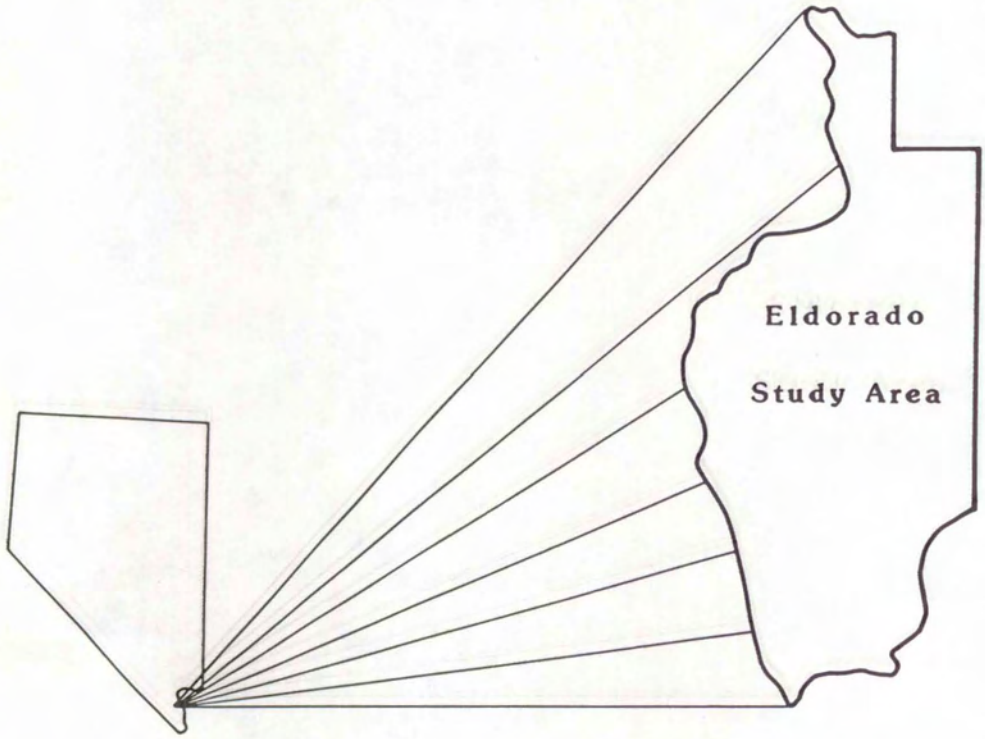
MLA 44-88

Mineral Land Assessment/1988
Open File Report

Mineral Resources of the Eldorado Study Area, Clark County, Nevada



BUREAU OF MINES

UNITED STATES DEPARTMENT OF THE INTERIOR

MINERAL RESOURCES OF THE ELDORADO STUDY AREA, CLARK COUNTY, NEVADA

by
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MLA 44-88

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UNITED STATES DEPARTMENT OF INTERIOR
Donald P. Hodel, Secretary

BUREAU OF MINES
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PREFACE

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U.S. Geological Survey and U.S. Bureau of Mines to conduct mineral surveys on U.S. Bureau of Land Management administered land designated as Wilderness Study Areas ". . . to determine the mineral values, if any, that may be present . . . ." Results must be made available to the public and submitted to the President and the Congress. This report presents the results of a Bureau of Mines mineral survey of a portion of the Eldorado Wilderness Study Area (NV-050-423), Clark County, NV.

This open-file report will be summarized in a joint report published by the U.S. Geological Survey. The data were gathered and interpreted by Bureau of Mines personnel from Western Field Operations Center, East 360 Third Avenue, Spokane, WA 99202. The report has been edited by members of the Branch of Resource Evaluation at the field center and reviewed at the Division of Mineral Land Assessment, Washington, DC.

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UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

ft	foot
in.	inch
mi	mile
oz	troy ounce
oz/ton	troy ounce per ton
ppb	part per billion
ppm	part per million
%	percent

SUMMARY

In 1987, at the request of the Bureau of Land Management, the U.S. Bureau of Mines studied 11,069-acres of the 12,290-acre Eldorado Wilderness Study Area (NV-050-423) in order to evaluate its identified mineral resources. The study area is located in Clark County, NV, adjacent to and northeast of the town of Nelson.

There are inferred subeconomic resources on the Paul (gold, silver), Bel (gold, silver), Big Horn-Inez (silver, copper, lead, zinc) claims, and Montezuma (gold, silver, copper, lead, zinc) patented claim group in the Eldorado study area. Because of lack of exposures, tonnage and grade on these properties could not be determined. No resources were identified for the other five properties examined in the area. The southern two-thirds of the area is in the Eldorado mining district, a base- and precious-metal district which has been intensely explored for over 100 years. Nine claim groups were examined in the study area. Eight claim groups are within the Eldorado district and include the Montezuma (patented - M.S. 3966), Bel, Eldorado, VAR, SINJUN, Paul, Rusty Bit, and Big Horn-Inez. One property, the Flintstone claim group, is north of the Eldorado mining district at the north end of the study area.

High-grade gold-silver veins, just south of the study area at the Techatticup mine, were a major source of production in the district. Mining ceased at a depth of about 600 ft for unknown reasons. Major mining companies, including Exxon and Placer Amex, located a few claims in the study area in the early 1980's, but dropped their interest by 1987 (written communication from the companies, 1987). Inside the study area, the Paul, Bel, and Big Horn-Inez claims and Montezuma patented claim group have favorable geology for base- and/or precious-metal deposits. The Paul and Bel claims overlie highly altered and brecciated quartz monzonite (described as Nelson "chaos" by geologists), which contains quartz-calcite filled veins possibly carrying economic quantities of gold and silver. The Big Horn-Inez claims and the Montezuma patented claim group cover Precambrian gneissic terrain which contains scattered copper minerals possibly associated with later granitic intrusive stocks.

Three Bureau of Land Management "material sites" (gravel pits), one granted in 1948 and two in 1950, situated along Nevada State Highway 165 are partly in the study area. The sites extend over both patented and unpatented claims as well as unclaimed lands. Alluvium on these sites has apparently been used for local road construction. On the east side of the area, there is limited gravel in the dry stream beds and extensive gravel in alluvial fans on the adjacent Lake Mead National Recreation Area. No demand is expected for sand and gravel from within the study area, except adjoining Nevada Highway 165. Road rehabilitation or modification would probably utilize material from the material sites.

A small area containing pumice, a lightweight aggregate, is present on the Eldorado claims, but is too small to be commercial. The study area has no known oil and gas or geothermal resources, and there has been no significant industry interest for these commodities in the vicinity. No radioactive anomalies were found during this investigation, and there are no other indications of uranium resources in the study area.

INTRODUCTION

This report describes the USBM (U.S. Bureau of Mines) portion of a cooperative study with the USGS (U.S. Geological Survey) to evaluate mineral resources and potential of a portion of the 12,290-acre Eldorado WSA (Wilderness Study Area) at the request of the BLM (U.S. Bureau of Land Management). The USBM examines individual mines, prospects, claims, and mineralized zones, and evaluates identified mineral and energy resources. The USGS evaluates potential for undiscovered resources based on areal geological, geochemical, and geophysical surveys. Results of the investigations will be used to help determine the suitability of the study area for inclusion into the National Wilderness Preservation System. Although the immediate goal of this and other USBM mineral surveys is to provide data for the President, Congress, government agencies, and the public for land-use decisions, the long-term objective is to ensure the Nation has an adequate and dependable supply of minerals at a reasonable cost.

Setting

In 1987 and 1988, the USBM studied 11,069 acres of the 12,290-acre Eldorado WSA. The Eldorado study area is located in southern Nevada, adjacent to and northeast of the town of Nelson and adjoins the west side of the Lake Mead National Recreation Area (fig. 1). Access from the north is by dirt roads, and from the west and south is by Nevada Highway 165. Four-wheel-drive vehicle access on the east is possible by driving up washes, but is prohibited by the U.S. National Park Service.

The terrain consists of rugged mountains with elevations ranging from about 2,320 to 3,871 ft. Vegetative cover is generally sparse and consists of grasses, cacti, and other succulants. Cholla cacti are particularly thick on the east side of the study area.

Previous Studies

Many reports and newspaper articles describe mining and other activity in the Eldorado mining district. These are noted in the section on mining history. Dr. O. Lowe reported early geological investigations by "an assistant of Professor Silliman, in 1865; by the State geologist of Nevada, in 1869;" (Wheeler, 1876, p. 61). The first published geologic report covering the area was made by G. K. Gilbert in 1871 during the Wheeler topographic survey (Kantor, 1961, p. 3). Spurr (1903, p. 15-17, 138-139, plates I and II) reported Gilbert's work in a publication which is more widely available. Ransome (1907, p. 63-68)

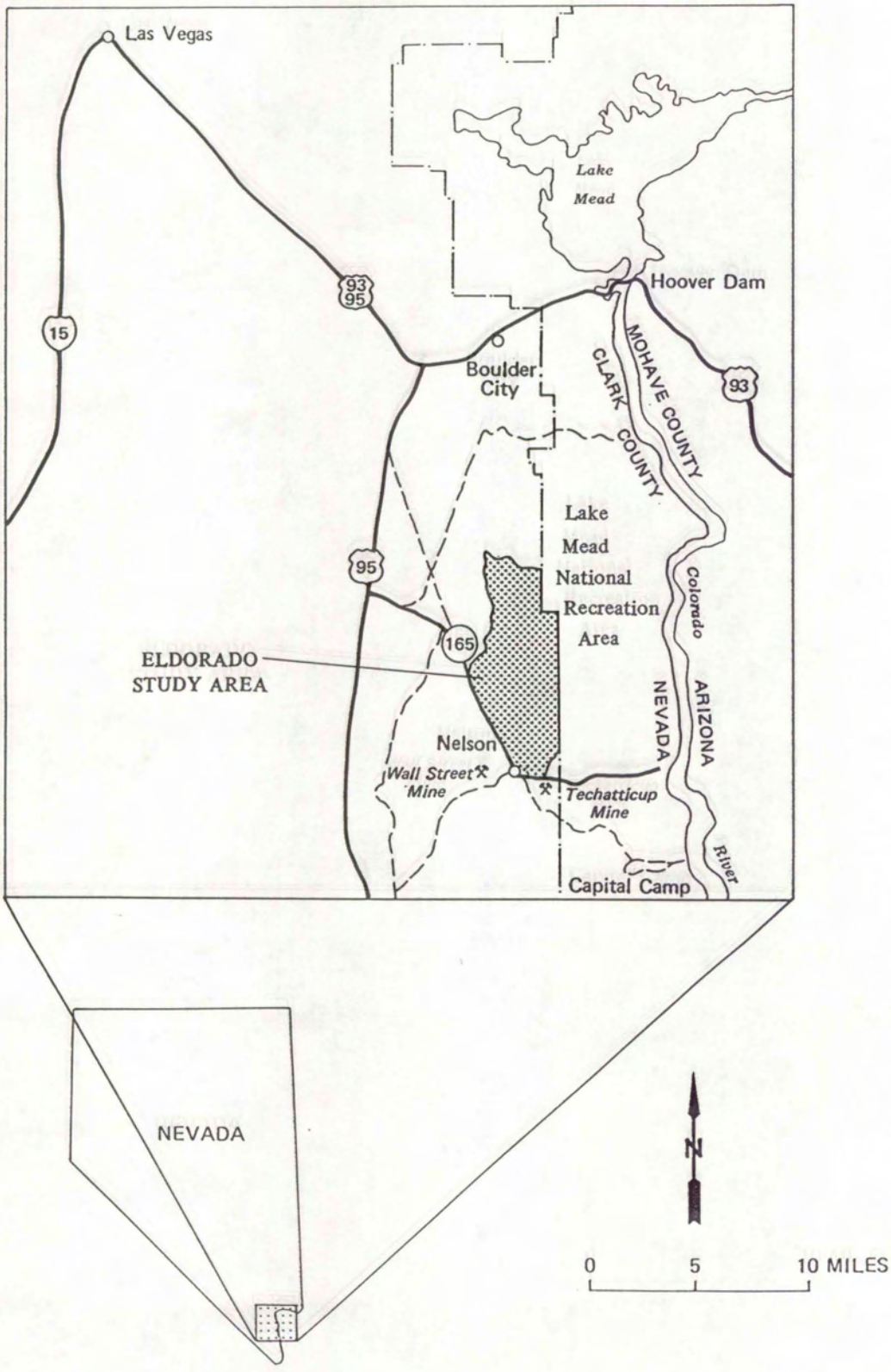

FIGURE 1.– Index map showing location of the Eldorado study area, Clark County, NV

conducted a brief reconnaissance of the Opal Mountains (Eldorado Mountains). Bowyer and others (1958) mapped the area on a 1:200,000 scale. Other geologic reports that are pertinent to the study area include Longwell's (1963) reconnaissance mapping, Longwell and others' (1965) geologic and mineral resource study of Clark County, Anderson's (1971) discussion of thin skin distension in Tertiary rocks, Anderson's (1977) geologic map of the Boulder City 15' quadrangle, Stewart and Carlson's (1978) geologic map of Nevada, and Stewart's (1980) report accompanying the geologic map. Geophysical studies are described in Bracken and Kane's (1982) gravity map of the Kingman 2° sheet and Luning and others' (1982) NURE study of the same area. Qualheim (1978) did a hydrogeochemical and stream sediment study of the area covered by the Kingman 2° sheet. Hewett and others (1936) discussed the mineral resources around Boulder Dam. Smith and Tingley (1983a, 1983b) reported on the Stateline Resource Area for BLM including the results of a geochemical sampling program, and the U.S. Bureau of Land Management (1983) contracted a G-E-M study of the Eldorado WSA. Sandberg (1982, 1983) mapped and described petroleum potential of wilderness study areas in Nevada.

Present Study

The USBM investigation of the study area included collection of information related to current and past mining activities. Library research included examination of USBM's files and MILS (Mineral Industry Location System). Claim location data was taken from BLM mining claim recordation indices, land status maps, mineral survey plats, and use records, and from Clark County, NV, claim records.

The field investigation was conducted during spring 1987 and 1988. Ninety-one rock samples were collected. Rock samples were of four types: 1) chip - a regular series of rock chips taken in a continuous line across an exposure; when taken at regular intervals rather than continuously, it is called intermittent; 2) grab - a collection of rock fragments taken at random from an homogeneous outcrop; 3) select - mineralized samples collected from dumps to characterize deposits; 4) channel - sample of uniform width and depth cut in exposed bank.

Rock samples were crushed, pulverized, and split at WFOC (Western Field Operations Center). All samples were checked in the WFOC laboratory for radioactivity and fluorescence. Seventy-three samples were sent to a commercial laboratory and analyzed for 18 elements 1/ by inductively coupled plasma methods (ICP), the remaining 18 samples were

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1/ The elements reported and their detection limits are: antimony (0.25 ppm), arsenic (1 ppm), bismuth (0.25 ppm), cadmium (0.25 ppm), copper (unknown), gallium (0.5 ppm), gold (0.05 ppm), lead (unknown), mercury (.1 ppm), molybdenum (.1 ppm), palladium (0.1 ppm), platinium (0.25 ppm), selenium (1 ppm), silver (0.014 ppm), tellurium (0.5 ppm), tin (0.5 ppm), thallium (0.5 ppm), zinc (1 ppm).

analyzed at another laboratory for 17 elements 2/ using atomic absorption spectroscopy, ICP, direct current plasma, and x-ray fluoresence.

ACKNOWLEDGEMENTS

The authors thank Carman Ridland and Alfred Schleicher for information on their claims. Edward Seggerson graceously provided information on his patented claim. John C. Kerkering provided software for geophysical data analysis. John Benham, geologist, and Bill Hale, supervisory physical scientist at WFOC ably assisted in the field.

GEOLOGIC SETTING

Rock Units

The following geologic description of the area is generalized from Hansen (1962), Longwell (1963), Anderson (1971), Volborth (1973), Smith and Tingley (1983a), and Kern and others (1988). The study area is underlain by Precambrian rocks which are intruded by a quartz monzonitic pluton, and granitic to dioritic dikes and irregular small plutons of unknown age; these rocks are capped by unmineralized Tertiary volcanic rocks. All rocks in the study area are cut by north-trending basin and range faults (fig. 2).

The Precambrian rocks, mainly gneiss (in part garnetiferous), schist, and granite, are exposed on the southeast side of the study area and commonly contain copper-bearing minerals. The gneiss is highly folded and faulted with crosscutting quartz veins.

Unconformably overlying the Precambrian rocks are the Patsy Mine Volcanics which include upper and lower andesitic units and a middle rhyolitic unit. A thick sequence of explosion breccia in the lower part of the formation was thought to be Eocene by Longwell (1963, p. E18), but mapped as Miocene by Anderson (1977).

The light colored and rhyolitic Tuff of Bridge Spring (Golden Door Volcanics of Longwell, 1963) overlies the Patsy Mine Volcanics. It is mainly exposed around Bridge Spring and east of Oak Creek Canyon (figs. 2 and 3). The tuff is unconformably overlain by 11- to 15-million year old Miocene Mount Davis Volcanics (Anderson, 1971, p. 51), which consists of a basal andesite unit, rhyodacite, and a cap of basalt. The youngest rocks in the study area are the sedimentary Muddy Creek Formation. Quaternary alluvium and colluvium cover the northernmost part of the area and the dry stream valleys.

2/ The elements reported and their detection limits are: antimony (5 ppm), arsenic (5 ppm), barium (20 ppm), bismuth (2 ppm), chromium (1 ppm), cobalt (1 ppm), copper (1 ppm), gold (5 ppb), lead (5 ppm), manganese (1 ppm), mercury (0.05 ppm), molybdenum (1 ppm), nickel (1 ppm), selenium (5 ppm), silver (0.1 ppm), tungsten (10 ppm), zinc (1 ppm).

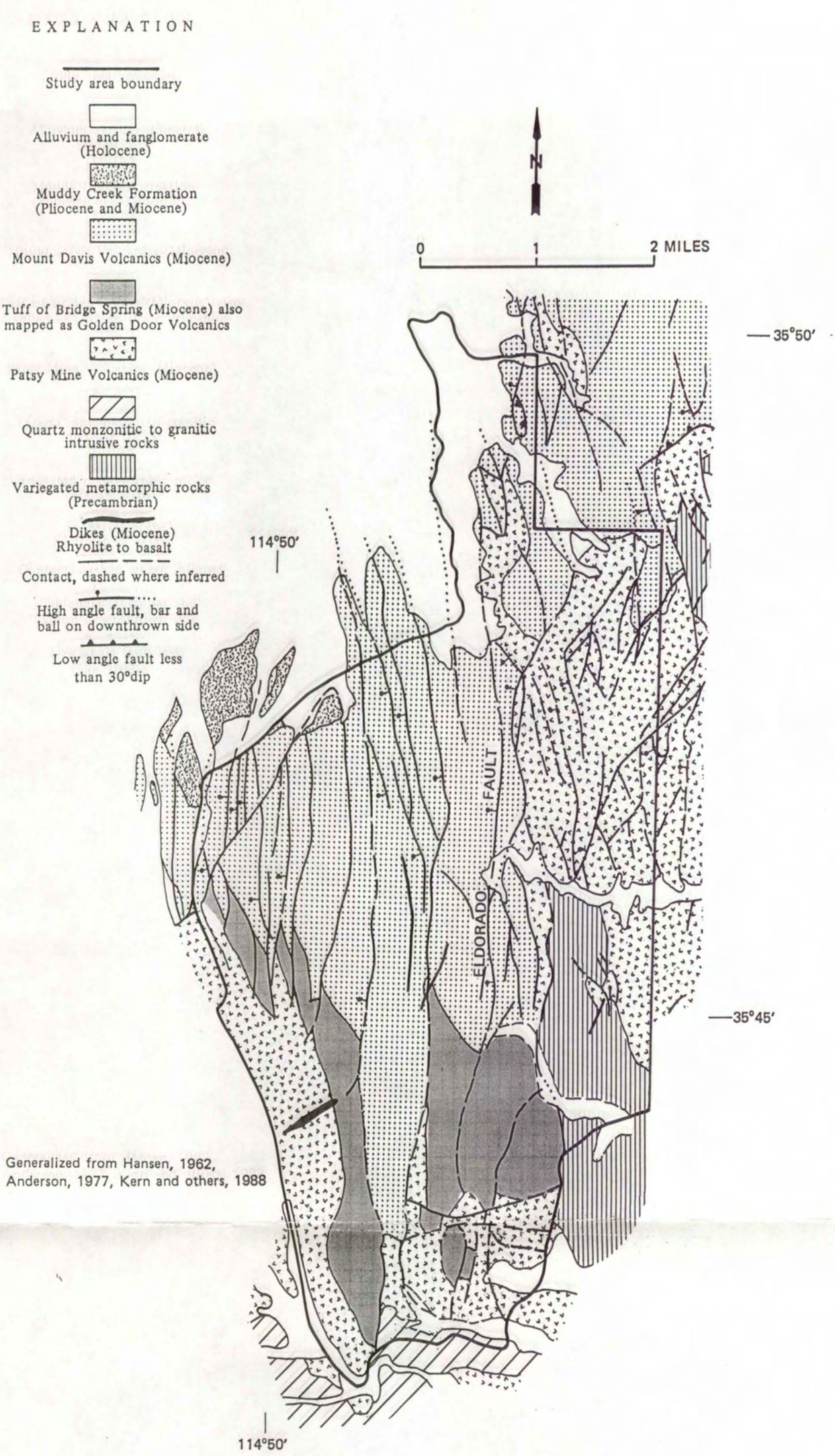

FIGURE 2.– Generalized geologic map of the Eldorado study area, Clark County, NV

The Nelson Quartz Monzonite (Hansen, 1962) intrudes the Precambrian rock and mostly crops out south of the study area, but is exposed at the southern tip of the study area (fig. 2). The east-trending pluton is the main host rock for mineralization in the Eldorado district. Age of the pluton is uncertain, but dating of similar intrusive bodies in the region give potassium-argon, fission track, and zircon lead-alpha dates from 8.1 to 27 million years old (Longwell, 1963, p. E18; Anderson, 1971, p. 45; Volborth, 1973, p. 39).

Structural Fabric

The study area is within the Basin and Range Physiographic Province. The area west of the Eldorado Fault was named the Nelson block, and the area to the east was named the Eldorado block by Longwell (1963). Recent workers in the area postulate three structural zones. The lower zone is a plate characterized by Nelson Quartz Monzonite and Precambrian gneiss. This is overlain by a detachment zone that contains the lower Patsy Mine Volcanics and the Nelson Quartz Monzonite which contains the "Nelson Fault Zone" or Nelson "chaos." Overlying the detachment zone is an upper plate of Patsy Mine and younger volcanics that are cut by numerous northerly trending faults (Kern and others, 1988). The "detachment" is not generally expressed as a single surface, but is a mass of anastomosing faults with every direction of movement. Some strike-slip movement is possible, but has not been proven. Anderson (1971, p.43) postulated left-lateral strike-slip faulting with movement of at least 20,000 ft along the "Nelson Fault Zone.".

Mineralized Structures

Mineralized structures in and near the study area consist of precious- and base-metal veins and stockworks with quartz-calcite gangue. The Nelson Quartz Monzonite of Hansen (1962), an east-trending pluton, contains an east-trending fault and fracture zone which hosts mineralized veins and stockworks in the Eldorado mining district. The pluton is exposed east of Nelson, at the south end of the study area on both sides of Highway 164 (including on the Paul and Bel claims, figs.2 and 3). Kern and others (1988, p. 67) propose an east-trending detachment fault zone as a factor which controlled mineralization. The Nelson pluton has been intensely fractured in many places, but at the Techatticup mine fracturing and propylitization of the rock are minor in the vicinity of the gold-silver veins. Mineralized zones occur in fissure veins that generally trend east within, and parallel to, the intensely fractured Nelson fault zone. The veins range from vertical to low-angle in dip, and typically contain quartz and calcite gangue and occasionally specularite. Mining began on oxidized near-surface rock containing hornsilver, free gold, chrysocolla, and probably some oxides of lead and zinc; and proceeded into the sulfide zone, containing chalcopyrite, pyrite, galena, and sphalerite.

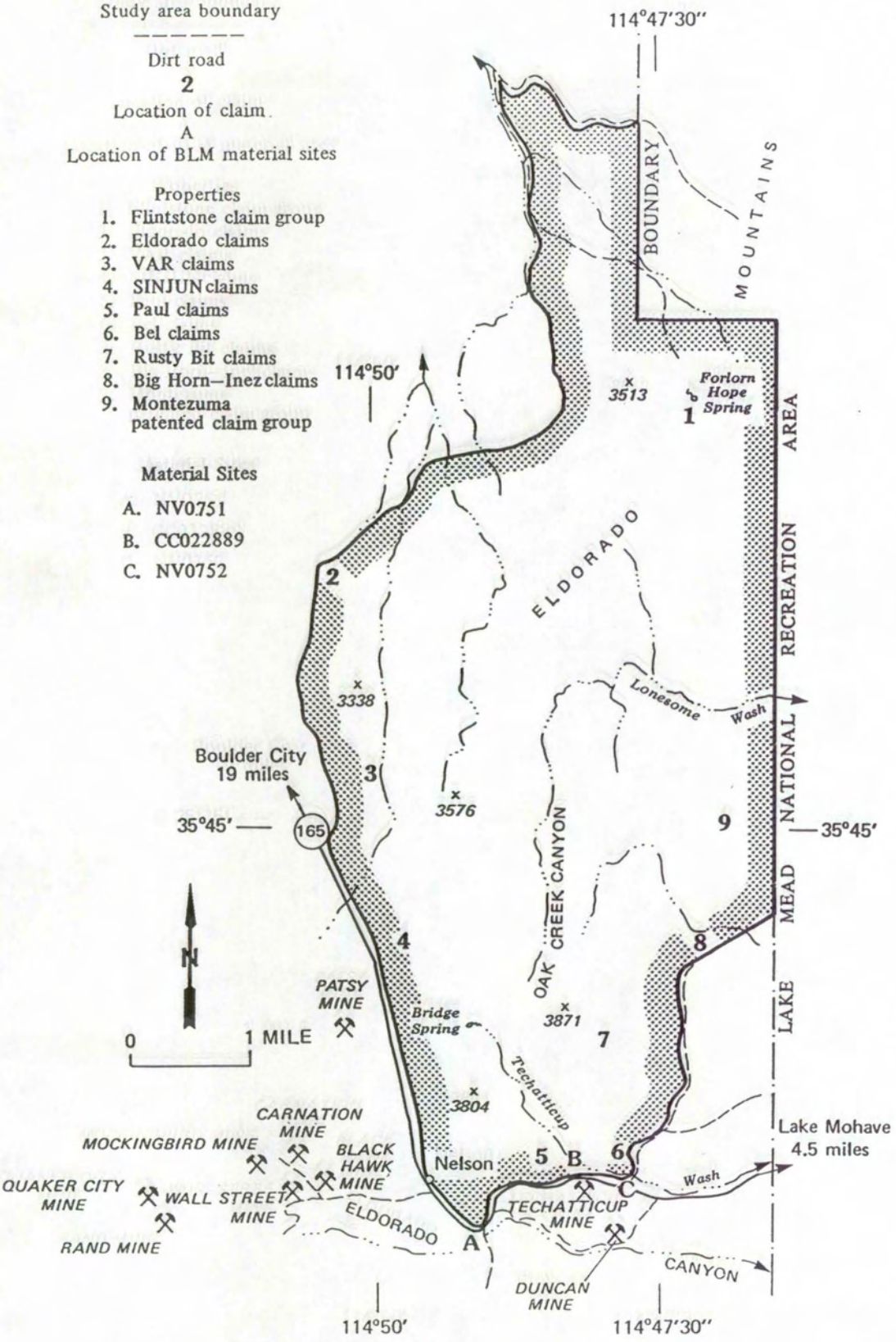

FIGURE 3.— Location of mines, claims, and prospects in and near the Eldorado study area, Clark County, NV

On the Big Horn and Montezuma claims base- and precious-metal-rich quartz veins and veinlets occur both along and crosscutting foliation in Precambrian gneiss, within intrusive granitic dikes and small bodies, and at the contact between the pluton and propylitically altered andesite flows and dikes. Mineralization on these claims may have been coincident with mineralization in the Nelson pluton. Smith and Tingley (1983a, p. 62) suggest that the Eldorado mining district is underlain by plutonic rocks.

Mercury occurrences in the region were only reported along the contact between highly fractured and altered Tertiary rhyolite and andesite flows at the Patsy mine (fig. 3)(Bailey and Phoenix, 1944). Volborth (1973, p. 15) suggests that significant mineralization in the Nelson area was mainly post-Miocene resulting from venting of hydrothermal fluids at the edge of fault blocks. However, Kern and others (1988, p. 67) suggest that the ore deposits were formed by passive flooding of epithermal fluids in large fault zones. During this study, mineralized rock was not seen along north-trending block faults or within upper Miocene-age volcanic rocks.

MINING HISTORY

Prospecting and Mining

The Eldorado mining district, located on the south and west sides of the study area, was organized as the Colorado mining district in 1861 and has since been reported as the El Dorado, Eldorado Canyon, and Nelson mining districts (Raymond, 1872, p. 266; Carlson, 1974, p. 106). When gold was discovered, the district was part of the New Mexico Territory. The area, which for a short time was included in Pah-ute County, Arizona Territory, became part of Lincoln County, NV, in 1866. Lincoln County was divided into two counties in 1908 with this region being part of the newly formed Clark County (Hansen, 1962, p. 185).

The first recorded discovery of gold and silver was either at the Techatticup mine in 1857 by soldiers from Fort Mohave (Hansen, 1962. p. 218) or on the Honest Miner claim, now part of the Rand (or Eldorado Rand) (fig. 3) property (Vanderburg, 1937, p. 26). The first mine developed (in 1862 or 1863) was the Techatticup (Tekehetukup), the biggest producer in the district. Two subparallel veins, Techatticup and Savage, were mined to a depth of at least 600 ft for more than 1,100 ft along strike. The Southwestern Mining Company controlled most mining and milling in the district from 1862 until 1897 (Longwell and others, 1965). Mining occurred, with minor breaks, until 1942 when all gold mines were ordered closed by War Production Order L-208. There has been little activity since 1942. In 1977, James Harris and P. G. Harrison reopened the Quaker City and Mockingbird mines (fig. 3), and an open-pit operation at the Wall Street mine (fig. 3) was attempted (Carman Ridland, 1987, written communication). A lessee tried to leach the Techatticup mine dumps in 1983 and another lessee, Canyon Mining, began leaching the tailings in September 1987. The operator is agglomerating the tailings and using zinc to recover the gold from the cyanide leach solution. In

the 1980's, Placer Amax and Exxon Corp. located a few claims in the area, but dropped the claims by 1987 (written communication from the companies, 1987). Kern and others (1988) report other active companies in the area in the 1970's and 1980's included Intermountain Exploration, Amselco, Weaco, and Homestake. They report exploration by Homestake and drilling by Amax in 1987.

In 1987 and early 1988, Mining and Milling Corporation of America was exploring for gold on patented claims at Capitol Camp in the Lake Mead National Recreation Area and was constructing a pilot mill on public land adjoining the Recreation Area. Also, a small heap leach was operating at the Wall Street mine (fig. 1). An undetermined amount of gravel was mined from BLM Material Site NV 0752 between 1987 and 1988.

Detailed histories of the Eldorado mining district can be found in Vanderburg (1937, p. 26-34), Hansen (1962, p. 182-205), and Longwell and others (1965, p. 116-122). Other historical information on the district are included in Browne (1868, p. 429), Raymond (1872, p. 266; 1873, p. 186), Ransome (1907, p. 63-79), The Mining World (1908a, p. 72; 1908b, p. 460; 1910, p. 724), Hillen (1909, p. 1025-1028), Ryan (1911, p. 14; 1913, p. 15), Hill (1912, p. 201), Lincoln (1923, p. 19-20), Hewett and others (1936, p. 55), Gallagher (1941a, p. 6; 1941b, p. 5), Ashbaugh (1959a, p. 22-23; 1959b, p. 47-48; 1959c, p. 30-31; 1959d, p. 30-31), and Swart (folders 182, 366, 463, 503).

Recorded Production

There are no production records from the district between 1863 and 1874. Yearly production records are found in Director of the Mint (1884. p. 535-536; 1888, p. 218; 1889, p. 148; 1890, p. 174; 1891, p. 158; 1892, p. 206; 1893, p. 148), Yale (1908, p. 366), Heikes (1911, p.500; 1912, p. 699; 1913, p. 786; 1914, p. 818; 1917, p. 627; 1919, p. 470-471; 1921a, p. 266; 1921b, p. 231; 1922, p.386-387; 1928, p. 676; 1931, p. 455; 1932, p. 652; 1933, p. 531; and 1934, p. 613) and Gerry (1929, p. 530). Some production was reported from the district for 1874 through 1897 (Couch and Carpenter, 1943). Hansen (1962, Table X) compiled production records from these and other sources for the years 1874 through 1945. Longwell and others (1965, p. 117) included data to 1961. There are small differences between the production reported by the various authors, and with the USBM production records. Ransome (1907) estimated gold and silver production before 1906 to be worth between $2 and $5 million; Longwell and others (1965) estimated production between 1907 and 1961 at $4.5 million in gold, silver, copper, lead, and zinc. Early production can only be roughly estimated, and records after 1907 are incomplete. Production from the Eldorado district between 1907 and 1981, however, was at least 98,285 oz gold, 2,264,528 oz silver, 167,893 lb lead, 38,623 lb copper, and 13,898 lb zinc (USBM production records).

MINES AND PROSPECTS

Base- and Precious- Metal Prospects

Eight unpatented properties and one patented claim group, the Montezuma, within the study area were examined during this project (fig. 3). Four properties, the Paul, Bel and Big Horn-Inez claims, and the Montezuma patented claim group classified as having inferred subeconomic resources, are described below.

Paul Claims

The Paul nos. 1 - 5 claims (fig. 3, no. 5 and fig. 4) are owned by Paul Harvey of Henderson, NV. They are at an elevation of about 2,700 ft, and straddle Nevada State Highway 165 about 1.2 mi east of Nelson, NV. This area probably has been claimed since the early days of the Eldorado mining district. When the Bunker Hill and associated claims were surveyed for patent in 1910, the survey plats showed adjoining claims named Keystone and Rosenberg that may overlap part of the area now occupied by these claims (fig. A-1). However, little else is known, since no production or major development has occurred on the property. The present claims were staked in 1981. Two old shafts on the north side of the highway predate these claims and are reported to be 87 and 95 ft deep (Paul Harvey, 1987, personal communication).

Exposed rock near Highway 165 is intensely fractured and highly chloritized quartz monzonite similar to the host rock at the Techatticup mine. Tension fractures are filled with quartz that contains silver and gold. On the northern edge of the claims, the monzonite is covered by unmineralized Golden Door Volcanics including units of andesite and volcanic breccia. Four rock samples were taken (fig. 4, table 1, nos. 27-30) of various rocks on the claims. Quartz-chalcedony veins in intensely fractured and highly chloritized quartz monzonite contain small quantities of silver and gold. One sample (no. 30) taken of quartz vein and altered quartz monzonite at the collar of a shaft contained 1.84 ppm (0.054 oz/ton) gold and 66.4 ppm (1.94 oz/ton) silver.

Both alluvial valley fill and Tertiary volcanic rocks probably overlie the Nelson Quartz Monzonite. Because the intrusive contains the Techtticup and Savage veins, which were major gold-silver sources and are in close proximity to the study area, it is likely that one or more undiscovered veins or stockworks similar to other deposits in the district may underlie these claims.

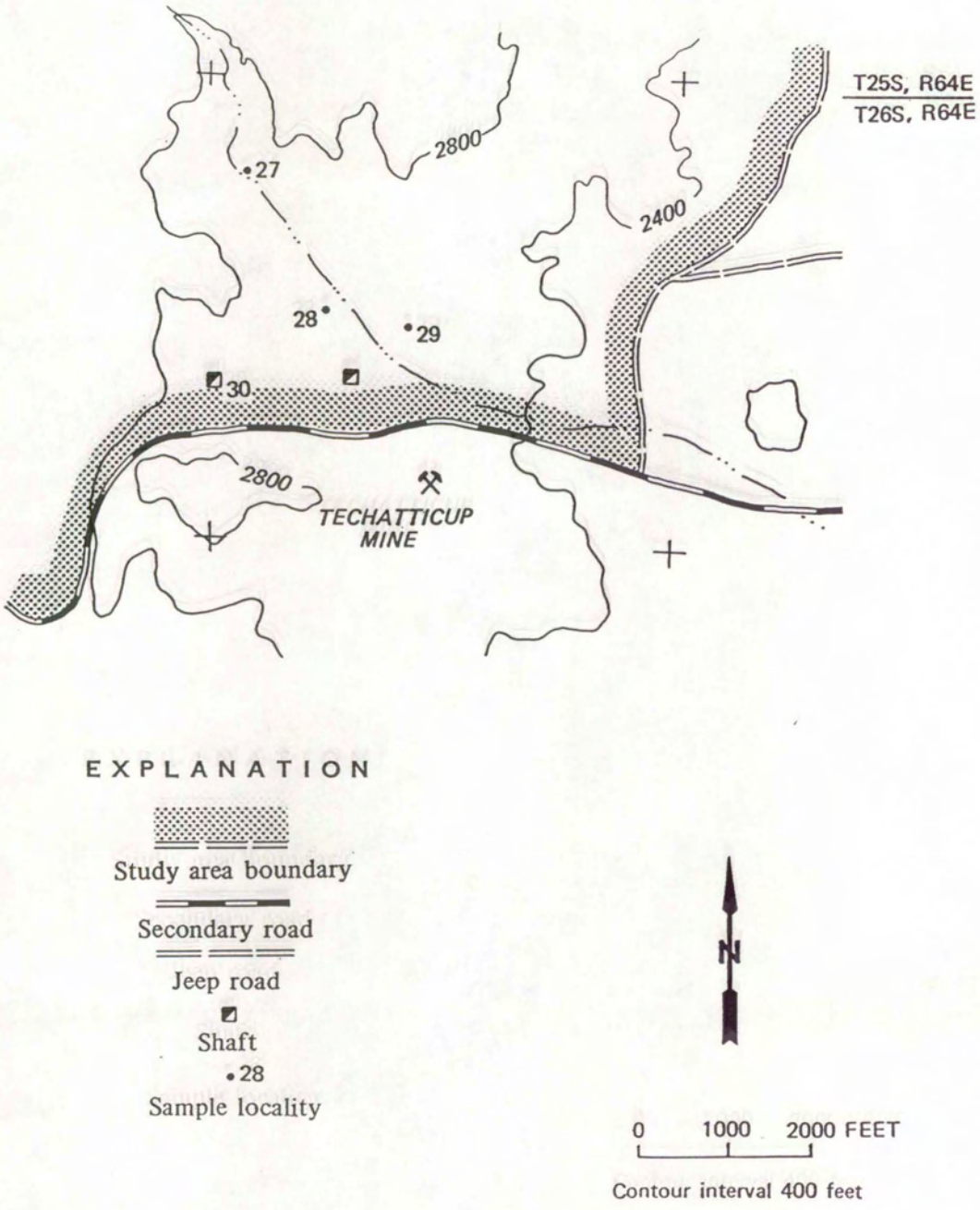

FIGURE 4.– Location of sample sites in and near the Paul claims, Eldorado study area, Clark County, NV

TABLE 1.--Analyses and description of samples from the Paul claims, Eldorado study area, Clark County, NV

Sample no.	Sample type	Length (ft)	Description
27	Select	NA	Light green hornfels (andesite?), highly fractured with chalcedony veins and red iron-oxide throughout.
28	Grab	NA	Sheared, bleached, silicified volcanic breccia with some chalcedony matrix.
29	do----	NA	Dark gray andesite-diorite, highly fractured with minor calcite in fractures.
30	Select	NA	Chalcedony-quartz veins in dark green hornfels (quartz monzonite?). Veins and veinlets, as thick as 1 ft, strike about N. 55° W. with dips of 80° NE to vertical.

TABLE 1. Analyses and description of samples from the Paul claims, Eldorado study area, Clark County, NV

[N, none detected; all values in parts per million (ppm) unless otherwise noted]

Sample Number	Au ppm	Ag ppm	As ppm	Bi ppm	Cd ppm	Cu ppm	Ga ppm	Hg ppm	Mo ppm	Pb ppm	Sb ppm	Se ppm	Tl ppm	Zn ppm
27	N	N	7.17	0.27	N	2.63	1.5	0.191	5.51	21.5	1.86	N	N	4.31
28	N	0.043	20.2	N	N	10.	1.2	4.94	17.5	2.75	1.59	N	N	1.52
29	N	0.033	1.58	N	N	72.1	3.0	N	2.89	4.12	N	N	N	54.2
30	1.84	66.4	6.18	N	N	19.7	4.1	0.109	11.7	13.4	1.16	N	N	44.1

No tellurium, platinium, or palladium was detected in any samples.

Bel Claims

The Bel claims (fig. 3, no. 6 and fig. 5) were located in 1986 and adjoin the Paul claims to the west and the Techatticup Consolidated group (MS. 3873 A and B) to the south. These claims are a relocation of the NEL claims located in 1979, 1980, and 1982). The Bel claims are north of Nevada State Highway 165 in Techatticup Wash about 2 mi east of Nelson, NV, at an elevation of approximately 2,400 ft. They are owned by Carman Ridland, Las Vegas, NV. This area has probably been explored and staked since the early days of the mining district. There are two prospect pits and tailings from the Techatticup Mill on these claims.

Outcrops on the claims consist of dark red and green andesite, variegated brecciated volcanic rocks, and intensely fractured and propylitically altered quartz monzonite. Part of the area is in the Techatticup Wash, and bedrock is covered by alluvium. Eleven rock samples were taken (fig. 5, table 2, nos. 31-41). Samples of altered, brecciated volcanic and plutonic rock did not indicate the presence of base- or precious-metals (fig. 5, nos. 31, 32, 37-41). No quartz or calcite veining was found in the few outcrops of plutonic rocks. However, this is similar to the Techatticup where no disseminated ore minerals are found outside of the vein.

Only samples of mill tailings (nos. 33-36) contain metal content of economic interest. Silver content ranged from 32.4 to 54.3 ppm (0.95 to 1.58 oz/t) and gold from 0.313 to 0.657 ppm (0.009 to 0.019 oz/t). The weighted average for the tailings samples is 1.33 oz/t silver and .016 oz/t gold. At a value of $6/oz silver and $450/oz gold, the tailings contain precious metals worth about $15/ton. There were an estimated 250,000 tons of mill tailings present in 1958 with 1.10 oz/t silver and 0.036 oz/t gold (Carmen Ridland, 1987, written communication). Total tailings at the Techatticup mill as of May, 1988, are estimated at 180,000 tons. These remaining tailings are to be heap leached by Canyon Mining for precious metals content by mid-1989 (Lloyd Mooney, 1988, oral communication).

It is probable that young volcanic formations and alluvium cover altered quartz monzonite within the area of these claims. Detachment fault patterns and structural trends indicate mineralized Nelson Quartz Monzonite may underlie these claims.

Big Horn-Inez Claims

The Big Horn claims (fig. 3, no. 8, and fig. 6) were located in the 1950's. Part of this area was covered by the Inez nos. 1 and 2 claims in 1974, but were relinquished in 1986 by the claimant (Carl Brunson, 1987, written communication). They adjoin the south side of the Montezuma patented claim group and the northeast side of the Rusty Bit claims. The south end of the claims are 1.7 mi north of Nevada State Highway 165 and 3.7 mi from Nelson, NV. The area is situated between 1,950 and 2,500 ft elevation, and accessed by a dirt road.

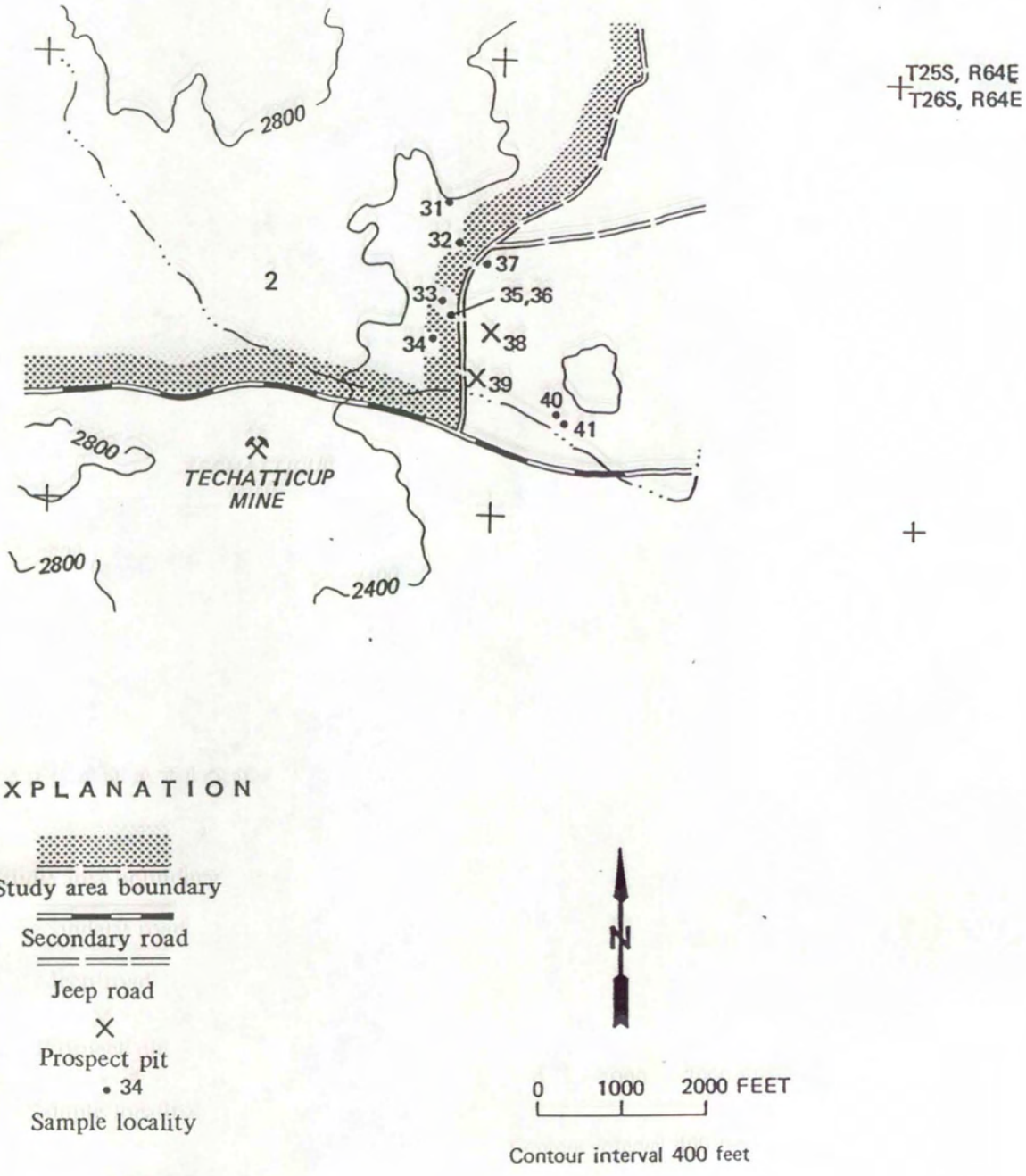

FIGURE 5.— Location of sample sites in and near the Bel claims, Eldorado study area, Clark County, NV

TABLE 2.--Analyses and description of samples from the Bel claims, Eldorado study area, Clark County, NV

Sample no.	Sample type	Length (ft)	Description
31	Grab	NA	Highly brecciated red volcanic (rhyolite ?) rock with chalcedony and calcite veining throughout.
32	Chip	1.0	Brecciated red volcanic rock.
33	Channel	3.2	Tailings from Techatticup Mill.
34	do-----	4.7	do.
35	do-----	1.2	do.
36	do-----	2.3	do.
37	Grab	NA	Bleached, kaolinized, silicified volcanic rock that is permiated with slickensided surfaces.
38	do-----	NA	Reddish-brown, black, and ochre colored extrusive rock fragments in prospect pit. No outcrop.
39	do-----	NA	Dark-gray to reddish-gray volcanic breccia in prospect pit.
40	do-----	NA	Highly altered, sheared volcanic rocks and gouge from Nelson fault zone. Minor silicification and intense iron-oxide staining.
41	do-----	NA	do.

TABLE 2. Analyses and description of samples from the Bel claims, Eldorado study area, Clark County, NV

[N, none detected; all values in parts per million (ppm) unless otherwise noted]

Sample Number	Au ppm	Ag ppm	As ppm	Bi ppm	Cd ppm	Cu ppm	Ga ppm	Hg ppm	Mo ppm	Pb ppm	Sb ppm	Se ppm	Tl ppm	Zn ppm
31	N	0.06	7.53	N	N	31.5	2.48	0.165	3.3	7.16	0.967	N	N	39.6
32	N	0.036	5.47	0.28	N	4.87	0.959	0.179	9.01	3.39	0.899	N	N	1.05
33	0.313	32.4	15.	N	8.38	50.7	6.32	N	1.94	209.	2.59	N	N	353.
34	0.657	52.	15.8	N	6.93	53.7	6.7	N	3.34	208.	2.55	N	N	338.
35	0.623	54.3	16.4	N	5.03	37.3	5.2	N	3.21	130.	2.04	1.1	N	252.
36	0.566	47.	19.3	N	6.4	44.1	6.37	N	2.18	172.	2.3	N	N	320.
37	N	0.085	11.2	N	N	5.39	1.36	N	7.24	2.94	0.32	N	N	N
38	N	0.083	36.5	8.04	N	32.6	6.16	N	48.6	6.72	0.684	12.7	N	5.48
39	N	0.106	23.9	0.292	N	16.3	6.48	N	9.95	1.97	0.754	N	N	27.7
40	N	0.133	25.2	2.22	N	25.9	3.03	N	3.44	3.6	1.61	2.1	0.638	16.
41	N	0.055	23.	1.55	N	57.2	3.98	N	19.9	1.91	1.77	1.6	N	5.41

No tellurium, platinium, or palladium was detected in any samples.

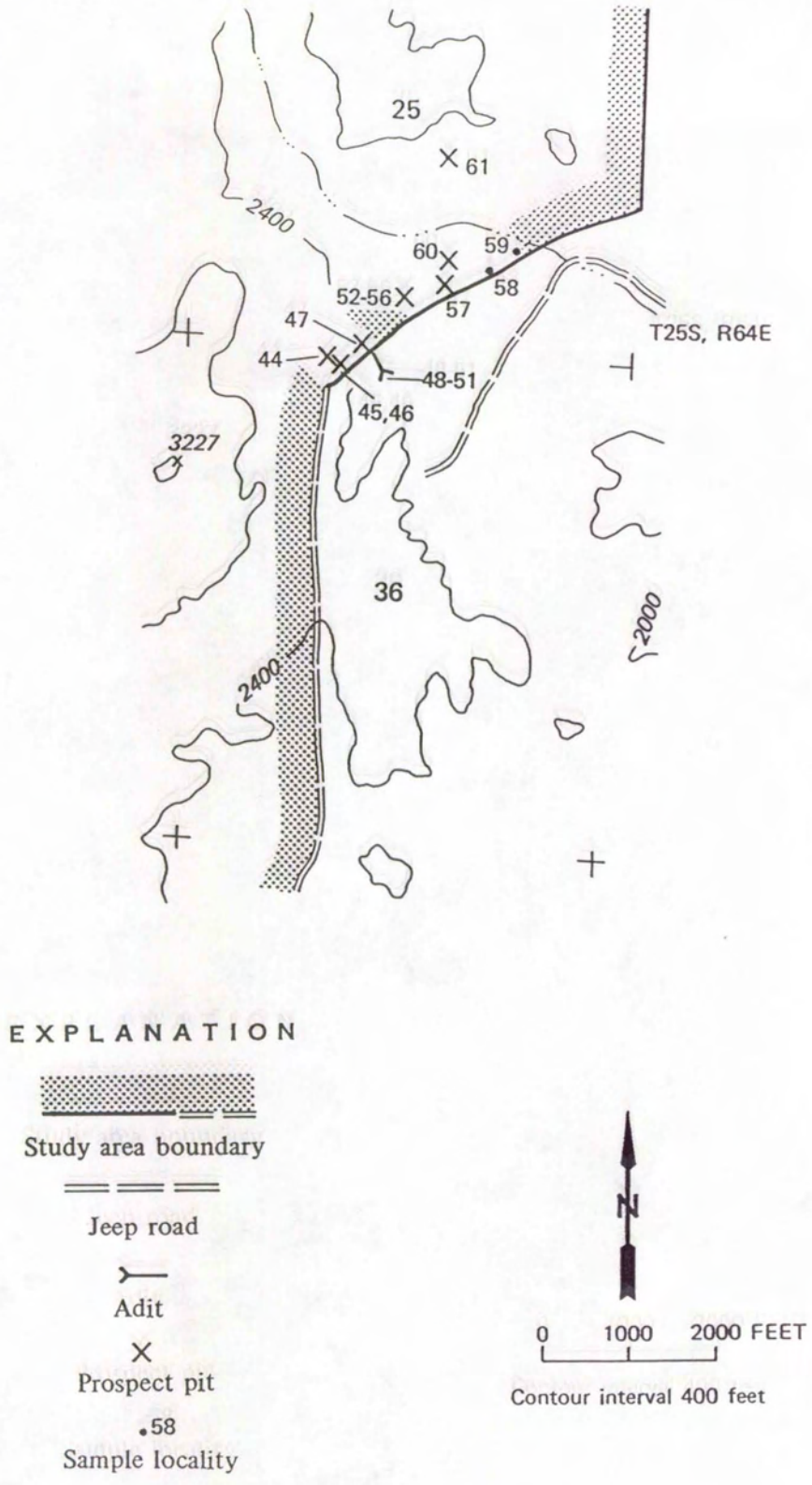

FIGURE 6.– Location of sample sites in and near the Big Horn-Inez claims, Eldorado study area, Clark County, NV

TABLE 3.--Analyses and description of samples from the Big Horn-Inez claims, Eldorado study area, Clark County, NV

Sample no.	Sample type	Length (ft)	Description
44	Chip	5.0	Prospect pit in heavily red iron-oxide stained, brecciated, and silicified quartz monzonite. Also contains sericite (?).
45	do--	11.0	Quartz monzonite with some red iron-oxide stain.
46	do--	4.2	Chloritized quartz monzonite with quartz veins.
47	do--	14.0	Massive quartz vein, 26 in. thick, strikes N. 60° E. and dips 70° SE. in red iron-oxide stained gneiss.
48	Chip (intermittent)	58.0	Fine grained monzonite-quartz monzonite from along rib of adit beginning at portal.
49	do--	12.0	Mixed gneiss and quartz monzonite from rib of adit.
50	do--	25.0	Fine grained quartz monzonite with pods of brown calcite from rib of adit.
51	do--	26.0	Granite from rib of adit.
52	Select	NA	Quartz from dump of small prospect pit at contact between schist/gneiss and quartz monzonite.
53	do--	NA	Copper- and iron- oxide stained quartz monzonite from stockpile at prospect pit.
54	do--	NA	do.
55	Chip	3.0	Fractured quartz monzonite.
56	Select	NA	Copper-oxide stained greenstone from stockpile is in contact with quartz monzonite in adjoining small prospect pit.
57	Grab	NA	Gneiss from area around small prospect pit which contains some copper-oxides, specular hematite, epidote, calcite, and chlorite.
58	do--	NA	Gneiss which contains minor red iron-oxide stain.

TABLE 3.--Analyses and description of samples from the Big Horn-Inez claims, Eldorado study area, Clark County, NV

Sample no.	Sample type	Length (ft)	Description
59	Grab	NA	Mixed quartz monzonite dikes and gneiss. Garnet present in siliceous zones.
60	Chip	3.0	Red iron-oxide stained quartz unit in gneiss strikes N. 65° E. and dips 80° SE. in prospect pit.
61	do--	5.0	Red iron-oxide stained gneiss in contact with quartz diorite (?). Foliation strikes N. 40° E. and dips 85° NW.

TABLE 3. Analyses and description of samples from the Big Horn-Inez claims, Eldorado study area, Clark County, NV

[N, none detected; --, not analyzed; all values in parts per million (ppm) unless otherwise noted]

SAMPLE NUMBER	Au ppm	Ag ppm	As ppm	Ba ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	Ga ppm	Hg ppm	Mn ppm	Mo ppm	Ni ppm	Pb ppm	Sb ppm	Se ppm	Tl ppm	W ppm	Zn ppm
44	N	0.092	17.3	--	0.431	N	--	--	52.9	1.63	N	--	14.7	--	6.57	1.42	N	0.488	--	21.1
45	N	0.254	63.5	--	0.288	1.27	--	--	19.1	3.78	N	--	13.5	--	21.2	3.43	N	N	--	89.4
46	N	0.057	10.1	--	0.252	0.229	--	--	6.41	7.48	N	--	8.23	--	3.87	0.665	N	N	--	61.6
47	N	0.289	2.89	--	N	N	--	--	5.19	1.05	0.109	--	13.3	--	8.28	0.386	N	N	--	21.4
48	N	0.261	3.49	--	0.291	N	--	--	67.7	2.8	0.109	--	4.75	--	51.5	N	N	0.498	--	109.
49	N	0.916	3.76	--	N	0.256	--	--	5.14	2.01	0.172	--	8.11	--	21.9	0.714	N	N	--	119.
50	N	0.103	1.5	--	N	0.244	--	--	20.3	4.52	N	--	5.24	--	24.	0.235	N	N	--	108.
51	N	1.25	N	--	N	N	--	--	11.1	2.27	N	--	7.44	--	12.3	N	N	N	--	59.5
52	N	12.1	4.95	--	4.85	N	--	--	18000.	7.94	N	--	88.1	--	890.	N	N	N	--	506.
53	N	0.686	6.61	--	2.97	3.61	--	--	3074.	11.8	N	--	148.	--	996.	1.47	N	N	--	1663.
54	N	0.593	9.89	--	3.09	1.02	--	--	14000.	15.4	N	--	21.	--	1713.	0.603	N	N	--	1545.
55	N	0.079	16.5	--	N	N	--	--	101.	2.01	N	--	13.3	--	33.4	1.26	N	N	--	71.3
56	N	3.	700.	--	26.1	0.457	--	--	13000.	8.11	N	--	17.8	--	381.	N	4.74	N	--	366.
57	N	0.574	22.1	--	0.701	N	--	--	570.	7.94	N	--	3.98	--	42.6	0.644	N	N	--	210.
58	N	0.072	3.96	--	N	N	--	--	30.6	3.31	N	--	6.99	--	13.9	0.478	N	N	--	51.4
59	N	0.042	1.93	--	N	N	--	--	6.34	5.28	N	--	8.67	--	6.64	N	N	N	--	51.5
60	N	0.095	29.2	--	0.262	N	--	--	22.2	5.76	0.117	--	9.31	--	36.1	1.49	N	N	--	187.
61	N	0.175	15.7	--	0.32	0.451	--	--	61.	4.2	0.128	--	8.45	--	222.	1.37	N	N	--	114.

No tellurium, platinum, or palladium was detected in any samples.

The claims were probably explored for silver and gold in the late 1800's, as were other Eldorado district properties. The Big Horn claims were staked during the 1950's uranium boom. Later exploration on the Inez claims again concentrated on precious metals. No production is reported and none is indicated by minor workings, which include one 121-ft-long adit and eight small prospect pits. Most of the workings occur along a northeasterly linear trend where copper oxide-bearing quartz veins are exposed on the surface, within Precambrian gneiss. The gneiss is cut in places by granitic dikes and plugs of uncertain age. Eighteen rock samples were taken (fig. 6 and table 3, nos. 44-61). Three select samples from dumps exceeded 1 percent copper. Small amounts of silver, lead, and zinc are also present, however, no gold was detected.

Two to three ft thick quartz veins with malachite and chrysocolla are more than 200 ft long and trend about N. 60° E. in Precambrian gneiss. Granitic dikes and pods are also common on the claims. The veins contain low-grade silver and base metals. However, the veins are not exposed well enough to allow quantification of resources with a high degree of accuracy.

A U.S. Atomic Energy Commission study cited by Garside (1973, p. 37-38) and Qualheim (1978, p. 9) reports 0.07 to 0.024 percent U_3O_8 associated with fractures in Precambrian metasedimentary rock on the Big Horn claims. Uranium minerals were not confirmed by the Garside or Qualheim studies nor found during the NURE study of the Kingman Quadrangle (Luning and others, 1982). No samples were analyzed for uranium during this study, but all samples were checked for radioactivity with a scintillometer, with negative results (20 to 40 cps using a Geometrix Model 101 scintillometer).

Montezuma Patented Claim Group

The Montezuma group (fig. 3, no. 9; fig. 7 and table 4) of four claims (Montezuma, Montezuma No. 1, Pizzaro, and Urbain), was patented in 1914. The property is owned by Edward Seggerson, Jr. of Las Vegas. The claims are situated at about 2300 ft elevation on the rugged east flank of the Eldorado Mountains. There are no paved or graded roads to the property. Access is by a 4-wheel drive road in a wash through the Lake Mead National Recreation Area. The area is 1.5 mi north of a dirt road leading to the Big Horn-Inez claims.

The property was surveyed for patent in 1911. At that time, the Montezuma lode had a 100-ft-deep shaft and a 35-ft-long adit; the Montezuma No. 2 lode had a 5-ft-long adit; the Urbain lode had a 106-ft-long adit; and the Pizzaro lode had an open chamber 6 ft high by 11.5 ft wide by 24 ft long, an open cut, and an adit with 17.5 ft of workings. Apparently little or no work has been done on these claims since they were surveyed. No production has been reported.

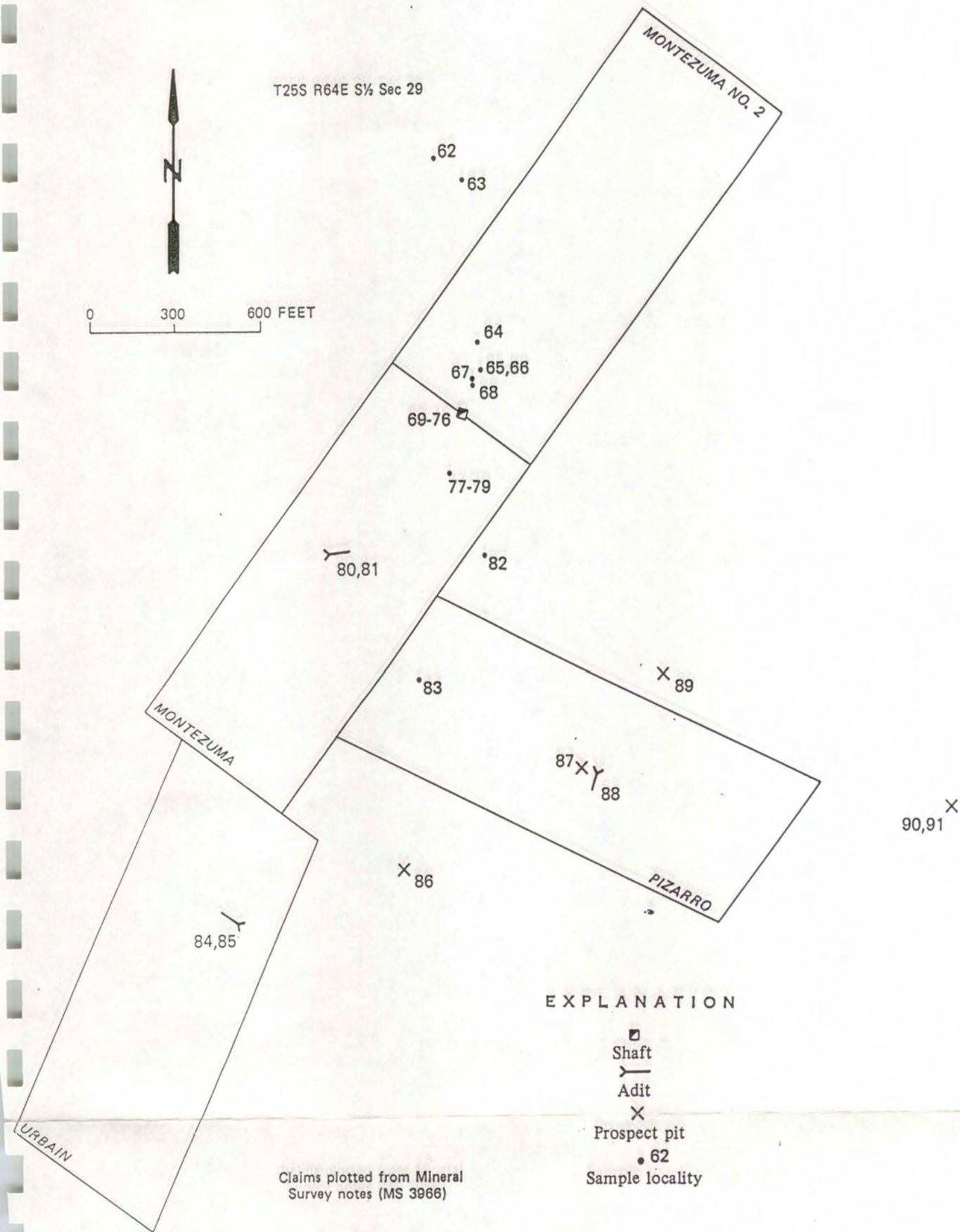

FIGURE 7.– Location of sample sites in and near the Montezuma patented claim group, Eldorado study area, Clark County, NV

TABLE 4.--Analyses and description of samples from the Montezuma patented claim group, Eldorado study area, Clark County, NV

Sample no.	Sample type	Length (ft)	Description
62	Chip (intermittent)	50.0	Red iron-oxide stained fracture zone in gray rhyolite strikes N. 10° W. and dips 65° W.
63	do--	4.0	do.
64	do--	2.3	Red iron-oxide stained quartz veinlets in granite.
65	do--	3.1	Veinlets of chrysocolla-malachite and calcite in sheared granite.
66	do--	0.2	Calcite veinlet.
67	Grab	NA	Red iron-oxide stained patches in gneiss.
68	Chip	1.0	Brecciated sheared granite with small calcite veinlets.
69	do--	3.0	Unaltered granite.
70	do--	6.0	Brecciated gneiss with red and green stained gouge.
71	Select	NA	Malachite and chrysocolla from vein in brecciated gneiss.
72	Chip	5.0	Shattered schistose gneiss with minor gouge.
73	do--	6.0	Brecciated and silicified gneiss with black iron oxides.
74	do--	0.6	Intense limonite filling and chrysocolla coated brecciated zone in gneiss, strikes N. 35° E. and dips 71° NW.
75	do--	1.0	do.
76	do--	1.5	Garnetiferous gneiss adjoining breccia zone.
77	do--	1.8	Intensely fractured garnetiferous gneiss with intermixed granite.
78	do--	2.2	Fractured granite.
79	do--	1.0	Garnetiferous biotite gneiss.

TABLE 4.--Analyses and description of samples from the Montezuma patented claim group, Eldorado study area, Clark County, NV--Continued

Sample no.	Sample type	Length (ft)	Description
80	Chip	1.7	Red iron-oxide coated granite and quartz veinlet, all fractured.
81	do--	3.0	Intensely brecciated, red iron-oxide stained, propyllitically altered granite.
82	do--	5.0	Brecciated granite with calcite matrix.
83	Select	NA	One ft diameter pod containing malachite and red iron-oxides in gray andesite.
84	Chip (intermittent)	80.0	Intermixed gneiss and granite.
85	Select	NA	Malachite stained rock with calcite and red iron-oxides from stockpile.
86	Chip	0.1	Gouge zone in granite trends N. 20° W., and dips 52° SW.
87	do-- (intermittent)	70.0	Propylitically altered and moderately fractured andesite.
88	do--	10.0	do.
89	do--	0.75	Malachite and red iron-oxide rich lens in gneiss. Lens at least 75 ft long and strike N. 60° E. and dip 45° NW.
90	do--	2.5	Brecciated andesite with some calcite and red iron-oxides.
91	do--	3.0	do.

TABLE 4. Analyses and description of samples from the Montezuma patented claim group, Eldorado study area, Clark County, NV

[N, none detected; --, not analyzed; all values in parts per million (ppm) unless otherwise noted]

Sample Number	Au ppm	Ag ppm	As ppm	Ba ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	Ga ppm	Hg ppm	Mn ppm	Mo ppm	Ni ppm	Pb ppm	Sb ppm	Se ppm	Tl ppm	W ppm	Zn ppm
62	.030	N	21.	640	N	--	N	66	9.	--	0.10	71	6.	2	13.	5.	N	--	N	14.
63	N	N	7.	580	N	--	N	56	3.	--	0.05	92	7.	1	13.	N	N	--	N	7.
64	N	N	N	70	N	--	3.	153	31.	--	N	81	13.	4	94.	N	10.	--	N	113.
65	.005	0.9	63.	980	4.	--	8.	97	124.	--	N	498	8.	8	714.	N	9.	--	N	70.
66	.010	0.7	587.	2000	17.	--	4.	63	975.	--	0.10	5665	6.	3	9972.	N	6.	--	N	34.
67	.010	N	14.	1200	3.	--	6.	105	49.	--	N	261	13.	6	17.	6.	N	--	N	71.
68	.030	1.7	50.	1100	3.	--	8.	113	138.	--	0.05	523	9.	9	1017.	6.	16.	--	N	93.
69	.005	N	10.	930	7.	--	N	83	11.	--	0.05	65	7.	3	33.	N	N	--	N	44.
70	.160	2.3	20.	1100	N	--	9.	116	1199.	--	0.05	231	10.	17	3970.	N	6.	--	N	2016.
71	10.1	16.8	8.66	--	11.	1.36	--	--	41000.	2.18	6.41	--	213.	--	16000.	14.3	2.48	N	--	676.
72	.070	2.5	18.	1200	N	--	12.	104	3150.	--	0.20	451	25.	16	4700.	N	N	--	N	5300.
73	0.195	2.75	7.7	--	N	1.29	--	--	1618.	2.14	0.204	--	6.67	--	5500.	2.14	N	N	--	1223.
74	1.970	2.1	N	680	N	--	14.	63	5.83%	--	0.35	244	63.	14	7960.	11.	N	--	N	8865.
75	4.145	2.2	95.	700	N	--	17.	93	12225.	--	1.40	207	56.	35	5863.	9.	5.	--	N	3.31%
76	N	N	14.	880	N	--	11.	106	47.	--	0.05	280	4.	33	154.	N	N	--	N	511.
77	.005	N	N	920	N	--	11.	107	21.	--	0.10	184	5.	36	7.	N	N	--	N	32.
78	.005	N	N	1300	3.	--	N	107	6.	--	N	34	10.	3	7.	6.	9.	--	N	19.
79	.005	N	6.	830	3.	--	19.	136	10.	--	N	189	3.	45	8.	N	7.	--	15.	46.
80	N	0.552	45.1	--	1.29	0.424	--	--	569.	0.632	N	--	40.7	--	125.	0.706	N	N	--	39.9
81	N	2.57	43.9	--	0.733	N	--	--	316.	N	N	--	12.	--	261.	1.33	N	N	--	5.47
82	N	0.082	20.	--	N	N	--	--	28.9	2.09	N	--	2.94	--	38.8	1.01	N	N	--	63.5
83	.080	1.6	30.	1500	25.	--	4.	62	10450.	--	0.05	97	10.	10	1157.	6.	N	--	N	430.
84	N	0.551	20.8	--	2.47	1.34	--	--	338.	3.2	0.133	--	6.14	--	154.	0.603	N	N	--	257.
85	0.071	2.74	29.2	--	26.7	3.45	--	--	42088.	6.41	13.7	--	9.04	--	1125.	N	1.45	N	--	99.4
86	N	0.122	5.24	--	0.476	0.894	--	--	233.	4.27	N	--	0.693	--	71.7	0.92	N	N	--	129.
87	N	0.099	9.91	--	N	0.266	--	--	41.9	4.96	N	--	2.36	--	50.5	1.37	0.963	0.496	--	117.
88	0.068	0.126	20.3	--	N	0.651	--	--	33.5	2.6	0.166	--	7.28	--	57.2	1.2	N	N	--	105.
89	.040	0.6	8.	2200	N	--	4.	80	1466.	--	N	56	7.	4	32.	9.	N	--	N	998.
90	N	0.056	4.28	--	N	0.299	--	--	27.3	5.86	N	--	4.49	--	118.	0.43	0.892	N	--	214.
91	N	0.087	23.9	--	N	0.59	--	--	23.5	2.28	N	--	4.05	--	143.	0.935	0.921	N	--	116.

No tellurium, platinium, or palladium was detected in sample nos. 71, 73, 81, and 83-91. These elements were not analyzed for in the other samples.

The claims are underlain by Precambrian gneiss and granitic dikes. Some andesitic volcanic rocks (Patsy mine volcanics?) are also present on all of the claims. The principal mineralized structure, a brecciated zone as wide as 12 ft, is exposed at the shaft which is on the common line between the Montezuma and Montezuma No. 2 claims (fig. 7). The zone trends approximately north. The breccia zone contains some quartz, calcite, and yellow and red iron-oxide zones 6 in. to 1 ft thick which contain malachite and chrysocolla.

Thirty samples were taken from in and near the claims (fig. 7, table 4). Gold content up to 10.1 ppm, silver up to 16.8 ppm, copper up to 5.83 percent, lead up to 1.6 percent, and zinc up to 3.31 percent were found in samples taken from around the shaft.

The copper mineralized rock was not traceable continuously for more than 50 ft along strike; however, the brecciated rock could be followed about 260 ft, N. 15° E. from the shaft and 50 ft south from the shaft. An EM-16 survey (Appendix) indicates that a strong structure follows this trend; a small copper-bearing outcrop, (fig. 7. no. 83) in andesitic volcanics about 1,000 ft south of the shaft may be on the same structure. A magnetometer was not useful in delineating structures in this area.

It is probable that mineralized rock on these claims correlates to rock found in similar geologic environments elsewhere in the Eldorado district, and in the Searchlight and Newberry mining districts (see Causey, 1988) and that low-grade vein precious- and base-metal deposits might be expected. The breccia zone is projected to be over 2,400 ft long following a trend of N. 85° E. between sample points 62 and 86 (fig. 7). While not well-defined in the volcanics which are exposed over much of this area, the breccia and associated mineralized rock is prominent in the underlying Precambrian formation.

Other prospects

The other five claim groups studied include the Flintstone group (Barney, Wilma, Fred, Betty, Bam Bam, and Pebbles), VAR, SINJUN (including the Silver Bullet claim), Eldorado, and Rusty Bit claims. Only the Silver Bullet claim, owned by Alfred Schleicher, was active in 1987. There was no other activity noted on the other claims during this study. All of these claims are on Tertiary volcanic rocks.

No mineralized rock was observed. However, 12 samples were above expected normal distribution of copper on the Flintstone, VAR and SINJUN claims. These five claim groups are summarized on Table 5 and sample analyses are shown on table 6.

TABLE 5.--Description of other claims and prospects in and near the Eldorado study area, Clark County, NV

[Asterisk (*) indicates claim group straddles study area boundary]

Fig. 3 No.	Name	Summary	Workings and production	Sample and resource data
1	Flintstone claim group (Barney, Fred, Wilma, Betty, Bam Bam, and Pebbles)	Tertiary age andesite and basaltic andesite are cut by northwesterly trending faults. Calcite and quartz veinlets are associated with the faults. A volcanic breccia is exposed in part of the area.	One prospect pit. No production.	Three samples taken (fig. A-2 and table 6, nos. 1-3); low metal concentrations had no economic significance. Two samples were above expected normal distribution of copper.
2*	Eldorado claims (Nos. 1-11)	The claims are underlain by Tertiary age tuff, pumiceous tuff breccia, and obsidian.	Bulldozed area about 100 yds wide by 300 yds long. No production.	One sample taken (fig. A-2 and table 6, no. 4). Low metal concentrations had no economic significance. The area contains an occurrence of pumice.
3	VAR claims	The claims are underlain by Tertiary age rhyolite and welded tuff which is tilted eastward.	Bulldozer scrapes and one drill hole. No production.	Six samples taken (fig. A-2 and table 6, nos. 5-10). Low metal concentrations have no economic significance. Three samples were above expected normal distribution of copper.
4*	SINJUN claim group (including Silver Bullet claim)	Interbedded rhyolite, andesite, and tuff breccia of the upper part of the Miocene age Patsy Mine Volcanics underlie these claims.	No workings and no production.	Sixteen samples taken (fig. A-2 and table 6, nos. 11-26). Low metal concentrations have no economic significance. Seven samples were above expected normal distribution of copper.
7	Rusty Bit claims group	Volcanic tuff and tuff breccia of the Tertiary age Golden Door Volcanics and the Miocene age Patsy Mine Volcanics underlie these claims.	One prospect pit. No production.	Two samples taken (fig. A-2 and table 6, nos. 42-43). Low metal concentrations have no economic significance.

TABLE 6. Analyses of samples from other claims and prospects in and near the Eldorado study area, Clark County, NV

[N, none detected]

Figure Number	Property Name	Sample Number	Ag ppm	As ppm	Bi ppm	Cd ppm	Cu ppm	Ga ppm	Hg ppm	Mo ppm	Pb ppm	Sb ppm	Tl ppm	Zn ppm
1	Flintstone	1	0.066	31.	N	N	84.4	2.29	0.235	0.095	6.82	N	N	27.3
	claim group	2	0.085	18.7	N	N	45.	5.3	N	0.225	10.	0.658	0.458	70.3
		3	0.023	8.1	N	1.14	5.06	N	0.262	N	2.39	N	N	7.16
2	Eldorado claims	4	0.024	1.73	0.293	N	3.7	0.629	N	1.86	4.41	N	N	2.91
3	VAR claims	5	0.055	1.11	N	0.274	47.4	5.05	N	N	14.9	N	0.731	71.7
		6	0.044	1.32	0.239	N	54.8	3.79	N	N	8.28	N	0.534	75.4
		7	0.022	3.06	N	N	6.54	0.602	N	N	2.33	N	N	24.7
		8	0.038	2.65	N	0.23	41.3	5.83	N	N	9.82	N	0.49	62.9
		9	0.031	1.84	N	0.228	7.83	1.14	N	0.126	5.25	N	N	41.9
		10	0.031	1.45	N	N	6.87	1.14	N	0.252	4.88	N	N	38.8
4	SINJUN	11	0.027	6.66	N	N	63.5	3.28	N	N	5.85	0.489	N	64.2
	claims	12	0.018	6.26	N	N	6.66	N	N	2.13	19.2	1.09	N	15.5
		13	0.014	1.26	N	N	1.17	2.78	0.093	N	12.6	0.352	N	5.13
		14	0.014	17.6	N	N	45.3	2.9	N	0.299	11.	0.533	N	55.9
		15	0.023	10.2	N	N	99.1	2.91	N	N	9.26	0.604	N	65.9
		16	0.026	30.2	N	N	81.3	4.58	N	N	13.3	0.385	N	72.7
		17	N	16.2	0.239	N	6.67	N	N	11.1	6.74	0.285	N	7.14
		18	0.025	48.4	N	N	70.8	4.71	N	N	13.5	0.461	N	74.4
		19	0.014	82.2	N	N	86.9	3.55	N	N	11.6	N	N	73.9
		20	0.033	7.76	N	N	11.2	2.66	N	2.09	19.2	0.911	N	23.9
		21	0.015	8.12	N	N	6.85	6.7	N	N	29.5	1.01	N	21.5
		22	0.028	10.6	N	N	4.07	6.23	N	N	14.3	1.05	N	14.9
		23	0.023	6.65	0.243	N	6.82	4.16	N	0.309	24.2	0.703	N	19.2
		24	0.027	13.3	N	N	6.16	5.64	N	N	27.9	0.862	N	20.5
		25	0.035	21.5	N	N	65.4	3.08	N	1.49	9.52	N	0.5	64.1
		26	0.053	10.1	0.296	N	5.34	8.28	0.133	N	26.4	N	0.607	19.5
7	Rusty Bit	42	0.017	8.96	N	N	32.9	4.09	N	1.	8.26	N	N	59.8
	claims	43	N	5.11	N	N	5.31	3.89	0.12	2.89	16.6	0.859	N	11.5

No gold, selenium, tellurium, platinium, or palladium was detected any sample.

Miscellaneous Commodity Prospects

Road Gravel

BLM has three material (gravel) sites wholly or partially within the study area (fig. 8). Material site CC 022889 covers S1/2SE1/4NW1/4 and N1/2NE1/4SW1/4 sec. 2, T. 26 S., R. 64 E., MDM and was approved March 18, 1948. Material sites Nev 0751, located in S1/2N1/2NE1/4 sec. 10, T. 26 S., R. 64 E., MDM, and Nev 0752, located in NE1/4SE1/4 sec. 2, T. 26 S., R. 64 E. MDM, were approved January 29, 1950. Material site CC 022889 covers part of the Bunker Hill (MS 3873A) patented claim and, in turn, is at least partly covered by the Paul claim group. Material site Nev 0751 overlies part of a patented claim outside the study area (Jupiter - MS 4617) and some older claims inside the study area which are no longer active (MS 4174). Material site Nev 0752 overlies part of the Lone Will, Real Good (MS 3873A), and Colusa (MS 4173) patented claims. Gravel was quarried from BLM Material Site NV 0752 between June 1987 and May 1988 from within the study area. Road construction along Highway 165 could utilize material from established BLM material sites (fig. 8); however, there are no additional gravel resources within the study area because the deposits are too small and distant from roads. Road construction could be just as easily and economically served by other nearby alluvial deposits which are outside the study area.

APPRAISAL OF MINERAL RESOURCES

The southern part of Eldorado study area is within the Eldorado mining district, which has been explored for gold, silver, copper, lead, and zinc since the 1850's. Ore worth over $6 million, mainly in silver and gold, has been produced from the district, south and west of the study area. Although no deposits have been discovered in the study area, there is indication of base- and precious-metal deposits occurring in the southern part of the study area. There are inferred subeconomic resources of gold and silver on the Paul and Bel claims; inferred subeconomic silver, copper, lead, and zinc resources on the Big Horn-Inez claims; and inferred subeconomic gold, silver, copper, lead, and zinc resources on the Montezuma patented claim group.

Mineralized veins similar to those which were mined at the Techatticup mine may underlie the Paul and part of the Bel claims (fig. 2), where Exxon and Placer Amax had minor holdings in the early 1980's. Well defined veins containing oxidized and enriched precious metals near the surface and sulfides at depth are possible. Extensive exploration would be necessary to determine if a viable low-grade base and precious metal deposit exists in the Big Horn-Montezuma area, but the claim groups are good exploration targets.

None of the other claim groups has surface indication of mineral resources. However, above normal expected distribution of copper was observed in samples from the Flintstone, VAR, and SINJUN claims. Because of the extensive mineralization in the vicinity, and because the main

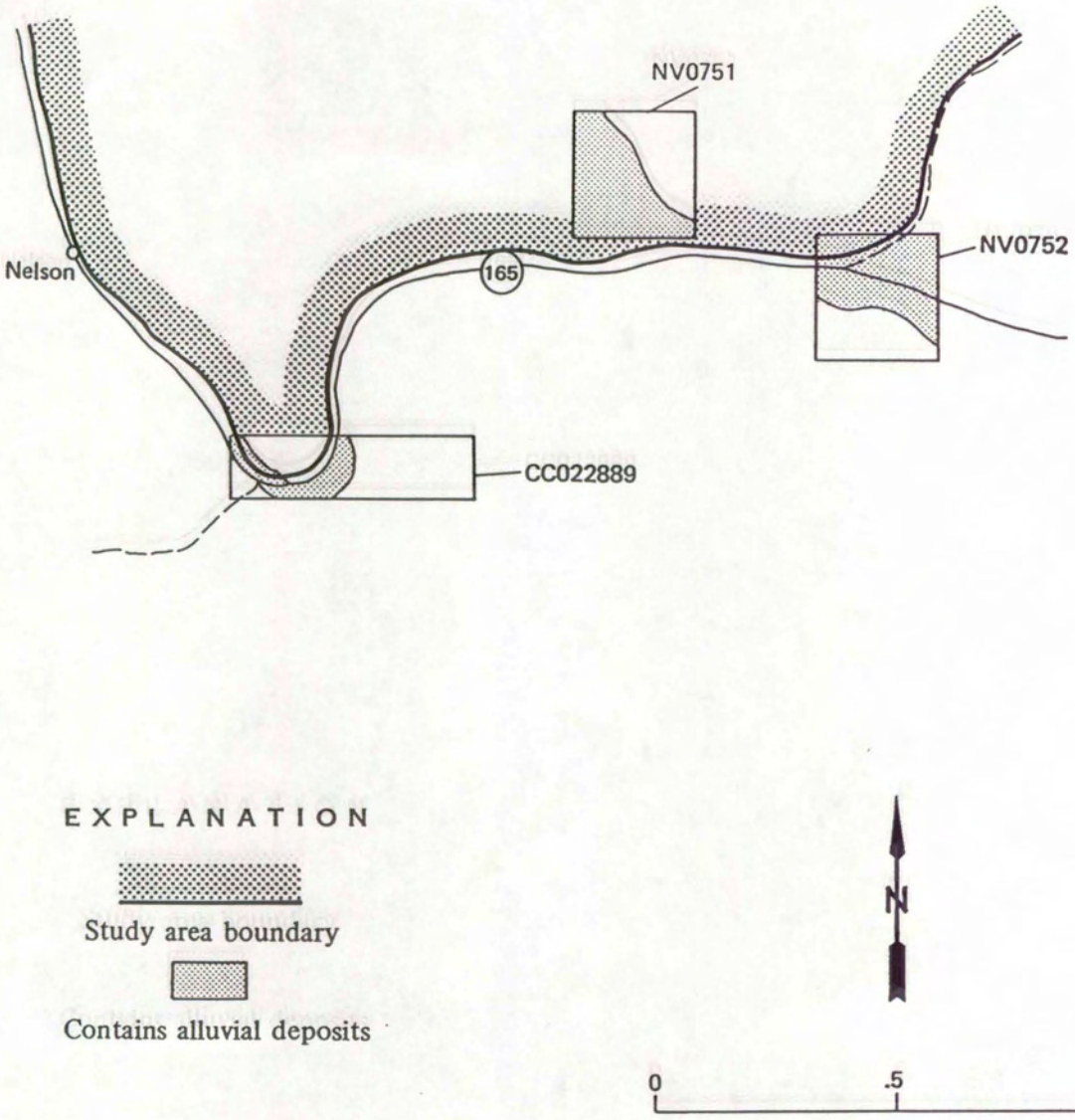

FIGURE 8.– Alluvial deposits in BLM material sites (sand and gravel), Eldorado study area, Clark County, NV

mineralized rocks, granite and gneiss, are capped by volcanic flows and alluvium throughout most of the study area, it is possible that undiscovered base- and precious-metal resources may underlie any part of the study area.

There is no evidence of economic concentrations of miscellaneous non-metallic commodities within the study area. The study area is apparently not valuable for geothermal resources (Muffler, 1979, map 1). No hot springs are known to be in the area and no unusual heat flow has been recorded.

One oil and gas lease was issued by BLM for sec. 35, T. 24 S., R. 64 E., MDM, in 1980 and one for sec. 10, T. 25 S., R. 64 E., MDM, in 1982. The leases were terminated in 1983 and 1985, respectively, with no development occurring. Oil and gas resources are not expected within the igneous and metamorphic rocks, which underlie the study area (Sandberg, 1983).

Pumiceous rock is present on the Eldorado claims (table 1, no. 3), but the amount is small and does not constitute a resource.

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APPENDIX

ILLUSTRATIONS

No.	Claim Name	Mineral Survey	Location Date	Amended Location Date	Patent Date
1.	Howinett	4174	Pre-1913	--------	Unpatented
2.	Beryl	4174	Pre-1913	--------	Unpatented
3.	Helen	4174	Pre-1913	--------	Unpatented
4.	Santa Barbara No. 2	4174	Pre-1913	--------	Unpatented
5.	Jupiter	4617	1-24-1925	--------	8-4-1927
6.	Wolf	Unsurveyed	Pre-1913	--------	Unpatented
7.	Eagles Nest	Unsurveyed	Pre-1913	--------	Unpatented
8.	Lawson	Unsurveyed	Pre-1922	--------	Unpatented
9.	Cinch	4491	4-1-1905	--------	11-27-1922
10.	Buster	2351	1-4-1893	5-8-1905	6-8-1907
11.	Piatt	2085	1-1-1875	--------	7-28-1905
12.	Gettysburg	41	Pre-1867	--------	5-19-1886
13.	Techatticup	3873A	1861	3-30-1910	4-11-1912
14.	Keystone	Unsurveyed	Pre-1912	--------	Unpatented
15.	Rosenberg	Unsurveyed	Pre-1912	--------	Unpatented
16.	Bunker Hill	3873A	10-11-1904	3-20-1907	4-11-1912
17.	Lone Will	3873A	3-28-1905	3-20-1907	4-11-1912
18.	Real Good	3873A	10-11-1904	3-20-1907	4-11-1912
19.	Techatticup Extension	3873A	3-30-1910	--------	4-11-1912
20.	Savage	3873A	1-1-1875	--------	4-11-1912
21.	Edith C.	4173	2-4-1913	--------	2-3-1915
22.	Shannon	4173	--------	4-10-1913	2-3-1915
23.	Colusa	4173	--------	4-10-1913	2-3-1915
24.	Modoc	4173	--------	4-10-1913	2-3-1915
25.	Urbain	3966	--------	4-10-1911	6-10-1914
26.	Montezuma	3966	--------	4-10-1911	6-10-1914
27.	Pizzaro	3966	--------	4-10-1911	6-10-1914
28.	Montezuma No. 2	3966	--------	4-10-1911	6-10-1914

No.	BLM Material Sites	Date Issued	(From BLM Master Title Plats)
29.	CC 022889	3-18-1948	
30.	NV 0751	1-20-1950	
31.	NV 0752	1-20-1950	

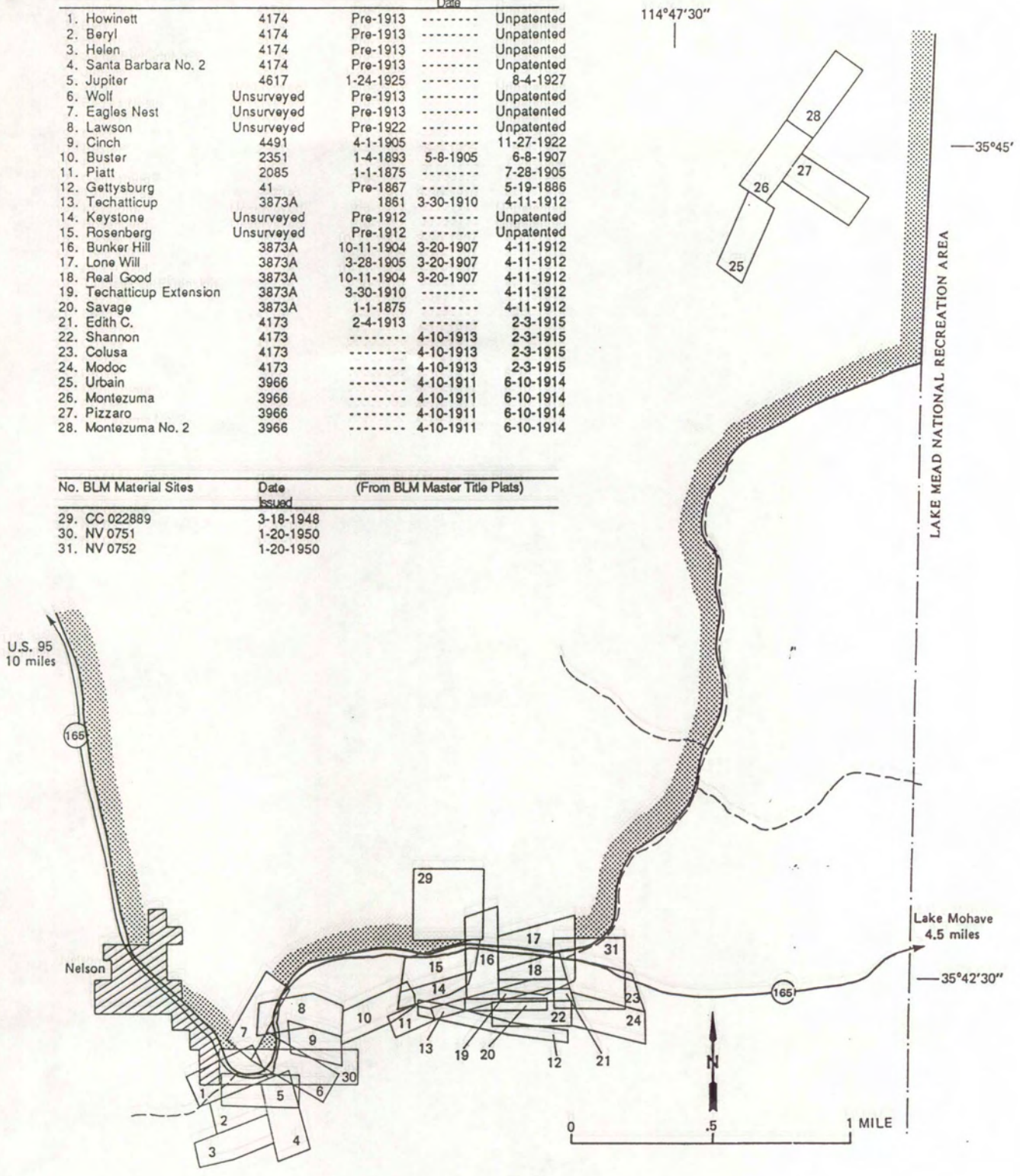

FIGURE A-1.– Location of patented claims and BLM material sites in and adjacent to the Eldorado study area, Clark County, NV

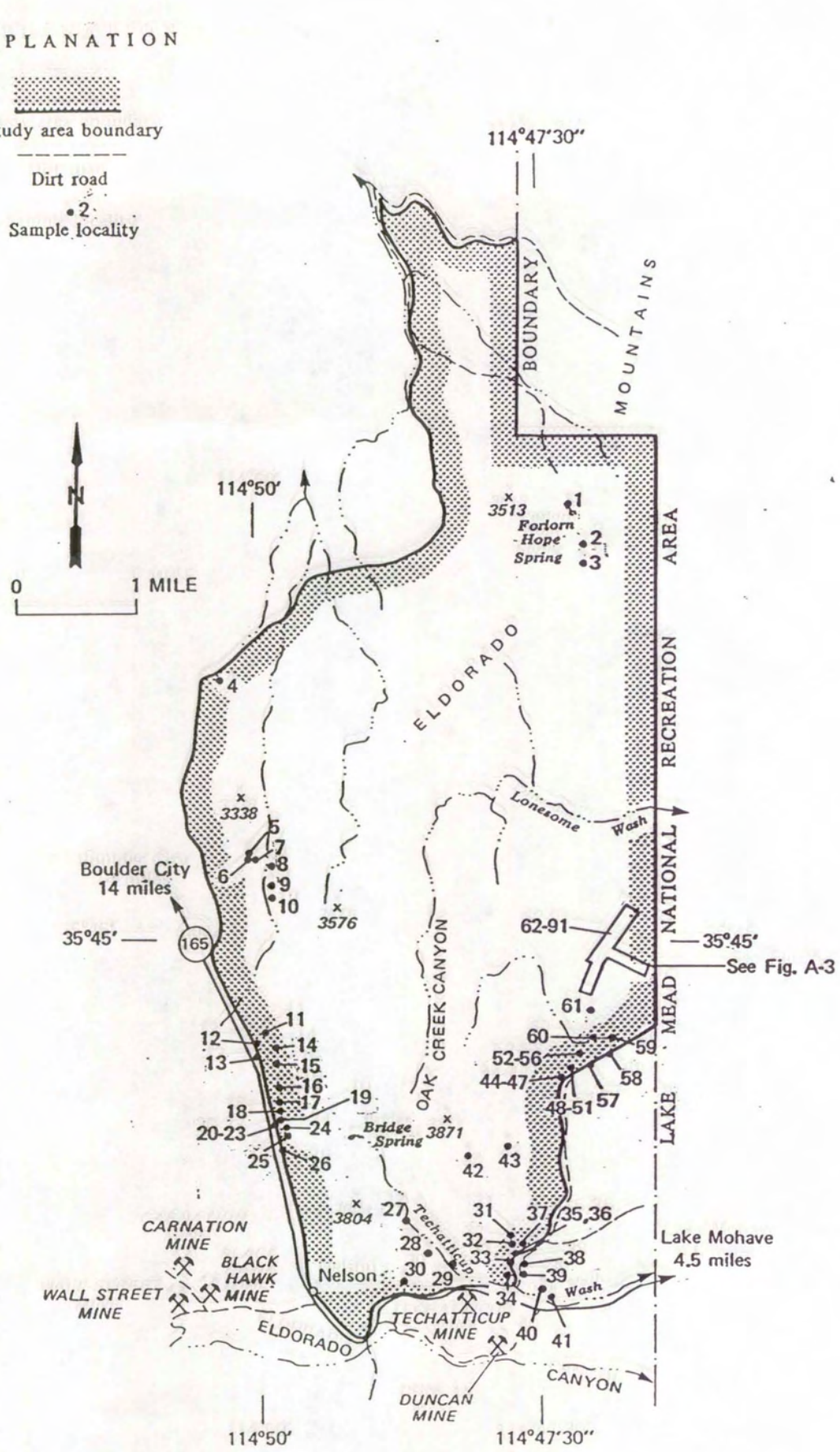

FIGURE A-2.—Location of sample sites in and near the Eldorado study area, Clark County, NV

MONTEZUMA PATENTED CLAIM GROUP

Geophysical Survey

A survey was conducted around a 100 ft deep shaft using a Geometrics EM-16 1/ instrument on the Montezuma and Montezuma No. 2 claims . The survey indicates changes in attitude and phase of very low frequency radio waves near rock masses and structures at shallow depths in the earth's crust. Nine profiles were run with readings every 10 ft. Profiles were between 50 and 100 ft apart. The profiles were oriented approximately perpendicular to the strike of the mineralized breccia zone and its projections both north and south of the shaft. The data were gridded and orthographic projection drawings of the phase (quadrature) and inclination readings were created using Surfer 1/ software (fig. A-3).

Four significant anomalies were revealed. Anomaly 1 is a linear feature corresponding to the outcrop trace of the mineralized zone north of the inclined shaft and the projection of the mineralized zone south of the shaft. Visible mineralization along the extension was minor with gold values of 0.005 to 0.030 ppm north of the shaft. There was significant copper and lead (up to 975 ppm copper and 9,972 ppm lead) along the zone (fig. 7, nos. 64-68). The zone, although not well defined, appears to be about 13 ft wide from the shaft northward until it disappears under talus at the base of a high ridge. Mineralized rock (containing visible oxidized copper minerals) usually is confined to a zone less than a foot wide within the brecciated rock.

Anomaly 2 is an area of relatively high quadrature and low inclination readings. This anomaly is on the southerly extension of anomaly 1 and the projection of the breccia zone exposed at the shaft. While minor brecciation is present in outcrop, analyses of samples from this area only contain near-background amounts of precious and base metals (fig. 7, nos. 77-79).

Anomaly 3 is an east-trending transition zone near the shaft. The quadrature generally increases to the north while the inclination decreases. Terrain or a change of rock type or characteristics may account for this transition zone. The strike and dip of gneissic foliation changes to the south and the amount of granitic rocks seems to increase within the limits of the survey.

Anomaly 4 is a lenticular area west of anomaly 1. Change of rock types at the surface (from gneiss to mafic and granitic dikes) and terrain effects are believed to account for this anomalous area.

Other anomalies at the west and east boundaries of the survey area are also believed to be caused by terrain and rock type variations. Complications caused by the dump at the edge of the shaft, by the presence of the shaft, and by intricately interlayered rock types prevent unequivocable interpretations of the data.

1/ Use of product name is for information purpose only and does not constitute and endorsement by the U.S. Bureau of Mines.

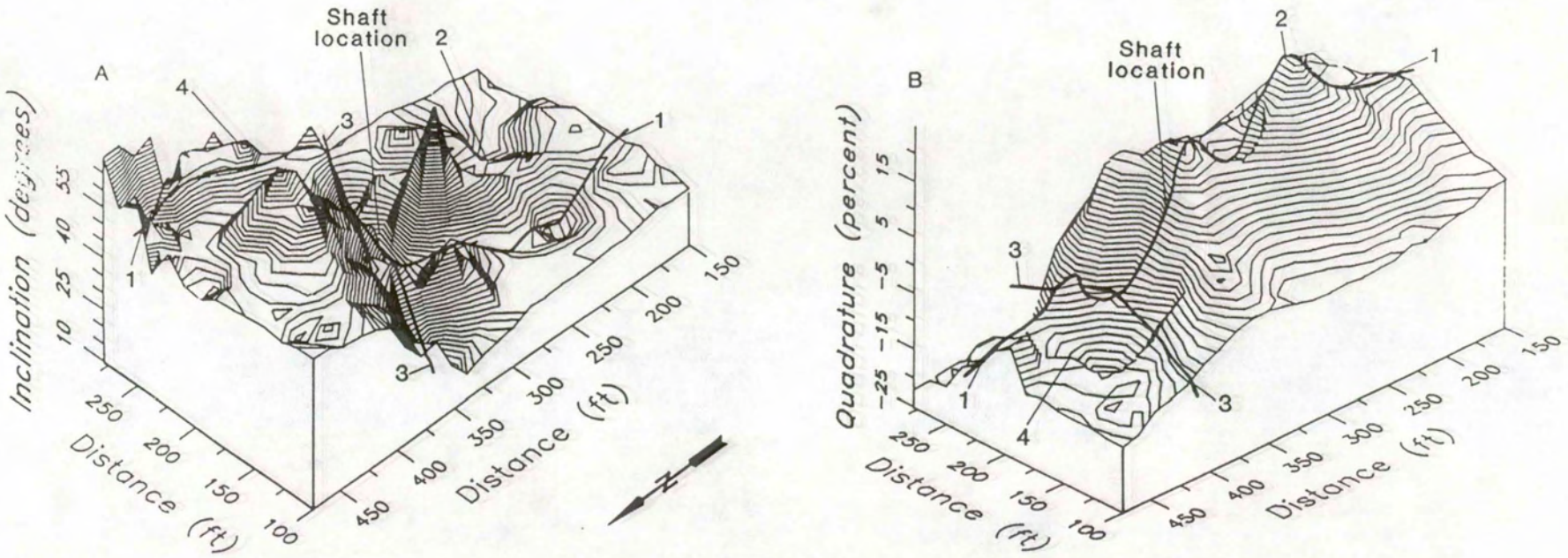

FIGURE A-3.– EM-16 survey of a portion of the Montezuma patented claim group