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Mineral Deposits and Mineral Potential of the China Lake Complex of the Naval Weapons Center, China Lake, California

AD-A163 464

by
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Public Works Department

DECEMBER 1983

NAVAL WEAPONS CENTER
CHINA LAKE, CALIFORNIA 93555

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FOREWORD

The China Lake Complex, which includes all of the north section of the Naval Weapons Center (NWC), China Lake, Calif., was investigated for its mineral potential under Task Z0833-SL for MAT-052 by members of the Geothermal Utilization Division, Public Works Department, NWC. The work was accomplished during fiscal year 1983 by a team of highly skilled geologists and mining engineers, with Conrad L. Neal as Project Manager. Both an extensive literature search and confirmatory field mapping and sampling activities were performed.

This report was reviewed for technical accuracy by James A. Whelan and LCdr. David Stevens.

Approved by
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30 December 1983

Under Authority of
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(U) This report presents the results of an extensive literature search and confirmatory field mapping and sampling activities as part of an investigation for the mineral potential of the China Lake Complex of the Naval Weapons Center. The field survey was of sufficient scope to ensure the validity of the literature and to obtain data on minerals of current or strategic interest. The following mineral commodities were evaluated: gold, silver, tungsten, iron, mercury, perlite, pumice, aggregate, evaporites, travertine, and diatomite. Geothermal and water-producing strata were also investigated. The potential for metallic and nonmetallic minerals, geothermal and water-producing strata, and oil and gas resources of the China Lake Complex are discussed. Assay results are included.

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    - Oil
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    - Pumice
    - Silver Occurrences
    - Springs
    - Travertine
    - Tungsten Occurrences
    - Water Analysis
    - Water Resources
    - Wells
    - Mineral Resources

CONTENTS

ACKNOWLEDGEMENT

Many people from the Naval Weapons Center and surrounding communities made their special skills and knowledge available to the mineral survey as needed. The contributions of C. Rodgers, C. Neal, D. Sprouse, G. Hobson, J. Crow, C. Nyholm, M. Richardson, R. Wilhelm, and D. Smith in the areas of mine safety and data collection during the field evaluation of numerous long-idle, and often dangerous, mines and prospects of the China Lake Complex are sincerely acknowledged. Special thanks go to the members of the Indian Wells Valley Search and Rescue Team's Mine Rescue Group for their assistance during the evaluation of the Argus Sterling Mine. The work of S. Kendall, R. Clodt, H. Dixon and W. Mauldin, in the careful preparation of samples for assay and in map drafting, is also acknowledged.

SUMMARY

The mineral potential of the China Lake Complex was investigated by extensive literature search and confirmatory field work. Although field evaluation was largely restricted to mineral occurrences and prospects claimed or explored prior to establishment of the U.S. Naval Ordnance Test Station (NOTS, now NWC) in 1943, new commodity concepts such as uranium, beryllium, and geothermal energy were also considered. The following mineral commodities were evaluated for the China Lake Complex: gold, silver, tungsten, iron, mercury, perlite, pumice, aggregate, evaporites, travertine, diatomite and geothermal and water producing strata. Other strategic mineral commodities, observed in various laboratory analyses, are listed in the appendixes even though no deposits of these were found that are of commercial interest. Scattered mineral occurrences that contain both precious and base metals are located within the China Lake Complex. Although occasional high-grade hand samples were found, all of the deposits located were too limited in quantity or too low in grade or both to be considered of commercial-scale economic interest barring major changes in technology or the world economy.

Several gold and silver locations were found that, while not being of interest to a minerals explorationist or mining company, could be worked by the "weekend miner." That is, were they located outside of Navy-controlled land, these sites would undoubtedly be staked and worked by a small miner or family-scale operator for tax advantages and possible small profits. The speculator or promoter would also find these sites of great interest, based on judicious use of assay results and the longtime romantic history of the area.

Nitrate or other evaporite deposits of mineable grade and size under the playa lakes in the Indian Wells Valley have not been found to date, and the minor mineral occurrences known are not considered to be of current commercial importance because superior deposits are available elsewhere in the region, i.e., Searles Lake, Boron, etc.

The other nonmetallic resources present within the China Lake Complex are also considered to be of no current economic importance. Perlite occurs as scattered deposits but it is not considered to be marketable because of alternative sources and the current state of technology involving competitive synthetic materials. Pumice, cinder, and aggregate could be widely produced from the China Lake Complex lands, but these commodities occur in large quantities in the general region and are produced locally from nonwithdrawn lands. Sources of travertine and diatomaceous earth were found, but the quality was poor and not suitable for market beyond minor rock hound interest.

The geothermal resources of the Coso KGRA are of national significance and are currently being developed for both Navy use and commercial-industrial use as a source of electrical power. The largely unexplored geothermal potential of areas in the Indian Wells and Salt Wells Valleys and in the Shepherd Canyon/Millspaugh area are also worth note. Because portions of each of these areas are off the Center, they can be explored by private industry if desired. The Navy portions of these possible deposits will be evaluated in further detail when Center present and future mission conflicts are determined.

The trend of small uranium deposits that occurs in the Tertiary Coso formation just outside the northwest boundary of the Complex does not extend onto Navy-controlled land. The potential does exist, however, for uranium occurrences associated with the active epithermal system of the Coso volcanic field and in the Shepherd Canyon Spring terrace deposits.

The potential for commercial-scale oil and gas production from lands within the China Lake Complex is negligible. This potential is limited to possible small quantities of sour methane which could be present along the western edge of Indian Wells Valley. This area is almost entirely outside of the base boundary.

INTRODUCTION

The China Lake Complex is located in south-central California in the upper Mojave Desert 150 miles north of Los Angeles and encompasses sections of three counties: Inyo, Kern, and San Bernardino. The Complex includes the North Ranges and the Administrative Center or "Main Side" of NWC. Figure 1 is an index map of a part of California showing the location of the entire Center.

Physiographically, the China Lake Complex lies in the Great Basin portion of the Basin and Range Province. It is bounded by the Sierra Nevada to the west, the Panamint Valley to the east, and encompasses most of Indian Wells Valley and the Coso Mountain Range as well as the western half of the Argus Range. The elevation change across the Complex is dramatic. The southwest corner of the Complex (in Salt Wells Valley) is at 1847 feet, while Maturango Peak in the Argus Range has an elevation of 8839 feet.

Access to the Complex is Navy controlled through the Main Gate at Ridgecrest. In special cases, arrangements can be made through the Safety and Security Department to enter the Complex through the Darwin, Coso, or other perimeter gates. The main roads to Navy facilities and to significant springs are maintained, but most of the infrequently used roads and old mine roads are not maintained and are often difficult to locate, especially where they follow seasonally active dry washes.

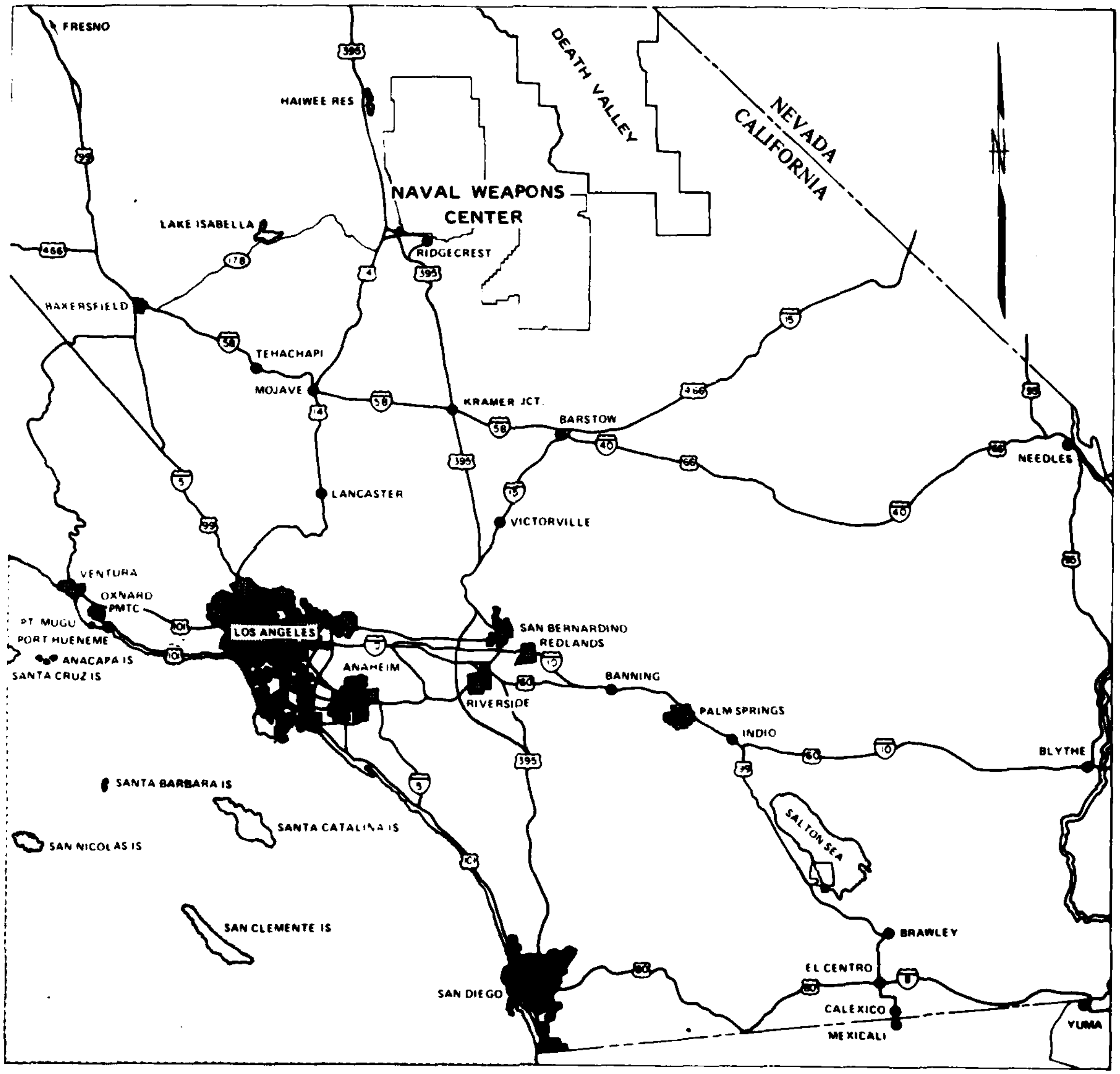

Figure 1. Index map of part of southern California.

The climate in the Indian Wells Valley is arid becoming semiarid in the mountains. Summer temperatures regularly exceed 100°F at the lower elevations. Late summer thunderstorms can frequently cause flashflooding of the canyons and washes. Many areas in the higher elevations are snow-covered throughout the winter months.

Developed water resources are varied and extensive. The Main Base and adjacent communities of Ridgecrest and Inyokern tap aquifers in the Indian Wells Valley. Surface water is limited to playa lakes in the valley, which produces water unsuitable for culinary use, and to springs in the mountains. While the majority of the springs are intermittent and small, a number of perennial springs do exist and are of particular historical note.

Coso Cold Spring has been used as a continuous water source for the town of Darwin (north of the Complex) since the mining boom of the early 1870s. The areas around all of the perennial springs and especially around Coso Hot Springs have had near continuous human occupation for approximately the past 10,000 years, according to present data. In more recent times these springs became the sites for mining camps (Old Coso Village) and numerous mills (Moscow, Cole, Bircham, etc.).

PROCEDURES

With the increased national interest in the mineral resources involved in military withdrawn lands, and the requirements of the Federal Land Policy and Management Act of 1976 (FLPMA), NWC elected to conduct a Level 1-1/2 mineral survey in support of its continued occupancy of the China Lake Complex as a part of its national defense mission. A Level 1-1/2 mineral survey consists essentially of a Level 1 survey—a literature search—plus a sufficiently comprehensive field survey of all reported claims and prospects to ensure the validity of the literature and to obtain data on minerals of current high interest. The added fieldwork was done for a number of reasons. A significant amount of the prospecting of the late 1930s was promotional and tended to be overstated in the literature. Changing technology in the past 20 years, especially in the areas of geothermal systems and related deposits, has meant that the modern literature has not adequately covered the mineral potential of this area because of its long-term inaccessibility to industry.

Indeed, except for the Coso KGRA, very little technical evaluation was done on deposits in this region, even during periods of active prospecting and mining, although a rather voluminous folklore and literature has resulted from both promotional enthusiasm and the passage of time. Thus, we commonly hear reports throughout this region of assays of purported rich vein materials. On-site examinations typically disclose that the vein—even where present and rich—is only a fraction of an inch in width and thus worthless, or, more commonly, there is no recognizable mineral value at all. When one views the multitude of prospects in mountainous regions such as make up the China Lake Complex, rather than become enamored of the number of such prospects (or the lack, in some instances) the reader must also bear in mind the typical odds of success for prospecting. It is not unusual to find the odds of success on the order of the following:

- 1000 prospects are considered to be worthy of claiming and exploratory effort.

- 250 of the 1000 prospects, after examination by a professional team from industry, are found to be worth a second look.

- 65 of the "second looks" deserve serious attention by industry.

- Three of those getting serious attention by industry are worth an option to purchase and heavy exploratory effort.

- One profitable mine results, the profits from which must support all of the exploratory activity needed to find the next mine.

Hence at the raw prospect level, we are, from a statistical point of view, dealing with odds on the order of 1 in 1000. The gaming tables of Las Vegas are obviously far more attractive from a statistical point of view; and it is hope based variously on hunch, geologic talent, and blind luck that combine to keep the industry supplied with prospects undergoing exploration and development.

By employing field investigation and a sampling program, we corrected three deficiencies of the Level 1 mineral survey:

1. The actual occurrence, grade, and width of the reported deposits are verified, and whether or not mining (i.e., stoping) took place can be determined.

2. Deposits that never became involved in promotional literature will receive fair treatment. The NWC Geothermal Utilization Division staff, with a background of over 20 years of continuous field investigations of the test ranges of the Center, is aware of the location of virtually every mine opening, test pit, and prospect on the China Lake Complex.

3. With changing technology and market trends, there has been a considerable shift in what might constitute a potential mineral deposit since the end of World War II, when the industrial prospecting of the test range ceased and new literature citations were no longer being made.

The Level 1 search reviewed all available literature including governmental and industry records, materials obtained by interlibrary loan, and items reviewed at historical libraries and universities. Additional data were obtained from the California Division of Mines, from the United States Geological Survey, and from the United States Bureau of Mines. The extensive files on the mineral occurrences of the region that are held by the Geothermal Utilization Division were of particular help. The U.S. Naval Ordnance Test Station (NOTS), now NWC, legal archives were also reviewed as part of the literature search, as were data developed by the geothermal utilization staff for various nearby condemnation actions involving mining claims. Surviving former claimants and their family members were interviewed when they could be located.

Field examinations of sites and prospects in the Complex itself were conducted by the geologic staff of the Geothermal Utilization Division. Additional site investigations were made by the division senior scientists where significant mineral values were reported to exist or where geologic evidence suggested a zone of potential deposition despite a lack of surface outcrop of economic mineralization.

Mineralogic determination was done by hand specimen examination. Where mineralization appeared to be significant, samples were taken of apparent highest grade material. The experience and discretion of the investigating team in choosing sample sites were relied upon for identification of those sites where mineral "salting" might have been done by mine or prospect promoters during active mining periods or just prior to Navy acquisition. Where sampling was done on in-place mineralized zones from either underground workings or surface outcrop, precaution was taken to avoid salting done in the past by stripping a few inches of surface rock before proceeding with the chip or channel sample method as required for each particular case. This method would help to ensure an honest representative sample if, for example, the mineralized vein surface had been salted with metallic gold or a gold-bearing solution.

Where sampling of "ore" piles on the surface was necessary, two questions had to be considered: Does this material bear any resemblance to the underground in-place material or to the visible surface outcrop material? Does the "ore" pile really represent what was mined or prospected for in a location where all workings are caved or filled in? Naturally, when mine openings and prospects are accessible, samples taken from in-place material are more desirable; but where the workings are caved-in or too dangerous to enter, the "ore" pile sampling method is the only practical alternative. The "ore pile" sample was composed of the apparent "best grade" material within the pile to determine if any mineralization exists at the prospect site. Where analysis of these samples indicated that economic mineralization may exist (and the field examination indicated that sufficient tonnage for an economic deposit also exists) the "ore pile" was resampled. This second "ore" pile sample was composed of representative, uniformly sized material collected along evenly spaced intervals from the top, sides, and from within the pile. Complete sampling from the surface to the core of the "ore" pile helped to ensure a valid assay result in the event the pile had been "topped" with foreign mineral material.

Sampling of sorted piles is not conclusive evidence of the presence or lack of value. If the pile is clearly local vein material and was clearly segregated for some purpose, its value or lack thereof is a clue to what is present. The validity of the approach—of sampling selected or sorted "ore piles"—makes more sense after one becomes familiar with this region and its history. Even through the Depression era this desert area was remote and very difficult to access. A prospector would move in, set up camp, and mine out a pile of rock, sorting the vein (usually an obvious quartz vein) until some preset time or expenditure was completed. Only then would a sample be hauled to town for assay; given no value on his sample, the operator would never return. The desert is dotted with short adits, trenches, and shafts with piles of worthless quartz containing pyrite or limonite along side the dump or sitting on a sorting deck. Two examples of such typical worthless piles are those seen on the sorting deck at the Lone Wolf Mine north of CT-4 test range and at the Oro Grande "Mine" in Etcheron Valley.

At mines where "high-grade" sampling showed very high results, i.e., the Mariposa Mine, a thorough channel sampling procedure was undertaken to better define the economic potential of the site.

A number of samples were evaluated by members of the Geothermal Utilization Division in NWC laboratories with a Kevex Energy Dispersive Spectrometry system. The system was used to prescreen samples to determine potential worth by presence of copper, lead, zinc, iron, antimony, and silver K-alpha and K-beta excitation peaks, plus copper and arsenic values as indicators for gold. X-ray evaluation was made on a loose-powder preparation basis. The Kevex was also used to check independent laboratory results.

All samples taken during the field examination were submitted for independent commercial laboratory analysis of gold and silver. These precious metal values were determined by the fire-assay technique by Skyline Laboratory, Inc., Wheatridge, Colo. Skyline Laboratory also performed base metal evaluations using atomic absorption methods as a check on the X-ray method results. For the purpose of this report, where an assay value is reported as "nil", it indicates that the concentration of the element analyzed was below the detection limit of the equipment employed.

Evaporite samples were evaluated for both industrial salts were evaluated for industrial salts by B-C Laboratories, Inc., Bakersfield, Calif.

Precious metal values are reported in troy-ounces (troy-oz) per ton. Base metals and industrial salts are reported in weight percent (wt%), while rare earth elements are reported in parts per million (ppm). By careful selection of what appeared to be the most mineralized of the high-grade sites, where such could be visually identified; by preparing the samples in accordance with strict engineering procedures; by conducting preliminary in-house analyses for prescreening and cross-checking of independent laboratory assay results, a consistent and prudent evaluation could be made on the grade and values represented by each prospect that could be sampled on the China Lake Complex. Where no mineralization would be visually identified, sufficient check samples were taken to ensure that the lack of apparent precious metals was not due to their obscurity.

When the sample assay results were returned from laboratory analysis, the task remained of interpreting the data and applying an overall grade and value estimate to each mine* or prospect.

The evaluator, at this point, must make a number of decisions requiring good judgment as to the relative importance of erratic high values—an intermingling of mainly low-grade assay values with occasional high-grade assay values for a single deposit or prospect. The high assay value could, indeed, be a genuine result—after "salting" has been ruled out during field evaluation. A second cause of a high-grade assay value could be the occurrence of the mineralization. As Austin (1978) states: "A mineralized zone with occasional flakes or blebs of gold is very difficult to sample; i.e., narrow channel samples are generally of either no value or of a rather high value."[1]

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*The term "mine" is used in this report only if actual stoping for production can be verified on scene.

[1]Naval Weapons Center. *Mines and Mineral Deposits of the South Portion of the Chocolate Mountain Gunnery Range*, by Carl F. Austin, William F. Daniel III, and James A. Whelan. China Lake, Calif., NWC, May 1978. (NWC TM 3483, publication UNCLASSIFIED.)

The dilemma of interpreting the value of a particular zone with such "erratic high assays" is discussed in detail by McKinstry (1948, pp. 49-59), in his excellent text on mining geology.[2]

Where these erratic high values presented themselves, the mine or prospect was revisited and the specific sample locations were resampled to check the reproducibility of assay results. Further sampling was conducted along the mineralized zone to delineate the area of potentially commercial value, if indeed it actually existed.

For the purposes of this study, the following currently realistic dollar values were arbitrarily assigned to the evaluated commodities:

Gold, $500/troy ounce	Silver, $15/troy ounce
Copper, $0.75/pound	Lead, $0.20/pound
Zinc, $0.38/pound	Mercury, $380/flask

Vein width measurements are given in feet except for those less than 0.5 foot (6 inches), which, for ease in reading, are given in inches. All volumes were calculated using engineering scale (0.1 feet), however. A minimum stope width of 1.5 feet and an average mined width of 3 feet were assumed except in mines (such as the Josephine (N-208)) where a measured average could be used or where geologic conditions (a bad hanging wall) would necessitate that a greater width be taken.

In addition, the term "valid claim" in this report refers to any mineral claim that was determined to be valid at the time of the NOTS condemnation proceedings of the 1940s. A list of these claims is given in the 1951 California Journal of Mines and Geology.[3] No valid mineral claims exist today on the lands covered by the China Lake Complex. At the time of condemnation a claim had to pass primarily the "prudent man test" (Maley, 1983)[4] in order to be considered valid. Recent U.S. Supreme Court decisions have established more stringent criteria so that were the proceedings carried out today, many of the claims found valid in the 1940s would probably be deemed invalid today.

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[2]H. E. McKinstry. *Mining Geology*. Englewood Cliffs, NJ, Prentice-Hall, 1948, pp. 49-59.

[3]L. A. Norman, Jr. and Richard M. Steward. "Mines and Mineral Resources of Inyo County," in *California Journal of Mines and Geology*, Vol. 47, 1951, No. 1, pp. 24-27.

[4]Maley, Terry, S., *Handbook of Mineral Law*, 3rd Edition, p. 214, M.M.R.C. Publications, Boise ID.

GEOLOGIC SETTING

A geologic map adapted from the Trona and Death Valley Sheets of the California Atlas is given as Figure 2. For the purpose of this discussion, the China Lake Complex is divided into three major units: the Coso Mountains, the Argus Range, and the Indian Wells Valley.

THE COSO MOUNTAINS

The Coso Mountains are the dominant physiographic feature of the China Lake Complex. They lie in the Great Basin at the western edge of the Basin and Range province and roughly follow the regional pattern of elongate, north to northwest trending mountain ranges, but their irregular shape reflects a more varied local tectonic history.

The Coso Range consists principally of Mesozoic plutons and pre-Cretaceous metamorphic rocks overlain on much of the range by late Cenozoic volcanics and sediments. In decreasing order of abundance, the plutonic rocks vary in composition from granitic to dioritic to gabbroic. Duffield, *et al* (1980)[5] state that "in general (within the basement complex), mafic plutons and metamorphic rocks are most abundant in the southern and eastern parts of the range, and granitic plutons dominate elsewhere." Northwest-trending, vertical to steeply dipping dikes, felsic or mafic in appearance and less than 10 feet thick, are abundant in parts of the range underlain predominately by the mafic plutons. East-west trending, steeply dipping granitic dikes up to 35 feet wide occur in the northern areas, associated with the larger granitic intrusives.

The metamorphic rocks occur primarily as roof pendants scattered throughout the range and are both metamorphosed igneous and sedimentary rocks in the form of marble, schist, greenstone, low-grade gneiss, and skarn.

The late Cenozoic volcanics occur in the western and southern parts of the range. They form two main groups: late Pliocene intermediate to basic volcanic rocks with subordinate interbedded continental sedimentary rocks, and the Pleistocene basalts and rhyolites that include the domes, flows, and pyroclastic deposits of the Coso volcanic field.

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[5]W. A. Duffield, C. R. Bacon, and G. B. Dalrymple. "Late Cenozoic Vulcanism, Geochronology and Structure of the Coso Range," Technical Paper No. 9B1076, in *Journal of Geophysical Resources*, No. 85, 1980, p. 24.

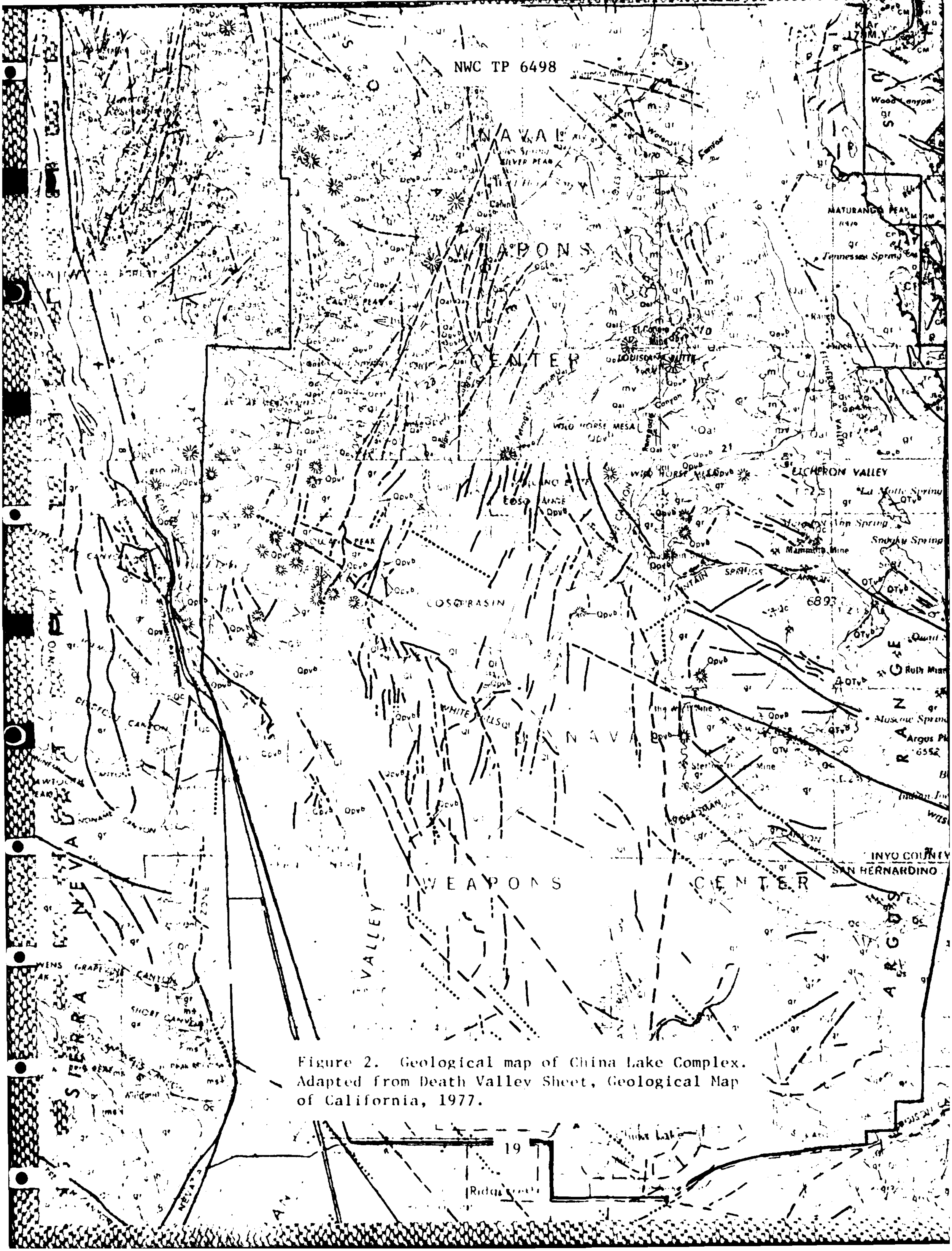

Figure 2. Geological map of China Lake Complex. Adapted from Death Valley Sheet, Geological Map of California, 1977.

EXPLANATION

SEDIMENTARY AND METASEDIMENTARY ROCKS

- Qs — Dune sand
- Qal — Alluvium
- Ql — Quaternary lake deposits
- Qc — Pleistocene nonmarine
- QP — Plio-Pleistocene nonmarine
- Tc — Tertiary nonmarine
- m, ls — Pre-Cretaceous metamorphic rocks (ls = limestone or dolomite)
- P, ls — Paleozoic marine (ls = limestone or dolomite)
- P — Permian marine
- CP — Pennsylvanian marine
- CM — Mississippian marine
- Devonian marine

IGNEOUS AND META-IGNEOUS ROCKS

- Qrv — Recent volcanic: Qrv^r – rhyolite; Qrv^a —andesite; Qrv^b – basalt; Qrv^p —pyroclastic rocks
- Qpv — Pleistocene volcanic: Qpv^r —rhyolite; Qpv^a –andesite; Qpv^b —basalt; Qpv^p —pyroclastic rocks
- Quaternary and/or Pliocene cinder cones
- Pv — Pliocene volcanic: Pv^r – rhyolite; Pv^a – andesite; Pv^b —basalt; Pv^p —pyroclastic rocks
- Tertiary intrusive (hypabyssal) rocks: Ti^r rhyolite; Ti^a –andesite; Ti^b –basalt
- Tv — Tertiary volcanic: Tv^r —rhyolite; Tv^a —andesite; Tv^b —basalt; Tv^p —pyroclastic rocks
- gr — Mesozoic granitic rocks: gr^a-granite and adamellite; gr^g-granodiorite; gr^t-tonalite and diorite
- bi — Mesozoic basic intrusive rocks
- JRv — Jura-Trias metavolcanic rocks
- mv — Pre-Cretaceous metavolcanic rocks

The Coso volcanic field is represented in Figure 3. The principal structures in the area are older high-angle faults striking northwest to west-northwest and northeast, and younger high-angle faults (many with recent displacement) striking north-northwest and north-northeast. These structures were formed by the intersection of the two major structural trends that form the west and south sides of the Coso Range: the Sierra Nevada fault zone and the Wilson fault zone. Active geothermal phenomena and hydrothermal alteration are concentrated along the younger faults, especially where they intersect older structures (Hulen, 1978).*

THE ARGUS RANGE

The Argus Range lies to the east of the Coso Mountains and consists predominately of intermediate range Mesozoic plutons, quartz monzonitic to quartz dioritic in composition. The Argus Range follows the regional pattern of the Basin and Range province. In the north half of the range, the Mesozoic plutons are capped by large remnants of Pennsylvanian and Permian marine carbonates. The valley lying between the two mountain ranges contains Quaternary alluvium and lacustrine deposits with isolated exposures of both plutonic rocks and Paleozoic sediments and metamorphics.

The north Argus Range is dominated by the Argus Sterling Thrust Fault. The fault is north-northwest trending and dips to the southwest at an average of 30 to 40 degrees. It separates two distinct plutonic terrains. From the west, the Maturango Peak quartz monzonite and related rocks of the Coso terrain were thrust over the Hunter Mountain quartz monzonite and its Paleozoic roof pendants to the east (Moore, 1976).[6] The south Argus Range, on the other hand, is dominated by a series of northwest-trending faults, the largest being the Wilson Canyon fault.

Several types and generations of dikes are present in the Argus Range: steeply dipping, northwest-trending, granitic dikes occur in several areas, i.e., in the vicinity of Wilson Canyon and Mountain Springs Canyon where they range up to hundreds of feet wide. Numerous mafic dikes also occur in this area but are relatively thin and do not appear to exhibit a preferred orientation. Altered green dikes of dioritic or porphyritic andesite trend northwest within the quartz monzonite and related rocks south of the Millspaugh site (Moore, 1976).[6]

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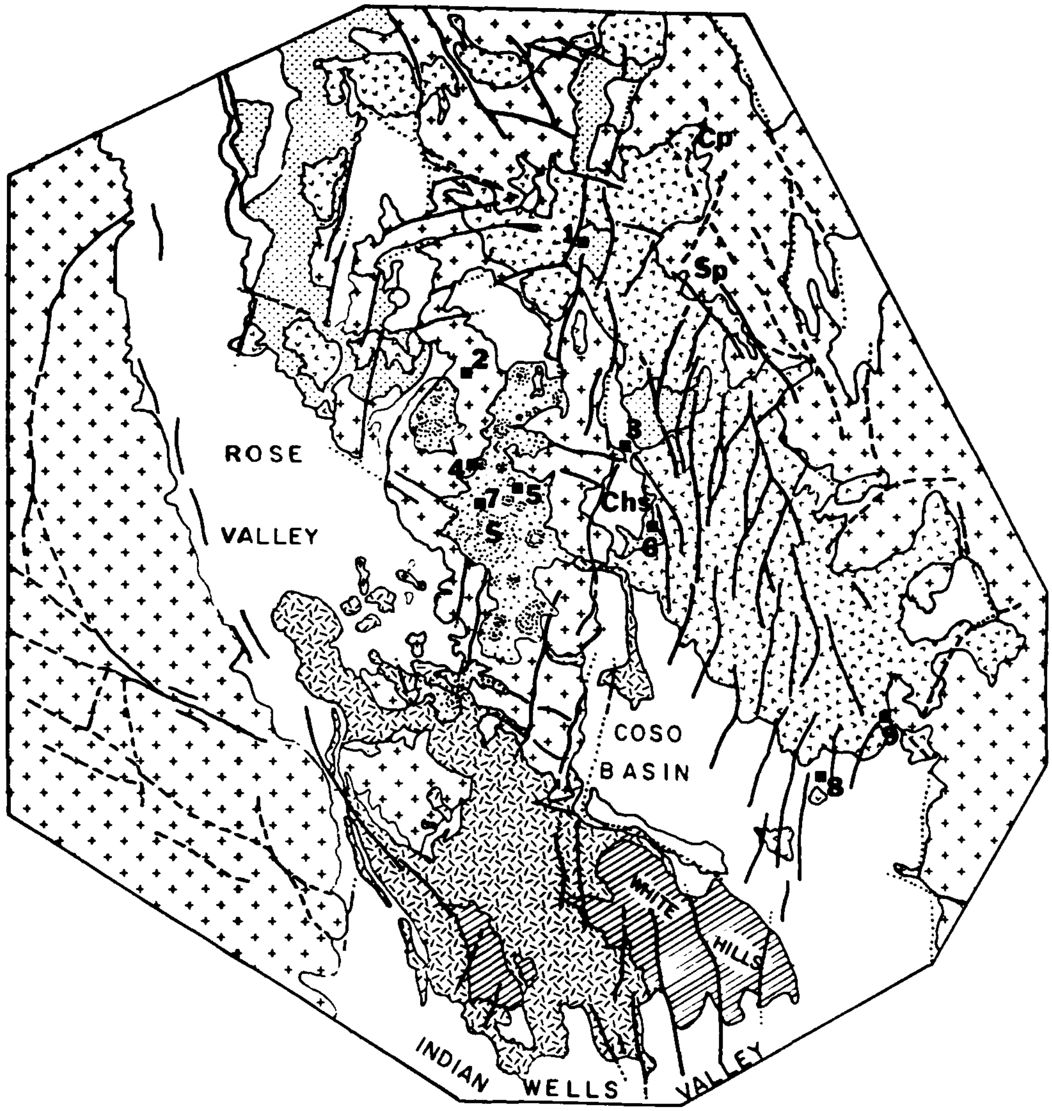
*J. B. Hulen. "Geology and Alteration of the Coso Geothermal Area, Inyo County, California." Earth Science Laboratory, University of Utah Research Institute, Salt Lake City, Utah, 1978.

[6]S. C. Moore. "Geology and Thrust Fault Tectonics of Parts of the Argus and Slate Ranges, Inyo County, California." University of Washington, Seattle, Wash., 1976. Ph.D. thesis, p. 127.



EXPLANATION

- Quaternary deposits
- Pleistocene basalt
- Pleistocene rhyolite domes, flows, and pyroclastic deposits
- Pliocene volcanic rocks and intercalated Coso Formation
- Pleistocene sedimentary rocks
- Pre-Cenozoic granitic and metamorphic rocks

1, Upper Cactus Flat Pumice; 2, N-401; 3, N-405; 4, N-409; 5, N-410; 6, N-701; 7, N-716; 8, N-1201; 9, N-1203; Cp, Coso Peak; Sp, Silver Peak; Chs, Coso Hot Springs; S, Sugarloaf.

Figure 3. Geologic map of the Coso Volcanic Field, adapted from Duffield, et al, 1980

Several small Cenozoic basalt and andesite flows occur in the central part of the range from Wilson Canyon to the Millspaugh area. In general, they appear to be related to a large set of flows that make up the north end of the Slate Range to the east.

Freshwater limestones of Tertiary age occur in the east-central area of the range outside the China Lake boundary and were probably formed within small lakes in the volcanic fields (Moore, 1976)[6]. Other, more recent, limestone and travertine deposits occur within the boundary near the Millspaugh site. Mineralogic analysis and the physical occurrence of these deposits indicate a probable geothermal origin.

INDIAN WELLS VALLEY

Indian Wells Valley is considered to be a large graben bounded by four major fault zones. Movement along the Sierra Nevada fault zone on the west side began in the mid-to-late Tertiary period and is still continuing today. The Argus fault zone on the east side is a series of near vertical faults that mark the boundary between the valley and the south Argus Range. The Argus fault system is offset by the Wilson Canyon fault zone. The Wilson fault zone is northwest-trending and near vertical. It cuts across the Argus Range, forms the north edge of the valley, and then appears to continue northwestward across the Sierran escarpment. The south side of the valley is marked by the Rademacher Hills and the El Paso Mountains. Complex faulting occurs along the north side of the Rademacher Hills that may be, in part, related to the Argus fault zone, and, in part, to the Garlock fault zone (Zbur, 1963)[7]. The Garlock fault zone is a major regional feature that in this area trends northeasterly and delineates the southern flank of both the El Paso Mountains and the Rademacher Hills.

The bedrock floor of Indian Wells Valley is at a maximum depth of 5000 feet near the former town of Brown, 9 miles north of Inyokern. The valley has been downdropped at a fairly continuous rate, as evidenced by the mix of continental sediments present as valley fill. These sediments include alluvium, lacustrine beds, fan deposits, windblown sand, and landslide debris. During the Tertiary period alluvium and the "dry" deposits predominated; while during much of the Pleistocene and Quaternary periods, the upper part of a large lake, Lake Searles, covered the valley. This arm of the lake acted as a settling basin in which the bulk of the suspended sediments from the

[7] U.S. Naval Ordnance Test Station. *A Geophysical Investigation of Indian Wells Valley, California*, by Richard T. Zbur. China Lake, Calif., NOTS, July 1963. (NOTS TP 2795, publication UNCLASSIFIED.)

Owens River were deposited, allowing the rest of the lake (now Searles Valley) to remain comparatively free of clastic material. This may, in part, account for the difference in the evaporite deposits of China Lake and Searles Lake, the latter having a much larger ratio of saline minerals to fine-grained clastics.

Within the China Lake Complex, two topographic features are worthy of note. The White Hills are a southeast-plunging anticline composed of early Pleistocene lake beds of silt and clay intercalated with lenticular sandstone, conglomerate, limestone, and tufa (Zbur, 1963)[7]. Two small playa lakes, China Lake and Airport Lake, occur in the northeastern part of the valley. They are underlain by recent deposits of silt and clay with occasional sand lenses. Thin evaporite encrustations are present on China Lake during the dry season, and very sparse ulexite nodules have been found in the silts beneath the playa surface at Airport Lake*.

MINERAL RESOURCES PROSPECTED IN THE PAST

The mineral commodities that have been produced or prospected for on the China Lake Complex include gold, silver, tungsten, lead, mercury, iron, evaporites, pumice, perlite, aggregate, and geothermal resources. Although the total gross metallic and nonmetallic value of production for this area has never been documented, family records and published references indicate that several individual mines were worked with enough success to support a family or two—but not much more. However, not all of the sites named as mines in the literature or on the claim notice, such as the Black Crow Mine, were actually developed into a mine by our definition, i.e., no stoping was done at the site.

Each deposit or prospect that could be located on the ground is described in the following detailed sections. There are prospect sites at which the geologist today can only surmise what the prospector may have had in mind while he labored there. Because this region lies directly between the gold mines of the Randsburg District and the silver deposits of the New Coso and Cerro Gordo Districts, one generally assumes gold and silver were the main object of the prospector's search if nothing else is present.

Figure 4 is an index map of the China Lake Complex showing the locations and relationships of the eight site location maps given as Figures 5 through 12 and referred to in the following site evaluations.

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*Personal commuication with K. Pringle, NWC, August 1983.

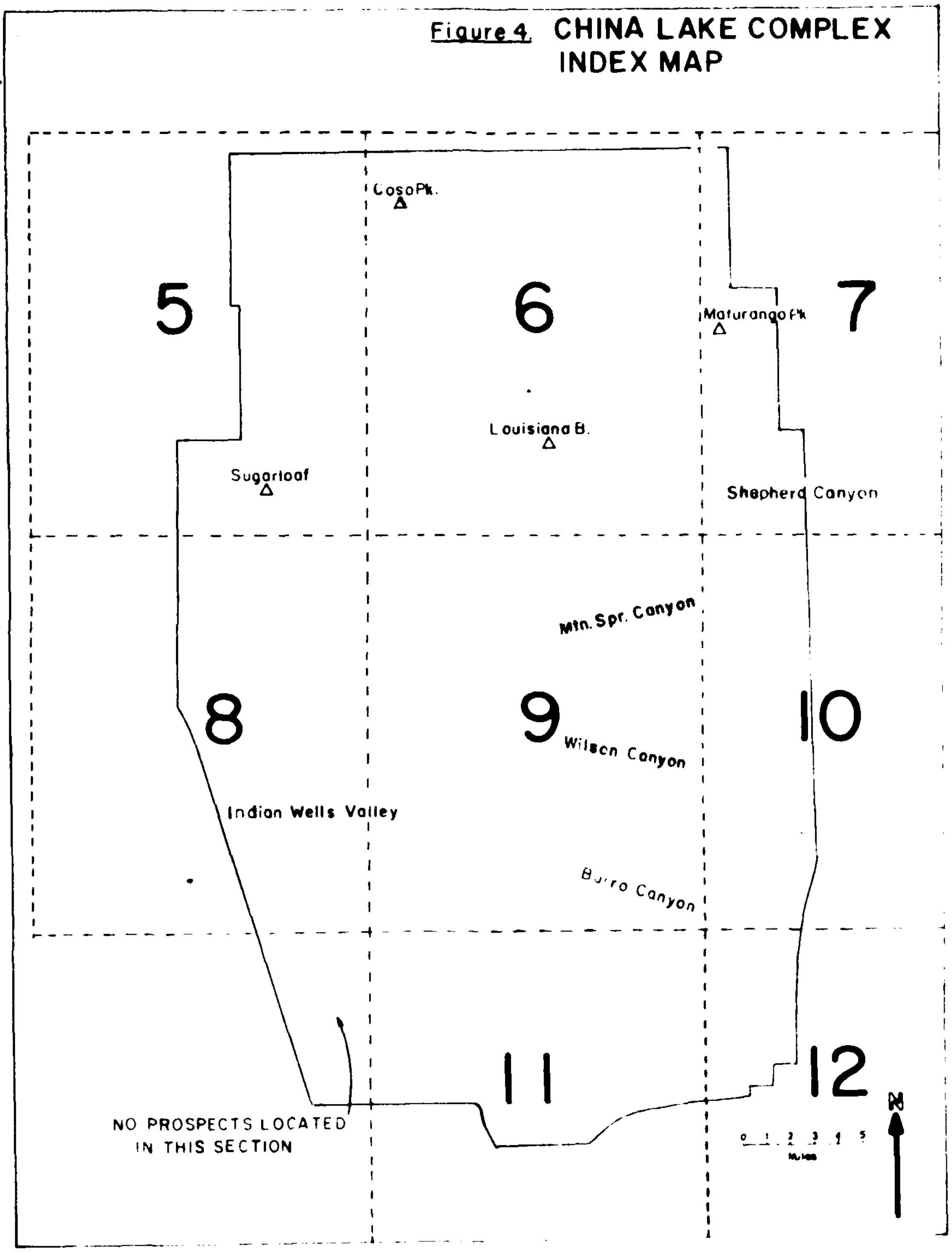

Figure 4. Index map to site location map, China Lake Complex.

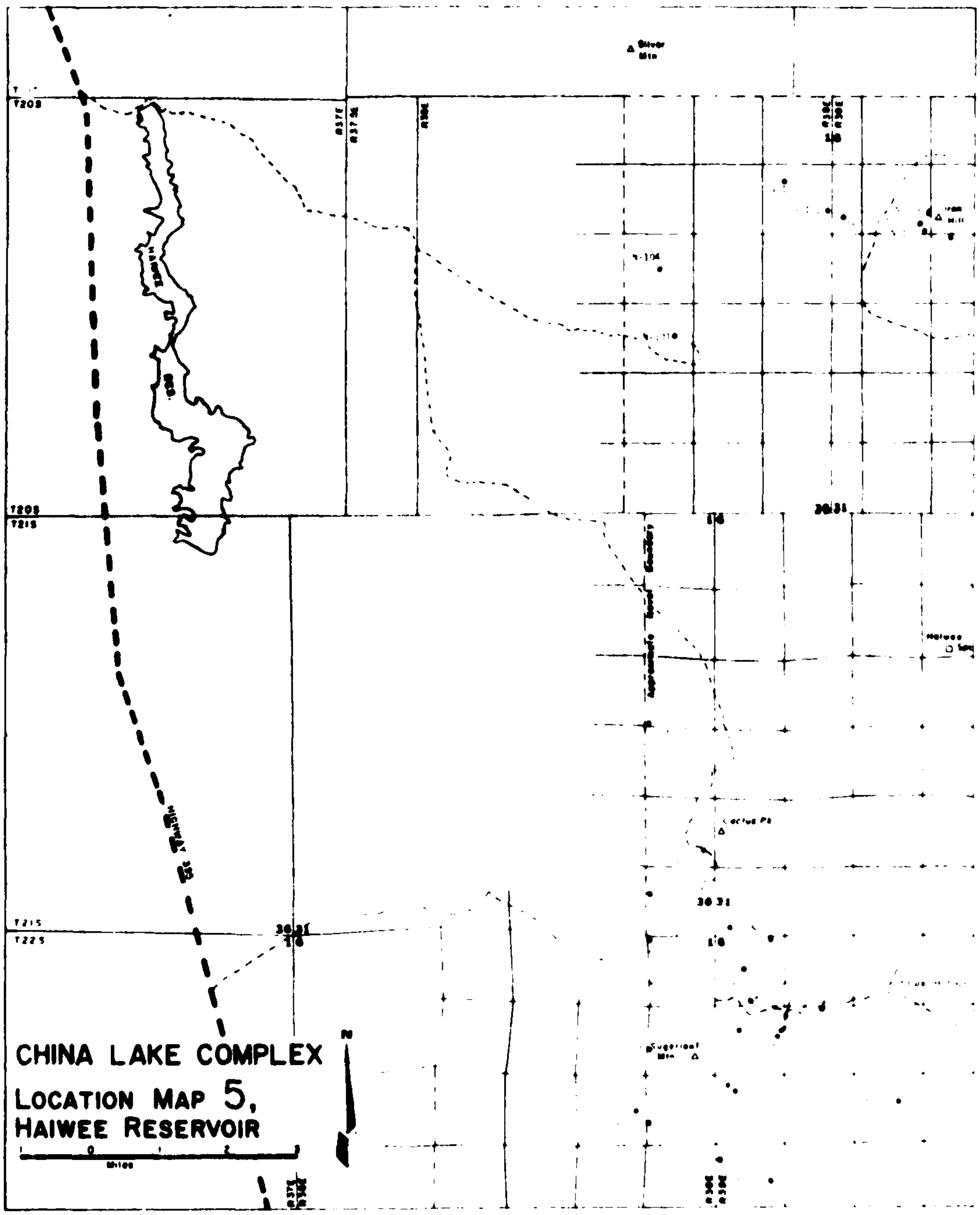

Figure 5. Site Location Map 5.

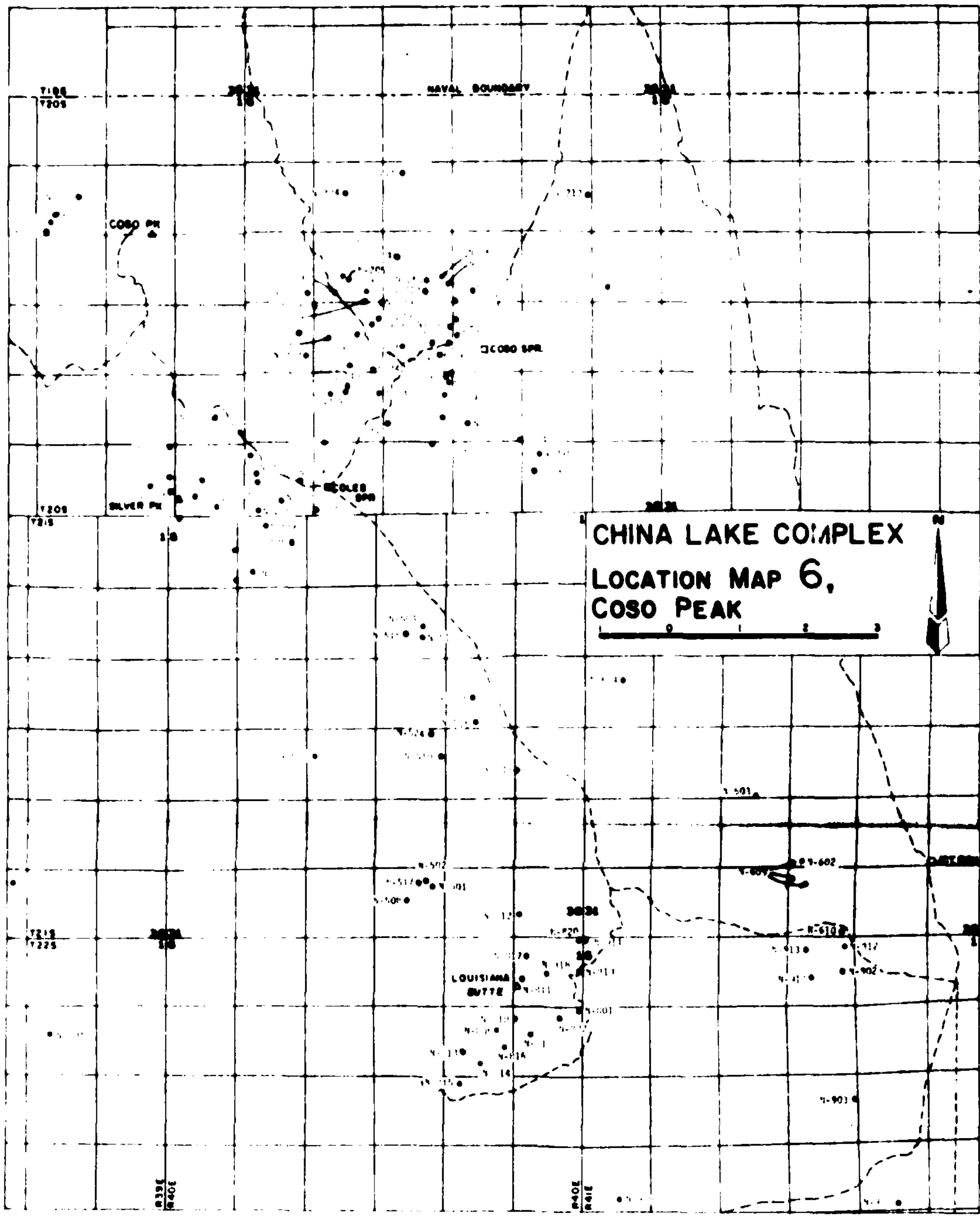

Figure 6. Site Location Map 6.

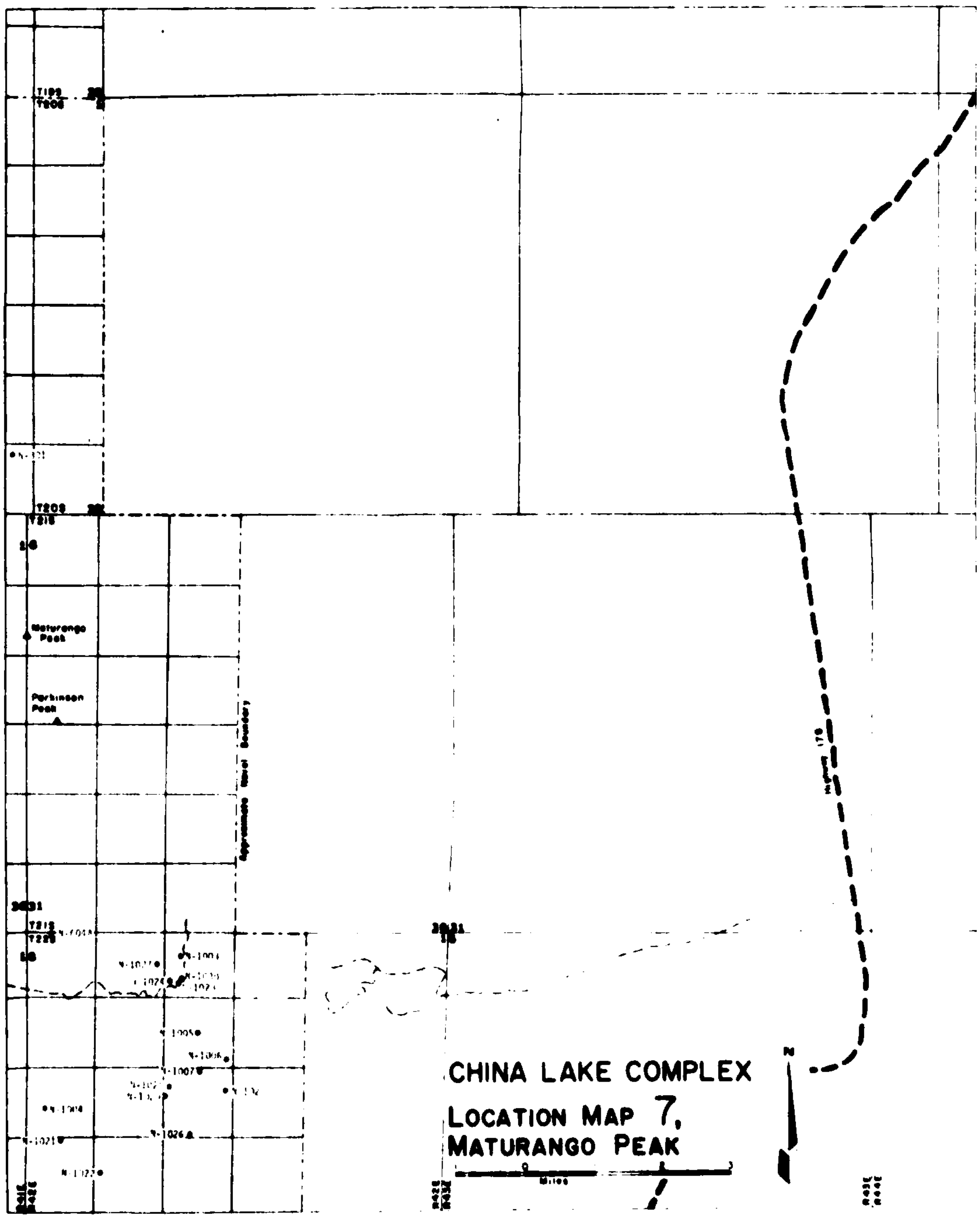

Figure 7. Site Location Map 7.

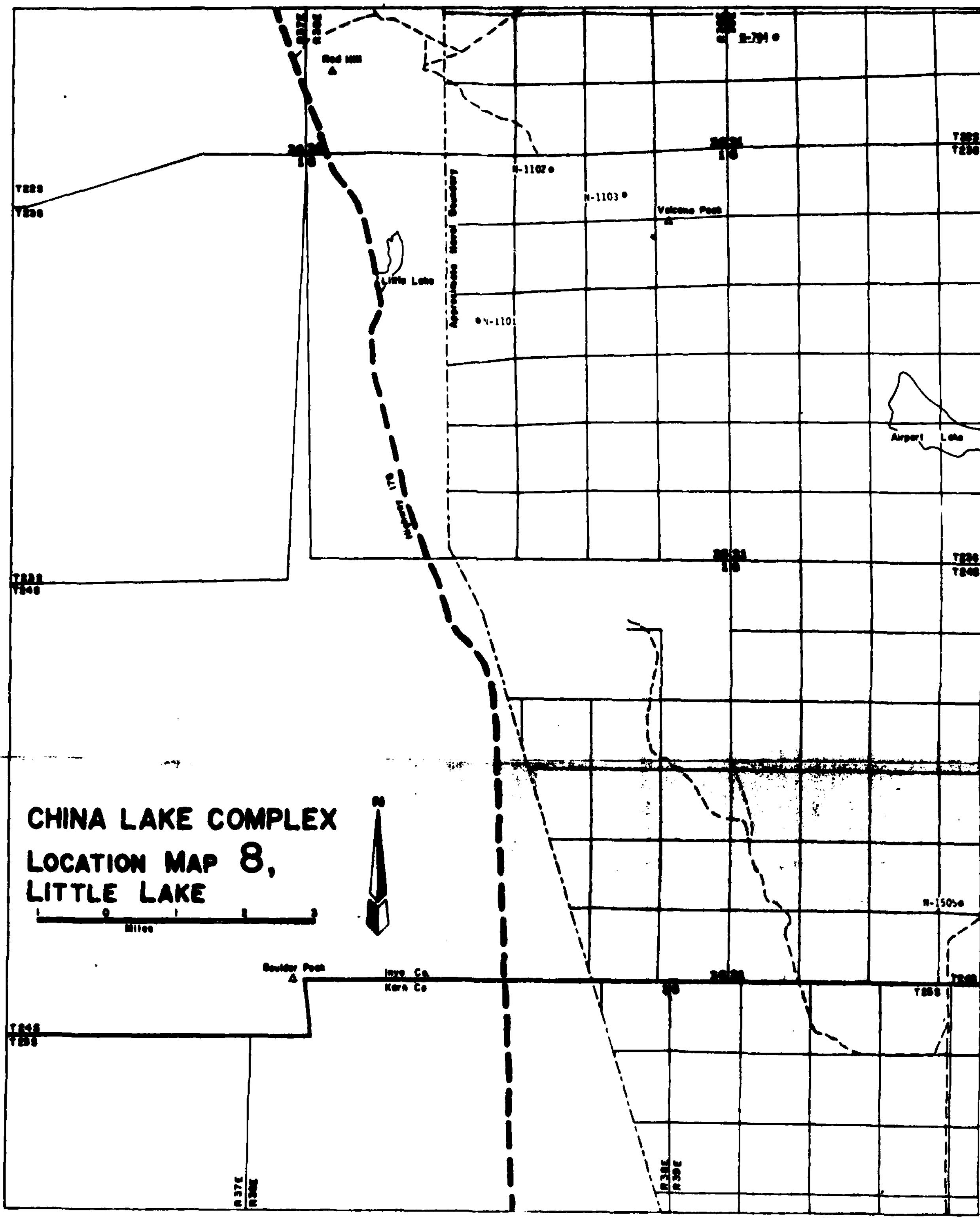

Figure 8. Site Location Map 8.

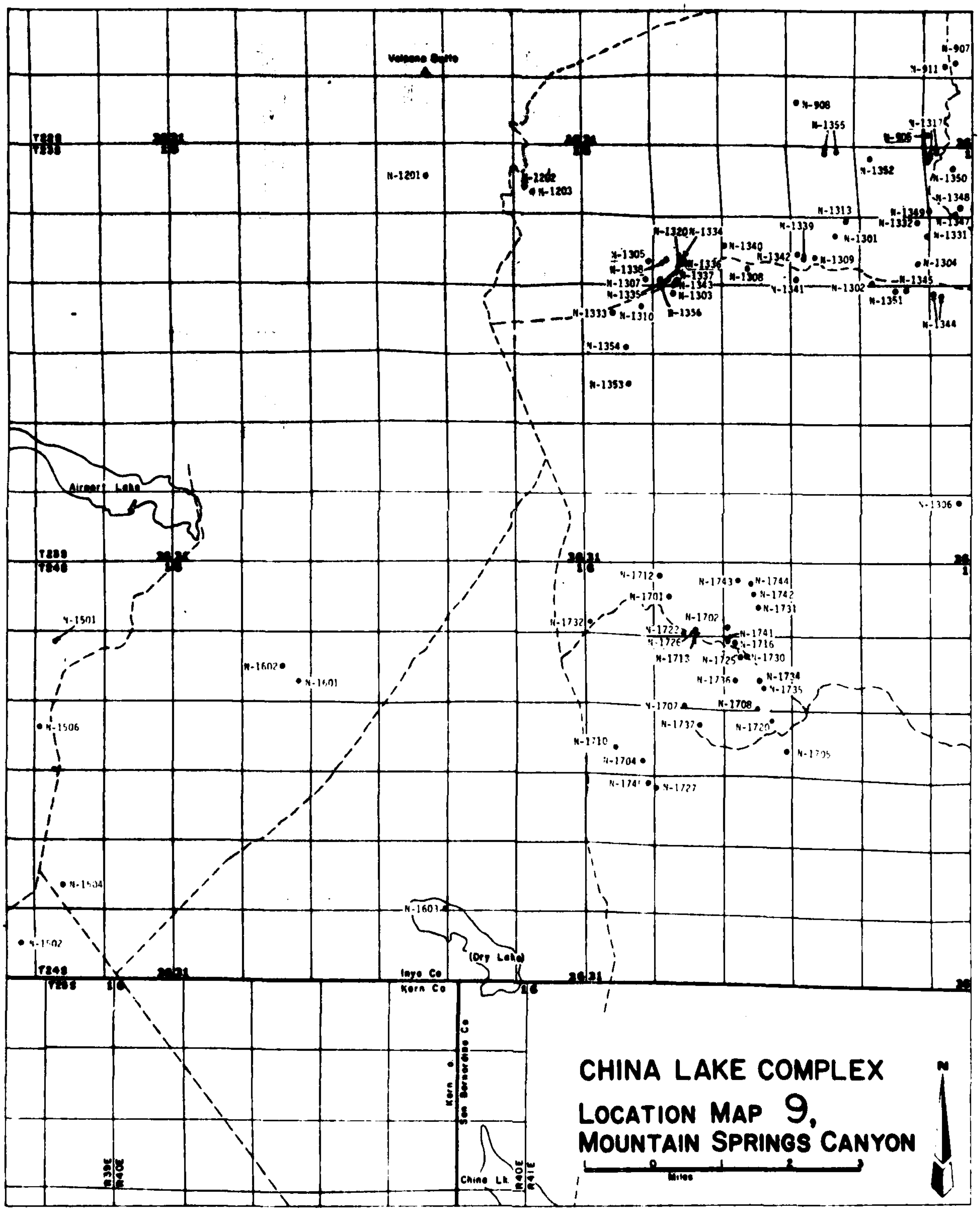

Figure 9. Site Location Map 9.

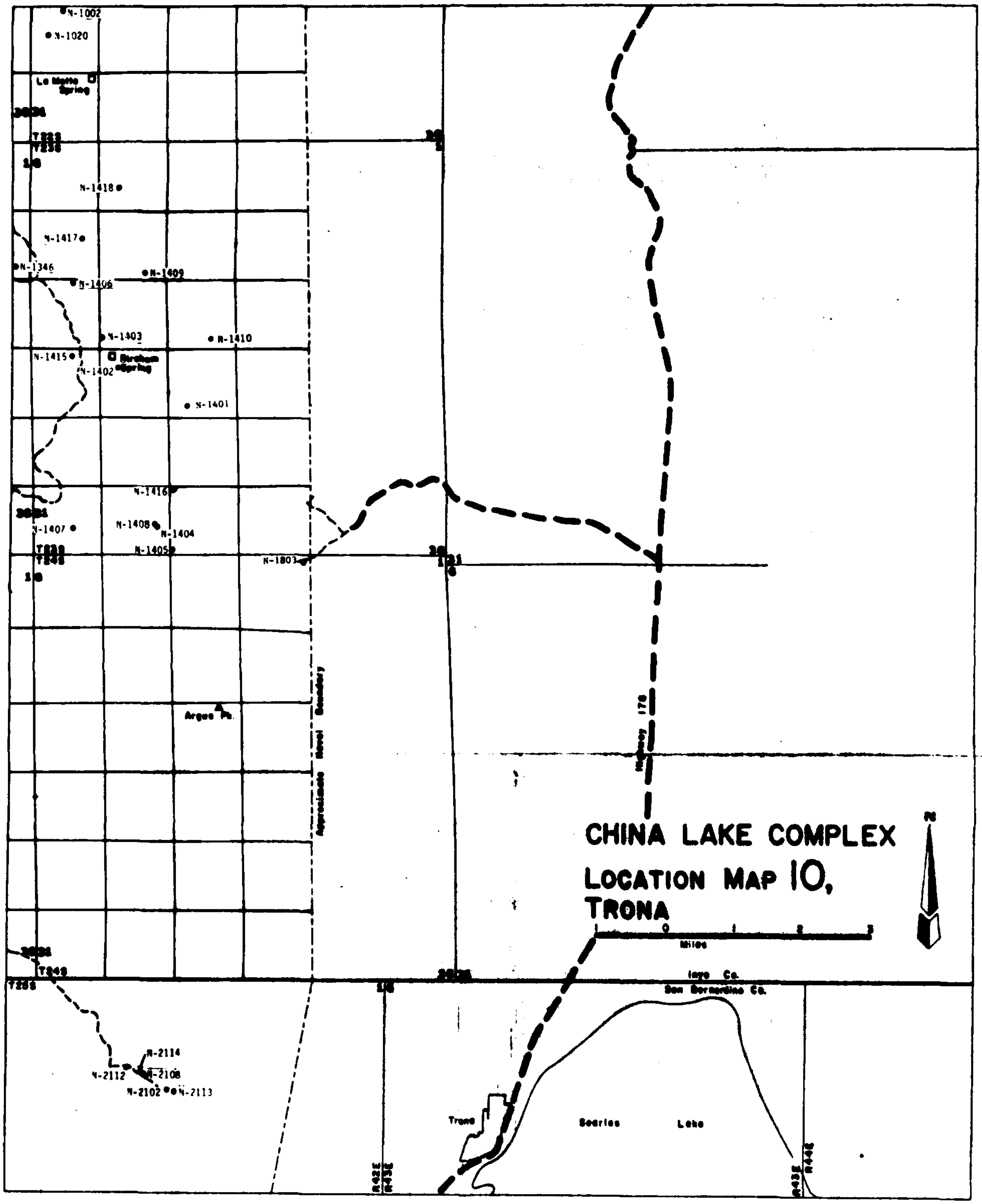

Figure 10. Site Location Map 10.

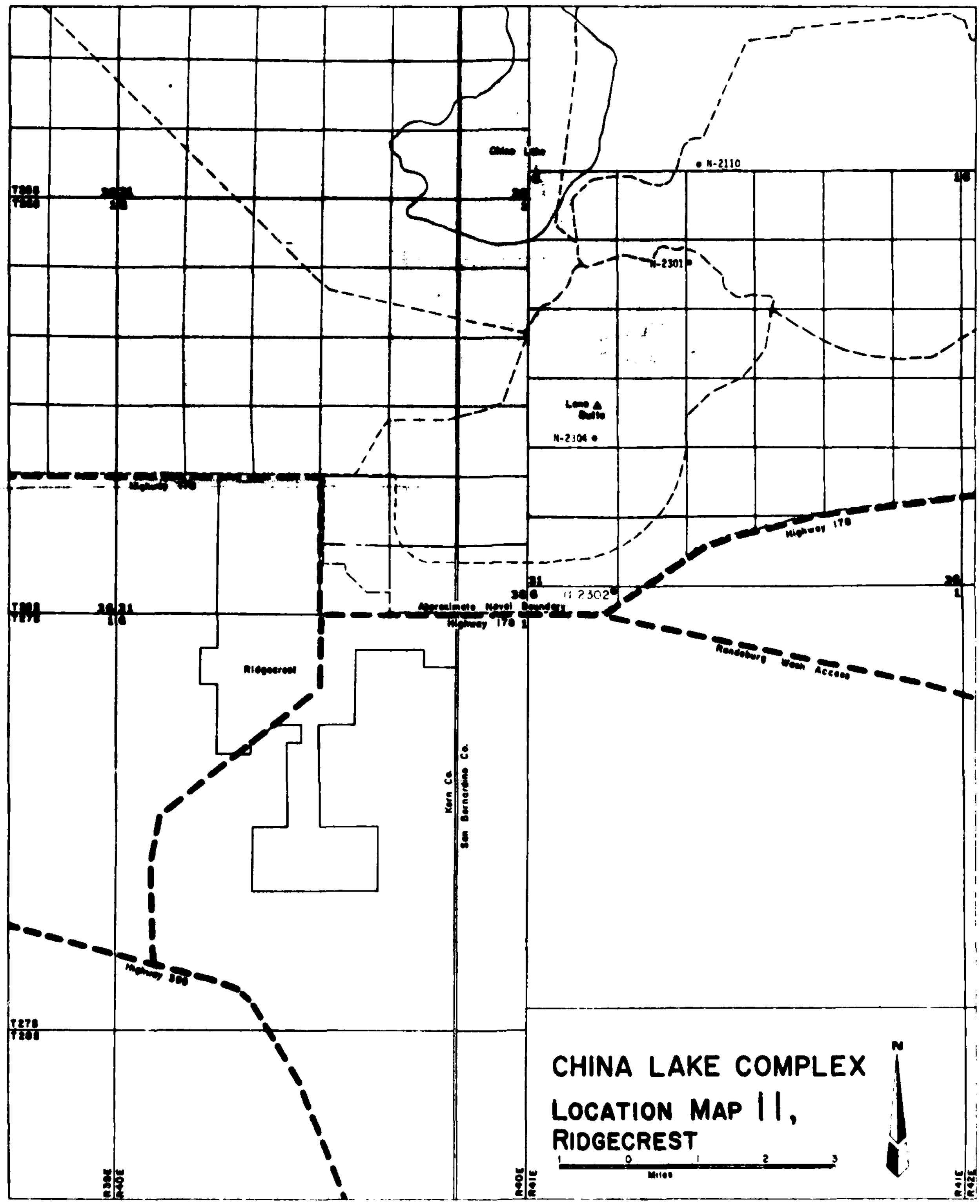

Figure 11. Site Location Map 11.

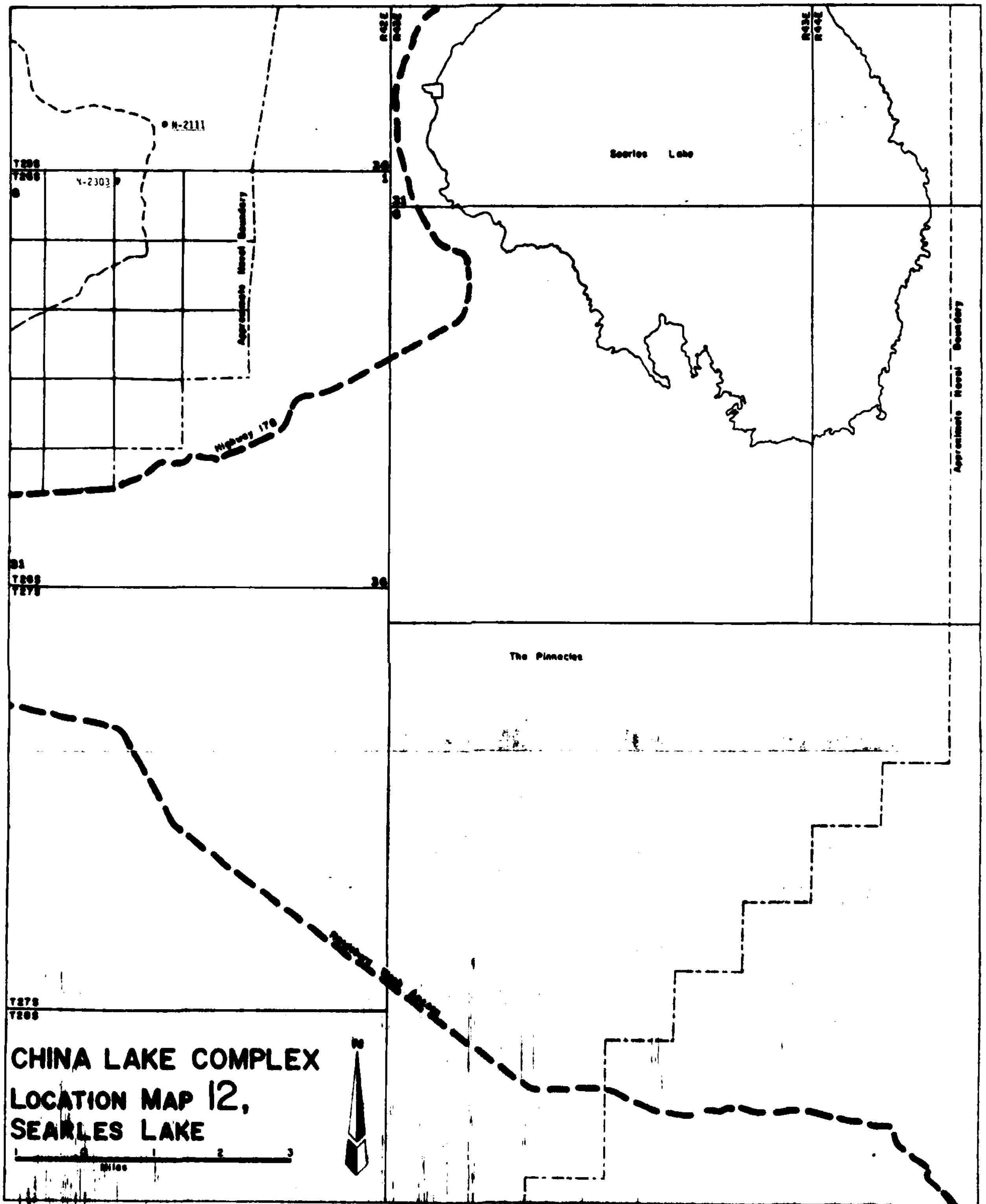

Figure 12. Site Location Map 12.

GOLD OCCURRENCES

Coso District

Coso Peak Area

Thorndyke Mine (Gold King Lode) (N-101)

The Naval Ordnance Test Station's legal files (NOTS is the previous name of NWC), makes note of this property in its Condemnation Proceedings calling it the Gold King Lode (NOTS Case No. 428). No other information regarding prior ownership, commodity, ore value or tonnage produced could be found.

The Thorndyke Mine is located on the western slope of the Coso Range just east of Cactus Flat approximately 4.2 miles south-southeast of the Silver Mountain vertical angle elevation benchmark (VABM) and 4.4 miles southwest of Iron Hill. The workings are shown as N-101 on Figure 5, which is a location map of the Haiwee Reservoir area. They are on surveyed land in the SE1/4, SE1/4, NW1/4 and SW1/4, SW1/4, NE1/4 of Sec. 22, T20S, R38E, MDB&M.

The host rock for this deposit is Mesozoic granite that has been decomposed by surface weathering to an average depth of 10 feet. Below this weathering zone the rock appears to be highly fractured but relatively unaltered. In places it is overlaid by a Pleistocene basalt flow with an average thickness of 6 feet in the vicinity of the workings. The vein material is situated along a fracture at the margin of an aplite dike (approximate average width, 0.5 foot). The dike material is brecciated and the vein is blocky and consists of quartz with minor limonite as fracture coatings. The vein averages 0.8 to 1 foot thick and occasionally swells to 2 feet thick. It strikes N60E and dips 62 degrees to the northwest.

The property was developed by three shafts and 11 prospects along the strike of the vein. (The Haiwee Reservoir 15-Minute Series Topographic Quadrangle published by the United States Geological Survey (USGS) in 1951 shows four shafts.[8] The solitary "shaft" to the east is a buried water-storage tank 4 feet in diameter by 15 feet deep with a 2-foot opening and is concrete lined.) The east shaft, oldest of the workings, is completely inaccessible without major reconstruction. It is caved and filled with slope wash and ladder and collar debris to within 10 feet of the surface. The surface opening has widened to 12 by 10 feet. The dump contains approximately 750 cubic yards of

[8]United States Geological Survey. "Haiwee Reservoir 15-Minute Series Topographic Quadrangle." 1951.

material. The center shaft is approximately 200 feet west from the previously described site. It was the primary working as is evidenced by the A-frame and hoist platform remaining on the site. The shaft dips 72 degrees to the northwest for approximately 30 feet and then appears to level out and continue northwest. The dump contains approximately 320 cubic yards of material. There are six small prospects between this shaft and the western most shaft, each averaging 3 cubic yards of disturbed material. The west shaft is 15 by 10 feet on the surface and narrows to approximately 6 by 6 feet approximately 10 feet below the surface. It then continues down at an angle of approximately 65 degrees to the northwest for a total depth of 20 to 25 feet. At this point it appears to level out and continue to the northwest. All sites were judged to be too unsafe for underground examination without extensive repairs.

Four samples were taken at the surface from the tailing pile at the east (old) shaft, N-101-1; loading area at the main shaft, N-101-2; an "ore" pile under the hoist platform, N-101-3; and an "ore" pile at the western most shaft, N-101-4. Results are given in Table 1 and in Appendix Table A-1.

TABLE 1. Fire Assay Results for Thorndyke Mine.

Sample	Gold		Silver		Total precious metal value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-101-1	Nil	0.0	Nil	0.0	0.0
N-101-2	0.018	9.00	Nil	0.0	9.00
N-101-3	0.005	2.50	0.09	1.35	3.85
N-101-4	0.019	9.50	0.10	1.50	11.00

The fire assay results indicate that the Thorndyke Mine has no commercial value for precious metals. Samples N-101-2 and N-101-4 represent the best available mineralized material as determined by the previous operator because these samples appear to represent sorted "ore" ready for shipping to market. There is no geologic reason to expect the precious metal value to increase with depth.

Orion (Moly Blu) Claims (N-104)

The location notice, found in the rock monument directly in front of the adit, names this property Moly Blu. Gary A. Watts of Big Pine, Calif., filed this claim on 5 February 1980. The claim is invalid, having been filed after the Navy had taken control of this property.

NWC's legal archive records of the 1947 Condemnation Proceedings lists this property as Orion No. 1 (NOTS Condemnation Case No. 496) owned by John L. Stewart.

The Orion claim is located on the western slope of the Coso Range just east, above Cactus Flats and in the canyon immediately north of Thorndyke Canyon. It is approximately 3.4 miles south-southeast of the Silver Mountain VABM and 4.15 miles west-southwest of Iron Hill. The workings are shown as N-104 on Figure 5. They are on land that has been covered by the public lands survey, which places them in the NW1/4, NW1/4, SE1/4 of Sec. 15, T20S, R38E, MDB&M.

The country rock is an alaskite of Mesozoic age, which has been hydrothermally altered. Effects are seen as alteration of the feldspars to clay and leaching of a majority of the mafic minerals. Three types of copper mineralization occur on the property; the first is fracture coatings of chrysocolla with minor amounts of malachite and azurite. Second, disseminated chrysocolla staining of clay within a shear zone. The third occurs as interstitial chrysocolla staining with blebs containing hematite, quartz, and calcite. Minor amounts of malachite occur around the fringes, and azurite occurs as a fracture coating on the blebs.

The property was explored by a 200-foot adit and a shaft. Figure 13 is a plan view of the adit. The adit was driven to investigate the mineralization along a 1-inch-wide fracture. Small fractures like these are abundant in this area, but none are greater than 1 to 2 inches wide and are not very extensive in length. The shaft is partially collapsed just 10 feet below the surface. This shaft may level out and continue eastward. The steepness of the slope makes estimating the extent of the workings impossible, because much of the dump has been dispersed far downslope. Along the south side of the dump is a blue streak of mineralized material that easily can be seen one-half mile from the claim site. This mineralized material is representative of the third type of mineralization discussed in the paragraph above.

Four samples were taken and their locations are shown in Figure 13. The assay results are shown in Appendix A. Sample N-104-1 represents high grade material; N-104-2 is from a 2.5-foot-wide shear zone containing clay and quartz with light chrysocolla staining throughout the center and limonite staining along the edges of the shear zone. Sample N-104-3 represents mineralization of the first type, fracture coatings of chrysocolla. Sample N-104-4 is from the intensely colored mineralization at the shaft. Analytical results indicate no gold mineralization and only low-grade silver mineralization at this site.

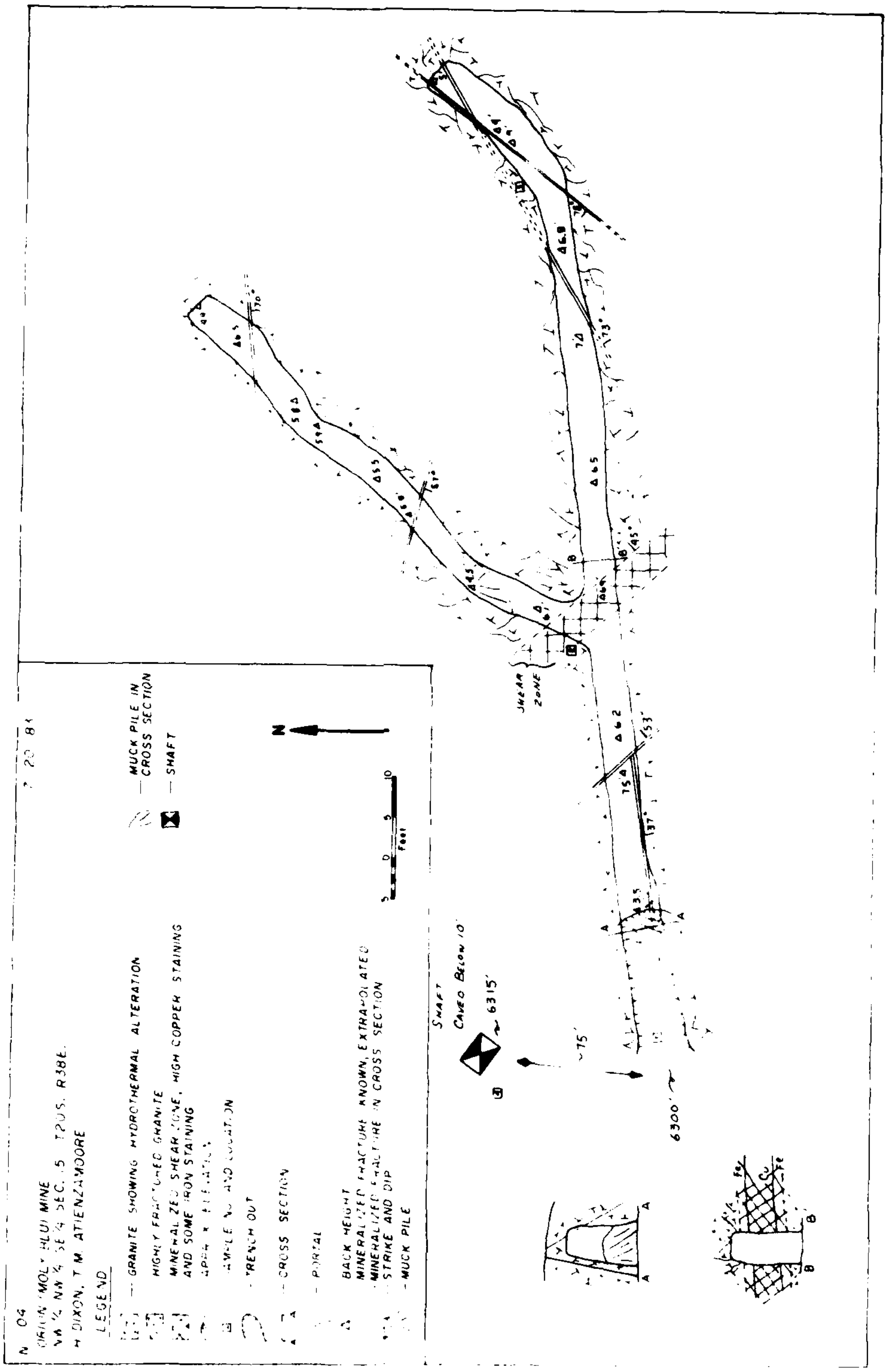

Figure 13. Plan view of adit, Orion (Moly Blu) claims.

Access to the claim is very difficult. The road across Cactus Flats is not maintained, but is in good condition; the road east from the mouth of the canyon is in poor condition, having been washed out by winter rains and occasional summer thundershowers. After proceeding 1 mile along the main canyon road, one must walk the remaining distance to the site. The claim is another one-half mile east along a small feeder canyon, with the last 0.1 mile being a 38% grade. The total precious metal values are not high enough nor is the deposit extensive enough to warrant constructing the road and tram system necessary to transport the mineralized material to market.

Ham and Eggs (N-105)

The Ham and Eggs Mine is located in the Coso Mining District and lies 3.7 miles due south of Coso Peak. It is situated in the NE1/4, NW1/4, SE1/4, Sec. 35, T20S, R39E, MDB&M and is shown on Figure 6. The NOTS (now NWC) legal archives list Frank Urban as the last operator of the property. No claim notices were found during field investigation.

The host rock is Mesozoic granite. It is intruded by a 2-foot-thick Mesozoic aplite dike that strikes N53E and has a vertical dip. A 4-foot-thick shear zone is developed along the granite-aplite contact. It is predominantly limonitized, fractured granite with scattered, discontinuous mineralized quartz veins to 3 inches wide.

Workings consist of a two-compartment vertical shaft 14 by 9 feet that tapers to 8 by 8 feet just below the collar. The shaft is inaccessible, but an estimate of the rock volume on the mine dump would place its minimum depth at between 80 and 90 feet of the 8- by 8-foot shaft. A caved adit is located to the southwest of the shaft near the bed of a dry wash. It appears to have been driven toward the shaft but the dump has washed out making drift length estimates impossible.

A grab sample of mineralized quartz was collected from material scattered around the shaft dump area. It contained substantial amounts of chrysocolla and specular hematite along with scattered pyrite crystals and limonite as quartz staining. The complete assay results for the sample, labeled N-105, are shown in Table A-1. A summary of precious metal values appears in Table 2.

TABLE 2. Precious Metal Values for Ham and Eggs Mine.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-105	0.670	335	0.46	6.90	341.90

Although the sample shows a commercial grade for precious metals, it must be noted that the hand sample was taken of material that *appeared* to be of highest grade and therefore not necessarily representative of an "as-mined" ore grade. Considering the narrow and sporadic occurrence of mineralized quartz veining, as seen in shear zone outcrops at the surface of the shaft, there is little potential for a commercially interesting geologic target worth exploring and the renovation of the existing workings would be cost-prohibitive.

Blue Joint (Coso View) Shaft (N-112)

The Blue Joint (Coso View) shaft is situated 1.5 miles northwest of Coles Spring. It is placed in the NE1/4, NE1/4, NE1/4, Sec. 36, T20S, R39E, MDB&M, and is shown on Figure 6.

The host rock is Mesozoic granite and a vertical shear zone that strikes N45W is the locus for mineralization. Chalcopyrite and minor pyrite occur as fracture-filling and small crystals in sheared granite. Quartz is distributed through the shear zone as tiny 1/16- to 1/4-inch stringers.

The single underground working is a 12- by 12-foot vertical shaft 165 feet deep. It is filled with water to within 30 feet of the surface.

A grab sample of mineralized granite plus quartz was taken from "high-grade ore" piles at the shaft collar. Complete assay results are found in Appendix Table A.

The low values for precious metals and other commodities, coupled with the prohibitive cost of pumping water and renovating the shaft, indicate that there is no commercial value present at this location.

Grand View Lode (N-115)

The Grand View Lode is situated on the eastern flank of Silver Peak 0.2 mile east of its crest. It is placed in the SW1/4, NE1/4, SW1/4, Sec. 36, T20S, R39E, MDB&M, and is shown in Figure 6. Claim notices found at the site list F. Moore, A. Moore, and Wm. Lewis as claimants in 1933.

The host rock is Mesozoic granite and prospecting took place along a quartz-bearing shear zone that strikes N30E and dips 60 degrees northerly. Where visible, the shear zone has a maximum thickness of

5 feet with quartz veining up to 0.5 foot wide mainly on the footwall contact. Mineralization in the quartz includes limonite as staining and as pseudomorphs after pyrite, and scattered chrysocolla as fracture-filling and quartz discoloration.

Workings include three small prospect pits and a small shaft, all caved and filled with slope wash. Total material removed was approximately 37 cubic yards.

A composite grab sample of "ore" material was taken from small piles at each working. Complete assay results are listed in Table A-1.

The sample assay results show low values for precious metals and other commodities. No discovery of commercial-grade mineralization was made at this location.

Silver Peak Mine (N-118)

The Silver Peak Mine is located 0.4 mile north-northeast of Silver Peak. It is placed in the SE1/4, SE1/4, NE1/4, Sec. 35, T20S, R39E, MDB&M, and is shown on Figure 6.

The host rock is medium- to fine-grained Mesozoic granite, strongly altered in places. The loci for mineralization are numerous shear zones with various orientations.

Figure 14 is a surface plan view of the entire Silver Peak group. The major workings were developed along a shear zone that strikes N22E with a westerly dip of 80 degrees. These workings consist of one 50- to 60-foot inacessible shaft, one caved shaft, and a 4-foot-deep prospect pit. A composite grab sample of loose apparently "high-grade" or sorted material from around the three workings contained quartz with abundant chalcopyrite, stringers of specularite, and limonite staining. The sample is labeled N-118-1. Three prospect pits to the northwest, east, and southeast of the major workings were caved and filled with slope wash. No mineralized rock was encountered in place or as loose rubble at these sites. A third shaft, caved and filled 6 feet from the surface, is developed on a shear zone that strikes N73E and dips 70 degrees northerly. The shear contains quartz with scattered pyrite and limonite staining. Sample N-118-2 was chipped from the outcrop at the edge of the shaft.

A complete list of assay results for the two samples is found in Appendix Table A.

The Silver Peak Mine complex appears to have little potential for future development and production. The assay results for the two "high-grade" samples indicate very low values for precious metals and

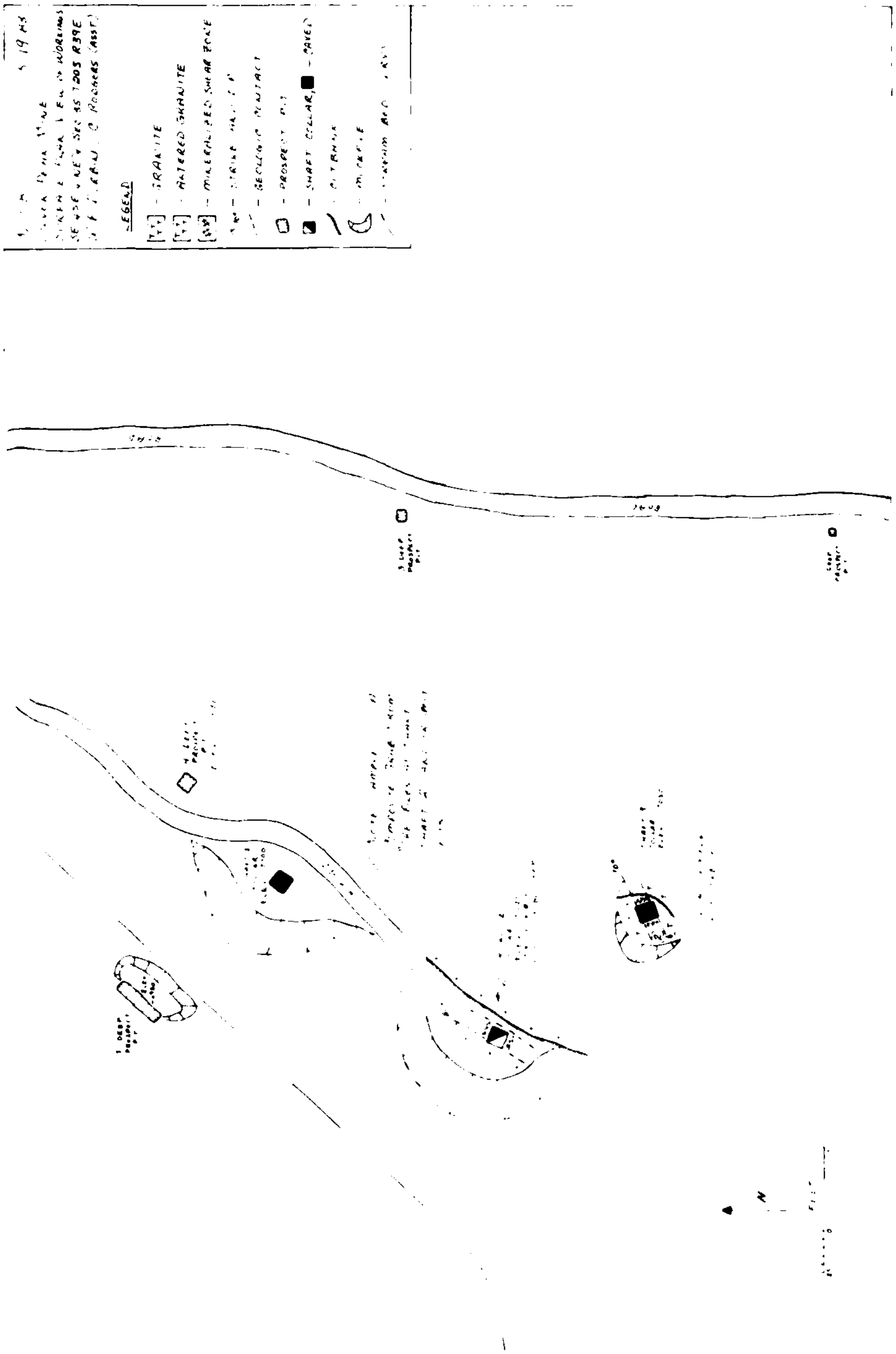

Figure 14. Surface view of Silver Peak group.

other commodities. The cost of roadwork, reopening shafts, and repairing headframes would be prohibitive. No discovery of commercial grade material was made at this location.

Granite Ring Prospect (N-125)

The Granite Ring prospect is situated on the east side of the access road between Coles Spring and Coso Peak and lies 1.4 miles northeast of Silver Peak. It is situated in the NE1/4, SE1/4, SE1/4, Sec. 25, T20S, R39E, MDB&M, and is shown on Figure 6.

Three prospect pits were developed along quartz-bearing shear zones in a Mesozoic granite host rock. The prospect pits range in orientation from N30W to east-west and are filled mostly with slope wash. The western-most pit strikes N82W, is 15 feet long, and 7 feet wide. Mineralized quartz, averaging 3.5 feet in width, outcrops at both ends of the pit. Quartz mineralization includes limonite staining and scattered small limonite pseudomorphs of pyrite. Approximately 150 cubic yards of material was removed from the prospect pits.

One composite grab sample was taken from in-place quartz and from small "ore" piles near each pit. The complete assay results for the sample are listed in Appendix Table A.

A claim notice found at the site lists the operators in 1933 as Walter Palmer and Mirtie A. Moore. The sample assay results indicate very low values for precious metals and other commodities. No discovery of commercial mineralization was made at the Granite Ring prospect.

Unnamed Prospect (N-126)

The prospect is situated 1.9 miles northwest of Coles Spring. It is placed in the SW1/4, NW1/4, SE1/4, Sec. 25, T20S, R39E, MDB&M, and is shown on Figure 6.

Mesozoic granite is the host rock for a shear zone that strikes S85W. The shear zone is partially exposed by a 26-foot-long trench that was dug along strike. The shear zone consists of broken clay-limonite altered granite with scattered 1- to 2-inch quartz veins containing limonite staining and fracture filling.

One sample of in-place vein material was taken and complete assay results are shown in Appendix Table A. The assay returns indicate nil values for precious metals and other commodities. There are no records available on this location and it appears to have been explored briefly and quickly abandoned.

Unnamed Adit (N-127)

This 33-foot unnamed adit is situated on the northern slope of Silver Peak. It is placed in the SE1/4, NE1/4, SE1/4, Sec. 35, T20S, R39E, MDB&M, and is shown on Figure 6.

The adit was driven in Mesozoic, clay-rich, altered granite as shown by the plan view in Figure 15. The last 11 feet of drifting encountered a clay and limonite-rich fracture zone that strikes N70E and dips 65 degrees northerly. A chip sample was taken from the fracture zone. No economic values for precious metals or other commodities are shown by the assay results, which are listed in Appendix Table A. No commerical mineralization is exposed at this location.

Unnamed Prospect (N-128)

This prospect is located in the far northwest corner of the China Lake Complex about 5 miles west-northwest of Coso Peak in the SW1/4, NE1/4, NW1/4, of Sec. 12, T20S, R38E, MDB&M, as shown in Figure 5. It consists of a single, 3-foot-deep pit dug on a thin quartz vein in Mesozoic diorite. The vein is 5 inches wide and is predominately barren white quartz with sparse patches of pyrite (and limonite pseudomorphs), chalcopyrite, hematite, and copper staining. A single sample was taken of the "high-grade" material. Analysis results are given in Appendix A. There is no mineral potential at this site.

Barney Google Lode (N-129)

The Barney Google Lode workings are located from 0.3 to 0.5 mile northeast of Silver Peak. They are placed in portions of the SW1/4, SE1/4, and NW1/4, Sec. 36, T20S, R39E, MDB&M, and are shown on Figure 6.

The host rock is Mesozoic granite that exhibits a locally gneissic texture. The loci for mineralization are shear zones that contain quartz with limonite staining and scattered small pyrite crystals.

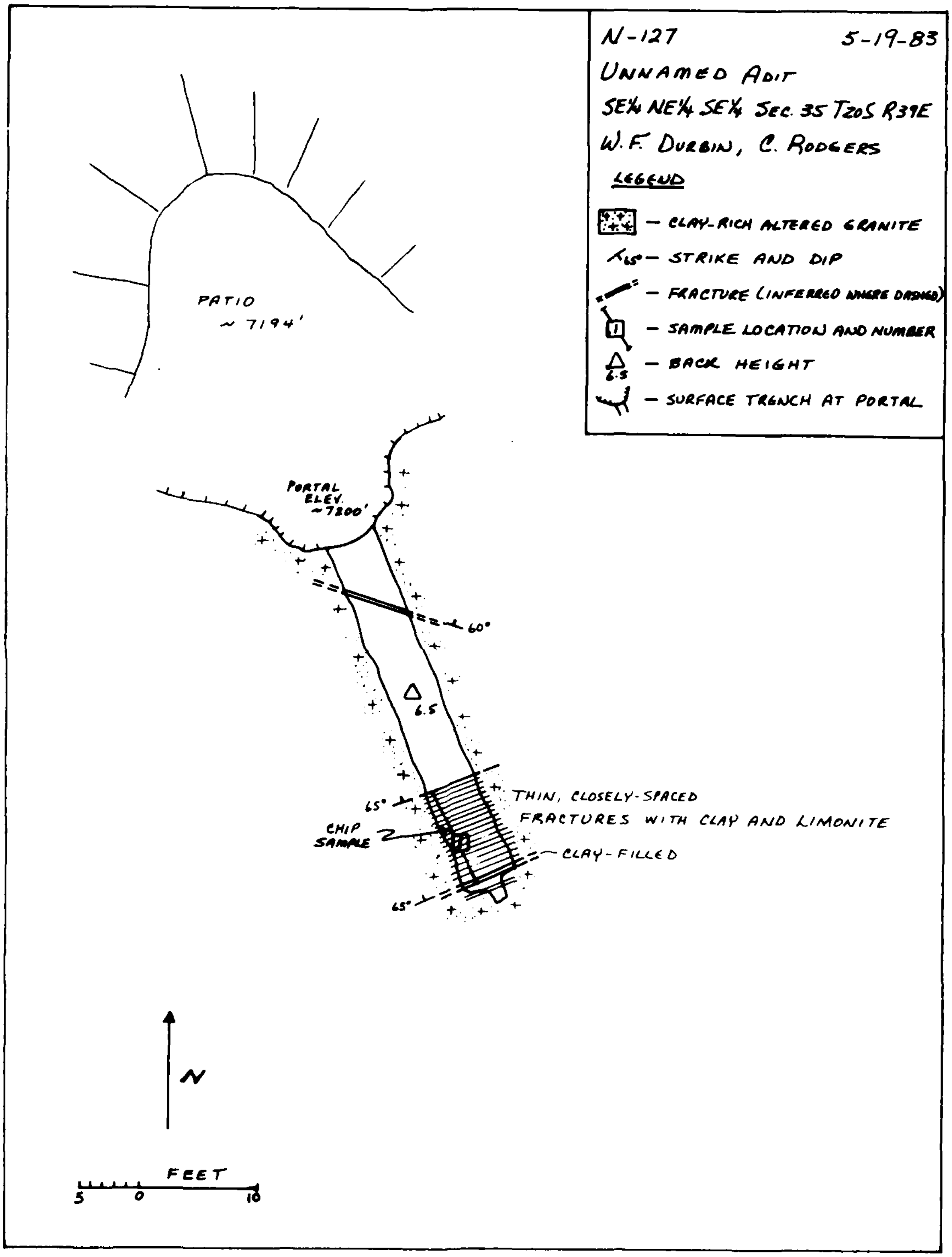

Figure 15. Plan view of adit, N-127.

Three workings were developed on the Barney Google Lode. The eastern-most adit is caved. An estimate of the mine dump volume indicates a minimum of 90 feet of 6- by 4-foot drift could have been driven. No mineralization was encountered in place or as loose rubble. An adit, the northern-most working of the group, is caved. A 0.5-foot-thick unmineralized quartz vein in a shear zone outcrops at the caved portal. Estimates of the mine dump volume indicate that a minimum of 170 feet of 6- by 4-foot drift could have been driven. The western-most working is a 41-foot prospect trench that bears S56W. It is filled with slope wash.

Two samples were taken at this location. One sample, labeled N-129-1, is a dump grab from the northern adit. The second sample, labeled N-129-2, is a dump grab from the prospect trench. A complete list of assay results is found in Appendix Table A.

F. F. Moore, A. R. Moore, R. Williams, and Wm. S. Lewis were the last known claimants (1933). Sample assay results indicate no gold and low values for silver. No discovery of commercial mineralization was made at this location.

Unnamed Prospect (N-130)

This unnamed prospect is situated approximately 0.5 mile east of Silver Peak. The workings are scattered throughout the W1/2 of SE1/4, Sec. 36, T20S, R39E, MDB&M and are shown in Figure 6.

The host rock for the area is Mesozoic granite that exhibits local gneissic texture and the workings are developed on shear zones of variable orientation and mineralogy.

The workings, listed in order from north to south, include a 10- by 10-foot prospect pit dug to a depth of 4 feet. Mineralization, in the form of very sparsely disseminated hematite, was present in a 2-inch vein of massive quartz that outcrops at the edge of the pit. An adit was driven to the southwest of the pit. It is now caved but an estimate of the tailings pile volume indicates a minimum of 30 feet of 4- by 6-foot drifting. The adit explored a northwest trending shear zone that outcrops at the portal. The shear zone averages 2 feet in width, and massive quartz is present as an irregular vein that ranges from a fraction of an inch to the full shear zone width of 2 feet. Quartz mineralization includes scattered disseminated hematite and sparse limonite box-work structures from 2 to 3 inches across. A sample of vein material was taken from the adit dump area and is labeled N-130-3.

A 12- by 12-foot pit was driven to the southeast of the adit. It is caved and filled with slope wash. No outcrop geology is visible but mineralized quartz scattered around the pit contains azurite, malachite, chrysocolla as coatings, and minor disseminated chalcopyrite, hematite, and bornite. Sample N-130-2 was taken of this material.

The largest group of workings consist of a caved shaft and two small prospect pits located approximately 75 yards southwest of the "copper mineralized" pit. The caved shaft, 6 by 6 feet and 6 feet deep, and the prospect pits were driven on a shear zone 6 to 10 feet wide that strikes N81W and dips 70 to 75 degrees southerly. Shear zone mineralization was present as discontinuous 4-inch quartz stringers with minor limonite staining. Sample N-130-1 was chipped from the quartz outcrops at the shaft and pits as a composite grab.

A complete list of assay results for the three samples is found in Appendix Table A.

The assay results indicate that no discovery of commercial values for precious metals or other commodities was made at this location.

Unnamed Prospect (N-133)

This prospect is situated near the floor of a narrow valley that separates Iron Hill from a portion of the Coso Mountain Range. It is placed in the NW1/4, SE1/4, SE1/4, Sec. 8, T20S, R39E, MDB&M, as shown by Figure 5.

The host rock at this location is pale gray, medium- to fine-grained granite.

A 45-foot prospect trench was driven at this site along a bearing of N75W. A quartz-bearing shear zone was presumably the target for prospecting but all outcrop information is gone through caving of trench walls and slope-wash filling. The only evidence of mineralization is found in several small piles of quartz located around the perimeter of the trench. The quartz is massive and white and is cut by hairline fractures that contain limonite. One composite grab sample was taken from the quartz piles and complete assay results are shown in Appendix Table A.

There are no commercial values for precious metals or other commodities.

Mariposa Mine (N-201)

The Mariposa Mine is situated about a mile northwest of Coso Village in the SW1/4, NE1/4, Sec. 20, T20S, R40E, MDB&M, as shown in Figure 6. It lies adjacent to an old wagon road that intersects the Darwin-Coles Spring Road at Old Coso Village about 10 miles south of Darwin.

The Mariposa Mine is located on one of three claims patented in 1883 by Mr. J. B Haggin of New York. The group is known as the Mariposa Quartz Mine and Mill Site Nos. 1 and 2 and is recorded in the mineral claims records of Inyo County, Calif., at the county courthouse in Independence as Mineral Entry #170, Lots 37, 37A, and 37B. The 1951 NOTS list of validated claims gives the claimants of the Mariposa as the Hearst and Haggin estates.

The two millsite, claims are located up in the mountains 1.2 to 1.4 miles west of the mine site. During a field check of the area, no evidence of the sites could be found and it is assumed that the structures, which sat in the bottom of a canyon, have been washed away in the intervening 100 years. It is probable that Mr. Haggin sought to control some of the water in the area, as a small spring is to be found within the boundaries of Mill Site Number 2.

The Mariposa appears to have been worked, sporadically, since the 1870s.[9] No production records are available, however. It also has been rumored that numerous small operators in the area were able to "high-grade" the mine a little at a time in order to raise the grade of their own ores being shipped to the smelter.

All of the underground workings were developed on a shear zone that trends N52W and dips northeast at 40 to 44 degrees in a Mesozoic granodiorite pluton. In its exposed sections, the shear zone is up to 3.5 feet wide with quartz veining up to 0.8 foot wide. The quartz varies in form from massive crystalline to loose and sugary. The accessory mineralogy is variable, ranging from clear barren quartz through local small masses of sulfides to merely hematite and limonite staining. The occurrence of good gold values appears to be most closely related to the sulfide masses that are composed of pyrite and chalcopyrite.

Figure 16 is a map of the Mariposa Mine Site claim showing the positions of the six shafts, all but two of which are caved shut. The two northernmost caved shafts are estimated to be 50 to 60 feet deep.

[9] State of California. "Annual Report of the State Mineralogist, Report XII," in *California Journal of Mines and Geology*, 1894.

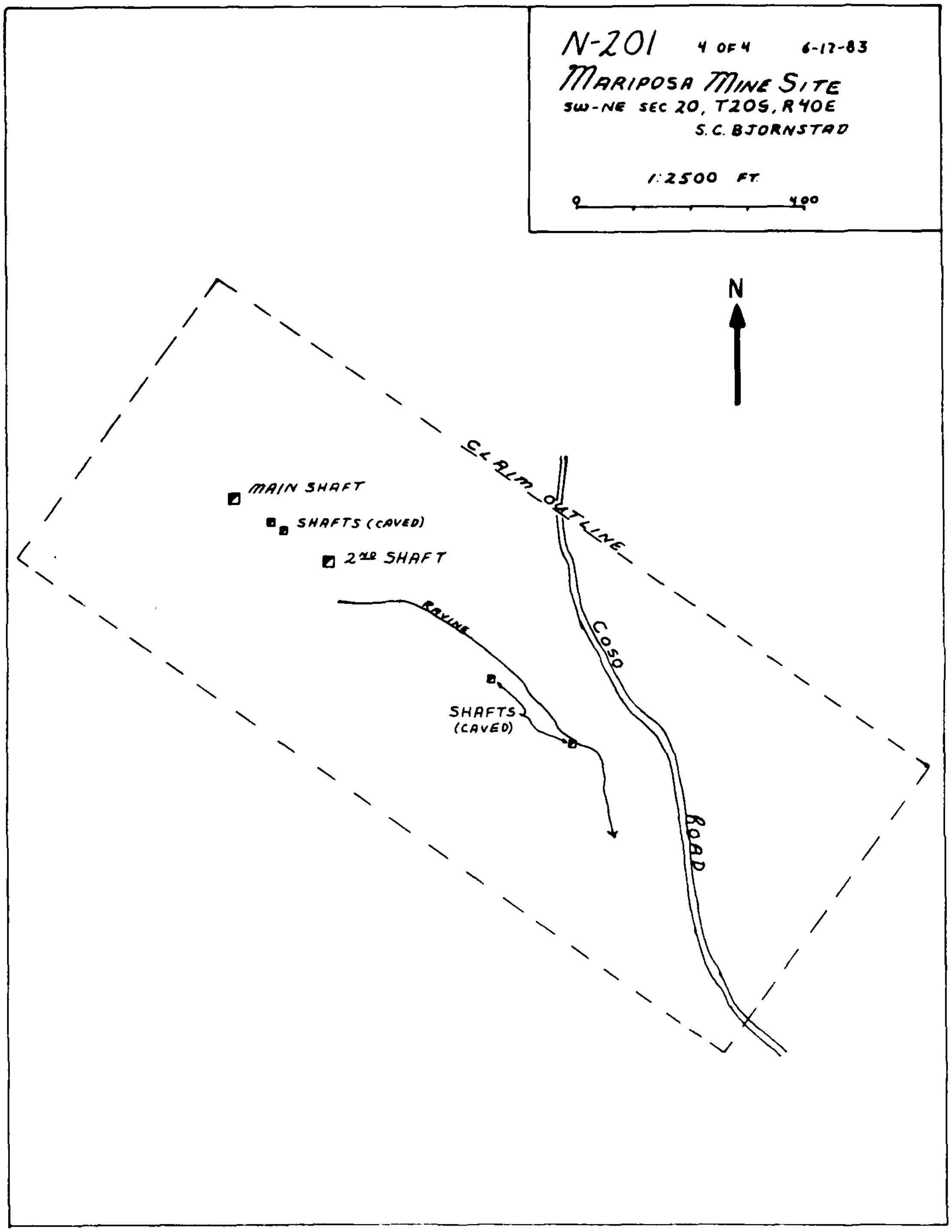

Figure 16. Surface view of Mariposa Mine Site claim.

It is not possible to estimate the extent of working at the two southern shafts, however, because they were dug in the ravine and the tailings have been washed away with the passage of time.

The main shaft is open to about 115 feet, as seen in Figure 17. In the 1894 Annual Report of the State Mineralogist,[9] the main shaft was reported to be 250 feet deep; but the lower workings, if they exist, are now inaccessible. In order to establish what additional, concealed, workings might be present, volumes for the accessible workings and the mine dump were calculated (Figure 18). The results are as follows:

Area of known workings (measured along the plane of the vein)	2,393 sq feet
Volume of known workings (using an average height of 5.9 feet)	523 cubic yards
Volume of known vein (using an average height of 1 foot)	89 cubic yards
Volume of waste rock mined from known workings	434 cubic yards
Volume of unbroken rock represented by the dump	684 cubic yards
Volume of waste rock mined from known workings	434 cubic yards
Volume available from concealed workings	250 cubic yards

From this we can conclude that if an additional 135 feet of 5- by 5-foot shaft existed (125 cubic yards), then an additional 125 cubic yards of workings probably also existed below the cave-in. This volume is approximately equal to a stope 50 by 15 by 5.9 feet.

Three samples were taken from the stope during the first visit to this site. Samples 1 and 2 were taken across the vein and Sample 3 was a sulfide nodule (6 by 4.5 by 3.5 inches) composed of a core of massive pyrite with quartz and very minor chalcopyrite and rimmed with silicified limonite and very sparse copper staining. Gold analyses of the samples were high enough to warrant additional full-width channel sampling. The locations of these are given as Samples 6 through 12 in Figure 17. Precious metal content and value of the main shaft samples are given in Table 3 below.

The other shaft that is still accessible is shown in Figure 19. It is about 101 feet deep with a short drift (34 feet) heading south at the bottom. A small amount of stoping (about 85 cubic yards) was

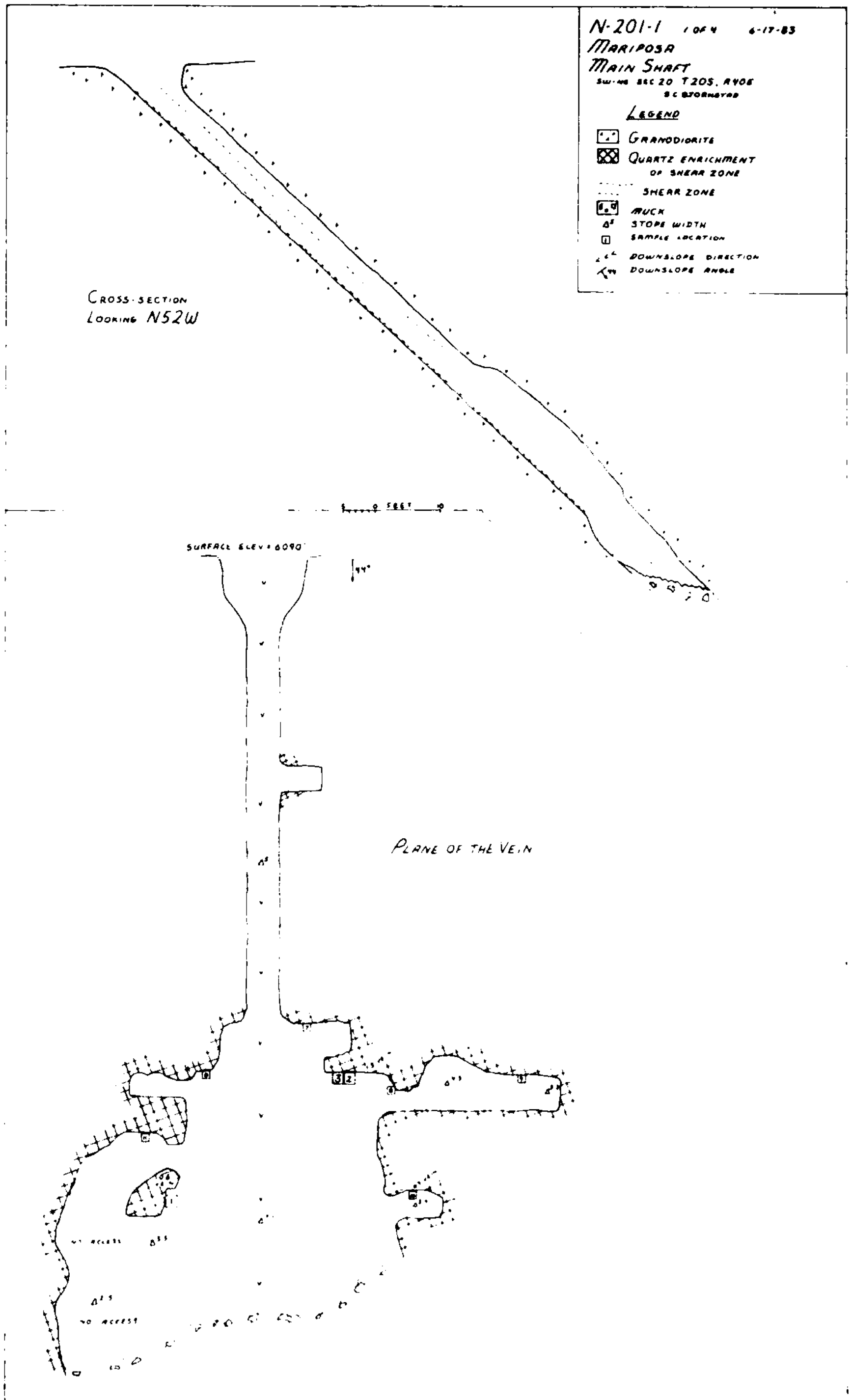

Figure 17. Mariposa Mine, main shaft.

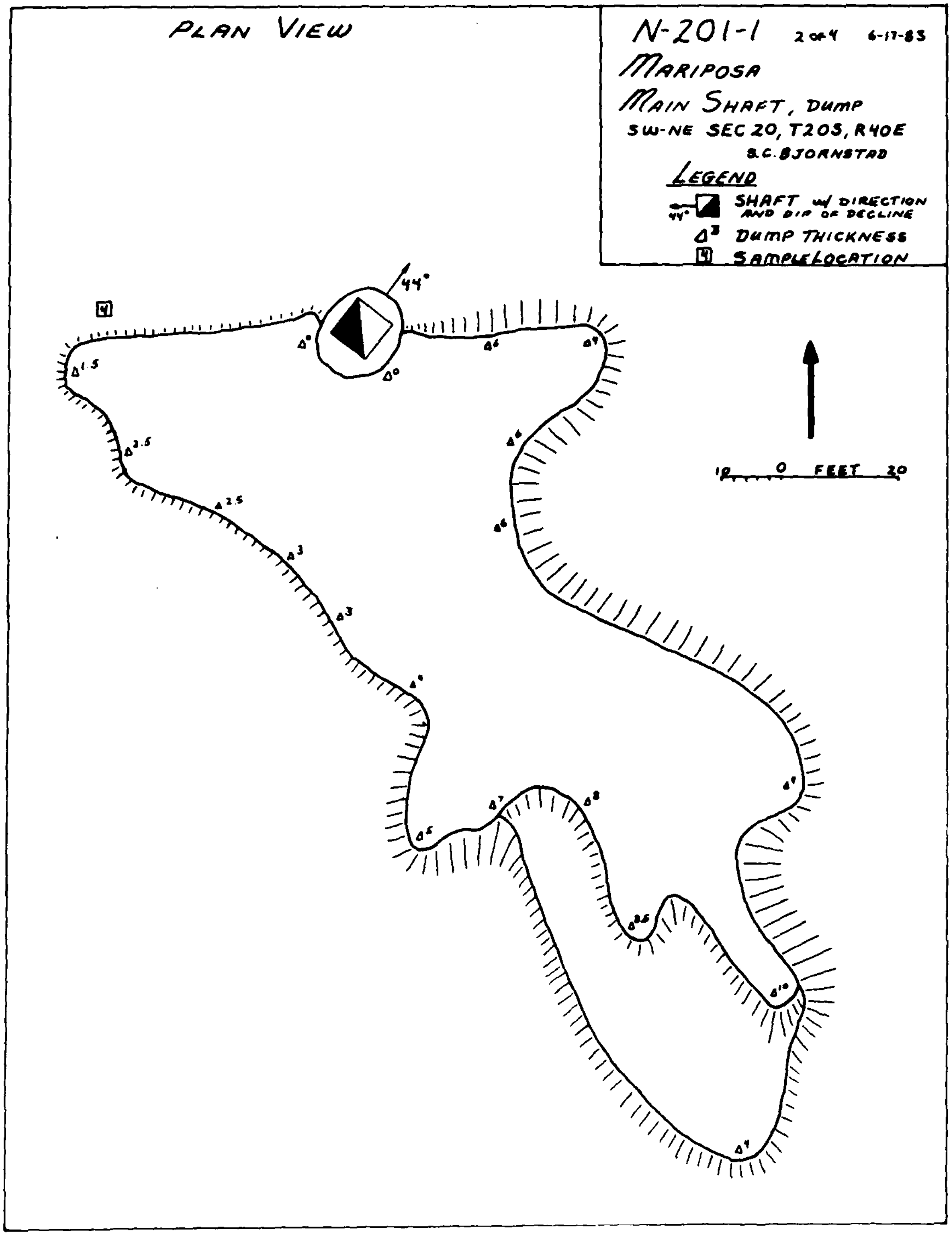

Figure 18. Plan view of main shaft dump.

TABLE 3. Precious Metal Content and Value,
Mariposa Mine, Main Shaft.

These figures, expecially the averages, are intended only to indicate an order of magnitude of the value of the vein material exposed in the stope and should not be used as a quantitative measure of the value of the material that might be mined at the site.

Sample	Gold		Silver		Value of sample, $/ton	Vein width, ft	Value/ton of rock at average 1.5-ft stope width
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton			
N-201-1	2.47	1235	1.05	15.75	1250.75	0.6	500.30
N-201-2	2.60	1300	1.25	18.75	1318.75	1.3	1142.92
N-201-3[a]	8.21	4105	22.50	337.50	...	...	...
N-201-6	0.26	130	0.62	9.30	139.30	0.5	46.43
N-201-7	0.12	60	0.37	5.55	65.55	0.8	34.96
N-201-8	1.86	930	Nil	0.0	930.00	0.3	186.00
N-201-9	0.18	90	0.56	8.40	98.40	0.3	19.68
N-201-10	0.17	85	0.53	7.95	92.95	0.7	43.38
N-201-11	0.16	80	0.37	5.55	85.55	0.6	34.22
N-201-12	0.27	135	0.25	3.75	138.75	0.2	18.50
Average					457.78	0.59	225.15[b] 171.42[c]

[a]Sulfide nodule.

[b]Average weighted by vein width.

[c]Average weighted by vein width and area of influence of each sample (inaccessible area excluded).

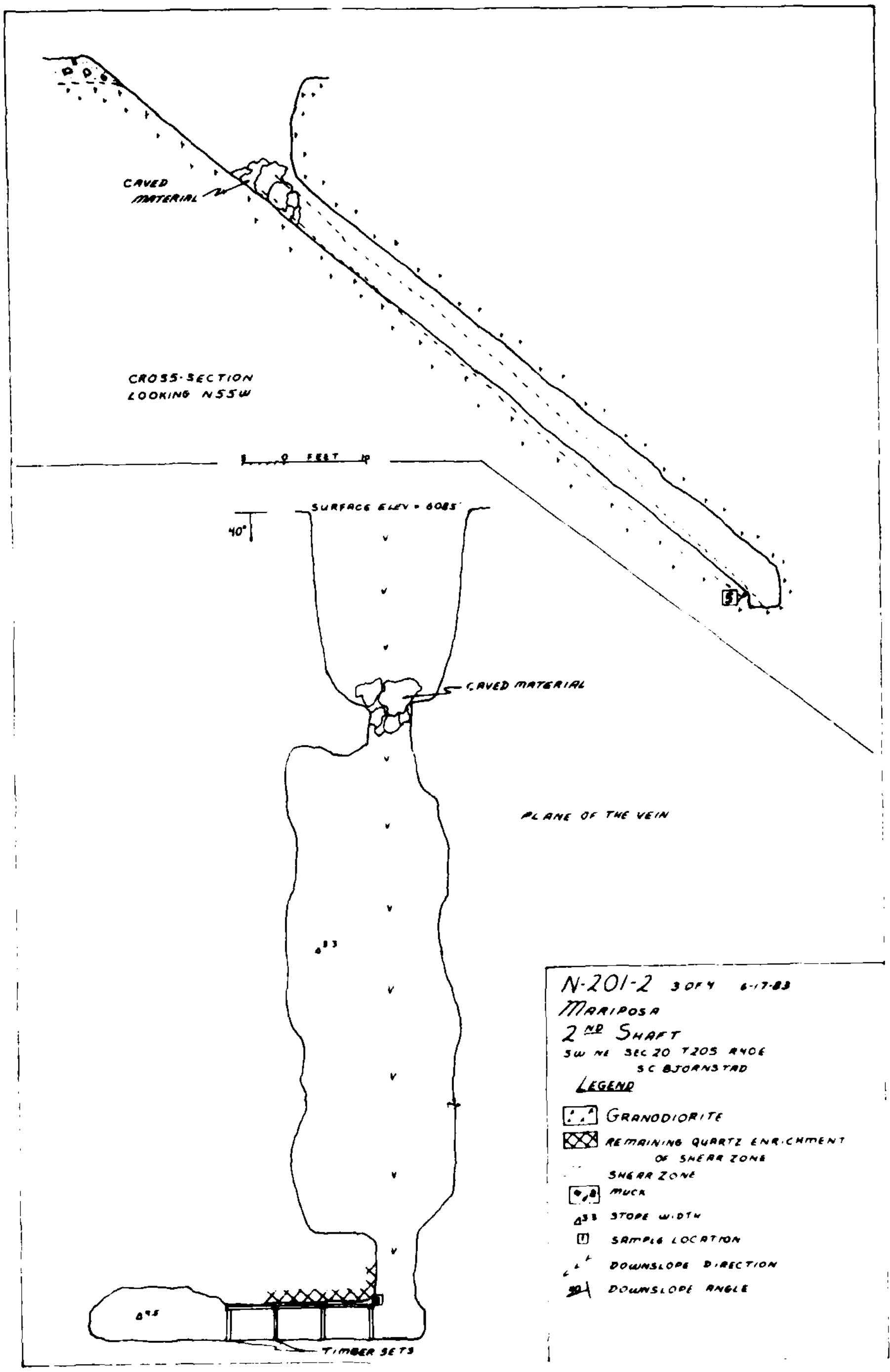

Figure 19. Mariposa Mine, number 2 shaft.

done along the length of the shaft, but very little quartz remains in the shear zone. A single channel Sample 5, was taken of the 2-inch-wide, oxide-free, quartz vein at the bottom of the shaft. The assay results showed 0.27 troy-oz/ton gold or $135/ton. Assay results for all of the Mariposa samples are given in Appendix A. (Note: Sample N-201-4 was picked up on the surface near this shaft by a miner who had worked in the area during the 1930s. He felt that it looked like it had "good gold values." So much for experience.)

The Mariposa Mine contains, by far, the highest grade ore in the Old Coso area; but, for the most part, the physical characteristics are the same as those of the other prospects. The gold occurs in quartz lenses in a northwest-trending shear zone, and the lenses appear (by the amount of surface work done) to be limited to about 1000 feet of strike length of the shear. The probability that a sizable gold deposit exists in this area is low, as individual lenses are scattered and are only erratically mineralized.

T and T No. 1 (World Beater) Lode (N-202)

The T and T No. 1 and World Beater lodes are listed in the NOTS legal archives as Condemnation Case Numbers 437 and 439, respectively. The lode claims are shown to be very close to one another, and it is not certain which of the lode claims this deposit falls within. The last claimant of the T and T No. 1 lode is listed as Mrs. Cora Taylor, and the last claimant of the World Beater No.1 lode was William Oliver. No claim notices were found during field investigation, and a foot search of a 1-1/2-square mile area around the site produced no prospected areas except for the Josephine Mine to the south and the Marigold Mine to the northeast.

The mine workings are situated 0.8 mile northeast of the old Coso Village as shown by Figure 6. They are placed in the NE1/4, SE1/4, NE1/4, Sec. 21, T20S, R40E, MDB&M.

The workings were driven to explore and develop a number of quartz-bearing mineralized shear zones within Mesozoic intrusive host rocks ranging in composition from alaskite to medium-grained pale gray granite to biotite quartz diorite. The more felsic rocks appear to be dikes, and the mineralized zone in one location cross cuts both granite and biotite quartz diorite.

There are five major workings at this location, and they are shown in surface plan view in Figure 20. Two are caved adits, located at elevations of 5,920 and 6,000 feet. The adit portals were started in

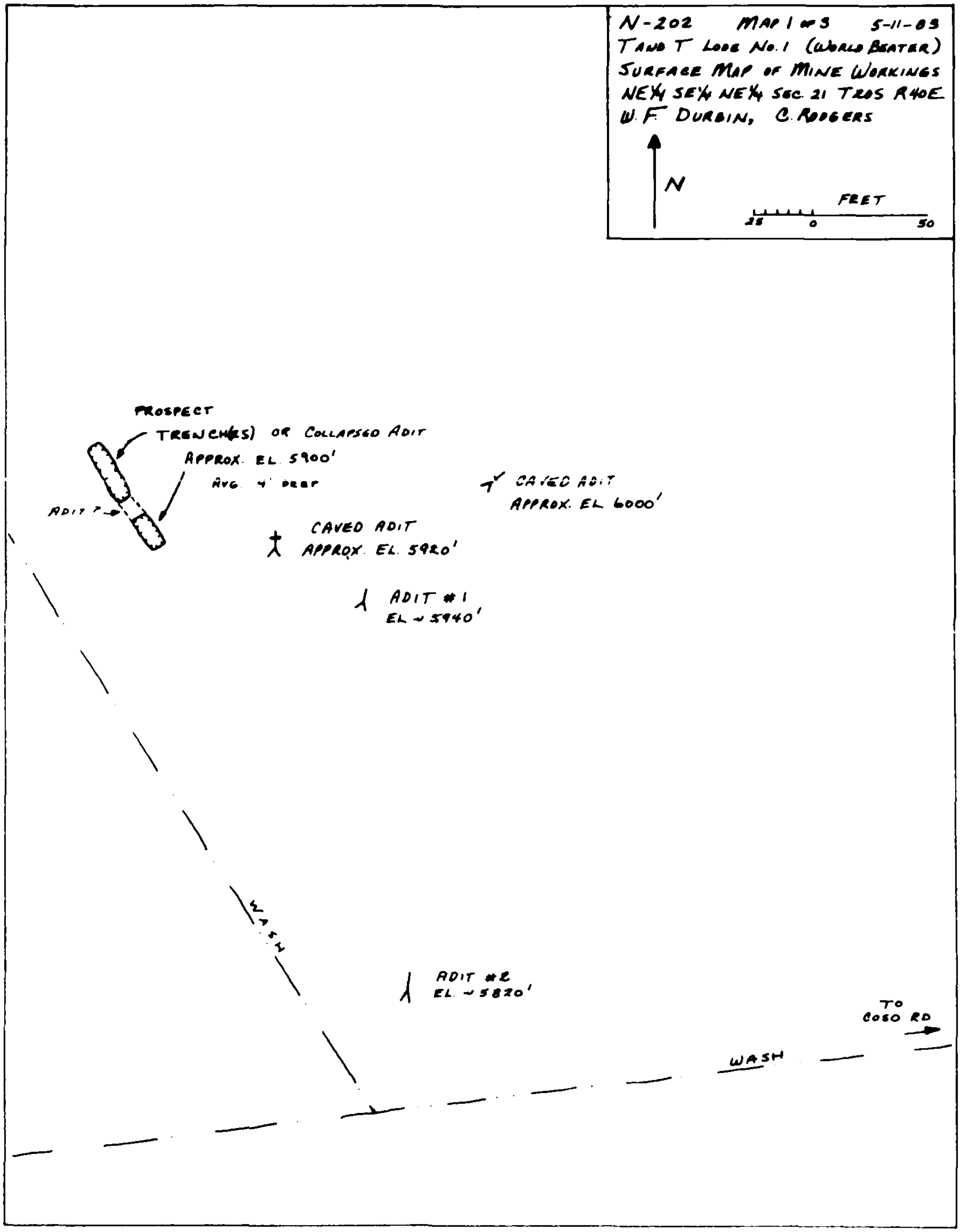

Figure 20. Surface plan view, T and T No. 1 (World Beater) Lode.

unsheared granite, and estimates made of the dump volumes at each location indicate that the adits probably did not exceed 50 feet in length if driven 5 feet high and 3 feet wide. Small amounts of massive white quartz with limonite filling of hairline fractures were found scattered at each site. The western-most working is a prospect trench or a possible short adit that has collapsed. The working is 52 feet long, strikes N32W, and has a 10-foot section in the central portion that is apparently a noncollapsed adit. The working was driven entirely in unsheared, unmineralized granite.

The upper accessible adit is labeled Adit 1 and is shown in plan view and cross section in Figure 21. The adit is 228 feet long and encountered a quartz-bearing shear zone from 60 feet into the adit face. The shear zone strikes an average of N51E and dips from 32 to 34 degrees southeasterly. The entire zone is quartz filled and contains clay seams, 1 to 2 inches of white clay bordering the hanging wall and footwall of the zone, disseminated very sparse pyrite, chalcopyrite, traces of chrysocolla, and limonite fracture-filling. The quartz ranges from 4 inches to 1 foot in width. A small amount of stoping, and raising, was done both up and down the dip of the zone. If we use an average height of 3.5 feet in these areas (heights on the map are shown generally less than 3.5 feet because of loose muck and some caving from the roof area), the estimated volume of material removed amounts to approximately 132 cubic yards. With an average quartz wein width of 1 foot in these areas, the volume of actual quartz removal would equate to 1 ÷ 3.5 x 132 or approximately 37 cubic yards. It is uncertain how large the actual stoped area is because there has been a large amount of rock fall from the roof and there are a number of timber bulkheads between pillars that block access.

Three chip samples were taken across those portions of the quartz vein that appeared to be of highest grade. The sample locations are shown on Figure 21. Complete assay analyses for the three samples are shown in Appendix Table A, and the precious metal values are listed in Table 4.

Sample 2 was taken across a 0.5-foot-wide portion of the vein located within a small pillar at the edge of a short raise. The quartz contained a few disseminated pyrite crystals, minor chalcopyrite grains, limonite fracture-filling, and a small amount of chrysocolla coating. The only potential for any amount of tonnage or grade within this working would appear to be at the Sample 2 site. If the 0.5-foot-wide vein were to be mined at a 3-foot width as in the nearby stope, the combined gold and silver values would equate to $1,143 ÷ 6 or $190/ton. The availability of a significant tonnage is doubtful as the vein decreases in width and mineralization along strike to the northeast and has been stoped out just to the west. If a 20- by 20-foot stope were driven at a 3-foot height up dip at the location of

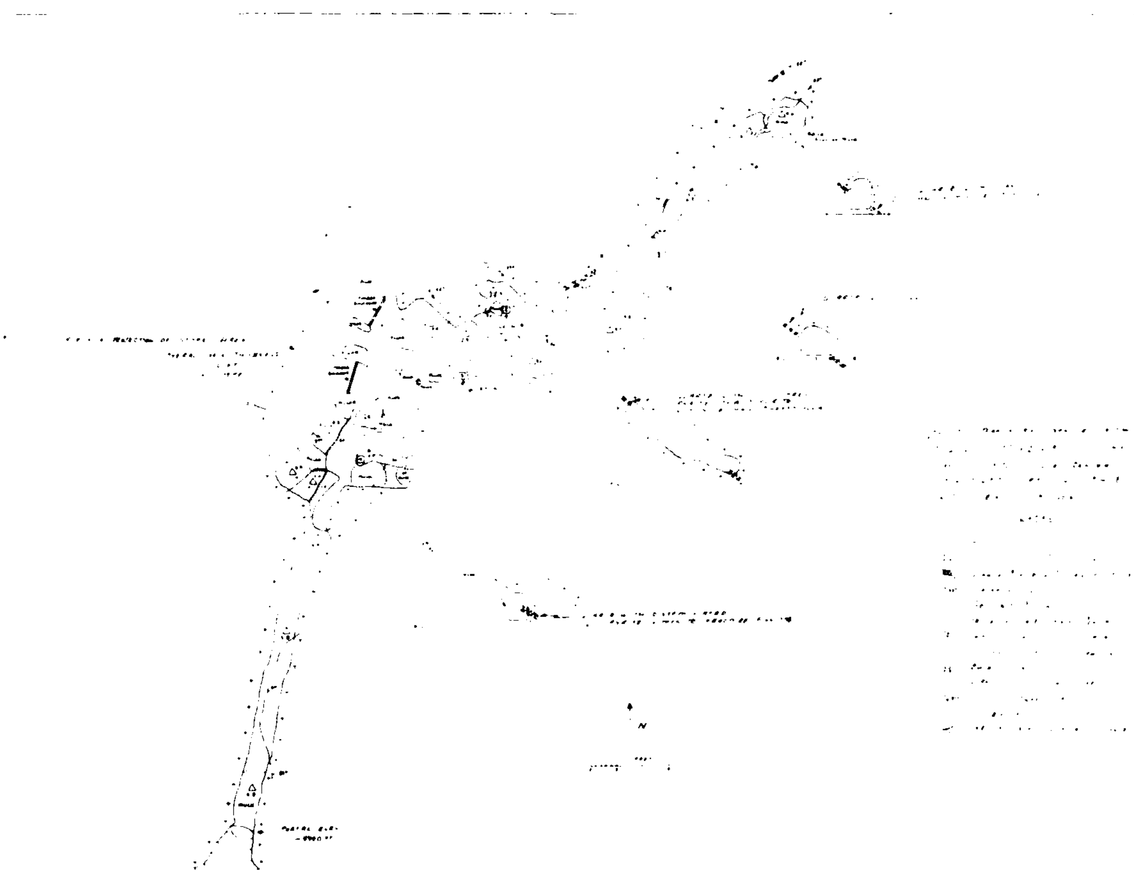

Figure 21. Plan view, adit 1, T and T No. 1 (World Beater) Lode.

TABLE 4. Precious Metal Values for T and T No. 1 Lode Adit 1 Samples.

Sample	Gold		Silver		Total precious metal values, $/ton
	troy-oz/ton	$/ton	troy-oz/ton	$/ton	
N-202-2	2.100	1,050	6.21	93.15	1,143.15
N-202-3	Nil	0	0.04	0.60	0.60
N-202-4	Nil	0	0.18	2.70	2.70

Sample 2, a volume of 45 cubic yards could be produced. If we use a factor of 12.5 cubic feet/ton for a granite-quartz mixed rock, the producible tonnage would equate to 96 tons of material with a value of $190/ton, which could be of possible interest to the weekend prospector or small operator. It must, however, be stressed again that the sampling was done in material of apparent highest grade, so the above values probably represent the maximum values to be found at this location. Samples 3 and 4 indicate nil values for precious metals in both the down dip and southern extent of the zone.

The southern-most working is situated due south of and 120 feet lower than Adit 1. It is labeled Adit 2 and shown in plan view on Figure 22. It is a 38-foot adit driven in very blocky, factured, pale tan alaskite. The only noteworthy feature in the adit is a 1- by 2-inch vein of massive specular hematite with interstitial clay. The vein strikes nearby east-west, dips 8 degrees southward and pinches out 10 feet from the adit portal. Sample 1 was chipped from the vein and assay analysis shows no commodity values except for iron (Table A-1), which is definitely not present in commercial quantity.

The T and T No. 1 lode has very little potential as even a small producer of commercial quantities of precious metals. The spotty nature of the mineralization, the irregular shape and narrow widths of the zone, and apparent thinning of the zone to the notheast indicate little potential for a geologic target worthy of even small-scale exploration in the future. A two-man operation could conceivably make money by selectively working areas in Adit 1, but any work done on a larger scale would be fruitless at this location.

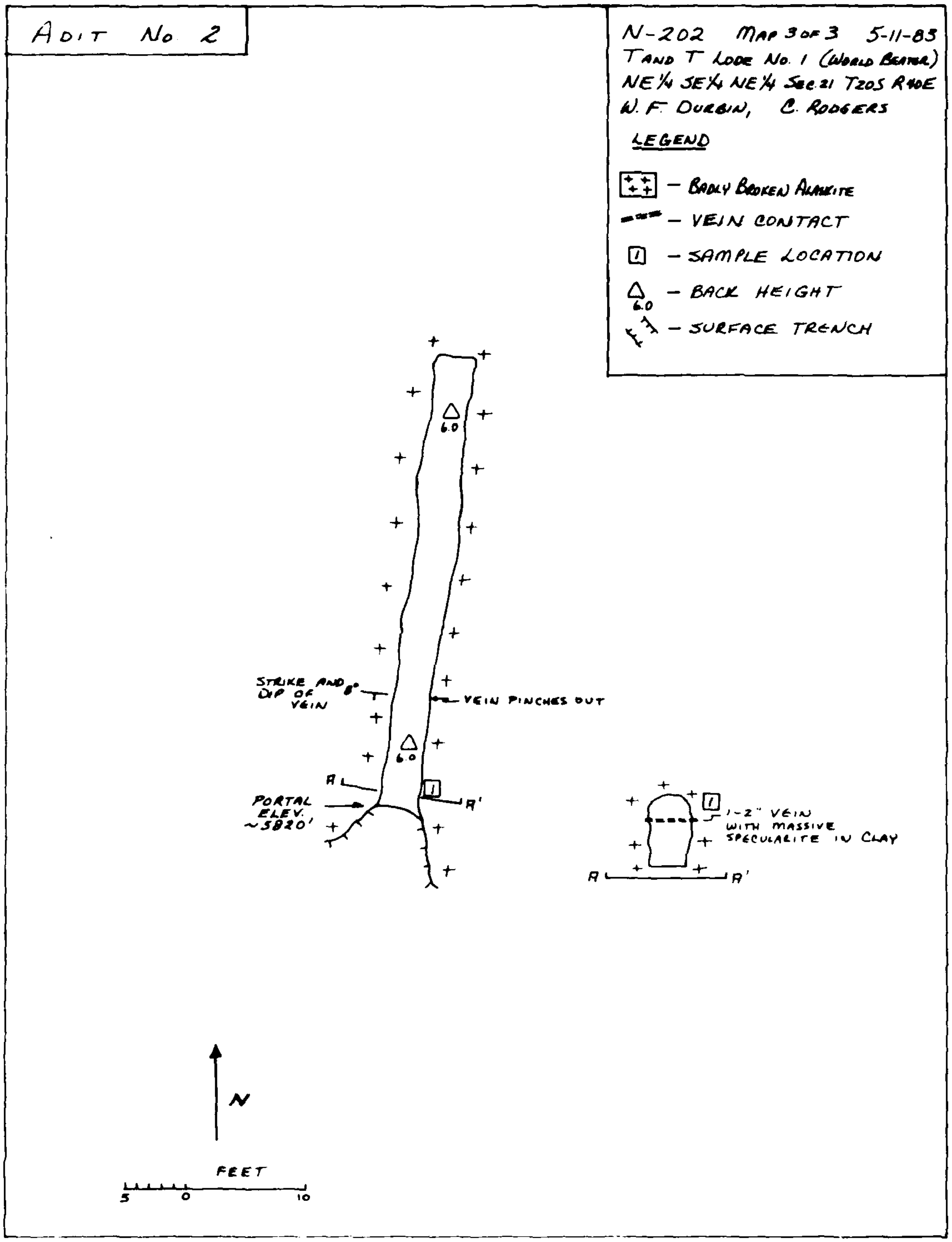

Figure 22. Plan view, adit 2, T and T No. 1 (World Beater) Lode.

Mamie Quartz (N-203)

The Mamie Quartz prospect is located approximately 1.5 miles north of Old Coso in the N1/2, NE1/4, SW1/4 of Sec. 17, T20S, R40E, MDB&M, as shown by Figure 6. Also known as the Coso Boy, it was staked in 1936 by E. M. Lorenz and W. B. Scott and was worked in conjunction with a placer claim nearby.

The workings consisted of three shafts, all caved shut, and several small pits. The estimated depths of the shafts are, 5, 15, and 35 feet. The workings were dug on thin veins of quartz (less than 3 inches) with sparse subhedral limonite pseudomorphs and bands, sparse specular hematite, and moderate hematite fracture coating. The veins occur in Mesozoic granodiorite (decomposed on the surface) and may be associated with granitic dikes at depth, as is the case with similar occurrences nearby.

Analysis of a "high-grade" grab sample taken by the shafts showed 0.24 troy-oz/ton gold or $120/ton. This figure, by itself, is somewhat encouraging, but the physical characteristics of this and nearby occurrences indicate a very limited economical potential at this site because of the narrow vein widths and the discontinuous and spotty nature of the mineralization.

Coso Maid Placer (N-205)

The NWC legal archives list this property as the Coso Maid Gold Placer Claims (NOTS Condemnation Case No. 482) owned and operated by E. M. Lorenz and Sons. The claims are located in the Coso Mountains, Old Coso Mining District, approximately 1.6 miles northwest of Old Coso, 2.1 miles west-southwest of China Garden Springs and 2.9 miles east-southeast of the Coso Peak VABM. The area worked is shown as N-205 on Figure 6. The claims are on surveyed land and cover the majority of Sec. 17, S20S, R40E, MDB&M.

The source of the deposit was probably a gold-bearing quartz vein in the Mesozoic granodiorite hills to the west. The placer deposits were probably formed during the last pluvial period. The majority of intermittent streams and washes in this area show evidence of having been worked by dry washer operations. Because of the extent of the workings, plus subsequent erosion and infilling of probable tailings piles, no suitable sampling locations could be found in the vicinity of the claims.

Mrs. Zelda Lorenz Butler, daughter of Mr. E. M. Lorenz, of Lone Pine, Calif., provided the following information during a private communication. No other production information was available. Mrs. Butler's father and brothers worked this area from 1935 to 1941. During this period their dry washing operation was the only source of the family's income.

The placer deposit values would seem to have been substantial; in addition to providing the necessities of life, the income was apparently sufficient to supply building materials for a concrete one-bedroom house and garage—an extravagant expenditure of funds for this area and period. Income from the operation also supplied fuel for the family car and water truck that was used to transport the family's water from Old Coso once a week. On the other hand, good wages in that era were $3.00/day (roughly 0.1 oz/day), and a family of four would expect to hand-process 10 yards/day easily, meaning that gravel values of $0.35/yard at $35/troy-oz were quite attractive.

During the period preceding Navy control of the area, it is very likely that all of the washes in and around the area were both wet washed and dry washed to some extent. In the 36 years since the Navy has taken ownership, it is unlikely that these placers have been replenished, because of their limited drainage area and the slow mechanical weathering of the scattered gold-bearing outcrops.

Grubstake Lode (N-206)

The 1951 list of validated claims within NOTS gives the claimant of the Grubstake Lode Claim as A. B. Freeman.[3] This claim is located about 1.2 miles southeast of Old Coso in the SE1/4, NW1/4, SW1/4 of Sec. 27, T20S, R40E, MDB&M, as shown in Figure 6.

The workings on this claim consist of a 10-foot-deep shaft and six small pits. They were dug on a shear zone in Mesozoic granite that trends N70°E, dips 75 degrees north, and is a maximum of 2 feet wide. The zone is hematite stained but shows only very sparse crystalline quartz formation.

No samples were taken. The shear zone alteration is very limited and no other alteration or mineralized outcrops were visible in the area.

Hortense #4 (Pauline) (N-207)

The NOTS legal archives mining claim map lists this prospect under Condemnation Case Numbers 476 and 483, with the last owner being listed as Margaret Wilburn. The prospect is placed in the NW1/4, SW1/4, SE1/4, Sec. 31, T20S, R40E, MDB&M, as shown by Figure 6.

The area host rock is a pale tan to pale gray Mesozoic intrusive that ranges in composition from granite to alaskite. A 10-foot-wide shear zone that strikes N10W and dips 60 degrees easterly is the locus for mineralization at this site.

A shaft and a 4- by 4-foot prospect pit are the only workings in the area. The shaft collar is 13 feet long, 10 feet wide, and is filled to within 8 feet of the surface. An estimate of the tailings dump volume indicates that the shaft may have extended from 50 to 75 feet (8- by 8-foot shaft) below the surface.

The outcrop at the shaft surface shows the shear-zone composition as crushed, clay-altered alaskite with limonite-staining. The shaft dump material indicates that at least half of the total shaft volume was driven in this type of material. The remaining (and overlaying) dump material is severely clay-altered alaskite heavily stained with chrysocolla. A composite dump grab of both limonite and copper-stained alaskite was taken, and the assay results are summarized in Table A-1.

The sample assay results indicate no economic values for precious metals or other commodities.

Portions of the headframe and scattered vehicle parts are all that remain at the site surface.

Josephine Mine (Three Star I, II, III Claims) (N-208)

The Josephine Mine is one of the oldest and most extensive mines in the Old Coso Mining District. The mine is listed in the XII Report of the State Mineralogist, 1894,[9] as a property with numerous workings and owned at the time by J. Wilson of Lone Pine, Calif. The report indicated that most ore from the mine had been removed by Mexican miners and worked in arrastras many years prior to 1894. The mine was listed as idle by the XIII Report of the State Mineralogist, 1896, but still owned by J. Wilson.[10]

The Report of State Mineralogist, Mineral Resource of Inyo County, Tucker, 1938, lists L. D. Owen, of Darwin, Calif., as the mine owner.[11] In 1937, the Josephine Mine was leased to the Coso Mining and Milling Company who subleased it to G. N. Sackett. During 1937, approximately

[10]State of California. "Annual Report of the State Mineralogist, Report XIII," in *California Journal of Mines and Geology*, 1896.

[11]W. B. Tucker and R. J. Sampson. "Mineral Resources of Inyo County," in *California Journal of Mines and Geology*, Vol. 34, No. 4, 1938, p. 401.

100 tons of material was mined. Ten tons of shipped material was valued at $40/ton, and a 20-ton shipment averaged $26/ton. The last claims filed before Navy acquisition were listed as the Three Star I, II, and III Claims, filed by Josephine Delys Owen on 1 July 1940. Louis D. Owen, father of Josephine D. Owen, came into the Old Coso area about 1910 and worked the Josephine Mine, the Yucca Mine (N-262), and others in the area sporadically until the early 1940s.*

The Josephine Mine is situated approximately 8 miles southwest of Darwin, Calif., and 0.6 mile northeast of old Coso Village as shown by Figure 6. It is placed in the NE1/4, NE1/4, SE1/4, Sec. 21, T20S, R40E, MDB&M.

The geologically simple and exemplary lode deposit strikes from N80W to S80W and dips from 32 to 38 degrees southerly. The deposit is developed within a narrow shear zone in Mesozoic intrusive rocks that range in composition from pale gray porphyritic granite to dark gray clay-bearing biotite quartz diorite. Two north-south striking post-mineral diabase dikes were noted in the underground workings. The shear zone that acts as the locus for mineralization ranges from 2 inches to 2.5 feet in width and is completely filled with white quartz containing variable amounts and compositions of mineralization.

The zone has been delineated and developed by numerous adits, shafts, and prospect pits that are shown in plan view in Figure 23. The exposed strike length of the deposit is approximately 670 feet, and a dip length of approximately 650 feet has been estimated. The major workings are situated on the south-facing slope of an east-west-trending ridge. The lowest point where the lode was encountered is at an elevation of approximately 5660 feet. The lode is mostly continuous up-dip to an elevation of about 5960 feet where it apparently outcropped and was explored by five prospect pits just below the ridge crest on the north-facing slope.

Figure 24 is a plan view of Level 6. It is the western-most adit of the complex and was driven 326 feet. It encountered only host rock and indicates that the lode has pinched somewhere to the east of that vicinity.

Figure 25 is a plan view of Level 9, the southwestern-most adit of the complex. It encountered no mineralization of any type in 136 feet of drifting which indicates no down-dip lode extension at that point.

*Personal communication with Josephine D. Owen, Old Coso Village, August 1983.

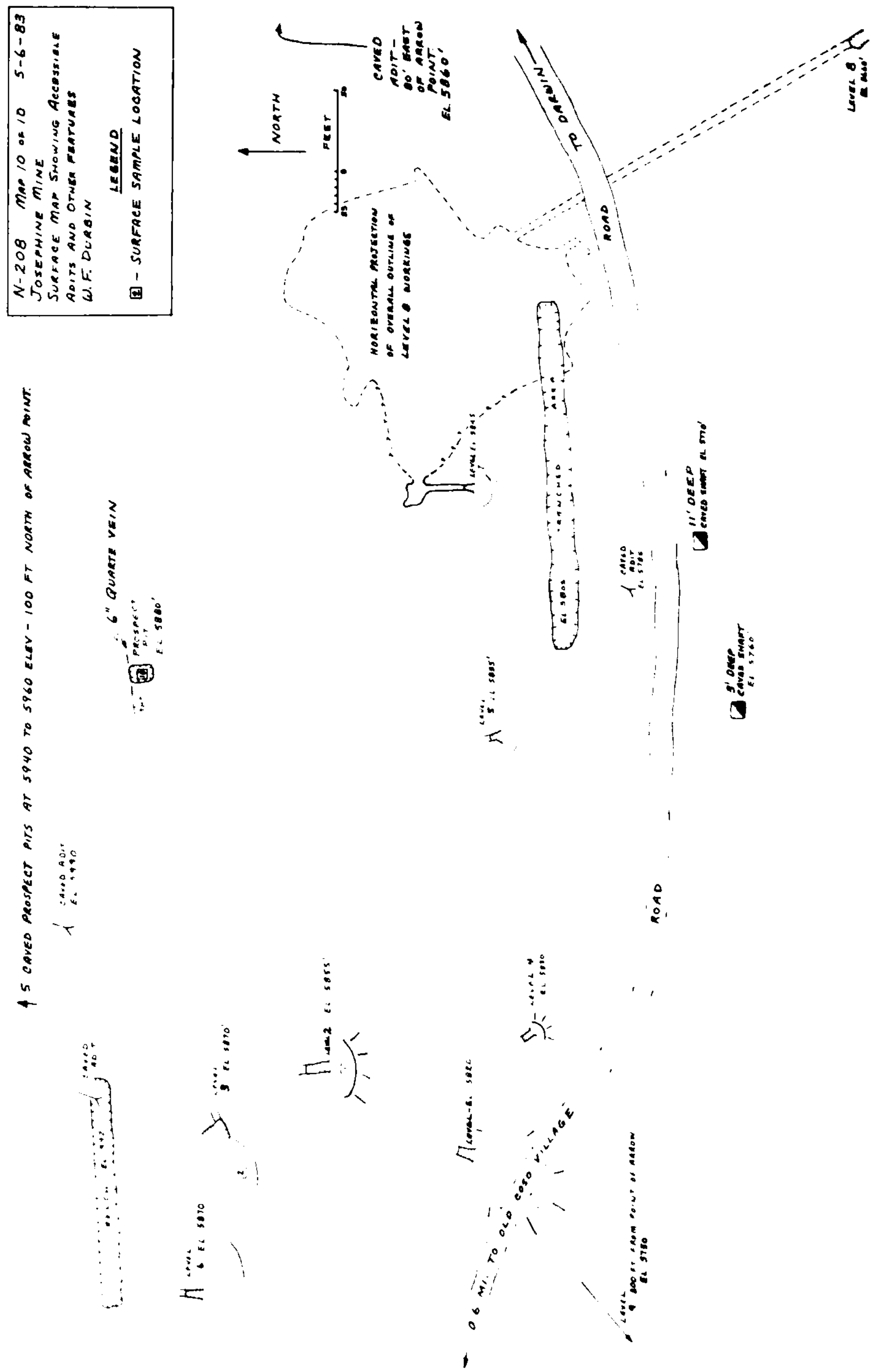

Figure 23. Surface plan view, Josephine Mine.

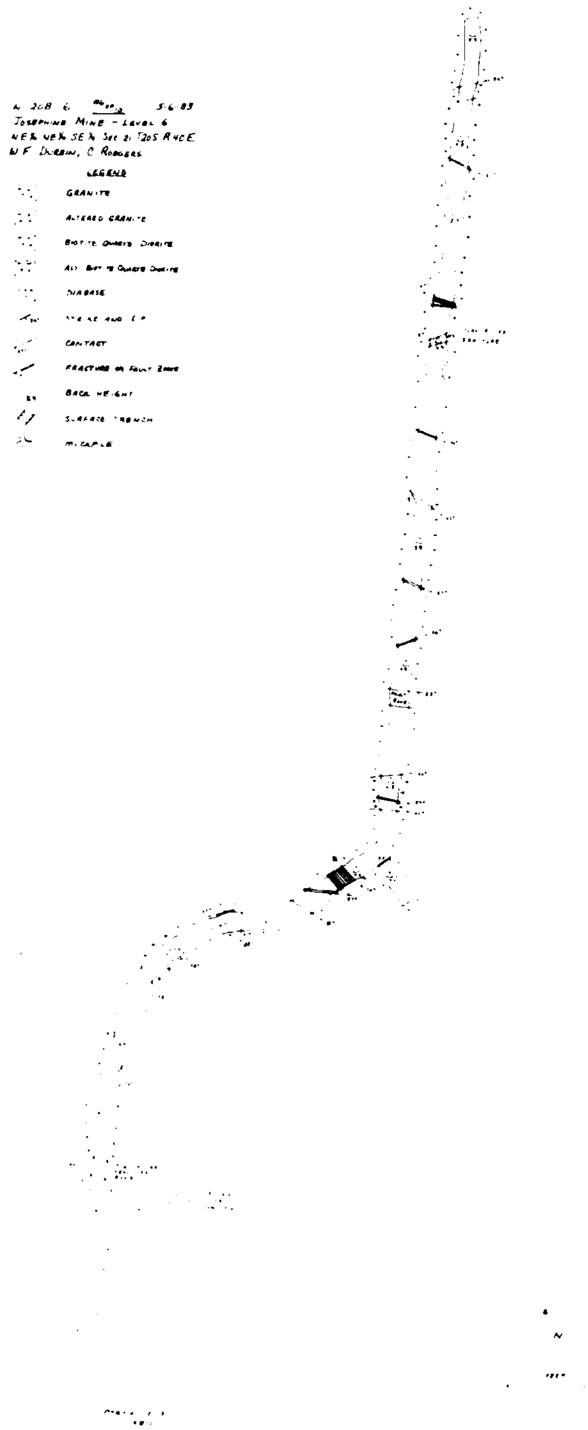

Figure 24. Plan view, level 6, Josephine Mine.

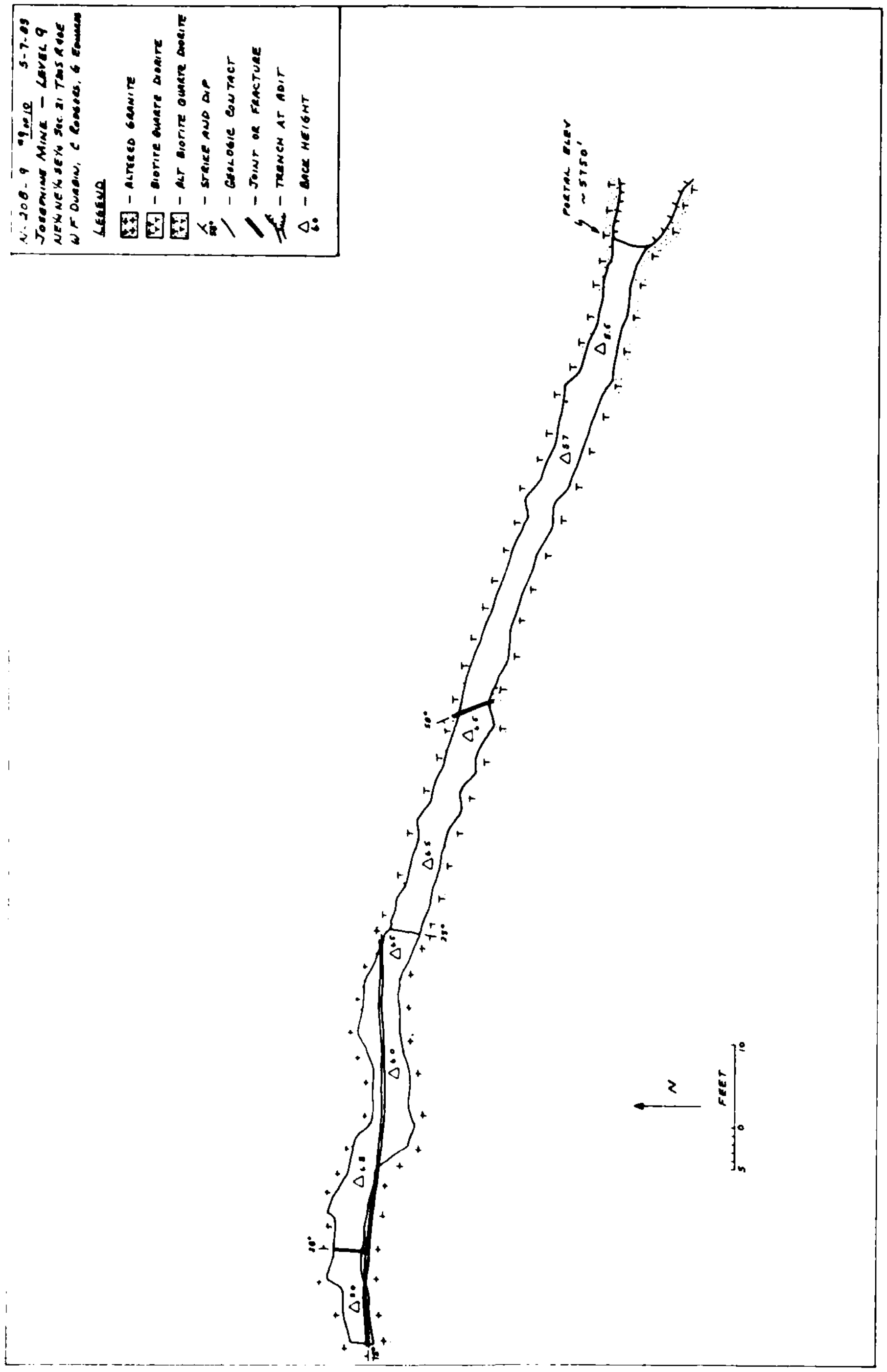

Figure 25. Plan view, level 9, Josephine Mine.

Figure 26 is a plan view of Level 1. It was driven 169 feet along a N15E bearing and contains a 124-foot crosscut driven northeasterly. The drifting encountered only biotite quartz diorite and granite host rocks and was apparently driven too short a distance to encounter the lode.

Adit 4 (Figure 27) was driven 7 feet in biotite quartz diorite and abandoned.

Adit 5 (Figure 28) was driven 112 feet along a N06W bearing in biotite quartz diorite containing 1- to 6-inch clay seams. It was apparently driven in the hanging-wall host rock but was stopped before reaching the lode.

Four caved adits located at 5785-, 5860-, 5920-, and 5990-foot elevations are shown in Figure 23. Mine dump volumes indicate that these workings probably did not exceed 100 feet in length of 3- by 5-foot drifting, and no lode material worthy of note was found on the dumps.

Six prospect pits were examined at the site. Five are located on the north-facing ridge where the lode was exposed in up-dip outcrop. The pits are now caved and filled with slope wash and no outcrops of lode material are currently visible. A 14- by 9-foot pit at an elevation of 5880 feet is located on the south-facing slope of the ridge. It contained a 6-inch-wide vein of pure white quartz that strikes S85W and dips 38 degrees southerly. Sample N-208-18 was chipped across the vein.

Two prospect trenches, located at 5805 and 5920 feet in elevation, were driven along the lode strike a total length of 355 feet. The trenches are caved and filled so *in-situ* exposures of the lode are not visible. Scattered quartz with minor chrysocolla and limonite fracture-filling was found in the vicinity of the trenches but was not sampled since its area of origin was uncertain.

Two shafts, located on the south side of Coso Road, were driven vertically to intersect the lode at depth. The western shaft is at the 5760-foot elevation and is caved and filled to within 3 feet of the surface. The eastern shaft, at the 5770-foot elevation is partially caved, filled to within 11 feet of the shaft collar, and was driven in biotite quartz diorite. No lode material is visible in the shaft walls.

The major workings are now discussed in order from west to east.

Level 3, shown in plan view by Figure 29, was driven 172 feet to intersect and follow the lode. The lode is developed on or near the contact between a biotite quartz diorite hanging wall and granite

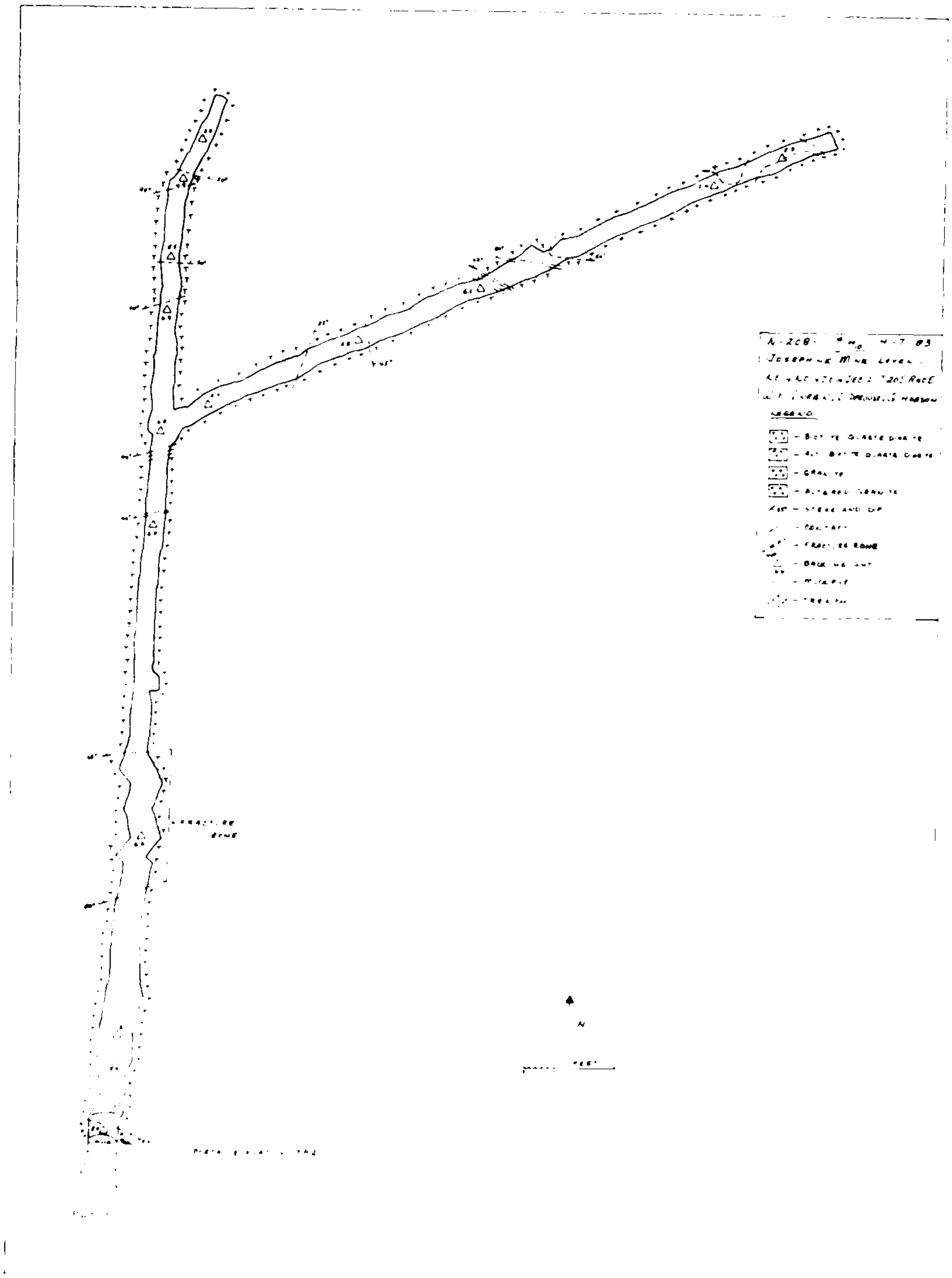

Figure 26. Plan view, level 1, Josephine Mine.

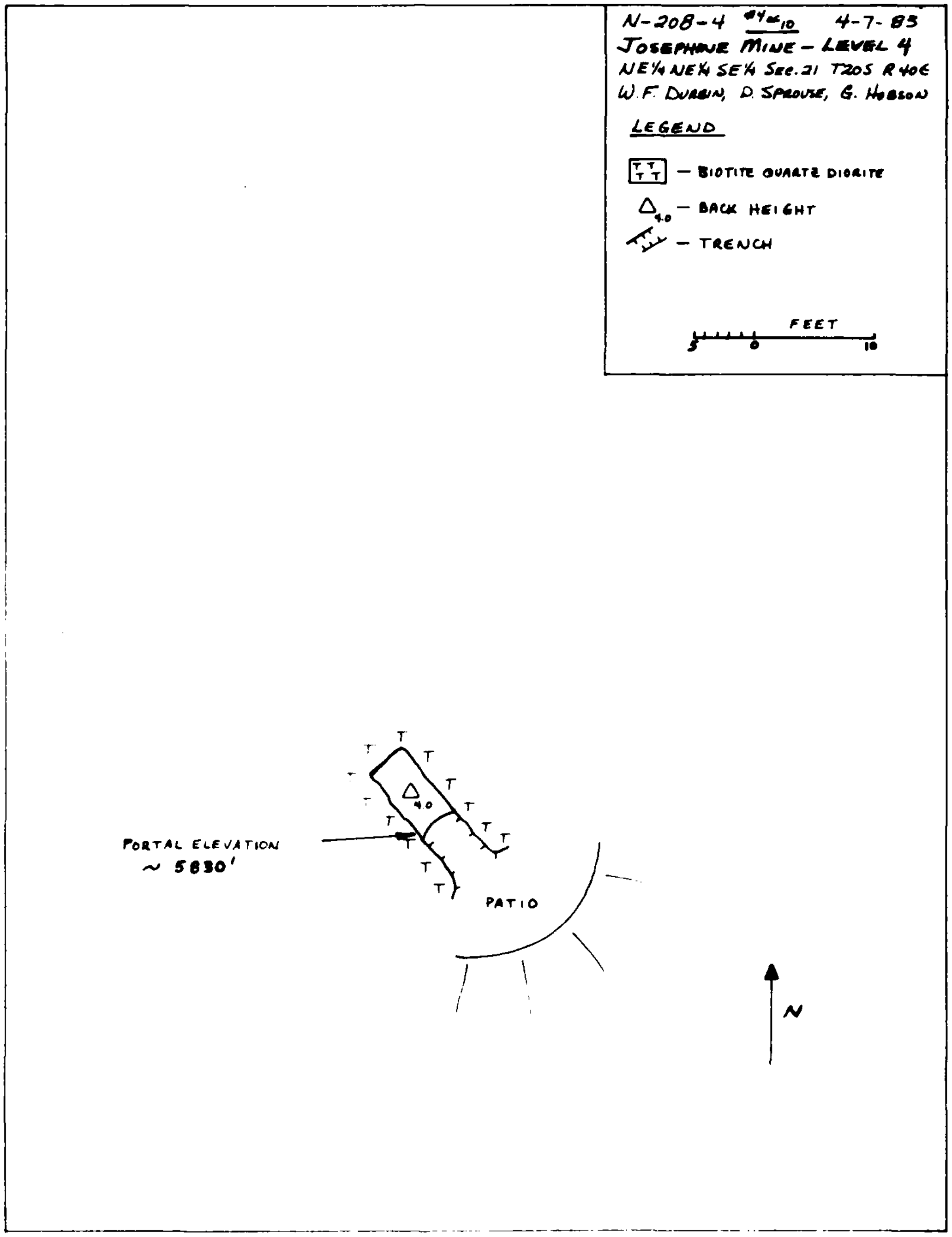

Figure 27. Plan view, adit 4, Josephine Mine.

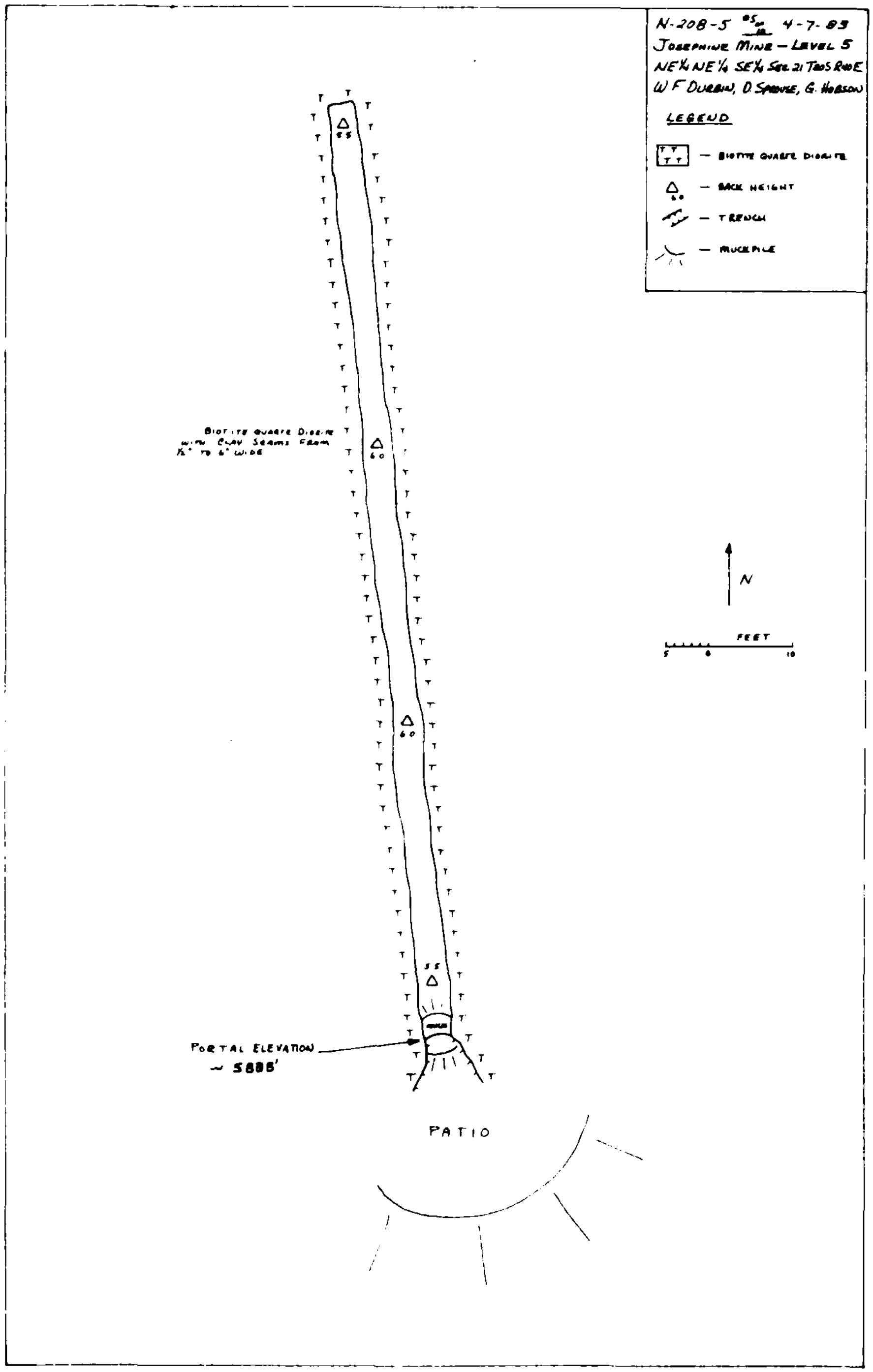

Figure 28. Plan view, adit 5, Josephine Mine.

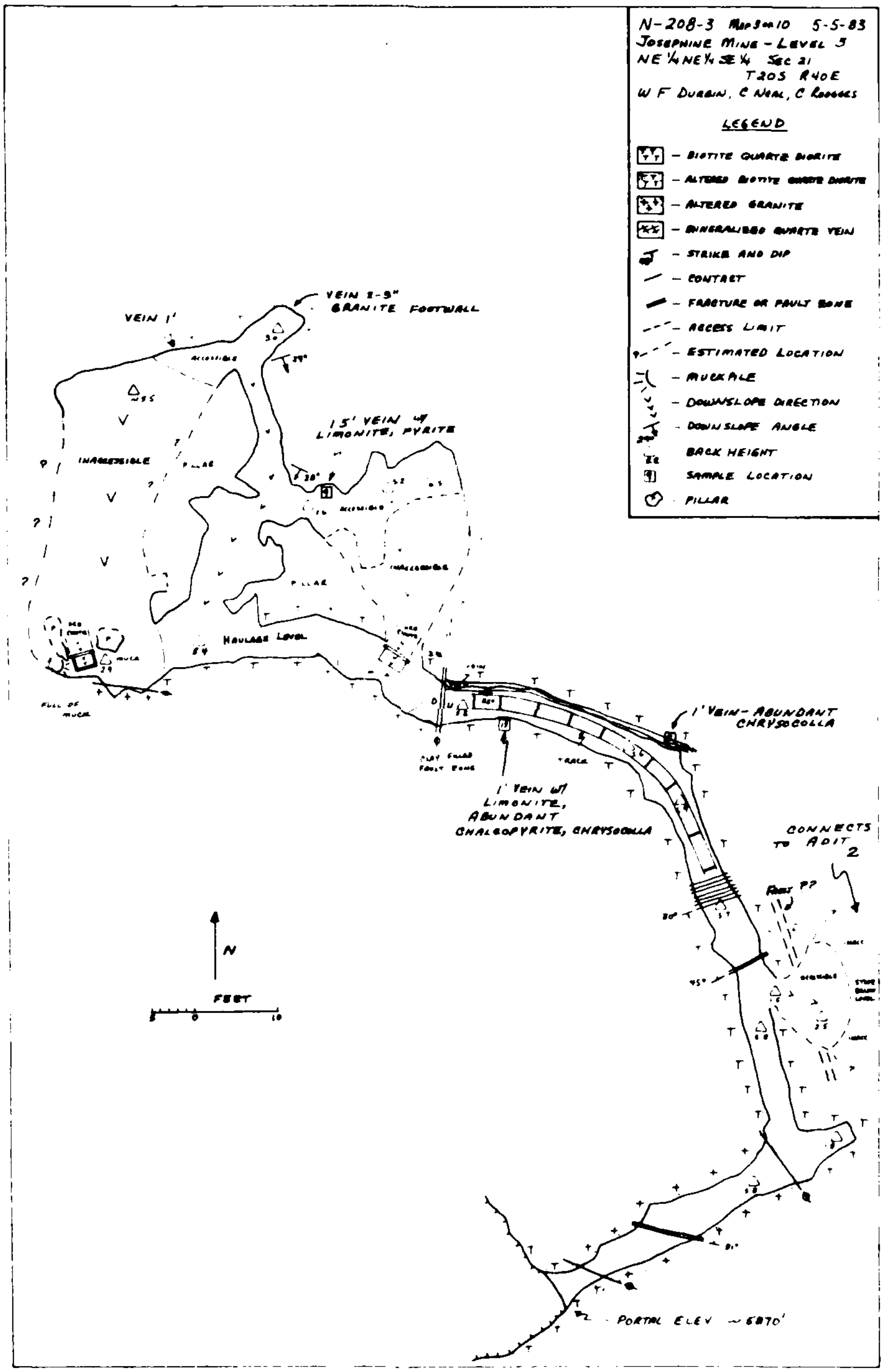

Figure 29. Plan view, level 3, Josephine Mine.

footwall. The lode, which ranges from 2 inches to 1.5 feet in width, is offset by two narrow faults that strike nearly north-south. An opening, located 45 feet from the adit portal and now mostly inaccessible, explores a down-dropped portion of the lode and probably connects with the workings of Level 2 to the east. The lode exposed in the last 50 feet of drifting was developed by raising and minor stoping. Most of the development area was inaccessible, but the material removed from raising and stoping at an average mining width of 3.5 feet was estimated to be approximately 115 cubic yards. The lode material is variable in composition. Samples N-208-3-8 and N-208-3-13 were chipped across 1-foot zones in the development and haulage drift. The samples contained quartz with abundant primary and secondary copper mineralization and limonite. Sample N-208-9 was chipped from a 1.5-foot portion of the lode in the face of the easterly stope area. The vein material was quartz with disseminated pyrite and limonite fracture-filling. Two wooden ore chutes and sections of narrow-gauge railroad remain in this working.

Figure 30 is a plan view with cross section of Level 2. This drift level was driven 80 feet before encountering the lode. Crosscuts were then driven to the west and east along the lode strike. The western crosscut is accessible for the first 53 feet, then muck-bound. The crosscut probably intersects the workings driven down from Level 3. The eastern crosscut is 108 feet long and exposes approximately 95 feet of the lode deposit. A 1.5-foot-wide diabase dike that strikes north-northeasterly has apparently cut off or offset the lode at the eastern end of Level 2.

A 23-foot shallow-dipping decline was driven on the dike but failed to expose the lode east of the dike. The Level 2 portion of the lode was developed by 114 feet of raising up-dip with minor stoping off the raises and a small amount of stoping down-dip from the drift level. The average vein width in this working is 1 foot. The total material removed from the raising and stoping, at an average mining width of 3.5 feet, is estimated at approximately 154 cubic yards. The major portions of the stoped area are caved or muck-bound. A 16-foot raise was driven up from the west crosscut and encountered severely altered clay-rich faulted granite with brecciated quartz. The ground was too badly broken to continue the raising. Two samples were taken in Level 2. Sample N-208-6 was chipped from the 1-foot-wide quartz vein with limonite fracture-filling and disseminated pyrite near the intersection of the drift and west crosscut. Sample N-208-7 was chipped from the diabase dike material in the east crosscut. A low-angle normal fault that strikes parallel to the lode strike was noted in the upper portion of the main raise-stope area. The fault dips northerly and has down-dropped the lode by 4 feet north of the fault.

The surface location of Level 7 is shown by Figure 23, and the plan view with cross section is shown in Figure 31. A 36-foot-long drift in severely altered clay-rich granite was driven to intersect

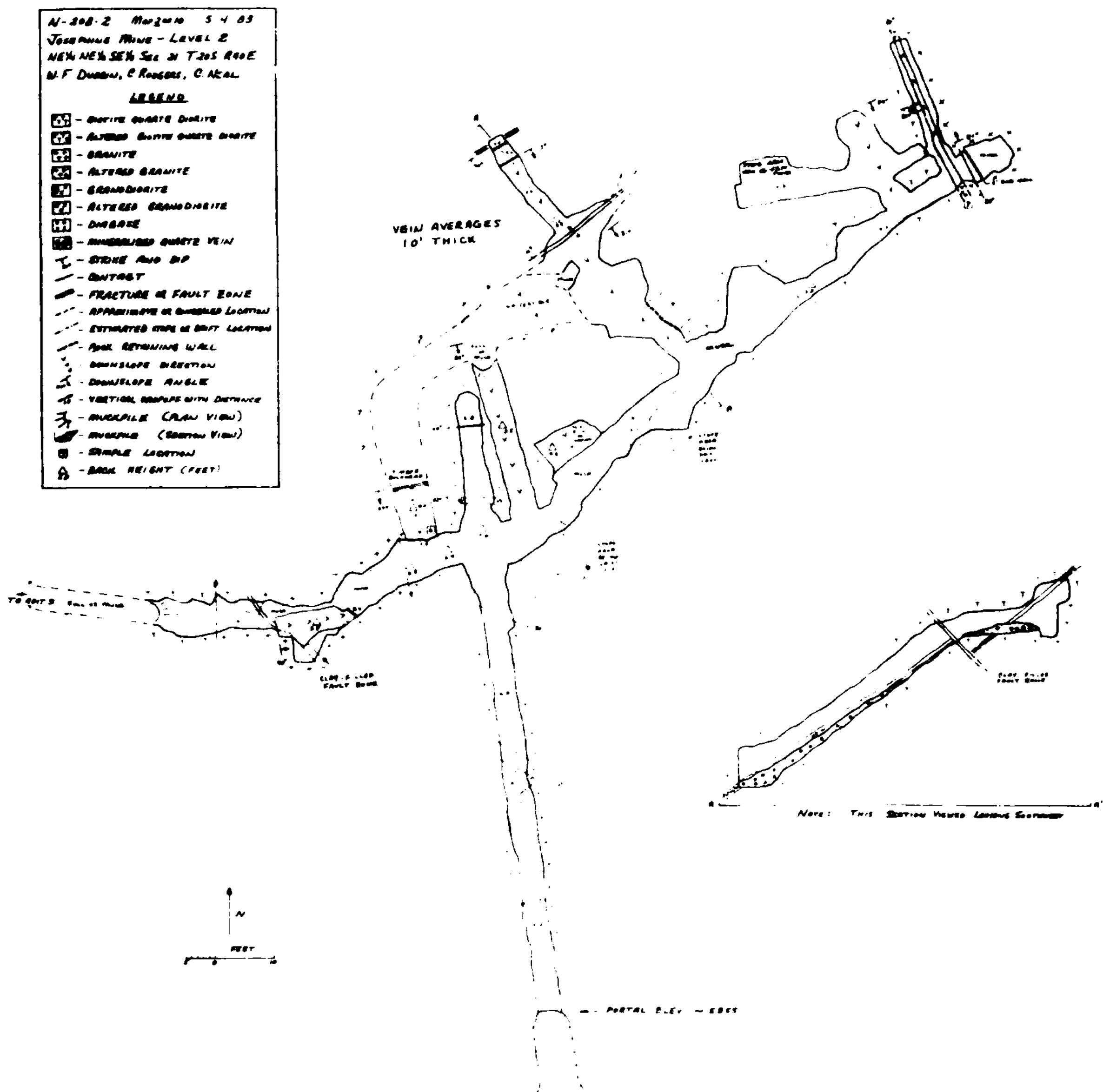

Figure 30. Plan view, level 2, Josephine Mine.

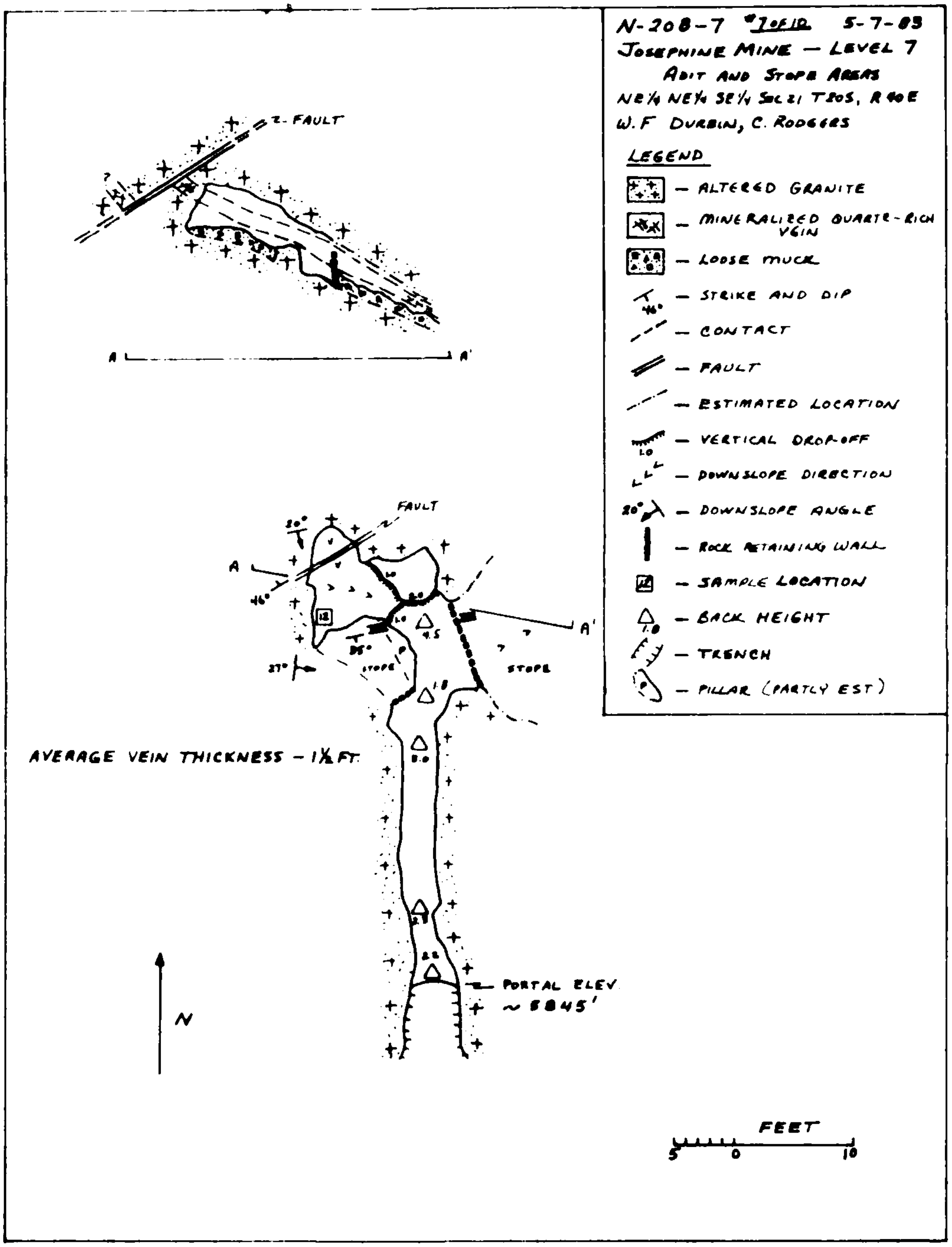

Figure 31. Plan view, level 7, Josephine Mine.

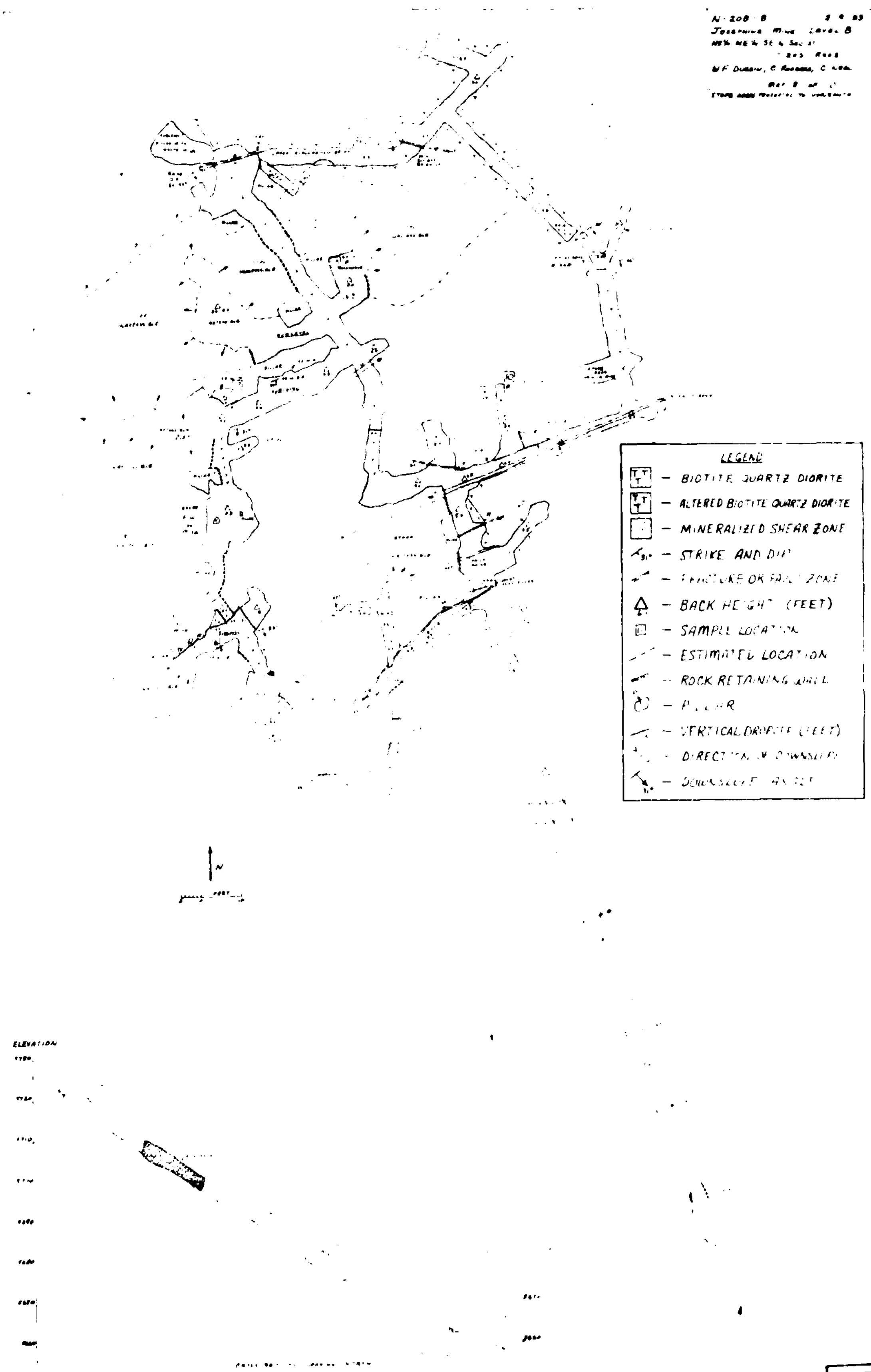

Figure 32. Plan view, level 8, Josephine Mine.

Six samples were taken in this working. Sample N-208-8-10 was chipped across the 0.7-foot-wide quartz vein with limonite fracture-filling at the face of a 20-foot exploratory raise driven from the main drift crosscut. Sample N-208-8-11 was chipped from a 5-inch-wide quartz vein with limonite and a few scattered limonite pseudomorphs after pyrite. The sample was taken from the pillar separating a raise branch in a 40-foot exploratory raise at the east end of the main drift crosscut. Sample N-208-8-14 was chipped across the 1-foot-wide massive white quartz vein in the upper exploration drift. Sample N-208-8-15 was chipped from a 1.5-foot-wide portion of the vein in the eastern sublevel just off the main access raise. The sample was composed of massive white quartz with abundant chrysocolla, limonite, pyrite, and scattered specular hematite. Sample N-208-8-16 was chipped from a 1-foot quartz width from the wall of a small sublevel off the western access raise. The quartz contained limonite pseudomorphs after pyrite, scattered chalcopyrite and covellite, chrysocolla, and limonite fracture-filling. Sample N-208-8-17 was chipped from a pillar at the edge of a large stoped area in the lowest, west-trending, sublevel. The quartz width was 1.2 feet and the sampled area contained abundant chrysocolla, chalcopyrite, covellite, and pyrite with scattered, disseminated specular hematite.

In addition to the 13 underground samples and one surface sample taken from in-place material, two grab samples, labeled N-208-1 and N-208-2, were taken of limonitized quartz from piles located on the dumps of Levels 2 and 3, respectively.

The complete list of assay results for all Josephine Mine samples is presented in Table A-1, and precious metal values are presented in Table 5.

The assay results for the 15 Josephine Mine samples indicate moderate to poor commercial values for precious metals and other commodities.

Three of the samples warrant special attention: Sample N-208-1 shows a total precious metal value of $113.00/ton. Though located on the waste dump of Level 2, the material could have come from a number of other workings in the vicinity. The samples taken within Level 2 indicate values ranging from nil to 0.019 troy-oz/ton gold so a "best guess" is that the sample N-208-1 material may have come from a pocket or zone of moderate grade material from the inaccessible stope or raise area of Level 2.

Sample N-208-7-12 was taken from a 1-foot-wide portion of the vein in Level 7. If any potential exists for further exploration and development at the Josephine Mine, Level 7 is the most likely area to pursue. The lode is exposed in the area in widths of 0.5 to 1.5 feet and could be looked at by exploring to the west and northward up-dip.

TABLE 5. Precious Metal Values for Josephine Mine Samples.

Sample no.[a]	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-208-1	0.190	95.00	1.20	18.00	113.00
N-208-2	0.071	35.00	0.69	10.35	45.35
N-208-6	0.019	9.50	1.45	21.75	31.25
N-208-7	Nil	0.0	Nil	...	...
N-208-3-8	Nil	0.0	0.06	0.90	0.90
N-208-9	0.043	21.50	1.02	15.30	36.80
N-208-8-10	0.005	2.50	0.14	2.10	4.60
N-208-8-11	0.005	2.50	0.53	7.95	10.45
N-208-7-12	0.460	230.00	5.482[b]	82.23	312.23
N-208-3-13	0.062	31.00	4.10	61.50	92.50
N-208-8-14	0.022	11.00	2.46	36.90	47.90
N-208-8-15	0.083	41.50	1.50	22.50	4.00
N-208-8-16	0.045	22.50	0.10	1.50	24.00
N-208-8-17	0.260	130.00	1.87	28.05	158.05
N-208-18	Nil	0.0	Nil	0.0	0.0

[a] Sample numbers N-208-3, -4, and -5 were not used.

[b] Kevex results.

If Level 7 is explored at a mining width of 3.5 feet (the typical mining width used elsewhere at this property), the gold value would equate to $230 ÷ 3.5 or $65.71/ton. This sample and all others taken represent material that appeared to be of highest grade so the values given should be construed as the best one could expect to find.

Sample N-208-8-17 was chipped from a 1.1-foot-wide vein in a small pillar near the edge of a stoped area in Level 8. If the precious metal value holds constant up-dip, a pillar removal operation would produce about 10 cubic yards of material if mined at 3.5 feet wide. Using a factor of 12.5 cubic feet/ton and a mining dilution factor of 1.1/3.5 x $158 the maximum producible tonnage and precious metal value would equate to 22 tons at $49.66/ton. All other samples from Level 8 indicate no commodity values worthy of further study.

The recent sample data, the history of small shipments of apparently hand-sorted material ranging from 0.74 to 1.14 troy-oz/ton (1937), plus the fact that the records show numerous owners and long idle periods, indicate very limited potential, at best, for new and rich extensions of this deposit. The field evaluation suggests that nearly all of the economic quartz vein widths have been exploited and best grade removed. There may be areas to the north and west of Level 7 and to the east of Level 2 (Figure 23) where the lode may be of economic width and grade. However, the general conclusion to be reached is that the Josephine Mine lode, though covering an area of about 14 acres, is too erratic in width and too low in grade to be of economic interest today and probably into the forseeable future.

Oro Grande Placer (N-211)

This claim is located in the NE1/4, SE1/4, NW1/4 of Sec. 29, T20S, R40E, MDB&M, as shown in Figure 6. The 1951 list of validated claims within NOTS gives the owners as Mary H. and William J. Barrett.[3] Notice of a prior claim, however, the Orofino, by Sam J. Clark of Darwin, Calif., was found on site, approximately 1 mile southwest of Old Coso.

The claim is located on a small wash less than 5 feet wide with stream sediments less than 1 foot deep. The wash is cut in Mesozoic granite. If any work had been performed at this site, evidence of it no longer exists.

The potential for even a small placer operation at this site is virtually nonexistent. The wash is very small with shallow alluvial gravels. Because the stream gradient is shallow over the length of the claim compared with the areas above and below the claim, any gold that may have been eroded out of the rocks upstream could be captured here.

However, the hills upstream are notable for the absence of mineralization that could have served as a source (as evidenced by the lack of old prospects and surface alteration zones).

Unnamed Prospect (N-213)

Prospect N-213 is located 1 mile southwest of Indian Gardens Spring in the NW1/4, SE1/4, SE1/4 of Sec. 16, T20S, R40E, MDB&M, as shown on Figure 6. The workings consist of two adits, both caved shut. Estimates of the extent of drifting are 90 and 15 feet.

The workings were dug on quartz veins developed along the contacts of north-trending aplitic dikes intruding Mesozoic granodiorite. The veins trend northwesterly and dip south at about 40 degrees, with the workings inclined to follow the dip. The quartz material is up to 0.3 foot thick and is fractured with moderate hematite and chrysocolla staining. Examination of the area revealed no other outcrops.

A single "high-grade" dump sample was taken from the larger adit dump. Analytical results are given in Appendix A. These results and the limited extent of the veins indicate that no potential exists at this site.

Unnamed Prospect (N-214)

This prospect is situated on a hill about 1.6 miles north of Old Coso in the NE1/4, SW1/4, NW1/4 of Sec. 16, T20S, R40E, MDB&M, as seen in Figure 6. The working consists of a single adit, now caved. The drift was driven an estimated 25 feet on a 0.6-foot crystalline quartz vein that trended N5W. The fractured quartz showed sparse chalcopyrite and very sparse hematite as fracture coating. The vein was developed in a Mesozoic hornblende granite. No other mineralization or prospects could be found.

A single sample was taken of the dump material. Assay results, which are listed in Table A-1, showed no precious metal values. This vein is an isolated occurrence and carries no economic potential.

Marigold Mine (N-215)

The NOTS legal archives mining claim records list the Marigold Mine under Condemnation Case Number 567 and refer to E. H. Fleming as the last owner before Navy acquisition.

This property is situated 0.9 mile northeast of Coso Village and is placed in the SW1/4, NW1/4, NW1/4, Sec. 22, T20S, R40E, MDB&M, as shown on Figure 6.

The area host rock is medium-grained dark gray biotite-rich quartz diorite. It is cut by scattered pale gray granitic dikes of unknown width that trend generally northeast-southwest.

Mineralized quartz is present within the single accessible working at the Marigold Mine and is present as loose float material from scattered prospect pits up-dip to the west of the accessible working. The loci for mineralization are irregular, subparallel shear zones that range from 4 inches to 3.5 feet wide. Where visible underground, the zones strike generally N55E. The upper zone is generally flatter in dip (0 to 30 degrees southeasterly) and narrower (4 inches to 1 foot wide). The lower zone dips from 25 to 30 degrees southeasterly and ranges from 0.5 foot to 3.5 feet in width. The two zones converge in at least one location. Throughout the accessible working, quartz has completely filled both shear zone areas. Mineralization within the quartz ranges from limonite and clay fillings around small quartz crystals to massive quartz with limonite stain and fracture-filling to quartz containing chrysocolla coatings and finely disseminated chalcopyrite and bornite.

Site workings include two caved adits that were apparently developed solely in biotite quartz diorite. Estimates of mine dump volumes produced minimum drift lengths of 33 and 47 feet (3 feet wide, 5 feet high). The accessible drift, as shown on Figure 33, was driven 145 feet along the pair of shear zones. The lower zone crosscuts a granitic dike near the adit portal. Associated with the drifting is 46 feet of raising and winzing for shear zone exploration and approximately 70 cubic yards of stoping both up- and down-dip. The three remaining workings consist of prospect pits driven on the surface to determine the up-dip extent and value of the shear zone(s). These workings accounted for a total of approximately 9 cubic yards of material removed.

Four samples were taken at the Marigold Mine, and complete assay results are listed in Table A-1. Sample N-215-1 was a composite grab of quartz rubble with limonite fracture-filling from the surface pits. Samples N-215-2, -3, and -4 were chip samples taken across the mineralized quartz vein(s) where shown on Figure 33.

The assay results for the four samples show no commercial values for precious metals or other commodities. It would appear that the operator either "high-graded" the prospect, i.e., mined some small pocket of commercial grade material in its entirety, and then abandoned

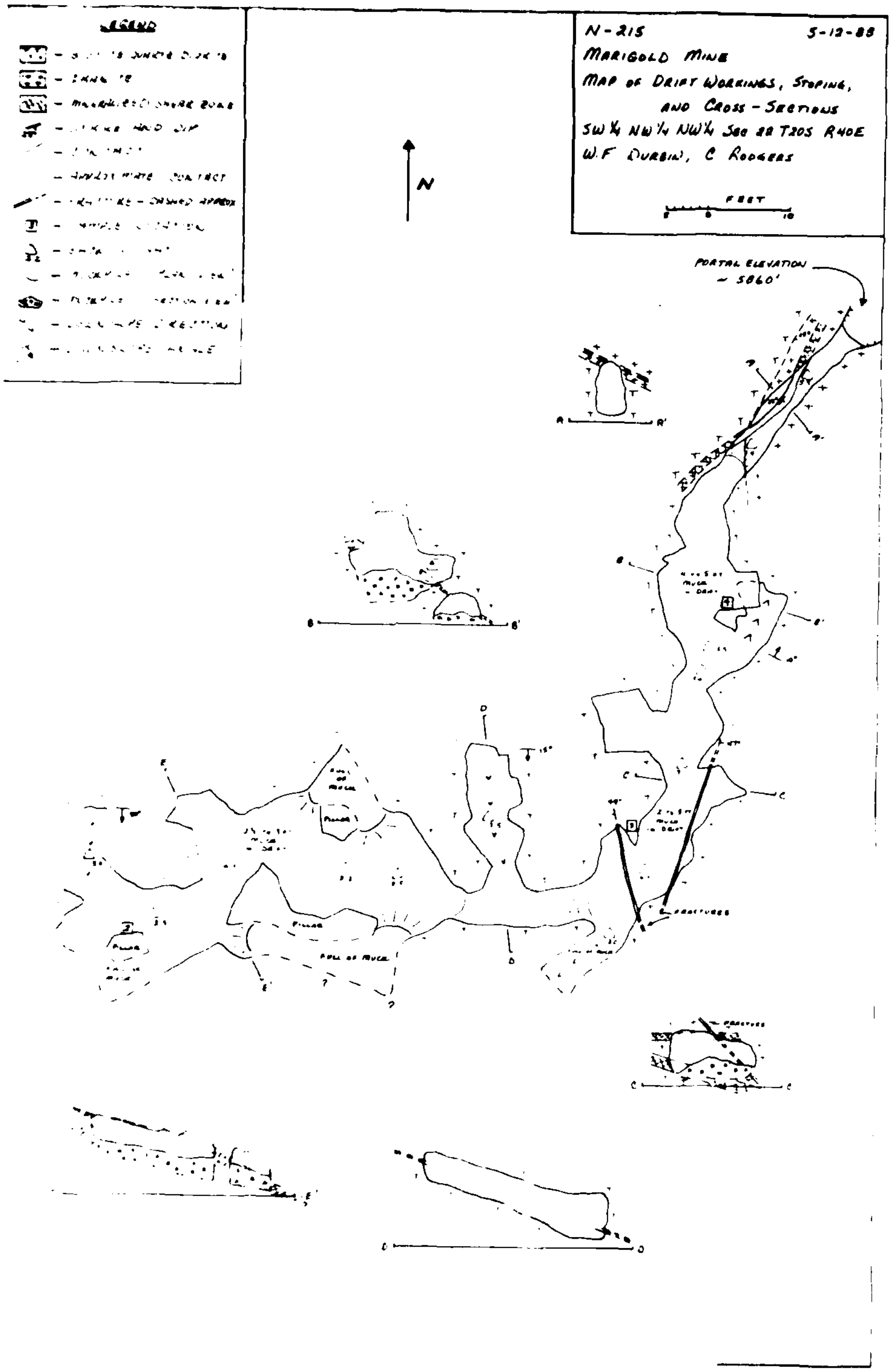

Figure 33. Plan view of adit, Marigold Mine.

the mine. Or, he kept drifting, raising, and did minor stope-like work with the hope of locating commercial-grade material, found none, and finally abandoned the deposit as there is no indication of commercial mineralization present today.

Unnamed Prospect (N-216)

This prospect is located on a hill overlooking the Yucca-Lorenz area about 1.8 miles northwest of Old Coso in the NE1/4, SE1/4, SE1/4 of Sec. 18, T20S, R40E, MDB&M as shown on Figure 6. A single trench, 10 by 8 by 4 feet deep, was dug on a 2.5-foot-wide shear zone in marmortized pre-Cretaceous limestone. The shear zone trends S70W, dips to the south 85 degrees, and is 2.5 feet wide. The hanging wall of the shear is mineralized to a thickness of 0.5 foot with abundant disseminated malachite and azurite. The remaining 2-foot width is heavily iron stained, both with hematite and limonite.

A single channel sample was taken across the shear, and the results are listed in Appendix A. Precious metal content of the sample was low, but copper was high, at 1.11%. The potential for an economic deposit at this site is low, however, because of the limited extent of the mineralization. Examination of the surrounding area failed to turn up anything except a few very scattered occurrences of light copper staining of the country rock in a 1,000-foot radius.

Vin Blano Mine (N-218)

The Vin Blano is a small mine that is situated about 1 mile south of Indian Gardens Spring in the NW1/4, SE1/4, SW1/4 of Sec. 15, T20S, R40E, MDB&M, as shown on Figure 6. There is a two-story cabin (in very good condition) and a well on the property. Underground, the workings consist of two shafts, side by side, inclined at 55 degrees to follow the vein. One shaft is 63 feet long and the other is at least 70 feet long; the bottom is now caved. A small amount of stoping occurred between 17 and 31 feet down-dip from the surface. Figure 34 is a "plane of the vein" view of the underground workings.

The geology consists of a quartz-enriched shear zone in a Mesozoic diorite pluton. The shear trends N85E and dips south at 55 degrees. A quartz vein follows the shear but is much narrower, ranging from 2 inches to 0.7 foot with the average width being about 3.5 inches. Although most of the quartz is stained by chrysocolla and hematite (both rock and as fracture coating), only a few small spots of massive chalcopyrite could be seen. The zone of mineralization noted on the drawing delimits the quartz veining.

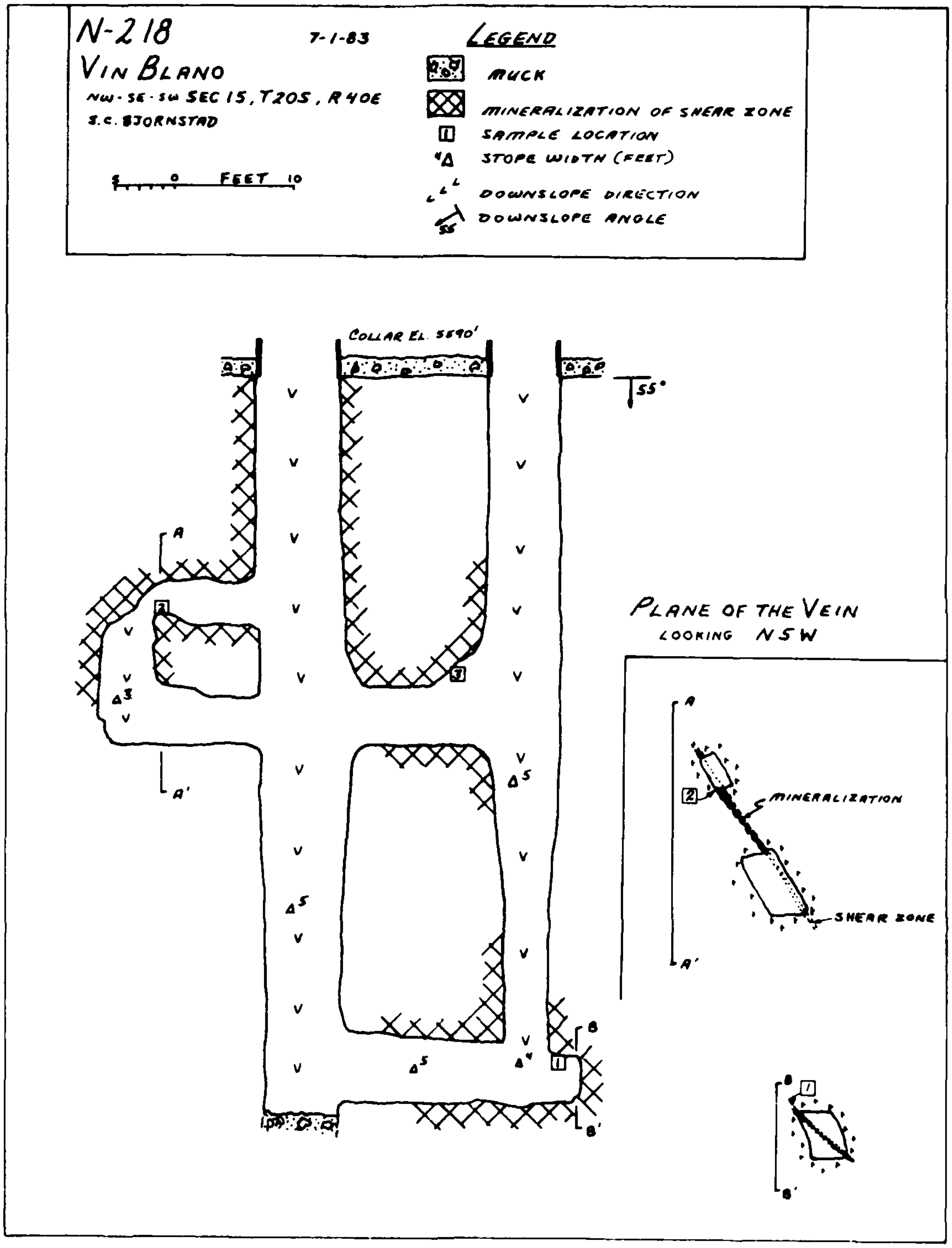

Figure 34. Plane of the vein view, Vin Blano.

Three channel samples were taken across the vein. Their locations are marked on Figure 34, and the analytical results are given in Appendix A and in the following Table 6.

TABLE 6. Vin Blano Sample Assay Results.

Sample	Vein width, in.	Gold		Silver		Combined value, $/ton	Value of rock at a 3-foot mine width, $/ton
		Troy-oz/ton	$/ton	Troy-oz/ton	$/ton		
N-218-1	2.5	0.73	365.00	3.15	47.25	412.25	28.63
N-218-2	8.0	Nil	...	5.72	85.80	85.80	19.07
N-218-3	5.0	1.33	665.00	17.00	255.00	920.00	127.78

The assays, by themselves, look interesting, but when applied to a mining situation they are not so encouraging.

Given cutoffs of a 3-foot mined width and a minimum ore grade of $50/ton, site 3, at $127.78/ton, could be mined at a good profit. However, the grade and vein width drop off sharply away from this sample site, as evidenced by sample sites 1 and 2. This assumes, too, that these samples are representative of the mineralization, when in fact they are not, since they were taken from apparent "high-grade" zones. It is safe to say that if the same mining effort was undertaken at this site today, it would be an unprofitable endeavor.

If one assumes some continuity of the mineral occurrence, an assessment of the down-dip potential of this property gives basically the same results.

The trend of mineralized zones appears to be plunging to the east (to the right in Figure 34) so that it is not unreasonable to discount sample 2 when assigning a potential grade for ore at depth. This would result in a maximum grade of about $78/ton for the mineralized zones *only*. Since they account for less than half of the total tonnage mined from the present workings, this figure is probably much closer to $35/ton. Again an unprofitable situation.

Reconnaissance of the surrounding surface was also accomplished during the survey. No evidence was found for the continuation of mineralization laterally along the shear zone, nor were any other veins found nearby.

Unnamed Prospect (N-220)

This prospect is located at Mariposa Spring about 1.8 miles southwest of Old Coso in the S1/2, SW1/4, SW1/4 of Sec. 29, T20S, R40E, MDB&M, as shown on Figure 6. It consists of a trench 10 feet long, 6 feet wide, and 4 feet deep and numerous small prospect pits that were dug on the sheared contact of Mesozoic granite and an overlaying remnant of pre-Cretaceous quartzite.

The shear zone trends N88W and is about 2 feet wide. It is composed mostly of hematite rich brecciated country rock (granite). Where quartz is present (as a short, 2-inch-wide vein), it is unstained; no hematite or other minerals are associated with it. A single grab sample was taken of both the quartz and the hematite-stained country rock. The analytical results, which indicate absolutely no economic potential, are given in Appendix A.

Black Crow Mine (N-225)

The Black Crow Mine, which is actually only a prospect, was located in 1937 by Mr. George Clapp. This, according to a relocation notice that was found on site and dated 1 December 1946. This prospect is located in the N1/2, NW1/4 of Sec. 9, T20S, R40E, MDB&M, as seen in Figure 6.

The workings at the Black Crow consist of two groups. In the relatively flat ground, two trenches were dug side by side in Mesozoic granodiorite, 20 feet apart along parallel quartz veins that trend N29W and dip to the east at 63 degrees. One trench is 40 feet long and 3 feet deep and the other is 25 feet long and only 2 feet deep. A small pit, 5 feet deep, was dug near the longest trench and on the vein, possibly as the beginning of a shaft. The veins are brecciated quartz with moderate hematite fracture filling and sparse disseminated pyrite crystals and limonite pseudomorphs. Sample N-225-2 was taken of the vein material.

The second group of workings are on a nearby hill that is strewn with granodiorite boulders that range up to several yards in diameter. During this survey, four tunnels were found among and beneath these boulders. One was caved shut and the others were short—21 feet or less—and, amazingly, all were less than 3 feet high. None of them intersected anything but granodiorite. There is abundant vein quartz float on the hillside, and the prospectors were apparently looking for the source of this float. A grab sample of the quartz, which has a light hematite coating, was taken as N-225-1.

The assay results, which are given in Appendix A, indicate that no occurrence of economic importance exists at either of these sites.

The only interesting thing about this prospect was the living quarters of the prospectors. At the bottom of the hill, several large boulders had fallen together (or eroded) in such a way that a large, flat rock lay up against some others. The rock formed a lean-to big enough for two or three people to live comfortably under it. The space is up to 8 feet high, 30 feet long, and 15 feet deep. It was walled up at each end and had a wood frame door with transom, a pantry, a built-in wood stove, and cots. Outside, between and beneath some other rocks, there appears to have been a "shower stall."

Orion No. 1 Lode (N-226)

The Orion mine is located at the north end of Coles Flat, about 1 mile from Old Coso, and is placed in the E1/2, NE1/4, SE1/4 of Sec. 28, T20S, R40E, MDB&M, as shown on Figure 6. According to the 1951 NOTS list of validated claims, the Orion No. 1 Lode was owned by H. R. Ellis and Walter W. Ross.

All of the workings at this mine were dug on quartz/hematite veins and hematite staining in shear zones cutting Mesozoic leucogranite. They consist of one adit and two shafts. The surface relationships can be seen in Figure 35.

The lowest working is the adit, which can be seen in plan view in Figure 36. It is 184 feet long and was driven along the strike of a N5E-trending shear zone that dips to the west at 80 to 85 degrees. The shear zone is an average of 1.5 feet wide. Quartz lenses occur along much of the shear, where they average about 4-1/4 inches thick, except toward the face. There the shear is almost totally occupied by the quartz vein. As can be seen in the plan view, the quartz in the first 90 feet of exposed shear is clear to milky in color; from there to the face, however, it is iron stained (hematite), predominately as a coating. Two samples were taken of the quartz vein, samples 5 and 6. The analytical results of these samples, as well as others taken at this mine, are listed in Appendix A.

Shaft No. 2 was dug on a shear zone that is near vertical and trends N13E at the point of intersection. This is probably the same shear that was followed in the adit below. Figure 37 is a cross section through this 39-foot shaft. The shear zone is 1 to 3 feet thick and hematite stained in the upper 12 feet but is barren of quartz. No samples were taken.

The main shaft was sunk on a shear zone that trends N55E and dips north from 70 to 80 degrees. The workings consist of the 95-foot shaft and 162 feet of drifting and stoping on three levels. Figure 38 is a "plane of the vein" view of the shaft, and Figure 39 is a plan view of the track level.

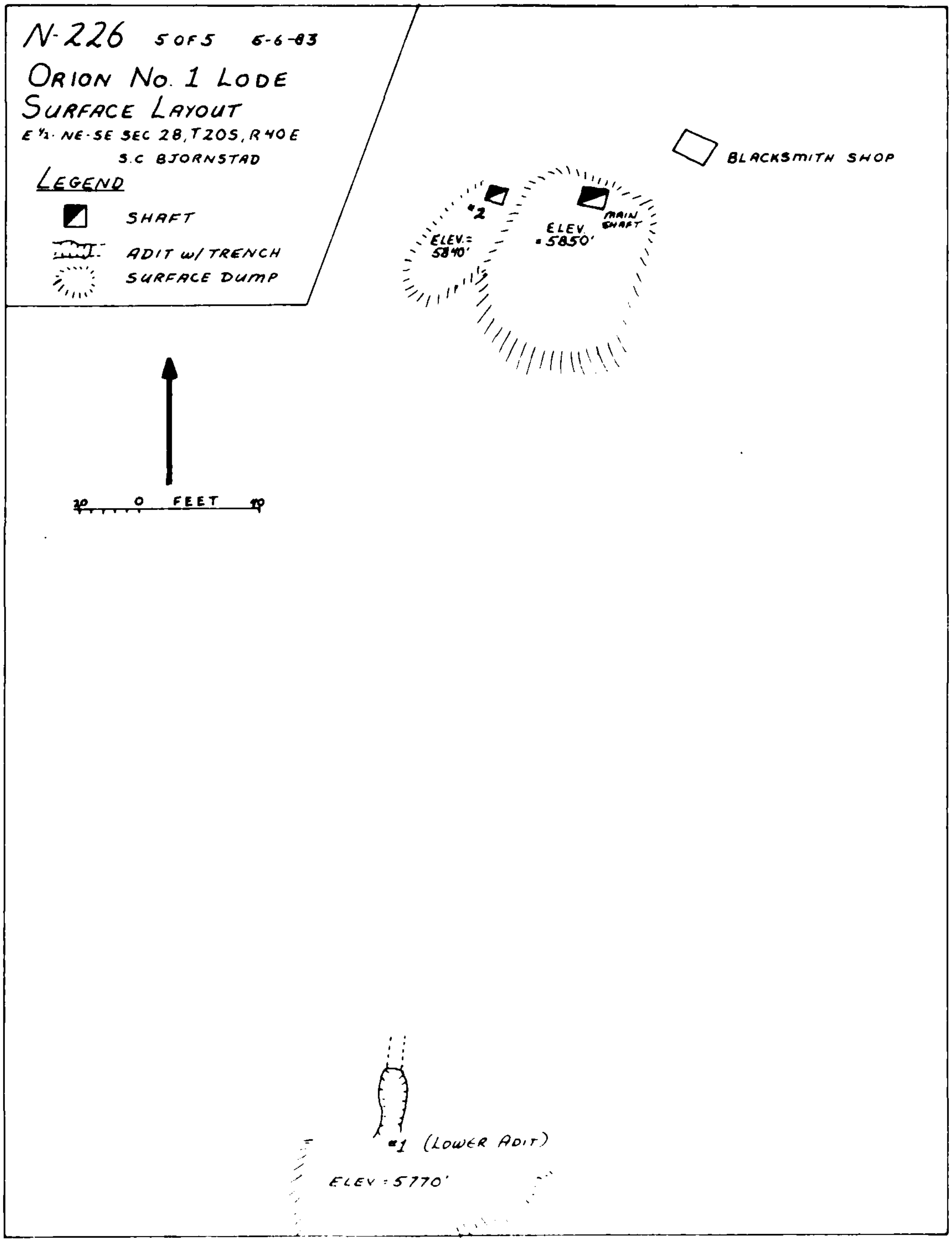

Figure 35. Surface map of Orion No. 1 Lode.

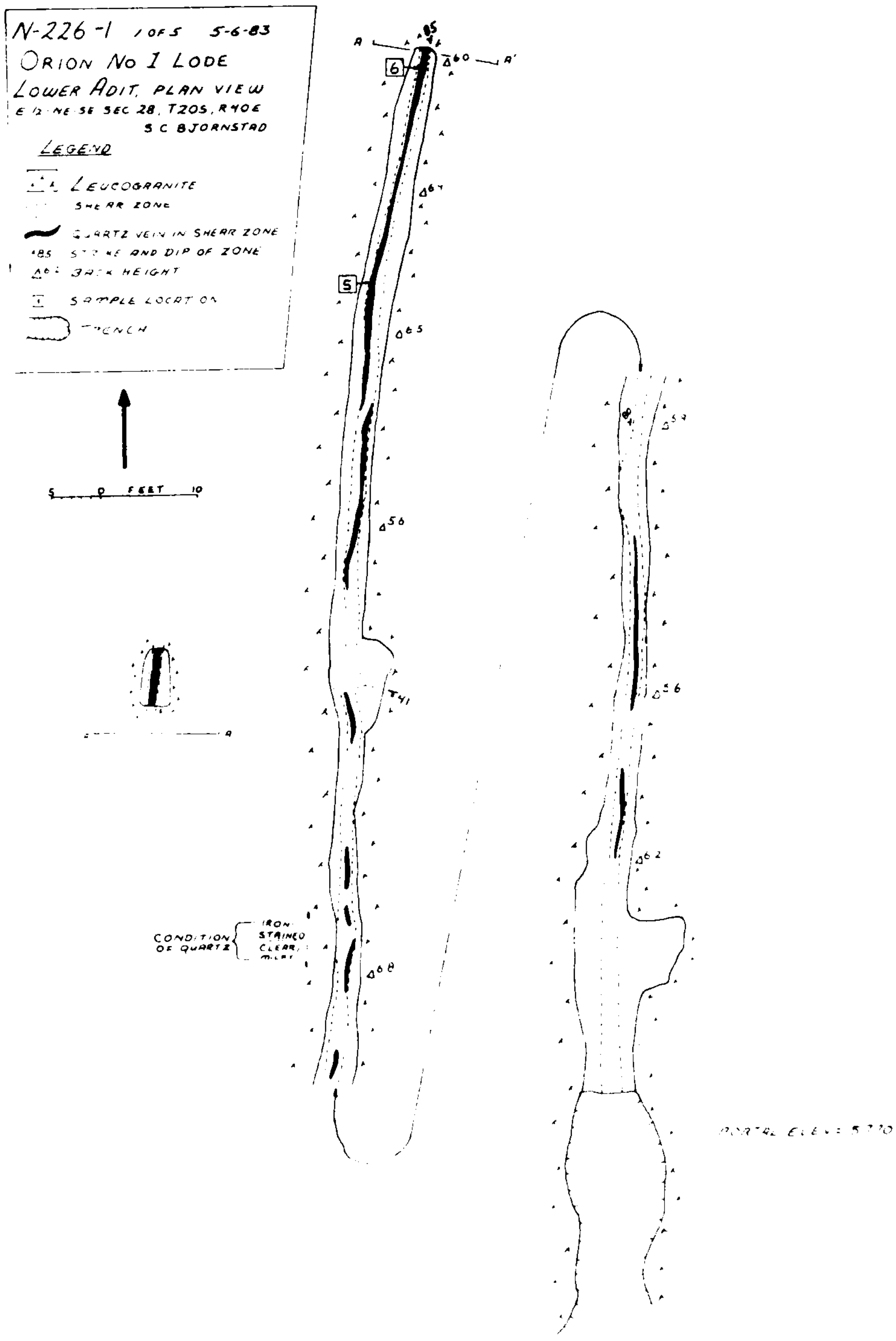

Figure 36. Plan view, adit, Orion No. 1 Lode.

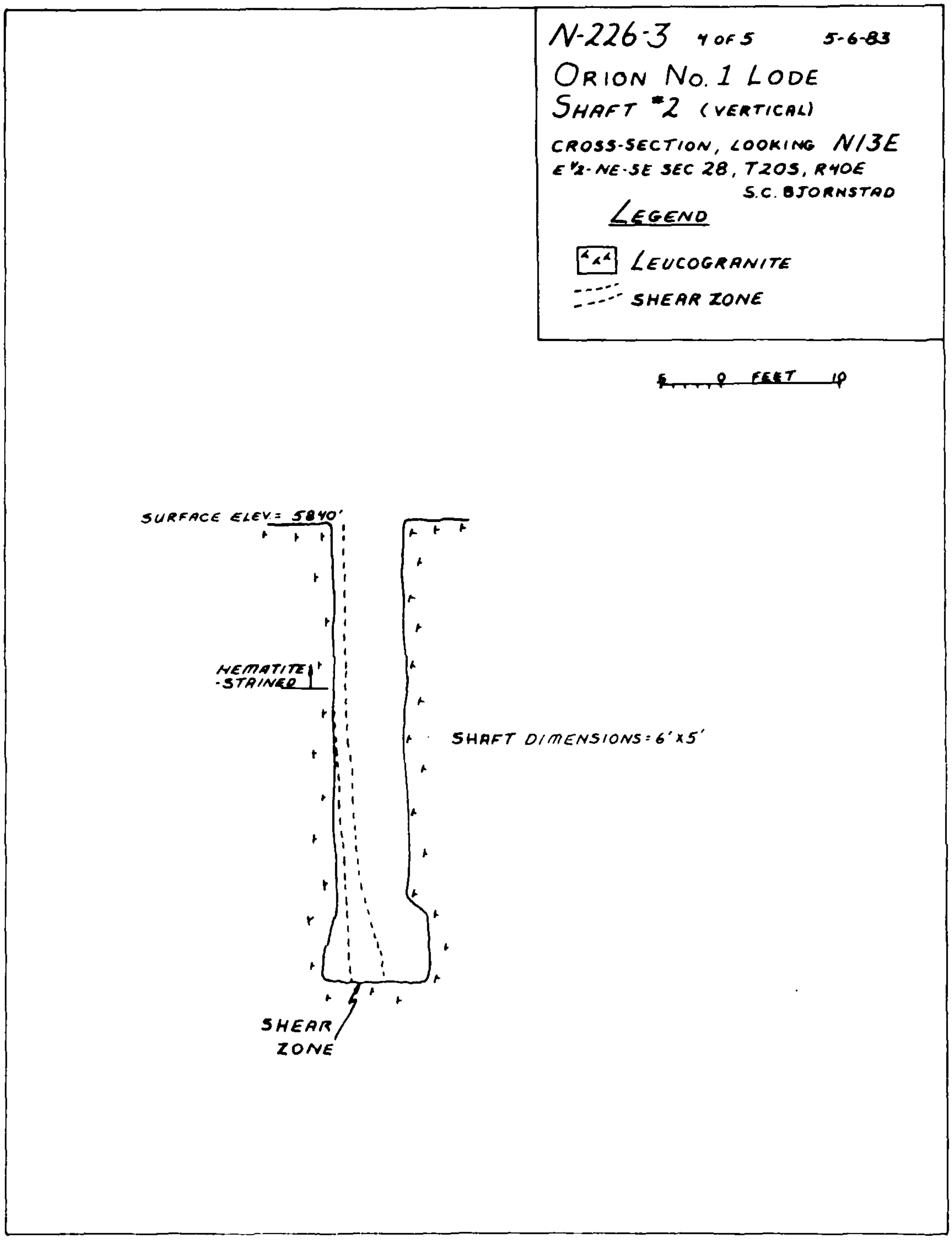

Figure 37. Cross section of shaft No. 2, Orion No. 1 Lode.

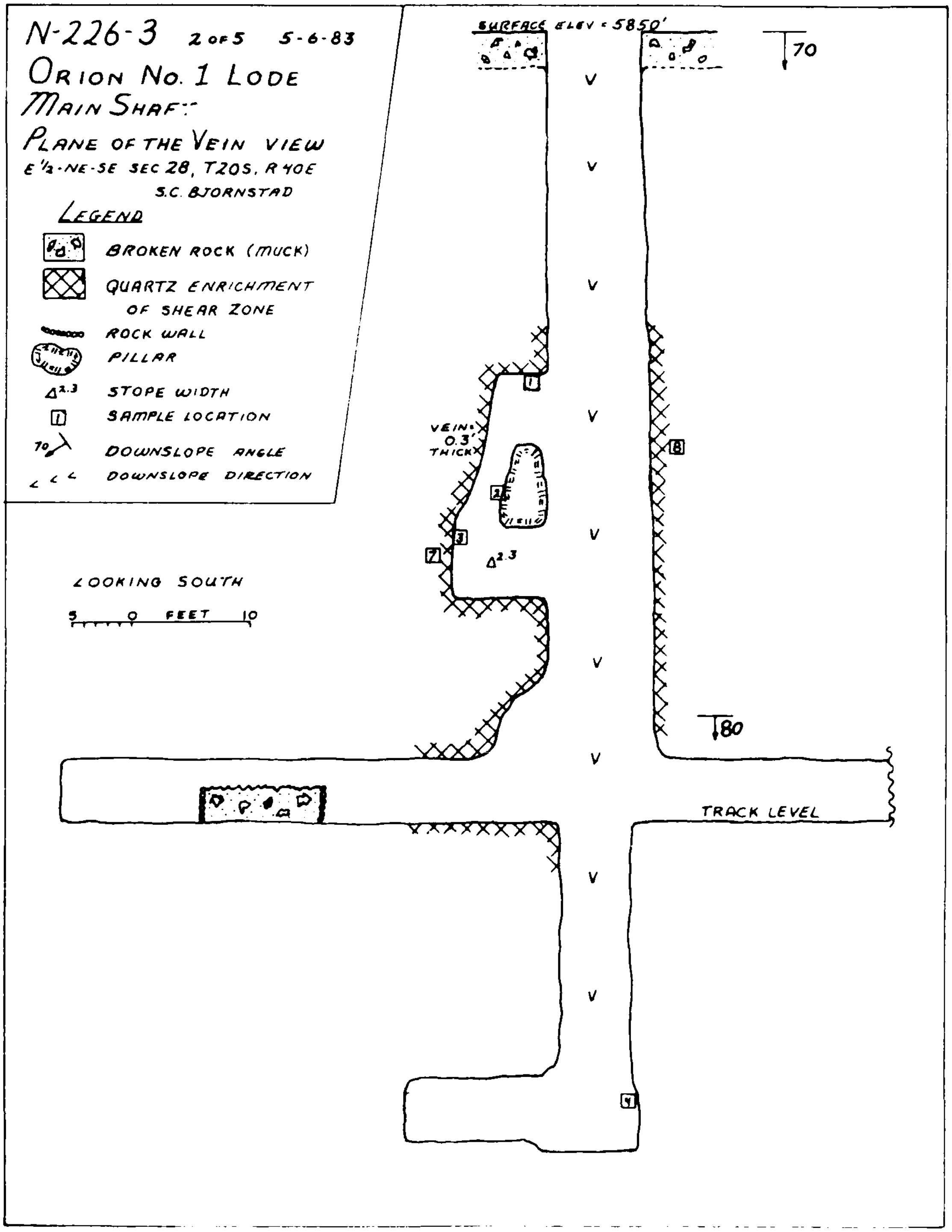

Figure 38. Plane of the vein view, main shaft, Orion No. 1 Lode.

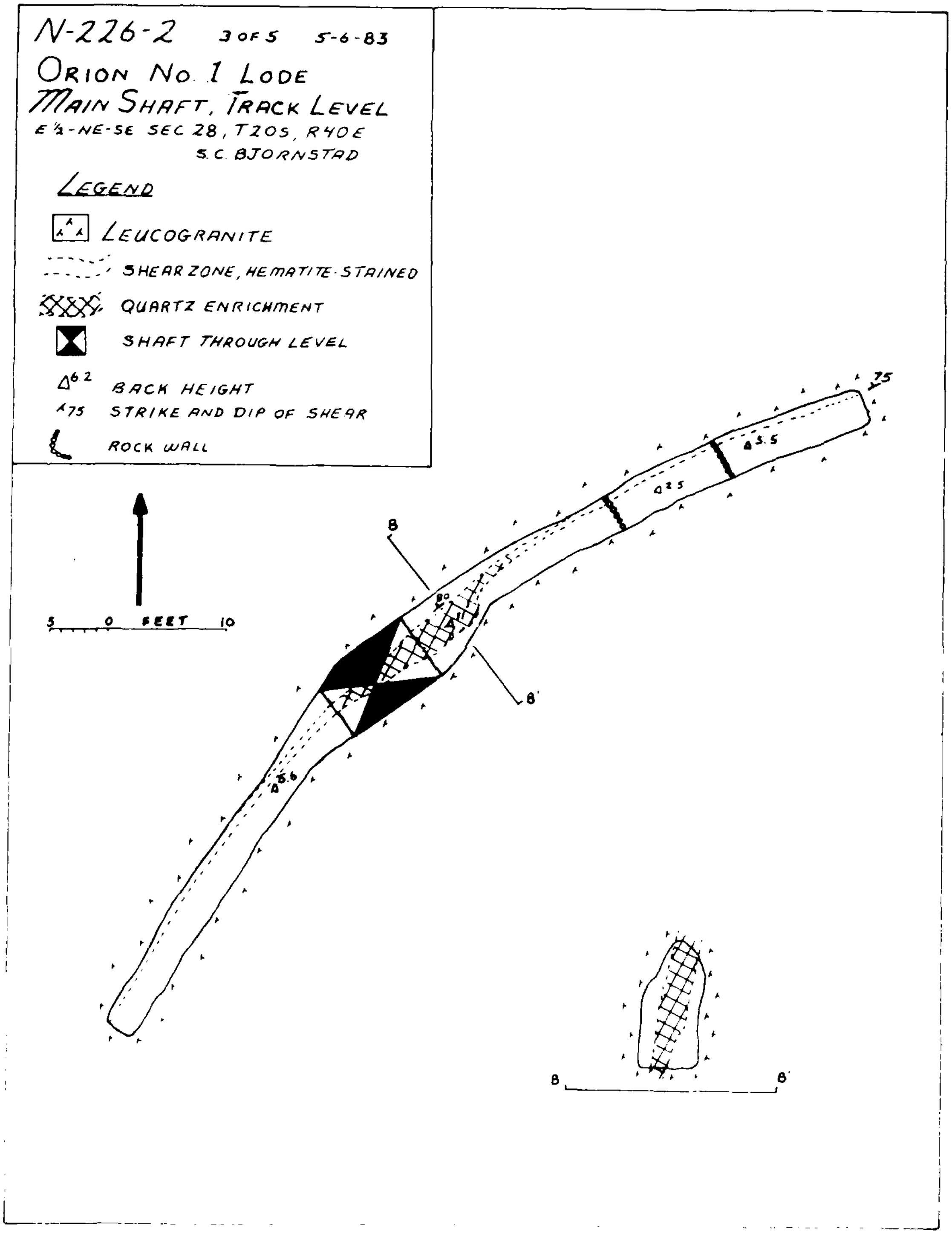

Figure 39. Plan view of track level, Orion No. 1 Lode

The shaft intersects a quartz lens about 20 feet below the surface. The lens averages about 4 inches wide and the quartz ranges from barren white massive to hematite-coated crystalline to jasperoid. On the west rib of the shaft the lens pinches out just above the rail level. On the east side it can be followed to about 5 feet below the level, where it disappears into the rib. The lens may be plunging to the east, but it appears that the miners tried to intersect it at the bottom of the shaft without success. A small spot of apparent high-grade material was stoped from an area between the surface and the track level. Approximately 10 cubic yards of rock were removed, including 1.2 cubic yards of the quartz vein. The drifts on the track level appear to have been exploratory only. They follow the shear in both east and west directions, but no other quartz was intersected.

Four samples were taken initially: (1) across the quartz vein in a small copper-stained zone at the top of the stope; (2) across the vein at a jasperoid zone in the stope; (3) across the vein at a zone of clear to lightly iron-stained quartz; and (4) in hematite-rich fault gouge material at the bottom of the shaft.

The assay results from the adit were low in precious metals and indicate low economic potential along the north-south shear zone. Precious metal assays for samples from the shaft, on the other hand, were high enough that additional samples were warranted. Sample 7 was taken from a deeper channel across the vein at sample site 3. Sample 8 was taken across the vein on the shaft rib opposite the stope. All of the shaft sample results are given in Table 7.

TABLE 7. Main Shaft Samples.

Sample	Vein width, in.	Gold		Silver		Combined metal value, $/ton	Value of rock at a 3-foot mined width, $/ton
		Troy-oz/ton	$/ton	Troy-oz/ton	$/ton		
N-226-1	3	0.69	345.00	4.34	65.10	410.10	34.18
N-226-2	4	0.28	140.00	0.87	13.05	153.05	17.01
N-226-3	4	5.31	2655.00	9.19	137.85	2792.85	310.32
N-226-4	6	Nil	...	0.02	Nil	...	...
N-226-7	4	4.20	2100.00	17.99	269.85	2369.85	263.32
N-226-8	3	0.40	200.00	0.90	13.50	213.50	17.79

In spite of the good assay results, the potential for this deposit to be any larger than a "mom and pop" operation is quite low. As noted earlier, this quartz occurrence is lensic in nature; and location of and drifting to other lenses, should they be found, would be prohibitively expensive. Also, this mine is developed on a fairly isolated occurrence and the surrounding area appears quite barren.

Daisy No. 1 (Golden Princess) (N-229)

The Daisy No. 1 (Golden Princess) site is located about 1 mile north of Old Coso in the SE1/4, SE1/4, SE1/4 of Sec. 17, T20S, R40E, MDB&M, as seen in Figure 6. According to location notices found in place, this site was first staked as the Daisy 1 on 14 June 1933; locators unknown. On 1 July 1936 it was overstaked by Louis D. Owen as the Golden Princess. Mr. Owen also controlled several other properties in the area during this period, including the Josephine (N-208) and the Yucca (N-262).

The workings consist of a 25-foot-deep, inclined shaft intersecting a 92-foot-long tunnel. A plan view of the tunnel can be seen in Figure 40. In addition, several small prospect pits dot the surface near the shaft collar.

The major workings were developed on a narrow aplite dike that had intruded a granodiorite body of Mesozoic age. The dike trends northeasterly and dips south at about 30 degrees. Quartz-sericitic alteration of the granodiorite occurs on both sides of the dike, more strongly on the hanging wall than on the footwall (1.2 feet versus 4 inches at the tunnel). Sample N-229-2 was taken from this alteration zone, although no other mineralization could be seen. Several narrow, barren quartz veins occur in the tunnel, one of which was sampled as well (N-229-1).

The surface pits were dug on several narrow quartz veins in a 35-foot-wide aplite. The quartz contains sparse disseminated pyrite and is fractured with hematite and limonite staining. A composite sample (N-229-3) taken from the pit stockpiles assayed 0.086 troy-oz/ton gold, while the other two samples were barren. The complete analyses are listed in Appendix A.

The potential here for an economic deposit is nil. The main workings fall into the "puzzler" category because you have to ask yourself "why was this work done?" If the alteration zone was mineralized

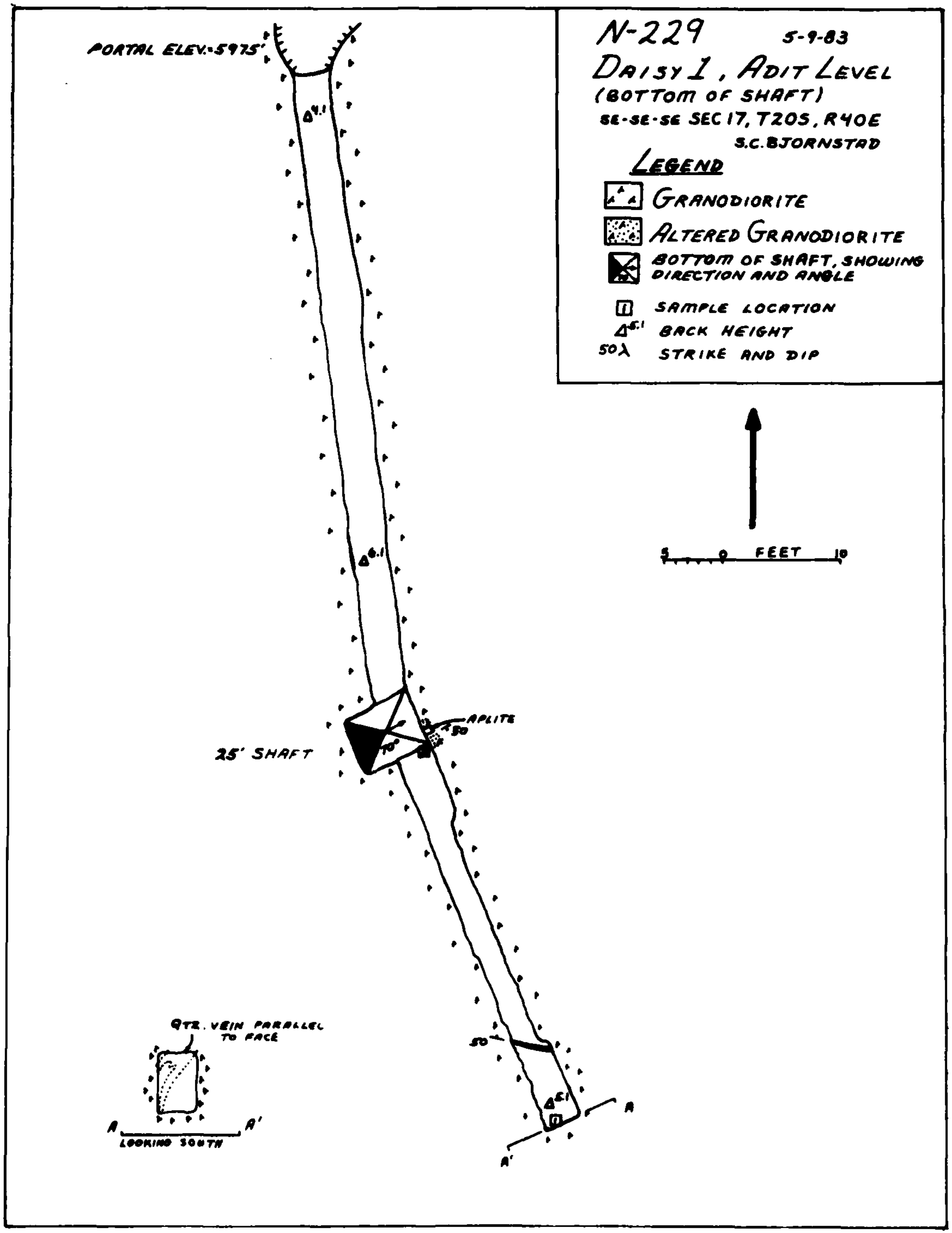

Figure 40. Plan view, Daisy No. 1 (Golden Princess).

at the surface, all evidence of it is long gone. The potential is slightly greater for the area by the surface pits because of the mineralogy of the veins but the occurrence is too limited to be of interest to anyone not driven by a hunch or blind hope.

Moonbeam Mine (N-230)

The Moonbeam mine is located about 1 mile north of Old Coso and is adjacent to the Daisy No. 1 property (N-229). The cadastral location is given as the SE1/4, SW1/4, SE1/4 of Sec. 17, T20S, R40E, MDB&M, as seen in Figure 6.

The workings at this property are in two groups. The first working consists of a shaft (with a motorized hoist) located in an east-west trending trench. The trench is 90 feet long, 9 feet wide, and 4 feet deep. The shaft, which is caved, is estimated to be 75 feet deep. The second group of workings is 500 feet to the east and contains a second shaft (also caved) and three large, shallow pits. This shaft is estimated to have 120 feet of workings.

All of the work was done on a 1.5-foot-wide quartz vein that developed on the contact of a granitic dike and a Mesozoic granodiorite pluton and trends N75W and dips north from 60 to 75 degrees. The vein consists of crystalline quartz with sparse massive and euhedral pyrite, massive chalcopyrite, and hematite as a fracture coating and as quartz coloration. In oxidized samples (from outcrops and dump stockpiles) the sulfides have been altered to limonite (both pseudomorphic and boxwork structures), chrysocolla, and massive hematite.

Since the shafts were caved shut and the best-looking ("high-grade") vein material was in the dumps and not in the outcrops in the trench, two samples were taken from the shaft stockpiles. Sample N-230-1 was taken from the first shaft and sample N-230-2 was taken from the second. The assay results are given in Appendix A.

Assessment of the economic potential of this site is difficult because there is no access to the vein underground. Thus, not much can be determined regarding possible down-dip potential except by extrapolating from the outcrops. The sample analyses show that gold does exist here, although a much better sampling technique would be necessary to establish the true grade. The vein is wider and can be traced further (several hundred feet in outcrop) than almost any other in this area, but these dimensions do not take it out of the small resource category. Substantial subsurface exploration (diamond drilling, sampling) would be needed to prove the deposit, but the cost effectiveness of such a program at this site is questionable.

Old Blue Bird (N-231)

The Old Blue Bird includes a large set of workings located about 1 mile south of Indian Gardens Spring in the SE1/4, NE1/4, SE1/4 of Sec. 16, T20S, R40E, MDB&M, as seen in Figure 6. The geologic setting is one of shear zones and small aplite dikes cutting a Mesozoic biotite quartz diorite pluton. The pluton is weathered (primarily by physical decomposition) to a depth of several feet, and the shear zones show intense oxidation where iron minerals are present.

The workings consist of three adits, one caved shaft, and several small prospect pits. There are also a wood frame blacksmith shop and a small primary crusher on site. Figure 41 is a surface map of the Old Blue Bird prospect.

A plan view of the undergound working at the first adit is given in Figure 42. This tunnel is 116 feet long and was driven in barren quartz diorite until it intersected a large quartz vein. The vein was then followed for about 60 feet. It trends N41W, dips northeast from 32 to 40 degrees, and is up to 4.5 feet thick. It is made up of brecciated white to clear quartz with moderate-to-abundant hematite cement and staining. Samples 1 and 2 were taken as channel cuts across the vein.

The second adit is shown in Figure 43. It was driven for 384 feet in barren, faulted quartz diorite. A 10-foot-deep winze was sunk in the middle of the drift, 135 feet in from the portal, also without intersecting any mineralization. It is possible that all this work was done because the miner was searching for the down-dip extension of a large quartz vein with copper and hematite staining that outcrops about 30 feet northeast of the portal. No samples were taken here.

The third adit is 20 feet long and is located adjacent to the blacksmith shop. It, too, was driven in barren rock, but it may have been made strictly for storage.

The shaft was dug on a quartz vein that developed in a shear zone contact between the quartz diorite and a 1- to 2-foot-thick granitic dike. The dike is primarily aplitic but shows a pegmatitic texture in places. The shear zone is about 4.5 feet wide, trends N70W, and dips 80 degrees north. The quartz vein occupies some or all of the shear

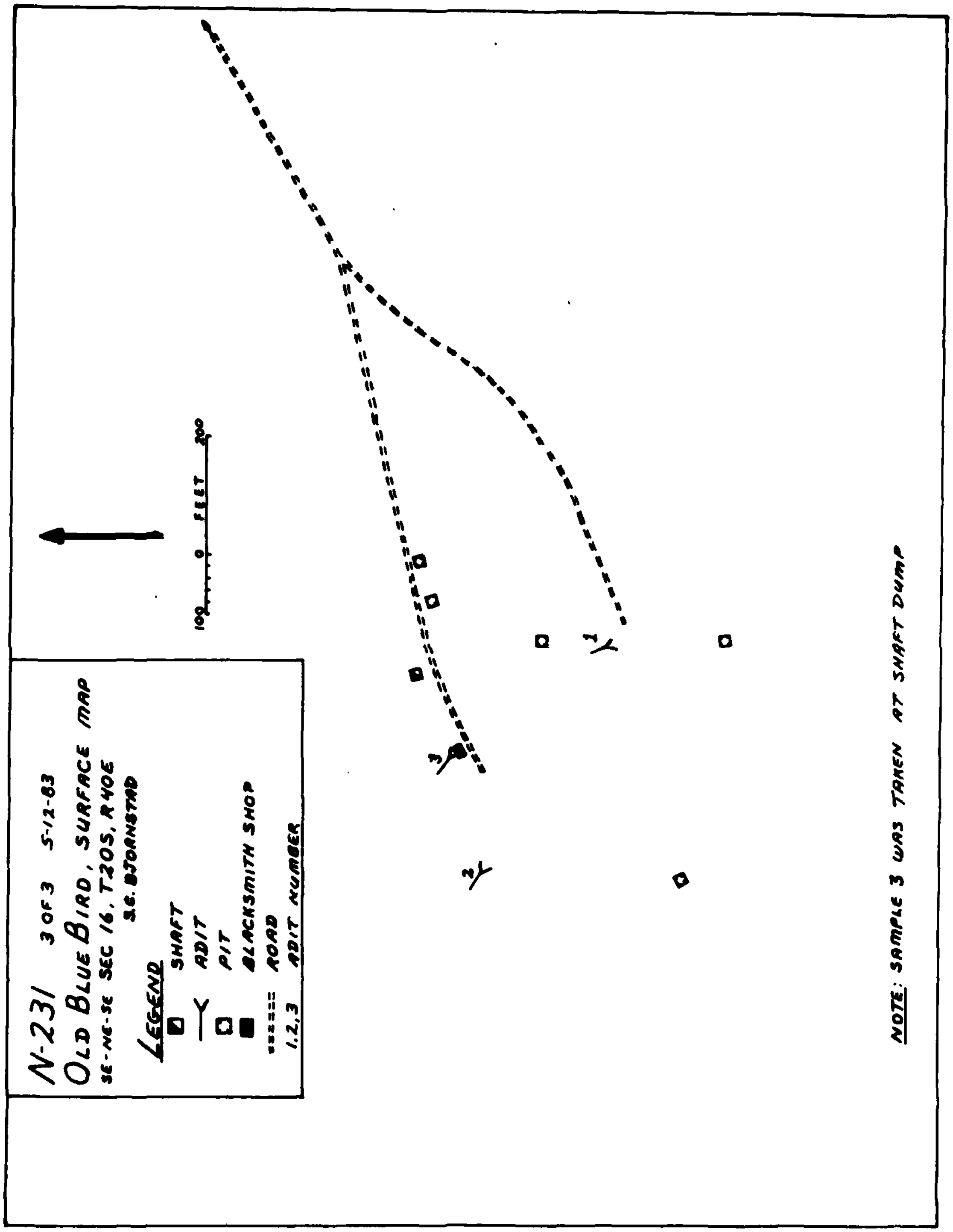

Figure 41. Surface map of Old Blue Bird prospect.

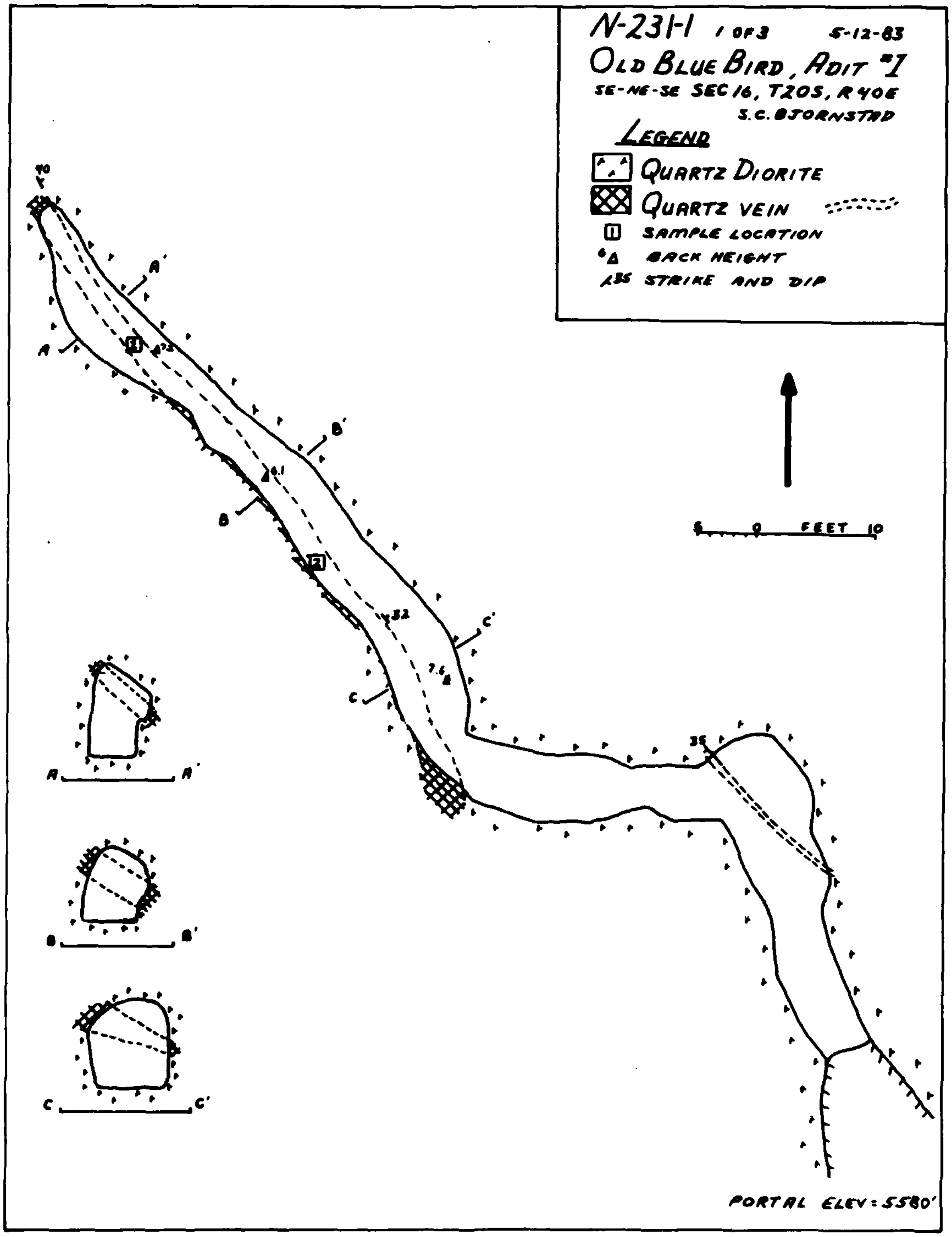

Figure 42. Plan view, adit 1, Old Blue Bird prospect.

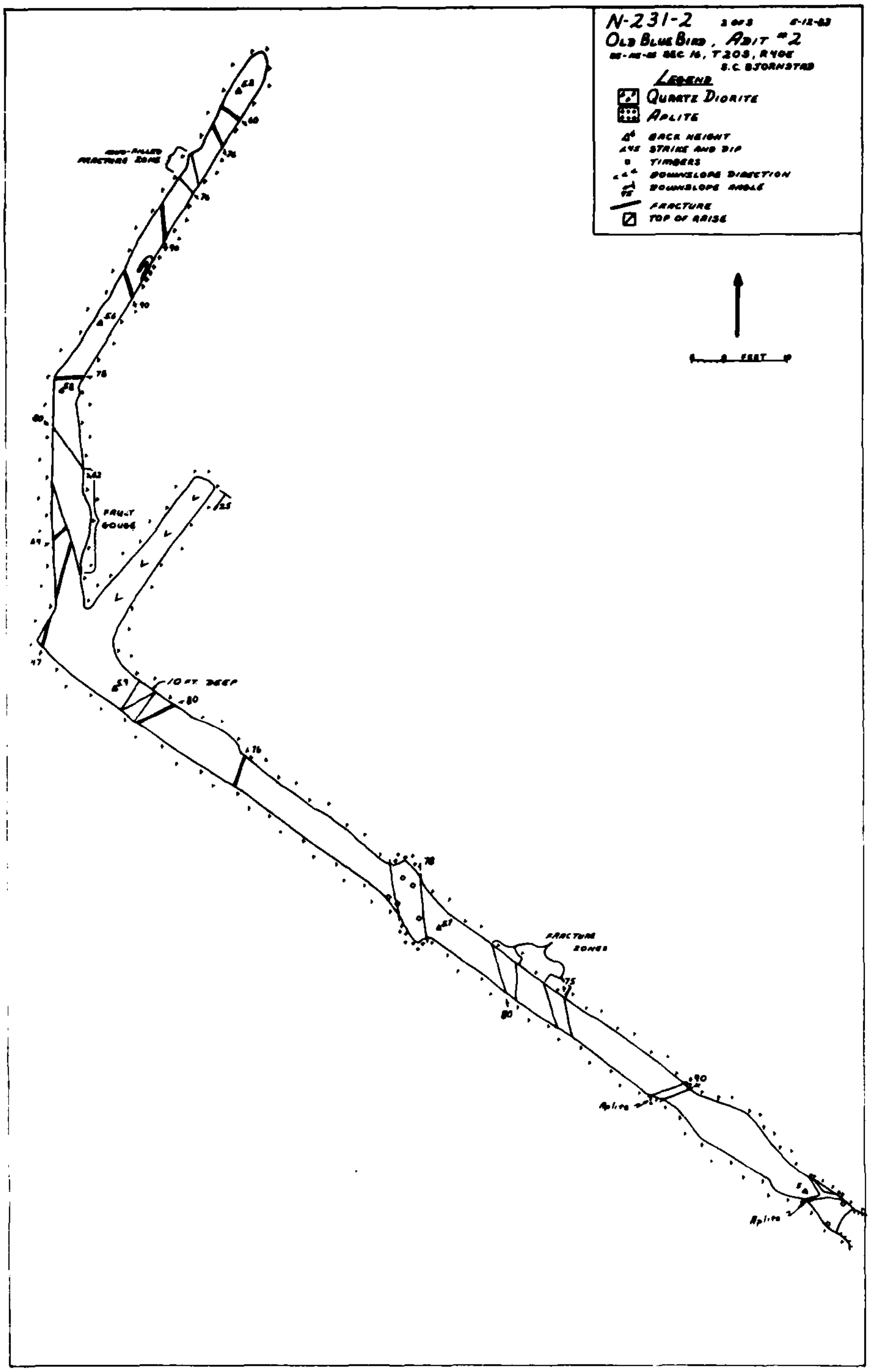

Figure 43. Plan view, adit 2, Old Blue Bird prospect.

zone, varying in width from 1 foot to 4.5 feet. Some vein outcrops in the area show copper staining, but this one has no copper and only sparse hematite as fracture coating in the outcrop. Very sparse copper staining (as chrysocolla) is present in the dump material and may be present at depth. The shaft is estimated to have been 50 feet deep. Sample 3 was taken here as a "high-grade" dump grab sample.

Several small surface scratches dot the area. Some exposed quartz veins while others found only decomposed quartz diorite. They range in size from 5 to 70 cubic yards.

A great deal of work was done at the site—apparently for no gain. The samples showed no precious metal values. There is no economic potential at this site.

Complete analytical results are given in Appendix A.

Unnamed Shaft (N-237)

This shaft is located across the road from the Mariposa Mine (N-201) about 0.8 mile northwest of Old Coso in the NW1/4, SE1/4, NE1/4 of Sec. 20, T20S, R40E, MDB&M, as shown in Figure 6. The shaft was sunk in Mesozoic quartz diorite to an estimated depth of 20 feet (shaft is caved shut). The quartz vein material on the dump consists of clear to milky quartz with very sparse massive pyrite and chalcopyrite with very sparse hematite and chrysocolla stain.

A single sample was collected of the dump material, and the results are listed in Appendix A. The results, together with the apparent limited extent of the prospecting work, indicate that no potential exists at this site.

Unnamed Prospect (N-239)

Prospect N-239 is situated near the Mariposa mine, 0.8 mile north of Old Coso in the SE1/4, NE1/4, NE1/4 of Sec. 20, T20S, R40E, MDB&M, as seen in Figure 6.

The workings consist of a 73-foot vertical shaft with a drift at the bottom heading off in a southerly direction for 31 feet. At the end of the drift is a veinlet of quartz with specular hematite on which the prospector drove a 38-degree raise 15 feet long. Figure 44 is a plan view of the underground workings.

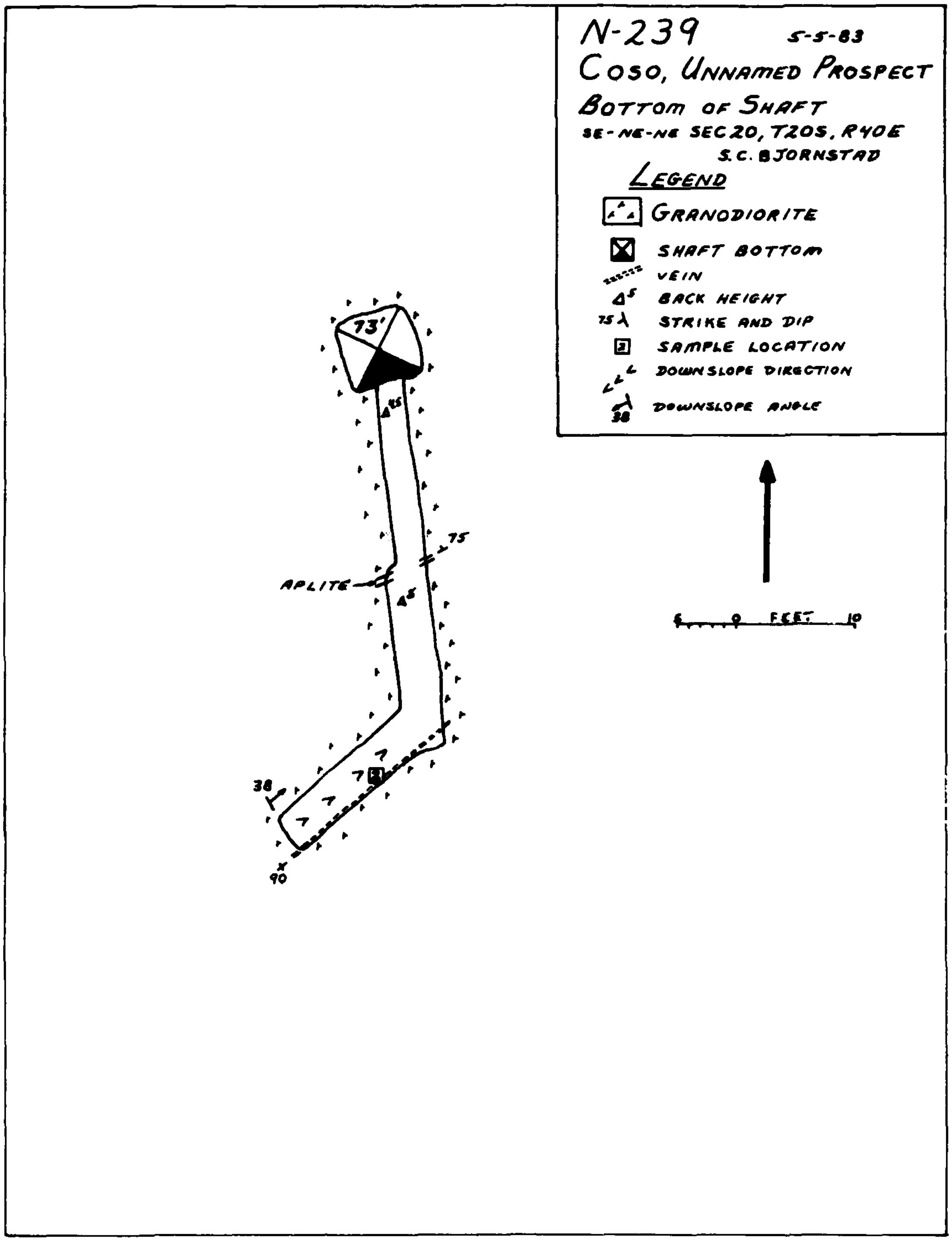

Figure 44. Plan view of drift at N-239.

The host rock is Mesozoic granodiorite that was competent at the drift level, but the first 20 feet of the shaft were cribbed to hold back the decomposed surface layer. Absolutely no other quartz or vein material or shear zone material was found underground, although a nice "stockpile" of brecciated quartz with hematite cement and disseminated euhedral to subhedral pyrite crystals and limonite pseudomorphs is adjacent to the shaft collar. The size of the chunks of quartz indicate that they came from a vein at least 4 inches wide.

Two samples were taken: (1) from the stockpile at the collar and (2) from the veinlet in the raise below. Complete analytical results are given in Appendix A.

This site is a clear-cut example of "salting" a claim with a foreign material, whether by design or accident, with the result that there is an increase in its *apparent* worth to modern samplers. Sample 2 assayed at 0.010 troy-oz/ton of gold or $5/ton; sample 1—the foreign-appearing quartz—assayed at 0.660 troy-oz/ton of gold or $330/ton.

Unnamed Prospect (N-241)

This prospect is on a hill to the west of and overlooks the Mariposa Mine about 1.1 miles northwest of Old Coso in the SE1/4, SW1/4, NW1/4 of Sec. 20, T20S, R40E, MDB&M, as shown by Figure 6. The workings consist of a single adit 86 feet long, with a 10-foot-long crosscut drift near the end. Figure 45 is a plan view of the underground workings.

The miner intersected a 1.5-foot-wide quartz vein at 37 feet. It trends east-west, dips south at 80 degrees, and is barren except for a sparse sprinkling of specular hematite. The host rock is a quartz diorite of Mesozoic age.

The potential here is practically nil. There are no other vein outcrops or alteration zones in the area, and analysis of the single sample taken from the vein underground showed no gold values. Appendix A lists the analytical results.

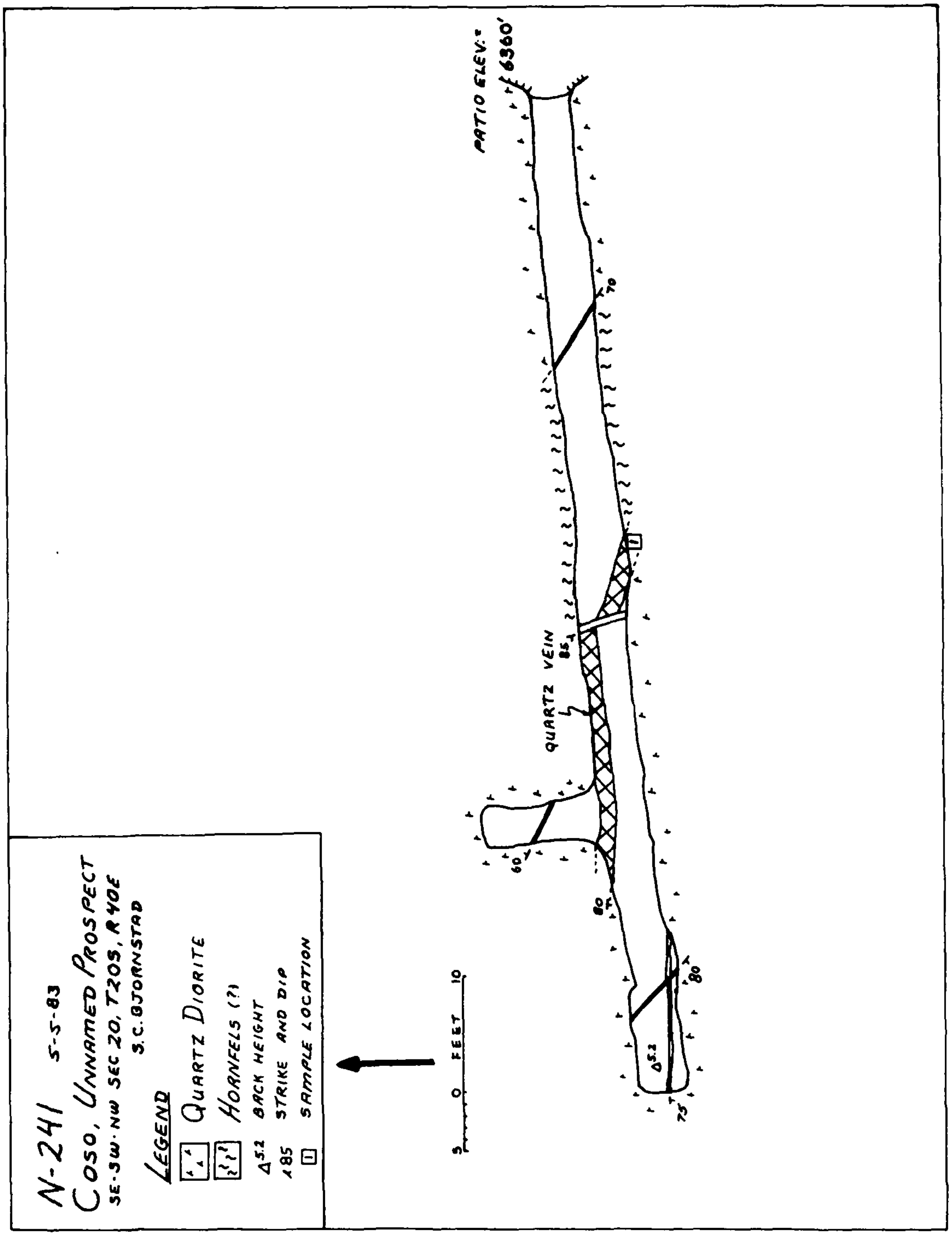

Figure 45. Plan view of adit at N-241.

Donna Bell (N-242)

The Donna Bell prospect is located about 1/2 mile west of Old Coso in the SW1/4, SE1/4, SE1/4, of Sec. 20, T20S, R40E, MDB&M, as seen in Figure 6. A location notice found on-site states that the claim was staked on 1 November 1936 by Mr. Steve Emptage. The notice further states that the Donna Bell was bounded on the south by the Eastern Prince quartz claim and overlaps the Coso Fine Gold quartz claim. No prospect work was evident at these two sites, however.

The workings consist of a trench 27 feet long and up to 4 feet deep, trending north-northeast along a 1.5-foot-wide, quartz-enriched shear zone. Near the center of the trench, a small decline was driven, bearing N70W and inclined at 60 degrees northwest to follow the shear zone down-dip. It is now caved shut.

The shear zone is made up mostly of hematite stained country rock (Mesozoic granodiorite), but there are also stringers of quartz in the zone. A combined width of quartz veins probably was never more than 3 or 4 inches (there is very little quartz in place in the trench today, so it is difficult to say for certain).

The quartz in the trench wall is barren and fractured with sparse hematite coating. Much of the stockpiled quartz (from the decline?) is the same, but about 25% of it also shows sparse limonite, both as pseudomorphs after pyrite and as veinlets. Because the purpose of the survey was to evaluate the maximum potential of each site, the stockpiled quartz was sampled because it looked better than that in the trench.

The analytical results (listed in Appendix A) confirmed that the sample taken was "high-grade" (4.1 troy-oz/ton of gold or $2050/ton of rock). The results are suspiciously high for this site. There are numerous probable reasons for this anomaly. For example:

1. The prospector and his family (artifacts at the site indicate they all lived here) left the area and were unable to return and remove the stockpile, which may in fact have originated at another prospect and was only being stored here—not an uncommon practice with small operators.

2. The sampler managed to pick up the one piece of rock with a flake of gold in it, resulting in an "erratic high" assay, as discussed in the procedures section.

3. The claim was of poor quality, so the stockpile was deliberately "salted" at some time in the past to increase the apparent value.

Given the physical characteristics of the mineralized zone and the foreign appearance of the "high-grade" stockpile material, the conclusion is that the pile was salted, whether by accident or design.

Unnamed Prospect (N-243)

Located in the SE1/4, NE1/4, NW1/4 of Sec. 29, T20S, R40E, MDB&M, as seen in Figure 6, this prospect can be found about 1 mile southwest of Old Coso.

There is not much to say about this prospect. A fair amount of work was done here, but the economic potential is next to zero.

Two shafts were dug in Mesozoic granite. Both are caved, but the estimated extent of the workings is 110 feet and 30 feet. Around the collar of the larger shaft, veinlets of quartz occur in a stockwork fashion as fracture-fillings and as replacement veins in the granite. Very sparse copper staining (chrysocolla) is present in the quartz.

A sample was taken of this vein material. Results of the analysis are given in Appendix A. They show no economic mineralization and give no indication that any potential grade exists down-dip.

Red Valley (N-244)

The Red Valley placer claim is located about 1 mile southwest of Old Coso in the NE1/4, SW1/4, NW1/4 of Sec. 29, T20S, R40E, MDB&M, as shown in Figure 6. According to the notice found on site, the claim was located on 12 April 1936 by Ralph Vittum and encompassed 20 acres of land.

The claim is located on a small wash less than 5 feet wide, with stream sediments less than 1 foot deep. The wash is cut in Mesozoic granite. If any work had been performed at this site, evidence of it no longer exists.

The potential for even a small placer operation at this site is virtually nonexistent. The wash is very small, with shallow alluvial gravels. Because the stream gradient is shallow over the length of the claim compared with the areas above and below the claim, any gold that may have been eroded out of the rocks upstream could be captured here. However, the hills upstream are notable for the absence of exposed mineralization that could have been a source (as evidenced by the lack of old prospects and surface alteration zones up stream).

Unnamed Prospect (N-245)

This prospect is on the northeast side of a hill overlooking the north end of Coles Flat in the SW1/4, NW1/4, NW1/4 of Sec. 35, T20S, R40E, MDB&M, as shown in Figure 6. The hill is composed primarily of Mesozoic granodiorite but it is capped by a roof pendant of pre-Cretaceous metavolcanics. The prospect overlaps the contact of these two rock types.

A small prospect pit was dug on a malachite-stained fracture in the metavolcanics. The fracture is small and its trace cannot be followed for more than a few feet. Forty feet down slope a shaft (now caved) was sunk on a 4-inch-wide quartz vein in granodiorite. The shaft is estimated to be a maximum of 65 feet deep. The quartz vein is broken and appears barren except for some sparse hematite fracture coating. A single sample was taken of the sparse vein material laying on the dump.

Analysis of the sample, given in Appendix A, indicates that no mineralization of economic importance exists at this isolated outcrop.

Mary Jo (N-246)

The Mary Jo claim was located in 1940 on the northeast corner of Coles Flat in the SE1/4, SW1/4, NW1/4 of Sec. 35, T20S, R40E, MDB&M, as seen in Figure 6.

The prospector dug a pit 8 feet across and 5 feet deep on a quartz vein that developed along the contact of a Mesozoic granodiorite pluton and pre-Cretaceous shale. The vein is less than 4 inches thick, trends N69E, and dips north at 65 degrees. The quartz is fractured and a sparse hematite layer coats the fractures.

A single sample was taken of the vein material. The analytical results are listed in Appendix A and confirm the observation that no economic potential exists at or near this site.

Unnamed Prospect (N-247)

This site is located near the Old Coso-Coles Spring Road, about 0.9 mile south-southwest of Old Coso. Its cadastral location is given as the SW1/4, NW1/4, SW1/4 of Sec. 28, T20S, R40E, MDB&M, as shown in Figure 6.

The northern section of the Coso Range (of which this is part) is dominated by Mesozoic plutons and hypabyssal intrusives of intermediate composition that are capped, in many places, by pre-Cretaceous sediments, volcanics, and the metamorphic equivalents of these. At this site, limestone was metamorphosed to marble by the intrusion of granite, which at the surface lies on top of the marble and may be an apophysis of a larger pluton below. It could also be a fault block that was pushed over the marble, but there is a small garnet tactite occurrence on this contact several hundred feet to the west that would indicate a heated intrusive contact rather than a simple fault emplacement.

The prospect consists of a small pit on the surface and a long adit underground. The pit is 9 feet long, 6 feet wide, and 4 feet deep. It was dug on a 4.5-foot-wide fault zone that cuts the granite, trending N20W and near vertical in the pit. The fault zone is highly mineralized with malachite and aurichalcite and looks like the oxidation zone that develops on the outcrop of a base-metal hydrothermal vein. A single sample was taken of the mineralized zone, the complete analytical results being listed in Appendix A. Some assay results and dollar values of the contained commodities are given in Table 8.

TABLE 8. Analytical Results From Sample N-247-1.

Commodity	Assay	Value, \$/ton
Gold	0.010 troy-oz/ton	5.00
Silver	9.33 troy-oz/ton	139.55
Copper	29.5%	442.50
Zinc	0.211%	4.58
Total value/ton =		591.63

The adit was dug in marble about 110 feet downhill of the pit and was probably driven to intersect the fault zone. The adit (Figure 46) is 129 feet long and intersects the fault zone about 40 to 45 feet beneath the pit. Except for thin encrustations of secondary copper minerals, the fault zone is virtually barren in the marble.

When assessing the potential of any of the occurrences discussed in this report, one has to take the size of the visible deposit (as determined from surface and subsurface exposures) and, within the framework of the regional geology and its mineral potential, see if it could conceivably be extrapolated to the minimum size necessary to support a large-scale operation. This occurrence does not survive the

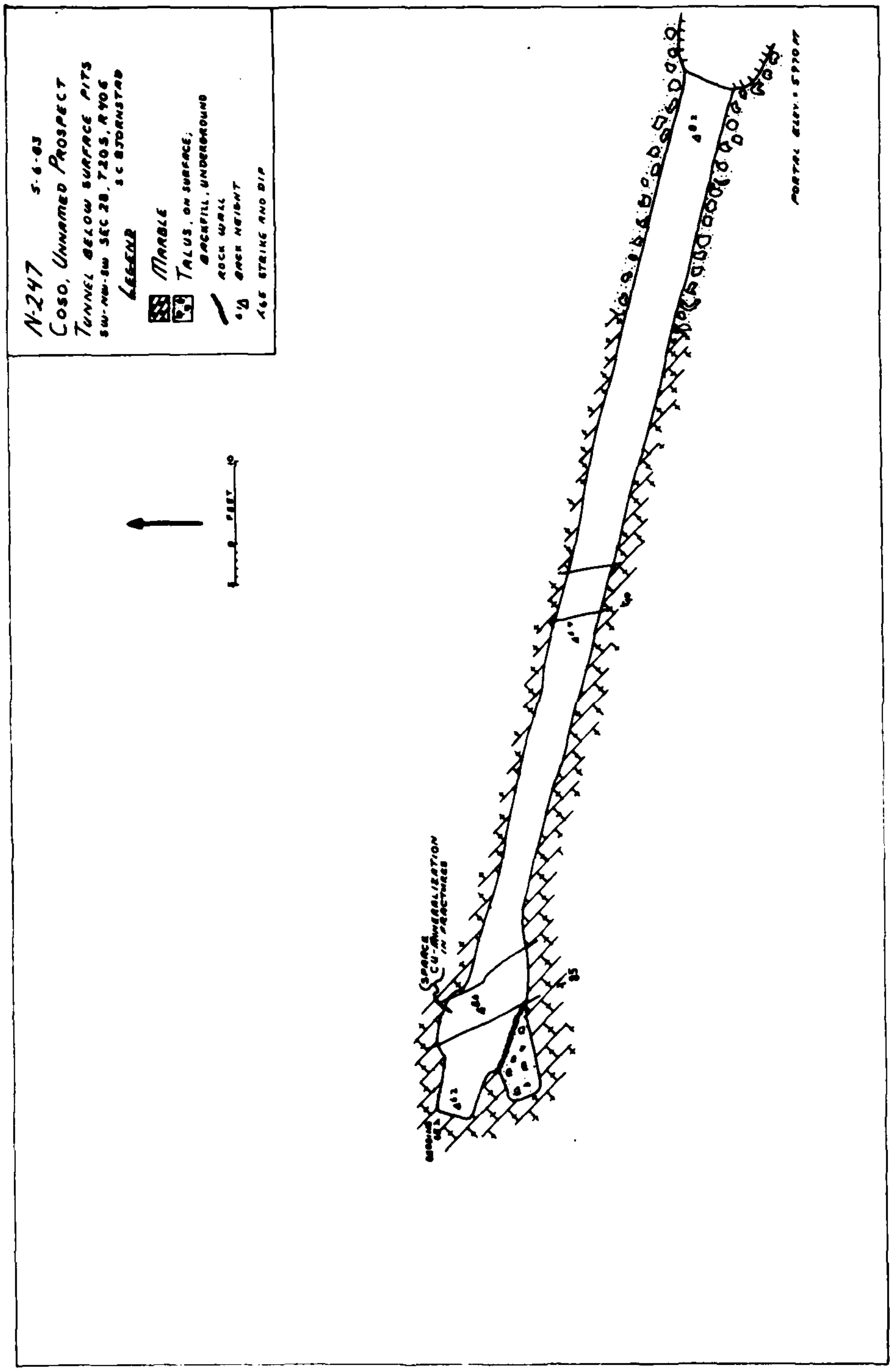

Figure 46. Plan view of adit at N-247.

extrapolation process. Its surface exposure is very limited and a down-dip extension apparently does not exist in the marble, although there is a possibility that the fracture system continues down through the metasediments and into the basement granitics. Granitic rocks appear to be better hosts at this site, and the mineral occurrence may pick up again below the marble. A geophysical survey combined with core drilling would be needed to explore the underside of this marble horizon.

Unnamed Prospect (N-248)

This prospect is located in the northeast corner of Coles Flat about 2.1 miles southeast of Old Coso in the SE1/4, SE1/4, SE1/4 of Sec. 27 and the NE1/4, NE1/4, NE1/4 of Sec. 34, T20S, R40E, MDB&M, as seen in Figure 6.

The workings consist of three short adits (all caved) with estimated lengths of less than 20 feet, and a trench 10 feet long and 3 feet deep, all of which were dug on a set of narrow quartz veins. The veins occur in a Mesozoic leucogranite and are composed predominately of barren white quartz although a very light hematite/copper stain can be seen on some of the quartz at the trench. A single composite sample was taken of the vein material, the assay results being listed in Appendix A.

This occurrence is isolated and has a limited surface exposure, which, when coupled with the poor assay results, indicates no potential.

Sue Bird (N-249)

According to location notices found on site, the Sue Bird quartz claim was staked in 1914. It was overstaked in 1931 as the Pearl B. quartz claim. The claim can be found in the northwest corner of Coles Flat in the NE1/4, NW1/4, NE1/4 of Sec. 33, T20S, R40E, MDB&M, as shown on Figure 6.

The workings consist of two trenches dug end-to-end along a shear zone trending N85W in pre-Cretaceous metavolcanics. The trenches exposed 20 feet of the shear zone 4 feet deep. Within the shear is a vein up to 1 foot wide composed of quartz with sparse to moderate specular hematite, cuprite, and chrysocolla. A sample of this material was taken for analysis, the results of which showed that no gold was indicated at this site (Appendix A).

Unnamed Prospect (N-250)

This prospect is situated 0.4 mile northeast of Old Coso Village and placed in the NE1/4, NW1/4, SE1/4, Sec. 21, T20S, R40E, MDB&M, as shown on Figure 6.

The area host rock is dark gray medium-grained biotite-rich quartz diorite that outcrops only in scattered localities through a 2- to 3-foot blanket of slope wash. One west-northwest striking limonitized aplite dike is situated to the north of the largest cluster of workings and forms the locus for minor mineralization and pit exploration.

The workings, which are shown in plan view by Figure 47, are described from north to south. Three prospect pits were driven in orange-colored limonitized aplite. The pits are each 5 by 5 feet and filled with slope wash to within 2 feet of the surface. The middle pit had a small visible outcrop of aplite on its north wall and the single sample for this prospect, labeled N-250, was chipped from the outcrop. The remainder of the workings include a 27-foot adit, three prospect pits, and the southern-most working, a 16-1/2-foot-deep vertical shaft. These workings encountered nothing but biotite quartz diorite.

A complete list of assay results is shown in Table A-1. The assay results show no commercial values for precious metals or other commodities. It is assumed that precious metals were sought at this location but no mineralization was identified.

Three Star No. III Prospect (N-251)

This prospect is located 0.9 mile northeast of Old Coso Village and the workings are situated on a north-facing ridge approximately 100 vertical feet above the wash that contains a portion of the Darwin access road. Figure 6 is a location map showing this site, which is placed in the SW1/4, SW1/4, NW1/4, Sec. 22, T20S, R40E, MDB&M.

The host rock in the area is Mesozoic biotite granite that contains 1/2 to 3/4 inch pink potassium feldspar phenocrysts. The rock is slightly altered as evidenced by clay and minor sericite.

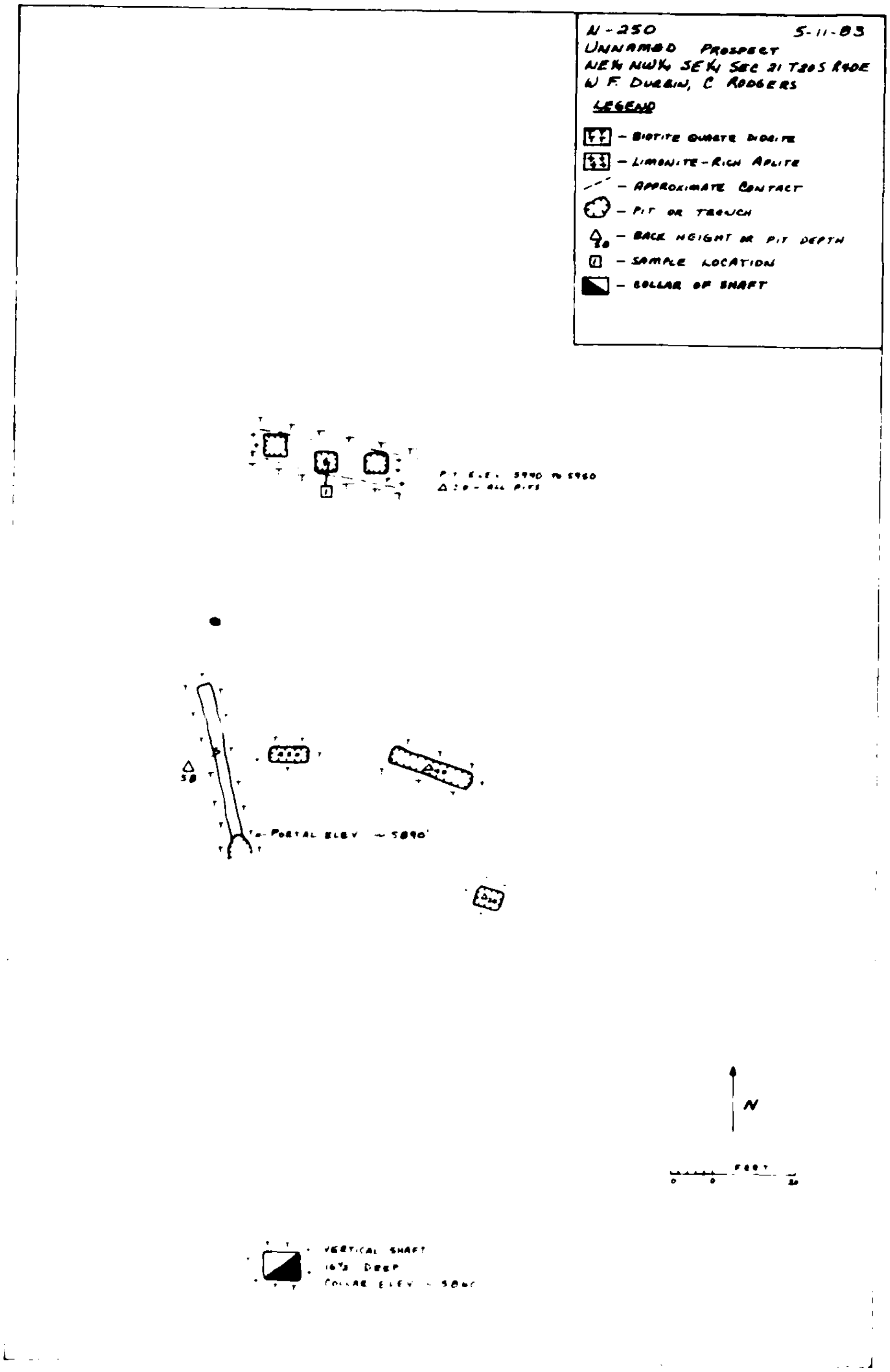

Figure 47. Surface plan view at N-250.

The workings consist of two caved adits and one prospect pit. One adit is situated 0.1 mile to the west of the other adit-pit location. It was driven a distance of 25 to 30 feet as estimated from measurements of the tailings dump. The adit apparently encountered no mineralization of any type. The second adit was driven an estimated 30 to 40 feet, and a prospect pit 8 by 10 feet and 2 feet deep is located 20 feet to the east of this adit. The only evidence of mineralization at this location was a small pile of limonite-stained quartz that was located between the adit and pit. A grab sample was taken from the pile and complete assay results are listed in Table A-1. Precious metal values for the sample are listed in Table 9.

TABLE 9. Precious Metal Values for Sample N-251.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-251	0.230	115	0.42	6.30	121.30

Field investigation revealed the remains of a small cable tram haulage system from the eastern adit pit group of workings down to the roadway.

Although the precious metal value for this prospect might be considered fair to moderately good by today's price standards, two considerations must be taken into account. First, the operator, presumably working in the 1930s or early 1940s, may have driven the workings the full length of the mineralized zone and found it too limited in extent to be commercially viable. Second, the sample taken was of material that appeared to be of highest grade and, therefore, not necessarily indicative of average mine-wide values.

There is little evidence here to suggest that a discovery of significant grade, tonnage, or exploration potential exists at this site.

A notice found in a claim center marker near the prospect places it within the Three Star No. III claim. The Three Star claims I, II, and III were filed in July 1940 by Josephine D. Owen.

Unnamed Prospect (N-252)

A badly obliterated claim notice found at this site lists the owners last name as Crouch and a date of 1939. A single prospect pit is located 1.2 air miles northwest of Coles Spring and is placed in the SW1/4, NW1/4, NW1/4, Sec. 31, T20S, R40E, MDB&M, as shown in Figure 6.

A 3-foot-wide, vertical, northwest-trending shear zone in Mesozoic granite is the locus for mineralization. The zone contains scattered 3- to 4-inch-wide quartz veins with abundant limonite staining and fracture-filling.

Prospecting was conducted with the development of a 12-foot-long, 5-foot-wide pit. The pit is now filled to within 4 feet of the surface by slope wash. Mineralized quartz is present in place at each end of the pit, and a composite chip sample, labeled N-252, was taken from this material. A complete list of sample assay results is recorded in Table A-1.

The assay results show no commercial values for precious metals or other commodities. No discovery of economic grade or tonnage was made and the site was quickly prospected and abandoned.

Tuesday Claims (N-253)

The Tuesday Claims were located by Fred Wilbur in 1934 as disclosed by a claim notice found at the site. This group of prospect pits and caved adits is situated 1.1 air miles northwest of Coles Spring and is placed in the S1/2, SW1/4, NW1/4, Sec. 31, T20S, R40E, MDB&M, as shown on Figure 6.

The host rock at this location is medium-grained Mesozoic granite. The rock is locally altered and limonitized and scattered outcrops exhibit a gneissic texture.

A 6-foot-wide, vertical, northwest-trending shear zone is the locus for very sparse quartz-limonite mineralization. There is nothing but broken, fractured granite with clay and limonite fracture-filling visible in surface expressions of the shear.

The workings consist of two caved adits and seven prospect pits developed along the shear zone. The dump volume estimates for the entire prospect add up to between 300 and 350 cubic yards of broken material. The dump area of the eastern-most caved adit had a scattering of limonite-stained quartz. A grab sample of this material was taken for analysis.

The sample assay results are listed in Table A-1 and show no commercial values for precious metals or other commodities.

No discovery was made at this long-idle prospect.

Unnamed Prospect (N-254)

This prospect group is situated 1.1 miles west of Coles Spring. It is placed in the NE1/4, NW1/4, SW1/4, Sec. 31, T20S, R40E, MDB&M, as shown in Figure 6.

The area is typical of numerous other prospecting areas in the Coso Range where Mesozoic granite is cut by a series of northwest-striking near vertical shear zones. This particular prospect is developed on two shear zones in granite that is strongly gneissic and is occasionally nearly alaskite in composition.

The northern-most shear zone trends approximately N30W and is composed mainly of broken alaskite with clay and limonite interstitial filling. The zone is generally 6 feet wide where exposed and contains irregular 1- to 2-inch white quartz stringers. One 6- by 6-foot shaft, now caved, and three prospect pits were developed on the zone but no mineralization of potential interest was found. The southernmost shear zone strikes N30W and is approximately 10 feet wide. The host rock at this location is strongly gneissic. The shear zone material is extremely broken and schistose at the outer margins. Three- to 4-inch quartz veins are present next to the schistose margins of the shear and contain abundant limonite coating and scattered fine crystalline pyrite. Two prospect pits were developed in this shear zone. A sample of quartz material was chipped from in-place vein rock. The sample, labeled N-254, shows no values for precious metals or other commodities as listed in Table A-1. No discovery was made at this prospect.

Unnamed Prospect (N-255)

This prospect is situated 1.2 miles southwest of Coles Spring. It is placed in the SW1/4, SW1/4, SW1/4, Sec. 31, T20S, R40E, MDB&M, as shown on Figure 6.

The host rock is Mesozoic granite that is locally limonite stained.

Two prospect pits, each yielding about 1.2 cubic yards of material, were driven but encountered nothing but limonitized granite. No samples were taken and no discovery of mineralization was made at this site, which was evidently prospected for precious metal values.

Unnamed Prospect (N-256)

This small unnamed prospect is situated 0.4 mile west of Coles Spring. It is placed in the SW1/4, SE1/4, NE1/4, Sec. 31, T20S, R40E, MDB&M, and the location is shown on Figure 6.

Two prospect pits, with a combined volume of approximately 33 cubic yards, are situated along an east-west-trending shear zone within a pale gray Mesozoic granite host rock. The pits were driven to explore quartz veining within the sheared granite. The western end of the westernmost pit shows a vertical 0.5 foot, massive, white quartz vein in place. Scattered within and around the pits is abundant massive quartz that contains limonite stain, disseminated pyrite, secondary crystalline quartz, and dendritic pyrolusite on fracture surfaces.

A composite chip/grab sample was taken from in-place and loose vein material, and the complete sample assay results are listed in Table A-1. A total volume of 880 cubic feet of material was removed from the two prospect pits. The assay results indicate no commercial values for precious metals or other commodities.

Unnamed Prospect (N-257)

This prospect is located on a hill overlooking the Yucca Mine about 1.6 miles northwest of Old Coso in the NW1/4, NW1/4, NW1/4 of Sec. 20, T20S, R40E, MDB&M, as seen in Figure 6.

Two trenches were dug side by side, 20 feet long and 3 feet deep, on a mineralized shear zone contact of pre-Cretaceous metavolcanics and a granitic dike. The shear trends N60E and is 2 feet wide with moderate malachite and calcite in vugs and fractures. A single sample was taken, the analytical results of which are given in Appendix A.

This is an isolated occurrence of little economic potential.

Unnamed Prospect (N-258)

This prospect is located midway between the Marigold (N-215) and Vin Blano (N-218) mines about 1.1 miles northeast of Old Coso in the SW1/4, SW1/4, SW1/4 of Sec. 15, T20S, R40E, MDB&M, as seen in Figure 6.

The workings consist of a 25-foot-long trench ending at a caved adit (estimated length of 12 feet), both of which were dug on a 2-inch-wide quartz vein with hematite stain in the fractures. A sample of the quartz was taken. Analysis of this sample (Appendix A) showed no gold and indicates that no potential for an economic occurrence exists in this area.

Unnamed Prospect (N-259)

The prospect is located on the hill above Old Coso Village in the NW1/4, NE1/4, SW1/4 of Sec. 21, T20S, R40E, MDB&M, as seen in Figure 6. It consists of a trench 20 feet long and up to 6 feet deep, and two small pits that were dug on hematite-stained fractures in Mesozoic granite. No vein material was evident.

This could most accurately be described as a "proximity" prospect, i.e., it is a very minor mineral occurrence that normally would have been passed over; but since it was located so close to town and in full view of everyone, someone apparently had to go up and satisfy his curiosity.

No samples were taken at this site as no veins or mineralization were exposed.

Blue Morn (N-260)

Location notices found at this site indicate that this claim has been known by a number of different names. The notices were in very poor condition, but it could be seen that the Blue Morn preceded the Oro Verde (located by Joe Crouch), which preceded the Guard B---dun. The claim is located about 1.2 miles north of Old Coso in the NE1/4, SW1/4, SE1/4 of Sec. 17, T20S, R40E, MDB&M, as seen in Figure 6.

The workings consist of three shafts located on a 150-foot-long section of a 2-foot-wide shear zone on the contact of an aplite dike and a Mesozoic granodiorite pluton. The shafts are caved shut. An estimate of the maximum depth of the working is (east to west) 20, 50, and 30 feet. The center shaft still has a headframe in place.

The shear zone trends N85E and dips south at 75 degrees. It outcrops about 40 feet west of the workings where it contains a 0.7 foot-wide vein of crystalline quartz with sparse to moderate disseminated limonite pseudomorphs after pyrite, and sparse hematite staining of the fractured quartz. Very little quartz vein material remains on the dump. It is similar in appearance to the outcrop vein except that the pyrites are not oxidized to limonite. A single sample was taken from the dump. The assay results (Appendix A) show low precious metal values and indicate a low potential for this site.

Yucca (N-262)

The Yucca Mine consists of several shafts and associated workings located about 1.5 miles northwest of Old Coso in the W1/2, SE1/4, SW1/4 of Sec. 17, T20S, R40E, MDB&M, as seen in Figure 6. According to historical papers provided by Ms. Josephine D. Owen, the Yucca Mine was owned by her father, Louis D. Owen, and was worked intermittently from about 1909 until 1942. In a letter to his wife in June of 1910, Mr. Owen reported that he had shipped $1293 worth of gold and was ready to ship an additional two tons of concentrate valued at $294/ton. In 1910, the price of gold stood at $20.67/troy-oz. Those same shipments would be worth about $40,000 today.

There are two clusters of workings that were dug on two separate vein occurrences on either side of the road to Old Coso Village, as seen in Figure 48. The surface at both sites is covered with several inches of decomposed Mesozoic quartz diorite (the host rock) and no veins are exposed. Ms. Owen states that the original discovery of the west vein was made by her uncle, George Bowler. While he and Louis Owen were prospecting the area, he overturned a small quartz boulder and found a gold leaf on the underside worth several hundred dollars.

The west vein(s) was exploited by four declines, one of which is still open. Decline No. 1 is shown in cross section in Figure 49 and plane of the vein view in Figure 50. It was dug on a fracture zone, with quartz lenses, that trends N38W and dips northeast at about 40 degrees. Two lenses were mined. Sample 1 was taken of the 2-inch quartz vein in the rib of the lower stope. The quartz showed sparse subhedral limonite pseudomorphs and very sparse dusty hematite, and it ran 0.16 troy-oz/ton gold ($80/ton).

The other declines are caved shut but their size (depth or amount of workings) can be estimated from the tailings piles. Decline No. 2 appears to be a third to a half again larger than No. 1 and was probably developed on the same fracture. No. 4 (35 feet deep) was also dug on this fracture, but decline 3 (12 feet deep) was dug about 40 feet "below" the main trend.

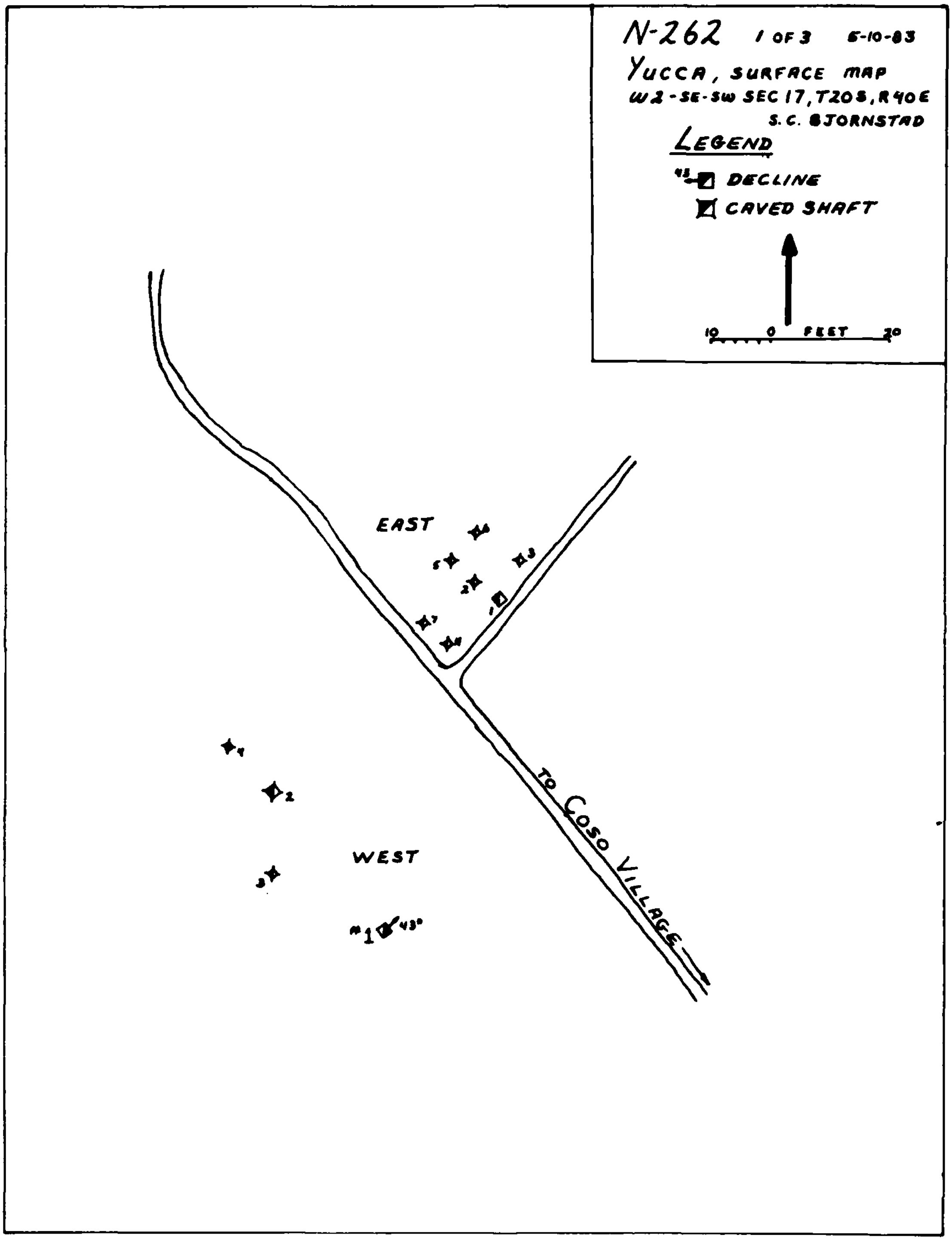

Figure 48. Surface plan view of Yucca.

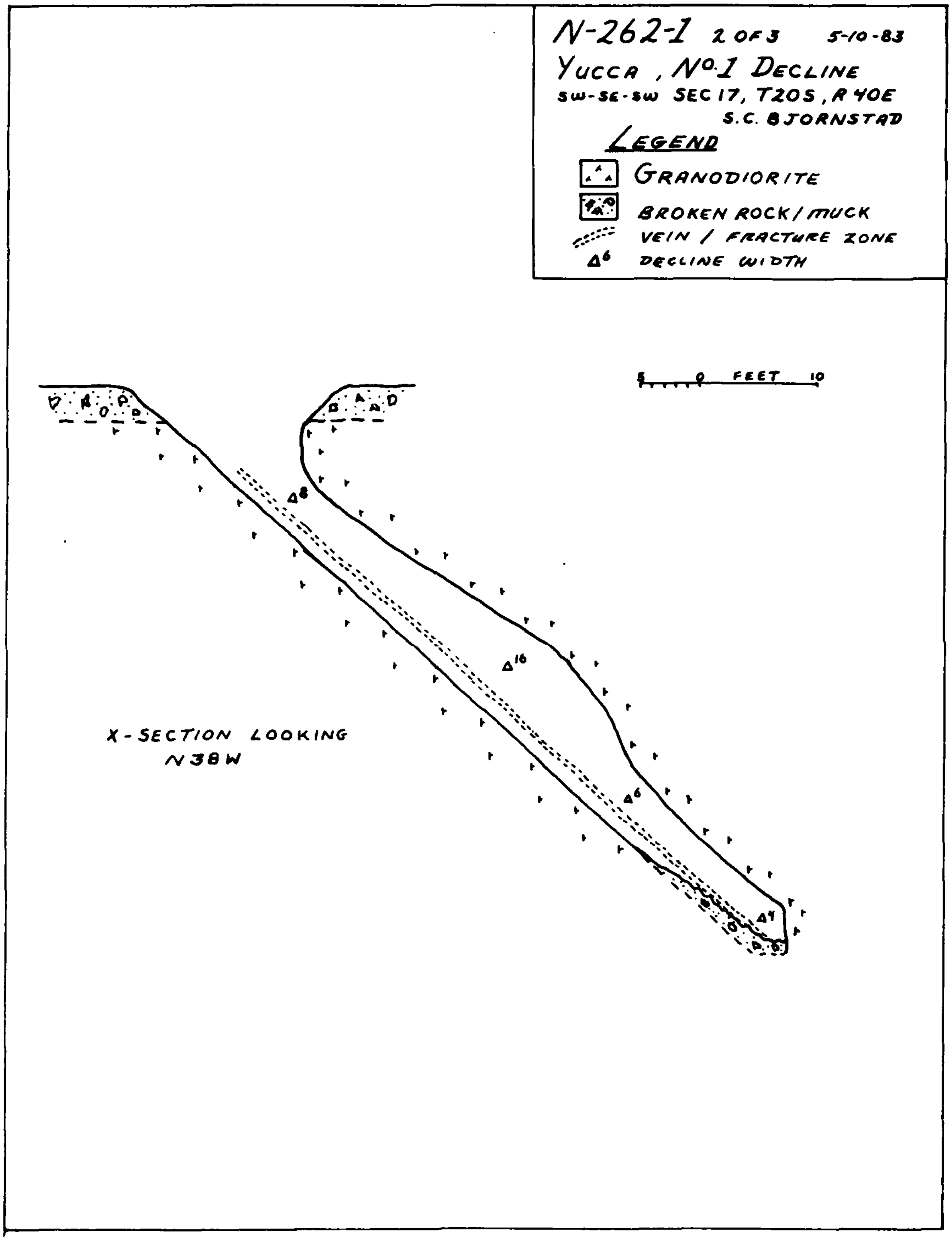

Figure 49. Cross-section of decline No. 1, Yucca.

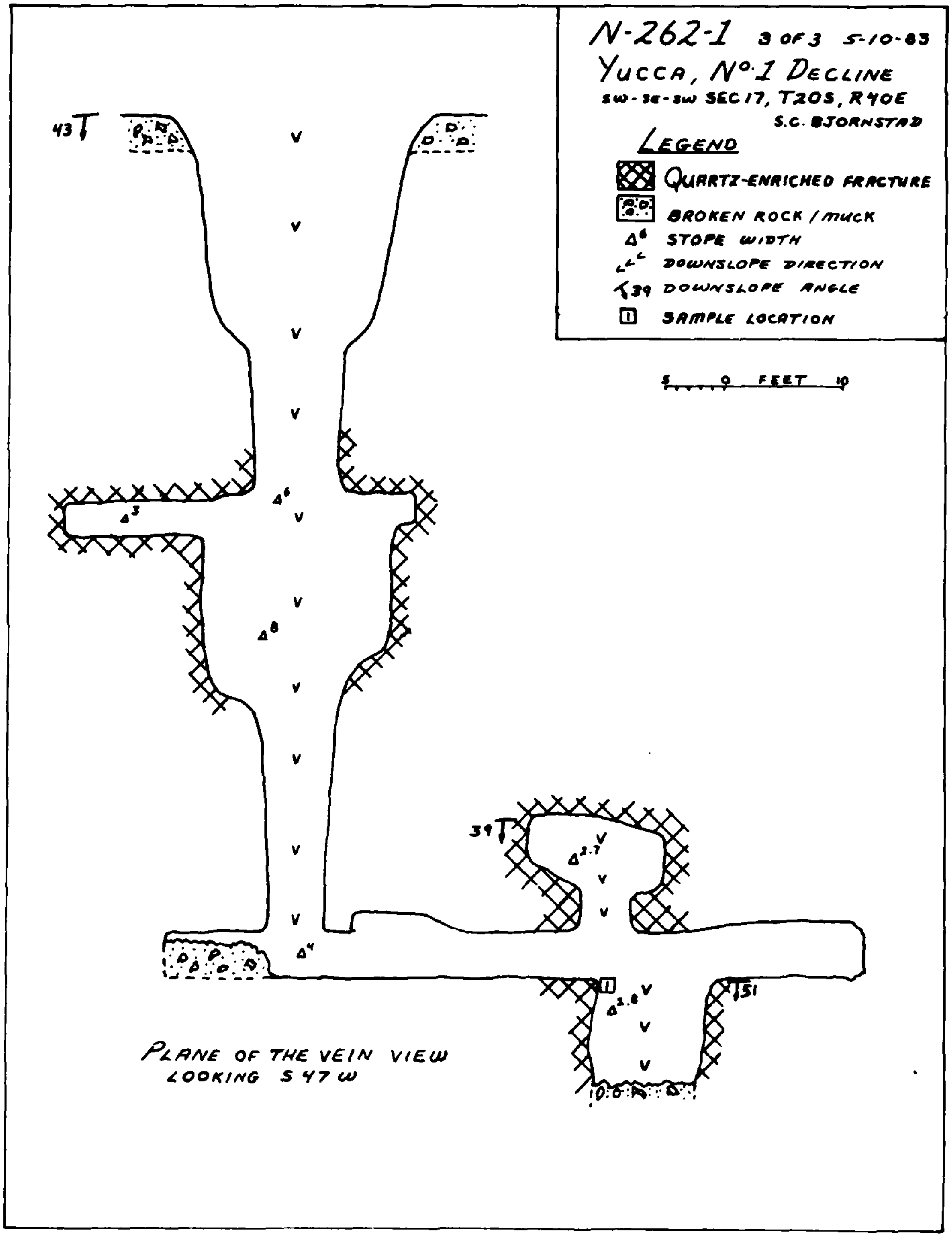

Figure 50. Plane of the vein view, decline No. 1, Yucca.

Seven short vertical shafts make up the east cluster. All are caved except No. 1, which is 29 feet deep with 5 feet of visible drift at the bottom. The drift is back-filled, so its full extent cannot be determined. There is no vein material visible underground. The other shafts have estimated lengths from 10 feet (No. 7) to 40 feet (No. 5). Very little quartz vein material is present on the dumps. What quartz is present is broken, with moderate to sparse hematite as fracture-filling. Sample No. 2 was taken as a composite of the quartz stockpiles at this site. It is doubtful that this is a representative sample, but with a gold assay of 0.18 troy-oz/ton ($90/ton), it does show that gold is present.

As with many other sites examined during this survey, the mineralization occurs in quartz lenses in fracture or shear zones. These lenses are irregular in size, shape, and distribution and are, therefore, difficult to mine economically. Given that there was small scale production at this site in the past, it is possible that the potential for a similar operation exists today. It is not likely, however, that a larger undertaking would be successful.

Unnamed Prospect (N-263)

This prospect is located 1.2 miles north of Old Coso and 1 mile southeast of Indian Gardens Spring, in the S1/2, NW1/4, SE1/4 of Sec. 16, T20S, R04E, MDB&M, as shown on Figure 6. It consists of a 6-foot-deep "doghole" adit and a 225-foot-long adit. They were both driven in nearly barren Mesozoic diorite. A plan view of the long drift is given as Figure 51. The drift crosscut several widely spaced quartz veins, but none was wider than 1 inch. Very sparse chrysocolla was present in two of the veins. Two samples were taken from the veins but the assay results were quite discouraging as sample N-263-1 showed no gold and sample N-263-2 showed almost none.

No other prospects or outcrops occur in the immediate area and there is no economic potential here.

Crisper No. 1 (N-264)

The cadastral location of the Crisper No. 1 is given as the NE1/4, NE1/4, SE1/4 of Sec. 16, T20S, R40E, MDB&M, as shown on Figure 6. On the ground, it is situated about 1 mile southwest of Indian Gardens Spring. According to a location notice found at the site, the claim was staked on 1 July 1941 by Mr. Eugene Crismon. It abuts the Old Blue Bird property (N-231) to the south and shares its geology and lack of mineral potential.

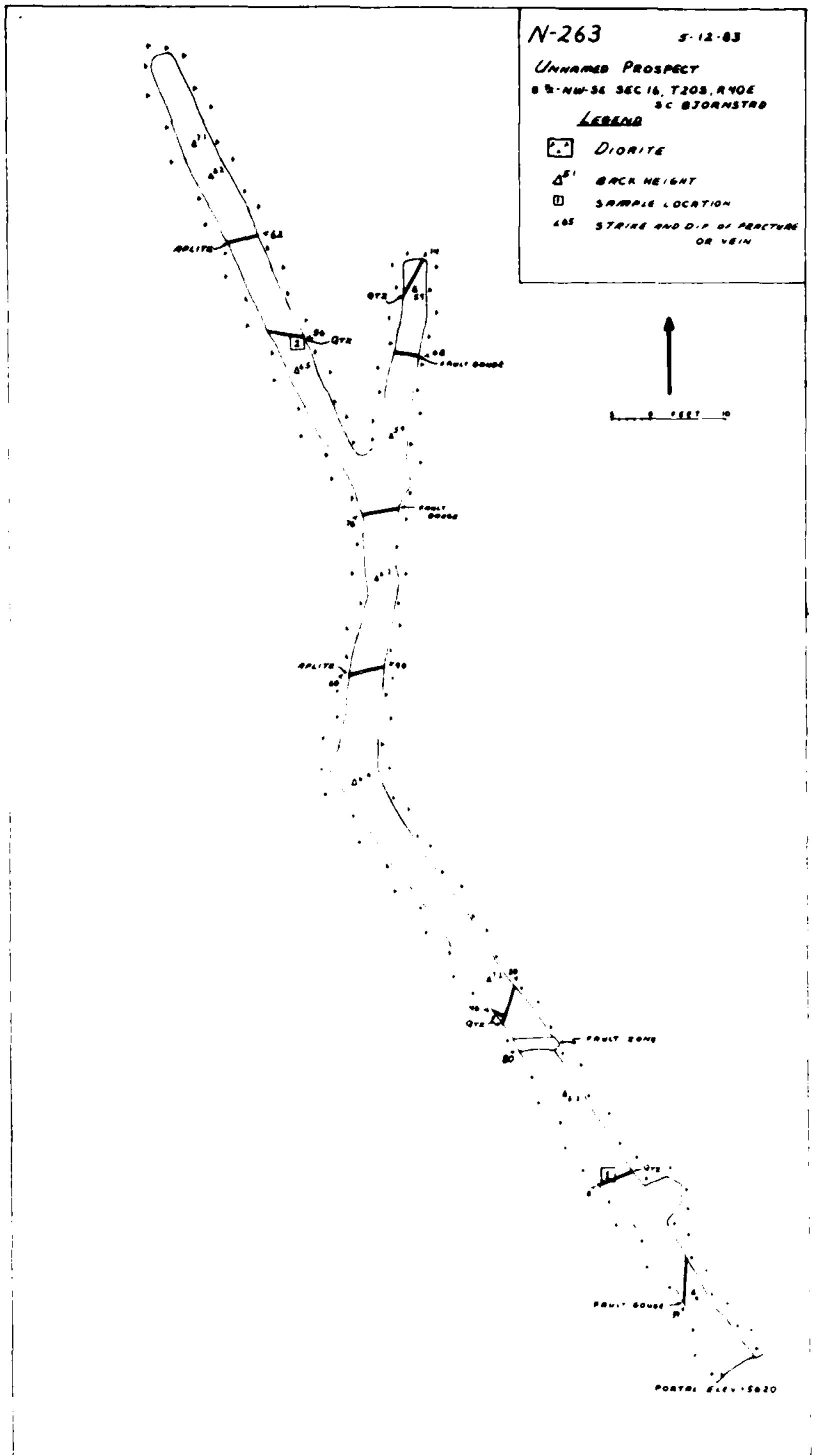

Figure 51. Plan view of drift at N-263.

The working consists of a single trench 40 feet long, 3 feet wide, and 2 feet deep. It was dug on a 2-foot-wide quartz vein that trends N20W and dips east at 30 degrees in Mesozoic biotite quartz diorite. The quartz is broken and has a sparse fracture coating of hematite and chrysocolla.

A single sample was taken, the results of which are given in Appendix A. The small amount of gold found in the sample (0.024 troy-oz/ton or $12/ton) indicates there is little potential in this area.

Unnamed Prospect (N-265)

A narrow mineralized quartz vein was explored for precious metals at this prospect that is shown on Figure 6. It lies 0.4 mile due east of Coso Village and is placed in the NW1/4, SE1/4, SE1/4, Sec. 21, T20S, R40E, MDB&M.

This lode deposit was developed in a medium-grained pale gray Mesozoic granite host rock.

The operator trenched along the outcrop of the quartz, which strikes N85E, for 14 feet before the vein material pinched down from 1 foot to less than 1 inch in width. Quartz material scattered around the trench contains minor limonite staining and small disseminated grains and pods of specular hematite. A grab sample of this material was gathered, and a complete list of assay results is shown in Table A-1. There are no commercial values for precious metals or other commodities and there was no discovery made at this location.

Unnamed Prospect (N-266)

This group of prospect pits and trenches is situated in the Coso Mining District approximately 0.7 mile southeast of Coso Village as shown on Figure 6. A 1942 Land Office Survey Marker was found during the field examination of the area and designates the section corners for Sections 21, 22, 27, and 28, T20S, R40E, MDB&M. The prospect workings are placed in portions of Sections 21, 22, and 27 and are shown in plan view in Figure 52.

The host rock in the area is Mesozoic pale gray granite. Though in-place geologic evidence is lacking, the operator apparently followed two parallel quartz-bearing shear zones developed within the granite. Based on the general trends of the prospect workings, the upper zone has a strike of N49E and the lower zone strikes N46E. The upper group of workings is located about 120 feet to the northwest of the lower pit and from 10 to 20 feet higher in elevation.

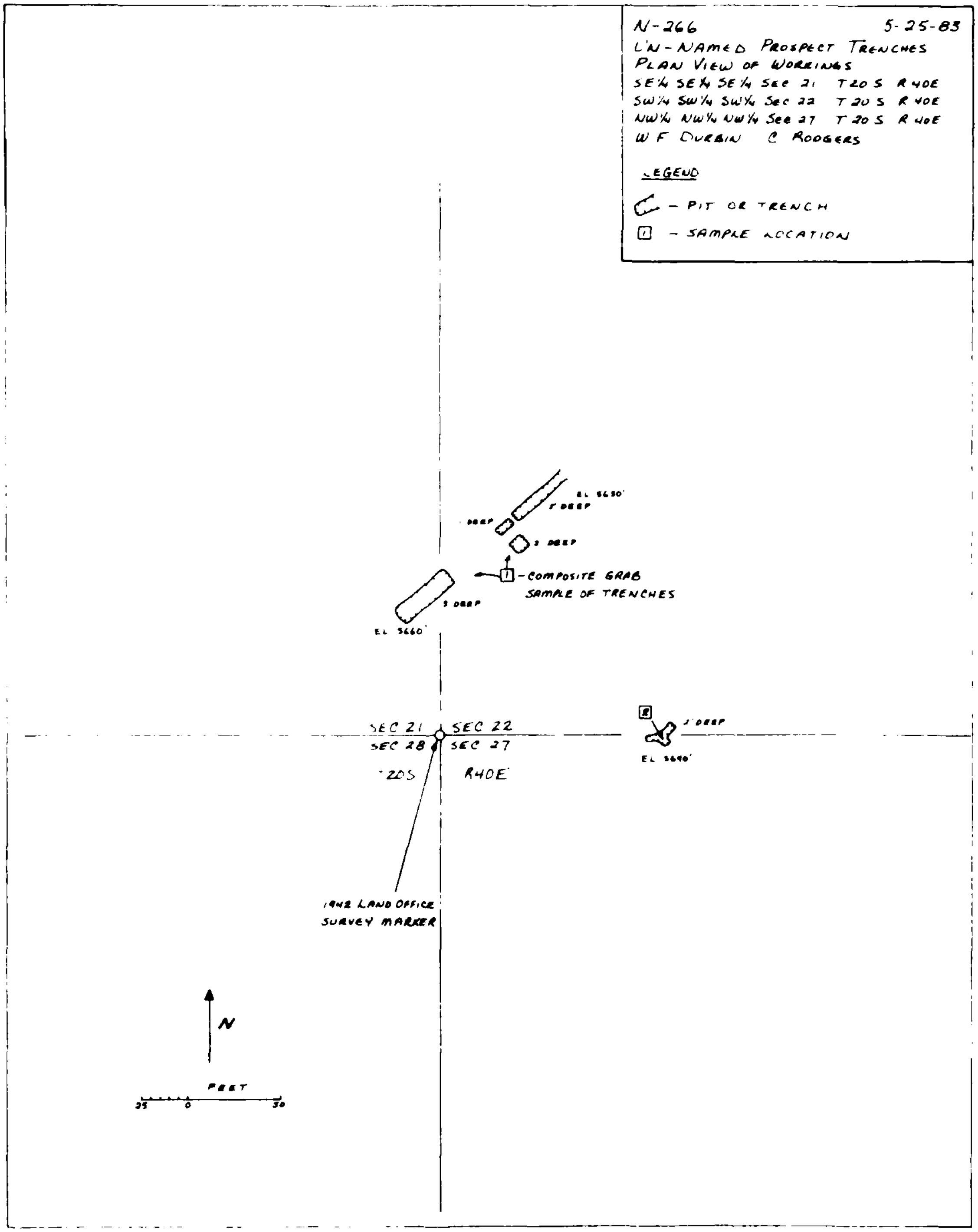

Figure 52. Surface plan view at N-266.

The upper group of workings consists of three prospect pits and one trench, all caved and partially filled with slope wash. These workings produced a total broken rock volume of approximately 66 cubic yards. No shear zone or quartz vein material outcrops, but scattered small piles of massive quartz with limonite stain, limonite pseudomorphs after pyrite, and traces of chrysocolla fracture-fillings were found along pit and trench margins. Sample N-266-1 is a composite grab sample of mineralized quartz taken from these rock piles.

The lower working is a prospect pit that produced a total broken rock volume of approximately 6 cubic yards. Mineralized quartz is present here only as piled and sorted loose material within the pit and at the pit margin. The quartz contains limonite staining, scattered small pyrite crystals, and a few isolated grains and small masses of chalcopyrite. Sample N-266-2 was a grab sample of the loose mineralized quartz that appeared to be of highest grade.

The complete assay results for the two samples are listed in Table A-1. The precious metal values for the two samples are shown in Table 10.

TABLE 10. Precious Metal Values for Unnamed Prospect (N-266).

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-266-1	0.240	120.00	0.62	9.30	129.30
N-266-2	0.067	33.50	0.38	5.70	39.20

Although sample N-266-1 shows a fair to moderate precious metal value by today's standards, it must be considered that the sample was taken of material that appeared to be of highest grade and not necessarily representative of an average prospect grade. There are no expressions of a continuous or widening mineralized zone along strike away from either group of workings. It is suspected that the operator produced a very few tons of mineralized material from the two zones and that the zones pinched out within the confines of the prospected area.

Also Claims No. 1 and No. 2 (N-267)

A badly decomposed claim notice found at this site lists the name of this location as the Also Claims No. 1 and No. 2. The claims were filed 25 November 1934 by Lou Razner and others (not legible). The

Also Prospect is located 0.6 mile southeast of Coso Village as shown by Figure 6. It is placed in the NE1/4, NE1/4, NE1/4, Sec. 28, T20S, R40E, MDB&M.

The area host rock is altered Mesozoic granite. It is pale gray and badly decomposed in surface outcrop. Within the mine workings the granite is altered to clay (feldspars) and the few percent of mafic minerals are altered to sericite.

The major workings were driven to explore the extent of a quartz-rich vein deposit that strikes N47W and dips from horizontal to 35 degrees southwesterly. The vein pinches and swells from 2 inches to a maximum width of 14 inches. Faulting along a northeasterly striking narrow fracture has produced minor off-setting and rotation of the quartz veining. The quartz contains limonite fracture-filling; sparse disseminated pyrite crystals; abundant chrysocolla as coatings; and quartz staining, clay, and scattered masses of chalcopyrite and specular hematite.

The workings, shown in plan view by Figure 53, consist of a drift driven along vein strike that is connected to the surface by two adits. These account for 146 feet of drift work. Located at the northwest end of the "vein strike" drift is a 10-foot-high, vertical raise driven in granite. A 17-1/2-foot decline driven at a 23-degree dip was located between the access adits and encountered the quartz vein at the bottom right side of the decline face. Figure 54 is a map showing the decline and other relationships in vertical cross sections. The remaining workings consist of a caved adit, one 4-1/2-foot-long adit driven in granite, and a 25-foot caved and filled prospect pit that is located to the northeast of the main mine workings.

Two samples, labeled N-267-1 and N-267-2, were taken at the Also prospect, and complete assay results are listed in Table A-1. Sample N-267-1 was chipped across a 4-inch-thick quartz vein with limonite stain, scattered pyrite, clay, and minor chalcopyrite. Sample N-267-2 was chipped from a 6-inch zone of brecciated white quartz with limonite stain, clay, scattered fine crystalline pyrite, and chrysocolla fracture-filling and clay stain. Sample locations are shown on Figure 53, and precious metal values are summarized in Table 11.

If mined at a minimum width of 3 feet, the 4-inch vein from which sample N-267-1 was taken would produce a net precious metals value equating to $37.08/ton. Because both samples were taken of material of apparent highest grade, this is the maximum commercial value for precious metals to be expected at this prospect. No economic values for other commodities were found and there is little evidence to suggest that even a small tonnage of commerical grade is present at this site.

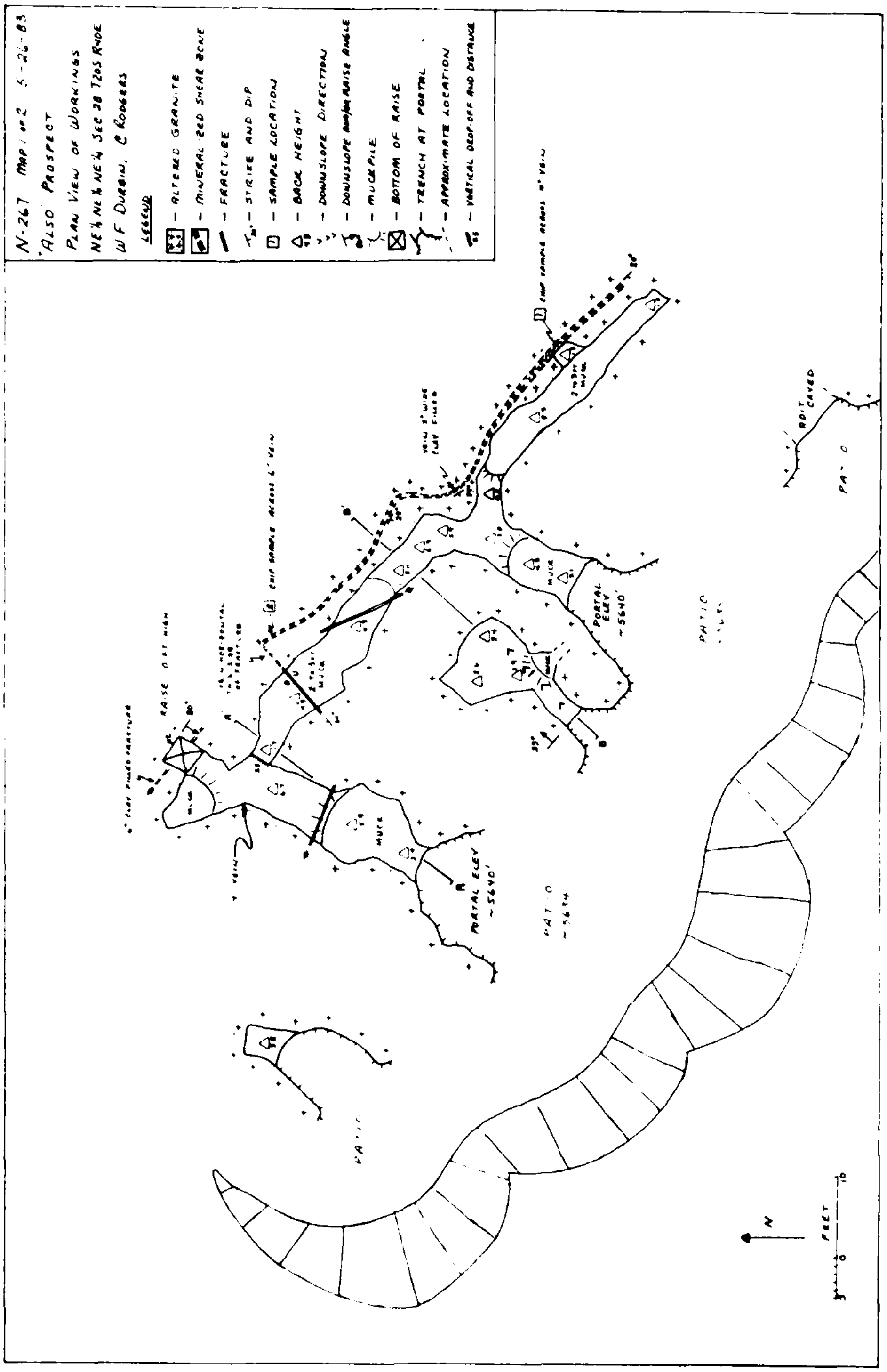

Figure 53. Plan view of drift at Also Claims No. 1 and No. 2.

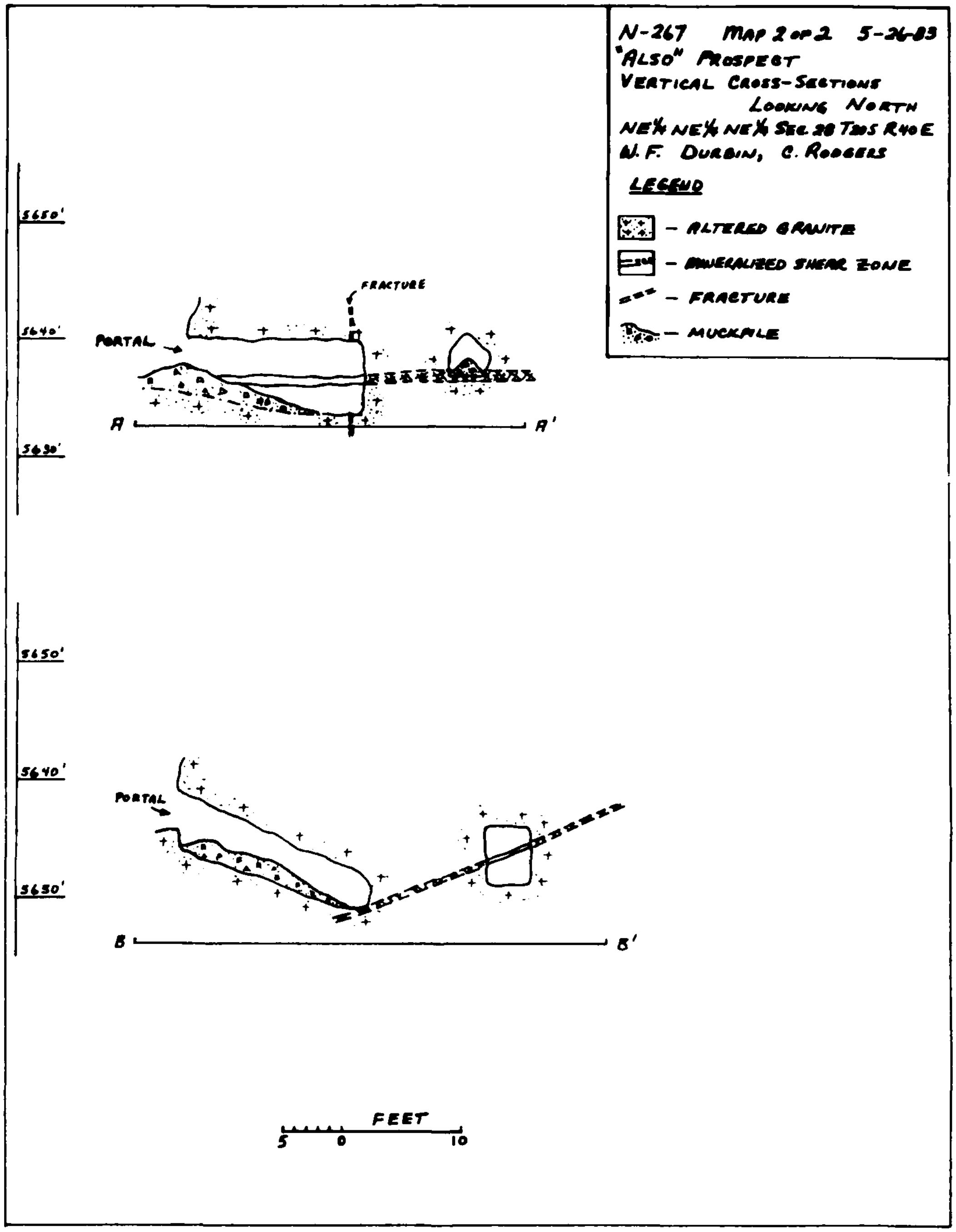

Figure 54. Map of center decline, Also Claims No. 1 and No. 2.

TABLE 11. Precious Metal Values for the Also Prospect Samples.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-267-1	0.620	310.00	1.58	23.70	333.70
N-267-2	0.059	29.50	6.13	91.95	121.45

Unnamed Adit (N-268)

This adit is situated 0.8 mile east-southeast of Coso Village. It is placed in the NE1/4, NE1/4, NE1/4, Sec. 28, T20S, R40E, MDB&M, as shown on Figure 6.

A 45-foot adit was driven in Mesozoic granite. The drifting was driven along a bearing of S35W and was presumably an exploratory prospect in the search for precious metals. The only mineralization encountered was specular hematite, which was present as thin lenses and pods in 1-foot wide fracture zones located at 4 and 11 feet from the adit portal. The fracture zones strike N40E and dip 75 degrees northwesterly and are composed solely of parallel hairline fractures in granite with hematite filling. The adit is open for the first 30 feet. The last 15 feet have been subject to severe back caving.

One sample, labeled N-268, is a composite chip sample across the two fracture zones. A complete list of assay results is shown in Table A-1.

The assay results show nil values for precious metals and other commodities. The extent of the iron deposition is far too inadequate for commercial value. It is apparent that no discovery of commercial mineralization made at this location.

She-Cat Adit (N-269)

A 6.5-foot adit was driven, presumably to explore for possible precious metal values, at this location. It was driven in Mesozoic hornblende-biotite diorite, which is slightly altered, and the clay-altered feldspar has faint limonite stain. No surface or undergound expression of any type of geologic target was encountered. The adit is situated 0.8 mile southeast of Coso Village and placed in the NE1/4, SE1/4, NE1/4, Sec. 28, T20S, R40E, MDB&M, as shown on Figure 6. No mineralization was encountered and no samples were taken.

This prospect is listed in the NOTS legal archives literature as the She Cat Prospect and the last claimant was A. B. Freeman.

Bulls-Eye Lode (N-505)

The Bulls-Eye Lode is listed in the NOTS legal archives as validated mining claim number 434, last claimed by V. F. Baggett. The lode is situated 1.4 miles southeast of Silver Peak and 1.9 miles southwest of Coles Spring as shown on Figure 6. It is placed in the NW1/4, SW1/4, SW1/4, Sec. 5, T21S, R40E, MDB&M.

The host rock at this location is medium- to fine-grained Mesozoic granite. The rock contains 5 to 10% mafic minerals and abundant potassium feldspar phenocrysts. The zone of mineralization explored by the operator is in the form of an aplite dike instrusion into the granite. The aplite is 3 feet wide, fractured and clay-rich. It strikes N45W and dips 60 degrees southwesterly. The aplite fractures are filled with quartz and limonite and range from 1 to 3 inches in width. The quartz filling is lensic and discontinuous.

Two workings were found at the site. The first was an apparent prospect pit. The depression is 10 by 10 feet and 5 feet deep. It was driven in the thin slope wash cover that blankets the area and failed to reach bedrock. No piles of host rock or mineralized quartz were evident at the pit perimeter. The second working is a collapsed shaft. It was driven down the dip of the quartz-bearing aplite dike. The shaft collar is 12 by 12 feet, and remnants of pipe and ladders stick up through the cave muck and slope wash that fills the shaft. A shaft dump volume estimate is impossible because the dump lies in an area that has been subject to flash flooding and is mostly washed downstream. There is no indication of a formerly extensive dump.

A chip sample of the quartz and limonite, amounting to a 3-inch total vein width, was taken from in-place material within the aplite dike. The complete assay results for the sample are presented in Appendix A, and precious metal values are summarized in Table 12.

TABLE 12. Precious Metal Values for the Bulls-Eye Lode.

Sample	Gold		Silver		Total precious metal value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-505	0.880	440	0.72	10.80	450.80

If the 3-inch zone were mined at an average width of 3 feet to incorporate the entire aplite dike, the resulting value would equate to 3/36 x $450.80, or $37.57/ton. The quartz width is too narrow and erratic to indicate that a discovery of an economic source of precious metals or other commodities was made at this prospect.

V. F. Baggett worked this lode and the Bulls-Eye Lode #2 (N-507) just to the north. The remains of two buildings located near the caved shaft were the apparent operator housing and shop facilities for both sites.

Luck of the Irish Prospect (N-506)

The NOTS legal archives list this property as the Luck of the Irish, last claimed by Fred I. Wilbur. The prospect is situated 1.1 miles southwest of Coles Spring, as shown on Figure 6. It is placed in the NE1/4, NE1/4, NW1/4, Sec. 5, T21S, R40E, MDB&M.

A caved, inclined shaft and a small prospect pit are all that remain of site workings. There is a headframe and partially caved building at the shaft collar and workings are situated next to a major road.

The workings were driven to explore a mineralized shear zone within Mesozoic rock that ranges in composition from granite to leucogranite. Because the workings are caved and filled with slope wash, the actual outcrop of sheared, limonitized granite that was explored can no longer be seen.

The strike and dip of the shear zone are based purely on the orientation of the shaft and prospect and on the angle of rails and timbers that formed part of the haulage system. The strike is estimated at N15W with a dip of 56E.

Careful measurements of the shaft tailings dump indicate that a volume of 450 cubic yards of material was removed from the shaft. This would equate to a shaft depth of approximately 190 feet if driven 8 feet by 8 feet.

Except for a small pile of quartz and scattered pieces lying about on the top of the dump, the dump material was entirely granitic rock. The quartz was mainly the massive white variety but contained some limonite stain and sparse disseminated pseudomorphic limonite crystals after pyrite.

A grab sample, labeled N-506, was collected from the quartz material on the shaft dump that contained the most concentrated amounts of mineralization. The complete assay results are presented in Table A-1, and precious metal values are shown in Table 13.

TABLE 13. Precious Metal Values for Luck of the Irish Prospect Sample.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-506	0.800	400.00	0.50	7.50	407.50

It would appear that the mineralized quartz may be lensic in form because it does not appear at the surface of the workings. This type of "pinch and swell" lode deposit is common throughout the region and is shown by numerous extensive workings in relatively small mineralized zones. The pile of mineralized quartz that was sampled could indeed be similar to what was found at depth, although it must be recalled that only the "apparent best grade" rock was collected. Therefore, the sample values represent the maximum value to be expected.

The possiblity that "salting" occurred at this site must also be considered. The prospect is near a crossroad that connected the Coles Spring-Silver Peak Road with the Dead End Cabin Road, all leading to heavily prospected areas. Salting could have occurred either to draw the attention of potential investors to the area or in an attempt to bring a higher price during Navy withdrawal proceedings. It is also possible this convenient location was used to store ore from some other property prior to shipment.

The indications of potential commercial values for precious metals and other commodities are scanty, at best, at this prospect. Additional trenching across the strike of the shear zone could produce some new information, as could renovation and re-access of the shaft, but this process could be accomplished at minimal cost only by a small operation.

Bulls-Eye Lode #2 (N-507)

The NOTS legal archives lists this property as validated claim number 435, last claimed by V. F. Baggett. The Bulls Eye Lode #2 is situated approximately 1.2 miles southeast of Silver Peak and 1.5 miles southwest of Coles Spring as shown on Figure 6. The prospected ground covers an extensive area that includes portions of Sections 5 and 6, T21S, R40E, MDB&M.

A total of 11 prospect trenches and pits were developed to explore and produce mineralized quartz within three separate shear zone structures. The host rock for the entire prospect is a medium- to fine-grained Mesozoic granite. It contains abundant potassium feldspar phenocrysts and 20 to 30% quartz. The granite contains 15 to 20%

hornblende near the northeastern workings and has a strongly banded gneissic texture to the southwest. Minor alaskite and diabase dikes with trends parallel to those of the shear zones were noted and will be discussed as encountered in the workings.

Figure 55 is a plan view of the workings of the Bulls-Eye Lode #2. Trench 1 and trench groups 2 and 3 were driven on a single shear zone that strikes from N47E to N66E, dips nearly vertical, and has been exposed for a strike length of approximately 560 feet. Trench 1 is the uppermost working driven on the zone. No *in-situ* host rock or mineralized zone was found. Piles and pieces of massive white quartz containing minor limonite, very sparse flecks and pods of chalcopyrite, and chrysocolla stain were scattered around the trench. Sample N-507-1 was collected from the loose quartz material.

Trench group 2 consists of one trench and two prospect pits that expose the shear zone for a strike length of approximately 128 feet. The trench and lower prospect pit contain *in-situ* exposures of mineralized quartz that range from 1 to 4 feet in width. The quartz in the lower prospect pit is in contact with the footwall side of a 3-foot-wide diabase dike. The quartz is massive, white, and contains limonite fracture-filling and scattered pods and individual limonitic pseudomorphs after pyrite crystals. Sample N-507-2 was a combination of material chipped from *in-situ* exposures of quartz and from loose mineralized quartz scattered around the workings.

Trench group 3 consists of three prospect pits and one trench that expose the shear zone for a strike length of 148 feet. The upper two small pits contain minor *in-situ* exposures of granite but are mostly caved and filled with slope wash. The lowest prospect pit contains a 1-foot width of quartz on the hanging wall side of a 6-foot diabase dike. These rocks are confined within the granite host rock. The lower trench is 103 feet in length, has granite exposed on the southeast wall, and is caved and filled with slope wash. The quartz, both in-place and loose material, is massive, white, and contains scattered masses of chalcopyrite with secondary chrysocolla. Sample N-507-3 was collected from a combination of in-place quartz and the loose material scattered around the workings.

Trench group 6 is located to the west of trench group 3 and consists of two prospect pits situated along an apparent shear zone structure that strikes N66W. There are exposures of strongly gneissic granite along the trench walls, but no quartz or other mineralization was apparently encountered in these workings.

Trench group 5 is located at the far northeastern end of the main shear zone structure. It consists of two small prospect pits, both developed in unmineralized, altered alaskite.

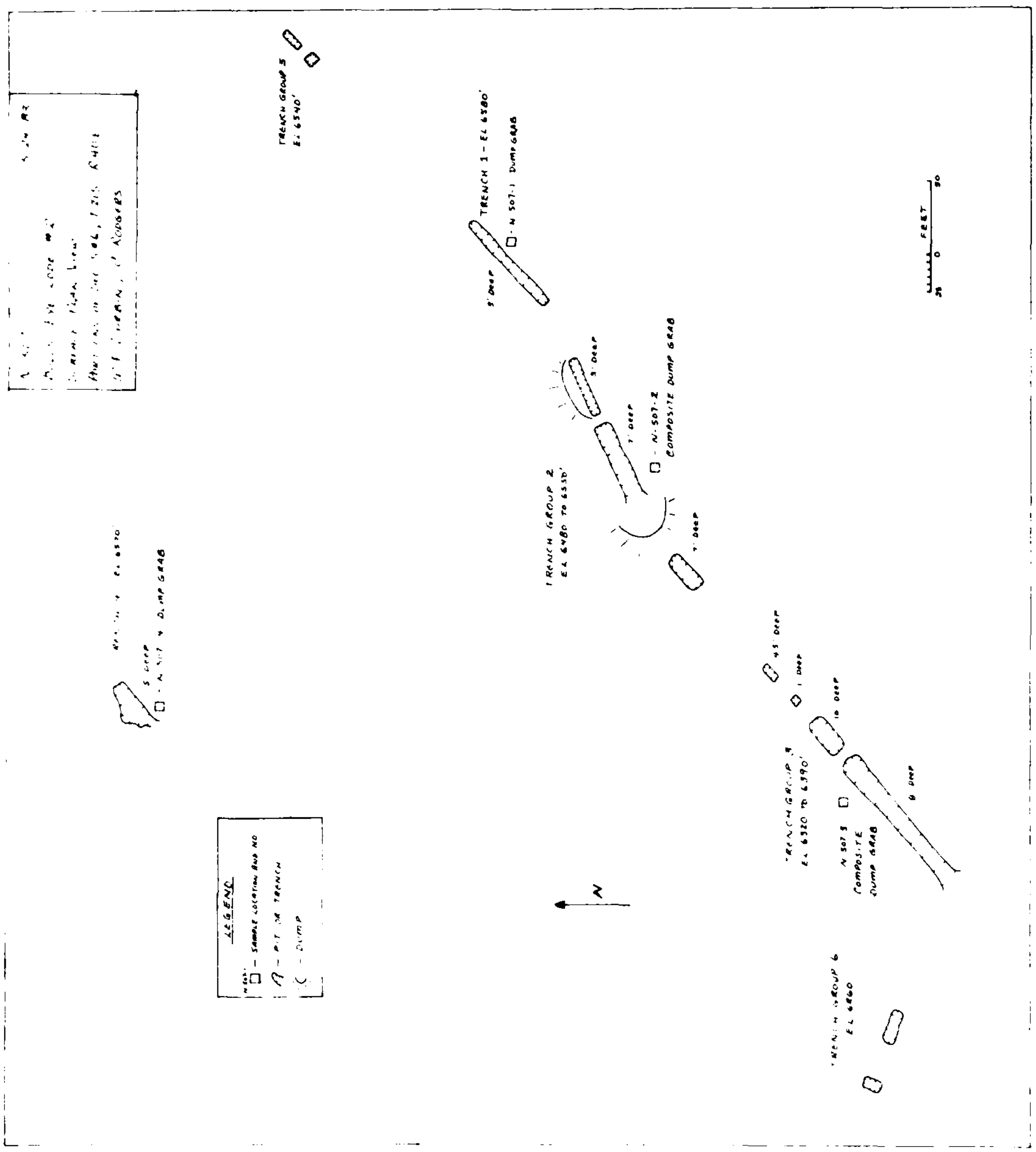

Figure 55. Plan view of workings, Bulls-Eye Lode No. 2.

The northernmost working is trench 4. It is a 35-foot prospect trench developed on a shear zone that strikes N50E. The mineralized structure is vertical in dip and consists of fractured granite with 1- to 2-inch quartz stringers containing limonite pseudomorphs after pyrite and calcite boxwork structures. Sample N-507-4 was collected from representative quartz material scattered within the trench.

The complete sample assay results are presented in Appendix A, and a list of precious metal values is shown in Table 14.

TABLE 14. Precious Metal Values for Bulls-Eye Lode #2 Samples.

Sample	Gold		Silver		Total precious metal values, $/ton	Value of rock mined at 3-ft width, $/ton
	Troy-oz/ ton	$/ton	Troy-oz/ ton	$/ton		
N-507-1	0.250	125.00	0.69	10.35	135.35	90.23
N-507-2	0.071	35.50	0.15	2.25	37.75	25.14
N-507-3	0.290	145.00	1.98	29.70	174.70	58.23
N-507-4	0.220	110.00	0.32	4.80	114.80	38.27

The assay data indicate low to moderate precious metal values at this prospect site. The values obtained should be considered the maximum available since the sampled material was taken from that which appeared to be of the best grade. A slight potential for development may exist through re-exposure of the mineralized zones in areas 1, 3, and 4 and extraction in the down-dip direction; but the mineralized zones are quite narrow, most ranging from 1 to 4 feet in width, and, at best, represent targets that could be explored by a one- or two-man operation.

Unnamed Prospect (N-511)

This prospect is situated on the southeast flank of Silver Peak in the NE1/4, NW1/4, NW1/4 of Sec. 6, T21S, R40E, MDB&M, as shown in Figure 6. The main working is an adit with over 160 feet of drift that was driven in weakly metamorphosed Mesozoic granite to intersect a mineralized shear zone (Figure 56). The shear zone is up to 14 feet wide, trends N50E, and dips 45 degrees north. In the drift walls the shear zone consists of brecciated country rock and barren selvage. The exposed mineralized zone has been totally mined out.

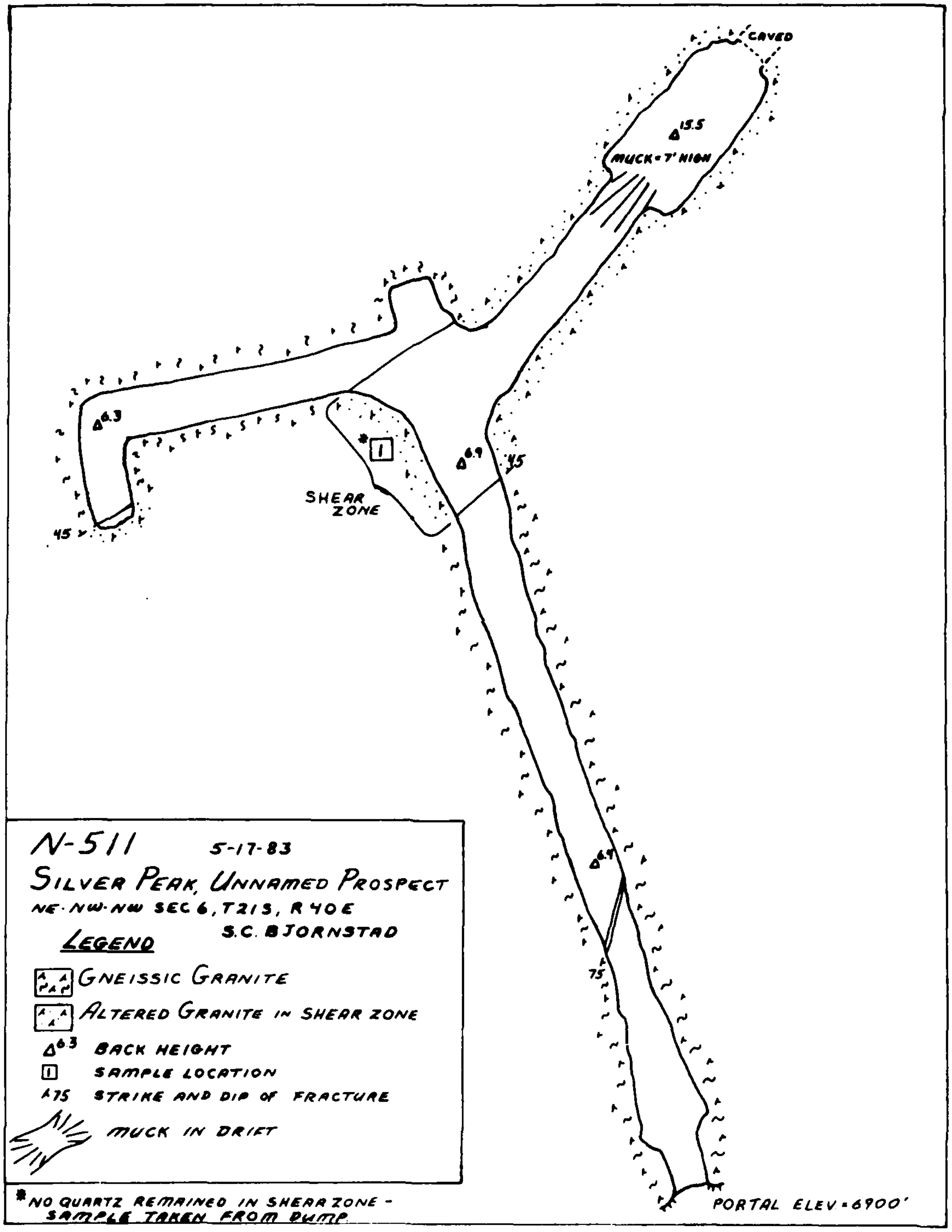

Figure 56. Plan view of adit at N-511.

Some quartz vein material is present in the dump. It consists of individual milky quartz fragments up to 0.8-foot thick, with sparse hematite as fracture coatings. Analysis of a sample of the quartz showed 0.18 troy-oz/ton gold, or $90/ton. Complete analytical results are given in Appendix A.

Two other prospect trenches flank the adit. Each is about 30 feet long and each was dug along small (<2 feet wide) shears that parallel the one described above. Neither trench shows any mineralization.

The mineral potential at this site is low. Even though a moderate gold value is indicated, it was contained in a fairly small quartz lens in the shear zone. Neither the grade nor the indicated tonnage appear to be of a commercial nature.

Unnamed Prospect (N-520)

A single prospect pit that produced a volume of approximately 50 cubic feet of material is located 1 mile southwest of Coles Spring on the east side of the Dead End Cabin Road. The prospect is placed in the NW1/4, SE1/4, NE1/4, Sec. 5, T21S, R40E, MDB&M, as shown on Figure 6. The area host rock is pale gray fine- to medium-grained Mesozoic alaskite, and the identification is based on alluvium examination since there are no in-place rock outcrops in the immediate area. The operator either traced quartz float to this site or saw a tiny outcrop of quartz sticking up through the thin alluvium and began prospecting. The perimeter of the trench was littered with a small quantity of white quartz with limonite coatings and a trace of fine-grained crystalline pyrite. A grab sample of the mineralized quartz was collected, and complete sample analysis is presented in Table A-1. There are no commercial values for precious metals or other commodities at this prospect.

Camino de Oro Prospect (N-521)

The location notice found at this site during the field investigation lists the prospect name as Camino de Oro. The locator was Hortense H. Wilbur, and 20 June 1939 was given as the date of location. The prospect is situated 2.0 miles east of Silver Peak and placed in the SW1/4, SW1/4, SW1/4, Sec. 32, T20S, R40E, MDB&M, as shown on Figure 6.

The area host rock is Mesozoic granite, and two narrow, quartz-bearing shear zones form the loci for the prospecting efforts.

The northernmost prospect is a 22-foot trench that strikes S83W. Granite is visible in the trench face and walls, the shear zone evidently pinching out somewhere along the length of the trench. Scattered white quartz with limonite coating and minor pyrolusite dendrite formation along fractures is present along the perimeter of the pit. A grab sample, labeled N-521-1, was taken from this loose material.

The southern working is a 9-foot-long pit that contains a 5-foot-wide shear zone that strikes S63W. One- to 2-inch quartz stringers are present in the shear and contain minor limonite stain. The stringers make up 10 to 15% of the shear zone volume. A chip sample, labeled N-521-2, was taken from the quartz stringer material.

The sample assay results, as shown in Table A-1, indicate no commercial values for precious metals or other commodities at the Camino de Oro Prospect.

Unnamed Prospect (N-522)

This group of prospects is situated on the east side of Coles Spring Road and spread over an area between 0.3 and 0.5 mile northeast of Dead End Cabin. It is placed in the NE1/4, SW1/4, SW1/4, Sec. 5, T21S, R40E, MDB&M, as shown on Figure 6. The group of workings, developed on three separate shear zones, are discussed individually, from north to south.

The northernmost prospect workings consist of two prospect pits driven on a vertical 1-foot-wide quartz vein that strikes N61E and is developed in a clay-altered Mesozoic alaskite host rock. Sample N-522-1 was chipped from the quartz vein that contains sparse covellite along fractures and tiny, scattered limonite pseudomorphs after pyrite. A total of approximately 20 cubic yards of rock was removed from the two pits.

The central group of workings consists of two prospect pits that held a volume of 65 cubic yards of material. These workings are developed in alaskite that has minor limonite staining. The pits trend along a bearing of N77E, but there are no indications of any type of shearing or quartz mineralization. A sample, labeled N-522-2, was chipped from the limonitized alaskite that outcrops at the borders of the pits.

The southernmost working is a single prospect pit that is caved and filled with slope wash. There is no outcrop of host rock or mineralized zone, but the slope wash contains rock of granite to alaskite composition. Scattered around the pit perimeter is quartz with tiny, sparse pseudomorphic limonite crystals after pyrite. A grab sample, labeled N-522-3, was taken of the quartz material.

The sample assay results, listed in Table A-1, show very low values for precious metals and other commodities. Field observations of these locations indicate the mineralized zones to be of very minimal extent and without the potential for further—even small-scale—exploration.

LOUISIANA BUTTE AREA

Silver King (N-501)

The Silver King No. 1 property is located approximately 1.9 miles northwest of Louisiana Butte in the NW1/4, SE1/4, NE1/4 of Sec. 34, T21S, R40E, MDB&M, and is shown in Figure 6. This claim was owned by M. Globerson and was adjacent to the Bonanza Mine (N-502), which was originally owned by Western Consolidated Gold Mines, Ltd. (Tucker and Sampson, 1938.)[11]

The mine was developed by two adits, the lower of which is now caved shut. The upper adit is 40 feet above the lower adit. Figure 57 shows a plan view of the upper workings, which consist of 62 feet of drift with a small amount of stoping (about 29 cubic yards) up-dip.

The workings were developed on parallel, mineralized shears in Mesozoic granite. The upper shear averages 1.2 feet thick (with a range of 0.8 foot to 2.5 feet), trends N38E, and dips 40 to 45 degrees to the northwest. The stoping occurred along a lens of quartz in the shear zone. The quartz occupied less than half of the shear zone thickness, was brecciated with hematite cement, and showed very sparse, irregular patches of copper staining. Two samples were taken of the quartz material: one with hematite cement only, and the second with hematite cement and copper stain. The analytical results are listed in Appendix A.

Sample 1 showed almost a quarter ounce of gold and 4.5 ounces of silver per ton, which might be encouraging if one did not have to dilute the vein to achieve a mined width of 3 feet. This dilution brings the value of the best material to be expected down to $73/ton. In addition, the samples were taken from a quartz lens less than 30 feet long. The prospector apparently stopped driving the drift when he ran out of quartz in the shear zone, most likely realizing that discontinuous mineralization of this sort very quickly increases the waste-to-ore ratio of an attempted mining operation.

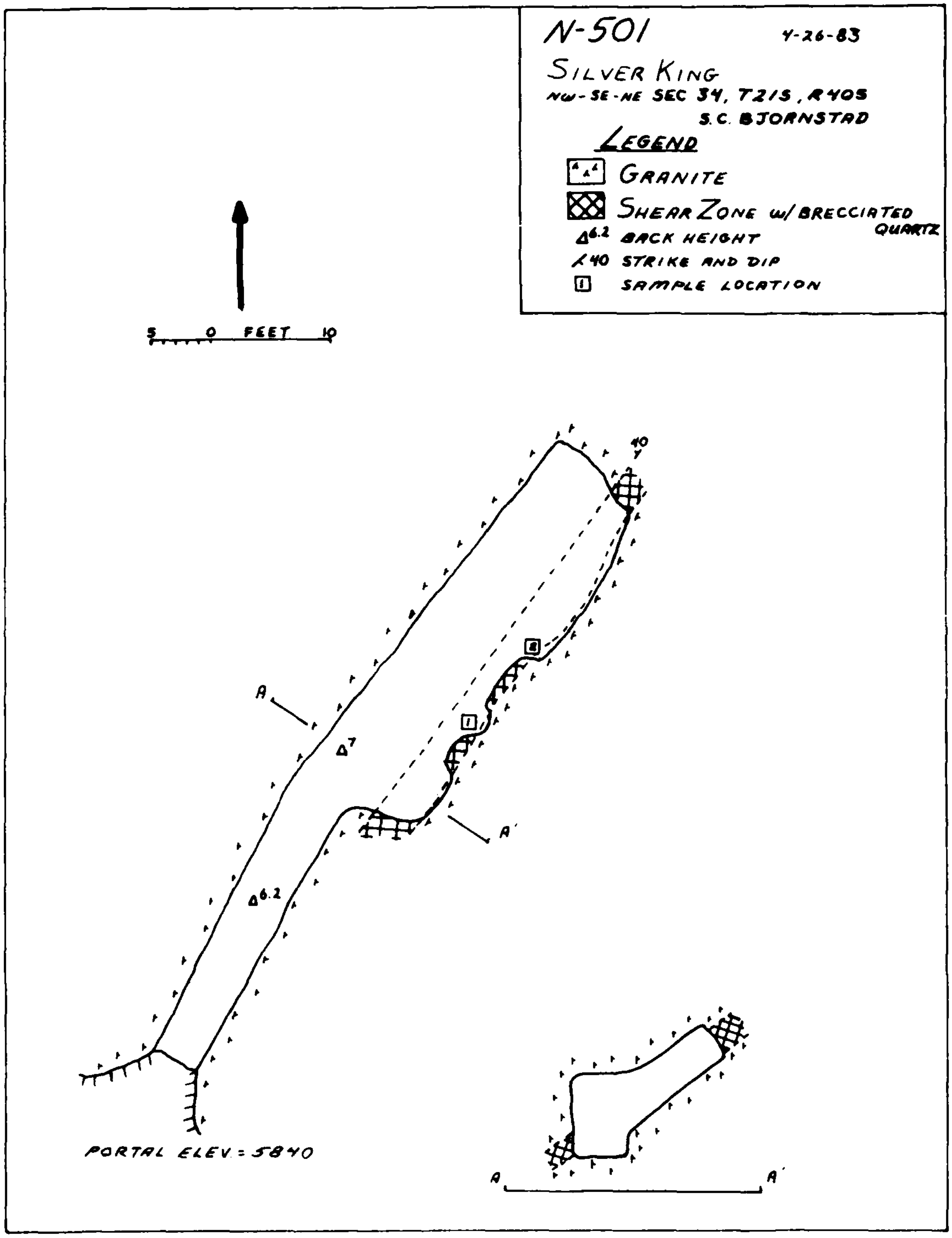

Figure 57. Plan view of upper adit, Silver King.

Bonanza (N-502)

The 1951 NOTS list of validated claims gave the owner of the Bonanza as "MacConnell," although the original owner is given as Western Consolidated Gold Mines, Ltd. in Tucker and Sampson (p. 468).[3] The mine is located about 2 miles northwest of Louisiana Butte in the SE1/4, NW1/4, NE1/4 of Sec. 34, T21S, R40E, MDB&M, as shown in Figure 6.

In the California Journal of Mines and Geology, Norman and Stewart[3] and Tucker and Sampson[11] make reference to this mine. They note that the mine owners reported the underground workings to consist of three adits dug in granite. The first, and largest, was driven east 575 feet to intersect the vein, then south 200 feet along the strike of the vein. A 50-foot high raise was driven at 100 feet along the strike; a second raise, 80 feet high, was driven at 200 feet from the portal. The second adit was driven east for 185 feet, about 90 feet above the first workings. The third adit was driven east for 100 feet, about 100 feet south of the first adit.

The mineral deposit was described as a vein, that varies from a narrow veinlet to 5 feet in thickness with brecciated quartz cemented with iron oxide. The gold ore occurs in short, lenticular shoots. While some small production was reported, no actual production record was provided.

This property was visited twice during the mineral survey. The first time, all adits were found caved shut. Two grab samples were taken of quartz vein material on the dump of the main adit, and an estimate was made of the workings of all three holes. Sample 1 was composed of quartz with sparse to moderate chyrsocolla and hematite fracture coating. Sample 2 was the same but without any chrysocolla. The assay results, which are listed in Appendix A, show that both samples contained subeconomic concentrations of gold.

The second visit was initiated because it was felt that the main adit could be reopened safely. This was accomplished in 4 hours with the combined efforts of three survey team members. Inspection of the workings netted the following information.

The country rock is Mesozoic granite that is cut by occasional mafic dikes and fractures and is decomposed near the surface and around the fractures. Because of this, there has been a great deal of rock fall throughout the drifts. Access to the entire 575-foot main drift is possible by climbing over several hundred feet of cave-ins. Only about 60 feet of the drift along strike is accessible. The "vein" at this point is a 1-foot wide shear zone with a discontinuous veinlet of barren quartz. The main drift is sinuous, generally trends east-southeast, while the cross drift trends south-southwest.

Two raises were found and investigated. The first is about 200 feet from the portal and follows a northeasterly dipping vein up-dip for about 80 feet. The upper end of the raise opens on a small stope from which about 200 cubic yards have been mined. The vein in the stope is up to 2 feet wide (in a pillar) and is composed of brecciated quartz cemented with hematite. Sample 3 was taken across the wide part of the vein and was later assayed at 0.960 oz/ton gold ($480/ton). The second raise is about 40 feet further down the drift. It follows the same vein (inclined at 33 degrees) up-dip for about 20 feet. The vein is very thin in the drift but it thickens to about 4 inches at the top of the raise.

(No map was made of these workings because the team decided that the ground appeared too unstable to chance spending several hours underground making a map.)

The inspection tour confirmed much of what had been reported in the literature regarding the workings. For the purposes of this survey, the other adits are assumed to be as reported. The vein observed matched the reported description in all aspects but thickness. It is possible that the vein was wider where mined or that it is wider at the back end of the mine (which is now inaccessible). It is probable that the entire local shear zone width was reported as a "vein." This was a common practice among small miners.

The potential for a commercial gold deposit at the site is small. A great deal of work was done here with, apparently, a very small return. Over 1200 feet of horizontal and vertical workings were developed, much of it along shears that contained, or could have contained, quartz veins. The veins are lenticular and discontinuous where developed, and there is no reason to think the occurrence will be better up or down-dip.

Lucky Red Mine (N-503)

The Lucky Red Mine claim was staked in 1935 by W. P. Chase and T. C. and Bobbie Murphree at the south end of Coles Flat in the NW1/4, NW1/4, SW1/4 of Sec. 24, T21S, R40E, MDB&M. The location is shown in Figure 6. Location notices found on site indicate that the claim was restaked in 1940 by Ernest Hugh Hooker and Mary Taylor of Los Angeles. However, this 1940 claim was either invalidated or subsequently overstaked because the 1951 list of validated claims released by NOTS gives the claimants as W. P. Chase and Inez MacDonald.

The claim was developed by a 150-foot-long trench and three short shafts that range (by estimate) from 8 to 16 feet deep, but are now all caved. These workings were dug on a northeast-trending and 20-degree southeast dipping quartz vein cutting diorite and leucogranite intrusives of Mesozoic age. The vein is a maximum of 4 feet thick and consists of hematite-stained quartz with sparse pyrite, chalcopyrite, and copper staining. The surface exposure of the vein is less than 300 feet in length.

Two samples were taken as hand-sorted grabs: N-503-1 is quartz with hematite and copper stain; N-503-2 is quartz with hematite only. The analytical results are listed in Appendix A.

Lucky Red may have been the name of this claim but it certainly was not a "lucky strike;" at least not as far as ore grade mineralization is concerned. The grab samples showed no gold content. It must be concluded, then, that the 4-foot-wide quartz vein is barren and that no potential exists in this area.

Ninety-Eight Quartz and Placer (N-504)

The Ninety-Eight Quartz and Placer group is located in the NE1/4, NW1/4, SE1/4 of Sec. 10, T21S, R40E, MDB&M, as shown by Figure 6. It is situated in the southwest quarter of Coles Flat about 2.5 miles south of Coles Spring, and consisted of 180 acres of unpatented quartz and placer claims. NOTS records give the last valid claimant as L. M. Allen, but they do not give a layout of the claims. It is possible, because of the proximity, that Unnamed Prospect N-518 is part of this claim group, but because of the uncertainty, N-518 is listed separately.

The hardrock workings at this claim group consists of a single adit, now caved, with a probable drift length of less than 50 feet. The claim was developed on the north side of a small hill that covers about 1/16 of a square mile. The hill is composed of Mesozoic diorite and hydrothermally altered diorite and stands 160 feet above the surrounding, more recent, alluvium. The Death Valley Sheet of the Geologic Map of California (1977)[12] shows this area to consist entirely of pre-Cretaceous metamorphic rocks, but field reconnaissance showed primarily Mesozoic intrusive rocks and only limited exposures of metavolcanics to the west and south of the hill.

The hydrothermal mineralization appears as quartz-sericite alteration of the diorite. This alteration occurs at widely scattered locations over the entire hill area and appears as irregular pods, up to 20 by 30 feet at the surface, associated with north-south trending fracture zones and very sparse mafic dikes. It is estimated that less than 10% of the outcrop of the hill is occupied by altered diorite. Within individual pods, milky crystalline quartz and limonite pseudomorphs (after pyrite) occur as small masses and veins and as individual

[12]California Division of Mines. "Geologic Map of California, Death Valley Sheet," 1977.

crystals in the diorite groundmass and make up less than 20% of the total volume. Crystals of quartz range up to 2 inches long, while limonite pseudomorphs were found up to 3 inches across.

At this site very little "vein" material is present on the dump so that grab sample N-504-1, which assayed nil gold, may not be representative of the material prospected. Sample N-518-1, which assayed 0.32 ounce per ton gold, was taken from similar material, *in-situ*, on the south side of the hill and may be more representative of the type of mineralization sought by the prospector. The analytical results for each sample are given in Appendix A.

The potential for a commercial deposit at this site is low. One of the samples indicates that ore-grade mineralization exists in the area, but the "vein" material is too disperse to be mined economically.

In addition to hardrock prospecting, the name and size of this claim group implies that the prospector was also interested in placer mining at this site. Some of the placer claims probably covered a large wash that cuts across Coles Flat in a west to east direction, incising the alluvial cover an average of 3 feet deep 1100 feet north of the adit. The wash is part of a drainage system that originates in the granitic hills 1 mile to the west and is tributary to Darwin Wash on the east side of Coles Flat. The drainage is fairly flat across the claims: just over 0.5% slope on average. No evidence of placer mining activity was found in this area.

The potential for the existence of a commercial placer gold deposit at this site is very low, as this small alluvial plain is a poor environment for the occurrence of near-surface placers. The relief is low, the supply of source material is limited, and the water regime is unfavorable to the concentration of gold or other heavy minerals.

Unnamed Prospect (N-508)

Prospect N-508 is located approximately 1.9 miles northwest of Louisiana Butte in the SE1/4, SE1/4, NW1/4 of Sec. 34, T21S, R40E, MDB&M, as shown in Figure 6.

The prospect consists of two workings on opposite sides of a small wash that is tributary to Petroglyph Canyon. On the east side of the wash is a pit 6 feet across and 3 feet deep, while on the west side is a 49-foot adit. Both were made on a 3-foot-wide shear zone, trending N30W and dipping 84 degrees south. Although the Death Valley Sheet of the Geologic Map of California (1977) shows the outcrop here to be pre-Cretaceous metavolcanics, it is actually Mesozoic granite.

The shear zone is composed primarily of hematite-rich selvage with sparse quartz as lenses and pods less than 0.5 foot wide. The surface exposure above the adit shows sparse to moderate malachite and chrysocolla as fracture coatings of the quartz, but there is none underground. A single sample was taken across the shear zone at the face. The assay results, which are listed in Appendix A, indicate that no mineral potential exists at this prospect.

Big Tee Group (N-509)

The Big Tee Group is located at the south end of Coles Flat in the N1/2, NE1/4, SW1/4, of Sec 14, T21S, R40E, MDB&M, as shown in Figure 6. The 1938 report of the State Mineralogist of the Mineral Resources of Inyo County[11] listed owners as Russell Lange, *et al*, of Darwin, Calif., while the 1951 NOTS list of validated claims gives the claimant as M. Globerson for Big Tee No. 2.

The workings were developed on a 2-foot-wide, vertical shear zone, trending N48E in Mesozoic leucogranite, and consist of a 20-foot-deep shaft, a 35-foot trench south of the shaft, and another 25-foot-long trench north of the shaft.

The shear zone is quartz-poor, consisting almost entirely of fractured country rock and sparse fault gouge. Hematite and secondary copper minerals occur as fracture-fillings and are concentrated at the shaft but quickly become less intense in both directions along the trenching. A single grab sample was taken of the "high-grade" dump material at the shaft. Gold analysis showed 0.14 troy-oz/ton, or $70/ton rock. Full analytical results are given in Appendix A.

Examination of the surrounding area turned up no other mineralization nearby. This, coupled with the limited extent of mineralization of the prospected shear zone, indicates that there is no potential at this site for a mineable deposit.

Yucca Queen (N-510)

According to claim papers found on site, the Yucca Queen prospect was staked by H. E. Robinson and Marton Cole in April 1937 at the south end of Coles Flat in the SE1/4, NE1/4, of Sec. 22, T21S, R40E, MDB&M. The location can be seen in Figure 6.

The work done on this prospect consisted of five pits in an area 500 by 700 feet. None of the pits was very large, the biggest being 8 feet across and 3 feet deep. The workings were dug in a pre-Cretaceous metavolcanic host on an irregular vein network consisting of fractured massive quartz with hematite cement. An individual vein may be up to 4 inches thick. Very sparse copper staining is present in the fractures as well. The outcropping of vein material was very indistinct and consists mostly of float on the gentle slope of the metamorphic terrain. An altered mafic dike cuts through this site, trending in a north-northwesterly direction,and the mineralization may be associated with it.

One composite, "highgrade" grab sample was taken from all of the pits. Full analytical results are listed in Appendix A. Although the sample ran 0.24 troy-oz/ton gold, the potential here for an economic deposit is very small. The veins are small and spread out and the site is isolated from any related sites of mineralization.

Northeast Louisiana Butte Prospect (N-512)

These workings are located approximately 1.1 miles north of the Louisiana Butte VABM and 6.2 miles west-southwest of the Junction Ranch bench mark at an approximate elevation of 5980 feet. The claim is shown as N-512 on Figure 6 and is in the SW1/4, NW1/4, SW1/4 of Sec. 36, T21S, R40E, MDB&M.

The site is an outcrop of massive quartz that shows minor mineralization. Limonite exists as a coating along hairline fractures and there are occasional pyrite and chalcopyrite crystals that are 1/8 inch or less. The smaller chalcopyrite crystals have reaction rims or halos of chrysocolla that stains the quartz. The tabular quartz vein has a surface exposure approximately 75 feet along its strike of N9E. It dips approximately 85 degrees northwest, and is approximately 10 feet thick. The outcrop is overlain by volcanic scoria from the nearby Pleistocene cinder cone; these cinders cover the slope down from the outcrop as well, concealing the identity of the host rock. The California Division of Mines geologic map of the area, the Death Valley Sheet (1977),[12] indicates that this site is in pre-Cretaceous metamorphic rock.

The outcrop was explored by a short shaft and a pit. The shaft is 4 by 5 feet and is 7 feet deep. It is driven down along a fault that strikes N72E and dips approximately 22 degrees southeast. The pit is 6 by 8 by 4 feet deep and two smaller pits accompany it. The pits were dug in a massive quartz pod with no visible structural features, nor are there any indications of commercial grades of mineralization.

One composite surface sample, N-512-1, was taken of material showing the highest mineralization. Assay results are shown in Appendix A. No precious metal values were found that would indicate commercial potential.

The quartz is fairly pure, having only minor amounts of iron and copper, and it could have a market value if crushed and sold as aggregate. There is, however, probably no more than 100 cubic yards of quartz. This small amount is not worth the road improvements that would be needed to transport this ore from the outcrop 1.5 miles to the main road and then to market.

Blue Rock Mine (N-515)

The 1938 report of the State Mineralogist on the Mineral Resources of Inyo County states the Blue Rock mine was a group of four claims owned by Walter Palmer, *et al*, of Darwin, Calif.[11] These claims were not on the NOTS list of validated claims in 1951, although it is possible that the 98 Quartz and Placer Group (N-504) encompasses this site. The location of this group is given as being near the southwest corner of Coles Flat, in the E1/2, NE1/4, SW1/4 of Sec. 10, T21S, R40E, MDB&M, as shown by Figure 6.

The visible workings consist of a 120-foot trench, 8 feet wide by 5 feet deep, with a caved decline near the center and a second caved shaft about 50 feet north. The trench (and decline) follows a 4-foot-wide quartz vein that trends N55W and dips to the northeast about 40 degrees. The decline was reported to be 40 feet deep. The second shaft should intersect the vein at about 45 feet. There are, however, an estimated 250 feet of underground working represented in the dump (if no stoping was done), with 90 feet at the second shaft and the remainder at the first. There are also several small pits northwest of the second shaft, apparently dug to investigate other, smaller quartz outcrops.

The vein itself consists of fractured quartz with hematite as a constituent of the quartz and as fracture-fillings. The host rock at the surface is pre-Cretaceous metavolcanic.

Two samples were taken at this site. The first was taken from the vein in the trench, while the second was taken from a small pit near the second shaft. Full analytical results are listed in Appendix A and the gold and silver values are also given in Table 15.

TABLE 15. Precious Metals Assays, Blue Rock Mine.

Sample	Gold		Silver		Total sample value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-515-1	0.021	10.50	0.34	5.10	15.60
N-515-2	0.087	43.50	0.72	10.80	54.30

The mineral potential at this site is uncertain because the amount of mining work done is not justified by the mineralization indicated by the samples. These samples, however, may more closely approximate the average "waste" vein material because there was no "best-looking" material on the mine dumps or stockpiled nearby. (This site is adjacent to a maintained road and the dumps have probably been well picked over previous to this examination.) At 4 feet (on the surface) the vein is as wide as or wider than any other encountered in the Coso District during this survey but its strike length is limited. Its dip length, while uncertain, is probably limited as well. If the vein does extend for some distance down-dip it would be anomalous to the district, which is characterized by lensic quartz bodies in narrow (less than 5 feet wide) shear zones.

Given the above information, it is unlikely that any potential for the occurrence of commercial mineralization exists at this site.

Unnamed Prospect (N-516)

Prospect N-516 is situated near the south end of Coles Flat in the SE1/4, SE1/4, SW1/4 of Sec. 14, T21S, R40E, MDB&M, as shown in Figure 6. The workings consist basically of a large pit, 20 by 25 feet by 11 feet deep, dug on the contact of a 5-foot-wide lamprophyre dike in Mesozoic granite. The dike trends N15E and dips 87 degrees east. At the bottom of the pit, a drift was driven 8 feet in a southerly direction along the dike.

Mineralization occurs in the altered granite on the footwall side of the dike. This alteration zone is several feet wide and is distinguished by degradation of feldspar to kaolinite and an increase of silica. The mineralization, however, appears to have been restricted to within a foot of the contact and appears to be characterized by quartz lenses (up to 10 inches wide) with moderate to abundant pyrite, chalcopyrite, covellite, malachite, and chrysocolla. The only mineralization still present in the pit wall is a small occurrence of copper staining in the altered granite near the drift entrance. A quartz stockpile next to the pit has chunks of mineralized quartz up to 10 inches across.

The analytical results of a "high-grade" grab sample (N-516) taken from the quartz stockpile are given in Appendix A. While the gold assay (0.36 troy-oz/ton, or $180/ton) indicates that "ore-grade" material existed at this site, the site has been mined out. This prospect is apparently another example similar to the Silver King No. 1 (N-501) in which numerous lenses of quartz occur in alteration and shear zones but are too small to be mined profitably by themselves and too scattered to be mined as a unit.

Unnamed Placer (N-517)

This placer working is located in a wash tributary to Petroglyph Canyon about 1.9 miles northwest of Louisiana Butte, in the S1/2, NW1/4, NE1/4 of Sec. 34, T21S, R40E, MDB&M, as shown on Figure 6. This placer appears to have been worked about the same time as the Bonanza (N-502) and may have been operated by the same people.

The alluvium consists primarily of recent stream gravels that extend approximately 1500 feet down the canyon until they join the sediments of a larger plain. Within the wash, the canyon floor is 100 to 400 feet wide.

The gravels at the upper end of the wash (and nearest the mine) were worked over an area approximately 600 feet long by 75 to 150 feet wide. No reference to any gold production was found during this investigation.

Some potential may exist over the unworked part of this deposit, but the deposit itself is too small to be of interest to any but the smallest operators.

Unnamed Prospect (N-518)

This prospect is located on the south side of a small hill in the southwest corner of Coles Flat. Its cadastral location is shown as the SE1/4, NW1/4, SE1/4 of Sec. 10, T21S, R40E, MDB&M, and is shown in Figure 6. As mentioned earlier, this prospect may be part of the Ninety-Eight Quartz and Placer Group (N-504).

The workings are shown in Figure 58 and consist of two trenches 25 feet apart. The east trench is 30 feet long, 10 feet wide, 4.5 feet deep, and is oriented N80E. The west trench is 20 feet long, 7 feet wide, and 8.5 feet deep. There is a 27-foot-long adit at the north end of this trench and both workings trend approximately N25E. There is also a small stone cabin nearby.

The hydrothermal mineralization appears as quartz-sericite alteration of the diorite. This alteration occurs at widely scattered locations over the entire hill area and appears as irregular pods up to 20 by 30 feet at the surface associated with north-south trending fracture zones and very sparse mafic dikes. It is estimated that less than 10% of the outcrop of the hill is occupied by altered diorite. Within individual pods, milky crystalline quartz and limonite pseudomorphs (after pyrite) occur as small masses and veins and as individual crystals in the diorite groundmass and make up less than 20% of the total volume. Crystals of quartz range up to 2 inches long,

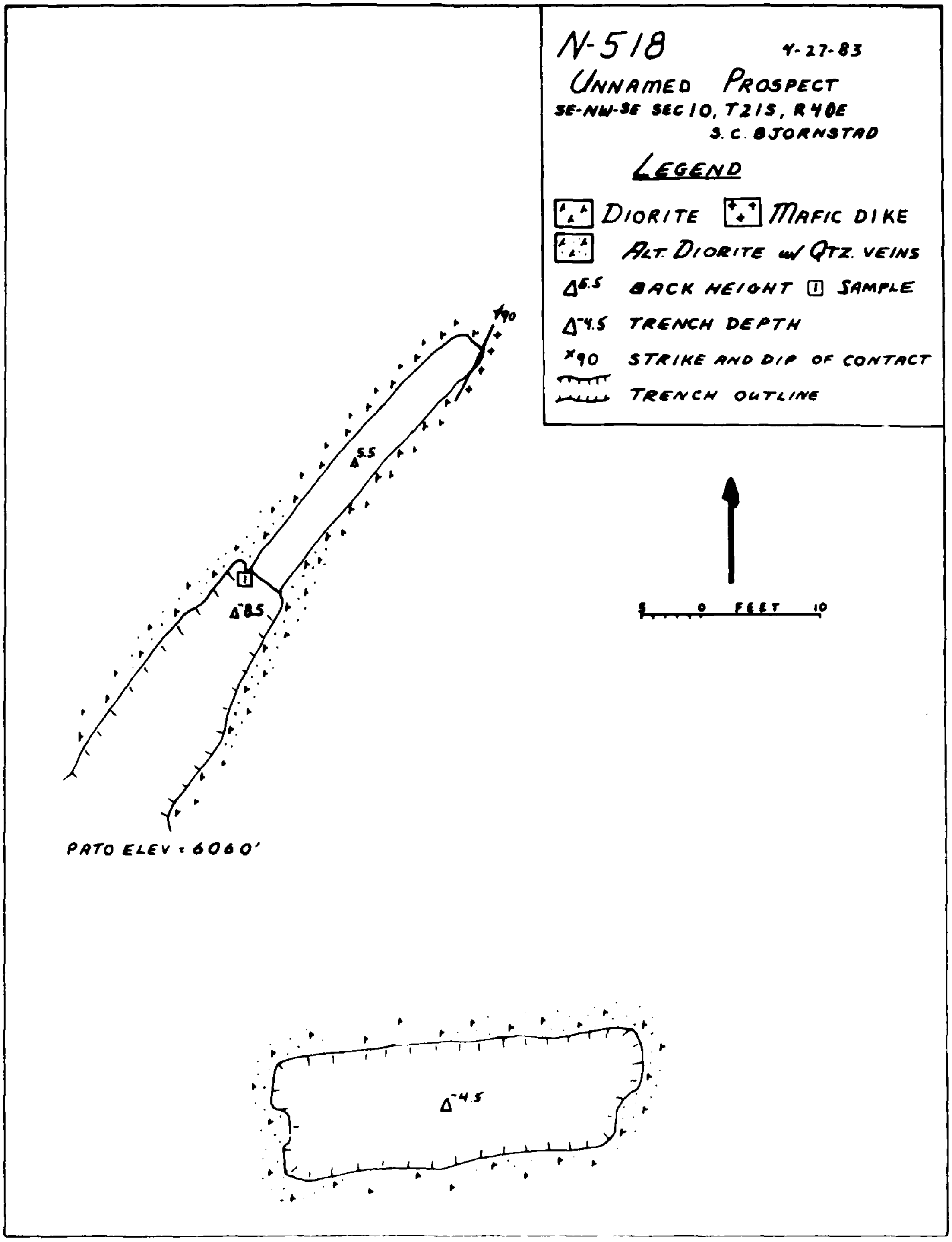

Figure 58. Plan view of working at N-518.

while limonite pseudomorphs were found up to 3 inches across. A single sample was taken of vein material at the adit. The assay results are given in Table 16 and in Appendix A.

TABLE 16. Precious Metals Analysis of Sample from Site N-518.

Sample	Gold		Silver		Total sample value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-518-1	0.320	160.00	1.12	16.80	176.80

The potential for a commercial deposit at this site is low. The sample indicates that ore-grade mineralization exists in the area, but the "vein" material is too disperse to be mined economically.

Unnamed Prospect (N-523)

A claim site located approximately 4.5 miles northwest of the Louisiana Butte VABM and 4.2 miles south-southeast of the Silver Ridge VABM was presumably staked for precious metals. It is shown as N-523 on Figure 6. The site is on surveyed land in the SW1/4, SW1/4, NW1/4 of Sec. 21, T21S, R40E, MDB&M.

This area is adjacent the large Pleistocene basalt flows of the east Coso Volcanic Field. The claim covers an area of hydrothermally altered Mesozoic granite that has interstitial staining and fracture coatings of limonite as well as minor manganese dendrites. No other mineralization was apparent, and the fire assay results show no precious metal values. See Appendix A for a complete listing of assay results.

Unnamed Prospect (N-524)

This prospect pit is located on the north side of the old stage road that links Coso Hot Springs with Coles Flat. It is approximately 3.8 miles north-northwest of the Louisiana Butte VABM and 3.5 miles southeast of Dead End Cabin in the Coso Mountains. Figure 6 shows this site as N-524 at an approximate elevation of 5960 feet. The pit is on lands covered by the public lands survey; this survey places it in the NW1/4, NE1/4, NE1/4 of Sec. 22, T21S, R40E, MDB&M.

The working is a 6- by 6-foot pit dug to a depth of 2 feet. It exposes a felsite dike striking N65W and dipping approximately 78 degrees southwest with a 2-inch wide quartz vein paralleling the dike along its northeast side. The host rock is Mesozoic granite that is decomposed by surface weathering. The quartz vein shows minor mineralization of galena and pyrite, with some pyrite showing alteration to limonite.

A sample was taken of the vein material. Assay results for the precious metals are shown in Appendix A. This sample showed no commercial precious metal values, and there is no geologic reason to expect precious metal values or vein size to increase with depth.

El Conejo (N-601)

The El Conejo property is located about 2 miles northwest of Louisiana Butte in the NW1/4 SW1/4, NE1/4, of Sec. 31, T21S, R41E, MDB&M, as shown by Figure 6. The surface structures on the property include a headframe over the shaft, a hoisthouse that also houses a compressor, and several dwellings that range from cabins to lean-tos. The shaft is vertical and 80 feet down to the muck pile. At the collar it measures 9 by 6 feet, but widens toward the bottom to 10.5 by 8 feet. No other underground workings are evident, although the muck may be deep enough to have covered a drift opening.

The geology of the area consists of Mesozoic diorite plutons capped by pre-Cretaceous metamorphic rocks. The shaft was sunk primarily in diorite. It followed a shear zone that cut the rocks in a northeasterly direction, dipping about 85 degrees north. A small amount of brecciated, barren quartz is present in the shear near the bottom of the shaft. A sample was taken of the quartz, and the results listed in Appendix A.

An assessment of the economic potential of this area is not difficult because there is very little vein material or mineralization present, either on the dump or *in situ* in the accessible workings. There are no other workings, vein outcrops or alteration zones exposed within a mile of the site, and the sample assay report showed no gold mineralization. No commerial potential exists at El Conejo.

Golden Monarch No. 2 (N-602)

Examination of a claim marker still in place disclosed a Quartz Claim Notice of Location. The locators, Joe Connor, J. C. Church, and Leo McDowell, named the claim Golden Monarch No. 2 of the Coso Mining District in Inyo County and filed the claim on 16 June 1930.

From the description on the mining claim, Golden Monarch No. 2 is the easterly of the claims, and is oriented north-south. Golden Monarch No. 1 was reclaimed in 1944 and renamed Gold Star (Gold Claim) No.4; its description can be found under this name with N-609.

The site is located approximately 2 miles west of the Junction Ranch bench mark and 2.6 miles east-northeast of the El Conejo Mine. It is shown on Figure 6 and is at an approximate elevation of 6405 feet. The claim is on surveyed land in the SE1/4, SW1/4, SW1/4, of Sec. 27, T21S, R41E, MDB&M.

The host rock is a porphyritic Mesozoic granite with 1/2-inch phenocrysts of potassium feldspar. The area is cut by northwest-trending gabbroic dikes that are associated with the quartz mineralization. The quartz shows a range of mineralization from simple limonite fracture coatings to fracture coatings of limonite, chrysocolla, and azurite with some residual pyrite.

The property was explored by an adit approximately 12 feet long and 6 feet wide covered with slope wash, and by a shaft 9 by 8 feet and 7 feet deep 30 feet above and to the south of the adit. The vein was not seen at either of the workings.

Two samples were taken. Sample N-602-2 was taken at the adit where the quartz showed only limonite fracture coatings. Sample N-602-1 was taken at the shaft and showed some copper-stained fractures in addition to the iron staining and some pyrite crystals. Table 17 below lists the precious metals assay results.

TABLE 17. Golden Monarch Assay Results.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-602-1	0.120	60.00	1.59	23.85	83.85
N-602-2	Nil	...	Nil	...	...

The samples taken represent the apparent best-grade material exposed at the site. The fact that the vein is not visible in the walls of the shaft indicates that it pinches and swells over a length of 8 feet, and the size of ore material sampled indicates a probable vein width of 3 to 4 inches. This in turn indicates that when mined, the value of the ore in place has dropped to an equivalent of $9.32/ton. In this light, neither sample shows any commercial potential for the production of precious metals or other commodities.

Unnamed Prospect (N-603)

Prospect N-603 is located about 2.4 miles northeast of the El Conejo Mine (N-601) in the SW1/4, SW1/4, SE1/4, of Sec. 21, T21S, R41E, MDB&M, as seen in Figure 6.

The workings consist of three short shafts (all caved) and two small, sloughed prospect pits that were dug on a quartz vein or veins in a Mesozoic hornblende granite. Although the workings are aligned in a N52E direction, the vein does not outcrop and cannot be seen in the pits, so it is difficult to say for certain that only one exists. The quartz material on the dumps is fractured with sparse to moderate hematite and limonite stain and very sparse druse of malachite.

The potential here is low. The closest other prospects are over a mile away and no outcrops or alteration zones can be seen nearby. A single composite sample was taken from the dumps, with discouraging results (Appendix A).

Unnamed Prospect (N-604)

This prospect is located toward the head of Darwin Wash in the NW1/4, SW1/4, NE1/4 of Sec. 18, T21S, R41E, MDB&M, as seen in Figure 6.

The workings consist of a 25-foot shaft and a 12- by 10-foot pit, 8 feet deep. They were dug 30 feet apart on a shear zone in Mesozoic quartz diorite. The shear zone trends N23W and dips west at 70 degrees. In the pit, the shear zone is 5 feet wide with abundant, brecciated, and lightly stained quartz. The stain is composed of hematite and malachite. To the north, the shear zone in the shaft is 5 feet wide at the surface but narrows to about 4 inches at the bottom. There is much less quartz and it is white and unstained.

A sample taken of the quartz breccia at the bottom of the shaft showed no gold values. The sample results are given in Appendix A. This vein is isolated, the nearest prospect being 2 miles away. It is also essentially barren—no potential exists here.

Gold Star (Gold Claim) Prospects (N-609)

Examination of claim markers still in place yielded two "Notice of Location" forms. The first is Gold Star (Claim) No. 4. It is found in the SE1/4, SE1/4, SE1/4, Sec. 27, T21S, R41E, and overlaps the earlier Golden Monarch No. 1 Claim (N-602). The second is Gold Star Claim No. 3. It is found in the SW1/4, NW1/4, NW1/4, of Sec. 34, T21S, R41E.

These two claims were located by the same person (name illegible), witnessed by Chas. F. Stanley, and filed 22 November 1944. The third prospect that makes up this group had no claim markers. It is located in the SW1/4, NE1/4, NW1/4 of Sec. 34, T21S, R41E, MDB&M (Figure 6).

The third prospect is a pit measuring 10 by 12 feet at the surface and is caved 8 feet below the surface. The prospect is in decomposed Mesozoic granite and exposes a 0.5- to 0.7-foot quartz vein that parallels a mafic dike striking N81W and dipping approximately 88 degrees northeast. The quartz contains limonite as fracture coatings and minor copper staining as chrysocolla. Sample N-609-1 represents this vein material.

On Gold Star No. 4 (Golden Monarch No. 1) there is a 5- by 4- by 2-foot deep pit in porphyritic granite just north of a northwest-trending porphyritic gabbro dike. The pit exposes a 2-inch quartz vein that parallels the dike. Sample N-602-2 represents the quartz vein that has fracture coatings of limonite and no copper staining.

Gold Claim No. 3 has a pit, 5 by 6 feet and 4 feet deep, in decomposed Mesozoic granite. The pit is along a N85W-striking, vertically dipping mafic dike and exposes a 1-foot-wide vein of quartz and calcite. The quartz has minor limonite staining along fractures and is represented by sample N-602-3. Table 18 lists the assay results for precious metals and shows the computed values for the vein material alone.

TABLE 18. Assay Results for the Gold Star (Claim) Prospects.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-609-1	0.100	50.00	0.70	10.50	60.50
N-609-2	0.016	8.00	Nil	...	8.00
N-609-3	Nil	...	Nil	...	...

There is no geologic reason to expect the precious metal values or the vein width to increase with depth; therefore, the assay values show there is no commercial potential at any of these sites.

Unnamed Prospect (N-610)

This site is located approximately 1.9 miles west of Howard Ranch and 1.7 miles southwest of Junction Ranch along the south side of the road to the El Conejo Mine at an approximate elevation of 6280 feet. It is shown as N-610 on Figure 6. The workings are on surveyed land in the SW1/4, SE1/4, SE1/4 of Sec. 34, T21S, R41E, MDB&M.

The property was presumably explored for precious metals by an adit, now caved, and a prospect pit. The adit proceeds S24W for approximately 15 feet at a width of 3 to 3.5 feet before it is caved closed. The dump indicates the operators were driving through Mesozoic granite and granodiorite, and intersected an aplite dike. The dump size indicates the drift to be 60 to 80 feet in length at a height of 5 feet and a width of 3.5 feet. No identifiable mineralization was found; therefore, no sample was taken.

Misstake Prospect (N-801)

The legal archives (NOTS Condemnation Case No. 415) indicate that this prospect was held by John P. Hyman and worked for gold and silver. It is located approximately 1.9 miles south-southwest of the El Conejo Mine along the southeast shoulder of Louisiana Butte. The site is shown as N-801 on Figure 6 and is found to be in the NE1/4, NE1/4, NE1/4 of Sec. 12, T22S, R40E, MDB&M.

The workings expose two types of mineralization that occur in the Mesozoic granite. The first is quartz with siderite as fracture coatings in a shear zone that is adjacent to a dacite dike; the dacite contains phenocrysts of plagioclase and pyroxene. The second type of mineralization is a 4- to 10-inch-wide quartz vein with minor limonite fracture coatings that parallels an aplite dike.

The property was explored by a shaft and minor prospects. The layout of the workings, as well as a cross-sectional view of the shaft, is shown in Figure 59. The 74-foot shaft was driven through weathered granite to the first type of mineralization. Sample N-801-1 was taken at the surface along the dike in a small prospect pit northwest of the shaft. The sample represents small pieces of loose quartz taken from the pit. Sample N-801-2 was taken from the shear zone at a depth of 70 feet. The prospects to the southeast of the shaft represent the second type of mineralization. Assay results for these samples are given in Table 19.

Although the grade and value for the samples is mildly encouraging, the following considerations should be taken into account.

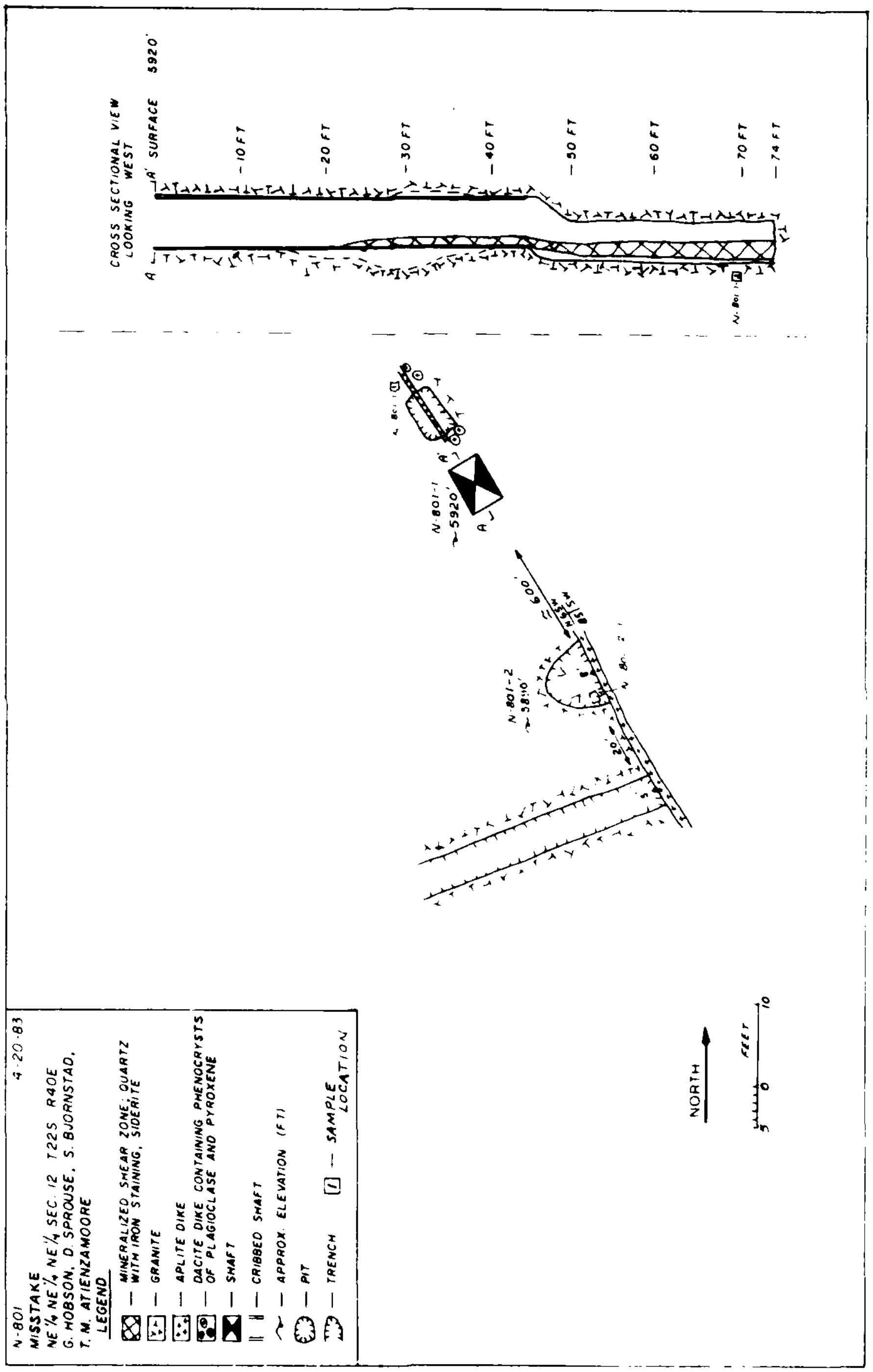

Figure 59. Map and cross section of workings, Misstake Prospect.

TABLE 19. Assay Results for Samples Taken From the Misstake Prospect.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-801-1	0.370	185.00	1.74	26.10	211.10
N-801-2	0.088	44.00	0.45	6.75	50.75

Each of the samples represents the apparent best grade of ore material available. The samples do not represent the entire vein width or mineable width. The values appear to decrease with increasing depth. The shear zone representing the highest values is cut off to the east by the aplite dike and is not traceable to the west beyond the small prospect pit. This site has no commercial potential for the production of precious metals due to the poor grade and limited tonnages indicated.

Mojave View (N-802)

Mr. John R. Hyman is listed as the claimant for this property (NOTS Condemnation Case No. 416) in the legal records covering the 1947 Condemnation Proceedings. The property is located approximately 2.1 miles south-southeast of the El Conejo Mine at an elevation of 6200 feet on a ridge trending southeast from the top of Louisiana Butte, shown as N-802 on Figure 6. It lies on surveyed land in the NW1/4, NE1/4 of Sec. 12, T22S, R40E, MDB&M.

The major working, a shaft, exposes a 16- to 24-inch quartz vein that is adjacent an aplite dike. The dike cuts pre-Cretaceous metavolcanic rock that has a gneissic structure with a composition approximately that of andesite. The vein strikes N86W and dips 76 degrees northeast. The quartz has intense copper staining in the form of chrysocolla and to a lesser extent malachite as fracture coatings. Bornite is also present as a fracture coating. There are also sparse massive chalcopyrite and 1/8-inch crystals of pyrite.

The smaller workings on the property consist of four small pits dug along the west flank of the ridge. These prospects are in the host rock, but no identifiable mineralization was exposed. The shaft, 4 by 6 feet wide, is partially closed off 30 feet below the surface. The dump indicates the shaft is probably another 30 feet deep. Approximately 80 feet below the shaft, on the north-facing slope of the same hill, is an adit. The adit was driven on a heading of S35W apparently to intersect the shaft but the connection was not completed.

Only one sample was taken at the site since the shaft was inaccessible. The sample was taken from the ore pile and represents the apparent highest grade material. Table 20 gives the assay results for the precious metal content of the ore.

TABLE 20. Mojave View Assay Results.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-802-1	0.100	50.00	3.79	56.85	106.85

The precious metal values appear to be slightly interesting, however, on traversing the ridge along the strike of the vein, no other outcrops or float indicative of quartz mineralization could be found. The dump covers up approximately 30 feet along the strike of the vein, which leads one to believe the vein may actually be a lens with a maximum length of 30 feet and a maximum width of 24 inches, indicating that a very low tonnage is present.

Unnamed Prospect (N-805)

This prospect is located on the south flank of Louisiana Butte in the NE1/4, SW1/4, NE1/4 of Sec. 11, T22S, R41E, MDB&M as shown in Figure 6. The prospect consists of a single adit developed on a small quartz vein in Mesozoic diorite. The vein, which was visible at the surface, trends N50W, dips 80 degrees north, contains moderate hematite as fracture coatings, and thins away from the outcrop from 1.2 feet to 2 inches in width. A plan view of this prospect is shown in Figure 60.

It is probable that the prospector was looking for precious metal values associated with the quartz since no other mineralization is evident. Because the small amount of quartz present is free of pyrite and chalcopyrite or other evidence typical of trace gold mineralization, no samples were taken and no mineral potential is believed to exist.

Yellow Ribbon No. 10 (N-810)

The Yellow Ribbon No. 10 is located in the SW1/4, NW1/4, NW1/4 of Sec. 12, T22S, R40E, MDB&M, on the south flank of Louisiana Butte as shown in Figure 6. It was staked by C. C. Martensen in 1942, probably as an overstake of older workings.

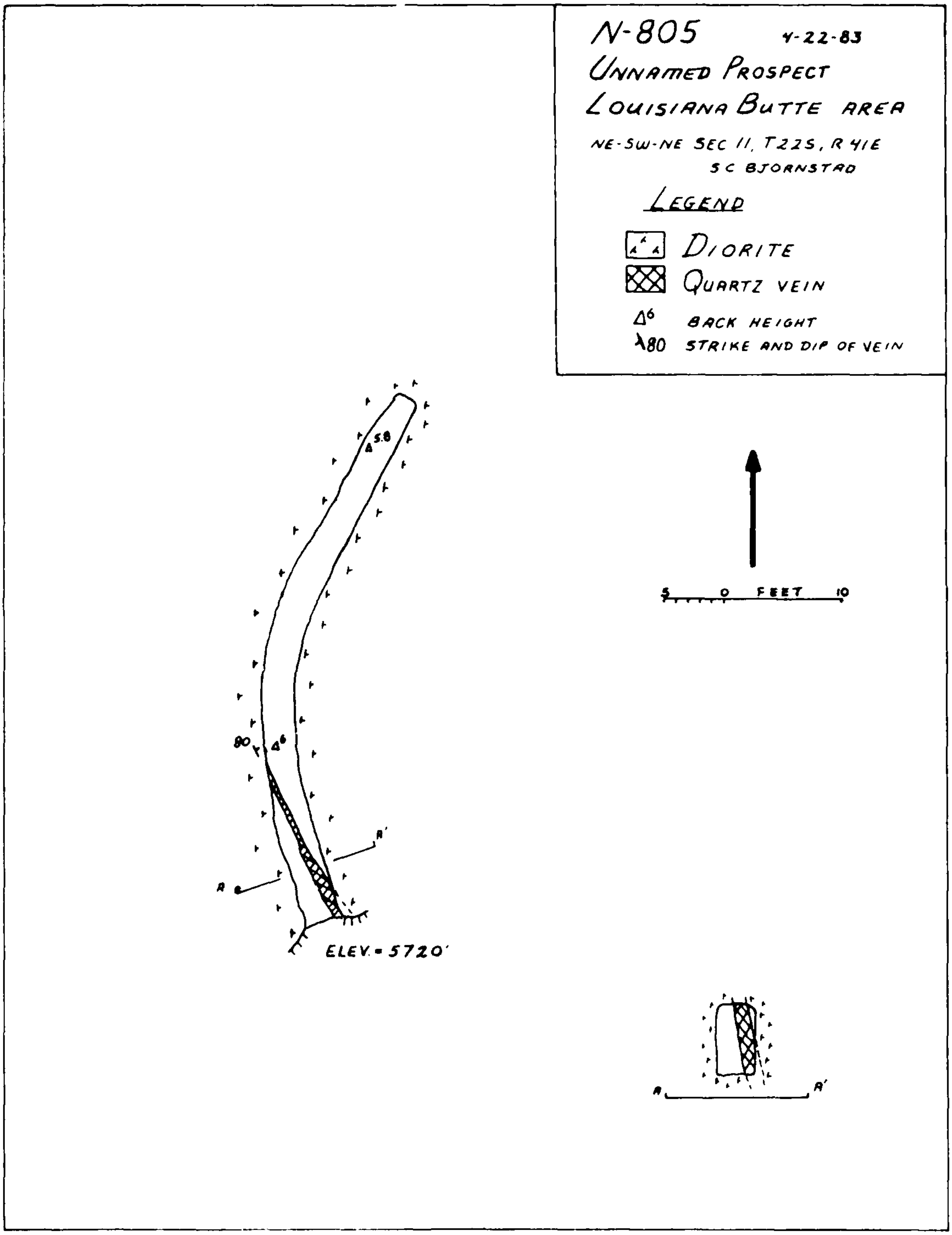

Figure 60. Plan view of adit at N-805.

The lower working, which consists of a caved adit (maximum 40 feet long) with a 30-foot-long trench in front, is developed along a 1.5-foot-wide quartz vein associated with thin aplite and lamprophyre dikes intruding Mesozoic quartz diorite. The vein follows the same zone of weakness that the dikes occupy, trending N10E, and dipping 75 degrees north. It shows only sparse hematite and chrysocolla staining. Analytical results from a sample of the vein material are listed in Table A-1.

The upper workings are situated 80 feet uphill from the adit, along the ridgeline. They consist of a 17-foot deep vertical shaft and three small prospect pits, and were dug on a 3-foot-wide, copper- and iron-stained shear zone in a Mesozoic aplite up to 30 feet thick.

All of the above-described workings were developed on outcrops with marginal potential. The resulting exposures further lowered this potential, showing that this prospect has no commercial value.

Unnamed Prospect (N-811)

This prospect can be found near the summit of Louisiana Butte in the NW1/4, NW1/4, SW1/4 of Sec. 1, T22S, R40E, MDB&M, as shown in Figure 6.

The workings consist of a 20-degree decline, 88 feet long, with a side drift 24 feet long; one other adit, caved, with a maximum length of 25 feet; and a test pit, all of which were developed on a low-angle (25 degrees southwest) vein in Mesozoic granite. The granite host is surrounded and overlain by erosional remnants of pre-Cretaceous metavolcanic and metasedimentary rocks and has been intruded by numerous mafic dikes.

The vein averages 1.5 feet wide and is composed of clear crystalline to milky massive quartz with sparse to moderate pyrite, siderite, chalcopyrite, and bornite in unaltered sections, altering to limonite pseudomorphs, hematite, and secondary copper minerals where oxidized. The mineralization is primarily limited to small pods in the quartz. A near vertical fault truncates the vein on the north side of the workings, and the north block appears to have been downthrown. Figure 61 shows a plan view and cross sections of the open workings as well as the locations of the three samples. Samples 1 and 2 were taken from pods of broken, high-copper, low-iron quartz. Sample 3 was taken adjacent to sample 2 but contains broken quartz with abundant hematite stain and fracture coating and little, if any, copper mineralization. Gold and silver assay results are given in Table 21 and the complete analytical results are listed in Table A-1.

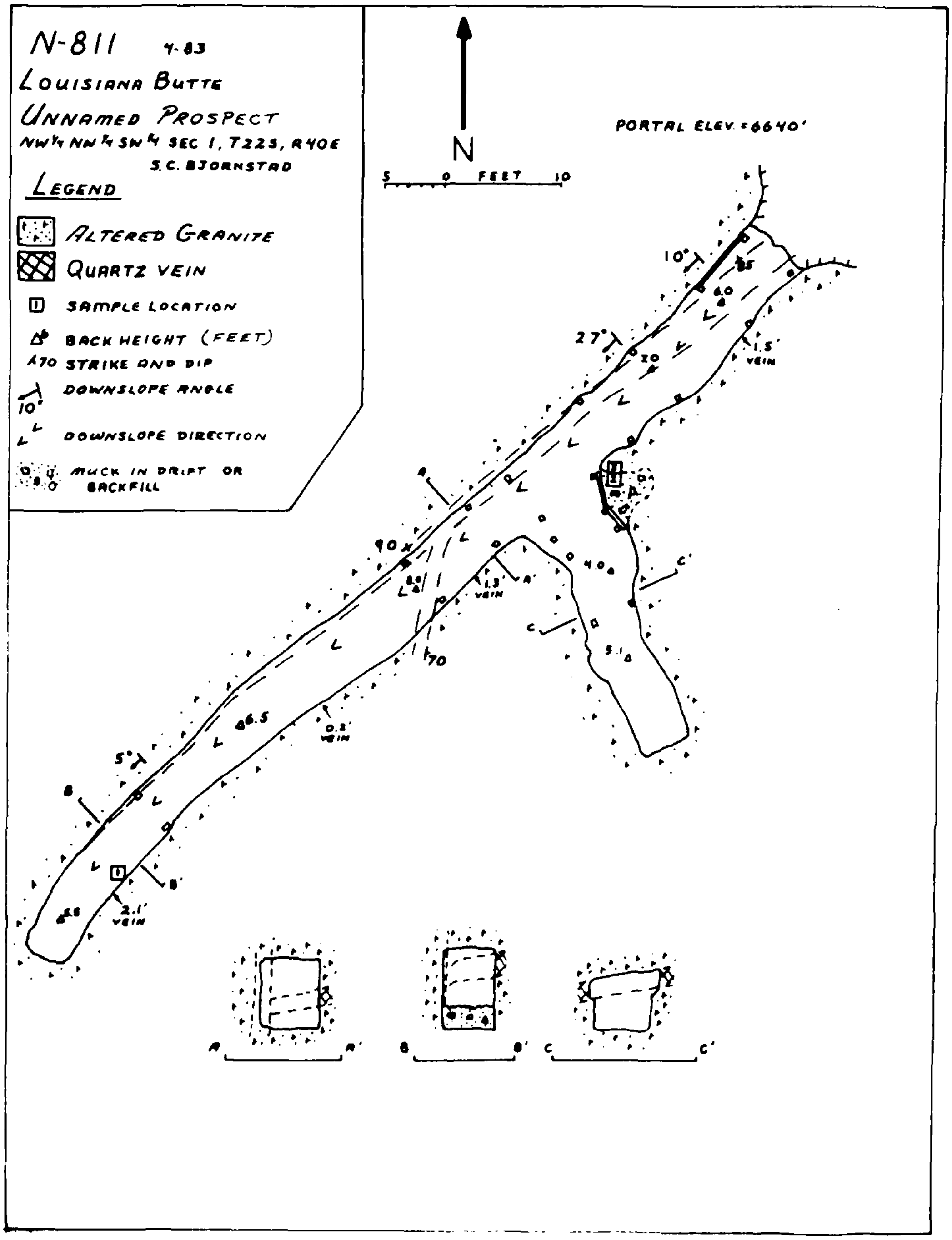

Figure 61. Plan view of adit at N-811.

TABLE 21. N-811 Assay Values.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-811-1	0.066	33.00	2.13	31.95	64.95
N-811-2	0.110	55.00	4.79	71.85	126.85
N-811-3	0.009	4.50	Nil	...	4.50

Although a potential exists for additional mineralization on the downthrown, unexplored, part of the vein, it would be expected to be similar to the section already explored and, therefore, would also be limited in grade and tonnage and of no commercial value.

Unnamed Prospect (N-812)

This prospect is located on the south flank of Louisiana Butte in the SE1/4, SW1/4, NW1/4, of Sec. 12, T22S, R40E, MDB&M, as shown in Figure 6, and consists of a single, 45-foot-long trench with a 5-foot-deep adit. It was developed on a 5-foot-wide alteration/shear zone along the contact of a S80E-trending lamprophyre dike intruding Mesozoic diorite. The shear zone shows moderate quartz enrichment wih abundant hematite staining but no evidence of trace gold mineralization. Therefore, no mineral potential is believed to exist and no samples were taken.

Unnamed Prospect (N-813)

Prospect N-813 is located on the southwest flank of Louisiana Butte in the NW1/4, NE1/4, SW1/4 of Sec. 11, T22S, R40E, MDB&M, as shown in Figure 6. The workings consist of a trench 35 feet long bearing N15W and ending at a shaft, now caved but with an estimated depth of 25 feet.

The prospect was developed in a Mesozoic diorite on a 6.5-foot-wide shear zone, trending N75E, with up to 2 feet of quartz veining. The vein consists of broken quartz with hematite staining and fracture coating, and sparse copper as chalcopyrite, covellite, chrysocolla and malachite. A sample of the vein was taken, and the results are listed in Table A-1.

The full extent of the discovery outcrop is now covered, but there is no indication on the surface of a lateral extension of the mineralization. This, coupled with the sample analysis, indicates no potential for commercial development.

Unnamed Prospect (N-814)

This prospect is located in the NW1/4, SW1/4, SE1/4 of Sec. 11, T22S, R40E, MDB&M, on the southwest flank of Louisiana Butte, as seen in Figure 6. It consists of a single 43-foot-long adit developed on a low angle (15-degree) shear zone in a Mesozoic biotite-rich diorite. The shear zone is thin (0.6 foot) but rich in crystalline quartz and fine grained chlorite or sericite. Analysis of the vein (Table A-1) shows no economic mineralization, and an examination of the surrounding surface revealed no indication of potential mineralization.

Unnamed Prospect (N-815)

Situated on the southwest flank of Louisiana Butte, this prospect is located in the E1/2, NW1/4, NW1/4 of Sec 14, T22S, R40E, MDB&M, as seen in Figure 6. The geology of the prospect consists of coarse-grained Mesozoic diorite intruded by a narrow gabbroic dike trending N15E and dipping 30 degrees west. A thin (less than 4 inches thick) milky quartz vein developed along the footwall contact of these bodies.

A single trench was dug into the hill along the vein 70 feet long and up to 6 feet deep.

A composite sample was taken, with assay results listed in Table A-1. The vein is thin and barren and the potential for commercial mineral values is nil.

Unnamed Prospect (N-816)

As seen in Figure 6, this prospect is located on the south flank of Louisiana Butte in the NW1/4, NE1/4, SE1/4, of Sec. 11, T22S, R40E, MDB&M. The prospect consists of a single trench 40 feet long and up to 8 feet deep trending S75E. The trench intersected an aplite dike that trends N30E intruding a biotite-rich diorite, both of Mesozoic age.

A shear zone up to 2.5 feet thick developed along the south contact of the two bodies. The zone consists primarily of mylonite with traces of copper staining. No samples were taken here, and there is no mineral potential indicated.

Unnamed Prospect (N-817)

The site is along the east side of the road leading to the top of Louisiana Butte, at an elevation of 6620 feet. The shaft is shown as N-817 on Figure 6 and is located in the SW1/4, SW1/4, NW1/4, of Sec. 1, T22S, R40E, MDB&M.

The shaft, which is 5 by 8 feet at the surface and approximately 20 feet deep, exposes a shear zone striking N58E and dipping 65 degrees southwest. The shear zone parallels an aplite dike that cuts the Mesozoic quartz diorite. The shear zone is primarily clay with only minor quartz. There is copper and iron staining throughout the zone and a fracture coating of chrysocolla and limonite within the quartz. A sample of vein material that was found on the dump contained no detectable precious metal values. A complete listing of assay results can be found in Table A-1. There is no commercial value present.

Unnamed Prospect (N-818)

The workings are located in the SW1/4, SW1/4, NE1/4, and NE1/4, NW1/4, SE1/4 of Sec. 1, T22S, R40E, MDB&M. They are approximately 1.6 miles south-southwest of the El Conejo Mine. They are shown as N-818 on Figure 6.

The area has been explored by a small pit, a shaft, and an adit. The shaft and pit expose an aplite dike striking N50W and dipping 70 degrees northeast through weathered Mesozoic granodiorite. The adit, which is located approximately 500 feet east of the shaft, exposes no identifiable mineralization; it is 20 feet long along a heading of S20W, 4 feet wide, and 11 feet high at the back end, which is covered with muck. The shaft is 6 by 4 feet and caved approximately 12 feet from the surface. The dump indicates the possibility of another 25 feet of working. A pinch-and-swell structure is indicated because no quartz vein is visible along the dike exposed at the shaft. There is, however, a sorted "ore" pile on the dump, which was sampled. The quartz in this pile showed some iron staining as a fracture coating of limonite. The size of the pieces of quartz indicates a maximum vein width of 4 to 6 inches. Assay results on this sample are given in Table 22.

TABLE 22. Assay Results for Sample N-818-1.

Gold		Silver		Total precious metal values, $/ton
Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
0.093	46.50	0.11	1.65	48.15

This is a discouraging value. There is no geologic reason to expect grade or vein width to increase with depth. Viewed with the above in mind, the deposit shows no commercial value.

Unnamed Prospect (N-819)

These pits are located approximately 1.3 miles south-southeast of the El Conejo Mine at an elevation of approximately 6150 feet, in the NE1/4, NE1/4, SE1/4 of Sec. 1, T22S, R40E, MDB&M. Figure 6 shows them as N-819.

The pits expose a 1.3- to 2-foot quartz vein striking N77W and dipping 59 degrees northeast through Mesozoic granodiorite. The quartz has moderate iron staining as fracture coatings of limonite. A sample of this vein material was taken, and assay results are presented in Table A-1.

The sample collected shows no mercial potential for the production of precious metals or other commodities. There is no geologic reason to expect these precious metal values to increase with depth.

Red Ribbon (N-820)

These workings are located approximately 1.1 miles northeast of the Louisiana Butte VABM and 1.5 miles southwest of the El Conejo Mine. Figure 6, a location map of the area, shows the site as N-820. It is on surveyed land in the NE1/4, NE1/4, NE1/4 of Sec. 1, T22S, R40E, MDB&M.

The host rock for the deposit is a Mesozoic intrusive grading from granodiorite to diorite and locally altered along two northwest-trending, northeast-dipping aplite dikes. The only mineralization found on the property is a small quartz lens, 6 inches wide (maximum) and 4 feet long in a 12-inch-wide shear zone that trends N5W and dips approximately 10 degrees northeast. The quartz had only minor limonite as fracture coatings.

The property was explored by a trench, a 10-foot adit, and a 200-foot adit. The 200-foot adit, shown in plan view on Figure 62, was in granodiorite and diorite with a 64-foot-long section showing minor iron staining from the percolation of hydrothermal fluids and alteration of the mafic minerals; no other mineralization was found. Above this working to the north was a 30-foot-long trench that might have been the start of an adit. South of the main adit is a small 10-foot adit shown in Figure 63. The quartz lens at this site was sampled, and the assay results are presented in Table A-1.

The mineralization has neither the grade nor the volume necessary for commercial exploitation; and there is no geologic reason to expect either of these to increase.

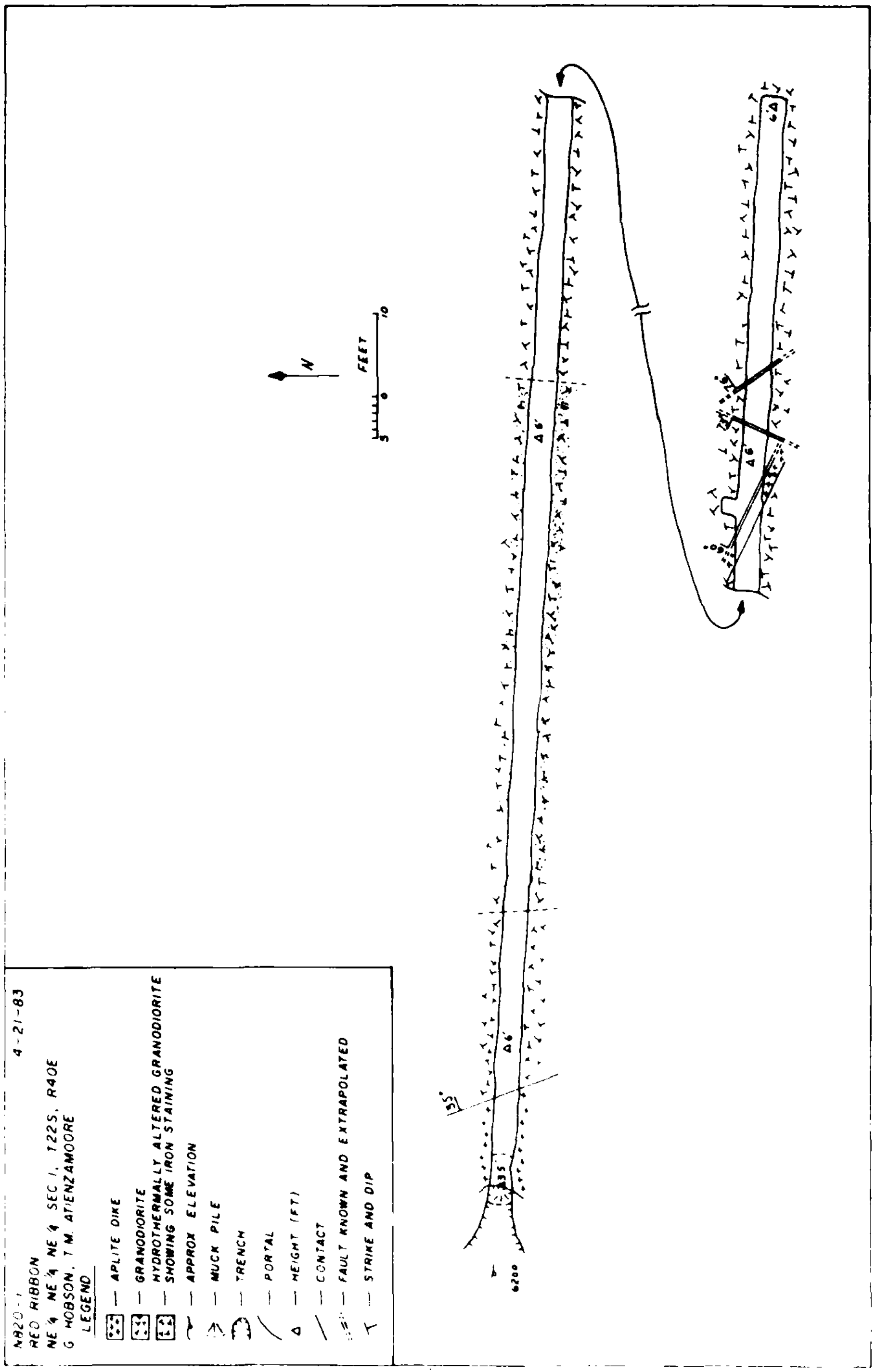

Figure 62. Plan view of main adit at Red Ribbon.

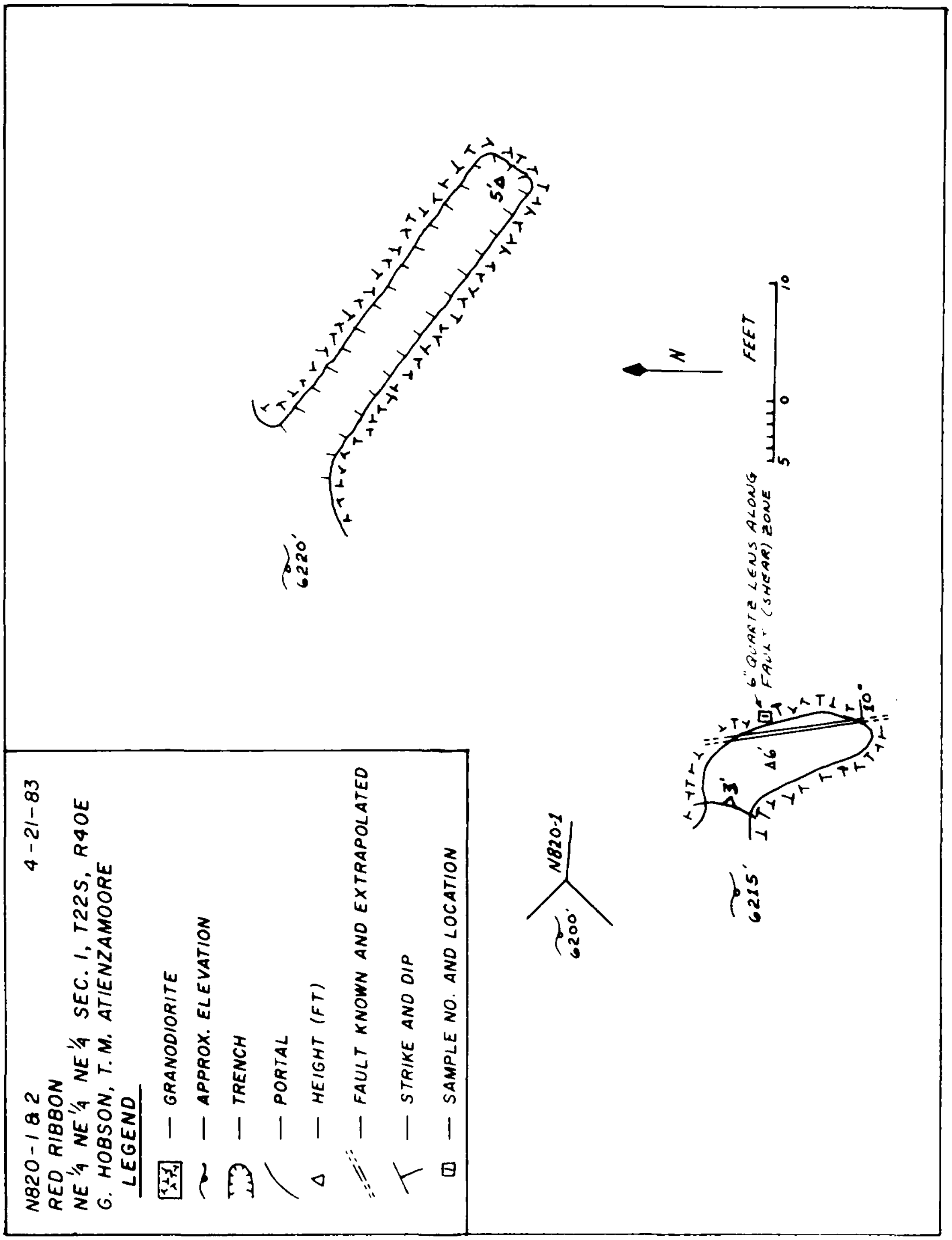

Figure 63. Plan view of small adit at Red Ribbon.

New Hope Group (N-902)

The New Hope Group consists of four contiguous claims staked in 1931 by C. W. Randolph and is located approximately 2 miles southwesterly of Junction Ranch in the NE1/2, SE1/4 of Sec. 3, T22S, R41E, MDB&M, as shown in Figure 6. Figure 64 is a plan view showing the claims and the workings.

Claim No. 1. The New Hope "community" was located on this claim, as were two small prospect pits and two short adits (both caved). The adits were probably approximately 6 and 15 feet deep, respectively. The workings appear to have been developed on quartz veins (with very sparse hematite fracture coating) along the contacts of Mesozoic lamprophyre dikes and Mesozoic quartz diorite, although the contacts are obscured by slope wash. The potential here is quite low and no samples were taken of the loose vein material.

Claims No. 2 and No. 3. The majority of the work was done on these claims. This consists of one shaft and four adits, all but one are caved shut. Adit no. 1 was driven in Mesozoic granite and has 70 feet of drift and a caved raise (possibly an ore pass from the upper level, no. 2). A shear zone was intersected which trends N65E, dips 60 degrees and contains broken quartz and hematite-rich clay. Figure 65 shows this adit and the location of sample N-902-1. The estimated extent of the other workings are no. 2, 90 feet; no. 3, 10 feet; no. 4, 20 feet; and the shaft, 30 feet. Sample N-902-2 was taken from the shaft dump.

Examination of the surface geology indicated a series of en echelon shears, some with quartz veins up to 3 feet thick, trending N65E with high angle dips. The veins are predominately barren, massive white quartz, with very sparse copper and iron staining. This, coupled with the sample analysis of the "best" looking vein material, indicates that no commercial potential exists at this site.

Claim No. 4. A shaft, 12 by 15 by 40 feet deep was dug along a shear zone which trends N59W and dips 74 degrees in Mesozoic granite. The shear consists of mylonite and both it and the host are oxidized. No sample was taken. A second, short, shaft and an adit are both caved. A single prospect pit, 13 by 11 by 5 feet deep, was developed on the contact of a 3-foot-wide aplite dike intruding the granite. A 3-foot-thick vein of quartz, with limonite, formed on the footwall side of the dike. Sample N-902-3 was taken here. Analysis of the sample and interpretation of the geology of this claim indicate a low potential for an economic deposit at this site.

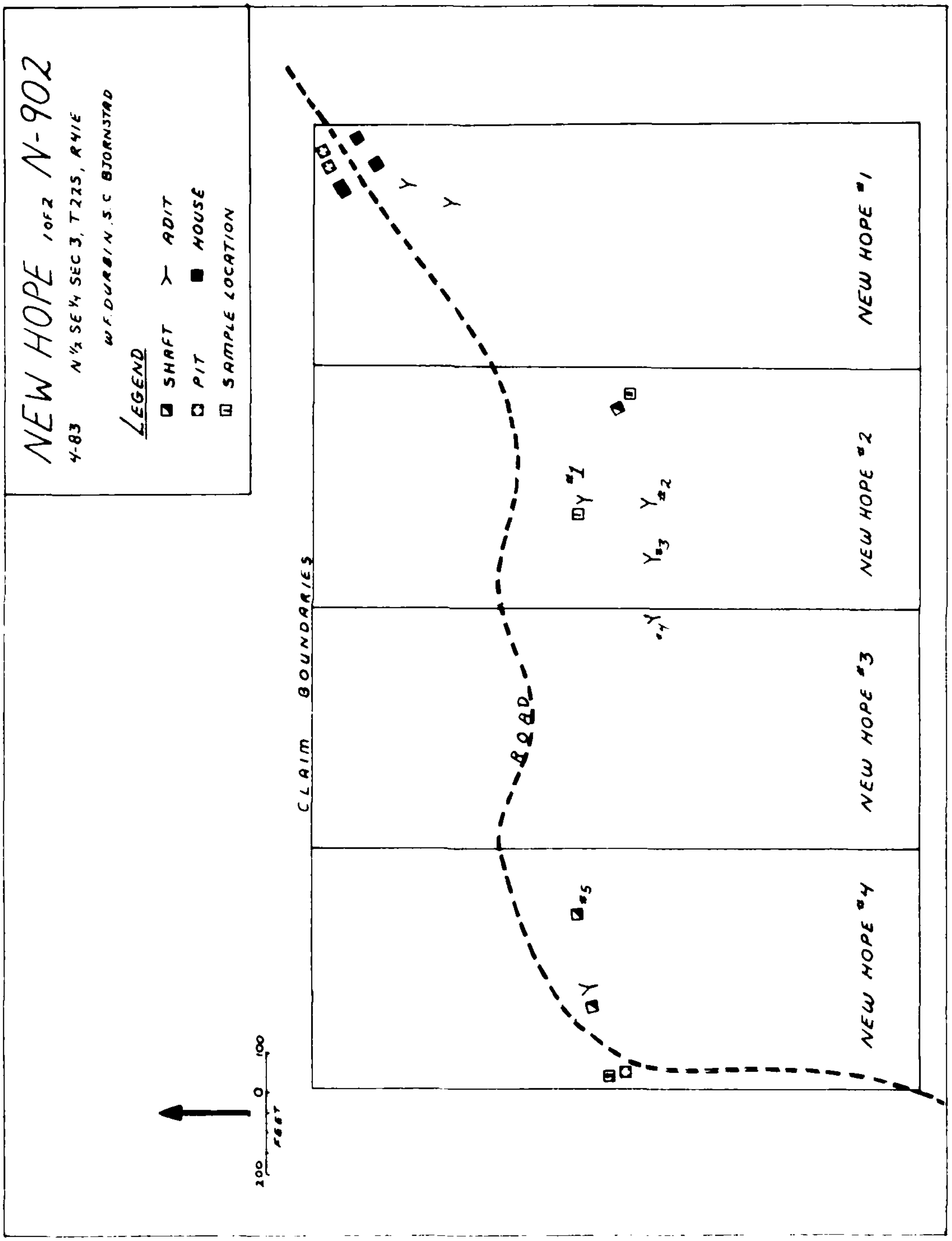

Figure 64. Plan view of New Hope Group.

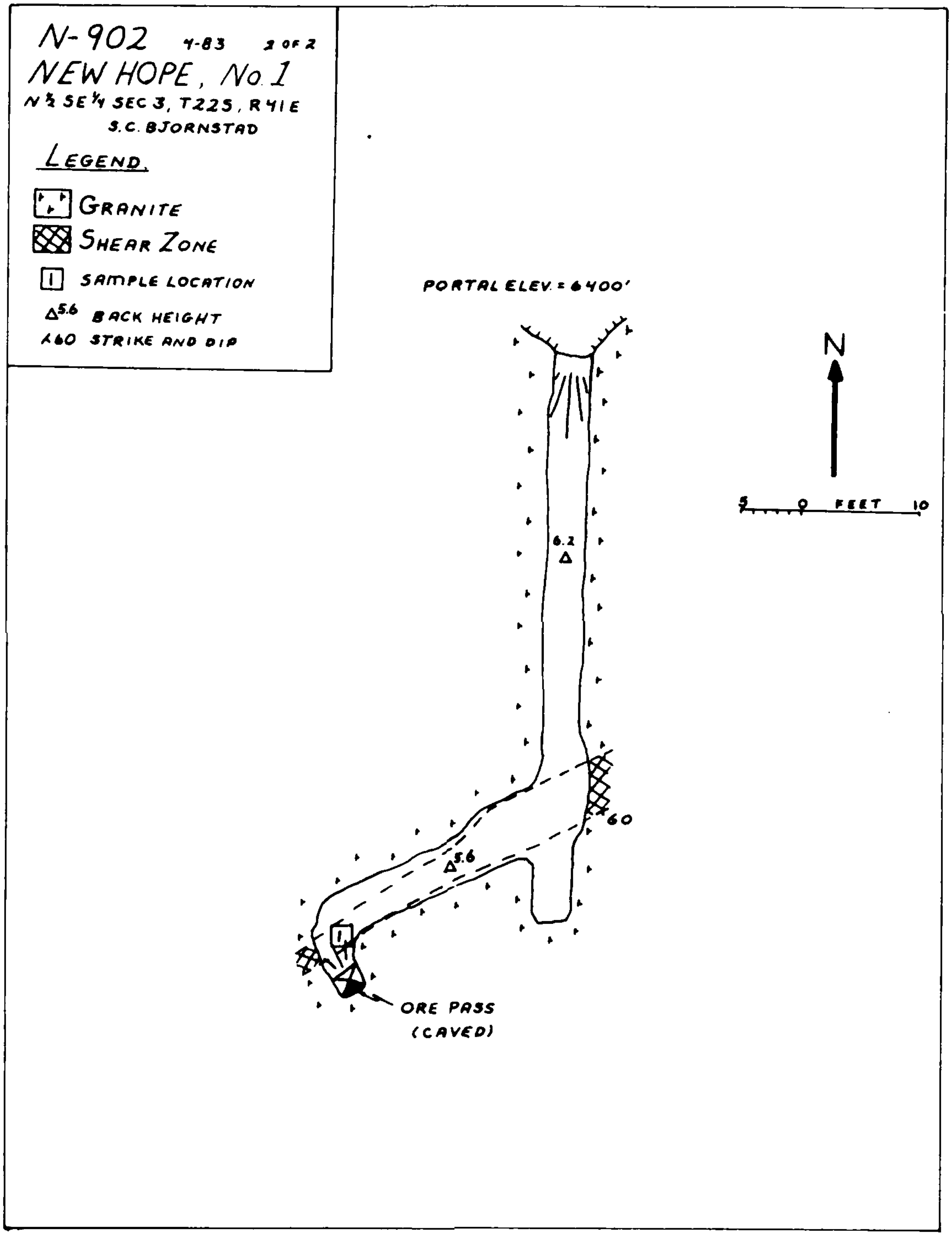

Figure 65. Plan view of adit no. 1, New Hope Group.

Assay results for all samples are listed in Table A-1.

Unnamed Adit (N-903)

A caved adit is situated near the eastern edge of the range that forms the western boundary of Etcheron Valley. It is located approximately 2 miles southwest of Carricut Lake and 3.7 miles south-southeast of Junction Ranch. It is placed in the SE/14, SE/14, NE1/4, Sec. 15, T22S, R41E, MDB&M, and is shown on Figure 6.

The adit was driven to explore for mineralization associated with a shear zone in Mesozoic granite host rock. The adit trends due north and a 2-foot vertical zone of fractured granite was noted at the portal. The mine dump volume indicates an adit from 30 to 40 feet in length if driven 3 feet wide, 5 feet high.

A small amount of quartz was scattered on the mine dump indicating that a lens or pod of mineralization may have been encountered in the adit. The massive white quartz contains secondary crystalline quartz, linarite (?) and malachite, limonite (as fracture-fillings), and yellowish cerargyrite (?).

One sample was taken from the scattered quartz. The complete assay results are shown in Table A-1 and equate to $55/ton gold and $49.50/ton silver. If coupled with a large tonnage these values would be economic, but only very limited tonnages are indicated so that no commercial potential exists at this site.

Unnamed Shaft (N-907)

An unnamed exploratory shaft is situated at the southern end of Etcheron Valley and located 8.7 miles due east of Volcano Butte as shown on Figure 9. It is placed in the NE1/4, SE/14, SW1/4, Sec. 25, T22S, R41E, MDB&M.

The shaft was driven 62 feet deep to explore the down-dip extent of a shear zone that contains minor quartz mineralization. The shear zone averages 8 feet in width and is in a Mesozoic quartz diorite host that is intensely altered and strongly gneissic in outcrops surrounding the shaft collar. The host rock is biotite-rich, contains clay and chlorite alteration, and is intricately fractured within the shear zone. The shear strikes N66W and dips 62 degrees southerly.

The inclined shaft was driven approximately 8 by 7 feet down the shear zone dip. The shear zone contained a discontinuous barren white quartz vein that reached a maximum width of 5 inches and pinched out at a depth of 54 feet. The shaft flattened in dip slightly below this point.

The shear zone mineralization consists of minor pods and streaks of specular hematite within the quartz diorite plus minor fracture-filling limonite and chrysocolla with very minor malachite and linarite (?) as pore space and fracture filling.

A grab sample of loose shear zone material was collected from the dump at the shaft surface but was lost prior to analysis and time constraints prevented analysis of a second sample. The very minor presence of accessory mineralization typical of trace gold occurrence, however, indicates that no mineral potential exists at this site.

Unnamed Prospect (N-909)

This site is located in the southwestern corner of Etcheron Valley approximately 6.5 miles southeast of Louisiana Butte VABM and 5.2 miles south of the Junction Ranch bench mark. It is shown on Figure 6, and is found in the NE1/4, SE1/4, SW1/4 and the NW1/4, SW1/4, SE1/4 of Sec.23, T22S, R41E, MDB&M.

The property has been explored by a 29-foot-deep inclined shaft, and two prospect pits. They expose a shear zone that strikes N57W and dips 47 degrees to the southwest and contains minor quartz with limonite fracture coatings. This shear zone cuts altered Mesozoic biotite quartz diorite. Assay results of the quartz sample, which are listed in Table A-1, show no precious metal value of commercial potential.

Unnamed Prospect (N-910)

A group of prospect workings is situated on both sides of a small northwest-trending canyon located 4.4 miles east of Louisiana Butte. The prospect is placed in the NE1/4, NE1/4, SW1/4, Sec. 3, T22S, R41E, MDB&M, as shown on Figure 6.

The area host rock is predominantly Mesozoic granodiorite with clay-rich altered areas mainly in the vicinity of shear zones. A number of shear zones are present in the area and exhibit general west-northwest trends with dips from 55 to 82 degrees southwesterly. The zones occur occasionally at this prospect in association with minor felsite dikes.

The easternmost group of workings consist of an adit with connecting shaft, a partially caved adit and two prospect pits.

Figure 66 is a plan view of a 30-foot adit with a 25-foot crosscut which is connected to a 25-foot shaft or glory hole.

The group of workings to the west consists of two prospect pits and the start of a shaft. All three of these were dug along a felsite dike. A 0.7-foot quartz vein with minor fracture coatings of limonite developed along the footwall side of the dike. The total volume of these workings was approximately 27 cubic yards.

Four samples were taken from this group of prospects. Sample N-910-1 represents the quartz vein material in the largest working. Figure 66 shows the sample location. Sample N-910-2 represents a 4-inch quartz vein which approximately that parallels one in the adit; sample N-910-3 represents the same vein material as N-910-1 only slightly higher and farther west. Sample N-910-4 represents quartz vein material of a vein parallel to the others.

None of these samples give assay results indicative of commercial potential. See Appendix A for a complete list of assay results.

Unnamed Shaft (N-911)

This unnamed shaft is situated near the southwestern edge of Etcheron Valley and is 8.5 miles due east of Volcano Butte as shown on Figure 9. It is placed in the SW1/4, SE1/4, SW1/4, Sec. 25, T22S, R41E, MDB&M.

The only exploratory working at this location is the shaft, which is caved and filled to within 2 feet of the surface. An estimate of the tailings dump volume of about 10 cubic yards of material would produce a shaft 7.5 feet deep if driven 6 by 6 feet.

The shaft was driven totally in Mesozoic granite which is light gray and medium- to fine-grained. Some hand specimens were strongly gneissic. No shear zone or mineralized zone was encountered in the working and no quartz or other minerals were observed.

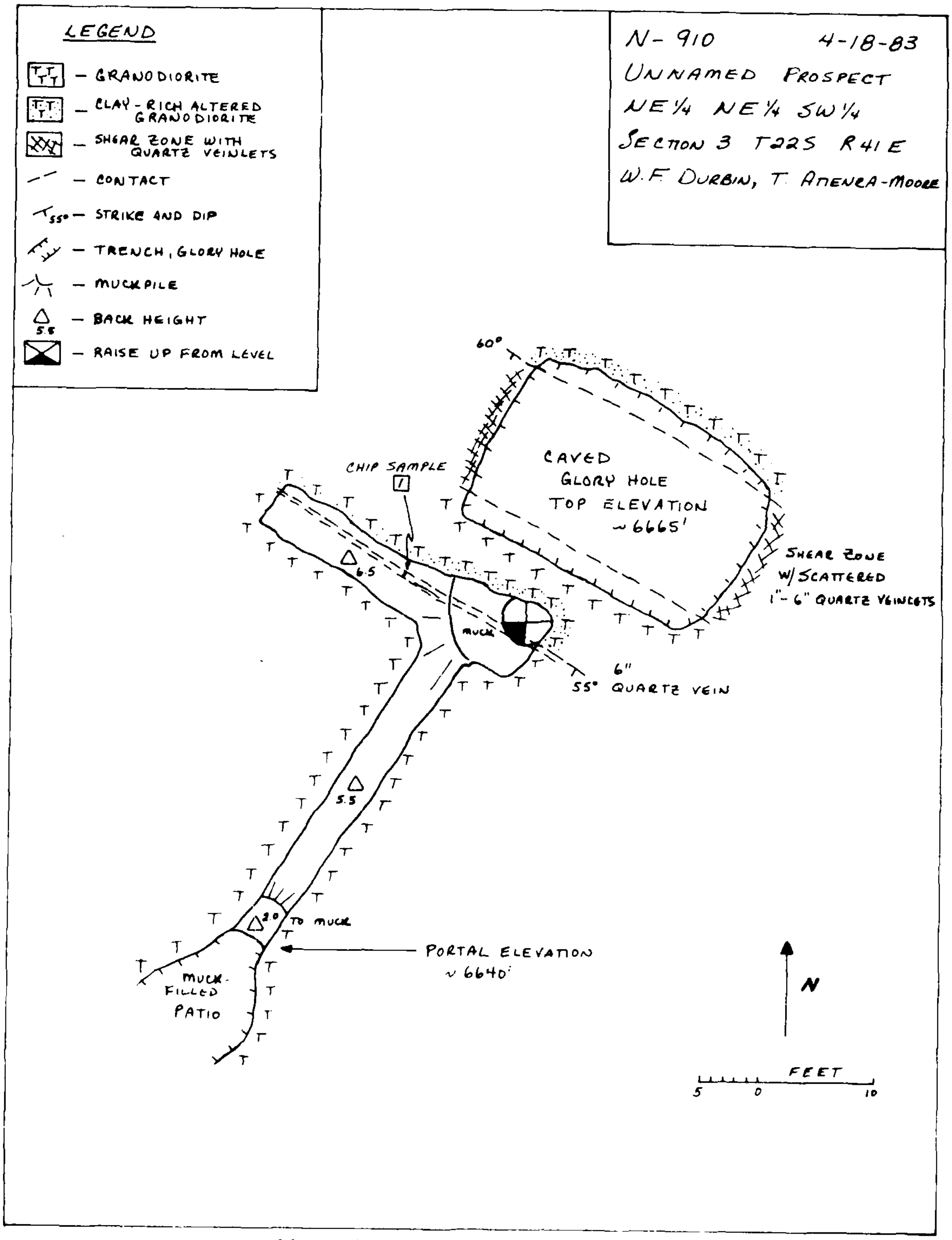

Figure 66. Plan view of adit at N-910.

Unnamed Prospect (N-912)

The prospects are located just north of the New Hope area along the El Conejo Mine Access Road; they are approximately 1.9 miles southwest of the Junction Ranch bench mark and 4.9 miles east of the Louisiana Butte VABM. Figure 6 shows this site as N-912 which is found in the S1/2, NE1/4, NE1/4 of Sec. 3, T21S, R41E, MDB&M.

The property was presumably explored for precious metals by two small pits and a trench. The pits expose a northeast-trending aplite dike which cuts the Mesozoic granite. Associated with the dike is a minor amount of milky white quartz with no other identifiable mineralization. Following the general trend of the dike to the northeast a small prospect trench was encountered which shows no evidence of an aplite dike nor any quartz mineralization. There is no indication of any mineralization that would warrant sampling.

Unnamed Prospect (N-913)

This site is located northwest of the New Hope area approximately 2.7 miles east-southeast of the El Conjeo Mine and 2.3 miles southwest of the Junction Ranch bench mark at an elevation of 6280 feet. It is shown as N-913 on Figure 6, and is found to be in the SW1/4, NE1/4, NW1/4 of Sec. 3, T22S, R41E, MDB&M.

The property was explored by a prospect pit which exposes a 4-inch milky white quartz vein. The vein parallels an aplite dike that strikes N80E and dips 75 degrees southeast in weathered Mesozoic quartz diorite. No indication of mineralization other than the milky white quartz was found and no sample was taken.

Unnamed Prospect (N-914)

These workings are located approximately 0.95 mile southwest of the El Conejo Mine and 1.2 miles northeast of the Louisiana Butte VABM at an elevation of 6200 feet. They are shown as N-914 on Figure 6. Their location places them in the NW1/4, NW1/4, NW1/4 of Sec. 6, T22S, R41E, MDB&M.

The property was explored by four small prospect pits, the start of an adit in the southern portion of the property, and an adit to the north which has been washed closed but whose dump volume indicates a total length of 120 feet of 3- by 5-foot drift. The prospectors were drifting southwest in Mesozoic diorite to intersect a northwest-trending felsite dike. A small stockpile of sorted quartz with limonite fracture coatings was found on this large dump. Assay of the quartz showed no commercial values. See Appendix A for a complete listing of assay results.

Jackass (Wildcat) (N-915)

The Jackass claim was staked in 1874 by L. Hamilton and Paul Grand and is located on Wild Horse Mesa, 1 mile northeast of the head of Little Petroglyph Canyon in the SW1/4, NW1/4, SE1/4 of Sec. 19, T22S, R41E, as shown in Figure 6.

It consists of a single prospect pit, 3 feet deep. The pit was dug on a highly mineralized quartz vein in Mesozoic leucogranite. The vein is up to 10 inches thick and exhibits a varied mineralogy with identifiable copper and silver minerals: covellite, bornite, malachite, chrysocolla, enargite. A sample was taken of the stockpiled vein material, with the analytical results being given in Appendix A. Although ore grade silver was found in the sample, no other outcrop is evident nearby and the extent of the mineralization appears very limited.

Unnamed Prospect (N-916)

This prospect located about 2.5 miles south-southeast of Louisiana Butte in the NW1/4, SW1/4, SW1/4 of Sec. 18, T22S, R40E, MDB&M, as seen in Figure 6. The workings consist of a caved shaft (maximum depth of 15 feet) and a 4-foot-deep pit that were dug on a quartz filled shear zone in pre-Cretaceous metavolcanics. The shear trends N65W, dips south at 88 degrees and is about 2 feet wide. The quartz occurs as a brecciated vein 1.2 to 1.4 feet thick with malachite, chrysocolla, hematite and limonite surrounding cores of cuprite, chalcopyrite, pyrite and specular hematite. Hematite and limonite also occur as fracture-fillings and cement.

A single sample was taken of the "high-grade" material at the shaft dump, which returned a gold assay of 0.26 troy-oz/ton or \$130/ton. Complete assay results are given in Appendix A.

The potential for commercial tonnage and grades at this site does not look good. Although the grab sample results are interesting, an examination of the surrounding area showed this occurrence to be quite isolated, as well as limited in extent. As with so many of the quartz vein occurrences investigated during this survey, the quartz at this site appears to be another small isolated lens in a general northwest-trending shear zone with insufficient frequency of occurrence to enable mining as a whole and insufficient tonnage to warrant mining of any given lens.

ARGUS DISTRICT

Shepherd Canyon Area

Manuel Prospects (N-604A)

This site, the Manuel Prospects, was not found in any of the literature references listing claims in the region. Its name comes from a name painted along the rib of the main adit (N-604A-1) near the 355-foot survey mark; at the same location the years "1940/1941" were painted, possibly indicating that the first 355 feet were driven prior to 1940 and the last 78 feet were driven in 1941.

These prospects are located along the western slope of the Argus Mountain Range in Etcheron Valley, just east of Carricut Lake. They occupy portions of two sections. The largest workings, at an approximate elevation of 6000 feet, are in the N1/2, NE1/4, NW1/4, Sec. 6, T22S, R42E, MDB&M. The smaller workings, at elevations ranging from approximately 6220 to 6300 feet, are in the S1/2, SE1/4, SW1/4, Sec. 31, T21S, R42E, MDB&M. The site is shown as N-604A on Figure 7.

The property was explored at the higher elevations by eight separate workings and at the lower elevation by a shaft and a long, northeast-trending adit. The shaft is approximately 10 feet west of the adit. It is 5 by 4 feet wide at the collar, with a 7-foot head frame, and has collapsed approximately 30 feet below the surface. The adit is 433 feet long and is an average of 4 feet wide and 6 feet high. It is primarily driven through Mesozoic granodiorite and is shown in detail on Figure 67. There is a short, 20-foot crosscut that explores a N83W trending, 63-degree north-dipping fault zone which has no commercial mineralization. There is also a short winze, which was sunk on a N63W striking, 53-degree northeast-dipping fault zone, for 16 feet. The fault zone, which is 6 to 8 inches wide, has a small quartz lens, 4 feet long, and 1 inch thick. This quartz has minor limonite fracture coatings and is the material sampled for sample N-604A-1.

The upper prospects, shown in Figure 68, consist of two inclined shafts, one adit and two small pits. The first shaft, at an approximate elevation of 6220 feet, is approximately 6 by 6 feet and has

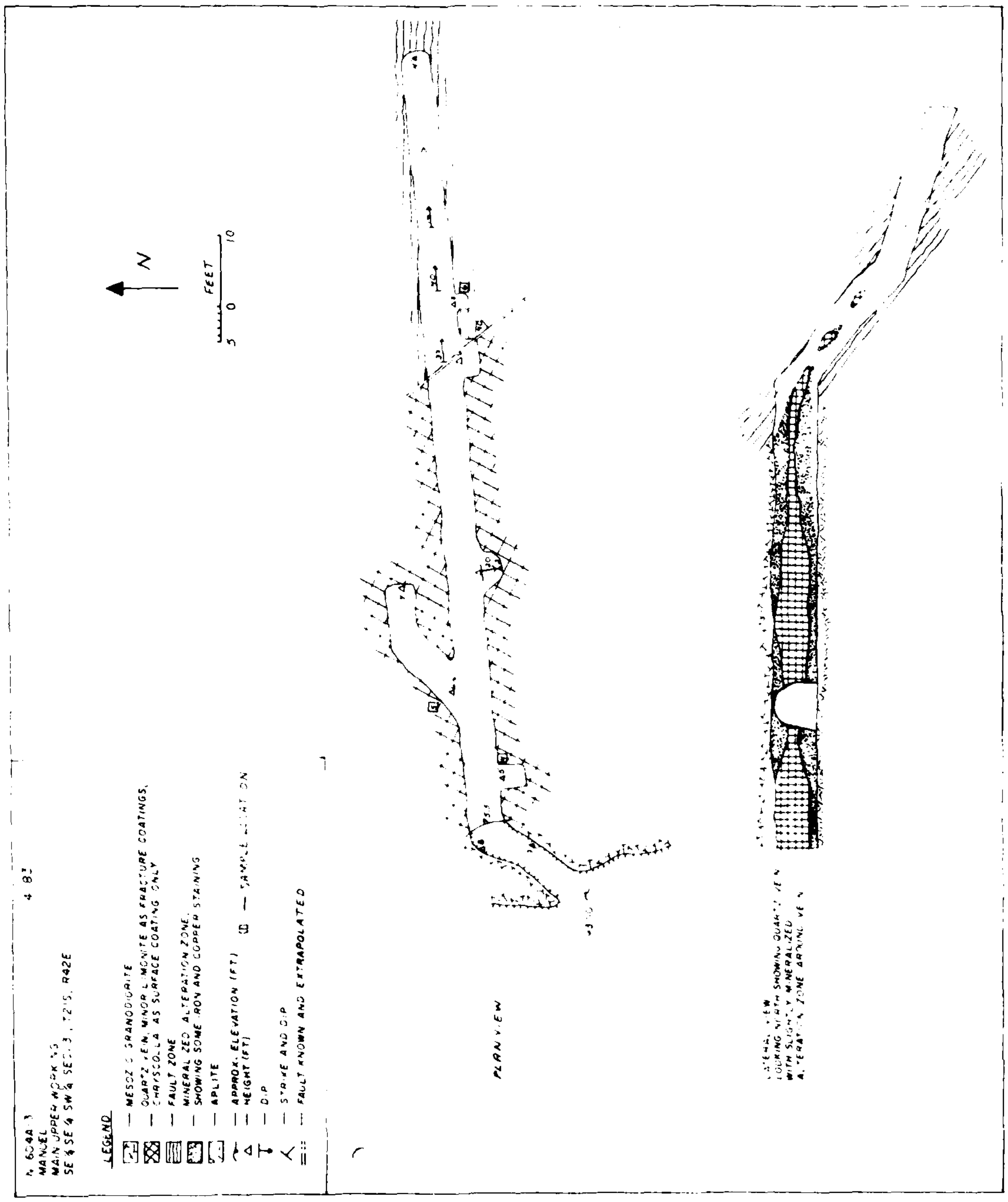

Figure 67. Plan view of main adit at Manuel Prospect.

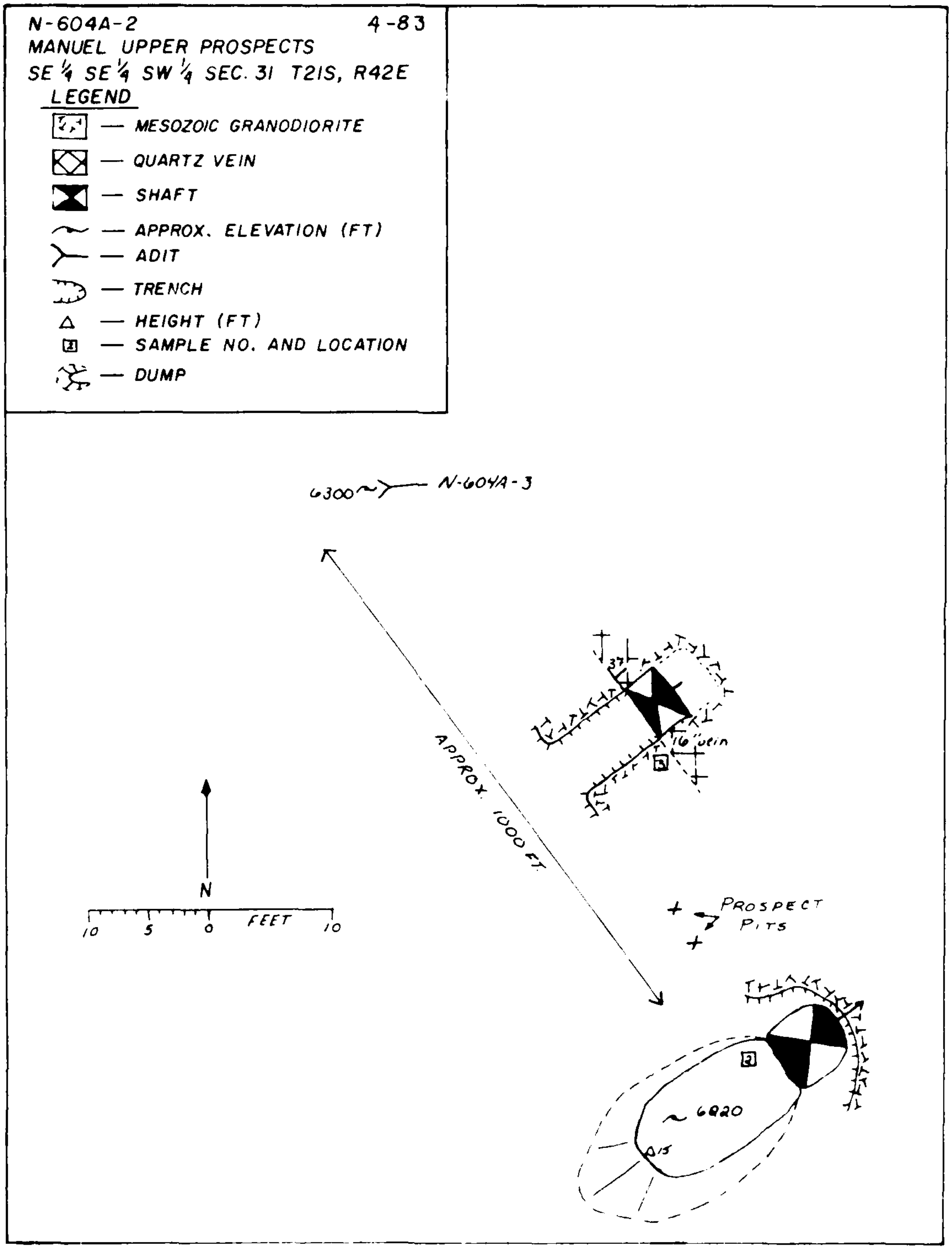

Figure 68. Plan view of upper prospects at Manuel Prospects.

collapsed approximately 4 feet below the surface, the dump indicates it may be as much as 23 feet deep. No mineralization is identifiable in the walls of the remaining pit, there was, however, a small "high-grade" pile on the dump. This pile, sample N-604A-2, consists of quartz which had minor limonite as fracture coatings and, to a lesser extent, chrysocolla as a surface coating. Further up along the hill-side are two small pits adjacent to another inclined shaft. This shaft exposes a 1.3-foot-wide quartz vein along a shear zone which strikes N36W and dips 37 degrees northeast; sample N-604A-3 is a chip sample taken across the face of this outcrop.

At an approximate elevation of 6300 feet is another adit, shown in detail on Figure 69. This adit explores a quartz vein with a maximum width of 4 feet. Above and below the vein is a clay alteration zone, varying in width from 0.5 to 2 feet and showing sporadic mineralization ranging from barren clay to intense limonite and chrysocolla staining. Sample N-604A-4 was taken from the alteration zone showing intense chrysocolla and limonite staining. The quartz vein shows limonite as fracture coatings and chrysocolla as a surface coating only, sample N-604A-5. Sample N-604A-6 is from the alteration zone showing moderate chrysocolla and limonite staining which has been carried along a N36W striking fault zone which dips approximately 40 degrees northeast. Mineralization, as quartz, limonite and chrysocolla staining, decreases down-dip along this shear zone.

There are three additional prospects along the north-facing slope of this hillside; they are shown in plan view on Figure 70. The highest adit exposes a N40W striking shear zone which dips approximately 45 degrees northeast; there was no quartz nor was there any copper or iron staining of the clay. The lower adit, at an approximate elevation of 6255 feet, exposes a 5-foot-thick quartz lens that is overlain by granodiorite above and an aplite dike, striking N35W and dipping 19 degrees southwest, below. The quartz has minor limonite as fracture coatings and minor chrysocolla staining along its contact with the aplite. Further downhill is a prospect pit, approximately 10 by 6 feet and 4 feet deep, that has broken quartz in it. The quartz appears to have only minor fracture coatings of limonite.

Of the areas sampled, only the interval represented by samples N-604A-4 through -6 is indicated to have economic potential. The sample analyses and their dollar equivalents are given in Table 23. A complete list of assay results can be found in Appendix A. The average mineralized zone is 4.5 feet wide (a 2.5-foot quartz vein with 1-foot of altered country rock above and below the vein). The total "high-grade" interval is indicated to be in the range of $113/ton if mined 4.5 feet wide. This high-grade interval, however, represents less than 25% of the total vein exposure, much of which is visibly barren. Therefore, the economic potential of the entire vein is low and no commercial potential is indicated at this site.

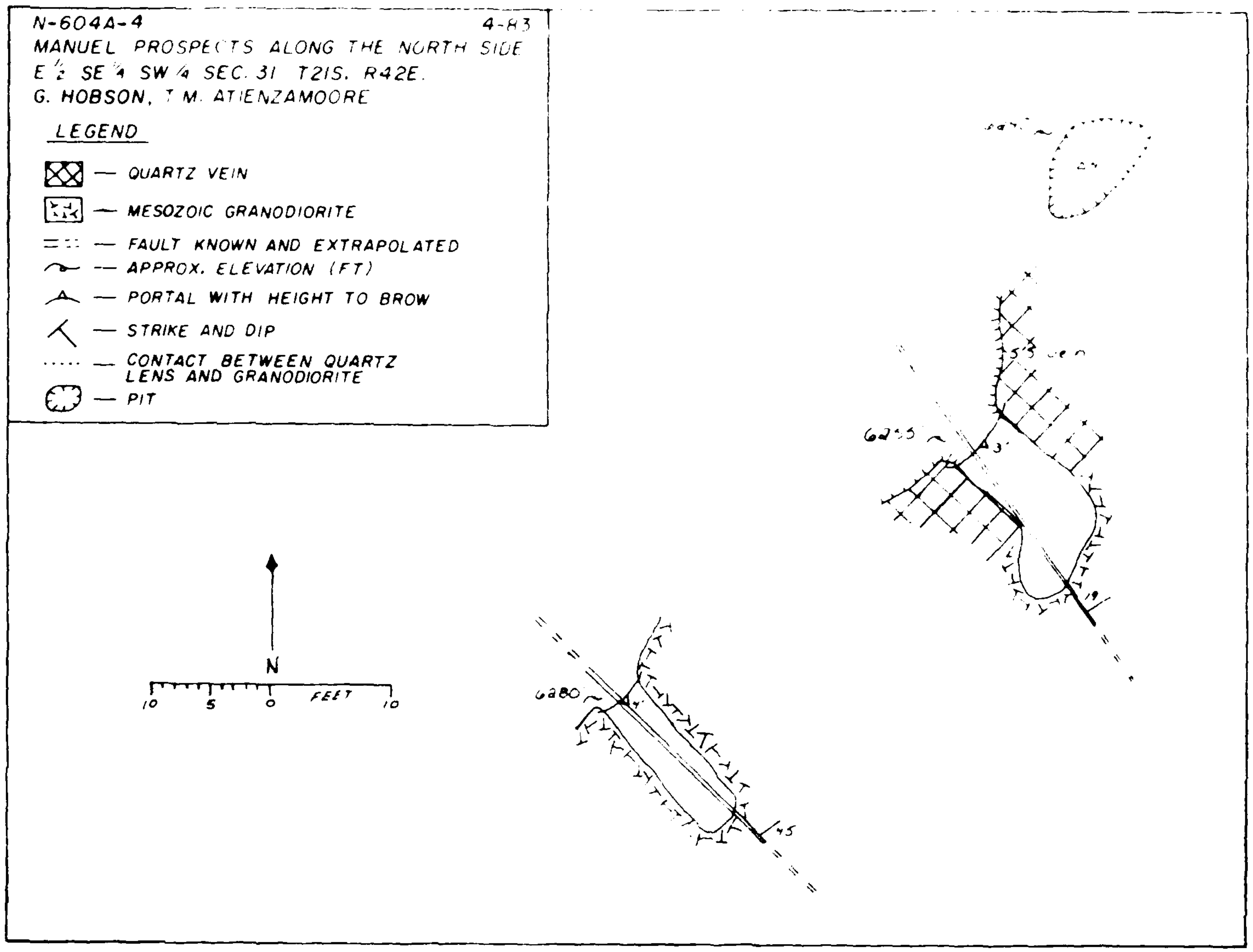

Figure 70. Plan view of north prospect at Manuel Prospects.

TABLE 23. Analysis of Precious Metals on Select Samples From the Manuel Prospects.

Sample	Gold		Silver		Total sample value, $/ton	Sample interval width, ft[a]
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton		
N-604-4	0.620	310.00	1.28	19.20	329.20	1.0
N-604-5	0.083	41.50	0.29	4.35	45.85	2.5
N-604-6	0.100	50.00	1.00	15.00	65.00	1.0

[a]Total interval = 4.5 feet at $113.07/ton.

Oro Grande (N-1002)

The Oro Grande claim is located in the NE1/4, NE1/4, NW1/4 of Sec. 30, T22S, R42E, MDB&M, on the southeast side of Etcheron Valley, midway between Junction Ranch and Mountain Springs Canyon, as shown in Figure 10.

The prospect was developed on a shear zone trending N43E and dipping 58 degrees west in Mesozoic granodiorite. It consisted of an 88-foot drift with two short (5 and 10 feet, respectively) crosscuts at the end and intersecting a 16-foot shaft (Figure 71). The shaft may have been deeper but it is now caved at the drift level. A head frame still stands above the shaft and a house is located nearby.

The shear zone itself is 2 to 6 feet wide and is made up primarily of crushed country rock with sparse to moderate quartz deposition and hematite and limonite staining.

Analysis results (listed in Appendix A) show very low grade gold in the remaining shear zone but sample 2 was taken from broken rock lying under the head frame chute and it indicates that higher grade materials may have been found here. However, the mineralization is not extensive and the potential for a commercial deposit is small.

Unnamed Prospect (N-1003)

This small group of prospect workings is located 0.6 mile northeast of the old Millspaugh Site at an elevation of approximately 6680 feet as shown on Figure 7. The prospect is placed in the NE1/4, SW1/4, NW1/4, Sec. 4, T22S, R42E, MDB&M.

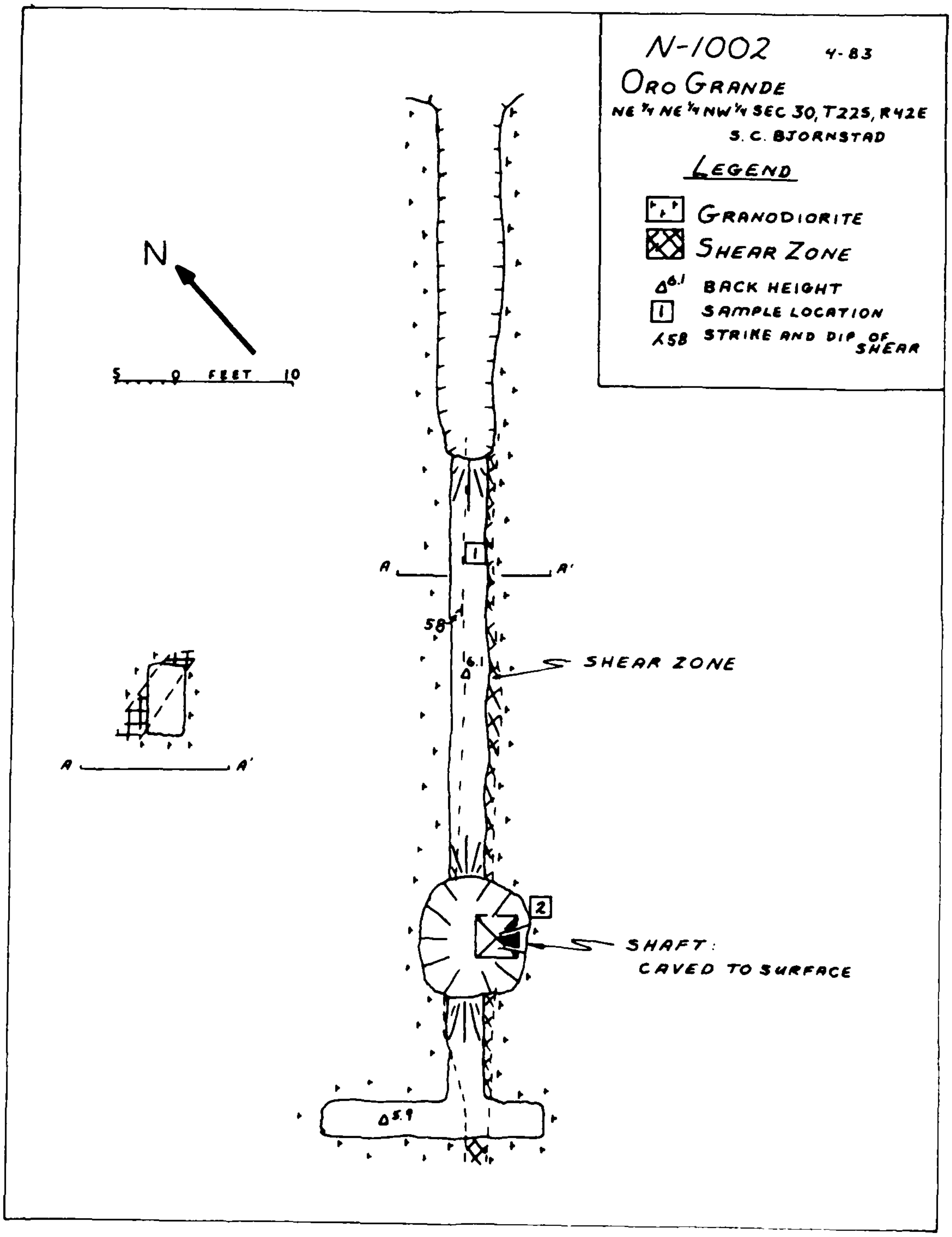

Figure 71. Plan view of adit, Oro Grande.

The prospecting was carried out along two separate shear zones within a porphyritic hornblende-rich granodiorite. A few percent of 1/2- to 2-inch pink orthoclase feldspar phenocrysts are scattered through the predominantely dark gray granodiorite.

Figure 72 is surface plan view that shows the workings, geologic features and sample localities. The eastern-most and largest of the shear zones strikes N21W and dips 71 degrees easterly. Two prospect pits, two short adits, and a 41-foot vertical shaft explore the limits of the shear zone for 160 feet of strike length and provide a limited down-dip view of the deposit. The shear zone is 2-1/2 feet wide at the shaft surface. It is composed mainly of fractured granodiorite and limonite-stained clay with scattered 4- to 6-inch stringers of white quartz. The shear zone pinches southward from the shaft, is continuous across a dry stream bed and is expressed, 70 feet southeast of the shaft, in the form of two parallel quartz veinlets, 1 inch and 2 inches wide, respectively, both containing minor limonite fracture coating. A 14-foot-long adit was driven along these veinlets and abandoned.

The two prospect pits, driven to explore the shear zone strike length to the north, encountered a 1-1/2-foot-wide zone with 5 to 6 inches of massive white quartz. The quartz contained scattered tiny pyrite cubes and limonite stain along hairline fractures. Sample N-1003-3 was chipped across the quartz vein material present in-place in the southern-most pit. The major prospect working is a 7- by 7-foot vertical shaft driven on the shear zone to a depth of 41 feet. The shear zone narrows from 2-1/2 feet to 1 foot with depth and the mineralized quartz zone within the shear pinches and swells between 1 inch and 5 inches in width. Sample N-1003-1 was chipped from the south wall of the shaft along a 5-inch-wide quartz vein that contained limonite stain and scattered pyrite at a depth of 36 feet below the surface. A 10-foot adit was driven northwest along a barren portion of the zone near the shaft collar but was too badly caved to be safely accessible.

The second mineralized zone lies approximately 140 feet west of the major workings. A caved and filled 5- by 6-foot prospect pit was dug apparently where a small outcrop of mineralized quartz was once visible. The only remaining evidence of mineralization is the scattering of white quartz with minor limonite stain and azurite coating located around the pit. Sample N-1003-2 is a grab sample of this loose material.

A complete list of assay results for the three samples is shown by Appendix A and precious metal values are presented in Table 24 below.

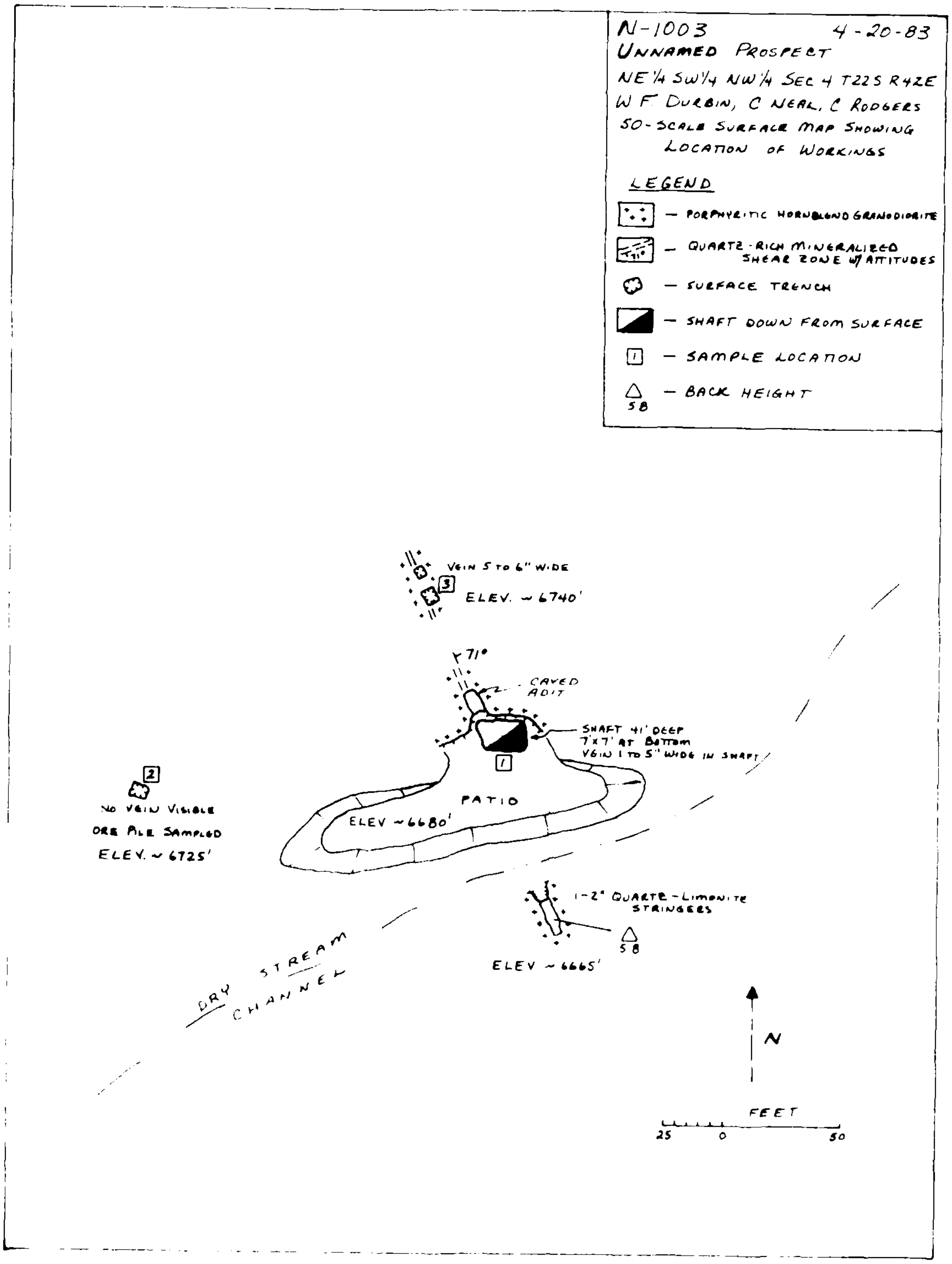

Figure 72. Surface view of workings at N-1003.

Table 24. Gold Values for N-1003 Samples.

Sample	Gold	
	Troy-oz/ton	$/ton
N-1003-1	3.140	1570.0
N-1003-2	0.350	175.0
N-1003-3	0.045	22.50

It is difficult to assess the potential of a deposit such as the main zone at this prospect. The quartz mineralization is of very limited extent along strike. It definitely pinches southward from the shaft and is untraceable beyond 5 feet north of the upper prospect pit. The zone pinches and swells numerous times down-dip in the shaft exposure. The grade of the zone appears to decrease to the north although the extremely high grade sample N-1003-1, taken in the shaft, is a probable "erratic high" assay. A further consideration regarding this sample is the fact that it was taken from the widest "swell" (5 inches) in the zone and that sampling was done where the mineralization appeared to be of best grade, and is thus not representative of average or "as mined" values.

The sample obtained from the prospect pit to the west (sample N-1003-2) of the main zone indicates a moderate gold value ($175/ton) although the zone is not traceable on the surface.

This prospect has, at best, very limited potential for further exploration and development. The erratic nature of width and grade distribution in the main zone could perhaps be dealt with by a small operator picking and chipping at the vein "swells" producing a few tens of pounds or even a few tons of economic grade rock but there is no indication of grade and tonnages needed to sustain a continuing operation.

There are no major geologic targets worthy of extensive exploration adjacent to the immediate area of existing prospect workings. The discovery made at this site is one of minimal tonnage and very spotty grades.

Gold Bird 1 and 2 (N-1004)

The Gold Bird claims lie 1 mile south of Carricut Lake in the NW1/4, NE1/4, SW1/4 of Sec. 18, T22S, R42E, MDB&M, as seen in Figure 7. The surface expression of the workings consist of [illegible] now caved shut, and the waste dump. It has been reported [illegible] operator, a Mr. Yount, that the workings consisted of a 90-foot shaft, a 40-foot drift, and a 60-foot drift.* This is consistent with what can be seen on the dump.

The geology of the claims consists of a Mesozoic granodiorite intruded by a Mesozoic lamprophyre dike which trends N73W and is nearly vertical. A quartz vein, with some visible copper and iron mineralization, was developed on the north side of the dike. Mr Yount reported vein widths of up to 8 feet and average grades of 0.4 to 0.42 troy-oz/ton gold. The grade is possible for sorted material but the width is inconsistent with what can be seen on the surface where the vein width does not exceed 1.5 feet. Typically, the former operator seemed to be referring to the total shear zone width, and not the width of the quartz vein.

Because the workings are inaccessible, there is almost no vein material on the dump and statements by the former operator appear consistent with other values seen in the area, no sample was taken here. The economic potential of the property does not appear to be significant. While this vein, and others like it, are fairly wide (up to 3 feet) and outcrop at several places in the immediate area (0.25 square mile), they are essentially devoid of any indicator mineralization, i.e., copper and iron staining.

Unnamed Prospect (N-1006)

A small, rusted, hoist and the fallen remnants of a wooden building are the only relics left at this small prospect site. It is located 1.4 miles southeast of the old Millspaugh Town Site and is shown on Figure 7. It is placed in the SE1/4, SE1/4, SE1/4, Sec. 9, T22S, R42E, MDB&M.

The prospected site is a 6-foot wide alaskite dike within a severely decomposed Mesozoic biotite-rich quartz diorite host rock. The dike strikes N10W and dips 50 degrees westerly. A decline was driven down-dip perpendicular to the strike of the dike. The decline is now caved and filled to within a few feet of the surface but an estimate of the dump volume indicates a depth of 40 to 50 feet of 8- by 8-foot decline.

There is no mineralization of any description visible at the surface outcrop and along the dike/host rock contacts. With increasing depth, however, there appears to be an increase in mineralization within the alaskite. Small scattered piles of alaskite with abundant

*Personal communication with Mr. Yount, 1980.

chrysocolla coating and malachite stain were found on the top layer of the dump and indicate that the mineralization was intersected near the bottom of the decline. Sample N-1006 was a grab sample taken from the most heavily mineralized rock. Complete assay results for the sample are listed in Appendix A. The assay results show very low values for precious metals and other commodities. No discovery of any type of commercial grade mineralization was made at this prospect.

Vulcan Prospect (N-1007)

A badly decomposed claim notice found at this location lists the name of this claim as the Vulcan. No claimant or claim date was visible on the notice. The prospect is situated 1.3 miles southeast of the old Millspaugh Town Site as shown on Figure 7. It is placed in the NW1/4, NW1/4, NE1/4, Sec. 16, T22S, R42E, MDB&M.

The host rock is Mesozoic granodiorite, which is altered by abundant clay mineralization and scattered thin fractures that contain limonite stained clay.

The prospect workings consist of one caved adit, a 118-foot adit, and a 8-by 8-foot prospect pit that is located approximately 200 yards south of the adits. The accessible adit shown by Figure 73 contains a 28-foot width of severely altered granodiorite, which has the appearance of mica schist. The caved prospect pit had no mineralized material visible in place but a scattering of loose limonite stained quartz was found around the pit perimeter.

Two samples were taken at the prospect. One sample was chipped from a section of granodiorite in the adit where there was clay with limonite staining. The second sample was a grab taken of limonite stained quartz from around the prospect pit. Complete assay results for the two samples are shown in Appendix A. The assay results indicate that no discovery of precious metals or other commodities was made at the Vulcan prospect.

Unnamed Prospect (N-1008)

This prospect is located 2 miles east of Millspaugh in the S1/2, SE1/4, SE1/4 of Sec. 3 and N1/2, NE1/4, NE1/4 of Sec. 10, T22S, R42E, MDB&M, as shown on Figure 7. It consists of two open adits (30 and 31 feet) and two caved adits (also short) that were dug on altered shear zones in Mesozoic granite. Two of them were dug on the shear

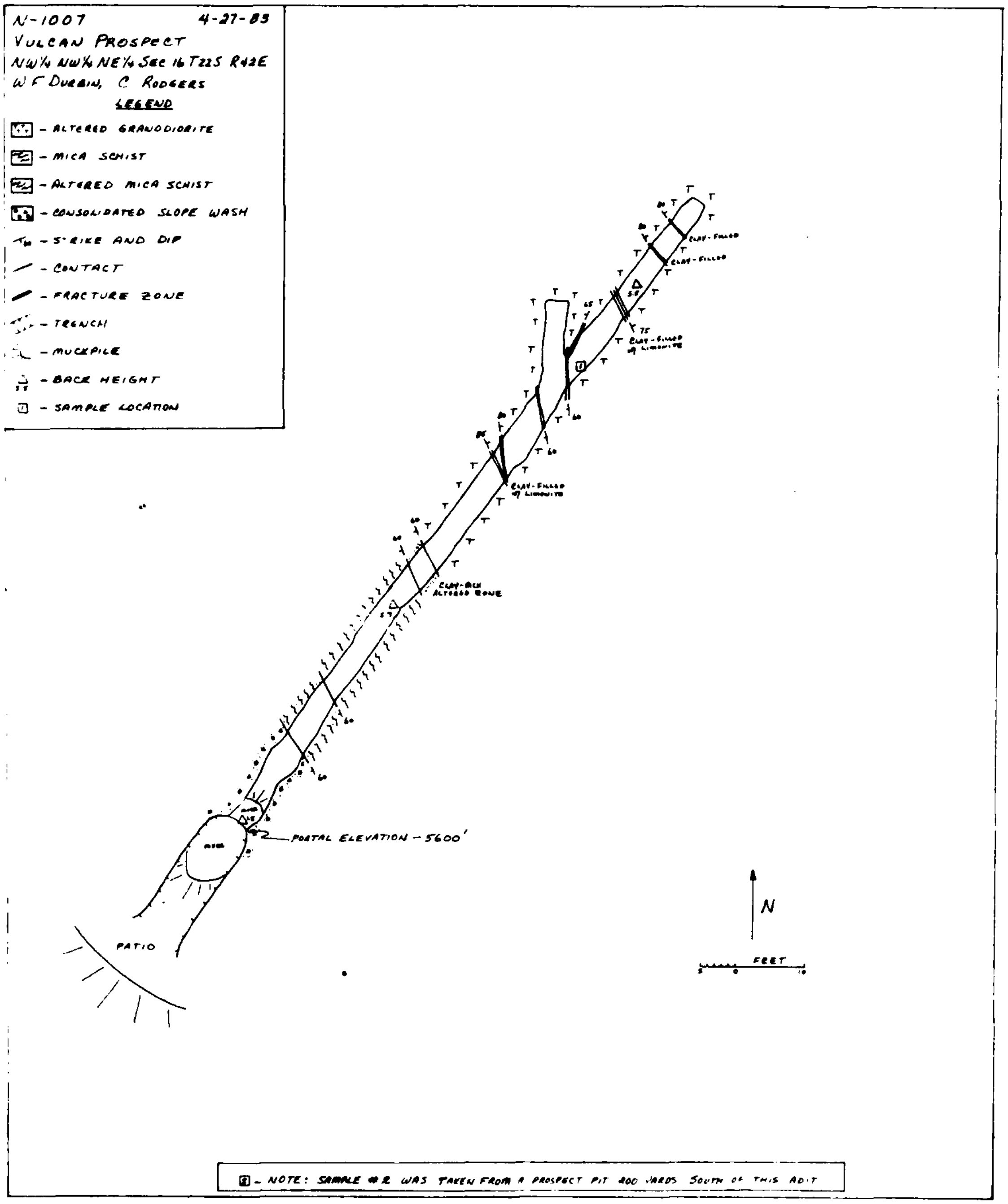

Figure 73. Plan view of adit, Vulcan Prospect.

zone outcrops. The granite was slightly metamorphosed and the shear showed carbonate enrichment and very sparse malachite staining at the surface. The other two adits were dug on the opposite hill. The copper stained shear outcrops at the top of the hill. The prospector tried to intersect it at depth (without success) by tunneling through 20 feet of slope wash and alluvium.

Two samples were taken–one from each shear zone. Both samples showed no commercial values for precious metals (see Appendix A). There is no commercial potential at this site.

Unnamed Prospect (N-1020)

This prospect is located at the south end of Etcheron Valley in the SE1/4, SW1/4, NW1/4, of Sec. 30, T22S, R42E, MDB&M, as shown in Figure 10, and consists of a single prospect pit, 4 feet across and 2 feet deep. The pit was dug on a small (less than 0.4 foot wide) fractured quartz vein in the Mesozoic granodiorite. The quartz shows moderate hematite staining of the fractures. Very sparse malachite fracture coating is also present.

The outcrop of the vein is about 15 feet long and the mineral potential for this prospect is very low. No sample was taken.

Unnamed Prospect (N-1021)

This prospect is located in the NW1/4,NW1/4, NE1/4, of Sec. 19, T22S, R42E MDB&M, east of Etcheron Valley, 2.5 miles south of Millspaugh, as shown in Figure 7. The prospector dug a small shaft and a pit on thin (less than 0.5 foot) quartz veins in Mesozoic granodiorite. The veins are roughly parallel, about 60 feet apart, trend N70W and dip steeply southward. Except for some very sparse hematite staining, the quartz veins are barren. No samples were taken.

The workings are all caved now but approximately 30 cubic yards of rock were moved. The potential here is essentially nil.

Unnamed Prospect (N-1022)

Located 2.7 miles south of Millspaugh, this unnamed prospect is found in the NW1/4, NW1/4, SW1/4 of Sec. 20, T22S, R42E, MDB&M, as seen in Figure 7. As with the other prospects in the vicinity, this was developed on a fairly narrow (less than 0.5 foot) quartz vein in Mesozoic granodiorite. A single shaft was dug to an estimated depth of 12 feet. The vein is fractured, with hematite and limonite as fracture fillings. A sample was taken of the quartz stockpile. The results are given in Appendix A. The vein is limited in extent and the sample analysis indicates no mineral potential at this site.

Unnamed Prospect (N-1023)

Two caved prospect pits, presumably dug for the purpose of exploration for precious metals, are situated 0.3 mile northeast of the old Millspaugh Town Site. The prospect is placed in the NE1/4, SW1/4, SW1/4, Sec. 4, T22S, R42D, MDB&M, as shown on Figure 7.

There is no in-place expression of host rock or mineralized zone in the prospect pits. Intrusive rocks outcropping in the vicinity are Mesozoic medium-grained, dark gray hornblend-rich granodiorites. The prospect pits, located approximately 100 feet apart in a north-south direction,were surrounded by scattered white quartz coated with secondary white drusy quartz crusts and limonite fracture-filling. A composite grab sample was collected of this slightly mineralized quartz and complete assay results are summarized in Appendix A. The assay results indicate no commercial values for precious metals or other commodities.

Unnamed Prospect (N-1025)

This prospect is located at an elevation of 5400 feet, approximately 1.8 miles southeast of the Millspaugh Site and 4 miles southwest of the Panamint Valley Onyx Mine. It is shown as N-1025 on Figure 7, and is found in the NW1/4, SE1/4, NE1/4, of Sec. 16, T22S, R42E, MDB&M.

The working, a 40-foot-long adit (shown in Figure 74), was presumably driven to explore possible precious metal values. It intersected a N44W striking shear zone in Mesozoic granite which dips approximately 52 degrees to the southwest. The rock within this shear zone has been altered to a chlorite schist, no mineralization was evident and no sample was taken.

Unnamed Prospect (N-1026)

Two prospect pits are situated on the eastern slope of a canyon that is tributary to Shepherd Canyon. The pits lie 0.3 mile south of Shepherd Canyon and 2.2 miles south-southeast of the old Millspaugh Town Site as shown on Figure 7. The prospect is placed in the SW1/4, SE1/4, SW1/4, Sec. 16, T22S, R42E, MDB&M.

Both pits explored shear zones developed in Mesozoic granite. The upper pit lies at the 5720-foot elevation. It strikes east-west and is filled in with slope wash. An estimated 18 cubic yards of material was removed from the pit. No *in-situ* expression of shear zone material was found but scattered quartz with coatings and staining of chrysocolla, azurite (?), and malachite was found around the pit perimeter.

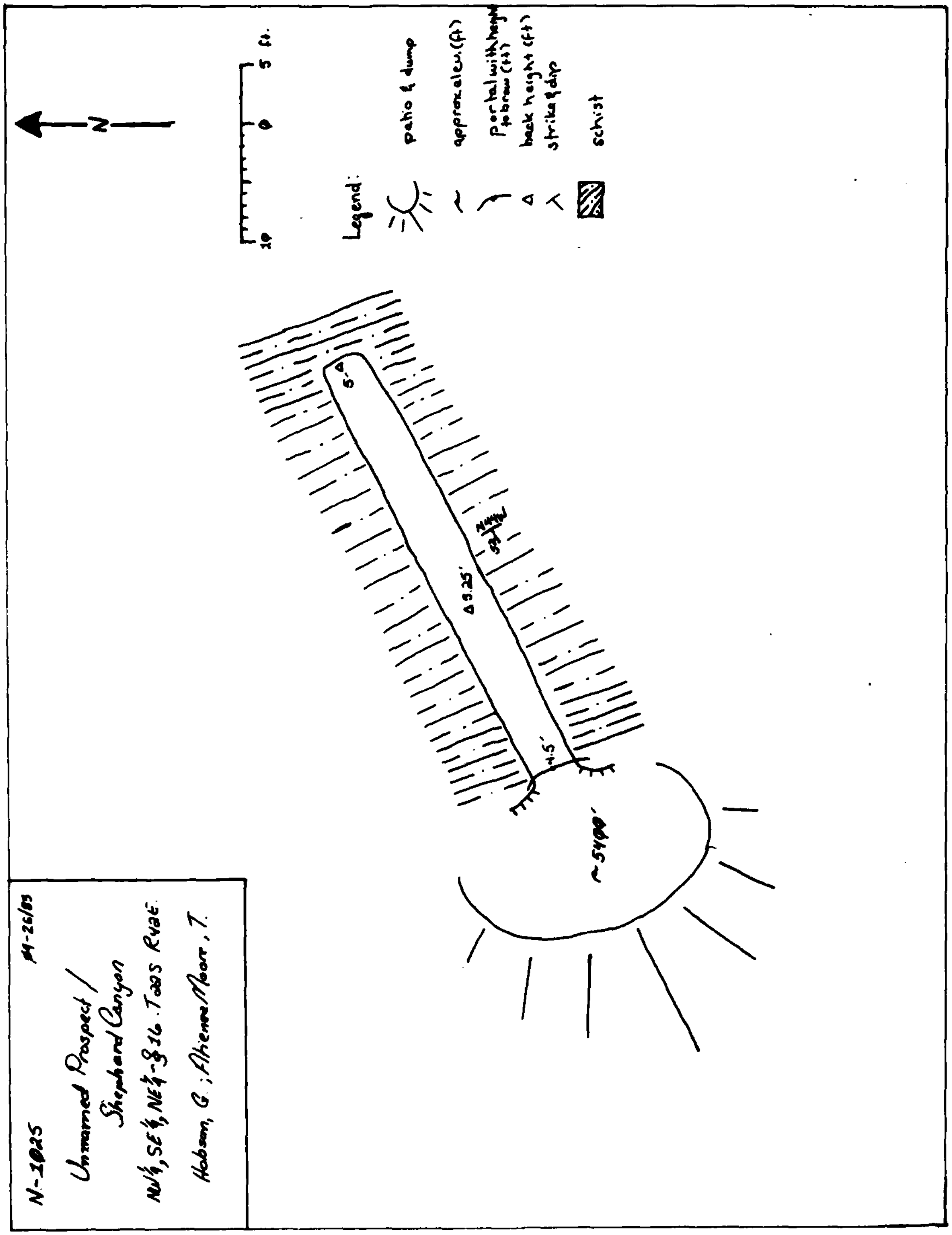

Figure 74. Plan view of adit at N-1025.

A grab sample, labeled N-1026-1, was collected from the highest grade material. The lower pit lies 80 feet to the north of the upper pit at an elevation of approximately 5714 feet. The pit is slightly elongate and strikes N10W and is filled with slope wash. An estimated 3 cubic yards of material was removed from the pit. There is no *in-situ* expression of shear zone material but several piles of massive white quartz with abundant specular hematite pods and stringers were located around the pit. Sample N-1026-2 was a grab of quartz with the greatest iron concentration.

The complete analysis for the two samples is presented in Appendix A and the results indicate that no discovery of commercial values for precious metals or other commodities was made at this prospect.

Unnamed Decline (N-1028)

A caved decline is situated 1.4 air miles south of the old Millspaugh Town Site and is located on the eastern aside of the northwesterly trending portion of Shepherd Canyon. Figure 7 is a location map that shows this prospect. It is placed in the NW1/4, SW1/4, NW1/4, Sec. 16, T22S, R42E.

The decline was driven to explore a shear zone present in the Mesozoic porphyritic granite host rock. The shear zone strikes N30W and dips 60 degrees to the northeast. The shear zone is an average of 8 feet wide and surface outcrops are of fractured, limonitized granite. There is no in-place quartz mineralization visible at the site. The decline surface opening is 10-1/2 by 10-1/2 feet and is caved and filled to within 8-1/2 feet of the surface. The dump volume indicates a possible total depth of 25 to 30 feet.

There was a small amount of quartz with limonite fracture-filling on the dump surface around the decline. A grab sample of the quartz was collected and the sample assay results are listed in Appendix A. The assay results indicate that no discovery of commerical values for precious metals or other commodities was made at this location.

Unnamed Prospect (N-1029)

This prospect is located approximately 1.5 miles south of Millspaugh at an elevation of 5640 feet. It is shown as N-1029 in Figure 7, and is found in the NW1/4, SW1/4, NW1/4 of Sec. 16, T22S, R42E, MDB&M.

The property includes a 50-foot-long ore chute and a small tram line. The tram leads to an 11-foot adit driven in Mesozoic granite, which exposes a 3-inch (maximum) quartz vein with minor limonite fracture coatings and chrysocolla at the margins of the vein. The vein strikes N37W and dips approximately 70 degrees to the northeast. It is cut off to the south by a fault striking N61E and dipping 56 degrees northwest and pinches out approximately 7 feet below the surface in the adit. The vein is not traceable to the north.

The assays for the sampled vein material show fair gold values; however, the vein has no persistence and there is no geologic evidence which would suggest anything more substantial then just minor fracture-filling veins of quartz. See Appendix A for the complete listing of assay results.

MOUNTAIN SPINGS CANYON/BIRCHAM SPRINGS AREA

Argus Silver (N-905)

The Argus Silver Claim is located near the Junction Ranch Road in the SW1/4, NW1/4, SW1/4 of Sec. 36, T22S, R41E, as shown in Figure 9. The main working is a tunnel 252 feet long driven in Mesozoic granodiorite but intersecting and following a sparsely mineralized shear zone near the contact of the granodiorite and a large aplite dike. The dike contact and shear zone both trend N70W and dip 65 degrees south and 74 degrees south, respectively. There is moderate quartz-enrichment of the shear but it is relatively free of associated minerals. Only very sparse pyrite crystals, and limonite and hematite staining are evident. Figure 75 shows a plan view of the tunnel as well as the locations of samples 1, 2, and 3. Analysis results for all of the samples are given in Appendix A.

The aplite dike forms the ridge crest 40 feet above the main tunnel. Along the contact outcrop a 30-foot trench and a 15-foot shaft were dug. Samples 4 and 5 were of quartz vein material taken from these prospects.

Three other prospects were looked at: a caved adit 120 feet northeast of the main tunnel and 2 prospect pits 160 feet northwest of the main tunnel. All three were dug in granodiorite and there was nothing left worth sampling.

In view of the assay results, which show very low values for precious metals, and the limited extent of a favorable environment for metalliforous ores, the potential for an economic deposit is very low at this site.

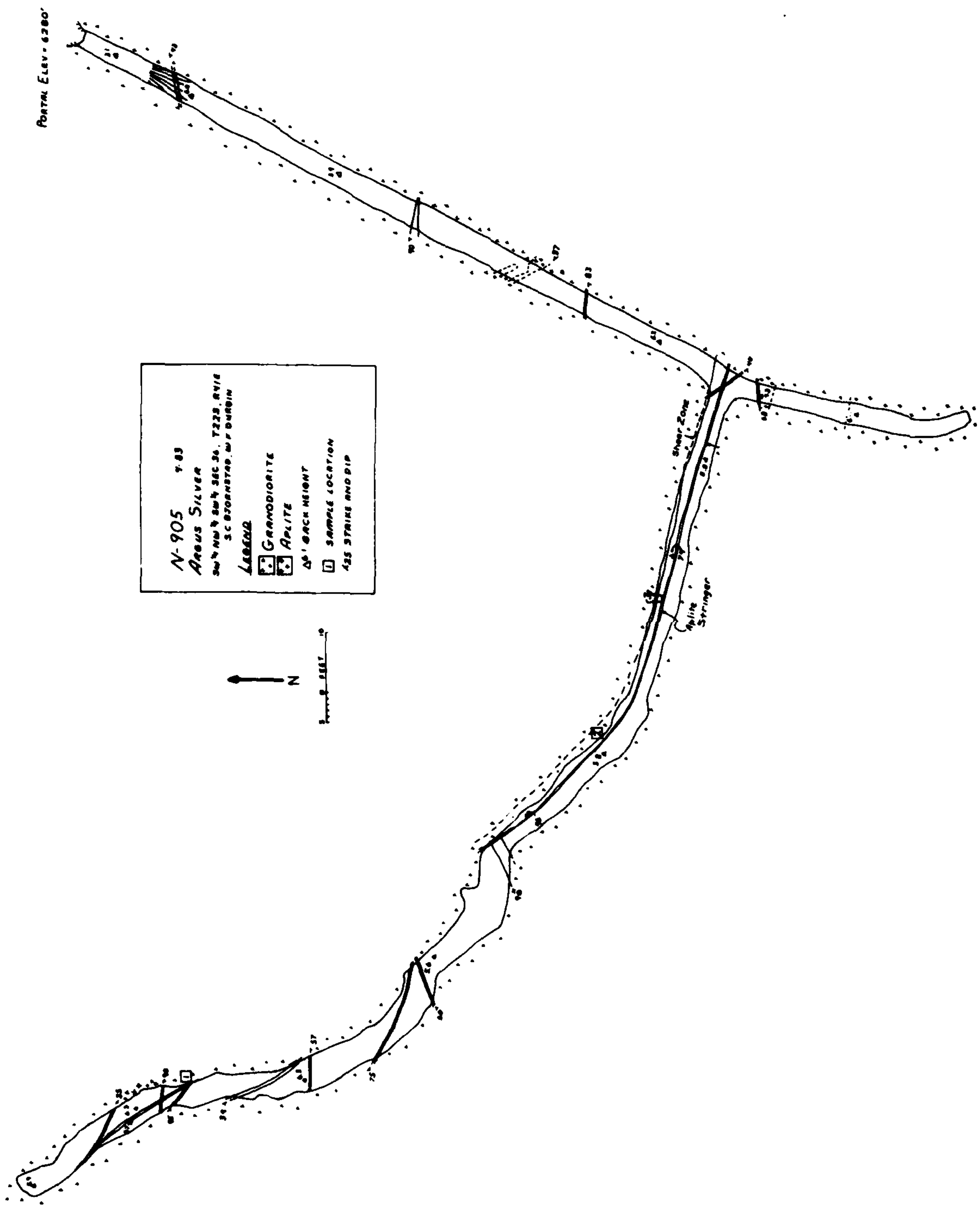

Figure 75. Plan view of main adit, Argus Silver.

Mammoth Mine (N-1301)

The Mammoth Mine Complex is located primarily in the central-eastern half of Sec. 10, T23S, R41E, MDB&M. It is shown as N-1301 in Figure 9.

The host rock is Mesozoic diorite that has sparsely mineralized shear zones. These northwest-trending zones are 6 to 10 inches wide and contain 6- to 8-inch by 4- to 6-foot-long quartz lenses that have minor fracture coatings of limonite.

The property was explored in the SW1/4, NE1/4, NE1/4 of the section by a 1000-foot adit driven toward a metasediment roof pendant, but this zone of schist and light silication with sparse zeolites (stilbite) in fractures was not reached. Figure 76 is a plan view taken from "A Reconnaissance Survey of Potential Underground Shelter Spaces Near Indian Wells Valley," by C. F. Austin and J. K. Pringle (1963). The mine was flooded to a depth of 18 inches at the time of the survey. No identifiable mineralization was found in the workings. The timbering seen in the back quarter of the drift was installed to support a fracture zone. These fractures produced 5 gallons per minute of water. In the NW1/4, SE1/4, NE1/4 of the section are two short adits. The lower one has been washed closed. Judging from the size of the dump it is estimated to have been about 15 feet long. The adit approximately 15 feet above this one is shown in plan view as N-1301-2 on Figure 77. Closer to Mountain Springs Canyon, in the SW1/4, NW1/4, SE1/4 of the section is another group of small prospects. There is a prospect trench 4 by 15 feet along the east side of the mines access road and no remarkable mineralization was found along this trench. To the west of the access road is a small prospect adit that exposes a gouge zone containing a small amount of quartz with minor fracture coatings of limonite.

Two samples were taken from this group of workings. The first, N-1301-2-1, is from a 0.5-foot quartz lens; its location is shown in Figure 77. The second, N-1301-3-1, is from the high grade pile of the prospect along the west side of the mines access road near Mountain Springs Canyon. Assay results for these samples are given in Appendix A. Neither of the samples taken show any commercial values for precious metals or other commodities and there is no potential for geologic targets in the area worthy of further examination.

Wildrose Mine (N-1302)

The Wildrose Mine is situated in the Argus Mining District and is located on the south side of Mountain Springs Canyon approximately 4 miles east of the canyon mouth. The workings are numerous and extend into Sections 10, 11, and 14 of T23S, R41E, MDB&M. Figure 9 is a location map of the area.

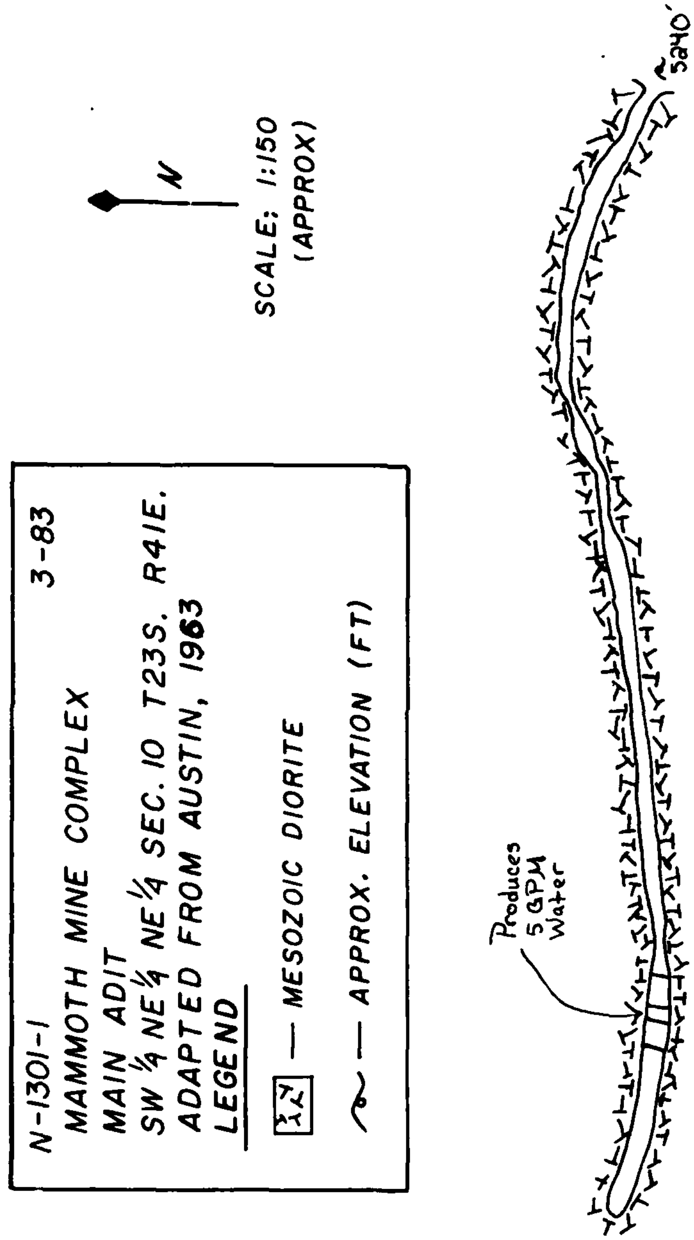

Figure 76. Plan view of main adit, Mammoth Mine.

N-1301-2 3-30-83

MAMMOTH MINE COMPLEX
SOUTHEAST PROSPECT
NW 1/4 SE 1/4 NE 1/4 SEC. 10 T23S. R41E.

LEGEND B. RICHARDSON, T.M. ATIENZAMOORE

— MESOZOIC DIORITE

— APPROX. ELEVATION (FT)

Δ — HEIGHT (FT)

□ — SAMPLE NO. AND LOCATION

— SHEAR ZONE KNOWN AND EXTRAPOLATED, CONTAINS QUARTZ LENSES WITH MINOR LIMONITE

— STRIKE AND DIP

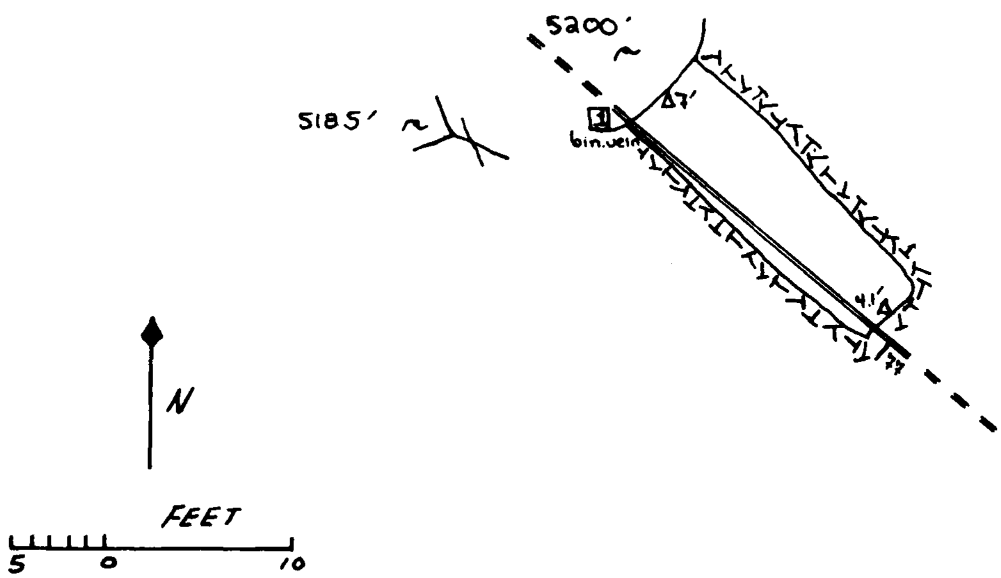

Figure 77. Plan view of short adit, Mammoth Mine.

The host rock for the deposit is a pale gray, fine grained Mesozoic granite. It is cut by several extensive lamprophyre dikes. A shear zone is the locus for mineralized quartz that is consistently 1-foot to 1-1/2 feet thick.

Figure 78 is a surface plan view showing the Wildrose workings which include numerous adits, a caved shaft, and a caved rail haulage level. Eight of the workings are on the north-facing slope of the hillside bordering Mountain Springs Canyon. The remaining five workings are situated to the west on both flanks of a north-south-trending stream tributary of Mountain Springs Canyon.

Adits 2, 3, and 4, located on the north-facing hillside, were accessible and are shown in Figures 79, 80, and 81. These accounted for 510 feet of drifting. No mineralization was encountered in these workings. The shaft and rail haulage level shown as location 5 on the surface map are caved and filled with slope wash. Mine dump volumes at most of the caved workings indicate 50- to 100-foot drift lengths.

Adits 6 and 7, located to the west, were accessible. The lower adit (no. 6) is 175 feet long and was an apparent development drift in granite. It is shown in Figure 82. The upper adit (no. 7) consisted of 378 feet of drifting and a 30-foot vertical winze and is shown in Figure 83. It is in this adit that the only visible in-place mineralization was observed. The quartz-rich zone is developed in a shear that strikes N40E and dips an average of 15 degrees southeasterly. The sparsely mineralized zone is 1 to 1 1/2 feet thick and contains mainly chrysocolla fracture-filling with minor amounts of galena, specular hematite, pyrite, limonite and clay. Three small areas were stoped along the quartz vein but account for only 9 cubic yards of material removed. Of that total, 2.3 cubic yards was actual vein material.

A total of eight samples were taken at the Wildrose Mine. Two grab samples were taken of quartz with extensive limonite staining from a pile of loose muck on the dump at adit 3. One grab sample was collected from scattered massive quartz on the dump near caved adit 5. One grab sample was collected from a sparsely mineralized quartz pile on the dump at caved adit 8. Three chip samples were taken from locations in adit 7 as indicated on Figure 83 and one grab sample was taken from a large stockpile of mineralized rock located along the Wildrose Mine access road. All samples were taken of material of apparent highest grade and assay results are summarized in Appendix A. Three samples, labeled N-1302-8-1, N-1302-7-3, and N-1302-5 are worthy of special mention and are summarized in Table 25.

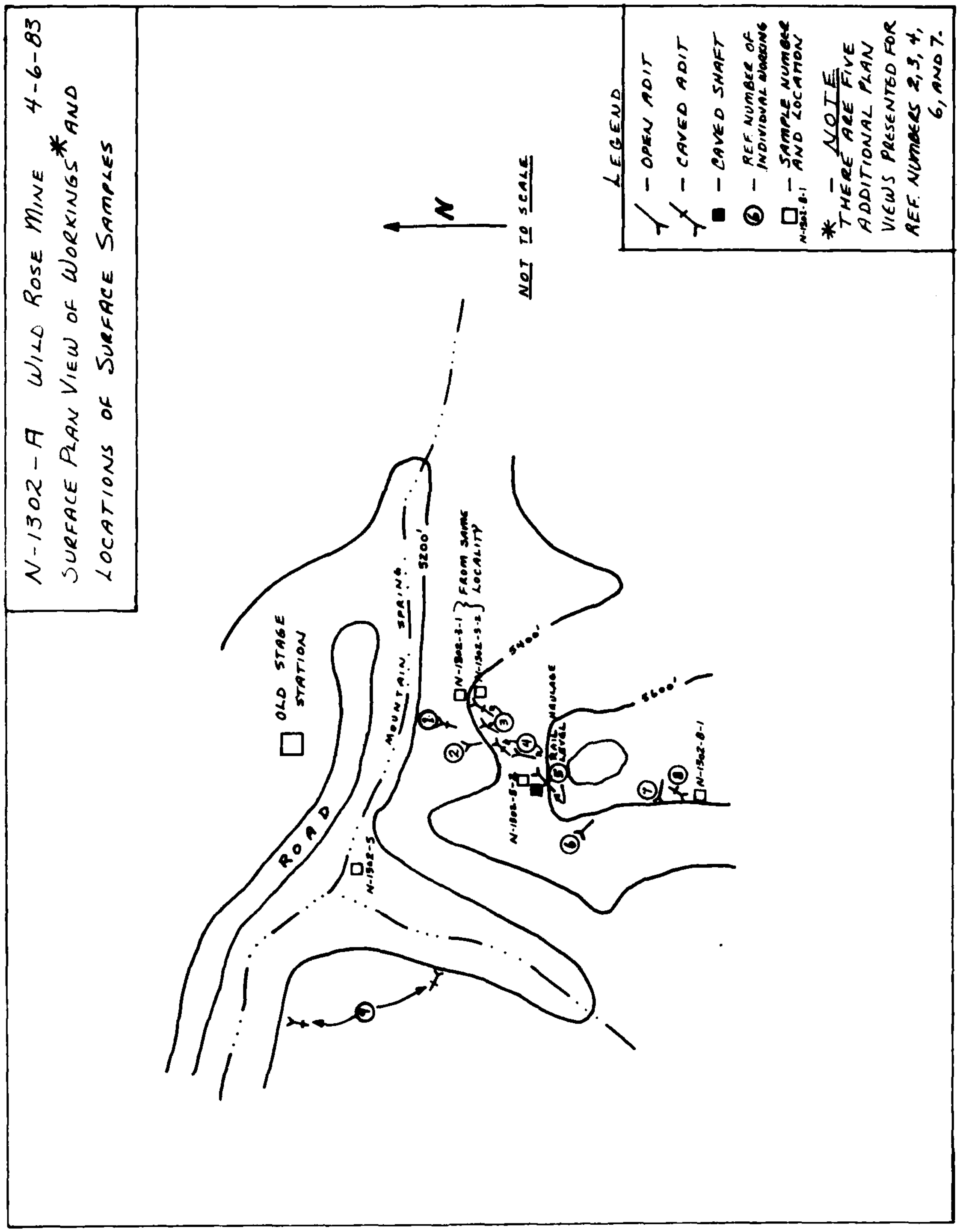

Figure 78. Surface Plan view of Wildrose Mine.

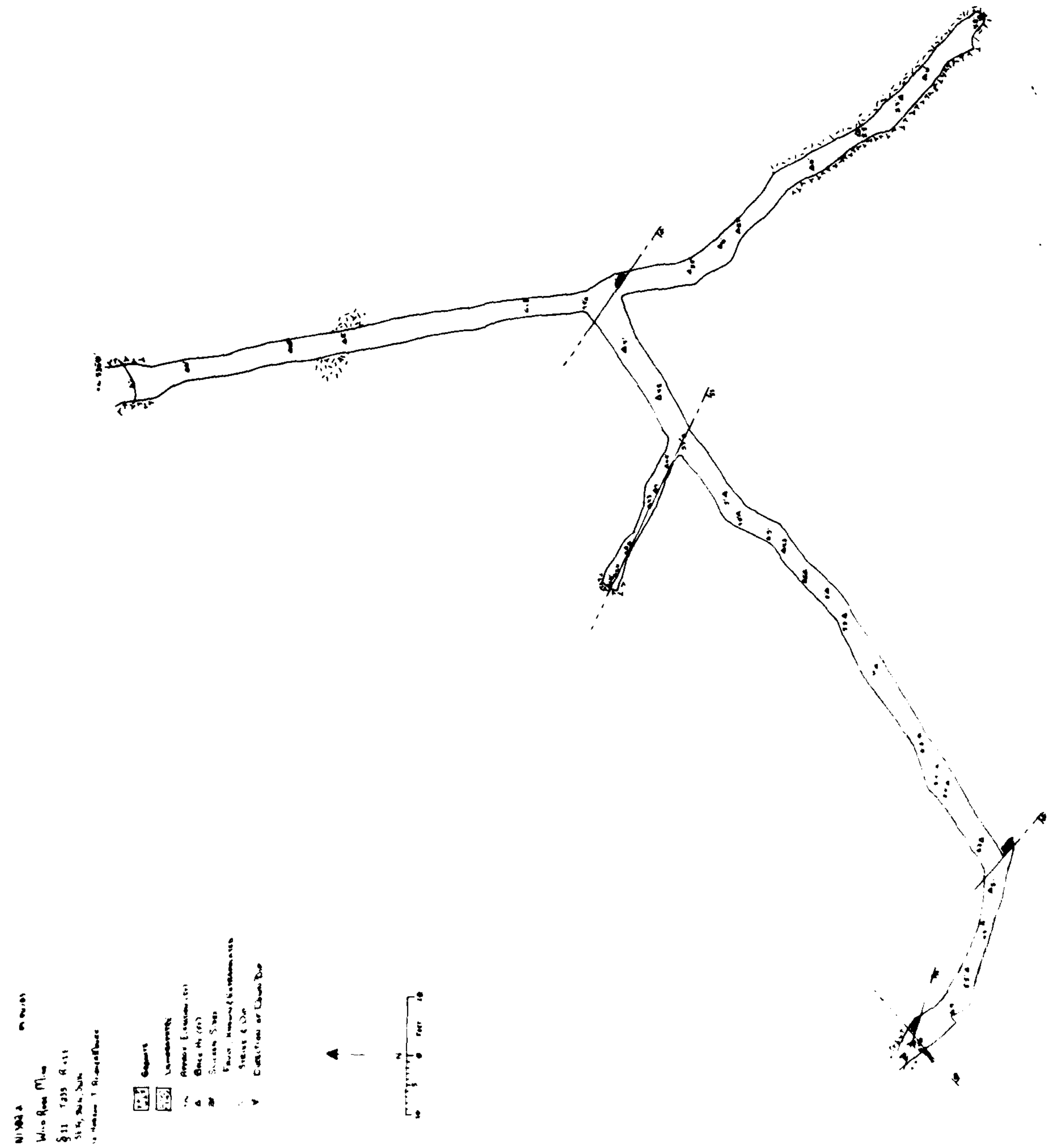

Figure 79. Plan view of adit 2, Wildrose Mine.

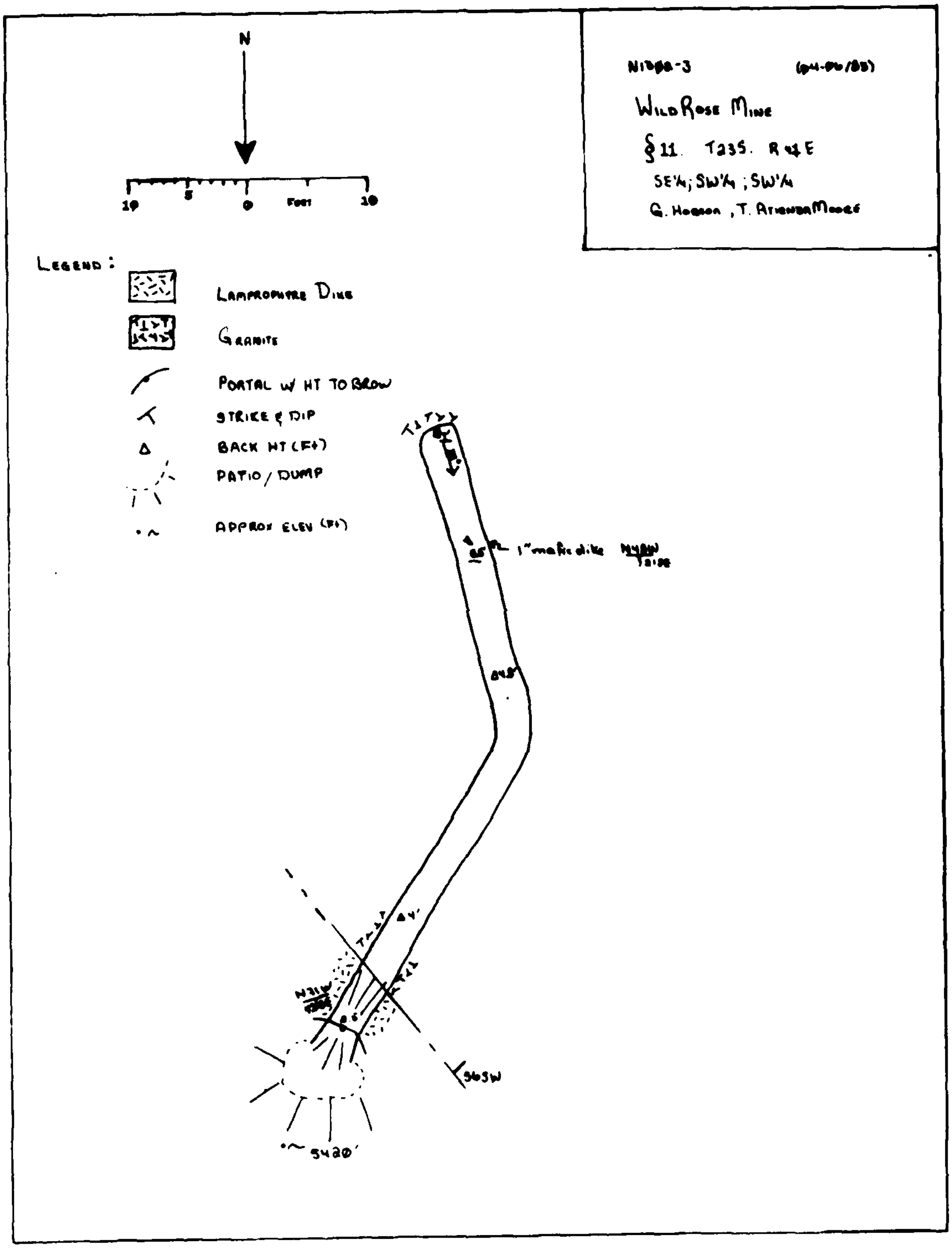

Figure 80. Plan view of adit 3, Wildrose Mine.

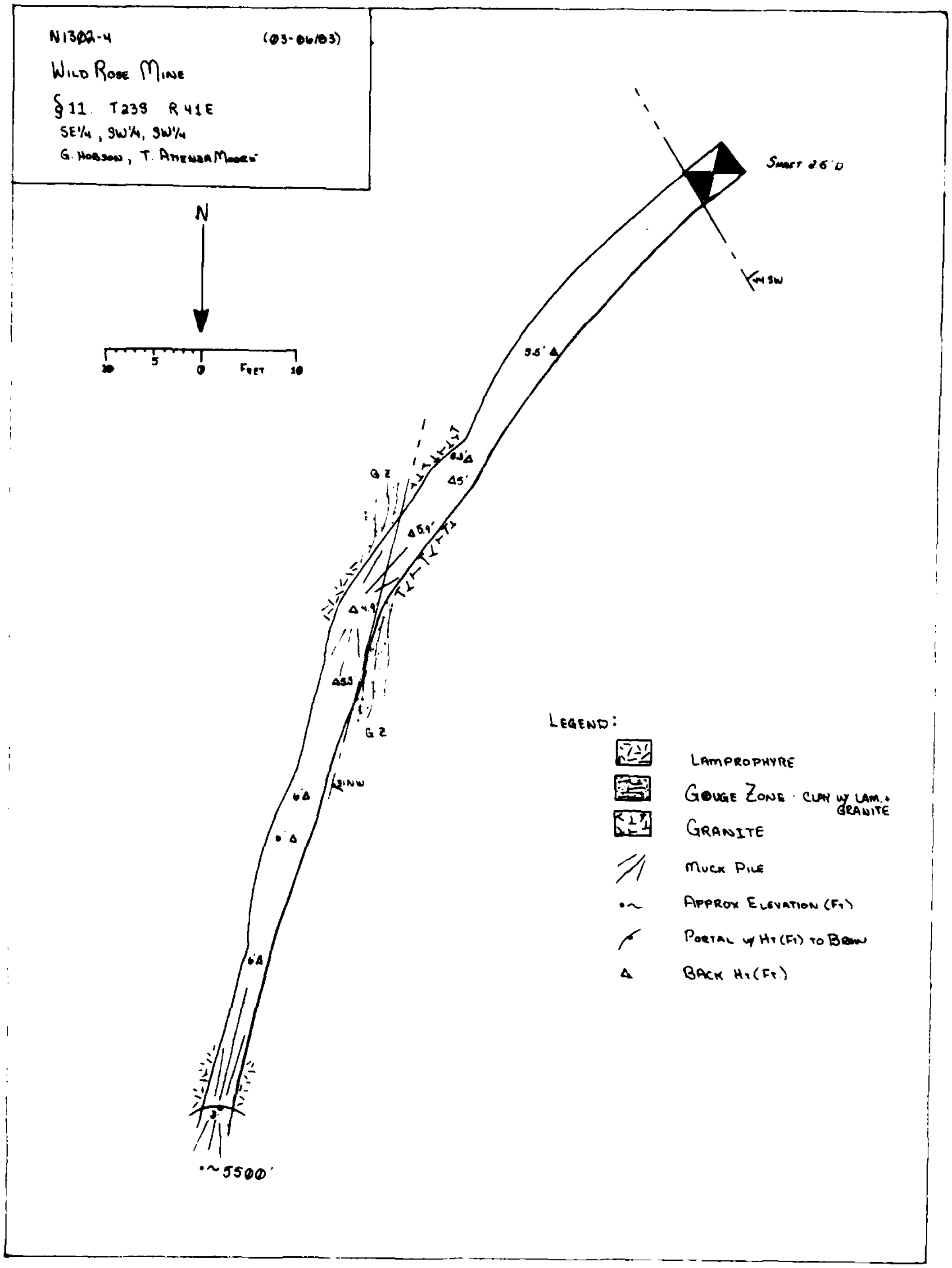

Figure 81. Plan view of adit 4, Wildrose Mine.

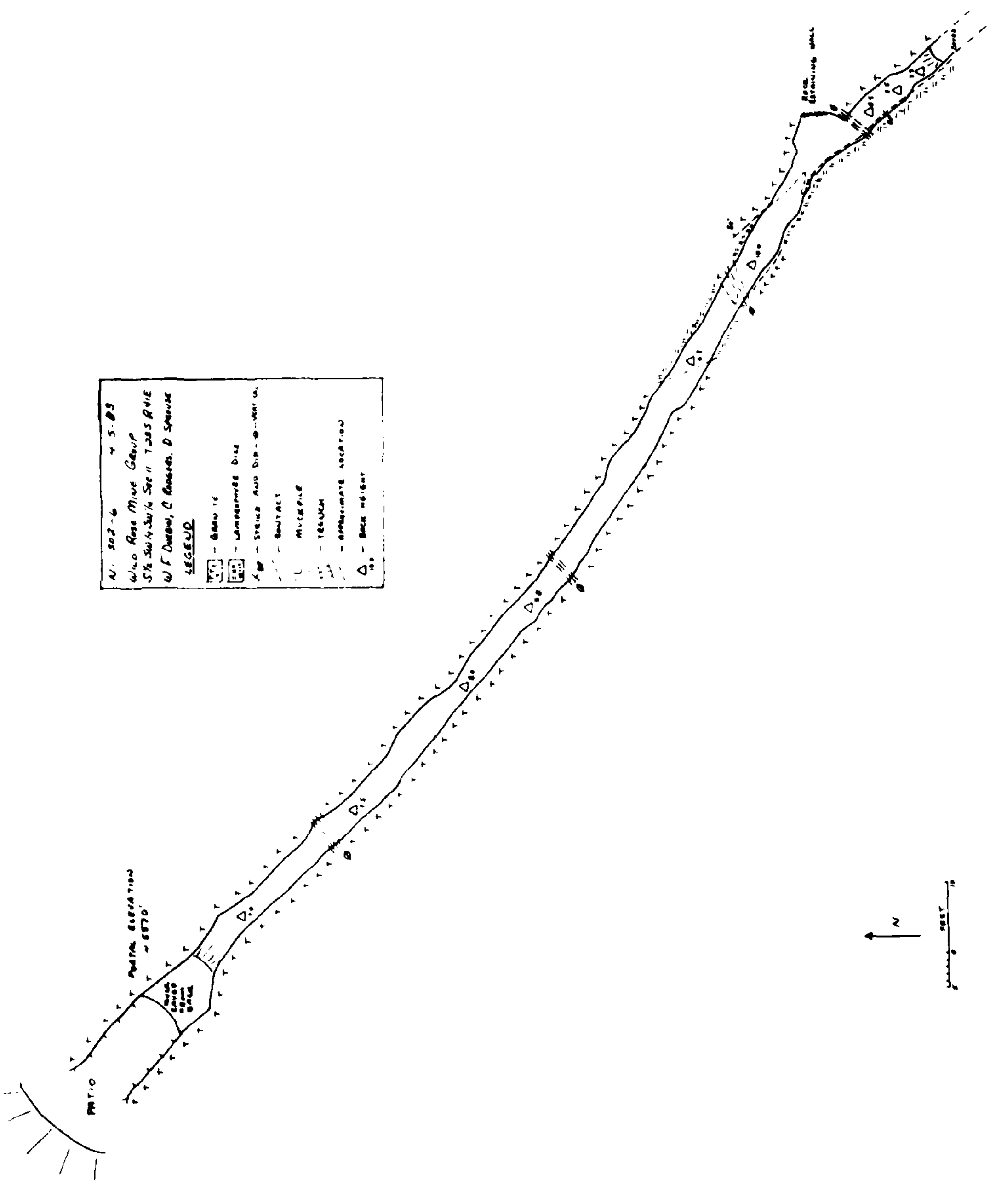

Figure 82. Plan view of adit 6, Wildrose Mine.

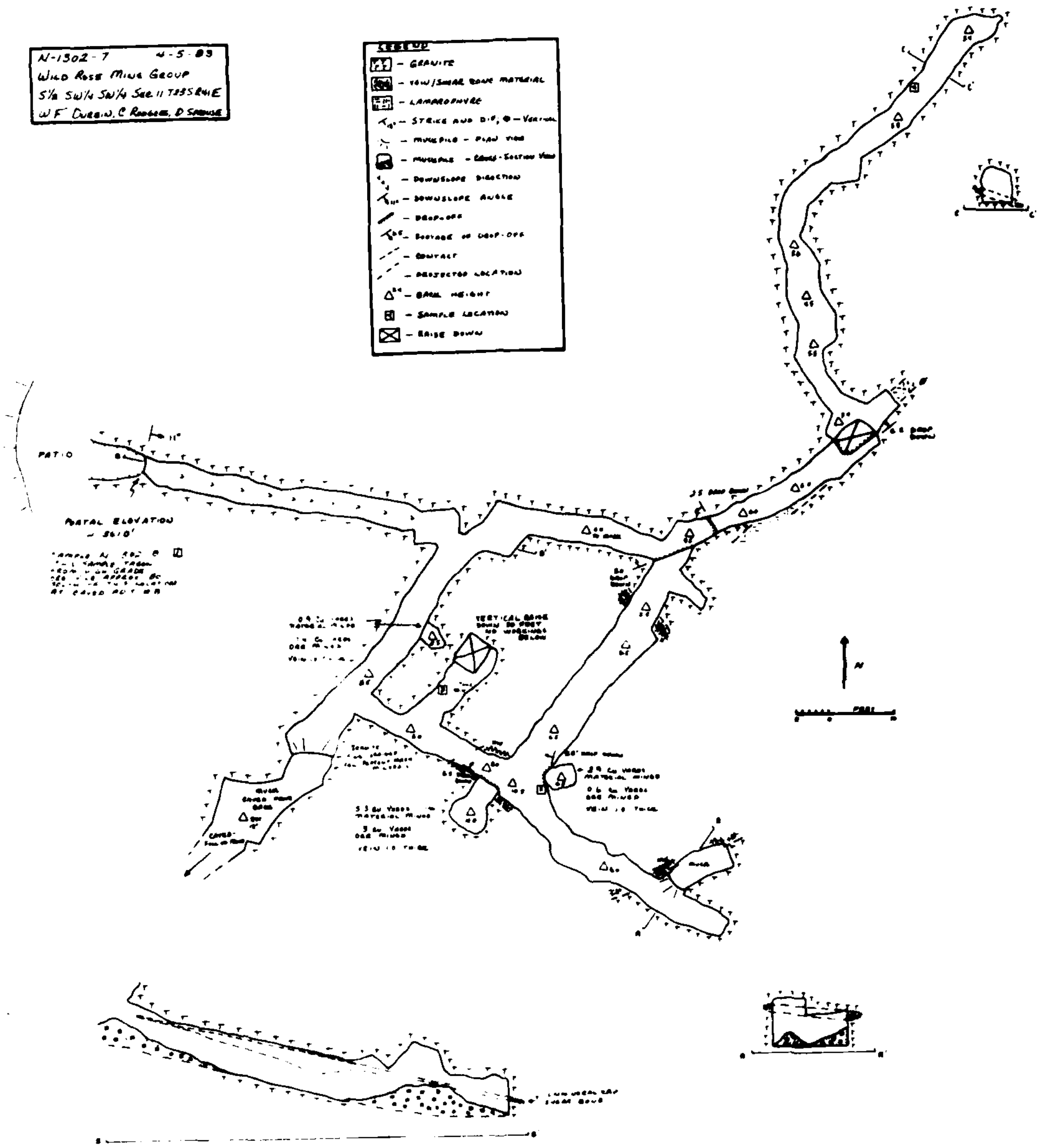

Figure 83. Plan view on adit 7, Wildrose Mine.

TABLE 25. Assay Results for Selected Samples, Wildrose Mine.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1302-8-1	0.800	400	1.04	15.60	415.60
N-1302-7-3	0.500	250	1.05	15.75	265.75
N-1302-5	1.390	695	6.80	102.00	797.00

Sample N-1302-8-1 was a grab from a small rock pile located at caved adit number 8 south of the western group of workings. The sample was composed of quartz with minor pyrite and limonite. This material may have come from the caved adit, but study by re-entry and renovation procedures would be too expensive for this study to consider. Sample N-1032-7-3 was a chip sample cut across the width of a 1-foot-thick vein in the drift workings shown in Figure 83. The quartz contains chrysocolla, limonite staining along fractures plus small hematite stringers, pyrite, and a trace of galena as isolated pods and crystals. Three other chip samples taken of similar material in this drift working indicate nil values for precious metals. If the area where sample N-1302-7-3 was taken were to be stoped using a minimum mining width of 3 feet, the precious metal value would equate to $265.75 ÷ 3 = $88.58/ton.

Sample N-1302-5 was taken from a conspicuous, highly mineralized rock pile located near the end of the access road for the Wild Rose Mine. The quartz-rich rock contains abundant chrysocolla, linarite (?), malachite, and limonite and appears quite dissimilar to the mineralized material found in-place in the Wild Rose Mine. It is highly probable that this apparently foreign material is from another source and may well have been dumped there to invite speculation on the Wild Rose Mine.

With the exception of one commercial grade sample possibly an erratic high assay from underground and two surface grab samples of commercial grade but from piles of suspicious and uncertain origin, none of the assay results show economic grades for precious metals or other commodities. The very narrow vein width and spotty mineralization indicate little chance for geologic targets suitable for even small scale exploration programs.

"Mill Site" Mine (N-1303)

This group of workings is situated in the Argus Mining District on the south side of Mountain Springs Canyon approximately 1.1 miles east of the canyon mouth. It is placed in the SW1/4, NE1/4, NW1/4, Sec. 17, T23S, R41E, MDB&M. Figure 9 is a location map of the area.

The host rock for the deposit is Mesozoic quartz diorite. It is cut by dark gray lamprophyre dikes. A shear zone is the locus for mineralized quartz that has developed along the contact of a hanging wall quartz-diorite and a foot-wall lamprophyre. Gangue minerals within the shear zone include massive quartz, limonite fracture-filling and white clay. The clay is present as a slicken side zone from 3 inches to 1 foot thick on the hanging wall of the shear zone. Mineralization within the quartz is comprised mainly of scattered pyrite, limonite psuedomorphs after pyrite and chrysocolla. The chrysocolla is present as fracture-filling in quartz and is disseminated a few inches into the lamprophyre foot wall, also as fracture-fillings.

The operator drove two adits to explore along the shear zone contact. The lower adit, driven at an elevation of approximately 4590 feet, was 90 feet long and encountered only sparsely limonite mineralized quartz lenses and is shown by Figure 84. Two small cross cuts driven from the main drift encountered no mineralization. The upper adit was driven at an elevation of approximately 4620 feet and is shown in Figure 85. It encountered the shear zone which strikes from N45W to N50W and dips 31 to 33 degrees southwesterly. Assorted crosscutting, raising and exploratory drifting were done to develop the ore body. A small ventilation raise was driven to the surface on the northeast side of the ore body. Stoping was carried out up the dip of the shear zone for approximately 85 feet. The stope height averaged 4 feet and had an average width of 27 feet. The mineralized zone had an average thickness of 1.25 feet. The apparent ore to waste ratio is 1.25 to 4 or 31.25% ore. The total estimated stope material removed was 213 cubic yards. Of that total, 67 cubic yards was probably actual mineralized material. The stope broke through to the surface directly above the upper adit.

Four samples were taken in these workings. One was taken in the lower adit and three were taken in the upper adit stope area. Two of the samples, labeled N-1303-1 and N-1303-2, are worthy of note and are summarized in Table 26.

Sample N-1303-1 was a chip sample taken from a 1-foot-thick quartz and limonite-rich vein at the top of the stope area. Sample N-1303-2 was a grab sample of loose muck taken from a stope ore pass on the upper level. A complete summary of assay results for this mine is listed in Appendix A.

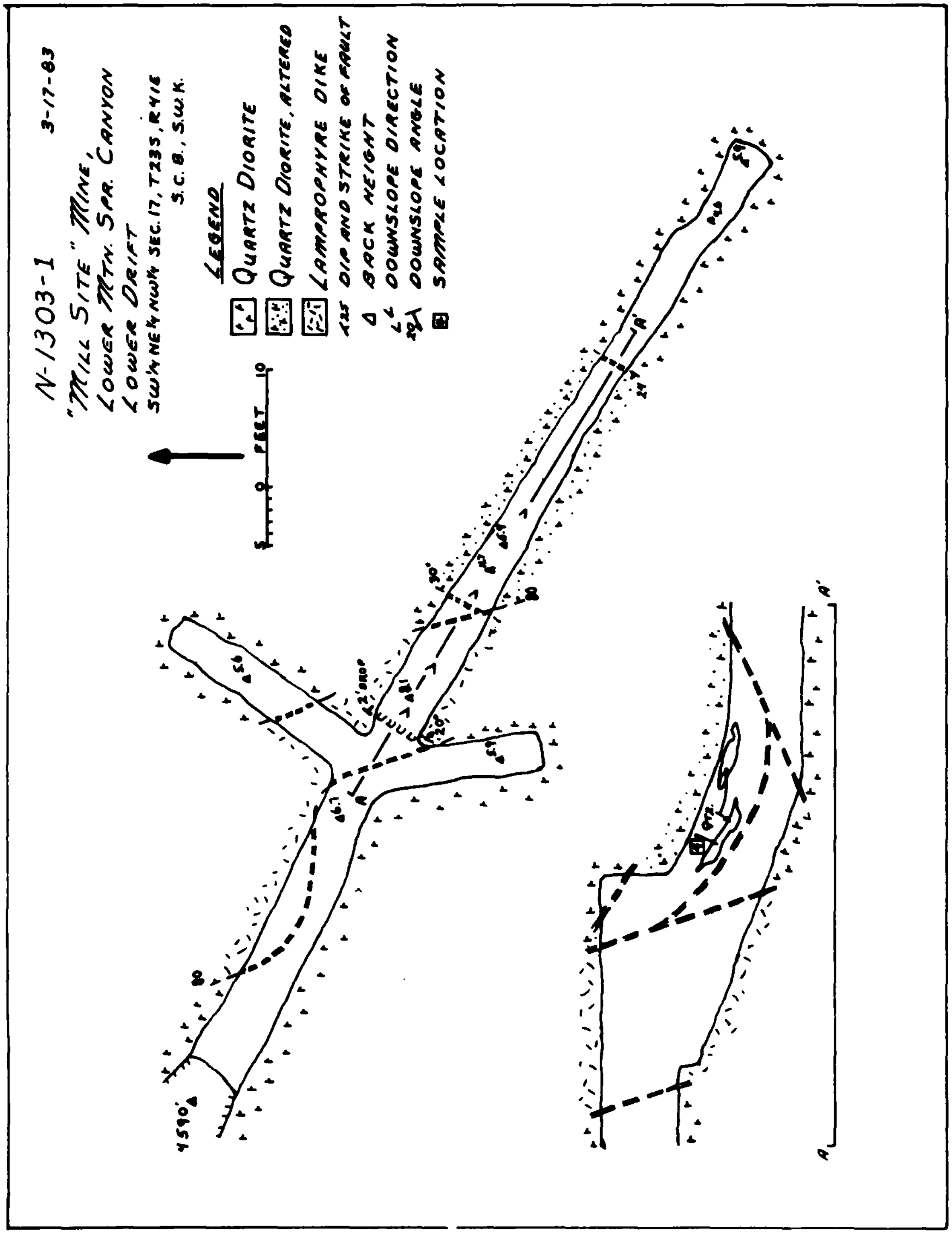

Figure 84. Plan view of lower adit, "Mill Site Mine".

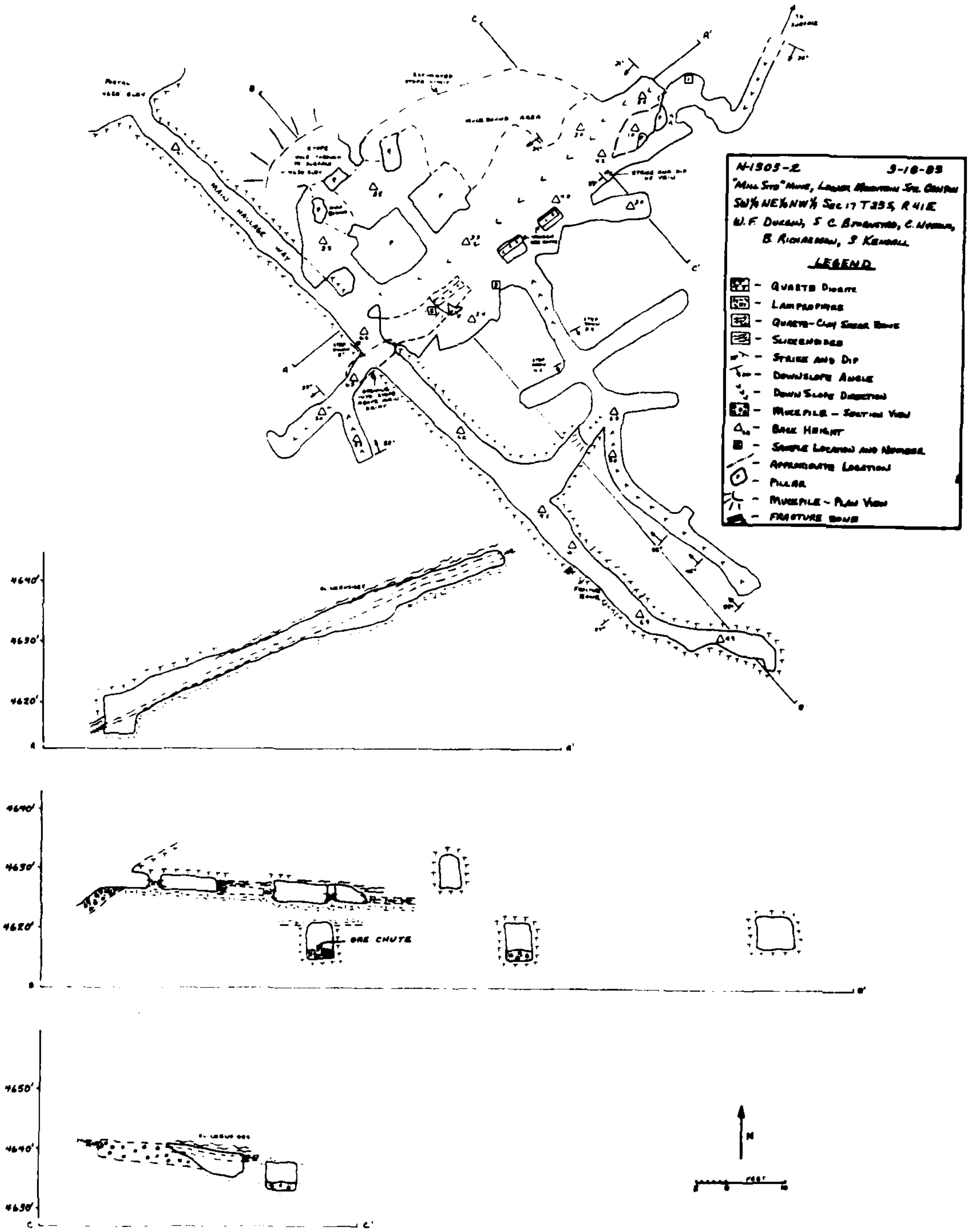

Figure 85. Plan view of upper workings, "Mill Site Mine".

TABLE 26. Assay Results for "Mill Site" Mine.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1303-1	0.170	85.00	2.28	34.20	119.20
N-1303-2	0.220	110.00	1.57	23.55	133.55

The potential for development and expansion of this property is minimal. Two of the samples indicate sub-marginal mined ore grade, the mineralization is sparsely distributed and appears to pinch with depth. Any up-dip extension of ore would shortly be cut off by the surface. Mineralization appears to decrease southward as indicated by exploratory drifting off of the stope. Access to the mine is by a weakly defined trail along a steep slope and road work to the site would be prohibitively expensive. There is no significant ore grade, tonnage, or geologic target at this location to warrant even small scale development or exploration programs.

Argus Rambler (N-1304)

The Argus Rambler claim is located near the head of Mountain Springs Canyon in the SW1/4, NE1/4, SE1/4 of Sec. 11, T23S, R41E, MDB&M, as shown in Figure 9, and encompasses three prospects, two of which are caved shut.

The open prospect is shown as Figure 86 and is a 25-foot incline which was dug to explore a 2-foot-wide shear zone in Mesozoic diorite. The shear is unmineralized—no samples were taken.

The other two pits are small adits in the same diorite. One shows only decomposed country rock on the dump. There was a small stockpile of sparsely stained (hematite) quartz at the other. One sample was taken here. Analytical results are listed in Appendix A.

The overall expression of a mineralizing system, i.e, quartz veining and alteration of the country rock,is very limited at this site. Examination of the surrounding area uncovered no additional evidence. This, coupled with the assay results, indicate that no commercial potential exists at this site.

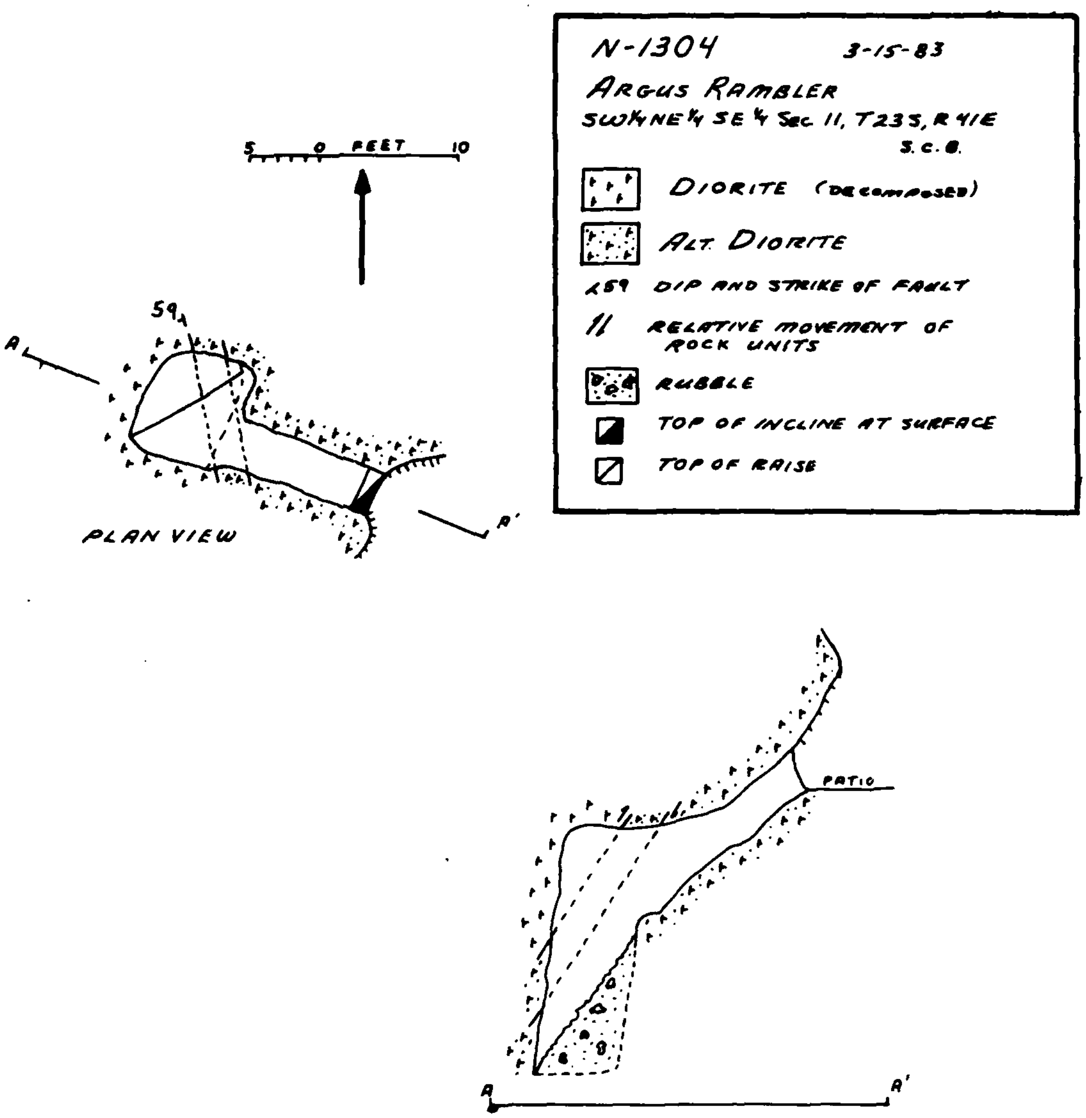

Figure 86. Cross section of incline at Argus Rambler.

Bonanza (N-1305)

Situated near the Red Wing Mine, 1 mile upstream from the mouth of Mountain Springs Canyon, the Bonanza claim is located in the SE1/4, NE1/4, SE1/4 of Sec. 7, T23S, R41E, MDB&M, as shown on Figure 9.

This prospect, a single 96-foot decline, was developed on the contact of a 39-degree northwesterly dipping pegmatite dike intruding Mesozoic quartz diorite. Figure 87 is a cross section through the decline. The quartz diorite forms the hanging wall and is highly altered to a depth of about 3 feet. Kaolinite alteration and quartz enrichment is prevalent over the entire exposed length but the accessory mineralization typical of trace gold mineralization (copper and iron minerals) is more limited. Copper mineralization is extensive throughout the zone from the surface to about 15 feet down-dip, but fades quickly from there and cannot be observed in the remainder of the working. Two samples were taken at the locations noted in the cross section. Complete analytical results are listed in Appendix A.

Two other prospect pits were dug along this vein, but they were quite shallow and encountered more sparse mineralization than the decline.

All of these prospects, while exposing some gold mineralization, also showed the total occurrence to be of very limited extent.

Unnamed Prospects (N-1306)

This group of prospects is located in the NW1/4 of Sec. 36 and the SW1/4, SW1/4 of Sec. 25, T23S, R41E, MDB&M. It is shown as N-1306 on Figure 9. The claim is reached from the north via the Birchum Springs Road, which is frequently washed out. The only surface structure at this site is a small cabin.

The prospects cover two separate, potentially mineralized, zones in Mesozoic granodiorite. The westernmost adits in the north and south are along a northwest-trending shear zone, both of these sets of workings are caved and no indication of mineralization can be found along the remaining exposure of the shear zone. The prospects east of the cabin, two caved prospect adits and two small prospect pits, show a 4-inch-wide northwest-trending discontinuous quartz vein which has limonite fracture coatings. A sample of this vein material gave the assays and ore value listed below in Table 27.

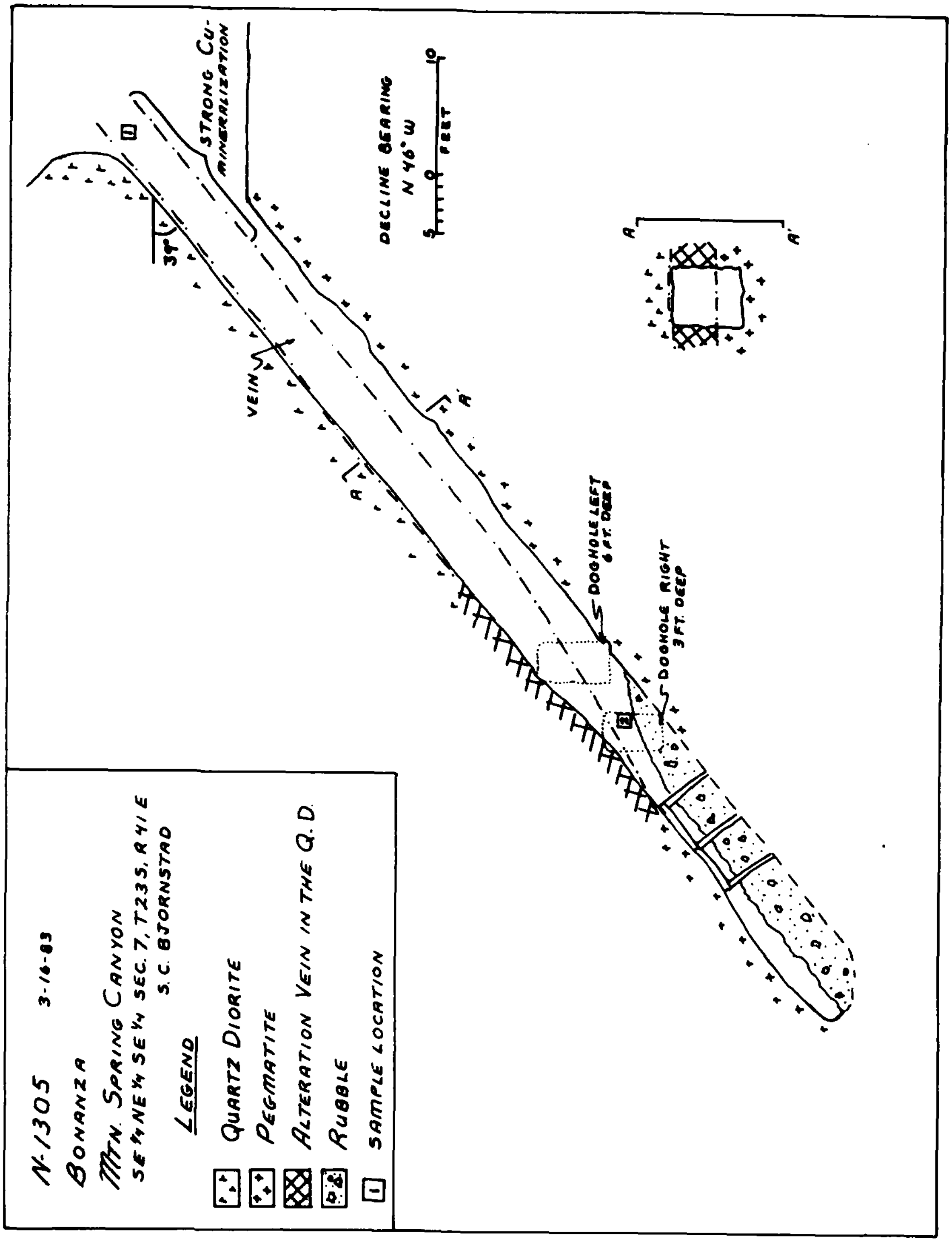

Figure 87. Cross section of decline at Bonanza.

TABLE 27. Assay Results for Sample No. N-1306-1.

Gold		Silver		Total precious metal values, $/ton
Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
0.500	250.00	0.62	9.23	259.23

The assay values look encouraging, however, the vein is only 4 inches wide and discontinuous. Even if the vein were continuous, stoping along the vein with a 36-inch mining width would result in a rock value of $28.80/ton.

Gold Dollar Group (N-1307)

The Gold Dollar group is located on the north side of Mountain Springs Canyon approximately 0.9 mile east-northeast of the canyon mouth. The workings are distributed within portions of Sections 7, 8, and 18, T23S, R41E, MDB&M, as shown on Figure 9. An examination of literature from the NOTS legal archives revealed that the Gold Dollar property was last claimed by Mary A. King (date unknown). No markers or claim notices were found during field examination.

The deposit host rocks range from Mesozoic granodiorite to biotite-rich quartz diorite and these rocks are cut by minor dikes and sills of dark fine-grained lamprophyre that exhibit variable orientations. Scattered quartz and clay-bearing shear zones form the loci for mineralization, which was explored in six locations, as seen in Figure 88. Each is discussed in order of ascending elevation.

Figure 89 is a plan view of adit 4, driven at an elevation of 3955 feet. The working is 152 feet long, was driven mainly in quartz diorite, and intersected two 3-foot-wide lamprophyre dikes. The last 30 feet of drifting encountered a stock work-like body of abundant calcic-clay-rich veinlets that show no preferred orientation. Sample N-1307-4-1 is a chipped grab from a small portion of the stockwork where indicated on the plan view.

Figure 90 is a plan view of parallel adit group 1 driven at an elevation of 3960 feet. They encountered no zones of mineralization and were driven a total of 15-1/2 feet then abandoned.

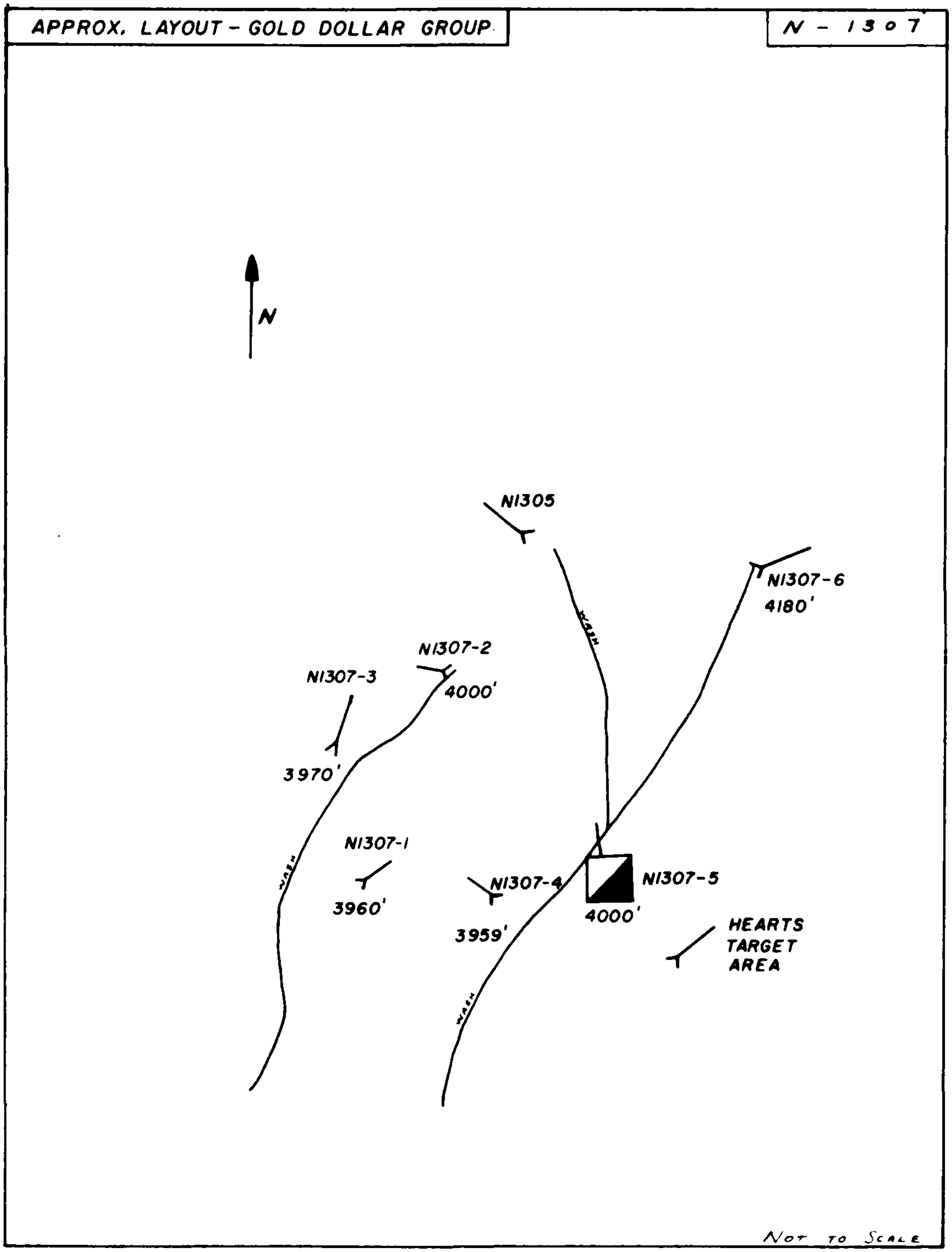

Figure 88. Surface view of Gold Dollar Group.

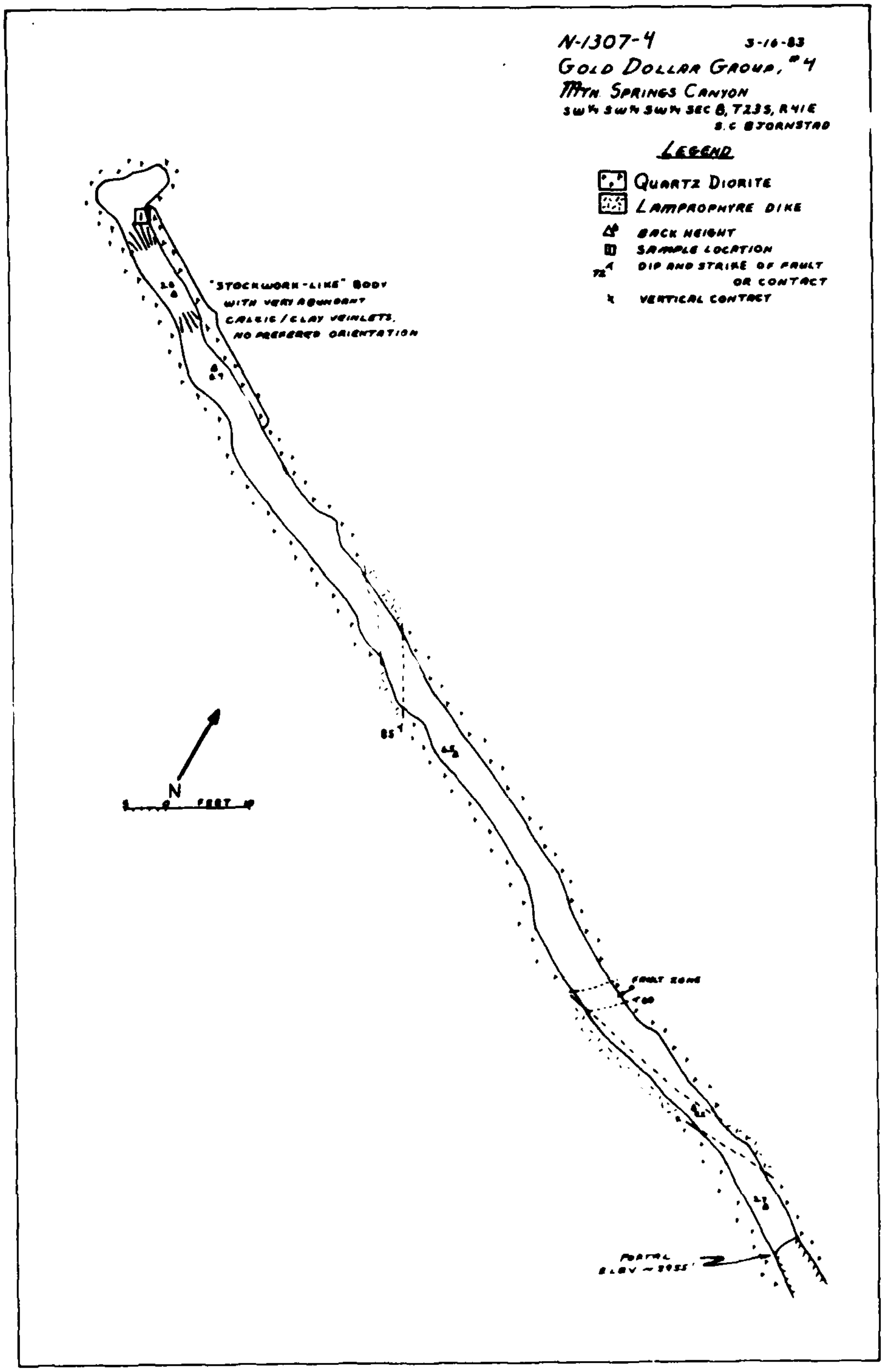

Figure 89. Plan view of adit 4, Gold Dollar Group.

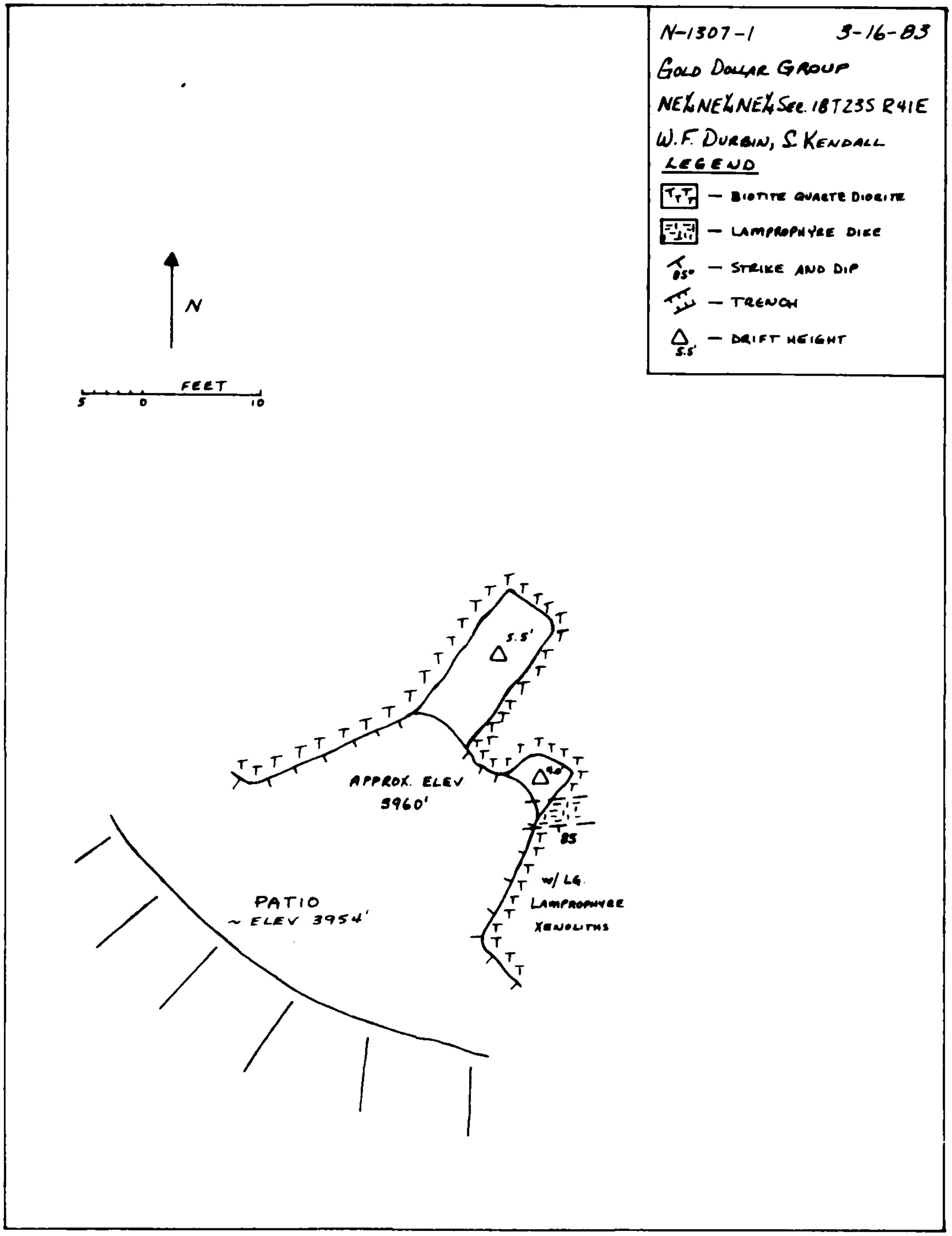

Figure 90. Plan view of adit 1, Gold Dollar Group.

Figure 91 is a plan view and cross sections of adit 3. It was driven at an elevation of 3970 feet and is 88 feet long. It was driven along a quartz- and clay-rich shear zone that strikes N05E and dips an average of 70 degrees westerly. The zone ranges from 1 to 3 feet in width and a 40-foot-long stoping area driven up-dip produced a total shear zone/host rock volume of approximately 60 cubic yards. Sample N-1307-3-1 was chipped across a 12-inch quartz vein with limonite fracture-filling where indicated on the plan view.

Fifty-three-foot adit 2, driven at the 4000-foot elevation, is shown by Figure 92. It was driven in decomposed biotite quartz diorite with scattered 1- to 2-inch clay seams. No commercial mineralization was encountered in this working.

Working adit 5, as shown by Figure 93, is reached by a 4-foot deep shaft that lies at the 4000-foot elevation. A 49-foot drift was driven from the shaft bottom to explore the limits of a fault-controlled quartz-bearing shear zone. The fault strikes N22E and dips steeply eastward. The shear zone averages 1-1/2 feet wide and pinches out 35 feet northeast of the shaft. Quartz with limonite fracture-filling is present in the shear zone and ranges from 0.6 to 0.8 foot in width. Samples N-1307-5-1 and N-1307-5-2 were chipped across the mineralized quartz where indicated on Figure 93.

The uppermost working, situated at the 4180-foot elevation, is a 25-foot adit accessed by two badly caved portals. Quartz with abundant pyrite, limonite stain, cuprite and minor malachite was present in two 1- to 2-inch veins, each about 3 feet long, bordering a mylonite zone several feet wide within the granodiorite host rock. Minor stoping was developed from the back of the adit and totalled approximately 25 cubic yards in volume. Sample N-1307-6 was a chip sample collected from the quartz vein material accessible near the western-most entrance to the stoped area.

The complete list of assay results for the Gold Dollar group appears in Appendix A. Sample N-1307-6 warrants special mention and is described in Table 28.

Although this sample is of very high grade, the material sampled is of very limited nature. The quartz is far too narrow and discontinuous for anyone but the weekend prospector to find interesting. The cost of renovation to safely reach this working plus the cost of building a trail or haulage system would be prohibitive for the meager tonnage producible.

The other four Gold Dollar sample assays indicate very low to nil commercial values for precious metals and other commodities.

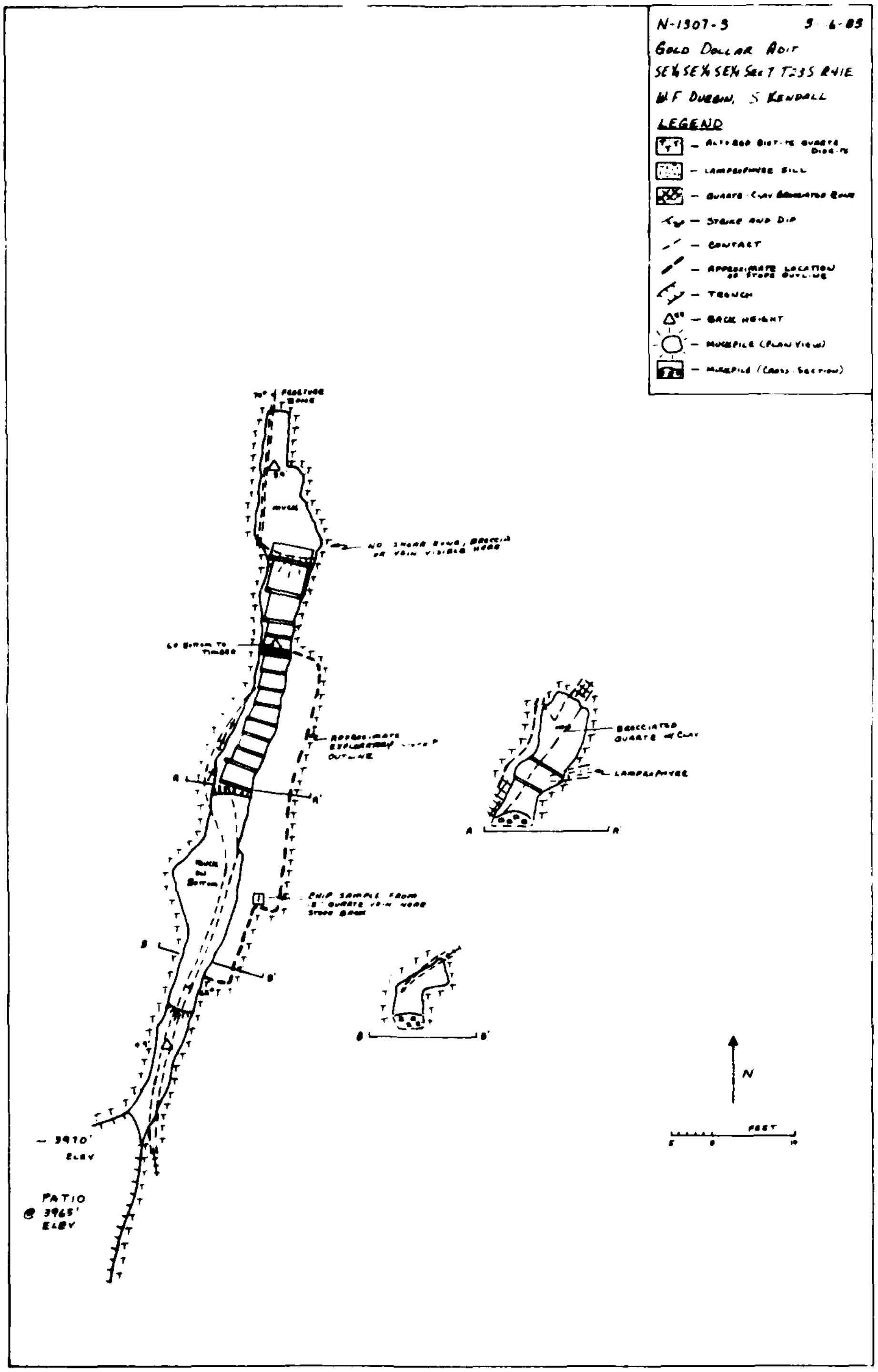

Figure 91. Plan view of adit 3, Gold Dollar Group.

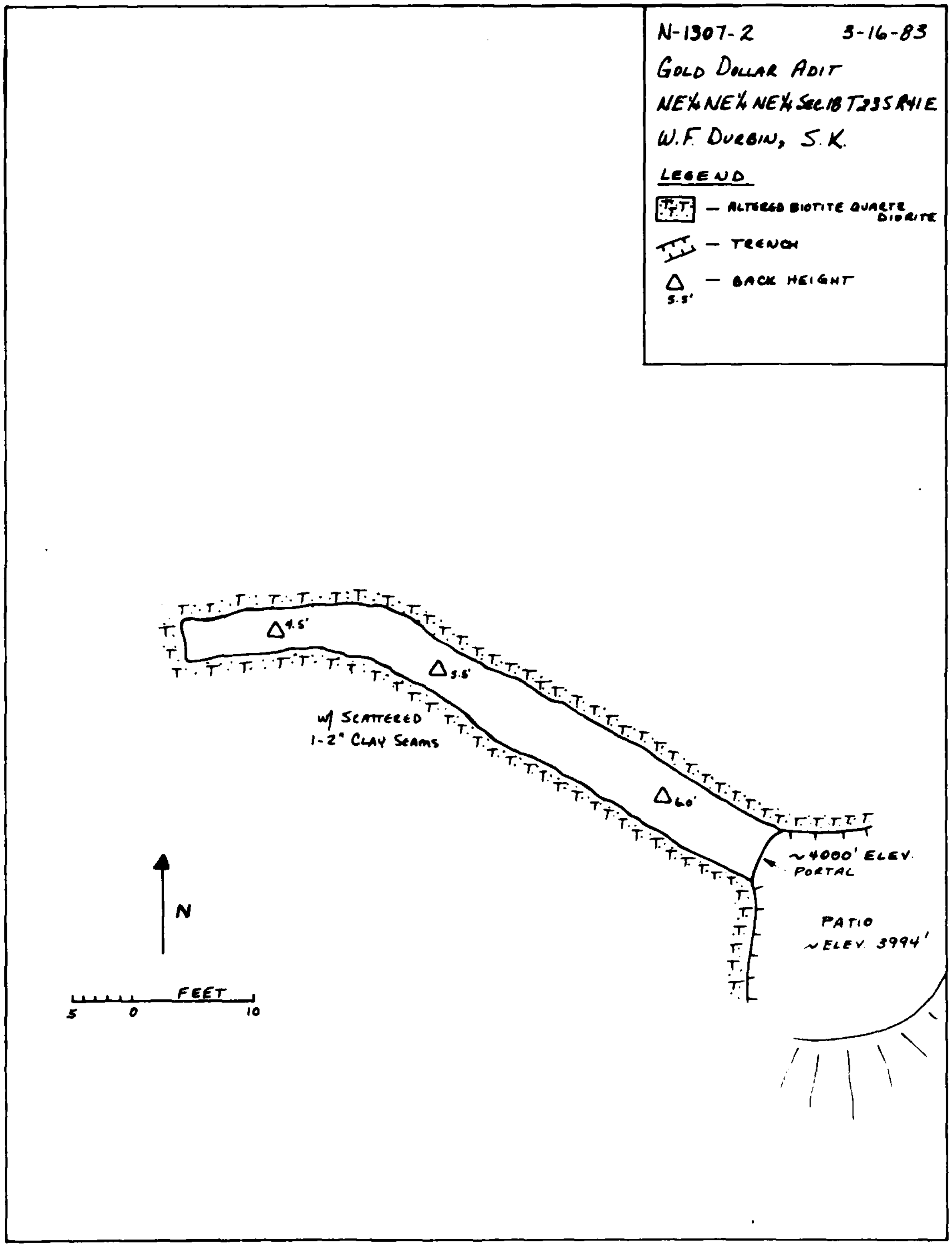

Figure 92. Plan view of adit 2, Gold Dollar Group.

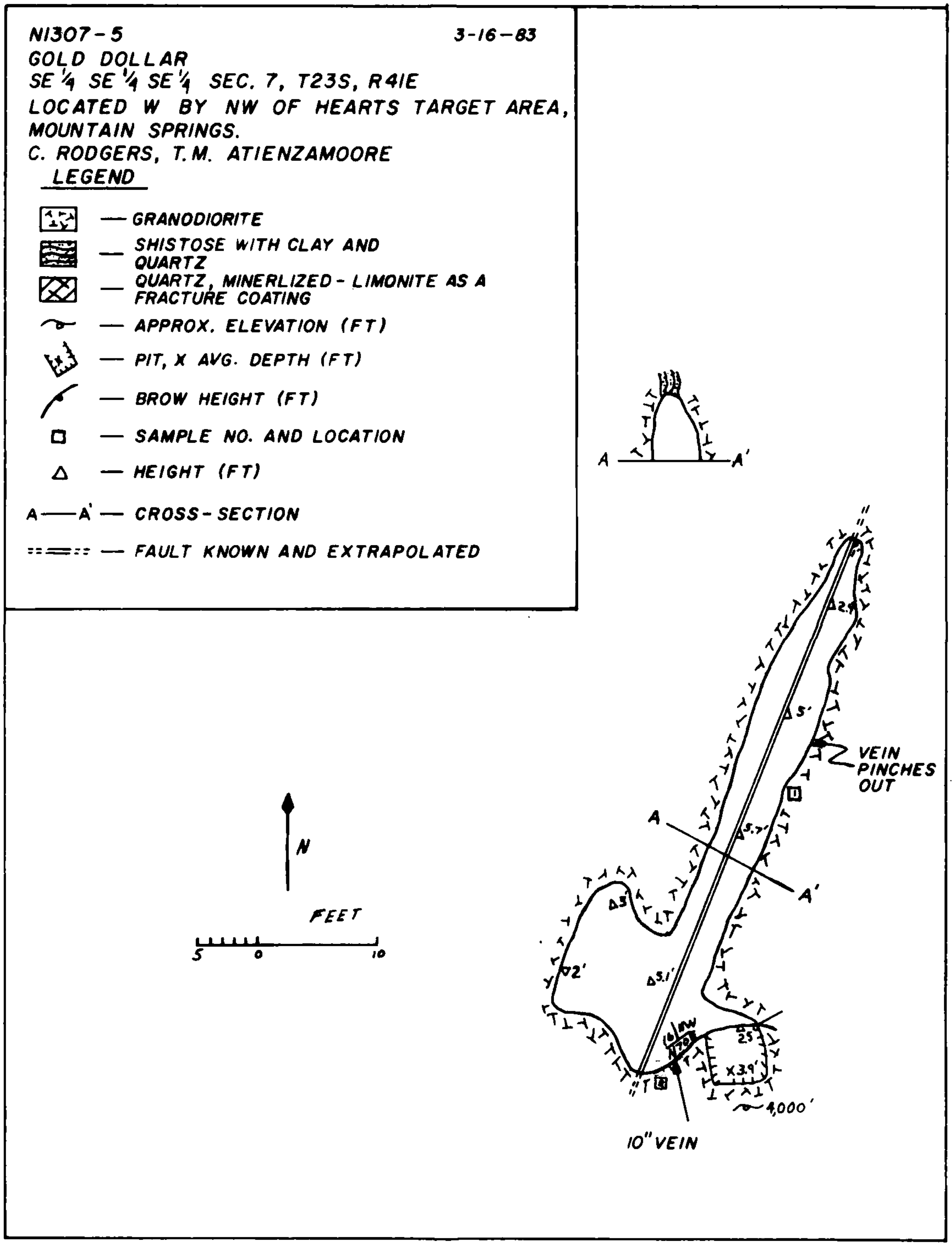

Figure 93. Plan view of adit 5, Gold Dollar Group.

TABLE 28. Precious Metal Values for Gold Dollar Sample N-1307-6.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1307-6	4.560	2280	Nil	...	2280

All of the workings at the Gold Dollar group were driven to explore a number of isolated, small, somewhat parallel mineralized zones. None of the zones that were encountered appears to have the continuity and mineral value to constitute a discovery worthy of further development.

Jeritza/Margarita (N-1308)

Both the Jeritza (NOTS Condemnation Case No. 432) and the Margarita (NOTS Condemnation Case No. 490) are listed as being located in Sec. 9, T23S, R41E, MDB&M.[3] This group of workings could be either or both of these claims. The claims were last held by Charles R. Smith and are located along the south side of Mountain Springs Canyon approximately 1.5 miles west-southwest of Mammoth Mine in the NW1/4, SE1/4, SW1/4 of the section at an elevation of 5000 feet. They are shown as N-1308 on Figure 9.

The Mesozoic granitic host rock grades in composition from granite to diorite. It is cut by northeast-trending fractures, some of which have been filled with quartz and limonite. The limonite exists as fracture coatings and pseudomorphs after pyrite, the latter being up to 1/4 inch along an edge. A second type of mineralization explored was a hydrothermally altered and filled fracture that occurs to the east of the main workings. This N36W striking fracture, which dips 52 degrees southwest, has altered iron stained margins and a drusy quartz filling, with a maximum width of 1.5 feet.

The property was explored at the east end by a short adit, heading S44E, with a probable length of 15 feet, as indicated by the volume of the dump. This working explores the hydrothermal alteration zone described above. The iron stained alteration margins are represented by sample N-1308-1, while sample N-1308-2 typifies the drusy quartz fracture-filling. Neither sample showed precious metal values when assayed.

The main body of workings are along the northeast trending quartz vein. This portion of the area was explored by three prospect pits and a series of short adits which were driven to intersect the vein perpendicularly. Working from east to west, the first of these adits was driven on a heading of S17W. It was accessible up to 25 feet in from the portal; at this point there was a large muck pile produced from successive roof-falls in a gouge zone. Visibility was limited to approximately 8 feet beyond this point. The area adjacent to the shear zone was severely fractured so no attempt was made to access the deeper workings. The dump indicates possibly another 10 feet of workings. There was no vein visible in the accessible workings and sample N-1308-3 represents material taken from a "high-grade" pile outside of this adit.

The next adit west was driven S6W. The portal was nearly caved shut but the interior could be viewed through a small opening. The drift continued from the portal approximately 15 feet before turning west, it was approximately 5 feet high by 4 feet wide and the dump indicates it may be another 40 feet long. No vein was visible at this location; sample N-1308-4 represents material taken from a "high-grade" pile. This pile included pieces of vuggy quartz with limonite psuedomorphs after pyrite.

The third adit in this group was caved as well; however, near the entrance was an outcrop containing a 1.3-foot-thick quartz vein showing extensive limonite coated hairline fractures; sample N-1308-5 represents this vein material.

Three small caved adits are found around the west side of the hill. These workings cover approximately 30 feet along this west facing flank and possibly indicate the southern, or down-dip, extent of the mineralized zone. A sample, N-1308-6, was taken from the "high-grade" pile of the largest of these sites.

One prospect adit further west was driven along a N75E striking fault which dips 62 degrees to the northwest. There was no identifiable mineralization at this location.

A total of six samples were taken from this property. Assay results for the first two, taken from the alteration zone, show no precious metal values; assay results for the remaining samples are shown below in Table 29.

The assay values look encouraging; however, when one considers the apparent extent of the mineralization, mining dilution, and the logistics of mining and hauling the "ore," the economic potential of this site disappears. The mineralized zone appears to extend 500 feet east-west along the south side of Mountain Springs Canyon, and 30 feet down-dip with a maximum thickness of 16 inches. If you stoped

TABLE 29. Assay Results of Selected N-1308 Samples.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1308-3	0.280	140.00	0.06	0.90	140.90
N-1308-4	0.230	115.00	0.11	1.65	116.65
N-1308-5	0.090	45.00	0.32	4.80	49.80
N-1308-6	0.120	60.00	0.16	2.40	62.40

along the vein, at a mining width of 36 inches, you cut the value of the rock in half. In addition, the workings are located along a very steep slope, they would have to be worked by hand and the ore materials removed by tram or chute to the bottom of the canyon. None of these factors appears to be insurmountable in itself; however, considered together they indicate that the commercial potential of the site is virtually nil.

King Henry Mine (N-1309-1)

The King Henry Mine (NOTS Case No. 457) was a valid claim held by Edith M. and Wm. J. Lange when NOTS started its Condemnation Proceedings in 1947. This mine is located in the NW1/4, NE1/4, SW1/4 of Sec. 10, T23S, R41E, MDB&M, along the north side of Mountain Springs Canyon at an elevation of 5180 feet, approximately 0.6 mile southwest of Mammoth Mine. It is shown as N-1309 on Figure 9.

The property was explored on two adjacent sites: an inclined shaft and an adit approximately 20 feet below and 25 to 30 feet to the southwest of the shaft. The incline was driven on a heading of N43W and dips approximately 40 degrees north. It exposes a 0.5 to 0.7 foot gouge zone in Mesozoic diorite. The gouge zone, striking N23E and dipping 34 degrees southwest, contains some brecciated quartz with minor limonitization of the gouge material and the fractures within the quartz. Sample N-1309-1-1 represents this material and was taken near the entrance. The incline continues down for approximately 30 feet. Stoping was done along the zone to either side of the shaft with an average stope width of 2.5 feet. The zone may flatten out at this point and continue to the east and west, but the diorite was badly fractured and the timbers left to support the back were rotten, so no attempt was made to access the lower workings or determine the extent of stoping. The adit to the southwest of the shaft was caved.

A sample was taken of the "high-grade" material that was left on the dump, sample N-1309-1-2. The "high-grade" consists of quartz with limonite as fracture coatings. Precious metal values from the analysis are given below in Table 30.

TABLE 30. Assay Results for Samples Taken From N-1309-1.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1309-1-1	0.069	34.50	Nil	...	34.50
N-1309-1-2	0.520	260.00	0.14	2.10	262.10

The values for this second sample look very encouraging; however, this material was not found in place, and although the material looks compatible with other material seen in place on site, the possibility of "salting" cannot be ruled out. If, however, this value is legitimate, mining dilution will still render the site uneconomic. With a stoping width of 2.5 feet the precious metal value is decreased to 24% of the original value, giving a value of $62.90/ton for this second sample.

Unnamed Prospect (N-1309-2)

This site is located in the SE1/4, NE1/4, SW1/4 of Sec. 10, T23S, R41E, MDB&M, below N-1309-1, at an elevation of 5040 feet. It is shown as N-1309 on Figure 9, which is a location map of the area.

The working, shown in Figure 94, explores a zone of alteration in the Mesozoic diorite. This zone is stained by iron oxides but shows no other mineralization. The sample taken in this zone, the location of which is shown on the plan view, shows no precious or base metal value. A complete list of assay results is available in Appendix A.

Unnamed Prospect (N-1310)

This small group of workings is situated on the south side of Mountain Springs Canyon approximately 0.6 mile east of the canyon mouth. It is placed in the NW1/4, SE1/4, NE1/4, Sec. 18, T23S, R41E, MDB&M, and is shown in Figure 9.

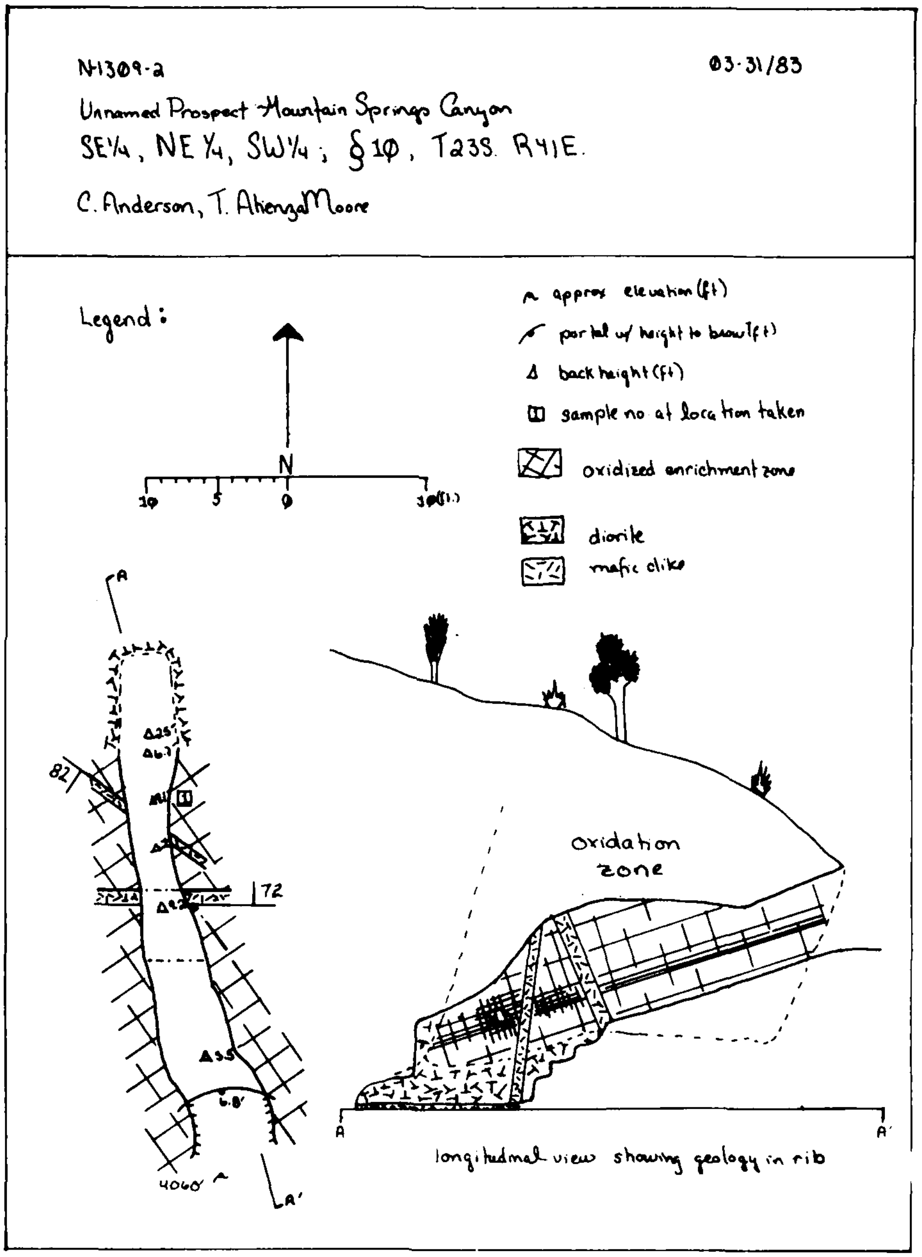

Figure 94. Map of workings at N-1309-2.

The host rock is Mesozoic biotite-rich quartz diorite that is cut by Mesozoic aplite and lamprophyre dikes.

Five workings were noted at the site, three of which were trenches or possible short adits now caved and filled with slope wash. One 14-foot adit was driven in aplite and encountered a 1-foot-thick quartz vein with minor clay that strikes northwesterly and dips easterly. This drift is shown in Figure 95. A second adit is located south and 30 feet uphill from the first adit and is shown in Figure 96. It was driven 68 feet in a brecciated aplite dike that strikes west-northwest and dips northeasterly. Mineralization includes abundant clay seams and minor quartz blebs with limonite as fracture-filling. The dike is bounded on the east by and terminated by biotite-rich quartz diorite. A lamprophyre dike is on the footwall side of the dike. A winze was driven on the hanging wall side of the aplite. It is open for the upper 16 feet and appears to flatten with depth. It was inaccessible.

No mineralization worthy of sampling was encountered at this site.

Mammoth Wash Group (N-1313)

The Mammoth Wash Group (which may be part of the Mammoth Mine Complex) is situated in Mammoth Wash, which is tributary to Mountain Springs Canyon. The workings are located in the N1/2, NE1/4 of Sec. 10, T23S, R41E, MDB&M. Figure 9 shows this location and Figure 97 shows the relative positions of the workings as well as the sample locations.

All of the workings in this group are dug on the same, near vertical, shear zone in a hornblende quartz diorite of Mesozoic age. In outcrop the zone is up to 10 feet thick and contains varying amounts of quartz with both copper and iron (as limonite and hematite) staining. Associated minerals include: pyrite, chalcopyrite, cuprite, malachite, and minor azurite.

The group is divided into three areas by the stream washes:

1. At the east end of the trend, a small prospect (caved) explored the eastern extent of mineralization.

2. In the center sits one caved adit (approximately 40 cubic yards), one "glory hole" 8 feet square by 12 feet deep, also caved, and one access drift, 25 feet long, ending under the caved hole. The drift was driven in quartz diorite.

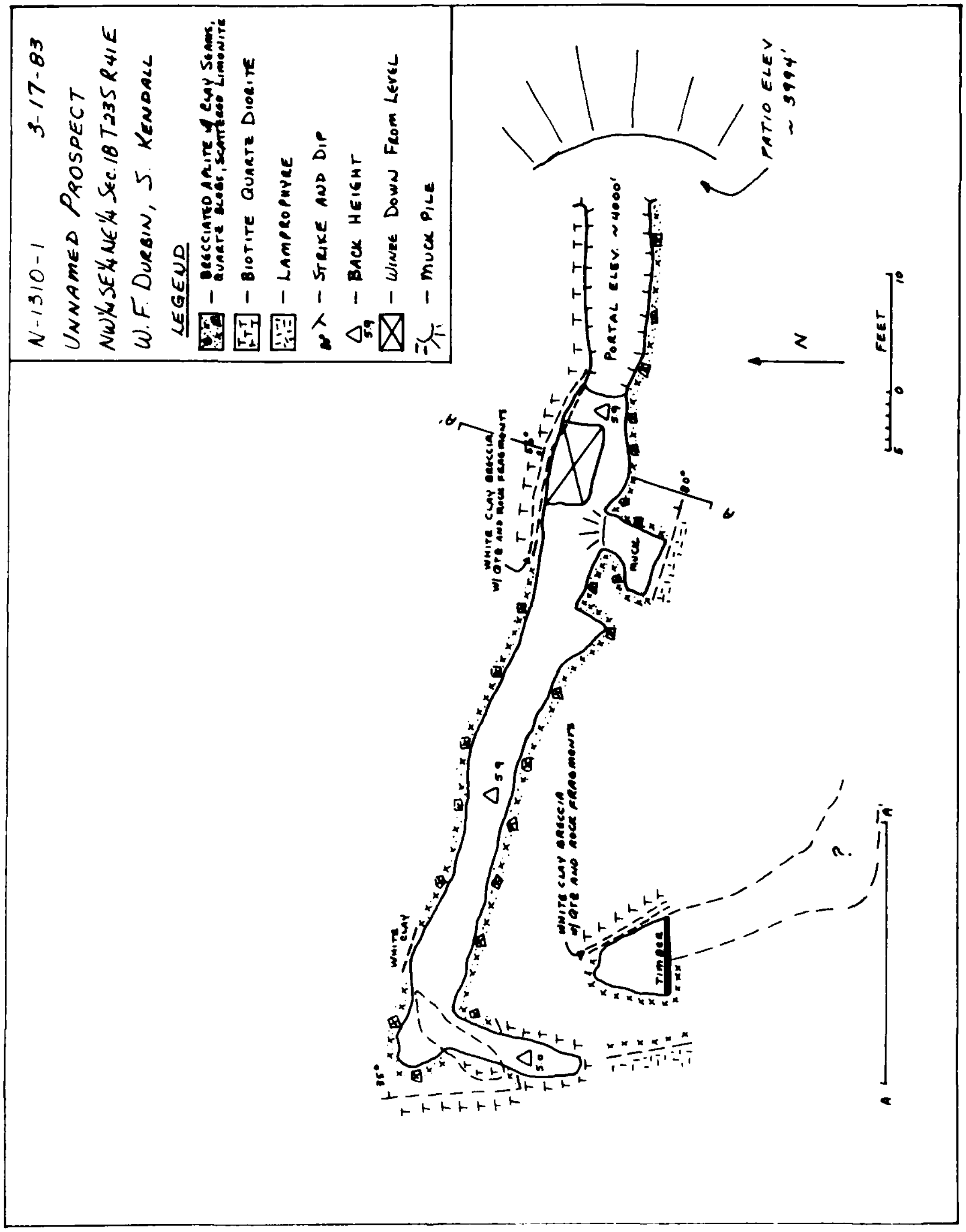

Figure 95. Plan view of adit 1 at N-1310.

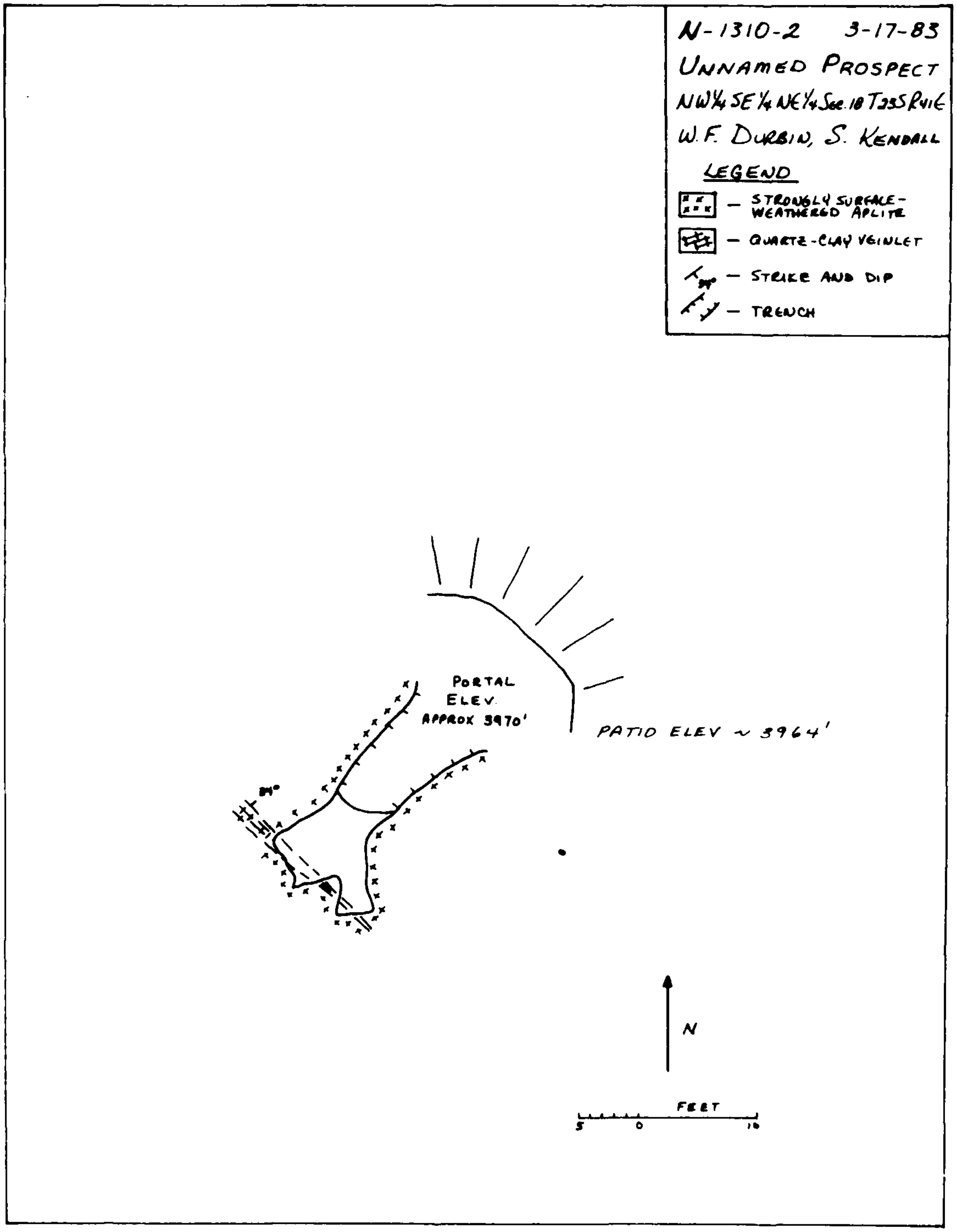

Figure 96. Plan view of adit 2 at N-1310.

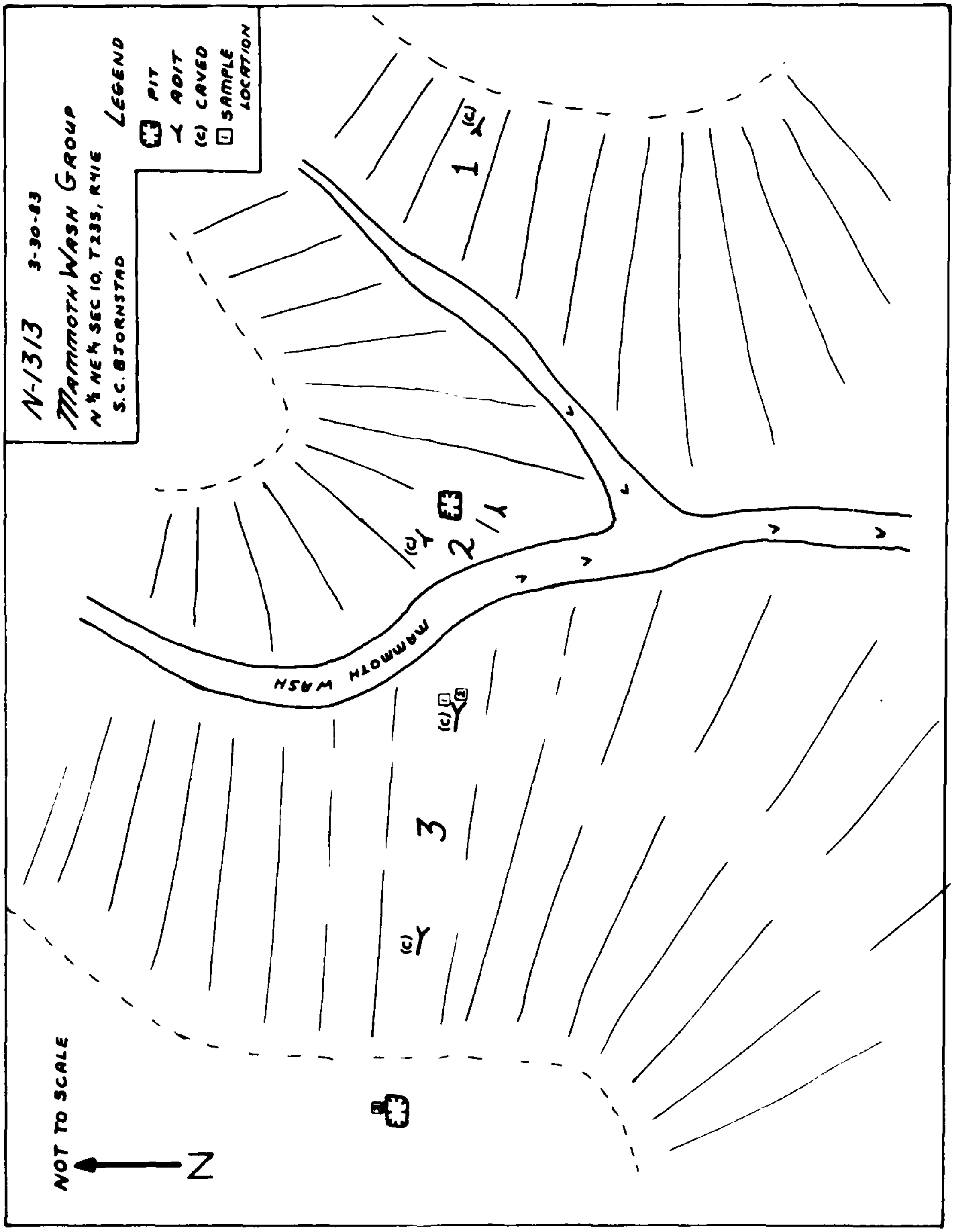

Figure 97. Surface view of workings, Mammoth Wash Group.

3. Most of the work was done at this, the west, end. The lower drift is now caved. This was by far the largest working of the group. When this site was visited in 1963 by C. F. Austin, the adit was open and he examined over 600 feet of drifting and a 50-foot-deep vertical winze. The winze area workings intersected a relatively narrow zone (a few feet at most) of copper stained quartz. Today the dump shows massive quartz with primary copper mineralization and specular hematite as well as copper and iron staining of oxidized material. Samples 1 and 2 were taken as hand-sorted dump grabs.

The upper adit is also caved. The dump material represents drift work of over 100 feet, but shows very little mineralization although there appears to have been a greater alteration of the wall rock at this level. The upper pit is approximately 17 by 10 feet by 15 feet deep and, although some mineralization is evident on the dump, none can be seen on the pit walls. Sample 3 was hand-sorted from the quartz stockpile of this pit.

Complete analysis results from the samples are given in Appendix A. Precious metal values are also listed below in Table 31.

TABLE 31. Precious Metal Assay Data and Value of Samples.

Sample	Gold		Silver		Total precious metal value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1313-1	0.46	230.00	1.79	26.85	256.85
N-1313-2	0.13	65.00	0.25	3.75	68.75
N-1313-3	0.29	145.00	1.06	15.90	160.90

Although the zone of apparent greatest mineralization is inaccessible (underground) some conclusions can be drawn from what can be seen.

The shear zone is traceable for at least 2300 feet (horizontal distance) but the mineralized zones are scattered and amount to a small fraction of the total length (in outcrop). The "pod-like" nature of these mineralized zones apparently extends down-dip as well, as evidenced at the pits in groups 2 and 3. If this is the case, the amount of gold and silver mineralization present in the pods would not be enough to offset the cost of drifting in the barren ground between them and as a result there is no commercial potential present.

Unnamed Shafts (N-1317)

Three unnamed shafts are situated along the Junction Ranch road approximately 2 miles north of the head of Mountain Springs Canyon. They are placed in the S1/2, NW1/4, NW1/4, Sec. 1, T23S, R41E, MDB&M. Figure 9 is a location map of the area.

The host rock is Mesozoic granite. A shear zone 2 to 4 feet wide is the locus for scattered 4- to 6-inch quartz veins containing minor hematite and limonite fracture-filling as mineralization. The shear zone strikes nearly east-west and dips southerly from 65 to 75 degrees.

The western-most shaft is caved and filled to within 4 feet of the surface. The two open shafts were driven down the dip of the shear zone to depths of 19-1/2 feet and 30-1/2 feet.

A single grab sample, labeled N-1317-1, was taken from a pile of mineralized quartz at the shaft collars. The assay results are summarized in Table 32.

TABLE 32. Assay Results from Unnamed Shafts (N-1317).

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1317-1	0.250	125	0.71	10.65	135.65

A complete list of assay results for sample N-1317-1 is found in Appendix A.

If an operator were to develop a stope in this area using a minimum width of 1.5 feet on a 0.5-foot mineralized vein, the precious metal value would equate to $135.65 ÷ 3 or $45.22/ton. This figure is below our assigned cutoff grade and indicates that no discovery of commercial importance was made at this location.

Reconstruction (N-1320)

The Reconstruction group is located on the north side of Mountain Springs Canyon approximately 1.4 miles northeast of the canyon mouth. It is placed in the NW1/4, SW1/4, SW1/4, Sec. 8, T23S, R41E, MDB&M, as shown on Figure 9. The NOTS legal archives lists Ralph E. Blewett as the last claimant of the property. No claim notices were found at the site during field investigation.

The deposit host rocks are Mesozoic in age and range in composition from quartz diorite to diorite. One working in the group has exposed a minor Mesozoic lamprophyre dike which is the footwall contact for a quartz-bearing shear zone. The loci for mineralization at this location are a number of isolated shear zones that strike from N10E to N47E, with northwesterly dips from 27 to 77 degrees. The shear zones contain variable amounts of quartz with associated interstitial clay and limonite. The numerous workings are shown on Figure 98, a surface plan view of the Reconstruction group.

Location 1 is a group of three prospect pits at 4120 feet in elevation. There was no mineralized quartz in place within the pits but a grab sample of massive quartz with limonite fracture-filling was collected from scattered material located around the pits.

Location 2 is a small working consisting of 24 feet of drifting and 20 feet of decline that is accessed by a badly caved 11-foot vertical shaft. Figure 99 shows a plan view and cross section of the area. The working was driven to explore a 2-foot wide quartz-filled shear zone with minor limonite stain. Sample N-1320-2-1 was chipped from in-place vein material value where it was visible on the north wall of the shaft.

Figure 100 is a plan view of adit 3, the most extensive of the Reconstruction group workings. It consists of a 23-foot decline, 153 feet of drifting, stoping areas and a winze located at the southwest end of the drift. These workings expose an irregular, northeast striking quartz-filled shear zone with interstitial clay and limonite fracture-filling. The shear zone pinches to the southwest and is found up to 2 feet wide. Two samples, N-1320-3-1 and N-1320-3-2, were chipped across the vein where noted on the plan view.

A 30-foot long decline, listed as working number 4, is shown by Figure 101. It was driven to explore a quartz vein with clay, siderite, and limonite in a shear zone that ranges from 0.5 foot to 2 feet wide and dips from 20 to 35 degrees, steepening with depth. Sample N-1320-4-1 is a chip sample taken across a 1-foot vein where indicated on the figure.

Figure 102 is a plan view of working number 5, a 50-foot decline driven in decomposed diorite. No mineralization was encountered by the decline.

Working number 6 is a badly caved decline in diorite that was driven to explore a 2- to 15-inch-wide blocky quartz vein. The vein strikes northeasterly and pinches out approximately 10 feet north of the decline portal. Sample N-1320-6 is a chip sample of quartz taken across the 2-inch-wide portion of the vein where it appears at the portal.

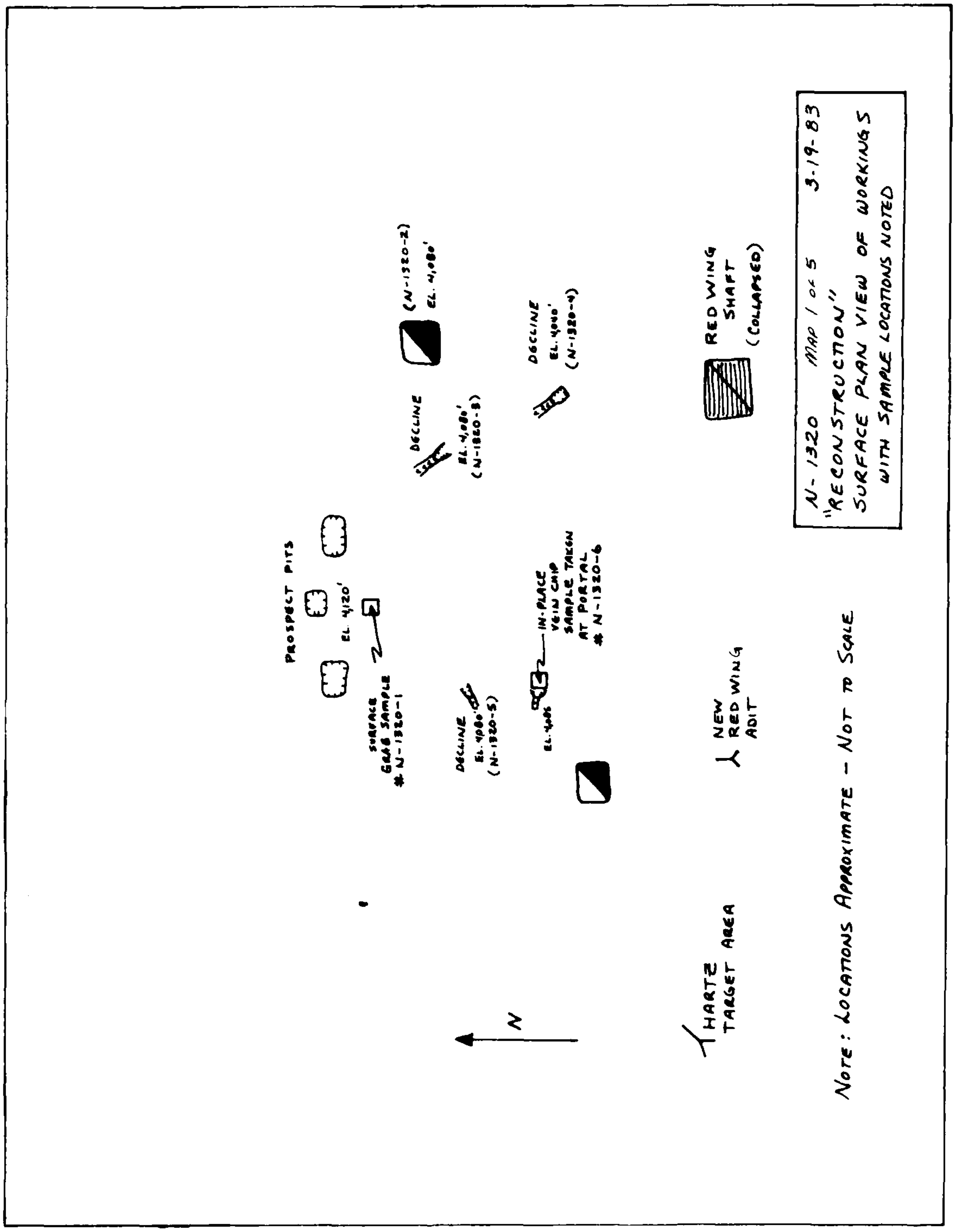

Figure 98. Surface plan view of Reconstruction.

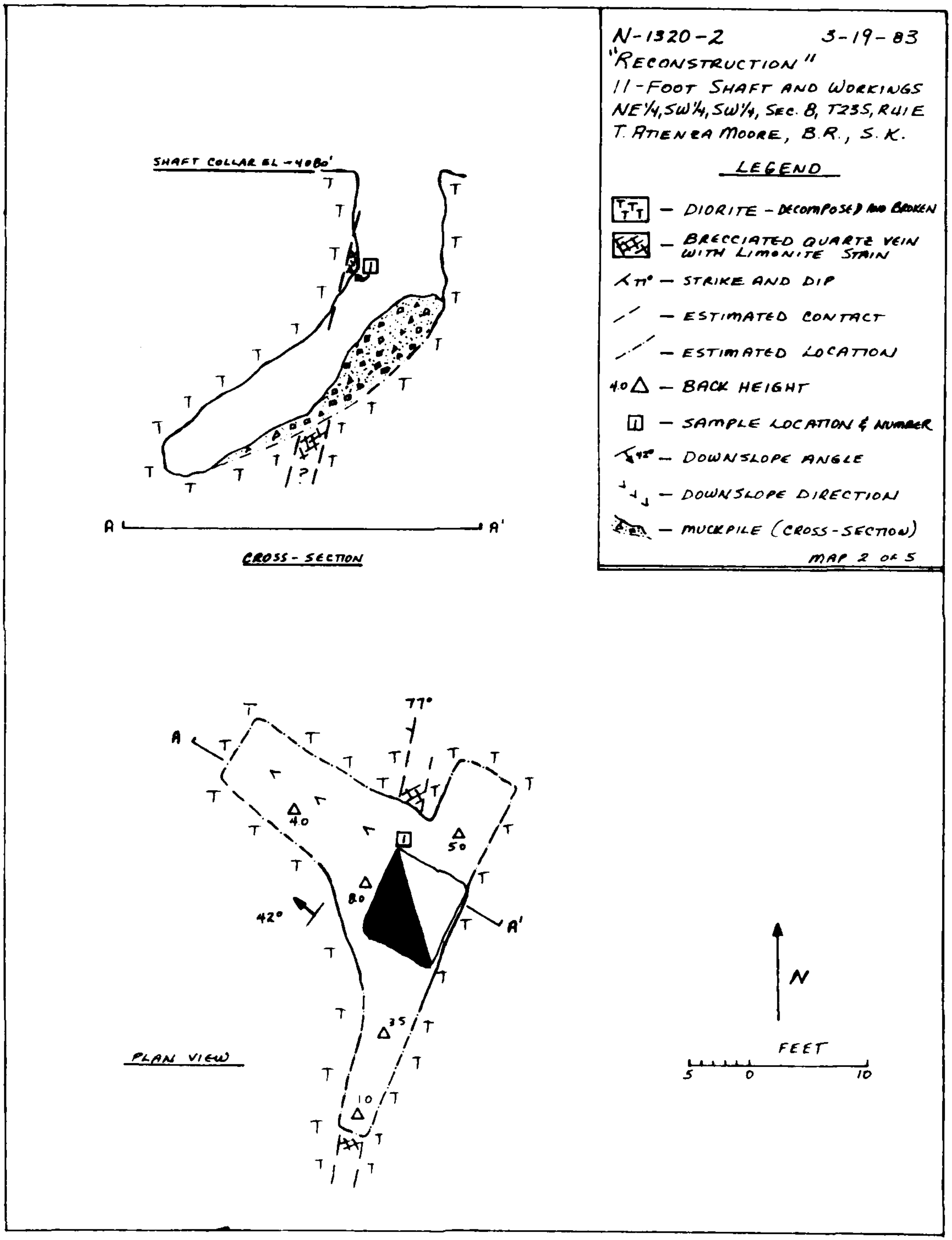

Figure 99. Plan view and cross section at location 2, Reconstruction.

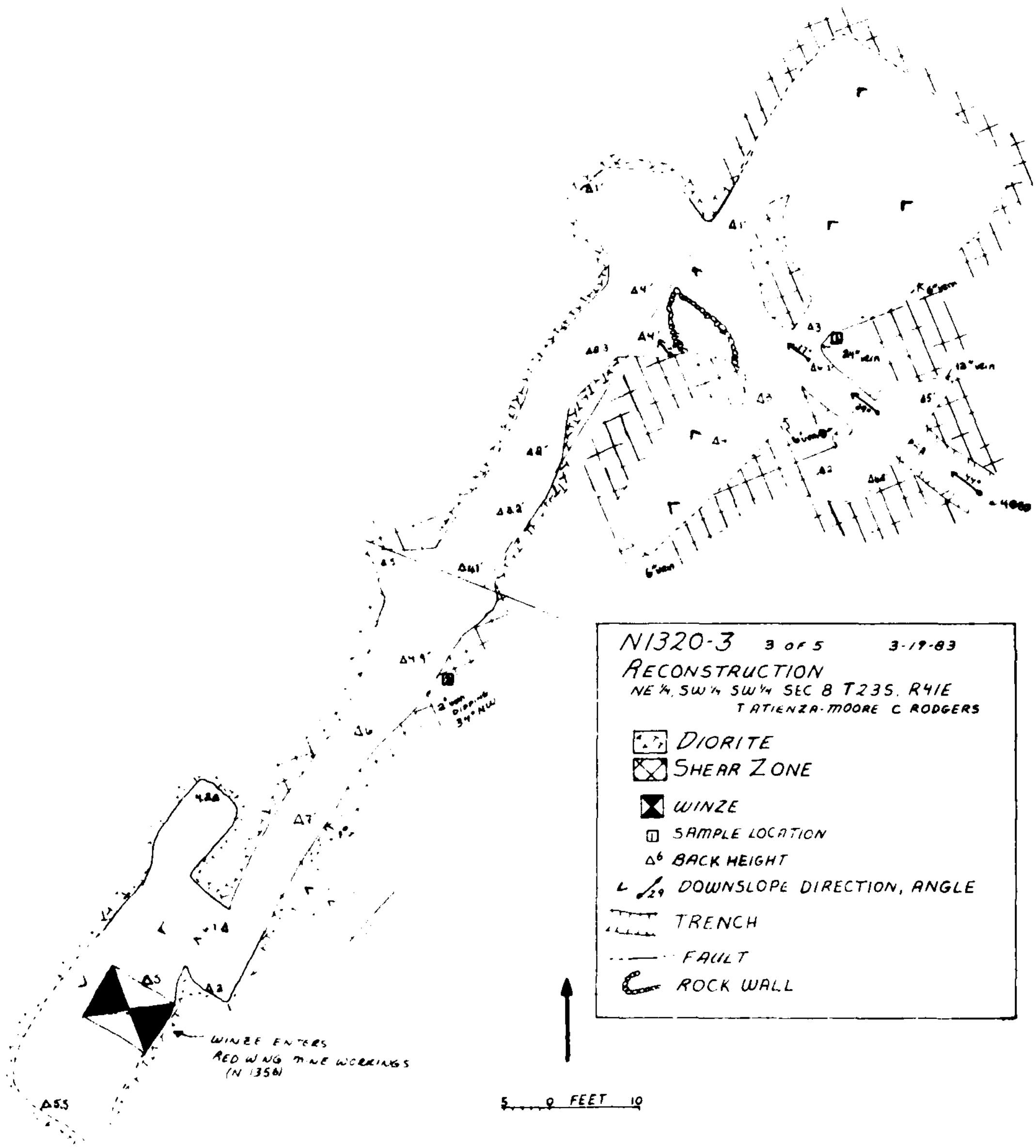

Figure 100. Plan view of adit 3, Reconstruction.

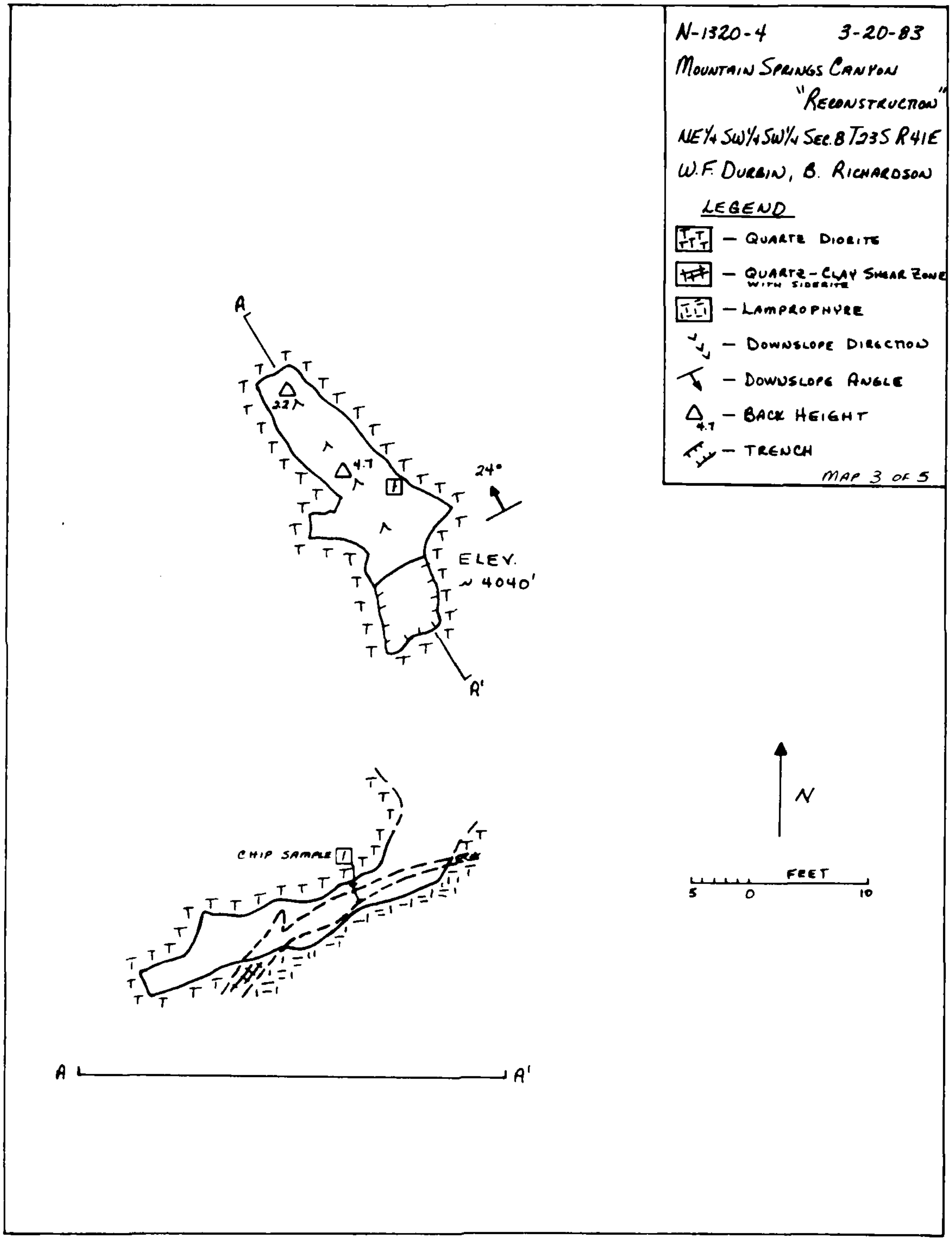

Figure 101. Plan view of adit 4, Reconstruction.

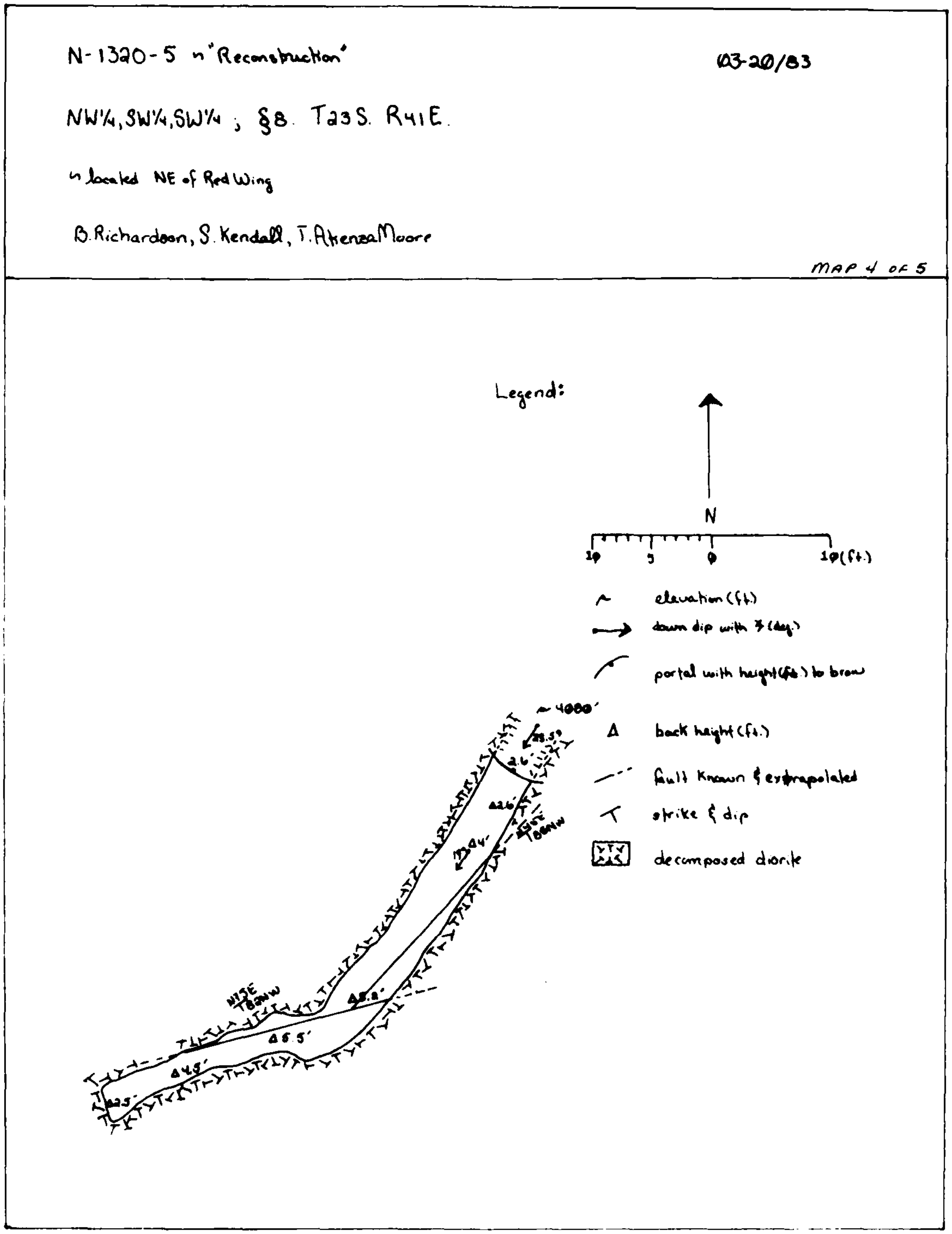

Figure 102. Plan view of adit 5, Reconstruction.

The complete list of assay results for the six samples is found in Appendix A. Two samples, labeled N-1320-2-1 and N-1320-3-2, warrant special mention and are shown below in Table 33.

TABLE 33. Precious Metal Values for Samples N-1320-2-1 and N-1320-3-2.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1320-2-1	0.250	125	0.30	4.50	129.50
N-1320-3-2	1.490	745	0.20	3.00	747.00

Sample N-1320-2-1 was cut from a weakly limonite stained 2-foot quartz vein that appears fairly continuous along strike and dip, at least within the confines of the working. There was no surface expression of the mineralized zone that could be traced away from the shaft. If this zone is similar to the other shear zones encountered at the Reconstruction and at other prospects nearby, it is expected to be very erratic and localized in extent.

Sample N-1320-3-2 shows a good precious metal value but was chipped from a 2-inch-wide vein. If the vein were mined using a minimum mining width of 3 feet, the precious metal value would equate to $41.50/ton. The vein width in the area of this sample ranges from 1 to 4 inches over a large area and to the north where the vein is 2 feet wide a sample taken indicates nil precious metal values so there is no potential for further exploration and development at this location.

The localized and erratic nature of the shear zones plus the sparsity of commercial precious metal values indicate that no discovery was made and that there are no extensive geologic targets worthy of exploration at the Reconstruction.

Unnamed Prospect (N-1331)

This prospect is situated in the NE1/4, SE1/4, NE1/4 of Sec. 11, T23S, R41E, MDB&M, as seen in Figure 9. On the ground it can be found 0.5 mile southwest of the Junction Ranch Road, 1 mile north of the head of Mountain Springs Canyon.

An adit was driven in decomposed Mesozoic quartz diorite, probably to intersect the quartz veins exposed in the trench higher up the hill. No vein material was evident in the dump, although approximately 29 cubic yards had been moved (representing 40 plus feet of drift). The trench is 50 feet long, 12 feet wide and 3 feet deep. It is located 40 feet uphill from the adit and bears N25W. Quartz vein material is in evidence in the trench but no in-situ quartz was found. A sample was taken that contained quartz with both primary and secondary copper and iron minerals. Assay results are given as Appendix A. Gold analysis showed 0.012 troy-oz/ton or $6/ton, which,coupled with the limited occurrence of the vein, indicates that no discovery was made of commercial material.

Unnamed Prospect (N-1332)

This prospect is across the canyon from Prospect N-1331 in the NW1/4, NE1/4, NE1/4 of Sec. 11, T23S, R41E, MDB&M as shown on Figure 9. It consists of a single prospect pit, 20 by 25 feet by 25 feet deep. The pit was dug on a 7-foot-wide shear zone trending N37W and dipping 75 degrees south in Mesozoic leucogranite. The entire zone shows only sparse to moderate quartz enrichment with attendant common hydrothermal minerals and alteration products (pyrite, barite, chalcopyrite, covellite, cuprite, argentojarosite (?), chrysocolla, limonite, hematite). Very little quartz is still present in the pit walls, so a hand-sorted grab sample was taken of the quartz material on the dump. Complete analytical results are given in Appendix A, while gold and silver assays are listed in Table 34.

TABLE 34. Precious Metals Values at Site N-1332.

Sample	Gold		Silver		Total value of sample, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1332-1	0.310	155	1.12	16.80	171.80

The precious metal values of the sample are moderately good but there is almost no quartz left in the pit walls. Reconnaissance of the surrounding area disclosed no other quartz outcrop or alteration zones nearby.

Unnamed Prospect (N-1333)

This group of workings is located on the south side of the mouth of Mountain Springs Canyon. It is placed in the NE1/4, SE1/4, NW1/4, Sec. 18, T23S, R41E, MDB&M, and is shown in Figure 9.

The host rocks range from Mesozoic granite to hornblende diorite. Also present are bodies of gray-green clay-rich chlorite schist.

Two adits and a caved and filled prospect trench comprise the site workings. The lower adit was driven 92 feet to explore a 1.5- to 2.5-foot-thick quartz vein with minor limonite staining. This adit is shown in Figure 103. The vein is extremely irregular and pinches out 50 feet from the portal. A second adit, located slightly southward and 20 feet higher in elevation, is shown in plan view by Figure 104. This adit is 62 feet long, crosscuts the schist bedding and encounters a single 1-foot-thick quartz vein.

Four samples were taken from the two adits where indicated on the plan views and assay results are summarized in Table A-1.

No commercial mineralization is present at this location as indicated by the assay results.

Unnamed Prospect (N-1334)

This prospect is situated on the north side of Mountain Springs Canyon about 1.3 miles from the canyon mouth in the SE1/4, NE1/4, SW1/4 of Sec. 8, T23S, R41E, MDB&M, as seen in Figure 9. This prospect consists of two dog-holes dug on a northwest-trending shear zone contact between a small lamprophyre dike and a larger aplite dike. Both dikes intruded a quartz diorite pluton and all three are Mesozoic in age.

The shear zone is about 3 feet wide and consists of clay and a small amount of barren quartz. No sample was taken here. No mineral discovery was made at this site.

Unnamed Prospect (N-1335)

This property is located in a steep wash on the north side of a tributary to Mountain Springs Canyon approximately 1.2 miles from the canyon mouth. Figure 9 also shows it to be in the SE1/4, NE1/4, SW1/4, of Sec. 8, T23S, R41E, MDB&M.

The workings consist of several adits developed on quartz-rich contacts between Mesozoic age small lamprophyre dikes, larger aplite dikes and quartz diorite intrusives. The seven prospects occur within

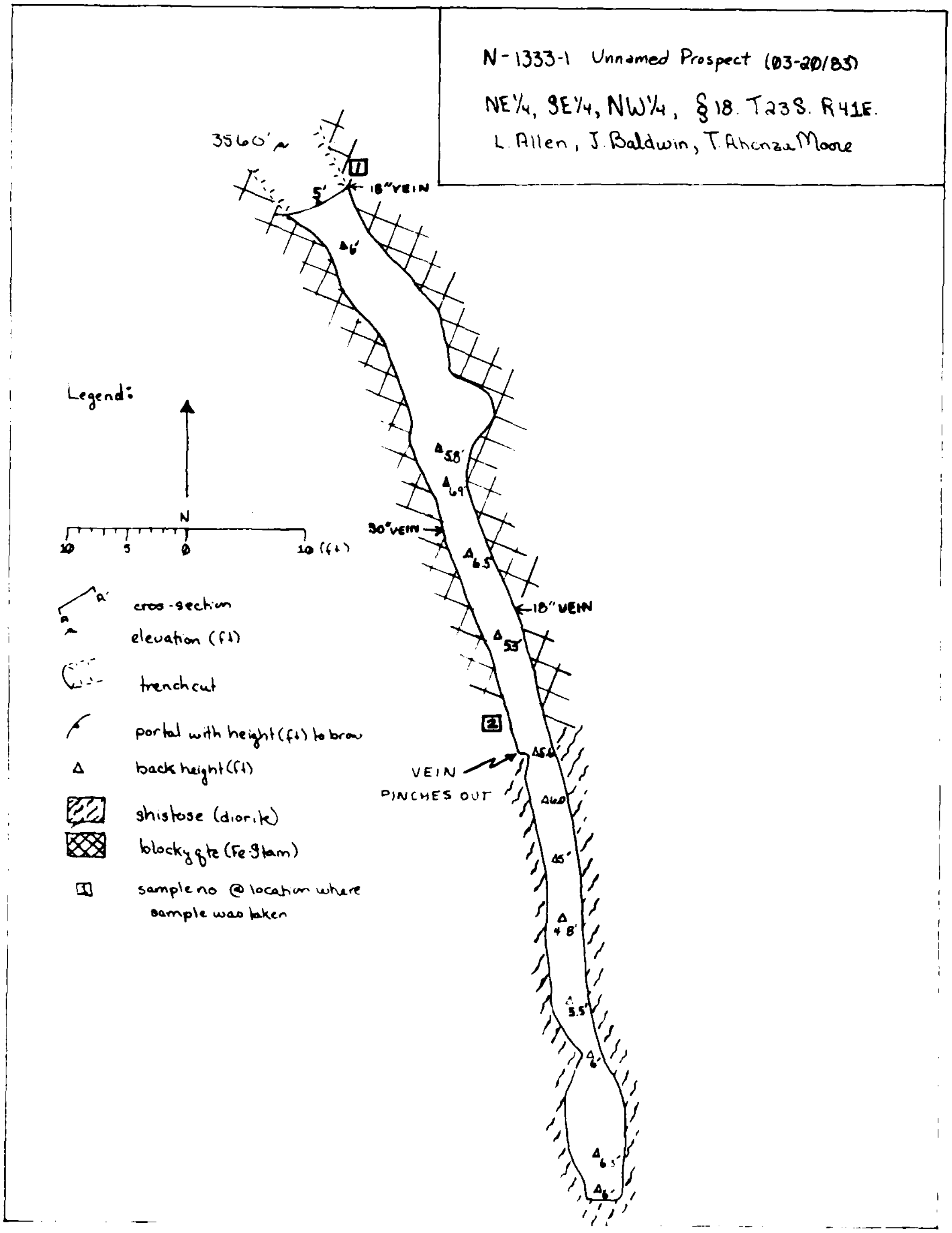

Figure 103. Plan view of adit 1 at N-1333.

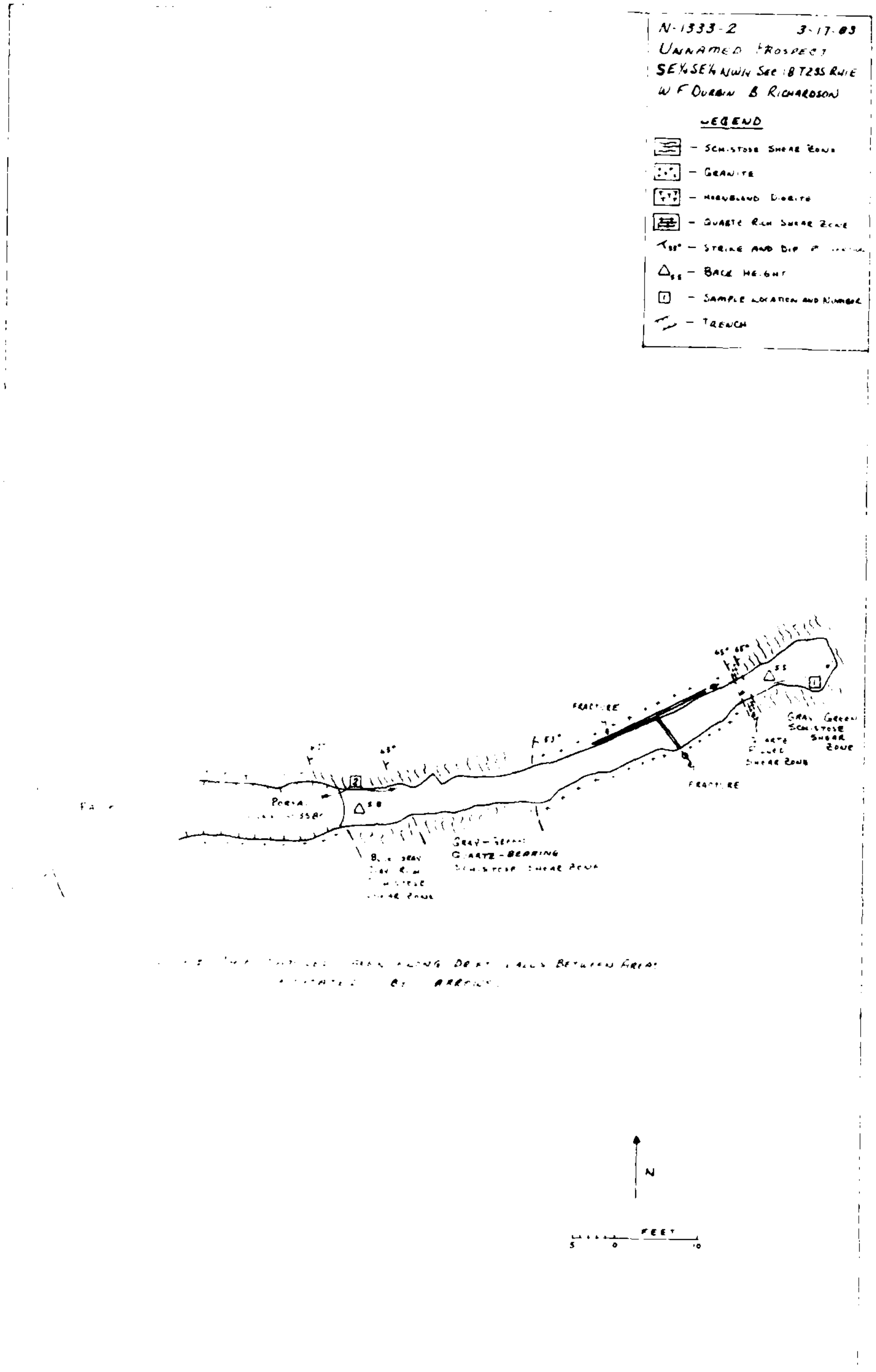

Figure 104. Plan view of adit 2 at N-1333.

100 feet of one another; three of them are still open. The total footage of the open workings is about 72 feet. The other four appear at least as small.

The veins are up to 1.5 feet wide, massive quartz, predominately brecciated with very sparse siderite inclusions. One sample was taken. As the assay results shown in Appendix A indicate, no economical mineralization is present and no discovery was made.

Unnamed Prospect (N-1336)

This unnamed gold prospect lies in the SE1/4, NE1/4, SW1/4 of Sec. 8, T23S, R41E, MDB&M, as shown on Figure 9, and can be found on the north side of Mountain Springs Canyon 1.2 miles from the canyon mouth.

Figure 105 is a plan view and cross section of the drift. The drift was driven on a quartz-rich contact of a thin lamprophyre dike and a larger aplite dike. Both are of Mesozoic age. The vein is small (less than 2 inches) and nearly flat lying and it consists of milky quartz with sparse limonite and hematite staining. One sample was taken and the analysis results are listed in Appendix A. The gold assay ran 0.042 troy-oz/ton or $21/ton. Neither the grade nor the tonnage exists here for an economic deposit.

Unnamed Adit (N-1337)

This working is situated on the south side of Mountain Springs Canyon approximately 1.3 miles northeast of the canyon mouth. It is placed in the NW1/4, NE1/4, NW1/4, Sec. 17, T23S, R41E, MDB&M, and is shown in Figure 9.

An 8-foot adit was driven along an iron stained shear zone in Mesozoic aplite. No mineralization of any kind was observed, no samples were taken, and no discovery of mineral potential exists at this site.

Unnamed Adit (N-1338)

This working is situated on the north side of Mountain Springs Canyon approximately 1.35 miles northeast of the canyon mouth. It is placed in the SE1/4, NW1/4, SW1/4, Sec. 8, T23S, R41E, MDB&M and is shown in Figure 9.

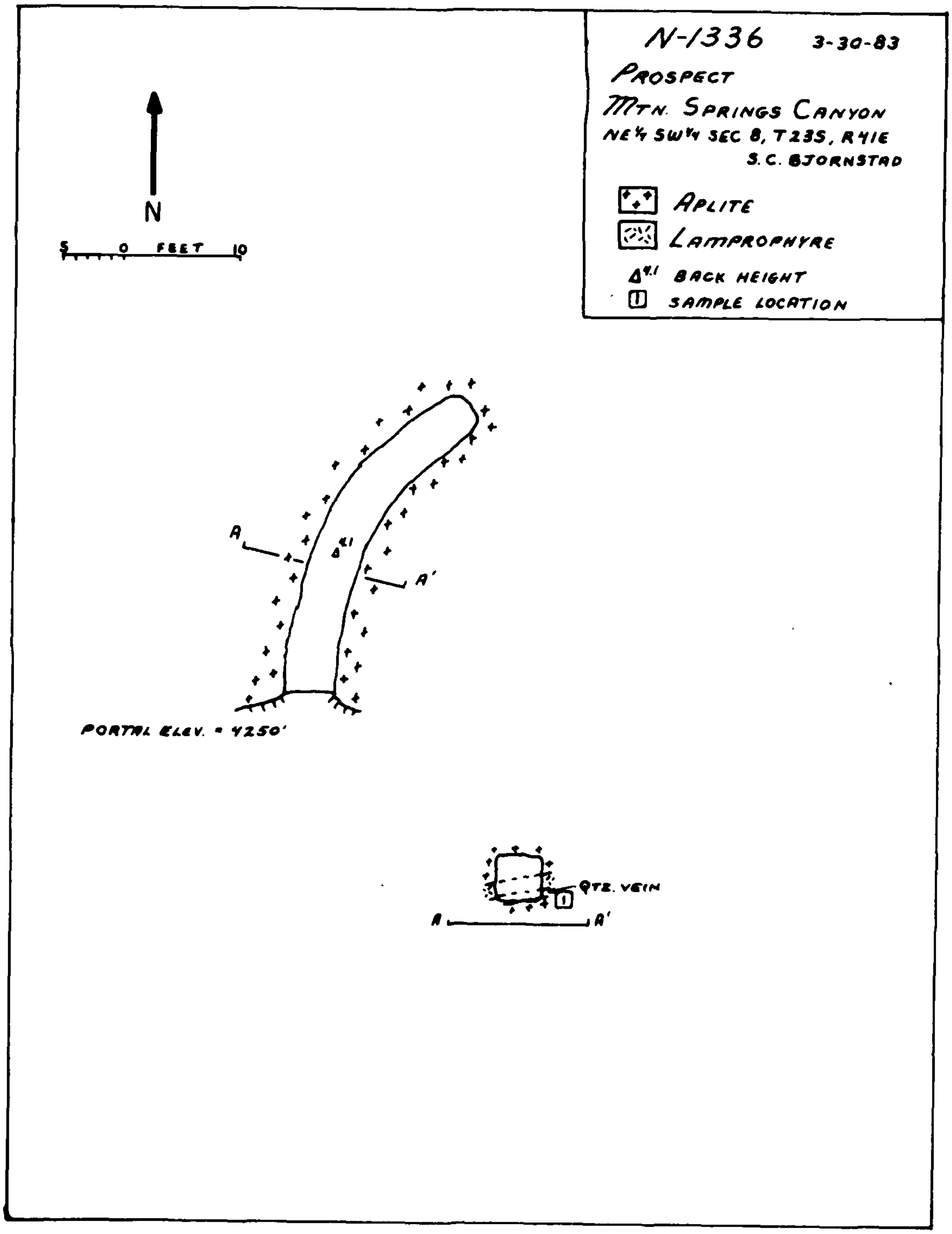

Figure 105. Plan view and cross section of the drift at N-1336.

The working consists of an adit, now caved and filled with slope wash. The host rock is Mesozoic biotite-rich quartz diorite and there is no expression of either shear zone or mineralization, and no mineralized rubble on the surface dump. No discovery of commercial material was made at this location.

Unnamed Group (N-1339)

This unnamed complex of workings is situated on the north side of Mountain Springs Canyon Road approximately 3.1 miles northeast of the canyon mouth. It is placed in the E1/2, NW1/4, SW1/4, Sec. 10, T23S, R41E, MDB&M and is shown in Figure 9.

Host rocks in this area range from Mesozoic biotite-rich quartz diorite to pale gray fine-grained Mesozoic aplite dikes.

Zones of suspected mineralization that were explored include northwest to northeast trending shear zones in aplite and scattered quartz-rich veins in biotite-rich quartz diorite. Limonite staining with minor hematite and secondary copper mineralization were associated with vein quartz.

Figure 106 is a surface plan view showing relative positions of the workings and sample locations. The largest single working is shown in Figure 107 and is an adit 36 feet long (15 feet of which is inaccessible) driven to explore a 7-foot-thick schistose shear zone with minor quartz veining. Figures 108a and 108b show two minor adits that encountered only host rock. Other workings consist of one 6-foot caved adit and five small prospect pits.

Three samples were taken and a complete list of assay results is found in Appendix A.

The sample assay results indicate very low values for precious metals and all other commodities. This group of workings in a localized alteration area made no discovery of commercial interest.

Unnamed Mine (N-1341)

Located on the south side of Mountain Springs Canyon about 2.9 miles from the canyon mouth, this unnamed mine falls in the SW1/4, SW1/4, SW1/4 of Sec. 10, T23S, R41E, MDB&M, as seen in Figure 9.

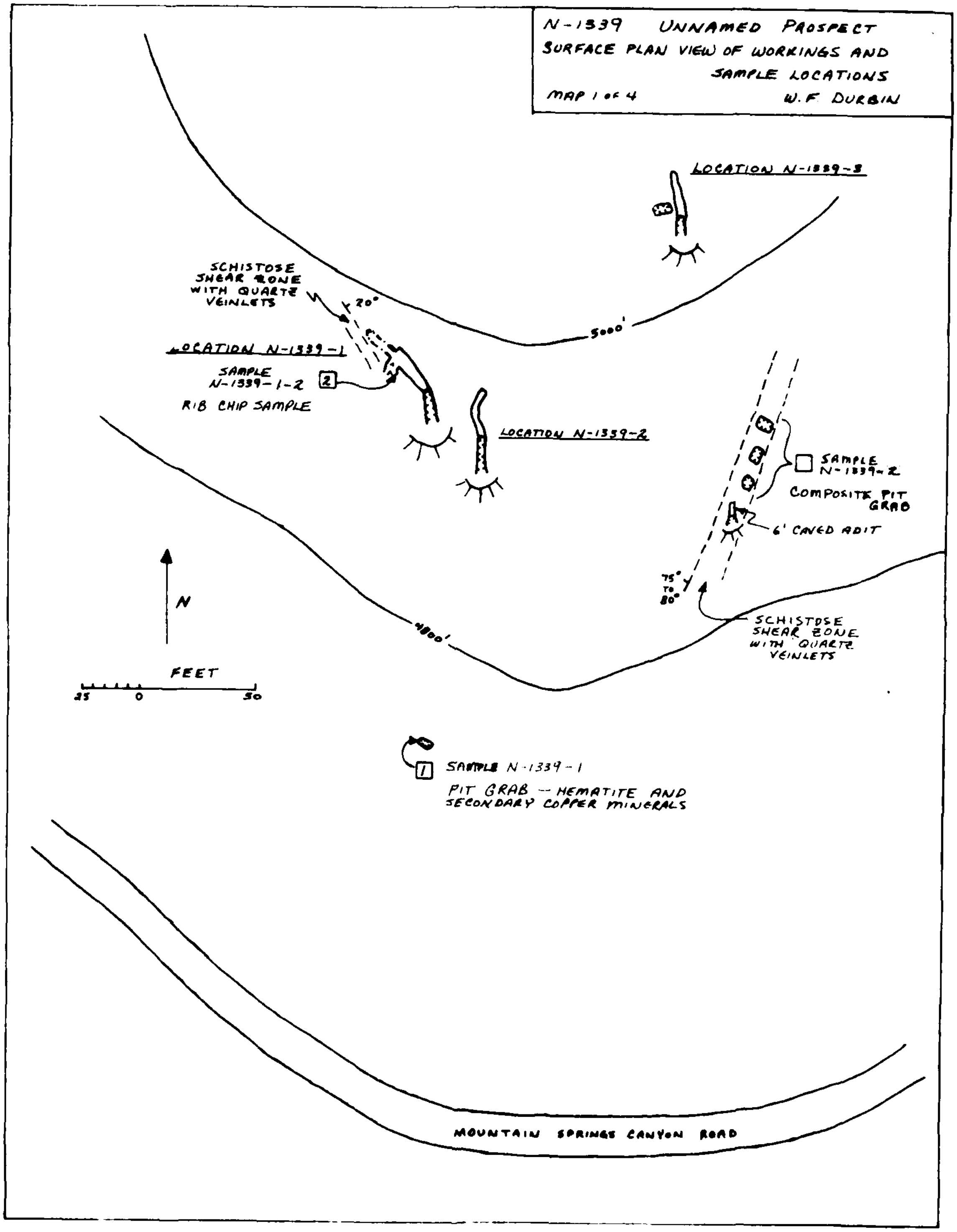

Figure 106. Surface view of prospect N-1339.

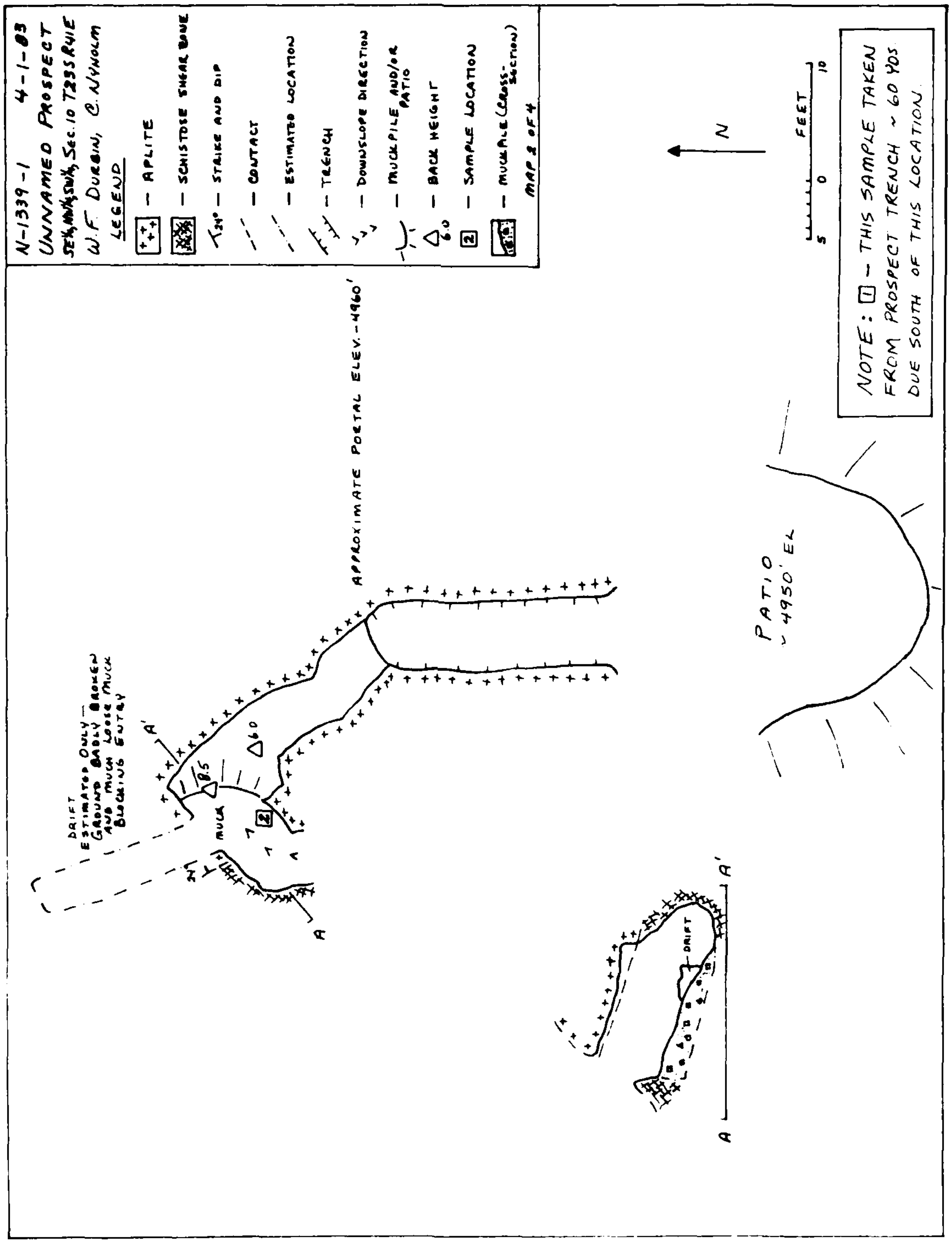

Figure 107. Plan view of main adit at N-1339.

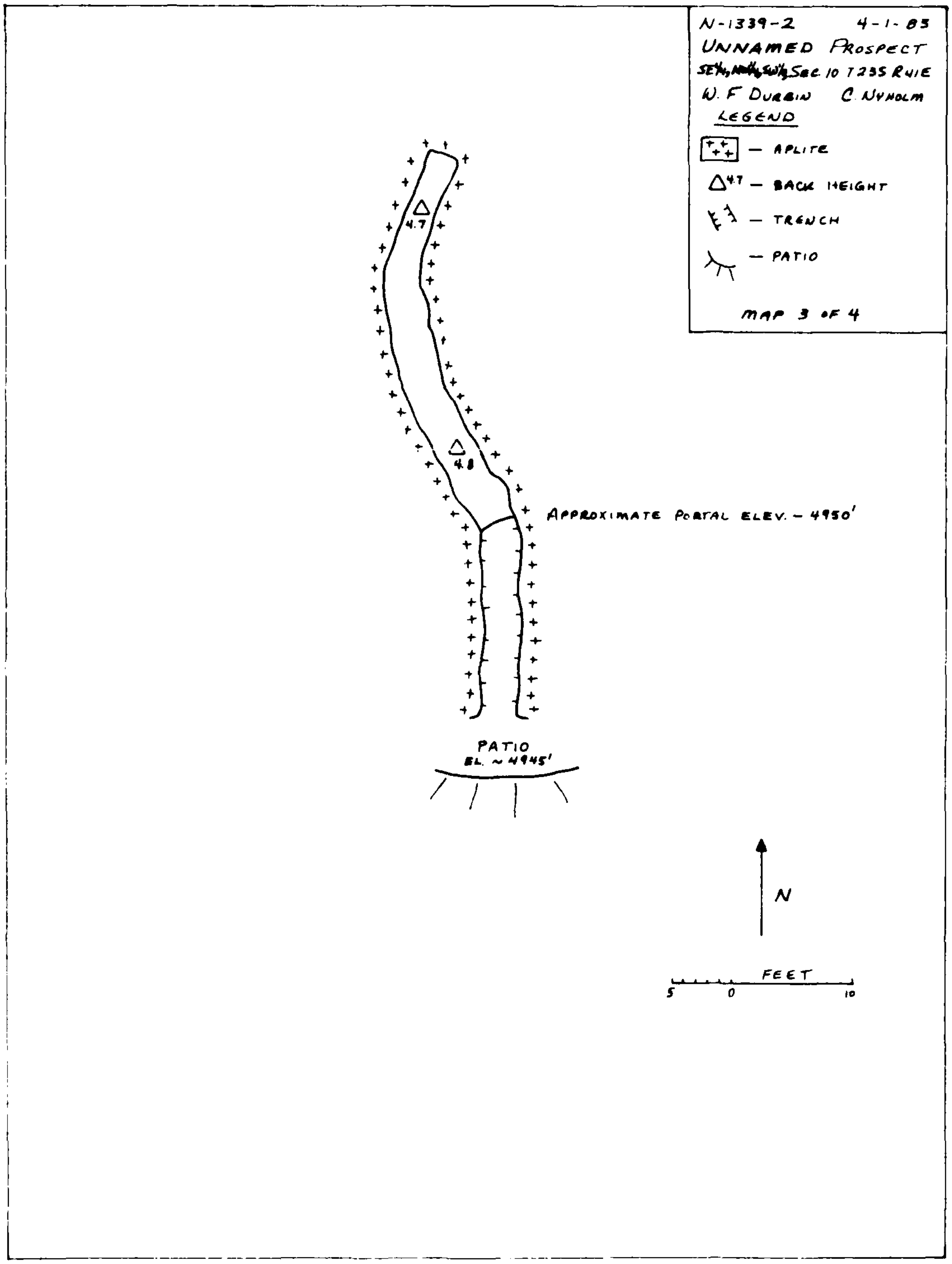

Figure 108a. Plan view of minor adit 1 at N-1339.

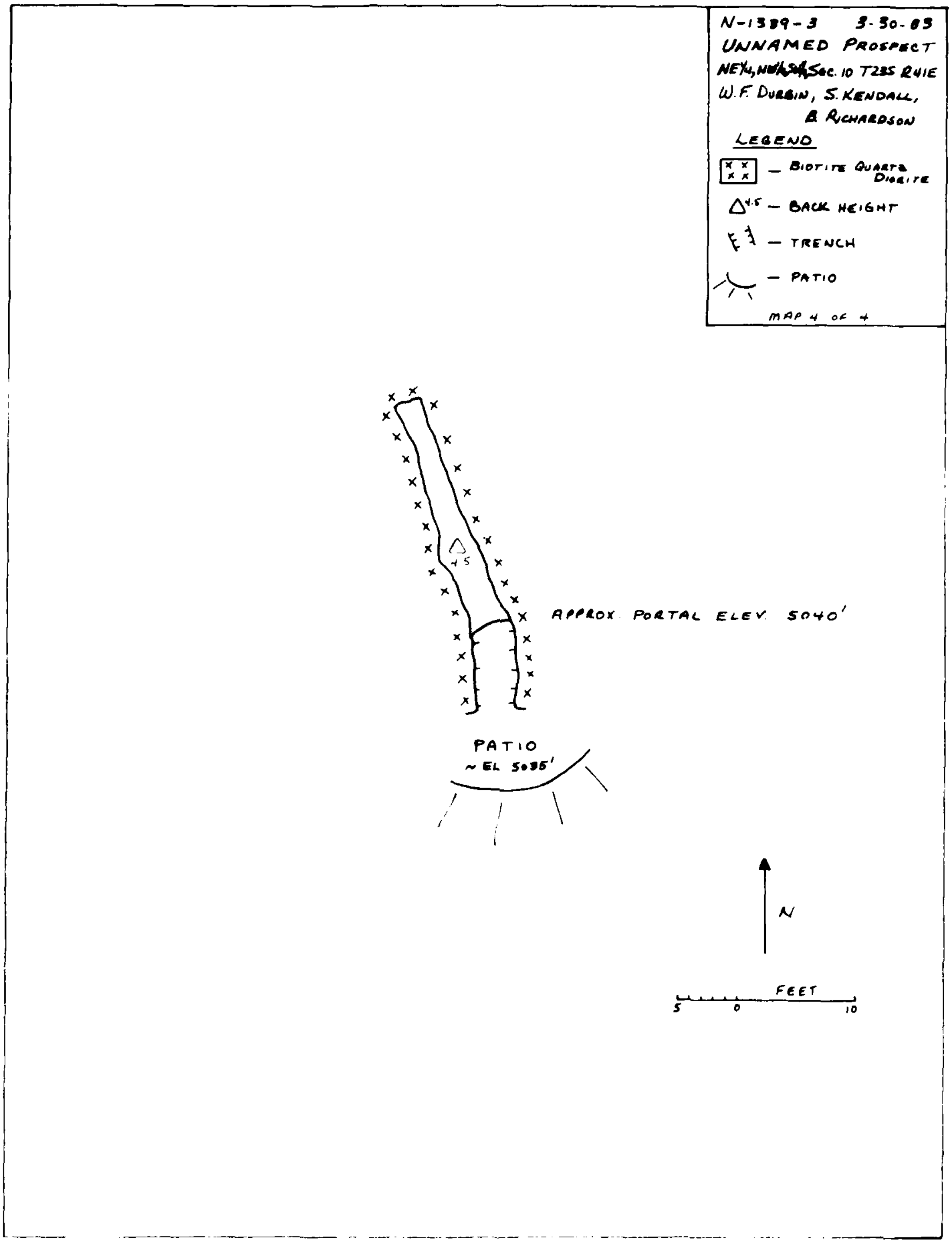

Figure 108b. Plan view of minor adit 2 at N-1339

The mine was developed some 450 feet above the canyon floor in a Mesozoic granodiorite pluton with aplite and lamprophyre dike intrusions. The five adits are all on the same level and within 70 feet of one another across the slope face. All five are caved shut. Because of the steepness of the slope, it is difficult to gauge the size of the dump and from it the extent of the workings; however, it is likely that there is between 150 and 250 feet of combined total workings.

Thin quartz veins (less than 3 inches wide) crop out irregularly over the surface near the adits but are not to be found elsewhere on the slope. It is likely that the miners followed these iron stained, clear crystalline to milky massive quartz veins.

The dump contains only very sparse vein material. One grab sample was taken with an assayed gold value of 0.14 troy-oz/ton or $70/ton. Full analysis results are listed in Appendix A.

As noted above, the hydrothermal deposition appears to have been quite restricted at this site, which severely limits the commercial potential.

Unnamed Prospect (N-1342)

Located on the north side of Mountain Springs Canyon about 2.9 miles from the canyon mouth, this unnamed prospect lies in the N1/2, NW1/4, SW1/4, of Sec. 10, T23S, R41E, MDB&M, as seen in Figure 9.

Two prospect drifts were dug along parallel, near-vertical shears in a Mesozoic quartz diorite. A plan view of the workings showing their relative positions is given as Figure 109. The upper shear was barren but the lower one contained moderate to sparse quartz enrichment with limonite, sericite and secondary calcite. A sample was taken across the lower shear. The analytical results are listed in Appendix A. The gold assay ran 0.052 oz/ton or $26/ton. Little or no mineral potential exists at this site.

Unnamed Prospect (N-1343)

This prospect is located on the south side of Mountain Springs Canyon, about 1 mile from the canyon mouth in the SW1/4, SE1/4, SW1/4 of Sec. 8, T23S, R41E, MDB&M, as shown in Figure 9. The working consists of a single tunnel, 44.5 feet long, driven along a southwest-

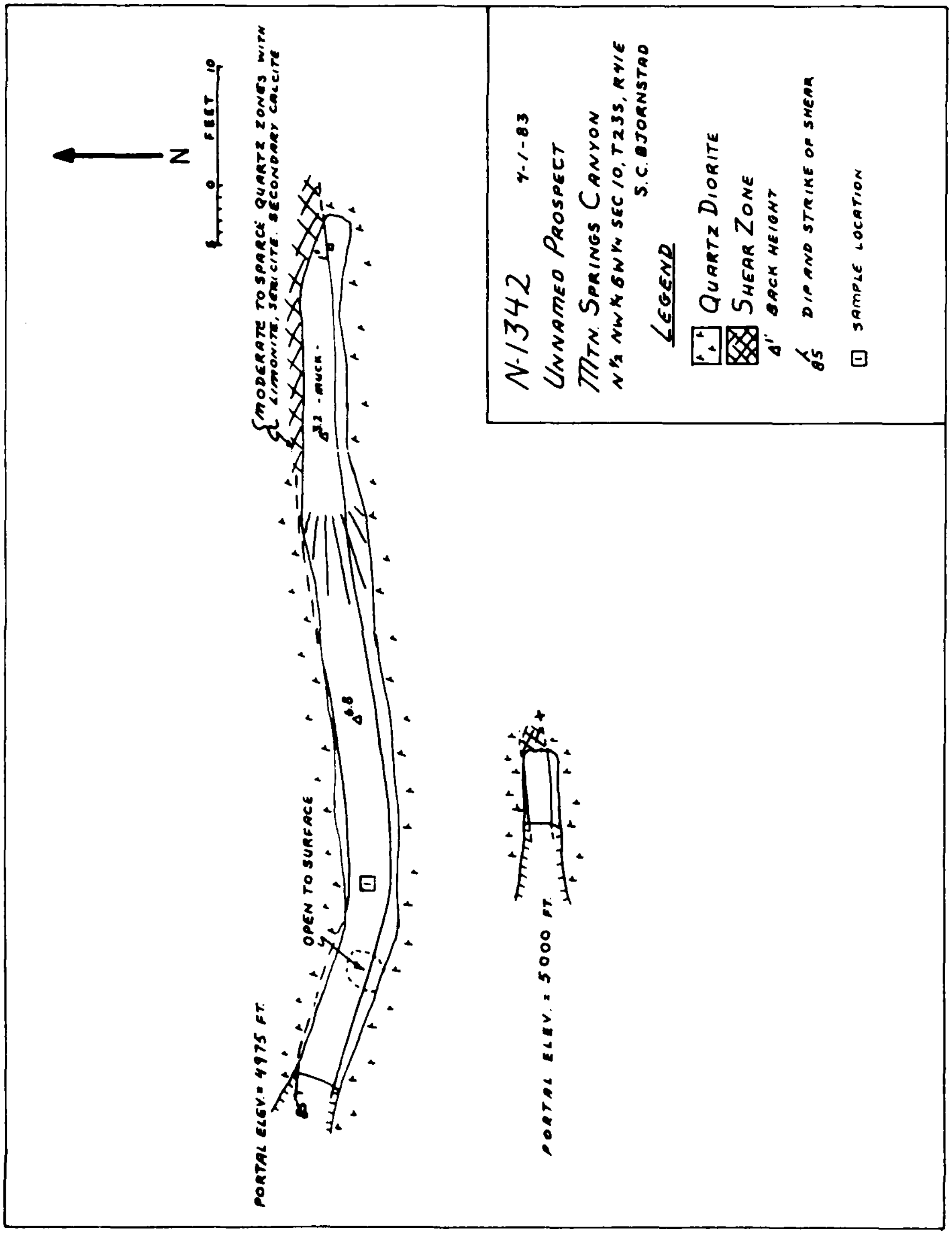

Figure 109. Plan view of working at N-1342.

trending contact between two Mesozoic intrusives: a quartz diorite pluton and a lamprophyre dike. Subsequent to the intrusion of the dike a narrow shear zone, less than 0.5 foot wide, formed along the contact. The zone shows only sparse quartz deposition with no accessory mineralization.

No samples were taken at this site, but it is apparent from the field examination that no discovery of commercial mineralization was made.

Old Glory Mine (N-1345)

The Old Glory Mine is actually only a prospect that sits on the south canyon slope near the upper end of Mountain Springs Canyon in the N1/2, NW1/4, NE1/4 of Sec. 14, T23S, R41E, MDB&M, as shown in Figure 9. The prospect consists of two adits, both caved. The upper adit is estimated to have been 25 feet long and was driven on an iron stained fracture zone in a thick Mesozoic aplite. The lower adit (40 feet downslope) is estimated to have been about 10 feet deep. The lower adit dump shows only decomposed quartz diorite.

No samples were taken here because the dumps, the general geologic environment, and the lack of exposed mineralization indicate that there is no potential for commercial mineralization.

Unnamed Prospect (N-1346)

Prospect N-1346 is situated in the NE1/4, SW1/4, SE1/4 of Sec. 12, T23S, R41E, MDB&M, as seen in Figure 10. It lies on the north side of Mountain Springs Canyon very near the head of the canyon. The working consists of a single, 27-foot, decline driven down the dip of a shear zone in Mesozoic leucogranite. Figure 110 is a cross section through the decline. The shear, which is 2.5 feet wide, trends N12W and dips 41 degrees east. It is primarily composed of broken country rock and clays with about 30% quartz in the form of individual veins up to 3 inches wide. Visibly associated with the quartz are sparse pyrite, limonite, hematite, chalcopyrite, covellite, malachite, cuprite, chrysocolla and argentojarosite (?).

One sample was taken as a combination vein sample and hand-sorted dump grab. Analytical results are given in Appendix A. Precious metal values, as listed in Table 35, are quite low.

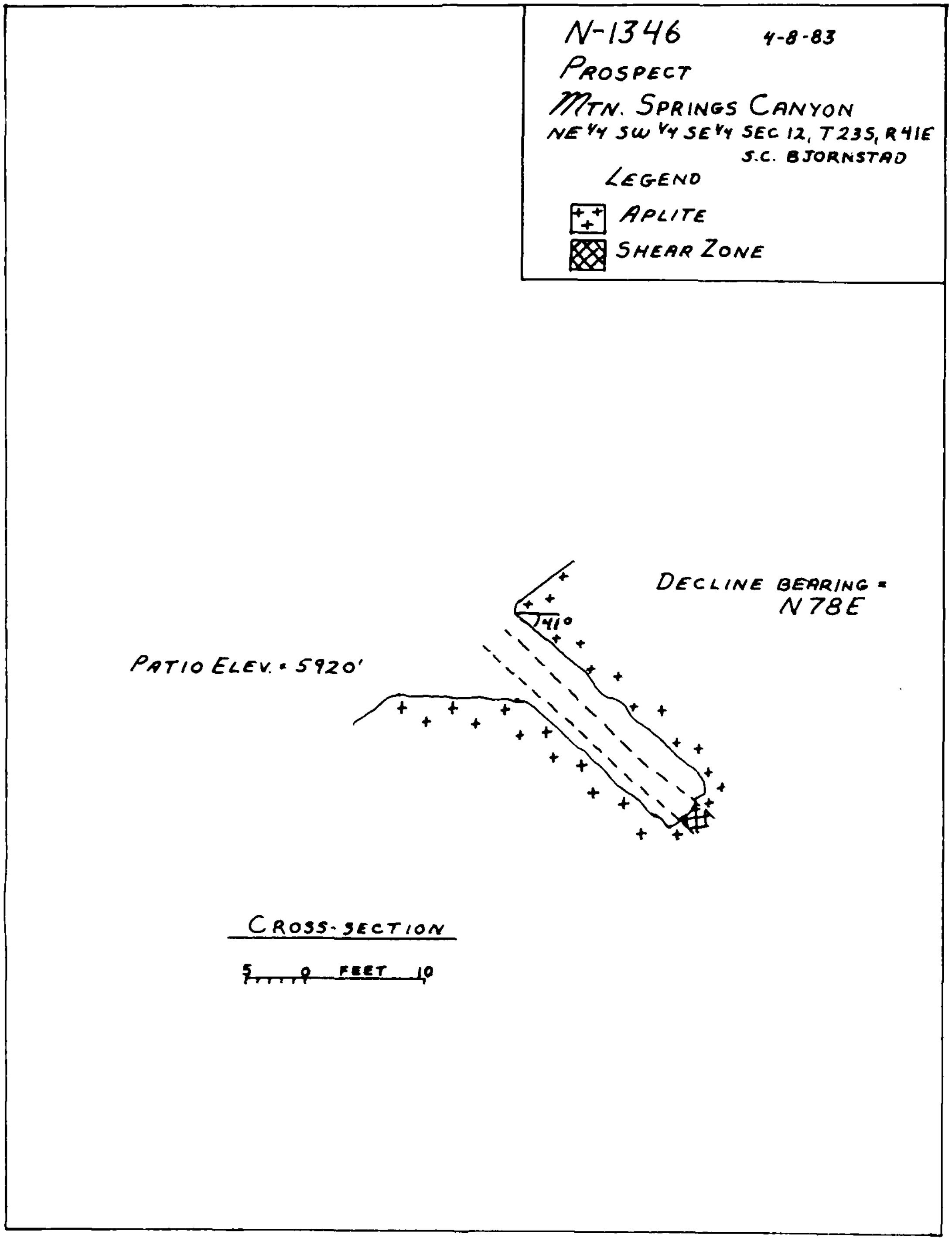

Figure 110. Cross section of decline at N-1346.

TABLE 35. Precious Metal Assays for Site N-1346.

Sample	Gold		Silver		Total value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1346-1	0.028	14	2.97	44.55	59.55

Examination of the surrounding area indicated no other mineralized outcrop. This, coupled with the small size of the occurrence, indicates that no potential exists at this site for economic mineralization.

Unnamed Prospect (N-1347)

This prospect is located along the Junction Ranch Road, about 1.6 miles north of the head of Mountain Springs Canyon in the SE1/4, SE1/4, SW1/4, of Sec. 1, T23S, R41E, MDB&M, as seen in Figure 9. The working consists of a single caved shaft (estimated to have been about 12 feet deep) that was dug on a shear zone in Mesozoic quartz diorite. The shear is relatively small (less than 2 feet thick) and, while no quartz is visible in place, there is a small amount present on the dump. It is massive and broken, with sparse hematite and limonite staining. In light of the proximity of this prospect to the road, the origin of the quartz material from this property is questionable.

A sample was taken, however, for analysis, the results of which are given in Appendix A. With 0.37 troy-oz/ton gold and 0.92 troy-oz/ton silver, the total precious metal value of the sample is $198.80/ton. Examination of this small prospect shows that it is highly unlikely the material present as loose pieces on dump came from the property.

Unnamed Prospect (N-1348)

Located along the Junction Ranch Road, 1.6 miles north of the head of Mountain Springs Canyon, Unnamed Prospect N-1348 lies in the SE1/4, SE1/4, SW1/4 of Sec. 1, T23S, R41E, as shown in Figure 9. The workings consist of a caved adit, of a 20-foot maximum length, and a prospect pit, 2 feet deep, located 200 feet uphill of the adit. Both prospects were developed on outcrops of hematite-copper-limonite stained quartz veins in Mesozoic quartz diorite.

Two hand-sorted dump grab samples were taken, the results of which are given in Appendix A. Sample 1 was taken at the adit and sample 2 at the pit. Surface reconnaissance indicates that the extent of the mineralization is limited. This, coupled with the low grade of the quartz stockpiles, shows that there is very low potential here for economic mineralization.

H and E #2 (N-1349)

The H and E #2 was staked by M. J. Farmer in 1932 as a claim on "gold and other metals" as shown by a location notice discovered at this site near the Junction Ranch Road, about 1.8 miles north of the head of Mountain Springs Canyon. The cadastral location is given as SW1/4, SW1/4, SW1/4 of Sec. 1, T23S, R41E, MDB&M, and is shown on Figure 9.

The work on this prospect is a pit, 5 feet in diameter and 2 feet deep, dug on a vein (less than 2 feet thick) in Mesozoic leucogranite. The outcrop is small and the extent of visible mineralization is smaller (copper staining of fractures). Results of the analysis of a sample taken on the quartz material on the dump are given in Appendix A. These results combined with the other physical information indicate a very low potential for economic mineralization at the site.

Unnamed Prospect (N-1350)

This unnamed prospect is located near the Junction Ranch Road, about 2.9 miles north of the head of Mountain Springs Canyon in the SE1/4, SE1/4, NW1/4 of Sec. 1, T23S, R41E, MDB&M, as shown on Figure 9. The working consists of a single pit 6 feet across by 4 feet deep developed on a thin (0.5-foot) hematite-stained shear zone in a Mesozoic granodiorite. The shear exhibited only sparse, barren, quartz enrichment. No samples were taken and no potential exists for commercial scale mineralization.

Bull Frog Mine (N-1351)

The Bull Frog Mine (actually a prospect only) was staked on 11 August 1924 by four persons whose last names can no longer be read from the claim notice. It is located on the south side of Mountain

Springs Canyon about 1-3/4 miles down from the head of the canyon, in the NW1/4, NW1/4, NE1/4 of Sec. 14, T23S, R41E, MDB&M, as shown in Figure 9. The Old Glory Mine abuts the claim along the south side.

This prospect consists of a single pit, 15 by 10 feet by 6 feet deep, dug on hematite stained fractures in a large Mesozoic aplite dike. The staining extends from the surface to 3 feet down. There is no other mineralization and there is no evidence for commercial mineralization at this site.

Shower of Gold No. 1 (N-1353)

The Shower of Gold No. 1 workings are situated near the western flank of the Argus Range 1.2 miles south-southeast of the mouth of Mountain Springs Canyon. They are placed in the NE1/4, SE1/4, NE1/4, Sec. 19, T23S, R41E, MDB&M and are shown in Figure 9. A claim notice found at the site, dated 1930, lists C. G. Schulz as the last known operator.

The host rock at this location is Mesozoic hornblende quartz diorite. The locus for mineralization is a 3-1/2 to 5-1/2-foot wide shear zone that strikes N58W and dips 65 degrees southwesterly. The shear zone contains abundant brecciated white quartz that ranges from 3 to 5 feet thick and is generally barren in outcrop. The hanging wall side of the shear is bounded by 0.5 foot of limonitized clay and is strongly slickensided. Mineralization in the quartz zone, mainly evident in loose dump material, consists of abundant chalcopyrite, covellite, and chrysocolla, plus specular hematite and minor amounts of siderite and pyrite.

Figure 111 is a surface plan view of the Shower of Gold No. 1 workings. These consist of a minor amount of surface stripping to expose the shear zone, 10 feet of drifting, and sinking of two shafts. The southerly shaft was driven down the dip of the shear zone for 39 feet. The northerly shaft was driven only a few feet down the shear zone and abandoned. It is caved and filled to within 2 feet of the surface.

One composite grab sample of "high-grade" material was taken from scattered piles on the mine dump patios. The sample assay results are recorded in Appendix A and Table 36.

The sample assay results indicate a moderate value for precious metals. The mineralization appears to be concentrated in isolated pods within the quartz as indicated by the barren nature of the surface outcrop quartz and by the shallow depth of the north shaft, which

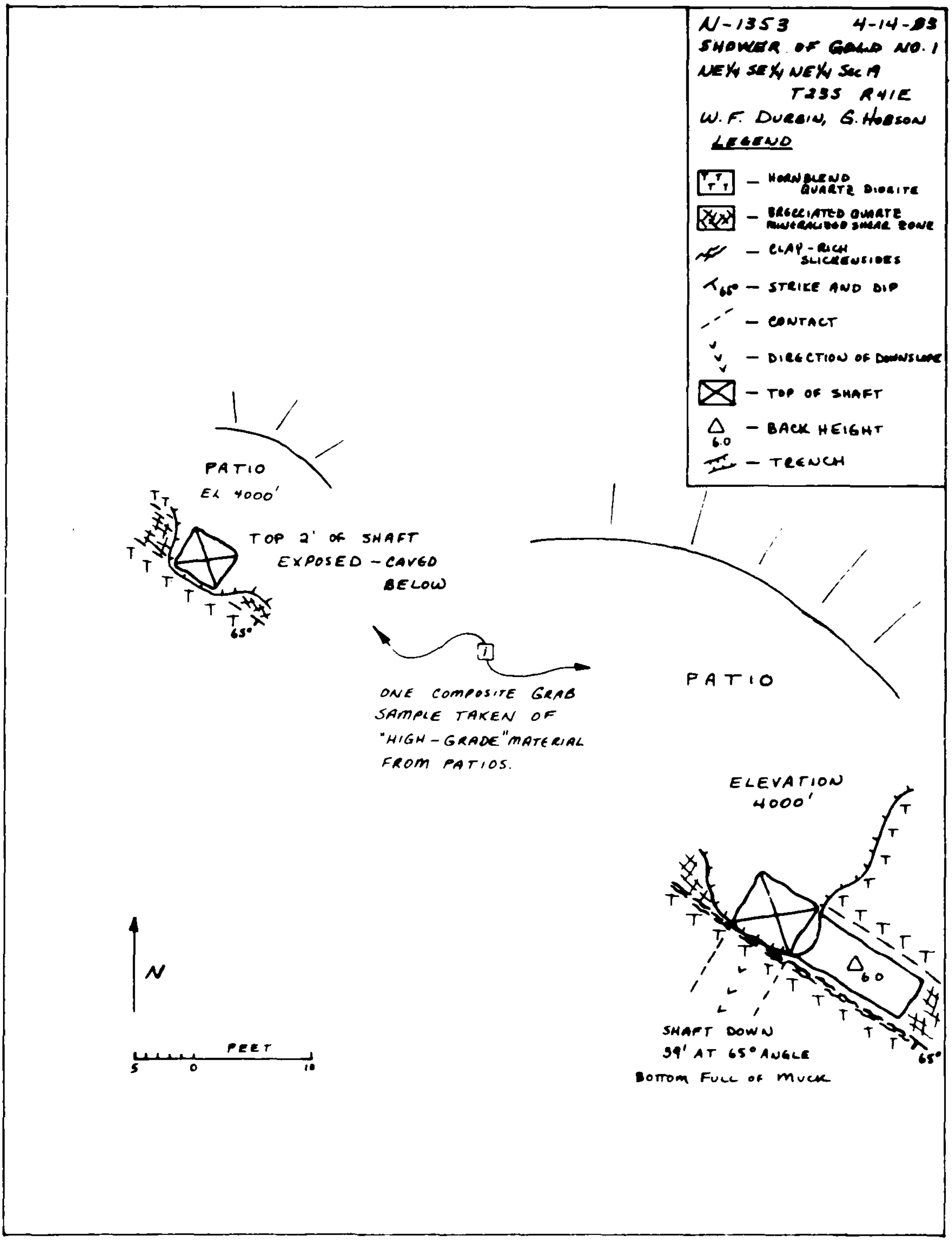

Figure 111. Surface plan view of Shower of Gold No. 1

TABLE 36. Shower of Gold No. 1, Sample Analysis.

Gold		Silver		Total value, $/ton
Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
0.16	80.00	4.36	65.40	145.40

apparently intersected no mineralization. A very minimal tonnage might be produced by a two-man operation by accessing the main shaft and mining along the mineralized zone, however no commercial potential is indicated at this site.

Thin Dime Prospect (N-1354)

A claim notice found at this prospect lists Oliver Hopkins and Wm. J. Lange as the claimants in 1938. The Thin Dime prospect is situated on the western flank of the Argus Range 0.7 mile southeast of the mouth of Mountain Springs Canyon. It is placed in the SE1/4, SW1/4, SE1/4, Sec. 18, T23S, R41E, MDB&M, as shown on Figure 9.

The operators explored a portion of a mineralized shear zone that developed on the contact of a Mesozoic biotite quartz diorite host and the hanging wall of a Mesozoic aplite dike. The shear zone, which strikes N37W and dips 45 degrees southwesterly, has been hydrothermally altered to mineralized quartz which ranges from 0.5 to 1 foot wide. The quartz mineralization consists of limonite stain and fracture-filling, scattered bornite, disseminated fine crystalline pyrite, and chrysocolla fracture coating.

Figure 112 is a plan view with cross section of the main working. It is a 22-foot drift driven along the shear zone strike. A small winze was driven down-dip near the drift face. The winze is full of muck and inaccessible.

Three prospect pits were developed along the south-facing hillside below the drift in an effort to locate the down-dip extent of the mineralized zone. The pits, dug at 20 feet, 50 feet, and 100 feet below the drift, exposed an unmineralized quartz diorite-aplite contact and a 1-foot lamprophyre dike that crosscuts the contact. The zone was traceable for only 10 feet up-dip.

A single sample was taken at the Thin Dime Prospect. It was a grab sample from a pile of mineralized quartz located at the drift portal. The material was identical in appearance to that found in

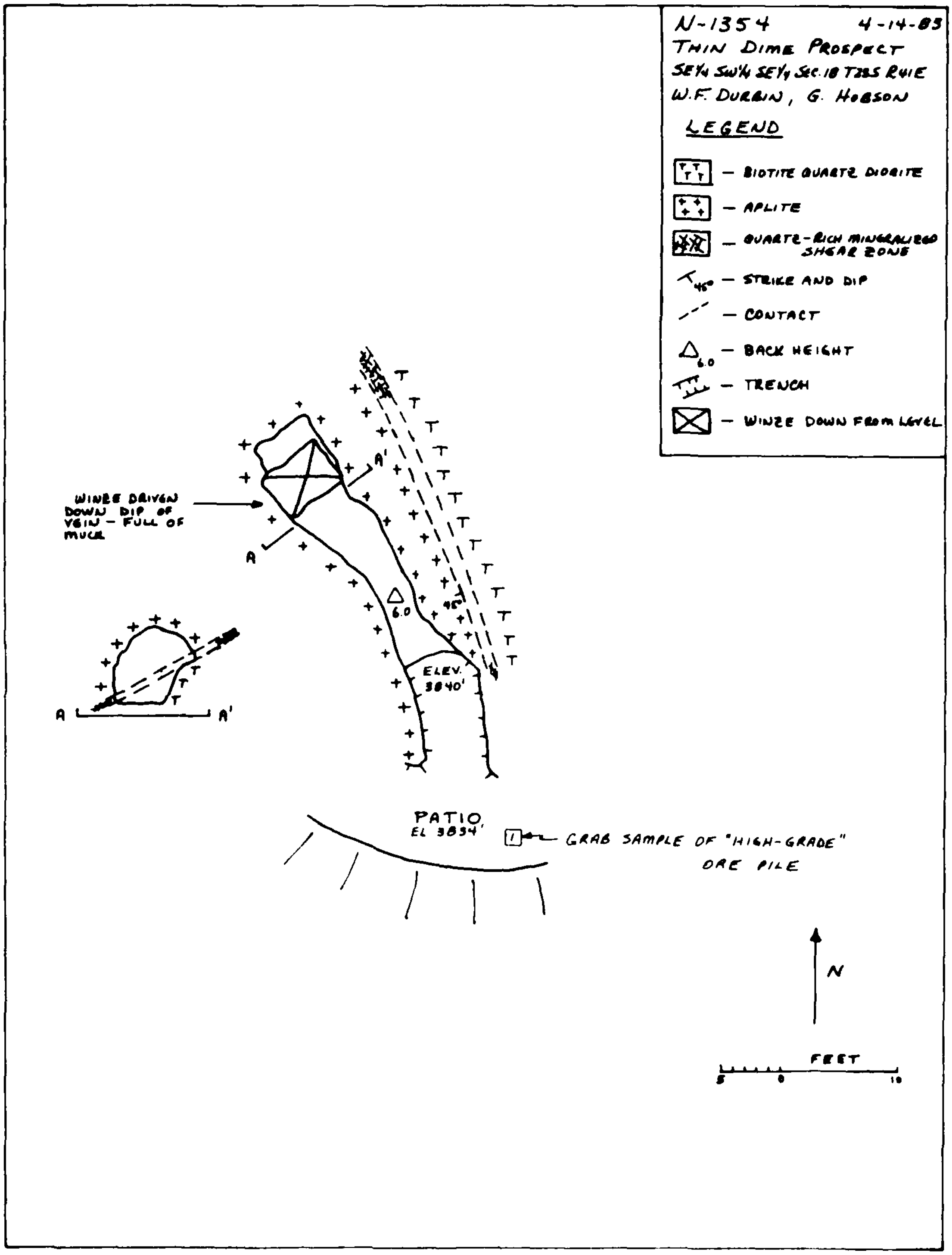

Figure 112. Plan view of main workings at Thin Dime.

place within the adit and the sample was taken to select that material of apparent highest grade. A complete sample analysis is found in Table A-1 and a summary of precious metal values is presented in Table 37.

TABLE 37. Precious Metal Values for the Thin Dime Prospect.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1354	0.990	495	0.21	3.15	498.15

The Thin Dime Prospect, although showing a slight potential for economic grade mineralization, exhibits little indication of tonnage sufficient for development by even a small operator. A few tons could be produced by extending the drift and perhaps by minor stoping both up- and down-dip. If an operator were to mine a 6-inch vein at a minimum mining width of 3 feet, the precious metal value would equate to $495 ÷ 6 or $82.50/ton. This should be considered the maximum value to expect based on the sampling technique. The vein appears to pinch rapidly both up- and down-dip.

This prospect is typical of many in the region that appears to have been briefly examined, developed sufficiently enough to produce a few tons of marginal to economic grade material, then abandoned.

Shirlee Jean Nos. 1 and 2 (N-1355)

The Shirlee Jean claims were identified from claim papers found in discovery monuments still in place on the property. Shirlee Jean No. 1 was posted on 27 May 1939 by Kurth E. and Henry C. Wiedow, and witnessed by Wm. J. Lange. It is described as being 1500 feet in an east-west direction and 600 feet along a north-south direction. Shirlee Jean No. 2 was posted on 24 August 1939 by Clifford H. Cunningham, Henry C. and Kurth E. Wiedow. It adjoins Shirlee Jean No. 1 along its southern boundary.

The property is located in the NW1/4, NE1/4, NE1/4 and the SW1/4, NW1/4, NE1/4 of Sec. 3, T22S, R41E, MDB&M. It is shown as N-1355 on Figure 9.

It is developed by two small prospect pits, one on each of the claims, only one of which showed sufficient mineralization to warrant sampling. This sample was taken from the pit on Shirlee Jean No. 1, and is representative of a 2-inch-wide quartz vein which dips 35 degrees southwest and strikes N74W. The quartz had limonite and chrysocolla fracture staining and minor amounts of pyrite and chalcopyrite.

The assay value for gold on this sample was 0.180 troy-oz/ton or $90/ton which indicates no economic potential on a vein this size. A complete list of assay results are given in Appendix A. There is no geologic reason to expect this vein to increase in size or value with depth.

Redwing (N-1356)

The NOTS legal archives lists this property as the Redwing No. 1-3 and as validated mining claim no. 445. It was owned by Ralph E. Blewett (date unknown) prior to Navy acquisition. The Redwing is situated on the north side of Mountain Springs Canyon 0.9 mile northeast of the canyon mouth and is placed in the NE1/4, NE1/4, NE1/4, Sec. 18, T23S, R41E, MDB&M, as shown on Figure 9.

The host rock for this deposit is Mesozoic diorite which is severely altered with clay, chlorite, and minor sericite throughout the workings. Clay is present as a feldspar decomposition product and as 1- to 2-inch seams. Scattered narrow fractures and joints contain vug-filling calcite crystals and minor limonitized clay filling.

The operator apparently prospected for precious metals at this location using two different geologic targets:

1. The operator drifted and drove raise along dark gray to black fine-grained spessartite dikes. These dikes strike northwesterly, dip from 75 degrees east to vertical and range from 2 to 3 feet in width. The dike contacts with the host rock proved barren.

2. Numerous shear zones were interesected and followed in the workings. These range from a few inches to 3 feet in width, strike northeasterly and dip from 40 to 68 degrees westerly. One shear zone dips easterly. The shear zones consist mainly of clay, chlorite, minor sericite, and fracture coatings of white calcite. Quartz lenses are scattered sparsely along the hanging wall sides of the shears. These range from 1 inch to 0.7 foot in width, while averaging 3 inches wide, and rarely exceed 5 feet in strike length. The quartz contains scattered limonite as fracture coating and minor crystalline siderite.

The Redwing workings consist of an upper level (Figure 113a) with 1158 feet of drifting, a 61-foot decline, one 25-foot baldhead raise, one 30-foot raise that intersects adit 3 of the "Reconstruction" property (Figure 100), and a 7-foot raise that connects to a lower drift level. The lower level is shown by Figure 113b and was driven a total of 355 feet.

A shaft, now collapsed, is situated northeast of the lower adit portal near the Mountain Spring wash bed. An estimate of the shaft tailings dump volume amounts to 2878 cubic yards of material removed. If the shaft and associated workings were driven 8 feet wide and 8 feet high, a minimum of 1214 feet of workings could have been driven. The tailings volume estimate is a minimum since the dump lies in Mountain Springs Canyon was and it appears to have been partially removed by flashflooding.

The potential for a commercially viable precious metal deposit is nil at this location. Because the small amount of quartz present is free of pyrite and chalcopyrite or other evidence typical of trace gold mineralization, no samples were taken and there is no geologic evidence underground or on the surface to indicate targets worthy of further exploration or development.

Alice Lode (N-1401)

The Alice Lode is listed as property number 407 in the NOTS legal archive files of validated mining claims. The lode was last claimed by C. Wiedow.

The lode is situated 1.8 miles west of the eastern Base boundary and 11.5 miles northwest of Trona, Calif., as shown on Figure 10. The property is placed in the NE1/4, SW1/4, SW1/4, Sec. 21, T23S, R42E, MDB&M.

The Alice Lode consists of a single caved shaft driven down-dip to explore the mineral potential of a shear or fracture zone in a Mesozoic granite host rock. The granite is equigranular, medium-grained and light gray. It is cut by irregular aplite dikes and a number of 2- to 6-inch stringers of quartz-rich alaskite with various orientations.

The shear zone at the shaft site is 6 feet in width, has a strike of N60W and dips 53 degrees southwesterly. The shear is composed of intensely fractured granite with limonite staining and minor clay. No quartz or other mineralization is visible within the shear zone in its limited exposure at the shaft collar. Scattered piles of massive white to glassy quartz are located on the shaft dump. The quartz contains cuprite, massive pyrite, chrysocolla, malachite, pods of specular hematite, limonite fracture-filling and scattered pyrolusite dendrites

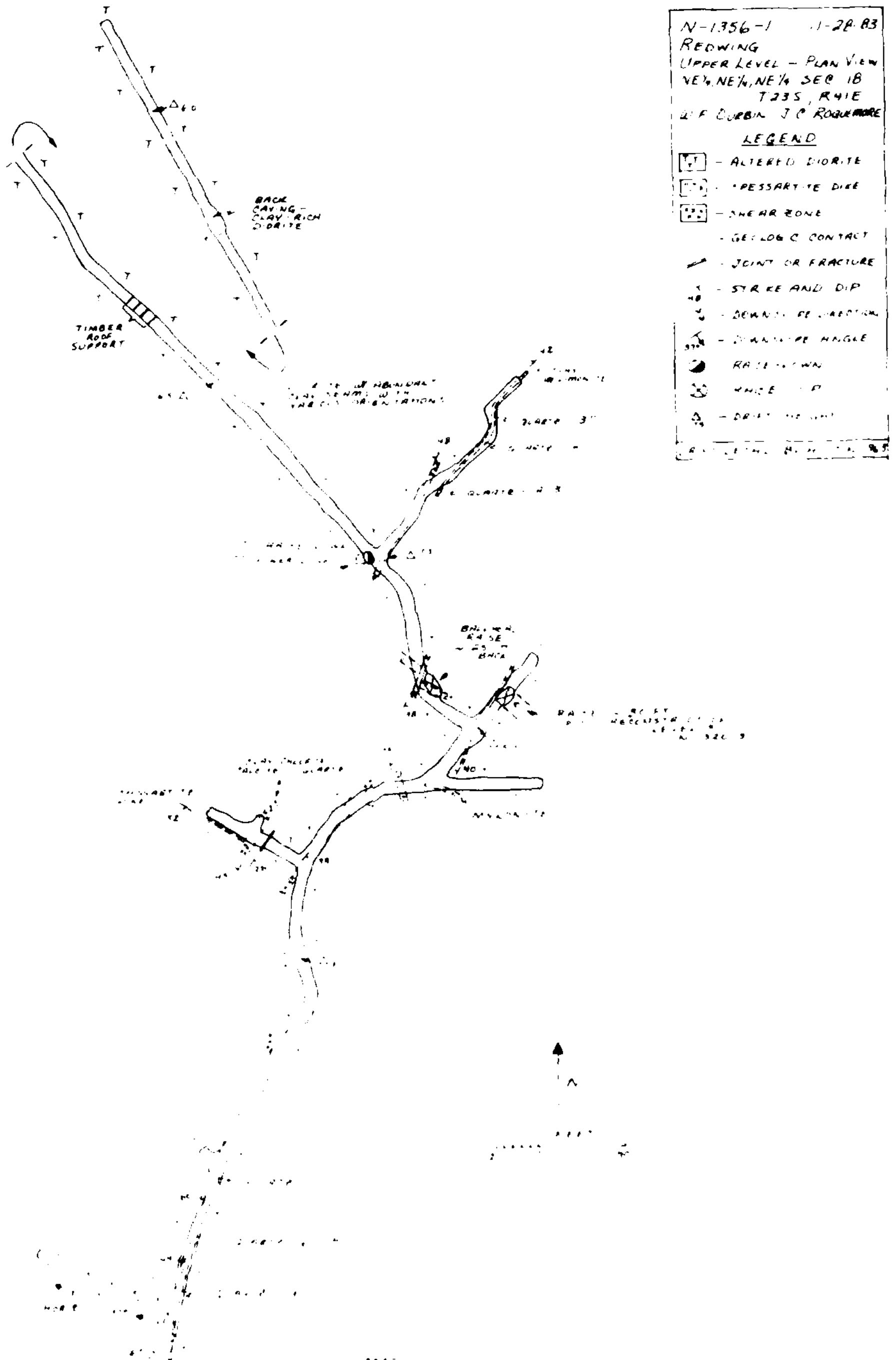

Figure 113a. Plan view of upper level at Redwing.

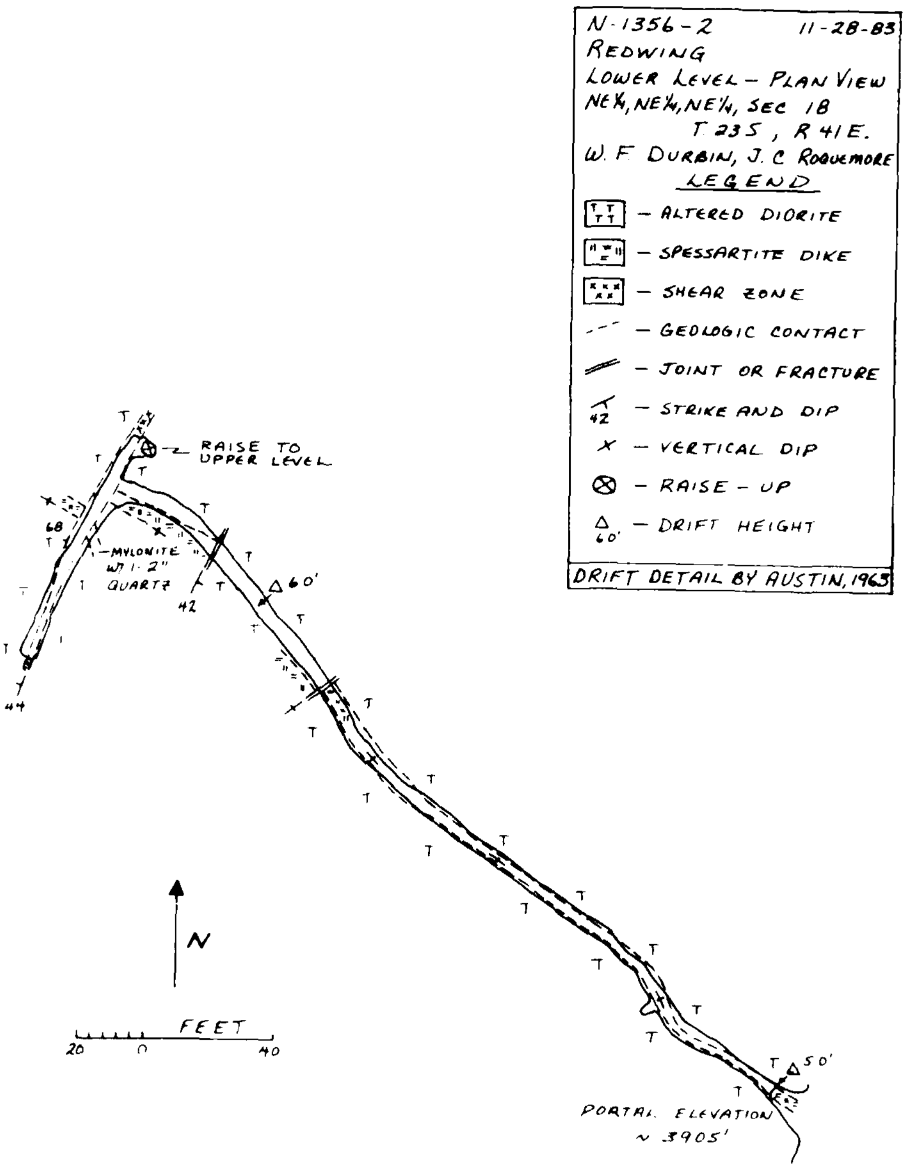

Figure 113b. Plan view of lower level at Redwing.

along fractures. Sample N-1401 was collected from the quartz material on the dump that contained the heaviest concentrations of minerals. The complete sample assay results are presented in Appendix A and precious metal values are listed in Table 38.

TABLE 38. Precious Metal Values for the Alice Lode Sample.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1401	0.360	180	2.76	41.40	221.40

The assay results for this sample indicate a moderate precious metal value that should be considered the maximum value probably present.

There is no expression of a major shear zone (only minor jointing) in the granite outcrops found along the shear zone strike. The lack of in-place quartz mineralization in the exposed shear zone indicates that the quartz veining is in lenses that pinch and swell.

Measurements of the mine dump volume indicate that approximately 2750 cubic feet of material were removed. If the shaft was sunk consistently 6 by 6 feet, it could have been 76 feet deep.

There was, perhaps a small exposure of modest grade mineralization made at the Alice Lode, but the results of field examination indicate that the mineralization is probably limited to narrow and discontinuous quartz bodies. The extent of down-dip mineralization is uncertain but the potential for mineralized zone development along strike is limited to no more than a few feet to the northwest or southeast of the shaft.

Golden Trio Nos. 1 and 2 (N-1402) and the Golden Trio Mill Site (N-1403)

The Golden Trio claims (NOTS Condemnation Case Numbers 404-5) and mill site (NOTS Condemnation Case No. 408) were owned by Edith M. and Wm. J. Lange, C. and H. C. Wiedow. They are located in the Bircham Springs area approximately 5.3 miles north-northwest of Argus Peak and 3 miles south-southwest of Margaret Ann Spring; they are shown in Figure 10 as N-1402 and N-1403. The workings are found in the N1/2, SE1/4, NW1/4, Sec. 20, the mill site is in the SW/1/4, NW1/4, SW1/4 of Sec. 17, both of T22S, R42E, MDB&M.

The workings explore small quartz veins in decomposed Mesozoic granodiorite. The granodiorite in this area is capped by a Cenozoic basalt flow. Quartz float is abundant along the hillside, however, no outcropping vein was found; the float size indicates a vein thickness of up to 2 to 3 inches. The quartz has minor limonite as fracture coatings. A surface sample, N-1402, of quartz with the highest available limonite content was taken, assay results are indicated in Table 39.

TABLE 39. Assay Results for the Gold Trio.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1402	0.005	2.50	0.03	0.45	2.95
N-1403	0.940	470.00	1.03	15.45	485.45

The property was explored by a short adit and five scattered prospect pits. The workings are shown on Figure 114, a layout map of the claim area. The adit is preceded by a 30-foot-long trench that strikes S61E and, although the portal was partially caved, one could see it was approximately 12 feet long, 4 feet wide and 5 feet high. No vein or shear zone could be seen along the ribs of the drift or in any of the prospect pits.

The mill site was found near the remains of a house and a barn. The site consisted of a well, a small dry washer, and a stamp mill platform. A concentrate sample was taken from the remains of a truck bed. Assay results for this sample, N-1403, are shown in Table 39.

One can at least surmise after examining these values that the operator must have had a good method for concentrating the mineral values from the material used. The quartz at the deposit is too disseminated and the values are too low to be of commercial value.

Little Star I (N-1405)

Examination of a discovery monument still in place disclosed a Notice of Location posted by John B. Hovis and named the claim the Little Star I of the Argus Mining district in Inyo County. The claim was filed 6 April 1940 and witnessed by George Wiedman and E. C. Washmuth, owners of the Great Divide claim group. Also noted on the form was the claim's former owner, Doug Graham.

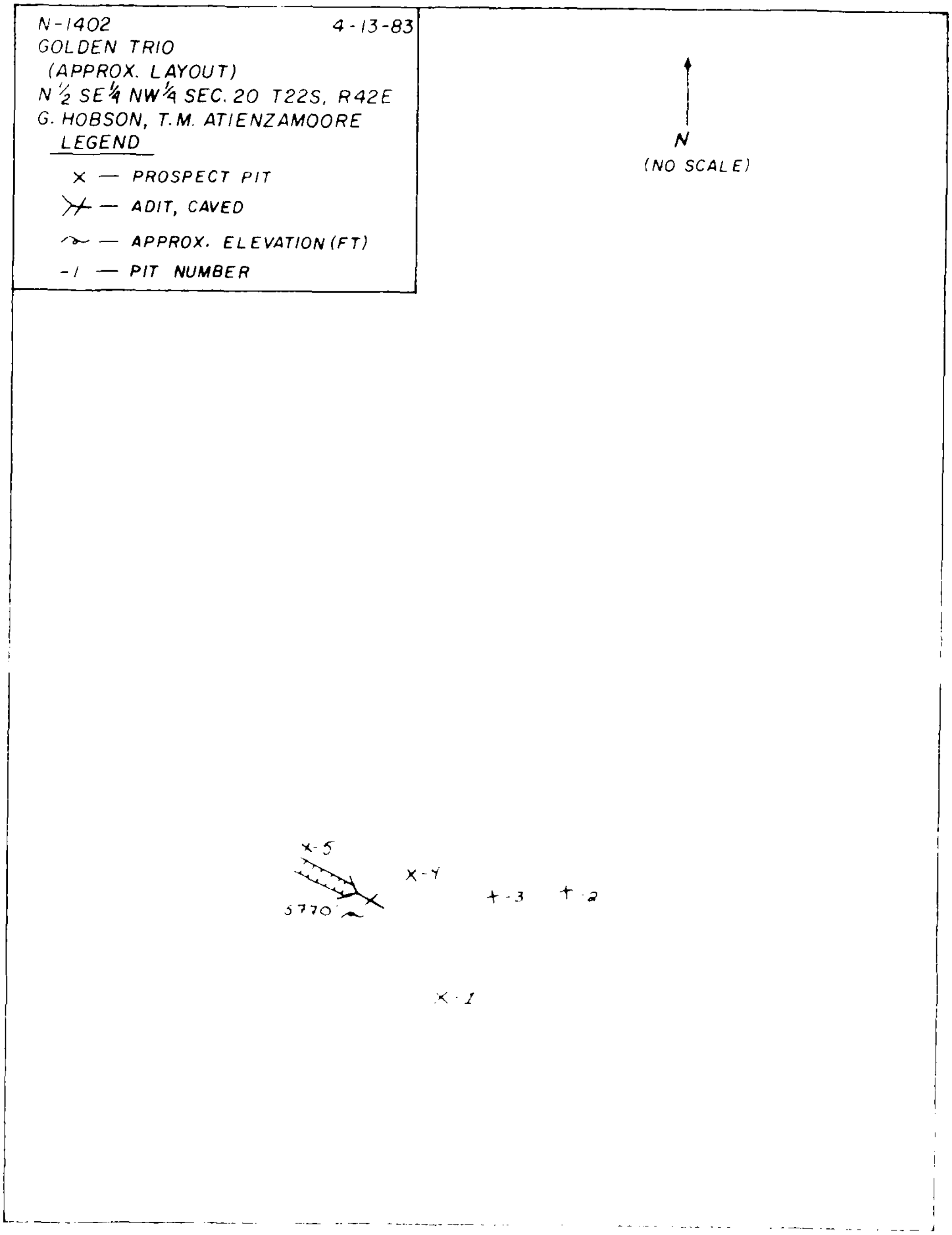

Figure 114. Surface plan view of the Golden Trio Claims.

The property is located approximately 1.7 miles southwest of Quail Spring, 2.4 miles northwest of Argus Peak and 2.8 miles west of the Ruth Mine. It is found in the SW1/4, SW1/4, SW1/4, Sec. 33, T23S, R42E, MDB&M. It is shown as N-1405 on Figure 10. This site may have been overstaked by E. C. Washmuth as the Great Divide Extension No. 4 (NOTS Condemnation Case No. 466).

The host rock is a decomposed Mesozoic quartz diorite. The claim, with two small prospect pits, is along an outcrop of quartz which is 4 to 5 feet wide in an east-west direction and 50 feet along a strike of N32E. The vein parallels an aplite dike which can be seen along the next ridge to the west; both are cut off to the north by a northwest-trending fault. The quartz has heavy iron staining as hematite along the fractures and sparse blebs of specular hematite.

A sample of this vein material was taken, and its assay results can be found in in Appendix A. The sample shows no commercial values for precious metals and there is no geologic reason to expect values to increase with depth.

Summit Lode (N-1406)

The Summit Lode (NOTS Condemnation Case No. 433) was owned by E. O. Graves. It is located approximately 1.5 miles northwest of Bircham Springs and 0.5 mile east of the intersection of Mountain Springs Canyon, Junction Ranch and Bircham Springs roads in the NE1/4, NW1/4, NE1/4, Sec. 18, T23S, R42E, MDB&M at an elevation of 5675 feet. Figure 10 shows this site as N-1406.

The property was explored by a prospect pit, 10 by 8 by 5 feet deep, which exposed a quartz vein along a 1.3-foot shear zone, which strikes N25W and dips 60 degrees southwest. The pit is located along a northeast-trending ridge, no mineralization could be seen to either side of the ridge. The quartz had minor amounts of hematite and chrysocolla as fracture coatings, and sparse pyrolusite dendrites. Quartz on the "high-grade" pile also contained anglesite with minor galena, and separately, minor blebs of specular hematite could be seen in the quartz. A sample of the "high-grade" pile was taken, assay results are shown in Table 40.

TABLE 40. Assay Results for Sample Number N-1406.

Gold		Silver		Total precious metal values,
Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	$/ton
0.320	160.00	1.579	23.69	183.69

The quartz occurs as a pinch and swell vein along a shear zone which makes the values irregular and the highly mineralized center portion of the vein had apparently been extracted. Along the sides of the pit the vein had narrowed to 4 inches and showed only minor mineralization. Following along the strike of the shear zone, no other mineralization could be seen beyond the small ridge. Although modest values are present the potential is slight due to the insignificant tonnage present.

Shower of Gold (N-1407)

George D. Wiedman is listed as the owner of the Shower of Gold claim (NOTS Condemnation Case No. 458) which is shown on Figure 10, a location map, as N-1407. It is reported to be in the NE1/4, NW1/4, SE1/4, Sec. 31, T23S, R42E, MDB&M.

A search of this area turned up a claim marker, located along a small intermittent stream channel. A minor amount of placer activity is evident in the channel. No commercial potential exists at this site and no samples were taken of this small accumulation of alluvial material.

Rudy and Rudy No. 2 (N-1408)

The Rudy claims (NOTS Condemnation Case Numbers 459 and 460) were owned by George D. Wiedman. The site is shown as N-1408 on Figure 10, a location map of the area, and is found in the NW1/4, NE1/4, SE1/4, Sec. 32, T23S, R42E, MDB&M. Access is difficult, the area is reached by Bircham Springs Road which is frequently washed out and 3 miles of jeep trail which is difficult to follow. The trail across the draw leading to the mine is long gone and great care must be used in picking your way down into the draw and up to the last 0.5 mile of the mine access road. Other claims owned by Mr. Wiedman are either adjacent to the Rudy claims or overlap them. These are the Great Divide Nos. 1, 2, and Fraction (NOTS Condemnation Case No. 461-2).

The working is developed on the outcrop of an altered felsite dike which strikes N39W and dips 64 degrees southwest through Mesozoic quartz diorite. The dike shows strong interstitial iron staining. No quartz vein was visible at the surface or in the walls of the shaft that could be seen from the surface.

The property was explored by a 5- by 5-foot shaft, inclined at about 75 degrees to the southwest. The shaft, which was not entered due to safety considerations, is 12 feet deep and appears to have two drifts heading from it in both north and south directions. The dump represents only about 20 cubic yards of unbroken rock so that a maximum of 12 feet of 4- by 5-foot drift is indicated.

A "high-grade" pile near the dump was the source of the sample taken at this site. The material was quartz which had limonite as fracture coatings. The size of the pieces indicates a 3- to 4-inch quartz vein. The quartz also contained sparse 1/8-inch chalcopyrite crystals, which had some chrysocolla staining around them, and 1/4-inch crystal masses of galena. The assay results for this sample are given below in Table 41.

TABLE 41. Assay Results for the Rudy Lode Sample.

Gold		Silver		Total precious metal values, $/ton
Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
0.008	4.00	12.80	192.00	196.00

Even though precious metal values for silver look encouraging the following should be taken under consideration. The size of the vein material in the stock pile indicates a maximum vein width of 4 inches. Mining the vein at a 3-foot width reduces the value of the rock to $21.78/ton which indicates this property has no commercial value.

Unnamed Prospect (N-1409)

The area is located 1.3 miles north-northwest of Bircham Springs and 1.6 miles east of the intersection of Mountain Springs Canyon, Junction Ranch and Bircham Springs roads. It is shown as N-1409 in the SE1/4, SW1/4, SE1/4, Sec. 8, T23S, R42E, MDB&M on Figure 10. A dry washer was found at this site. The operation appeared to be placering efforts covering intermittent stream channels in parts of Sec. 8, 17, and 18. All of these channels appeared to have been worked extensively.

The placer operations are in stream gravels created after the last pluvial period. The source of the gold placer is probably scattered gold-bearing quartz veins in the Mesozoic granitics to the west. In addition to, or in lieu of, recovering gold, the operator may have actually been collecting hematite cobbles, which are fairly abundant in this region, to sell as flux to the former Darwin smelters. Due to the widespread prior disturbance or mining of the gravels in the area no appropriate undisturbed sampling location could be found and no potential for unworked deposits appears to exist.

Unnamed Placer Prospect (N-1410)

The site is located along an intermittent wash in the SE1/4, SW1/4, NE1/4, Sec. 16, T23S, R41E, MDB&M and is shown as N-1410 on Figure 10. Figure 115 shows an approximate layout of the site. A series of riffles was constructed in the stream channels using basalt cobbles, possibly to act as a concentrator for placer gold or other heavy minerals. It does not appear to have been used, however.

The stream channel drains a small area of basalt capped mesas underlain by Mesozoic grantic intrusives, and a broad valley, which is covered, primarily, by basalt rubble. The gravels in the channel are made up predominately of basalt, but also contain 1- to 2-inch fragments of quartz, epidote, and a variety of granitics. The valley itself is an older drainage basin that ultimately feeds into Homewood Canyon. It is these older channel deposits that are the major source of whatever placer deposits are now present as modern flashflood gravels.

The site may have the potential for a limited, one time production along the area partly readied for mining. However, the values would not regenerate themselves due to the limited surface exposure of the source materials, the size of the drainage basin and the low water flow.

Unnamed Placer (N-1415)

This site is located in the NW1/4, NW1/4, NE1/4, Sec. 19, T23S, R42E, MDB&M and is shown as N-1415 on Figure 10. Field investigations turned up a discovery monument with an illegible notice. The monument was near an intermittent stream channel which had been extensively dry washed approximately 0.2 mile downstream of the monument, and small, occasional, disturbances could be seen closer to the monument. The placer source is undoubtedly scattered minor gold-bearing quartz veinlets in the weathered granitics to the west; however, no quartz veins were seen in the outcrops immediately west of the monument. No samples were taken since the area had been extensively worked and it is believed that 33 years is an insufficient period for the regeneration of economic placer values in modern flashflood channels of this type.

Silver Gold No. 1 and 2 (N-1416)

The Silver Gold claims (NOTS Condemnation Case No. 463-4) were owned by Norma M. Lengel. They are shown as N-1416 on Figure 10. The site sits on, or near, the section line separating Sections 28 and 33. It will be described here as the NW1/4, NW1/4, NW1/4, Sec. 33, T23S,

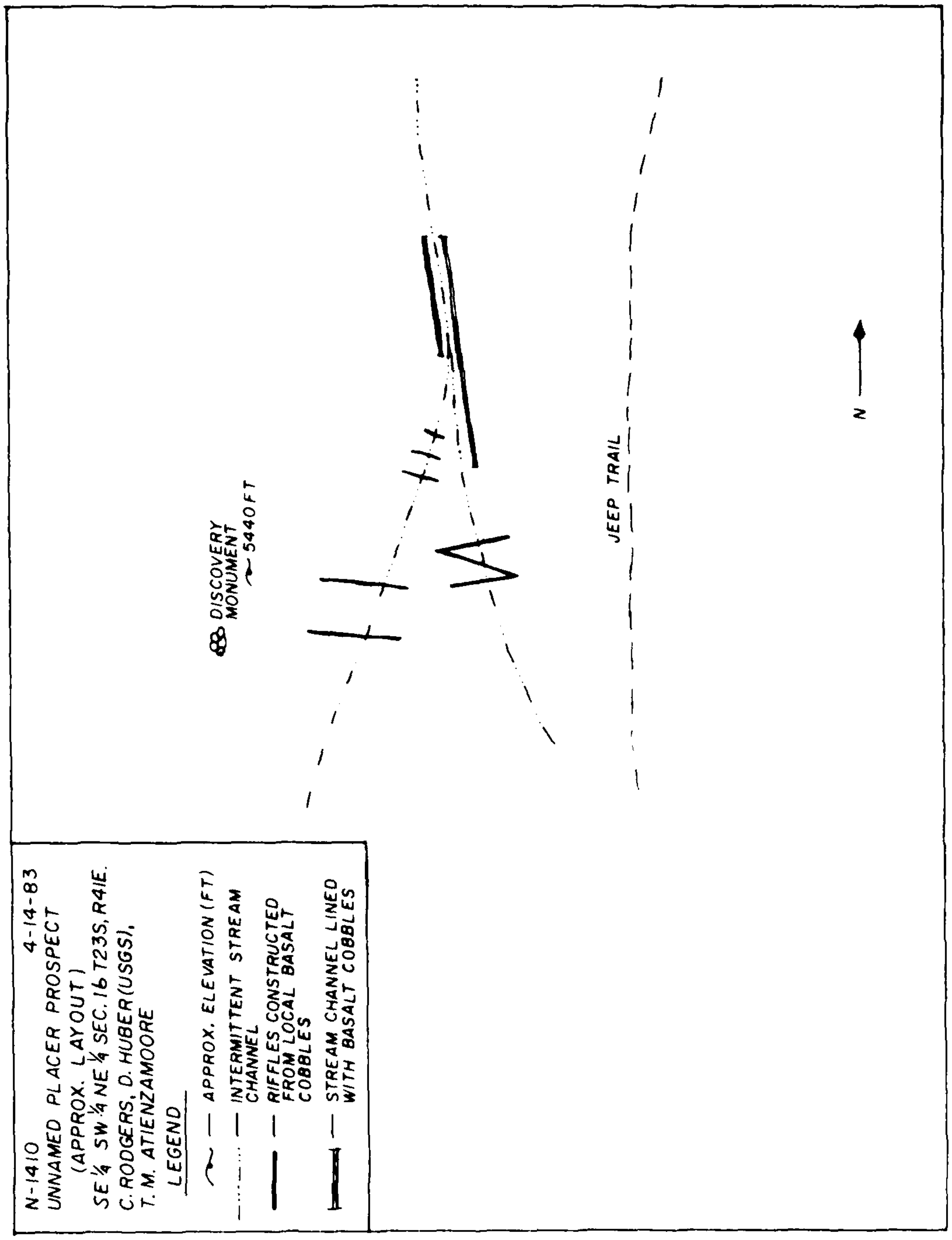

Figure 115. Surface plan view of placer prospect N-1410.

R42E, MDB&M, at an approximate elevation of 5560 feet. Access to the area is extremely difficult, as the trails along the bottom of the various canyons leading to the site have been washed out many times during the past 30 years.

The host rock is Mesozoic quartz diorite which has been decomposed by surface weathering. The mineralization occurs in quartz lenses along a N68W-trending shear zone which dips 85 degrees northeast. The quartz contains sparse clusters of pyrite and, separately, galena crystals, with the pyrite clusters being no more than 1/4 inch in diameter, and fracture coatings of predominantly chrysocolla with minor linarite (?).

The property was explored by an adit with a bearing of S68E that has been caved to the surface some 30 feet in from the portal. The dump indicates a total length of no more than 50 feet. Approximately 4 feet of the shear zone is visible at the cave-in. At this point the shear zone is 16 to 18 inches wide and contains no visible quartz. A "high-grade" pile atop the dump was sampled. The size of the pieces in this pile indicates a maximum vein width of 4 to 6 inches. Assay results for this sample are shown in Table A-1. These assays indicate a submarginal commercial potential for this narrow vein.

Unnamed Prospect (N-1417)

This prospect is on the north side of the road leading to Margaret Ann Spring, approximately 0.1 mile northeast from the benchmark, with an elevation of 5611 feet. It is shown in Figure 10 as N-1417 and is located in the NW1/4, SE1/4, NE1/4, Sec. 7, T23S, R42E, MDB&M.

The property was explored by a 10- by 10-foot pit that is 6 feet deep and exposes a 0.7-foot-wide quartz vein that parallels an aplite dike in Mesozoic granodiorite. The vein strikes N73W and dips 84 degrees to the northeast. The quartz contains minor chalcopyrite and limonite as fracture coatings.

The assay value on the sample taken is shown in Appendix A. This prospect has no commercial value as a precious metal deposit.

Undeveloped Prospect (N-1418)

This site is on the trail to Margaret Ann Spring, approximately 1.5 miles west-southwest of Margaret Ann Spring and 1.9 miles northeast of the intersection of Mountain Springs Canyon, Junction Ranch and Bircham Springs roads. It is located in the SW1/4, NE1/4, SW1/4 of Sec. 5, T23S, R42E, MDB&M and is shown on Figure 10.

A discovery monument is located on a small ridge of Mesozoic granodiorite which is cut by six 2- to 4-inch quartz veins all trending northwest and dipping northeast. The quartz veins have varying degrees of limonite as fracture coatings. The outcrop is not traceable for more than 25 feet along the trend of the veins.

No samples were taken because the quartz present is free of pyrite, hematite or other evidence typical of trace gold mineralization. There is no commercial potential at this site based on this lack of mineralization, the limited extent of the quartz lens themselves and the difficulty of access.

Homewood Canyon Prospects (N-1803)

These workings are located approximately 1 mile southwest of the Ruth Mine in Homewood Canyon along the eastern front of the Argus Mountain Range. The property is shown as N-1803 on Figure 10 and is located at an approximate elevation of 3600 feet in the NW1/4, NE1/4, NE1/4 of Sec. 3, T24S, R42E, MDB&M.

The area was explored with two short adits. The lower adit bears S27W and explores the lower contact of an aplitic dike and the Mesozoic granite intrusive. The dike strikes N77W and dips south at 34 degrees. The lower contact consists of a 1.5- to 2-foot argillaceous zone with 1 to 2 inches of limonite staining along the outer margin. The adit is muckbound 24 feet from the portal but it appears to have been only a few feet longer.

The upper adit, located 65 feet up slope from the first, bears S6E and is caved to within a foot of the portal. The adit is preceded by a 36-foot-long trench. The only sign of possible hydrothermal activity at this site is a narrow limonite-stained fracture that strikes N6W and dips 74 degrees west at the portal. The mine makes a small amount of water. A 1.5 inch plastic pipe (with audible running water) extends from beneath the cave-in and heads downhill where it joins the pipeline that provides water to the community down the canyon.

No identifiable mineralization, beyond the minor limonitization noted above, was found and no samples were taken. No commercial potential exists at this site.

WILSON CANYON AREA

Unnamed Prospect (N-1701)

This 18-foot long prospect adit is located in the SE1/4, SW1/4, NW1/4 of Sec. 5, T24S, R41E, MDB&M, and is shown as N-1701 on Figure 9.

A limonite stained quartz vein strikes N76W with a dip of 33 degrees southerly and varying 3.5 to 4.0 feet thick. The country rock is highly decomposed biotite quartz diorite. Two samples were taken, one off of the northeast wall and a second off of the dump. Assay results are shown in Appendix A. Neither of the two samples taken indicate economic potential.

Star of the West Lode Claims

The Star of the West Mining and Milling Company owned seven claims in the Sherman and Custer Mining Districts (also known as the Argus District) of Inyo County, Calif. These claims were patented (Patent No. 068005, Serial No. 05580), 14 June 1922, and included the Star de West, Peerless, National, Pierce Arrow, Winton, American, and Reo Lode Mining Claims. A mineral survey conducted by B. E. Sherwin, U.S. Mineral Surveyor, in June 1915 shows the locations of the claims and their workings. Figure 116 is an updated location map showing the reference numbers used in the current survey. The claims are located in portions of Sections 4, 5, 8, and 9, T24S, R41E, MDB&M; they cover a majority of the north side of Wilson Canyon and the Wilson Mesa area.

The descriptions given below, of the exploration and development on the property, come from Sherwin's Field Notes (Mineral Survey No. 5177 of the Independence Land District/Field Notes of the Survey of the Mining Claim of "Star of the West Mining and Milling Company" by B. E. Sherwin, U.S. Mineral Surveyor). Updated descriptions are given under the claim names and the appropriate NWC reference number, which is found in parentheses next to Sherwin's reference number.

Star de West

No. 1 (No NWC reference number)	The discovery point of the Star de West Lode ...
No. 2 (Caved, no reference number)	A cut 4 feet wide, ..., runs N54° 38'E. 13 feet to mouth of tunnel, 4 x 6 feet, thence in tunnel, same course 43 feet to face.
No. 3 (Caved, no reference number)	Cut and Tunnels, ... cut bears... S79°20'E. 14 feet to mouth of tunnel, 38 feet to sta. f. an incline, thence S55E. 13 feet to sta. h., junction of tunnels, thence S86°E 21 feet to portals, thence S86°E 31 feet to sta. j., east tunnel, thence N47E 50 feet

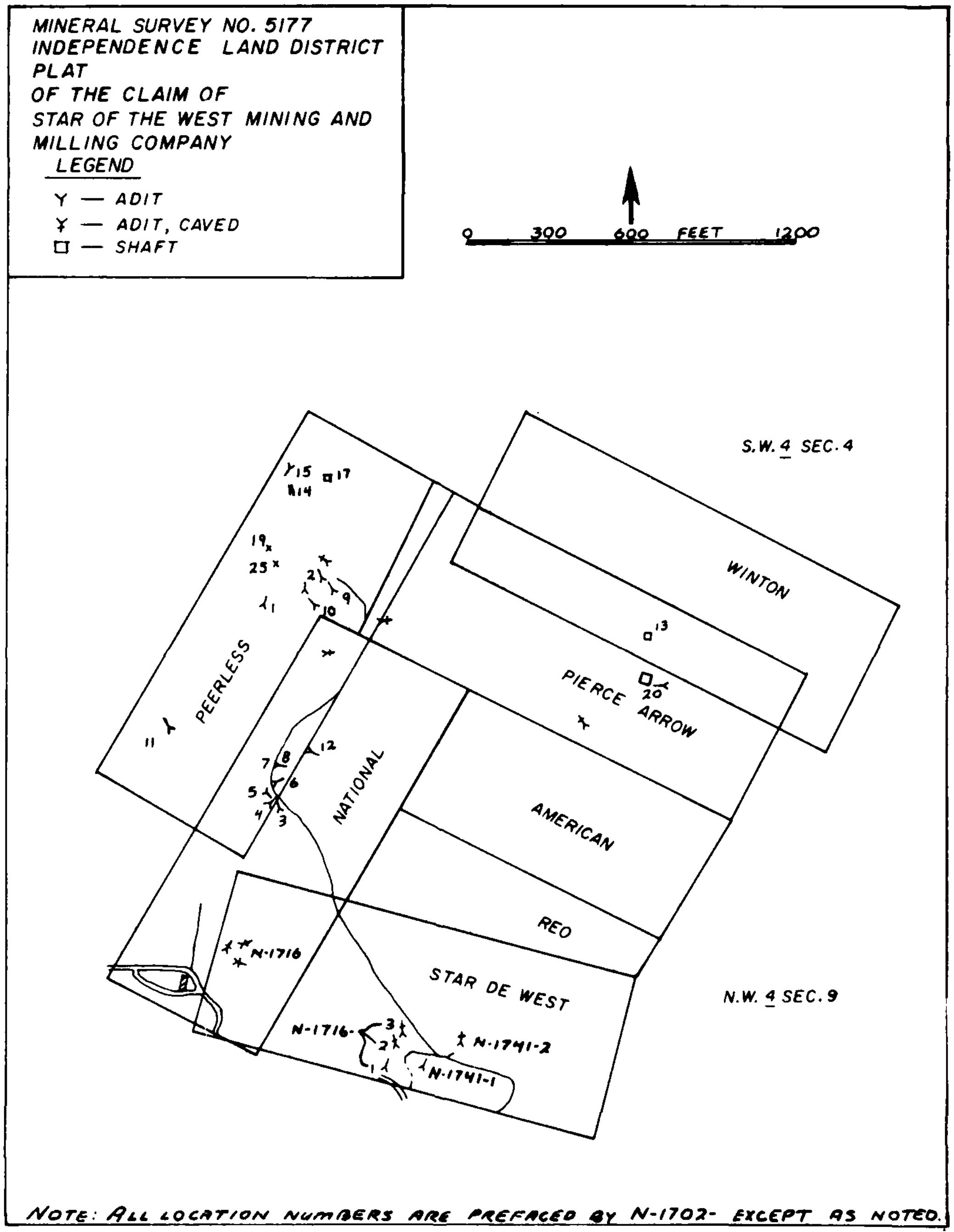

Figure 116. Updated claim map with site locations, Star of the West.

	to face of incline 4 x 5 feet, also from sta. f. S46W 83 feet on 45-degree slope to bottom of incline 4 x 6 feet, also from sta. h., S5W 19 feet thence S55E 16 feet to face of tunnel 4 x 6 feet, also from sta. h., N10E 22 feet on 19-degree slope to face of stope, also from sta. j. S75E 21 feet to face of tunnel.
No. 4 (Caved, no reference number)	Cut and tunnels, ...N33E 16 feet to portal of tunnel, thence S73E 19 feet to sta. t., incline from tunnel, S36E 10 feet to face of tunnel 4 x 6 feet, also from sta. r. N33E 23 feet to top of incline, also from sta. t. N62E 17 feet to top of incline.
No. 5 (Caved, no reference number)	Cut and tunnel, ...N28°30'E 24 feet to portal of tunnel, 70 feet to face of tunnel 4.5 x 6 feet.
No. 6 (N-1716-1)	Cut and tunnel, ... N29°30'E 27 feet to face of cut 4 feet wide and 12 feet high 42 feet to sta. h., thence N23°50'W 9 feet to sta. c., at winze on south side, thence N3E 27 feet, thence N49W 34 feet, thence N29W, 32 feet to face 4 x 6 feet, also winze at sta. c., 48 feet deep with crosscut at 31 feet deep, 34 feet on north and 10 feet on south.
No. 7 (N-1741-1)	Cut and tunnel, ... N17°10'W 14 feet to face of cut 5 feet wide and 8 feet high, ... N46W 45 feet to face of tunnel 4 x 6 feet.

No. 8 (N-1716-3)	Cut and tunnel, ... N9°30'W 14 feet to face of cut 4 feet wide and 14 feet high, ... N42W 24 feet to face of tunnel 4 x 6 feet.
No. 9 (N-1716-2)	Cut and tunnel, ... N9E 14 feet to face of cut 5 feet wide and 8 feet high, 38 feet to face of tunnel 4 x 6 feet.

Peerless

No. 1 (No reference number)	The discovery point of the Peerless Lode ...
No. 2 (N-1702-2, Levels 3 and 4)	Cut and tunnel, ... N25W 24 feet to face of tunnel, thence in tunnel same course 122 feet to sta. a., thence N21°30'W 44 feet to sta. b., thence N8W 30 feet to face of tunnel, 4 x 6 feet, also from face of cut, N46°30'W 112 feet to sta. d., thence N47°30'W 30 feet to sta. i., therce N22°10'W 36 feet to face of tunnel 4 x 6 feet also from sta. a., S20W 45 feet in connecting drift to sta. d., also sta. d. West 22 feet to sta. f., and incline south at right angles to main drift 15 feet long, 42 feet to face of drift 4 x 6 feet.
No. 3 (N-1702-2, Level 5)	Cut and tunnel, ... N62W 45 feet to face of cut portal of tunnel, thence N34°30'W 95 feet, thence N3W 58 feet to face of tunnel 4 x 6 feet.
No. 4 (Not found)	Incline, ... West 12 feet to face 4 x 5 feet.
No. 5 (Not found)	Incline, ... S46W 42 feet to face 4 x 6 feet. Dip 10 degrees.

No. 6 (N-1702-15)	Cut and tunnel, ... S29W 18 feet to face of cut, 48 feet to face of tunnel 4 x 6 feet.
No. 7 (Not found)	Shaft ... 4 x 6 feet, 31 feet deep.
No. 8 (N-1702-2, Level 5)	Incline shaft ... incline connects with tunnel No. 3, shaft 4 x 6, 35 feet deep with a dip of 70 degrees.
No. 9 (N-1702-1, Level 2)	... shaft 4 x 6 feet, 23 feet deep.
No. 10 (N-1702-1, Level 2)	Tunnel, ... N5W 60 feet, thence N73W 38 feet to connection with shaft No. 9, thence 20 feet to face 4 x 6 feet.
No. 11 (N-1702-1, Level 1)	Cut and tunnel, ... N20E 24 feet to portal of tunnel, thence N20E 95 feet to sta. a., thence N31E 110 feet to face of tunnel 4 x 6 feet, also from sta. a., N61W 15 feet, thence N19W 34 feet to face of tunnel 4 x 6 feet.
No. 12 (N-1702-10)	Cut and tunnel, N46°40'W 12 feet to portal of tunnel, 75 feet to face of tunnel 4 x 6 feet.
No. 13 (No reference number)	Cut and tunnel, ... N81E 13 feet to portal of tunnel, 42 feet to face to tunnel 4 x 6 feet.
No. 14 (N-1702-12)	Cut and tunnel, ... N80E 19 feet to portal of tunnel, 31 feet to face of tunnel.
No. 15 (N-1702-9)	Cut and tunnel, ... N29W 13 feet to face of cut 7 feet high, 5 feet wide, 33 feet to face of tunnel 5 x 6 feet.

National Lode

No. 1 (No reference number) — The discovery point of the National Lode...

No. 2 (No reference number) — Cut and tunnel, ... N85°20'E 29 feet to face of cut 5 feet wide and 9 feet high, 37 feet to face of tunnel 5 x 6 feet.

No. 3 (No reference number) — Cut and tunnel, ... S85E 13 feet to face of cut 12 feet high, 32 feet to sta. 3, N1E 21.5 feet to face of drift 5 x 6 feet.

No. 4 (No reference number) — Cut and tunnel, ... N35E 15 feet to face of cut 14 feet high at face, 56 feet to face of tunnel, 4 x 6 feet.

No. 5 (N-1702-7) — Cut and tunnel, ... S78°30'E 19 feet to face of cut 7 feet high, 24 feet to point, thence S33E to face of tunnel 4 x 5 feet.

No. 6 (N-1702-6) — Cut and tunnel, ... S85E 26 feet to face of cut 7 feet, tunnel 68 feet to point, thence south 78E 52 feet to face of tunnel 4 x 6 feet.

No. 7 (N-1702-4) — Cut and tunnel, ... N48E 21 feet to face of cut 8 feet high, 28 feet to point, thence N24°7'E 22 feet to face of tunnel 4 x 5 feet.

Pierce Arrow Lode

No. 1 (No reference number) — The discovery point of the Pierce Arrow Lode ...

No. 2 (N-1702-20) — ... shaft 4 x 7 feet, 29 feet deep with drift running NW 3 x 6 feet, drift running SE 10 feet, 3 x 6 feet.

No. 3 (N-1702-20)	Cut and tunnel, ... N81°40'W 24 feet to face of cut, 59 feet to point in tunnel, thence N60W 14 feet to face of tunnel 4 x 6 feet.
No. 4 (Not found)	Cut and tunnel, ... S37E 16 feet to face of cut, 34 feet to point in tunnel, thence S44E 16 feet to face of tunnel 4 x 6 feet.
No. 5 (Not found)	Cut, ... N46W 22 feet to face 6 x 6 feet.

Winton Lode

No. 1 (Not found)	The discovery point of the Winton Lode ...
No. 2 (Not found)	... shaft 4 x 7 feet, 6.5 feet deep.
No. 3 (Not found)	... dimensions of cut 3.5 x 10 x 2.5 feet.
No. 4 (Not found)	Cut, ... N52E 28 feet to face 4 x 3 feet.

American Lode

No. 1 (Not found)	Discovery shaft of the American Lode ... 4 x 7 feet, 6 feet deep.

Reo Lode

No. 1 (Not found)	The discovery shaft of the Reo Lode ... 4 x 6 feet, 7 feet deep.

In addition, there was a quartz mill, shown in Figure 117, a bunk house, a boarding house, a blacksmith shop, a tool house and an assay office. Only one of these buildings remains standing.

Figure 117. Star of the West Mill Site Looking South From the Trail Leading to the Main Mine Complex. (A) End of aerial tram line. (B) Stamp mill foundation. (C) Riffle table and cyanide tank. (D) Well.

The workings are all controlled by the same geologic structure. Von Huene[13] describes the geologic structure as follows, "One major and four minor faults occur in the Wilson Mesa area. The major fault, called the Wilson Fault, is generally parallel to Wilson Canyon with a N62W trend."

"Another fault of a similar trend is located in the southwest corner of the Wilson Mesa area and forms a lesser plane of weakness. The remaining faults in the Wilson Mesa area generally trend at right angles to the Wilson fault, and they form nearly vertical zones of crushed rock approximately 1 to 30 feet thick."

Mineralization occurs in the quartz filled joints and fractures of a Mesozoic quartz diorite host rock. The deposits are along trends that are consistent with regional tectonic stress patterns and are roughly parallel to the Wilson Canyon Fault. Many of the workings are along a prominent aplitic intrusion. Mineralization can be found in gouge along this contact as well as in quartz pinch and swell veins. Mineralized zones vary from 4 feet to 1 inch in width. Quartz occurs as blocky to brecciated veins with clay as fracture filling and along shear zones. The principal minerals include limonite and chrysocolla as random staining and fracture fill plus sporadic occurrences of bornite, covelite, pyrite, chalcopyrite, malachite and pyrolusite are also noted.

Star de West (N-1716)

The Star de West Lode mining claim consists of four prospects near the trail head to Star of the West. Another small group of prospects, reported by Sherwin to be situated above the mill, appears to have been totally destroyed. The prospects were covered by debris slides during heavy rains in 1978. The vein at this locality has been described as a highly fractured, chrysocolla stained quartz, about 1 foot in width. The lateral extent of the vein was undeterminable because of its discontinous nature. Descriptions of the workings are listed as Star de West Nos. 2, 3, 4, and 5. The underground working maps and descriptions of the remaining prospects are given as follows.

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[13]U.S. Naval Ordnance Test Station. *Geological Investigation of Wilson Mesa Hard-Rock Target Site*, by Roland Von Huene. China Lake, Calif., NOTS, 1956. (NOTS 1539, TPR 162, publication UNCLASSIFIED.)

The main workings of this prospect is 111 feet long as shown in Figure 118. Fifteen feet in front of the portal a 60-degree incline follows the vein down 27 feet. Seven feet before the bottom of the incline, another drift explores the vein. This drift has a total working distance of 50 feet. The main drift has three stopes and a small 11-foot drift. The prospect is located in the NE1/4, NW1/4, NW1/4, Sec. 9, T24S, R41E, MDB&M and is shown on Figure 9. The vein trends N50E and has a dip of 89 degrees south. Minor amounts of limonite and chrysocolla staining are present along the vein. Three samples were taken. Sample N-1716-1 was taken across a 1-foot vein, 8 feet from the face. Sample N-1716-2 was taken from a pillar in a stope 63 feet from the portal. Sample N-1716-3 was taken in the second level drift across a 1.4-foot vein. Assay values for this prospect, shown in Appendix A, indicate only one sample has commercial potential. N-1716-2, taken from the pillar, has a gold content equivalent to $250/ton, however, this property shows no economic potential beyond one time high grading of pillars.

Star de West Upper Workings (N-1741)

These sites are part of the Star de West claim. They are located along the lower end of the trail leading to the main complex at an approximate elevation of 3730 feet. Shown as N-1741 on Figure 9, they are found to occupy the NW1/4, NW1/4, NW1/4, Sec. 9, T24S, R41E, MDB&M.

The location was explored and developed by two short adits. The upper adit is inaccessible, the tailing pile indicates a maximum length of 10 feet of drift, 3 feet wide and 5 feet high. Sample N-1741-4 was taken from the "high-grade" pile found on this dump. The "high-grade" pile consisted of quartz with limonite and bornite fracture coatings. The lower adit, 24 feet long and shown in Figure 119, explores two lenses within the Mesozoic quartz diorite. The lens seen in the A-A' cross section is blocky blocky quartz with minor limonite as fracture coatings. Sample N-1741-1 represents this vein material. A 31-foot eastward driven cross cut intersected a second quartz lens, which has been severely fractured along a N74W striking and a 76-degree southwest dipping fault. This quartz shows intense limonite staining. Sample N-1741-2 represents this material. A grab sample, sample N-1741-3, was taken from the "high-grade" pile located on the dump of this working.

A complete listing of assay results in Appendix A indicates excellent precious metal values. However, this lens is mined out, as is shown on the C-C' and D-D' cross sections, except for one small pillar, approximately 1.6 cubic yards. There are no indications, in the immediate area, for other lenses with this degree of mineralization.

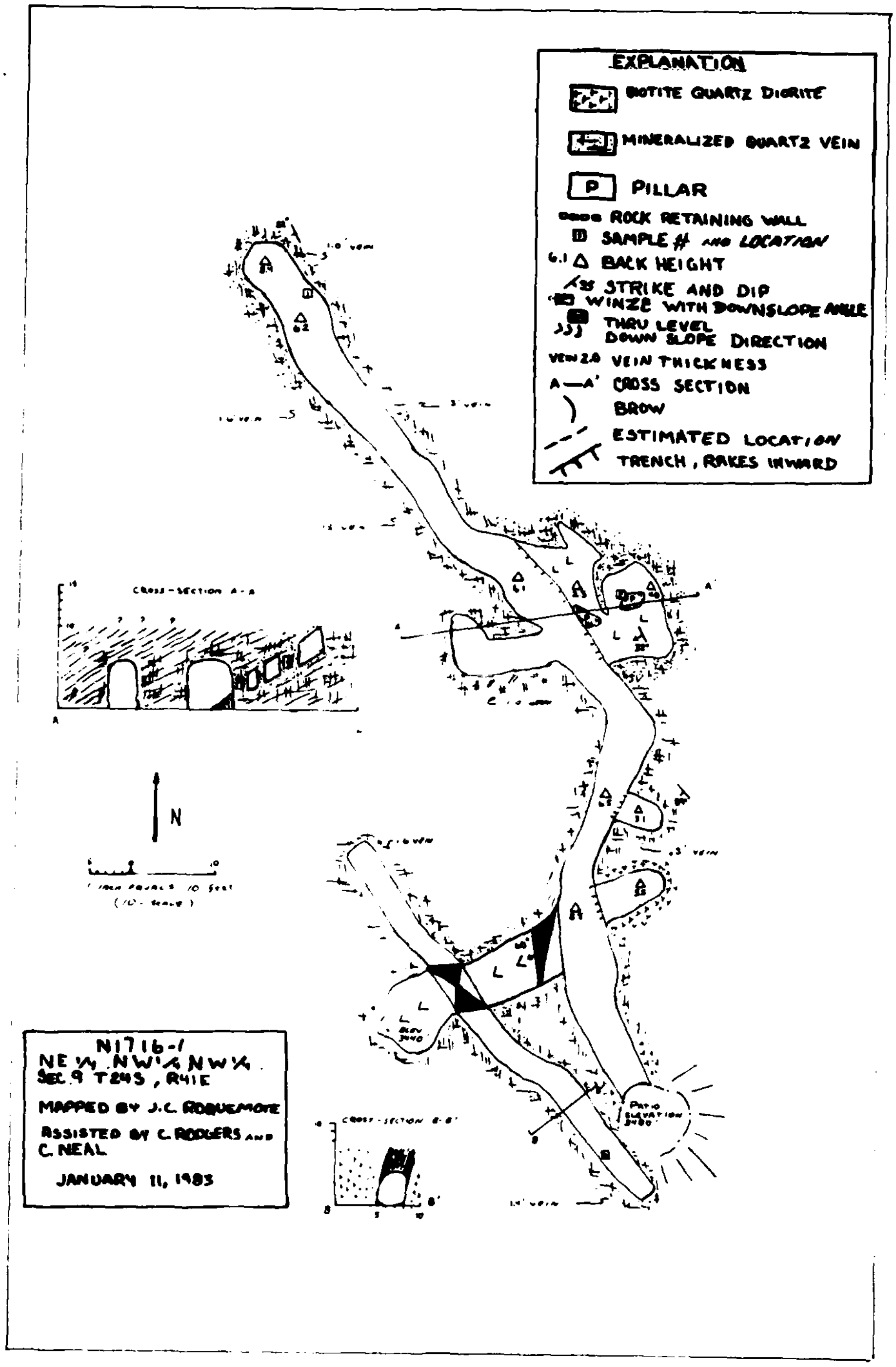


Figure 118. Map of main exposed workings at N-1716 (Star de West).

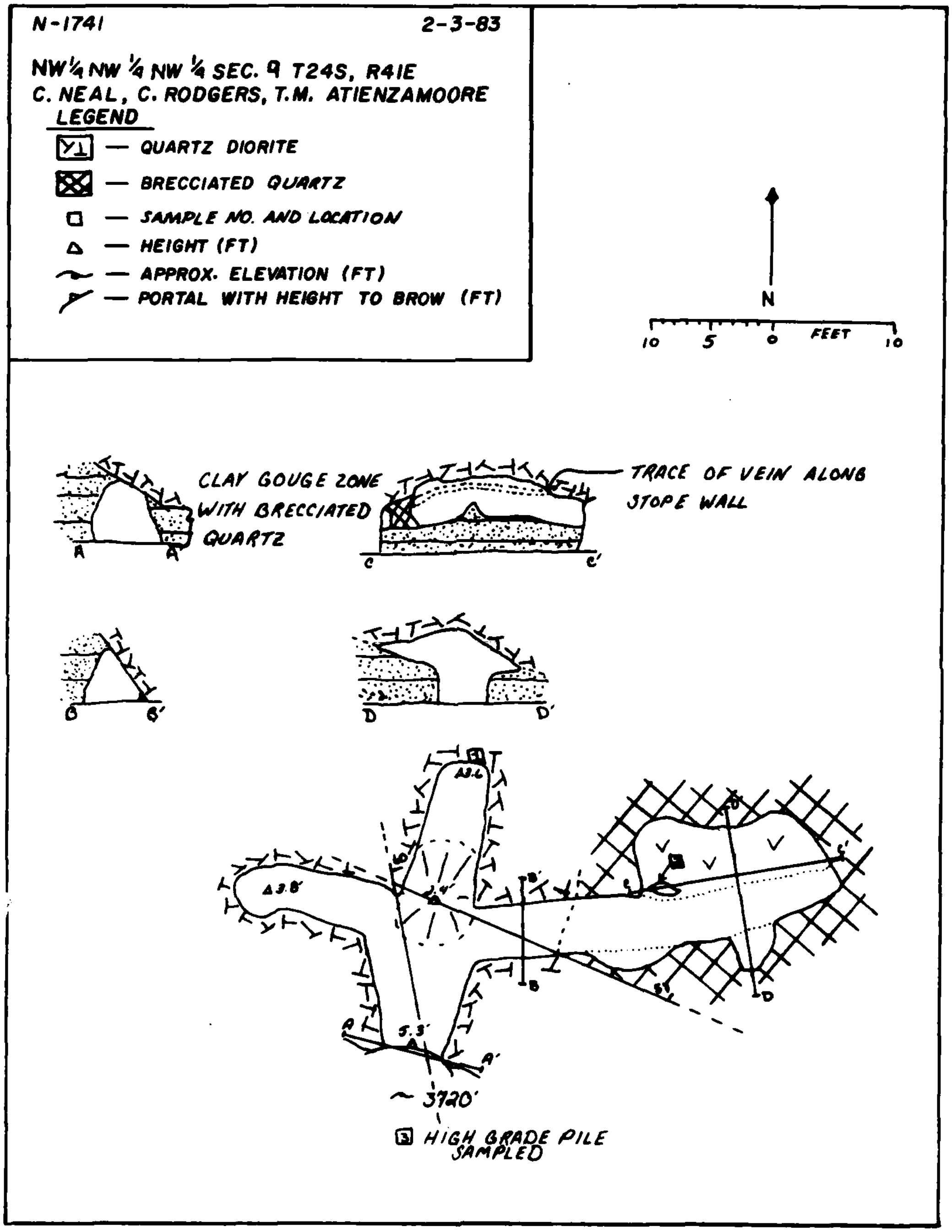


Figure 119. Plan view of lower adit at N-1741 (Star de West).

Peerless

The Peerless Lode mining claim covers a multi-level mine. The Star of the West, 12 small adits, one open and two collapsed shafts along with scattered prospect pits and trenches. Maps of the underground workings and descriptions of individual workings are given as follows.

Star of the West Main Complex (N-1702-1 and -2)

The main complex of workings, shown as N-1702 on Figure 9, was originally part of the Peerless lode mining claim. They are located in NW1/4, SW1/4, SW1/4, Sec. 4, T24S, R41E, MDB&M. The complex is recognized by the ore bins and aerial tramway found at the main haulage way and the group of relatively large tailings piles and sorted "ore piles" just east of this transportation equipment; Figure 120 is a photograph showing the workings of the main complex.

The workings explore and develop a pinch and swell vein which lies directly above an aplite dike. The dike cuts Mesozoic biotite quartz diorite on a strike approximately parallel to that of the Wilson Canyon Fault, N62W, and dips approximately 16 degrees southwest. The quartz has random fracture coatings and minor interstitial staining of limonite and, to a lesser extent, chrysocolla. Other sporadic evidence of mineralization is discussed as it was noted in each sample.

The property was explored by 1050 feet of drifting and crosscutting. Stoping was involved along 25% of the working length with an estimated volume of 700 cubic yards of ore material removed. Below is a description of each level in the mine, incorporated in these discussions are the descriptions of the locations and material sampled for each of the 10 samples whose assay results are shown in Table 42 and Appendix A.

Level 1 in the main complex, N-1702-1, is the haulage level, shown in plan view on Figure 121a. Tracks from this drift lead to the ore bins and aerial tramway. The drift is approximately 190 feet long with the first half driven in biotite quartz diorite and the back half in aplite. There is a 38-foot crosscut which was driven in a northwesterly direction to explore a 1-foot shear zone which strikes N15W and dips 18 degrees southwest. This shear zone is composed of a 4- to 6-inch-wide quartz lens with 5 to 8 inches of clay above and below it. The zone lies directly above the aplite dike as is shown in the A-A' cross section seen on Figure 121c. The clay comprising the top and bottom portion of the shear zone has moderate limonite staining and the quartz has minor fracture coatings of limonite; sample N-1702-1-2 is a chip sample taken along the quartz vein in this crosscut. The chutes which enter this main drift originate in Level 2, N-1702-2, they

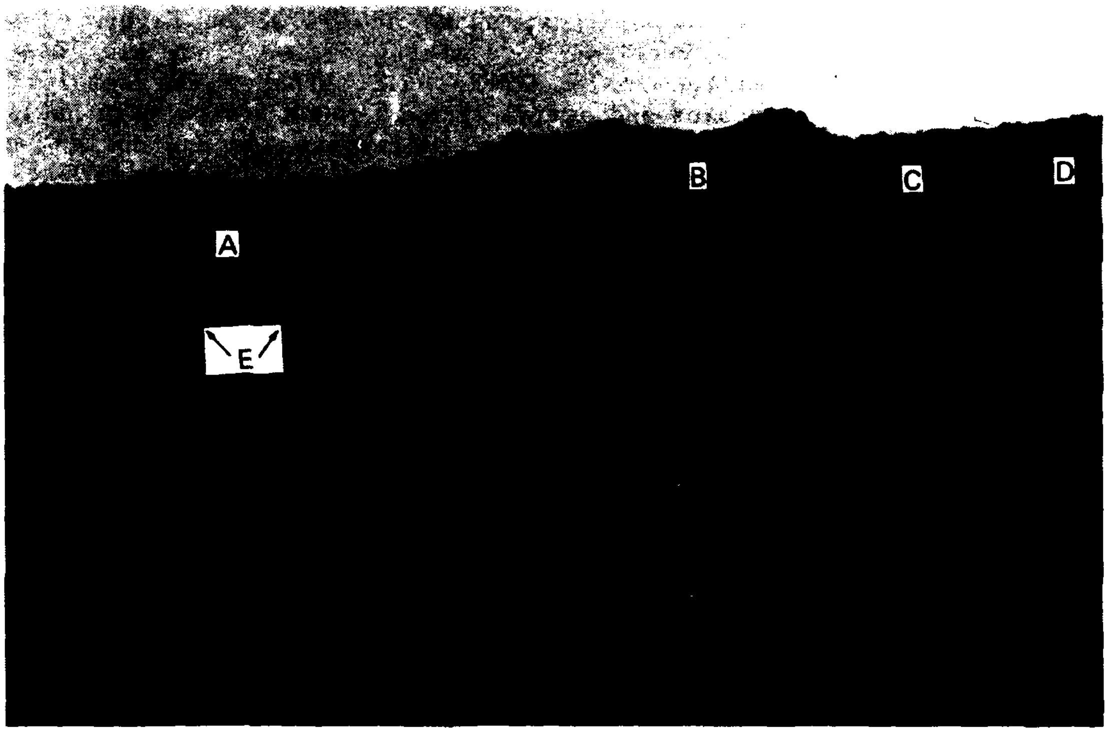


Figure 120. Star of the West Mine Looking North at the Main Mine Complex. (A) Level one, haulage level. (B) Level two. (C) Levels three and four. (D) Level five. (E) Ore bins and aerial tram line.

TABLE 42. Assay Results and Dollar Values of Commodities and Potential Commodities for Samples Taken of the Main Complex of the Star of the West Mine.

Sample	Gold		Silver		Copper		Precious metal metal value, $/ton	Total metal value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	wt %	$/ton		
N-1702-1-1	Nil	...	Nil	...	0.475	0.36	...	0.36
N-1702-1-2	Nil	...	0.006	0.09	0.045	0.03	0.09	0.12
N-1702-1-3	0.046	23.00	0.255	3.83	0.180	0.14	26.83	26.97
N-1702-1-4	0.188	94.00	4.495	67.43	8.000	6.00	161.43	167.43
N-1702-1-5	Nil	...	0.012	0.18	0.005	...	0.18	0.18
N-1702-1-6	0.725	362.50	15.080	226.20	7.300	5.48	588.70	594.18
N-1702-1-7	0.128	64.00	9.860	147.90	19.600	14.70	211.90	226.60
N-1702-1-8	0.049	24.50	0.290	4.35	0.035	...	28.85	28.88
N-1702-2-2	0.200	100.00	2.030	30.45	1.550	1.16	130.45	131.61
N-1702-2-3	0.145	72.50	9.135	137.03	33.800	25.35	209.53	234.88

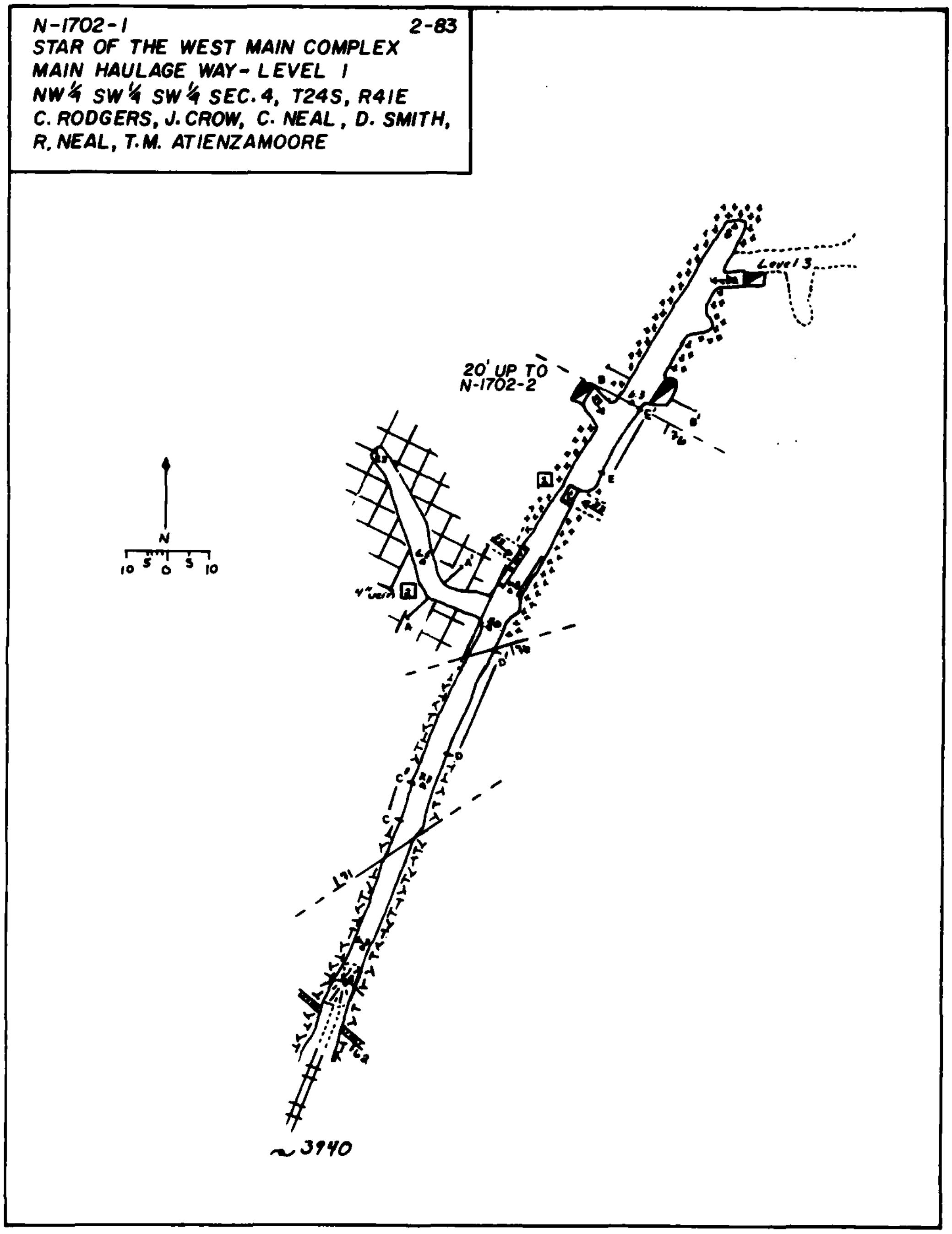


Figure 121a. Plan view of level 1 at site N-1702-1.

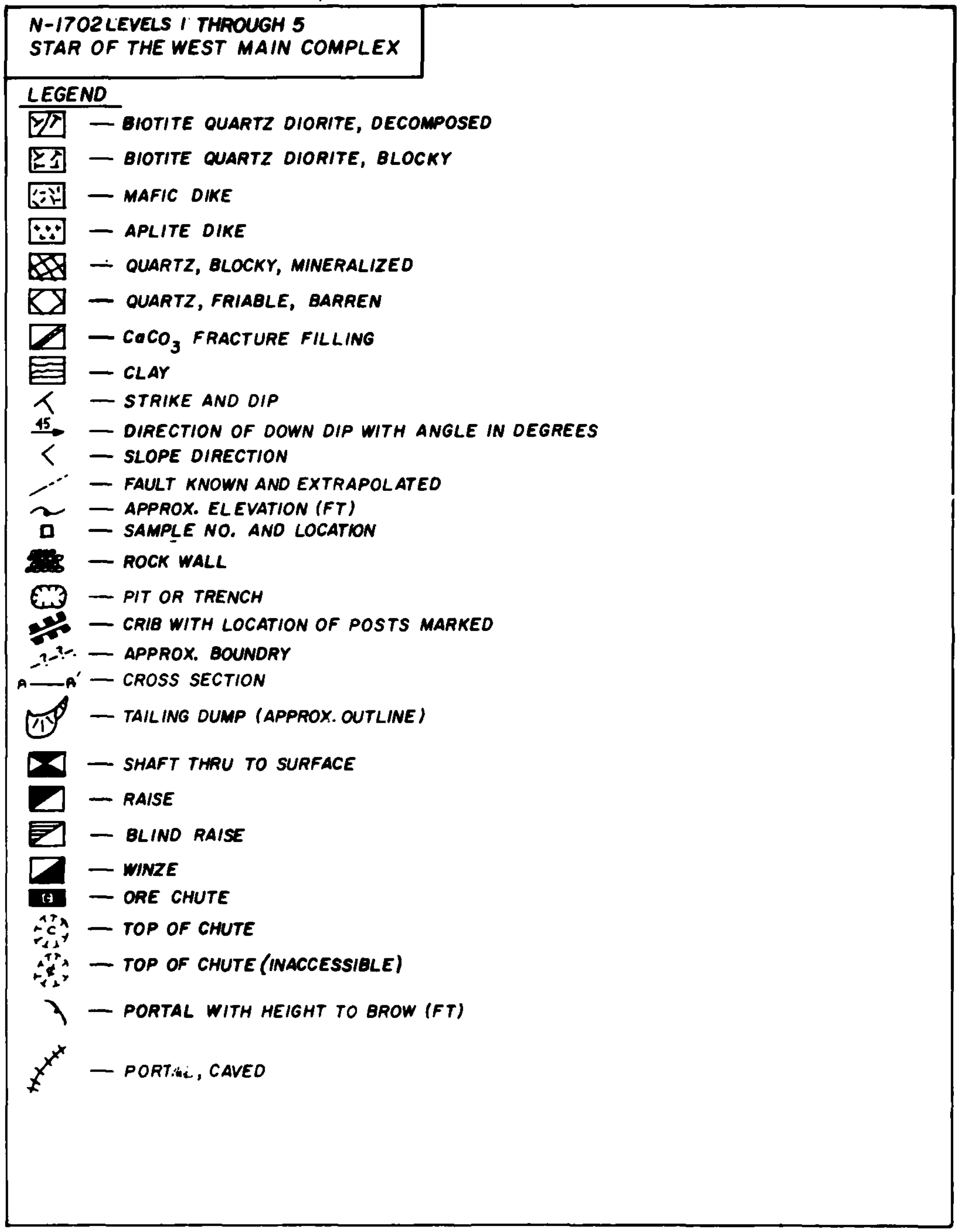
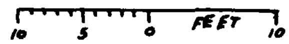
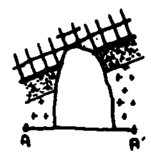


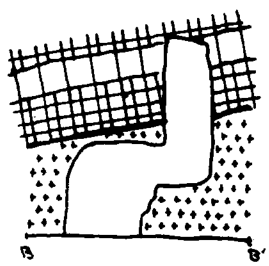
Figure 121b. Legend for Figures 121 through 125.

N-1702-1
STAR OF THE WEST
CROSS SECTIONAL AND LATERAL VIEWS
LEVEL 1

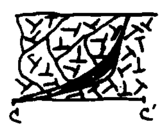




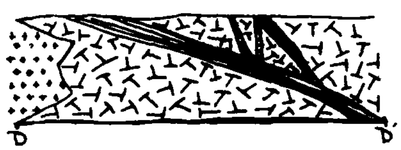
Cross sectional view along crosscut showing shear zone with 4 in. quartz lense and clay, also shows iron staining in aplite dike below shear zone.



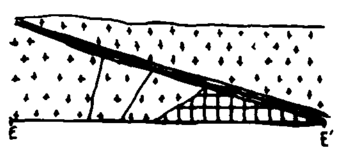
Cross sectional view showing barren quartz along shear zone. Barren zone identifiable from the friability of the quartz and the lack of intense secondary mineralization.
Description of profile:
- top 6 in. has some iron staining
- 38 in. white friable quartz
- 44 in. friable quartz with light iron staining
- 2 in. clay with bits of quartz
- remaining aplite



Lateral view showing contact of decomposed biotite quartz diorite with the more competent quartz diorite along west wall of the drift. Note fractures along contact are filled with calcite.



Lateral view showing N43W striking and 29 SE dipping shear zone in quartz diorite; also diorite/aplite contact along east wall of the drift.



Lateral view showing normal fault dipping 76S, striking N65W. Shows a bit of mineral potential below aplite dike. Quartz is blocky with moderate iron staining as fracture coatings.

Figure 121c. Cross sections of level 1 at site N-1702-1.

are shown in detail on Figure 122a, a plan view; the west raise also leads to this level. The east raise is a dead-end leading to a barren zone of friable quartz. It can be seen in the B-B' cross section shown on Figure 122b. Sample N-1702-1-1 is of the aplite dike material which showed strong interstitial copper staining and minor fracture coatings of chrysocolla and pyrolusite. Approximately 15 feet from the face of the drift is another raise to the east which leads to Level 3 of the main complex.

N-1702-2 is a large stope room, 72 feet east-west by 60 feet north-south with an average stope width of 2.5 feet. Approximately 400 cubic yards of vein material was removed from this stope which is reached by an 84-foot dog-leg drift entering the stope from the east. The drift was driven in biotite quartz diorite. The stope has a shaft that connects it to the surface, this appears to have been driven for ventilation. North from this shaft is an 18-foot drift which explores along the margins of this stope area. The quartz vein along this drift is an average of 3 feet wide. The chutes removed the ore from this stope to the main haulage level shown in Figure 121a. An access raise from Level 1 below is located in the northwest corner of the area, it is reached by a 30-foot drift. Sample N-1702-2-3 was taken from the vein just east and above the raise. The vein at this point is 3 feet thick. This is the only place in the workings found to contain mineralized material of this type. The sample contains pyrite, chalcopyrite, bornite, covellite plus chrysocolla and limonite.

Level 3 is a 165-foot drift with stoping along the first 90 feet of the drift. It is shown in plan view on Figure 123a. This stope accounts for an estimated 167 cubic yards of ore removed. Just west of this stope is a shallow raise which runs northward and connects to Level 4. Across the drift is a ramp that heads west and intersects a raise from Level 1. Along the ramp is a 15-foot crosscut which explores a blocky, iron stained quartz lens, sample N-1702-1-3, within the brecciated barren quartz. The ramp is shown in the H-H' cross section in Figure 123b. Sample N-1702-1-4 is representative of a 1.3-foot vein which has been stoped out just north of the sampling location; this minor stoping represents 1 to 2 cubic yards. The main drift continues for another 38 feet. Cross section G-G' is taken across the main drift, toward the back end. A quartz pocket was mined at the drift end (about 0.5 cubic yards). Sample N-1702-1-5 represents this material. A short cross-cut drift ends in a pit which can be seen in detail in cross section F-F' in Figure 123b.

Figure 124 shows Level 4 in plan view. This level is directly updip from Level 3. The vein is stoped along the first 100 feet of the 202-foot drift primarily along the east (updip) side of the drift with an average stoping width of 1.5 feet, which is estimated to equal 100 cubic yards of rock. Beyond this stope to the west is the raise that leads to Level 3; to the east is a shallow, partially backfilled,

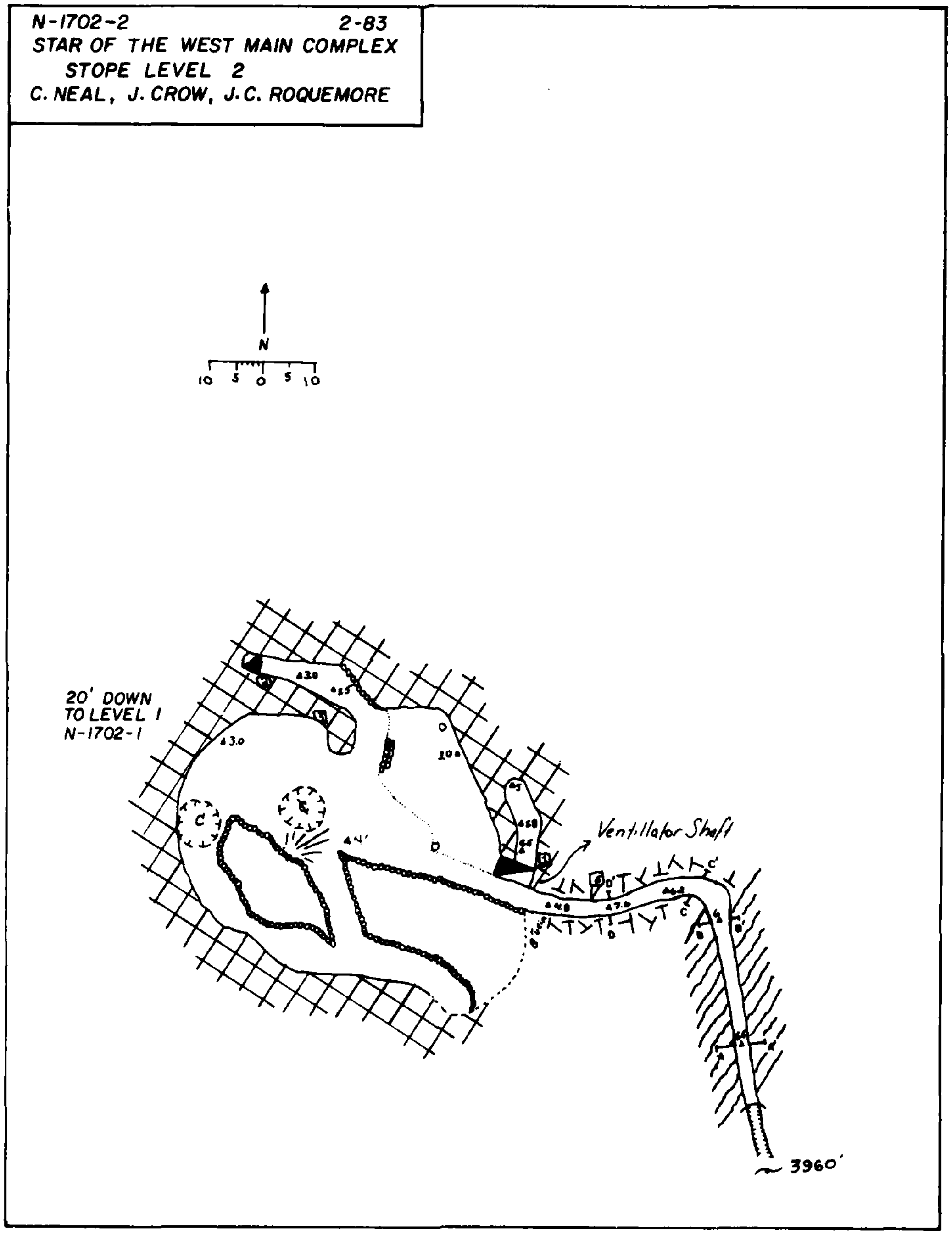
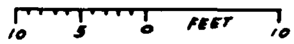
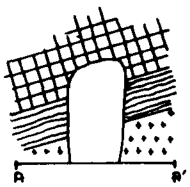


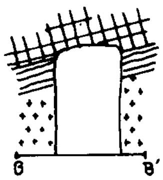
Figure 122a. Plan view of level 2 at site N-1702-1.

N-1702-2
STAR OF THE WEST MAIN COMPLEX
CROSS SECTIONAL VIEWS
LEVEL 2

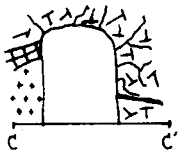




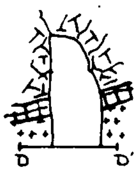
Cross sectional view showing quartz vein with limonite staining underlain by 3 ft. of fault gouge and aplite dike. Strikes N62W and dips 16SW.



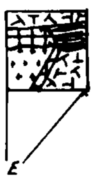
Cross sectional view showing quartz vein with minor limonite staining; fault gouge has decreased to 1.5 ft. thick. Both are underlain by aplite



Cross sectional view showing the fault zone along which the quartz vein was implaced, seen on left rib. The vein is offset by a poorly defined fault in the biotite quartz diorite.



Cross sectional view showing highly fractured biotite quartz diorite. A 1 ft. wide quartz vein showing minor limonitization of fractures and underlying aplite dike.



Enlargement showing abrupt end of quartz vein. Vein ends against limonite stained fault gouge; note small quartz veinlet comming off contact, veinlet shows no secondary mineralization, no iron staining.

Figure 122b. Cross sections of level 2 at site N-1702-1.

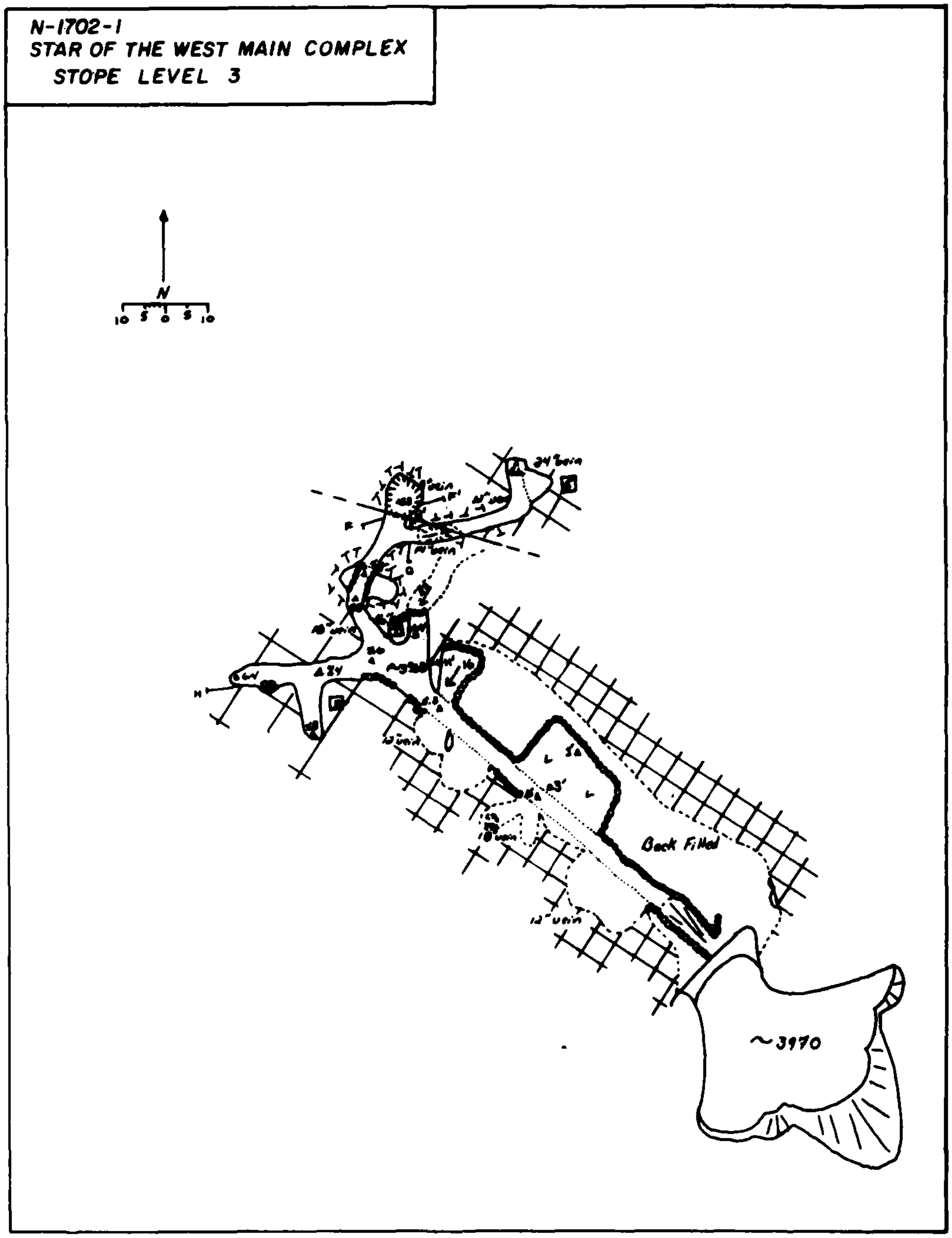


Figure 123a. Plan view of level 3 at site N-1702-1.

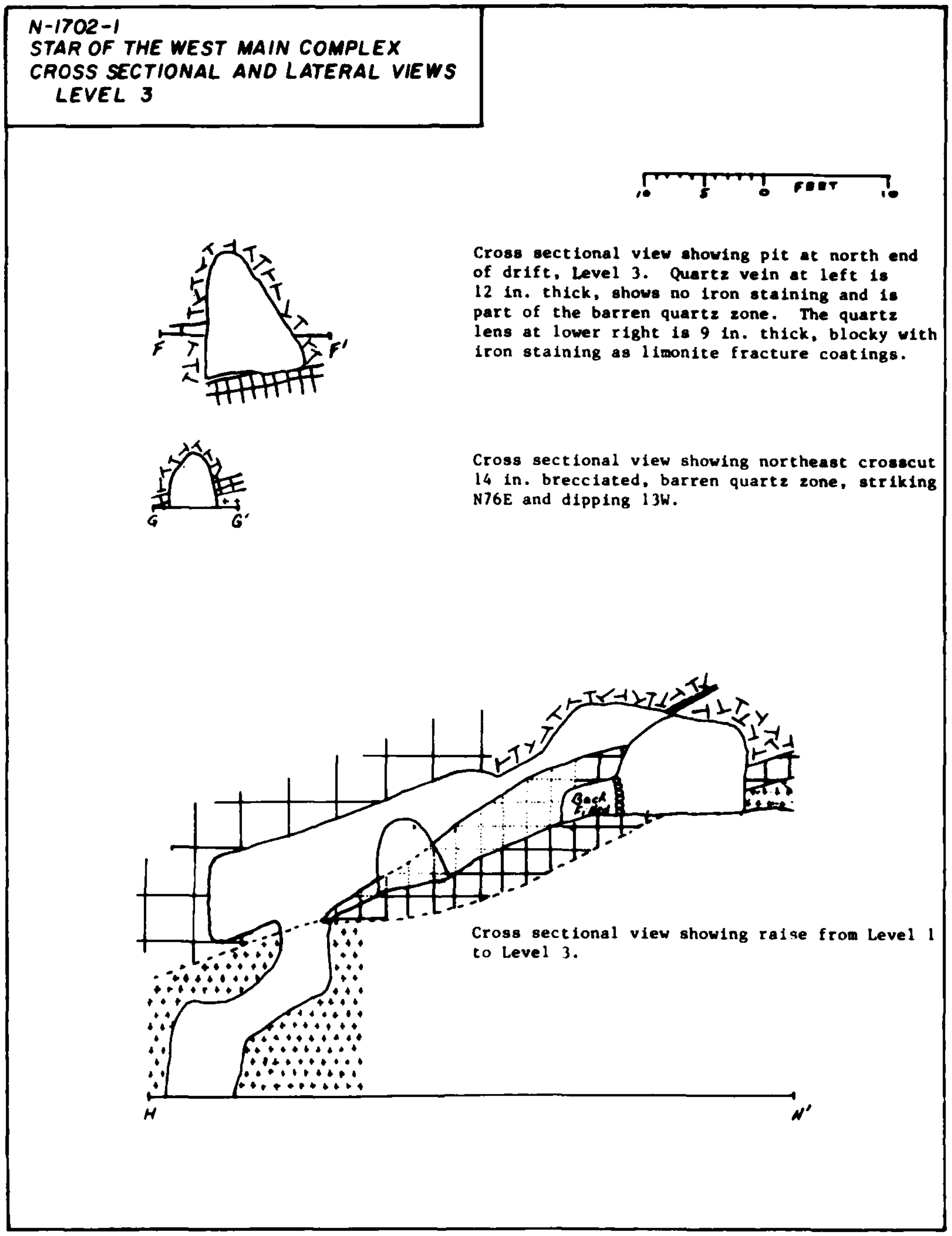


Figure 123b. Cross sections of level 3 at site N-1702-1.

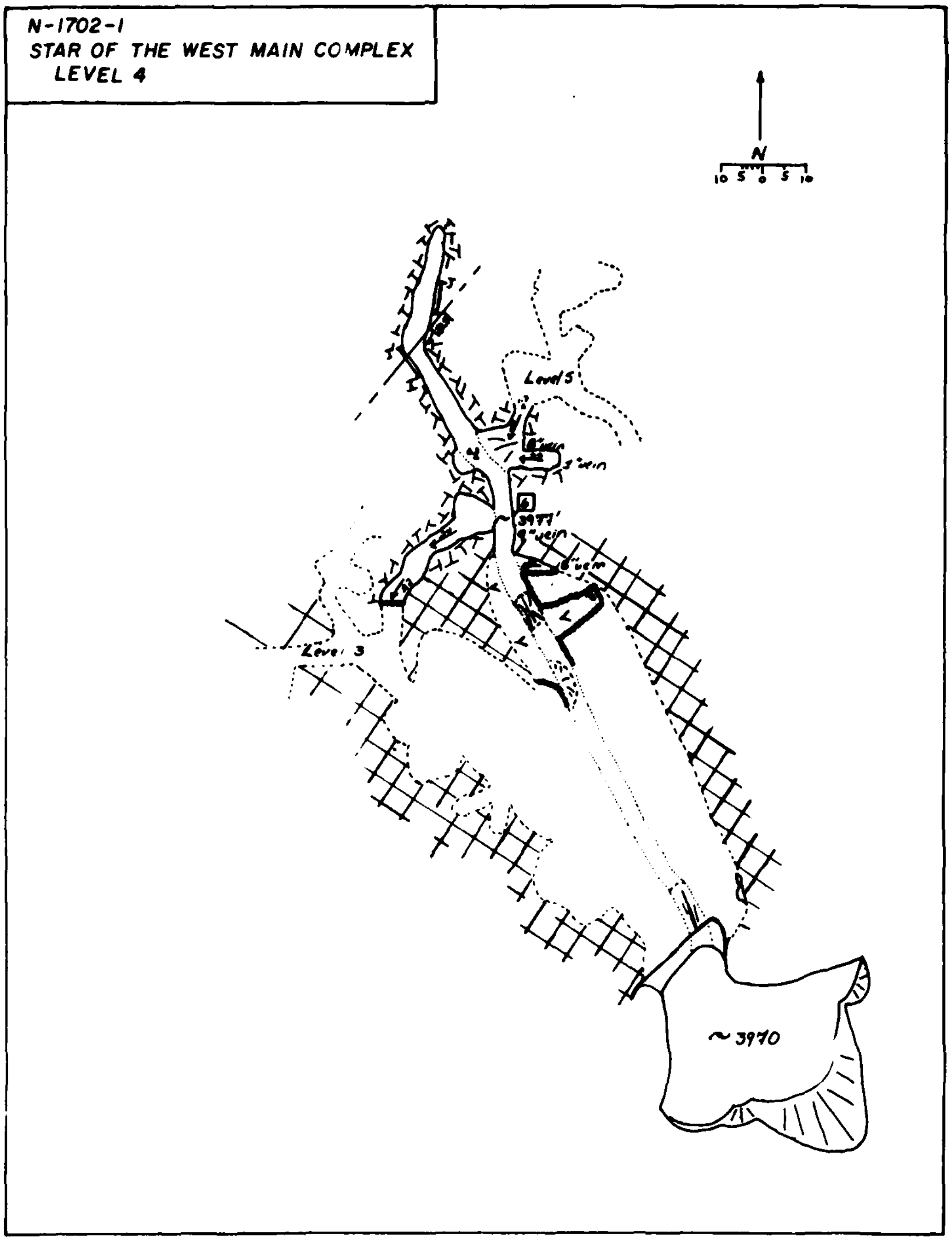


Figure 124a. Plan view of level 4 at site N-1702-1.

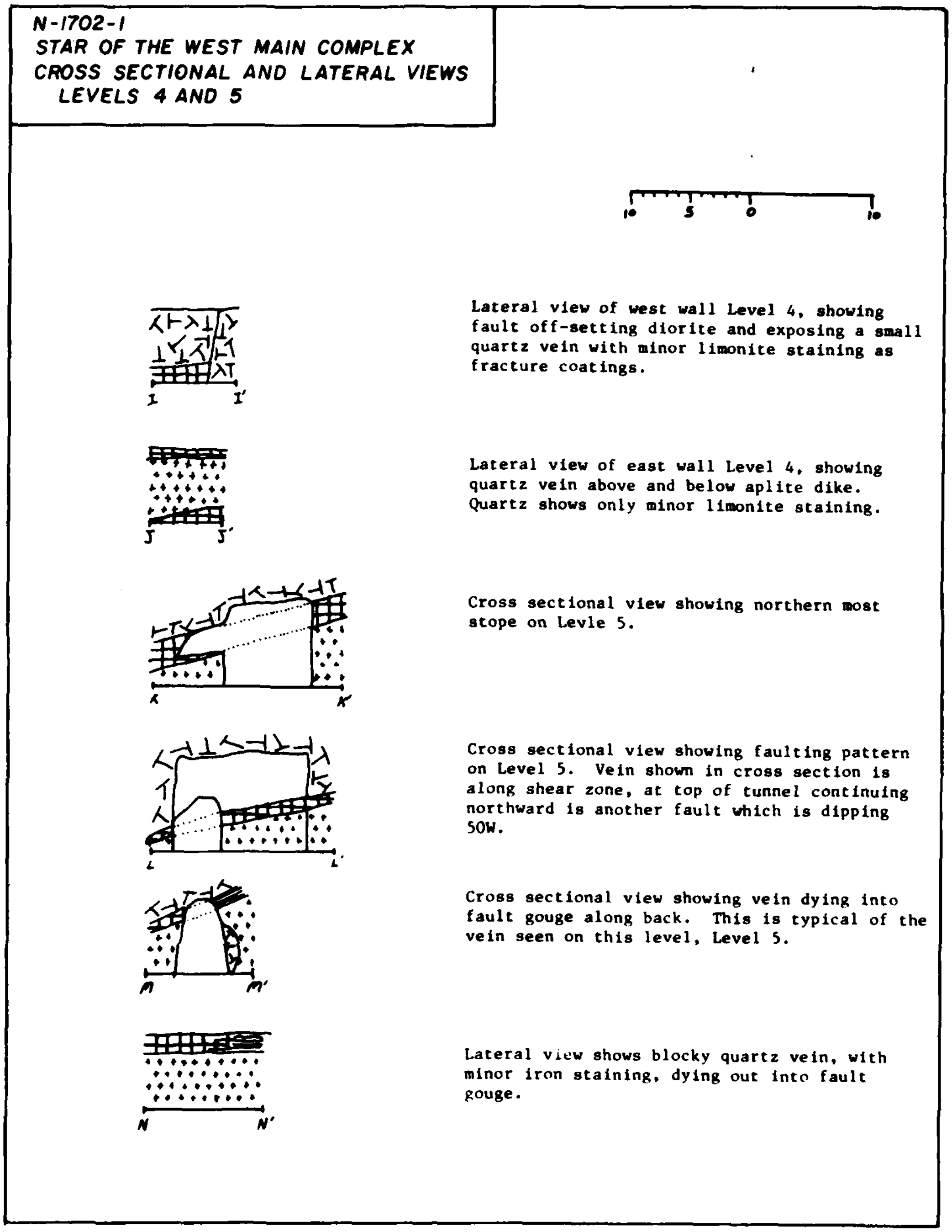


Figure 124b. Cross sections of levels 4 and 5 at site N-1702-1.

raise which leads to Level 5. Sample N-1702-1-6 was taken from the vein directly across from the Level 3 raise. The vein at this point has pinched to a 0.8-foot average width and contains small, 1/8 inch, crystals of pyrite and chalcopyrite and to a much lesser extent bornite and covellite with fracture coatings of limonite and chrysocolla.

Level 5 is an exploratory drift, 165 feet in length, with only minor stoping which represents some high grading; it is shown in detail on Figure 125. Sample N-1702-1-7 was taken from the southern-most stope on this level. The quartz here shows minor coatings of covellite and bornite with copper and iron staining as chrysocolla and limonite fracture coatings. Cross-sectional and lateral views show how this vein pinches, swells and dies out along the shear zone. Approximately 100 feet along the drift from the collapsed portal is the raise that leads to Level 4; just beyond is a small stope (about 11 cubic yards) a ventilation shaft and a 20-foot-long dog-leg drift which exposes the vein showing a 0.8-foot width. The quartz vein at the north end of the drift is 2.1 feet wide and shows limonite, as fracture coatings. Sample N-1702-1-8 was taken at this location.

The assay results shown on Table 42 indicate that "ore" material of moderate grade was mined at this site in the past. It is worth note, however, that assays of the material in the ore bin at the tram head (collected by C. F. Austin in 1971) indicate over 3 troy oz/ton in gold, far beyond any values seen in place, suggesting extensive salting of the material in the bin and a concomitant inflation of the potential of the area. The only "ore" material remaining in the workings is in pillars and narrow, marginally economic veins along the faces of the stopes and the potential for the occurrence of additional, near-surface, reserves appears to be limited to approximately 600 feet down-dip, between this site and site N-1702-11. At N-1702-11, no mineralization was encountered in the vein and the vein was displaced and lost by movement along a cross-cutting aplite dike.

The potential for a commercial occurrence at this site is low. The ore to waste ratio of the deposit appears to be slightly better than any other gold occurrence examined during this survey, but the geometry and concentration of the mineralization is essentially the same. It is erratic and spotty, and the overall tonnage is small.

N-1702-3. This prospect is in the Peerless and overlapping National claims. Its location is given as the SW1/4, SW1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M shown as N-1702-3 in Figure 116. At the portal of the main 42-foot drift, a 45-degree incline is driven for 40 feet shallowing to 15 degrees 30 feet from the face, as seen in Figure 126. The drift and incline explore an N65E quartz vein with a dip of 35 degrees southwesterly. The vein is 2 inches to 3.0 feet thick and is emplaced along a 5-foot-wide gouge zone. Sample N-1702-3-1 was chipped at the face of the main drift across a 2 foot vein. Sample

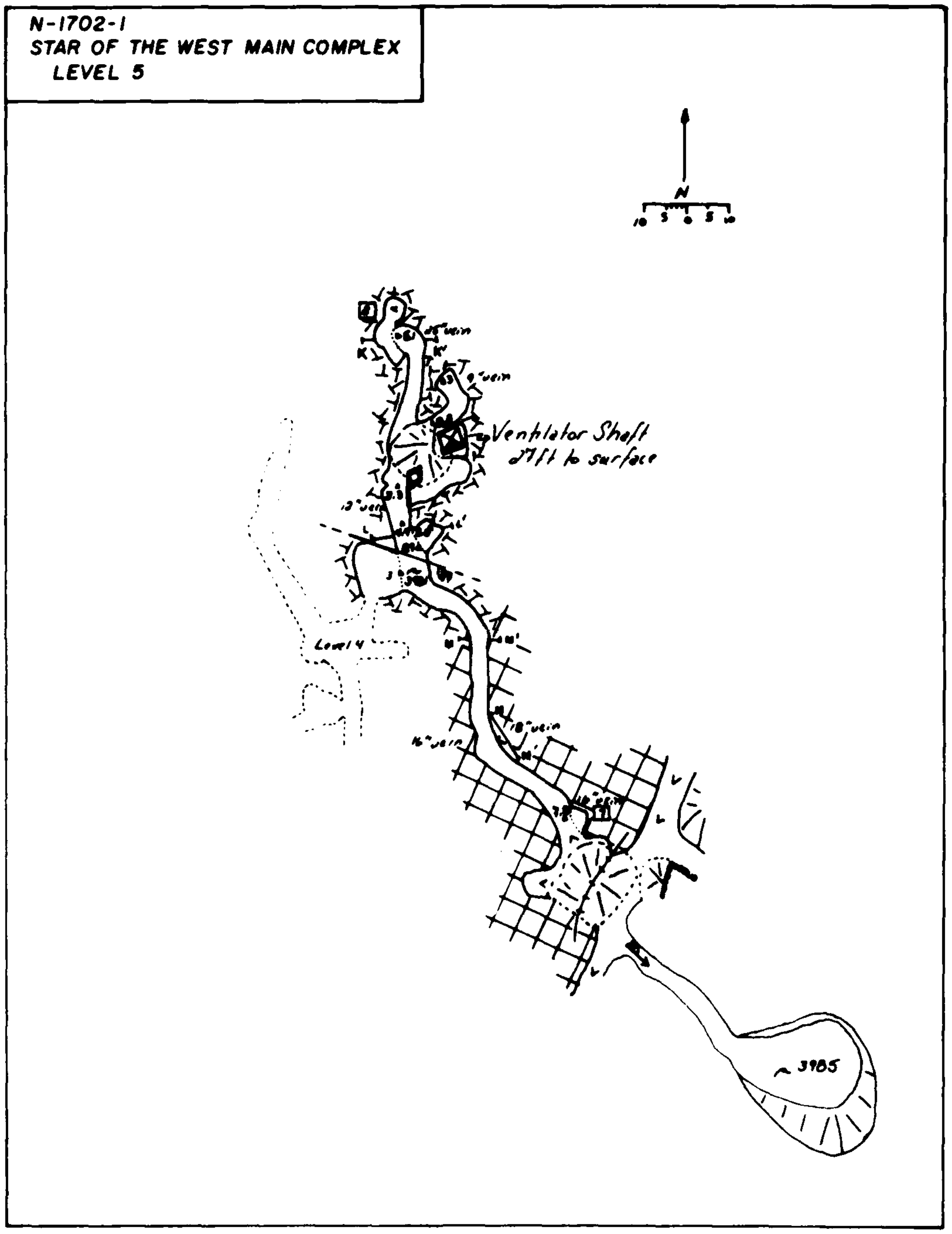


Figure 125. Plan view of level 5 at site N-1702-1.

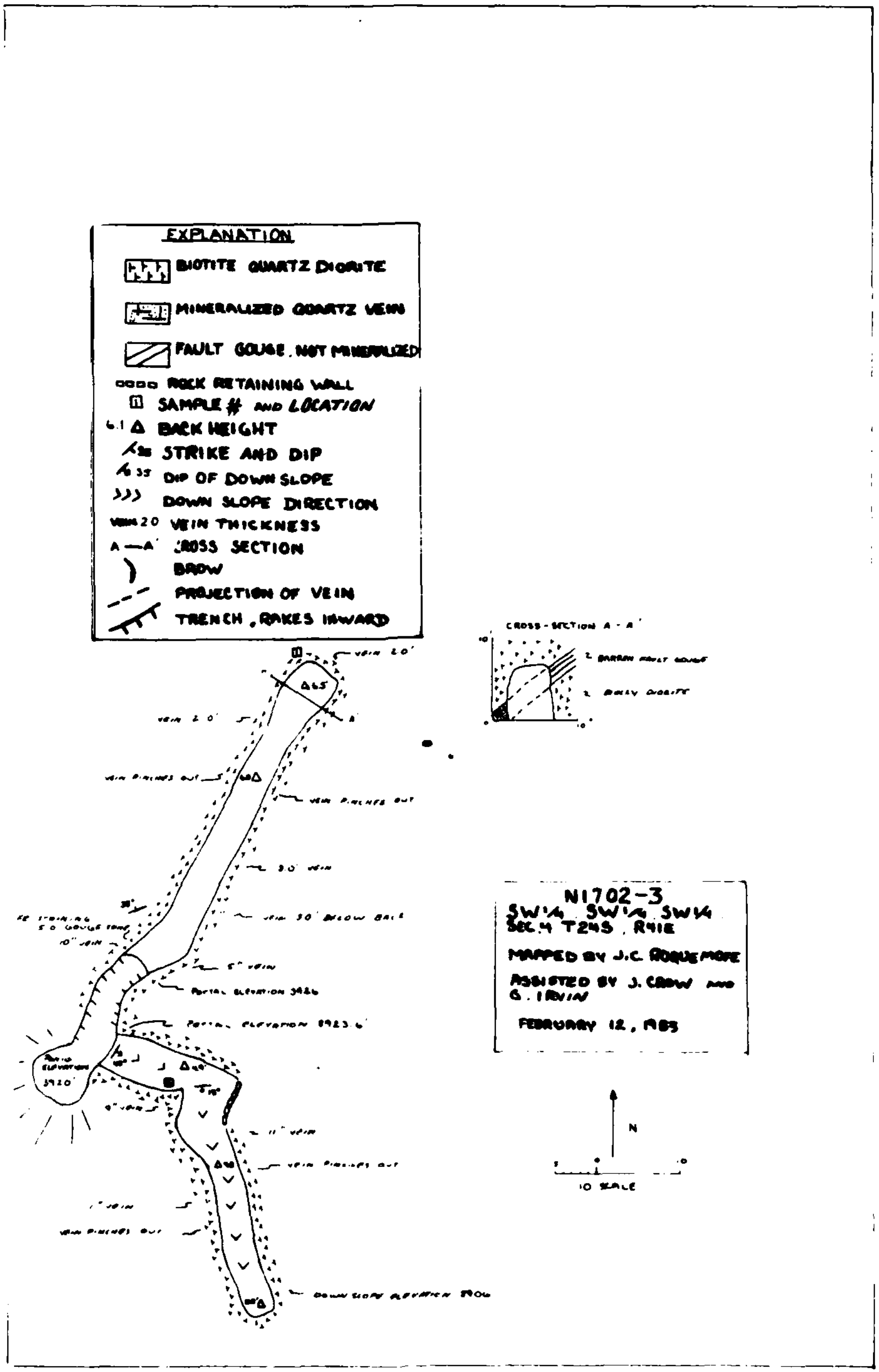


Figure 126. Plan view of workings at site N-1702-3.

N-1702-3-2 was taken 9 feet from the portal of the incline across a 0.8-foot vein. Sparse limonite and chrysocolla staining is present in both the vein and surrounding gouge. Assays for the precious metals are shown in Table 43 below.

TABLE 43. Assay Results.

Sample	Gold		Silver		Total precious metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1702-3-1	0.022	11.00	0.180	2.70	13.70
N-1702-3-2	0.319	159.50	2.610	39.15	198.65

Sample N-1702-3-2 shows significant precious metal content. However, the vein is not consistent in its value, as can be seen from sample N-1702-3-1, nor in its width. This site has potential for a small amount of high grading only. There is no geologic reason to expect values or vein to increase beyond the working face of the drift.

N-1702-4. This prospect is located in the SW1/4, SW1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M and shown as N-1702-4 on Figure 116. The workings consist of a relatively straight 95-foot drift and approximately 25 feet of trench, as seen in Figure 127. The drift follows a shear zone that strikes N60W, with a dip of 36 degrees southerly and a thickness to 2 feet. The vein is cut off by an aplite intrusive 30 feet from the face. Six feet from the portal a single chip sample was taken across 0.8 foot of limonite and chrysocolla stained quartz vein. Assay results, given on Appendix A, show this site to have no commercial potential.

N-1702-5. The workings here are located in the SW1/4, SW1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M, as seen on Figure 116. The adit is 34 feet long with a 19-foot-long trench extending from the portal, as seen in Figure 128. The adit explores a small 3- to 6-inch vein that strikes N54W and has a dip of 55 degrees southerly. The vein is lightly mineralized with limonite and chrysocolla. An aplite/diorite contact runs along the back with the same attitude as the veins. A single sample was taken at the portal across 6 inches of vein. Complete assay results are given in Appendix A. From these results it is obvious this site has no commercial potential.

N-1702-6. A small prospect, one of many put in after Sherwin's survey. It is located in the SW1/4, SW1/4, SW1/4, Sec. 4, T24S, R41E, MDB&M, shown as N-1702-6 on Figure 116. The adit follows a prominent aplite/diorite contact. Along the contact a gouge zone striking N65W with a dip of 16 degrees southerly shows no evidence of mineralization. The total workings consist of 23 feet of drift and 16 feet of trench, as seen in Figure 129. No samples were taken at this location.

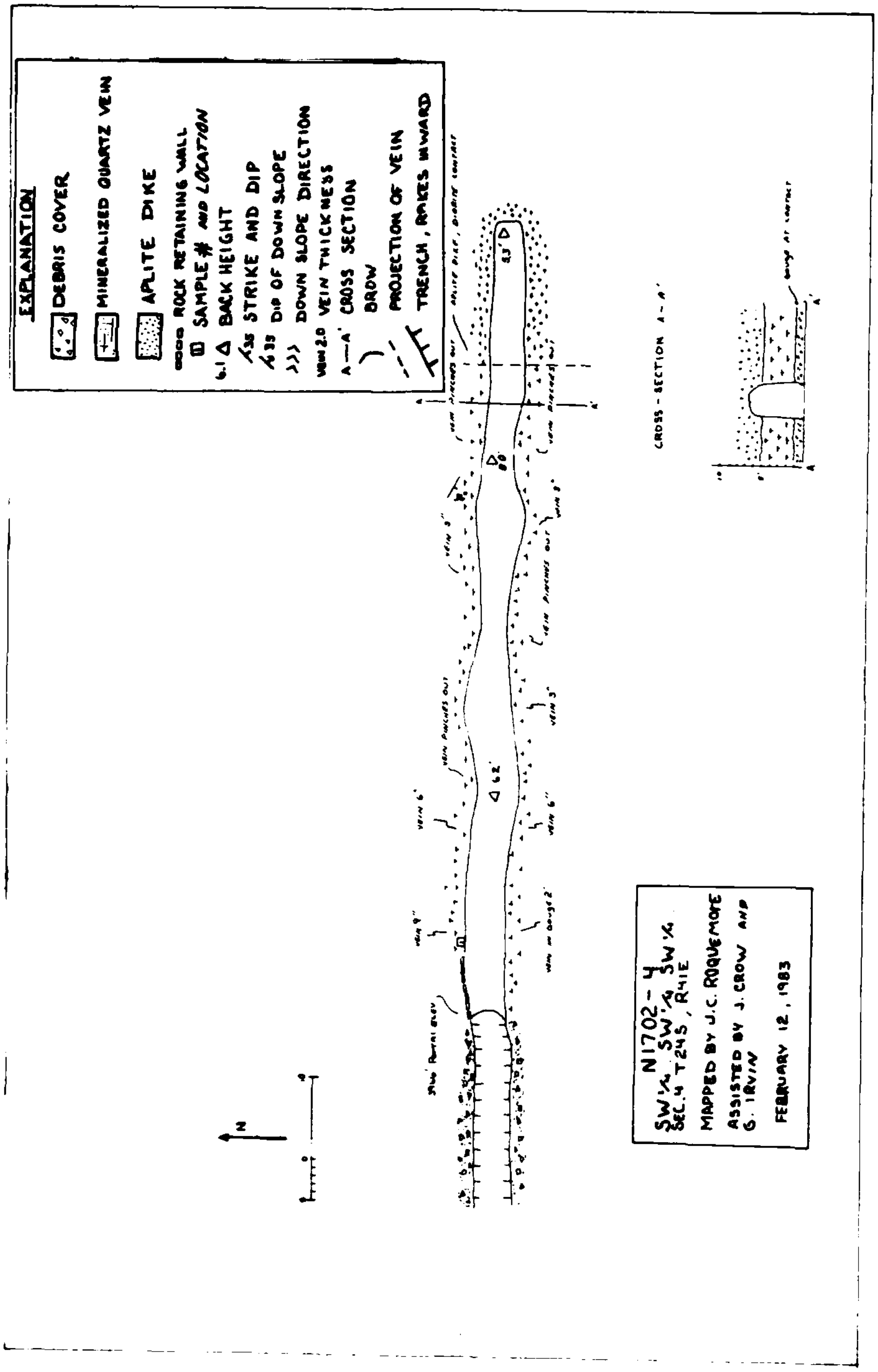


Figure 127. Plan view of workings at site N-1702-4.

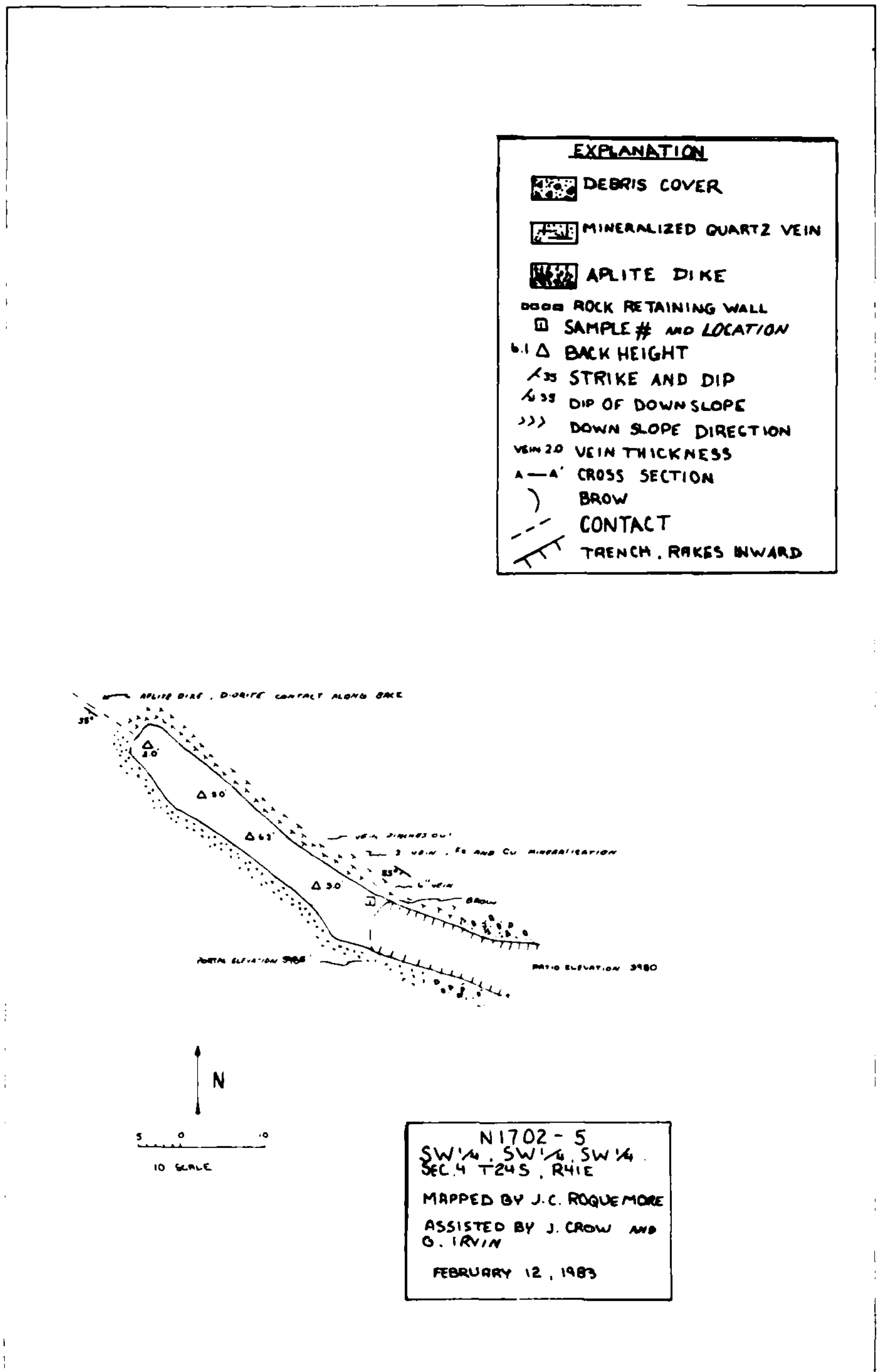


Figure 128. Plan view of workings at site N-1702-5.

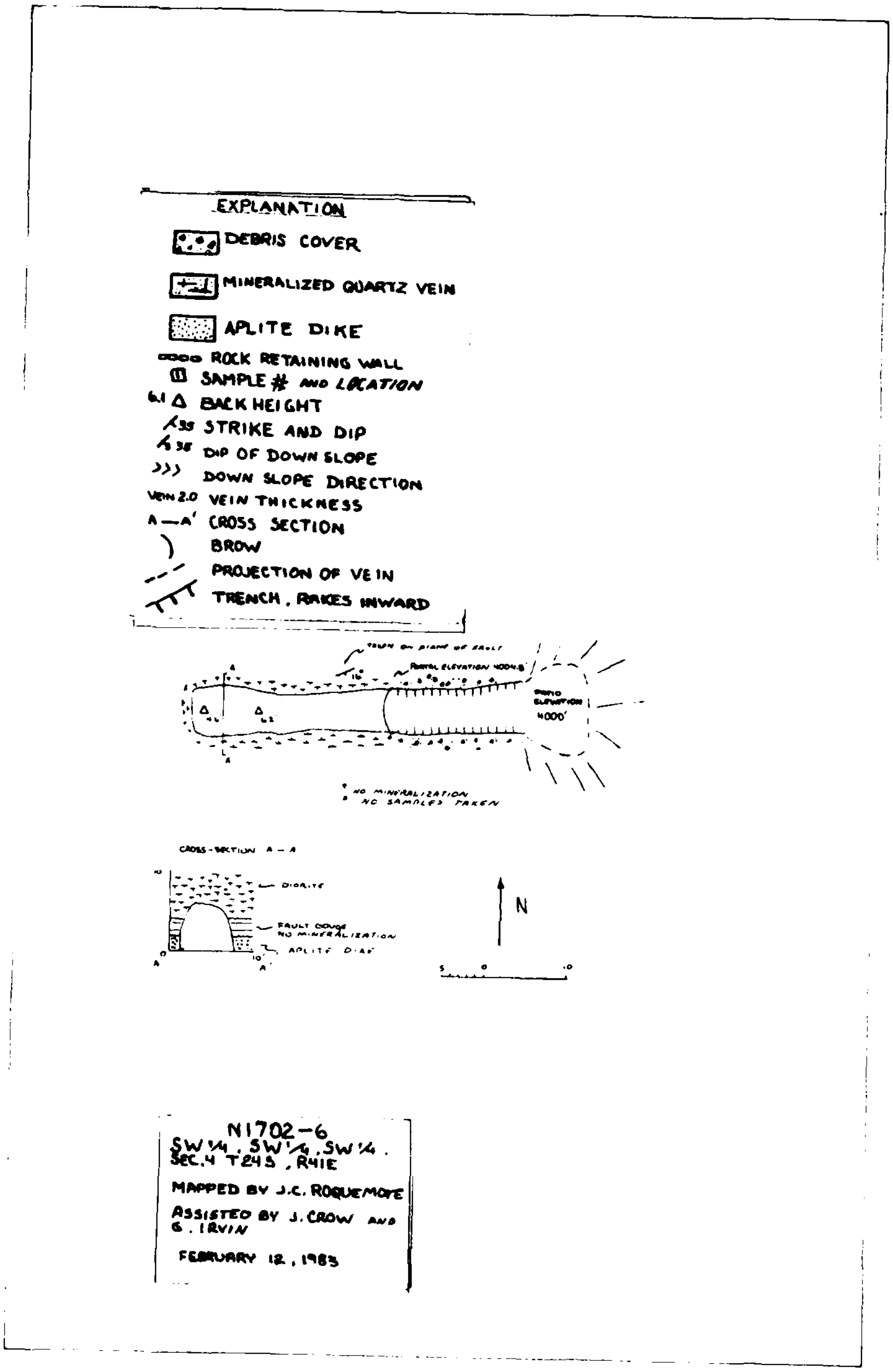


Figure 129. Plan view of workings at site N-1702-6.

N-1702-7. The prospect trends N84E and is 44 feet in length, as seen in Figure 130. It is located in the SW1/4, SW1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M,shown as N-1702-7 on Figure 116, an updated claim map. Mineralization occurs in a quartz lens along the back of the drift. The lens varies from 1 inch to 2 feet in thickness and pinches out completely 7 feet from the face. A sample was taken across 1 foot of mineralization 12 feet from the portal. The results are shown in Appendix A, and indicate that this site has no potential for precious metal production.

N-1702-8. This prospect explores a 0.6- to 3-foot-wide quartz vein in a quartz diorite host rock. It can be found in the SW1/4, SW1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M,shown as N-1702-8 on Figure 116. The vein runs the length of the drift and is poorly mineralized. From the portal the drift is inclined at 30 degrees for 31 feet and is horizontal for the remaining 47 feet, as seen in Figure 131. Only minor stoping has been done. Because of the weak mineralization exposed at this site the prospect was not sampled.

N-1702-9. This adit is located in the SW1/4, SW1/4, SW1/4, of Sec. 4, T24S, R41E, MDB&M,shown as N-1702-9 on Figure 116. The workings, shown in Figure 132, consist of a 24-foot main adit with 10 feet of drift bearing slightly right of the main portal. The main portal has been partially covered by a rock fall. The adit follows a vein bearing N20W with a dip of 17 degrees south. Its thickness varies from 1 to 7 inches. A chip sample was taken 6 feet from the portal. The assay results, shown in Appendix A, indicate no commercial potential for this site.

N-1702-10. The prospect consists of a 63-foot adit, shown in detail on Figure 133, driven into diorite country rock. It is located in the SW1/4, SW1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M,shown as N-1702-10 on Figure 116. The adit follows a N65W bearing zone that dips 32 degrees southerly. The zone is predominantly fault gouge varying from 4 inches to 1.5 feet thick. The gouge contains only scattered pockets of brecciated quartz. Nineteen feet from the face a limonite stained vein crosscuts the zone bearing N40E and dipping 65 degrees southerly. The crosscutting vein appears to have been emplaced along a perpendicular joint associated with the zone. A chip sample representing best grade for the prospect was taken at this feature. The assay values, shown in Appendix A, show this site to have no commercial potential.

N-1702-11

A small 13-foot long prospect drift explores a 3-foot-wide quartz vein down-dip from the Star of the West complex, as seen in Figure 134. The prospect is in the SW1/4, SW1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M (Figure 116). Three feet in from the portal the vein is cut off by an aplitic intrusion. No significant mineralization was present and no samples were taken.

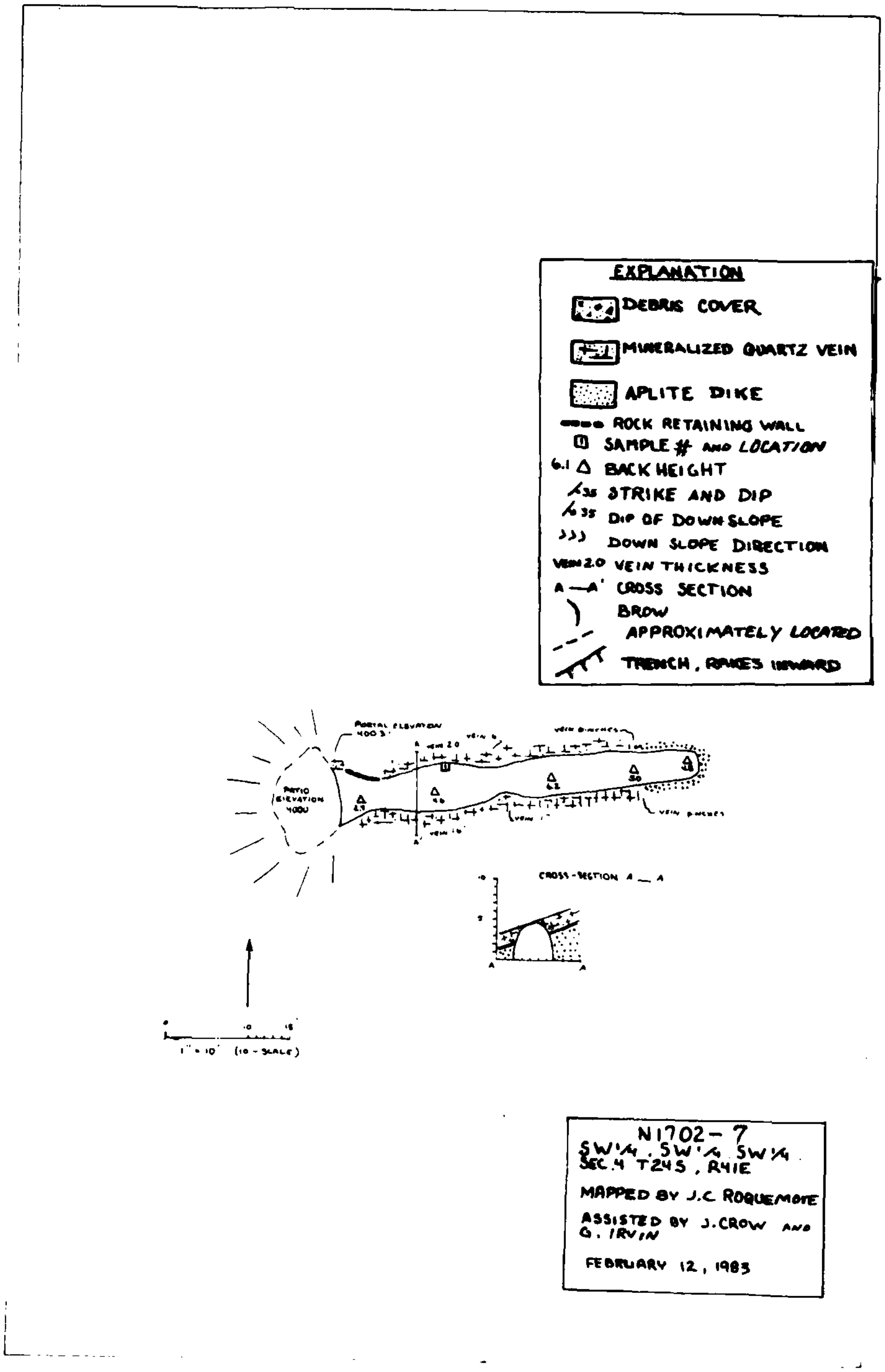


Figure 130. Plan view of workings at site N-1702-7.

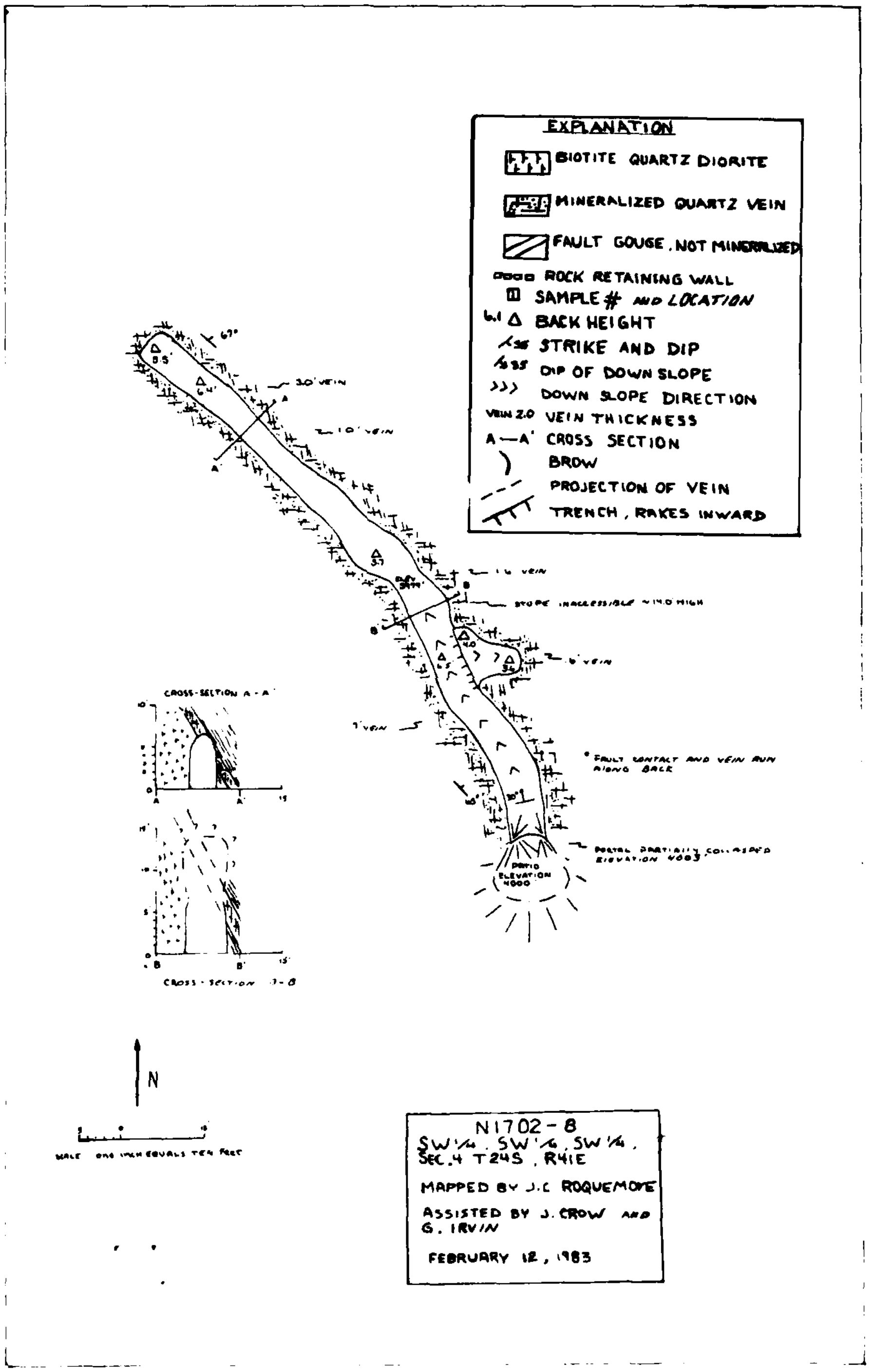


Figure 131. Plan view of workings at site N-1702-8.

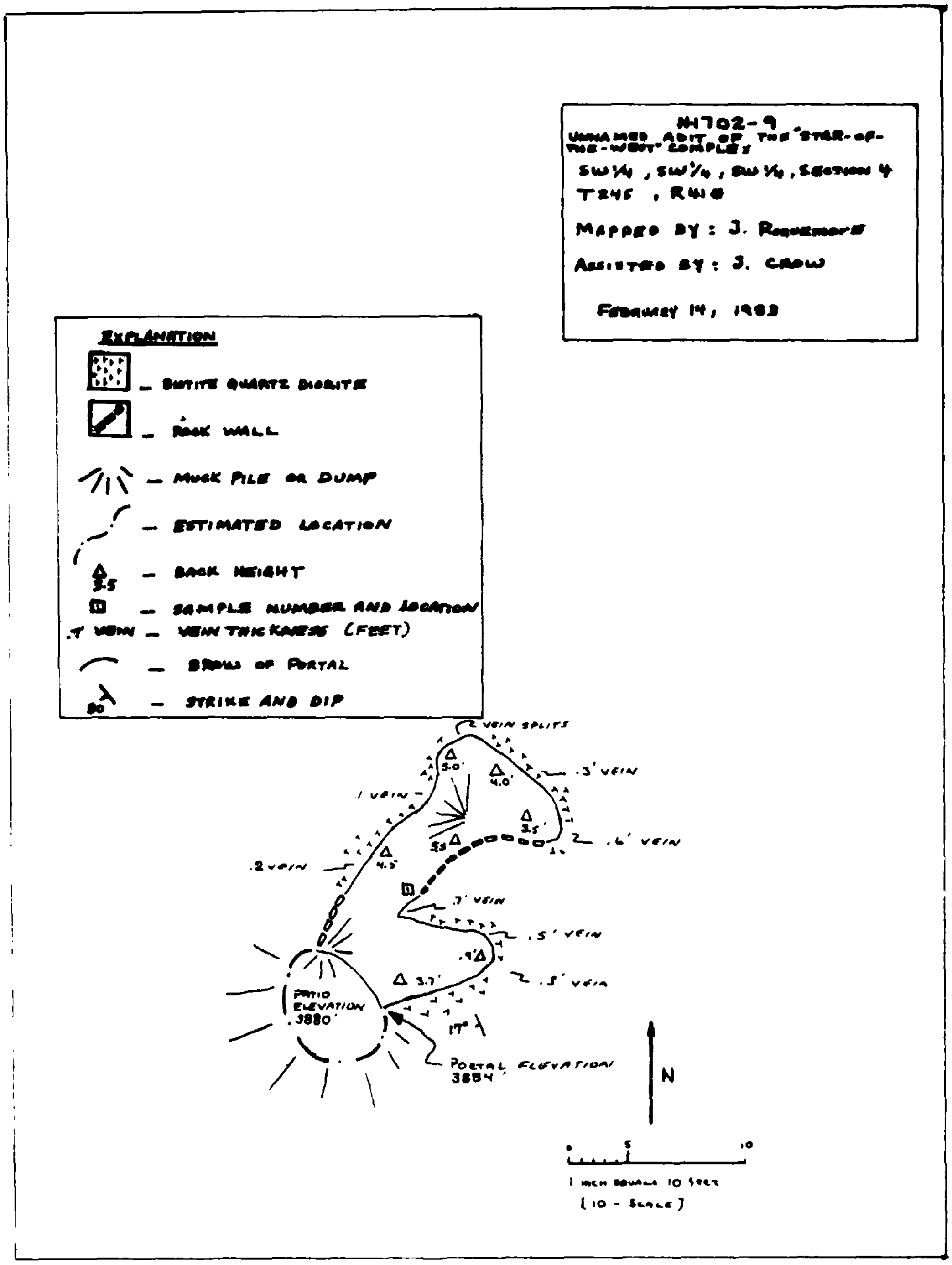


Figure 132. Plan view of workings at site N-1702-9.

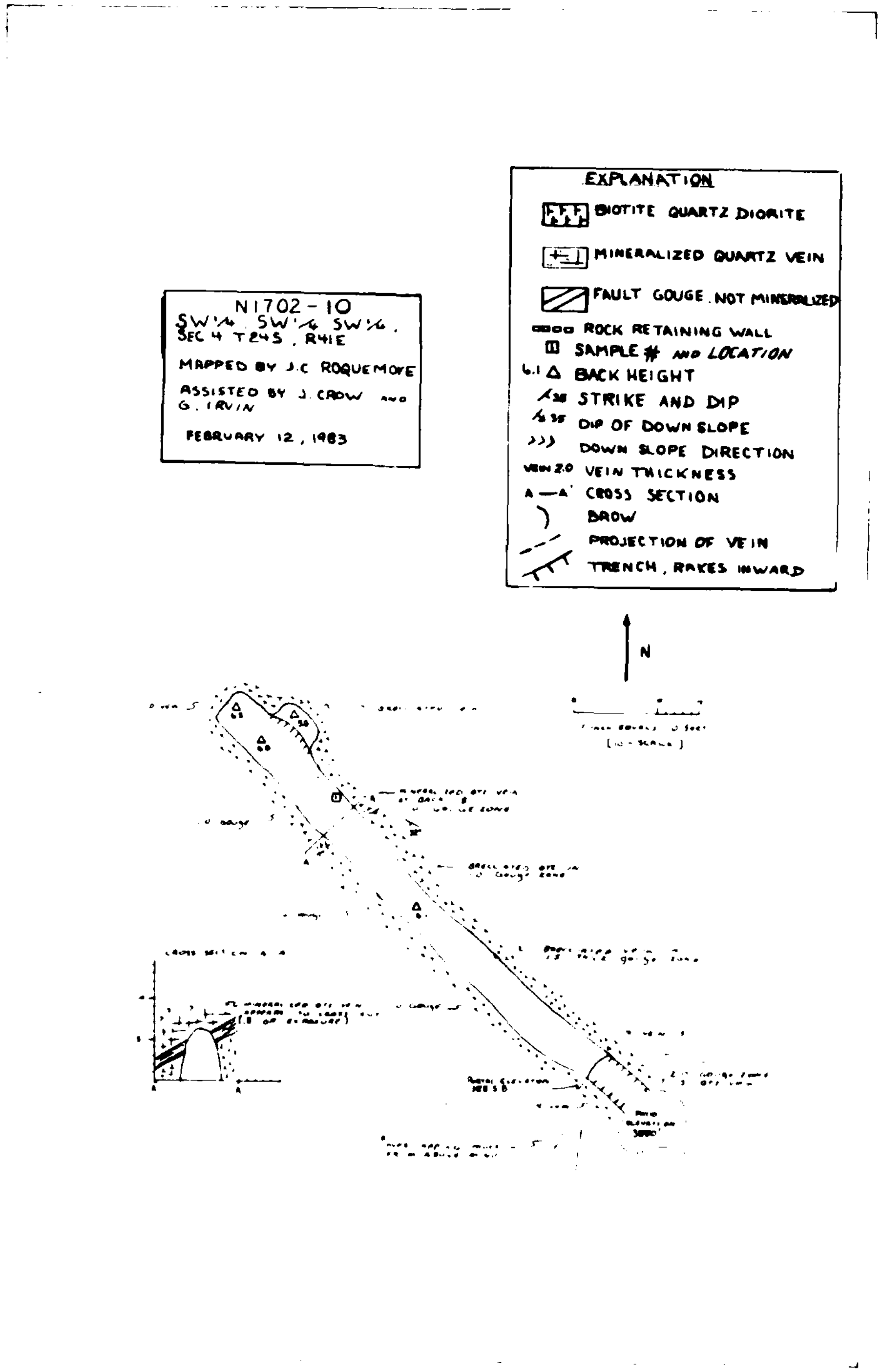


Figure 133. Plan view of workings at site N-1702-10.

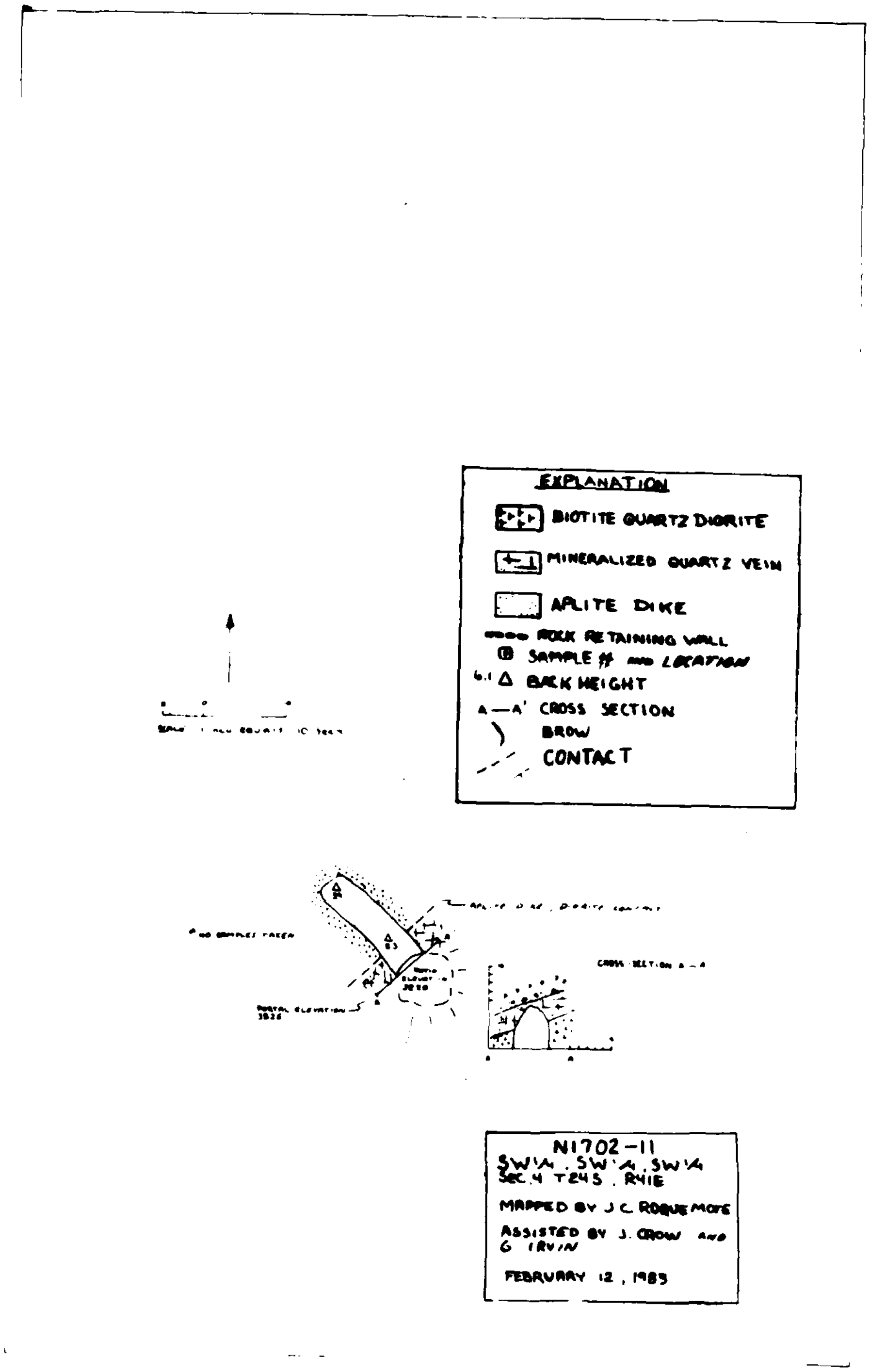


Figure 134. Plan view of workings at site N-1702-11.

N-1702-12

The main drift of this adit is 47 feet long, shown in detail on Figure 135. It is located in the SW1/4, SW1/4, SW1/4, of Sec. 4, T24S, R41E, MDB&M, as shown on Figure 116. A small crosscut ends at a stoped area 7 feet in from the portal. Twenty-two feet in from the portal another small crosscut bears right for 18 feet. The adit explores a 2.0-inches to 2.0-foot limonite and chrysocolla stained vein. The vein pinches out near the face of the main drift. A sample was taken at the stoped area which showed no economic potential (results are shown in Appendix A).

N-1702-14

A small exploratory trench shown as N-1702-14 on Figure 116 exposes aplite and quartz material. The trench is located in the NW1/4, SW1/4, SW1/4 Sec. 4, T24S, R41E, MDB&M. No samples were taken.

N-1702-15

This prospect is located in the NW1/4, SW1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M,and is shown as N-1702-15 on Figure 116. The workings at this site are confined to a N62W striking vein. A 35-foot incline dipping 23 degrees southerly follows the vein, as shown in Figure 136. The vein varies from 2 to 3.5 feet in width. Two drifts, one 9 feet from the face and the other 29 feet from the face, further explore the extent of the vein. The back height in the drift never exceeds vein thickness. A sample was taken across 2.9 feet of vein 21 feet from the portal. The sample had only minor amounts of limonite and chrysocolla staining occurring with the quartz. The assay value reported in the Appendix show the ore to have a commercial value of $51.45 troy-oz/ton. This same ore body was heavily mined down-dip at the Star of the West but there is no continuation of the vein updip. Because there is not much left in the way of mineable material, this prospect is not of any economic value and probably of no interest even to weekend prospectors.

N-1702-17

A vertical shaft 29 feet deep with a 3- by 5-foot collar at the surface is located in the NW1/4, SW1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M shown as N-1702-17, on Figure 116, a modified claim layout and location map. The shaft is driven in decomposed diorite and no mineralization is present. No samples were taken.

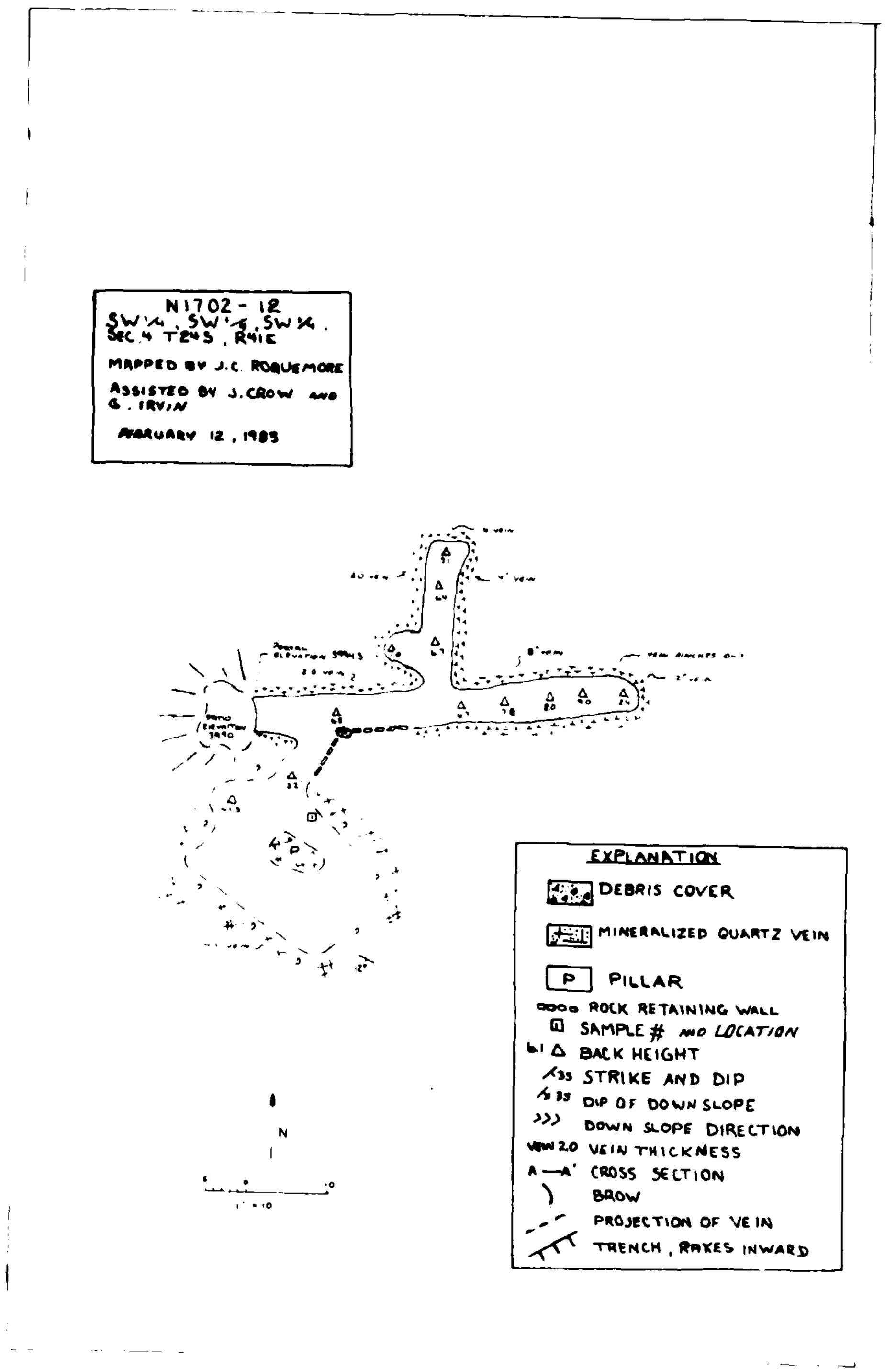


Figure 135. Plan view of workings at site N-1702-12.

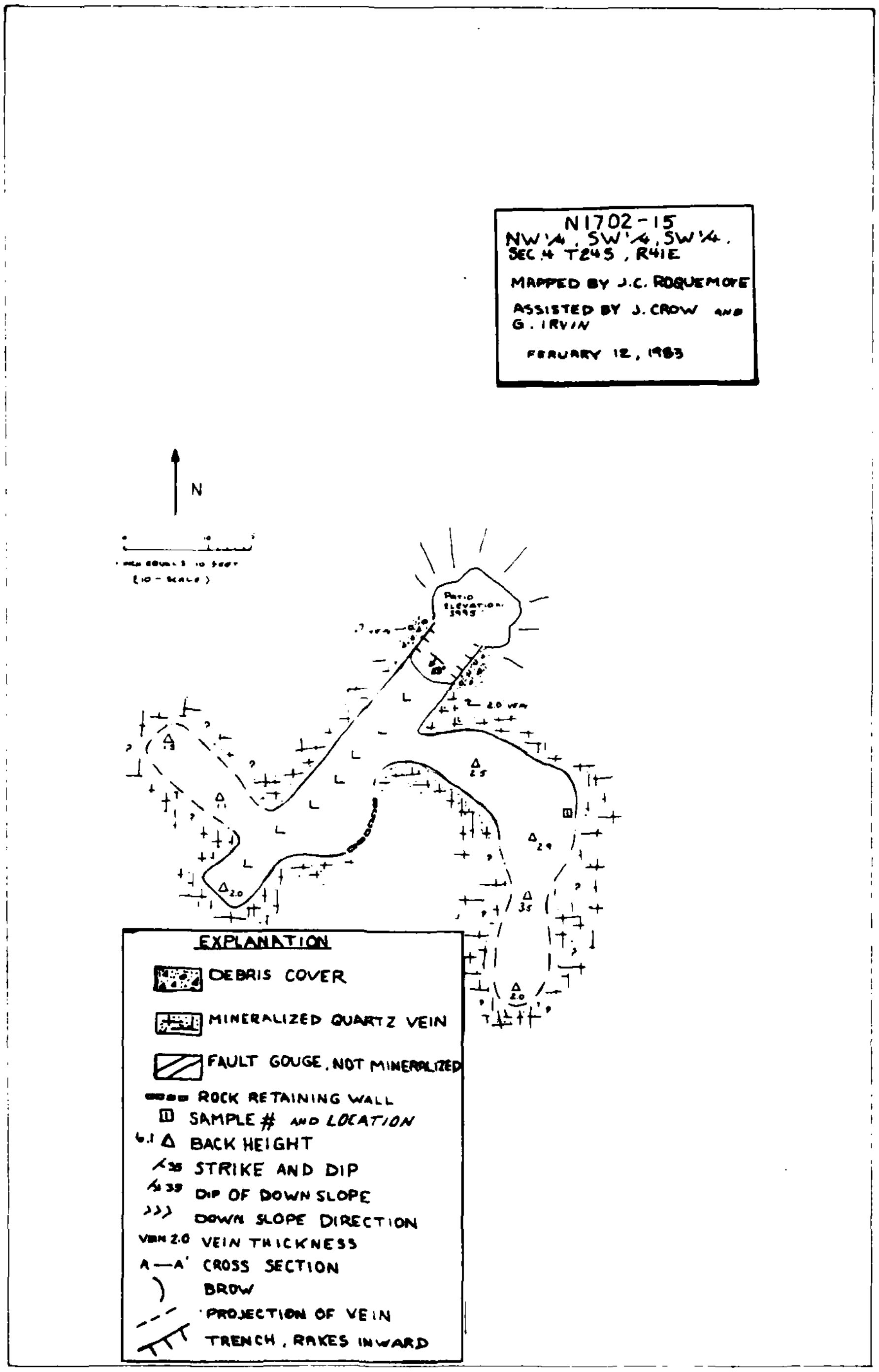


Figure 136. Plan view of workings at site N-1702-15.

N-1702-19 and -25

These two prospect pits are shown on the updated location map, Figure 116. Both pits exposed limonite-stained quartz. No samples were taken. The pits are located in the NW1/4, SW1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M.

Pierce Arrow (N-1702-13)

A collapsed shaft located in the NW1/4, SW1/4, SW1/4, Sec. 4, T24S, R41E, MDB&M, shown as N-1702-13 on Figure 116, explores a fault contact along a mafic dike. The collapsed shaft is 4 by 5 by 6 feet deep. No mineralization was present and no samples were taken.

Sterling Queen Mine (N-1704)

The Sterling Queen Mine is located about 3.2 miles north-northwest of Paxton Ranch in the SE1/4 of Sec. 18, T24S, R41E, MDB&M, as shown in Figure 9. A surface plan view of the property is given as Figure 137. The mountainous terrain of the area is shown by the radical differences in portal elevation from one group of workings to the next.

Site 1 (Figure 138). Site 1 consists of an adit, 69 feet long, that was driven along a quartz-filled shear zone cutting Mesozoic quartz diorite on the trend of N10W while dipping southwesterly 39 to 54 degrees. The quartz vein is from 3 to 5 feet thick and is massive white with clay and limonite seams throughout. Limonite also occurs as pseudomorphic clusters after pyrite crystal groups. A single sample was taken along the vein (N-1704-1-1). The results show noneconomic concentrations of gold.

Main Mine (Figures 139 through 141). Adits 2, 3, and 4 make up the main mine. They follow a shear zone (also in quartz diorite) that averages about 2 feet thick, trends N5W and dips south from 10 to 42 degrees (averaging 25 degrees). The shear is filled with quartz, which is barren in +90% of the exposure. Where mineralization is exposed in the lower unstoped portions of the shear zone, it is present as small, widely scattered, clots and masses of sulfides (pyrite, chalcopyrite) with alteration products of chrysocolla, hematite and limonite. (All of the samples taken for this survey are from some of these sulfide occurrences.) Post-mineral movement along the shear has caused the vein to be badly broken. The sulfide zones themselves are badly sheared and brecciated, which has facilitated rather pervasive weathering.

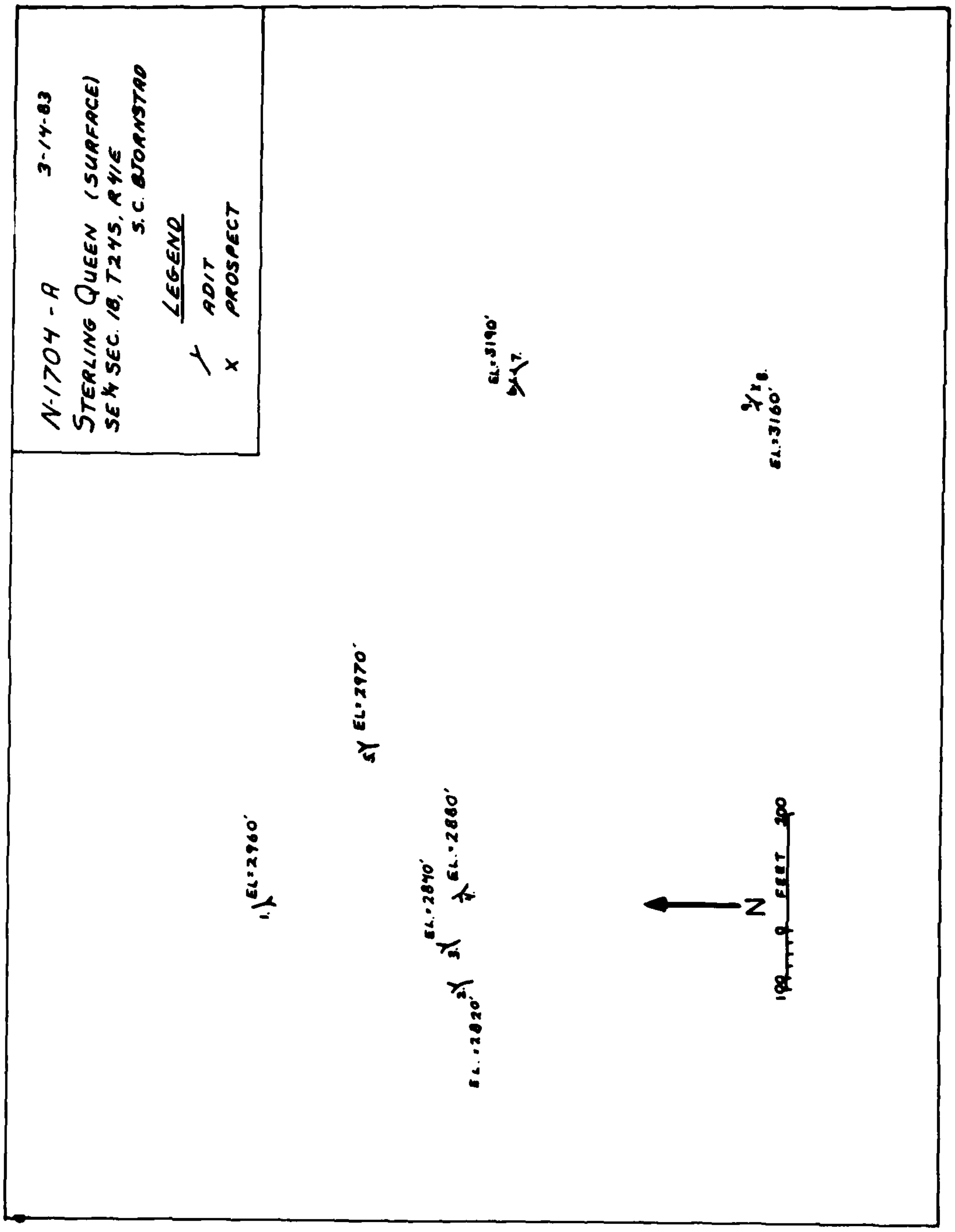


Figure 137. Surface plan view of Sterling Queen workings.

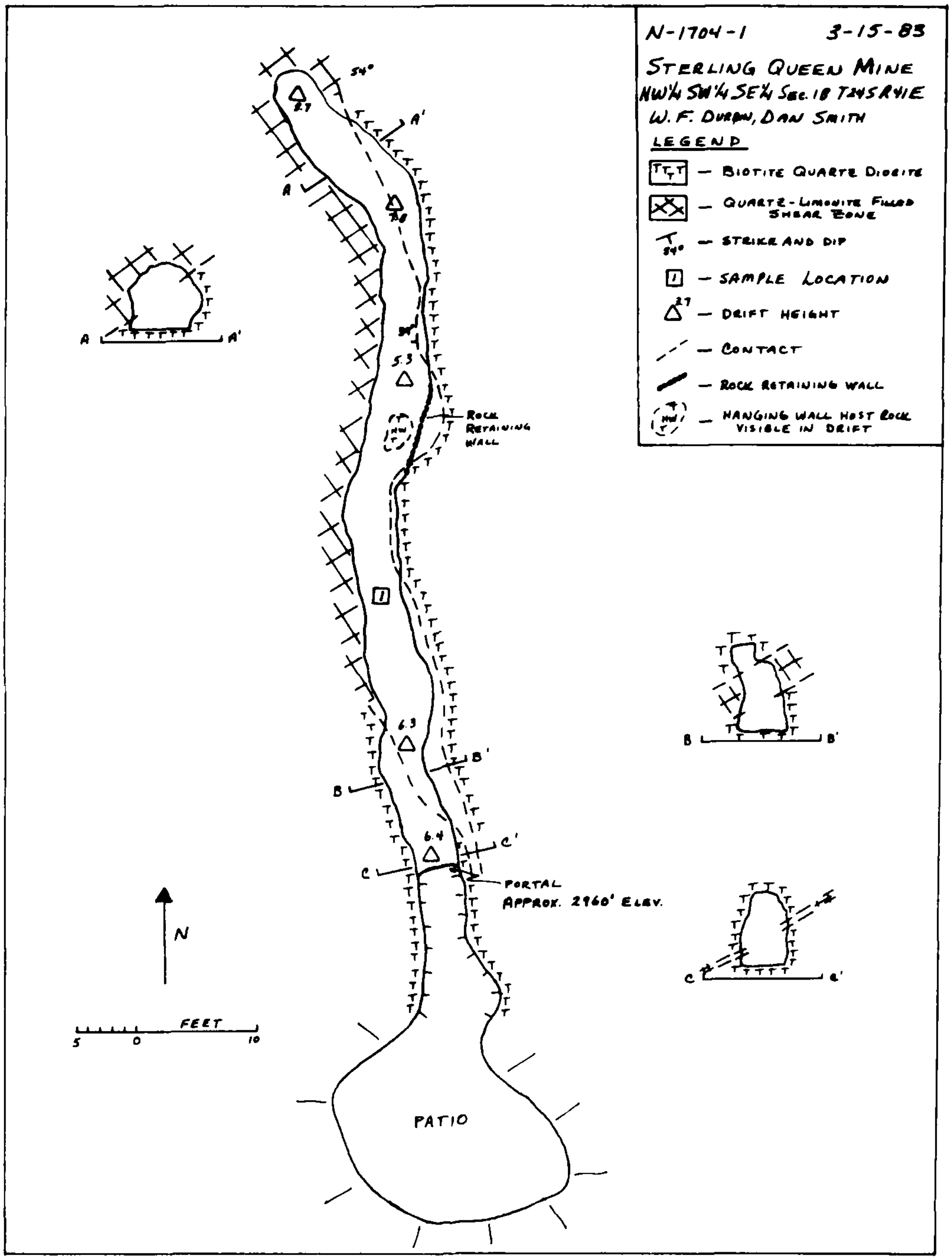


Figure 138. Plan view of site 1 adit, Sterling Queen Mine.

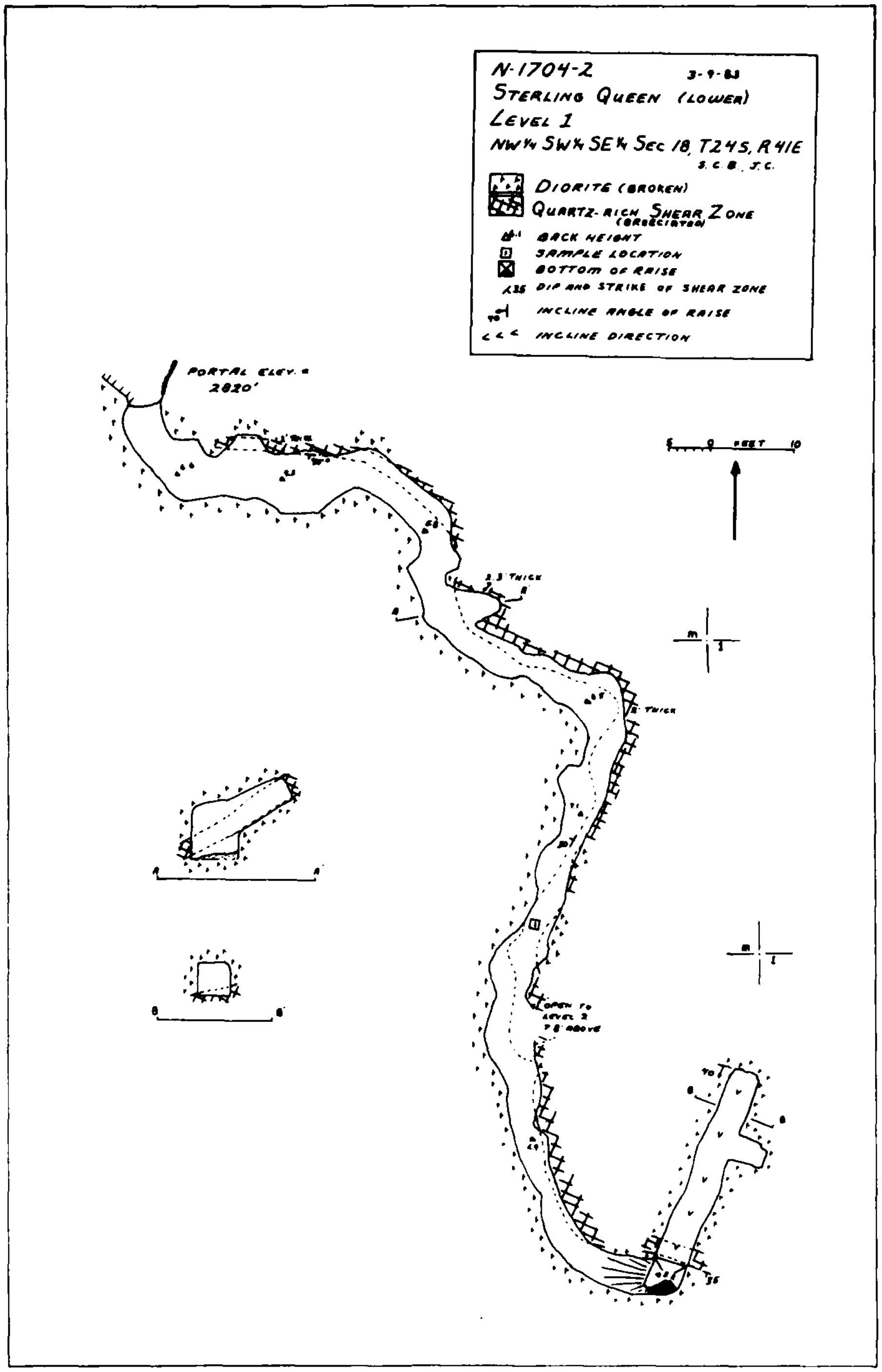


Figure 139. Plan view of adit 2, main workings, Sterling Queen Mine.

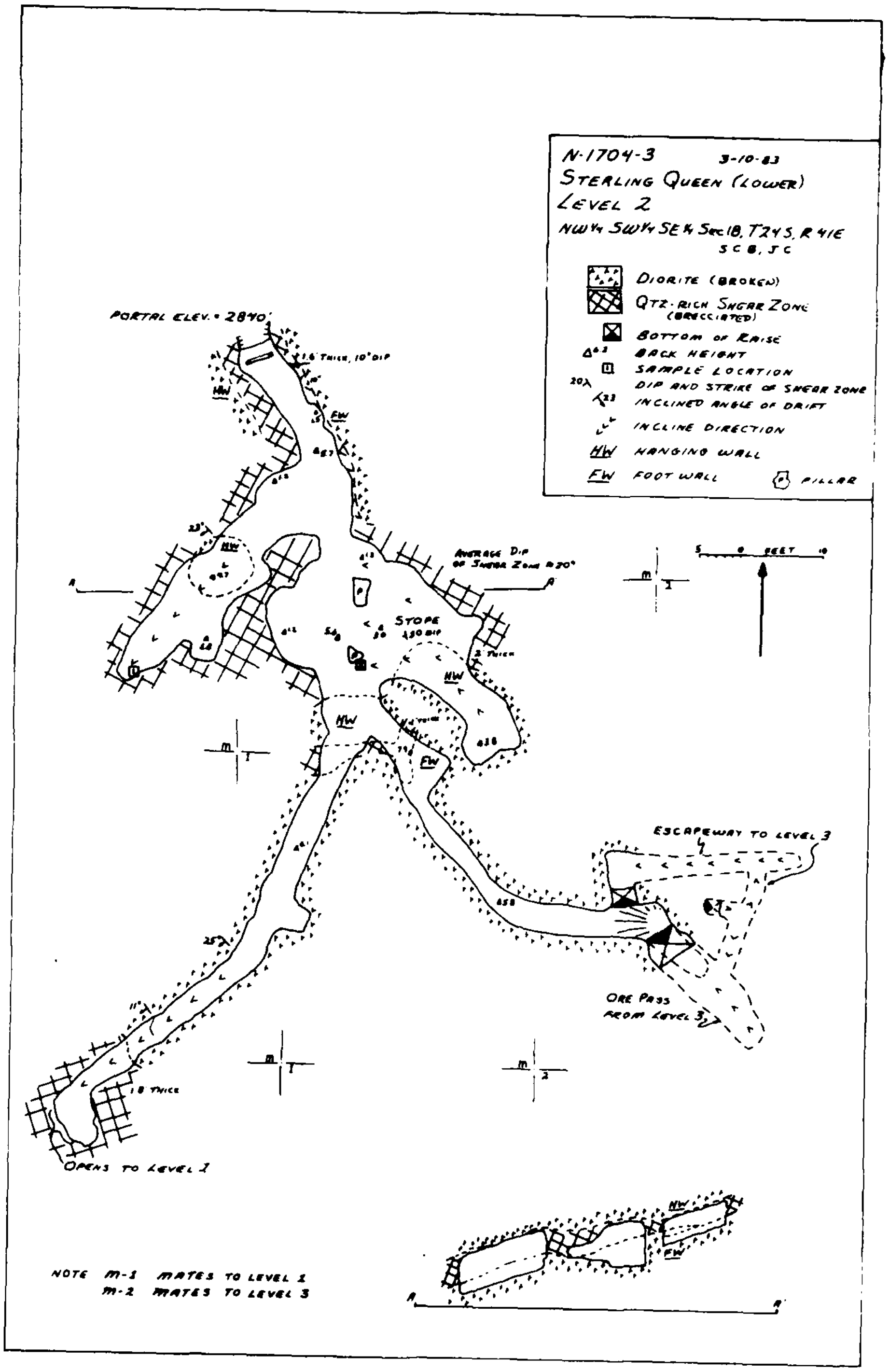


Figure 140. Plan view of adit 3, main workings, Sterling Queen Mine.

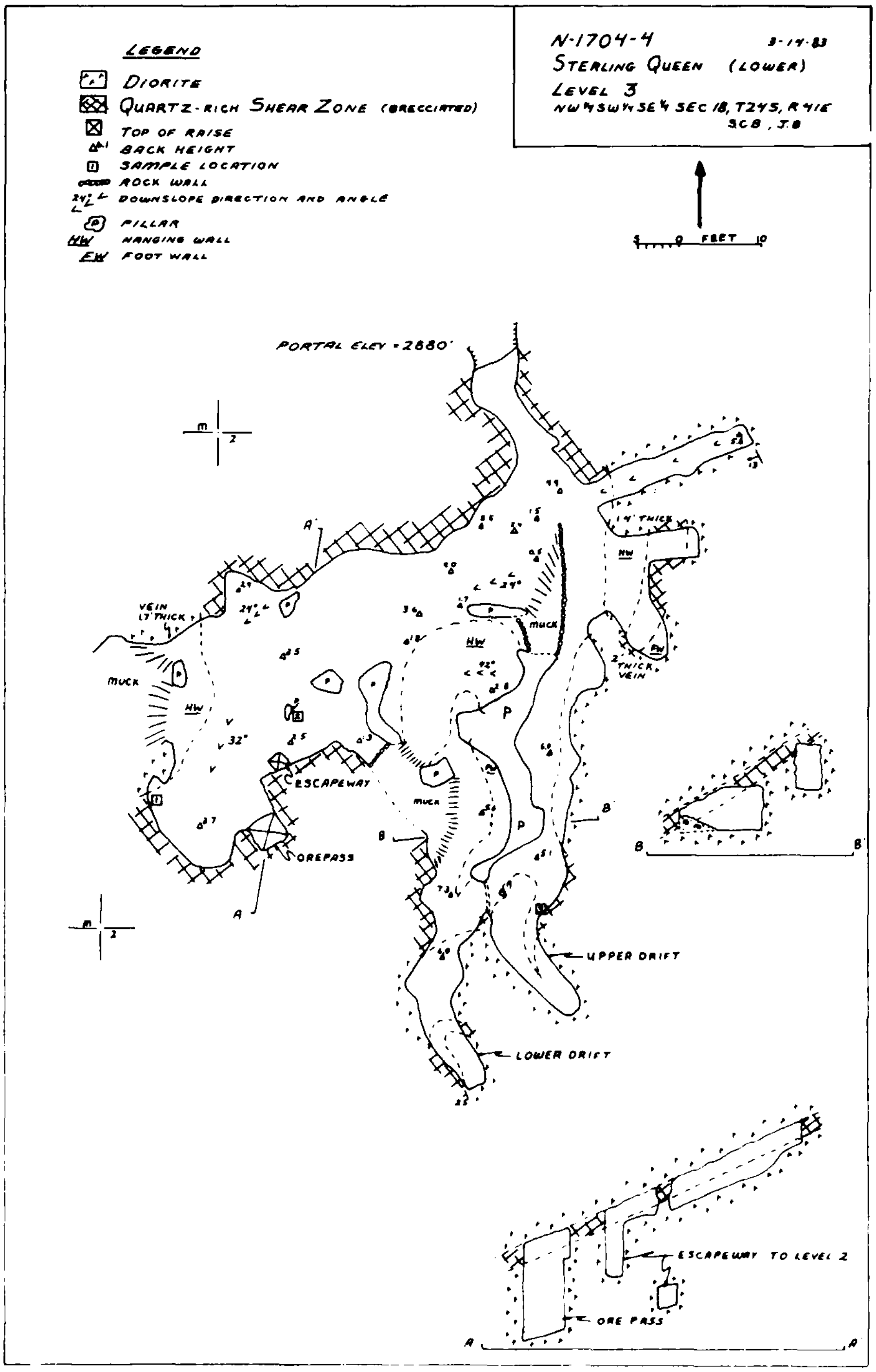


Figure 141. Plan view of adit 4, main workings, Sterling Queen Mine

The adits are numbered in the following manner: N-1704-2 is Level 1, the lowest level; N-1704-3 is the middle workings, Level 2; and N-1704-4 is Level 3, the upper level. Level 1 workings consist of 156 feet of drift and 34 feet of raise, all driven along the vein. The vein at this level is almost totally barren, except toward the rear where it connects to Level 2. Sample N-1704-2-1 was taken from this area.

Level 2 workings include 193 feet of drift and 70 feet of raises (as an escapeway and ore pass from Level 3). About 204 cubic yards of material was removed by stoping on this level, with less than 88 cubic yards of it being vein material. Sample N-1704-3-1 was taken from a sulfide occurrence at the bottom of a short decline and sample N-1704-3-2 was taken from a small stope pillar.

Level 3 workings include 149 feet of drift and 20 feet of shallow raise. Stoping was most extensive on this level with approximately 402 cubic yards mined, 270 cubic yards of which was quartz vein. Samples N-1704-4-1 and N-1704-4-2 were taken in the stope while N-1704-4-3 was taken at a point in the upper drift where the vein died out. Gold and silver assays and values are given in Table 44 below and are listed in Appendix A.

TABLE 44. Precious Metal Values for High-Grade Grab Samples Taken From the Main Mine Workings.

Sample	Gold		Silver		Total value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1704-2-1	0.770	385	0.43	6.45	391.45
N-1704-3-1	0.470	235	3.20	48.00	283.00
N-1704-3-2	0.120	60	1.146[a]	17.19	77.19
N-1704-4-1	0.270	135	1.15	17.25	152.25
N-1704-4-2	0.064	32	0.36	5.40	37.40
N-1704-4-3	0.320	160	1.44	21.60	181.60

[a]Kevex results.

<u>Site 5 (Figure 142)</u>. Site 5 consists of an adit with 80 feet of drift and winze driven on a quartz vein 3 to 7 feet thick in quartz diorite. The vein strikes northerly, dips west at about 15 degrees and is composed of milky quartz with very sparse siderite inclusions. The vein is cut off by a steeply dipping east-west fault. No mineralization was seen and no samples were taken.

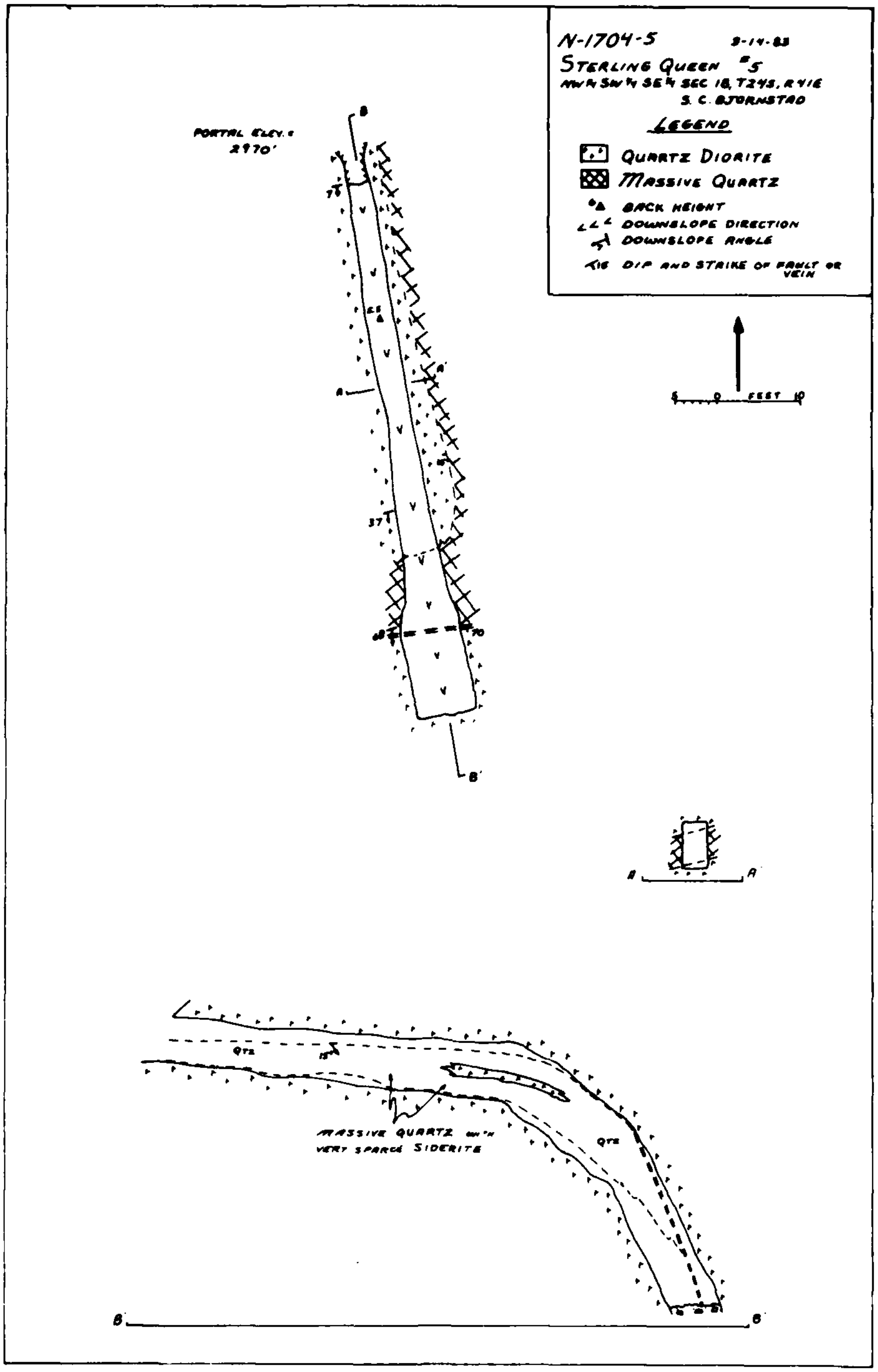


Figure 142. Map of workings at site 5, Sterling Queen Mine.

Upper Mine (Figures 143 and 144). The uppermost workings consist of two closely spaced adits. N-1704-6 is a 20-degree decline that was driven to explore the extent of a 1-foot-thick, quartz-limonite filled, shear zone in the quartz diorite. The decline was driven 67 feet down-dip. The vein pinches out at about 25 feet and the rest of the workings exposed no other vein. No samples were taken from this decline.

The other adit (N-1704-7) consists of a 110-foot drift and a 65-foot decline (-14 degree slope). The workings explored a 1 foot thick vein of quartz, limonite, and clay. The vein cuts across both the quartz diorite pluton and a later stage, light-gray to pinkish, fine-grained aplite. Three small areas were mined on the drift level for a total of about 12 tons. The vein at these points contains sparse to moderate azurite and malachite fracture coatings with sparse disseminated pyrite (and limonite pseudomorphs). Outside of these areas the quartz vein is barren. The vein dies out down-dip and along strike to the southeast. A sample was taken of one of the highly mineralized pods. It assayed at 0.63 troy-oz/ton or $315/ton.

Southwest Sites 8 and 9 (Figure 145). Site 8 consists of several prospects (doghole adits, shallow trenches and pits, and a 19-foot shaft) that were dug near the adit at Site 9. They were dug on a variety of small occurrences (aplite dike with light chrysocolla coating, fractured 5-inch massive barrier quartz vein with sparse hematite staining). Sample N-1704-8-1 was taken from one of the quartz veins. The results showed no appreciable gold. Site 9 has more extensive workings but the mineral occurrence is the same. A 135-foot adit was driven to intersect a 2-foot-wide shear zone that trends N55W and dips northeast at 41 degrees. The shear contains sparse brecciated quartz with very little copper and hematite staining. Sample N-1704-9-1 was taken at this site.

The potential for a commercially economic gold deposit on the Sterling Queen property is slight. Some of the "high-grade" grab samples taken from the main and upper mines showed good precious metal values, but these were taken from small isolated pockets of strong mineralization that represent somewhat less than 10% of the total exposed vein. There is no geologic reason to expect the mineralization to become more pervasive with depth, expecially in light of the extensive vertical exposures provided by the high relief of the area.

Unnammed Prospect (N-1705)

NWC reference number N-1705 corresponds to a small prospect located in the NE1/4, NE1/4, SE1/4, of Sec. 16, T24S, R41E, MD&BM, as shown in Figure 9. The prospect pit is 4 feet deep and 7 feet wide and was dug in Mesozoic biotite quartz diorite. The only mineralization is some slight hematitic staining along a small shear zone and broken,

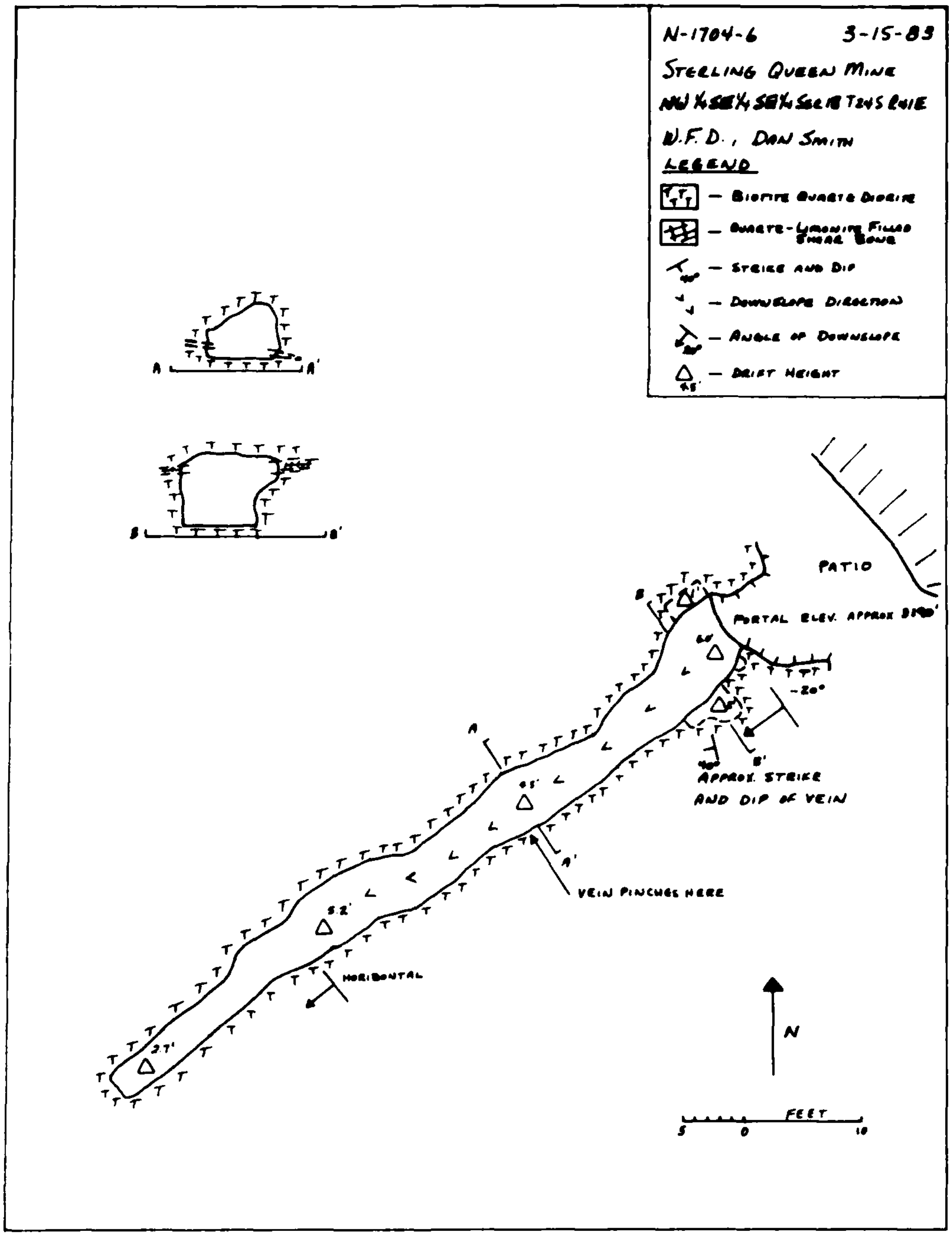


Figure 143. Map of workings at site 6, Sterling Queen Mine.

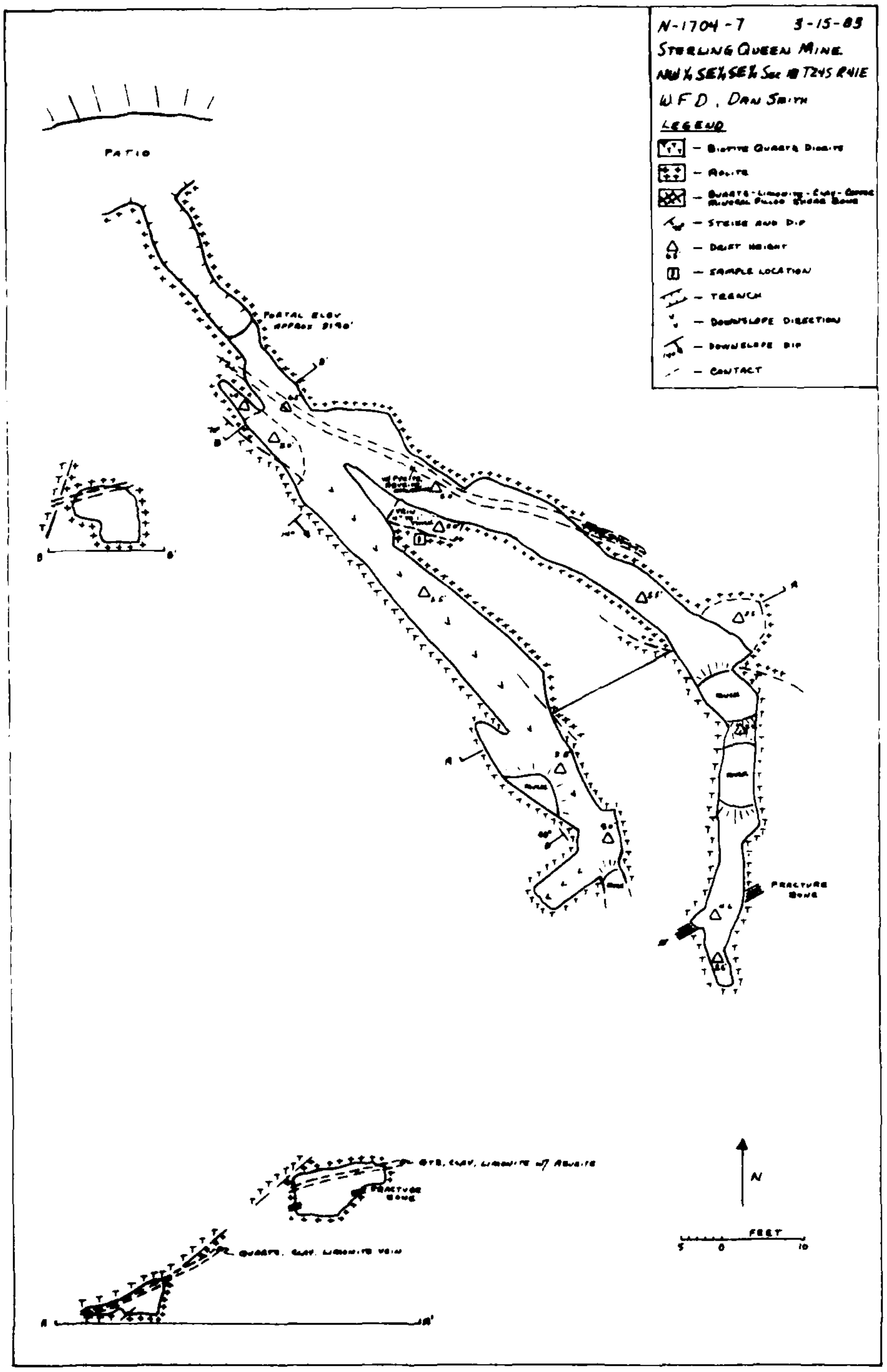


Figure 144. Map of workings at site 7, Sterling Queen Mine.

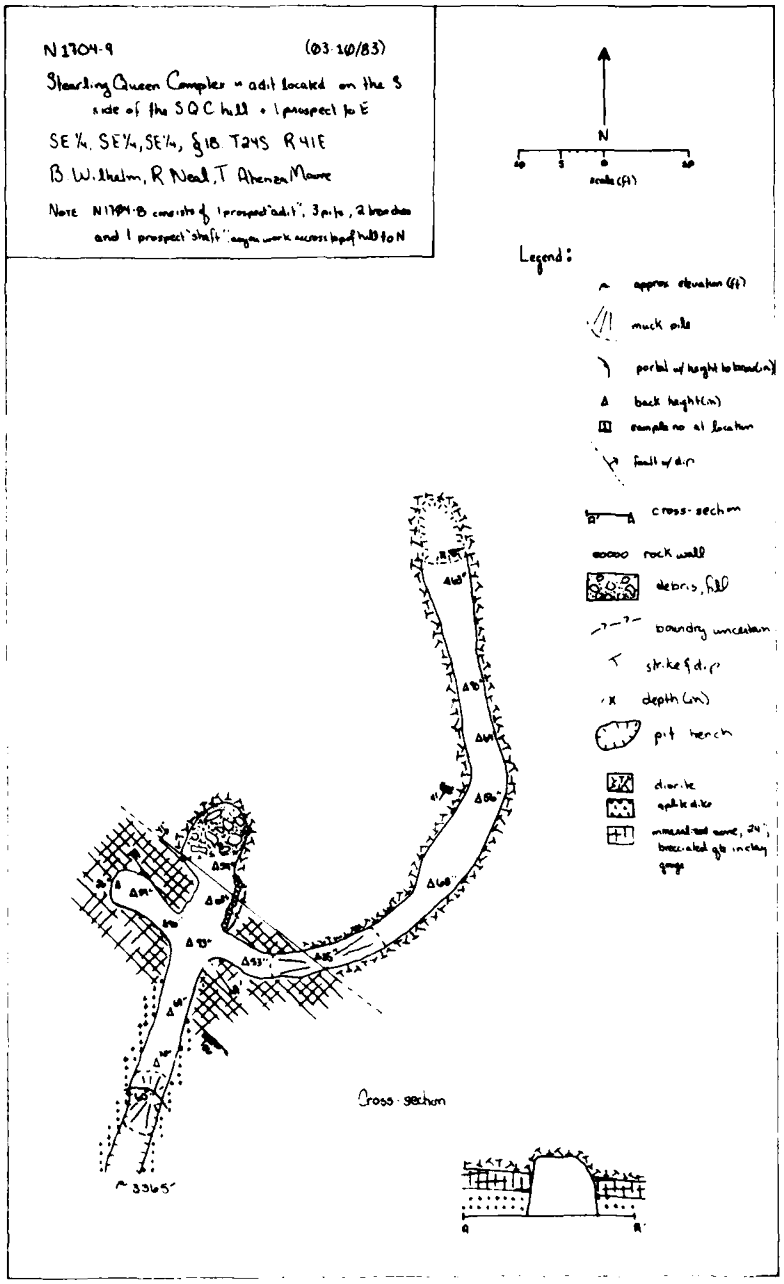


Figure 145. Map of workings at sites 8 and 9, Sterling Queen Mine.

chrysocolla and limonite stained, quartz in the dump. All indications suggest that a small isolated lens of mineralized quartz has been removed. Although the assay values for gold indicate 0.9 troy oz/ton for a grab sample taken from the dump, there is obviously not enough material to make it of any interest, even to weekend prospectors. Assay results are shown in Appendix A.

Unnamed Prospect (N-1707)

These sites are located in the SE1/4, SE1/4, SW1/4, Sec. 8, T24S, R41E, MDB&M, at an approximate elevation of 3840 feet. They are shown as N-1707 on Figure 9.

The property was explored by digging three small prospect pits and an adit. The pits expose small quartz lenses along a poorly defined northwest trending shear zone. Sample N-1707-3 was taken from the northwestern-most pit, the quartz at this site showing moderate iron staining as limonite fracture coatings. The adit, shown in detail in Figure 146, exposes an 11-inch quartz vein which is faulted off just 15 feet into the adit. The drift then follows a N41W striking shear zone which dips an average of 70 degrees northeast and contains sparse small quartz lenses. The quartz vein and lenses have minor limonite as fracture coatings. Sample N-1701-2 was taken from this vein material. Directly above the vein is a 12-inch blue clay zone which was sampled as N-1707-1.

Assay analysis of these samples, given in Appendix A, show this property to have no commercial potential for precious metals.

Unnamed Prospect (N-1708)

This prospect is located approximately 1.2 miles south-southwest of the Star of the West Mine and 2.15 miles northeast of the Sterling Queen in the S1/2, SE1/4, SW1/4, Sec. 9, T24S, R41E, MDB&M. It is shown as N-1708 on Figure 9.

The inclined shaft, shown in detail on Figure 147, shows a pinch and swell quartz vein in Mesozoic granodiorite. The vein strikes N36W and dips an average of 27 degrees southwest. The quartz shows intense secondary mineralization of limonite, chrysocolla and minor malachite as fracture coatings at the surface but this mineralization drops off dramatically as you follow the vein down dip.

Three samples were taken along the vein as indicated in Figure 147. Assay results, shown in Appendix A, indicate this site has no commercial potential for metal production.

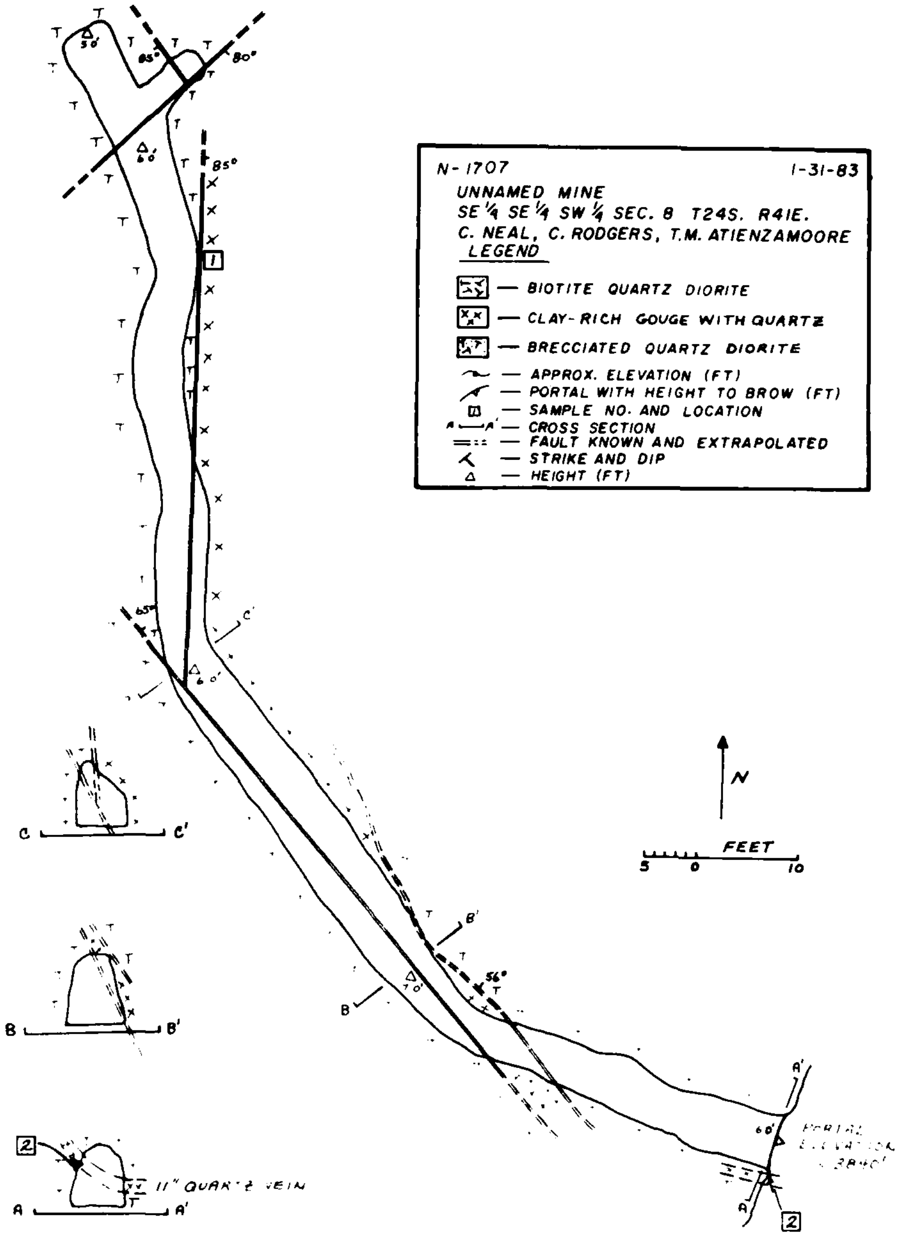


Figure 146. Plan view of workings at site N-1707.

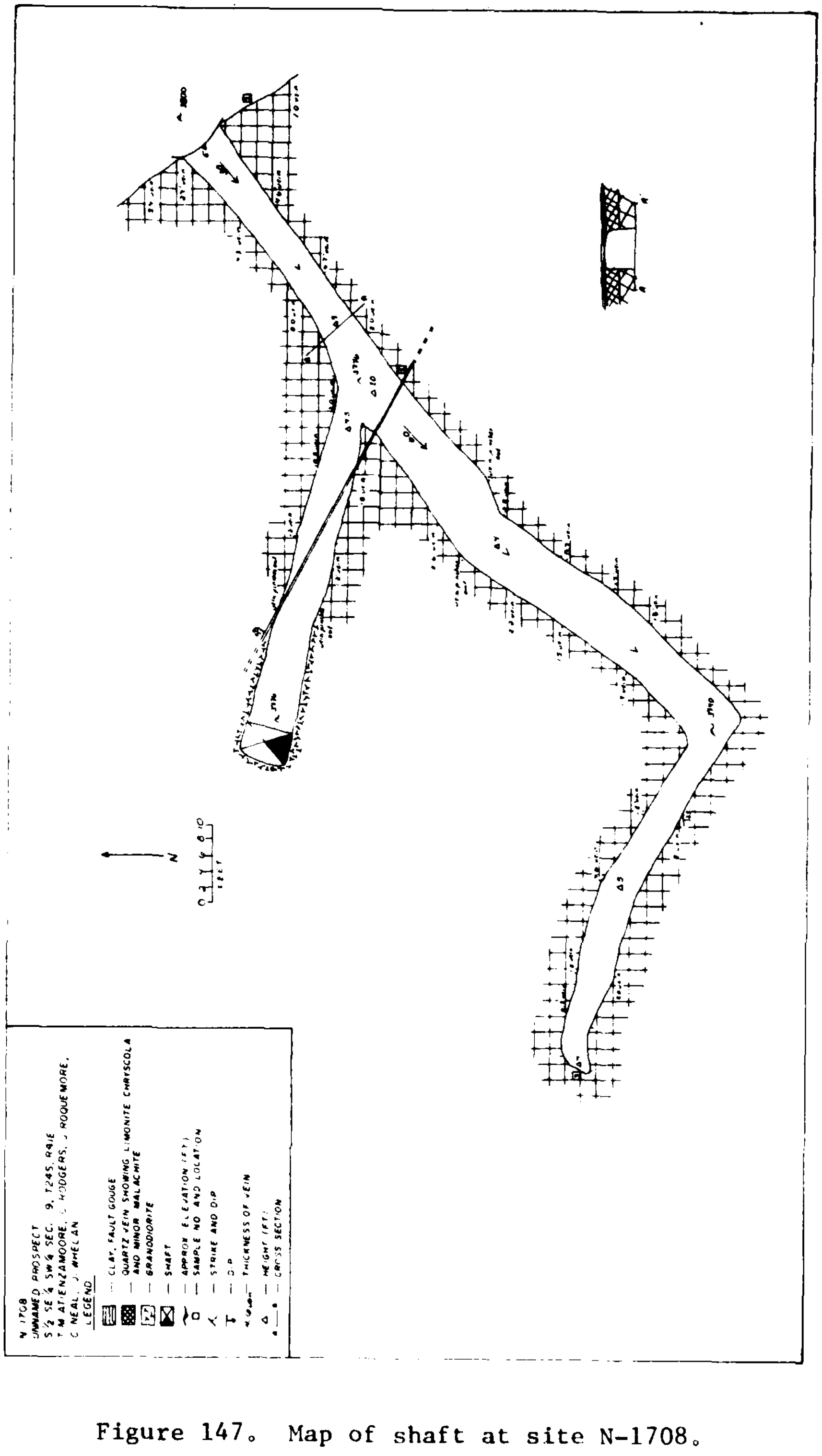


Figure 147. Map of shaft at site N-1708.

Unnamed Prospect (N-1712)

This 174-foot prospect, shown in Figure 148, is located in the SW1/4, NW1/4, NW1/4 of Sec. 5, T24S, R41E, MDB&M, and is shown as N-1712 on Figure 9. An aplite dike outcrops near the portal and is 3.5 feet wide with a bearing of N36E and dipping 89 degrees southerly. The workings are developed on a shear zone in Mesozoic quartz diorite with quartz veinlets occurring sporadically along the shear which strikes N70W and dips 52 degrees south. A sample was taken at the face across a veinlet. The assay results, shown on Appendix A, indicate the property has no commercial potential.

Unnamed Prospect (N-1713)

Thirty-three feet of workings, shown on Figure 149, explore a 0.3- to 1.0-foot-wide vein. The adit is located in the SW1/4, SW1/4, SE1/4, Sec. 5, T24S, R41E, MDB&M, and is shown as N-1713 on Figure 9. It follows a limonite and chrysocolla stained vein that is along a 1- to 4-foot shear zone cutting the diorite country rock along a N53W strike and dipping at 50S. A sample from the vein was taken at the face. Assay results, shown on Appendix A indicate that this site has no commercial potential for precious metal production.

Unnamed Prospect (N-1720)

This inclined shaft is located approximately 1.4 miles south-southeast of the Star of the West Mine and 2.1 miles east-northeast of the Sterling Queen Mine in the SE1/4, NW1/4, NE1/4, Sec. 16, T24S, R41E, MDB&M. Figure 9 shows this site as N-1720.

The workings, shown in detail on Figure 150, expose a pinch and swell quartz vein which lies in a N24E striking shear zone which dips, on an average, 41 degrees southeast. The host rock for the deposit is a Mesozoic biotite quartz diorite. The quartz shows secondary iron and minor copper mineralization as fracture coatings of limonite with occasional traces of chrysocolla.

Two samples of vein material were taken. They represent the most concentrated secondary mineralization available. N-1720-1 was taken from the 0.5-foot wide vein. The vein shows intense limonite and trace chrysocolla. Sample N-1720-2 shows limonite only, in a vein 0.9 foot wide at the point of sampling. Neither of the samples taken shows commercial potential for precious metals as can be seen from their assay analysis shown on Appendix A.

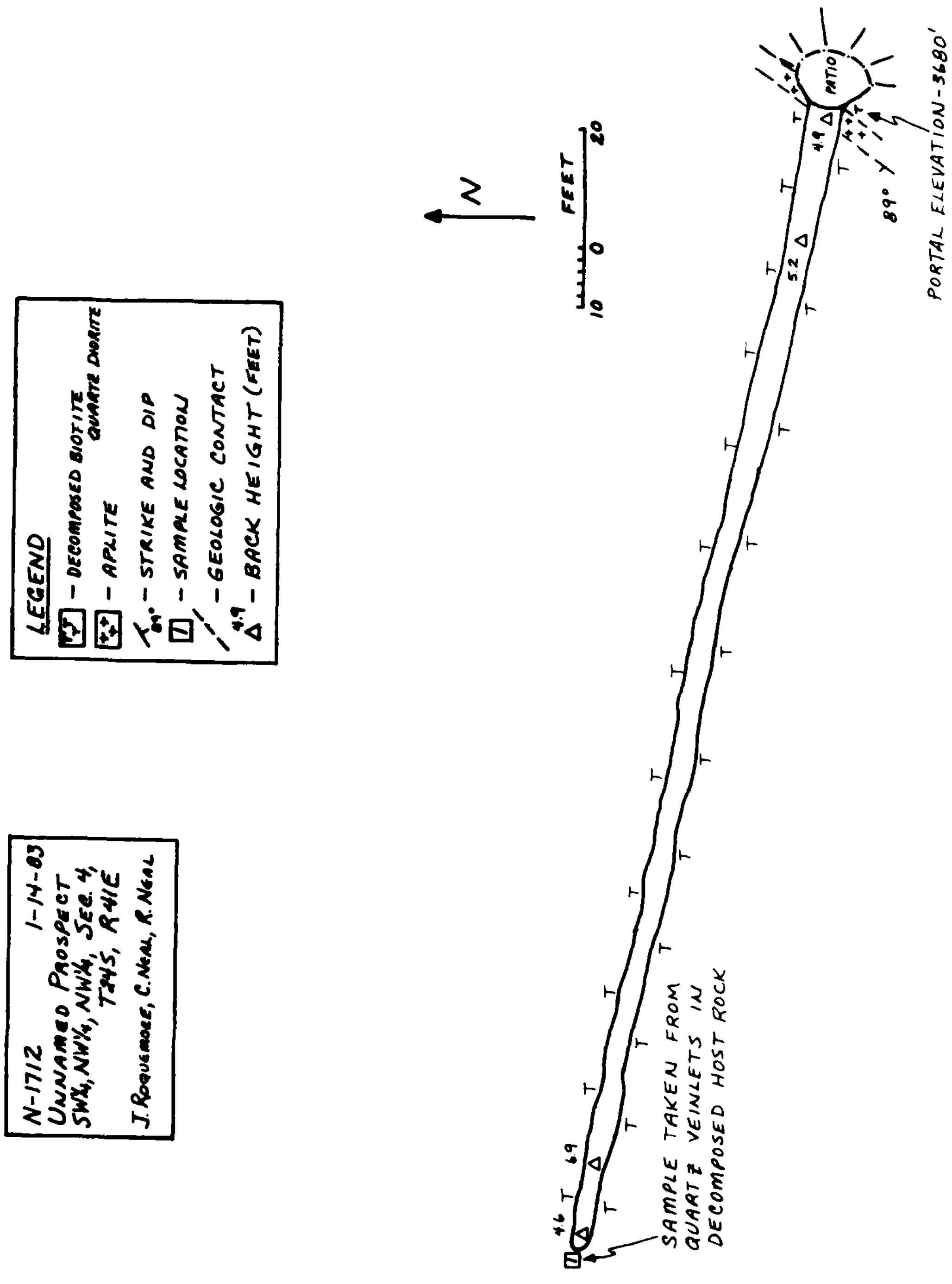


Figure 148. Plan view of workings at site N-1712.

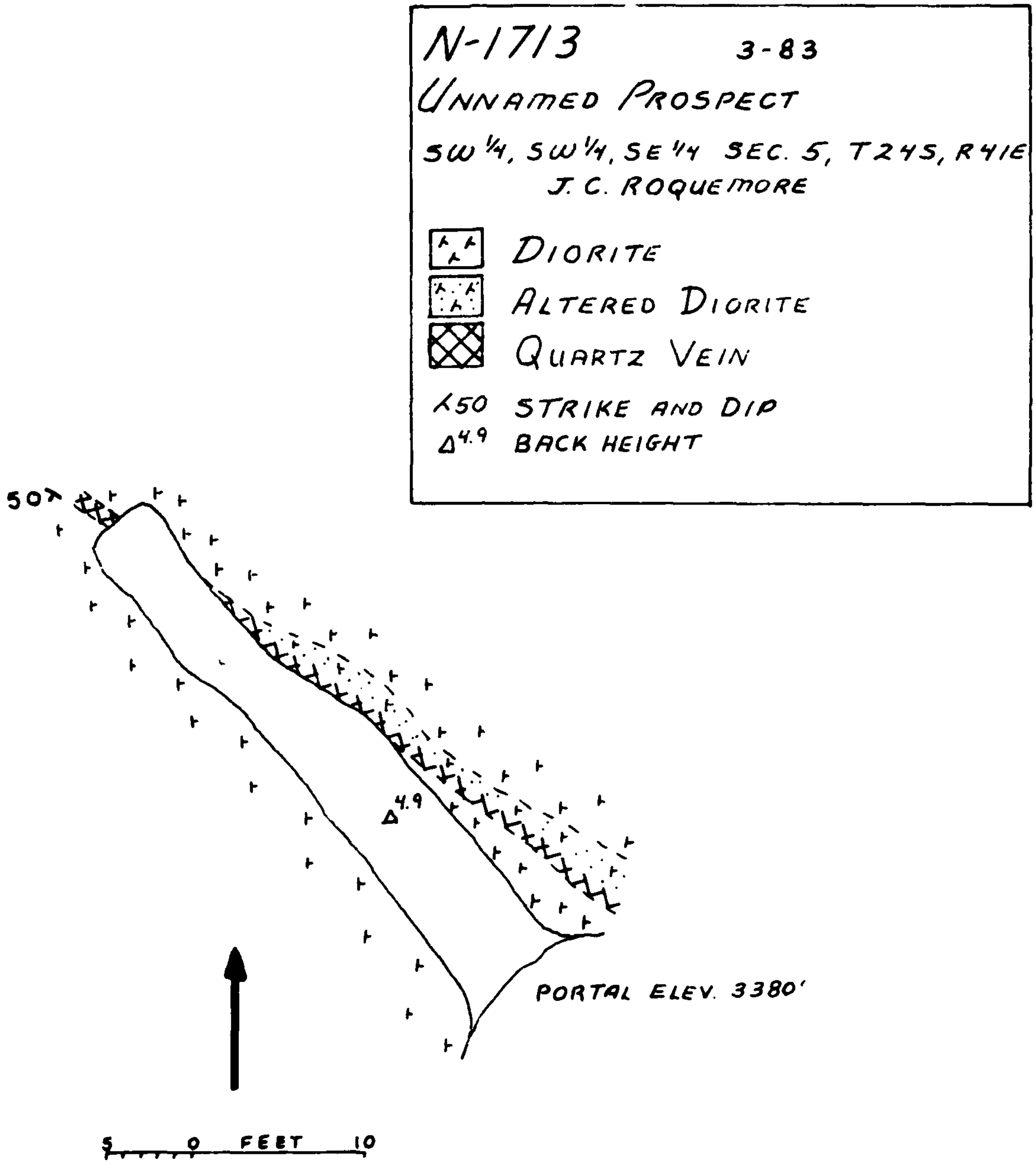


Figure 149. Map of workings at site N-1713.

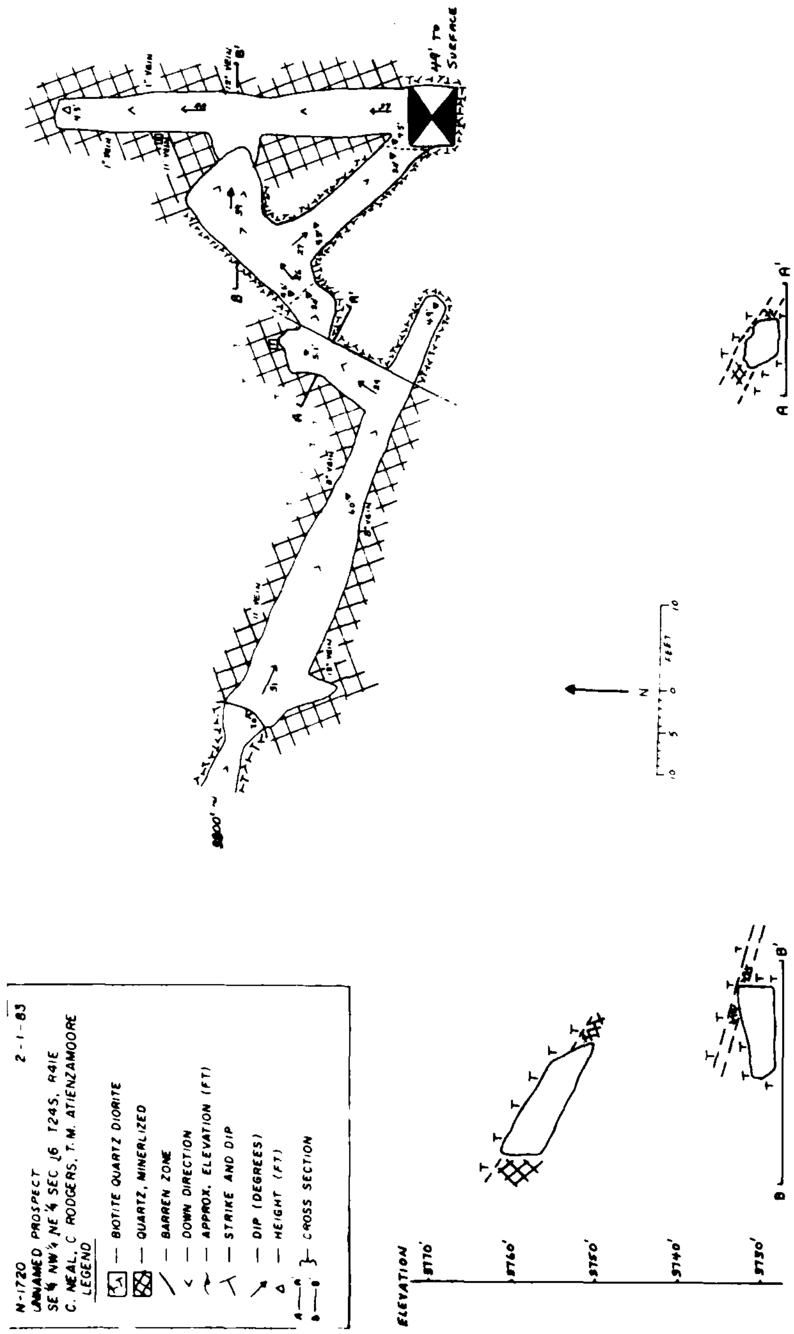


Figure 150. Map of inclined shaft at site N-1720.

Octavius Claim (N-1722)

The claim notice found at this location states that the site was discovered 18 February 1937. The prospect is located in the SE1/4, SE1/4, SW1/4 of Sec. 5, T24S, R41E, MDB&M, and is shown on Figure 9. This prospect is a 4- by 3- by 4-foot pit that explores a massive limonite stained quartz lens in quartz diorite country rock. Two samples were taken, with the assay results being found in Appendix A. This site shows no economical potential for the production of precious metals.

Unnamed Prospect (N-1725)

This 26-foot adit, shown in Figure 151, in the NW1/4, SE1/4, NW1/4, of Sec. 9, T24S, R41E, MDB&M and is shown on Figure 9. The prospect explores a N20E shear zone with a dip of 30 degrees southeasterly. Limonite stained quartz veinlets comprise approximately 10% of the gouge material. The total width of the shear zone is 3 feet. The sample locations are also shown in the plan view. Two samples were taken of the quartz veinlets. Sample N-1725-1 shows negligible gold, while sample N-1725-2 has a gold value of 2.2 troy-oz/ton or $1100/ton. Complete assay results are shown in Appendix A. Assuming that this is a valid and representative sample (and not an erratic high), it indicates that a few tons of ore, at $1100/ton, could be mined at the surface here. Field observations indicate, however, that there is little potential for an extension of this occurrence. Given the position of the high-grade occurrence (at the portal) and the extensive salting seen elsewhere in this area, the validity of sample 2 is rather suspect.

Unnamed Prospect (N-1726)

A total of 94 feet of workings are located in the SW1/4, SW1/4, SE1/4 of Sec. 5, T24S, R41E, MDB&M. They are shown as N-1726 on Figure 9. Twenty-nine feet from the portal the workings incline 21 degrees for 28 feet as shown in Figure 152. The adit explores limonite stained fault gouge in diorite country rock. Two samples were taken: sample N-1726-1 from a small stoped area and sample N-1726-2 from the face. Analytical results are shown in Appendix A. No economic potential exists at this location.

Star Dust Nos. 1 and 2 (N-1727)

Examination of discovery monuments in place on the property disclosed two lode claim notices which named the property Star Dust. The notices were posted in 1938 by Lee Briste, Rose N., Philip C. and

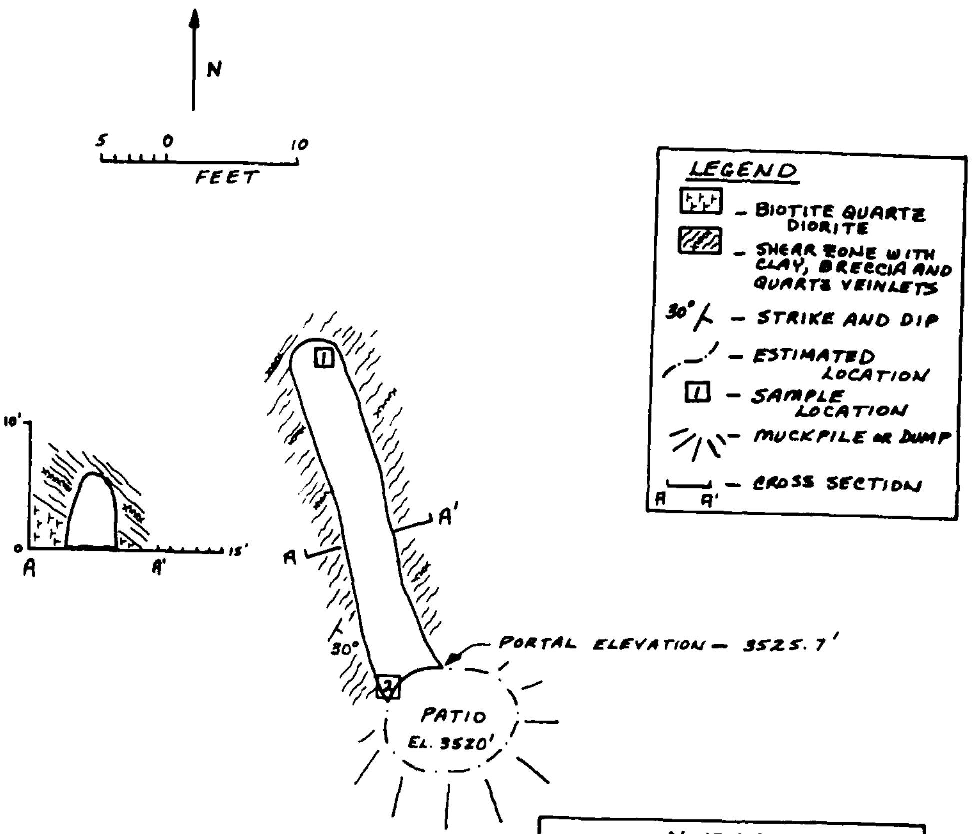


Figure 151. Plan view of adit at site N-1725.

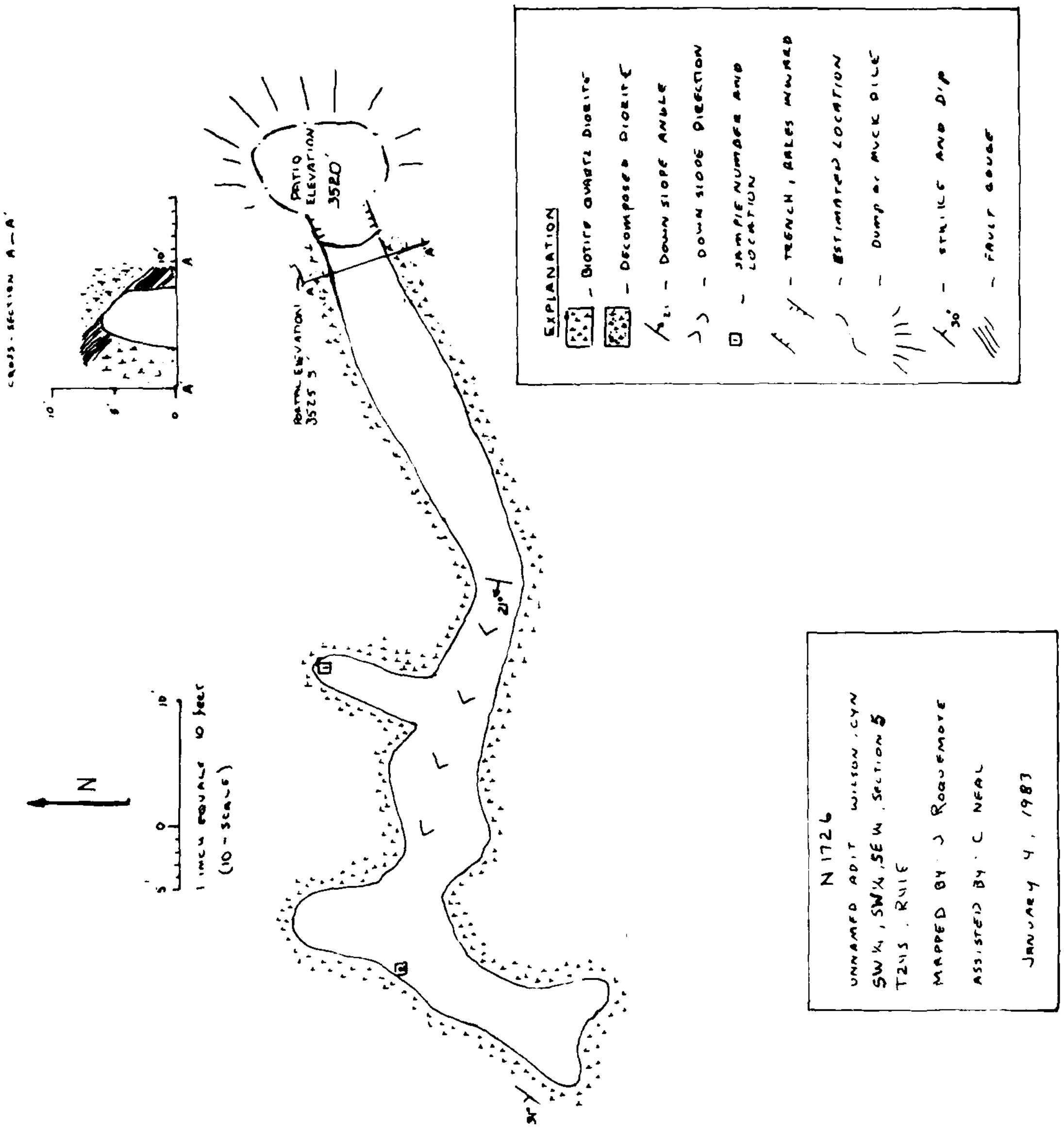


Figure 152. Plan view of workings at site N-1726.

Geo. C. Smith. The workings are located in the N1/2, SW1/4, NW1/4, Sec. 20, T24S, R41E, MDB&M, and are shown as N-1727 on Figure 9.

The workings explore quartz lenses along northwest-trending, southwest-dipping shears in Mesozoic biotite quartz diorite. The quartz lenses show two separate stages of mineralization; the quartz was emplaced, fractured, limonite then filled these fractures. The quartz was fractured a second time, carbonate bearing waters partially filled these second fractures with calcite and minor limonite and chrysocolla, giving the fractures a drusy texture.

The property was explored by a prospect pit and two inclined shafts. The prospect pit was dug to expose a small quartz lens below a calcium carbonate capping. The quartz shows only minor fracture coatings and is represented by sample N-1727-1. The easternmost shaft, shown in Figure 153, part of Star Dust No. 2, is inclined at an angle of 25 degrees southwest to follow a quartz lens which has a maximum thickness of 3.5 feet. Sample N-1727-2 was taken near the collar on the east wall of this shaft. It shows a modest amount of chrysocolla in addition to the limonite. The westernmost shaft, shown in Figure 154, part of Star Dust No. 1, is inclined at approximately 46 degrees west-southwest to explore and develop a pinch and swell quartz vein that has intense chrysocolla staining and moderate limonite staining. Sample N-1727-3 was taken from a "high-grade" pile located on the dump of this shaft.

Assays, listed in Appendix A, for the samples described above indicate that this site has no commercial potential for precious metals.

Unnamed Prospect (N-1730)

Shown as N-1730 on Figure 9, this 35 feet of workings is found in the NW1/4, SE1/4, NW1/4 of Sec. 9, T24S, R41E, MDB&M. The adit explores a N24W gouge zone with a dip of 26 degrees. The gouge is limonite stained. Two samples were taken, one near the portal and the second 19 feet in from the portal. The workings and sample locations are shown in Figure 155. Assay results are found in Appendix A. Values show no economic potential at this site.

Unnamed Prospects of Little Wilson Canyon (N-1731-1, -2, -3)

This group of prospects is located in the NW1/4, NW1/4, SE1/4, of Sec. 4, T24S, R41E, MDB&M, shown as N-1731 in Figure 9. The prospects are described as follows:

N-1731-1 follows an aplitic intrusive for 39 feet. A N55W fault zone with a 73-degree dip is exposed along the footwall of a northwest-trending mafic dike. The workings are shown in Figure 156. Assay

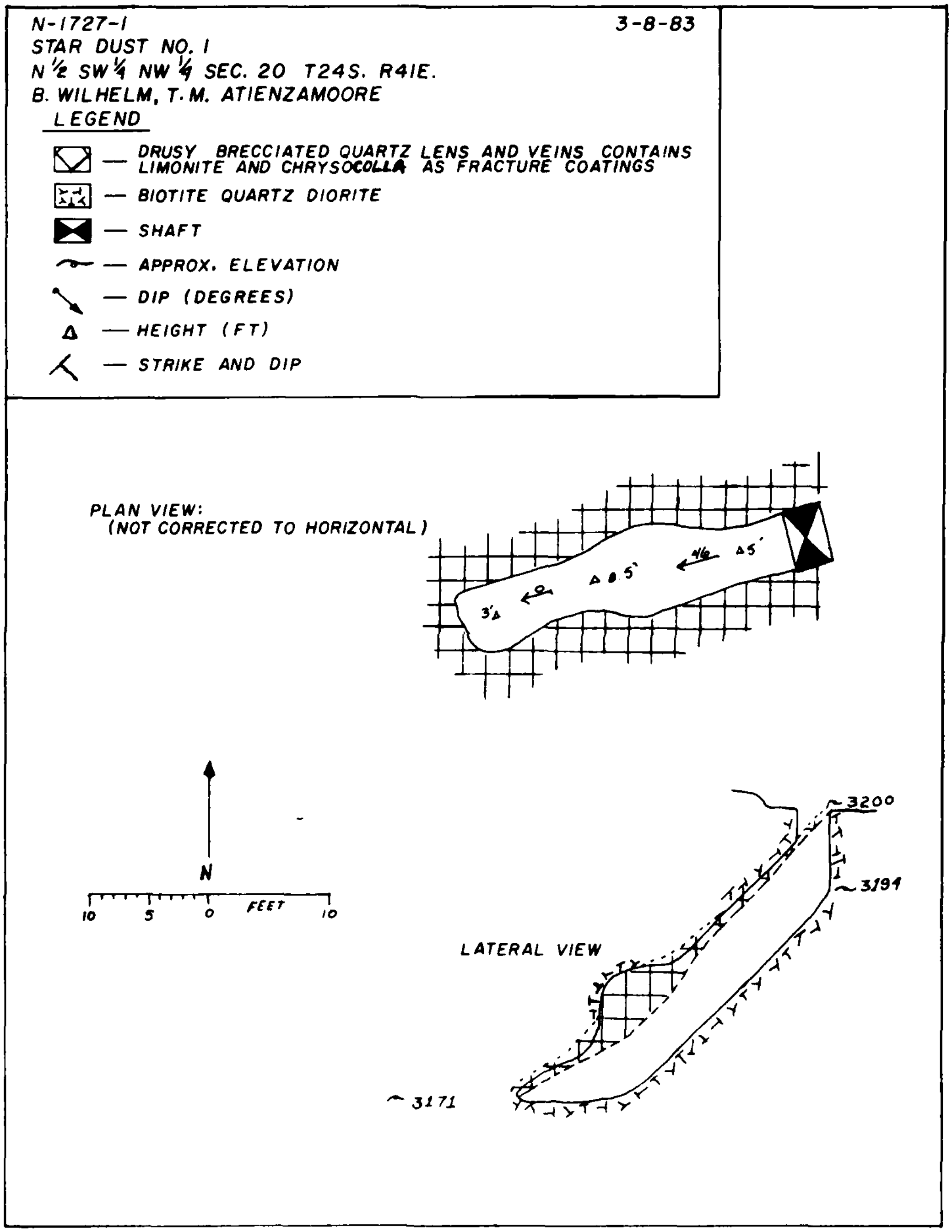


Figure 153. Map of east shaft at Star Dust No. 1.

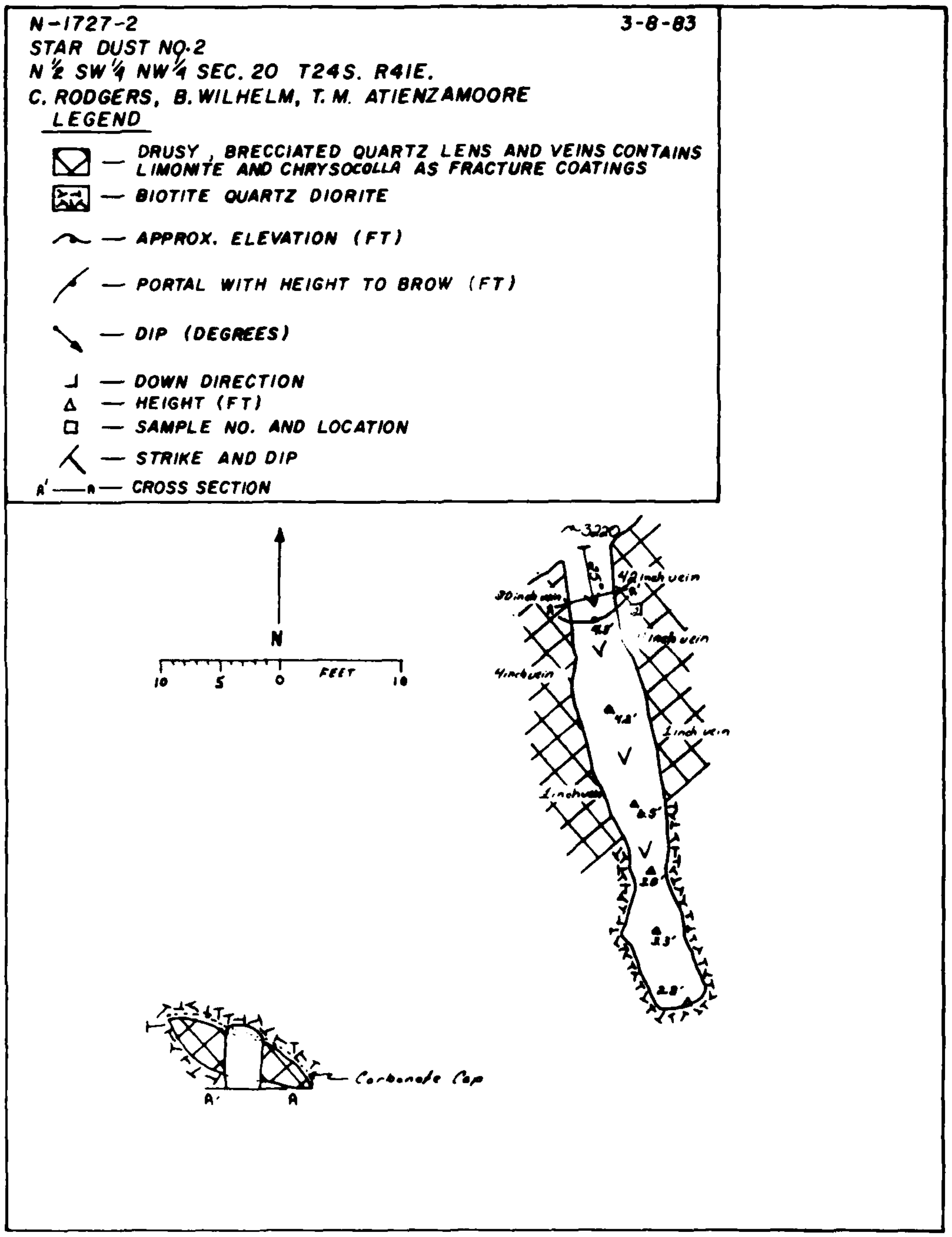


Figure 154. Map of west shaft at Star Dust No. 2.

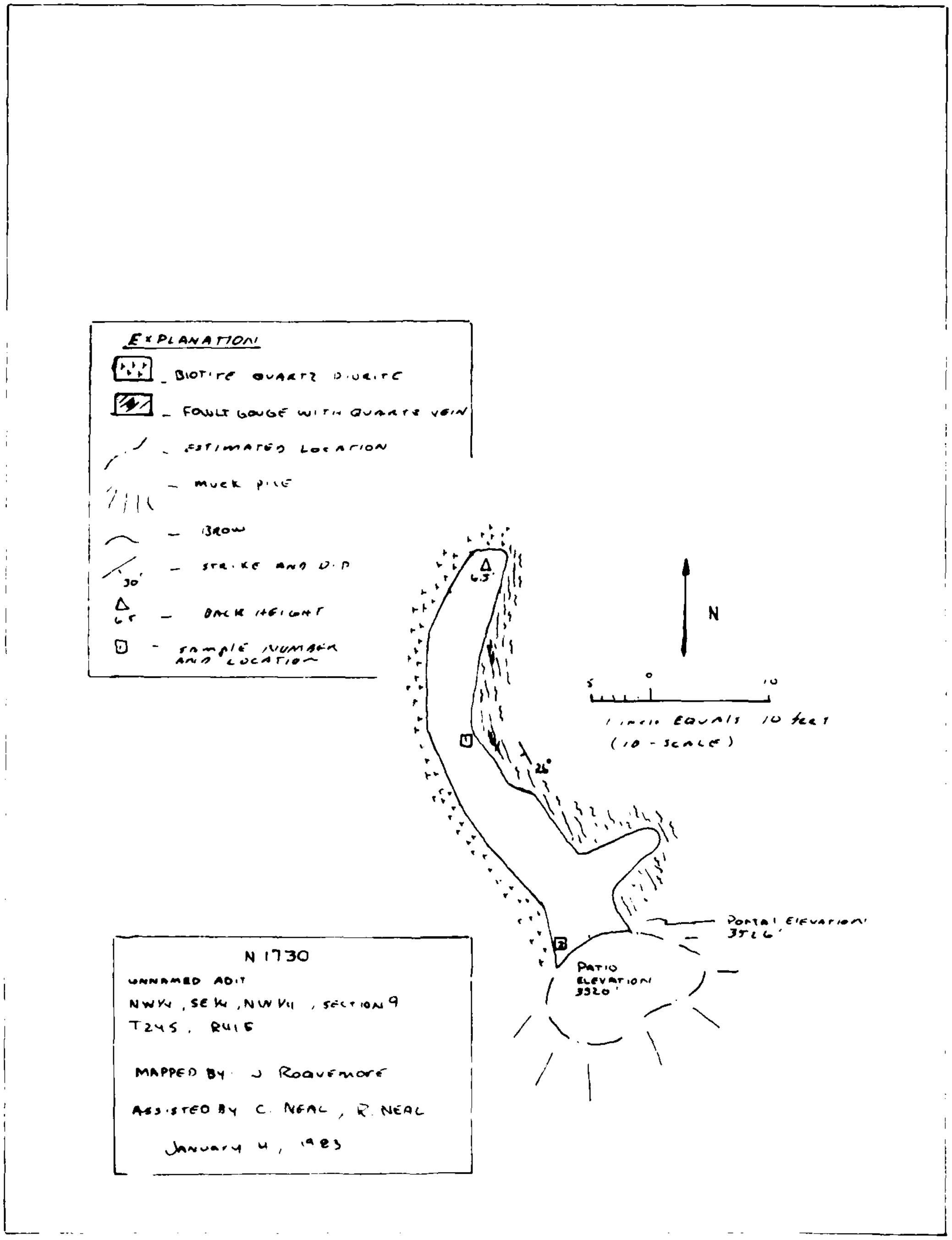


Figure 155. Plan view of adit at site N-1730.

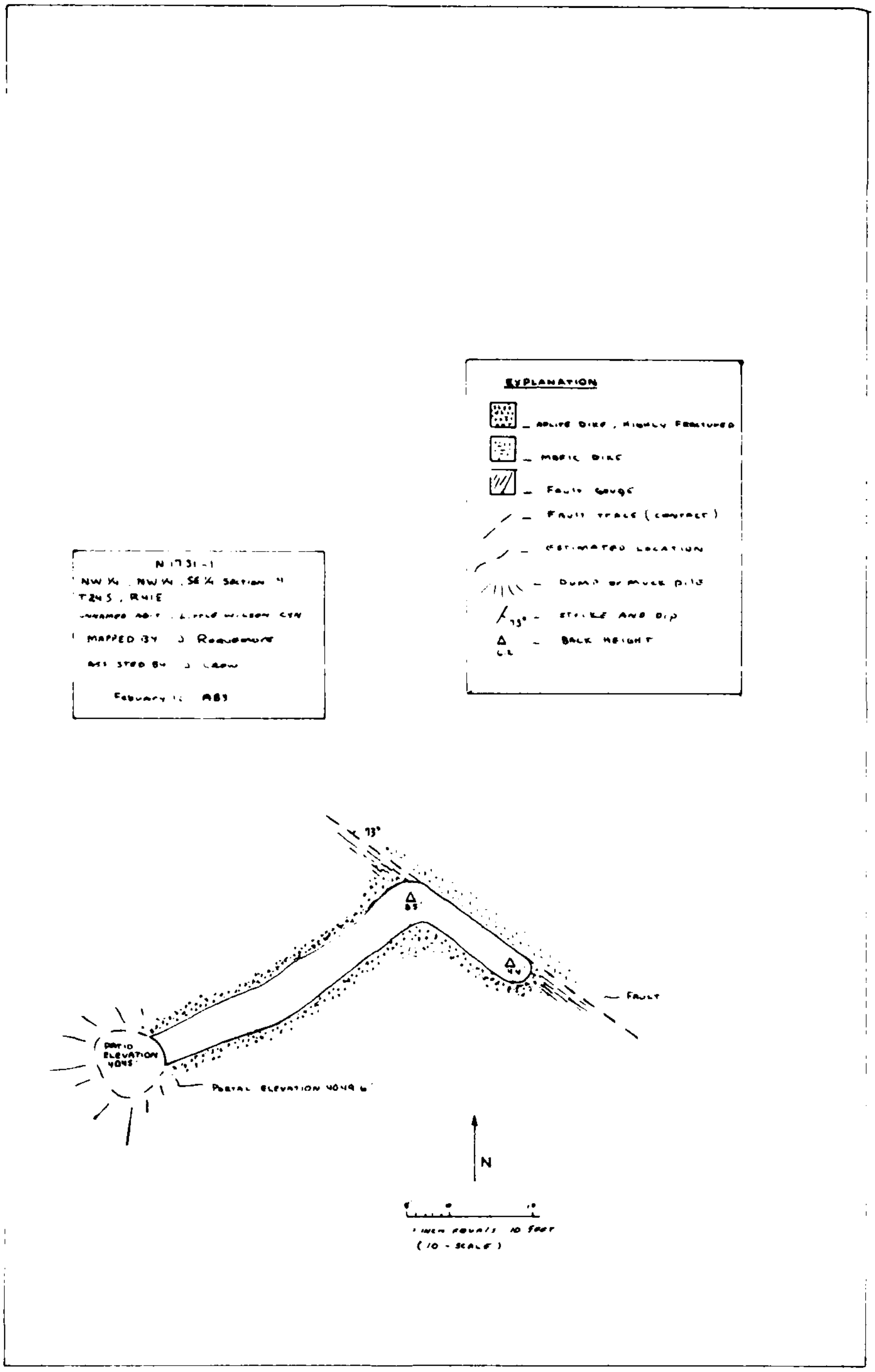


Figure 156. Map of workings at site N-1731-1.

results, shown in Appendix A, indicate that this property has no commercial potential for precious metals.

N-1731-2 is a north-trending 14-foot prospect. It cuts an east-west bearing limonite stained aplitic dike 8 feet from the face. A sample was taken across the 73-degree northerly dipping instrusion. Sample location and underground workings are shown in Figure 157. Assay results in Appendix A show this site to have no potential.

N-1731-3 is a 24-foot drift that explores a fault zone as seen in Figure 158. No mineralization was present along the 73-degree northerly dipping zone. The material exposed in the drift was barren gouge and no samples were taken.

Unnamed Prospect Adit (N-1731-4)

This prospect adit is located along the north side of Little Wilson Canyon in the NW1/4, NW1/4, SE1/4, Sec. 4, T24S, R41E, MDB&M. It is shown as N-1731 on Figure 9.

The 62-foot adit, shown in Figure 159, explores a nearly vertical, 3-foot-wide shear zone which strikes N71W through the Mesozoic biotite quartz diorite. The crosscuts driven off of the main drift were for no apparent geologic reason. No mineralization within the clay alteration of the shear zone was evident, and no samples were taken.

Unnamed Prospect (N-1732)

This property was explored by two trenches cut along an aplitic intrusion located in the NW1/4, SW1/4, SW1/4, of Sec. 6, T24S, R41E, MDB&M, and is shown as N-1732 on Figure 9. The lower trench is 34.4 feet long and 1.5 to 5.5 feet wide; the upper trench is 75.9 feet long, 3.5 to 8.0 feet wide. An ore chute was set up to get the material down the hillside as shown in the site sketch, Figure 160. Assay results, shown in Appendix A, indicate 0.740 troy-oz/ton of gold. Considering that the aplite intrusive has no indications of mineralization anywhere along its entire extent, the probable explanation for this unusually high value is that the site has been salted at some time in the past.

Unnamed Prospect (N-1734)

A small 27-foot adit in the NW1/4, NW1/4, SE1/4 of Sec. 9, T24S, R41E, MDB&M is shown as N-1734 on Figure 9, a location map. The adit is driven in barren biotite quartz diorite, as shown in Figure 161. No samples were taken.

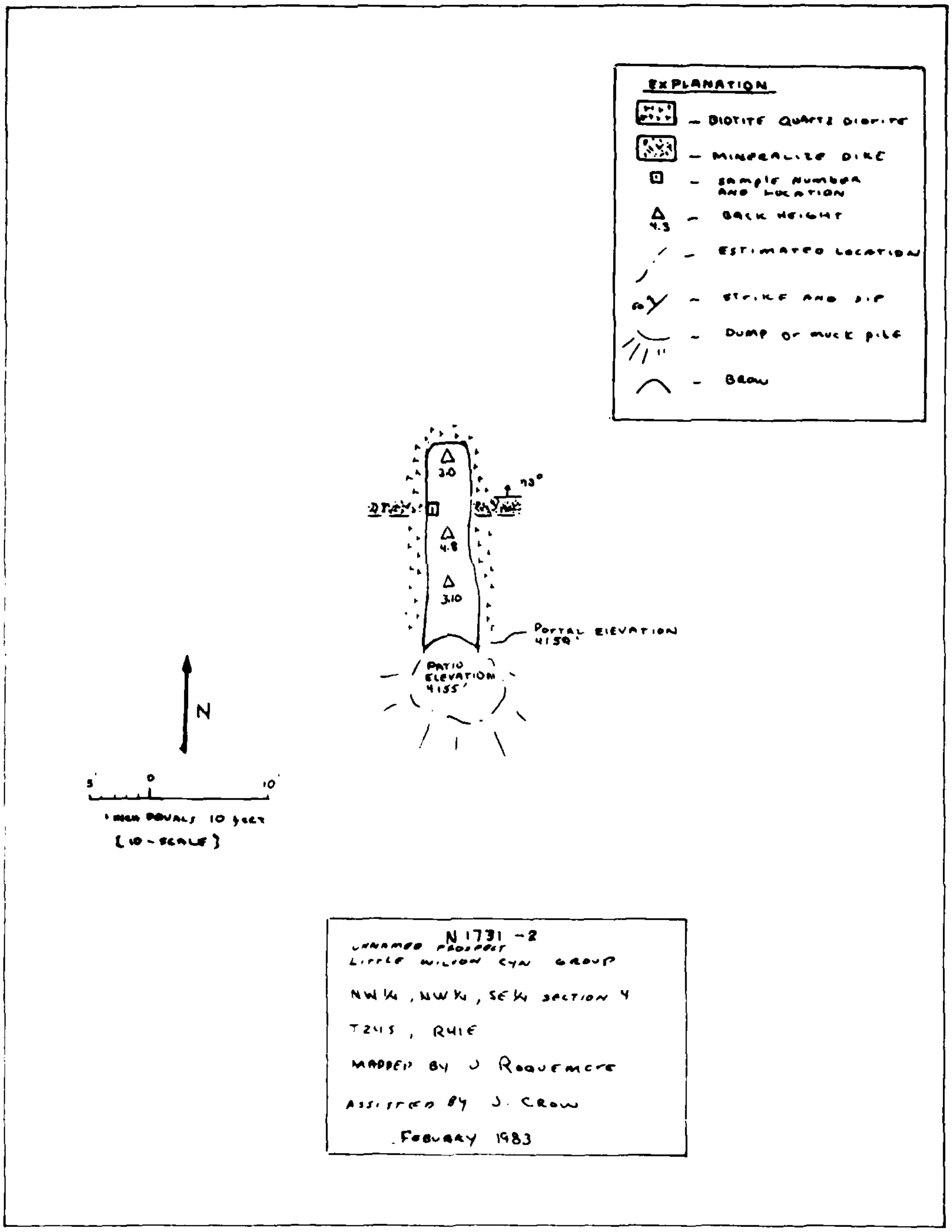


Figure 157. Map of workings at site N-1731-2.

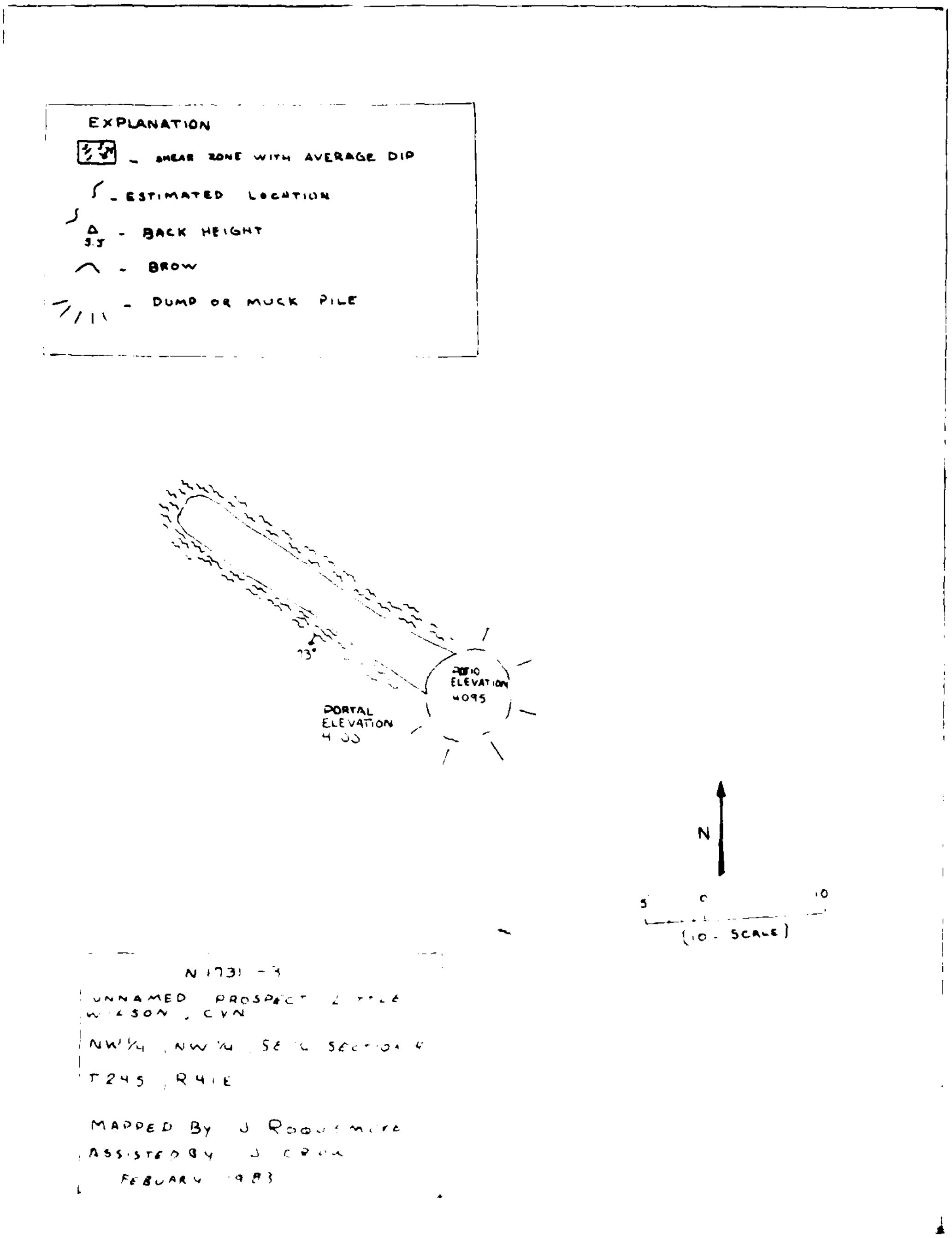


Figure 158. Map of adit at site N-1731-3.

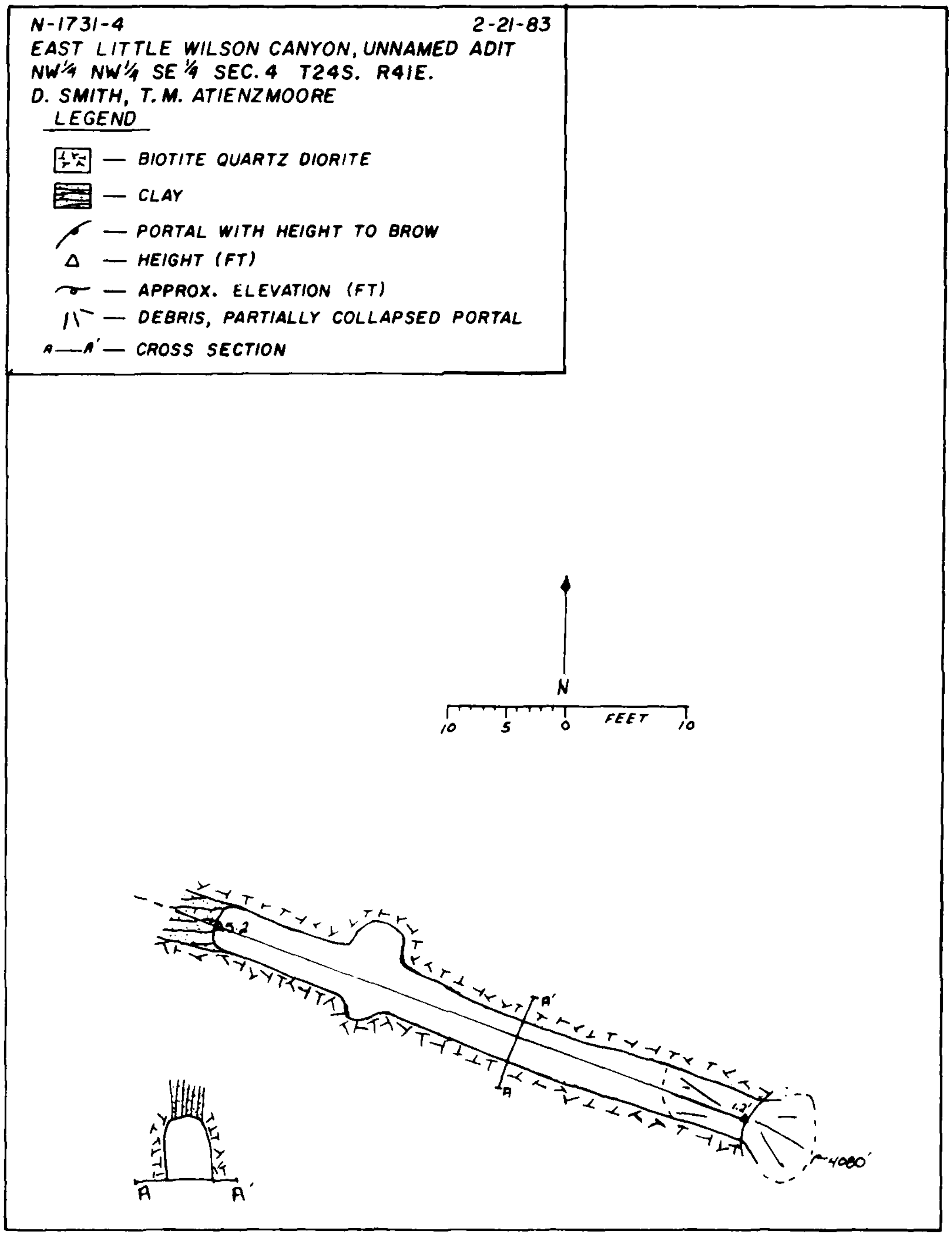


Figure 159. Plan view of adit at site N-1731-4.

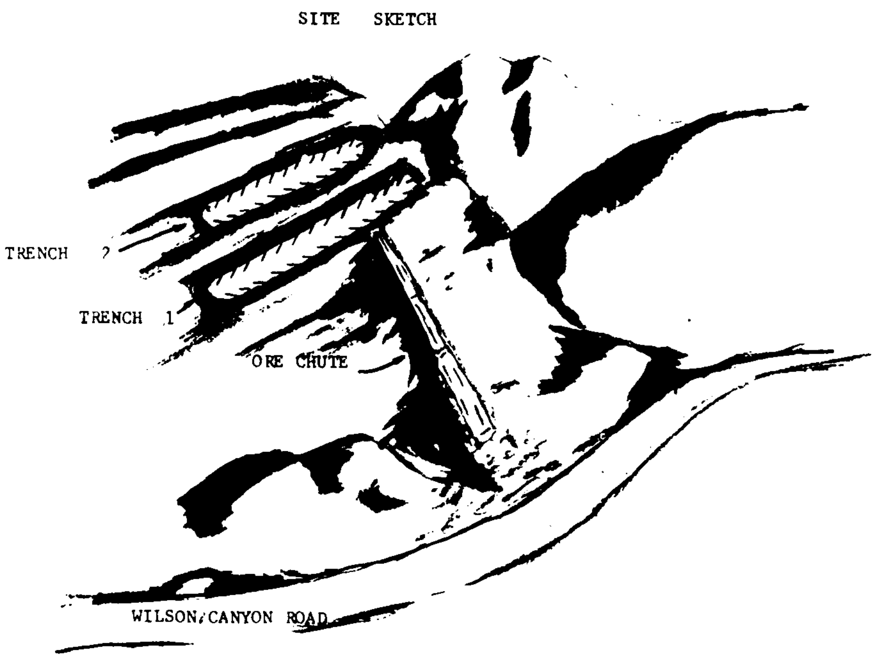


Figure 160. Site sketch showing trenches and ore chute at site [illegible].

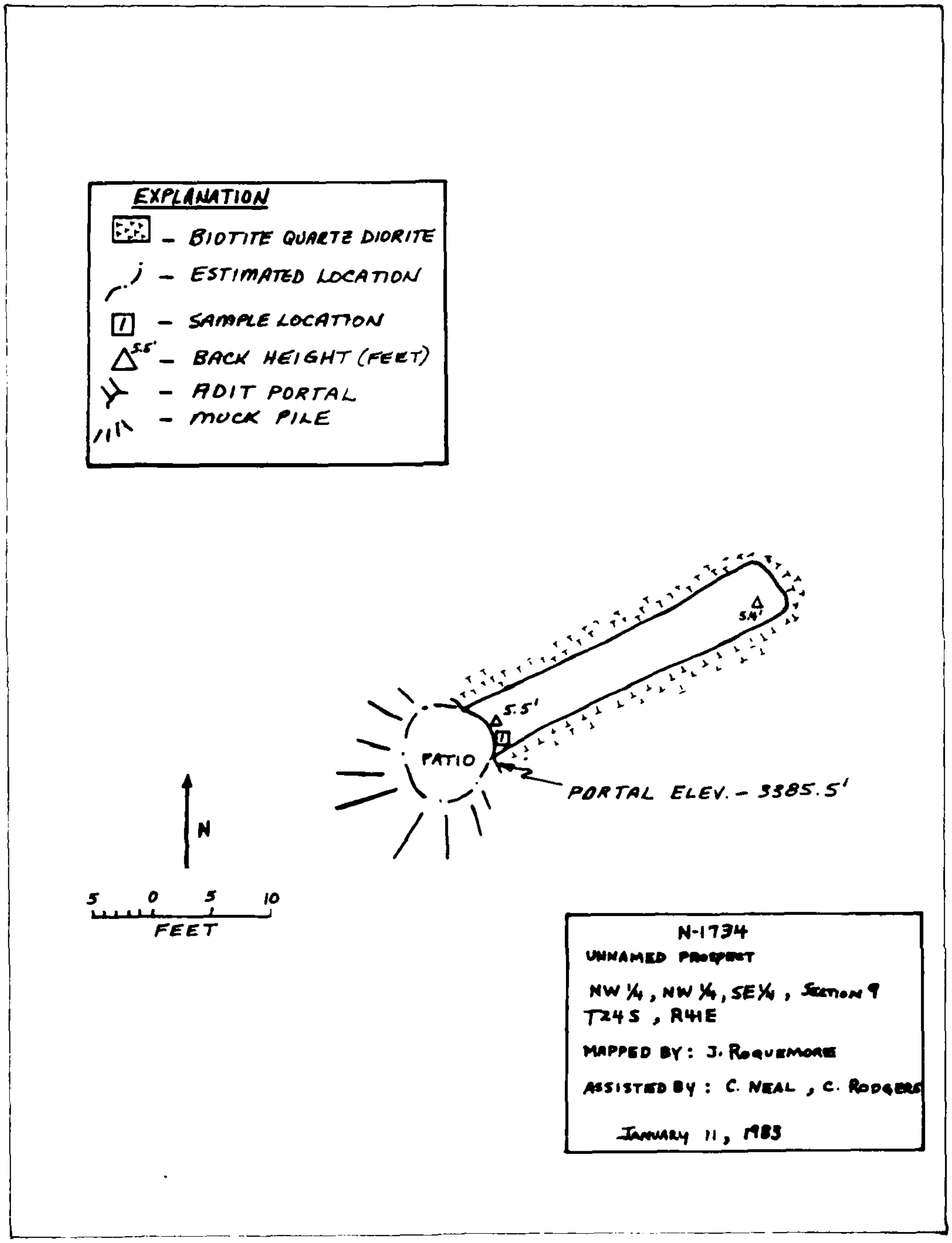


Figure 161. Plan view of adit at site N-1734.

Unnamed Prospect (N-1735)

A small prospect pit 4.0 feet deep by 6.0 feet across is located in the SW1/4, NW1/4, SE1/4 of Sec. 9, T24S, R41E, MDB&M, shown as N-1735 in Figure 9. The prospect exposes a chrysocolla and limonite stained quartz lens. The lens is not extensive and cannot be traced for more than a few feet. The prospect has no economic potential. The assay results of a dump sample are shown in Appendix A.

Unnamed Prospect (N-1736)

A trench bearing N10E, 7.0 feet long, 3.0 feet deep, is located in the NE1/4, NW1/4, SW1/4 of Sec. 9, T24S, R41E, MDB&M, as shown in Figure 9, a location map. The trench exposed a 1 foot wide N19W bearing limonite stained quartz vein. Assay results, shown in Appendix A, indicate the site does not appear to have any economical value.

Unnamed Prospect (N-1737)

This collapsed shallow shaft is in the SE1/4, NW1/4, NE1/4, of Sec. 17, T24S, R41E, MDB&M, shown as N-1737 in Figure 9 which is a location map. The shaft was driven in decomposed Mesozoic diorite. There was no evidence of mineralization, either in the shaft or in the dump, and no samples were taken.

Unnamed Prospect (N-1742)

This group of two adits and two prospect pits is situated along the northern flank and near the top of the ridge that separates the north and south forks of Little Wilson Canyon. The workings are placed in the SE1/4, SE1/4, NW1/4, Sec. 4, T24S, R41E, MDB&M, and are located 0.6 mile northeast of the Star of the West mine complex, as shown by Figure 9.

The workings were developed on at least two northwest-trending, steeply dipping, quartz-bearing shear zones. The shear zones are developed in Mesozoic biotite-rich quartz diorite that is occasionally clay-altered and, in places, strongly surface weathered. A minor aplite dike forms the shear zone foot-wall in one location.

Figure 162 is a surface plan view of the workings.

The southernmost and highest group of workings are two prospect pits that were developed along a vertical, erratically striking shear zone. Each pit is 15 feet long and together the two produced approximately 15 cubic yards of broken rock. Sample N-1742-1 was a chip

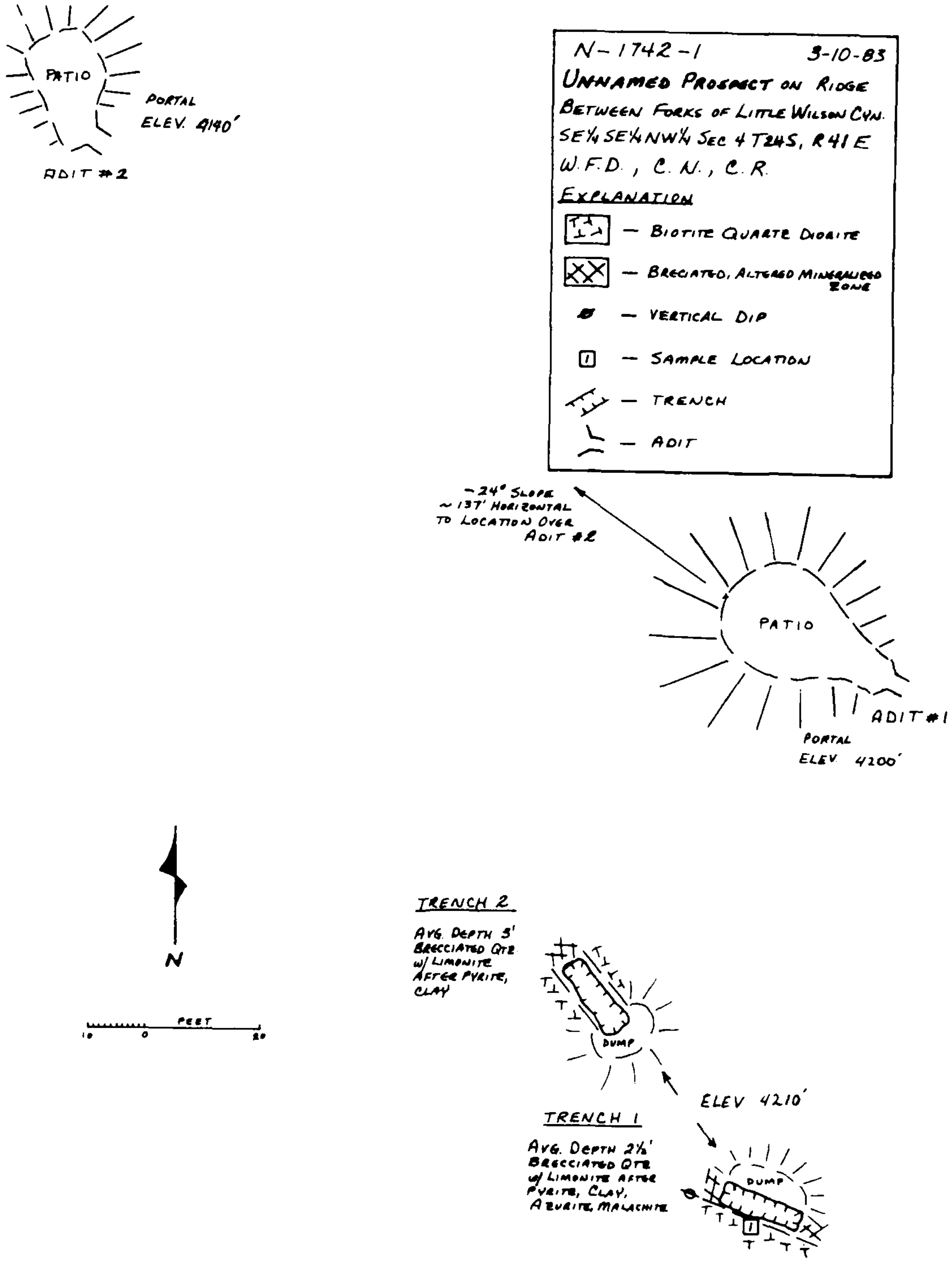


Figure 162. Surface plan view of workings at site N-1742.

sample taken across the shear zone material of Trench 1. The zone is 5 feet wide and composed of brecciated white quartz with limonite pseudomorphs after pyrite, interstitial clay as filling around quartz breccia and minor secondary azurite and malachite staining.

Two adits, located northward and lower in elevation, are also shown on the surface plan view and are shown in detail in Figure 163.

The upper adit, shown as Adit 1, was driven 12 feet in fractured, altered host rock and encountered no visible mineralization. Adit 2 was driven 72 feet along the strike of a 5-foot-wide brecciated quartz-rich shear zone. The zone is developed between the contact of an altered biotite quartz diorite hanging wall and a pale gray aplite dike footwall. The quartz mineralization is composed of limonite stain, and minor clay is present as fracture filling. Sample N-1742-2 was chipped across this quartz-bearing zone 8 feet from the drift face.

The complete summary of assay results for the two samples is found in Table A-1.

While the shear zone material from Adit 1 and from the prospect pits appears to have a limited potential for mineable vein width both along strike and down-dip, the assay results indicate that no discovery of commercial value was made for precious metals or other commodities at this location.

Unnamed Adits (N-1743)

This prospect consists of two adits that are located on the very steep hillside that forms the northern wall of Little Wilson Canyon. The prospect is situated approximately 0.6 mile north of the Star of the West mine complex and is placed in the SE1/4, NW1/4, NW1/4, Sec. 4, T24S, R41E, MDB&M, as shown by Figure 9.

The area host rock is Mesozoic biotite-rich quartz diorite. It is medium-grained, dark gray and has undergone severe granular exfoliation on the surface.

The zone of mineralization explored by the operator is a shear zone that strikes from N70W to S85W with dips from 60 to 83 degrees north-northeasterly. The full shear zone is not exposed on the surface or in either underground working but is at least 9 feet wide. The zone is composed almost totally of broken, brecciated white quartz blebs and fragments with interstitial limonite-stained clay.

Two workings were developed at this location and their surface relationships are shown by Figure 164.

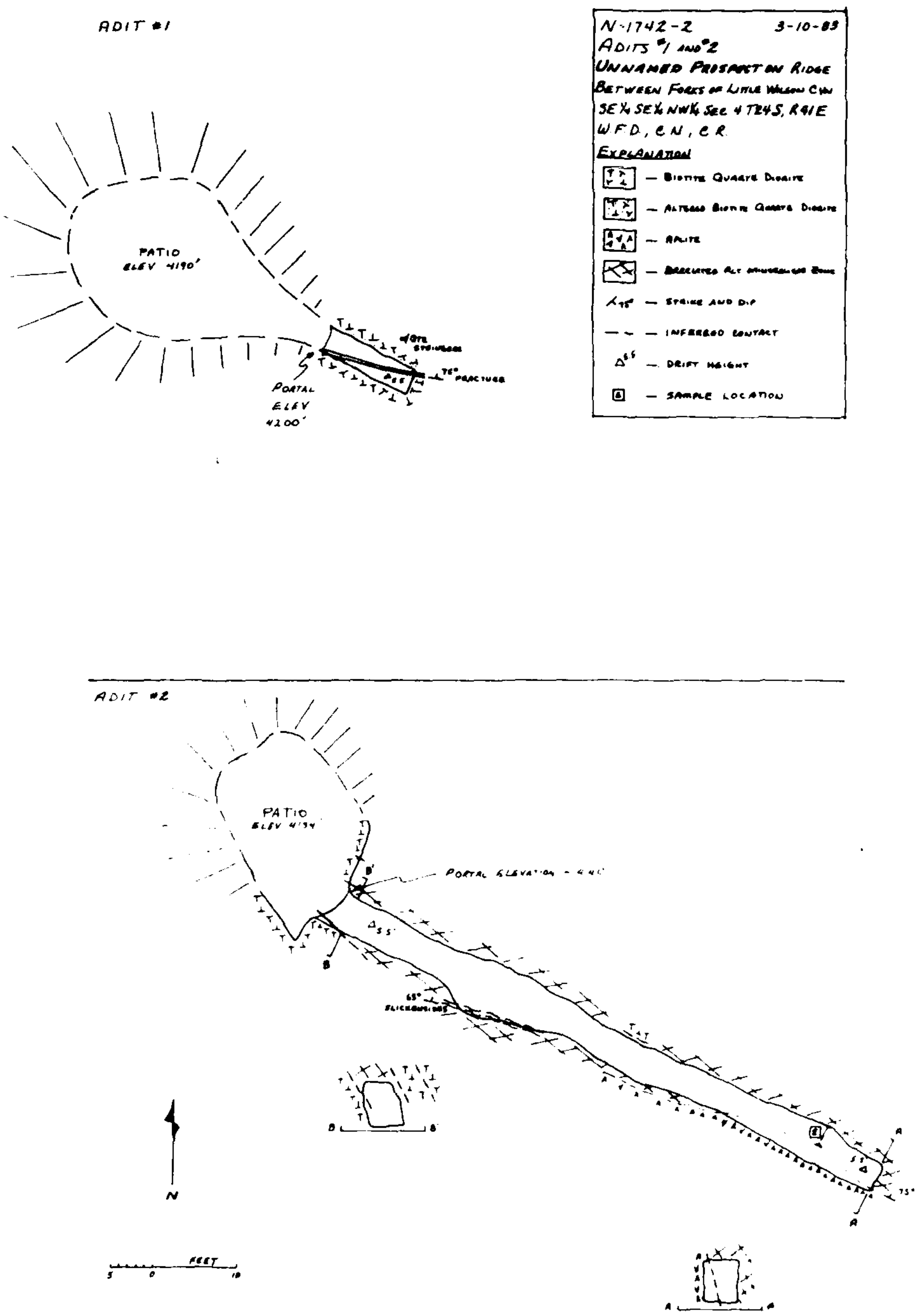


Figure 163. Detail of two lower adits at site N-1742.

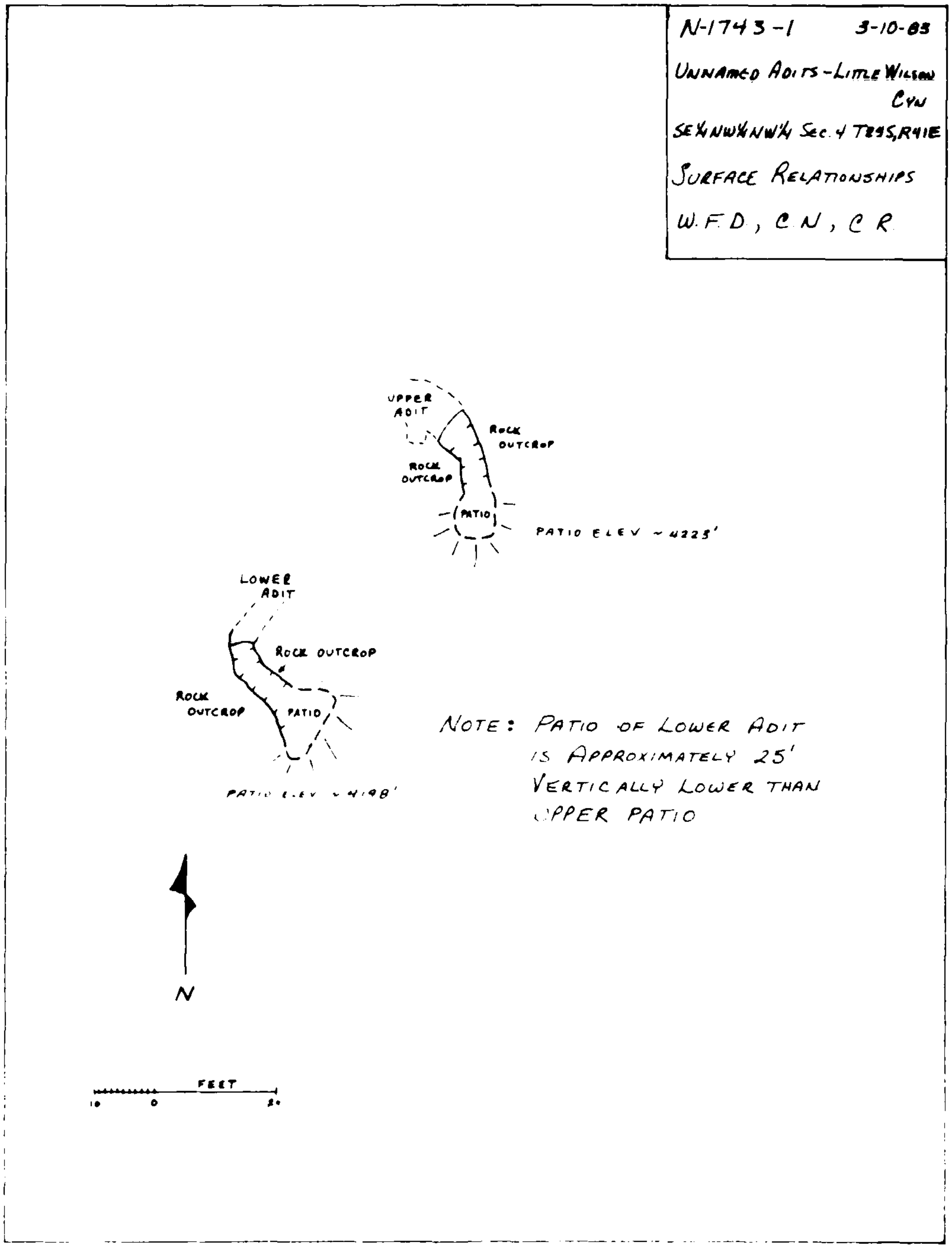


Figure 164. Surface plan view at site N-1743

Detailed views of the workings are shown by Figure 165. The upper adit is a 28-foot drift driven along the strike of the shear zone with the foot-wall contact exposed to maintain the proper bearing. A chip sample, labeled N-1743-1, was taken across the shear zone where limonitization appeared most heavily concentrated in the clay within the breccia. The lower working is a 78-foot adit driven approximately 25 to 30 vertical feet below the upper adit. It was driven in biotite quartz diorite that contained one major northwest-trending fault zone and two minor northwest-trending open fractures that apparently have been watercourses during wet seasons. These fractures were dripping intermittently during the field investigation. The adit intersected the shear zone at a nearly perpendicular angle approximately 70 feet from the portal. A chip sample from the lower adit, labeled N-1743-2, was cut from the breccia zone perpendicular to strike as shown in Figure 165. The complete assay results for the two samples are found in Appendix A.

The shear zone is exposed for nearly 40 feet along strike and is partially exposed for nearly 35 feet down-dip and shows no visible signs of pinching in either direction, but the low sample assay results indicate that no commercial values for precious metals or other commodities exist at this site.

Unnamed Prospect (N-1744)

This group of workings is located along the north branch of Little Wilson Canyon approximately 2.0 miles east of the canyon mouth. The prospect is placed in the NW1/4, SE1/4, NW1/4, Sec. 4, T24S, R41E, MDB&M and is shown on Figure 9.

The prospect consists of an adit and a possible inclined shaft, both now caved and filled. The workings lie at the same approximate elevation and are 80 feet apart in an east-west direction.

The workings apparently were driven to explore a 6- to 8-foot-wide shear zone that strikes east-west and is developed in Mesozoic biotite-rich quartz diorite. The shear zone, which dips steeply northward, is expressed on the surface as severely fractured quartz diorite with abundant limonite vein filling and staining. There is no visible quartz or other evidence of mineralization in place at the site.

The dump volumes for each working were estimated and equate to an approximate 100 feet of 3- by 5-foot inclined shaft and 67 feet of 3- by 5-foot drifting at the adit site. There is no mineralized material visible as loose rock on the mine dumps.

The most noteworthy feature at this location is the very extensive roadway haulage system that was built to service the prospect. The

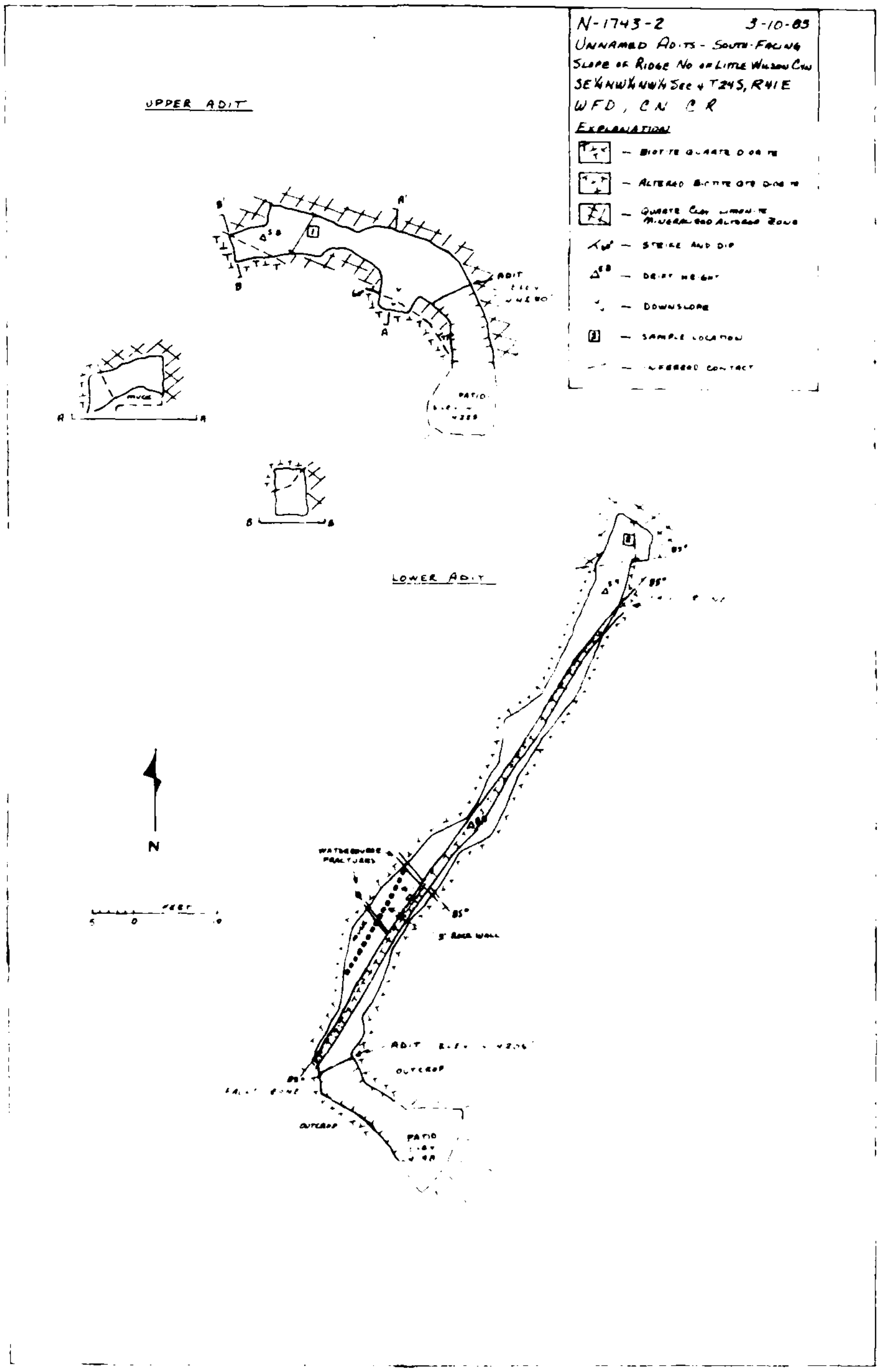


Figure 165. Detail of underground workings at site N-1743.

roadway extends westward for 1/2 mile from the site along the southern wall of the northern branch of Little Wilson Canyon. The road winds over the ridge between the north and south forks of Little Wilson Canyon and ends in the wash near the point where the canyon branches meet. The road has been mostly obliterated by flash flooding to the mouth of Little Wilson Canyon.

The roadway, in the vicinity of the prospect site, lies 75 to 100 feet above the canyon floor and was built using elaborate rockwork and backfill. Strewn along the roadway are hundreds of 30-inch-long 3- by 4-inch railroad ties. It would appear that the operators intention or practice was to haul rock by hand or animal pulled rail cart to a loading point near the Little Wilson Canyon intersection.

Intriguing questions surround the history of this prospect. What mineralization was sought by the operator? It is assumed that precious metals were explored for, considering the nature of the shear zone and proximity to the Star of the West mine and other prospects, but no sampling could be done because there was no quartz or other mineralized rock in-place or lying about that could be sampled. The appearance is that the roadway was built as an elaborate promotional gimmick to entice and impress potential investors. Based on the apparent small size of the workings and the utter lack of visible mineralized zones or scattered low grade mineralization on the dumps, the obvious conclusion is that there is no commercial potential at this site.

Desert View (N-1745)

Examination of a claim marker still in place disclosed three Notices of Location. The oldest, dated 25 January 1907, lists the property as the Ruth Quartz Mining Claim of the Argus Mining District; it was located by John Waage with H. C. Hamilton and Chas. Tragurd witnessing. On 25 January 1910 the site was claimed by E. P. Trull and D. G. Lytta; they renamed it the Valley View Mining Claim of the Custer Mining District. The newest claim, filed 2 March 1940, renames the property the Desert View Lode Mining Claim also of the Custer Mining District, Inyo County; located by Lou Cantrill and Alfred Quiruin of Brown, Calif. and witnessed by Walter Simmons and Mable Cantrill.

The site is located approximately 2.6 miles south-southwest of the Star of the West mine, 3.2 miles north-northeast of the Paxton Ranch site in the NE1/4, NE1/4, NE1/4, Sec. 19, T24S, R41E, MDB&M. It is shown as N-1745 on Figure 9.

The host rock is Mesozoic biotite quartz diorite which has been fractured by two, apparently distinct, faulting episodes. The first is manifested by low-angle, north-trending fractures, which served as conduits for the hydrothermal fluids and as sites for the quartz and associated metals mineralization. The second set of fractures is high-angle and northwest-trending, which cuts and offsets the quartz veins. These veins are broken, with limonite and chrysocolla coatings in the fractures.

The property was explored by a 30-foot adit and four small prospect pits to the west. The adit shows the most extensive limonite and chrysocolla mineralization, it is shown in plan view with appropriate cross sections in Figure 166. Two samples were taken at this site. N-1745-1 is from a high-grade pile located on the dump. N-1745-2 was taken from a 0.8-foot vein on the east wall of the drift, as shown on the plan view. Assay results for precious metals with corresponding ore values are shown in Table 45 below.

TABLE 45. Assay Results for the Samples Taken From the Desert View Prospect.

Sample	Gold		Silver		Total Precious metal value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1745-1	0.220	110.00	3.15	47.25	157.25
N-1745-2	0.180	90.00	0.69	10.35	100.35

There is no potential for a commercial deposit at this site. The vein width and tonnage of mineralized rock are insufficient to sustain a mining effort.

BURRO CANYON AREA

Red S Lode (N-2102)

The literature from NOTS legal archives lists this location as Parcel No. 509 in the Navy land withdrawal proceedings of 1947 to 1949. An appraisal of the Red S Lode, which included both the claim value and the improvement and development value, was made in 1947 and 1948 and showed a total value of $1000.

The Red S Lode is located on the top of the ridge that borders the south side of Burro Canyon and lies 4.7 miles west of the town of Trona. Figure 10 shows the site location. It is placed in the SW1/4, NE1/4, SE1/4, Sec. 9, T25S, R42E, MDB&M.

A sparsely mineralized quartz vein in a Mesozoic granodiorite host rock was the exploration target for the operator, whose name is listed

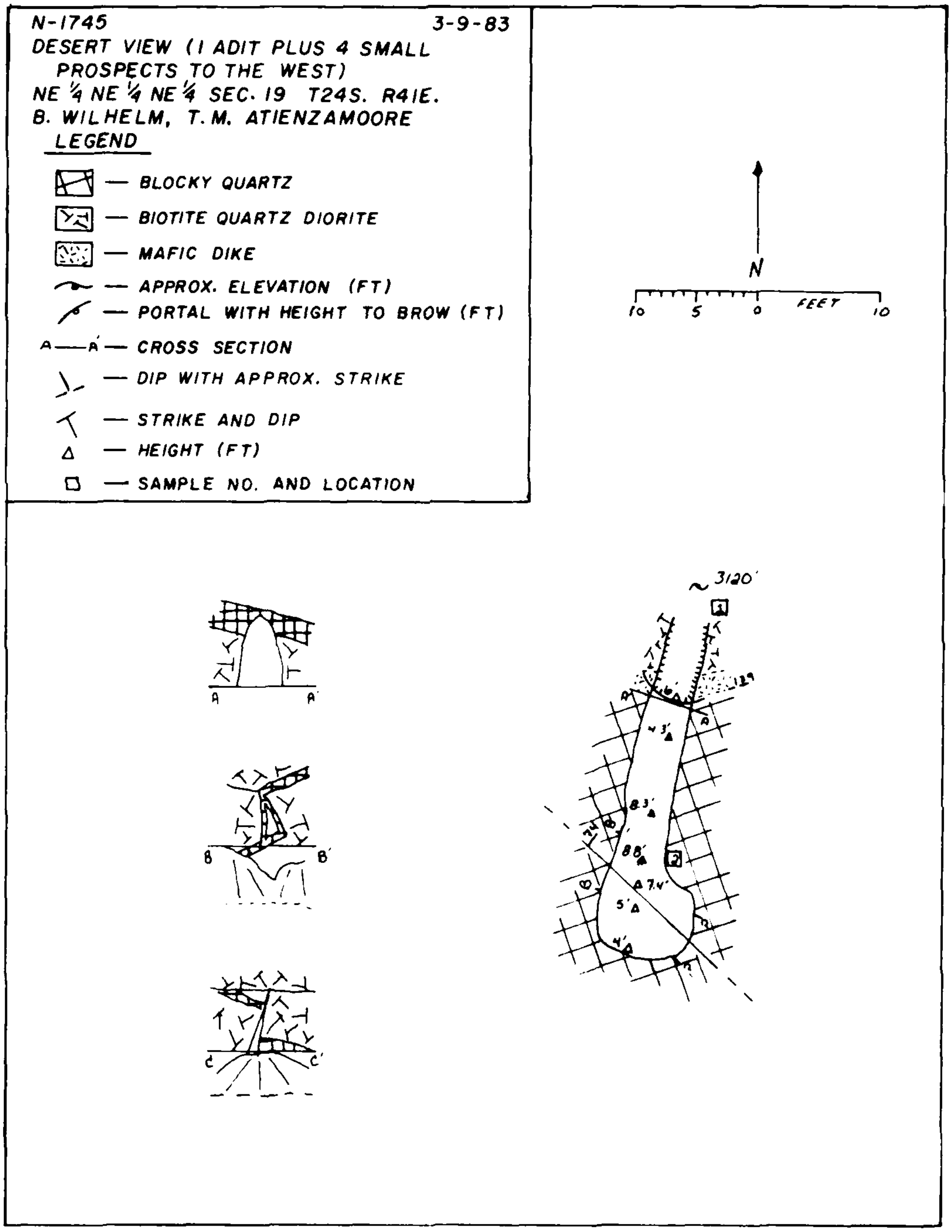


Figure 166. Plan view of main workings at the Desert View.

as H. G. Steven. The vein strikes N57E and dips 25 degrees in a southeasterly direction. The lode was explored by a 32-foot trench and by a 65-foot shallow decline and crosscut drift as shown in plan view by Figure 167. The vein pinches and swells from 0.5 foot to 1.5 feet in width and is composed of massive white quartz with minor limonite staining and fracture-filling plus very slight traces of chrysocolla, and malachite also as coatings and fracture fillings. One sample was chipped from a 1-foot-wide vein with the heaviest concentration of accessory minerals. The sample location is shown on Figure 167 and the complete assay results are presented in Appendix A. Though the vein does appear to continue down-dip, the assay results indicate no commercial potential for precious metals.

Birds Eye Porphyry (N-2103)

The NOTS legal archives list this prospect as validated claim number 481, last claimed by Louis H. Osborne. It is situated 2.5 miles west of Borosolvay, Calif. The prospect lies on unsurveyed land but a westward projection of an adjacent public land survey places it in the NE1/4, NW1/4, SE1/4, Sec. 27, T25S, R42E, MDB&M, as shown by Figure 12.

The prospect is developed on a shear zone within Mesozoic biotite quartz diorite rock. The shear zone strikes N36E, dips 45 degrees easterly, and is traceable for approximately 100 feet along strike. It is cut off to the north by a northwest striking lamprophyric dike and appears to pinch out to the south. The shear ranges between 4.5 and 6 feet in width.

Two prospect pits were dug on the zone. The upper pit is 12 feet long, 10 feet wide and 4 feet deep. The shear at this site consists of clay and limonite-rich fractured quartz diorite with 1- to 3-inch quartz veinlets. No larger quartz material was found in place but numerous quartz cobbles and boulders were strewn around the pit perimeter. These contained massive chalcopyrite with cuprite alteration rims, limonite as pseudomorphs of pyrite and strong fracture coatings, minor coatings of chrysocolla and malachite with very minor azurite (?) and argentojarosite (?). One sample of the most heavily mineralized material was chipped from the loose quartz rubble.

The lower prospect pit is situated approximately 90 feet south and 20 vertical feet below the upper pit. The pit is 7 feet wide, 6 feet long and 3 to 4 feet deep. It was dug on broken and altered quartz diorite with limonite-goethite fracture filling.

The complete assay results for the sample are presented in Table A-1 and show no commercial values for precious metals or other

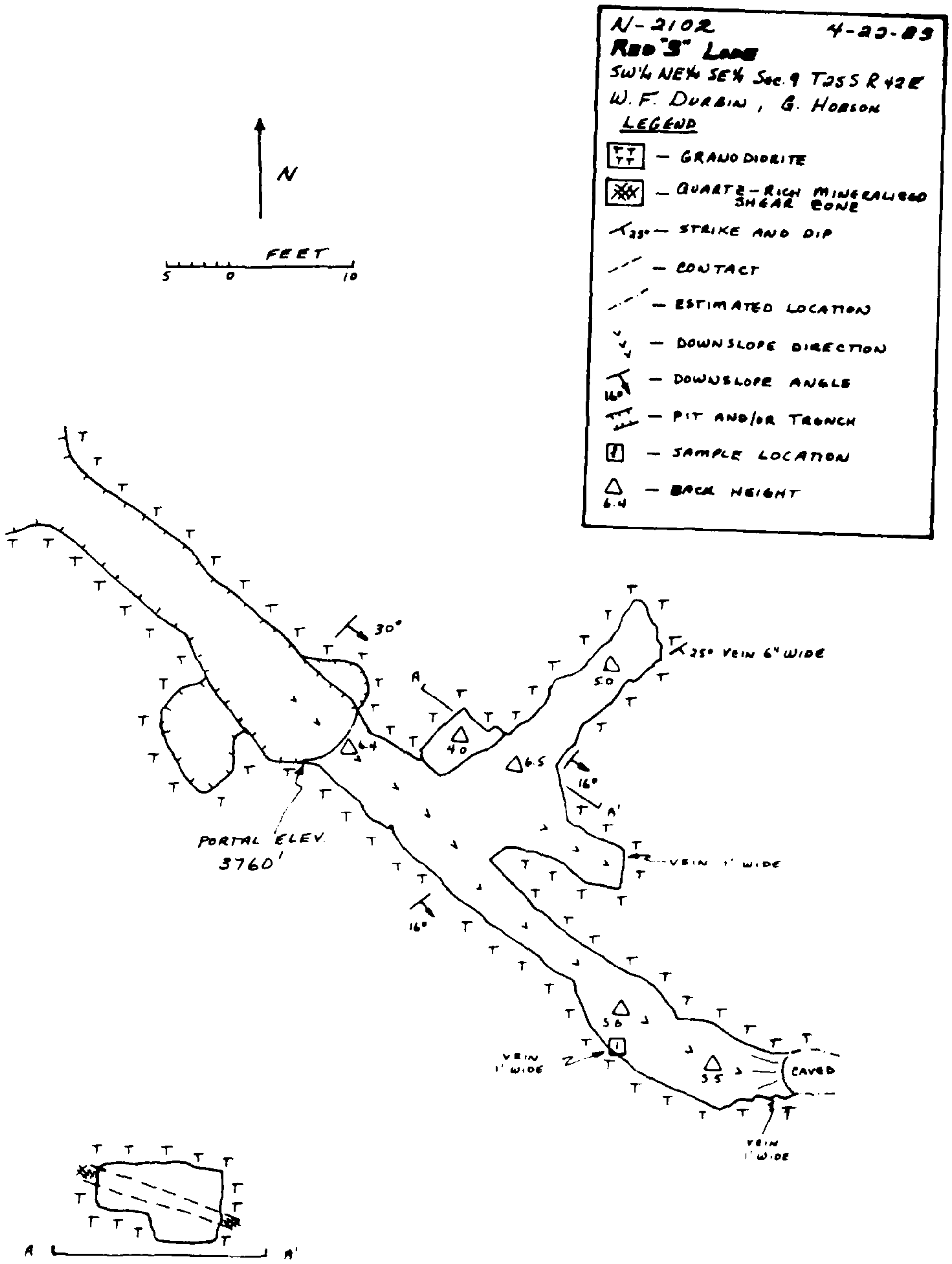


Figure 167. Plan view of workings at the Red S Lode.

commodities. The limited extent of the shear zone and apparent irregular nature of mineralized quartz within the shear indicate that no potential for a deposit of commercial grade and tonnage exists at this site.

Unnamed Prospect (N-2107)

A single prospect pit with a volume of about 1 cubic yard is situated in the central portion of the Argus Range 3.2 miles west of Argus, Calif. as shown by Figure 10. It lies on unsurveyed land but a southward projection of an adjacent public land survey places it in the SW1/4, NE1/4, SW1/4, Sec. 15, T25S, R42E, MDB&M.

The pit was dug in a thin slope wash veneer of decomposed quartz diorite to expose a quartz occurrence that was indicated by quartz float on the slope. The pit has caved in over the years so no in place quartz or shear zone rocks are visible. A few small pieces of massive quartz with limonite fracture coating were present around the pit perimeter. No sample was taken and no commercial potential exists at this site.

Great El Oro Lode (N-2108)

The literature from NOTS legal archives lists this location as Parcel No. 467 in the Navy land withdrawal proceedings of 1947 to 1949. An appraisal of the Great El Oro Lode, which included both the claim value and the improvement and development values, was made in 1947 and 1948 and showed a total property value of $600. The last operator of the site is listed as Herbert G. Steven.

The Great El Oro Lode is situated at the top of the northwest-trending ridge that borders the south side of Burro Canyon. The site lies 5.0 miles west-northwest of Trona, Calif. as shown on Figure 10. It is placed in the SE1/4, SE1/4, NW1/4, Sec. 9, T25S, R42E, MDB&M.

The host rock is medium-grained, gray, Mesozoic granodiorite. It is generally unaltered but is cut by numerous steeply-dipping northwest-trending fractures. A vert small diabase dike was noted in the underground workings and appears to be cut off at both ends by fractures. A shear zone, completely filled with massive quartz, strikes from N85W to east-west and has a gently rolling dip that averages approximately 15 degrees southerly. The quartz vein pinches and swells between 4 inches and 3 feet in width, although there appears to be a slight trend of increasing vein width with depth. Quartz mineralization is minor limonite and chrysocolla as coatings and fracture-fillings.

Figure 168 is a plan view of the Great El Oro workings. These include a caved and filled prospect trench and a decline 253 feet in length. The decline was driven at an angle of approximately 20 degrees to the strike of the vein. Two chip samples were taken across the vein where mineralization appeared to be most heavily concentrated. The complete list of assay results for the two samples, labeled N-2108-1 and N-2108-2, are shown in Appendix A.

No discovery of commercial values for precious metals or other commodities is indicated by the assay results.

Unnamed Prospect (N-2110)

This prospect is situated near the western edge of the South Argus Range 6.4 miles northeast of Burroughs High School. The prospect lies on unsurveyed land but a northward projection of adjacent public land surveys places it in the SE1/4, SW1/4, SW1/4, Sec. 33, T25S, R41E, MDB&M. The prospect location is shown on Figure 11.

The westernmost working is an inclined shaft. It was driven to explore a poorly mineralized shear zone in a Mesozoic biotite quartz diorite. The shear zone is approximately 4 feet wide at the shaft collar. It strikes nearly east-west and dips 62 degrees northerly. There is no quartz or other mineralization present in place within the exposed portion of the shear zone. The shaft was not explored during this survey but an estimate of the tailings dump volume indicates a probable depth of 80 to 100 feet of 8- by 8-foot shaft.

The eastern working is a prospect trench located 0.3 mile due east of the shaft. It strikes N18W and is 15 feet long, 4 feet wide, and 3 feet deep. It was driven in a 3-foot-wide sheared, limonitized fracture zone in quartz diorite. No quartz or other mineralization was observed and no samples were taken from the trench.

One sample was taken from loose quartz-rich material scattered around the shaft. It contained disseminated crystalline pyrite, limonite fracture-filling, and heavy black pyrolusite fracture coatings. Complete assay results for the sample, labeled N-2110, are reported in Appendix A and indicate that no discovery of precious metals or other commodities was made and no commercial potential exists at this location.

Big Ruin Prospect (N-2111)

A claim notice found during field investigation of this prospect lists the claimant as C. O. Jackson and a date of March 1939. The Big Ruin Prospect is situated 3-1/2 miles west-southwest of Borosolvay,

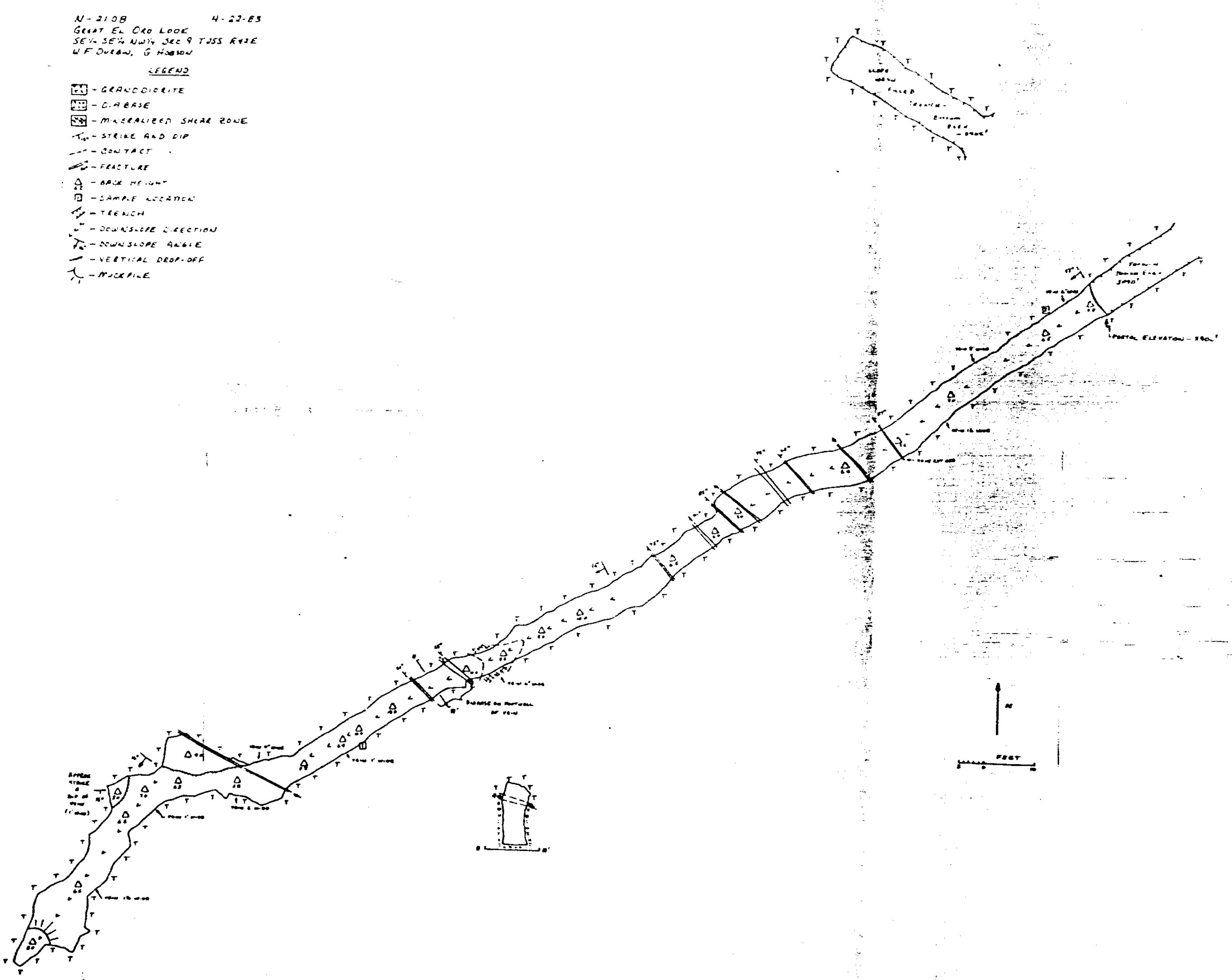


Figure 168. Plan view of the Great El Oro workings.

Calif., as shown by Figure 12. It lies on unsurveyed land but a projection of the public land survey from the east places it in the NE1/4, SW1/4, NE1/4, Sec. 33, T25S, R42E, MDB&M.

The only evidence of work was a 6- by 4-foot prospect pit which was driven along a northwest striking shear zone developed at the contact of Mesozoic biotite-rich quartz diorite and a mylonitized diabase dike. The shear zone dips approximately 45 degrees to the southwest and contained no in-place mineralized quartz. Loose quartz rubble scattered around the site contained minor pyrite, abundant limonite fracture-fillings, and a trace of chrysocolla.

No sample was taken as the small size of the occurrence indicates that no commercial potential exists at this site.

El Oro Lode (N-2112)

The El Oro Lode is listed as Parcel No. 467 in the NOTS legal archives. The lode claim was owned by H. G. Steven and the total value of the claims and improvements at the site was appraised at $600 during land withdrawal proceedings of 1947 to 1949.

The lode is situated on the top of the ridge that forms the southern wall of Burro Canyon and is located 5.5 miles west-northwest of Trona, Calif., as shown by Figure 10. It lies on unsurveyed land but a westward projection of an adjacent public land survey places it in the NW1/4, SW1/4, NW1/4, Sec. 9, T25S, R42E, MDB&M.

The workings, shown in plan view and cross section by Figure 169, explore the extent of a quartz-bearing shear zone within a Mesozoic biotite quartz diorite host rock. Associated with the host rock in the main working is a small tabular sill of black fine-grained diabase. The shear zone strikes N38W and dips from 20 to 28 degrees northeasterly. The shear zone is filled with fractured massive white quartz with limonite as fracture-fillings. The quartz vein ranges from 1 to 2 feet in width and pinches with depth.

The zone was explored by a 93-foot decline driven down-dip which was joined by a second 70-foot decline driven from a point to the southeast. The upper 35 feet of the second decline is caved and inaccessible but appears to have been driven in the shear zone. The third working, a 15-foot decline south of the main workings, was apparently driven to intersect the vein extension to the south and east. It was driven 15 feet in biotite quartz diorite and abandoned.

One sample was chipped from a 1-1/2-foot-wide portion of the vein in the main decline as shown on Figure 169. Assay results for the sample, listed as N-2112 in Appendix A, indicate no commercial values for precious metals or other commodities.

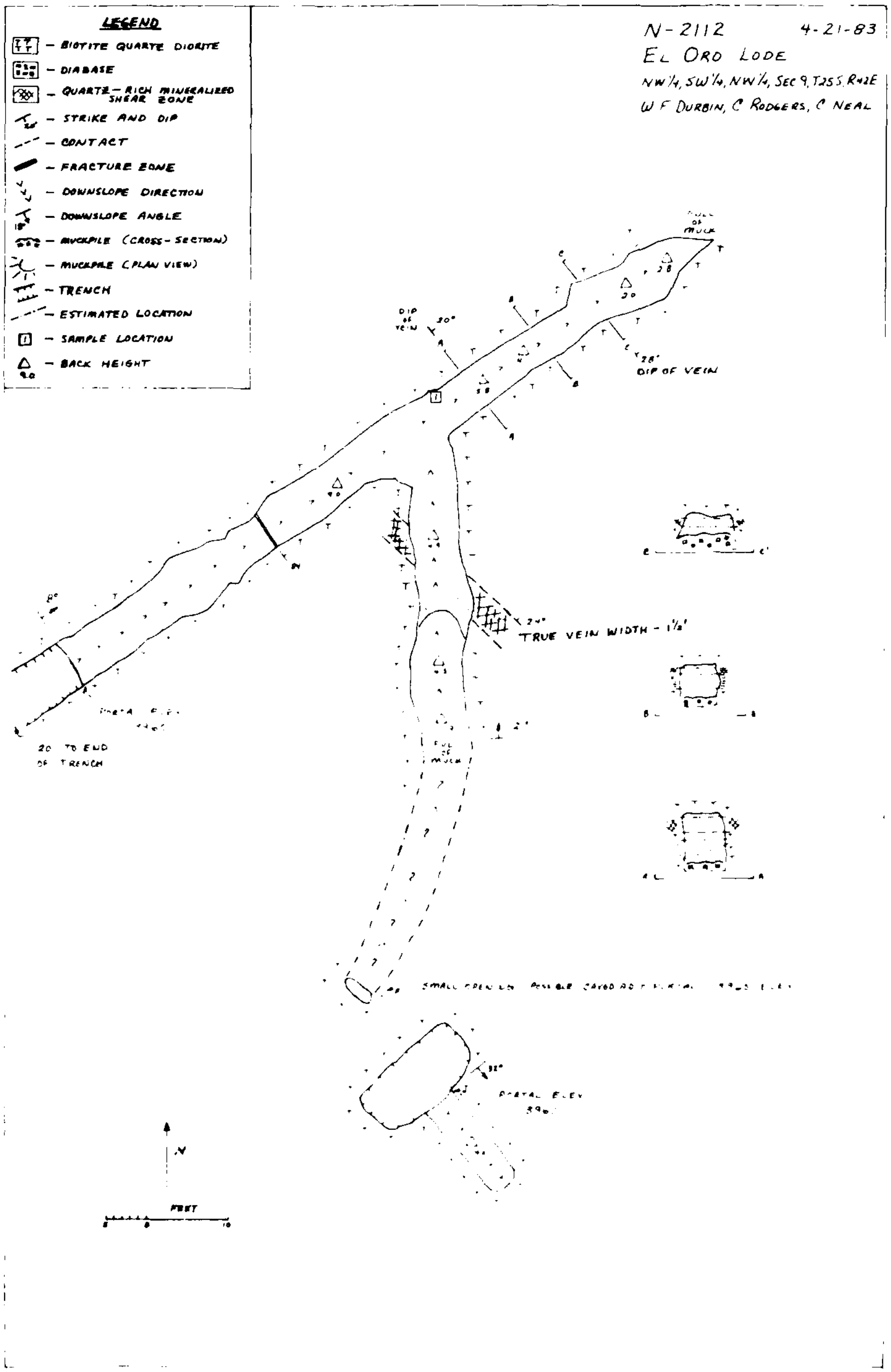


Figure 169. Plan view of the El Oro Lode workings.

Royal Lode (N-2113)

A single prospect pit with a volume of approximately 2 cubic yards was developed at this site, presumably by an operator searching for precious metals. The pit lies atop the northwest-trending ridge that forms the southern wall of Burro Canyon and is situated 4.5 miles west-northwest of Trona, Calif., as shown by Figure 10. The prospect is placed in the SE1/4, NE1/4, SE1/4, Sec. 9, T25S, R42E, MDB&M.

The host rock is gray Mesozoic granodiorite as indicated by outcrops in the immediate vicinity. The pit is filled with slope wash so no information on geology and mineralization is present in-place. Scattered white quartz with azurite and malachite coating litters the area around the pit. A grab sample of this material was collected for assay. The sample results, shown in Appendix A, indicate that no commercial potential for precious metals exists at this location.

This prospect is listed in literature of the NOTS legal archives as the Royal Lode Condemnation, Case Number 467. The total value of the claim plus the value of improvements at the site was appraised at $1000 during land withdrawal proceedings that took place between 1947 and 1949. The last claimant is listed as H. G. Steven.

Unnamed Prospect (N-2114)

This unnamed prospect trench was dug along a quartz-bearing shear zone, presumably by an operator exploring for precious metals. The prospect is situated 5.1 miles west-northwest of Trona, Calif., as shown by Figure 10, a location map of the area. It is placed in the SE1/4, SE1/4, NW1/4, Sec. 9, T25S, R42E, MDB&M.

The area host rock is Mesozoic hornblende granodiorite. The shear zone and associated quartz, though not seen in place, had an apparent strike of S47W, as based on the trend of the 15-foot-long prospect pit. The scattered quartz material around the perimeter of the pit contained minor limonite and chrysocolla, both as fracture-filling and surface coating. A grab sample of the loose mineralized quartz rock was collected and sample assay results are shown in Appendix A.

Based on the sample assay data and on the very limited extent of the prospect workings, it is evident that no discovery of commercial mineralization was made at this location.

Unnamed Shaft (N-2301)

This 7 by 7 by 15-1/2-foot vertical shaft was driven to explore the down-dip potential of a quartz mineralized shear zone that formed in a Mesozoic biotite-rich quartz diorite.

The shaft is situated on the north side of a small mesa located 2.0 miles north-northwest of Lone Butte, as shown on Figure 11. It is placed in the NW1/4, SW1/4, NW1/4, Sec. 18, T26S, R41E, MDB&M.

The shear zone strikes east-west, has a vertical dip, and averages 5 feet wide. The quartz, which is massive white with minor limonite stain and fracture-filling, is 3.5 feet wide in the eastern wall of the shaft and pinches to 0.5 foot wide on the western shaft wall. The remaining shear zone material is altered, fractured biotite quartz diorite with a few scattered 1/8- to 1/4-inch quartz stringers.

A grab sample of the quartz with limonite was taken from abundant loose material located around the shaft collar. The assay results, shown as sample N-2301-1 in Appendix A, indicate that no discovery of commercial values for precious metals was made at this location.

Lone Wolf (Drednaugh) Mine (N-2303)

The literature from the NOTS legal archives lists this location as the Drednaugh claim, last claimed by J. W. Haselbusch. A badly obliterated claim notice found at the site lists the claimant named above, a claim date of 1938, and states the claim name as Lone Wolf.

The Lone Wolf Mine is situated in the southwestern portion of the Argus Range and lies 4.3 miles due west of south Trona, Calif. It is placed in the SW1/4, NW1/4, NW1/4, Sec. 4, T26S, R42E, MDB&M and is shown on Figure 12.

A surface plan view showing the relative positions of the workings is given by Figure 170. The workings explored at least two mineralized, quartz-bearing shear zones within Mesozoic intrusive rocks that range in composition from hornblende/biotite quartz diorite to clay-altered hornblende diorite.

Figure 171 is a plan view with cross sections of the major group of mine workings. Adit 1 was driven a total length of 174 feet. It intersected a quartz-bearing shear zone 45 feet from the portal. The shear zone is up to 1.5 feet wide and strikes from N25W to N33W with dips ranging from 20 to 25 degrees southwesterly. At 75 feet in from the portal the drift turns southeasterly to explore 85 feet of the shear zone strike length. The zone narrows southward, commonly with widths of 2 to 4 inches. The quartz vein material in the zone averaged 1 to 2 inches in width and is a discontinuous 1-inch wide veinlet at the drift face. A raise was driven from the drift level 75 feet from the portal to determine up-dip limits of the mineralized shear zone. The raise, driven a total of 55 feet, exposed quartz vein widths ranging from 1.5 to 4 feet. The mineralized quartz contained disseminated fine crystalline pyrite, scattered azurite and malachite

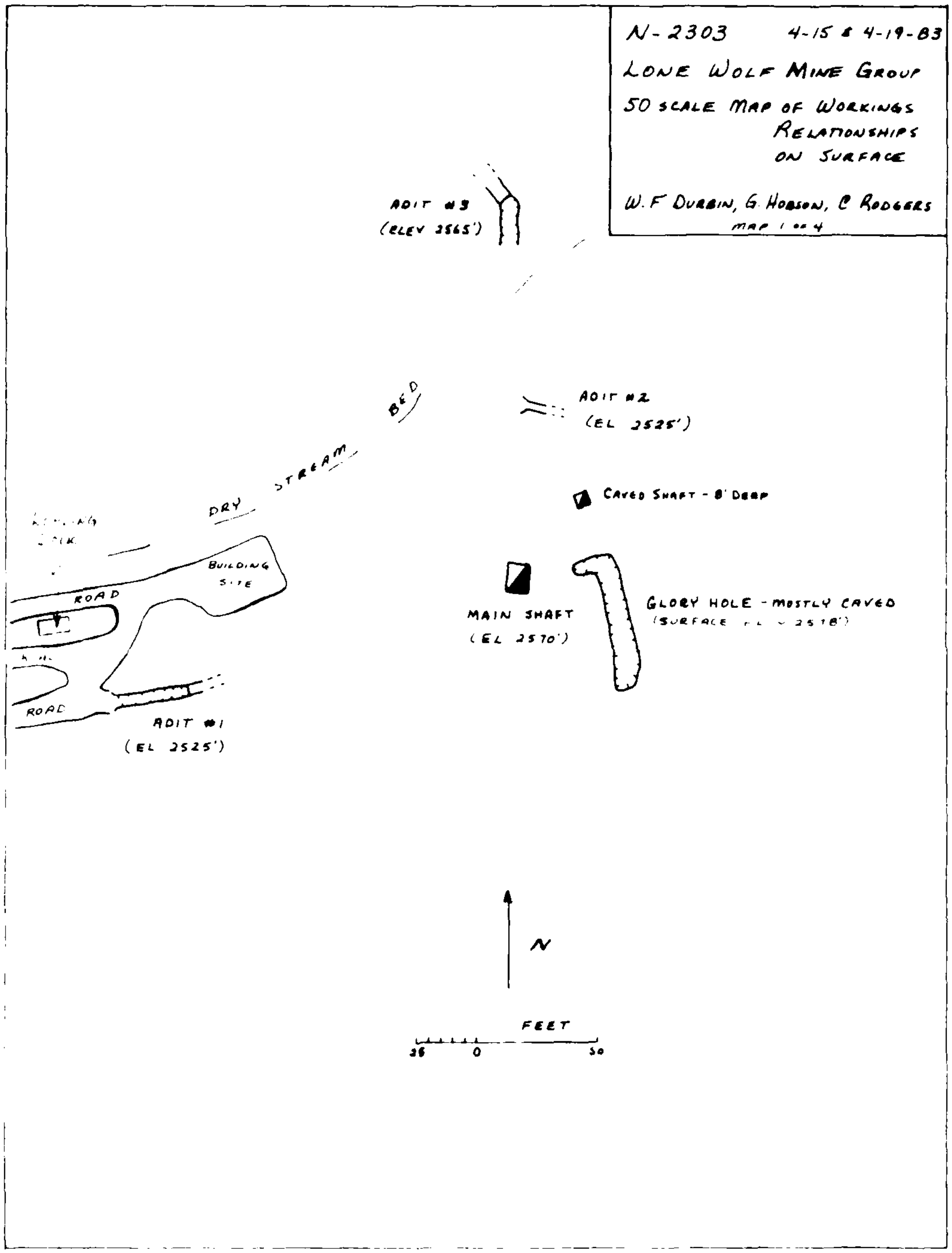


Figure 170. Surface view of the workings at the Lone Wolf (Drednaugh) Mine.

Figure 171. Plan view with cross sections of the major workings, Lone Wolf (Drednaugh) Mine.

fracture-filling, interstitial white clay, and limonite fracture-coating. The raise intersected a 22-foot vertical shaft from the surface. A stope, now caved and inaccessible, was driven up-dip from the bottom of the shaft to the surface where the mine work is expressed as a 56-foot-long, 10-foot-wide glory hole, also shown in Figure 171. A second stope was made in the upper portion of the raise driven up from Adit 1. The total volume of material removed from the raise and stoping area amounts to 108 cubic yards. Actual quartz vein material removed in the area was approximately 43 cubic yards. Samples N-2303-1 and N-2303-2 were chipped across the mineralized quartz and were taken of the material appearing to be the best grade.

Adit 2 is shown in plan view by Figure 172. It lies 70 feet to the north of the main shaft. It was driven a total length of 40 feet in hornblende-rich quartz diorite and encountered a 0.5-foot-wide quartz vein at a depth of 37.5 feet. The vein strikes N45E and dips 30 degrees northwesterly. The quartz is massive, white, and unmineralized. No samples were taken.

A caved shaft is situated 35 feet northeast of the main shaft. It is caved to within 8 feet of the surface and contains remnants of rotted wooden ladders. No mineralization was observed in place in the shaft walls, nor was there mineralized quartz rubble lying around the shaft surface area. The shaft dump volume indicates the working may have extended downward to a depth of 20 to 25 feet of a 6- by 5-foot shaft.

Adit 3 is shown on Figure 173. It lies 150 feet north of the main shaft and across a small dry stream channel. The working consists of a 61-foot drift, a 16-foot winze, and a 1.5-foot-wide stoped area. The drifting was done to explore the limits of a shear zone with quartz mineralization that strikes N32W and dips 40 to 46 degrees southwesterly. The shear zone ranges in width from less than 1 foot to 3.5 feet and quartz within the zone is from 1 to 2.5 feet wide. The hanging wall of the shear is bounded by a few inches of clay-rich slickensided material. The host rock is Mesozoic hornblende diorite, the footwall diorite being strongly clay altered.

The mineralization within the shear zone consists of massive white quartz with disseminated fine crystalline pyrite and limonite fracture-filling. The zone splits into two minor quartz-bearing shears at 45 feet from the adit portal but the zones rejoin at about 50 feet and the single zone continues to the face of the adit, narrowing to approximately 0.4 feet in width. The 16-foot winze was driven down the dip of the split portion of the shear at 45 feet from the adit portal. The shear zones rejoin a few feet down-dip and the single zone is 2 feet wide at the winze face. One sample, labeled N-2303-3, was chipped from the winze wall in a 2-foot-wide portion of the quartz vein. The small stoped area located at the right side of the adit portal produced 2 cubic yards of material.

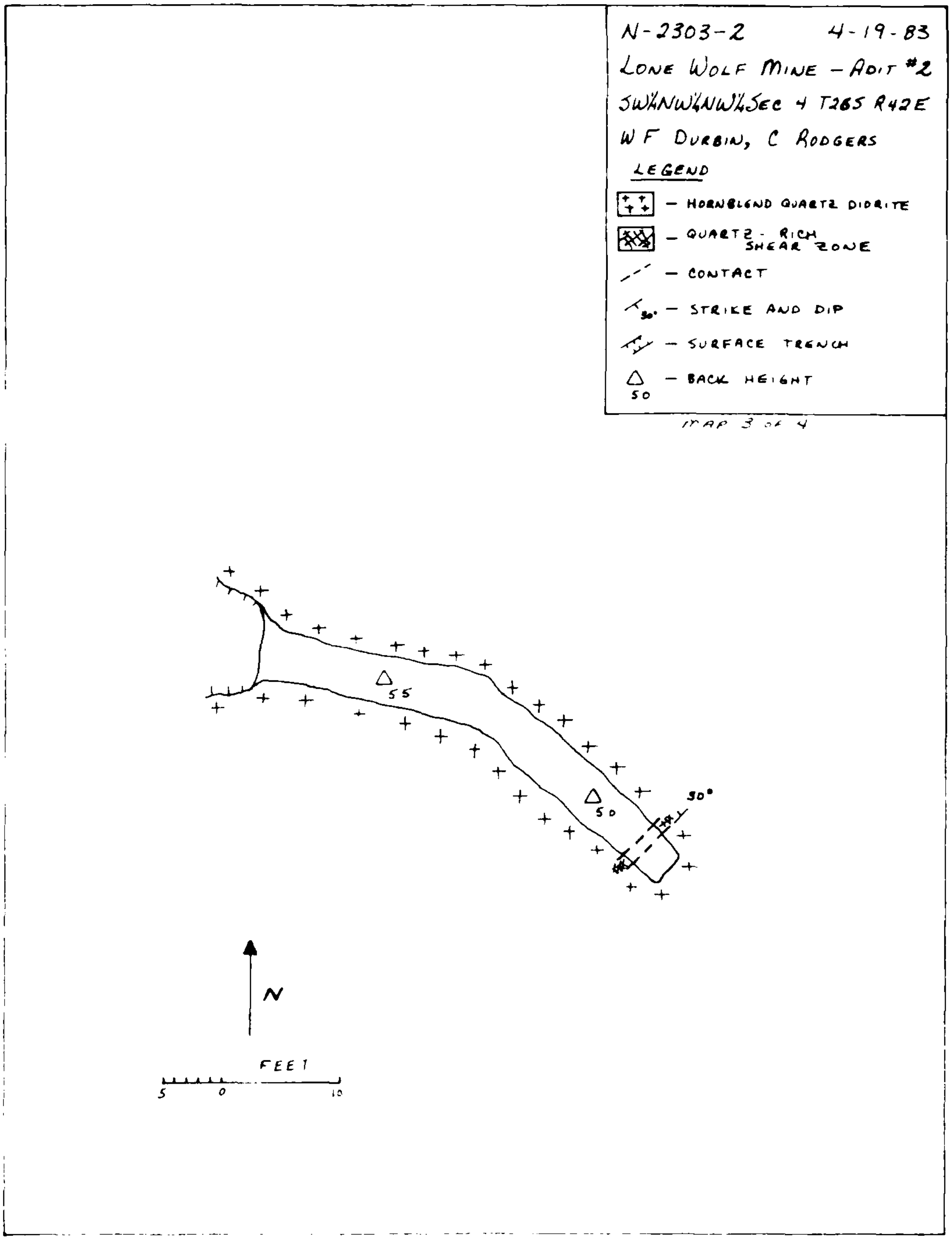


Figure 172. Plan view of adit 2, Lone Wolf (Drednaugh) Mine.

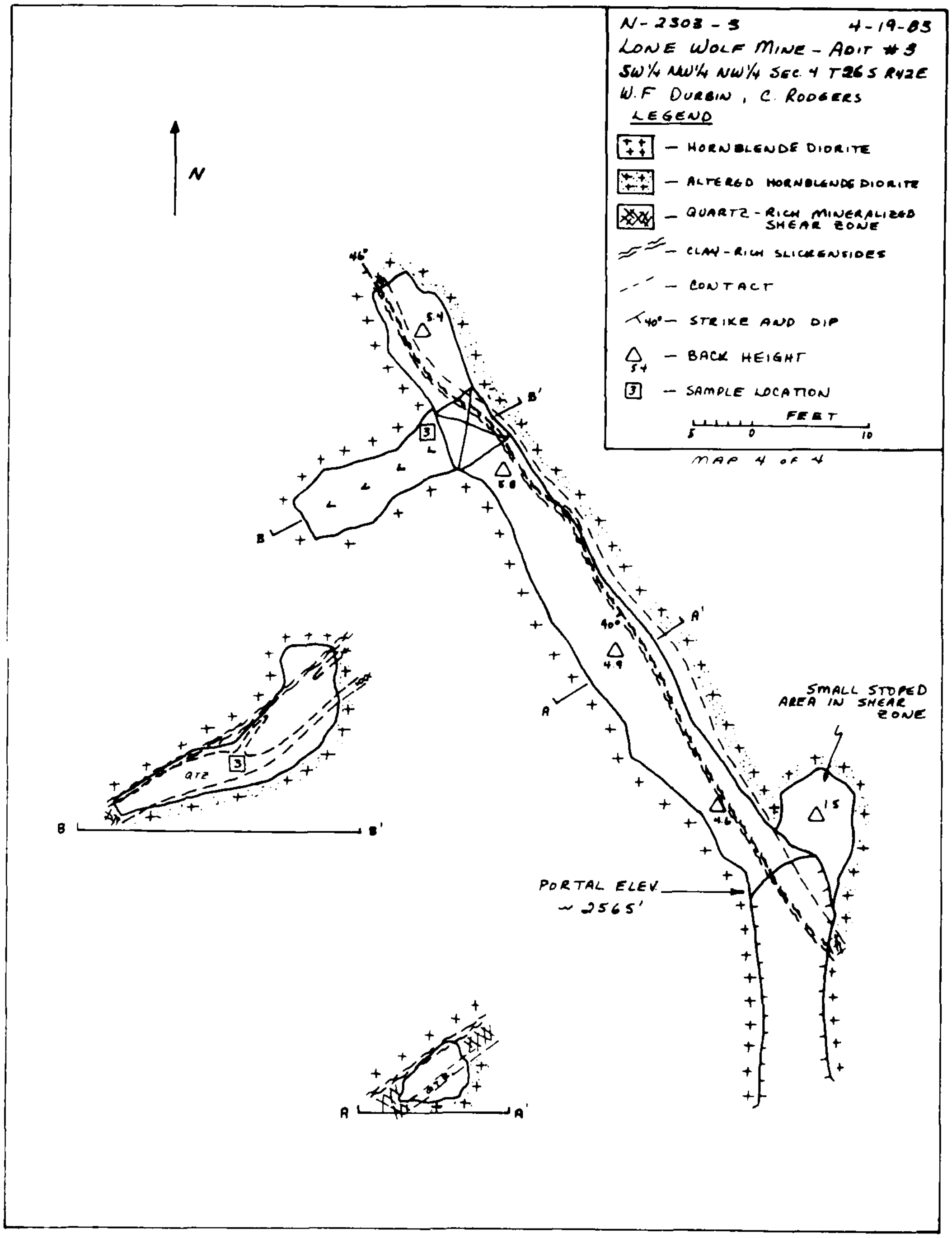


Figure 173. Plan view of adit 3, Lone Wolf (Drednaugh) Mine.

The Lone Wolf Mine apparently supported a number of workers. A cluster of five or six tumbled-down buildings was situated on the mine road 0.3 mile to the southwest of the mine site. The remains of a maintenance building and yard are located near the portal of Adit 1. There is a small loading dock for ore haulage and the scattered remains of a mill site are situated approximately 1 to 1.5 miles by road to the south of the mine.

In spite of the apparent flurries of activity at this site, there is little evidence to indicate that it was a producer of significant grade or tonnage of precious metals or other commodities. The assay results for the three samples, shown in Appendix A, indicate low to nil values for gold and silver, too low to be of commercial interest.

Based on the assay data, the spotty nature of mineralization within the quartz, and the narrow, discontinuous and localized nature of the various shear zones, no commercial potential exists at this site.

Lone Butte Shaft and Prospect Pits (N-2304)

These workings, shown on Figure 11 as N-2304, are located approximately 0.45 mile south of the B Mountain triangulation station on Lone Butte, at an elevation of 2850 feet. They are in the NW1/4, SE1/4, SE1/4, Sec. 19, T26S, R41E, MDB&M.

The host rock is a Mesozoic quartz diorite. The workings expose a 1- to 2-inch-wide quartz vein along a 1-foot-wide shear zone which cuts the quartz diorite along a N76E strike with a dip of 71 degrees southeast. The quartz has minor amounts of limonite staining as fracture coatings.

The property was explored by two small prospect pits and a 60-foot shaft, which is 6 by 8 feet at the surface and narrows to 4 by 6 feet approximately halfway down. The pit to the south is 6 by 8 feet and 1 foot deep. It exposes no mineralization. The north pit, which is adjacent to the shaft, is 5 by 6 feet and 6 feet deep. This pit exposes the shear zone described above. Sample N-2304 was taken across the shear zone of this site. Assay for precious metals on this sample indicates no commercial potential at this site. A complete list of fire assay results can be found in Appendix A.

INDIAN WELLS VALLEY

Bonanza #2 (N-1501)

The Bonanza #2 is situated in the White Hills in northern Indian Wells Valley, in the N1/2, NW1/4 of Sec. 11, T24S, R39E, MDB&M, as seen in Figure 9. These prospect pits may also be within the Volcanic Ash #10 and #12 claims, at one time owned by Lida Iola Bassell (NOTS Legal File); however, the exact location of these claims within Section 11 could not be found.

Two pits are the only visible workings at this site. At Site A, the pit is 15 by 8 by 8 feet deep and was dug in Pleistocene river gravels which overlay lake sediments. It is probable that the pit was dug in order to investigate the contact for placer gold concentration. The potential for a commercial occurrence is nil, as lacustrine silts which are contemporaneous to the stream gravels make a poor substrate for gold deposition.

The second pit (Site B) is 4 by 3 by 1 foot deep and was dug on an outcrop of diatomaceous earth. The occurrence, in outcrop, is very small (35 feet long and less than 3 feet thick): too small to be of any commercial interest.

Bonanza Fraction L (N-1504)

This prospect is located south of the White Hills and adjacent to G-1 Tower Road in northern Indian Wells Valley. Its cadastral location is given as being in the S1/2 of Sec. 26, T24S, R39E, MDB&M, as shown by Figure 9.

The workings consist of two large pits (75 feet across and 4 feet deep) plus a trench, 35 by 3 by 4.5 feet deep. The pits were dug entirely in caliche but the caliche was much shallower at the trench so that the underlying Pleistocene silts and lightly cemented pebble conglomerate were exposed. It is likely that the prospector was searching for placer gold.

Three samples were taken: (1) bottom of pit, (2) silt in trench wall, and (3) pebble conglomerate from the trench bottom. The results are listed in Appendix A. No gold was found in samples 1 and 2, while sample 3 assayed 0.005 troy-oz/ton (equivalent to $2.50/ton). The potential for commercial placer gold at this site is nil. Sample 1 was analyzed for evaporite potential as well (Appendix E). No economic concentrations of saline or rare earth minerals were indicated.

Placer Mining Claim No. 5 (N-1506)

This claim is located near G-1 Tower Road in the White Hills of northern Indian Wells Valley. Its cadastral location is given as the NW1/4, SW1/4, NW1/4 of Sec. 14, T24S, R39E, MDB&M, as shown by Figure 9.

A single prospect pit, 24 by 10 by 3 feet deep, was dug in Pleistocene lake sediments. It is unclear what the prospector may have been searching for, but the potential for a commercial gold placer or an evaporite deposit at this site is nil.

East White Hills Prospect (N-1601)

This prospect is located at the east end of the White Hills in northern Indian Wells Valley. Its cadastral location is given as being in the S1/2, NE1/4, SE1/4 of Sec. 8, T24S, R40E, MDB&M, as shown in Figure 9.

The working consists of a single trench, 80 by 45 by 12 feet deep, trending N75E in Pleistocene river gravels. It is likely that the prospector was looking for placer gold. A sample of the gravels was taken for this survey, but no gold was found (Appendix A).

SILVER OCCURRENCES

COSO DISTRICT

Coso Peak Area

Five Tunnel No. 2 and 4 (N-102)

According to the 1951 NOTS list of validated claims, the last owners of the Five Tunnel Claims 2 and 4 were A. L. Palmer and E. V. Sims, though it is not known if they were the original locators. The claims are located about 4 miles west of Coso Peak in the NE1/4, SE1/4, of Sec. 12, T20S, R38E and in the SW1/4, N1/2, SW1/4 of Sec. 7, T20S, R39E, MDB&M, as can be seen in Figure 5.

A 2-foot-wide quartz vein strikes across the property at N72W, dipping 60 degrees south in Mesozoic diorite. The vein outcrops for about 2000 feet and consists of fractured crystalline quartz with sparse to moderate hematite staining of the fractures. Although none was found in-situ, sparse pockets of sulfide mineralization were apparently present in the vein, as there are fragments of this material present in the dump. Minerals which are identifiable in hand specimens are: pyrite, chalcopyrite, chalcocite, galena, malachite, aurichalcite, cuprite, limonite and hematite.

The workings consist of 19 prospect holes dug along the length of the outcrop, or nearby in order to intersect the dip of the vein. Most of the holes are pits that vary in size from 6 by 6 by 2 feet deep up to 10 feet across and 12 feet deep. Near the center of the outcrop, a trench, 4 feet wide by 3 feet deep, runs for 60 feet along the vein. At the east end of the trench is a caved decline with an estimated length of 40 feet. Several people apparently lived at this site, as there are three collapsed stone cabins nearby.

As no mineral was evident in the exposed vein, a single grab sample was taken of the "high-grade" material from the various dumps. The analytical results are listed in Appendix B. Although the vein is fairly thick and continuous, the mineralization is very spotty, resulting in a very low potential for an economic deposit at this site.

Climax 1 and 2 (N-116)

The Climax 1 and 2 claims are located on a ridge face overlooking the south end of Upper Centennial Flat 4 miles west of Coso Peak, in the S1/2 of Sec. 7, T20S, R39E, MDB&M. Their location is shown in Figure 5. A location notice found on site gives the locator as W. J. Johnson and a date of discovery of 30 September 1940.

A series of closely spaced, en echelon quartz veins outcrop on the north-south ridge face, trend N80W, and dip from 35 to 60 degrees southerly. It is possible that this is a single, broken vein but because of the talus cover on the slope this is difficult to determine. The veins are a maximum of 2 feet thick and are slightly to moderately fractured with moderate hematite fracture coating. Very sparse, disseminated pyrite crystals (and limonite pseudomorphs) occur throughout the quartz, while other sulfides apparently occur in pockets within the quartz, as evidenced by the material on the dumps. Visible minerals which occur in the pockets include chalcopyrite (and pyrite), galena, chrysocolla and argentojarosite (?).

The host rock is a Mesozoic granite. Clay alteration and silica enrichment occurs adjacent to the vein. Diffuse copper-staining is visible in the altered zone near the front of the trench at the upper adit.

The relative positions of the workings can be seen in Figure 174, a view of the property looking west at the ridge face. All four adits are closed, either caved in or blasted shut. The upper adit (#1) was probably less than 60 feet long; #2 about 20 feet long; #3 was 10 to 15 feet long; and #4, the lower adit, was probably less than 30 feet long. Four small pits occur above the upper adit on the same vein system.

Five samples were taken at this site, in two stages. On the first visit "high-grade" grab samples were taken from the dumps. These are samples 1, 2, and 3. The geologist returned to the site a second time after analysis of the samples showed high concentrations of silver in

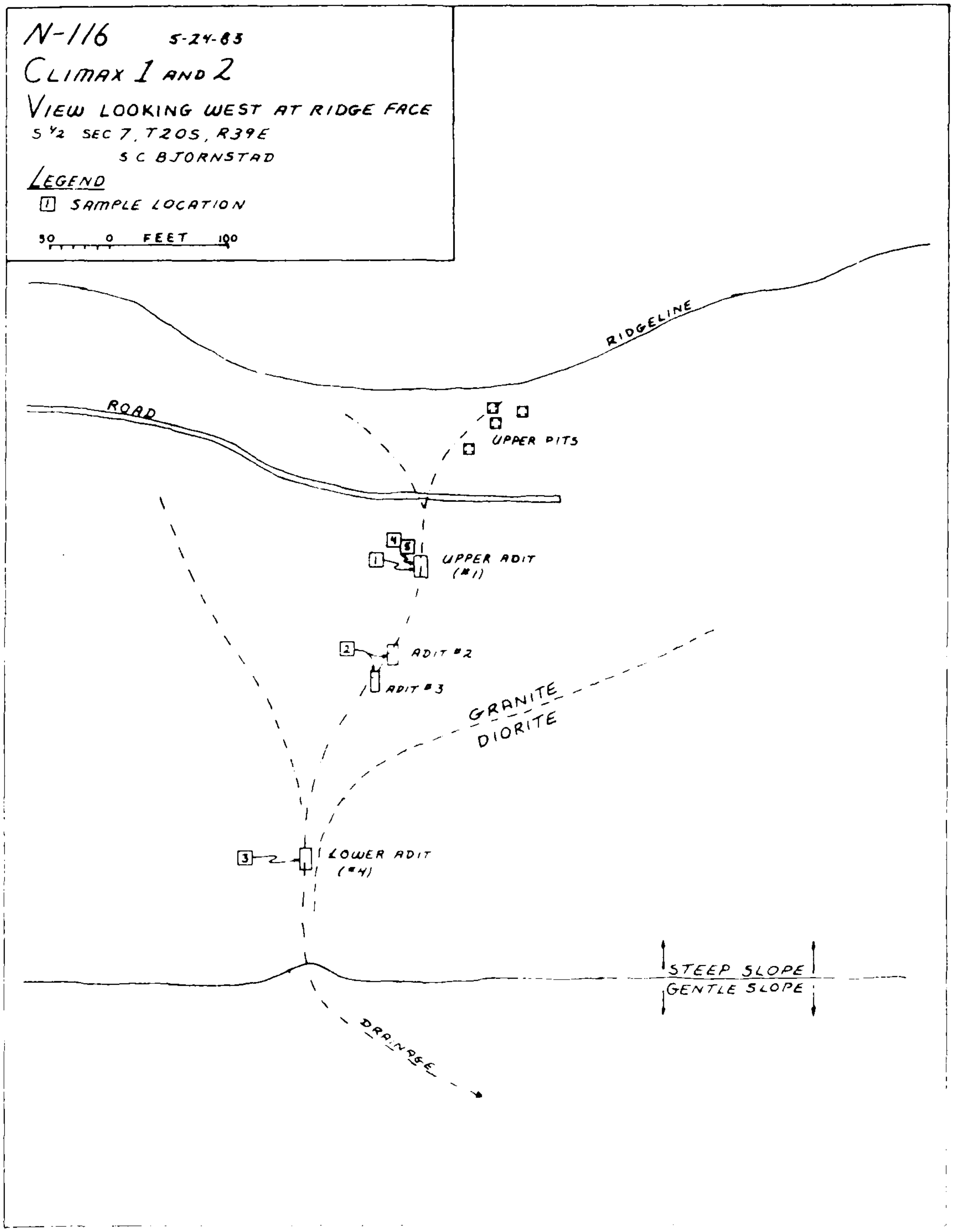


Figure 173. A view of the Climax 1 and 2, [illegible].

Nos. 1 and 3. Two additional samples (Nos. 4 and 5) were taken from veins in place in the walls of the collapsed trench which had been the upper tunnel. It is unlikely that these vein exposures were deliberately contaminated, as they were probably not exposed until after prospecting had ceased on the base. No "high-grade" material was visible in the vein, so "low-grade" material (quartz with sparse steel galena and argentojarosite (?)) was sampled. Gold and silver assays are given in Table 46, and complete analytical results are given in Appendix B.

TABLE 46. Analytical Results of Samples from the Climax 1 and 2.

Sample	Gold		Silver		Total precious metal value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-116-1	0.019	9.50	25.31	379.65	389.15
N-116-2	Nil	...	1.10	16.50	16.50
N-116-3	0.040	20.00	17.70	265.50	285.50
N-116-4	0.010	5.00	7.50	107.25	112.25
N-116-5	Nil	...	0.86	12.90	12.90

The potential for a commercial occurence at this site is low. The vein system is broken up and discontinuous at the surface. Although the samples confirmed that good mineralization exists (or existed) here, it apparently occurs in pockets in otherwise barren quartz making it much less profitable to mine than were it continuous through the vein. Also, the vein system apparently continues under the hill and outcrops 1000 feet to the west as a 2-foot-wide vein that runs along for another 2000 feet. This outcrop was discussed as the Five Tunnel Prospect (N-102) and the spotty nature of the mineralization repeats itself there.

ARGUS DISTRICT

Maturango Peak Area

Argus Sterling Mine (N-301)

Location and History. The Argus Sterling Mine is situated along the western slope of the Argus Range 2.5 miles north of Maturango Peak and 9.5 miles southeast of Darwin, Calif. It is placed in the SE1/4, NW1/4, NE1/4, Sec. 35, T20S, R41E, MDB&M and is shown on Figure 7.

The mine is listed in the NOTS legal archives as the Argus Lode, last claimed by Theo. Peterson. Tucker (1926)[14] and Goodwin (1957),[15] list the property as the Argus Sterling Mine. Goodwin (1957) indicates the active production period of the mine as 1917 through 1923 with ore production values of 15% lead, an average silver grade of 4.25 troy-oz/ton, plus some copper and gold.

Mine Working. Argus Sterling Mine workings consist of a 156-foot vertical shaft, three drift levels connected by a series of raises and winzes, five sublevels, and ten stoped areas plus minor exploration pits and surface trenches.

Geology. The Argus Sterling Mine is situated on the southern edge of the Argus Sterling Thrust Fault less than 0.5 mile east of the western slope of the Argus Mountain Range. The fault strikes northwesterly and dips 30 to 45 degrees southwesterly. Rocks of the Permian Owens Valley formation are found to the north and east of the Argus Sterling Mine. These rocks are an intensely folded and faulted sequence of carbonate-rich sediments ranging from silty limestones, calcarinates, and limestones to shales, and they form the footwall of the Argus Sterling Thrust Fault.

An extensive lensic, irregular limestone body is situated along the trace of the Argus Sterling Thrust Fault. It is considered by Moore (1976)[6] to be a tectonite marble and of late Paleozoic age. This limestone is the host rock in which the ore bodies of the Argus Sterling Mine are developed. The limestone observed in the mine is generally fine-grained and from bluish-gray to white in color. The limestone is locally marblized and shows strong bedding in most areas with bedding dips to the northeast, away from the intrusive contact discussed later in this section. The limestone becomes a tan, locally marblized massive dolomite to the north of the mined area as shown by two exploratory drift workings.

The body of rock that forms the over-thrust block or hanging wall of the Argus Sterling Thrust Fault in the mine area is a small intrusion of quartz monzonite. It is a fine- to medium-grained, light gray, equigranular granitic rock. This pluton, mapped by Moore (1976), covers approximately 1 square mile and has been dated at between 108 and 139 million years (biotite and hornblende ages, respectively).

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[14] W. B. Tucker. *"Report 22 of the State Mineralogist,"* Vol. 22, No. 4, 1926, California Mineral Bureau, p. 476-77.

[15] J. C. Goodwin. "Lead and Zinc in California," *California Journal of Mines and Geology,* Vol. 53, No. 3 and 4, 1957, p. 451.

At the Argus Sterling Mine, minor contact metasomatism was noted where the quartz monzonite was in contact with limestone on the surface. The resulting skarn (tactite) averaged from 6 inches to 1 foot in width and was composed of reddish-brown garnet with minor idocrase, calcite, epidote, and quartz.

Structure and Ore Occurrence. The Argus Sterling Mine deposit is similar in character to the lead-zinc-silver deposits of the Darwin and Cerro Gordo districts. Mineralizing fluids from the adjacent intrusive body penetrated bedding plane fractures and premineral fault zones within the limestone, depositing a variety of ore and gangue minerals. Secondary mineralization and alteration of lead and zinc minerals has occurred through most of the ore bodies in the mine. There are two prominent mineralized structures that form the Argus Sterling ore body. The largest of these is a pipe-like structure that apparently resulted from closely spaced and intersecting vertical faults. The mineralized zones in this structure are 2.5 to 5 feet wide and were mined or explored from Level 3 nearly to Sublevel 2B (approximately 80 feet). This fault system parallels the strike of the limestone bedding. The smaller structure is a narrow bedding plane fracture zone that strikes N55W to N60W and dips from 35 to 60 degrees northeasterly. It ranges from 4 inches to 4 feet in width. This zone can be followed from the surface downward to the sublevels below Level 3, a vertical distance of approximately 210 feet. The two structures may intersect in Sublevel 2B.

The deposit is extensively oxidized and is, therefore, composed predominately of secondary minerals with occasional cores of primary sulfides. Primary sulfide mineralization consists of fine-grained steel galena with small amounts of sphalerite and pyrite noted in the lower levels of the mine. Cerussite and anglesite are the most abundant secondary ore minerals. Smithsonite and hydrozincite are also present in smaller quantities as are minium and massicot. Gangue minerals include quartz, calcite, barite, hematite, limonite and pyrolusite.

The main access shaft is vertical, 156 feet deep and is developed totally in blue-gray limestone. It was used primarily for ore haulage from Level 3, the rail haulage level and the only working that intersects the shaft. A rusted cable hoist at the shaft collar is all that remains of the haulage system.

Level 1 is the upper haulage and access way and is shown in plan view on Figure 175. It lies at the same elevation (6120 feet) as the shaft collar. It was driven northwesterly 440 feet, approximately perpendicular to the strike of limestone bedding. It was driven through quartz monzonite (first 23 feet) into marmarized limestone and encountered dolomite approximately 160 feet from the adit portal. The quartz monzonite/limestone contact is barren. A 17-foot width of

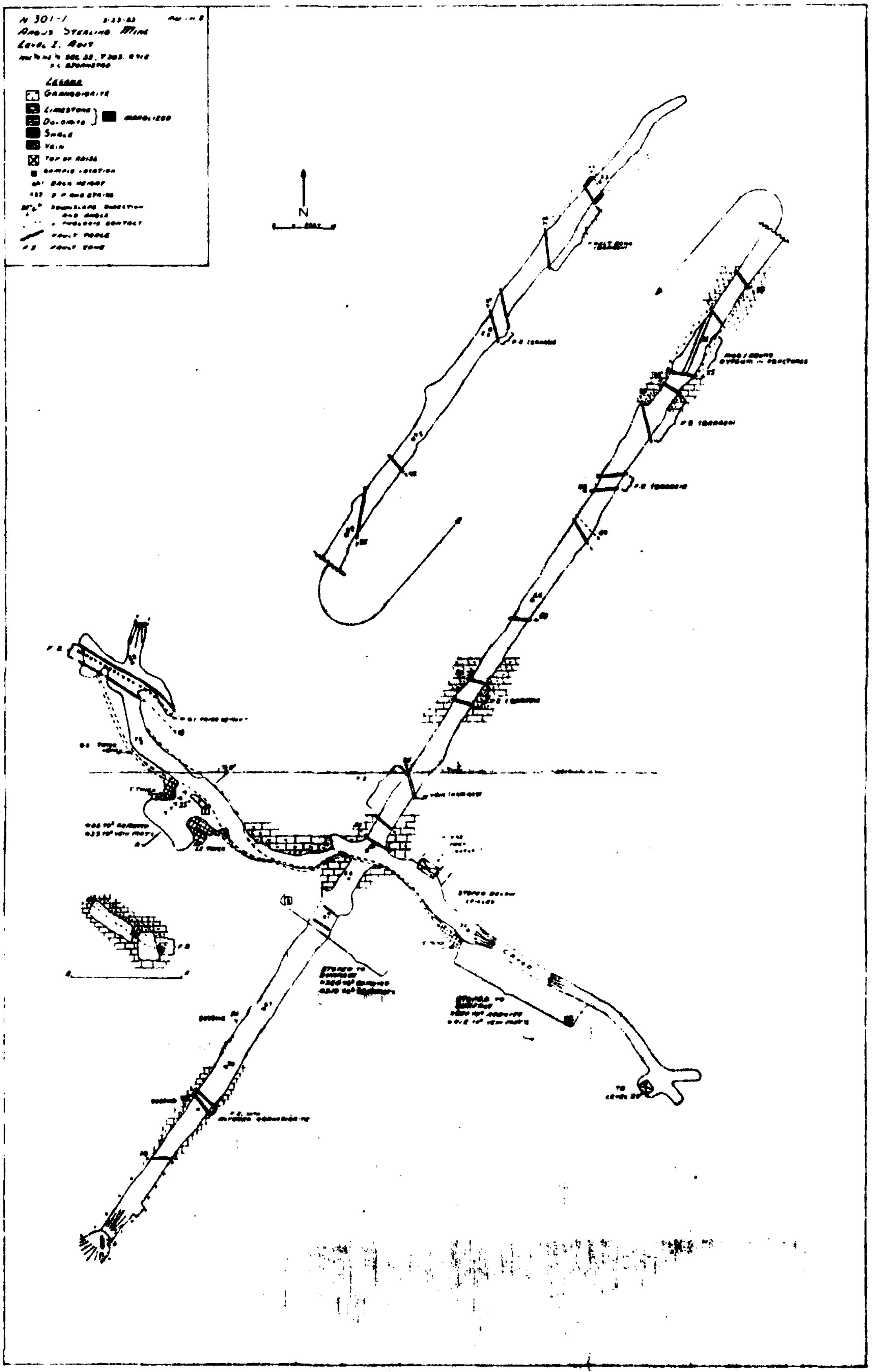

Figure 175. Plan view of level 1, Argus Sterling Mine.

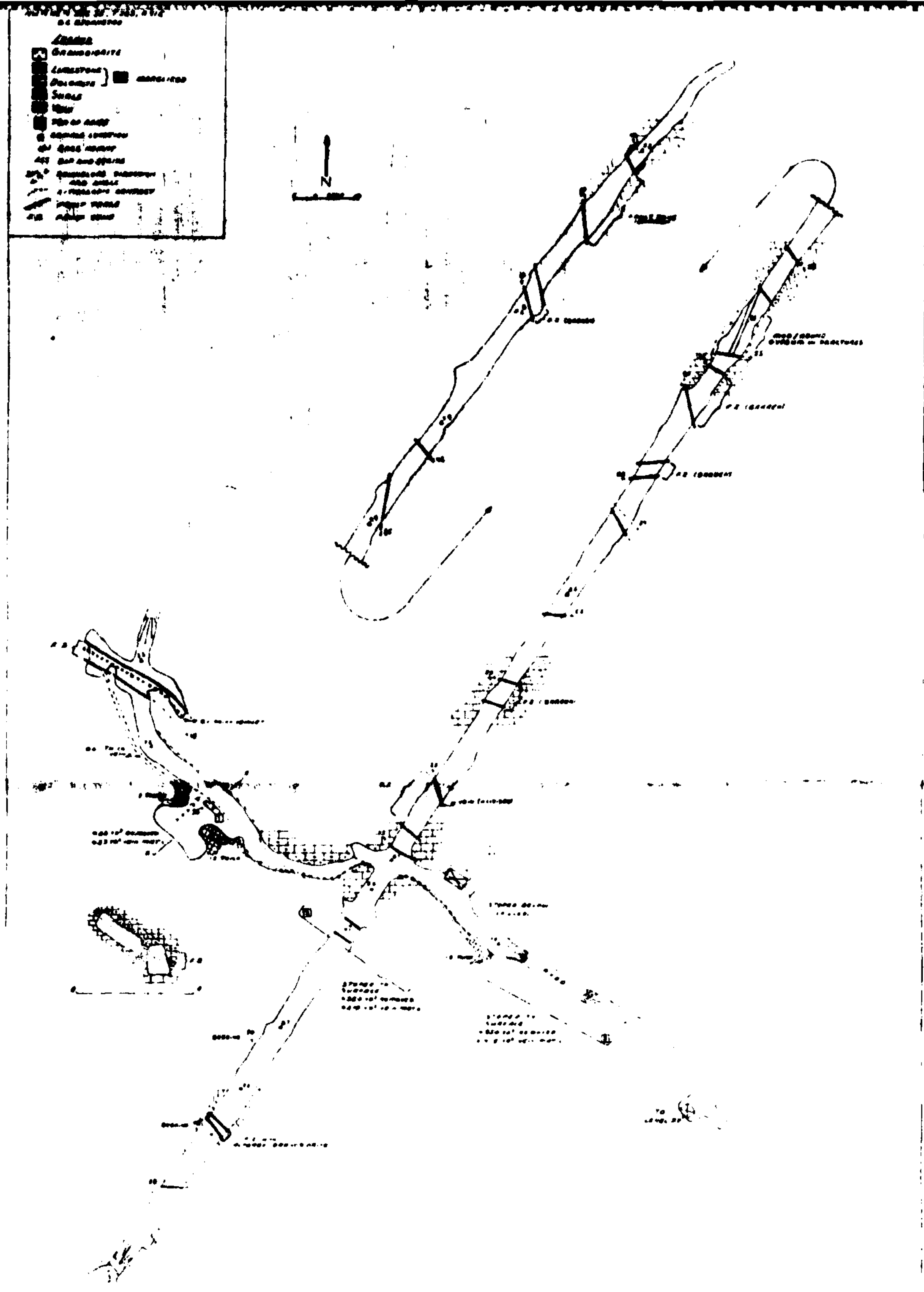

Figure 12[illegible]. Plan view of level 1, Argus Sterling Mine.

gypsum-rich altered quartz monzonite was intersected at 250 feet from the portal and no significant mineralization was encountered through the dolomite sequence. Two crosscut drifts were driven along the mineralized zone. The crosscuts are located 110 feet from the portal, driven 130 feet to the west, and 90 feet to the east. Three stopes were developed up-dip from Level 1 on veins from 1.5 to 4 feet wide and dipping from 35 to 55 degrees northeasterly. The western-most stope was driven 15 feet to a point where the vein pinched out. The two easterly stopes were mined up-dip to the surface (approximately 70 to 75 feet). The ore mineralogy in the stopes above Level 1 consists of central cores of cerrusite and anglesite with border zones of minimum, massicot, smithsonite and hydrozincite. No galena was observed. The footwall host rock is blue-gray limestone while the hanging wall is whitish marblized limestone grading outward to pure limestone. One sample was chipped across the mineralized vein in each of the three stopes above Level 1. The locations for the samples, labeled N-301-1, 2, and 3, are shown on Figure 175. Each sample was taken from the mineralized zone with a width averaging 1.5 feet. The stopes produced a total of approximately 1266 cubic yards of material, 658 cubic yards of that total being vein material. Access to workings below Level 1 is by a short raise below the east crosscut drift, near the junction with the main drift, and by a manway raise at the face of this same crosscut drift. The bottom of the manway raise is on Level 3, near the shaft.

Figure 176 is a plan view with cross section of the 40-foot raise between Levels 1 and 2 and plan view of sublevel 1A. The raise was driven on the vein which ranges from 4 inches to 1.5 feet in width. The vein splits and follows a parallel bedding plane fracture for a few feet just below Level 1. Sublevel 1A was driven from the raise 50 feet east along the vein which dips an average of 52 degrees northeasterly. The vein pinched out at the east end of the sublevel; but where present, it averages 1.5 feet wide and is composed primarily of cerrusite and anglesite with abundant minimum and massicot near the contact margins. A raise located at the east end of the sublevel is filled with muck to within 2 feet of the sublevel bottom. A stope driven up-dip from the sublevel to Level 1 produced 21 cubic yards of rock, 8 cubic yards of which was vein material.

Level 2 is shown in plan view and cross section by Figure 177. It was driven a total of 155 feet, predominantly in a northwesterly direction along the vein strike, and is approximately 28 to 30 vertical feet below Level 1. The drifting exposed veins with occasional splits but with average widths of about 2 feet and dips ranging from 45 to 60 degrees. Three small stopes were developed from this level, two of which are accessible. The accessible stopes, located just west of the access raise and at the west end of the level, produced a total volume of 33 cubic yards of material, 10.5 cubic yards being vein material. Samples N-301-4 and N-301-8 were taken on Level 2. N-301-4 was chipped from a 1.5-foot width of vein on a pillar at the foot of the access

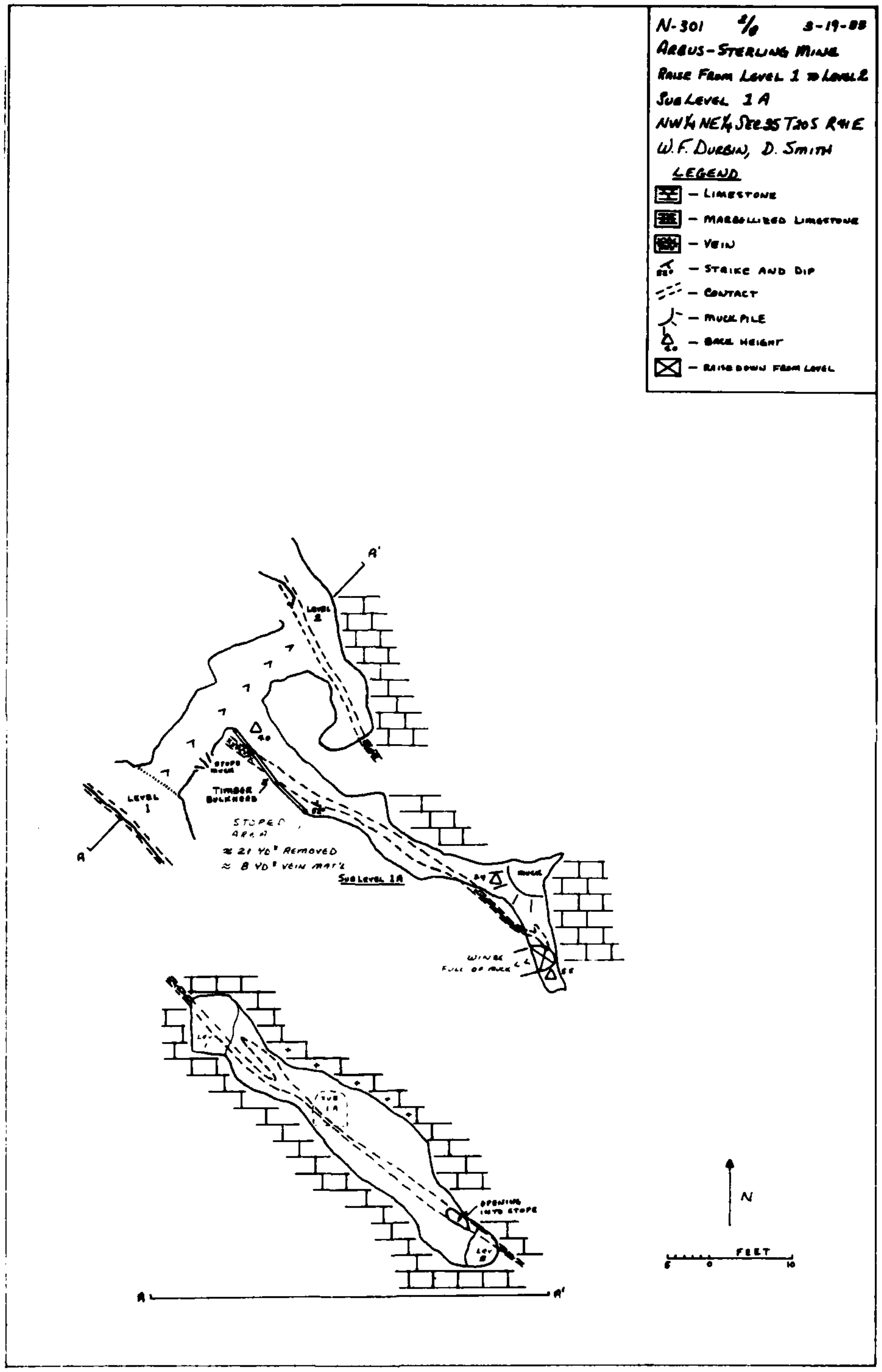

Figure 176. Plan view (with cross section) of raise between levels 1 and 2, Argus Sterling Mine.

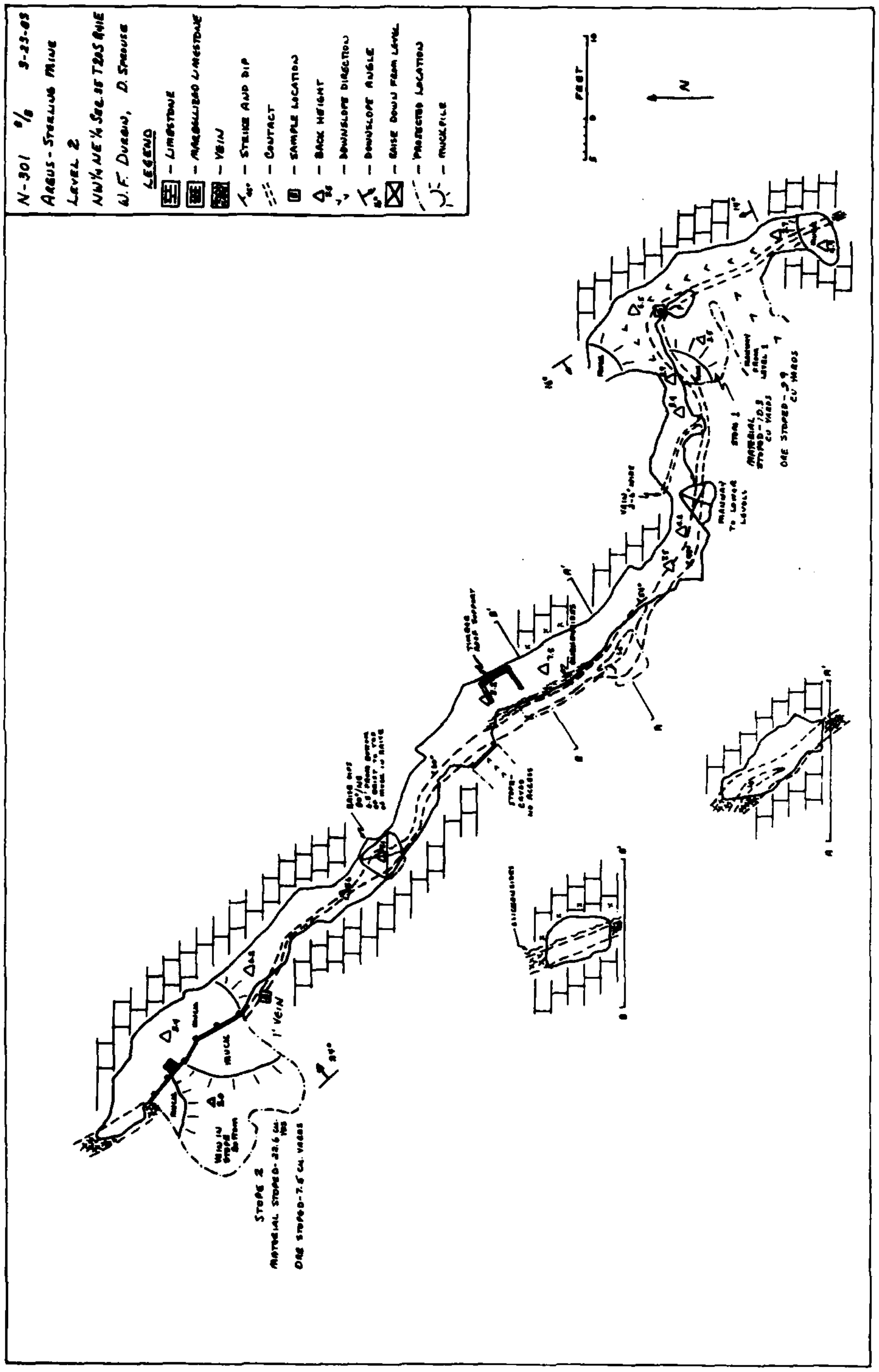

Figure 177. Plan view of level 2, Argus Sterling Mine.

raise. The vein material contained two or more 1/4-inch veinlets of galena surrounded by cerussite, smithsonite and anglesite crusts and veinlets, the remaining voids and spaces filled with lead and iron oxides. A very few disseminated grains of sphalerite were observed along with minor amounts of hydrozincite. Sample N-301-8 was from the drift level near the edge of the western stope. The vein was 1 foot in width and contained scattered disseminated galena, anglesite, cerrusite, and a trace of sphalerite and 1 to 2 inches of lead and iron oxides on each contact margin. A vertical manway, located 25 feet west of the access raise, provides the passageway to the lower levels.

Sublevel 2A, located approximately 20 feet below Level 2, is shown in plan view on Figure 178. The sublevel was driven 10 feet to the northwest of the manway and approximately 60 feet to the southeast along the vein strike. The mineralized zone has developed along a nearly vertical bedding plane fault in limestone that is locally marblized. The zone is partially bounded by a few inches of white clay that is slicken-sided. Mineralization in the zone is predominantly cerussite and anglesite with scattered quartz and white interstitial clay. The vein appears to turn easterly in the southern end of the working, and was apparently explored but the drift is muck-bound and inaccessible. Another vertical manway, located 14 feet southeast of the Level 2 manway provides access to the lower levels.

Sublevel 2B was driven off the manway raise 30 feet below Sublevel 2A and is shown in Figure 179. It explores the mineralized zone for approximately 28 feet to the northwest of the manway. The structure observed in this level is complicated by possible intersection of the vertical fault seen on Sublevel 2A above and another subparallel fracture or fault system. They intersect just west of the manway. The limestone host in the area is bleached, partially marblized and has been folded so that the bedding dips southwesterly, opposite to what is seen elsewhere in the mine. Sample N-301-9 was chipped across a 2.5-foot vein width where the fault structures have intersected. The vein contains scattered galena, mainly as tiny streaks 2 to 3 inches long, cerussite, anglesite, smithsonite, limonite, and abundant clay stained with lead oxides. No stoping was done. A possible ore pass from Sublevel 2A connects to Sublevel 2B and appears to go below the sublevel but is muck-bound and inaccessible. The manway raise continues vertically downward approximately 70 feet to Level 3.

Figure 180 is a plan view of Level 3. From the main shaft, Level 3 was driven east 40 feet to intersect the vertical mineralized zone. The drifting proceeded along the vein strike to the northwest for another 225 feet, encountering tan, marblized dolomite at 165 feet with no mineralized rock observed beyond that point. A 100-foot crosscut was driven northeasterly and intersected a 1-foot mineralized zone in intensely fractured limestone. The zone is cut off to the west by a steeply dipping northwest-trending fault. The mineralized vein strikes

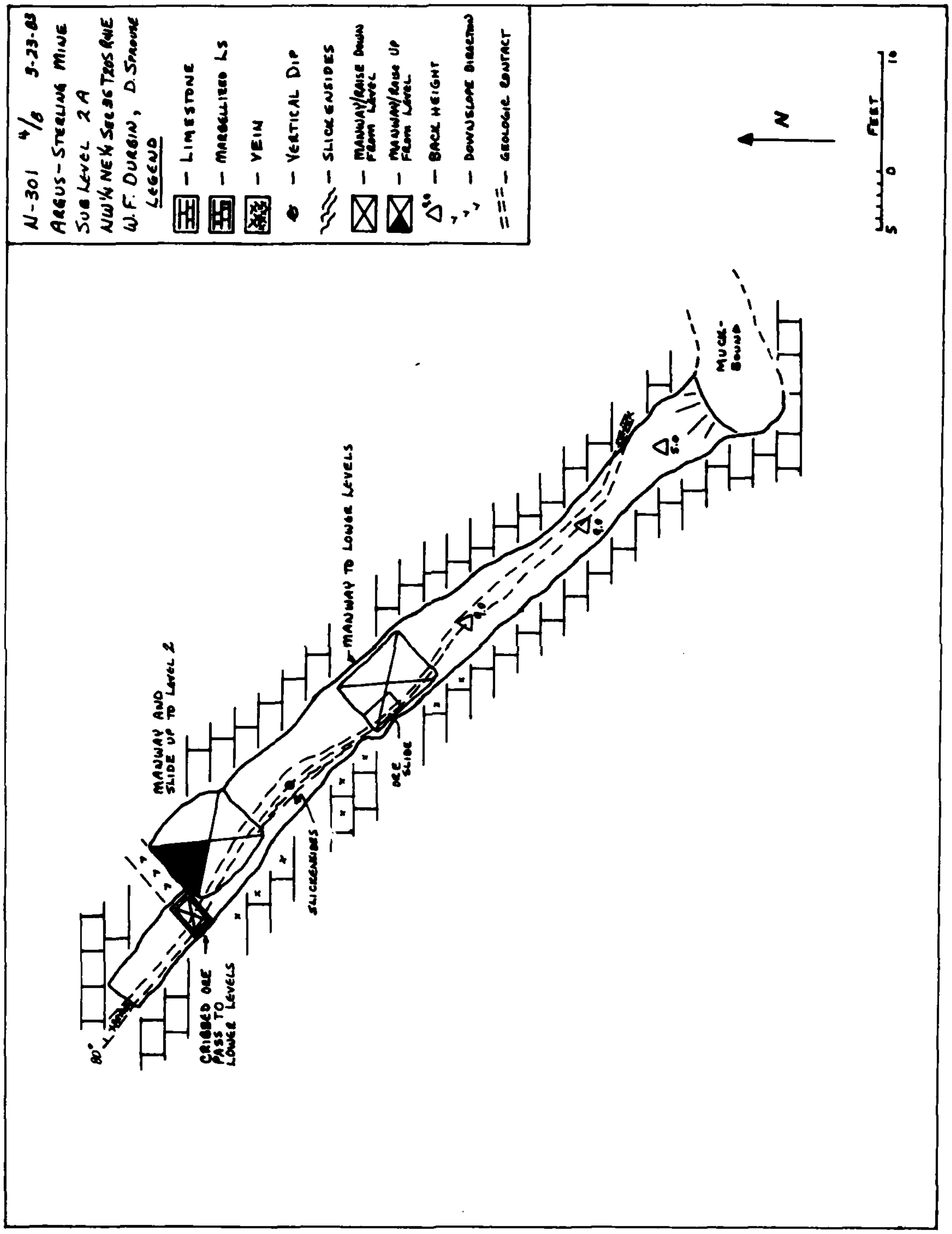

Figure 178. Plan view of sublevel 2a, Argus Sterling Mine.

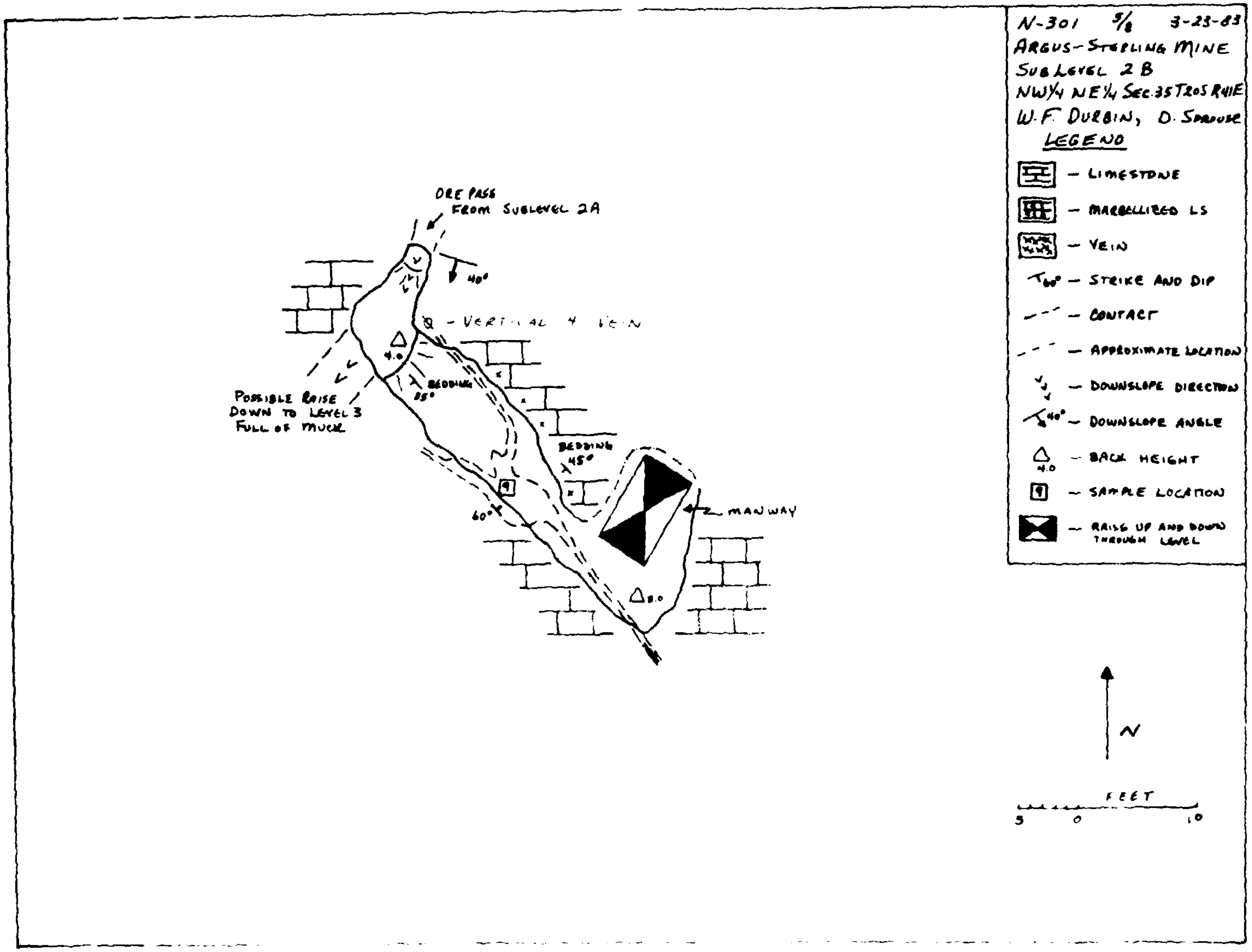

Figure 179. Plan view of sublevel 2b, Argus-Sterling ...

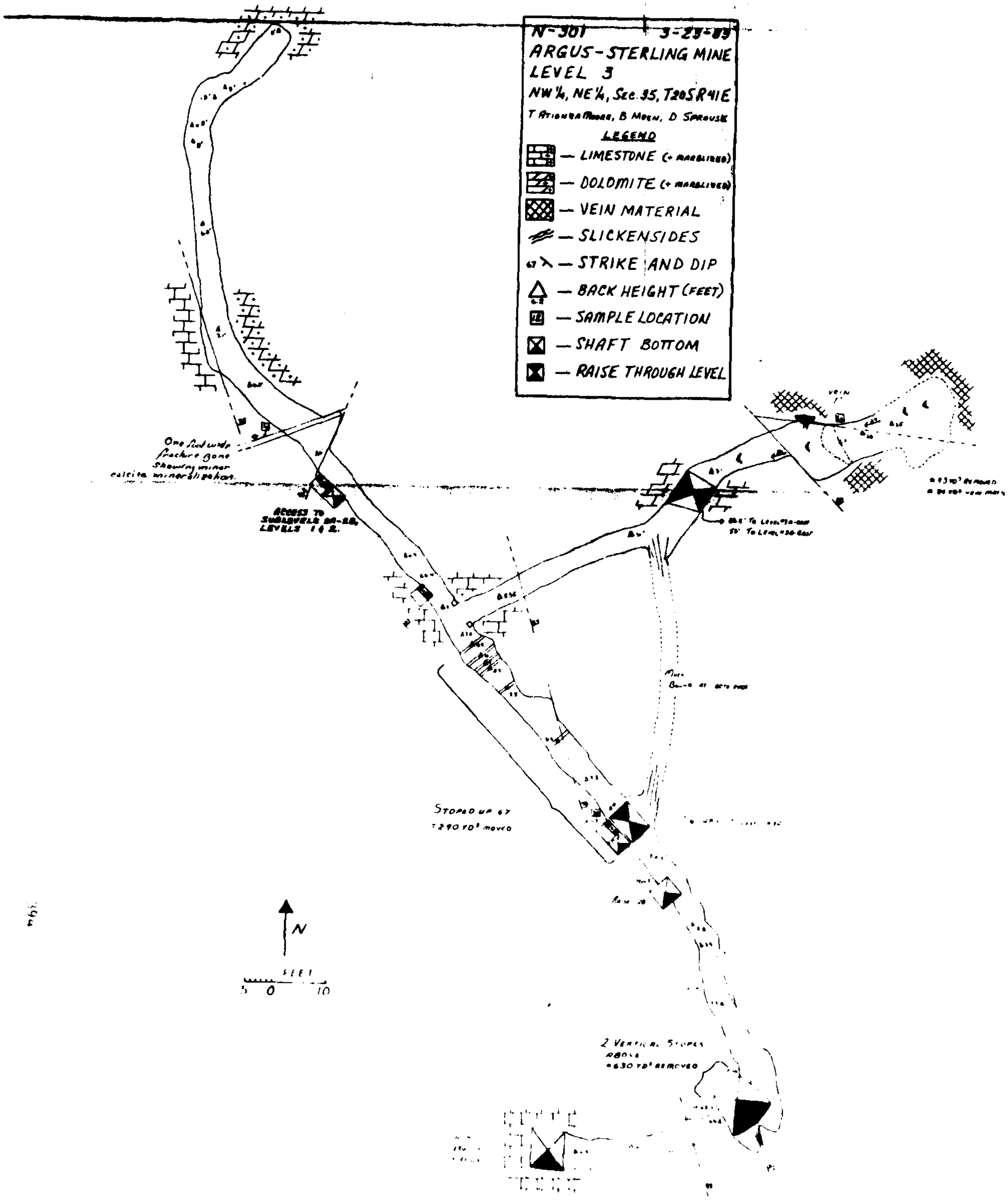

Figure 180. Plan view of level 3, Argus Sterling Mine.

NWC TP 6498

nearly east-west and dips 9 degrees southerly. The shallow, reverse dip may indicate that this section lies just east of the trough of a synclinal fold and that the bottom of the deposit is near. The stope here had a volume removed of 93 cubic yards, 74 cubic yards of which was mineralized zone. Sample N-301-11 was chipped from a 1-foot vein width in the zone that contained 2 to 3 inches of anglesite and cerussite with abundant lead and iron oxides and limonite.

Two stopes were driven up-dip from Level 3. The northernmost stope was developed directly above the main level for a strike length of 47 feet. The stope is vertical for the lower 45 feet, shallows to 65 degrees westerly for 12 feet then shallows again to a 35-degree westerly dip. The stope is caved a few feet beyond this point. The mineralized zone contains veinlets of cerussite 1 inch or less in width surrounded by smithsonite, calcite and clays. Sample N-301-5 was collected from the stope face 45 feet above the drift level at a point where the stope dips to 65 degrees. Sample N-301-6 was chipped from the stope wall across the vein where the stope dips to 35 degrees. Very little oxide material was observed. The stope produced approximately 290 cubic yards of material. Sample N-301-10 was chipped from a 3-inch vein located in the main drift Level 3, at the bottom of the stope. The vein may be an offshoot of the main vertical ore body and contains galena, cerussite, anglesite and smithsonite with lead and iron oxides on the vein margins. Sample N-301-12 was a chip sample taken across a 1 foot northeast-trending vertical fault zone in the drift. The zone contained mainly smithsonite and possibly some sphalerite.

The southernmost Level 3 stope is accessed by a manway raise 30 feet east of the main shaft. Fifty feet above the level is a vertical stope 20 by 20 feet by 40 feet high. About 23 feet westerly and slightly above this stope is another, 8 by 8 feet by 15 feet high. Both stope areas were developed in mineralized zones that formed at the intersection of two, nearly vertical, fault zones. Sample N-301-7 was chipped from a pillar near the top of the lower stope. The 1-foot zone contained minor crusts of cerussite and very fine-grained galena. At least 95% of the remaining vein material was composed of lead and iron oxides. A total of approximately 630 cubic yards of material was removed from these stopes.

A vertical winze was driven below the crosscut, 50 feet from its intersection with the main drift. Two sublevels, labeled 3A East and 3B East, were driven off the winze at 28.5 feet and 57 feet, respectively, and are shown in plan view by Figure 181. Sublevel 3A East was driven 14 feet to the northeast and 37 feet to the southwest. The host and mineralized zone rocks are intensely fractured but the zone appears to have a shallow southwesterly dip. A total volume of 57 cubic yards of material removed, 17 cubic yards is vein material. Sample N-301-15 was chipped from a 3-foot width of vein from the left rib of the drift

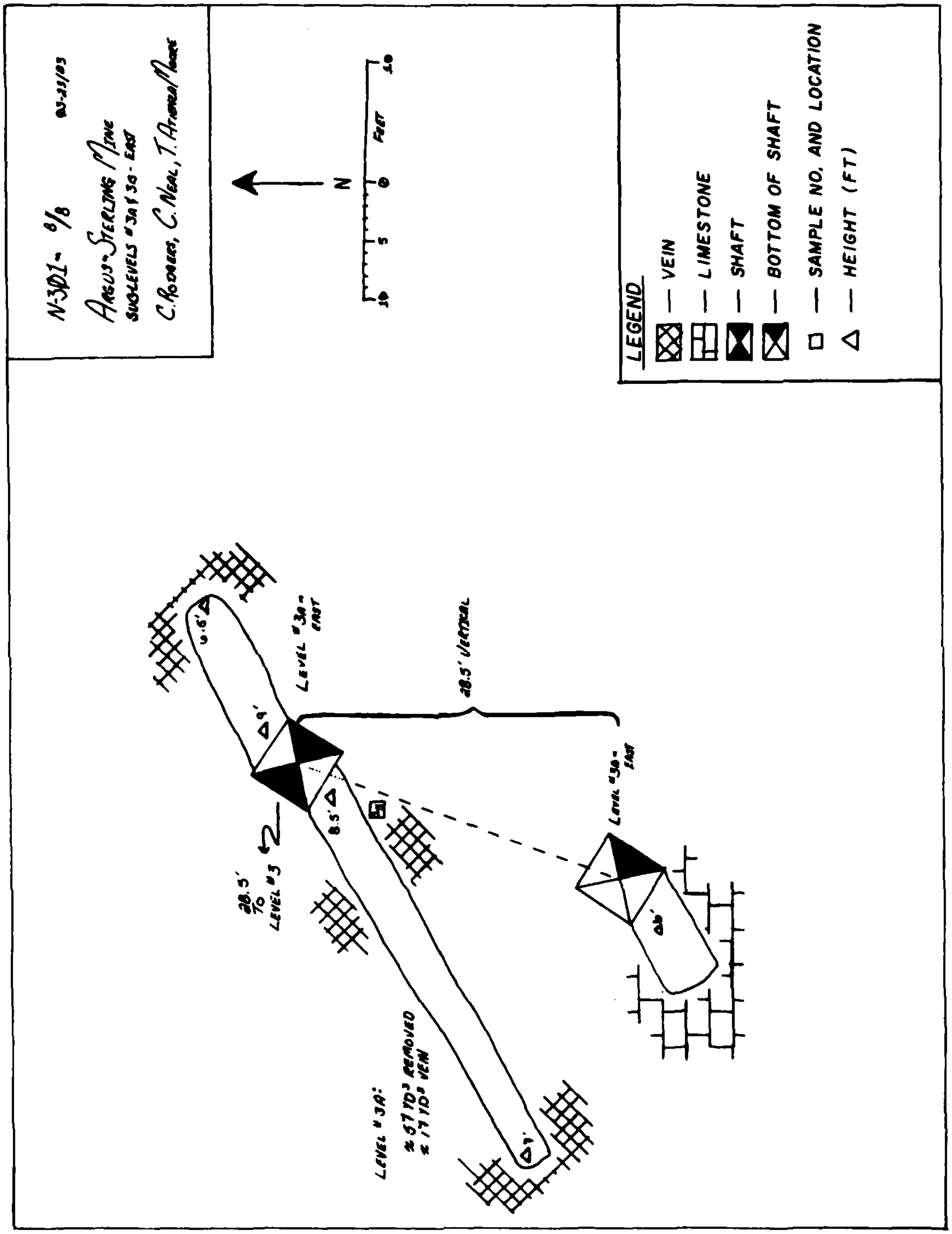

Figure 181. Plan view of sublevels 3a east and 3b east, Argus Sterling Mine.

(looking southwest from the winze), 5 feet from the winze. The sample contained tiny stringers of galena and scattered pyrite with abundant minium, massicot and iron oxides. It is difficult to tell in this area whether this zone lies within the trough of a fold or is an offshoot of the major vertical mineralized pipe that lies a short distance to the west. Sublevel 3B East was driven 9 feet to the southwest in fractured barren limestone and abandoned, indicating that the zone of mineralization seen on the level above has bottomed out.

A winze was driven from the main level down approximately 29 feet to intersect and develop the down-dip extension of the northernmost stope. Sublevel 3A was driven from the winze bottom as shown by Figure 182. A total of 122 feet of drifting was done, 57 feet of which is now backfilled to within 0.5 feet of the back. An 8-foot deep winze was dug at the end of the southeast crosscut. The northwest drift had minor stoping directly from the back which amounted to approximately 30 cubic yards removed. The mineralized zone is the down-dip extension of the vein in the northernmost stope of Level 3. It is bounded by two faults that strike northwesterly and dip steeply westerly to vertically. The zone contains cerussite, anglesite, and minor smithsonite, tiny stringers and pods of galena and abundant blue-gray to whitish clay and averages 6 feet in width. Samples N-301-13 and N-301-14 were chipped from the vein in the stoping area and near the edge of the winze, respectively. The host rock is intensely broken, fractured limestone.

Assay Data, Potential and Conclusions. All of the samples collected during this investigation were selected from sites having the apparent highest grade in each area. The metal values (gold, silver, lead, zinc) for the 15 Argus Sterling Mine samples range from \$3.73/ton to \$527.17/ton with an average *sample* value of \$231.69/ton. The complete list of assay results for the Argus Sterling Mine samples is presented in Appendix B. A table of total metal values for gold, silver, lead, and zinc is presented in Table 47.

Although these assay values are good, they only represent the high-grade zones of narrow, discontinuous veins and stope pillars. The vein has generally a pinch and swell configuration and all of the exposed "swells" have been mined-out. A small amount of additional ore could be economically recovered from the existing workings (possibly as much as 50 cubic yards), but no commercial potential appears to exist here. In addition, the potential for successful exploration and development of additional ore appears to be minimal. Past surface exploration along the strike of the deposit (in the form of pits, trenches and short adits) failed to expose further mineralization, and, as noted earlier, the deposit apparently bottoms out in a synclinal trough approximately 200 feet below the surface (between levels 3A and 3B).

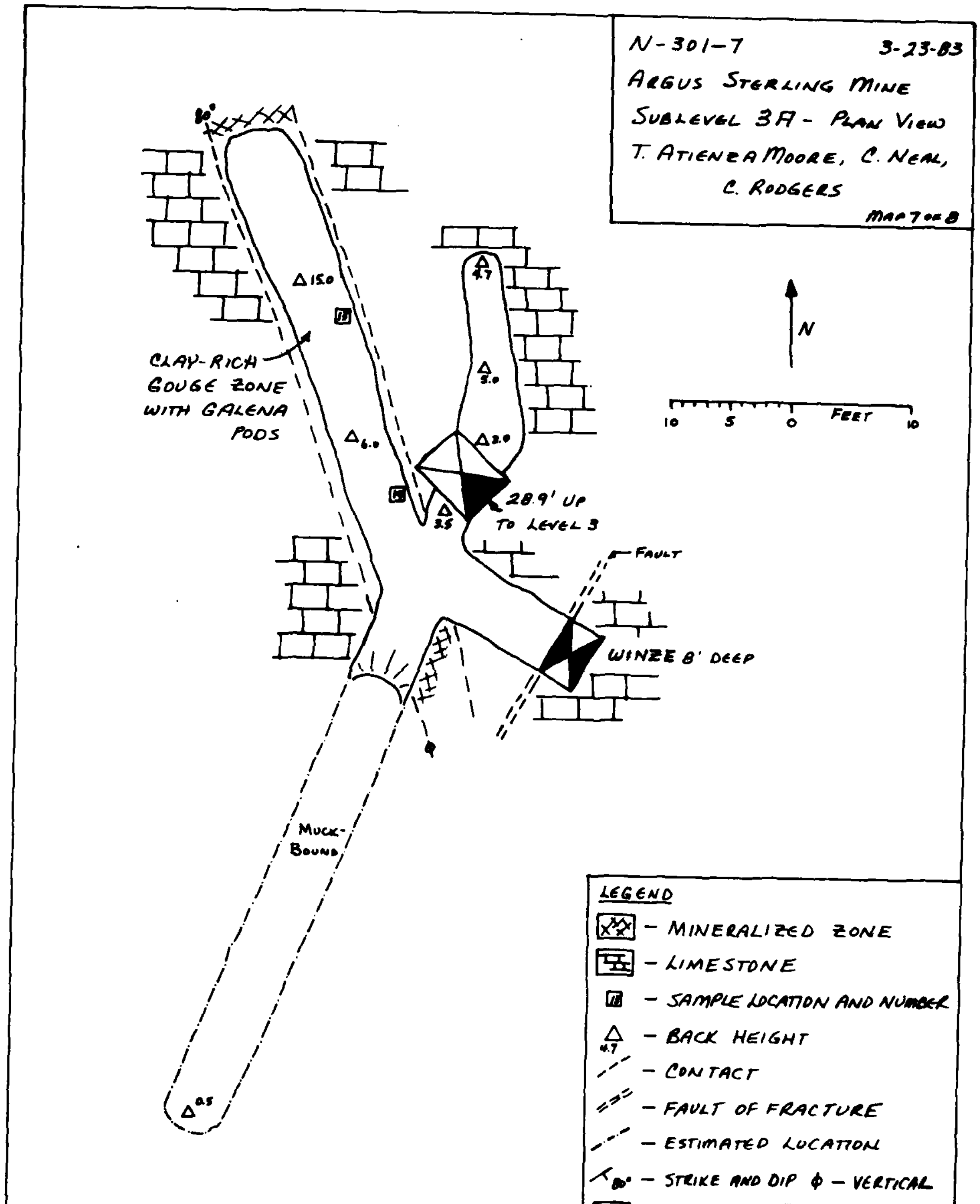

Figure 182. Plan view of sublevel 3a, Argus Sterling Mine.

TABLE 47. Argus Sterling Sample Analyses.

Sample	Gold		Silver		Lead			Zinc			Total metal values, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	Wt%	Lb/ton	$/ton	Wt%	Lb/ton	$/ton	
1	0.013	6.50	26.60	399.00	31.50	630.00	126.00	0.285	5.70	2.17	527.17
2	0.015	7.50	12.30	184.50	18.00	360.00	72.00	3.75	75.00	28.50	285.00
3	0.027	13.50	4.13	61.95	17.00	340.00	68.00	0.355	7.10	2.70	132.65
4	0.009	4.50	1.72[a]	25.80	28.50	570.00	114.00	8.95	179.00	68.02	207.82
5	0.009	4.50	1.01	15.15	29.00	580.00	116.00	0.445	8.90	3.38	134.53
6	0.011	5.50	0.56	8.40	6.15	123.00	24.60	0.215	4.30	1.63	34.63
7	0.017	8.50	10.20	153.00	22.50	450.00	90.00	1.350	27.00	10.26	253.26
8	0.007	3.50	13.10	196.50	11.50	230.00	46.00	14.50	290.00	110.20	352.70
9	0.007	3.50	9.58	143.70	11.00	220.00	44.00	10.50	210.00	79.80	267.50
10	0.025	12.50	18.60	279.00	22.00	440.00	88.00	1.60	32.00	12.16	379.16
11	0.012	6.50	1.85	27.75	8.15	163.00	32.60	0.81	16.20	6.16	38.76
12	Nil	0.00	0.71	10.65	0.79	15.80	3.16	32.50	650.00	247.00	260.81
13	Nil	0.00	0.20	3.00	0.094	1.88	0.38	0.047	0.94	0.36	3.73
14	0.017	8.50	16.40	246.00	32.50	650.00	130.00	0.345	6.90	2.62	378.62
15	0.059	29.50	2.07[a]	31.05	46.00	920.00	184.00	0.53	10.60	4.03	219.08

[a]Kevex analysis.

MOUNTAIN SPRINGS CANYON/BIRCHAM SPRINGS AREA

Pooch Nos. 1 and 2 (N-908)

Examination of a claim marker at this site disclosed a location notice that gave the locators as, Jewel F. Fallenius and John Carricart. The claims were named Pooch Nos. 1 and 2 of the Coso Mining District in Inyo County, and the notices were dated 10 April 1942.

The Pooch Claims are located approximately 5.3 miles east-southeast of the Volcano Butte VABM and approximately 2 miles north-northwest of Mammoth Mine. This working, shown as N-908 on Figure 9, is found in the SE1/4, SW1/4, NW1/4 of Sec. 34, T22S, R41E, MDB&M.

The pit, 25 by 20 feet and 5 feet deep, is dug in the floor of a moderately broad valley and exposes a northeasterly-trending aplite dike in the Mesozoic quartz diorite. The material sampled was found broken in the bottom of the pit and presumably comes from a lens or a pinch and swell vein associated with the dike. Because of the alluvial valley fill, the vein (or lens) and the aplite dike were not traceable beyond the workings. The vein material is quartz with 2- by 3- by 3-inch pods of galena, occasional 1/8- to 1/4-inch crystals of pyrite, and fracture coatings primarily of chrysocolla with malachite and linarite. Some minor bornite and covellite were also noted. Assays on two samples taken of this material are presented below in Table 48 and Appendix B.

TABLE 48. Assays of the Pooch Samples.

Sample	Gold		Silver		Total precious metal value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-908-1	0.110	55.00	1.05[a]	15.75	70.75
N-908-2	0.290	145.00	...[b]	...	(145.00)

[a]Kevex analysis.

[b]Sample lost, no more material with visible galena present on dump.

Sample N-908-1 represents ore material high in galena, sample N-908-2 represents ore material high in copper staining. The values are moderate and, coupled with the size of the pit and the fact that the structure was untraceable beyond the margins of the workings, indicates that no commercial potential exists at this site.

Rip Van Winkle Nos. 1, 2, and 3 (N-1352)

The Rip Van Winkle claim group is located near the upper end of Mammoth Wash, a tributary to Mountain Springs Canyon. The cadastral location is given as the SE1/4, NW1/4, NW1/4 of Sec. 2, T23S, R41E, MDB&M as shown in Figure 9. Location notices found at the site indicate that the claims were staked in October 1926 by L. E. Williams, G. E. Anderson and Joel A. Anderson.

The prospectors developed one shaft (to a maximum of 25 feet) and several trenches and pits on a swarm of mineralized quartz and calcite veins within a several hundred square yard area. The veins are associated with lamprophyre dike contacts with the quartz diorite pluton, trend N25W and are moderately to steeply dipping southward. No single vein is greater than 0.5 foot thick nor are any two veins closer than 15 feet.

The veins are, of course, weathered at the surface. The visible mineralogy of this material consists of quartz and subordinate calcite and barite as major gangue minerals with anglesite, cuprite, limonite, chrysocolla, marcasite, aurichalcite, and argentojarosite (?) disseminated throughout the gangue and surrounding remnants of galena, pyrite, chalcopyrite and chalcocite.

Gold and silver assays for four samples taken from separate trenches (hand sorted, stockpile grab samples) are given in Table 49, and the remaining analyses are listed in Appendix B.

TABLE 49. Precious Metal Assays and Value, Site N-1352.

Sample	Gold		Silver		Total precious metal value, $/ton
	Troy-oz/ton	$/ton	Troy-oz/ton	$/ton	
N-1352-1	0.006	3.00	3.03	45.45	48.45
N-1352-2	Nil	...	Nil	...	...
N-1352-3	Nil	...	0.52	7.80	7.80
N-1352-4	0.150	75.00	3.00	45.00	120.00

Although sample N-1352-4 indicates that moderate precious metal values exist at this site, the combined analyses and the size of the occurrence indicate that no commercial potential exists.

WILSON CANYON AREA

Pierce Arrow Nos. 2 and 3 (N-1702-20)

The Pierce Arrow claim is part of the Star of the West Mining and Milling Company patent of the Star de West, et al, claims as described in Mineral Survey No. 5177, completed in June 1915 by the Office of the U.S. Surveyor General, San Francisco, Calif. The registered claimant is given as W. S. Saviers of Oxnard, Calif. The Pierce Arrow workings Nos. 2 and 3 are located in the NE1/4, SE1/4, SW1/4 of Sec. 4, T24S, R41E, MDB&M. On Figure 9, the Star of the West complex can be found in the SE1/4, SE1/4 of Sec. 5, T24S, R41E, and MDB&M. A map of the complex can be found as Figure 116.

The workings at this site consist of an inclined shaft and an adit, both dug on the same vein. The shaft, as seen in Figure 183, is 25 feet deep with two short drifts driven on a 2-foot-wide quartz vein that developed on the hanging wall contact of two Mesozoic intrusives: a gabbroic lamprophyre dike and a quartz diorite pluton. The vein trends N53W, dips northeast at 66 degrees and contains visible mineralization in the form of sparse, disseminated pyrite, chalcopyrite, bornite and galena, and a moderate oxidation stain of hematite, limonite, malachite, chyrsocolla, aregentojarosite. The argentojarosite identified in the field is most likely a mixture of argento-, plumo-, and true jarosite. Mineralization was much stronger on the dump than in the vein underground. A single sample was taken at the west drift face, the results of which are given in Appendix B.

The adit is located S68E, about 70 feet away from the shaft collar and about 25 to 30 feet downhill. As seen in Figure 184, it was driven northwesterly to intersect the dike/pluton contact. The contact was found and followed for about 12 feet, but the quartz vein was thin (less than 0.2 foot) off the contact, and unmineralized. No samples were taken.

No commercial potential exists at this site. The mineralization is localized as a pod in a discontinuous quartz vein on a dike-pluton contact. The sample results indicate that no significant mineralization exists underground and two very small pits nearby that were dug on similar contacts are totally barren.

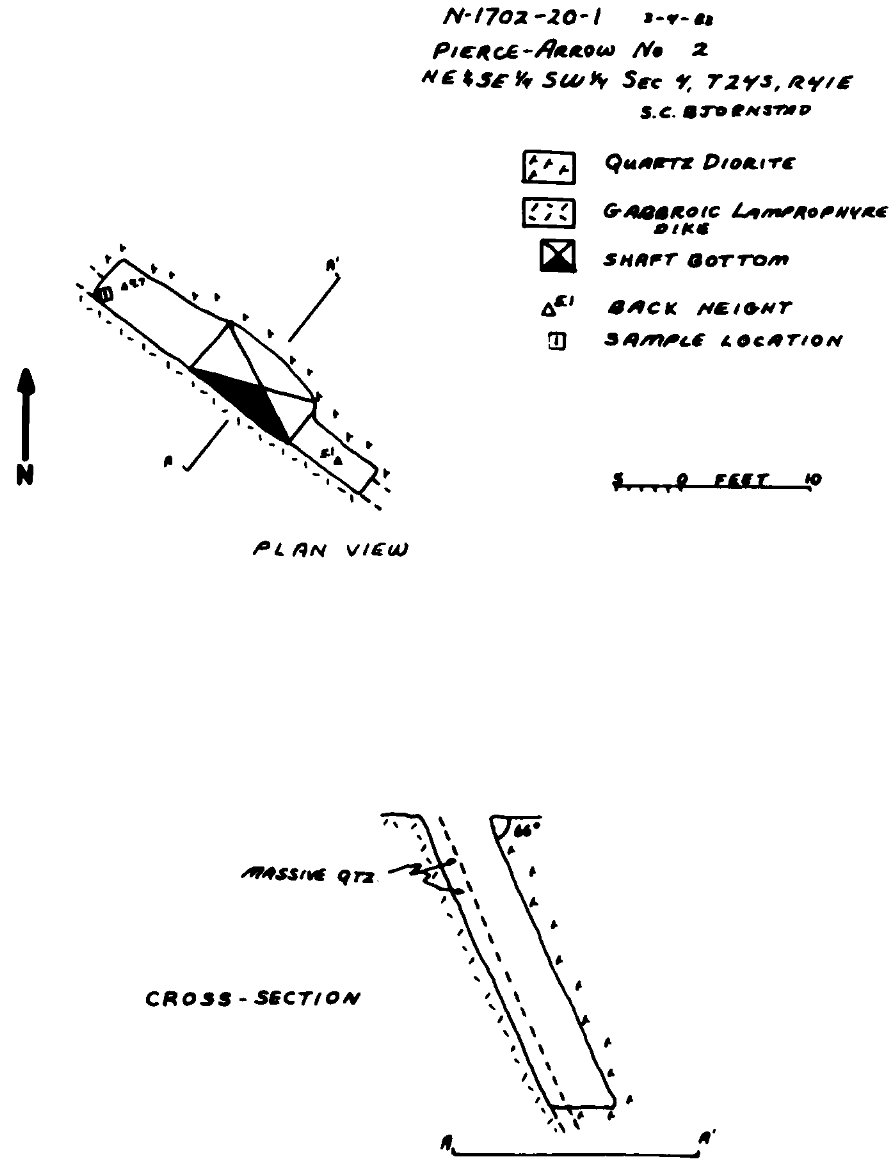

Figure 183. Detail of shaft at the Pierce Arrow No. 2 (N-1702-20).

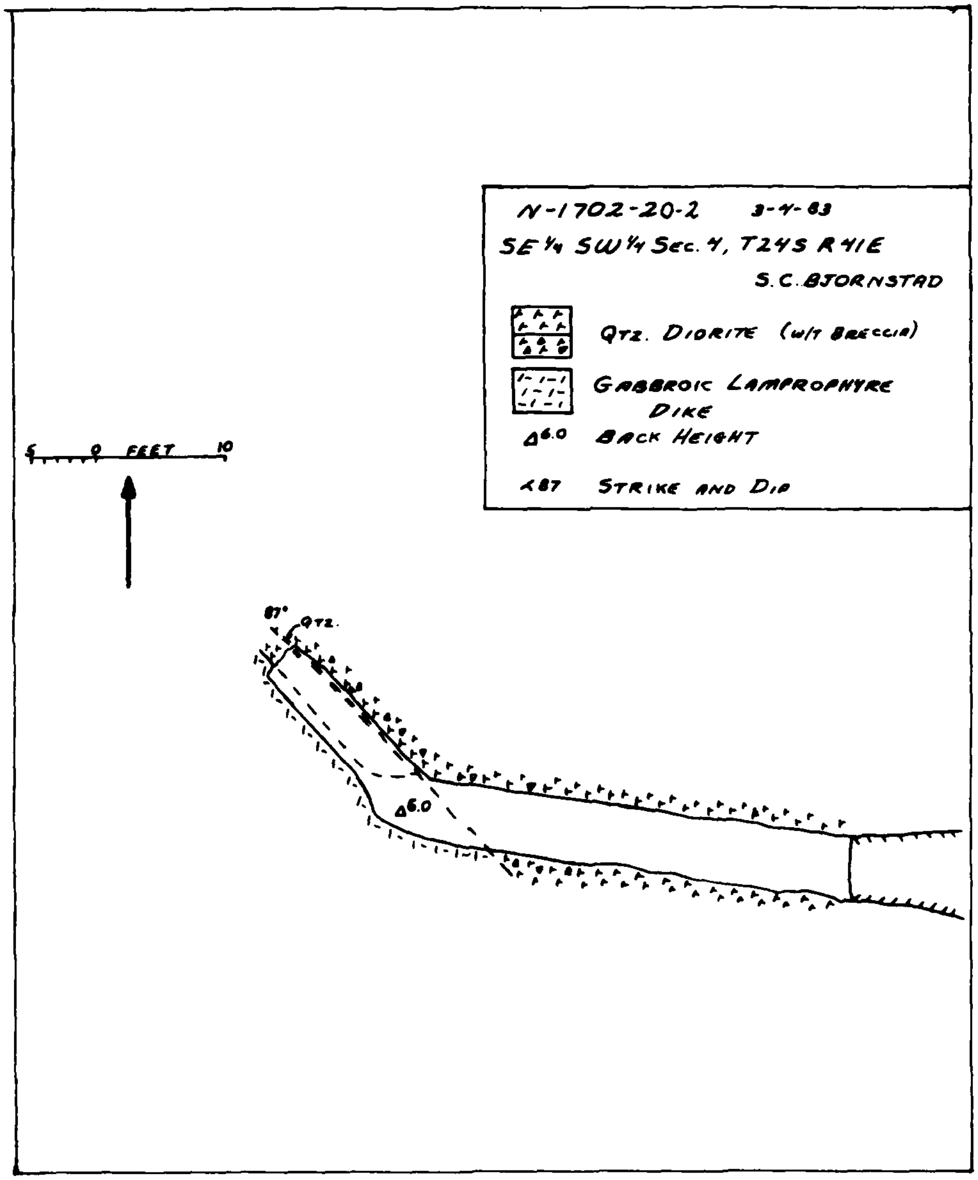

Figure 184. Detail of adit at the Pierce Arrow No. 3 (N-1702-20).

TUNGSTEN OCCURRENCES

COSO DISTRICT

Coso Peak Area

23 Lode (N-108)

A location notice found at the site states that the 23 Lode was located in June 1942, by Messrs. Burkhardt, Myers, Salsbury, and Hoelleson approximately 2.5 miles from Centennial Springs. This is 1.5 miles west of Coso Peak in the NW1/4, SW1/4, SW1/4 of Sec. 10, T20S, R39E, MDB&M. The location is shown in Figure 6.

The geology at this site consists of a skarn alteration of pre-Cretaceous metasediments along a Mesozoic granodioritic intrusive contact. The alteration takes the form of a medium-grained, epidote-garnet tactite, less than 5 feet wide. Later fluid movement along the contact resulted in the formation of coarse crystalline quartz with very sparse iron and copper sulfides that have been altered to limonite and malachite staining.

The working consists of a single adit, 16 feet long, 2.5 feet wide and 4 feet high, which was driven parallel to the contact and in the tactite. A single sample was taken of the tactite just outside the adit. Analysis results are listed in Appendix C.

The tactite prospected here exhibit very low grade tungsten and is very limited in extent. The potential for a larger, buried, deposit is very low in light of the fact that the host limestone is a small roof pendant capping this small hill and is totally surrounded by intrusive rock on the slopes below.

Mountain Goat (N-210)

The Mountain Goat claim was staked on a garnet tactite outcrop by Paul Wilbur 0.8 mile west of Old Coso in the SW1/4, SW1/4, SE1/4 of Sec. 20, T20S, R40E, MDB&M, as shown in Figure 6. The workings consist of a single tunnel 67 feet long. Figure 185 is a plan view of the tunnel.

The tactite developed along the contact of a Mesozoic granodiorite and a pre-Cretaceous marblized limestone. The zone is narrow, less than 15 feet, and has been offset and displaced by faulting. Very limited scheelite is visible in the tunnel walls. A single sample was

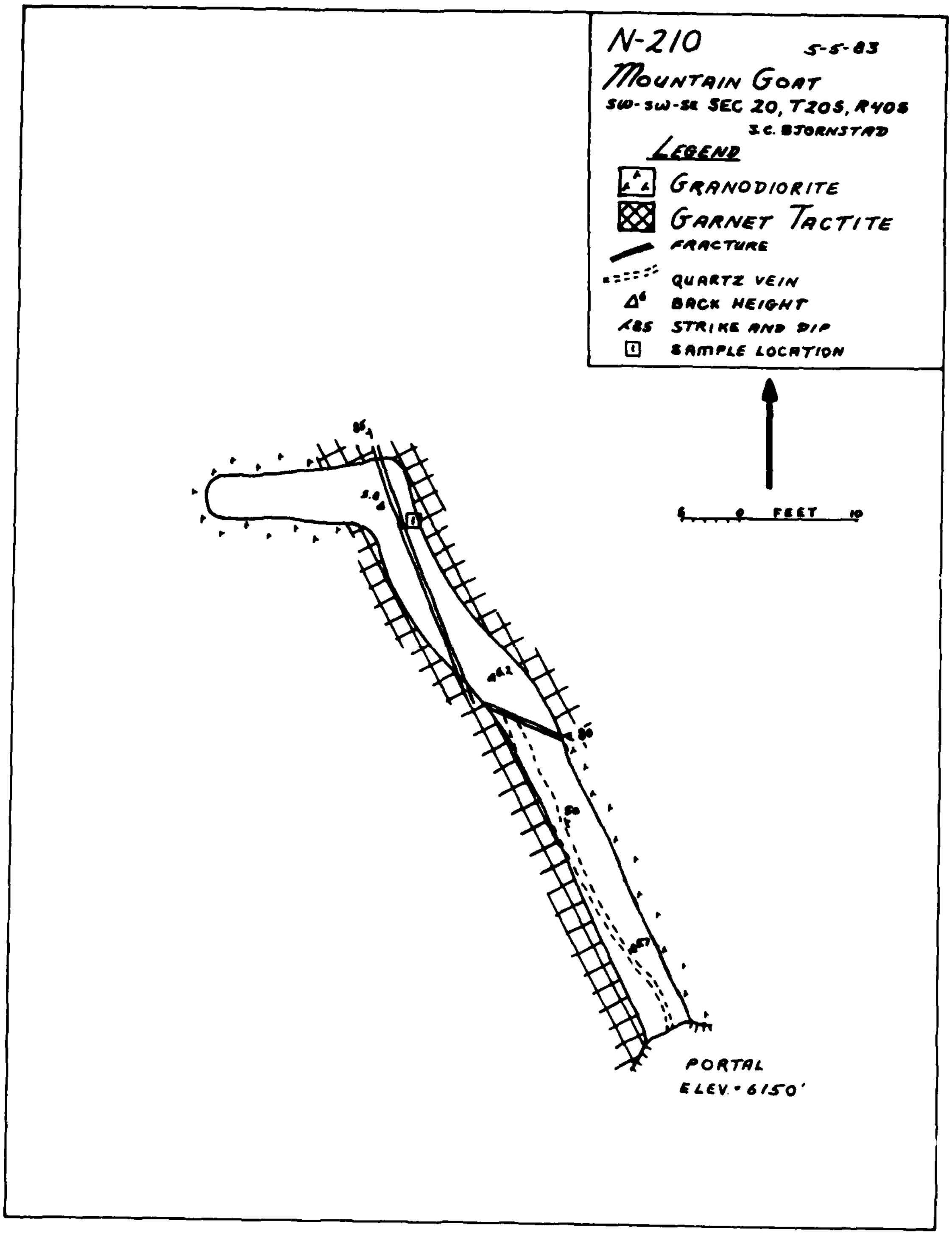

Figure 185. Plan view of adit at the Mountain Goat.

taken with very poor results. Complete analytical results are given in Appendix C. No potential for an economic tungsten deposit exists at this site.

Panyo Nos. 1 and 3 (N-212)

The Panyo claims were staked on a skarn that developed along the contact of a Mesozoic quartz diorite and pre-Cretaceous marblized limestone. Located about 0.7 mile north of China Gardens Spring, this site can be found in the SE1/4, SE1/4, NE1/4 of Sec. 11, T20S, R40E, MDB&M as seen in Figure 6. The last owner of this property is given in the NOTS literature as Walter J. Sorenson.

The workings consist of a single pit, 65 feet long, 19 feet wide (average) and 12 feet deep (average). A 9-foot-long drift was driven in limestone, in the pit wall. Figure 186 is a plan view of the pit. A total of about 550 cubic yards was mined with probably 75% being skarn material. The skarn itself is a small garnet-epidote tactite that is localized along the intrusive contact and crosscutting fractures. It was up to 20 feet wide on the contact at the fracture intersections but thinned to less than 2 feet wide away from the fractures. All that remains of the tactite (excluding the pit floor) is a thin skin on the pit walls.

A single sample was taken of the "high-grade" material in the pit walls as indicated by survey with an ultraviolet mineralight. Analytical results are given in Appendix C. The indicated tungsten content of the sample is well above current mining grade cut-off values, but the generally poor nature of the tactite and the limited extent of additional outcrop, indicates a very low potential for an economic tungsten deposit at or near this site.

Garden Spring (N-217)

According to a marker found at the south end center of the claim, the Garden Spring claim was staked on 18 December 1940, claimant unknown. The location is 0.9 mile southeast of China Gardens Spring in the NE1/4, SW1/4, SW1/4 of Sec. 13, T20S, R40E, MDB&M, as seen in Figure 6.

The geology of the prospect consists of a 10-foot-thick, coarse crystalline, garnet-epidote tactite on the contact of a Mesozoic granodiorite and a pre-Cretaceous marble. The marble occurs as a small roof pendant, probably no larger than 200 by 80 by 20 feet deep. It caps a small hill but the tactite is not present anywhere else along the intrusive contact. Single garnet and epidote crystals can be found up to 1.5 inches long on their longest axis but only a few tiny grains of scheelite were visible by ultraviolet light.

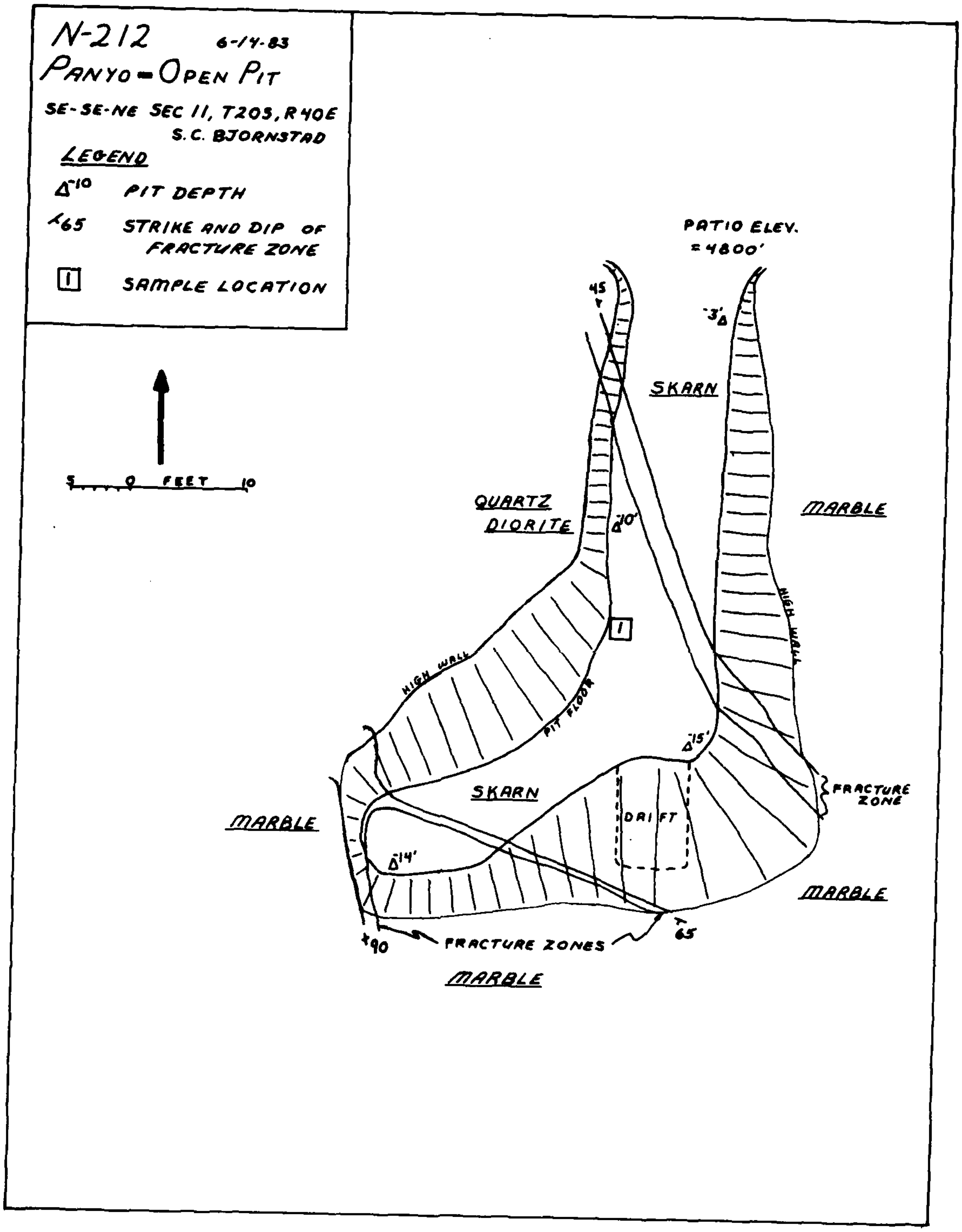

Figure 186. Plan view of pit at the Panyo No. 1 & 2.

The working consists of a single pit, 40 feet long, 3 feet wide and 3 feet deep. A single sample was taken from the pit walls for this survey, the results of which are given in Appendix C. There is no commercial potential at this site.

Mountain Kid (N-222)

The Mountain Kid prospect is located about 1.5 miles west of Old Coso in the SE1/4, NE1/4, SE1/4 of Sec. 19, T20S, R40E, MDB&M, as seen in Figure 6. No location notices were found on site but a reference to the property is to be found in "Recent Developments in Tungsten Resources of California," by W. B. Tucker and R. J. Sampson.[16] A field check of the area confirmed many of the physical aspects of the property as reported, but the tungsten grades reported were not confirmed.

The workings are shown in Figure 187 and consist of a 27-foot vertical shaft (plus a 5-foot-deep sump) with east-west trending drifts of 14 and 44 feet long, respectively. The west drift ends at a raise, 12 feet deep. Two large ore bins were built on the surface, one at the shaft collar which is on a hillside, and the second bin is 80 feet lower, at the bottom of the hill. They are connected by a rail slide and trestle.

The workings were developed on a contact metasomatic alteration zone of pre-Cretaceous marblized limestone which was intruded by a Mesozoic granodiorite. The alteration zone is a 17-foot-wide, high-garnet tactite, which is continuous on the surface for 80 feet along strike. Underground, fault offsets make the true extent of the zone difficult to estimate. An examination of the mineral content of the tactite showed, in order of decreasing abudance: almandine garnet, epidote, quartz, calcite, and scheelite. There was also a small occurrence of endoskarn in the granodiorite near the contact. The minerals seen were: epidote, quartz, and scheelite.

Tucker and Sampson (1941)[16] give reference to an assay of 1.16% WO_3 from the Mountain Kid. There is nothing remaining underground today that approaches this grade. It is possible that a small amount of high-grade material existed at this prospect, but the run-of-the-mine grade was, undoubtedly, considerably lower because nothing remaining underground today approaches this grade. Three samples were taken during the present survey: N-222-1 and N-222-2 from the underground workings and N-222-3 from rock stockpiled in the lower bin. The analytical results are given in Appendix C.

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[16] W. B. Tucker and R. J. Sampson. "Recent Developments in Tungsten Resources of California," in *California Journal of Mines and Geology*, Vol. 37, No. 4, 1941.

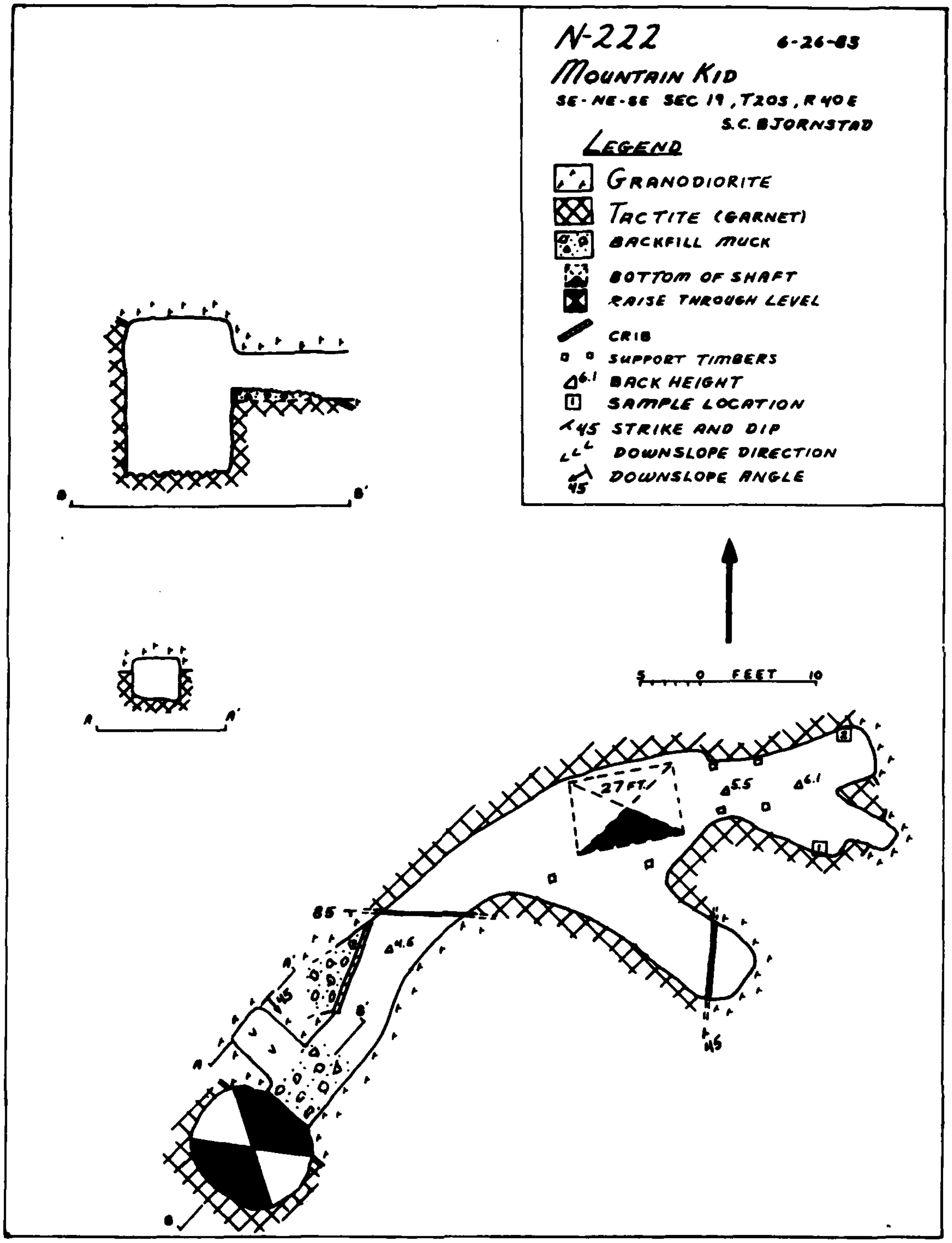

Figure 187. Plan view of the drift level, Mountain Kid.

As with all the tactite occurrences in the China Lake Complex, the Mountain Kid host is a relatively small, shallow roof pendent. As such, it carries a low potential for an extensive deposit, which, in itself, is not a totally limiting factor, but this deposit is also too narrow (17 feet) and the remaining material is too low grade to be of economic importance.

Unnamed Prospect (N-238)

This prospect is located on the road to the Mariposa Mill Site claims about 0.9 mile west of the Mariposa Mine and 1.7 miles northwest of Old Coso. The cadastral location is given as SW1/4, SE1/4, NE1/4 of Sec. [illegible], T20S, R40E, MDB&M, and is shown in Figure 6.

A small pit was dug in a hillside outcrop of garnet-iron skarn, which developed on the contact of a Mesozoic granodiorite intrusive and a pre-Cretaceous marmartized limestone. The skarn is narrow, less than 20 feet and very localized. A survey along the contact showed no other metasomatic alteration in the area.

The site has no potential for an economic occurrence but three samples were taken to test the different materials found in the skarn: sample 1 is an opaline material; sample 2 is a calcite vein with limonite nodules; sample 3 is a high iron-oxide material (oxidized sulfides (?)). The analytical results, given in Appendix C, show that each has a trace of tungsten mineralization and little else.

Unnamed Prospect (N-240)

This tungsten prospect is situated on a hill overlooking Old Coso to the northeast. It is located in the NE1/4, SE1/4, NE1/4 of Sec. 29, T20S, R40E, MDB&M, as shown on Figure 6.

The surface structures consist of a headframe/ore bin combination at the shaft collar with another ore bin down the hill about 40 feet. The underground working consist of a 43-foot vertical, two-compartment shaft and a total of 33 feet of drift at the bottom. The drift is shaped like a "Y" headed in a southwesterly direction with its tail tied to the shaft.

The mineral occurrence type is a metasomatic tactite that developed in a pre-Cretaceous marble along the contact of the marble and a Mesozoic granodiorite pluton. The tactite body is very badly faulted, with offsets occurring in three distinct planes. The minerals present are primarily garnet and epidote. A few scattered grains of scheelite can be seen with an ultraviolet mineral lamp.

A single sample was taken from the ribs of the drift, with the assay results being listed in Appendix C. A visual estimate underground indicates, and the analyses confirm that no tungsten of even marginal grade occurs here. Also, reconnaissance of the area confirms that the occurrence is isolated and that the potential for an economic deposit does not exist at this site.

Sugarloaf Area

Feldman Tungsten Claim (N-1101)

The Feldman claim is referenced in both the USGS CRIB Mineral Resources Files[17] and Kerr (1946)[18]. It is located approximately 1.5 miles east of the Little Lake BM and 3.2 miles west-southwest of the Volcano Peak VABM in the SE1/4, SE1/4, NW1/4 of Sec. 16, T23S, R38E, MDB&M, as seen in Figure 8.

The property was explored by a shaft, declining northeast at 25 degrees, and a 10-foot adit with 15 feet of trenching ahead of the portal. The shaft was not investigated due to the hazardous ground.

The tungsten occurs as scheelite in quartz lenses in a N6W striking chloritized shear zone that dips 44 degrees east in a Mesozoic granodiorite. The massive white quartz lenses are from 18 to 48 inches wide. Only one or two specks of scheelite could be seen in hand specimens using the ultraviolet lamp. A sample of the quartz material was taken from the dump at the shaft. Assay results, listed in Appendix C, show no significant tungsten values. No commercial potential exists at this site.

Scheelite Prospect (N-1102)

This prospect site is located approximately 1.9 miles west-northwest of the Volcano Peak VABM and 3.3 miles northeast of the Little Lake bench mark. It is shown as N-1102 on Figure 8, and is situated in the NE1/4, NE1/4, NW1/4 of Sec. 3, T23S, R38E, MDB&M.

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[17]United States Geological Survey. *CRIB, the Mineral Resources Data Bank of the Unites States Geological Survey*. Washington, D.C., Department of the Interior.

[18]Paul F. Kerr. "Tungsten Mineralization in the United States," in *Geological Society of America*, 1946. (Memoir 15.)

Several prospect pits were used to explore a 3-foot wide, north-trending shear zone in Mesozoic granite. Massive white quartz lenses, up to 25 feet long occur in the shear. A few specks of scheelite can be seen in the quartz as well as some minor fracture coatings of pyrolusite. Two samples of the quartz material were taken. The assays, which are listed in Appendix C, indicate only trace amounts of tungsten. No commercial potential exists at this site.

IRON OCCURRENCES

COSO DISTRICT

Coso Peak Area

"Big Iron" Mine (N-106)

The Big Iron Mine is situated in the Coso Mining District on the northwest slope of Iron Hill. It is placed in the SE1/4, NE1/4, SE1/4, Sec. 8, T20S, R39E, MDB&M, and is shown in Figure 5. A claim notice found at the site gives the name of the property and claim date of 1949 but is otherwise illegible.

A roof pendant of pre-Cretaceous metasedimentary rocks forms the locus for iron mineralization at this location. The mineralizing fluids for this contact metasomatic deposit come from a Mesozoic granite that underlies the roof pendant and outcrops throughout the Iron Hill area. The roof pendant includes beds of gray-green quartzite, quartz-garnet tactite, and the ore bed of garnet-idocrase-specularite (specular hematite) tactite. The ore zone strikes from N40W to N15W and dips 80 degrees westerly.

Figure 188 is a plan view of three major pits driven in mineralized tactite. Total volume of material removed from the three pits was 898 cubic yards. The total volume of iron "ore" removed was 420.7 cubic yards. Using the factor of 6.10 cubic feet/ton for hematite, the undiluted "ore" tonnage would be 1,862 tons. Three small caved prospect pits are located to the northwest and represent minor tonnages.

A composite chip sample was taken across the "ore zone" at each end of the main pit site, and a list of assay results appears in Appendix D.

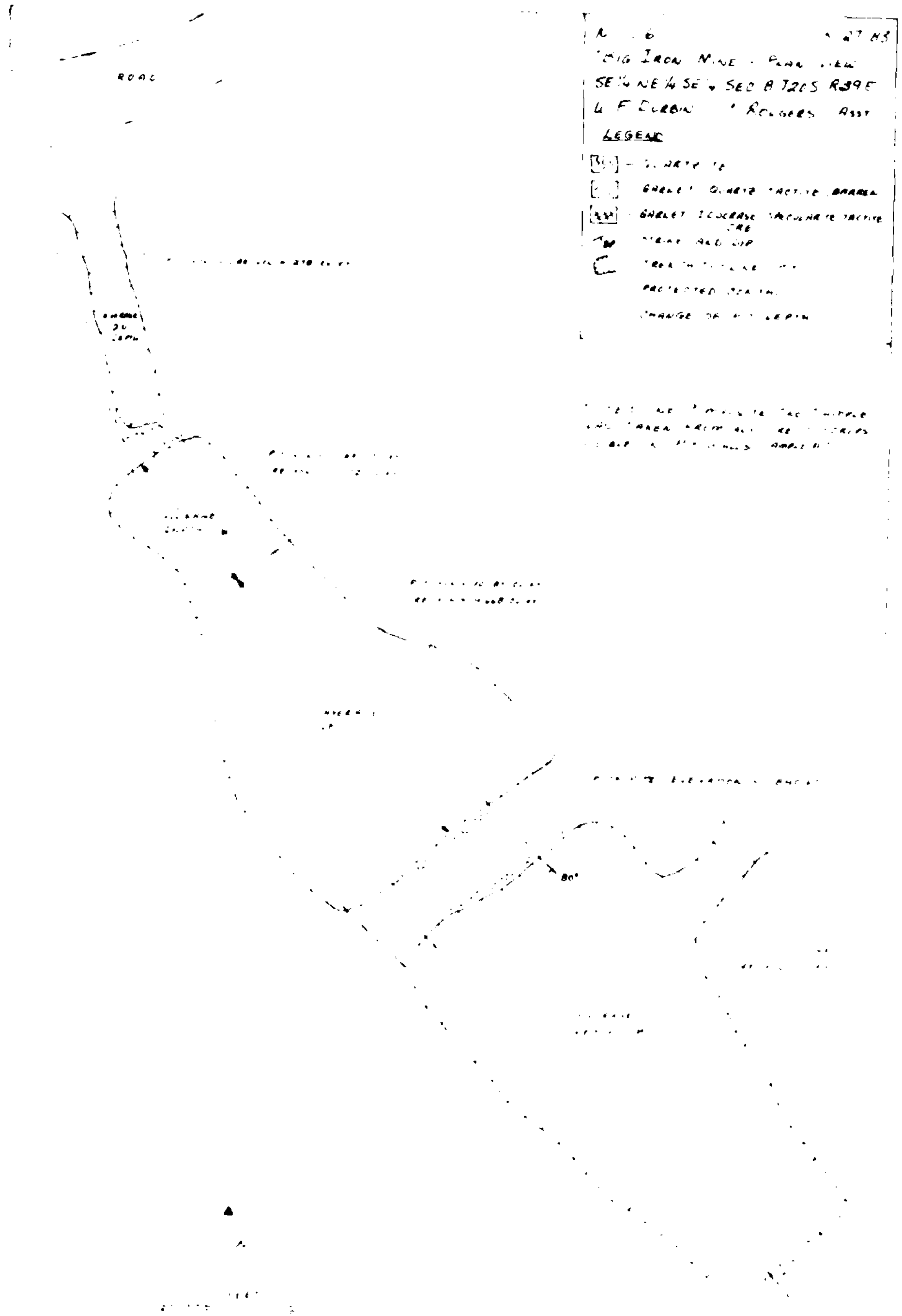


Figure 188. Plan view of three major pits, "Big Iron" Mine.

The iron produced at this location was shipped to local smelting operations for use as flux in metals recovery. In the context of current economic conditions, there is neither sufficient tonnage nor grade present to warrant future development and production at the Big Iron Mine.

Unnamed Iron Mine (N-107)

This group of workings is located in the Coso Mining District approximately 0.3 miles southwest of Iron Hill. It is placed in the SE1/4, SE1/4, SE1/4, Sec. 8, T20S, R39E, MDB&M, and is shown in Figure 5.

The host rock is Mesozoic diorite and the area is cut by several Mesozoic diabase dikes of varying size and orientation. The loci for specularite mineralization are shear zones that are present at the diorite-diabase contact or within the diabase dikes.

Figure 189 is a plan view of the major mine workings. Two pits were developed along the strike (N76W) of the shear zone. The pits are caved and filled with slope wash and no outcrops of shear zone material are present. Measurements indicate that a minimum of 706 cubic yards of material was removed from the two pits. Three stock piles of "high-grade" iron ore were located near the pits. These piles were calculated to have 3242 cubic feet of broken rock volume. Using a factor of 140% for rock-blast expansion, a conversion of 100%/140% = 0.714 is derived to calculate in-place, unbroken rock volume. An in-place volume of "ore" is calculated to be 86 cubic yards. This undoubtedly represents a minimum volume for the "ore" piles since a considerable amount could have been previously shipped. Using 6.10 cubic feet/ton, a shippable tonnage of 380 tons is readily available.

Two prospect pits are located approximately 200 yards northeast of the main mine group. These are developed along a 3.5-foot-wide shear zone developed in a diabase dike that strikes N76E. The zone dips southerly at 70 degrees and contains stringers of specularite. One inch veinlets and small pods of specularite are present in the diabase up to a few feet from the shear zone. These pits produced approximately 37 cubic yards of material.

Two samples, labeled N-107-1 and N-107-2, were taken and the assay results are given in Appendix D. Sample N-107-1 was a composite grab from the three "ore" stockpiles at the main mine site. Sample N-107-2 is a composite grab of loose "iron ore" surrounding the two northeastern prospect pits.

The iron produced at this location was shipped to smelting operations in the area for use as flux in metals recovery. In the context

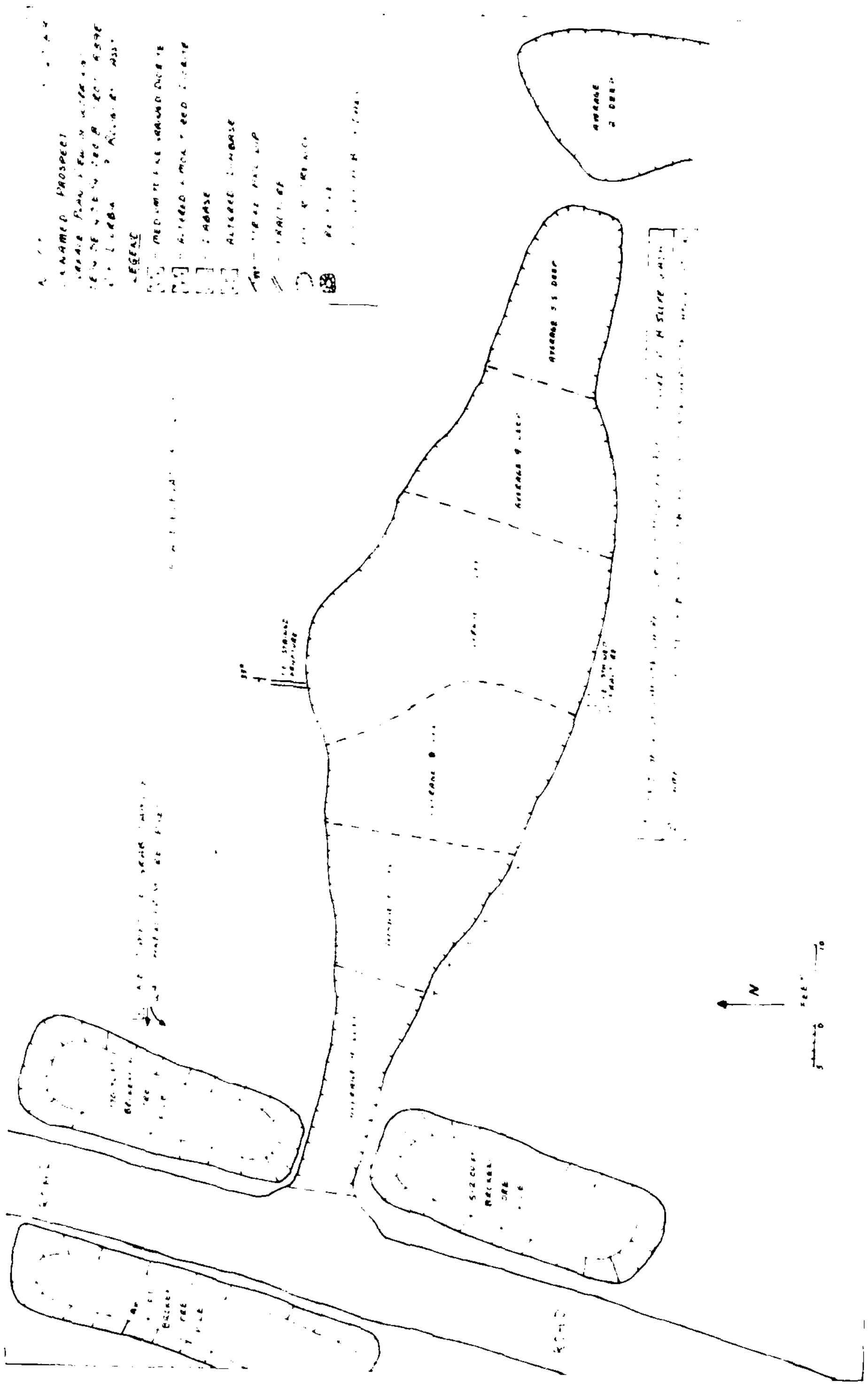


Figure 189. Plan view of major mine workings at N-107.

context of current economic conditions, there is not sufficient tonnage and grade of iron ore to warrant future development and production at this location.

Unnamed Prospect (N-117)

This prospect can be found about 1.5 miles west of Coso Peak in the S1/2, SW1/4, SW1/4 of Sec. 10, T20S, R39E, MDB&M, as seen in Figure 6. The workings, which consist of three large trenches were dug on an iron-rich, contact metasomatic zone in pre-Cretaceous marble. The intruding rock is Mesozoic granodiorite. The contact zone or skarn is primarily specular to massive hematite grading to minor garnet and epidote banding on the margins of the zone. Although some of the iron may have originally occurred as magnetite, none could be found during the field check. The skarn outcrops are very irregular and appear to be controlled, in part, by fractures crosscutting the contact. The iron zone averages about 6 feet wide at the trenches but is apparently absent elsewhere along the contact.

Two trenches were dug on the north outcrop. One is 20 by 40 by 8 feet deep, and the other is 35 by 8 by 4 feet deep. Sample 1 was taken here. The third trench was dug on the south outcrop and measures 70 by 12 by 6 feet deep. Sample 2 was taken here. Analytical results from both samples are listed in Appendix D.

A total of about 75 cubic yards (330 tons) of hematite ore is stockpiled adjacent to the trenches. The marble host is an erosional remnant so it is unlikely that a large deposit exists at depth. This deposit is too small and too remote to be of commercial interest.

Jumbo No. 4 (N-122)

This claim is located 1.2 miles northwest of Coso Peak in the SW1/4, SW1/4, NE1/4 of Sec. 10, T20S, R39E, MDB&M, as shown in Figure 6. Claim notices found on site indicate the Jumbo No. 4 was staked in July 1934, by M. W. Myers and subsequently overstaked as the Iron Canyon Claim in June 1942, by Bill Holden and John Salsbury.

The mineral deposit prospected here is an iron-rich skarn that formed along the contact of a Mesozoic granite and pre-Cretaceous marblized limestone. The exposed contact is irregular, showing a maximum skarn thickness of 7 feet. Hematite is the predominant mineral present and exhibits both specular and massive forms.

Three prospects were dug here: a pit, 10 by 19 by 5 feet deep; a trench, 25 feet long, 5 feet wide and 3 feet deep, both on the north side of the canyon; and a single trench 25 by 15 by 8 feet deep on the opposite hillside to the south. A single sample was taken on the iron ore from the pit. Analytical results are listed in Appendix D.

There is no commercial potential here. The deposit is small and the region is rugged with limited accessiblity.

Unnamed Prospect (N-131)

This prospect can be found about 1.4 miles west of Coso Peak in the SW1/4, NE1/4, SW1/4 of Sec. 10, T20S, R39E, MDB&M, as shown by Figure 6. A single large trench was dug into the hillside. The trench trends N38E and measures 95 feet long, 20 feet wide and averages 8 feet deep. It crosscuts an iron-rich skarn that occurs along the contact of a Mesozoic granite and a pre-Cretaceous calcareous shale. The skarn is irregular but trends north, dips 65 degrees east and is about 5.5 feet thick where exposed.

A single sample was taken of the iron ore. The analytical results are given in Appendix D. The work done here is in no way justified by the contact exposed and there is no potential for an economically viable deposit.

Unnamed Prospect (N-132)

This iron prospect is situated 0.3 mile south-southeast of Iron Hill and 2.7 miles due west of Coso Peak. Figure 5 shows the location of the site which is placed in the NW1/4, NE1/4, NW1/4, Sec. 16, T20S, R39E, MDB&M.

The prospect workings consist of a trench and a pit. The trench is 15 feet long, 3 feet deep and from 3 to 8 feet wide. It trends S47E (also becoming wider in this direction). The prospect pit, located about 500 feet northwest of the trench, is 11 feet across and 5 feet deep. The mineralized zone is exposed in the trench but is covered by slope wash in the pit.

Geologic information is sparse in the immediate area of this prospect because of a 2-foot-thick cover of alluvium. The nearest outcrops (of Mesozoic quartz monzonite) occur over 500 feet southwest of the trench. No host rock is evident in the workings, but numerous small roof pendants of Paleozoic limestones occur throughout the area, and it is likely that this site is at or near the contact of one of these pendants and the underlying intrusive. In the trench, the exposed skarn zone is a fine-grained, dark reddish-brown tactite consisting of garnet, diopside, and scattered coarse epidote. Abundant 1/4- to 1/2-inch veinlets of specular hematite are scattered throughout the zone in no apparent preferred orientation. Fragments of garnet-diopside tactite with tiny stringers of specular nematite are scattered on the perimeter dump of the pit, although none can be seen in place.

This prospect is just one of many in the region that were explored for content of iron (specular hematite) that could be easily developed and the material shipped for use as a fluxing agent in local smelting operations.

Two samples were collected at this prospect and complete assay results are shown in Appendix Table D. The trench sample was chipped across the full exposure of the skarn (N-132-1) and a grab sample (N-132-2) was taken of loose skarn material around the pit.

The assay results indicate no commercial values for precious metals or other commodities at this site.

ARGUS DISTRICT

Shepherd Canyon Area

Unnamed Shaft (N-1005)

A 148-foot shaft with offshoot drifts is situated 0.8 mile southeast of the old Millspaugh Town Site as shown by Figure 7. It is placed in the NE1/4, NE1/4, SW1/4, Sec. 9, T22S, R42E, MDB&M.

The area host rock is a Mesozoic biotite-rich quartz diorite and a narrow shear zone. The 1.5-foot-wide shear strikes N33W and dips an average of 55 degrees northeasterly. Milky white quartz occurs within the shear zone and contains scattered traces of chrysocolla, isolated pods of specular hematite, and limonite fracture-fillings.

The shaft, shown in plan view and cross section in Figure 190, was driven down the dip of the shear zone which pinches at a depth of 141 feet. Three drifts were driven off the shaft to explore the strike length of the shear zone. Two drifts were driven at -50 feet from the shaft collar. The total drift length was 83 feet, and the average width of quartz vein material intersected was 0.5 foot. The lower drift, driven at -90 feet from the shaft collar, is 103 feet long. At this depth the mineralized quartz vein is up to 0.6 foot wide.

Two small prospect pits, located to the east and southwest of the shaft collar, were examined and found to be developed only in quartz diorite.

Two samples were taken at the prospect. Sample N-1005-1 was chipped across a 4-inch-wide portion of limonite-bearing quartz in the 90-foot-deep drift. Sample N-1005-2 was a grab sample of loose chrysocolla and specular hematite-bearing white quartz taken from the shaft dump. A summary of assay results for the two samples is listed in Appendix D.

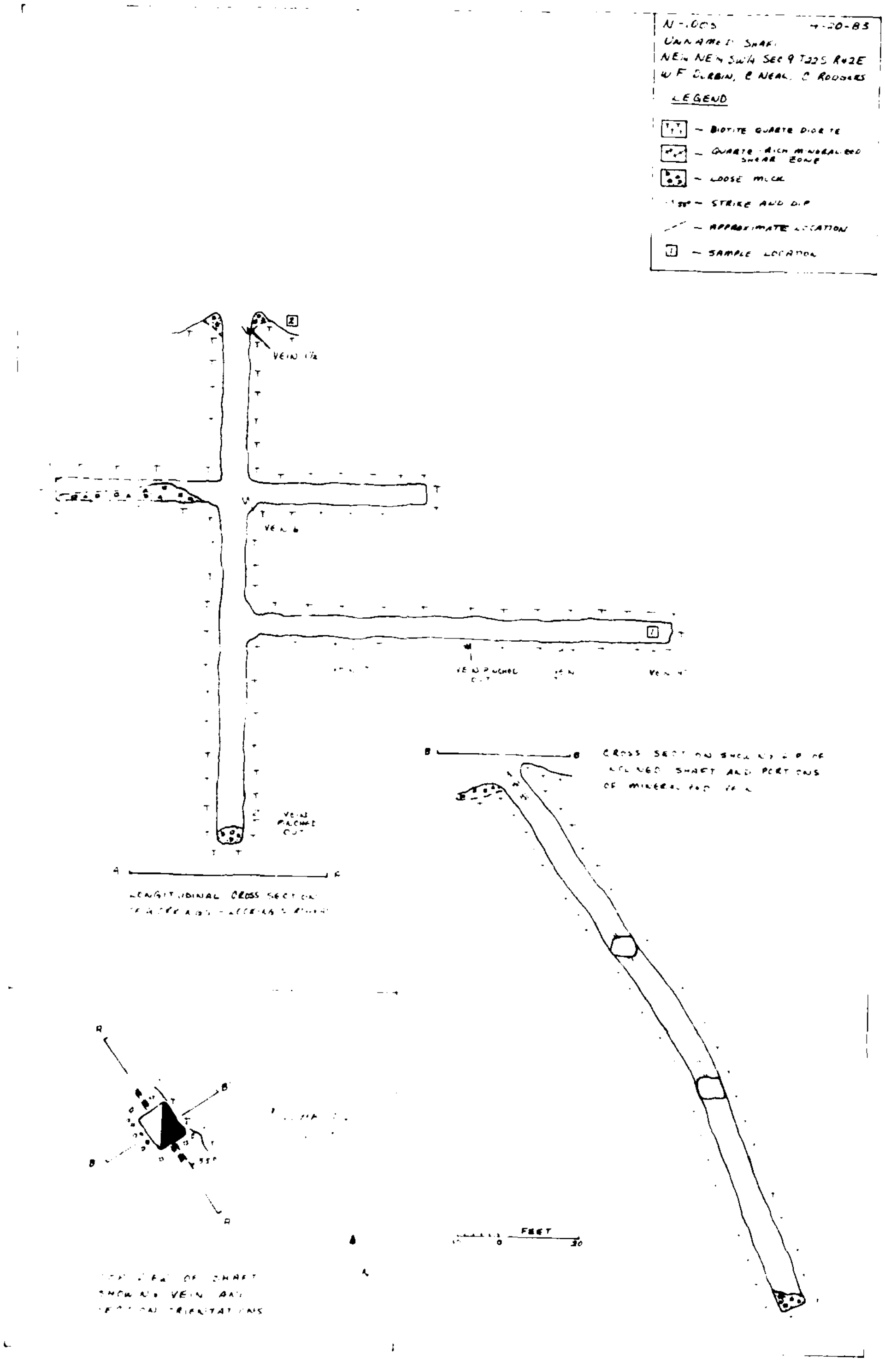


Figure 190. Detail of the shaft at site N-1005.

The sample assay results show nil or insignificant values for precious metals and iron. No commercial potential is indicated at this site.

Big 4 Iron Nos. 1, 2, and 3 Claims (N-1024)

The Big 4 Iron Mine is situated 0.1 mile northeast of the old Millspaugh town site. It is placed in the NW1/4, SW1/4, SW1/4, Sec. 4, T22S, R42E, MDB&M, as shown in Figure 7. The NOTS legal archives literature lists Nathan Burton as the last claimant (date unknown) of the property prior to Navy acquisition.

The host rocks at this location range in composition from Mesozoic porphyritic hornblende granodiorite to Mesozoic granite. Dikes and sills of fresh, dark-gray to black diabase are scattered throughout the workings and exhibit extremely variable widths and orientations.

The mine explores a large area that is structurally complex. Figures 191, 192, 193, and 194 are plan views that, when fit together, show a single mine level with 1638 feet of drifting. The drift encounters numerous fault and fracture zones, the most extensive of which is a maximum of 3 feet wide and is found along the northeastern most drift crosscut. This major fault zone strikes generally N55E and dips from 60 degrees northerly to nearly vertical. It is composed of severely decomposed granite with discontinuous quartz lenses and stringers up to 1 foot wide and limonite-stained clay that fills fractures and pore spaces in the zone. Clay is the predominant material that makes up the 2- to 4-inch-wide slickenside margins of the fault zone. Many of the narrow fractures and tight joints within the granite strike in generally north-northeasterly or northwesterly directions.

Figure 195 is a surface plan view of the shaft collar and prospect trench that are situated to the north of and approximately 80 vertical feet higher than the adit portal. The shaft is vertical and extends to the adit level where shown on Figure 192. The upper 43 feet of the 14- by 10-foot shaft are accessible, but the lower 35 to 40 feet are filled with loose muck and rock slabs that have fallen from the shaft walls. Situated 25 feet to the west of the shaft collar is a 6- by 5-foot prospect pit that is 3 feet deep. These workings were driven along an 8-foot-wide shear zone that strikes N70W and dips 80 degrees southerly. Scattered 0.5- to 1-foot-wide quartz lenses with specular hematite and minor limonite stain are present within the shear zone.

The operator developed these workings in an apparent effort to explore for, and produce, commercial quantities of specular hematite ore. During the time frame in which the development was done (presumably the late 1920s through the early 1940s), there was a demand for specular hematite, which was used as a fluxing agent in smelting operations that were located in the New Coso and Cerro Gordo District and elsewhere in the region.

N-1024 6-2 THROUGH 6-3-83

"BIG 4" IRON NO. 1, 2, 3 CLAIMS-ADIT

NW¼ SW¼ SW¼ SEC. 4 T22S R42E

W.F. DURBIN, C. RODGERS, C. NEAL,

T. ATIENZA-MOORE

LEGEND

- GRANITE
- GRANITE WITH HEMATITE MINERALIZATION
- FAULT OR SHEAR ZONE - MINERALIZED
- DIABASE
- STRIKE AND DIP
- VERTICAL DIP
- GEOLOGIC CONTACT
- FRACTURE ZONE
- BACK HEIGHT
- SAMPLE LOCATION
- ESTIMATED LOCATION OF RAISE
- MUCKPILE OR MINEDUMP
- PORTAL WITH SURFACE TRENCH

Figure 191a. Legend for figures 191b - 194.

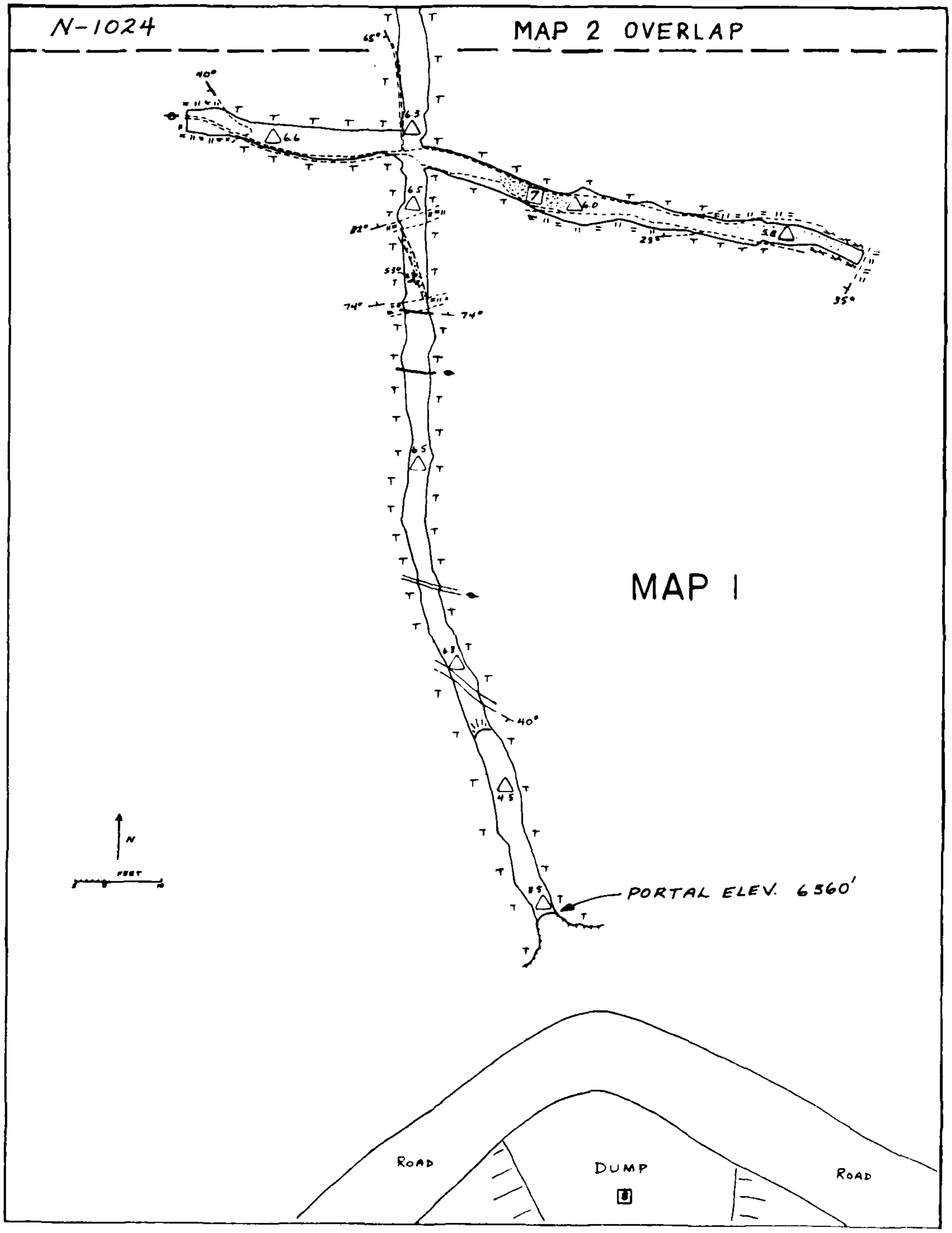


Figure 191b. Map 1 of the main mine workings at the Big 4 Iron claims.

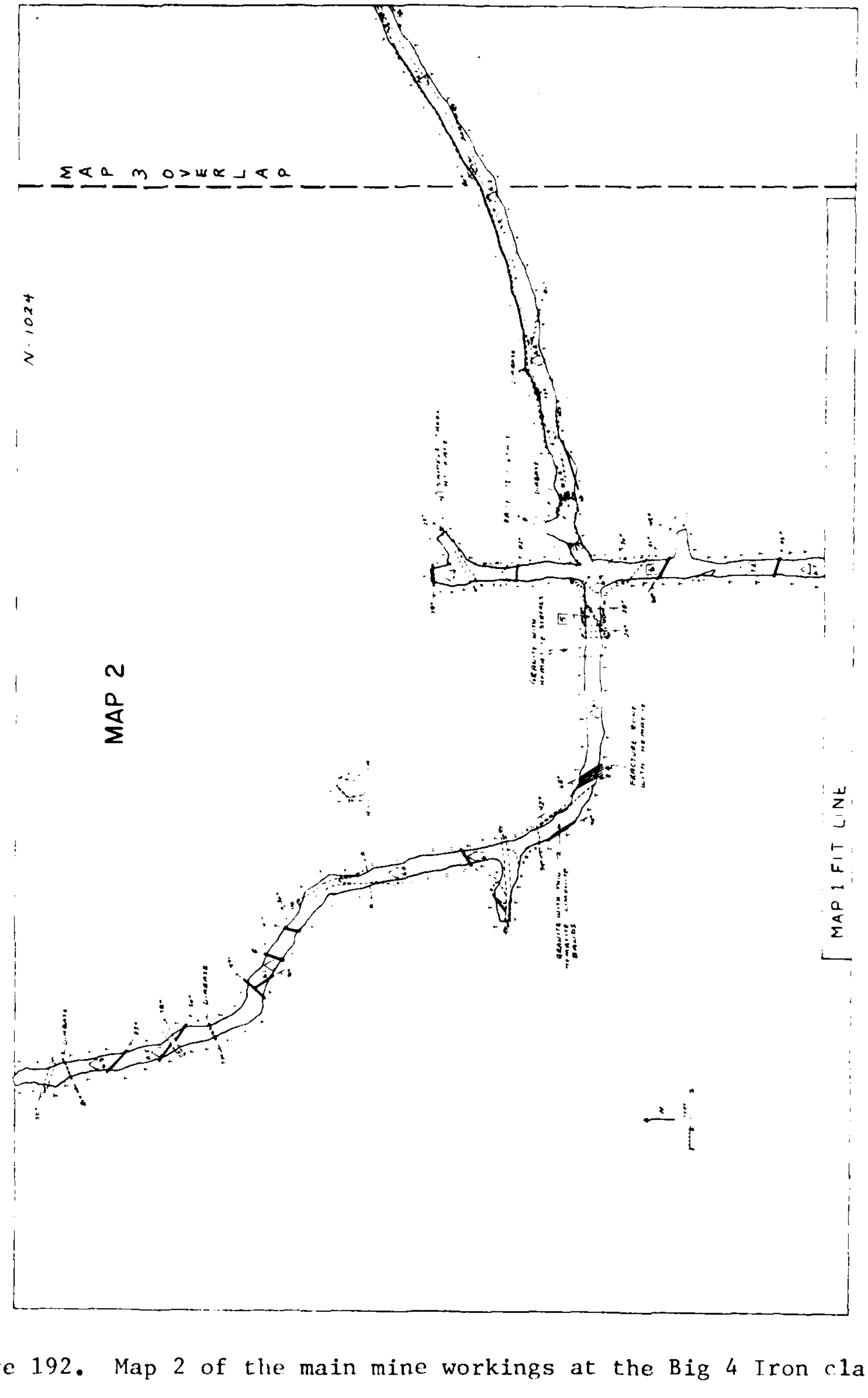


Figure 192. Map 2 of the main mine workings at the Big 4 Iron claims.

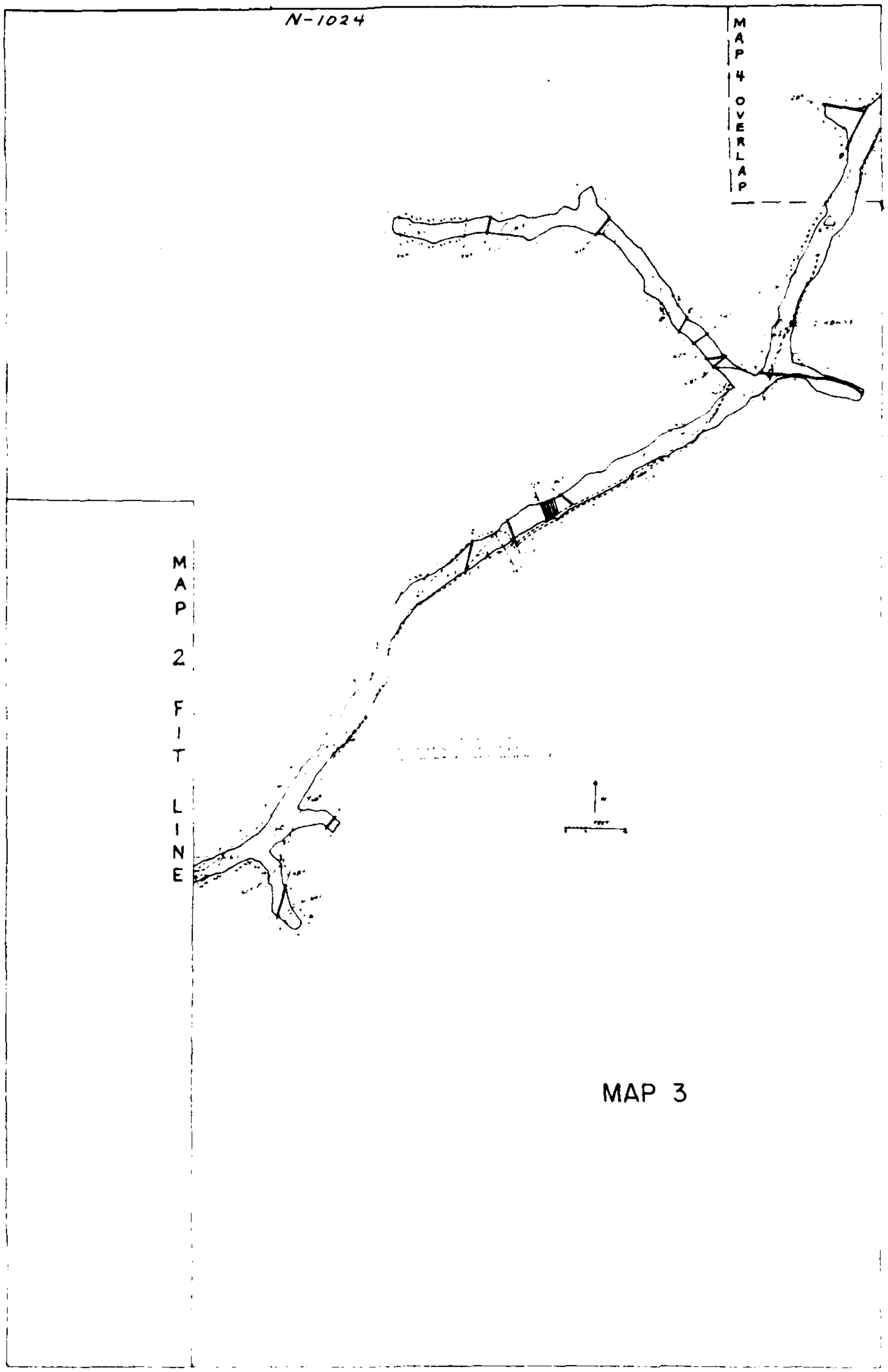


Figure 193. Map 3 of the main mine workings at the Big 4 Iron claims.

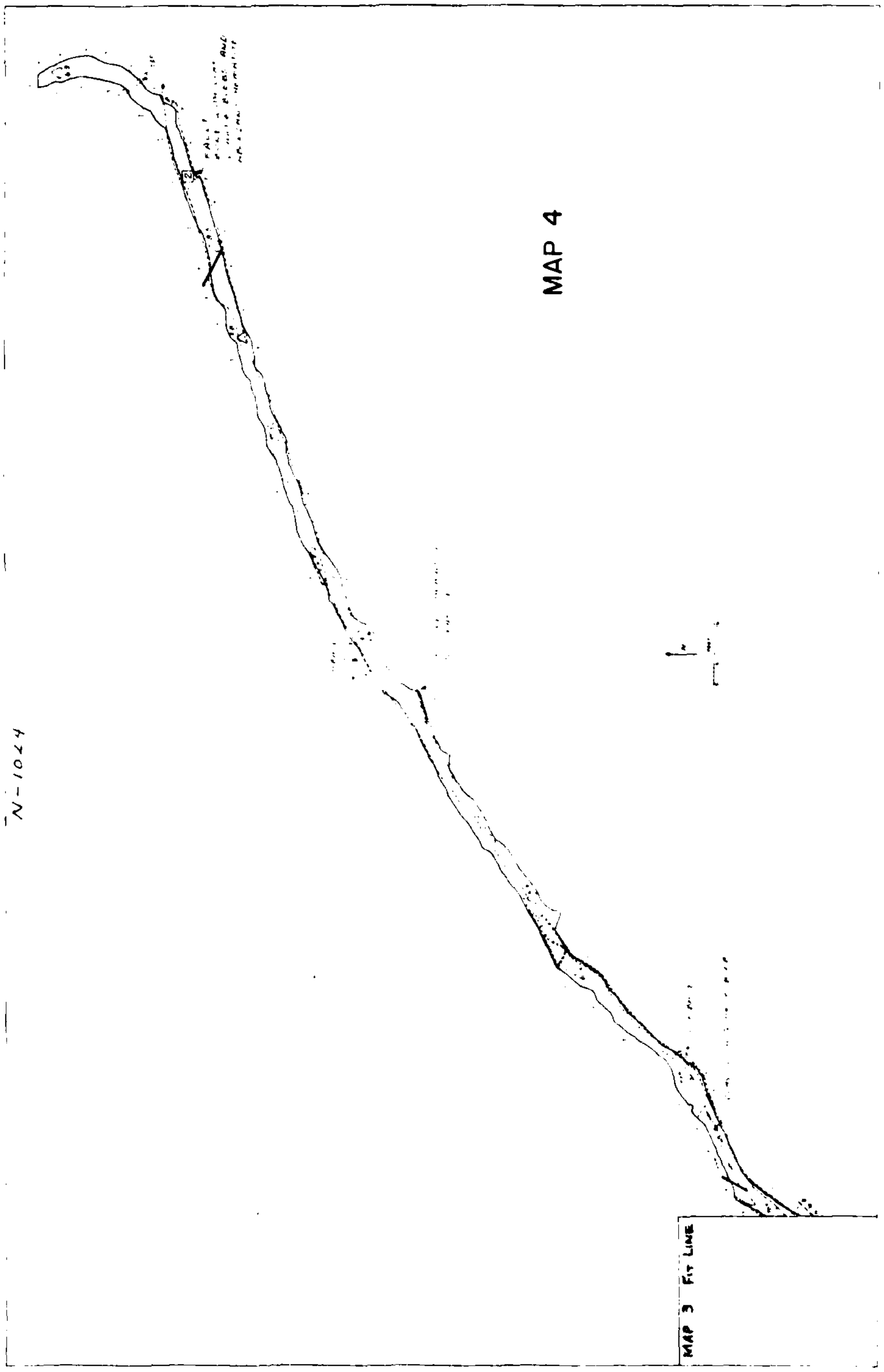


Figure 194. Map 4 of the main mine workings at the Big 4 Iron claims.

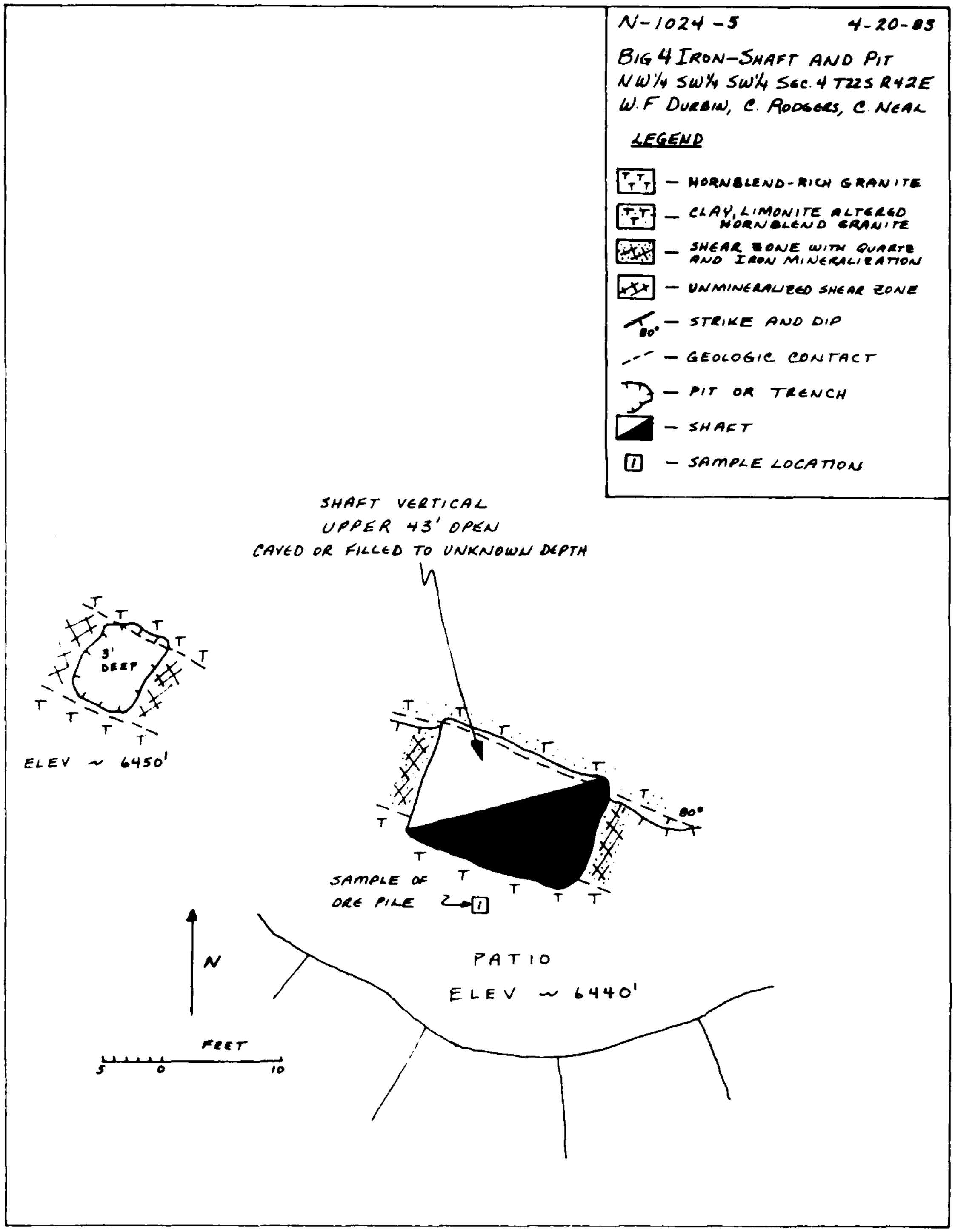


Figure 195. Surface plan view of the shaft area at the Big 4 Iron claims.

Within the main level workings, a total of nine small and isolated areas were found that contained quantities of specular hematite. These are shown by a dotted pattern on the map view. The hematite was found in several modes of occurrence: (1) pods, streaks, and small lenses associated with crushed quartz and clay within the major fault zones; (2) scattered 1/2- to 3/4-inch veinlets of nearly pure material located along the fault contact margins; and (3) disseminated crystals and thin veinlets within the granite host rock.

Eight samples were collected from the Big 4 Mine. These are labeled N-1024-1 through N-1024-8. Samples 2 through 7 were chipped across the mineralized areas in the drift where indicated on the map view. Sample 1 is a grab sample taken from a pile of hematite-bearing quartz located near the shaft collar, and sample 8 is a grab sample of hematite-bearing granite taken from the surface of the drift dump. A complete list of assay results for the eight samples is found in Appendix D. There are no commercial values for iron or precious metals indicated by these samples, and no commercial potential exists at this site.

A tonnage estimate was made for the specular hematite that was removed from the drift level in the nine areas of iron concentration. A total of 78 cubic yards of iron-bearing material was removed from these areas. Using an average of 2% iron for the zones, the specular hematite volume would equate to 1.6 cubic yards. Incorporating a factor of 6.10 cubic feet/ton for hematite would produce a net tonnage of 6.9 tons.

Millspaugh Hematite Prospects (N-1027)

These prospects are located approximately 0.2 mile north of the Millspaugh site. They are shown as N-1027 in Figure 7 and are found in the NE1/4, NE1/4, SE1/4 and the SE1/4, SE1/4, NE1/4 of Sec. 5, T22S, R42E, MDB&M.

The workings, consisting of three small pits, are developed on iron-rich outcrops. The iron, as specular hematite, occurs as a metasomatic replacement along a N11W-striking fracture that dips approximately 58 degrees southwest in Mesozoic granite. The iron occurs as pods approximately 1 foot wide and 2 to 3 feet long.

Assay results of the two samples show low iron content and no precious metal values. The prospect has no commercial potential.

Unnamed Adit (N-1030)

An unnamed adit is situated along the Piñon Peak Road 0.35 mile northeast of the old Millspaugh town site. It is placed in the SE1/4, NW1/4, SW1/4, Sec. 4, T22S, R42E, MDB&M, and shown on Figure 7.

The 12-foot adit, shown in plan view by Figure 196, was driven in Mesozoic, sericitized granite. Approximately 7 feet inside the adit portal a 6-inch-wide fracture was encountered that strikes nearly east-west and dips 35 degrees northerly. The fracture contains a white clay matrix with quartz blebs and scattered pods of specular hematite.

One sample was chipped across the fracture on the left-hand wall of the adit, and the assay results are shown on Appendix D. The assay results show insignificant concentrations of iron and gold. The grade and size of the mineralized fracture indicate that no discovery of a commercial source of iron was made at this location.

Mountain Springs Canyon Area

Unnamed Prospect (N-1340)

This group of workings is situated on the north side of Mountain Springs Canyon approximately 2.1 miles northeast of the canyon mouth. It is placed in the SW1/4, SW1/4, NW1/4, Sec. 9, T23S, R41E, MDB&M, and is shown in Figure 9.

The host rock for the area is Mesozoic, clay-rich altered aplite. Specular hematite was the commodity sought by the prospector. It occurs in a single vein that strikes from N45W to N52W with a dip of 75 degrees northerly. The vein, nearly pure specular hematite, outcrops discontinuously for at least 200 feet and averages 6 feet in thickness.

Surface exploration consisted of three prospect pits dug along the strike of the vein. These produced approximately 13 cubic yards of material, all of which was stockpiled at the site. The second stage of exploration consisted of driving a 31-foot adit with small crosscut drifts at the end of the adit. Figure 197 is a map of the adit. No iron ore was encountered at depth.

One sample was taken from the surface pits. The assay results are listed in Appendix D. With the exception of high iron values, no precious metals or other commodities are present at this location. There is neither sufficient tonnage of specular hematite nor economical access to the area to warrant future development. No commercial potential exists at this site.

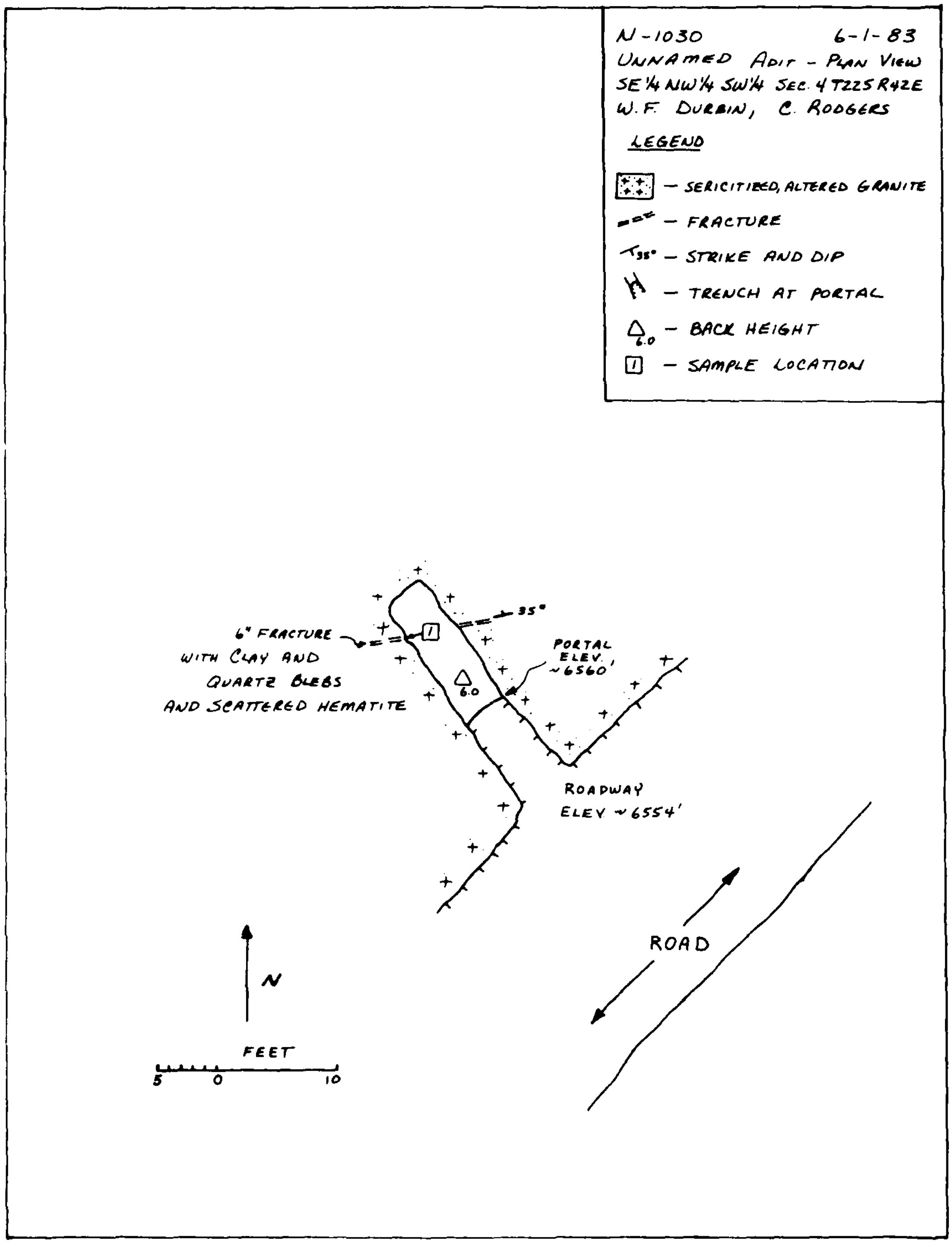


Figure 196. Plan view of the adit at site N-1030.

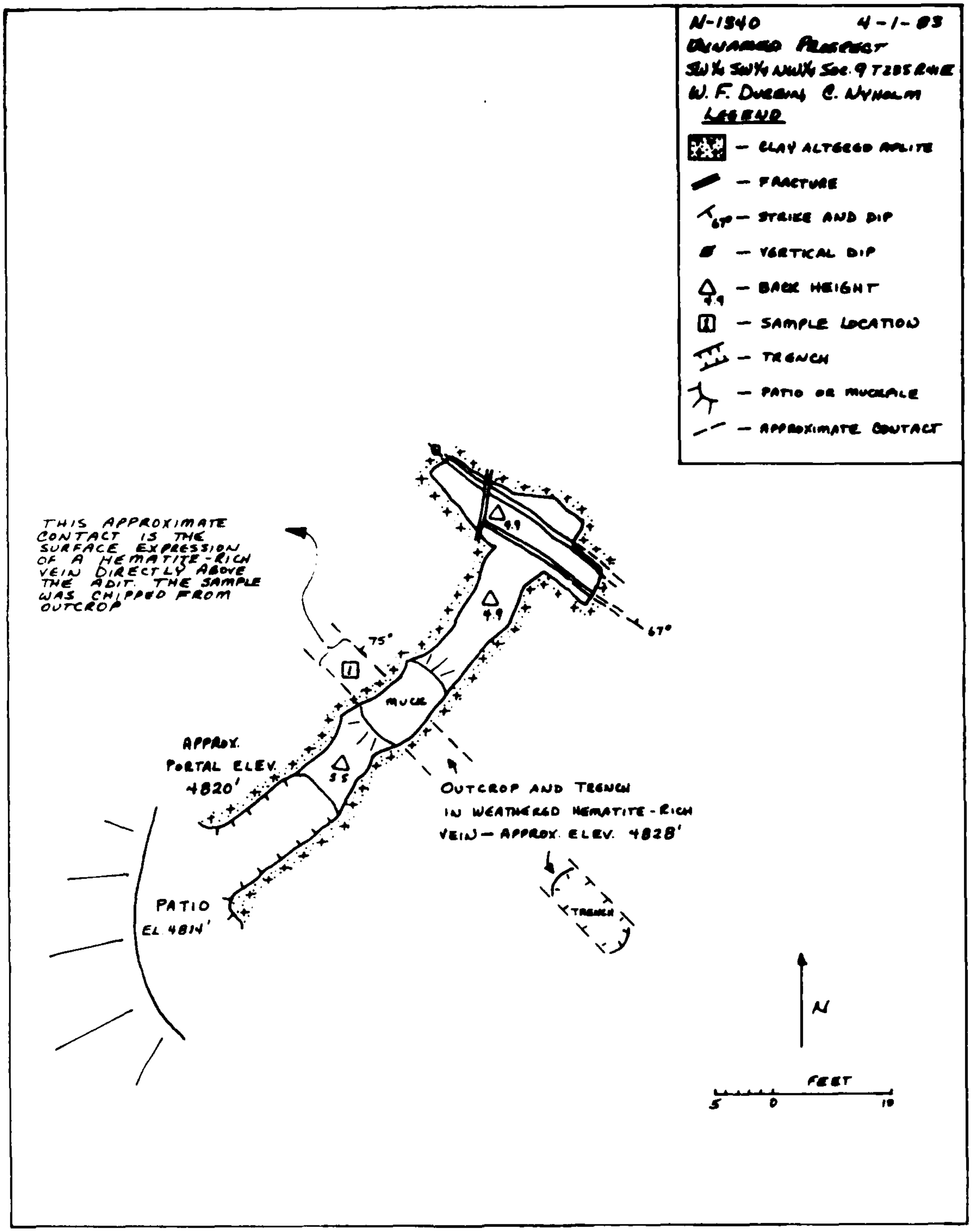


Figure 197. Plan view of the adit at site N-1340.

Iron Mask and Iron Chief Claims (N-1344)

The Iron Mask and Iron Chief claims are reported[3] to occupy the same section, township, and range. The Iron Mask Claim (NOTS Condemnation Case No. 489) was owned by Chester P. Smith, the Iron Chief Claim (NOTS Condemnation Case No. 488) was owned by J. T. McCord. These iron prospects are found along the southside of Mountain Springs Canyon at an elevation of approximately 5700 feet in the NW1/4, NW1/4 of Sec. 13, T23S, R41E, MDB&M. They are shown as N-1344 on Figure 9.

The property was explored by two small prospect pits that are dug on iron-rich outcrops in Mesozoic granite. The mineralization appears to occur as a metasomatic replacement, which takes the form of irregular veins and small pods of hematite and magnetite developed along a small east-west-trending fracture system.

Samples from each of the pits were assayed. The results, which are given in Appendix D, indicate variable iron concentrations and no gold values. Because of this and the apparent limited size of the occurrence, no commercial potential is indicated.

Burro Canyon Area

Unnamed Shaft (N-2305)

A short exploration shaft is situated 2.5 miles north of the Lone Butte as shown on Figure 11. It is placed in the SE1/4, SW1/4, SE1/4, Sec. 6, T26S, R41E, MDB&M.

A shear zone that strikes N15E and dips 75 degrees southeast forms the locus for mineralization in the Mesozoic quartz monzonite host rock. The quartz monzonite within the shear zone is strongly altered with chloritization of mafic minerals, sericite formation along fractures and minor chrysocolla staining within the altered rock itself. The shear zone contains abundant iron as specular hematite and magnetite in large bodies and veins several inches in width. The iron material is weather-resistant, and outcropping veins can be traced at least 50 feet south of the shaft. Visible quartz veining was limited to one or two 1-inch stringers in the shaft walls.

The shaft was driven down the dip of the 6.5-foot-wide zone for approximately 30 feet, but is now caved and filled to within 17 feet of the surface.

A sample of the shear zone material was collected from the area near the shaft collar, and the sample assay results are presented in Appendix D. The sample assay indicates no commodities of value are present at this site with the exception of iron. The potential for this area as a commercial iron producer is nil. The specular hematite-magnetite body occurs in small and discontinuous lenses or veins within the shear zone. Though traceable for a short distance from the shaft, the size, grade, and tonnage of this deposit are not indicative of an economic deposit.

MERCURY OCCURRENCES

Coso District

Sugarloaf Area

The Coso Quicksilver District is located in the southwest portion of the Coso Range and includes the Devil's Kitchen area, Nicol property, and Wheeler prospect. Cinnabar has been irregularly and sparsely distributed in fumarolic sinter as fracture and grain coatings. Because of the photosensative nature of cinnabar, the surface mineralization is nearly all metacinnabar, the alteration product. These Pleistocene to Recent siliceous sinters are bounded by severely altered Mesozoic granodiorite.

Coso Quicksilver Claims (N-702)

The NOTS 1947 Condemnation Proceedings (NOTS Condemnation Case No. 50) list Lloyd W. King, A. W. Loege, and M. J. Lynch as former owners of these claims that included the Devil's Kitchen area and Nicol property. The claims were contained on portions of Sec. 5, 6, 7 and 8 of T22S, R39E, MDB&M, and shown on Figure 5, a location map of the area, as N-702.

The sinter of Devil's Kitchen covers an area of approximately 50 acres in the SE1/4, NE1/4 of Sec. 7 and the SW1/4, NW1/4 of Sec. 8. Exploration of the deposit is reported to consist of three quarries, several shallow trenches, a short tunnel, and several 36-inch-diameter exploratory holes drilled by the Bureau of Mines, U.S. Department of the Interior, in 1942[19]. The area has since been eroded making identification of the workings difficult.

[19] C. P. Ross, and R. G. Yates. "The Coso Quicksilver District, Inyo County, Calif." in the *1942 Strategic Minerals Investigations*, pp. 394-416.

The Nicol deposit, which covers approximately 30 acres, is primarily in the E1/2, NE1/4, NW1/4 and W1/2, NW1/4, NE1/4 of Sec. 8, and overlaps slightly into Sec. 5. The workings consist of a shaft 4 by 5 feet at the surface and approximately 54 feet deep, a partially caved adit, and several trenches and pits. A short (10-foot) adit and prospect pit are found on the north side of the Coso Hot Springs Road just east of the main site. This field investigation showed that the major workings were flooded with carbon dioxide. In 1961 a 100-foot long adit was open on the property. Distinct thin films of cinnabar were visible in fractures on the drift walls. This opening was bulldozed shut for safety reasons.

Schimpff-Wheeler Prospect (N-711)

The claimants of this property are listed as Chas. and June Wheeler Schimpff in the NWC legal archives (NOTS Condemnation Case No. 272). The prospect is located approximately 2 miles southeast of Devil's Kitchen and 1.65 miles south of Coso Hot Springs in the SE1/4, SW1/4, NE1/4 of Sec. 16, T22S, R39E, MDB&M. Figure 5 shows this property as N-711.

The only working that remains at this site is a small prospect area along an intermittent stream channel. The hot-springs deposits occur on the surface over an area of about 20 by 30 feet, but the outcrop exhibits only very minor metacinnabar mineralization. Recent surface geochemical sampling in the area indicates background mercury values in the range of 500 to 600 ppb. These values are substantially less than those found in the Devil's Kitchen area and are not indicative of potential economic mineralization.

Because this property was listed as a gold claim in the 1951 NOTS List of Validated Claims,[3] a sample (N-711) was taken at the workings and assayed for gold. The assay results, which are given in Table A-1, show no detectable gold. The remains of a small mercury retort are still present at this site.

Sugarloaf Fumarole (N-714)

This area is located along the western shoulder of Sugarloaf Mountain in the NW1/4, NW1/4, SW1/4 of Sec. 12, T22S, R38E, MDB&M. It is shown as N-714 on Figure 5. Claim markers were found in the vicinity of the working; however, no claim papers were found, nor did the literature search reveal any ownership information. The collared pit, 3 by 4 feet and approximately 6 feet deep, was sunk in a hot-spring deposit. There is no visible metacinnabar mineralization, so no sample was taken.

The Coso Quicksilver District produced 231 flasks of mercury between 1931 and 1940. Regarding resource potential, Ross and Yates[20] in their evaluation of the district state:

> "... the total quantity of sinter in the district is roughly computed to be about 1,800,000 tons; only a fraction of this, however, is thought to average as much as 2 pounds of quicksilver to the ton."

Recent close-spaced surface sampling in this area (accomplished as part of the project to define the potential of the Coso KGRA) indicates that this quicksilver value is much too high. The Devil's Kitchen area is the most geothermally active site in the district. These recent geochemical surveys indicate an average concentration of 9 ppm, or 0.0087 lb/short ton with an occasional sample reaching as high as 13 ppm (0.0126 lb/short ton). At this concentration the ore material would gross $0.44/ton, not a commercially exploitable deposit. Mercury analysis of samples taken at the same site but at different depths indicate that the concentrations could increase as much as 2 to 3 times with depth. However, the sinter has an estimated maximum thickness of 40 feet, beneath which is altered Mesozoic granodiorite that has a much lower mercury concentration because of the rapid increase in temperature with depth. The entire area has no commercial value as a mercury prospect.

A small amount of sulfur was mined at the Nicol deposit during World War II from a short adit and an open cut. The potential for a commercial sulfur deposit at this site is nil.

SEDIMENTARY DEPOSITS

Coso Peak Area

Last Chance Placer (N-224)

The Last Chance Placer claim is located in an area of gently rolling hills about 2.6 miles north of Old Coso in the SE1/4, SE1/4, NW1/4 of Sec. 8 T20S, R40E, MDB&M, as shown on Figure 6. This narrow band of hills, at the upper end of Lower Centennial Flat, is underlain by Pliocene alluvium and lacustrine deposits. The claim was staked on a small outcrop of travertine associated with a 60-foot-thick layering of laminated and reworked freshwater limestones. According to a notice found on site, the claim was staked on 5 April 1934 by Emerson L. Carr.

[20]Ibid., pp. 411-12.

The travertine outcrop is less than 1 foot thick and is interbedded in the clastic carbonate beds. There is no evidence of work at this site and no commercial potential exists here.

Indian Wells Valley

East White Hills Prospect (N-1602)

This prospect is located in NW1/4, NW1/4, SE1/4 of Sec. 8, T24S, R40E, MDB&M, as seen in Figure 9. It consists of a side hill cut about 15 feet long and a trench, 45 by 3 by 3.5 feet deep, trending N62E. The workings were dug on an outcrop of Pleistocene diatomaceous earth that has an average exposed thickness of 4 feet and an outcrop length of about 1200 feet. The bed strikes west-northwest and dips northeast.

The deposit is of very limited extent and, therefore, has no economic potential.

EVAPORITES

Indian Wells Valley

Bonanza Group (N-1502)

The Bonanza Group includes the following claims: Bonanza Addition, Bonanza Fraction #1, Bonanza Addition A, Bonanza Addition 1A, and possibly others. The group is located in the E1/2, E1/2 of Sec. 34 and W1/2, W1/2 of Sec. 35, T24S, R39E, MDB&M, as seen in Figure 9.

The claims covered two small dry lakes (and the surrounding area) south of the White Hills in northern Indian Wells Valley and were probably staked to control any evaporite minerals that may have been present in the Recent deposits. Since no work has been done here for over 40 years, much of the evidence of prospecting has been obliterated. Two evaporation pans that were dug on the east shore of the larger lake is all that remains. A sample of the lake sediments was taken. The analytical results, given in Appendix E, indicate that no commercial concentrations of evaporite minerals are present at this site.

Standard No. 5 (N-1505)

The Standard No. 5 is located just south of the lava fields of the western White Hills in the S1/2, SW1/4 of Sec. 27, T24S, R39E, MDB&M, as shown on Figure 8. The prospect consists of a single pit (8 by 4 by 3 feet deep) that was dug in quaternary alluvium. No other workings are evident in the immediate area.

Because of its proximity to the dry lakes of site N-1502 (and its remoteness), it is assumed that the prospector was looking for evaporites. No potential for evaporite minerals, commercial or otherwise, is evident at this site.

Paxton Placer (N-1603)

The Paxton Placer was staked on the dry lake bed at Paxton Ranch in the northeast corner of Indian Wells Valley on 9 February 1916. Location notices found on site list the locators as J. H. and J. L. Shirburne, W. G. Kelsay, and C. A. Churchill. The cadastral location is given as being in the S1/2, SE1/4 of Sec. 27, T24S, R40E, MDB&M, as seen in Figure 9.

This claim is one of a group of claims that blanketed this small playa lake just north of China Lake. (Actually, if the water in China Lake (as defined by the topographic map) was to rise 8 feet, the two lakes would be connected). There was no record of mining activity found in the literature, and all traces of workings have long since disappeared.

Two samples were taken for this survey N-1603-1 is a sample of the lake sediments, and N-1603-2 is of sparse crystal clusters and nodules that were growing in the sediments. The analytical results are given in Appendix E.

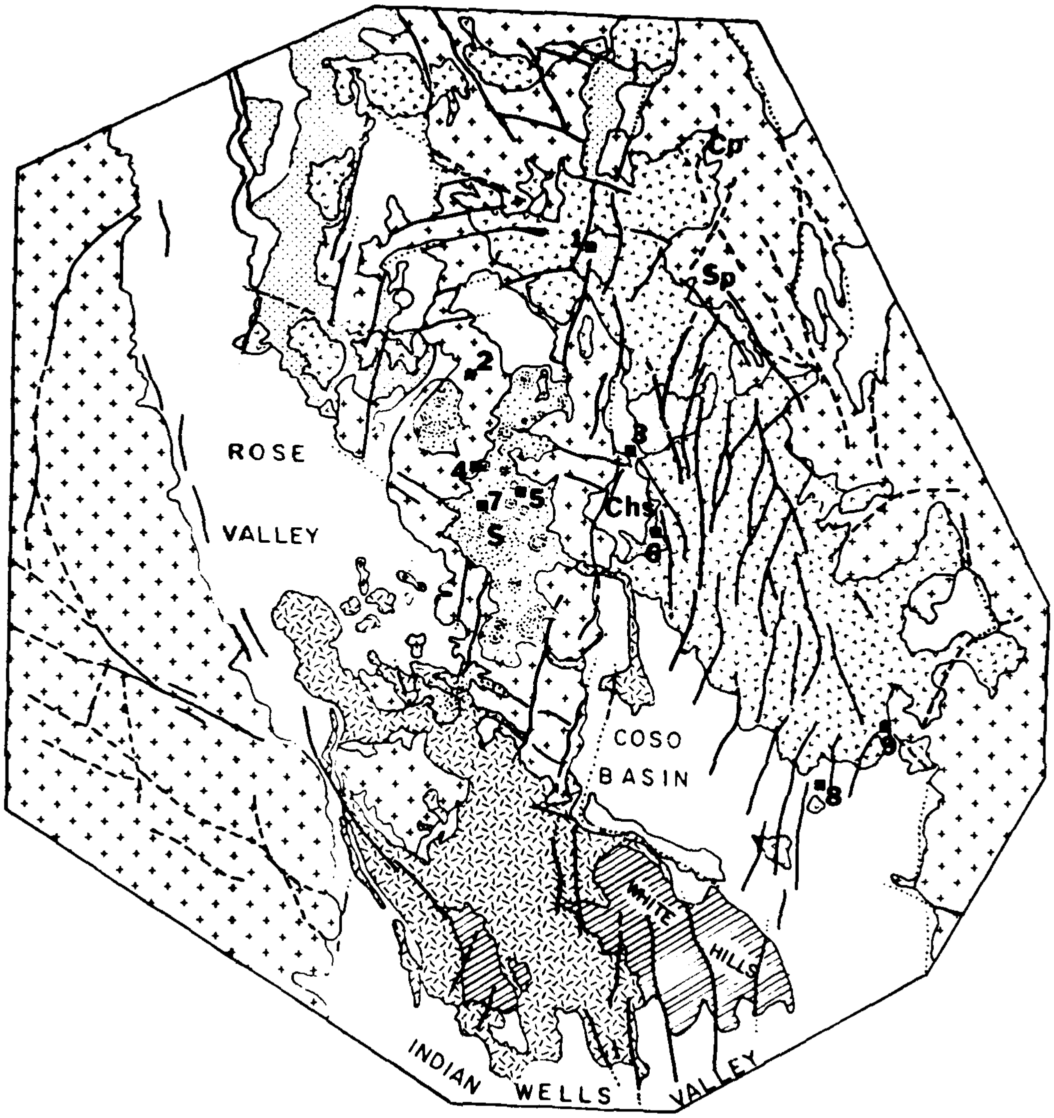
As the assays indicate, the concentration of saline and metallic minerals is subeconomic, at least at the surface. The Paxton sediments appear to have a much higher clastic-to-evaporite ratio and a much lower evaporite concentration than do lakes with major economic evaporite deposits, such as Searles Lake. This, coupled with the limited size, indicates a low potential for a commercial deposit. Subsurface exploration would be needed to evaluate any possible buried deposits.

OTHER INDUSTRIAL RESOURCES

Coso District

Sugarloaf Area: Perlite

The perlite deposits are scattered within the Coso Volcanic Field. Figure 3 (repeated here for reader convenience) is a geologic map of this area. The deposits exist as a covering of loose blocks of perlite



EXPLANATION

Quaternary deposits

Pleistocene basalt

Pleistocene rhyolite domes, flows, and pyroclastic deposits

Pliocene volcanic rocks and intercalated Coso Formation

Pleistocene sedimentary rocks

Pre-Cenozoic granitic and metamorphic rocks

1, Upper Cactus Flat Pumice; 2, N-401; 3, N-405; 4, N-409; 5, N-410; 6, N-701; 7, N-716; 8, N-1201; 9, N-1203; Cp, Coso Peak; Sp, Silver Peak; Chs, Coso Hot Springs; S, Sugarloaf.

Figure 3. Geologic map of the Coso Volcanic Field and vicinity.

on isolated, steep-sided Pleistocene rhyolite flows. Duffield, Bacon, and Dalrymple[5] have shown that the domes are not only uniform in shape but have uniform composition: the SiO_2 content varies within <7% on an anhydrous basis.

Each former claim site is described in the following pages. The description includes the location, the volume of the dome or domes, and an estimation of the total tonnage available for exploitation.

Let-er Be (N-402)

The mine and mill site are located approximately 1.7 miles northwest of Devil's Kitchen and 1.3 miles south of the Cactus Peak VABM. The site is shown as N-402 on Figure 5 and lies on surveyed land in the NE1/4, SW1/4, SW1/4 of Sec. 31, T21S, R39E, MDB&M.

The 1947 Condemnation Proceedings indicate that this claim was co-owned by eight individuals: Irma and B. J. Compton, Gene Delaney, Roy Hooper, W. H. Montgomery, Harold and Irma Olson, and R. R. Walker. No claim markers were found, and only minimal surface disturbance is evident on the one rhyloite dome in this section. The dome covers an area of approximately 20 acres at an average height of 200 feet or 6.5×10^6 cubic yards.

Remnants of a small perlite processing site plant can be found at the base of the dome along the north slope. The plant consisted of a small furnace and crusher. All that remains today are a few fire bricks, the heavy duty wooden foundation, and a cubic yard or so of processed rock.

Cactus Peak (N-408)

The prospects are located on the south flank of Cactus Peak and the northeast flank of a small unnamed dome which lies to the southwest of Cactus Peak. It is shown as N-408 on Figure 5 and is located in the NE1/4, SE1/4 of Sec. 25, T21S, R39E, MDB&M.

Cactus Peak covers approximately 125 acres at an average height of 840 feet. The small unnamed dome covers approximately 25 acres at an average height of 260 feet, their combined volume is approximately 1×10^7 cubic yards. There are two small diggings, one on each of the domes, each having had approximately 4.4 cubic yards of material removed.

Sun Lode (Elm Lode) (N-704)

The NWC legal archives show that H. H. Howard and E. G. Wolley owned these properties, shown as N-704 on Figure 8. The claims were reported to have been located in Sec. 30, T22S, R39E, MDB&M; however, a search of the area showed there were no claim markers or signs of quarrying. The section does contain portions of two rhyolite domes along its western edge, and these domes are probable lode claim sites. The northwest dome contains approximately 9.6×10^6 cubic yards, and the southwest dome contains approximately 1.1×10^7 cubic yards.

Mary Lee/Noel No. 1 (N-706 and N-708)

The Mary Lee was listed as a valid claim with McElroy, Rossner, and Parks as claimants on the "1951 List of Validated Claims within U.S. Naval Ordnance Test Station, Inyokern" as published in Vol. 47 of the *California Journal of Mines and Geology*.[3] The Noel No. 1 was owned by W. G. Bradley, John Herbert, N. J. Redmond, and W. J. Valkenburg as listed on the NOTS 1947 Condemnation Proceedings Claim Location Map. These claims are shown as N-706 and N-708 on Figure 5. Field reconnaissance showed no sign of workings and no claim markers. However, the area of the claims are on the southeast flank of Sugarloaf Mountain, which is a composite rhyolite dome. The flank covers an area of approximately 80 acres in the NW1/4 of Sec. 18, T22S, R39E, MDB&M, at an average height of 100 feet (1.3×10^7 cubic yards).

Thomas Lode/Morning Star (N-707)

The Thomas Lode claim was owned by Beam, L. Mills, Jack McElroy, and George Parks. R. M. Thomas is listed as the claimant of Morning Star. Both claims are reported in Sec. 6, T22S, R39E, MDB&M.[3] There are two rhyolite domes in the southwest quarter of this section that could be covered by these claims. The smallest covers roughly 40 acres at an average height of 80 feet, the larger covers 160 acres at an average height of 160 feet. The combined volume of these two domes is 4.6×10^7 cubic yards.

Oak Nos. 1 and 2 (N-709)

The Oak claims, owned by Horace H. Howard and Elisa G. Wolley, are located in the S1/2, SW1/4 of Sec. 13, T22S, R38E, MDB&M, and cover part of a rhyolite dome that overlaps into Sec. 18. Figure 5 shows these claims as N-709. No claim markers were found, nor were there signs of excavation. The dome covers an area of approximately 48 acres at an average height of 80 feet (6.2×10^6 cubic yards).

Perlite Lode, Perlite Placer Nos. 1 Through 6, Star Lite Nos. 1 Through 6 (N-710 and N-712)

A review of the NWC legal archives shows these claims were held by Horace H. Howard and Elisa G. Wolley. They are located in Sec. 19, T22S, R39E, MDB&M. The site is approximately 2.1 miles south of Devil's Kitchen and can be accessed by good dirt roads. They are shown on Figure 5 as N-710 and N-712. There is a small cabin and an ore bin on the property. The ore bin has an approximate capacity of 20 cubic yards and was loaded by a rail cart. The rail extends 25 feet to the west along the north slope of the rhyolite dome. There is a minimal amount of ground disturbance, which seems to indicate that the operator rolled the perlite boulders down the hill and handloaded them into the rail cart. Total volume of material removed is estimated at 10 to 15 cubic yards. The dome has an approximate volume of 2.5×10^7 cubic yards.

King Nos. 1 and 2/White Duster 1 and 2 (N-715)

Horace H. Howard and Elisa G. Wolley were the claimants of the White Duster claims; Lloyd W. King is listed as holder of the King claims.[3] Both sets of claims are reported to occupy Sec. 7, T22S, R39E, MDB&M. They are shown as N-715 on Figure 5. Claim markers were found along the northeast flank of Sugarloaf Mountain, however, no claim papers or location notices were recovered. The area that could be covered by these claims is approximately 40 acres, with an average dome height of 50 feet or 3.2×10^6 cubic yards. In addition, Sugarloaf Mountain covers roughly 3 square miles with an approximate average thickness of 300 feet. Roughly 75% of this surface is perlite, the remainder being obsidian.

Unnamed Prospect Pit (N-718)

The site is located approximately 2.4 miles southwest of Devil's Kitchen in the SW1/4, SE1/4, NE1/4 of Sec. 14, T22S, R38E, MDB&M, shown as N-718 on Figure 5. The property was explored by a single pit 6 by 6 and 3 feet deep which exposes no perlite.

N. W. Curson Associates (N-1103)

This proposed prospect site is located approximately 0.9 mile northwest of the Volcano Peak VABM, and 4.2 miles northeast of the Little Lake bench mark. This site was proposed for a Perlite Quarry by N. W. Curson Associates on July 28, 1952. Their request was denied for safety and security reasons. It is shown as N-1103 on Figure 8 and is found to be in the NW1/4, SE1/4 of Sec. 2, T23S, R38E, MDB&M.

The dome covers approximately 102 acres at a height of 60 feet, or a volume of 9.9×10^6 cubic yards.

In addition to the deposits described above, there are domes in Sections 18, 20, 30, and 36 of T21S, R39E, MDB&M, which were not covered by claims. These domes have a combined volume of 8.9×10^7 cubic yards. Assuming that only 10% of this total volume (8.9×10^6 cubic yards) is useful perlite, NWC has a potential for producing 1.8×10^6 short tons[21] of perlite for use as lightweight aggregates. Although these deposits have the required tonnage to make them economical there are deposits with the same potential on nearby off-Center lands (Sections 22 and 27 of T21S, R38E) which are not being developed.

Sugarloaf Area: Pumice

The NWC pumice deposits are scattered throughout the Coso Volcanic field and adjacent areas. Figure 3 is a location and geologic map of this area adapted from Duffield, Bacon, and Dalrymple.[5] Quaternary pyroclastic deposits have been removed to expose the Tertiary rhyodacite air-fall pumice deposits in the western region. The younger pyroclastics are reworked and contain fragments of obsidian and basement rock in addition to the pumice. Pleistocene basalt flows cover those deposits located in the east and south parts of the volcanic field. The deposits are ultimately underlain by the Mesozoic granitics.

The pumice contains phenocrysts of biotite, hornblende, and plagioclase. Sieve analysis of the Ray Gill No. 31 pumice deposit by Chesterman[22] indicates the following size distribution among the fragments (Table 50). This distribution appears to be fairly representative of all of the sites visited.

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[21]Using an average density of 2.45 grams, as reported in *Rocks That Occur as Brittle Solid Test Material at the U.S. Naval Ordnance Test Station, China Lake, California*, by C. F. Austin and J. K. Pringle. China Lake, Calif., NOTS, July 1962. (NAVORD Report 7928, NOTS 2955, publication UNCLASSIFIED.)

[22]Charles W. Chesterman. "Pumice, Pumicites, and Volcanic Cinders in California," in *California Division of Mines Bulletin 174*, December 1956, p. 64.

TABLE 50. Aggregate Size Distribution of Ray Gill No. 31 Pumice.

Screen size	Percent retained
1-1/4 inch	9.78
3/4 inch	10.00
1/2 inch	24.85
1/4 inch	17.17
4 mesh	11.30
8 mesh	10.87
14 mesh	5.87
30 mesh	6.30
50 mesh	1.37
100 mesh	1.30
140 mesh	0.79
200 mesh	0.40

Each of the sites is described in the pages following and an estimate of reserves given. Following these descriptions is a summary of the pumice resources on the China Lake Complex.

Ray Gill No. 31 (N-401)

This site is located approximately 1.9 miles northeast of Cactus Peak VABM. The quarry is shown as N-401 on Figure 5. It lies on surveyed land in the NW1/4, NW1/4, NW1/4 of Sec. 24 and the SW1/4, SW1/4, SW1/4 of Sec. 13, T21S, R38E, MDB&M.

This deposit was formerly known as the Ray Gill No. 31 Claim.[23] Figure 198 taken directly from Chesterman's work shows the quarry and extent of the proven deposit. The pit exposes a Tertiary rhyodacite air-fall pumice deposit which extends far into Sections 14 and 23 of the same township and range. Along its western boundary the deposit is at least 25 feet thick and is overlain by 3 to 4 feet of soil. The deposit measures approximately 1000 feet east to west, and 1500 feet north to south, and may be as thick as 35 feet with an estimated volume of 1.94×10^6 cubic yards.

[23]Ibid., p. 17, Figure 11.

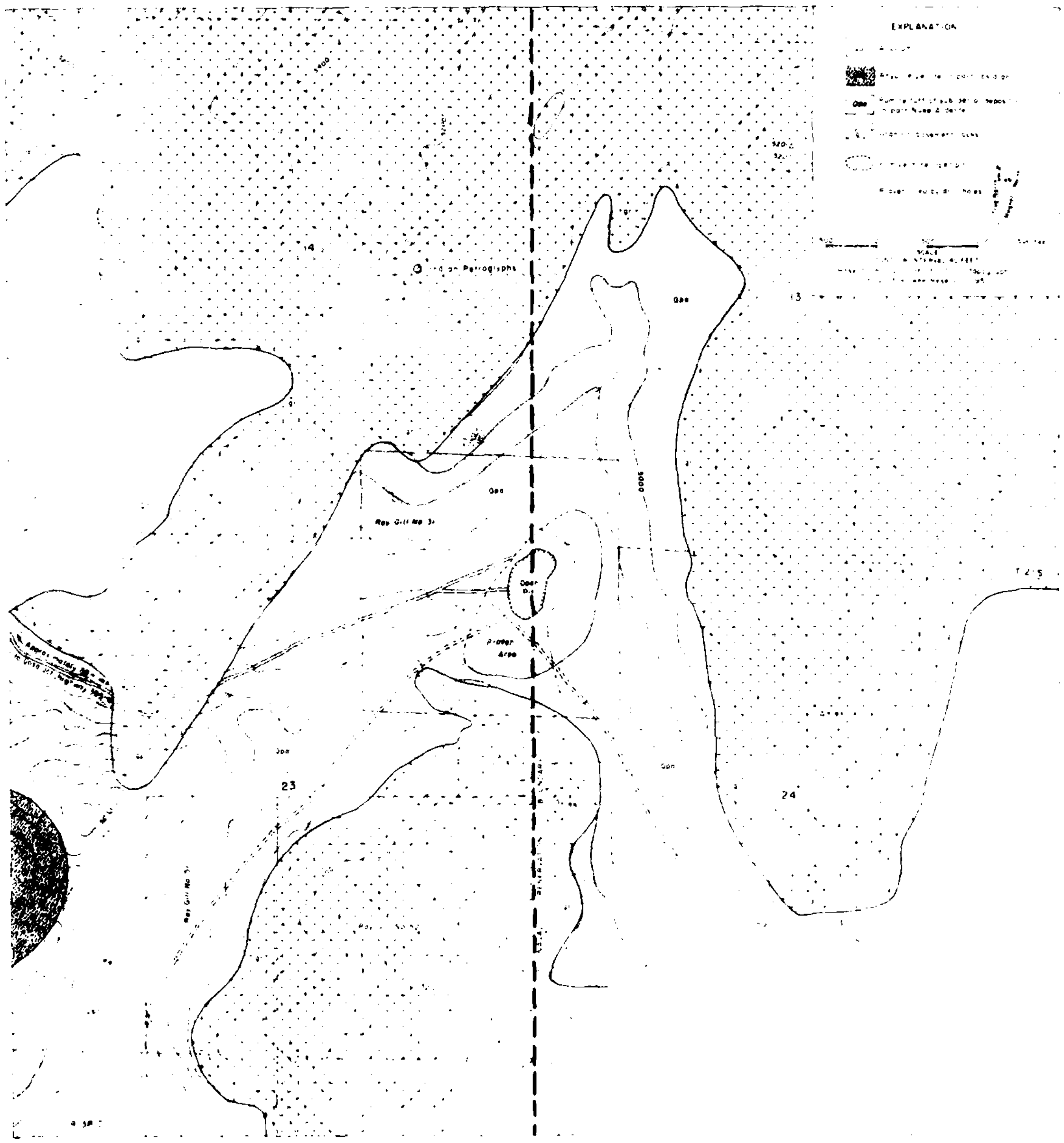

Figure 198. Surface map of the Ray Gill No. 31 and vicinity.

Unnamed Adit (N-405)

This working is located near the basalt flows in the eastern portion of the Coso Volcanic field. It is approximately 7.7 miles northwest of the Louisiana Butte VABM and 2 miles northeast of Coso Hot Springs; it can be found by traveling along the Old Stage Road that leads to Coles Spring and Old Coso Village. The adit is shown as N-405 on Figure 6 and is in the SW1/4, NE1/4, NE1/4 of Sec. 34, T21S, R39E, MDB&M.

The property was explored by a 52-foot-long adit as is shown in Figure 199. The adit was driven just below a Tertiary basalt flow and exposes unconsolidated, well sorted sediments. The prospector could have been looking for a pumice deposit; there are others along the east side of Coso Wash that are capped by basalt flows. However, no identifiable mineralization could be found.

Crownite Corporation Pumice Deposit (N-409)

A small quarry is located within the Coso Volcanic field approximately 1.4 miles southwest of Cactus Peak and 2.8 miles northwest of Devil's Kitchen. It is shown as N-409 on Figure 5 and is on surveyed land in the W1/2, SW1/4, NW1/4 of Sec. 36, T21S, R38E, MDB&M.

The quarry is approximately 100 feet along a north-south direction and 50 feet wide. It is approximately 15 feet deep and accounts for the removal of approximately 2780 cubic yards. It is developed on the eastern portion of a larger deposit known as the Donna Group, which exists outside the NWC boundary. The area is shown in Figure 200, which is taken directly from Chesterman.[23]

Straight Line Pumice (N-410)

This prospect is located approximately 1.6 miles south-southeast of the Cactus Peak VABM, 2 miles west-northwest of Coso Hot Springs, and 1.4 miles north of Devil's Kitchen. The claim is shown as N-410 on Figure 5. It lies on surveyed land in the S1/2, SE1/4, SE1/4 and S1/2, SW1/4, SE1/4 of Sec. 31, T21S, R39E and continues into the N1/2, NE1/4, NE1/4 and N1/2, NW1/4, NW1/4 of Sec. 16, T22S, R39E, MDB&M.

The NWC legal archives indicate that this claim was co-owned by Irma and B. J. Compton, Gene Delaney, Roy Hooper, W. H. Montgomery, Harold and Irma Olson, and R. R. Walker. The original working has been

[23]Ibid., p. 20.

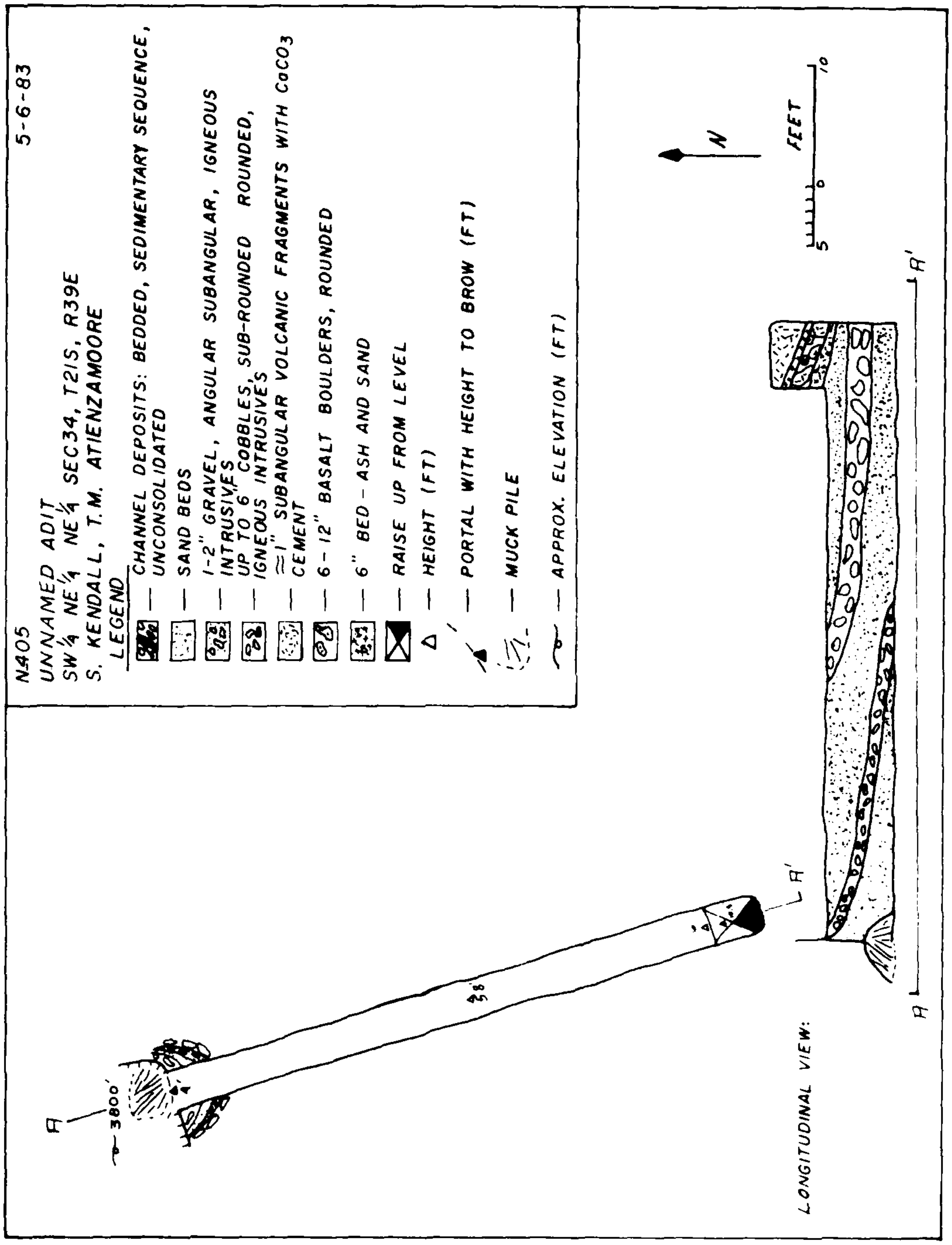

Figure 199. Plan view of the adit at site N-405.

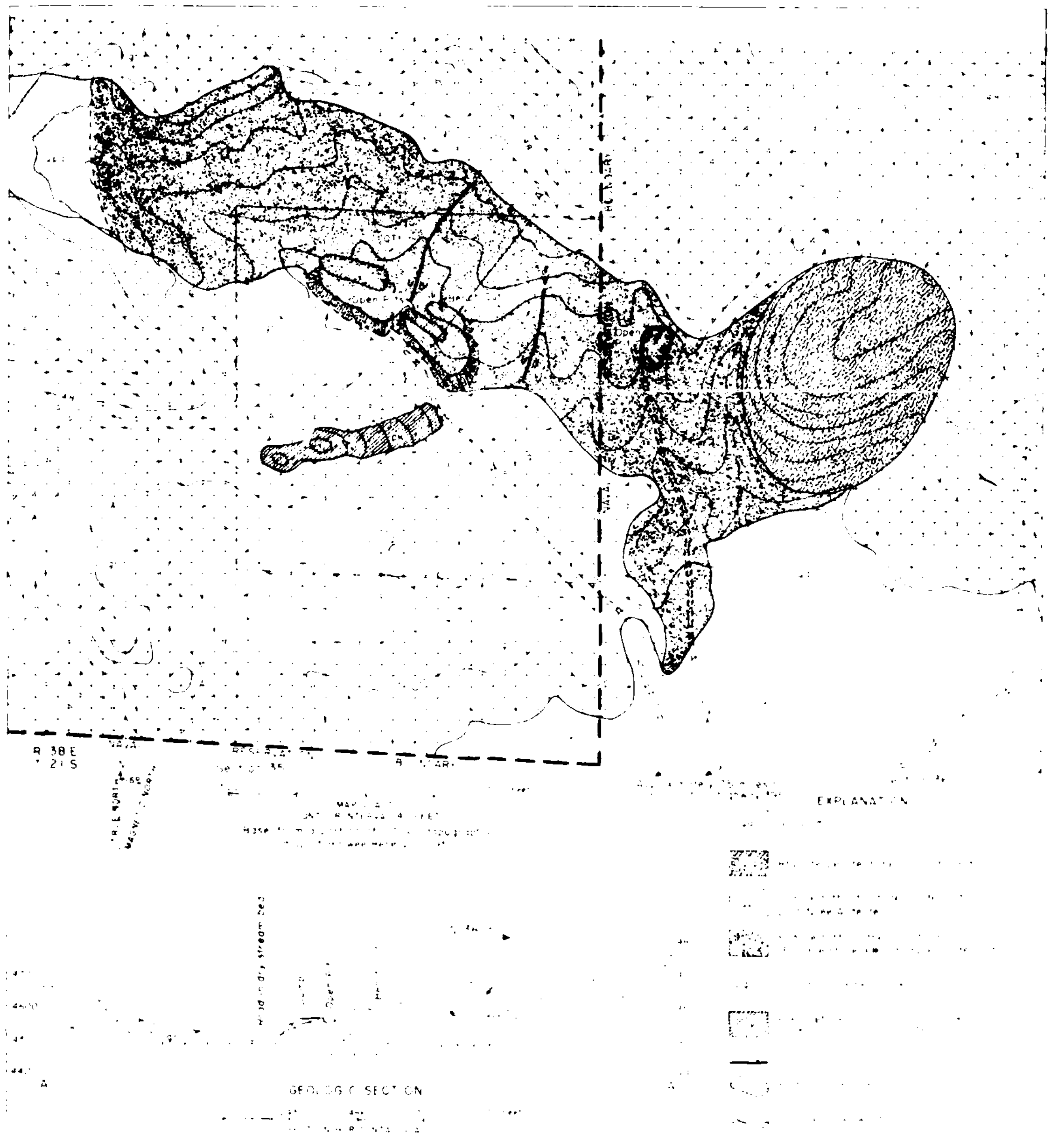

Figure 200. Surface map of the Donna Group and vicinity (N-409).

obliterated by the 1978 site preparations for the Department of Energy Well CEGH-1 (Coso Geothermal Exploration Hole No. 1). The deposit in this area appears to be less pure than those to the west, containing more fragments of obsidian. This is a reworked pyroclastic deposit of Quaternary age and not a commercial-grade Tertiary deposit.

East Pumice Prospects (N-701)

This group of prospects is located approximately 1.9 miles east-southeast of Coso Hot Springs and encompasses most of the W1/2 of Sec. 11, T22S, R39E, MDB&M. The claim group is shown as N-701 on Figure 6 and consists of five claims. The names of the claims are followed by the NOTS Condemnation Case Numbers in parentheses. World Beater No. 1 (Case No. 418) is located in the N1/2, NW1/4, NW1/4 of Sec. 11. World Beater No. 2 (Case No. 499) is located in the S1/2, SW1/4, SW1/4 of Sec. 11. These two claims were owned by J. H. Buckner, Wm. Oliver, Garfield and Mabel Hopps, Leita and Roy N. Rousey, Ed and M. E. Schober, John Shedd and C. G. VanNess. White Elephant No. 1 (Case No. 417) is located in the S1/2, NE1/4, NW1/4 of Sec. 11. White Elephant No. 2 (Case No. 501) is located in the N1/2, NE1/4, SW1/4 of Sec. 11. These two claims were owned by Irene and W. T. Baird, Lizzie and John Graves, Gloria Hopps, John and Sophia S. Lilley, and Delia Schober. Many of these people were, at one time, residents of the Coso Hot Springs area. White Pumice No. 2 (Case No. 500) is located in the SE1/4, NW1/4 of Sec. 11 and was the only producer among the group. It was co-owned by Gerald C. Hidecker and the American Pumice Co., but it was operated by the American Pumice Co.

The prospect pit at White Pumice No. 2 exposes a deposit that is a maximum 15 feet thick. The western half of the claim is covered by 2 to 3 feet of reworked surface material. The deposit is at best 1050 feet wide by 3200 feet long and contains approximately 2.5×10^6 cubic yards of material.

Unnamed Pumice Prospect (N-716)

The property is located approximately 1.9 miles southwest of the Cactus Peak VABM in the NW1/4, NW1/4, NW1/4 of Sec. 1, T22S, R39E, MDB&M, shown as N-716 on Figure 5. It appears to be the loading area of the quarrying operation in Sec. 35, T21S, R38E. The ramps and haulage way are cut into the pumice deposit to a depth of approximately 10 feet; the deposit has an estimated average thickness of 10 to 15 feet and may extend onto Navy-controlled lands to cover as much as 1/3 of Section 1.

ARGUS DISTRICT

Mountain Springs Canyon Area: Pumice

Tired Boy Mine (N-1201)

The site of the Tired Boy pumice mine, previously owned by the American Pumice Co. (NOTS Condemnation Case No. 400), is located in the SE1/4, SW1/4, NE1/4 of Sec. 3, T23S, R40E, MDB&M. It lies west of Renegade Canyon and is approximately 1.5 miles south of the Volcano Butte VABM and is shown as N-1201 on Figure 9.

The property was developed by two separate room and pillar mines that expose an air-fall pumice deposit estimated to be a maximum of 1500 feet long east-west by 700 feet wide and 40 feet thick. The deposit is overlain by 5- to 8-foot thick Pleistocene basalt flow associated with nearby Volcano Butte. The workings are shown in Figure 201, which was taken from "A Reconnaissance Survey of Potential Underground Shelter Near Indian Wells Valley," by Austin and Pringle in 1963. The workings cover approximately 70% of the estimated extent of the deposit. An estimated 9.3×10^5 cubic yards of pumice remain at this site as both undeveloped resources and pillars.

White Gold, White Gold Extension, and White Gold Placer (N-1202 and N-1203)

This site, once controlled by the American Pumice Co. (NOTS Condemnation Case Nos. 401, 402, 493, and 494), is located approximately 2.3 miles southeast of the Volcano Butte VABM and 4.6 miles west-northwest of Mammoth Mine in the SW1/4, NE1/4, SW1/4 of Sec. 1, T22S, R41E, MDB&M. It is shown as N-1202 on Figure 9.

The property was developed by one large room and pillar working and two short adits that expose an air-fall pumice deposit. The deposit is overlain by approximately 6 to 8 feet of Pleistocene basalt and underlain by Mesozoic granitic rock. The deposit is a maximum of 700 feet long east-west, 500 feet wide, and approximately 30 feet deep. Approximately 50% of of the total volume of the deposit, or 2×10^5 cubic yards has been mined.

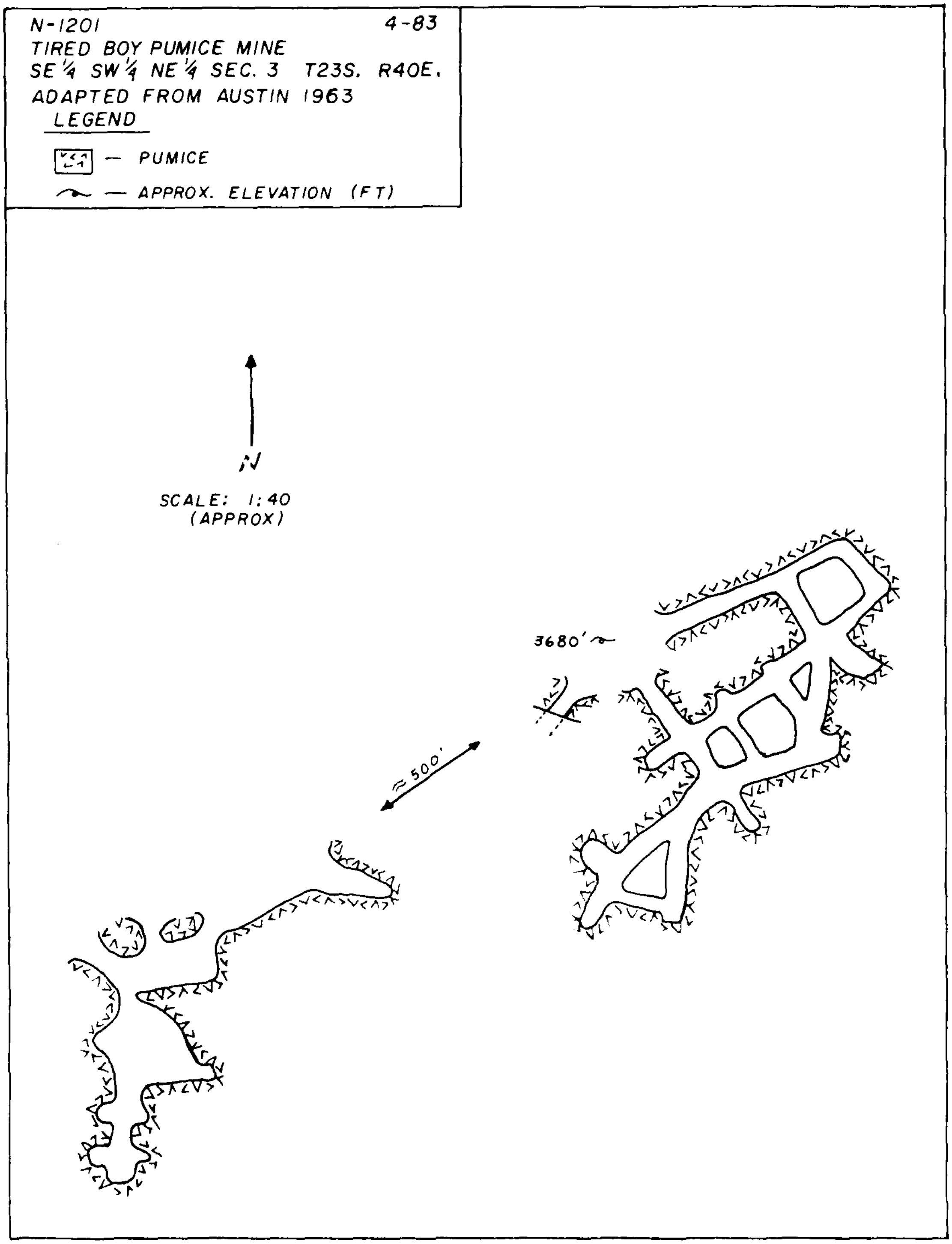

Figure 201. Detail of the underground workings, Tired Boy Mine.

The reserves of previously worked NWC pumice deposits totals 1.5 x 10^7 cubic yards. In addition, there are large surface outcrops of these Tertiary air-fall pumice deposits northeast of Upper Cactus Flats (Figure 3). These deposits have an estimated production potential of 6.3 x 10^7 cubic yards with an estimated average thickness of 20 feet.

Although these are commercial grade deposits, there are a number of localities along the western flank of the Coso Range, and outside the Center boundaries that are capable of producing this quality of pumice. These sites are being commercially exploited. They are, however, only sporadically worked during periods of maximum market favorability because of their distance from the market place—the Los Angeles area.

Mountain Springs Canyon Area: Cinder

Volcanic Cinder Cone (N-1710)

A cinder cone is situated along the Argus Range front and located 1.2 miles south of the mouth of Wilson Canyon as shown on Figure 9. It is placed in the SE1/4, NE1/4, SW1/4, Sec. 7, T24S, R41E, MDB&M.

This Tertiary volcanic feature consists of reddish to black basaltic cinder ranging from lapilli to large volcanic bombs. The material apparently emanated from a vent along a range-front fault that borders the west side of the Argus Range. The cone rests upon the Mesozoic granitic rocks of the Argus Range and measures approximately 160 feet high by 800 feet wide. True thickness of the deposit is uncertain, but measurements taken in the large trench area on the southern flank of the cone indicate a thickness of at least 35 feet.

The large trench or patio area was measured, and a total of approximately 3500 cubic yards of material was mined. It would appear that most of the material was moved for NWC testing purposes. A small amount of it was used as shock attenuation pads in early development of the Walleye warhead. Some cinder material may have been removed for use as road aggregate.

The cinder exposed by trenching is generally of adequate quality for road aggregate or decorative rock. The material at the westerly end of the trench could be removed easily and produced without the need of crushing. The material to the east contains much solid material as bombs and competent beds and would require crushing.

This deposit contains a source for cinder material of adequate quality for use in the building and construction industries but is a very small deposit. Larger sources of equal or better quality material are situated outside NWC property at numerous localities.

Burro Canyon Area: Aggregate

D. G. Quarry (N-2302)

The D. G. Pit (decomposed granite) is located in T27S, R41E, MDB&M, about 2.6 miles south of Lone Butte and 1000 feet north of Highway 178. It has been dug in fractured and spheroidally weathered biotite/hornblende quartz diorite of Mesozoic age. The rock is medium- to coarse-grained with sparse xenoliths of fine grained diorite. One small area in the southwest pit shows moderate iron and copper sulfide nodule emplacement. The nodules have been oxidized to a limonite core with a copper oxide margin.

Two mafic dikes intrude the quartz diorite pluton. Both occur in the north central part of the outcrop. One trends N65E, dips northerly, and is about 1 foot thick; the other is up to 2.5 feet thick, trends N75E, and dips south at 75 to 80 degrees.

In the pits, blocks of more resistant or unfractured rock occur, ranging in size from a few inches up to 18 by 10 by 10 feet. As much as 70% of the material, however, is decomposed. That is, the cement attaching the component crystals to one another has been removed by weathering processes. This is the material being quarried. It has been used as a substrate additive for roadbeds and parking lots throughout the Center. It adds body and compactability to the sandy surface materials over which the roads must be built.

This site is one of several scattered around the south Argus Range from which roadbed material is quarried. Some also contain decomposed rock, while others are dug in alluvial gravels. All are small and have limited potential.

REPORTED OCCURRENCES NOT LOCATABLE ON THE GROUND

Several references to prospect or claim locations were noted during the Level 1 survey that were not substantiated during the subsequent field check. Some are placer claims that were located and probably worked, but evidence of small-scale placering operations such as these is easily washed away by the occasional flashfloods that occur in this region. Other claims may have been staked but never worked, while still others may have been recorded at the Inyo County courthouse at Independence but never located on the ground.

The Chloride Claim (N-1315) is a good example of these "lost" claims. It is listed as a gold lode claim in the NOTS legal archives and on the published list of validated claims. Its location is reported as being in Sec. 24, T23S, R41E, MDB&M, which is in the Argus

Range in an area of Mesozoic granitic intrusives. A search of the section, on foot, failed to turn up evidence of workings, claim markers, or mineralized quartz veins.

A list of all the claims or prospects for which references were identified during the literature search but could not be verified in the field is given as Table F-1. One other claim group warrants special mention-the Baxter patented claims.

These claims occupy the NW1/4, the W1/2 NE1/4, and the N1/2 SW1/4 of Sec. 26, T24S, R39E, MDB&M, and were patented in 1926 by a Dr. Todd Baxter. It was discovered by the Western Division Naval Facilities Engineering Command during a recent mineral estate study of the acquired lands of NWC that the Baxter claims were not purchased during the Condemnation Proceedings in the 1940s.

A field check of the area was done with, essentially, negative results. Except for a single claim post (without a claim notice), no evidence of any digging or surface structure was found. The area is underlain by Pleistocene and Recent alluvial and lacustrine sediments. As evidenced by other prospects in the area, there is little economic potential in these deposits for gold placers, aggregate, or evaporites. It is not possible to determine on what basis these claims were patented from what can be seen on the ground.

GEOTHERMAL RESOURCES - COSO KGRA

The most significant mineral resource of the China Lake Complex of NWC is the Coso Known Geothermal Resource Area (KGRA). The area consists of approximately 165 square miles, most of which (112 square miles) lies within NWC boundaries. Estimates of power potential have ranged from 650 megawatts electrical (MWe) (Muffler, 1979)[24] to 1360 MWe (Nathenson and Muffler, 1975).[25] Figure 202 shows the general location of the Coso KGRA and the potential geothermal areas within the Complex.

[24]United States Geological Survey. *Assessment of Geothermal Resources of the United States - 1978*, by L. J. P. Muffler. U.S.G.S. Circular 790, 1979.

[25]United States Geological Survey. "Geothermal Resources in Hydrothermal Convection Systems and Conduction-Dominated Areas," by M. Nathenson and L. J. P. Muffler, in *Assessment of Geothermal Resources of the United States - 1975*, ed. by D. F. White and D. L. Williams. U.S.G.S. Circular 726, 1975, pp. 104-121.

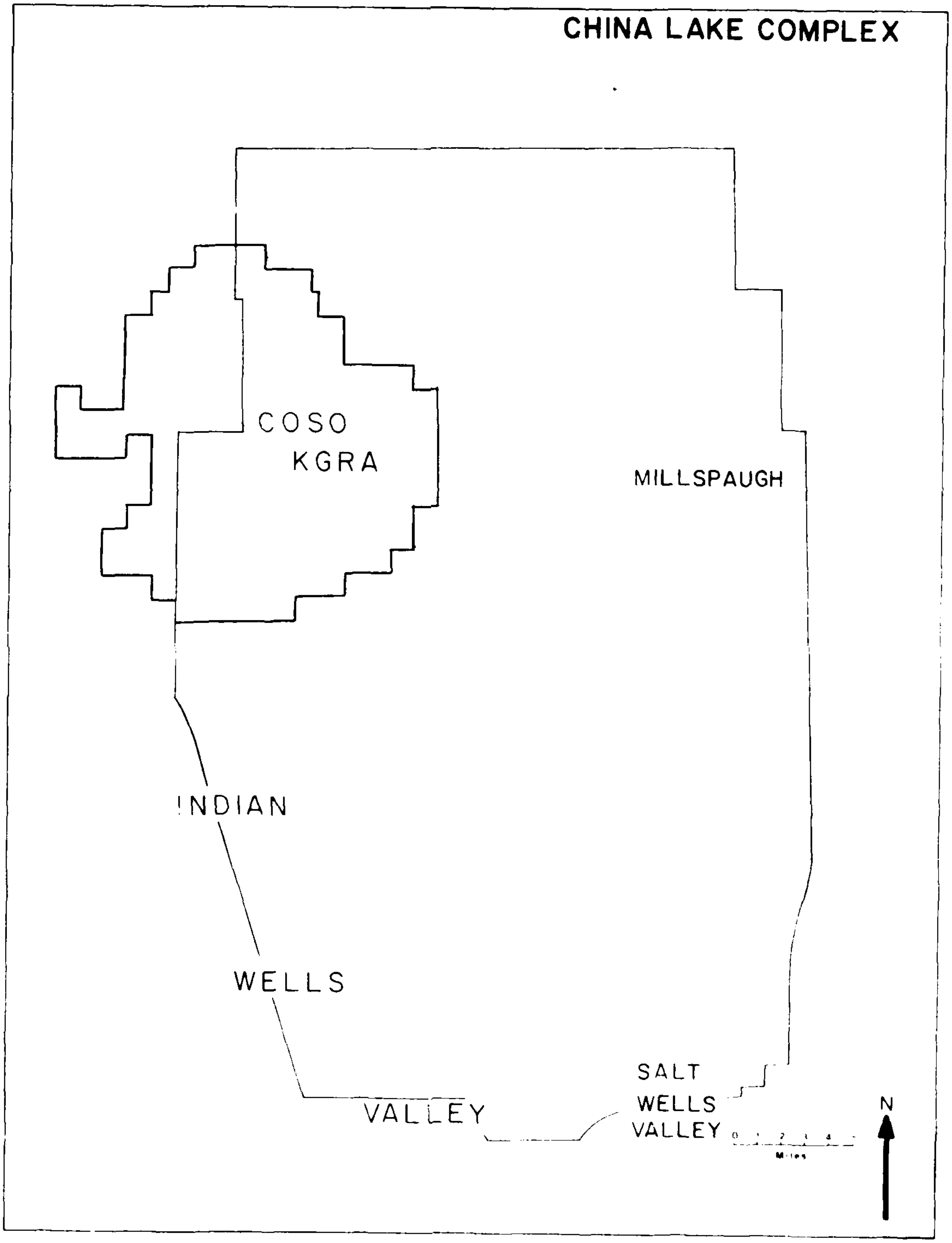

Figure 202. Areas of Geothermal occurence, known and potential.

The first recognition of the Coso area as having geothermal power potential was by H. N. Siegfried (1925).[26] The potential of the area was first noted by NOTS personnel in 1963 (Austin, 1963).[27] It was noted then that this potential could cause political pressure to allow development by industry and that the resulting encroachment could seriously affect the ability of the NOTS/NWC Command to perform its Mission. It was further noted that geothermal potential exists at other naval facilites as well.

To assess the geothermal potential of Navy lands while preventing encroachment, and to ensure the orderly development of resources under Navy control (resources large enough to have a significant effect on the National Energy Inventory), the Geothermal Utilization Division, Public Works Department was established at NWC in March 1977. A rider to the Military Construction Authorization Act of 1980 allowed the Navy to develop geothermal resources under acquired lands for its own use.

Under the Geothermal Steam Act of 1970, the U.S. Geological Survey was to designate favorable lands for geothermal development as Known Geothermal Resource Areas (U.S. Department of the Interior, May, 1975).[28] Coso was so designated. The Navy controlled area of the Coso KGRA was such that commercial development was deemed feasible, provided leases contained stipulations to ensure protection of the Center Mission, security, and safety. A Memorandum of Understanding between the Secretary of the Navy and the Secretary of the Interior was signed to allow the Bureau of Land Mangement to lease certain Navy-controlled lands within the KGRA for commercial geothermal development. On 15 September 1981 a bid opening was held, and leases were granted to four companies.

A request for Technical Proposal was issued allowing California Energy Company, Inc. (CECI), Santa Rosa, to explore and develop about 4 square miles and, if successful, to build a power plant at no cost to the Navy. The power supplied would always cost less than local utility power and the Navy would buy power for the remaining portion of the 30-year contract. A rider to the Military Construction Authorization Act of 1981 allowed the Navy to develop withdrawn land. (Both

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[26]Geothermal Resources Council. Untitled article by H. N. Siegfried, in *Geothermal Exploration in the First Quarter Centery,* ed. by D. N. Anderson and B. A. Hall. Special Report 3, 1925, 191 pp.

[27]U.S. Naval Ordnance Test Station. *Coso Hot Springs—A Geologic Challenge,* by C. F. Austin. China Lake, Calif., NOTS, 1964. (TS 64-18, publication UNCLASSIFIED.)

[28]U.S. Department of the Interior, U.S. Geological Survey. *Geothermal Steam Act of 1970 and Regulations on the Leasing of Geothermal Resources.* Washington, D.C., USGS, 19, 44 pp.

the 1980 and 1981 riders have been codified as 10 U.S.C 2689). An additional area of 4 square miles has been added to the CECI contract. Development for the Navy by CECI is targeted for 75 MWe, initially.

The Coso Mountains in the KGRA consist of a horst of Sierra granites with their associated metamorphics, containing basaltic cinder cones and flows and rhyolite/perlite domes. Surface thermal manifestations include boiling mud pots, a boiling spring, steaming ground, sulfuratic and hematitic alteration, current deposition of sulfur and cinnabar, and snow melt patterns.

Literature on the region is extensive; however, the references in this section will be minimal. The Geothermal Utilization Divison maintains a Coso bibliography on open file to the public.

Prior to withdrawal, the area was used as two hot springs resorts and several cinnabar prospects and mines. Some wells were drilled for steam for use at the resorts, and some exploratory drilling for minerals was also done. The first geothermal hole (Coso Well 1) was drilled by NWC under the supervision of Dr. Carl Austin in 1967. This 374-foot-deep hole had a maximum temperature of 288°F. It did not flow, but samples of the geothermal fluid were recovered. In 1977, the Department of Energy drilled Coso Geothermal Exploratory Hole Number 1 (CGEH-1) to a depth of 4854 feet. Unfortunately the hottest portion of the hole (-1875 to -2700 feet) was cased over (Galbraith, 1978)[29] and some 346 tons of mud, lost-circulation materials, and other insolubles were lost in the hole, The well did not flow. A maximum temperature of 383°F was obtained, and additional reservoir fluids were successfully recovered.

In 1981-1982, CECI drilled six wells, all of which produced steam and/or hot water. While CECI has not released any details of the reservoir, the discovery well produced 170,000 lb/hour of steam at 413°F (Oil and Gas Journal).[30] It is anticipated that CECI will have its first power plant on line in September 1985.

The source of the heat appears to be a magma chamber centered beneath Sugarload Mountain (Fournier and Thompson, 1980).[31] The youngest rhyolite is 41,000 years old (Diffield and others, 1980,

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[29]Robert M. Galbraith. *Geological and Geophysical Analysis of Coso Geothermal Exploration Hole No. 1 (CGEH-1), Coso Hot Springs KGRA, California*. Department of Energy Report, Contract EG-78-C-07-1701, May 1978.

[30]Oil and Gas Journal, 15 February 1982.

[31]United States Geological Survey. *Recharge Area for the Coso, California Geothermal System, Deduced From δD and δ^{18}O in Thermal and Non-Thermal Waters in the Region*, by R. O. Fournier and J. M. Thompson, Open File Report 80-454, 1980, 25 pp.

1981).[32,33] The water is meteoric, and the recharge area is in the Sierra Nevada to the west (Fournier and Thompson, 1980).[31] Permeability is enhanced by fractures and normal faults that trend in a north-northeast direction. An analysis of waters from several of the thermal wells can be seen in Table G-3.

WATER RESOURCES

Water for the NWC China Lake Complex facilites is supplied by 11 wells that tap aquifers in the Indian Wells Valley, The aquifers consist of interbedded continental sands and gravels, and the potable water they contain is separated from saline surface waters and deeper brackish waters by the confining clay beds above and below. Although the topographic basin area is 1152 square miles and includes parts of the Sierra Nevada, Coso Mountains, Argus Mountains, and the El Paso Mountains/Radamacher Hills, the recharge comes from a much larger area due to steep hydrologic gradients from west of the Sierran Crest, as verified by isotope analyses of recharge waters. Analysis of the well waters is given in Table G-1.

Water in remote areas of the complex is supplied by natural springs, most of which have intermittent flow. This flow is sufficient, however, to satisfy the need of the local wildlife population as well as some of the nearby human population. The mining town of Darwin, Calif. (population approximately 36), which is located about 2.5 miles north of the Complex, receives water, via a pipline, from Coso Cold Springs. Analysis of water from this and other springs within the complex is listed in Table G-2.

RESOURCE POTENTIAL

Metallic Minerals

The area now covered by the China Lake Complex was extensively surface-prospected during the period of 1870 through 1940. The prevailing exploration philosophy of the time in this region of California centered primarily around hydrothermal gold-bearing quartz, especially where granitic rocks predominate. Within the Complex boundaries the

[32]C. R. Bacon, W. Al Duffield, and K. Nakamura. "Distruction of Quaternary Rhyolite Domes of the Coso Range, California: Implications for Extent of the Geothermal Assembly," in *Journal of Geophysical Research,* Vol. 85, No. B5, 10 May 1980, pp. 2425-33.

[33]United States Geological Survey. *Geologic Map of the Coso Volcanic Field and Adjacent Areas, Inyo County, California,* by W. A. Duffield and C. R. Bacon. Miscellaneous Investigations Series, Map I-1200, 1981.

hydrothermal quartz occurs as narrow and discontinuous veins and lenses of insignificant economic potential in widely scattered northwest-to-northeast-trending shear zones and dike/pluton contacts.

Very few mineralized outcrops were located during this minerals survey that did not show at least some evidence of former exploration activity. The two largest of the apparently unprospected outcrops are located in the NE1/4 of Sec. 22, T20S, R40E, MDB&M, between Coso Cold Springs and China Gardens Spring. They consist of two parallel, east-west-striking veins of rose quartz within a Mesozoic leucogranite host rock. The quartz veins are 1.5 feet in width and outcrop discontinuously along strike for about 75 feet. Because the quartz present is free of pyrite and chalcopyrite and other evidence typical of trace gold mineralization in this area, no samples were taken and no mineral potential is believed to exist. Considering the easy access to this site and the large number of prospects in this area, especially to the west around Old Coso Village, it is likely that these outcrops were observed in the past, sampled and assayed, and found to be without commercial value.

No other areas were observed within the China Lake Complex that indicate hydrothermal quartz targets with greater potential for a commercial gold deposit. In addition, no evidence was found that would indicate a potential for other major types of gold occurrence, such as a disseminated stock work system or a large tonnage placer deposit.

Silver occurs at the Argus-Sterling Mine in association with lead and zinc minerals in a limestone host rock. This mine is located in the northeast corner of the Complex at the south end of the north Argus Range and is very similar, geologically, to the lead-silver-zinc deposits of the New Coso District (Darwin) immediately north of NWC. These deposits are mesothermal replacement systems in fractured Paleozoic limestones. No evidence was found, either near the Argus Sterling Mine or at any other site, that would indicate a potential for a large tonnage deposit of this type on the Center.

Tungsten and molybdenum occur within the China Lake Complex as scheelite/powellite in garnet tactites of contact metasomatic origin. These tactites occur as thin, discontinuous replacement zones in small limestone roof pendants at or near contacts with granitic intrusives. None of the prospected tactite occurrences contained sufficient grade or tonnage to be of commercial interest, and there is no demonstrable geologic reason to expect that the occurrence will be of a more commercial quality in the unexplored portions of the zones.

Although numerous iron occurrences have been prospected and developed throughout the China Lake Complex, none contains grade and tonnages of commercial value. The market for iron produced in these areas was limited to local precious metal smelting operations, all of which are now abandoned. A small number of both shear zone and contact metasomatic iron deposits may exist on the Center, but there are no identifiable geologic targets of commercial value.

The occurrence of mercury within the Complex is restricted to the residual siliceous acid sulfate alteration zones and hydrothermally altered country rock at the hot springs deposits within the coso KGRA. The exposed occurrence is low grade, is only a few feet thick, and is of no commercial value. There is no evidence that would indicate a potential for a commercial deposit in the deeper sections of the alteration zones.

While a potentially commercial uranium deposit occurs along a north-south trend in the Tertiary Coso formation just outside the northwest boundary of the China Lake Complex, this trend does not extend onto Navy-controlled land. An unexplored potential does exist for uranium mineralization associated with other metals (mercury, antimony, arsenic, gold, etc.) in the peripheral fractures of the active epithermal system of the Coso KGRA and the relict system of the Shepherd Canyon spring terrace deposits. It is unlikely, however, that this occurrence would have commercial mineral potential.

The potential for commercial deposits of other strategic minerals, such as tin, antimony, cobalt, and nickel is also low within the China Lake Complex. In order to determine if this potential could be established for the primary geologic environment of the Center (hydrothermal quartz veins in granitic intrusives) without analyzing every sample taken, a representative site was selected at the beginning of the project and all samples gathered at the site were analyzed for a variety of strategic minerals. The site was the Star of the West Mine, and a complete list of analyses for the 20 samples is given in Table H-1. No significant concentrations of any strategic minerals were encountered, so that it was deemed unnecessary to analyze the majority of the samples for anything but the primary minerals prospected.

Three exceptions to this decision will be noted:

1. All of the tactite samples were analyzed for beryllium (Table C-1) because beryllium is known to occur in economic concentrations in some garnet tactites in New Mexico. No beryllium was found in any sample.

2. Two samples were analyzed for tin at an iron prospect (N-1005). This was done because the site was rumored to be a tin prospect. The analyses showed no tin values (Table D-1).

3. A sample at site N-247 was analyzed for copper and zinc because of the visibly high concentration of secondary copper minerals across the entire 4.5-foot width of the zone (Table 8).

Another reason for the low potential for the economic occurrence of some of the strategic minerals, especially cobalt, nickel and chromium, is that the geologic environment within which these minerals normally occur in economic concentrations is not exposed within the Complex boundaries. Except for relatively narrow and scattered mafic dikes, virtually no basic or ultrabasic intrusive rocks are present on the surface beyond two small gabbro plugs.

NONMETALIC MINERALS

Travertine Southeast of Millspaugh

An undeveloped travertine deposit is situated 1.5 miles southeast of the old Millspaugh town site. It is placed in the NW1/4, SW1/4, SW1/4, Sec. 10, T22S, R42E, MDB&M.

Two distinctive beds of travertine are interbedded with limestone and limestone conglomerate that outcrop on the west, south, and east sides of a small Tertiary andesite neck.

The travertine is present in two parallel beds that strike generally north-south and dip 25 to 30 degrees easterly. The upper bed is 6 to 8 feet thick and can be followed along strike for 80 to 100 feet. The lower bed is separated from the upper bed by 50 to 75 feet of limestone and is 10 to 12 feet in thickness. It can be followed continuously for approximately 100 feet along strike.

The travertine is "buff-colored" to brown and most is heavily stained with limonite. It is composed predominantly of calcite in concentrically layered bands in algal pisolites and as tube-shaped algal casts to 1 inch or more in diameter. The tubes are generally hollow, and the spaces around the tubes and pisolites are fractured and clay-filled causing hand specimens to break with a minimum amount of pressure.

The deposit is capable of producing approximately 1300 cubic yards of material (if the deposit is assumed to continue up-dip for 20 feet). However, as a gemstone, the brownish color, softness, and amount of open spaces in the pisolites under the travertine is undesirable. As a source of industrial limestone or marble, this deposit is of low commercial value because of fairly extensive silicification of the limestones and the abundance of clay and limonite impurities in the travertine.

Perlite and Pumice

Perlite and pumice are distributed throughout the northwest portion of the China Lake Complex in varying extents and thicknesses. Although these areas are of potential commercial value, extensive deposits of equal or superior quality are currently being developed off withdrawn lands to the northwest of the Center.

Evaporites

Evaporite minerals occur within the playa lake sediments in Indian Wells Valley. As indicated by the sample analyses in Table E-1 the surface minerals are carbonates, chlorides, and sulfates, with traces of phosphates, nitrates, borates, lithium, and strontium. Two of the samples were taken from the China Lake sediments. Sample N-2115-1 is of surface encrustations, and sample N-2115-2 is of near-surface sediments underlying the encrustations. The analyses indicate that the crystalline crusts are primarily sodium chloride with lesser carbonates, while the underlying sediments (sandy silts) contain much more carbonate and fewer salts. Visual examination of the crystal material also showed that there is abundant fine quartz sand caught up in it.

Table E-2 shows the average composition of brine filling interstices of the crystal body, Searles Lake. A comparision of this table with the analyses of the samples obtained during this survey indicate close similarities in the mineralogy of the China Lake basin and Seales Lake, but that the mineral concentrations at Searles Lake are considerably higher than the average for the survey samples.

Subsurface exploration has been conducted only in the form of deep recovery operations of weapon impacts on the playa lakes. A few gypsum and ulexite crystals were seen in the resulting craters. In addition, one deep drill hole has been drilled in the White Hills. The indicated potential for evaporite beds or lithium minerals resources is considered low, however, because of the proximity of the Sierra Nevada that was the sediment source that kept the China Lake basin filled during subsidence. The bitter salts that leached from the Coso geothermal system and that were brought in from drainage systems to the north are considered to have been lost to the lower Searles basin.

GEOTHERMAL

Indian Wells Valley

Possible geothermal potential in Indian Wells Valley is indicated by warm wells, wells that produce water with hydrogen sulfide contents high enough to have an unpleasant odor, fossil hot spring deposits in the vicinity of Richmond Elementary School and the Commissioned Officer's Mess, Naval Weapons Center China Lake and suggestive structural features on satellite photographs.

The mean air temperature at China Lake (1945-79) is 64.8°F (18.2°C). Looking at water temperatures as measured throughout the valley, the mean is about 23.6°C so that wells are considered warm if they have temperatures about 24°C.

Summary data on the warm wells are given in Table I-1. These data are compiled from Kunkel and others (1954),[34] Kunkel (1963),[35] and Warner (1975).[36] An isotherm contour map of well water temperatures is shown as Figure 203.

Dutcher and Moyle (1973)[37] note that in a general way the western portion of Indian Wells Valley is underlain by an unconfined deep sweet water aquifer, which becomes confined by impermeable clay beds to the east. On the east side of the valley, a shallow aquifer of poor water quality is present above the confining clay beds. The confining beds were positioned by a concealed fault that prevents the migration of shallow aquifer waters from the east. This is called the China Lake Barrier.

All of the warm wells penetrate the deep aquifer. It is apparent from the map (Figure 203) and Table I-1 that, overall, the deep aquifer is warmer than the shallow aquifer. The warm wells are structurally

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[34] F. Kunkel, G. H. Chase, and W. J. Hiltgen. *Open-File Appendix Tables of Selected Data to Accompany U.S.G.S. Closed-File Report on Geology and Ground Water of the Inyokern Naval Ordnance Test Station and Vicinity.* 1954.

[35] F. Kunkel. "Data on Water wells in Indian Wells Valley Area, Inyo, Kern, and San Bernardino Counties, California." *California Department of Water Resources Bulletin No. 91-9,* 1963, 243 pp.

[36] I. W. Warner. *Ground Water Quality in Indian Wells Valley, California.* U.S.G.S. Water Resources Investigation 8-75, 1975, 59 pp.

[37] L. C. Dutcher and W. R. Moyle, Jr. *Geologic and Hydrologic Features of Indian Wells Valley California.* U.S.G.S. Water Supply Paper 2007, 1973, 30 pp.

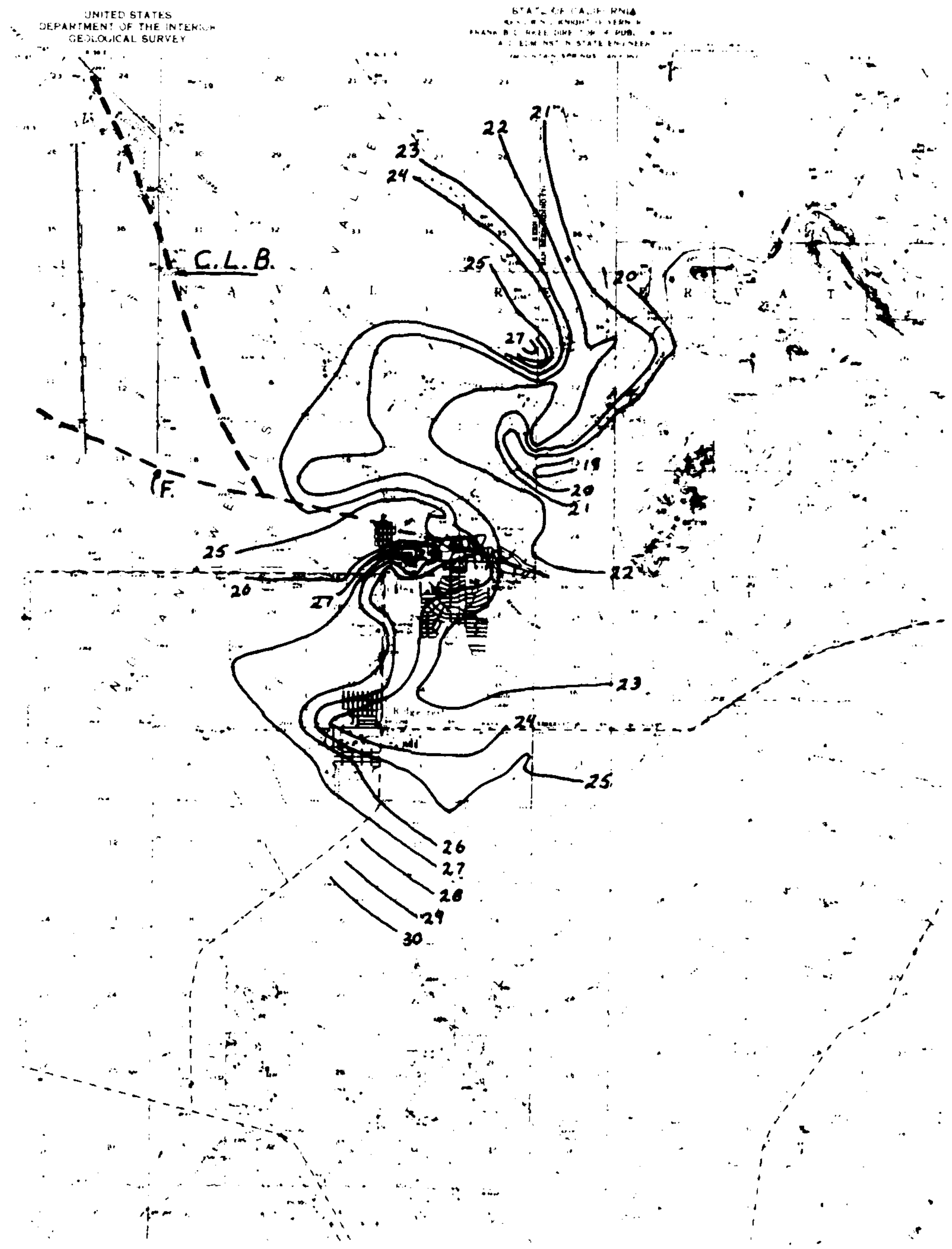

Figure 203. Isotemp contour map of well water temperature, Indian Wells Valley.

controlled. One set of wells is along the east-trending fault that cuts off the China Lake Barrier. This trend probably controls the fossil hot spring deposits. Another set of wells is related to Sierra frontal faults. The warm area south of Ridgecrest is probably related to the complex faulting along the north side of the Rademacher Hills. Only the hot spot 2 miles east of Armitage Airfield is not obviously structurally controlled.

The wells that produce water with a strong hydrogen sulfide odor form a narrow northwest-trending zone over 3 miles long west of Leliter.

All available well data were plotted on a piper diagram. It was hoped that some definite families of water would become apparent but none did.

Possible reservoir temperatures were calculated for all available analyses utilizing several geothermometers: the sodium-potassium (Na-K) (Truesdell, 1976),[38] the modified sodium-potassium (Na-K) (Fournier, 1979),[39] the sodium-potassium-calcium (Na-K-Ca) (Fournier and Truesdell, 1973),[40] the sodium-potassium-calcium-magnesium (Na-K-Ca-Mg) (Fournier and Potter, 1979),[41] sodium-potassium-calcium-carbonate (Na-K-Ca-CO_3) (Paces, 1975),[42] the quartz conductive cooling, and the chalcedony conductive cooling (Fournier, 1977).[43]

[38]A. H. Truesdell. "Summary of Section III Geochemical Techniques in Exploration," in *Proceedings, Second United Nations Symposium on the Development and Use of Geothermal Resources, San Francisco, California, USA, 20-29 May 1975*. Volume 1. Washington, D.C., U.S. Government Printing Office, 1976, pp. liii-lxxix.

[39]R. O. Fournier. "A Revised Equation for the Na/K Geothermometer," in *Expanding the Geothermal Frontier, Transactions Volume 3, Geothermal Resources Council Annual Meeting, 24-27 September 1979, Reno, Nevada*. Davis, Calif., Geothermal Resources Council September 1979, pp. 221-24.

[40]R. O. Fournier and A. H. Truesdell. "An Empirical Na-K-Ca Geothermometer for Natural Waters." *Geochimica et Cosmochimica Acta*, 37, 1973, pp. 1255-75.

[41]R. O. Fournier and R. W. Potter II. "Magnesium Correction to the Na-K-Ca Chemical Geothermometer." *Geochimica et Cosmochimica Acta*, 43, pp. 1543-50.

[42]T. Paces. "A Systematic Deviation From Na-K-Ca Geothermometer Below 75°C and Above 10^{-4} ATM P_{CO_2}." *Geochimica et Cosmochimica Acta*, 43, pp. 541-44.

[43]R. O. Fournier. "Chemical Geothermometers and Mixing Models for Geothermal Systems," in *Geothermics*, Volume 5, pp. 41-50.

Reservoir temperatures determined by the Na-K geothermometer ranged from -5 to 337°C and averaged 119°C. The modified Na-K geothermometer gave temperatures ranging from 46 to 327°C and averaged 157°C. The Na-K-Ca formula gave temperatures ranging from -15 to 289°C with an average of 101°C. The Na-K-Ca-Mg formula gave temperatures from -15 to 174°C with an average of 157°C.

The quartz, steam flashing, geothermometer gave temperatures from 51 to 122°C, with an average of 52°C; the quartz, conductive cooling, 43 to 123°C with an average of 88°C. The chalcedony, conductive cooling gave temperatures from 8 to 94°C with an average of 58°C. Because the alkaline metal-alkaline earth geothermometers are subject to distortion by the aquifer waters dissolving playa salts and because the silica formula never gives high determinations, the authors believe that the silica (quartz-chalcedony) geothermometers are probably the most reliable and the most geologically conservative. Because of the granite rocks in the Sierra Nevada and Spangler Hills, the authors believe that the quartz, conductive cooling, geothermometer would be applicable. It is doubtful that there is any steam flashing in this system.

For the warm wells, it was decided to determine what, if any, correlation exists between measured temperatures and chemical geothermometers. Least squares correlations utilizing linear, power, expotential, and logarithmic models were made between aquifer temperatures and various parameters. The parameters included measured aquifer temperature and calculated Na-K-Ca temperature, measured aquifer temperature and calculated Na-K-Ca-Mg temperature, measured aquifer temperature and quartz conductive cooling temperature, Na-K-Ca temperature and quartz conductive cooling temperature, and Na-K-Ca-Mg temperature and chalcedony conductive cooling temperature. No significant correlations were found. Neither the silica nor the chloride mixing models (Fournier, 1977)[43] are applicable to Indian Wells Valley aquifers. The chloride model requires boiling springs, and enthalpies of the warm well waters are too low to apply the silica model.

After combining the data, we determined that the following are the most probable conclusions.

1. There is a basement bedrock geothermal reservoir below the deep aquifer of Indian Wells Valley that is leaking geothermal fluids into the deep aquifer through faults, causing localized thermal plumes with resulting warm wells and a general heating of the aquifer as a whole.

2. The minimum temperature of the geothermal fluids leaking into the deep aquifer is 123°C. Based on deep aquifer water quality, the quantity of geothermal fluids leaking into the deep aquifer is small. Therefore, the expected temperature of the geothermal fluids that appear to occur beneath Indian Wells Valley is expected to be much above the predicted minimum.

Salt Wells Valley

The name Salt Wells Valley implies salt water wells that could indicate numerous geological settings such as (1) an aquifer intercepting a playa salt deposit, (2) salt water leakage from China Lake playa, or (3) an area in which the groundwater contains chloride-bearing leakage from a geothermal reservoir. Unfortunately only two water samples are available from Salt Wells Valley. Sample 26S/42E-29J1 was collected 29 June 1953 from a 30-foot well in Sec. 29, T26S, R42E, MDB&M (Kunkel, Chase and Hiltgen, 1954, p. 108)[34] and analyzed by the Department of Water Resources, State of California. This sample gives chemical geothermometer temperatures as follows: sodium-potassium, 95°C (Truesdell, 1976);[38] sodium-potassium modified, 139°C (Fournier, 1979);[39] sodium-potassium-calcium, 147°C (B = 1/3) (Fournier and Truesdell, 1973),[40] and sodium-potassium-calcium-magnesium, 106°C (Fournier and Potter, 1979).[41]

Kunkel and others (1954, p. 112)[34] describe a second sample as "rising water" in Salt Wells Canyon below the bridge at 26S/40E-28A. (The range must be 42E not 40E.) This sample gave a sodium-potassium temperature of 72°C, a sodium-potassium modified temperature of 119°C, a sodium-potassium-calcium temperature of 181°C (B = 1/3), and a sodium-potassium-calcium-magnesium temperature of 34°C. No silica analyses are available. Thus, it is indeterminable as to whether the apparent geothermal resource located in the vicinity of the Haystack extends under or is leaking into Salt Wells Valley, or if all of the chloride present is simply leakage from China Lake playa.

Millspaugh/Shepherd Canyon

An undeveloped travertine deposit outcrops on the west, south, and east sides of a small Tertiary volcanic neck that is situated about 1.5 miles southeast of the old Millspaugh town site in the NW1/4, SW1/4, SW1/4, Sec. 10, T22S, R42E, MDB&M.

Although considered by some to be a deposit found in terraces associated with lacustrine margin areas (Moore, 1976),[6] the travertine deposition may be intimately related to ground water or spring deposition. The limonitization of the travertine may indicate warm or hot spring deposition. There may also be spring or ground water associated with the weathering and porosity of the host limestones as a result of the fracturing and tilting of beds caused by volcanic activity.

Although there are no active thermal manifestations such as springs, the widespread abundance of opal and jasper in the spring terraces indicate a young geothermal system and should, therefore, represent a secondary target for geothermal exploration.

Water

There are adequate underground potable water supplies and natural springs to support the wildlife in the area as well as Center facilities and test activities. Water supplies in the northern portion of the Center are too restricted to support large-scale industrial development, but known supplies within the main Indian Wells Valley are sufficient for the present level of industrial development. If this development occurs, or if the population expands significantly, NWC can expect to be pressured to permit capture of water now stored beneath the southern portion of the Center as well as the water lost to the China Lake playa.

Oil and Gas

The potential for oil and gas production of a commercial nature from lands within the China Lake Complex of the Naval Weapons Center is negligible. The older marine sediments of the area have been intruded and intensely metamorphosed, and are largely converted to hornfels, tactites and marbles. The only area of even slight potential is the valley fill of Indian Wells Valley. This valley fill is relatively shallow, with a maximum depth of mixed lake beds and fanglomerates of some 5000 feet, being deepest near the western edge of the valley.

Persistent rumors of oil seeps and tar sands on the margins of Indian Wells Valley have been field checked in detail. In addition, a number of samples of supposed tar sands have been brought in to NWC scientists for examination through the years. In every case, those supposed seeps and tar sands have proven to be sands cemented with manganese oxide. This phenomenon, the segregation of manganese oxides into thin bands of interstitial cement, is a common shallow subsurface phenomenon that is being actively exposed by stream, wash, and gully formation of the past 60 years. The result is numerous black "tarry" appearing outcrops around the valley margin that are repeatedly "discovered" by hunters and hikers.

Indian Wells Valley was also the scene of a wildcat oil play prior to 1920. A wildcat well was attempted 4-1/2 miles south of the town of Inyokern in SW1/4, Sec. 16, T27S, R39E, MDB&M (Thompson, 1929).[44] This well was abandoned at a depth of 2100 feet after encountering only normal groundwater at 408 feet. No hydrocarbon shows were reported. This play did complicate land titles in the valley, however. To protect possible speculative interests, landowners who were aware of this wildcat venture often separated the surface and mineral estates as they sold

[44] D. G. Thompson, *The Mojave Desert Region, California*, U.S. Geological Survey Water Supply Paper No. 578, 1929, pp. 144-170.

farm lands for subdivision and development at the time of the development of the valley in response to the formation of the Naval Ordnance Test Station. The result is that considerable surface and mineral estate separation still exists in the valley.

There is a slight potential for methane production from the sediments of Indian Wells Valley for possible household or farmstead utilization. Water wells in a northwest-trending zone on the west side of the valley have encountered sufficient hydrogen sulfide to be a major nuisance to the homeowner, especially in the Leliter Road area just west of Brown Road (Sec. 1, T26S, R38E, MDB&M). This area appears to coincide with the margin of a thick clay or silt lens, though the linearity of the zone strongly suggests of fault boundary rather than a depositional boundary. In any event, this clay/silt lens contains organic trash, as evidenced by one recent water well that perforated a 3-foot diameter tree near the top of the lens. Decomposition of this organic trash could result in local methane accumulations and if a stratigraphic or fault controlled trap is present, locally producible methane is certainly possible. An analysis of the separated gasses from a water storage tank servicing a well near Leliter Road showed 12% methane. The sour nature of this methane (its H_2S content) limits its usefulness, however. There is some suggestion that the H_2S is fault controlled and may not be present throughout the clay/silt source bed for the methane so that wells slightly further north and east may be less sour in nature.

The evidence to date shows that the potential for producing usable methane is not only very low, but is limited to the western edge of Indian Wells Valley and is almost entirely outside of the base boundary. This low potential is further corroborated by the Kerr McGee well which perforated the clay lens at Sec. 17, T26S, R39E, MDB&M in 1983, finding no reportable hydrocarbons and the deep NOTS well drilled in 1965-66 in the White Hills in Sec. 2, T24S, R39E, MDB&M to a depth of 1800 plus feet, also found no macroscopic indications of hydrocarbons.

The conclusion reached is that the valley fill of the southern portion of the China Lake Complex has a very slight potential for small localized amounts of sour methane but the base has no potential at all for commercial scale production of oil or gas and NWC lands should not be considered to be of interest for the prospecting of these commodities.

CONCLUSIONS

Based on an examination of essentially all of the prospected or developed outcrops of metallic mineral occurrences within the China Lake Complex and a reconnaissance survey of the surface geology surrounding these prospects, the conclusion reached is that no presently demonstrable commercial potential exists at any of the previously worked sites. While scattered mineral occurrences that contain both precious and base metals are located within the Complex, none has presently exposed mineralization of commercial grade and tonnage.

A few hundred tons of moderate-grade ore could be recovered by family-scale or weekend miners from pillars and the remains of stoped-out lenses in a handful of small mines developed on widely scattered hydrothermal veins; specifically, gold ore from the Mariposa, Orion, Bonanza, and Star of the West Mines, and lead-silver-zinc ore from the Argus-Sterling Mine. At all of these mines except the Argus-Sterling, as with the smaller precious metal occurrences, the exposed mineralization appears in discontinuous and scattered quartz veins and lenses, and there is no demonstrable geologic reason to expect that the occurrence will be of a more commercial quality in the unexplored portions of these occurrences. At the Argus-Sterling Mine the deposition is present as scattered replacements of favorable bedding-fracture intersections.

The situation is essentially the same with contact metasomatic or replacement deposits of tungsten and iron. These occur as thin, discontinuous replacement zones in small limestone roof pendants at or near contact with granitic intrusives. These occurrences show neither the grade nor the tonnage necessary to be of commercial interest.

Mercury is present in small quantities as metacinnabar and cinnabar disseminated within the residual siliceous acid sulfate alteration zones and hydrothermally altered country rock at the hot springs deposits within the Coso KGRA. The three exposed zones of mineralization were explored extensively by drilling in the World War II era and have been shown to be of insufficient grade and tonnage to be of commercial interest, especially so as the deposits have only a few feet of vertical extent.

With respect to potential metallic mineral resources, the evaluation is equally negative. The area now covered by the China Lake Complex was extensively surface-prospected during the period of 1870 through 1940, and very few mineralized outcrops were located during this minerals survey that did not show at least some evidence of former exploration activity. Except for the fumarolic hot springs deposits, the minor replacement ores of the Argus-Sterling Mine, and the small contact metasomatic occurrences of the scattered roof pendants, the economic mineral deposits of the China Lake Complex can be characterized as narrow discontinuous hydrothermal quartz veins and lenses of insignificant exposed economic potential in widely scattered northwest-to-northeast-trending shear zones and dike/pluton contacts. No evidence was found that would indicate a potential for other major types of occurrence, such as a base metal porphyry system, a disseminated gold stockwork system, a large tonnage placer gold deposit, or a large tonnage mesothermal replacement system in the limestones of the northern Argus Range. A potentially commercial uranium deposit occurs on a north-south trend in the Tertiary Coso formation just outside the northwest boundary of the Complex, but this trend does not extend onto Navy-controlled land. An unexplored potential does exist for uranium mineralization associated with other metals (mercury, antimony, arsenic, gold, etc.) deposited in the peripheral fractures of the active epithermal system of the Coso KGRA and the relict system of the Shepherd Canyon spring terrace deposits, although it is unlikely that this occurrence would have commercial mineral potential.

The potential for commercial deposits of other strategic minerals, such as tin, antimony, cobalt, and nickel, is also low within the China Lake Complex. Analysis of the Star of the West samples demonstrated the low potential for the occurrence of these minerals within the hydrothermal vein systems throughout the Complex, and the geologic environments within which these minerals normally occur in economic concentrations are not exposed within the Complex boundaries.

Beryllium, which occurs in economic concentrations in some garnet tactites in New Mexico, was analyzed for in all of the tactite samples taken during this survey. No beryllium was found in any of these samples.

The conclusions reached after evaluating the prospected nonmetallic mineral occurrences and the potential for nonmetallic mineral resources are essentially the same as those for metallic minerals but, in some cases, for different reasons.

Travertine is present in the Coso, T-Range, and Shepherd Canyon areas but the deposits are very small. The commercial value of this travertine for cutting or as a decorative stone is nil.

Diatomite (diatomaceous earth) occurs in the upper part of Indian Wells Valley as thin blanket deposits interbedded with other lake and river sediments. These deposits are of too low a tonnage to be of commercial value.

Evaporite minerals occur within the playa lake sediments in Indian Wells Valley. The surface minerals are primarily carbonates, chlorides, and sulfates with traces of nitrates, borates, phosphates, lithium, and strontium. Subsurface exploration has been conducted only in the form of deep recovery operations of weapon impacts on these playa lakes plus one deep drill hole in the White Hills. The indicated potential for evaporite beds or lithium minerals resources is considered low because of the proximity of the Sierra Nevada that was the sediment source that kept the China Lake basin filled during subsidence. The bitter salts that were flushed from the Coso geothermal system during past pluvial periods are considered to have been lost to the lower Searles basin. As a result, a world-class deposit of these minerals is present in nearby Searles Lake.

Significant tonnages of perlite and pumice occur in the west-central and northwest portions of the China Lake Complex. Although these deposits are of good quality and economic quantity, comparable deposits occur in the surrounding region—off NWC-controlled lands—and provide abundant industrial and building stone material for current market conditions.

Volcanic cinder, decomposed granite and other aggregate have been produced in small quantities within the Complex, primarily for use as roadbed material on the Center. Volcanic cinder is currently being produced in the nearby Red Hill area outside the Complex, and granitic and other aggregate material is plentiful on non-withdrawn lands throughout the Upper Mojave Desert area should the demand increase.

The single known significant mineral resource within the China Lake Complex that has a demonstrated potential as a commercial commodity is the geothermal deposit of the Coso KGRA. This resource is currently being developed for both Navy use and commercial/industrial use as a source of electric power. The first power plant is scheduled to go on-line in 1985.

In addition to the Coso KGRA, geothermal potential exists in the unexplored Indian Wells and Salt Wells Valleys and in the Shepherd Canyon/Millspaugh area. A significant portion of each of these areas lies outside the Navy boundaries so that they could be explored by private industry at any time. Geologic and geophysical reconnaissance of the areas is warranted for evaluation of this potential resource.

A locally controversial commodity investigated during this survey is water. Water from wells in Indian Wells Valley (within the Complex boundaries) is of adequate quality and quantity to support the Main Side and test range needs. Numerous small springs, most of which are intermittent, supply water to the isolated facilities on the Center and also provide water for the wildlife population. If the population or industrial base (or both) of the Indian Wells Valley grows significantly, or if the chemical industry of Searles Valley expands heavily, NWC can expect to be pressured to permit capture of water now stored beneath the southern portion of the Base as well as the water lost to the China Lake playa.

The potential for commercial-scale oil and gas production from lands within the China Lake Complex is negligible. The older marine sediments of the north range have been intensely metamorphosed so that essentially no potential exists in that area. The only area of even slight potential is the valley fill of Indian Wells Valley where such potential is limited to possible small quantities of sour methane gas which is present in sediments along the western margin of the valley. This part of the valley is almost entirely outside of the base boundary, however, so that the NWC lands within the valley should not be considered to be of interest for the prospecting of this commodity.

No other commodities were indicated during this survey that warrant commercial prospecting in light of today's technology and market conditions or those of the foreseeable future.

Appendix A

GOLD PROSPECTS SAMPLE ANALYSES

TABLE A-1. Gold Prospect Samples Analyses.

Sample	Gold, oz/ton	Silver, oz/ton	Sample	Gold, oz/ton	Silver, oz/ton
N-101-1	Nil	Nil	N-202-2	2.100	6.21
N-101-2	0.018	Nil	N-202-3	Nil	0.04
N-101-3	0.005	0.09	N-202-4	Nil	0.18
N-101-4	0.019	0.10	N-203	0.240	0.42
N-104-2	Nil	0.248[a]	N-205	0.520	0.57
N-104-3	Nil	Nil	N-207	0.068	1.97
N-104-4	Nil	5.51[a]	N-208-1	0.190	1.20
N-105	0.670	0.46	N-208-2	0.071	0.69
N-112	0.015	5.29	N-208-2-8	Nil	0.06
N-115	0.130	0.27	N-208-3-13	0.062	4.10
N-118-1	0.130	0.23	N-208-6	0.019	1.45
N-118-2	0.036	0.17	N-208-7	Nil	Nil
N-125	0.016	0.53	N-208-7-12	0.460	5.482[a]
N-126	Nil	0.17	N-208-8-10	0.005	0.14
N-127	Nil	Nil	N-208-8-11	0.005	0.53[a]
N-128	Nil	2.62	N-208-8-14	0.022	2.46
N-129-1	Nil	0.05	N-208-8-15	0.083	1.50
N-129-2	0.054	2.05	N-208-8-16	0.045	0.10
N-130-1	0.005	0.15	N-208-8-17	0.260	1.87
N-130-2	0.017	2.77	N-208-9	0.43	1.02
N-130-3	0.024	0.28	N-208-18	Nil	Nil
N-133	Nil	Nil	N-213	0.009	1.08
N-201-1	2.470	1.05	N-214	0.016	1.21
N-201-2	2.600	1.25	N-215-1	Nil	Nil
N-201-3	8.210	22.50	N-215-2	0.150	1.24
N-201-4	0.013	Nil	N-215-3	0.005	1.51
N-201-5	0.270	0.58	N-215-4	0.400	1.85
N-201-6	0.260	0.62	N-216	0.006	3.65
N-201-7	0.120	0.37	N-218-1	0.730	3.15
N-201-8	1.860	Nil	N-218-2	Nil	5.72
N-201-9	0.180	0.56	N-218-3	1.330	17.00
N-201-10	0.170	0.53	N-220	Nil	0.11
N-201-11	0.160	0.37	N-225-1	0.026	0.60
N-201-12	0.270	0.25	N-225-2	Nil	0.40
N-202-1	Nil	Nil	N-226-1	0.690	4.336[a]

TABLE A-1. (Cont'd.)

Sample	Gold, oz/ton	Silver, oz/ton	Sample	Gold, oz/ton	Silver, oz/ton
N-226-2	0.280	0.87[a]	N-262-2	0.180	0.52
N-226-3	5.310	9.19	N-263-1	Nil	Nil
N-226-4	Nil	0.02	N-263-2	0.009	Nil
N-226-5	0.007	0.19	N-264	0.024	1.69
N-226-6	0.037	0.22	N-265	Nil	Nil
N-226-7	4.200	17.993[a]	N-266-1	0.240	0.62
N-226-8	0.400	0.898[a]	N-266-2	0.067	0.38
N-229-1	Nil	Nil	N-267-1	0.620	1.58
N-229-2	Nil	0.05	N-267-2	0.059	6.13
N-229-3	0.086	1.75	N-268	Nil	Nil
N-230-1	0.049	1.04	N-501-1	0.230	4.55
N-230-2	0.640	1.55	N-501-2	0.055	2.45
N-231-2	Nil	Nil	N-502-1	0.026	2.00
N-231-3	Nil	0.16	N-502-2	0.065	1.34
N-237	Nil	0.29	N-502-3	0.960	11.087[a]
N-239-1	0.660	1.77	N-503-1	0.005	2.942[a]
N-239-2	0.010	0.46	N-503-2	Nil	0.17
N-241	Nil	Nil	N-504	Nil	0.20
N-242	4.100	2.50	N-505	0.880	0.72
N-243	Nil	0.48	N-506	0.800	0.50
N-245	0.050	0.41	N-507-1	0.250	0.69
N-246	0.070	1.04	N-507-2	0.071	0.15
N-247-1	0.010	9.33	N-507-3	0.290	1.98
N-248	0.006	Nil	N-507-4	0.220	0.32
N-249-1	Nil	1.77	N-508	Nil	Nil
N-250	Nil	Nil	N-509	0.140	0.95
N-251	0.230	0.42	N-510	0.230	0.41
N-252	0.100	0.03	N-511	0.180	0.06
N-253	Nil	Nil	N-512-1	Nil	0.15
N-254	Nil	Nil	N-515-1	0.021	0.34
N-256	0.005	0.434[a]	N-515-2	0.087	0.72
N-257	0.041	4.98	N-516	0.360	2.46
N-258	Nil	0.71	N-518	0.320	1.12
N-260	0.018	0.30	N-520	0.009	0.32
N-262-1	0.160	0.37[a]	N-521-1	0.006	0.04

TABLE A-1. (Cont'd.)

Sample	Gold, oz/ton	Silver, oz/ton	Sample	Gold, oz/ton	Silver, oz/ton
N-521-2	0.007	Nil	N-902-2	0.091	Nil
N-522-1	0.160	0.26	N-902-3	0.037	Nil
N-522-2	0.088	0.16	N-903	0.110	3.30
N-522-3	0.100	0.09	N-905-1	0.031	0.20
N-523-1	Nil	Nil	N-905-2	0.006	0.87
N-524	0.009	Nil	N-905-3	0.005	0.018
N-601	Nil	Nil	N-905-4	Nil	Nil
N-602-1	0.120	1.59	N-905-5	0.034	125.80
N-602-2	Nil	Nil	N-909	0.006	Nil
N-603	0.180	12.50	N-910-1	0.220	0.69
N-604	Nil	Nil	N-910-2	0.130	0.10
N-604A-1	Nil	Nil	N-910-3	0.030	Nil
N-604A-2	0.007	0.80	N-910-4	0.006	Nil
N-604A-3	Nil	Nil	N-914-1	1.040	1.239[a]
N-604A-4	0.620	1.28	N-915	0.170	2.94
N-604A-5	0.083	0.29	N-916	0.260	1.21
N-604A-6	0.100	1.00	N-1002-1	0.009	Nil
N-609-1	0.100	0.70	N-1002-2	0.082	0.12
N-609-2	0.016	Nil	N-1003-1	3.140	0.465[a]
N-609-3	Nil	Nil	N-1003-2	0.350	...
N-801-1	0.370	1.74	N-1003-3	0.045	Nil[a]
N-801-2	0.088	0.45	N-1005-1	0.006	Nil
N-802-1	0.100	3.79	N-1006	0.120	1.25
N-810-2	Nil	0.72	N-1007-1	Nil	Nil
N-811-1	0.066	2.26[a]	N-1007-2	Nil	0.08
N-811-2	0.110	4.79	N-1008-1	Nil	Nil
N-811-3	0.009	Nil	N-1008-2	Nil	Nil
N-812	0.010	Nil	N-1023-1	Nil	0.292[a]
N-813-2	0.030	...	N-1026-1	0.008	0.341[a]
N-814	Nil	Nil	N-1026-2	Nil	Nil
N-817-1	Nil	0.38	N-1028	0.035	Nil
N-818-1	0.093	0.11	N-1029-1	0.088	0.22
N-819-1	0.014	0.74	N-1032	Nil	Nil[a]
N-820	0.022	1.31	N-1301-2-1	Nil	Nil
N-902-1	Nil	Nil	N-1301-3-1	0.009	Nil

TABLE A-1. (Cont'd.)

Sample	Gold, oz/ton	Silver, oz/ton	Sample	Gold, oz/ton	Silver, oz/ton
N-1302-3-1	Nil	...	N-1320-2-1	0.250	0.30
N-1302-3-2	0.093	0.12	N-1320-3-1	0.074	Nil
N-1302-5	1.390	6.80[a]	N-1320-3-2	1.490	0.20
N-1302-5-2	0.090	0.10	N-1320-4-1	0.011	Nil
N-1302-7-2	0.041	Nil	N-1320-6	0.130	0.17
N-1302-7-3	0.500	1.05	N-1331-1	0.012	11.17[a]
N-1302-7-4	0.007	Nil	N-1332	0.310	1.12
N-1302-8-1	0.800	1.04	N-1333-1-1	Nil	Nil
N-1303-1	0.170	2.28	N-1333-1-2	Nil	1.98
N-1303-2	0.220	1.57	N-1333-2-1	Nil	Nil
N-1303-3	0.051	Nil	N-1333-2-2	Nil	Nil
N-1303-4	Nil	1.03	N-1335	Nil	Nil
N-1304	Nil	Nil	N-1336	0.042	0.07
N-1305-1	Nil	0.525[a]	N-1339-1	Nil	Nil
N-1305-2	Nil	Nil	N-1339-1-2	0.005	Nil
N-1306	0.501	0.62	N-1339-2	Nil	Nil
N-1307-3-1	0.034	Nil	N-1341	0.140	0.12
N-1307-4-1	Nil	0.204[a]	N-1342	0.052	0.16
N-1307-5-1	0.009	0.16	N-1346	0.028	2.97
N-1307-5-2	0.013	0.03	N-1347	0.370	0.98
N-1307-6	4.560	Nil	N-1348-1	0.005	1.79
N-1308-1	Nil	0.12	N-1348-2	Nil	1.98
N-1308-2	Nil	0.02	N-1349	0.044	2.79[a]
N-1308-3	0.280	0.06	N-1353-1	0.160	4.36
N-1308-4	0.230	0.11	N-1354	0.990	0.21
N-1308-5	0.090	0.32	N-1355	0.180	0.50
N-1308-6	0.120	0.16	N-1401	0.360	2.756[a]
N-1309-1-1	0.069	Nil	N-1402	0.005	0.03
N-1309-1-2	0.520	0.14	N-1403	0.940	1.03
N-1309-2-1	Nil	Nil	N-1405	Nil	Nil
N-1313-1	0.460	1.79	N-1406	0.320	1.579[a]
N-1313-2	0.130	0.25	N-1408-1	Nil	7.84
N-1313-3	0.290	1.06	N-1416	0.085	10.40
N-1317-1	0.250	0.71	N-1417	0.009	1.33
N-1320-1	0.018	Nil	N-1504-1	Nil	Nil

TABLE A-1. (Cont'd.)

Sample	Gold, oz/ton	Silver, oz/ton	Sample	Gold, oz/ton	Silver, oz/ton
N-1504-2	Nil	Nil	N-1705	0.910	5.97
N-1504-3	0.005	Nil	N-1707-1	Nil	. Nil
N-1601	Nil	Nil	N-1707-2	Nil	Nil
N-1701-1	Nil	Nil	N-1707-3	Nil	Nil
N-1701-2	0.150	0.56	N-1708-1	0.0[illegible]2	0.28
N-1702-1	...	0.43	N-1708-2	Nil	Nil
N-1702-1-1	Nil	Nil	N-1708-3	Nil	Nil
N-1702-1-2	Nil	0.006	N-1712	Nil	Nil
N-1702-1-3	0.046	0.255	N-1712A	0.012	Nil
N-1702-1-4	0.188	4.495	N-1713	0.005	Nil
N-1702-1-5	0.003	0.012	N-1716-1	0.013	Nil
N-1702-1-6	0.725	15.080	N-1716-2	0.500	1.73
N-1702-1-7	0.128	9.860	N-1716-3	0.008	Nil
N-1702-1-8	0.049	0.290	N-1720-1	Nil	Nil
N-1702-2-2	0.200	2.030	N-1720-2	0.010	Nil
N-1702-2-3	0.145	9.135	N-1720-3	0.027	0.06
N-1702-3-1	0.022	0.180	N-1722-1	Nil	Nil
N-1702-3-2	0.319	2.610	N-1722-2	Nil	Nil
N-1702-4-1	0.044	0.290	N-1723	2.540	7.63
N-1702-5-1	0.007	0.061	N-1724	0.014	0.06
N-1702-7-1	Nil	0.041	N-1725-1	0.012	0.32
N-1702-9-7	0.017	0.041	N-1725-2	2.200	10.90
N-1702-10-1	0.007	0.029	N-1726	0.011	Nil
N-1702-12	0.021	0.754	N-1727-1	0.005	Nil
N-1702-15-1	0.099	0.130	N-1727-2	0.008	Nil
N-1704-1-1	0.012	0.03	N-1727-3	0.010	0.29
N-1701-2-1	0.770	0.43	N-1730-1	0.040	0.06
N-1704-3-1	0.470	3.20	N-1730-2	Nil	Nil
N-1704-3-2	0.120	1.146[a]	N-1731-1	Nil	Nil
N-1704-4-1	0.270	1.15	N-1731-2	0.012	Nil
N-1704-4-2	0.064	0.36	N-1732	0.740	3.73
N-1704-4-3	0.320	1.44	N-1733	0.020	Nil
N-1704-7-1	0.630	2.37	N-1735	0.400	2.08
N-1704-8-1	0.007	Nil	N-1736	Nil	Nil
N-1704-9-1	0.015	1.084[a]	N-1740	1.760	8.54

TABLE A-1. (Cont'd.)

Sample	Gold, oz/ton	Silver, oz/ton	Sample	Gold, oz/ton	Silver, oz/ton
N-1741-1	0.980	2.27	N-2110	Nil	Nil
N-1742-1	0.120	1.20	N-2112	0.013	0.02
N-1742-2	Nil	Nil	N-2113	0.097	0.78
N-1743-1	0.65	0.30	N-2114	Nil	Nil
N-1743-2	0.025	0.20	N-2301-1	Nil	Nil
N-1745-1	0.220	3.15	N-2303-1	0.024	1.02
N-1745-2	0.180	0.69	N-2303-2	0.007	Nil
N-2102	0.017	0.71	N-2303-3	0.033	Nil
N-2108-1	Nil	Nil	N-2304-1	Nil	7.80
N-2108-2	Nil	Nil			

[a]Kevex results.

Appendix B

SILVER PROSPECTS SAMPLE ANALYSES

TABLE B-1. Silver Prospect Samples Analyses.

Samples	Gold, oz/ton	Silver, oz/ton	Lead, %	Zinc, %
N-102	0.013	4.96	1.550	0.027
N-116-1	0.019	25.31	0.685	0.035
N-116-2	Nil	1.10	0.010	0.006
N-116-3	0.040	17.70	1.250	0.250
N-116-4	0.010	7.15[a]	0.925	0.022
N-116-5	Nil	1.83[a]	0.066	0.011
N-301-1	0.013	26.60	31.500	0.285
N-301-2	0.015	12.30	18.000	3.750
N-301-3	0.027	4.13	17.000	0.355
N-301-4	0.009	1.72[a]	28.500	8.950
N-301-5	0.009	1.01	29.000	0.445
N-301-6	0.011	0.56	6.150	0.215
N-301-7	0.017	10.20	22.500	1.350
N-301-8	0.007	13.10	11.500	14.500
N-301-9	0.007	9.58	11.000	10.500
N-301-10	0.025	18.60	22.000	1.600
N-301-11	0.012	1.85	8.150	0.810
N-301-12	Nil	0.71	0.790	32.500
N-301-13	Nil	0.20	0.094	0.047
N-301-14	0.017	16.40	32.500	0.345
N-301-15	0.059	2.07[a]	46.000	0.530
N-605A	Nil	Nil	0.006	0.040
N-908-1	0.110	1.05[a]	5.550	0.230
N-908-2	0.290	1.36[a]	6.350	0.105
N-1352-1	0.006	3.03	0.330	0.002
N-1352-2	Nil	Nil	Nil	0.008
N-1352-3	Nil	0.52	0.008	Nil
N-1352-4	0.150	3.00	0.205	Nil
N-1702-20-1	Nil	0.200	...	...

[a] Kevex results.

Appendix C

TUNGSTEN PROSPECTS SAMPLE ANALYSES

TABLE C-1. Tungsten Prospect Sample Analyses.

Sample	Tungsten, ppm	Molybdenum, %	Beryllium, ppm	Gold oz/ton
N-108	442[a]	0.001[a]	<2	Nil
N-210	12	Nil	<2	Nil
N-212	9700	0.008	<2	Nil
N-217	8	0.002	<2	Nil
N-222-1	380	0.013	<2	Nil
N-222-2	1325	0.018	<2	Nil
N-222-3	26	0.038	<2	Nil
N-238-1	24	Nil	<2	Nil
N-238-2	38	Nil	<2	Nil
N-238-3	9	Nil	<2	Nil
N-240	16	0.002	<2	Nil
N-1101-1	320	0.001	<2	Nil
N-1102-1	275	Nil	<2	Nil
N-1102-2	8	Nil	<2	Nil

[a]Kevex results.

Appendix D

IRON PROSPECTS SAMPLE ANALYSES

TABLE D-1. Iron Prospect Samples Analyses.

Sample	Iron, %	Gold, oz/ton	Tin, ppm
N-106	44.0	Nil	...
N-107-1	57.6	Nil	...
N-107-2	60.3	Nil	...
N-117-1	59.8	Nil	...
N-117-2	54.9	Nil	...
N-122	63.63	0.022	...
N-131	57.1	Nil	...
N-132-1	43.40	Nil	...
N-132-2	39.23	Nil	...
N-1005-1	1.821	Nil	Nil
N-1005-2	2.086	0.005	Nil
N-1023-1	1.2	Nil	...
N-1024-1	18.1	Nil	...
N-1024-2	28.2	Nil	...
N-1024-3	2.2	Nil	...
N-1024-4	2.4	Nil	...
N-1024-5	31.5	0.013	...
N-1024-6	40.0	0.006	...
N-1024-7	60.37	...	...
N-1024-8	23.68	...	...
N-1027-1	33.7	Nil	...
N-1027-2	38.7	Nil	...
N-1030	2.4	Nil	...
N-1340-2	57.0	Nil	...
N-1344-1	65.7	Nil	...
N-1344-2	38.7	Nil	...
N-2305	69.55	...	...

Appendix E

EVAPORITE SAMPLE ANALYSES

TABLE E-1 Survey Sample Analyses.

All results reported on a dry basis. Silica reported as acid-insoluble material.

	Sample Number					
Constituents, %	N-1502	N-1504-1	N-1603-1	N-1603-2	N-2115-1	N-2115-2
Sulfate, SO_4	0.38	0.25	1.07	13.48	0.23	0.38
Carbonates, CO_3	5.86	28.5	2.24	8.23	4.92	12.6
Phosphate, PO_4	0.071	0.043	0.32	0.17	0.12	0.23
Boron, B	0.004	0.0002	0.08	0.023	0.02	0.02
Chloride, Cl	0.27	<0.005	3.88	2.83	15.6	4.13
Nitrate, NO_3	0.00155	0.00042	0.00135	0.00137	0.00052	0.0009
Sodium, Na	0.33	0.035	2.30	1.20	11.0	3.5
Potassium, K	0.52	0.15	0.50	0.30	0.32	0.45
Lithium, Li	0.0034	0.0041	0.0031	0.0022	0.0026	0.0044
Silica, SiO_2	78.7	26.2	73.7	44.6	63.0	67.1
Bromide, Br	<0.003	<0.003	<0.003	<0.003	0.012	0.003
Strontium, Sr	0.019	0.083	0.180	0.058	0.009	0.020

TABLE E-2. Average Composition of Brine Filling Interstices of Crystal Body, Searles Lake, Calif.

Source: Mineral commodities of California, Division of Mines Bulletin 156, 1950, P.211.

Component	Wt, %
NaCl	16.50
Na_2SO_4	6.82
KCl	4.82
Na_2CO_3	4.80
$Na_2B_4O_7$	1.51
Na_3PO_4	0.155
NaBr	0.109
LiCl	0.021
Na_2S	0.020
As_2O_3	0.019
CaO	0.0022
Fe_2O_3 and 1_2O_2	0.0020
NH_3	0.0018
NaI	0.0014
Sb_2O_3	0.0060
Total dissolved solids	34.782

Appendix F

REPORTED OCCURRENCES NOT LOCATABLE ON THE GROUND

TABLE F-1. Reported Occurrences Not Locatable on the Ground.

NWC Reference Number	Reported Location
N-109	Sec. 2, T20S, R38E
N-113	Sec. 15, T20S, R39E
N-114	Sec. 13, T20S, R39E
N-204	Sec. 21, T20S, R40E
N-209	Sec. 1, T20S, R40E
N-219	Sec. 21, T20S, R40E
N-221	Sec. 36, T20S, R40E
N-223	Sec. 9, T20S, R40E
N-228	Sec. 18, T20S, R40E
N-236	Sec. 5, T20S, R40E
N-302	Sec. 26, T20S, R41E
N-303	Sec. 2, T20S, R41E
N-403	Sec. 6, T21S, R38E
N-404	Sec. 13, T21S, R38E
N-406	Sec. 36, T21S, R39E
N-407	Sec. 13, T21S, R39E
N-410	Sec. 10, T21S, R39E
N-513	Sec. 24, T21S, R40E
N-514	Sec. 24, T21S, R40E
N-519	Sec. 23, T21S, R40E
N-605	Sec. 15, T21S, R41E
N-703	Sec. 21, T22S, R38E
N-704	Sec. 30, T22S, R39E
N-706	Sec. 18, T22S, R39E
N-707	Sec. 6, T22S, R39E
N-712	Sec. 29, T22S, R39E
N-713	Sec. 1, T22S, R39E
N-719	Sec. 24, T22S, R38E
N-720	Sec. 16, T22S, R39E
N-803	Sec. 2, T22S, R40E
N-804	Sec. 11, T22S, R40E
N-808	Sec. 13, T22S, R40E
N-901	Sec. 22, T22S, R41E
N-1001	Sec. 5, T22S, R42E
N-1009	Sec. 15, T22S, R42E

TABLE F-1. (Cont'd.)

NWC Reference Number	Reported Location
N-1104	Sec. 3, T22S, R39E
N-1312	Sec. 15, T23S, R41E
N-1315	Sec. 24, T23S, R41E
N-1316	Sec. 16, T23S, R41E
N-1507	Sec. 26, T24S, R39E
N-1508	Sec. 26, T24S, R39E
N-2101	Sec. 32, T25S, R42E
N-2104	Sec. 2, T25S, R42E
N-2105	Sec. 32, T25S, R42E
N-2106	Sec. 12, T25S, R41E
N-2109	Sec. 16, T24S, R42E

Appendix G

WATER ANALYSES

TABLE G-1. Water Well Analysis.

					B-1 range	LB range	C range	B-4 range			
	12	15	16	18	20	21	22	23	27	28	29
Calcium, ppm	67.2	53.6	38.8	11.2	38.8	50.4	38.0	58.8	59.2	35.2	26.8
Magnesium, ppm	8.3	6.3	5.1	2.9	23.4	35.9	28.5	13.4	6.1	5.1	5.0
Sodium, ppm	94.0	81.0	81.0	56.0	102.0	161.0	172.0	114.0	61.0	36.0	36.0
Potassium, ppm	3.23	2.86	2.73	2.20	9.9	14.1	13.5	3.50	2.68	2.46	2.93
Carbonate, ppm	...	...	...	33.6	...	395.3	...	...	...	...	...
Bicarbonate, ppm	68.3	78.1	87.8	48.8	317.2	...	336.7	175.7	73.2	107.4	92.7
Sulfate, ppm	88.0	86.0	72.0	20.0	67.0	136.0	132.0	174.0	69.0	38.0	35.0
Chloride, ppm	176.0	120.0	108.0	28.0	6.0	128.0	128.0	108.0	132.0	36.0	48.0
Nitrate, ppm	1.5	1.3	1.1	1.3	<0.5	<0.5	0.5	0.5	0.9	1.5	1.3
Silica, ppm	28.0	30.0	24.0	27.0	46.0	39.0	39.0	39.0	36.0	32.0	32.0
Fluoride, ppm	0.66	0.89	0.84	0.95	1.14	0.80	0.95	0.89	0.89	0.71	0.66
Boron, ppm	0.37	0.32	0.30	0.39	1.40	3.20	2.80	0.71	0.30	0.30	0.19
Iron, ppm	<0.03	<0.03	<0.03	0.07	0.34	0.03	0.03	0.15	0.09	0.08	0.06
Manganese, ppm	0.01	<0.01	<0.01	0.01	0.01	0.04	0.01	0.06	0.02	0.02	<0.01
Copper, ppm	0.02	<0.01	0.01	0.01	0.01	<0.01	0.04	<0.01	0.01	<0.01	<0.01
Synthetic detergents	0.031	0.059	0.033	0.093	0.044	0.060	0.041	0.041	0.040	0.021	0.020
Phosphate, ppm	<0.05	<0.05	<0.05	0.05	0.05	0.14	0.05	0.05	<0.05	<0.05	<0.05
Silver, mg/l	...	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic, mg/l	...	<0.001	<0.001	0.003	0.001	0.008	0.012	<0.001	<0.001	0.002	0.018
Barium, mg/l	...	0.049	0.026	0.042	0.045	0.046	0.046	0.040	0.038	0.054	0.073
Cadmium, mg/l	...	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Total chromium, mg/l	...	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029
Mercury, mg/l	...	<0.0002	0.0004	<0.0002	0.0006	<0.0002	0.0011	<0.0002	<0.0002	<0.0002	<0.0002
Lead, mg/l	...	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002

TABLE G-1. (Cont'd.)

					B-1 range	LB range	C range	B-4 range			
	12	15	16	18	20	21	22	23	27	28	29
Selenium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total hardness[a]	202.0	160.0	118.0	40.0	193.0	273.0	214.0	202.0	168.0	109.0	88.0
Calcium hardness[a]	168.0	134.0	97.0	28.0	97.0	126.0	97.0	147.0	143.0	88.0	67.0
Magnesium hardness[a]	34.0	26.0	21.0	12.0	96.0	147.0	117.0	55.0	25.0	21.0	21.0
Phenolphthalein alkalinity	0.0	0.0	0.0	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methyl orange alkalinity	56.0	64.0	72.0	96.0	260.0	324.0	276.0	144.0	60.0	88.0	76.0
Total dissolved solids gravometric	535.0	441.0	368.0	188.0	518.0	749.0	726.0	573.0	438.0	258.0	209.0
Specific conductance, µohms at 25°C	970.0	780.0	720.0	380.0	870.0	1280.0	1250.0	950.0	720.0	440.0	380.0
pH	7.78	7.74	7.79	8.70	7.65	7.42	7.76	7.44	7.80	7.79	7.89
Temperature, °F	82.0-84.0	82.0-84.0	82.0-84.0	82.0-84.0	76.0	76.0	76.0	76.0	82.0-84.0	82.0-84.0	82.0-84.0
pHg	7.87	7.89	7.97	8.35	7.42	7.27	7.40	7.47	7.88	7.90	7.84

[a] As $CaCO_3$ ppm.

[b] Calculated.

TABLE G-2. Spring Analysis.

	Haiwee Spring	China Garden Spring	Coso Cold Spring	Coles Flat Spring	Dead End Spring	Junction Ranch Spring	Tennesse Spring	Wild Rose Mine (Mtn Spring Canyon) Spring	Mountain Springs Canyon	Wilson Canyon Spring	Center Line Road Artesian Well
Calcium[a]	36.0	64.0	97.0	150.0	64.0	59.0	47.0	80.0	97.0	79.0	4.0
Magnesium[a]	16.5	19.0	16.0	52.0	13.0	9.0	4.0	18.0	28.0	27.0	2.0
Sodium[a]	28.5	54.0	33.0	44.0	34.0	20.0	12.0	39.0	71.0	72.0	500.0
Potassium[a]	5.9	8.1	2.4	3.9	1.7	1.6	2.5	1.5	1.7	4.3	21.0
Bicarbonate[a]	171.0	154.0	159.0	220.0	263.0	187.0	162.0	317.0	398.0	297.0	836.0
Sulfate[a]	66.0	130.0	140.0	320.0	30.0	40.0	29.0	30.0	66.0	40.0	110.0
Chloride[a]	18.0	55.0	30.0	43.0	23.0	14.0	16.0	44.0	69.0	126.0	252.0
Silica[a]	52.6	38.0	42.0	27.0	34.0	17.0	19.0	30.0	40.0	38.0	78.0
Fluoride[a]	0.24	0.59	0.38	0.13	0.28	<0.10	<0.10	0.12	0.41	0.37	3.5
Boron[a]	0.30	0.40	0.20	0.20	0.20	0.15	0.15	0.20	0.50	0.50	9.5
Silver[b]	...	...	...	...	...	<0.005	...	...	...	...	...
Arsenic[b]	...	...	...	...	...	<0.001	...	...	...	...	...
Barium[b]	...	...	...	...	...	0.029	...	...	...	...	...
Cadmium[b]	...	...	...	...	...	<0.003	...	...	...	...	...
Total chromium[b]	...	...	...	...	...	<0.029	...	...	...	...	...
Mercury[b]	...	...	...	...	...	<0.002	...	...	...	...	...
Lead[b]	...	...	...	...	...	<0.002	...	...	...	...	...
Selenium[b]	...	...	...	...	...	<0.01	...	...	...	...	...
TDS gravometric[c]	395.0	523.0	520.0	464.0	464.0	351.0	301.0	560.0	772.0	684.0	1816.0

[a] ppm.
[b] mg/l.
[c] Calculated (±).

Note: Spring and CGEH-1 analysis from "The Recharge Area for the Coso, California Geothermal System Deduced from δD and $\delta^{18}O$ in Thermal and Non-Thermal Waters in the Region" by R. O. Fournier and J. M. Thompson, 1980. OFR 80-454.

TABLE G-3. Thermal Well Analysis.

	CGEH No. 1	Coso Well 1	Well 4K1	Well 4P1	Coso New Water Well
Calcium[a]	55.0	52.0	10.0	6.2	65.0
Magnesium[a]	1.0	<0.01	0.59	0.11	6.9
Sodium[a]	1510.0	2,750.0	33.0	24.0	1550.0
Postassium[a]	132.0	460.0	7.1	12.6	150.0
Carbonate[a]	...	51.1	0.0	0.0	0.0
Bicarbonate[a]	119.0	91.8	1.7	69.3	213.1
Sulfate[a]	53.0	130.0	100.0	27.0	50.0
Chloride[a]	2330.0	4,602.0	2.1	1.8	2499.2
Nitrate[a]	...	1.8	<0.4	<0.4	2.7
Silica[a]	119.0	410.0	70.0	165.0	110.0
Fluoride[a]	3.3	4.3	0.41	0.42	3.9
Boron[a]	49.0	107.0	0.12	0.05	18.0
Iron[a]	...	<0.05	1.3	0.09	0.14
Manganese[a]	...	<0.01	0.16	<0.01	1.80
Copper[a]	...	0.44	<0.01	<0.01	...
Phosphate[a]	...	10.5	<0.1	<0.1	1.1
Arsenic[b]	...	10.0	0.22	<0.01	5.0
Mercury[a]	...	<0.0002	<0.0002	0.0004	0.0240[b]
Selenium[b]	...	...	...	...	0.43
TDS gravimetric	4384.0[e]	8,706.0	228.0	306.0	4693.0
Specific conductance[c]	...	12,700.0	370.0	175.0	8000.0
pH	5.40	8.5	6.7	7.6	7.2
Temperature[d]	195°C				

[a] ppm.

[b] mg/l.

[c] µohms at 25°C.

[d] Degrees Fahrenheit.

[e] Calculated (±).

Appendix H

STAR OF THE WEST SAMPLE ANALYSES

TABLE H-1. Star of the West Sample Analyses.

Sample	Gold Troy-oz/ton	Silver Troy-oz/ton	Lead ppm	Zinc ppm	Copper wt. %	Cadmium ppm	Cobalt ppm	Nickel ppm	Molybdenum ppm	Tin ppm	Arsenic ppm	Antimony ppm	Barium ppm	Bismuth ppm	Manganese wt. %	Iron wt. %	Calcium wt. %
N-1702-1-1	Nil	Nil	Nil	10	0.475	Nil	5	10	Nil	2	Nil	Nil	550	Nil	0.078	1.20	0.180
N-1702-1-2	Nil	0.006	Nil	Nil	0.005	Nil	Nil	Nil	2	Nil	Nil	Nil	340	Nil	0.091	1.10	0.093
N-1702-1-3	0.046	0.255	Nil	20	0.18	Nil	10	Nil	4	Nil	20	130	40	Nil	0.058	2.10	0.017
N-1702-1-4	0.188	4.495	Nil	25	8.0	0.4	10	5	4	Nil	10	17	530	7	0.058	3.90	0.066
N-1702-1-5	0.003	0.012	Nil	Nil	0.005	Nil	5	5	2	Nil	Nil	Nil	10	Nil	0.080	0.64	0.028
N-1702-1-6	0.725	15.080	Nil	30	7.3	Nil	90	35	26	Nil	20	85	550	2	0.099	9.50	0.053
N-1702-1-7	0.128	9.860	Nil	10	19.6	Nil	25	10	6	Nil	10	40	2550	Nil	0.165	2.40	0.057
N-1702-1-8	0.049	0.290	Nil	5	0.035	Nil	Nil	5	2	Nil	Nil	Nil	90	Nil	0.083	1.20	0.024
N-1702-2-2	0.200	2.030	Nil	15	1.55	Nil	100	30	4	Nil	10	4	320	4	0.066	11.50	0.043
N-1702-2-3	0.145	9.135	Nil	35	33.8	0.6	35	30	6	Nil	Nil	50	1550	Nil	0.089	2.80	0.110
N-1702-3-1	0.022	0.180	Nil	10	0.445	Nil	80	105	8	Nil	30	15	160	Nil	0.135	11.80	0.039
N-1702-3-2	0.319	2.610	Nil	40	6.7	Nil	90	35	10	Nil	20	15	600	Nil	0.094	17.30	0.100
N-1702-4-1	0.044	0.290	Nil	Nil	0.445	Nil	Nil	10	4	Nil	5	2	140	Nil	0.099	2.30	0.074
N-1702-[illegible]-1	0.007	0.061	Nil	10	0.333	Nil	20	10	4	Nil	15	Nil	190	Nil	0.100	3.20	0.200
N-1702-7-1	Nil	0.041	Nil	15	0.115	Nil	15	10	4	Nil	25	2	220	Nil	0.145	5.00	0.790
N-1702-9-7	0.017	0.041	Nil	20	0.013	Nil	5	Nil	4	Nil	15	5	310	Nil	0.280	1.90	13.800
N-1702-10-1	0.007	0.029	Nil	15	0.006	Nil	10	Nil	Nil	Nil	10	2	150	Nil	0.130	1.80	2.900
N-1702-12	0.021	0.754	Nil	25	1.950	Nil	65	30	8	2	15	9	550	Nil	0.135	9.30	0.200
N-1702-15-1	0.099	0.130	Nil	5	0.150	Nil	5	Nil	70	Nil	30	4	140	2	0.075	8.10	0.300
N-1702-20-1	Nil	0.200	25	45	0.013	0.6	Nil	5	Nil	Nil	Nil	48	50	Nil	0.054	0.73	0.440

Appendix I

WARM WELLS (WATER TEMPERATURE >24°C), INDIAN WELLS VALLEY, WITH TEMPERATURES MEASURED AND CALCULATED FROM Na-K-Ca, Na-K-Ca-Mg, AND SILICA GEOTHERMOMETERS

TABLE I-1. Warm Wells (Water Temperature >24°C), Indian Wells Valley, with Temperatures Measured and Calculated from Na-K-Ca, Na-K-Ca-Mg, and Silica Geothermometers.

Location	Well	Depth, feet	Temperature °F measured	Temperature °C measured	Temperature °C Na-K-Ca	Temperature °C Na-K-Ca-Mg	Quartz conductive cooling, °C	Chalcedony conductive cooling, °C
24S, 38E								
	28Q1	452	78	26	71	26	...	...
25S, 40E								
	35P1	200	77	25	112	45	...	...
26S, 39E								
	7N1	368	82	28	...	...	...	...
	19K1	803	77	25	34	34	85	52
	19P1	446	83	28	...	...	...	...
	19Q1	361	87	31	33	33	...	...
	24K1	800	80	29	...	...	...	...
	24P1	825	93	34	51	51	88	56
	24Q1	361	80	27	33	33	...	...
	24R1	480	83	28	70	70	...	...
	25C1	387	78	26	...	...	...	...
	24M1	800	87	31	36	36	75	43
	25E1	387	78	26	...	...	...	...
26S, 40E								
	11A1	5.4	83	28	207	200	...	...
	17N1	178	77	25	201	141	...	...
	18N1	69	79	26	73	54	...	...
	19P1	261	87	31	56	56	...	...
	20N1	190	78	26	56	56	...	...
	21A1	102	77	25	95	60	104	72
	22B1	67	77	25	142	25	108	77
	22H2	77	77	25	132	60	101	69
	22J1	77	77	25	176	20	117	86
	22K1	52	78	26	91	49	116	86
	22N1	203	78	26	137	37	106	74
	22P1	830	90	32	125	25	80	46
	22P2	87	77	25	98	43	124	94
	30E2	300	80	27	60	60	...	...
	32D1	279	80	27	60	60	...	...
	32E1	300	80	27	43	43	...	...
	33P1	400	77	25	48	48	...	...
	34N1	232	79	26	60	60	...	...
27S, 40E								
	2J1	220	77	25	66	66	107	76
	2H1	200	77	25	192	96	104	72
	4B1	375	78	26	45	45	...	...
	4B2	62	78	26	45	45	...	...
	4G1	410	86	30	30	70	70	...
	4L1	89	80	27	77	27	...	...
	9P1	230	86	30	54	54	106	74
	10A7	150	77	25	71	66	120	70
	10C1	250	78	26	73	73	...	...
	10H1	...	77	25	66	66	99	67