Special Publication

Bureau of Mines Mineral Investigations in the Juneau Mining District, Alaska, 1984–1988

Volume 2.–Detailed Mine, Prospect, and Mineral Occurrence Descriptions

Section D

Juneau Gold Belt Subarea

UNITED STATES DEPARTMENT OF THE INTERIOR

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By Earl C. Redman, Kenneth M. Maas,
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UNITED STATES DEPARTMENT OF THE INTERIOR
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JUNEAU GOLD BELT SUBAREA

By Earl C. Redman,[1] Kenneth M. Maas,[2] Joseph M. Kurtak,[3] and Lance D. Miller[4]

INTRODUCTION

LOCATION

The Juneau Gold Belt, centered on Juneau and approximately 120 miles long by 10 miles wide, stretches from Berners Bay on the north to Windham Bay on the south (fig. D-1). Access within the Juneau Gold Belt is provided by the Glacier, Thane, and North Douglas Highways. The Glacier Highway extends northwest from Juneau for approximately 40 miles to Echo Cove, and the other two roads end 5.5 miles southeast and 12.6 miles west from Juneau, respectively. None of these roads connect with other highway systems and access to other areas is restricted to airplanes, the State ferry system, and commercial barge lines.

BUREAU ACTIVITIES

The majority of lode gold produced in Alaska came from the Juneau Gold Belt portion of the Juneau Mining District. To evaluate the economic potential of the Gold Belt, the Bureau located 173 mines and prospects within the area. A total of 263 adits and shafts were found and 56,650 feet of underground workings were mapped. The Bureau collected and analyzed 1,557 samples during the study. In addition, considerable detailed geologic mapping was done in the vicinity of the mines and prospects from which ore control models were developed.

The most significant mines and prospects are discussed in the beginning of this report; all others are then described in geographic order (starting from the north). An alphabetical cross-reference table is included at the beginning of this section. Sample locations are shown on the figures accompanying the descriptions and sample results are listed by mine, prospect, or occurrence in Appendix D-1.

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RECENT MINERAL EXPLORATION WORK

Since 1984, the Juneau Gold Belt has received a considerable amount of renewed interest from the mining industry. Barrick Resources and WGM, Inc., gained a lease on the Alaska Juneau and Treadwell properties in 1984. The lease was assumed by Echo Bay Mines in 1985 and the new company began an aggressive program to reevaluate the former mine. By 1988, the company had reopened the Sheep Creek Tunnel, driven a 2,000-foot decline to connect it with the Alaska Juneau 4-level, collected a bulk sample, done considerable diamond drilling, and initiated engineering studies. They are currently (Jan. 1989) in the midst of an extensive drilling program to block out 25,000,000 tons of reserves.

Echo Bay is also actively exploring the Kensington and Herbert Glacier deposits. In 1988, Echo Bay Mines and Coeur d'Alene Mines began a 5,300-foot adit at an elevation of 800 feet to undercut the Kensington orebody approximately 1,200 feet below the old Kensington Tunnel and 600 feet below the deepest drill hole. They cut the orebody in December, 1988, and are drilling to define both upward and downward extensions. At the Herbert Glacier prospect, Echo Bay drilled the gold-bearing veins in 1986 and 1988. Echo Bay also examined the Reagan prospect in 1988.

Another company active in the area has been Curator American, Inc., which is currently exploring the Jualin Mine and Silver Falls and Gold King prospects. They had extensively drilled the Jualin and plan to drive a decline to test the orebody in 1989. They also examined the Enterprise Mine in 1988.

Other companies working in the Juneau Gold Belt have included FMC at Treasury Hill (1987-1988), BP Minerals on the Alaska Treasure prospect (1988-1989), Houston Oil and Minerals in Yankee Basin (1985), Monument Resources at the Bessie and Aurora Borealis Mines (1988), and Hazelton Resources on the Alaska Juneau mill tailings dump (1988-1989).

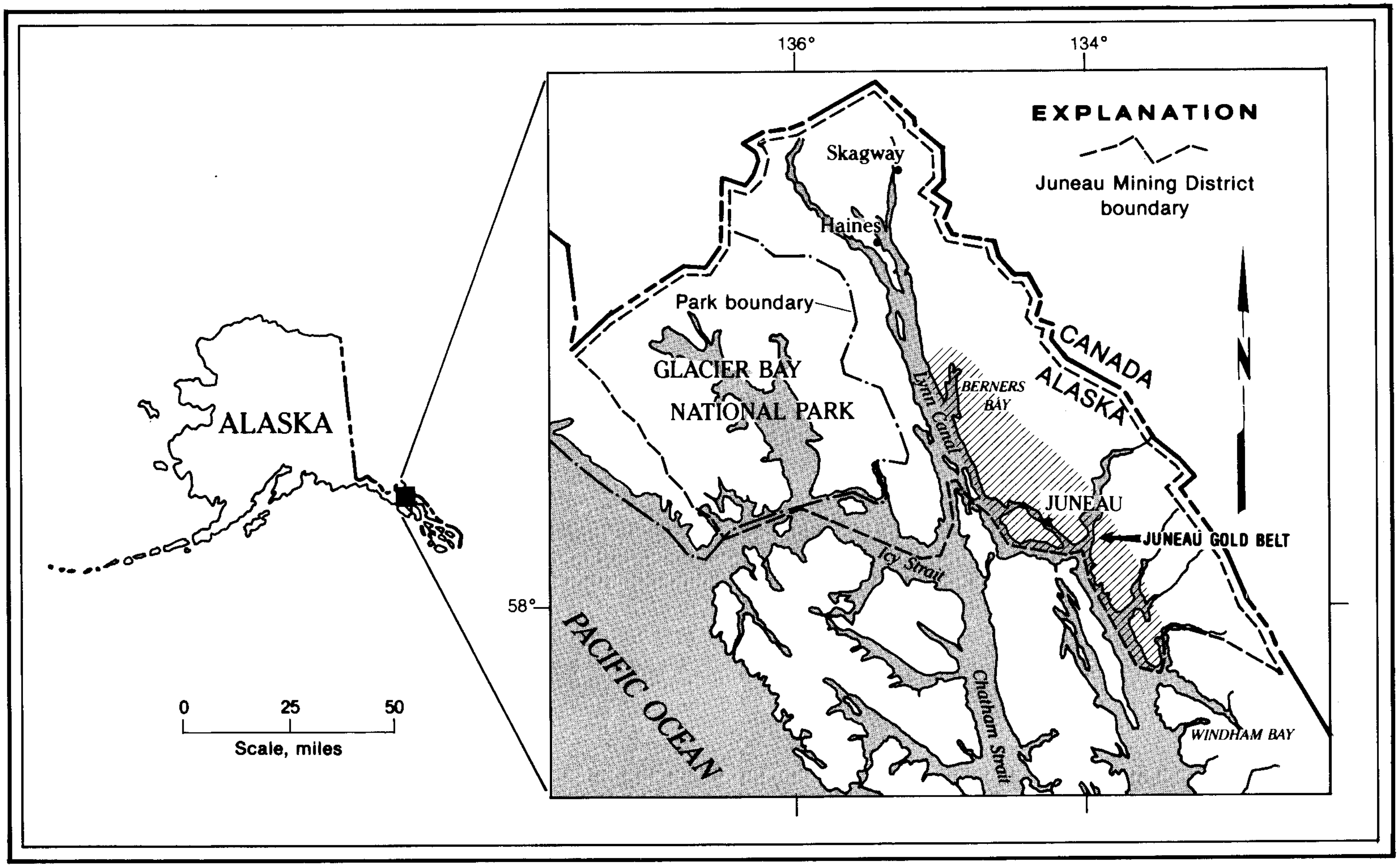

Figure D-1.—The Juneau Gold Belt area.

LAND STATUS

Bottge (*D-15*)[5] and Roberts (*D-100*) have compiled the most recent land status of the Juneau Gold Belt. Most of the Gold Belt is managed as part of the Tongass National Forest (76%) but privately-held, Native-owned, and City and Borough of Juneau lands form a significant portion of the region (17%). State of Alaska lands cover a minor portion of the Gold Belt (7%). Only an insignificant amount of the Juneau Gold Belt is closed to mineral entry and mining (4%), but most of the area (65%), although open for mineral entry and mining, is subject to restrictions (private land, Native land, City and Borough of Juneau land, and selected Forest Service land).

[5] Italic numbers in parentheses refer to list of references preceding the appendix.

ACKNOWLEDGMENTS

Numerous local prospectors, claim owners, and geologists generously allowed the Bureau to map and sample their respective prospects. Special thanks are due to Dale Henkins, Roger Eichman, John Ritter, Joan Candy, Don Legrand, and Don Madson, claim owners, who accompanied Bureau personnel on trips into the field and shared their knowledge of area prospects, workings, and geology. George Moerlein, who worked as District Geologist for both Houston Oil and Minerals and Echo Bay Mines, pointed out many mine workings and offered many comments on geology and other subjects. Rick Frederickson, Senior Geologist for WGM and Project Manager in charge of Echo Bay's Alaska Juneau evaluation project, deserves many thanks for providing access to underground workings at the Alaska Juneau Mine and for keeping Bureau personnel updated on current work. The Bureau would also like to thank Al Kirkham, geologist with Echo Bay Mines, Kensington Project, for allowing Bureau geologists to examine the new Kensington adit and for his aid in the study of tellurium in the Berners Bay area. We also thank John Barnett, Exploration Geologist for Wescord Resources and Project Manager for Curator American, Inc.'s Jualin project, for information he provided on work at the Jualin Mine. Finally, the Bureau also appreciates the help of David Stone, Vice President of Customer Service for Alaska Electric Light and Power Company, who provided unending information on mining history from old Alaska Juneau Gold Mining Company records.

The authors were assisted in the field and office by Ed Fogels, Terry Hayden, Rich Giraud, Lynn Oliver, Brian Peck, Dennis Southworth, and Anthony Dunn, seasonal employees, who aided in locating, mapping, and sampling the mines and prospects.

HISTORY

The first recorded gold discoveries in the Juneau Gold Belt occurred in the Windham Bay area in 1869. Since that time, mines in the Gold Belt have produced more than 6.7 million ounces gold, 3.1 million ounces silver, and 45 million pounds of lead (table D-1). The vast bulk of this production came from the Treadwell and Alaska Juneau Mines (fig. D-2), both of which were the largest low grade gold mines in the world while they were active.

Initial gold production from the Gold Belt came from placer deposits in the Windham Bay area and, later, around Gold Creek and on Douglas Island. In the early 1880's, however, lode deposits became increasingly important. The first stamp mills were erected at the Treadwell Mine and in Silver Bow Basin (fig. D-3) in 1882, and lode production increased rapidly. The years between 1890 and 1915 were the heyday of the smaller mines in the region, such as the Comet, Jualin, Silver Queen, and Eagle River Mines (figs. D-4 to D-6). This was also the time of greatest production from the Treadwell Mines (the Treadwell, 700-Foot, Mexican, and Ready Bullion Mines). During this period, the Treadwell Mines were producing a world-record 5,000 tons of ore each day.

By 1918, most of the smaller mines had shut down and the Treadwell Mines, except for the Ready Bullion, were forced to close because of a cave-in which completely filled them with sea water. The Treadwell Mines produced a total of about 3.2 million ounces gold from ore that averaged 0.13 ounces/ton gold. The Alaska Gastineau (the old Perseverance Mine) and the Alaska Juneau Mines, however, began their large-scale opera-

Table D-1. Summary table of mine production

Mine	Years Active	Production Au (oz)	Ag (oz)	Pb(lb)
Juneau Area				
Alaska Juneau	1880–1944	2.9 MM	1.9 MM	40.0 MM
Perseverance	1886–1921	500,900	482,279	4.8MM
Ebner	1888–1907	32,000	987	—
Silver Bow Basin placer	1889–1912	26,000	577	—
Little Basin placer	pre-1900	2,400	—	—
Ground Hog	1892–1895	150	—	—
Glacier/Silver Queen	1888–1906	$500,000 combined Au,Ag[1]		
Gould & Curry	1895	1,250	—	—
Alaska Juneau tailings	1948–1954, 1981–83	7,106	1,663	2,800
Alaska Gastineau tailings	1937–1948	1,105	273	—
Treadwell	1881–1921	3.2 MM	181,301	—
Treadwell tailings	1922–1949	320	12	
Berners Bay area				
Ivanhoe	1898–1903	340	—	—
Horrible	1896–1900, 1912	min 75	—	—
Kensington	1897–1900	2,600	—	—
Northern Belle	1896–1897	940	—	—
Bear	1891–1897	800	—	—
Comet	1893–1900	22,250	—	—
Jualin	1896–1919, 1928	37,913	12,640	—
Eagle River area				
E Pluribus Unum	1904–1909, 1935–1940	154	34	100
Aurora Borealis	1895	150	—	—
Bessie	1902–1903	150	—	—
Rex	1904	145	—	—
Eagle River	1902–1915	19,451	8,865	—
Windfall Creek	1903–1908	249	—	—
Smith & Heid	1897–1904, 1933–1934	205	—	—
Peterson	1903–1922	211	8	—
Treasury Hill	1908–1909	302	—	—
Dull & Stephens	1908–1909	32	—	—
Port Snettisham–Windham Bay areas				
Enterprise	1906–1916	100	—	—
Crystal	1899–1909	3,441	204	—
Sumdum Chief	1890–1903	24,000	24,000	—
Redwing	1897,1901–02	3,000	—	—
Marty	1925–1927	55	—	—
TOTALS		6.8 MM	2.7 MM	45.6 MM

NOTE.—Dashes represent no data or production.

[1] Reported as combined silver and gold.

tions at this time. The Alaska Gastineau operation was highly innovative and, at first, very successful, using ball mills patterned after those being used at porphyry copper deposits in the American southwest. But mine and mill problems forced the operation to stop work in 1921.

The Alaska Juneau Mine tried to copy the milling example of the Alaska Gastineau Co. and used a ball mill for ore grinding. After initial difficulties, the mine and mill became very successful, handling over 12,000 tons of ore each day and making a profit from ore that averaged 0.04 ounces/ton gold. During the 1930's and early 1940's, the Alaska Juneau Mine was the largest and lowest grade gold mine in the world and one of the largest lead producers. The fixed price of gold and war-time inflation made the operation unprofitable and the mine closed in 1944 after it had produced 2.9 million ounces gold, 1.9 million ounces silver, and 40 million pounds lead (*D-98*).

GEOLOGIC SETTING

REGIONAL GEOLOGY

The Juneau Gold Belt is underlain by progressively metamorphosed metasedimentary, metavolcanic, and metaplutonic rocks which trend NW and dip moderately to steeply NE (figs. D-4 to D-6, D-11, D-12). Most of the Gold Belt is composed of interlayered black phyllites, mafic metavolcanic flows and sills, and local felsic phyllite. Plutonic rocks outcrop at Berners Bay, Limestone Inlet, and Port Snettisham areas. The eastern edge of the Gold Belt is roughly marked by a foliated quartz diorite (tonalite) that forms the western margin of what Brew and Ford (*D-22*) have named the Coast Range plutonic-metamorphic complex. The complex consists of high-grade schist and gneiss intruded by Cretaceous and Tertiary plutonic rocks.

The vein deposits in the Juneau Gold Belt are hosted by black phyllite, mafic metavolcanic flows, metagabbro sills, and diorite sills and plutons. The rocks of the Gold Belt are bisected by the Coast Range megalineament (*D-19*), a major discontinuity and topographic lineament. Based on fossils found near the head of Sheep Creek (*D-18*), rocks to the NE of the megalineament are thought to be mostly Triassic. Those to the SW are Jurassic and Cretaceous based on fossils found in similar rocks on Admiralty Island (*D-22*). Lithologic differences between the two areas, however, are minimal.

The black phyllite unit contains a variety of dark-colored, rock types including graphitic phyllite, chloritic phyllite, phyllitic graywacke, and minor graphitic marble. In addition to the dark rocks, light-colored felsic phyllite is locally interbedded with the black phyllites. The felsic phyllite probably represents metamorphosed tuffaceous siliceous metavolcanic rocks. All of the metasedimentary rocks are all highly folded.

Metamorphosed mafic igneous rocks consist of sills, dikes, and surface flows. The rocks are interlayered with the metasediments and originally consisted of hornblende diorite, gabbro, volcanic breccias and conglomerates, and mafic and felsic tuffs. The metavolcanic rock groups, such as the Douglas Island metavolcanics and Gastineau metavolcanics, are composed of augite-bearing metabasalt, metaandesite, metavolcanic breccia, mafic tuff, and minor metavolcanic graywacke, and chlorite phyllite (*D-22*). Generally, these rocks are conformable with the regional foliation but, locally, have discordant contacts.

Plutonic rocks include the Jurassic Jualin diorite, the Cretaceous diorite bodies in the Limestone Inlet/Taku Inlet area, the Cretaceous Snettisham pyroxenite, and the Tertiary Treadwell diorite (*D-22*). Except for the Treadwell body, the diorite plutons are moderately well foliated. The Jualin, Limestone Inlet, and Treadwell plutons host gold-bearing quartz veins. The foliated tonalite sill also hosts gold-bearing veins.

Most rocks in the Juneau Gold Belt area have been subjected to a regional progressive metamorphic event and consequently vary in metamorphic grade from low-grade prehnite-pumpellyite facies on the SW to high-grade kyanite gneiss on the NE. The majority of vein gold deposits occur in greenschist-facies rocks which roughly follow the Coast Range megalineament in the Juneau Gold Belt.

STRUCTURE

Rocks in the area display a strong regional foliation trend of 120°-150° and usually dip moderately to steeply to the NE. Dips to the SW occur in some areas including the Berners Bay area.

Folding in the Gold Belt ranges from microscopic to megascopic in scale. The larger folds, exemplified by the Perseverance syncline and Nevada Creek anticline, are probably very common throughout the region in general but are rarely obvious because of their size. The Perseverance syncline has a wavelength of about 2,500 feet in upper Silver Bow Basin and an amplitude of at least 3,500 feet. Regional foliation parallels the axial planes of these large folds. Smaller folds, with amplitudes of a few inches to a few feet are common in outcrop and mine workings and represent drag folding along the limbs of the major folds. At least three different episodes of folding were identified at the Perseverance Mine area during this study.

There are two major fault sets in the Juneau Gold Belt: 1) foliation parallel faults, and 2) faults approximately normal to foliation that trend 070° to 080°. The Coast Range megalineament is an example of the former type. Many other smaller foliation-parallel faults occur along the contacts between the massive, resistant metavolcanic units and the more plastic black phyllite. The Rubicon, Herbert Glacier, Bessie, and Alaska Washington veins are hosted in faults normal to the foliation. Most of these faults are small with offsets of a few feet to a few tens of feet. The Silver Bow fault, in the Alaska Juneau Mine, however, has both horizontal and vertical offsets of about 1,800 feet.

ALTERATION

Hydrothermal alteration assemblages within vein wall-rock in the Juneau Gold Belt is dependent on both wallrock lithology and the intensity of veining. Black phyllite and similar rocks exhibit very little obvious alteration but mafic metavolcanic and plutonic rocks are often intensely altered. The metagabbros at the Alaska Juneau Mine, diorite at the Kensington and Jualin Mines, and amphibolite at the Crystal Mine show extensive carbonate-biotite-quartz-pyrite alteration. Carbonate minerals are generally ankerite with minor calcite. Sericitization is also widespread at the Alaska Juneau Mine.

A second type of alteration occurs at the Treadwell Mine and, more weakly, at the Boston and Wagner prospects. At these prospects, dioritic sill/dikes have been intensely altered to albite, quartz, calcite, and pyrite with the coeval destruction of all mafic minerals (*D–50*).

Intensity of alteration is directly related to the size of the vein system which, in turn, is a result of the amount of hydrothermal fluid which penetrated a given area. The carbonate alteration halo around the Alaska Juneau Mine extends up to 0.7 miles outward from the orebodies (*D–87*); at the Jualin Mine, mafic minerals have been destroyed over a width of about 200 feet; and at the Crystal Mine, alteration has affected the wallrock within only 5 feet of the vein margin.

MINERALIZATION

The Juneau Gold Belt is delineated by the occurrence of gold-bearing quartz veins which commonly carry silver, galena, sphalerite, and chalcopyrite. Pyrrhotite and pyrite are present in veins throughout the region and portions of the Gold Belt also contain other sulfide minerals such as arsenopyrite, tellurides, or molybdenite. Generally, sulfide minerals form less than 5% of a typical vein.

The veins in the Juneau Gold Belt usually contain native gold, pyrrhotite, pyrite and lesser sphalerite, galena, and chalcopyrite. Some areas, however, also contain distinctly different mineral assemblages. These include: 1) the Berners Bay gold-silver-copper-telluride area, 2) the Eagle River gold-arsenopyrite area (Berners Bay to Mendenhall valley), and 3) the gold-sphalerite-galena district (the area south of the Mendenhall valley).

The Berners Bay gold-silver-copper-telluride area includes the Jualin-Kensington Mines area on the north side of Berners Bay. Most deposits commonly contain pyrite, small amounts of gold, silver-gold tellurides, chalcopyrite, and traces of galena. There is approximately twice as much tellurium as gold in the veins. Petzite, hessite, calaverite, and montbrayite have been identified to date. Most of the veins in this area are within or near the Jualin diorite.

The gold-arsenopyrite area stretches from the south side of Berners Bay to the Mendenhall valley. Arsenopyrite is the dominant sulfide and pyrite, galena, pyrrhotite, sphalerite, and gold occur in subordinant quantities. Black phyllite and mafic metavolcanic rocks host most of the veins in this area.

Most of the veins in the Gold Belt south of the Mendenhall valley are dominated by pyrrhotite and/or pyrite with lesser sphalerite, galena, chalcopyrite, and gold. This portion has several local variations including: 1) the Perseverance-Silver Falls-Penn Alaska arsenopyrite-stibnite area, 2) the Sheep Creek silver area, and 3) the Treadwell molybdenite area. In the Perseverance-Silver Falls-Penn Alaska area, arsenopyrite is common at the Perseverance Mine and very abundant at the Silver Falls prospect where it occurs with stibnite. Stibnite, in small amounts, also occurs at the Penn Alaska prospect.

The Sheep Creek silver area, which includes the Ascension, Glacier, Silver Queen, and Reagan veins, contains far more silver than gold in the quartz veins. Common minerals are galena, sphalerite, tetrahedrite, native silver, and electrum. Silver to gold ratios are as high as 300:1.

The Treadwell molybdenite area includes the Treadwell, 700-Foot, Mexican, Ready Bullion, and Mineral Queen deposits. Pyrite, molybdenite, and gold are the most common minerals in these deposits.

VEIN CONTROLS

Four type of quartz veins occur in the Juneau Gold Belt: 1) foliation-concordant veins, 2) foliation-discordant veins, 3) cross-shear veins, and 4) breccia-fillings. The presence of a specific type of vein is dominantly controlled by differences in lithology, competency contrasts, and/or structure.

Foliation-concordant veins

Foliation-concordant quartz veins are the most common type in the Juneau Gold Belt and can be found in three settings: 1) at the contact between a plastic and a competent unit, 2) in shear zones within black phyllite, and 3) in stringer zones. Veins which form at the contact between rocks with contrasting competencies are the most common of the varieties. Most of these veins, found at the California-Gold Standard, Smith & Heid, and the Alaska Juneau Mine, parallel the contact between black phyllite and mafic metaigneous rocks or metagraywacke. Where foliation doesn't parallel bedding, such as the Glacier/Silver Queen area in Sheep Creek, the veins begin at the metamafic-phyllite contact and follow the foliation away from the contact. Concordant veins are generally sheared and boudined with irregular, discontinuous forms.

The second type of concordant veins are hosted by linear shear zones of highly deformed and crushed black phyllite in the Eagle River area. Veins in these tectonic zones tend to be very irregular in size and shape, and highly discontinuous.

The third type of concordant veins occur in stringer zones at the E Pluribus Unum, Dividend, and Black Chief. These zones are basically swarms of very small, foliation-concordant quartz veins. The zones range from a few inches to a few tens of feet in width, contain numerous small veins with widths averaging only one inch or two, and may contain up to 50% quartz veins. The zones usually occur, as do most other concordant veins, within the black phyllite along the contact with mafic metaigneous rocks and may contain larger, concordant quartz veins.

Foliation-discordant veins

Discordant quartz veins are steeply dipping, sharp-walled veins whose strike parallels foliation and whose dip crosscuts it. This type of vein includes those hosted by metagabbro in the Alaska Juneau mineral system (Dora, Humboldt, Ebner, AJ, Perseverance, Gould & Curry) and those hosted by larger igneous bodies (Berners Bay, Enterprise, Crystal, Friday). In the larger igneous bodies, the veins have dips ranging from 8° to 65° and are commonly bounded on one or both margins by shears.

Cross-shear veins

Cross-shear veins usually form in mafic metaigneous rocks and other brittle rocks that did not develop strong foliations (such as diorite and felsic gneiss). This type of vein is found at the Bessie, Alaska Washington, Mitchell-McPherson, Herbert Glacier, Summit/St. Louis, Montana Basin, Treasury Hill, Dull & Stephens, and Rubicon prospects. Cross-shear veins are almost always associated with small shears that trend nearly perpendicular to bedding (070° to 075°). Most of the shears have small offsets (less than 100 feet) but are persistent. In at least one case (Rubicon), the shears form an en echelon set of vein-filled fractures.

Breccia-filling veinlets

This type of veining is predominant in the altered diorite at the Treadwell group of mines, the Boston, and the Wagner deposits. In these deposits, the diorite has been brecciated and healed by both quartz and calcite. Generally, the veinlets are very thin (less than an inch) but some larger veins are also present. Veining is confined to the altered diorite and does not extend into the surrounding country rock.

ORIGIN OF VEIN GOLD DEPOSITS

Recent work by Goldfarb and others (*D-41, D-42*) and Newberry and Brew (*D-86, D-87*) indicate that the Alaska Juneau deposit and other vein gold deposits in the Juneau Gold Belt were created by metamorphically-derived hydrothermal fluids. Their model involves the release of H_2O-CO_2-rich fluids at depth during prograde metamorphism. The fluids migrated upwards along the Coast Range megalineament and related fractures to shallower, cooler crustal levels. Gold was leached from the country rocks during fluid migration. Oxidation, sulfidization, and declining pressure and temperature resulted in gold deposition in the Gold Belt; at the Alaska Juneau Mine boiling was also important (*D-42*). Deposition occurred in an elongate belt of greenschist facies rocks which follow the Coast Range megalineament. Where the megalineament cuts into higher grade metamorphic rocks south of Windham Bay, vein gold deposits cease (*D-41, D-87*).

Field observations of hydrothermal alteration and gold-bearing veins at many mines indicated that ore deposition followed regional metamorphism of the host rocks (*D-41, D-42*). Newberry and Brew (*D-87*) indicate that the peak of metamorphism in the mine area occurred about 70 Ma and Goldfarb and others (*D-41*) have dated hydrothermal sericite from a gold-bearing quartz vein at the Alaska Juneau Mine and the Sumdum Mine as 55 Ma.

VOLCANOGENIC SULFIDE BODIES

Volcanogenic sulfide bodies also occur in the Gold Belt at Sweetheart Ridge and the Alaska Treasure and Yakima prospects on Douglas Island. These deposits include weakly-developed massive sulfide bodies at Sweetheart Ridge, Alaska Treasure, Yakima, Jersey, and New Boston prospects.

THE ALASKA JUNEAU MINE

HISTORY

The lode system of the Alaska Juneau Mine (figs. D-5, D-11, D-12) was discovered in Silver Bow Basin by Richard Harris and Joe Juneau in 1880, and many claims were staked. Initial work consisted primarily of placer mining of soil and gravel over the deposit and between $600,000 to $800,000 in gold was produced between 1881 and 1890. The first arrastras (rock-lined pit) were built to crush the vein quartz on the Fuller First claim in 1882, 1883 ($2,000 produced), and 1884. In 1886, Huntington mills were erected on both the Fuller First and Aurora lodes but neither worked well. Another arrastra was operated at the Fuller First Mine in 1889, and some work was done at the Aurora.

A Dodge mill was erected by Archie Campbell at the Fuller First (Juneau Mining Company) in 1890, and operated each summer until 1893. Campbell drove several tunnels and, in 1892, sold $11,500 worth of gold to the U.S. Mint. In 1893, Campbell purchased the original 5-stamp mill used by John Treadwell at the Treadwell Mine in 1882 and set it up at the Fuller First (fig. D-3). The mine produced $11,761 from 2,447 tons of ore during that year and $10,219 from 2,174 tons of ore in 1894.

A second Huntington mill was erected on the Aurora claim in 1893, and $4,500 of gold was produced from 100 tons of ore. Development continued in 1894 but the mill did not run.

In late 1894, Californians A. Hayward and C.D. Lane purchased the Fuller First and 16 other claims. A 30-stamp mill was built in 1896 and both it and the 5-stamp mill ran during the year, treating a total of 8,426 tons of ore.

The Fuller First claim was sold to the Alaska Juneau Gold Mining Company in January 1897. The new company explored the area by diamond drilling and produced a total of 3,808 tons of ore during the year. The 30-stamp mill was used for regular ore while the 5-stamp mill was used only to crush rock from development work.

In 1901, an adit was started from Last Chance Basin (Gold Creek Tunnel) but work was intermittent over the next few years. A sea level tunnel was started from the beach near Juneau in November 1902, but was halted after only a couple hundred feet were completed.

In 1904, adits were driven below the mining pits to test mineralization at depth. The mine produced $40,000 during 1905, $26,000 in 1906, $22,093 in 1907, $19,231 in 1908, and $36,290 in 1909.

In 1911, Frederick Bradley contracted to drive the Gold Creek Tunnel and build a 200-stamp mill on the beach near Juneau. Work on the tunnel started in August 1911, and was completed 2 years later. Mill construction began in September 1912. A 40-stamp pilot mill was started in 1914, expanded to 50 stamps in 1915, and the 30-stamp mill closed down in Silver Bow Basin.

In 1915, mill plans were changed from stamps to an 8,000 ton/day ball mill. The mill was completed in March 1917 but proved to be capable of handing less than half (maximum of 3,833 tons/day) of the design capacity. Capacity was further reduced to less than 2,000 tons/day by machinery problems. Milling costs were $0.72/ton, more than twice the expected cost.

The company was forced to use the 50-stamp mill for much of the crushing as modifications were made to the new mill between 1918 and 1920. Hand sorting was introduced which eliminated waste rock from going through the fine crushers. Milling costs were reduced to $0.45/ton by 1920. The first small operating profit was made in early 1920 when almost a million tons of ore were sent to the mill.

In 1920, the South Orebody (fig. D-7) began to produce ore of higher grade than that from the North Orebody. An average of 6,328 tons of ore/day were produced in 1922, of which about half was rejected as waste. Milling costs were reduced to $0.26/ton (down $0.45 since 1917). The South Orebody produced almost 11% of the ore.

In 1923, the Ebner Mine (fig. D-8) was acquired under a royalty agreement. The Alaska Juneau Mine sent 2.5 million tons of ore to the mill. About 20% of the ore came from the South Orebody and half rejected as waste.

The company's first net profit was made in 1924 when an average of 8,250 tons were mined daily and milled at a cost of $0.25/ton. The ore yielded only $0.65/ton. In 1925, with almost half of the ore from the South Orebody, production was increased to more than 10,000 tons/day. The South Orebody continued to supply more of the ore to the mill and was producing 92% of the total by the end of 1928. The higher grade ore from the South Orebody ($1.11) resulted in the first really profitable year in 1928. Indebtedness was paid off in late 1929 and the company was able to declare its first dividends.

In 1931, work began on the Deep North Orebody. Ore from this area averaged $3.30 in gold per ton compared with $1.11 from the South Orebody. The big hoist for the Main Shaft, which was driven 1,300 feet below the 4-level to open the Deep North Orebody, was in operation in

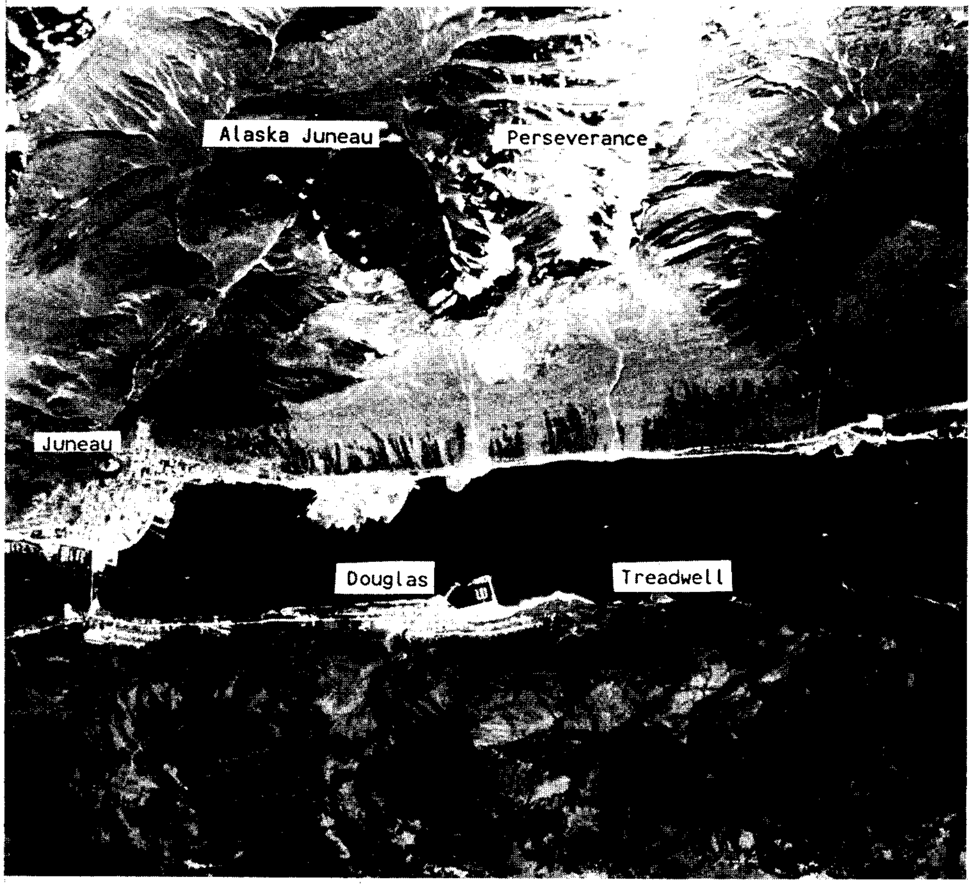

Figure D-2.—Infrared photograph of the Alaska Juneau, Perseverance, and Treadwell Mine area, showing Juneau, Douglas, and the Alaska Juneau and Treadwell glory holes.

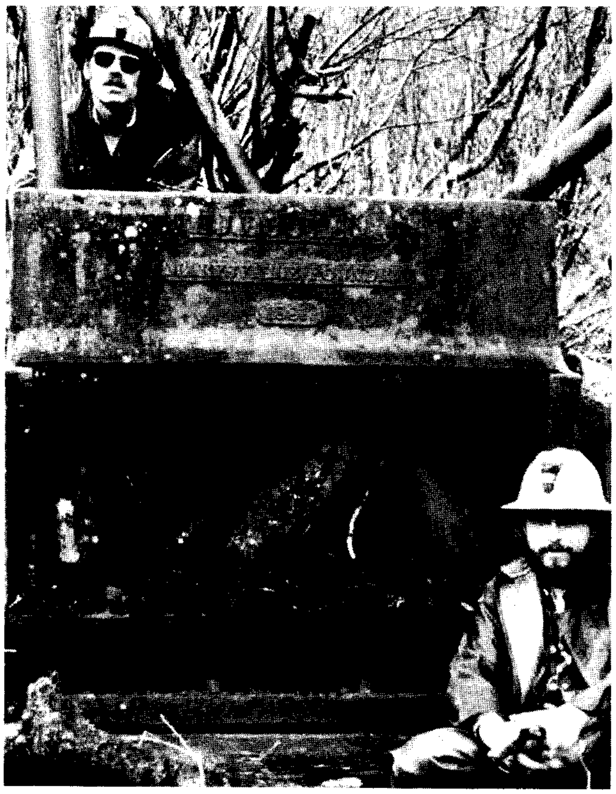

Figure D-3.—The original 5-stamp mill brought to Treadwell by John Treadwell in 1882. The mill was purchased by Archie Campbell in 1893 and used at his mine on the Fuller First claim (which later became part of the Alaska Juneau Mine). (All photographs taken by authors unless otherwise noted.)

Figure D-7.—The Alaska Juneau Glory Hole, the source of much of the mine's 88 million ton production. The vegetation-covered dump of the Perseverance Mine is on the left.

1934 and, by the end of 1936, was hauling up 500,000 tons of ore each year.

The holdings of the defunct Alaska Gastineau Company were purchased by the Alaska Juneau Company in 1934 and connected by tunnels the next year. In 1936, the Perseverance portion of the mine produced 1% of the total ore sent to the mill but during the following years as the huge South Orebody was mined out, the Perseverance section contributed an increasingly large percentage of the ore mined. A total of 15% of the ore came from the Perseverance in 1937, 35% in 1938, and 70% in 1943.

The Alaska Juneau Mine produced over 3.5 million tons of ore each year after 1924, achieving a record of 4.8 million tons of ore mined in 1940. But in 1942, labor shortages caused by World War II reduced the amount of ore that could be extracted. Annual production dropped to 2.8 million tons in 1942, then to 1.5 million tons in 1943, and finally to 240,879 tons in 1944. Labor shortages, which had reduced the work force from 1,000 workers in 1940 to 275 in 1944, and rising prices forced the mine to stop all operations in April, 1944.

Between 1901 and 1944, the Alaska Juneau Mine produced 88,052,480 tons of ore and recovered 2.9 million ounces of gold, 1.9 million ounces of silver, and 40 million pounds lead. Prior to 1901, only another few tens of thousands of tons of ore were produced. The Alaska Juneau mineral system, including the Ebner and Perseverance mines yielded 3.5 million ounces gold, 2.2 million ounces silver, and 45 million lb lead from 100 million tons of ore.

The Alaska Juneau company purchased the Ebner Mine in 1951 but, in 1957, the company began selling obsolete and unneeded equipment. Within 2 years, the company was selling everything and abandoned hope of reopening the mine. In 1972, Alaska Electric Light and Power Company purchased all the Alaska Juneau holdings in order to acquire the power facilities and 2 years later sold most of the property to the City and Borough of Juneau (*D-16, D-97*).

Barrick Resources and WGM, Inc. gained a lease on the Alaska Juneau and Treadwell properties in 1984. The lease was assumed by Echo Bay Mines in 1985 and the new company began an aggressive program to reevaluate the mine. By the end of 1988, the company had reopened the Sheep Creek Tunnel (fig. D-9), driven a 2,000-foot decline to connect it with the Alaska Juneau 4-level, collected a 1,000-ton bulk sample, completed considerable diamond drilling (fig. D-10), and initiated engineering studies. During the winter of 1988-1989, Echo Bay conducted a drilling program to block out 25,000,000 tons of reserves.

WORKINGS AND FACILITIES

There are 93.7 miles of workings on 15 levels (lowest 5 are flooded) (fig. D-7) in the Alaska Juneau portion of the mine and a total, including Perseverance workings, of 119.7 miles of workings.

During 1986–1988, Echo Bay Mines renovated the Sheep Creek Tunnel and AJ 4-level, drove about 1,100 feet of workings in the Perseverance orebody and completed a 2,000-foot decline driven from Sheep Creek Tunnel to AJ 4-level.

PREVIOUS WORK

Geological work in the Alaska Juneau Mine by the U.S. Geological Survey began in 1895 with the investigations of Becker (*D-13*). During their work in the area, the Alaska Juneau was just beginning to be explored but they noted the extensive "fissure" system and it's geological similarities to the Mother Lode deposits in California and some of the British Columbia lodes. Spencer (*D-130*) accurately described the major lithologic units and relationships of the Alaska Juneau Mine area and the association of the quartz veins with the interfingered phyllite and metagabbro. In the early 1920's, Buddington and Chapin (*D-24*) mapped the regional geology of southeast Alaska and recognized the overturned isoclinal geometry of the metamorphic rocks bordering the Coast Range metamorphic-plutonic complex in the Juneau area.

The first detailed work on the geology of the Alaska Juneau Mine was published by Wernecke (*D-153*) in 1932. Wernecke described the quartz vein swarms that formed the orebodies at the mine, the alteration associated with the quartz veining, the relationships between mineralization and faulting, and predicted the rich orebodies in the Deep North section of the mine. He noted that the vein swarms were along a "metagabbro wedge" but did not identify any structural controls on mineralization.

Wayland (*D-148*) worked at the Alaska Juneau Mine in 1937 and collected data on the paragenesis of the metallic minerals. Twenhofel (*D-144*) studied the Alaska Juneau Mine in 1946 and 1947, after the mine had closed. His work reiterated much of what Wernecke had found but added detail to ore mineralogy and hydrothermal alteration associated with quartz veining.

Studies by Herreid (*D-49*) and by Brew and Ford (*D-21*) noted that there were large isoclinal folds in the mine area. Each concluded that the veins were axial planar and may have been controlled by the fold axis. Goldfarb and others (*D-42*) studied fluid inclusions from

Table D-2.—Gold and silver production from the Alaska Juneau Mine

Year	Tonnage (st)	Oz/t ore	Oz/t recovered	Total ($)	Production oz Au	Production oz Ag
			Early Years			
1883	na	na	na	2,000	97	na
1892	na	na	na	11,500	556	na
1893	2,447	na	0.140	11,761	569	na
1894	2,174	na	0.137	10,219	494	na
			30-Stamp Mill (Juneau Mining Co., Alaska Juneau Gold Mining Co.)			
1895	8,426	na	na	na	na	na
1896	na	na	na	na	na	na
1897	na	na	na	120,000[1]	4,838	na
1898–1900	no data					
1901	13,530	0.098	0.073	20,566	995	na
1902	18,290	0.120	0.090	34,019	1,646	na
1903	18,012	0.105	0.078	29,179	1,412	na
1904	23,749	0.103	0.077	37,761	1,827	na
1905	24,400	0.082	0.061	40,000	1,935	na
1906	23,472	0.071	0.053	26,000	2,419	328
1907	19,798	0.072	0.054	22,093	1,451	333
1908	17,333	0.072	0.054	19,231	1,090	191
1909	17,911	0.123	0.092	36,290	1,790	365
1910	19,017	0.078	0.058	22,665	1,091	201
1911	16,686	0.046	0.034	11,927	574	109
1912	19,939	0.093	0.071	28,079	1,657	139
			Pilot Mill (50 stamps)			
1913	new mill under construction					
1914	60,026	0.064	0.051	69,023	3,339	420
1915	179,892	0.064	0.050	187,088	8,255	3,657
1916	180,113	0.045	0.031	121,378	5,387	2,797
			New Ball Mill			
1917	677,410	0.042	0.031	460,665	22,107	11,327
1918	592,218	0.045	0.035	459,445	21,130	11,771
1919	692,895	0.048	0.035	542,385	24,480	15,762
			Ball Mill Reconstruction			
1920	942,870	0.052	0.038	791,389	35,474	23,295
1921	1,613,600	0.042	0.029	1,035,250	46,812	38,982
1922	2,310,550	0.039	0.027	1,388,679	62,675	49,369
1923	2,476,240	0.092	0.028	1,514,774	69,008	41,866
1924	3,068,190	0.042	0.030	2,055,781	92,210	63,252
1925	3,481,780	0.041	0.028	2,184,384	98,223	55,945
1926	3,829,700	0.036	0.024	2,067,836	93,512	51,004
1927	4,267,810	0.037	0.027	2,463,262	112,646	61,004
1928	3,718,140	0.054	0.041	3,316,016	151,951	77,596
1929	3,836,440	0.054	0.043	3,627,247	164,979	90,635
			Peak Years			
1930	3,924,460	0.053	0.041	3,551,950	163,298	97,607
1931	4,162,350	0.054	0.043	3,879,839	179,785	119,788
1932	4,001,630	0.048	0.038	3,236,183	151,347	94,276
1933	4,085,960	0.047	0.037	3,960,165	150,967	109,483
1934	4,302,600	0.040	0.030	4,582,558	128,015	127,119
1935	3,729,660	0.041	0.032	4,281,110	118,998	77,787
1936	4,366,800	0.042	0.034	5,400,620	149,157	101,148
1937	4,442,760	0.044	0.031	5,516,414	151,671	120,691
1938	4,663,880	0.039	0.032	5,364,487	147,984	125,418
1939	4,648,060	0.035	0.028	4,695,537	128,775	109,917
1940	4,739,790	0.033	0.023	4,447,171	123,408	96,776
1941	4,354,770	0.035	0.026	4,370,920	119,370	98,500
1942	2,765,190	0.035	0.028	2,749,118	74,432	58,443
1943	1,461,830	0.035	0.028	1,455,860	39,927	35,531
1944	240,879	na	0.042	353,517	9,712	8,454
Totals	88,063,677	0.044	0.032	76,986,093	2,873,475	1,890,651

NA Not available.

[1] May represent several years production.

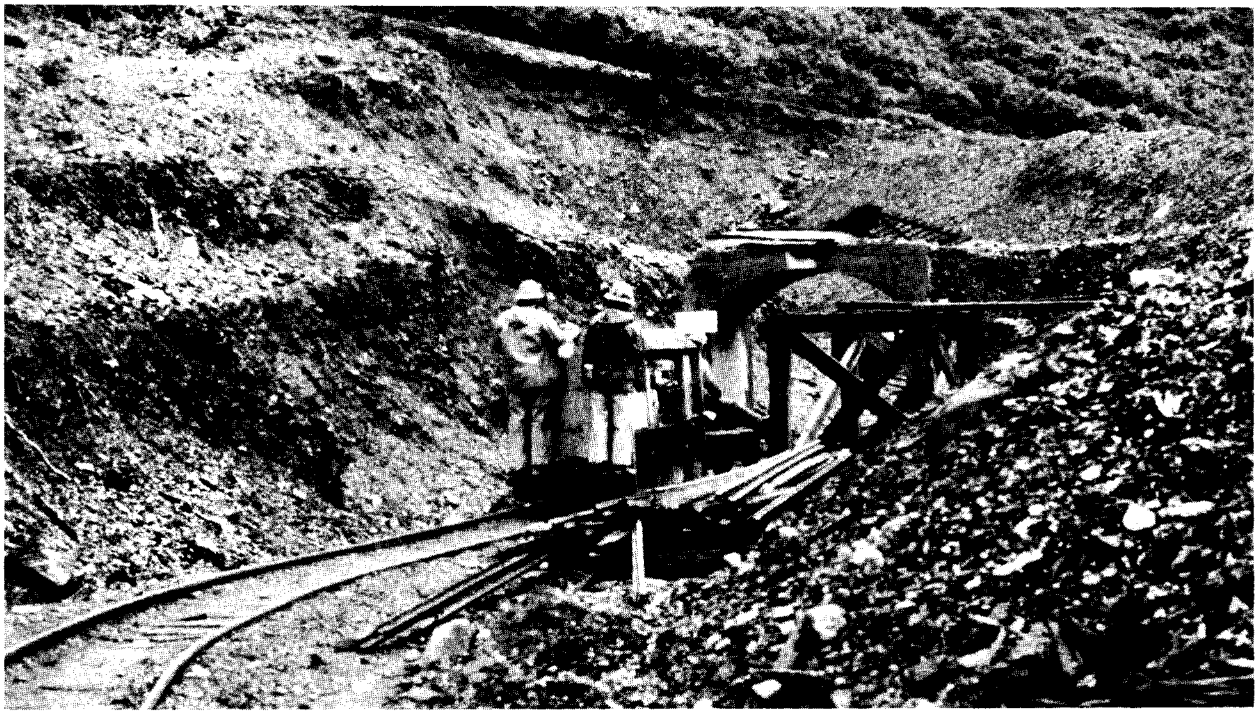

Figure D-9.—The Sheep Creek Tunnel was reopened in 1986 by Echo Bay Mines in order to begin an underground evaluation of the Alaska Juneau Mine.

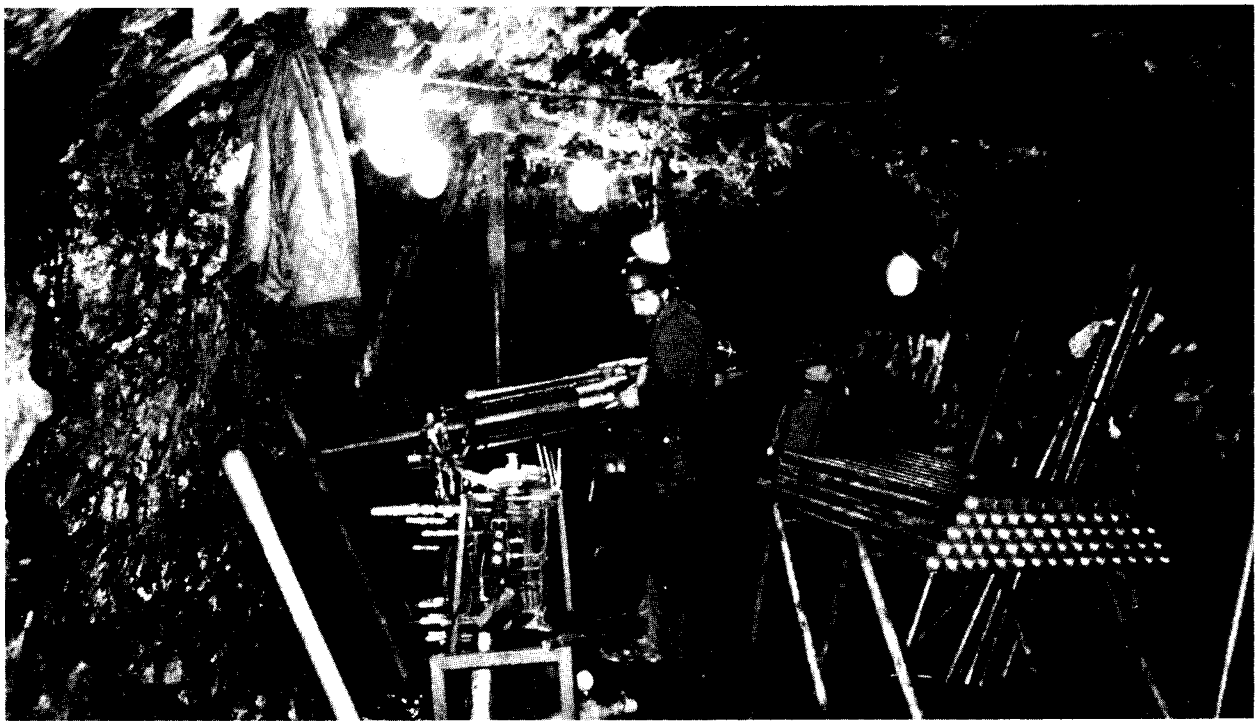

Figure D-10.—Drilling in the Alaska Juneau Mine, part of evaluation work by Echo Bay Mines.

quartz veins in the Alaska Juneau Mine. Their work supported a metamorphic fluid source for the mineralization at the mine.

The Bureau mapped the 6- and 8-levels of the Alaska Juneau Mine and the surface of the Perseverance Mine in detail during the Juneau Mining District study. After 3 years of field work, Miller (*D-74*), and Miller and Redman (*D-75*), devised a structural ore control model for the Alaska Juneau deposit based on metamorphic gold deposits and a large synclinal fold. The model is currently being used by Echo Bay Mines in its exploration work.

BUREAU INVESTIGATIONS

Regional Geology

Rock units in the Alaska Juneau Mine area consist of NW-striking and NE-dipping, regionally metamorphosed argillaceous sedimentary and mafic volcanic rocks of Triassic age. Metamorphic grade of the rocks is middle to upper greenschist. The strata have been isoclinally folded and attenuated along the limbs so that lithologic continuity is difficult to reconstruct.

Alaska Juneau Geology

The mine area consists primarily of the black pelitic Perseverance phyllite, that lies structurally above chlorite schist. The chlorite schist lies above the massive Gastineau metavolcanics. The Perseverance phyllite includes interbeds of quartzose felsic phyllite and quartz-chlorite phyllite and has been intruded by locally numerous metagabbro sills (figs. D-11, D-12). The units have been compressed into large isoclinal folds.

During late structural deformation, competency contrasts between the metagabbro in the fold hinge and the surrounding phyllite led to open fractures and the shearing needed for the deposition of quartz and the base and precious metals. Differences in competence between the plastic phyllite and brittle metagabbro resulted in many fractures along the contacts between the rocks. The ore bodies follow the SE plunge along and near fold hinges, at the contact between the phyllite and metavolcanic rocks, and in homogenous rocks adjacent to fault zones.

Structure

Folding is pervasive in the Alaska Juneau area but is obviously visible only in the felsic phyllite unit. Folds range from large (wavelengths of about 2,500 feet) to microscopic in size. Three episodes of folding have been identified at the Alaska Juneau Mine. The dominant fold set (F2) is overturned to the west and has axes which plunge 30°-50° to the SE (figs. D-13, D-14). The large syncline that controls the Alaska Juneau ore zone displays polyharmonic folding (complex internal folding) in the hinge area. The folds on the nose of the major fold form the digitations that controls the location of the Alaska Juneau deposit.

There are two orientations of faults in the Alaska Juneau Mine area (figs. D-11, D-12): 1) faults that are subparallel to bedding and orebodies, and 2) faults that crosscut the rock units and the orebodies. Many of the faults have undergone both pre- and post-mineralization movement. Field evidence indicates that ground preparation prior to veining was facilitated by shearing.

Many NW-trending, steeply NE-dipping foliation-parallel faults occur in the mine area, including the Nugget Gulch, Taku, and Ebner faults. Fault planes tend to be undulatory with strike and dip both varying up to 15° in a few hundred feet, and have both horizontal and vertical slickensides. Horizontal movement was probably right-lateral. The faults are usually subparallel to foliation but, locally, dip more steeply. They also cut quartz veins. Many of these subparallel structures are brittle-ductile shears and are subparallel to the axis of the large fold hinge in the mine area. The most notable of these faults is the Nugget Gulch fault which can be traced from the Ebner to the Perseverance mines and occurs in the black phyllite within 100 feet of the metavolcanic contact. The latest movement on these faults, based on quartz vein offsets, had a reverse sense.

Crosscutting faults tend to strike E-W and dip steeply to the N or S. The Silver Bow fault, the most notable of the crosscutting structures, consists of two anastomosing strands composed of schistose graphite up to 20 feet wide. According to Wernecke (*D-153*), the fault has had oblique offset with about 1,800 feet of displacement in both normal vertical and left-lateral horizontal directions. More recent Alaska Juneau Company maps (dated 1945) show only 900 feet of vertical separation but Bureau work supports the larger figure. Most of the displacement was post-mineral but initial movement occurred during mineralization as shown by the streaked sulfides in veins near the fault on the 6- and 8-levels. Sulfide masses in veins near the fault on these levels have a distinctly elongate form down dip that contrasts markedly with highly irregular sulfide masses common in veins away from the fault.

Alteration

Quartz veining in the mine area was accompanied by the development of intense biotite-ankerite alteration.

The alteration assemblage consists of brown biotite and ankerite/ferroan dolomite with fuchsite (Cr-mica) common locally in the metagabbro and chlorite schist. Newberry and Brew (*D-86*) have noted that there is an inner ferroan dolomite/ankerite alteration zone adjacent to the orebody which is surrounded by an outer calcite zone. These zones are elliptical in plan view with the long axis in a NW-SE orientation. Reactive metagabbros and chlorite schists exhibit the most conspicuous alteration. Alteration in the black phyllites is much less obvious than in the mafic rocks.

Alteration increases in intensity toward the center of the vein swarms. In the center of the ore body where veining is the most intense, the metagabbro bodies are intensely altered with abundant biotite and have been mapped as "brown metagabbro". In areas with less intense quartz veining, and consequently less alteration, the metagabbros contain more chlorite than biotite and have been mapped by color as "green metagabbro" (*D-153*). Isolated quartz veins that cut green metagabbro away from the orebodies have altered the wallrocks along their margins to brown metagabbro. The alteration assemblage is identical to that associated with the main orebodies but is usually restricted to a zone in the metagabbro about the thickness of the vein.

In the Ground Hog, Perseverance, and eastern South Orebody areas, where the quartz veins are hosted in part by chlorite schist, the schist has been altered to a rock very similar to the brown metagabbros. The altered schist has been mapped by previous workers as either brown metagabbro or altered Gastineau metavolcanics.

Most alteration is confined to areas with quartz vein swarms but the contact between the chlorite schist and the Perseverance phyllite also displays biotite/carbonate alteration well away from the main orebodies. In Ebner and Jeff & Russell tunnels, the metavolcanic rocks at the contact are cut by quartz veins and altered even though the ore zones are over 1,000 feet away. It is obvious that the metavolcanic/black phyllite contact has acted as a conduit for mineralizing fluids.

Ore Controls

Age and Pressure/Temperature Conditions

Fluid inclusion studies (*D-42, D-65*) indicate that ore deposition at the Alaska Juneau Mine occurred from a boiling, H_2O-CO_2-rich fluid at temperatures in excess of 230°C. Minimum pressure estimates of 1.5 kb limit vein formation to depths of over 3 miles. Sulfide geothermometry and geobarometry measurements (*D-87*) suggest veining occurred at 300° to 380°C and 3 to 4 kb. The latter data imply gold deposition at crustal depths of greater than 6 miles. Peak metamorphic temperatures in the host rocks occurred at roughly 70 Ma (*D-87*). Hydrothermal minerals from the Alaska Juneau veins have been dated at 55 Ma (*D-40*)

Mineralization at the Alaska Juneau Mine occurred near the end of regional metamorphism under mesothermal conditions at a depth of about 8 km. The peak of the metamorphic event occurred about 70 to 90 Ma (*D-87*) and recent work by Leach and others (*D-65*) and Newberry (*D-86*) has given ages of mineral deposition, based on K-Ar from muscovite in quartz veins, of 55 Ma and 57 Ma. Sulfide minerals indicate that temperatures were 300° to 375°C in the veins, and in excess of 375°C in the wallrocks (*D-86*). Sphalerite geobarrometry by Newberry and Brew (*D-86*) gave vein formation pressures of about 2.5 kb. Leach and others (*D-65*) studied fluid inclusions from the Alaska Juneau veins which suggested pressures in excess of 1.5 kb and, probably, 3 kb.

Veins

At least six quartz vein sets have been delineated in the Alaska Juneau Mine area by the Bureau. Three vein sets are premineral and contain no other minerals than pyrrhotite but three of the vein sets contain economic mineralization. The premineral veins tend to be thin, barren, and strongly folded with the foliation.

The most common mineralized vein sets both strike NW, but (fig. D-15) one set dips moderately to steeply NE while the other dips steeply SW. Generally, the NE-dipping veins occur in the NE-dipping black phyllite while SW-dipping veins occur in cross-fractures in metagabbro bodies (fig. D-16). The SW-dipping veins commonly crosscut the NE-dipping set but the converse is also true so the two sets are probably of similar age.

The NE-dipping veins were formed by shearing while the SW-dipping veins are tensional in origin. Calcite fibers that occur in the mineralized veins are oblique to the vein walls in the NE-dipping veins, which indicates a shear stress synchronous with or after the formation, while fibers in SW-dipping veins are perpendicular to the vein walls, indicating a tensional origin.

The third mineralized quartz vein set strikes E-NE and dips subvertically. These veins comprise $<1\%$ of the total veins. Crosscutting relationships indicate they were formed after the first two vein sets.

Vein orientation changes in both strike and dip along the trend of the ore body (figs. D-13, D-14). Vein strike varies from approximately 015° at the Jeff & Russell tunnel (north) to about 310° in the South Orebody. Vein dip remains relatively constant with veins dipping about 75° NE and 80° SW. Foliation strike over the same area remains a constant 310° but dip steadily increases from

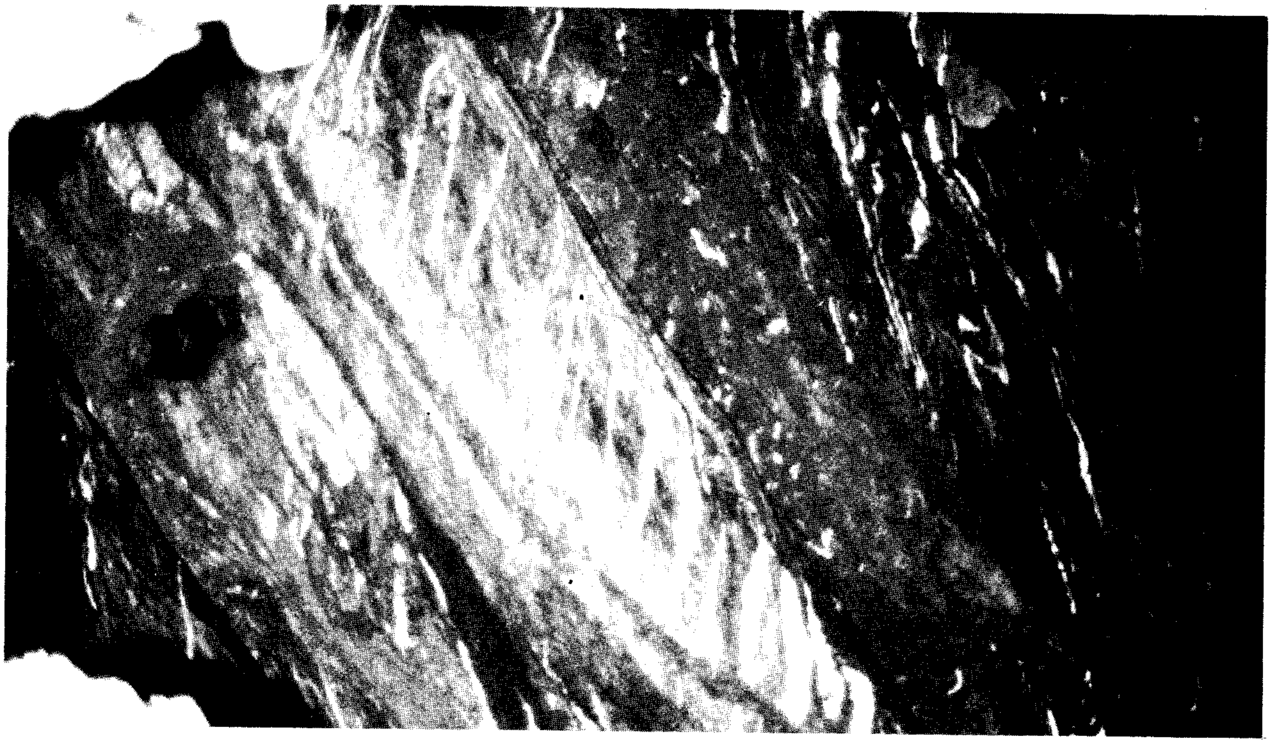

Figure D-15.—Differences in quartz veining in metagabbro and black phyllite, 160 stope, Alaska Juneau Mine. Short thick veins dipping to the left cut metagabbro and irregular, right-dipping veins cut black phyllite.

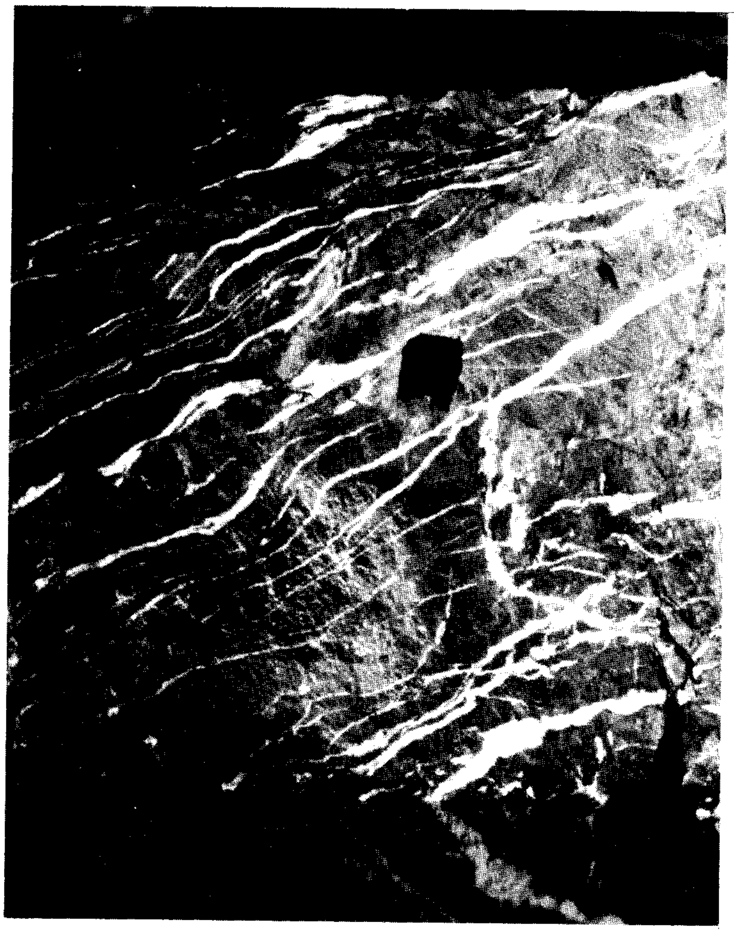

Figure D-16.—Quartz veins cutting altered metagabbro in the 1000 stope, Alaska Juneau Mine (crosscut on far side of stope is 6 feet high).

50° NE on the north to more than 60° NE on the south. Boudinage is common in the NE-dipping veins probably because they occur in the mobile phyllite.

Synclinal Hinge Model

The major synclinal fold hinge, that plunges SE from the North Orebody, has been strongly mineralized along both the upper and lower contacts of a large metagabbro unit (figs. D-7, D-17). The ore bodies are controlled by the superposition of the anastomosing, NW-striking faults on the hinge area of the fold. The lower contact hosts the Ebner stopes mined by the Alaska Juneau Co., and the 440, 800, 810, 830, 1000, 1010, 1030, and the 1200 stopes while the upper contact controls the 420 and 410 stopes in the North Orebody, the South Orebody, and the Icy Gulch Orebody (fig. D-7). In the Perseverance Mine, the ore is concentrated underneath a folded felsic schist unit.

By looking at ore grades in stopes above and below the metagabbro and felsic schist bodies, it is apparent that the richest orebodies occur at the bottom of the folded units. In the Deep North Orebody, on the bottom of the folded metagabbro, the ore averaged over 2.4 ppm gold while ore in the South and Upper North Orebodies, above the metagabbro, averaged about 1.4 ppm. In the Perseverance Mine, ore from the zone below the felsic schist ran over 3.4 ppm gold (private Alaska Juneau production reports). This difference is attributed to the permeability of the rocks overlying the metagabbro-phyllite contact. Below the dense, less fractured rocks in the fold (metagabbro and felsic schist) upward fluid migration would tend to be restricted causing ponding. Above the dense units, the fluids could easily migrate upward into the more fractured phyllite, thereby spreading the gold-bearing fluids through more rock and creating lower grades.

The ore zone crosscuts the regional fabric at 10° to 15° more northerly and dips more steeply. Because of this, the ore zone cuts into greenschist at the southern (Perseverance Mine) end of the mineralized zone. At the northern end, the Ebner Mine, the mineralized zone is about 1,200 feet from the metavolcanic contact but in the Perseverance Mine, the greenschist hosts some of the ore. The ore zone also thins to the SE. At the Ebner end of the ore zone, at least two quartz vein-rich areas, about 100 feet wide, are separated by 500 feet of barren rock in the old workings. The same zone is about 1,500 feet wide on the Ebner Tunnel level. In the South Orebody, the mineralized zone thins to 750 feet wide and is reduced further to 70 feet in the Perseverance Mine.

In the fold hinge, the metagabbros are several hundred feet thick and the orebodies occur along both the upper and lower contacts. The core of the metagabbro is poorly mineralized. The lower contact of the metagabbro in the fold hinge has been mined over a distance of about 2,000 feet while the upper contact has been mined over a distance of 5,000 feet. At the eastern end of the deposit, a quartzose felsic schist in the hinge of the syncline has been mined for 2,000 feet down plunge.

Mineralization

The auriferous quartz veins in the Alaska Juneau deposit contain pyrrhotite, sphalerite, galena, pyrite, chalcopyrite, and arsenopyrite, as well as minor tetrahedrite and native silver. Microprobe studies by the Bureau have also noted native bismuth, bismuthinite, joseite ($Bi4TeS3$), and an unidentified Bi-Pb-Ag-S mineral.

In the old Alaska Juneau Company reports, pyrrhotite, sphalerite, and galena were reported to carry the same amount of gold. Results from Bureau studies (*D-75*) in which high-grade mineral separates were selectively hand collected from the veins, do not support this. Studies of metallic assays, in which the +100 mesh and −100 mesh fractions were analyzed separately with the final assay being calculated from the combined data, showed that the coarser gold is predominantly concentrated in and near sphalerite. Six sphalerite samples contained an average of 380.7 ppm gold, of which the +100 mesh portion contained 65% of the gold. For comparison, 4 galena samples averaged 71.7 ppm gold (81% of gold was in the +100 fraction) and 5 pyrrhotite samples taken averaged 86.4 ppm gold, (65% of gold was from the +100 mesh fraction).

There is no obvious mineral zonation within the quartz veins, but there is a change in sulfide assemblages and in gold/silver ratios both along and across the ore zone. Previous workers have recognized a longitudinal zonation from the Ebner Mine on the NW to the Perseverance Mine on the SE. Pyrrhotite is the most abundant sulfide throughout all the mine sections but, starting in the North Orebody, sphalerite becomes more common. Galena first occurs in the SE portion of the North Orebody and becomes abundant in the South Orebody where it is in near-equal amounts to sphalerite. In the SE end of the South Orebody, arsenopyrite begins to appear and at the Perseverance Mine end of the ore zone, galena is more abundant than sphalerite and arsenopyrite reaches its highest percentage.

In the North Orebody, a concentric lateral zonation also occurs (figs. D-18, D-19). This zonation is much like that displayed longitudinally. Pyrrhotite, sphalerite, and galena all occur at the footwall and can be found in discrete zones to the NE. In the North Orebody, the Nugget Gulch fault forms the footwall of the deposit and

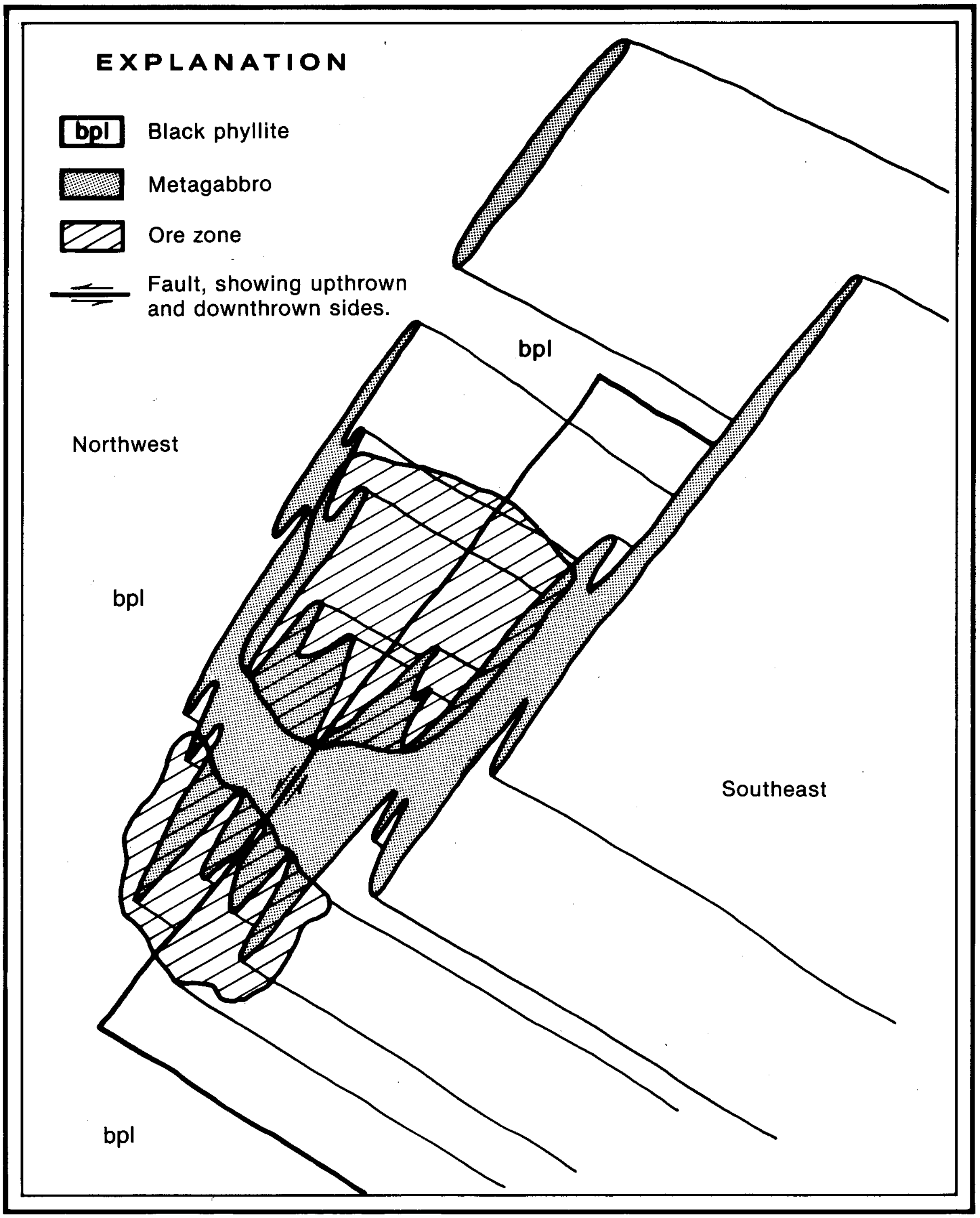

Figure D–17.—Alaska Juneau Mine, synclinal fold hinge ore-control model.

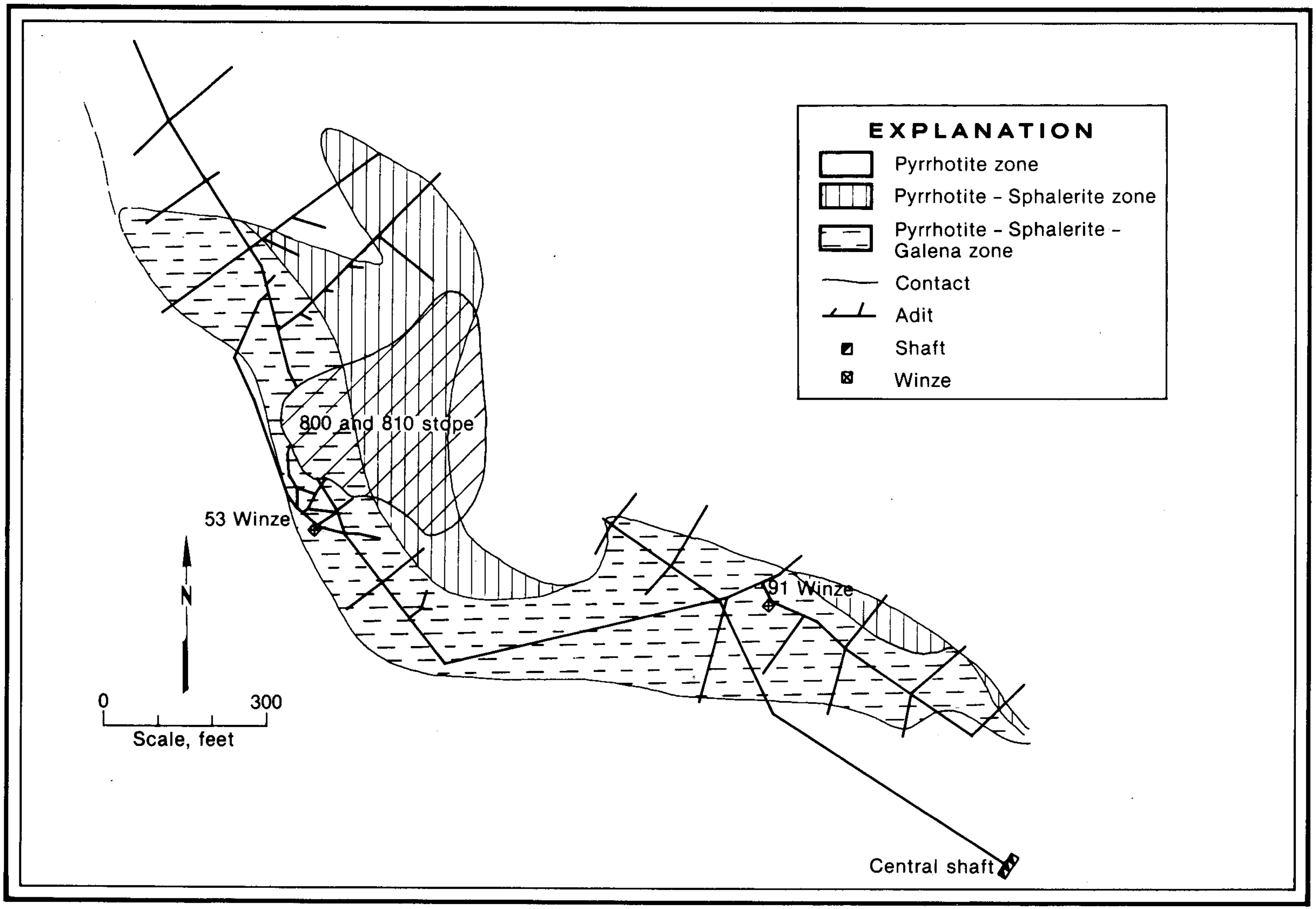

Figure D-18.—Mineral zonation map, 6-level, Alaska Juneau Mine.

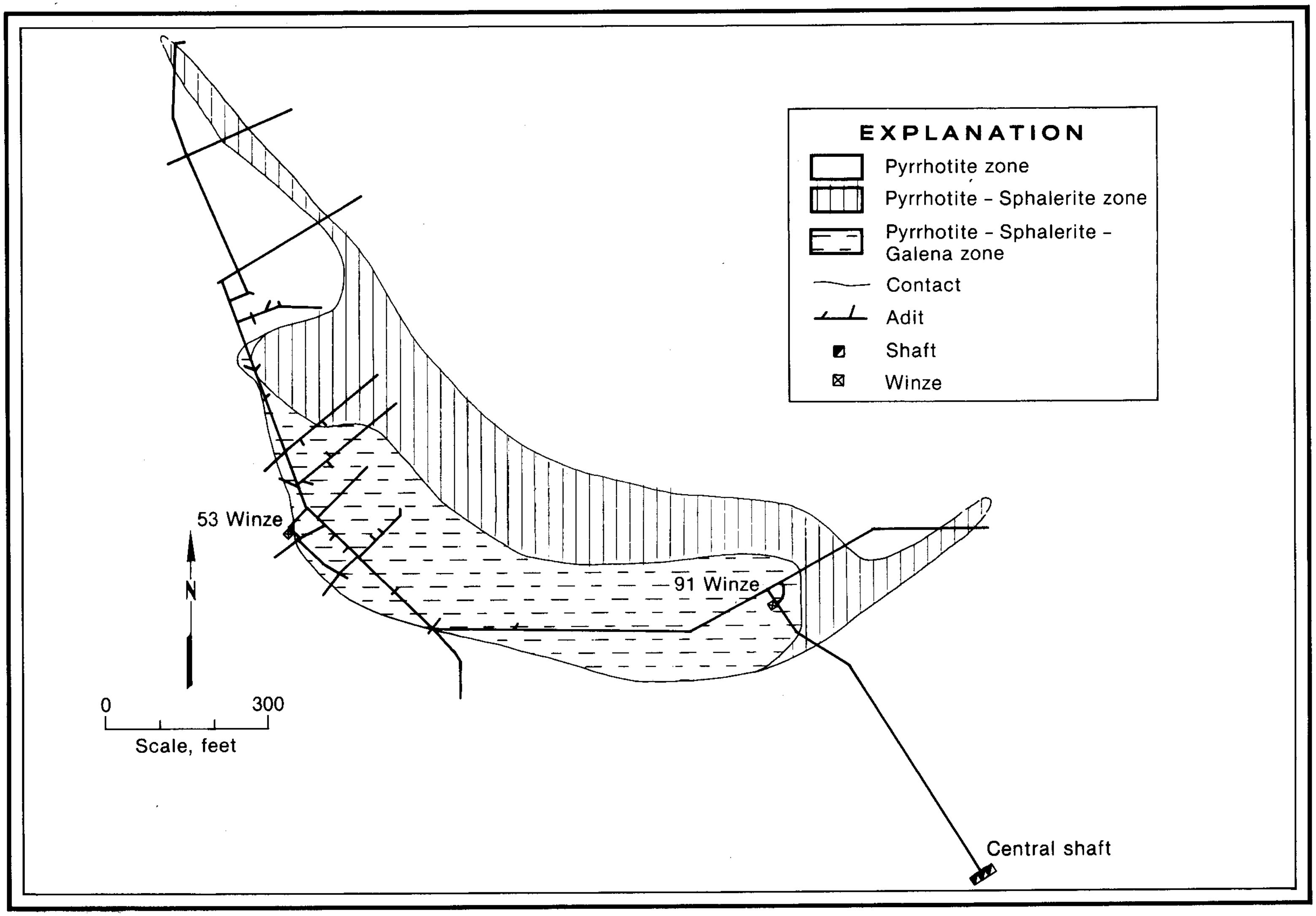

Figure D-19.—Mineral zonation map, 8-level, Alaska Juneau Mine.

galena is found concentrated within about 200 feet of the fault. Sphalerite is more extensive and occurs within and beyond the galena zone. Pyrrhotite is the most extensive sulfide and extends well into the hanging wall and beyond the orebody.

In addition to the mineral zonation in the Alaska Juneau deposit, there is a distinct change in the ratio of gold to silver from NW to SE. Ratios of gold/silver are highest at the NW end of the system in the Ebner Mine where Spencer (*D-130*) reported a 7:1 gold to silver ratio. The ratio decreases steadily to the SE. In the North Orebody, the ratio is 2.4:1, while the South Orebody has 1.5:1 ratio, and Perseverance Mine has a ratio of 1:1. One mile further to the SE, at the Ascension and Glacier/Silver Queen Mines, the gold/silver ratio drops radically to 1:200.

Sample Results

The Bureau collected a total of 48 samples from the 6- and 8-levels of the Alaska Juneau Mine (figs. D-20, D-21). Samples 1-9, 13, 15-17 (fig. D-20), and 1-2 (fig. D-21) were taken from sphalerite-, galena-, and pyrrhotite-rich areas to determine the distribution of gold. Samples 10-12, and 14 (fig. D-20) were taken from selected quartz veins with abundant sulfide minerals.

A series of chip channel samples (fig. D-20, Nos. 18-46) were collected across 160 feet in a crosscut on 6-level to compare Alaska Juneau Company sampling with Bureau results. Bureau sample results, excluding one sample which contained 384.5 ppm gold, gave a weighted average of 3.5 ppm gold. This compares very favorably with the 3.8 ppm gold average of the Alaska Juneau Co. for the same section.

RESOURCE ESTIMATE

There are 28,903,000 tons of measured reserves with a grade of 0.04 ounces/ton gold in the Alaska Juneau Mine (*D-5*) and 100,000,000 tons of geologically inferred ore with a grade of 0.04 ounces/ton gold (*D-38*).

RECOMMENDATIONS

The Alaska Juneau orebody has been mined over a horizontal distance of about 2.5 miles and vertically for 2,800 feet. The fold-hinge ore control model suggested above, indicates that the best areas for the discovery of new ore in the Alaska Juneau Mine would be along the bottom of the folded metagabbro in the North Orebody deeper to the SE, and along the top of the metagabbro SE of the South Orebody under Icy Gulch. The bottom of the folded felsic schist in the Perseverance Mine should also contain ore. The unexplored lower contact of the metagabbro at the old Ebner Mine should also contain areas of economic ore. Small metagabbro sills and the greenschist contact east of the Icy Gulch and Perseverance areas would offer other exploration targets for ore.

KENSINGTON MINE

HISTORY

The Kensington veins (figs. D-4, D-22) were discovered by the Berners Bay Mining and Milling Co. in 1897. A tram was built between the mine and the top of the Bear Mine tram that year and ore was being crushed by the fall of 1897. At the end of 1899, a total of 4,500 tons of ore had been extracted and, in 1900, 20 stamps of the Comet mill treated an additional 5,842 tons of Kensington ore. Total production was 2,600 ounces gold from 10,342 tons of ore.

In 1902, litigation forced the Berners Bay Company to be placed into receivership. Mine Surities Co. acquired control and began driving the Kensington Tunnel which was driven to 1,000 feet but then work was stopped in the fall. Joseph MacDonald bonded the mine in 1904 and continued driving the Kensington Tunnel, cutting the Kensington orebody in July. MacDonald dropped his bond in 1905. The Treadwell Company tried to solve the litigation and bond the Berners Bay properties in 1905 but the attempt failed. The mine was again closed by litigation between 1905 and 1909.

In 1909, the suits were resolved and the Kensington Mines Co. formed. Bart Thane, associated with the International Trust Co., bought the mine in 1910 and began surface renovation the next year. Considerable development work was done during 1912 and 1913. In the latter year, the Hayden-Stone investment bankers acquired an option.

The Kensington Tunnel was extended to cut the Johnson prospect in 1913 and was driven to a total length of 4,750 feet in 1915. Plans were made for a 500-ton/day mill. Drifting and crosscut work was done in 1916 but metallurgical problems and financial difficulties at the

Alaska Gastineau Mines (which was also being financed by the Hayden-Stone group) halted work.

After 1916, only minor work was done until 1935 when A. B. Trites optioned the ground. Trites built a gravel road to the mill site and did extensive renovation but dropped the property in 1938.

In 1980, Placid Oil Co. optioned most of the patented claims in the Sherman Creek area and drilled over 20,000 feet of core. In 1987, the option was purchased by Echo Bay Mines and Coeur d'Alene Mines. The joint venture renovated the Trites road and drove a 5,300-foot adit (fig. D-23) at an elevation of 800 feet to undercut the Kensington orebody 1,200 feet below the old Kensington Tunnel and 600 feet below the deepest drill hole. The new adit cut the Kensington deposit in December 1988 (fig. D-24). Work in early 1989 consisted of drilling approximately 9,000 feet of core from the new adit (fig. D-25) to further define the orebody and shipping a 250-ton sample for metallurgical testing (*D-97*).

WORKINGS AND FACILITIES

The original workings consist of a 225-foot adit with a 75-foot crosscut and stope to the surface and second 150-foot adit. The Kensington Tunnel, with a total length of 4,750 feet, has 360 feet of workings in the Eureka orebody, 980 feet of workings at the Kensington orebody, and 1,600 feet workings at the Johnson orebody (fig. D-22).

In 1988, Echo Bay Mines and Coeur d'Alene Mines drove the 5,300-foot new Kensington adit at an elevation of 800 feet (fig. D-23).

PREVIOUS WORK

The earliest published information about the Kensington deposit was reported by Wright and Wright (*D-161*) of the U. S. Geological Survey in 1906. Many private company reports were written during development and operation of the deposit and some of these, written between 1902 and 1909, were later released by the Territory of Alaska (*D-54*). The most detailed published study of the Kensington deposit was by Knopf (*D-59*) in 1909. Townsend (*D-141*) examined the Kensington orebodies in 1940 for the property owners.

Until Echo Bay Mines acquired the Kensington property, the Bureau was only allowed to briefly tour the Kensington Tunnel and was not able to map or sample the deposit. The U. S. Bureau of Mines briefly examined the mine in 1985 and 1987 (*D-99*) but, in 1988, Bureau geologists were able to examine the new Kensington Adit being driven by Echo Bay Mines. These late studies, aided by Echo Bay geologists, resulted in the discovery of at least two telluride minerals in the gold-bearing quartz veins.

BUREAU INVESTIGATIONS

Regional Geology

The area immediately north of Berners Bay consists of a foliated diorite pluton that was intruded along or near the contact between massive metabasaltic flows and black phyllite (fig. D-4). Chloritic metavolcanic rocks also occur locally. The pluton, known as the Jualin diorite, is an elongate body which parallels the regional NW-trending foliation and structure of the area. The diorite consists of medium-grained, moderately-foliated hornblende and plagioclase with lesser magnetite. Hornblende is commonly altered to chlorite and sausseritized plagioclase is widespread. Granodioritic and quartz monzonitic phases also exist. Magnetite is an important accessory mineral. Plutonic margins exhibit a distinct chill zone where the diorite becomes aphanitic in texture.

Along lower Sherman Creek at the NW end of the area, the metabasalts are adjacent to black phyllite. It is not known what type of contact separates the units. To the SE in Johnson Creek, the metabasalts are overlain by porphyroblastic greenschist and gray phyllite and separated from the black phyllite and chloritic metavolcanic rocks by an unconformity. This unconformity is marked by conglomerate and, locally, crossbedded magnetite-rich sandstone.

Regionally, the most obvious relationship between all gold deposits in the Berners Bay district is that they form a very linear band parallel to the Slate Creek/Sweeny Creek lineament (Coast Range megalineament of Brew and Ford, *D-19*). Most of the quartz veins in the district trend either N-S (Kensington, Eureka, Ivanhoe, Horrible, Johnson, Comet, Northern Belle, and Seward) or N-NW (Bear, Jualin, Ophir, Yankee Boy, and Gold King).

Kensington Geology

The Kensington deposit is hosted by the Jualin diorite. In the Kensington Tunnel, the orebody consists of a large central quartz vein, bounded by a fault on the footwall, with zones of stockwork quartz veins on both the footwall and hanging wall. The main vein trends N-S and dips about 65° E (fig. D-22). Two prominent sets of stockwork veins roughly parallel the main vein in trend but dip moderately E and steeply W. The main vein

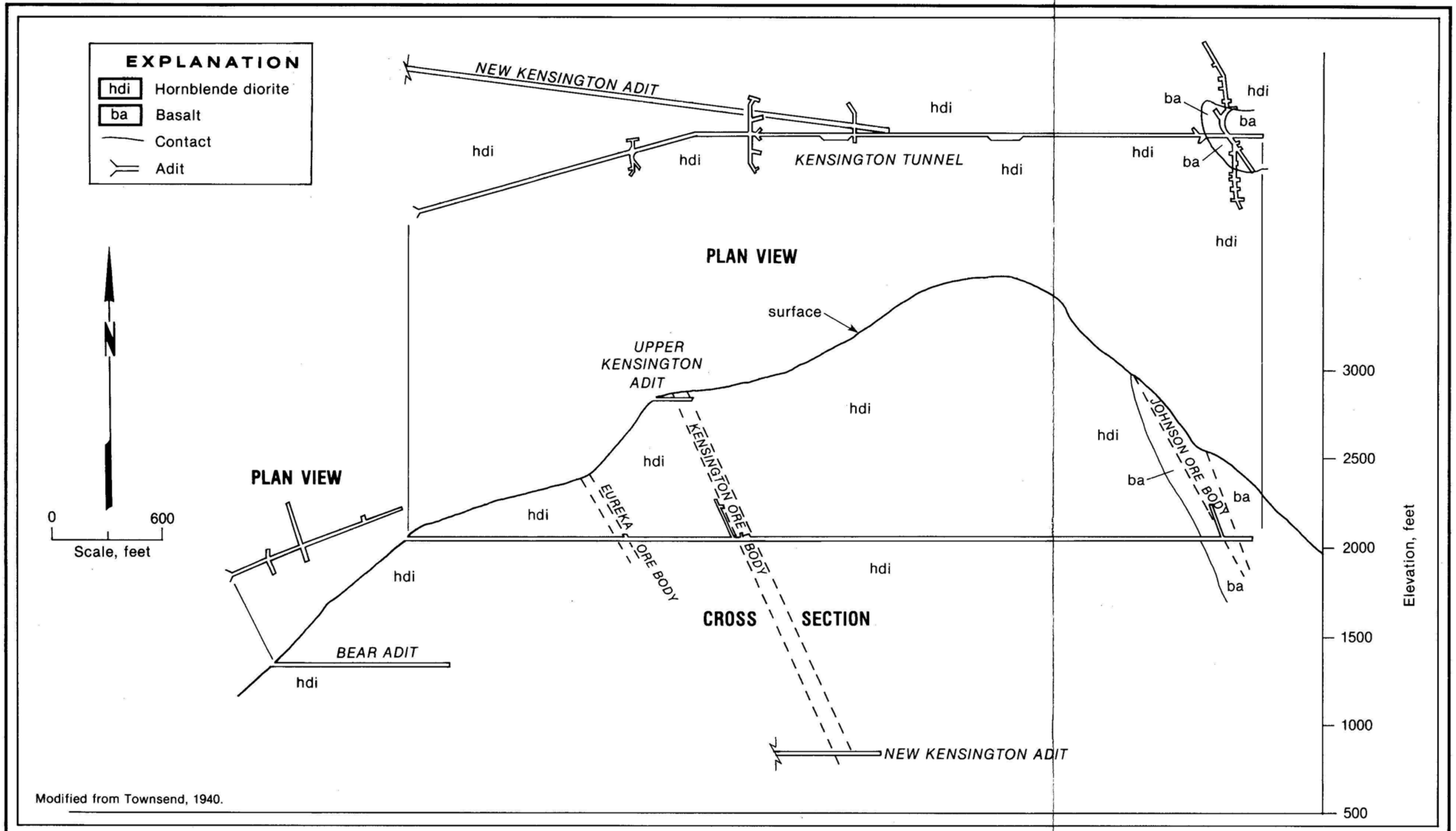

Figure D-22. — The Kensington Mine, plan map and cross section.

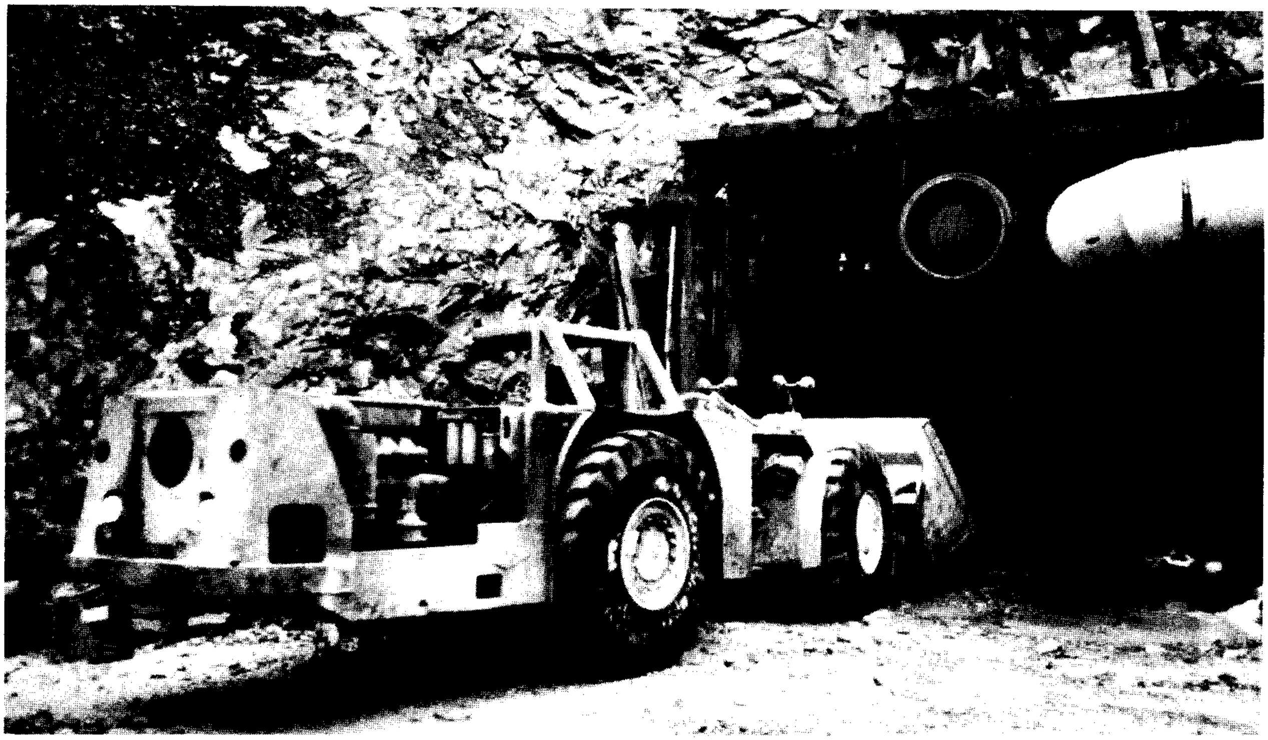

Figure D-23.—Portal of the new Kensington adit being driven by Echo Bay Mines and Coeur d'Alene Mines. This 5,300-ft adit undercut the Kensington deposit 1,200 feet below the old Kensington Tunnel.

Figure D-24.—The Kensington orebody in the new Kensington adit. The ore zone is 70 feet wide and averages about 0.22 ounces/ton gold.

pinches and swells but can be up to several feet thick while the individual stockwork veins tend to be less than 2-in thick. The stockwork portion of the deposit does not consist entirely of stockwork veins but also includes en echelon veins and sigmoidally-distorted en echelon vein sets (fig. D-24). The Kensington orebody, including the core vein and stockwork, averages 60 feet in thickness and has been traced for 600 feet along strike.

Where the new Kensington adit cuts the Kensington orebody, 1,200 feet below the old adit, the stockwork vein system is 70 feet wide and has an average grade of 0.227 ounces/ton gold (fig. D-24). The orebody appears very similar to the orebody above, but shows some distinct differences. The most prominent feature of the orebody in the lower adit is the moderately E-dipping vein system. West-dipping veins are much less common than in the upper adit. The central fault-bounded quartz veins found in the upper adit are not present in the lower workings. Faults do cut the orebody in the lower workings but they are much less pronounced than in the upper adit.

Structure

The vein-controlling N-S and N-NW fractures in the Berners Bay area appear to be formed by the imposition of NW-SE-trending stress field acting on the homogenous, brittle Jualin diorite pluton. Vein orientation throughout the Berners Bay area, combined with en echelon and sigmoidal veins found at the Kensington, suggest that the whole area underwent regional N-S compression. This compression created the right-lateral NW-SE shearing stress which in turn created NW-SE tension. The regional shearing was oriented about 130° and most of the veins occur in shears oriented approximately N-S, reflecting a tensional elongation of the brittle Jualin diorite. At stockwork deposits like the Kensington, the shear forces acting in the brittle-ductile range created many en echelon sigmoidal veins in addition to shear-controlled and stockwork veins (fig. D-24). The sigmoids plunge about 35° to the SE. The Eureka, Kensington, and Johnson mineralized zones exposed in the Kensington Tunnel exhibit brittle-ductile fracturing.

Alteration

Alteration is restricted to the wallrock adjacent to the main fissure veins at the Kensington, Eureka, and Johnson orebodies; wallrocks are notably unaltered around the much thinner stockwork veins. Alteration consists of quartz, ankerite, and pyrite with some potassic alteration. The diorite along the main vein has been strongly bleached due to breakdown of hornblende and magnetite that are replaced by ankerite, albite, and pyrite. This alteration is similar to but less pervasive than that at the Jualin Mine.

Mineralization

Pyrite is the dominant sulfide mineral with minor chalcopyrite and only a trace of galena. Tests done by the Kensington Mines Co. (*D-54*) in 1902 revealed that 48% of the gold was in the minus 80-mesh range. Early mining of the deposit resulted in only 5% of the gold being recovered by the stamps (*D-59*) and a variety of tests were done to determine the best method of gold recovery. In 1902, the company experimented with cyanide recovery. Ore which averaged 2.4 ppm gold was crushed to minus 80-mesh and agitated in 20 pounds of cyanide for 12 hours, resulting in 85.2% recovery (*D-54*). Flotation tests done in 1916 gave gold recovery of over 96% (*D-141*).

In 1988, significant tellurium minerals were discovered by Echo Bay and Bureau geologists in veins cut in the new Echo Bay adit. Bureau analysis of telluride grains by scanning electron microscope (*D-70*) resulted in discovery of petzite (Ag_3AuTe) and a second tellurium mineral containing 7% atomic percent each of Au, Hg, Pb, and Bi (possibly hessite, Ag_2Te). Echo Bay identified calaverite and, possibly, montbrayite (Au_2Te_3) in the veins (*D-57*). All visible telluride minerals in the new Kensington adit have been found in veins which probably correlate with the Horrible, Bear, and Ophir veins. The only telluride minerals identified in the Kensington orebody occur as microscopic grains within pyrite (*D-57*).

The discovery of telluride minerals in the new Echo Bay adit led to a reexamination of the veins in the Kensington Mine area to see how widespread tellurium minerals are. Leveille (*D-67*) had already detected hessite and petzite at the Jualin Mine and geochemical analyses revealed significant tellurium concentrations in samples from the Valentine prospect. Twenty-eight samples collected in previous years from the Ivanhoe, Horrible, and Mexican veins were reanalyzed for tellurium and five additional samples were collected (fig. D-23, Nos. 1-4). Results showed tellurides to be widespread throughout the area and that there is a positive correlation between silver, gold, and tellurium. Average ratios between gold, silver, and tellurium were found to be:

Au/Te	0.67
Ag/Te	1.60
Au/Ag	0.42

Data from Leveille (*D-67*) and Echo Bay geologist Al Kirkham (*D-57*) show a wide range in the Au/Te ratio. Leveille's Jualin samples which contain visible gold had an average Au/Te ratio of 3.5, a Ag/Te ratio of 2.7, and an Au/Ag ratio of 1.3. Kirkham reported Au/Te ratios ranging from 1.0 to 2.7 from the Echo Bay adit and also noted a close relationship between gold values and tellurium. Ore analyses done by Echo Bay were conspicuously lacking in lead, zinc, and arsenic, but indicated that copper increased slightly with depth (*D-57*).

In the Kensington orebody in the new Echo Bay adit, calaverite is the only telluride mineral and it tends to form coatings on the surfaces of pyrite grains. Grain size of gold and calaverite is between 10 and 100 microns with no visible grains of either mineral (*D-57*).

RESOURCE ESTIMATE

The Kensington deposit has a published indicated reserve of 425,000 ounces gold, or 1,800,000 tons with a grade of 0.24 ounces/ton gold (*D-53*). Inferred reserves projected by Echo Bay are 7,400,000 tons of ore at a grade of 0.142 ounces/ton gold (*D-57*).

JUALIN MINE

HISTORY

The Jualin veins were discovered by Frank Cook and Harvey Hurlbut in 1895 (fig. D-4). Judge Henry Mellon leased the property in the fall of 1895 and started driving an adit in December. Mellon and Herbert Hoggatt formed the Jualin Mining and Milling Company in 1896 and brought in a 10-stamp mill. The mill started up on August 20. By year's end, the company had completed a corduroy road from the mine to beach, a boarding house, bunkhouse, office, warehouse, and blacksmith shop and had produced $25,500 in gold.

The Jualin Mine produced $78,500 in 1897, $45,800 in 1898, $49,300 in 1899, and paid its first dividend in 1899. Most of the upper stopes had been worked out by the end of 1900 and a shaft was started to work deeper ore. The shaft was sunk to 70 feet in 1901 but water problems halted work. The company was reorganized that year and plans were made, but never carried out, for a 1,000-foot shaft and 20 more stamps. In 1903, a crew of 31 men began sinking the shaft deeper but work was halted in early 1904. The mine was reopened in 1905 and pumped out. By end of year, there were two inclined shafts, 220 and 160 feet deep, 850 feet of crosscuts, and 5,600 feet of drifts (fig. D-26). During 1906, most work was done on the 160 and 220 levels and a heavy influx of water forced the mine to close.

The mine was leased by Al Nadeau and Dunk Steward during 1907–1908. The men cleaned up old stopes and recovered $22,050. The mine was idle during 1909 and 1910 and Nadeau leased it, again, in 1911, but did not recover much gold.

In 1912, the Jualin Mine was acquired by a Belgian company, the Algunican Development Company, and 75 men were put to work building a wharf, bunkhouse, a 4,000-foot flume, 3,800-foot pipeline, and setting up new pumps. A new compressor was installed in 1913 and the mine dewatered. By the end of the year, the main shaft had been sunk to 325 feet below the main level. In 1914, the first semi-diesel generators in Alaska were installed and work began on the Berners Tunnel, a 7,500-foot-long adit to undercut the Jualin veins and also provide for drainage. The stamp mill ran between September and November, producing $1,520. By end of year, the Berners Tunnel was over 2,000 feet long.

Work was halted on Berners Tunnel in 1915 when Germany overran Belgium in World War I. Mining was renewed on the 310-level in May 1915, and the stamp mill started on July 1, producing $32,658 by end of year. The mine worked all of 1916 and produced $118,485. In the fall, a three-story bunkhouse was built.

The Jualin mill ran from January through October, 1917 and crushed out $154,399 worth of gold. In October, the mine closed, when the United States entered World War I, and remained idle in 1918. General repair work was started in January 1919 and underground activity concentrated on driving the Berners Tunnel, which, by the end of the year, was 4,000 feet long. In addition, 4,500 feet of diamond drilling was done underground. The mill started in October and produced 124 ounces of gold.

In January 1920, the stamp mill was destroyed by fire and only minor work was done during the year. In March 1921, the mine was reorganized under the Jualin Mining Company and general maintenance was done during 1922. Work was renewed on the Berners Tunnel in January 1923, and continued until June when a fault with a heavy flow of water was cut at a distance of 5,000 feet and the tunnel flooded.

The mine was idle from 1924 until 1928 when Southeast Alaska Mining Corporation took over the property. The South Shaft was started in late 1928 and reached 150

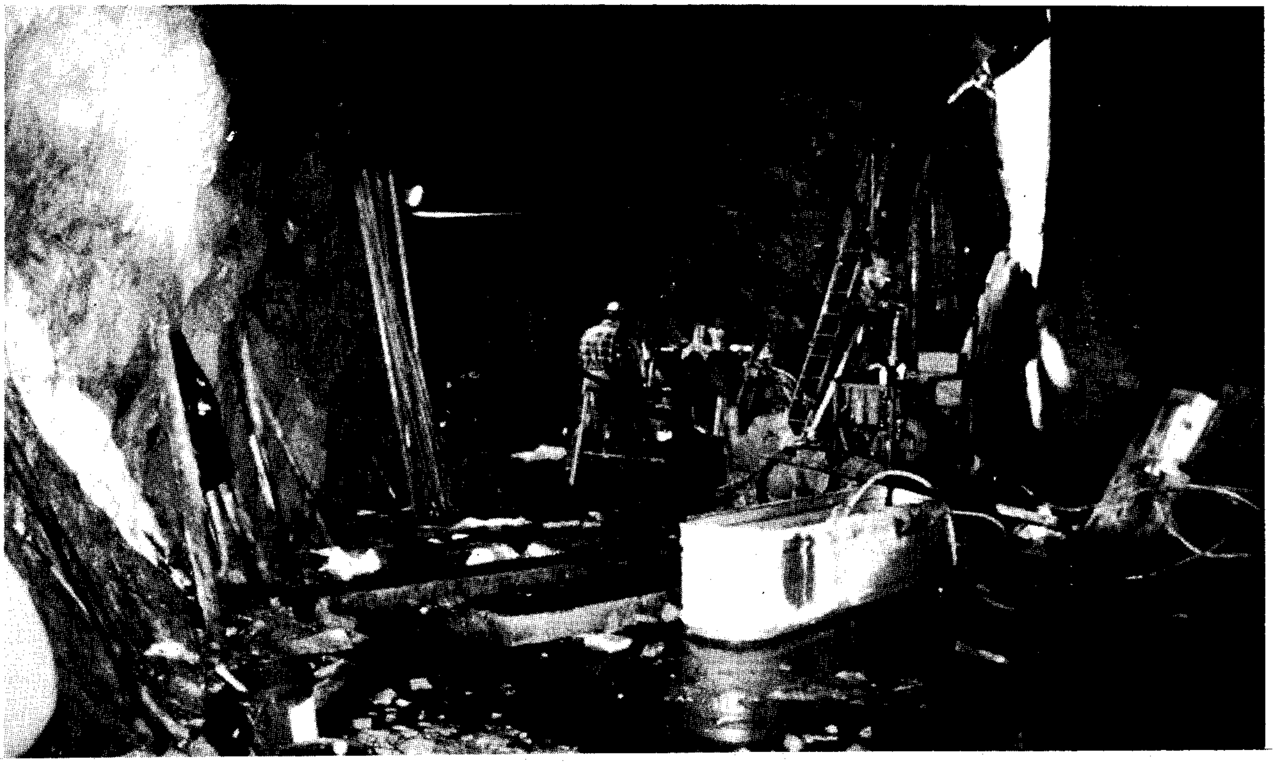

Figure D-25.—Drilling the Kensington orebody from the new Kensington adit.

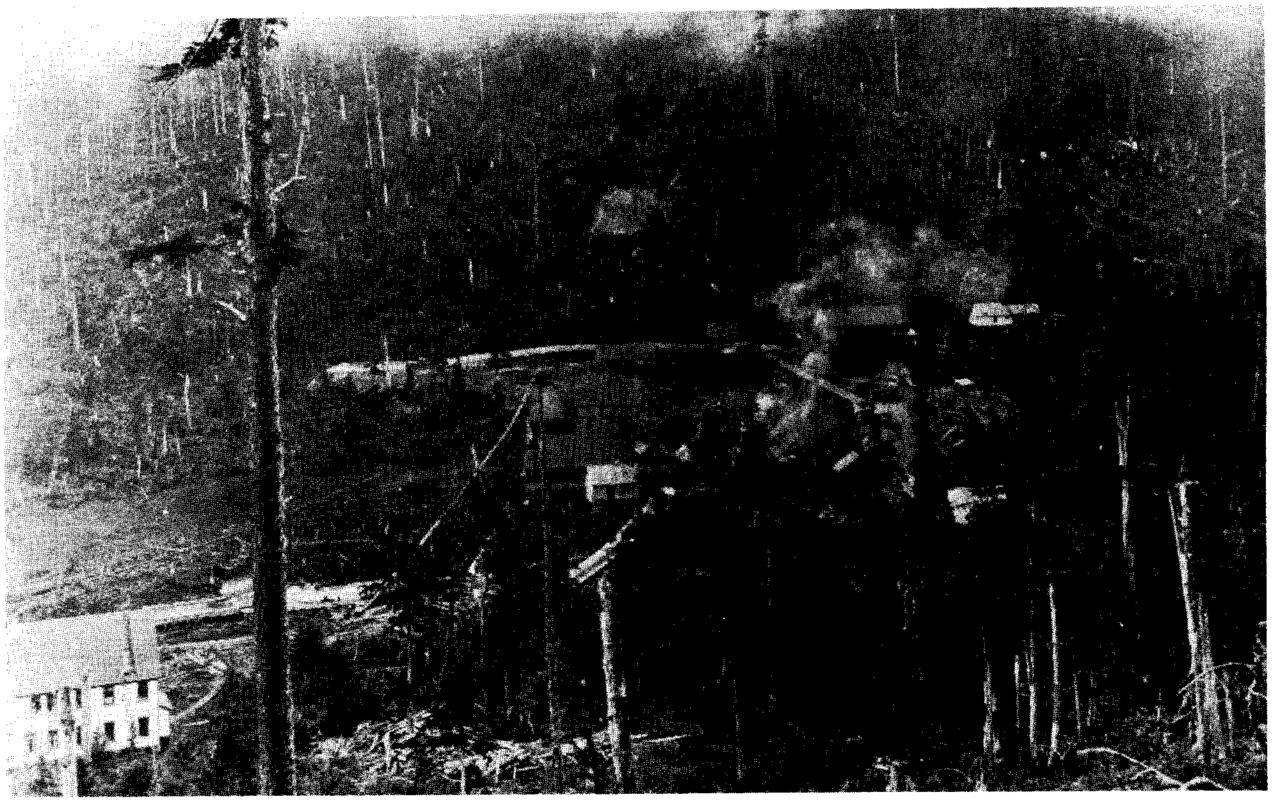

Figure D-26.—The Jualin Mine in about 1905 (photo courtesy Alaska State Library).

Table D-3.—Gold and silver production from the Jualin Mine

Year		Tonnage (st)	Value ($)	Production oz Au	oz Ag
			Boonville Group		
1896		na	25,511	na	na
1897		na	78,480	na	na
1898		na	45,769	na	na
1899		na	49,292	na	na
1900		na	81,477	na	na
1901		na	46,741	na	na
1902–1904	mine closed				
1905		4,125	74,429	3,550	1,217
1906		na	50,892	na	na
1907		600	16,500	800	na
1908		na	5,500	na	na
1909–1913	mine closed				
			Jualin Alaska Mines Co.		
1914		2,000	1,520	84	na
1915[1]		6,000	32,658	2,015	293
1916		12,551	118,485	5,636	3,018
1917		9,328	154,399	7,358	1,497
1918	mine closed				
1919		519	2,604	110	33
1920		181	497	24	7
1921		na	4,000	na	na
1922–1927	mine closed				
1928		150	3,000	145	na
Total[2]		74,624	791,754	37,913[3]	12,640[3]

NA Not available.

[1] Values reported are from Dept. of the Interior yearly mine production reports and differ significantly from values given in Southeast Alaska Mining Company report (D–127).

[2] Production figures from Southeast Alaska Mining Co. report (D–127).

[3] Total production of gold and silver are calculated from ratio of known production and total value produced.

feet in depth in 1929. About $3,000 in gold was produced from the work. Between 1895 and 1929, the Jualin Mine produced about 37,913 ounces gold from 74,624 tons of ore.

The mine was examined by various parties in 1935 and 1939 and then restaked by Hyak Mining Company in 1978. Bear Creek Mining Company leased the property from 1983 to 1985 and did some diamond drilling. In 1987, the mine was leased to Curator American, Inc. which drilled 15,100 feet of core from 28 holes (fig. D-27). During 1988, the company completed a 5-mile access road from tidewater and drilled an additional 15,000 feet of core. Work planned for 1989 includes the driving of an 800-foot decline and collection of a large sample for testing purposes (*D–97, D–122*).

WORKINGS AND FACILITIES

There are approximately 10,000 feet of workings on 5 levels (main adit is caved at 125 feet, intermediate level is caved at 40 feet, and upper level has 550 feet of open workings but is very dangerous and does not connect with lower levels). In addition, the Berners Tunnel (caved at the portal) is 5,000-feet long. Remains of the bunkhouse at the mine and power plant on lower Johnson Creek are also on the property.

PREVIOUS WORK

The first published geologic examination of the Jualin Mine was done by the U.S.G.S. in 1904 (*D–161*). Adolf Knopf (*D–59*) studied the mine in more detail during his examination of the Berners Bay area in 1909 and Eakin (*D–33*) made a brief visit in 1916. Geologists working for the various companies who operated the Jualin Mine wrote a number of comprehensive reports including those done by the Southeast Alaska Mining Company (*D–127*), Poncin (*D–90*), and Redman (*D–93*). Bear Creek Mining Company explored the veins in 1983 and 1984 (*D–11, D–12*).

In 1985 and 1986, the Jualin Mine was examined by the U. S. Bureau of Mines (*D–98, D–99*). Leveille (*D–67*) did detailed petrographic, alteration, and mineralogic studies as part of a Master's thesis for the University of Alaska between 1985 and 1987.

BUREAU INVESTIGATIONS

Jualin Geology

The Jualin deposit consists of several quartz veins in a large shear zone that cuts the Jualin diorite (for a discussion of the regional geology of the Berners Bay area, see the section on the Kensington Mine). At least 5 veins were mined in a zone up to 300 feet wide (*D-59*). Both veins and shear zone trend 325° south of the main adit but bend to 320° north of the adit. The large quartz veins range up to 20 feet thick and dip about 70° NE. Abundant quartz veinlets up to 3 inches thick, dipping moderately both NE and SW are found in the sheared diorite between the main fissure veins (*D-93*).

The main quartz veins average 5 feet in width and have been mined vertically over as much as 500 feet and horizontally for 300 feet (fig. D-28) (*D-59*). Ore shoots plunge moderately SE. The veins fill fault strands along which there has been post-vein movement. The veins are composed primarily of quartz but ankerite and felted masses of chlorite are locally major constituents.

The veinlets between the major veins range from 0.25 inches to 3 inches in thickness. These veinlets are well exposed in the upper level workings where they are present for at least 100 feet NE of the Number 2 vein (fig. D-28). Approximately 10% of the rock is composed of these veinlets (*D-93*).

Mineralogy

Mineralogy of the veins and veinlets is similar. Pyrite is the most common sulfide mineral but chalcopyrite is locally common and minor amounts of sphalerite and galena are present. In addition, traces of arsenopyrite, tetrahedrite, and the telluride minerals, hessite (Ag_2Te) and petzite (Ag_2AuTe), have also been identified (*D-67*). In general, sulfide content of the veins is only about 1% but, locally, up to 5% of a vein may be composed of sulfide minerals.

Old company reports indicate that 80% of the gold at the Jualin Mine was free-milling (*D-127*). Leveille (*D-67*) found free gold in quartz in the lower caved stope but noted that it was usually associated with limonite and highly-weathered pyrite. Polished section work by Leveille (*D-67*) identified minute grains of gold mixed with hematite in a dense network of fractures within pyrite. The overall gold:silver ratio is 1.02:1 but in the richest ore the ratio is commonly 5 or 7:1 (*D-67*).

Alteration

Alteration is strongly developed at the Jualin Mine. The Jualin diorite adjacent to the veins is strongly altered to a rock composed of ankerite, quartz, and sericite. This altered rock is commonly cut by calcite veinlets and may contain up to 50% ankerite (*D-67*). Away from the main veins, the carbonate alteration changes to calcite. In general, the carbonate-altered rock is bleached and orange-colored from weathering of ankerite and disseminated pyrite. Ankerite and albite also occur in the veins, most commonly along vein margins (*D-67*).

Sample Results

The Bureau mapped and sampled the open workings at the Jualin Mine, taking a total of 34 rock samples and a metallurgical sample (figs. D-28, D-50). Fourteen samples were taken of material on the main dump (fig. D-28, Nos. 12-25). Eleven of these samples (fig. D-28, Nos. 12-22) were collected from pits dug into the tops and sides of the dump east of the main portal. Sample 21 (fig. D-28) contained 12.4 ppm gold and seven others averaged 1.4 ppm gold (overall average 3.1 ppm gold). These results were similar to those of dump samples taken by Bear Creek Mining Company and Hyak Mining Company (the companies collected a total of more than 20 dump samples which averaged 2.8 ppm gold (*D-11, D-93*). Samples 15 and 18 (fig. D-28) were composed of selected material from the dump and contained 5.9 and 8.4 ppm gold, respectively. The latter sample also contained 29 ppm silver, 1.71% lead, and 1.45% zinc.

The metallurgical sample was collected from material on the main dump which represents the altered and mineralized rock between the large quartz veins mined before 1920. This material assayed 4.1 ppm gold and 1.4 ppm silver. The results of preliminary cyanide amenability tests gave recoveries of 71.1% gold and 65.5% silver:

Grind	Assay (ppm)				Extraction (%)	
% −325	Head		Residue		Au	Ag
Mesh	Au	Ag	Au	Ag		
80.3	4.1	1.4	1.2	−1.7(sic)	71.1	65.5

Curator American also did cyanidation tests on the combined core from 20 different drill hole ore intercepts. Their initial tests, carried out on −200 mesh sample, gave a gold recovery of 98.9%. Bulk concentrate flotation tests also done by the company resulted in the extraction of 97.3% of the gold (*D-10*). The higher gold recovery in the Curator test is probably because the Curator sample consisted primarily of quartz vein material while the Bureau sample was composed of altered and mineralized diorite cut by small quartz veins.

Three samples were taken from the development dump south of the main portal. Two composite samples (fig. D–28, Nos. 24–25) contained less than 0.2 ppm gold but a selected sample of quartz from the dump contained 1.8 ppm gold.

A total of 13 samples were collected from the caved stopes and underground workings at the mine. Four samples were taken from the lower caved stope (fig. D–28, Nos. 6–9), two chip samples were taken across the vein, and two selected samples were taken of quartz containing visible gold. The chip samples contained 1.4 ppm and 4.9 ppm gold. The gold-bearing samples carried 224.6 ppm and 80.4 ppm gold, 166.2 ppm and 44.4 ppm silver, and 0.5% copper and 0.1% lead, respectively.

Two samples were taken at both the main haulage adit (fig. D–28, Nos. 10–11) and the South shaft (fig. D–28, Nos. 26–27). A quartz vein sample from the haulage adit contained 42.4 ppm gold and 4.6 ppm silver. At the South shaft, samples contained 4.0 ppm and 35.7 ppm gold.

Most of the upper level of the mine was too dangerous to enter but five samples were taken from the safer portions (fig. D–28, Nos. 1-5). A sample taken over the portal, carried 0.08 ppm gold and underground samples from the quartz vein contained 1.0, 0.2, 1.5, and 3.9 ppm gold.

Six other samples were taken from a magnetite-bearing fluvial sandstone overlying an unconformity near Snowslide Gulch (fig. D–50, Nos. 1-6). The unconformity truncates gray phyllite and the Jualin diorite and is marked by a conglomerate made of the phyllite, Jualin diorite, basalt, and felsic metavolcanic fragments (*D–94*). Cross-bedded magnetite sandstone in the conglomeratic unit contains magnetite probably derived from the Jualin diorite and the samples were collected to determine whether gold from the Jualin veins could also have been deposited in the sediments. Cheney (*D–28*) reported gold values up to 1.9 ppm but Bureau samples all contained less than 0.1 ppm gold.

RESOURCE ESTIMATE

The Jualin has an inferred resource of 1,060,000 tons at a grade of 0.31 ounces/ton gold (*D–10*). Geologic resources are at 2,000,000 tons with approximately the same grade (*D–10*).

TREADWELL MINE

HISTORY

On December 17, 1880, Billy Meehan discovered placer gold in Ready Bullion Creek on Douglas Island (figs. D–5, D–190). During the winter, Meehan and his partners extracted $1,200 in gold and staked the Ready Bullion and Golden Chariot claims. On May 1, 1881, Pete Errusard staked the Parris claim on top of what would become the Treadwell Mine and the Mexican lode claim was staked by G. Picket, D. Mitchell, and Stilman Lewis. Placer operations began on top of lodes that summer and the Parris lode was purchased by John Treadwell. Treadwell collected 22 sacks of samples and, based on their gold content, erected a 5-stamp mill in August 1882. Before mining could begin, conflicts with placer miners over water usage had to be solved by the U.S. Navy from Sitka. Placer mines working on the Treadwell lode recovered about $45,000 in gold by the end of 1883.

Treadwell started three tunnels in 1882 and, with John Fry, and James Freeborn, formed the Alaska Mining and Milling Company in December of the same year. The 5-stamp mill ran during 1883 with encouraging results and a decision was made to build a 120-stamp mill.

The 120-stamp mill was completed during 1884. Revenues rose from $280,179 during 1885, to $366,180 in 1886, and $476,934 in 1887. Expansion of the mill to 240 stamps began in 1887. The 240 stamps were in operation in 1888 and the company recovered $652,495 worth of gold in 1889. A chlorination plant was also erected to recover gold from pyrite.

In 1886, the Mexican Gold and Silver Mining Company was formed by Treadwell, Fry, Freeborn, T.J. Hay, and C.F. Stone. By 1890, the new company had driven a crosscut through the Mexican deposit and run a drift in the ore toward Treadwell mine. In 1891, management of the Treadwell and Mexican Mines was consolidated.

In 1889, Thomas Mein, representing the Rothschild Brothers and English capitalists, purchased the Treadwell Mine for $4 million. They formed the Alaska Treadwell Gold Mining Company and put its stock on London and Paris stock exchanges.

By the end of 1891, the Treadwell mill was crushing 700 tons of ore per day and the company recovered an average of $1.35 in gold per ton. In 1894, electric lights were placed in the mine. Surface mining, which had been prevalent, began to be replaced by underground mining in 1896. In that year, the mine was being worked 220 feet below the surface and ore was being mined and milled at a cost of $1.16 per ton.

Tunnelling at the Mexican Mine continued during 1892 and 450 tons of ore were tested at the Treadwell mill. A 60-stamp mill was completed at the mine in 1893. The mill, which started on December 20, 1893, had a capacity of 250 tons per day and was expanded to 120 stamps in 1897.

In 1894, Ernesto Hahn acquired an option on the Ready Bullion and formed the Alaska United Gold Mining Company. Hahn died before much work could be done and development of a stamp mill was delayed for several years. By 1897, the Ready Bullion Mine was being worked 500 feet below the surface and in 1898, a 120-stamp mill erected.

A 300-stamp mill was built at the Treadwell Mine in 1898 and the main shaft reached a depth of 458 feet. The chlorination plant was shut down in 1899 because it was cheaper to ship the concentrates to the Tacoma smelter.

At the 700-Foot Mine, between the Treadwell and Mexican Mines, a 100-stamp mill was built in 1899 and 85,065 tons of ore treated the first year.

The Treadwell shaft was down to 844 feet in 1901 and the mine was producing 2,800 tons of ore per day. Horses were used on upper levels to haul ore but a steam-powered wire rope was used on deeper levels.

All four mines, the Treadwell, 700-Foot, Mexican, and Ready Bullion, employed a total of 824 workers in 1902 and 1,300 in 1903. The Ready Bullion and Mexican mines were connected by tunnel in 1904 but a concrete bulkhead was placed in the tunnel in 1913 because of worry about the potential for a cave-in of the Ready Bullion Mine which could flood the others. The 700-Mine was shut down between 1903 and 1906 but Mexican Mine extracted 34,911 tons from the 700-Mine workings. In 1907, the 700 mill restarted and mining was renewed. One of the largest hoists on the Pacific Coast was installed at the Treadwell Mine in 1905 and, in 1908, oil replaced coal for fuel. A pilot cyanide plant was also tested in 1908.

A complete cyanide plant was in use for all the mines in 1910, the Sheep Creek power plant was completed in 1911, and the Nugget Creek power project was finished in 1912. By 1914, carbide headlamps had replaced candles in the mines. In 1915, 30 stamps were added to Ready Bullion mill giving it a total of 150.

The 700 shaft, chosen to be the central shaft for Treadwell, 700-Foot, and Mexican mines in 1911, began work in 1913. Thirty stamps were added to the 700 mill in 1914 and by the end of 1916, the mines were being worked as much as 2,700 feet below the surface (figs. D-29, D-33, D-34).

Major caving began in the 440 and 660 stopes of the Treadwell Mine in November 1909 and lasted into 1910. Serious surface subsidence occurred at the Mexican Mine in May 1913 and ground along the Treadwell-700-Foot claim line caved extensively in October. More caving occurred in the 700-Mine in February 1914. In mid-1915, caving occurred in Treadwell Mine and Mexican Mines. Ground subsidence was common in 1916. Lean ore in the mine caused mill shut-downs in July 1916, and ore production for the year was down at all mines except the Ready Bullion.

Active ground movement began, again, in February 1917 and on April 21, 1917, a cave-in at the 700-Mine flooded the Treadwell, 700-Foot, and Mexican mines. Only the Ready Bullion Mine survived.

All the big stamp mills, except those at the Mexican and Ready Bullion, were torn down and the equipment sold by 1919. Mining continued at the Ready Bullion Mine for a few years after the cave-in but development stopped in 1919 and mine closed in 1922. Combined production from Treadwell, 700-Foot, Mexican, and Ready Bullion mines between 1883 and 1922 was 3.2 MM ounces gold from 28 MM tons of ore (table D-4).

The Ready Bullion Mine was leased by Nels Anderson who put three shifts, 30 stamps, and the cyanide plant into operation between May and August, 1923.

In 1923, N. F. Gilkey leased the Treadwell mill tailings and operated discontinuously until about 1927. A fire destroyed most of Treadwell buildings in 1926 and the mine and remaining facilities were sold to the Alaska Juneau Company in 1928. Howard Hayes mined the Treadwell tailings in 1949.

Occidental Minerals drilled and mapped the Treadwell area in 1980 and 1981. In 1984, Barrick Resources/WGM, Inc. began to evaluate the deposit under an agreement with Alaska Electric Light & Power Company and the City and Borough of Juneau which included the Alaska Juneau Mine (*D-6, D-8, D-9, D-97, D-150, D-151*).

WORKINGS AND FACILITIES

There are approximately 75 miles of underground workings in the Treadwell, 700-Foot, Mexican, and Ready Bullion mines. All but 3,360 feet of the workings are flooded.

PREVIOUS WORK

The earliest published descriptions of the Treadwell Mine were done in 1889 by George Dawson (*D-30*) who

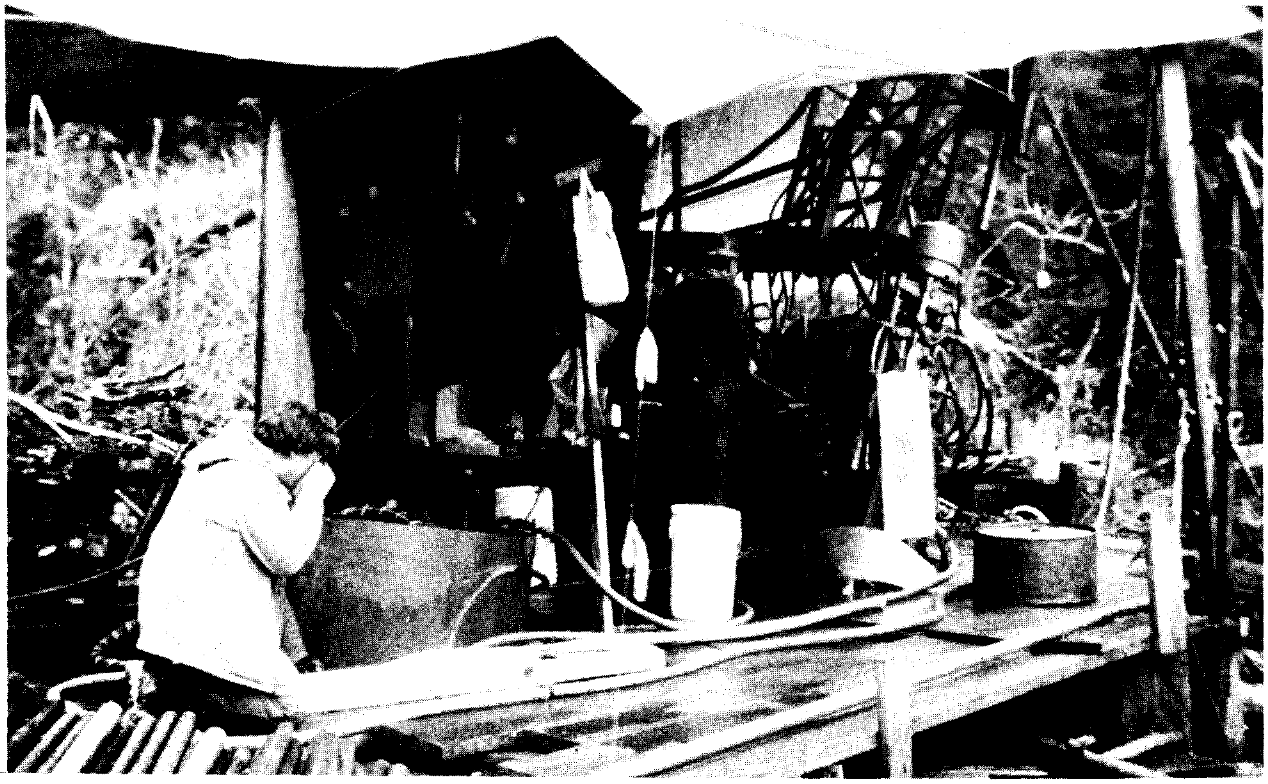

Figure D-27.—Drilling by Curator American at the Jualin Mine. The company's drilling program has defined 1,060,000 tons of inferred reserves.

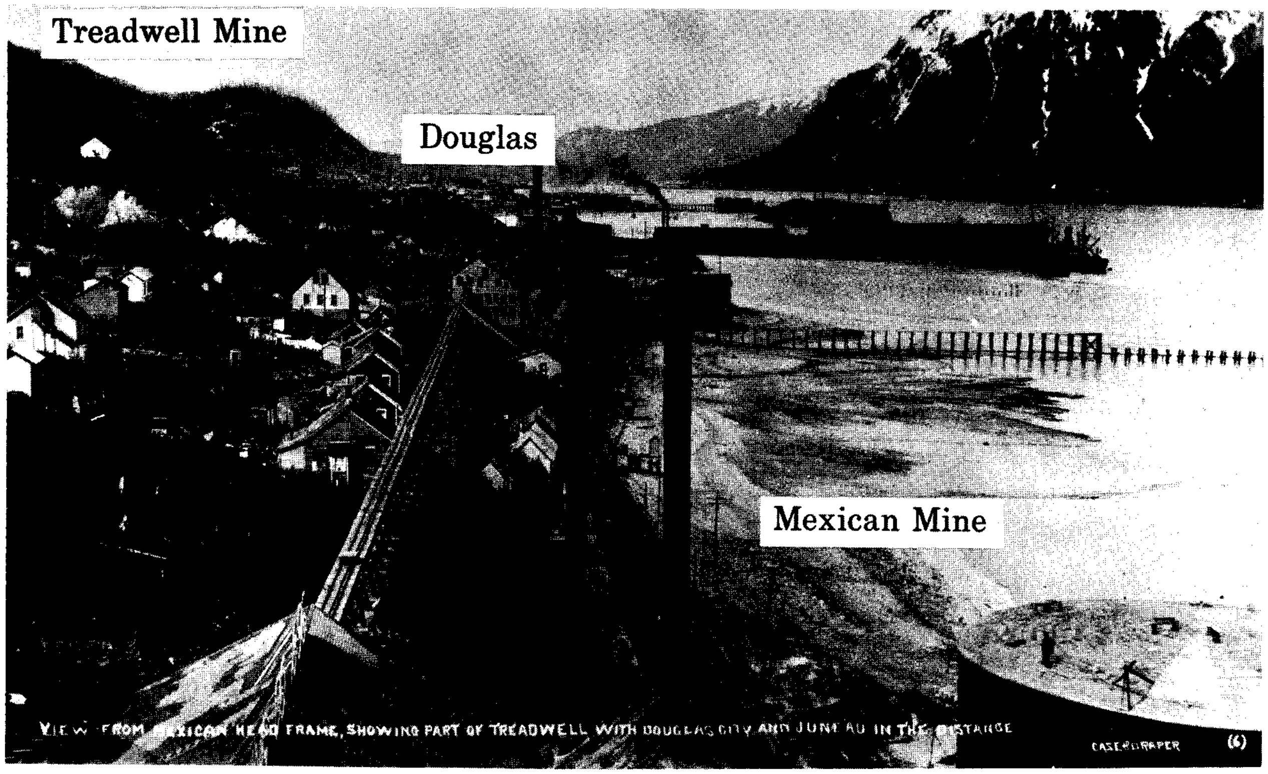

Figure D-29.—The Treadwell Mine and facilities, 1916 (photo courtesy Alaska State Library, Case & Draper collection).

Table D-4.—Gold and silver production from the Treadwell Mines (*D-97, D-133*)

Year	Tonnage (t)	Value/t ore ($)	Yield/t ($)	Total ($)	Production oz Au	oz Ag
1885	na	na	na	280,179	13,555	na
1886	na	na	na	366,180	17,716	na
1887	na	na	na	476,934	23,074	na
1888	na	na	na	na	na	na
1889	na	na	na	652,495	31,567	na
1890	220,980	na	2.77	612,190	29,617	na
1891	220,686	na	3.49	769,765	37,043	na
1892	239,633	na	2.95	707,017	32,715	na
1893	237,235	na	2.94	694,658	37,725	na
1894[1]	293,184	na	3.10	909,990	44,025	na
1895	320,717	na	2.66	852,585	41,247	na
1896	365,372	na	2.82	1,028,690	45,450	na
1897	400,032	na	2.53	1,011,692	45,824	na
1898[2]	436,398	na	2.32	1,010,234	48,874	na
1899[3]	663,634	na	2.42	1,294,309	62,618	na
1900	1,049,431	na	2.03	2,081,838	100,718	na
1901	896,854	2.06	1.86	1,665,371	80,569	na
1902	1,235,411	1.99	1.83	2,223,371	107,565	na
1903	1,198,659	2.37	2.19	2,627,806	127,131	na
1904	1,199,353	2.56	2.37	2,854,993	137,687	na
1905	1,344,635	2.52	2.34	3,146,714	152,236	na
1906	1,362,963	2.45	2.26	3,085,323	150,752	20,696
1907	1,130,586	2.44	2.23	2,519,999	121,109	16,153
1908	1,369,948	2.43	2.28	3,124,116	145,097	19,190
1909	1,407,788	2.65	2.47	3,534,870	170,565	na
1910	1,388,845	2.85	2.70	3,737,496	170,686	22,588
1911	2,024,221[4]	2.65	2.46	4,983,745	241,110	19,199
1912	1,576,284	2.80	2.59	4,020,298	194,499	21,295
1913	1,561,596	2.71	2.49	3,891,565	188,260	20,534
1914	1,602,056	2.65	2.40	3,842,374	180,618	18,490
1915	1,650,058	2.19	1.97	3,250,693	157,266	11,996
1916	1,395,782	na	1.91	2,669,239	125,925	1,850
1917	436,282	na	2.29	997,439	48,254	na
1918[5]	191,342	2.50	2.24	439,467	21,261	na
1919	266,111	2.08	1.81	482,202	23,329	na
1920	298,914	2.15	1.87	562,978	32,080	3,849
1921	266,938	2.03	1.71	464,245	27,145	3,597
1922	152,106	2.10	1.78	273,138	13,124	1,864
Totals	28,395,024	2.41	2.18	67,146,198	3,228,027	181,301

NA Not available.

[1] Combined totals from Treadwell and Mexican Mines.

[2] Combined totals from Treadwell, Mexican, and Ready Bullion Mines.

[3] Combined totals from Treadwell, Mexican, Ready Bullion, and 700-Foot Mines.

[4] 19.5 month total due to change in company fiscal year.

[5] Ready Bullion Mine only after cave-in.

proposed that water accompanying intrusion of the Treadwell diorite was responsible for the formation of the orebody. Becker (*D-13*), a USGS geologist who visited the Treadwell Mine in 1895, made a detailed study of the geology and mineralogy of the orebody and suggested that gold-bearing fluids may have been contemporaneous with intrusion of an analcite basalt dike seen in the Treadwell pit.

Between 1904 and 1911, three major articles describing the geology and ore deposits of the Treadwell Mine were published. In 1904, Robert Kinzie, superintendent of the Treadwell Mine, published a detailed description of the mine in the Transactions of the American Institute of Mining Engineers (*D-56*). Two years later, Arthur Spencer (*D-129, D-130*), of the USGS included an extensive section on the geology, petrology, mineralogy, metallogenesis, and alteration of the Treadwell Mine in his report on the Juneau Gold Belt (*D-130*). Oscar Hershey, in 1911 (*D-50*), concentrated on gaps in the earlier reports and described the ore body level by level.

The Bureau was unable to do much work on the Treadwell ore deposit because of limited exposures but a careful examination of all older geological reports led to a synthesis of the geology into the form discussed below.

BUREAU INVESTIGATIONS

Regional Geology

The Treadwell area consists of NW-trending interlayered bands of black phyllite (called the Treadwell slate in older literature), a metamorphosed mafic-ultramafic sill, and a number of dioritic sills (fig. D-30). The ore occurs in the dioritic bodies that are immediately adjacent to the mafic-ultramafic sill.

The Treadwell slate underlies most of mine area and is actually a black, carbonaceous phyllite. The rocks have a regional NW-strike and dip steeply NE. The Treadwell unit has been intruded by both the mafic-ultramafic sill and the dioritic sill.

The mafic-ultramafic sill outcrops near the mouth of Ready Bullion Creek and has been tentatively traced for several miles to the NW. The unit is conformable with foliation in slate and, in the mine area, the unit varies from 100 to 400 feet in width. Texture of the sill varies from coarse-grained hornblendite (grain-size to 1 inch) near Ready Bullion Creek and at the Ready Bullion Mine, to andesite containing phenocrysts of plagioclase and augite at the Mexican Mine, to fine-grained diabase NW of the mines (*D-50*).

Both margins of the mafic/ultramafic sill have been converted to chlorite phyllite by regional metamorphism and shearing. The phyllitic zone NE of the metamafic is usually less than 10 or 15 feet thick but, on the SW margin of the unit, the phyllite ranges from a few feet to 200 feet thick. The chlorite phyllite grades outward from the sill into the black slate in thicker section (*D-50*). At the Mineral Queen prospect, south of the Ready Bullion Mine, shears within the coarse-grained hornblendite have created zones of chlorite phyllite up to 20 feet thick (*D-99*). The chlorite phyllite is notable because it hosts almost all of the gold-bearing albite diorite dikes (*D-50*).

Treadwell Geology

The most important rock unit in the mine area is the albite diorite which hosts the Treadwell mineralization (fig. D-31). The diorite is generally conformable with the foliation in the phyllites but also exhibits crosscutting relationships. There are two fine- to medium-grained diorite phases: 1) a dark, early phase which generally consists of hornblende diorite and contains pyrite but only rare gold, and 2) a later light-colored phase that intrudes the dark phase and is gold-rich. The least altered portions of the light phase locally contain plagioclase phenocrysts but only rarely containing mafic minerals, has been brecciated, and has undergone sodium metasomatism (*D-50, D-130*). Brecciated zones have been completely healed with quartz. On a region scale, the albite diorite sills are conformable with the regional foliation but a closer examination of the contacts shows many crosscutting relationships (*D-50*).

In the mine area, the albitized diorite forms the Ready Bullion and the Treadwell/Mexican sills (fig. D-30). The Ready Bullion sill is 569 feet long and 60 feet wide at the surface but thickens up to 290 feet at depth. The Treadwell/Mexican sill has been traced for 3,800 feet. It has a maximum width of 400 feet but thins to just a few feet between the 700-Foot and Mexican Mines and again between the Mexican No. 3 and No. 1 pits (figs. D-32 to D-34).

Other dioritic sills occur in the black phyllite, including the Bears Nest, Starr, and many small sills. These sills are much like the Ready Bullion and Treadwell/Mexican sills and are composed of both light and dark phases. The Starr sill, up to 1,000 feet wide and 5,000 feet long, is usually porphryitic and contains phenocrysts of plagioclase and hornblende in a fine-grained ground mass. The sill also commonly displays a good trachytic alignment of plagioclase phenocrysts (*D-98*). There are many thinner albite diorite sills that commonly occur in local swarms (as seen in the Great Eastern and Douglas Island adits, figs. D-186 and D-189, respectively). These are mostly light-colored diorite with uncommon hornblende and moderately common plagioclase phenocrysts. Sills hosted by the black phyllite are usually altered and contain disseminated pyrite along their margins and, locally, along crosscutting faults. Thin sills tend to be altered and mineralized throughout but wider portions of the Bears Nest and Starr sills are more massive and less altered in the center (*D-98*). The Bears Nest sill, which has a maximum width of 600 feet and is 3,300 feet long, has many quartz veinlets and abundant disseminated pyrite but reportedly carried less than 0.1 ppm gold (*D-50*). Some hornfelsing of the slate has occurred along the margins of the sills.

The Ready Bullion and Treadwell/Mexican sills pinch out both north and south. At the northern end of the Treadwell Mine, the bottom of the sill can be seen in company cross-sections to pitch steeply toward the SE. The Bears Nest Adit, about 1,000 feet NW of the Glory Hole (fig. D-30), cut the mafic-ultramafic sill, chlorite phyllite, and black phyllite but did not locate the Treadwell/Mexican sill. The Treadwell/Mexican sill pinches out shortly after leaving the Glory Hole. At the south

Figure D-31.—The Treadwell sill and orebody, 1904. This light-colored albitized diorite sill was mined to a depth of 2,800 feet and yielded 3.2 million ounces of gold (photo from Spencer *D-130*).

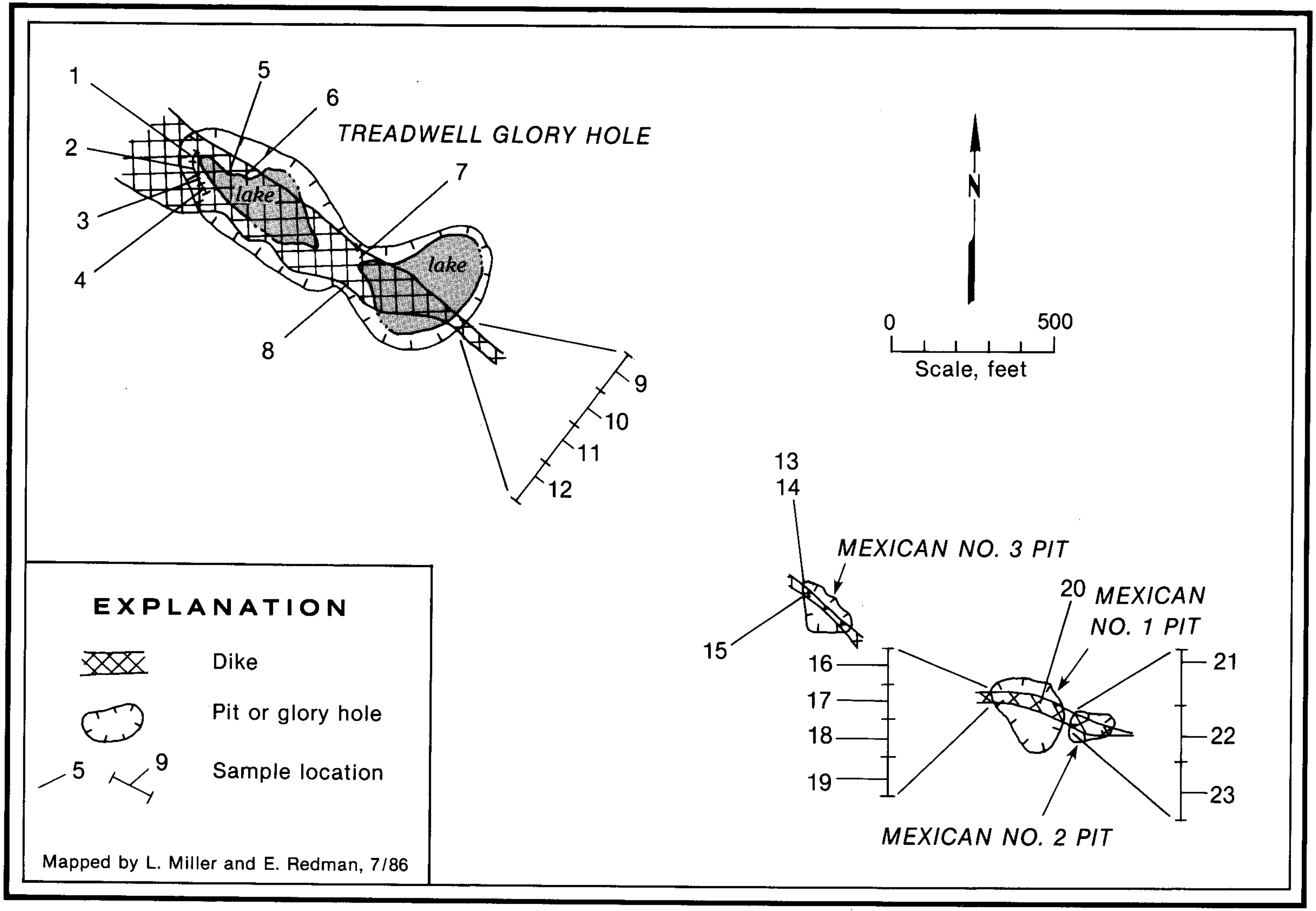

Figure D-32.—The Treadwell Glory Holes, showing geology and sample locations.

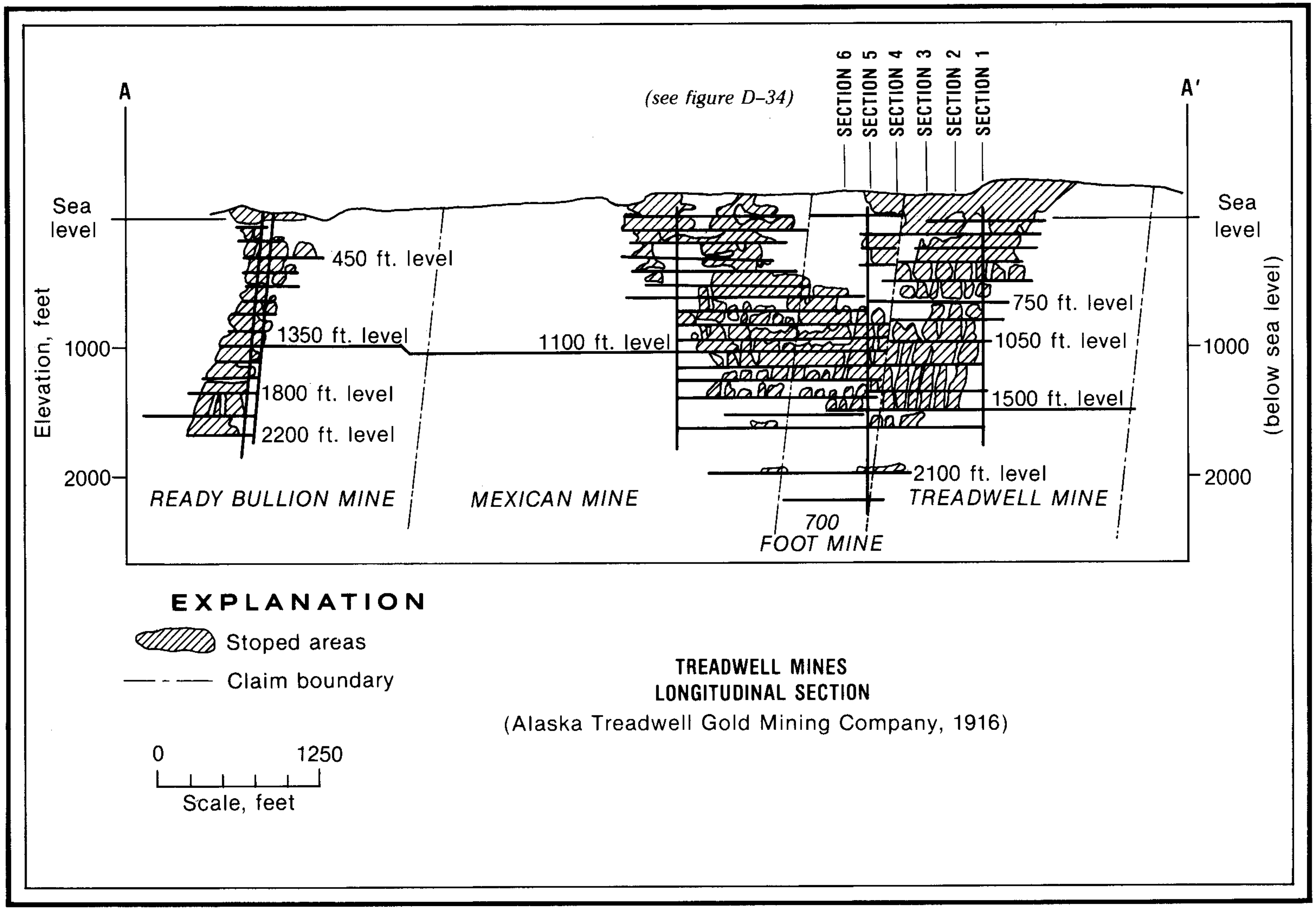

Figure D-33.—Longitudinal section of the Treadwell Mines. View looking west.

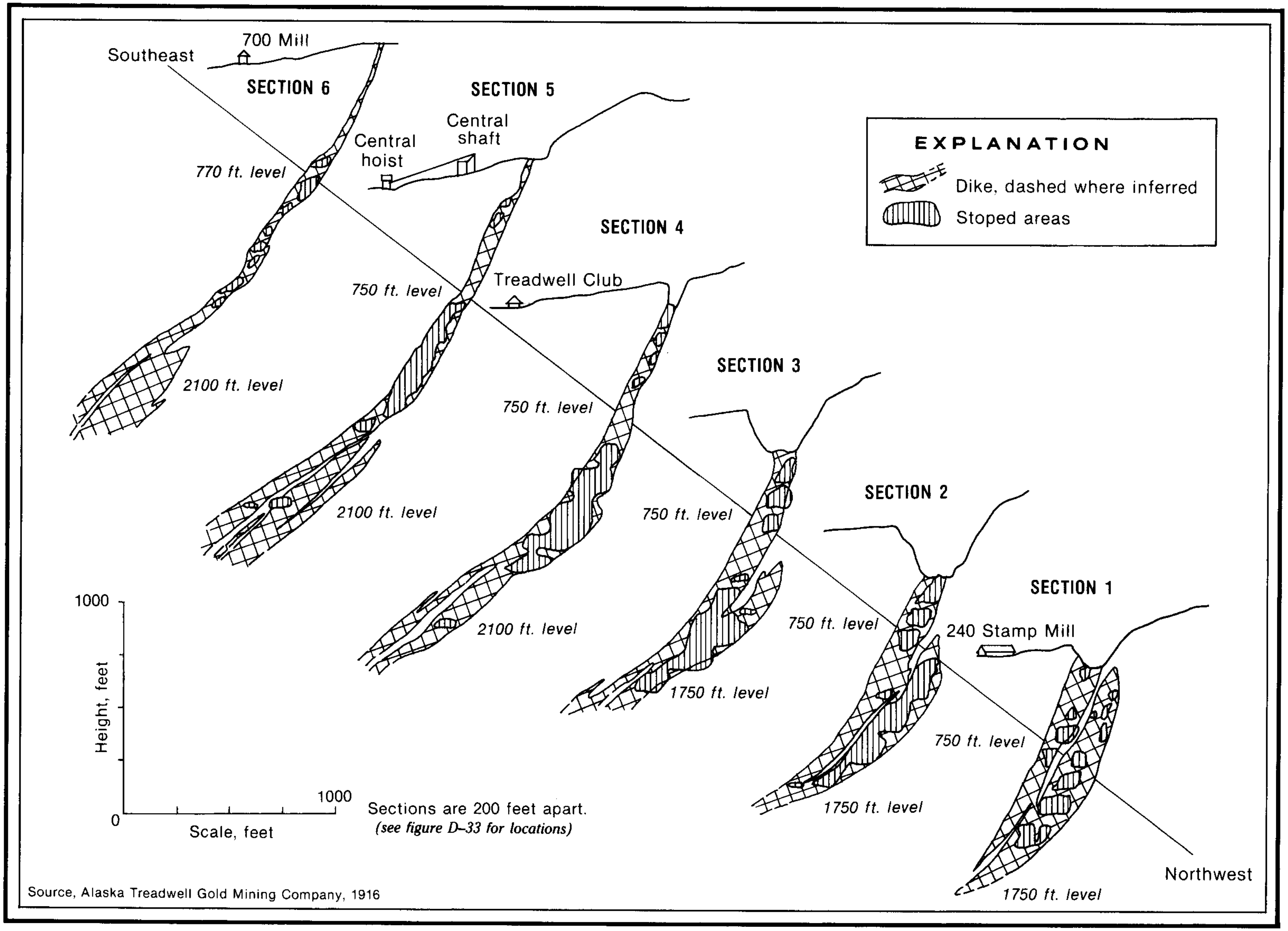

Figure D-34.—Transverse cross sections of the Treadwell orebody.

end of the Treadwell/Mexican sill, the sill follows the chlorite phyllite and mafic-ultramafic sill as they begin their sharp north bend. At that point, both the foliation and the sill cut away and return to the regional trend. At this point, where the sill intrudes into black phyllite, gold mineralization decreases and the sill appears to pinch out (*D-50*). The Ready Bullion sill pinches out to the south and interfingers into the chlorite phyllite to the north.

A few thin (to 3 feet) basalt dikes also occur in the mine area. These dikes trend approximately N-S, dip steeply west, and are post-mineralization (*D-130*).

Structure

All of the albite diorite sills pinch and swell along strike (fig. D-30). Adjacent sills, such as the Starr and the Treadwell/Mexican, tend to pinch and swell with an inverse relationship (*D-50*). A swell in one is juxtaposed next to a pinch in the adjacent sill. The northern swell in the Starr sill is next to the pinch in the Treadwell/Mexican sill between the 700-Foot and Mexican mines. Hershey interpreted this to be caused by the force of intrusion of the sills where one sill was able to push the surrounding slates apart with the resulting compression of the slates forcing the adjacent sill to thin.

Small faults are moderately common in the mine area and cut all units older than the basalt. The only large fault cut by the mine workings is the Channel Fault (*D-50*). This fault was found in a drift on the 1100-foot level of the Mexican Mine. Hershey describes the fault as having left-lateral movement and also suggests a vertical offset of at least 1,000 feet based on its truncation of the mafic-ultramafic sill.

Alteration

Gold-bearing portions of the diorite have been altered by hydrothermal fluids to the extend that they now consist of secondary albite and calcite with almost all traces of the original mafic minerals destroyed. There is some uralite (secondary hornblende), chlorite, and epidote (*D-130*). Quartz is rare except in veinlets within the brecciated diorite.

Mineralization

Economic mineralization at Treadwell is confined to albite diorite sills within the chlorite phyllite footwall section of mafic-ultramafic sill (Ready Bullion and Treadwell/Mexican sills). Within these sills, almost all of the ore was found in the light phase of the diorite (*D-50*).

Most ore occurs in diorite which has been brecciated and hydrothermally-altered to albite-rich rock (*D-130*). The brecciated areas appear to be randomly distributed throughout the sill in both swells and pinches. The diorite has been brecciated by quartz and calcite veinlets which contain cubes of pyrite. Disseminated pyrite cubes to 0.05 inches also occurs within the altered diorite. Although calcite is found in both veinlets and in the altered diorite, quartz is found only in the veinlets. The richest ore tended to occur in areas with the most quartz and calcite veining although, in some areas, good ore was found in zones that contained only albite alteration. There were also zones of abundant veining with low gold values (*D-50, D-130*). Some gold was found in the wall rock surrounding the sills.

Quartz and calcite veinlets, usually only a few inches thick, form about 20% of the ore zones. Veinlets can consist mostly of calcite but quartz is almost always present (*D-50*). Veinlet margins are usually gradational with the surrounding rock (*D-130*).

There are two primary veinlet sets: 1) veins roughly parallel to the regional foliation and 2) veinlets, at right angles to the strike of the sills, that dip SE. The dominant veinlet set formed in tensional cross fractures at right angles to sill margins. Some of the foliation-parallel veinlets extend beyond the ends of the sills where they form concordant veins in the phyllite (*D-130*).

Pyrite is by far the most common sulfide but molybdenite, pyrrhotite, magnetite, chalcopyrite, galena, sphalerite, and tetrahedrite are also locally present. Generally, gold is very fine-grained but Hershey reports some coarser gold grains in calcite veinlets (*D-50*). An early examination of Treadwell ore revealed some gold to be intergrown with pyrite (*D-130*). The milling process recovered 60% to 75% of the gold by amalgamation, and Spencer (*D-130*) thought that much of this gold came from the veinlets. The pyrite concentrates averaged 2% of the ore and contained the remaining 25% to 40% of the gold. Over the life of the mines, overall recovery averaged almost 90%. Cyanide leach tests conducted by the Bureau resulted in recovery of over 98% of the gold (*D-98*).

Molybdenite is a common accessory mineral in parts of the Treadwell mines. It occurs locally, and Spencer noted that higher grades of gold were thought to be associated with molybdenite-bearing portions of the sill (*D-130*).

Gold grades in the mines display a vague subhorizontal banding of grade (*D-130*). In the Ready Bullion Mine, gold concentrations steadily decreased from the surface to the 600-level then rose down to the 1350-level. Below the 1350-level, grades decreased. Grades at the Treadwell decreased down to the 440-level, then increased to the 1450-level after which they dropped, again. At the Mexican Mine, grades dropped from the surface to the 770-level then rose to peak between the 880 and 990-levels after which they dropped. The 990-level in the Mexican and the slightly deeper 1450-level in the Treadwell were the best levels in those mines (*D-50, D-130*).

Sample Results

The Bureau sampled the Treadwell sill in the Treadwell and Mexican glory holes (fig. D-32) and briefly surveyed the open workings on the Adit Level of the Mexican Mine. Twelve samples were collected from three sites in the main Treadwell glory hole (fig. D-32, Nos. 1-12). Eleven spaced-chip samples across the mineralized sill ranged from 0.07 ppm to 10 ppm gold, with an average of 2.8 ppm (fig. D-32, Nos. 1-4, 6-12). Five of the samples contained between 21 ppm and 99 ppm molybdenum. A selected sample of altered pyritic diorite (fig D-32, No. 5) contained 11 ppm gold.

Three smaller glory holes at the Mexican Mine were sampled. A total of eight samples were taken from Pits No. 1 and No. 2 (fig. D-32, Nos. 16-23). These samples ranged from 0.14 ppm to 22.4 ppm gold, averaging 9.6 ppm. Six of the samples contained from 31 to 107 ppm molybdenum. In Pit No. 3, 3 samples (fig. D-31, Nos. 13-15) ranged from 0.14 ppm to 97.7 ppm gold.

Copper concentrations were distinctly higher at the Mexican Mine than at the Treadwell, averaging 446 ppm at the Mexican versus only 85 ppm at the Treadwell. This may reflect the more common occurrence of tetrahedrite.

A 275-lb metallurgical sample was collected from Pit No. 1 and tested for gold extraction by cyanide amenability. The sample contained 10.7 ppm gold and 1.7 ppm silver. Results of the tests show that 98.4% of the gold was recovered by the technique but only 51.6% of the silver was saved:

Grind	Assay (ppm)				Extraction (%)	
% −325	Head		Residue		Au	Ag
Mesh	Au	Ag	Au	Ag		
84.4	10.6	1.7	0.2	−1.7(sic)	98.4	51.6

RESOURCE ESTIMATE

Proven reserves, including broken ore in stopes, standing and caved pillars above the 1750-level, and deep ore under development, are 3 million tons (*D-88*). Grade is not known.

HERBERT GLACIER PROSPECT

HISTORY

In 1889, gold-bearing quartz veins were discovered along the margin of the Herbert Glacier and staked as the Summit and St. Louis claims. Since then, the glacier has retreated and thinned considerably, exposing bedrock where the ice had been at least 500 feet thick adjacent to the old claims. In 1986, the Bureau and Houston Oil and Minerals Corp. simultaneously discovered a series of quartz/calcite fissure veins in quartz diorite gneiss below the toe of the glacier, NW of the Summit and St. Louis claims. Fifty unpatented claims were staked by Houston Oil and Minerals and 1,650 feet of core drilling was completed by the end of 1986. Ownership of the claims shifted to Echo Bay Mines Company by the end of the year. In 1988, Echo Bay did additional drilling of the veins.

BUREAU INVESTIGATIONS

The Bureau first noticed and sampled the south Herbert Glacier quartz veins while searching for the Summit/St. Louis claims (figs. D-4, D-35, D-36). Simultaneous to the Bureau's investigation, the veins were sampled by geologists from Houston Oil and Minerals Company (HOM). HOM sample results were completed before the Bureau's, and they subsequently staked claims over the area. This company has since been purchased by Echo Bay Mines.

Geologic Setting

The Herbert Glacier area is underlain by andesitic metavolcanics rocks (greenstones) to the west and quartz diorite gneiss to the east. The diorite gneiss is part of the tonalite sill of Brew (*D-20*) and marks the edge of the Coast Range metamorphic-plutonic belt. Cutting across the foliation of these rocks are two subparallel or en echelon sets of 070° to 080°-trending quartz veins that dip steeply to the north (fig. D-37).

The veins are composed of both white and gray quartz, with lesser calcite, and locally exhibit ribbon texture. The veins vary in thickness from a few inches to 4 feet, often pinching and swelling. Slickenside surfaces occur locally in the vein centers indicating movement

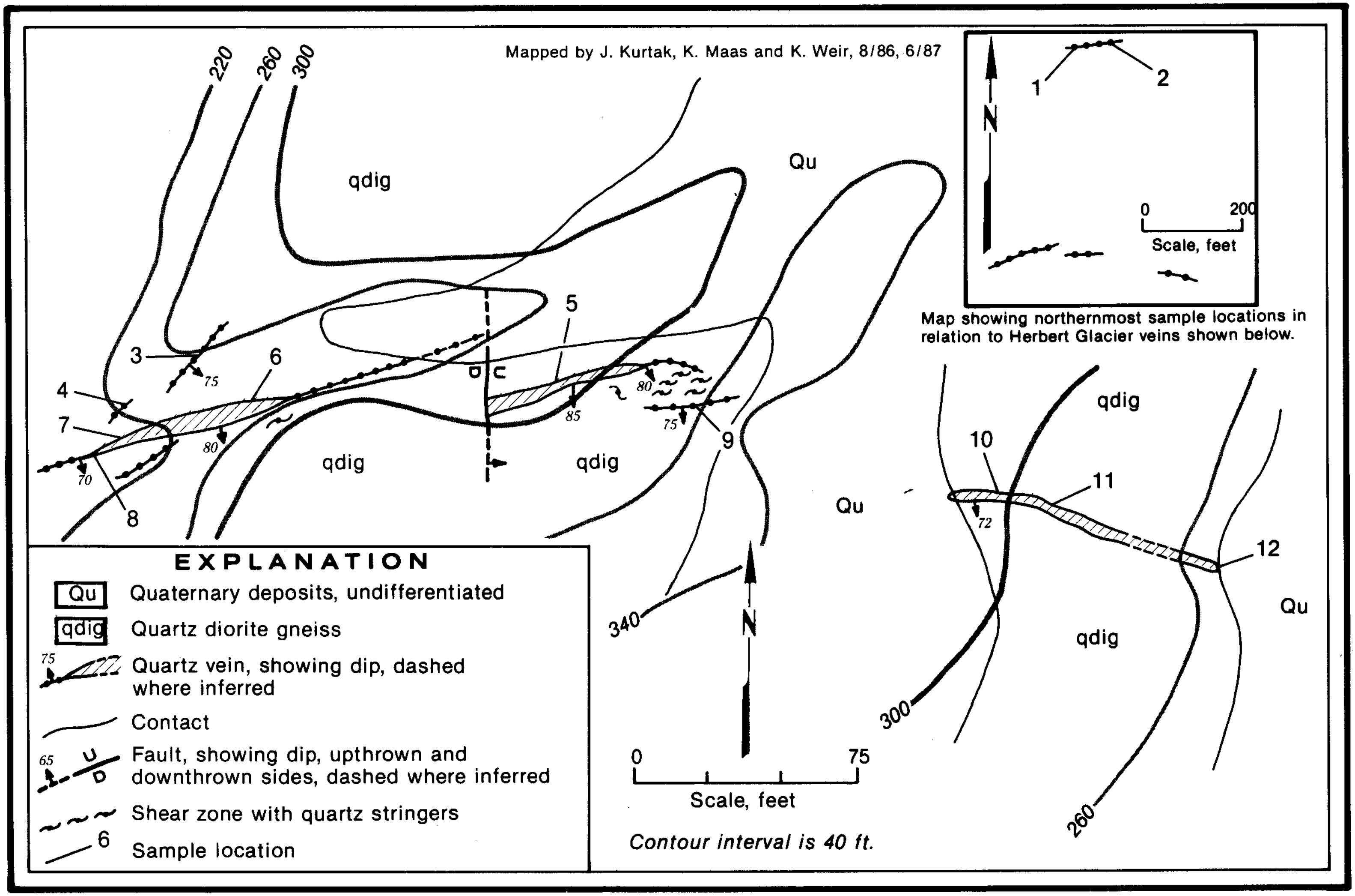

Figure D-35.—Herbert Glacier north, showing geology and sample locations.

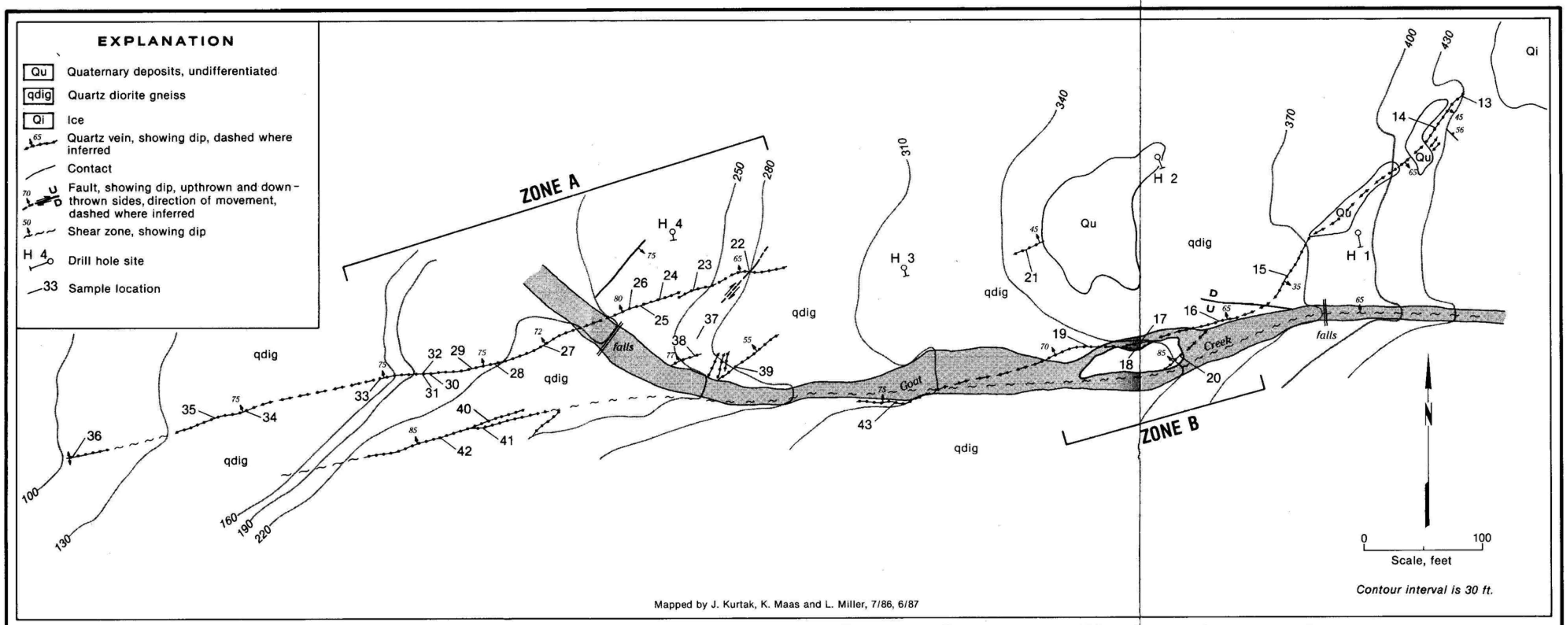

Figure D-36. —Herbert Glacier south, showing geology and sample locations.

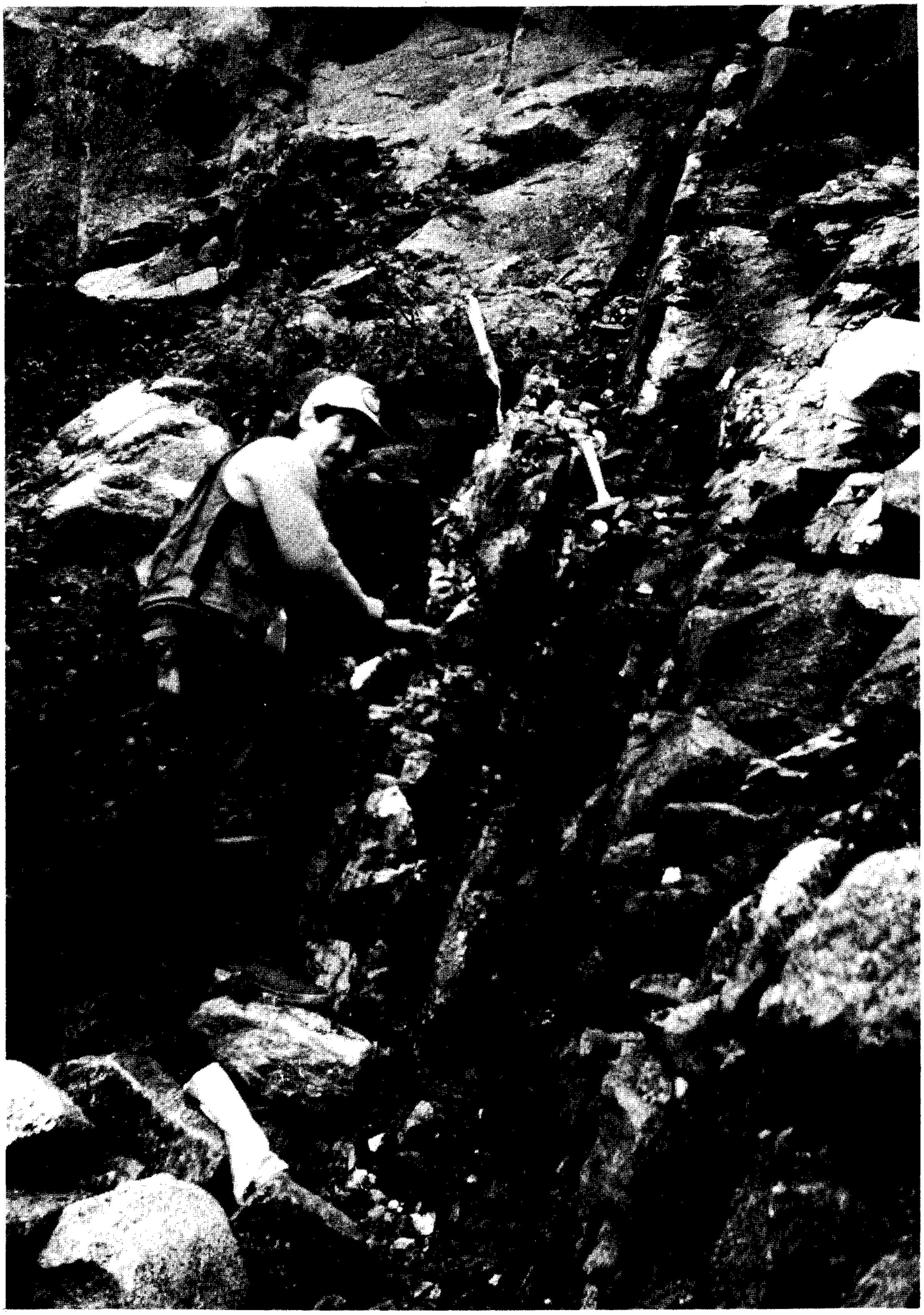

Figure D-37.—Gold-bearing quartz veins at the Herbert Glacier prospect were simultaneously discovered by Bureau and Houston Oil and Minerals personnel. Retreat of the Herbert Glacier has exposed the veins in the last 20 years.

after emplacement. The veins were emplaced along a series of shear zones that cut regional foliation at about right angles. The largest vein set generally follows the present channel of Goat Creek (fig. D-36) making access difficult.

Sulfide minerals consist of arsenopyrite, pyrite, galena, and sphalerite. Locally, arsenopyrite comprises up to 20% of the vein in fist-sized clots. Scheelite is also present. Visible gold occurs locally in both types of quartz but appears to be most prevalent in the galena-bearing white quartz located near the footwall of the veins.

Alteration in the host rock occurs on both margins of the veins up to several feet out from the vein, but is more pervasive on the footwall side of the vein. Where a vein pinches out locally, only an altered zone is apparent. Vein margins are characterized by carbonate and potassic alteration as indicated by abundant calcite, sericite, ankerite, secondary potassium feldspar, chloritized biotite, and silicification. The marginal rocks contained up to 1% to 2% finely disseminated arsenopyrite but carried low gold concentrations.

Two distinct vein sets occur below the glacier. For simplicity, these are called the north and south vein sets. The south veins can be followed intermittently for 1,200 feet along strike and 320 feet vertically. The northern vein set is less extensive and contains fewer sulfides than the south set. However, the alteration halos for both sets are very similar.

Sample Results

A total of 44 samples were collected from the Herbert Glacier prospect, 12 from the north vein set and 32 from the south vein set. The north vein set is subparallel to the south vein set and has much lower gold values. Of the 12 samples taken from the north vein set (fig. D-35, Nos. 1-12), one carried 37.2 ppm gold, 186.7 ppm silver, greater than 1% lead, and 0.36% zinc, while 4 others contained between 1.3 ppm and 2.8 ppm gold. The samples yielded 16.0 ppm, 17.0 ppm, and 42.0 ppm silver.

Samples from the south vein set (fig. D-36, Nos. 13-43) contained up to 240.8 ppm gold and 126.9 ppm silver). Though gold values range widely along strike, a weighted average of all vein samples gave a result of 21.1 ppm gold and 14.6 ppm silver over an average vein width of 1.6 feet. A sample of vein selvage contained 1.4 ppm gold. High gold concentrations show a positive correlation with high zinc values but do not correlate as well with high lead values. In cut slabs, a spatial relationship was noted between galena and gold grains. Lead and silver values show a positive correlation. Basically, gold occurs in areas containing sphalerite and galena.

A 240-lb metallurgical sample was collected for analysis and beneficiation tests by the Bureau's Salt Lake Research Center. Results are as follows:

Gravity Separation Tests

Test	Head Assay Au (ppm)	Head Assay Ag (ppm)	Recovery (%) Au	Ag
Test 1	65.5	—	88.8	—
Test 2[1]	70.7	36.7	88.4	80.7
Test 3[2]	35.8	32.6	77.9	72.0

[1] *D-43.*
[2] *D-71.*

The sample was also found to contain scheelite. The metallurgical sample had a 0.03% tungsten trioxide (WO_3) mill head and a gravity separation yielded a concentrate of 0.35% tungsten trioxide (WO_3) at 21.7% recovery (*D-43*).

RESOURCE ESTIMATE

The Bureau estimated that there are 11,340 tons of indicated reserves with an average grade of 0.86 ounces/ton gold at Herbert Glacier. Two areas of high-grade gold mineralization resources have been outlined and consist of area A, with 8,900 tons at 0.97 ounces/ton gold, and area B with 2,440 tons grading 0.48 ounces/ton gold (fig. D-36).

Drilling of the same area by Houston Oil and Minerals showed that the veins extend for at least 190 feet down dip from the surface and contain gold values of 0.9 ounces/ton gold at that depth. This drilling indicated the presence of at least six ore shoots each of which may contain 40,000 tons of material with 1.0 ounces/ton gold (*D-84*). There is a potential for a much larger, lower grade resource.

RECOMMENDATIONS

This property could probably be developed as a small operation based on the existing resource data. Closer-spaced drilling would further delineate gold concentrations in the veins and trenching would help to test surface gold values between outcrops. The majority of the vein is exposed along its 1,200-foot strike length which suggests at least 600 feet of vertical extent (at a two to one strike length to depth ratio).

OTHER MINES AND PROSPECTS IN THE JUNEAU GOLD BELT

Cross-reference Table

Mines, prospects and occurrences are discussed in geographical order as they appear on Figures D-4 to D-6. In order to make it easy to locate any specific mine, prospect, or occurrence, this alphabetical cross-reference list is included.

Map No. (figs. D4-D6)	Page No.	Mine or Prospect	Type
153	D-34	700-Foot	vein
174	D-356	AEK	unknown
49	D-126	Alaska Washington	vein
160	D-338	Alaska Atlin	vein
123	D-289	Alaska Consolidated	vein
163	D-341	Alaska Treasure	strat
108	D-262	Alaska Taku	vein
131	D-305	Alaska Gastineau tails	placer
93	D-8	Alaska Juneau	vein
112	D-253	Alaska Juneau tails	placer
120	D-286	Anderson	vein
191	D-377	Anmer Creek	vein
80	D-201	April	placer
188	D-375	Argenta Basin	vein
189	D-376	Arm	dissem (?)
115	D-272	Ascension	vein
47	D-120	Aurora Borealis	vein
167	D-349	Bach	vein
132	D-305	Bar Placer	placer
142	D-315	Bear Creek	placer
12	D-65	Bear	vein
149	D-325	Bear's Nest	vein
31	D-83	Berners Bay	vein (?)
27	D-29	Berners Tunnel	
97	D-234	Bess	vein
48	D-125	Bessie	vein
39	D-96	Black Chief	vein
36	D-90	Blue Jay	vein
177	D-358	Bogert Point	placer
83	D-206	Boston	dissem
195	D-381	Boulder Creek	placer
94	D-227	Bridle	vein
104	D-251	Bull Consolidated	vein
169	D-354	Bum Cat	placer
34	D-86	California	vein
193	D-378	Carroll Creek	placer
43	D-109	Cascade	vein
75	D-196	Clark	vein
13	D-66	Comet	vein
186	D-374	Cook	vein
114	D-269	Cross Bay	vein
183	D-367	Crystal	vein
16	D-69	Cumberland	vein
122	D-286	Denny	vein

Map No. (figs. D4–D6)	Page No.	Mine or Prospect	Type
45	D–115	Dividend	vein
127	D–296	Dolan	vein
86	D–213	Dora	vein
76	D–198	Doran	vein
134	D–307	Douglas Antimony	vein
148	D–323	Douglas Island	dissem
67	D–182	Dull & Stephens	vein
71	D–194	Dutch Lady	vein
40	D–102	E Pluribus Unum	vein
51	D–136	Eagle River	vein
82	D–206	Early Bird	dissem
87	D–218	Ebner	vein
4	D–23	New Kensington adit	
178	D–358	Enterprise	vein
7	D–61	Eureka	vein
137	D–309	Foster	vein
25	D–80	Fremming	vein or strat
182	D–363	Friday	vein
184	D–375	Gilbert Bay	vein
35	D–90	Gillen	vein
117	D–279	Glacier	vein
73	D–196	Glacier Placer	placer
116	D–279	Golconda	vein
187	D–375	Goldnest	vein
18	D–75	Gold King	vein
33	D–86	Gold Standard	vein
128	D–303	Gold Belt	vein
78	D–200	Goldstein	vein
124	D–294	Gould & Curry	vein
172	D–355	Great Bear	unknown
141	D–316	Great Eastern	dissem
17	D–69	Greek Boy	vein
105	D–251	Ground Hog	vein
79	D–200	Hallum	vein
118	D–285	Hartford	vein
56	D–147	Herbert Group	placer
55	D–43	Herbert Glacier	vein
24	D–78	Hoggatt Creek	vein
144	D–316	Holeman	dissem
164	D–344	Homestake	strat
2	D–55	Hope	
5	D–57	Horrible	vein
85	D–209	Humboldt	vein
19	D–75	Indiana	vein
171	D–354	Iron Lode	dissem (?)
1	D–55	Ivanhoe	vein
84	D–209	Jeff & Russell	vein
151	D–325	Jersey	strat
176	D–357	JLC	placer
29	D–83	Johnson Creek	placer
9	D–63	Johnson	vein

Map No. (figs. D4–D6)	Page No.	Mine or Prospect	Type
30	D-83	Johnson Creek placer	placer
38	D-95	Joyce-Jensen	vein
20	D-29	Jualin	vein
81	D-201	Jualpa/Last Chance	placer
41	D-115	Julia	vein
106	D-227	Jumbo	vein
146	D-318	Jumbo	dissem
8	D-23	Kensington	vein
10	D-23	Kensington Tunnel	
136	D-308	Kowee Creek	placer
140	D-315	Lawson Creek	placer
74	D-196	Lemon Creek	placer
72	D-194	Lemon Creek lode	vein
91	D-227	Little Basin	placer
138	D-309	Lost Lucy	vein
102	D-247	Lurvey Placer	placer
165	D-346	Mammoth	strat
194	D-378	Mapco	strat
99	D-234	Margarite	vein
95	D-230	Martin	vein
37	D-95	Maude S	vein
143	D-318	Mayflower	vein
125	D-295	McCartney	vein
62	D-168	McGinnis Creek	placer
103	D-247	McKinley	vein
68	D-173	Mendenhall Glacier	strat
65	D-191	Mendenhall	vein
6	D-58	Mexican (Berners Bay)	vein
154	D-33	Mexican (Douglas Is.)	vein
156	D-326	Mexico & Belvedere	dissem
130	D-303	Middle Peak	vein
88	D-226	Middle Basin	placer
159	D-330	Mineral Queen	vein
180	D-360	Mist Creek	placer
54	D-147	Mitchell-McPherson	vein
61	D-166	Montana Basin placer	placer
60	D-159	Montana Basin	vein
63	D-166	Montana Creek	placer
50	D-136	Mother Lode	vein
52	D-144	Mountain Queen/Westover	vein
28	D-82	Mystery Lode	vein or strat
135	D-307	New Boston	dissem
44	D-109	Noonday	vein
11	D-63	Northern Belle	vein
70	D-194	Nugget Creek	placer
53	D-144	Oleson	vein
3	D-57	Ophir	vein
139	D-315	Pansy	vein
110	D-262	Penn Alaska	vein
101	D-242	Perseverance	vein
64	D-169	Peterson	vein

Map No. (figs. D4-D6)	Page No.	Mine or Prospect	Type
158	D-330	Portland	vein
175	D-356	Prospect Creek	placer
111	D-263	Point Bishop	strat
109	D-262	Point Cooper	dissem
197	D-382	Point Coke	dissem (?)
42	D-109	Puzzler	vein
133	D-306	Rainbow	vein (?)
155	D-33	Ready Bullion	vein
126	D-296	Reagan	vein
166	D-349	Red Diamond	vein
89	D-226	Reilly	vein
90	D-226	Republican	vein
46	D-116	Rex	vein
100	D-238	Rubicon	vein
14	D-67	Seward	vein
121	D-245	Sheep Creek Tunnel	
129	D-303	Sheridan	vein
119	D-279	Silver Queen	vein
92	D-228	Silver Bow Basin	placer
107	D-258	Silver Falls	vein
147	D-323	Skookum Chief	dissem
59	D-152	Smith & Heid	vein
181	D-363	Snettisham	dissem
113	D-269	Snowslide Gulch	vein
21	D-78	Snowslide Gulch	vein
98	D-234	Solo	vein
196	D-381	S. Snettisham Peninsula	vein (?)
57	D-149	Summit/St. Louis	vein
173	D-355	Sunrise Canyon	strat
15	D-67	Sweeny Creek	vein
185	D-374	Sweetheart Creek	unknown
190	D-376	Sweetheart Ridge	strat
32	D-84	Tacoma	vein
168	D-353	Taku Chief	vein (?)
170	D-354	Taku placer	placer
22	D-75	Thomas	vein
150	D-326	Treadwell tailings	placer
152	D-33	Treadwell	vein
66	D-175	Treasury Hill	vein
145	D-316	Tyee	dissem
161	D-338	Ulela/Alice	vein
96	D-230	Upper Gold Creek	vein
23	D-78	Valentine	vein
77	D-198	Wagner	dissem
179	D-360	Whigg placer	placer (?)
192	D-374	Williams Cove	dissem (?)
58	D-149	Windfall Creek	placer
69	D-191	Winn	vein
157	D-328	Yakima	strat
26	D-82	Yankee Boy	vein
162	D-338	Zelda	vein

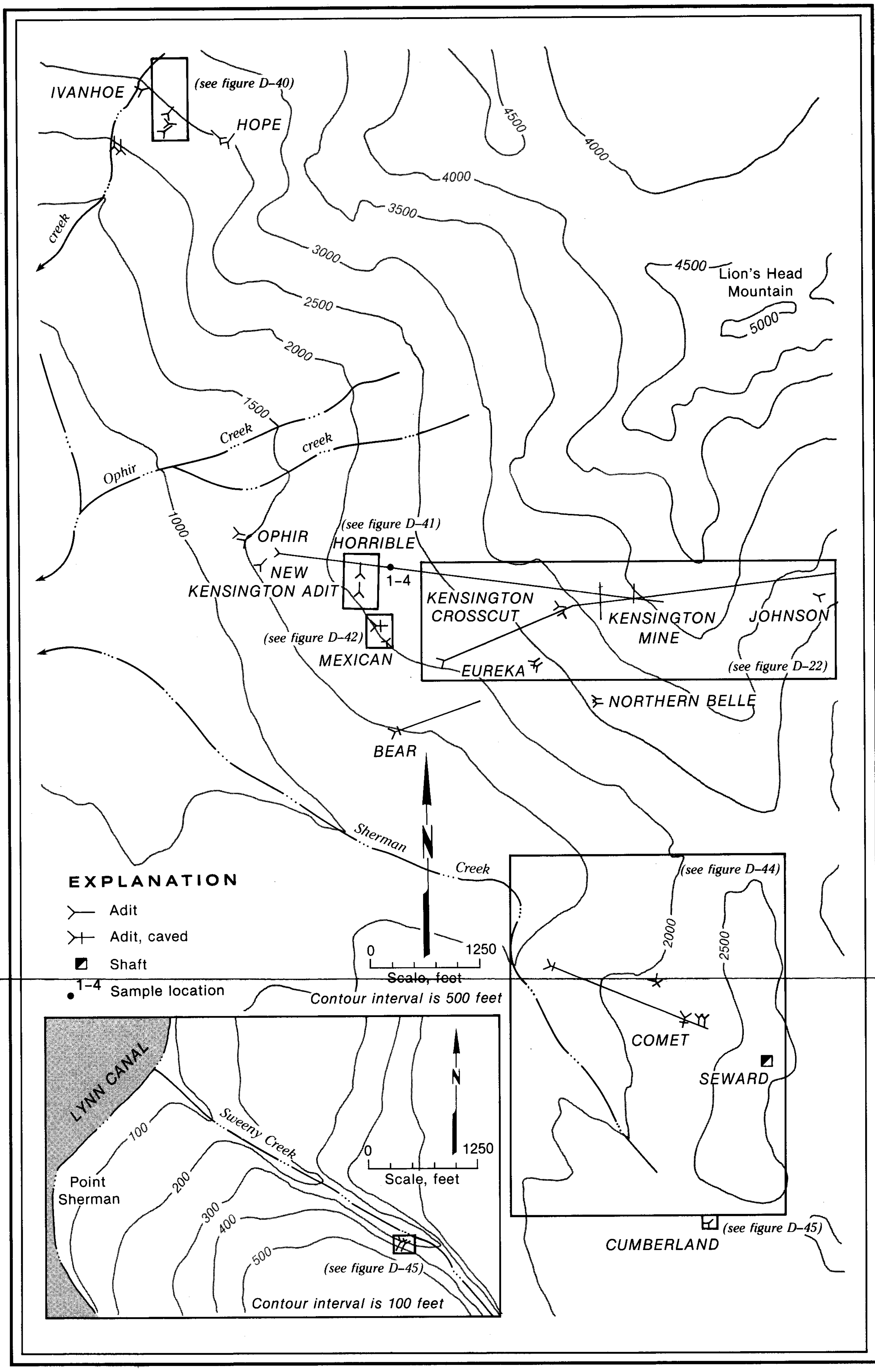

Figure D-38. — Mines and prospects in the Sherman Creek area, Berners Bay.

IVANHOE MINE

Production

Known production is 340 ounces of gold from 3,500 tons of ore.

History

The Ivanhoe vein was discovered by George Bach in 1896 (figs. D-4, D-38). In 1897, Bach's claim was purchased by Mellen Gold Mining Company. The company built a 20 stamp mill on Sherman Creek and a 5,700-foot tramway to the mine. The mill cost a total of $10,331 to build. The mine began operations in 1899 and, by the end of 1900, had treated 2,400 tons of ore. In 1901, some mining was done and the last mill run was reported to have produced $1,200 from 151 tons of ore.

The final $25,000 payment to the discoverers was made by the Mellen Company in 1902 and the mill operated for 2 months. A search for ore in 1903 failed to find enough gold and the mine shut down. Between 1899 and 1902, a total of 3,500 tons were mined and at least 340 ounces of gold produced.

In 1912, minor work was done at the property but no production was reported. The mine was abandoned after that year (*D-97*).

Workings and Facilities

The main adit has 1,100 feet of workings and two stoped areas. There are three other open adits, two of which have 8 feet and 120 feet of workings, and one which has a 100-foot shaft that connects with the main adit. Two other tunnels are reported on the Ivanhoe claim (a 160-foot adit and an 80-foot adit with 30-foot crosscut) (*D-79*).

Bureau Investigations

The Ivanhoe vein, unlike most veins in the Berners Bay area, cuts metamorphosed basalt about 1 mile north of the contact with the Jualin diorite. The southern portion of the vein trends N-S but the northern portion swings to the NW until it parallels the regional layering. Vein dips range from 35° to 55° E to NE. Vein thickness varies from 1 foot to 9 feet but averages about 5 feet (fig. D-39) and was traced for approximately 1,500 feet along strike. Contacts between the vein and the adjacent basalt are commonly sheared but sharp contacts are also present. Fragments of basalt are locally common in the quartz.

Pyrite and chalcopyrite occur in the veins as small clots or thin bands. In some parts of the vein, sulfide clots are scattered throughout the quartz whereas in other parts, sulfides are concentrated on the hanging wall side of the vein. The vein exposed in the deepest stope in the mine contained small dendrites of native copper on thin fractures in the quartz.

The Ivanhoe vein is much like those at the Horrible and Mexican properties although hosted by a different rock.

Sample Results

The Ivanhoe Mine (fig. D-40) was briefly examined by the Bureau in 1985 and was mapped and sampled in 1987 (*D-99*). A total of 15 samples were collected (fig. D-40, Nos. 1-15). Gold values ranged from 0.2 ppm to 15 ppm with a weighted average of 2.3 ppm gold over a vein width of 4.3 feet. Silver values had a weighted average of 5.9 ppm and sample nos. 9 and 13 contained 0.14% and 0.11% copper, respectively.

Resource Estimate

Based on a minable strike length of 1,000 feet, the Ivanhoe Mine has an inferred resource of 180,000 tons with 0.7 ounces/ton gold and 0.2 ounces/ton silver. This gives the mine moderate development potential.

Recommendations

The Ivanhoe vein should be explored by diamond drilling to determine its length and depth.

MAS No.	MS No.
211200054	593

References

D-59, D-79, D-95, D-97, D-99, D-161

HOPE PROSPECT

Production

The Hope prospect has had very little development.

History

The Hope claims were located adjacent to the Ivanhoe in 1895 (figs. D-4, D-38). By August 1902, two adits and an open cut had been excavated and the claims were patented (*D-78*). No other work has been recorded.

Figure D-39.—The Ivanhoe quartz vein was mined about the turn of the century. This vein contains the only native copper known in the Gold Belt.

Workings and Facilities

The Hope prospect has two adits, with 18 and 77 feet of workings, and a 20-foot open cut (*D-78*).

Geologic Setting

The Hope vein, like the Ivanhoe, is hosted entirely by metabasalt. Unlike the Ivanhoe vein, however, it is an E-W trending vein and, in the longer adit, has a width of 8 feet. Samples taken by the present claim owner range in value from nil to approximately 25 ppm Au (*D-69*).

Bureau Investigations

The Bureau did not examine the Hope prospect.

Resource Estimate

No estimate can be made.

Recommendations

The Hope quartz veins should be located, traced, mapped, and sampled to determine their potential.

MAS No.	MS No.
21120234	570

References

D-69, D-78

OPHIR PROSPECT

Production

There may have been some minor production from the Ophir but none is documented.

History

The Ophir prospect was discovered by Jack McLaughlin in 1887 (figs. D-4, D-38). McLaughlin did 45 feet of tunneling, then sold the prospect in 1890. A Mr. Venator did exploration work for a new company in 1891 and drove several adits.

The Ophir was purchased by the Berners Bay Mining and Milling Company about 1893 and more tunneling done the next year. By 1898, there were a total of 790 feet of workings. Some additional work was done about 1910. In 1988, Echo Bay Mines and Coeur d'Alene Mines drove the new Kensington adit through the Ophir claim, cutting many veins but no other work was done (*D-97*).

Workings and Facilities

Three adits have been reported on the Ophir prospect (*D-54*), but none were found by the Bureau. The workings include a 350-foot adit with 250 feet of drifts, a 125-foot adit with a 75-foot crosscut, and a 75-foot inclined shaft.

Bureau Investigations

The Bureau was unable to examine the old Ophir prospect because owners of the ground did not give permission. Echo Bay Mines allowed the Bureau to collect samples from their new adit but no mapping was done. Sample results are discussed as part of the Kensington Mine.

The Ophir prospect contains at least five quartz veins (Ophir, Hartford, Selkirk, Chilkat, and Acropolis) that cut Jualin diorite. The veins, that trend 150° and dip 45° NE, are 2 feet to 14 feet thick and contain many vugs and cavities lined with euhedral quartz crystals. Sulfide minerals consist solely of very small amounts of pyrite. Samples collected by the Kensington Mines Co. in 1896 ranged between 1.4 ppm and 7.3 ppm gold (*D-54*).

Resource Estimate

The Bureau was unable to examine the Ophir prospect and, therefore, could not make a resource estimate.

Recommendations

The workings should be located and examined followed by trenching and/or drilling.

MAS No.	MS No.
21120131	37A

References

D-54, D-59, D-95, D-96, D-97, D-99

HORRIBLE MINE

Production

Approximately 1,500 tons were mined from stopes in the mine but published production figures show only 75 ounces of gold recovered from 500 tons of ore.

History

The Horrible vein was discovered about 1887 (figs. D-4, D-38). Frank and George Bach drove adits into the vein in 1895 and 1896, completing about 400 feet of workings. Later in 1896, the Portland Alaska Gold Mining Co. purchased the Horrible and adjacent Mexican claims. The next year, the company began construction of a 10-stamp mill on the beach and a 2-mile aerial tramway. The mine was in operation by July 1897.

The Horrible Mine operated on a small scale during the latter part of 1897 and during 1898 but dissention within the Portland Company closed down the operation in 1899 and 1900. A little work was done in 1901.

In 1911, the Lynn Canal Mining Company acquired the mine. The company renovated the mine and erected a new aerial tram to the Ivanhoe mill. One span of the tram was 3,730 feet between towers and was claimed to be a world record distance. The mill ran for 2 months during 1912 but the company was not able to recover the gold from the ore. The mine was abandoned after 1912 (*D-97*).

Workings and Facilities

The main Horrible adit is 408 feet long with a 230-foot crosscut, an approximately 20-foot deep winze, and a stoped area. The upper adit is 84 feet long.

Bureau Investigations

The Savage vein in the Horrible Mine trends N-S, dips 45° to 75° E, cuts the Jualin diorite, and extends south into the Mexican prospect (fig. D-41). The vein, which is exposed for 450 feet, is 1 to 12 feet thick and locally has a stockwork of thin veins on the footwall. The stockwork zone is usually less than 5 feet wide. The main vein is commonly bounded by shear zones and exhibits at least one splay. Alteration of the diorite adjacent to the vein is common but unaltered diorite was also found in contact with the vein. Alteration minerals consists of ankerite and quartz.

Mineralization consists primarily of pyrite and chalcopyrite but traces of galena are also present. Sulfides tend to be concentrated along the hanging wall side of the vein but also occur as clots scattered through the quartz.

Sample Results

The Bureau located two adits, the old tram cable, and miscellaneous ruined buildings at the Horrible Mine (fig. D-41). In the upper adit, 4 samples were taken (fig. D-41, Nos. 1-4). One sample (fig. D-41, No. 4) contained 31.3 ppm gold, 74.6 ppm silver, and 1.4% copper and another sample (fig. D-41, No. 3) yielded 57.4 ppm silver, 0.1% copper, and 0.5% lead. Samples taken from the adit had a weighted average of 17.0 ppm gold and 42.8 ppm silver over 2.5 feet.

Fourteen samples were collected from the main Horrible adit (fig. D-41, Nos. 5-18). The weighted average of these samples was 3.1 ppm gold and 7.2 ppm silver over an average vein width of 4.4 feet. Three samples contained significant gold concentrations. Sample 18 (fig. D-41), from the shaft near the portal, contained 18 ppm gold and 39.6 ppm silver. Two samples from the main drift beyond the stoped area (fig. D-41, Nos. 6, 8) contained 10.9 ppm and 19.3 ppm gold, 13 ppm and 27 ppm silver, respectively. Samples 5 and 8 (fig. D-41) also contained 0.34% and 0.28% copper.

Resource Estimate

The Horrible Mine has an inferred resource of at least 40,000 tons of ore grading over 0.09 ounces/ton gold and 0.21 ounces/ton silver. The Savage vein exposed at the Horrible is continuous with the vein on the Mexican claim 900 feet to the south and the combined inferred resource would be 130,000 tons of ore with an estimated grade of 0.06 ounces/ton gold and 0.22 ounces/ton silver.

Recommendations

The Savage vein should be drilled to determine its extent. Gold values appear to increase up slope so drilling could be concentrated on the bench above the upper adit.

MAS No.	MS No.
21120009	60

References

D-54, D-59, D-95, D-96, D-97, D-99, D-161

MEXICAN PROSPECT

Production

There is no reported production from the Mexican prospect.

History

The Mexican prospect was discovered by Lucky Tom Smith in 1887 who drove a short adit into the discovery

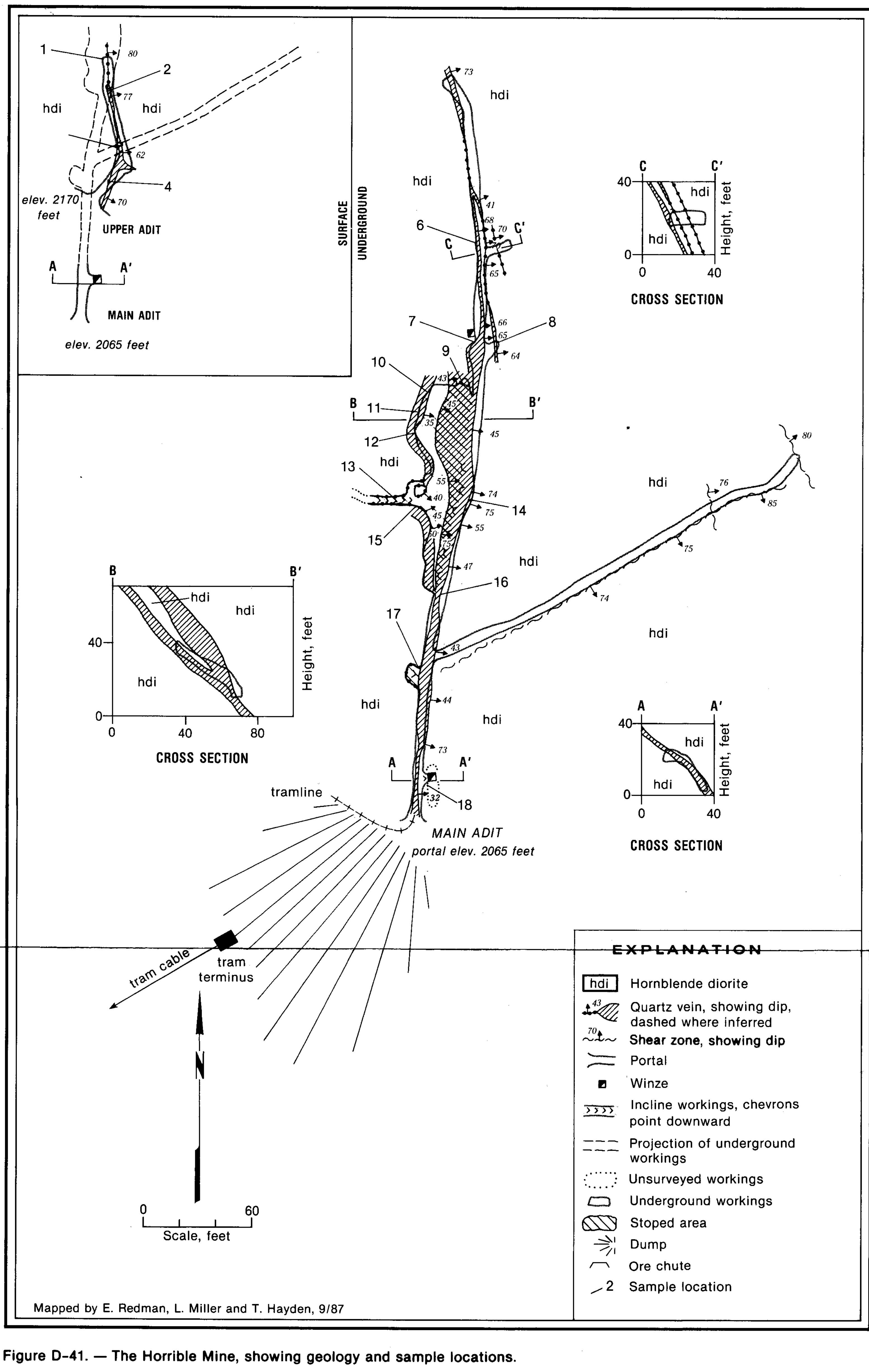

Figure D-41. — The Horrible Mine, showing geology and sample locations.

outcrop (figs. D-4, D-38). The claim had been acquired by Frank and George Bach by 1895 and was purchased along with the Horrible Mine by the Portland Alaska Gold Mining Company in 1896. The Portland Company drove a 135-foot crosscut and 106-foot drift along the vein before 1900 (*D-97*).

Workings and Facilities

Two open adits were located on the Mexican claim: the Mexican adit which contains a 135-foot crosscut and 106-foot drift, and the 8-foot Discovery adit.

Bureau Investigations

The Mexican prospect is very similar to the Horrible Mine and is also on the same vein (known as the Savage vein). It is hosted by the Jualin diorite and consists of a quartz vein that ranges from 1 to 8 feet wide, trends 010°, and dips 60° to 84° E. The diorite is medium-grained and composed of chloritized hornblende and plagioclase. Diorite along the hanging wall of the vein has been strongly sheared.

Mineralization in the quartz vein consists predominantly of pyrite with only traces of chalcopyrite.

Sample Results

The Bureau located, mapped, and sampled the two Mexican adits (fig. D-42). Five samples were taken in the Mexican adit (fig. D-42, Nos. 1-5) and one was taken in the Discovery adit (fig. D-42, No. 6). The weighted average for samples was 0.2 ppm gold and 7.8 ppm silver over a vein width of 3.4 feet. Moderate concentrations of zinc (to 870 ppm), lead (to 645 ppm), and copper (to 259 ppm) were also detected.

Resource Estimate

See the resource estimate for the Horrible Mine.

Recommendations

See recommendations for the Horrible Mine.

MAS No.	MS No.
21120223	61

References

D-96, D-97

EUREKA PROSPECT

Production

Other than ore taken for testing purposes, there has been no production from the Eureka prospect.

History

The Eureka prospect (figs. D-4, D-38) was discovered in 1897 by the Berners Bay Mining and Milling Company. The Eureka veins were originally exposed by open cuts at an elevation of 2,300 feet. In 1903, the Eureka was cut by the Kensington Tunnel and several hundred feet of drifting and a short raise completed about 1912 or 1913 (*D-97*).

Geologic Setting

The Eureka prospect consists of a large quartz vein cutting Jualin diorite and a stockwork of small veinlets on the footwall of the main vein. The main vein strikes N-S and dips 63°E while the whole mineralized zone is approximately 350 feet long and up to 60 feet wide. Pyrite, with the exception of uncommon chalcopyrite, is the only sulfide mineral.

Workings and Facilities

The Eureka prospect is cut by 360 feet of workings from the Kensington Tunnel (fig. D-22) and reportedly has two 25-foot adits (*D-54*). It is also cut by the new Kensington adit.

Bureau Investigations

The Bureau was allowed by property owners to briefly examine the Eureka deposit from the Kensington Tunnel but was not allowed to map or sample the mineralization. The Eureka veins are very much like those at the Kensington. Mineralization consists of a central quartz vein, which has been altered along its margins, and border zones of stockwork quartz veining (see Kensington for additional details). The zone is narrower and longer than the deposit at the Kensington.

Resource Estimate

The Eureka prospect has an inferred reserve of 300,000 tons (*D-54*) with a grade of 0.17 ounces/ton gold (*D-141*).

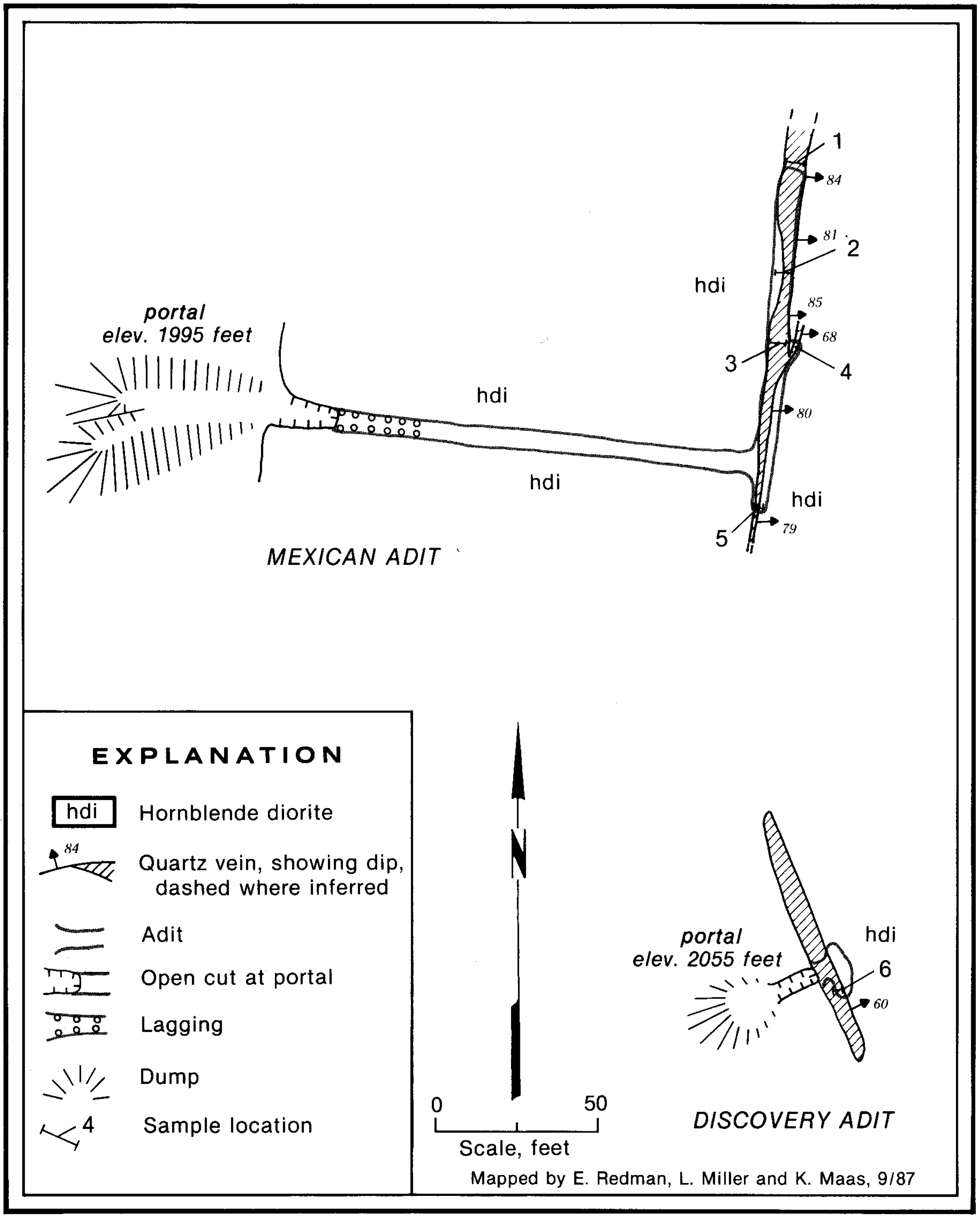

Figure D-42.—The Mexican prospect, showing geology and sample locations.

Recommendations

The ore zone has been drilled by Placid Oil Company and is currently under examination by Echo Bay Mines. The new Kensington adit did not cut much mineralization where the Eureka veins had been projected, therefore further drilling is needed to determine the bottom of the present stockwork system.

MAS No.	MS No.
21120227	46

References

D-59, D-95, D-96, D-97, D-141, D-161

JOHNSON (NORTHERN LIGHTS) MINE

Production

There was minor production from the Johnson Mine in 1887 but production totals are not known. When the vein system was cut by the Kensington Tunnel during the early 1900's, some ore was mined but no figures are available.

History

The Johnson Mine (figs. D-4, D-38) was discovered by David Price and Dick Johnson in 1886 and staked as the Northern Lights claim. In 1887, the men put a Huntington mill on the property, which they ran for a short time. A snowslide carried the mill away in 1888.

In 1895, the Northern Lights claim was purchased by the Berners Bay Mining and Milling Company. The company extended the Kensington Tunnel and cut the Johnson ore body in 1913 (*D-97*).

Workings and Facilities

The Johnson Mine was originally opened with the 75-foot Johnson adit. Later, the mineralized zone was examined by 1,360 feet of workings from the Kensington Tunnel (fig. D-43).

Geologic Setting

The Johnson veins are much like those at the Kensington and Eureka deposits except that the mineralization is along or near the contact of the Jualin diorite and metabasalt. The quartz stockworks occur in both rock types.

The mineralized area at the Johnson is much longer than at the Kensington or Eureka and extends up to 1,500 feet. The grade is lower, however, ranging from 1.7 to 3.1 ppm gold (*D-59*). The quartz stockwork follows the diorite-metabasalt contact and the vein crosses from one rock to the other (*D-54*). Assay values reported by Townsend (*D-141*) from the Kensington Tunnel level range from 1.7 ppm to 4.1 ppm gold but 260 surface samples, up to 1,100 feet vertically above the tunnel, averaged 7.6 ppm gold. The veins contain pyrite and, like the Kensington, only rare free gold.

Bureau Investigations

The Bureau was unable to get permission to map or sample the Johnson ore body.

Resource Estimate

The Johnson Mine has an inferred resource of 125,000 tons at 0.11 ounces/ton gold (*D-54*).

Recommendations

The Johnson Mine should be drilled both from the Kensington Tunnel and from the surface in order to define the vertical and horizontal extent of the mineralization. Speculative resource estimates made before 1910 were in the millions of tons and the drilling could ascertain the validity of these high tonnages (*D-54*).

MAS No.	MS No.
21120095	380

References

D-34, D-59, D-96, D-97, D-99, D-130, D-141, D-161

NORTHERN BELLE MINE

Production

A total of 2,302 tons of ore were mined from which 940 ounces of gold were extracted.

History

The Northern Belle Mine (figs. D-4, D-38) was discovered prior to 1896 by the Berners Bay Mining and Milling Company. During 1896 and 1897, 2,302 tons of ore were mined and 940 ounces of gold were produced. No further work was done after 1897 (*D-97*).

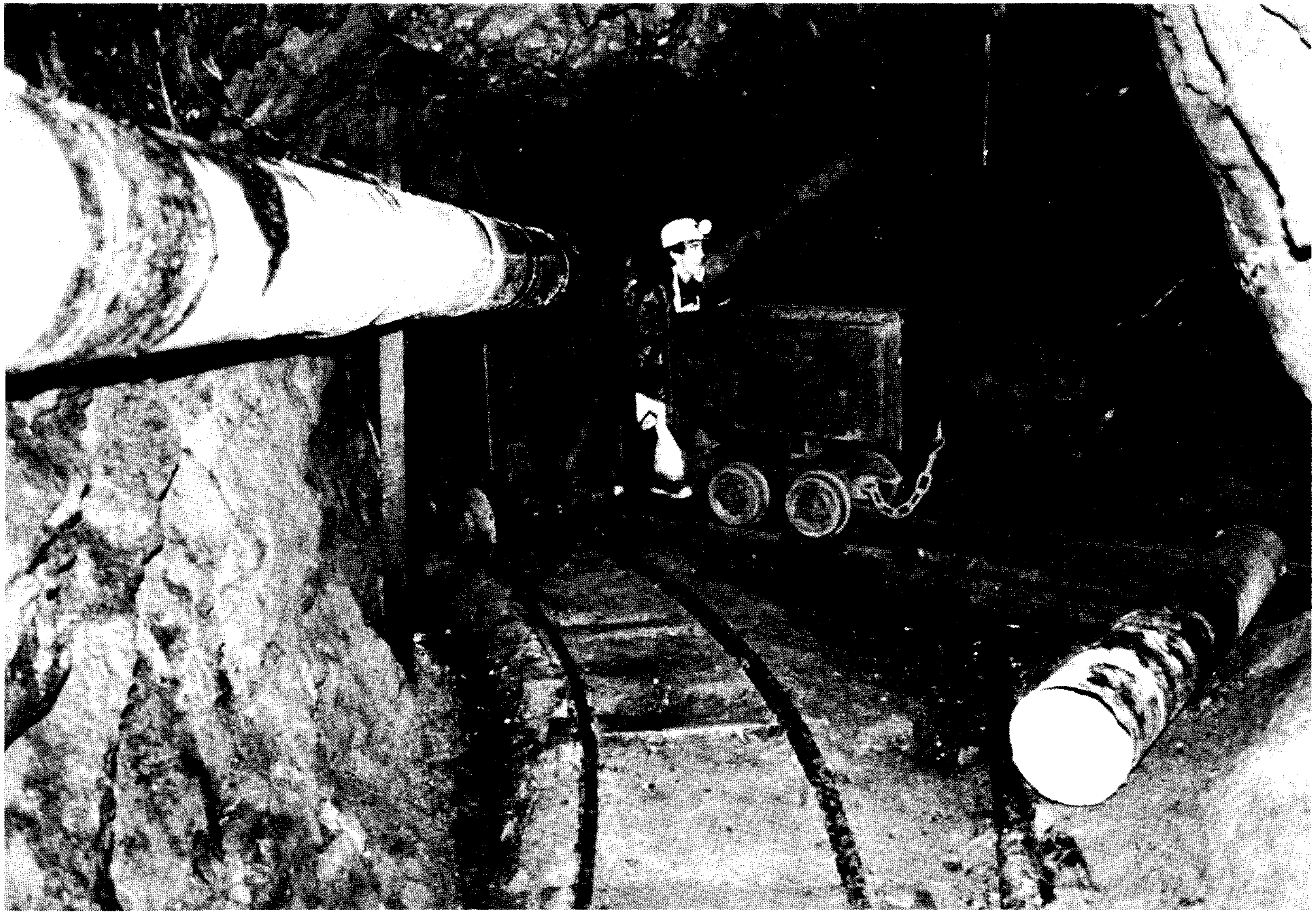

Figure D-43.—Workings of the old Kensington Tunnel where it cuts the Johnson orebody, a very large, low-grade Kensington-type gold deposit.

Workings and Facilities

The Northern Belle Mine has one caved adit with two open stopes and the open Cookhouse Adit (105 feet long).

Geologic Setting

The Northern Belle consists of a north-striking quartz vein that cuts the Jualin diorite. Like the Eureka deposit, the Northern Belle also has stockwork veins along portions of the main vein. The main vein is 3 feet to 10 feet thick and has been traced for 1,500 feet. Samples collected by the Kensington Mines Co. in 1896 contained between 5.5 and 140.6 ppm gold, averaging 37.8 ppm gold. Reportedly, 78% of the gold in the vein was free-milling (*D-54*).

Bureau Investigations

The Bureau was unable to get permission to map or examine the Northern Belle Mine.

Resource Estimate

The Bureau was unable to get permission to map or examine the Northern Belle Mine.

Recommendations

Placid Oil Corp. drilled an ore body in the vicinity of the Northern Belle Mine. Additional drilling will be needed to adequately define the body.

MAS No.	MS No.
21120187	42, 43, 44

References

D-54, D-59, D-95, D-96, D-97, D-99, D-161

BEAR MINE

Production

A total of 800 ounces of gold was recovered from 5,900 tons of ore.

History

The Bear deposit was discovered by Jack McLaughlin in 1887 (figs. D-4, D-38). McLaughlin put in a 12-foot adit that year and had an arrastra operating in June 1889. In 1893, Thomas Nowell's Berners Bay Mining and Milling Co. purchased the small mine. During the next year, the new owners extended the adit to 80 feet and surveyed a tram line from the Comet mill to the portal. The tram was completed in July 1895 and ore was sent to the Comet mill. By the end of the year, 500 feet of new workings had been completed and 4,900 tons of ore mined. The adit was extended to 1,100 feet and 1,000 tons of ore were mined in 1897. Production for 1895 and 1897 was 800 ounces of gold (*D-97*).

Workings and Facilities

The Bear Mine has an 1,100-foot crosscut that contains a 200-foot raise, and 3 levels with 850 feet of drifts (*D-54*). The portal is caved.

Geologic Setting

The Bear Mine consists of a quartz vein in the Jualin diorite. The vein trends about 160° with dip varying from 70° NE at the surface to 40° NE on the adit level. The vein averages 2 feet in thickness on the surface and 5 feet thick in the adit and contains small amounts of pyrite and chalcopyrite (*D-59*). Samples taken by the Kensington Mines Co. (*D-54*) in 1898 averaged 3.6 ppm gold (values ranged between 2.1 ppm and 6.2 ppm gold). Locally, the wallrock adjacent to the vein has been hydrothermally altered and all mafic minerals destroyed. These altered zones are cut by a stockwork of thin quartz veins and contain disseminated pyrite cubes (*D-59*).

A second vein was cut between the Bear vein and the portal. The veins have similar strikes and widths but the second vein dips from 10° to 40° NE.

Bureau Investigations

The Bureau could not get permission to examine the workings of the Bear Mine. The main portal was visited briefly and found to be caved.

Resource Estimate

See Bureau Investigations above.

Recommendations

The Bear adit should be reopened and the vein drilled from both the surface and underground to determine whether additional ore is present.

MAS No.	MS No.
21120133	38A, 39

References

D-54, D-59, D-95, D-96, D-97, D-99, D-161

COMET MINE

Production

Table D-5.—Gold production from the Comet Mine (*D-54*)

Year	Tonnage (t)	Value of bull. ($)	Value of conc. ($)	Total Value ($)	Oz Au[1]	Ounces/ton[1]
1894	6,300	68,211	4,622	72,833	3,520	0.56
1895	10,800	149,201	3,150	152,351	7,370	0.68
1896	5,915	68,559	4,780	73,339	4,560	0.77
1897	12,750	84,156	2,676	86,832	4,200	0.33
1898	6,582	16,248	960	17,208	830	0.13
1899	6,191	26,261	2,458	28,719	1,390	0.23
1900	2,925	10,887	1,888	12,774	615	0.21
Total	51,463	423,523	20,534	444,057	22,485	0.44

[1] Numbers calculated from tonnage and total value.

History

Veins at the Comet Mine were discovered in the 1880's (figs. D-4, D-38). During summer 1891, an unsuccessful attempt was made to placer mine the colluvium on top of the veins. In November 1891, Thomas Nowell's Berners Bay Mining and Milling Company purchased the property and began tunneling.

By fall 1892, a 150-foot adit and 30-foot-deep shaft were completed. The next year, Nowell's company built a 2.5-mile railroad, started a 6,000-foot tram line, and began construction of a 20-stamp mill. The tram and mill were completed in 1894 and mining began. A total of 6,300 tons of ore were mined, producing $72,833, in 1894.

In 1895, 20 stamps were added to the mill. The mine reached a depth of 510 feet and a lower haulage adit was started. In 1895, the mine produced 10,800 tons of ore worth $152,351 and in 1896, $73,339 of gold was produced.

The lower adit, 1,875 feet long, was completed in 1897 and $86,832 worth of gold was mined. During 1898 and 1899, a lack of ore dropped production to $17,208 and $28,719, respectively. During 1900, its final year of production, the Comet Mine produced 2,925 tons of ore worth $12,774.

Both litigation and the lack of ore closed the mine after 1900. In 1910, all of the properties owned by the Berners Bay Company, including the Comet, Kensington, Bear, Northern Belle, and Johnson, were bought at a Marshal's sale by Bart Thane and the International Trust Company. Thane put most of his effort into development of the Kensington Mine and did little at the Comet. Paul Kegot and G. Grinnel leased the mine and worked it in a small way in 1923 but nothing further was done until after 1980 when all of the old Berners Bay Company properties were leased by Placid Oil Company. The company did some diamond drilling at the Comet but, like Thane, did most of their work on the Kensington Mine (*D-97*).

Workings and Facilities

The Comet Mine has 9,000 feet of workings on 9 levels (fig. D-44). Five adits, all caved, and one open stope are present.

Geologic Setting

The Comet Mine consists of two north-trending quartz veins which cut the Jualin diorite. On the surface, the main vein dips about 70° east and is 2 feet to 3 feet thick but widens to 8 feet in the subsurface workings. The vein contains many inclusions of diorite. To the south, the vein crosses the diorite-phyllite contact where it splits into several fingers and ends (fig. D-44). To the north the vein is truncated by a large left-lateral fault; the northern continuation of the vein has not been traced with certainty although it has been suggested that the Northern Belle vein may be the extension (*D-54*).

The Comet vein contains pyrite and free gold. The gold commonly occurs in rich pockets. Knopf (*D-59*) reports that 87% of the gold recovered was free while 5% was contained in concentrates. The vein has been mined over a vertical distance of about 680 feet and a horizontal distance of 300 feet to 500 feet (*D-59*).

Bureau Investigations

The Bureau did not have permission to work at the Comet Mine. Bureau work was confined to regional interpretation.

Resource Estimate

The mine was not open for examination so no resource estimates could be made.

Recommendations

The Comet adits should be reopened and the Comet vein drilled to see if the deeper continuation of the vein exists.

MAS No.	MS No.
21120065	51, 52A, 53, 54A, 56, 57, 58

References

D-54, D-59, D-95, D-96, D-97, D-99, D-130, D-161

SEWARD PROSPECT

Production

There has been no production from the Seward prospect.

History

The shaft and open cuts on the Seward vein (figs. D-4, D-38) were probably completed during the 1890's.

Workings and Facilities

There is a caved 60-foot shaft with a 15-foot drift at the bottom and 2 open cuts at the Seward prospect.

Geologic Setting

The Seward vein is a 5- to 12-foot wide north-trending, east-dipping quartz vein that cuts the Jualin diorite. The vein has been traced for approximately 1,100 feet. Pyrite, the only sulfide mineral in the vein, occurs in small amounts and gold is reported to be free milling. Sampling done before 1906 gave values ranging between 5 ppm and 24 ppm gold (*D-54*).

Bureau Investigations

The Bureau did not examine the Seward prospect because it was unable to acquire permission.

Resource Estimate

A resource estimate is not possible for the Seward prospect because the length of the vein is not known.

Recommendations

The Seward vein should be traced by trenching and drilling to delineate its size and grade.

MAS No.	MS No.
21120230	40A, 41

References

D-54, D-59, D-99

SWEENY CREEK PROSPECT

Production

There has been no production from the Sweeny Creek prospect.

History

T. H. Jarmy started development work on the "Comet City Mine" in 1904 (figs. D-4, D-38). By the next year, he had completed two adits and planned to purchase a stamp mill. After 1905, nothing is known until 1911, when Jarmy sold the prospect to men from Chicago. No additional work was reported (*D-97*).

Workings and Facilities

The Bureau located two caved adits (estimated lengths of 20 feet and 100 feet) that occur on the prospect (fig. D-45).

Bureau Investigations

The Sweeny Creek prospect is underlain by black phyllite on the south side of a regional lineament that follows Sweeny Creek. The phyllite contains several thin, concordant, discontinuous quartz veins which carry minor amounts of pyrrhotite.

The Bureau located and examined the caved adits above Sweeny Creek and collected five samples (fig. D-45, Nos. 4-8). A sample of pyritic black phyllite with pyrite-bearing quartz contained 600 ppm lead but no gold.

Resource Estimate

Not enough mineralization is present at the Sweeny Creek prospect to develop a resource.

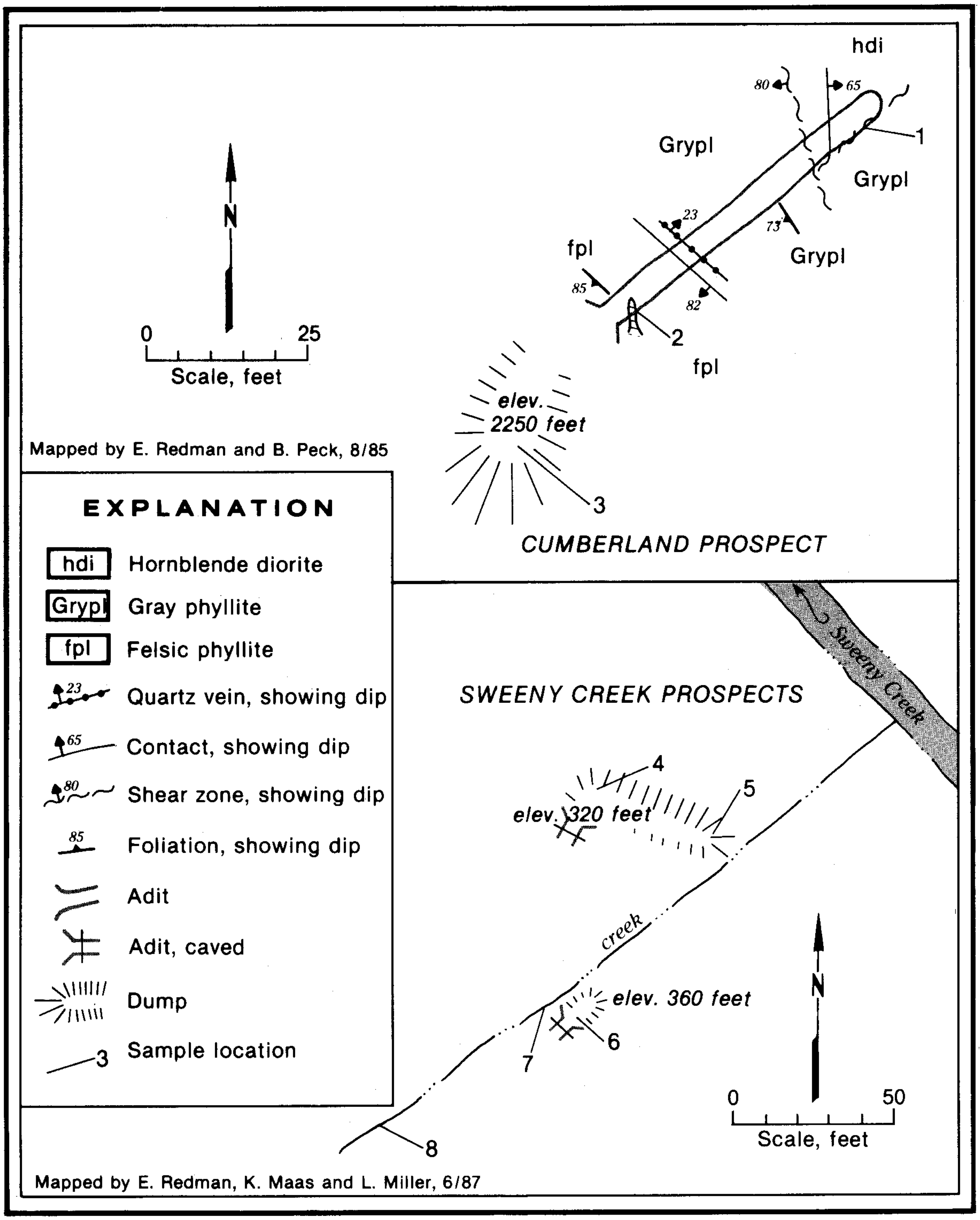

Figure D-45.—The Cumberland and Sweeny Creek prospects, showing geology and sample locations.

Recommendations

The Sweeny Creek prospect does not contain significant mineralization and no work is recommended.

MAS No.
21120200

References

D-96, D-97, D-99, D-160

CUMBERLAND PROSPECT

Production

There has been no production from the Cumberland prospect.

History

Work was done on the Cumberland claim prior to 1909 (figs. D-4, D-38).

Workings and Facilities

The Bureau located a 54-foot adit and open cut on the claim.

Bureau Investigations

The Cumberland adit exposes gray phyllite and felsic phyllite (fig. D-45). Thin quartz veins with minor pyrite occur near the portal and in a small shear near the face of the adit. The rocks exposed in the adit lie a short distance above an unconformity, marked by pebble conglomerate, on gray phyllite and the Jualin diorite.

The Bureau mapped and sampled the adit. Three samples taken all contained less than 0.1 ppm gold (fig. D-45, Nos. 1-3).

Resource Estimate

There is not enough mineralization known to develop a resource on the Cumberland claim. It has a low development potential.

Recommendations

None.

Mas No.	MS No.
21120224	50A

References

D-54, D-99

GREEK BOY PROSPECT

Production

There has been no significant production from the Greek Boy prospect.

History

The Greek Boy prospect was probably discovered prior to 1889 (figs. D-4, D-46). In that year, buildings and a trail were constructed at the Greek Boy. In 1890, the prospect was examined by the Perseverance Company and was leased by another company in 1894. Frank Bennett, a Juneau merchant, paid for trail building in 1895 and the Free Gold Mining and Milling Co. purchased the property in 1897. By 1899, the Free Gold Company had driven No. 1 adit to 180 feet and No. 2 adit to 200 feet.

In 1902, Col. William Sutherland leased the prospect. No. 1 and No. 2 adits were connected by shaft that year. During 1903, the main adit (No. 1) was extended to 400 feet. Sutherland formed the Greek Boy Mining Co. in 1904 and lengthened the main adit to over 900 feet in 1905. The Greek Boy Mining Co. was declared bankrupt in 1906 and sold. Joe Demos and Steward Wood renewed work in the fall and continued to do minor work until the closing of the Jualin Mine in 1917 when the Greek Boy prospect was abandoned. In 1934, the adits were reopened by Gudmund Jensen but little other work was done (*D-97*).

Workings and Facilities

Three caved adits (No. 1 adit—937 feet, No. 2 adit—200 feet, connected to No. 1 adit by 55-foot winze, and No. 3 adit—95 feet) and four open cuts were found on the property (fig. D-46).

Geologic Setting

The Greek Boy prospect lies along the contact of a foliated hornblende diorite pluton and chlorite, hornblende schist (fig. D-4). Knopf (*D-59*) and Roehm (*D-116*) state that a quartz stringer zone, from 8 to 20 feet wide, cuts the schistose marginal phase of the diorite and trends about 150°. It is more likely that the "marginal phase", which consists of rounded plagioclase

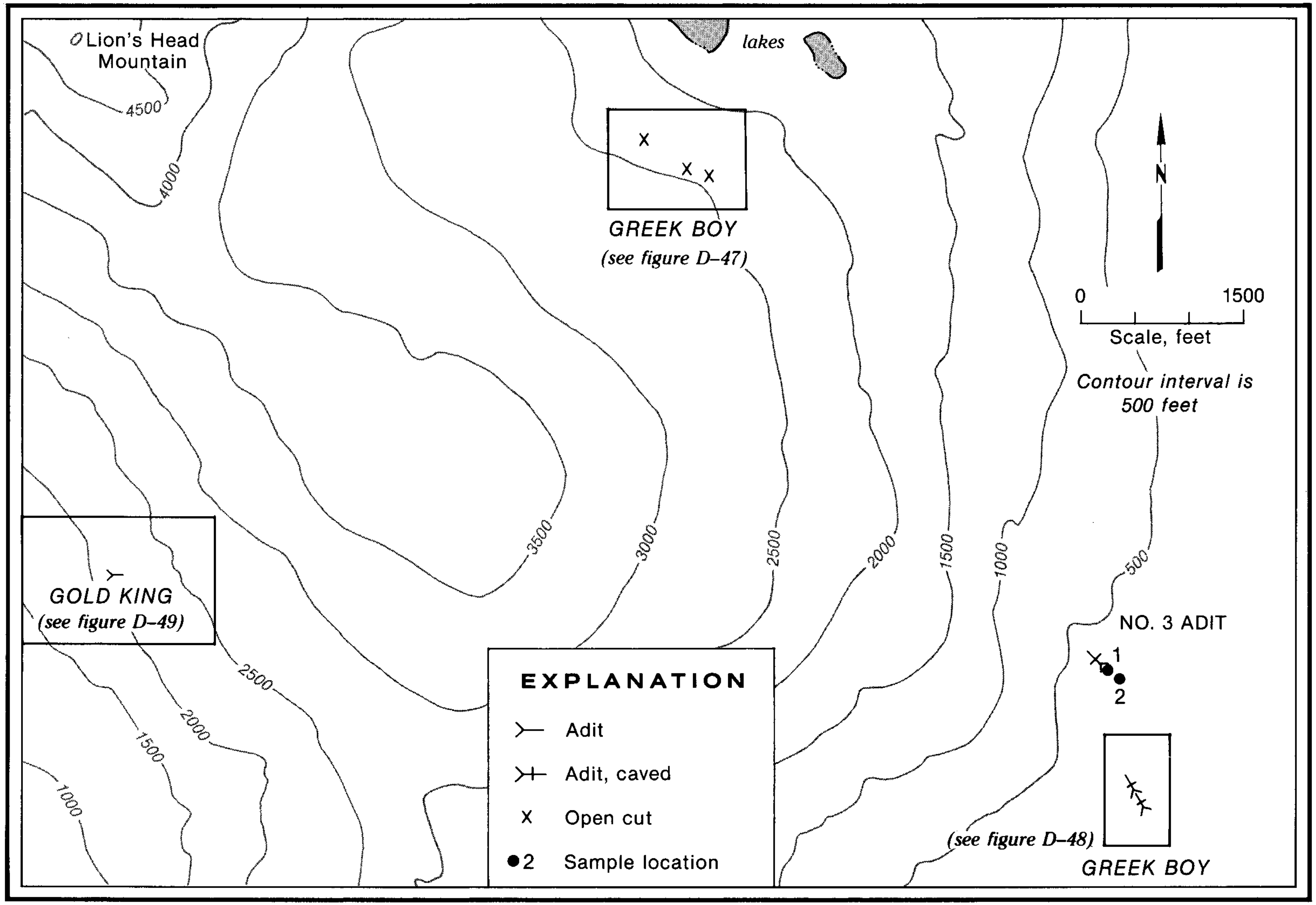

Figure D-46.—Prospects in the Lions Head Mountain area, Berners Bay.

grains in a black matrix of hornblende and biotite, is a hornfelsed and regionally metamorphosed basalt. The stringer zone consists of bunches and masses of quartz up to 4 feet wide with only traces of pyrite in the quartz. Roehm (*D-116*) sampled all three adits on the prospect. His results gave a weighted average of 1.5 ppm gold over a vein width of 5.0 feet in No. 1 adit, a single sample with 4.1 ppm gold over 6 feet in No. 2 adit, and 1.4 ppm gold over 4 feet in the No. 3 adit.

Approximately 6,000 feet NW of the adits, four open cuts were found that follow a 4- to 10-foot quartz vein in chlorite schist about 100 to 200 feet SW of the diorite contact. The vein splits and recombines along its length and contains minor amounts of pyrite.

Bureau Investigations

The Bureau located three caved adits near the Berners River and four open cuts about 1.25 miles to the NW (fig. D-46, Nos. 1-2; fig. D-47, Nos. 1-7; fig. D-48, Nos. 1-4). Two samples were collected from the dump of the longest No. 1 adit (fig. D-48, Nos. 3, 4). These contained 14.9 ppm and 7.2 ppm gold but a sample of altered diorite contained no significant metal values.

Three of the cuts were mapped and sampled (fig. D-47, Nos. 1-7). The weighted average for the vein exposed in the cuts was 0.6 ppm gold over a vein width of 4.9 feet. One sample, composed of selected quartz from the dump of the second cut, contained 4.2 ppm gold, 3.5 ppm silver, 1,560 ppm copper. A fourth open cut further to the NW was not visited.

Resource Estimate

Based on Roehm's (*D-116*) work, the Greek Boy prospect has the potential for 100,400 tons of ore grading 0.04 ounces/ton gold. The low values give the area a low development potential.

Recommendations

To evaluate the Greek Boy, the adits need to be reopened and the vein traced uphill by trenching and diamond drilling.

MAS No.
21120083

References

D-59, D-96, D-97, D-99, D-116, D-161

GOLD KING PROSPECT

Production

The Gold King prospect has had no production.

History

The Gold King prospect was discovered prior to 1903 (figs. D-4, D-46). Some development work started in 1903 and a crosscut driven in 1904. In 1988, Curator American explored the area to determine the size of the Gold King vein (*D-97*).

Workings and Facilities

A 64-foot adit, which has 20 feet of drifts, was located on the prospect and two other adits, 30 feet and 122 feet respectively, are reported (*D-14*).

Bureau Investigations

Mineralization at the Gold King prospect consists of a series of thin quartz veins that cut the Jualin diorite. Most of the veins are up to 10 inches thick but one vein, in a shear zone, was 2 feet thick. The main veins trend 130°, dip about 75° NE, and usually contain 1% to 2% pyrite and minor chalcopyrite. Local areas in the veins contain up to 20% pyrite.

Sample Results

The Bureau mapped the 64-foot adit and collected 10 samples (fig. D-49, Nos. 1-10). Three samples were taken from the vein on the surface above the adit. One of these samples contained 9.9 ppm gold. Seven samples were collected from the adit (fig. D-49, Nos. 4-10). One quartz vein sample from the drift at the end of the adit contained 36.8 ppm gold and 18.0 ppm silver. A sample of altered diorite yielded 2.5 ppm gold.

Resource Estimate

Not enough is known about the extent of the Gold King vein to estimate resources.

Recommendations

The Gold King vein could be traced by trenching and diamond drilling to determine strike length. The area between the Gold King and the Yankee Boy prospect should be examined to see if the two veins are along the same structure.

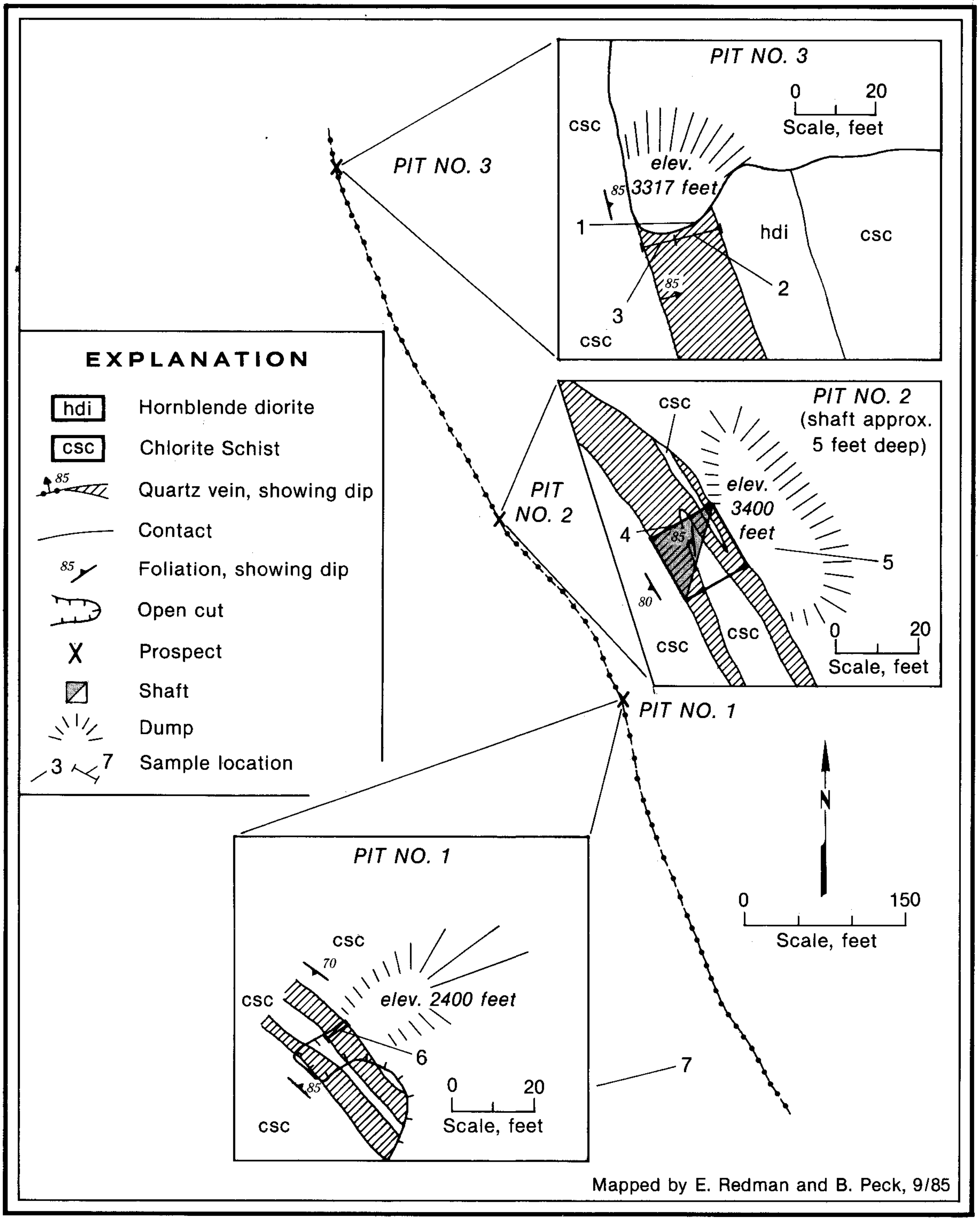

Figure D-47.—The Greek Boy prospect pits, showing geology and sample locations.

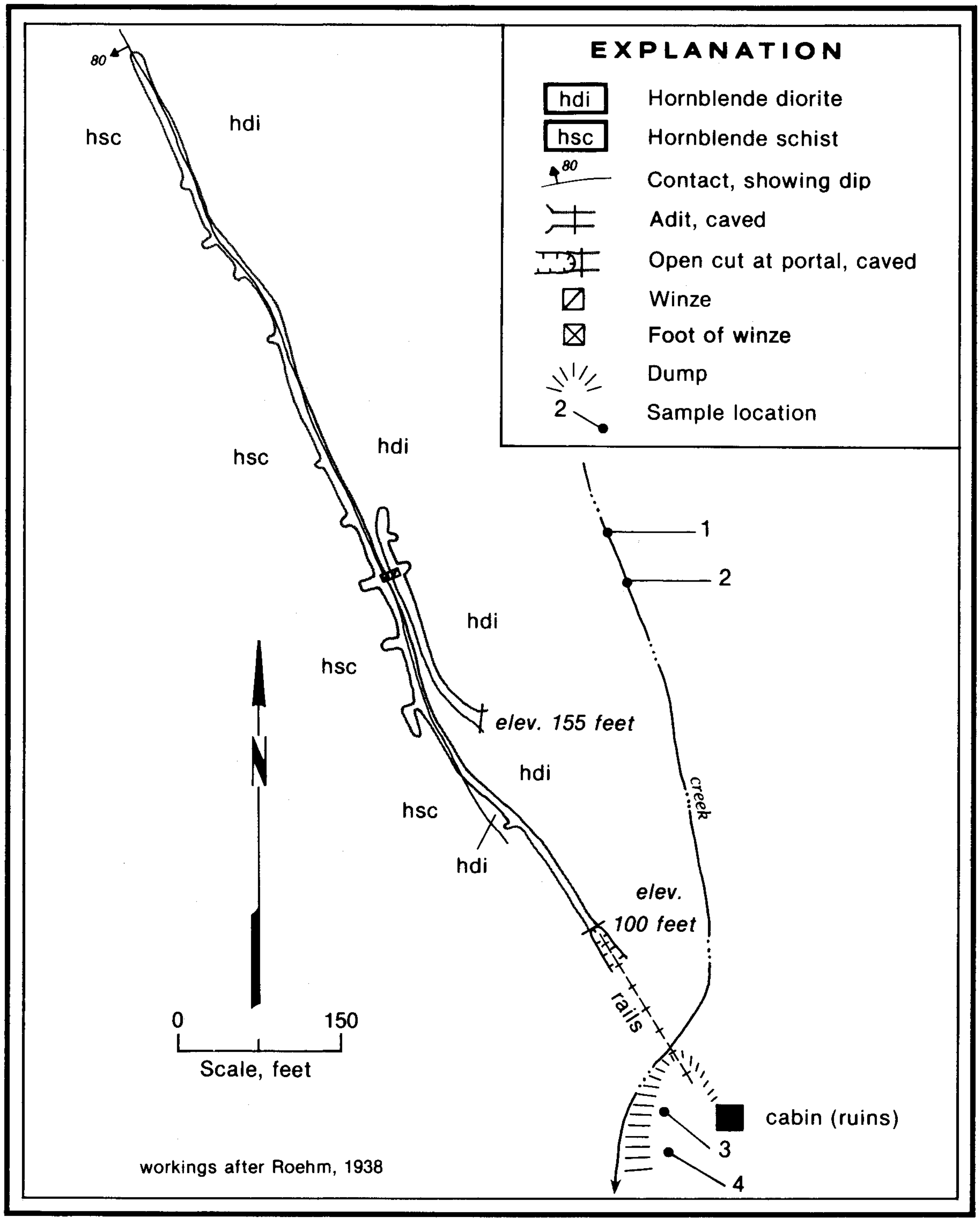

Figure D-48.—The Greek Boy adits, showing geology and sample locations.

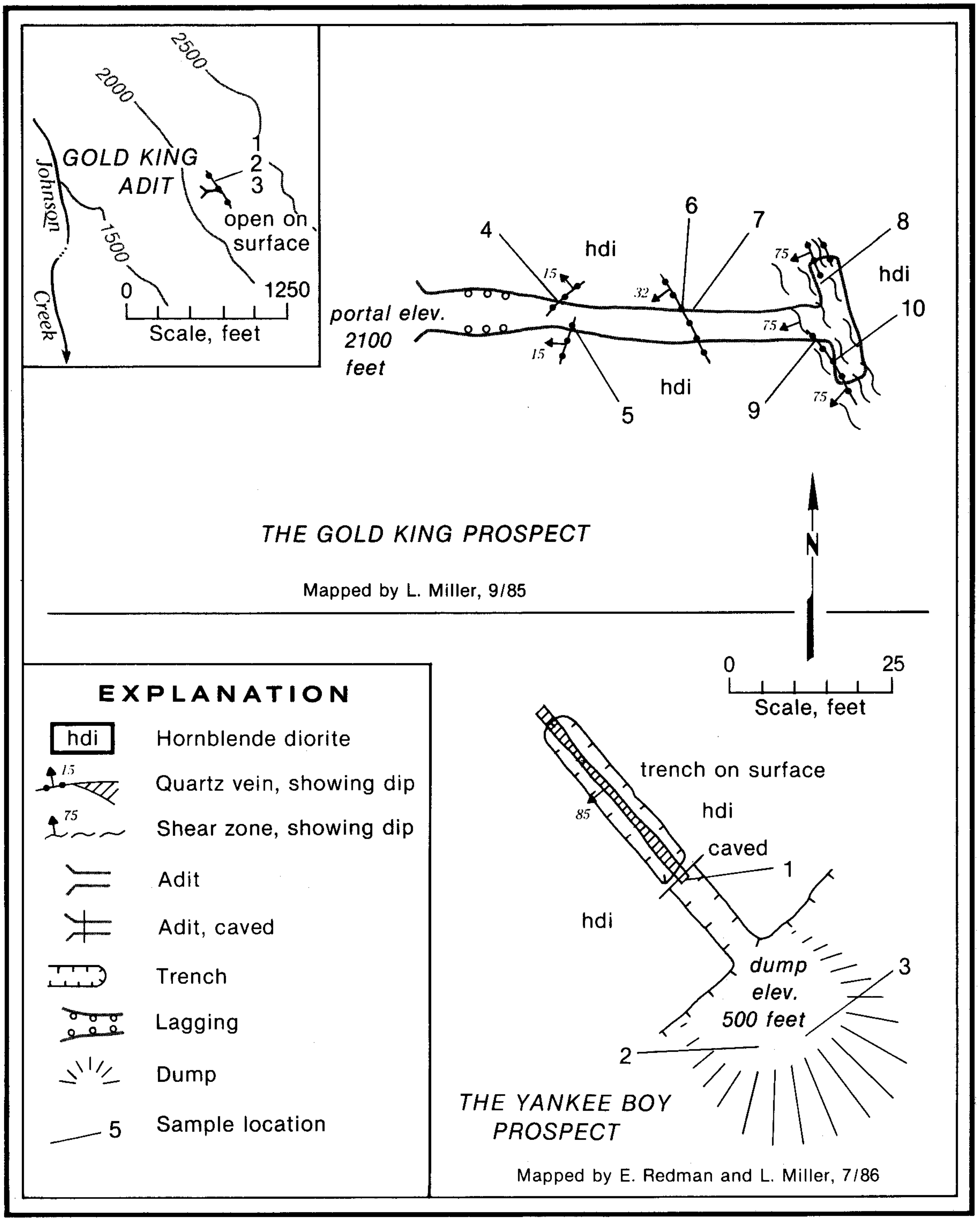

Figure D-49.—The Gold King and Yankee Boy prospects, showing geology and sample locations.

MAS No. 21120056 MS No. 643

References

D-14, D-96, D-97, D-99

INDIANA PROSPECT

Production

There has been no production from the Indiana prospect.

History

The Indiana prospect (figs. D-4, D-50) was staked by Alaska Gold Mining Company of Indiana in 1896 following the discovery of the Jualin deposit. By the end of 1899, a 1,300-foot adit had been driven and a 10-stamp mill erected but, again, no ore located. Two more adits, with a total of 1,600 feet of workings, were driven in 1900 and 1901 but no ore was found. In February 1908, the Indiana mill, which had never been run, was destroyed by an avalanche (*D-97*).

Workings and Facilities

There are three caved adits with 1,600 feet, 900 feet, and 400 feet of workings. The remains of a 10-stamp mill lie below the lowest adit (*D-59*).

Geologic Setting

The Indiana prospect was staked to cover the northern extension of the Jualin vein system in the Jualin diorite. The veins, however, make a bend at the Jualin Mine and change in trend from northerly to northwesterly, passing west of the Indiana adits. One 6-inch-wide quartz vein was cut near the portal of one adit but no other mineralization was located.

Bureau Investigations

The Bureau did not examine the Indiana prospect because it was known that the workings did not cut any mineralized rock (*D-93*).

Resource Estimate

The Indiana adits were driven to cross the Jualin quartz veins. The veins, however, bend to the NW and do not pass through the Indiana claims. There is no known resource on the prospect.

Recommendations

The longest Indiana adit could be driven a few thousand feet to cut the Comet and Seward veins and could serve as a production adit for them. The prospect itself has no known mineralization.

MAS No. 21120206 MS No. 578

References

D-59, D-93, D-95, D-96, D-97, D-99, D-161

THOMAS PROSPECT

Production

The Thomas prospect has produced nothing.

History

The Thomas prospect was probably worked in the late 1890's during work at the Jualin Mine (figs. D-4, D-50).

Workings and Facilities

There is a short caved adit on the claim.

Bureau Investigations

The Thomas claim is completely covered by colluvium but is probably underlain by the Jualin diorite. The Bureau located the caved adit and collected one sample of dump material (fig. D-51, No. 1) which contained 0.1 ppm gold.

Resource Estimate

Unknown.

References

None.

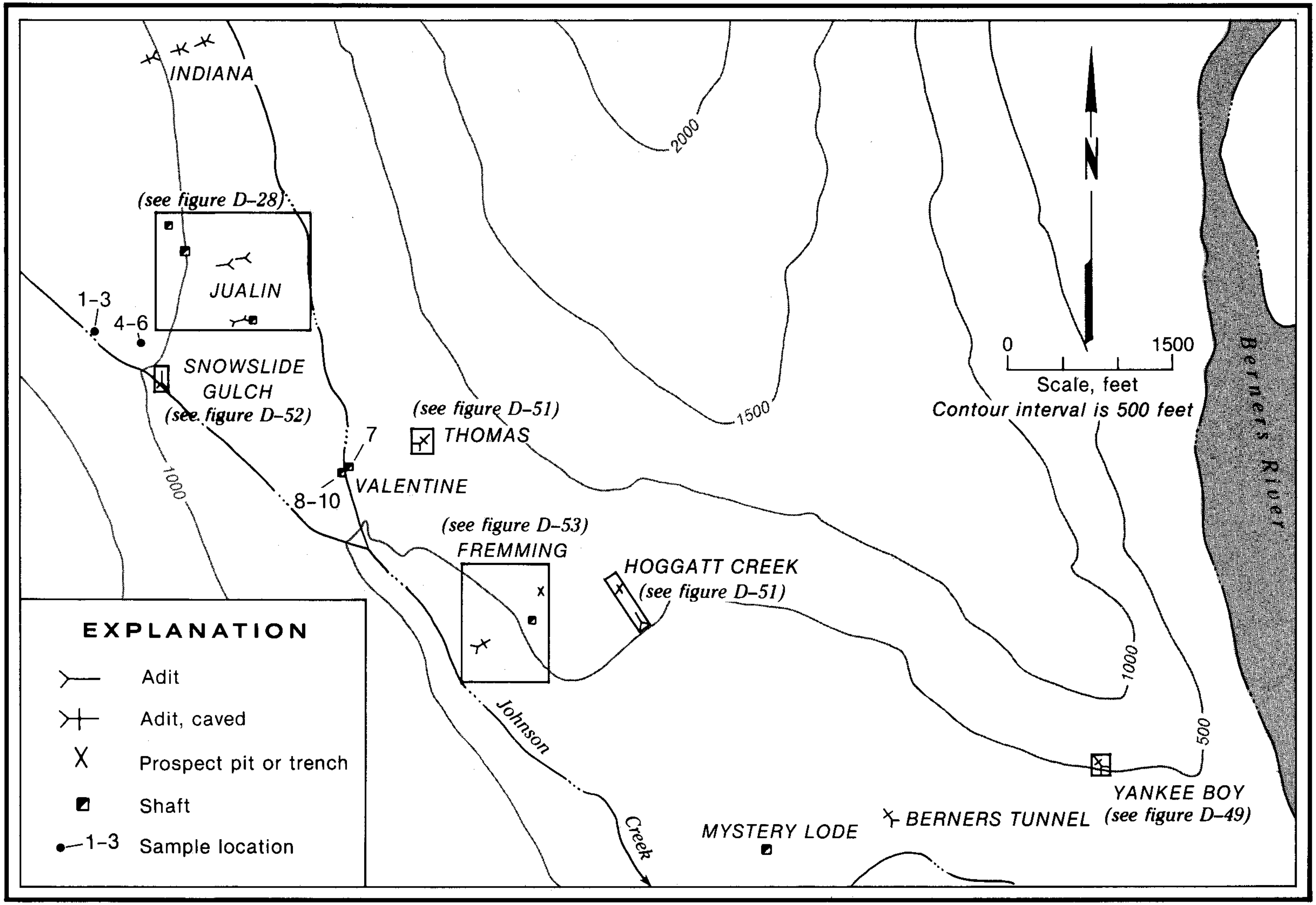

Figure D-50.—Mines and prospects in the Johnson Creek area, Berners Bay.

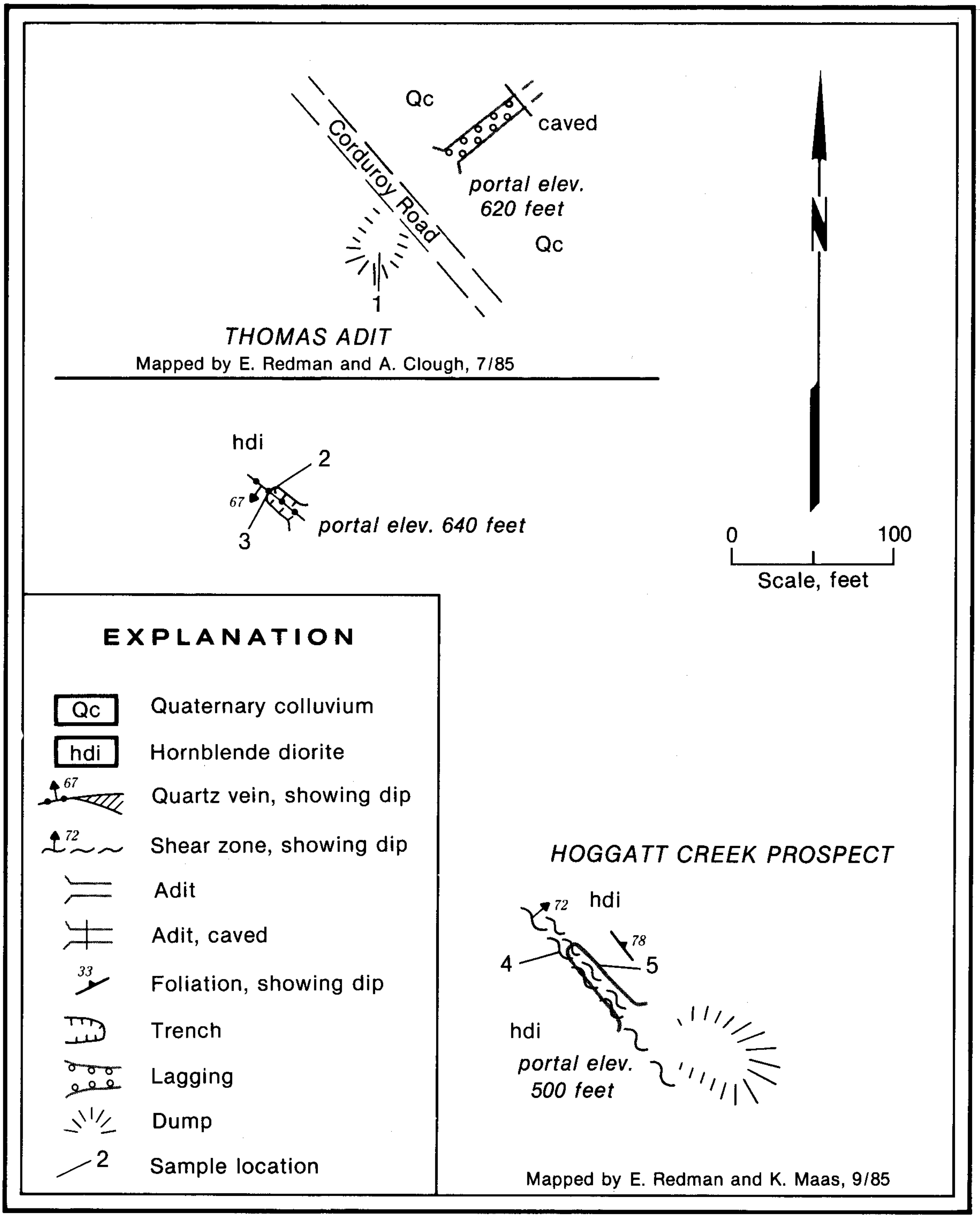

Figure D-51.—The Thomas adit and Hoggatt Creek prospect, showing geology and sample locations.

VALENTINE PROSPECT

Production

There is no known production from the Valentine or Snowslide Gulch prospects.

History

The Valentine prospect, which consists of the Falls and Diana claims, was probably worked before 1900 but nothing is known about its history (figs. D-4, D-50).

Workings and Facilities

There are two water-filled shafts, one reported to be 55 feet deep (*D-127*), on the Diana claim and a 115-foot adit in Snowslide Gulch on the Falls claim.

Bureau Investigations

The two shafts on the Valentine prospect were sunk into felsic (quartz sericite) phyllite and chlorite phyllite on opposite banks of Johnson Creek near the contact of the Jualin diorite. The Snowslide Gulch adit exposes pyritic quartz chlorite phyllite.

Both shafts expose disseminated pyrite. The southern shaft was driven into a 5-foot-wide band of chlorite phyllite and quartz chlorite phyllite which contains strat-iform pyrite and chalcopyrite. The mineralization has been traced for at least 150 feet to the SE and occurs within 100 feet to 300 feet south of the Jualin diorite contact. The zone contains up to 15% chalcopyrite as lensoid masses within the phyllite.

Mineralization at the shafts is probably hosted by shears along the contact of the Jualin diorite.

Mineralization in the Snowslide Gulch adit consists of disseminated pyrite in quartz chlorite phyllite and pyrite in a bluish quartz vein (fig. D-52). The vein occurs in a shear zone within the phyllite.

Sample Results

The Bureau collected three samples from the shaft on the south side of Johnson Creek (fig. D-50, Nos. 8-10), one sample from the shaft on the north side of the creek (fig. D-50, No. 7), and two samples from the Snowslide Gulch adit (fig. D-52, Nos. 1-2). No significant metal values were found in the northern shaft or in the adit. Samples 8 and 10 (fig. D-50) from the southern shaft contained 35.1 ppm and 161.9 ppm gold, 44.7 ppm and 89.1 ppm silver, and 5.1% and 4.1% copper, respectively.

Resource Estimate

Gold and silver values from samples taken at the southern shaft indicate that significant metal values exist at the Valentine prospect but not enough is known about the extent of the mineralization to estimate resources. The prospect has a moderate development potential.

Recommendations

Pumping out the shafts and drilling along the trend of the mineralized zone would allow the mineralized zone to be defined.

MAS No.	MS No.
21120229	880

References

D-98, D-99, D-127

HOGGATT CREEK PROSPECT

Production

There was no production from the Hoggatt Creek prospect.

History

Nothing is known about the history of the prospecting work in the Hoggatt Creek area (figs. D-4, D-50). Most of the work, including the adit, open cuts, and trenches, was probably done shortly after the discovery of the Jualin veins in 1895.

Workings and Facilities

An open 22-foot adit, two open cuts, and several trenches exist in the area.

Bureau Investigations

The Hoggatt Creek prospect consists of a concordant quartz vein cutting metavolcanic greenschist and Jualin diorite near the Jualin pipeline. The vein, which has been traced for at least 600 feet, ranges from a few inches to 4 feet thick, trends 135° and dips between 65° and 75° SW. Most of the quartz contains no more than 1% pyrite but an open cut at an elevation of 640 feet exposes quartz with 3% to 7% pyrite.

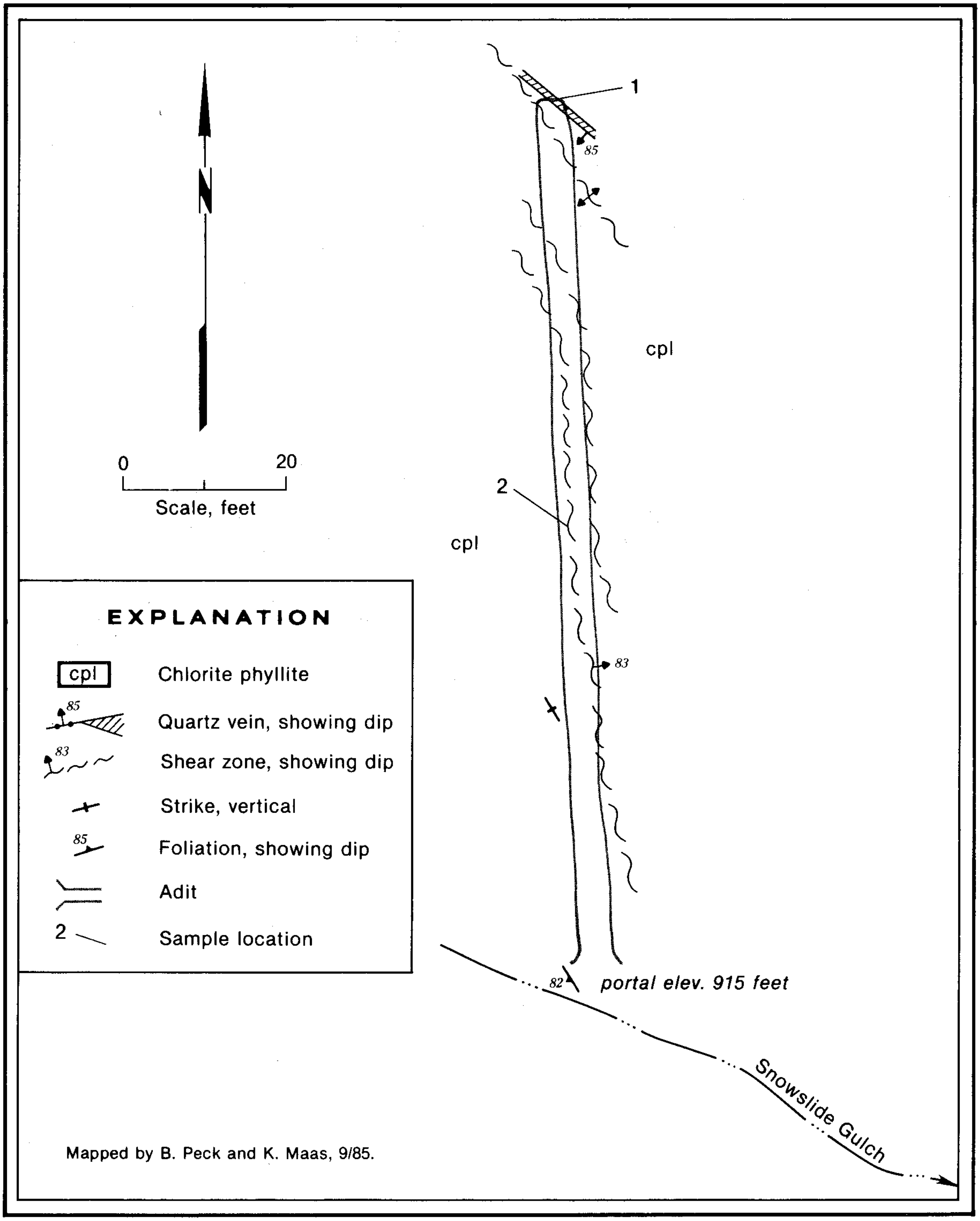

Figure D-52.—The Snowslide Gulch adit, showing geology and sample locations.

Greenschist and diorite adjacent to the vein are sheared, altered, and contain some disseminated pyrite cubes.

Sample Results

The Bureau mapped and sampled the adit and the main open cut, taking four samples (fig. D-51, Nos. 2-5). The two samples from the adit averaged 268 ppm copper and one contained 0.4 ppm gold.

Resource Estimate

Metal values and the discontinuous nature of quartz veining give the Hoggatt Creek prospect a low development potential.

Recommendations

Trenching and soil sampling could be used to determine the extent of mineralization in the area.

MAS No.
21120214

References

D-99

FREMMING PROSPECT

Production

There has been no recorded production from the Fremming prospect.

History

The Fremming prospect was discovered by Frank Fremming about 1897 (figs. D-4, D-50). Fremming had completed a 360-foot adit and an 85-foot shaft by 1905 and patented the claims in 1909. An English company bonded the prospect in 1909 but little work was done. Fremming announced financing for development in 1916 but, again, little work was done (*D-97*).

Workings and Facilities

The Fremming prospect has a caved 360-foot adit which connects to an open 85-foot inclined shaft (*D-59*). The present water-level is 55 feet below the collar and drifts are exposed but half-filled with water (*D-93*).

Bureau Investigations

The Fremming prospect is underlain by massive metavolcanic rocks and light-green chlorite phyllite. A 6-foot-thick metavolcanic phyllite layer exposed in the Fremming shaft contains 1% to 3% disseminated pyrite and thin stratiform lenses of pyrite. This layer with stratiform pyrite lenses has been traced for approximately 800 feet along strike by trenching. Knopf (*D-59*) reports that a 6-foot schistose unit at the end of the adit contained stringers of quartz and pyrite, chalcopyrite, sphalerite, galena, and free gold.

Mineralization at the Fremming prospect consists of both volcanogenic massive sulfides and remobilized sulfides. A shear zone near the shaft includes a quartz vein containing sphalerite, galena, pyrite, and chalcopyrite.

Sample Results

The Bureau mapped the workings at the main Fremming prospect and collected three samples (fig. D-53, Nos. 1-3). A sample from the adit dump, containing high-grade sphalerite, galena, and chalcopyrite, yielded 12.7 ppm gold, 99.1 ppm silver, 7.4% zinc, 2.2% lead, and 0.2% copper (fig. D-53, No. 3). A sample of pyritic felsic phyllite from the shaft dump (fig. D-53, No. 2) contained 31 ppm gold and 27 ppm silver while a sample from a vein exposed in an open cut carried 3.6 ppm gold, 17 ppm silver, and 1% zinc (fig. D-53, No. 1).

Resource Estimate

Not enough is known about the grade and extent of mineralization at the Fremming prospect but the few samples taken indicate a moderate development potential.

Recommendations

The Fremming prospect was drilled in 1987 by Curator American Inc. (*D-52*) but additional drilling should be done to determine the length and depth of the mineralization. The Fremming adit should also be exhumed.

MAS No.	MS No.
21120055	676

References

D-52, D-59, D-93, D-96, D-97, D-99

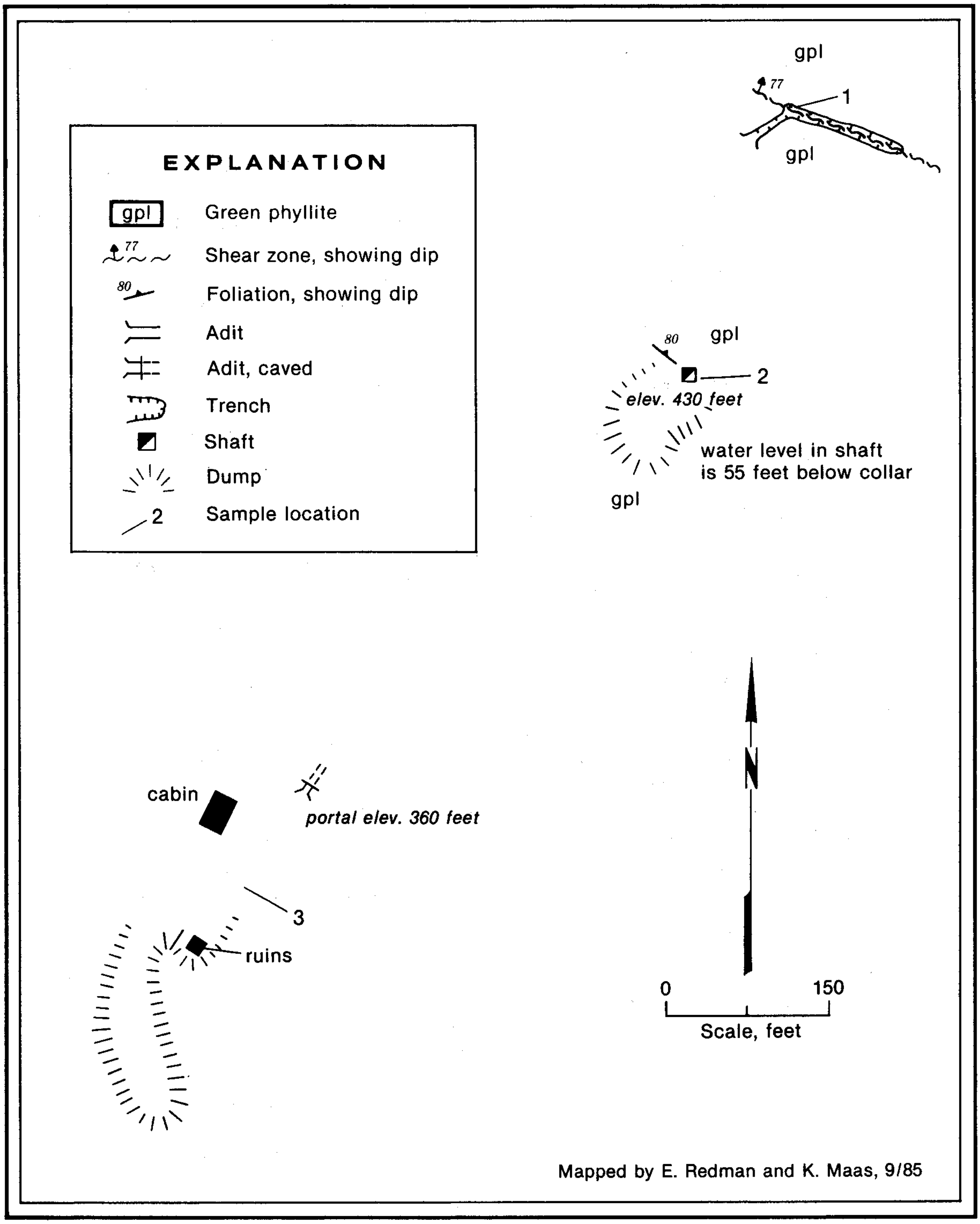

Figure D-53.—The Fremming prospect, showing geology and sample locations.

YANKEE BOY PROSPECT

Production

There has been no production from the Yankee Boy prospect.

History

The Yankee Boy prospect was discovered about 1911 by the McCloskey brothers (figs. D-4, D-50). Shortly after the discovery, a 136-foot adit and four open cuts were done but then the property was abandoned.

In 1934, the Yankee Boy was restaked by Niles Schroeder but little work was done (*D-115*).

Workings and Facilities

The Yankee Boy prospect has a caved 136-foot adit and 4 sloughed open cuts.

Bureau Investigations

The Yankee Boy quartz vein cuts Jualin diorite and greenschist and has been traced for over 3,000 feet (*D-115*). The vein ranges from a few inches to 5 feet in thickness, trends about 140°, and dips 86° S. The marginal portions of the vein are composed of essentially barren white quartz but the center consists of bluish quartz containing up to 5% pyrite and very finely disseminated arsenopyrite. Roehm's (*D-115*) sampling ranged from nil to 11.7 ppm gold in the adit and up to 54.9 ppm gold from a trench.

The diorite wallrock is moderately altered and sheared adjacent to the vein. Disseminated pyrite and traces of arsenopyrite occur in the diorite near the vein.

A probable continuation of the Yankee Boy vein was located by geologists working for Hyak Mining Company in 1983 in a steep, deep gully about a half mile along strike to the NW (*D-93*). The vein in the gully was 1 foot thick and occurred along the contact between Jualin diorite and greenschist. A sample of the iron-stained, pyritic vein taken by the Hyak crew contained 22 ppm gold.

Sample Results

The Bureau located and sampled the Yankee Boy adit and dump (fig. D-49, Nos. 11–13). Two samples were collected from the dump and one was taken from the quartz vein over the caved portal. A sample of bluish quartz found on the dump yielded 4.2 ppm gold and 23 ppm silver. A chip sample across the vein contained 2.1 ppm gold.

Resource Estimate

The Yankee Boy vein has a significant length and locally significant gold values which give it a moderate development potential. If the Yankee Boy vein is continuous, it potentially contains up to 20,000 tons of ore with 0.03 to 0.05 ounces/ton gold.

Recommendations

The Yankee Boy vein should be exposed by trenching or drilled to determine its length, depth, and grade. The NW extension of the vein should be traced to see if it is continuous with the Gold King vein.

MAS No.
21120057

References

D-93, D-98, D-99, D-115

MYSTERY LODE PROSPECT

Production

There is no known production from the Mystery Lode prospect.

History

The Mystery Lode was probably staked the same time as the Fremming prospect, about 1897, and was patented with the Fremming in 1909 (figs. D-4, D-50). A short shaft was sunk during this period.

Workings and Facilities

The Mystery Lode has a water-filled shaft, estimated at 20 feet deep and several sloughed-in prospect pits (*D-93*).

Geologic Setting

Rocks at the Mystery Lode are similar to those at the Fremming prospect, consisting of light-colored chlorite phyllite and more massive metavolcanic rocks. The shaft was sunk on a 3-foot-thick light-colored phyllitic layer that contains disseminated pyrite and stratiform massive pyrite layers in the foliation. Massive layers are up to 2 inches thick and disseminated pyrite forms from 5% to 15% of the unit. Samples taken for Hyak Mining Company in 1983 (*D-93*) contained 1.4 ppm gold, 1.5 ppm silver, and 5,500 ppm copper.

Bureau Investigations

The Bureau did not visit this prospect.

Resource Estimate

No estimate has been made.

Recommendations

The area between the Mystery Lode and the Fremming prospect should be examined to determine whether mineralization is continuous.

MAS No.
21120228

References

D-93, D-99

JOHNSON CREEK PROSPECT

Production

There has been no production from the Johnson Creek prospect.

History

A short shaft was sunk into the gravels of lower Johnson Creek sometime during the early years of the 1900's but no other work is known (fig. D-4). In 1977, a group of placer claims was staked in the same area but no work was done.

Workings and Facilities

There is a shallow, water-filled shaft near the mouth of Johnson Creek (*D-93*).

Geologic Setting

Lower Johnson Creek has filled an area between its lower waterfall and the Berners River with gravels. Gold can be panned from the present stream channel.

Bureau Investigations

The Bureau did not visit the area.

Resource Estimate

No sampling was done to evaluate the placer potential of lower Johnson Creek.

Recommendations

Sampling with a sluice box could determine if significant gold occurs in lower Johnson Creek. If enough gold is found, some shallow holes could be drilled to test the gold content of gravels on bedrock.

References

D-93, D-99

BERNERS BAY PROSPECT

Production

There has been no production from the Berners Bay prospect.

History

The Berners Bay prospect was located in 1885 along the mouth of Boulder Creek, north of Echo Cove (fig. D-4). In 1898, the claim was patented and some prospecting continued in 1905.

Workings and Facilities

The map for Mineral Survey 318 shows two shafts, a 31-foot adit and an open cut (*D-76*).

Geologic Setting

The Berners Bay prospect area is underlain by black phyllite and mafic metavolcanic rocks.

Bureau Investigations

The Bureau was not given access to the Berners Bay prospect by the landowner.

Resource Estimate

Unknown.

Recommendations

No work is recommended.

MAS No. 21120058 MS No. 318

References

D-48, D-63, D-76, D-95, D-161

TACOMA PROSPECT

Production

There has been no production from the Tacoma prospect.

History

The Tacoma prospect was discovered in 1901 by Wahl and Johnson along a tributary on the south side of Sawmill Creek (fig. D-4). Assessment work was performed intermittently until 1914, at which time the six lode claims were abandoned. The property remained idle until 1936, when a small amount of assessment work was done (*D-114*).

Workings and Facilities

There are three caved adits, reported to be 18 feet, 29 feet, and 72 feet long, and several open cuts, one of which is reported to be 200 feet long (*D-114*).

Bureau Investigations

The Tacoma prospect is underlain by black phyllite and metabasalt which is cut by a quartz vein which strikes east and dips 75°N (*D-114*). The Tacoma vein is reported to outcrop along or near a small creek south of Sawmill Creek. The vein, which is reported to be at least 8 feet wide (*D-114*), consists of two parts separated by a septum of phyllite. Thickness of the vein is uncertain because the adit does not expose the footwall and the vein on the surface is covered. The vein contains brecciated quartz and much pyrite (*D-114*). Phyllite overlying the vein contains pyrite and is cut by many stringers of pyrite-bearing quartz. On the footwall side, but some distance from it, is a similar stringer lode.

In a 200-foot trench, at an elevation of 390 feet, across a contact of phyllite and metabasalt, quartz stringers occur in a 15-foot zone in phyllite. A 10-foot sample taken by Roehm (*D-114*) gave only a trace of gold and silver.

A 72-foot adit was reportedly driven at an elevation of 1,020 feet, a distance of over 2,000 feet from the lower trench. The adit was driven in phyllite and exposes a network of heavily mineralized quartz veins which vary from a few inches to 4 feet in width. The quartz is folded and shattered. Masses of pyrite, arsenopyrite, galena, and sphalerite occur in the quartz. A sample taken by Roehm (*D-114*) across 4 feet of quartz gave only a trace of gold and 1.2 ounces of silver per ton.

Two adits, at elevations of 680 feet and 780 feet, were reported by Roehm (*D-114*) about 1,000 feet NW of the above adit. The upper adit cuts 8 feet of quartz at the portal and follows the vein for 29 feet. The quartz is folded and highly fractured. Pyrite was the only mineralization noted by Roehm (*D-114*) who collected four channel samples which contained only traces of gold. The lower adit was reported to be 18 feet long and exposes a 2-in to 4-in vein.

Sample Results

The Bureau located only one caved adit and two prospect pits on the west side of a stream at 1,060 feet elevation (fig. D-54). The adit is probably the same as Roehm's 72-foot adit at 1,020 feet elevation (*D-114*). Quartz vein float from the dump contains abundant pyrite with galena and sphalerite. Four samples were collected from the area (fig. D-54, Nos. 1-4) and one sample of sulfide-rich quartz from the dump contained 1.1 ppm gold, 169.8 ppm silver, and 2.78% lead. A 2-foot-thick pyrite-bearing quartz vein exposed nearby contained no detectable gold or silver. The other workings were not located.

Resource Estimate

The resource potential is unknown because most of the reported workings were not located and low gold values were found in Bureau samples.

Recommendations

The workings described by Roehm (*D-114*) need to be located and examined to determine what is present on the prospect.

MAS No.
21120059

References

D-27, D-63, D-98, D-99, D-114

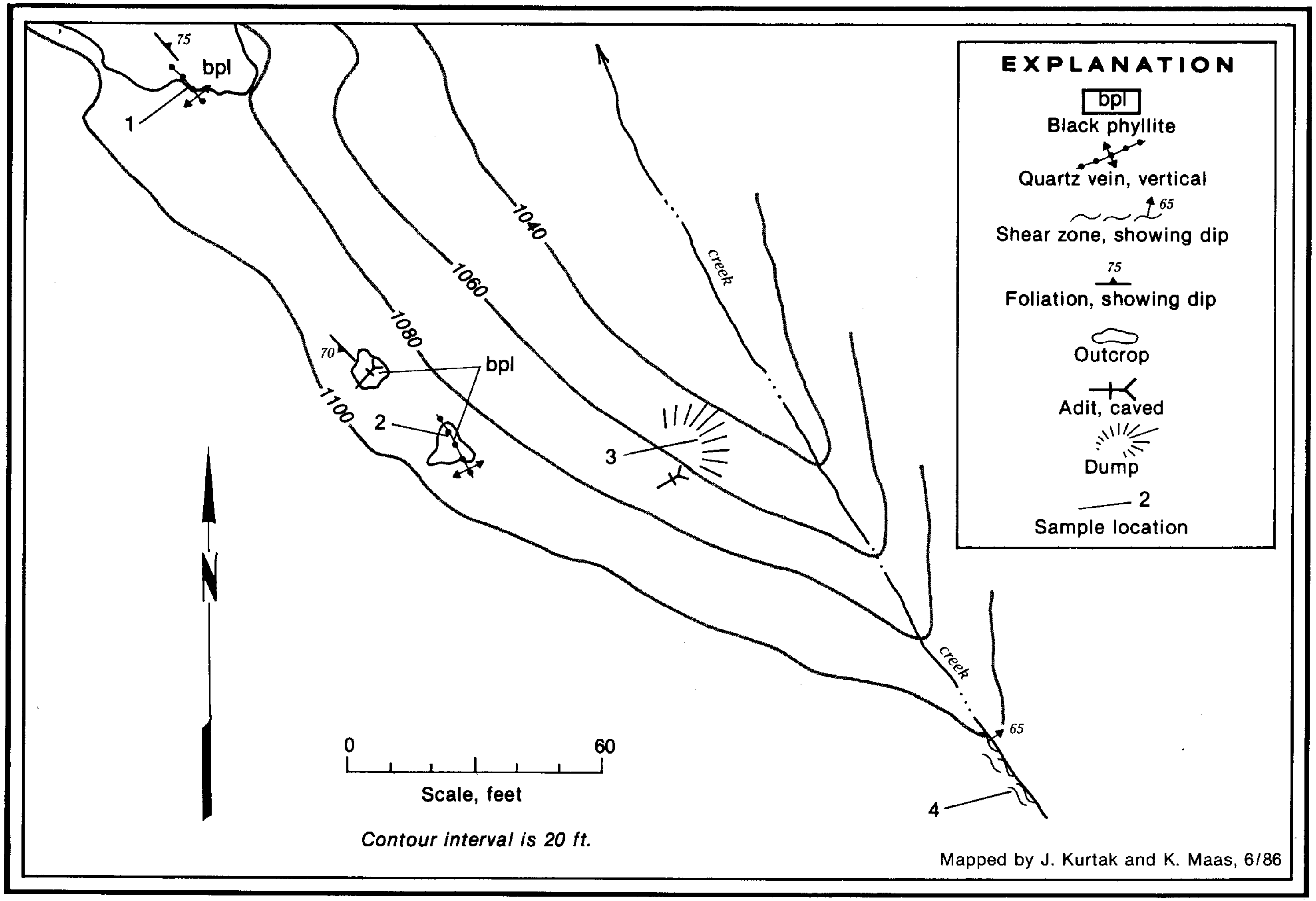

Figure D-54.—Tacoma prospect, showing geology and sample locations.

CALIFORNIA/GOLD STANDARD PROSPECT

Production

There has been no reported production from the California/Gold Standard prospect.

History

The California and Gold Standard claims were discovered as separate properties along the same vein system in 1897 (figs. D-4, D-55). E. P. Pond and J. Davies discovered the California prospect and drove the Falls Tunnel by 1898. J. McWilliams, George Stucky, Charles Brown, D. Fraser, and Pete Early discovered the Gold Standard property and drove the Contact Tunnel by 1898. The properties were consolidated under Pond and Davies ownership in 1898, and the Greenstone Tunnel on the upper Gold Standard workings started.

The Contact Tunnel was driven below the falls on the California prospect in 1900, and by 1902, the Cabin Tunnel was completed. Assessment work was performed until 1905. After that time, no known work was done until 1935, when the Knob discoveries were made at the southern end of the property. Whelan Mining and Exploration restaked the area in 1980 and, after they dropped the property, Jim Wilson restaked the area in 1986 (*D-113*).

Workings and Facilities

There are six adits on the California/Gold Standard prospect. The California prospect has the 140-foot Cabin tunnel, 80-foot Falls tunnel, and 115-foot Contact tunnel. On the Gold Standard prospect, the 85-foot Greenstone tunnel, and 120-foot-long Gold Standard tunnel were driven. North of the Gold Standard workings, one caved inclined shaft and caved adit are also located. In addition, there are numerous open cuts and trenches occurring between 660 and 1,750 feet elevation.

Bureau Investigations

The California/Gold Standard prospect is located on interbedded greenstone and black phyllites. The prospect area marks a transition from greenstone on the west and phyllite to the east. Quartz veins and stringer zones follow the contacts of at least two greenstone layers interbedded with phyllite for a distance of about 4,500 feet along strike and 1,150 feet vertically.

Fresh greenstone contained little mineralization, but quartz veins and stringers containing arsenopyrite occur in sheared greenstone, and phyllites along the contact hanging wall. Gangue minerals consist of calcite and ankerite. Shears trend 155° to 165° and dip moderately to the east. Individual veins are up to 2.0 feet wide and locally display ribbon texture. Most of the mineralization occurs in quartz stringer zones with numerous wallrock (black phyllite) partings. These zones are up to 3.5 feet wide and have been traced continuously for up to 60 feet underground. Sulfides consist of up to 10% pyrite and arsenopyrite; galena is also reported (*D-113*). Visible gold was noticed in quartz at the upper adits.

Sample Results

The Bureau mapped all open workings and several trenches (figs. D-55 to D-58), and collected a total of 34 samples. Two samples were collected from the caved upper workings on the Gold Standard prospect (fig. D-56, Nos. 1-2) but neither contained detectable gold. Fifteen samples were taken from the main adits and trenches of the Gold Standard prospect (fig. D-55, Nos. 3-4; and figs. D-55, D-57, Nos. 5-17). The three samples collected from the Contact Tunnel contained an average of 5.9 ppm gold and a select sample of quartz float below the adit contained 3.4 ppm gold. Other samples in the area yielded very low concentrations of metals.

Thirteen samples were collected from the main California workings (fig. D-58, Nos. 18-30). Most metal values were very low but each adit or trench contained one sample with between 1.1 ppm gold and 2.3 ppm gold.

Four samples were taken from trenches (fig. D-55, Nos. 31-34) on the Gold Knob. A continuous chip sample from one trench contained 2.1 ppm gold and a select sample of arsenopyrite-rich quartz float from the other trench carried 10.7 ppm gold. A sample collected in the same area by Roehm (*D-113*) contained 24.7 ppm gold.

Resource Estimate

The samples from the Gold Standard Contact Adit are the only ones with consistently high gold values. Indicated resources here consist of 1,000 tons at 0.12 ounces/ton gold.

Recommendations

The poddy nature and lensing of the quartz veins making exploratory work very speculative. High grade pods may exist, but predicting their location will be very difficult.

MAS No.
21120073

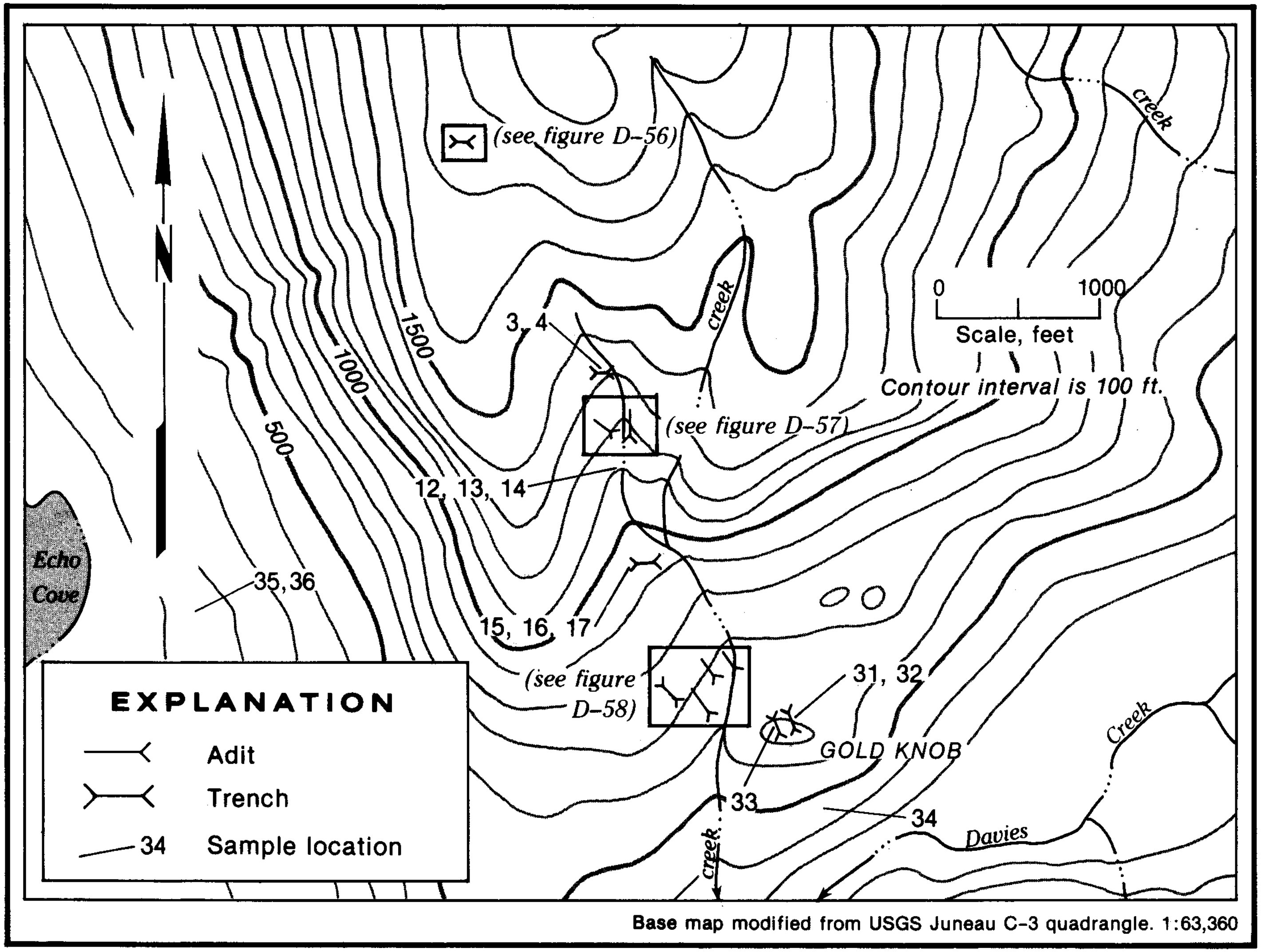

Figure D-55.—California/Gold Standard prospect area, showing sample locations.

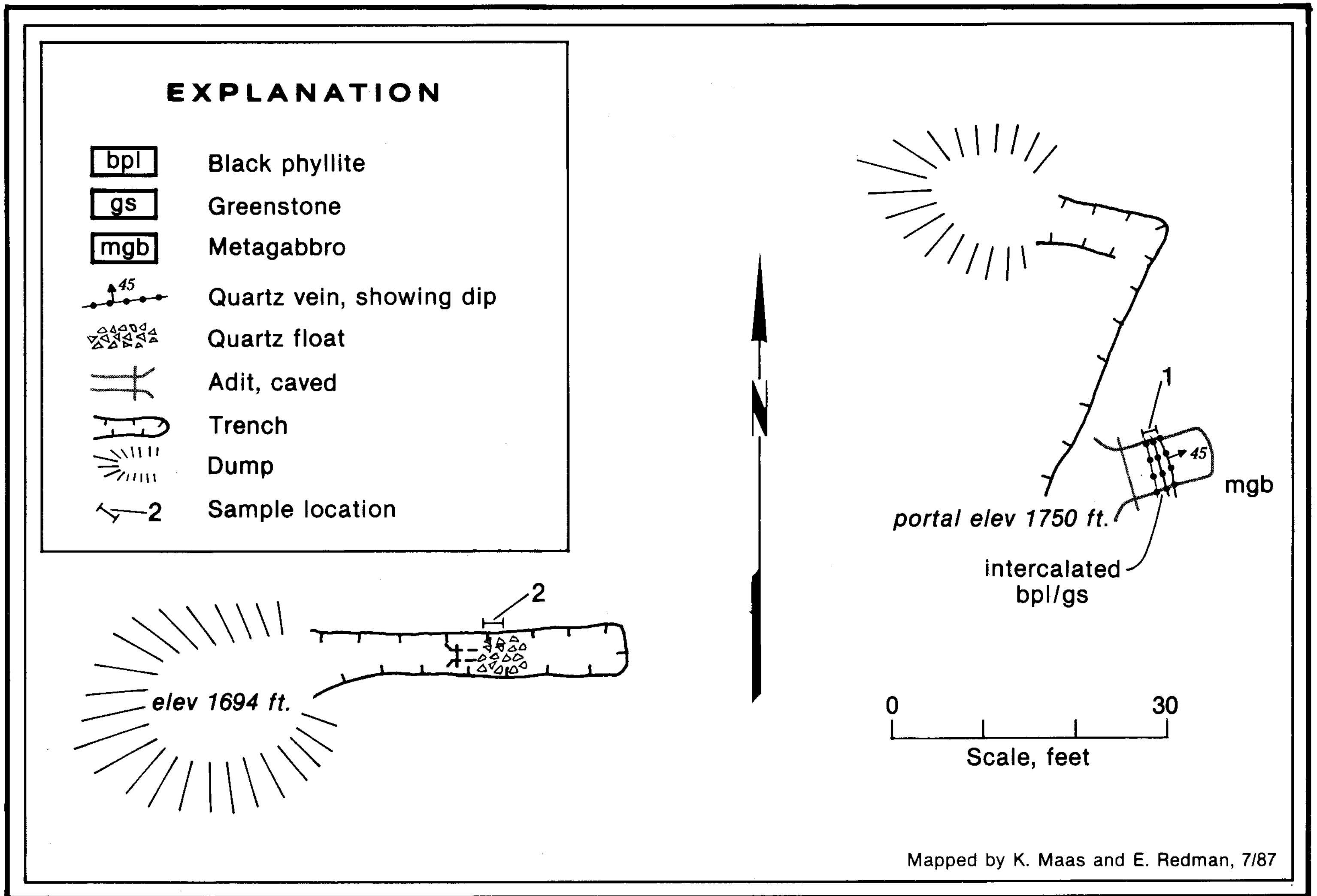

Figure D-56.—Gold Standard property, upper workings, showing geology and sample locations.

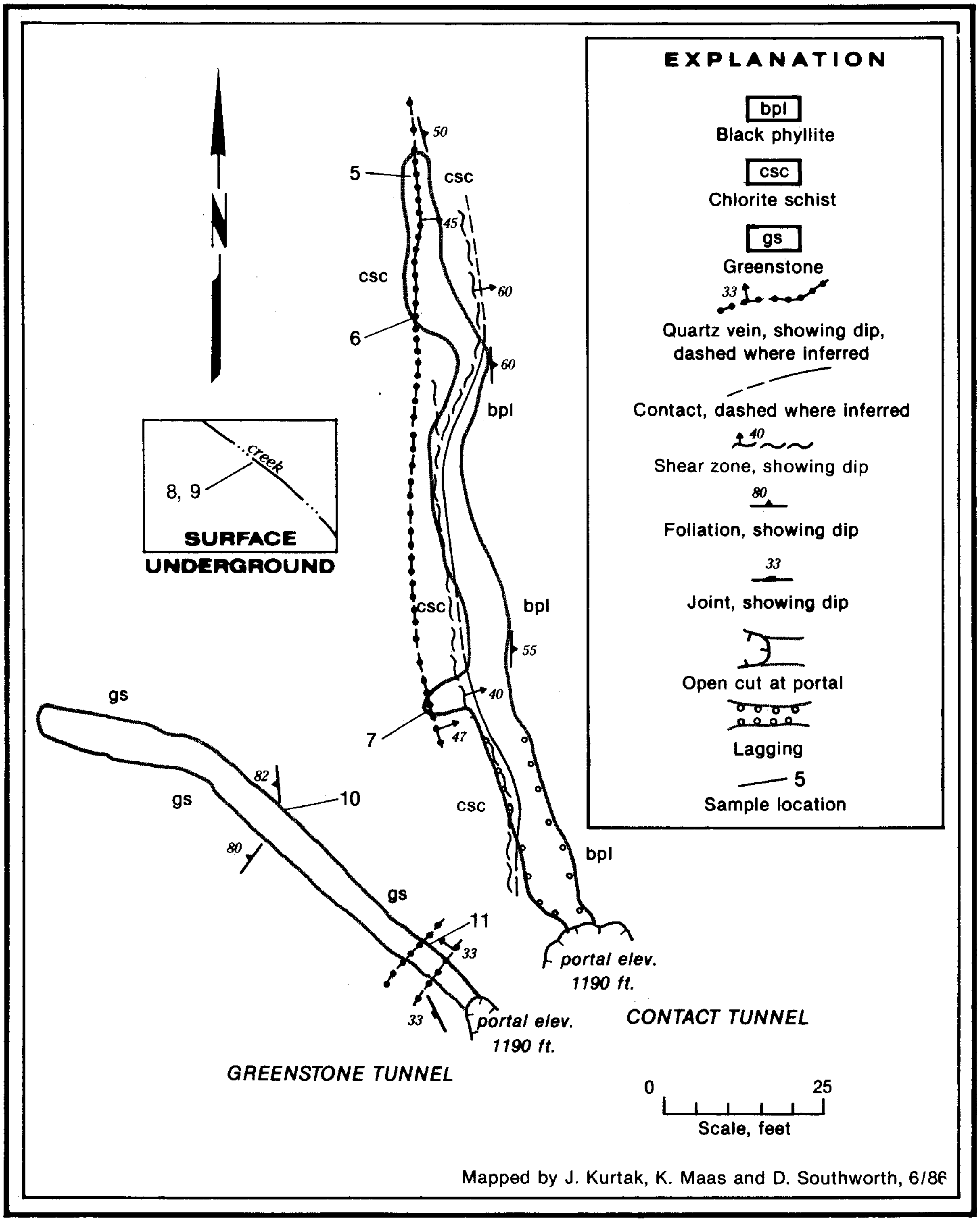

Figure D-57.—Gold Standard property, Greenstone and Contact tunnels, showing geology and sample locations.

References

D-45, D-62, D-63, D-96, D-98, D-99, D-113

GILLEN PROSPECT

Production

There has been no production from the Gillen prospect.

History

The Gillen prospect was located by James Gillen in about 1910 (fig. D-4). Three short adits were driven on the veins shortly after discovery but no additional work was done (*D-137*).

Workings and facilities

Three adits (two of which are 16 feet and 24 feet long) and several caved open cuts are reported (*D-137*).

Geologic setting

The Gillen prospect is underlain by interbedded black phyllite and greenstone. Foliation concordant stringer-type quartz veins occur along or near the contact between the two rock types (fig. D-59). Disseminated pyrite occurs in both rock units.

Bureau Investigations

The Bureau could not locate the Gillen workings.

Resource Estimate

No estimate can be made.

Recommendations

The Gillen workings should be located, mapped, and sampled.

MAS No. 21120213

References

D-137

BLUE JAY PROSPECT

Production

There has been no production from the Blue Jay prospect.

History

The Blue Jay prospect is located at the northernmost extension of the Yankee Basin shear-zone stringer-system and was located near the head of Cowee Creek in 1906 simultaneously with five other groups of claims in the area (figs. D-4, D-60). In 1907, a 25-foot adit driven on the property intersected an orebody; however, not much additional activity occurred until 1913 when Gudmund Jensen made a "big strike" in the area. Jensen and James Joyce, who had other claims in the vicinity, combined their properties, which became known as the Joyce-Jensen. Just where Jensen's "big strike" was is uncertain because claims were staked and restaked with different names and were often mixed up with adjacent workings (*D-97*).

Workings and Facilities

The Blue Jay has one caved adit and several trenches.

Bureau Investigations

The Blue Jay prospect lies in a gully that may be following a major shear zone that trends NW-SE and extends at least as far as the Julia group located 2 miles to the SE. The gully walls are schistose and are composed of black phyllite locally cut by quartz stringers and stockworks. Quartz vein float can be found in the gully bottom.

The Bureau located a caved adit on the east side of the gully and sampled the quartz float on the slope above (fig. D-60, Nos. 1-4). A sample from a pile of quartz fragments contained 3.7 ppm gold and quartz from a trench downslope assayed 5.0 ppm gold. The trench contained a quartz vein which trends 160°, averages 1.1 feet in thickness, and has up to 8% pyrite.

Resource Estimate

Too little is known of the geology of the Blue Jay prospect to estimate a resource.

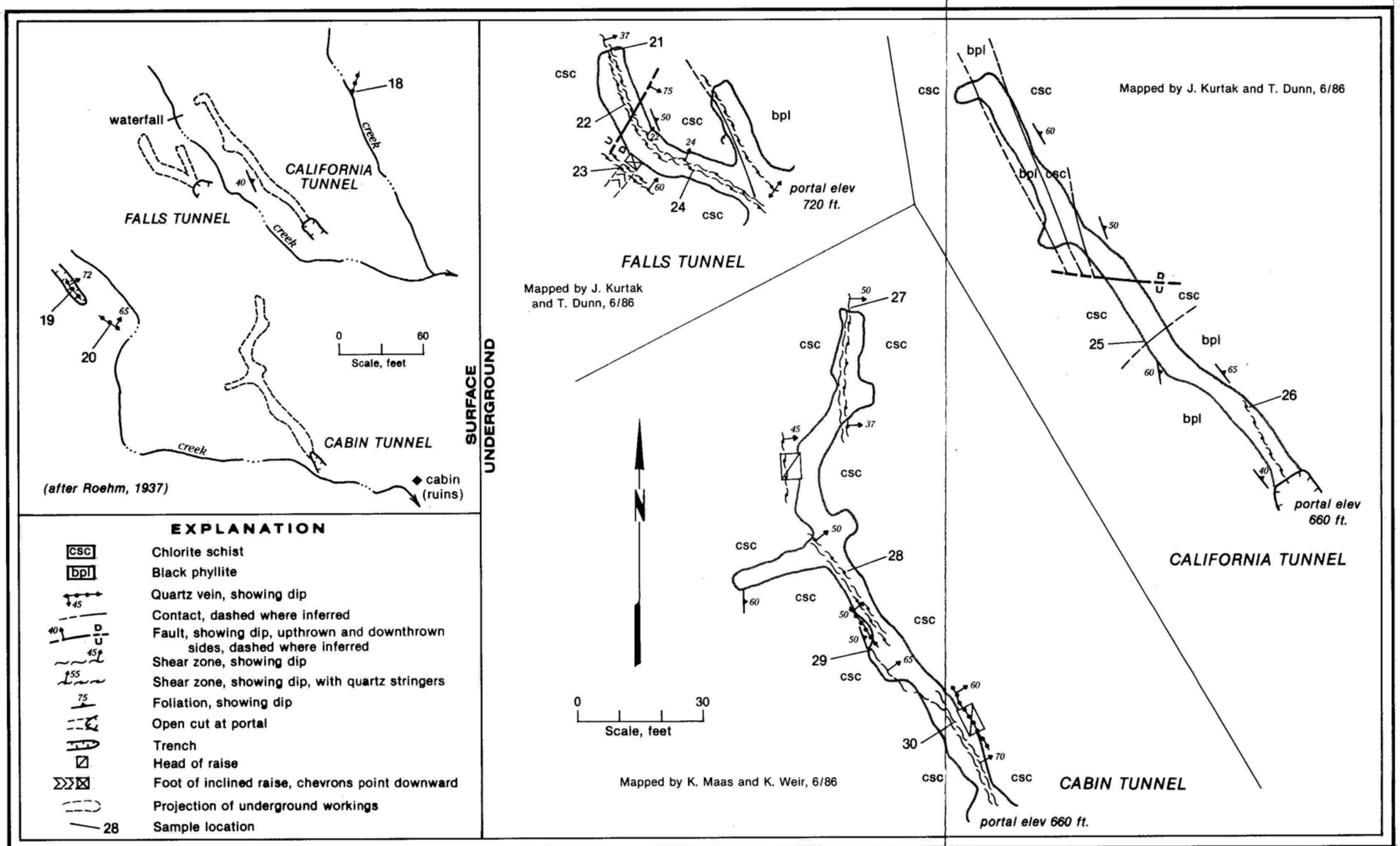

Figure D-58. — California tunnels, showing geology and sample locations.

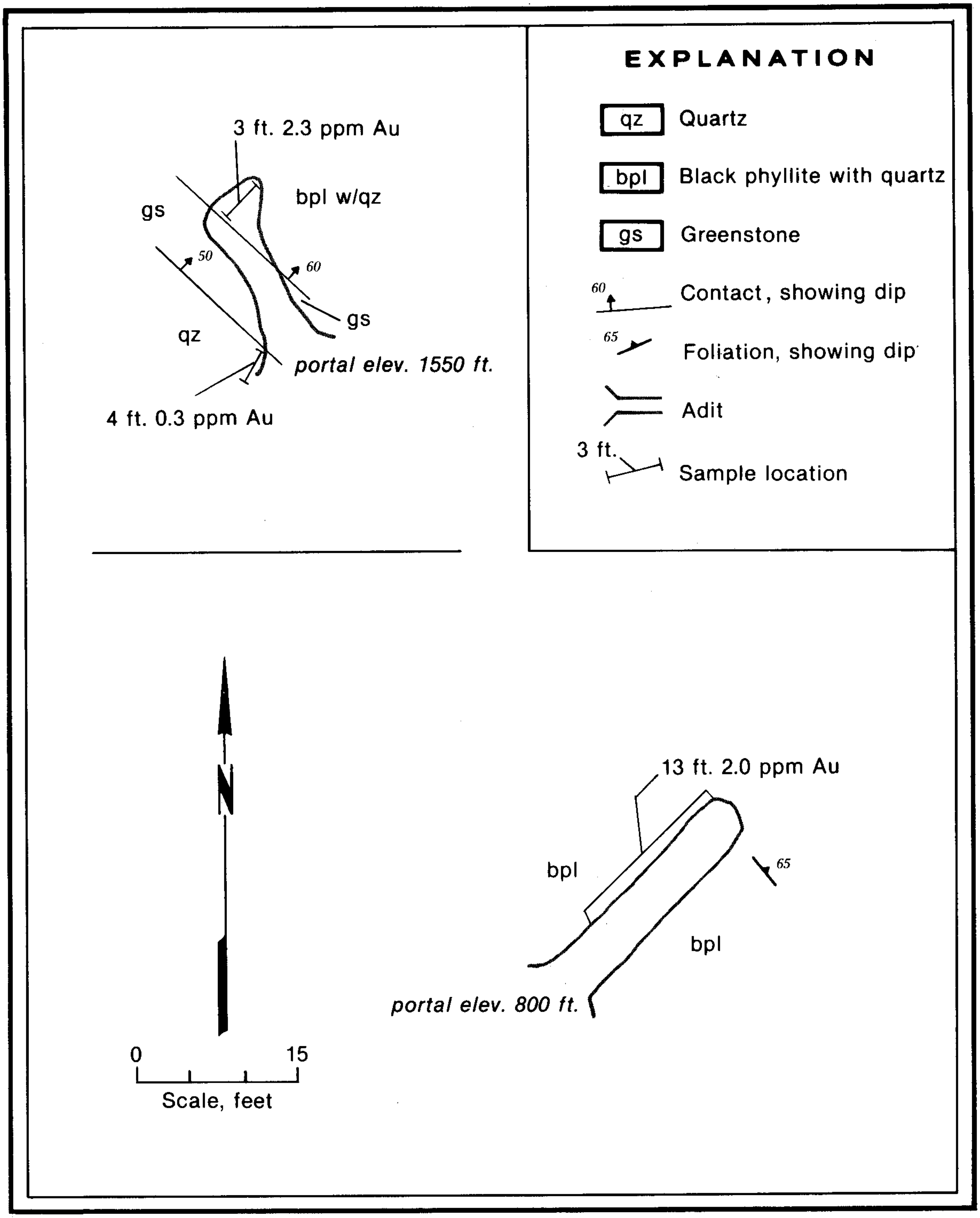

Figure D-59.—The Gillen prospect adits, showing geology and samples taken by Townsend (*D-137*).

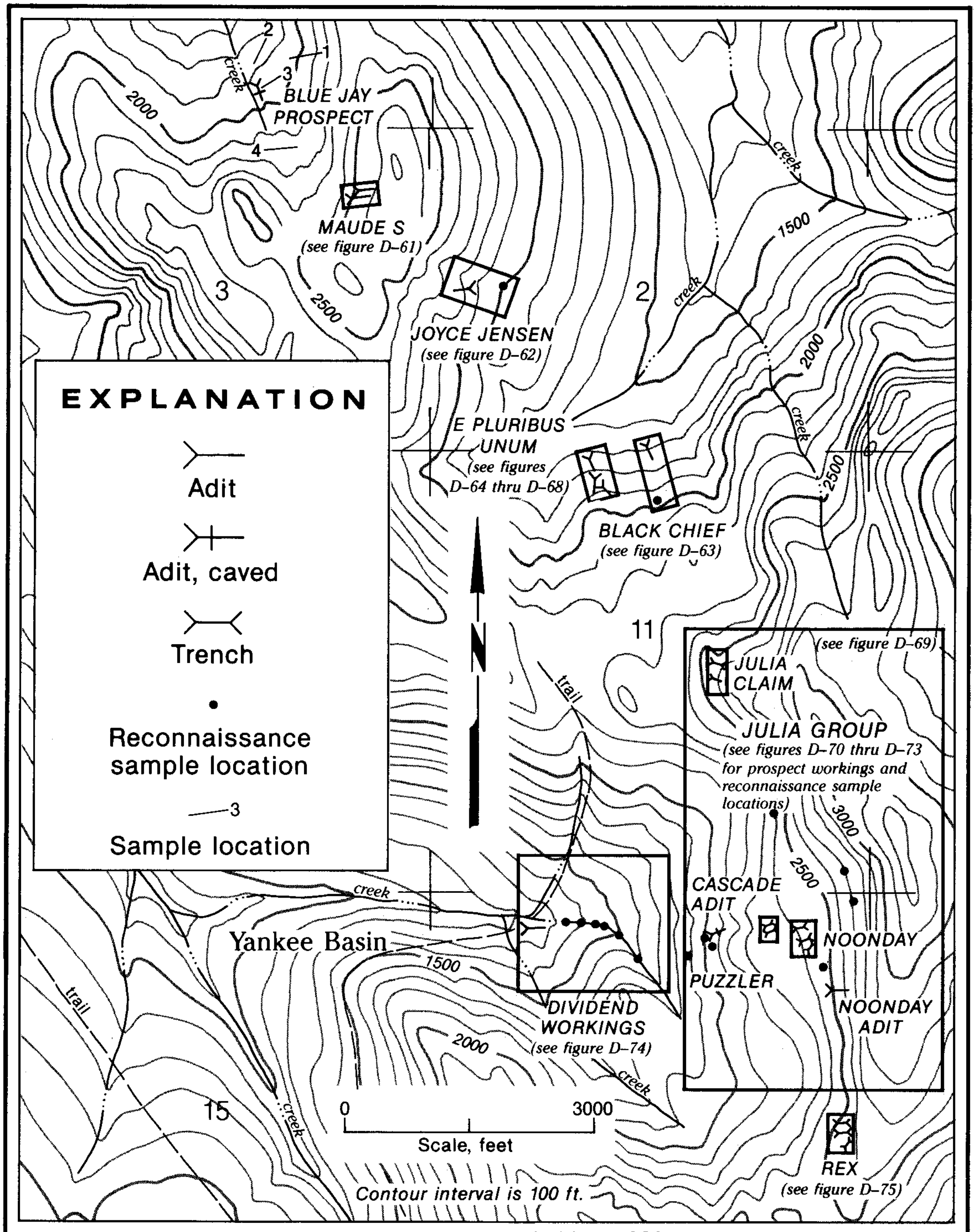

Figure D-60.—Yankee Basin area, showing mines, prospects, and reconnaissance sample locations.

Recommendations

Trenching between the Blue Jay prospect and the Joyce Jensen property may uncover veins or stringer zones lying along the trend of the shear zone.

MAS No.
21120232

References

D-62, D-63, D-83, D-95, D-96, D-97, D-98, D-99, D-159

MAUDE S PROSPECT

Production

There has been no production from the Maude S prospect.

History

The Maude S claim was located during 1906, along with the Black Chief, E Pluribus Unum, and Joyce Jensen claims. The prospect is situated just over the divide from Yankee Basin at the head of Canyon Creek (figs. D-4, D-60). A 40-foot adit was driven by Joyce in 1907 and, according to the Daily Alaska Dispatch, another 150-foot adit was driven on the property by November 1908 (*D-97*). This story conflicts with an account by Knopf (*D-62*) in 1910, which stated that a 100-foot adit had been completed. Activity ceased in the area until 1980 when Whelan Exploration staked the Canyon Creek area. Houston Oil and Minerals drilled the property in 1985 as part of its Yankee Basin exploration program. Presently, the area is claimed by Whelan's Mining and Exploration Co.

Workings and Facilities

The Maude S prospect has a 45-foot and a 125-foot adit.

Bureau Investigations

The Maude S prospect is underlain by intercalated black phyllite and graphitic schist with quartz lenses up to 3 feet wide that trend 040°. The quartz masses contain no visible sulfides and are bordered by quartz stringer zones with the same orientation. The upper adit cuts a 35-foot quartz stringer zone. The lower adit, 42 feet vertically below the first, cuts through a series of concordant quartz stringer zones, the majority of which trend NW.

The Bureau mapped and sampled the surface outcrops and underground workings of the Maude S prospect (fig. D-61). Nine samples were taken from the vicinity (fig. D-61, Nos. 1-9) and three contained values of 2.0 ppm, 3.2 ppm, and 4.4 ppm gold. The best sample (fig. D-61, No. 9) came from a 3-foot-wide quartz stringer zone in black phyllite.

Resource Estimate

The low gold values and discontinuous nature of the quartz stringers and pods give this prospect very little potential for development.

Recommendations

No work is recommended.

MAS No.
21120233

References

D-61, D-62, D-63, D-83, D-95, D-96, D-97, D-98, D-99, D-159

JOYCE-JENSEN PROSPECT

Production

There has been no production from the Joyce-Jensen prospect.

History

The property that ultimately became known as the Joyce-Jensen was first discovered in 1906 by James Joyce at the head of Canyon Creek (figs. D-4, D-60). Later, in 1913, these claims were combined with adjacent claims located by Gudmund Jensen, to form the Joyce-Jensen property. During 1907, an 80-foot adit was driven on the property and, by 1913, the claim had been combined with the Joyce Jensen prospect. The adit was extended to its present length of 220 feet (*D-98*), probably in the mid-1930's, because a dynamite box at the face is stamped with the date 1935. The area was staked in 1980 by Whelan Exploration and drilled in 1985 by Houston Oil and Minerals (*D-97*).

Workings and Facilities

There are a 220-foot-long adit, a 10-foot adit, an open cut, and a series of trenches at the prospect.

Bureau Investigations

The Joyce-Jensen prospect is underlain by black phyllite and is along the trend of the major shear zone which extends from the Julia claims to the Blue Jay prospect. The phyllite is strongly contorted and sheared. A large quartz vein outcropping on the surface parallels both foliation and the shears. A surface trench exposes a 6-foot-wide vein that trends 135° and dips steeply NE. The vein contains up to 5% arsenopyrite and pyrrhotite in pods and stringers. Several quartz lenses are exposed in trenches nearby. A 10-foot adit driven to intersect some of these quartz masses failed to do so because the quartz pinched out at depth.

A second adit was driven 130 feet downslope from the first adit to intersect the largest surface exposure of quartz at depth. It cuts a series of faults and shear zones containing quartz stringers but no substantial vein such as that exposed on the surface. The quartz stringer zones are up to 10 feet wide, trend generally parallel to foliation, and contain minor amounts of pyrite and pyrrhotite.

Sample Results

The Bureau mapped and sampled all the workings and collected ten samples (fig. D-62, Nos. 1-10). Samples from veins in the upper trenches and the long adit contained less than 1 ppm gold. A 1.5-foot-wide quartz vein trending 100° exposed in an open cut downstream from the other workings contains the highest gold values on the property. Sulfides consist of up to 15% combined pyrite, galena, and chalcopyrite. Two samples were collected, a continuous chip and a select dump sample, which contained 7.0 ppm and 11.8 ppm gold, respectively.

Resource Estimate

The highly erratic nature of the quartz veins makes it very difficult to estimate a resource.

Recommendations

The quartz vein exposed in the lower trench contains the highest gold values and its extent has not been thoroughly revealed. Continued trenching along the trend of the vein may reveal an extension as well as an estimate of the depth dimension. Drilling may also aid in determining the depth of the vein, but this would be discouraged due to the cost and the discontinuous nature of the quartz veins in the area.

MAS No.
21120081

References

D-62, D-63, D-83, D-95, D-96, D-97, D-98, D-99, D-159

BLACK CHIEF PROSPECT

Production

There has been no recorded production from the Black Chief prospect.

History

The Black Chief vein was discovered in 1906, the same year the E Pluribus Unum, Joyce Jensen, and Maude S claims were located (figs. D-4, D-60). An adit was started in 1907 to undercut the lode and driven to 180 feet the next year by Harry Jourdan. Sometime after 1910, the adit was extended until it contained 320 feet of workings. This later work may have occurred during the mid-1930's when small scale mining operations were underway at the adjacent E Pluribus Unum Mine (*D-97*).

Workings and Facilities

The Black Chief prospect has an open adit with 320 feet of workings, a sloughed prospect pit, and a caved adit.

Bureau Investigations

The Black Chief prospect consists of black phyllite and graphitic schist. Many 135°-trending shear zones, up to 20 feet wide, are exposed in the adit and stream bottom at 1,750 feet elevation in upper Canyon Creek. The shear zones contain numerous quartz stringers averaging 1 inch in width and which locally contain pyrite, arsenopyrite, and galena. The prospect was originally staked for a 2-foot to 4-foot-wide quartz vein (called the Gold Pan Vein) observed in a gulch above the present workings. Locally, the phyllites develop into graphitic schists within the shear zones.

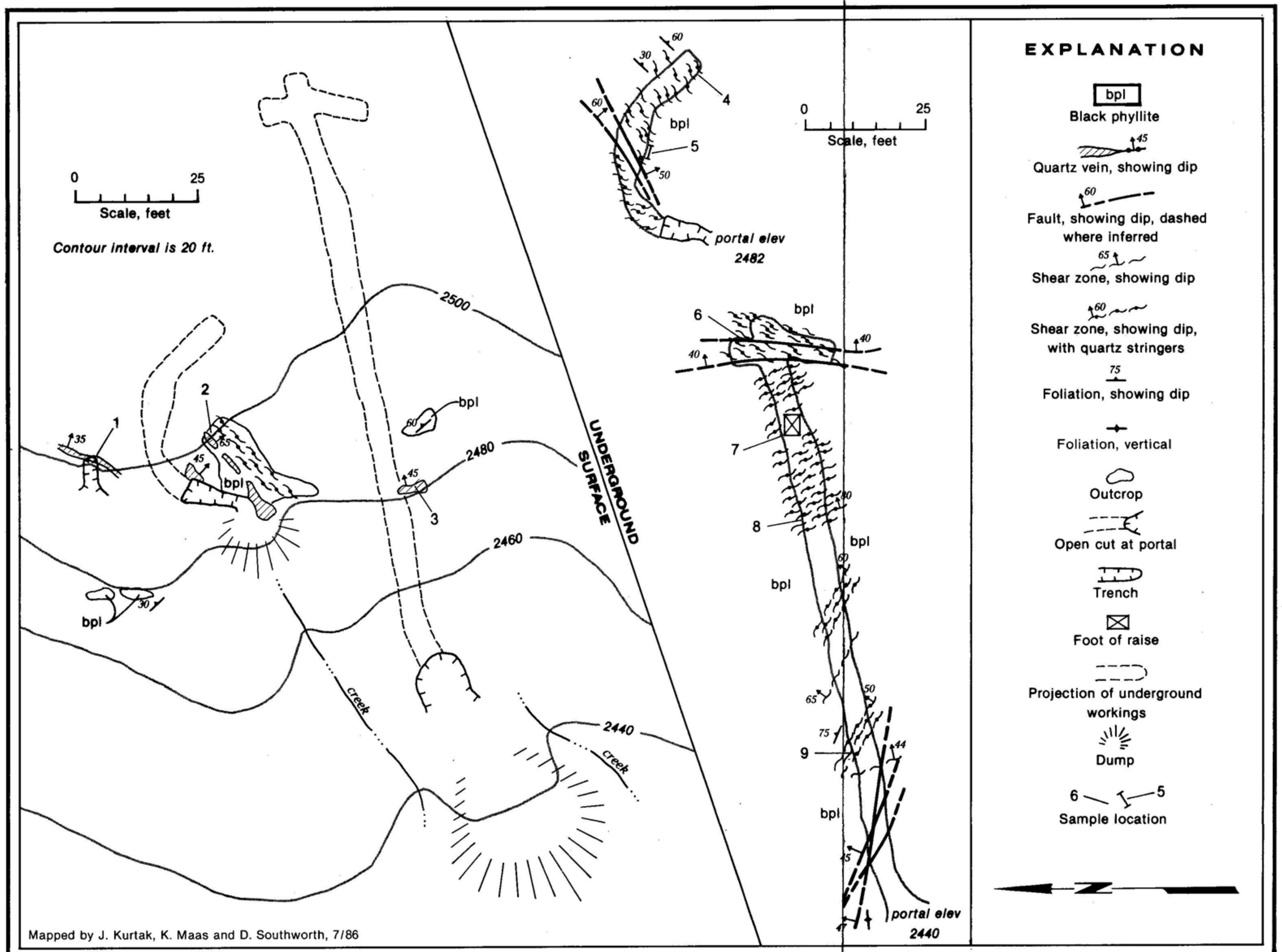

Figure D-61. — Maude S prospect, showing geology, workings, and sample locations.

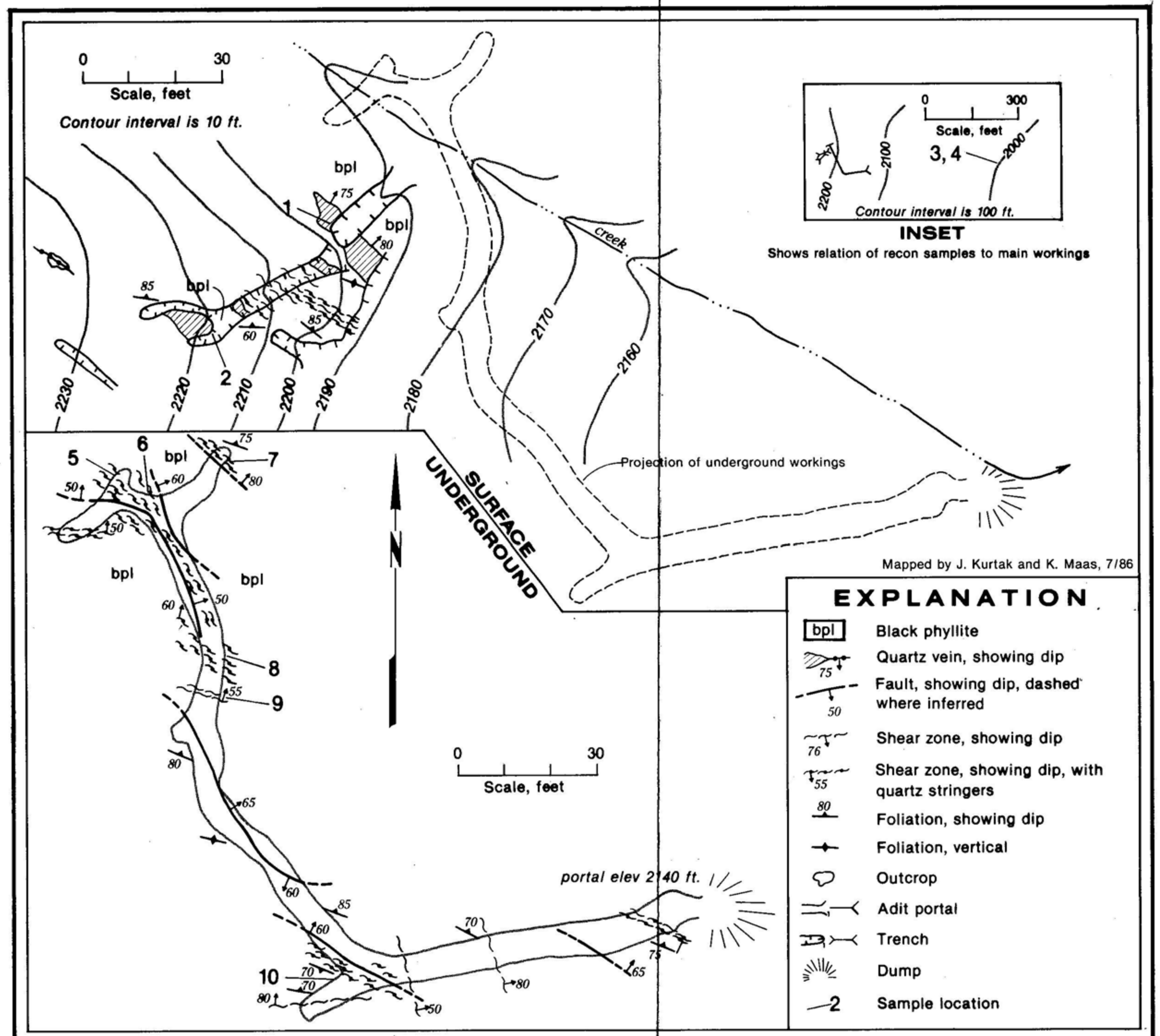

Figure D-62. — Joyce Jensen workings, showing geology and sample locations.

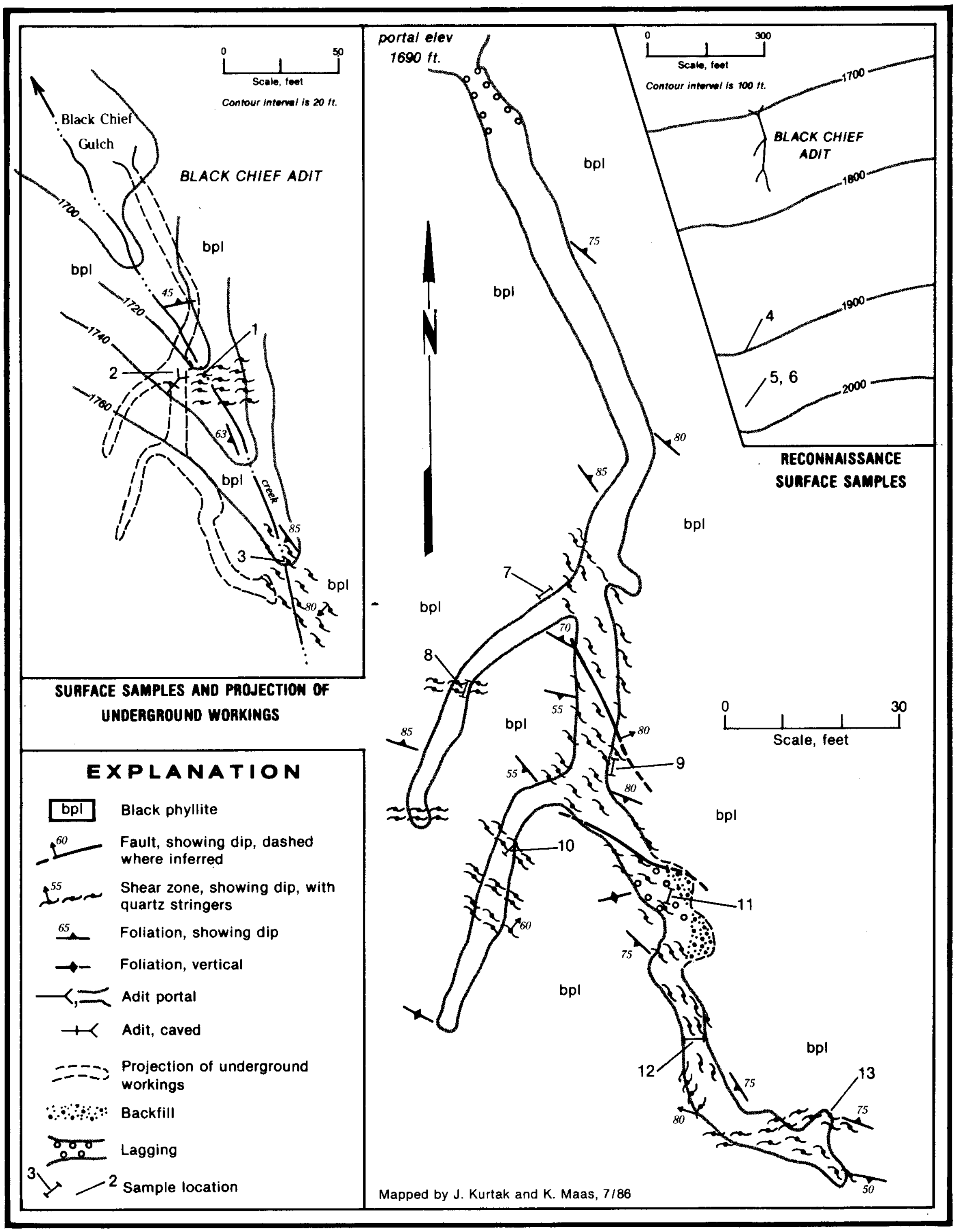

Figure D-63.—Black Chief prospect, showing geology and sample locations.

The adit driven to undercut the shear zones and the Gold Pan quartz vein, which outcrops 60 feet above the adit level, cut 10-foot-wide shear zones but failed to locate the Gold Pan vein. The shear zones in the adit form an anastomosing system which encloses masses of more competent, silicified rock.

Sample Results

The Bureau mapped and sampled the adit and the surface outcrops and collected 13 samples (fig. D–63, Nos. 1–13). Samples from the surface quartz stringer zones contained up to 16.7 ppm gold across a 2-foot-wide zone, but none of the underground samples contained significant gold values. A sample of quartz float found below the rich stringer zone carried 10.2 ppm gold.

Resource Estimate

The gold values found in surface outcrops did not extend down as far as the adit level making a resource estimate difficult. As in most of the Yankee Basin/ Canyon Creek area, veins are too discontinuous or faulted to develop any tonnage.

Recommendations

The vein in the creek should be trenched and sampled to determine the gold concentrations present. The vein was not intersected at depth in the adit, so drilling would not be recommended.

MAS No.
21120204

References

D–62, D–63, D–83, D–95, D–96, D–97, D–98, D–99, D–159

E PLURIBUS UNUM MINE

Production

The following table was compiled from Bureau records (*D–146*):

Table D–6.—Gold, silver, lead, and copper production from the E Pluribus Unum Mine

Year	Tonnage	Production		Average grade[1]		Production	
		oz Au	oz Ag	oz/t Au	oz/t Ag	lb Pb	lb Cu
1935	35	34	10	0.97	0.29	35.0	
1936[2]	1	50	15	50.0	15.0	100.0	
1939	30	34	8	1.13	0.27	23.0	2
1940	40	36	11	0.9	0.28	84.0	9
Total	106	154	44			242.0	11

[1] Average grades: 1.45 ounces/ton gold, 0.42 ounces/ton silver.
[2] Tonnage probably refers to a concentrate.

History

The E Pluribus Unum property was discovered in 1906 by Cottrell and Spaulding (figs. D–4, D–60). In 1908, Harry Jourdan and Cottrell drove 275 feet of tunnel and a 60-foot raise to intersect the vein. In 1909, additional work was done. A small mill may have been sledded to the prospect during the winter of 1909–1910 but it is not known if any ore was milled.

In 1910, Jourdan and Cottrell drove a second adit 40 feet into their vein and added a 10-foot drift. After 1910, work at the E Pluribus Unum diminished. Victor Spaulding relocated the claims in 1927–1928, but it wasn't until Karl Ashenbrenner and Jack Koby leased the E Pluribus Unum from Spaulding in 1935 that activity resumed for a 5-year period. A 2-ton Gibson Mill and a 3-ton capacity Wilfley table, both powered by a 1½ hp Fairbanks-Morse gasoline engine, were erected at the mouth of the lower adit and mining began. In 1935, over 34 ounces of gold were recovered from 1,456 pounds of concentrates. Mining continued until 1940 when Ashenbrenner and Koby departed. A total of 154 ounces of gold, 44 ounces of silver, 242 pounds of lead, and 11 pounds of copper were recovered from 106 tons of ore during this 5-year period.

The E Pluribus Unum Mine was restaked by Dale Henkins and Roger Eichman in the early 1980's. Core drilling was performed in the area by Houston Oil and Minerals in 1985 (*D-97*).

Workings and Facilities

There are three open adits and several trenches on the property. No. 1 adit has 275 feet of workings and a 60-foot upraise, No. 2 adit has 50 feet of workings, and No. 3 adit is 20-feet long. The remains of a small Gibson mill, a 7-in jaw crusher, and a gravity table are located below No. 1 adit.

Bureau Investigations

The E Pluribus Unum Mine lies within a zone of sheared black phyllite and graphitic schist at least 130 feet wide that can be traced nearly 5,000 feet along a trend of 135°. Locally, green phyllite is interbedded with the black phyllite. Rocks within the zone are intensely folded, sheared, and are characterized by ubiquitous crenulation folding. Foliation strikes from 150° to 175° and dips steeply to the NE. Recumbent folds are present underground and may have developed after crenulation-type cleavage. This type of folding is best developed in No. 1 adit. An open syncline exposed in No. 2 adit folds a large quartz vein and plunges 33° SE. A series of faults, trending approximately 120° and dipping steeply to both the NE and SW, cut across foliation.

Two types of concordant quartz veins are found in the area: 1) quartz stringer zones and 2) massive quartz veins. Quartz stringer zones are up to 6 feet wide with individual stringers averaging less than 1 inch. They are often localized adjacent to fault zones. The quartz stringers, which contain minor pyrite, arsenopyrite, and a trace of chalcopyrite, are prevalent in the No. 1 adit. Gold values from stringer zones averaged 0.3 ppm.

More massive concordant quartz veins are associated with fold noses. They occurs as fillings in open spaces on the noses and adjacent limbs of folds. They are up to 2.5 feet thick and trend both NW and NE. They often contain massive arsenopyrite with minor sphalerite and galena. These veins are exposed in adits No. 2 and 3, gold values averaged 30.2 ppm gold. Stibnite is reported (*D-102*) to occur in the veins at the E Pluribus Unum Mine, the only reported occurrence of the mineral in the Eagle River area.

Sample Results

The Bureau mapped the mine workings (figs. D-64 to D-68), collected 26 geochemical samples, and took a 300-pound metallurgical sample of vein quartz from dumps and outcrops at all three adits. The highest gold values were obtained from samples collected in adit No. 2 (fig. D-67, Nos. 11-20). A sample of quartz vein material (fig. D-67, No. 13) containing scorodite ($FeAs_4.H_2O$) assayed 122.6 ppm gold and another sample of quartz in graphitic schist contained 59.9 ppm gold. Three other samples contained 4.2 ppm, 5.8 ppm, and 14.3 ppm gold. One of these samples (No. 18) also contains 31.9 ppm silver.

Ten samples were taken from No. 1 adit (fig. D-66, Nos. 1-10). Of these, only two contained greater than 1.0 ppm gold (2.5 ppm and 29.8 ppm gold). The richer of the samples was found below the upraise which was used as an ore chute and was probably derived from the vein in No. 2 adit. Adit No. 1 did not cut the vein exposed in adit No. 2 although Knopf (*D-62*) stated that ore was encountered in the raise driven between the two levels. The Bureau did not find significant quartz veining in the raise.

Three samples were collected from No. 3 adit (fig. D-68, Nos. 21-23). Two of these samples contained 5.7 and 8.3 ppm gold. Three additional samples were taken from trenches above No. 3 adit (fig. D-64, Nos. 24-26) but none contained significant metal values.

The metallurgical test sample was analyzed by the Bureau's Salt Lake City Research Center and the results are shown below (*D-43*):

Results of Cyanide Amenability Tests

Grind %-325 mesh	Assay (ppm) Head Au	Head Ag	Residue Au	Residue Ag	Extraction (%) Au	Extraction (%) Ag	Reagents lb/ton NaCN	Reagents lb/ton Lime
82	4.3	4.2	0.3	-1.7(sic)	92.1	83.4	23	1.1

The cyanide amenability test results show 92% recovery of the extractable gold, using 23 pounds of sodium cyanide reagent.

Resource Estimate

The following estimate is based on Bureau sampling and mapping of the exposed veins:

Indicated Resources

Area	Tonnage	Gold (oz/t)	Avg. vein width (ft)
Adit No. 2	65	0.87	1.8
Adit No. 3	37	0.13	2.2
Total	102	0.46	2.0
Over Mining Width (3 ft)	135	0.30	

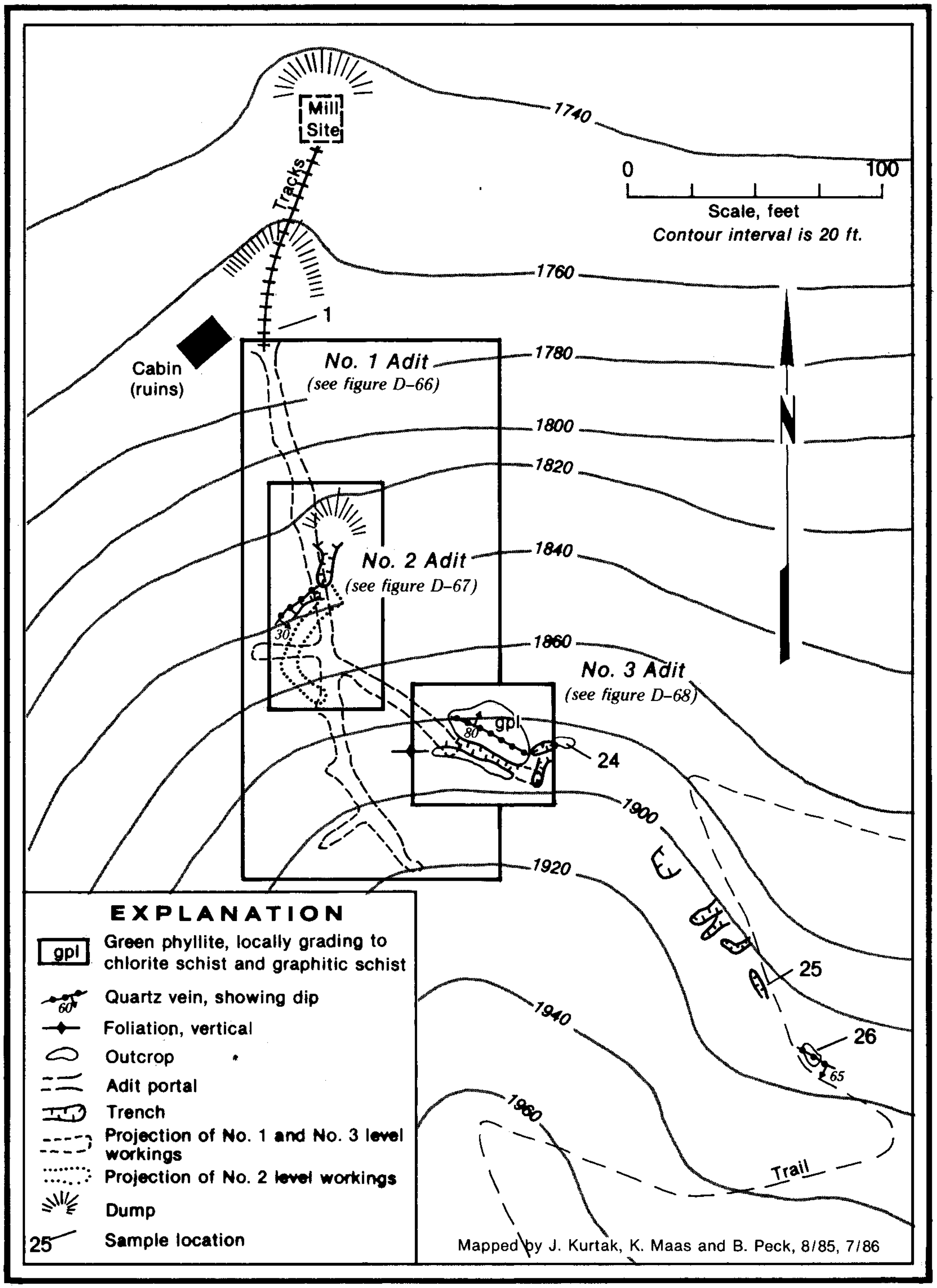

Figure D-64.—E Pluribus Unum Mine, surface geology, workings, and sample locations.

The E Pluribus Unum Mine was restaked by Dale Henkins and Roger Eichman in the early 1980's. Core drilling was performed in the area by Houston Oil and Minerals in 1985 (*D-97*).

Workings and Facilities

There are three open adits and several trenches on the property. No. 1 adit has 275 feet of workings and a 60-foot upraise, No. 2 adit has 50 feet of workings, and No. 3 adit is 20-feet long. The remains of a small Gibson mill, a 7-in jaw crusher, and a gravity table are located below No. 1 adit.

Bureau Investigations

The E Pluribus Unum Mine lies within a zone of sheared black phyllite and graphitic schist at least 130 feet wide that can be traced nearly 5,000 feet along a trend of 135°. Locally, green phyllite is interbedded with the black phyllite. Rocks within the zone are intensely folded, sheared, and are characterized by ubiquitous crenulation folding. Foliation strikes from 150° to 175° and dips steeply to the NE. Recumbent folds are present underground and may have developed after crenulation-type cleavage. This type of folding is best developed in No. 1 adit. An open syncline exposed in No. 2 adit folds a large quartz vein and plunges 33° SE. A series of faults, trending approximately 120° and dipping steeply to both the NE and SW, cut across foliation.

Two types of concordant quartz veins are found in the area: 1) quartz stringer zones and 2) massive quartz veins. Quartz stringer zones are up to 6 feet wide with individual stringers averaging less than 1 inch. They are often localized adjacent to fault zones. The quartz stringers, which contain minor pyrite, arsenopyrite, and a trace of chalcopyrite, are prevalent in the No. 1 adit. Gold values from stringer zones averaged 0.3 ppm.

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Sample Results

The Bureau mapped the mine workings (figs. D-64 to D-68), collected 26 geochemical samples, and took a 300-pound metallurgical sample of vein quartz from dumps and outcrops at all three adits. The highest gold values were obtained from samples collected in adit No. 2 (fig. D-67, Nos. 11-20). A sample of quartz vein material (fig. D-67, No. 13) containing scorodite ($FeAs_4.H_2O$) assayed 122.6 ppm gold and another sample of quartz in graphitic schist contained 59.9 ppm gold. Three other samples contained 4.2 ppm, 5.8 ppm, and 14.3 ppm gold. One of these samples (No. 18) also contains 31.9 ppm silver.

Ten samples were taken from No. 1 adit (fig. D-66, Nos. 1-10). Of these, only two contained greater than 1.0 ppm gold (2.5 ppm and 29.8 ppm gold). The richer of the samples was found below the upraise which was used as an ore chute and was probably derived from the vein in No. 2 adit. Adit No. 1 did not cut the vein exposed in adit No. 2 although Knopf (*D-62*) stated that ore was encountered in the raise driven between the two levels. The Bureau did not find significant quartz veining in the raise.

Three samples were collected from No. 3 adit (fig. D-68, Nos. 21-23). Two of these samples contained 5.7 and 8.3 ppm gold. Three additional samples were taken from trenches above No. 3 adit (fig. D-64, Nos. 24-26) but none contained significant metal values.

The metallurgical test sample was analyzed by the Bureau's Salt Lake City Research Center and the results are shown below (*D-43*):

Results of Cyanide Amenability Tests

Grind	Assay (ppm)				Extraction		Reagents	
%-325	Head		Residue		(%)		lb/ton	
mesh	Au	Ag	Au	Ag	Au	Ag	NaCN	Lime
82	4.3	4.2	0.3	-1.7(sic)	92.1	83.4	23	1.1

The cyanide amenability test results show 92% recovery of the extractable gold, using 23 pounds of sodium cyanide reagent.

Resource Estimate

The following estimate is based on Bureau sampling and mapping of the exposed veins:

Indicated Resources

Area	Tonnage	Gold (oz/t)	Avg. vein width (ft)
Adit No. 2	65	0.87	1.8
Adit No. 3	37	0.13	2.2
Total	102	0.46	2.0
Over Mining Width (3 ft)	135	0.30	

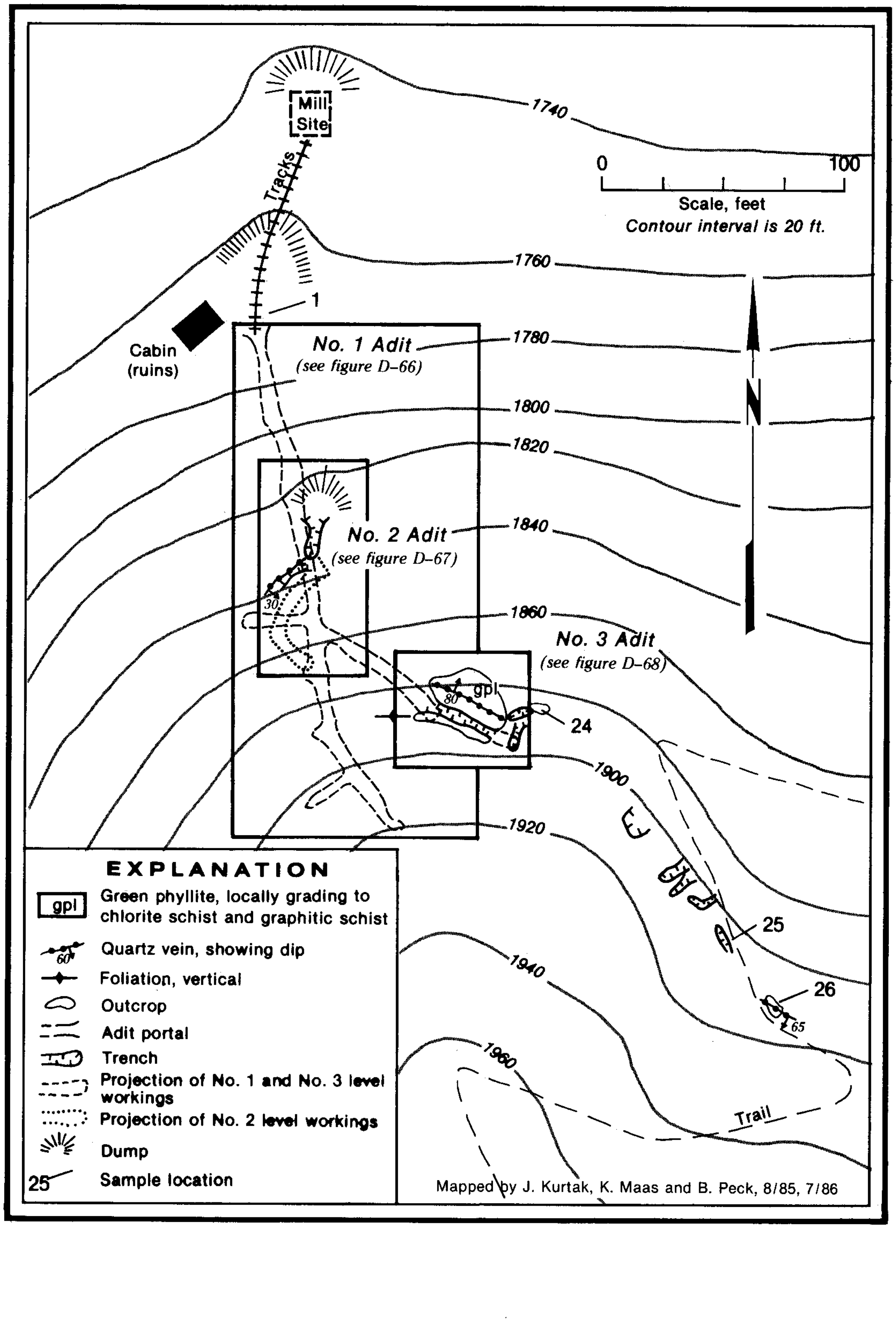

Figure D-64.—E Pluribus Unum Mine, surface geology, workings, and sample locations.

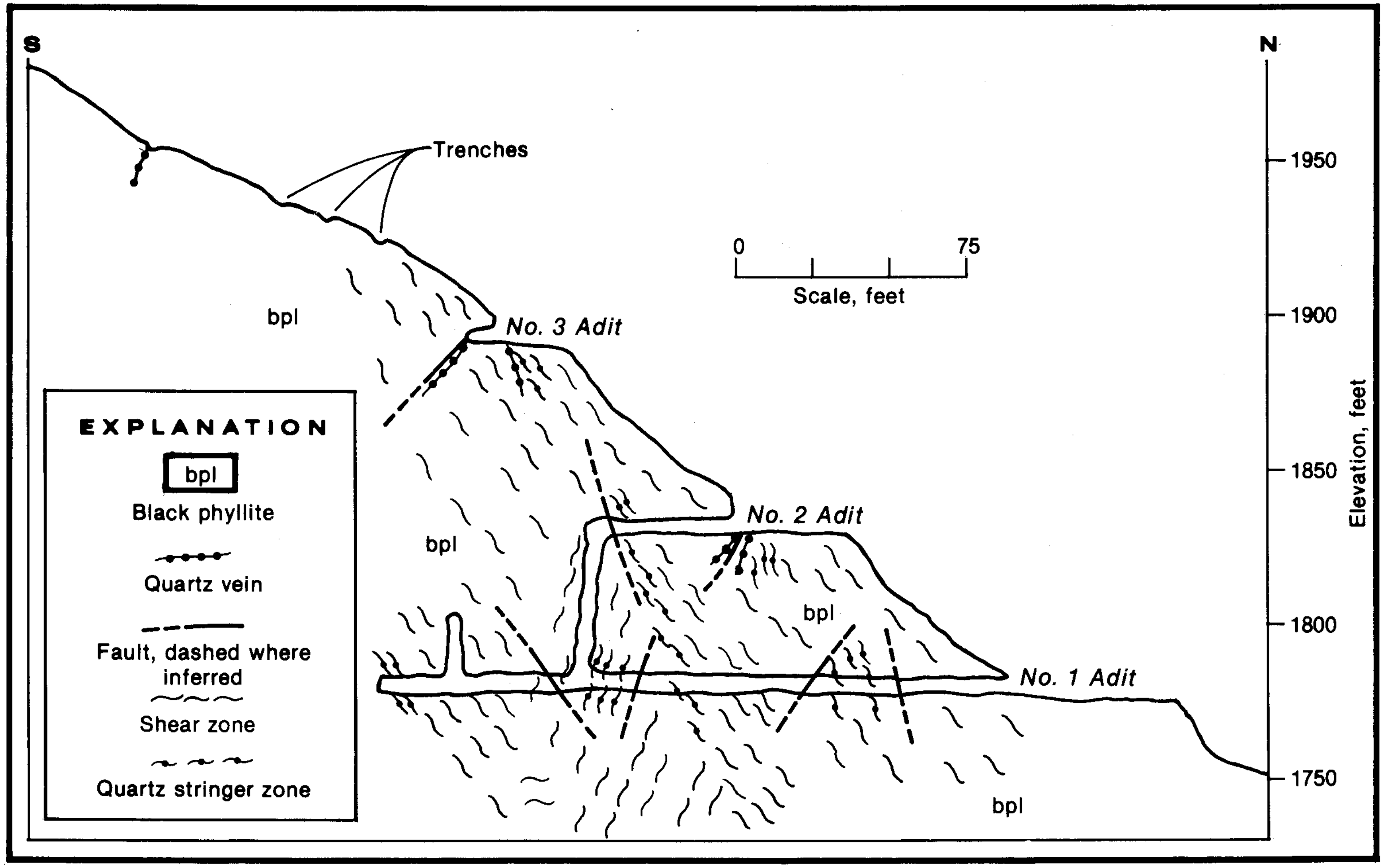

Figure D-65.—E Pluribus Unum longitudinal section, looking west.

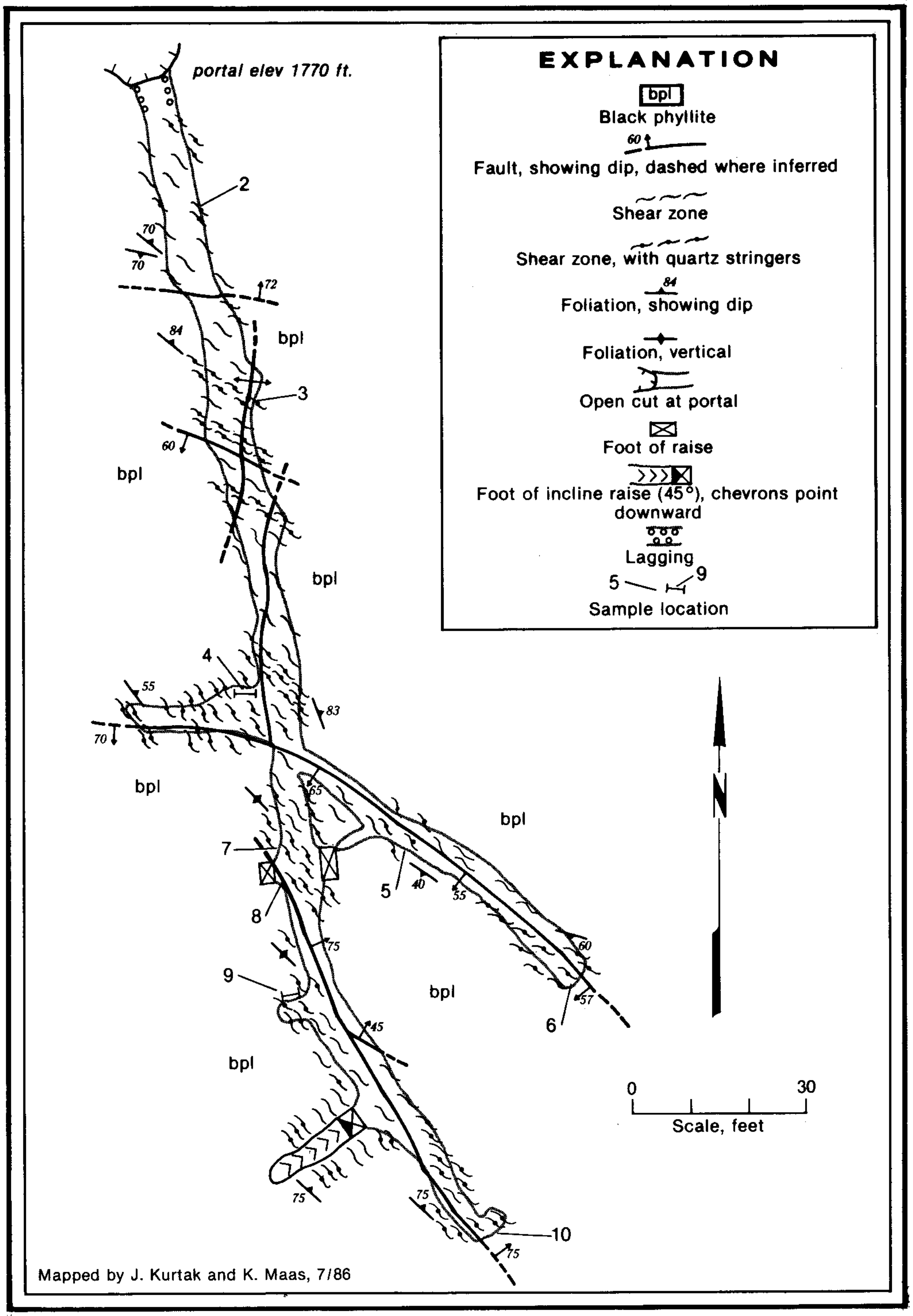

Figure D-66.—E Pluribus Unum—No. 1 adit, showing geology and sample locations.

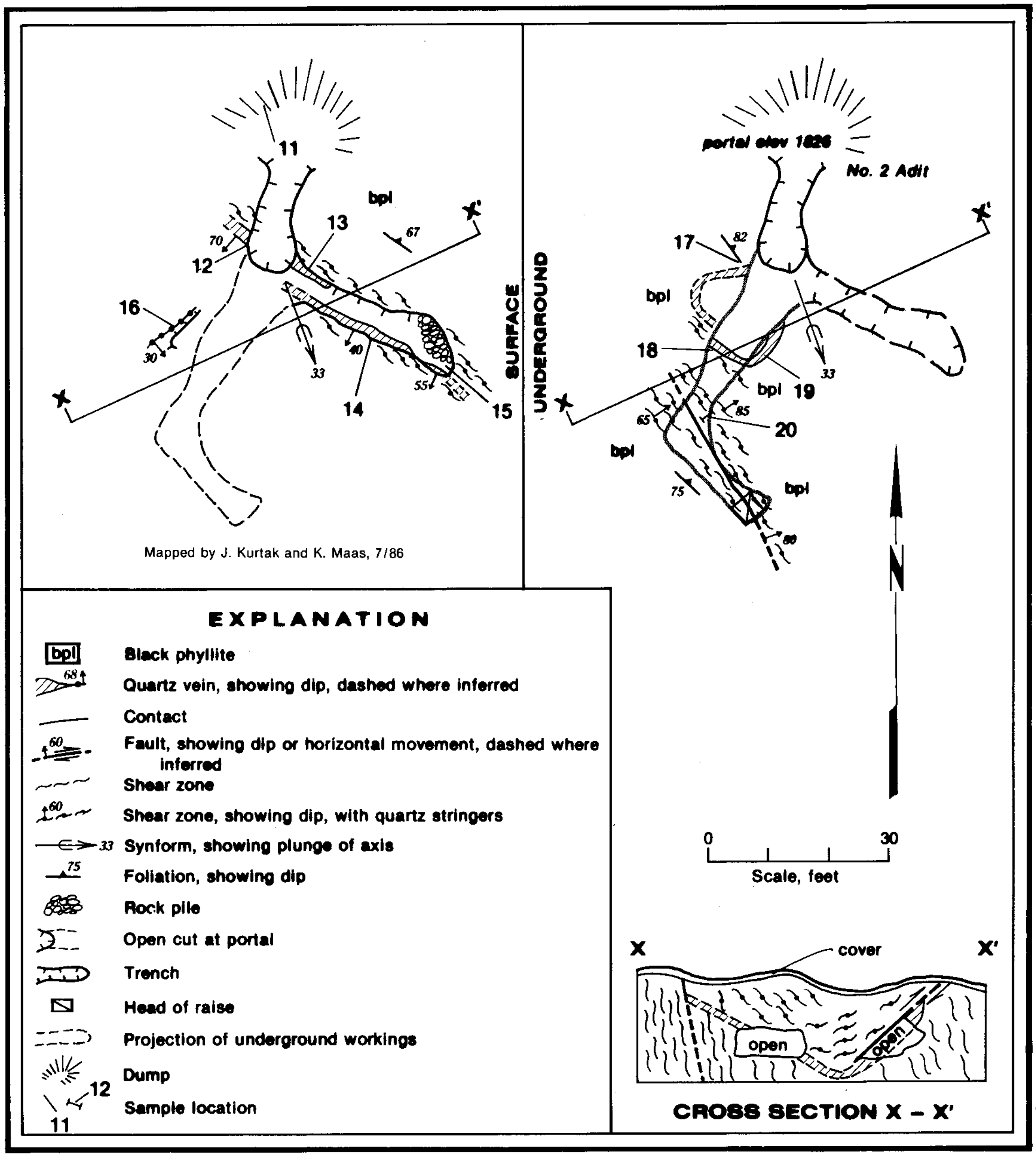

Figure D-67.—E Pluribus Unum—No. 2 adit, showing geology and sample locations.

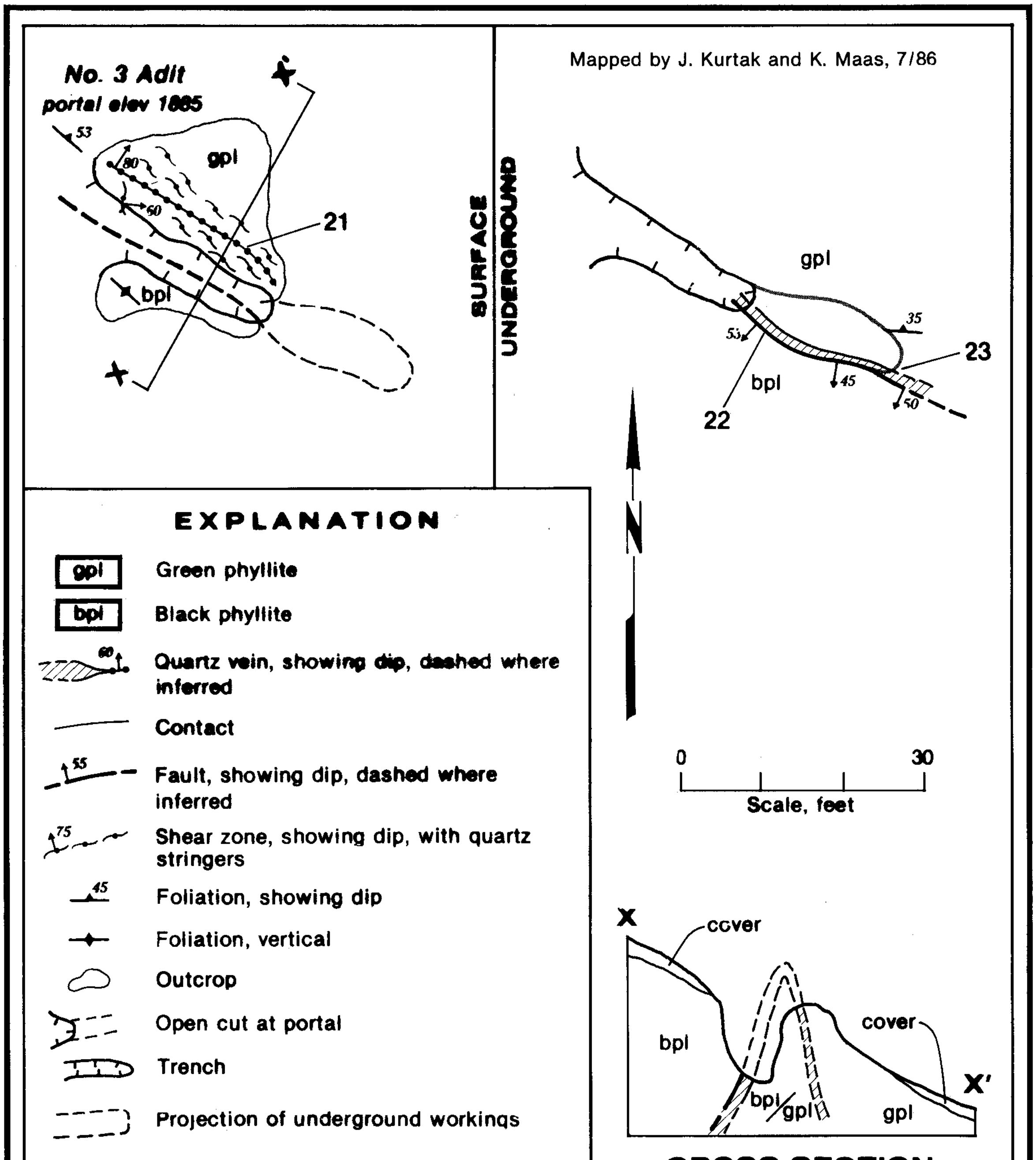

Figure D-68.—E Pluribus Unum—No. 3 adit, showing geology and sample locations.

Recommendations

Drilling between adit No. 2 and adit No. 3 would help determine the continuity of the south limb of folded vein. Trenching along the northern limb of the fold seen in adit No. 2 would help delineate the vein. Drilling to test downward extension of veins and nose of the synform exposed in adit No. 2 would also help identify the potential for economic mineralization.

MAS No.
21120037

References

D-43, D-62, D-63, D-83, D-95, D-96, D-97, D-98, D-99, D-102, D-146, D-157, D-159

JULIA GROUP
(including Julia, Noonday, Puzzler, and Cascade)

Production

There has been no production from the Julia group of claims.

History

William Ripstein and John Riggins discovered gold in Yankee Basin in 1887 (figs. D-4, D-60, D-69). A year later, Archer and Moran located a "very good claim" in Yankee Basin and were doing assessment work. While Archer and Moran were working, John Heid and Jim Smith staked additional claims. Thomas Nowell bought the Heid and Smith claims, hauled in a large amount of hydraulic piping and equipment and tried to sluice the surface. Nowell's venture failed and Yankee Basin was idle until 1903.

In 1903, Milo Kelly and Thomas Smith stumbled upon an outcrop "so rich that they were getting $150-$500 worth of gold each day." Another strike was made by Frank Bach and his partners nearby, and Yankee Basin became the site of a rush.

In 1904, John Heid acquired the Julia Group of claims which included the Cascade, Noonday, Puzzler, and Dividend (discussed separately, p. 115). Heid concentrated on opening the Dividend lode, but exploration and minor development did occur on the other claims during this year. The last recorded activity, until the 1980's, included the sinking of an inclined shaft by 1912 on the Cascade lode.

Whelan Exploration staked the area in 1980 and leased the ground to Placid Oil and then to Houston Oil and Minerals, both of whom drilled the Canyon Creek area (*D-97*).

Workings and Facilities

Two open adits (an 18-foot adit at 2,490 feet elevation and an 8-foot adit occurs at 2,570 feet elevation), a caved inclined shaft and prospect pit at 2,000 feet elevation, and many trenches and prospect pits were located on the prospect.

Bureau Investigations

The Julia group in Yankee Basin is underlain by NW-striking intercalated black phyllite, graphitic schist, and felsic phyllite. The felsic phyllite occurs high on the basin walls and can be traced intermittently for 2,000 feet across the basin. The felsic phyllite contains numerous quartz stringers and lenses that parallel foliation. The rocks in this area have undergone deformation as indicated by the variability in dip directions of the shear zones and crenulation folds.

Felsic phyllite is exposed at the portal of the Noonday adit at 2,490 feet elevation and, further east, a series of trenches at 2,450 feet and 2,280 feet elevation, respectively, expose both quartz lenses and stringer zones in black phyllite. The quartz lenses, which are very discontinuous, contain minor amounts of pyrite, arsenopyrite, scorodite, and galena. Mineralized zones cut by the Noonday adit and trenches, 650 feet to the NW, may be along the same NW-trending shear zone that passes through the Canyon Creek workings to the north.

Sample Results

The Bureau mapped all the workings located in the area and collected a total of 28 quartz samples (figs. D-69 to D-73, D-75). Six samples were taken from the Julia claim area (fig. D-69. No. 1; fig. D-70, Nos. 2-6), two of which contained 3.6 ppm and 20.2 ppm gold. The richer gold sample also yielded 12.0 ppm silver.

A total of 15 samples were taken from the Noonday workings and outcrops (fig. D-69, Nos. 8-9, 23; fig. D-72, Nos. 13-19; and fig. D-73, Nos. 24-28). Of these, three contained significant gold values: 12.4 ppm, 18.5 ppm, and 50.3 ppm. The highest silver values, 7.0 ppm and 6.3 ppm, came from the two samples with the highest gold values. The best sample from the Noonday prospect came from a 10-foot by 25-foot quartz lense exposed by trenching at 2,280 feet elevation (fig. D-72, No. 17).

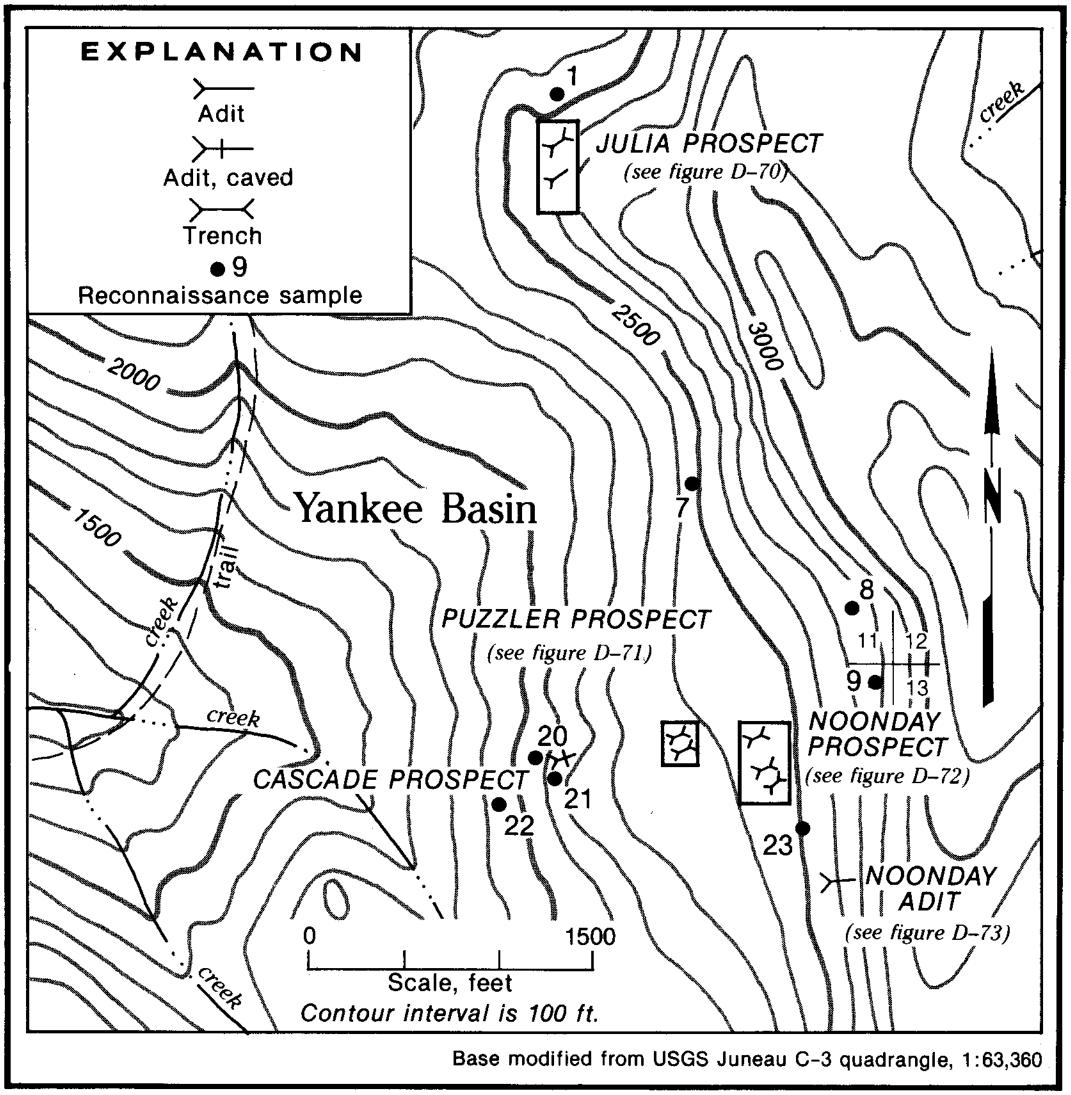

Figure D-69.—Yankee Basin: Julia group—prospect locations and reconnaissance sample locations.

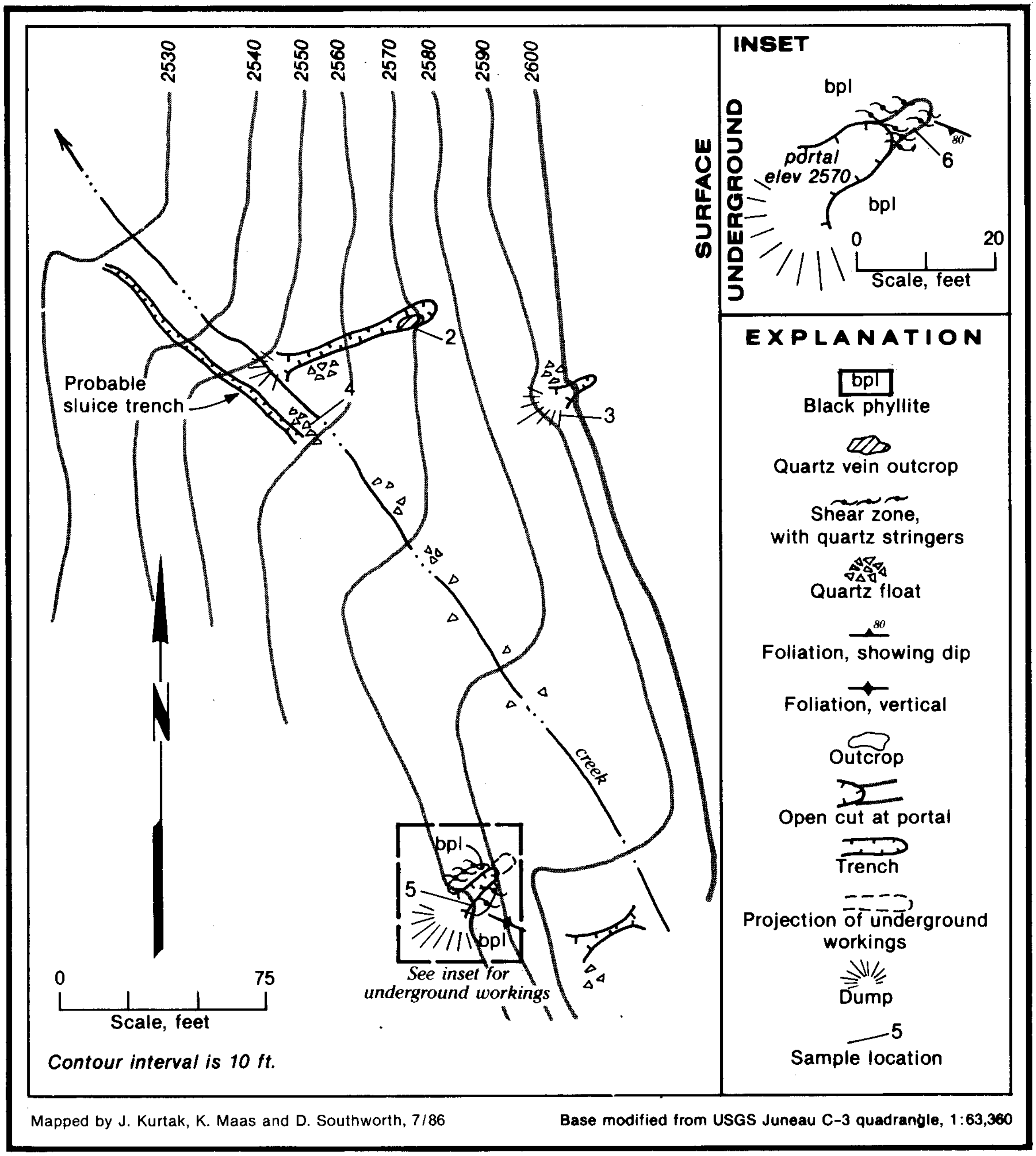

Figure D-70.—Julia prospect, showing geology and sample locations.

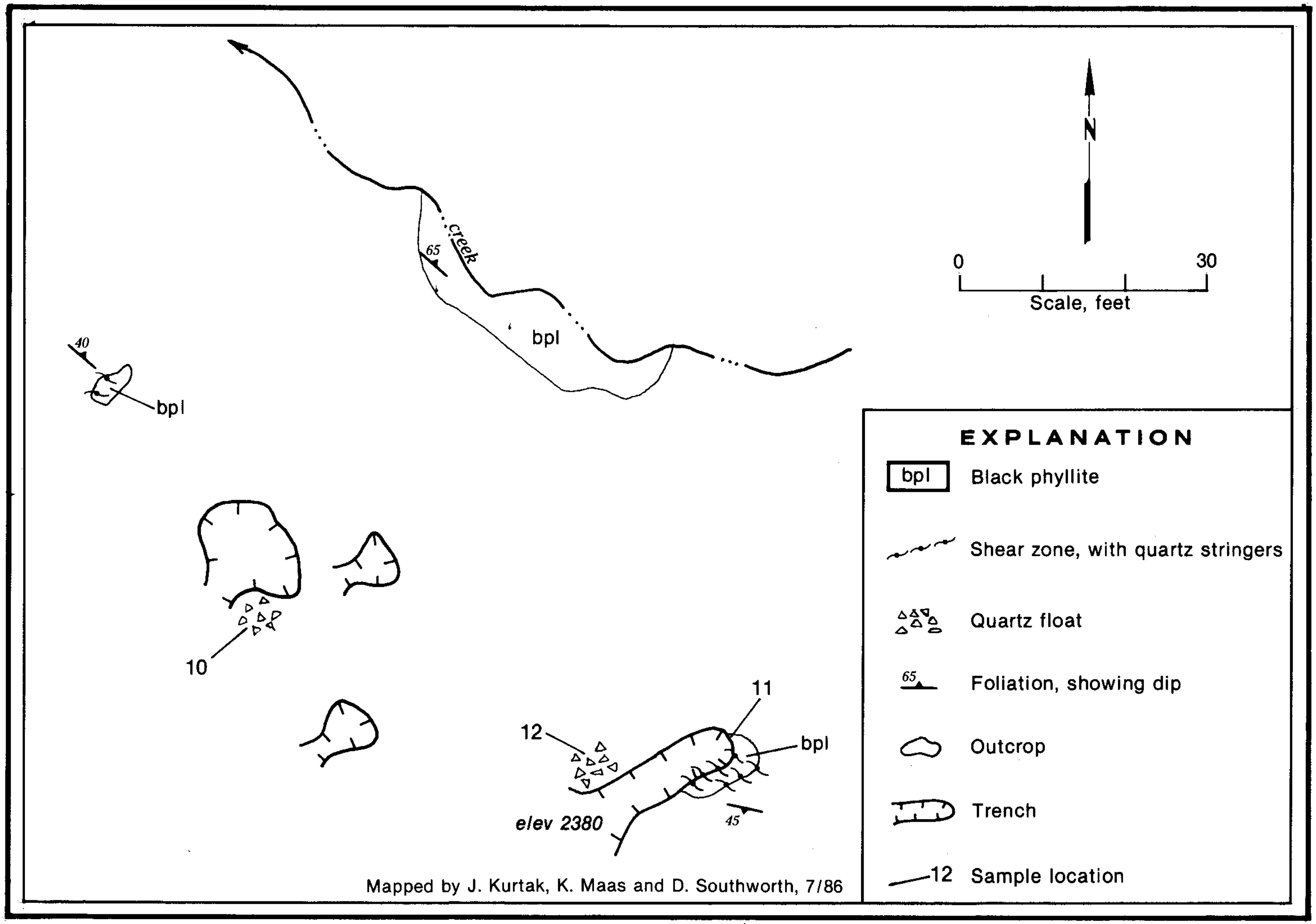

Figure D-71.—Puzzler prospect, showing geology and sample locations.

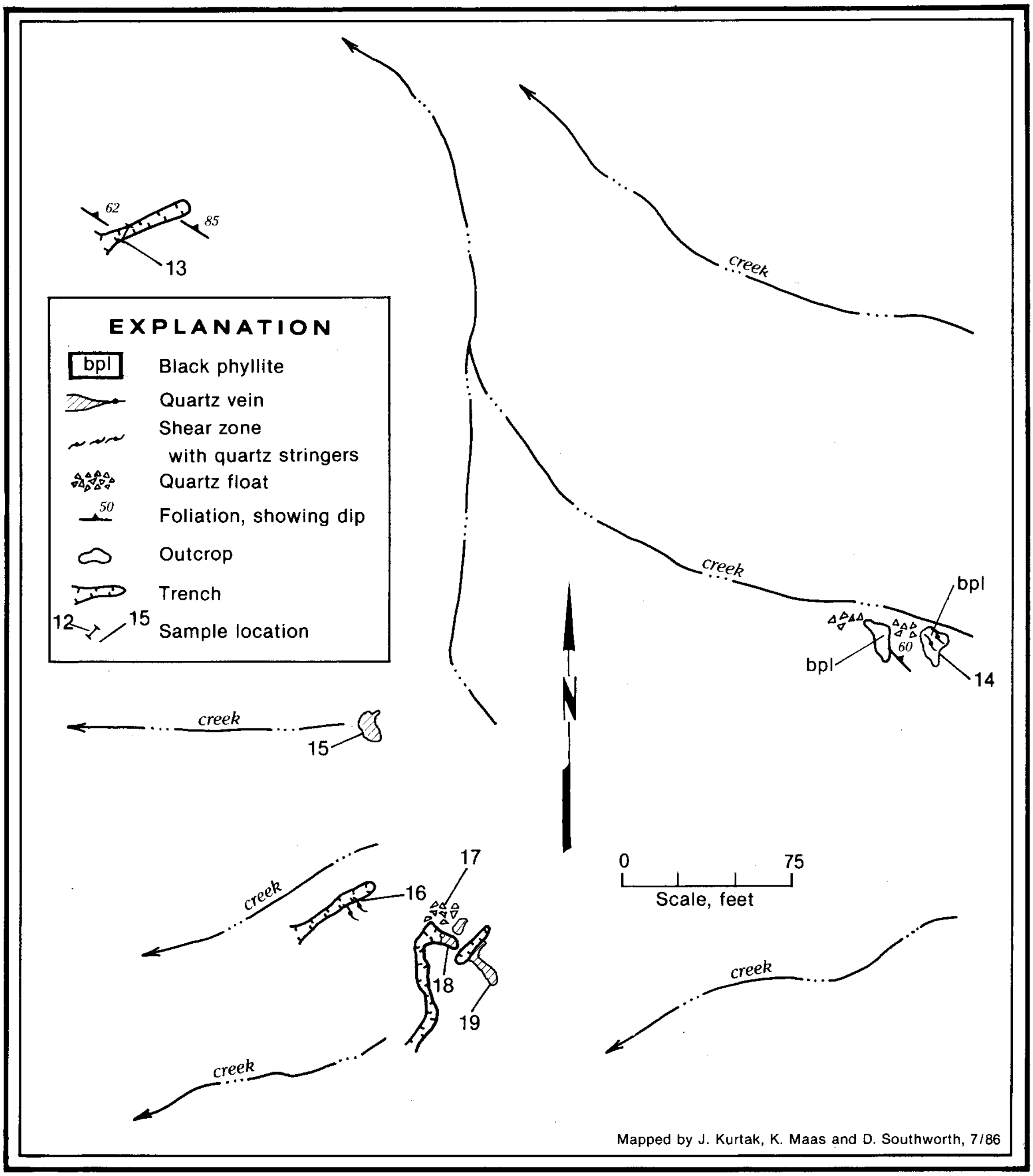

Figure D-72.—Noonday prospect, showing geology and sample locations.

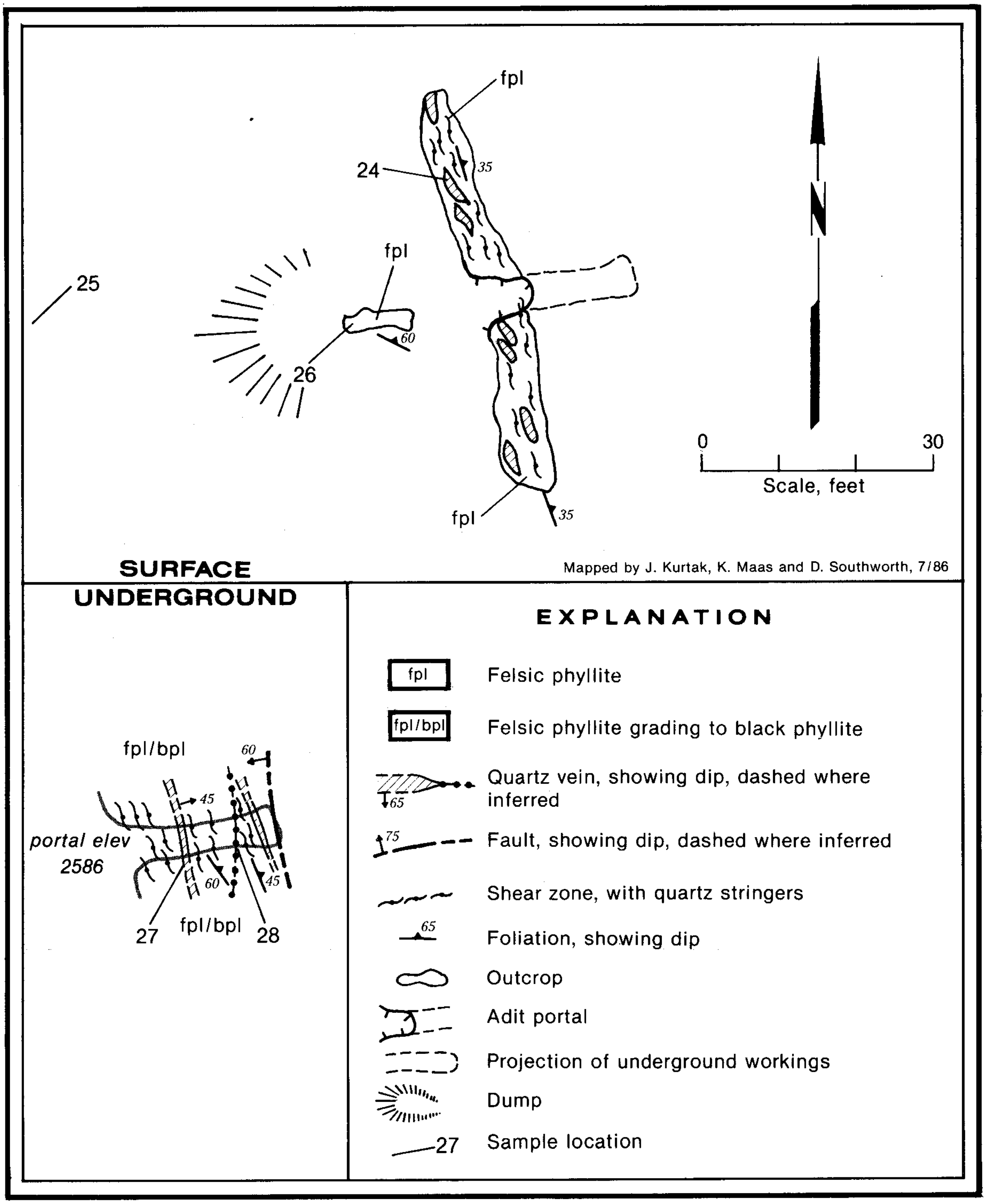

Figure D-73.—Noonday adit, showing geology and sample locations.

Four samples were taken from the Puzzler prospect (fig. D-69, No. 7; fig. D-71. Nos. 10-12). One sample contained 6.2 ppm gold with 4.7 ppm silver (fig. D-71, No. 10) and another carried 4.0 ppm silver.

Of three samples collected on the Cascade prospect (fig. D-69, Nos. 20-22), one taken from a trench on the upper end of the claim contained 4.3 ppm gold and 4.4 ppm silver.

Resource Estimate

The gold values from the 2,280-feet elevation workings at the Noonday prospect would give that area a moderate mineral production potential, but tonnages are probably quite small. A drill hole put down by Houston Oil and Minerals in the vicinity of the 2,280-feet showings crossed an 18-foot-thick zone of sheared phyllites containing quartz stringers with traces of pyrite. Assays of this zone are unavailable.

Recommendations

Previous drilling has shown that surface quartz exposures rarely extend to any appreciable depth. A major trenching program undertaken across strike of the local foliation at various intervals along strike may expose enough quartz veining to merit a detailed sampling program.

MAS No.
21120082

References

D-27, D-62, D-63, D-73, D-83, D-96, D-97, D-98, D-99, D-142, D-161

DIVIDEND PROSPECT

Production

There has been no recorded production from the Dividend prospect.

History

Mineralization in Yankee Basin was discovered as early as 1887 by Ripstein and Riggins (figs. D-4, D-60). Other claims were staked by Archer, Moran, John Heid, and Smith in 1888. The same year, Heid and Thomas Smith sold their claims to Thomas Nowell, who unsuccessfully tried a hydraulic operation in the late 1880's. After Nowell's departure, there was no further activity for more than 10 years.

In 1903, Thomas Smith, this time with Milo Kelly, discovered new veins which led to staking of the Julia, Cascade, Puzzler, Noonday, and Dividend claims. John Heid obtained this group of claims in 1904 and put men to work exposing the veins. In 1905, Pete Early and John McWilliams were driving the Standard Crosscut on the Dividend property. This effort continued in 1906 and by late November 1907, the adit had reached a length of 903 feet with 250 feet of drifts.

In 1910, Early reported that drifts from the long adit were in high-grade ore. After this announcement, however, the stories and reports stopped. The crosscut that was supposed to undercut the Dividend, Cascade, and Julia lodes was never completed. The Yankee Basin claims (Dividend, Julia, Cascade, Noonday, Puzzler, Rex, Joyce-Jensen) were consolidated with the Eagle River Mine in 1915 in an attempt to promote the area but there was little interest (*D-97*).

Workings and Facilities

The Standard Crosscut on the Dividend, reopened by Houston Oil and Minerals and the Bureau, contains 1,100 feet of accessible workings. In addition, a 6-foot deep water-filled shaft and a hydraulic giant and piping occur 0.2 miles up the creek from the Standard Crosscut. A short crosscut and shaft reported to be 235 feet above the portal (*D-62*) were not located.

Bureau Investigations

The geology of the Dividend claim area consists of an intercalated sequence of black phyllite and greenstone trending 130° and dipping 50° to 70°NE. The greenstones and phyllites are locally sheared and altered to chlorite schist and graphitic schist, respectively. Shear zones are up to 25 feet wide and roughly parallel foliation.

The shears contain quartz stringer zones. A drift from the Standard Crosscut along the contact between metavolcanic rocks and sheared phyllites exposes a stringer zone at least 10 feet wide. The stringers average 1 inch in width but, locally lenses up to 1 foot wide occur. The zones carry minor amounts of pyrite and are reported to also carry arsenopyrite, galena, and free gold (*D-62*). Adjacent to the contact, the greenstones are altered to a tan color.

Sample Results

When first located, the Standard Crosscut had been caved for many years. Bureau personnel and employees from Houston Oil and Minerals reopened, mapped, and sampled the workings (fig. D–74, Nos. 8–16). Nine samples were collected from the quartz stringer zones in the adit. The highest values obtained were 2.1 ppm and 3.1 ppm gold across a 5-foot and 7-foot-wide zone, respectively.

The east-west-trending creek bottom just north of the tunnel exposes bedrock which was similar to that in the adit (fig. D–74, Nos. 1–7). Two samples were taken over the adit itself, one of which contained 2.6 ppm gold, and four others were collected near a flooded shaft sunk on the same stringer zone exposed in the drift from the Standard Crosscut (fig. D–74, Nos. 4–7). On the surface, the stringer zone is 8 feet wide and contained gold values of up to 6.4 ppm (No. 6). A riveted water pipe and an old hydraulic nozzle were found along a side tributary to the main channel at 1,750 feet elevation. Evidence of ground sluicing could be seen near this location. Panning on the main creek below this site produced several very fine gold colors.

Resource Estimate

The low gold concentrations obtained from samples taken in the Standard Crosscut give this property a low mineral production potential. The 8-foot-wide exposure in the creek bottom yielding 6.4 ppm gold has enough width to warrant further work, but the continuation of this zone encountered underground contained low gold values when sampled.

Recommendations

Digging trenches in the area is recommended to further expose the creek bottom showings and then sample any quartz showings.

MAS No.
2112082

References

D–62, D–63, D–83, D–96, D–97, D–98, D–99

REX MINE

Production

Reported production was $3,000 worth of gold (145 ounces of gold) (*D–62*).

History

Gold-bearing quartz veins were found in Yankee Basin in 1887 by Ripstein and Riggins (figs. D–4, D–60). The next year, more claims were staked by Archer, Moran, John Heid, and Thomas Smith. That same year, Thomas Nowell attempted unsuccessfully to sluice the surface. After Nowell's attempt, the Yankee Basin area was essentially dormant until 1903 (*D–97*).

The Rex deposit was discovered by Pete Early in 1903. In 1904, a 15-foot adit was driven to intersect surface showings and a high-grade pocket of ore was encountered. This pocket yielded $3,000 (approx. 145 ounces) in gold and was the only production reported from the Yankee Basin area (*D–62*). The area was not looked at again until the 1980's, when Houston Oil and Minerals did some sampling in the area as part of their Yankee Basin evaluation.

Workings and Facilities

A 15-foot adit was reported by Knopf (*D–62*) and at least five trenches occur on the property.

Bureau Investigations

According to Spencer (*D–130*), the Rex property is located several hundred feet west of a phyllite-greenstone boundary at an elevation of 2,800 feet. A quartz-calcite lens crosscutting the foliation of the encompassing greenstone was the source of the paying ore. This locality was not discovered. Country rock in the vicinity of the known trenching consists of 150°-trending, NE-dipping silicified phyllite, and fresh black phyllites. These rocks contain quartz veins up to 3 feet wide and quartz stringer zones up to 6 feet wide. The quartz stringers zones are exposed in the trenches for only short distances, but the general strike of the veining appears consistent between trenches. In some locations, only quartz float was found.

Sample Results

The Bureau mapped and sampled the trenches on the property (fig. D–75) but was unable to locate the adit where production occurred. Twelve samples (fig. D–75, Nos. 1–12) were collected and the highest values were 0.2 ppm gold.

Resource Estimate

The low gold values from samples of the quartz veins and the silicified phyllite give the property a low mineral production potential.

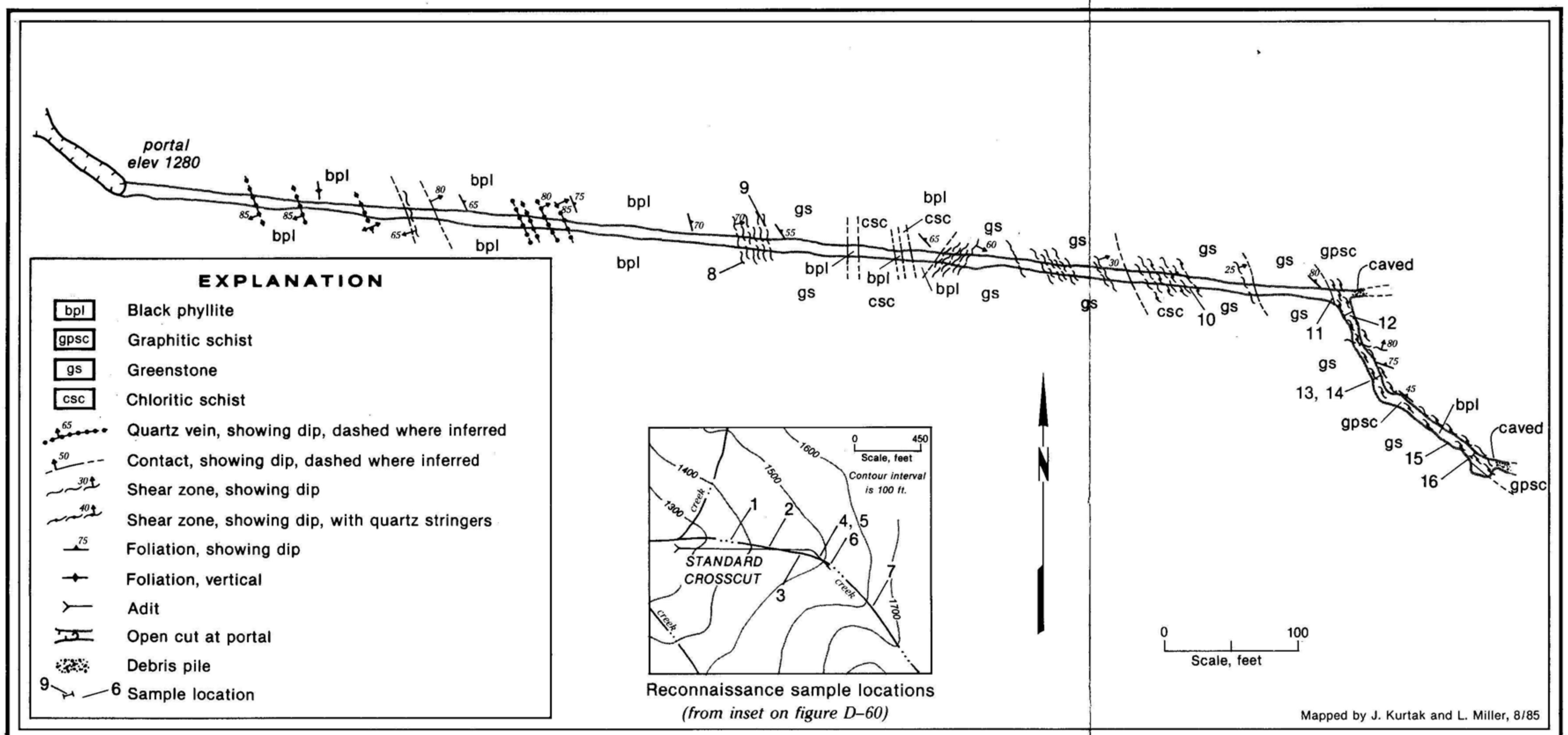

Figure D-74. — Dividend: Standard Crosscut, showing geology and sample locations.

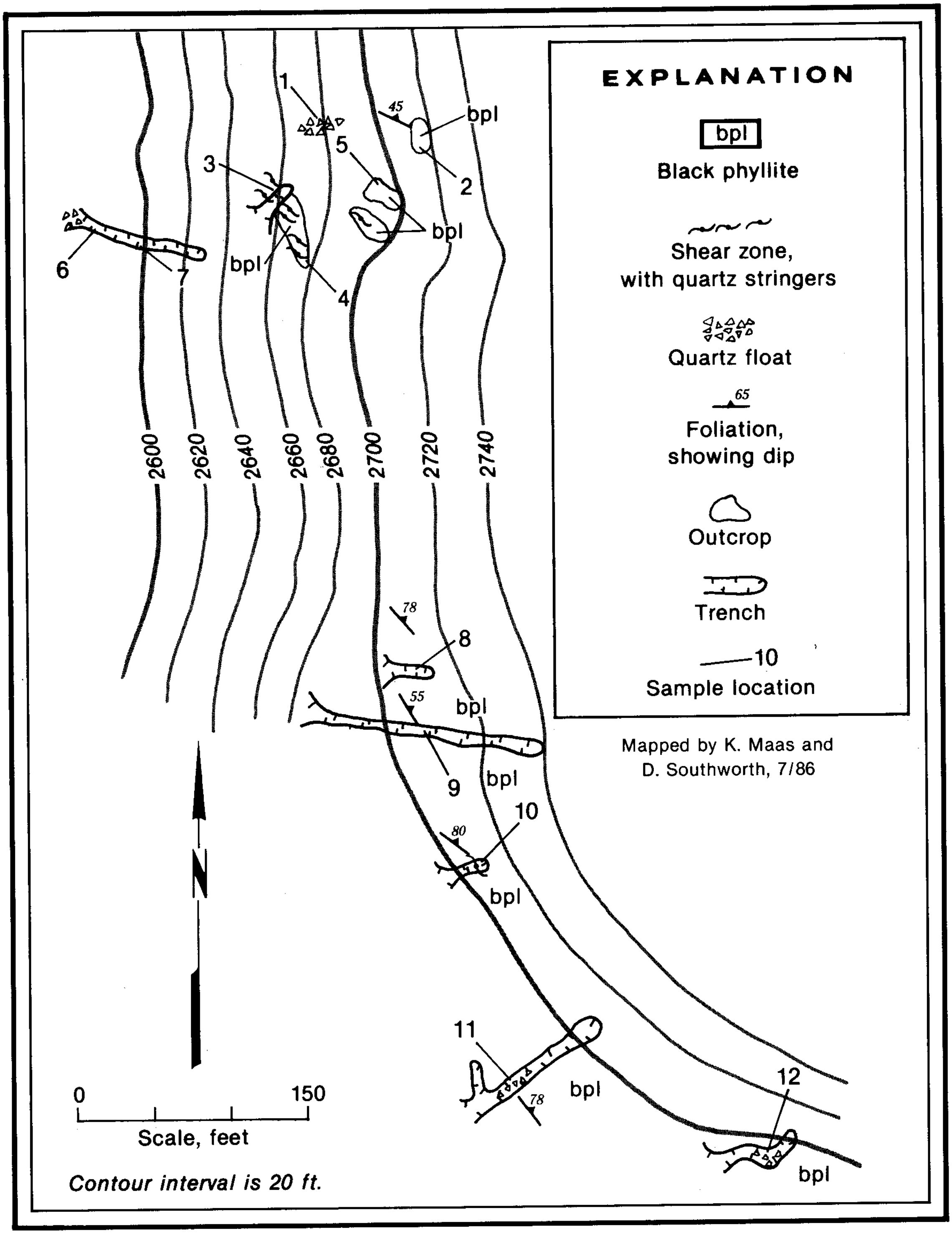

Figure D–75.—Rex Mine area, showing geology and sample locations.

Recommendations

The immediate area has been thoroughly trenched and samples taken show low gold values. The best method of assessment for this area is to continue trenching toward the Noonday and Puzzler showings at regular intervals along strike to determine if sufficient quartz veining or stringer zones exist to consider a low-grade bulk tonnage surface operation. The Yankee Basin area should be looked at as a whole and not as individual prospects as high-grade pockets may exist, but they can not be relied on to support any significant mining operation.

MAS No.
21120082

References

D-62, D-63, D-96, D-97, D-98, D-99, D-130

AURORA BOREALIS MINE

Production

A total of $6,000 of gold was reportedly mined (equivalent to about 300 ounces of gold) from both the Aurora Borealis and Bessie mines. The Bureau estimated that each mine produced approximately half of that figure.

History

The Aurora Borealis Mine was discovered late in the fall of 1896 by Pete Early, George Stucky, Dave Conkel, and the McWilliams brothers (fig. D-4). In 1897, after assays ranging from $8 to $464 were obtained, Early went south to make arrangements for a 5-stamp mill, while the others began construction of a 2-mile road between Yankee Cove and the mine.

By January 1898, the mill building had been completed and the stamps were being emplaced. Some gold was evidently recovered using the crusher and shaker table but installation of the stamps was never finished. The base was hoisted onto the platform but the stamps were not installed. A 10-stamp mill for the Bessie property was hauled up to the Aurora Borealis millsite in 1903 but was never uncrated.

Four tunnels were driven on property during its development. "Several thousands dollars" worth of gold were reportedly produced (*D-130*) but this figure includes production from the adjacent Bessie Mine.

John McWilliams bonded the Aurora Borealis in 1913 and Joe Green restaked the mine area in 1945 but neither did much work. Noranda Exploration staked claims in the area in 1981 but relinquished them after an unsuccessful exploration program. Roger Eichman restaked the area in 1987 and leased the prospect to Monument Resources in 1988. The company drilled the prospect that year (*D-97*).

Workings and Facilities

Two open adits, with 260 feet and 43 feet of workings, two caved adits, an uncompleted stamp mill, remains of a hydropower plant, and two cabins are on the property. An overgrown corduroy roadway leads 2.5 miles west from the mine to Yankee Cove.

Bureau Investigations

The veins at the Aurora Borealis Mine occur in black phyllite adjacent to a thick unit of volcanic metaconglomerate that has been folded on a large scale. Both rock units trend roughly N-S, dipping west. The quartz vein exposed in the underground workings trends approximately 045° and has an average dip of 20°NW (fig. D-76). The vein both follows and crosscuts the foliation of the phyllites near the metavolcanic contact. This same contact was previously reported in the now-caved adit No. 3. The contact follows a roughly north-south trend and lies just west of the stream draining the area. This is the same contact cut by adit No. 1 at the Bessie Mine, 0.2 miles to the SW. The mineralized vein at the Aurora Borealis is hosted in phyllites as opposed to a volcanic metaconglomerate at the Bessie. The vein is exposed in the No. 2 adit for 230 feet along strike and at one point is offset 2 feet by a reverse fault.

The vein in the No. 2 adit varies in width from a few inches to 3.6 feet, and commonly branches into many anastomosing quartz veinlets between phyllite partings. The vein follows a shear zone in the phyllites. Locally, tension fractures occur in the vein and these are filled with quartz, carbonates, and phyllite partings which impart a ribbon texture to the vein. The quartz contains up to 2% pyrite and arsenopyrite with traces of galena. Locally, sulfides are concentrated along vein margins. The phyllites contain unusual ellipsoidal masses resembling footballs in size (6 inches by 10 inches) and shape. These features are most likely the result of shearing because the long axis of the concretions is subparallel to the foliation of the enclosing rocks.

Sample Results

The Bureau located, mapped, and sampled two open adits and located a third caved adit (fig. D-77). No evidence could be found of a reported fourth adit. One sample was taken from No. 1 adit (fig. D–77, No. 2), nine samples were collected from the No. 2 adit (fig. D–77, Nos. 3-11), and a single sample was taken from an outcrop of altered metavolcanic rock (fig. D–77, No.1). Vein samples from adit No. 2 contained up to 11.3 ppm gold over a 2.7-foot vein width and had a weighted average of 4.1 ppm gold over 2.0 feet. Other samples from the Aurora Borealis area contained no significant metal values.

Resource Estimate

Indicated

Area	Tonnage	Au (oz/t)	Avg. vein width (ft)
Adit No. 2	1,500	0.12	2.0
Over Mining Width	2,000	0.08	3.0

This area has a moderate mineral development potential because of gold grades, resources, and untested extensions of mineralized veins.

Recommendations

Opening and resampling the caved workings and drilling untested vein extensions is recommended to determine extent and grade of vein.

MAS No.
21120076

References

D–62, D–63, D–96, D–97, D–99, D–106, D–120, D–130

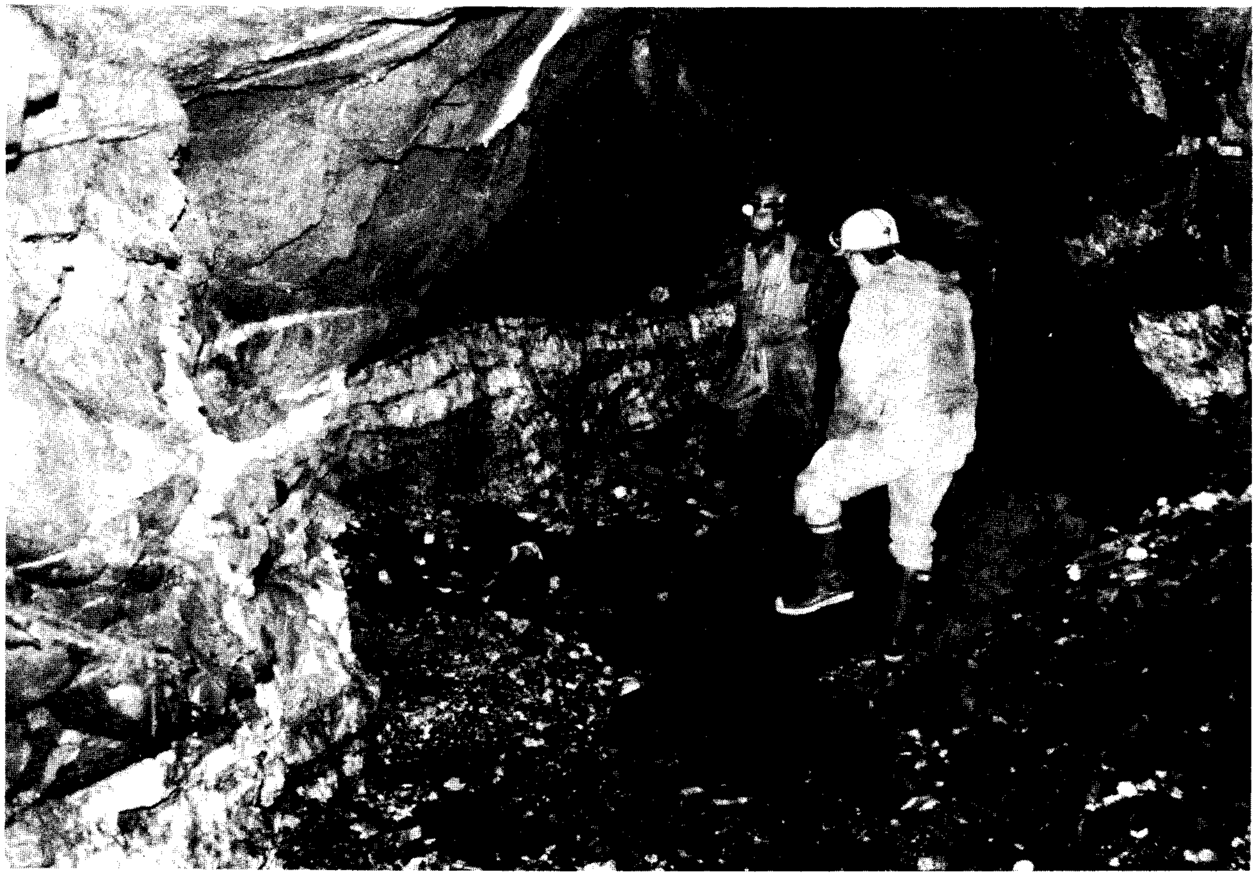

Figure D–76.—Gently dipping quartz vein at the Aurora Borealis Mine.

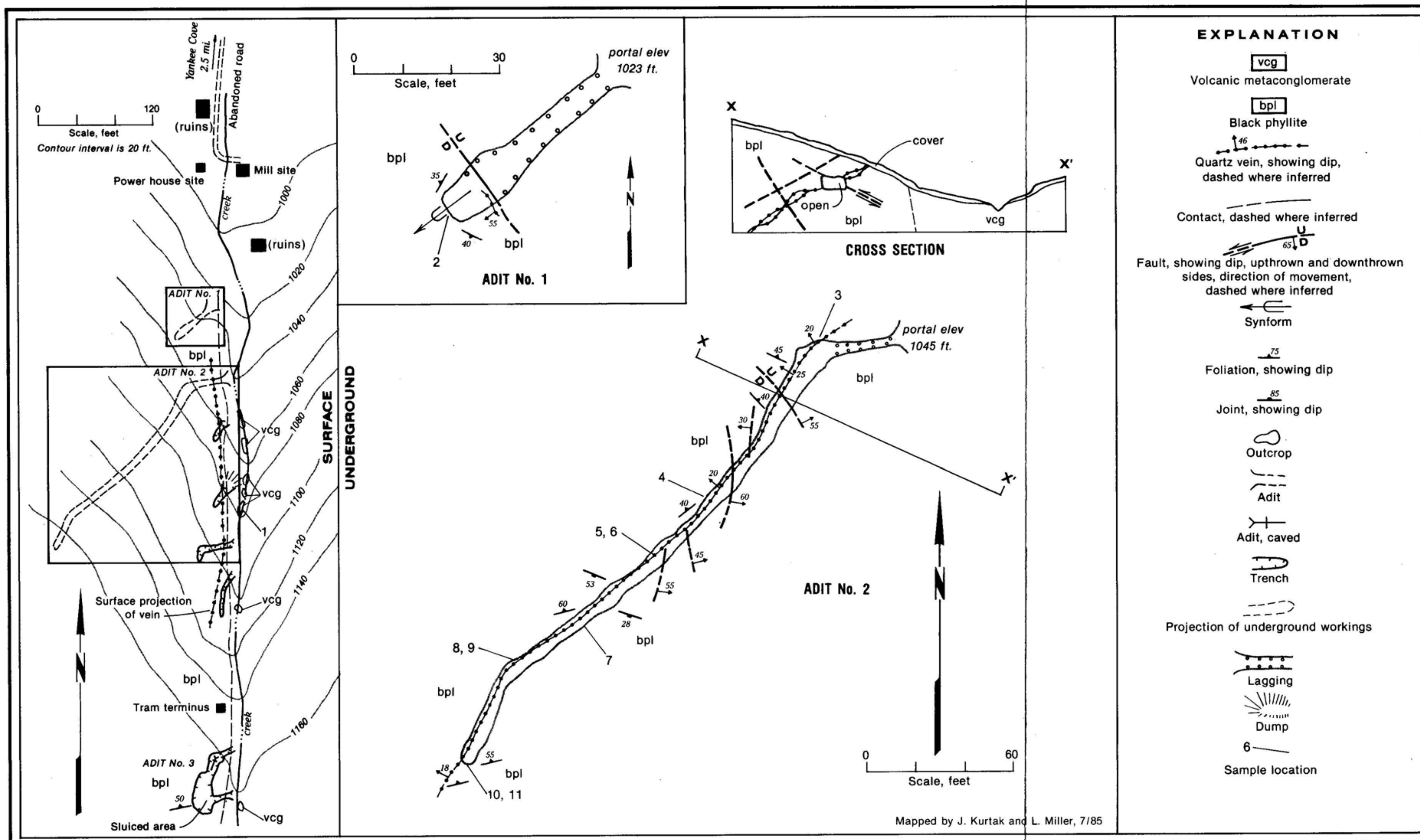

Figure D-77. — Aurora Borealis, showing geology and sample locations.

to the regional trend of the enclosing rocks and is similar to many other metavolcanic-hosted veins throughout the Juneau Gold Belt. The Bessie vein can be traced intermittently on the surface and underground for a distance of 500 feet along strike and 140 feet vertically. The vein appears to be offset left-laterally between the two adits.

The Bessie vein averages 1 foot in thickness, but attains widths up to 2 feet in adit No. 1. In this same adit a raise followed the vein 45 feet vertically to a point under a caved shaft driven from the surface. The vein contains ribbon structures, up to 10% pyrite, arsenopyrite, and a trace of galena. Sphalerite is also reported (*D-62*). The adjacent wallrock has been partially altered to sericite and ankerite.

Sample Results

The Bureau mapped the workings at the Bessie Mine and collected 21 samples (figs. D-79 to D-81). Six samples from adit No. 1 (fig. D-81, Nos. 16-21) had a weighted average of 6.8 ppm gold over 1.4 feet and 11 samples from adit No. 2 (fig. D-80, Nos. 5-15) averaged 1.3 ppm gold over a vein width of 1.1 feet. The highest gold concentrations were found in the trenches in the vicinity of the caved shaft near adit No. 1 (fig. D-79, Nos. 1-4). A sample from the shaft dump contained 33.4 ppm gold and two of the trench samples yielded 8.3 and 14.5 ppm gold.

Resource Estimate

The following estimate was derived from Bureau sampling and mapping:

Indicated Resources

Area	Tonnage	Au (oz/t)	Avg. vein width (ft)
Adit No. 1	1,088	0.2	1.4
Adit No. 2	970	0.04	1.1
Total resource projected between veins	19,000	0.2	3.0

These grades and tonnages indicate that the prospect has a moderate mineral potential for gold.

Recommendations

Drilling of vein extensions between adits and below adit levels is recommended.

MAS No.
21120077

References

D-62, D-63, D-96, D-97, D-98, D-99, D-106, D-120, D-130

ALASKA WASHINGTON PROSPECT

Production

There has been no reported production from the Alaska Washington prospect.

History

The Alaska Washington property was staked during the Bessie Mountain rush in 1897 by Judge J. Ostrander, H. Robinson, and H. Shepard (fig. D-4). A 150-foot-long tunnel and surface stripping was completed by Judge Ostrander and Milo Kelly in 1900. When activity increased at the nearby Bessie property in 1902, the owners of the Alaska Washington prospect continued to drive more tunnels and dig more trenches.

In 1904, H. H. Hunter began driving another tunnel expecting to cut the vein, after which he planned to set up a stamp mill. The mill was never built, and little more than assessment work was done at the Alaska Washington prospect through 1910, at which time the property was abandoned. Noranda Exploration restaked the entire Bessie Mountain area in 1981, but their efforts were unrewarded and they dropped the claims. The property is currently idle (*D-97*).

Workings and Facilities

Four adits, with 500 feet of workings, have been reported between the 1,800 feet and 2,500 feet elevations at the Alaska Washington prospect. A 100-foot adit with a caved upraise, a 120-foot adit, a caved adit, a caved shaft, and numerous trenches were located.

Bureau Investigations

The Alaska Washington veins cut volcanic metaconglomerates similar to those at the Bessie Mine, 0.6 miles to the NW. Like the Bessie vein, the Alaska Washington vein trends approximately 075° and dips steeply north. A fault curves through the prospect area separating the two open adits. The fault zone follows a south-flowing stream valley south of the Alaska Washington and follows the north-flowing stream at the Aurora Borealis Mine. Between these streams, the fault follows a conspicuous lineament trending 150°. Intersection of the fault

BESSIE MINE

Production

Several thousand dollars worth of gold was reportedly mined from both the Aurora Borealis and Bessie mines (*D-130*). The Bureau estimated that each mine produced approximately 150 ounces.

History

The Bessie was probably staked by J. Ostrander, H. Robinson, and H. Shepard during the summer of 1897 as prospecting activity expanded out from the initial claims staked at the Aurora Borealis the previous year (fig. D-4). In the spring of 1902, Pete Early and Frank Bach set up concentrating and amalgamating equipment at the old Aurora Borealis millsite to test ore from the Bessie adit. Initial results were promising, with enough gold recovered to pay their expenses, so that in July, Early, Bach, and others purchased the mine and formed the Bessie Gold Mining Co.

The new company employed 24 workers at the property extracting ore from the mine. Six hundred tons had been piled up on the dumps. The company planned to build a tram to the beach, enlarge the mill, and build a new road to the mine. The mine produced approximately $3,000 worth of gold during 1902 using a crusher and concentrating table at the mill at the Aurora Borealis.

A 10-stamp mill arrived at Yankee Cove below the mine in May, 1903. The machinery was hauled up the road to the Aurora Borealis millsite but was then abandoned, still packed in its wooden shipping crates. The company was evidently unsatisfied with the ore from their adit because the next year they drove another tunnel in search of better ore. A good strike was reported in Juneau's newspapers but work was halted after the 1904 season. Peter Taft acquired an interest in the property in 1908 and drove a 240-foot adit along the vein but did not do any additional work. Joe Green covered the property with the Wanderer Group of claims in 1945 and sampled the old workings. Noranda Exploration looked at the property in 1981 and most recently, Roger Eichman restaked the Bessie Mine area 1987. In 1988, Monument Resources did some exploratory drilling to test the Bessie vein (*D-97*).

Workings and Facilities

Two open adits, a caved shaft, and a series of trenches were located on the Bessie property. No. 1 adit has 270 feet of workings and No. 2 adit has 250 feet of workings including a 45-foot raise.

Bureau Investigations

The Bessie veins are hosted by indurated volcanic metaconglomerates composed of well-rounded pebbles up to 5 inches in diameter. The conglomerates have a sheared contact with interbedded graywacke and black phyllite to the west. The sheared contact trends approximately 150° and is paralleled by a shear zone that was cut in the No. 2 adit over the ridge to the east. In the No. 2 adit, the shear zone offsets the vein with 27 feet of right lateral movement.

Mineralization consists of cross-shear quartz veins that trend approximately 075° and dip steeply to the south (fig. D-78). This structure is nearly perpendicular

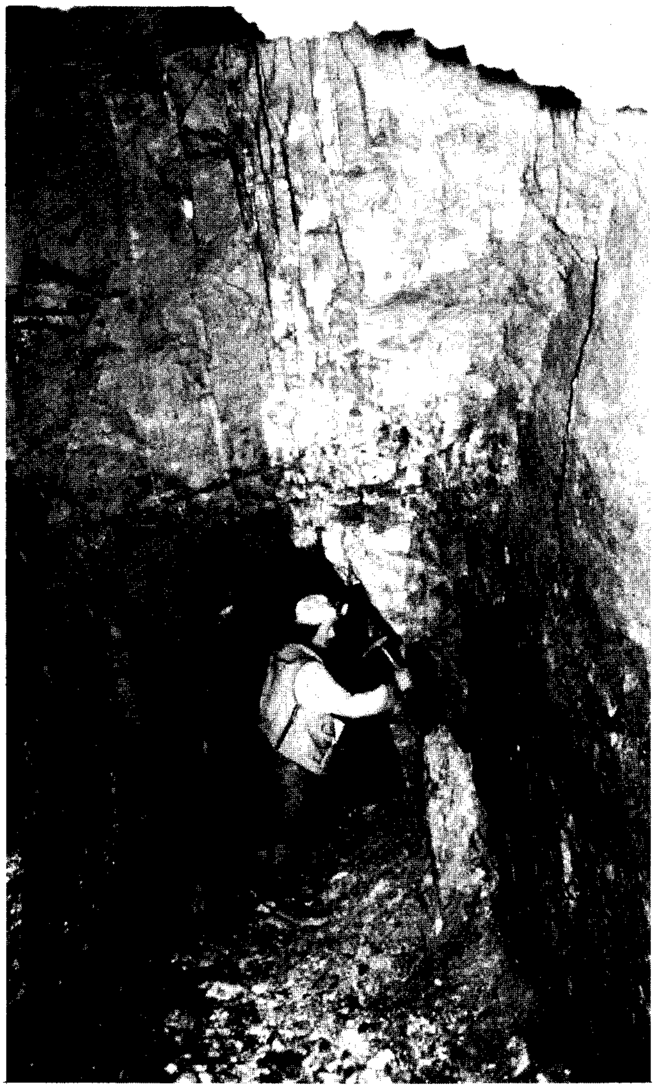

Figure D-78.—Near-vertical cross-shear quartz vein in the Bessie Mine.

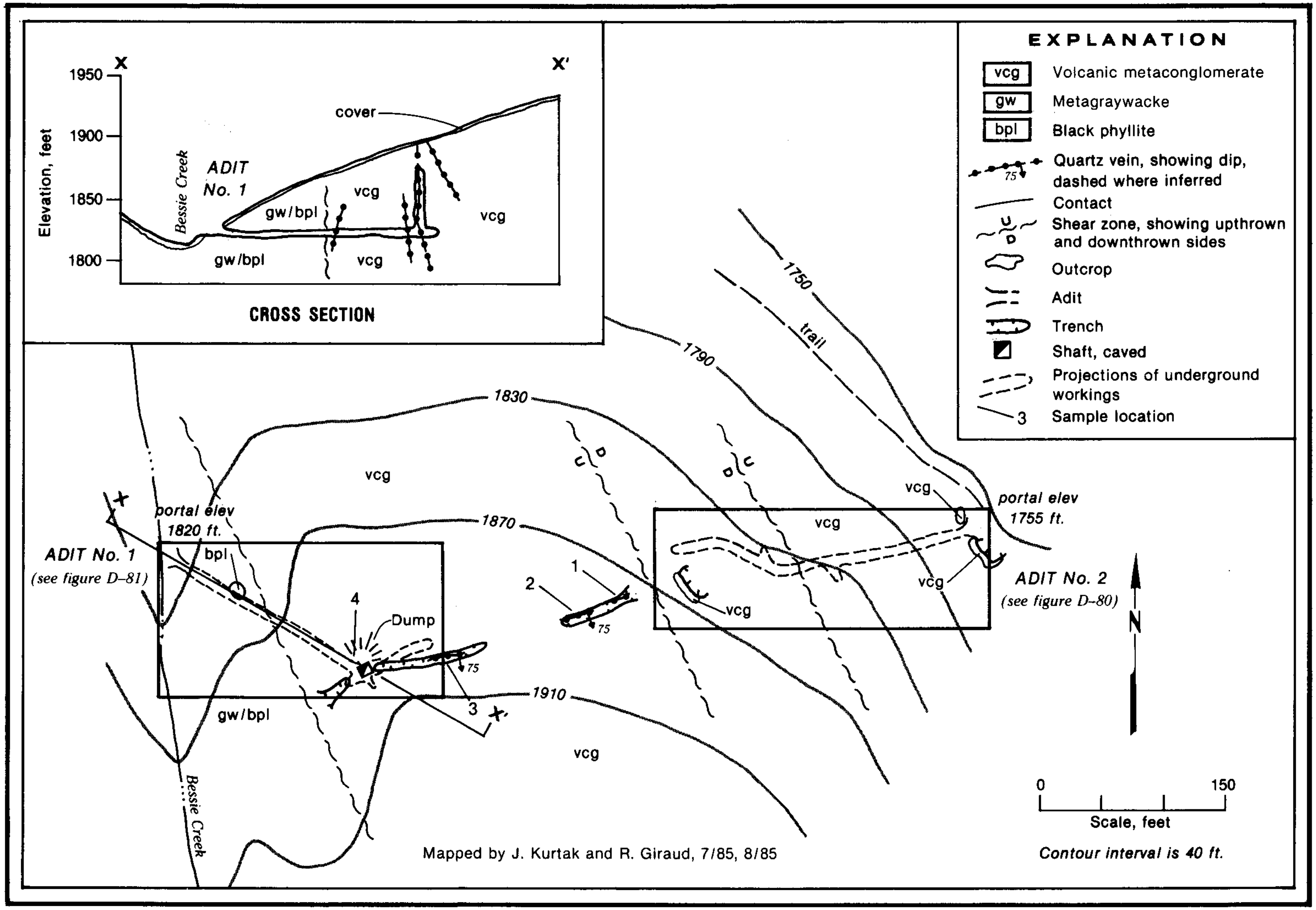

Figure D-79.—Bessie Mine—surface workings, showing geology and sample locations.

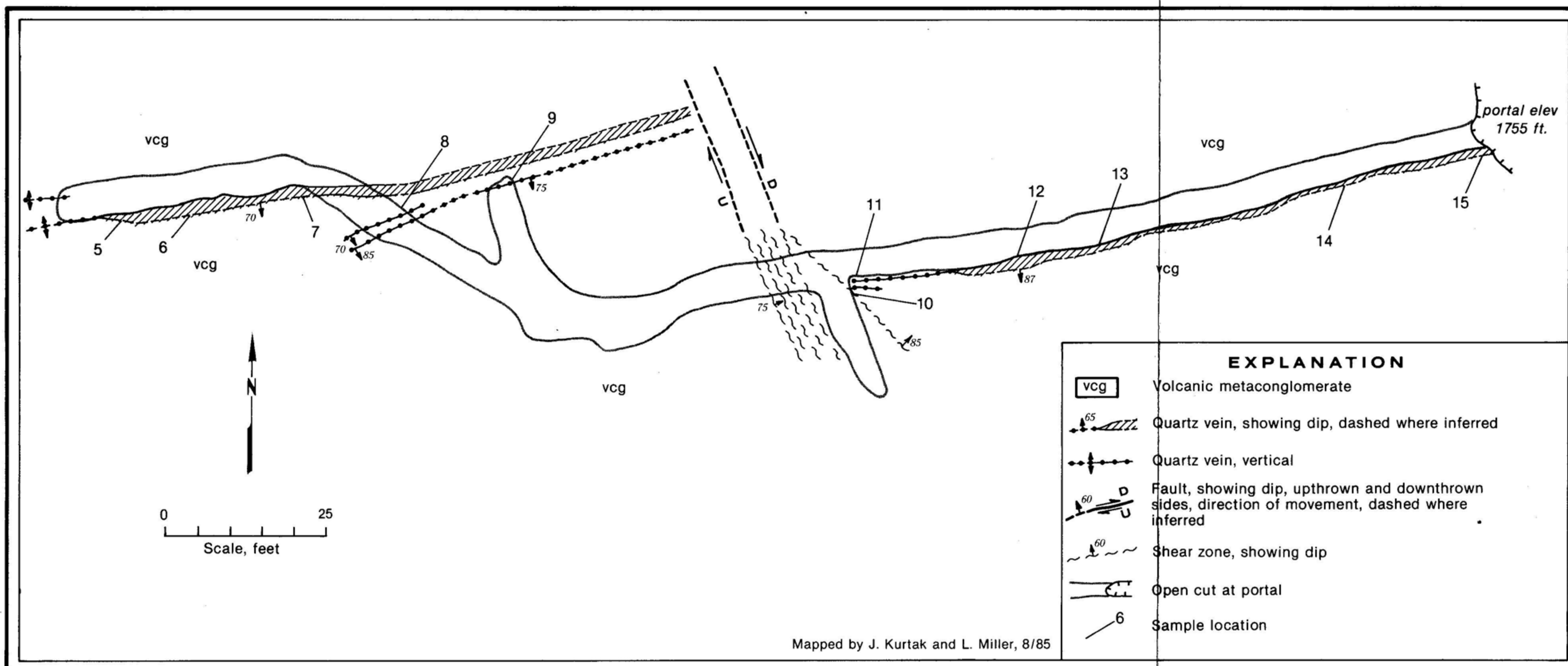

Figure D-80. — Bessie Mine - Adit No. 2, showing geology and sample locations.

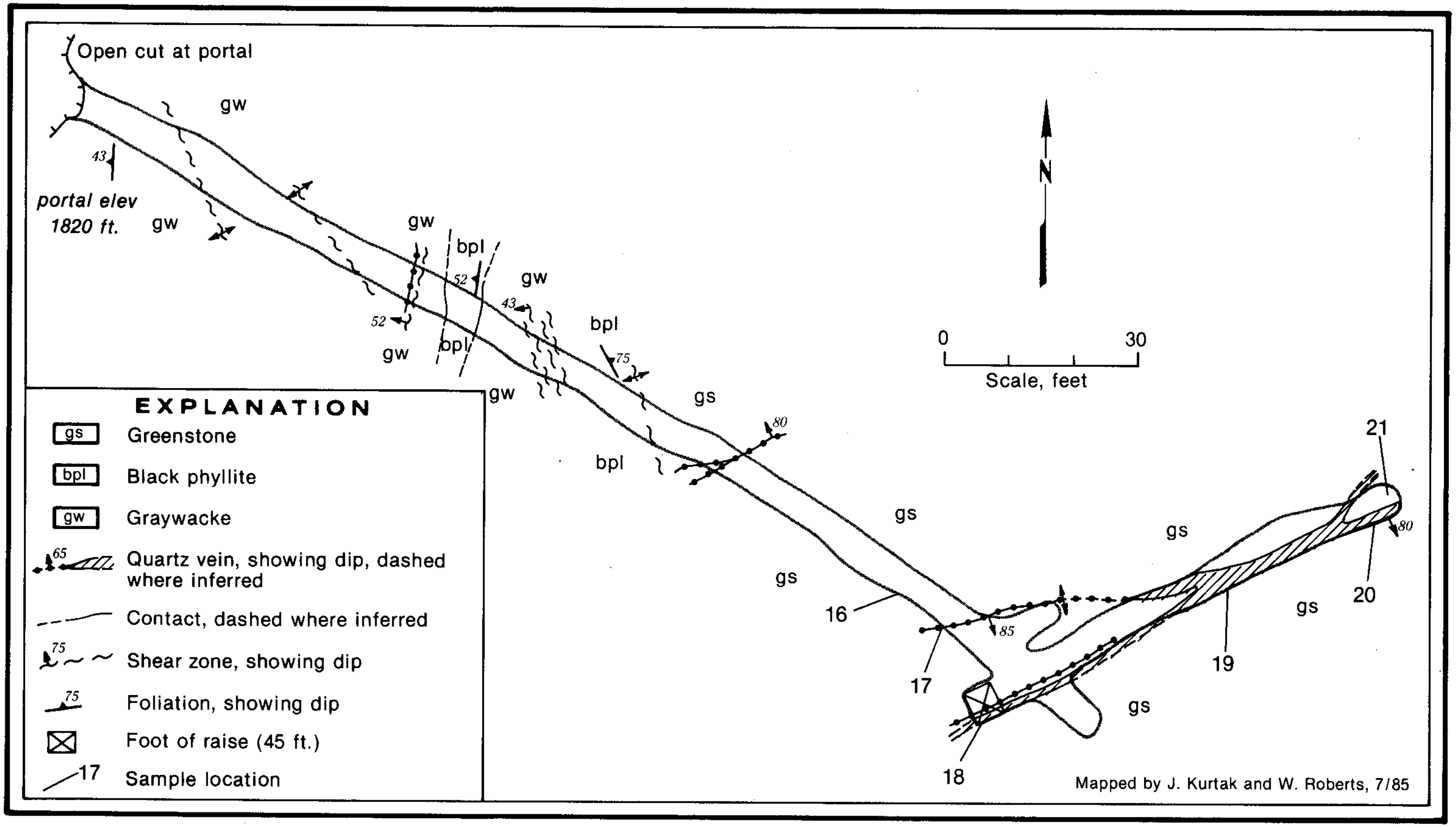

Figure D-81.—Bessie Mine—Adit No. 1, showing geology and sample locations.

and the vein is buried, but the trend of the old trenching that exposed the vein suggests approximately 100 feet of left-lateral offset of the vein. The veins exposed above and below the fault may also be separate but parallel veins.

The veins are cross-fracture type and follow faults and shear zones in volcanic metaconglomerate. The veins display shearing and slickensides along their margins. Sulfides in the quartz consist of pyrite and arsenopyrite. The volcanic metaconglomerate is bleached and altered along vein margins. Adit No. 2 follows a single distinctive vein along a fault but No. 1 adit contains a series of semi-parallel veins within a shear up to 5 feet wide. The veins, which average 1.4 feet wide, have been intermittently exposed for 1,500 feet along strike, and 500 feet vertically.

Sample Results

The Bureau mapped and sampled the surface showings and the two open adits (fig. D-82). A total of 15 samples were collected (fig. D-82, Nos. 1-15). The highest gold value came from dump float at the caved shaft at 2,440 feet elevation. This sample (fig. D-82, No. 3) contained 18.3 ppm gold. In adit No. 1, three samples (fig. D-82, Nos. 13-15) were taken which averaged 1.2 ppm gold over a vein width of 1.7 feet. Five samples collected in adit No. 2 (fig. D-82, Nos. 7-9, 11, 12) gave a weighted average of 1.9 ppm gold over a 1.4-foot vein width All other samples contained low gold values.

Resource Estimate

Indicated Resources

Area	Tonnage	Au (oz/t)	Avg. vein width (ft)
Adit No. 1	469	0.05	1.4
Adit No. 2	458	0.03	1.7

Inferred Resources

Area	Tonnage	Au (oz/t)	Mining Width (ft)
Projected shear zone west of Adit No. 1	26,000	0.03	3.0

The low grades of the resources along with low tonnage would give this property a low mineral production potential.

Recommendations

It is recommended that vein extensions between adits be drilled to test for higher gold values.

MAS No.
21120075

References

D-62, D-63, D-96, D-97, D-99, D-106, D-160

MOTHER LODE PROSPECT

Production

There has been no production from the Mother Lode prospect.

History

No direct references have been made to the development of the Mother Lode (fig. D-4). Knopf (*D-62*) refers to the Mother Lode group in his discussion of the Alaska Washington property and states that in 1910 both sets of claims were under the same ownership. Several opencuts and a caved inclined shaft were probably excavated in the late 1890's or early 1900's.

Workings and Facilities

A 10-foot decline and a trench were located on the prospect.

Bureau Investigations

The Mother Lode prospect has been described as consisting of quartz masses cutting across mafic volcanic metaconglomerate near its contact with a belt of slates lying to the northeast (*D-62*). The quartz contains minor pyrite and arsenopyrite. The only vein found in place is 3 feet thick, trends approximately 170° and dips 35°W. A red-stained, altered fault follows the creek valley located west of the workings.

Sample Results

The Bureau located workings which appear to follow a vein for 230 feet along strike (fig. D-83). Five samples were collected from both float and quartz veins in outcrop (fig. D-83, Nos. 1-5). A select sample of quartz float in the creek below the inclined shaft contained 8.8 ppm gold and a quartz vein sample from an open cut carried 1.5 ppm gold. Other samples contained low metal values.

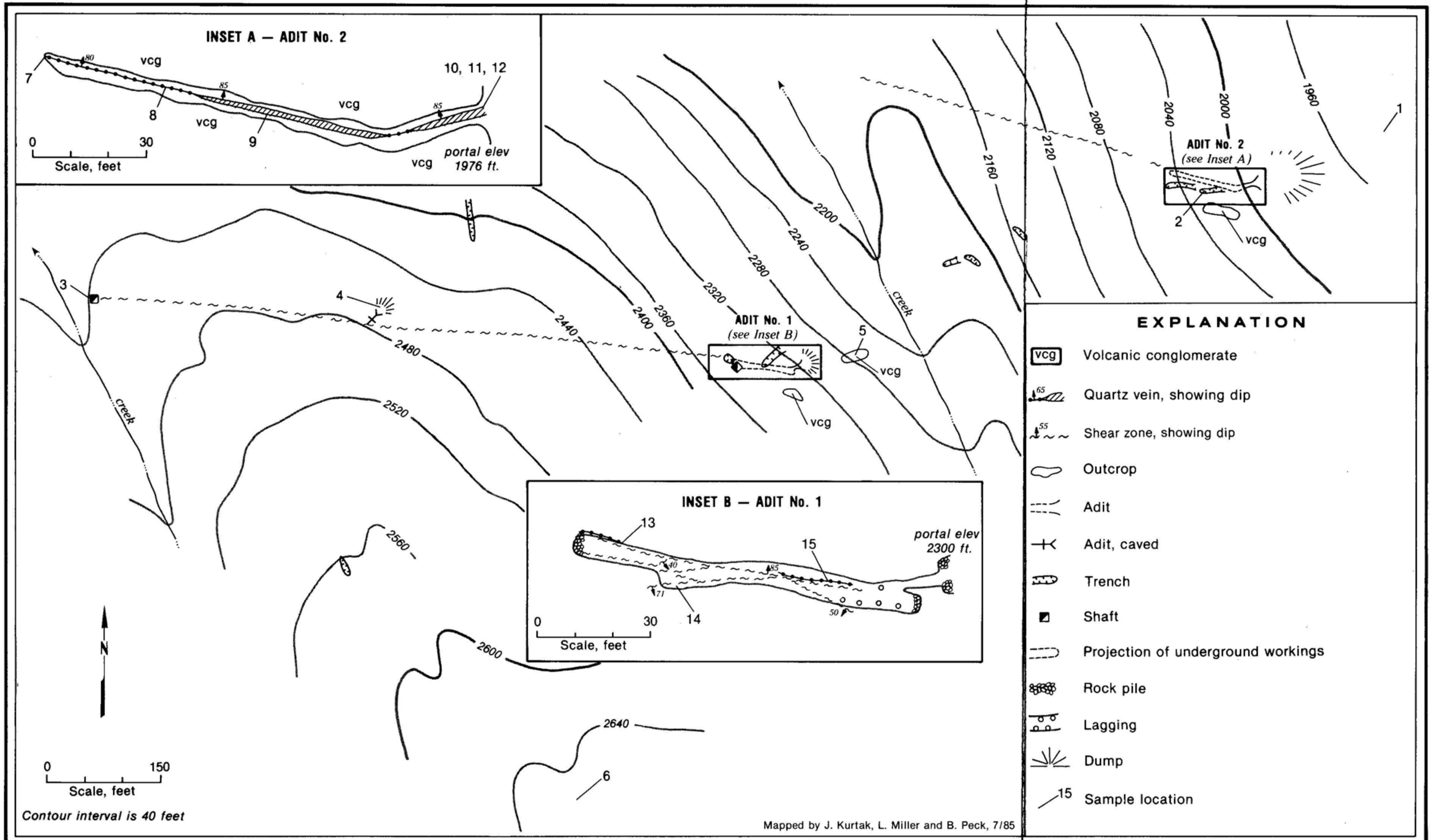

Figure D-82. — Alaska Washington prospect, showing workings, geology, and sample locations.

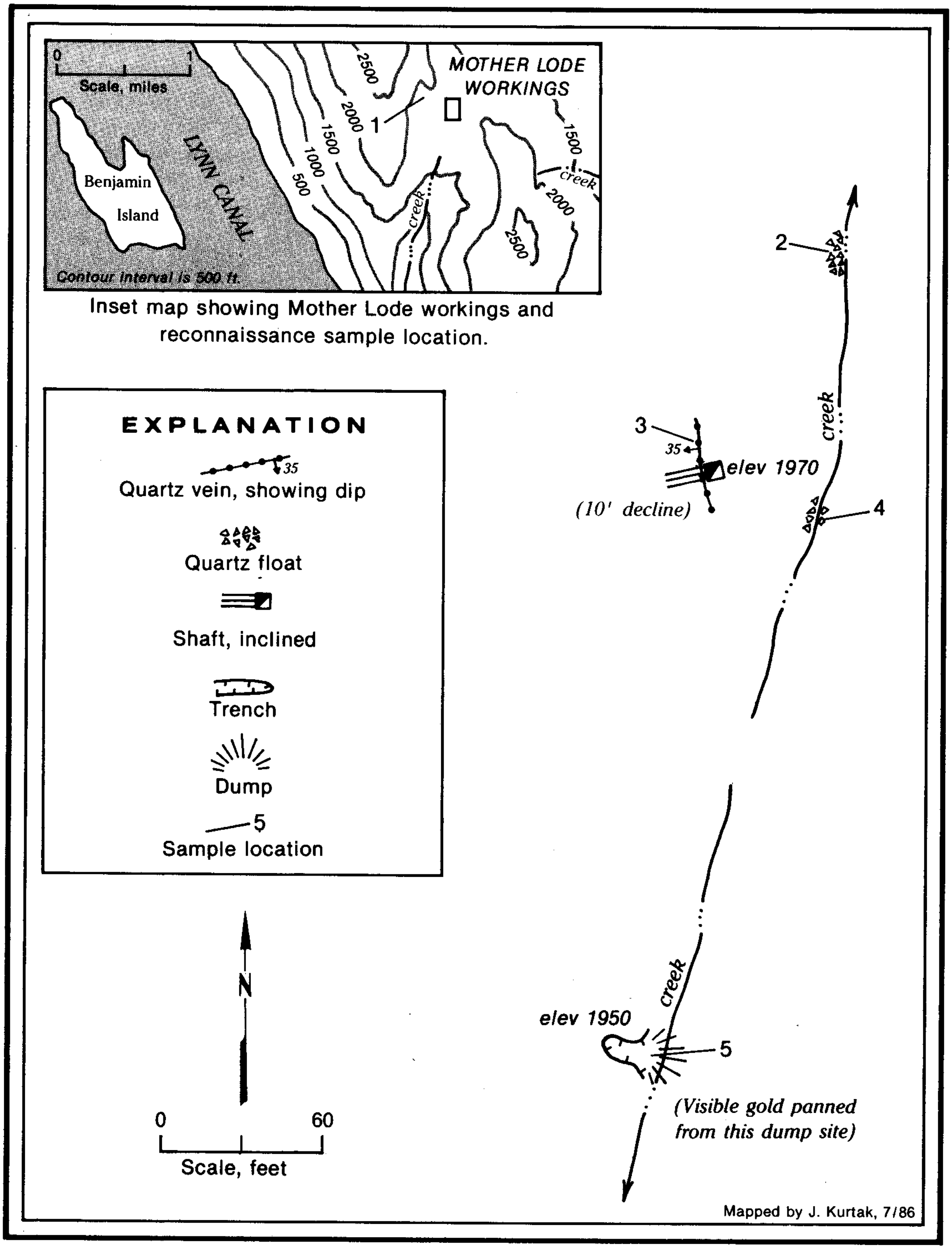

Figure D-83.—Mother Lode workings, showing geology and sample locations.

Resource Estimate

Spotty gold values and lack of exposed quartz vein give this prospect low mineral production potential.

Recommendations

No work is recommended.

MAS No.
21120080

References

D-62, D-63, D-99

EAGLE GLACIER RECONNAISSANCE

History

There has been no recorded activity along the margins of Eagle Glacier (figs. D-4, D-84).

Bureau Investigations

The rocks occurring along the margin of Eagle Glacier consist of slivers of biotite schist and marble surrounded by diorite gneiss. Quartz-calcite veins crosscut foliation in the rocks, similar to those which occur at the Herbert Glacier and Mitchell-McPherson prospects to the south. The veins are thin and carry trace amounts of pyrite, pyrrhotite, and arsenopyrite. The biotite schist is red-stained because of the weathering of biotite in the schist.

Sample Results

Three samples were collected from quartz-calcite veins (fig. D-84, Nos. 1, 3, 4) and two from diorite gneiss (fig. D-84, Nos. 2, 5). Trace amounts of pyrrhotite, chalcopyrite, and arsenopyrite were observed in these rocks. One vein sample contained 2.7 ppm gold but no other sample carried significant metal values.

Resource Estimate

Because of the low gold assays, this area has a low mineral production potential.

Recommendations

No work is recommended.

References

D-63, D-98

EAGLE RIVER MINE

Production[6]

Table D-7.—Production from the Eagle River Mine[1]

Years	Gross tonnage	Gross value $	$/t Heads	$/t Tails	Receipts from bullion & conc.
		Old Workings			
1904	8,640	53,135.00	6.15	0.35	$ 50,100.00
1905	8,128	49,987.20	6.15	0.35	47,200.00
1906	12,395	76,229.25	6.15	0.35	71,600.00
1907	8,426	49,460.62	5.87	0.35	46,592.26
1908	16,368	103,104.38	6.30	0.35	97,375.75
1909	11,620	54,988.49	4.73	0.35	50,921.49
1910	3,815	8,364.48	2.19	0.25	7,410.73
1911	545	1,199.00	2.20	0.20	1,089.49
1912	175	350.00	2.00	0.15	322.63
Total	70,112	$396,819.42	5.65	0.33	$372,612.35
		New Workings—Flume Tunnel			
1913	Mill not running this year.				
1914	2,353	36,095.02	15.34	6.75	20,225.35
1915	2,411	12,223.77	5.07	2.10	7,153.97
Total	4,764	48,318.79	0.14	4.39	27,379.33
Grand Total	74,876	$445,138.21			$399,991.68

[1] Total production: 19,451 ounces of gold and 8,855 ounces silver.

[6] *(D-134)*

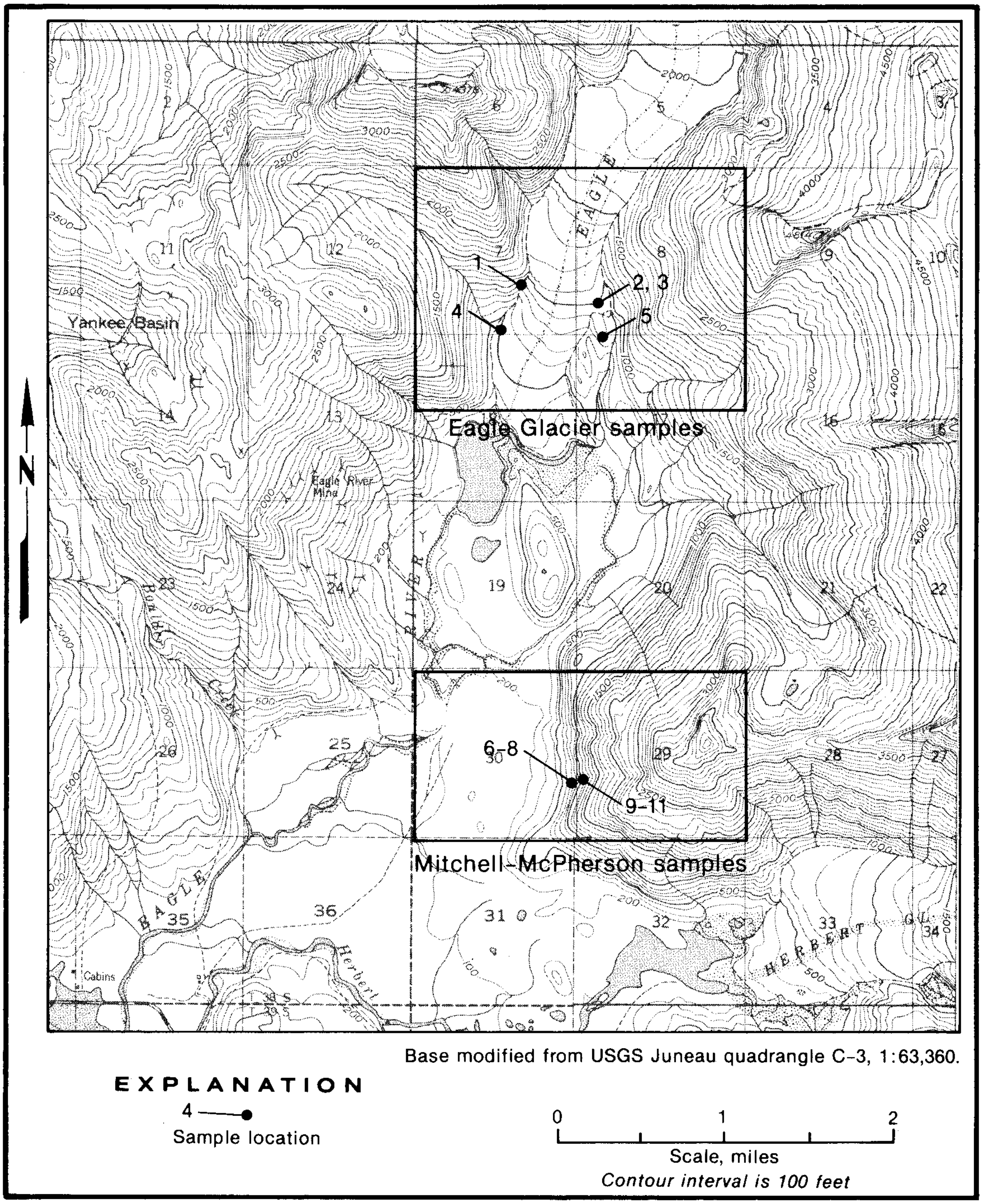

Figure D-84.—Eagle River reconnaissance samples and Mitchell-McPherson sample locations.

History

The Eagle River Mine was discovered by Neil Ward and O. L. Sandstone in October 1902 (figs. D-4, D-85). The two men had carefully prospected the area and had turned up interesting cobbles but could not find the lode. Stumbling back to camp one evening after another fruitless search, the men happened to take a break next to an uprooted tree and were surprised to find gold-bearing quartz tangled in the roots of the tree. The discovery caught the interest of C. D. Mallory of Macon, Georgia, who quickly took an option on the property in late 1902. He sent Bart Thane to examine the outcrops and, upon Thane's positive recommendation, Mallory purchased the claims for $150,000 and organized the Eagle River Mining Company.

In 1903, with Thane as superintendent, the company proceeded to build a 7-mile road from the mine to Amalga Harbor, a 10-stamp mill, trams, flumes and a waterpower plant, a boarding house and bunkhouse, general store, assay office, sawmill, a blacksmith and machine shop and a 2-mile horse tramway (fig. D-86). By January 1904, the mill was in operation and, under mine foreman Paddy O'Neil and his 50 workers, the company produced $50,100 worth of gold by year's end.

Ten more stamps were added to the mill in 1905. Production totalled $47,200 worth of gold and concentrates for that year. In 1906, the 1,500-foot-long Adit Tunnel was driven below existing workings while the miners above continued to bring rich ore to the mill. During that year, the mine produced $71,600 worth of precious metals. Other new tunnels and stopes were added to the workings between 1907 and 1909. Production peaked in 1908 when $97,376 worth of bullion and concentrates were recovered. The last big year for the mine was 1909 when over $50,900 worth of gold and silver was produced.

Thane left the Eagle River Mine to become the superintendent of the Kensington operation north of Berners Bay in 1910, and James Whipple replaced him at Eagle River. The years 1910–1912 were spent exploring the workings for new ore shoots but the efforts were unsuccessful. In 1912, it was decided to abandon the old workings and drive a new adit 500 feet below the previous workings. This work was financed by Thane, Whipple, and a couple of stockholders.

Work began on the Flume Tunnel in 1913 and continued through 1915 until the tunnel was 3,000 feet long. Some ore was encountered and mined but the veins were small. In late 1914, a new vein was located by diamond drilling. Ore from the vein was sent to the mill but, where ore from the old workings yielded 90% of its gold during milling, the new ore gave up only 56%. When money necessary to adapt the milling facilities for a flotation circuit was not available, Thane tried to sell the mine. But even after the Eagle River and Yankee Basin properties were combined, Thane was unable to raise interest in them. After 1915, mining efforts at the Eagle River Mine were halted. Total production from the mine was nearly 19,400 ounces of gold and at least 8,850 ounces of silver.

In 1935, a group reopened the Flume Tunnel but did little else. In 1940, C. Grohman recovered 100 ounces of gold, 5 ounces of silver, and 1 pound of lead from tailings at the minesite. Whelan Exploration Company restaked the area in 1980 and reevaluated the property with great optimism. Some drilling was done by both Placid Oil Co. and Houston Oil and Minerals Co. in 1981, 1982, and 1985 (*D-97*).

Workings and Facilities

During the height of activity, the mine boasted a 20-stamp mill connected to the workings by an aerial tramway. A horse-drawn rail tram led from Eagle River Landing to Amalga, the mine townsite. At one time, over 30,000 feet of underground workings existed. The underground workings are presently all caved and all the buildings are either in ruins or gone. Remains of the old aerial tramway and the mill stamps can still be found.

The Bureau located seven caved adits at the Eagle River Mine including the Flume and Adit tunnels.

Geologic Setting

In 1912, Knopf (*D-62*) published a good summary of the geology at the Eagle River Mine:

> The rocks at the mine consist of an interstratified series of clay slates and graywacke slates, with which are associated a few thin intrusive sheets of green augite melaphyre. A few other types are found, but they are exceedingly rare. Near the end of the 200-foot crosscut into the footwall on level No. 1 a 3-foot bed of light-colored siliceous schist was encountered, which simulates an aphanitic flow-banded rhyolite with small porphyritic crystals. Such rocks that differ greatly from the associated beds may perhaps be of service when attempts are made to relocate ore bodies lost through faulting. This is particularly true of the melaphyre sheet occurring in the footwall of the lode, which may be reasonably expected to possess both regularity and continuity. For example, the melaphyre in the 200-foot footwall crosscut on level No. 1 probably corresponds to the similar rock exposed along the flume line 300 feet south of the aerial

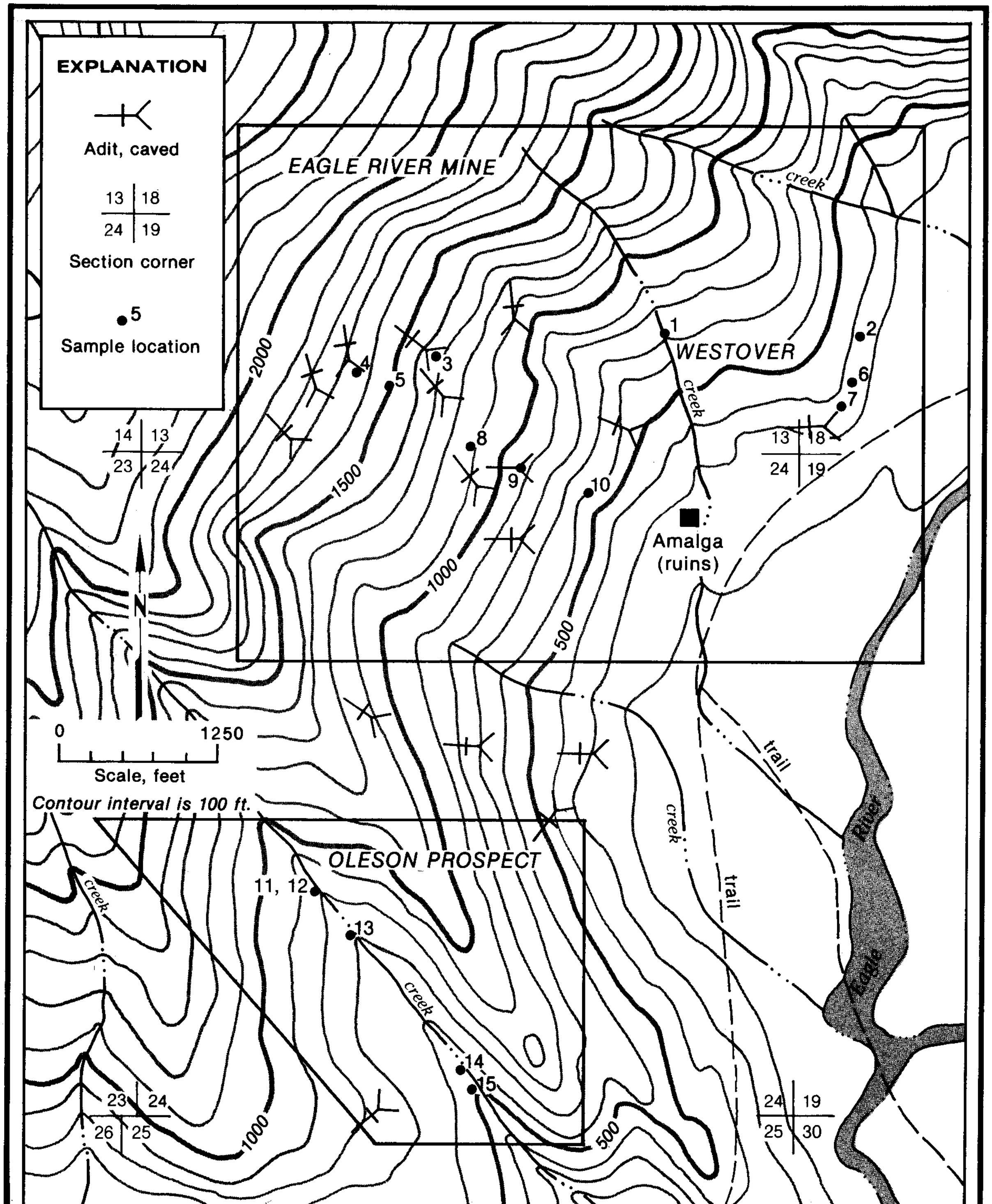

Figure D-85.—Eagle River area, showing sample locations; includes Eagle River Mine and Oleson prospect.

tramway and indicates the position of the lode line, which is here covered with slide material.

The rocks, where undisturbed, trend between N. 30° W. and N. 45° W. (true meridian) and dip from 60°NE. to 90°, ranging near 70°. Owning to gravity creep because of the very steep slopes, they generally lie flat or even with reversed dip. In some of the gulches the horizontal slates can be seen partly resting on vertical slates, the zone of crushed slate that separates the slates in normal position from those that have slumped over being well shown. Underground operations show that this creep and landslide action is far more extensive and persists deeper than would be suspected from the surface exposures. Broad zones of broken and ground-up slate were encountered in the mine and when wet formed a running mass of clayey mud. This gave much trouble, necessitating heavy timbering, and in some places it was found impossible to keep the drifts open and hundreds of feet of workings have had to be abandoned. It is reported that in some tunnels 100 feet or more underground logs and diorite boulders were encountered, proving that the landslide action took place in post-glacial time. This action has broken the continuity of the ore deposit, and as landslides act under the force of gravity, masses of ore torn off from the roots of the deposit in place will have moved out into the hanging wall, because the hanging wall is on the downslope side of the mountain. The writer believes, however, that beyond this general tendency to be displaced to the hanging-wall side, nothing can be postulated as to the probable position of the displaced masses of ore. It is likely that their orientation in both strike and dip will be radically changed.

Level No. 1 undercuts the original Eagle outcrop at a depth of 215 feet, and the ore has been stoped out from this level to the surface. The workings extend more than 1,000 feet northwestward along the trend of the ore zone, but sinking has not been attempted from this level. The ore body in the outcrop was 250-feet long and, as described by Wright (*D–158*), consisted of a chain of three ore shoots, elliptical in cross section, striking N. 30° W., dipping 50° NE., and pitching northwestward into the mountain at an angle of 30°. They averaged from 5 to 15 feet in width. At the time of the writer's visit, the old workings were no longer accessible. The different shoots are stated to have carried distinctive ores. High gold values were generally accompanied by large quantities of metallic sulphides; quartz heavily mineralized with arsenopyrite and galena was especially good ore. In spite of its base character the ore is reported to have been 90 per cent free milling; the arsenopyrite-galena concentrates carried $100 a ton in gold. In places a honeycombed quartz barren of sulphides carried considerable free gold.

Much broken ground was encountered in following the ore zone northwestward. The ore extracted during 1909 and 1910 belonged to the stringer-lode type, with some lenticular masses of quartz. There is a certain tendency for good ore to localize along the contacts of thick graywacke beds with black slate. Commonly the slate resting on the graywacke is intensely crushed and ribboned with quartz. But this is not an invariable rule, for one of the largest lenses of quartz, having maximum dimensions of 100 feet in length, 20 feet in width, and 30 feet in height, possessed no definite walls. The central portion consisted of massive quartz, but toward the periphery the ore body frayed out into irregular veinlets penetrating the surrounding highly polished carbonaceous or graphitic slate. The major axes of the quartz mass corresponded in direction with the strike and dip of the slate. Some of the quartz contained much silvery-white mica; the sulphides, mainly arsenopyrite, were sparse in amount, but the slate was in places highly impregnated with barren arsenopyrite. Toward the center of the quartz body considerable quartz was encountered carrying massive pyrrhotite with some galena scattered through it, and this constituted ore of good grade.

Roehm, in 1936 (*D–103*), described the Flume Tunnel (fig. D-87), which was driven after Knopf's visit to the mine, in 1913:

> The Flume Tunnel is located at an elevation of 560 feet on the south slope of the divide between Eagle River and Yankee Basin. The tunnel was driven approximately 3,000 feet in a zigzag northwesterly direction following a somewhat intercalated contact of slaty schistose graywacke and graphitic slate. The slate appears to rest on the graywacke and both dip to the northeast. This contact is a zone of weakness which occurs as a soft crumpled, crushed mass that contains small quartz lenses, stringers, and gash veins. Where the quartz stringers are numerous along the zone it constitutes a low grade ore.

Past the first stope a fault zone was encountered that displaced the zone horizontally. With the aid of a diamond drill the zone was found displaced approximately 250 feet to the west. Since this zone is tightly timbered, movement along the zone could not be seen. Minimum small slip faults or joints were encountered over the entire distance of the tunnel. They vary considerably in dip and strike. Two large normal fault zones were encountered in the tunnel and marked as Nos. 1 and 2 fault zones on the map. These zones are wide crushed areas and very recent. They appear to have been caused by the retreat of Eagle River Glacier, leaving a very steep bluff which later crumbled down and over. These show only vertical movement and only small amounts distributed through the crushed zone. They carry considerable water and necessitate timbering. An altered dike rock occurs over a width of 100 feet located approximately 1,300 feet from the portal. This dike has a schistose structure and lies parallel to the foliation of the schistosity. Its color ranges from various shades of green to a yellowish brown, the

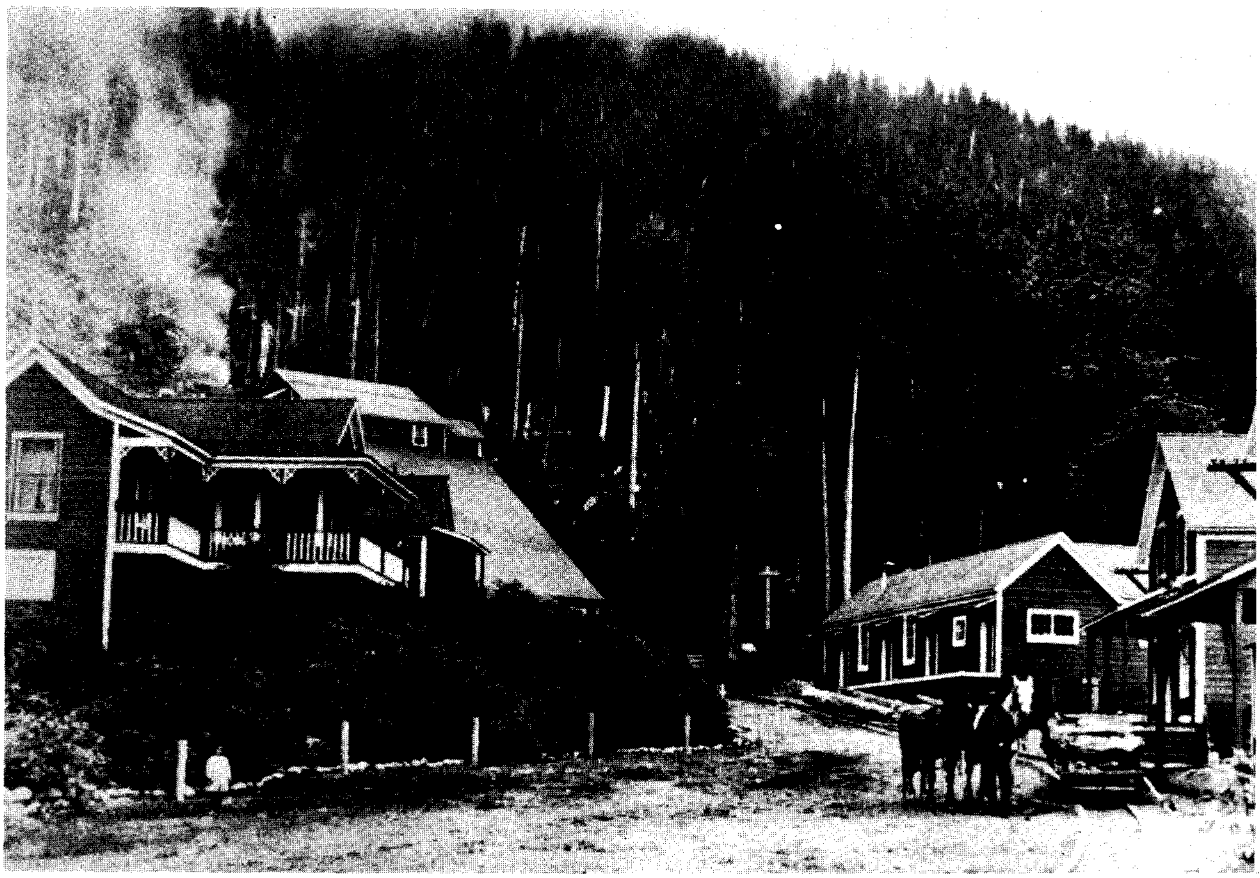

Figure D-86.—The Eagle River Mine area in about 1909. This mine produced almost 20,000 ounces of gold between 1903 and 1915 (photo courtesy Alaska State Library).

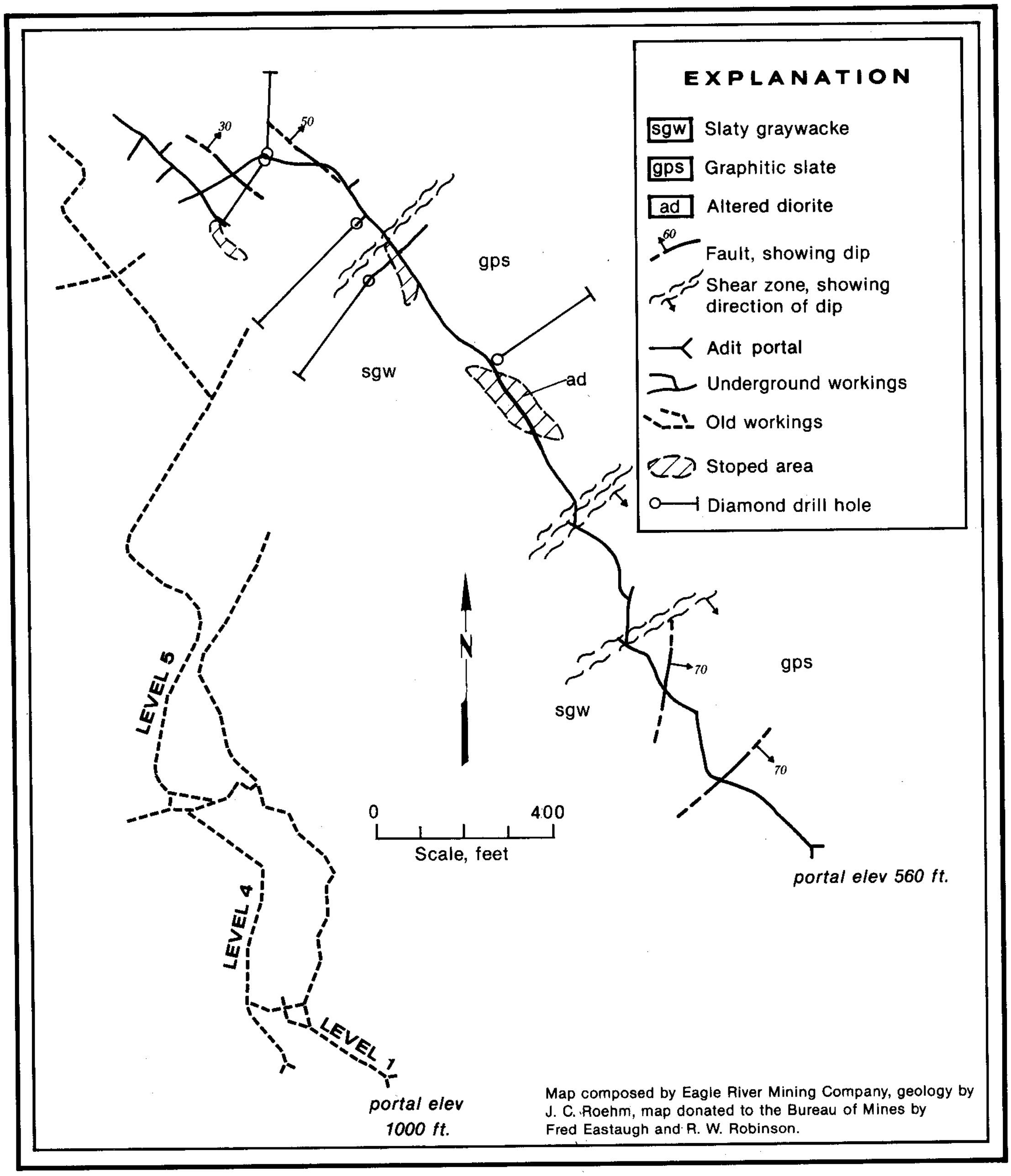

Figure D-87.—Flume Tunnel, Eagle River Mine, showing geology and underground workings in relation to main workings of the mine.

latter on the outer edges shows considerable alteration. Numerous large to small pieces of this dike material are found in several places occurring in bunches along the drift.

Orebodies:

The orebodies consist of small tabular lenses or faulted blocks distributed along the zone of weakness or apparent contact of the two sediments. Two workable lenses were discovered and mined in this tunnel. These are shown in the stoped areas. These appeared to be faulted blocks of a larger body and contained commercial values. Other small bunches of quartz and ore are evident as shown by the red areas on the map. These were not sampled, but some were reported to contain commercial values. The depth to which the ore below the stope will extend is uncertain. (Short faulted blocks are very uncertain as to depth.).

Diamond drill hole No. 1 was reported as having cut two feet of ore which assayed $5.95 in gold per ton [@ $20.67/ounce]. Hole Nos. 2 and 4 no doubt hit the ore as the later development led to the mining of the stope. Hole Nos. 3, 5, 6, and 7 were reported barren. The dips and depths of these holes are not known, but locations and lengths were taken from an old blueprint of the tunnel from which this map was constructed.

Mineralization:

The ore mined in this tunnel, according to the aforementioned mill sheets, shows a much higher per ton value than the ore milled from the old above workings. However, the recovery shows a marked difference in the amount of free milling gold. Only a 56.5% recovery was made from the ore milled in this tunnel by the processes of amalgamation and concentration. It was reported by Mr. Thane that a 90% recovery was made from flotation tests. This shows that the mineralization contains less free gold and is of a somewhat more complex nature in depth. The ore is a milky white to grayish quartz that is banded with graphitic streaks. It contains sulphides to the extent of 2% by volume and numerous flattened and angular wall rock pieces. It contains free gold, pyrite, galena, arsenopyrite, pyrrhotite, and chalcopyrite. This mineralization is well distributed through the quartz. Sulphides of zinc have been reported found in places in the ore. Pyrite and arsenopyrite appear to be the main mineralization of the stringer zones in both the small veins and country rock. Some sections were reported to have shown assay values up to $3.75 per ton [@ $20.67/ounces]. To arrive at a conclusion as to the amount of ore in this tunnel at the present time is undeterminable. To determine this would necessitate considerable sampling and some development work. How far the ore goes in depth below the mined stopes is unknown, whether it extends above is also not known. The small quartz bunches as shown on the accompanying sketch contain some ore, but this amount could not be considered large. Whether or not sections of the stringer zones contain veins to be considered ore is undeterminable without sampling.

Bureau Investigations

The Bureau located seven caved adits and numerous prospect pits, trenches, and open cuts (fig. D-85), and collected ten samples (fig. D-85, Nos. 1-10). Because all underground workings are caved and surface exposures are rare, samples were collected from the dumps. A select dump sample from the upper-most workings contained 50.3 ppm gold, 42.5 ppm silver, 1.27% lead, and 0.7% zinc (fig. D-85, No. 3). Another selected dump sample from the Adit Tunnel yielded 12.8 ppm gold and 6.2 ppm silver (fig. D-85, No. 8).

Resource Estimate

The veins at the Eagle River Mine were relatively small and broken up by faults. Most known veins were mined out prior to mid-1915 so, at present, there is no large measured or indicated resource at the mine. Because of the erratic and discontinuous nature of quartz veining at the mine, it is difficult to infer a resource, although imaginative geologic interpretation of the area could develop hypothetical resources.

A feasibility study done on the property by a private company in 1985 calculated an indicated resource totalling 751,875 tons at a weighted average grade of 0.21 ounces/ton gold (*D-155*). This grade and tonnage is based on extending the last vein mined from below the Flume Tunnel up to the old workings at 1,300 feet elevation and is, therefore, unrealistic. The vein has been traced for about 300 feet on the Flume Tunnel level but its vertical extent is speculative. Because of the faulted, discontinuous nature of the veins in the Eagle River Mine, it is unlikely that a minable width of the vein persists a vertical distance of 850 feet. Therefore, it is unlikely the vein extends 850 feet vertically. Assay results by the Eagle River Mining Co. show that the stoped portion of the vein averaged 0.59 ounces/ton gold over 4.5 feet, a 36-foot section in a crosscut 80 feet SE of the stope averaged 0.18 ounces/ton gold, and a 2-foot intersect in a drill hole 120 feet NW of the stope had a grade of 0.29 ounces/ton gold.

The only calculatable resource at the Eagle River Mine is based on the last-mined vein at the end of the Flume Tunnel. This vein gives an inferred resource of 53,100 tons of ore at a weighted average of 0.28 ounces/ton gold.

Recommendations

Drilling is necessary to substantiate inferred resources. The discontinuous nature of the ore shoots and the faulted character of the country rock make drilling targets a matter of guesswork, rather than science. Reopening the Flume Tunnel would access mineralized quartz and permit beneficiation studies to be done on the ore.

MAS No.
21120084

References

D-62, D-63, D-96, D-97, D-98, D-99, D-103, D-121, D-123, D-133, D-134, D-146, D-155, D-161

MOUNTAIN QUEEN PROSPECT

Production

There has been no production from the Mountain Queen prospect.

History

John Heid, Neil Ward, and O. L. Sandstone staked the Mountain Queen, Mountain Queen No. 2, and Westover claims in 1903 and 1904 immediately to the east of the Eagle River Mine group of claims (fig. D-4). By late 1905, the men had driven a short adit and made three open cuts, and spent a total of $2,222.50 during their efforts (*D-80*).

In October 1905, a mineral survey was completed and the claims were patented in September 1906. After patent, no further work was recorded (*D-66*).

Workings and Facilities

There is a caved adit (with approximately 10 feet to 15 feet of workings) and three reported open cuts.

Bureau Investigations

No rocks are exposed on the portion of the claims visited by Bureau personnel but the dump of the caved adit contained phyllitic graywacke and black phyllite with minor quartz. Three large boulders of pyrite-bearing quartz near the portal of the adit suggest that mineralized quartz veins exist somewhere under the colluvium.

The Bureau located the caved adit on the Westover claim (fig. D-88) but did not find the open cuts. No outcrops were found in the vicinity of the adit but three quartz boulders were found at the mouth of the adit trench in a small stream valley. The boulders, which are up to 4 feet by 4 feet by 2 feet, lay in close proximity to each other and the portal but did not come from the adit nor are they related to any known outcrop. The quartz was massive, white but iron-stained, and locally contained up to 5% pyrite. A composite sample taken from the boulders (fig. D-88, No. 1) did not contain significant metal values.

Resource Estimate

There was no historically discovered resource.

Recommendations

A more detailed examination of the claims would give a much better understanding of the geology and potential of the claims.

MAS No.	MS No
21120231	702

References

D-66, D-80

OLESON PROSPECT

Production

There has been no production from the Oleson prospect.

History

The Oleson prospect (figs. D-4, D-85) was discovered in September 1908. Knopf mentions the property in his 1912 report on the Eagle River region (*D-62*).

Workings and Facilities

Two open cuts and a short adit are reported (*D-62*).

Geologic Setting

Country rock in the area consists mainly of phyllites intercalated with greenstones and metavolcanic breccias. The prospect is reported to lie along the contact between these rock types. Some narrow quartz stringer lodes

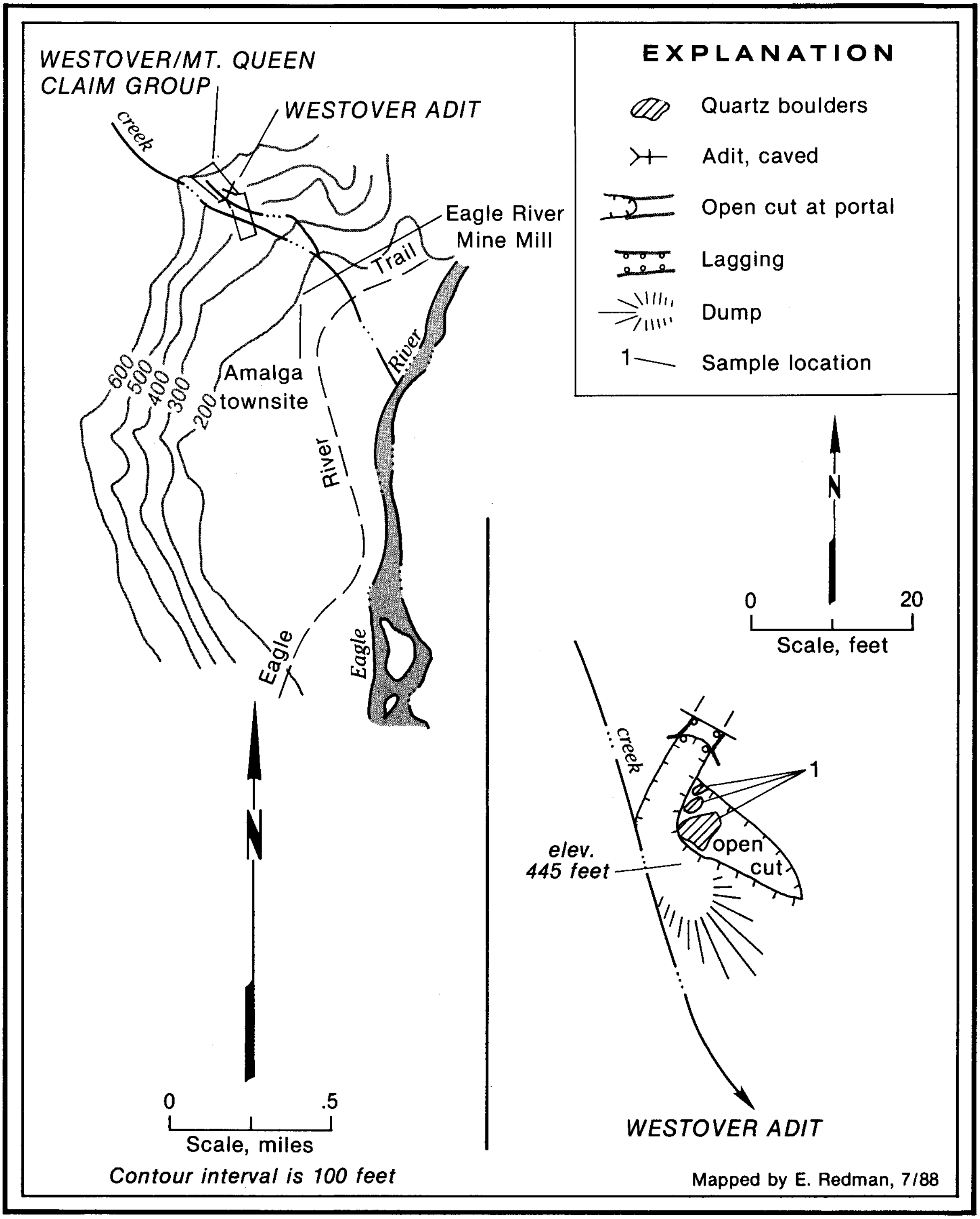

Figure D-88.—Mountain Queen prospect, showing sample locations.

trending 150° are exposed here and lie parallel to the phyllite-greenstone contact. Arsenopyrite occurs in wall-rock fragments enclosed in the quartz (*D-62*).

Bureau Investigations

The Bureau did not locate the Oleson workings (fig. D-85), but did collect five samples of quartz float and some pyrrhotite-pyrite-bearing quartz veinlets from stringer zones in the area (fig. D-85, Nos. 11-15). No significant metal values were found.

Resource Estimate

A resource estimate cannot be made because the property was not located. Samples collected in the area by the Bureau were not encouraging.

Recommendations

It is recommended that the search for workings be continued on east side of the tributary creek at an elevation between 250 and 400 feet.

MAS No.
21120085

References

D-62, D-63, D-96, D-98, D-99

MITCHELL-McPHERSON PROSPECT

Production

There has been no production from the Mitchell-McPherson prospect.

History

In 1904, James Mitchell and John McPherson followed quartz fragments high up the steep west slope of Goat Mountain and discovered gold-bearing quartz veins (figs. D-4, D-84). The veins were reported to carry values between $5 and $12/ton of gold but the site was very exposed to rock fall and avalanches. In 1907, the men tried to reach the veins with an adit but the 75-foot drive failed to reach them.

A new tunnel was started in 1910 from a protected location at an elevation of 1,200 feet. It is not known whether this adit reached the vein.

In 1914, the mayor of Douglas, Mike J. O'Connor, bought a one-third interest in the property. O'Connor bought out McPherson in December 1914 and bonded Mitchell's interest. In 1915, work began on the Rainbow Tunnel which was planned as a 600-foot adit. The vein was reached at 125 feet and assays reported $10.25/ton gold across 3 feet of quartz. Work continued in 1916, when O'Connor reported values to $30/ton gold.

After 1916, little work was reported. In 1925, Mitchell did some assessment work but nothing else was documented for the next 15 years. In 1940, Thomas Gillis reevaluated the property, but this effort was short-lived (*D-97*).

Workings and Facilities

Three adits have been reported (*D-97*); two adits and several trenches were described by Knopf (*D-62*), but the Bureau found only a wheel barrow, drill steel, tree stumps, and water pipe on the steep 45° slopes.

Geologic Setting

The geology has been described by Knopf (*D-62*):

> The country rock enclosing the lode is a black diorite gneiss, which forms a band about 1,500 feet wide. The foliated structure of the gneiss, which is well marked, trends N. 40° W. and dips 60° NE. The footwall of this band of diorite gneiss is a belt of schists, which comprises a considerable variety of rocks. That immediately adjoining the gneiss is a garnetiferous biotite schist. The foliation of the schists is parallel to that of the gneiss.
>
> The lode consists of a zone of crushed and mineralized diorite gneiss striking N. 45° E., nearly transverse to the foliation. The dip is probably vertical. The ore body, as exposed in the open cuts, averages 6 feet in thickness and is reported to average from $5 to $12 a ton in value. The surface ore is considerably stained by iron oxide, but the unweathered material is snow white. Sulphides are rare and consist of pyrite and galena. In a few places veinlets of quartz interlace the ore irregularly. The lowest outcrop of the lode lies in the diorite gneiss near the contact with the schists; whether the lode extends into the schist has not been determined.
>
> The ore, when examined microscopically, is found to be composed of dolomite, albite, sericite, and accessory apatite. Minute veinlets of carbonate traverse the older dolomite and albite and indicate a second period of mineralization. The microscopic examination thus confirms the conclusion reached from the appearance of the ore—that intense changes were produced in the diorite gneiss by the solutions which brought in the gold.

The vein mineralogy, wallrock alteration, and general trend of the veins appear similar to veins described at the

Herbert Glacier prospect, 1.5 miles to the southwest. The veins are considerably thicker at Herbert Glacier, however.

Bureau Investigations

The Bureau could find no evidence of the trenches, but did find what appears to be a possible dump from one of the adits at 1,275 feet elevation (fig. D-84). Quartz float was found in gullies nearby. A contact between the metasediments and black diorite gneiss was seen trending 140° and a series of shears within the gneiss trend 045° to 060°E, and dip steeply. Iron-stained selvage zones up to 6 feet wide are associated with the shears, but quartz veining in the zones is minimal. Traces of pyrite, chalcopyrite, and galena were found in some of the quartz float.

Six samples were collected from the Mitchell-McPherson prospect (fig. D-84, Nos. 6-11). One sample of altered pyritic diorite contained 2.7 ppm gold and a sample of vein quartz contained 39.0 ppm silver and 0.14% lead.

Resource Estimate

In 1939, an inferred resource of 1,500,000 tons at 0.2 ounces/ton gold was calculated by one examiner of the deposit (*D-39*). Due to poor exposures and lack of accessibility to the old workings, Bureau personnel were unable to fully evaluate the prospect and cannot confirm this estimate. Low gold values obtained by the Bureau do not support the inferred resource estimate given above.

Recommendations

Continue the search for old workings around 1,000 to 1,200 feet elevation where a large number of tree stumps occur.

MAS No.
21120087

References

D-39, D-62, D-63, D-96, D-97, D-98, D-99

HERBERT GROUP

Production

There has been no known production from the Herbert group.

History

The Herbert Group of claims was staked in 1931 and 1932 by a Mr. Gelsinger (figs. D-4, D-89). The property includes the old workings of the Summit/St.Louis prospect originally discovered in 1889 and discussed in the next section. The claims were optioned to J. Holland in 1932 and 1933 and he made an attempt to placer mine the glacial sands near the end of the glacier with a centrifugal concentrator. Holland's efforts failed and only minor assessment work was done in following years (*D-105*).

The area is currently held by Echo Bay Mines Company who obtained the claims after purchasing Houston Oil and Minerals.

Workings and Facilities

There are no known workings on this property.

Bureau Investigations

The Herbert Group of claims includes the area below the Herbert Glacier. Concordant quartz veins occur in the foliation of locally iron-stained greenschist that outcrops below the glacier. Calcite was locally observed in these veins. Individual vein widths range from less than 1 in up to 5 feet wide and vein swarms occur in zones almost 20 feet wide within the enclosing schistose rocks. Sulfide minerals present in the veins include pyrrhotite, pyrite, and traces of arsenopyrite and chalcopyrite. The mineralization reported to occur along the contact between the greenschist and phyllite further to the south (*D-105*) were not located due to dense ground cover.

Placer gold in the gravels below Herbert Glacier was derived from the veins on the Herbert Glacier and Summit/St. Louis claims.

Sample Results

The Bureau examined the area and collected 11 samples of the mineralized quartz and silicified greenschist in the area (fig. D-89, Nos. 1-11). None of the samples contained significant metal values although 6 samples contained copper values between 112 ppm and 415 ppm.

Resource Estimate

The low gold values obtained from samples in the area give this property a low mineral production potential.

Recommendations

Significant gold mineralization occurs nearby in quartz diorite gneiss rocks at the Herbert Glacier pros-

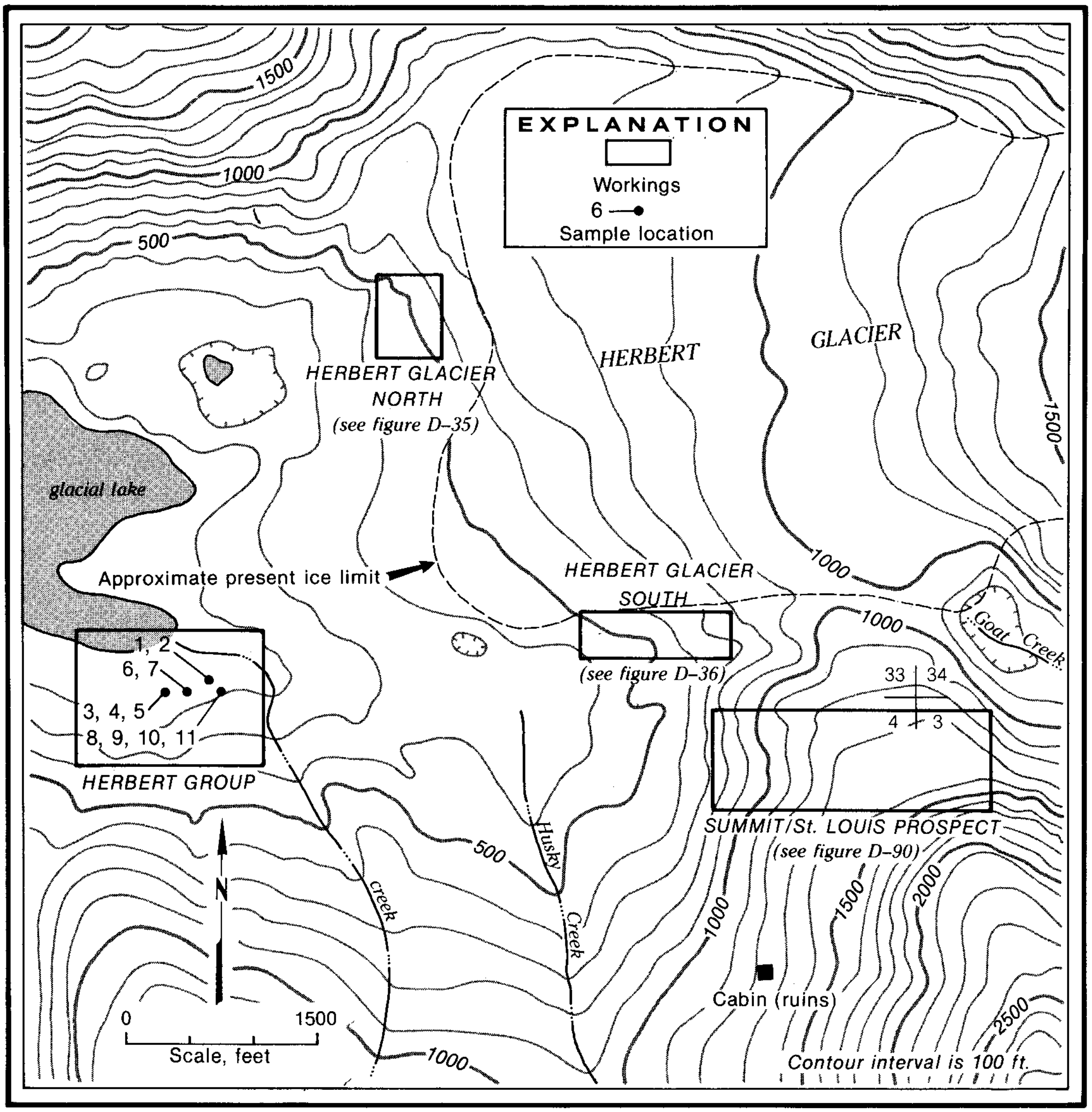

Figure D-89.—Herbert Glacier area, showing sample locations; includes Herbert Glacier prospect, Summit/St. Louis prospect, and Herbert group.

pect. Further work in the area should concentrate on gneissic rocks rather than in the greenschists and phyllites.

MAS No.
21120091

References

D-63, D-98, D-99, D-105

SUMMIT/ST. LOUIS PROSPECT

Production

There has been no production from the Summit/St. Louis prospect.

History

Gold-bearing quartz veins were discovered adjacent to the Herbert Glacier by J. Sundof and William Moran in 1889, although they didn't stake the Summit and St. Louis claims until 1902 or 1903 (figs. D-4, D-89). T. Smith and William Hatcher sunk a 22-foot shaft on the Summit Claim (*D-105*).

The claims remained idle until 1931-32 when 42 claims were staked on the property by Mr. Gelsinger. J. Holland took an option on the Herbert Group (a ten claim portion of the total claim block) during which time he unsuccessfully tried to placer mine the glacial sands at the snout of the glacier (*D-105*). The area remained idle after this effort until 1986.

A large claim block was staked in the Herbert Glacier area in 1986, including the old Summit/St. Louis property, by Houston Oil and Minerals Co. The claims were staked to cover previously undiscovered mineralization that is similar in nature to that reported on the original Summit/St. Louis property. The property is currently held by Whelan Mining.

Workings and Facilities

A 22-foot shaft was located on the property.

Bureau Investigations

A 065°-trending quartz vein, dipping 75° SE, cuts quartz diorite gneiss in the vicinity of the old Summit workings. This vein can be followed for 40 feet along strike by tracing float. The vein averages 0.7 feet in thickness and contains disseminated arsenopyrite. Earlier workers reported that the vein extends for 150 feet along strike and contains free gold (*D-62*).

The 4-foot-wide quartz vein at the St. Louis claim also occurs in diorite gneiss and occupies a shear zone trending 075°. The quartz is mineralized with arsenopyrite and pyrite. The host rocks display alteration similar to that at the Herbert Glacier prospect to the northwest.

Sample Results

The Bureau mapped the workings (fig. D-90) and collected seven samples (fig. D-90, Nos. 1-7). The shaft on the Summit claim was full of water and could not be entered. Three of the samples (Nos. 4, 5, 7) taken from the quartz vein exposed at the shaft contained an average of 12.8 ppm gold and 3.1 ppm silver. A grab sample from a nearby dump contained 35.7 ppm gold.

Resource Estimate

Inferred resources consist of 45 tons at 0.37 ounces/ton gold. This gold value gives the prospect a moderate mineral production potential, but the tonnage is quite small.

Recommendations

Trenching along the soil-covered vein extension to the west could be done to see if any continuity exists between it and the vein exposed on the St. Louis claim.

MAS No.
21120088

References

D-62, D-63, D-98, D-99, D-105

WINDFALL CREEK PLACER MINE

Production

A minimum of 249 ounces of gold were mined from Windfall Creek (*D-97*). Records are very limited.

History

Placer gold was discovered in Windfall Creek in 1882, about the same time it was found in Montana Creek (figs. D-5, D-91). Small-scale attempts to placer mine the creeks during the next few years had mixed results. Placer mining efforts on Windfall Creek picked up by

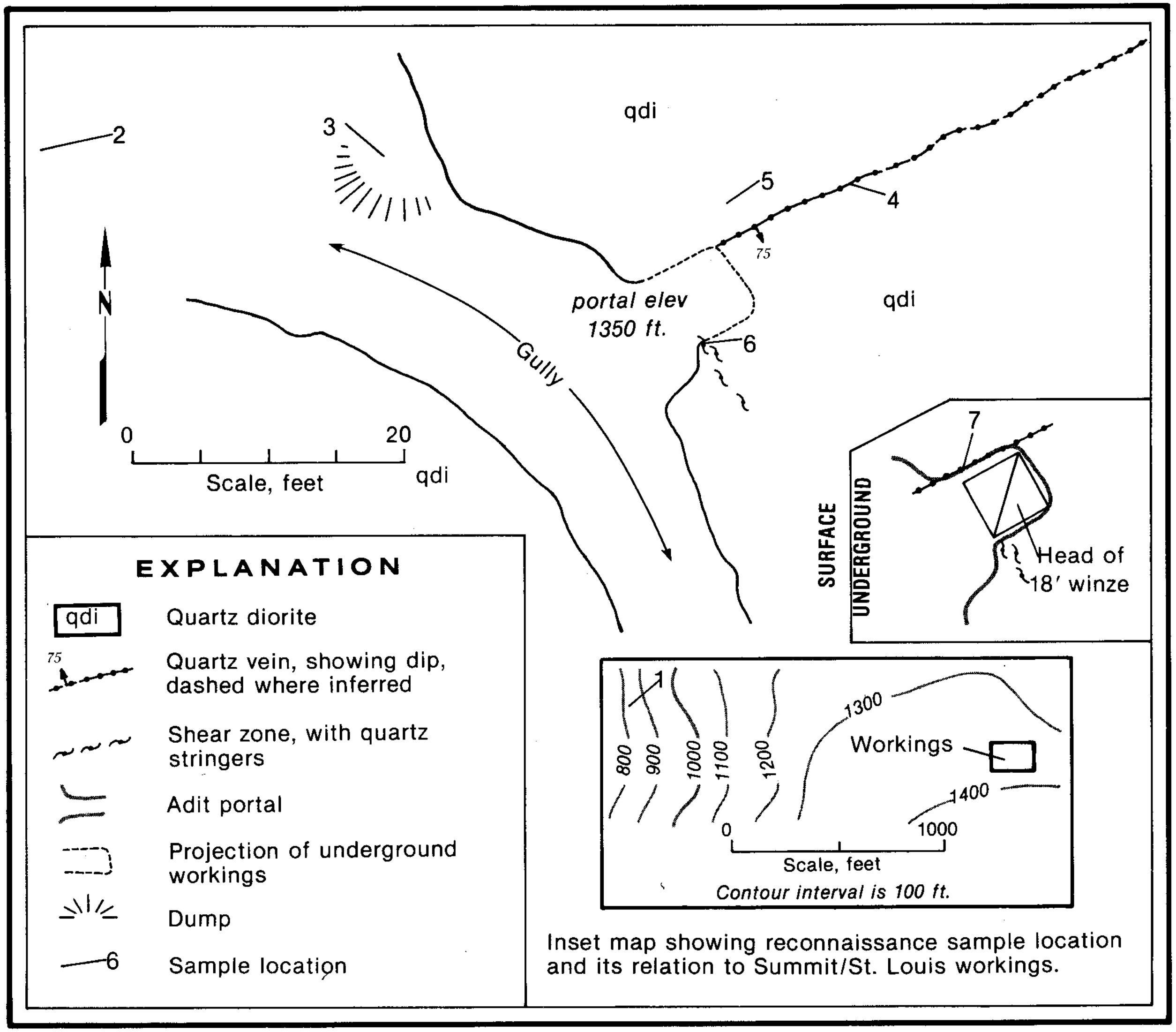

Figure D-90.—Summit/St. Louis prospect, showing geology and sample locations.

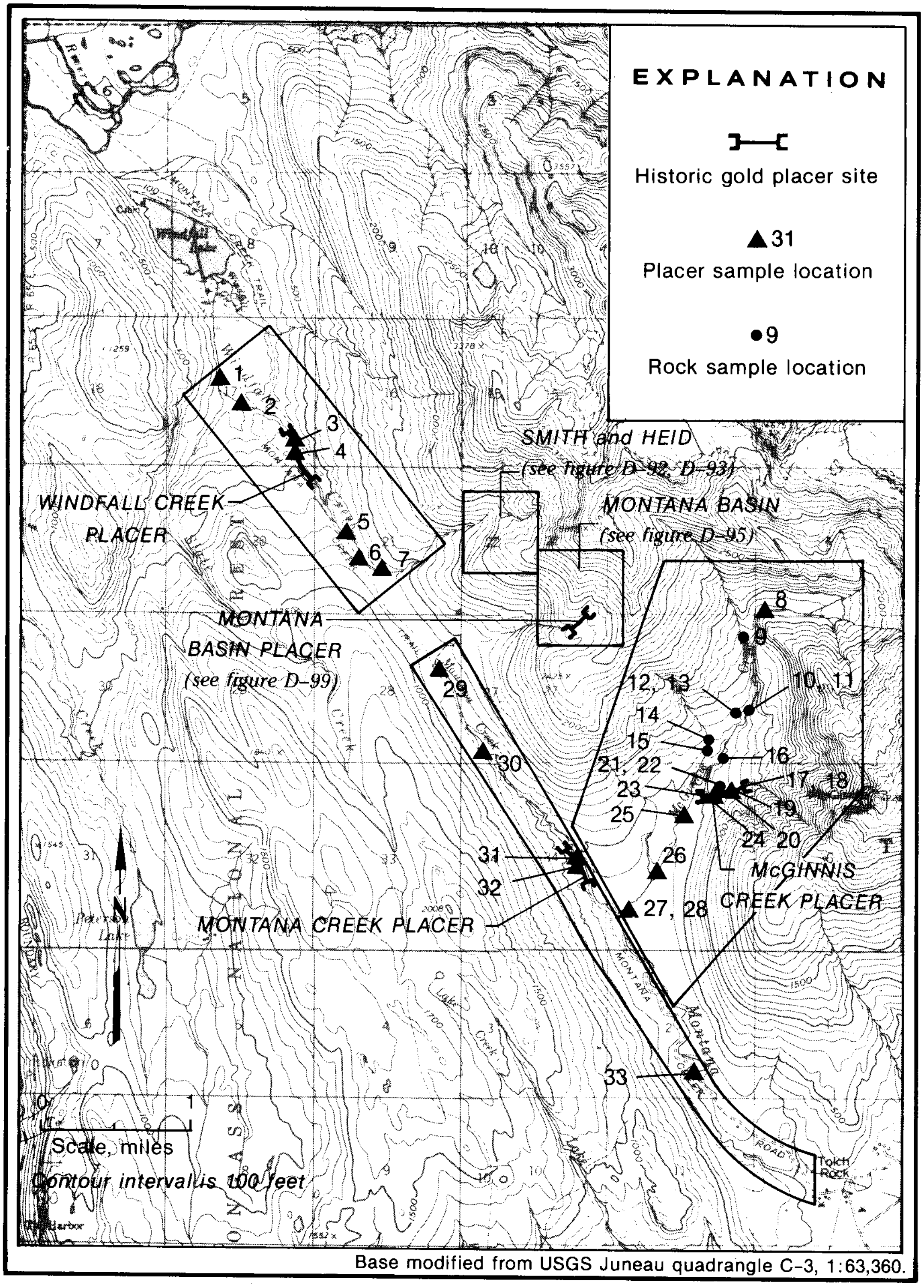

Figure D-91.—Windfall, Montana, and McGinnis basins, showing sample locations.

1892, when James Smith and Gus Brown started work there.

Smith was joined by James Patton in 1893, and the two men recovered nearly 35 ounces of gold. Gold-bearing quartz veins were discovered as a result of their sluicing operations and, in 1894, Smith and John Heid built an arrastre.

In 1902, the Alaska-Detroit Mining Co. acquired about 300 acres of placer ground on Windfall Creek. Twenty tons of equipment were sledded to Windfall Creek in early 1903, and, by late summer, a hydraulic plant was installed and operating. Some gold was evidently produced in 1904, but Supt. George Otterson noted that most of the effort went into prospecting.

Tom Ellis replaced Superintendent Otterson by 1905, and more new equipment was brought to the property. Newspaper stories reported 14 ounces of gold were produced during July and that 200 ounces of gold were recovered during their last clean-up in October. The year 1906 was busy, and about 1,000 yd^3 of gravels were processed but production is unknown. A newspaper report in 1907 stated that the mine did well in 1906 but no details were given. In 1909, a one-half interest in the property was sold to a group of Portlanders but no work was reported. Although production records are incomplete, as much as 249 ounces of gold was probably produced from the Windfall Creek area (*D-97*).

Workings and Facilities

Old diversion ditches, water pipe, and placer tailings lie along a 400-foot stretch of Windfall Creek.

Bureau Investigations

Windfall Creek drains rocks which consist of intercalated black and felsic (quartz, sericite, feldspar) phyllites, greenschists, and thin bands of greenstone. The phyllites and schists are cut by gold-bearing quartz veins near the head of Windfall Creek on the Smith and Heid property. As with lower Montana Creek, the trace of the Coast Range megalineament follows lower Windfall Creek. The worked placer gravels lie at the upper end of a low-angle alluvial fan that is located in the Windfall Creek drainage south of Windfall Lake. The gravels are terminated by a steep section of waterfalls on bedrock in the stream bottom. It appears that no mining was done above this point except for the unrelated work occurring in the upper basin.

Sample Results

The Bureau collected 7 placer samples along a 1.7-mile stretch of Windfall Creek (fig. D-91, Nos. 1-7) which includes the old workings. Along the lower reaches of the creek, bedrock was not close to the surface, but in the upper portion samples were collected down to bedrock. The stream gravels contain numerous large boulders up to 4 feet in diameter, but most range from 0.5- to 1.0-foot. Samples contained up to 0.008 ounces/yard^3 gold and averaged 0.0017 ounces/yard^3 gold. The highest values occur 0.6 miles above the old workings, between 600 and 700 feet in elevation. The gold varies from 0.001 to 0.002 inches in diameter with occasional particles up to 0.004 inches. The gold is more angular and coarser than that found on Montana Creek. Four of five samples analyzed for tungsten contained between 450 ppm and 775 ppm tungsten in the form of scheelite.

Resource Estimate

The upper portions of Windfall Creek above the old placer workings contain relatively high gold values and the area has a moderate mineral development potential for placer gold. The tungsten may originate in the quartz veins in the area. Scheelite is known to occur in the quartz veins at Herbert Glacier.

Recommendations

It is recommended that trenching be done to bedrock and placer samples taken at regular intervals along Windfall Creek, especially between 500 and 700 feet elevation.

MAS No.
21120092

References

D-63, D-95, D-96, D-97, D-98, D-99, D-112, D-130, D-161

SMITH & HEID MINE

Production

At least 205 ounces of gold were extracted from the Smith & Heid Mine.

History

James Smith and Gus Brown discovered placer gold in upper Windfall Basin in 1892 (figs. D-5, D-91). Smith, joined by James Patton in 1893, uncovered quartz lodes at an elevation of 2,000 feet as a result of sluicing operations and drove 36 feet of the Falls Tunnel. In the fall of 1894, the men built an arrastre to crush gold from the quartz. Many tons of quartz were crushed during 1895 by Smith and John Heid and 193.5 ounces of gold were produced. Smith and Heid planned to sled a stamp mill to the mine during the winter of 1896 but the plan never materialized though a second arrastre was built. In 1897, John Tisdale bonded the property and drove two adits of 90 feet and 150 feet.

Work efforts slowed on the property until 1900 when Tom Smith and French Louis built another arrastre and milled 20 tons of ore from which they recovered 11.5 ounces gold. In 1903, the Smith & Heid was purchased by Charlie Lane and J. H. Conrad, but the results of their work are not known. The Treadwell Company examined the property in 1904 and a Mr. Conrad also looked at the property for other interests.

Tom Smith returned to the Smith & Heid Mine in 1907 and drove a few feet on Tunnel No. 2 and had put in an inclined raise to cut the vein at the face of the tunnel. It was not until 1910 that further development work on the adits was chronicled. By this time, 500 feet of adits existed on the property with 335 feet occurring in Tunnel No. 1. The next activity at the mine did not occur until 1930, when two men named Ashby and Torro restaked the property.

In 1931, the Alaska Juneau Company took an interest in the property, but their effort was shortlived. Two years later, in 1933, Tony Torro and T. H. and C. T. Ashby staked more claims and sluiced the tops of quartz outcrops on the property. A minor amount of gold was recovered from this operation. Some trenching was done on the veins in 1934 and 1937 and then the property was abandoned. An informal appraisal of the property was done in 1986 (*D-97*).

Workings and Facilities

Two open adits with 505 feet of workings (Tunnel No. 1—335 feet, Tunnel No. 2—170 feet), and one caved adit (36-foot Falls Tunnel) were found at the Smith & Heid Mine. Numerous trenches also occur above the underground workings.

Bureau Investigations

The gold-bearing quartz veins and stringer zones at the Smith & Heid Mine lie within an interbedded sequence of black and felsic phyllite, and chlorite schist. Graphitic schist occurs in areas of intensely sheared black phyllite. These rocks are cut by a series of northwest-trending faults dipping both northeast and southwest. The phyllite and graphitic schist contain quartz stringer zones up to 35-feet wide which are best exposed in Tunnel No. 1. These zones parallel schistosity, trending NW and dipping from 40° to 60°NE. The quartz stringers constitute up to 50% of the total volume of rock in the zones and contain up to several percent arsenopyrite and pyrite. Knopf (*D-62*) reports that galena occurs with the arsenopyrite. The stringer zones are also exposed in Windfall Creek north of the adit. A tan felsic phyllite is exposed in both adits as well as on Windfall Creek. It is rusty, vuggy, and contains disseminated pyrrhotite and quartz stringers. Knopf (*D-62*) also reports that the stringers contain galena, sphalerite, pyrite, arsenopyrite, and chalcopyrite. Red oxidized portions of this unit were reported to yield gold when panned.

Sample Results

The Bureau mapped all the known workings and showings in the area and took a total of 27 samples (figs. D-92 to D-94). Twelve samples were collected from Tunnel No. 1 (fig. D-94, Nos. 10-20) and the trench above it (fig. D-93, No. 9). The highest gold value, 107.8 ppm, was obtained from a 2-foot-wide mixed zone of quartz stringer-bearing graphitic schist and felsic phyllite in a folded and sheared zone in Tunnel No. 1 (fig. D-94, No. 15). Other samples from the tunnel contained 18.1 ppm and 2.4 ppm gold.

Six samples were collected in Tunnel No. 2 (fig. D-94, Nos. 22-27). A 1.2-foot-wide brecciated quartz vein on the footwall side of a sheared graphitic schist zone assayed 32.2 ppm gold. A sample collected in approximately the same location by Roehm contained 20.2 ppm gold.

Samples collected from quartz veins and stringer zones in Windfall Creek (fig. D-92, Nos. 1-5), which are probably northern extensions of the zones observed underground, did not contain significant gold.

The felsic phyllite zone mentioned by Knopf (*D-62*) as having significant potential by earlier reports did not contain appreciable gold. Bureau results are similar to Nelson (*D-85*) who stated that sampling indicated that the unit had no significant commercial value.

A placer sample collected in Windfall Creek above the upper falls contained 0.0002 ounces/yard^3 gold.

Resource Estimate

Bureau sampling indicates that the highest gold values are in the quartz stringer zones hosted in the felsic phyllite and graphitic schist. A brecciated quartz vein exposed in Tunnel No. 2 also contains high gold values.

Because no continuity or strike extension could be determined for any of these zones, no realistic resource

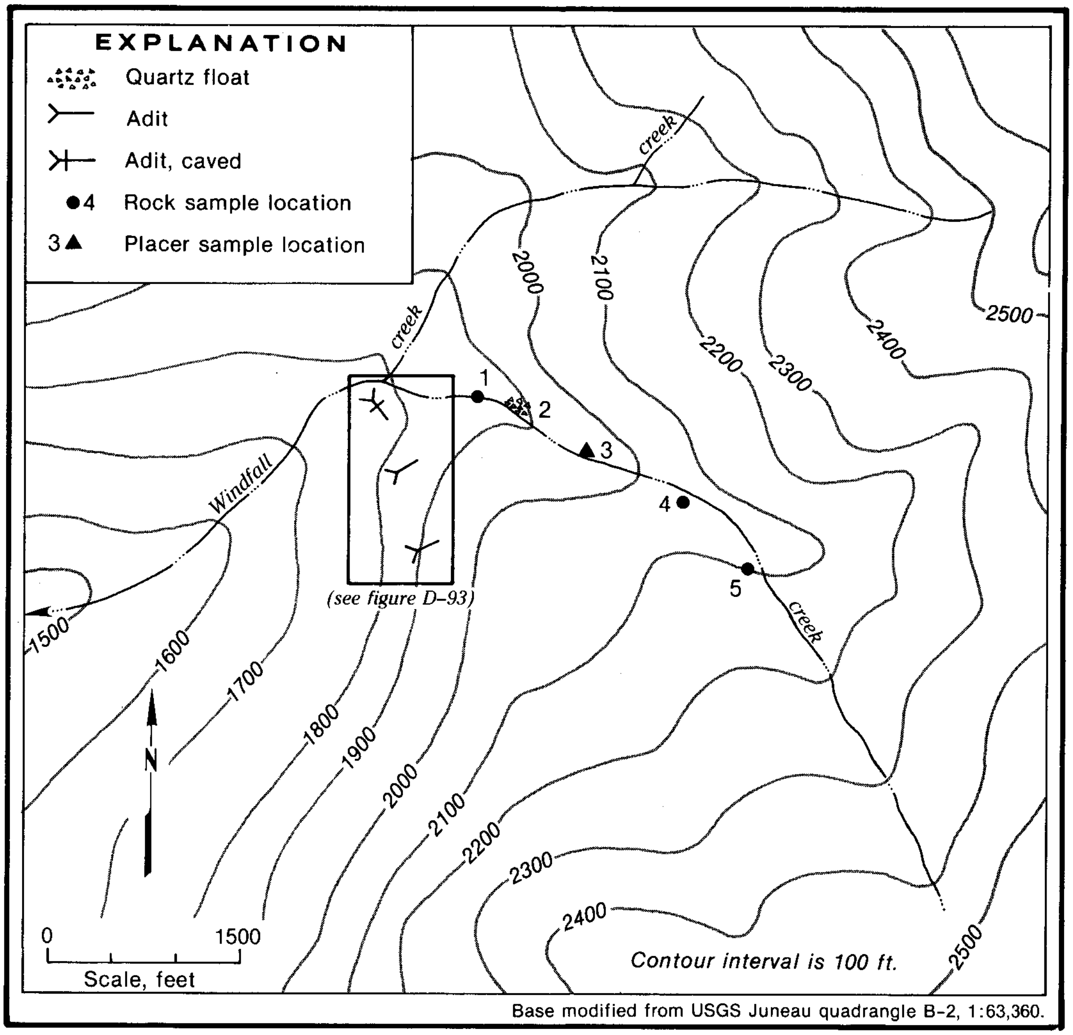

Figure D-92.—Smith & Heid, showing workings and reconnaissance sample locations.

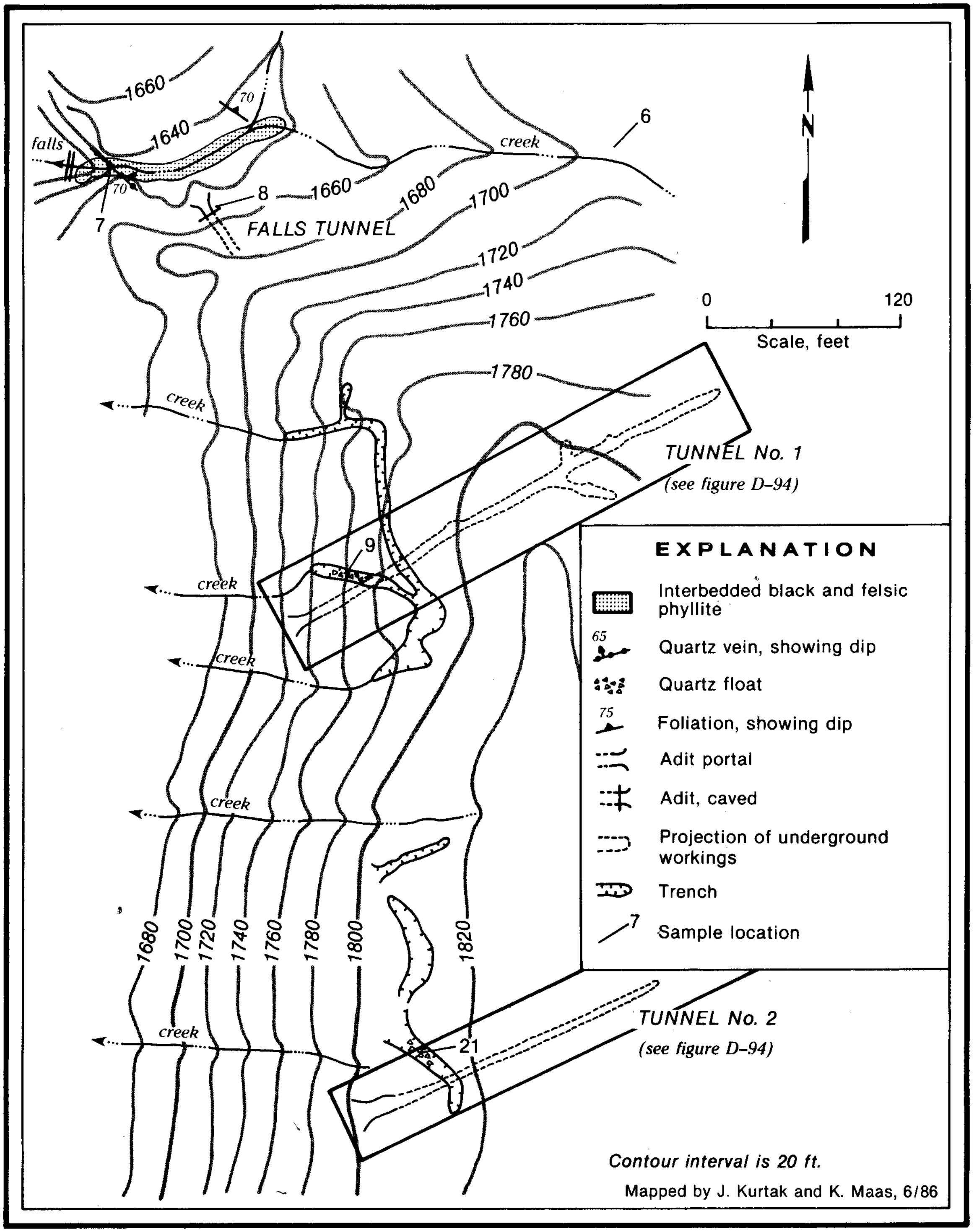

Figure D-93.—Smith & Heid, showing surface geology and sample locations.

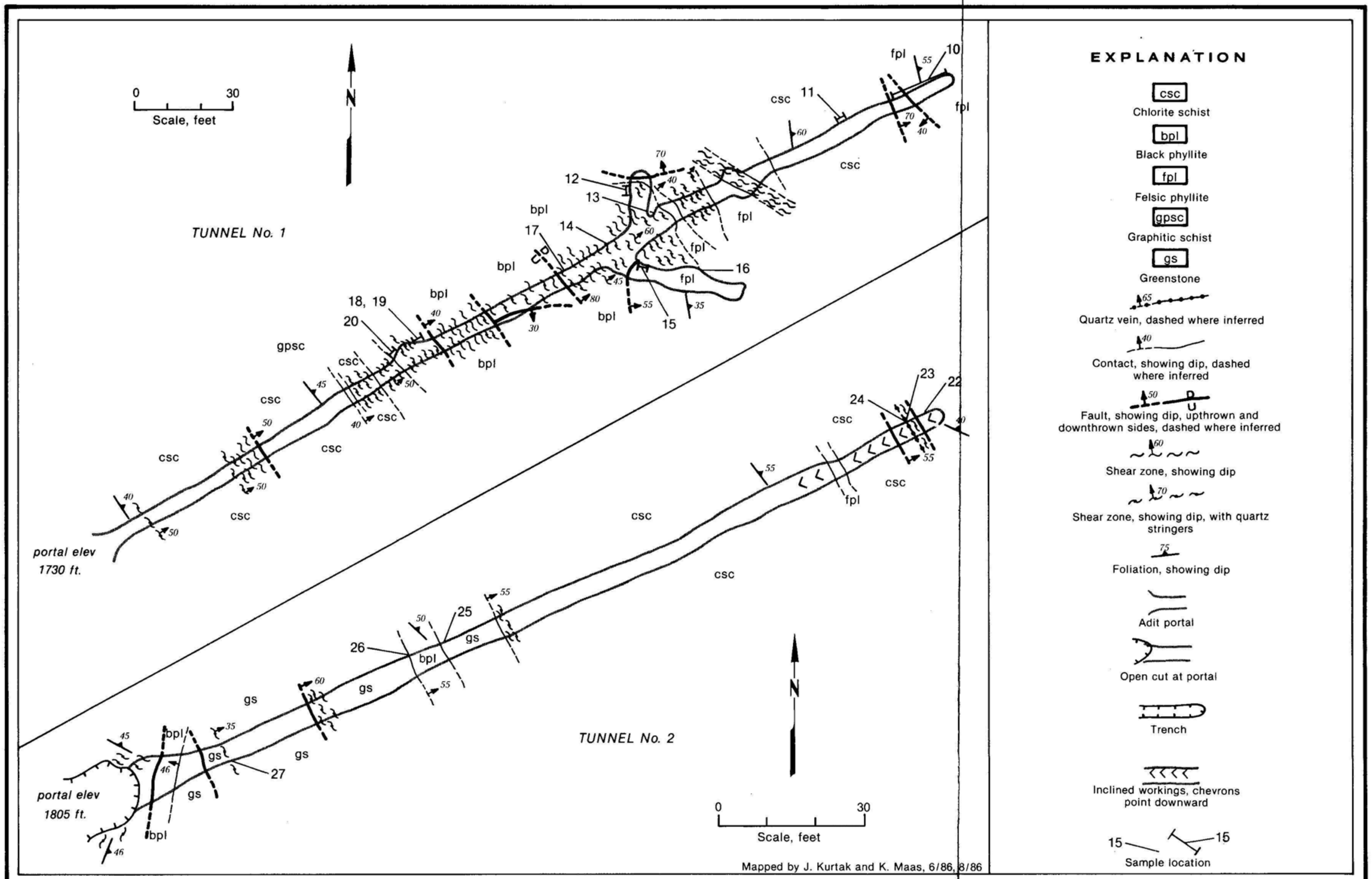

Figure D-94. — Smith & Heid, showing underground geology and sample locations.

estimates can be made. Sporadic high gold values give the area a moderate mineral production potential.

Recommendations

Drilling along the north-south extensions of the veins could be done to determine tonnage and grade. Trenching in a southerly direction from Tunnel No. 2 would help determine the extent of the brecciated quartz vein exposed in the rear of the adit.

MAS No.
21120093

References

D-62, D-63, D-85, D-95, D-96, D-97, D-98, D-99, D-112

MONTANA BASIN PROSPECT (also known as Patton)

Production

A small quantity of gold has been produced from the veins of Montana Basin.

History

Lode deposits in upper Montana Basin were first discovered in 1882 (figs. D-5, D-91). During the next 5 years, prospectors worked their way around the basin looking for more quartz veins. In July 1888, Sullivan Lewis and his partners owned the Congress First lode mine at the head of Montana Creek. An arrastre was built and some quartz milled. During 1889, only assessment work was done and, in 1890, Lewis died, halting operations.

In 1891, Lewis' brother returned to the basin with two other men to renew development of the quartz veins. The men worked on a 1.5-mile long ditch to provide water for the millsite, but progress was slowed by the steep terrain of the basin. James Smith and James Patton, supported by Judge Truitt, R. F. Lewis, William Sanders, George Garside, and John Heid, planned to build an arrastre and a 4-mile trail from Tee Harbor to the mine in 1895.

In 1899, Portlanders acquired the basin claims, and a Mr. Batchelor began driving an adit to undercut the veins. By the end of the year, 160 feet had been driven. A second adit was driven below the first one. Additional work was done in 1899 at the Lewis, Sanders, Garside, and Heid claims, adjacent to Batchelor's property.

In 1904, Tom Drew had workers opening up additional quartz veins. Judge States acquired a group of claims in Montana Basin in 1910, and had a group of miners working to get the property ready for an examination by a St. Louis mining expert the next spring. In the fall of 1912, G. A. Irwin sampled the property for some San Francisco investors and returned in 1913 to prepare for the summer's work, but little else is known. The States property was patented in 1914.

A Tacoma company bonded the Montana Basin claims in 1914 and took several sacks of samples the next year. The basin was quiet until the Alaska Juneau Company took a short-lived interest in the area in 1931. By 1934, two adits totalling 315 feet of workings were reported on the claims.

During summer 1935, M. L. Ferguson, W. B. Thomas, Tom Larson, Keldon Adams, and James Locke worked what they called the Big Hurrah Mine (No. 3 adit, see figs. D-95, D-96). On June 20-21, Vern Gorst, using his flying boat, airdropped 1,100 pounds of parts for a 5-ton Gibson Prospector's Friend Mill. The next year, a 170-pound gyratory crusher was also dropped but soon afterwards, the mines in Montana Basin were abandoned. Six patented claims are present in the Basin, although no hard-rock mining has taken place here for 50 years (*D-97*).

Workings and Facilities

Numerous sloughed trenches and four adits (with 500 feet of underground workings) are reported but only three of the adits were located. Adit No. 1 is 22 feet long, adit No. 2 (Sandy Smith Tunnel) has a 66-foot crosscut and a 94-foot drift, and No. 3 adit has a 70-foot crosscut with 38 feet of drifts. The caved adit is reported to be 210 feet long (*D-85*). A small concentrating mill lies below adit No. 3 and has a Pelton wheel driving a 4-foot by 8-foot concentrating table.

Bureau Investigations

The Montana Basin area consists of interbedded black phyllite and biotite schist. Foliation averages 145° with dips ranging from 40° to 70°NE. The biotite schist contains two sets of quartz veins. One set of veins parallels foliation and consists of both massive veins and stringer zones. This set, which is also common in the black phyllite, contains minor pyrite and no gold.

The second, less common, vein set trends between 080° and 090°, crosscutting schistosity and has dips ranging from 55° to 65°N. Fault gouge and slickensided surfaces occur along the vein margins. These veins contain gold in association with arsenopyrite.

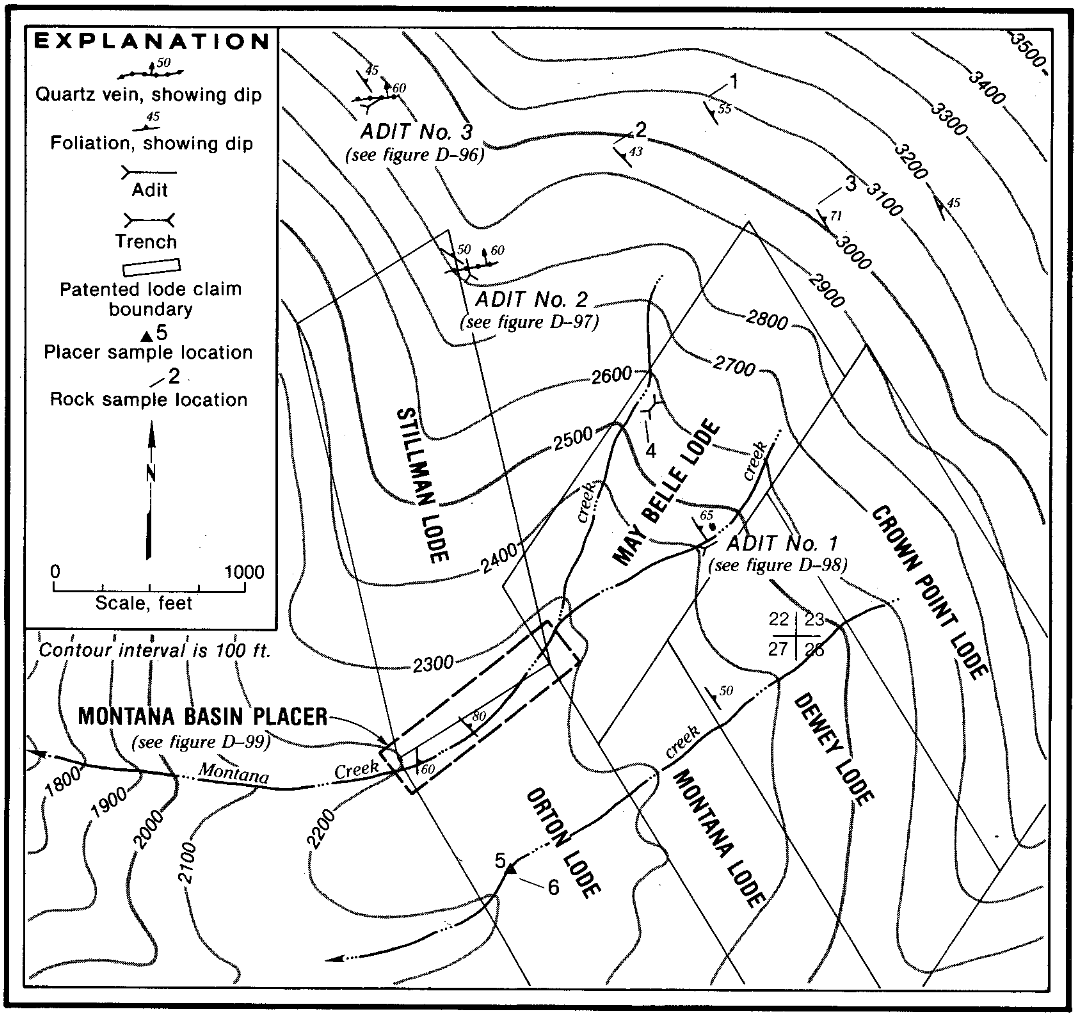

Figure D-95.—Montana Basin, showing geology and sample locations.

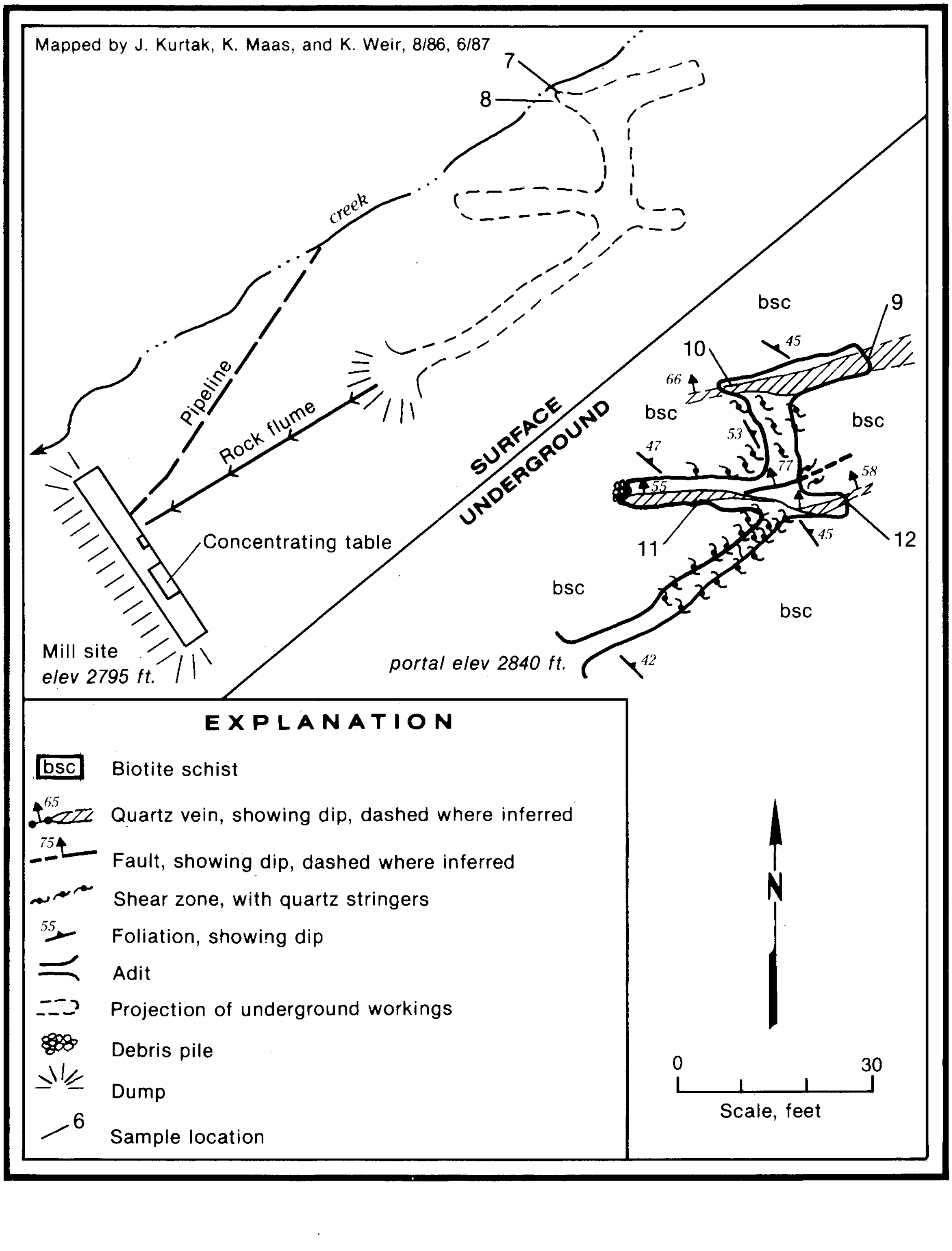

Figure D-96.—Montana Basin—Adit No. 3, showing geology and sample locations.

Sample Results

The Bureau located, mapped, and sampled three adits and other workings in Montana Basin (figs. D-95 to D-98). A fourth adit reported to be at 2,475 feet elevation was not located (*D-85*). The highest gold values were from the No. 2 adit (Sandy Smith adit). Of the 14 samples collected in the adit and vicinity (fig. D-97, Nos. 13-26), the 11 samples taken from the main vein gave a weighted average of 23.0 ppm gold and 3.9 ppm silver over an average vein width of 1 foot. The two highest samples from the vein contained 64.3 ppm and 76.3 ppm gold. The vein in the adit was explored, and mined for 100 feet along strike.

The No. 3 adit (fig. D-96) cuts two semi-parallel quartz cross-shear veins which trend nearly east-west and average 2.2 feet in thickness. Four samples were collected from the veins (two from each) and two additional samples were taken of quartz on the surface above the adit (fig. D-96, Nos. 7-12). Samples from the front vein in the adit contained 4.4 and 2.0 ppm gold and the back vein yielded 18.2 and 0.1 ppm gold. Surface samples carried 2.2 and 1.0 ppm gold.

One sample was collected from adit No. 1 (fig. D-98, No. 27) and it did not contain any significant metal values.

Five samples were taken from surface veins (fig. D-95, Nos. 1-5). All of these samples contained insignificant metal values.

The quartz veins exposed in adits No. 2 and 3 are similar in orientation and character. Gouge occurs along the margins of both veins, the quartz is crushed and iron-stained, and minor amounts of sulfides are present. Investigation of the workings suggested that the parallel nature of the veins in adit No. 3 initiated a search for a second vein in adit No. 2 after the original work took place. The miners extended the crosscut in adit No. 2 approximately 60 feet beyond the first vein but did not intersect the suspected second vein.

Resource Estimate

Measurements of old stopes in the workings indicate that 35 tons of ore were mined. The following resource estimate was derived from Bureau sampling and mapping of the remaining quartz exposed in the workings:

Indicated Resources

Area	Tonnage	oz/t Au	Avg. vein width (ft)
Adit No. 2	165	0.64	1.0
Adit No. 3	84	0.15	2.7
Over Mining Width	587	0.23	3.0

Recommendations

The biotite schist rocks should be prospected for cross-shear veins. A search for these occurrences should be done in the upper elevations of the basin in both a northwest and southeast direction towards Windfall and McGinnis basins respectively. Drilling is not recommended until target areas have been delineated by trenching and sampling methods.

MAS No.	MS No.
21120097	937

References

D-62, D-63, D-85, D-95, D-96, D-97, D-98, D-99, D-130, D-138

MONTANA BASIN PLACER

Production

Some gold has been produced from the Montana Basin placers but the amount is not known.

History

Placer gold was discovered in Montana Creek in 1882 by John Olds (figs. D-5, D-91, D-95). Small scale mining was done for several seasons after the discovery, most of the work probably done in Montana Basin at the head of the creek. In 1890, John Wilson and Joe Woods began working the creek in the basin and continued mining through 1892. In 1900, placer miners on lower Montana and McGinnis Creeks were recovering enough gold to start a small stampede to the benches along lower Montana Creek.

Not much else is known about placer mining in Montana Basin except that Elliot Fremming, Dominick Perelle, Frank Cincentini, and Tony Torro staked placer claims on most of Montana Creek in 1927 (*D-97*). In 1986 and 1987, Sonny Hogan leased the property and did some small scale mining (*D-51*).

Workings and Facilities

Placer tailings are stacked along the margins of the present stream channels, and quartz boulders are stacked adjacent to the south bank of the main channel. Remains of an arrastre and sluice boxes are also present. Several water ditches are still discernible.

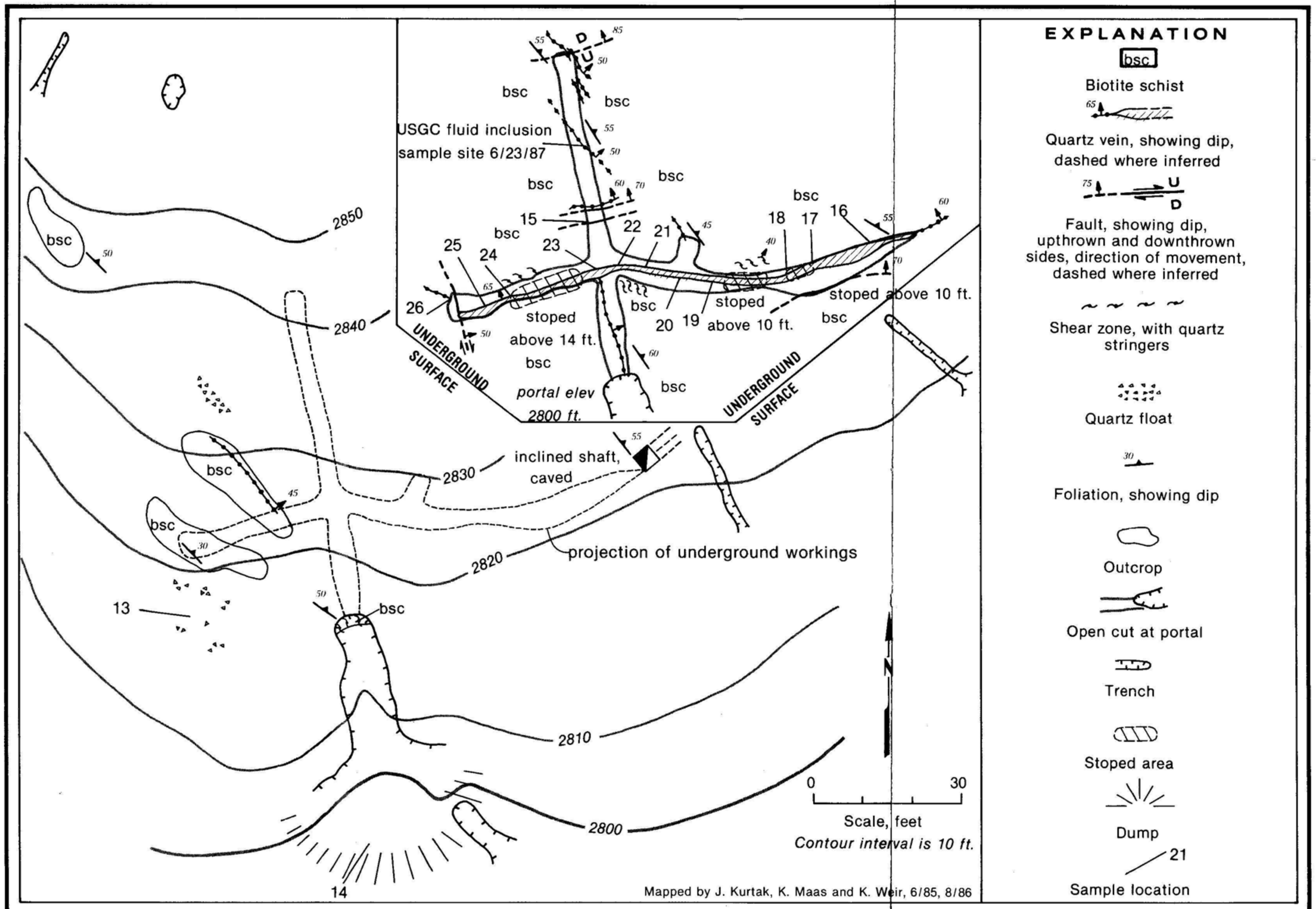

Figure D-97. — Montana Basin-Adit No. 2, showing geology and sample locations.

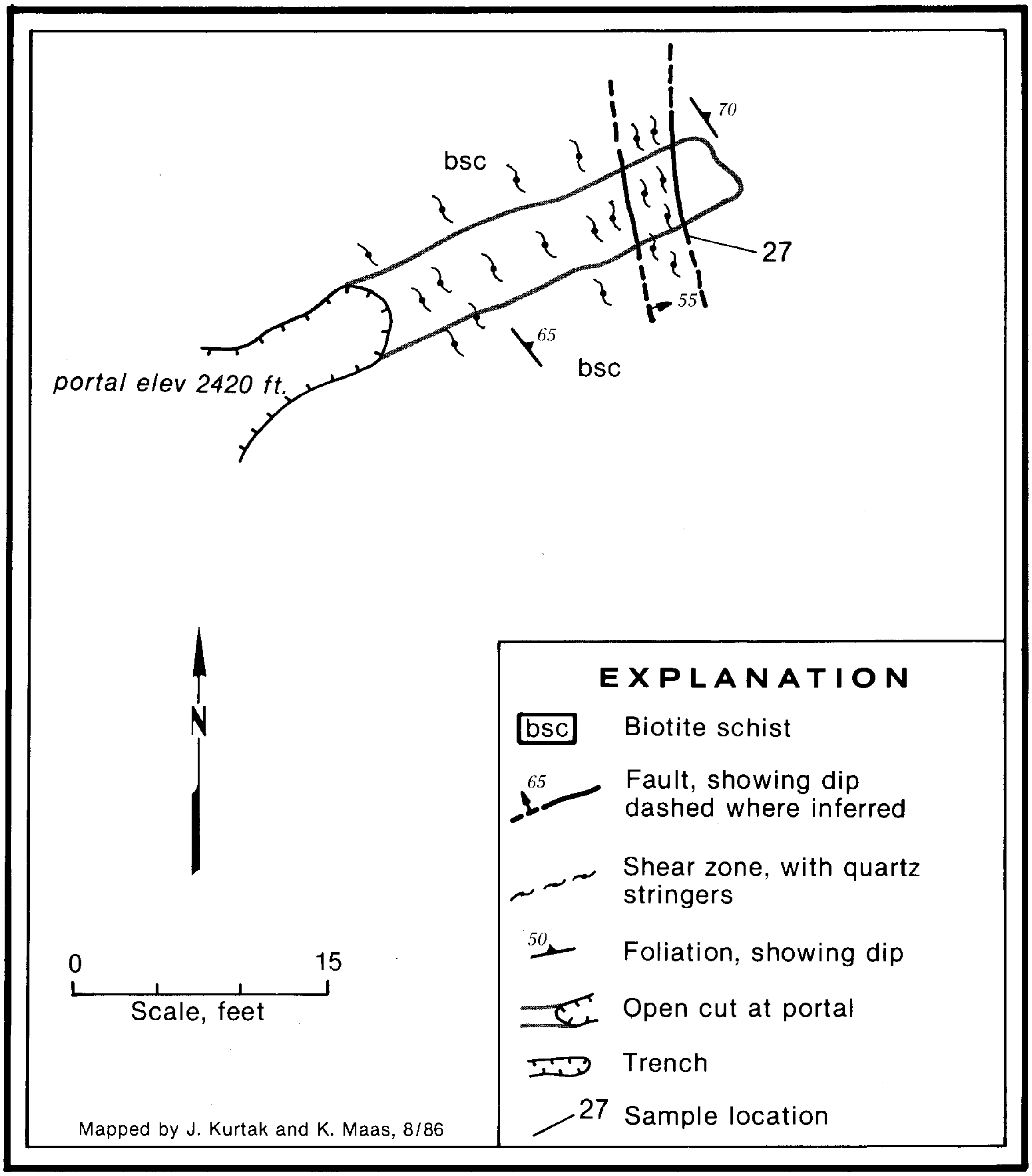

Figure D-98.—Montana Basin—Adit No. 1, showing geology and sample locations.

Bureau Investigations

Bedrock underlying the gold-bearing gravels consists of northwest-trending, NE-dipping interbedded black phyllite, chlorite schist, and minor greenstone. Quartz stringer zones up to 4 feet in width and individual quartz veins up to 1-foot wide roughly parallel foliation. Quartz locally contains up to 1% arsenopyrite, pyrrhotite, and a trace of chalcopyrite. The present stream channel flows on or near bedrock in the area and cuts across schistosity which provides natural riffles for the accumulation of placer gold. A thin discontinuous layer of clay locally occurs on top of bedrock and sampling proved it is also a good trap for gold. Stream gravels contain at least 30% small-medium size boulders (10 to 30 inches diameter).

Sample Results

The Bureau collected seven 0.1 yd^3 placer samples from Montana Creek in Montana Basin (fig. D-99, Nos. 2-4, 6, 8-10). The highest gold value of 0.035 ounces/$yard^3$ was obtained from previously worked gravels on the north side of the basin (fig. D-99, No. 8). The average grade from the samples was 0.016 ounces/$yard^3$ gold. A map delineating the extent of potential gold-bearing gravels in the immediate vicinity of the sample sites is included. Gravel depths vary from 1 to 6 feet with an average depth of 3 feet. Old tailings piles indicate that some of the gravels had been previously mined using hand methods. The gold recovered during sampling is rough textured, indicating a short transport distance, and particle sizes averaged 0.02 inch in diameter. Occasional pieces up to 0.2 inch were found and several contained quartz. Mercury coatings appear on some pieces suggesting that previous operations used amalgamation in their sluice boxes in an attempt to recover the fine gold. Five of the seven samples showed concentrations of silver greater than 30 ppm. Three samples of quartz veins exposed in the stream bottom and float from the old tailings piles contained no traces of gold (fig. D-99, Nos. 1, 5, 7).

The placer gold in Montana Basin probably has its source in the numerous quartz veins and stringers at the head of the basin. Several quartz veins have been previously prospected and samples contain up to 69 ppm gold. The arrastre near the placer tailings was probably used to crush gold-bearing quartz float.

Resource Estimate

The high gold content of numerous placer samples indicates a high mineral development potential for an initially small scale placer mining operation. An indicated resource of 8,100 yd^3 with a weighted average of 0.016 ounces/$yard^3$ gold was calculated for this area.

Recommendations

Trenching is recommended to further test the gold-bearing gravels as outlined by the Bureau. In addition, the terrace gravel deposits to the southeast should be sampled to determine possible resources.

MAS No.	MS No.
21120225	937

References

D-51, D-62, D-63, D-95, D-96, D-97, D-98, D-99, D-130

MONTANA CREEK PLACER

Production

A total of 46.9 ounces of gold were produced between 1928 and 1935 (*D-146*).

History

John Olds is credited with discovering placer gold along Montana Creek in 1882 (figs. D-5, D-91). He eventually located claims in the upper basin, undoubtedly following colors up lower Montana Creek to reach the upper basin. Additional activity along the lower stretch of the creek resumed in 1900 when placer miners working the creek reported good results. Their success sparked a small rush to mine the benches along the creek.

In 1927, a group staked most of Montana Creek with placer claims. Harry Watson bought a large interest in these claims and in 1928 began mining. Watson built a bridge over the Creek, moved in a tractor and dragline, and, with the help of the U. S. Bureau of Public Roads and the Forest Service, a road was built to the creek. Watson worked the placer intermittently between 1928 and 1935, recovering a total of 46 ounces of gold from at least 1,650 yd^3 of gravel (*D-97*). U. S. Mint records shows that Don Graves recovered 0.85 ounces of gold from prospecting efforts in 1940 (*D-146*).

Workings and Facilities

Signs of historic suction dredging along the creek are evident.

Bureau Investigations

Bedrock in the Montana Creek area consists of interlayered, NW-trending, E-dipping black phyllite, chlorite

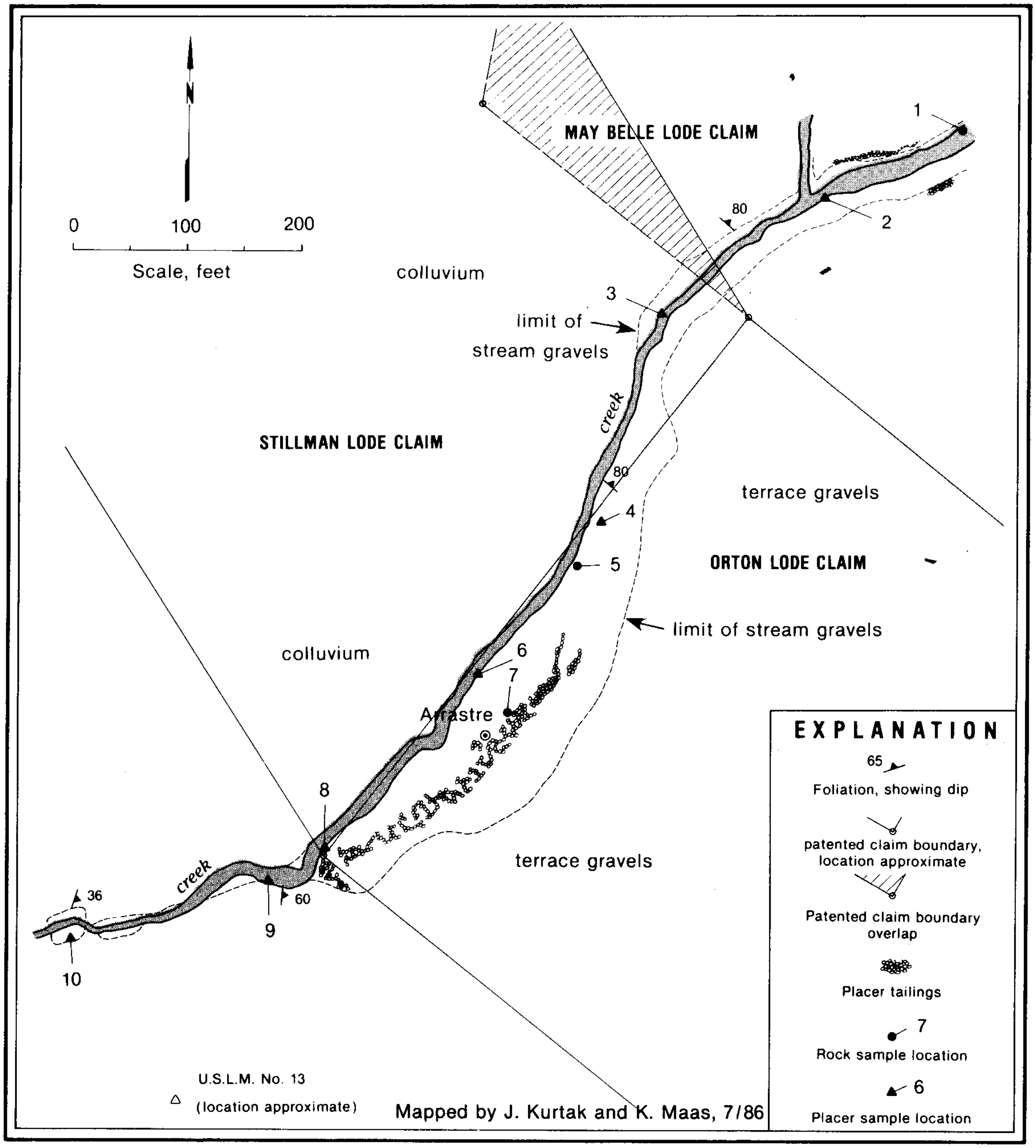

Figure D-99.—Montana Basin Placer, showing sample locations.

schist and greenstone. The Coast Range Megalineament is projected along the trend of lower Montana Creek (*D-22*). Foliation of the country rock roughly parallels the drainage direction. One foot diameter boulders are common in the stream gravels and boulders up to 3 feet long are also present.

Sample Results

The Bureau collected five 0.1 yd^3 reconnaissance placer samples along a 1.7 mile stretch of Montana Creek (fig. D-91, Nos. 30-33, 36). The highest-grade sample contained 0.0009 ounces/$yard^3$ gold; an average from all samples yielded 0.0007 ounces/$yard^3$ gold. The stream flows on bedrock in only a few places along the stretch sampled. Gold ranges from 0.001 to 0.002 inches in size with an occasional flake up to 0.012 inches. The particle nature is somewhat smooth and flaky indicating a longer transport distance than that of gold found in upper Montana Basin. This indicates that gold in lower Montana Creek may have its source in the upper basin. The area with the highest grade sample appears to have been previously worked by a suction dredge.

Resource Estimate

Placer gold collected from gravels in Montana Creek both upstream and within 0.5 miles from the end of the Montana Creek road give the area moderate potential for placer gold. An estimate of the volume of material present was not done for this area.

Recommendations

Closer-spaced placer sampling in the vicinity of the higher value samples and additional trenching (to bedrock) would produce a better determination of available gravel volumes.

MAS No.
21120096

References

D-22, D-63, D-95, D-96, D-97, D-98, D-99, D-126, D-130, D-146

McGINNIS CREEK PLACER MINE

Production

An unknown quantity of gold was sluiced from McGinnis Creek between 1904 and 1908. Three ounces of gold were mined in 1939.

History

Placer gold was probably discovered in McGinnis Creek (figs. D-5, D-91) in the 1880's but the first documented claims were staked by Adam Reidlinger in 1897. The Mansfield Gold Mining Company acquired these placer claims, along with associated lode claims, in 1903.

Ralph B. Day, superintendent of the company, installed hydraulic machinery and a 1,000-foot-long flume by the end of July 1903. In July 1904, the flume was in operation and the company was using high-pressure water nozzles (giants) to sluice the grounds. A test sample from a trench 2 feet deep by 12 feet long returned about 0.6 ounces gold. The company was also developing the quartz veins by opening up a number of pits during this time.

In 1905, the Mansfield Company had 500 acres of placer ground and 39 quartz claims in the valley. George Otterson took charge of the company's operations and installed a small compressor, drill, and a 1,500-pound cable tram. Facilities were readied for handling oversize quartz boulders, sluicing gravels, and housing workers. By May, a 500-foot tunnel had been driven to undercut the lode occurrence and 5,000 pounds of quartz boulders had been stockpiled during sluicing operations. Otterson suddenly closed down the operation in June of 1905 because of poor results.

The Mansfield Company was reorganized into the Juneau Mining and Power Company in 1906. In September, George Kyrage took a crew to the mine and worked until January 1907, when cold weather and legal squabbles kept the operation closed. Minor work was accomplished during 1908 and 1909 and again between 1912 and 1917. The company acquired a patent to the claims in 1914 (*D-97*).

The property was idle until 1939, when new claims were staked adjacent to the patented group and 3 ounces of gold were recovered from 220 yd^3 of material obtained from 2 placer cuts (*D-118*). This was soon abandoned and the property remained idle.

Workings and Facilities

In 1910, several buildings, flumes, ditches, and an open cut were still present on the property. Now only the remains of several placer ditches, a placer cut, and some hydraulic pipe can be found amongst the thick alder. The reported adits were not found. The placer cut is approximately 60 feet by 300 feet and contains colluvial gravel overgrown with abundant vegetation.

Bureau Investigations

Bedrock in the area consists of NW-trending, NE-dipping black phyllite and biotite schist. The phyllite contains quartz stringers both parallel and oblique to foliation. These quartz showings are reported to locally contain pyrite and up to 0.04 ounces/ton gold (*D-118*).

Placer gold occurs in colluvium derived from the ridges on the east side of McGinnis Creek. The colluvium forms a series of talus cones whose lower portions coalesce with each other and merge with the gravel bed of the creek. This material was prospected by test pits, some of which went down to bedrock. A tunnel was driven into the colluvium for 50 feet and creek water was diverted for hydraulicing by a flume nearly a mile long. Gold was reported to occur mostly as fine rough grains derived from the numerous quartz stringers occurring in the phyllites (*D-130*).

Several trenches were also cut in the colluvium on the west side of McGinnis Creek at 535 feet elevation. One of these reportedly produced 3 ounces of gold. The gold was reported to be rough and fine to flaky. The concentrates were reportedly mainly black sands containing pyrite, galena, and limonite (*D-118*).

Sample Results

The Bureau located the hydraulic workings described above the east side of McGinnis Creek (fig. D-91). Two placer samples (fig. D-91, Nos. 21, 24), which averaged 0.0017 ounces/yard^3 gold, were collected in gravels along a tributary stream to McGinnis Creek just south of the pit. This tributary stream contains abundant quartz float which locally makes up to 10% of the stream gravels. The quartz locally contains up to 1% pyrrhotite, pyrite, chalcopyrite, and arsenopyrite. Two samples of this quartz contained 0.07 ppm gold.

Two tunnels are shown on the Mineral Survey plat to occur 800 feet southeast of the hydraulic cut but a search of this area located no workings, although abundant quartz float was found. One float sample contained 1.1 ppm gold.

A series of placer samples were collected along the main McGinnis Creek drainage (fig. D-91, Nos. 8, 26-28) with the highest value, 0.0013 ounces/yard^3 gold, obtained where the creek mouth enters Montana Creek.

A branch of McGinnis Creek draining in from the west, 1 mile above the McGinnis placer, was examined as placer gold was previously reported there. The drainage was very steep and no gold was found by panning.

A total of 14 samples were taken of quartz vein and float material in the valley (fig. D-91, Nos. 9-13, 15-20, 22, 23, 25). A sample of quartz float collected from a trench on the west side of McGinnis Creek, 0.6 miles above the hydraulic open cut, contained 2,860 ppm zinc and a sample of quartz float in the stream east of the placer cut carried 1.1 ppm gold (No. 18).

Resource Estimate

This area has low mineral production potential for placer gold due to the low gold values in placer samples.

Recommendations

It is recommended that a search be made for the source of the abundant mineralized float in the area and attempt to locate the underground workings. To determine the placer potential of McGinnis Creek, the valley bottom should be drilled.

MAS No.	MS No.
21120104	939

References

D-63, D-95, D-96, D-97, D-98, D-99, D-118, D-130, D-160

PETERSON MINE

Production

Table D-8.—Gold and silver production from the Peterson Mine (*D-146*)

Year	Tons Milled	Oz Au	Oz Ag
1905–1908	unknown	unknown	unknown
1913–1915	unknown	unknown	unknown
1916[1, 2]	25	61	
1917	134	39	
1918	82	24	
1919	90	26	
1920	100	29	
1921	100	30	8
1982	13	2	
Total	544	211	8

[1] These figures probably refer to concentrates as the grade is nearly eight times as high as in other years.

[2] Average grade for production 1916–1921: 0.39 ounces/ton gold, 0.29 ounces/ton gold without 1916 production.

History

The gold-bearing quartz veins near Peterson Lake were first discovered by George Rudd and others in 1897 (figs. D-5, D-100). John Peterson acquired the property later in the year and in 1900 sluiced the ground over the veins. An arrastre was built in 1901 but it was only partially successful.

During 1903, Tom Drew optioned the mine from Peterson. Drew's men built a 4-mile road connecting the

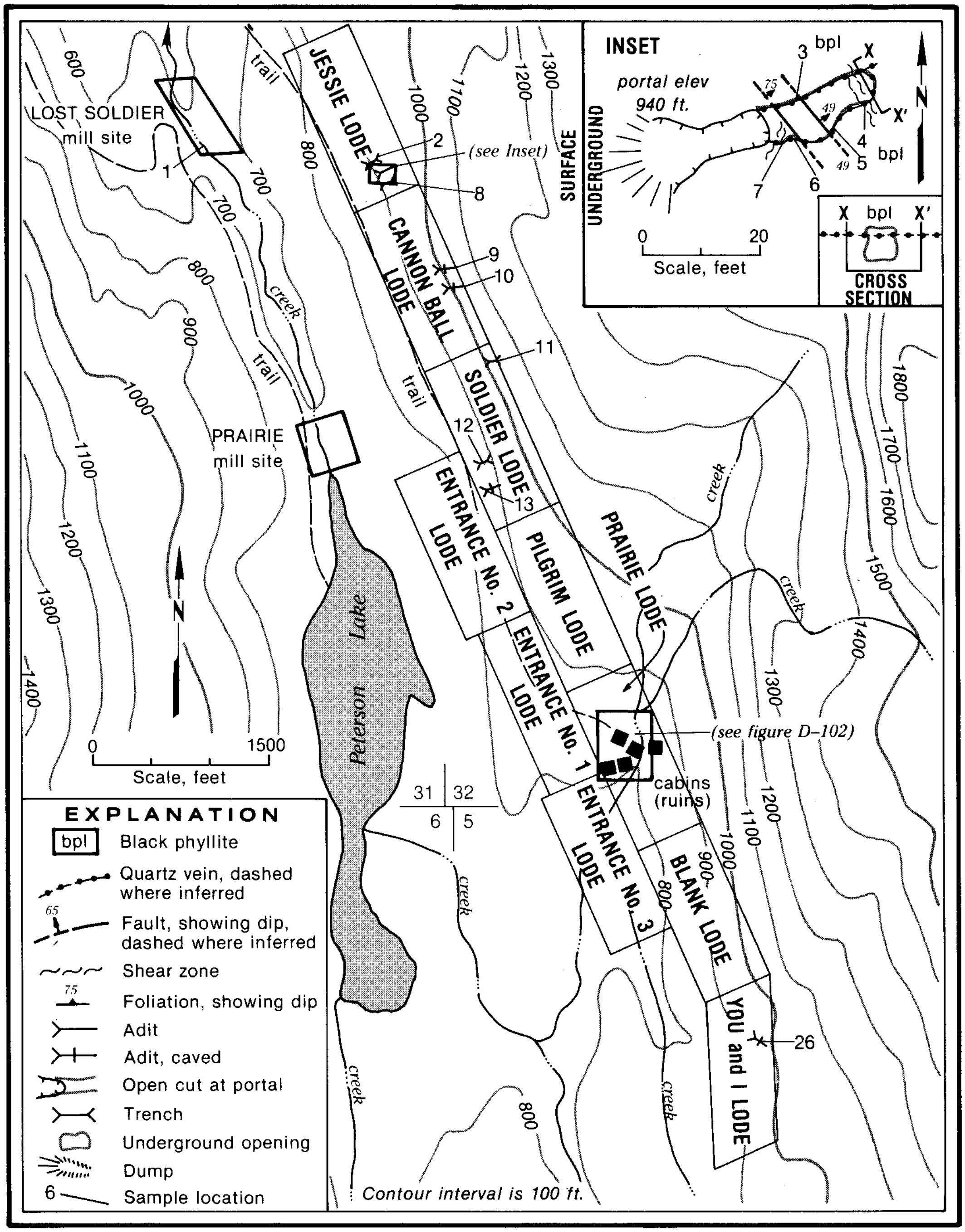

Figure D-100.—Peterson Mine area, showing historic claim boundaries, surface workings, and sample locations.

mine to Pearl Harbor, sunk shafts, excavated open cuts, and stockpiled 5,000 tons of ore. Drew rented a 3-stamp mill (fig. D-101) and assay office from J. G. Davies to evaluate the ore in 1904. By October, Drew dropped his interest and Peterson purchased the mill for $450.

Peterson tried to lease out his property in early 1905 but, being unsuccessful, began mining himself. He operated the mine and mill during the years 1905 through 1908 on a small scale.

In 1909, J. Milligan, of the Southern Alaska Consolidated Mines Company, leased the property. The company worked the claims in 1910 under A. T. Holman who renovated the existing workings and drove the Prairie Tunnel. The company starting using a diamond drill in October, 1910. By December, a few hundred tons of ore had been mined but the drilling program had not gone well and the company returned the property to Peterson.

By the end of 1911, there were 11 tunnels totalling 625 feet of workings, 4 shafts with 163 feet of workings, and 16 trenches. Peterson did some work in 1911 but in 1912, Bart Thane and Herman Tripp optioned the property. During 1912 and 1913, their Alaska Southern Mines sunk a 135-foot shaft which cut a large vein 70 feet down. They explored the vein but low gold values caused them to drop the property.

Peterson operated the property with the help of his wife Mary and two daughters, Irma and Margaret, between 1913 and 1916. In 1916, however, Peterson died, and the work fell to the three women. The family worked the Cannon Ball claim and processed 10 tons of ore each week, making a sufficient amount to pay expenses.

The Peterson women continued to work the mine until 1923, producing gold in all but the last 2 years. The total production for this period was 209 ounces of gold and 8 ounces of silver from over 550 tons of ore. The success of the mine gained national recognition for the Peterson daughters, who became known as the "girl gold miners of Alaska" (*D-97*).

The property was leased to J. Holland in 1935. He tried to put the mine back into operation after gold prices rose to $35/ounce but he was unsuccessful.

In 1982, Dale Henkins reworked the old mine dumps with an impact mill and gravity table. About 2 ounces of gold were recovered from 13 tons of material. The mine is currently leased to FMC Corp., which is core drilling in the area.

Figure D-101.—Three-stamp mill at the Peterson Mine. John Peterson, his wife Mary, and daughters, Irma and Margaret, produced small amounts of gold from the Peterson Mine between about 1905 and the early 1920's.

Workings and Facilities

The Peterson Mine has 4 shafts (the 2 largest are 100 feet, 50 feet deep), 11 adits (Cannonball claim—20 feet, 60 feet and 80 feet, Prairie claim—300 feet in 5 adits, Entrance No. 1 claim—360 feet, Jessie claim—20 feet, You and I claim—20 feet), and numerous trenches (*D-109*). All underground workings, except for the adit on the Jessie claim, are presently inaccessible. A three stamp mill, gravity table, and steam hoist are still present as are several ruined and one habitable cabin.

Bureau Investigations

The Peterson Mine area is underlain by NW-trending black phyllite and greenstone. The rocks dip at low angles to the east. Four types of greenstone are described in the area (*D-62*). A chloritized, 80- to 100-foot-thick diorite sill lies on the footwall of the lode. Phyllite along the contact with the diorite is impregnated with fine pyrrhotite and pyrite. An augite lamprophyre is exposed in the dike footwall. Augite diorite is also exposed on the west side of a ridge lying to the east of the Peterson Mine, while breccias and lavas of augite metabasalt form the ridge top. As with the diorite dike in the mine vicinity, these units gently dip to the east.

On the Prairie claims, masses of quartz up to 30 feet in surface width have been exposed for a length of 350 feet along a 150° trend. Some of the quartz masses form flat irregular bodies from which stringers penetrate the surrounding phyllite, crosscutting the foliation (*D-62*).

Arsenopyrite is the only sulfide mineral found in the ore. Free gold is also present. The ore was free milling and could be divided into two classes: one consisting of white quartz and the other containing banded quartz. Assays show that gold values are concentrated in the banded quartz (*D-25*).

Roehm (*D-109*) suggests that the rocks underlying the Peterson area represent a northern extension of the same series associated with the Gold Knob and Treasury Hill prospects. Quartz veins appear to be concentrated along unit contacts and are mainly confined to a narrow zone

Cyanide Amenability Test Results

Product	Weight, g	Assay, oz/t		Distribution, %	
		Au	Ag	Au	Ag
Leach Solution	817	8.0	1.3	96.9	38.1
Leach Residue	1008	0.006	0.1	3.1	61.9
Head (Calculated)	1008	0.195	0.08	100.0	100.0

Bulk Sulfide Flotation Results

Product	Weight, %	Assay, oz/t		Distribution, %	
		Au	Ag	Au	Ag
Concentrate	1.9	2.126	.43	90.8	44.4
Tail	98.1	.010	.05	9.2	55.6
Head (Calculated)	100.0	.107	.04	100.0	100.0

Cyanide Leach and Assay Screen Analysis

Product	Weight, g	Assay, oz/t		Distribution, %	
		Au	Ag	Au	Ag
Leach Solution	3529	.120	.06	92.3	30.3
Leach Residue	3842	.007	.13	7.7	69.7
Head (Calculated)	3842	.119	.18	100.0	100.0

Leach residue size fractions, mesh	Weight, g	Assay, oz/t		Distribution, %	
		Au	Ag	Au	Ag
+20	40.24	.005	.19	21.95	60.44
−20: +35	24.93	.011	.15	29.93	29.57
−35: +65	14.21	.008	.05	12.41	2.81
−65: +100	5.93	.010	.05	6.48	1.17
−100: +150	3.90	.028	.06	11.93	1.85
−150: +200	1.56	.010	.19	1.71	2.35
−200: +325	1.56	.018	.05	3.07	0.31
−325	7.65	.065	.05	12.53	1.51
Residue (Calculated)	99.98	.007	.13	100.01	100.01

of phyllite on the east side of the altered dike. At this location the phyllites show intense folding and gold-bearing quartz veins appear concentrated near an anticlinal fold crest that plunges to the southeast.

Sample Results

The Bureau located and sampled old workings (mainly caved adits and associated dumps) along a 7,500-foot trend within the Peterson claim block (fig. D-100). A 350-pound metallurgical sample was collected from two dumps on the Prairie claim, and shipped to the Bureau research center in Salt Lake City, Utah, for gold beneficiation tests.

Cyanide amenability, flotation, and cyanide-leach-with-assay-screen analysis of the leach residue were done on the sample. Results of the tests are presented on the previous page (*D-71*).

The Bureau located and mapped the workings at the Peterson Mine and collected a total of 26 samples (figs. D-100, D-102), including the metallurgical sample. The highest gold values obtained from Bureau sampling were obtained on the Jessie, Lost Soldier millsite, and Cannon Ball claims (fig. D-100, Nos. 1, 8, 10). Seven samples were taken from the Jessie claim (fig. D-100, Nos. 2-8) and, exclusive of grab samples, gave a weighted average of 3.0 ppm gold over a width of 1.8 feet. One grab sample from vein quartz exposed in a trench contained 15.3 ppm gold. A select sample collected from the Lost Soldier millsite yielded 14.7 ppm gold (fig. D-100, No. 1). Two samples were collected from the Cannon Ball claim (fig. D-100, Nos. 9-10). A sample of float from arsenopyrite-bearing quartz found in a trench on the claim contained 9.5 ppm gold.

The veins in the Jessie and Cannon Ball area are subhorizontal veins and may be a northern extension of the vein system on the Prairie claim. Three samples from trenches on the Lost Soldier claim (fig. D-100, Nos. 11-13), between the Cannonball and Prairie claims, contained no significant metal values.

Eleven samples plus the metallurgical sample were taken from the Prairie claim (fig. D-102, Nos. 14-25). The mathematical average of these samples (five samples came from float or dumps so a weighted average was not possible) was 1.9 ppm gold. Free gold could be panned from fines collected from a 5-foot-thick sheeted quartz vein from an inclined shaft near the mill. Chip samples of the same material, however, contained only 2.3 ppm and 0.1 ppm gold. Grab samples from all the dumps averaged 1.4 ppm gold.

A single grab sample taken from the dump of a caved adit on the You and I claim (fig. D-100, No. 26) contained no significant metal values.

Resource Estimate

Roehm (*D-109*) reported that ore from the Prairie claim milled by the Petersons averaged 0.29–0.39 ounces/ton gold. This ore was obviously carefully selected because samples collected by the Bureau give average values of less than 0.05 ounces/ton (1.87 ppm) gold. Shafts sunk over 100 feet through the flat-lying, near-surface veins and cut by drill holes did not appear to intercept higher grades of ore at depth.

Low assays obtained from samples at the Prairie claim give this portion of the Peterson property a low mineral development potential. Samples from the Cannonball and Jessie claims contained more gold but the low tonnage exposed gives this area a low potential for gold.

Recommendations

To trace the veins, trenches could be excavated between the caved workings on the Prairie claim. Drilling could be done to intersect parallel veins at depth. Trenching north and south on the Jessie claim could trace that vein.

MAS No.	MS No.
21120094	919, 919B

References

D-25, D-47, D-62, D-63, D-71, D-95, D-96, D-97, D-98, D-99, D-101, D-109, D-130, D-146

MENDENHALL GLACIER OCCURRENCE

History

No prospecting has been reported from the area (figs. D-5, D-103).

Bureau Investigations

Prominent reddish-brown iron oxide stains can be observed on the rocks along the east margin of the Mendenhall Glacier. They are predominantly caused by the weathering of biotite in a biotite schist host but, locally, the iron staining is a result of leaching from massive pyrrhotite. The zone examined is up to 10 feet wide and occurs within siliceous greenstone that also contains small amounts of disseminated chalcopyrite.

Quartz veins also occur in garnet amphibolite near the pyrrhotite zone. The discordant veins were between 6 and 24 inches wide. Pyrite and pyrrhotite are more common

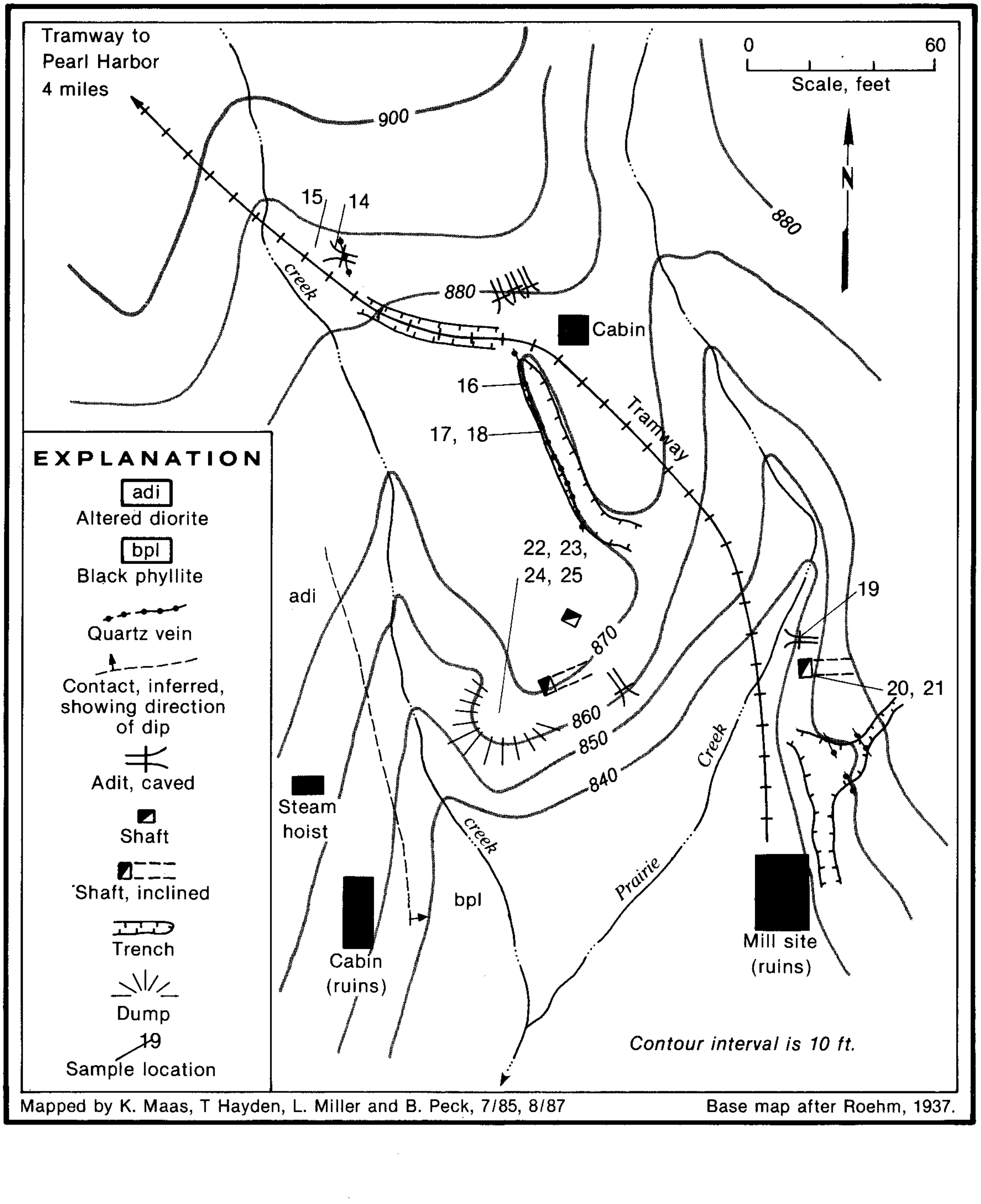

Figure D-102.—Peterson Mine, Prairie Lode claim, showing geology and sample locations.

in the vein selvage than in the veins themselves. The rocks units are also cut by garnet aplite sills.

The Bureau sampled the iron-stained zones (fig. D–103, Nos. 2–3, 7) and found the massive sulfides to contain up to 820 ppm copper and 905 ppm zinc. Samples from the quartz veins (fig. D–103, Nos. 4–6, 8) and aplite sill (fig. D–103, No. 1) did not exceed background metal values.

Resource Estimate

The low copper and zinc values give the area a low mineral development potential.

Recommendations

Additional red-stained zones observed across the valley along the same trend could contain massive pyrrhotite and should be examined.

MAS No.
21120226

References

None.

TREASURY HILL PROSPECT

Production

At least 302 ounces of gold were produced in 1908 and 1909 (*D–97*). Treasury Hill is not classified as a mine in spite of its production. This is because gold production came from a variety of small placer mines scattered across the area, each with a different operator.

History

The Treasury Hill prospect was discovered in 1908 by Victor Spaulding, Perry Wiley, and Saltwater Jack Childs (figs. D–5, D–104). The prospectors recovered nearly $500 worth of gold from a single pocket which roused considerable interest in the area. In early February 1909, the three men started driving an adit and continued trenching to open up the vein. The majority of the early work concentrated on sluicing the dirt overlying the veins and nearly $5,000 was reportedly produced (*D–143*). Placer activity in late 1909 reportedly produced an additional $1,250 worth of gold.

In 1910, the Canadian Exploration Company bonded the property for nearly $10,000 per claim. The company

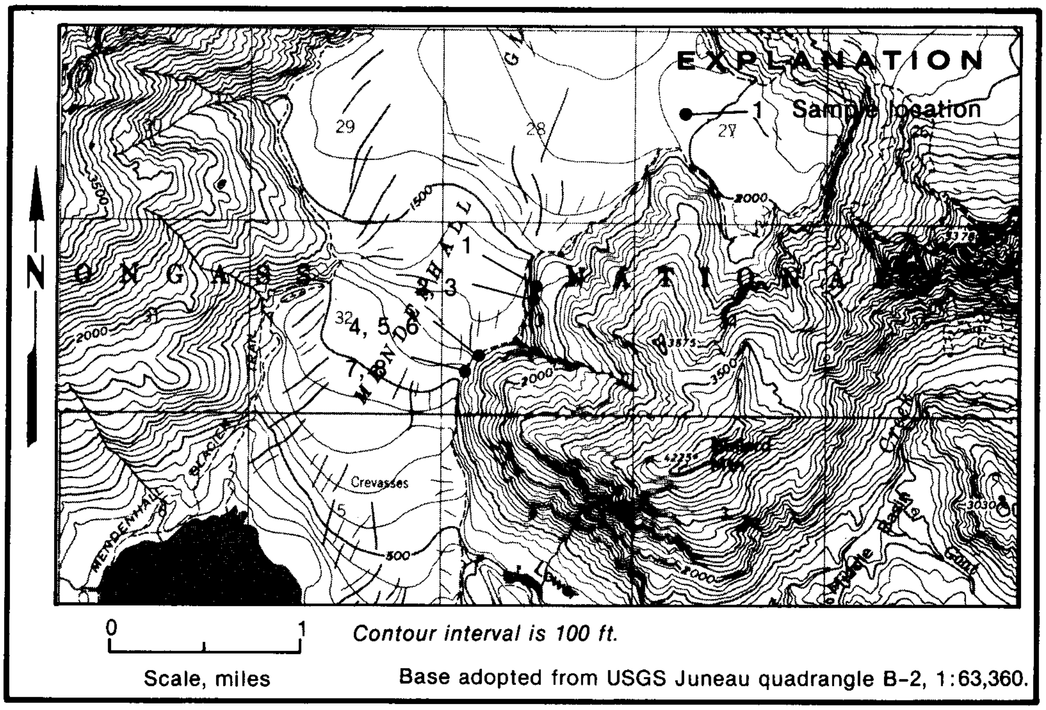

Figure D–103.—Mendenhall Glacier occurrence, showing sample locations.

began an adit on the Gold Knob claim but did not drive it very deep before dropping their interest.

Henry Bratnober and the London Exploration Company picked up the lease on the Treasury Hill property in 1911. By the end of 1912, the London company had extended the Gold Knob tunnel to 600 feet in length and collected 1,000 samples for assaying. In late December, however, orders came to shut down all work.

The Hammond organization optioned the property in 1913 and, in 1914, H. R. Plate had 50 employees working the property. An additional 100 feet of tunneling was completed in the Gold Knob adit but results were poor and the company let their interest go.

The Guggenheims and Senator Frank Aldrich each examined the Treasury Hill property in 1914 but neither did any further work.

Henry Brie, along with Perry Wiley, and Alex Butterbough, formed the Auk Bay Development Company in 1917 and purchased a 2-stamp Nissen mill from the Fairbanks-Morse Company. The mill was dragged about halfway to the prospect and abandoned.

In 1930, A. Zenger and D. L. Dutton restaked the area but did little work. Their claims lapsed and the original owner, Vic Spaulding, restaked the area, again, in 1935. Old trenches and tunnels were cleared out, but Spaulding died in 1937 and the property was again abandoned (*D-97*).

Over 40 years passed before activity resumed on Treasury Hill. Occidental Minerals drilled the property in 1979, and John Ritter restaked the area as the Paradise Peek claims soon afterward. Ritter exhumed old trenches and did some placer work until his death in 1985. FMC Corp. leased the area in 1987 and tested the mineralization by drilling in 1988.

Workings and Facilities

Workings consist of the Gold Knob adit, with 655 feet of workings, a water-filled adit, a caved adit, and numerous trenches and open cuts on the property.

Bureau Investigations

The Treasury Hill-Gold Knob area is underlain by black phyllite, phyllitic graywacke, greenstone, and greenschist. A NW-trending, altered augite basalt sill lies between a footwall of phyllite and a hanging wall of greenstone and greenschist. The sill, which is approximately 200 feet wide and may extend over 2 miles along strike, is cut by locally numerous quartz veins and stringers. Some veins trend parallel to the sill but most cut the body at approximately right angles to its strike. Knopf (*D-62*) states that the veins range up to several feet in thickness but that the sill is also cut by thin, interlaced quartz and calcite veinlets less than an inch in thickness. Extensive muskeg cover makes a thorough examination difficult.

Quartz veins are exposed in old prospect pits and trenches at four localities over a distance of 2 miles. The best veining occurs in a zone 500 feet long at an elevation of about 1,600 feet. The veins are up to 4.5 feet in width, have an average width of 2.0 feet, and extend at least 50 feet along strike across the dike. Prospect pits along the sill indicate that the dimensions of this mineralization may be as much as 150 feet wide and may extend for 2,000 feet along strike.

At 1,200 feet elevation, in the vicinity of the Gold Knob adit, an area 400 feet long and 200 feet to 300 feet across strike contains a considerable amount of quartz veining. The veins are transverse to foliation and up to 50 feet long.

The quartz veins locally contain appreciable amounts of arsenopyrite, some pyrite and pyrrhotite, traces of galena, and visible gold (*D-111*). Tripp (*D-143*) indicated that gold occurred both as free grains and in pyrite.

Wallrocks adjacent to the veins are strongly altered to a rock composed of albite, chlorite, carbonate, sericite, and apatite (*D-62*). Arsenopyrite and pyrrhotite are common near vein margins. Prospecting has been concentrated along the trend of this dike because the quartz veins are mostly concentrated within it.

Quartz veining is concentrated in the altered augite basalt. The sill was evidently much more brittle than the surrounding schists and phyllites and, during deformation, it fractured across strike, opening up spaces for the emplacement of mineralizing solutions.

Sample Results

The Bureau mapped and sampled all the workings that could be found in the area (figs. D-104 to D-107). The examination was hindered by the extensive alluvial cover and the fact that most trenches were sloughed in, but 30 samples were collected. A total of 13 samples were taken from the trenches and workings at an elevation of 1,600 feet (figs. D-104, Nos. 16, 17; D-106, Nos. 18-28). Seven of the samples contained from 1.5 ppm to 4.3 ppm gold.

The highest gold values on the property came from quartz exposed in a trench at an elevation near 1,750 feet (fig. D-104, Nos. 7-11, 13, 14). Of 7 samples collected, one contained 18.7 ppm gold (No. 11). Nearby, a caved adit located on a tributary to upper Peterson Creek yielded two samples (fig. D-104, Nos. 12, 15). Quartz float containing 1% to 2% arsenopyrite found below the adit carried 6.4 ppm gold.

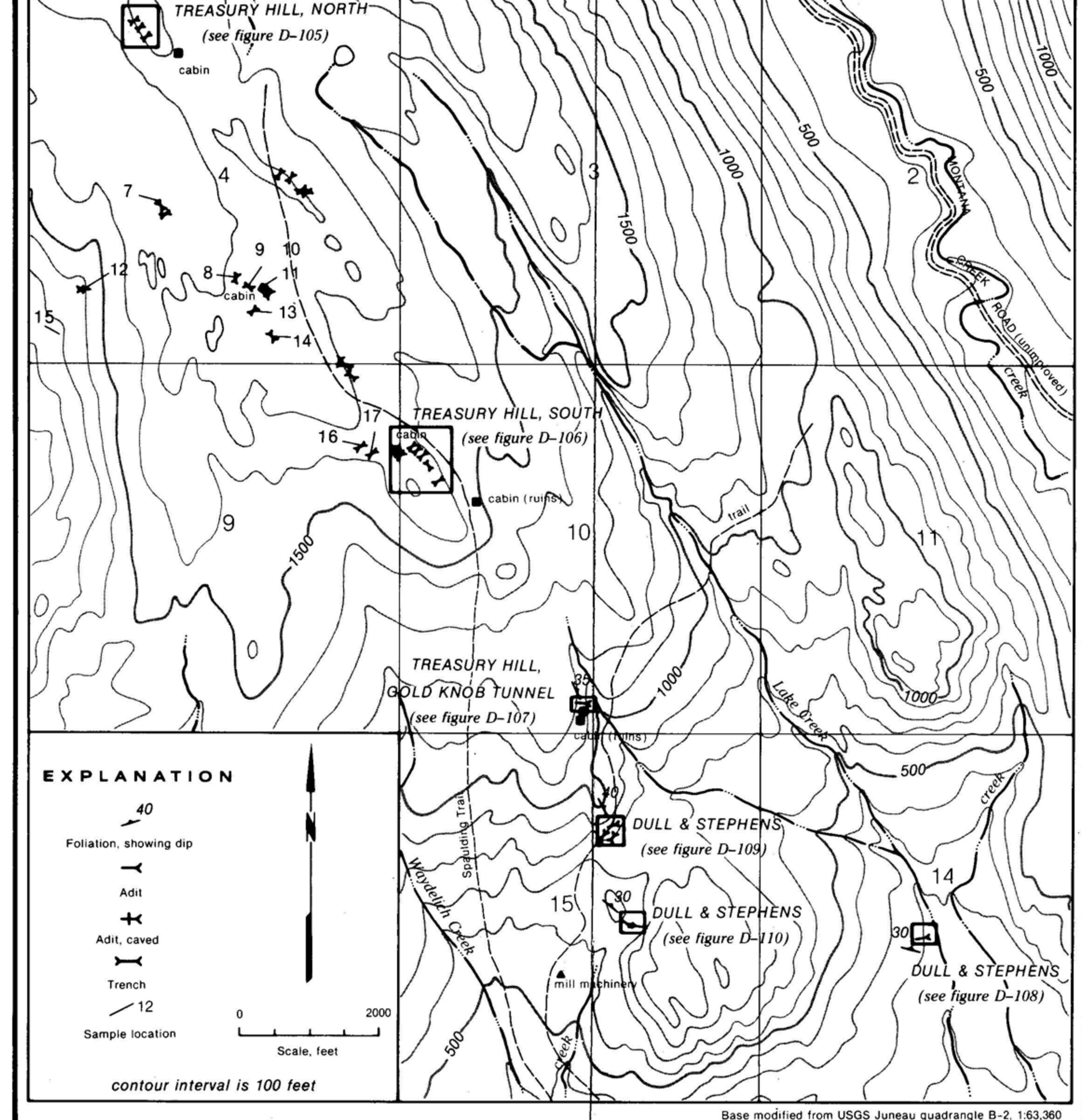

Figure D-104. — Spaulding Meadows area, showing Treasury Hill workings and sample locations, and Dull & Stephens workings.

Six samples were taken from the northern-most trenches (fig. D-105, Nos. 1-6) at an elevation of 1,800 feet and two samples were collected in the Gold Knob adit (fig. D-107, Nos. 29-30). None contained as much as 0.1 ppm gold or more than 0.2 ppm silver.

Thirteen drill holes, spaced over a 2.5-mile stretch along the greenstone, were drilled by Occidental Minerals. No significant gold mineralization was encountered (*D-83*).

Resource Estimate

This area has been prospected for many years as it has potential for vein stockwork type mineralization in altered augite basalt. Surface and drill hole assays were not encouraging but the Gold Knob Tunnel did not appear to adequately test the sill as surface samples contained higher values than those obtained underground.

Overall, the low gold values in Bureau samples and poor drill hole results indicate that this property has a low mineral development potential for gold.

Recommendations

Soil sampling and drilling could be used to delimit the mineralized area and determine its extent.

MAS No.
21120098

References

D-60, D-62, D-63, D-83, D-95, D-97, D-98, D-99, D-111, D-133, D-139, D-143

DULL & STEPHENS PROSPECT

Production

A minimum of 32 ounces of gold have been produced from the Dull and Stephens (18 ounces in 1909 and 14 ounces in 1919) (*D-97*).

History

The Dull & Stephens prospect was discovered in 1908 by Tom Dull and J. Stephens and started a small rush to the area north of Auke Bay (figs. D-5, D-104). Initial work on the property consisted of digging some open cuts and sluicing over the discovery. A June placer cleanup gave Dull and Stephens about 18 ounces of gold. In 1910, William Ebner and M. F. Howe bonded the property but did little real work.

By 1917, when the Treadwell Company optioned the Dull & Stephens property, about 1,000 feet of trenches and a 20-foot tunnel had been dug on the property. The Treadwell Company drove 2 more adits with a total of 500 feet of workings at the head of Waydelich Creek. By March 1918, the property had reverted back to the original group of claimholders who drove 2 additional tunnels, one next to Lake Creek and the other on lower Gold Knob. A high-grade pocket of ore was found near the Lake Creek adit and 14 ounces of gold were recovered by panning in 1919.

Very little occurred after 1919 until 1933, when John Berg, A. Zenger, and C. Tripp restaked the prospect. Other than reopen some trenches, though, the men did little work (*D-97*).

Workings and Facilities

Four adits (Lake adit—150 feet, lower Gold Knob adit—144 feet, Waydelich Creek adits—199 feet and 297 feet) totalling 790 feet of workings and numerous trenches exist on the property.

Bureau Investigations

The Dull & Stephens prospect area is underlain by black phyllite and greenstone which trend 110° to 150°. The greenstone is extensively altered to albite, chlorite, carbonate, sericite, pyrite, and fuchsite.

Quartz veins and stringers occur both parallel to the phyllite/greenstone contact and as discordant veins within the greenstone. The discordant veins trend 050° to 060° and dip steeply north. Veins within the greenstone vary in width from a few inches to 3 feet and rarely reach 100 feet in length. The quartz is commonly vuggy and contains pyrite with lesser arsenopyrite, traces of galena and chalcopyrite, and free gold. The highest gold values are reportedly associated with arsenopyrite (*D-108*). Small NW-trending faults offset the veins.

Near the Lake Creek adit (fig. D-108), a mineralized zone 35 to 40 feet wide, contains stringer veinlets, massive veins, and irregular quartz masses in phyllite along the margins of the greenstone. The quartz commonly cements a breccia of phyllite and greenstone fragments. One quartz vein, which occurs along the contact between greenstone and phyllite, contains sericite, fuchsite, arsenopyrite and pyrite. Phyllite and greenstone partings occur within the vein. There is considerable quartz but little gold (*D-108*).

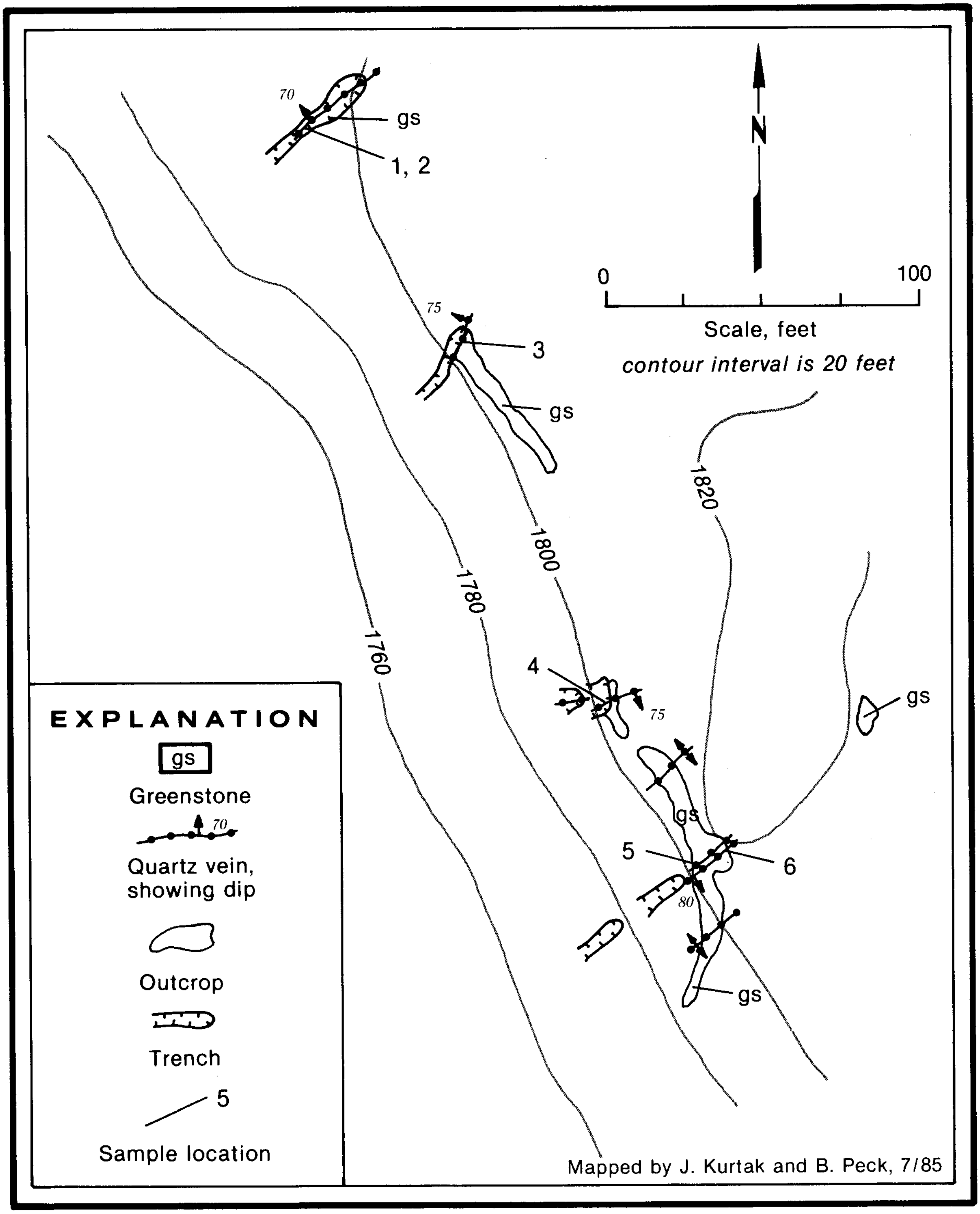

Figure D-105.—Treasury Hill, north, showing geology and sample locations.

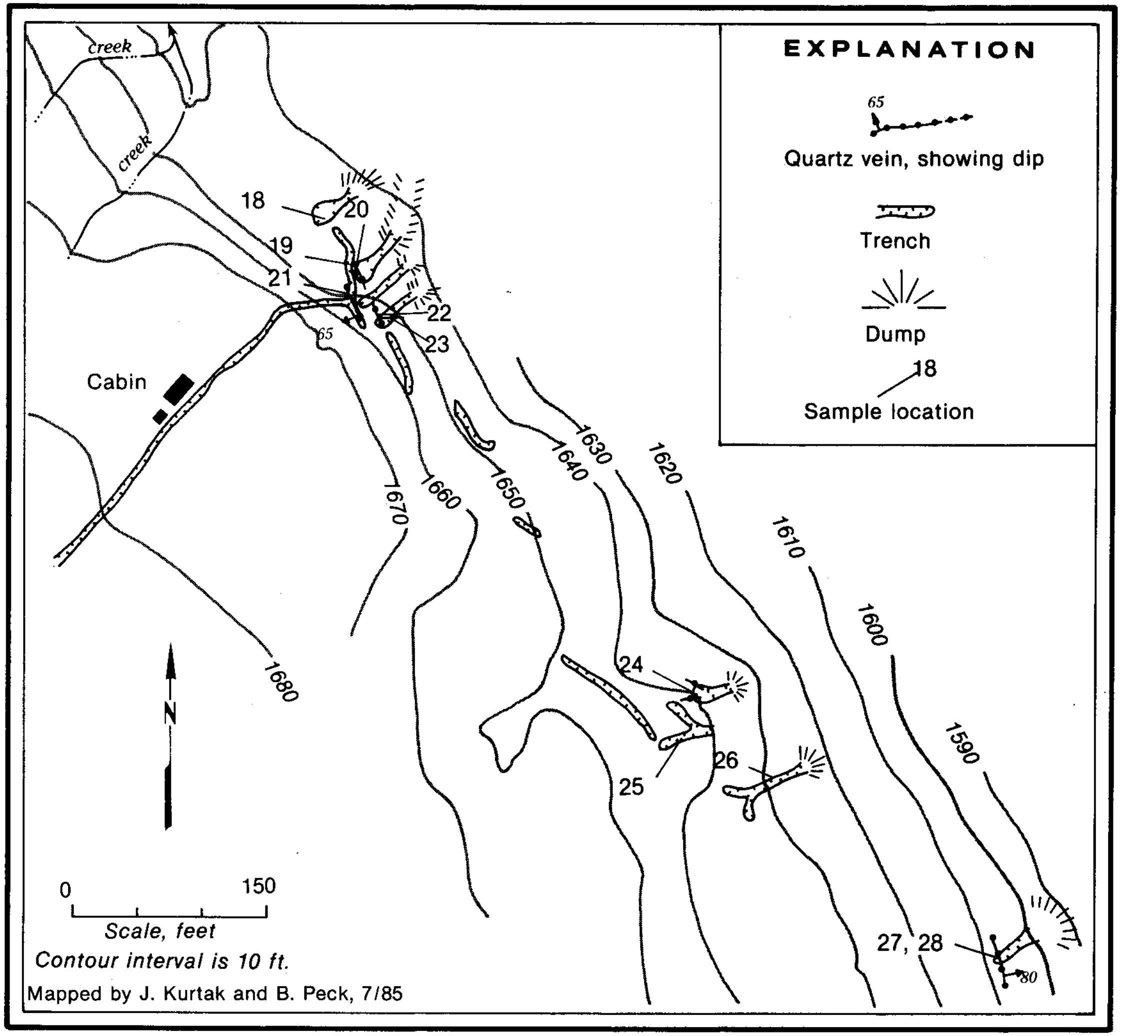

Figure D-106.—Treasury Hill, south, showing surface geology and sample locations.

Sample Results

Bureau personnel mapped four adits and associated trenches (figs. D-108 to D-110), and collected 31 samples. Six samples were taken in and around the lower Gold Knob adit (fig. D-109, Nos. 1-6). Four of the samples gave a weighted average of 1.8 ppm gold over a vein width of 1.9 feet (Nos. 3-6). In the southern Waydelich Creek adit (Adit No. 2), 8 samples were taken (fig. D-110, Nos. 16-23). Samples of the vein exposed by the drift had a weighted average of 2.0 ppm gold over 1.8 feet. A total of 9 samples (fig. D-110, Nos. 7-15) were collected in the northern Waydelich Creek adit. The vein in the drift averaged 1.8 ppm gold over a vein width of 1.5 feet and the vein in the back of the adit gave a weighted average of 1.5 ppm gold and a vein width of 2.5 feet. Eight samples (fig. D-108, Nos. 24-31) were taken from the Lake Creek adit and its overlying trench but none contained significant metal values.

Resource Estimate

The low gold values and low tonnage give this property a low mineral development potential.

Recommendations

The extent of mineralization at the Dull & Stephens prospect could be determined by soil sampling and drilling.

MAS No.
21200101

References

D-60, D-62, D-63, D-95, D-96, D-97, D-98, D-99, D-108, D-152

MENDENHALL PROSPECT

Production

There has been no production from the Mendenhall prospect.

History

The history of the Mendenhall prospect is not known (figs. D-5, D-111). The quartz veins were probably discovered in the later 1890's, during the prospecting activity associated with work in Montana Basin, or in 1900, during the excitement after the discovery of gold in Nugget Creek. Adam Reidlinger showed an interest in the property after locating the McGinnis Creek properties in 1897. Knopf (*D-62*) visited the property in 1909 and 1910 and noted that the main adit and open cut existed but did not mention the short northern adit.

Workings and Facilities

A 90-foot adit and 30-foot open cut were located at 290 feet elevation. Approximately 450 feet east, a 25-foot adit was found at 295 feet elevation. In addition, several open cuts are present on the property.

Bureau Investigations

The Mendenhall prospect consists of a series of shear zones which contain quartz veins and stringers that trend 140° to 160°. The veins parallel the foliation of black and gray phyllite. Individual quartz veins are up to 3 feet wide and have been traced for 100 feet along strike. Quartz stringer zones are up to 10 feet wide. Knopf (*D-62*) reported that free gold could be panned from an amphibolite dike in the area but the dike was not located by the Bureau.

Sample Results

The Bureau located, mapped, and sampled the Mendenhall prospect workings. Thirteen samples were collected from the two adits and open cut at the prospect (fig. D-111, Nos. 3-15). One sample contained 0.4 ppm gold but most contained less-than-detectable gold values.

Resource Estimate

The low gold values give this prospect a low mineral production potential.

Recommendations

No work is recommended.

MAS No.
21120102

References

D-62, D-63, D-95, D-98, D-99

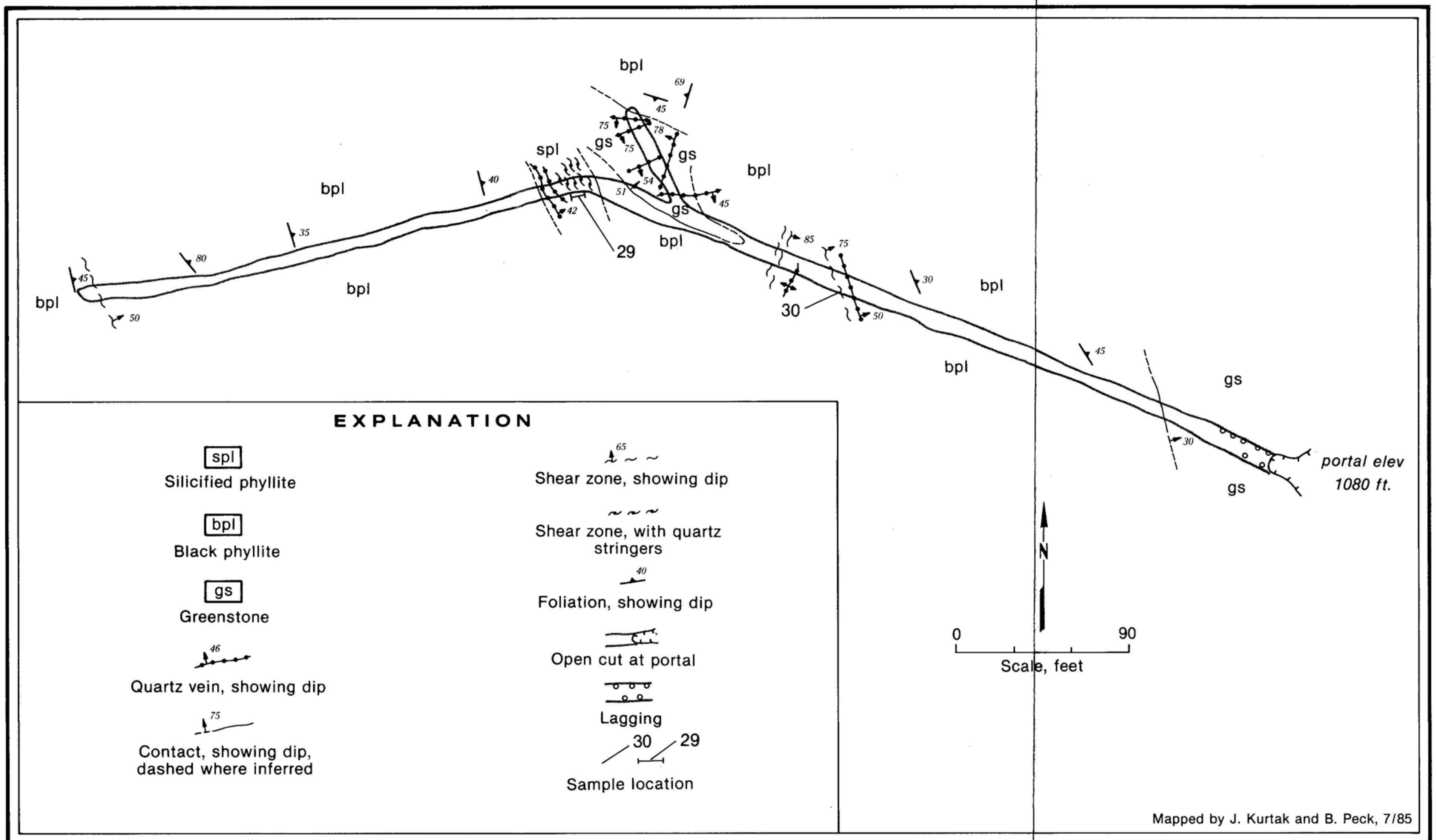

Figure D-107. — Treasury Hill, Gold Knob Tunnel, showing geology and sample locations.

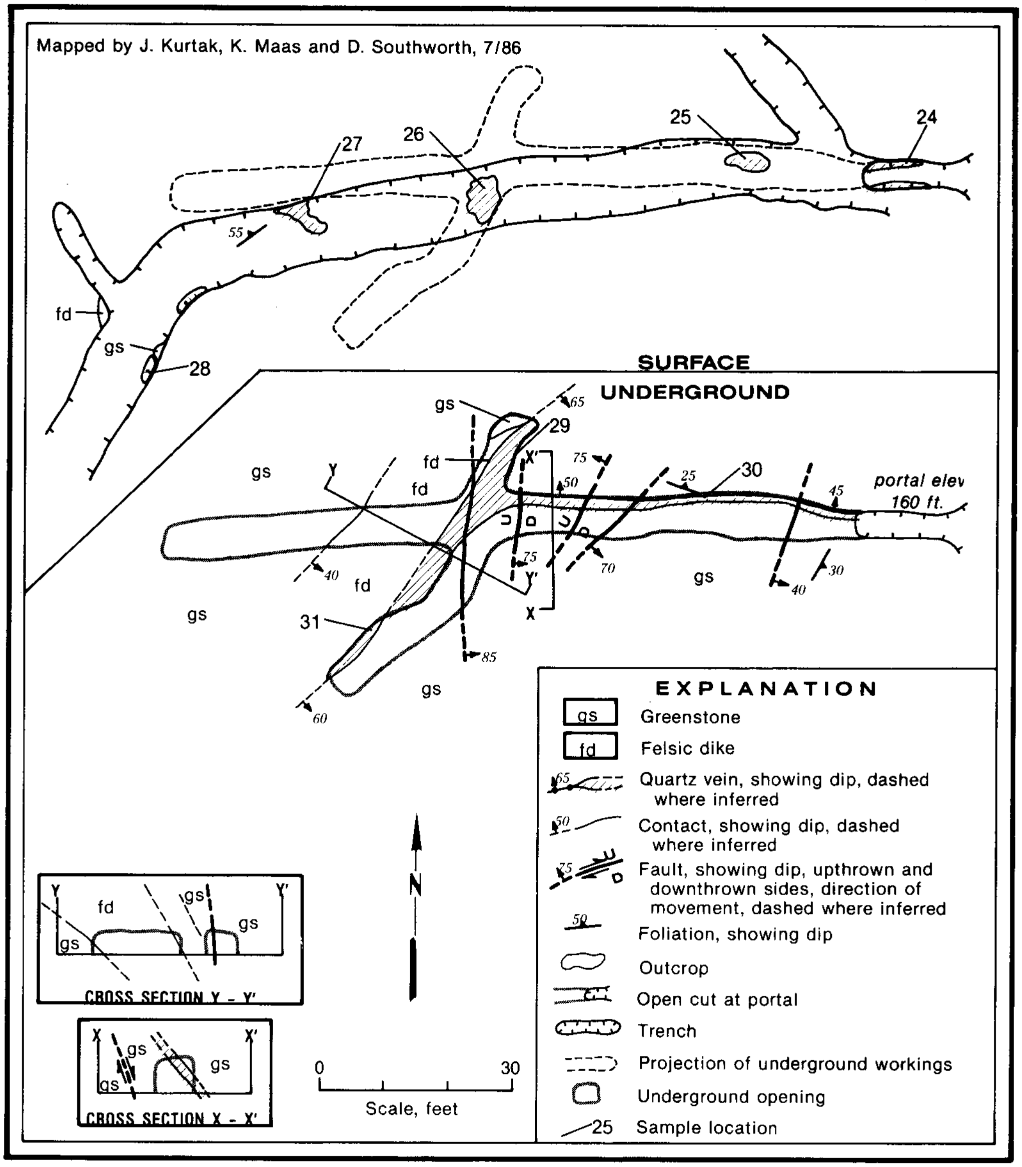

Figure D-108.—Dull & Stephens, Lake Creek adit, showing surface geology and sample locations.

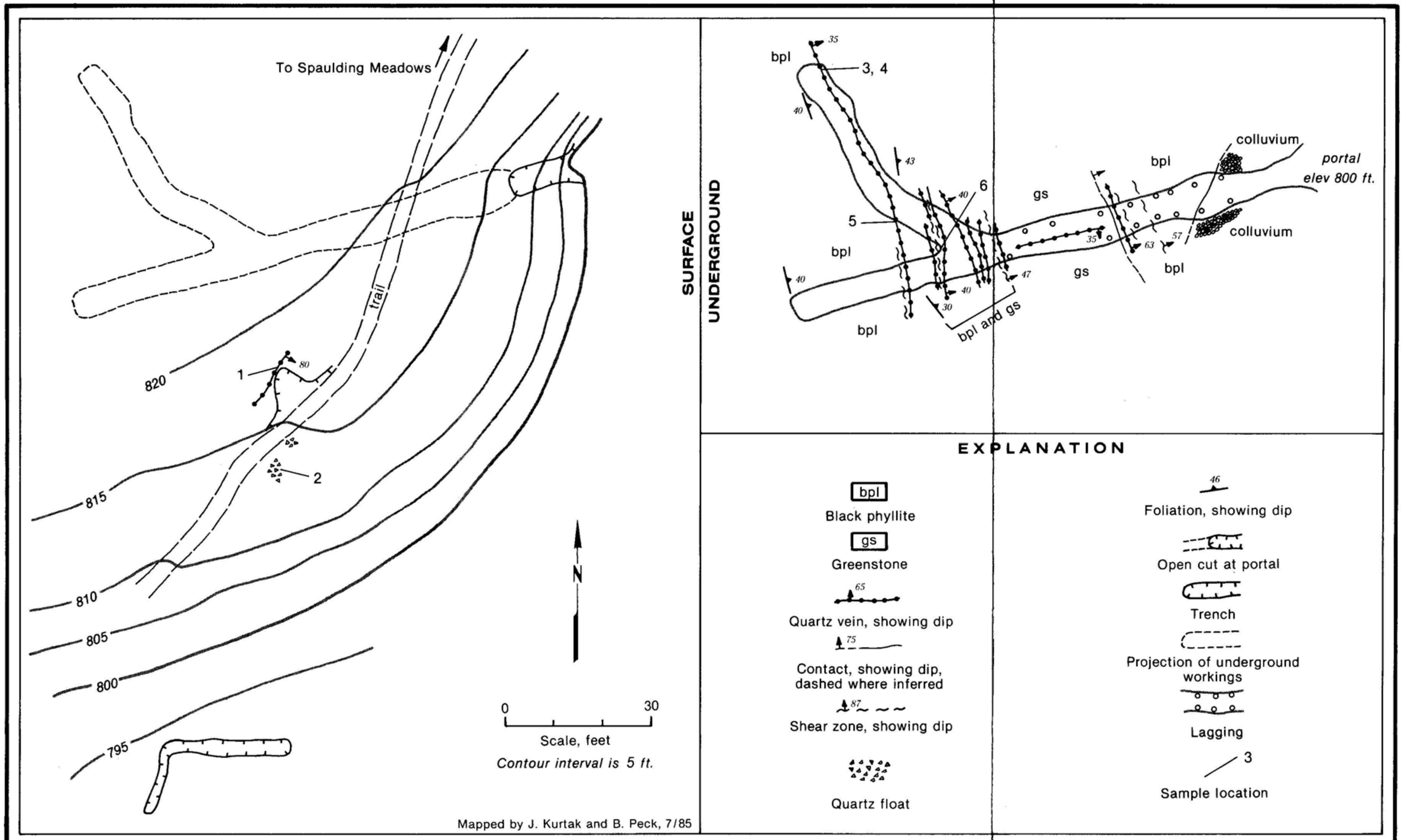

Figure D-109. — Dull & Stephens, Lower Gold Knob adit, showing geology and sample locations.

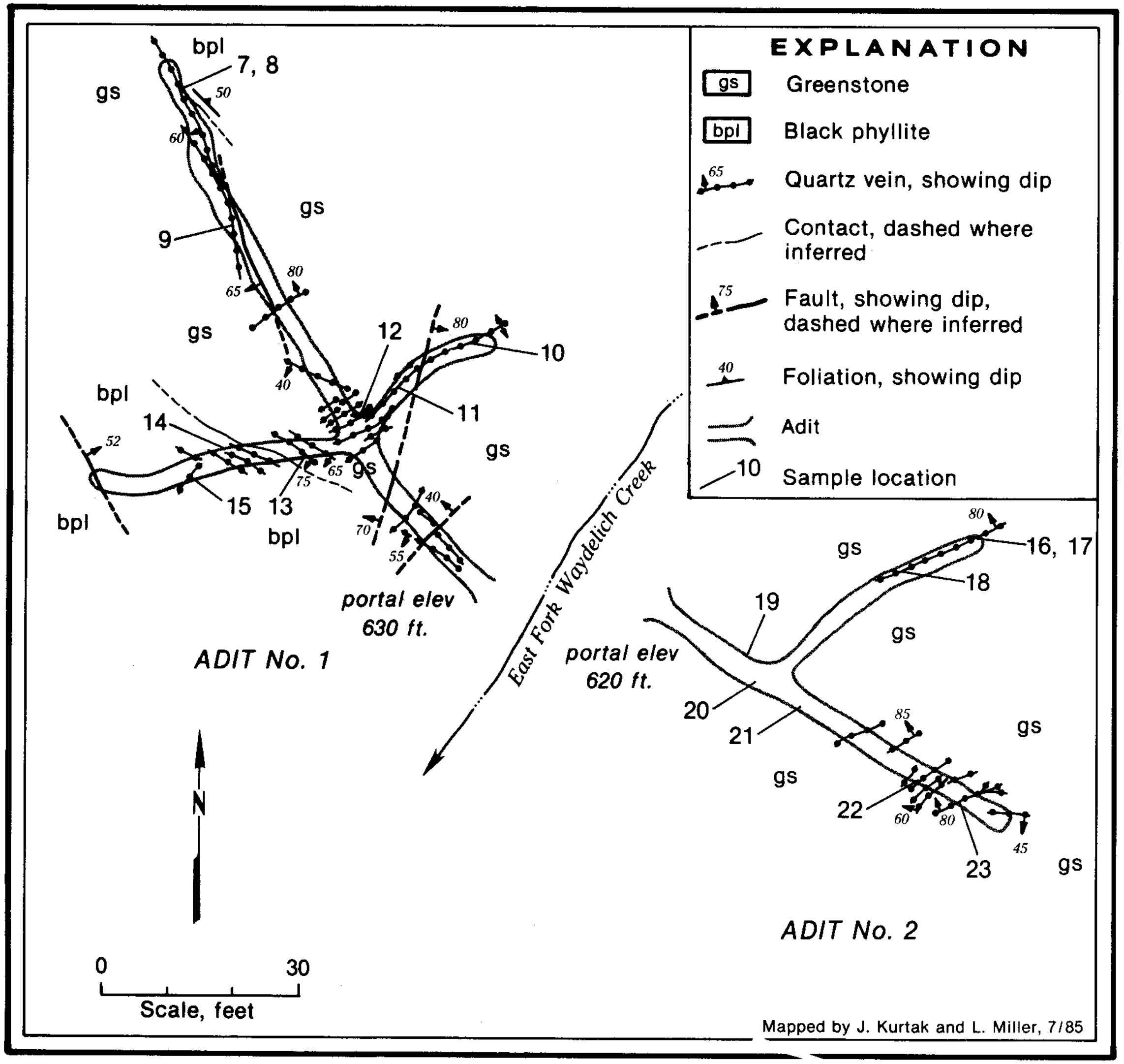

Figure D-110.—Dull & Stephens, Waydelich Creek adits, showing geology and sample locations.

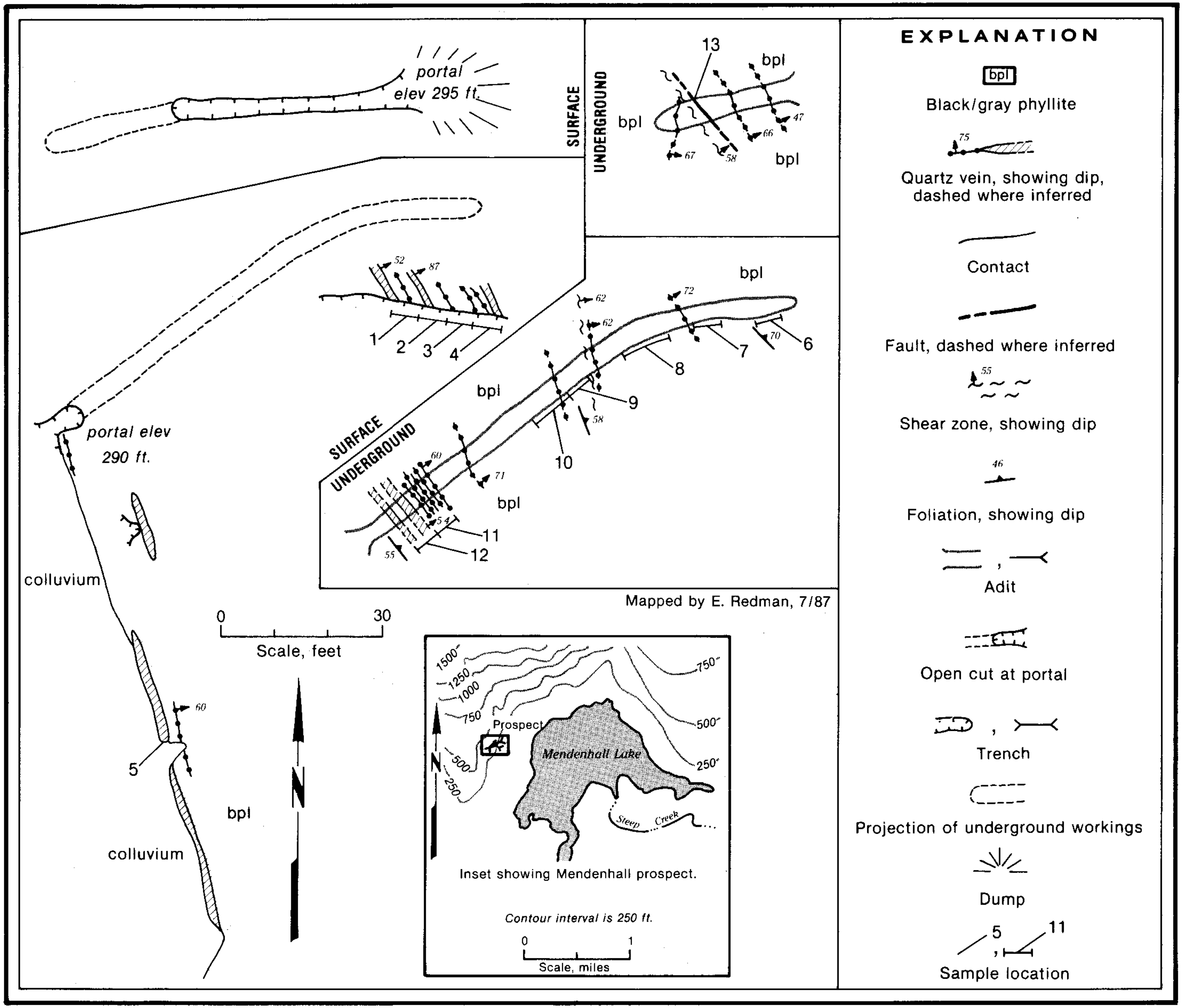

Figure D-111.—Mendenhall prospect, showing geology and sample locations.

WINN PROSPECT

Production

There has been little production from the Winn prospect.

History

The Winn prospect was located in 1882 at the same time gold was discovered in Montana Basin (fig. D-5). In 1909, Colonel William Winn and his son John restaked the area and had employees working on their claims. By 1910, Winn had driven a 20-foot adit and dug several trenches (*D-97*). Production previously attributed to the Winn prospect for 1924 by Redman and others (*D-99*) based on U. S. Mint records at the Bureau is probably incorrect (original report indicated that B. A. Winn, Thane Alaska, had recovered 290 ounces gold and 102 ounces silver from 27 tons; this probably represents cleanup work at the Alaska Gastineau mill).

In the mid 1930's, Ernie Torgeson blasted some short trenches and crushed a small amount of gold from the quartz.

Workings and Facilities

A caved adit, reported to be 20 feet long, and several trenches exist on the property.

Geologic Setting

The Winn prospect area is covered by surficial deposits. Because the trenches are caved, Knopf's geologic description is used here (*D-62*):

> The ore consists of dike rock irregularly cut by veinlets of quartz, albite, and ferriferous carbonate. In the vicinity of these stringers the rock is much impregnated with cubical pyrite and arsenopyrite and contains much albite and carbonate, which on weathering imparts a strong red color to the ore. The most unaltered-looking rock is found under the microscope to consist of carbonate, albite, chlorite, muscovite, pyrite, and accessory apatite which is fairly abundant in characteristic jointed prisms. On account of the great abundance of albite in the veinlets and dike as a whole, it is believed that the dike originally consists of albite diorite, like that on Salmon Creek and at the Boston Mine, Juneau.
>
> The extension of this dike apparently outcrops at the outlet of Auke Lake, about 2,000 feet northwest of the tunnel. It is soft, rotten, and ocherous. The exposure here shows that green augite melaphyres, somewhat schistose, form the footwall of the dike.

Bureau Investigations

The Bureau mapped the workings and sampled the albite diorite and the greenstones exposed in a trench wall (fig. D-112). Because the underground workings were not accessible and no bedrock was exposed in the immediate vicinity, quartz float from the adit and trenches was sampled. None of the four samples (fig. D-112, Nos. 1-4) contained more than 0.1 ppm gold.

Resource Estimate

Low gold values in Bureau samples give the prospect a low mineral production potential.

Recommendations

The caved adit could be reopened and resampled. Excavating trenches could also help identify the economic potential of the area.

MAS No.
21120107

References

D-62, D-63, D-95, D-97, D-99

NUGGET CREEK PLACER PROSPECT

Production

A minimum of 20 ounces gold were produced (*D-97*).

History

Gold was discovered in Nugget Creek in July 1900, by Sam Butts and Jess Crawford, who were prospecting for Wes Matlock (figs. D-5, D-113). When news of their discovery reached Juneau, a rush began and many men stampeded to the area and staked claims. By August, the larger groups had sluices in operation. The first clean-up in September resulted in recovery of 20 ounces of gold. After September, interest in the area waned. Although Matlock sent out a crew in July 1901, there was little activity (*D-97*).

Workings and Facilities

There are no identified placer workings on Nugget Creek.

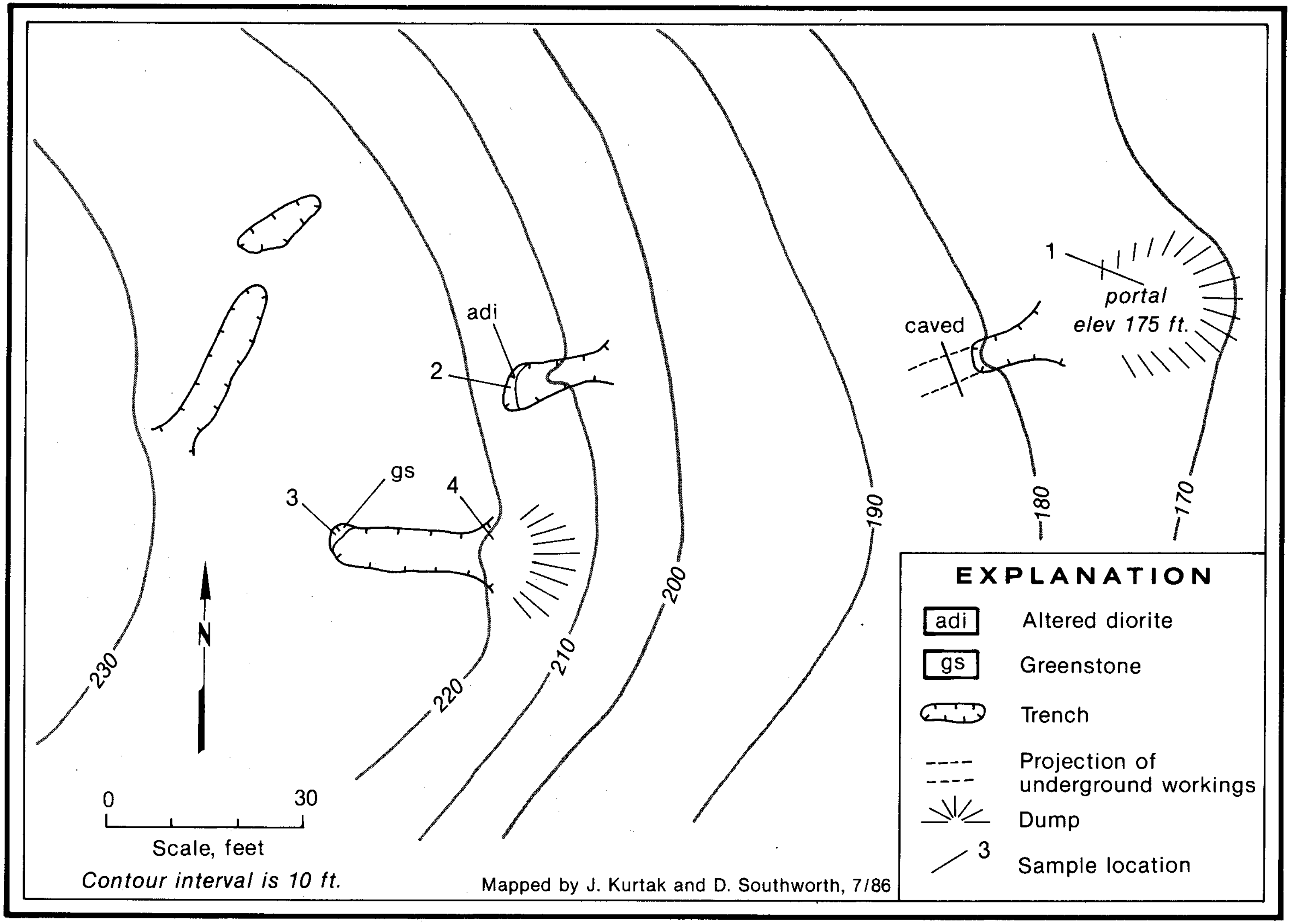

Figure D-112.—Winn prospect, showing geology and sample locations.

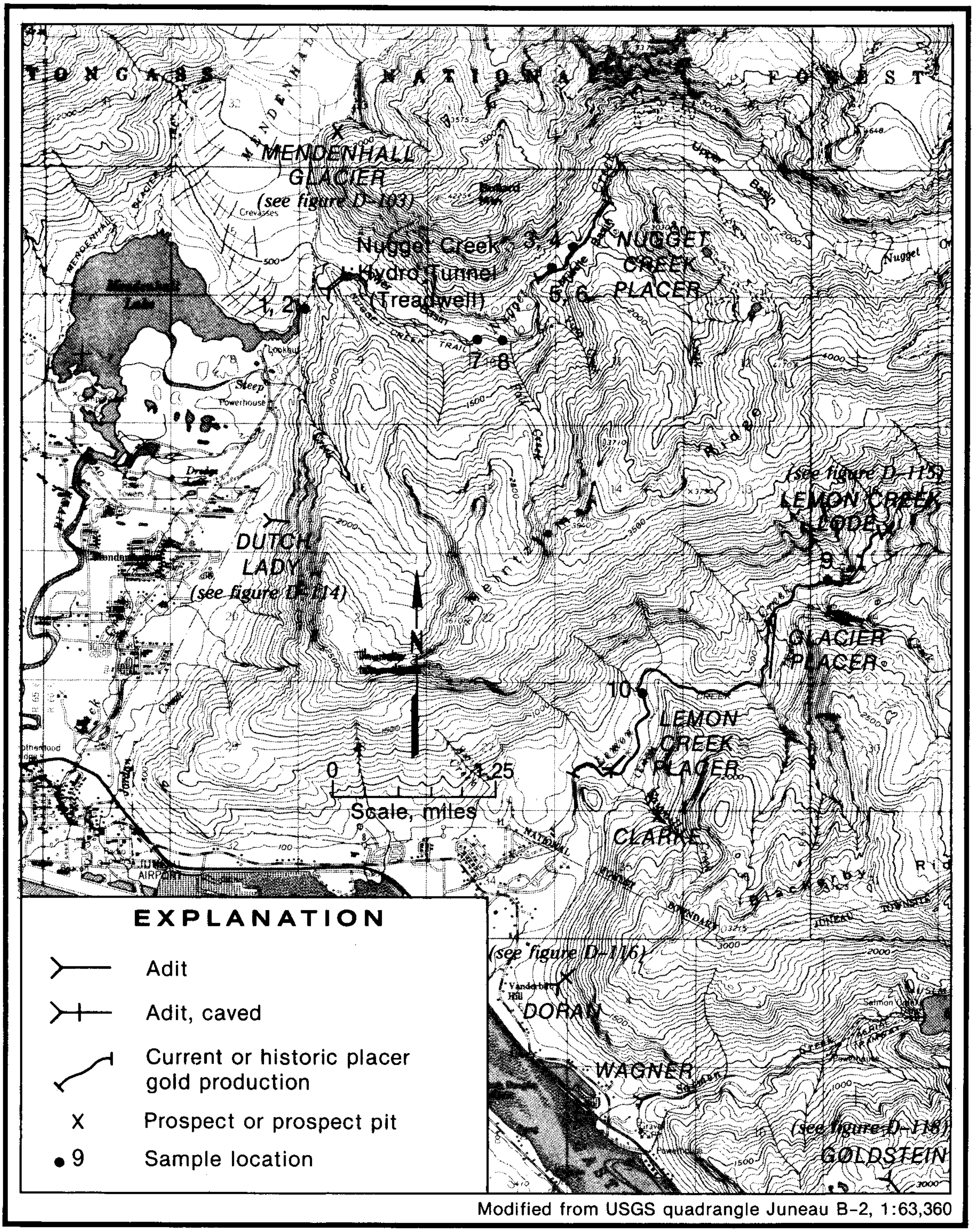

Figure D-113.—Prospects in the Mendenhall Valley, Lemon Creek, and Salmon Creek areas.

Bureau Investigations

There are three gravel-filled basins on Nugget Creek. Most of the early placer mining activity took place in the middle basin. Gold in the basins was probably derived from quartz veins located in 1900 on the slopes above Nugget Creek.

The Bureau collected three panned concentrate and two 0.1 yd^3 placer samples from Nugget Creek (fig. D-113, Nos. 3, 5-8). A panned concentrate sample and one placer sample were taken in the lower basin. The pan sample contained visible gold and the placer sample carried 0.0008 ounces/yd^3 gold. The second placer sample was taken from Middle Basin where most of the early work was done and contained 0.002 ounces/yd^3 gold. Two panned concentrate samples from Middle Basin contained no detectable gold. One sample of quartz with 2% pyrite (fig. D-113, No. 4) was also barren.

Two grab samples were collected near the mouth of Nugget Creek (fig. D-113, Nos. 1-2). These samples were of iron-stained black phyllite which carried 4.5 ppm and 6.4 ppm silver, 845 ppm and 770 ppm zinc, and 367 ppm and 1,000 ppm copper.

Resource Estimate

Nugget Creek has an estimated 185,000 yd^3 of auriferous gravel in Middle Basin and 1,600,000 yd^3 in Lower Basin.

Recommendations

Careful placer sampling of the two basins is needed to determine actual gravel volumes and gold grades.

MAS No.
21120109

References

D-96, D-97, D-98, D-99, D-130

DUTCH LADY PROSPECT

Production

There has been no production from the Dutch Lady prospect.

History

The Dutch Lady prospect (figs. D-5, D-113) was discovered prior to 1911 when the Treadwell Company used the adit for dynamite storage during construction of the Nugget Creek power project (*D-132*). The prospect was examined briefly by Anaconda in 1931 (*D-136*).

Workings and Facilities

An 80-foot adit with a water-filled inclined shaft was located on the prospect. A 20-foot adit was also reported but not found (*D-136*).

Bureau Investigations

The Dutch Lady prospect consists of highly folded black phyllite and abundant foliation-concordant quartz veins. The veins appear to be in the crest of an anticline and contain small amounts of pyrrhotite.

The Bureau located, mapped, and sampled the 80-foot adit at the Dutch Lady prospect (fig. D-114). Eleven samples were taken in the adit (fig. D-114, Nos. 1-11) but none contained significant metal values.

Resource Estimate

Low gold values give the Dutch Lady prospect a low potential.

Recommendations

No work is recommended.

MAS No.
21120221

References

D-132, D-136

LEMON CREEK PROSPECT

Production

There has been no production from the Lemon Creek prospect.

History

The Lemon Creek prospect was located about 1890 at the foot of the Lemon Creek Glacier (figs. D-5, D-113). Other than some stripping, little work was done (*D-130*).

Workings and Facilities

There are no identified workings.

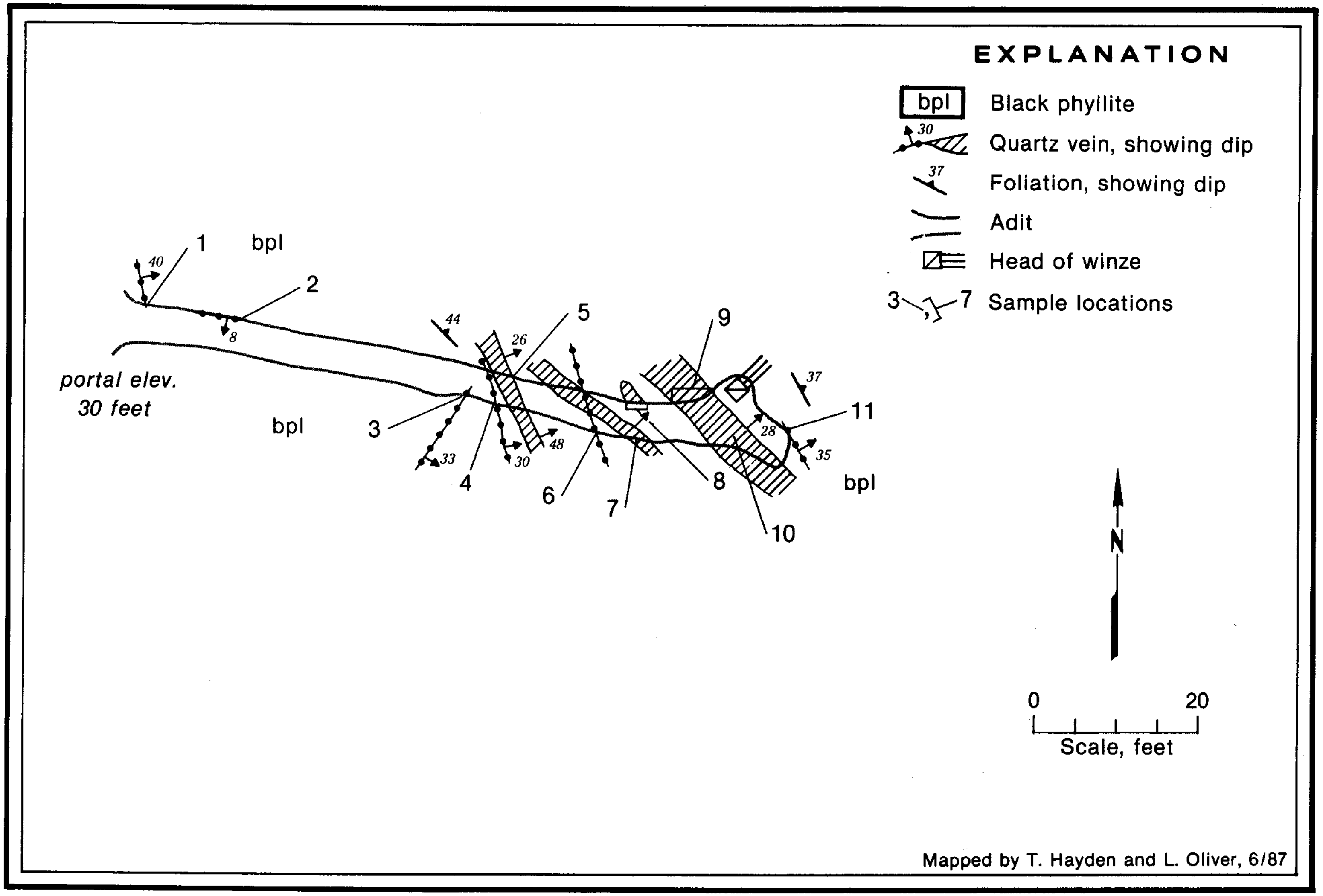

Figure D-114.—The Dutch Lady prospect, showing geology and sample locations.

Bureau Investigations

The Lemon Creek prospect consists of three quartz veins in biotite gneiss. The veins are 6 inches to 1 foot thick, up to 300 feet long, and are generally concordant with layering. The western end of the largest vein, however, crosscuts the gneiss and grades into a pyrite-rich band in the gneisses. The veins contain pyrrhotite, galena, sphalerite, and chalcopyrite. Sulfide mineralization tended to be concentrated in the center or on the hanging wall side of the veins; the footwall side of the veins was usually barren.

Sample Results

The Bureau mapped the quartz veins at the Lemon Creek prospect, and collected 14 samples (fig. D-115, Nos. 1-14). Six of the samples (Nos. 3, 9-10, 12-14) contained an average of 2.6 ppm gold, 87.0 ppm silver, 2.9% zinc, and 0.26% lead over a width of 0.8 feet.

Resource Estimate

An indicated resource of 10,000 tons with 0.03 ounces/ton gold, 0.84 ounces/ton silver, and 2.9% zinc occurs at the Lemon Creek prospect.

Recommendations

Soil sampling, trenching, and geologic mapping could help delineate mineralized areas.

MAS No.
21120169

References

D-130

LEMON CREEK AND GLACIER PLACERS

Production

Lemon Creek had minor placer production between the 1880's and 1900. In 1902, an unknown volume of gravel was mined but gold recovery is also unknown (*D-97, D-130*).

History

Gold was discovered in Lemon Creek in the early 1880's and minor work was done (figs. D-5, D-113). Pete Wyborg and William Nelson did some small-scale placer mining in 1890. Minor work was done between 1891 and 1900 when the Lemon Creek Company acquired the placer ground and placed large promotional ads in eastern newspapers.

The company constructed a road and flume in 1901, but floods in September destroyed most of the work. In 1902, the company had 30 employees working on the property. The flume was rebuilt and the sluices worked for 6 weeks. The operation was hampered by lack of water and was closed down by early fall.

The Lemon Creek Company did minor work from 1903 through 1905 then abandoned the claims. In 1915, the placer ground was acquired by the C.O. Holding & Development Company but little work was done (*D-97*). During the 1980's, gravel was mined from Lemon Creek by the City and Borough of Juneau and private companies.

Workings and Facilities

A drainage tunnel was started but was only driven about 100 feet. There are also remains of a sawmill. Most of the old placer cuts were removed during gravel mining operations.

Geologic Setting

A bedrock ridge which crosses the valley about 1.5 miles from Gastineau Channel has formed a silt and gravel-filled basin. A test shaft reportedly sunk in the early 1900's (*D-130*) found glacial silt covered by stream gravel on the bottom of the basin. Gravels in the basin are 100 to 500 feet wide and up to 10 feet thick at the lower end of the basin.

Bureau Investigations

The Bureau collected 0.1 yd^3 placer samples near the old Lemon Creek Placer Mine which operated in 1902 (fig. D-113, No. 10) and another from the Glacier Placer at the upper end of Lemon Creek (fig. D-113, No. 9). The sample from the old workings (No. 10) contained 0.016 ounces/yd^3 gold but the sample from the upper end of the stream only yielded 0.0002 ounces/yd^3 gold (No. 9).

Resource Estimate

There is an inferred resource of about 500,000 yd^3 of gold-bearing gravel in Lemon Creek. Grade is unknown.

Recommendations

The Lemon Creek placer should be drilled and sampled to determine volume and grade.

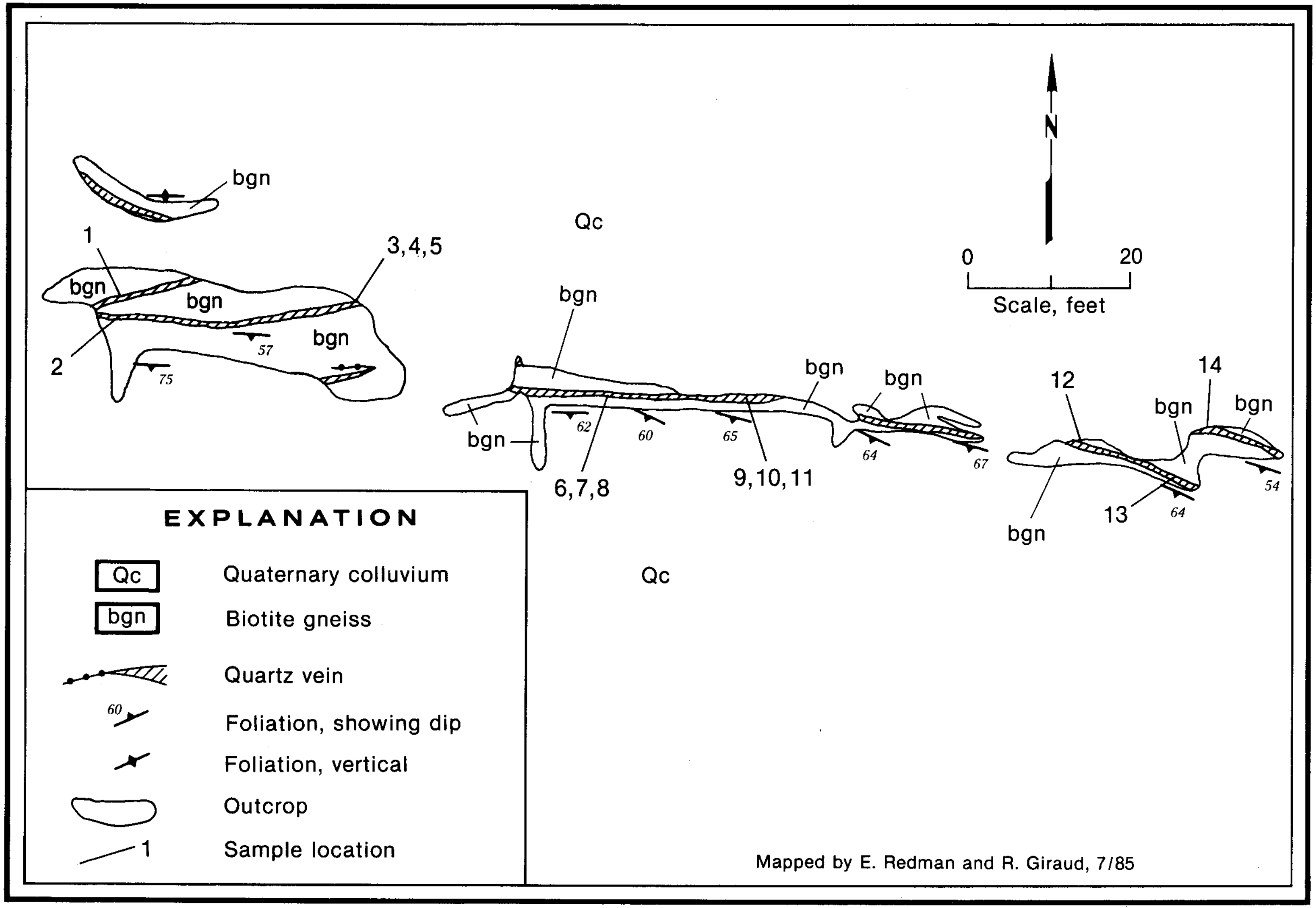

Figure D-115.—The Lemon Creek lode prospect, showing geology and sample locations.

MAS No. 21120108

MS No. 526, 582, 585, 609

References

D-96, D-97, D-98, D-99, D-130

CLARK PROSPECT

Production

There has been no production from the Clark prospect.

History

The Clark prospect (also known as the Sawmill Creek prospect) was probably located in the 1880's but little work was done (figs. D-5, D-113).

Workings

Minor stripping was done along the vein.

Geologic Setting

The Clark prospect consists of black phyllite and altered metagabbro dikes. Several quartz veins occur along or near the contact of the two rock units. The largest vein, which is up to 4 feet wide and exposed for 200 feet in Sawmill Creek, contains pyrrhotite and minor chalcopyrite (*D-130*).

Bureau Investigations

The Bureau did not examine the Clark prospect.

Resource Estimate

Too little is known of the Clark prospect to determine resources.

Recommendations

The Clark vein should be traced and examined to determine size, shape, and grade.

MAS No.
21120112

References

D-130

DORAN PROSPECT

Production

There has been no production from the Doran prospect.

History

Initial work in the Doran area began in 1889 when prospectors traced an altered diorite unit northward from the Early Bird prospect on Gold Creek (figs. D-5, D-113). A number of claims were staked between Salmon Creek and the Lemon Creek valley during that year. Several adits were driven by various miners between 1890 and 1895 but it isn't known whether any were done on what later became known as the Doran (*D-97*).

Sometime prior to 1911, John Doran had a claim in the area. Knopf (*D-62*) reported finding two adits, a 100-foot adit with a 30-foot drift and a 180-foot adit, but it is not known who drove them. After 1912, no further work was done at the prospect.

Workings and Facilities

There is a caved adit reported to be 100-feet long (*D-97*) and a second reported, but unlocated, 180-foot adit (*D-62*).

Geologic Setting

The Doran area is underlain by greenstone with some interbedded black phyllite that has been intruded by an albitized diorite sill. This sill may be continuous with the one exposed at the Wagner, Boston, and Cross Bay prospects.

Rocks at the caved portal include black phyllite and massive greenstone with a few thin quartz veins near the contact.

Bureau Investigations

The Bureau located one caved adit and collected one sample of quartz from the adit dump (fig. D-116, No. 1). No significant metal values were detected.

Resource Estimate

All metal values at the Doran prospect were below background levels.

Recommendations

Soil sampling and geologic mapping could help determine whether the prospect has potential for containing mineralization.

MAS No.
21120116

References

D-62, D-97, D-98, D-99

WAGNER PROSPECT

Production

There has been minor unrecorded production at the Wagner prospect.

History

Placer gold was discovered by Richard Harris and Joe Juneau in 1880 (figs. D-5, D-113). The lode deposit was discovered in 1889 and staked by several groups. The Blossom Lode, Mark Twain claim, Treasure Boy, Swinler claims, Wisconsin, Safe Deposit, and Sandstone claims were staked along the trend of the mineralization between Gold Creek and the Lemon Creek Valley.

Between 1889 and 1895, short adits were driven on three of the claims (up to 26 feet long), and a 215-foot adit put into the Treasure Boy claim that cut a 17-foot vein. The area was abandoned during 1896 and 1897.

John Wagner, John McGonigle, and Charles Skuse restaked the Salmon Creek falls area in 1898 and did "several thousand dollars" of work by 1900. The Alaska Gold King Gold Mining Company was formed by Wagner, Charles Goldstein, Judge H. Folsom, Lester Goldberg, and Nick Wagner in 1901, and by 1903 had done 500 feet of underground development. In 1905, a 2-stamp mill was erected but did very little work. Wagner discovered new ore in 1908 and sank a 20-foot shaft. More work was also done during 1909.

In 1912, a right-of-way was leased to the Alaska Gastineau Company for their hydroelectric project.

The Wagner prospect, along with the Lemon Creek, Dora, Hallum, and Boston properties, were consolidated by George Noble for the Hallum Construction Company in 1914. The company sank a 250-foot shaft and drove 500 feet of workings from it. A 150-ton mill was also built. Work was halted by legal entanglements in 1915 and all work had been abandoned by 1916.

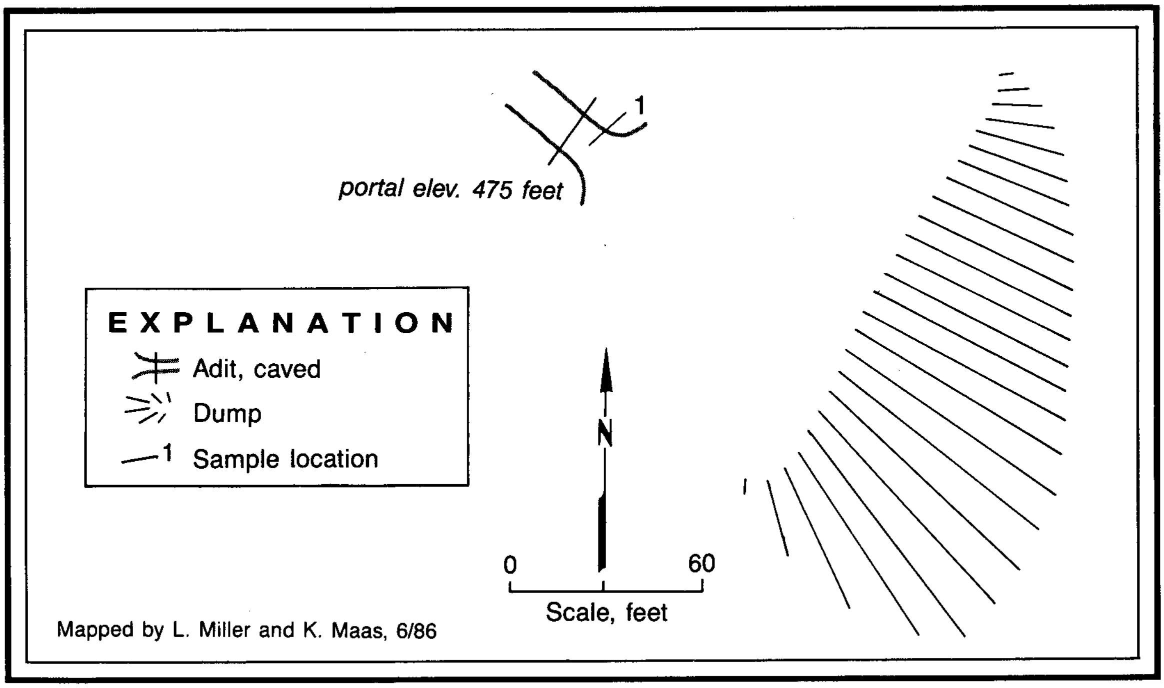

Figure D-116.—The Doran prospect, showing sample location.

In 1928, the property was leased by S.G. Oslund but little work was done (*D-97*).

Workings and Facilities

There is one open adit (unexamined), a 250-foot shaft with 500 feet of workings and, reportedly, at least two additional adits (*D-97, D-130*) in the prospect area. A total of 1,600 feet of workings are supposed to exist (*D-34, D-97*).

Geologic Setting

The Wagner prospect occurs along the contact between black phyllite on the SW and greenstone to the NE. The greenstone, according to Spencer (*D-130*), is schistose and "is probably an altered dike of gabbro."

Mineralization is not well described in geologic literature but Spencer (*D-130*) notes that it is similar to the deposit at the Boston prospect. The deposit, therefore, probably consists of a highly altered diorite sill. Spencer (*D-130*) states that the veins ranges from a stringer to 8 feet in width and contain arsenopyrite, pyrite, chalcopyrite with minor sphalerite, and galena. Albite, rutile, and some sericite also occur within the veins. The contact between the mineralized body and the altered metagabbro is highly irregular and, Spencer (*D-130*) notes, "is gashed by many short stringers running out from the vein."

Bureau Investigations

The Bureau was not given permission to examine the Wagner prospect.

Resource Estimate

Because the Bureau was unable to examine the Wagner prospect and since geologic literature does not well describe the deposit, no resource estimate is possible.

Recommendations

If permission could be acquired to examine the Wagner prospect, it could be mapped and sampled to determine its character and potential grade.

MAS No.	MS No.
21120117	955, 968

References

D-34, D-96, D-97, D-99, D-130, D-133

GOLDSTEIN PROSPECT

Production

There has been no production from the Goldstein prospect.

History

The Goldstein prospect was discovered in 1916 (figs. D-5, D-113, D-117). Reportedly, a 48-foot adit was driven by October of that year (*D-97*) but no other work is recorded.

Workings and Facilities

A 7-foot adit and two 25-foot trenches were located but a reported 48-foot adit was not.

Bureau Investigations

The Goldstein prospect consists of a concordant quartz vein up to 3 feet wide in chlorite phyllite.

The Bureau located and mapped a sloughed adit and two sloughed trenches (fig. D-118). Four samples were collected of quartz float in and near the trenches (figs. D-117, Nos. 1-2; D-118, Nos. 1-2). One sample contained 0.1% copper and 3.2 ppm silver.

Recommendations

Other workings have been reported. Finding these workings, which include a 48-foot adit, would help evaluate the property.

MAS No.
21120196

References

D-96, D-97

HALLUM PROSPECT

Production

There has been no production from the Hallum prospect.

History

The Hallum prospect was located in 1901 by the Hallum brothers (figs. D-5, D-117). In 1909, the claims were purchased by the California-Nevada Company (owners of the Ebner Mine) and later, in 1913, consolidated with the Boston, Dora, Wagner, and Lemon Creek prospects by George Noble. Noble drove the Hallum tunnel, which was planned to be 3,000 feet long, in 1913 and 1914. The tunnel was driven 523 feet before legal problems halted work in early 1914. The short upper adit on the side of Mt. Juneau was driven in 1915 (*D-97*).

Workings and Facilities

The Hallum prospect has a 27-foot adit located near the Mt. Juneau trail and a 523-foot adit above Last Chance Basin.

Bureau Investigations

The Hallum prospect lies on the NW extension of the Alaska Juneau mineral trend. The prospect is underlain by black phyllite, with minor felsic phyllite (mostly sericite with some quartz and/or feldspar), intruded by metagabbro dikes and sills. Quartz veins occur along or near the contacts of the metagabbro which displays local hydrothermal alteration similar to that at the Alaska Juneau Mine. Quartz veining has been traced over a distance of 4,000 feet to the NW from the Ebner Mine.

Sample Results

The Bureau located and mapped two adits on the Hallum prospect (fig. D-119). The longer adit above Last Chance Basin was designed as a haulage tunnel and did not cut any significantly mineralized rock, therefore no samples were taken from it. In the upper adit, two samples were collected (fig. D-119, Nos. 1-2) and one had gold values of 0.4 ppm.

Resource Estimate

Mineralization at the Hallum prospect is poorly exposed because of dense brush and steep, drift-covered slopes.

Recommendations

To evaluate the Hallum prospect, the mineralization could be located by soil sampling, trenching, and mapping.

MAS No.	MS No.
21120129	1048A, 1048B

References

D-96, D-97, D-98, D-99, D-125, D-130

LOWER GOLD CREEK PLACERS (including April placer)

Production

Production from the lower Gold Creek placers is not known but a small amount of gold was probably recovered.

History

The lower Gold Creek placers were staked on lower Gold Creek between Last Chance Basin and Gastineau Channel in the early 1880's but nothing is known about work done or production (figs. D-5, D-117).

Workings and Facilities

Any workings have been destroyed by expansion of the city of Juneau and construction of the present flume.

Geologic Setting

The placers cover a portion of the lower canyon of Gold Creek below Last Chance Basin and the Gold Creek delta.

Bureau Investigations

The Gold Creek delta is covered by urban development and the stream confined to a concrete channel.

Resource Estimate

There is no resource in lower Gold Creek.

Recommendations

No work is recommended.

MAS No.	MS No.
21120130	289, 317, 580, 581

References

D-44, D-130

JUALPA PLACER MINE

Production

An unknown volume of gravels was sluiced in 1901 and 1905, but the results of the work are not known (*D-97*).

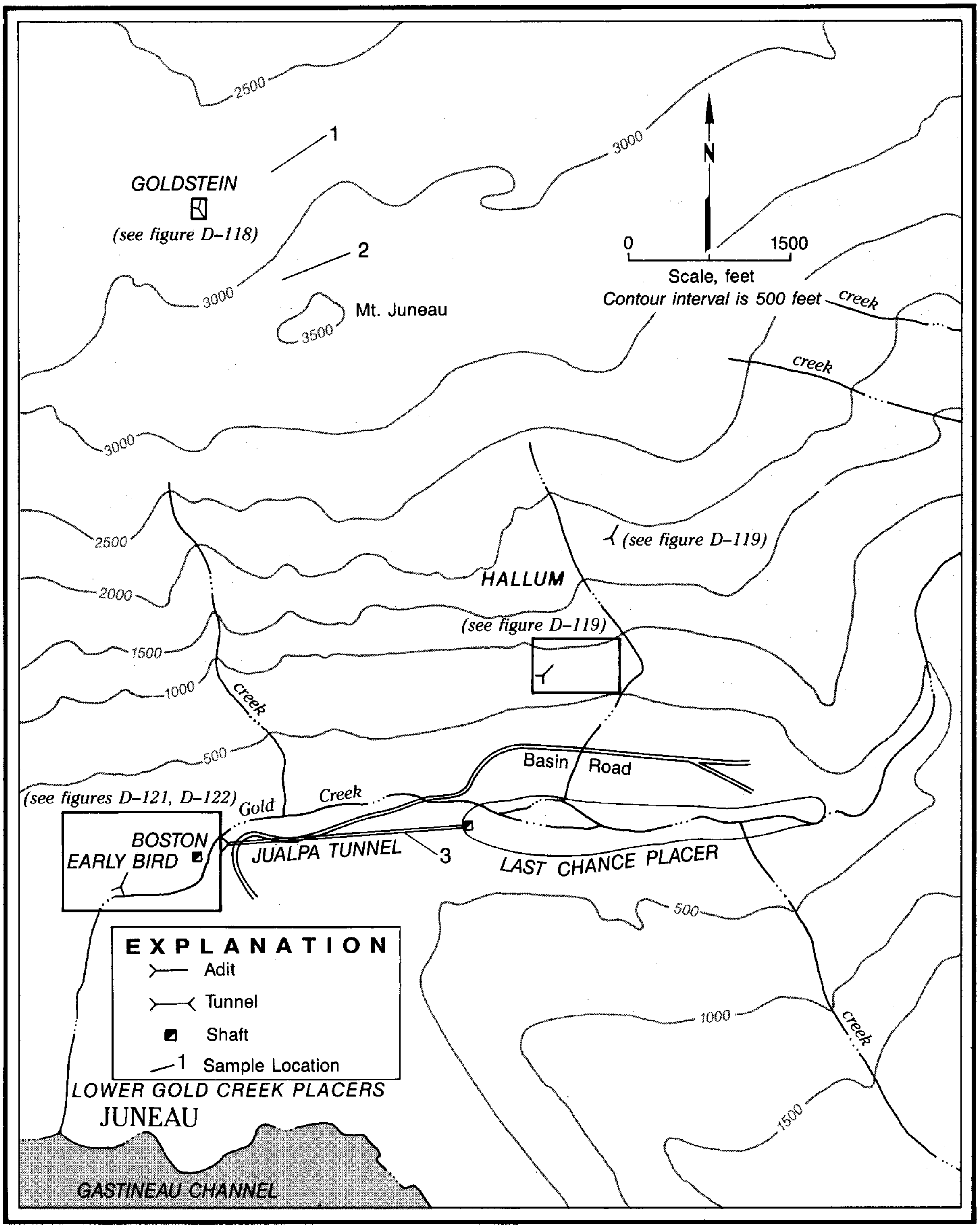

Figure D-117.—Mines and prospects in the lower Gold Creek and Mount Juneau areas.

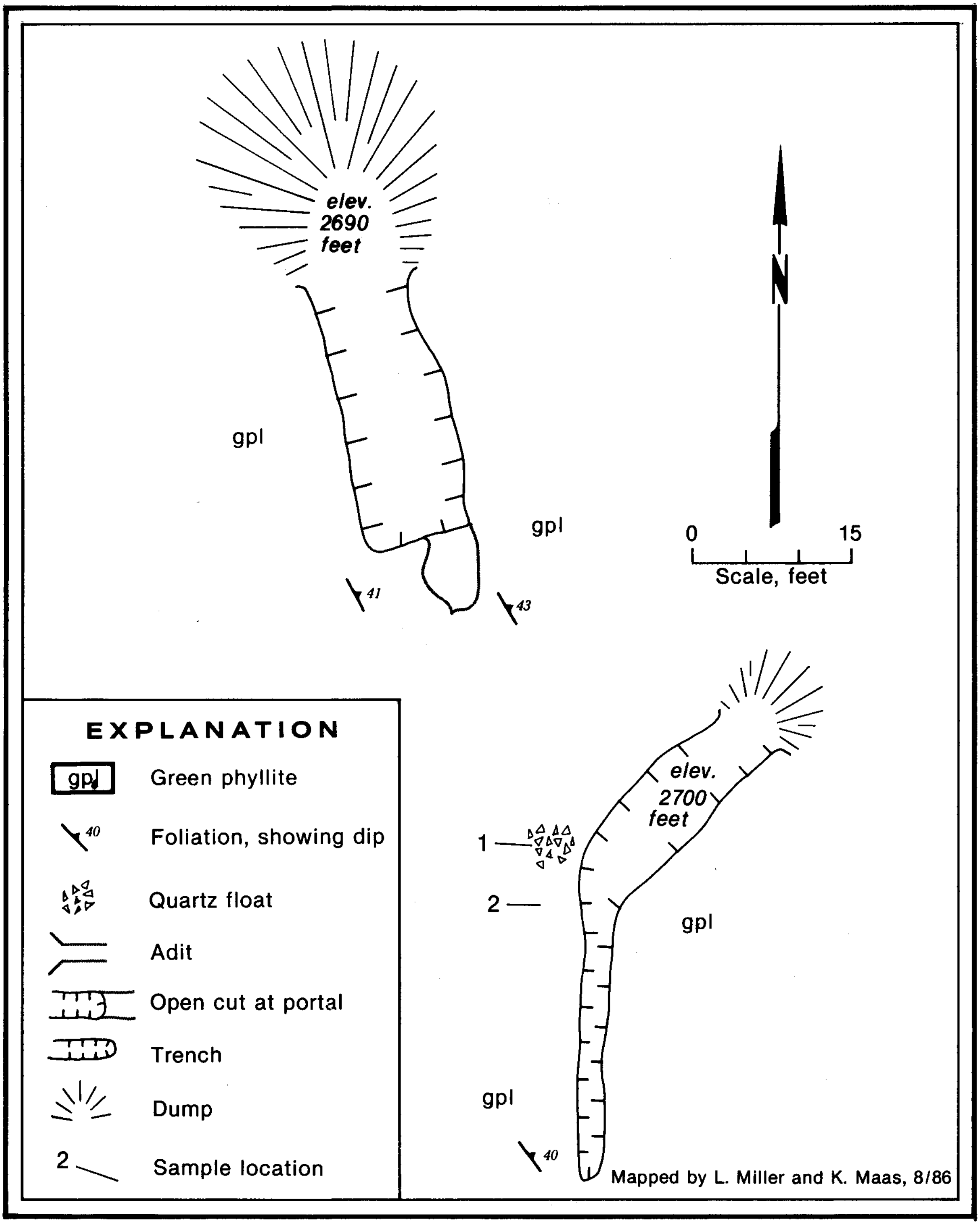

Figure D–118.—The Goldstein prospect, showing geology and sample locations.

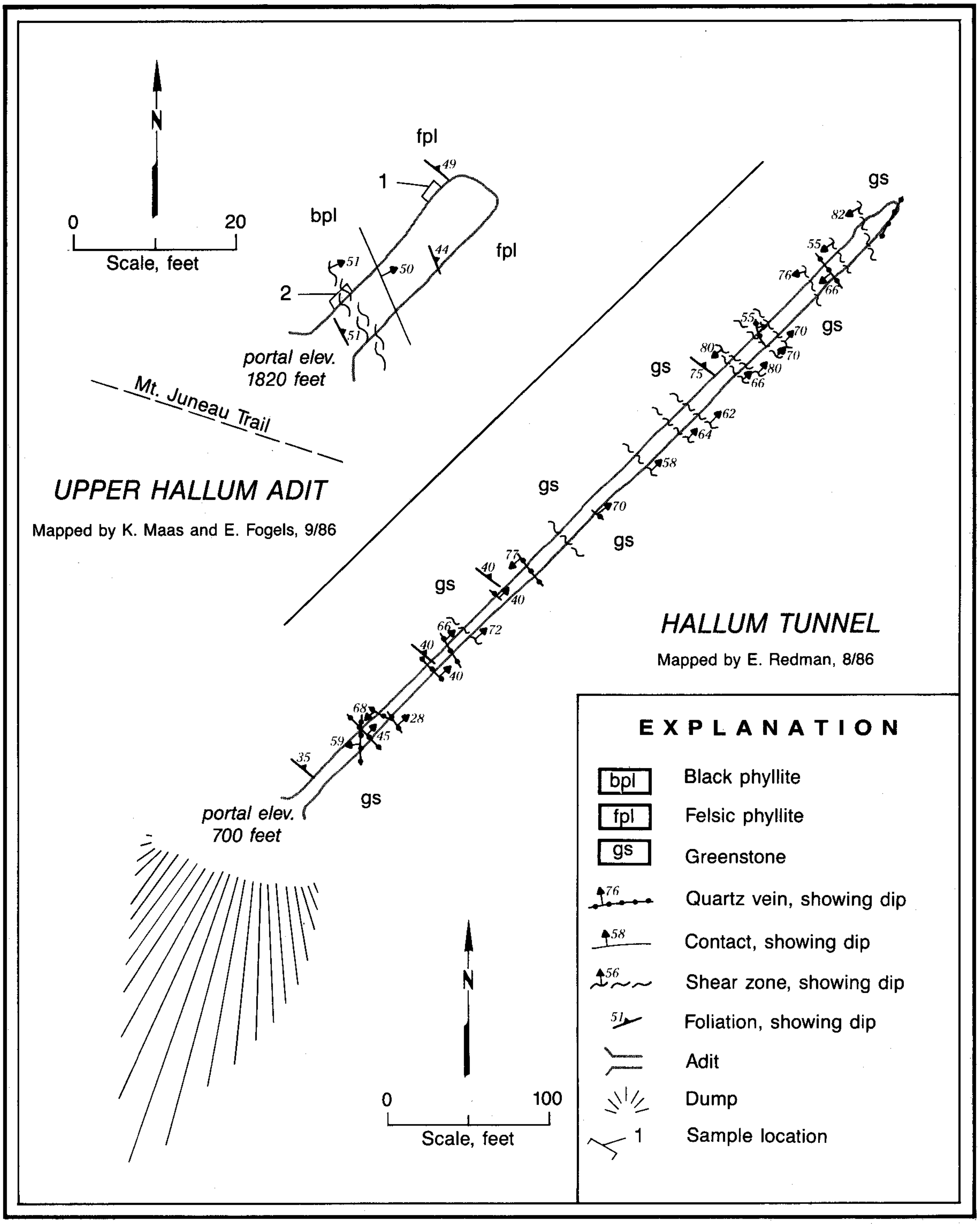

Figure D-119.—The Hallum prospect adits, showing geology and sample locations.

History

Placer gold was discovered in what became known as Last Chance Basin in 1880 by Richard Harris and Joe Juneau (figs. D-5, D-117). Placer claims in the basin were consolidated by George Garside and William Sanders in 1887, but only minor work was done until 1898.

Last Chance Hydraulic Mining Company was formed by Garside in 1898, and a 2,000-foot drainage tunnel started in 1899. In the fall of 1900, the company drove a raise to the surface from the tunnel and had completed a flume. Because the first raise came out on the slope at the side of the basin, the tunnel had to be extended during the summer of 1901. Actual mining started in August 1901, but many large boulders and stumps made work very difficult. Floods in early November washed out part of flume and blocked the tunnel with debris. After the flood, work was halted.

Little work was done in 1902, and the mine was sold to the Jualpa Gold Mining Company in 1903. A large derrick was erected to move large boulders but it collapsed on the first try. In 1904, a new flume was constructed and sluicing began in June 1905, continuing until September (fig. D-120). Heavy rains in September washed out much of the flume and blocked the tunnel with debris and the mine was closed.

No work was done in 1906, and the mine was sold to John Hile (previously the consulting engineer for the mine). Another September flood destroyed more of the flume and equipment. The Jualpa placer mine was abandoned after 1906 (*D-97*). In 1960, the City and Borough of Juneau sealed the drainage tunnel and used it for water storage.

Workings and Facilities

The 2,000-foot drainage tunnel is now being used for water storage by the City and Borough of Juneau.

Geologic Setting

Last Chance Basin is a large basin filled by gravel when landslides blocked Gold Creek. Gravels have accumulated to a depth of about 90 feet at the lower end of the basin (*D-130*).

Bureau Investigations

Other than to examine the sluice that is still in place in the Jualpa Tunnel, the Bureau did not examine the deposit. One sample of material was collected in a riffle set near the upper end of the Jualpa tunnel sluice (fig.

Figure D-120.—The Jualpa Placer Mine, Last Chance Basin. Although extensive work was done to develop the placer, problems including large boulders, tree stumps, and floods, precluded any significant gold recovery (photo courtesy Alaska State Library, Winter & Pond collection).

D–117, No. 3) and the heavy mineral concentrate obtained yielded 15.8 ppm gold. This sample was heavily laden with amalgam. A similar nearby sample taken by an Alaska Dept. of Environmental Conservation employee using a suction device recovered considerably more amalgam than did the Bureau sample so it is possible that the Bureau sample represents a low value for the upper end of the sluice.

Resource Estimate

Last Chance Basin is approximately 4,000 feet long, 550 feet wide, and may contain an average gravel thickness of about 70 feet. These dimensions would provide a maximum resource of 5,700,000 yd^3 of potentially gold-bearing gravel. Gold content of the gravel is unknown, making resource estimates unfeasible.

Recommendations

The area is part of Juneau's watershed so no additional work is recommended.

MAS No.	MS No.
21120207	142–162

References

D–96, D–97, D–99, D–130, D–161

EARLY BIRD AND BOSTON PROSPECTS

Production

There has been no reported production from the Early Bird or Boston prospects.

History

The Early Bird prospect was discovered prior to August 1888 when McCully and McGlinchy were doing assessment work and George Garside and William Sanders were driving an adit (figs. D–5, D–117). Additional work was done in 1889.

In 1899, William Ebner, John Wagner, and F.A. Brown had 10 miners at the Boston sinking a 100-foot shaft and driving tunnels at the 50- and 100-foot levels to expose the same rock cut in the Early Bird adit. The men spent about $20,000 on development and machinery that year. The Boston Group Gold Mining Company formed in 1900 with Ebner as president. After the shaft was pumped out, the company did some work on the prospect. In 1901, a mill test was run on ore from the 50-foot level. The mine was leased and sampled in 1904 and then purchased in 1906 by an English group. The group sank the shaft to 150 feet and did more work on the levels. At the end of 1906, there were 500 feet of tunnels from the shaft.

The Treadwell Company leased the prospect in 1911 and did systematic sampling but did not follow up their work. In 1914, the Boston prospect was acquired by George Noble of the Hallum Construction Company. Noble rebuilt the shaft and compressor house and sunk the shaft an additional 100 feet by the end of the year. Legal problems halted work in 1915, and there was no further effort to develop the property (*D–97*).

Workings and Facilities

There is a caved shaft, hoist, and boiler at the Boston prospect and an adit with 202 feet of workings at the Early Bird prospect.

Bureau Investigations

The Boston/Early Bird prospect includes interbedded black and green phyllites intruded by an altered diorite sill (fig. D–121). The diorite has been chloritized and, in the core of the sill, may contain albitization similar to the Treadwell. The albitized portion of the sill contains up to 5% disseminated pyrite. It is reported that quartz/albite veins occur along the contacts of the sill elsewhere in the area (*D–130*).

A second, less-altered diorite sill outcrops in Gold Creek about 160 feet upstream from the Early Bird adit. This sill was the target of exploration from the Boston shaft. Samples from the Boston dump were similar in appearance to the most altered portion of the Early Bird sill.

Sample Results

The Bureau mapped and sampled the Early Bird adit and examined the Boston dump, collecting 12 samples in the adit (fig. D–122, Nos. 1–12) and 3 from the Boston shaft area (fig. D–122, Nos. 13–15). Values were all very low with the highest values being only 0.6 ppm gold in the Early Bird adit and 0.6 ppm gold from the Boston dump.

Resource Estimate

There is a potentially large tonnage of altered and pyritized rock available at the Boston/Early Bird prospect but not enough is known about the amount and

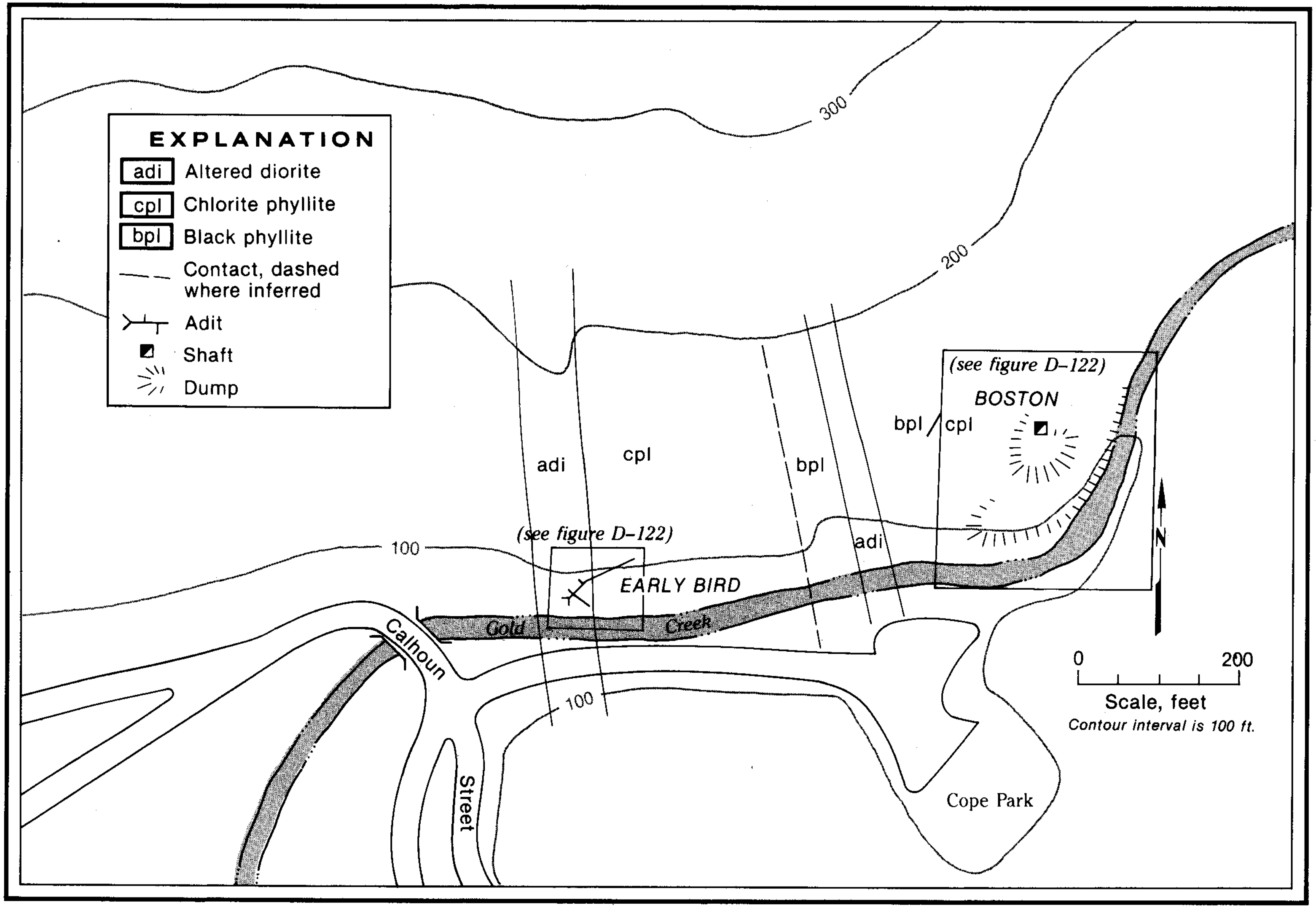

Figure D-121.—The Early Bird and Boston prospects.

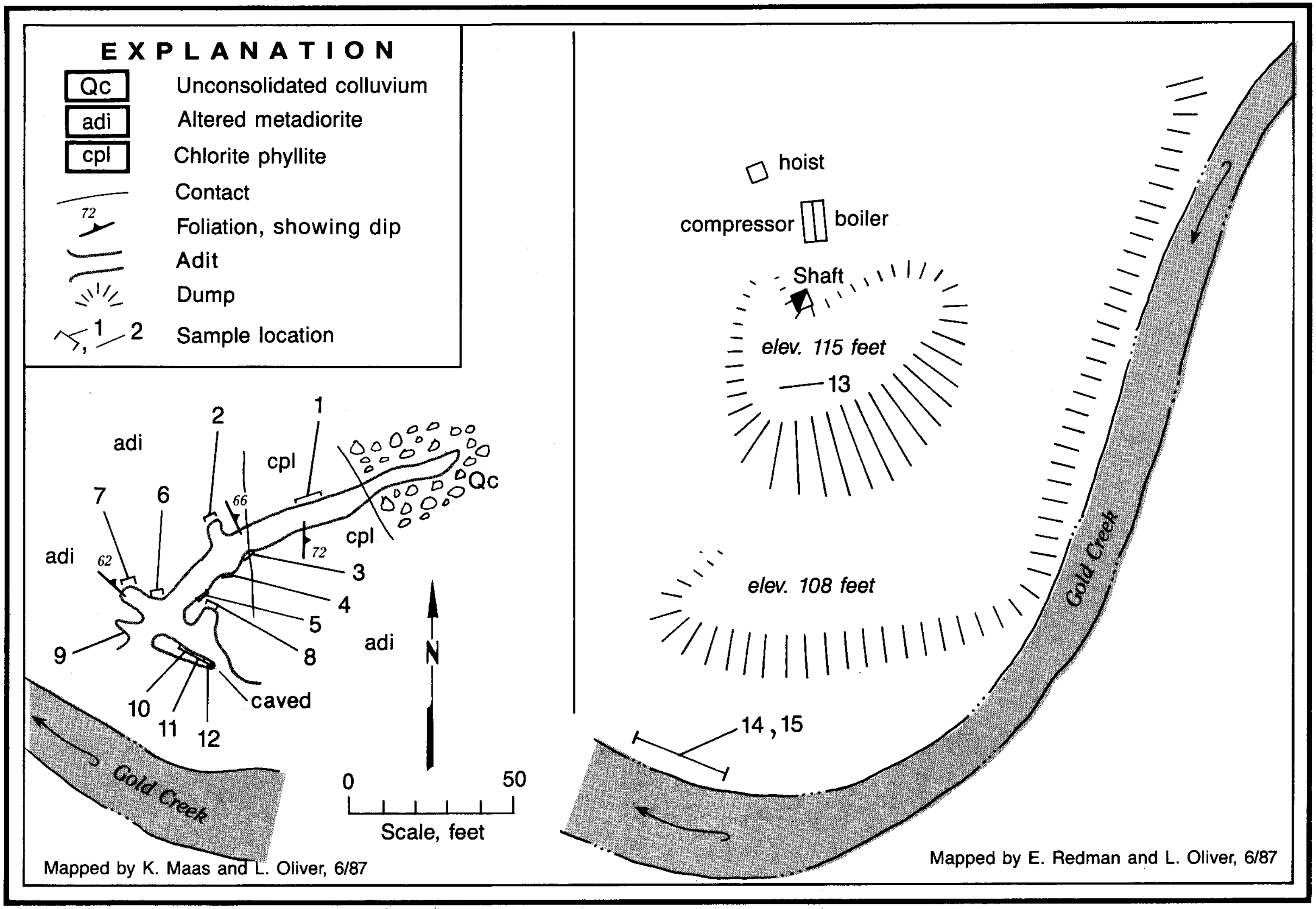

Figure D-122.—The Early Bird adit and Boston shaft, showing geology and sample locations.

distribution of metal concentrations to estimate resources.

Recommendations

Diamond drilling would be the best method to test the Boston mineralization.

MAS No.	MS No.
21120128	926

References

D-33, D-95, D-96, D-97, D-99, D-130, D-133, D-158

JEFF & RUSSELL PROSPECT

Production

There was no production from the Jeff & Russell prospect.

History

The Jeff & Russell prospect was leased by the Alaska Juneau company in 1930 and the long adit driven during the winter of 1930–1931 (figs. D–5, D–123, D–124). The property was dropped the next year and no further work was done (*D-4*).

Workings and Facilities

The Jeff & Russell adit is 2,630 feet long with 1,080 feet of crosscuts.

Bureau Investigations

The Jeff & Russell adit cuts interlayered black phyllite, felsic phyllite (quartz, feldspar), carbonate-altered metagabbro, and unaltered metagabbro. Quartz veins occur in the vicinity of the contacts between the less resistant black phyllite and the more resistant felsic phyllite, metagabbro, and greenstone. Small swarms of veins occur at the black phyllite-greenstone and black phyllite-felsic phyllite contact. Pyrrhotite is the only sulfide present in the veins.

The Jeff & Russell adit was mapped and sampled by the Bureau; a total of 23 samples were collected in the adit (fig. D–125, Nos. 1–23). The first crosscut off the main adit contained four samples which yielded 2.6, 10.1, 3.6, and 2.4 ppm gold. Two of four samples taken from a mineralized section near the end of the adit gave values of 2.3 and 3.0 ppm gold. Three samples were taken of dump material (fig. D–125, Nos. 24–26) but none contained significant values.

Resource Estimate

The low density of veins and lack of consistently high gold values in the area suggest that mineralization is not widespread. The area is, however, on trend with the Alaska Juneau mineral system.

Recommendations

Drilling could be used to explore for economic mineralization.

MAS No.	MS. No.
21120141	1008

References

D-4, D-97, D-99

HUMBOLDT MINE

Production

Approximately 1,400 tons of ore was mined from 7 adits between 1882 and 1905.

History

In August 1882, William Webster set up a 5-stamp mill on Gold Creek to process ore from the lodes in Silver Bow Basin (figs. D–5, D–123, D–124). When the miners were unable to supply Webster's mill with enough ore, Webster staked the Humboldt later that year. Some mining and milling was done between 1883 and 1889, and a bucket tram erected between the upper adit and mill in the fall of 1889. By 1898, the Humboldt Mine had six short adits and a longer one. The mill was shut down because of worn out equipment in August 1898. Only sporadic work was done at the Humboldt Mine and mill between 1899 and 1905.

The Alaska Juneau Company drove a long adit through the Humboldt property in 1930 (Jeff & Russell) to test its potential but little veining was found and the property was dropped (*D-97*).

Workings and Facilities

There are 5 open adits (the upper adit has 200 feet of drifts and crosscuts plus a 40-foot raise and stope; the

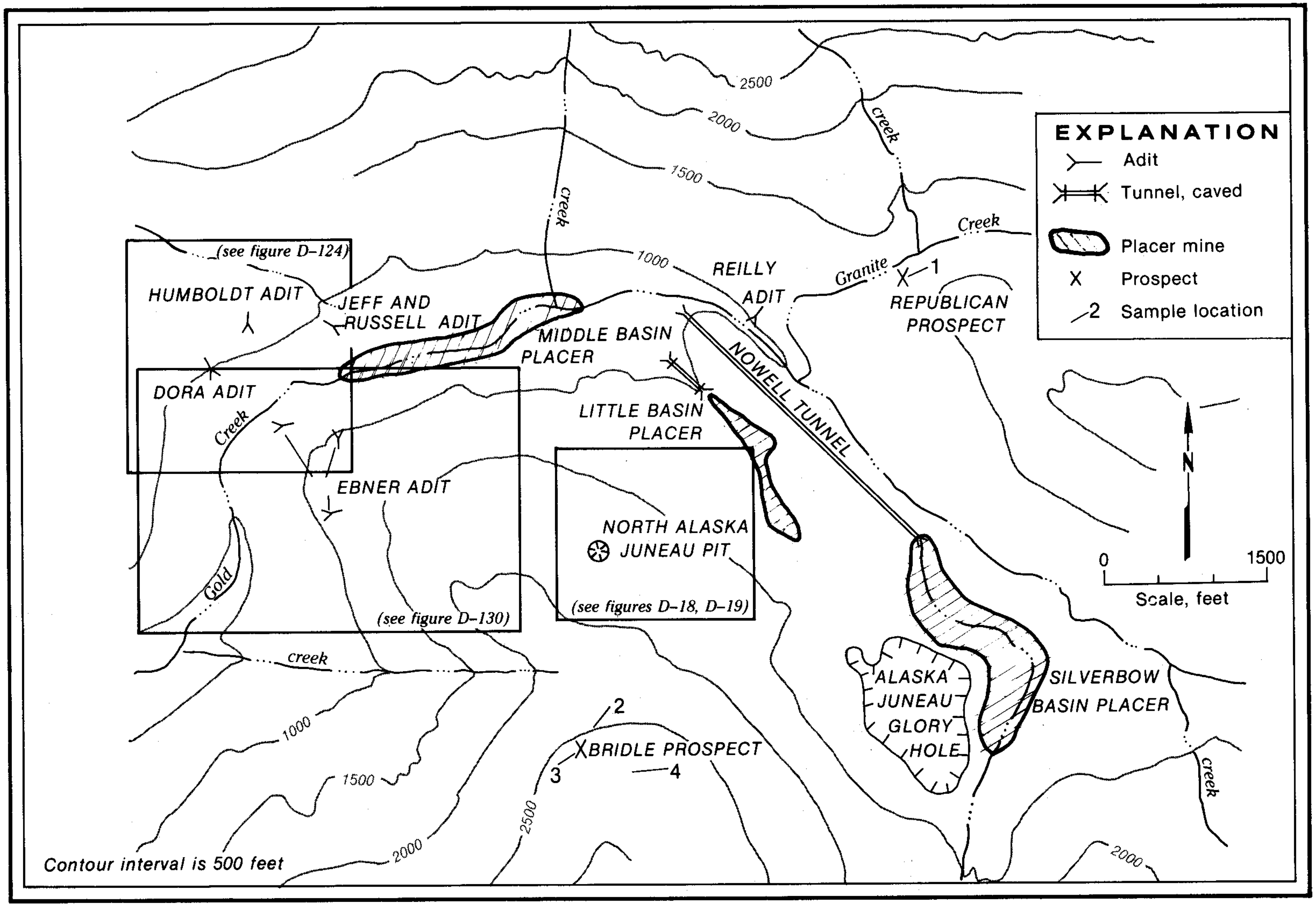

Figure D-123.—Mines and prospects in the middle Gold Creek area.

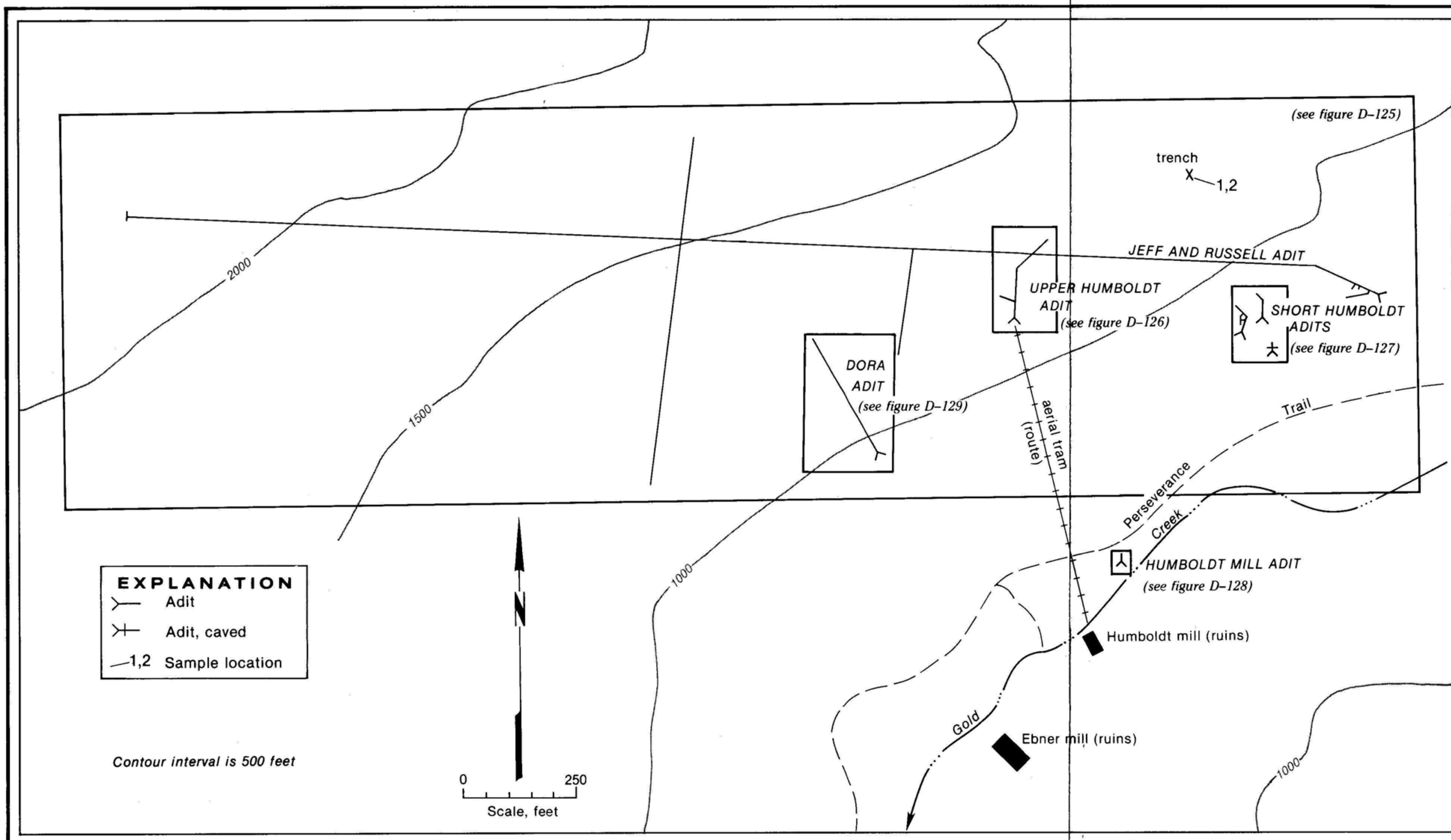

Figure D-124. — Workings in the Jeff & Russell, Dora, and Humboldt areas.

mill adit has 48 feet of workings; other adits have 16 feet, 38 feet, and 94 feet of workings). There is one caved adit at the Humboldt Mine.

Bureau Investigations

The Humboldt Mine is underlain by black phyllite and metagabbro dikes and sills. All workings, except for the mill tunnel by the edge of Gold Creek, are in black phyllite with foliation-concordant, boudinaged quartz veins. The mill adit cuts altered metagabbro. Most of the quartz veins are irregular, discontinuous, and short. In the long upper adit, one vein, with a thickness of between 4 inches and 1 foot, was stoped for a distance of about 50 feet.

Mineralization in the veins within the black phyllite is primarily pyrrhotite with only a trace of sphalerite. In the mill adit, one vein set contained conspicuous amounts of sphalerite, and some galena and pyrrhotite.

Sample Results

The Bureau located and mapped the adits at the Humboldt Mine and also found the remains of the old Humboldt stamp mill (figs. D-126 to D-128). The upper Humboldt adit was sampled (fig. D-126, Nos. 1-7) but yielded only two samples with gold values over 1 ppm (1.4 and 1.5 ppm). Eleven samples were taken from the cluster of four adits near the Jeff & Russell adit (fig. D-127, Nos. 1-11). Of these, only three contained gold values over 1 ppm (1.2, 3.0, and 5.6 ppm gold). Three samples of quartz taken in the mill adit (fig. D-128, Nos. 1-3), located on the north side of Gold Creek across from the mill remains, contained 35.9 and 2.0 ppm gold. Two samples were taken from a trench above the adits (fig. D-124, Nos. 1-2), one of which contained 4.5 ppm gold.

Resource Estimate

None of the quartz veins observed in the Humboldt adits had any length or continuity; therefore, it is not possible to establish tonnage or grade of the deposit.

Recommendations

Drilling and trenching should be done to determine the frequency and grade of quartz veining.

MAS No.	MS No.
21120145	76A, 76B

References

D-95, D-96, D-97, D-98, D-99, D-128, D-130, D-133, D-160

DORA MINE

Production

There was unknown but probably minor production from the Dora Mine during the 1890's.

History

The Dora Mine was discovered in the early 1880's but was not actively worked until 1889 when Dr. H. S. Wyman built an arrastra along Gold Creek below the claim (figs. D-5, D-123, D-124). Wyman set up a rope tram in 1889 and operated the arrastra until 1892 when he sold the mine to William Ebner. Ebner did some tunnelling in 1893 and 1894 and crushed ore from the Dora at the Takou Union mill in 1895.

After 1895, little work was done. George Noble consolidated the Dora with the Boston, Wagner, Hallum, and Lemon Creek properties in 1913 but concentrated his efforts on other parts of the group. By 1915, Noble's venture was bankrupt and no further work was done on the Dora (*D-97*).

Workings and Facilities

A 285-foot adit was found on the Dora claims but a second, shorter adit (shown on a proprietary Ebner Gold Mining Co. map) was not.

Bureau Investigations

The Dora adit is entirely within carbonate-altered metagabbro. Quartz veins concentrated in the back half of the adit trend N-S, dip steeply both E and W, and contain pyrrhotite. Some veins near the portal trend approximately 075° and dip 50° to 60° NW.

The Bureau located, mapped, and sampled the Dora adit (fig. D-129) but did not locate a second adit. A total of 14 samples were taken (fig. D-129, Nos. 1-14). One vein sample contained 65.7 ppm gold across 1.5 feet and the other 13 samples averaged 1.6 ppm gold.

Resource Estimate

Gold values are spotty but the mineralization is along the trend of the Alaska Juneau mineral system. This gives the area a moderate development potential.

Recommendations

A drilling program from both the surface and the Jeff & Russell adit could help define the Dora mineralization.

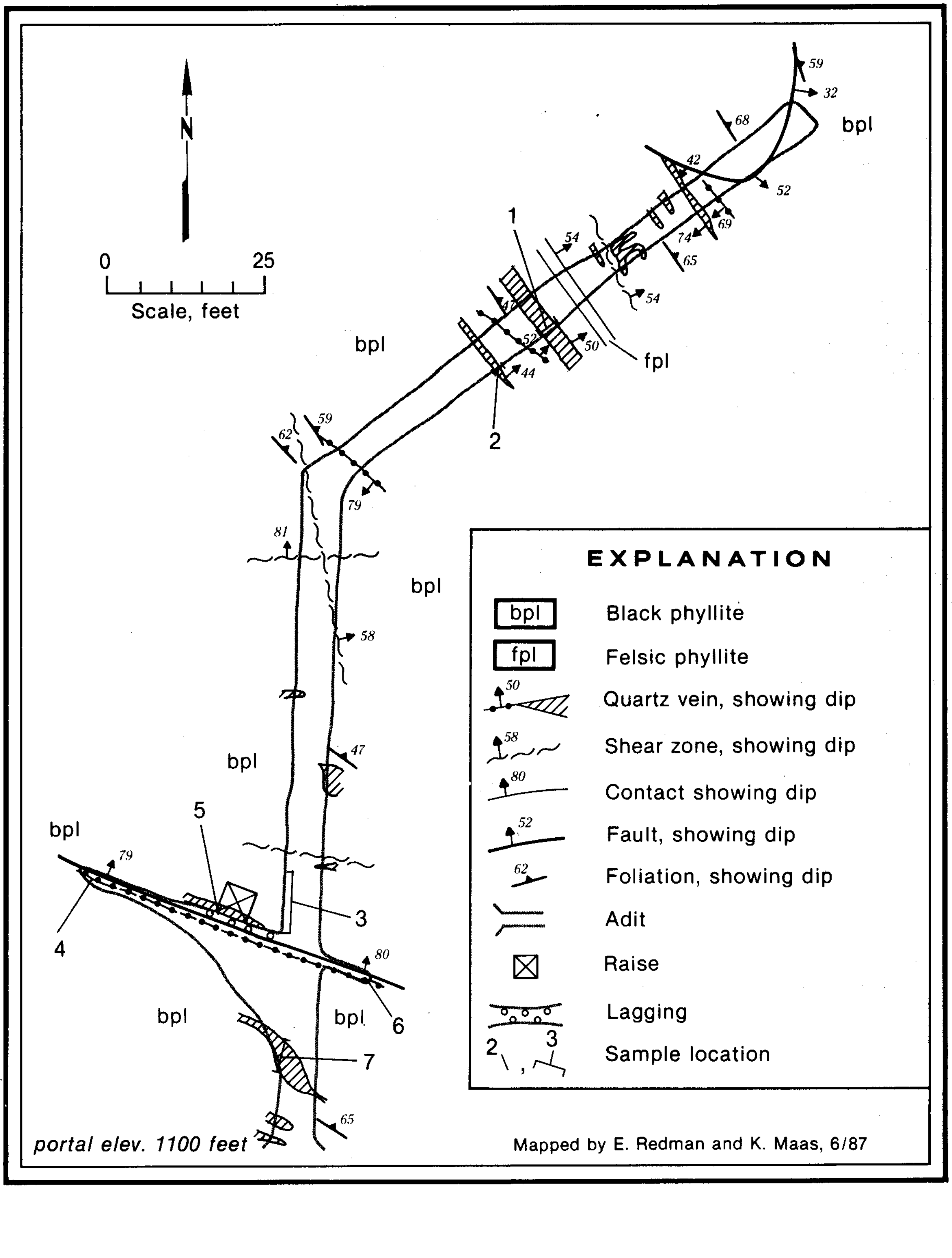

Figure D-126.—The upper Humboldt adit, showing geology and sample locations.

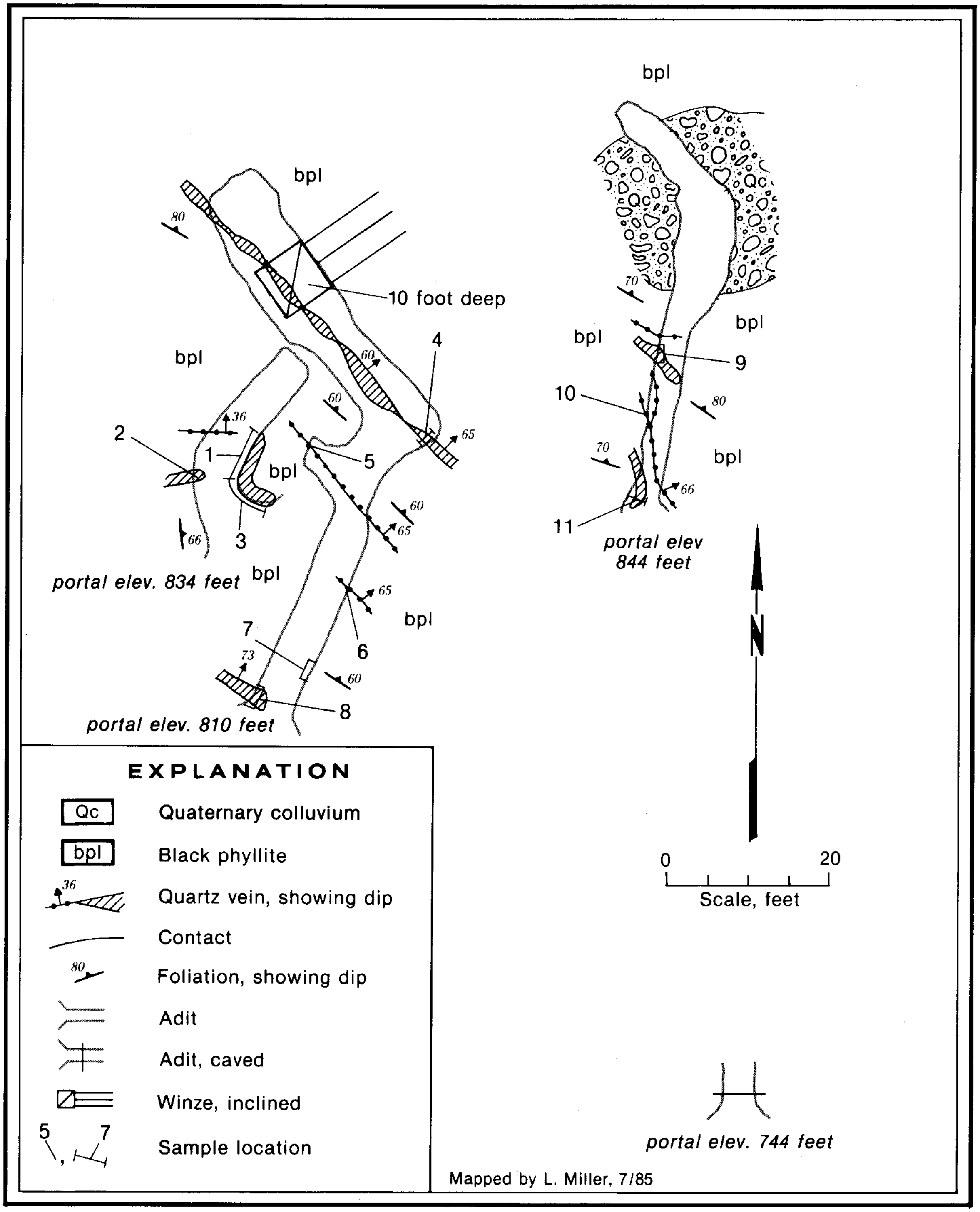

Figure D-127.—Short Humboldt adits, showing geology and sample locations.

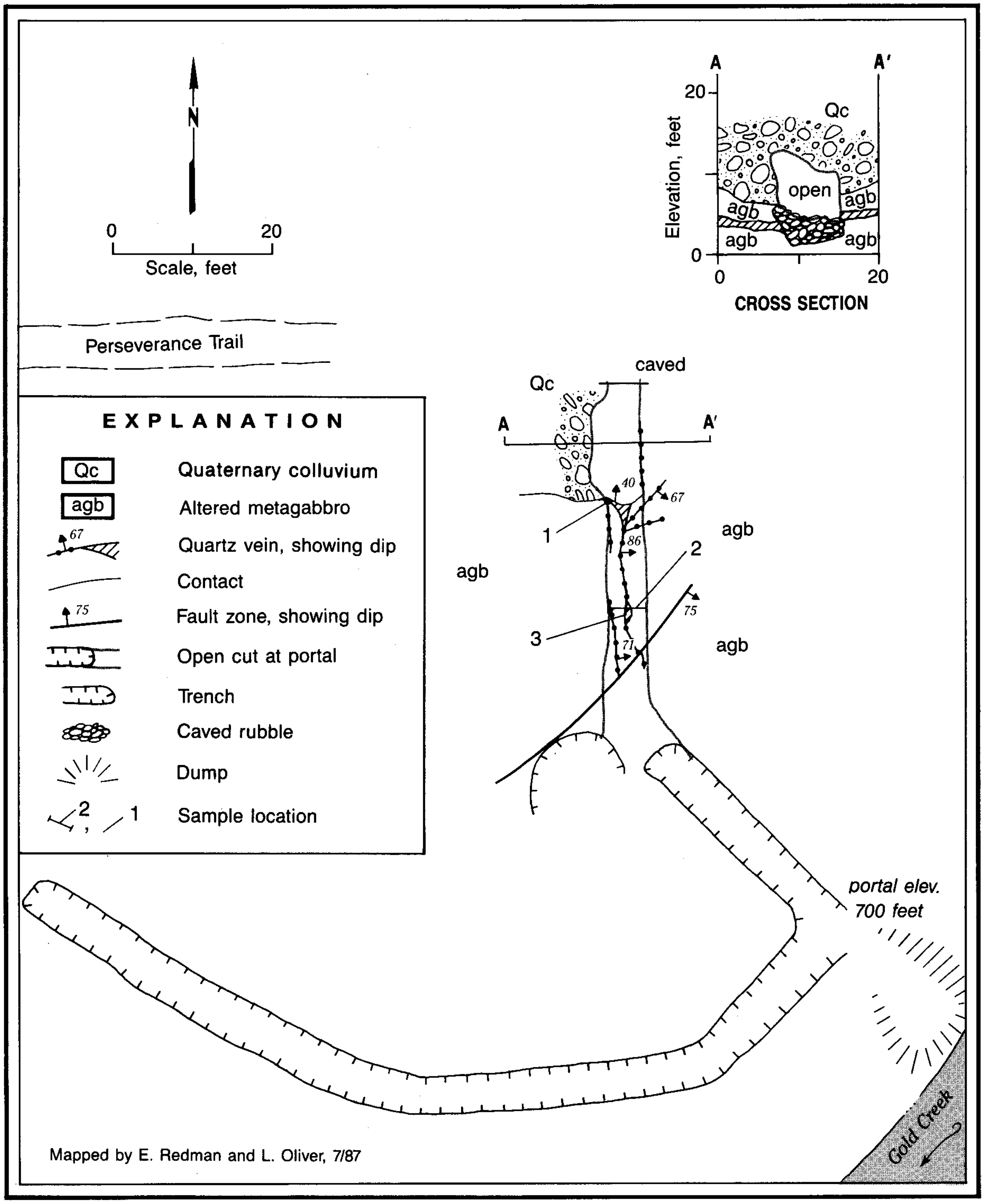

Figure D-128.—The Humboldt mill adit, showing geology and sample locations.

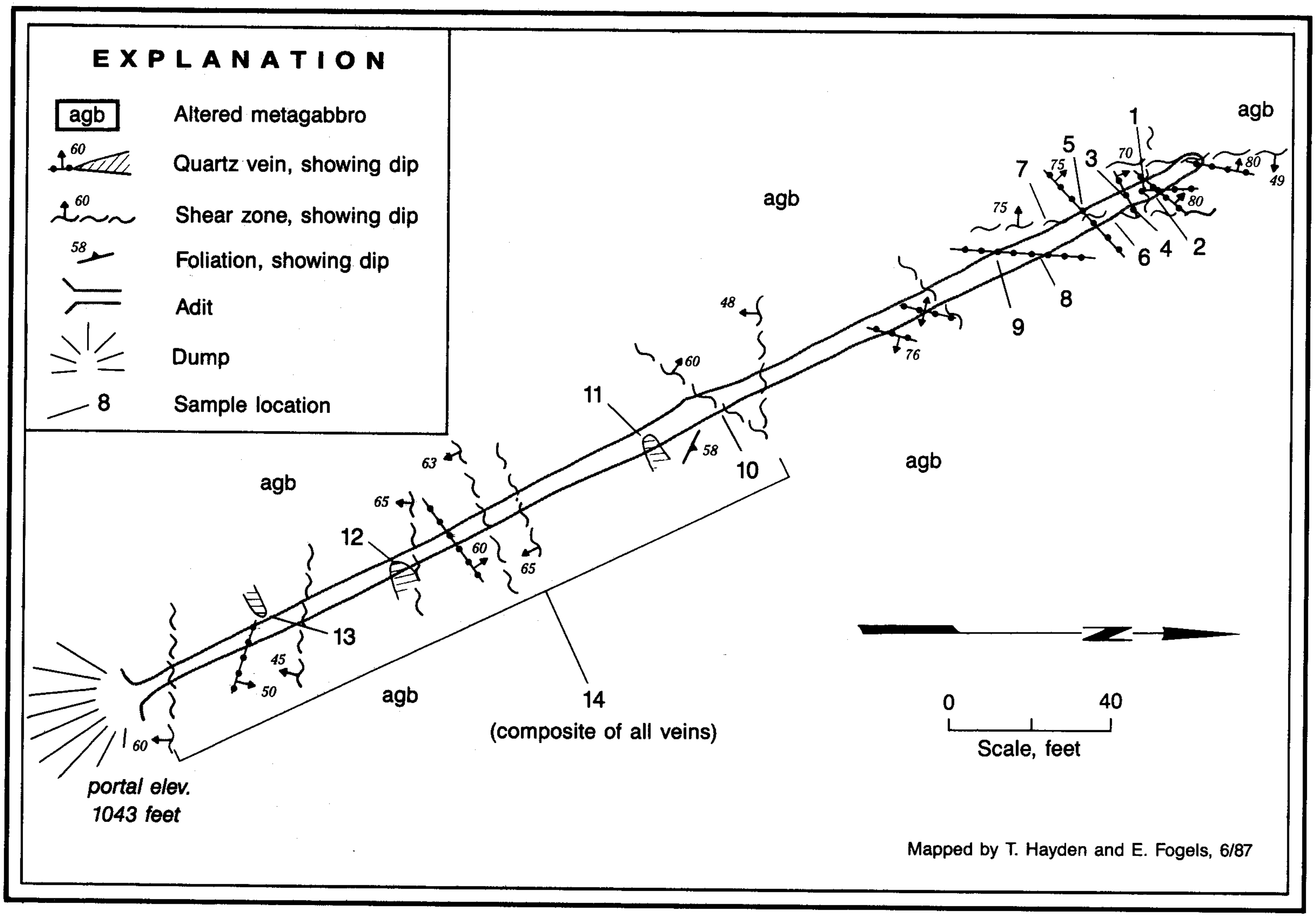

Figure D-129.—The Dora adit, showing geology and sample locations.

MAS No.	MS No.
21120197	545, 677

References

D-96, D-97, D-98, D-99, D-133

EBNER MINE

Production

Table D-9.—Gold and silver production from the Ebner Mine

Year	Tonnage (st)	Value of bull. ($)	Value of conc. ($)	Total value ($)	Production oz Au	oz Ag
1886	600	na	na	na	na	na
1887	unknown production					
1888	new mill being set up					
1889	unknown production					
1890-92	mine closed due to management problems					
1893	unknown production					
1894	na	na	na	6,970	na	na
1895	na	na	na	35,000		
1896	na	na	na	15,000	726	na
1897	na	na	na	65,000	3,000	na
1898[1]	na	4,847	na	4,846	233	51[2]
1899	na	26,559	na	26,563	1,586	68
1900	na	33,279	na	33,280	1,932	92
1901	na	15,988	na	15,986	929	44
1902	na	26,198	na	26,198	1,536	66
1903	na	17,665	na	17,675	1,046	47
1904	na	17,237	na	17,236	1,024	50
1905	11,000	27,975	6,025	34,000	1,640	81
1906	9,000	15,674	10,726	26,400	1,267	299
1907	5,400	4,057	14,143	18,200	873	227
Total	105,600[3]	$189,479	unknown	$342,354[4]	15,792[3]	1,025

NA Not available.

[1] Totals from 1898–1904 are from bullion production only (*D-37*), no concentrate values available. Other values from Redman (*D-97*).

[2]Silver values for years except 1897-1907 are from mill (*D-37*). Silver from concentrates not known.

[3] Total 1898-1907 from Ebner Mining Co. reports. Values are mill recovery only; they do not include any smelter values. Courtesy AEL&P (*D-37*).

[4] Incomplete production records total $118,970 worth of gold between 1889 and late 1898. Known bullion production between late 1898 to 1907 by Ebner Mining Co. was $189,490.43 (11,138.56 ounces gold and $1,069.63 silver). Amount of gold recovered from concentrates between 1898 and 1904 is unknown. Total known production is $339,354. Spencer (*D-130*) reports production of $600,000 through 1903. Total production from 1889 through 1907 is estimated to be approx. $700,000 and 32,000 ounces gold. Alaska Juneau Company production from 1925 to 1930 was 165,750 tons of ore averaging about 0.1 ounces/ton gold (*D-4*).

History

The Ebner Mine veins were found in 1880-81 when Richard Harris and Joe Juneau discovered gold in Silver Bow Basin (figs. D-5, D-123, D-124, D-130). In 1886, the Johnson Mining and Milling Company purchased a group of claims that covered the present-day Ebner Mine. The company built a road from Juneau to the upper end of Last Chance Basin and, by August, had erected a mill. The mill was finished in 1887 but proved to be unsuccessful.

The claims were purchased by J.W. Van Brocklin for the Takou Consolidated Mining Company in 1888. The company built a new road on the south side of the Basin and began work on a 10-stamp mill in September 1888. The mill started operations in late March 1889 and continued until November. Dissention among owners idled the mine in 1890 and, though the mill started in late July 1891, further owner problems halted work.

Willis Thorpe leased the mine in the spring of 1893. By July, Thorpe had 30 men at work and ran the mill until November. In 1894, John Avery leased the mine and operated it until late November. A total of $6,970 in gold was produced.

William Ebner leased the mine in early 1895 and had 36 men at work by May. Thorpe purchased the mine from Takou Consol. Co. in July but by November, debts forced him to sell it to the Ebner Gold Mining Co. Ebner rebuilt the tram and erected new ore bins in 1896. The mine produced $65,000 worth of gold in 1897. The mill was moved a short way down Gold Creek to the top of Ebner Falls in the fall of 1898. A total of 233 ounces of gold, worth $4,846, was produced by end of 1898. The next year, 1,586 ounces of gold, worth $26,563, were produced.

In 1900, five additional stamps added to the mill produced 1,932 ounces of gold worth $33,280. The mine ran continuously from spring 1901 to the winter of 1902, producing 929 ounces of gold in 1901 and 1,536 ounces of gold in 1902 for a total of $42,184. The mine produced 1,046 ounces gold in 1903, 1,024 ounces in 1904, and 1,640 ounces in 1905.

The mine produced 1,267 ounces of gold bullion with a total value of $26,400 from 9,000 tons of ore in 1906. In 1907, the mine was worked until June, recovering 873 ounces gold in the mill and a total of $18,200 from 5,400 tons of ore. Total production by Ebner Gold Mining Co. from the time of the mill move in 1898 was 105,600 tons of ore from which $220,384 of bullion was recovered. Of this amount, $1,070 came from silver. Total production from the Ebner Mine, including concentrates, was probably about $300,000.

In September 1907, the mine was purchased by the California-Nevada Copper Co. A large stamp mill was planned but no work was started until 1909 when a shipment of mill parts arrived and work began on a 100-stamp mill site. The company purchased the nearby

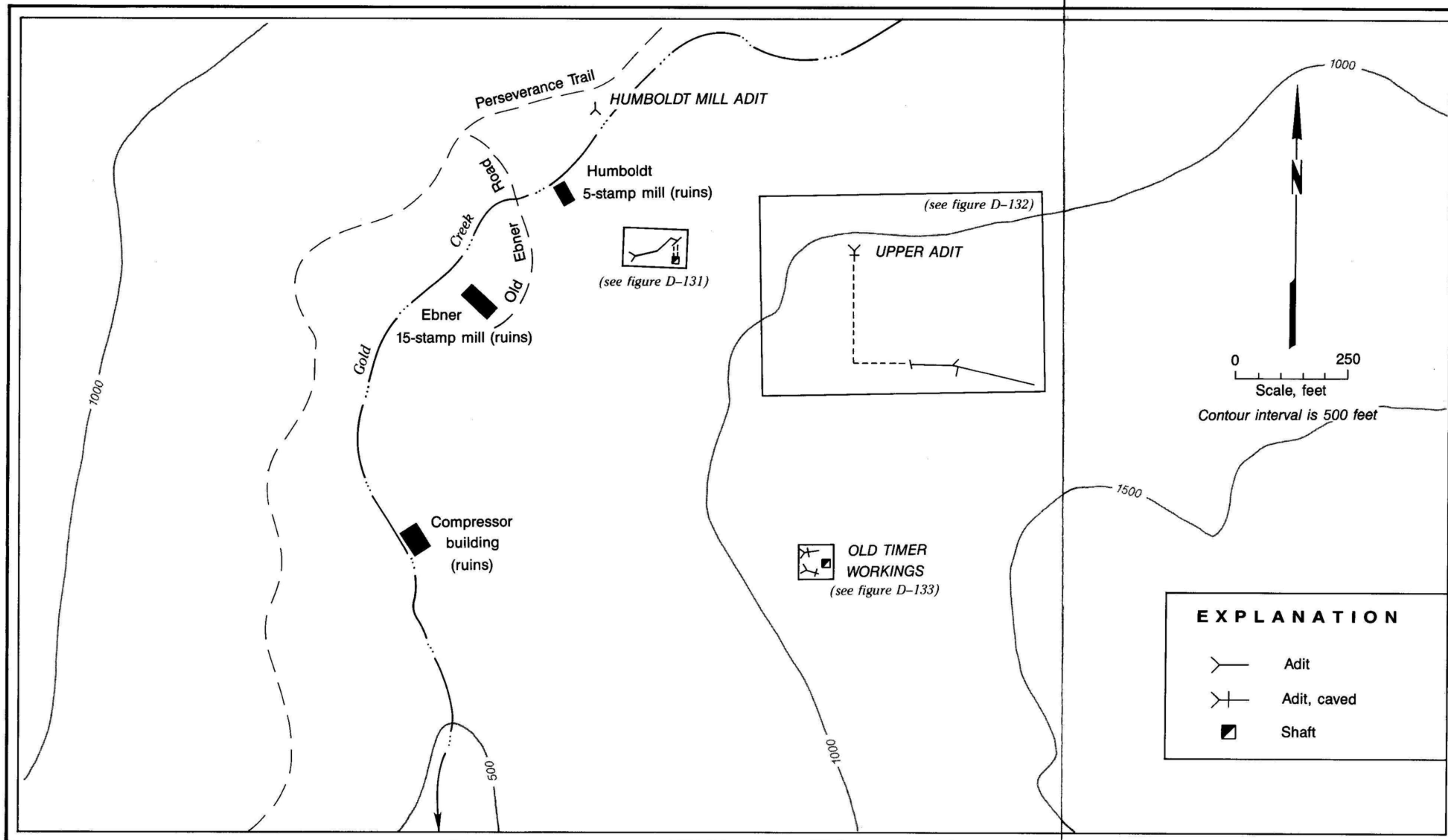

Figure D-130. — Workings in the Ebner Mine area.

Hallum group of claims in 1909. In 1910, 50 workers began work on the new mill site and, in August, the Ebner Tunnel was started. The tunnel was driven to 750 feet by July 1911, but financial problems halted work. In 1912, some work was also done.

The mine was put into receivership in 1913 but George Noble, of the Hallum Construction Company, arranged to continue work on the Ebner Tunnel. By the end of the year, the tunnel had reached 2,500 feet. In October, U.S. Smelting and Refining took control of the mine.

The Ebner Tunnel cut the ore body at a distance of 3,500 feet in April, 1915, and about 5,200 feet of exploration tunnels were driven between 1916 to 1920. In 1920, U.S. Smelting and Refining stopped all work on the mine.

The Alaska Juneau Company made a royalty agreement for the Ebner Mine in 1923 and extracted 165,750 tons of ore between 1925 and 1930. In 1951, the Alaska Juneau Company purchased the Ebner Mine for $1,500 (*D-97*).

Echo Bay Mines renovated the Ebner Tunnel in 1987 during its evaluation of the Alaska Juneau Mine.

Workings and Facilities

The Ebner Mine has workings in three areas. At the lower workings, there are approximately 600 feet of workings; the adit is caved at 108 feet (fig. D-131). The Ebner Tunnel section consists of a 3,500-foot adit and 5,200 feet of workings. The main workings are composed of the upper and lower workings. There are approximately 800 feet of workings in the upper workings. The main portal is caved but 340 feet of workings are accessible from the open stopes (fig. D-132). The Old Timer includes approximately 200 feet of workings in two adits (longer adit caved at portal, second adit is caved at 52 feet and connects with a shaft and open stope) (fig. D-133).

Bureau Investigations

The Ebner Mine area is underlain by interlayered black phyllite, felsic phyllite (quartz, sericite, feldspar), and metagabbro. The synclinal axis that trends from the Perseverance through the Alaska Juneau Mines extends through the middle of the Ebner Mine area. The core of the syncline is occupied by the felsic phyllite which is underlain by a thin layer of black phyllite. Beneath the phyllite is a thick metagabbro unit below which is another black phyllite unit.

The felsic and black phyllite units are highly folded and commonly have sheared contacts with each other and with the metagabbro. The fault mapped in the Alaska Juneau Mine extends down the axis of the syncline and goes through the middle of the property.

All of the ore zones in the Ebner property occur in metagabbro adjacent to black phyllite (fig. D-132). The veins cut the metagabbro and are perpendicular to the contact with the black phyllite. In the metagabbro, the veins tend to be regular, from 1 to 5 feet thick, and 50 to 150 feet long. At the contact with the phyllite, the veins abruptly terminate with only a few thin veins crossing the contact.

There are two ore zones at the Ebner Mine, one on each side of the syncline: 1) the Oldtimer workings and 2) the main workings. The Oldtimer workings occur in metagabbro on the SW limb of the fold while the main workings are on the NE limb.

The only conspicuous sulfides in the Ebner Mine are pyrrhotite, pyrite, and small amounts of chalcopyrite. The gold/silver ratio is about 7:1 (*D-130*).

The Bureau located and mapped all open workings but took no samples.

Resource Estimate

Quartz veining is common in the vicinity of the open stopes of the main workings and, locally, on the Ebner Tunnel level. The Alaska Juneau Company mined a significant tonnage of ore from the Ebner claim group. The ore averaged 0.1 ounces/ton gold, much higher grade than ore from other parts of the Alaska Juneau Mine. Because the Ebner area is on the continuation of the Alaska Juneau mineral system, it has a high development potential. It is estimated that there are at least 150,000 tons of ore above the present workings and another 150,000 tons inferred below the workings. Estimated grade is probably about 0.07 ounces/ton gold.

Recommendations

The ground between the open stopes of the main workings and the Alaska Juneau Company's Ebner stopes and down dip to the Deep North Ore body should be explored by diamond drilling to determine continuity.

MAS No.	MS No.
21120146	87-93

References

D-4, D-37, D-60, D-95, D-96, D-97, D-99, D-130, D-133, D-144, D-149, D-161

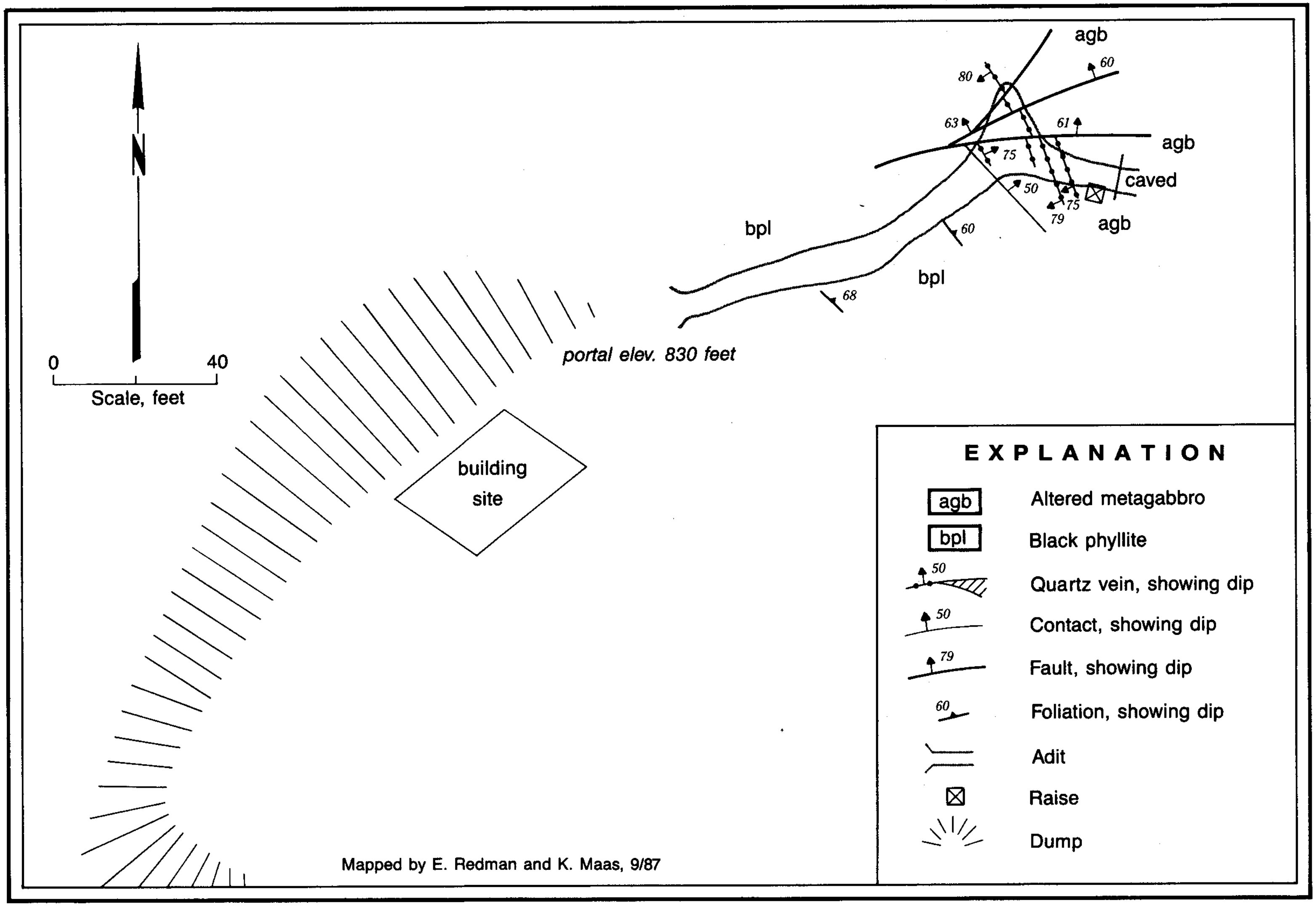

Figure D-131.—The lower Ebner adit, showing geology and sample locations.

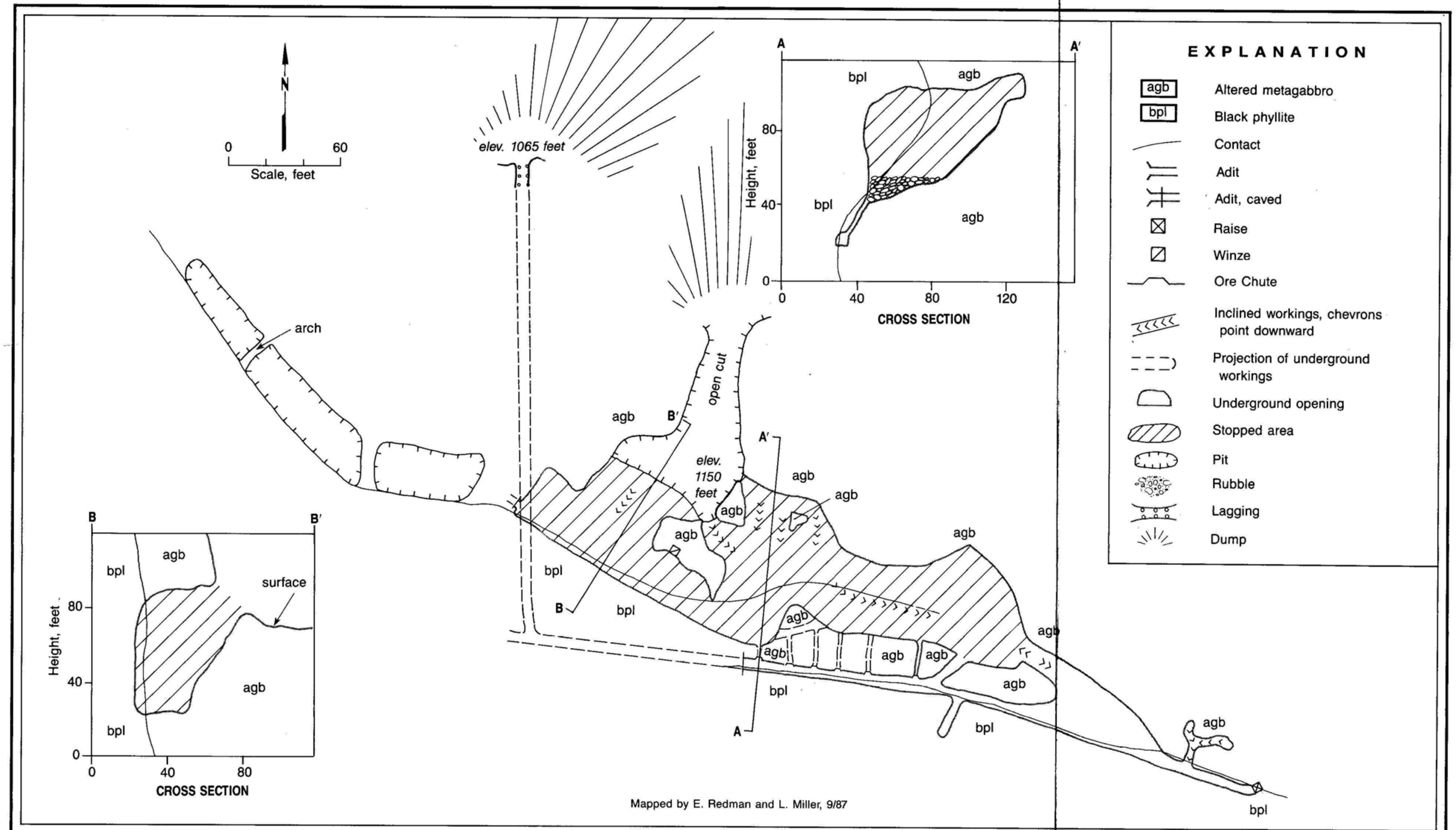

Figure D-132. — The upper Ebner workings, stopes, and pits, showing geology and sample locations.

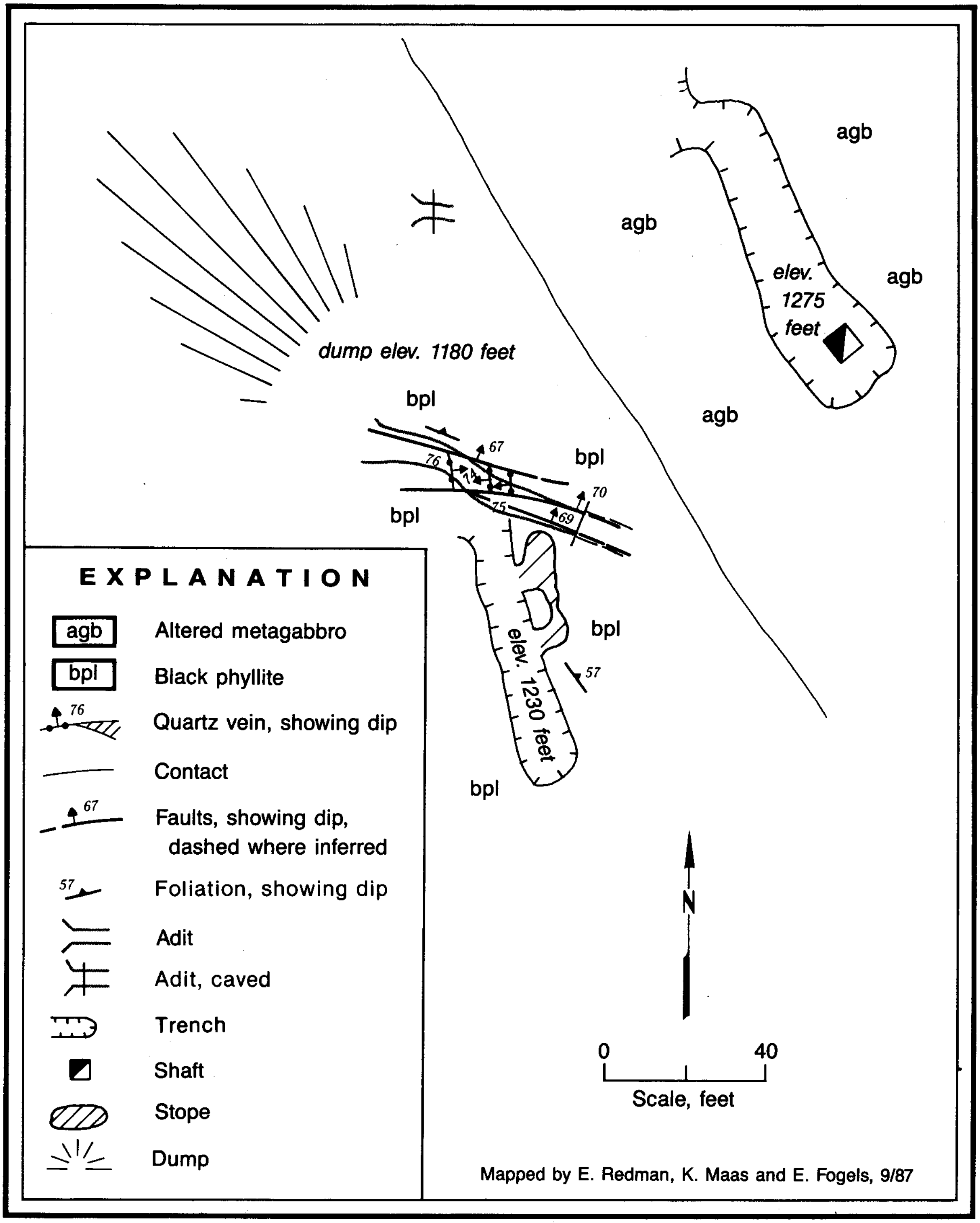

Figure D-133.—The Ebner Old Timer workings, showing geology and sample locations.

MIDDLE BASIN PLACER PROSPECT

Production

There has been no reported production from Middle Basin.

History

The Middle Basin Placer was discovered in 1881 (figs. D-5, D-123). Minor work was done on the basin during the following years but no production was recorded (*D-130*).

Geologic Setting

Middle Basin lies between the canyon below Silver Bow Basin and Ebner Falls. It is approximately 2,500 feet long and 200 feet wide but has not been tested for depth. A rock rib which crosses the valley and forms Ebner Falls acted as a dam for alluvial material from Gold Creek and the surrounding mountains.

Bureau Investigations

Middle Basin was not evaluated.

Resource Estimate

The Bureau did not evaluate the placer potential of Middle Basin.

Recommendations

The Middle Basin placer should be sampled and drilled to determine the volume and gold content of gravels.

MAS No.	MS No.
	131–141, 234–236

References

D-130

REILLY PROSPECT

Production

There has not been any production from the Reilly prospect.

History

The Reilly adit (figs. D-5, D-123) was driven before 1917 (*D-1*).

Workings and Facilities

A 5-foot adit occurs on the prospect.

Geology

The Reilly prospect is underlain by chlorite phyllite.

Bureau Investigations

The Reilly adit was located but, since no mineralization or alteration was found, no samples were taken.

Resource Estimate

No mineralization was located.

Recommendations

No work is recommended.

MAS No.	MS No.
21120144	1007

References

D-1, D-34, D-99

REPUBLICAN PROSPECT

Production

There has been no production from the Republican prospect.

History

The Republican claim group (figs. D-5, D-123) was staked before 1916 and four adits were driven (*D-1*).

Workings and Facilities

Four adits are reported but none were located (*D-147*).

Bureau Investigations

The Republican claim group is underlain by metagabbro that is strongly iron-stained and altered along its western margin. The carbonate-altered rock contains up to 2% disseminated pyrite.

The Bureau made a brief search for some of the reported adits but dense brush hindered efforts. One sample (fig. D-123, No. 1) of the highly iron-stained and altered metagabbro was collected and it contained 0.2 ppm gold.

Resource Estimate

The Republican prospect contains a large volume of altered and pyritic rock. Not enough is know about the mineralization to evaluate the occurrence.

Recommendations

Locate the reported adits to see areas of previous interest.

MAS No.

References

D-1, D-147

LITTLE BASIN PLACER MINE

Production

Approximately 52,000 yd^3 of gravel was taken the from upper part of Little Basin and 23,000 yd^3 from lower part, for a total of 75,000 yd^3. Spencer (*D-130*) reported production of $50,000.

History

The Little Basin area was discovered in 1881 and was the scene of small scale placer work until 1888 (figs. D-5, D-123). In the latter year, Heppner, Faulkner, and Grear drove a tunnel "several hundred feet long" (*D-130*) to work the lower portion of the mine.

Considerable placer work was done in 1889 and Spencer (*D-130*) reported that the mine produced at least 2,400 ounces of gold. There was little activity after 1889.

Workings and Facilities

There is a 300-foot-long drainage tunnel which is mostly caved and filled with gravel.

Bureau Investigations

Two portions of Little Basin have been sluiced.

The Little Basin placer was formed by the erosion of the adjacent North Ore body of the Alaska Juneau deposit. The upper portion consists of colluvial material and the lower section is primarily alluvial in origin.

The Bureau located the two parts of the Little Basin Placer Mine and the old drainage tunnel but did not map or sample the present stream valley.

Resource Estimate

Some placer gold may still exist in the lower portion of Little Creek but not enough is known to estimate a resource.

Recommendations

No work is recommended.

MAS No.	MS No.
21120202	176-192, 200-208

References

D-96, D-97, D-99, D-130

BRIDLE PROSPECT

Production

There has been no production from the Bridle prospect.

History

Nothing is known of the history of the Bridle claim (figs. D-5, D-123).

Workings and Facilities

A caved trench or short adit was located on the Bridle claim.

Bureau Investigations

Three quartz vein swarms cut massive greenstone west of the Alaska Juneau Glory Hole. The greenstone has some carbonate alteration adjacent to the quartz veins which contain small amounts of pyrrhotite.

The Bureau located the caved trench or adit and examined and sampled the quartz veins, taking three samples (fig. D-123, Nos. 2-4). Samples contained low values of copper (up to 290 ppm), zinc (up to 208 ppm), and silver (1.3 and 1.4 ppm).

Resource Estimate

Metal values are very low, giving the Bridle claim a low development potential.

Recommendations

No work is recommended.

MAS No.	MS No.
	982-A

References

None.

SILVER BOW BASIN PLACER MINE

Production

Table D-10.—Gold and silver production from the Silver Bow Basin Placer Mine

Year	Value ($)	Production oz Au	Production oz Ag
1891			
1892	80,000	3,870	—
1893–95	unknown production		
1896	100,000	4,838	—
1897	125,000	6,047	—
1898–1905	unknown production		
1906	19,680	1,240	—
1907	6,022	290	22
1908	15,000	725	—
1909	50,000	2,419	346
1910	3,000	145	36
1911	10,000	484	63
1912	10,000	484	74
1913	5,000	242	21
1914–15	no production		
1919	832	51	10
1920	no production		
1921	500	24	5
1922	no production		
1923	1,486	91	—
1924	2,571	168	—
1925	2,437	118	—
1926	1,541	75	—
1927	1,406	69	—
Total[1]	434,475	21,380	577

[1] Totals based on Spencer (*D-130*), Redman (*D-97*), and Bureau production reports (*D-146*). Approx. 1.6 MM yd^3 mined between 1890 and 1901 with recovery of about $400,000 (19,350 ounces gold). Spencer estimated grade to be $0.14/ yd^3. An additional 6,625 ounces gold were produced between 1905 and 1927 (*D-146*).

History

Gold in Silver Bow Basin was discovered by Richard Harris and Joe Juneau in the fall of 1880 (figs. D-5, D-123). By 1887, an estimated $60,000 to $100,000 of gold was removed by placer miners in the basin. By 1887, two companies, Coon & Co. (Henry Coons) and the Bulger Hill Co. (George Harkrader), had consolidated separate groups of claims and were working on and near Quartz Gulch. In 1889, Coon & Co., the Bulger Hill Co., Connelly and Cadman (Silver Bow Basin), Frank Matthison, and others had placer operations. Matthison had erected a derrick capable of handling 5-ton boulders. Coon, joined by Archie Campbell, also built a derrick.

Thomas Nowell consolidated a large number of placer claims covering 200 acres in 1889 and formed the Silver Bow Basin Mining Company. The Company started a 3,400-foot drainage tunnel in July and completed the tunnel in the winter of 1890.

Sluicing operations at the Nowell placer mine began in May 1890, and continued all summer and fall. Nearby, Connelly and Cadman worked their placer pit at a depth of 60 feet during summer, then sold their ground to Nowell in fall.

In 1892, the Silver Bow Basin Mining Co. and Nowell Gold Mining Co., both owned by Nowell, were consolidated. Two giants worked between 1892 and 1897, by which time the placer pit had reached 1,500 feet long and up to 100 feet deep (fig. D-134). Placer work continued during 1898, 1899, 1900. In 1900, about 2,000 tons of quartz boulders from the placer pit were sent to the Red Mill. The Silver Bow placer was worked in 1901 but legal problems closed the operation between 1902 and 1904.

George Otterson leased the Silver Bow placer from 1905 through 1907. He installed a hydraulic elevator in 1907 but flooding damaged the elevator soon after it was put into service and shut down the mine. Emil Kaufman leased the Silver Bow Mine during 1908 and 1909, and A.J. White leased and operated the Silver Bow placer from 1910 through 1912. In 1911, the Alaska Gastineau Company purchased the ground after it had produced approximately 25,000 ounces of gold.

The placer mine did not work between 1913 and 1921. From 1921 until the end of 1927, the mine was operated on a small scale which resulted in production of at least 300 ounces gold (*D-97*).

Workings and Facilities

There is a 3,400-foot drainage tunnel, with two shafts to the surface. The tunnel leads to a placer pit 1,800 feet long, 200 feet to 500 feet wide, and 50 feet to 100 feet deep.

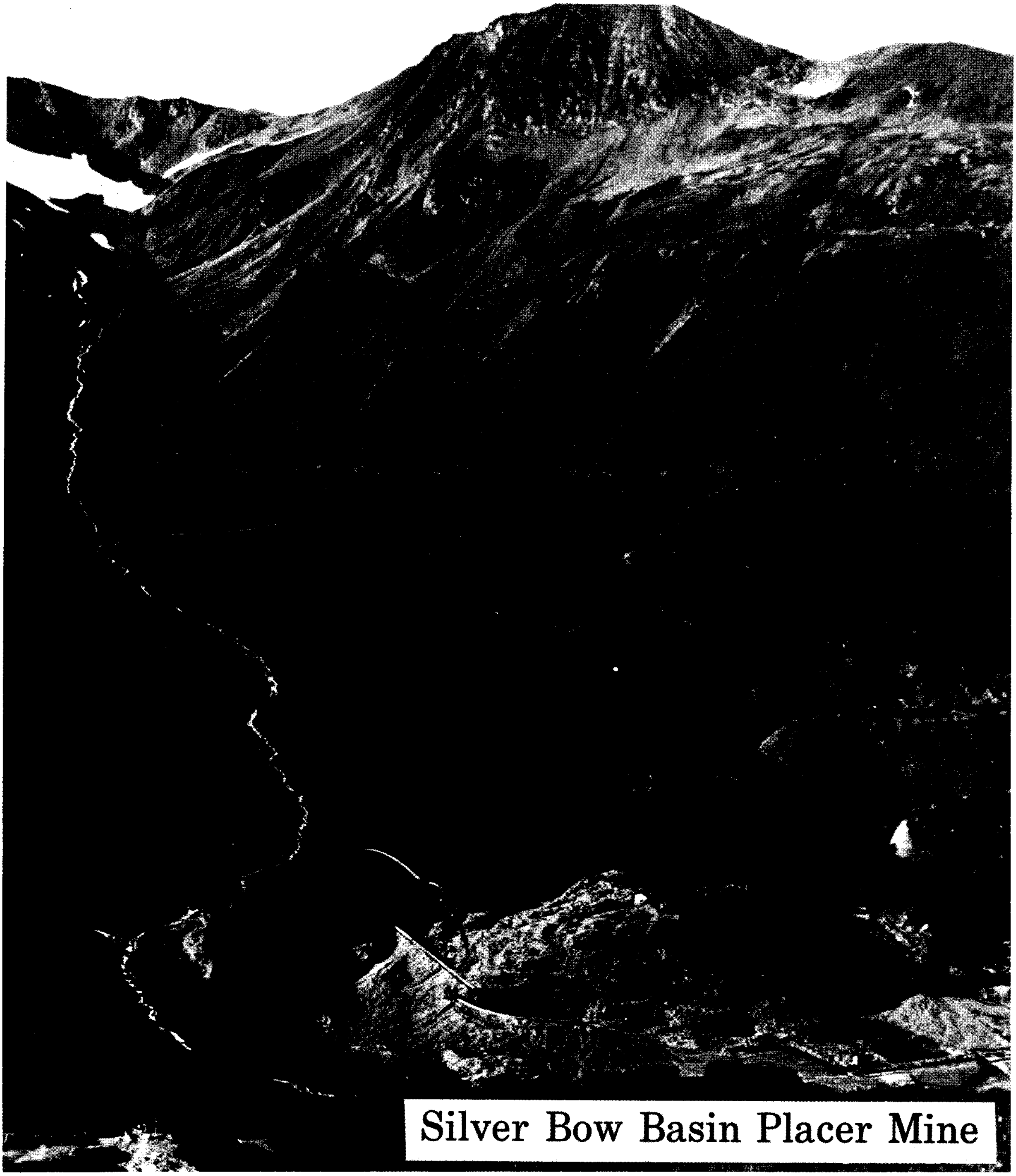

Figure D-134.—The Silver Bow Basin Placer Mine, below the quartz veins of the Alaska Juneau Mine, was operated successfully between 1890 and 1912, producing 26,000 ounces of gold (photo courtesy Alaska State Library, Case & Draper collection).

Geologic Setting

Silver Bow Basin is a glacially-scoured basin that formerly contained a lake. Alluvium from Icy, Nugget, and Quartz Gulches, Lurvey and Gold Creeks, and from Alaska Juneau lodes filled the basin, eventually filling in the lake. The gravel-filled basin was 3,000 feet long and up to 1,000 feet wide. Mining operations concentrated on that portion of the deposit immediately below the Alaska Juneau vein system and involved less than a third of the basin.

Bureau Investigations

The Bureau's evaluation of the Silver Bow Basin Placer Mine was limited to examining the placer pit and the drainage tunnel.

Resource Estimate

At least 4.0 MM yd^3 of gravel remain in Silver Bow Basin. The gold content of the remaining gravels would probably be lower than that of previously mined ground because it is farther away from the lode deposits.

Recommendations

Drilling is needed to determine whether the remaining gravels of Silver Bow Basin contain enough gold to be economically mined.

MAS No.	MS No.
21120167	77-80, 115-119, 121-130, 210-219

References

D-13, D-96, D-97, D-99, D-130, D-146, D-159, D-161

MARTIN PROSPECT

Production

There has been no known production from the Martin prospect.

History

The Martin claim was staked prior to 1900 and some work may have been done by 1920 (figs. D-5, D-134). The last work was probably done in the 1930's because dynamite boxes found in the longer adit were from that time period.

Workings and Facilities

Two adits, with 16 feet and 126 feet of workings, were located.

Bureau Investigations

The Martin claim area is underlain by black phyllite with foliation-concordant quartz veins. The main vein system is discontinuously exposed in both adits and varies from 1 inch to 10 feet in thickness. In the upper adit, pinching and swelling of the veins and their discontinuous nature are well exposed. Minor pyrrhotite occurs in the veins.

Five samples were collected from the quartz veins in the upper adit (fig. D-136, Nos. 2-6) and one more was taken from the lower adit (fig. D-136, No. 1). One sample collected in the long adit contained 1.3 ppm gold but no other samples carried more than 0.1 ppm gold.

Resource Estimate

The low gold values obtained from Bureau sampling gives the Martin prospect a low potential.

Recommendations

No work is recommended.

MAS No.	MS No.
21120219	754

References

None.

UPPER GOLD CREEK PROSPECT

Production

There has been no production from the Upper Gold Creek prospect.

History

The last evidence of work on upper Gold Creek, dynamite boxes and blasting cap cans found on the site, indicate that some work was done in the 1930's (figs. D-5, D-135). Some work was probably done in the late

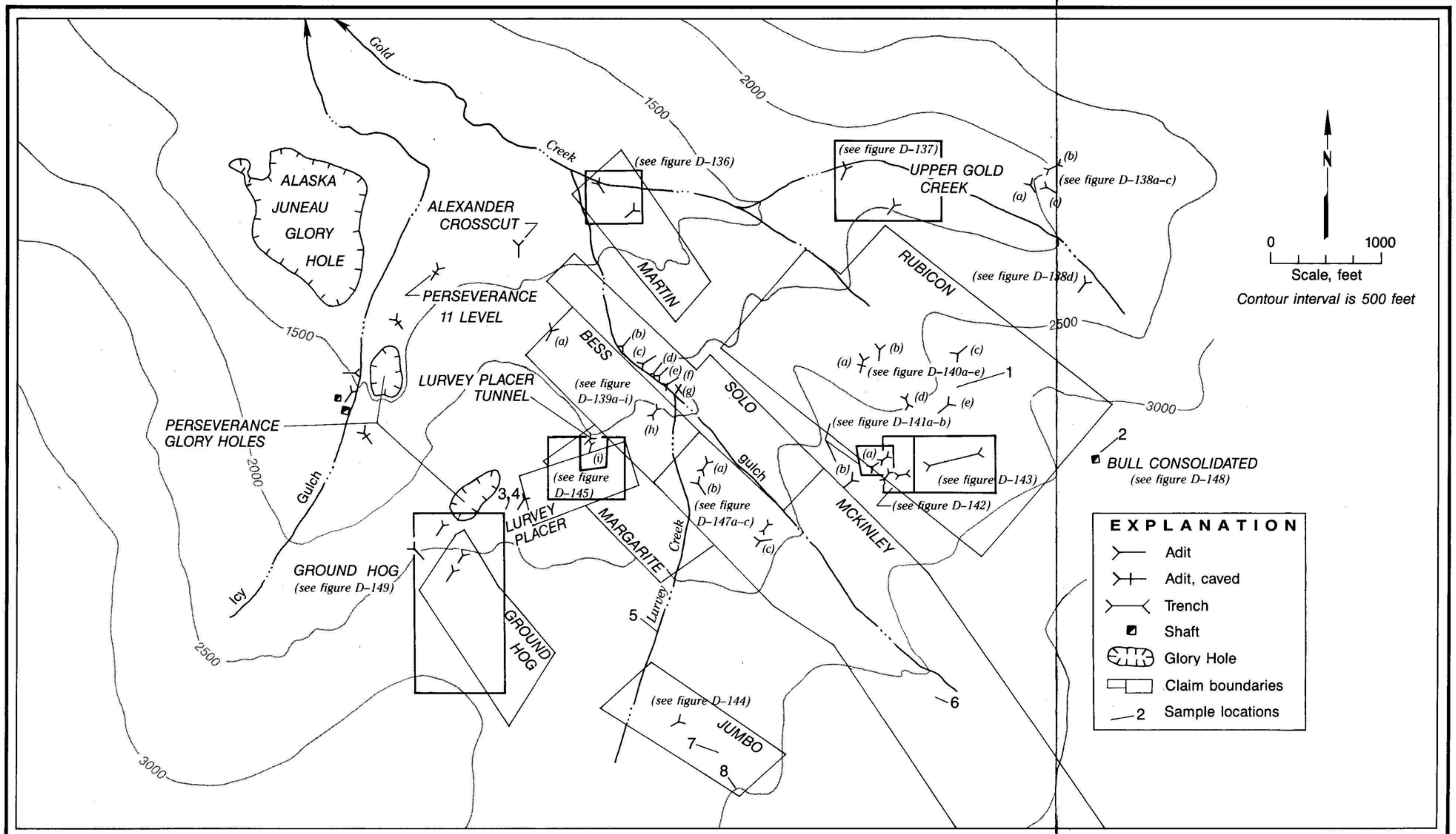

Figure D-135. — Mines and propsects in the upper Gold Creek area, showing claim boundaries.

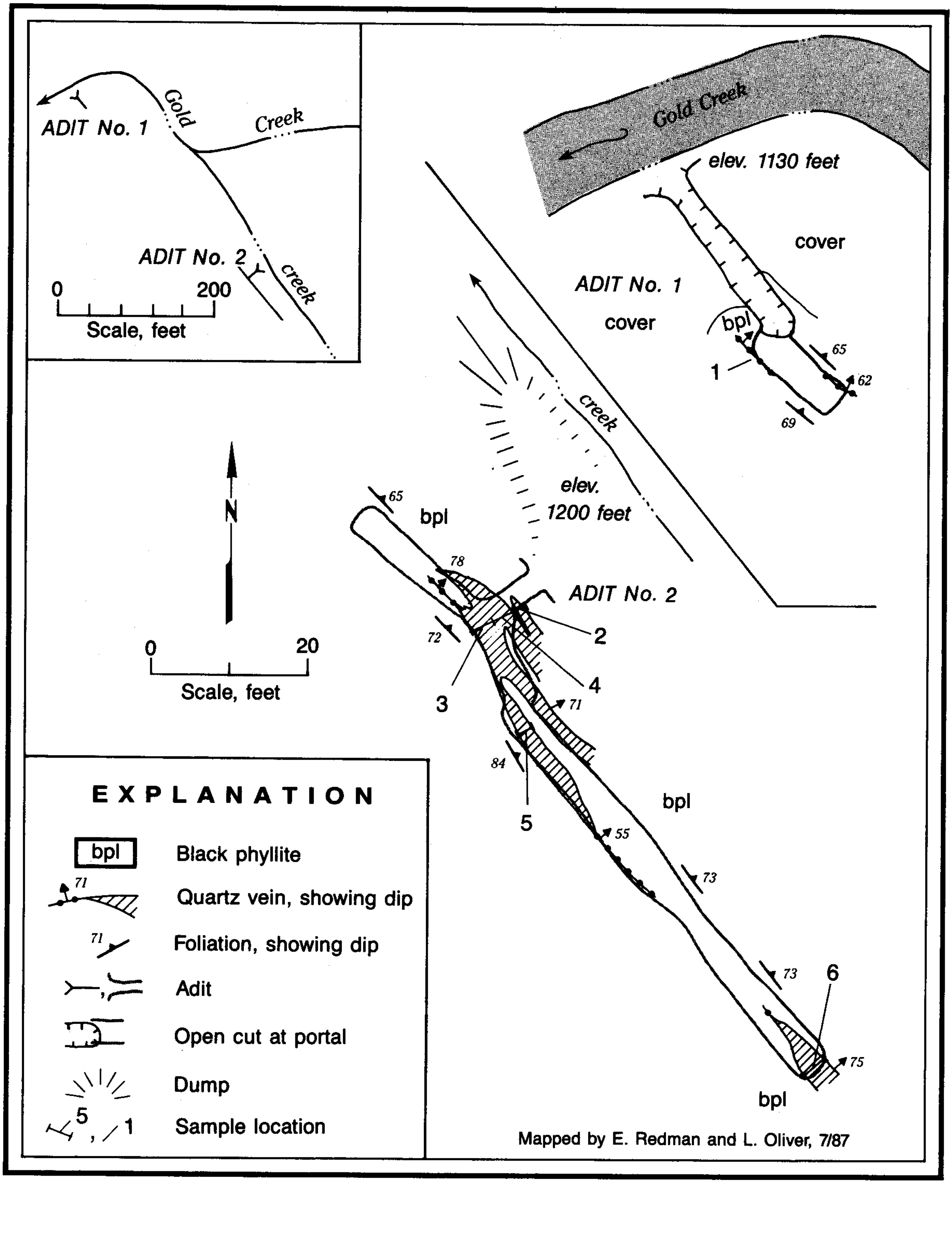

Figure D-136.—The Martin prospect, showing geology and sample locations.

1800's or early 1900's but nothing is known from the published record.

Workings and Facilities

Five adits, with 4 feet, 6 feet, 13 feet, 65 feet, and 110 feet of workings, and one trench were found at the head of Gold Creek.

Bureau Investigations

The workings on upper Gold Creek expose interlayered biotite schist and biotite-feldspar gneiss with a foliated hornblende diorite sill that may be related to the Mt. Juneau pluton. The biotite schist locally contains thin, concordant quartz veins which contain small amounts of pyrrhotite. The gneiss exposed in the longer adits is locally altered to carbonate and quartz. The altered sections have 1% to 3% disseminated pyrite and are cut by a few generally concordant quartz veins which also carry minor pyrite. The altered zones in the gneiss are up to 20 feet wide.

The hornblende diorite sill is concordant with the gneisses and, where exposed in the open cut, is cut by a series of thin quartz veins that contain pyrite. The veins are up to a few inches thick.

Sample Results

The Bureau located, mapped, and sampled all the workings at the head of Gold Creek (figs. D–137, D–138). A total of 10 samples were collected from the workings (fig. D–137, Nos. 1-6; fig. D–138, Nos. 1-4) but none contained detectable gold values.

Resource Estimate

The upper Gold Creek area has some altered rock and small quartz veins but the area generally is of little interest.

Recommendations

No work is recommended.

MAS No.	MS No.
21120220	984

References

None.

SOLO/BESS/MARGARITE CLAIMS

Production

There has been no production from the Solo/Bess/Margarite claims.

History

Nothing is known about the history of these claims (figs. D–5, D–135).

Workings and Facilities

Five adits (lengths of 7 feet, 9 feet, 10 feet, 14 feet, and 30 feet of workings), a 20-foot trench, and a caved open cut were located on the Solo claims. On the Bess claim, a 31-foot adit with a 34-foot drift was located, and a 9-foot adit was found on the Margarite claim.

Bureau Investigations

The Solo claims lie along the contact between black phyllite on the SW and felsic (sericite, quartz) phyllite on the NE. All five adits and the sloughed open-cut were driven along the contact. A few foliation-concordant quartz veins occur within the foliation of the black phyllite. Other than minor pyrrhotite, the veins are barren. The Solo trench exposes two narrow bands of metagabbro. Quartz veins occur along the contacts of the metagabbro but they contain only minor pyrrhotite.

The Bess and Margarite claims lie adjacent to and SW of the Solo group. They are underlain by black phyllite with thin bands of metagabbro. The black phyllite in the adits is cut by irregular, discontinuous quartz veins. In the Bess drift, the main vein repeatedly pinches and swells along strike from 3.5 feet in width to nil.

Sample Results

The Bureau mapped and sampled all the open adits on the Solo, Bess, and Margarite claims (fig. D–139). Five samples were taken from the Solo adits (fig. D–139, Nos. 3-7), two from the Bess (fig. D–139, Nos. 1-2), and one was collected in the Margarite adit (fig. D–139, No. 8). One quartz vein sample from the Bess adit contained 0.6 ppm gold but all other samples contained less than 0.1 ppm gold.

Resource Estimate

Low metal values and discontinuous veins on the Solo, Bess, and Margarite claims give the area a low potential.

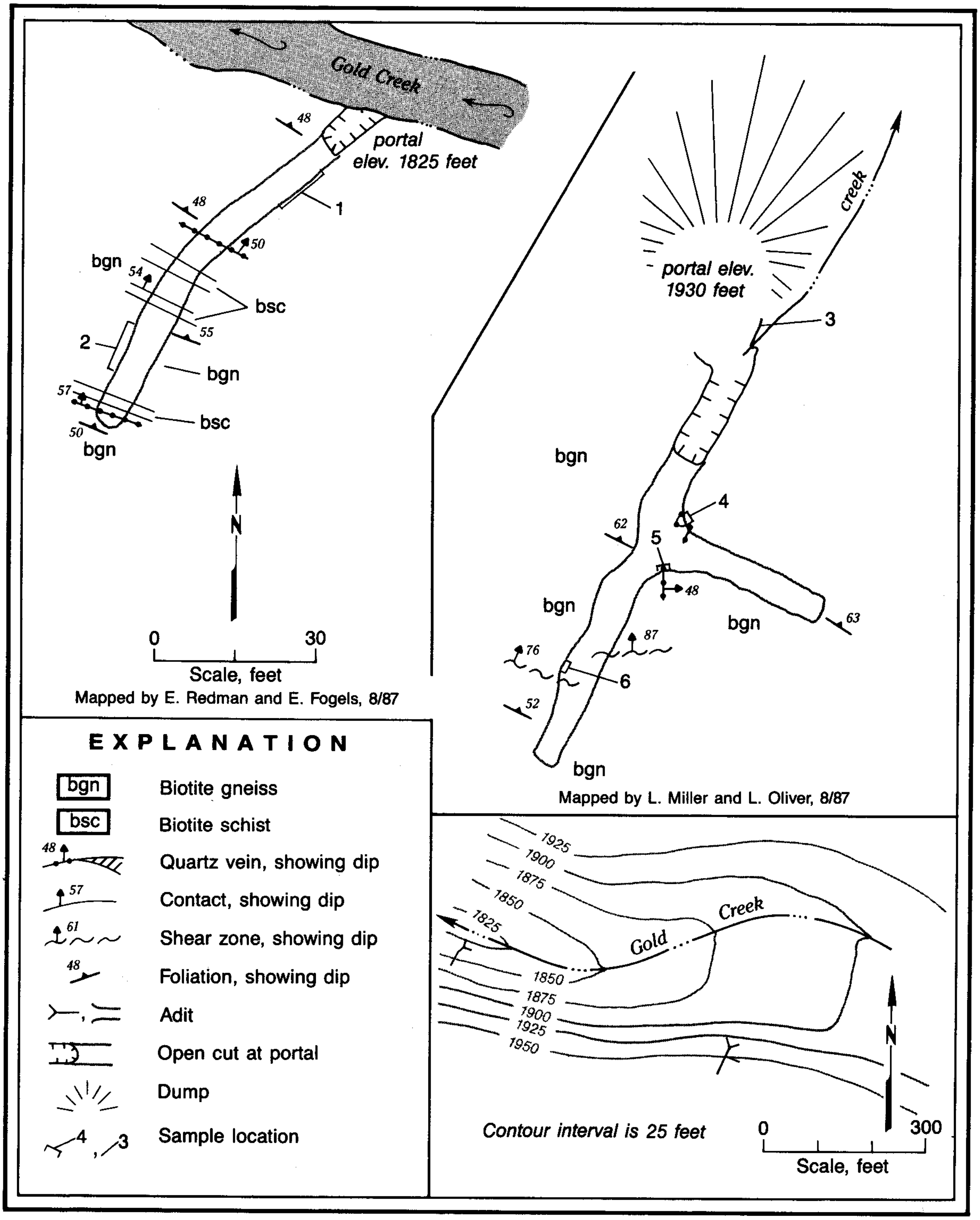

Figure D–137.—Adits at the head of Gold Creek, showing geology and sample locations.

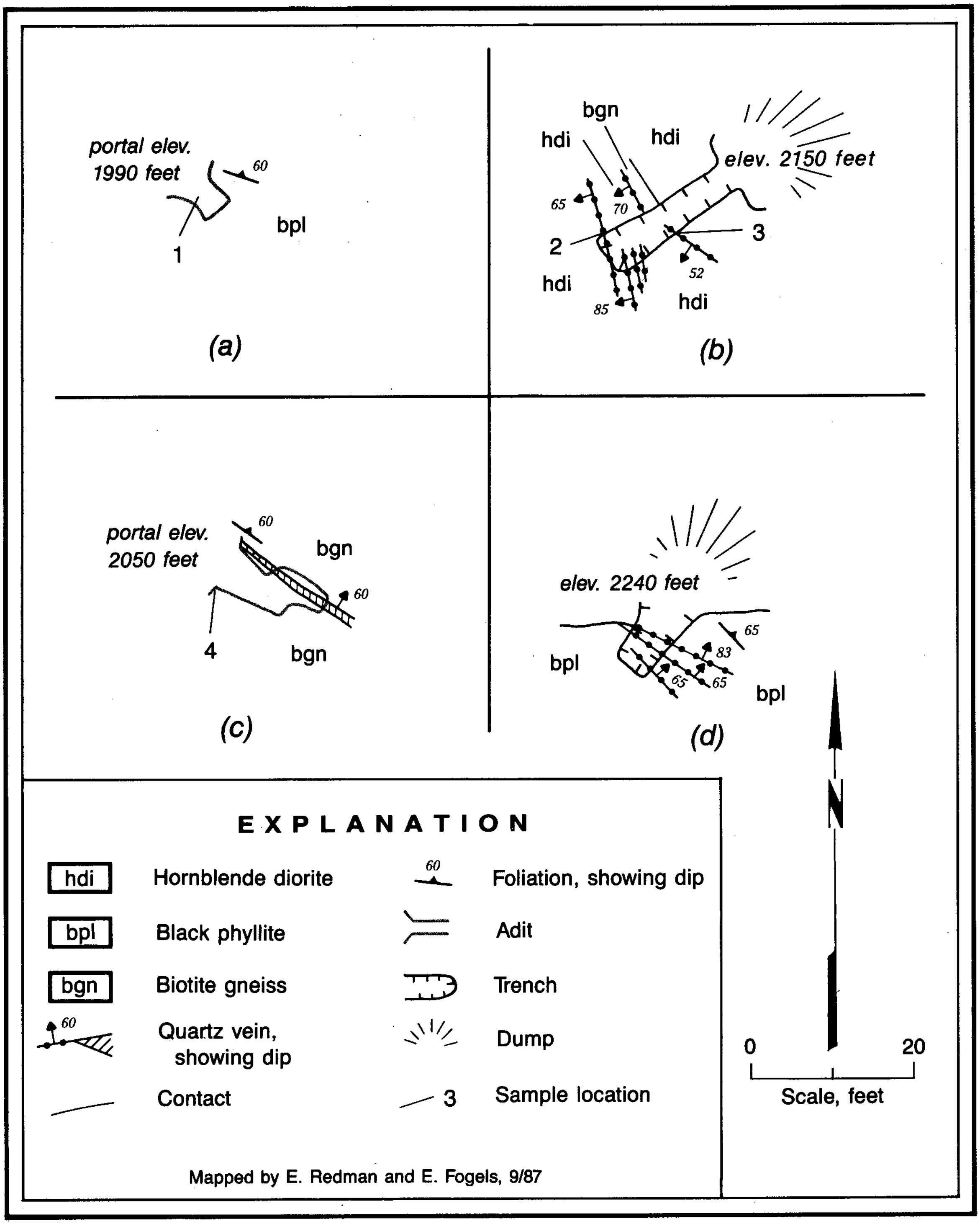

Figure D-138.—Other workings at the head of Gold Creek, showing geology and sample locations.

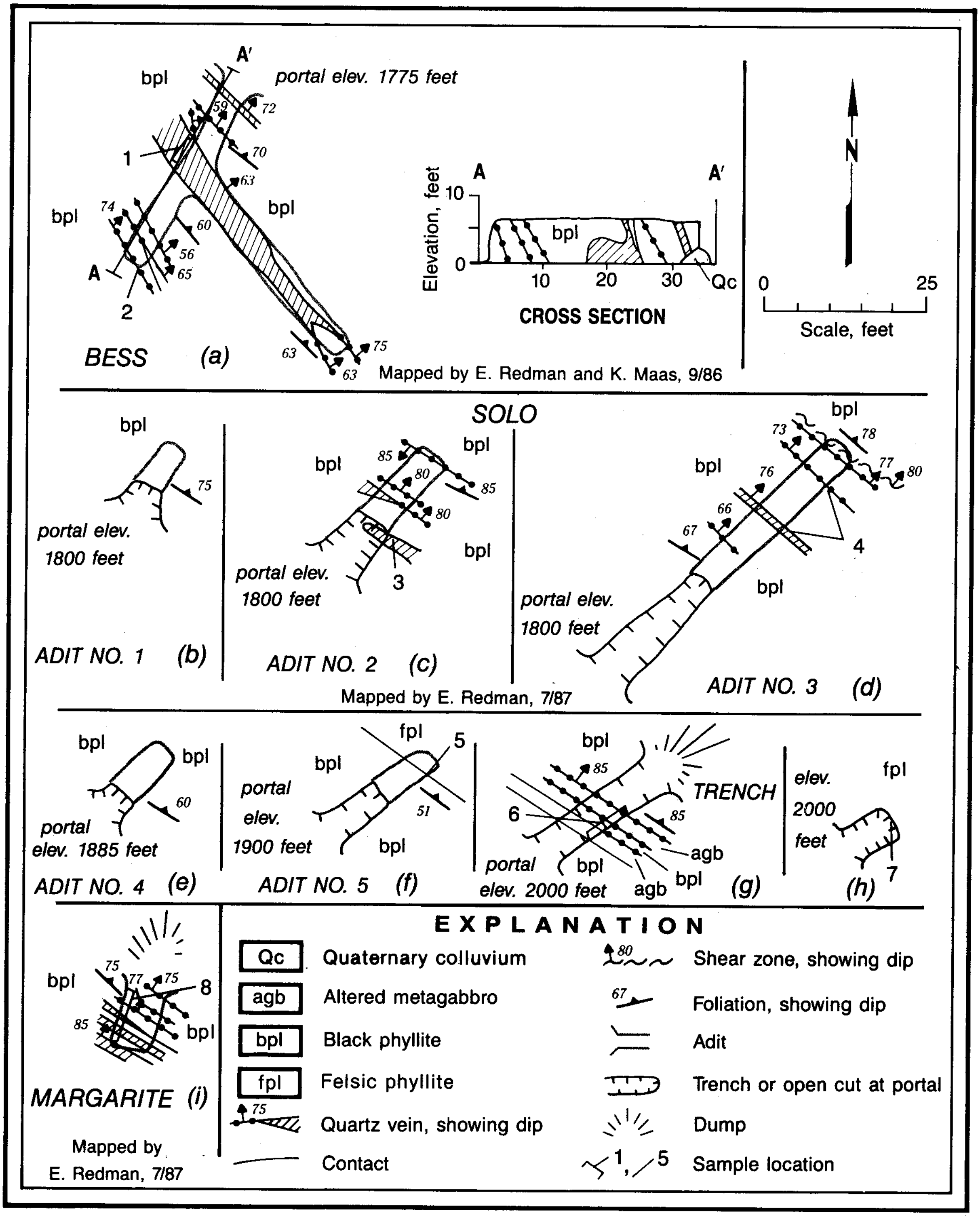

Figure D–139.—The Bess, Solo, and Margarite prospects, showing geology and sample locations.

Recommendations

No work is recommended.

MAS No.	MS No.
	1022

References

None.

RUBICON PROSPECT

Production

There has been no recorded production from the Rubicon prospect.

History

Four claims were staked by the Alaska Rubicon Gold Mining Company below the glacier on Sheep Mountain in 1906 (figs. D-5, D-135). A 700-foot-long tunnel was proposed in 1907 but only the short adits and trenches were actually done. The claims were picked up by Jessie Blakeley of the Penn Alaska Company in 1910 and patented in 1912 (*D-97*).

Workings and Facilities

There are five open adits (6 feet, 15 feet, 16 feet, 21 feet, and 21 feet of workings), one caved adit, and five trenches (16 feet, 40 feet, 42 feet, 60 feet, and 400 feet long).

Bureau Investigations

The Rubicon prospect is underlain by black phyllite and biotite schist on the SW and felsic gneiss (quartz, feldspar) and black phyllite on the NE. Biotite schist occurs in the most eastern adit. Concordant, boudinaged quartz veins up to 10 feet in thickness and 200 feet long are common in both the black phyllite and the felsic schists. Other than minor pyrrhotite, these veins have little mineralization.

Additionally, a series of en echelon faults cut the prospect. Three faults trend approximately 075°, dip steeply SW, and display up to 40 feet of left-lateral offset. The faults have been filled with quartz and siderite. The longest fault is over 400 feet in length and the system is at least 800 feet long. The adjacent wallrock is altered to a carbonate-rich rock, which weathers to a bright orange color, for 1 to 5 feet from the vein. Brecciation is common in both the wallrock and, locally, in the quartz. Quartz in the faults is up to one foot thick. Locally, the veins contain abundant galena with lesser sphalerite, pyrrhotite, and arsenopyrite.

Sample Results

The Bureau located and examined the six adits and five trenches (figs. D-140 to D-143). All the adits exposed concordant quartz veins from which eight samples were collected (fig. D-134, No. 1; fig. D-140, Nos. 1-3; fig. D-141, Nos. 1-4). None of these samples contained gold values above 0.07 ppm.

Samples taken from the trenches, which exposed the crosscutting quartz veins, carried notable amounts of silver, lead, and zinc. Six samples collected from the trenches (fig. D-142, Nos. 1-2; fig. D-143, Nos. 1-4) averaged 245.1 ppm silver, 2.6 ppm gold, 0.97% lead, and 1.2% zinc. High values were 797.1 ppm silver, 5.7 ppm gold, 2.47% lead, and 3.65% zinc.

Resource Estimate

The Rubicon prospect has inferred resources of 40,500 st grading 2.37 ounces/ton silver and 0.03 ounces/ton gold. The vein, however, averages less than a foot thick, so much waste would have to be mined with the vein material.

Recommendations

The main Rubicon vein could be drilled to determine its lateral and vertical extent.

MAS No.	MS No.
21120210	931, 932, 977

References

D-96, D-97, D-98, D-99

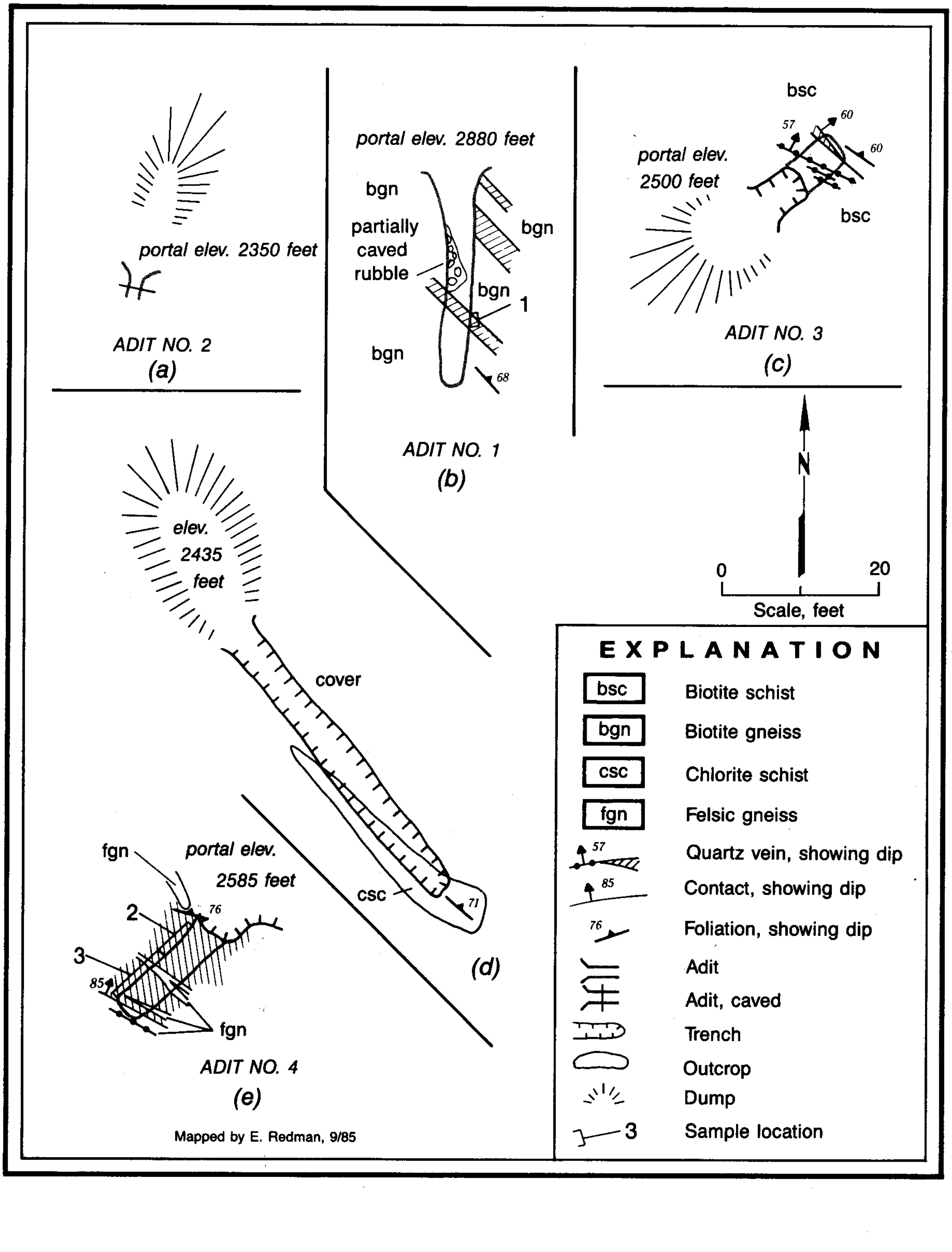

Figure D-140.—The Rubicon prospect, northeast adits, showing geology and sample locations.

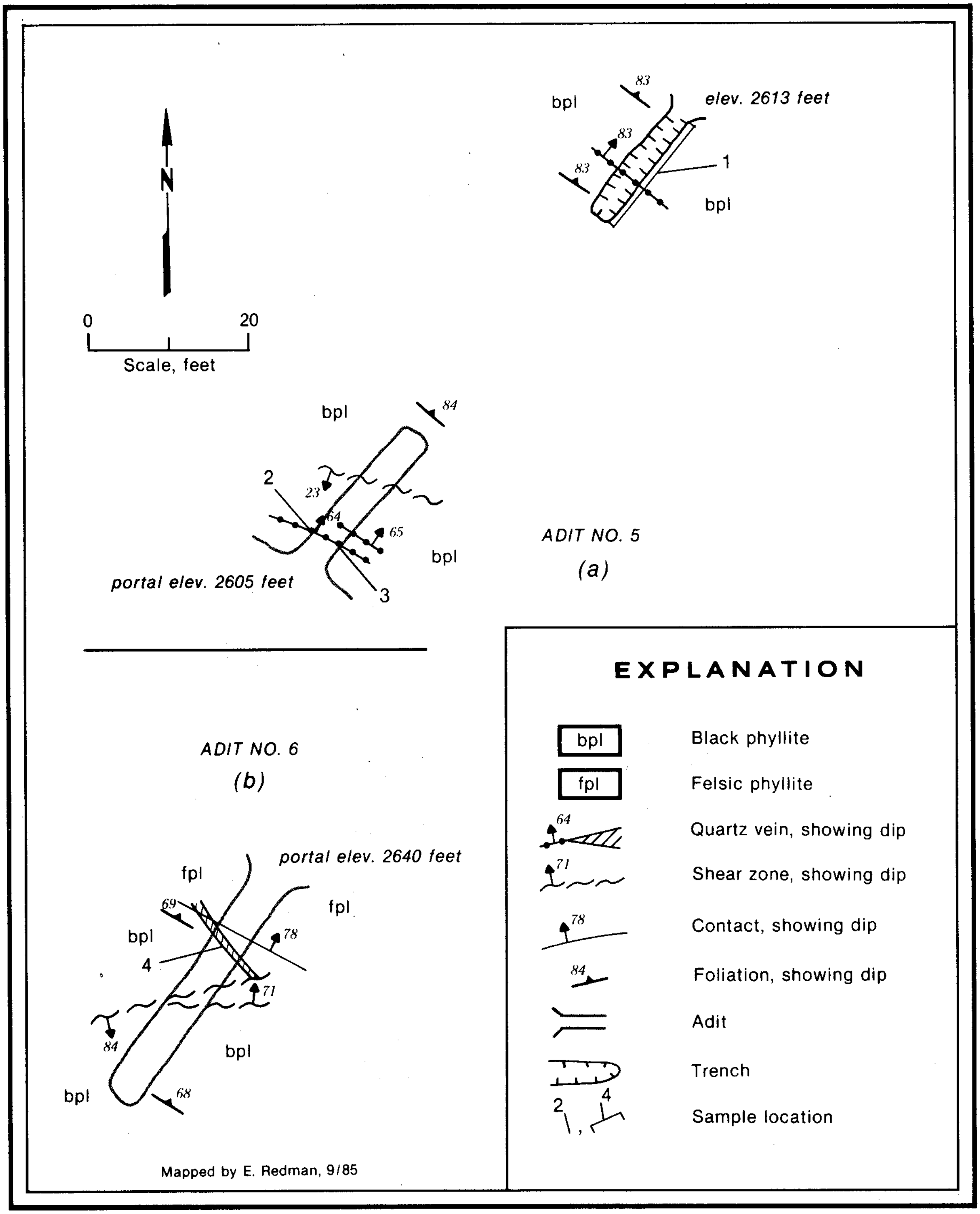

Figure D-141.—The Rubicon prospect, southwest adits, showing geology and sample locations.

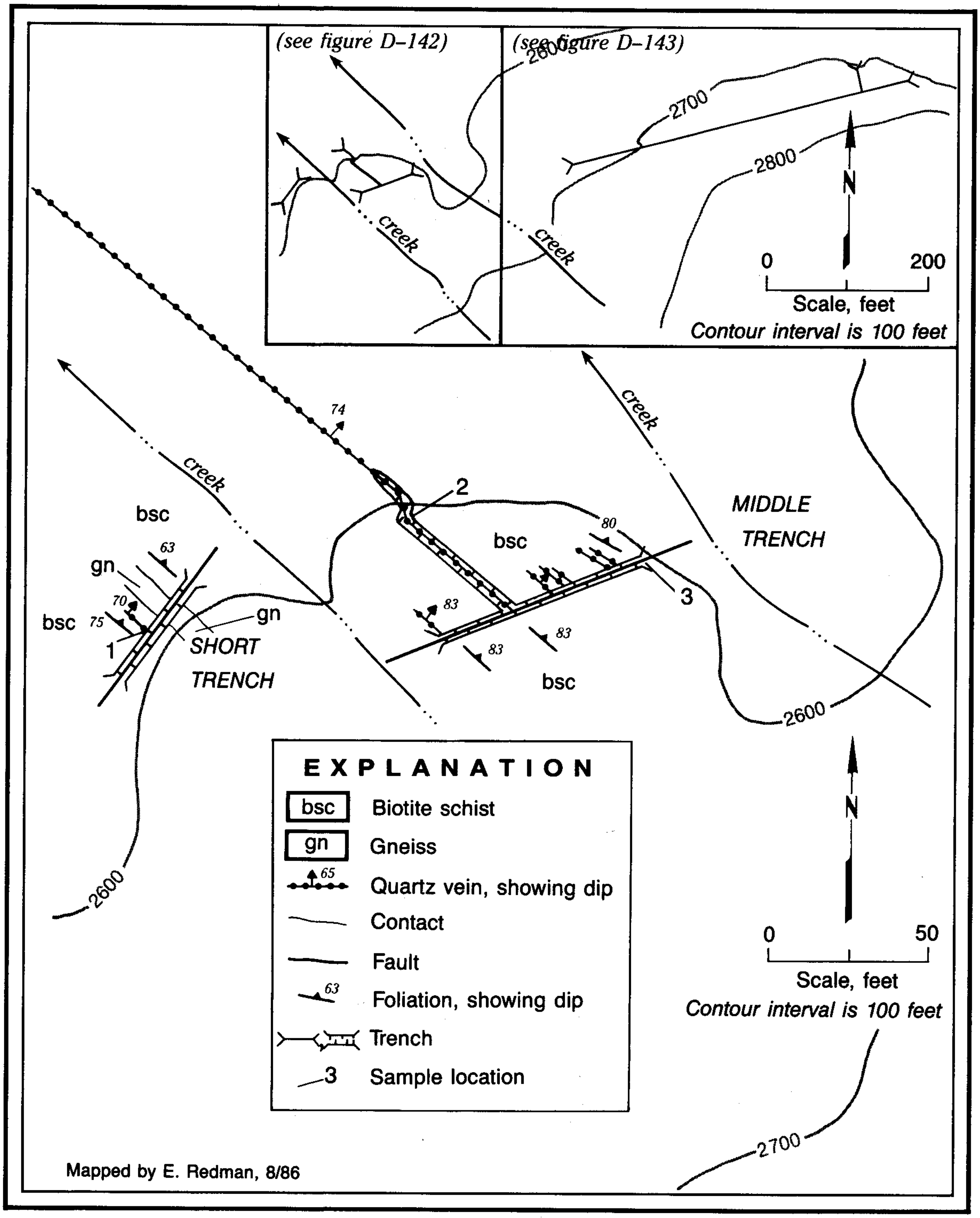

Figure D-142.—The Rubicon prospect, trenches, showing geology and sample locations.

PERSEVERANCE MINE

Production

Table D-11.—Gold and silver production from the Perseverance Mine[1]

Year	Tonnage (st)	Value ore($/st)	Value recov.($/st)	Total value ($)	Production oz Au	Production oz Ag
			Hand sorting (1887) and 10-stamp mill			
1887	10	na	na	2,500	na	na
1890	na	na	na	50,000	na	na
1891	na	na	na	2,000	na	na
1892–95	unknown production					
1896	closed					
			Alaska Perseverance Co. 100-stamp mill			
1897–1906	rebuilding					
1907	32,000	na	na	67,285	3,149	3,657
1908	70,000	na	na	163,784	7,740	7,140
1909	65,787	na	na	124,435	5,845	6,501
1910	78,605	na	na	124,170	5,766	4,574
1911	73,887	na	na	101,816	4,728	3,705
1912	74,754	na	na	77,202	3,554	3,272
			Alaska Gastineau Co. Tube mill			
1913	423	1.72	na	726	na	na
1914	no production					
1915	1,115,294	1.16	0.94	1,046,103	47,451	53,951
1916	1,892,788	1.19	0.97	1,837,290	82,163	84,586
1917	2,240,346	1.10	0.90	2,009,631	87,556	98,687
1918	1,285,445	1.11	0.88	1,136,223	49,358	55,849
1919	2,251,658	0.83	0.66	1,474,490	64,744	62,685
1920	2,133,458	0.88	0.70	1,487,575	64,754	64,775
1921	973,368	na	na	778,918	35,118	32,897
Total	12,287,823	1.12	0.91	10,484,148	500,900[2]	482,279

NA Not available.

[1] *D-2, D-97, D-133.*

[2] *D-133.*

NOTE.—In addition to gold and silver, 4.8 MM pounds of lead was recovered between 1912 and 1921.

History

The veins at the Perseverance Mine were discovered in 1880–81 and staked by several prospectors (figs. D-5, D-135). In 1884, the area was staked by George Garside, James Riley, and George Steller. The men mined approximately 100 tons of ore from short tunnels and cuts in 1886 and crushed it in an arrastra. The ore averaged $7 per ton. More tunnelling and mining was done in 1887 but little was accomplished in 1888.

In 1889, the mine was purchased by Eastern Alaska Mining and Milling Co., who built a road from Last Chance Basin to the mine (cost $11,000 for the 4-mile road), a tram, and a 10-stamp mill. The mill was started on October 16 and produced $50,000 during 1890. Only $2,000 worth of gold and silver was sold to the U.S. Mint in 1891.

In 1892, the company name was changed to Juneau Mining and Manufacturing Co. The mill ran all summer and a generator was installed. The mine worked for 5 to 6 months each summer during 1893 and 1894 but law suits halted work during 1895. An avalanche destroyed the mill in December 1895.

The property was purchased by John Gilbert in 1896, and 570 feet of workings were driven in the Gilbert tunnel in 1897. More work was done in 1898 and 1899. In 1900, William Sutherland formed the Perseverance Mining Co. and bought Gilbert's claims. The next year the mine buildings were constructed and the Alexander Crosscut was started.

By the end of 1903, the Alexander Crosscut was 2,500 feet long. In 1904, a 900-foot raise was started and the mine was sold to Alaska Consolidated Ltd. of London. A 100-person bunkhouse and 60 stamps were set up by

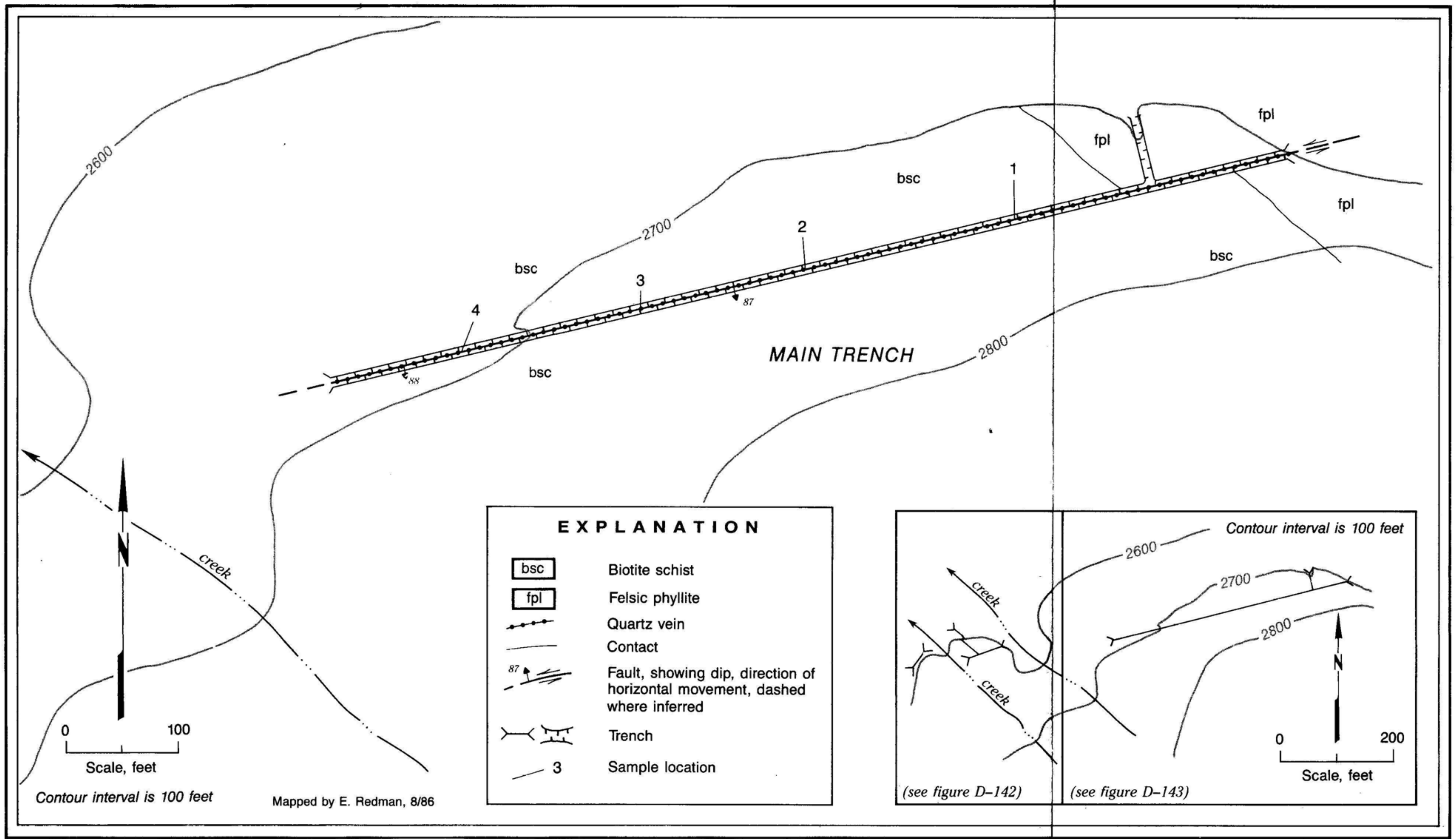

Figure D-143. — The Rubicon prospect, trenches, showing geology and sample locations.

late 1906 and 50 stamps were in operation in 1907. In 1908, 100 stamps were being used to crush up to 550 tons per day. The mine worked 5 to 6 months each year during 1909 and 1910.

The Alaska Gastineau Mining Company formed in 1911 to take over the interest of Alaska Consolidated Ltd. In April, Sutherland died, and Bart Thane acquired control.

A great expansion began in 1912. The Salmon Creek dam and Sheep Creek Tunnel were started that year but the 100-stamp mill was destroyed by fire in December. In 1913, a new stampless tube mill, designed after the copper mills in the Southwest U.S., was started. The Sheep Creek Tunnel was finished in April 1914, and a dam completed in August of the same year.

The 6,000 ton/day mill began operations in February 1915. The Annex Lake hydropower project was started to supply additional electricity so mill capacity could be expanded to 10,000 tons/day. Mining and milling costs were reduced to an average of $0.71 per ton in 1915 but ore value was only $1.16 per ton. Large volumes of low grade ore were encountered during 1916 and, with 81% gold recovery in the mill, the company averaged $0.24 profit per ton.

The Perseverance Mine produced up to 8,000 tons of ore daily during the first half of 1917 but entry of the United States into World War I severely reduced the number of miners available for work. During 1917, the mine produced 2.2 million tons of ore with an assay value of $1.10 per ton with mining and milling costs of $0.77 per ton. In 1918, only 1.3 million tons of ore were mined because of the labor shortage (down from 940 men in 1916 to less than 400) and the company ended the year with a deficit. With the war over in 1919, more men were available for work. Production rose to a high of 10,000 tons per day by November, and 2.2 million tons of ore were milled during the year. Ore value was only $0.83/ton, of which $0.66 was recovered, and the company had another deficit.

In 1920, the mine produced 2.1 million tons of ore and recovered $0.70 per ton. Mining and milling cost, however, were $0.82 per ton and the mine was forced to close on June 2, 1921.

The Perseverance Mine was acquired by the Alaska Juneau Company in 1933 and connected with the Alaska Juneau Mine in 1935. By 1943, Perseverance ore made up 70% of all ore mined by the Alaska Juneau Company. The mine was idle for the next 40 years (*D-97*).

The Sheep Creek Tunnel was reopened in 1986 by Echo Bay Mines and a 1,000 ton test sample taken in 1987.

Workings and Facilities

There are 26 miles of workings on 10 levels in the Perseverance Mine (*D-132*).

Geologic Setting

The geology of the Perseverance Mine has been discussed in the section on the Alaska Juneau Mine. The reader is referred to that section for additional information.

Bureau Investigations

The Bureau did extensive detailed geologic mapping of the surface above the Perseverance Mine during its study of the Alaska Juneau mineral system (fig. D-12). Only brief reconnaissance examinations were made underground at the mine and only one high-grade sample was collected from the mine workings (10-level, No. 3120). This random-grab sample, taken from a sulfide-rich quartz vein, contained 19.7 ppm gold, 96.0 ppm silver, 8.6% zinc, and 4.7% lead.

Four additional samples were taken from quartz veins on the surface above the mine (fig. D-135, Nos. 3-4, 7-8) and a 0.1 yd^3 placer sample was collected from the gravel-filled Lurvey Lake (fig. D-135, No. 5). Silver values ranged from 0.6 to 2.6 ppm from these samples. The placer sample contained 0.022 ounces/yd^3 gold.

The best of the vein samples came from a trench and short adit on the Jumbo claim (fig. D-144, Nos. 1-3). One of the samples (No. 1) contained 18.1 ppm gold, 37.7 ppm silver, and 0.66% lead while two other samples yielded 10.5 ppm and 2.6 ppm gold.

Resource Estimate

See the resource estimate for the Alaska Juneau Mine.

Recommendations

See Alaska Juneau Mine description.

MAS No.	MS No.
21120148	67, 68, 69, 165, 166, 168, 240A, 319A, 319B, 605

References

D-2, D-35, D-72, D-82, D-95, D-96, D-97, D-98, D-99, D-130, D-132, D-133, D-144, D-148

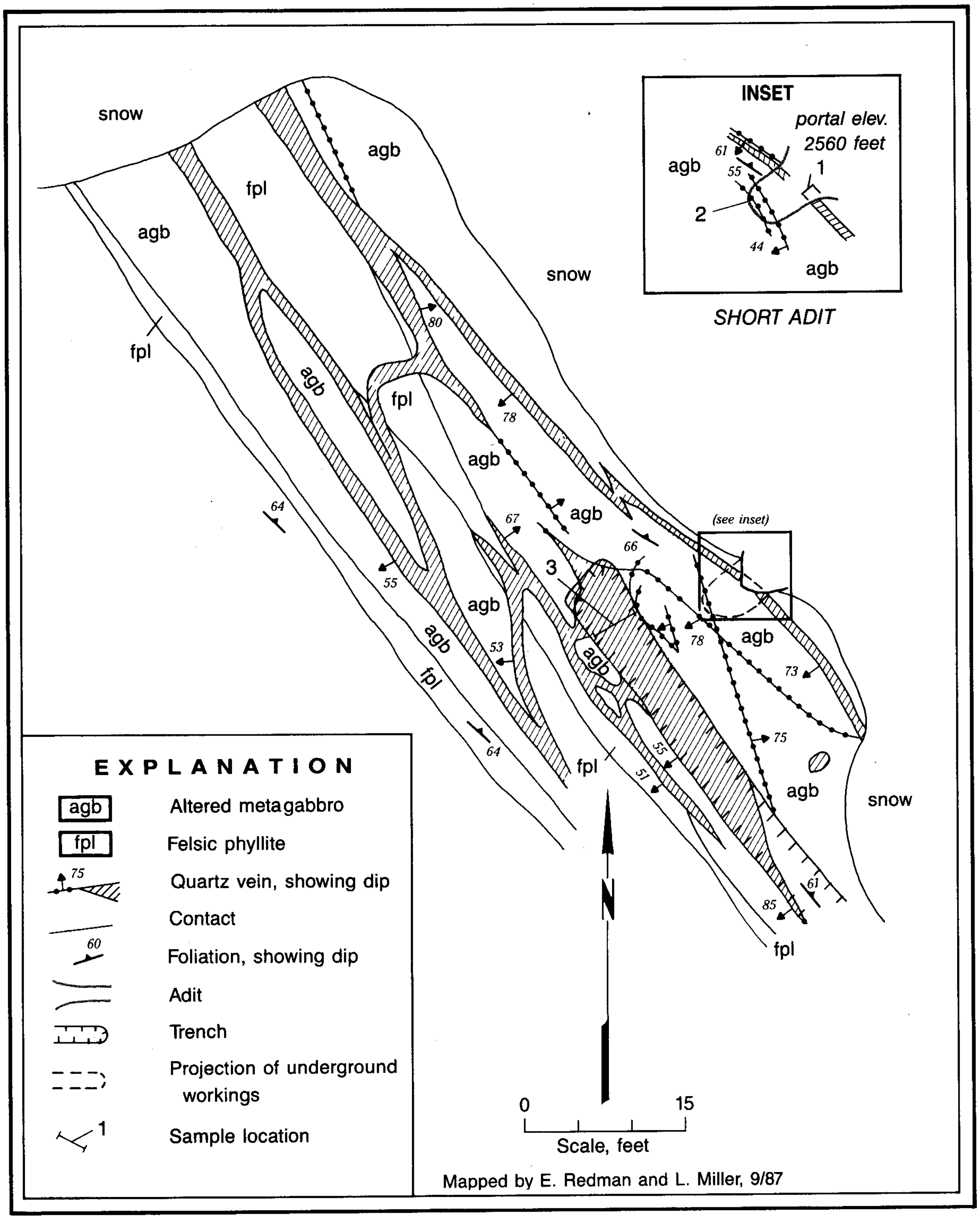

Figure D-144.—The Jumbo claim workings, showing geology and sample locations.

LURVEY PLACER MINE

Production

Approximately 30,000 to 40,000 yd^3 of gravel were mined but there is no record of gold recovery.

History

The Lurvey was probably discovered about 1881 (figs. D-5, D-135). By 1889, the small basin near the Perseverance Mine was owned by George Nelson who drove a tunnel under the basin but did little mining. Nelson and George Garside formed the Last Chance Hydraulic Mining Co. in 1898 and drove a second tunnel in 1899 to tap the bottom of the basin. This tunnel was 343 feet long and had a 90-foot raise at the end. A giant worked gravels in the basin from August into October, 1899. About 30,000 to 40,000 yd^3 of gravel were sluiced from an area about 200 feet by 450 feet but recovery is unknown. After the winter, the mine never reopened (*D-97*).

Workings and Facilities

A placer pit and a 343-foot drainage tunnel with a 90-foot raise still exist on the property.

Bureau Investigations

The Lurvey Creek placer occupies an old lake basin that was filled with gravel from Lurvey Creek and from the Perseverance Mine area. The basin is approximately 300 feet by 700 feet and, in the deepest part, the gravel is over 20 feet thick.

The drainage tunnel cuts black phyllite and discordant quartz veins which contain pyrrhotite and traces of sphalerite.

The Bureau mapped and sampled the Lurvey drainage tunnel but was unable to sample the placer pit because of snow cover (fig. D-145). Gravel washed into the upper end of the drainage tunnel was panned but no gold was observed. Below the mouth of the tunnel, a 0.1 yd^3 placer sample was taken (fig. D-146, No. 1) that contained 0.0002 ounces/yd^3 gold.

Six samples were collected from quartz veins in the drainage tunnel (fig. D-146, Nos. 2-7) but none contained above 0.07 ppm gold or 0.6 ppm silver.

Resource Estimate

Approximately 50,000 to 60,000 yd^3 of gravel remain in Lurvey Basin.

Recommendations

The basin could be drilled to determine the actual volume and grade of the remaining gravels.

MAS No.	MS No.
21120143	113-114

References

D-96, D-97, D-98, D-99, D-130

McKINLEY PROSPECT

Production

There has been no production from the McKinley prospect.

History

The McKinley prospect was staked by John Winn and L.R. Gillette in 1907 (figs. D-5, D-135). The adits and trenches were done by the owners between 1907 and 1909. The claims were patented in 1912 (*D-97*).

Workings and Facilities

The McKinley prospect has a 150-foot adit, a 15-foot adit, and two trenches.

Bureau Investigations

The McKinley prospect is underlain primarily by black phyllite with a few metagabbro sills. Foliation-concordant, boudined quartz veins up to 1.5 feet thick and 100 to 200 feet long occur in the phyllites and contain pyrrhotite.

The Bureau located, mapped, and sampled two adits and one trench (one other trench was located but not mapped) on the McKinley prospect (fig. D-135, No. 6; fig. D-147, Nos. 1-3, 5, 6). Six samples were collected but none contained more than 0.1 ppm gold or 1.8 ppm silver.

Resource Estimate

Metal values are too low to be of interest.

Recommendations

No work is recommended.

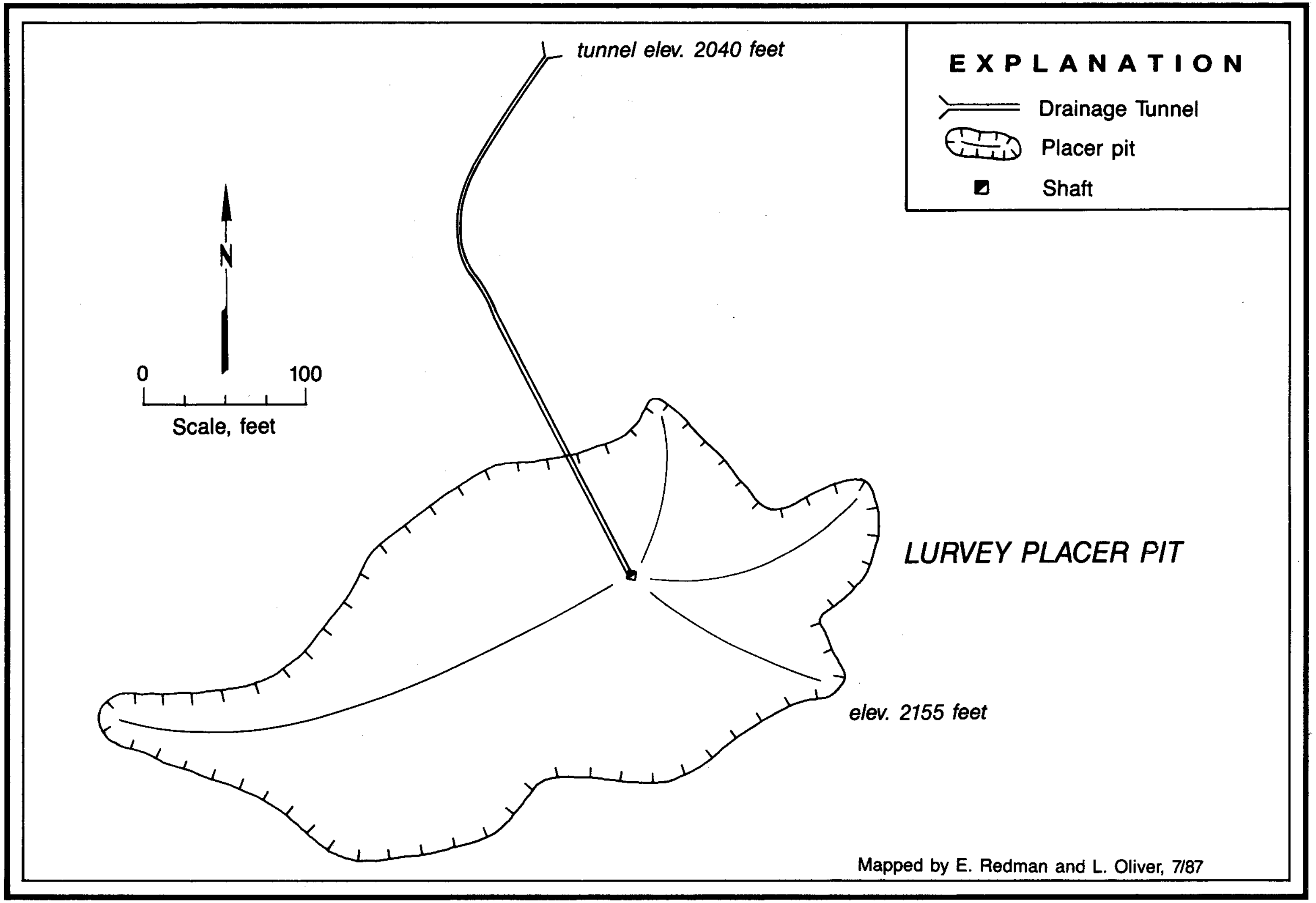

Figure D-145.—The Lurvey Placer Mine, showing placer pit and drainage tunnel.

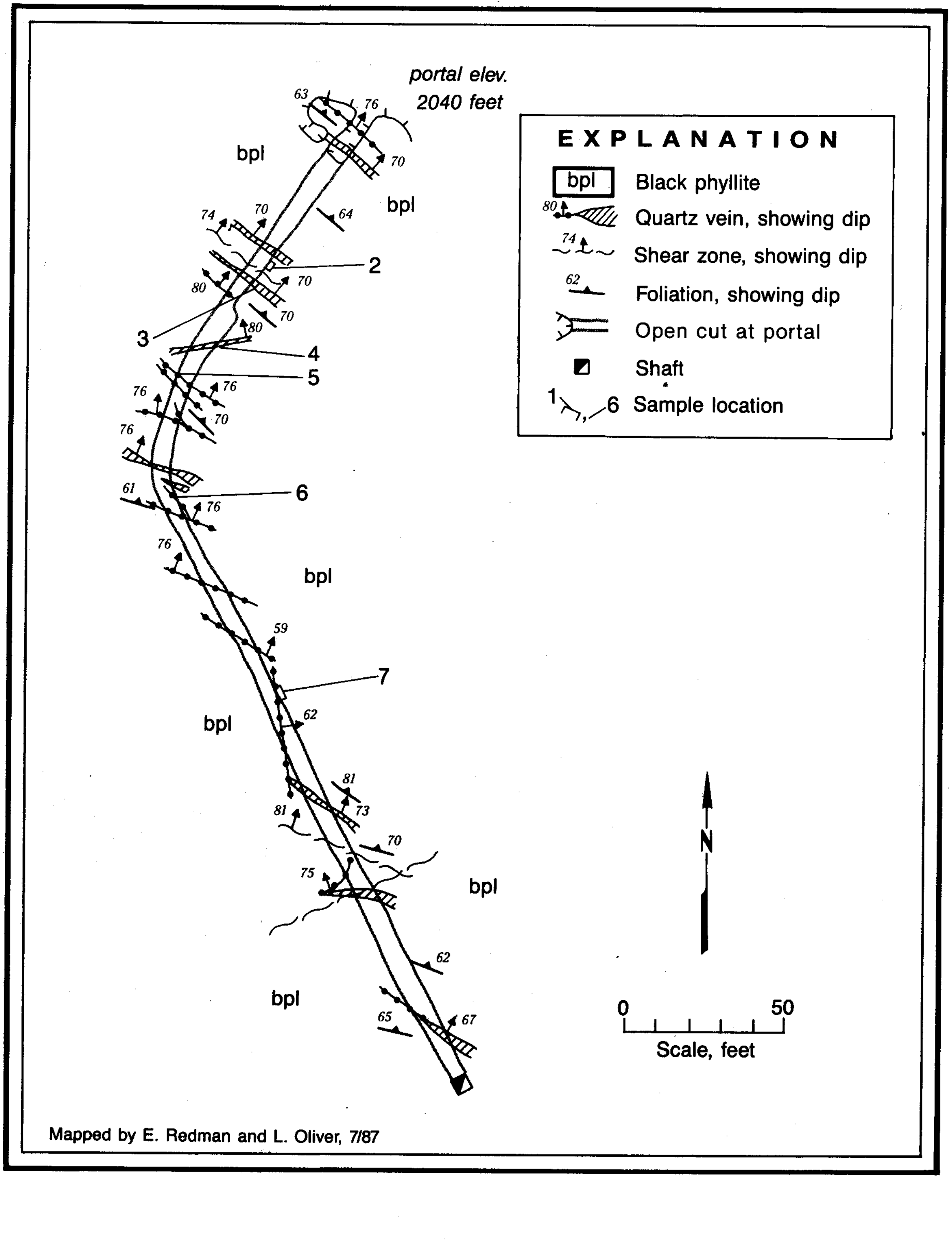

Figure D-146.—The Lurvey Placer Tunnel, showing geology and sample locations.

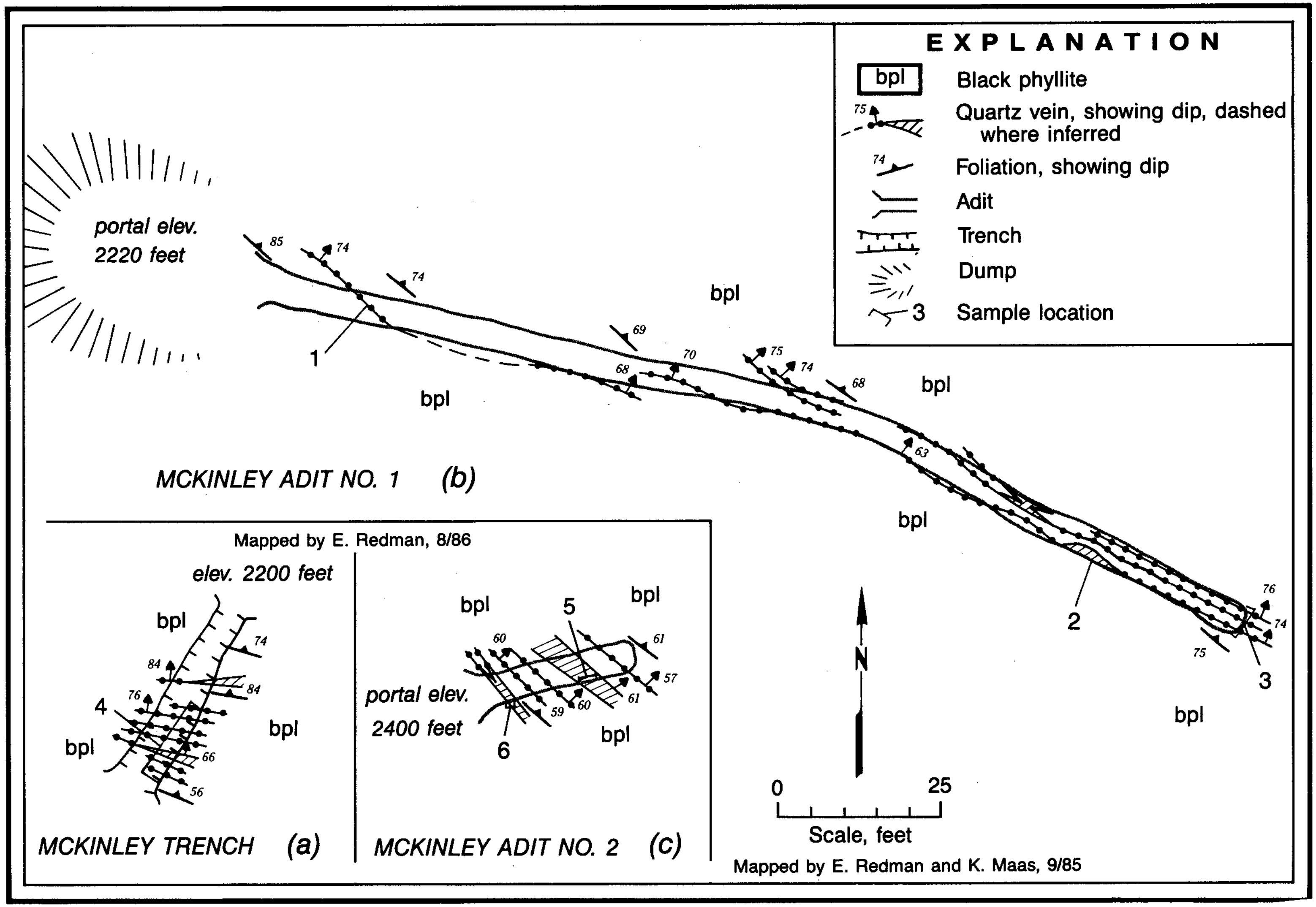

Figure D-147.—The McKinley prospect, showing geology and sample locations.

MAS No.

MS No.
935

References

D-96, D-97, D-98, D-99

BULL CONSOLIDATED PROSPECT

Production

Other than a few sacks of ore collected for testing, the Bull Consolidated prospect had no production.

History

The Bull Consolidated prospect (figs. D-5, D-134) was discovered in 1905 and several sacks of high-grade ore were extracted for testing (*D-161*). No work was reported after 1905.

Workings and Facilities

A water-filled shaft and open cut were found on the Bull Consolidated prospect.

Bureau Investigations

The Bull Consolidated prospect consists of iron-stained biotite gneiss cut by three foliation-concordant quartz veins. The veins are from 0.5 to 3 feet thick and contain small amounts of pyrite.

The Bureau located and sampled the shaft and nearby outcrops at the Bull Consolidated prospect, taking two samples (fig. D-135, No. 2; fig. D-148, No. 1). One of the samples contained 1.2 ppm silver.

Resource Estimate

The low metal concentrations detected in Bureau samples give the prospect a low potential.

Recommendations

No work is recommended.

MAS No.
21120162

References

D-95, D-161

GROUND HOG MINE

Production

Approximately 900 tons of ore were mined from the trenches and adits at the Ground Hog Mine. Reported production during 1895 was "several thousand dollars" worth of gold (*D-130*).

History

Prior to 1888, the soil over the Ground Hog veins was placer mined (figs. D-5, D-135). During the summer of 1888, Thomas Nowell had a large crew opening up the deposit and erecting buildings. By fall, he had 75 tons of ore on the dump, and boarding and bunkhouses built. In 1889, Nowell began work on a 3,000-foot wire tram but work on the project was halted by Nowell's concentration on the Silver Bow placer tunnel and operation.

In 1892, Nowell built the 20-stamp Red Mill near the mouth of the placer tunnel. In 1893, he renewed work on the tram, which had to be extended to 4,440 feet. The tram was completed in the fall of 1894 and connected the mine with the upper end of the Nowell placer tunnel. Ore was hauled through the tunnel to the Red Mill.

The longer adit was completed by spring of 1895. Active mining began in August and continued until October. Spencer (*D-130*) reported that the mine produced "several thousand dollars."

Some work may have been done between 1896 and 1897, and in 1898, the London Exploration Company purchased the mine. Bart Thane acquired the mine in 1910 and consolidated it with the Perseverance operation in 1911 (*D-97*).

Workings and facilities

There are three adits (30 feet, 62 feet, and 118 feet of workings), eight open cuts, and the remains of the wire tram, buildings, and placer workings.

Bureau Investigations

The Ground Hog area is underlain by chlorite phyllite (metamorphosed mafic volcanic rock) adjacent to the black phyllite of the Perseverance area. The chlorite phyllite in the mine area has been extensively altered by hydrothermal fluids and strongly resembles the brown altered metagabbro found in the Alaska Juneau Mine. Parent rocks of both the metagabbro and the chlorite phyllite (mafic flow or tuff) had similar compositions and consequently mineralizing fluids recrystallized both into similar biotite-carbonate rocks. Alteration is most

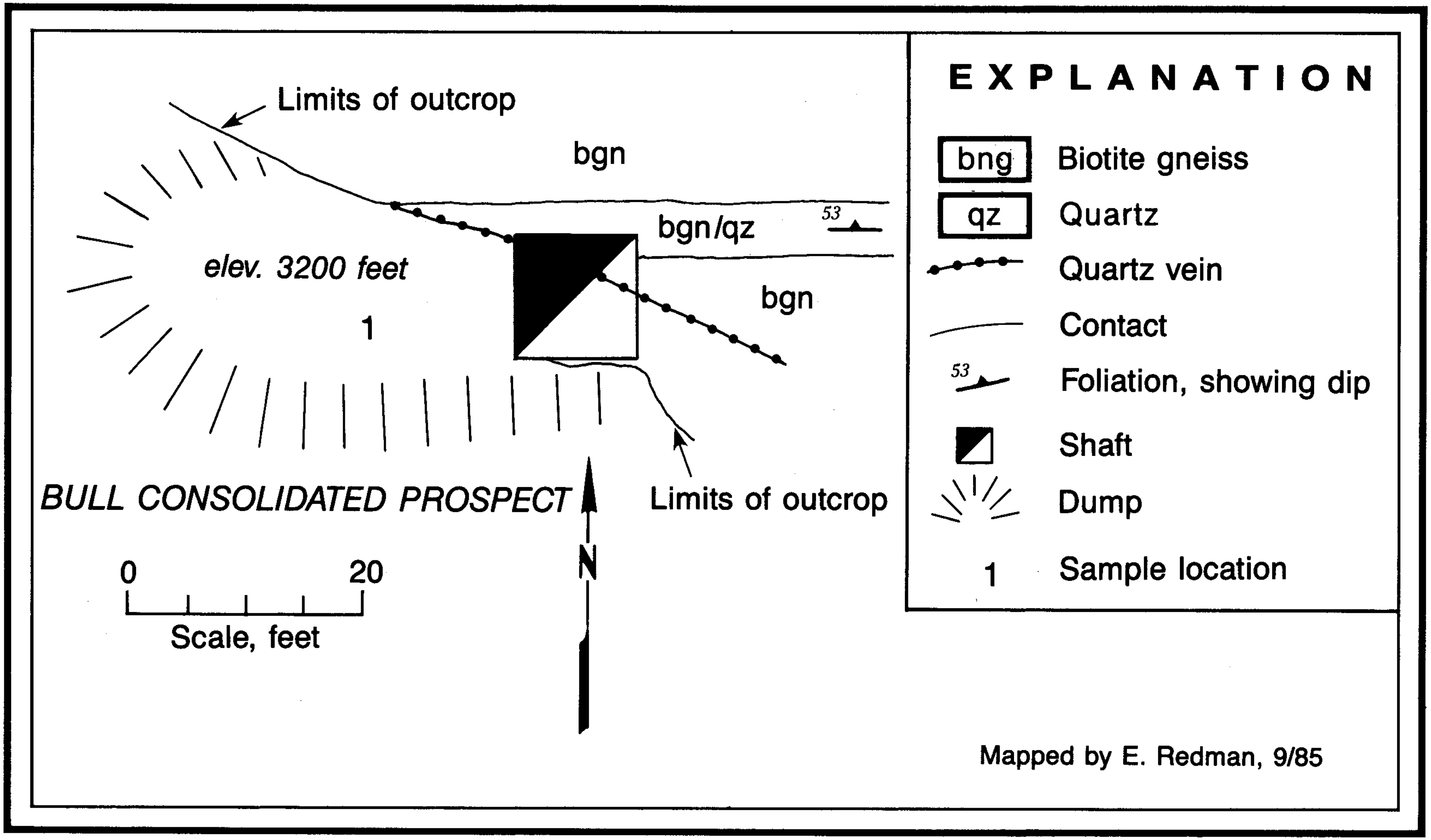

Figure D-148.—The Bull Consolidated prospect, showing geology and sample locations.

intense in the immediate vicinity of quartz veining but generally decreases to the SW away from the black phyllite contact. Green chromian mica (fuchsite ?) is common near quartz veins.

Quartz veining is locally abundant in the prospect area and includes both large fissure veins and vein stockworks. Most of the veins strike nearly parallel to foliation but dip more steeply both NE and SW. Pyrrhotite, galena, and sphalerite are common in the larger veins.

Sample Results

The Bureau mapped three adits and seven trenches at the Ground Hog Mine and collected 18 samples (figs. D-149, D-150). Five samples collected from quartz veins in the upper trenches averaged 31.7 ppm gold, 122.0 ppm silver, 1.79% lead, and 0.42% zinc (fig. D-149, Nos. 3-7). Nine samples were taken in the two main Ground Hog adits (fig. D-150, Nos. 3-11) and two more were collected from a trench near the adits (fig. D-149, Nos. 1-2). Samples from quartz veins in the adits and trench averaged 7.2 ppm gold but 20-foot spaced chip samples taken in the adits carried an average of only 0.1 ppm gold. Two samples from a short adit away from the developed Ground Hog area contained less than 0.07 ppm gold and up to 0.9 ppm silver (fig. D-150, Nos. 1-2).

Resource Estimate

Chip samples from the adits did not contain significant metal values but quartz samples from the trenches were very encouraging. Because of these values and the proximity of the Perseverance Mine, the Ground Hog has a moderate potential. Quartz veins in the trenches contain an inferred resource of 7,700 tons grading 0.9 ounces/ton gold and 2.8 ounces/ton silver.

Recommendations

Diamond drilling and trenching are needed to define the extent and grade of the mineralized zone.

MAS No.	MS No.
21120201	73, 74

References

D-95, D-96, D-97, D-98, D-99, D-130, D-161

ALASKA JUNEAU TAILINGS

Production

Table D-12.—Production from the Alaska Juneau mill tailings

Year	Production			
	oz Au	oz Ag	Pb (lb)	Cu (lb)
1948	1,448	484	2,000	1,200
1949	1,727	375	500	200
1950	1,876	404	—	—
1951	253	63	—	—
1952	215	55	300	—
1954	412	82	—	—
1955	50	—	—	—
1956	100	—	—	—
1957	125	—	—	—
1981-1983	900	200	—	—
Total	7,106	1,663	2,800	1,400

(D-46, D-146)

History

Howard Hayes and others sluiced about 150,000 tons of material from the Alaska Juneau tailings between 1948 and 1954 (fig. D-5). In 1981, the Taku Mining Company entered into an agreement to mine the tailings and the next year sluiced 70,000 tons of tailings and recovered 900 ounces gold and 200 ounces silver (*D-46*). When the lease expired, Hayes staked mining claims but subsurface ownership litigation halted work in 1983. In 1988, the claims staked by Hayes were ruled to be valid by the Alaska Supreme Court and were consequently leased to Regent Alaska, Inc.

Geologic Setting

The Alaska Juneau tailings dump consists of the hand-sorted and rejected waste material and the processed tailings from the mill.

Resource Estimate

The Alaska Juneau tailings have a measured resource of 47 million tons with an unknown grade.

Recommendations

The Alaska Juneau tailings should be drilled and sampled to determine the quantity and extent of gold.

MAS No.
21120017

References

D-46, D-53, D-96, D-97, D-99, D-146

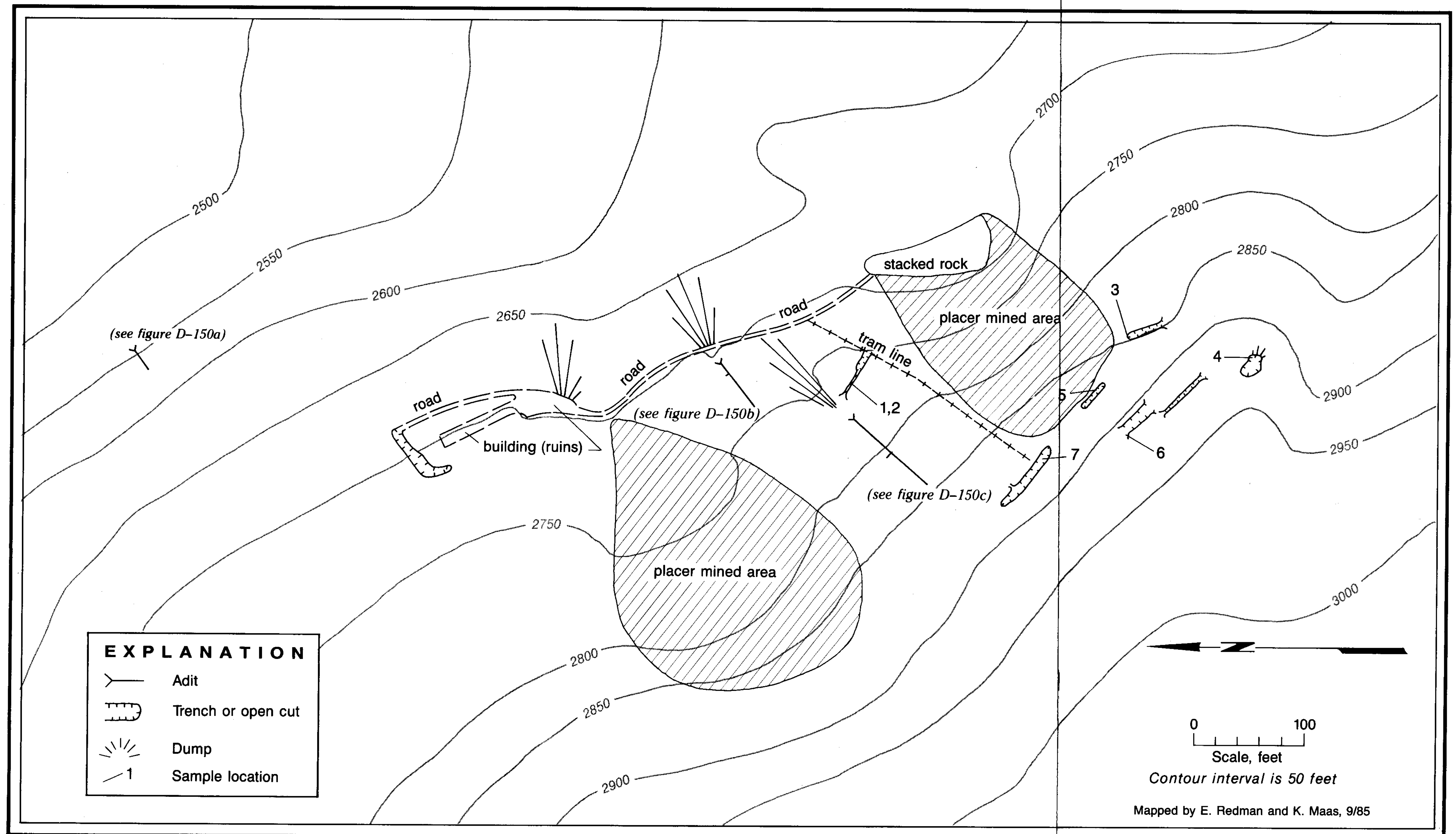

Figure D-149. — The Ground Hog Mine area, showing geology and sample locations.

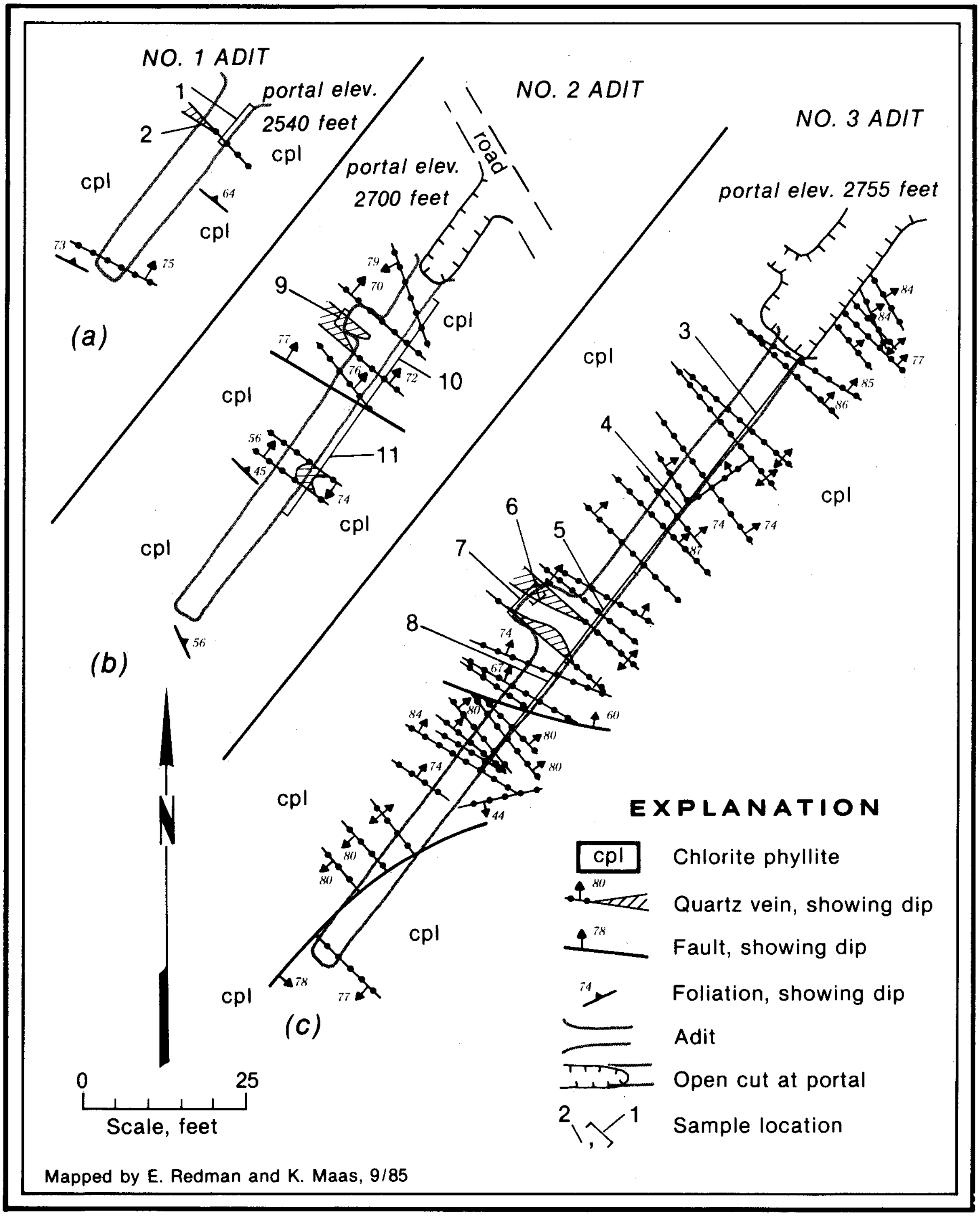

Figure D-150.—The Ground Hog adits, showing geology and sample locations.

SILVER FALLS PROSPECT

Production

There has been no known production from the Silver Falls prospect.

History

The Silver Falls prospect (also known as the Carlson Creek and the Clark prospects) was discovered in 1911 by William Clark (figs. D-5, D-151). Clark drove a 140-foot adit but did little else. The Premier Mining Company did considerable stripping and sampling of the property in 1932. By 1937, the adit had been extended to 152 feet. In 1934, a 15-foot drift was run from the adit and a second adit was driven at least 10 feet through the vein (*D-140*).

After 1939, little work was done on the prospect until Curator American leased the area in 1988. Curator mapped and sampled the quartz veins.

Workings and Facilities

There are two adits containing 150 feet and 10 feet of workings each.

Bureau Investigations

The Silver Falls area is underlain by biotite gneiss and schist. Mineralization is hosted in a large quartz vein that parallels foliation (Kathleen vein) and two crosscutting veins (Lenora and William R veins). The veins commonly include fragments of strongly altered gneiss. Wallrock of the vein exposed in the longer adit (which evidently did not reach the main vein) is altered to carbonate and quartz for at least 100 feet away from the vein with chromium-bearing mica (fuchsite ?) being locally common. The vein may be up to a mile long.

The Kathleen vein, which is up to 20 feet thick, is crosscut by two quartz-filled faults called the Lenora and William R veins. The Lenora and William R veins are up to 5 feet wide and cut the main vein at nearly right angles. Offset on both faults is left lateral and the Kathleen vein is displaced about 200 feet along the fault which hosts the William R vein.

All veins contain pyrite, arsenopyrite, stibnite, sphalerite, and galena. The stibnite is coarse-grained and arsenopyrite is usually so fine-grained that individual crystals are difficult to identify. The arsenopyrite commonly turns the quartz a blue color.

Sample Results

The Bureau mapped and sampled the main adit and traced the Kathleen vein for several hundred feet along strike (fig. D-152). Between the lower Kathleen adit and the Lenora vein, outcrops are on an extremely steep slope and sampling was limited by the topography. A total of 21 samples were collected on the property. Eight samples were collected in the main adit (fig. D-153, Nos. 1-8), five were taken from the lower Kathleen adit area (fig. D-152, Nos. 9-13), three from the William R vein (fig. D-152, Nos. 6-8), three from the Kathleen vein (fig. D-152, No. 3-5), and two samples were taken from the Lenora vein (fig. D-152, Nos. 1-2). Three other samples were collected from quartz float below Silver Falls (fig. D-152, Nos. 14-16).

The best sample collected from the Silver Falls prospect was a random grab sample of quartz from the Upper Kathleen vein which contained 881.5 ppm gold and 1737.2 ppm silver (fig. D-152, No. 5). Samples from the Lower Kathleen vein averaged 8.4 ppm gold and 110.4 ppm silver over an average vein width of 4.4 feet, Lenore vein samples averaged 3.3 ppm gold and 143.7 ppm silver over 1.5 feet, and samples from the William R averaged 0.4 ppm gold and 39.4 ppm silver. The cross vein above the Upper Kathleen vein averaged 2.1 ppm gold and 2.4 ppm silver while the mineralized portion of the main adit averaged 2.0 ppm gold and 11.0 ppm silver over 2.6 feet.

Resource Estimate

The Silver Falls prospect has an inferred resource of 150,000 st with a grade of 0.1 ounces/ton gold and 2.15 ounces/ton silver based on the 800 feet of exposed length of the vein.

Recommendations

The vein should be delineated by drilling and trenching.

MAS No.
21120113

References

D-23, D-96, D-98, D-140

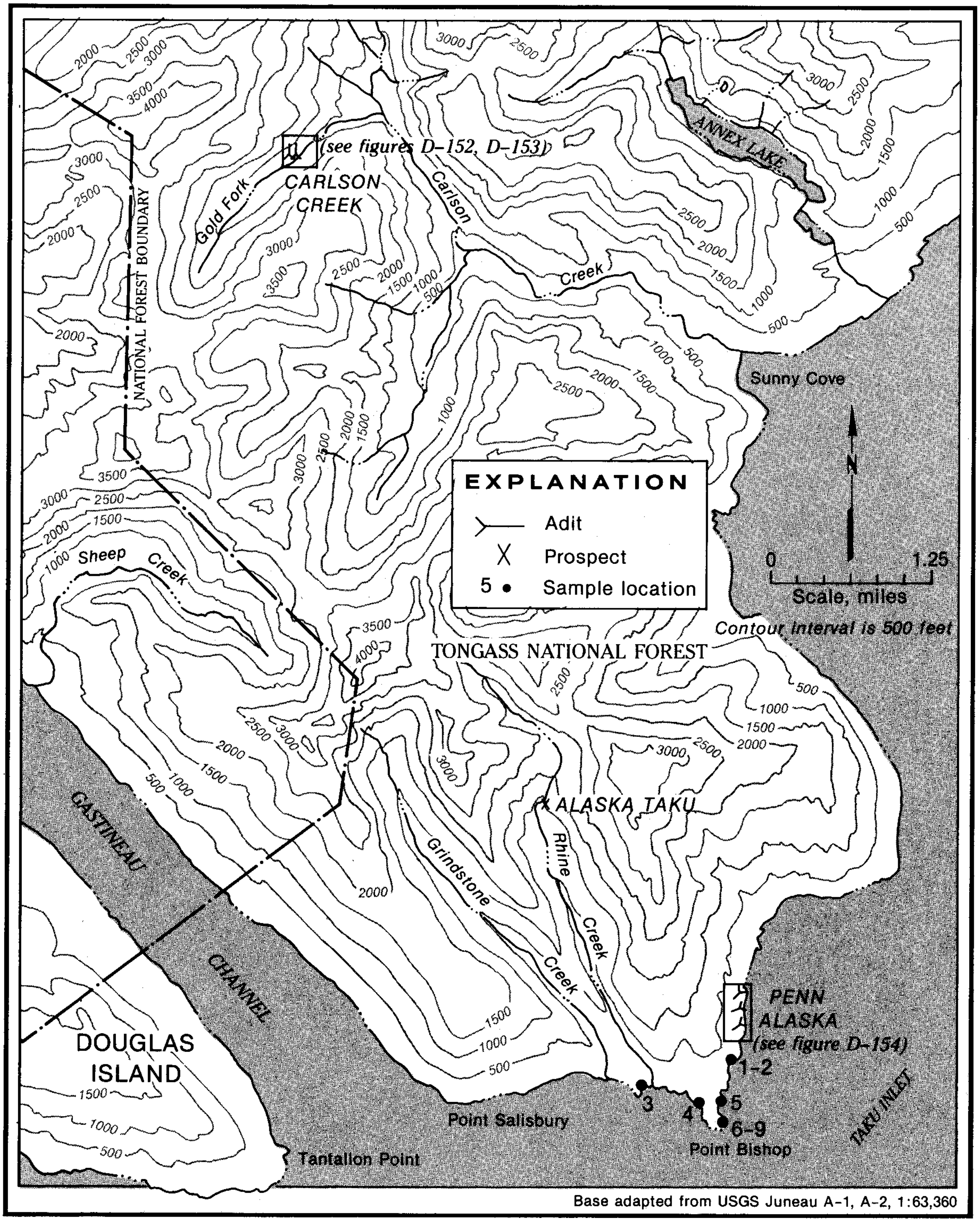

Figure D-151.—The Carlson Creek and Point Bishop areas, showing location of the Silver Falls, Alaska Taku, and Penn Alaska prospects.

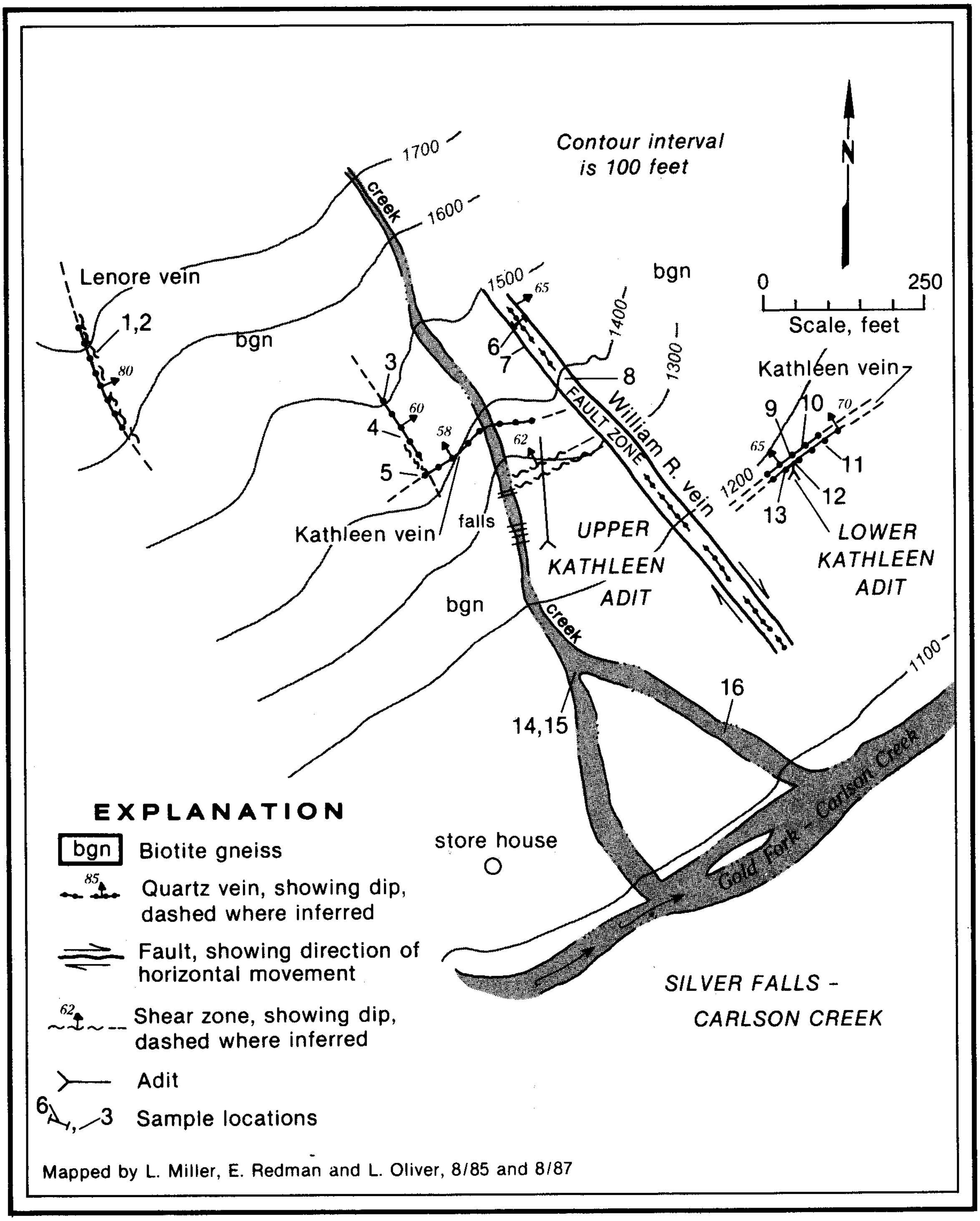

Figure D-152.—Geology and workings of the Silver Falls prospect.

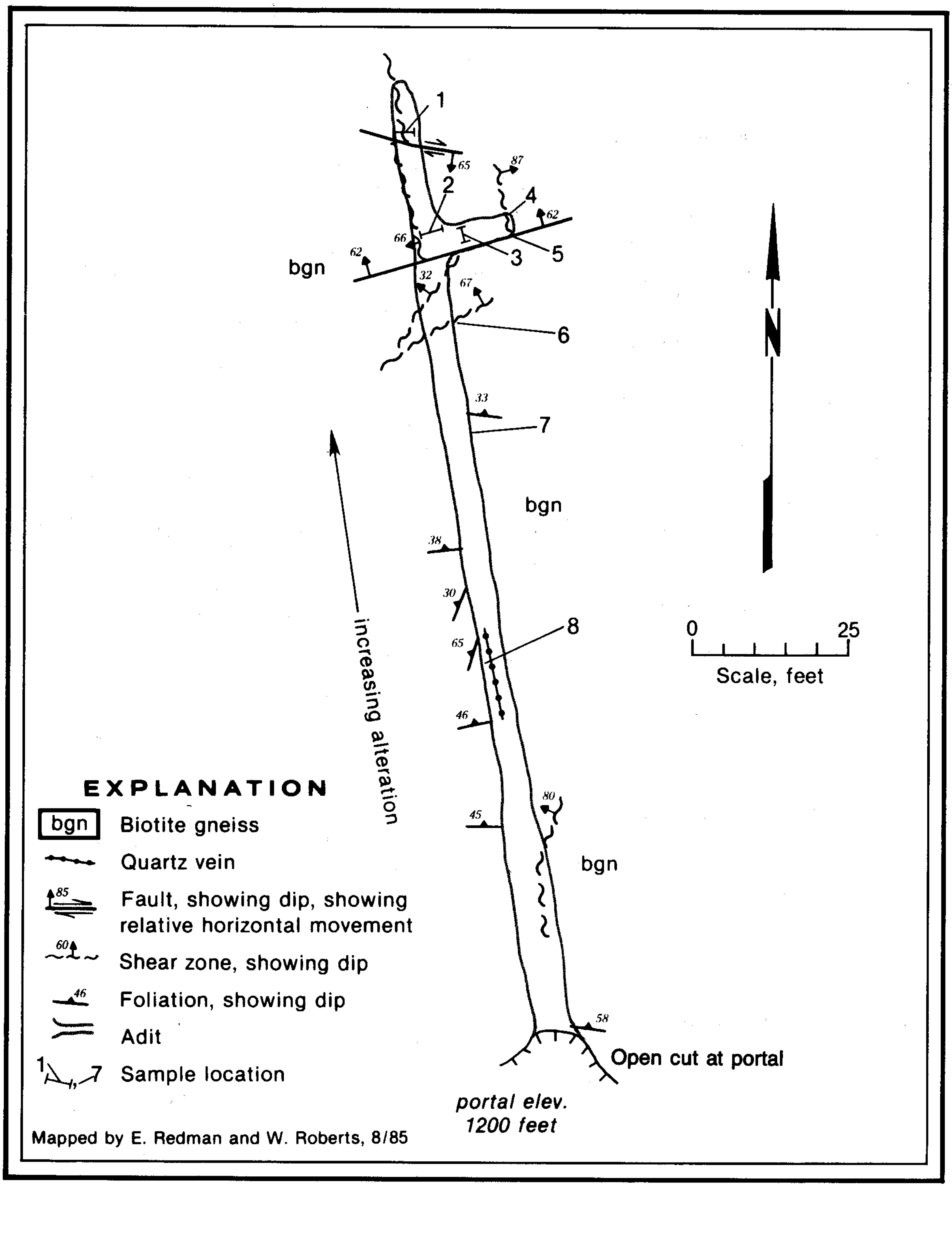

Figure D-153.—Silver Falls prospect, upper Kathleen adit, showing geology and sample locations.

ALASKA TAKU PROSPECT

Production

There has been no production from the Alaska Taku prospect.

History

The Alaska Taku prospect, on upper Grindstone and Rhine Creeks, was staked in 1915 (fig. D-5, D-151). A few open cuts were made in 1916 but legal problems with the Alaska Goldbelt Company in 1915 and 1916 hampered work. No work was recorded after 1916 (*D-34*).

Workings and Facilities

A few open cuts are reported (*D-34*).

Geologic Setting

The Alaska Taku prospect was reportedly located along the contact between black phyllite and greenstone (*D-34*)

Bureau Investigations

The Bureau did not visit the Alaska Taku prospect.

Resource Estimate

The Bureau did not examine the prospect.

Recommendations

The area should be examined to determine the nature and extent of mineralization.

MAS No.
21120106

References

D-27, D-34, D-97, D-99

POINT COOPER OCCURRENCE

History

Small amounts of gold were discovered in pyrrhotitic gneiss and schist at Point Cooper in 1960 (*D-49*). No work has been done (fig. D-5).

Workings and Facilities

There are no workings.

Geologic Setting

The Point Cooper area is composed of high-grade schists and gneisses. The rocks contain small amounts of disseminated pyrrhotite and are strongly iron-stained. Samples taken by Herreid (*D-49*) contained 0.7 ppm gold.

Bureau Investigations

The Bureau did not examine the Point Cooper area.

Resource Estimate

There is no known resource.

Recommendations

The area of Point Cooper should be geologically mapped and sampled to determine whether mineralization exists.

References

D-32, D-49

PENN ALASKA PROSPECT

Production

There has been no reported production from the Penn Alaska prospect.

History

Jesse and William Blakeley, Gifford Wright, James Cooke, and David McClintock formed the Penn Alaska Mining Co. in 1906 to work the Penn Alaska prospect (figs. D-5, D-151). Between 1906 and 1909, some trenching and blasting were done, and the Seawall and Pittsburg adits were probably driven. In the summer of 1909, a contract was awarded to George Dull to drive a 700-foot tunnel. The adit was finished by the end of summer, 1910, and a 200-foot drift was driven from the adit in September 1911.

The ground was patented in 1912 and the old Friday 20-stamp mill was purchased in December 1912. Only minor work was done in 1913 after Blakeley, the primary backer, suffered a stroke (*D-97*).

Workings and Facilities

There are three adits at the Penn Alaska prospect: the Seawall Tunnel (123 feet), the Pittsburg Tunnel (125 feet), and the Washington Tunnel (700-foot adit with a 200-foot drift). There is also an open cut and several sloughed-in trenches.

Bureau Investigations

The Penn Alaska area is underlain by interlayered black phyllite and hydrothermally-altered mafic volcanic rocks. Most of the black phyllite contains either disseminated or thinly-banded pyrite. Alteration products in the mafic rocks may include ankerite, quartz, and/or albite. A short distance south is the contact with the massive Gastineau metavolcanic rocks.

A 20-foot-thick mineralized band that crops out on the beach extends through the Seawall adit and is followed by the drift in the Washington adit. The band is brightly yellow stained (from iron) and contains thin quartz veins that carry pyrite and rare sphalerite, galena, chalcopyrite, and stibnite. The host rocks for the bands are altered and bleached black phyllite with up to 6% disseminated pyrite. A second mineralized band can be traced from the beach through the Pittsburg adit. This band is composed of altered mafic rock and is cut by many thin, contorted quartz veins with pyrite.

Sample Results

The Bureau located three adits, and an open cut at the Penn Alaska prospect (figs. D-154, D-155). A total of 32 samples were taken from the adits and sea cliff exposures.

Three samples were taken from the Seawall adit (fig. D-155, Nos. 23-25) and another seven (fig. D-154, Nos. 1-7) from mineralized outcrops on the sea cliff below the adit. Four samples taken across the best mineralized zone on the sea cliff averaged 3.9 ppm silver but no other samples contained more than 1.2 ppm silver or 0.1 ppm gold.

Eighteen samples were collected from the Washington adit and surrounds (fig. D-155, Nos. 5-22). One sample contained 0.17% zinc but no silver values exceeded 3.0 ppm or gold values were greater than 0.1 ppm.

At the Pittsburg adit, four samples were taken but none contained greater than 0.7 ppm silver or 0.07 ppm gold (fig. D-155, Nos. 1-4).

Resource Estimate

The low metal values give the Penn Alaska prospect a low potential.

Recommendations

Geologic mapping and soil sampling may locate mineralization in the area.

MAS No.	MS No.
21120105	963, 978

References

D-27, D-33, D-96, D-97, D-98, D-99

POINT BISHOP OCCURRENCE

History

The Point Bishop locality was examined by the Bureau in 1986 (figs. D-5, D-151).

Workings and Facilities

There are no known workings at Point Bishop.

Bureau Investigations

The Bureau examined and sampled an interbedded series of black phyllite, mafic metavolcanic rocks, metamorphosed pillow basalt, and metafelsic (quartz, feldspar ?) rocks in the Point Bishop area. The black phyllite hosted concordant quartz veins up to 3 feet thick, which have minor pyrite. The felsic rocks and greenstones commonly contained 1% to 5% disseminated pyrite cubes and uncommon chalcopyrite. In one area, the metamorphosed pillow basalt contained stratiform bands of massive pyrite up to 2 inches thick.

Sample Results

The Bureau took nine samples from the Point Bishop area (fig. D-151, Nos. 1-9). One sample of pyritic greenstone (fig. D-151, No. 3) contains 0.1 ppm gold and 138 ppm copper. A sample of metabasalt with thin massive stratiform bands of pyrite and minor chalcopyrite yielded 0.27% copper (fig. D-151, No. 8).

Three samples taken of quartz and black phyllite (fig. D-151, Nos. 1-2, 9) contained low values although No. 9 did carry 3.1 ppm silver, 590 ppm zinc, and 375 ppm copper. The metafelsic rocks locally contained disseminated pyrite and minor quartz veinlets. Four samples of the felsic unit (fig. D-151, Nos. 4-7) contained less than 0.07 gold and a maximum of 2.2 ppm silver.

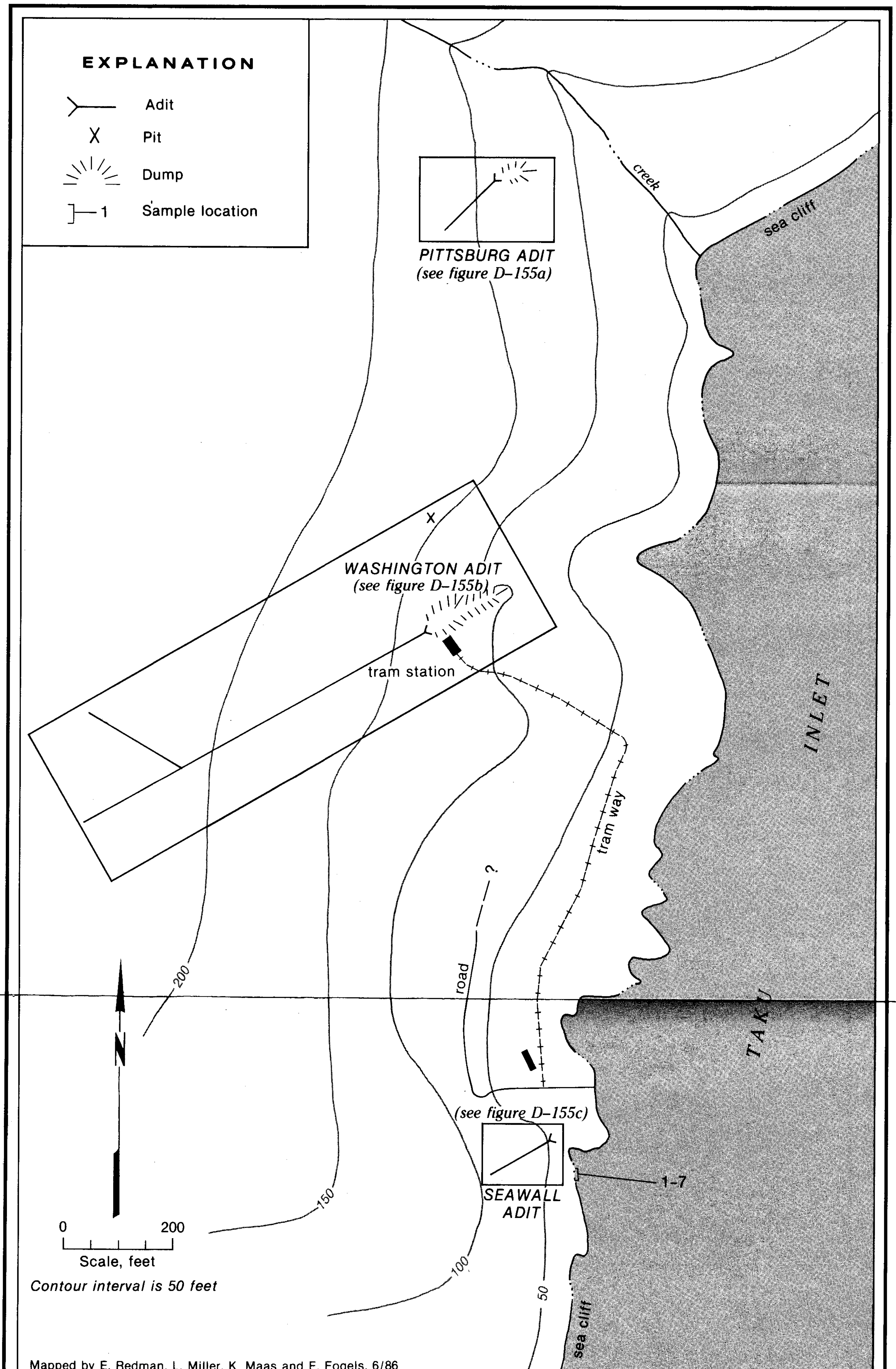

Figure D-154. — The Penn Alaska prospect area, showing workings and sample locations.

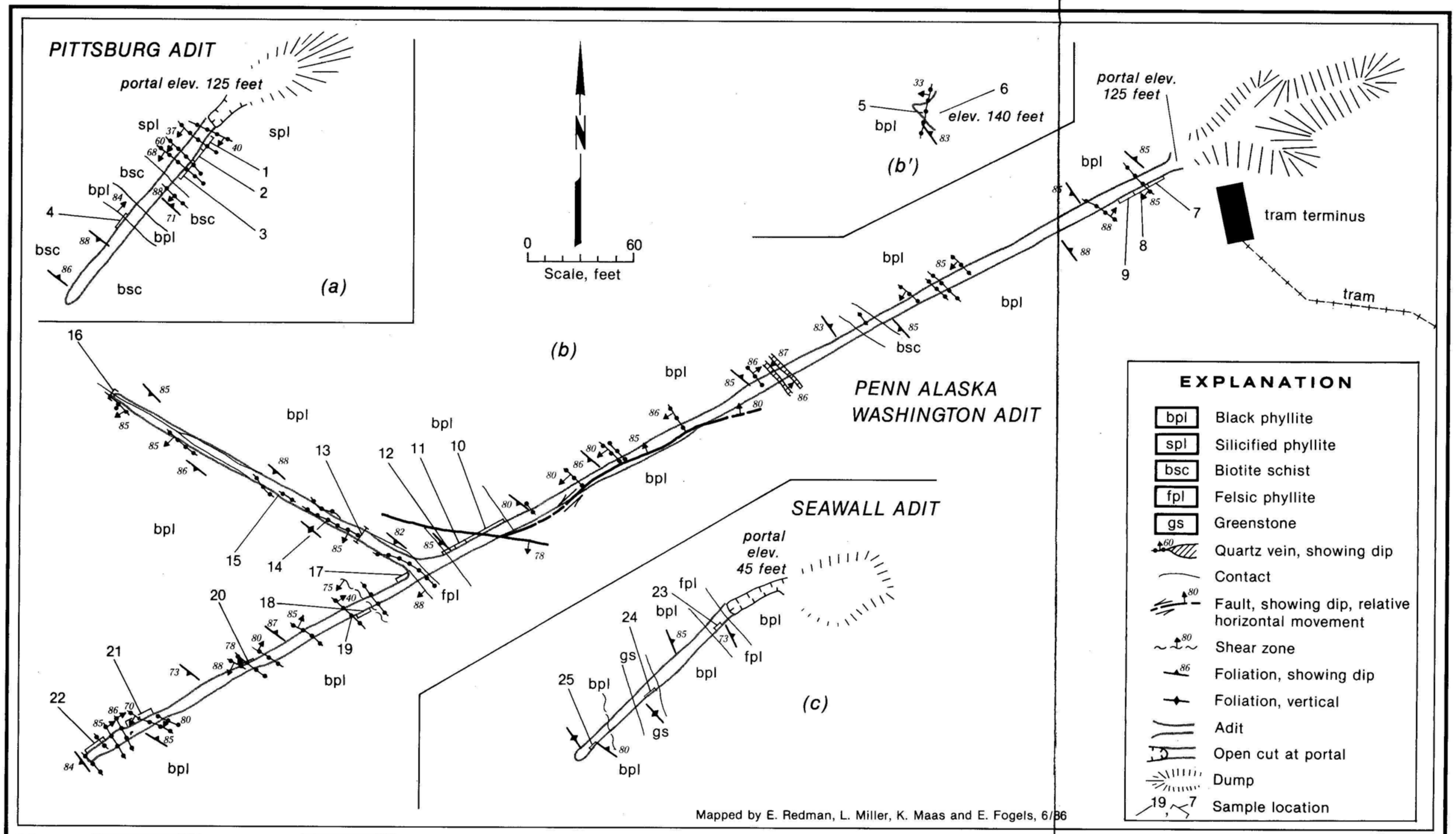

Figure D-155. — Penn Alaska prospect: the Pittsburg, Washington, and Seawall adits.

Resource Estimate

Metal values are too low for the area to be of interest.

Recommendations

No work is recommended.

References

D-98, D-99

SNOWSLIDE GULCH PROSPECT

Production

There has been no production from the Snowslide Gulch prospect.

History

The history of the Snowslide Gulch prospect is not known (figs. D-5, D-156).

Workings and Facilities

There is a 198-foot adit at the Snowslide Gulch prospect.

Bureau Investigations

The Snowslide Gulch adit cuts massive greenstone and chlorite phyllite. A few thin calcite-quartz veins cut the rocks but most are barren. Only minor disseminated pyrite is present locally in the metavolcanic rocks.

The Bureau located, mapped, and sampled the Snowslide Gulch adit (fig. D-157). One sample was collected (fig. D-157, No.1) from the most highly pyritized chlorite phyllite but it contained no detectable gold and less than 0.2 ppm silver.

Resource Estimate

Only low metal values were found in the adit; therefore, the prospect has a low development potential.

Recommendations

No work is recommended.

MAS No.	MS No.
	1027A

References

D-98

CROSS BAY PROSPECT

Production

There has been no production from the Cross Bay prospect.

History

The Cross Bay prospect was discovered in 1894 by George Bach and others who drove a beach tunnel 20 feet (figs. D-5, D-156). The next year, Bach, Oscar Larson, Andy Anderson, Oscar Ohman, and Anton Lillestrand did assessment work on the prospect. In 1900, a 70-foot adit was connected with a 50-foot-deep shaft (another account mentions a 120-foot-deep shaft with connecting tunnel) (*D-97*).

In 1905, the Cross Bay prospect was sold to the Perseverance Company but later reverted to the original owners. The prospect was purchased again by the Perseverance Company in 1912 and the shaft used for water storage (*D-132*).

Workings and Facilities

Two open adits were found on the Cross Bay prospect: 194-foot adit at the edge of the road and a 104-foot adit on beach. A reported 50-foot shaft (*D-97*) was not found. One additional adit is shown on the Mineral Survey map (MS 989) but was not located.

Bureau Investigations

The present adit at the Cross Bay prospect cuts massive greenstone with some interbedded chlorite phyllite and black phyllite. Small amounts of disseminated pyrite occur in the greenstone and chlorite phyllite. A few thin quartz veins cut the metavolcanic rocks locally but contain no visible sulfide minerals.

Spencer (*D-130*) reports that a rock resembling the altered albite diorite at the Treadwell mines and at the Boston prospect crops out on the beach in the area of the adit but it was not cut by the present workings.

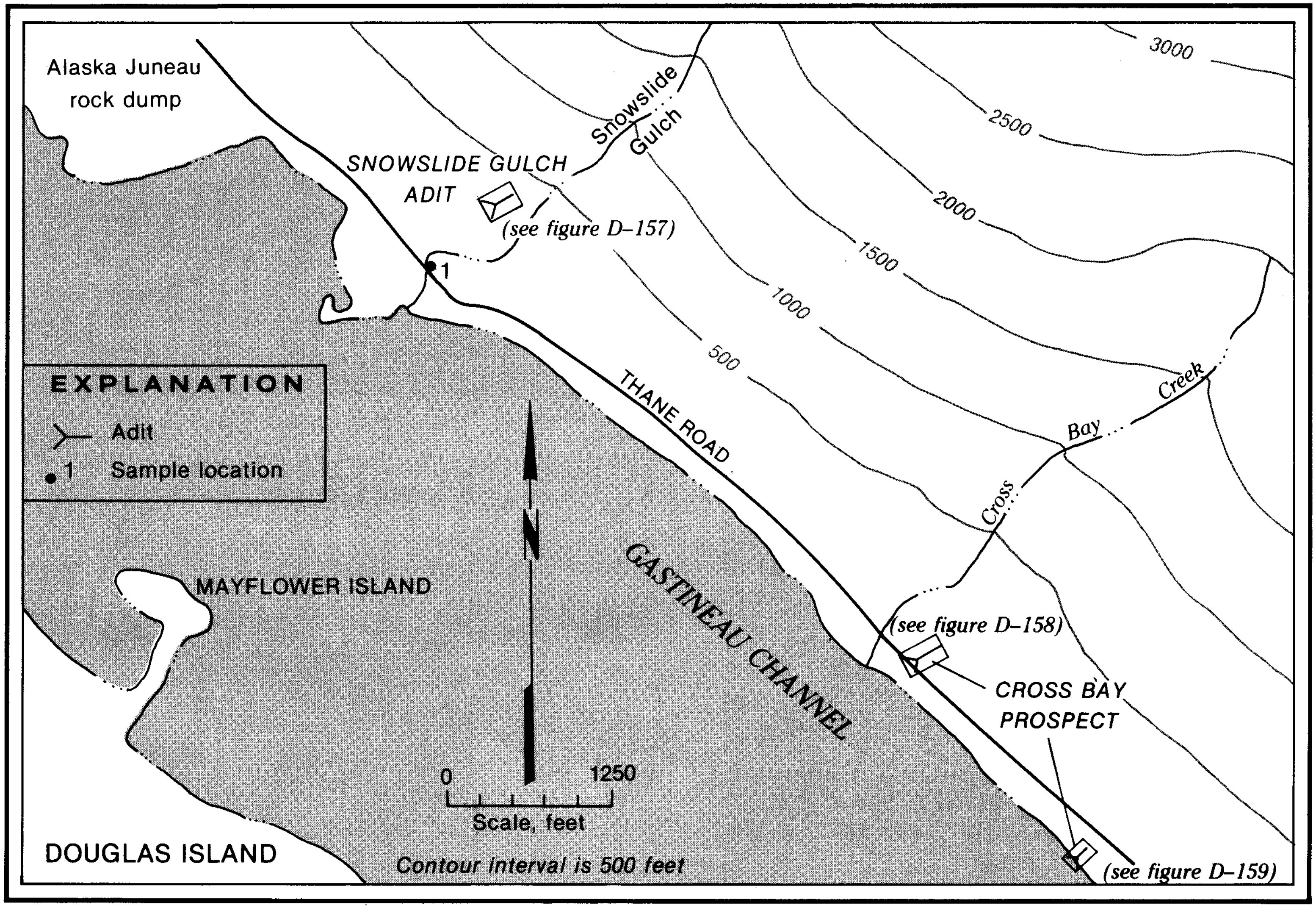

Figure D–156.—Workings of the Snowslide Gulch and Cross Bay prospects.

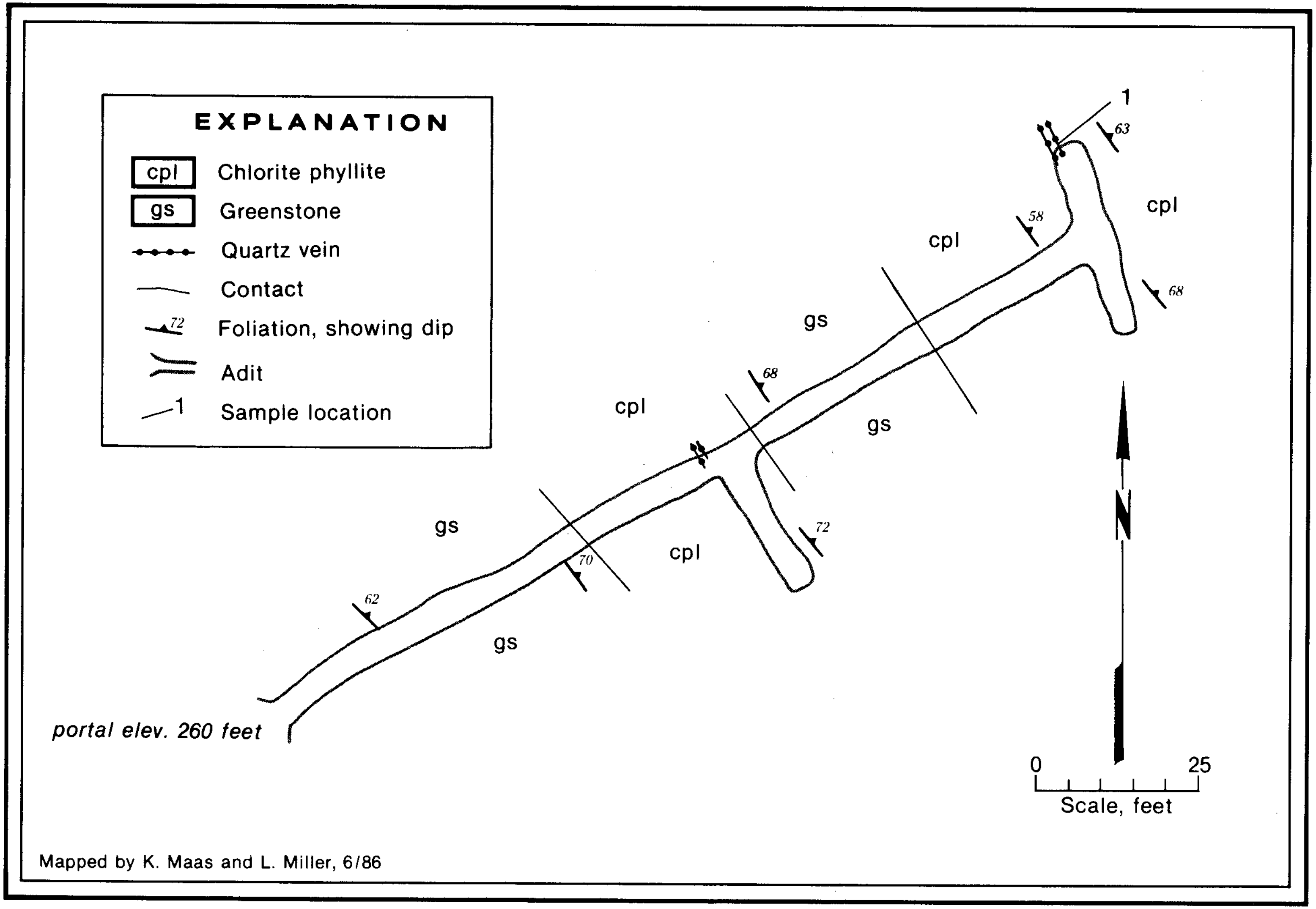

Figure D-157.—The Snowslide Gulch adit, showing geology and sample locations.

Sample Results

The Bureau located two adits at the Cross Bay prospect and collected four samples, two from each adit. None of the samples from either the road adit (fig. D-158, Nos. 1-2) or the beach adit (fig. D-159, Nos. 1-2) contained more than 0.1 ppm gold or 0.2 ppm silver.

Resource Estimate

The Cross Bay prospect has a low potential.

Recommendations

No work is recommended.

MAS No.	MS No.
21120164	989

References

D-77, D-96, D-97, D-99, D-130, D-132

ASCENSION MINE
(also known as the Ibex)

Production

An estimated 800 tons of ore was mined from upper stope. The value of production is unknown.

History

The Ascension claim was staked by H. E. Hunsaker in August 1887 (figs. D-5, D-160). Some mining was done from 1888 to 1890. The mine was leased in 1891 by a company that drove a tunnel but then dropped their interest. Hunsaker continued to mine small quantities of ore between 1892 and 1894. In 1895, the Ascension Mine was purchased by the Nowell Gold Mining Co.

By 1895, the vein in the working tunnel had been stoped to the surface. A short cable tram connected the working tunnel with the lower adit where a blacksmith's shop was located. A steep zig-zag trail led from the mine to the Sheep Creek valley (*D-97*).

Workings and Facilities

The main adit, which connects with the open stope, is caved at 42 feet. Two other adits which occur on the claim are a caved lower adit and an open 80-foot upper adit.

Bureau Investigations

The Ascension Mine occurs near the contact of black phyllite and green phyllite. Three quartz veins explored by workings all begin within a few feet of the contact and, following the foliation which trends obliquely to regional bedding, diverge at a low angle. The veins are 200 to 300 feet long, up to 1.5 feet wide, and are well boudinaged. Sulfides in the veins include pyrrhotite, sphalerite, galena, tetrahedrite, with traces of chalcopyrite, gold, and native silver. The sulfide minerals tend to occur as vague bands within the veins and in the necks of boudins. The deposit is much like those at the Glacier and Silver Queen mines.

Sample Results

The Bureau located, mapped, and sampled two adits and a surface quartz vein outcrop at the Ascension Mine (figs. D-161, D-162). Five samples were taken from quartz veins in the adits (fig. D-161, Nos. 1-2; fig. D-162, Nos. 1, 3, 7), one was taken from a small pile of quartz fragments (fig. D-162, No. 5), and two others were taken from black phyllite wallrock adjacent to the veins (fig. D-162, Nos. 2, 6). In addition, a 300-pound metallurgical sample was collected from the same ore pile as sample No. 5 (fig. D-162).

The six quartz vein samples contained an average of 354.6 ppm silver but only 0.7 ppm gold. One of the wallrock samples contained 18 ppm silver. Lead and zinc values were low in the middle adit but averaged 0.54% lead and 0.47% zinc in the upper adit.

The metallurgical sample contained pyrrhotite, sphalerite, galena, tetrahedrite, and rare gold and assayed 382 ppm silver and 6.2 ppm gold. Cyanide amenability tests gave a recovery of 63.7% gold but only 1.1% silver. Results of flotation tests have not been received.

Resource Estimate

Silver values at the Ascension Mine are very significant. Vein size is small, however, giving the mine a moderate development potential. There is an inferred resource of about 10,000 tons of material averaging 3.44 ounces/ton silver and 0.01 ounces/ton gold over a mining width of 3 feet.

Recommendations

Drilling would be the best method to determine the size and thickness of the Ascension quartz veins. Reopening the adits would allow the veins to be carefully sampled.

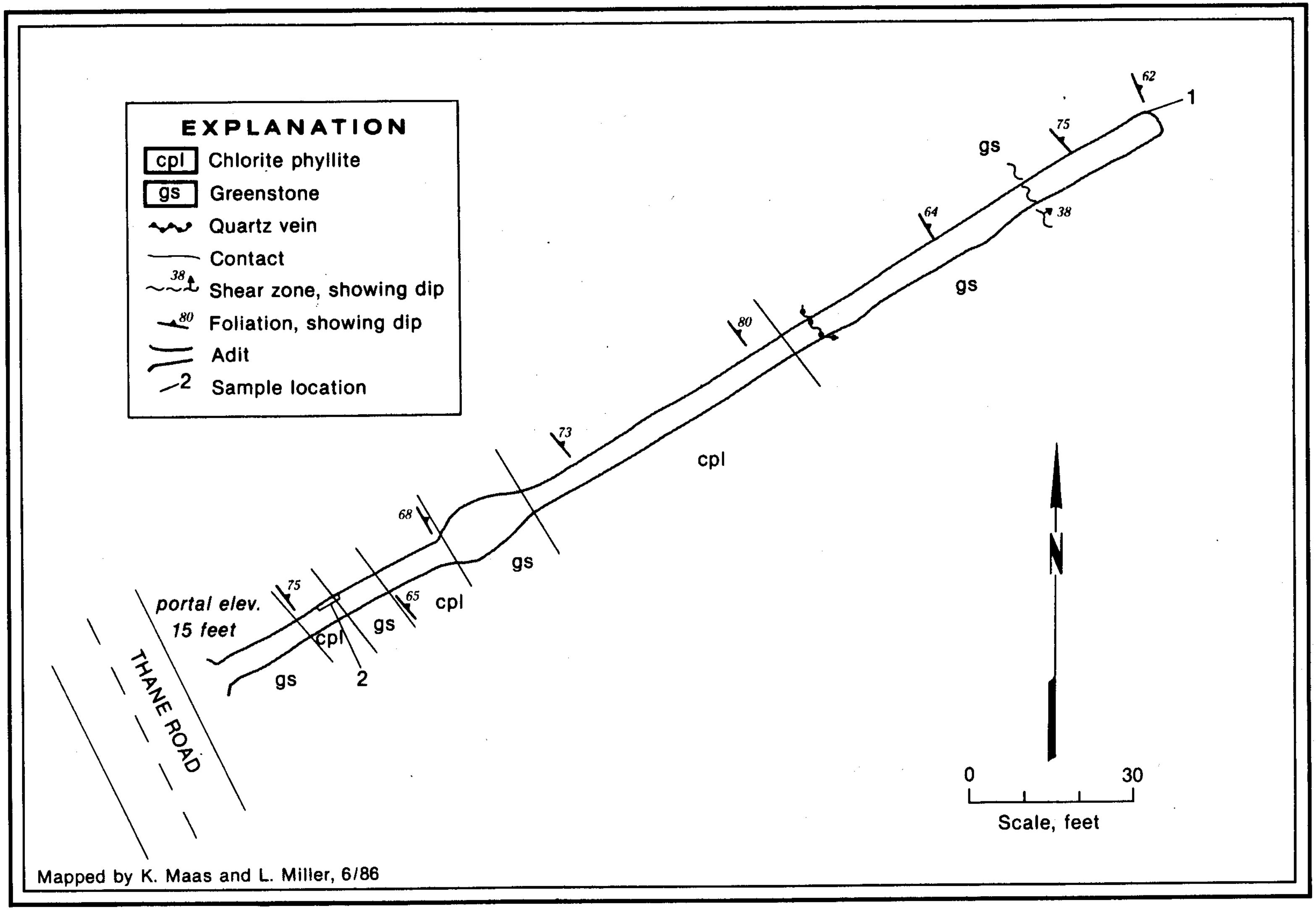

Figure D-158.—The Cross Bay road adit, showing geology and sample locations.

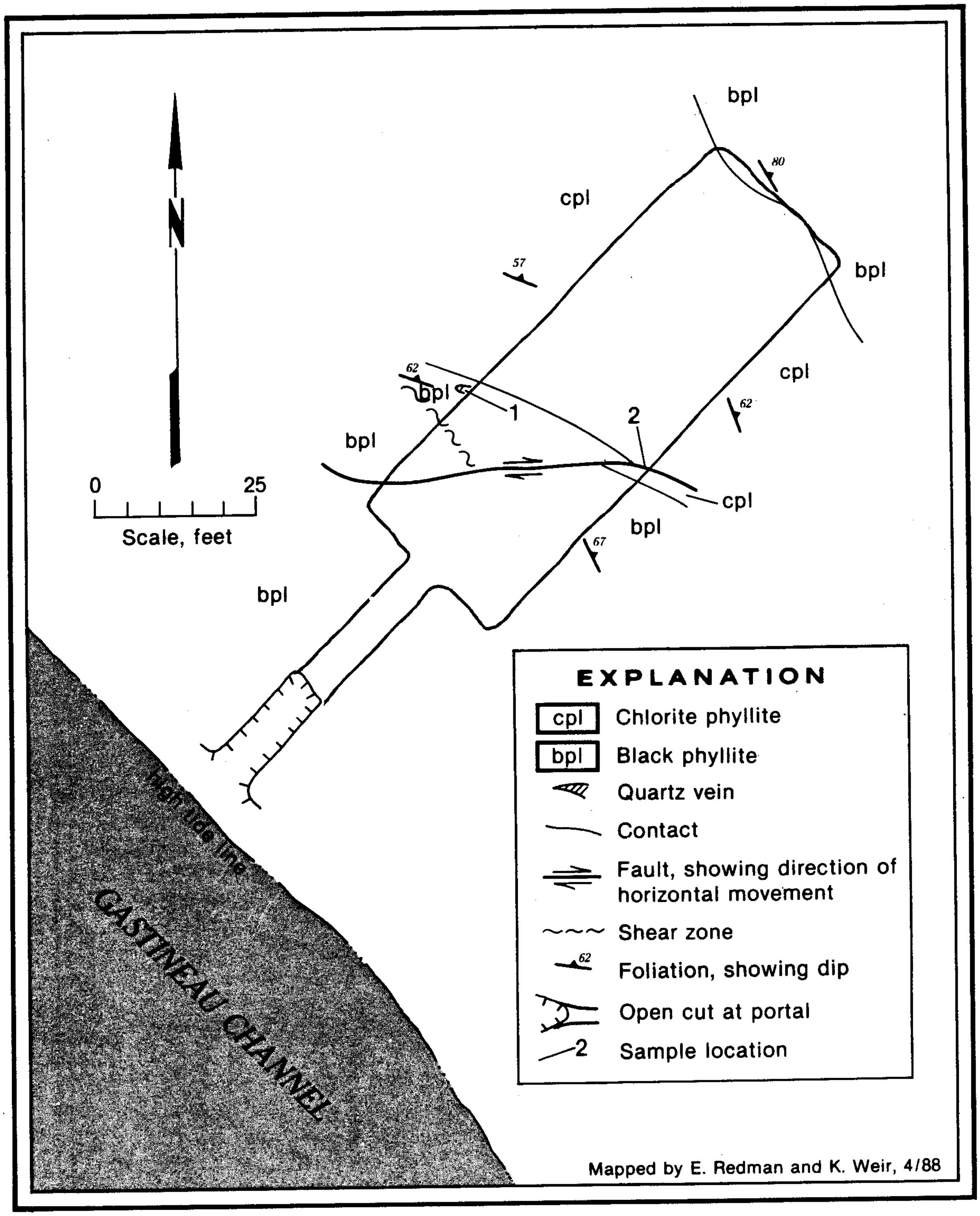

Figure D-159.—The Cross Bay beach adit, showing geology and sample locations.

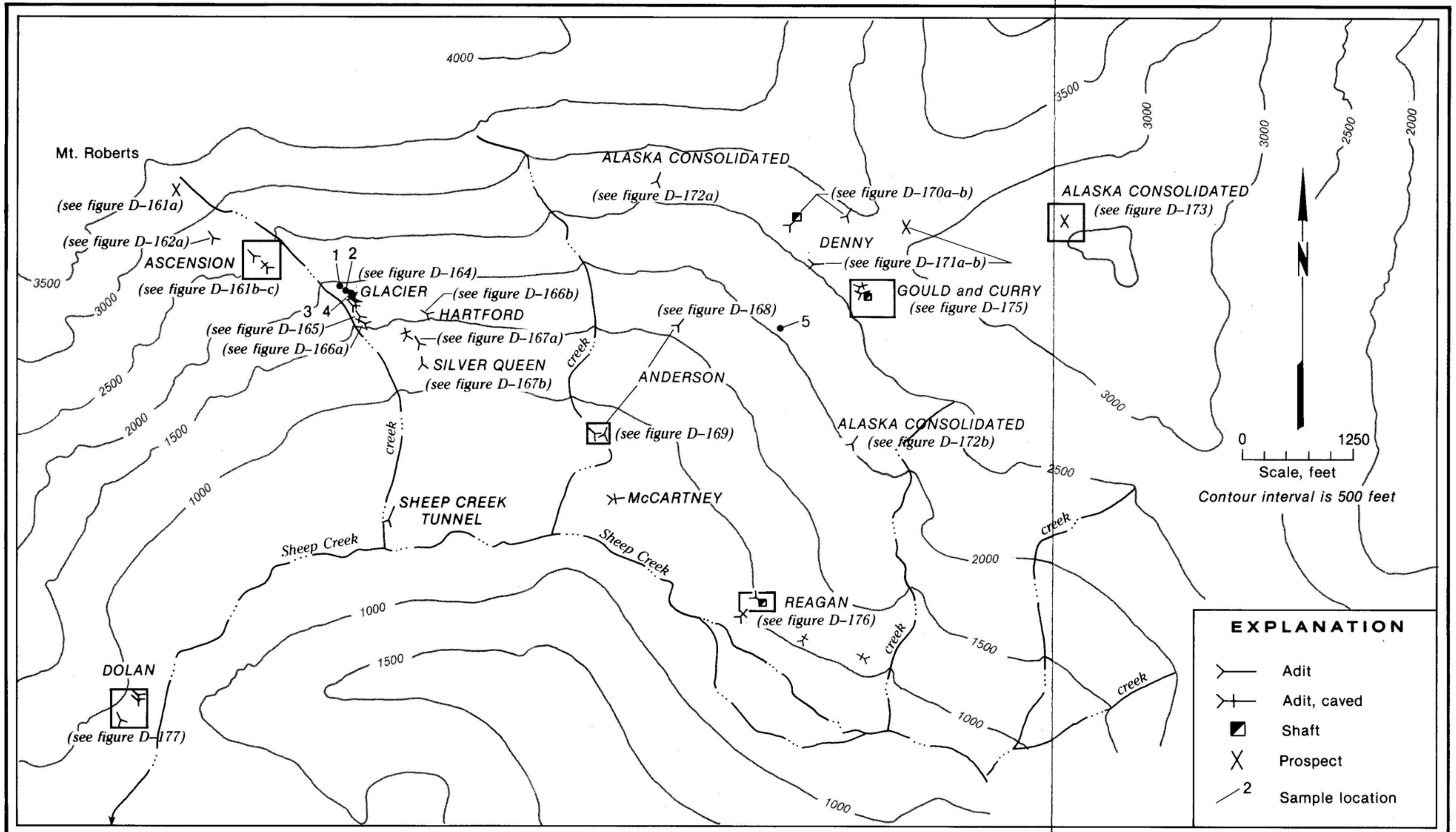

Figure D-160. — Mines and prospects in the lower and middle Sheep Creek areas.

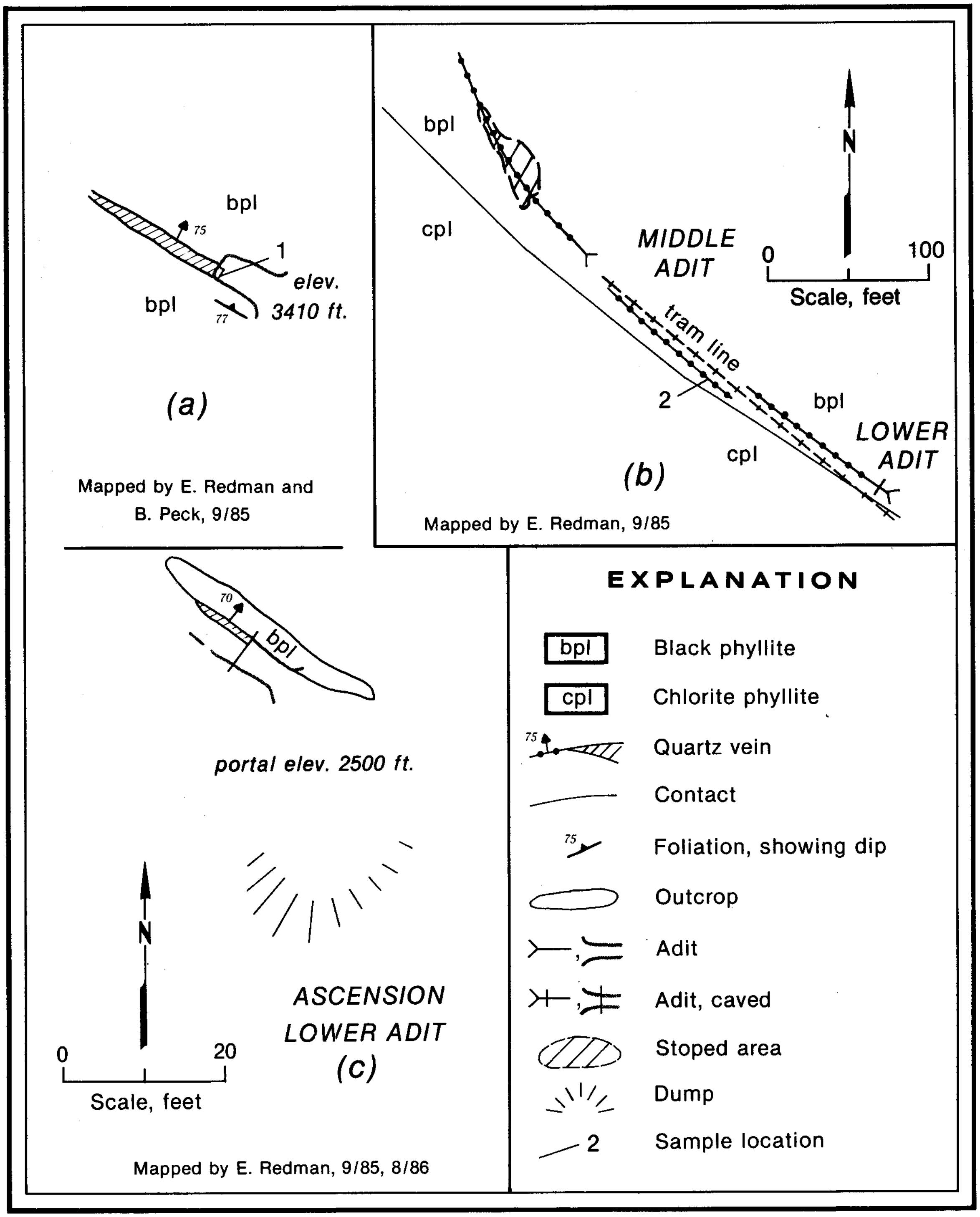

Figure D-161.—The Ascension Mine, showing workings, geology, and sample locations.

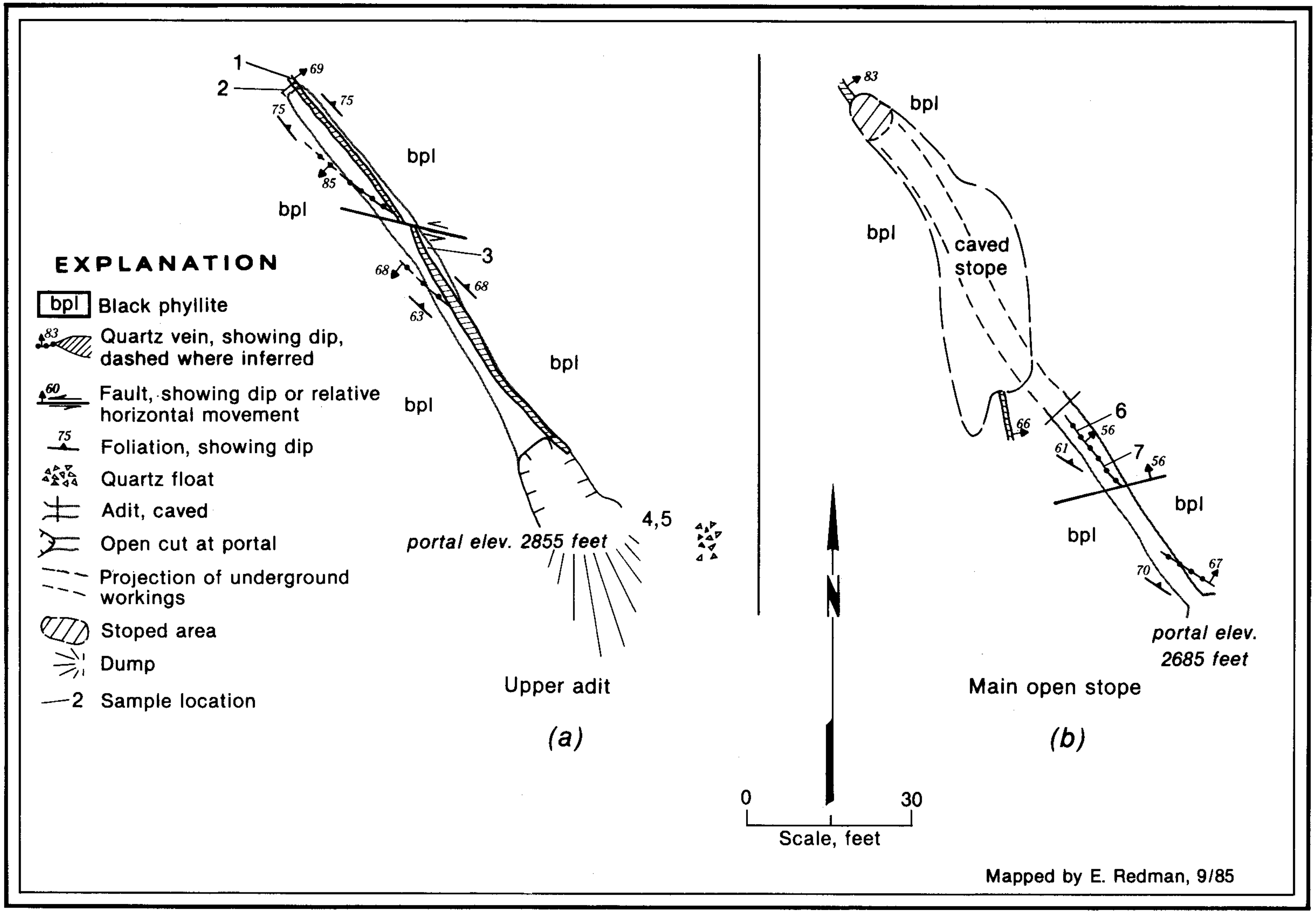

Figure D-162.—Ascension upper adit and main open stope, showing geology and sample locations.

MAS No.
21120137

References

D-95, D-96, D-97, D-98, D-99, D-130

GOLCONDA PROSPECT

Production

A few tons of material was shipped from the Golconda prospect for testing purposes but no other production is known.

History

The Golconda prospect was discovered by A. C. McKee, Al Noyes, and Frank Howard in July 1887 (fig. D-5). A 200-pound test sample was sent to a smelter in September and a small amount of ore was shipped between 1888 and 1890 (*D-97*).

Workings and Facilities

Open cuts have been reported (*D-97*) but none were found.

Geologic Setting

The Golconda area was not examined because of the extreme steepness of the terrane but it is probably similar to that of the Glacier and Silver Queen mines.

Bureau Investigations

The Bureau was unable to locate any workings on the Golconda prospect. The ground was too steep for a careful examination.

Resource Estimate

The resource at the Golconda prospect is unevaluated.

Recommendations

Any further work should begin with an attempt to locate the old workings to determine whether economic mineralization is present.

MAS No.
21120137

References

D-96, D-97

GLACIER/SILVER QUEEN MINES

Production

The Glacier and Silver Queen Mines produced about $500,000 in combined silver and gold through 1905 (*D-130*). Most production was of silver. According to the U. S. Mint report for 1891, 19,300 ounces of silver and 41 ounces gold were produced (*D-146*).

History

The Glacier claim was located in 1887 by Frank Howard, Al Noyes, and A.C. McKee, while Andy Anderson and Frank Reynolds staked the Silver Queen claim at the same time (figs. D-5, D-160). Minor work was done on the claims during 1888. Sixty tons of ore was shipped from the Silver Queen to a smelter in 1889. In 1890, two adits were driven into the Silver Queen and several hundred sacks of ore were sent to the smelter. Some work was also done at the Glacier. A gravel-covered corduroy road was built from the beach to Frank Bach's hotel below the Silver Queen Mine in 1890.

The Silver Queen Mining Co. erected a 10-stamp mill in 1891 and crushed several thousand tons of ore, recovering 19,300 ounces of silver and 41 ounces of gold. The Silver Queen and Glacier Mines were both active in 1892 but litigation between the two mines forced a shutdown in 1893. In spite of the legal questions, some work was done at the Glacier that year.

Frank Hammond became the operator of the Silver Queen Mine in 1894. He built a 900-foot tram and ran the mill until December. The Silver Queen Mine operated from April 1895, until late fall. Number 2 tunnel was driven to a length of 450 feet. In August, the Alaska Improvement Co. (Hammond, Fred Nowell, and John Maloney) leased the Silver Queen and Gould & Curry Mines. Five stamps in the mill worked ore from each mine. Production for 1895 was 14,080 ounces gold and 92,106 ounces silver.

At the Glacier Mine, Noyes mined until January 1895, then returned with Anderson to work on the property in 1896. The men worked in four adits and made preparations for a tram and 5-stamp mill.

In late 1895, the Glacier and Silver Queen mines were purchased by the Nowell Gold Mining Co. The Nowell Company added 10 more stamps to the mill in 1896 and built a boarding house, store, and office near the mine.

Both mines had 900-foot aerial trams, and an elevated tram was built from the aerial trams to the mill. Extensive work was done at the mines during 1897 and 1898. In fall 1897, ten more stamps were added to mill. In 1899, the mines began to run out of ore and a prospecting crew spent 2 months locating new ore. Milling resumed in August and continued into 1900.

Hammond leased the mine from the Nowell Company in September 1900, for the American Gold Mining Company and resumed operations in 1901, starting 15 stamps in September and getting all 30 stamps working in October (fig. D-163). The mines were leased by Oscar Meyer in 1902 and operated continuously during 1902 and 1903. Tunnels connected the mines in 1903.

The mines were leased by John Maloney for "eastern capitalists" in late 1903 and operated during most of 1904 and 1905 but legal problems idled the mines in 1906. Some renovation work was done in 1907 but legal problems continued until William Sutherland leased the mine and drove a prospecting adit in 1908. Sutherland dropped his lease in 1908 and there was no further activity at the mines. In 1911, the mines were purchased by the Alaska Gastineau Company but no mining was done (*D-97*). The mines were reported to have produced $500,000, primarily in silver, by the end of 1905 (*D-130*).

Workings and Facilities

Spencer (*D-130*) reported that there were 2,600 feet of workings, with 500 feet of connecting raises, on three levels in the Silver Queen Mine in 1903. At the Glacier Mine (figs. D-164 to D-166), there were 3,200 feet of workings and 1,200 feet of connecting raises, on four levels. The Bureau located four adits at the Silver Queen Mine (No. 1 adit, caved at 45 feet; No. 2 adit, caved; No. 3 adit, caved; and an 18-foot prospect adit above No. 2 adit (fig. D-167). At the Glacier Mine, the Bureau located 3 adits (No. 1 adit and No. 2 adit were not found; No. 3 adit, with two entrances, caved at 91 feet, 81 foot adit adjacent to portal No. 3 adit; No. 4 adit, caved at 186 feet, and a 72-foot adit above No. 3 adit).

Bureau Investigations

The Glacier and Silver Queen Mines are at the contact between the black phyllite and chlorite phyllite. Three veins start near the contact, range from a few inches to 9 feet in thickness, and parallel the foliation in the black phyllite which trends away from the contact. The veins are all well boudinaged. The Silver Queen vein, which averaged 2 feet in thickness, was mined over a horizontal

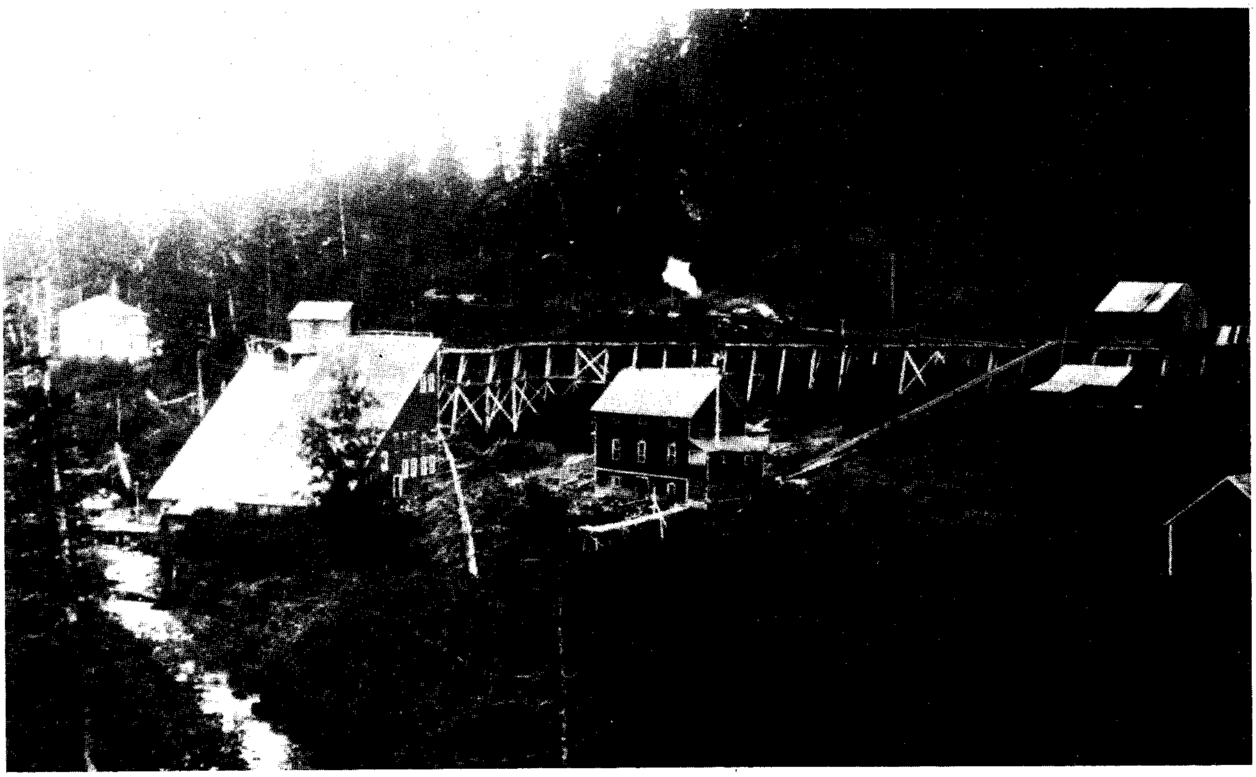

Figure D-163.—Silver Queen mill operated intermittently during the 1890's and first few years of the 1900's. Unlike other mines in the Juneau Gold Belt, the Silver Queen, Glacier, and Ascension Mines produced much more silver than gold (photo courtesy Alaska State Library, McDaniel collection).

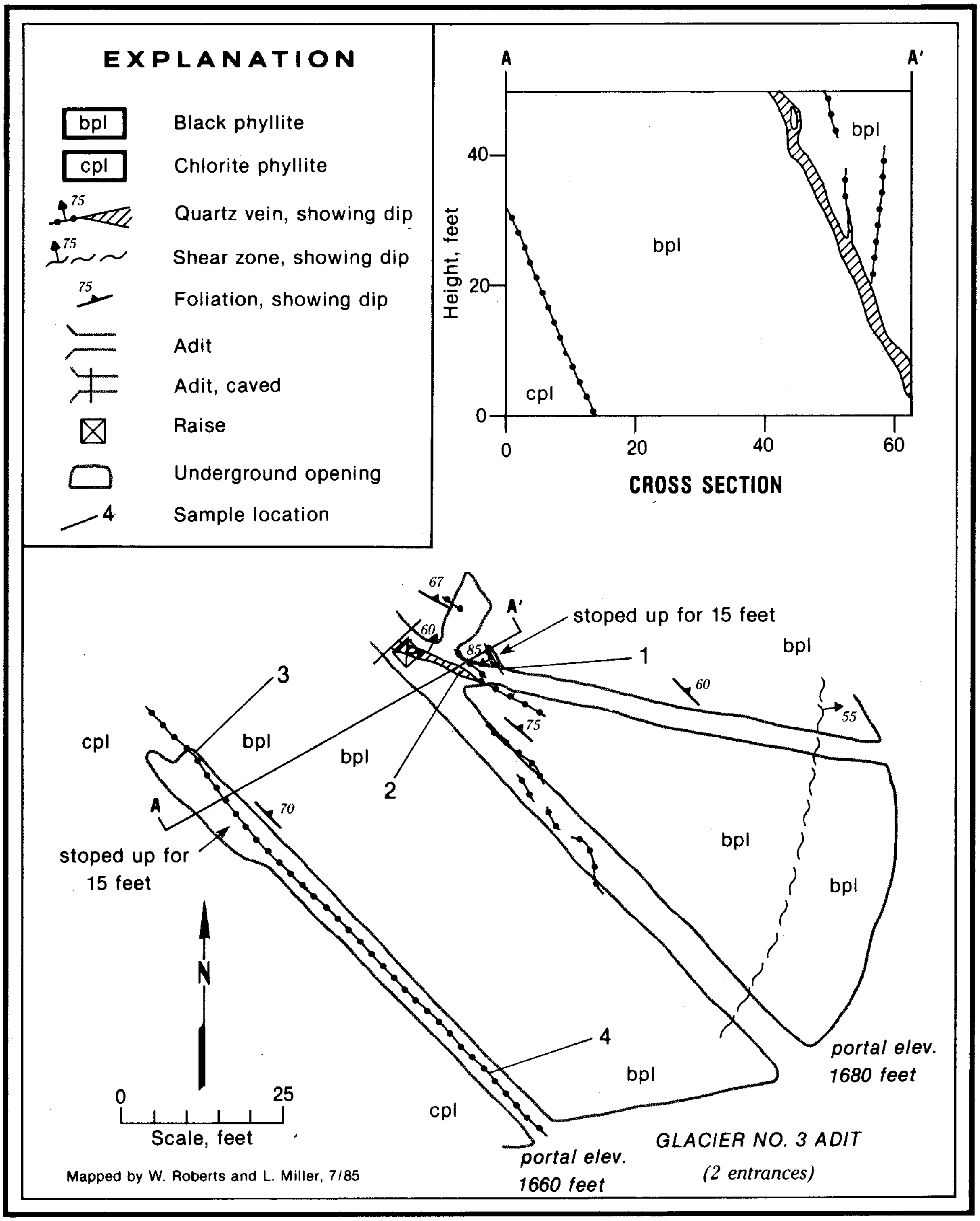

Figure D-164.—Glacier Mine No. 3 adit, showing geology and sample locations.

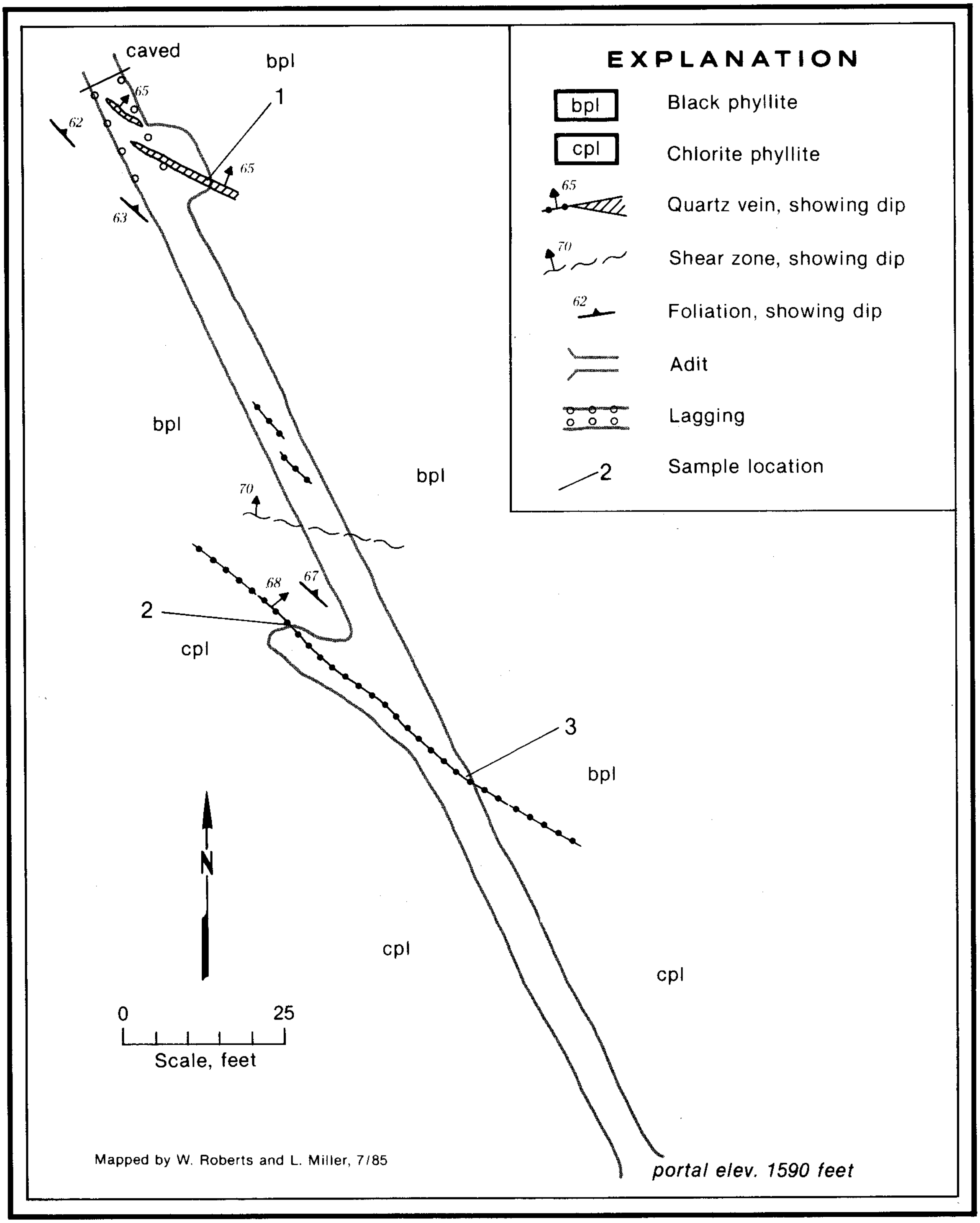

Figure D-165.—Glacier Mine No. 4 adit, showing geology and sample locations.

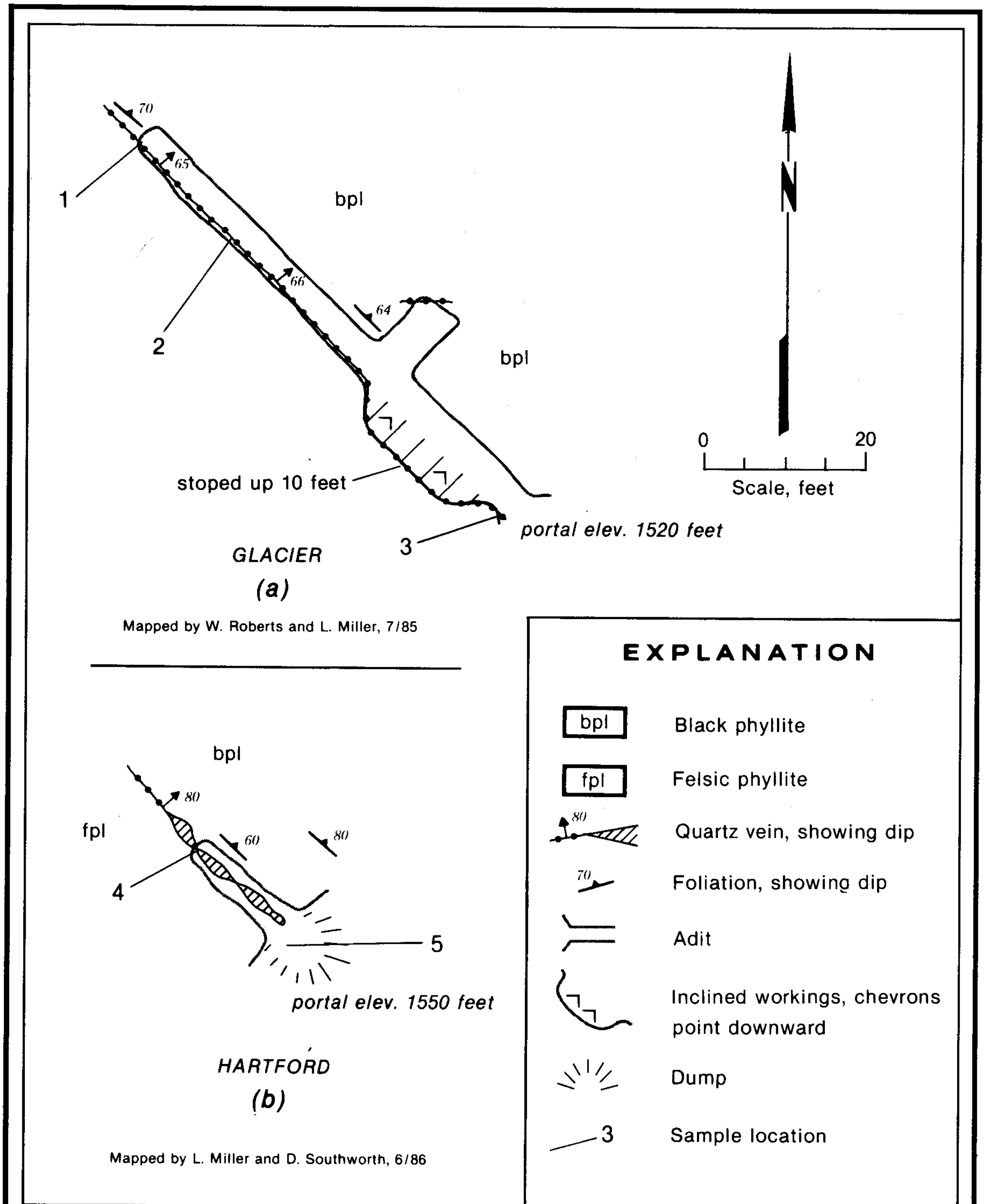

Figure D-166.—Glacier Mine prospect adit and Hartford prospect adit, showing geology and sample locations.

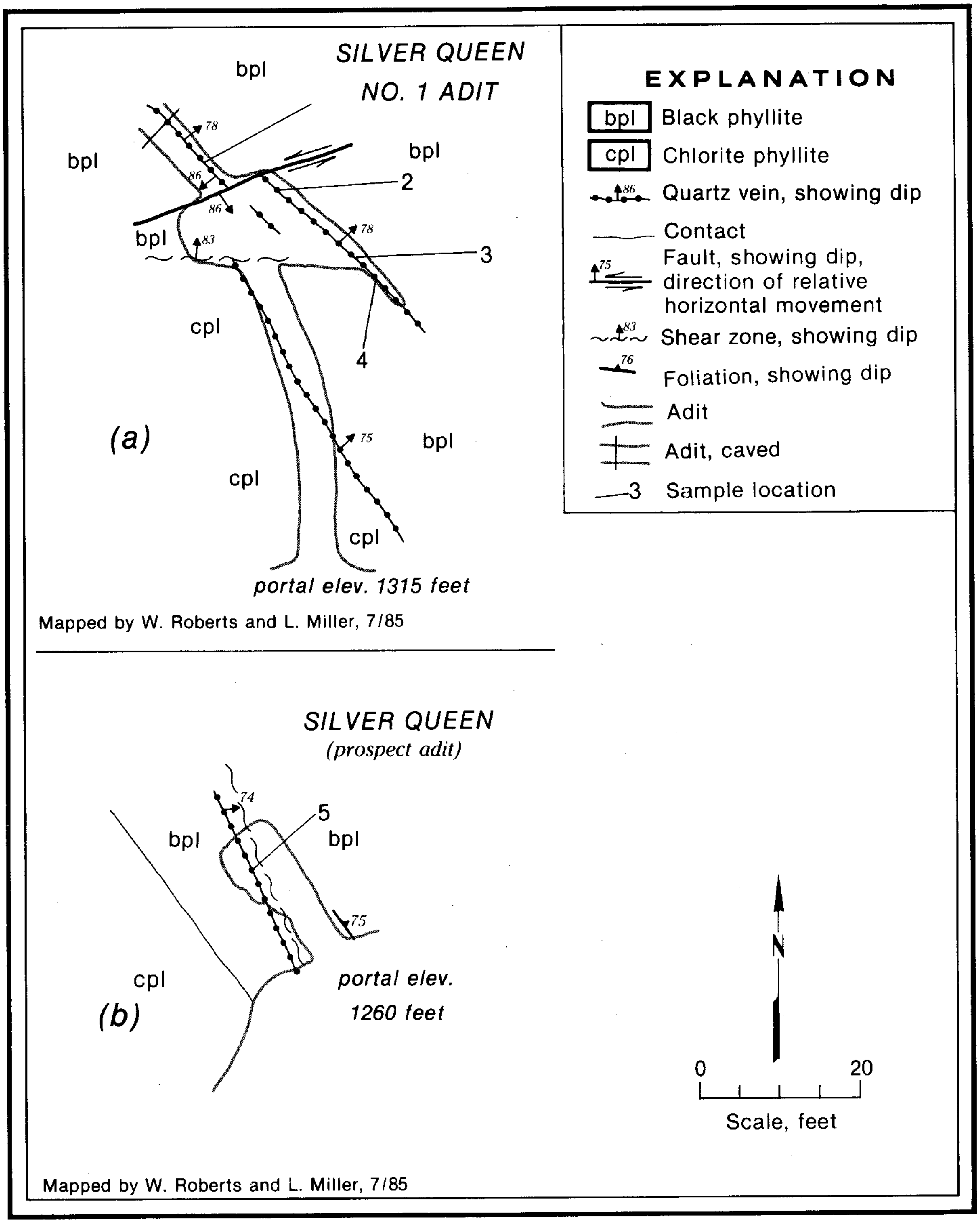

Figure D-167.—Silver Queen Mine No. 1 adit and prospect adit, showing geology and sample locations.

distance of 900 feet and a vertical distance of 400 feet. The Glacier and Copper Streak veins were mined 400 and 700 feet down dip, respectively. Locally, the veins would splay out into a series of thin veins which would reform a short distance later (*D-130*).

Mineralization in the veins included pyrrhotite, pyrite, sphalerite, galena, tetrahedrite, chalcopyrite, and some native silver. Unlike mineralization in the Alaska Juneau veins, sulfides in the Glacier and Silver Queen veins tend to occur as small, discrete grains or masses less than 0.5 inches across. The sulfides usually occurred in vague sulfide-rich bands within the veins and were bounded by relatively barren quartz.

Sample Results

Ten samples were taken from the four open Glacier Mine adits. Two samples each were collected from the No. 3 Glacier adit (fig. D-164, Nos. 1-2) and the adjacent shorter adit (fig. D-164, Nos. 3-4). One sample from the No. 3 adit (fig. D-164, No. 1) contained 237.7 ppm silver and 0.33% lead. Samples from the shorter adit yielded 98.8 ppm and 479.9 ppm silver and 0.25% and 0.14% lead.

At the Glacier Mine No. 4 adit, three samples were collected (fig. D-165, Nos. 1-3). Two of the samples contained 333.7 ppm and 223.3 silver, 2.9 ppm and 1.2 ppm gold, 0.71% and 0.25% lead, and 0.06% and 0.11% zinc, respectively while the other carried only low values.

Above the Glacier Mine workings, Bureau geologists located a series of quartz veins on the surface and took four samples (fig. D-160, Nos. 1-4). Two of the samples averaged 168.9 ppm silver (fig. D-160, Nos. 3-4).

The Silver Queen No. 1 adit and a short prospect adit were mapped and sampled by the Bureau. Five samples collected from quartz veins (fig. D-167, Nos. 1-5) contained an average of 1,076 ppm silver, 4.4 ppm gold (ranging from 1.1 ppm to 14.3 ppm gold), 0.62% lead, 0.68% zinc, and 0.10% copper. One high grade sample (fig. D-167, No. 4) also contained 509 ppm tungsten.

Resource Estimate

Spencer (*D-130*) noted that the limits of at least one of the important veins in the Glacier/Silver Queen Mine (the Copper Streak) had not been found. The high silver values found in Bureau sampling and the possibility of moderate amounts of additional ore, give the Glacier/ Silver Queen Mines a moderate development potential.

Recommendations

The Glacier and Silver Queen workings should be reopened and the amount of remaining ore determined by mapping and sampling. Underground and/or surface drilling could be used to delineate additional quartz veins and extensions.

MAS No.	MS No.
21120137	901

References

D-13, D-95, D-96, D-97, D-98, D-99, D-128, D-130, D-146, D-161

HARTFORD PROSPECT

Production

Other than a few sacks of material shipped for testing purposes, the Hartford prospect has had no production.

History

The Hartford claim was staked adjacent to the Silver Queen claim in 1888 or 1889 (figs. D-5, D-160). Some work was done in 1890 but little else is known about the prospect.

Workings and Facilities

A 14-foot adit was located on the Hartford claim.

Bureau Investigations

The Hartford vein lies along the contact between black phyllite and a felsic (quartz, feldspar) phyllite. The vein is concordant with foliation and exhibits well-developed boudinage. Mineralization is very similar to that at the Glacier and Silver Queen Mines.

The Bureau located, mapped, and sampled a short adit on the Hartford prospect (fig. D-166 b). Two samples were taken from the adit (fig. D-166, Nos. 4-5) and one contained greater than 30 ppm silver (detection limit).

Resource Estimate

Although it is similar to veins at the Silver Queen Mine, the Hartford vein is much less developed. More information is needed before its potential can be determined.

Recommendations

Trenching and careful mapping of the steep, brush-covered slope could help locate the quartz veins.

MAS No.

References

D-97, D-98, D-130

ANDERSON PROSPECT

Production

There has been no known production from the Anderson prospect although some material may have been shipped for testing.

History

The Anderson prospect was discovered about 1890 (figs. D-5, D-160). Andy Anderson drove several short adits by 1905 and the area was included in claim groups located by the owners of the McCartney and Alaska Consolidated prospects in 1908 and the midteens, respectively (*D-97*).

Workings and Facilities

Three adits, with 34 feet, 55 feet, and 64 feet of workings, have been located on the Anderson prospect. Other workings may exist.

Bureau Investigations

The Anderson prospect is primarily underlain by felsic phyllite, consisting of quartz, sericite, and chlorite, with some black phyllite. All quartz veins located occurred in the felsic phyllite. The veins are concordant, strongly boudinaged, and contain pyrite, pyrrhotite, and galena.

Sample Results

Three adits were located, mapped, and sampled by the Bureau (figs. D-168, D-169). The upper Anderson adit examined contained a vein from which one sample was taken (fig. D-168, No. 1). The sample carried 0.3 ppm silver. The lower two adits appear to expose the same quartz vein from which six samples were collected (fig. D-169, Nos. 1-3 from the west adit, Nos. 5-7 from the east adit). Samples from the west adit contained an average of 0.7 ppm gold, and 2.4 ppm, 4.9 ppm, and greater than 30 ppm silver (detection limit). A high-grade vein sample (fig. D-169, No. 4) from a trench near the adit contained 6.3 ppm gold and 20 ppm silver. In the east adit, all gold values were less than detection limit and silver values averaged 4.2 ppm.

Resource Estimate

The veins at the Anderson prospect were small and carried relatively low values. However, the Glacier/Silver Queen Mines and the well-mineralized Reagan prospect border the Anderson on either side giving it the potential for hosting similar veins. The vein exposed by the lower adits, if continuous between the adits, could contain an inferred resource of 3,400 tons with 0.9 ounces/ton silver.

Recommendations

Mapping and trenching could locate quartz veins under the brush and alluvial cover on the Anderson prospect.

MAS No.
21120165

References

D-96, D-97, D-98, D-99, D-130 (listed as McCartney)

DENNY PROSPECT

Production

There has been no recorded production from the Denny prospect.

History

In 1903, the Alaska Reliance Gold Mining Company, headed by John Denny, worked 15 claims near the old Gould & Curry Mine (figs. D-5, D-160). One tunnel was driven that year. In 1905, Denny made another discovery of "free-milling gold" but did little additional work. More tunneling was also done in 1908 and 1909.

Denny tried to purchase the old 20-stamp mill at Friday Mine in 1910 but was apparently unsuccessful in moving it to the mine (*D-97*).

Workings and Facilities

There are 3 adits, with 44 feet (including a 10-foot shaft from the surface), 86 feet, and 11 feet of workings, and an open cut on the Denny prospect.

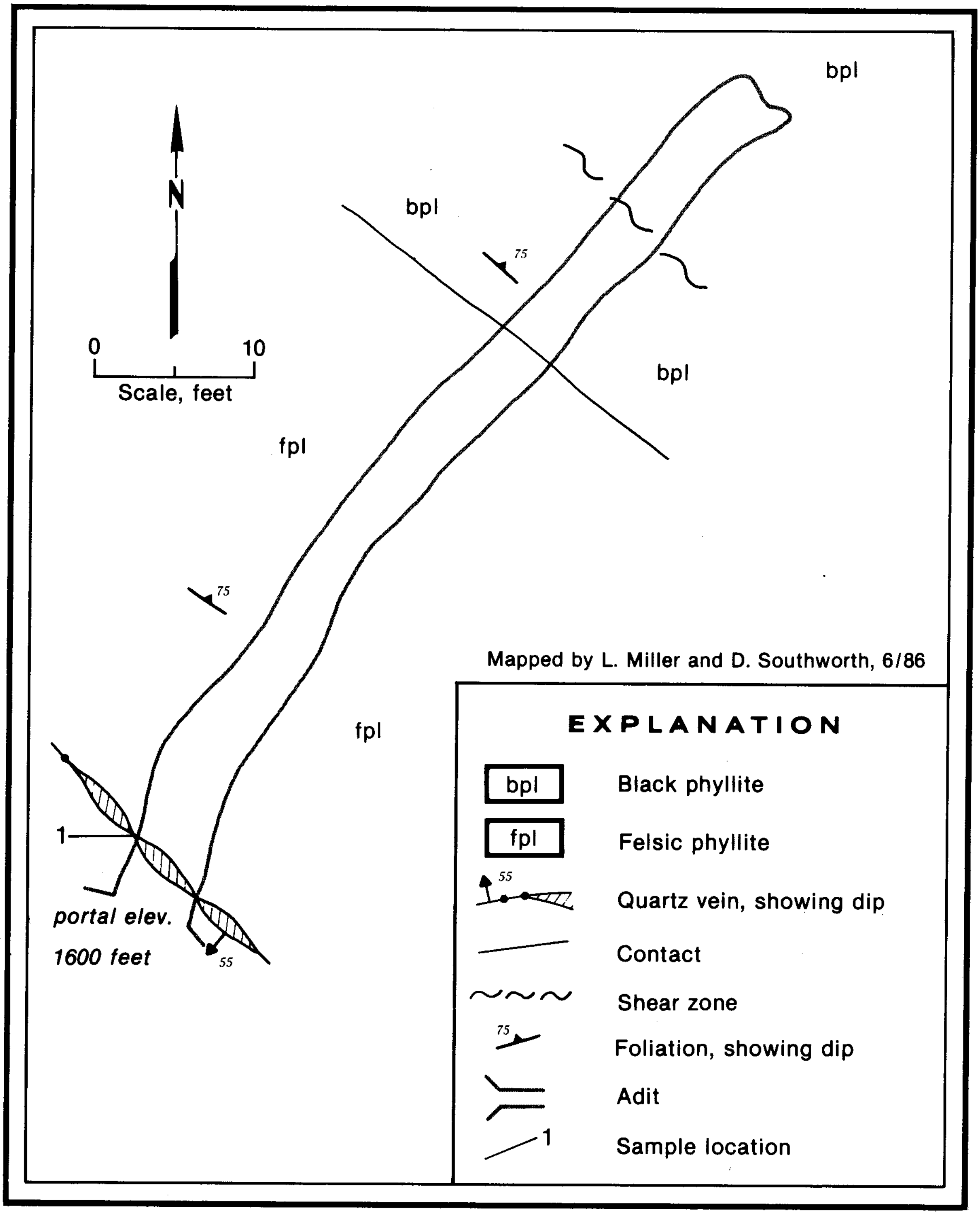

Figure D-168.—Upper Anderson prospect adit, showing geology and sample locations.

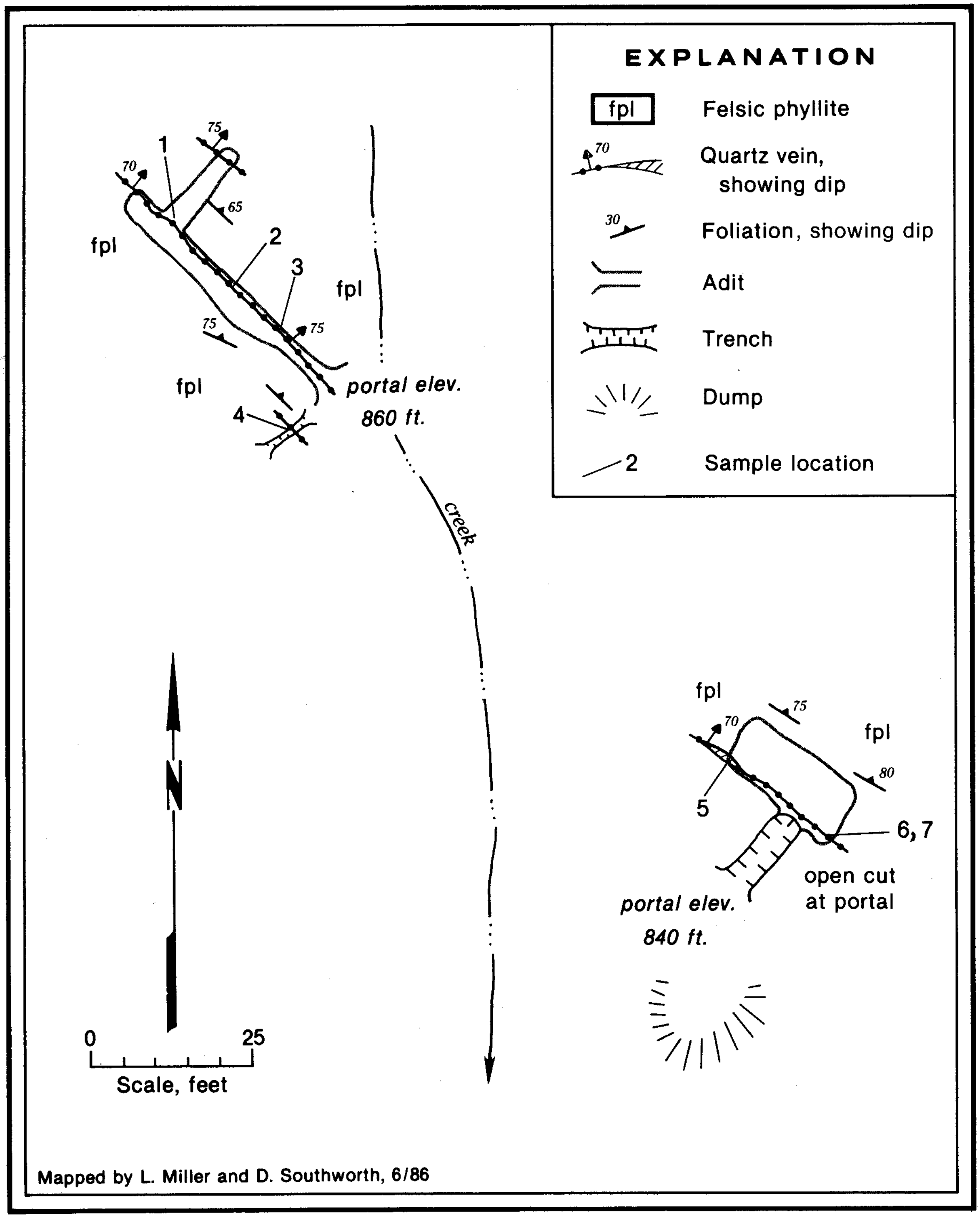

Figure D-169.—Lower Anderson prospect adits, showing geology and sample locations.

Bureau Investigations

The Denny prospect is underlain by rocks grading from black phyllite to biotite gneiss. Near the top of the ridge, the gneisses have been intruded by a foliated hornblende diorite sill. The sill has been strongly silicified and is cut by many quartz veins in the area of the Denny prospect.

The two longer adits were driven into quartz-rich portions of the sill. The veins contain small amounts of pyrrhotite and traces of chalcopyrite. The shorter adit cuts black phyllite with concordant quartz veins which contain minor amounts of pyrite.

Sample Results

The Bureau located, mapped, and sampled three adits and an open cut at the Denny prospect (figs. D-170, D-171). Nine samples were taken in the two upper adits (fig. D-170, Nos. 1-9). Two samples from the lower of the two adits contained 0.4 and 0.1 ppm gold. One sample taken in an open cut on the ridge top (fig. D-171, No. 1) near the adits carried 0.2 ppm gold.

The third adit, at an elevation of 2,625 feet, contained a quartz vein with no visible sulfides but a sample collected from the vein yielded 14.6 ppm gold (fig. D-171, No. 2).

Resource Estimate

Low values from most of the quartz veins give the Denny a low development potential but the 14.7 ppm gold value from the short adit suggests more merit.

Recommendations

Mapping and sampling of the quartz veins in the area of the high grade sample along with trenching and soil sampling could help delineate gold mineralization.

MAS No.
21120205

References

D-96, D-97, D-98, D-99

ALASKA CONSOLIDATED PROSPECT

Production

There has been no production at the Alaska Consolidated prospect.

History

The Alaska Consolidated claim group (figs. D-5, D-160) is shown on an aerial claim map prepared by the Alaska Gastineau Company in 1916 (*D-1*). It is not known when work was done on the group.

Workings and Facilities

There are two adits, 15 feet (at elevation 2,630 feet) and 18 feet long (at elevation 2,040 feet), and an open cut located on the Alaska Consolidated claim group.

Bureau Investigations

Rocks underlying the Alaska Consolidated prospect include black phyllite, green phyllite, biotite gneiss, and altered diorite. The two adits expose thin, concordant quartz veins in black phyllite, and the open cut near the top of Powerline Ridge opens up a vein in biotite gneiss.

The veins on Powerline Ridge consist of three parallel, foliation-concordant veins in biotite gneiss and have been offset by at least two faults with left-lateral offset (40 feet and 120 feet of displacement).

Pyrite is locally present in veins on Powerline Ridge but is not common. No other sulfide minerals were noted.

Sample Results

The Bureau located, mapped, and sampled two adits and an open cut on the Alaska Consolidated prospect (figs. D-172, D-173). One sample was collected from the adit at 2,630 feet elevation (fig. D-172, No. 1), two were taken at the elevation-2,040-feet adit (fig. D-172, Nos. 2-3), and four more were collected from the veins and open cut at the top of Powerline Ridge (fig. D-173, Nos. 1-4). One additional sample (fig. D-160, No. 5) was taken from pyritic felsic schist. None of the samples contained more than 0.7 ppm silver or 0.1 ppm gold.

Resource Estimate

The lack of any significant metal values give this prospect a low potential.

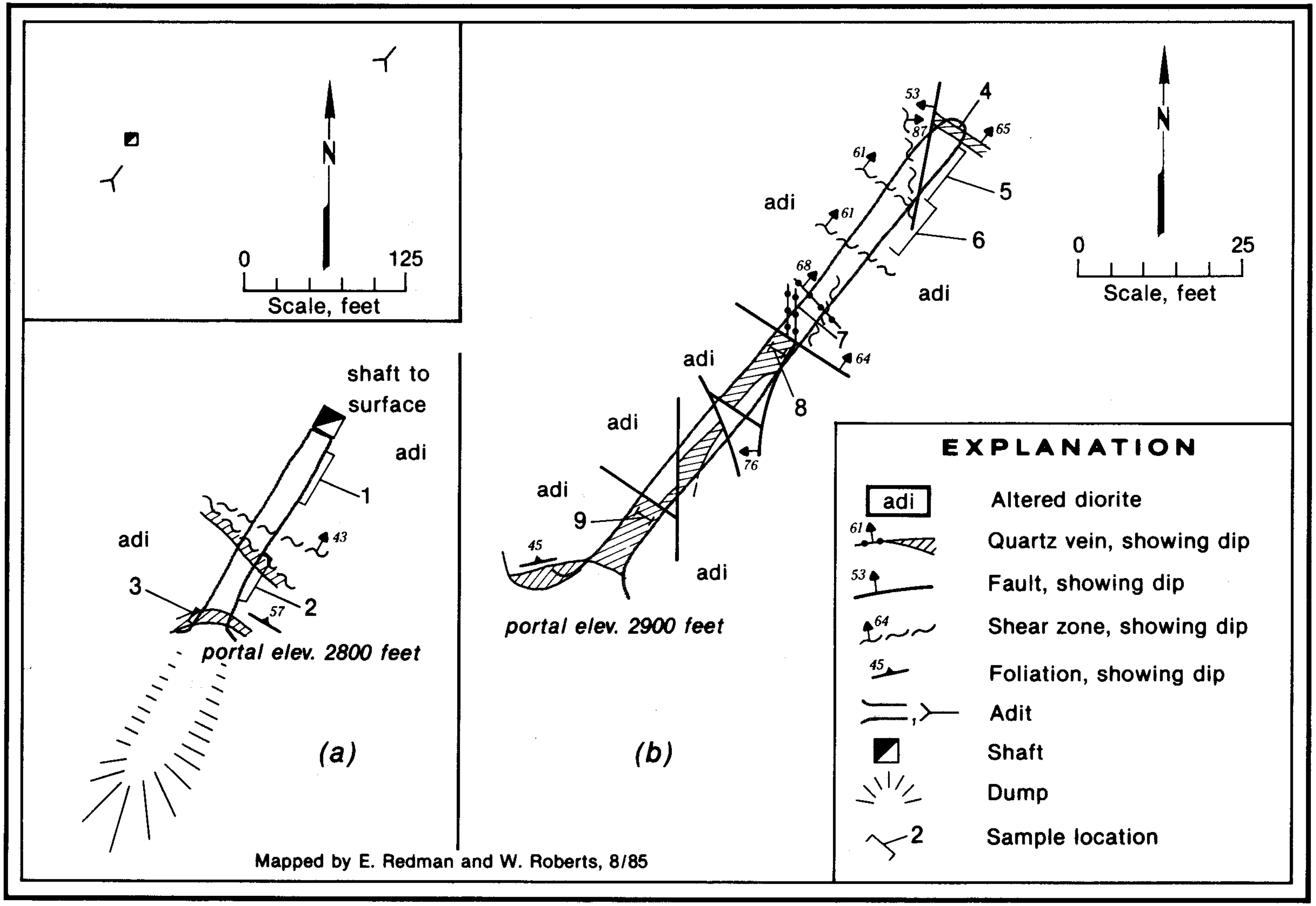

Figure D-170.—Upper Denny prospect adits, showing geology and sample locations.

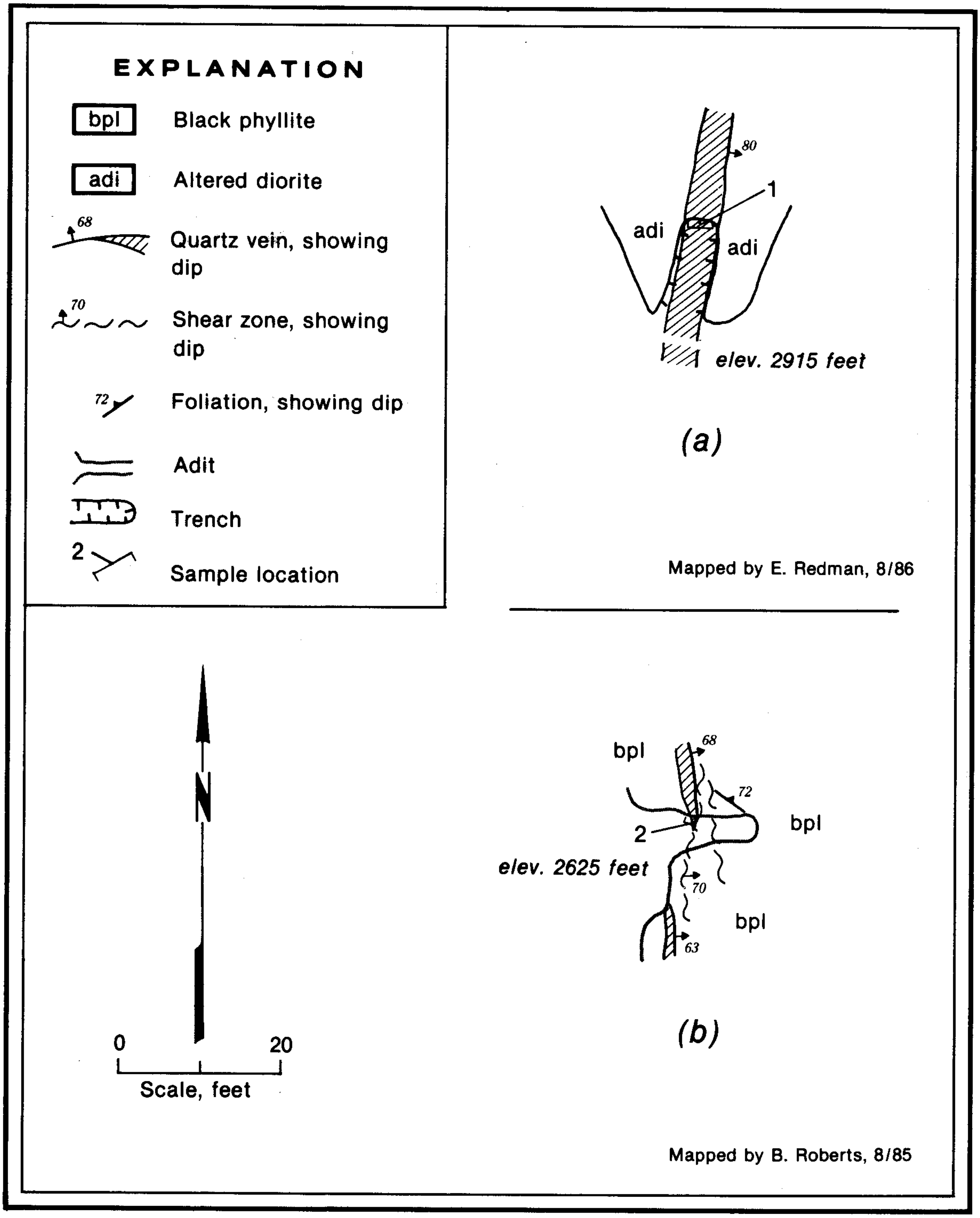

Figure D-171.—Denny prospect adit and trench, showing geology and sample locations.

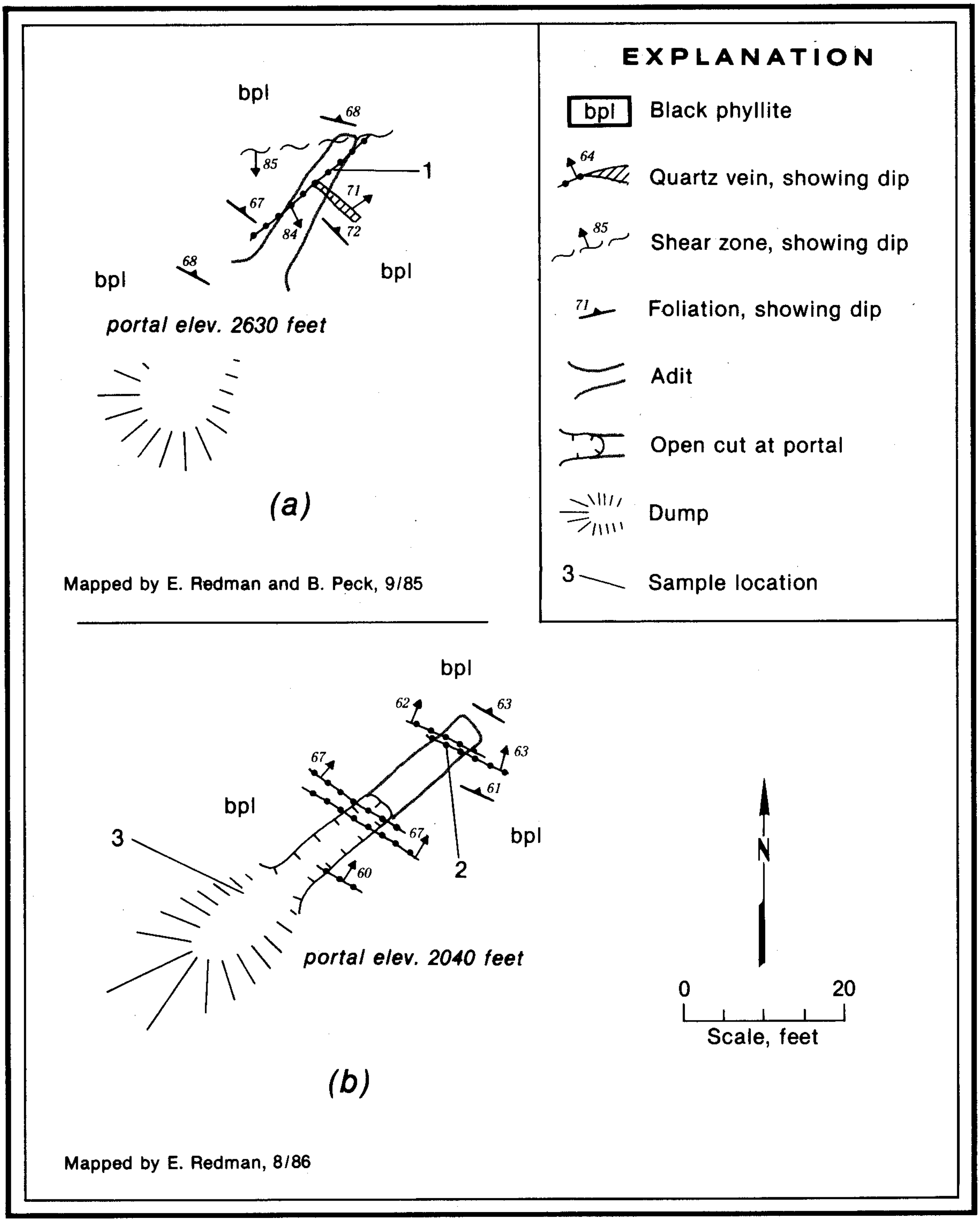

Figure D–172.—Alaska Consolidated prospect adits, showing geology and sample locations.

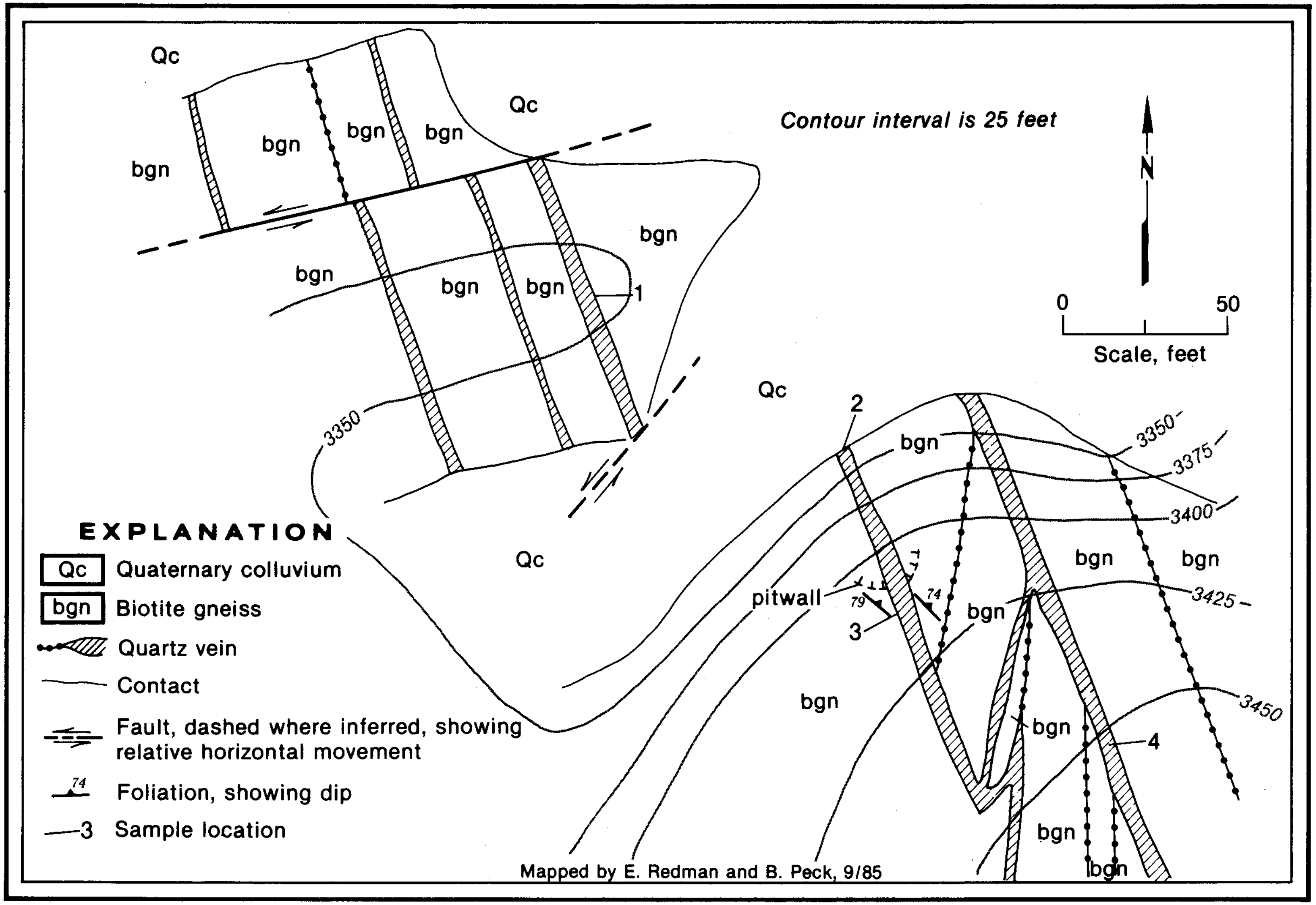

Figure D-173.—Alaska Consolidated quartz vein system, Powerline Ridge, showing geology and sample locations.

Recommendations

No work is recommended.

MAS No.

References

D-1, D-96, D-98, D-99

GOULD & CURRY MINE

Production

A total of $25,000 was reported by the U.S. Mint (equivalent to 1,250 ounces gold) in 1895 and there was unknown production during 1894 (*D-146*).

History

The Gould & Curry Mine was discovered before 1890 (figs. D-5, D-160). Judge Williams had a crew sink a 30-foot shaft and drive a tunnel from the bottom of the shaft in 1890. Some ore was mined by Williams that year and sent to a smelter. More shaft work was done in 1891. A long zig-zag trail was completed from the bottom of the valley to the mine.

The mine was leased in fall 1894, and a team of pack horses was brought in to carry ore down to the Silver Queen mill. In 1895, the Alaska Improvement Company was formed by Frank Hammond, Fred Nowell, and John Maloney, which leased the Gould & Curry and Silver Queen Mines. A 4,500-foot wire tram was erected to connect the mine with the valley floor and ore from the mine crushed under 5 stamps at the Silver Queen mill (*D-97*).

Workings and Facilities

There are two caved adits, a covered shaft that connects with a stope, and two open stopes which open into 150 feet of open underground workings. One accessible stope shows a vein that was mined for about 40 feet both horizontally and vertically.

Bureau Investigations

The Gould & Curry Mine is underlain by amphibolitic rock surrounded by black phyllite. The rocks have been folded into two synclines and an anticline, with a wavelength of about 50 feet. Three large quartz veins, and many thin ones, parallel the axial planes of the folds but crosscut foliation. The veins range from 0.2 feet to 3 feet in thickness and can be traced for up to 150 feet (fig. D-174).

Mineralization consists of pyrrhotite and sphalerite as well as some free gold.

Sample Results

The Bureau mapped the Gould & Curry Mine and collected 17 samples (fig. D-175, Nos. 1-17). Four samples taken underground in the southern-most stope (fig. D-175, Nos. 14-17) contained a weighted average of 10.2 ppm gold over an average vein width of 1.1 feet. The sample with the highest gold value also carried 2.94% zinc.

Five samples were taken from the surface in the middle stope (fig. D-175, Nos. 6-10). Three quartz vein samples contained a weighted average of 8.6 ppm gold over 2.5 feet.

Four samples were collected from stacked quartz on the two adit dumps (fig. D-175, Nos. 2-5). These samples yielded 26.2 ppm, 2.2 ppm, 49.6 ppm, and 6.1 ppm gold and 5.2%, 0.63%, 1.34%, and 4.26% zinc.

An additional four samples (fig. D-175, Nos. 1, 11-13) were collected from trenches, open cuts, or outcrops in the area but none contained more than 0.2 ppm gold.

Resource Estimate

The Gould and Curry has an inferred resource of 4,000 tons with a grade of 0.2 ounces/ton gold based on veins exposed in the mine area.

Recommendations

Drilling would be the best way to determine the length and depth of the Gould and Curry veins.

MAS No.	MS No.
21120138	922

References

D-13, D-95, D-96, D-97, D-98, D-99, D-130, D-146, D-161

Figure D-174.—Narrow quartz vein in a stope of the Gould & Curry Mine. This small mine was worked during the early 1890's and produced $25,000 in gold.

McCARTNEY PROSPECT

Production

There has been no known production from the McCartney prospect.

History

Dan McCartney, foreman of the John Brown Mining Company, drove several hundred feet of tunnels during 1908 (figs. D-5, D-160). At least one vein was located but little other work done (*D-97*).

Workings and Facilities

Two caved adits were found near the Sheep Creek trail.

Geologic Setting

The McCartney prospect lies along the same chlorite phyllite-black phyllite contact as the Ascension, Glacier, and Silver Queen Mines.

Bureau Investigations

The Bureau located two caved adits near Sheep Creek but took no samples.

Resource Estimate

There is not enough information to evaluate the McCartney prospect.

Recommendations

Further work should begin with reopening the two adits and, if mineralization warrants, drilling to test the veins.

MAS No.
21120165

References

D-96, D-97, D-99

REAGAN PROSPECT

Production

There has been no recorded production from the Reagan prospect.

History

In 1894, Pat Evoy staked the Ready Bullion claim and started an adit (figs. D-5, D-160). The next year Evoy was joined by John Reagan and the men continued driving the adit until 1896. Reagan sunk a 60-foot shaft on the Ready Bullion claim in 1896 but then only minor work was done until 1903.

Reagan and Andy Anderson were back at the prospect in 1903 and encountered ore in a new tunnel. Neil Ward acquired what had become known as the Reagan prospect in 1911 and patented the claims in 1912. The prospect was examined by Northern Ontario Exploration Company in July, 1912, but no further work was done (*D-97*).

Neil Ward was reported to have possibly worked on the prospect during the mid-1930's (*D-66*). Echo Bay Mines leased the property in 1988 and collected samples from the winze.

Workings and Facilities

The Reagan prospect includes a 250-foot adit with a 42-foot inclined winze, a 40-foot water-filled shaft, and 3 caved adits.

Bureau Investigations

The veins at the Reagan prospect lie along the sheared contact between black phyllite on the NE and chlorite phyllite on the SW. Two closely-spaced veins followed the shear. The vein is SW-dipping, from 1 to 3 feet thick, and banded.

Mineralization is similar to that at the Glacier and Silver Queen Mines. The veins contain galena, sphalerite, chalcopyrite, pyrite, tetrahedrite, arsenopyrite, electrum, and native silver. These minerals occur in vague bands within the vein.

Sample Results

Bureau personnel mapped and sampled the open adit and located three other caved adits. A caved adit is located approximately 75 feet below the open adit and the other two exist several hundred feet to the SE.

The Bureau collected a total of 19 samples from the open workings (fig. D-176, Nos. 1-19). Twelve of the samples were taken from the quartz vein exposed in the adit (fig. D-176, Nos. 1-12) and seven others were collected from the winze (fig. D-176, Nos. 13-19). Assay values shown on a map made by the Northern Ontario Exploration Co. in 1912 indicate that values in the shaft were much higher than those in the adit. The Bureau results confirmed this.

Bureau sampling of the adit had a weighted average 56.1 ppm silver (with a high value of 209.6 ppm silver) and 0.5 ppm gold over 2.6 feet. However, the six vein samples from the winze gave a weighted averaged of 1,086 ppm silver and 12.8 ppm gold over an average vein width of 2.3 feet. Base metal values were comparatively low with maximum values in the adit being 0.21% zinc, 0.15% lead, and 0.06% copper, while maximum values from the winze were 1.71% zinc, 0.97% lead, and 0.37% copper. A wallrock sample from the winze (fig. D-176, No. 17) contained 4,612 ppm silver and 52.2 ppm gold.

Resource Estimate

The Reagan prospect has an indicated resource of 4,000 tons and an uncertain, but high grade, concentration of silver and moderate concentration of gold. Grade is uncertain because of the great variance between values from the adit and from the shaft. In addition, there is an inferred resource of 82,000 tons. This gives the Reagan prospect a moderate development potential.

Recommendations

To test for additional mineralization, the lower Reagan adit should be reopened and either extended to the vein or used to drill the vein. Trenching should be done to trace the vein along trend. A drilling program would provide information about continuity and grade.

MAS No.	MS No.
21120166	1600, 2019

References

D-66, D-95, D-96, D-97, D-98, D-99, D-130, D-161

DOLAN PROSPECT

Production

There has been no production from the Dolan prospect.

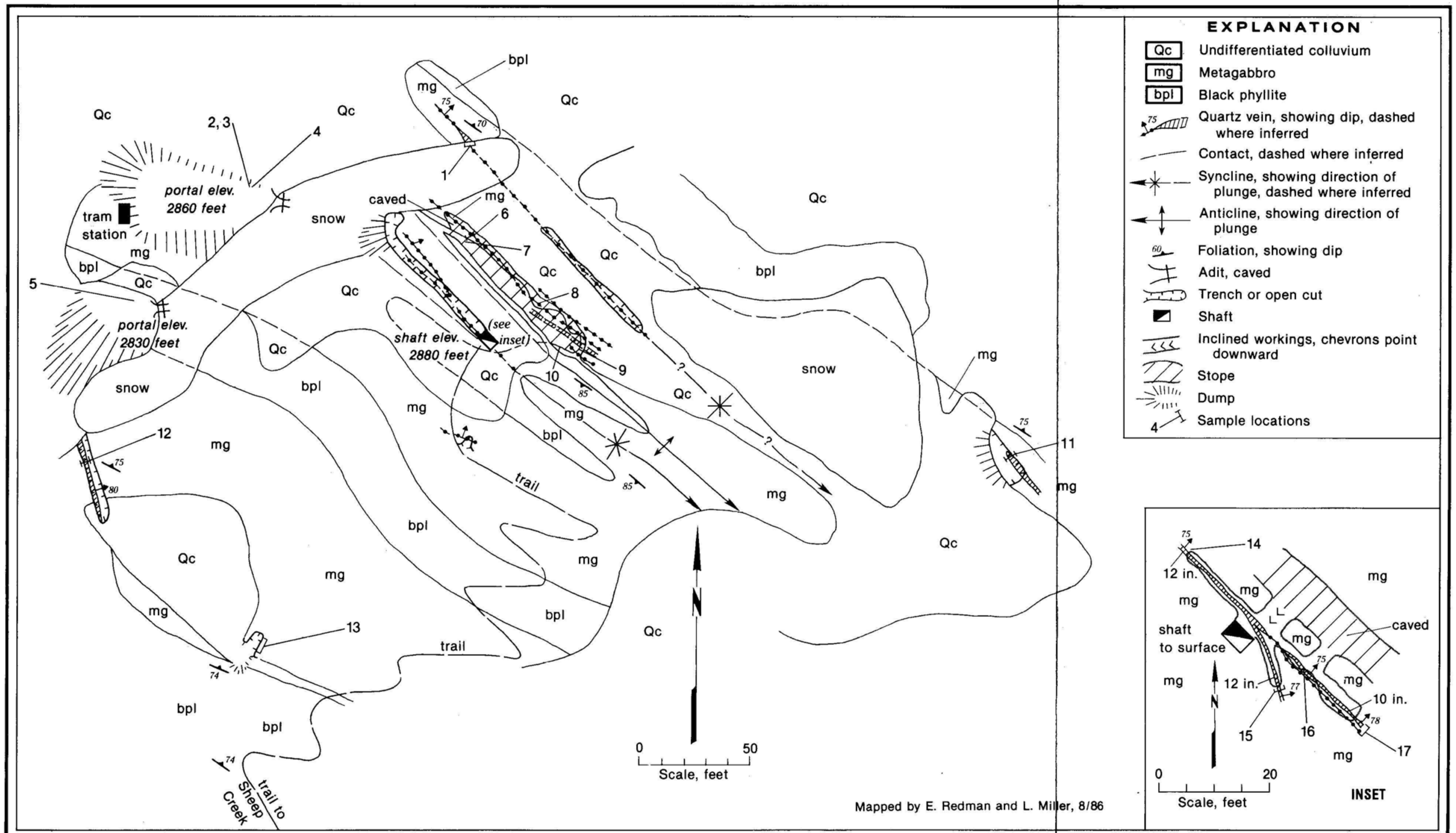

Figure D-175. — The Gould & Curry Mine area, showing workings, geology, and sample locations.

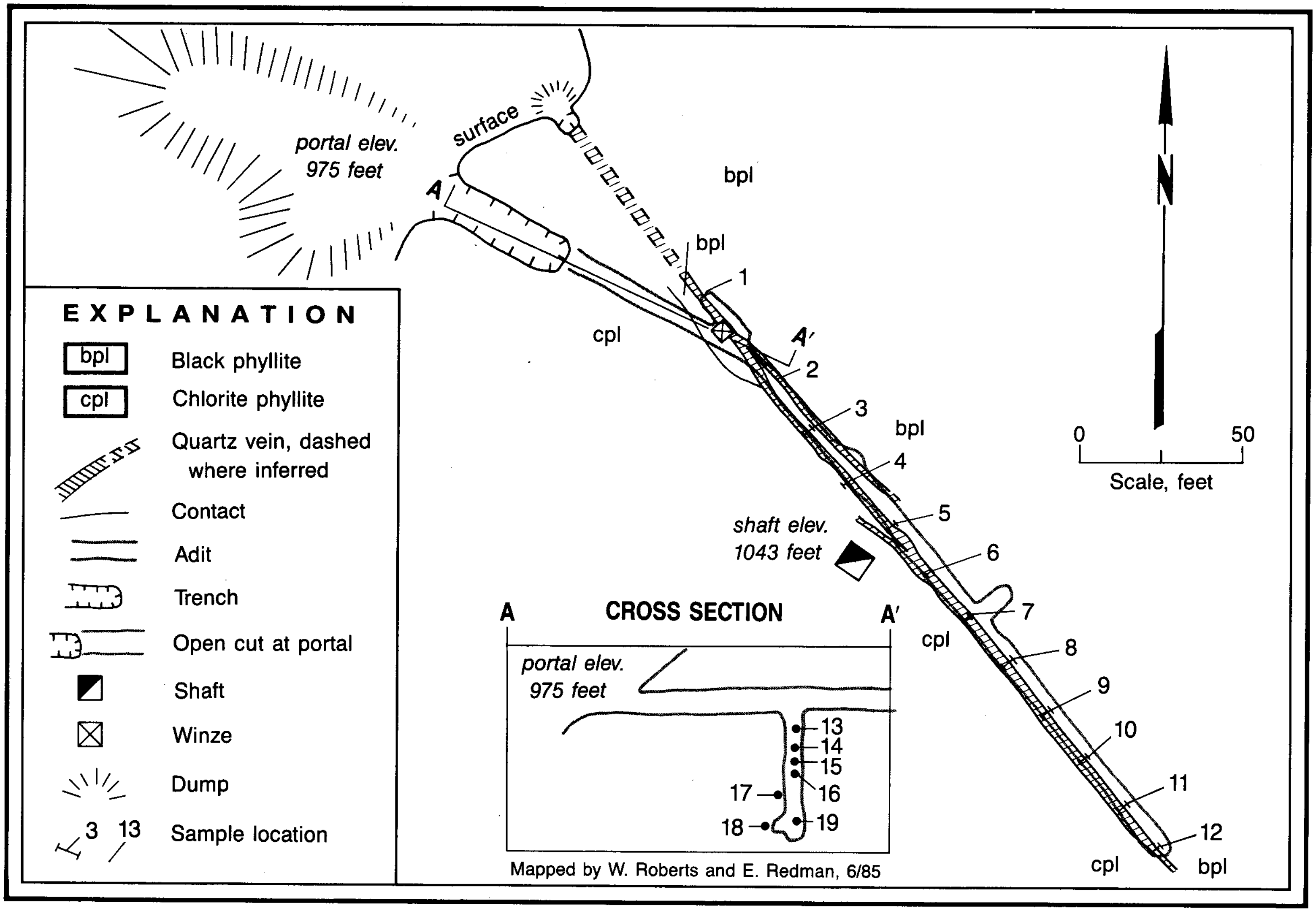

Figure D–176.—The Reagan prospect, showing geology and sample locations.

History

In 1897, John Dolan drove several short tunnels into the metavolcanic rocks above the Silver Queen dam (figs. D-5, D-160). No further work has been reported (*D-97*).

Workings and Facilities

The Dolan prospect has three interconnected adits with 175 feet of workings. There is also an 11-foot adit.

Bureau Investigations

The Dolan prospect is underlain by massive to foliated greenstone cut by a few thin, discontinuous quartz-calcite veins that contain felted chlorite, epidote, magnetite, and local pyrite.

The Bureau mapped the three interconnected adits and the short adit and took three samples (fig. D-177, Nos. 1-3). None of the samples contained detectable silver or gold.

Resource Estimate

There is no known resource at the Dolan prospect.

Recommendations

No work is recommended.

MAS No.
21120135

References

D-34, D-96, D-97, D-98, D-99

GOLD BELT PROSPECT

Production

There was no production from the Gold Belt prospect.

History

The Alaska Gold Belt Company acquired the old Sheridan claim group and began erecting buildings at a tunnel site in upper Sheep Creek in May 1915 (figs. D-5, D-178). They proposed to build a 30,000 ton/day mill on the beach south of the Alaska Gastineau mill. A 2,570-foot adit was driven between June and December 1915. A large snow slide destroyed the buildings at the tunnel portal that December. Diamond drilling was done from the tunnel face in December 1915 and January 1916. Legal entanglements with the Alaska Taku Company stopped work in 1916. In spite of the fact that the suit was resolved in favor of the Gold Belt Co., no further work was done (*D-97*).

Workings and Facilities

The Gold Belt prospect has a 2,570-foot adit that is caved at the portal.

Bureau Investigations

The Gold Belt adit cuts an interbedded series of black phyllite, chlorite phyllite, and metagabbro rocks. Quartz veins are not uncommon within the foliation in the black phyllites or along the contacts between the black phyllite and the more resistant felsic and green phyllite and metagabbro. The only mineralized rocks found on the dump were quartz and some strongly silicified black phyllite.

The Bureau located the caved Gold Belt adit. Two samples were taken from rock on the dump (fig. D-178). One sample of quartz (fig. D-178, No. 1) carried 24 ppm silver but only 0.1 ppm gold. A sample of silicified black phyllite (fig. D-178, No. 2) contained 7.4 ppm silver.

Resource Estimate

Too little is known about the Gold Belt prospect to estimate its potential.

Recommendations

To assess the Gold Belt prospect, the adit should be reopened and both subsurface and surface mapping done to determine geology and mineralization. If a target is found, it could be drilled from both surface and subsurface.

MAS No.
21120115

References

D-27, D-34, D-97, D-98, D-99, D-124

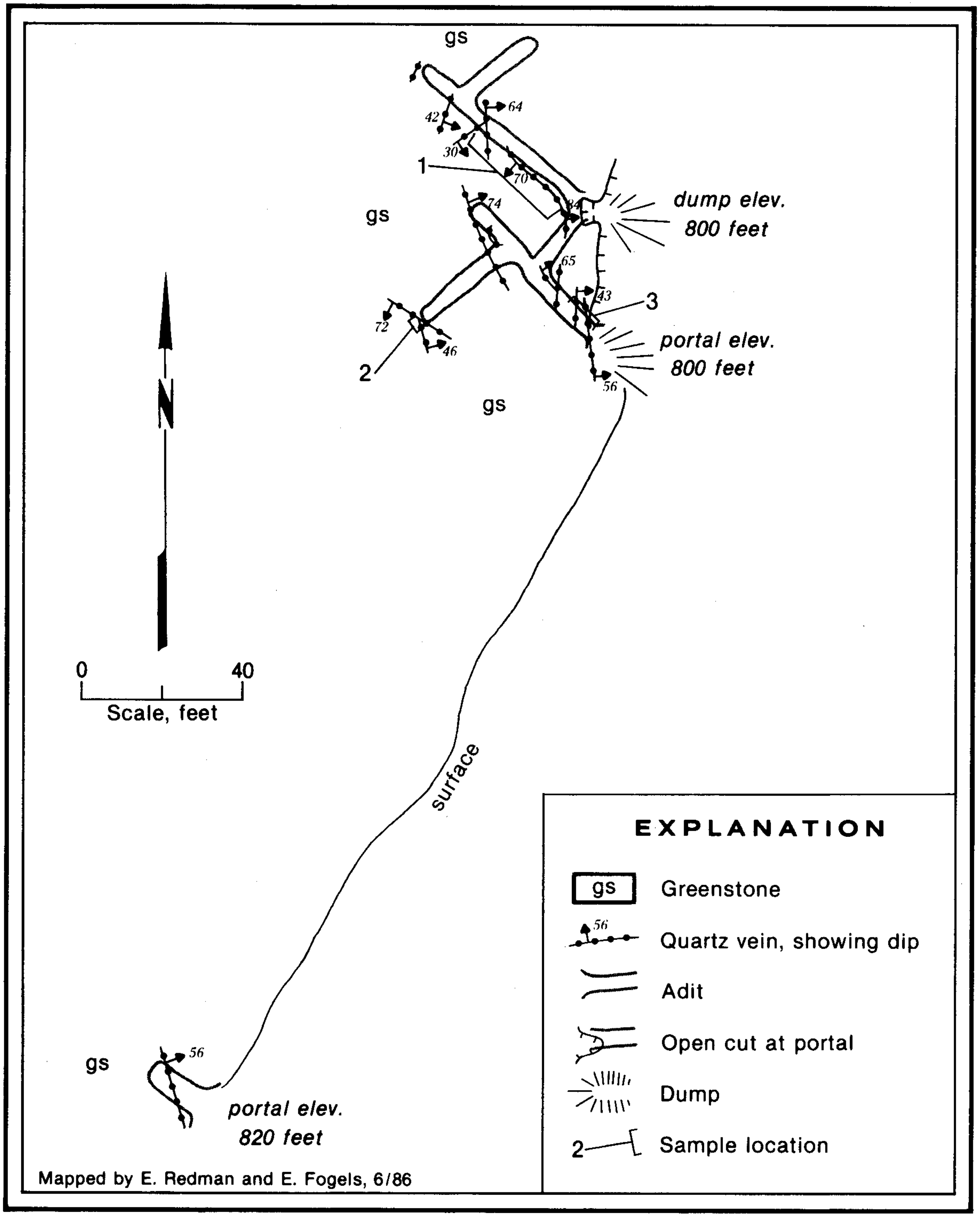

Figure D-177.—Dolan prospect, showing geology and sample locations.

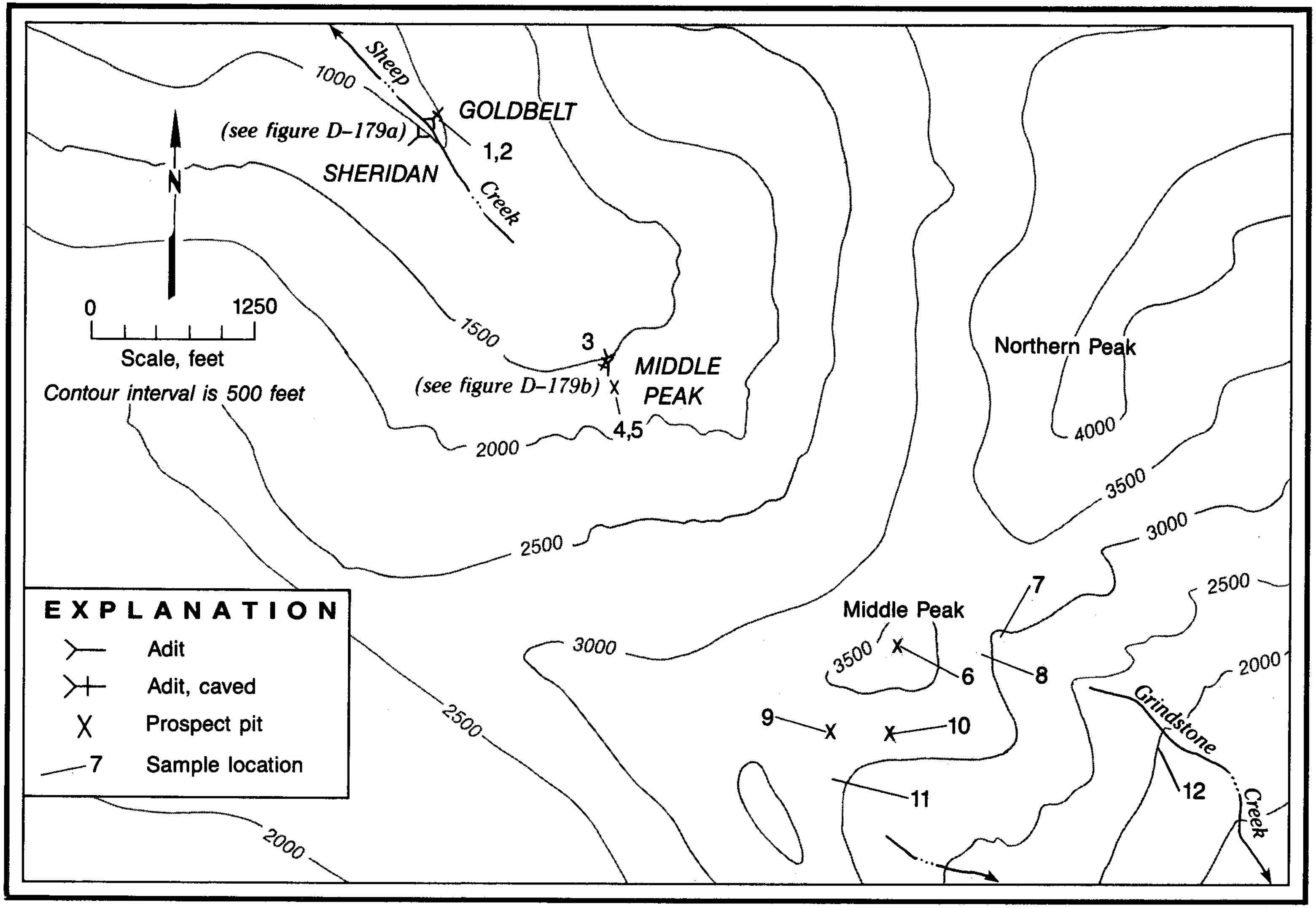

Figure D-178.—Prospects in the upper Sheep Creek area.

SHERIDAN PROSPECT

Production

There has been minor production from the Sheridan prospect.

History

Mineralization was discovered at the head of Sheep Creek in about 1890 (figs. D–5, D–178). Several claims, including the Sheridan, Little Queen, Star of Bethlehem, and Last Chance, were staked between the Reagan prospect and the head of Grindstone Creek (the Middle Peak prospect).

Several adits, open cuts, and trenches were reportedly completed by 1903 and small shipments of copper ore were made. There was little, if any, work done after 1903 (*D-97*).

Workings and Facilities

The Sheridan prospect includes a 30-foot adit and other unlocated adits reported by Redman (*D-97*).

Bureau Investigations

The only adit located on the Sheridan prospect is across Sheep Creek from the Gold Belt adit. This adit exposes black phyllite that contains several concordant quartz veins up to 18 inches thick. The veins contain only minor amounts of pyrite and no copper minerals were seen.

The Bureau located and mapped the 30-foot adit. Two samples were taken from quartz veins (fig. D–179, Nos. 1–2) in the adit but neither contained detectable gold.

Resource Estimate

No significant mineralization was located on the Sheridan prospect giving it a low potential.

Recommendations

Any further work should begin with attempt to locate some of the other workings mentioned in newspaper accounts of the area, particularly the one which exposed copper mineralization.

MAS No.
21120218

References

D-96, D-97

MIDDLE PEAK PROSPECT

Production

There have been a few shipments of material for testing.

History

The claims in the Middle Peak area (Little Queen, Sheridan, Last Chance, and Bethlehem) were located about 1890 and extended from about the Reagan prospect in Sheep Creek, over Middle Peak, and into Grindstone Creek (figs. D–5, D–178). In 1892, several hundred pounds of copper ore were sent to a smelter. More ore was extracted in 1894. In 1895, a 45-foot adit was driven on the Last Chance claim and two tons of copper ore extracted.

In 1897, a 150-foot adit was driven at the head of Sheep Creek and an 18-foot adit into Grindstone Creek. Minor work continued until about 1903 (*D-97*).

Workings and Facilities

A 24-foot adit, a caved adit, and several open cuts were located on Middle Peak but other reported 18-foot, 45-foot, and 150-foot adits (*D-97*) were not found.

Bureau Investigations

The Middle Peak area is underlain by chlorite phyllite on the SW and black phyllite on the NE. On the Sheep Creek side of the peak, a felsic phyllite (quartz, feldspar, sericite) lies between the green and black phyllites. Most of the known workings are along the contact or in the green phyllite near the contact. Concordant quartz veins in the workings contain small amounts of pyrite.

Sample Results

The Bureau examined both the Sheep Creek and Grindstone Creek slopes of Middle Peak. One open adit, one caved adit, and a prospect pit were located at the head of Sheep Creek below Middle Peak. In addition, three prospect pits were found over the divide on Grindstone Creek. Five samples were taken at the head of Sheep Creek (fig. D–179, Nos. 3–4; fig. D–178, Nos. 3–5) of pyrite-bearing quartz and felsic phyllite. One sample (fig. D–178, No. 5) contained 13 ppm silver.

Seven samples were taken from the Grindstone Creek slope of Middle Peak (fig. D–178, Nos. 6–12). One sample from a prospect pit at the summit of Middle Peak contained 6.8 ppm silver.

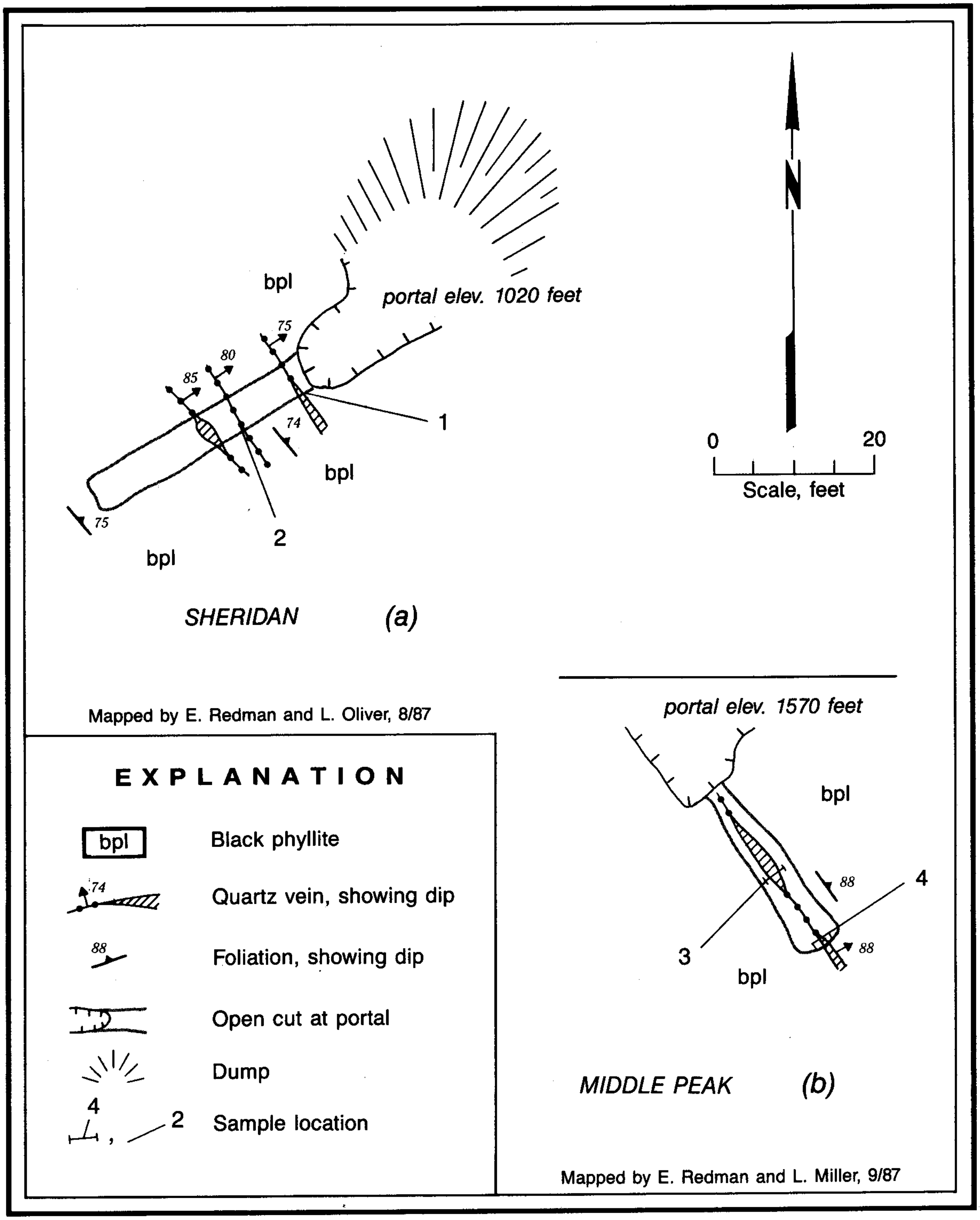

Figure D-179.—The Sheridan and Middle Peak adits, showing geology and sample locations.

Resource Estimate

No significant mineralization was located in the Middle Peak area giving it a low development potential.

Recommendations

The unlocated adits should be found and examined and the copper mineralization identified.

MAS No.
21120114

References

D-64, D-96, D-97, D-99

ALASKA GASTINEAU TAILINGS MINE

Production

Table D-13.—Gold and silver production from the Alaska Gastineau tailings (*D-46, D-146*)

Year	Production	
	oz Au	oz Ag
1940	250	90
1941	190	35
1942	181	70
1944	22	6
1945	29	7
1946	94	17
1947	139	10
1948	200	38
Total	1,105	273

History

The Alaska Gastineau tailings were dumped by the Alaska Gastineau Gold Mining Company from their large mill near the mouth of Sheep Creek between 1915 and 1921 (fig. D-5). In 1937, Howard Hayes and others started a placer operation which processed 13,400 tons of material. By the end of 1948, the operation had produced 1,105 ounces gold and 273 ounces silver.

In 1983, the Juneau Mining Company acquired the tailings and did feasibility studies and facility construction. By 1984, operations failed because of design problems in the mill and in 1986, the company declared bankruptcy (*D-97*). Echo Bay Mines and WGM, Inc., now own the mill building and have converted it into office and warehouse space.

Workings and Facilities

There is an open cut where the Juneau Mining Company attempted a placer mine.

Bureau Investigations

The Bureau did not examine or sample the Alaska Gastineau tailings because of the litigation which involved the Juneau Mining Co.

Resource Estimate

There is an indicated resource of 4 million tons of tailings with an unknown grade.

Recommendations

The tailings should be drilled on a grid to accurately identify the tonnage and grade of the deposit.

MAS No.
21129001

References

D-26, D-36, D-46, D-97, D-99, D-146

BAR PLACER PROSPECT

Production

There is no reported production from the Bar Placer prospect.

History

The Bar Placer was staked in July 1911, by Dr. Martin Damourette who named it the Concrete Placer Mine (fig. D-5). In August, Damourette had a Keystone drill at work to test the depth and grade. Two tons of sand from the deposit was shipped to Black Sand Company of St. Louis for gold recovery tests.

Some work was done in 1912 but then the claims were abandoned (*D-97*).

Workings and Facilities

There are no workings.

Geologic Setting

The Bar Placer consists of fluvial sand and gravel deposited by Lemon Creek and the Mendenhall River.

Bureau Investigations

The Bureau did not examine the Bar Placer.

Resource Estimate

There is a tremendous volume of gravel in the vicinity of the Bar Placer but there is no information on gold content. Because no sampling was done, it is not possible to estimate a resource.

Recommendations

To further evaluate the area, the gravels should be drilled and sampled to determine their potential.

MAS No.
21120216

References

D-97, D-99

RAINBOW PROSPECT

Production

No production has occurred at the Rainbow prospect.

History

The Rainbow claim was staked in 1955 but no work is known to have occurred (fig. D-5).

Workings and Facilities

There are no known workings.

Geologic Setting

The Rainbow claim contains quartz veins in black phyllite exposed in a quarry.

Bureau Investigations

The Bureau did not examine the Rainbow occurrence.

Resource Estimate

The Rainbow occurrence was not examined, therefore, no estimate can be made.

Recommendations

The Rainbow prospect area should be examined to determine whether there is any economically significant mineralization.

MAS No.
0021120118

References

D-99, 131

EAGLE CREEK PROSPECT

Production

No production is known for the Eagle Creek prospect.

History

A placer claim was staked in 1954.

Workings and Facilities

There are no known workings at the Eagle Creek placer.

Bureau Investigations

Lower Eagle Creek is underlain by black phyllite, greenstone, and felsic (quartz-sericite) phyllite. Gold may have been derived from the New Boston lode.

Resource Estimate

There is no known resource.

Recommendations

No work is recommended.

MAS No.
0021120119

References

D-99

DOUGLAS ANTIMONY PROSPECT

Production

Nothing has been produced from the Douglas Antimony prospect.

History

The Douglas Antimony prospect was located by Ralph Thompson in 1932 (figs. D-5, D-180). An open cut had been made by 1942 and a 40-foot adit driven by 1951. No work was reported after 1951 (*D-119*).

Workings and Facilities

A 40-foot adit has been driven into the vein in the bottom of Eagle Creek. The adit is accessible at times of low rainfall or snowmelt.

Geologic Setting

The prospect is underlain by black phyllite and greenstone. Mineralization consists of a quartz vein up to 16 inches thick that cuts the greenstone near the phyllite contact. Massive stibnite occurs in a thin zone along the footwall of the vein. Assays done in 1942 (*D-119*) gave almost 53% antimony from the massive stibnite and 20.7% antimony across the 16-inch vein.

Bureau Investigations

The Bureau examined the adit but a sample of massive stibnite (fig. D-180, No. 1) contained no gold or silver.

Resource Estimate

The Douglas Antimony prospect has a low development potential because of its small size and lack of precious metal values.

Recommendations

Surface trenching or drilling are needed to determine the extent of the and quality of mineralization.

MAS No.
21120036

References

D-99, D-119

NEW BOSTON PROSPECT

Production

A small amount of ore was milled in 1888 but only $40 in gold was recovered (*D-31*).

History

The Alaska Union Mining and Milling Co. purchased two claims in the Eagle Creek area late in 1886 (figs. D-5, D-180). In January 1887, a contract was awarded for a 160-stamp mill. In the summer, two adits were started. The shorter adit in Eagle Creek was completed by winter and the main adit had been driven to a length of 1,040 feet by early 1888. The adit was connected to the mill, which contained 80 stamps, by a 2,800-foot-long tramway. The company expended almost $300,000 building the tram, stamp mill, adits, wharfs, and dock facilities. When ore was finally sent to the mill, only $40 worth of gold was recovered.

The rails from the tram were moved to the Douglas sawmill in May 1889, and the compressor moved to Silver Bow Basin in July 1889. The stamps were moved to several smaller mills in the area including the Silver Queen Mine (*D-97*).

Working and Facilities

There are two adits at the New Boston prospect. One has a length of 1,040 feet and the other has 415 feet of workings.

Bureau Investigations

The New Boston prospect area is underlain by black phyllite, felsic phyllite, greenstone, and very fine-grained augite metagabbro or diabase.

The black phyllite is part of the unit that hosts the Treadwell sill and trends NW with a moderate NE dip. Greenstone units were cut in the main adit and are massive, featureless units that may represent volcanic flows. The augite metagabbro or metadiabase is similar to the mafic-ultramafic sill found in the Treadwell area. It contains phenocrysts of plagioclase and/or augite.

In the Eagle Creek adit and the back third of the main adit, felsic phyllite is common. This unit is composed of quartz, muscovite, and feldspar similar to that found at the Alaska Treasure prospect on Nevada Creek. The unit is up to a few hundred feet thick and contains from 1% to 3% disseminated pyrite. A few quartz veins with chalcopyrite, sphalerite, and galena cut the felsic phyllite.

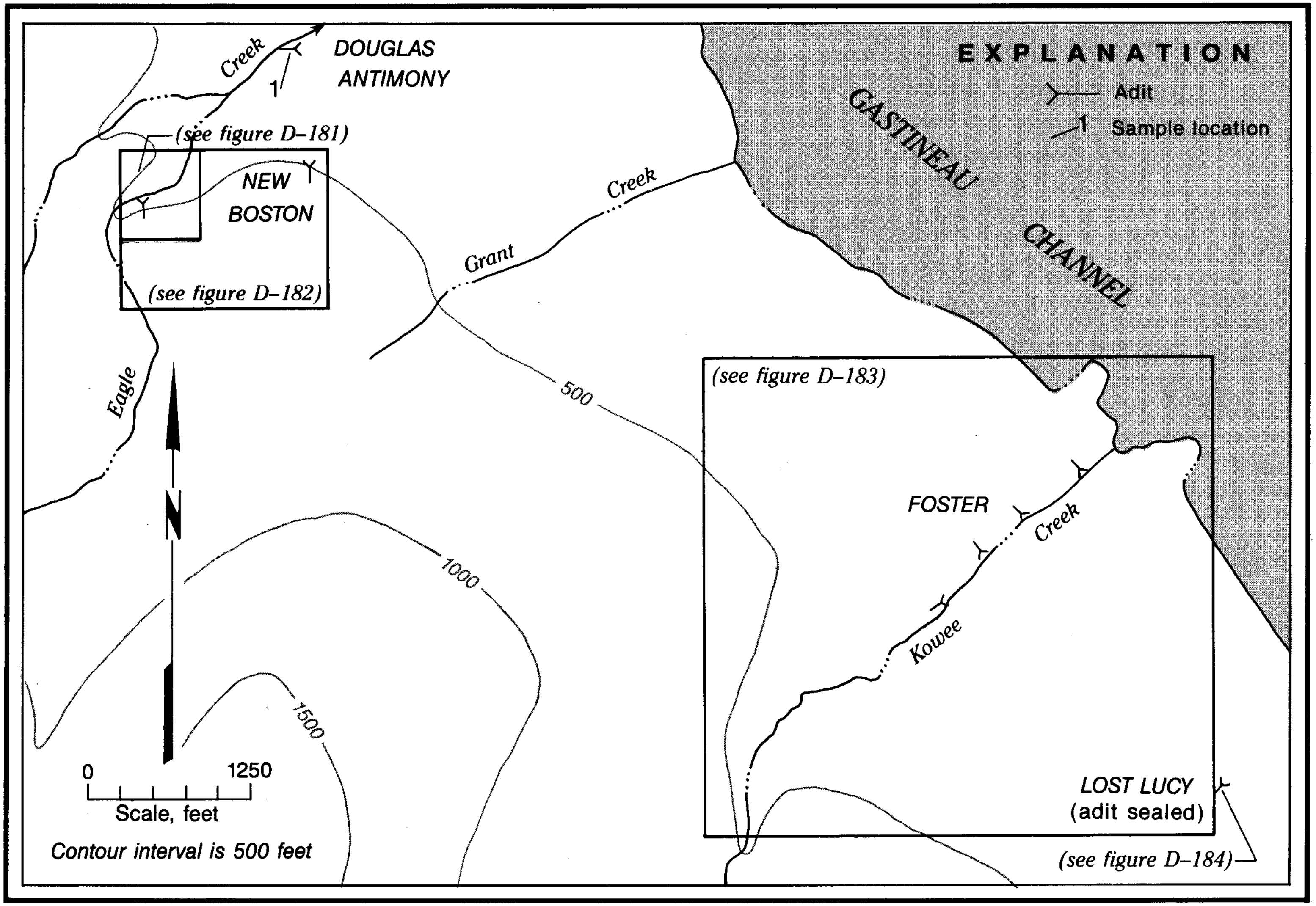

Figure D-180.—Prospects in the Eagle and Kowee Creek areas, Douglas Island.

Sample Results

The Bureau mapped both adits and collected a total of 12 samples (fig. D-181, Nos. 1-5; fig. D-182, Nos. 6-12). Gold values were all less than 0.05 ppm. One sample contained 303 ppm copper.

Resource Estimate

There is a large volume of pyritic felsic rocks in the New Boston area but because gold values are very low, the area has a low development potential.

Recommendations

The rocks that were the target of the New Boston work are metamorphosed felsic volcanic rocks and have the potential to host volcanogenic massive sulfide deposits similar to those at the Nevada Creek and Yakima prospects. Soil sampling and detailed geologic mapping could determine whether the area had the potential for mineral deposits.

MAS No.
21120199

References

D-31, D-96, D-97, D-99, D-133

FOSTER PROSPECT

Production

There has been no production from the Foster prospect.

History

The history of the Foster prospect (also known as Kowee Creek) is not known (figs. D-5, D-180). The short adits were probably driven between 1880 and 1900.

Workings and Facilities

Four adits were located in the canyon of Kowee Creek. Three of the adits contain 12 feet, 12 feet, and 22 feet of workings. The fourth adit was open but inaccessible due to the steep canyon walls of Kowee Creek.

Bureau Investigations

The Foster prospect is underlain by black phyllite cut by thin, foliation-concordant quartz veins which contain small amounts of pyrite.

The Bureau mapped three short adits along lower Kowee Creek (fig. D-183). Five samples were collected at the prospect and along the creek, but none contained detectable gold (fig. D-183, Nos. 1-5).

Resource Estimate

The very low gold values give the Foster prospect low development potential.

Recommendations

There is no mineralization to trace and no work is recommended.

MAS No.	MS No.
21120215	569

References

D-99, D-132

LOST LUCY PROSPECT

Production

There has been no production from the Lost Lucy prospect.

History

The Lost Lucy prospect (figs. D-5, D-180) was located and the adit driven sometime before 1939 (*D-117*).

Workings and Facilities

A 315-foot adit with a raise to surface was reported by Roehm (*D-117*) in 1939. Most of the adit has recently been removed by subdivision development and the entrance sealed with concrete and a bolted-on metal plate.

Geologic Setting

The adit exposes black phyllite and greenstone (fig. D-184). A few thin, concordant quartz veins with traces of pyrite occur along the contact between the units.

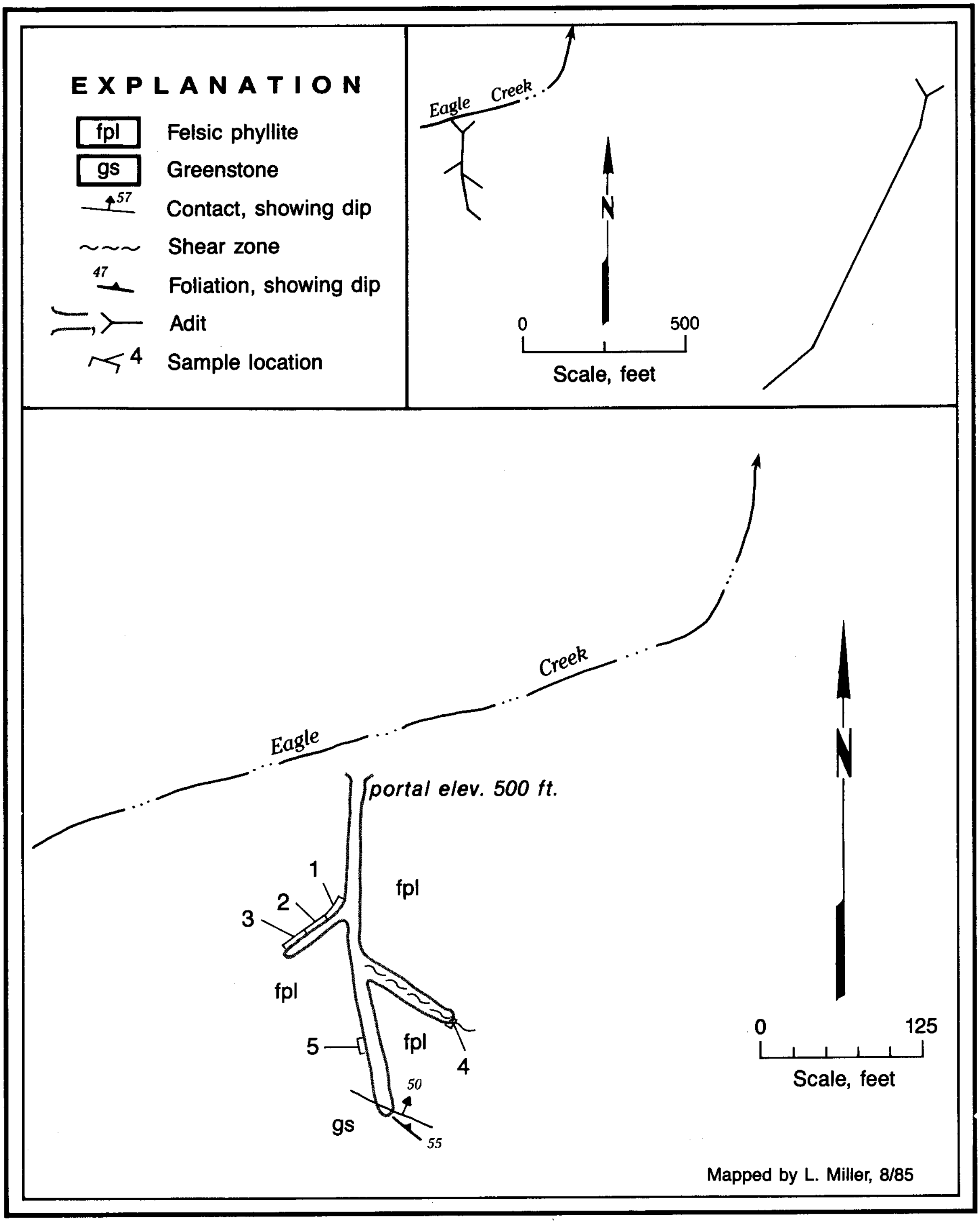

Figure D-181.—The New Boston prospect, Eagle Creek adit, showing geology and sample locations.

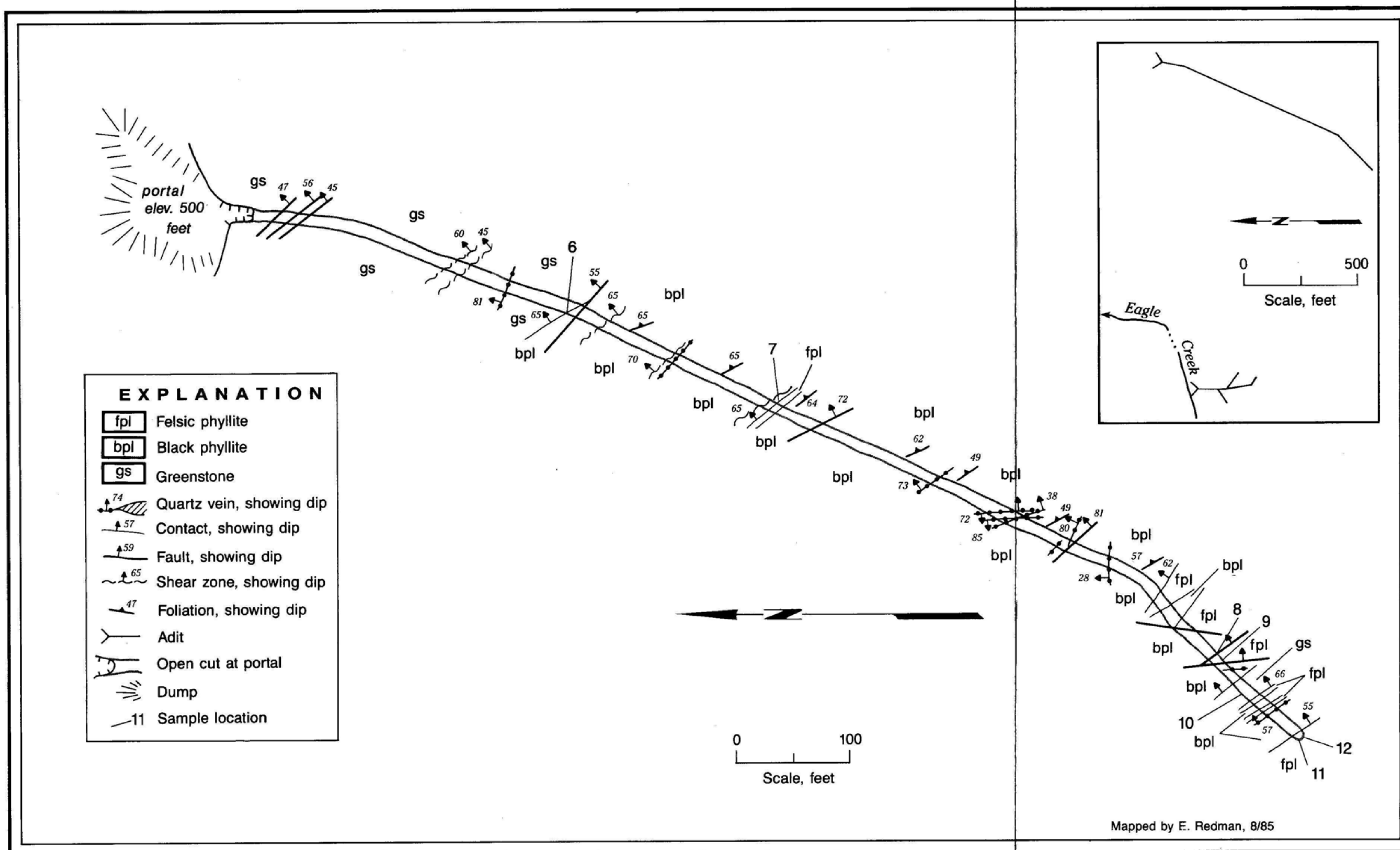

Figure D-182. — The New Boston prospect, main adit, showing geology and sample locations.

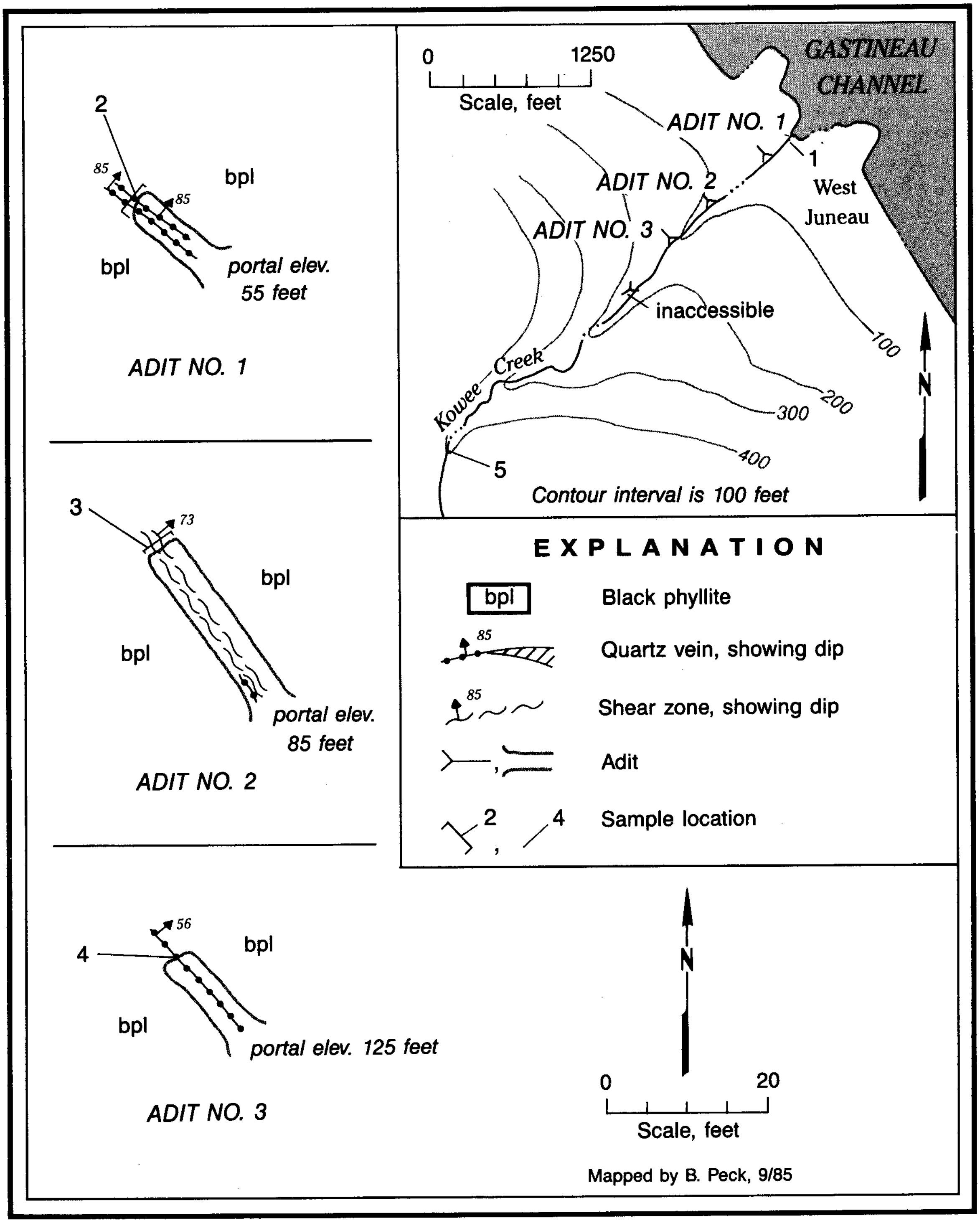

Figure D-183.—The Foster prospect, showing geology and sample locations.

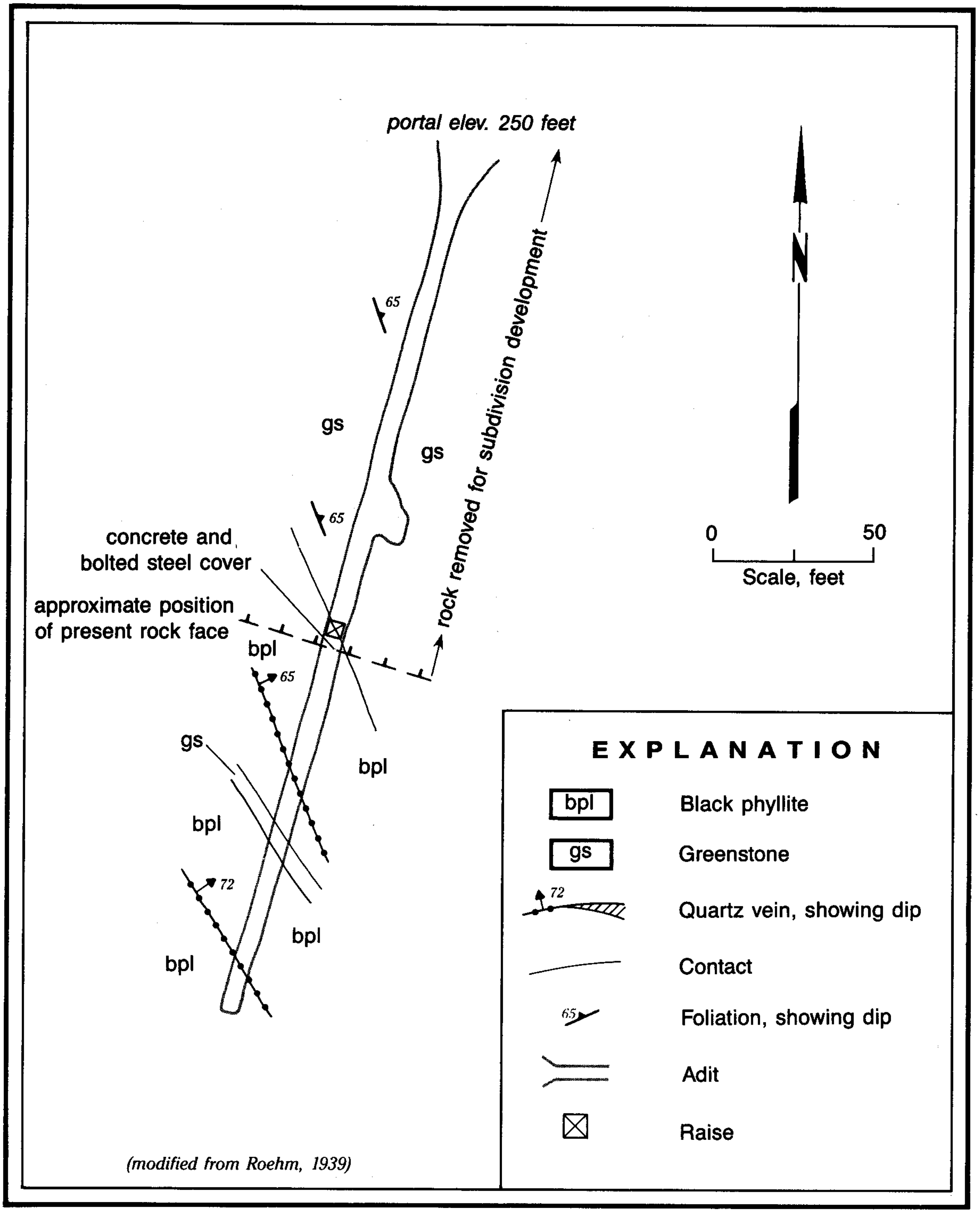

Figure D-184.—The Lost Lucy adit, showing geology.

Bureau Investigations

The Bureau tried to examine the adit but found the entrance to be sealed with concrete and a bolted cover. Over half of the adit has been removed by subdivision development. No veins or other mineralization was exposed in the area.

Resource Estimate

No mineralization is exposed.

Recommendations

No work is recommended.

MAS No.	MS No.
21120120	59

References

D-99, D-117

PANSY PROSPECT

Production

A few tons of ore were sent to a mill but no results are known.

History

In 1889, a 35-foot adit was driven into black phyllite and greenstone near Lawson Creek (fig. D-5). Several hundred tons of ore were piled on the dump and some ore was sent to New Boston mill for testing. After 1889, the prospect was abandoned (*D-97*).

Workings and Facilities

A 35-foot adit has been reported but it was not found (*D-97*). The adit probably lies under the Forest Edge Condominiums.

Geologic Setting

The Pansy prospect area is underlain by black phyllite and greenstone.

Bureau Investigations

The Pansy prospect and adit are now buried under the Forest Edge Condominium development and could not be examined.

Resource Estimate

The Pansy prospect was not examined but probably has only a low development potential.

Recommendations

No work is recommended.

MAS No.	MS No.
21120136	262

References

D-97

LAWSON CREEK PROSPECT

Production

There has been no known production from the Lawson Creek prospect

History

Ten placer claims were staked on Lawson and Bear Creeks sometime after 1881 (fig. D-5).

Workings and Facilities

No workings are known.

Bureau Investigations

Lawson and Bear Creeks are underlain by black phyllite, greenstone, and diorite. The Bureau collected a panned concentrate sample from Lawson Creek that contained 1.7 ppm gold (Appendix D-1, sample number 3432).

Resource Estimate

The volume of gravels present in Lawson Creek is too small to contain a significant amount of gold.

Recommendations

No work is recommended.

MAS No.

References

D-99

GREAT EASTERN PROSPECT

Production

No production is known from the Great Eastern prospect.

History

In 1888, a crew of men ground-sluiced a portion of the Great Eastern claim near Bear Creek (figs. D-5, D-185). By the end of the year, they had completed a 200-foot adit and a short shaft (*D-97*).

Working and Facilities

There is a 200-foot adit and short shaft on the prospect.

Bureau Investigations

The primary rock unit in the area is black phyllite that has been intruded by a swarm of hydrothermally altered diorite sills. The sills vary in width from a few inches to 20 feet. Alteration has destroyed most mafic minerals. Disseminated pyrite forms between 0.5% to 3% of the sills. No other sulfide minerals were seen. The prospect was probably worked because of the similarity of the altered diorite with the rocks at the Treadwell Mine.

Sample Results

The Bureau mapped the adit and shaft and collected eight samples (fig. D-186, Nos. 1-8). None of the samples contained greater than a trace of gold, but 3 samples contained 20, 23, and 164 ppm molybdenum.

Resource Estimate

Low gold values give the Great Eastern prospect a low potential.

Recommendations

Trenching and sampling would further define the mineralization and determine whether any significant metal values exist at the prospect.

MAS No.	MS No.
21120208	340

References

D-97

TYEE AND HOLEMAN PROSPECTS

Production

There has been no production from the Tyee and Holeman prospects.

History

The Tyee prospect was known in 1902 but little work was done at that time (figs. D-5, D-185). The Tyee and Holeman claim groups were staked in 1914, and in 1916, along with the Jersey Group, acquired by the Tyee Mining Company. Two diamond drill holes were started in May 1916, but work was abruptly halted in late August and no further work was done (*D-97*).

Workings and Facilities

There are no known workings.

Geologic Setting

The area covered by the Tyee and Holeman claims is underlain by black phyllite intruded by a mafic metavolcanic sill and mostly-concordant diorite sills. The diorite bodies are partly altered and contain small amounts of disseminated pyrite, particularly along their margins. Quartz veins with minor pyrite also occur in the phyllite.

Bureau Investigations

The Bureau examined the Jersey prospect but did not extend its work onto the Tyee or Holeman prospects.

Resource Estimate

See Jersey, Great Eastern, and Douglas Island prospects.

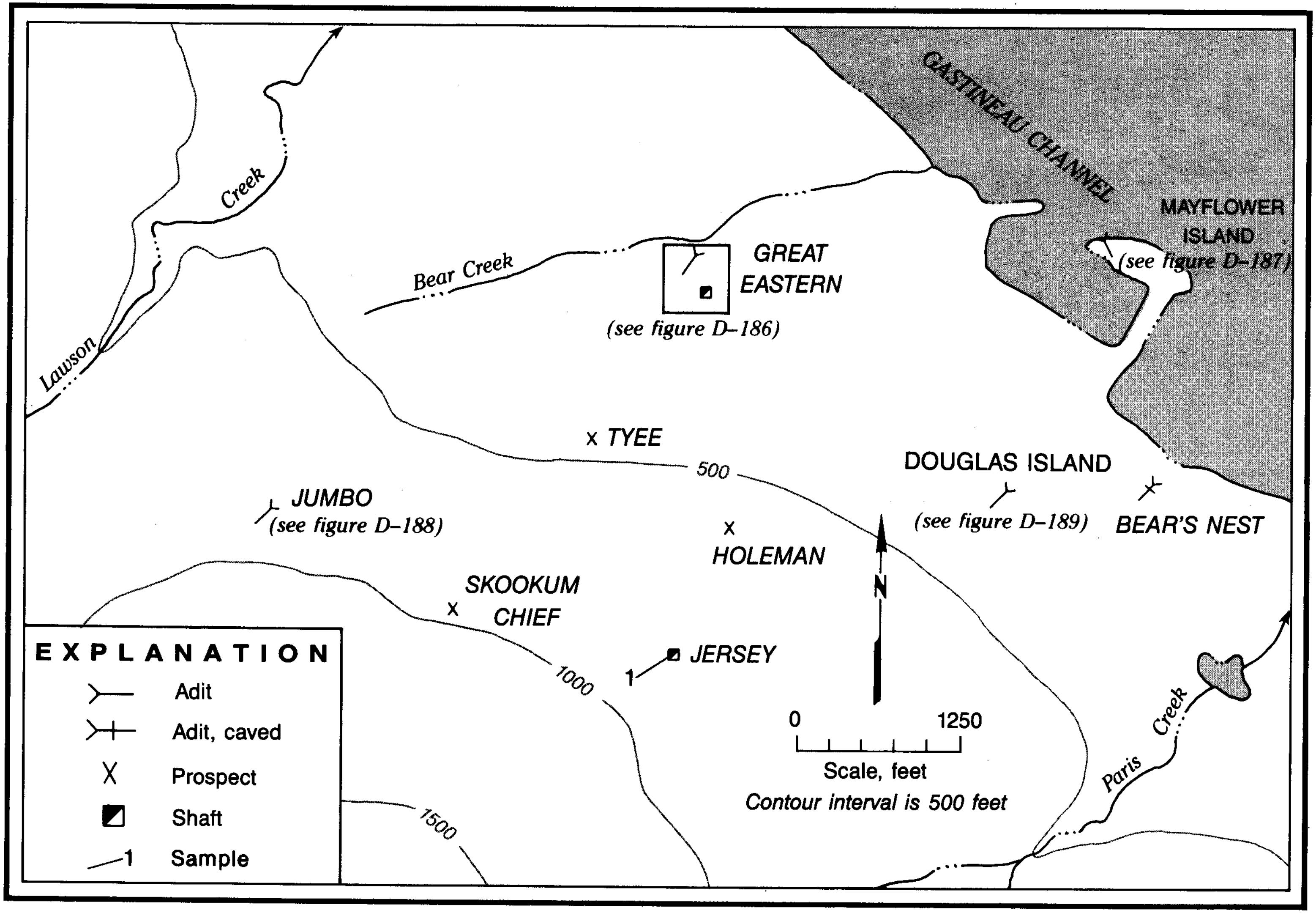

Figure D-185.—Prospects in the Douglas townsite area.

Recommendations

Careful geological mapping and soil sampling could identify mineralized areas on the Tyee and Holeman prospects.

MAS No.
21120126

References

D-34, D-97, D-99

MAYFLOWER PROSPECT

Production

The Mayflower prospect has produced no ore.

History

The adit (figs. D-5, D-185) on Mayflower Island (more recently marked as Juneau Island) was driven sometime before 1895 (*D-13*).

Workings and Facilities

A 14-foot adit has been driven into the north end of the island.

Bureau Investigations

The Mayflower Island adit lies along the contact between altered metadiorite and black phyllite where a shear cuts the rocks.

Two samples were collected from the Mayflower adit but neither contained detectable gold or silver (fig. D-187, Nos. 1-2).

Resource Estimate

There is no known resource at the Mayflower prospect.

Recommendations

No work is recommended.

MAS No.
21120195

References

D-13, D-98, D-99

JUMBO PROSPECT

Production

There has been no known production from the Jumbo prospect.

History

The Jumbo prospect was discovered in November, 1922 (figs. D-5, D-185). In February 1923, F.M. Shaw, James Christoe, F.A.J. Gallwas, Joseph Kendler, L.W. Kilburn, and Guy Smith, all of Douglas, formed the Douglas Mining Company to work the new prospect. Four 200-foot trenches were dug and some fine gold was sluiced from the open cuts. To undercut the gold-bearing outcrops, 82 feet of adit were driven in 1923. The adit was extended to a length of 125 feet by late April 1924. The company brought a 1-stamp prospecting mill to the prospect but never set it up. Minor work was done on the prospect in 1925 (*D-97*).

Workings and Facilities

The Jumbo prospect has a 124-foot adit and several caved-in trenches.

Bureau Investigations

The Jumbo adit cuts interlayered black phyllite and a pyritic greenschist. A few thin quartz veins occur in the center of the greenschist unit. Pyrite occurs as disseminated cubes in the greenschist.

The Bureau mapped the Jumbo prospect and took seven samples in the adit (fig. D-188, Nos. 1-7). No detectable gold or silver were found.

Resource Estimate

The Jumbo prospect has a low development potential because of its low gold values.

Recommendations

No work is recommended.

MAS No.
21120122

References

D-23, D-97, D-98, D-99, D-110

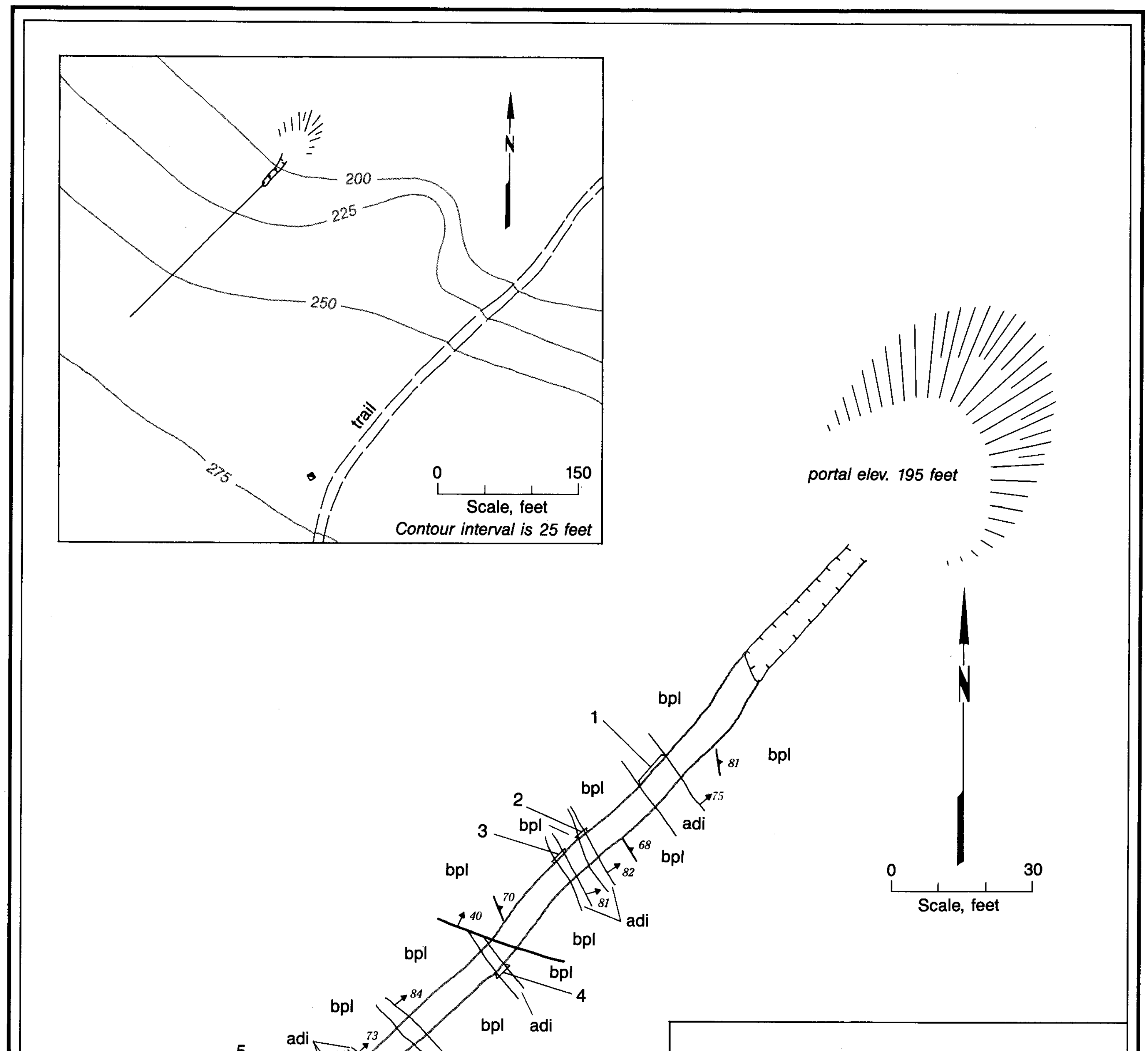

Figure D-186. — The Great Eastern prospect, showing geology and sample locations.

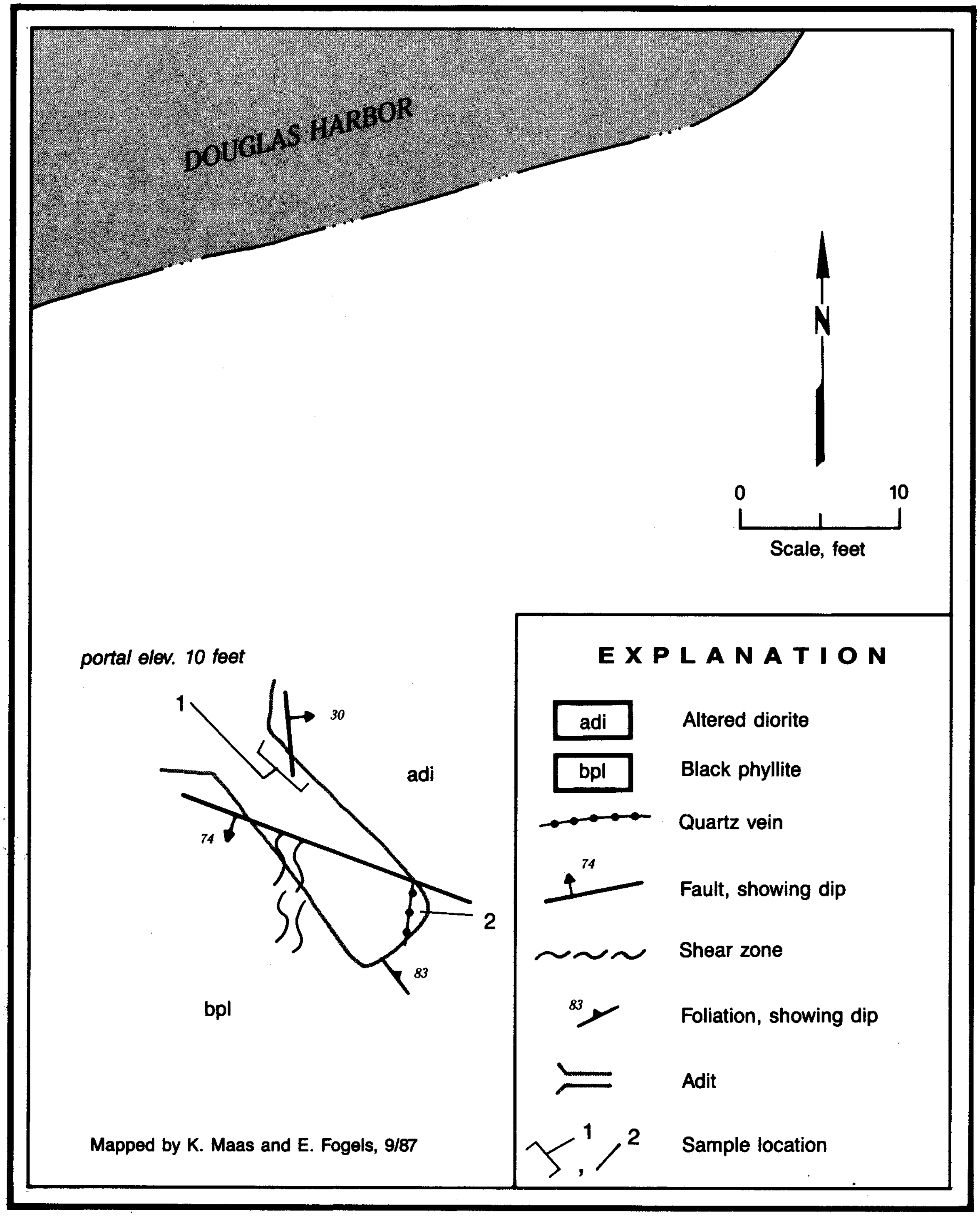

Figure D-187.—The Mayflower prospect, showing geology and sample locations.

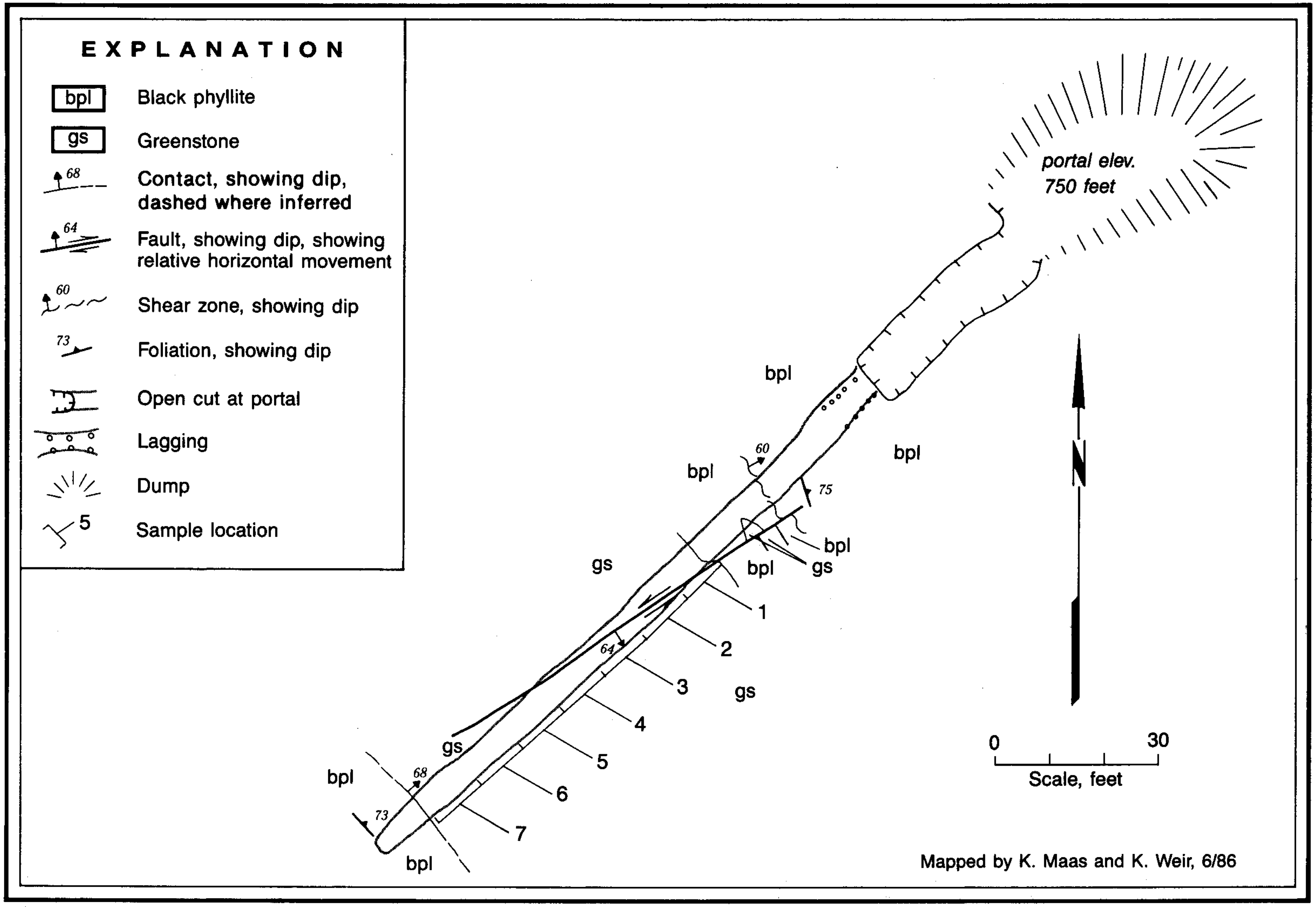

Figure D-188.—The Jumbo prospect, showing geology and sample locations.

DOUGLAS ISLAND PROSPECT

Production

There has been no known production from the Douglas Island prospect.

History

Sometime between 1886 and 1889, a 175-foot adit with a 22-foot winze was completed (figs. D-5, D-185).

Workings and Facilities

The prospect has a 175-foot adit with a 22-foot winze at the back.

Bureau Investigations

The adit cuts black phyllite that has been intruded by diorite sills. The sills are similar to the Starr and Bear's Nest sills and are hydrothermally altered (possibly to albite). The diorite contains disseminated pyrite but no other sulfides. Like the Great Eastern, the Douglas Island prospect was probably worked because of its similarity to the Treadwell Mine.

The Bureau mapped the adit, collecting seven samples (fig. D-189, Nos. 1-7). No gold or silver values exceeded 0.9 ppm.

Resource Estimate

Low gold values give the prospect a low potential.

Recommendations

Soil sampling and geologic mapping could determine whether there were any areas of interest near the Douglas Island prospect.

MAS No.	MS No.
21120089	110

References

D-47, D-97

SKOOKUM CHIEF PROSPECT

Production

There has been no production from the Skookum Chief prospect.

History

The Skookum Chief prospect was staked before 1936, possibly in the early 1920's when work was being done on the nearby Jumbo prospect (figs. D-5, D-185). Five open cuts were made (*D-104*).

Workings and Facilities

Five open cuts are reported to have been made at the Skookum Chief prospect (*D-104*).

Geologic Setting

The area is underlain by black phyllite and a 150-foot-thick greenstone layer. The greenstone contains small amounts of disseminated pyrite. The area is very similar to, and may be continuous with, the Jumbo prospect.

Bureau Investigations

The Bureau did not examine the Skookum Chief prospect but suspects that it may be a continuation of the Jumbo.

Resource Estimate

There is no known resource at the Skookum Chief prospect.

Recommendations

Soil sampling and geologic mapping could determine whether there were any areas of interest near the Douglas Island prospect.

MAS No.
21120121

References

D-99, D-104

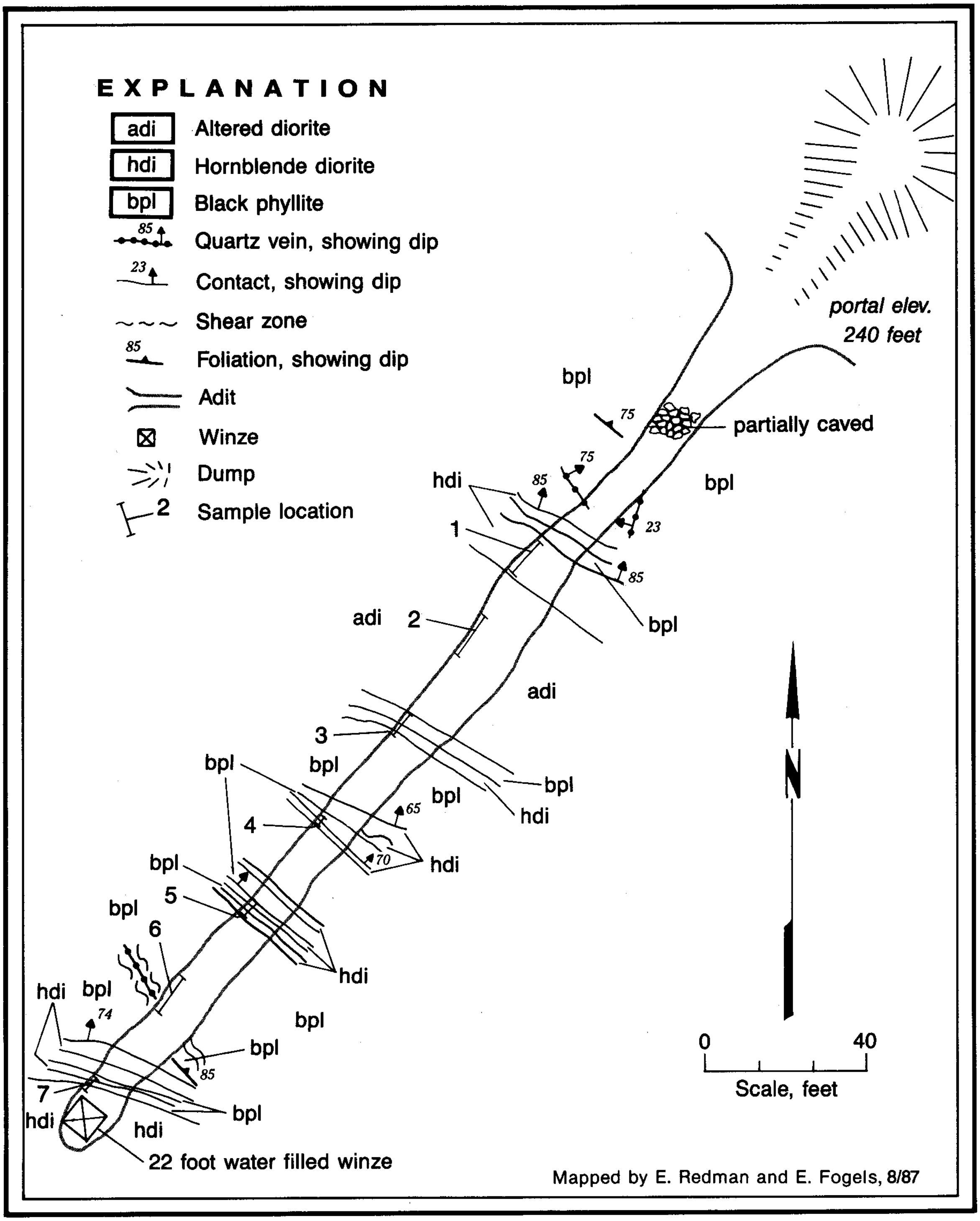

Figure D-189.—The Douglas Island adit, showing geology and sample locations.

BEAR'S NEST PROSPECT

Production

No ore was produced from the Bear's Nest prospect.

History

Henry Borein staked the Bear's Nest claim in June 1881 (figs. D-5, D-185). In July 1888, the claim was purchased from Martin Murray, Nathan Fuller, James Treadwell, James Carroll, and E.O. Downing by the Alaska Gold Company, which drove a 1,500-foot adit, constructed an 80-stamp mill, and erected support buildings in 1889. In August 1889 all work was halted because of a lack of ore. The property was abandoned in the fall and was widely considered to have been salted by Murray and/or others.

In 1909, the Bear's Nest adit was reopened and some work was done that year and in 1910. The Treadwell Company leased the property in 1911 but did little work (*D-97*).

Workings and Facilities

There is a caved 1,500-foot adit at the Bear's Nest prospect.

Geologic Setting

The Bear's Nest adit cuts black phyllite, massive metagabbro, chloritic phyllite, and, near the face, the hornblende diorite of the Bear's Nest sill. The geology is very similar to that at the Treadwell Mine except that the mineralized Treadwell sill, which was projected to have been in the chlorite phyllite, is absent. The Bear's Nest sill contains some disseminated pyrite and pyrite-bearing quartz stringers but was reported to contain only low gold values (*D-50*).

Bureau Investigations

The Bureau did not examine the Bear's Nest prospect because the adit is caved and the surface is now covered by housing. Records from the Treadwell Company, however, proved that the mineralized Treadwell dike did not extend into the Bear's Nest prospect.

Resource Estimate

There is no known resource at the prospect.

Recommendations

The Treadwell ore body plunges away from the Bear's Nest. The area has been well explored by the original work and by the Treadwell Company. No other work is suggested.

MAS No.	MS No.
21120125	98, 99, 100, 102,164

References

D-50, D-96, D-97, D-133

JERSEY PROSPECT

Production

There has been no recorded production from the Jersey prospect.

History

The Jersey prospect (also known as the Jersey City) was discovered in 1896 by Joe Coombs, Jim Mitchell, and James Borbridge (figs. D-5, D-185). Between 1896 and 1899, they excavated five trenches, up to 30 feet long and 8 feet deep, and began sinking a shaft. In 1900, the Treadwell Company examined the property but little work was done until 1908, when Mike O'Connor, Mitchell, and S. Zenger acquired the ground and dug more trenches. A high-grade pocket was discovered in 1909. One nugget from the pocket was reportedly worth $100. The shaft reached a depth of 85 feet in 1909 and at least 16 feet of drifts were run.

There was no active work between 1910 and 1913 when the Jersey was purchased by the Treadwell Company. The Treadwell Company did some tunnel work from the bottom of shaft in 1914.

In 1914, the property was leased to Capt. Armstrong and Walter Bracking, who did some work in 1915. The Tyee Mining Company bought the property in 1916 and consolidated it with the Tyee and Holeman prospects. In May 1916, a diamond drilling program was started. The first hole, drilled behind the town of Douglas, reached a depth of 700 feet. The second hole was located on the beach near Mayflower Island. Drilling was abruptly halted in August and no further work was done (*D-97*).

Workings and Facilities

The Jersey prospect has an 85-foot deep, water-filled shaft with some drifting at the bottom, and 5 caved trenches.

Bureau Investigations

The Jersey prospect is underlain by interbedded felsic and black phyllites. Both units contain disseminated pyrite.

The Bureau examined the Jersey prospect and took one sample which contained 1.0 ppm gold (fig. D-185, No. 1).

Resource Estimate

There is too little rock exposure at the Jersey prospect to determine resources.

Recommendations

Trenching and diamond drilling are needed to determine the extent and grade of potential mineralization.

MAS No.
21120123

References

D-33, D-34, D-95, D-97, D-99

TREADWELL TAILINGS PLACER MINE

Production

Table D-14.—Gold and silver production from the Treadwell mill tailings

Year	Production oz Au	oz Ag
1922–1927	unknown production	
1943	40	—
1944	75	—
1945	60	—
1946	30	—
1949	115	12
Total	320	12

History

In 1923, Nels Anderson leased the tailings of the Ready Bullion mill and N. F. Gilkey leased the tailings from the Treadwell mills (figs. D-5, D-190). Anderson's operation lasted only a year but Gilkey worked intermittently through 1927 with unknown results.

Howard Hayes worked the tailings from 1943 to 1949 and, after working 4,900 tons of material, recovered 320 ounces gold and 12 ounces silver (*D-97*).

Workings and Facilities

There are no workings.

Geologic Setting

The deposit consist of the tailings from the various Treadwell stamp mills.

Bureau Investigations

The Bureau collected 0.1 yd^3 placer samples from the Treadwell 240-mill tailings (fig. D-190, No. 1), Mexican mill tailings (fig. D-190, No. 2), and Ready Bullion mill tailings (fig. D-190, Nos. 3, 4). Sample No. 4 was weighed and its gold content calculated to be 0.0004 oz/yd^3 gold.

The other samples are reported for information. The 240-mill sample contained 373 ppm gold and 19 ppm silver. The sample from the Mexican mill contained 261.9 ppm gold, 20 ppm silver, and 540 ppm copper. The other Ready Bullion mill sample carried 6.7 ppm gold and 14 ppm silver.

Resource Estimate

There are 15 MM tons of tailings with a grade estimated at 0.0004 ounces/ton gold (grade based on Bureau samples).

Recommendations

Systematic placer sampling is needed to determine the potential of the Treadwell tailings.

MAS No.
21120132

References

D-46, D-97, D-98, D-99

MEXICO & BELVEDERE PROSPECT

Production

There has been no recorded production from the Mexico & Belvedere prospect.

History

In June 1887, the Eastern Alaska Mining and Milling Company, from Wisconsin, purchased the Mexico, Fall,

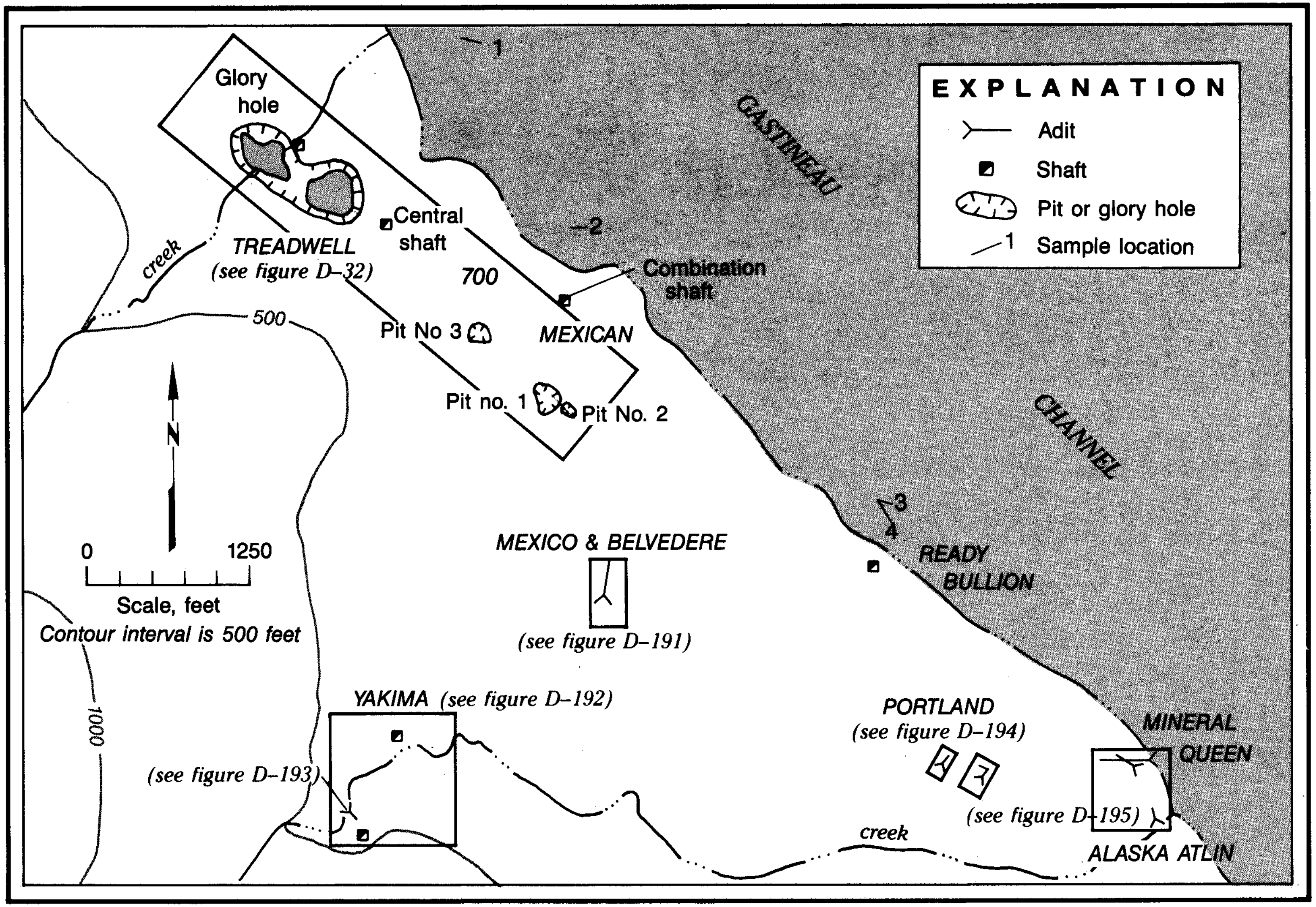

Figure D-190.—Mines and prospects in the Treadwell Mine area.

and Belvedere claims from N.L. Lenham and W.S. Corbett (figs. D-5, D-190). In October, an adit was started to cut a mineralized diorite body. By the fall of 1888, the adit had been driven 300 feet and mill sites had been staked at mouth of Sheep Creek.

In March 1889, the company announced that it had purchased an 80-stamp mill for the property but it never arrived. The company bought the Perseverance Mine and by 1890 had abandoned the Mexico & Belvedere work (*D-97*).

Workings and Facilities

There is an open 301-foot adit and a caved shaft on the Mexico claim.

Bureau Investigations

The Mexico & Belvedere adit cuts black phyllite and a diorite sill. The diorite may be a part of the Starr sill (actually a large sill) or may be a smaller, parallel body. The sill is about 140 feet wide. Several thinner sills (up to 10 feet) parallel the main sill on both sides.

The main sill is composed of hornblende diorite porphyry with a strong trachytic alignment of plagioclase phenocrysts. The rock contains phenocrysts of plagioclase and hornblende in a very fine-grained matrix.

The margins of the main sill and all of the thinner sills are hydrothermally altered and contain no mafic minerals but the interior portion of the main sill is mostly unaltered. Disseminated pyrite cubes are common (up to 5%) along sill margin areas and diminish toward the middle of the body.

Black phyllite along the margins of the main sill exhibits the effects of thermal metamorphism. It is poorly foliated, dense, and hard.

Sample Results

Seven samples were taken from the pyritic margins of the diorite but no sample contained more than 0.3 ppm silver or 0.07 ppm gold (fig. D-191, Nos. 1-7).

Resource Estimate

None of the samples taken had any significant metal values so there is no development target.

Recommendations

No work is recommended.

MAS No.	MS No.
0021120198	71A, 72A, 94

References

D-97, D-98

YAKIMA PROSPECT

Production

There has been no recorded production from the Yakima prospect.

History

The Yakima prospect was probably discovered in the early 1880's but little was done until Wes Weydelich acquired the property in late 1880's (figs. D-5, D-190). The 60-foot Davis adit was driven before 1898.

In 1898, the Yakima Mining Company was formed by James Moore. The next year, Moore sunk a shaft to 90 feet. The shaft was sunk to a total depth of 175 feet in 1900 and a 500-foot crosscut and 500-foot drift were run from the bottom of the shaft during the same year.

Dr. Lincoln, the Yakima Mining Company's primary financial backer, died in December 1900, and no further significant work was done on the prospect.

The Yakima property was examined by several companies, including the Treadwell Company, between 1907 and 1924 (*D-97*). In the late 1970's and early 1980's, the property was examined by Occidental Petroleum, and Noranda but both companies did only surficial work.

Workings and Facilities

The Yakima prospect has a water-filled shaft that is reported to be 175 feet deep with a 500-foot crosscut and 500-foot drift at the bottom (*D-7*). A second, shallower, water-filled shaft and the 60-foot-long Davis adit are also present.

Bureau Investigations

The Yakima area is underlain by felsic (quartz-sericite) phyllite bounded by green phyllite. The felsic phyllite outcrops in an area 1,000-feet wide and about 3,000-feet long. Locally, the unit includes layers of volcanic meta-conglomerate. All of the felsic phyllites contain disseminated pyrite in amounts ranging from 1% to 3%.

Surrounding the felsic phyllite are massive green phyllite of the Douglas Island metavolcanics. These rocks are moderately to poorly foliated near the felsic unit and become massive away from the contact. Disseminated pyrite is present in minor amounts.

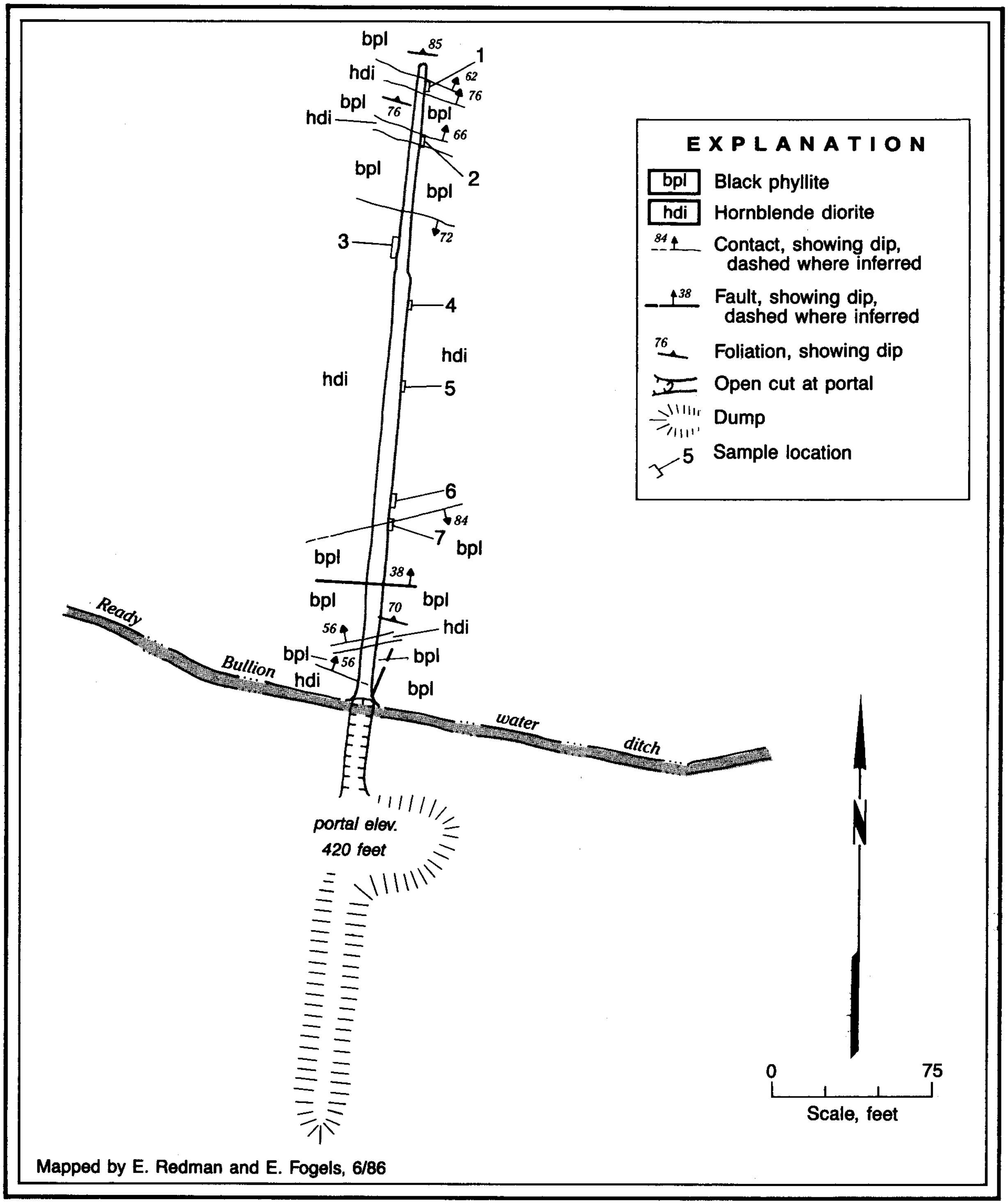

Figure D-191.—The Mexico & Belvedere prospect, showing geology and sample locations.

Mineralization at the Yakima consists of disseminated pyrite, with traces of galena and sphalerite, thin seams of sphalerite and galena, and mineralized quartz veins. The phyllite contains from 1% to 3% disseminated pyrite. The seams of sphalerite and galena are concordant and rarely more than 0.25-inch thick. A few quartz veins cut the phyllite and contain pyrite, sphalerite, and galena.

Sample Results

The Bureau mapped the Yakima prospect area (figs. D–192, D–193) and a total of 23 samples were collected. Two samples from the Moore shaft dump (fig. D–192, Nos. 14–15) contained no gold values above the detection limit (0.07 ppm) but four samples from the Davis adit (fig. D–193, Nos. 1–4) averaged 0.9 ppm gold, 3,160 ppm zinc, 1,120 ppm lead, and 272 ppm copper. Thirteen samples were taken from outcrops along Ready Bullion Creek and an adjacent creek (fig. D–192, Nos. 5–13, 16–19) but none contained more than 0.4 ppm gold. Four samples were collected near the small shaft (fig. D–192, Nos. 1–4). One selected sample (fig. D–192, No. 1) contained 11.3 ppm gold, 9.7 ppm silver, and 830 ppm copper but little lead or zinc. A sample taken from an outcrop near the shaft (fig. D–192, No. 4) contained 1.0 ppm gold, 11.0 ppm silver, 760 ppm lead, and 475 ppm copper.

Resource Estimate

There is a potentially large tonnage of low-grade gold with zinc, lead, and copper but the area is buried under muskeg and forest, preventing resource estimates without further work. The deposit occurs within felsic metamorphic rocks and is similar to the Alaska Treasure prospect.

Recommendations

The Yakima area has little exposed rock and needs to be drilled to determine the size and shape of the potential ore body. Reopening the Moore shaft and the underground workings should give a good indication of the prospect's potential.

MAS No.	MS No.
21120163	369

References

D-7, D-95, D-96, D-97, D-98, D-99, D-128, D-154

PORTLAND PROSPECT

Production

There has been no production from the Portland prospect.

History

Two adits were driven into what is now called the Portland claim (figs. D–5, D–190). The work was probably done before 1890.

Workings and Facilities

The Portland claim has two adits which contain 19 feet and 118 feet of workings, respectively. There are also several long trenches.

Bureau Investigations

The Portland claim is underlain by a metamorphosed ultramafic sill, chlorite phyllite, black phyllite, and altered diorite. The ultramafic consists of amphibolite like that at the Mineral Queen prospect. In the longer adit, the ultramafic appears to intrude the green phyllite which grades into black phyllite. The black phyllite is intruded by two altered diorite sills in the longer adit.

Two types of mineralization occur at the Portland claim. First, along the ultramafic-chlorite phyllite contact, the phyllite has been silicified and impregnated with disseminated pyrite. The silicification decreases away from the contact. The other type of mineralization occurs in the altered diorite sills. Secondly, the diorite sills are similar to the Starr and Bear's Nest bodies and probably consist of albitized diorite with disseminated pyrite. Alteration has destroyed all mafic minerals in the diorite.

Sample Results

The Bureau mapped and sampled the two adits and several trenches on the prospect (fig. D–194). Eight samples were collected (fig. D–194, Nos. 1–8) and none contained gold values over 0.1 ppm. Sample No. 6 (fig. D–194) contained 164 ppm molybdenum from quartz in amphibolite.

Resource Estimate

Low gold values give the Portland prospect a low development potential.

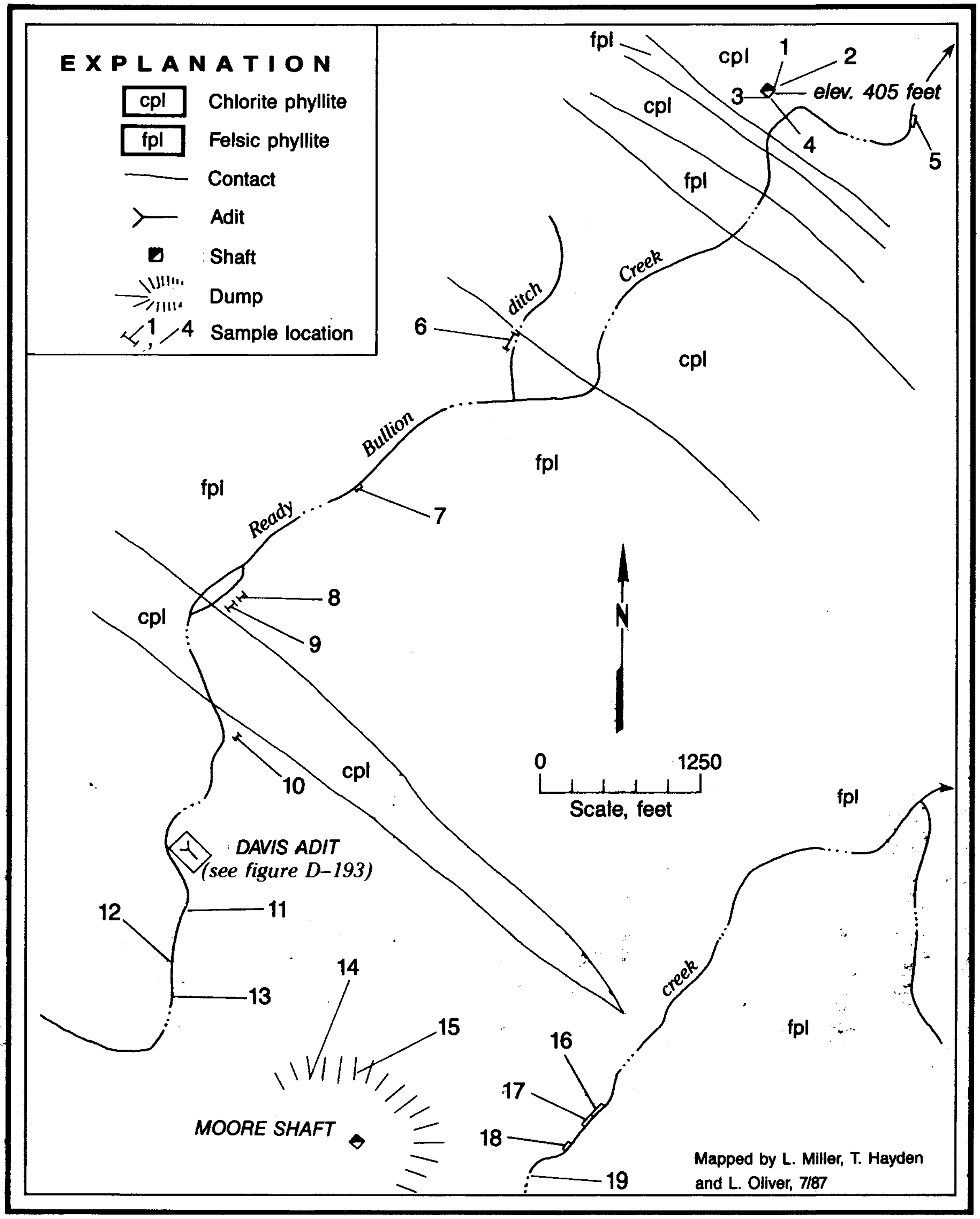

Figure D-192.—The Yakima prospect area, showing workings, geology, and sample locations.

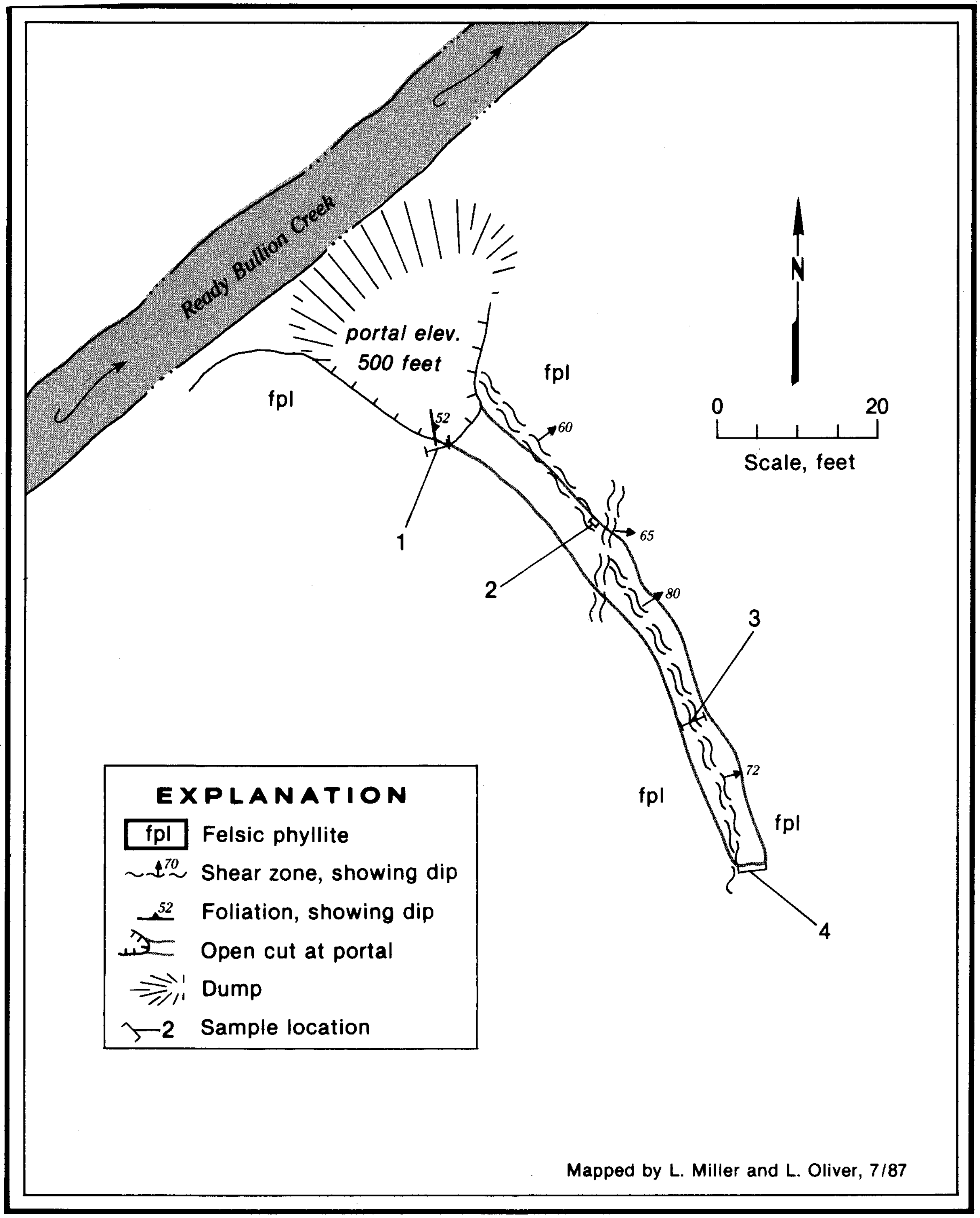

Figure D-193.—The Davis adit, Yakima prospect, showing geology and sample locations.

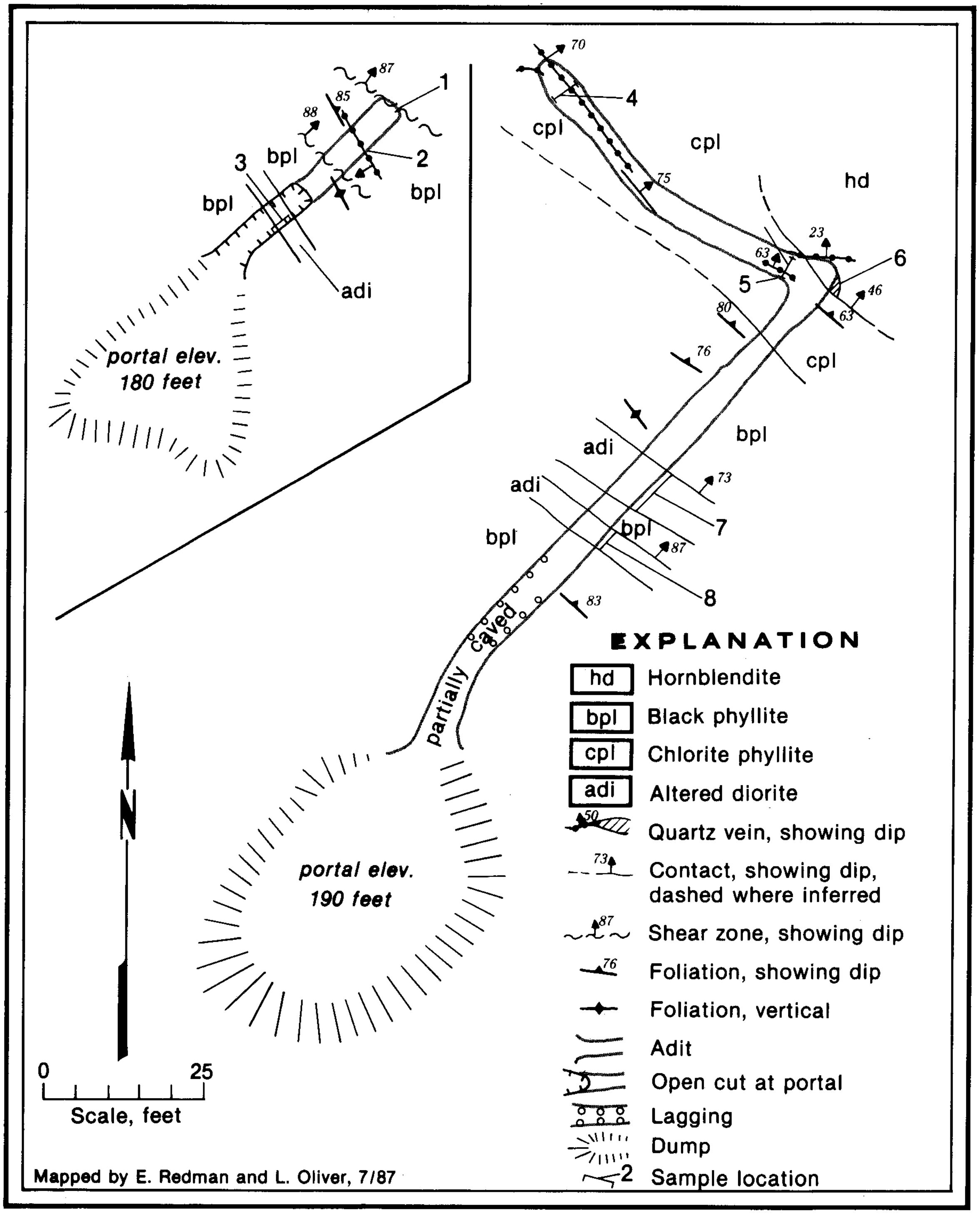

Figure D-194.—Portland adits, showing geology and sample locations.

Recommendations

Soil sampling and geologic mapping could determine whether metals are present in the area.

MAS No.	MS No.
21120210	1458

References

None.

MINERAL QUEEN PROSPECT

Production

There has been no reported production from the Mineral Queen prospect.

History

The Mineral Queen Mining Company drove a 410-foot adit in 1887 (figs. D-5, D-190). A second, shorter adit was probably also driven at this time. The work was abandoned by 1888.

Some time after 1900, the first 100 feet of the longer adit were enlarged and used for storing explosives by the Ready Bullion Mine (*D-97*).

Workings and Facilities

There are three open adits on the Mineral Queen prospect, which have 410 feet, 40 feet, and 18 feet of workings. There is also an open cut and several long, sloughed-in trenches.

Bureau Investigations

The Mineral Queen prospect is underlain by a coarse- to fine-grained amphibolite. The amphibolite contains disseminated pyrrhotite and traces of chalcopyrite. Locally, portions of the amphibolite have been strongly sheared into chlorite phyllite or schist. In the longer adit, a 20-foot section of the amphibolite has been sheared into chlorite phyllite which also contains foliation-concordant quartz veins and abundant pyrite cubes up to 0.5 inches on a side. Molybdenite is also common both on the margins of the quartz veins and in the foliation of the phyllite.

In the upper adit, a 6-foot-thick quartz vein in chlorite phyllite contains small fragments of an altered dioritic rock that strongly resembles the altered albite diorite found at the Treadwell mines. It appears that the diorite was intruded first and was then engulfed by quartz.

Sample Results

The Bureau mapped three adits, an open cut, and outcrops (fig. D-195 to D-197). A total of 20 samples were collected from the prospect. Eight samples (fig. D-196, Nos. 1-8) were taken in the lower Mineral Queen adit. Three samples of pyritic amphibolite in the back half of the adit contained minor copper but only traces of gold. Four samples (fig. D-196, Nos. 4-7) taken across 11.5 feet of a greenschist band exposed across from the first drift averaged 7.5 ppm gold, 2.3 ppm silver, and 1,184 ppm copper. A 15-foot sample across the same zone (fig. D-196, No. 8) contained 5.7 ppm gold, 0.1% copper, and 0.13% molybdenum.

Nine samples of quartz (fig. D-197, Nos. 1-9) were collected from the upper adit. Seven of the samples from the adit had a weighted average of 2.1 ppm gold over an average vein width of 2.0 feet. One sample (fig. D-197, No. 3) contained 441 ppm gold (reassay yielded 433 ppm gold). The samples also averaged 132 ppm molybdenum (with a high value of 635 ppm molybdenum). Three samples carried 11 ppm, 12 ppm, and 34 ppm silver.

Two samples of pyritic chlorite schist (fig. D-195, No. 1-2) were collected from outcrops on the prospect. The sample taken near the portal to the lower adit (fig. D-195, No. 1) contained 51.9 ppm gold, 5.7 ppm silver, and 360 ppm molybdenum. The other sample was taken from an open cut south of the adit (fig. D-195, No. 2). It contained 0.1 ppm gold, 3.0 ppm silver, and 35 ppm molybdenum.

A single sample (fig. D-195, No. 3) was also taken from a short adit cutting black phyllite along Ready Bullion Creek. It contained 0.9 ppm gold.

Resource Estimate

The veins are poorly exposed and occur at widely separated localities. The relationship between the exposed vein segments is unknown. There is an indicated resource in the upper adit of 800 tons grading 0.6 ounces/ton gold. In the lower adit, there is an inferred resource of 5,225 tons averaging 0.22 ounces/ton gold, 0.07 ounces/ton silver, and 0.12% copper. Gold values from the veins give the prospect a moderate development potential.

Recommendations

The Mineral Queen veins should be traced by soil sampling, trenching, and/or drilling to determine the extent of mineralization.

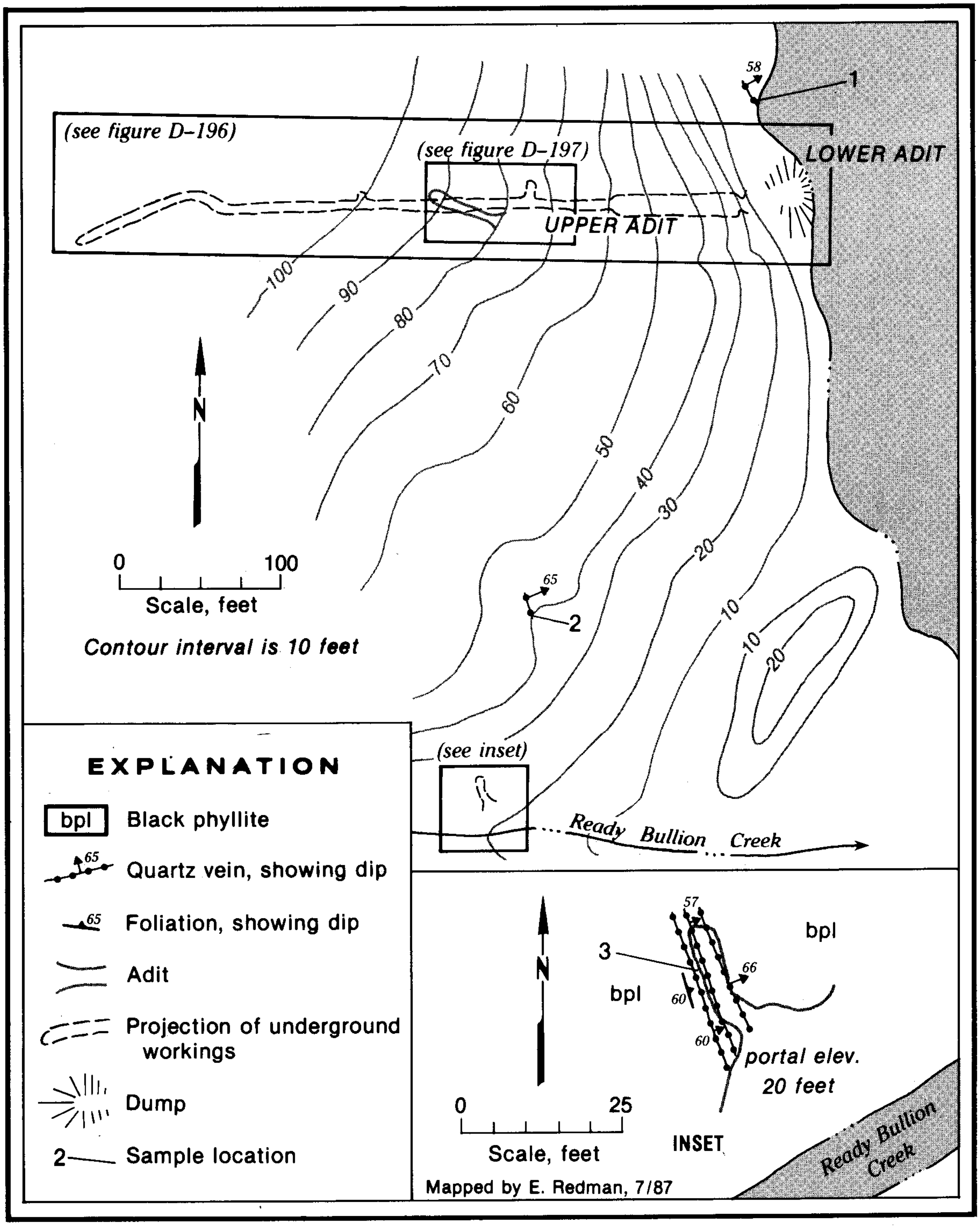

Figure D-195.—The Mineral Queen prospect area, showing workings and sample locations.

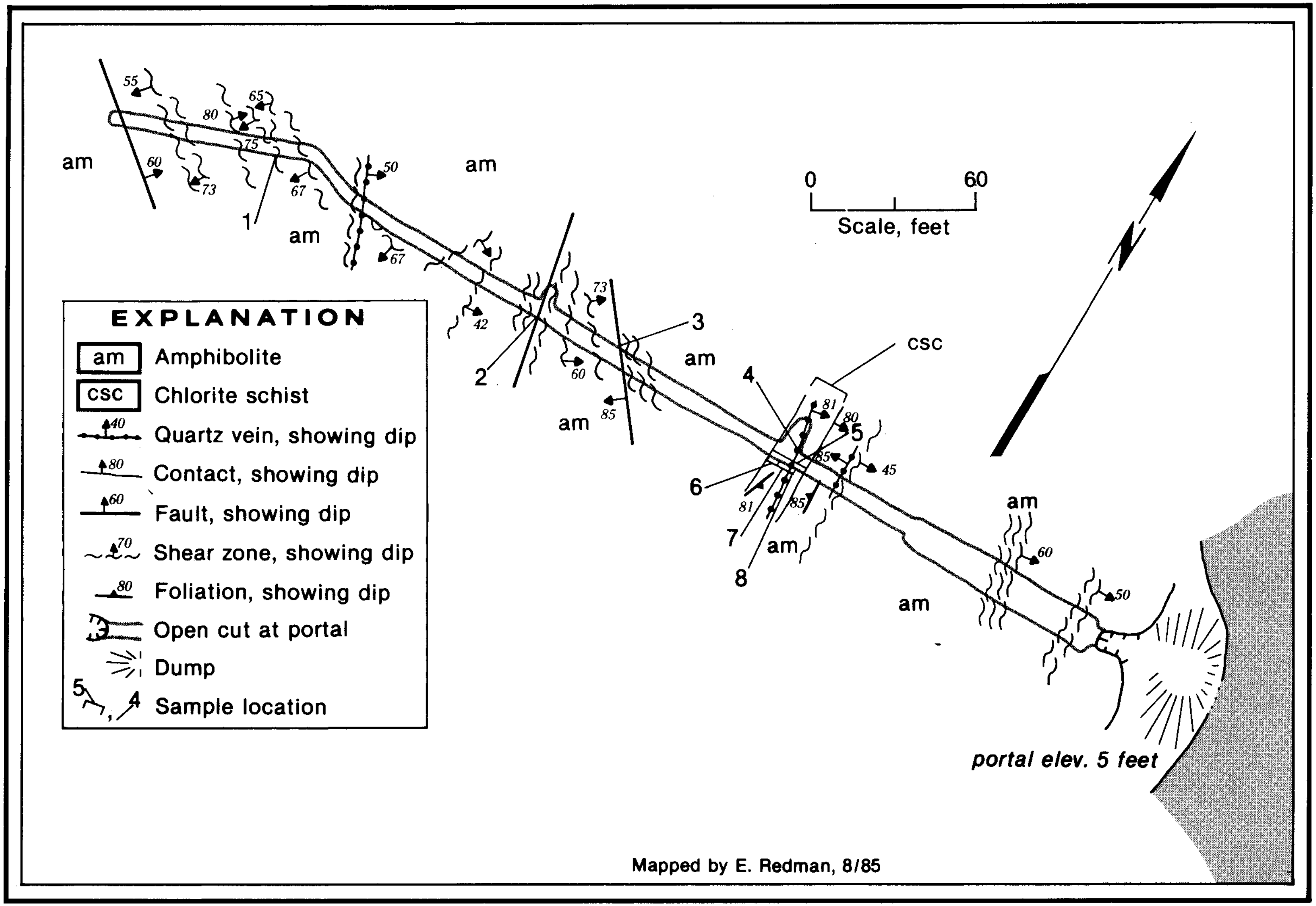

Figure D-196.—The lower Mineral Queen adit, showing geology and sample locations.

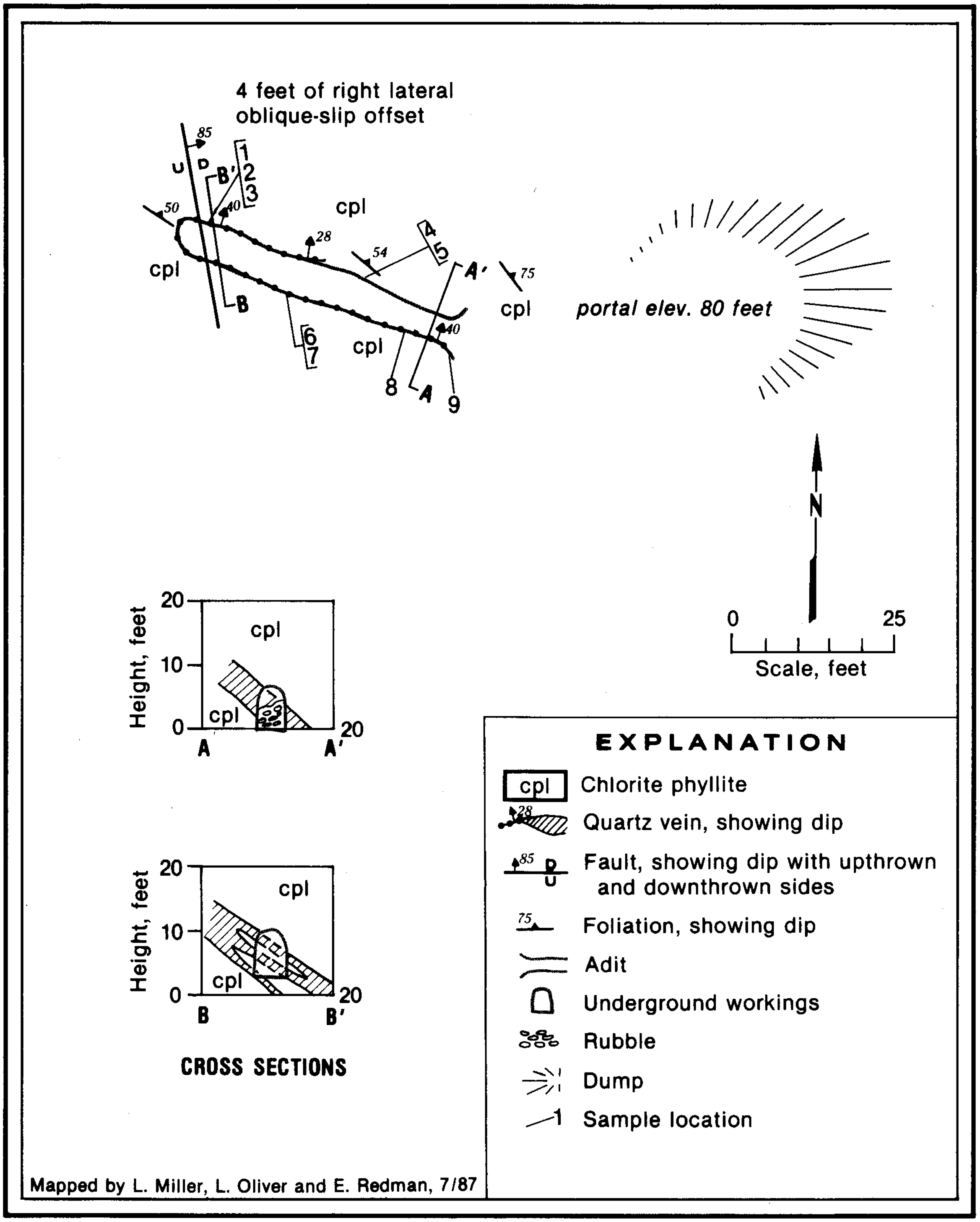

Figure D-197.—The upper Mineral Queen adit, showing geology and sample locations.

MAS No.	MS No.
21120209	342

References

D-97, D-98, D-99

ALASKA ATLIN PROSPECT

Production

There has been no production from the Alaska Atlin prospect.

History

Dr. Lovett, editor of the Daily Alaska Dispatch, and John Wagner formed the Alaska Atlin Co. in 1901 to work ground adjacent to and south of the Ready Bullion Mine (figs. D-5, D-190). The men purchased several claims, including the Homestake and Atlin, using financing from eastern capitalists.

By late 1901, several buildings had been put up and a tunnel had been started. No other work was reported after 1901 (*D-97*).

Workings and Facilities

Two short shafts and a tunnel are reported on the Alaska Atlin prospect (*D-97*).

Geologic Setting

Most of the Alaska Atlin prospect is underlain by black phyllite. A greenstone unit crops out on the beach near the mouth of Ready Bullion Creek and the claim group included portions of the felsic phyllite and greenstone that occur in the Nevada Creek area. A few thin foliation-concordant quartz veins occur in the black phyllite. Other than minor pyrite, no other sulfide minerals are present.

Bureau Investigations

The Bureau did not examine any of the workings at the Alaska Atlin prospect.

Resource Estimate

The Alaska Atlin prospect was staked to cover the projected southern extension of the Ready Bullion dike. The dike does not extend into the prospect, therefore, there is no known resource.

Recommendations

No work is recommended.

MAS No.
0021120161

References

D-96, D-97, D-99, D-158

ALICE, ULELA, ZELDA PROSPECT

Production

There has been no production from the Alice, Ulela, Zelda claims.

History

The Alice, Ulela, and Zelda claims were located in 1912 by J.B. Martin (figs. D-5, D-198). By 1917, three adits, a shallow shaft, and several trenches had been completed on the claims. The three claims were surveyed for patent in 1917 and patented in 1920 (*D-81*).

Workings and Facilities

There is a 12-foot adit and an open cut on the Ulela claim; two water-filled shafts, one 7.5 feet deep, and a few trenches on the Alice claim; and a 6-foot adit and a caved adit on the Zelda claim.

Bureau Investigations

All the workings exposed black phyllite cut by thin, discontinuous, foliation-concordant quartz veins that contain minor amounts of pyrite.

The Bureau mapped and sampled the adits, shafts, and trenches on the claims (fig. D-199). Two samples were collected from the Ulela claim (fig. D-199, Nos. 1-2), four from the Alice claim (fig. D-199, Nos. 3-6), and one was taken at the Zelda claim (fig. D-199, No. 7). All gold values were below detection limit except for the sample from a quartz vein in the Zelda adit which contained 1.7 ppm gold.

Resource Estimate

No significant metal values were found on the claims.

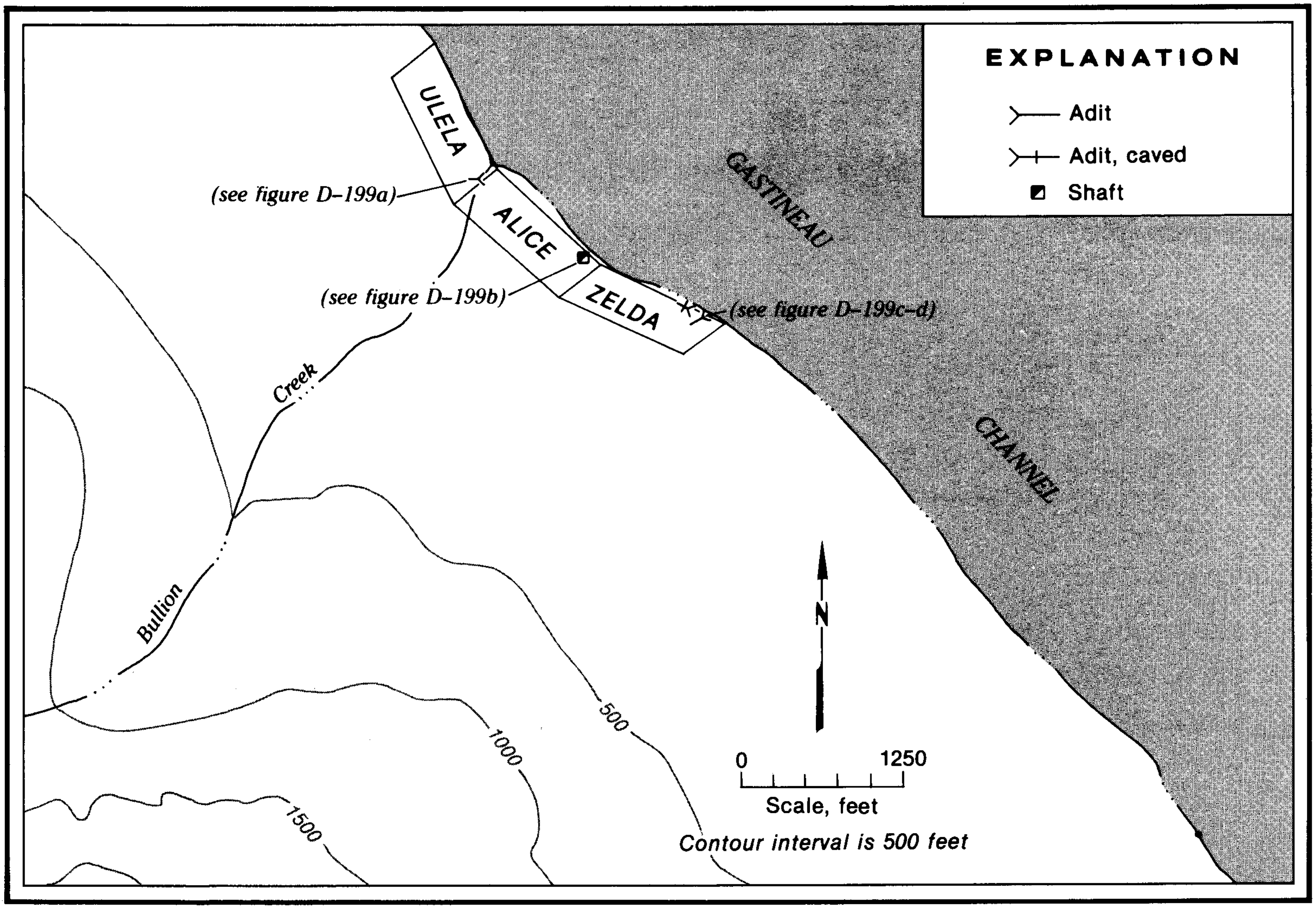

Figure D-198.—Prospects in the Bullion Creek area.

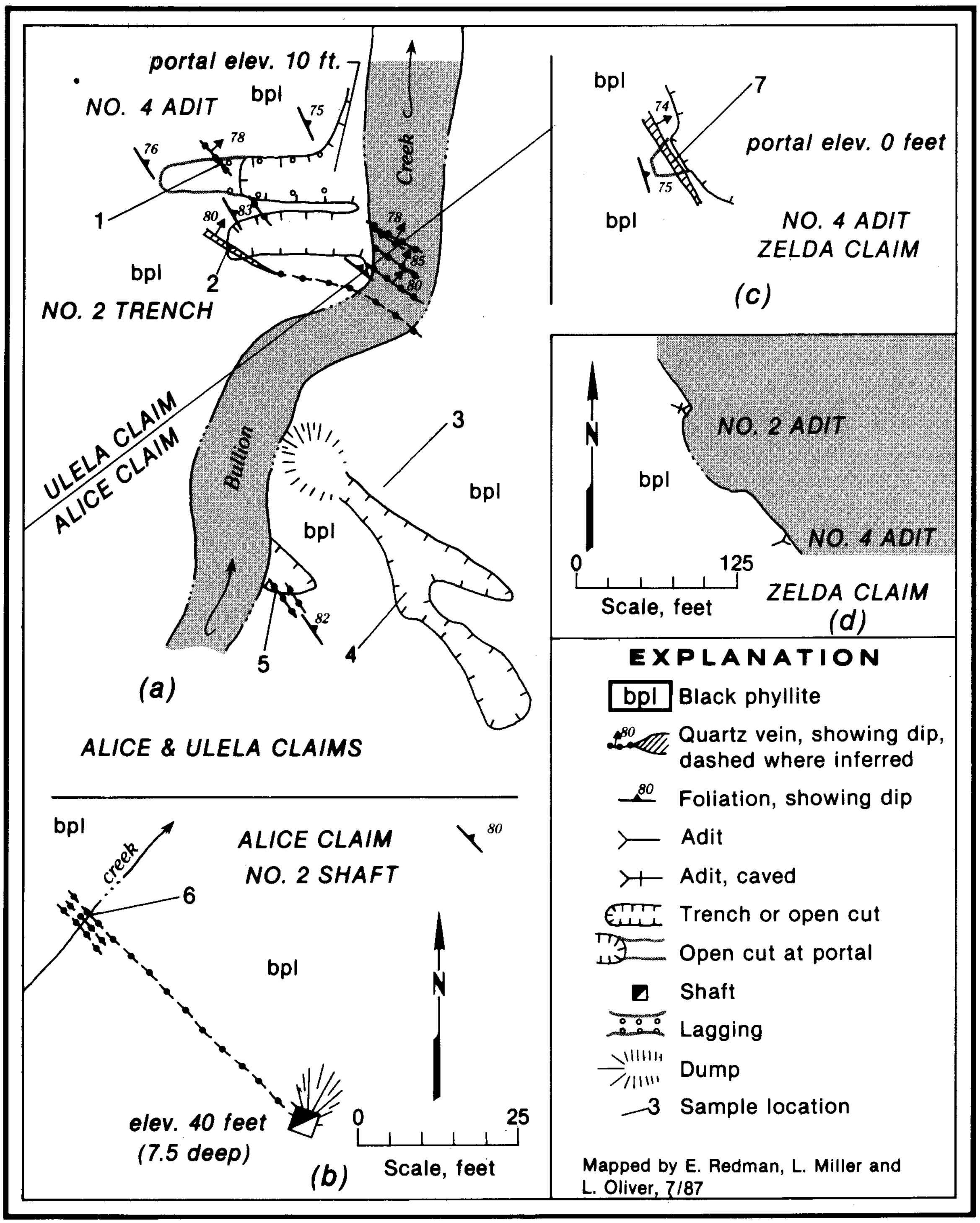

Figure D-199.—Workings and sample locations on the Alice, Ulela, and Zelda claims.

Recommendations

No work is recommended.

MAS No.	MS No.
21120217	1062

References

D-81

ALASKA TREASURE PROSPECT

Production

Approximately 700 to 800 tons were mined in 1906, but recovery is uncertain. About 1.5 tons of hand-picked ore sent to a smelter in 1906 resulted in $11,000 (equivalent to 532 ounces of gold).

History

Mineralization was discovered in the Nevada Creek area in 1884 by William Thompson but no development was done until Col. Frank Stone and Percy Morgan acquired the ground and formed the Alaska Treasure Gold Mining Company (figs. D-5, D-200). In 1904, 25 employees were at work on the property. During 1905, a crew of about 50 were at work putting in a road from the beach, erecting buildings, and drilling tunnels. By the end of the year, the Corbus, Mill, and Hudson adits, the Hogback shaft, and 700 feet of trenches had been completed.

About 1.5 tons of hand-picked ore was sent to a smelter in 1906 and returned $11,000. In October 1906, a 20-stamp mill arrived, was erected, and began crushing ore on Thanksgiving Day (fig. D-201). Ten stamps were idled almost immediately because of a broken part, and the other stamps ran for two weeks until freeze-up.

No work was done on the Alaska Treasure lodes during 1907-1908 but minor placer mining was done at the mouth of the creek by Bob Sanders in 1908.

In 1909, a boarding house and bunkhouse were erected and a telephone line hooked up. Work also began on the Main Working Tunnel which was extended to a length of 3,400 feet by October (fig. D-202). Dissension among the company's backers stopped work in 1911 and 1912.

John Lynch bought the Alaska Treasure property at a foreclosure sale in 1913 and started work on the "60-foot vein", in the Main Working Tunnel. Only minor work was done in 1914 but in October 1915, a crew continued drifting along the "60-foot vein." Work continued until early 1916 when the drift was 500 feet long.

No work was done after 1916. A foreclosure sale in 1921 raised hopes but no additional work was done until the workings were sampled in 1935. AlVenCo sampled mapped, and drilled the prospect in 1968-1969 (*D-97*). The property is currently leased to BP Minerals.

Workings and Facilities

There are four adits and one shaft at the Alaska Treasure prospect with a total of 5,509 feet of workings. These include the Main Working Tunnel (3,350-foot adit and 760 feet of drifts), the Hudson Tunnel (657-foot adit, 280 feet of drifts, and a 145-foot water-filled shaft), the caved Corbus Tunnel (130-foot adit), the Mill adit (61-foot adit, 26 feet of drifts, and a water-filled shaft), and the water-filled Hogback Shaft (100 feet deep).

Bureau Investigations

The Nevada Creek area contains a large mass of felsic metavolcanic rocks within the Douglas Island metavolcanics (fig. D-203). These rocks consist of felsic phyllites, felsic volcanic metaconglomerates, and pale green phyllite. All of the felsic rocks contain disseminated pyrite. The felsic units are composed of quartz, feldspar, and, probably, sericite. The Douglas Island metavolcanics are composed of massive greenstone layers with some thin interbedded phyllitic units. Along Nevada Creek, the felsic unit is 1 mile wide but a large NE-SW-trending fault south of the creek displaces the felsic package to the south. The unit appears to pinch to the NW.

Rock units and foliation at the Alaska Treasure prospect trend 140° and dip steeply NE. At the Homestake prospect the foliation trend is about 015° and foliation at the Red Diamond is about 075° (fig. D-203). The rough outcrop pattern of the felsic phyllites of the Alaska Treasure and Homestake prospects suggests a large anticline that plunges steeply to the SE, much like those at the Alaska Juneau Mine. The Nevada Creek area would represent the thickened fold hinge which would explain the thick sequence of felsic rocks found there.

Mineralization at the Alaska Treasure prospect consists of widespread disseminated pyrite in the felsic phyllite, thin, concordant bands (to 2 inches) of massive sphalerite, pyrite, and galena in the felsic phyllite, and remobilized quartz veins associated with the mineralized zone. The disseminated pyrite occurs as small cubes (up to 0.05 inches on a side) that form between 2% and 5% of the felsic units. The thin, massive sulfide bands are scattered through the most pyrite-rich section of the phyllite and are associated with those areas which also

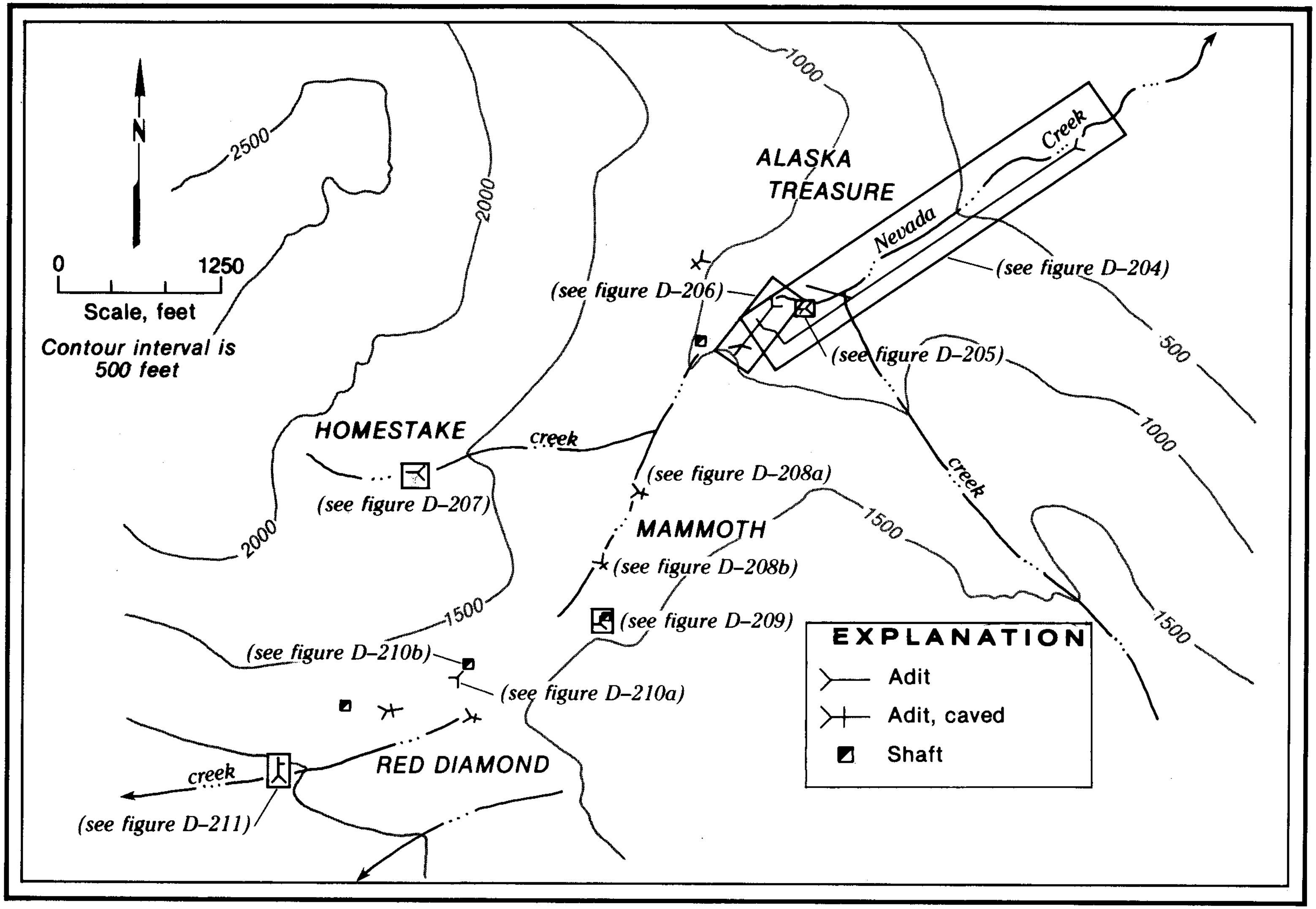

Figure D-200.—Prospects in the Nevada Creek area.

Figure D-201.—Remains of the Alaska Treasure 20-stamp mill which operated for only two weeks. Although extensively developed by 5,509 feet of workings, the Alaska Treasure prospect never produced more than a few hundred tons of ore because stamps were not able to recover the gold from the disseminated pyrite in the deposit.

contain gold. The remobilized veins occur in faults or fractures away from the center of mineralization and contain up to 30% pyrite, sphalerite, galena, and chalcopyrite.

Sample Results

The Bureau mapped the Hudson, Mill, and Main Working adits and the outcrops in Nevada Creek (figs. D-203 to D-206). A total of 68 samples were collected, including 30 from the Hudson Tunnel (fig. D-206, Nos. 7-36), 23 from the Main Working Tunnel (fig. D-204, Nos. 1-23), 8 from the Mill adit (fig. D-205, Nos. 1-8), one from the Hogback shaft (fig. D-203, No. 2), and 5 from the Hudson dump and nearby outcrops (fig. D-206, Nos. 1-6). In addition, a 275-pound metallurgical sample was collected from the ore chutes and mineralized portions of the Hudson Tunnel.

In the Hudson Tunnel, at an elevation of 800 feet, a 90-foot zone averaged 3.4 ppm gold and included thin stratiform bands of sphalerite, with minor galena, and chalcopyrite (fig. D-206, Nos. 13-32, 34). The lower Main Working Tunnel, at elevation 200 feet, was driven to undercut the down-dip extension of this zone but only barren rock was found (fig. D-204). About 775 feet NE of the projected extension of the Hudson Tunnel zone in the Main Working Tunnel, the tunnel intercepted a mineralized zone called the "60-foot vein" by the original workers (*D-97*). This zone is lithologically and mineralogically similar to the 90-foot zone in the Hudson Tunnel. A 20-foot section of the "60-foot vein" averaged 1.9 ppm gold in the main tunnel (fig. D-204, Nos. 4-12). Samples taken about 200 feet down the drift on the 60-foot vein averaged 0.3 ppm gold for a 25-foot interval (this may be a low value because a higher-grade area with a quartz vein was not sampled at this point; a sample along the vein 30 feet east assayed 4.5 ppm gold). The Hudson zone and the 60-foot vein may be the same horizon that has been faulted or folded.

A sample from a rich quartz vein in a fault that cuts the Hudson Tunnel (fig. D-206, No. 10) contained 75.4 ppm gold, 47.0 ppm silver, 5.10% zinc, and 3.57% lead. A sample taken from an outcrop along Nevada Creek (fig. D-206, No. 3) that probably lies on the same fault yielded 77.9 ppm silver, 0.4 ppm gold, 9.4% lead, and 15.9% zinc.

Several bags of concentrate material, containing mostly pyrite, were found near the concentrating tables in the Hudson mill. A sample of this material (fig. D-206, No. 5) contained 26.1 ppm gold, 19.0 ppm silver, 1.78% zinc, and 1.02% lead.

The metallurgical sample from the Hudson Tunnel assayed 3.8 ppm gold. A cyanide amenability test resulted in gold recovery of 77.6%.

Resource Estimate

There is an indicated resource in the Hudson Tunnel of 240,000 tons of material with an average grade of 0.1 ounces/ton gold and an inferred resource of 5.6 MM tons with an average grade of 0.05 ounces/ton gold.

Recommendations

The mineralized zone in the Hudson Tunnel should be traced both vertically and horizontally by drilling to determine whether its higher gold values form a potentially economic ore body.

MAS No.	MS No.
21120127	575, 724, 1526

References

D-17, D-29, D-58, D-95, D-96, D-97, D-98, D-99, D-130, D-154, D-158, D-161

HOMESTAKE PROSPECT

Production

There has been no production from the Homestake prospect.

History

In 1904, Dr. Lovett staked claims in upper Nevada Creek for the Alaska Homestake Company (the Homestake was thought to be the Alaska Atlin in Redman and others, 1986 (*D-99*), but subsequent research proved otherwise (*D-98*) (figs. D-5, D-200). An adit with 179 feet of workings was driven in 1905 but there was no further work after that year (*D-97*).

Working and Facilities

The Homestake prospect has a 145-foot adit, with a 34-foot drift, and open-cut.

Bureau Investigations

The Homestake prospect is composed of light-colored felsic (quartz, sericite) phyllite that contains local felsic metaconglomerates. The unit is highly iron-stained because it contains 1% to 7% disseminated pyrite. The pyrite occurs both as cubes and as small foliation-parallel lenses up to 0.1 inches long. Random clots of sphalerite

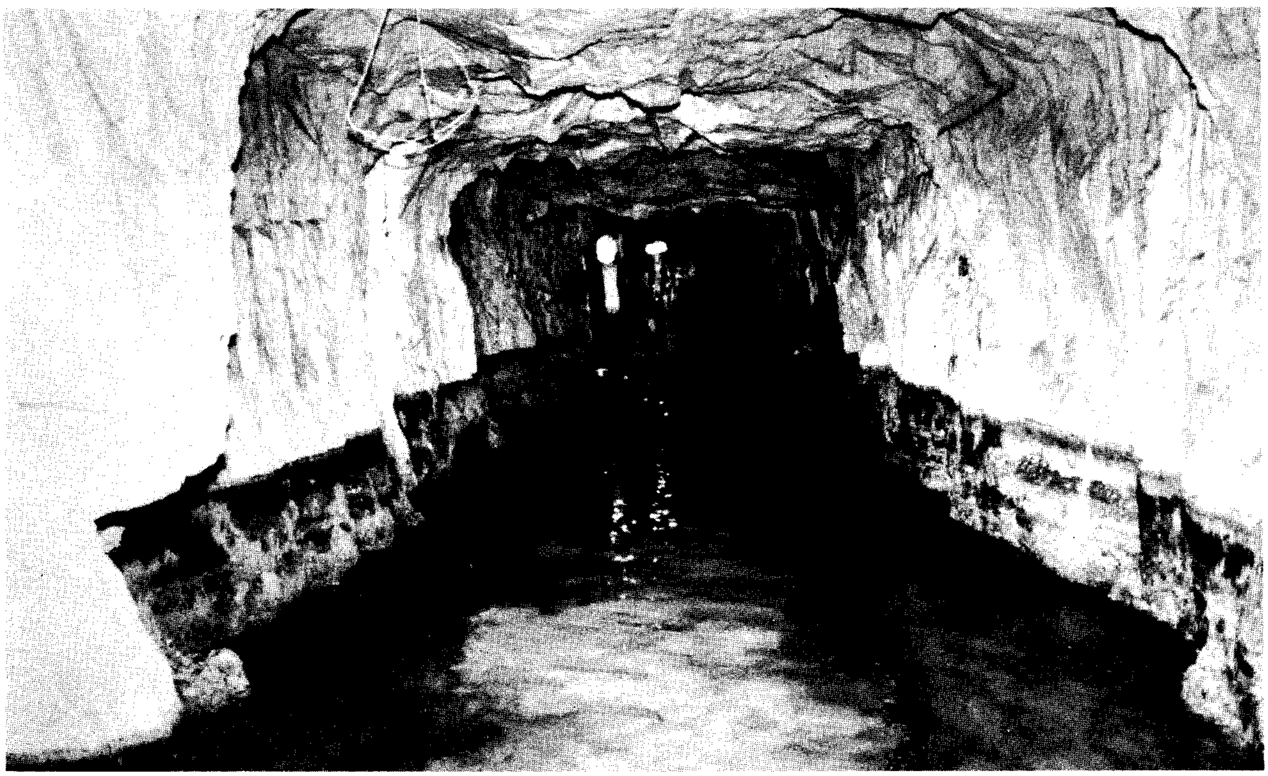

Figure D-202.—Main Working Tunnel at the Alaska Treasure prospect.

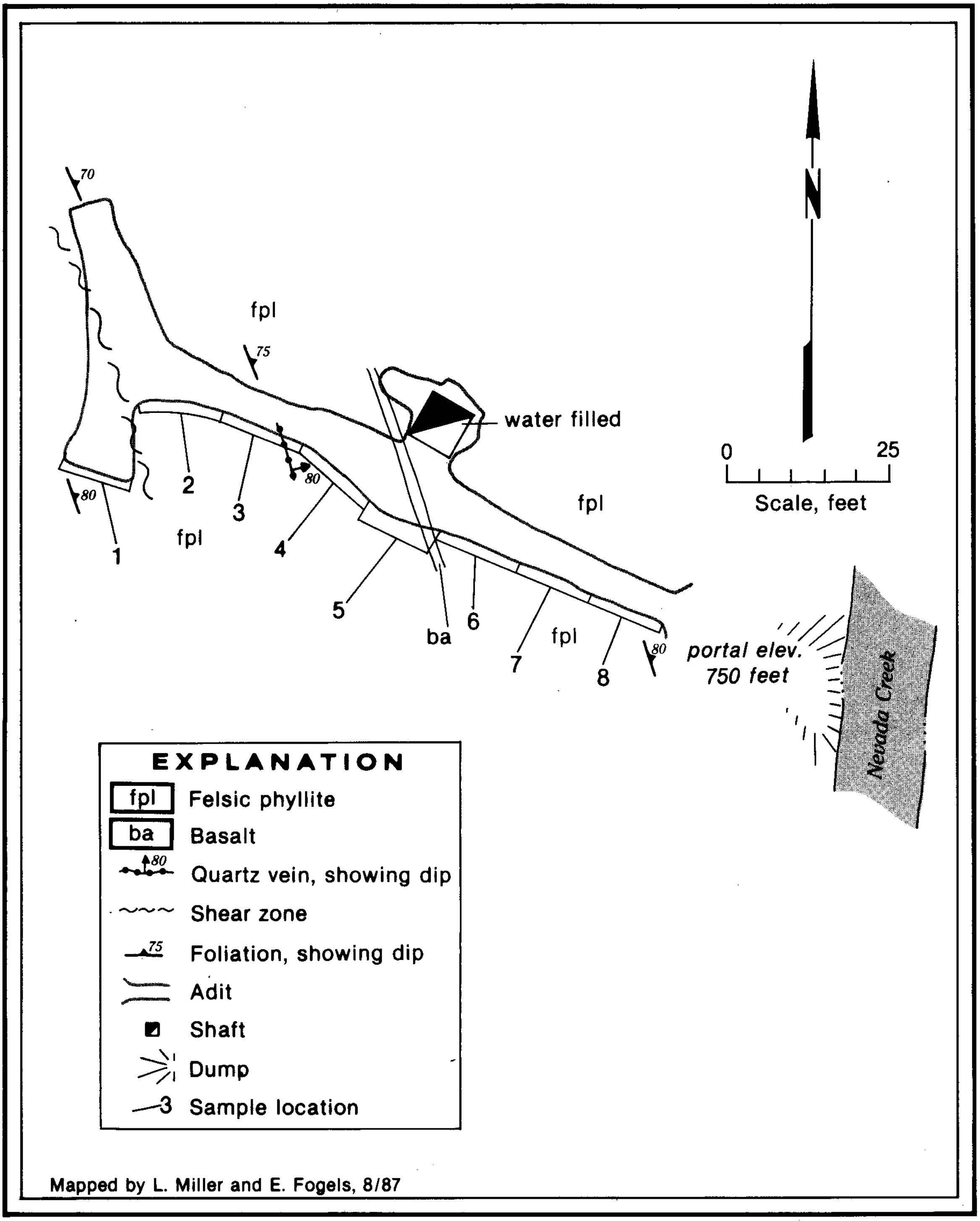

Figure D-205.—The mill adit, Alaska Treasure prospect, showing geology and sample locations.

and galena occur on the rib across from the drift (fig. D-207).

A quartz vein up to 6 inches thick in the drift also contains small amounts of sphalerite and galena. The vein can be traced to the open-cut 70 feet south of the adit. The vein is up to 14 inches thick but it breaks up into several thin splays in the open-cut.

Sample Results

The Bureau mapped the adit and open cut at the prospect (fig. D-207) and 11 samples were collected in the adit (fig. D-207, Nos. 1-11), 2 samples were taken in the open cut (fig. D-207, Nos. 12-13), and 1 other was taken from outcrops in the area (fig. D-203, No. 8). Gold values ranged from nil to 0.8 ppm and 2 samples contained 2.1 ppm and 12.0 ppm silver. Six of the pyritic felsic phyllite samples from the adit yielded from 379 ppm to 2,900 ppm zinc. Seven samples contained between 203 ppm and 580 ppm lead, and 3 samples carried 195, 198, and 735 ppm copper.

Resource Estimate

There is a large volume of bleached, light-colored pyritic rock and, potentially, higher grade mineralization could exist elsewhere in the area.

Recommendations

The Homestake area should be carefully prospected to determine if higher metal values are present anywhere in the area. Trenching and drilling could be of benefit.

MAS No.
21120211

References

D-97, D-98, D-99 (listed mistakenly as Alaska Atlin)

MAMMOTH PROSPECT

Production

There has been no known production from the Mammoth prospect.

History

Two adits were driven into the Mammoth prospect in 1905 and assessment work was done in 1906 (figs. D-5, D-200). There are no reports of any further work (*D-161*).

Workings and Facilities

The Mammoth prospect has two caved adits with an estimated 100 to 200 feet of workings each (based on the size of the dumps).

Bureau Investigations

The Mammoth prospect lies adjacent to and north of the large fault which roughly follows Nevada Creek (fig. D-203). Rocks consist of interlayered chlorite phyllite and lesser felsic (quartz, sericite) phyllite both of which contain 1% to 3% disseminated pyrite.

Sample Results

The Bureau examined the dumps of the two caved adits, collecting five samples from the lower adit dump (fig. D-208, Nos. 1-5), two samples from the upper adit dump (fig. D-208, Nos. 6-7), and three samples from outcrops in the area (fig. D-203, Nos. 9-11), and a stream sediment sample (No. 12).

One sample from the lower dump contained 3,580 ppm lead, 860 ppm zinc, 730 ppm copper, and 9.3 ppm silver but no significant gold was found. Samples from the upper dump contained 0.4 ppm and 0.5 ppm gold.

Resource Estimate

Low gold values give the Mammoth prospect a low potential.

Recommendations

The Mammoth adits should be reopened to determine what originally interested the prospectors. Trenching could also be done on the steep hillside above the workings.

MAS No.	MS No.
21120222	723

References

D-99, D-161

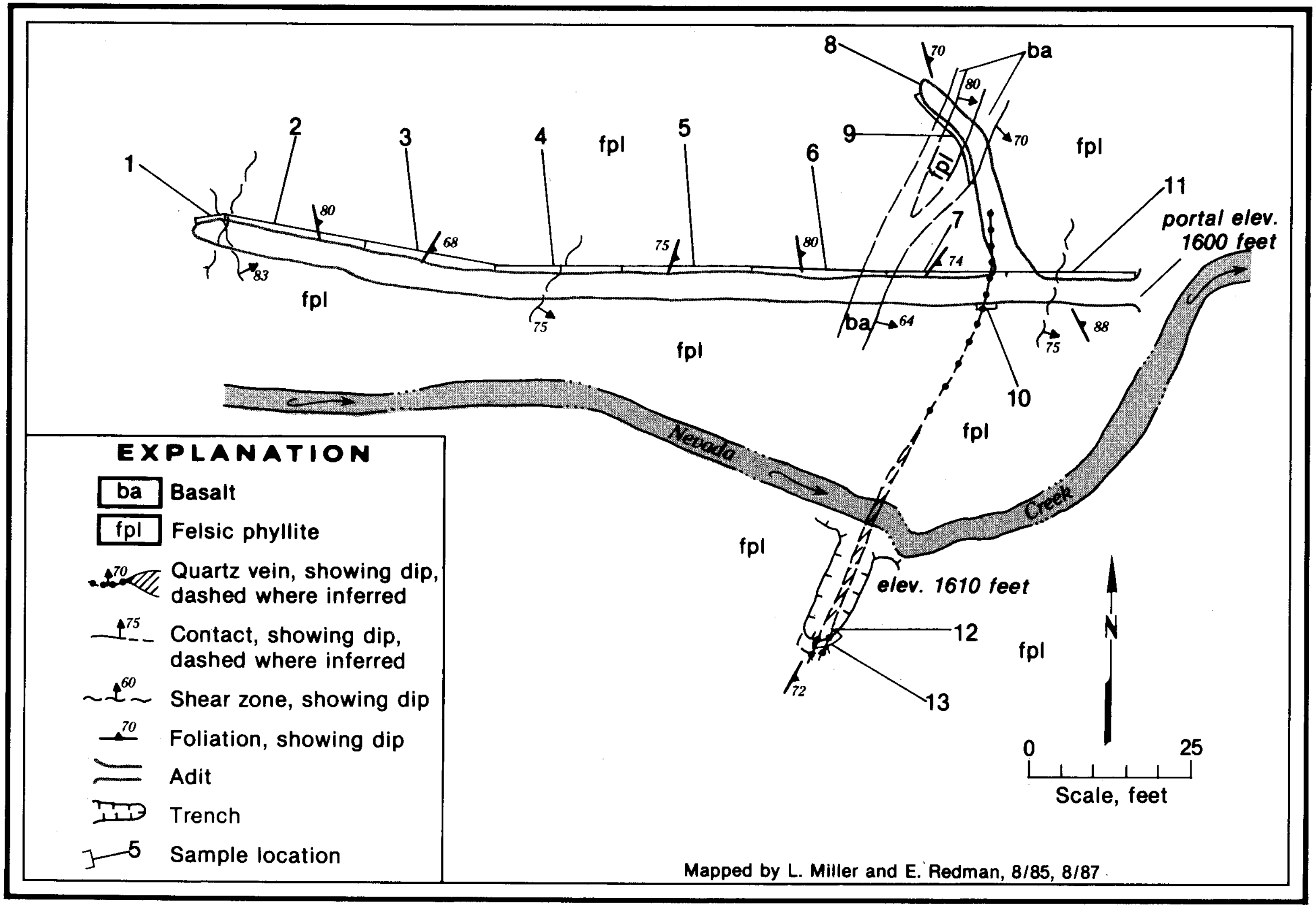

Figure D-207.—The Alaska Homestake prospect, showing geology and sample locations.

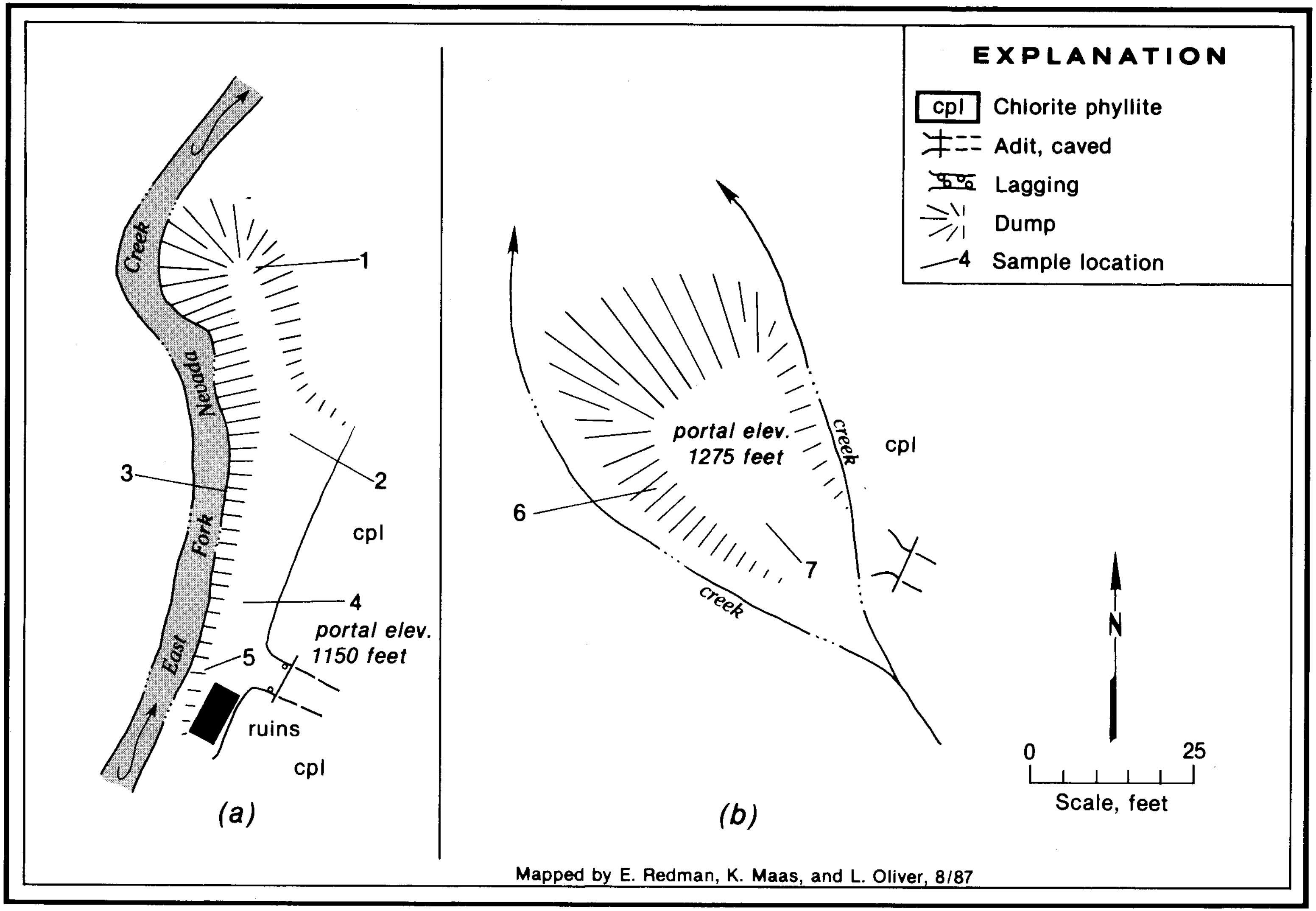

Figure D-208.—The Mammoth prospect, showing geology and sample locations.

RED DIAMOND PROSPECT

Production

There has been no recorded production from the Red Diamond prospect although a test sample was sent through the Treadwell stamp mill.

History

The Red Diamond prospect was discovered in 1902 by Col. William Winn, Frank Cook, and California Joe (figs. D-5, D-200). They staked nine claims and drove several short adits by 1904. In 1905, Winn and Cook extended an old tunnel for over a hundred feet and intersected an ore body with "rich samples". That same year, the Treadwell Company ran a mill test of Red Diamond ore, then leased the property. The company used 20 men to drive an adit with 240 feet of workings by December.

In 1906, Winn sank a 75-foot shaft but no work was done in 1907. The shaft was completed and a hoist was installed in 1908, but only minor work was done in 1909. Between 1909 and 1913, several companies examined the Red Diamond property but no work was done (*D-97*).

Workings and Facilities

The Red Diamond prospect has three open adits that have 235 feet, 245 feet, and 100 feet of workings. In addition, there are two caved adits, a caved shaft, 3 water-filled shafts (7 feet, 20 feet, and 35 feet deep), and many trenches.

Bureau Investigations

The Red Diamond prospect is underlain by massive greenstone containing interbedded chlorite phyllite. Some of the phyllite is pale green in color and commonly contains up to several percent disseminated pyrite. Unlike rocks in most of the area, foliation in the Red Diamond area trends approximately 070° and dips very steeply both north and south. Foliation at both the Mammoth and Alaska Treasure prospects, a short distance NE, follows the regional NW trend. The Nevada Creek fault cuts through the Red Diamond prospect and may be responsible for the unusual foliation direction.

Mineralization consists of disseminated pyrite in pale-green phyllite and pyrite in quartz veins. Both types of mineralization appear to have been the target of exploration activities in the past. Disseminated mineralization is composed of 1% to 5% pyrite cubes scattered throughout the pale-green phyllite. Foliation-concordant to locally discordant quartz veins are present and, in the middle adit, are abundant. Pyrite is the dominant sulfide in the veins but traces of chalcopyrite are also present.

Sample Results

The Bureau located five adits, four shafts, and many trenches at the Red Diamond prospect (figs. D-209 to D-211). A total of 24 samples were collected from the workings. Two samples were collected from the shaft near the upper adit (fig. D-209, Nos. 1-2), three from the upper adit (fig. D-209, Nos. 3-5), eight from the middle adit (fig. D-210, Nos. 2-9), seven samples were taken from the lower adit (fig. D-211, Nos. 1-7), and one from the lower shaft (fig. D-210, No. 1). Two additional samples were collected from the dump of a small caved adit and another was taken from a trench (fig. D-203, Nos. 13-15).

The best metal values on the prospect came from the shaft near the upper adit, the lower shaft, and the dump of a small caved adit. A random grab sample of quartz from the upper shaft dump (fig. D-209, No. 1) yielded 13.7 ppm gold and a chip sample of mineralized phyllite in the shaft (fig. D-209, No. 2) carried 2.4 ppm gold. A chip sample across a cut by the lower shaft (fig. D-210, No. 1) contained 5.4 ppm gold and 2.1 ppm silver. A dump sample from a small caved adit contained 4.4 ppm gold and a float sample of quartz downstream from the adit carried 955 ppm zinc and 620 ppm lead.

Resource Estimate

There are a few scattered samples with significant gold values but most samples contained only very low values. The area has a moderate development potential.

Recommendations

The many trenches should be dug out to allow examination of the area which was originally of interest. Drilling would help delineate the best mineralization.

MAS No.
21120194

References

D-97, D-98, D-99

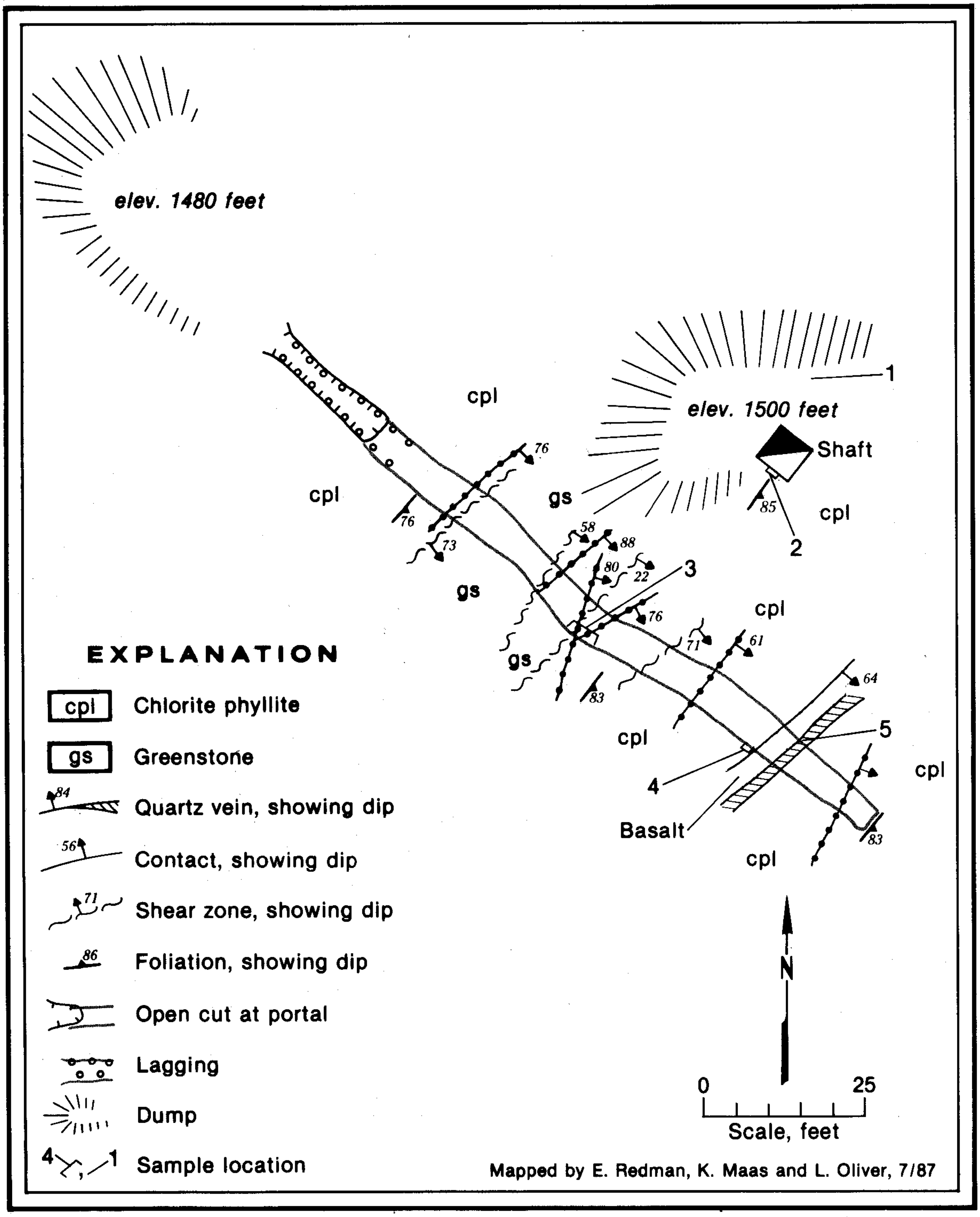

Figure D-209.—Upper Red Diamond adit and shaft, showing geology and sample locations.

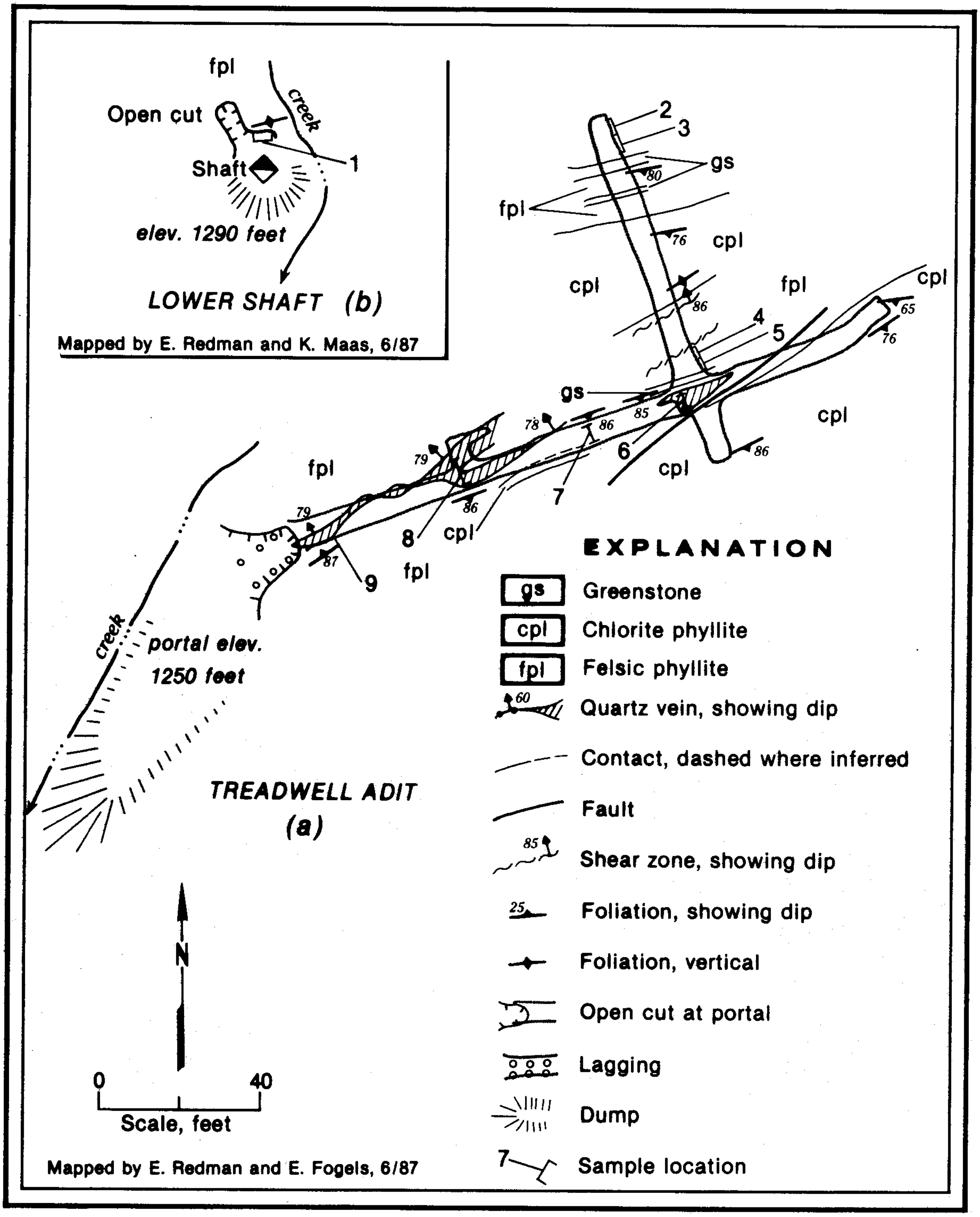

Figure D-210.—Middle Red Diamond adit and shaft, showing geology and sample locations.

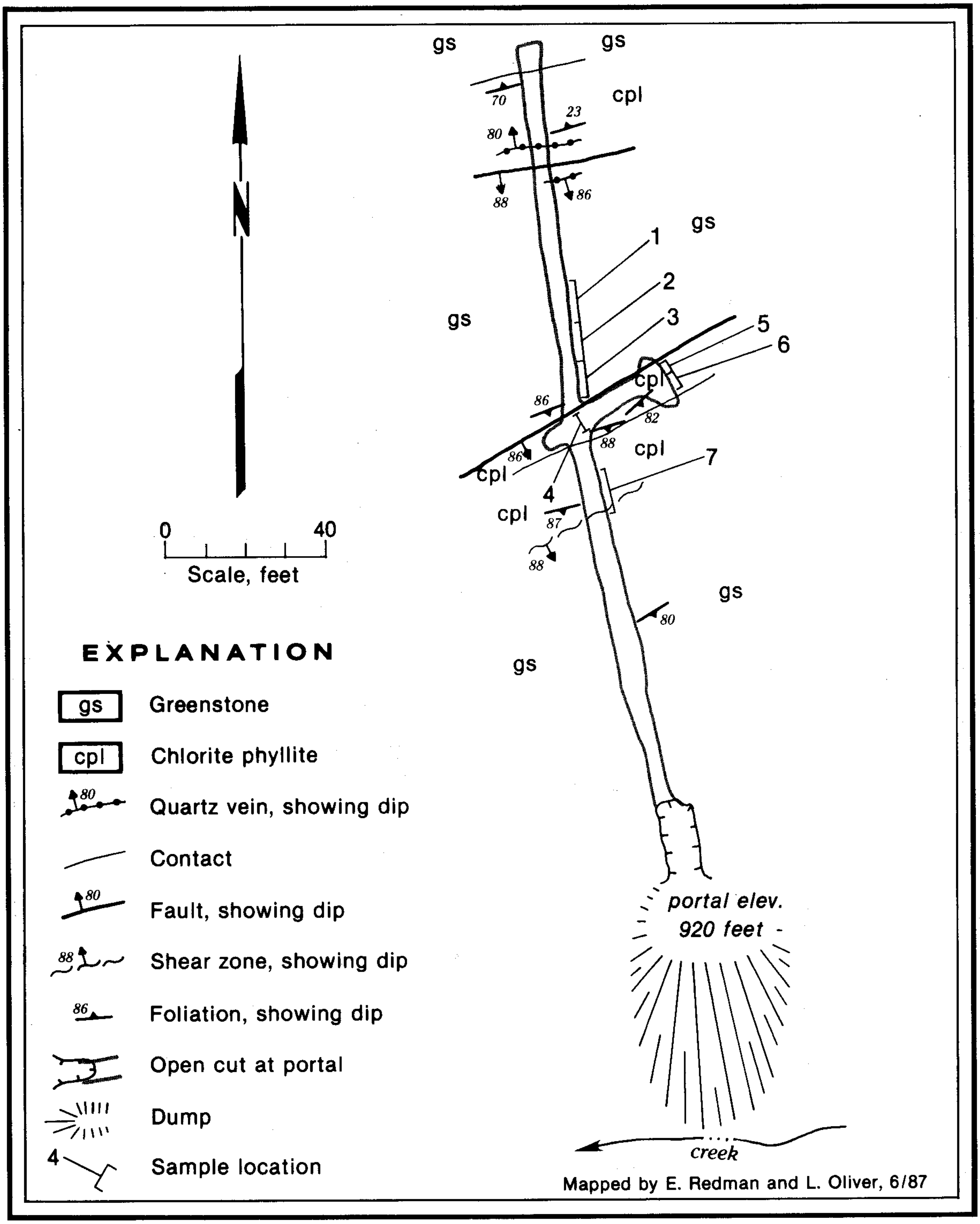

Figure D-211.—Lower Red Diamond adit, showing geology and sample locations.

BACH PROSPECT

Production

The Bach prospect has not produced any ore.

History

The Bach prospect was reportedly staked at an elevation of 2,500 feet above Speel Arm just after the turn of the century (fig. D-6). Assessment work was done for several years prior to 1905 (*D-161*). Nothing else is known about the prospect.

Workings and Facilities

No workings are reported.

Geologic Setting

The reported location of the Bach prospect is underlain by foliated hornblende diorite with local inclusions of gneissic country rock. Mineralization is reported to consist of auriferous sulfides in a quartz vein (*D-161*).

Bureau Investigations

The Bureau attempted to locate the Bach prospect but was unable to find any quartz veins or workings around the reported position. A stream sediment sample was taken from a small creek in the area of the prospect (Appendix D-1, sample number 3263) but it contained no detectable gold or silver values.

Resource Estimate

No mineralization was located.

Recommendations

Before the prospect can be evaluated, it needs to be rediscovered.

MAS No.
21130010

References

D-99, D-161

TAKU CHIEF PROSPECT

Production

There has been no production from the Taku Chief prospect.

History

The Taku Chief claims were staked in 1954 by Henry (Tiger) Olson above Taku Harbor (fig. D-6). Some open cuts, trenching, and an adit were reportedly made (Juneau recording district mining claim records). The claims were still active in 1976.

Workings and Facilities

A few open cuts, trenches, and an adit have been excavated.

Geologic Setting

The Taku Chief area is underlain by black phyllite, felsic phyllite, and chlorite phyllite that have been intruded by diorite and metagabbro. The phyllites locally contain both disseminated and stratiform pyrrhotite and pyrite.

Bureau Investigations

The Bureau did not locate the Taku Chief prospect.

Resource Estimate

The potential of the prospect is unknown.

Recommendations

The prospect and workings should be located and examined to determine if economic metals are present.

MAS No.
21130049

References

D-99, D-145

BUM CAT PLACER PROSPECT

Production

There has been no production at the Bum Cat placer.

History

The Bum Cat placer, at the head of Taku Harbor, was originally staked in 1905 and restaked in 1945 (fig. D-6).

Workings and Facilities

There are no known workings or facilities.

Bureau Investigations

The Bum Cat placer area is underlain by black phyllite, siliceous phyllite, and chlorite phyllite that have been intruded by diorite and metagabbro. The phyllites locally contain both disseminated and stratiform pyrrhotite and pyrite.

The Bureau collected a 0.1 yd^3 placer sample (Appendix D-1, sample number 7121) from the mouth of the small stream that flows into the northern end of Taku Harbor (fig. D-6). The concentrate from the sample contained 80.0 ppm gold and 12.0 ppm silver (sample was underweight making results somewhat unreliable). A sample of phyllite taken near the placer sample (Appendix D-1, sample number 7011) contained no significant metal values. Gravel volume in the area is small.

Resource Estimate

Although the sample contained significant gold, gravel volume in the area is small, giving the area a low development potential.

Recommendations

The Bureau sample should be verified by further sampling.

MAS No.
21120053

References

D-98, D-99, D-145

TAKU PLACER PROSPECT

Production

No production has ever been reported from the Taku Placer prospect.

History

The Taku placer claim was staked in 1968 (fig. D-6).

Workings and Facilities

There are no workings.

Geologic Setting

The Taku placer area is underlain by black phyllite, siliceous phyllite, and chlorite phyllite that have been intruded by diorite and gabbro. The phyllites locally contain both disseminated and stratiform pyrrhotite and pyrite.

Bureau Investigations

The Bureau did not examine the Taku placer.

Resource Estimate

The resource estimate is undetermined.

Recommendations

The area should be sampled for placer gold to determine its distribution and grade.

MAS No.
21120049

References

D-99, D-145

IRON LODE PROSPECT

Production

There has been no production from the Iron Lode prospect.

History

The Iron Lode prospect, alternately known as the Magnetite Lode, Spruce Tree, Olson, Little Tiger, Vern Pick, and Coral Keys, was staked in 1964 and 1969 for iron (fig. D-6). The claims were held as late as 1974.

Workings and Facilities

There are no known workings at the Iron Lode prospect.

Geologic Setting

The Iron Lode prospect area is underlain by a gabbro and diorite pluton that intrudes black and felsic phyllites.

Bureau Investigations

The Bureau did not locate the prospect.

Resource Estimate

The resource of the Iron Lode area is undetermined.

Recommendations

The area should be mapped and sampled to determine if the gabbroic pluton hosts any mineralization.

MAS No.
21120050

References

D-99, D-145

GREAT BEAR PROSPECT

Production

The Great Bear prospect has had no production.

History

The Great Bear claim, which was staked in 1962, may have been known as early as 1900 (fig. D-6). During the fall of 1900, a diamond drill was used on a claim at Taku Harbor but results of the work are not known. In 1901, Frank Bach owned the claims but no additional work was recorded (*D-96*). Between 1962 and 1969, the Great Bear, Brown Bear, Sharon-Skrznski, Henry Olson, and Mang Mose claims were staked on mineralization reported to contain gold and nickel (*D-145*).

Workings and Facilities

There are no known workings.

Geologic Setting

Geology of the area is uncertain but it is probably underlain in part by a gabbroic pluton that has intruded black and felsic phyllite.

Bureau Investigations

The Bureau did not locate any workings or mineralization on the Great Bear claim but did take two samples in the area (Appendix D-1, sample numbers 7119-7120). Neither contained any significant values.

Resource Estimate

The resource is undetermined.

Recommendations

The area should be mapped and sampled.

MAS No.
21120048

References

D-96, D-99, D-145

SUNRISE CANYON PROSPECT

Production

There has been no production from the Sunrise Canyon prospect.

History

The Sunrise Canyon prospect was discovered by Henry (Tiger) Olson in 1935 between Lake Olson and Lost Rocker Lake, north of Limestone Inlet (fig. D-6). A Canadian company optioned the property in 1953 and held it until 1955 but little work was done (*D-89*).

Workings and Facilities

There are no workings at the Sunrise Canyon prospect.

Geologic Setting

The Sunrise Canyon prospect is composed of rhodochrosite, manganite, and rhodonite in veins or layers in gray-green phyllite overlain by metabasalt and metatuff. The thickest manganese layer occurs in the upper portion of the phyllite and consists of a 1- to 3.5-foot-thick band that parallels foliation. The mineralized horizons contain about 70% rhodochrosite, 15% manganite, and 5% rhodonite. Some psilomelane may also be present. Jasperoid may be associated with the bands (*D-89*).

One-half mile NW of a small divide, several small bands (0.1- to 0.5-foot thick) can be traced for about 300 feet. Samples of the bands taken by the Bureau in 1957 (*D-89*) averaged 28.6% Mn with virtually no gold and 1.7 ppm silver. A beneficiation test done in 1957 by the Bureau produced only a 40.6% concentrate of Mn (*D-89*).

Bureau Investigations

The Bureau did not examine the Sunrise Canyon prospect during this project.

Resource Estimate

A large tonnage of manganese exists at the prospect but tests by the Bureau in 1957 failed to produce an economic concentrate (which was 48% at that time) (*D-89*).

Recommendations

The manganese bands should be traced by drilling and/or trenching. New beneficiation tests should be done to see if an economic concentrate can be produced.

MAS No.
21130001

References

D-89, D-99

AEK PROSPECT

Production

There has been no production from the AEK prospect.

History

The AEK group of 202 claims were staked on the ridge divide between Prospect and Limestone Creeks in 1978 (fig. D-6). The claims were dropped in 1980 (*D-131*).

Workings and Facilities

There are no workings at the AEK prospect.

Geologic Setting

The claims cover a belt of iron-stained black phyllite that contains thin quartz veins (*D-145*). Barium and trace amount of silver have been reported (*D-131*).

Bureau Investigations

The Bureau did not examine this prospect.

Resource Estimate

Data on the AEK claim group is not sufficient to determine its potential.

Recommendations

The area should be mapped and sampled to determine the extent and concentration of any mineralization.

References

D-131, D-145

PROSPECT CREEK PLACER PROSPECT

Production

There has been no production from the Prospect Creek Placer prospect.

History

Seventy-five placer claims were staked on Prospect Creek (fig. D-6) in 1979 (*D-145*). The claims were dropped in 1982 (*D-131*).

Workings and Facilities

There are no workings.

Bureau Investigations

The Prospect Creek drainage is underlain by black phyllite and metavolcanic rocks.

The Bureau collected two 0.1 yd^3 placer samples (Appendix D-1, sample numbers 7095-7096). Trace amounts of gold were seen in the concentrates but assays contained no detectable gold values.

Resource Estimate

There is a large volume of gravel in the Prospect Creek valley but low gold values give the area a low development potential.

Recommendations

The Prospect Creek valley should be mapped and the gravels drilled to determine its potential.

References

D-68, D-99, D-131, D-145

JLC PLACER PROSPECT

Production

No production has occurred at the JLC Placer prospect.

History

In 1980, 114 placer claims of the JLC group were staked in a valley north of Bogert Point on the east side of Speel Arm (fig. D-6). No assessment work was recorded after that year (*D-131, D-145*).

Workings and Facilities

There are no workings at the JLC prospect.

Bureau Investigations

The area of the JLC claim group is underlain by foliated diorite. The Bureau took one 0.1 yd^3 placer sample from the stream (Appendix D-1, sample number 7097) and examined rock float. No gold was detected in the samples and no mineralization was seen in the float.

Resource Estimate

There is a large volume of gravels in the valley but no gold was found.

Recommendations

No work is recommended.

References

D-68, D-99, D-131, D-145

BOGERT POINT PLACER PROSPECT

Production

There has been no production at the Bogert Point prospect.

History

Forty-two claims of the Lady D group were staked in the area of Bogert Point (fig. D-6) in 1978 (*D-145*). The claims lapsed in 1984.

Workings and Facilities

There are no workings.

Geologic Setting

The Bogert Point area is underlain by black phyllite and mafic metavolcanic rocks. Very small amounts of very-fine gold can be panned from the little stream a short distance SE of the point.

Bureau Investigations

The Bureau did not examine the Point Bogert area.

Resource Estimate

Resources at Bogert Point are unknown.

Recommendations

The area should be mapped and sampled to determine whether economic metals are present.

References

D-145

ENTERPRISE MINE

Production

Table D-15.—Gold production from the Enterprise Mine (*D-107*)

Year	Tonnage	Approx. oz Au
1911	na	na
1914	200	15
1915	300	85
Totals	500	100

NA Not available.

History

George Bach discovered the Enterprise vein in 1905 above Limestone Inlet (figs. D-6, D-212). Two years later, Bach began stripping the soil from the outcrop and built a boarding house on the beach below the deposit. A Chicago company examined the deposit in 1909. The company drove a 30-foot adit in 1910 to expose the vein, but did no additional work.

Frank Bach and John Heid joined George Bach in 1911, and together they drove two adits from which several tons of ore were mined and sent to the smelter in Tacoma, Washington.

In 1913, three British Columbians became interested in the Enterprise and financed more work. By the end of the year, a Johnson rod mill had been erected on the beach and a tram built between the mill and the mine. To open the vein, a 195-foot adit had been completed. In May 1914, the mill crushed 200 tons of ore during a 120-hour test run. Unfortunately, the men had problems recovering the gold and only managed to save about 15 ounces of gold and a little silver.

In May 1914, Bart Thane purchased the Enterprise Mine by paying $2,021.25 of bills owed by the Bach brothers to Juneau merchants. Thane, along with James Whipple, W. S. Bayless, and W. A. Irwin, began driving an adit that year. By late 1915, two adits, 320 feet and 120 feet long, had been driven, a 5-stamp mill erected, and 300 tons of ore mined. After milling the ore, the workers recovered 85 ounces of gold.

Between the end of 1915 and 1934, the Enterprise Mine was idle. In 1934, H. Jackson and A. Westhall restaked the mine and drove a 52-foot raise but did little other work (*D-97*). After that year, the mine remained inactive until 1988 when Curator American examined the mine.

Workings and Facilities

The Enterprise Mine has 320-foot and 120-foot-long adits connected by a raise-stope. An area was stoped above the upper adit and a 52-foot inclined raise was driven from the end of the lower adit.

Bureau Investigations

The Enterprise vein cuts porphyritic biotite, hornblende granite and consists of banded white quartz that has been traced for about 500 feet along trend. Slickensides alongside the vein plunge approximately 50° N.

Two faults cut the Enterprise vein. One exposed in the lower adit trends 075°, dips 74° SE and offsets the vein 20 inches. The other fault cuts the lower stope. The fault strikes parallel to the vein, dips 63° E, and displaces the vein 13 inches.

The vein trends 025° and dips 35° to 55° W. The dominant sulfide mineral is pyrite, which forms an average of 6% of the vein, but galena and sphalerite are locally common and traces of chalcopyrite are present. Free gold also occurs in the vein.

The Enterprise vein is mostly a massive quartz vein varying in width from 0.6 feet to 3.0 feet. Sulfide stringers and elongated masses, fractures, and bands parallel the vein walls. Carbonate alteration is restricted to within an inch or 2 of the vein margins, and a thin (less than 0.5 inches) gouge zone can be found on the footwall.

In the first 100 feet of the lower adit, the vein occurs in a shear zone up to 3.0 feet thick. The vein itself is 0.4 feet to 0.6 feet thick and is in a zone of highly altered, fractured, and sheared granite. The altered granite contains up to 10% disseminated pyrite cubes. Slickensided surfaces are moderately common throughout the zone.

According to Roehm (*D-107*), gold values decrease downdip. Quartz veins in an open cut at an elevation of 1,430 feet yielded 46 ppm gold; the upper adit at an elevation of 1,340 feet contained between 4.1 ppm and 33.6 ppm gold; the stope between the two adits carried from 2.1 ppm to 16.5 ppm gold; and the lower adit at an elevation of 1,260 feet contained 0.3 ppm to 7.5 ppm gold. Roehm's samples had a weighted average of 7.8 ppm gold over an average vein width of 2.2 feet.

Sample Results

The Bureau mapped the adits and collected a total of 11 samples (fig. D-213, Nos. 1-11). Three samples of the vein taken in the lower adit (fig. D-213, Nos. 9-11) had a weighted average of 8.6 ppm gold over an average width of 1.7 feet.

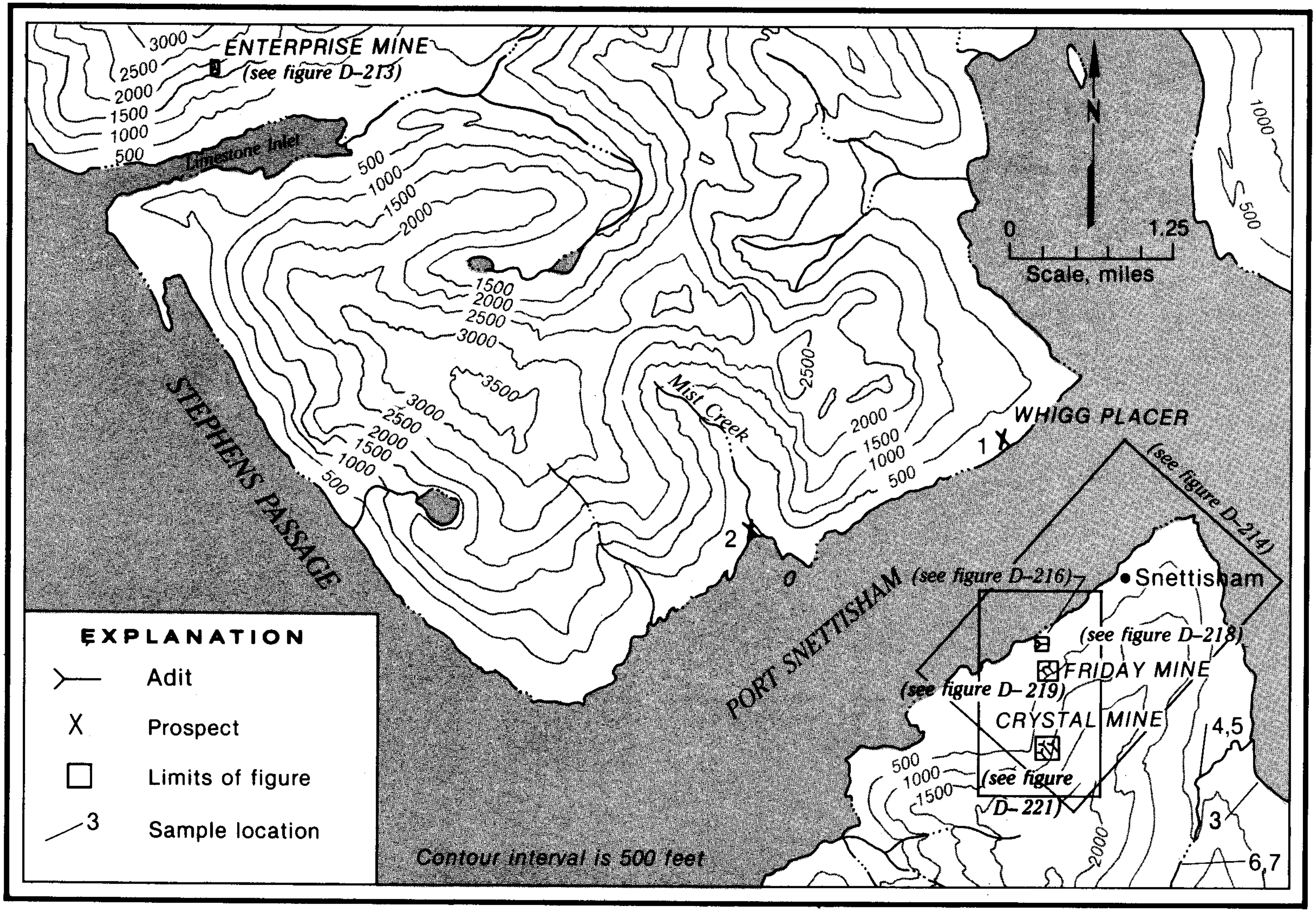

Figure D-212.—Mine and prospect location map for the Limestone Inlet and Port Snettisham areas.

Five samples were taken from the quartz vein in the upper adit (fig. D–213, Nos. 1, 4–7) and two from the adjacent wallrock (fig. D–213, Nos. 2–3). Sample No. 1 was taken from the same part of the vein sampled by Roehm (*D–107*). Roehm's sample contained 10.2 ppm gold and the Bureau's sample contained 25.2 ppm gold. The Bureau's samples from the upper adit gave a weighted average of 9.8 ppm gold over an average width of 1.7 feet. A high-grade sample containing galena (fig. D–213, No. 7) yielded 1.1% lead. Samples of the granitic wallrock next to the vein carried 1.5 ppm and 0.3 ppm gold.

Resource Estimate

The Enterprise Mine has an inferred resource of 24,600 short tons with a grade of 0.23 ounces/ton gold (based on Roehm, *D–107*).

Recommendations

Trenches and open cuts would expose the vein along strike and drilling would delineate the vein's depth and grade.

MAS No.
21130012

References

D–96, D–97, D–99, D–107, D–156

WHIGG PLACER PROSPECT

Production

There has been no production from the Whigg Placer prospect.

History

The name "Whigg Placer" first appeared on the U.S. Geol. Survey Taku River 1:250,000 quadrangle (figs. D–6, D–212) in 1960. It is not known where information on the name and location was derived. In 1980, 38 claims were staked along with a large number of other placer gold claims in the Port Snettisham area (*D–131*). No work has been recorded since that time.

Workings and Facilities

The ruins of a log cabin were located on the north side of Port Snettisham just above the high-tide line near the mouth of Whigg Creek.

Bureau Investigations

The Whigg Creek area is underlain by black phyllite. A dioritic pluton crops out approximately a mile to the west. The Bureau collected a stream sediment sample at the reported site of the Whigg placer which contained 0.1 ppm gold (fig. D–212, No. 1).

Resource Estimate

The area has a very low development potential.

Recommendations

No work is recommended.

MAS No.
21130009

References

D–99, D–131

MIST CREEK PLACER PROSPECT

Production

There has been no production from the Mist Creek prospect.

History

A group of 19 placer claims were staked on Mist Creek (figs. D–6, D–212) in 1980 and dropped 2 years later (*D–68*).

Workings and Facilities

There are no workings at the Mist Creek prospect.

Bureau Investigations

The Mist Creek drainage contains diorite, black phyllite, and mafic metavolcanic rocks. The Bureau collected a 0.1 yd^3 placer sample from the mouth of Mist Creek (fig. D–212, No. 2). A trace of visible gold was seen in the concentrate but analysis of the sample revealed no significant metal values.

Resource Estimate

Known gold placer values are too low for the area to have any significant development potential.

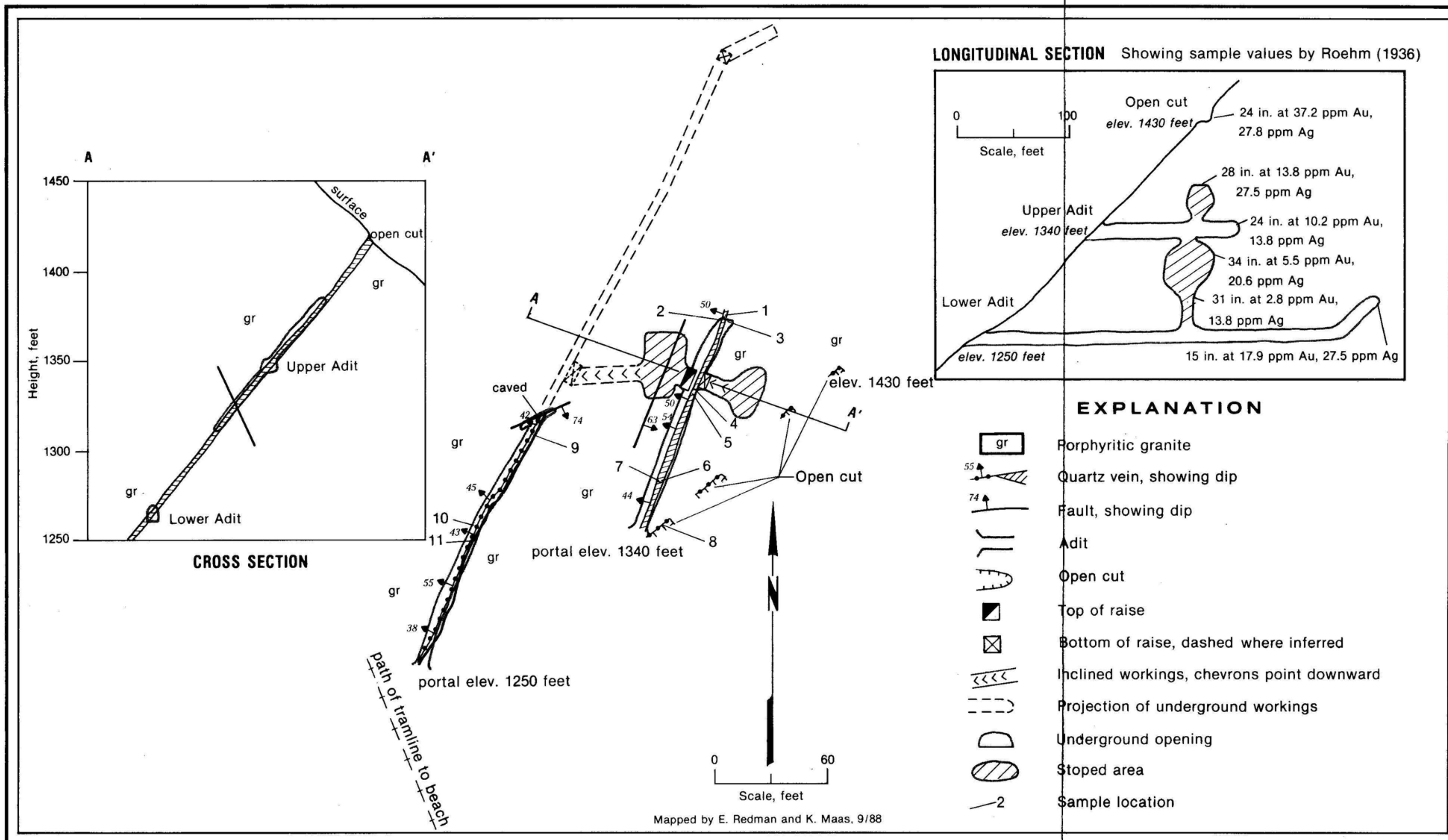

Figure D-213. — The Enterprise Mine, showing geology and sample locations.

Recommendations

Stream gravels could be systematically sampled to determine whether gold is present.

References

D-68, D-99

SNETTISHAM PROSPECT

Production

Four or five tons of titaniferous magnetite were mined and sent to Treadwell for mill testing in 1918.

History

The Snettisham iron ore deposit was known by the later 1890's, but gold mining at the Crystal and Friday took precedence (figs. D-6, D-212). After the Treadwell Mine caved, 4 or 5 tons of titaniferous magnetite was shipped to the mill in an attempt to find new uses for the shut-down mills and facilities but the work was unsuccessful.

Robert Coughlin and W. Pekovich staked the Michele and Suzanne claims groups in 1950. In 1953, the Bureau of Mines drilled 6,543 feet of diamond drill holes at the property. The Marcona Corp. optioned the Snettisham iron ore prospect in 1969 and did extensive exploration including drilling and bulk sample collection (*D-135*).

Workings and Facilities

There are diamond drill holes and open cuts in the area.

Geologic Setting

The Snettisham iron ore deposit is in a metamorphosed pyroxenite-diorite pluton that intrudes black phyllite and amphibolite (fig. D-214). The pyroxenite is commonly composed of coarse-grained pyroxene that has widely been converted to hornblende and biotite. Biotite books to 0.5 inch across are common. Magnetite is widespread and is associated with sphene, apatite, epidote, pyrrhotite, chalcopyrite, ilmenite, and spinel (*D-135*).

The pyroxenite is reported to grade into diorite in some areas and intrude directly into the country rocks in others. At its NE end, the pluton intrudes the phyllite while in the vicinity of the Crystal Mine, the pyroxenite intrudes amphibolite.

The pyroxenite pluton is cut by many faults, both normal and thrust. Most trend approximately E-W, dip moderately to steeply N, and have displacements of a few feet. Other faults trend roughly 030° and 150°.

The most conspicuous fault can be traced from the Friday adits to the Crystal Mine. This structure is a thrust fault that begins as a series of low-angle fractures that merge as they reach the edge of the pyroxenite body and become a single fault. The thrust fault trends roughly N-S and dips from 8° to 45° E. The fault usually consists of a shear zone up to two feet thick exhibiting carbonate alteration and silicification. Locally, the fault has been filled with quartz and consists of a breccia.

Bureau Investigations

The Bureau did not examine the Snettisham iron deposit during the present study, concluding that previous studies were sufficient.

Resource Estimate

Thorne and Wells (*D-135*) give the iron deposit a minable size of 9,600 feet by 2,400 feet by up to 1,000 feet consisting of pyroxenite with titaniferous magnetite. Reserves consist of 450,000,000 tons of material grading 19% iron, 2.6% titanium oxide, and 0.05% vanadium.

Recommendations

No work is recommended.

MAS No.
21150001, 21150029, 21150030

References

D-99, D-135

FRIDAY MINE

Production

Approximately 350 short tons of ore was mined from Friday stopes with possible production of about 75 to 150 ounces gold. An unknown quantity of ore was mined from the Minnehaha adit and crushed in the mill.

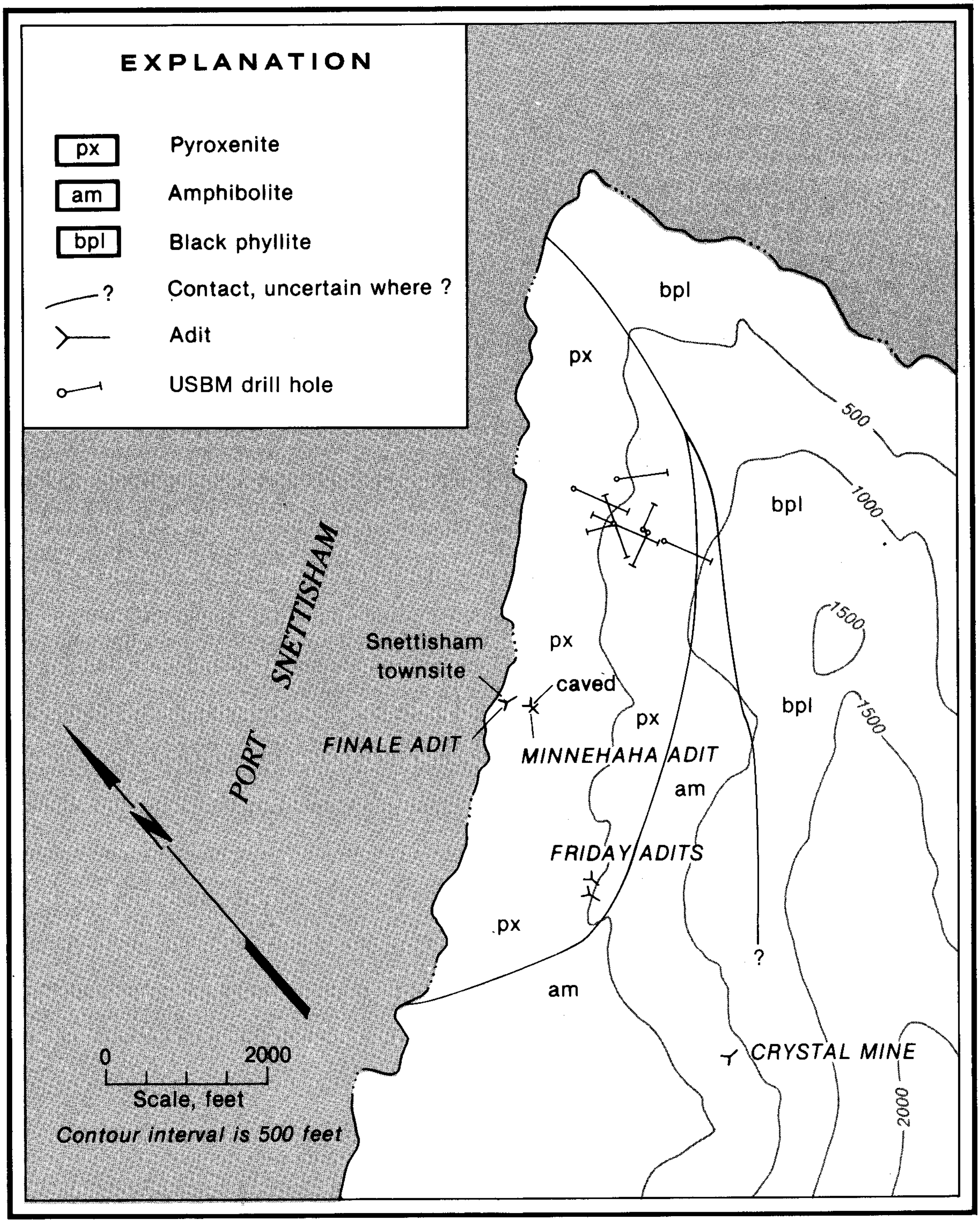

Figure D-214.—Geology of the Snettisham iron deposit, showing Bureau of Mines drill hole sites.

History

The Friday deposit was discovered in the mid-1890's (figs. D-6, D-212). In 1898, John Tisdale began development work on the deposit and had completed a 400-foot adit in 1899. By the end of 1899, the Alaska Snettisham Gold Mining Co. had built a sawmill and a wharf and had set up a compressor. A year later, the company had erected a 10-stamp mill powered by water brought to the mill by a mile-long pipeline.

An additional 10 stamps were added to the mill in 1901 and some ore was crushed that year and the next. The Snettisham Co. also enlarged its town to include a store, residences, and a boarding house. The road connecting the buildings was illuminated by electric lights.

By 1903, the Company had mined a few hundred tons of ore from adits on both the Friday and Minnehaha claims but the ore was not rich enough to provide a profit. The company, therefore, optioned the nearby Crystal Mine. The Crystal Mine was connected to the company's 20-stamp mill with a corduroy road and, during 1903 and 1904, $31,500 worth of gold was produced. Tisdale was forced to stop operations at the end of 1904 because of financial problems and, by the next summer, had dropped the Crystal Mine. The Snettisham Co. tried unsuccessfully to sell the Friday Mine and facilities in early 1905. All attempts to reopen the mine were halted in late 1905, when Tisdale committed suicide in New York.

The 20-stamp mill at Snettisham was sold to the Penn Alaska Co. in 1912 (*D-97*).

Workings and Facilities

Five adits have been located at the Friday Mine. Three adits, with 550 feet, 725 feet and 20 feet of workings, occur on the Friday claim, a large caved adit was driven on the Minnehaha claim (estimated workings - 700 to 1,000 feet), and a mostly gravel-filled adit occurs on the Finale claim with 430 feet of accessible workings.

Bureau Investigations

Mineralized quartz veins at the Friday Mine occur within the Snettisham pyroxenite pluton. The pyroxenite has been widely converted to biotite with a grain-size of 0.3 in to 0.5 in and contains abundant magnetite. Serpentine is also common.

In the Friday Mine area, the pyroxenite has been intruded by two stages of trondhjemite dikes. In the Finale adit area, the dikes form both flat-lying tabular and steeply-dipping bodies. At the Friday adits, the trondhjemite forms moderately and steeply dipping dikes. The trondhjemite is composed dominantly of plagioclase feldspar but also has a significant amount of quartz and traces of biotite. Grain size ranges from coarse in the Finale adit (0.1 to 2 inches) to sucrosic in the Friday adits.

The earliest trondhjemite dikes are barren of mineralization. In the Friday adits, these dikes have been cut by a series of low-angle thrust planes. Later, trondhjemite dikes cut the earlier stage dikes and fill portions of the thrust faults. The later felsites contain disseminated pyrite with traces of chalcopyrite. One notable feature of the mineralized felsite bodies is that they grade into normal quartz veins. In several dikes, the trondhjemite can be seen to grade into more and more siliceous material until the core of the dike consists of white quartz bordered by aplitic trondhjemite. Further along the dike, the trondhjemite fades away leaving a massive quartz vein (fig. D-215). In the lower of the two Friday adits, premineral trondhjemite is common as are the trondhjemite-quartz gradations. In the uppermost Friday adits, the veins are much like those at the Crystal Mine.

Faulting in the Finale adit trends generally E–W and has dips of 45° to 65° N. Less common are faults that trend about 150° and dip NE. The E–W faults also occur in the Friday adits. In addition, a series of moderately-dipping, roughly 030° shears are also present in the Friday adits.

There are at least three or four thrust planes in the Friday adits, though none were identified in the Finale adit. These thrusts are not as well developed as the fault at the Crystal Mine. The thrust planes are interpreted to be the root of the Crystal fault, forming a series of coalescing fractures facilitated by the serpentine. When the fractures reached the amphibolite, they were forced into a single, large thrust fault that was propagated away from the pyroxenite and which became the host for the Crystal vein.

Alteration is usually confined to the wallrock adjacent to the quartz veins and varies from an inch to 2 feet of serpentinized pyroxenite.

Mineralization at the Friday Mine consists of pyrite and traces of chalcopyrite in quartz veins and trondhjemite. The quartz vein in the fault of the upper Friday adit is up to 4 feet thick and consists of an undulating vein up to a few hundred feet long. The vein contains some open spaces partially filled with euhedral quartz. Pyrite forms up to 25% of the vein. Chalcopyrite is the only other sulfide mineral noted in the quartz veins. The trondhjemite contains between 0.5% and 5% disseminated pyrite.

Sample Results

The Bureau located 4 open adits and one caved adit, mapped and sampled them, and collected a total of 28 samples (figs. D-216 to D-219). Seven samples (fig. D-218, Nos. 1-7) were collected from the Finale adit. These samples averaged 3.1 ppm silver and had up to 541 ppm copper and 1,637 ppm lead. Gold values ranged from 0.1 ppm to 1.5 ppm. One sample (fig. D-217, No. 1) was taken of selected material on the dump of the Minnehaha adit. It contained 7.6 ppm silver and 0.4 ppm gold.

A total of 13 samples (fig. D-219, Nos. 7-19) were collected in the large upper Friday adit, which contains a vein much like that at the Crystal Mine. Of these, 12 came from stoped areas and gave a weighted average of 7.4 ppm gold over an average vein thickness of 1.6 feet. A sample of quartz taken from the main haulage adit (fig. D-219, No. 9) away from the stopes did not contain significant gold. Samples taken from the lower Friday adit (fig. D-219, Nos. 1-6), which contained mineralized aplite but little quartz, had a weighted average of 1.0 ppm gold over an average thickness of 1.0 feet. A single sample from a short adit above the main workings (fig. D-219, No. 20) did not contain detectable gold or silver.

Resource Estimate

The upper Friday adit has an indicated resource of 600 short tons with a grade of 0.22 ounces/ton gold.

Recommendations

The Minnehaha adit should be reopened to determine what type of material was mined. Old trenches should also be exhumed and an attempt made to trace mineralization between the Minnehaha and Friday adits, and the Friday and Crystal adits.

MAS No.	MS No.
21150014	382A, 382B

References

D-96, D-97, D-99, D-130

Figure D-215.—Quartz vein in the Friday Mine. The Alaska Snettisham Gold Mining Company built a 20-stamp mill and drove at least four adits but only recovered a small amount of gold.

CRYSTAL MINE

Production

Table D-16.—Gold and silver production from the Crystal Mine (*D-3*)

Year	Tonnage	Value/t ($)	Bullion ($)	Conc. ($)	Approx oz Au	Approx oz Ag
1902	583	9.60	3,768	1,198	240	na
1903	2,305 (approx)	7.73	13,812	4,012	862	na
1904	2,600 (approx)	7.73	10,834	9,251	1,048	na
1905	340	7.72	1,600	1,025	127	na
1906	481	7.82	2,236	1,154	164	na
1907	700	4.94	4,646	1,379	267	76
1908	725	5.37	na	na	242	73
1909	1,120	5.37	8,942	3,655	357	48
1910	70	9.51	367	299	59	—
1911–1914	no production					
1915	na	na	312	90	19	—
1916–1919	no production					
1920	180	7.72	940	450	45	6
1921	40	8.80	238	114	11	1
Totals	9,144		$47,695	$22,627	3,441	204

NA Not available.

History

The Crystal Mine was discovered in 1895 by Frank Cook, discoverer of the Jualin Mine, Barney Heins, and Martin Olsen (figs. D-6, D-212). Little was done with the discovery until October 1900, when the men formed the Crystal Gold Mining Co. and cut the quartz vein in a 350-foot adit. During summer 1901, a corduroy road was cut from the beach and a mill building completed but, due to a machinists strike, the 5 stamps for the mill didn't arrive until December and weren't emplaced until 1902.

Milling began at the Crystal Mine in June 1902, with Frank Cook bringing gold bricks into Juneau twice a month. The mill operated for 44.5 days and $5,000 in gold was produced that first year.

In July 1903, the Alaska Snettisham Gold Mining Co., owner of the nearby Friday Mine, optioned the Crystal Mine. The company built a road between the Crystal Mine and the town of Snettisham, where it had a 20-stamp mill. Heins was hired to manage the work at the mine and $15,500 worth of gold was extracted from the vein that year. By the end of 1904, ore above the main haulage level was mined out after an additional $16,000 worth of gold was extracted. In December 1904, the company was forced to close the Crystal Mine due to financial problems.

The Snettisham Co. was unable to sell the Crystal Mine so Heins began to work the mine on his own. In 1905, Heins produced $2,600 in gold. Cook died in late 1905, but Heins and Olsen continued work until 1910. In 1906, Heins mined 481 tons of ore, recovering $3,400 worth of gold, and extracted another 700 tons, containing $6,600 of gold, the next year. During 1908 and 1909, Heins mined 1,845 tons of ore and produced $12,600 worth of gold. During mining, Heins opened a new ledge which contained 80- to 100-pound pyrite cubes.

Active mining ceased after the 1909 season but 70 tons of broken ore was crushed in the 5-stamp mill during 1910, resulting in the recovery of $1,500 in gold.

In 1915, Heins made a trial run with the mill and recovered $402 worth of gold and sold all his accumulated concentrates to the Treadwell Co. Heins began mining again in 1919 and processed 220 tons of ore in 1920 and 1921, recovering 84 ounces of gold and a single ounce of silver. Only minor work was done in 1922.

The Alaska Homestake Gold Mining Co. purchased the Crystal Mine in 1924 and did some work into 1925. No additional work was done after 1925 (*D-97*).

Workings and Facilities

The main part of the Crystal Mine has 2,350 feet of workings, including 5 stopes, and a 175-foot upper adit with stope.

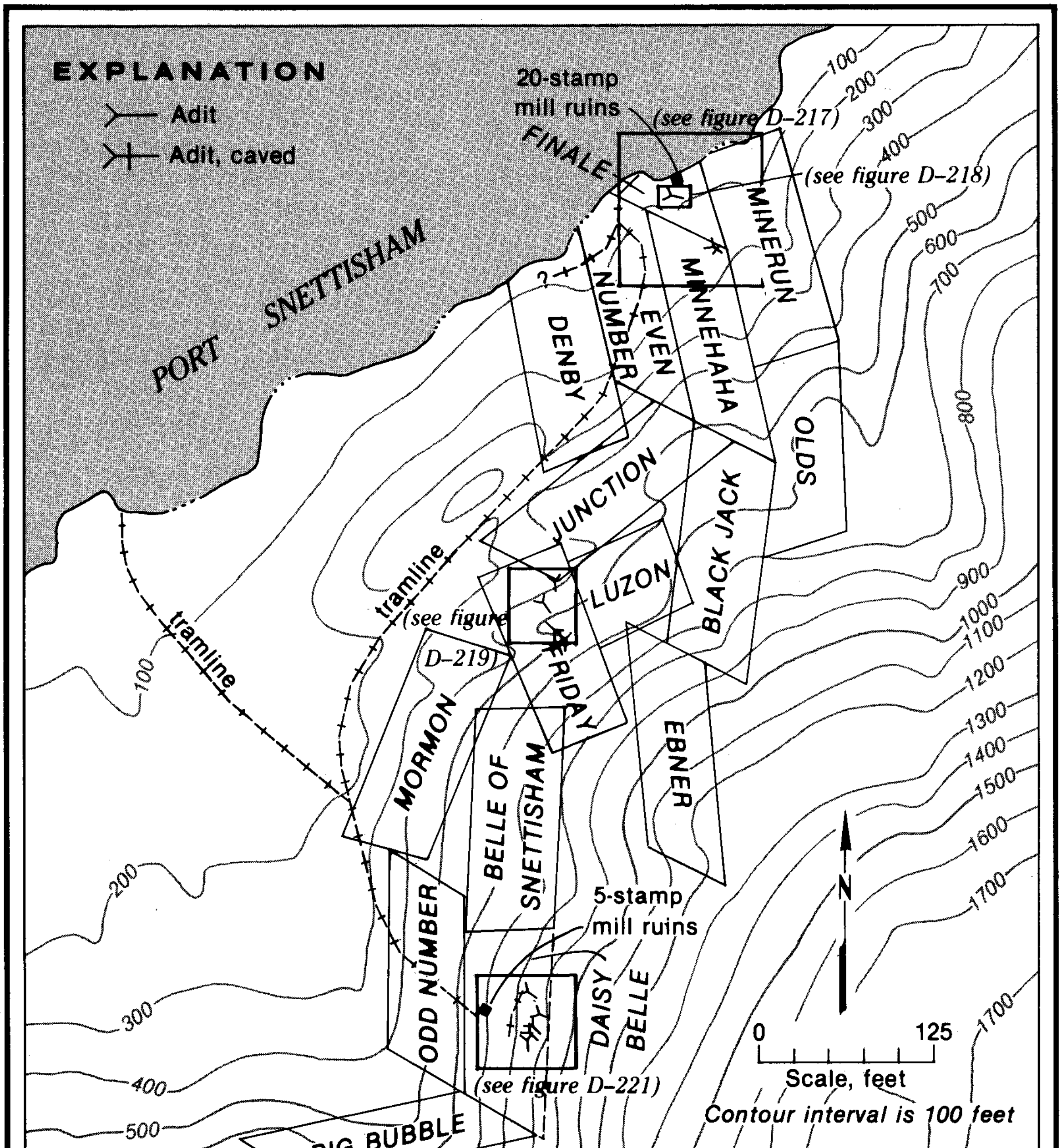

Figure D-216.—Historic claim map of the Crystal and Friday Mine area.

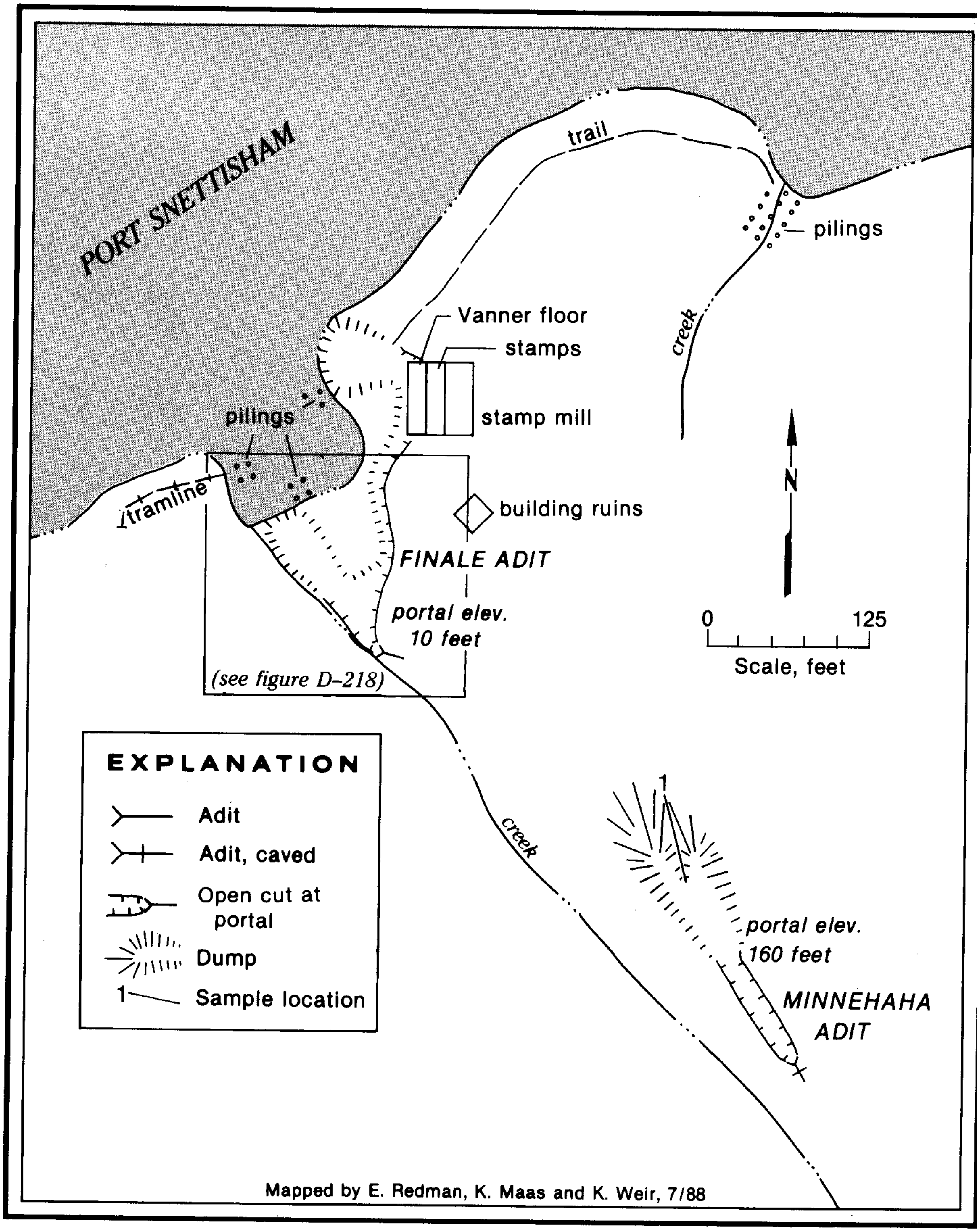

Figure D-217.—The Finale and Minnehaha adits, Friday Mine, showing workings and sample locations.

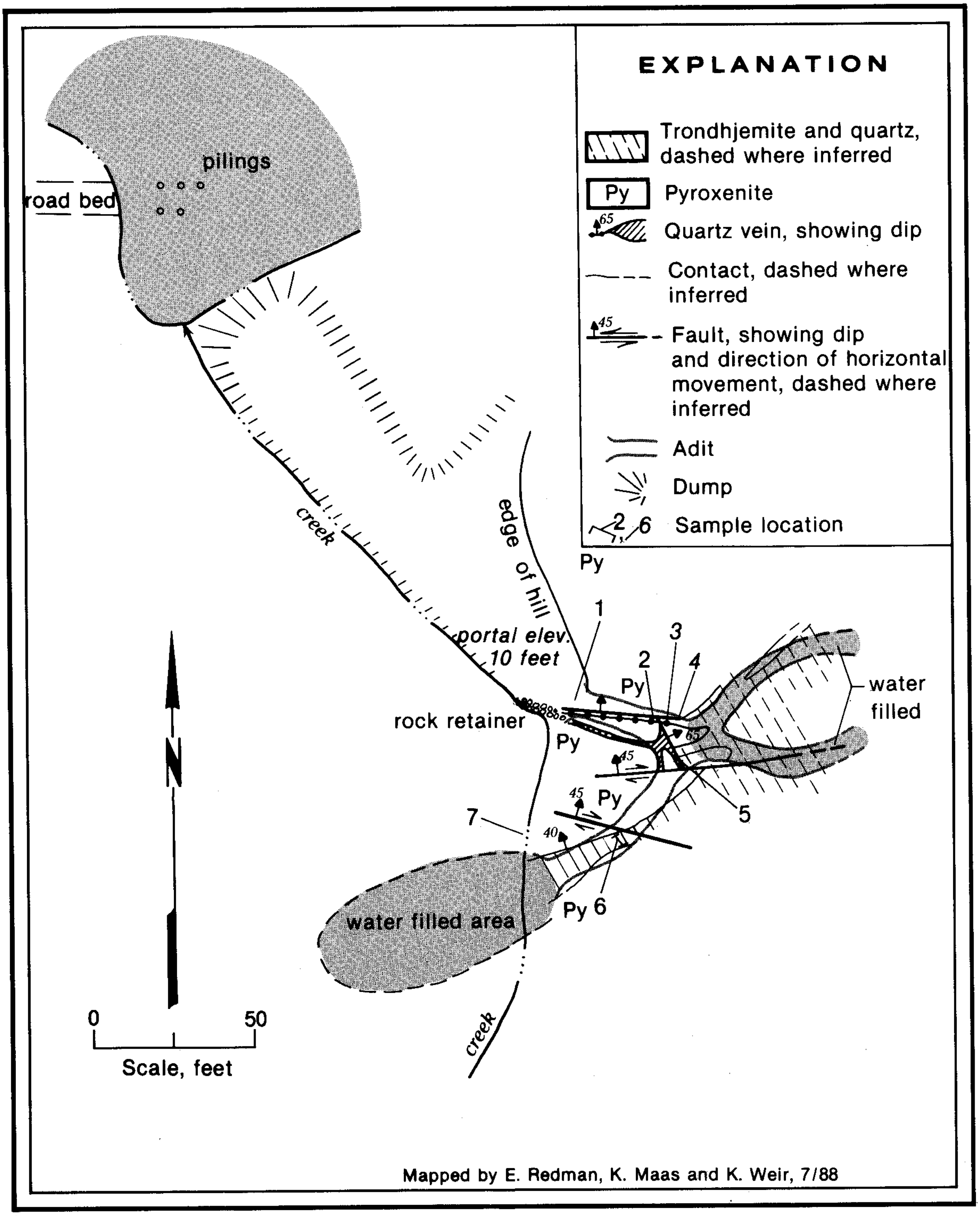

Figure D-218.—The Finale adit, Friday Mine, showing geology and sample locations.

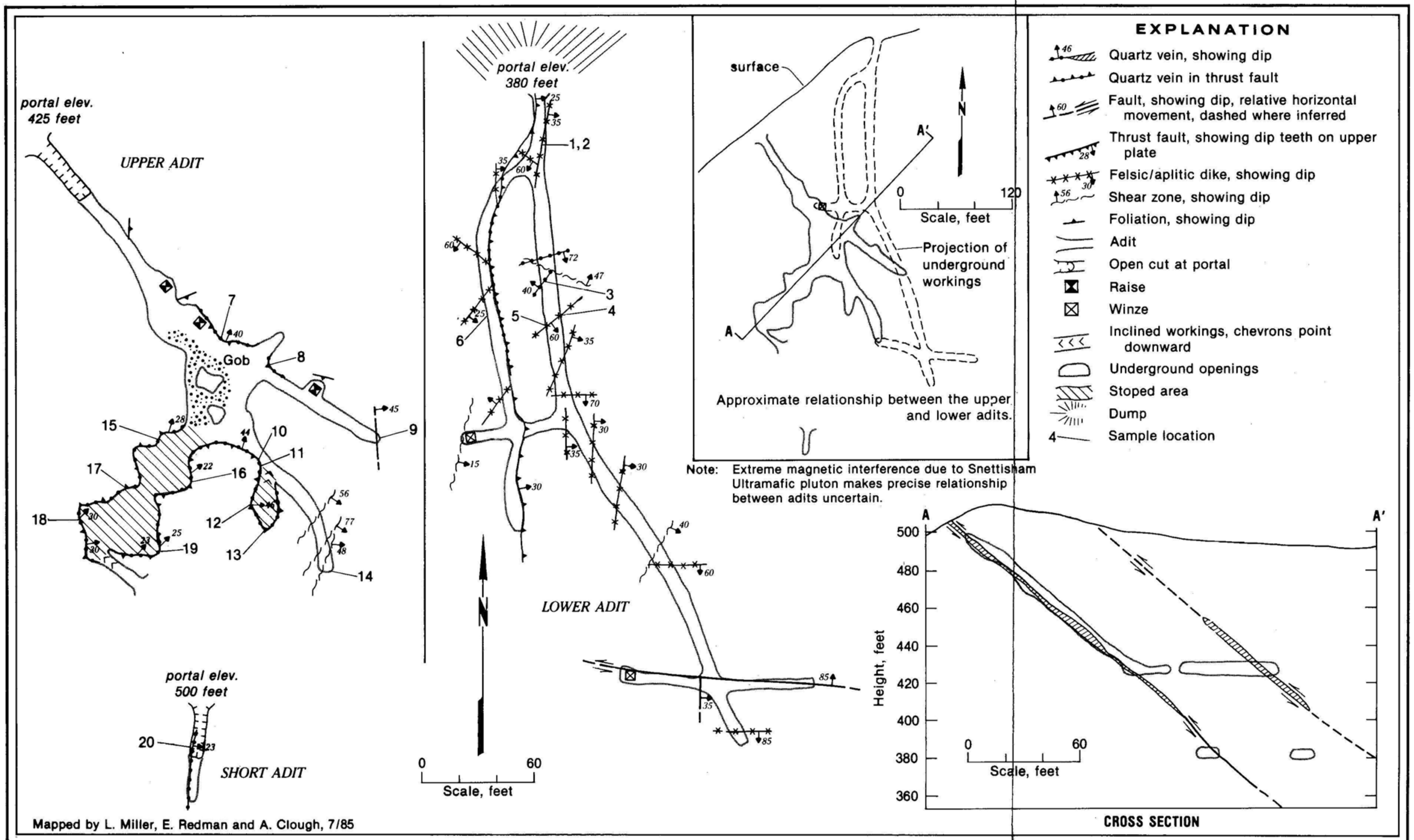

Figure D-219. — The upper Friday Mine adits, showing geology and sample locations.

Bureau Investigations

The vein at the Crystal Mine occupies a low-angle thrust fault which cuts amphibolite near the Snettisham ultramafic pluton. The fault, which appears to begin within the ultramafic body as a series of low-angle fractures that merge together as they enter the amphibolite, trends 125° to 150°, and dips from 8° to 35° NE.

The amphibolite in the area of the Crystal Mine consists of dark-green hornblende with aligned porphyroblasts of plagioclase. Plagioclase foliation trends 140° and dips 50° to 80° NE.

The thrust fault has an undulating plane and changes character from area to area. Where the fault does not contain quartz, it consists of 12 to 18 in of sheared and altered amphibolite. Orange-weathered calcite is common both as thin stringers and as a general component of the zone. Within the mine area, much of the fault contains from a few inches to 10 feet of quartz. Some portions of the vein are composed of up to 50% silicified fragments of the amphibolite (fig. D-220), whereas in other areas wallrock fragments are restricted to the margins of the vein. Altered fragments in the vein commonly contain 5% to 25% pyrite cubes.

Gouge zones are common and may occur at the top, bottom, or within the fault. Most gouge layers are 1 to 4 inches thick and contain euhedral pyrite crystals up to 1 in across. Slickensides indicate motion on the fault was roughly parallel to the dip of the fault.

Alteration along the veins varies from an inch to 2 feet of silicified and chloritized amphibolite. Ankerite is also present. In most areas, alteration is usually concentrated on either the top or the bottom of the vein but not both margins. Felted biotite is locally present in altered amphibolite. Alteration is not present away from the fault.

The quartz vein in the fault, which is 1 foot to 10 feet thick with an average width of 4 feet, consists of large, discontinuous, lensoid masses of quartz up to a few hundred feet long. The vein contains many open spaces partially filled with euhedral quartz and calcite crystals up to 6 inches long. The open spaces are usually narrow but may extend for several feet parallel to both strike and dip of the vein. Pyrite is common in the quartz, ranging from 1% to 60% of the vein. Both euhedral crystals and masses of pyrite are present. Locally, pyrite cubes to 2 feet on a side can be seen. Spencer (*D-130*) reported that euhedral gold crystals were found on the faces of pyrite cubes in the mine.

Chalcopyrite is the only other sulfide mineral noted in the quartz veins. Except in a small section of the northern-most stope, chalcopyrite is rare.

Sample Results

The Bureau mapped and sampled all the workings of the Crystal Mine, collecting 45 samples (fig. D-221, Nos. 1-45). An overall weighted average of all Crystal samples yielded 7.2 ppm gold over 1.7 feet and a selected sample of pyrite (fig. D-221, No. 27) contained 221.7 ppm gold.

Figure D-220.—The quartz vein in the Crystal Mine commonly contains abundant, strongly altered wallrock fragments.

When examined by stope, samples from the Crystal Mine show some variation (fig. D-221). The stope above the upper adit averaged 6.4 ppm gold over 1.6 feet but the entry stope (upper-most stope in the main workings) gave an average of 13.0 ppm gold for 1.6 feet of vein. The small stope above the intermediate level and near the entry stope had an average of 10.5 ppm gold and an average vein thickness of 0.9 feet. The southern-most stope yielded a weighted average of 4.3 ppm gold over an average 2.2 feet vein and the northern-most stope contained an average of 5.6 ppm gold for 1.8 feet of vein. The stopes near the chute to the lowest haulage level contained the lowest values with an average of only 1.2 ppm gold over an average vein width of 2.0 feet.

An attempt was made to trace the Crystal vein along its trend both toward the Friday Mine and up the hill to the SW but boulder-sized talus covered with a thin veneer of moss stymied the search.

Resource Estimate

The Crystal Mine has an indicated resource of 9,000 short tons with a grade of 0.21 ounces/ton gold based on vein material in sight.

Recommendations

The Crystal vein should be traced with trenching along its trend and should be drilled from the surface to determine extent.

MAS No.
21150017

References

D-3, D-96, D-97, D-99, D-130, D-133

SWEETHEART CREEK PROSPECT

Production

There has been no production from the Sweetheart Creek prospect.

History

Two claims were staked in 1964 at the mouth of Sweetheart Creek (fig. D-6).

Workings and Facilities

There are no workings.

Geologic Setting

The lower portion of Sweetheart Creek is underlain by mafic metavolcanic rocks.

Bureau Investigations

The Bureau did not examine Sweetheart Creek.

Resource Estimate

Little is known about the occurrence.

Recommendations

Mapping and sampling could determine if mineralization exists.

MAS No.
21150041

References

D-99

COOK PROSPECT

Production

There has been no known production from the Cook prospect.

History

Frank Cook staked three claims along the south side of Sweetheart Lake near its outlet in 1902 (fig. D-6).

Workings and Facilities

There may be some prospect pits.

Geologic Setting

The Cook prospect area is underlain by mafic metavolcanic rocks cut by quartz veins. Mineralization reportedly consists of considerable galena and some gold in the veins (*D-161*). During its Tracy Arm/Ford's Terror study (*D-161*), the Bureau collected stream sediment samples from streams north of the outlet of Sweetheart Lake that were slightly anomalous in lead and gold. Rock chip samples taken south of the lake were moderately anomalous in lead, gold, and silver (*D-55*).

Bureau Investigations

The Bureau did not examine the Cook prospect area during this study because the area had previously been examined by the Bureau in the Tracy Arm/Ford's Terror project.

Resource Estimate

The Cook prospect area is roughly along trend with the Sweetheart Ridge massive sulfide prospect. Galena float has been reported (*D-91*) from the steep slope south of the outlet of Sweetheart Lake.

Recommendations

Mapping and sampling the reported prospect area could locate old workings or mineralization.

MAS No.
21150012

References

D-55, D-91, D-95, D-128, D-130, D-161

GOLDNEST PROSPECT

Production

There has been no production at the Goldnest prospect.

History

The Goldnest claims were staked in 1912 and minor work was done at that time (fig. D-6).

Workings and Facilities

A short open cut occurs SW of a saddle at 3,000-feet elevation.

Geologic Setting

A 30-foot-thick brecciated quartz vein occurs in metamorphosed mafic metavolcanic rocks. The vein trends 030°, dips steeply NW and contains small amounts of pyrite. One sample taken by Kimball and others (*D-55*) of arsenopyrite-bearing float near the vein contained 7.0 ppm gold and 950 ppm lead but other samples contained only traces of these metals.

Bureau Investigations

The Goldnest claims were examined by the Bureau during the Tracy Arm/Ford's Terror study.

Resource Estimate

Generally, metal values are low.

Recommendations

Any further work should include an attempt to trace the quartz vein along trend and trench to expose the mineralization.

MAS No.
21150055

References

D-55, D-99

ARGENTA BASIN PROSPECT (includes Gilbert Bay prospect)

Production

There is no recorded production from the Argenta Basin prospect.

History

Copper, silver, and gold were discovered in 1889 in Argenta Basin about 3 miles south of the Friday Mine on the Snettisham Peninsula (fig. D-6). By 1891, H. E. Hunsaker, John Meyer, and men named Snow, Johnson, and Miller, were working in the upper end of the basin while Frank Rapid explored gold-bearing veins closer to Gilbert Bay. Work continued through 1892.

With the increased work at the Friday and Crystal Mines in 1901, George Bach bought the Mammoth and Jackson claims from Charles Morse and Sam Kohn. The two had driven 150-foot and 125-foot adits on the claims over the years. After 1901, no additional work was recorded (*D-97*).

In 1979, the Gilbert Bay prospect was staked in the area of lower Argenta Basin.

Workings and Facilities

Two adits, with 150 and 125 foot of workings, have been reported (*D-97*) and an open cut was located along Gilbert Bay.

Bureau Investigations

Argenta Basin is underlain by mafic metavolcanic rocks in its upper portions and mafic metavolcanic rocks and black phyllite in its lower section. Foliation-concordant quartz veins are locally common. Pyrrhotite and pyrite are usually present in the veins and iron-staining is common.

Sample Results

The Bureau examined the coastal portions of the Snettisham Peninsula along Gilbert Bay but was unable to work in the higher parts of the peninsula because of snow cover. A total of 11 samples (fig. D-212, Nos. 3-7; fig. D-6, field sample numbers 7125-7127, 7132-7134) were collected in the area. A sample of chlorite phyllite taken along Gilbert Bay (fig. D-212, No. 3) contained 400 ppm copper, another sample of black phyllite taken about 1.5 mile upstream (fig. D-212, No. 7) carried 0.6 ppm gold, and a sample of pyritic black phyllite in lower Argenta Basin yielded 1.4 ppm silver.

Resource Estimate

The Argenta Basin area has not been adequately examined to determine its potential.

Recommendations

To identify mineralization in the area, interested companies should locate old adits and prospect the vicinity of the basin.

MAS No.
21150033

References

D-97

ARM GROUP PROSPECT

Production

There has been no production from this prospect.

History

Four claims were staked on conspicuously iron-stained rocks in a steep gully at the elbow of Tracy Arm in 1974 (fig. D-6).

Workings and Facilities

There are no known workings at the Arm Group prospect.

Geologic Setting

The Arm Group covers iron-stained gneiss near the contact with a foliated quartz diorite body (termed "tonalite sill" by Brew, *D-20*). Sampling by the Bureau during the Tracy Arm/Ford's Terror study yielded low values of zinc but no gold or silver (*D-161*).

Bureau Investigations

The Bureau examined the Arm Group during the Tracy Arm/Ford's Terror study.

Resource Estimate

The Arm Group is between the Tracy Arm prospect (outside the study area) and the Goldnest quartz vein occurrence but has only low metal values.

Recommendations

The Arms prospect should be geologically mapped and sampled to determine extent of mineralization.

MAS No.
21150056

References

D-20, D-55, D-99, D-161

SWEETHEART RIDGE PROSPECT

Production

There has been no production from the Sweetheart Ridge prospect.

History

Mineralization at the Sweetheart Ridge prospect may have been discovered as early as the late 1890's when the Elephant, Readgister, and Golden Gate claims were staked in the general vicinity of the prospect (*D-55*). In 1974, the Bureau rediscovered the area (fig. D-6).

Local prospectors staked the Sweetheart Ridge area in 1978 and optioned the property to Mapco (*D-92*) which drilled a few thousand feet of holes between that year and 1982 (*D-47*).

Workings and Facilities

There are a few open pits at the prospect.

Geologic Setting

The Sweetheart Ridge area is underlain primarily by greenstone with local felsic (muscovite) schist (fig. D-222). The felsic schist belt contains small pods of stratiform massive sulfides and chalcopyrite-bearing quartz veins in a zone 200 feet wide and 10,000 feet long. Four types of mineralization have been identified at the prospect: 1) massive chalcopyrite and sphalerite with lesser galena, 2) disseminated pyrite and chalcopyrite which border the massive sulfide lenses, 3) chalcopyrite in concordant quartz veins, and 4) thin stringers and blebs of chalcopyrite. Drilling by Mapco indicates that the massive sulfide and associated mineralization increases in thickness with depth.

The massive sulfide pods consist of about equal amounts of sphalerite and chalcopyrite plus minor galena. The massive sulfide pods occur along a discrete stratigraphic horizon near the top of the muscovite schist belt. The pods, the largest of which is 0.75 feet wide and 6 feet long, can be traced for 200 feet along trend. Between pods, massive mineralization pinches down to about 2 inches. Sampling by the Bureau in 1974 (*D-55*) showed that a 5.4-foot zone across the best surface mineralization contained 0.93% copper, 0.52% zinc, 0.23% lead, and 10.3 ppm gold. Mapco drilling found that the same zone was 6.8 feet thick at a depth of 70 feet below the surface with 0.64% copper, 0.62% zinc, 0.49% lead, and 2.5 ppm gold. At a depth of 150 feet below the surface, the horizon was 11.5 feet thick and carried 1.1% copper, 1.58% zinc, 0.63% lead, and 9.3 ppm gold. Most of the gold values came from the disseminated pyrite zone above the massive sulfide pods.

Disseminated pyrite and chalcopyrite occur both immediately above and below the massive sulfide layer. Most chalcopyrite is found close to the massive pods. The sulfide mineral grains are less than 0.05 inches in diameter and compose up to 5% of the muscovite schist but decrease in volume away from the massive sulfide pods. The disseminated pyrite zone above the massive pods carried 10.3 ppm, 2.5 ppm, and greater than 15.0 ppm gold (fig. D-222).

Chalcopyrite occurs in quartz veins in two bands within the muscovite schist unit. The veins are thin, usually less than an inch, discontinuous, and are usually associated with the chalcopyrite stringers described below. Chalcopyrite is most abundant along the margins of the veins. Drilling cut sections 15 feet, 30 feet, and 15 feet thick with 0.25%, 0.29%, and 0.22% copper, respectively in the first band and 10 feet, 15 feet, and 15 feet thick with 0.06%, 0.34%, and 0.25% copper in the second band.

Chalcopyrite stringers are more common than massive mineralization. The stringers occur in biotite- and feldspar-rich schists and can be found scattered in different stratigraphic horizons for approximately 2.5 miles along strike. The stringers are up to 0.8 inches thick and 10 feet long and are usually solid chalcopyrite. The same horizon may have discontinuous stringers for tens of feet (*D-92*).

Bureau Investigations

The Sweetheart Ridge prospect was only briefly examined by the Bureau in 1986 but, no mapping or sampling was done because of the detailed work previously done by the Bureau following its original discovery, and because of the availability of data from the 1978 Mapco drilling program.

Resource Estimate

Base metal grades are modest at the Sweetheart Ridge prospect but the associated gold values are of particular interest. The prospect has an inferred resource of 45,000 tons of material grading 0.22 ounces/ton gold, 0.9% zinc, 0.9% copper, and 0.45% lead. The area has a high development potential.

Recommendations

Drilling and a deep-reading EM survey could help define the size, grade, and potential of the deposit.

MAS No.
21150057

References

D-47, D-55, D-92, D-99

ANMER CREEK OCCURRENCE

History

There is no historical record of any work being done in Anmer Creek.

Bureau Investigations

Anmer Creek (informally named) cuts through black phyllite on the NW portion of the Snettisham Peninsula (fig. D-6). Its upper course follows the trend of a distinct lineament that can be traced south to the area east of Pt. Coke. Two streams which drain the lineament, Carroll and Boulder Creeks, contain placer gold. The phyllites host scattered foliation-concordant quartz veins.

Sample Results

The Bureau collected four pan concentrate samples (fig. D-6) from Anmer Creek (Appendix D-1, sample numbers 7024-7025, 7100-7101). Two of the samples contained 1.1 ppm and 0.9 ppm gold.

Resource Estimate

Low gold values give Anmer Creek a low potential.

Recommendations

Because gold is present in small amounts, the area could contain mineralized quartz veins. Geologic mapping, soil sampling, and stream sediment sampling could help determine the source of the gold.

References

D-99

CARROLL CREEK PLACER MINE

Production

There was minor production of gold from Carroll Creek in the early to middle 1980's but totals aren't known.

History

The Carroll Creek placer deposit may have been known as early as 1881 (fig. D-6). The stream was staked in the 1980's (*D-131*) and a small portable dredge used to placer mine the lower portion of the creek in 1984 and 1985 with unknown results.

Workings and Facilities

A few small placer cuts were visible at the time of the Bureau's visit.

Bureau Investigations

Most of the rocks in the vicinity of Carroll Creek are black phyllite. The upper portion of the creek is controlled by the lineament that extends the length of the Snettisham Peninsula. Traces of gold can be found by panning.

The Bureau collected a 0.1 yd^3 placer sample (Appendix D-1, sample number 7098) from Carroll Creek but no gold was detected.

Resource Estimate

Carroll Creek has a modest volume of gravels available for mining but the distribution of gold is not known.

Recommendations

The stream should be carefully sampled for placer gold.

References

D-99, D-131

MAPCO PROSPECT

Production

There has been no production from the Mapco prospect.

History

Stream sediment samples taken by the Bureau during the Tracy Arm/Ford's Terror study in the mid-1970's showed that the stream flowing south of Meigs Peak (fig. D-6) contained anomalous amounts of zinc (400 ppm), lead (to 200 ppm), silver (to 5 ppm), and gold (to 0.7 ppm) (*D-55*). In 1981, Mapco did a large airborne EM survey in the area and subsequently staked the Cars group of claims covering the stream and ridge east of Meigs Peak. It is unknown what other work the company did in the area.

Workings and Facilities

There are no known workings.

Geologic Setting

The area south and east of Meigs Peak is underlain by mafic metavolcanic rocks and black phyllite. Quartz

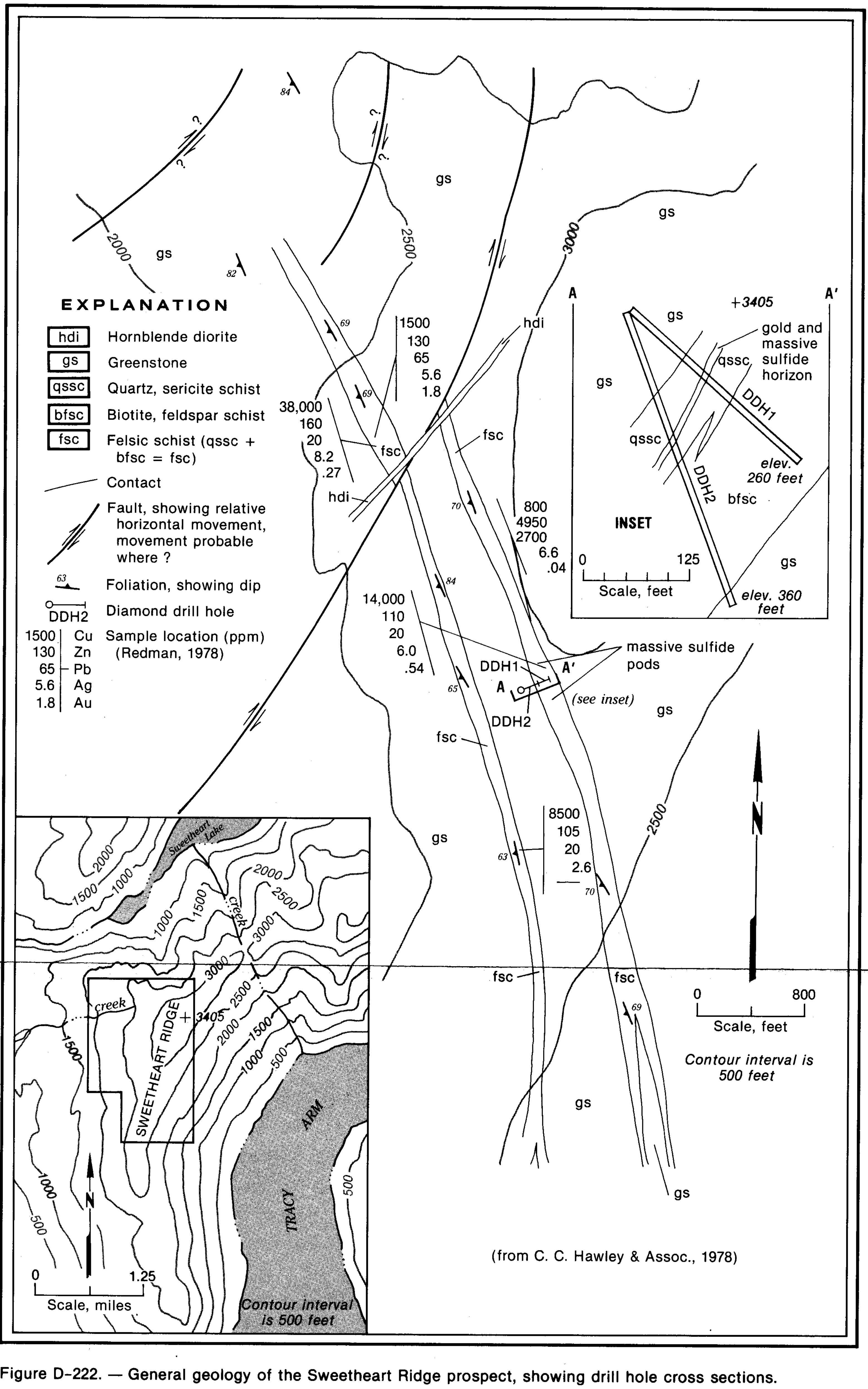

Figure D-222. — General geology of the Sweetheart Ridge prospect, showing drill hole cross sections.

veins, usually concordant with foliation, are present locally and may contain pyrrhotite. Some of the metavolcanic rocks contain disseminated pyrite (*D-55*).

Bureau Investigations

The Bureau investigated the area during the Tracy Arm/Ford's Terror wilderness study and located anomalous concentrations of zinc, lead, silver, and gold in the stream south of Meigs Peak (*D-55*).

Resource Estimate

Massive sulfide mineralization occurs in the Snettisham Peninsula area (Sweetheart Ridge, Tracy Arm) but there is no known deposit in the Meigs Peak area.

Recommendations

Detailed mapping and sampling could define a potential deposit.

References

D-55, D-99

BOULDER CREEK PLACER MINE

Production

A small amount of gold was produced in the early to middle 1980's.

History

The Boulder Creek placer may have been discovered as early as 1881 (fig. D-6). In 1980, the stream was restaked and some small scale mining was done near the mouth of the stream using a tractor and sluice box.

Workings and Facilities

There is a placer cut near the mouth of the stream.

Bureau Investigations

Placer gold is being washed down the canyon of Boulder Creek from metavolcanic rocks and black phyllite. In its middle section, Boulder Creek follows the lineament which parallels the west shoreline of the Snettisham Peninsula. Gold can be panned from the stream.

The Bureau collected a 0.1 yd^3 placer sample from the active channel of Boulder Creek. A trace of fine gold was present in the concentrate but the sample assayed only a trace of gold.

Resource Estimate

The amount of placer gravel available for mining is small and the area has a low development potential.

Recommendations

A placer sampling program could define the extent and grade of gold in the gravels of Boulder Creek.

References

D-99

SOUTHERN SNETTISHAM PENINSULA OCCURRENCE

History

Nothing is known about the history of the area (fig. D-6).

Workings and Facilities

There are no known workings.

Bureau Investigations

Near the southern end of the Snettisham Peninsula, an area of NW-trending marble is cut by quartz veins and exhibits well-developed karst topography. To the east, the marbles grade into argillite and mafic metavolcanic rock. Very-fine gold can be panned from some of the small creeks in the area.

The Bureau collected seven samples of quartz and marble (Appendix D-1, sample numbers 7137-7139, 7151-7154). In spite of visible gold found by panning, the highest gold value from the samples was 0.1 ppm.

Resource Estimate

Metal values were insignificant and the area has a low development potential.

Recommendations

Detailed mapping and sampling may locate additional mineralization.

References

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PT. COKE PROSPECT

Production

There has been no production.

History

About 1900, the Hecla, Black Hawk, Grey Eagle, and Chicago claims were staked on mineralized metavolcanic rocks (fig. D-6). The area was restaked in the 1920's (*D-55*).

Workings and Facilities

There are no known workings.

Geologic Setting

The Pt. Coke area is underlain by metavolcanic rocks and black phyllite. A 240-foot-wide zone within the metavolcanic rocks contains quartz veins which carry minor amounts of pyrite. Kimball and others (*D-55*) sampled the area but only one of their sample contained elevated metal values. This sample contained 300 ppm copper.

Bureau Investigations

The Bureau examined the Pt. Coke prospect during the Tracy Arm/Ford's Terror study.

Resource Estimate

Metal values at the Pt. Coke prospect are insignificant and the area has a low development potential.

Recommendations

No work is recommended.

MAS No.
21150063

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D-55

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APPENDIX D-1.—ANALYTICAL RESULTS

Sampling and Analytical Procedures

Stream sediment, panned-concentrate, placer, and rock samples were collected for analysis. The procedure for collecting placer samples consisted of processing 0.1 yd^3 of gravels through a 4-foot-long sluice box. The resultant concentrates were visually examined to ascertain free gold content and also submitted for analysis. Rock samples were of several types, including grab, select, random-chip, representative-chip, spaced-chip, continuous-chip, and chip-channel. Grab samples are randomly collected outcrop or float materials and select samples are grab samples of specific material. Random-chip samples consist of small rock fragments broken randomly from outcrop whereas representative-chip samples are used to characterize an outcrop. Spaced-chip samples are composed of a series of rock fragments taken at a designated interval and continuous-chip samples consist of a continuous series of rock fragments taken from the outcrop. Chip-channel samples are taken over a relatively uniform width and depth across the outcrop.

Detection limits for the various techniques, as determined by Bondar-Clegg, Inc., are listed below. When sample determinations exceed the maximum detection limits of the atomic absorption spectrophotometry technique, a specific chemical analytical procedure was used to determine metal concentration.

Atomic absorption spectrophotometry

Element	Minimum, ppm	Maximum, ppm
Ag	0.2	30
Cu	1	20,000
Pb	2	7,500
Zn	1	20,000
As	2	1,000
Mo	1	20,000
Te	0.2	unknown
Fire assay-atomic absorption spectrophotometry		
Au	0.1	none

Analytical Results

Analytical results and sample data are listed in Appendix D-1. In addition to the sample results, the following information is listed in the appendix: map number, figure number, prospect name, sample number, sample type, and sample size. Abbreviations used in the table are defined following this.

Key to listing of sample results

Prosp. No.—Prospect number shown on figures D-4 to D-6.

Map No.—Sample location number shown on figures.

Fig.No.—Number of figure which shows location of samples.

Prospect Name—Name of mine, prospect, or occurrence. Some prospect names are followed by name of specific locality to make it easier to differentiate workings at a prospect.

Sample No.—Sample field number.

Sample Type—See key to abbreviations following.

Sample Lithology & Remarks—Brief description of rock type, minerals present, or other pertinent information.

Sample Size—Sample length or volume.

Atomic Absorption—Analyses of Cu, Pb, Zn, Ag, As, Mo, and Te by atomic absorption spectrophotometry technique.

FA/AA—Analyses of Au by fire assay-atomic absorption spectrophotometry technique.

Specific—Quantitative assays for Cu, Pb, and Zn by specific chemical techniques.

ABBREVIATIONS

Heading	Abbreviation	Term
Sample type	CC	continuous-chip
	CH	channel
	CR	representative-chip
	G	grab
	PC	panned-concentrate
	PL	placer
	RC	random-chip
	RG	random-grab
	S	select
	SC	spaced chip
	SS	stream-sediment
	F	float
Sample lithology & remarks	aggl	agglomerate
	alt	altered
	amph	amphibolite
	aspy	arsenopyrite
	bas	basalt
	bk	black
	brn	brown
	chl	chlorite
	cp	chalcopyrite
	cgl	conglomerate
	dior	diorite
	dissem	disseminated
	f	fine (placer gold)
	fel	felsic
	gn	galena
	gns	gneiss
	gry	gray
	grn	green
	gnst	greenstone
	hnbd	hornblende
	mcgl	metaconglomerate
	mgb	metagabbro
	msed	metasedimentary rock
	phyl	phyllite
	py	pyrite
	po	pyrrhotite
	qz	quartz
	sch	schist
	sed	sediments
	ser	sericite
	sil	silicified
	sl	sphalerite
	sulf	sulfides
	stib	stibnite
	vf	very fine (placer gold)
	vol	volcanic
	w/	with
Sample results	—	not analyzed

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption: Cu ppm	Atomic Absorption: Pb ppm	Atomic Absorption: Zn ppm	Atomic Absorption: As ppm	Atomic Absorption: Mo/W ppm	Atomic Absorption: Te ppm	Fire Assay/AA: Ag ppm	Fire Assay/AA: Au ppm	Specific: Cu %	Specific: Pb %	Specific: Zn %
1	1	40	Ivanhoe	3745	S	qz		51	14	3	—	—	—	7.6	15.0	—	—	—
	2		Open cut	4234	SC	qz w/1% py, cp	6.0′	285	2	3	—	—	2.10	3.0	0.9	—	—	—
1	3	40	Ivanhoe	4227	SC	qz, alt bas w/4% py	2.5′	32	13	16	—	—	6.20	7.6	3.1	—	—	—
	4		Main adit	4228	CC	qz, alt bas w/1% py	1.5′	95	24	45	—	—	2.20	3.2	1.3	—	—	—
	5			4229	SC	qz w/4% py, 2% cp	3.5′	18	4	14	—	—	1.60	2.6	0.9	—	—	—
	6			3639	S	qz		16200	10	27	—	—	—	9.5	1.7	—	—	—
	7			4230	SC	qz w/2% cp, 2% py	4.0′	480	345	5	—	—	1.75	1.7	0.6	—	—	—
	8			4165	CC	qz w/1% py, cp	6.5′	20	2	7	—	—	0.25	0.4	0.2	—	—	—
	9			4050	CC	qz w/2% cp, 1% py	2.5′	1450	2	17	—	—	8.00	11.0	5.7	—	—	—
	10			3744	CC	qz	6.0′	15700	10	9	—	—	—	24.0	10.5	—	—	—
	11			4232	S	sheared bas	0.75′	43	3	126	—	—	—	0.2	0.4	—	—	—
	12			4233	CC	gnst	1.0′	125	3	120	—	—	—	0.2	0.1	—	—	—
	13			4231	SC	qz w/.5% py, cp	6.0′	1100	5	8	—	—	2.20	5.5	1.1	—	—	—
	14			4167	CC	qz w/1% py, cp	4.0′	65	6	3	—	—	1.00	1.0	0.3	—	—	—
	15			4166	SC	qz w/7% py, cp	5.0′	9	7	6	—	—	1.53	2.4	1.0	—	—	—
3	1	38	Ophir	1833	S	alt dior		655	158	385	—	—	5.8	6.9	3.6	—	—	—
	2		(new Kensington	7072	S	qz w/ py		7	18	27	—	—	3.1	6.0	2.8	—	—	—
	3		adit)	7073	S	qz w/py, tellurides		28	136	10	—	—	19.0	33.6	15.8	—	—	—
	4			7074	CC	qz w/8% py, tellurides	0.6′	61	109	298	—	—	15.0	36.5	7.8	—	—	—
5	1	41	Horrible	3749	CR	alt dior		352	15	76	—	—	—	4.3	0.7	—	—	—
	2		upper adit	3748	SC	qz	2.0′	77	26	13	—	—	—	2.7	0.9	—	—	—
	3			3747	SC	qz	1.5′	1110	4690	181	—	—	—	57.4	0.4	—	—	—
	4			3746	SC	qz	4.0′	14200	2	17	—	—	—	74.6	31.3	—	—	—
5	5	41	Horrible	4065	CC	qz w/3% py, 3% cp	3.0′	3400	10	136	—	—	1.50	16.0	1.7	—	—	—
	6		main adit	4064	CC	qz w/3% py	1.6′	678	4	3	—	—	6.50	13.0	10.9	—	—	—
	7			4063	SC	qz w/1% py	7.5′	118	149	30	—	—	1.58	3.6	1.7	—	—	—
	8			4062	CC	qz w/2% py, 3% cp	3.2′	2850	2	7	—	—	11.00	27.0	19.3	—	—	—
	9			4249	CC	qz w/trace py	6.0′	43	35	8	—	—	1.20	2.6	0.3	—	—	—
	10			4248	CC	qz w/5% py, cp	1.5′	5000	2	196	—	—	0.80	22.0	1.2	—	—	—
	11			4247	RC	alt dior	10.0′	171	7	32	—	—	1.95	3.2	1.8	—	—	—
	12			4075	RC	qz w/5% gn	3.0′	445	>10000	79	—	—	6.5	109.4	1.6	—	1.8	—
	13			4246	CC	qz w/trace malachite	3.4′	87	13	17	—	—	6.50	5.0	2.8	—	—	—
	14			4244	CC	qz w/trace py	4.0′	69	106	8	—	—	0.37	1.0	0.1	—	—	—
	15			4245	CC	qz stockwork in dior	4.0′	265	28	30	—	—	1.50	2.0	1.7	—	—	—
	16			4243	RC	qz w/malachite	3.0′	37	131	10	—	—	1.05	4.4	0.3	—	—	—
	17			4242	CC	qz w/1% py	7.5′	240	73	17	—	—	2.10	2.9	0.8	—	—	—
	18			4241	CC	qz w/2% py	2.0′	73	7	3	—	—	28.00	39.6	18.0	—	—	—
6	1	42	Mexican	4066	SC	qz w/1% py, cp, gn	6.5′	54	162	202	—	—	0.3	3.2	nil	—	—	—
	2		Main adit	4067	CC	qz w/1% py	2.0′	25	21	69	—	—	0.8	4.0	0.5	—	—	—
	3			4321	CC	qz w/15% py, gn	6.0′	87	316	870	—	—	4.8	11.0	0.4	—	—	—
	4			4322	CC	qz w/3% py, cp	1.5′	148	645	61	—	—	2.0	22.0	1.2	—	—	—
	5			4323	CC	qz w/2% py, cp	1.3′	10	17	12	—	—	1.5	1.7	0.9	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
6	6	42	Mexican Discovery adit	4068	SC	qz w/5% py	3.0′	259	14	16	—	—	0.7	9.6	0.7	—	—	—
15	4	45	Sweeny Creek	4032	RG	pyritic bk phyl		58	600	76	—	—	—	0.2	0.1	—	—	—
	5			4033	S	qz from dump		38	9	80	—	—	—	0.8	0.1	—	—	—
	6			4101	RG	qz w/limo stain		105	3	53	—	—	—	0.2	nil	—	—	—
	7			4102	CC	silic phyl w/qz	2.0′	64	6	97	—	—	—	0.2	nil	—	—	—
	8			4103	RG	float qz		54	8	18	—	—	—	0.1	nil	—	—	—
16	1	45	Cumberland	3921	CC	qz	4.0′	101	14	138	—	—	—	0.2	nil	—	—	—
	2			3809	CR	qz		39	26	85	—	—	—	0.6	nil	—	—	—
	3			3920	G	Slates-dump		67	17	51	—	—	—	0.4	nil	—	—	—
18	1	49	Gold King	3149	RC	chl dior		116	23	223	—	—	—	0.9	0.2	—	—	—
	2			3150	RC	chl dior		170	13	60	—	—	—	0.2	0.1	—	—	—
	3			3151	RC	qz		6	18	51	—	—	—	7.7	9.9	—	—	—
	4			3154	CH	dior	0.4′	130	11	69	—	—	—	2.4	2.5	—	—	—
	5			3159	RC	chl dior		73	5	42	—	—	—	<0.2	0.2	—	—	—
	6			3156	CH	qz	4.0′	71	15	52	—	—	—	0.9	0.5	—	—	—
	7			3157	RC	chl dior		128	14	72	—	—	—	<0.2	0.1	—	—	—
	8			3155	RC	chl dior		120	13	74	—	—	—	<0.2	0.3	—	—	—
	9			3158	RC	chl dior		69	12	45	—	—	—	0.2	0.2	—	—	—
	10			3152	CH	qz	8.0′	35	22	23	—	—	—	18.0	36.8	—	—	—
17	1	47	Greek Boy pits	3916	CC	qz	5.0′	275	13	18	—	—	—	0.5	0.2	—	—	—
	2			3917	S	qz-dump		470	10	20	—	—	—	0.9	0.6	—	—	—
	3			3918	CC	qz	5.0′	74	12	12	—	—	—	0.2	0.1	—	—	—
	4			3914	CC	qz	8.0′	125	10	27	—	—	—	0.4	0.7	—	—	—
	5			3915	S	qz-dump		1560	11	28	—	—	—	3.5	4.3	—	—	—
	6			3913	CC	qz	6.2′	129	14	33	—	—	—	0.5	1.0	—	—	—
	7			3919	CC	qz	0.5′	115	280	53	—	—	—	10.0	2.2	—	—	—
17	1	46	Greek Boy No. 3 Adit	3260	S	dior-dump		47	18	175	—	—	—	<0.2	0.0	—	—	—
	2			3261	SS	alluvium		194	3	40	—	—	—	<0.2	0.3	—	—	—
17	1	48	Greek Boy No. 1 Adit	3259	SS	alluvium		101	4	39	—	—	—	<0.2	0.1	—	—	—
	2			3258	SS	alluvium		51	6	37	—	—	—	<0.2	nil	—	—	—
	3			3124	G	dump		14	22	48	—	—	—	<0.2	14.9	—	—	—
	4			3125	G	dump		410	6	51	—	—	—	3.1	7.2	—	—	—
20	1	50	Snowslide Gulch area	3264	RC	mag sandstone		59	15	238	—	—	—	<0.2	nil	—	—	—
	2			3265	RC	cgl		57	15	215	—	—	—	<0.2	0.1	—	—	—
	3			3266	RC	cgl		55	11	229	—	—	—	<0.2	0.1	—	—	—
	4			3267	RC	cgl		45	10	151	—	—	—	<0.2	0.1	—	—	—
	5			3268	S	msed		30	6	220	—	—	—	<0.2	0.1	—	—	—
	6			3269	RC	msed		48	11	172	—	—	—	<0.2	nil	—	—	—
20	1	28	Jualin Upper adit	3499	CR	qz		22	37	31	—	—	—	3.3	3.9	—	—	—
	2			3497	CC	qz	2.1′	114	30	81	—	—	—	1.4	0.2	—	—	—
	3			3498	CC	qz	3.9′	133	30	15	—	—	—	1.9	1.5	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
6	6	42	Mexican Discovery adit	4068	SC	qz w/5% py	3.0′	259	14	16	—	—	0.7	9.6	0.7	—	—	—
15	4	45	Sweeny Creek	4032	RG	pyritic bk phyl		58	600	76	—	—	—	0.2	0.1	—	—	—
	5			4033	S	qz from dump		38	9	80	—	—	—	0.8	0.1	—	—	—
	6			4101	RG	qz w/limo stain		105	3	53	—	—	—	0.2	nil	—	—	—
	7			4102	CC	silic phyl w/qz	2.0′	64	6	97	—	—	—	0.2	nil	—	—	—
	8			4103	RG	float qz		54	8	18	—	—	—	0.1	nil	—	—	—
16	1	45	Cumberland	3921	CC	qz	4.0′	101	14	138	—	—	—	0.2	nil	—	—	—
	2			3809	CR	qz		39	26	85	—	—	—	0.6	nil	—	—	—
	3			3920	G	Slates-dump		67	17	51	—	—	—	0.4	nil	—	—	—
18	1	49	Gold King	3149	RC	chl dior		116	23	223	—	—	—	0.9	0.2	—	—	—
	2			3150	RC	chl dior		170	13	60	—	—	—	0.2	0.1	—	—	—
	3			3151	RC	qz		6	18	51	—	—	—	7.7	9.9	—	—	—
	4			3154	CH	dior	0.4′	130	11	69	—	—	—	2.4	2.5	—	—	—
	5			3159	RC	chl dior		73	5	42	—	—	—	<0.2	0.2	—	—	—
	6			3156	CH	qz	4.0′	71	15	52	—	—	—	0.9	0.5	—	—	—
	7			3157	RC	chl dior		128	14	72	—	—	—	<0.2	0.1	—	—	—
	8			3155	RC	chl dior		120	13	74	—	—	—	<0.2	0.3	—	—	—
	9			3158	RC	chl dior		69	12	45	—	—	—	0.2	0.2	—	—	—
	10			3152	CH	qz	8.0′	35	22	23	—	—	—	18.0	36.8	—	—	—
17	1	47	Greek Boy pits	3916	CC	qz	5.0′	275	13	18	—	—	—	0.5	0.2	—	—	—
	2			3917	S	qz-dump		470	10	20	—	—	—	0.9	0.6	—	—	—
	3			3918	CC	qz	5.0′	74	12	12	—	—	—	0.2	0.1	—	—	—
	4			3914	CC	qz	8.0′	125	10	27	—	—	—	0.4	0.7	—	—	—
	5			3915	S	qz-dump		1560	11	28	—	—	—	3.5	4.3	—	—	—
	6			3913	CC	qz	6.2′	129	14	33	—	—	—	0.5	1.0	—	—	—
	7			3919	CC	qz	0.5′	115	280	53	—	—	—	10.0	2.2	—	—	—
17	1	46	Greek Boy No. 3 Adit	3260	S	dior-dump		47	18	175	—	—	—	<0.2	0.0	—	—	—
	2			3261	SS	alluvium		194	3	40	—	—	—	<0.2	0.3	—	—	—
17	1	48	Greek Boy No. 1 Adit	3259	SS	alluvium		101	4	39	—	—	—	<0.2	0.1	—	—	—
	2			3258	SS	alluvium		51	6	37	—	—	—	<0.2	nil	—	—	—
	3			3124	G	dump		14	22	48	—	—	—	<0.2	14.9	—	—	—
	4			3125	G	dump		410	6	51	—	—	—	3.1	7.2	—	—	—
20	1	50	Snowslide Gulch area	3264	RC	mag sandstone		59	15	238	—	—	—	<0.2	nil	—	—	—
	2			3265	RC	cgl		57	15	215	—	—	—	<0.2	0.1	—	—	—
	3			3266	RC	cgl		55	11	229	—	—	—	<0.2	0.1	—	—	—
	4			3267	RC	cgl		45	10	151	—	—	—	<0.2	0.1	—	—	—
	5			3268	S	msed		30	6	220	—	—	—	<0.2	0.1	—	—	—
	6			3269	RC	msed		48	11	172	—	—	—	<0.2	nil	—	—	—
20	1	28	Jualin Upper adit	3499	CR	qz		22	37	31	—	—	—	3.3	3.9	—	—	—
	2			3497	CC	qz	2.1′	114	30	81	—	—	—	1.4	0.2	—	—	—
	3			3498	CC	qz	3.9′	133	30	15	—	—	—	1.9	1.5	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
	13			3862	S	blue qz		13	14	23	—	—	—	23.0	4.2	—	—	—
32	1	54	Tacoma	3755	S	qz	2.0′	6	<2	6	2	—	—	<0.2	nil	—	—	—
	2			7302	CC	qz	2.0′	107	209	229	18	—	—	1.6	nil	—	—	—
	3			7301	S	qz, float		159	>7500	1960	66	—	—	169.8	1.1	—	2.78	—
	4			7290	RG	qz, calcite		50	12	152	15	—	—	2.1	nil	—	—	—
33	1	56	Gold Standard	4308	CC	crushed qz	4.0	10	4	8	—	—	—	0.2	nil	—	—	—
	2		Inclined shaft	4309	S	qz w/1% aspy		6	<2	3	—	—	—	<0.1	nil	—	—	—
33	3	55	Gold Standard	6001	CR	gnst, qz	5.0′	16	3	37	15	—	—	<0.2	nil	—	—	—
	4		Prospect pits	7304	CR	qz	10.0′	4	8	4	280	—	—	<0.2	0.8	—	—	—
33	5	57	Gold Standard	6003	CC	qz, bk sch	3.0′	66	48	26	—	—	—	0.8	7.0	—	—	—
	6		Contact Tunnel	6004	CC	qz	2.0′	136	158	36	—	—	—	3.4	6.7	—	—	—
	7			6002	CC	qz, bk phyl	2.0′	109	224	39	—	—	—	1.0	3.9	—	—	—
	8			6005	CR	qz, phyl	2.0′	4	82	39	68	—	—	0.6	nil	—	—	—
	9			6006	S	qz		3	35	1	—	—	—	0.5	1.9	—	—	—
33	10	57	Gold Standard	6023	CC	pyritic gnst	2.0′	148	12	92	40	—	—	<0.2	nil	—	—	—
	11		Greenstone Tunnel	6022	S	qz, gnst		31	31	27	800	—	—	<0.2	0.1	—	—	—
33	12	55	Gold Standard	6024	S	qz, gnst	7.5′	16	4	19	85	—	—	<0.2	nil	—	—	—
	13			6025	CR	gnst	7.5′	97	22	54	700	—	—	<0.2	0.1	—	—	—
	14			6026	S	qz, float		33	241	11	>1000	—	—	0.9	3.4	—	—	—
33	15	55	Gold Standard	6027	CR	qz		32	22	19	>1000	—	—	0.2	0.2	—	—	—
	16		Trenches	6028	S	qz		5	5	1	260	—	—	<0.2	nil	—	—	—
	17			6029	CR	qz, gnst	3.0′	59	50	35	>1000	—	—	<0.2	0.8	—	—	—
34	18	58	California	6009	CR	qz, bk phyl	6.0′	14	7	19	35	—	—	<0.2	0.1	—	—	—
34	19	58	California	3780	CC	qz	1.1′	11	17	9	800	—	—	<0.2	2.3	—	—	—
	20		Prospect pits	3781	CH	qz	1.1′	3	<2	1	300	—	—	<0.2	0.2	—	—	—
34	21	58	California	7305	CC	qz	2.0′	63	32	64	400	—	—	0.3	0.2	—	—	—
	22		Falls Tunnel	6102	CC	gry phyl, qz	0.9′	110	125	76	—	—	—	0.8	1.2	—	—	—
	23			6101	CC	phyl, qz	3.3′	55	99	115	800	—	—	0.4	nil	—	—	—
	24			6100	CC	sch, qz	2.9′	131	77	64	900	—	—	0.4	0.2	—	—	—
34	25	58	California tunnel	6008	CC	bk phyl, gnst	2.0′	90	9	85	—	—	—	<0.2	nil	—	—	—
	26			6007	CR	qz	0.1′	21	19	33	—	—	—	0.2	1.1	—	—	—
34	27	58	California	7306	CC	qz	2.0′	128	9	49	—	—	—	1.4	1.5	—	—	—
	28		Cabin Tunnel	6103	CC	gry phyl	2.8′	104	23	79	—	—	—	0.3	0.3	—	—	—
	29			6104	CC	ser sch	2.0′	181	10	80	450	—	—	0.4	0.1	—	—	—
	30			6105	CC	chl sch	3.9′	61	10	123	600	—	—	0.3	nil	—	—	—
34	31	55	California	6030	CC	qz, calcite	3.7′	3	21	6	>1000	—	—	0.2	2.1	—	—	—
	32		Gold Knob	6106	S	qz		99	5	9	—	—	—	<0.2	0.4	—	—	—
	33			7307	S	qz, float		10	5	2	—	—	—	1.3	10.7	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
	34			6031	S	qz, float	10.0′	14	45	31	24	—	—	<0.2	nil	—	—	—
36	1	60	Blue Jay	7366	S	qz, from pile		134	4230	460	>1000	—	—	15.0	3.7	—	—	—
	2			6319	S	qz		415	60	28	>1000	—	—	6.5	5.0	—	—	—
	3			7365	S	qz, float		10	16	29	155	—	—	0.2	nil	—	—	—
	4			7364	RC	qz		5	4	10	140	—	—	<0.2	nil	—	—	—
37	1	61	Maude S	7358	CR	qz	2.1′	76	142	90	800	—	—	2.0	2.0	—	—	—
	2		Upper adit	7357	CC	brecciated qz	4.0′	30	70	58	>1000	—	—	0.5	0.3	—	—	—
	3			7356	CC	brecciated qz	5.0′	39	13	160	>1000	—	—	0.3	0.1	—	—	—
	4			7355	CC	brecciated qz	2.0′	33	165	212	>1000	—	—	2.5	3.2	—	—	—
	5			7359	CR	qz		4	92	3	>1000	—	—	0.4	0.3	—	—	—
37	6	61	Maude S	7360	CC	bk phyl, qz	3.0′	51	77	105	>1000	—	—	1.2	0.6	—	—	—
	7		Lower adit	7362	CC	bk phyl	6.0′	26	12	128	180	—	—	0.2	nil	—	—	—
	8			7361	CC	bk phyl, qz	5.0′	45	30	149	160	—	—	0.6	0.1	—	—	—
	9			7363	CC	bk phyl	3.0′	52	247	86	>1000	—	—	3.4	4.4	—	—	—
38	1	62	Joyce-Jensen	7349	CR	qz	0.3′	90	84	10	>1000	—	—	1.4	0.7	—	—	—
	2		Open cuts	7350	RC	qz		10	93	19	>1000	—	—	0.6	0.3	—	—	—
38	5	62	Joyce-Jensen	7343	CC	qz	3.0′	44	67	80	190	—	—	0.7	0.1	—	—	—
	6		Adit	7344	CC	qz	2.5′	63	25	78	325	—	—	0.4	0.3	—	—	—
	7			7345	CC	qz	2.0′	62	27	130	400	—	—	0.5	0.2	—	—	—
	8			7346	CR	qz	3.0′	10	17	50	600	—	—	<0.2	0.1	—	—	—
	9			7347	CC	qz	1.5′	16	32	62	75	—	—	0.2	nil	—	—	—
	10			7348	CR	qz	7.0′	33	53	73	34	—	—	0.2	nil	—	—	—
38	3	62	Joyce-Jensen	7351	CC	qz	1.5′	378	3600	22	>1000	—	—	27.0	7.0	—	—	—
	4		Open cut	7352	S	qz		1655	5240	71	>1000	—	—	39.1	11.8	—	—	—
39	1	63	Black Chief	7342	S	qz		1510	>7500	810	>1000	—	—	47.0	10.2	—	1.70	—
	2			7329	CR	qz, gry phyl		50	16	55	110	—	—	0.3	3.4	—	—	—
	3			7330	CC	qz	2.0′	530	>7500	155	1000	—	—	41.8	16.7	—	1.38	—
	4			7341	S	qz		46	4	42	130	—	—	0.2	0.5	—	—	—
	5			7339	S	qz		2	66	51	60	—	—	0.2	nil	—	—	—
	6			7340	S	qz	7.0′	27	25	43	150	—	—	0.3	1.7	—	—	—
	7			7335	CC	qz	3.0′	43	14	81	120	—	—	<0.2	0.1	—	—	—
	8			7338	CC	qz	2.5′	44	8	72	62	—	—	<0.2	nil	—	—	—
	9			7331	CC	qz, bk phyl	5.0′	19	16	46	100	—	—	<0.2	nil	—	—	—
	10			7336	CC	qz	3.0′	40	3	80	150	—	—	<0.2	nil	—	—	—
	11			7337	CC	qz	3.0′	28	9	68	150	—	—	0.2	nil	—	—	—
	12			7333	CC	qz, bk phyl	2.0′	7	3	49	100	—	—	<0.2	nil	—	—	—
	13			7332	CC	qz, bk phyl	3.5′	30	7	45	>1000	—	—	<0.2	0.1	—	—	—
40	1	66	E Pluribus Unum	7318	S	qz		2	7	10	>1000	—	—	0.3	2.5	—	—	—
	2		No. 1 Adit	7309	CC	qz	2.0′	37	5	67	16	—	—	<0.2	nil	—	—	—
	3			7310	CC	qz	4.0′	41	6	58	24	—	—	<0.2	0.1	—	—	—
	4			7316	CC	qz	4.5′	42	12	99	63	—	—	<0.2	0.1	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
	5			7313	CC	qz	2.5′	57	3	92	750	—	—	<0.2	0.2	—	—	—
	6			7312	CC	qz	2.0′	71	5	110	80	—	—	<0.2	nil	—	—	—
	7			7311	CC	qz	3.0′	21	7	39	35	—	—	0.2	0.9	—	—	—
	8			7317	S	qz		<1	188	9	>1000	—	—	1.5	29.8	—	—	—
	9			7315	CR	qz, bk phyl	6.0′	37	41	89	250	—	—	0.2	0.4	—	—	—
	10			7314	CC	qz, chl sch	4.0′	147	10	117	26	—	—	0.2	nil	—	—	—
40	11	67	E Pluribus Unum	3275	G	dump		5	1200	16				—	6.1	6.7		
	12		No. 2 Adit	7319	CC	qz	1.5′	1	16	13	>1000	—	—	0.4	5.8	—	—	—
	13			7320	CR	qz		3	460	22	>1000	—	—	14.0	122.6	—	—	—
	14			7321	CC	qz, bk phyl	2.8′	3	340	138	>1000	—	—	8.0	59.9	—	—	—
	15			7325	CR	qz, bk phyl		11	14	27	1000	—	—	<0.2	0.1	—	—	—
	16			7328	CC	qz, phyl	1.0′	10	92	22	>1000	—	—	0.4	2.2	—	—	—
	17			7323	CC	qz, bk phyl	2.0′	7	1940	39	>1000	—	—	7.1	14.3	—	—	—
	18			7326	S	aspy	0.4′	3	8600	23	>1000	—	—	31.9	4.2	—	—	—
	19			7322	CC	qz	2.5′	<1	420	36	>1000	—	—	1.5	3.1	—	—	—
	20			7324	CC	qz, bk phyl	5.0′	65	23	81	280	—	—	<0.2	0.2	—	—	—
40	21	68	E Pluribus Unum	3273	CC	qz	1.5′	7	540	207	—	—	—	2.5	8.3	—	—	—
	22		No. 3 Adit	7327	CC	qz, slate	2.5′	18	98	40	>1000	—	—	0.2	0.9	—	—	—
	23			3272	C	qz	2.5′	11	56	—	—	—	—	0.7	5.7	—	—	—
40	24	64	E Pluribus Unum	3274	CC	qz	5.0′	16	15	47	—	—	—	<0.2	0.1	—	—	—
	25		Trenches	7220	G	qz		7	7	31	—	—	—	<0.2	0.2	—	—	—
	26			7219	RC	qz	0.8′	10	9	33	—	—	—	<0.2	0.1	—	—	—
				3330	G	metallurgical sample		—	—	—	—	—	—	4.1	4.3	—	—	—
41	1	69	Julia	6336	S	qz		11	14	32	85	—	—	0.2	nil	—	—	—
	2	70		6334	S	qz	1.0′	14	8	13	120	—	—	0.2	nil	—	—	—
	3			6333	F	qz		16	14	40	400	—	—	0.7	0.2	—	—	—
	4			6335	RG	qz		13	1125	22	300	—	—	5.2	0.5	—	—	—
	5			6337	S	qz		43	1050	370	700	—	—	12.0	20.2	—	—	—
	6			6332	SC	qz	4.0′	16	102	46	>1000	—	—	1.0	3.6	—	—	—
42	7	69	Puzzler	6341	S	qz		16	9	72	25	—	—	0.2	nil	—	—	—
	10	71		6080	RG	qz	12.0′	5	835	8	>1000	—	—	4.7	6.2	—	—	—
	11			6343	S	gry phyl, qz		34	23	53	>1000	—	—	1.0	0.1	—	—	—
	12			6344	F	qz		20	540	28	>1000	—	—	4.0	3.8	—	—	—
44	8	69	Noonday	6342	CC	bk slate, qz	6.0′	18	5	95	25	—	—	<0.2	nil	—	—	—
	9			7376	S	qz		4	<2	8	14	—	—	<0.2	0.1	—	—	—
	13	72		6073	S	qz		25	14	40	19	—	—	0.3	0.1	—	—	—
	14			7377	CR	qz		3	25	18	>1000	—	—	0.2	1.0	—	—	—
	15			7373	F	qz		71	455	6	>1000	—	—	7.0	18.5	—	—	—
	16			7374	S	qz pod		5	47	18	>1000	—	—	1.6	12.4	—	—	—
	17			7375	S	qz pod		35	234	4	>1000	—	—	6.3	50.3	—	—	—
	18			6078	CR	qz	1.0′	18	5	27	120	—	—	0.4	nil	—	—	—
	19			7388	S	qz		44	4	43	62	—	—	3.8	0.5	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
	23	69		6079	CC	bk phyl	1.5′	52	12	126	150	—	—	0.4	nil	—	—	—
	24	73		6076	CC	qz, slate	3.0′	33	19	25	30	—	—	4.5	0.4	—	—	—
	25			6077	CR	qz	3.0′	54	9	64	90	—	—	1.8	0.2	—	—	—
	26			6345	S	qz		12	2	30	20	—	—	<0.2	nil	—	—	—
	27			6074	CC	qz, bk phyl	3.0′	11	8	67	6	—	—	<0.2	0.1	—	—	—
	28			6075	CR	qz, bk phyl	2.5′	14	<2	19	3	—	—	<0.2	nil	—	—	—
45	1	74	Dividend	6085	S	phyl, qz	4.0′	85	18	56	>1000	—	—	0.4	1.3	—	—	—
	2		Surface	7381	S	qz		8	15	7	>1000	—	—	0.8	2.6	—	—	—
	3			7308	CC	gnst, qz	4.0′	97	4	50	950	—	—	<0.2	0.2	—	—	—
	4			6083	CC	qz	8.0′	38	9	81	32	—	—	<0.2	0.1	—	—	—
	5			6084	CR	sheared phyl, qz	22.0′	34	11	69	65	—	—	<0.2	0.9	—	—	—
	6			7379	CR	qz	8.0′	46	11	96	70	—	—	0.4	6.4	—	—	—
	7			7378	CR	qz	11.0′	10	11	55	11	—	—	<0.2	nil	—	—	—
45	8	74	Dividend	3189	CC	qz	1.5′	21	8	21	—	—	—	0.2	0.5	—	—	—
	9		Standard Crosscut	3188	CC	qz	0.5′	30	11	25	—	—	—	0.2	0.2	—	—	—
	10			7278	SC	chl sch		200	11	70	—	—	—	0.2	nil	—	—	—
	11			7277	RC	alt gnst		77	8	53	—	—	—	<0.2	0.1	—	—	—
	12			7275	SC	slate & qz		41	16	42	—	—	—	0.3	1.4	—	—	—
	13			7273	CC	Slate & qz	7.0′	46	15	87	—	—	—	1.2	3.2	—	—	—
	14			7274	RC	alt vol		72	13	67	—	—	—	0.3	nil	—	—	—
	15			7272	S	slate & qz		43	16	35	—	—	—	0.3	0.5	—	—	—
	16			7276	CC	slate & qz	5.0′	120	15	69	—	—	—	0.6	2.1	—	—	—
43	20	69	Cascade	6082	RG	qz, float		39	18	65	160	—	—	0.2	0.1	—	—	—
	21			6081	RG	qz, slate	8.0′	7	15	23	160	—	—	<0.2	0.1	—	—	—
	22			7380	F	qz		4	500	115	>1000	—	—	4.4	4.3	—	—	—
46	1	75	Rex	6095	F	qz		8	<2	13	4	—	—	<0.2	nil	—	—	—
	2			6094	S	bk phyl, qz		28	<2	90	21	—	—	<0.2	nil	—	—	—
	3			6091	S	phyl		135	18	119	30	—	—	0.3	0.1	—	—	—
	4			6092	S	qz, phyl	2.0′	19	<2	45	4	—	—	<0.2	0.1	—	—	—
	5			6093	S	qz	3.0′	13	<2	6	6	—	—	0.3	nil	—	—	—
	6			6086	S	qz		5	<2	6	550	—	—	<0.2	nil	—	—	—
	7			6087	F	qz		11	<2	52	4	—	—	<0.2	nil	—	—	—
	8			6089	CC	brecciated qz	6.0′	42	13	31	70	—	—	1.6	0.2	—	—	—
	9			6090	CC	qz	3.0′	30	<2	34	22	—	—	1.7	0.1	—	—	—
	10			7386	G	qz, ser sch		30	16	42	19	—	—	0.4	0.2	—	—	—
	11			7387	F	qz		20	10	49	22	—	—	0.2	nil	—	—	—
	12			6088	F	qz		46	<2	128	30	—	—	<0.2	nil	—	—	—
47	1	77	Aurora Borealis	3123	RC	alt vol		134	7	116	—	—	—	<0.2	nil	—	—	—
47	2	77	Aurora Borealis Adit No. 1	7218	RC	slate & qz		75	17	129	—	—	—	0.3	0.4	—	—	—
47	3	77	Aurora Borealis	7202	CC	qz	3.0′	8	44	13	—	—	—	0.2	0.5	—	—	—
	4		Adit No. 2	7203	CC	qz	3.3′	19	58	86	—	—	—	0.5	2.8	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
	5			7204	CC	qz	2.7′	14	52	83	—	—	—	2.1	11.3	—	—	—
	6			7205	RC	qz		97	16	143	—	—	—	0.5	2.2	—	—	—
	7			7213	CC	qz	1.6′	59	13	77	—	—	—	0.8	4.1	—	—	—
	8			7214	CC	qz	1.0′	65	9	81	—	—	—	0.9	3.9	—	—	—
	9			7215	RC	slate	1.0′	79	11	127	—	—	—	0.2	0.1	—	—	—
	10			7216	SC	qz	1.2′	42	59	104	—	—	—	0.4	3.3	—	—	—
	11			7217	RC	slate & qz	1.0′	70	3	108	—	—	—	0.3	2.3	—	—	—
48	1	79	Bessie	7078	CC	qz	1.1′	15	122	22	—	—	—	0.5	8.3	—	—	—
	2		Trenches	7079	CC	qz	1.1′	9	91	17	—	—	—	0.5	0.8	—	—	—
	3			7206	CC	qz	1.3′	11	117	23	—	—	—	0.4	14.5	—	—	—
	4			7077	G	qz		98	263	118	—	—	—	2.2	33.4	—	—	—
48	5	80	Bessie	7291	CH	qz	0.9′	11	<2	10	>1000	/20	—	0.3	1.5	—	—	—
	6		No. 2 adit	7292	CH	qz	1.4′	12	<2	8	300	—	—	0.2	0.1	—	—	—
	7			7293	CH	qz	1.4′	47	17	25	>1000	—	—	0.3	3.5	—	—	—
	8			7299	S	aggl		132	6	100	600	—	—	<0.2	0.2	—	—	—
	9			7300	CH	qz	0.8′	64	2	38	>1000	—	—	<0.2	0.2	—	—	—
	10			7303	CC	selvage	0.4′	98	35	98	>1000	—	—	0.6	1.4	—	—	—
	11			7294	CH	qz	1.6′	14	9	16	>1000	—	—	0.2	0.8	—	—	—
	12			7295	CH	qz	1.3′	3	14	6	>1000	—	—	0.3	0.5	—	—	—
	13			7296	CH	qz	0.9′	20	78	35	>1000	—	—	0.4	3.6	—	—	—
	14			7297	CH	qz	1.0′	23	4	39	900	—	—	<0.2	0.3	—	—	—
	15			7298	CH	qz	1.3′	8	2	11	220	—	—	<0.2	0.3	—	—	—
48	16	81	Bessie	7211	RC	mcgl		108	10	102	—	—	—	0.7	nil	—	—	—
	17		No. 1 adit	7210	CC	qz	0.6′	80	5	180	—	—	—	0.6	2.5	—	—	—
	18			7209	CC	qz	0.8′	16	11	52	—	—	—	1.0	4.6	—	—	—
	19			7208	CC	qz	2.8′	19	21	22	—	—	—	0.5	2.7	—	—	—
	20			7207	CC	qz	1.5′	41	73	105	—	—	—	0.2	10.3	—	—	—
	21			7212	CC	cgl	2.0′	171	5	104	—	—	—	<0.2	nil	—	—	—
49	1	82	Alaska Washington	3276	RC	vol cgl		123	11	88	—	—	—	<0.2	nil	—	—	—
	2		Adit No. 2	7200	G	qz		15	50	30	—	—	—	0.3	3.5	—	—	—
	7			3278	CC	qz	2.0′	38	7	192	—	—	—	<0.2	5.0	—	—	—
	8			3280	CC	qz	0.5′	22	7	47	—	—	—	0.3	2.9	—	—	—
	9			3279	CC	iron-stained qz	2.8′	9	4	40	—	—	—	<0.2	0.8	—	—	—
	10			3135	S	qz		44	40	37	—	—	—	0.6	2.8	—	—	—
	11			3136	CC	qz	1.0′	32	24	17	—	—	—	<0.2	0.3	—	—	—
	12			3137	RC	qz		140	57	242	—	—	—	<0.2	0.5	—	—	—
49	3	82	Alaska Washington Shaft	7201	S	dump w/up to 10% py		40	1380	189	—	—	—	4.7	18.3	—	—	—
49	4	82	Alaska Washington Caved adit	7222	G	qz		6	8	8	—	—	—	0.3	0.9	—	—	—
49	5	82	Alaska Washington	7221	G	tuff breccia		101	10	89	—	—	—	<0.2	nil	—	—	—
	13		Adit No.1	3138	CC	qz	1.0′	37	26	41	—	—	—	0.2	1.2	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
	14			3139	CC	qz	1.0′	83	9	76	—	—	—	0.2	2.1	—	—	—
	15			3277	CC	cgl	3.0′	114	17	78	—	—	—	<0.2	0.3	—	—	—
49	6	82	Alaska Washington	7199	F	qz		12	4	5	—	—	—	<0.2	0.2	—	—	—
50	1	83	Mother Lode	3861	CR	alt andesite		100	15	76	6	—	—	<0.2	0.1	—	—	—
	2			7385	S	qz, gnst		22	12	19	150	—	—	1.6	8.8	—	—	—
	3			7384	CC	qz	3.0′	22	5	20	130	—	—	<0.2	0.2	—	—	—
	4			7383	F	qz		7	3	8	70	—	—	<0.2	0.1	—	—	—
	5			7382	S	qz		4	2	4	110	—	—	0.3	1.5	—	—	—
	1	84	Eagle Glacier Area	3358	CR	qz	2.0′	51	32	27	600	—	—	2.4	2.7	—	—	—
	2			7438	S	qz	1.5′	88	29	12	11	—	—	0.8	nil	—	—	—
	3			7439	CR	gneiss	1.5′	46	4	40	11	—	—	<0.2	0.1	—	—	—
	4			3359	CR	qz	0.4′	430	8	14	6	—	—	0.8	0.1	—	—	—
	5			7437	CR	gneiss	7.0′	64	13	81	50	—	—	0.4	0.3	—	—	—
51	1	85	Eagle River	6072	S	qz		126	64	68	32	—	—	0.9	1.2	—	—	—
	2			7391	S	phyl		87	22	112	>1000	—	—	0.6	0.1	—	—	—
	3			6070	G	qz, dump		580	>7500	6620	>1000	—	—	42.5	50.3	—	1.27	—
	4			7371	F	qz		8	15	26	24	—	—	<0.2	nil	—	—	—
	5			7372	F	qz		25	11	55	90	—	—	0.4	1.5	—	—	—
	6			7390	RC	gnst		118	<2	80	5	—	—	<0.2	0.1	—	—	—
	7			7389	S	qz		8000	<2	36	6	—	—	7.3	3.2	—	—	—
	8			6071	F	qz		20	175	69	400	—	—	6.2	12.8	—	—	—
	9			7370	F	qz		42	540	515	>1000	—	—	1.5	3.3	—	—	—
	10			6069	F	qz		13	14	26	500	—	—	0.3	0.1	—	—	—
52	1	88	Westover	4069	G	qz from boulders		37	<2	30	—	—	—	<0.2	nil	—	—	—
53	11	85	Oleson	7538	RC	bk slate		70	9	108	28	—	—	<0.2	nil	—	—	—
	12			7539	RC	qz, slate float		18	25	32	6	—	—	<0.2	nil	—	—	—
	13			7537	RC	bk slate		67	4	120	14	—	—	<0.2	nil	—	—	—
	14			7536	RC	Bk slate		86	7	104	13	—	—	<0.2	nil	—	—	—
	15			3331	F	qz		8	<2	11	3	—	—	<0.2	nil	—	—	—
54	6	84	Mitchell-McPherson	4313	RC	qz w/1% py	0.5′	6	13	24	—	—	—	<0.1	nil	—	—	—
	7			4314	RC	sil dior	1.0′	18	10	70	—	—	—	0.1	nil	—	—	—
	8			4315	S	qz w/up to 5% py		78	8	33	—	—	—	0.1	nil	—	—	—
	9			4316	S	alt dior w/qz, 2% py		11	11	85	—	—	—	0.2	0.1	—	—	—
	10			4318	S	qz w/trace py, cp		63	1350	575	—	—	—	39.0	0.1	—	—	—
	11			4319	CC	alt dior w/trace py	2.0′	22	13	59	—	—	—	1.2	2.7	—	—	—
55	1	35	Herbert Glacier	8202	RC	qz w/2% aspy, 8% gn	1.3′	5	3850	182	—	/3	—	17.0	1.7	—	—	—
	2		north vein	8204	CC	qz w/10% aspy	1.0′	95	>1000	3600	—	/3	—	188.2	37.3	—	—	—
	3			8200	CC	qz w/2% aspy, gn	1.0′	6	198	22	—	/270	—	1.8	0.4	—	—	—
	4			8201	CC	qz w/1% aspy, gn	0.7′	2	215	9	—	/4	—	1.8	0.6	—	—	—
	5			3671	CC	qz w/2% aspy, trace gn	2.5′	2	102	18	—	/960	—	0.2	0.2	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
	6			3672	CC	qz w/2% aspy, 1% gn	5.0′	2	300	9	—	/540	—	2.4	0.3	—	—	—
	7			3673	CC	qz w/2% aspy	3.0′	19	134	25	—	/630	—	1.1	0.2	—	—	—
	8			3674	RC	qz w/5% aspy, 2% gn	1.5′	10	265	22	—	/1800	—	5.8	1.3	—	—	—
	9			3670	RC	qz w/2% aspy, 1% gn	2.0′	4	136	23	—	/190	—	1.3	0.9	—	—	—
	10			3669	S	qz w/3% gn, 2% aspy	1.0′	2	4850	5	—	/19	—	42.0	0.3	—	—	—
	11			3668	CC	qz w/2% aspy, gn	2.5′	28	455	23	—	/540	—	16.0	2.9	—	—	—
	12			3667	CC	qz w/2% aspy, 1% gn	2.0′	2	935	9	—	—	—	5.6	1.5	—	—	—
55	13	36	Herbert Glacier	7451	CC	qz w/20% aspy, 1% gn	1.4′	8	500	122	—	/5	0.4	3.6	16.2	—	—	—
	14		south vein	7452	CC	qz w/5% aspy, 3% gn	2.0′	5	4050	750	—	/405	0.4	9.0	35.7	—	—	—
	15			7453	CC	qz w/3% aspy, 5% gn	1.0′	4	4350	34	—	/3	0.2	10.0	1.9	—	—	—
	16			7454	CC	qz w/20% aspy, 5% gn	0.5′	5	>1000	32	—	/4	0.3	28.0	6.5	—	—	—
	17			3662	RC	qz, dior w/aspy	1.0′	8	34	48	—	—	—	3.1	6.5	—	—	—
	18			3663	RG	qz w/2% gn	1.0′	4	3800	2300	—	/2	—	19.0	68.2	—	—	—
	19			6049	RC	qz	2.0′	1	4950	7	>1000	/450	—	16.0	16.7	—	—	—
	20			6048	CC	qz	1.8′	3	3150	22	>1000	/520	—	5.2	9.1	—	—	—
	21			8213	CC	qz w/1% aspy	0.4′	9	2200	315	—	—	—	6.4	26.0	—	—	—
	22			7436	CC	qz w/sulf	2.5′	7	1420	620	>1000	—	—	38.0	117.2	—	—	—
	23			6050	CC	qz	1.8′	13	4800	1620	>1000	/360	—	126.9	240.9	—	—	—
	24			8211	RC	alt zone w/1% aspy	1.5′	23	22	205	—	—	—	2.3	1.2	—	—	—
	25			8212	CC	qz w/1% aspy	0.5′	22	700	61	—	—	—	6.4	37.1	—	—	—
	26			8214	CC	qz w/1% aspy	0.7′	4	39	32	—	—	—	1.0	1.3	—	—	—
	27			6051	CC	qz & dior	3.5′	8	100	55	>1000	—	—	2.0	3.5	—	—	—
	28			8215	CC	qz w/1% aspy	1.0′	10	835	325	—	—	—	2.9	1.6	—	—	—
55	29	36	Herbert Glacier	7444	S	qz w/10% aspy, 2% py	0.5′	32	38	70	—	/4	7.4	1.4	2.1	—	—	—
	30		south vein	7443	CC	qz w/minor limo	1.0′	32	8	8	—	/315	5.2	0.7	0.3	—	—	—
	31			7445	RC	qz w/2% py, aspy	1.5′	11	28	15	—	/6	5.0	9.4	7.3	—	—	—
	32			7448	RC	qz, dior, 2% py	2.0′	20	21	52	—	/6	4.8	0.9	2.4	—	—	—
	33			7446	CC	qz w/25% aspy, 2% py	1.5′	2	1650	8	—	/4	0.4	7.2	0.6	—	—	—
	34			7450	CC	qz w/2% aspy, py, gn	0.2′	65	4400	5000	—	/3	<0.2	88.4	106.7	—	—	—
	35			7447	CC	qz, dior, 3% aspy	1.5′	10	126	50	—	/135	0.6	8.8	5.2	—	—	—
	36			7449	CC	qz, dior, 3% py	2.0′	18	1850	1100	—	/4	<0.2	13.0	36.1	—	—	—
	37			8208	CC	qz w/1% gn, 10% aspy	3.0′	2	1400	87	—	—	—	6.1	25.0	—	—	—
	38			3665	RC	qz w/3% aspy, gn	1.0′	5	24	34	—	/4	—	1.1	1.4	—	—	—
	39			3666	RC	alt dior w/5% aspy	2.5′	6	15	92	—	—	—	0.2	1.2	—	—	—
	40			3664	CC	qz w/2% aspy	1.5′	2	33	49	—	/12	—	0.5	1.4	—	—	—
	41			7442	CC	alt dior w/3% aspy	4.0′	18	13	102	—	—	<0.2	0.6	0.6	—	—	—
	42			6053	CC	qz & dior	7.0′	10	1430	67	>1000	—	—	26.0	16.8	—	—	—
	43			6052	RC	qz	3.0′	1	213	20	>1000	—	—	1.6	2.2	—	—	—
				7441	RC	metallurgical sample		—	—	—	—	/300	—	--	65.7	—	—	—
56	1	89	Herbert Group	6041	RC	qz w/2% sulf	0.3′	112	6	11	>1000	—	—	<0.2	0.1	—	—	—
	2			6042	S	qz	0.6′	1	4	10	>1000	—	—	<0.2	0.1	—	—	—
	3			6036	S	qz		26	2	6	>1000	—	—	<0.2	nil	—	—	—
	4			6037	S	qz, gnst		270	4	14	>1000	—	—	<0.2	nil	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
	5			6038	CR	qz, gnst	15.0′	55	4	6	1000	—	—	<0.2	nil	—	—	—
	6			6039	S	qz	1.0′	23	8	19	>1000	—	—	<0.2	0.1	—	—	—
	7			6040	CR	qz, gnst	20.0′	137	3	43	>1000	—	—	<0.2	0.1	—	—	—
	8			6032	SC	gnst, qz	36.0′	131	34	58	14	—	—	<0.2	0.1	—	—	—
	9			6033	CC	qz	5.0′	12	<2	3	22	—	—	<0.2	nil	—	—	—
	10			6034	S	mineralized gnst	2.0′	415	16	77	7	—	—	0.6	0.1	—	—	—
	11			6035	CC	gnst	4.0′	199	76	377	7	—	—	<0.2	nil	—	—	—
57	1	90	Summit/St. Louis	6054	CR	qz	5.0′	42	7	9	200	—	—	0.2	0.2	—	—	—
	2			8140	S	qz from dump		4	7	7	—	/4	—	0.2	1.3	—	—	—
	3			8207	G	qz w/2% aspy		32	32	12	—		—	3.4	35.7	—	—	—
	4			8205	RG	qz w/2% aspy	0.7′	10	44	12	—	/4	—	3.6	27.8	—	—	—
	5			8206	G	qz w/2% aspy		10	103	19	—	/4	—	2.6	1.7	—	—	—
	6			8139	CC	sil fault gouge	1.5′	580	60	40	—	/2	—	0.6	nil	—	—	—
	7			8138	CC	qz w/dissem aspy	0.8′	8	72	9	—	/3	—	3.2	8.8	—	—	—
58	1	91	Windfall Creek	6044	PL	10 vf, 1 f Au	$0.1yd^3$	45	5	73	44	/33	—	1.8	*0.0003	—	—	—
	2			6043	PL	50 vf Au	$0.1yd^3$	44	8	59	400	/450	—	12.0	*0.0006	—	—	—
	3			3309	PL		$0.1yd^3$	—	—	—	—	—	—	—	*0.0080	—	—	—
	4			3310	PL		$0.1yd^3$	—	—	—	—	—	—	—	*0.0006	—	—	—
	5			6045	PL	50 vf, 10 f Au	$0.1yd^3$	56	8	52	>1000	/775	—	1.7	*0.0007	—	—	—
	6			6046	PL	100 vf, 25 f Au	$0.1yd^3$	54	18	56	>1000	/700	—	1.5	*0.0008	—	—	—
	7			6047	PL	28 vf, 2 f Au	$0.1yd^3$	59	16	55	>1000	/575	—	1.8	*0.0012	—	—	—
59	1	92	Smith & Heid Windfall Creek	7414	S	qz	1.0′	47	280	52	7	—	—	3.4	0.2	—	—	—
	2			3353	S	qz, bk phyl		44	22	35	>1000	—	—	0.4	1.0	—	—	—
	3			3354	PL	24 vf, 2 f Au	$0.1yd^3$	44	15	90	>1000	/43	—	14.0	*0.0002	—	—	—
59	4	92	Smith & Heid	3350	CC	ser sch, qz	2.0′	23	61	33	24	—	—	0.4	nil	—	—	—
	5			7416	CR	ser sch	1.5′	127	8	91	4	—	—	0.2	nil	—	—	—
	6	93		3351	CR	qz, chl sch	2.0′	122	9	62	>1000	—	—	0.4	0.1	—	—	—
	7			7415	S	qz	1.0′	16	2	24	400	—	—	<0.2	0.1	—	—	—
59	8	93	Smith & Heid Falls Tunnel	3352	CR	qz, bk phyl	8.0′	21	2	37	200	—	—		nil	—	—	—
59	9	93	Smith & Heid	6014	F	qz	4.0′	40	5	40	—	—	—	0.3	1.7	—	—	—
	10	94	Tunnel No. 1	7407	SC	sch, qz	23.0′	201	38	120	120	—	—	1.1	0.1	—	—	—
	11			7408	SC	sch, qz	39.0′	226	5	88	18	—	—	<0.2	0.1	—	—	—
	12			3345	CC	qz, bk phyl	4.0′	28	<2	53	>1000	—	—	<0.2	0.2	—	—	—
	13			7409	CH	bk phyl, qz	5.0′	47	3	70	>1000	—	—	<0.2	0.1	—	—	—
	14			3348	CC	bk phyl, qz	5.0′	37	5	58	400	—	—	<0.2	1.0	—	—	—
	15			3347	CC	qz, bk phyl	2.0′	9	<2	18	>1000	—	—	8.6	107.8	—	—	—
	16			3346	CC	qz	1.1′	47	9	38	>1000	—	—	3.4	18.1	—	—	—
	17			3349	CC	qz, bk phyl	5.0′	32	3	31	>1000	—	—	<0.2	0.5	—	—	—
	18			7410	CC	bk phyl, qz	3.8′	38	6	78	>1000	—	—	0.3	0.9	—	—	—
	19			7411	CC	bk phyl, qz	1.2′	41	7	84	>1000	—	—	0.4	1.0	—	—	—
	20			7412	S	qz	0.3′	2	13	12	>1000	—	—	1.1	2.4	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
59	21	93	Smith & Heid	6013	F	qz		7	24	22	—	—	—	0.2	1.6	—	—	—
	22	94	Tunnel No. 2	6010	CH	bk sch, qz	1.1′	55	14	80	—	—	—	1.3	3.0	—	—	—
	23			7406	CC	alt ser sch	1.0′	135	5	76	800	—	—	0.3	0.4	—	—	—
	24			6011	CC	brecciated qz	1.1′	5	211	7	—	—	—	1.7	32.2	—	—	—
	25			3343	CC	sil chl sch	3.0′	108	9	76	40	—	—	<0.2	nil	—	—	—
	26			3344	CC	bk phyl, qz	1.7′	39	7	74	>1000	—	—	0.2	0.1	—	—	—
	27			6012	CC	qz	1.3′	46	10	97	600	—	—	0.2	0.2	—	—	—
60	1	95	Montana Basin	6097	CR	qz	15.0′	11	<2	19	60	—	—	<0.2	nil	—	—	—
	2			6096	CR	qz	4.0′	23	<2	30	45	—	—	<0.2	nil	—	—	—
	3			6098	CR	qz	1.0′	14	<2	28	18	—	—	<0.2	nil	—	—	—
	4			6099	CR	qz	1.0′	2	<2	4	9	—	—	<0.2	nil	—	—	—
	5			7404	PL	much visible Au	0.1yd^3	30	8	81	190	/55	—	1.4	*0.001	—	—	—
	6			3342	CR	bk sch, qz	2.0′	20	209	32	40	—	—	0.4	nil	—	—	—
60	7	96	Patton	7433	CC	brecciated qz	2.0′	23	21	24	>1000	—	—	2.3	1.0	—	—	—
	8		Adit No. 3	7432	CC	qz	5.0′	48	52	100	>1000	—	—	11.0	2.2	—	—	—
	9			7428	CC	qz, phyl	4.0′	34	166	73	>1000	—	—	2.6	18.2	—	—	—
	10			7429	CC	brecciated qz	2.0′	7	6	44	800	—	—	<0.2	0.1	—	—	—
	11			7430	CC	qz	2.0′	48	47	96	>1000	—	—	3.4	2.0	—	—	—
	12			7431	CC	qz	1.4′	33	69	104	>1000	—	—	4.4	4.4	—	—	—
60	13	97	Patton	3122	G	dump		4	36	16	—	—	—	1.5	20.9	—	—	—
	14		No. 2 adit	7198	S	qz		18	8	16	—	—	—	0.2	nil	—	—	—
	15		(Sandy Smith adit)	7413	CC	brecciated qz	0.1′	69	9	80	>1000	—	—	1.2	1.2	—	—	—
	16			7427	CC	qz	1.5′	32	12	56	>1000	—	—	2.0	2.0	—	—	—
	17			7426	CH	qz	1.3′	18	47	72	>1000	—	—	3.8	8.0	—	—	—
	18			7425	CH	qz	0.5′	14	38	45	>1000	—	—	2.4	3.8	—	—	—
	19			7424	CC	qz, gouge	1.1′	66	23	101	>1000	—	—	2.2	10.4	—	—	—
	20			7423	CH	qz, breccia	0.9′	4	137	60	>1000	—	—	5.0	28.8	—	—	—
	21			7422	CH	qz	0.7′	5	445	110	>1000	—	—	13.0	76.3	—	—	—
	22			7421	CH	qz	0.5′	15	174	104	>1000	—	—	3.3	29.6	—	—	—
	23			7420	CH	qz	0.3′	11	37	69	>1000	—	—	1.4	8.3	—	—	—
	24			7419	CH	qz	1.9′	48	59	236	>1000	—	—	1.4	8.3	—	—	—
	25			7418	CH	qz	1.4′	24	307	220	>1000	—	—	5.2	64.3	—	—	—
	26			7417	CH	qz	0.9′	36	37	61	>1000	—	—	3.5	13.6	—	—	—
60	27	98	Patton No. 1 adit	3327	CC	qz	4.0′	48	7	96	40	—	—		nil	—	—	—
61	1	99	Montana Basin Placer	3341	CR	qz, bk phyl	10.0′	12	15	36	60	—	—	0.2	nil	—	—	—
	2			7398	PL	24 vf, 2 f Au	0.1yd^3	37	35	55	>1000	/33	—	>30.0	*0.007	—	—	—
	3			7397	PL	much visible Au	0.1yd^3	38	52	60	>1000	/73	—	>30.0	*0.011	—	—	—
	4			7395	PL	36 vf, 1 f Au	0.1yd^3	50	53	102	>1000	/4	—	6.4	*0.003	—	—	—
				7403	CR	qz	4.0′	40	32	43	22	—	—	—	nil	—	—	—
	6			7396	PL	much visible Au	0.1yd^3	56	42	68	>1000	/63	—	108.7	*0.017	—	—	—
	7			3328	F	qz		17	31	20	12	—	—	<0.2	nil	—	—	—
	8			7393	PL	much visible Au	0.1yd^3	38	28	78	>1000	/185	—	26.0	*0.035	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
	9			7394	PL	much visible Au	0.1yd^3	36	22	74	>1000	/87	—	145.9	*0.025	—	—	—
	10			7400	PL	much visible Au	0.1yd^3	47	37	90	>1000	/105	—	65.7	*0.025	—	—	—
63	29	91	Montana Creek	6055	PL	20 vf Au	0.1yd^3	50	7	70	290	/58	—	2.0	*0.0008	—	—	—
	30			6056	PL	15 vf Au	0.1yd^3	42	5	69	350	/40	—	1.0	*0.0004	—	—	—
	31			7353	PL	50 vf, 5 f Au	0.1yd^3	46	130	85	105	/15	—	1.9	*0.0009	—	—	—
	32			7354	PL	75 vf, 8 f Au	0.1yd^3	30	11	57	58	/40	—	15.0	*0.0005	—	—	—
	33			6066	PL	24 vf, 3 f Au	0.1yd^3	38	3000	66	160	/38	—	1.1	*0.0009	—	—	—
62	8	91	Mansfield Gold	6059	PL	8 vf Au	0.1yd^3	24	<2	34	8	/5	—	<0.2	*0.0001	—	—	—
	9		Mining Co.	8219	S	qz w/2% po		45	8	72	—	—	—	0.2	nil	—	—	—
	10		(McGinnis Creek)	3312	S	qz		11	6	2860	—	—	—	0.4	0.3	—	—	—
	11			3313	G	qz		11	4	33	—	—	—	0.3	nil	—	—	—
	12			7434	S	qz, float		19	2	12	—	—	—	0.4	nil	—	—	—
	13			7435	CC	qz	1.0′	41	9	80	40	—	—	0.2	nil	—	—	—
	14			3311	PC	qz		—	—	—	—	—	—	—	T	—	—	—
	15			3355	CR	qz, float		7	<2	20	22	—	—	<0.2	nil	—	—	—
	16			3356	CR	qz, float		8	<2	32	38	—	—	<0.2	nil	—	—	—
	17			3357	F	pyritic phyl		30	4	216	18	—	—	0.3	0.2	—	—	—
	18			3697	RG	qz w/2% py		28	10	33	—	—	—	0.1	1.1	—	—	—
	19			8220	S	qz w/1% po		40	9	40	—	—	—	0.1	nil	—	—	—
	20			8217	S	qz w/1% po		34	16	90	—	—	—	0.1	nil	—	—	—
	21			8216	PL		0.1yd^3	7	12	133	250	/5	—	1.0	*0.0018	—	—	—
	22			8033	F	qz, float		37	8	29	—	—	—	0.1	nil	—	—	—
	23			8034	F	qz, float		14	5	16	—	—	—	<0.2	nil	—	—	—
	24			8218	PL		0.1yd^3	—	18	141	175	/5	—	—	*0.00160	—	—	—
	25			8209	RG	qz w/1% py		10	126	40	—	—	—	<0.1	0.2	—	—	—
	26			6057	PL	10 vf, 2 f Au	0.1yd^3	33	2	82	110	/5	—	0.4	*0.0008	—	—	—
	27			6058	PL	4 vf Au	0.1yd^3	30	3	80	58	/21	—	0.6	*0.0002	—	—	—
	28			6065	PL	3 vf Au	0.1yd^3	135	4600	52	100	/340	—	18.0	*0.0013	—	—	—
64	1	100	Peterson Lost Soldier mill	3691	S	qz from mill		45	51	36	—	—	—	1.3	14.7	—	—	—
64	2	100	Peterson	3689	RG	qz w/1% aspy		5	3	4	—	—	—	0.1	3.3	—	—	—
	3		Jessie claim	3679	CC	qz w/15% aspy	0.7′	12	15	56	—	—	0.2	0.2	5.8	—	—	—
	4			3675	CC	qz in sheared bk phyl	3.0′	46	13	78	—	—	<0.2	0.2	0.2	—	—	—
	5			3676	CC	qz w/2% aspy	2.0′	10	7	14	—	—	0.2	0.1	7.2	—	—	—
	6			3677	CC	qz w/2% aspy	1.5′	10	11	18	—	—	0.2	0.2	5.5	—	—	—
	7			3678	CC	qz w/1% aspy	2.0′	32	11	53	—	—	—	0.2	0.4	—	—	—
	8			3690	RG	qz	2.0′	2	2	4	—	—	—	<0.1	15.3	—	—	—
64	9	100	Peterson	6062	F	qz, float		<1	3	2	>1000	—	—	<0.2	0.5	—	—	—
	10		Cannon Ball claim	6061	F	qz, float		7	9	5	>1000	—	—	2.0	9.5	—	—	—
64	11	100	Peterson	6060	CR	brecciated qz	4.0′	6	13	10	45	—	—	<0.2	0.1	—	—	—
	12		Soldier Lode claim	6321	RG	qz, float		4	<2	2	73	—	—	<0.2	nil	—	—	—
	13			6320	RG	qz		3	3	4	>1000	—	—	0.1	0.5	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
64	14	102	Peterson	6063	CC	qz	2.0′	1	30	3	>1000	—	—	0.2	3.4	—	—	—
	15		Prairie claim	3204	RC	qz-dump		6	43	20	—	—	—	2.3	4.6	—	—	—
	16			3203	CC	qz	4.0′	3	15	5	—	—	—	0.3	1.5	—	—	—
	17			3102	CC	qz	1.0′	3	22	15	—	—	—	0.2	0.6	—	—	—
	18			3103	CC	qz	0.3′	63	36	73	—	—	—	0.3	1.0	—	—	—
	19			6322	F	qz, float		2	11	2	>1000	—	—	0.2	1.2	—	—	—
	20			6323	CC	qz	1.7′	16	10	16	>1000	—	—	<0.2	0.1	—	—	—
	21			6324	S	qz		2	8	2	>1000	—	—	0.3	2.3	—	—	—
	22			3101	G	dump		171	14	174	—	—	—	0.3	0.1	—	—	—
	23			3201	RC	qz-dump		33	29	18	—	—	—	1.3	4.1	—	—	—
	24			3202	RC	qz-dump		91	25	86	—	—	—	1.7	0.9	—	—	—
64	25	100	Peterson You and I claim	7367	F	qz, float		15	26	4	450	—	—		nil	—	—	—
65	1	111	Mendenhall	6064	S	qz		33	12	130	600	—	—	0.2	0.3	—	—	—
	2		Recon	7402	CR	qz	5.0′	23	<2	16	19	—	—	<0.2	nil	—	—	—
65	3	111	Mendenhall	4020	CC	gry phyl, qz	5.0′	47	30	60	>1000	—	—	0.3	nil	—	—	—
	4		Open cut	4019	CC	gry phyl, qz	5.0′	37	22	54	300	—	—	0.2	nil	—	—	—
	5			4018	CC	gry phyl, qz	5.0′	39	9	60	>1000	—	—	0.2	nil	—	—	—
	6			4017	CC	gry phyl, qz	5.0′	22	65	63	>1000	—	—	0.3	nil	—	—	—
	7			4043	CC	qz w/1% py, aspy	3.0′	31	36	34	—	—	—	0.2	0.2	—	—	—
65	8	111	Mendenhall:	4016	CC	gry phyl, qz	2.3′	101	11	71	54	—	—	<0.2	nil	—	—	—
	9		Short and	4023	CC	gry phyl, qz	5.0′	53	16	40	110	—	—	<0.2	nil	—	—	—
	10		Main adits	4143	SC	gry phyl w/3% py	8.0′	41	12	81	—	—	—	0.4	nil	—	—	—
	11			4021	CC	gry phyl, qz	5.0′	29	102	61	1000	—	—	0.4	nil	—	—	—
	12			4022	CC	gry phyl, qz	6.0′	37	17	70	800	—	—	<0.2	nil	—	—	—
	13			4144	SC	gry phyl w/1% py, aspy	10.0′	40	26	60	—	—	—	0.4	0.4	—	—	—
	14			4042	SC	qz, phyl, 1% py, aspy	5.0′	37	29	55	—	—	—	0.4	0.3	—	—	—
	15			4041	SC	qz, phyl, 1% py, aspy	8.0′	17	2	59	—	—	—	0.2	0.1	—	—	—
66	1	105	Treasury Hill	3226	RC	alt gnst	1.4′	10	9	11	—	—	—	<0.2	nil	—	—	—
	2		Upper trenches	3227	RC	alt gnst		57	14	68	—	—	—	<0.2	nil	—	—	—
	3			7192	CC	qz	6.0′	14	11	12	—	—	—	<0.2	nil	—	—	—
	4			3225	CC	qz	2.1′	28	19	6	—	—	—	<0.2	nil	—	—	—
	5			3224	S	dump		50	10	3	—	—	—	<0.2	nil	—	—	—
	6			3271	CC	qz	3.0′	17	6	22	—	—	—	0.2	nil	—	—	—
66	7	104	Treasury Hill	3228	S	qz		30	35	15	—	—	—	<0.2	nil	—	—	—
	8		Middle trenches	3231	RC	qz		89	21	40	—	—	—	0.3	1.0	—	—	—
	9			3229	RC	qz	0.7′	189	46	69	—	—	—	0.3	0.4	—	—	—
	10			3230	G	qz		53	20	13	—	—	—	0.2	0.4	—	—	—
	11			3322	G	qz		208	103	91	—	—	—	1.0	18.7	—	—	—
	13			3319	S	qz		11	8	15	—	—	—	<0.2	0.1	—	—	—
	14			3323	CC	qz	1.2′	5	6	5	—	—	—	<0.2	0.3	—	—	—
66	12	104	Treasury Hill	3320	S	qz		4	125	5	—	—	—	1.2	6.4	—	—	—
	15		caved adit	3321	S	qz		32	6	18	—	—	—	0.3	0.4	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
66	16	104	Treasury Hill	3210	G	qz-trench		3	10	4	—	—	—	<0.2	1.5	—	—	—
	17		Lower trenches	3211	G	qz-dump		23	12	12	—	—	—	0.2	nil	—	—	—
	18	106		3215	RC	qz-dump		11	16	5	—	—	—	<0.2	1.5			
	19			3213	CC	gnst	3.0′	226	9	105	—	—	—	0.3	0.9	—	—	—
	20			3214	CC	qz		135	9	56	—	—	—	<0.2	1.5	—	—	—
	21			3212	G	qz-dump		5	20	1	—	—	—	<0.2	4.3	—	—	—
	22			3315	G	qz		3	2	12	—	—	—	0.5	1.9	—	—	—
	23			3316	CC	qz	1.0′	21	5	27	—	—	—	0.2	nil	—	—	—
	24			3317	RC	qz		4	2	4	—	—	—	0.2	0.2	—	—	—
	25			3216	G	qz		2	12	3	—	—	—	<0.2	0.3	—	—	—
	26			3318	S	qz		3	10	2	—	—	—	0.3	2.3	—	—	—
66	27	106	Treasury Hill	3324	RC	qz	3.5′	118	47	47	—	—	—	0.2	2.3	—	—	—
	28		Adit	3325	RC	gnst	1.5′	204	11	27	—	—	—	<0.2	0.3	—	—	—
66	29	107	Treasury Hill	3326	SC	slate & qz	7.0′	107	14	93	—	—	—	<0.2	nil	—	—	—
	30		Gold Knob adit	7191	SC	slate & qz	5.0′	64	14	68	—	—	—	<0.2	nil	—	—	—
67	1	109	Dull & Stephens	3241	RC	qz		<1	15	5	—	—	—	<0.2	nil	—	—	—
	2		Lower Gold Knob	7197	F	qz, float		4	6	3	—	—	—	<0.2	nil	—	—	—
	3		adit	7194	CC	qz	1.1′	50	33	39	—	—	—	<0.2	0.9	—	—	—
	4			7195	CC	slate & qz	2.0′	146	15	89	—	—	—	<0.2	1.5	—	—	—
67	5	109	Dull & Stephens	7193	CC	qz	1.6′	26	13	35	—	—	—	0.2	3.3	—	—	—
	6			7196	CC	qz	3.0′	156	35	65	—	—	—	<0.2	1.4	—	—	—
67	7	110	Dull & Stephens	7281	CC	qz	3.0′	77	12	56	—	—	—	0.4	2.4	—	—	—
	8		North Waydelich Ck	7282	CC	qz, gnst selvage		85	10	92	—	—	—	0.3	0.8	—	—	—
	9		adit	7283	CC	qz	1.9′	44	5	21	—	—	—	<0.2	0.1	—	—	—
	10			7279	CC	qz	0.6′	61	20	41	—	—	—	<0.2	0.5	—	—	—
	11			7280	CC	qz	2.1′	21	5	26	—	—	—	<0.2	1.0	—	—	—
	12			3199	CH	qz	1.1′	17	6	6	—	—	—	0.2	0.2	—	—	—
	13			7284	CC	qz	0.9′	27	7	29	—	—	—	<0.2	0.1	—	—	—
	14			7285	CC	qz	3.0′	109	153	19	—	—	—	0.7	3.2	—	—	—
	15			3198	CC	qz	1.0′	57	26	60	—	—	—	1.7	3.3	—	—	—
67	16	110	Dull & Stephens	3194	CC	qz	1.0′	19	13	15	—	—	—	0.2	0.1	—	—	—
	17		South Waydelich Ck	3195	CR	gnst		109	7	107	—	—	—	<0.2	nil	—	—	—
	18		adit	3193	CR	gnst		15	12	18	—	—	—	0.2	2.8	—	—	—
	19			3190	CC	qz	0.5′	98	12	75	—	—	—	0.2	0.8	—	—	—
	20			3191	CR	qz		10	68	10	—	—	—	0.6	1.8	—	—	—
	21			3192	CR	qz		12	6	12	—	—	—	0.4	2.6	—	—	—
	22			3196	S	calcite		16	15	31	—	—	—	<0.2	0.1	—	—	—
	23			3197	CC	qz	0.9′	22	2	16	—	—	—	<0.2	nil	—	—	—
67	24	108	Dull & Stephens	6327	CC	qz w/2% py, aspy	2.5′	10	84	23	>1000	—	—	0.3	nil	—	—	—
	25		Lake Ck adit	6068	CC	qz w/3% py, aspy	2.0′	26	35	24	800	—	—	0.3	0.3	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
	26			6340	S	barren qz		3	5	4	61		—	<0.2	nil	—	—	—
	27			6339	S	barren qz	2.5′	2	8	4	90	—	—	<0.2	0.1	—	—	—
	28			6338	RC	qz w/trace py	2.0′	22	42	17	130	—	—	0.4	0.2	—	—	—
	29			6329	S	sericitic alt		2	4	8	148	—	—	<0.2	nil	—	—	—
	30			6331	CC	qz w/gnst	2.8′	43	14	53	>1000	—	—	<0.2	0.1	—	—	—
	31			6330	S	across contact w/dike		9	10	21	175	—	—	<0.2	0.1	—	—	—
68	1	103	Mendenhall Glacier	3698	CC	aplite dike	2.0′	8	10	19	—	—	—	<0.1	nil	—	—	—
	2			8221	S	biotite sch		106	7	62	—	—	—	0.5	0.1	—	—	—
	3			8222	S	biotite schist		40	8	123	—	—	—	1.8	nil	—	—	—
	4			3699	RC	qz w/5% py	0.5′	24	13	11	—	—	—	1.6	nil	—	—	—
	5			4301	RC	qz w/3% po	1.0′	70	<2	11	—	—	—	<0.1	nil	—	—	—
	6			4302	CC	breccia w/2% py	2.0′	113	3	48	—	—	—	0.2	nil	—	—	—
	7			8223	S	massive po, tr cp		820	20	905	—	—	—	2.4	nil	—	—	—
	8			8224	CC	qz w/1 % py	0.3′	88	15	152	—	—	—	1.1	nil	—	—	—
	1	113	East Mendenhall Lake	3700	G	bk slate		367	190	845	—	—	—	4.5	nil	—	—	—
	2			3701	G	bk slate		1000	49	770	—	—	—	6.4	0.1	—	—	—
69	1	112	Winn	6325	RG	qz		14	5	28	95	—	—	<0.2	0.1	—	—	—
	2			6326	RG	gnst		174	7	92	85	—	—	<0.2	nil	—	—	—
	3			7368	S	granite, qz		15	25	28	160	—	—	0.2	0.1	—	—	—
	4			7399	S	qz		5	2	8	150	—	—	<0.2	nil	—	—	—
70	3	113	Nugget Creek Middle Basin	4312	PC	bk sand, no visible Au		12	6	68	—	—	—	0.1	nil	—	—	—
	4			4310	S	qz w/2% py		5	2	4	—	—	—	<0.1	nil	—	—	—
	5			4311	PC	Goat Ck, no visible Au		26	4	47	—	—	—	0.3	nil	—	—	—
	6			3367	PL		$0.1yd^3$	35	10	48	100	/585	—	4.0	*0.0020	—	—	—
70	7	113	Nugget Creek Lower Basin	3366	PL		$0.1yd^3$	55	8	54	82	/270	—	1.9	*0.0008	—	—	—
	8			3872	PC	6 vf colors	3 pans	48	25	78	30	—	—	2.9	4.3	—	—	—
71	1	114	Dutch Lady	4116	CC	qz w/3% po	1.0′	13	54	36	—	—	—	0.9	nil	—	—	—
	2			4117	CC	qz	1.4′	10	11	26	—	—	—	0.2	nil	—	—	—
	3			4118	CC	qz	0.5′	4	20	152	—	—	—	<0.1	nil	—	—	—
	4			4119	CC	qz	2.2′	2	11	114	—	—	—	<0.1	nil	—	—	—
	5			4120	CC	qz w/1% py	1.5′	4	7	23	—	—	—	<0.1	nil	—	—	—
	6			4121	CC	qz w/1% py	2.5′	22	7	16	—	—	—	0.2	nil	—	—	—
	7			8155	CC	qz w/1% py	1.5′	20	5	5	—	—	—	0.1	nil	—	—	—
	8			8154	CC	qz	1.6′	88	10	44	—	—	—	0.8	nil	—	—	—
	9			8153	CC	qz w/5% po	3.0′	72	8	20	—	—	—	0.2	nil	—	—	—
	10			8152	SC	qz w/5% po	4.1′	63	8	50	—	—	—	0.2	nil	—	—	—
	11			8151	RC	qz w/2% po		52	14	41	—	—	—	0.2	nil	—	—	—
72	1	115	Lemon Creek	7075	CC	qz	1.5′	232	80	116	—	—	—	1.9	nil	—	—	—
	2			7076	RC	qz		61	11	46	—	—	—	0.2	nil	—	—	—
	3			7072	CC	qz	1.2′	164	1125	920	—	—	—	46.3	2.0	—	—	—
	4			7073	CC	qz	0.3′	62	1135	135	—	—	—	16.0	0.1	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
	5			7074	CC	qz	0.4′	136	24	345	—	—	—	0.8	nil	—	—	—
	6			7069	CC	qz	0.3′	79	76	415	—	—	—	2.5	0.1	—	—	—
	7			7070	CC	qz	0.7′	560	312	342	—	—	—	17.0	0.5	—	—	—
	8			7071	CC	qz	0.3′	166	361	2080	—	—	—	6.1	nil	—	—	—
	9			3417	CC	qz	1.0′	292	4450	20000	—	—	—	>30.0	5.6	—	—	2.66
	10			3418	CC	qz	0.3′	308	5910	>20000	—	—	—	188.6	2.9	—	—	9.70
	11			3419	CC	qz	0.5′	38	151	232	—	—	—	2.8	nil	—	—	—
	12			3422	CC	qz	0.7′	87	945	>20000	—	—	—	71.7	1.1	—	—	3.19
	13			3421	CC	qz	0.7′	101	2290	9800	—	—	—	33.3	2.4	—	—	—
	14			3420	CC	qz	0.7′	255	860	5800	—	—	—	95.0	1.7	—	—	—
73	9	113	Glacier Placer	3369	PL	Gaging Station	0.1yd^3	36	14	53	120	/63	—	1.6	*0.0002	—	—	—
74	10	113	Lemon Ck Placer	3368	PL	near Sawmill Ck	0.1yd^3	25	24	39	120	/290	—	5.6	*0.0160	—	—	—
76	1	116	Doran	3768	RG	qz, bk phyl		5	<2	47	<2	—	—	<0.2	nil	—	—	—
78	1	118	Goldstein	3581	F	qz, float		1040	<2	10	—	—	—	3.2	0.1	—	—	—
	2		Adit	3582	RG	qz, float		41	<2	4	—	—	—	<0.2	nil	—	—	—
78	1	117	Goldstein	3584	F	qz, float		12	<2	8	—	—	—	<0.2	nil	—	—	—
	2			3583	RG	qz, float		20	<2	7	—	—	—	<0.2	0.1	—	—	—
79	1	119	Hallum	7616	CC	sil bk phyl	5.0′	41	12	34	—	—	—	<0.2	nil	—	—	—
	2			7617	CC	phyl, qz	1.1′	44	16	93	—	—	—	0.4	nil	—	—	—
81	3	117	Jualpa	1676	PC	from old sluice box		96	71	168	21	—	—	0.6	15.8	—	—	—
82	1	122	Early Bird	3661	SC	grn phyl	10.0′	93	18	56	—	—	—	<0.1	nil	—	—	—
	2			3660	CC	sil schistose dior	4.0′	19	10	90	—	—	—	0.1	nil	—	—	—
	3			4115	CC	alt dior	5.0′	8	10	77	—	—	—	<0.1	nil	—	—	—
	4			4114	CC	alt dior, 1% dissem py	5.0′	2	6	84	—	—	—	0.1	nil	—	—	—
	5			3659	CC	sil schistose dior	5.0′	38	7	78	—	—	—	0.1	nil	—	—	—
	6			3658	CC	sil schistose dior	4.0′	32	9	80	—	—	—	0.2	nil	—	—	—
	7			4109	CC	chl sch	5.0′	10	8	96	—	—	—	0.6	nil	—	—	—
	8			4110	CC	alt dior	5.0′	21	10	78	—	—	—	0.1	nil	—	—	—
	9			3657	CC	alt dior w/1% py	3.0′	20	9	96	—	—	—	0.1	nil	—	—	—
	10			4111	CC	alt dior w/.5% py	5.0′	72	7	92	—	—	—	0.4	nil	—	—	—
	11			4112	CC	alt dior, 1% dissem py	5.0′	32	9	56	—	—	—	0.3	nil	—	—	—
	12			4113	CC	alt dior, 5% dissem py	5.0′	18	14	80	—	—	—	0.2	nil	—	—	—
83	13	122	Boston	4024	S	alt pyritic dior		20	17	67	—	—	—	0.6	nil	—	—	—
	14			4025	S	qz		5	12	12	—	—	—	<0.1	nil	—	—	—
	15			4026	S	alt vol and sed rocks	100′	21	42	48	—	—	—	0.2	nil	—	—	—
84	1	125	Jeff & Russell	3444	S	qz		6650	11	249	—	—	—	28.0	1.5	—	—	—
	2		Adit	3445	S	qz		167	5	32	—	—	—	1.0	2.3	—	—	—
	3			3446	RC	alt hnbd sch		89	11	76	—	—	—	0.4	nil	—	—	—
	4			3447	RC	po & phyl		166	17	95	—	—	—	6.7	0.1	—	—	—
	5			3448	RC	qz		85	9	35	—	—	—	0.7	3.0	—	—	—

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
	6			3449	RC	brn mgb		103	12	63	—	—	—	0.2	0.1	—	—	—
	7			3613	G	gry mgb		115	15	51	—	—	—	1.0	0.1	—	—	—
	8			3612	G	bk argillite		30	10	75	—	—	—	0.2	nil	—	—	—
	9			3614	G	gry amph		119	20	60	—	—	—	1.2	nil	—	—	—
	10			3615	G	grn amph		54	5	43	—	—	—	0.3	nil	—	—	—
	11			3616	G	gry quartzite		145	10	160	—	—	—	0.6	nil	—	—	—
	12			7092	G	massive Po		570	29	59	—	—	—	7.8	0.4	—	—	—
	13			7090	CC	qz	1.1′	51	8	14	—	—	—	0.7	2.4	—	—	—
	14			7089	CC	qz	1.9′	11	54	38	—	—	—	0.8	3.6	—	—	—
	15			7088	CC	qz	2.1′	190	6	19	—	—	—	4.8	10.1	—	—	—
	16			7087	CC	qz	1.4′	58	30	219	—	—	—	1.5	2.6	—	—	—
	17			7091	G	sil phyl		1280	16	386	—	—	—	7.3	0.1	—	—	—
	18			3055	CC	qz	7.0′	23	11	15	—	—	—	0.6	nil	—	—	—
	19			3054	CC	gry phyl		101	15	78	—	—	—	0.4	nil	—	—	—
	20			3053	CC	qz	0.3′	31	8	46	—	—	—	0.3	nil	—	—	—
	21			3050	CC	qz	1.8′	57	5	10	—	—	—	1.4	2.6	—	—	—
	22			3052	RC	gry mgb		175	16	40	—	—	—	0.4	nil	—	—	—
	23			3051	RC	gry phyl		53	9	12	—	—	—	1.1	nil	—	—	—
84	24	125	Jeff & Russell	3056	RG	dump		63	16	70	—	—	—	0.5	nil	—	—	—
	25		Dump	3057	RG	dump		52	12	40	—	—	—	0.3	0.1	—	—	—
	26			3058	RG	dump		75	8	85	—	—	—	1.3	nil	—	—	—
85	1	124	Humboldt	3587	RG	qz		7	<2	3	—	—	—	<0.2	nil	—	—	—
	2		Trench	3588	RG	qz		33	<2	6	—	—	—	0.5	4.5	—	—	—
85	1	126	Humboldt	4028	CC	qz w/1% po	2.3′	68	11	38	—	—	—	0.5	0.9	—	—	—
	2		Upper adit	3696	CC	qz w/minor limo	2.7′	100	5	20	—	—	—	0.3	0.6	—	—	—
	3			3692	CC	qz w/1% po	0.5′	32	9	38	—	—	—	0.7	0.7	—	—	—
	4			3693	RC	qz w/1% po	2.5′	8	2	15	—	—	—	0.9	1.4	—	—	—
	5			3695	SC	bk phyl w/20% qz	10.0′	40	9	69	—	—	—	0.4	nil	—	—	—
	6			4027	CC	qz w/0.5% po	0.5′	55	10	30	—	—	—	0.6	1.5	—	—	—
	7			3694	CC	qz w/1% po	3.5′	79	9	13	—	—	—	0.2	0.3	—	—	—
85	1	127	Humboldt	3576	CC	qz	5.0′	10	3	16	—	—	—	<0.2	0.1	—	—	—
	2		834′ adit	3575	CC	qz	1.5′	37	<2	11	—	—	—	<0.2	0.1	—	—	—
	3			3577	CC	qz	5.0′	12	<2	12	—	—	—	<0.2	0.7	—	—	—
85	4	127	Humboldt	6303	CC	Gry phyl, qz	2.5′	37	6	85	15	—	—	0.5	nil	—	—	—
	5		810′ adit	6302	CC	qz	0.9′	15	11	23	14	—	—	0.2	nil	—	—	—
	6			6301	CC	qz	1.5′	31	9	1450	10	—	—	0.3	0.2	—	—	—
	7			6304	S	bk phyl, qz		710	19	241	6	—	—	4.2	0.1	—	—	—
	8			6300	CC	qz	2.5′	73	27	105	220	—	—	1.6	1.2	—	—	—
85	9	127	Humboldt	3580	CC	qz	0.8′	8	8	16	—	—	<0.2	1.0	3.0	—	—	—
	10		844′ adit	3579	CC	qz	1.6′	12	28	23	—	—	—	1.6	5.6	—	—	—
	11			3578	CC	qz	1.2′	24	<2	14	—	—	—	0.2	0.6	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
85	1	128	Humboldt	4038	CC	qz w/1% po	3.7′	22	3	16	—	—	—	0.1	2.0	—	—	—
	2		mill adit	4126	CC	mgb w/10% po	5.0′	100	4	64	—	—	—	0.5	0.6	—	—	—
	3			4127	CC	qz w/10% po, sl	1.0′	245	2	8	—	—	<0.2	1.6	35.8	—	—	—
86	1	129	Dora	8150	CC	qz w/limo stain	3.0′	200	9	55	—	—	—	1.6	0.9	—	—	—
	2			8142	CC	qz	4.0′	88	8	27	—	—	—	1.6	nil	—	—	—
	3			8143	CC	qz w/2% po	1.5′	35	7	36	—	—	<0.2	1.6	65.7	—	—	—
	4			8144	SC	qz w/1% po	3.0′	70	7	25	—	—	<0.2	0.1	0.9	—	—	—
	5			8146	CC	qz w/5% po	3.0′	530	7	48	—	—	<0.2	1.6	1.3	—	—	—
	6			8145	CC	qz	2.0′	110	8	49	—	—	<0.2	0.4	7.5	—	—	—
	7			8148	CC	qz	3.0′	120	92	45	—	—	—	0.7	0.5	—	—	—
	8			8147	CC	qz w/15% py	2.0′	400	5	18	—	—	<0.2	1.1	2.2	—	—	—
	9			8149	CC	qz w/3% py	3.0′	285	11	16	—	—	—	0.5	0.6	—	—	—
	10			8038	CC	qz w/up to 20% py	3.0′	245	14	87	—	—	—	4.8	0.4	—	—	—
	11			8037	RC	qz w/minor py		180	2	20	—	—	—	1.0	0.2	—	—	—
	12			8036	RC	qz w/minor py		95	3	16	—	—	—	0.2	1.9	—	—	—
	13			8039	S	qz w/40% po, 10% py		1050	7	23	—	—	—	4.0	3.7	—	—	—
	14			8035	RC	qz		110	<2	4	—	—	—	0.2	nil	—	—	—
90	1	123	Republican	3375	CR	alt mgb		185	2	40	—	—	—	0.3	0.2	—	—	—
93	1	20	Alaska Juneau	3464	S	po		805	>7500	11000	—	—	—	576.2	155.3	—	2.10	—
	2		6-level	3443	S	sl		211	>7500	>20000	—	—	—	1759.6	590.6	—	0.79	42.10
	3			3465	S	sl		825	2560	>20000	—	—	—	336.1	130.0	—	—	27.50
	4			3442	S	po		1080	450	410	—	—	—	15.0	46.2	—	—	—
	5			3466	S	sl		400	>7500	>20000	—	—	—	2064.9	401.9	—	6.20	28.00
	6			3467	S	gn		54	>7500	10200	—	—	—	2010.0	104.0	—	21.50	—
	7			3468	S	gn		234	>7500	>20000	—	—	—	1296.5	12.4	—	41.30	2.39
	8			7086	S	po		283	675	2000	—	—	—	49.4	3.7	—	—	—
	9			3469	S	gn		19	>7500	327	—	—	—	2809.2	7.4	—	35.00	—
	10			3002	CC	qz	4.0′	46	36	3333	—	—	—	0.6	nil	—	—	—
	11			3003	CC	qz	4.0′	100	24	58	—	—	—	0.4	0.1	—	—	—
	12			3001	CC	qz	2.1′	3	26	10	—	—	—	1.6	nil	—	—	—
	13			3441	S	sl		535	>7500	>20000	—	—	—	1094.2	185.7	—	1.29	36.60
	14			3087	CC	qz	2.4′	144	1960	26600	—	—	—	184.5	34.0	—	—	—
	15			3470	S	sl & po		178	3930	>20000	—	—	—	242.5	279.2	—	—	27.80
	16			3440	S	gn		111	>7500	5940	—	—	—	>30.0	162.8	—	13.80	—
	17			3439	S	po		1330	>7500	3530	—	—	—	19.0	5.2	—	1.05	—
93	18	20	Alaska Juneau	3610	CC	mgb	10.0′	74	104	102	—	—	—	0.3	0.6	—	—	—
	19		crosscut near	3609	CC	qz	2.0′	37	125	125	—	—	—	0.6	1.0	—	—	—
	20		91 winze, 6-level	3608	CC	mgb	3.0′	96	131	119	—	—	—	0.6	0.7	—	—	—
	21			3607	CC	mgb	3.0′	126	>7500	204	—	—	—	51.4	101.5	—	9.10	—
	22			3606	CC	mgb	6.0′	96	266	254	—	—	—	0.6	1.6	—	—	—
	23			3605	CC	mgb	10.0′	119	119	77	—	—	—	0.4	0.5	—	—	—
	24			3604	CC	qz	4.0′	276	>7500	10300	—	—	—	171.5	384.6	—	1.00	—
	25			3603	CC	mgb	2.0′	32	3450	725	—	—	—	20.0	8.2	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
	26			3602	CC	mgb	7.0′	123	103	308	—	—	—	0.6	2.2	—	—	—
	27			7110	CC	qz	1.0′	81	6270	4960	—	—	—	18.0	3.3	—	—	—
	28			7109	CC	mgb	8.5′	146	12	59	—	—	—	0.5	1.9	—	—	—
	29			7108	CC	shear	1.0′	73	46	65	—	—	—	1.1	0.9	—	—	—
	30			7107	CC	gry phyl	9.4′	73	14	109	—	—	—	0.3	0.1	—	—	—
	31			7106	CC	phyl	12.0′	80	9	84	—	—	—	0.2	0.1	—	—	—
	32			7105	CC	gry phyl	6.5′	71	15	105	—	—	—	0.3	0.1	—	—	—
	33			7104	CC	gry phyl	7.4′	91	45	86	—	—	—	0.4	0.1	—	—	—
	34			7103	CC	brn phyl	3.8′	71	30	52	—	—	—	0.6	0.2	—	—	—
	35			7102	CC	qz	0.5′	86	43	57	—	—	—	1.8	33.5	—	—	—
	36			3187	CH	bk phyl	2.0′	54	21	89	—	—	—	0.6	nil	—	—	—
	37			3186	CH	bk phyl	2.0′	126	1210	475	—	—	—	14.0	10.7	—	—	—
	38			3185	CH	bk phyl	5.0′	82	52	98	—	—	—	0.3	0.3	—	—	—
	39			3184	CH	qz	2.0′	137	1980	450	—	—	—	5.6	9.9	—	—	—
	40			3183	CH	bk phyl	4.5′	86	35	102	—	—	—	0.5	0.3	—	—	—
	41			3182	CH	qz	0.5′	770	83	210	—	—	—	15.0	48.6	—	—	—
	42			3181	CH	qz	4.0′	170	163	352	—	—	—	0.6	1.7	—	—	—
	43			3180	CH	qz	10.0′	166	55	174	—	—	—	0.4	0.5	—	—	—
	44			3179	CH	qz	7.0′	199	20	90	—	—	—	0.7	2.6	—	—	—
	45			3178	CH	qz	2.0′	150	38	2190	—	—	—	0.5	0.8	—	—	—
	46			3177	CH	qz	10.0′	91	33	96	—	—	—	0.5	nil	—	—	—
93	1	21	Alaska Juneau	3438	S	po		1460	18	>20000	—	—	—	425.3	222.0	—	—	2.47
	2		8-level min. conc.	3437	S	sl		400	18	>20000	—	—	—	0.2	703.50	—	—	37.30
94	2	123	Bridle	3586	S	qz		28	4	6	—	—	—	0.2	nil	—	—	—
	3			3889	CR	alt gnst	4.0′	150	27	208	—	—	—	1.3	0.1	—	—	—
	4			3890	CR	qz	100′	290	4	26	—	—	—	1.4	nil	—	—	—
95	1	136	Martin No. 1 adit	4128	S	qz	2.0′	8		7	—	—	—		nil	—	—	—
95	2	136	Martin	4140	CC	qz w/3% po	2.0′	6	<2	3	—	—	—	0.1	0.1	—	—	—
	3		No. 2 adit	4131	CC	qz w/2% po	5.0′	28	2	7	—	—	—	0.7	0.1	—	—	—
	4			4039	CC	qz	5.0′	22	3	46	—	—	—	0.4	nil	—	—	—
	5			4130	CC	qz w/1% po	1.0′	3	2	6	—	—	—	0.1	0.1	—	—	—
	6			4129	CC	qz w/5% po	4.0′	10	2	13	—	—	—	0.2	1.3	—	—	—
96	1	137	Upper Gold Creek	4142	RC	gns w/trace py	10.0′	64	6	47	—	—	—	0.3	nil	—	—	—
	2		1,825′ adit	4040	Sc	alt gns w/1% py	10.0′	57	8	52	—	—	—	0.2	nil	—	—	—
96	3	137	Upper Gold Creek	4141	RG	gns from dump		32	6	78	—	—	—	0.2	nil	—	—	—
	4			4170	CC	qz w/1% py	1.0′	3	2	10	—	—	—	<0.1	nil	—	—	—
	5			4171	CC	calcite vein, no sulf	0.3′	5	31	9	—	—	—	<0.1	nil	—	—	—
	6			4172	RC	biotite gns		61	14	50	—	—	—	<0.1	nil	—	—	—
96	1	138	Upper Gold Creek 1,990′ adit	8085	RG	qz in phyl		4	3	13	—	—	—		nil	—	—	—
96	2	138	Upper Gold Creek	8083	RG	qz in dior w/0.5% py		7	6	90	—	—	—	0.3	nil	—	—	—
	3		Trench	8084	CC	qz in dior w/0.5% py	1.0′	2	7	13	—	—	—	0.1	nil	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
96	4	138	Upper Gold Creek 2,020′ adit	8082	RG	qz w/3% py		45	9	86	—	—	—	1.3	nil	—	—	—
97	1	139	Bess	3373	CC	qz, sil phyl	1.0′	38	4	46	—	—	—	0.2	nil	—	—	—
	2			3374	S	qz	1.0′	60	2	16	—	—	—	1.0	0.6	—	—	—
98	3	139	Solo - Adit No. 2	3893	S	qz		52	<2	38	—	—	—	0.3	nil	—	—	—
	4		Solo - Adit No. 3	3894	S	qz		25	<2	54	—	—	—	0.2	0.2	—	—	—
	5		Solo - Adit No. 5	3895	S	qz		32	<2	168	—	—	—	0.8	0.1	—	—	—
98	6	139	Solo - trench	3585	CC	qz	0.9′	47	2	60	—	—	—	0.6	0.1	—	—	—
98	7	139	Solo - trench	3891	SC	Brn metamafic	6.0′	100	6	144	—	—	—	2.1	nil	—	—	—
99	8	139	Margarite	3892	S	qz		67	3	34	—	—	—	<0.2	nil	—	—	—
100	1	140	Rubicon Adit No. 1	3819	CR	qz		55	8	60	—	—	—		nil	—	—	—
100	2	140	Rubicon	3888	SC	qz	7.0′	17	12	83	—	—	—	0.6	nil	—	—	—
	3		Adit No. 4	3887	SC	qz	8.0′	17	15	139	—	—	—	1.0	nil	—	—	—
100	1	134	Rubicon	3886	CR	qz		107	31	108	—	—	—	1.6	nil	—	—	—
100	1	141	Rubicon Open cut	3818	SC	bk phyl	1.1′	50	12	224	—	—	—	1.3	nil	—	—	—
100	2	141	Rubicon	3817	CR	qz		74	18	292	—	—	—	1.6	nil	—	—	—
	3		Adit No. 5	3878	CR	qz		45	20	368	31	—	—	2.6	nil	—	—	—
100	4	141	Rubicon Adit No. 6	3879	CR	qz		33	10	28	11	—	—	0.8	nil	—	—	—
100	1	142	Rubicon Short trench	3877	CR	qz		775	1560	520	600	—	—	73.4	5.7	—	—	—
100	2	142	Rubicon	3881	CR	qz, siderite	0.7′	96	>7500	545	—	—	—	232.6	1.4	—	2.47	—
	3		Middle trench	3880	CR	qz		83	6	12	80	—	—	0.8	nil	—	—	—
100	1	143	Rubicon	3885	CR	qz, alt sch		6	175	296	—	—	—	6.0	0.8	—	—	—
	2		Main trench	3884	CR	qz	0.5′	470	5800	>20000	—	—	—	340.3	1.0	—	—	3.02
	3			3883	CR	qz	0.4′	905	>7500	>20000	—	—	—	797.1	5.4	—	2.46	3.65
	4			3882	CR	qz, siderite	0.3′	115	1140	1940	—	—	—	21.0	1.4	—	—	—
101			Perseverance 10-level	3120	RG	qz & sulf		48	>7500	>20000	—	—	—	96.0	19.7	—	4.72	8.60
101	3	135	Perseverance	3589	CC	qz	2.0	5	18	17	2.9	2/	—	0.6	0.1	—	—	—
	4		Shaft area	3590	CC	alt mgb	3.0′	30	43	150	2.9	2/	—	1.3	0.4	—	—	—
101	7	135	Perseverance	3594	CR	qz	2.0′	12	16	710	3	—	—	1.3	nil	—	—	—
	8			3599	CC	qz	1.5′	31	290	25	6	—	—	2.6	0.2	—	—	—
102	1	146	Lurvey Placer	3365	PL	below tunnel	0.1yd^3	36	10	92	29	/7	—	1.9	*0.0002	—	—	—
	2		Tunnel	4153	SC	bk phyl, qz, 2% sulf	7.0′	32	4	69	—	—	—	0.6	nil	—	—	—
	3			4154	CC	bk phyl and qz	5.0′	16	4	59	—	—	—	0.1	nil	—	—	—
	4			4156	CC	qz w/2% po	1.5′	8	<2	75	—	—	—	0.1	nil	—	—	—
	5			4155	CC	bk phyl and qz	2.0′	40	6	370	—	—	—	0.5	nil	—	—	—
	6			4157	CC	qz w/1% po	0.7′	52	<2	32	—	—	—	0.3	nil	—	—	—
	7			4158	CC	qz w/1% po	3.3′	25	10	36	—	—	—	0.2	nil	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
103	1	147	McKinley	3841	S	qz		60	7	152	—	—	—	1.8	nil	—	—	—
	2		Adit No. 1	3840	CR	qz		73	7	79	—	—	—	0.3	nil	—	—	—
	3			3842	CC	phyl	6.0′	73	7	79	—	—	—	0.3	nil	—	—	—
103	6	135	McKinley	3598	CC	qz in bk phyl	4.0′	4	2	5	3	—	—	<0.2	nil	—	—	—
103	5	147	McKinley	3370	CC	qz in sil phyl	4.0′	50	35	54	—	—	—	0.2	nil	—	—	—
	6		Adit No. 2	3371	S	qz	1.5′	42	14	34	—	—	—	<0.2	nil	—	—	—
104	1	148	Bull Consolidated	3829	G	alt gns		27	133	60	—	—	—	1.2	nil	—	—	—
	2	135		3830	G	qz		24	7	13	—	—	—	0.8	nil	—	—	—
105	1	150	Ground Hog	3827	RC	qz		58	13	42	—	—	—	0.3	nil	—	—	—
	2		No. 1 adit	3828	CC	chl sch	11.0′	65	10	46	—	—	—	0.9	nil	—	—	—
105	9	150	Ground Hog	3837	CR	qz		20	11	16	—	—	—	0.7	1.1	—	—	—
	10		No. 2 adit	3838	SC	qz & grn sch	20.0′	54	11	59	—	—	—	4.0	0.1	—	—	—
	11			3839	SC	qz	20.0′	57	16	50	—	—	—	1.7	0.1	—	—	—
105	3	150	Ground Hog	3833	SC	alt grn sch	20.0′	100	34	48	—	—	—	1.6	nil	—	—	—
	4		No. 3 adit	3834	SC	alt grn sch	20.0′	54	14	48	—	—	—	0.9	0.1	—	—	—
	5			3835	SC	alt grn sch	20.0′	72	19	50	—	—	—	1.1	nil	—	—	—
	6			3831	CC	qz	8.0′	32	3650	13	—	—	—	27.0	2.5	—	—	—
	7			3832	CC	grn sch	7.0′	61	46	53	—	—	—	1.6	0.2	—	—	—
	8			3836	SC	sil grn sch	20.0′	62	22	53	—	—	—	1.9	0.2	—	—	—
105	1	149	Ground Hog	3592	SC	alt metamafic	10.0′	71	16	17	246	<1/	—	<0.2	0.2	—	—	—
	2		Trenches	3593	CC	qz	3.0′	75	5000	158	642	4/	—	50.1	25.1	—	—	—
	3			4014	CC	qz	4.5′	83	>7500	9800	—	—	—	30.0	49.9	—	2.03	—
	4			4013	CC	qz	0.7′	136	>7500	1150	—	—	—	181.4	50.5	—	2.95	—
	5			3363	RC	qz	10.0′	25	4170	170	—	—	—	2.5	1.3	—	—	—
	6			3362	RC	qz, sil sch	12.0′	170	>7500	10000	—	—	—	269.9	56.4	—	3.80	—
	7			3361	RC	qz	12.0′	18	232	14	—	—	—	1.4	0.3	—	—	—
	5	135	Lurvey Lake	3364	PL	Lurvey Lake	0.1yd³	60	109	68	39	/16	—	7.4	*0.0220	—	—	—
106	1	144	Jumbo - adit	4010	CR	qz, sil phyl	1.4′	64	6550	630	—	—	—	37.7	18.1	—	—	—
	2		(part of Persev.)	4011	CR	qz	2.0′	16	277	208	—	—	—	2.0	10.5	—	—	—
	3			4012	CC	qz	4.0′	45	2920	106	—	—	—	17.0	2.6	—	—	—
107	1	152	Silver Falls	4237	CC	alt gns	2.0′	40	13	52	550	—	0.2	3.9	1.3	—	—	—
	2		Lenore vein	4238	CC	qz w/1% aspy, py	0.9′	21	16	15	1000	—	1.0	283.5	6.5	—	—	—
107	3	152	Silver Falls	4236	CC	qz w/2% aspy, py	0.8′	10	6	25	>1000	—	<0.2	4.8	4.2	—	—	—
	4		Kathleen vein	4169	RG	qz w/3% py, aspy, stib		9	9	20	>1000	8	<0.2	nil	1.2	—	—	—
	5			4235	RG	qz w/2% aspy, py, stib		880	555	240	>1000	—	<0.2	1737.2	881.5	—	—	—
107	1	153	Silver Falls	3460	CC	msed	5.0′	142	17	101	—	—	—	5.3	0.4	—	—	—
	2		Upper Kathleen	3459	CC	alt msed	4.5′	51	19	95	—	—	—	15.0	2.6	—	—	—
	3		adit	3458	CC	msed	2.0′	31	10	65	—	—	—	13.0	2.6	—	—	—
	4			3457	CC	qz	3.0′	25	12	70	—	—	—	6.8	1.8	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
	5			3456	CC	qz	1.9′	20	13	32	—	—	—	9.2	1.1	—	—	—
	6			3064	CC	alt msed	2.4′	63	15	95	—	—	—	8.2	0.4	—	—	—
	7			3063	CC	alt msed	1.5′	40	91	93	—	—	—	5.1	0.4	—	—	—
	8			3062	CC	qz	0.6′	6	3	13	—	—	—	1.2	0.1	—	—	—
107	6	152	Silver Falls	4213	SC	qz w/4% aspy, py	8.0′	17	4	49	>1000	—	<0.2	5.1	nil	—	—	—
	7		William R vein	4212	RG	qz w/10% py, aspy		25	20	19	>1000	—	<0.2	104.2	nil	—	—	—
	8			3067	RG	qz w/4% aspy, py		14	6	36	—	—	—	8.9	1.3	—	—	—
107	9	152	Silver Falls	3066	CC	qz & aspy	4.7′	54	173	42	—	—	—	154.4	10.4	—	—	—
	10		Lower Kathleen	4211	RG	qz w/5% py, aspy		41	14	32	>1000	—	—	0.2	40.2	nil	—	—
	11		adit	3462	CC	qz	6.0′	41	57	20	—	—	—	170.1	5.5	—	—	—
	12			3461	CC	qz	5.0′	9	284	65	—	—	—	41.8	2.6	—	—	—
	13			3065	CC	qz & aspy	2.0′	88	550	79	—	—	—	144.7	20.6	—	—	—
107	14	152	Silver Falls	3059	RG	qz & stib		21	7	10	—	—	—	2.8	nil	—	—	—
	15		float	3060	RG	qz & aspy		15	17	59	—	—	—	9.3	7.7	—	—	—
	16			3061	RG	qz		9	15	16	—	—	—	16.0	2.0	—	—	—
110	1	155	Penn Alaska	7161	CC	alt gns	10.0′	22	43	94	—	—	—	0.6	nil	—	—	—
	2		Pittsburg Adit	7162	CC	alt gns	10.0′	22	10	96	—	—	—	0.7	nil	—	—	—
	3			7150	CC	alt gns	10.0′	20	7	94	—	—	—	0.7	nil	—	—	—
	4			7163	CC	alt gns	10.0′	63	12	148	—	—	—	0.2	nil	—	—	—
110	5	155	Penn Alaska	3521	CC	qz	1.3′	2	3	12	—	—	—	0.2	nil	—	—	—
	6		Open cut	3522	S	qz		21	162	20	—	—	—	1.9	0.1	—	—	—
110	7	155	Penn Alaska	3519	CC	pyritic bk phyl	10.0′	26	22	288	—	—	—	3.0	nil	—	—	—
	8		Washington Adit	3518	CC	pyritic bk phyl	10.0′	27	21	217	100	—	—	1.7	0.1	—	—	—
	9			3520	CC	pyritic bk phyl	10.0′	35	18	505	—	—	—	2.3	nil	—	—	—
	10			7144	SC	bk phyl	25.0′	35	11	565	—	—	—	1.5	nil	—	—	—
	11			7143	CC	bk phyl	5.0′	40	11	1670	—	—	—	2.8	nil	—	—	—
	12			7142	CC	sil bk phyl	5.0′	44	25	355	—	—	—	1.4	nil	—	—	—
	13			3753	CC	pyritic bk phyl	6.0′	38	12	290	—	—	—	0.8	nil	—	—	—
	14			7145	S	qz		19	48	121	—	—	—	0.6	nil	—	—	—
	15			3788	S	qz		60	9	410	5	—	—	0.9	nil	—	—	—
	16			3754	CC	pyritic bk phyl	6.0′	149	10	234	—	—	—	1.2	nil	—	—	—
	17			3752	CC	sil bk phyl	9.0′	52	18	261	—	—	—	0.9	nil	—	—	—
	18			3793	CC	sheared bk phyl	9.0′	119	7	140	—	—	—	1.2	nil	—	—	—
	19			3792	S	py		6	12	22	—	—	—	2.2	nil	—	—	—
	20			3791	CC	sil phyl	10.0′	70	8	425	—	—	—	0.8	nil	—	—	—
	21			3790	S	sil phyl	1.5′	11	5	22	—	—	—	<0.2	nil	—	—	—
	22			3789	SC	sil phyl	15.0′	34	6	70	—	—	—	<0.2	nil	—	—	—
110	23	155	Penn Alaska	7140	CC	sil bk phyl	5.0′	64	14	116	17	—	—	1.2	nil	—	—	—
	24		Seawall Adit	7141	CR	gnst, bk phyl	10′	62	6	86	55	—	—	0.2	nil	—	—	—
	25			3787	CC	sil bk phyl	8.0′	41	7	111	—	—	—	0.3	nil	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
110	1	154	Penn Alaska	3541	SC	sil bk phyl	3.0′	10	14	38	—	—	—	0.2	nil	—	—	—
	2		Beach	3868	SC	sil bk phyl	5.0′	100	14	118	—	—	—	4.5	nil	—	—	—
	3			3869	SC	sil bk phyl	5.0′	28	7	87	—	—	—	5.2	nil	—	—	—
	4			3870	SC	sil bk phyl	5.0′	95	9	141	—	—	—	3.2	nil	—	—	—
	5			3871	SC	sil bk phyl	5.0′	70	59	100	—	—	—	2.8	nil	—	—	—
	6			6107	CR	sil bk phyl	12′	60	2	120	—	—	—	0.8	0.1	—	—	—
	7			6108	CR	sil bk phyl	2.0′	8	<2	76	—	—	—	0.4	nil	—	—	—
111	1	151	Pt. Bishop	3511	S	qz		32	47	31	80	—	—	0.5	nil	—	—	—
	2			3512	S	pyritic bk phyl		75	33	226	5	—	—	0.9	nil	—	—	—
	3			3777	CR	pyritic gnst	4.1′	138	<2	54	7	—	—	0.2	0.1	—	—	—
	4			3778	CC	fel sch	4.0′	65	2	102	<2	—	—	<0.2	nil	—	—	—
	5			3513	S	sil vol		138	2	73	<2	—	—	2.2	nil	—	—	—
	6			3514	RG	pyritic vol		57	6	24	125	—	—	0.8	nil	—	—	—
	7			3515	RG	metatuff		33	10	48	250	—	—	0.3	nil	—	—	—
	8			3516	RG	metabasalt		2740	2	58	<2	—	—	1.4	nil	—	—	—
	9			3517	RG	bk phyl		375	42	590	7	—	—	3.1	nil	—	—	—
113	1	157	Snowslide Gulch	3771	CC	qz, calcite	2.0′	17	3	82	<2	—	—	<0.2	nil	—	—	—
	1	156		3436	PC		2 pans	—	—	—	—	—	—	1.2	—	—	—	
114	1	158	Cross Bay	3769	CC	gnst	2.0′	23	2	53	<2	—	—	0.2	nil	—	—	—
	2		Road adit	3770	CC	pyritic grn phyl	3.0′	43	44	84	<2	—	—	0.2	nil	—	—	—
114	1	159	Cross Bay	1903	CC	qz	0.8′	51	12	84	—	—	—	<0.1	0.1	—	—	—
	2		Beach adit	1904	CC	fel phyl	2.7′	38	16	8	—	—	—	0.2	nil	—	—	—
115	1	161	Ascension pit	3299	CC	qz	2.6′	25	490	32	—	—	—	11.0	0.1	—	—	—
115	1	162	Ascension	3820	CC	qz	1.0′	212	3460	735	—	—	—	522.7	0.5	—	—	—
	2		Upper adit	3821	RC	bk slate		74	23	89	—	—	—	5.7	nil	—	—	—
	3			3822	CC	qz	0.8′	87	2810	6560	—	—	—	128.9	0.6	—	—	—
	4			3823	CC	qz	0.9′	1030	>7500	8720	—	—	—	1018.4	1.7	—	1.32	—
	5			3876	CR	qz		292	1990	2900	78	—	—	382.4	0.5	—	—	—
				—	RC	qz, metallurgical sample		—	—	—	—	—	—	381.8	6.2	—	—	—
115	6	162	Ascension	3825	CC	phyl & qz		39	61	77	—	—	—	18.0	0.1	—	—	—
	7		Middle adit	3824	CC	qz	0.5′	25	58	73	—	—	—	25.0	nil	—	—	—
115	2	161	Ascension	3826	CC	qz	3.8′	92	820	405	—	—	—	76.8	0.9	—	—	—
117	1	160	Glacier-1990′	3024	CC	qz	0.6′	33	41	45	—	—	—	5.9	nil	—	—	—
	2		Glacier-1930′	3025	CC	qz	0.8′	37	76	39	—	—	—	14.0	0.3	—	—	—
	3		Glacier-1800′	3026	CC	qz & sch		37	2050	2820	—	—	—	175.6	0.2	—	—	—
	4		Glacier-1775′	3027	CC	qz	2.4′	180	286	570	—	—	—	161.2	1.1	—	—	—
117	1	164	Glacier	3019	CC	qz & phyl		322	3330	131	—	—	—	237.7	0.5	—	—	—
	2		No. 3 adit	3021	CC	qz	0.7′	12	83	39	—	—	—	9.7	nil	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
117	3	164	Glacier–1660′	3022	CC	qz	0.6′	144	2490	2990	—	—	—	98.8	0.1	—	—	—
	4			3023	CC	qz	0.6′	219	1360	685	—	—	—	479.9	0.6	—	—	—
117	1	165	Glacier	3029	CC	qz	0.6′	203	7150	600	—	—	—	333.7	2.9	—	—	—
	2		No. 4 adit	3030	CC	qz	0.6′	55	830	635	—	—	—	19.0	nil	—	—	—
	3			3028	CC	qz	0.5′	189	2490	1100	—	—	—	223.3	1.2	—	—	—
117	1	166	Glacier–1520′	3020	CC	qz	2.0′	144	1455	1140	—	—	—	51.8	0.1	—	—	—
	2			3018	CC	qz	0.9′	352	1505	3580	—	—	—	307.0	0.6	—	—	—
	3			3017	CC	qz	0.8′	76	1195	256	—	—	—	172.2	0.3	—	—	—
118	4	166	Hartford	3523	CC	qz	2.0′	32	227	465	—	—	—	8.3	0.2	—	—	—
	5			3524	S	qz		69	1125	680	—	—	—	>30.0	0.9	—	—	—
119	1	167	Silver Queen	3257	CC	qz	0.4′	1290	>7500	5950	—	—	—	1491.0	14.3	—	2.11	—
	2		No. 1 adit	3255	CC	qz	0.8′	1370	6830	8100	—	—	—	1194.0	2.9	—	—	—
	3			3256	CC	qz	1.0′	1500	>7500	15300	—	—	—	1219.0	3.5	—	0.83	—
	4			9–1–1	S	high-grade qz		1570	640	9000	361	/509	—	1354.9	1.1	—	—	—
119	5	167	Silver Queen–1260′	3043	CC	qz	1.1′	287	725	2470	—	—	—	106.0	1.4	—	—	—
120	1	168	Anderson 1,600′ adit	3526	CC	qz	1.1′	16	7	11	—	—	—	0.3	nil	—	—	—
120	1	169	Anderson	6310	CC	qz	0.5′	44	9	46	—	—	—	2.4	0.4	—	—	—
	2		860′ adit	6309	SC	qz	10.0′	113	52	56	—	—	—	>30.0	1.5	—	—	—
	3			6308	CR	qz		23	18	31	—	—	—	4.9	0.1	—	—	—
	4			6311	S	high-grade qz		122	153	32	—	—	—	20.0	6.3	—	—	—
120	5	169	Anderson	6307	CR	qz	1.3	32	44	20	—	—	—	0.8	nil	—	—	—
	6		840′adit	6305	CR	qz		68	24	99	—	—	—	6.6	nil	—	—	—
	7			6306	RC	qz-mica sch		81	26	136	—	—	—	5.1	nil	—	—	—
122	1	171	Denny - trench	3875	CR	alt dior & qz	4.0′	44	3	25	54	—	—	0.6	0.2	—	—	—
122	1	170	Denny	3477	SC	sil gns	10.0′	25	16	96	—	—	—	0.2	0.1	—	—	—
	2		2800′ adit	3476	SC	sil gns	10.0′	45	22	88	—	—	—	0.2	0.9	—	—	—
	3			3475	CC	qz	2.5′	263	15	137	—	—	—	0.2	0.9	—	—	—
122	4	170	Denny	3472	CC	qz	1.3′	29	38	381	—	—	—	0.6	0.4	—	—	—
	5		2900′ adit	3473	SC	gns	10.0′	26	44	261	—	—	—	0.3	nil	—	—	—
	6			3474	SC	gns	10.0′	17	38	184	—	—	—	0.2	nil	—	—	—
	7			3471	CC	qz	0.5′	167	141	375	—	—	—	1.6	0.1	—	—	—
	8	171		3097	CC	qz	3.2′	20	5	28	—	—	—	0.2	nil	—	—	—
	9			3096	CC	qz	3.8′	9	27	12	—	—	—	0.2	nil	—	—	—
122	2	171	Denny - 2625′adit	3600	CC	qz	1.7′	135	8	45	—	—	—	0.8	14.6	—	—	—
123	1	172	Alaska Consolidated 2,630′ adit	3298	G	qz & phyl		32	12	34	—	—	—	0.2	nil	—	—	—
123	1	173	Alaska Consolidated	3912	RC	qz		70	8	9	—	—	—	0.5	nil	—	—	—
	2		Powerline Ridge	3911	S	qz-dump		291	13	18	—	—	—	0.4	nil	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
	3			3300	CC	qz	3.9′	227	13	10	—	—	—	0.7	nil	—	—	—
	4			3808	CR	qz	3.9′	54	11	9	—	—	—	<0.2	nil	—	—	—
123	5	160	Alaska Consolidated	3525	RC	qz, ser sch	2.0′	47	19	46	—	—	—	0.7	nil	—	—	—
123	2	172	Alaska Consolidated	3480	CC	qz	0.6′	1	8	26	—	—	—	0.2	0.1	—	—	—
	3		2,040′ adit	3479	RG	qz - dump		8	15	120	—	—	—	0.2	nil	—	—	—
124	2	175	Gould & Curry	3098	RG	qz		263	195	52000	—	—	—	2.5	26.1	—	—	5.20
	3		Dump	3099	RG	qz		1810	60	6300	—	—	—	3.2	2.2	—	—	—
	4			4004	S	qz		256	6	13400	—	—	—	1.4	6.1	—	—	—
	5			3478	S	qz		390	1200	>20000	—	—	—	9.5	49.6	—	—	4.26
124	6	175	Gould & Curry	3596	CC	qz	0.5′	710	16	10	5.5	3/	—	0.2	nil	—	—	—
	7		Open stope	3597	CC	alt metamafic	4.0′	91	21	98	24	<1/	—	0.6	0.5	—	—	—
	8			3896	CC	qz	0.5′	145	<2	7350	—	—	—	2.6	42.4	—	—	—
	9			3897	CC	qz, metamafic	3.1′	30	<2	72	—	—	—	0.3	13.7	—	—	—
	10			3898	CC	qz, bk phyl	3.0′	116	<2	136	—	—	—	0.4	nil	—	—	—
124	14	175	Gould & Curry	4006	CC	qz	1.0′	126	8	84	—	—	—	0.9	2.9	—	—	—
	15		Underground stope	4009	CC	qz	1.2′	160	14	940	—	—	—	0.4	8.5	—	—	—
	16			4008	CC	qz	1.0′	103	57	230	—	—	—	0.4	0.8	—	—	—
	17			4007	CC	qz	1.25′	950	2	>20000	—	—	—	1.5	25.1	—	—	2.94
124	1	175	Gould & Curry	4001	SC	qz	3.1′	40	2	36	—	—	—	<0.2	0.2	—	—	—
	11		Pits and trenches	4003	CC	qz	1.0′	30	<2	26	—	—	—	<0.2	nil	—	—	—
	12			4002	SC	alt metamafic	6.0′	56	10	102	—	—	—	<0.2	nil	—	—	—
	13			4005	CR	qz		67	4	108	—	—	—	0.2	0.1	—	—	—
126	1	176	Reagan	3004	CC	qz	1.8′	600	820	785	—	—	—	101.5	0.2	—	—	—
	2		Main adit	3005	CC	qz	1.7′	152	227	385	—	—	—	16.0	nil	—	—	—
	3			3006	CC	qz	4.0′	95	374	261	—	—	—	19.0	0.3	—	—	—
	4			3007	CC	qz	2.8′	132	384	238	—	—	—	79.9	0.4	—	—	—
	5			3008	CC	qz	3.2′	94	172	336	—	—	—	15.0	1.4	—	—	—
	6			3009	CC	qz	1.0′	36	36	85	—	—	—	5.1	nil	—	—	—
	7			3010	CC	qz	3.0′	54	112	131	—	—	—	13.0	0.2	—	—	—
	8			3011	CC	qz	3.0′	55	135	75	—	—	—	12.0	0.2	—	—	—
	9			3012	CC	qz	3.1′	99	1535	2080	—	—	—	51.4	0.7	—	—	—
	10			3013	CC	qz	2.0′	81	104	130	—	—	—	10.0	nil	—	—	—
	11			3014	CC	qz	3.3′	165	885	1160	—	—	—	140.6	1.2	—	—	—
	12			3015	CC	qz	2.4′	108	1265	625	—	—	—	209.9	2.6	—	—	—
126	13	176	Reagan	3527	RC	qz, chl sch	4.0′	660	5970	4970	—	—	—	408.5	4.4	—	—	—
	14		winze	3528	RC	qz, phyl	2.5′	540	635	520	—	—	—	382.4	11.4	—	—	—
	15			3530	RC	sil phyl	1.8′	124	75	211	—	—	—	14.0	0.2	—	—	—
	16			3531	RC	qz	1.5′	1455	3970	2320	—	—	—	602.3	5.9	—	—	—
	17			4336	CC	qz w/5% gn, py	1.9′	3680	5880	1160	—	/4	—	4612.3	52.2	—	—	—
	18			4334	CC	qz w/ 5% gn, sl, py	1.8′	1036	9690	17100	—	/4	—	808.1	8.9	—	—	—
	19			4335	CC	qz w/ <1% py	1.9′	711	1061	710	—	/3	—	559.4	2.4	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
127	1	177	Dolan	3859	CR	qz	30.0′	29	3	10	—	—	—	<0.2	nil	—	—	—
	2			3858	CR	qz	6.0′	14	4	28	—	—	—	<0.2	nil	—	—	—
	3			3857	CR	qz	10.0′	12	4	18	—	—	—	<0.2	nil	—	—	—
128	1	178	Gold Belt	3865	S	qz		64	13	42	—	—	—	24.0	0.1	—	—	—
	2			3866	S	sil phyl		28	4	23	—	—	—	7.4	nil	—	—	—
129	1	179	Sheridan	8081	RC	qz		21	7	28	—	—	—	0.3	nil	—	—	—
	2			8080	RC	qz		12	5	13	—	—	—	0.1	nil	—	—	—
130	3	178	Middle Peak Caved adit	3537	S	qz		50	8	77	—	—	—		nil	—	—	—
130	3	179	Middle Peak	3538	CC	qz	2.4′	25	2	38	—	—	—	<0.2	nil	—	—	—
	4		Adit	3539	CC	qz	2.3′	78	6	86	—	—	—	<0.2	nil	—	—	—
130	4	178	Middle Peak	3540	CC	qz	2.2′	9	3	6	—	—	—	0.5	nil	—	—	—
	5		Pit	3867	SC	sil sch	3.5′	178	5	40	—	—	—	13.0	nil	—	—	—
	6		Pit	7166	CR	qz in sch	3.0′	74	33	56	—	—	—	6.8	nil	—	—	—
	7			3534	RC	qz	0.6′	12	2	24	—	—	—	0.3	nil	—	—	—
	8			3533	S	sil gnst		89	6	48	—	—	—	0.7	0.1	—	—	—
	9		Pit	7165	CR	qz in phyl	2.5′	18	18	30	—	—	—	0.5	nil	—	—	—
	10			3860	CR	qz and calcite		38	5	43	—	—	—	0.2	nil	—	—	—
	11		Pit	7164	CC	qz in gnst	2.5′	66	<2	10	—	—	—	0.3	nil	—	—	—
	12			3532	S	qz		27	17	44	—	—	—	2.6	0.1	—	—	—
134	1	180	Douglas Antimony	3130	G	stib		24	24	17	—	—	—	<0.2	nil	—	—	—
135	1	182	New Boston	3735	SC	gnst	20.0′	152	2	40	—	—	—	0.3	nil	—	—	—
	2		Eagle Ck adit	3736	SC	gnst		263	6	50	—	—	—	0.4	nil	—	—	—
	3			3737	SC	sch	20.0′	165	10	80	—	—	—	0.3	nil	—	—	—
	4			3738	SC	gnst	9.0′	118	16	49	—	—	—	0.5	nil	—	—	—
	5			3739	SC	gnst	15.0′	303	9	41	—	—	—	0.2	nil	—	—	—
135	6	182	New Boston	3129	G	qz sch		121	21	97	—	—	—	<0.2	nil	—	—	—
	7		Main adit	3450	RC	qz ser sch		78	26	115	—	—	—	<0.2	nil	—	—	—
	8			3451	RC	alt dior		40	13	55	—	—	—	<0.2	nil	—	—	—
	9			3452	RC	grn phyl		91	23	36	—	—	—	0.5	nil	—	—	—
	10			3453	RC	qz		16	11	21	—	—	—	0.3	nil	—	—	—
	11			3454	RC	qz ser sch		149	111	2510	—	—	—	0.8	nil	—	—	—
	12			3455	RC	metavol		143	26	100	—	—	—	0.4	nil	—	—	—
136	1	183	Kowee Ck	3433	PC		4 pans	NA	NA	NA	—	—	—	—	nil	—	—	—
137	2	183	Foster - Adit No. 1	3951	CR	qz, bk phyl		107	18	52	—	—	—	0.2	nil	—	—	—
137	3	183	Foster - Adit No. 2	3952	CC	bk phyl	3.3′	58	17	111	—	—	—	0.4	nil	—	—	—
137	4	183	Foster - Adit No. 3	3953	CR	mica sch		28	27	67	—	—	—	0.2	nil	—	—	—
	5	183	Kowee Ck	3954	RC	metadior		151	28	141	—	—	—	0.4	nil	—	—	—
		183	Lawson Ck (mouth)	3432	PC		2 pans	—	—	—	—	—	—	—	1.7	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
141	1	186	Great Eastern	4054	SC	alt pyritic dior	8.5′	85	14	47	—	13/	—	0.3	nil	—	—	—
	2		Adit	4055	CC	alt dior w/2% py	1.2′	29	11	10	—	2/	—	<0.1	nil	—	—	—
	3			4056	CC	alt dior w/py	1.3′	81	31	57	—	20/	—	0.2	nil	—	—	—
	4			4057	CC	alt dior w/2% py	1.9′	85	26	130	—	23/	—	0.1	nil	—	—	—
	5			4058	SC	sil bk phyl w/4% py	10.5′	61	13	161	—	4/	—	0.1	nil	—	—	—
	6			4059	SC	sil bk phyl w/4% py	10.0′	75	37	79	—	164/	—	0.8	nil	—	—	—
	7			4060	SC	alt dior w/2% py	17.5′	89	22	71	—	7/	—	<0.1	nil	—	—	—
141	8	186	Great Eastern Shaft	4061	RC	alt dior w/3% py		33	16	87	—	1/	—	0.1	nil	—	—	—
143	1	187	Mayflower Is.	3381	S	qz, alt dior	2.0′	8	10	24	—	—	—	<0.2	nil	—	—	—
	2			7618	CR	alt dior		19	6	47	—	—	—	<0.2	nil	—	—	—
146	1	188	Jumbo	6015	SC	porphyritic gnst	10′	86	13	42	—	—	—	<0.2	nil	—	—	—
	2			6016	SC	porphyritic gnst	10′	45	3	16	—	—	—	<0.2	nil	—	—	—
	3			6017	SC	porphyritic gnst	10′	41	4	39	—	—	—	<0.2	nil	—	—	—
	4			6018	SC	porphyritic gnst	10′	40	4	32	—	—	—	<0.2	nil	—	—	—
	5			6019	SC	porphyritic gnst	10′	48	3	10	—	—	—	<0.2	nil	—	—	—
	6			6020	SC	porphyritic gnst	10′	37	6	19	—	—	—	<0.2	nil	—	—	—
	7			6021	SC	porphyritic gnst	10′	35	6	31	—	—	—	<0.2	nil	—	—	—
148	1	189	Douglas Island	4226	SC	dior w/qz and 5% py	8.0′	44	11	136	—	—	—	0.2	0.2	—	—	—
	2			4225	SC	phyl	10.0′	2	10	24	—	—	—	0.1	0.1	—	—	—
	3			4224	CC	dior w/2% dissem py	1.2′	76	12	67	—	—	—	0.3	0.3	—	—	—
	4			4223	CC	dior w/2% dissem py	3.0′	67	22	33	—	—	—	0.1	0.1	—	—	—
	5			4221	RC	dior w/5% dissem py		82	9	58	—	—	—	0.2	0.2	—	—	—
	6			4222	CC	qz and phyl w/5% py	3.0′	155	164	154	—	—	—	0.9	0.9	—	—	—
	7			4220	SC	gry phyl	6.0′	145	25	71	—	—	—	0.4	0.4	—	—	—
150	1	190	Treadwell Tailings	3428	PL	240-mill tailings	$0.1yd^3$	28	120	160	—	—	—	19.0	373.0	—	—	—
	2	190	Treadwell Tailings	3488	PL	Mexican mill tailings	$0.1yd^3$	540	94	68	—	—	—	20.0	262.0	—	—	—
151	1	185	Jersey	3119	RC	qz		26	14	9	—	—	—	0.3	0.1	—	—	—
152	1	31	Treadwell	3547	SC	alt dior	10.0′	100	8	80	—	10/	—	<0.2	0.1	—	—	—
	2			3546	SC	pyritic dior	10.0′	82	12	90	—	15/	—	0.4	1.4	—	—	—
	3			3545	SC	pyritic dior	10.0′	103	9	91	—	11/	—	0.8	0.9	—	—	—
	4			3544	SC	pyritic dior	20.0′	79	12	91	—	28/	—	0.5	2.3	—	—	—
	5			3548	S	pyritic dior		43	12	23	—	3/	—	2.0	11.2	—	—	—
	6			3549	SC	alt dior	20.0′	66	13	19	—	23/	—	0.4	1.2	—	—	—
	7			3551	RC	pyritic dior		137	37	20	—	8/	—	0.2	1.6	—	—	—
	8			3550	RC	alt dior		100	16	21	—	21/	—	0.2	1.9	—	—	—
	9			3555	SC	alt dior	10.0′	140	19	18	—	4/	—	0.2	1.3	—	—	—
	10			3554	SC	pyritic dior	10.0′	61	42	10	—	8/	—	<0.2	0.5	—	—	—
	11			3553	SC	pyritic dior	10.0′	68	39	10	—	30/	—	0.9	9.8	—	—	—
	12			3552	SC	sil dior	5.0′	41	83	20	—	99/	—	0.8	8.5	—	—	—
154	13	31	Mexican	3561	RG	alt dior		440	19	18	—	33/	—	3.8	97.4	—	—	—
	14		Pit No. 3	3562	RG	alt dior w/Mo		212	21	16	—	95/	—	1.7	28.2	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
	15			3560	RG	pyritic dior		180	21	18	—	4/	—	0.2	1.6	—	—	—
154	16	31	Mexican	3874	CR	alt dior	10.0′	345	32	74	—	74/	—	1.1	12.5	—	—	—
	17		Pit No.1	3873	CR	alt dior	10.0′	860	32	39	—	107/	—	1.0	22.5	—	—	—
	18			3543	RC	pyritic dior	10.0′	1380	42	119	—	31/	—	2.0	14.0	—	—	—
	19			3542	RC	pyritic dior	10.0′	585	30	39	—	51/	—	1.6	10.5	—	—	—
	20			3559	S	pyritic dior		160	16	20	—	15/	—	0.9	12.6	—	—	—
	21			3556	SC	sil dior	10.0′	156	20	21	—	5/	—	<0.2	2.5	—	—	—
	22			3557	SC	alt dior	10.0′	256	15	29	—	12/	—	0.3	1.7	—	—	—
	23			3558	SC	alt dior	10.0′	333	21	20	—	4/	—	<0.2	1.4	—	—	—
155	3	190	Ready Bullion tails	3431	PL	Mill tailings on beach	0.1yd^3	68	12	47	—	—	—	14.0	6.7	—	—	—
	4			3380	PL	Mill tailings on beach	0.1yd^3	66	14	104	22	/8	—	1.2	*0.0004	—	—	—
156	1	191	Mexico & Belvedere	3854	SC	alt dior	5.0′	86	15	144	—	—	—	<0.2	nil	—	—	—
	2			3855	SC	alt dior	4.5′	185	16	80	—	—	—	0.3	nil	—	—	—
	3			3856	SC	alt dior	5.0′	58	14	41	—	—	—	<0.2	nil	—	—	—
	4			7146	SC	pyritic dior	5.0′	54	8	58	—	—	—	<0.2	nil	—	—	—
	5			7147	SC	pyritic dior	5.0′	59	8	25	—	—	—	<0.2	nil	—	—	—
	6			7148	SC	pyritic dior	5.0′	90	9	33	—	—	—	<0.2	nil	—	—	—
	7			7149	SC	pyritic dior	5.0′	112	9	63	—	—	—	<0.2	nil	—	—	—
157	1	192	Yakima	8163	S	qz w/20% py		830	22	83	—	—	—	9.7	11.3	—	—	—
	2		Small shaft	8162	CC	chl phyl w/3% py	2.5′	225	15	62	—	—	—	0.7	0.9	—	—	—
	3			4135	CC	pyritic qz-ser sch	3.0′	169	30	101	—	—	—	4.7	4.3	—	—	—
	4			3743	S	qz ser sch		475	760	244	—	—	—	11.0	1.0	—	—	—
157	5	192	Yakima	4137	CC	qz-chl sch	4.0′	165	7	57	—	—	—	0.2	0.1	—	—	—
	6		Ready Bullion Ck	4136	SC	pyritic qz-ser sch	5.0′	66	14	142	—	—	—	0.1	0.1	—	—	—
	7			8161	CC	chl phyl w/3% py	6.0′	205	54	315	—	—	—	0.3	0.1	—	—	—
	8			4134	SC	pyritic qz-ser sch	5.0′	89	14	91	—	—	—	0.4	0.1	—	—	—
	9			4133	SC	pyritic qz-ser sch	5.0′	225	13	183	—	—	—	0.1	nil	—	—	—
	10			4132	SC	trace cp	5.0′	440	159	305	—	—	—	1.0	0.1	—	—	—
	11			4106	SC	pyritic qz-ser sch	5.0′	65	10	31	—	—	—	<0.1	nil	—	—	—
	12			4107	SC	pyritic qz-ser sch	5.0′	118	8	153	—	—	—	<0.1	nil	—	—	—
	13			3740	S	qz ser sch		85	4	19	—	—	—	0.5	nil	—	—	—
157	1	193	Yakima	4108	CC	pyritic qz-ser sch	5.0′	93	185	335	—	—	—	0.3	0.2	—	—	—
	2		Davis adit	4204	SC	qz-ser sch	3.0′	470	940	5800	—	—	—	4.0	1.5	—	—	—
	3			4203	SC	qz-ser sch	4.0′	285	1250	2500	—	—	—	1.4	0.6	—	—	—
	4			4205	SC	qz-ser sch	3.0′	240	2100	4000	—	—	—	2.2	1.1	—	—	—
157	14	192	Yakima	4104	RG	pyritic qz-ser sch		115	67	187	—	—	—	0.5	nil	—	—	—
	15		Moore shaft	4105	RG	pyritic qz-ser sch		168	17	245	—	—	—	0.2	nil	—	—	—
157	16	192	Yakima	8158	CC	pyritic qz-ser sch	5.0′	87	20	91	—	—	—	0.5	0.2	—	—	—
	17			8159	CC	qz-ser sch w/10% py	5.0′	430	192	600	—	—	—	3.3	0.4	—	—	—
	18			8160	RC	qz-ser sch w/3% py		155	535	1400	—	—	—	0.6	0.4	—	—	—
	19			3741	S	qz ser sch		27	8	50	—	—	—	0.3	nil	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
158	1	194	Portland	4202	CC	shear zone w/qz	0.75′	9	4	70	—	—	—	0.1	0.1	—	—	—
	2		short adit	4201	SC	qz	4.0′	64	50	92	—	—	—	0.4	nil	—	—	—
	3			4200	CC	alt porphoritic dior	3.0′	76	17	98	—	2/	—	0.2	nil	—	—	—
158	4	194	Portland	4161	CC	alt grn phyl w/1% py	5.0′	114	8	66	—	14/	—	0.3	0.1	—	—	—
	5		Long adit	4162	CC	alt grn phyl w/1% py	4.0′	105	3	104	—	4/	—	0.1	0.1	—	—	—
	6			4045	CC	qz, amph w/15% py	1.8′	740	4	80	—	164/	—	0.5	0.1	—	—	—
	7			4163	CC	pyritic alt dior	7.0′	60	17	50	—	3/	—	0.1	0.1	—	—	—
	8			4046	CC	alt dior w/3% py	3.8′	93	18	100	—	3/	—	0.3	0.1	—	—	—
159	1	195	Mineral Queen Outcrop	4051	CC	chl sch w/15% py cubes	0.3′	39	235	20	—	360/	—	5.7	51.9	—	—	—
159	1	196	Mineral Queen	3481	CR	amph		349	7	47	—	—	—	0.2	0.1	—	—	—
	2		lower adit	3482	CC	amph	2.5′	298	13	72	—	—	—	0.3	0.2	—	—	—
	3			3483	CC	amph	1.5′	390	11	87	—	—	—	0.4	0.1	—	—	—
	4			3484	CC	sch	5.0′	348	58	83	—	—	—	0.5	4.8	—	—	—
	5			3485	CC	sch	5.0′	1570	168	91	—	—	—	3.6	14.8	—	—	—
	6			3486	CC	sch	1.5′	1210	35	79	—	—	—	1.8	2.3	—	—	—
	7			3487	CC	sch	3.3′	1740	251	91	—	—	—	4.5	9.6	—	—	—
	8			4218	SC	best mineralized zone	15.0′	1050	105	73	—	1250/	—	1.4	5.7	—	—	—
159	1	197	Mineral Queen	4208	CC	qz w/10% py, cp	1.5′	495	12	12	—	1/	0.2	1.0	0.4	—	—	—
	1		Upper adit	4208		reassay		—	—	—	—	—	—	—	0.5	—	—	—
	2			4209	CC	chl sch w/10% py cubes	1.5′	205	83	96	—	31/	0.6	2.7	8.1	—	—	—
	2			4209		reassay		—	—	—	—	—	—	—	8.0	—	—	—
	3			4210	CC	qz w/7% py, cp	1.5′	66	120	26	—	63/	2.0	34.0	441.0	—	—	—
	3			4210		reassay		—	—	—	—	—	—	—	432.5	—	—	—
	4			4160	CC	qz w/25% py	1.4′	170	700	27	—	70/	—	11.0	2.3	—	—	—
	5			4173	S	py concentrate		260	690	14	—	—	—	12.0	3.6	—	—	—
	6			4207	CC	qz	3.0′	120	154	22	—	635/	—	2.0	1.9	—	—	—
	7			4159	CC	qz, chl phyl	1.4′	198	40	66	—	17/	—	1.3	1.1	—	—	—
	8			4239	CC	chl sch w/10% py	1.4′	33	31	65	—	200/	—	0.8	2.2	—	—	—
	9			4206	CC	qz	3.0′	720	26	14	—	35/	—	1.0	0.4	—	—	—
159	2	195	Mineral Queen Open cut	4052	CC	chl sch, qz, 8% py, gn	2.5′	46	189	20	—	35/	—	3.0	0.1	—	—	—
159	3	195	Mineral Queen Ready Bullion adit	4053	CC	qz w/3% py	0.8′	20	10	50	—	4/	—	0.4	0.9	—	—	—
161	1	199	Ulela	4047	CC	bk phyl and qz	1.0′	44	20	89	—	—	—	0.1	nil	—	—	—
	2			4048	CC	bk phyl and qz	2.0′	29	15	65	—	—	—	0.2	nil	—	—	—
161	3	199	Alice	4215	RG	qz float from trench		13	<2	19	—	—	—	0.1	nil	—	—	—
	4			4214	S	qz from trench		<1	<2	<1	—	—	—	0.1	nil	—	—	—
	5			4216	S	qz		13	<2	11	—	—	—	0.1	nil	—	—	—
161	6	199	Alice Shaft	4217	S	qz		9		20	—	—	—	0.1	nil	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
162	7	199	Zelda	4164	CC	qz w/0.5% py	1.5′	23	13	30	—	—	—	0.2	1.7	—	—	—
163	1	204	Alaska Treasure	3622	SC	qz ser sch	20.0′	75	19	26	—	—	—	0.6	0.2	—	—	—
	2		Main Working Tunnel	3621	SC	chl andesite	20.0′	91	25	63	—	—	—	0.4	nil	—	—	—
	3			3620	SC	qz ser sch	20.0′	148	134	338	—	—	—	1.0	0.1	—	—	—
	4			3569	CC	pyritic ser sch	20.0′	141	232	210	—	—	—	0.8	0.3	—	—	—
	5			3568	RC	pyritic ser sch	5.0′	81	61	83	—	—	—	0.6	0.4	—	—	—
	6			3619	SC	qz ser sch	20.0′	384	1380	3160	—	—	—	4.9	4.4	—	—	—
	7			3570	CC	pyritic ser sch	20.0′	740	630	5070	—	—	—	2.6	0.5	—	—	—
	8			3618	SC	qz ser sch	20.0′	143	30	70	—	—	—	0.9	0.6	—	—	—
	9			3623	SC	qz ser sch	20.0′	214	25	55	—	—	—	1.1	1.1	—	—	—
	10			3563	CC	pyritic ser sch	10.0′	200	700	1495	—	—	—	2.5	2.0	—	—	—
	11			3566	CC	shear, ser sch	2.0′	350	2770	2670	—	—	—	5.1	0.6	—	—	—
	12			3567	CC	pyritic ser sch	10.0′	290	730	915	—	—	—	2.4	1.8	—	—	—
	13			3564	CC	shear, ser sch	4.0′	690	5930	4950	—	—	—	9.7	0.1	—	—	—
	14			3565	S	qz		2900	>7500	>20000	—	—	—	62.1	5.3	—	8.36	4.00
	15			3624	SC	qz ser sch	20.0′	250	690	1250	—	—	—	1.8	0.1	—	—	—
	16			3625	SC	qz ser sch	20.0′	202	1020	1280	—	—	—	1.4	0.2	—	—	—
	17			3626	SC	qz ser sch	20.0′	92	105	269	—	—	—	0.7	0.9	—	—	—
	18			3627	SC	qz ser sch	20.0′	154	13	103	—	—	—	0.2	nil	—	—	—
	19			3628	SC	qz ser sch	20.0′	75	13	150	—	—	—	<0.2	0.1	—	—	—
	20			3629	SC	qz ser sch	20.0′	98	16	83	—	—	—	0.2	nil	—	—	—
	21			3630	SC	qz ser sch	20.0′	86	30	200	—	—	—	0.4	nil	—	—	—
	22			3631	SC	qz ser sch	21.0′	94	14	35	—	—	—	<0.2	nil	—	—	—
	23			3734	S	chl sch		33	8	29	—	—	—	0.2	nil	—	—	—
163	1	205	Alaska Treasure	3573	CC	pyritic ser sch	8.0′	180	985	304	—	—	—	2.9	0.7	—	—	—
	2		Mill Adit	3572	CC	pyritic ser sch	10.0′	79	32	59	—	—	—	1.0	0.4	—	—	—
	3			3571	CC	pyritic ser sch	10.0′	78	55	154	—	—	—	0.8	0.3	—	—	—
	4			7502	CC	pyritic ser sch	10.0′	59	18	100	—	—	—	<5	0.2	—	—	—
	5			7501	CC	pyritic ser sch	10.0′	120	120	120	—	—	—	1.5	0.4	—	—	—
	6			7170	CC	pyritic ser sch	10.0′	110	37	32	—	—	—	1.1	0.9	—	—	—
	7			7169	CC	pyritic ser sch	10.0′	74	52	30	—	—	—	1.2	0.4	—	—	—
	8			7168	CC	pyritic ser sch	10.0′	50	10	<20	—	—	—	<5	0.1	—	—	—
163	1	206	Alaska Treasure	3574	S	qz breccia		26	39	93	—	—	—	0.4	0.2	—	—	—
	2		Nevada Creek	3106	CC	qz ser sch	5.0′	321	>7500	10400	—	—	—	9.2	0.1	—	1.00	—
	3			3107	CC	qz ser sch	5.0′	475	>7500	>20000	—	—	—	77.9	0.4	—	9.40	15.90
	4			3709	CH	qz ser sch	3.0′	270	7500	12000	—	—	—	7.2	0.2	—	—	—
163	5	206	Alaska Treasure	4034	S	mill concentrate		3750	10000	>20000	—	—	—	19.0	26.1	—	1.02	1.78
	6		Hudson Adit	3105	G	dump		1320	7360	>20000	—	—	—	6.2	4.7	—	—	2.76
	7			3706	CH	qz	3.0′	166	2230	4080	—	—	—	2.1	0.1	—	—	—
	8			3708	RC	vol aggl		495	>7500	>20000	—	—	—	9.2	0.4	—	1.36	2.01
	9			3707	RC	qz		47	231	213	—	—	—	0.7	nil	—	—	—
	10			3810	CR	qz		775	>7500	>20000	—	—	—	47.0	75.4	—	3.57	5.10
	11			3815	SC	qz ser sch	20.0′	268	900	830	—	—	—	1.7	0.3	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
	12			3814	SC	qz ser sch	20.0′	430	750	3510	—	—	—	1.6	0.7	—	—	—
	13			3813	SC	qz ser sch	20.0′	207	1000	1795	—	—	—	1.8	0.7	—	—	—
	14			3812	SC	qz ser sch	10.0′	420	329	3110	—	—	—	1.0	0.6	—	—	—
	15			3811	SC	qz ser sch	7.0′	600	585	9140	—	—	—	1.9	2.4	—	—	—
	16			3712	CC	qz ser sch	6.0′	920	3400	18100	—	—	—	15.0	7.2	—	—	—
	17			3711	CC	qz ser sch	6.9′	115	36	116	—	—	—	0.3	1.0	—	—	—
	18			3710	CH	qz ser sch	6.1′	1660	430	18100	—	—	—	9.6	11.8	—	—	—
	19			3713	CC	qz ser sch	7.5′	450	169	875	—	—	—	0.6	1.0	—	—	—
	20			3816	CC	qz ser sch	5.9′	605	1005	5420	—	—	—	2.2	0.1	—	—	—
	21			3536	S	sil ser sch		1070	121	6650	—	—	—	1.8	2.5	—	—	—
	22			3715	RC	qz ser sch	5.2′	755	2700	5690	—	—	—	3.4	1.3	—	—	—
	23			3714	CC	qz ser sch	6.7′	165	176	389	—	—	—	0.4	0.7	—	—	—
	24			3934	RC	chl qz sch		334	135	475	—	—	—	0.6	1.5	—	—	—
	25			3933	RC	chl qz sch		645	795	1530	—	—	—	6.5	6.0	—	—	—
	26			3932	RC	chl qz sch		381	75	1380	—	—	—	1.4	6.1	—	—	—
	27			3931	RC	chl qz sch		327	53	197	—	—	—	0.6	1.3	—	—	—
	28			3930	SC	chl qz sch	10.0′	193	2000	1910	—	—	—	4.1	2.3	—	—	—
	29			3929	RC	chl qz sch		363	22	1860	—	—	—	0.7	1.5	—	—	—
	30			3928	CC	chl qz sch	5.0′	179	55	396	—	—	—	0.6	2.5	—	—	—
	31			3927	RC	chl qz sch		330	23	121	—	—	—	0.7	2.4	—	—	—
	32			3926	RC	chl qz sch		555	84	193	—	—	—	1.1	2.0	—	—	—
	33			3925	CC	chl qz sch	10.0′	245	36	139	—	—	—	1.1	4.1	—	—	—
	34			3923	RC	chl qz sch		233	19	72	—	—	—	0.2	1.0	—	—	—
	35			3924	CC	chl qz sch	12.0′	195	17	52	—	—	—	0.3	0.6	—	—	—
	36			3922	CH	qz ser sch	5.0′	172	17	82	—	—	—	<0.2	nil	—	—	—
163	1	203	West Fork Nevada Ck	3722	S	qz ser sch		70	14	186	—	—	—	0.4	nil	—	—	—
163	2	203	Alaska Treasure Hogback Shaft	3304	RC	qz calcite		1430	3220	4580	—	—	—	5.1	25.6	—	—	—
	3	203	South Fk Nevada Ck	3939	CC	qz ser sch		60	23	138	—	—	—	<0.2	nil	—	—	—
	4	203	SW Fork Nevada Ck	3719	S	jasperoid		118	15	176	—	—	—	<0.2	nil	—	—	—
	5			3721	G	jasperoid		94	78	54	—	—	—	0.5	nil	—	—	—
	6			3720	G	qz		805	>7500	4800	—	—	—	4.8	nil	—	1.17	—
	7			3717	S	qz ser sch		2970	176	1870	—	—	—	3.1	0.4	—	—	—
164	1	207	Alaska Homestake Adit	3732	CC	qz	5.0′	53	580	206	—	—	—	1.4	0.1	—	—	—
	2			3733	CC	qz ser sch	10.0′	32	373	950	—	—	—	0.7	0.1	—	—	—
	3			3731	CC	qz ser sch	6.0′	198	54	124	—	—	—	1.3	0.6	—	—	—
	4			3730	CC	qz ser sch	20.0′	102	65	32	—	—	—	1.2	0.8	—	—	—
	5			3729	CC	qz ser sch	20.0′	84	79	379	—	—	—	1.0	0.5	—	—	—
	6			3728	CC	qz ser sch	20.0′	47	90	295	—	—	—	0.9	0.1	—	—	—
	7			3727	CC	qz ser sch	20.0′	53	203	845	—	—	—	0.9	0.1	—	—	—
	8			3726	CC	qz ser sch	20.0′	62	311	970	—	—	—	0.8	0.1	—	—	—
	9			3725	CC	qz ser sch	20.0′	195	304	1740	—	—	—	2.1	0.2	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
	10			3724	CC	qz ser sch	20.0′	96	285	106	—	—	—	1.8	0.2	—	—	—
	11			4304	CC	fel phyl w/8% py, sc	2.3′	735	1400	2900			—	12.0	0.3			
164	12	207	Alaska Homestake	3718	S	qz ser sch		90	48	64	—	—	—	0.8	0.1	—	—	—
	13		Open Cut	4303	RC	chl, qz phyl w/10% py	3.0′	119	310	380	—	—	—	1.6	0.1	—	—	—
	8	203	SE Fork Nevada Ck	3716	G	qz ser sch		96	16	103	—	—	—	0.7	nil	—	—	—
165	1	208	Mammoth	4305	S	dump sample of grn phyl		24	32	32	—	—	—	0.4	nil	—	—	—
	2		Lower adit	3303	S	qz-dump		32	152	81	—	—	—	0.5	nil	—	—	—
	3			3302	S	qz calcite		191	179	345	—	—	—	1.9	nil	—	—	—
	4			3938	S	dump		730	3580	860	—	—	—	9.3	nil	—	—	—
	5			4306	RC	pyritic grn phyl from dump		199	17	149	—	—	—	0.8	0.2	—	—	—
165	6	208	Mammoth	4150	S	pyritic grn phyl		114	10	48	—	—	—	1.0	0.4	—	—	—
	7		Upper adit	4151	S	qz w/3% py from dump		26	10	14	—	—	—	0.4	0.5	—	—	—
	9	203	Nevada Creek	4240	RG	limo-rich soil		6	11	14	—	—	—	0.3	0.5	—	—	—
	10			3937	SC	chl qz sch	6.0′	28	54	780	—	—	—	1.9	0.3	—	—	—
	11			3936	SC	chl qz sch	4.0′	42	28	173	—	—	—	<0.2	nil	—	—	—
	12			3935	SS	alluvium		56	57	130	—	—	—	0.7	0.2	—	—	—
	16	203	SE Fork Nevada Ck	3944	S	qz calcite		84	3	59	—	—	—	<0.2	nil	—	—	—
	17			3942	CC	chl qz sch	3.0′	89	17	35	—	—	—	<0.2	nil	—	—	—
	18			3943	SC	qz ser sch		206	10	133	—	—	—	<0.2	nil	—	—	—
	19			3941	S	qz		105	24	48	—	—	—	<0.2	nil	—	—	—
	20			3940	SC	qz ser sch		24	11	39	—	—	—	<0.2	nil	—	—	—
166	1	209	Red Diamond	4146	S	qz and grn phyl		64	6	310	—	—	—	2.1	13.7	—	—	—
	2		Upper shaft	4044	CC	pyritic fel sch	2.0′	39	7	50	—	—	—	0.8	2.4	—	—	—
166	3	209	Red Diamond	4147	CC	qz, chl phyl w/5% py	2.0′	107	3	74	—	—	—	0.1	0.1	—	—	—
	4		Upper adit	4148	CC	chl, qz phyl	1.0′	75	4	76	—	—	—	0.2	0.1	—	—	—
	5			4149	CC	qz, alt phyl w/1% py	2.1′	45	2	40	—	—	—	0.2	1.3	—	—	—
166	13	203	Red Diamond	3301		trench		9	620	955	—	—	—	0.8	nil	—	—	—
	14		Main shaft area	3535	S	qz, ankerite		18	4	31	—	—	—	0.4	2.7	—	—	—
166	1	210	Red Diamond Lower shaft	4307	RC	chl, qz phyl w/10% py	2.0′	26	13	4	—	—	—	2.1	5.4	—	—	—
166	2	210	Red Diamond	8044	CC	qz, chl phyl w/5% py	5.0′	100	19	44	—	—	—	1.0	10.3	—	—	—
	3		Middle adit	8043	CC	qz, chl phyl w/5% py	5.0′	70	15	50	—	—	—	0.6	0.3	—	—	—
	4			8042	CC	qz, chl phyl w/5% py	6.0′	108	8	36	—	—	—	<0.2	0.4	—	—	—
	5			8041	CC	qz, chl phyl w/5% py	6.0′	96	11	57	—	—	—	0.2	1.4	—	—	—
	6			8040	CC	qz, chl phyl w/5% py	10.0′	93	11	26	—	—	—	<0.2	0.5	—	—	—
	7			4031	CC	qz, gry phyl, to 5% py	5.0′	92	11	38	—	—	—	0.1	0.4	—	—	—
	8			4030	CC	qz w/1% py	7.0′	60	27	25	—	—	—	<0.2	0.5	—	—	—
	9			4029	CC	qz w/1% py, cp	4.0′	70	24	30	—	—	—	<0.2	0.3	—	—	—
166	15	203	Red Diamond Caved adit	3104	G	dump		35	28	78	—	—	—	0.7	4.4	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
166	1	211	Red Diamond	4037	CC	alt gnst w/5% py	10.0′	118	6	55	—	—	—	0.1	nil	—	—	—
	2		Lower adit	4125	SC	gnst w/5% dissem py	10.0′	144	5	52	—	—	—	<0.1	3.4	—	—	—
	3			4124	SC	gnst w/10% dissem py	10.0′	140	3	72	—	—	—	<0.1	nil	—	—	—
	4			4122	CC	grn phyl in shear, 5% py	5.0′	87	6	65	—	—	—	<0.1	nil	—	—	—
	5			4123	CC	grn phyl in shear, 5% py	5.0′	117	5	74	—	—	—	0.1	nil	—	—	—
	6			4035	CC	alt chl phyl w/10% py	5.5′	91	15	80	—	—	—	0.1	nil	—	—	—
	7			4036	SC	alt chl phyl w/5% py	10.0′	112	5	85	—	—	—	<0.1	nil	—	—	—
167			Bach	3263	SS	alluvium		7	7	41	—	—	—	<0.2	nil	—	—	—
169			Bum Cat Placer	7011	S	msed		55	14	29	—	—	—	0.6	nil	—	—	—
				7121	PL		0.1yd³	34	34	90	105	—	—	12.0	80.0	—	—	—
172			Great Bear	7119	RG	mafic tuff		38	3	80	<2	—	—	<0.2	nil	—	—	—
				7120	RG	sil phyl		32	2	99	<2	—	—	0.2	nil	—	—	—
175			Prospect Ck	7096	PL	alluvium		—	—	—	—	—	—	—	T	—	—	—
				7095	PL	alluvium		—	—	—	—	—	—	—	T	—	—	—
176			JLC	7097	PL	alluvium		—	—	—	—	—	—	—	nil	—	—	—
178	1	213	Enterprise	7001	CC	qz	2.4′	14	1160	105	—	—	—	21.0	25.2	—	—	—
	2		Upper adit	7003	RC	dior		9	89	109	—	—	—	0.6	nil	—	—	—
	3			7002	RC	dior		12	60	68	—	—	—	0.6	nil	—	—	—
	4			7004	CC	qz	2.0′	4	1445	22	—	—	—	20.0	1.3	—	—	—
	5			4331	CC	qz	1.8′	8	3770	34	—	—	—	56.8	6.3	—	—	—
	6			4332	CC	qz	1.5′	5	802	24	—	—	—	8.6	1.3	—	—	—
	7			4347	S	qz w/gn, py, sl	1.8′	8	10000	23	—	—	—	44.8	7.8	—	1.13	—
	8			4348	CC	qz	2.6′	4	169	23	—	—	—	3.5	1.0	—	—	—
178	9	213	Enterprise	4329	CC	qz	2.0′	14	402	129	—	—	—	5.7	18.4	—	—	—
	10		Lower adit	4330	CC	qz	2.0′	6	1901	73	—	—	—	32.8	1.9	—	—	—
	11			4328	CC	qz	1.1′	55	136	128	—	—	—	1.7	3.0	—	—	—
179	1	212	Whigg Placer	7135	SS			42	10	135	2	—	—	<0.2	0.1	—	—	—
180	2	212	Mist Ck	7094	PL	alluvium		—	—	—	—	—	—	—	T	—	—	—
182	1	218	Friday	4049	S	qz w/8% py		156	37	2	—	—	—	0.7	0.1	—	—	—
	2		Finale adit	4070	S	qz w/ 30% py		117	1637	6	—	1/	—	8.3	0.1	—	—	—
	3			4338	CC	qz and trondjhemite	0.5′	139	482	2	—	<1/	—	2.7	0.1	—	—	—
	4			4337	CC	qz and trondjhemite	0.6′	541	238	6	—	<1/	—	1.4	0.0			
182	5	218	Friday	1834	RC	qz and trondjhemite	1.0′	48	17	16	—	<1/	—	0.2	0.1	—	—	—
	6			1835	CC	qz	3.0′	23	60	4	—	<1/	—	4.8	1.5	—	—	—
	7			4071	S	qz w/8% py		38	126	8	—	<1/	—	1.2	nil	—	—	—
182	1	217	Friday Minnehaha adit	4339	S	qz float from dump		229	113	13	—		—	7.6	0.4	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
182	1	219	Friday	3109	CC	qz	0.9′	48	25	7	—	—	—	0.4	0.1	—	—	—
	2		Lower adit	3111	CC	qz	0.3′	116	24	35	—	—	—	0.6	1.7	—	—	—
	3			7013	CC	qz	1.0′	590	67	26	—	—	—	0.6	nil	—	—	—
	4			3110	CC	qz	1.5′	48	21	10	—	—	—	0.9	0.6	—	—	—
	5			7014	CC	qz	2.5′	16	44	10	—	—	—	0.2	nil	—	—	—
	6			3112	CC	qz	0.3′	159	87	10	—	—	—	0.4	nil	—	—	—
182	7	219	Friday	7015	CC	qz	1.5′	460	25	54	—	—	—	4.3	12.4	—	—	—
	8		Upper adit	7016	CC	qz	1.5′	157	14	47	—	—	—	2.5	14.3	—	—	—
	9			3223	CC	qz	0.8′	14	22	48	—	—	—	<0.2	0.2	—	—	—
	10			3118	CC	qz	1.4′	214	23	44	—	—	—	2.1	11.1	—	—	—
	11			3113	CC	qz	1.2′	32	16	24	—	—	—	0.8	3.7	—	—	—
	12			3114	CC	qz	1.4′	1940	57	45	—	—	—	15.0	43.3	—	—	—
	13			3116	CC	qz	1.8′	640	43	51	—	—	—	5.3	22.5	—	—	—
	14			3115	CC	qz	4.0′	450	26	86	—	—	—	2.9	5.1	—	—	—
	15			3221	CC	qz	1.0′	875	24	80	—	—	—	2.1	4.1	—	—	—
	16			3405	CC	qz	0.5′	8	5	10	—	—	—	0.6	1.7	—	—	—
	17			3406	CC	qz	3.5′	595	26	84	—	—	—	1.5	4.3	—	—	—
	18			3222	CC	qz	1.0′	740	24	75	—	—	—	1.8	5.3	—	—	—
	19			3117	CC	qz	0.4′	1980	28	34	—	—	—	1.0	0.3	—	—	—
182	20	219	Friday prospect adit	3407	CC	qz	1.0′	34	20	78	—	—	—		nil	—	—	—
183	1	221	Crystal	3034	CC	qz & gnst	3.4′	895	320	50	—	—	—	8.9	19.9	—	—	—
	2		Lower workings	3035	CC	qz	2.1′	205	120	51	—	—	—	8.9	4.1	—	—	—
	3			3305	SC	qz	3.0′	92	18	37	—	—	—	5.0	24.6	—	—	—
	4			3306	SC	qz	1.3′	135	7	64	—	—	—	0.4	0.2	—	—	—
	5			3307	CC	qz	1.0′	50	15	29	—	—	—	0.8	0.9	—	—	—
	6			3403	CC	qz	1.0′	9010	1650	94	—	—	—	36.4	19.7	—	—	—
	7			3220	CC	qz	1.5′	208	33	95	—	—	—	4.6	11.1	—	—	—
	8			3308	CC	qz	1.4′	107	17	45	—	—	—	1.2	0.9	—	—	—
	9			3218	CC	qz	1.5′	18	11	16			—	0.4	0.5	—	—	—
	10			3219	CC	qz	2.0′	84	38	55	—	—	—	2.4	4.6	—	—	—
	11			3402	CC	qz	2.5′	125	20	34	—	—	—	3.4	2.5	—	—	—
	12			3404	CC	qz	4.5′	62	10	36	—	—	—	0.6	0.7	—	—	—
	13			3209	CC	qz	3.0′	61	17	52	—	—	—	0.8	0.6	—	—	—
	14			3208	CC	qz	1.5′	75	23	27	—	—	—	6.6	17.9	—	—	—
	15			7048	CC	qz	1.7′	141	20	57	—	—	—	3.4	0.6	—	—	—
	16			7052	CC	qz	3.0′	21	14	24	—	—	—	1.8	2.3	—	—	—
	17			7046	CC	qz	1.5′	88	13	105	—	—	—	2.3	5.2	—	—	—
	18			7051	CC	qz	0.6′	45	20	39	—	—	—	2.3	11.1	—	—	—
183	19	221	Crystal	3206	CC	qz	1.4′	32	4	18	—	—	—	1.0	3.8	—	—	—
	20		Middle workings	3207	CC	qz	3.0′	174	22	91	—	—	—	1.2	1.3	—	—	—
	21			3205	CC	qz	0.2′	89	36	76	—	—	—	0.8	3.4	—	—	—
	22			7049	CC	qz	1.1	38	10	35	—	—	—	0.8	8.5	—	—	—
	23			7045	CC	qz	0.5′	122	29	57	—	—	—	3.4	7.2	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Fire Assay/AA Ag ppm	Au ppm	Specific Cu %	Pb %	Zn %
	24			7050	CC	qz	1.6′	98	27	66	—	—	—	2.3	4.7	—	—	—
	25			7037	CC	qz	3.0′	540	28	112	—	—	—	0.8	23.6	—	—	—
	26			7036	CC	qz	2.5′	64	20	26	—	—	—	0.6	91.6	—	—	—
	27			7038	S	py		186	22	34	—	—	—	42.5	221.7	—	—	—
	28			7044	CC	qz	0.9′	26	32	36	—	—	—	6.7	13.9	—	—	—
	29			7041	CC	qz	1.2′	190	13	73	—	—	—	0.4	1.0	—	—	—
	30			7040	CC	qz	1.8′	67	13	56	—	—	—	0.9	3.0	—	—	—
	31			7039	CC	qz	1.4′	52	20	89	—	—	—	1.0	1.8	—	—	—
	32			7043	CC	qz	2.5′	2020	25	13	—	—	—	11.0	30.2	—	—	—
	33			7042	CC	qz	0.5′	400	17	10	—	—	—	4.5	20.5	—	—	—
	34			3036	CC	qz	1.1′	48	29	67	—	—	—	0.3	0.2	—	—	—
183	35	221	Crystal Mine	3401	CC	qz	0.6′	131	71	87	—	—	—	5.8	10.6	—	—	—
	36		Upper adit	7035	CC	qz	2.2′	186	22	34	—	—	—	1.4	2.3	—	—	—
	37			7033	CC	qz	2.6′	64	20	26	—	—	—	0.6	1.1	—	—	—
	38			7034	CC	qz	1.2′	540	28	112	—	—	—	0.8	0.9	—	—	—
	39			7031	CC	qz	2.0′	365	39	32	—	—	—	8.2	41.1	—	—	—
	40			7032	CC	qz	2.7′	710	33	42	—	—	—	12.0	1.1	—	—	—
	41			7026	CC	qz	0.8′	97	29	71	—	—	—	1.0	0.9	—	—	—
	42			7027	CC	qz	0.8′	4	19	13	—	—	—	0.2	0.1	—	—	—
	43			7028	CC	selvage	1.0′	102	25	105	—	—	—	0.8	0.7	—	—	—
	44			7030	CC	qz	1.0′	169	102	95	—	—	—	9.5	16.5	—	—	—
	45			7029	CC	qz	1.7′	204	24	106	—	—	—	1.0	1.3	—	—	—
184	3	212	Lower Gilbert Bay	7124	RG	chl sch		400	<2	41	<2	—	—	0.2	nil	—	—	—
	4		tributary	7128	CR	qz	0.5	40	86	45	180	—	—	0.7	nil	—	—	—
	5			7129	CR	bk argillite		69	4	70	<2	—	—	0.2	nil	—	—	—
	6			7130	CC	qz	1.5	5	<2	3	1000	—	—	<0.2	0.1	—	—	—
	7			7131	CR	bk argillite	3.0	139	<2	102	20	—	—	0.3	0.6	—	—	—
188		6	Argenta Basin	7125	RG	qz, calcite		5	14	12	4	—	—	<0.2	nil	—	—	—
				7132	CR	bk argillite		45	6	96	<2	—	—	0.2	nil	—	—	—
				7133	CR	qz		15	63	63	<2	—	—	0.5	0.1	—	—	—
				7134	CR	bk phyl w/py		9	5	37	20	—	—	1.4	nil	—	—	—
184		6	Gilbert Bay	7126	CR	qz	0.9′	36	<2	13	<2	—	—	0.2	nil	—	—	—
				7127	CC	bk slate	3.0	18	18	31	<2	—	—	0.4	nil	—	—	—
191		6	Anmer Creek	7024	PC	alluvium		64	7	183	—	—	—	0.8	1.1	—	—	—
				7025	PC	alluvium		84	9	187	—	—	—	1.3	nil	—	—	—
				7100	PC	alluvium		48	11	188	—	—	—	0.5	nil	—	—	—
				7101	PC	alluvium		84	8	233	—	—	—	1.1	0.9	—	—	—
193		6	Carroll Creek	7098	PL	alluvium		—	—	—	—	—	—	—	nil	—	—	—
194		6	Mapco	7022	RC	qz		7	8	5	—	—	—	<0.2	0.1	—	—	—
196		6	South Snettisham	7154	S	qz		<2	<2	4	2	—	—	<0.2	nil	—	—	—
				7153	S	marble		4	15	22	<2	—	—	<0.2	0.1	—	—	—

APPENDIX D-1.—JUNEAU GOLD BELT RESULTS—Continued

Prosp. No.	Map No.	Fig. No.	Prospect Name	Sample No.	Sample Type	Sample Lithology & Remarks	Sample Size	Atomic Absorption						Fire Assay/AA		Specific		
								Cu ppm	Pb ppm	Zn ppm	As ppm	Mo/W ppm	Te ppm	Ag ppm	Au ppm	Cu %	Pb %	Zn %
196		6	South Snettisham	7137	PC			10	6	48	4	—	—	<0.2	0.1	—	—	—
				7151	CR	qz	2.0′	3	<2	1	<2	—	—	<0.2	0.1	—	—	—
				7152	S	marble		3	11	52	<2	—	—	<0.2	nil	—	—	—
				7138	CR	qz	2.0′	<2	<2	1	<2	—	—	<0.2	nil	—	—	—
				7139	CR	qz	3.0′	2	<2	1	<2	—	—	<0.2	0.1	—	—	—