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

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

Section A

Haines-Klukwan-Porcupine Subarea

UNITED STATES DEPARTMENT OF THE INTERIOR

HAINES-KLUKWAN-PORCUPINE SUBAREA

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HAINES-KLUKWAN-PORCUPINE SUBAREA

by Jan C. Still[1]

INTRODUCTION

The Haines-Klukwan-Porcupine subarea of the Juneau Mining District (JMD) is located in the northern portion of the JMD and consists of the land between the Alaska—British Columbia boundary, the Chilkoot Valley, Glacier Bay National Park boundary, and extending south to the Davidson Glacier and the Chilkat Peninsula and Islands (fig. A-1). This area was studied as part of the larger JMD study in a cooperative effort between the Alaska Division of Geological and Geophysical Surveys (ADGGS) and the Bureau during 1985 to 1988. Prior to this, during 1984, the ADGGS and the Bureau cooperated in a study of the Porcupine mining area and during 1981 to 1983 conducted separate studies in the area. Field work was conducted by foot, boat, truck, and helicopter. Figure A-1 shows the Haines-Klukwan-Porcupine subarea and shows the areas covered by previous Bureau and ADGGS studies.

PHYSIOGRAPHY AND CLIMATE

The physiography of the subarea ranges from gentle to rugged. Glaciers formed the major features in the subarea and left "U" shaped steep walled valleys and rugged mountains. The Chilkat, Chilkoot, Klehini, Tsirku, and Takhin are the major rivers in the subarea. The higher mountains are glacier clad and some valleys still harbor glaciers that reach the valley floors. Lush forests and dense brush predominate up to timberline at about the 2,000-foot elevation. Low point in the subarea is at sea level in the area around Haines while the high point is 7,434 feet at Mount Henry Clay in the Porcupine mining area.

The average annual precipitation is 60 inches a year at Haines and is notably less at Klukwan and areas away from tidewater. Long cold winters with snowfall from October to April characterize the areas away from tidewater. The areas near tidewater have a somewhat milder climate.

ACCESS

The Haines-Klukwan-Porcupine subarea is serviced by an all weather road that connects Haines and Klukwan with the Alaska Highway and the interior road systems of Alaska and Canada. Dirt roads connect the old partly abandoned town of Porcupine, the Kelsall River area, and the Chilkat Peninsula area with the Haines highway. Haines connects with Seattle, Washington, and most coastal towns in Southeast Alaska via the Alaska Marine Highway System. A small airport with a paved 4,500-foot runway at Haines services smaller aircraft from other communities in Southeast Alaska. Figure A-1 shows the location of the highways, roads, and cities within the Haines-Klukwan-Porcupine subarea.

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ACKNOWLEDGMENTS

A special thanks goes to Haines Mayor Henderson (1986–1987) and the staff of the Haines Borough, to Haines City Administrator Walter Wilcox, and to Pete Lapham, Haines Maintenance Supervisor for the State of Alaska Department of Transportation. All helped facilitate the Bureau's program in the subarea. John Gammon of Falconbridge Mines Limited, British Columbia, allowed access to company claims on the Windy Craggy and Klukwan deposits. Doug Perkins of Stryker Resources, Brian Jones of Kennecott Exploration, and Earl Redman and C.C. Hawley of C.C. Hawley and Associates allowed access to company data and prospects in the subarea. Local prospectors Merrill Palmer, Jim McLaughlin, Jo Jurgeleit, and R.C. Manuel all helped with this study.

Robert B. Hoekzema and Steven A. Fechner of the Bureau of Mines, and Tom Bundtzen of the ADGGS conducted the field work, research, and wrote the Bureau Report (*A-30*)[2] from which the section covering the Porcupine Placers was adapted. Robert Forbes and Wyatt Gilbert, both ADGGS geologists, and Earl Redman[3] mapped most of the regional geology contained in this report. Acknowledgment is given to Bureau employee Kevin R. Weir, who worked as a laborer, sampler, and field and office technician on the project. Mr. Weir has studied geology, prospecting, and mining on his own and on the job for more than 15 years. He participated in the discoveries of a number of prospects and occurrences during this study. In addition, he prepared all the analytical tables and sampling maps used in this report.

[2] Italic numbers in parentheses refer to list of references preceding the appendixes.

[3] Earl Redman was employed by C.C. Hawley and Associates during the first part of the JMD study. During that time he did contract work for the ADGGS and the Bureau; Mr. Redman is currently employed by the Bureau.

DIVISION OF THE SUBAREA

The Haines-Klukwan-Porcupine subarea is divided into the Porcupine mining area (fig. A-1, Nos. 3-24), the Klukwan mafic/ultramafic complex (fig. A-1, Nos. 26-31) vicinity, the area between Klukwan and Haines (fig. A-1, Nos. 32-35), and the Chilkat Peninsula and Islands (fig. A-1, Nos. 36-42). These areas are discussed in the order listed. Lastly, the remaining prospects and occurrences, not within the above areas, at scattered locations in the subarea are discussed (fig. A-1, Nos. 1-2 and 25). Appendix A-1 contains the analytical results, while appendix A-2 contains the results of metallurgical testing.

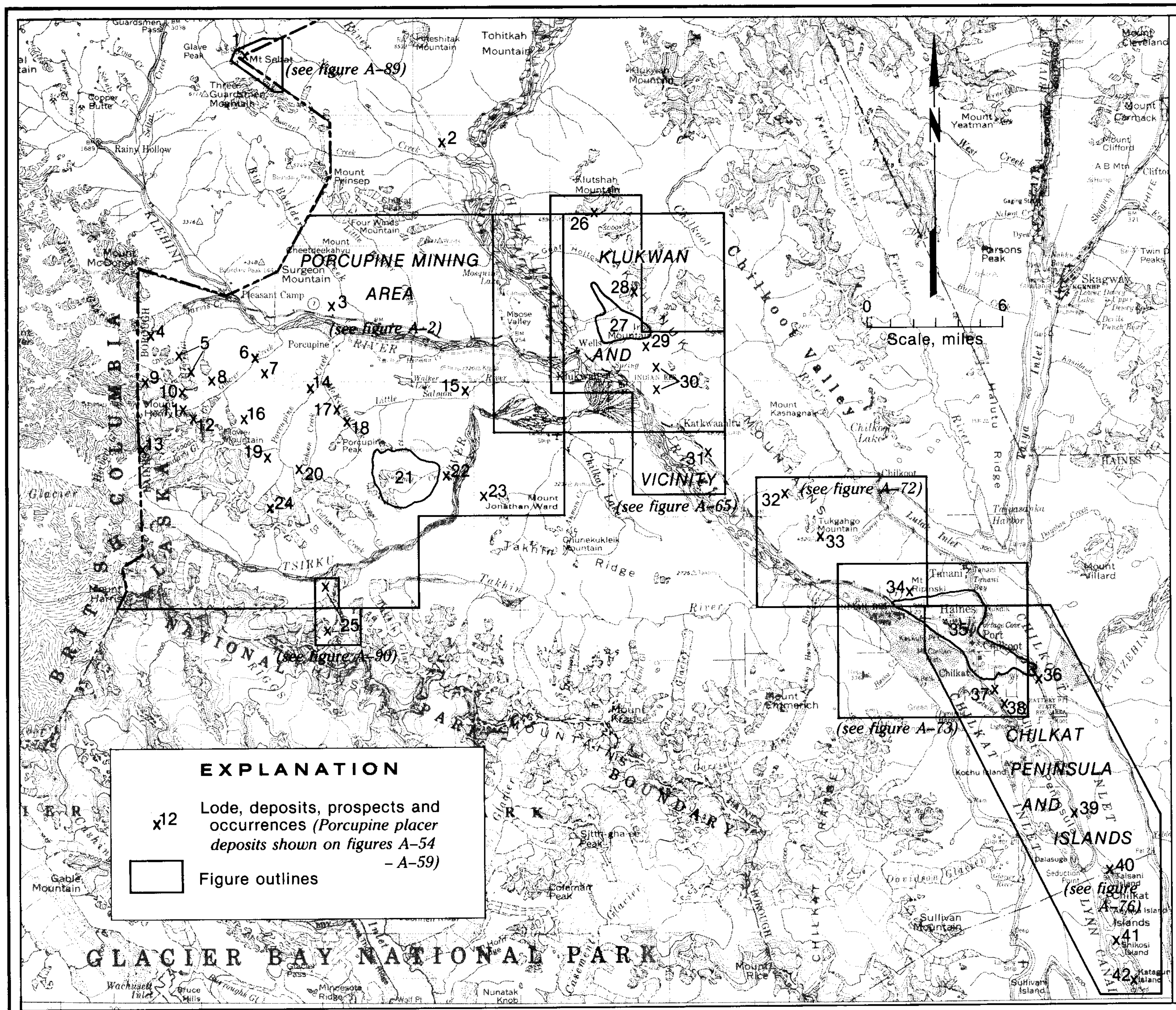
PORCUPINE MINING AREA

LAND STATUS

The Porcupine mining area is made up of Federal, State, and private land. Figure A-2 shows the area and figure outlines. Figure A-3 shows its land status. State and private land occupies most of the Klehini and Chilkat River valleys. About one-third of the State land is part of the Chilkat Eagle Preserve, which is closed to mining by State law. The remainder of the State land is open to exploration and development under State law. The remainder of the area is Federal land administered by the Bureau of Land Management and open to exploration and development under the Mining Law of 1872.

MINING CLAIMS

In the Porcupine mining area, 688 mining claims were active sometime during 1983-1987. About 78% of these are lode claims; the remainder are placer claims. Most of the placer claims are located along Porcupine, Cahoon, McKinley, Nugget, and Cottonwood Creeks. Most of the area's lode claims are located between the British Columbia—Alaska Border and Porcupine Creek. Figure A-4 shows the location of claims active between 1983 and 1987 in the Porcupine mining area, and table A-1 contains information relating to these claims.



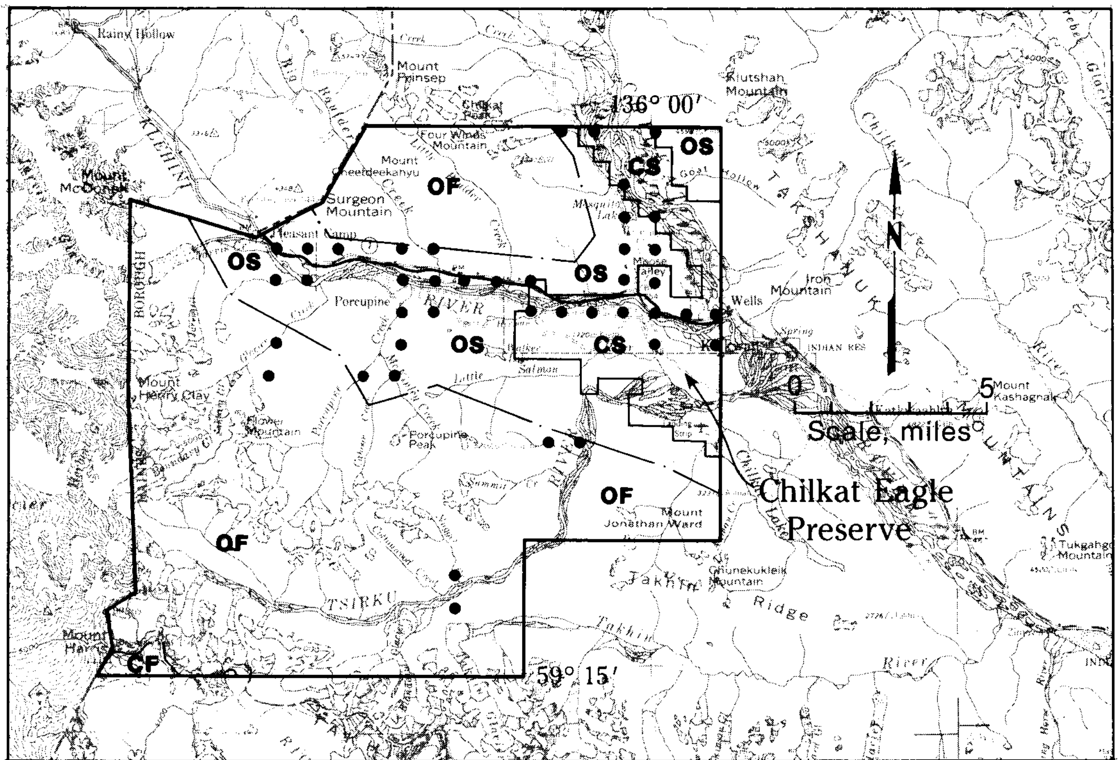
Deposits, prospects and occurrences.

1. Mount Seltat occurrence................Zn, Cu, Pb, Ag (Au, W)
2. Iron Bridge prospect................................Cu, (Au)
3. Big Boulder Quartz Ledge prospect..........Au, (Ag, Pb, Sb, Bi)
4. Jarvis Glacier Gulches prospect......Zn, Cu, Ag, (Co, Au, Ba, Sn)
5. Little Jarvis Glacier prospect............Zn, Pb, Ag, (Au, Ba, Cu)
6. Glacier Creek prospect.......................Au, Ag, (Cu, Pb)
7. Wolf Den prospect...........................Au, Ag (Zn, Pb)
8. Main deposit.....................Zn, Ag, Pb, Ba, (Au, Cu, As)
9. Mount Henry Clay prospect..........Zn, Ag, Cu, Pb, Ba, (Au, Sb)
10. Hanging Glacier prospect..............Ag, Zn, Pb, Ba, (Cu, Au)
11. Cap prospect........................Ag, Ba, (Zn, Pb, Au, As)
12. Nunatak prospect..................Ag, Zn, Pb, Ba (Cu, Au, As)
13. Boundary occurrence.....................Ba, Cu (Zn, Co, As)
14. Annex No. 1 prospect.........................Au (Ag, As, Sb)
15. Merrill's Silver prospect.......................Ag, Zn, Pb (Au)
16. Shannon prospect...........................Au (Ag, Cu, Zn, Co)
17. McKinley Creek Falls prospect.............Au, Zn (Ag, Co, As)
18. Golden Eagle prospect.................Au (Ag, Zn, As, Sn, Sb)
19. Clair Bear prospect.............Cu, Co, Ag, (Sb, Au, Bi, Sn, Ni)
20. Porcupine roof pendant occurrence................Au, Ag (Cu)
21. Summit Creek zinc occurrence........Zn (Ag, Au, Pb, Sn, As, Bi)
22. Lost Silver Ledge prospect........Ag, Zn, Pb, Au,(Sb, Cu, Sn, As)
23. Tsirku Silver occurrence...................Ag, Zn, Pb (Au, Cu)
24. Quartz Swarm prospect................Au (As, Zn, Sb, Sn, Ba)
25. Le Blondeau skarn and vein occurrences...Fe, Cu, Au, Ag, Pb, Zn
26. Goat Hollow North occurrence..........................Cu, Au
27. Klukwan deposit......................Fe, Ti, V, Pt, Pd, Au, Cu
28. Goat Hollow occurrence...............................Cu, Au
29. 20 mile ridge occurrence.......................Cu, Au, Pt, Pd
30. 19 mile ridge occurrence.............................Cu, Au
31. 15 - 16 mile Haines Highway occurrences.........Au, Ag, Cu, Zn
32. 12 mile Au, Cu occurrence............................Au, Cu
33. Chilly occurrence...........................Au, Cu, (Mo)
34. Mount Ripinski occurrence..............................Au,Cu
35. Haines mafic/ultramafic complex occurrence....Fe, Ti, Pt, Pd, Cu
36. Battery Point occurrence..............................Au, Cu
37. Road Cut prospect..........................Au, Ag, Cu (As)
38. Road Cut II prospect..........................Cu, Zn, Au, Ag
39. Zinc Beach occurrence.....................Au, Ag, Zn, Cu, Pb
40. Talsani Island jadeite occurrence.........................(Cu)
41. Shikosi Island prospect...........................Cu, Zn, Au
42. Islands copper occurrence.............Cu, Zn, Au, Ag (Pb, Cu)

Principal commodities listed with other elements in parentheses

Base modified from USGS quadrangle Skagway, 1:250,000

Figure A-1. — Haines-Klukwan-Porcupine subarea showing locations of study areas, occurrences, and figure outlines.



EXPLANATION

OF	Federal land open to exploration and development under the Mining Law of 1872 (as amended).
OS	State land open to exploration and development under State Statute, Sections 38.05.185-280.
CF	Federal land closed to mining by Federal Law.
CS	State land closed to mining by State Law.
●	A section of land containing at least one parcel of private land including Native allotments, patented, mining claims, homesteads, etc.
——	State highway right-of-way.

Base modified from USGS quadrangle Skagway, 1:250,000

Figure A-3.—Porcupine mining area land status map.

Table A-1.—Active mining claims in the Porcupine mining area, 1983-1987 (shown on Figure A-4)

Map No	Claim name	Lode/ Placer	Active during 1987	Remarks
1	FOEE 1-5	Lode	Yes	Located 1986. 2Tolls Lode No Assessment work done in 1984.
3	Candy	Lode	No	Located in 1984.
4	Marmot 46	Lode	No	Abandoned 11-20-85.
5	Big Boulder	Lode?	Yes	Located in 1985.
6	Marmot 40	Lode	No	Abandoned 11-20-85.
7	Jasper	Placer	Yes	Located in 1985.
	Marmot 1-3	Lode ?	No	Located in 1983
8	Jarvis 1-8	Lode	Yes	Assessment work done in 1984 and 1987.
9	Fey 1-20	Lode	Yes	Assessment work done in 1985. Assessment work done in 1987.
10	Sourdough	Placer	Yes	Located in 1985 & 1986.
11	Gunnysack 1-2	Placer	No	No assessment work since 1983.
12	Standard Placer Group (MS 1541)	Placer	?	Patent issued 11-18-30. Relocated in 1980 reported in BLM 1986 readout.
13	Alaska Sunshine 1-4	Placer	Yes	Assessment work reported 1985 and BLM readout on claims 1-3.
	B Channel	Placer	Yes	Located 1986. Same location as site #13. Could be a relocation.
14	Jim Nail	Placer	Yes	Void BLM decision 4-20-86—active. Status reported BLM readout of 1986.
15	MS 571	?	?	Owned by State of Alaska.
16	J D S 3	Placer	No	Void by BLM 4-24-84. Assessment work reported in 1986.
17	J D S 2	Placer	No	Void by BLM 4-24- 84—Assessment work reported 1986 BLM readout.
18	Arcadian	Placer?	Yes	Located in 1986.
19	Lucky	Placer	No	Located 1984—not reported in 1986 BLM readout.
	CLAIMS NOT PLOTTED BUT LOCATED IN 29S, 54E S 28 WE 1 and 2	Placer	Yes	WE 2 void by BLM 6-11-84—Both claims abandoned reported by BLM. 1986 readout. Assessment work reported during 1987.
	FE 1 and 2	Placer	No	FE 2 void by BLM 3-19-84—Both claims abandoned in 1986 readout.
19	Black Bear 1 and 2	Placer	Yes	Black Bear 1 located 1984. Assessment Work reported in 1985 on Black Bear 2. Both claims abandoned in 1986 BLM readout. Assessment work reported in 1987.
	C Channel 1 and 2	Placer	No	Voided by BLM 6-11-84.
20	Hot Dawg 1-28	Lode	Yes	Assessment work in 1985 and 1987. Hot Dawg 28 was located between 1986 and 1987.
21	Marmot Claim Group	Lode	Yes	Assessment work reported in 1985 and 1987.
	NOT PLOTTED BUT LOCATED IN THE HOT DAWG AND MARMOT CLAIM GROUP			
	Rat Dawg	Lode	No	Abandoned by Anaconda (no date). Relocated by S W Minerals. Assessment work reported for Rat Dawg 43-44, 53-58, 64-68, 75-77, and 85-87.
22	Mineral Survey 896	Lode	No	State of Alaska.
23	M Palmer	Placer	No	Abandoned reported in BLM 1986 readout.
24	V Palmer	Placer	No	Abandoned reported in BLM 1986 readout.
25	Wolf Den	Lode	Yes	Located 1987.
26	Mineral Surveys			
	MS 574 Discovery	Placer	No	Voided by BLM 8-9-84. State of Alaska (owner).
	MS 627 Chief Placer	Placer	Yes	Assessment work reported in 1985-1987. Patent cancelled 5-11-08.
	MS 636 Mix Claim	Placer	No	Voided by BLM 4-28-84. State of Alaska (owner).
	MS 639 TP#1	Placer	No	Voided by BLM 3-27-84. State of Alaska (owner).
	MS 897 Lucky Joe	Placer	No	State of Alaska (owner).
	MS 573 Hanson	?	?	No Patent.
27	Nugget Bench 1 and 2	Placer	No	Assessment work reported in 1983.
28	KIC 1-16	Lode	Yes	Assessment work reported in 1985. Assessment work reported in 1987.

Table A-1.—Active mining claims in the Porcupine mining area, 1983-1987—Continued

Map No	Claim name	Lode/ Placer	Active during 1987	Remarks
29	Connexion 1–31	Lode	No	Located in 1984. Intent to hold from BLM 1986. Assessment work reported in 1987.
30	ICE 34–97	Lode	Yes	Assessment work reported in 1985. Assessment work reported in 1987 on Ice 43–51, 54–57, and 60–70.
	DS 19,21–38	Lode	Yes	Assessment work reported in 1985 & 86. Location 29S, 54E, Sec. 2 and 3.
	4S 1 and 2	Placer	No	Abandoned in 1986. Location 29S, 54E, Sec. 2.
	Jenny	Placer	No	No assessment reported since location (1982).
31	Shannon 1–2	Lode	Yes	Located in 1987.
32	Snow Lion	Placer & Lode	Yes	Assessment work reported 1985. Placer closed. No conveyance, but 3 Lode claim. Intent to hold BLM read out (1986). Assessment work reported in 1986 for claims 1–7. Claims 7–9 located.
33	Porcupine 1	Placer	Yes	Assessment work reported in 1985 & 87. Not listed in the BLM 1986 readout.
34	McKinley Falls	Placer	Yes	Assessment work reported in 1985 & 87. Not listed in the BLM 1986 readout.
35	McKinley #1	Placer	Yes	Assessment work reported in 1985 & 87. Not listed in the BLM 1986 readout.
36	McKinley #2	Placer	Yes	Assessment work reported in 1985 & 87. Not listed in the BLM 1986 readout.
	Mac 1–4	Placer	No	Voided by BLM 2–27–84.
37	Whipped #1	Placer	Yes	Located 1985. Not listed in the BLM 1986 readout.
38	Grey Beard 1–4	Placer	Yes	Assessment work reported in 1985. Not listed in the BLM 1986 readout. Assessment work reported in 1986.
39	Phones 1–2	Placer	Yes	Assessment work reported in 1985. Not listed in the BLM 1986 readout. Assessment work reported in 1987.
40	Warner 1–2	Placer	Yes	Assessment work reported in 1985. Not listed in the BLM 1986 readout.
41	Clay 17–60	Lode	Yes	Assessment work reported in 1985. Assessment work reported in 1987.
42	M–C	Placer ?	Yes	Located in 1986.
43	Marmot 20–23	Lode	Yes	Assessment work reported in 1985.
44	Sally 3–7, 19, 24, 25	Placer	Yes	Assessment work reported in 1986 on 7, 1–4, 10, 26–27, 35–40. No location maps for 1–2, 10, 35–43. BLM 1986 readout listed assessment work only on claims 5–7.
	Cahoon 1–9	Placer	Yes	Assessment work reported in 1985–87. Location 29S, 54E, Sec. 1, 11, 12.
45	Gaunche 1 and 2	Placer	Yes	Located in 1985. Listed in BLM readout. Assessment work reported in 1986.
46	B & F	Placer	Yes	Located in 1985. Listed in BLM 1986 readout. Assessment work reported in 1987.
47	Golden Eagle 1–7	Lode	Yes	Assessment work reported in 1985–1987.
	Skookum 1–3	Placer	Yes	Assessment work reported in 1985–1987.
48	Bonanza 1–9	Placer/ Lode	Yes	Assessment work reported in 1985–1987. Bonanza 1–6 (placer) and Bonanza 7–9 (lode). Assessment work reported in 1986 on PW Assoc 1–5, 16–17, 10–12, 5–9, and 12–17.
49	PW Assoc. 1–11	Placer	Yes	Located in 1985. Listed in BLM readout as PW 5–9 and 12–17.
50	Boundless 1–45	Lode	Yes	Assessment work reported in 1985. Assessment work reported in 1987.
51	Lobo 1–3	Placer	Yes	Assessment work reported in 1985 & 86. The BLM 1986 readout listed the claims as lode.
52	Lobo 4	Placer	Yes	Assessment work reported in 1985 & 86. The BLM 1986 readout listed this claim as lode.
	Lee 1 and 3	Placer	Yes	Assessment work reported in 1985 & 86. Location 29S, 54E, Sec. 16.

Table A-1.—Active mining claims in the Porcupine mining area, 1983–1987—Continued

Map No	Claim name	Lode/ Placer	Active during 1987	Remarks
53	Sally 15–24	Lode	Yes	Assessment work reported in 1985.
54	Delta Minerals 21–28	Placer	Yes	Assessment work reported in 1985 and 1987.
55	Delta Minerals 201–4	Lode	No	Located in 1980, No record of assessment work was found.
	Betty Jean 1 and 2	Lode	No	Abandoned 9–19–85.
56	Misreport 1–10	Lode	Yes	Located in 1985.
57	Sally 25–31	Placer	No	Located in 1974. No record of assessment work was found.
58	Billy Goat 1–3, Discovery	Lode	Yes	Located in 1987.
59	Twin Glacier 1–7	Lode	Yes	Assessment work reported in 1985.
60	Mer 1–11	Lode	No	Located in 1983 with no record of assessment work.
61	Little Cottonwood 1–5	Placer	Yes	Assessment work reported in 1985 and claims 3–5.
62	Big Cottonwood	Placer	Yes	Assessment work reported in 1985.
63	Nugget Placer MS 1564	Placer	Yes	Patented claim. Bassford 1/4 owner and Chisel 3/4 owner (kardex file). BLM 1985 readout listed Bassford and DeBlondeaue as owners.
64	Chicken Bullion 1–5	Placer	Yes	Assessment work reported in 1985 and 1987.
	Chicken Bullion 6	Placer	yes	1987 Location.
65	Old Nugget 1–4	Placer	yes	Assessment work reported in 1985.
	Big Salmon 1–2	Placer	No	Abandoned in 9–20–85.
66	KATI, Pogo, & Sweet Thing 1–2	Placer	Yes	Located in 1987.

PREVIOUS WORK

Reported mining interest in the Porcupine mining area began in 1898 with the discovery of gold placers along Porcupine Creek (*A–12*). Shortly thereafter, gold placers were discovered along Glacier Creek and other creeks in the area. From 1898 to 1969 geologic mapping and prospecting in the vicinity centered on the Porcupine placers. Attempts were made by early prospectors to find a lode source for the Porcupine placers, and during the early 1930's a local prospector discovered the Lost Silver Ledge Mine near Summit Creek (*A–38*). During the early 1980's, Jim McLaughlin discovered the Golden Eagle Lode prospect on McKinley Creek.

The first reported occurrences of massive sulfide deposits within the Porcupine mining area were the 1969 and 1971 discoveries by prospector Merrill Palmer of Haines, Alaska (*A–42*). From 1969 to 1971 E.M. MacKevett of the USGS mapped the geology of the Skagway B–3 and B–4 quadrangles and briefly examined the Glacier Creek occurrences (*A–35*, *A–36*). Phil Holdsworth, mining consultant, examined the Glacier Creek prospects in 1977 (*A–31*), as did Inspiration Development Company in 1979, and Anaconda Copper Corporation in 1980. Anaconda drilled three holes, one of which intersected the Main Deposit. In 1981, B. Peterson of Coronado Mining Corporation mapped the Main Deposit in detail (*A–43*).

PRESENT STUDY

During 1983–1986 ADGGS and Bureau personnel mapped the geology of the Porcupine mining area, examined, mapped and sampled the lode and placer deposits, and conducted geochemical studies (*A–24*, *A–27*, *A–30*, *A–45*, *A–54*, *A–56*, *A–57*, *A–58*). Kennecott Exploration participated in the mapping of the regional geology (*A–50*).

GEOLOGIC SETTING

The Porcupine mining area geology is shown in Figure A–5. The area is underlain by three metamorphic bedrock rock groups (*A–27*, *A–45*). The oldest group occurs in the northeast part of the area and is informally designated the Four Winds Complex. This area of the Complex consists of a lower amphibolite unit overlain by a unit of discontinuously intercalated phyllite, felsic schist, mafic schist, chert, and marble. North of the Klehini River metamorphic grade increases to the northeast from greenschist to amphibolite facies. The Four Winds Complex is truncated on the northeast by the Chilkat fault, which transects isograds so that rocks of the garnet-amphibolite facies occur to the north but not south of the Klehini River. The protolith age of the Four Winds complex is presumed to be older than overlying Mississippian-Devonian rocks.

Overlying the Four Winds complex are the Porcupine slate and Porcupine marble. Most of the central part of the Porcupine mining area is underlain by tightly folded, commonly limonite-stained, black slate, and dark-gray phyllite with subordinate black argillite and banded siltstone. Locally the unit contains sheared, recrystallized, medium-gray bioclastic limestone and marble. Where thick, the marble can be mapped separately (Porcupine marble.) Near the mouth of Porcupine Creek, the Porcupine marble contains Devonian-Mississippian fossils.

The Glacier Creek volcanics overlie and interfinger with the Porcupine slate. The unit is composed of massive to slightly schistose flows of basalt and basaltic andesite, which also locally occur in dikes. Slate, chert, and argillaceous marble form important but subordinate intervals. The lower part of the Glacier Creek volcanics is likely Devonian in age (*A-22*), whereas the upper part of the unit is, in part, Triassic in age (*A-21*).

South of the Tsirku River, the Glacier Creek volcanics pinch out into two units: a lower unit of thin bedded argillaceous marble, overlain by a unit composed of thin bedded chert, argillite, and marble.

The older metamorphic units in the Porcupine mining area are cut by Cretaceous granodiorite and diorite (*A-27, A-45*). These plutonic rocks, and associated dikes, are particularly abundant at the head of Porcupine Creek. In the northeast corner of the Porcupine mining area the highest-grade part of the Four Winds Complex contains intermediate orthogneiss, with subordinate amphibolite, pelitic schist, and paragneiss. Orthogneiss appears to be a late-kinematic hornblende-biotite granodioritic intrusion or partially recrystallized plutonic granitic rocks.

Pre-Cretaceous metamorphic rocks of the Porcupine mining area exhibit the effects of regional dynothermal metamorphism and large-scale folding. Most rocks display phyllitic foliation, schistosity, or gneissic foliation and scattered microscopic to outcrop-scale isoclinal folds from an early deformational event. Overprinted on the older metamorphic structures are large, tight folds with axes that trend 300° to 315° and plunge steeply to the northwest (*A-27, A-45*).

Gilbert reports that the Chilkat fault segment of the Denali fault system trends northwest along the Chilkat River, just north of the Porcupine mining area, and juxtaposes the Taku terrane, on the northeast, against the Craig subterrane of the Alexander terrane, to the southwest (*A-6*). However, based on newer information, Brew and Karl[4] indicate that the Taku terrane may not extend into the JMD (*A-9*). West of the Chilkat fault, concealed major faults are also probably responsible for geologic discontinuities across the Tsirku and Klehini River valleys.

[4] New fossil data for the west side of the Chilkat Peninsula indicates a Cretaceous age instead of the Triassic age originally reported.

LODE DEPOSITS, PROSPECTS, AND OCCURRENCES

Volcanic-Associated Massive Sulfide

Introduction

There are eight volcanic-associated prospects or occurrences in the Triassic Glacier Creek sequence (fig. A-5, locs. C, E, F, G, H, I, J, and P). These are located 4 to 8 miles southwest of the Pleasant Camp border station on the Haines Highway. These deposits were discovered between 1959 and 1983 by local prospector Merrill Palmer (*A-42*).

The Glacier Creek sequence consists predominantly of northwesterly striking basalts that locally show pillow structure, and flows and tuffs with minor sedimentary rocks, which have undergone greenschist facies metamorphism. Mineralized zones hosted in these rocks are characterized by lenses of iron-stained quartz sericite schist, chloritic phyllite, tuff hydrothermally altered volcanic rocks, and some metasedimentary rocks. These lenses may be many hundreds of feet thick and may be many thousands of feet long. According to studies by Forbes, the quartz sericite schists were derived from impure cherts with a clay component (*A-24*). Within the mineralized zone are stratiform barite lenses that are known to be up to 800 feet long and up to 70 feet thick. These lenses contain interspersed sulfides that consist of varying amounts of sphalerite, pyrite, chalcopyrite, and galena. According to studies by Forbes, the volcanic rock hosting these deposits were emplaced in an island arc, back-arc, or shelf environment, and these are submarine exhalative volcanic massive sulfide deposits (*A-24*).

Also included in this sequence is a slate-hosted zinc occurrence (fig. A-5, loc. S) that is likely the result of volcanic activity in the area.

Main Deposit

The Main Deposit is exposed between elevations of 4,000 to 5,000 feet on the west side of Glacier Creek (fig. A-5, location F). It was discovered in 1959, and has been optioned and examined by a number of mining companies including Anaconda Copper Corporation, Kennecott Exploration, and Newmont Exploration. Both Anaconda and Newmont drilled this prospect; however, the drilling information was not made available for this report. Bureau work on this deposit consisted of mapping and sampling at selected locations along its 2,000-foot length, and obtaining metallurgical test samples (fig. A-6).

The Main Deposit consists of a sedimentary break in a sequence of basalts that over- and under-lies the deposit for thousands of feet of stratigraphic thickness. Figure A-7 shows the deposit. In places the basalts form a pillow structure, in others they are flows. The deposit strikes from about 300° on the eastern end to about east-west on the western end and dip is steeply northward. It is surrounded by orange-red-yellow-stained rocks that are much more extensive than the mineralized zone itself. These rocks are hydrothermally altered basalts, andesites, and sediments. The mineralized zone itself consists of two lenses composed of barite and interbedded sulfides. The sulfides are predominantly sphalerite, but locally chalcopyrite, galena, or pyrite might predominate. Magnetite was observed at some locations. Figures A-8—A-11 show sections through the deposit.

The westernmost lens averages 15 feet thick over a strike length of 250 feet, while the easternmost lens averages 70 feet thick over a strike length of 800 feet. Samples collected by the Bureau contain up to 9.980 ppm gold, 356.5 ppm silver, 7.8% zinc, 1.8% copper, 7.2% lead, 56.5% barium, 4,000 ppm arsenic, 100 ppm nickel, and 2,000 ppm antimony (analytical results table A-1-1)[5]. Based on an average of 15 composite samples collected by J.A. Robson and C.C. Hawley in 1974, these lenses average 60% barite, 1.73% zinc, and 60 ppm silver. Peterson (*A-43*) estimates the lenses contain about 0.75 million tons of ore based on the inference that the lenses continue at depth for a distance of one-half their strike length and that 9 cubic feet of ore weigh a ton.

A 3,000 pound bulk sample was collected from the deposit by owner ALYU Mining. It assayed 76.4% $BaSO_4$, 3.6% zinc, 0.98% copper, 0.12% lead, and 92

[5] Table numbers following analytical results indicate the Appendix A-1 (A-1-1 to A-1-39) table.

Figure A-6.—Bureau of Mines and Canadian Geological Survey personnel use a fixed rope to safely cross a steep snow slope during a cooperative study of the west end of the Main Deposit (J. Still, photographer).

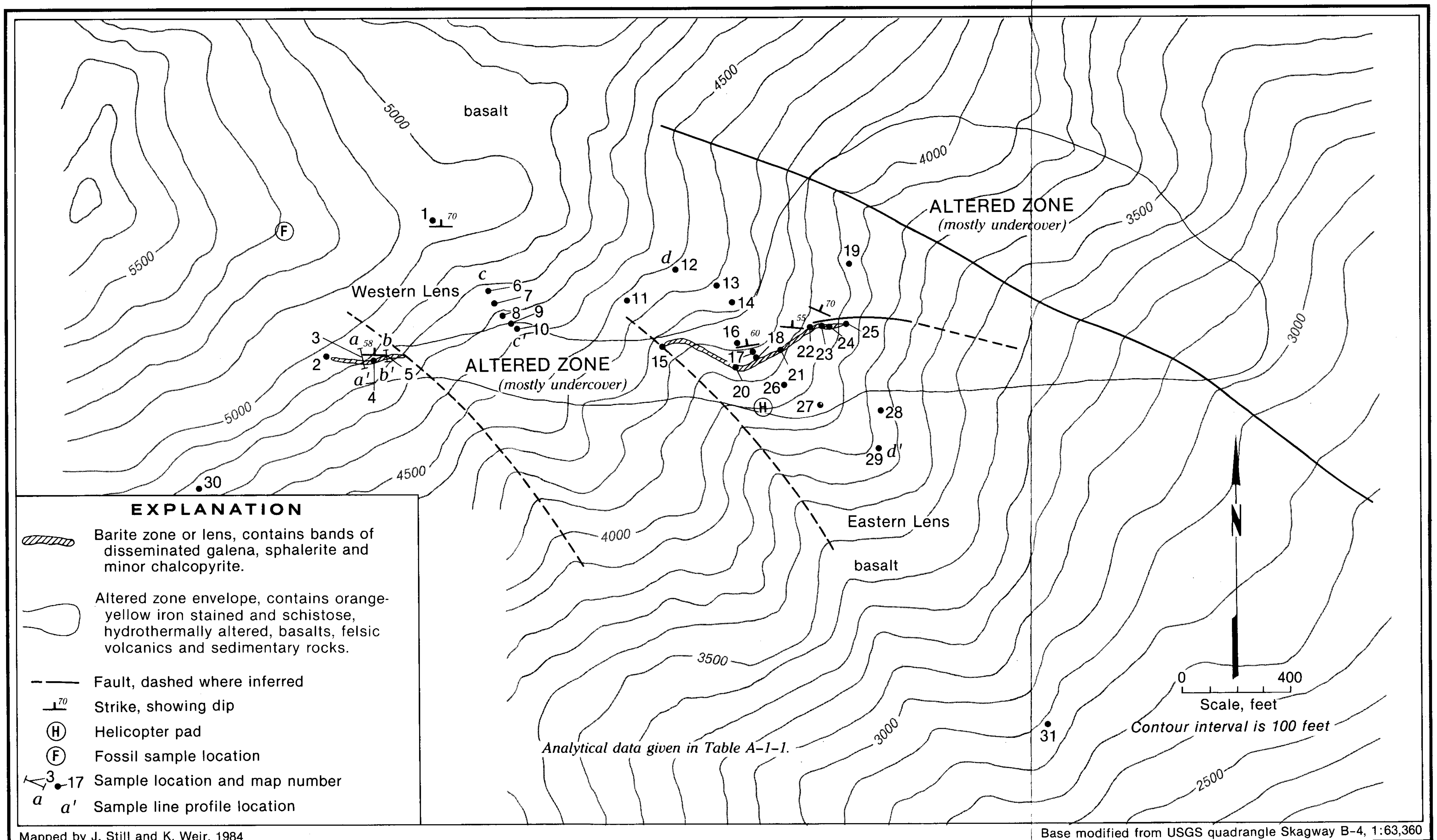


Figure A-7. — Main deposit showing geology, sample location map and cross sections a-a′, b-b′, c-c′ and d-d′.

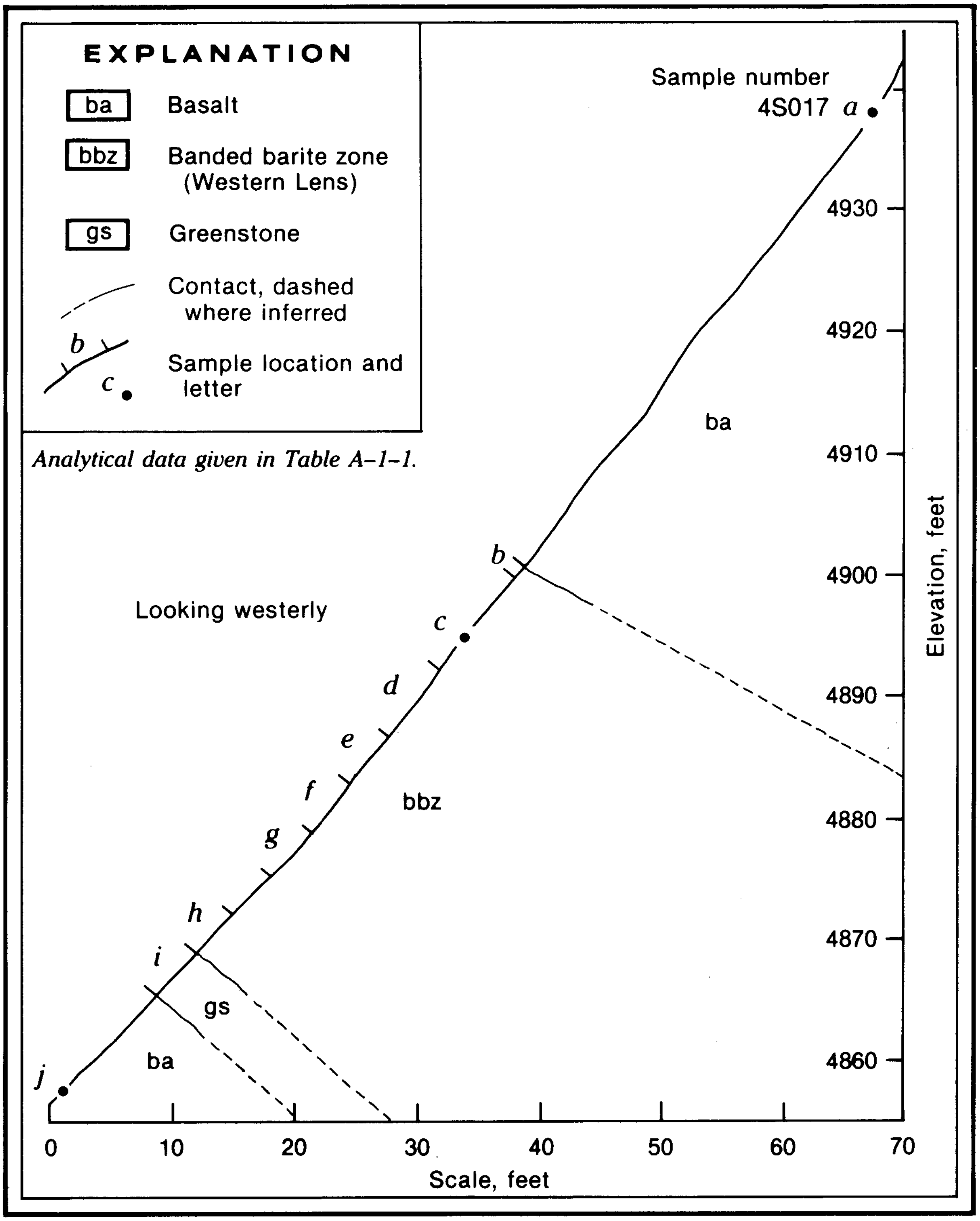


Figure A-8.—Main deposit sample line profile a-a′ (figure A-7, map number 3).

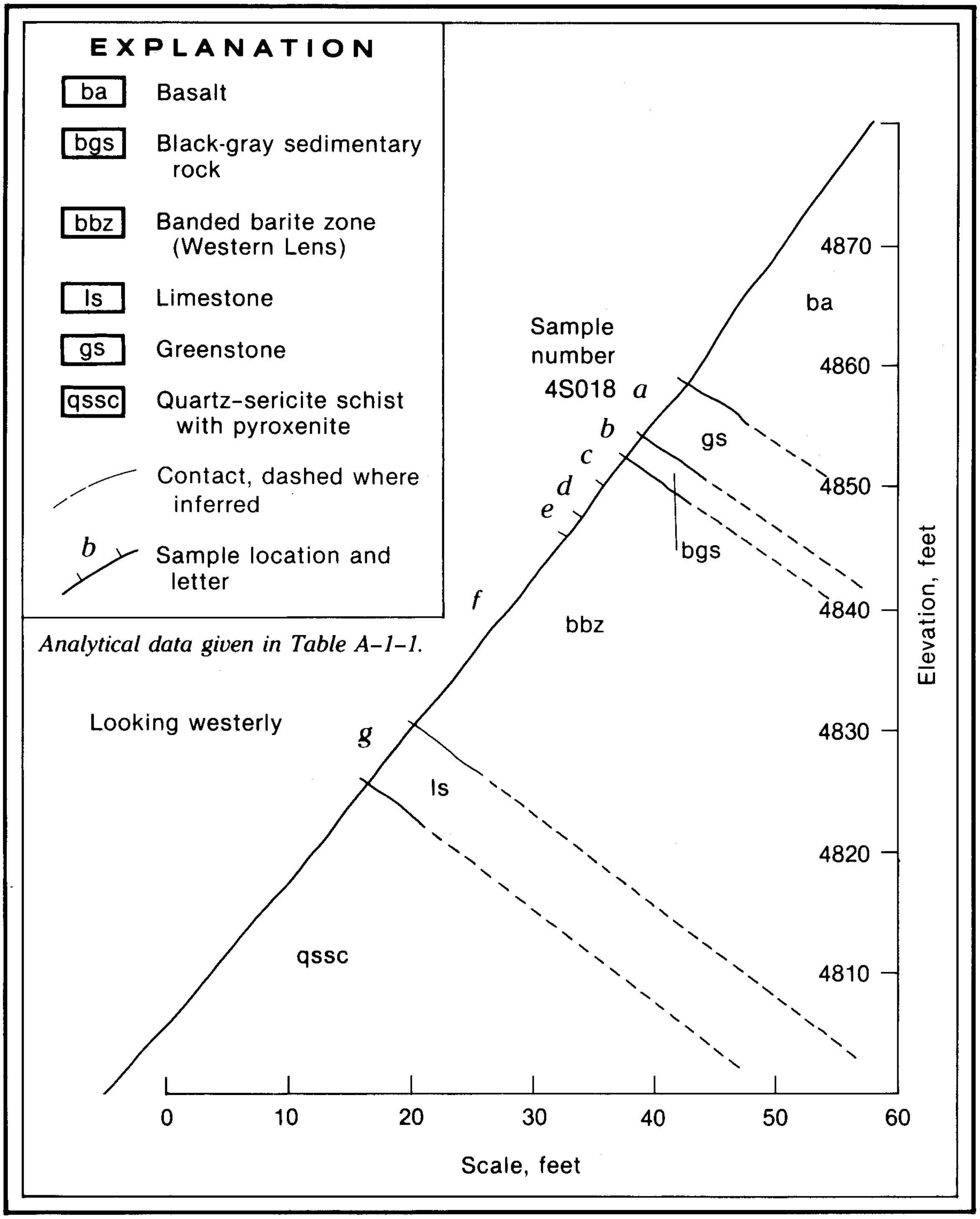


Figure A-9.—Main deposit sample line profile b-b′ (figure A-7, map number 5).

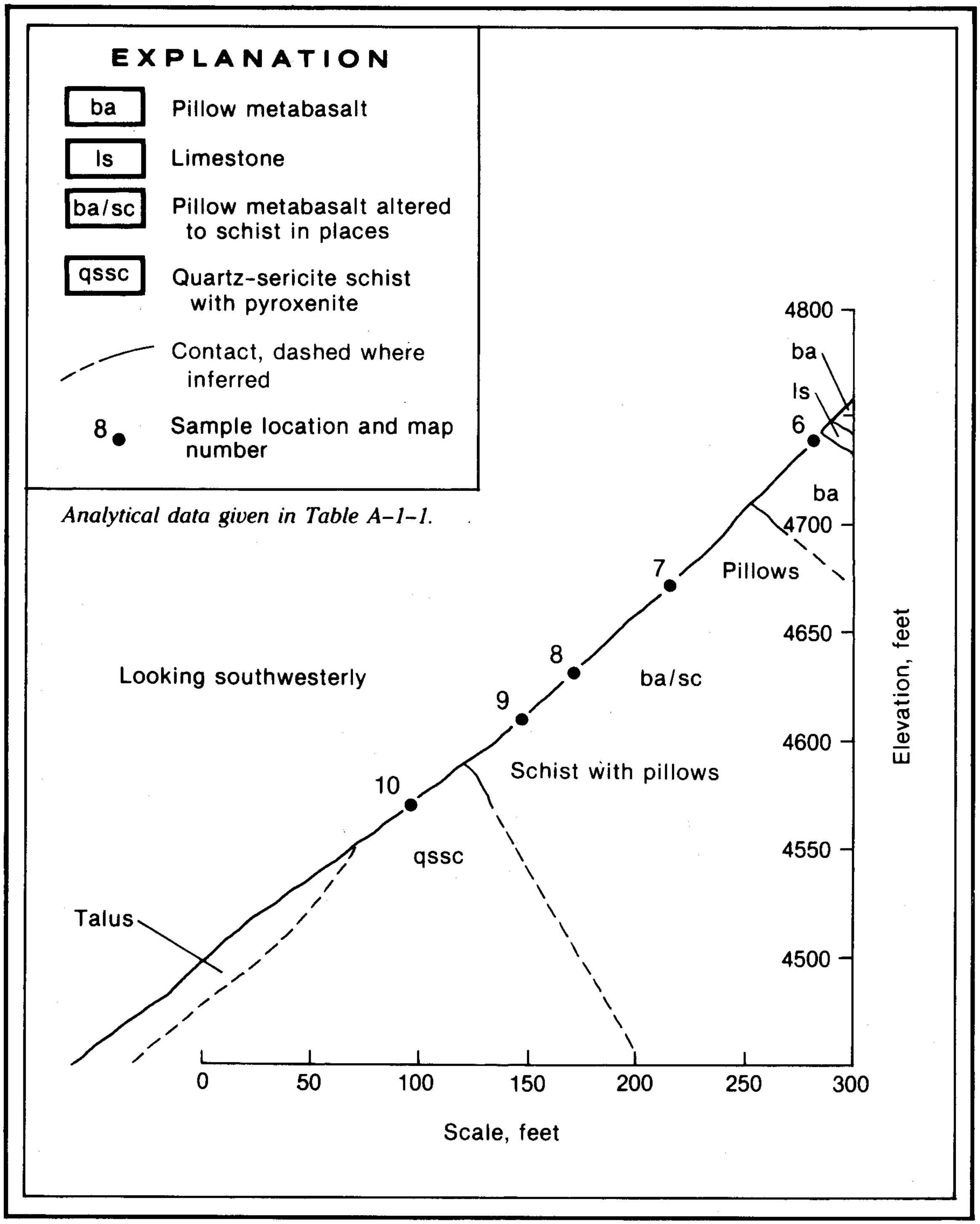


Figure A-10.—Main deposit sample line profile c-c′, located between the Eastern and Western Lenses (see figure A-7, map numbers 6-10).

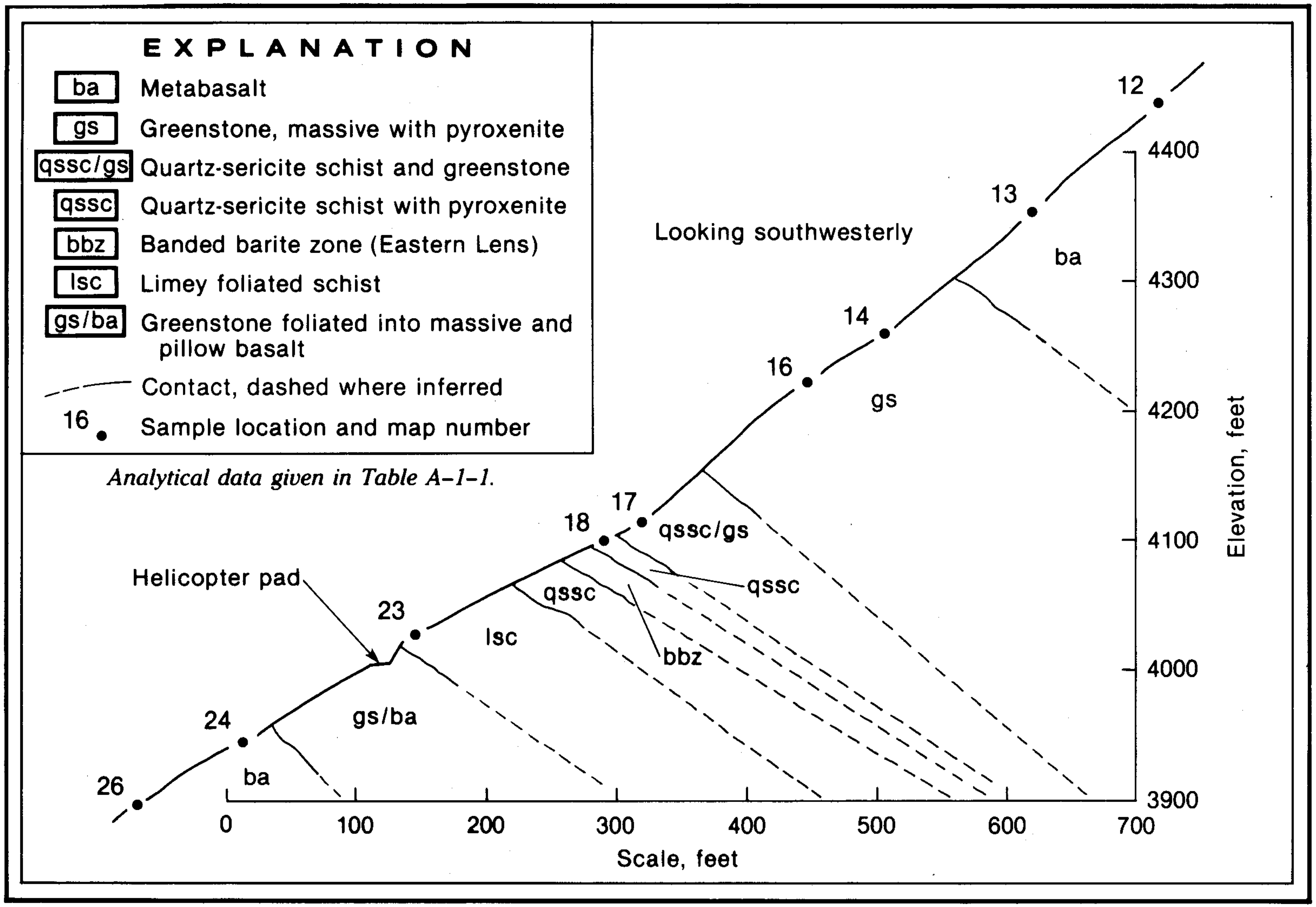


Figure A-11.—Main deposit sample line profile d-d′ (figure A-7, map numbers 12-14, 16-18, 23, 24 and 26.)

ppm silver. Peterson reports that several metallurgical tests were conducted by the Denver Equipment Division of Joy. The most successful involved grinding, flotation of sulfides, and conditioning of the barite (*A-43*):

> "Grinding of the ore to 200 mesh to meet size specifications for the barite product, flotation of the sulfides, followed by conditioning and flotation of the barite, provides a simple flowsheet which yielded recoveries of 93.0% of the barium, 96% of the zinc, and 66% of the silver. Two stages of cleaner flotation produced a cleaned barite concentrate having a specific gravity of 4.40, and indications are that a single stage of cleaning would be adequate.
>
> On the basis that the bulk sulfide concentrate is marketable as produced, little work was done on separation of the various sulfide minerals. The bulk concentrate produced contained about 24% zinc, 5.5% copper, and 11.5 ounces/ton of silver as the principal values. The remainder of the concentrate is primarily pyrite which may carry a significant portion of the silver values. The zinc minerals present are highly activated for flotation due to the presence of copper salts, and indications are that any further separation of the sulfide minerals would be very difficult and would probably involve high losses in the copper and silver values."

The Bureau collected two metallurgical test samples from the eastern barite-sulfide lens (3S118 and 3S258) and one from the western barite-sulfide lens (3S112). Head analysis for these three samples ranged from 43.4% to 56.5% barium, from 0.01% to 0.87% copper, from less than 0.01% to 4.64% zinc, from 0.08% to 4.98% lead, from 0.004 to 0.005 ounce/ton gold, and from 0.36 to 1.02 ounce/ton silver. These results are in approximate agreement with previous results. Details of the metallurgical testing are contained in appendix A-2.

Samples were collected across the mineralized zone at several locations (figs. A-8—A-11). Samples collected of metabasalt, at what appeared to be well out of the mineralized zone, contained significantly elevated zinc and lead values (see fig. A-10, map No. 6 and fig A-11, map No. 12).

The Main Deposit is well-exposed and its surface outcrops have been examined in detail. These lack sufficient grade and tonnage to be considered for economic development. While data on the drilling of the deposit in 1980 by Anaconda Copper Corporation and in 1988 by Newmont Exploration have not been made available for this report, some fragments of that data have been examined by the author. In general, most of the holes were placed outside the mineralized zone and the largest part of the down dip extension of the deposit remains unexplored. Such deposits often show lateral zoning between sulfides and barite.

Mount Henry Clay Prospect

The Mount Henry Clay prospect is located near the Alaska-British Columbia border on the rugged glacier-clad north side of Mount Henry Clay, about 5 miles southwest of the Pleasant Camp border station on the Haines Highway (fig. A-5, loc. G). Figures A-13—A-17 show the prospect geology, sample, and diamond drill hole locations. Table A-1-2 gives the analytical results.

History—Bureau Work

The Mount Henry Clay prospect was discovered in August 1983 by Merrill Palmer. During 1983 Bureau personnel were in the prospect vicinity examining a large area of basalt that had been previously incorrectly mapped as diorite (*A-36*) for massive sulfide deposits. A few days after Palmer's discovery, Bureau personnel mapped and sampled the Mount Henry Clay prospect and collected metallurgical test samples (*A-54*). In 1984 and 1985 Kennecott Exploration optioned the Mount Henry Clay prospect, mapped the area in detail, conducted geophysical surveys and drilled 7 holes totaling 5,661 feet (*A-50*). Not encouraged by the results of their work, Kennecott dropped their option on the property in 1986. In 1987 Newmont optioned the property. Additional work on the prospect has not been reported.

The Mount Henry Clay prospect extends west across the Alaska-British Columbia border. Investigations of the prospect in Canada were initiated by a Bureau crew, where a brief examination was made of the Jan Still Ridge. During 1984, Stryker Resources Ltd. and Freeport Resources Inc. (hereafter referred to as Stryker) mapped and sampled the British Columbia portion of the prospect in detail, discovering in place barite-zinc mineralization and a train of barite-sphalerite boulders at the snout of the hanging glacier. During 1985, Stryker Resources Ltd. drilled 5 holes totalling 2,787 feet (fig. A-16) (*A-50*). Figures A-18—A-20 show personnel working on this prospect.

Prospect Description

Massive sulfide mineralization was not found in place on the Mount Henry Clay prospect; however, sphalerite-barite-pyrite-chalcopyrite-banded massive sulfide boulders, up to 6 feet thick, are found along the terminus of a small hanging glacier (henceforth referred to as hanging glacier) on the north side of Mount Henry Clay for a distance of 4,300 feet. Figure A-13 shows sample locations, while Figures A–14 and A–15 show the distribution of samples containing greater than 20% barium, or 10% zinc, or 34 ppm silver and the gully numbers. Most of these boulders have rounded edges and appear to have been carried underneath the glacier to near their present location. The greatest abundance of massive sulfide boulders was located between gullies 2 and 4 where the largest, highest-grade boulders were also found. Samples collected here indicated most of the sulfide boulders between 1 and 6 feet thick contain from 20% to 44% zinc, about 5% barium, and several percent of copper. A 6-foot chip sample (fig. A–13, No. 27) across the largest boulder found assayed 33% zinc, 2.5% copper, 5% barium, 65 ppm silver, and a trace of gold. Sulfide boulders between gullies 1 and 2, and between gullies 4 and 12 were mostly smaller, lower-grade, and much less abundant. There were a few exceptions, however; higher-grade boulders were found distributed throughout the hanging glacier terminus area. Abundant massive sulfide boulders were found at gully 12, and these were generally higher in barium and lower in zinc than those found between gullies 2 and 4.

Most of the sulfide boulders are crudely banded on a scale of fractions of an inch up to a foot. The bands represent differences in sulfide or sulfate composition from sphalerite to barite to pyrite to chalcopyrite to galena. The predominant sulfide is sphalerite with lesser amounts of the sulfate barite, and the sulfides pyrite, chalcopyrite, and galena. Bornite was observed in thin sections. One boulder (fig. A–13, No. 40) was found with attached host rocks that consisted of chlorite-epidote phyllite (altered andesite.) The remainder of this boulder is silicified with chalcopyrite the predominate sulfide and lesser amounts of barite, pyrite, and sphalerite. Most of the sulfide boulders in the area have unoxidized surfaces and blend in with the greenish gray andesite float exposed in the area.

The focus of work on this prospect by Kennecott Exploration (Alaska portion) and Stryker (British Columbia portion) has been to find the source of the massive sulfide boulders. The immediate prospect area is mostly covered by snow and ice. Bedrock exposures are limited to areas east and west of the hanging glacier and the area between the hanging glacier terminus and the Jarvis Glacier.

Figure A–12.—Bureau of Mines, Bear Creek Mining, and British Columbia Department of Mines and Energy personnel crossing the Mount Henry Clay Glacier in Alaska during a white-out. Rugged terrane, frequent storms, and similar geology strongly favored cooperative work between government agencies and private industry on both sides of the border for safety and information reasons (J. Still, photographer).

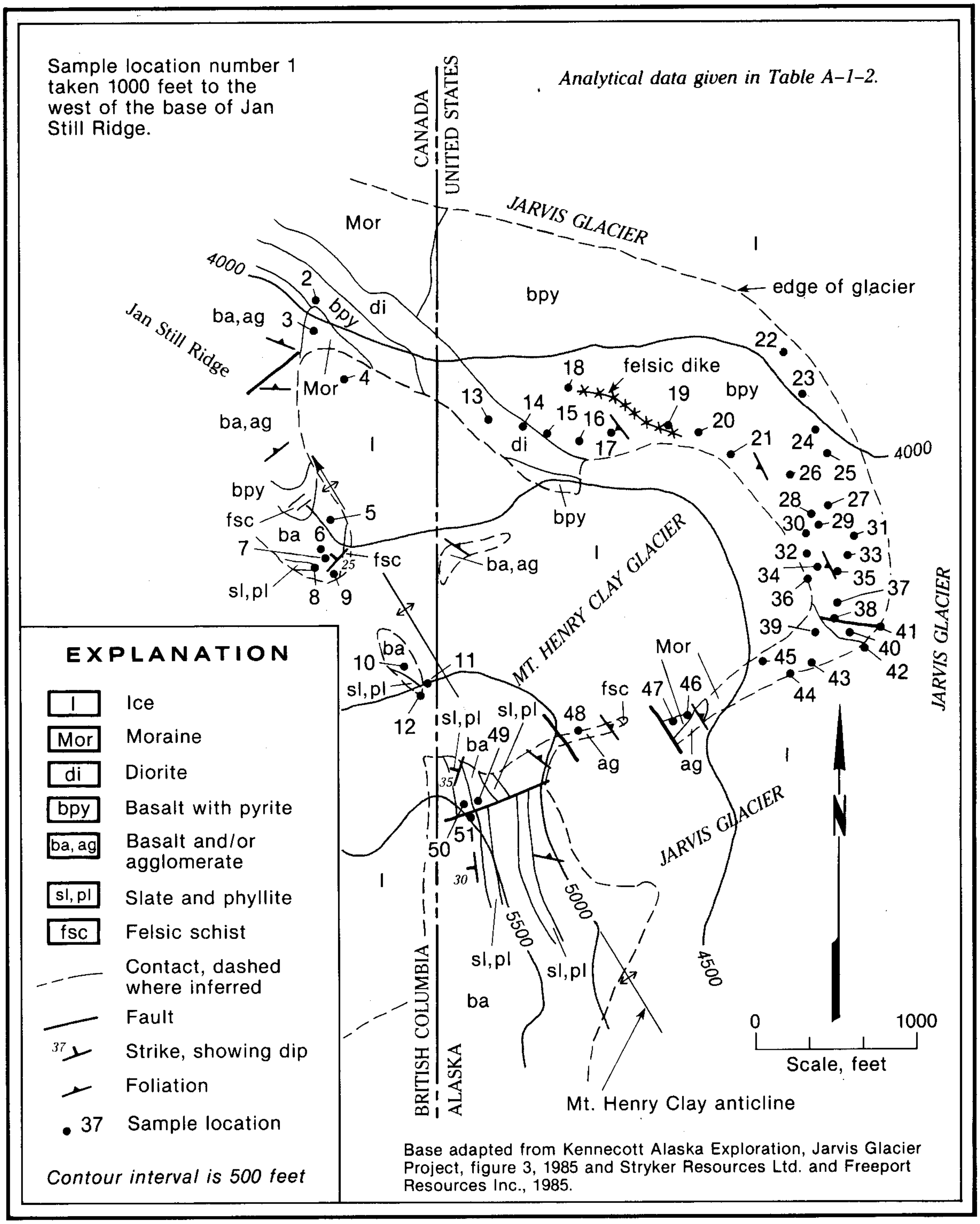


Figure A-13.—Mount Henry Clay prospect sample locations and geology.

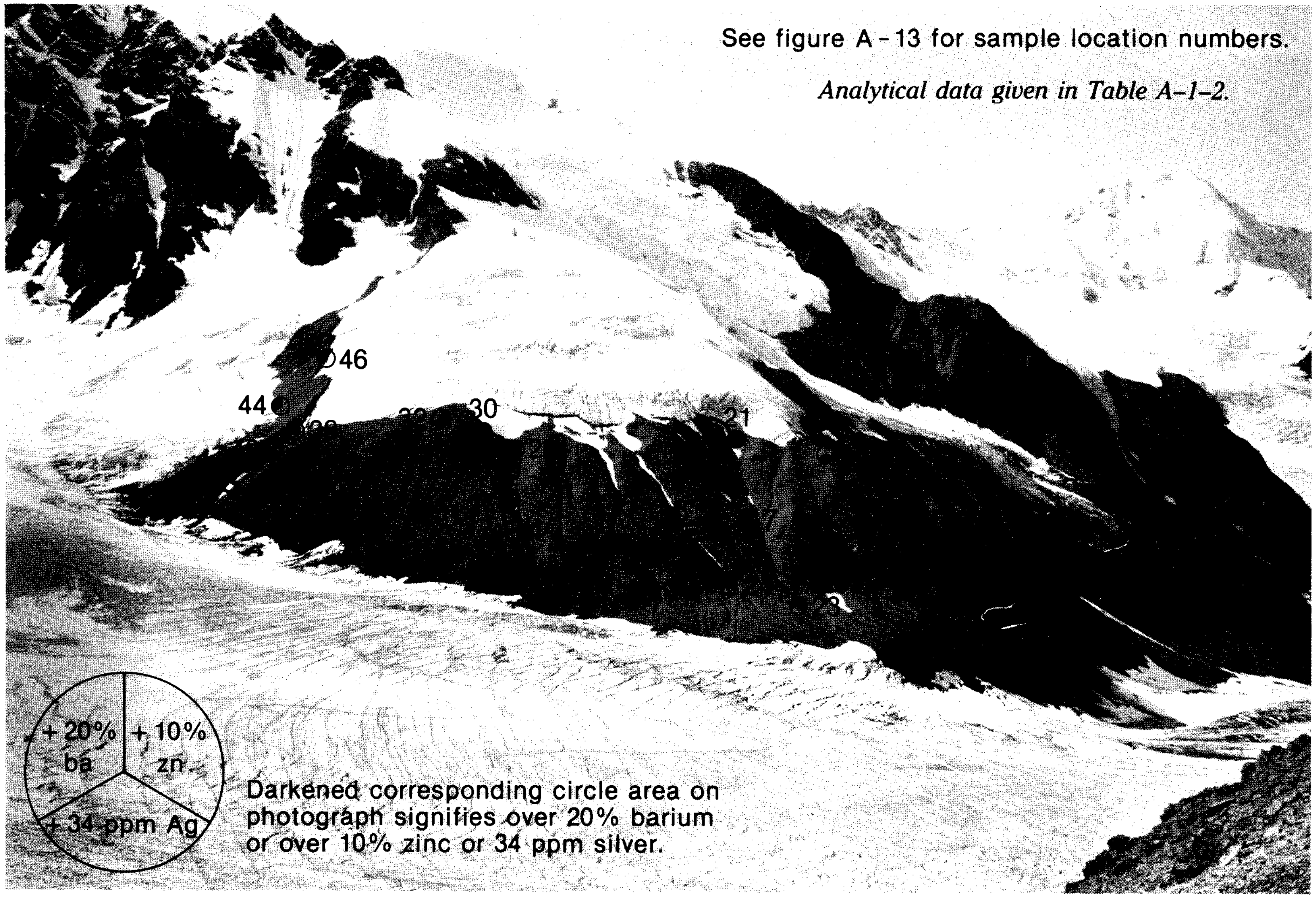


Figure A-14.—Photograph of the eastern portion of the Mount Henry Clay prospect showing high-grade zinc, silver, and barium sample locations and gully number (G1–G9).

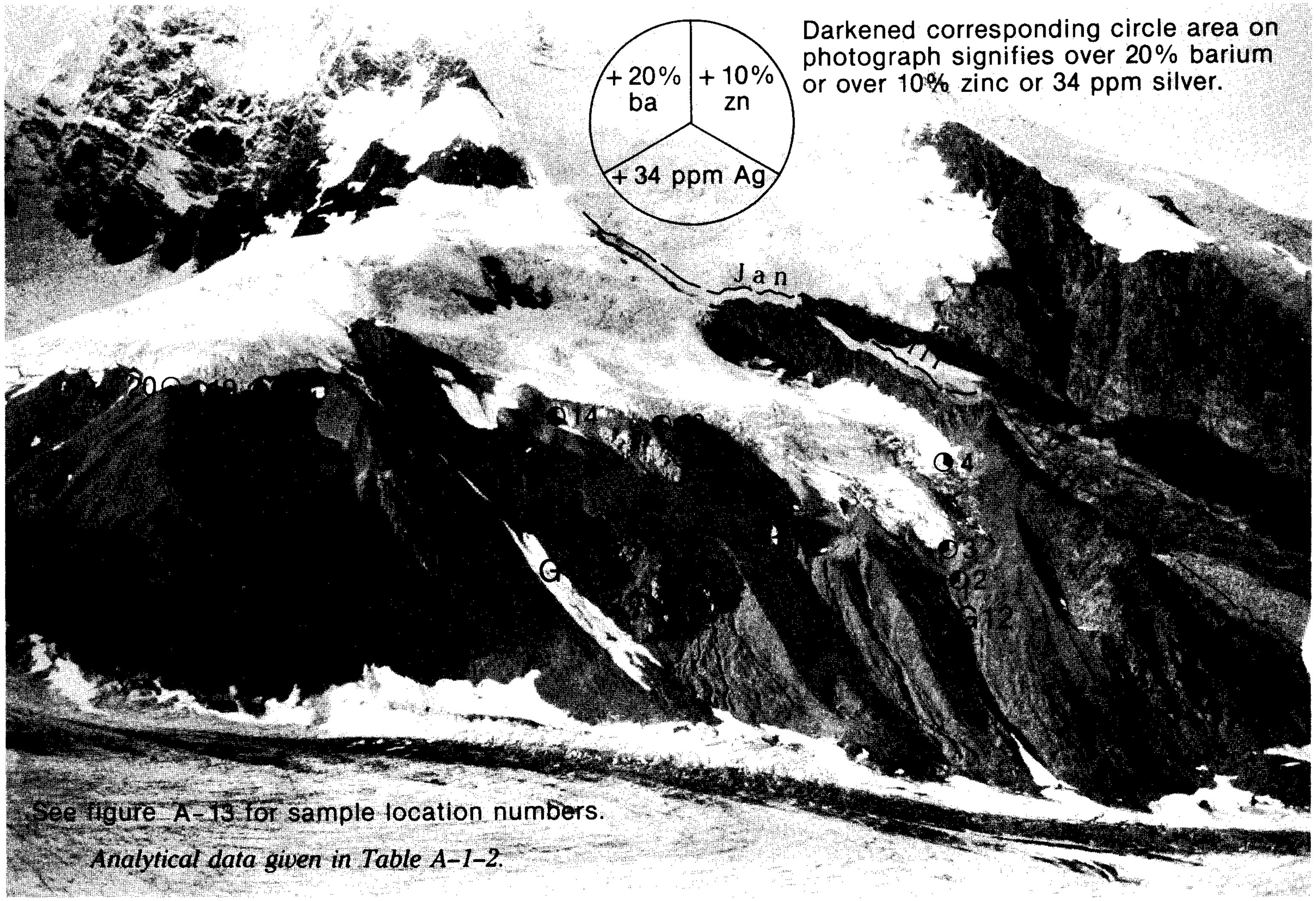


Figure A-15.—Photograph of the western portion of the Mount Henry Clay prospect showing high-grade zinc, silver, and barium sample locations and gully numbers (G8–G12).

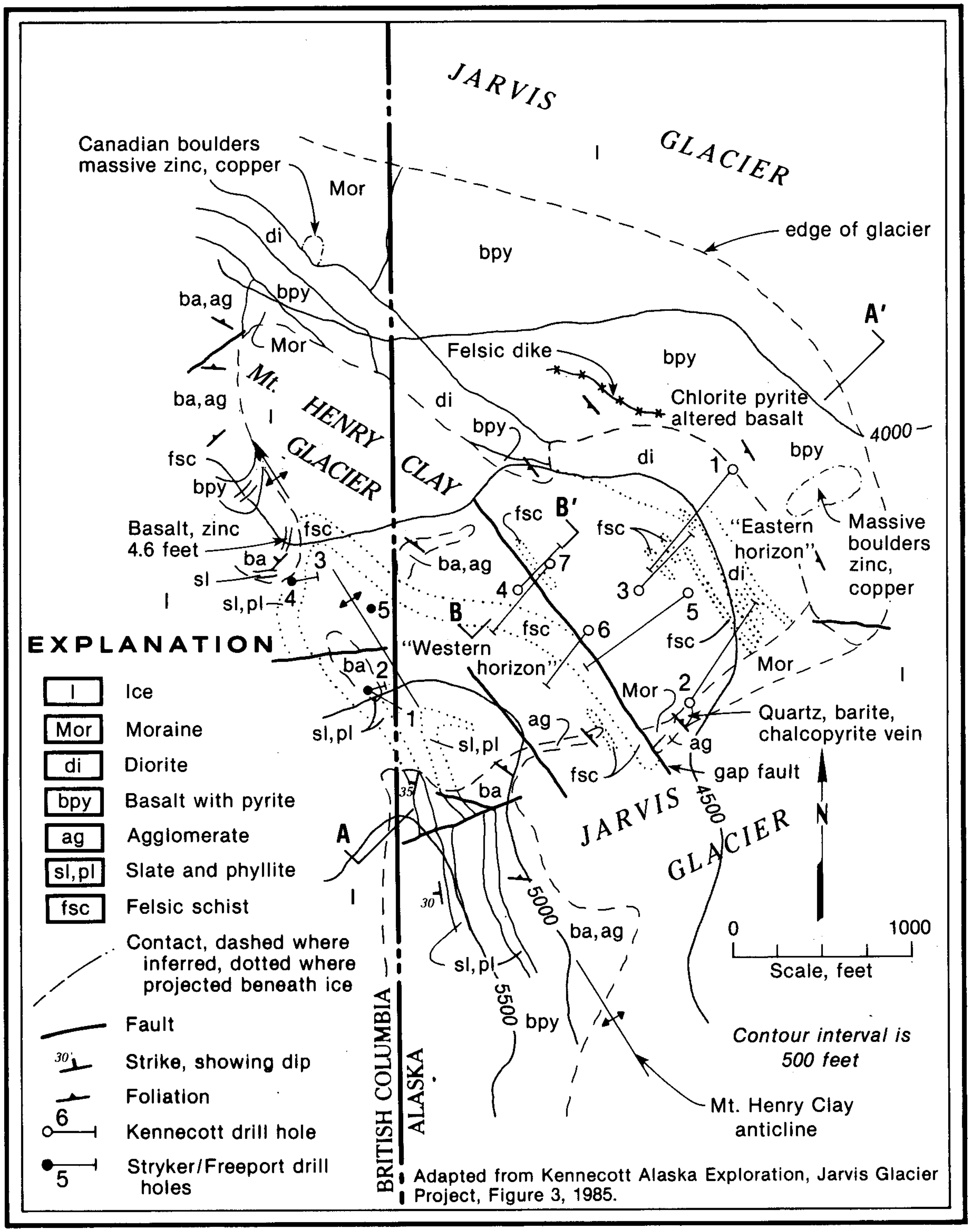


Figure A-16.—Mount Henry Clay prospect geology, diamond drill hole, and cross section locations A-A' and B-B' (see figure A-17).

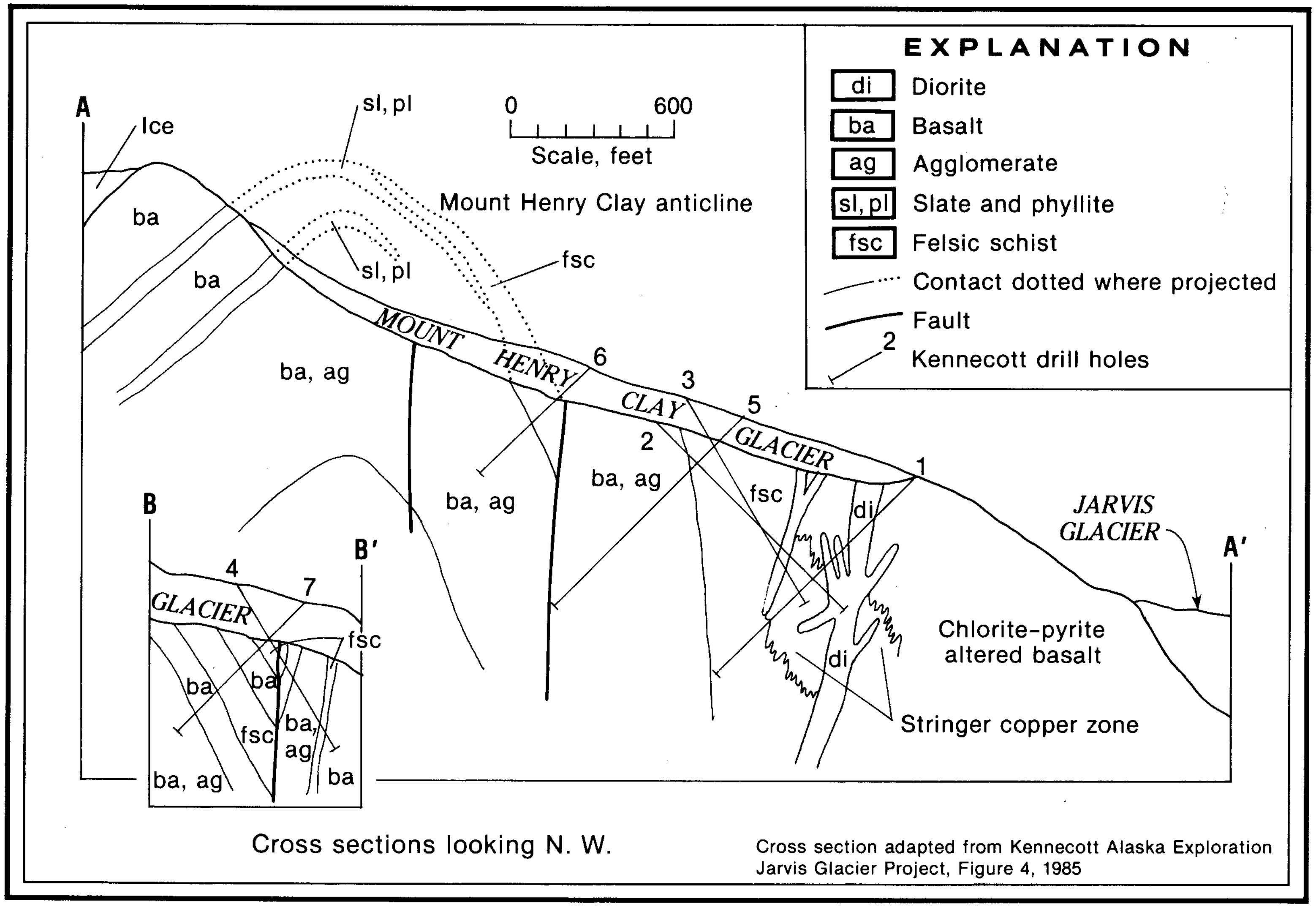
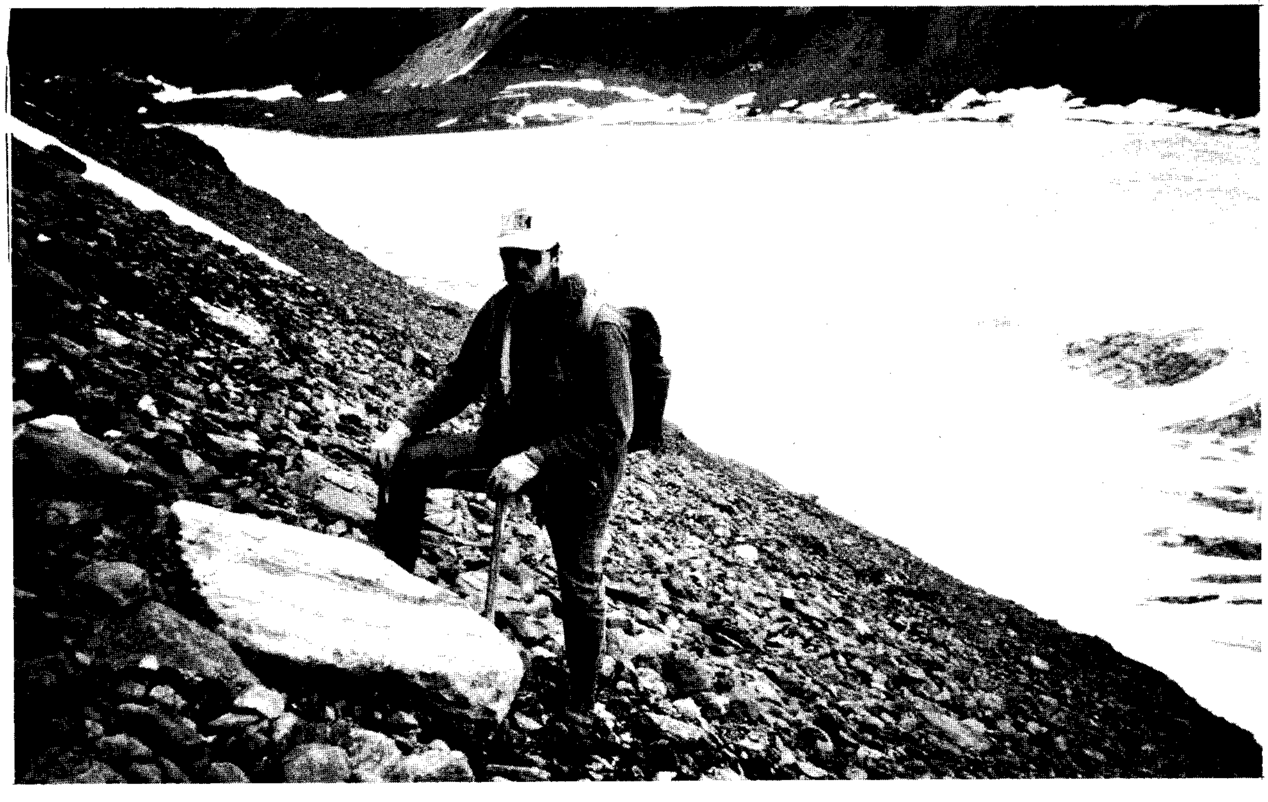


Figure A-17.—Mount Henry Clay prospect cross sections (see figure A-16 for location).

Figure A-18.—Bureau of Mines and ADGGS personnel examine a 6-ft thick sphalerite boulder in gully number 4 of the Mount Henry Clay prospect. A chip sample across this boulder assayed 33% zinc. Such massive sulfide boulders found along a glacier terminus for a distance of 3/4 mile led private companies to diamond drill through the glacier and narrow rock ribs in the hopes of discovering the bedrock source of the boulders. Below, a 2-foot thick sphalerite-barite boulder located between gully number 3 and 4 (J. Still, photographer).



Samples collected of bedrock exposures and streams near the hanging glacier terminus bear elevated values in zinc, silver, copper, lead, and barium. Samples collected from the east and west areas of the hanging glacier also contained elevated base metal values. The west area contains a 4-foot-thick band of weak barite-zinc mineralization, while the east area contains quartz-barite veins (fig. A-13, No. 46). Bedrock samples contain up to 3.4 ppm silver, 910 ppm zinc, 3.5% copper, 1,400 ppm lead, and 25.3% barium.

Because of sparse exposures, diamond drilling gives the best insight into this prospect. Kennecott drilled 7 holes (5 of which were collared in the ice) and Stryker drilled 5 holes. The following prospect description combines surface geology with drill hole data and is based mostly on information contained in Kennecott's 1985 report (*A-50*).

Correlating the geology of the drill holes beneath the glacier with that exposed in bedrock is difficult because of faults with significant offset, major folds, rapid facies changes in the volcanics, and a lack of marker horizons. Figure A-16 shows the prospect geology and Figure A-17 shows cross sections through the prospect. Both are modified from Kennecott's 1985 report (*A-50*). According to the Kennecott report: "The structure appears to be that of a major anticline on the east face of Mount Henry Clay with a possible syncline with axial plane faulting near the east edge of the Mount Henry Clay Glacier." Two felsic schist horizons have been identified by drilling. The eastern is penetrated by DDH 1 to 4 and the western by DDH 5 to 7. These felsic schists host barite-sphalerite mineralization and are underlain by pyrite-chalcopyrite stringer zones in chloritized metabasalt. The best mineralized zones are as follows:

Kennecott Drill Holes		
DDH 1:	55	feet (835–880 feet) grading 0.21% Cu
DDH 2:	35	feet (650–685 feet) grading 0.42% Zn
	35	feet (725–760 feet) grading 0.44% Cu
DDH 3:	161	feet (678–839 feet) grading 0.19% Cu
DDH 6:	20	feet (230–250 feet) grading 0.70% Zn

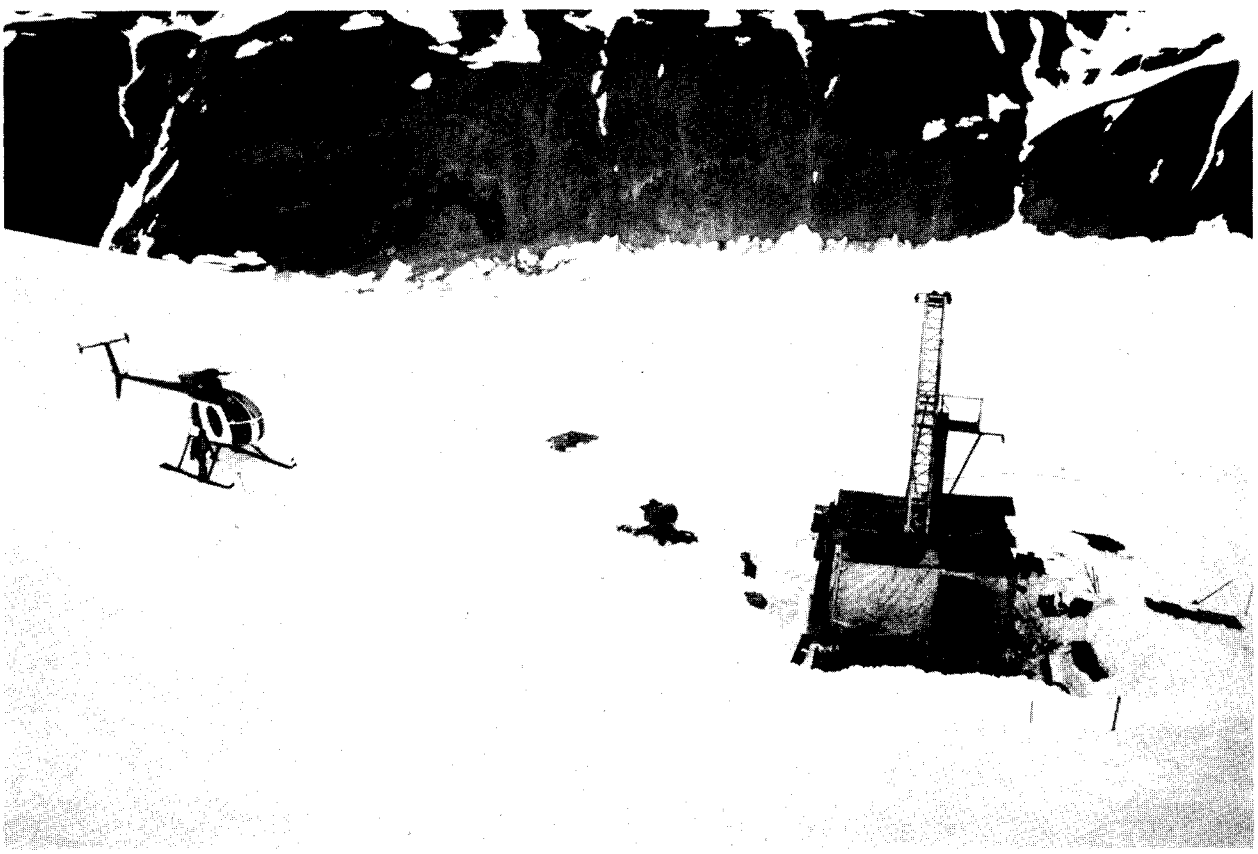


Figure A-19.—Bear Creek Mining diamond drilling through the Mount Henry Clay Glacier during 1986, on the Henry Clay prospect (J. Still, photographer).

Stryker Drill Holes

MCH 1:	1	meter	(37.6–38.6 meters)	grading 0.67% Zn
	2	meters	(152–154.0 meters)	grading 0.29% Cu
MCH 2:	63.1	meters	(30.9–94.0 meters)	grading 0.10% Zn
MCH 3:	24	meters	(30–54 meters)	grading 0.32% Zn
	1	meter	(52–53 meters)	grading 2.0% Cu
MCH 4:	21	meters	(68–89 meters)	grading 0.15% Zn
MCH 5:	1	meter	(80–81 meters)	grading 0.18% Zn

The grade of mineralization intersected by the drill holes does not approach that found in the boulders along the terminus of the hanging glacier.

Conclusions

Bureau and company surface bedrock sampling and 12 company drill holes failed to intercept massive sulfide mineralization of the type found in the boulders. However, two mineralized horizons, east and west, were intercepted that showed sphalerite, barite, and chalcopyrite mineralization. The environment strongly suggests potential for massive zinc-barium-copper deposits and drilling, to date, is not sufficient to preclude such deposits from the prospect area.

Hanging Glacier Prospect

The Hanging Glacier prospect is located between elevations of 5,100 to 5,700 feet on the west side of the Saksaia Glacier (fig. A-5, loc. H). Figure A-21 shows its geology and sample locations. This prospect consists of a pillow basalt-capped iron-stained zone several hundred feet thick and about 2,000 feet long, that strikes northeast and dips steeply north. This zone consists of metasedimentary rocks and hydrothermally altered basalt. It contains barite lenses up to several feet thick and quartz calcite ladder veins up to 0.5 foot thick. Both the lenses and ladder veins contain pyrite, sphalerite, galena, and chalcopyrite. Samples from the lenses and veins contain up to 54% barium, 14.1% zinc, 3,600 ppm copper, 2.3% lead, 198.9 ppm silver, 1.575 ppm gold, 60 ppm tin, and 900 ppm arsenic (table A-1-3).

Cap Prospect

The Cap prospect is located at an elevation of 3,800 feet on the west side of the Saksaia Glacier (fig. A-5 loc.

Figure A-20.—Stryker Resources diamond drilling at the top of the Jan Still Ridge on the British Columbia portion of the Mount Henry Clay prospect (J. Still, photographer).

I). Figure A-22 shows its geology and sample locations and Figure A-23 shows personnel on the prospect. It consists of an iron-stained zone about 50 feet thick and 220 feet long, capped by volcanics that outcrop just above the Saksaia Glacier and whose extent is hidden by the glacier and cover. The iron-stained zone consists of metasedimentary rocks and hydrothermally altered basalt. Barite lenses up to 8 feet thick occur in this zone. Pyrite, sphalerite, galena, and tetrahedrite are found in the barite. Samples collected from this occurrence contained up to 55% barium, 1.1% zinc, 3,300 ppm lead, 227.7 ppm silver, 1.371 ppm gold, and 130 ppm cobalt (table A-1-4). In 1988 Newmont diamond drilled through the mineralized zone. Details of the drilling were not made available for this report.

Nunatak Prospect

The Nunatak prospect is located between elevations of 3,800 to 4,500 feet on the east side of the Saksaia Glacier (fig. A-5, loc. J). Figure A-21 shows its geology and sample locations. The property consists of an iron-stained zone of quartz sericite schist and altered volcanics exposed across the face of a glacier bounded nunatak for 1,500 feet. Within this zone, barite lenses and beds outcrop, containing interbedded and remobilized sulfides.

Barite exposures through rubble crop indicate some of the beds may be up to 20 feet thick. Samples collected of the barite contained up to 2.58 ppm gold, 335.3 ppm silver, 2.38% zinc, 1,820 ppm copper, 2.0% lead, 48% barium, and 1,000 ppm arsenic (table A-1-5).

Little Jarvis Glacier Prospect

The Little Jarvis Glacier prospect is located on the east and west sides of the Little Jarvis Glacier (fig. A-5, loc. C). Figure A-24 shows the prospect geology and sample locations. It consists of small discontinuous sulfide bands hosted in metasedimentary rocks and meta-andesite and metabasalt. Samples collected from the prospect contained up to 0.345 ppm gold, 11.8 ppm silver, 13.6% zinc, 1,900 ppm copper, 3.8% lead, 1.44% barium, and 2,000 ppm arsenic (table A-1-6).

Jarvis Glacier Gulches Prospect

The Jarvis Glacier Gulches prospect is located on the south side of the Jarvis Glacier in a steep walled canyon about 4 miles east by southeast from the Pleasant Camp border station on the Haines Highway (fig. A-5, loc. B). Figure A-25 shows the prospect geology and sample locations and table A-1-7 gives the analytical results.

Sulfide float found at the mouth of the canyon led to the discovery of some of the occurrences in August, 1983, by Bureau personnel. Other occurrences discovered in September, 1983, by ALYU Mining Corporation, consist of small showings of stratabound or stratiform sulfides, such as sphalerite, pyrite, pyrrhotite, chalcopyrite, galena, and barite. Four occurrences have the best exposures of mineralization, and these are shown on Figure A-25 by map numbers 14, 17, 18, and 24.

Geologic Setting

The Jarvis Glacier Gulches prospect is located in the Little Jarvis volcanic and sedimentary sequence that consists of northwesterly-striking metabasalts, meta-andesites, and metasediments that include slate and limestone. Most of the occurrences are contained within a volcanic/sedimentary unit that consists of slate, limestone, and andesite. This unit is capped by meta-andesites and pillow basalts. Redman (*A-54*) suggests that this sequence is similar in age to the Glacier Creek sequence and may represent either a distal or a vertical facies change with it.

Prospect Description

Thousands of feet of alternating bands of limestone, slate, and volcanics are exposed on the southwest side of the canyon. Some of the beds are prominently iron-stained. Only a few locations were examined in this canyon and the extent of sulfide mineralization may be much greater than that indicated by the small occurrences discussed below.

The most interesting occurrence examined was located at an elevation of about 3,600 feet on the southeast side of the canyon (fig. A-25, No. 18) and consists of a zone of chlorite-altered metasediments and meta-andesites containing lenses of massive and disseminated sulfide mineralization. The zone follows bedding, is up to 5 feet across, and contains massive sulfide lenses up to 0.5 foot thick. It can be traced for about 100 feet and may extend much farther but time was not sufficient to determine its extent. The sulfide lenses consist of pyrite, sphalerite, chalcopyrite, and galena in calcite- and quartz-rich rock. Samples collected from the zone contained up to 17.8% zinc, 3,000 ppm lead, 1.3% copper, 0.163 ppm gold, and 11.6 ppm silver. Two hundred fifty feet below the above zone, samples (map No. 17) collected from a 0.4-foot-thick quartz sulfide lens contained up to 5.4% zinc, 3,000 ppm lead, 160 ppm cobalt, 980 ppm copper, 0.416 ppm gold, and 25.0 ppm silver. About 1,500 feet northwest of the above location (map No. 14) a 4- by 15-foot

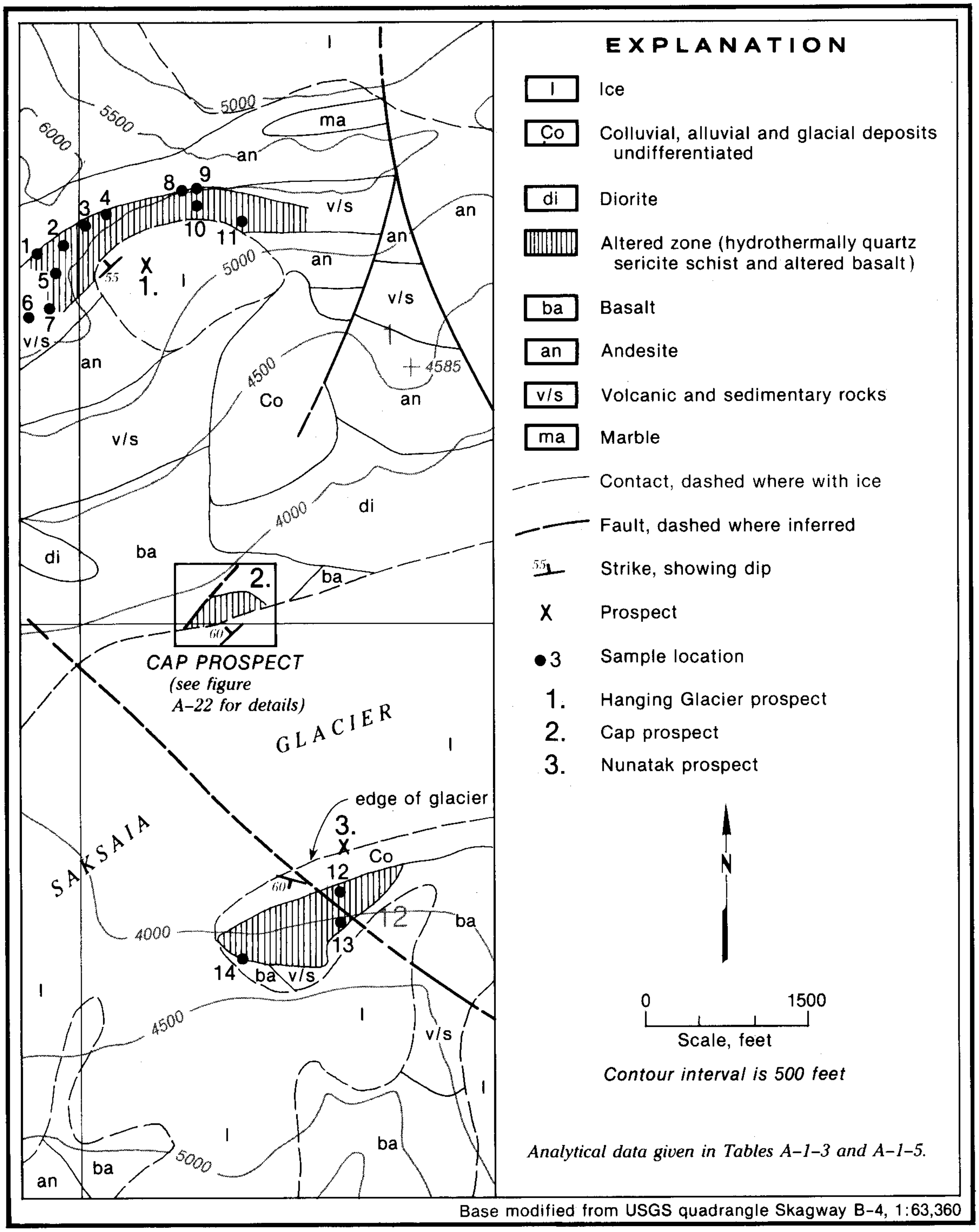


Figure A-21.—Hanging Glacier, Cap, and Nunatak prospects showing geology and sample locations for the Hanging Glacier and Nunatak prospects.

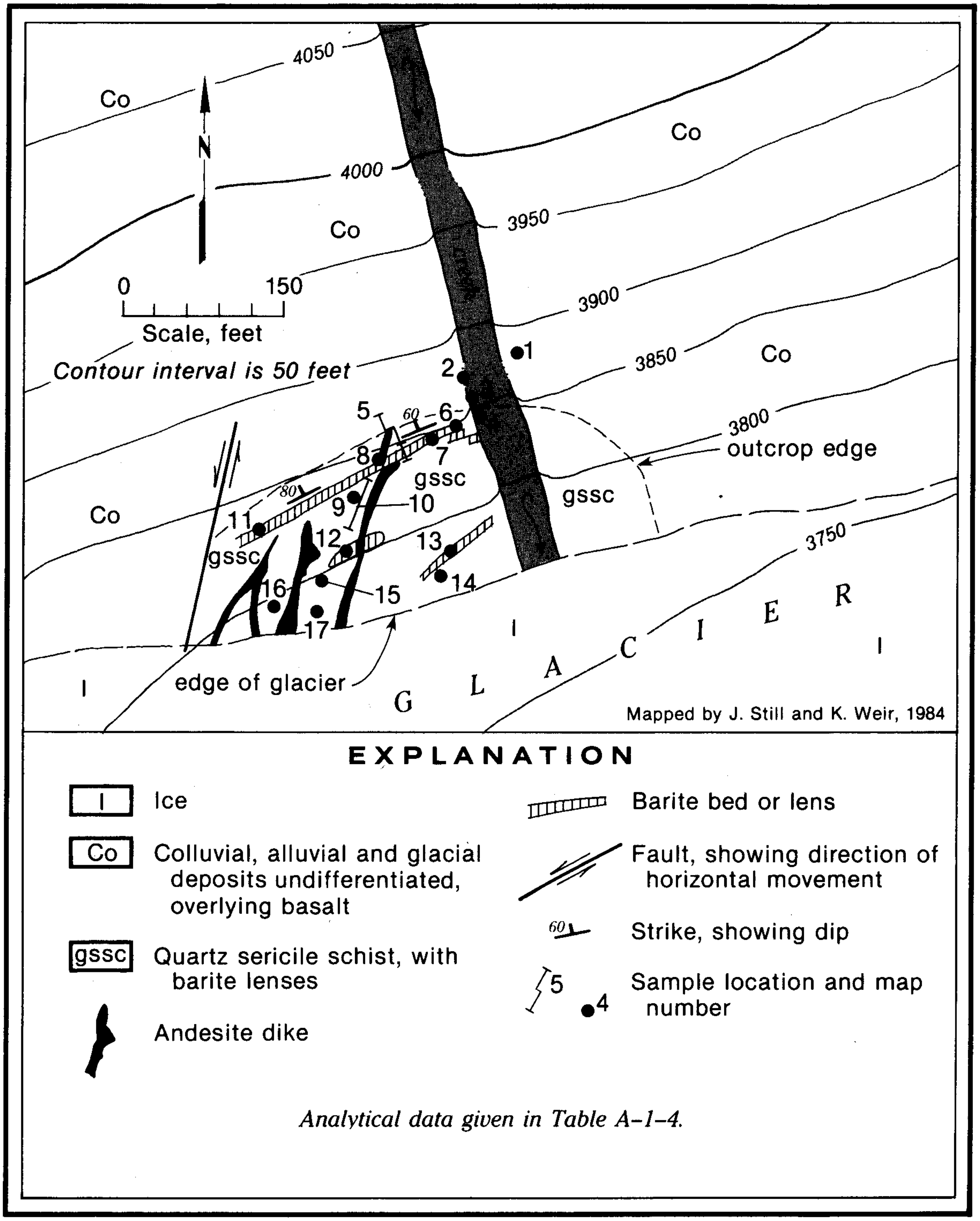


Figure A-22.—Cap prospect geology and sample locations.

lens of iron-stained calcite, quartz, goethite, chlorite, pyrrhotite, and chalcopyrite assayed 790 ppm copper.

On the north side of the canyon, in the volcanic/sedimentary unit just above the canyon floor at an elevation of 3,200 feet, quartz stringer zones and sulfide zones occur (map No. 24.) The sulfides occur in narrow lenses and disseminated zones in meta-andesite and are up to 9.5 feet thick. A chip sample (3S263) across a 0.7-foot-thick zone of barite, pyrrhotite, sphalerite, chalcopyrite, quartz, calcite, and chlorite assayed 5,600 ppm copper, 1.57% zinc, 1.1 ppm silver, and 122 ppm cobalt. Other samples of sulfide zones taken at this locality contained up to 6.1% zinc, 7,600 ppm copper, 110 ppm cobalt, 0.127 ppm gold and 4.6 ppm silver. The quartz stringer zones contain veins up to 0.5 foot thick that contain sparse knots of pyrrhotite and chalcopyrite.

Boundary Occurrence

The Boundary occurrence is located about 1.75 miles south of Mount Henry Clay at elevations between 5,700 and 6,000 feet (fig. A-5, loc. P). Figure A-26 shows its geology and sample locations. It consists of narrow bands of iron-stained metasediments and altered basalts outcropping through glacial ice. A barite band hosted in white phyllite contained 47% barium. Other samples collected from this prospect contained up to 960 ppm copper, 330 ppm cobalt, 400 ppm arsenic, and 200 ppm nickel (table A-1-8).

Summit Creek Zinc Occurrences

The Summit Creek zinc occurrences are located in the Summit Creek drainage (fig. A-5, loc. S). Figure A-27 shows the geology and sample locations of the occurrences. Stream sediment samples collected during 1985 at the mouth of Summit Creek and from small springs near the head of Summit Creek contained up to 0.020 ppm gold, 1.2 ppm silver, 1,620 ppm zinc, 0.195% barium, and 600 ppm bismuth (table A-1-9). In an attempt to locate the source of the metals in these highly anomalous samples, bedrock and float samples were collected at scattered locations across the Summit Creek drainage. The area consists predominately of slate and phyllite,

Figure A-23.—Merrill Palmer, a local prospector, and Bureau personnel examine a barite lens at the north end of the Cap prospect (J. Still, photographer).

limy slate, and some limestone.

Quartz-calcite-sulfide float samples contained up to 0.686 ppm gold, 380.9 ppm silver, 2.48% zinc, 700 ppm copper, 4.10% lead, and 0.375% barium. These were mostly collected from talus slopes and moraine. Bedrock slate samples contained up to 570 ppm zinc.

A stream sediment sample, collected below a spring with an iron-stained gossan around it, contained 1.94% zinc (map No. 63.) A sample of iron-stained calcite cemented slate scree, collected several hundred feet below the above sample, contained 1.2% zinc (map No. 60.) This indicates that ground water that feeds area springs is enriched in zinc, which probably accounts for some of the high stream sediment zinc values from samples collected near the mouth of Summit Creek.

A sedimentary-hosted zinc-rich massive sulfide deposit could easily have escaped discovery in this area. However, the large number of highly anomalous zinc samples may be the result of persistent moderate (subeconomic) zinc values in the slate, and/or leaching of zinc by ground water processes and deposition of such in the area's streams.

Adjacent British Columbia Prospects and Deposits

The Glacier Creek volcanics that host all the volcanic-associated massive sulfide prospects in the Porcupine mining area extend across the British Columbia-Alaska border, and outcrop over a large area in British Columbia (fig. A-28). These same rocks trend to the area of the Windy Craggy Deposit (fig. A-29, loc. A) where they are less metamorphosed than those in the Glacier Creek area. The characteristics of the British Columbia deposits were briefly studied for a comparison to the deposits found in the Porcupine mining area.

Prospects G, H, I, J, K, L, and M (fig. A-28) were explored by Stryker Resources Ltd. from 1983 to 1987. In general, most of these are volcanic-associated massive sulfide zinc-copper-barium-silver-gold prospects, hosted in felsic schists and altered volcanics located within basalts and pillow basalts (fig. A-29). They are similar to the Porcupine mining area volcanic-associated prospects. Exploration by Stryker included mapping, geochemical sampling, geophysics, and many thousands of feet of diamond drilling. Work on these prospects was not reported during 1988.

Prospects A, B, C, and D (fig. A-28) are in the Windy Craggy vicinity and are volcanic-associated massive sulfide deposits hosted in basalts, altered basalts, and thin sedimentary sequences. The most important of these is the Windy Craggy Deposit, whose significance was not realized until 1981-1982 when diamond drilling revealed a world class massive sulfide deposit. It contains 300 million tons averaging 1.52% copper and 0.08% cobalt. A more chert-rich portion of this deposit, about 1.8 million tons, averages about 0.29 ounce/ton gold (*A-34*). Figure A-30 shows drilling rig on the Windy Craggy Deposit.

Vein Gold Prospects

Introduction

Six vein gold prospects are known within the Porcupine mining area (fig. A-5, locs. A, E, L, N, O, and V). These are mostly hosted in slate and four of these are principally dike ladder veins. One, location O, has gold values in the host slate. None of these occurrences has the combination of gold values and tonnage to attract mine development. However, there is sufficient potential at locations E, L, N, and O to encourage additional prospecting.

A vein gold prospect is located adjacent to the international border in British Columbia near the west edge of the Jarvis Glacier (fig. A-28, loc. F). It consists of a fault-controlled quartz vein hosted in diorite that extends for thousands of feet and has been extensively explored between 1915 and 1985 by shallow shafts, trenches, and diamond drilling.

Golden Eagle Prospect

Introduction—History

The Golden Eagle prospect is centered at an elevation of 1,850 feet on McKinley Creek, a long-known placer area (fig. A-5, loc. O). The area is mostly covered with brush and timber, with the only bedrock exposures in the area along the banks of McKinley Creek. In 1983, Haines prospector Jim McLaughlin discovered visible gold hosted in quartz and sulfides at what is now called the Vug vein and staked the seven Golden Eagle lode claims (fig. A-31). Access to the prospect is via a 4-mile-long trail from the end of the Porcupine Road along the east side of Porcupine and McKinley Creeks or by unimproved helipad at the south end of the prospect.

Bureau—ADGGS Work

In 1984 and 1985 this study examined, mapped, and sampled 2,000 feet of bedrock exposed along McKinley Creek. Figures A-32—A-37 show the prospect geology and sample locations, and appendix A, table A-1-10 gives the analytical results.

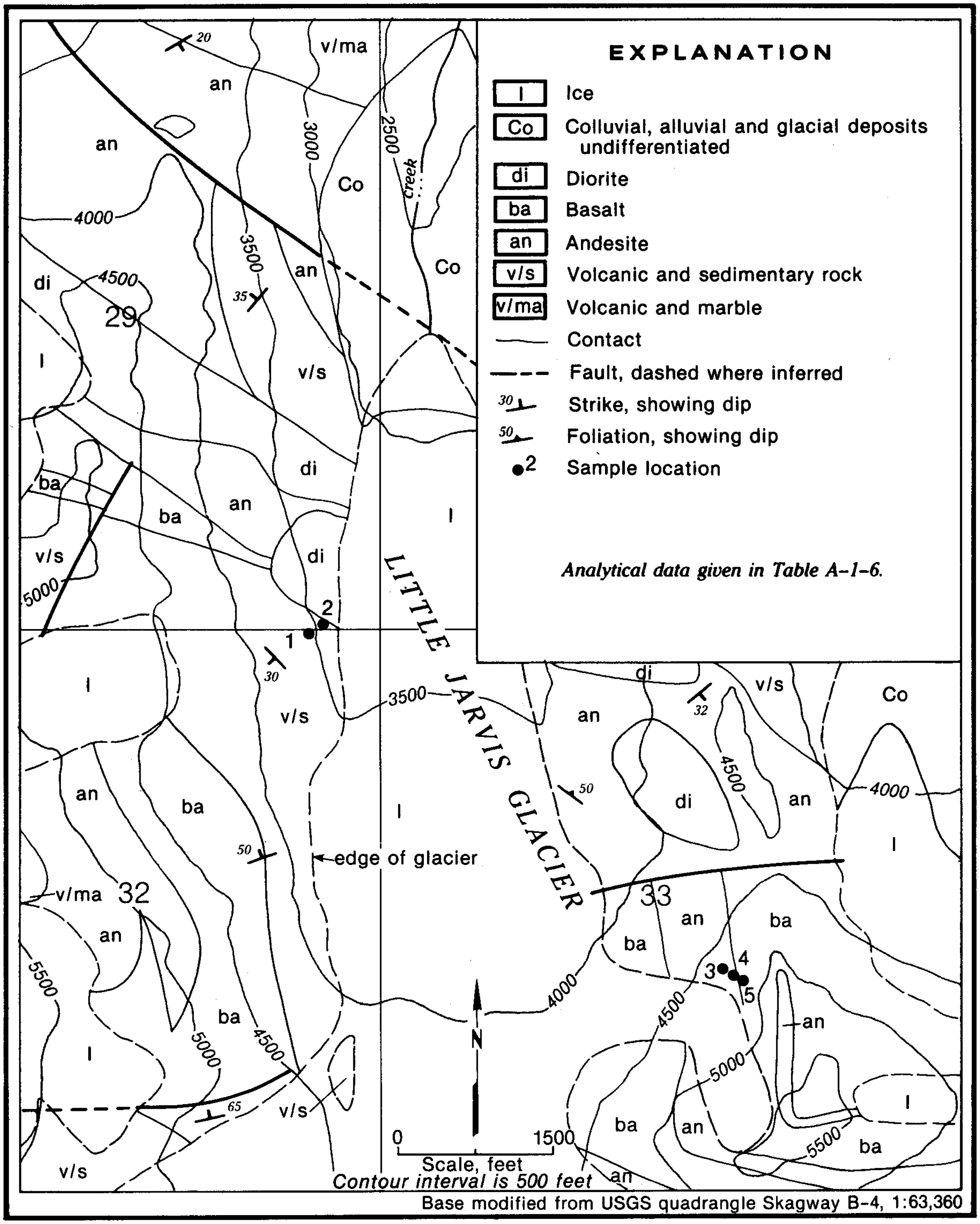


Figure A-24.—Little Jarvis Glacier prospect geology and sample locations.

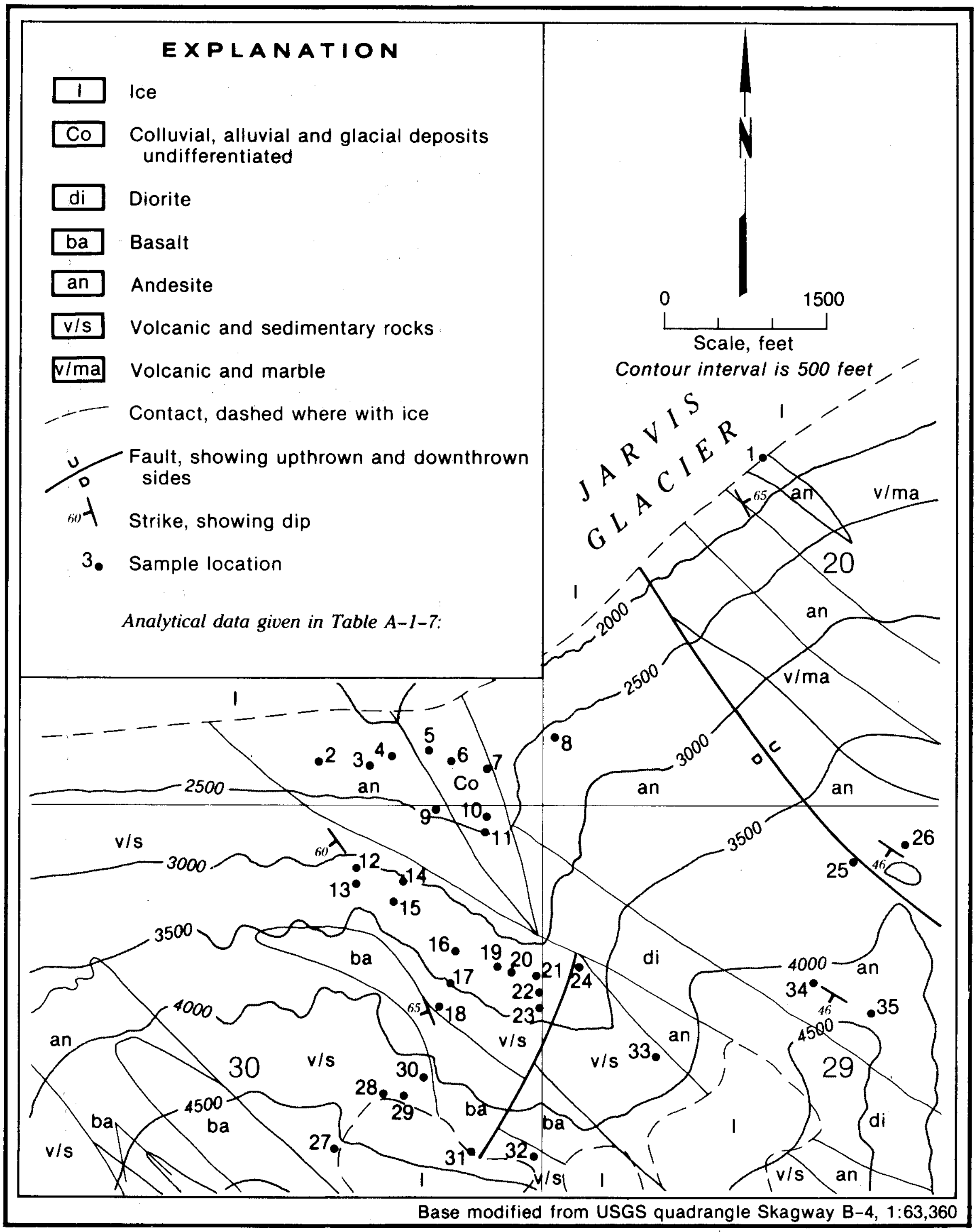


Figure A-25.—Jarvis Glacier Gulches prospect geology and sample locations.

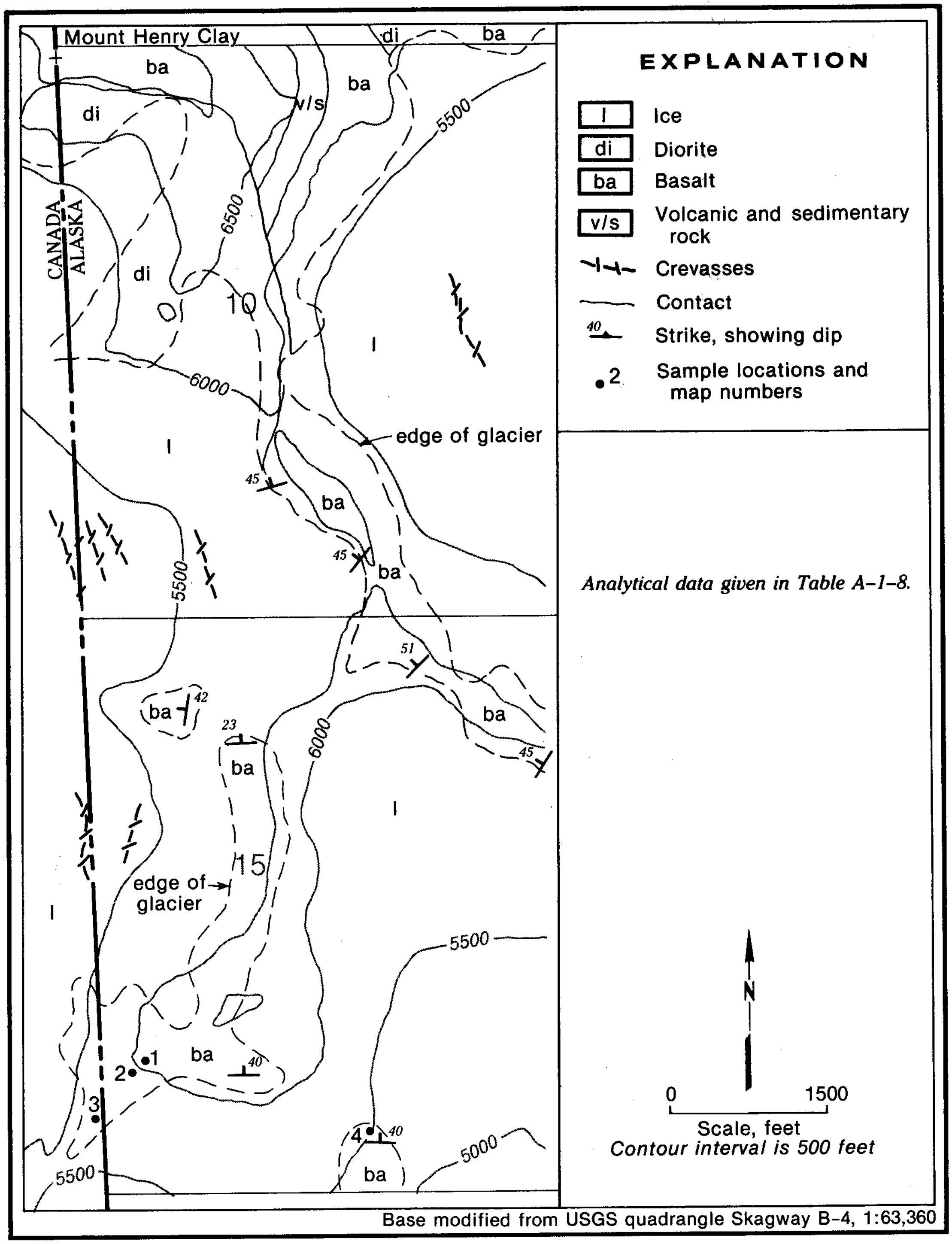


Figure A-26.—Boundary occurrence geology and sample locations.

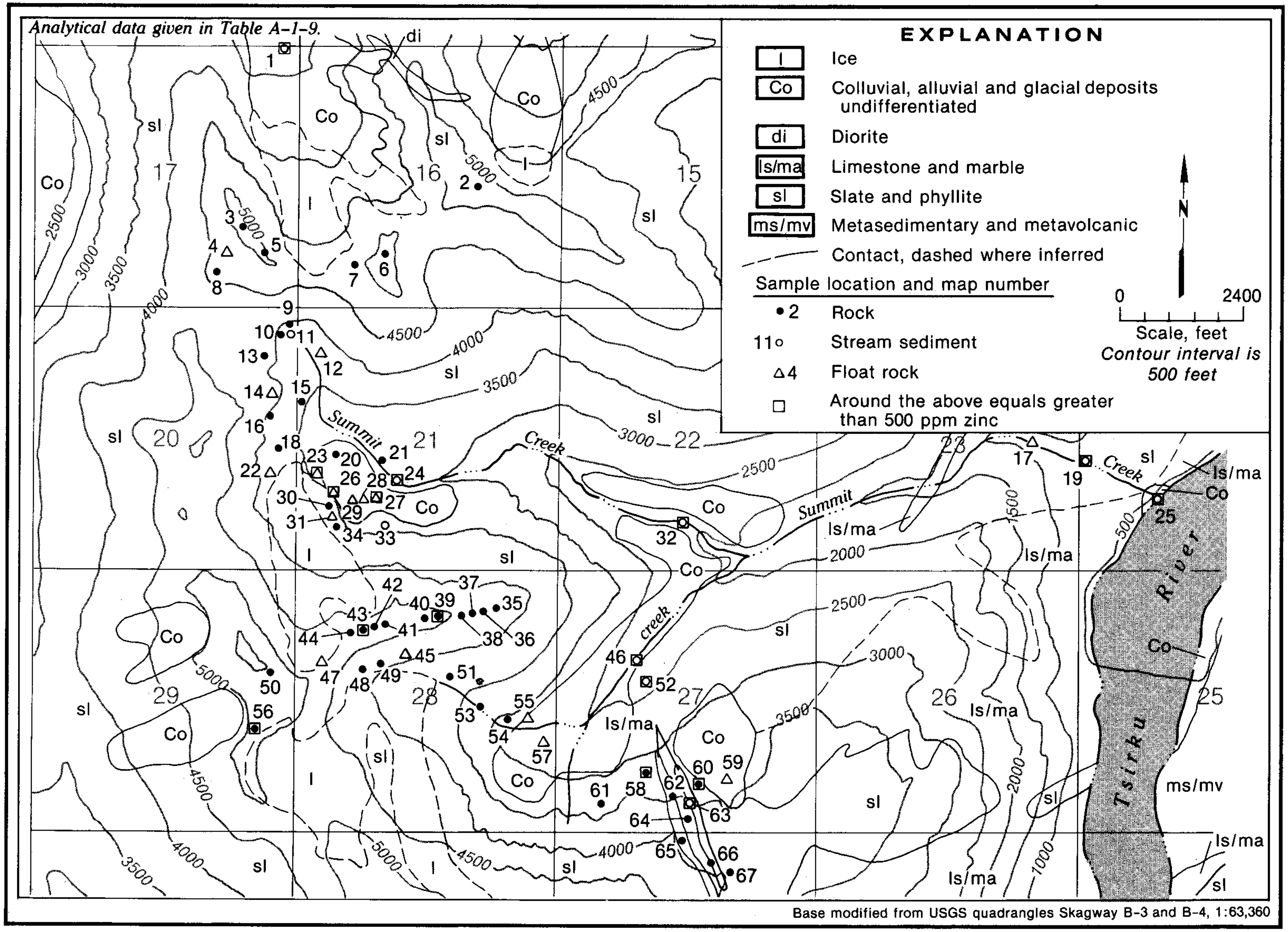


Figure A-27.—Summit Creek zinc occurrence geology, sample locations, and anomalous zinc sample locations.

Prospect Geology—Mineralization

Introduction

The area consists of gray slate and phyllite of the Porcupine slate unit intruded by numerous tan dikes that range in thickness from a few feet to over 20 feet. These dikes both crosscut and follow the foliation of the slate. Both dikes and slate generally strike east to northeasterly and dip steeply.

Quartz Veins

Almost all the prospect quartz veins examined are transverse fracture fillings in dikes. They range in thickness from a few inches to 2 feet, and at some locations are regularly spaced and could be termed ladder veins. Usually the dike margins are tight and rarely contain quartz veins. The veins are usually at right angles to the strike of the dike and are confined in length by the width of the dike. Only rarely does a quartz vein extend more than a few feet into the slate. While one area vein is 30 feet in length, most are well under 10 feet in length.

The discovery vein or vug vein is the largest, most highly mineralized vein yet discovered on the prospect and is located at the west edge of McKinley Creek at an elevation of 1,800 feet. It is shown in Figures A–35 and A–37 and consists of a 0.3- to 2.0-foot-thick quartz vein exposed for 18 vertical feet and 9 horizontal feet in a 12-foot-thick dike. The dike strikes 75° and dips 84° south, while the slates follow the same strike but dip about 78° south. The vein strikes (at about right angles to dike) 340° and dips 60° to 70° east. After it was mapped in 1984, the east dike wall of the vug vein collapsed where it had been undercut by McKinley Creek. This exposed the vein to where it terminated at the northerly dike-slate contact. Assuming this vein follows the pattern of almost all of the prospect veins examined and also terminates at the southern dike-slate contact, its maximum strike length is about 13 feet.

A 1-foot-wide by 4.5-foot-high by 8-foot-deep vug occupies the lower 4.5 feet of the vug vein. Both walls of the vug are coated with up to 0.1-foot-thick quartz crystals. The floor and back of the vug are filled with masses and lenses of crystalline pyrite, pyrrhotite, and lesser sphalerite. The floor of the vug is coated with a red gossan and sulfur. Unusual lenses of sphalerite coated with sulfur, up to 0.15 foot thick, were also observed.

Visible gold is found within both the iron sulfides and sphalerite, and rarely within the quartz. Over 150 pounds of sulfides were reported mined from the vug with a recovery of about 0.5 ounce of gold. Samples collected from the vug sulfides contained from 48.86 to 531.10 ppm gold. Samples collected of the vug quartz with sulfides contained from 11.93 to 75.43 ppm gold while a sample from the vug wall of vuggy crystalline quartz contained 0.738 ppm gold.

A 1.0-foot channel sample across the quartz vein, at a location 0.2 foot above the vug, contained 20.35 ppm gold, while chip channel samples across the vein at heights of 8 and 15 feet above the creek contained from 0.075 ppm to 1.957 ppm gold.

Quartz veins located along McKinley Creek to 1,300 feet southeast of the vug vein and to 650 feet northwest of the vug vein were mapped and sampled. Samples collected of quartz veins to the southeast of the vug contained up to 0.050 ppm gold and 150 ppm zinc (figs. A–32, A–36). Those to the northwest contained up to 182.130 ppm gold and 1.14% zinc (figs. A–32—A–35). Small vugs, quartz crystals, and small pyrite-sphalerite lenses are occasionally found in these veins.

The highest-grade vein sample, 182.130 ppm, was from a 0.25-foot-thick by 8-foot-long vein with 1-inch pyrite crystals (fig. A–34, No. 23). Two adjacent samples of the vein contained 0.245 and 1.501 ppm gold. Eight of the remaining highest-grade veins sampled contain from 4.240 to 36.620 ppm gold. The most significant of these (fig. A–33, Nos. 12, 14) is from 0.3 to 0.4 foot thick and 30 feet long. Samples collected from it, at locations 18 feet apart, contained 36.620 and 22.220 ppm gold. It cuts a dike for 18 feet and then slate for another 12 feet.

Dikes

The area dikes are tan in color. Forbes (*A–25*) reports the dike that contains the vug vein may contain relic quartz grains of detrital (sedimentary) origin. It is possible that this dike is a silica carbonate unit of sedimentary origin. Some of the dikes in the area examined had chill margins. It may be that some of the dikes shown on the prospect maps are, in fact, sedimentary units. Most of the samples from the area dikes did not contain gold. A minority contained up to 0.560 ppm gold.

Slate

The slate in the area of the Golden Eagle lode prospect contains from no visible sulfides up to 5% sulfides over large areas. Bands of massive sulfide up to 0.1 foot thick that follow bedding were also noted. The sulfides consist of pyrite, that at some locations forms cubic crystals up to 0.05 foot across. Twenty-eight of the 34 slate samples were chip samples up to 22 feet long, the remainder were grab samples. Four of the samples collected did not

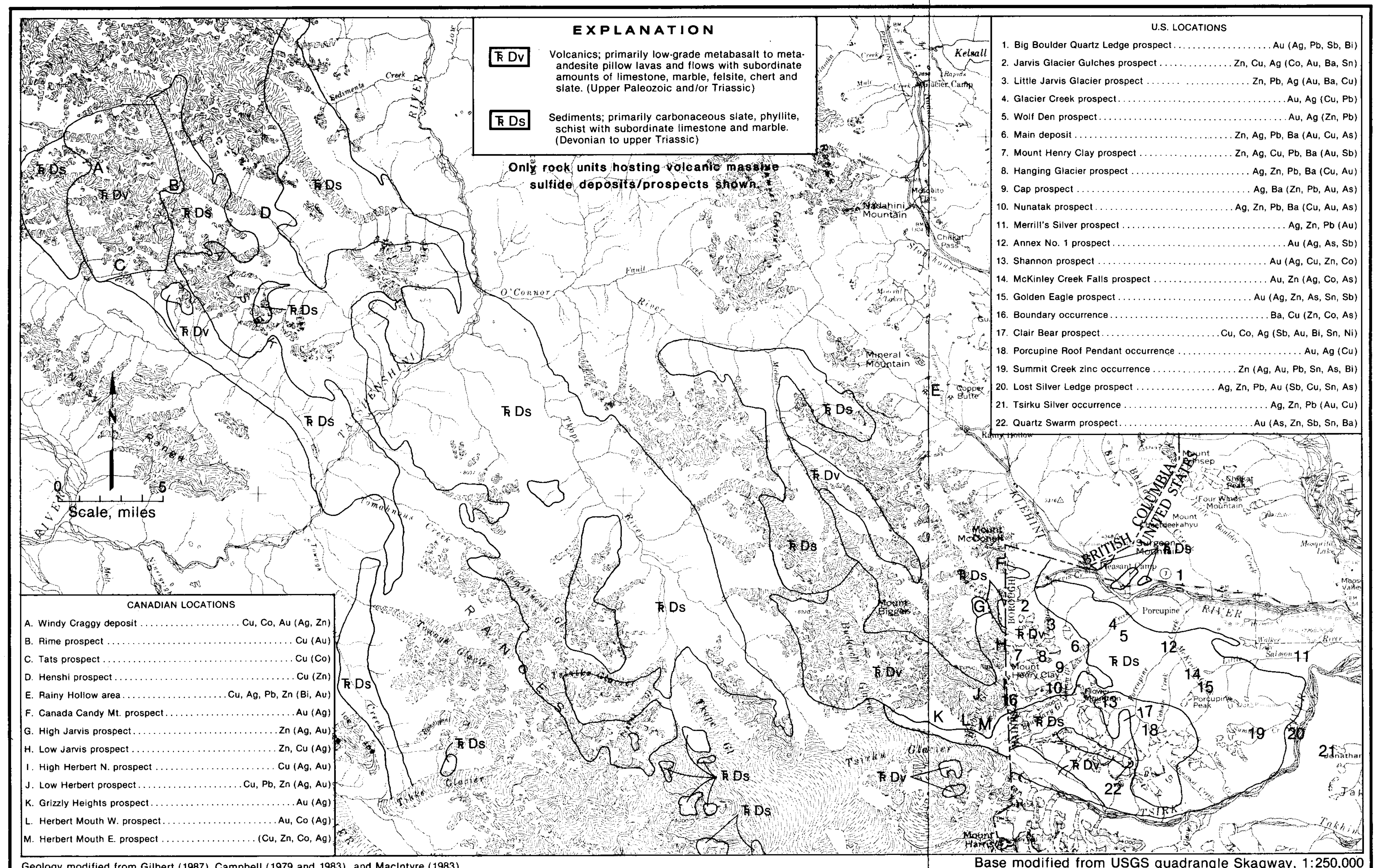


Figure A-28. — Simplified geology of the area between the Porcupine Mining area and Windy Craggy deposit showing prospect location.

contain detectable gold, while the remaining 30 contained from 0.005 to 2.65 ppm gold. The highest value sample (fig. A-34, No. 40) was collected of a pyrite-rich band about 0.1 foot thick. A 5-foot chip sample that contained the same band assayed 0.095 ppm gold. Petrographic examination of the sulfides in the slate revealed gold within some of the pyrite cubes.

Conclusions

With the exception of the vug vein, the 30, or so, quartz ladder veins examined on this prospect do not approach the size, nor are they close enough together, to be considered for mine development. The vug vein may indicate potential for isolated spots of high-grade gold mineralization, but finding such high-grade areas may be very difficult. Exploring for and mining such veins would at best be a very small, one or two person, operation. However, the gold values in the quartz do encourage exploration in the area for faults or other structures where potential quartz veins could be of a sufficient size to attract serious exploration interest.

The gold values in the slate, while well below grades needed to be of economic consideration, indicate the potential for low-grade large-volume gold mineralization and encourage detailed examination of the prospect for such. Surface trenching and soil sampling would be good tools to penetrate the thin gravel that covers the largest portion of this prospect.

McKinley Creek Falls Prospect

An examination was made of a gold-zinc prospect, located near the base of a falls in a steep walled canyon that contains McKinley Creek (fig. A-5, loc. N). Figure A-38 shows the prospect and sample locations.

The area consists of slate with interbedded limestone that hosts tan dikes. Quartz, sphalerite veins, or silicified bands were found hosted in the dikes, and to a lesser extent, in the slate and limestone.

Samples collected of rubble crop quartz sphalerite veins, hosted in dikes, contained up to 13.4% zinc and

Figure A-29.—Bureau of Mines and Stryker Resources personnel examine a copper-rich area on the Low Herbert prospect located in British Columbia adjacent to the international border (J. Still, photographer).

8.959 ppm gold, while a 2.5-foot chip sample across a limy silicified band hosted in limy slate, contained 24.83 ppm gold and 280 ppm zinc (table A-1-11).

Annex No. 1 Prospect

The Annex No. 1 prospect, located on the cliffs above the west side of Porcupine Creek, was discovered by Jerry Fabrizio, a local prospector, in about 1983 (fig. A-5, loc. L). The prospect consists of pyrite-bearing quartz veins associated with tan to grey dikes, exposed in a narrow fault formed gulch. Overhanging loose boulders choke the upper reaches of the gulch and occasionally a burst of rock fall sweeps the gulch, making safe access difficult. Figure A-39 shows the prospect geology and sample locations.

Samples collected of narrow discontinuous quartz veins bearing pyrite in the margins of dikes and in slate contained from 0.20 to 114.140 ppm gold. Samples of dike and slate contained from 0.005 ppm to 0.315 ppm gold. Samples contained up to 9 ppm silver, 840 ppm zinc, 100 ppm tin, and 8,000 ppm arsenic (table A-1-12).

Wolf Den Prospect

The Wolf Den prospect, located on the north slopes of Flower Mountain, was discovered and staked by Merrill Palmer during 1987 (fig. A-5, loc. E). It consists of quartz-pyrite-arsenopyrite-sphalerite veins hosted in a tan dike less than 10 feet thick. The veins were up to 0.3 foot thick, extended distances up to 5 feet, and were confined to the dike. A sketch of the dike and veins is shown in Figure A-40. Samples collected from them contained up to 11.417 ppm gold and 3,500 ppm zinc. A 5-foot chip sample collected up creek from the dike, of slate with pyrite bands, contained 0.103 ppm gold and 225 ppm zinc, while a sample collected from quartz-sphalerite galena-pyrite vein float, contained greater than 20,000 ppm zinc, 0.171 ppm gold, and 645 ppm lead (table A-1-13).

Quartz Swarm Prospect

The Quartz Swarm prospect is located on a mountain surrounded by glaciers that feed the headwaters of Por-

Figure A-30.—Drill rig on tne north end of the world class Windy Craggy copper-cobalt deposit located in Canada, 50 miles northwest of Mount Henry Clay and hosted in basalt rocks similar and on trend with those that host the Mount Henry Clay prospect. The world class size of this deposit was not realized until it was drilled in 1982 and 1983. As a result, active mineral exploration greatly increased in the vicinity of Mt. Henry Clay in both Canada and the United States (J. Still, photographer).

cupine Creek (fig. A-5, loc. V). It was discovered and staked in 1984 by Merrill Palmer. It consists of quartz vein swarms hosted in slate and metabasalt exposed through elevations from 3,600 feet to 5,400 feet. These veins average about 0.5 foot to 1.5 feet thick and extend for hundreds of feet. The swarms of veins are many hundreds of feet across and extend for thousands of vertical feet. Figure A-41 shows the prospect geology and sample locations.

Sixty samples were collected from the veins and surrounding wall rock at various locations and elevations. Six of these samples, mostly quartz veins, contained from 0.005 to 0.090 ppm gold. The sixty samples contained up to 2.4 ppm silver, 390 ppm zinc, 150 ppm copper, 3,000 ppm barium, 700 ppm arsenic, 200 ppm nickel, and 3,000 ppm antimony (table A-1-14). Although trace amounts of gold and favorable geochemistry were found in these quartz swarms, significant gold values were not found in samples collected through 1,500 feet of elevation and 4,000 feet across structure.

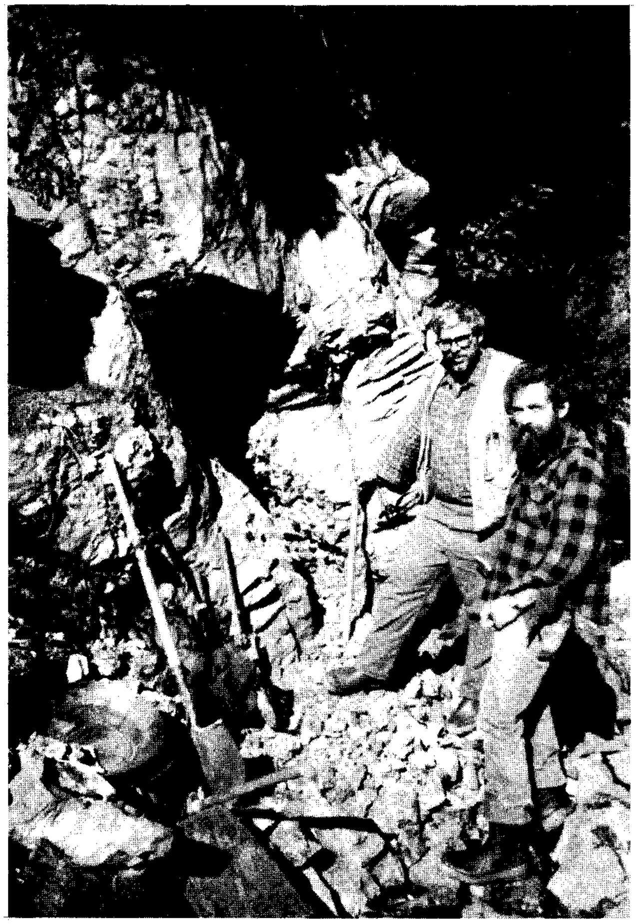


Figure A-31.—Local prospector Jim Mclaughlin and Bureau personnel examine the vug vein on the Golden Eagle prospect. The vein shown contains a 6-ft by 2-ft by 8-ft quartz crystal, pryite, sphalerite, sulfur, limonite-lined vug from which about 1/2 oz of gold was recovered (K. Weir, photographer).

Big Boulder Quartz Ledge Prospect

The Big Boulder Quartz Ledge prospect, located at an elevation of 1,500 feet east of Big Boulder Creek, consists of a shallow adit and a series of felsic dikes bearing quartz segregation and veins, (fig. A-5, loc. A). These dikes are hosted in slate. The adit was likely driven about 80 years ago, as a 1.5-foot-thick spruce tree is growing on the dump near the adit's portal. Figures A-42 and A-43 show the prospect geology and sample locations.

The quartz-bearing dikes have a steep dip, are up to 1.3 feet thick, and outcrop for up to 60 feet along strike. The adit is driven through a felsic dike for 18 feet and cuts a quartz band for about 5 feet. Twenty samples were collected from the quartz, felsic dike, and adit. Two contained 0.005 ppm gold. The remainder did not contain detectable gold, but contained up to 1.8 ppm silver, 308 ppm lead, 100 ppm tin, 500 ppm arsenic, 700 ppm bismuth, and 900 ppm antimony (table A-1-15).

Polymetallic Vein Silver Prospects

Three polymetallic vein silver prospects and one occurrence are known in the study area. One is located near Glacier Creek, the other three are located near the Tsirku River in the vicinity of Summit Creek and Sunshine Mountain (fig. A-5, locs. D, K, T, and U). These mostly consist of silver-bearing, galena-sphalerite quartz veins hosted in limestone or dolomite. All lack sufficient volume to attract serious development; however, the high silver grades (up to 100 ounces/ton) in some of these occurrences, and the silver-zinc-lead geochemical anomalies reported in the dolomite and limestone rocks in the Porcupine mining area (*A-56*), encourage exploration in these rocks for larger mineralized zones.

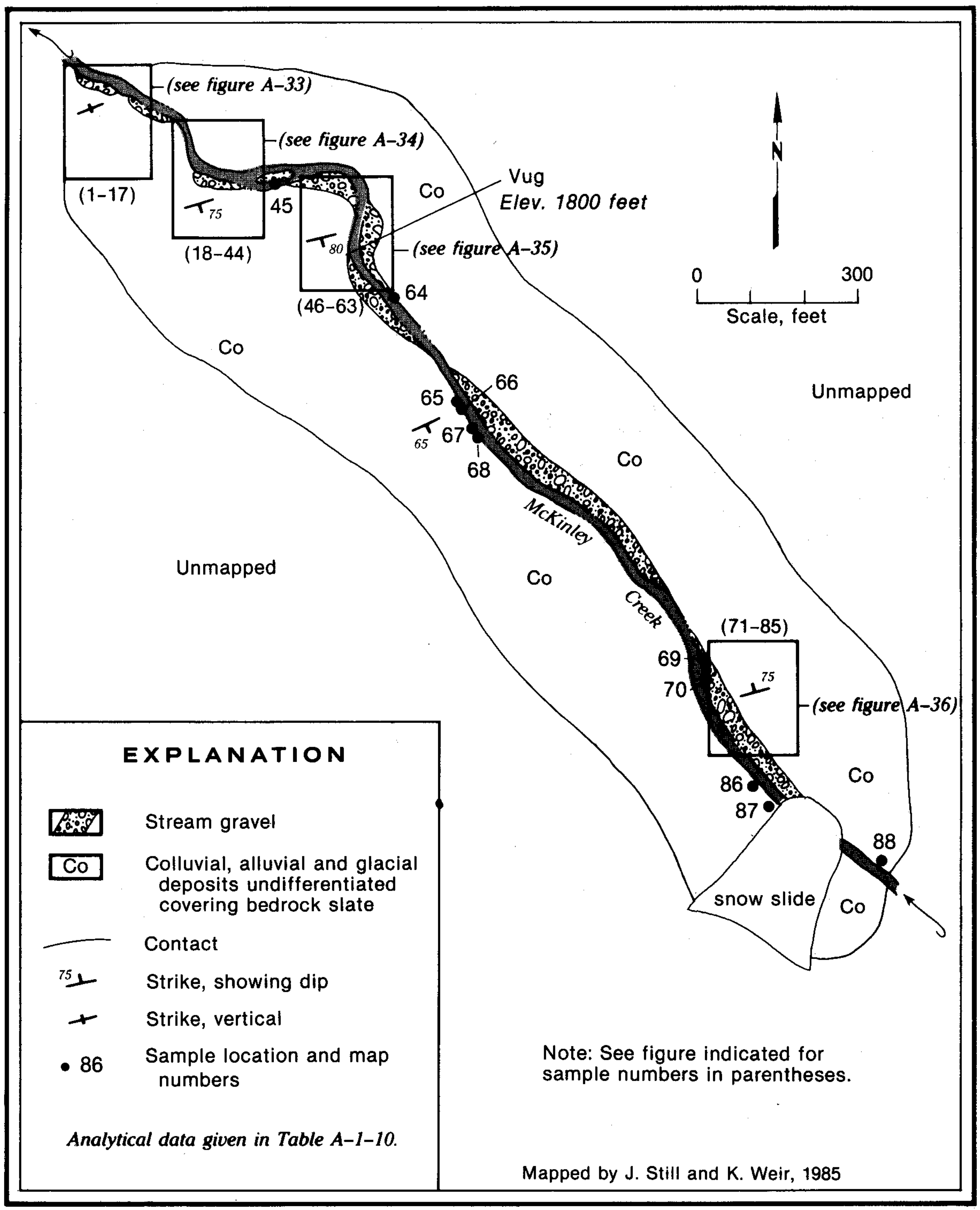


Figure A-32.—Golden Eagle prospect showing geology, detailed map locations, and sample locations.

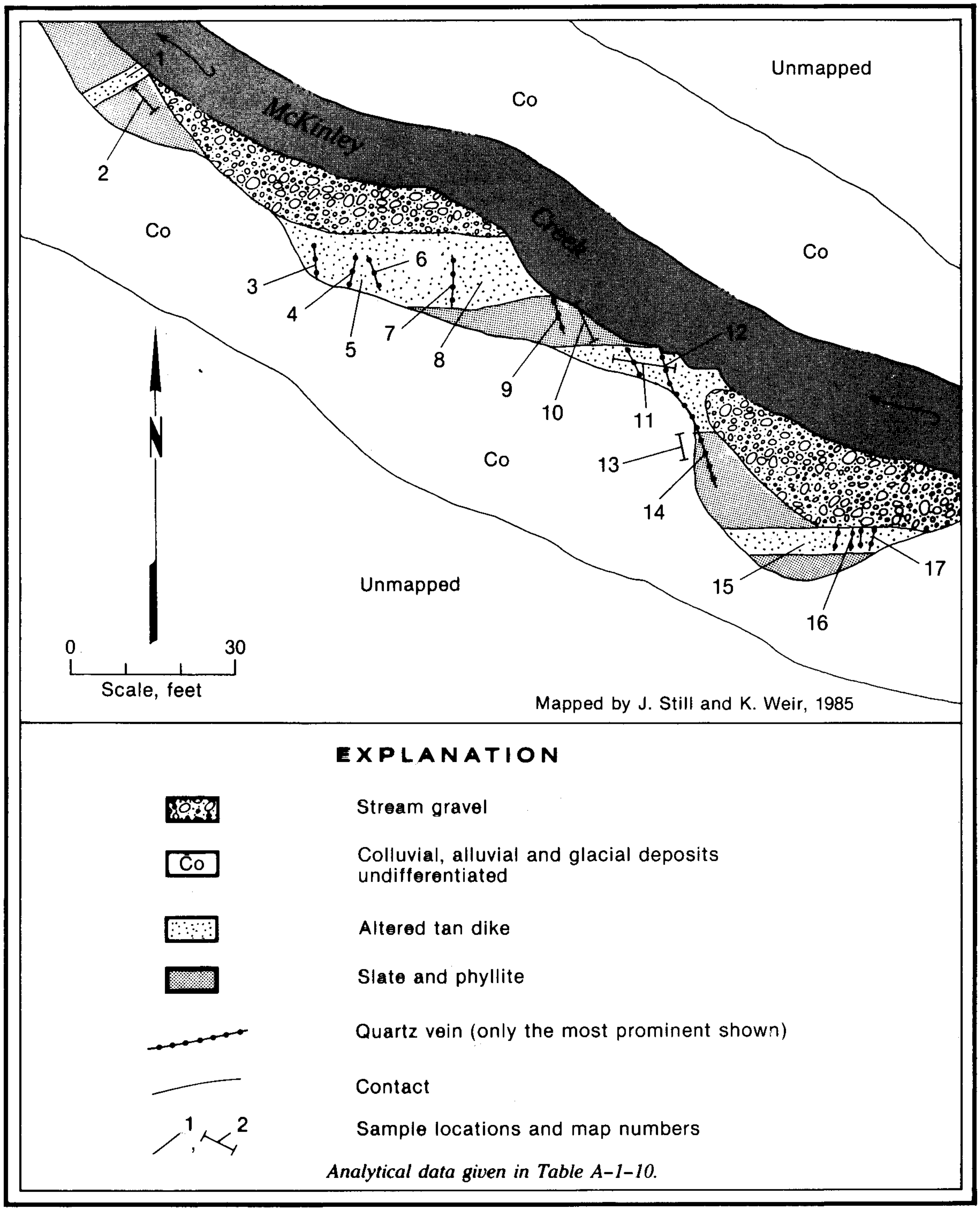


Figure A-33.—Golden Eagle prospect showing detailed geology and sample locations.

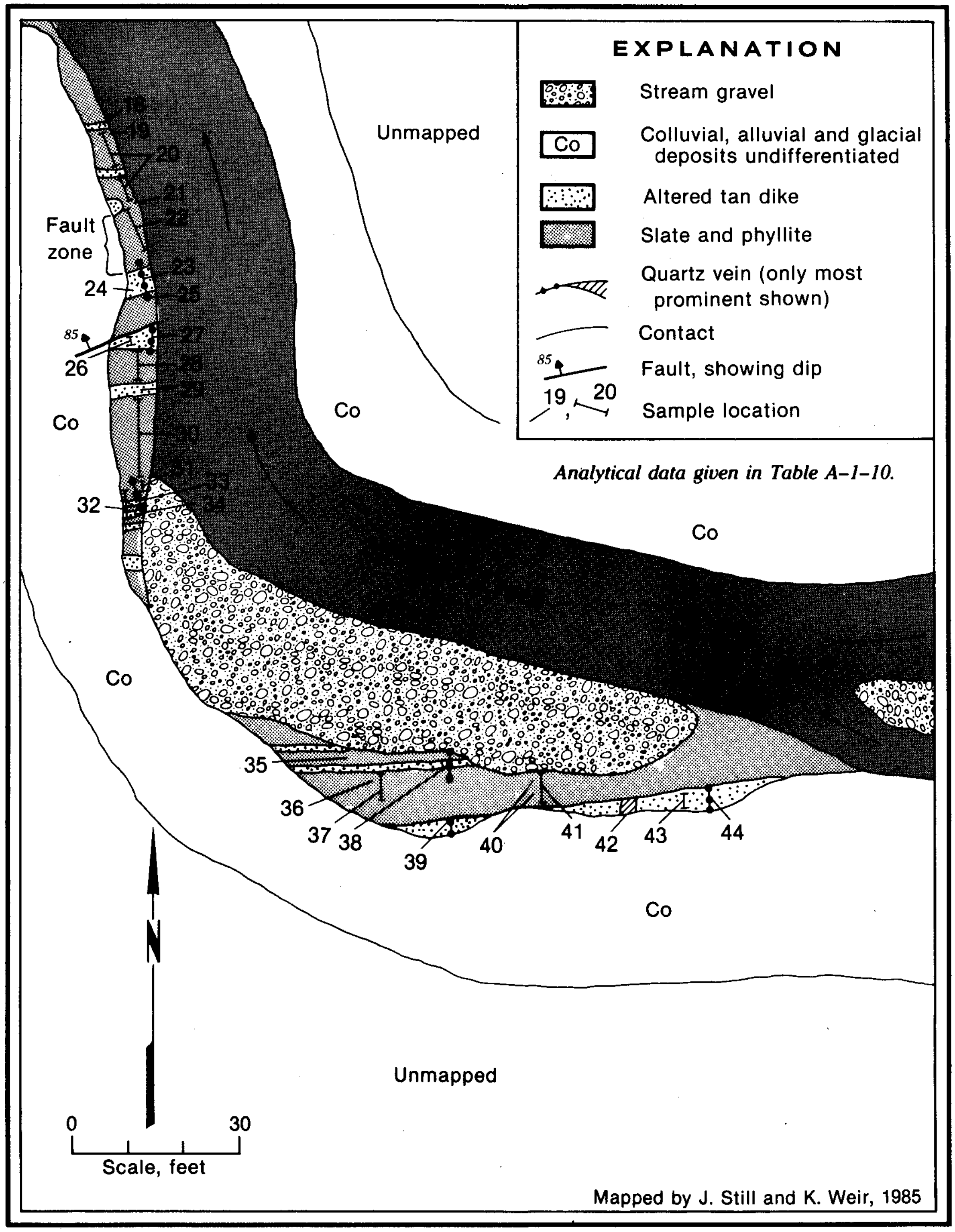


Figure A-34.—Golden Eagle prospect showing detailed geology and sample locations.

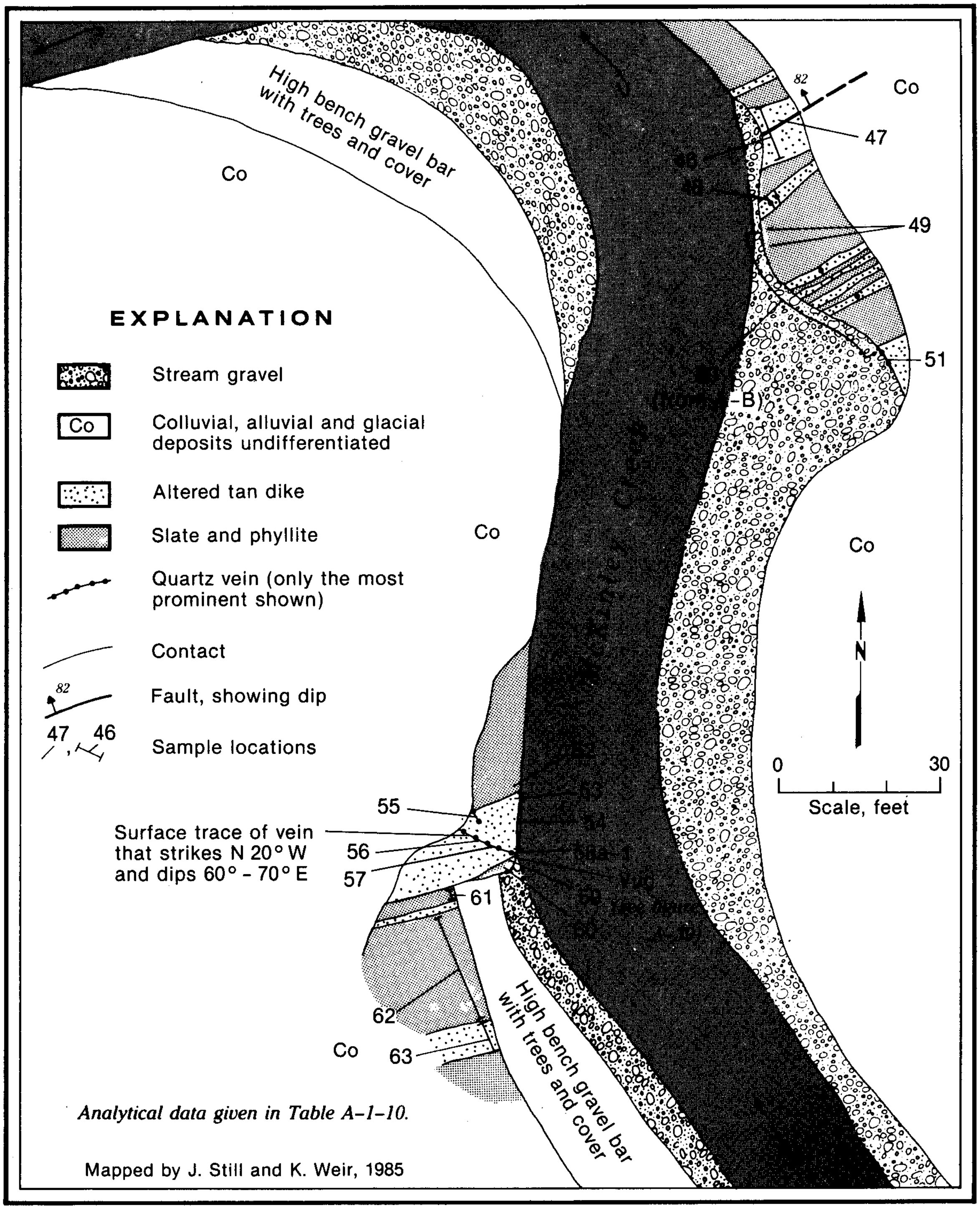


Figure A-35.—Golden Eagle prospect showing detailed geology and sample locations.

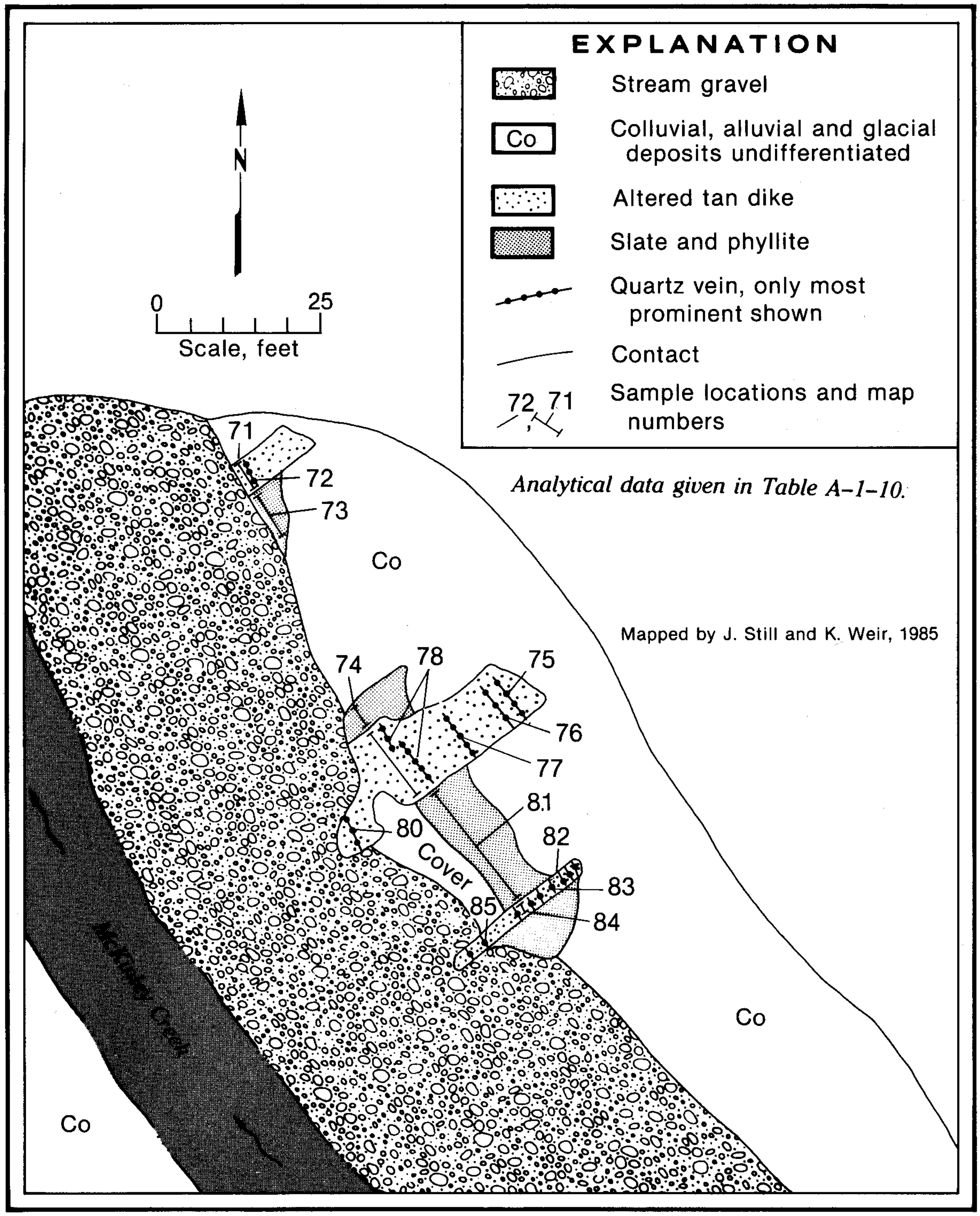


Figure A-36.—Golden Eagle prospect showing detailed geology and sample locations.

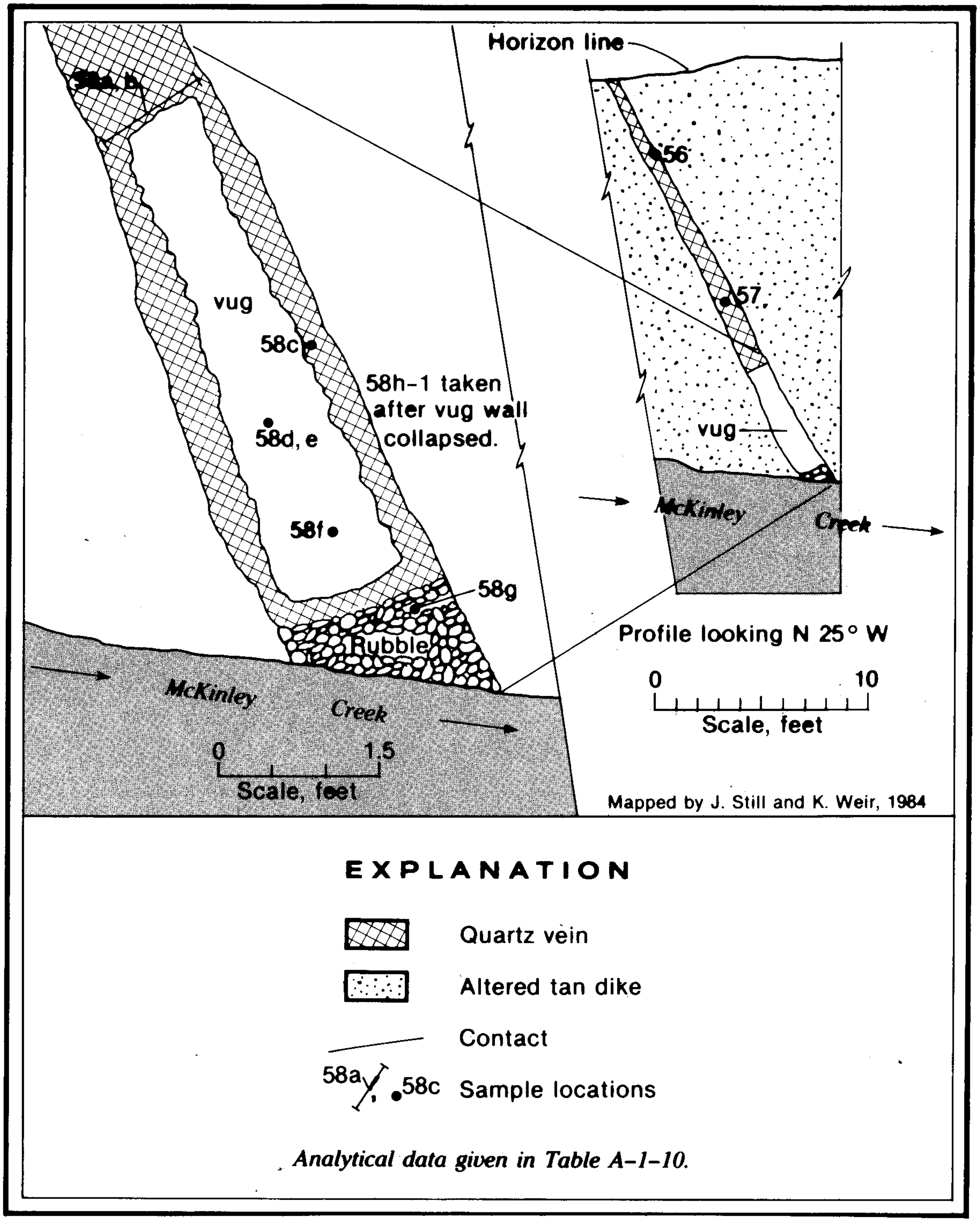


Figure A-37.—Golden Eagle prospect showing the vug geology and sample detail.

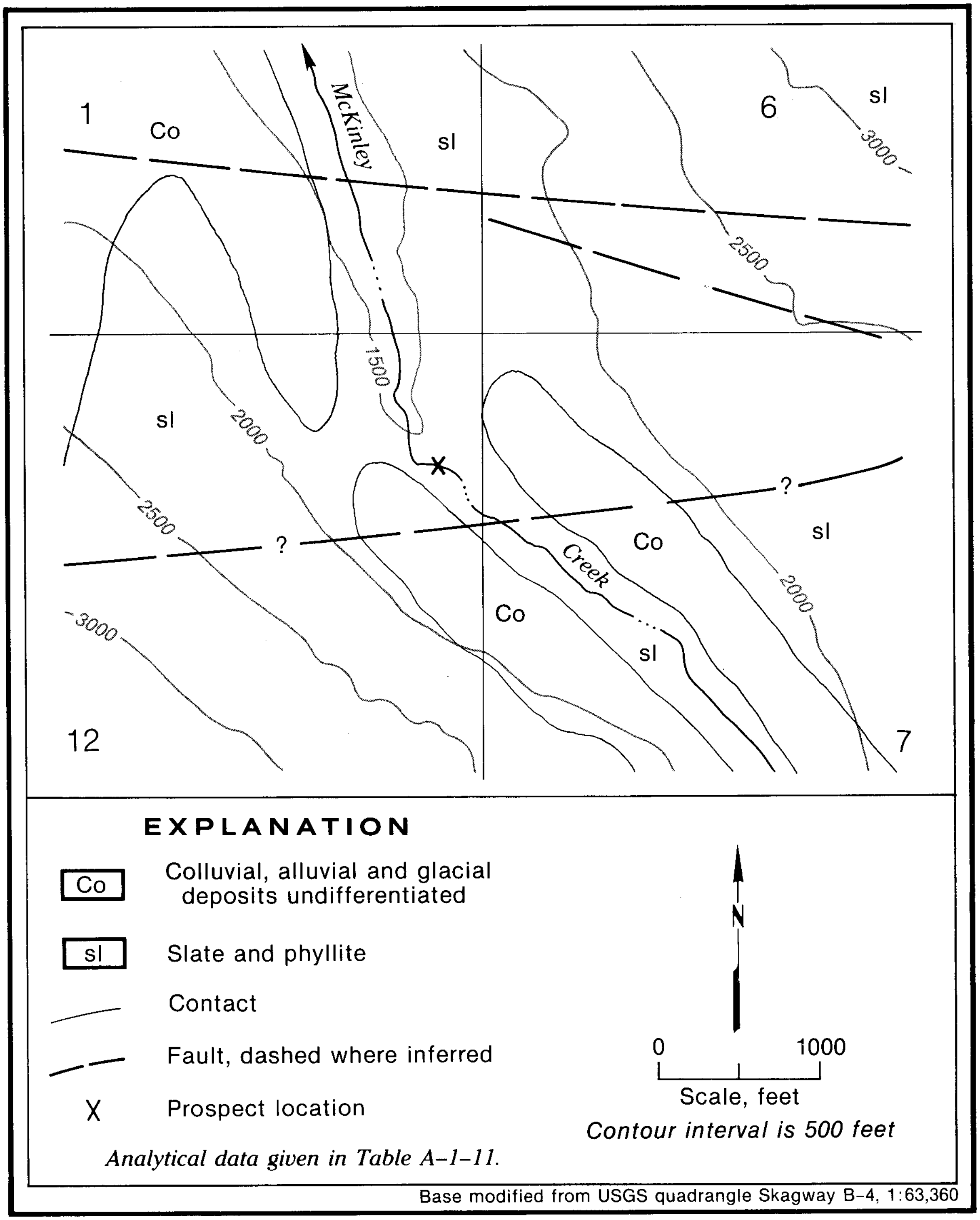


Figure A-38.—McKinley Creek Falls prospect showing location and geology.

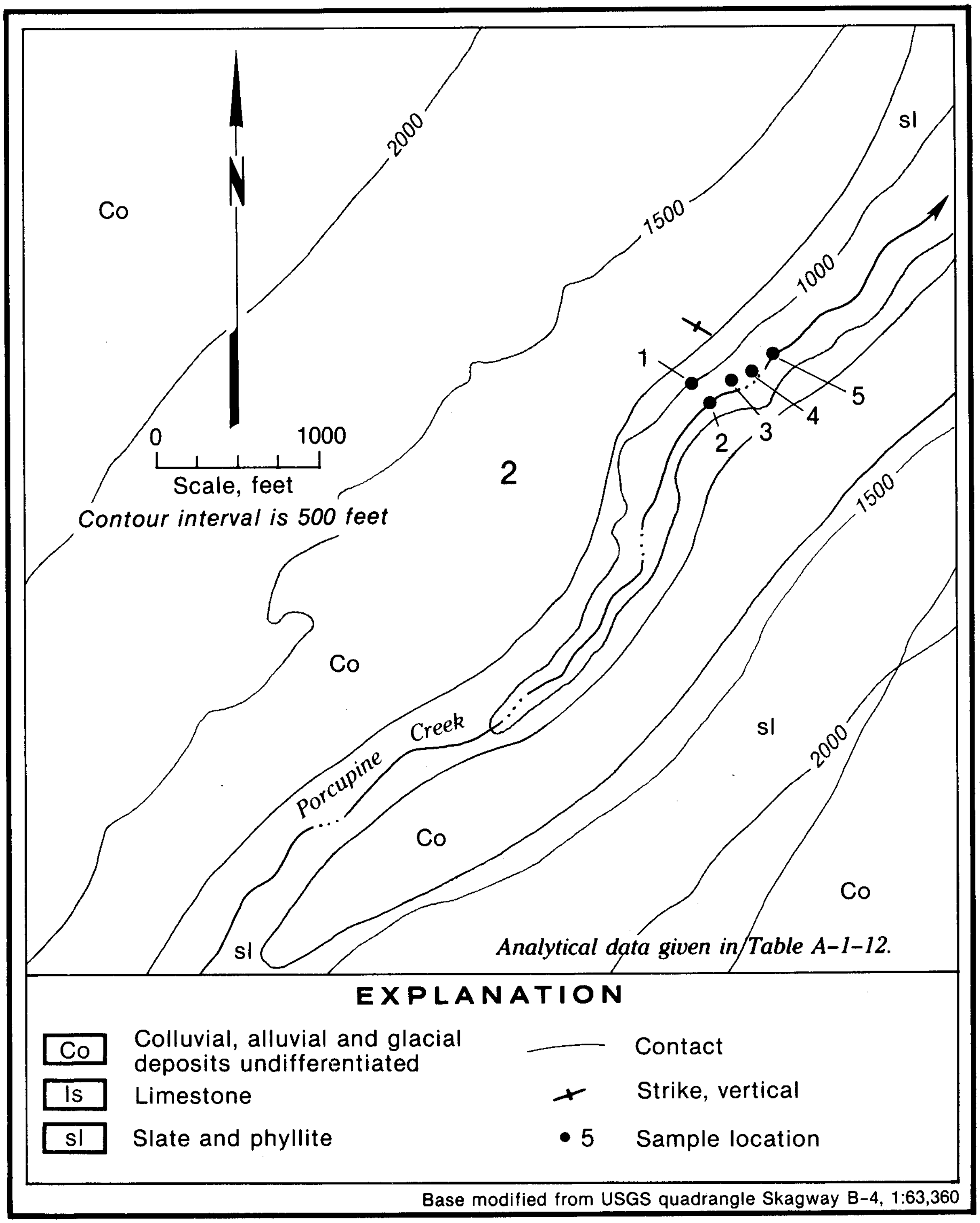


Figure A-39.—Annex No. 1 prospect showing geology and sample locations.

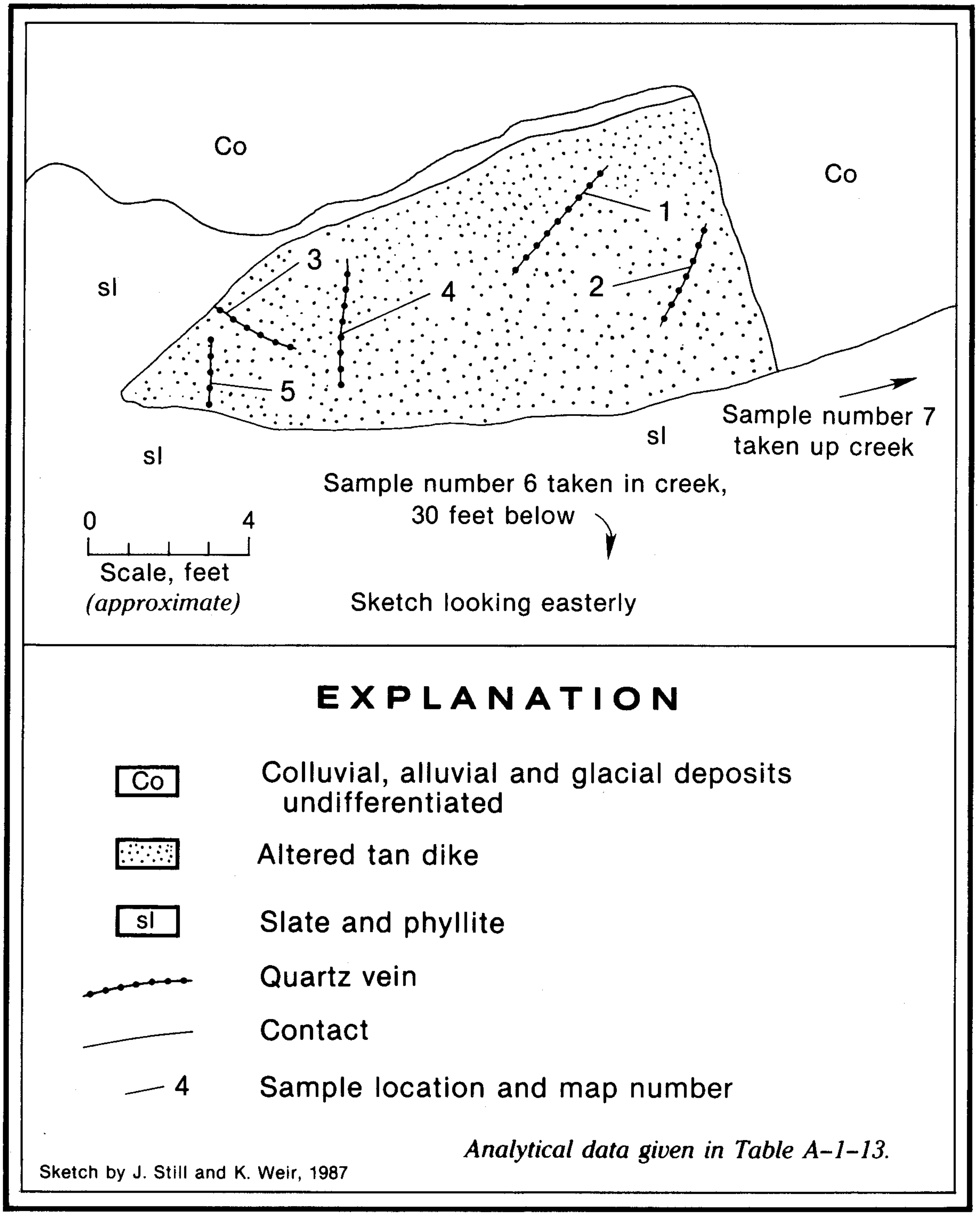


Figure A-40.—Wolf Den prospect detail showing geology and sample locations.

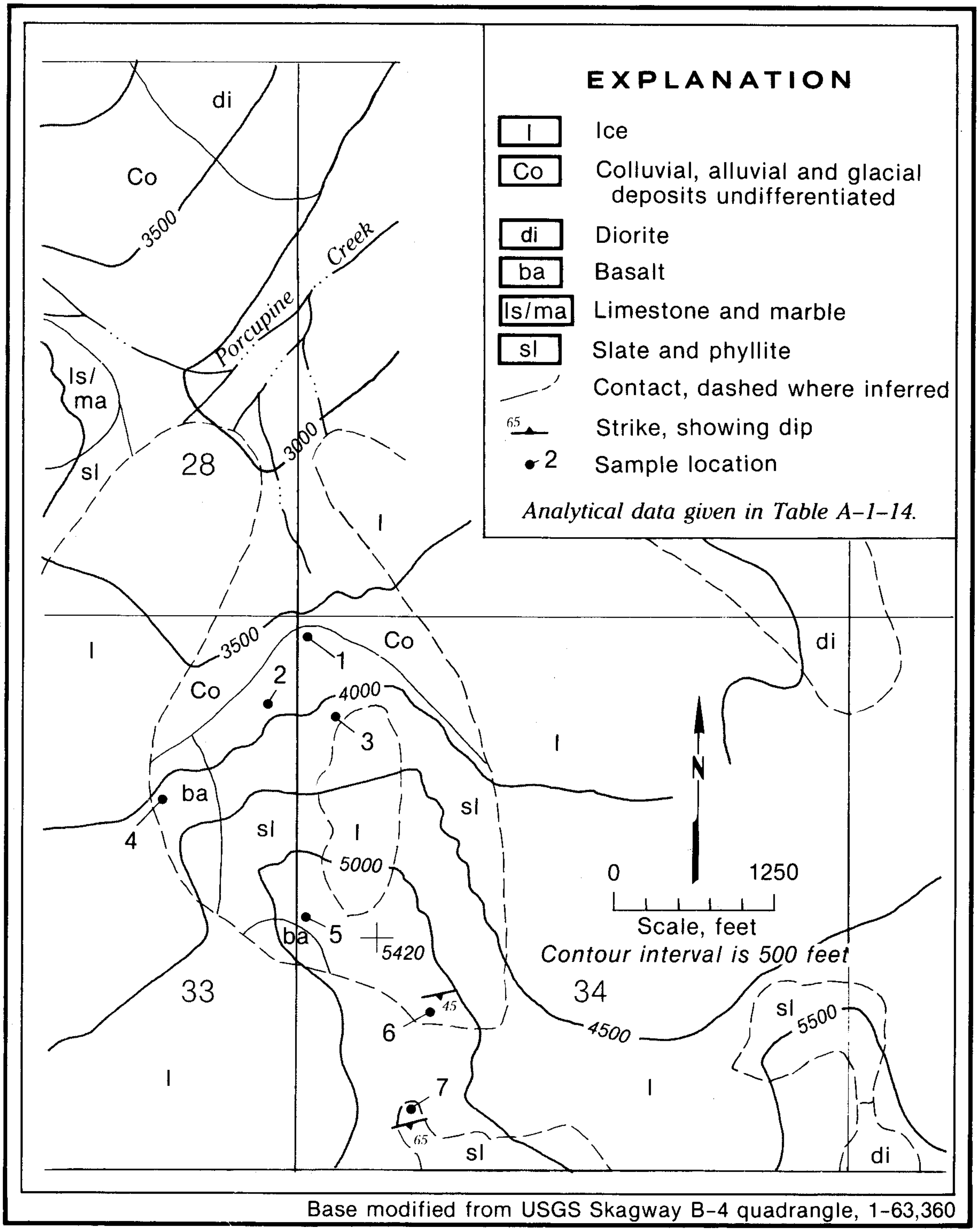


Figure A-41.—Quartz Swarm prospect showing geology and sample locations.

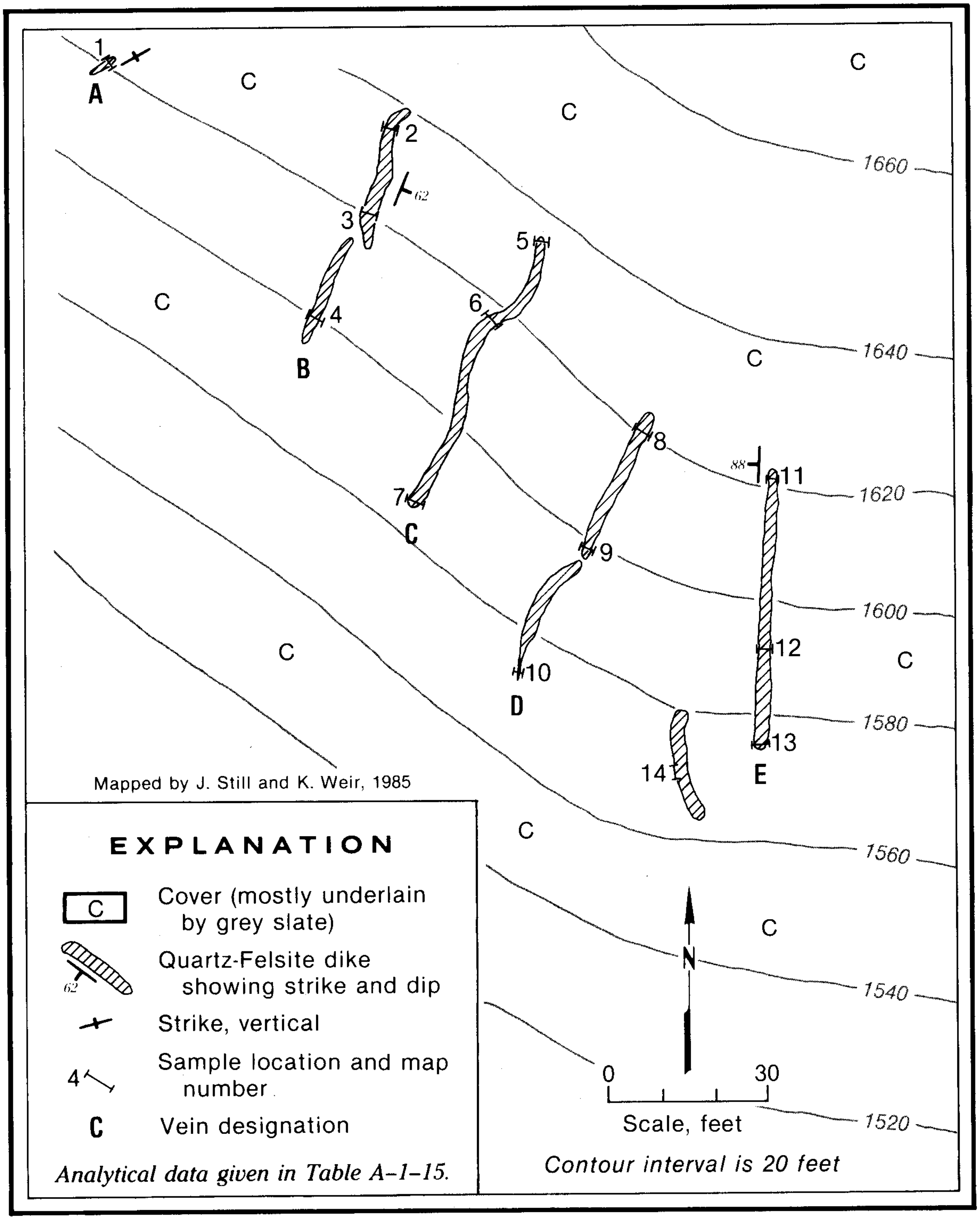


Figure A-42.—Big Boulder Quartz Ledge prospect showing geology and sample locations.

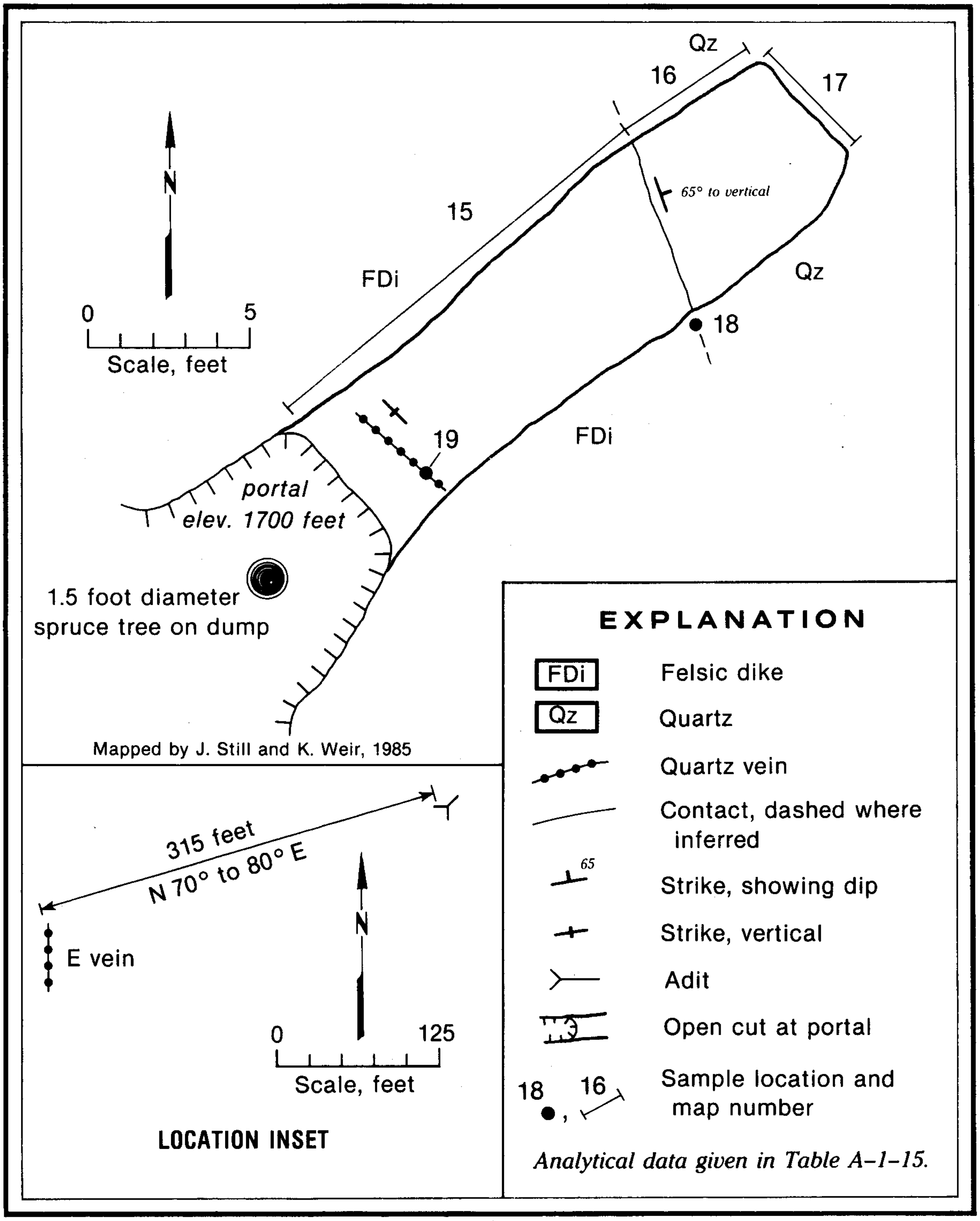


Figure A-43.—Big Boulder Quartz Ledge prospect adit showing geology, sample locations and inset of entire prospect.

Lost Silver Ledge Prospect

Introduction—History

The Lost Silver Ledge prospect is located on a ledge in the middle of an east facing cliff about 0.5 mile south of Summit Creek near its mouth (fig. A-5, loc. T). Mr. R.C. Manuel, a local prospector, originally discovered the prospect and mined a high-grade silver lens from it during the 1930's. Although Mr. Manuel revealed that he had mined a high-grade silver ledge and used a sled to move the ore during the winter, he did not reveal the prospect's location (*A-38*).

The discovery by this study of an old sled left in a tree near the mouth of Summit Creek, led to a search of the area, finding sphalerite-galena-rich quartz float in a gulch located 0.5 mile south of Summit Creek, and to the rediscovery of the old prospect during August 1985. Figure A-44 shows Bureau personnel at the prospect.

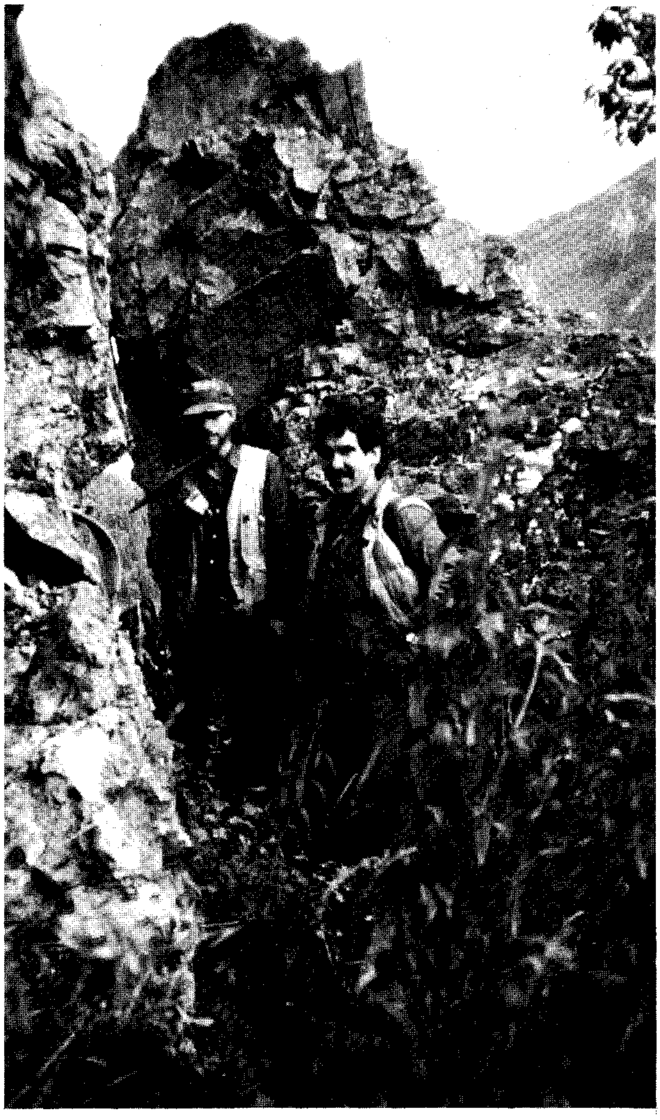


Figure A-44.—Bureau personnel examine the Lost Silver Ledge prospect. A Haines prospector, R. C. Manuel, reportedly mined a small amount of silver from this prospect during the 1930's. It was rediscovered by Bureau personnel in 1986 (J. Still, photographer).

Prospect Description

The Lost Silver Ledge prospect consists of quartz sulfide veins hosted in dolomitic limestone. These veins are exposed in a 500-foot-high cliff and do not continue into adjacent slate. The dolomitic limestone in the area is of limited extent. Figure A-45 shows the area geology while Figures A-46 and A-47 show the prospect geology and location of samples and workings. Appendix A-1 table A-1-16 contains the analytical results. Access to the prospect is via gulches from the Tsirku River to the base of the dolomitic limestone cliff at an elevation of 1,500 feet. The cliff can be skirted along its base to the north. The north rim of the cliff can be traversed up brush choked gullies to an elevation of 2,000 feet where a scramble over loose slate brings one to the top of the dolomitic limestone. A short scramble down a narrow limestone rib brings one to the top of the prospect stope.

Prospect workings consist of a 5-foot adit and stope across a narrow rib where a silver-rich lens was reportedly mined out. The stope is about 10 feet high, 3 to 5 feet wide, and 20 feet long. (An old pick and shovel with rotted out handles, and vegetation covering portions of the workings tend to confirm that they had not been disturbed for 50 years.)

Examination of the stope revealed a narrow quartz sulfide vein striking 45° and dipping 40° west that extended about 8 feet. The sulfides consisted predominantly of jamesonite with lesser amounts of galena and tetrahedrite. The vein is up to 0.4 foot wide and is adjacent to a felsic dike. Samples collected from it contained up to 14.190 ppm gold, 871.6 ppm silver, 1,540 ppm zinc, 1.70% copper, and 42.5% lead (fig. A-46, No. 3).

The most prominent vein system on the prospect starts 25 feet southeast of the stope, continues 55 feet, and then extends down the cliff face for hundreds of feet (fig. A-46, Nos. 6-11 and fig. A-47, No. 10). Samples from this vein system contained from 0.06 to 1.320 ppm gold, from 346.0 to 3,423.1 ppm silver, from 0.99% to 4.89% zinc, and from 4.36% to 39.3% lead. Samples were collected of quartz veins near the base of the dolomitic limestone cliff 500 feet below the workings described above (fig. A-45, No. 16). These samples contained up to 0.04 ppm gold, 8.9 ppm silver, 54% zinc, and 4,580 ppm lead.

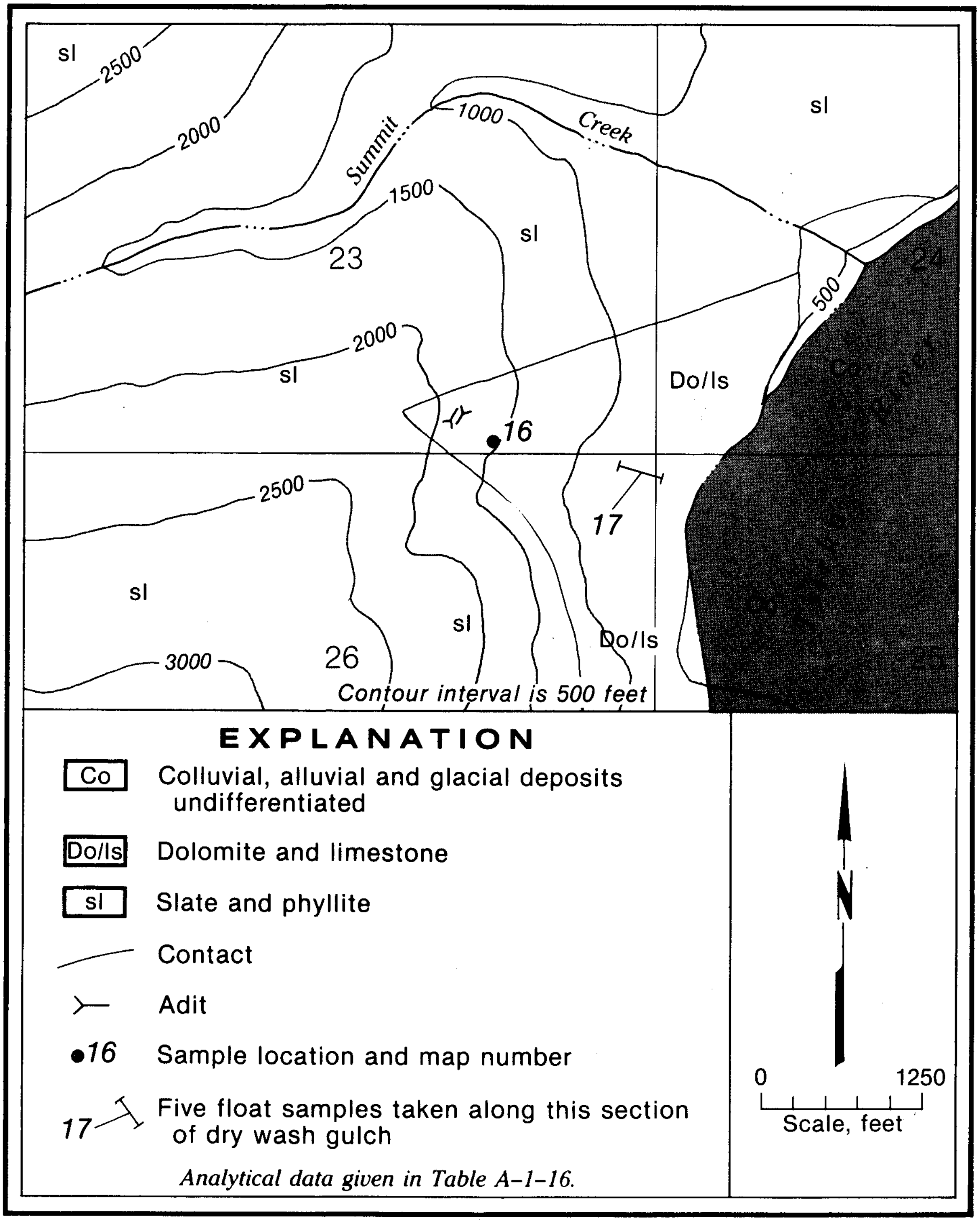


Figure A-45.—Lost Silver Ledge prospect area showing geology and sample locations.

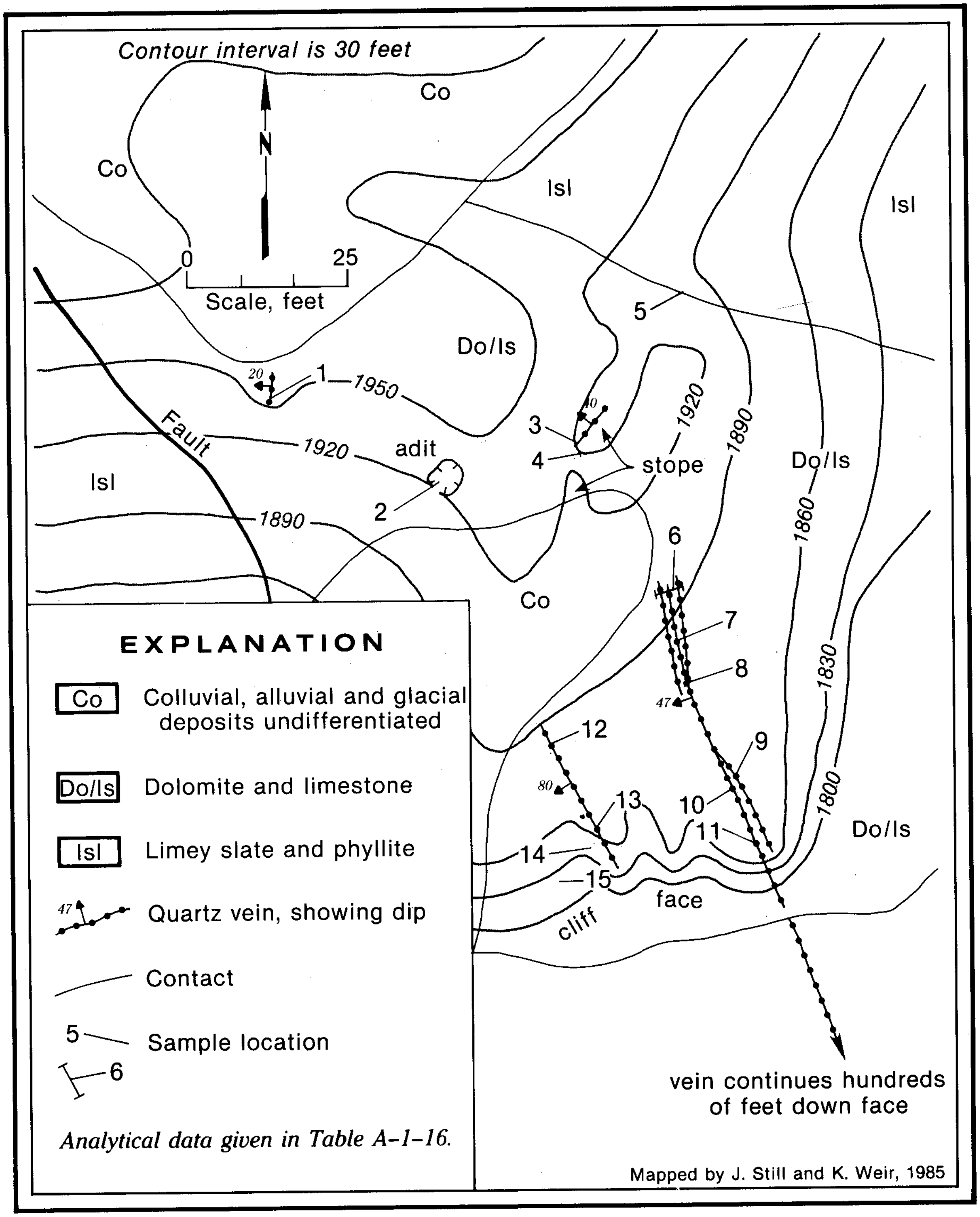


Figure A-46.—Lost Silver Ledge prospect detail, geology, workings, and sample locations.

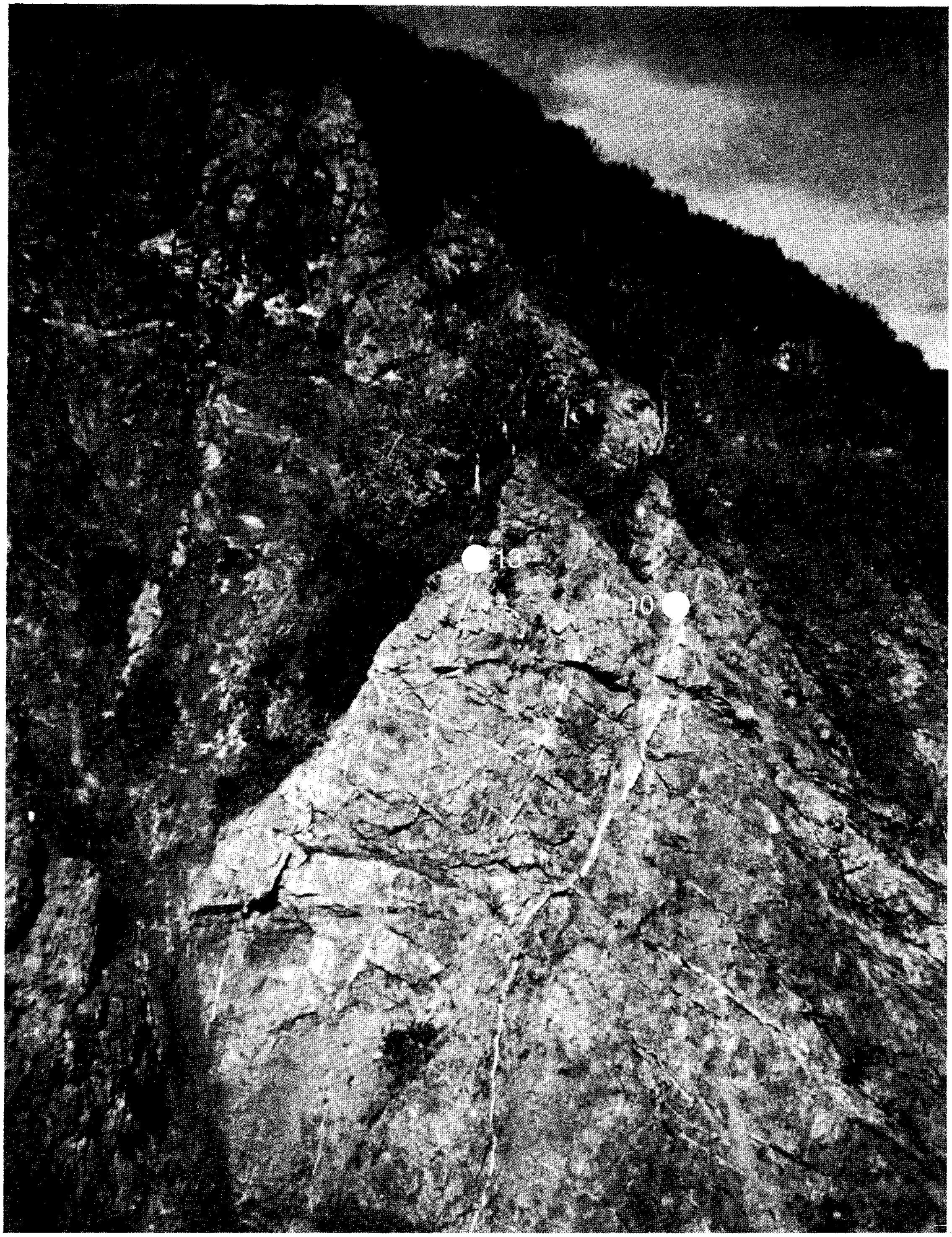


Figure A-47.—Photograph of the Lost Silver Ledge prospect showing veins in cliff and sample locations 10 and 13.

Conclusions

While some of the veins sampled contained ore-grade material, it was of very limited extent. However, such material encourages prospecting in the area for larger silver, lead, and zinc mineralized systems.

Tsirku Silver Occurrence

The Tsirku silver occurrence is located on the east side of the Tsirku River at a location across from Summit Creek and the Lost Silver Ledge prospect. It was discovered by this study in 1986 and consists of scattered, narrow, and discontinuous silver-bearing zinc-galena quartz veins hosted in dolomite and limy slate. Samples across these veins contained up to 0.380 ppm gold, 653.5 ppm silver, 18.4% zinc, and 6.20% copper (table A-1-17). Figure A-48 shows the area geology and sample locations.

Merrill's Silver Prospect

A silver prospect located 1.5 to 2 miles southwest of VABM knob 1,720 (fig. A-5, loc. K) was first discovered by Merrill Palmer in 1980. It is located in an area of brush and timber, penetrated by overgrown logging roads, with few outcrops. Figure A-49 shows the area geology and sample locations. It consists of narrow silver-bearing galena-sphalerite quartz veins, located in isolated outcrops scattered over a distance of at least 1,500 feet, and between elevations of 700 to 950 feet. These veins are hosted in dolomite and argillite, and samples across them contained up to 0.471 ppm gold, 610.3 ppm silver, 13.0% zinc, 1,640 ppm copper, and 15.7% lead (table A-1-18).

Glacier Creek Prospect

A 10-foot-long adit, located along a pyrite-bearing shear zone in limestone, is located on the east bank of Glacier Creek (fig. A-5, loc. D.) This adit is reported in MacKevett, 1971. Samples collected in the adit and its vicinity contained up to 0.590 ppm gold, 3.0 ppm silver, 1,100 ppm zinc, 550 ppm copper, and 140 ppm lead (table A-1-19). Figure A-50 shows the adit and sample locations.

Skarn Occurrences

Two skarn occurrences were discovered as a result of this study (fig. A-5, locs. Q, R), and a third was discovered in 1986 by Merrill Palmer (fig. A-5, loc. M). These are all located in the vicinity of Flower Mountain or to the east of Flower Mountain. All are located near medium grained hornblende diorite (Ki) contacts with metasediments and metavolcanics (TrDb, Pzs, MDI.) These are all too low-grade and small to attract development, but establish the development of skarn mineralization along contacts in the area and encourage exploration for such deposits.

The Rainy Hollow skarn area, located 10 miles from the border in British Columbia, has been known for its gold-silver base metal skarns since 1900, and has been the target of exploration that included diamond drilling, and underground development since 1908 (fig. A-28, loc. E).

Clair Bear Occurrence

The Clair Bear occurrence (fig. A-5, loc. Q) is located east of Flower Mountain at an elevation of 3,700 feet, in an area of considerable turf cover. Figure A-51 shows the occurrence and sample locations. It consists of narrow discontinuous pyrrhotite-pyrite-chalcopyrite lenses that are hosted in a felsic dike. Samples collected from these lenses, or the rubble crop below them, contain up to 0.028 ppm gold, 56.2 ppm silver, 2,290 ppm copper, 1,070 ppm cobalt, 700 ppm tin, 1,000 ppm arsenic, 800 ppm nickel, 1,000 ppm bismuth, and 7,000 ppm antimony (table A-1-20).

Porcupine Roof Pendant Occurrence

A 400-foot by 1,000-foot roof pendant surrounded by diorite (Ki) is located at an elevation of 3,500 feet, near the headwaters of Porcupine Creek (fig. A-5, loc. R). Figure A-52 shows the occurrence and sample locations. A sample of gossan rubblecrop collected 500 feet below the pendant contained 6.33 ppm gold, 18.2 ppm silver, and 515 ppm copper. The pendant consists of metamorphosed slates and limestone that at some locations form bands of garnet and diopside. Samples collected from the pendant contained up to 0.068 ppm gold, 1.1 ppm silver, 192 ppm zinc, and 230 ppm copper (table A-1-21).

Shannon Prospect

The Shannon prospect (fig. A-5, loc. M), discovered in 1987 by Merrill Palmer, is located on the north slopes of the Flower Mountain at an elevation of 4,500 feet. Figure A-53 shows the prospect and sample locations (all samples collected at prospect X). It consists of a small iron-stained lens of grossularite garnet-sulfide-magnetite skarn mineralization. Samples collected from this lens contained up to 0.068 ppm gold, 1.3 ppm silver, 600 ppm zinc, 3,400 ppm copper, and 245 ppm cobalt (table A-1-22).

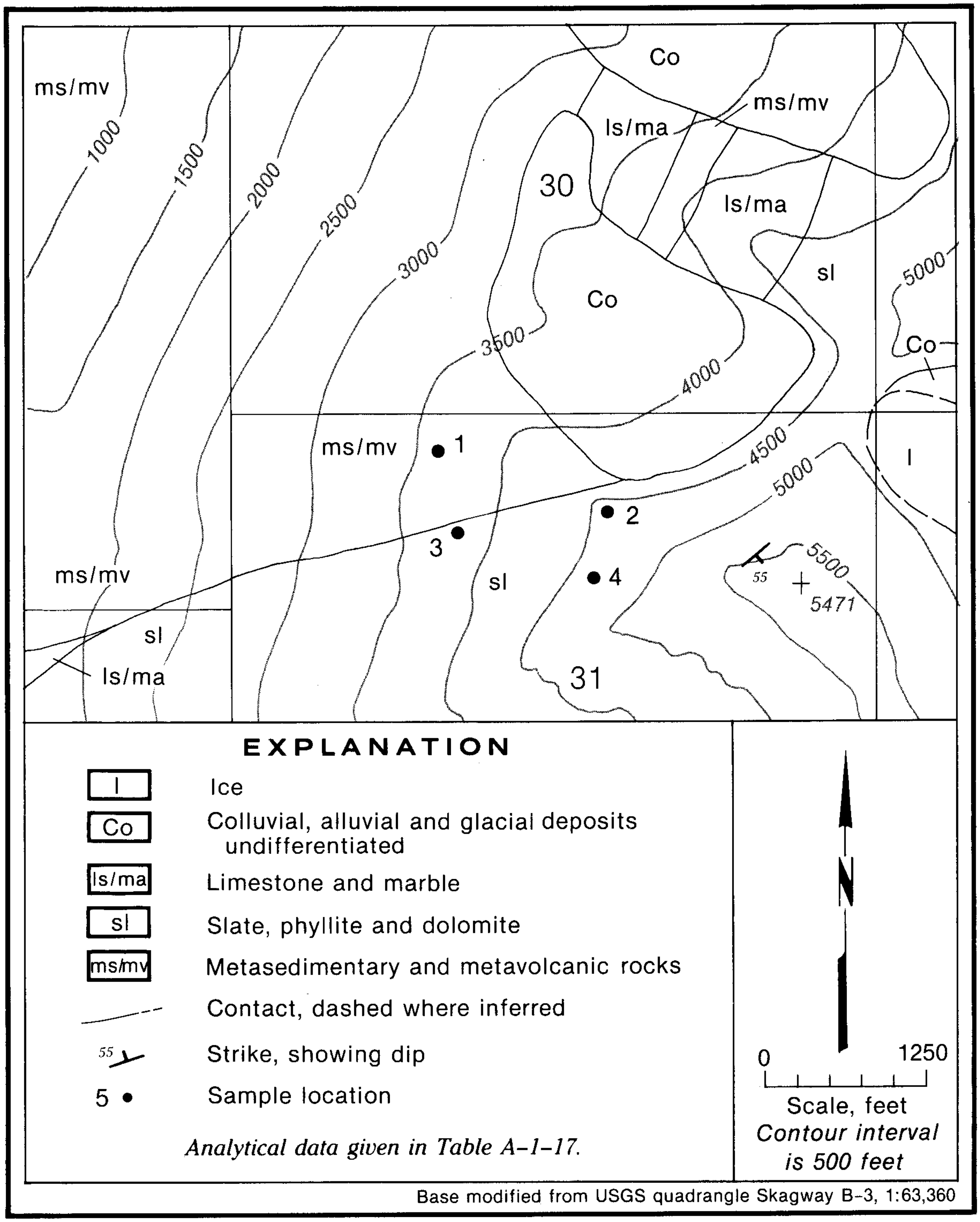


Figure A-48.—Tsirku Silver occurrence showing geology and sample locations.

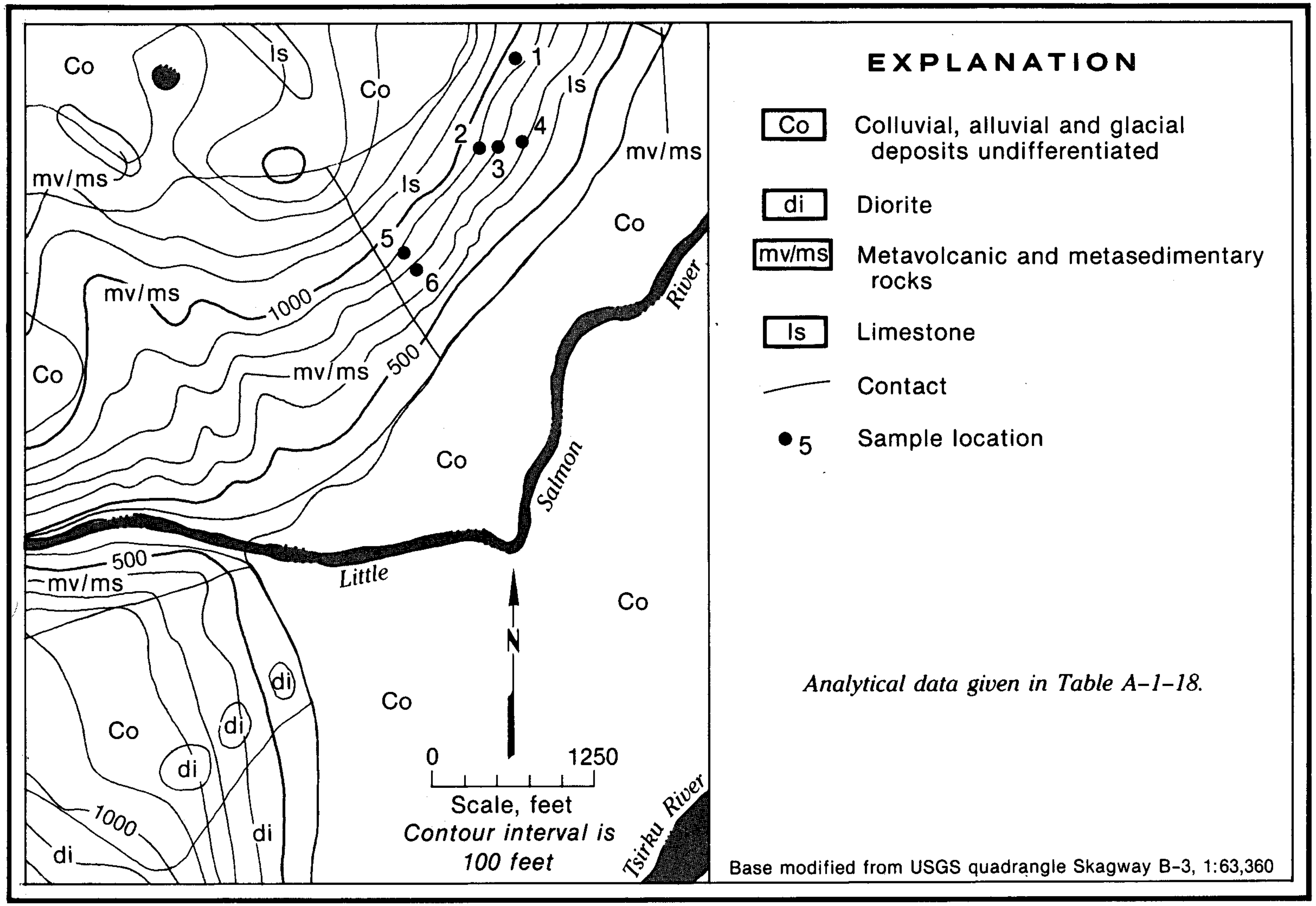


Figure A-49.—Merrill's Silver prospect, showing geology and sample locations.

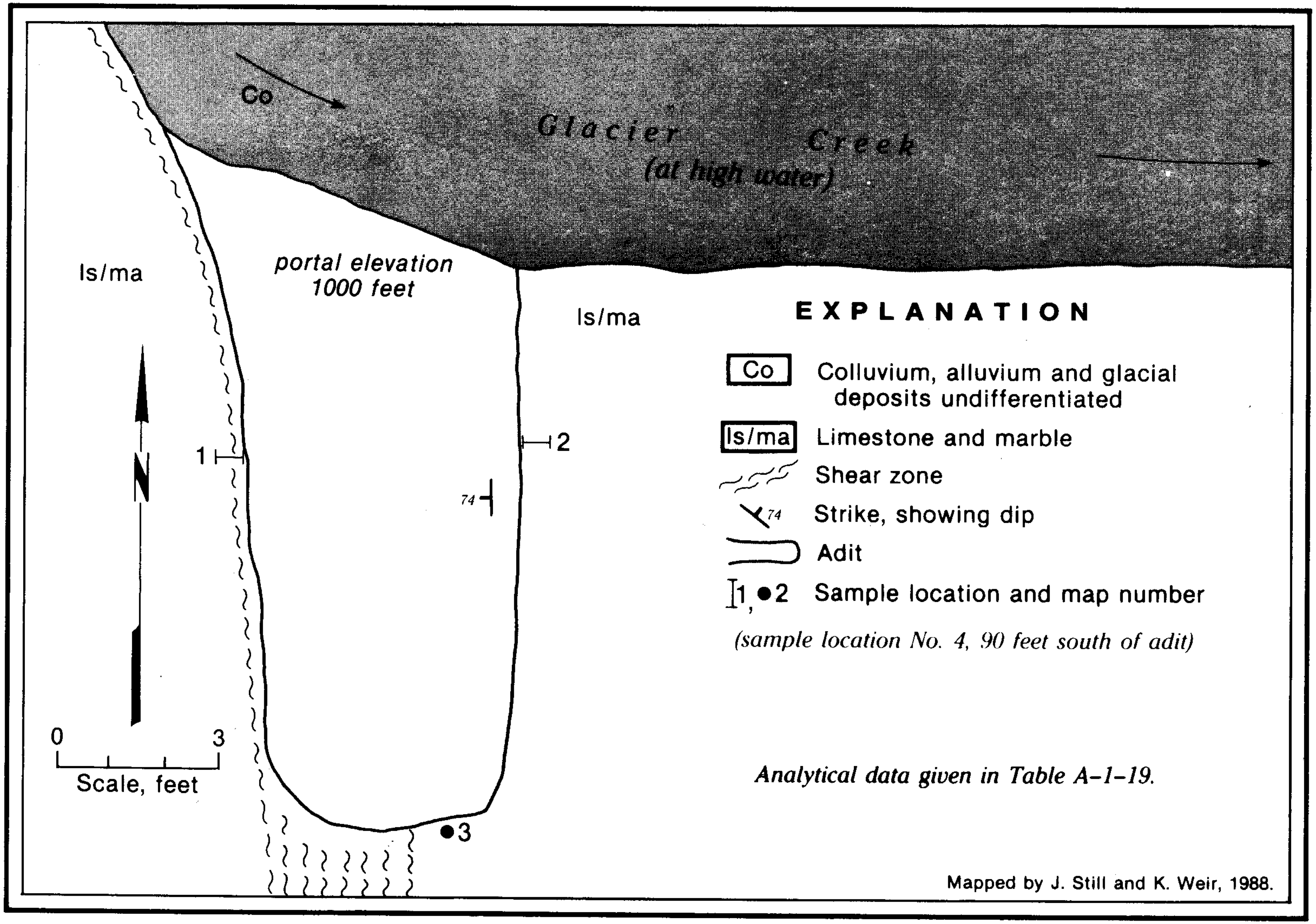


Figure A-50.—Glacier Creek prospect showing geology, workings, and sample locations.

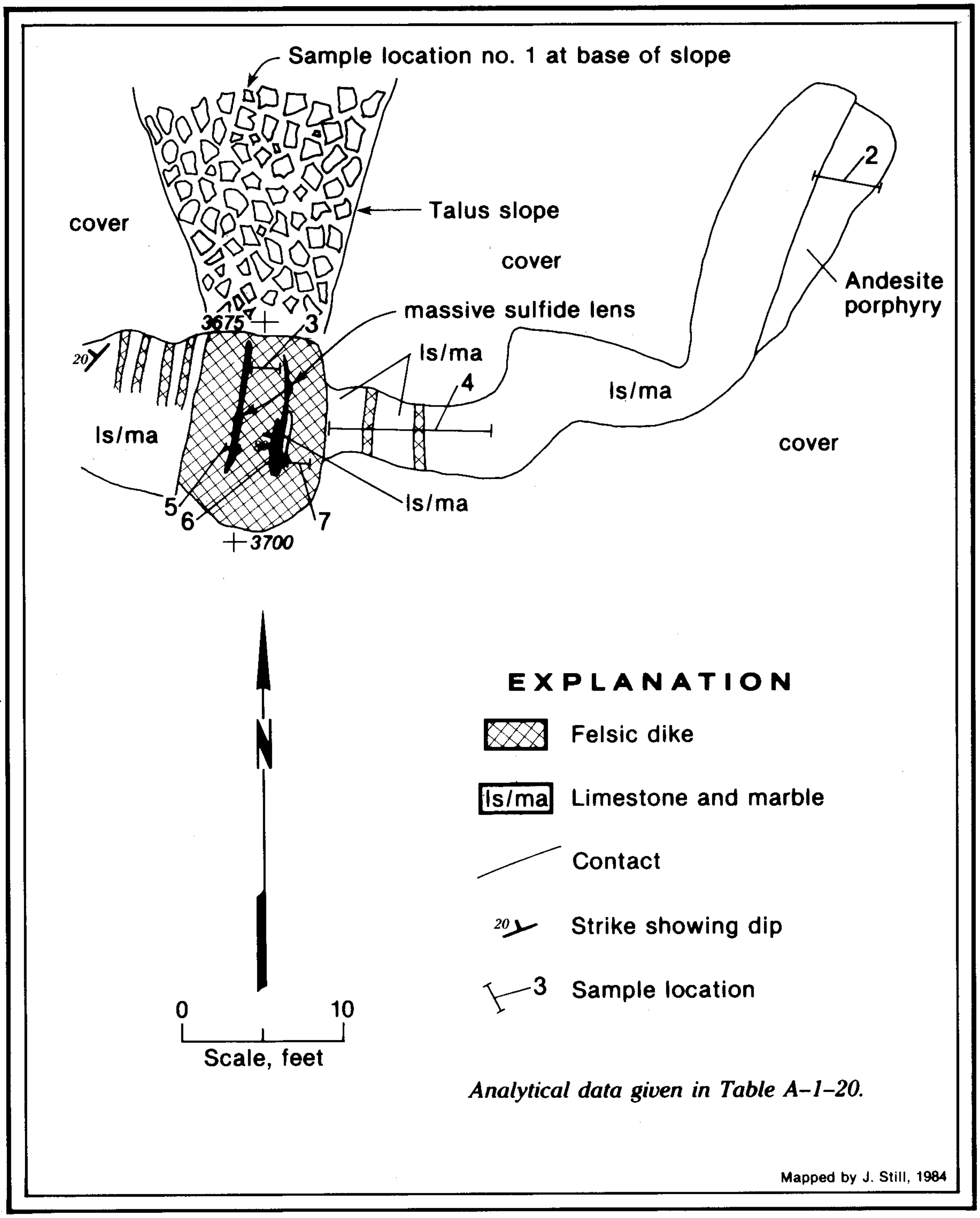


Figure A-51.—Clair Bear prospect showing geology and sample locations.

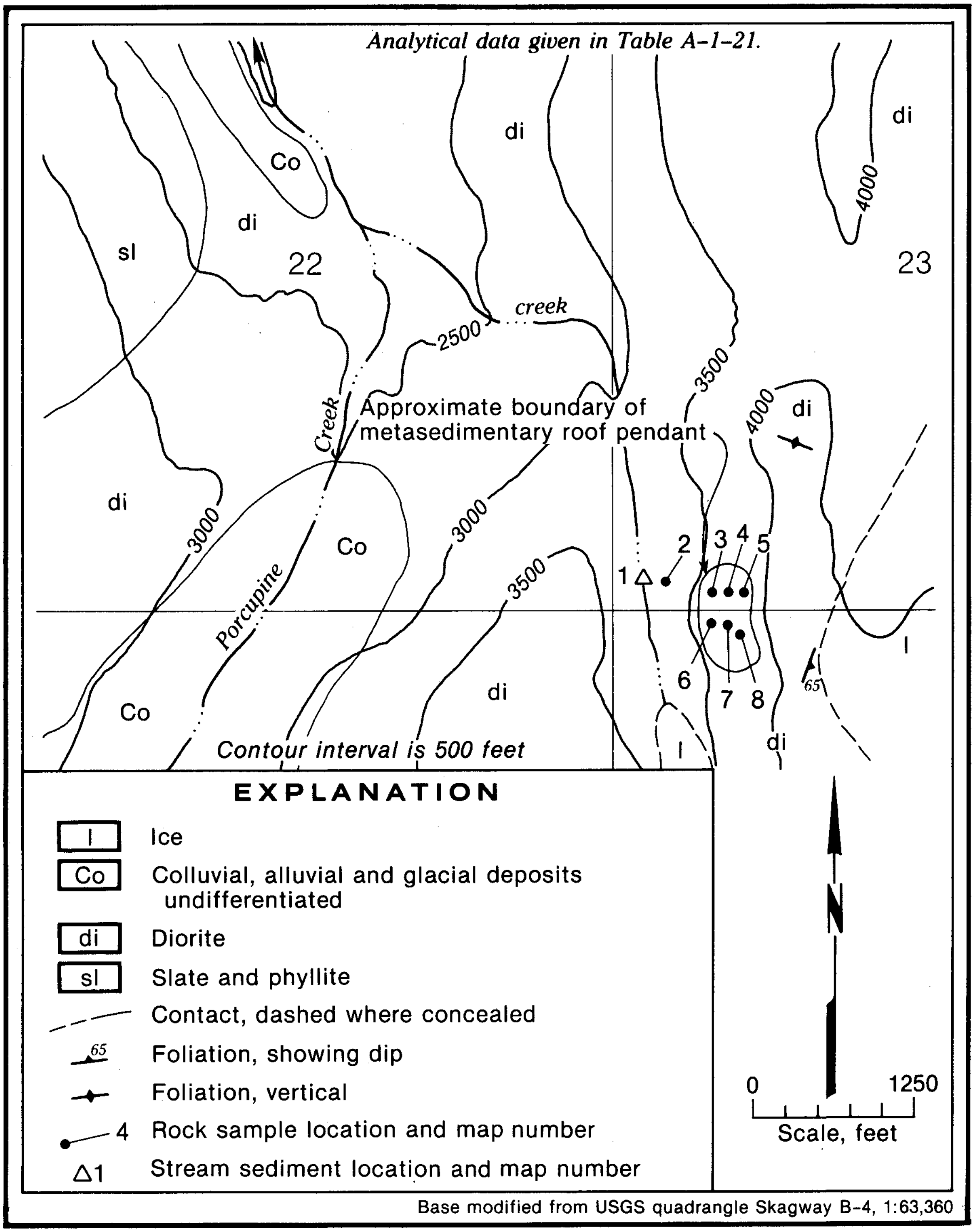


Figure A-52.—Porcupine Roof Pendent occurrence showing geology and sample locations.

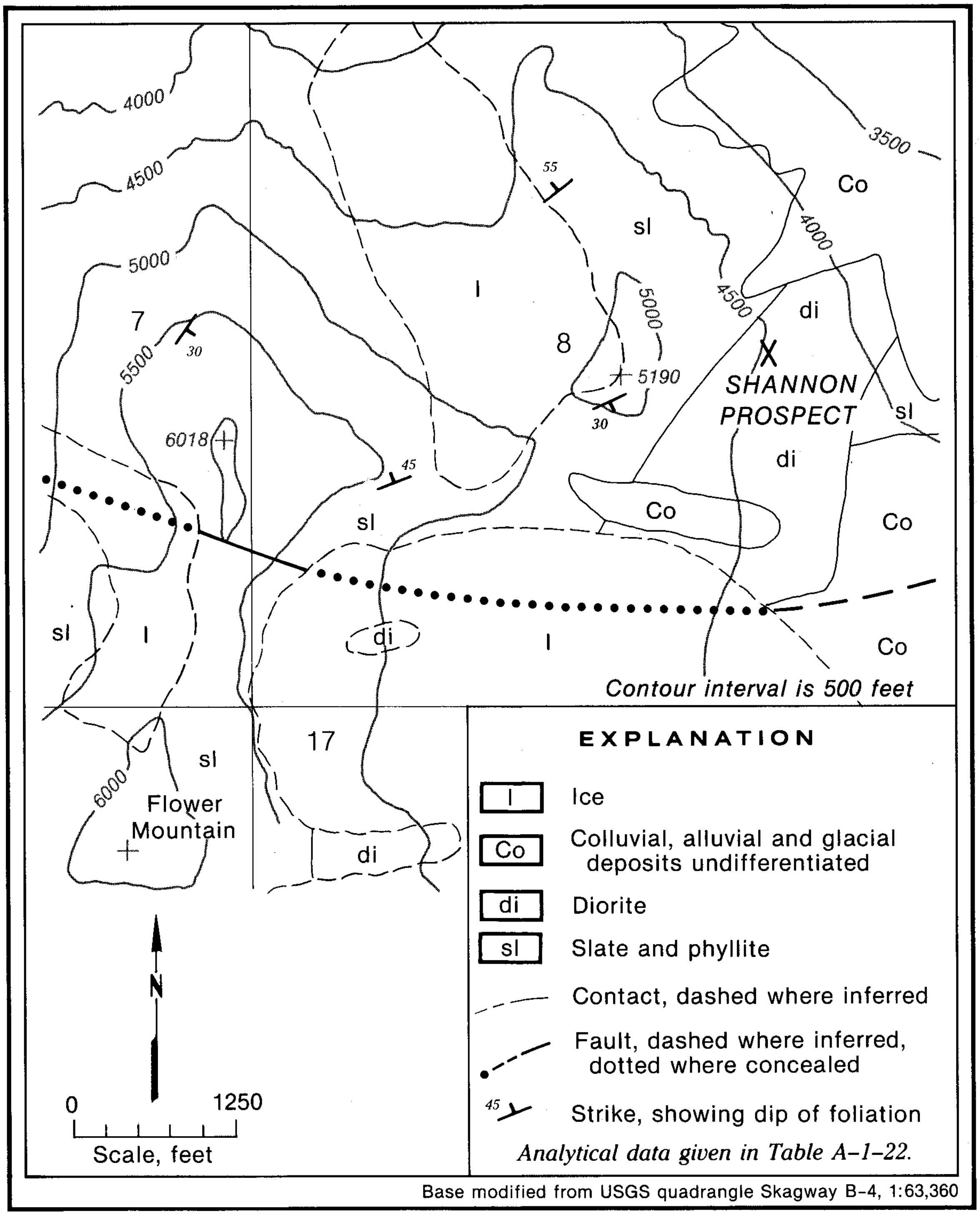


Figure A-53.—Shannon prospect showing geology and location.

PLACER DEPOSITS

Introduction

This section summarizes the results of Bureau and ADGGS placer studies in the Porcupine mining area during 1985, which included the collection of 79 reconnaissance, 53 channel, and 4 site specific bulk placer samples, surficial geologic mapping of auriferous gravels, and size fractionation studies. Figure A-2 shows the location of the streams mentioned herein.

Previous Studies

Coastal Indian trade routes had long been in use in the Klehini River valley by the time of the first recorded exploration. G.M. Dawson in 1888, and J.B. Tyrrell in 1892, both members of the Geological Survey of Canada, explored the district as part of a reconnaissance program (*A-20*, *A-60*). A. H. Brooks of the USGS reported on the geology of the area in 1899 (*A-12*). The first detailed study of the Porcupine mining area was made in 1903 by C. W. Wright of the USGS (*A-66*). H. M. Eakin also of the USGS, visited the area in 1916 and provided an excellent discussion of glaciation and placer mining operations in the area (*A-23*). Numerous references to the Porcupine mining area are made in USGS "Mineral Resources of Alaska" and related series (*A-30*). B.D. Stewart reported on placer operations in the area in 1926 (*A-52*). W. B. Beatty worked on Porcupine Creek in 1936 and wrote a comprehensive thesis concerning the placer deposits of the Porcupine mining area while at the University of Washington (*A-5*). More recent studies in the area have been completed by personnel of the USGS (*A-18*, *A-19*, *A-36*, *A-66*), ADGGS (*A-15*, *A-16*, *A-46*), and the Bureau. The history of the Porcupine mining area has been the subject of several recent articles. The most detailed history of the Porcupine mining area has been compiled by Roppel (*A-49*).

Mining History

In the spring of 1898, packers on the Dalton trail panned gold from the gravels of the Klehini River. Shortly after the discovery most of the streams in the Porcupine mining area were staked; however, many claims were subsequently dropped because of the low quantities of gold found on many of the drainages. Several drainages in the Porcupine mining area have historically produced gold. These include Porcupine, McKinley, Cahoon, Nugget, Cottonwood, and Christmas Creeks. Production records for the Porcupine mining area are sparse. Minimum estimated production through 1985 based upon Bureau records (*A-62*) and reports by Wright (*A-67*), Roppel (*A-49*), and Beatty (*A-5*), is 79,650 ounces (table A-2.)

Placer gold has reportedly been found on several other drainages in the area including Big Boulder and Little Boulder Creeks, the Tsirku and Klehini Rivers, and western drainages to the Chilkat River north of Mosquito Lake. However, no significant production has been reported.

Porcupine Creek

Mining started on Porcupine Creek in 1898. Reported production averaged as high as 9,000 ounces of gold per year until 1906, when high water destroyed much of the workings (*A-5*). During the early years relatively primitive methods of mining were used to recover the gold such as with picks and shovels, small sluices, and rockers.

Table A-2.—Reported placer gold production from the Porcupine mining area

Drainage	Active years	Source	Quantity (oz)
Christmas Creek	1900–1985	estimated	200
Nugget Creek	1902–1909	Beatty (*A-5*)	350[1]
	1909–1985		100
Porcupine, Cahoon, and McKinley Creeks	1898–1903	Wright (*A-67*)	27,000[1]
	1904–1915	Eakin (*A-23*)	43,000[1]
	1916–1925	Beatty (*A-5*)	6,000[1]
	1926–1936	Greatlander (*A-28*)	—[2,3]
	1936–1975	Roppel (*A-49*)	500
	1975–1985	estimated	2,500
TOTAL			79,650

[1] Based upon placer gold evaluated at $17.00/ounce.

[2] Based upon placer gold evaluated at $17.00 prior to 1934 and $30.00/ounce from 1934 to 1936. One-half of the production during this period is assumed to have occurred from 1934 to 1936.

[3] The Greatlander reported that 78,000 ounces of gold were produced during this period. However, this quantity is unsubstantiated by any other source of information available to the authors. Some additional production is likely.

Ground sluicing (booming) also became a popular method for recovering gold. This technique requires the diversion of the creek into a flume or pre-dug channel which allows the miners to remove large boulders from the original channel and loosen the gravel deposits. The water is allowed to flow back into the original channel to remove the loosened gravel and concentrate the gold in depressions for recovery after the stream has been diverted back into the flume or diversion ditch.

In 1907, the Porcupine Mining Company was organized to consolidate the workings in the area. The company erected a flume 1 mile below the junction of McKinley and Porcupine Creeks at a reported cost of $200,000 (*A-49*). This opened up the lower end of Porcupine Creek to gold mining. A trolley lift with 2.5-foot automatic dump buckets was used to feed the hopper with gravel from the dried up creek channel. The company operated until 1915, with an average yearly production of 3,000 ounces (*A-5*). The flume was destroyed by a disastrous flood in 1915.

In 1916, the operations of the Porcupine Mining Company were taken over by the Alaska Corporation. The old flume was repaired and a new flume constructed to feed water to hydraulic mining operations. Mining continued until a flood destroyed the flume in September of 1918. Over 6,000 ounces of gold were produced between 1916 and 1918 (*A-5*).

The next large mining operation began in 1926 when Porcupine Gold Mines, which subsequently became the Alaska Sunshine Gold Mining Company, managed by August Fritsch, took over the Porcupine Creek property. This company constructed several of the existing buildings at the townsite of Porcupine and a 12,000-foot-long "high line flume" to supply hydraulic water at any needed location on Porcupine Creek below its junction with McKinley Creek. The headgate of the flume was located 0.5 mile above the mouth of McKinley Creek. McKinley Creek was spanned by a bridge 160 feet above the creek bed a few hundred yards above its junction with Porcupine Creek. The flume and related structures were completed near the end of 1928. Mining commenced in 1929 but was shut down at the end of the season due to poor returns on investment. Following extensive exploration work mining operations on Porcupine Creek restarted in 1935 by processing gravels from the MacElvery (dry) channel. (*A-5*). Work continued into 1936 until the bridge over McKinley Creek was destroyed by a rock slide. The bridge was rebuilt later in the season. Fritsch died in 1936, and large scale mining on Porcupine Creek ceased. Fritsch's records show that the Alaska Sunshine Gold Mining Company recovered $1,700,000 worth of gold from the Porcupine claims but this report has been unsubstantiated by any other source (*A-28*).

Activities since the Second World War have been sporadic, but a brief mining resurgence occurred in 1959–1960, when five small operations employing 15 people worked various claims on Porcupine Creek and its tributaries (*A-65*). When gold prices soared in the late 1970's and early 1980's, mechanized placer mining was employed and produced up to several hundred ounces annually until 1984. Jo Jurgeleit, James McLaughlin, Merrill Palmer, and others continue to take out small amounts of placer gold from their claims. Activity in 1985 was limited to minor hand placering with only a few ounces of gold being produced.

McKinley Creek

Mining on lower McKinley Creek (below Cahoon Creek) began at about the same time as activity on Porcupine Creek. Most of this section was mined out by 1904. From 1903–1916, old channels of McKinley Creek up to 200 feet above the current creek level were mined successfully by the Cahoon Creek Mining Company. The last operation of the Cahoon Creek Mining Company consisted of driving a tunnel through a narrow bedrock spur above McKinley Falls to divert the creek into Porcupine Creek and dry up the plunge pool and lowermost section of McKinley Creek (*A-5*). Over 4,400 ounces of gold were recovered in a few weeks time during 1916 from the plunge pool and stream bed below the falls.

The lower section of McKinley Creek has been mined sporadically by hand by individuals and small groups through the years. Recent attempts have been made to mine the plunge pool below McKinley Falls and suction dredges have been used to mine the channel.

Stewart reported that in 1926 six men were mining on Upper McKinley Creek (above Cahoon Creek) about 1 mile above its mouth using "booming" techniques. Reportedly $60,000 was expended on the property but no production figures are known. Upper McKinley Creek has been prospected in recent years using suction dredges and hand placering techniques. Significant production has not been reported from Upper McKinley Creek though placer gold concentrations have been identified as suggested by Stewart (*A-52*) and demonstrated by Bureau sampling in 1985.

Cahoon Creek

The lower 0.5 mile section of Cahoon Creek was extensively mined by the Cahoon Creek Mining Company from 1908 to about 1913. Wright reports that a small hydraulic plant was set up and operated at the face of Cahoon Glacier in 1902 and 1903 (*A-67*). This operation was apparently unsuccessful. A hydraulic plant also reportedly worked on Cahoon Creek from 1910–1913 (*A–12, 14*). Hand placer methods have been used to prospect the creek gravels in more recent years but results are unknown.

Glacier and Christmas Creeks

Glacier Creek and its tributaries were originally prospected and staked in 1899 and 1900 but were undeveloped because of the great gravel depths and low ore grades. A keystone drill was used to prospect lower Glacier Creek in 1911, apparently with encouraging results. A mill was erected and a 2,000-foot-long flume constructed. Mining operations began in 1916 and continued into 1918. Recovery was poor and the operation closed down after working a quarter mile of stream channel. Beatty reports that a quarter of a million dollars was spent to develop the property based upon the drilling returns which later proved to have been salted (*A–5*).

A small eastern tributary to Glacier Creek, known locally as Christmas Creek, was worked by a small hydraulic plant in 1910. This property was patented in 1916. A small heavy equipment operation worked near the mouth of Christmas Creek during the late 1970's with meager results. A total production of 200 ounces of gold is estimated on the basis of tailings present and grades determined during 1985 Bureau field work.

Nugget Creek

Placer gold was discovered in Nugget Creek in 1899. Sporadic mining is reported to have occurred from 1902 to 1913, 1929, and since 1980 (*A–30*). Eakin reports that approximately 350 ounces of gold were produced by a small hydraulic operation between 1902 and 1909 (*A–23*). The operation processed gravels near the mouth of Nugget Creek canyon by diverting the creek into a flume. This both freed the creek channel from water and supplied power to run a derrick used to remove large boulders from the creek. The remains of a small hydraulic plant exist on the east side of Nugget Creek about 1.5 miles above its junction with the Tsirku River. No known reports are available concerning this operation. Suction dredges were used to test the gravels in the lower section of Nugget Creek canyon between 1980 and 1985 with encouraging results. The alluvial fan at the mouth of Nugget Creek was patented in 1934 (*A–30*).

Cottonwood Creek

Gold was discovered on Cottonwood Creek in 1899 but workings on the creek never produced gold in significant amounts. The alluvial fan extending along the Tsirku River from Cottonwood Creek to below Nugget Creek was prospected with encouraging results prior to 1912 and a company was formed to dredge the alluvial fan gravels about that time (*A–13*). Fifty claims were staked to cover the fan but the ground was abandoned in 1916. Portions of the Nugget-Cottonwood Creek fan were patented in 1934.

Other Streams

Gold has been discovered on several other drainages in the Porcupine mining area. These include Big Boulder and Little Boulder Creeks, and the Little Salmon River. None of these drainages have been significant producers according to all historical data available. However, evidence of recent suction dredging and hand placer work exists on the Little Salmon River.

Geologic Setting And Mineralization

Bedrock in the Porcupine mining area consists of metamorphosed sedimentary rocks (slates, phyllites, and marbles), which have been intruded by igneous rocks of Cretaceous and Tertiary age. The area has been extensively glaciated and glaciers still occur at the headwaters of many drainages.

Bedrock Geology

Bedrock geology was examined only in mined areas during the investigation. The various sedimentary, metamorphic, and granitic rocks were originally described by Eakin (*A–23*), later by MacKevett and Winkler (*A–36*), and most recently by Gilbert and Redman during this study. Figure A-5 shows the area geology which was previously discussed (p. 10). Auriferous lodes cutting a slate belt are believed by most workers to be the source of most placer gold in the Porcupine mining area.

Glacial Geology

This section is a summary of the discussion of glacial geology by Bundtzen (*A–15*) to which the reader should refer for a more complete description of the glacial processes in the study area.

The study area bears impressive evidence of extensive glaciation but specific limits of the various Pleistocene and Holocene glacial advances are not well understood. The recent nature of glaciation throughout southeastern Alaska has masked all evidence of ice activity prior to about 70,000 year BP (*A–37*) and virtually all glacial deposits and landforms observed today in the Porcupine area are probably Late Wisconsinian (30,000 to 10,000 year BP) and younger.

The Holocene glacial chronology worked out by Mann (*A-37*) in the adjacent Glacier Bay region shows a four-phase history of glacial maxima at 9,000 to 13,000 year BP, 5,000 to 6,000 year BP, 2,500 to 3,600 year BP, and approximately 1,500 year BP, each separated by periods of deglaciation, downcutting or incision of former glacial valleys, and stream aggradation of major trunk meltwater streams.

These Pleistocene ice advances and readvances resulted in at least three, and possibly four, bedrock-incised channels or terrace levels in the valleys of Porcupine, Cahoon, and McKinley Creeks (shown as Qat_1, Qat_2, and Qat_3 on figs. 54 and 55). Apparently in most cases the remnants of these channels avoided ice scour and were unaffected by later events except for deposition of glacial drift and erratics. The oldest recognized terrace level occurs at 250 to 300 feet above modern canyon levels of McKinley and Porcupine Creeks, followed downstream by channels at 140 to 200 feet, 50 to 75 feet, and a final and most youthful terrace that is 25 to 40 feet above the modern drainages. The oldest terrace level (Qat_1) may be a composite of fluvial material and drift not incised into bedrock.

Radiocarbon samples were collected from an exposed mine cut directly on the channel base of the "dry channel", as described by Beatty , which corresponds to Qat_3 shown on Figures A-54 and 55. The two dates, 2,150 year BP and 2,640 year BP (table A-3), suggest that the third terrace level on Porcupine Creek was deposited subsequent to the third Holocene glacial advance shown by Mann (*A-37*) to have occurred 2,500 to 3,600 year BP.

The last Holocene advance (Beatty's (*A-5*) second and final retreat) occupied 1- to 2-mile stretches of Porcupine, McKinley, and Glacier Creek valleys below present glacial termini as clearly indicated by recent morainal limits on air photos. It could correlate with the 1,000 to 1,500 year BP Late Holocene advance described by Mann. Beatty reports that the active glacier on Cahoon Creek retreated nearly a mile during the years 1898 to 1937, indicating that the region is still undergoing deglaciation following the latest Holocene advance.

Table A-3.—Summary of radiocarbon analyses of channel gravels from Porcupine mining area

Lab number	Field number	C-14 age	Remarks
Beta 11090	85BTE2	2,190 ± 90 BP	Woody material in dry channel near waterfall.
Beta 11091	85BTE3	2,640 ± 100 BP	Wood from base of dry channel, western side of Porcupine Creek

Source: reference A-30.

Besides leaving behind multiple drift limits, bedrock-incised bench channels, trimlines, and hanging valleys, multiple glacial episodes also produced perched alluvial and colluvial fans and ice-marginal meltwater channels (fig. A-54). The alluvial fan complex of Porcupine and Glacier Creeks (Qaf unit on fig. A-55) has obviously had more than one period of aggradational development and the former fan apex was probably at least 1 mile south of its present position. A distributary channel of this fan probably spilled over into the drainage now occupied by Walker Lake. As Porcupine and other alluvial fans built up, the streams developed multiple distributary channels across their surfaces. The barbed tributary effect of the Glacier and Porcupine fans for the last 1.5 miles of their courses to the Klehini River reflects these changes during fan evolution.

Development of alluvial fans on Cottonwood and Nugget Creeks have been significantly influenced by earlier east to west glacial-meltwater features that drained Late Wisconsinian or Holocene valley ice in the Tsirku River. Former ice marginal meltwater channels have left prominently notched, beheaded drainages in the Herman Creek and Walker Lake area, along the Klehini River near the United States-Canada border, and in isolated sections of the Tsirku River (fig. A-55). The meltwater channels are incised in glacial drift in contrast to the bedrock incision of fluvial channels previously described.

Elevated, modern terrace alluvium and alluvial fans of Late Holocene age parallel the modern floodplains of the Tsirku and Klehini Rivers and are a result of recent periods of stream aggradation during distributary channel development.

Placer Geology

Heavy-mineral placer deposits in the Porcupine mining area formed during multiple glaciofluvial cycles previously described. The excellent work of Beatty (*A-5*) provides many detailed summaries of placer deposits and their exploitation in the district. Heavy-mineral placer concentrations occur in bench deposits in incised bedrock channels and glacial till, alluvial fans, and modern-stream incisions.

Very high stream gradients (fig. A-56) indicate that the Porcupine mining area, as a whole, is characterized as very immature and nested in a very high-energy fluvial environment. The average stream gradient of the study area is about 500 feet/mile compared with averages of 80 to 150 feet/mile in many interior Alaska placer districts.

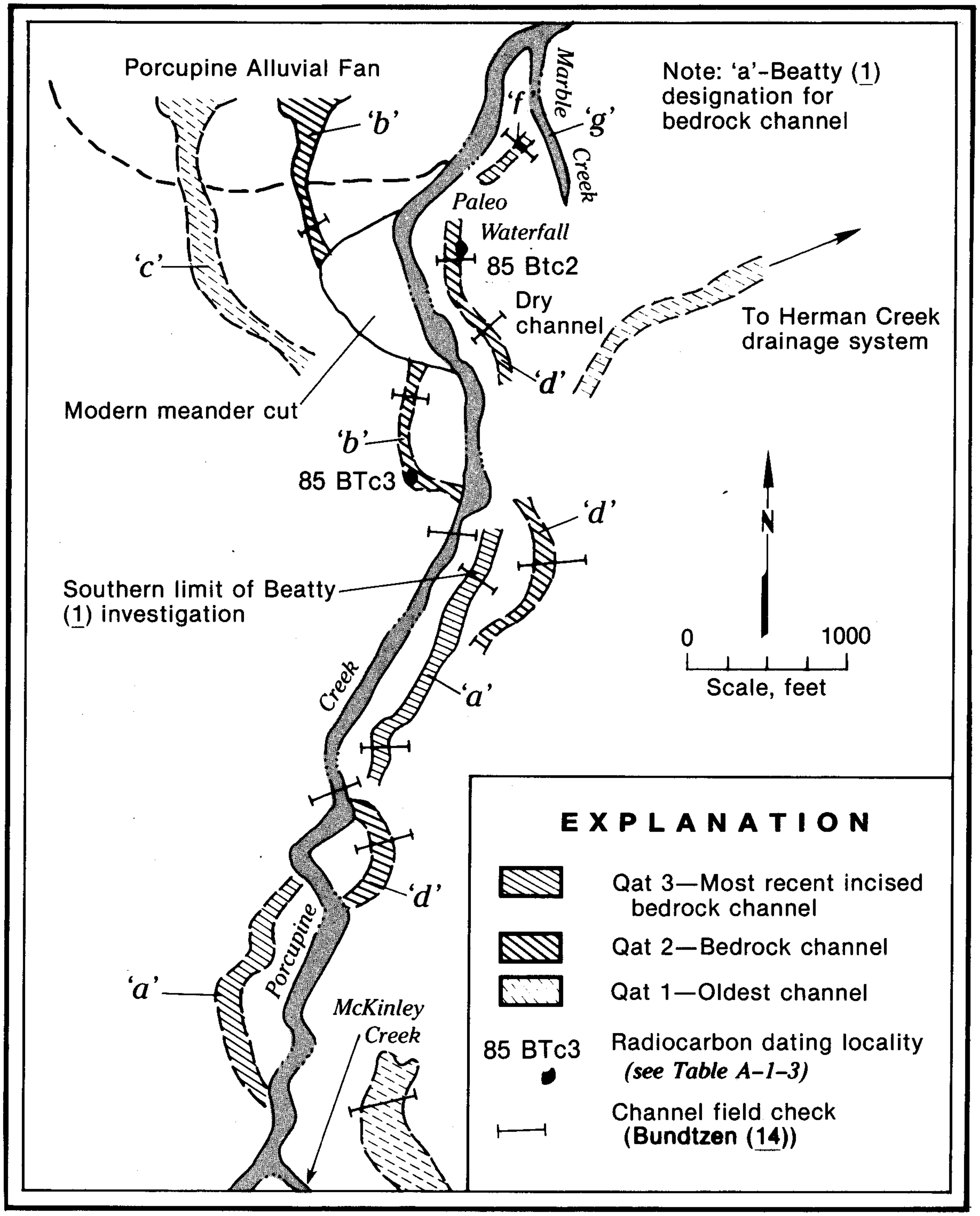


Figure A-55.—Abandoned channels on Lower Porcupine Creek, after Bundtzen (*14*).

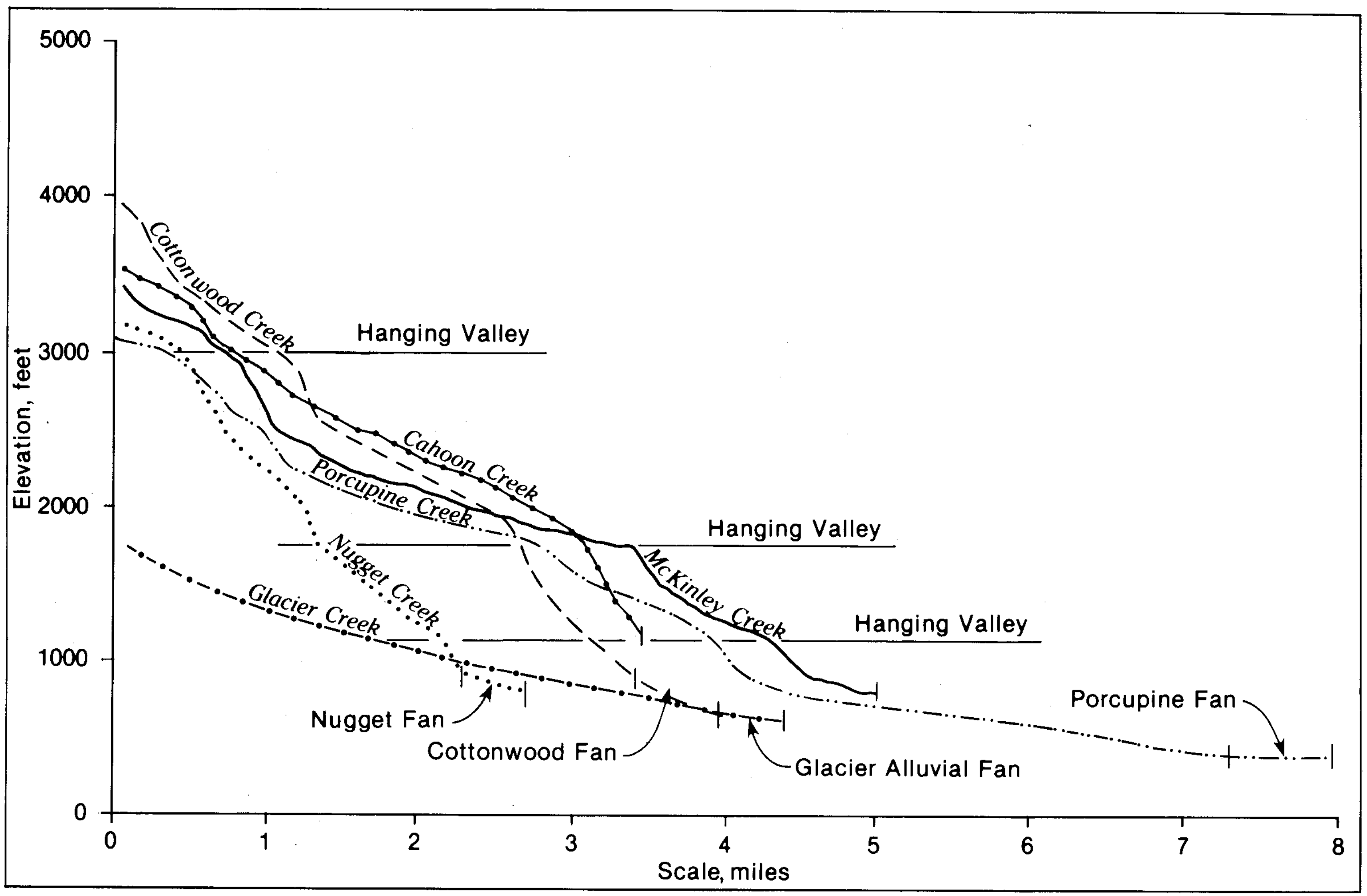


Figure A-56.—Stream gradients in the Porcupine Mining area, after Bundtzen (*14*).

Bedrock sources of most heavy-mineral concentrations, including the placer gold, have been identified by Eakin (*A-23*), Beatty (*A-5*), and Still and others (*A-56*). The most likely bedrock sources are crosscutting quartz-sulfide-gold fissure veins associated with altered mafic dikes cutting Porcupine Slate in the McKinley and Cahoon Creek drainages. Pyritiferous zones in the Porcupine Slate also contain anomalous gold values ranging up to 1-2 ppm gold (*A-55*). Localized silver-lead-(gold) deposits, such as those identified in the Summit Creek drainage may also contribute to heavy-mineral placer concentrations (*A-55*). Placer gold in Christmas and Herman Creeks may be derived from deposits in the Porcupine Slate, or alternatively from stratiform metallic mineral deposits in metavolcanic rocks such as the Glacier Creek deposits.

Table A-4 summarizes trace element and gold fineness of placer gold collected during the course of investigations. ADGGS samples are mainly reconnaissance concentrates (three to five pans of gravel) while most collected by Bureau personnel are derived from processing 0.1 yd^3 channel samples. Sample locations are shown on Figure A-54. The gold-fineness results are consistent with features observed in the field but the small sample sizes limit geologic interpretations. Because there are significant impurities in the bullion, gold fineness is

Table A-4.—Trace element and gold fineness analyses of placer gold from Porcupine mining area[1] (fig. A-54)

Map No.	Field No.	Drainage basin locality (creek)	Sample weight (mg)	Gold (ppt)	Silver (ppt)	Copper (ppt)	Antimony (ppt)	Other (ppt)	True fineness[2]	Remarks
1	9047	Porcupine	21.64	794	140	15	50	1	850	Channel sample 0.1 yd^3, Porcupine Creek.
4	9096	Porcupine	64.01	902	90	ND	ND	8	909	Channel sample 0.1 yd^3, but below channel.
6	9081	Porcupine	35.36	817	145	ND	ND	38	849	Channel sample 0.1 yd^3, modern Porcupine channel.
3	9043	Porcupine	34.75	812	144	ND	ND	44	849	Channel sample 0.1 yd^3, bench upstream from cabin.
9	9002	Porcupine	64.94	822	155	ND	ND	29	841	3 pans on bedrock from bench west side of creek.
8	9037	Porcupine	67.18	838	107	ND	ND	55	886	Channel sample 0.1 yd^3.
10	9119	Porcupine	50.70	838	115	ND	ND	47	879	0.5 pan, dry channel, east side Porcupine Creek.
13	9112	McKinley..........	65.82	811	187	ND	ND	2	813	Channel sample 0.1 yd^3, on bedrock.
15	9109	McKinley..........	4.97	779	170	ND	ND	51	820	Channel sample 0.1 yd^3, boulder layer under colluvium.
16	9106[3]	McKinley..........	33.74	669	259	22	ND	50	721	From sulfide vug, 'ladder vein'.
17	84BT313......	McKinley..........	16.15	855	136	9	ND	0	859	3 pans, modern flood-plain, boulder-rich.
18	84BT317a[3]...	McKinley..........	8.15	780	219	ND	ND	1	780	From Golden Eagle vug vein.
14	9054	Cahoon............	70.10	738	201	37	11	13	786	Channel sample 0.1 yd^3, on and in bedrock cracks.
11	9005	Glacier.............	36.60	855	136	ND	ND	9	863	Channel sample 0.1 yd^3, 6 in gravel on bedrock.
12	85BT25........	Christmas	9.01	835	129	ND	ND	36	866	3 pans from auriferous till on bedrock.
19	9061	Nugget	60.09	722	236	ND	ND	42	754	Channel sample 0.1 yd^3, fluvial gravel and till.
20	85BT29........	Nugget	28.40	756	207	ND	ND	37	785	3 pans, modern flood-plain, not on bedrock.
21	85BT28........	Cottonwood	18.30	769	193	ND	ND	38	799	3 pans, modern flood-plain, not on bedrock.

ND Not detected.

[1] Raw placer gold derived from channel and grab samples collected by Bureau and ADGGS. All elements presented in parts per thousand; gold and silver determinations by commercial laboratories in Vancouver, B.C., Lakewood, Colorado, and ADMG Mineral Laboratory in Fairbanks, Alaska. Zinc and lead were looked for but not detected.

[2] 'True Fineness' as defined by Boyle (*A-7*, p. 197) is the ratio of gold to gold plus silver times 1,000 or $\frac{Au}{Au + Ag} \times 1000$.

[3] Gold panned from 'hardrock' quartz-sulfide vein near Golden Eagle prospect.

expressed as a ratio of gold to silver + gold as suggested by Boyle (*A–7*) and Metz and Hawkins (*A-39*).

Gold fineness on Porcupine Creek and its incised bench deposits ranges from 841 to 909 and averages 866 (7 samples.) There does not appear to be a noticeable difference in fineness between the lower elevated fluvial channels and the modern stream though Beatty mentions that the highest bench levels on Porcupine Creek have a distinctly lower fineness bullion mined in the modern stream.

Placer-gold fineness from McKinley and Cahoon Creeks ranges from 786 to 859 and averages 821 (4 samples); gold extracted from two quartz veins in the area averages 750. Fineness predictably increases downstream with increasing distance from the probable lode sources in these two drainages (*A–32*). Results from this study also show an increase in fineness downstream from an average of 821 on McKinley and Cahoon Creeks to an average of 866 on Porcupine Creek.

Fineness of placer gold collected from Nugget and Cottonwood Creeks averages 779 (3 samples), while that of Glacier and Christmas Creeks drainage averages 865 (2 samples), which is very similar to values found in lower Porcupine Creek.

The average overall fineness from the Porcupine mining area, using the Boyle (*A–7*) method is 837, compared to 820 reported by Smith (*A–51*), who used records from four locations on the Porcupine Creek drainage for his analysis. The range of fineness in the Porcupine mining area is consistent with those reported by Moiser (*A–41*) for epithermal and lower mesothermal temperatures of formation. Bullion was analyzed for the trace metals copper, lead, zinc, and antimony besides the precious metals. Significantly, samples containing detectable copper were found in McKinley and Cahoon Creeks, perhaps suggesting recent association with lode sources. The gold to copper ratio is much too high for typical gold placers of any temperature range, but the presence of antimony in single samples on Cahoon and Porcupine Creeks also suggests formation in epithermal or lower mesothermal temperature ranges (*A–41*).

Heavy mineral concentrates from nine streams are summarized in table A–5. Sample locations are shown on Figure A–54. A preponderance of magnetite in virtually all drainages suggests that magnetometer exploration techniques may be useful in delineating buried channels and other heavy mineral concentrations. Pyrite is predictably abundant in Porcupine, Cahoon, McKinley, Nugget, and Cottonwood Creeks, where it could be derived from pyritiferous zones in the slate as well as epigenetic-vein deposits. Scheelite and uncommonly cassiterite are present in McKinley, Cahoon, and Cottonwood Creeks but the minor concentrations are probably not economically noteworthy. Barite is abundant in Glacier Creek and in the immature placers of the Herman Creek area. Its presence in the Herman Creek drainage suggests that barite mineralization may exist in metavolcanics underlying the thick glacial drift that blankets the area. Massive barite-sulfide deposits in metavolcanics at the head of Glacier Creek are probably the source of barite in this drainage.

Placer gold from McKinley, Porcupine, Nugget, and Christmas Creeks was examined under the microscope in hopes of delineating characteristics of transport and origin of the bullion that has been mined. Consistently, two distinctive types of gold are present in the analyzed concentrates: well-worn, rounded, bright 'nugget' gold that shows evidence of fluvial transport, and small wire-like grains with quartz and undetermined gangue mineralogy that shows little evidence of stream transport. There may be either more than one lode source present, or alternatively, proximal lode gold and 'nugget' gold that has been transported by fluvial mechanisms.

Beatty and the authors have noted a general lack of fine gold (100 mesh or smaller) in the Porcupine mining area. The extremely high-energy nature of placer formation in the area suggests that virtually all fine gold has been flushed down the streams and possibly out of the study area. However, the Glacier, Porcupine, and Nugget alluvial fans represent significantly lower energy fluvial environments than those of the main feeder streams entering into the lower valleys, suggesting that alluvial fans may have accumulated part of the fine-gold fraction absent in the main-production streams.

Gold was panned from a thick section of glacial till exposed in Christmas Creek, a tributary of Glacier Creek during this study. The gold was apparently interspersed throughout at least the lower 6 feet of till with no apparent concentration on bedrock. The bullion is very fine-grained, well-worn 'glacial' gold possibly due to milling effects of glaciation. Although Christmas Creek was the only locality where gold was recognized in till, its existence, as well as that mentioned in till by Beatty in other drainages, suggests that 'glacial gold' may be an intermediate host between hard-rock sources and downstream accumulations in fluvial deposits.

BUREAU OF MINES INVESTIGATION

In 1985, the Bureau collected 78 reconnaissance, 53 channel, and 4 site specific bulk placer samples. All of the major streams in the mining area were sampled, with at least one sample taken from each drainage. All site specific bulk samples were taken from lower Porcupine Creek.

Table A-5.—Mineral identification of selected pan concentrates and placer samples from the Porcupine mining area

Map No.	Field No.	Drainage	Major (>15%)	Minor (3%–15%)	Trace (<3%)	Remarks/field notes
3	9043[1]	Porcupine..............	Magnetite (60%)	Sulfide	Zircon, magnetite	32 gold colors iron-stained and smoothed on edges.
9	9002[1]	Porcupine..............	ND	Pyrite, magnetite	Zircon, garnet, scheelite	24 gold colors; some shiny and rodlike.
8	9037[1]	Porcupine..............	Magnetite (25%)	Pyrite	Zircon, garnet	22 gold colors, iron-stained
5	85BT32[2]....	Porcupine 'Palmer' bench level (Qat_2).................	Magnetite (30%), ilmenite (10%)	Pyrite, sphalerite, zircon	Idocrase, cassiterite (?), pyrrhotite	37 flat-shaped colors; 1–2 pennyweight nugget; gold in Fe rug-like features on bedrock; gold heavily Fe stained; derived from pyrite ?
*	85BT35[2]....	McKinley................	Pyrite (65%), magnetite (15%)	Sphalerite (6–8%)	Scheelite (30 grains), cassiterite, pyrrhotite	7 colors—bright rounded 'glacial gold'?
17 17	84BT313[2].. 85BT42	McKinley................	Magnetite (65%), amphibole	Garnet, pyrite, ilmenite	Cassiterite, bornite	150 colors; both chunky Fe stained type; bright rounded fine 100 mesh; Bureau sample contains idocrase.
14	9054[1]	Cahoon.................	Magnetite (70%)	Garnet, zircon	Sulfide (pyrite)	128 colors of gold; biggest smooth; some are bright and shiny and haven't traveled far.
12	85BT25[2]....	Christmas Creek	Magnetite (15%), ilmenite (10%)	Pyrite, barite	Scheelite, undetermined sulfides	6 colors of gold, smooth and bright, sample very clay rich.
*	85BT44[2]....	Glacier Creek.........	Magnetite (25%), barite (15%)	Amphibole/ pyroxene	Undetermined sulfide	No gold observed; barite grains up to 0.2 in diam.
21	85BT28[2]....	Cottonwood Creek..	Pyrite (30%), magnetite (25%)	Pyroxene	Zircon	35 rounded to angular colors; Bureau sample contains scheelite, olivine.
20	85BT29[2]....	Nugget Creek.........	Pyrite (45%), magnetite (35%)	ND	Scheelite, amphibole	Rounded colors indicate transportation.
7	85BT55[2]....	Herman Creek	Barite (20%), magnetite (15%)	Amphibole	ND	Abundant barite grains; no gold.
12	85BT57[2]....	Marble Creek.........	Magnetite (15%), sulfide (pyrite)	ND	Zircon, garnet	No gold observed, some pyrite as cubes up to 0.4 in diam.

ND Not determined.

[1] Visual inspection including ultraviolet radiation by Steve Fechner, Bureau.

[2] X-ray diffraction analyses of 3.3 specific gravity fractions augmented by visual inspection and ultraviolet radiation; 1984 analyses by N.C. Veach; 1985 analyses by T.K. Bundtzen, ADGGS.

The procedure for collecting reconnaissance placer samples consisted of processing, on the average, 0.1 yd^3 of gravel through a portable aluminum mini-sluice box. Where use of the sluice box was not feasible, pans were used. Sixteen slightly heaping 16-in gold pans equal 0.1 yd^3 of gravel (fig. A-57).

The procedure for channel placer sampling consisted of digging an approximate 1- by 1-foot channel from the top of a gravel section to bedrock (whenever feasible). The gravel taken from the channel was processed in 0.1 yd^3 increments through a hydraulic concentrator.

The concentrates from all of the samples were saved and were examined with a binocular microscope to identify heavy minerals present and examine the character of the gold (table A-4). Gold particles which weighed greater than approximately 0.0001 ounces were recovered from the concentrates by use of a pan. The concentrates have been retained for future chemical analysis. The gold was weighed, and thirteen samples of gold were sent to the ADGGS laboratory in Fairbanks for fineness determination. Results of the fineness determinations and sampling are summarized in table A-4 and in appendix A-1, table A-1-23, respectively.

The procedures for taking site specific bulk samples were to dry screen, using 1, 2, and 4 mesh screens, 560 to 690 lbs of gravel in the field. The plus 1, 2, and 4 mesh size fractions were weighed, washed through a hydraulic concentrator, and discarded in the field. The minus 4 mesh fraction was bagged and shipped to the Bureau's processing lab in Anchorage, Alaska. The samples were then dried and screened to +6, +10, +14, +20, +30, +40, +50, +60, +70, +80, +100, +200, and -200 mesh sizes. Heavy mineral concentrates were separated from the +100 mesh and greater size fractions by using a sluice and pan. The free gold was separated from the concentrates by panning.

Figure A-57.—Placer samples collected by Bureau investigators were used to evaluate placer deposits in the Porcupine Mining area (B. Hoekzema, photographer).

Results of Reconnaissance and Channel Sampling

Sample locations are plotted on Figure A–2 (map No. 1–22, 79–132), A–58 (map No. 23–64), and A–59 (map No. 65–78) and sample results are listed in appendix A–1, table A–1–23. Of the 78 reconnaissance and 53 channel samples collected, 35 were found to contain values greater than 0.005 ounce/yd^3 gold.

Results from reconnaissance and channel sampling were used to give each stream a mineral development potential rating for placer gold using one of four levels: "high", "moderate", "low", and "unknown" (table A–6.) These ratings are estimates based on an evaluation of grades and extent of mineralization as well as other factors such as depth of overburden, presence of large boulders, and stream configuration.

A deposit of high mineral development potential would, by definition, have high grades (greater than 0.01 ounce/yd^3 gold) and probable continuity of mineralization. A deposit of moderate mineral development potential would have either a high metal content or continuous mineralization identified but not both. A deposit with low mineral development potential would contain uneconomic grades and/or show little evidence of continuity of mineralization. For example, a placer deposit with grades below 0.001 ounce/yd^3 gold would rank as low. Similarly, deposits containing less than 5,000 yd^3 would rank low unless the grade was very high. Unknown mineral development potential has been assigned to placer occurrences having little or no available geologic information.

Resource estimates were made for streams having moderate or high potential for placer gold mineral development and for the Nugget and Porcupine Creek fans. Resource estimates were derived by multiplying the length of the deposit being evaluated by the average width (as identified from available maps or from tape and compass traverses) by the average depth of the gravel. Average depths used were based upon trenching results except in the case of the Porcupine and Nugget Creek fans where assumed depths are used due to lack of information. The results of these estimates are listed on table A–6.

The following drainages will be discussed in greater detail below because of their moderate to high mineral development potential: Porcupine, McKinley, Cahoon, Nugget, and Christmas Creeks. Glacier and Cottonwood Creeks will also be discussed because of their historical interest.

Porcupine Creek

Porcupine Creek is a steep rapidly downcutting drainage, with an average gradient of 350 feet/mile (fig. A–56). Gold was discovered on Porcupine Creek in 1898. Since then over 77,000 ounces of gold have been produced from the creek and its tributaries. Reportedly, little gold was produced from Porcupine Creek above its junction with McKinley Creek, and during this study six reconnaissance samples taken above the junction contained undetectable to 0.0004 ounce/yd^3 gold (81, 107–

Table A–6.—Mineral development potential ratings and identified resource estimates for drainages in the Porcupine mining area

Drainage	Mineral development potential				Identified resources (yd^3)
	High	Moderate	Low	Unknown	
Big Boulder			X		ND
Cahoon		X			10,000
Christmas		X			42,000
Cottonwood				X	ND
Glacier			X		ND
Klehini				X	ND
Little Boulder			X		ND
Little Salmon			X		ND
McKinley	X				20,000
Nugget Channel		X			3,000
Alluvial fan				X	2,000,000
Porcupine—(lower)					
Channel		X			500,000
Bench	X				152,000
Alluvial fan				X	6,000,000
Porcupine—(upper)			X		ND
Summit			X		ND
Tsirku				X	ND

ND—Not determined.

NOTE.—Identified resources include auriferous gravels identified by the Bureau in 1985. Additional hypothetical resources are likely to exist but were not evaluated.

111)[6]. The following discussion pertains to lower Porcupine Creek (below McKinley Creek.)

Three categories of placer deposits occur on Lower Porcupine Creek: abandoned channel and bench deposits; recent stream gravels; and an alluvial fan. Bureau sampling identified the highest grades in the abandoned channels and bench deposits where the identified resources are limited in quantity. A much larger potential resource occurs in the alluvial fan but grades are unknown.

Abandoned Channels and Bench Deposits

Figures A-54 and A-55 depict a series of bedrock-incised, ancestral-fluvial channels of at least three ages in Porcupine Creek valley, each formed during glaciofluvial activity previously described. The original channel designations by Beatty (*A-5*) have been correlated with the assigned geologic units on Figures A-54 and A-55 by Bundtzen (*A-15*).

According to Beatty (*A-5*):

> "Channels 'a', 'b', 'c', and 'd', because of good bedrock conditions, are considered likely to contain placer concentrations in natural riffles formed by the bedrock. Channel 'a' is the narrowest and the steepest of all; the stream coming down that channel must have been very rapid. These conditions make this less likely to be of value than others. However, the fact that a later wing of the stream cut off the lower portion of this channel, leaving a bluff twenty feet high across the end makes a section where bedrock may quickly be reached for hand prospecting...The greater widths, more gradual slopes (gradients), and considerably greater lengths of channels 'b' and 'c' make these more favorable for consideration . . . Depth to bedrock in these channels is unknown, but if the upper open channels of 'b' and 'c' prove to be profitable, a geophysical survey of their extensions in bedrock under the patented ground—the channels to be mined . . . Porcupine Creek was carrying gold at the time it was occupying these three channels."

Figures A-58 and A-59 identify five gravel resource areas on Lower Porcupine Creek blocked out on the basis of channel samples collected by the Bureau in 1985. These areas consist of abandoned channel and bench gravels, some of which correlate with old channels identified by Beatty (*A-5*) in 1936 and Bundtzen (*A-15*) in 1985 (fig. A-45.) Area 4 corresponds to channel f (Qat_3), area 3 to channel d (Qat_2), and area 2 incorporates a portion of channel b (Qat_2). These gravels are apparently quite young as wood obtained from Beatty's "dry channel" was dated at about 2,200 years BP (table A-3, sample 85BTc2) (fig. A-55). The abandoned channels are known to contain gold as proven by past production and Bureau sampling. Portions of channels d, f, and g have been mined historically. Channel d was reportedly a significant producer (*A-5*).

The Bureau collected twelve samples from channels labeled as b (31), d (60-63), e (64), f (39-41, 50-51), and g (22) on Figures A-55 and A-58. These samples contained from a trace to 0.021 ounce/yd^3 gold (table A-1-23). Thirty-eight additional channel samples were collected from abandoned channels and bench deposits located further upstream in the area referred to locally as the "mushroom" (67-68, 73), area 5 (65-66, 69-72) and old channel (74-76) on Figure A-59, and from bench deposits in areas 1 (32-43) and 2 (44-49, 53-59) on Figure A-58. These samples contained from a trace to 0.058 ounce/yd^3 gold. Gold sizes were 4% larger than 0.08 in, 20% from 0.04 to 0.08 in, 25% from 0.02 to 0.04 in, and 51% smaller than 0.02 in. Concentrates contained 5 to 70% magnetite, up to 10% pyrite, and less than 1% zircon, garnet, and scheelite. The balance of the concentrates consist of rock fragments and quartz (table A-5.)

Samples collected indicate a collective identified resource in the 5 resource areas of approximately 152,000 yd^3 grading 0.0106 ounce/yd^3 gold. These values are likely to be lower than actual values as bedrock was not reached at all channel sample sites. Table A-7 summarizes the quantities of gravel and weighted average grades for each of the 5 areas.

Additional resources are known to exist along upstream portions of Porcupine Creek but were not evaluated as part of this study. Some of these deposits, such as

Table A-7.—Identified resources in bench and abandoned channel deposits, Porcupine Mining Area

Area	Figure	Volume (yd^3)[1]	Grade (oz/yd^3 Au)[2]	Samples
1	A-58	21,000	0.0215	B 3, 32-43
2	A-58	75,000	0.0087	B 4, 44-59
3	A-58	23,000	0.0106	60-63
4	A-58	20,000	0.0038	39-41, 50, 51
5	A-68	13,000	0.0145	B 2, 65-72
TOTAL		152,000	0.0106	

[1] Volumes were calculated by multiplying the surface area of the block times a thickness chosen on the basis of field information if available. Thickness figures used tended to be minimum values.

[2] Grades were calculated by averaging the grades determined for each channel. No weighting factors were used. These values are likely to be lower than the actual values as bedrock was not reached at every sample site. However, gold values are distributed throughout the gravel. Best values are correlated with coarse gravel layers.

[6] Numbers refer to samples listed in appendix A-1, table A1-1-23 and found on figs. A-2, A-58, and A-59.

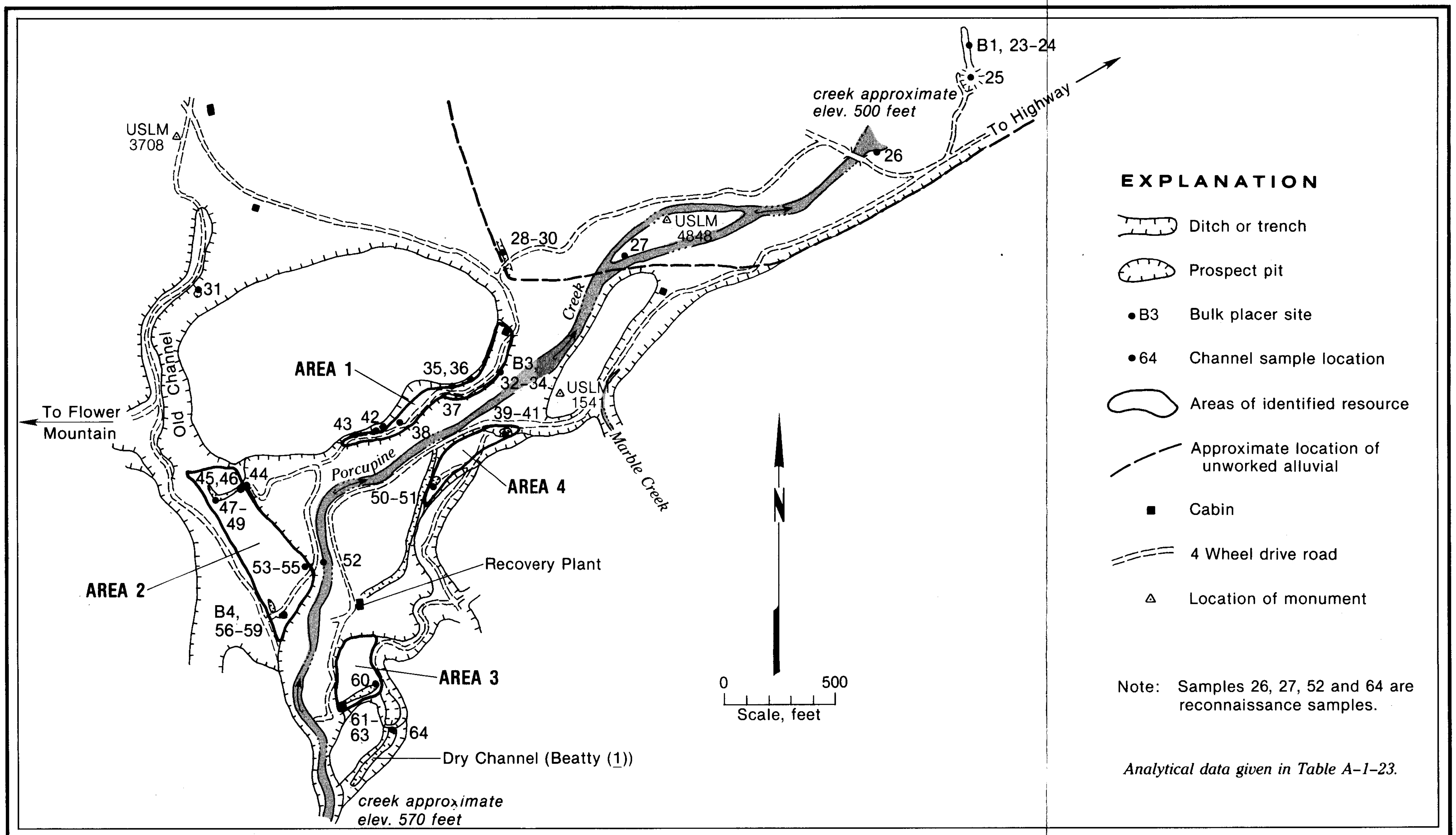


Figure A-58. — Placer sample locations Lower Porcupine Creek area.

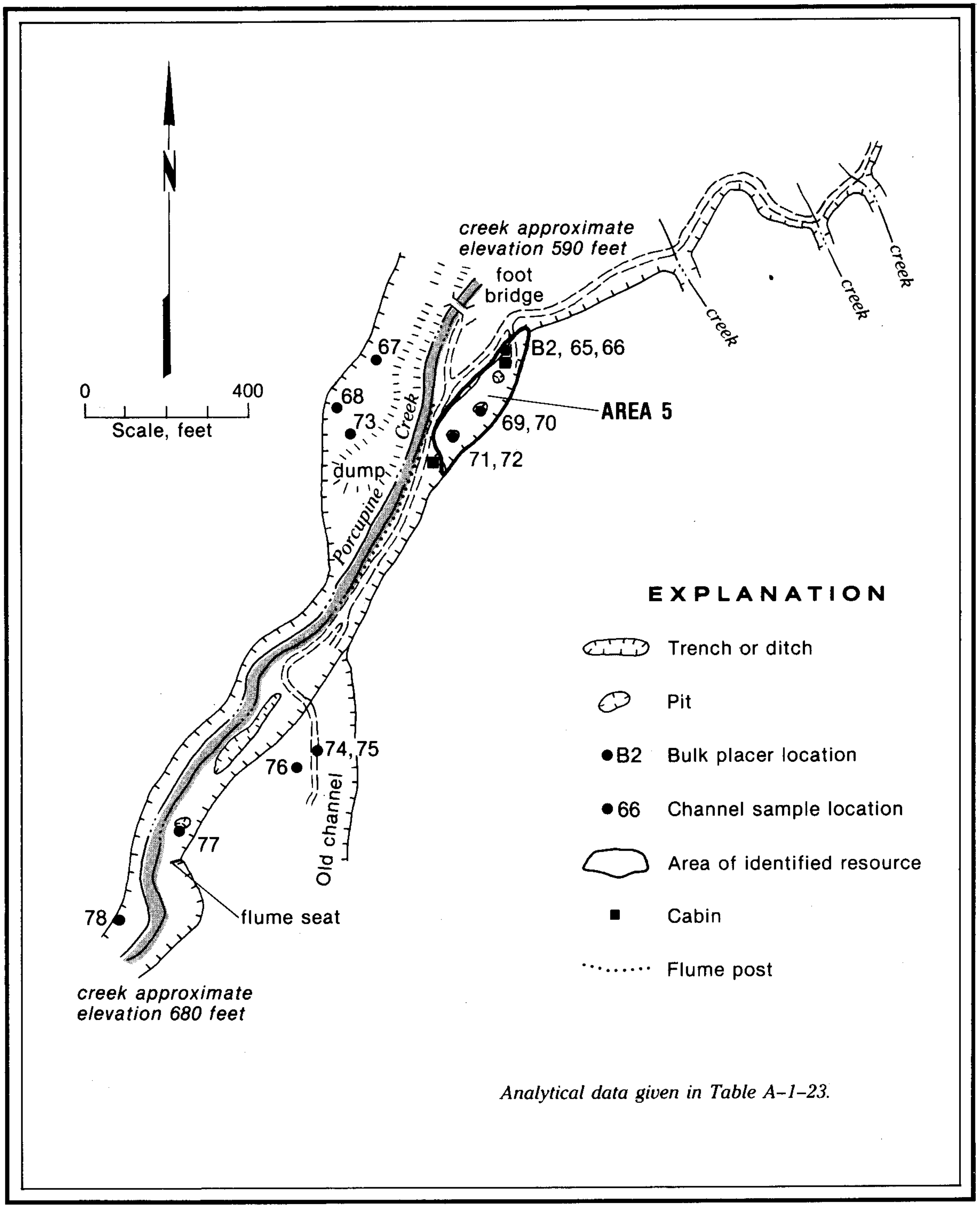


Figure A-59.—Place sample locations Middle Porcupine Creek area.

at Bear Gulch (fig. A-54), have been previously mined but unmined deposits which warrant further evaluation also remain.

Recent Stream Gravels

The present day stream gravels consist of poorly to moderately well sorted gravels containing appreciable silt and boulders weighing up to several tons. These gravels have been worked historically with apparently good results.

The Bureau collected five samples (26-27, 52, 77, 80) from recent gravel deposits. These samples, which contained from a trace to 0.004 ounce/yd^3 gold (sample 80), are representative of surface values only. Since gold values in the Porcupine mining area are concentrated on bedrock, higher values should be anticipated at depth. The gold sizes were 3% between 0.04 and 0.08 inch, 11% from 0.02 to 0.04 inch, and 86% less than 0.02 inch. The concentrates consisted of from 15% to 35% magnetite, 5% to 45% pyrite, and minor percentages of zircon, garnet, and scheelite (table A-5.) Results indicate gold is continuing to be transported by Porcupine Creek during flood stages. The best values are concentrating just below McKinley Creek, which is the acknowledged source of most of the Porcupine Creek placer gold. The McKinley Creek junction area of Porcupine Creek has been mined several times in the past. Apparently, placer gold in this area reconcentrates periodically depending upon flood intervals. However, little gold appears to have been transported downstream to the fan area in recent years. Several thousand feet of stream bed beginning about 1,000 feet below McKinley Creek and extending to the southern limit of the Beatty (fig. A-55) investigation have not been mined completely. This section is virtually inaccessible to large heavy equipment but suction dredging might be possible. The channel gravels of Lower Porcupine Creek comprise an identified resource of at least 500,000 yd^3 of unknown grade based upon an average thickness of 18 feet and an average width of 90 feet (table A-7.) Actual thickness of mined sections is reported to have exceeded 40 feet in some locations (*A-49*).

Alluvial Fan

The alluvial fan gravels consist of 12 to 15 feet of recent stream gravels overlying an unknown thickness of older gravels. Old channels correlative with older abandoned channels along Porcupine Creek are anticipated to occur beneath the fan. To date these potentially gold-bearing channels have not been identified. Some drilling is reported to have occurred in the early 1900's but results are unknown. Rumors suggest that bedrock was encountered at a depth of 70 feet in at least one hole.

The Bureau collected eight samples (9-10, 23-25, 28-30) on the alluvial fan. However, these are mostly representative of recent surface gravels and with the possible exception of samples 24 and 30 did not test the older channel deposits which may exist at depth. Results were encouraging however as these samples recovered from a trace to 0.011 ounce/yd^3 gold (30). The gold sizes consisted of 1% greater than 0.08 inch, 23% between 0.04 and 0.08 inch, 24% between 0.02 and 0.04 inch, and 52% less than 0.02 inch. The concentrates contained magnetite (up to 40%), garnet, zircon, and minor pyrite and scheelite.

The Porcupine Fan contains in excess of 6 million yd^3 of potential resources based upon a length of 2,400 feet, width of 1,800 feet, and depth of 40 feet (table A-6.) Most of this volume will likely prove to be uneconomic to mine. However, potential exists for the presence of several potentially high-grade channels at depths of less than 100 feet. Additional evaluation of this resource is warranted.

McKinley Creek

McKinley Creek is the largest northwest-flowing tributary of Porcupine Creek. The average gradient of the creek is nearly 500 feet/mile (fig. A-56.) A lode gold deposit is located adjacent to the creek at 1,800-foot elevation approximately 2 miles above its junction with Porcupine Creek (fig. A-5, loc. K). Free gold can be panned from the sulfides in the lode deposit.

By 1904, the last mile of McKinley Creek below Cahoon Creek had been mined. It was remined in 1908. Abandoned channels have also been mined on the west and east sides of McKinley Creek below Cahoon Creek. Approximately 4,500 ounces of gold were taken out from below McKinley Falls, which is located at the junction of McKinley and Porcupine Creeks.

Bureau reconnaissance samples (92-98) collected above the lode deposit contained from less than 0.0004 to 0.0056 ounce/yd^3 gold. Samples taken below the lode deposit (83-91) contained from less than 0.0004 to 0.0539 ounce/yd^3 gold. The concentrates contained up to 30% magnetite, 10% pyrite, minor zircon, garnet, and scheelite. The gold consisted of rough angular fragments with 0.54% greater than 0.08 inch, 8.45% between 0.04 and 0.08 inch, 13.31% between 0.02 and 0.04 inch, and 77.7% less than 0.02 inch in size.

Identified resources consist of narrow point bar deposits and channel deposits comprising from a few hundred to 2,000 yd^3 each. Approximately 20,000 yd^3 grading from 0.001 to 0.054 ounce/yd^3 gold are estimated to occur on McKinley Creek between sample location 91 and Cahoon Creek (fig. A-2). Additional resources exist below Cahoon Creek but this section has been mined several times in the past and grades of the remaining gravels are unknown.

Cahoon Creek

Cahoon Creek is a steep northeast flowing tributary to McKinley Creek. The average gradient is 650 feet/mile (fig. A-56). Very little gravel is present in the channel of the creek, with much of the stream flowing on bedrock. Cahoon Creek has been recognized by miners as a source for the gold on McKinley and Porcupine Creeks. The lower 0.5 mile of the creek has been extensively worked.

Steep terrain and the presence of large amounts of brush precluded sampling of the lower one mile of the creek. Sampling was also impeded by the lack of gravel present. The nine samples taken indicate that the gold concentration increases as the junction with McKinley Creek is approached (99-106). The samples contained from less than 0.0004 to 0.045 ounce/yd^3 gold. The concentrates contained greater than 70% magnetite, with minor pyrite, zircon, and garnet. The gold is nuggety with 1% greater than 0.08 inch, 8% between 0.04 and 0.08 inch, 8% between 0.02 and 0.04 inch, and 83% less than 0.02 inch in size.

Limited quantities of channel gravels occur in Cahoon Creek (table A-6.) Some potential for abandoned channels or bench deposits may exist but these have generally been covered or diluted with colluvium and avalanche debris. The channel gravels might be successfully mined on a small scale using suction dredges, especially along the lower 1.5 miles of the creek. An abandoned channel of Cahoon Creek which joins McKinley Creek about 0.25 mile upstream from the current junction should be investigated.

Nugget Creek

Nugget Creek flows south into the Tsirku River. Its average gradient is over 900 feet/mile (fig. A-56). Placer deposits are present as alluvium/colluvium in the stream bottom, abandoned channels at high elevations on the east side of the creek, and an alluvial fan at the mouth of the creek. Alluvium in the lower canyon of the creek is from 12 to 20 feet deep. Gold is found on or near bedrock, with little gold found in the overlying gravels.

The Bureau collected eleven reconnaissance samples from Nugget Creek and its alluvial fan (116-126). The best value (0.0138 ounce/yd^3 gold) was in a sample (116) collected at the mouth of an abandoned channel of Nugget Creek adjacent to the Tsirku River. Only minor amounts of gold (trace to 0.0007 ounce/yd^3 gold) were found in the creek itself. A sample collected from a hydraulic cut at the 2,550-foot elevation on the east side of the creek contained 0.0006 ounce/yd^3 gold (122). Gold sizes were 0.3% greater than 0.08 inch, 2.4% from 0.04 to 0.08 inch, 4.3% from 0.02 to 0.04 inch, and 93% less than 0.02 inch. Concentrates contained from 25% to 70% magnetite, less than 1% to 70% pyrite, and minor percentages of zircon, garnet, scheelite, and galena.

Gravel resources in the existing stream channel are minimal in volume but have been shown to contain coarse gold by recent suction dredging operations. The alluvial fan contains an estimated 2,000,000 yd^3 of identified resource but the grade remains unknown. Only portions of this volume would be minable as high grades would likely be restricted to channels.

Cottonwood Creek

Cottonwood Creek is a southeast flowing tributary of the Tsirku River located approximately 1 mile west of Nugget Creek. The average gradient of the creek is 750 feet/mile (fig. A-56). Encouraging amounts of gold have been found in the creek, but no extensive mining has been done.

The Bureau took three reconnaissance samples (113-115) from the creek and found from less than 0.0004 to 0.0005 ounce/yd^3 gold. Concentrates contained from 10% to 20% magnetite, up to 10% pyrite, and minor percentages of garnet, zircon, and minor scheelite (table A-5.)

Gravel resources in the creek channel are very limited due to the steep gradient and narrow bedrock canyon. A significant though untested identified resource does exist in the alluvial fan at the mouth of the creek. This fan coalesces with the Nugget Creek fan. Abandoned channels have been identified in the fan between Cottonwood and Nugget Creeks which should be investigated.

Glacier Creek

Glacier Creek is a northeast flowing tributary of the Klehini River and is located approximately 2 miles west of Porcupine Creek. The creek is less steep than most of the creeks of the area, with an average gradient of 250 feet/mile (fig. A-56).

The Bureau's reconnaissance sampling of the drainage found no significant recoverable gold values in 7 samples collected (8, 12-14, 19-21.) The concentrates contained up to 70% sulfides (mostly pyrite), 10% magnetite, minor garnet, and zircon.

Glacier Creek contains a significant gravel resource. However, no evidence of recoverable gold values in these gravels exists. Christmas Creek is the only auriferous tributary to Glacier Creek identified to date.

Christmas Creek

Christmas Creek is a small north flowing eastern tributary of Glacier Creek. The gradient is 1,000 feet/mile.

The Bureau collected four reconnaissance samples from gravels exposed in the mining cut near the junction of Christmas and Glacier Creeks (15–18.) Results indicate that there is a relatively equal distribution of gold through 8 feet of gravel. The value of the gravel averages 0.0065 ounce/yd^3 gold. The gold is rough and nuggety with 3.8% greater than 0.08 inch, 24% from 0.04 to 0.08 inch, 12.7% from 0.02 to 0.04 inch, and 59.5% less than 0.02 inch in size. The concentrates contained magnetite, zircon, garnet, minor pyrite, and scheelite (table A-5.)

Identified resources are largely restricted to the lower 0.5 mile of the creek. The lowermost section of the creek in the vicinity of the workings is estimated to contain 12,000 yd^3 of identified resource grading 0.0065 ounce/yd^3 gold. An additional resource of up to 30,000 yd^3 is estimated to occur further upstream (table A-6.)

Results of Site Specific Bulk Placer Sampling

Four site specific bulk placer samples (B1-B4) were collected from previously unworked gravels on Porcupine Creek for purposes of analyzing gravel and gold particle sizes. Because of the disseminated nature of most placer gold within a gravel deposit, the gold from the channel samples taken at the site specific sample locations was also screened and weighed. The weights of the gold recovered from the channel samples were added to the weights recovered from the site specific samples to reflect a larger sampling volume and are listed in table A-8. Because of this the totals on table A-8 cannot be used to calculate grades. Histograms of the percentages of gravel and gold in the mesh sizes are shown on Figures A-60—A-64.

A 604.05 lb sample (B-1) was taken from the Porcupine Creek alluvial fan (fig. A-58). The sample was taken from approximately a 10-foot-thick interval of alluvium. Over 65% of the gravel is greater than +4 mesh in size. Gold was found in mesh sizes between -14 and +100, with over 88% in the -14 to +50 mesh sizes (fig. A-60).

A 584.25 lb sample (B-2) was taken from a gravel bench along Porcupine Creek (fig. A-59). The sample was taken from 12 feet of alluvium resting on slate bedrock. Over 90% of the gold was from -10 to +30 mesh in size (fig. A-61).

A 562.4 lb sample (B-3) was taken from an abandoned channel of Porcupine Creek (fig. A-58). The sample was taken from 16 feet of alluvium. Over 95% of the gold was from -10 to +50 mesh in size (fig. A-62).

A 689.9 lb sample (B-4) was taken from alluvium along Porcupine Creek (fig. A-58). The sample was taken from 13 feet of gravel. Over 90% of the gold was from -10 to +60 mesh in size (fig. A-63).

Figure A-64 is a graph of the cumulative results for all four site specific samples. The graph indicates that over 90% of the gold is from -10 to +50 mesh in size; and that over half of the gravel is greater than 1 mesh in size.

Table A-8.—Results of site specific bulk placer samples collected from Lower Porcupine Creek

Sieve size (mesh)	Sample B-1		Sample B-2		Sample B-3		Sample B-4	
	Gravel weight (lb)	Gold weight (grams)	Gravel weight (lb)	Gold weight (grams)	Gravel weight (lb)	Gold weight (grams)	Gravel weight (lb)	Gold weight (grams)
+1	308	0	300	0	360	0	395	0
+2	33	0	40	0	22	0	42	0
+4	70	0	78	0	54	0	79	0
+6	17.25	0	10.75	0	10.5	0	14	0
+10	41	0	35.75	0	28	0	42.8	0
+14	20	0	17.6	0.0989	12.75	0.0824	19.4	0.0405
+20	20	0.0025	17.5	0.0208	11.8	0.0206	18	0.0314
+30	18.75	0.0060	15.75	0.0475	10.75	0.0654	16	0.0322
+40	16.5	0.0049	13	0.0078	9.75	0.0294	13.4	0.0117
+50	16	0.0028	8.5	0.0094	8.5	0.0202	11.25	0.0163
+60	6.75	0.0007	4.8	0	4	0.0051	4	0.0038
+70	5.25	0.0004	3.6	0.0002	3.2	0.0018	3.25	0.0010
+80	4.8	0.0006	3.5	0	3	0.0025	2.75	0.0026
+100	5	0.0005	4.25	0.0004	3.5	0.0005	3.25	0.0016
+200	11.75	0	17.25	0	11.4	0	13.4	0
-200	10	0	14	0	9.25	0	12.4	0
Total	604.05	0.0184	584.25	0.1850	562.40	0.2279	689.90	0.1411

Summary

The Bureau conducted reconnaissance and site specific bulk placer sampling in the Porcupine mining area in 1985. Reconnaissance sampling identified gravel deposits having moderate to high mineral development potential on Lower Porcupine, Cahoon, Christmas, McKinley, and Nugget Creeks.

Abandoned channel and bench deposits on Lower Porcupine Creek have the best potential for supporting a small to medium sized (500–1,000 yd^3/day) heavy equipment type placer operation. However, the prospective developer should identify a resource having average grades nearly double those identified by this study (ie 0.02 ounce/yd^3 gold) prior to making a substantial investment in the area. Bureau records indicate that successful operators in Alaska, during the past 5 years (1980–1985) using heavy equipment to mine at these rates, mine ground averaging more than 0.015 ounce/yd^3 gold. A 1-mile-long section of McKinley Creek above Cahoon Creek has high mineral development potential for small placer operations using suction dredge and hand placer techniques. Moderate development potential for small heavy equipment (50–500 yd^3/day) and/or hand placer operations exist on Christmas and Nugget Creeks. However, the greatest potential for future mining on a large scale in the area is dependent upon the results of exploring the Porcupine and Nugget Creeks alluvial fans which together conservatively contain in excess of 8,000,000 yd^3 of gravel resource. Site specific samples collected from Lower Porcupine Creek indicate that washing plants should screen to minus 1 mesh and be designed to recover gold down to +80 mesh.

The ADGGS investigated and mapped the Quaternary geology and placer deposits of the Porcupine mining area and identified the fineness values of gold samples collected from the study area. The average overall fineness of placer gold from the Porcupine mining area is 837. Dating of organic material collected from bench deposits indicate that the Porcupine placers are less than 3,000 years old. Glacial features suggest 4 stages of glacial advance within the past 13,000 years.

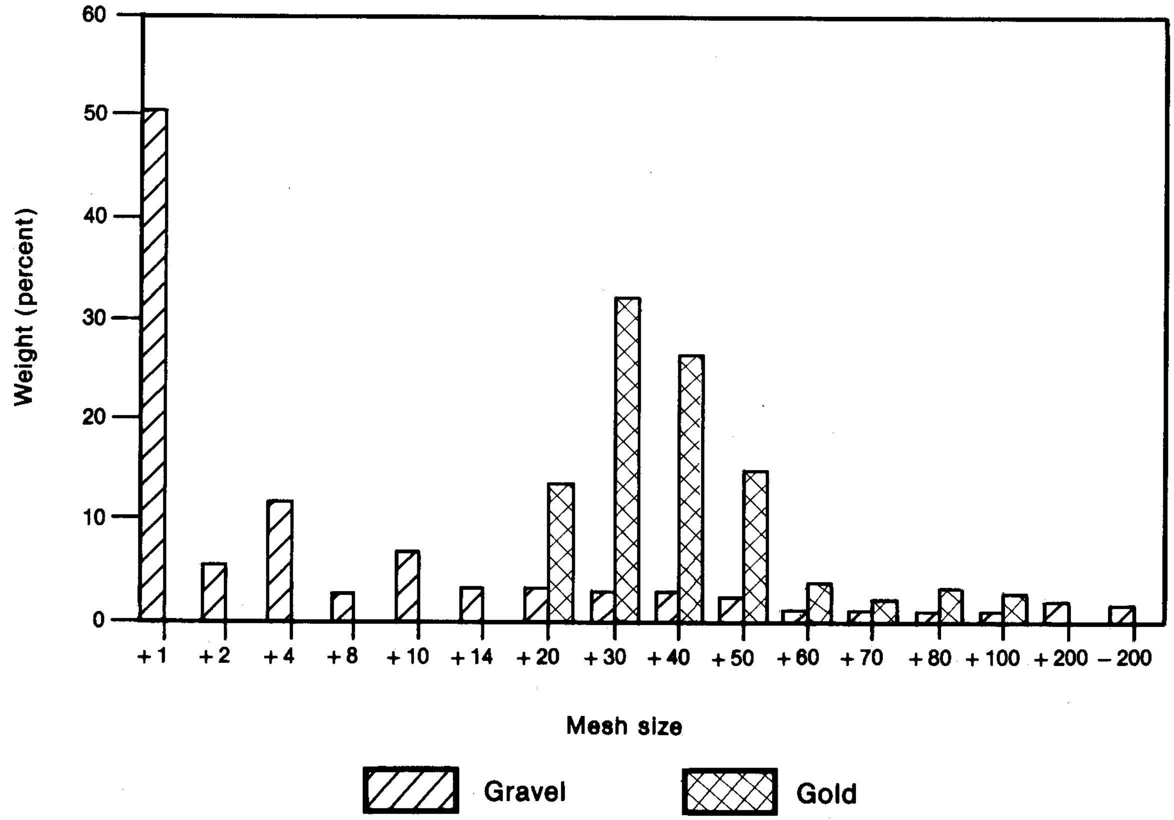


Figure A-60.—Histogram of gold and gravel weight percents for varying sieve sizes for Porcupine Creek sample B-1.

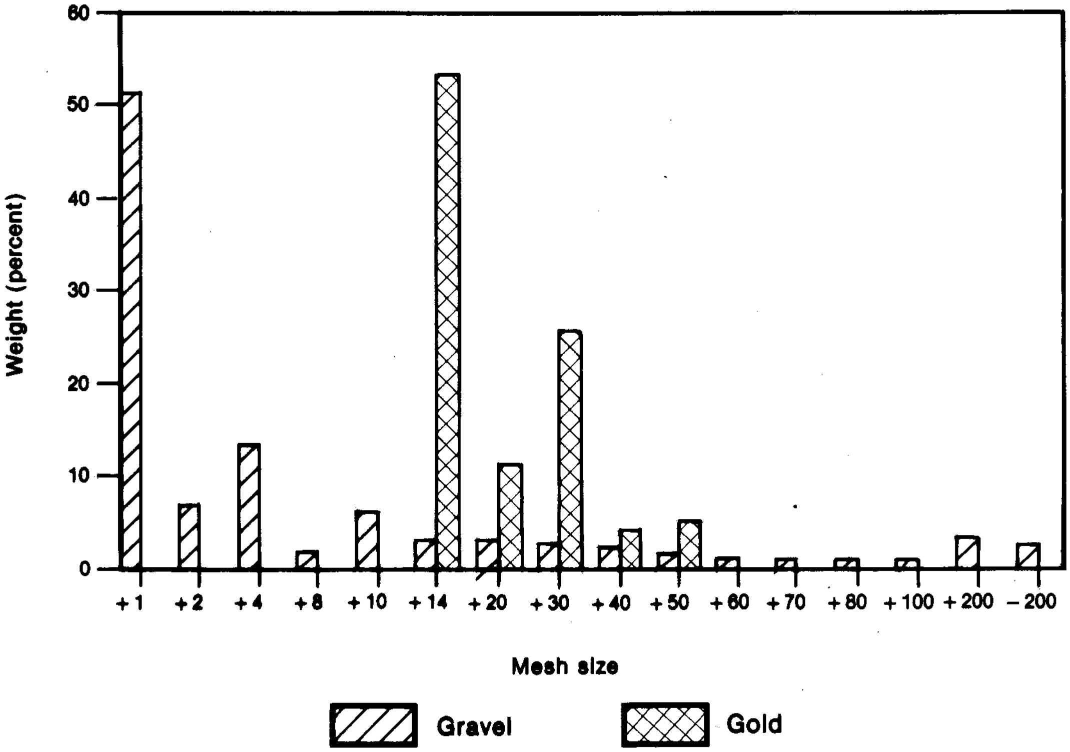


Figure A-61.—Histogram of gold and gravel weight percents for varying sieve sizes for Porcupine Creek sample B-2.

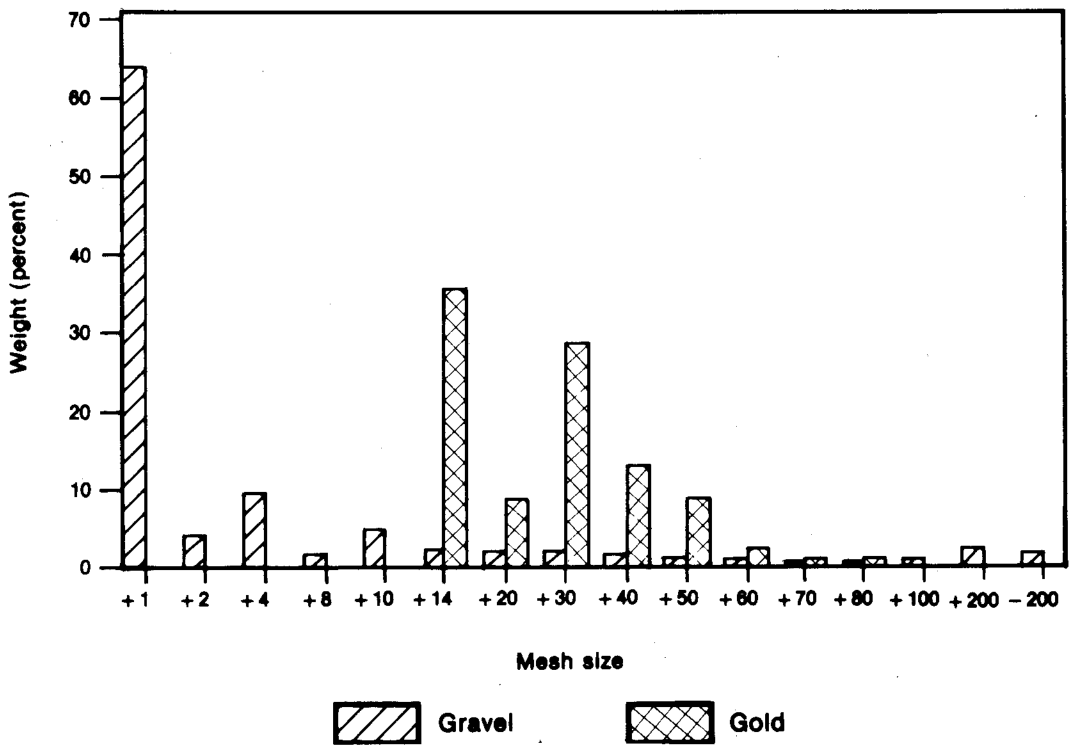


Figure A-62.—Histogram of gold and gravel weight percents for varying sieve sizes for Porcupine Creek sample B-3.

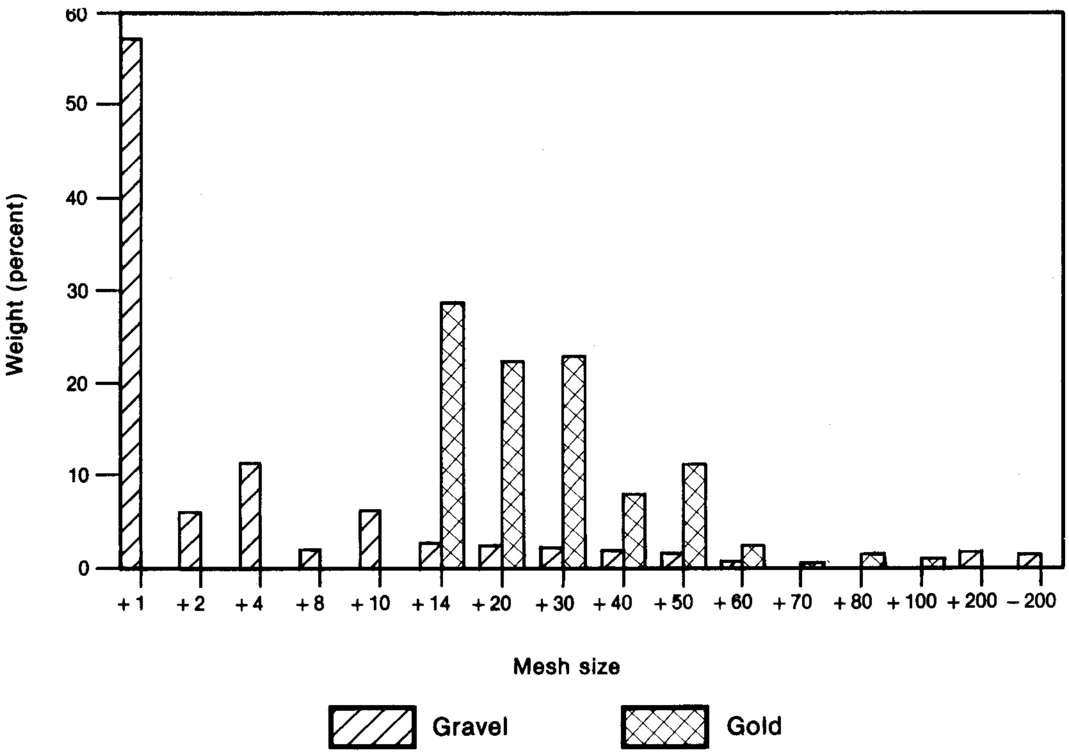


Figure A-63.—Histogram of gold and gravel weight percents for varying sieve sizes for Porcupine Creek sample B-4.

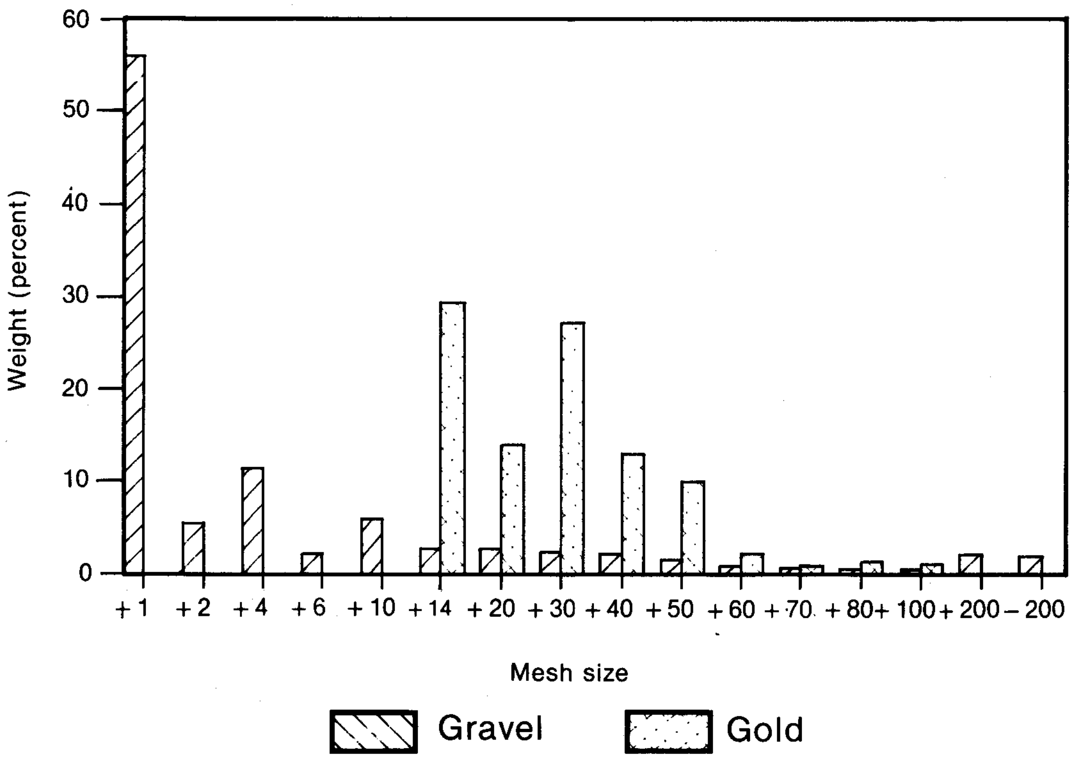


Figure A-64.—Histogram of cumulative gold and gravel weight percents for varying sieve sizes Porcupine Creek samples B-1—B-4.

KLUKWAN MAFIC/ULTRAMAFIC COMPLEX

INTRODUCTION

The Klukwan mafic/ultramafic complex is located 24 miles northwest of the port city of Haines near the native village of Klukwan. Access is by an all weather paved highway that connects Haines with the Alaska Highway in Canada. The ultramafic portion of the complex has an exposed length and width of 3 miles by 1 mile, along the 5,000-foot-high west side of the rugged Takshanuk Mountains. Below the ultramafic is an extensive alluvial fan partly made up of material from the ultramafic. The fan and ultramafic have long been recognized as a significant iron deposit. Figure A–1, location 27, shows the general location of the area, and Figure A–65 shows the ultramafic and the extent of the study area.

The complex is transected by a series of deep canyons that form steep cliffs thousands of feet high and provide excellent rock exposures. In the spring, rock and snow avalanches sweep these canyons and thick slide alder with an adequate lacing of devils club makes travel in the less steep portions of the canyons difficult. Below the 3,000-foot elevation, the area is covered by a forest of cottonwood, hemlock, spruce, willow, and alder.

LAND STATUS

The Klukwan fan deposit is mostly covered by 49 patented placer claims. However, a small portion at lower elevations is held by Klukwan village or by owners of homesteads. The lower one-third of the Klukwan ultramafic is covered by 26 patented lode claims while the surrounding area is administered by the Bureau of Land Management and open to mineral location.

PREVIOUS STUDIES

Portions of the Klukwan mafic/ultramafic complex have been extensively investigated as an iron deposit. In 1946, claims covering both the ultramafic (pyroxenite) lode and alluvial fan were staked, and Alaska Iron Mines was incorporated to develop the deposit. Development work proceeded from that date and by 1961 consisted of surface sampling and diamond drilling of the lode, pit sampling, and churn drilling of the placer, aeromagnetic and ground magnetic surveys, and surface mapping. In addition, a pilot mill was constructed and cobber concentrates were produced for metallurgical testing.

In 1948, the Bureau collected samples of the deposit for metallurgical testing (*A–64*). In 1953 and 1954, the USGS examined and mapped the deposit (*A–48*).

In 1961, Columbia Iron Mining Company (U.S. Steel) leased the claims for 75 years and in 1964 patented portions of the property. The lease by Columbia Iron Mining Company was not kept up and sometime after 1972 control of the property reverted back to Alaska Iron Mines.

While the work on the iron potential of the Klukwan deposit has been thorough, investigations concerning the potential for platinum group metals, gold, and copper have not. A 1972 USGS report by Clark and Greenwood contains results of ten samples collected at Klukwan that averaged 0.046 ppm platinum and 0.040 ppm palladium (*A–17*). A 1973 report by Brobst and Pratt indicates 500 million tons of titaniferous magnetite that averages 0.0027 ounce/ton platinum group metals (*A–11*).

GEOLOGY

The Klukwan mafic/ultramafic complex lies within Berg's Taku Terrane[7] (*A–6*) which is bordered on the west by the Chatham Strait Fault and forms the north end of the Klukwan-Duke belt of concentrically zoned mafic/ultramafic complexes of estimated middle Cretaceous age (*A–10*). This belt extends the length of southeastern Alaska and includes numerous mafic/ultramafic intrusives.

Figure A–65 shows the geologic setting for the Klukwan ultramafic (Kp unit.) It is surrounded by hornblende diorite (Kgg unit) which is in contact with metabasalt (Kmb unit) to the west and quartz diorite (TKq unit) to the east. The TKq unit is a part of the Coast Range batholith complex. The hornblende diorite shows epidote alteration in the vicinity of the ultramafic body. Nobel considers the ultramafic (Kp unit) to be the end or near end result of successive intrusions of progressively more basic magmas (*A–59*).

When the geology shown in Figure A–65 was published (1974) it was thought that the Kp unit intruded the hornblende diorite (*A–36*). Recent (1987) geology by ADGGS crews as shown in Figure A–71 indicates that the hornblende diorite intrudes and engulfs the Kp unit (*A–27*).

[7] Recent fossil age dating indicates that the area may all be Alexander terrane (*A–9*).

The ultramafic consists of pyroxenite which is composed principally of augite that has been altered to hornblende with lesser amounts of feldspar, epidote, chlorite, magnetite, ilmenite, and at some locations, sulfides. The sulfides are often chalcopyrite; but pyrrhotite, pyrite, and bornite occasionally occur. The largest concentration of titaniferous magnetite occurs in the lower portions of the ultramafic.

KLUKWAN IRON DEPOSIT

Lode Iron Deposit

The lode portion of the Klukwan iron deposit consists of vanadium-bearing titaniferous magnetite hosted in pyroxenite. The magnetite occurs as massive bodies, irregular stringers, and coarsely and finely disseminated grains in the pyroxenite. The deposit has been diamond drilled and sampled extensively by Columbia Iron. The results of this work indicates the entire pyroxene mass contains between 12% and 20% soluble iron, with rich localized zones of magnetite in the lower portions of the ultramafic as high as 30% to 50% iron. The pyroxenite mass constitutes about 3.5 billion tons if one assumes it extends down dip about 2 miles. The soluble iron content is reported at 16.8% iron (*A-29*). The TiO_2 content is 1.5%-4.4% and the V_2O_5 content is 0.2%.

Alluvial Fan Iron Deposit

The Alluvial Fan iron deposit is located at the foot of the lode iron deposit described above and consists of diorite and magnetite pyroxenite materials that range in size from silt to 8-foot boulders. This fan extends for an approximate radius of 1 mile, slopes an average of 11%, and ranges in elevation from its perimeter at 130 feet to its apex at 950 feet.

This fan resulted when retreating glaciers left a steep walled canyon along the Chilkat Valley near the west edge of the easily eroded pyroxenite lode deposit. Erosional downcutting and mass wasting of the pyroxenite resulted in a large portion of it being spilled out onto the floor of the Chilkat Valley forming the alluvial fan. One study estimates that it took approximately 20,000 years to form this fan and material continues to be spilled out onto the fan today (*A-53*).

The Klukwan fan has been mapped in detail, extensive geophysical surveys have been conducted; test pits, trenching, churn drilling, and Becker drilling were conducted, and test shafts were sunk. The samples collected were utilized to determine composition and size distribution of the fan material. Finally, this material was run through a pilot plant and a mine feasibility study was conducted (*A-53*).

The iron content of the fan occurs as magnetite in the pyroxenite rock as massive bodies, irregular stringers, and coarsely and finely disseminated grains in the pyroxenite. Gangue minerals, in decreasing order of abundance are: pyroxenite, amphibole, ilmenite, chlorite, epidote, calcite, feldspar, quartz, and apatite.

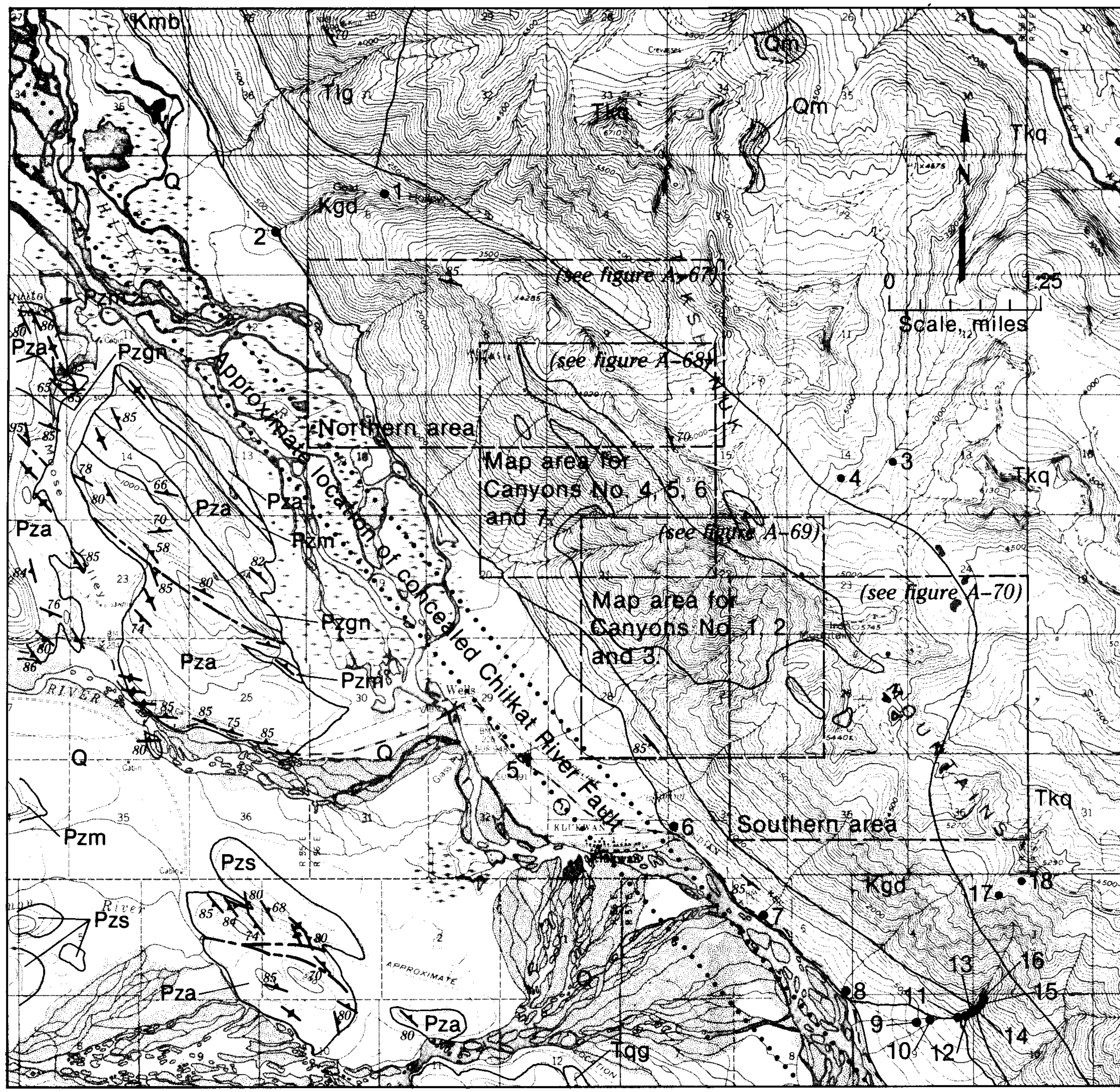
The minable reserve above and below the water table are 989,761,700 dry tons with an overall average grade of 10.8% soluble iron (*A-29*). Reportedly, there is 1.7% titania (TiO_2) and 0.1% to 0.3% vanadium. A 0.10 yd^3 sluice box sample collected of material from the central stream that flows across the fan, assayed 0.1 ppm platinum and 0.02 ppm palladium.

Bureau Investigations at Klukwan for Copper, Gold, Platinum, and Palladium

The Klukwan mafic/ultramafic complex was investigated briefly in the fall of 1981 and in more detail in the spring and early summer of 1982. Access was mostly by foot from a camp located on the fan. A helicopter was utilized for access to some portions of the area. Over 400 rock, panned concentrate, and stream sediment samples were collected and analyzed for an array of elements. Metallurgical test samples were collected at 5 locations and submitted to the Bureau Albany Research Center for metallurgical testing.

Most of the samples were analyzed for gold, platinum, and palladium by fire assay-atomic absorption (FA-AA) or by inductively coupled argon plasma spectroscopy (ICP). Silver, copper, iron, vanadium, titanium, cobalt, chromium, and nickel were analyzed by atomic absorption or X-ray fluorescence. The latter three elements (cobalt, chromium, and nickel) were not found in any significant quantity and are not included in the analytical results. The samples with the best gold, platinum, and palladium values were also run for iridium, osmium, rhodium, and ruthenium by fire assay-spectrography (FA-Spec). None of the latter four elements were detected. Appendix A-1 (table A-1-24) contains analyses for the elements of interest: gold, platinum, palladium, silver, copper, iron, vanadium, and titanium.

By most laboratory standards, gold, platinum, and palladium analyses are difficult. Analysis of control standards and repeated analysis by fire assay or several labs indicate that there were inconsistencies in the values reported. For example, one lab may not have detected values of platinum, palladium, and gold, or may have reported lower values in samples that were found by another lab to have significantly higher values. Where multiple assays show a disparity in sample results, the



EXPLANATION

Q Undivided surficial deposits — include old and modern alluvium, landslides, talus, colluvium and diverse moraines.

Qm Moraines on ice.

East of Chilkat River <u>Igneous Rocks</u>

Tlg Leucogranodiorite and minor granite.

Tkq Quartz diorite and minor granodiorite.

Kp Pyroxenite. Dominantly hornblende pyroxenite.

Kgd Gabbro and diorite. Locally metamorphosed.

Kmb Metabasalt. Metamorphosed mafic lava.

West of Chilkat River <u>Intrusive Rocks</u>

Tqg Quartz diorite and subordinate granodiorite.

<u>Metamorphic Rocks</u>

Pzgn Dominantly gneiss rich in quartz and biotite and generally containing muscovite and plagioclase associated with minor schist, phyllite and marble.

Pzm Marble, chiefly banded, light gray or white, fine grained, locally dolomitic.

Pzs Dominantly chlorite-biotite schist and phyllite in places carbonaceous. Subordinate slate, impure quartzite and marble. Chiefly greenschist-facies rock.

Pza Chiefly amphibolite and schist, some phyllite and minor gneiss, hornfels and marble. Mainly amphibolite and greenschist-amphibolite transition facies rock.

Contact, approximately located.

Fault, approximately located, dotted where concealed.

Lineament from aerial photograph. Dotted where concealed. Most lineaments are probably faults.

30 Strike, showing dip

40 Foliation, showing dip. Foliation, vertical

6 Sample location *(map numbers 1 – 18 are keyed to Table A-1-24)*

Geology modified from MacKevett (1974) USGS Professional Paper 832

Base modified from USGS quadrangle Skagway B-3, 1:63,360

Figure A-65. — Klukwan area index map showing outlines of more detailed maps, geology and sample locations not shown on other maps.

result estimated to be the most correct is given in the tables in appendix A-1.

Results

Figures A-65 through A-70 are a series of maps showing sample locations from this study and iron- and copper-mineralized zones in the Klukwan area. Earlier workers have numbered the canyons that drain the Klukwan area from 1 through 8 from south to north and these numbers have been retained. Canyon 9 has been added to the sequence along with the "South Canyon" located at the extreme south end of the area studied. The area south of Canyon 1 has been termed the "Southern Area". Figure A-65 shows the extent of the 9- by 3-mile area, area geology, outlines of more detailed maps, samples not shown on other maps, and the South Canyon. Figure A-67 shows Canyon 9 and upper portions of canyons 8 and 7. Figure A-68 shows Canyons 4, 5, 6, 7, and portions of 8 and iron-rich areas in canyons 4 and 5. Figure A-69 shows Canyons 1 to 3, and iron- and copper-rich areas delineated by this study. Figure A-70 shows the "Southern area" located south of Canyon 1.

Appendix A-1 shows the analytical results presented in order by sample numbers given in Figures A-65—A-70.

Table A-9 is a summary of the geological and analytical results from the various areas investigated. The order of discussion is from north to south.

Following are the most important results of the Bureau of Mines work in this area:

In general, interesting values in precious metals and copper are found in a variety of environments (Kp, Kgd, and Tqg units) extending from the South Canyon to Canyon 9.

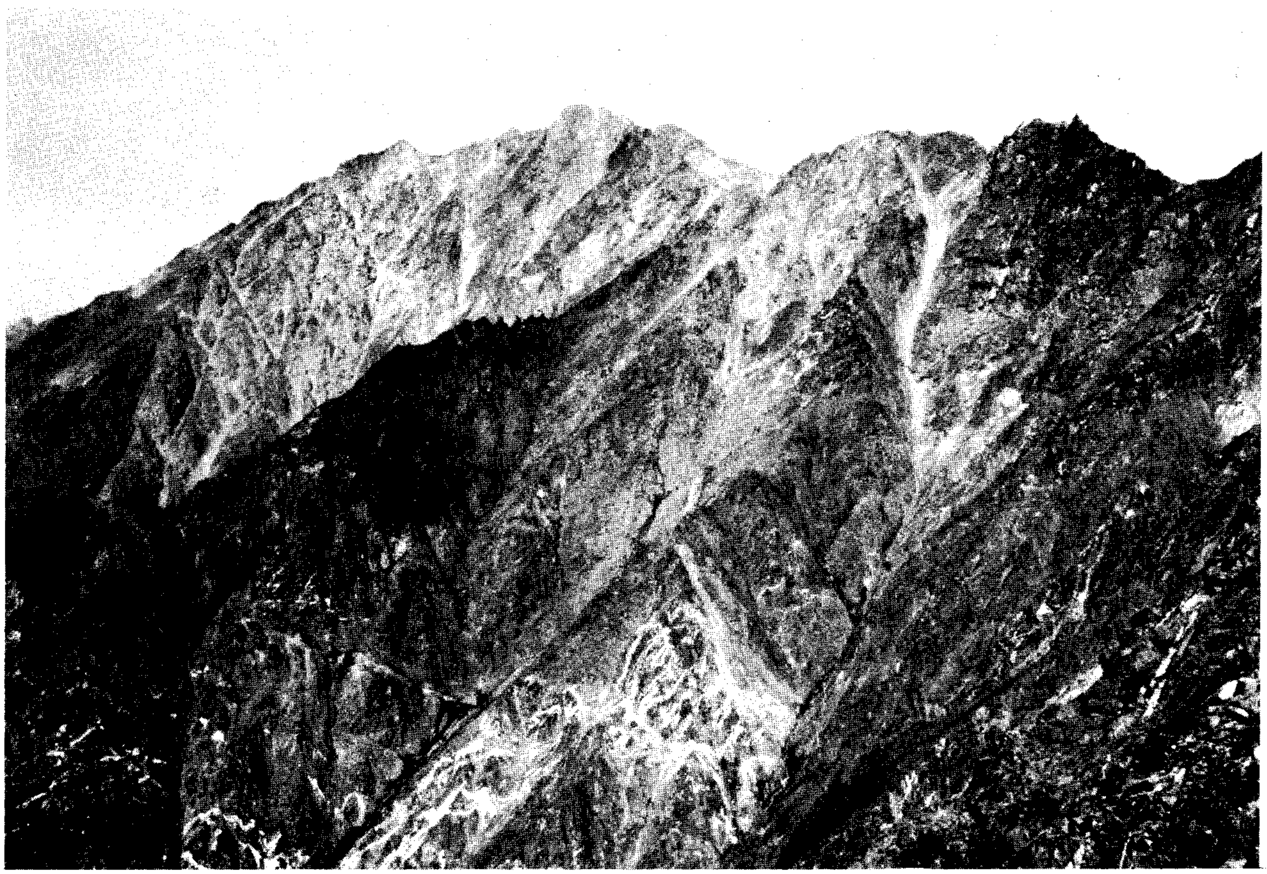
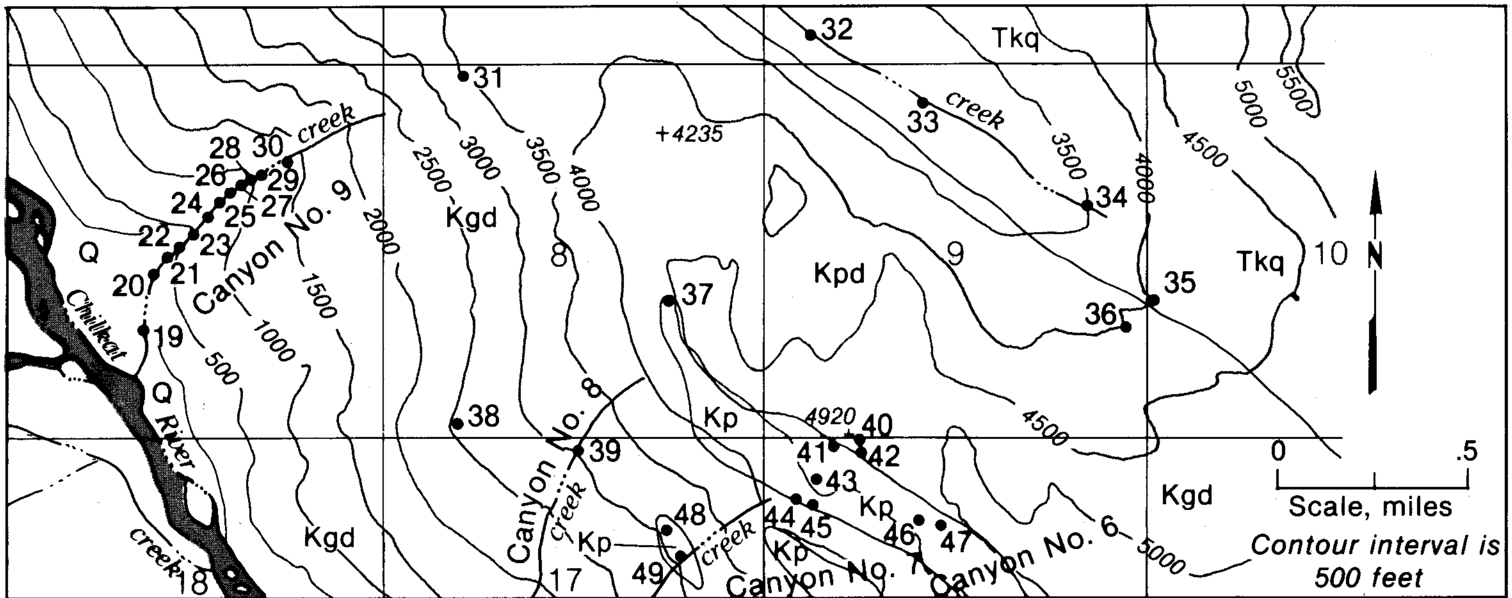


Figure A-66.—The Klukwan mafic/ultramafic complex which contains the 3.5 billion-ton Klukwan iron lode deposit. Mass wasting of the gulches shown in this photograph produced the 1-billion-ton Klukwan Alluvial Fan iron deposit located below. Bureau personnel examined the Klukwan mafic/ultramafic complex during 1981 and 1982 for copper, gold, platinum, and palladium (J. Still, photographer).



EXPLANATION

Q	Undivided surface deposits — include old and modern alluvium, landslides, talus, colluvium and diverse moraines.

<u>Igneous Rock</u>

Tkq	Quartz diorite and minor granodiorite.
Kp	Pyroxenite. Dominantly hornblende pyroxenite.
Kgd	Gabbro and diorite. Locally metamorphosed.
	Contact
•37	Sample location *(map numbers 19 – 49 are keyed to Table A-1-24)*

Geology modified from MacKevett (1974) USGS Professional Paper 832 Base modified from USGS quadrangle Skagway B-3, 1:63,360

Figure A-67.—Northern area map showing geology, sample locations, Canyon No. 9, area east of Canyon No. 9, and upper portions of Canyons No. 8, No. 7, and No. 6.

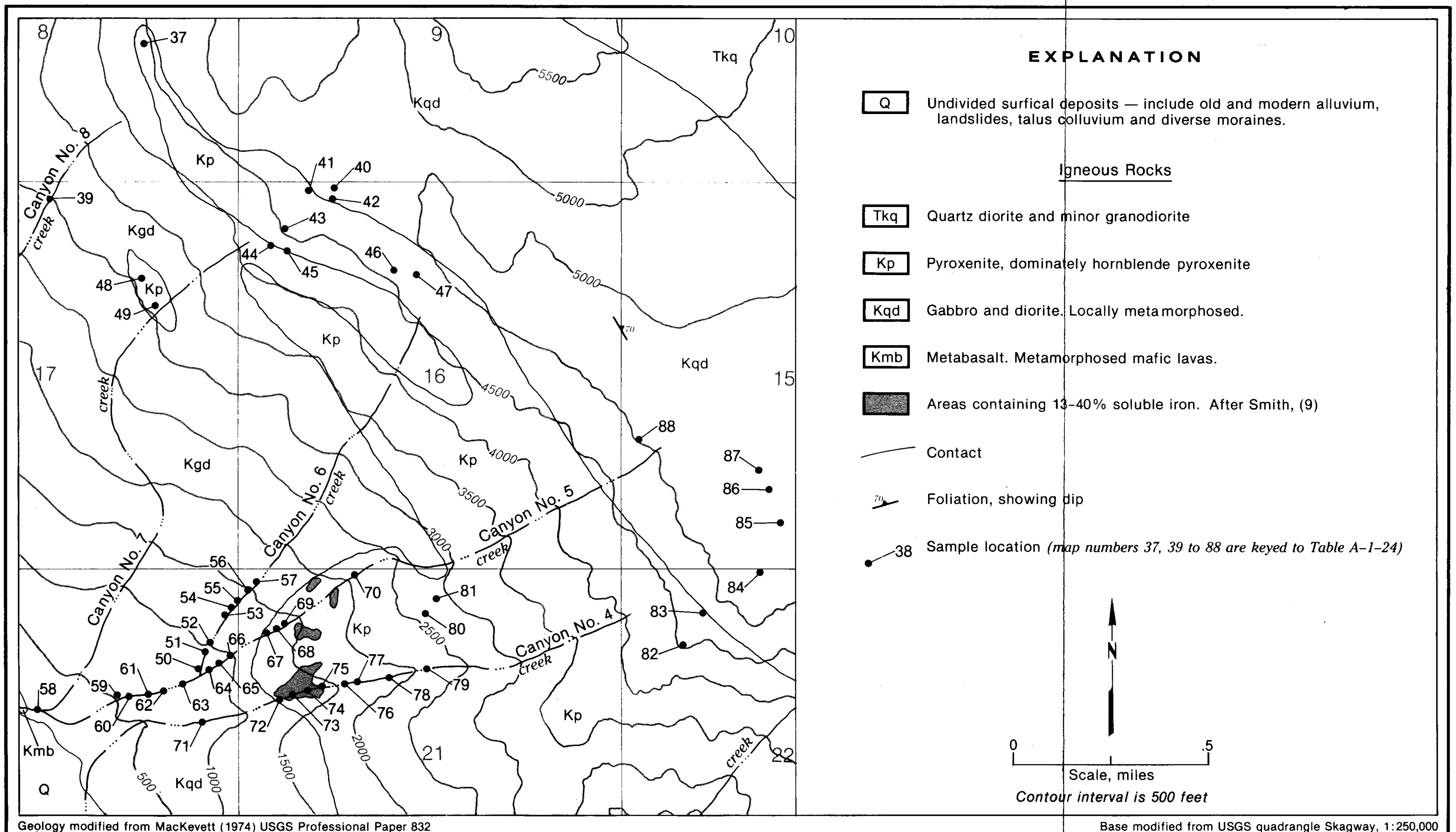


Figure A-68. — Geology and sample locations for Canyons No. 4, 5, 6, 7 and 8.

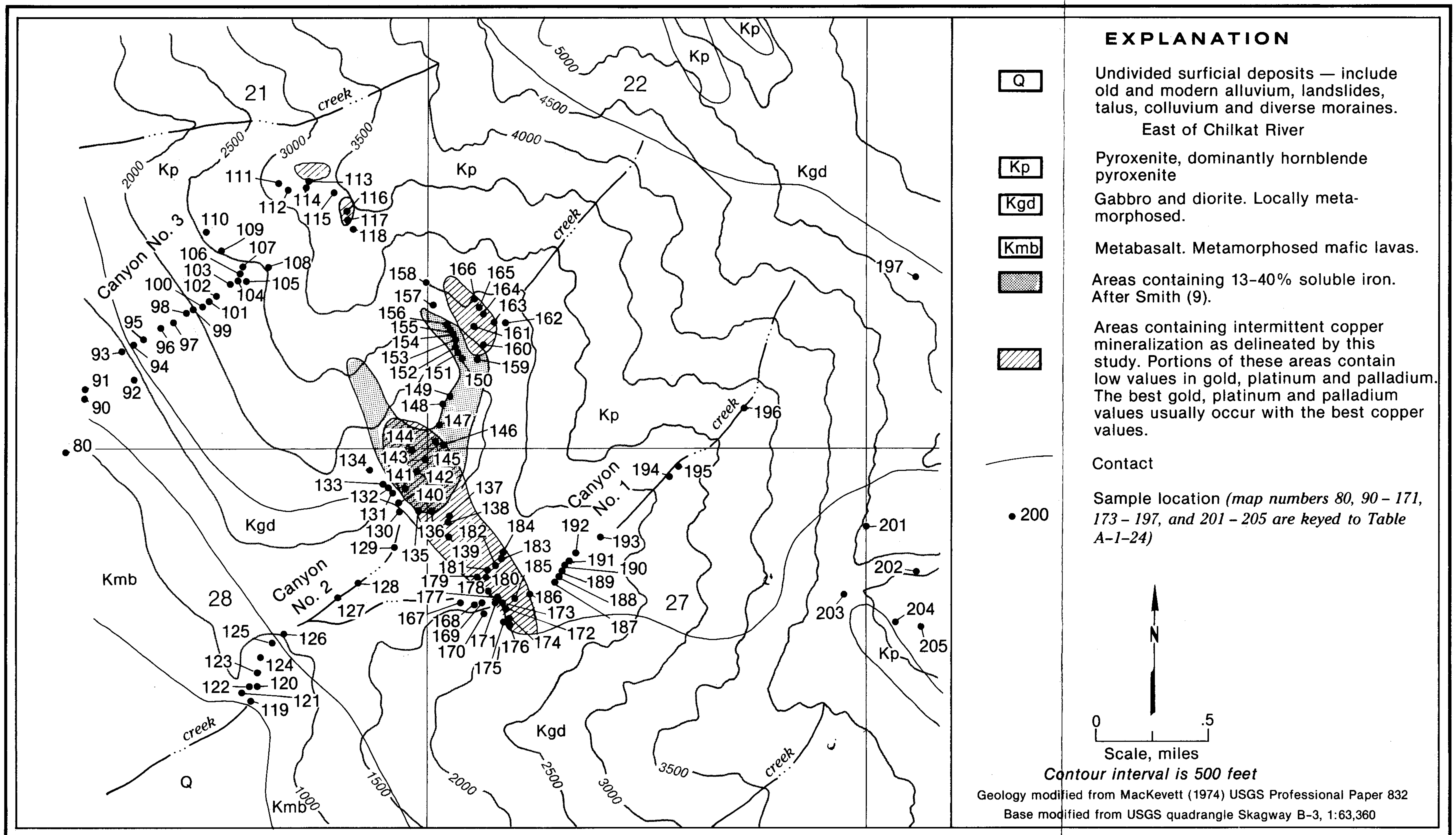


Figure A-69. — Geology and sample locations for Canyons No. 1, No. 2 and No. 3.

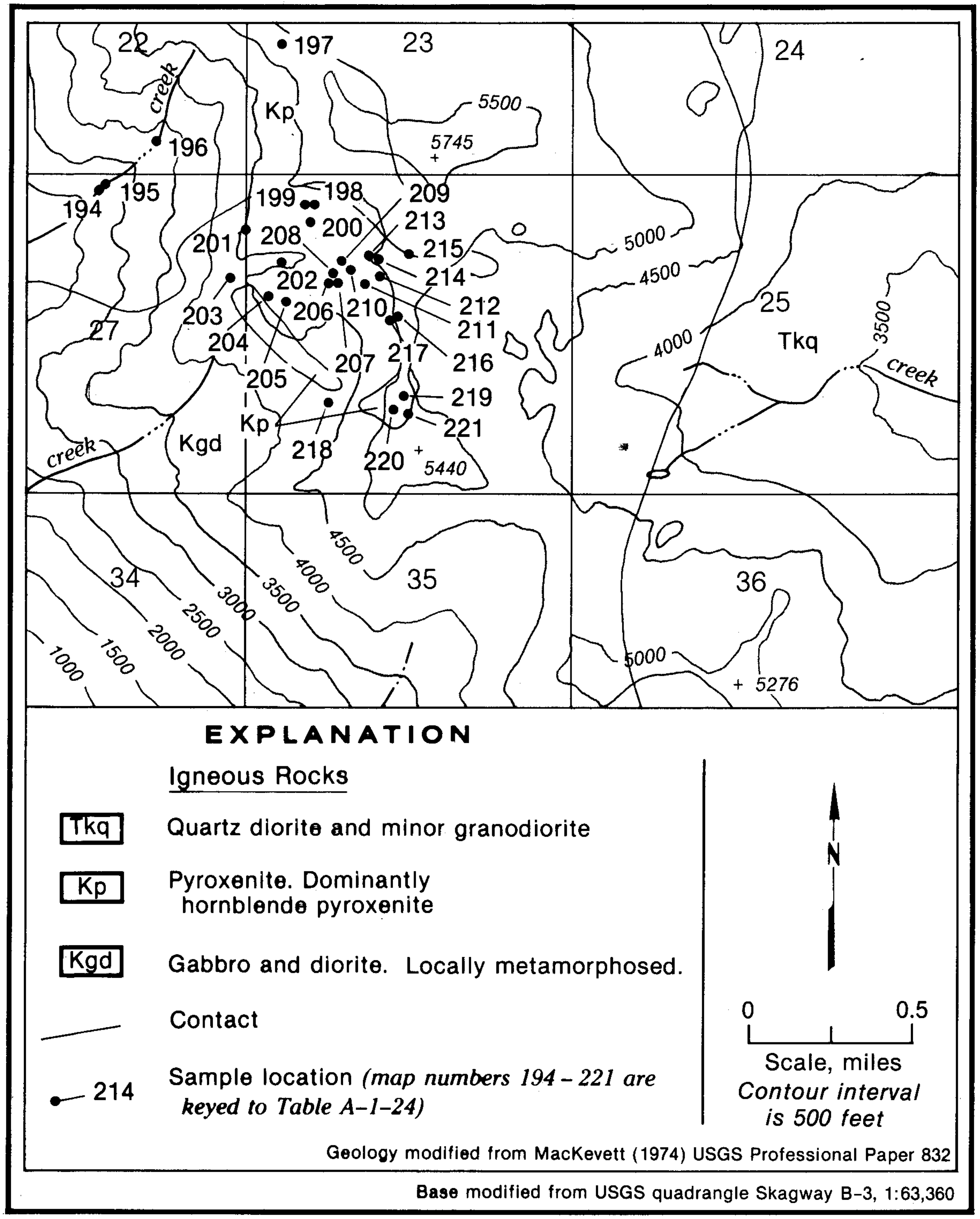


Figure A-70.—Southern area showing geology and sample locations for the area south of Canyon No. 1.

1. Areas of intermittent low-grade mineralization (areas sampled are estimated to average from 750 to 1500 ppm copper) were delineated, extending along the basal contact of the pyroxenite unit (Kp) from the south side of Canyon 1 to the north side of Canyon 2, in the upper portion of Canyon 2 and in Canyon 3. See Figure A-69 and table A-9.

2. Gold, platinum, or palladium mineralization generally associated with sulfides, predominately chalcopyrite, and was not often found associated with magnetite. This does not support earlier claims of 0.00027 ounce/ton combined platinum group elements contained in a half billion tons of titaniferous magnetite (*A-11*). Portions of the copper areas delineated above contained low-grade gold, platinum, and palladium mineralization. Estimated combined gold, platinum, and palladium values for areas indicated in appendix A-2 ranged from less than 0.001 ounce/ton to 0.002 ounce/ton.

3. To the south of Canyon 1, a series of hydrothermal pinch and swell veins with irregular sulfide mineralization occupy northerly striking steeply dipping shear zones. These veins are composed of probable residual material from the ultramafic and contain chalcopyrite, bornite, and malachite. Assays ran up to 0.14 ounce/ton gold, 0.003 ounce/ton platinum, 0.008 ounce/ton palladium, and up to 6.5% copper. This area is worthy of examination for structural or contact zones that might have controlled deposition. See Figure A-70.

4. A panned concentrate and a stream sediment sample taken in Canyon 9 contained low gold, platinum, and palladium values (fig. A-67, Nos. 19 and 26). Since the ultramafic is the likely source of this mineralization and only diorite (Kgd unit) is mapped in this drainage, a potentially easy to find exploration target is presented.

5. Samples of diorite float collected in the South Canyon contained veins of bornite and chalcopyrite up to 0.1 foot thick, with up to 0.14 ounce/ton gold and 2.95% copper. A brief examination of the area revealed similar mineralization in place at an elevation of 4,500 to 5,000 feet on the mountain above the canyon. This area is worthy of detailed examination.

Metallurgical Test Samples

Metallurgical test samples were collected at copper-rich areas of the Klukwan complex. Samples were collected in Canyon 2 at map numbers 144 (2S292) and 151 (2S222) and in Canyon 1 at map numbers 172 (2S182), 174 (2S193's and 2S194's), and 176 (2S195). Head analysis of these samples ranged from 0.082% to 0.34% copper and 19.4% to 25.5% iron, with most precious metal values below the detection limit.

Although both copper and precious metal contents are low, samples responded well to bulk flotation. Copper recoveries ranged from 57% to 76% and platinum, palladium, gold, and silver reported to concentrate in tests producing sufficient concentrate for analysis. Appendix A-2 contains details of the metallurgical testing.

OTHER OCCURRENCES IN THE KLUKWAN VICINITY

There are copper-gold occurrences located north, east, and south of the Klukwan iron deposit (fig. A-71, locs. A, B, C, and D). Locations A, B, and C consist of chalcopyrite-bornite mineralization as disseminations, segregations, or as joint fillings in rocks ranging in composition from granite to diorite; while location D consists of quartz calcite veins in metabasalt. The mineralized zones examined are discontinuous and very limited in extent.

At location B a sample collected from a 0.6- by 0.5-foot chalcopyrite bornite lens contained 15.052 ppm gold, 54.2 ppm silver, and 21.8% copper. Other samples collected at location B contained up to 0.72 ppm gold, 4.1 ppm silver, and 1.20% copper. Samples collected at locations A, C, and D contained up to 2.430 ppm gold, 34.9 ppm silver, 7.10% copper, and 1.85% zinc. Analytical results are given in appendix A-1, tables A-25 to A-28.

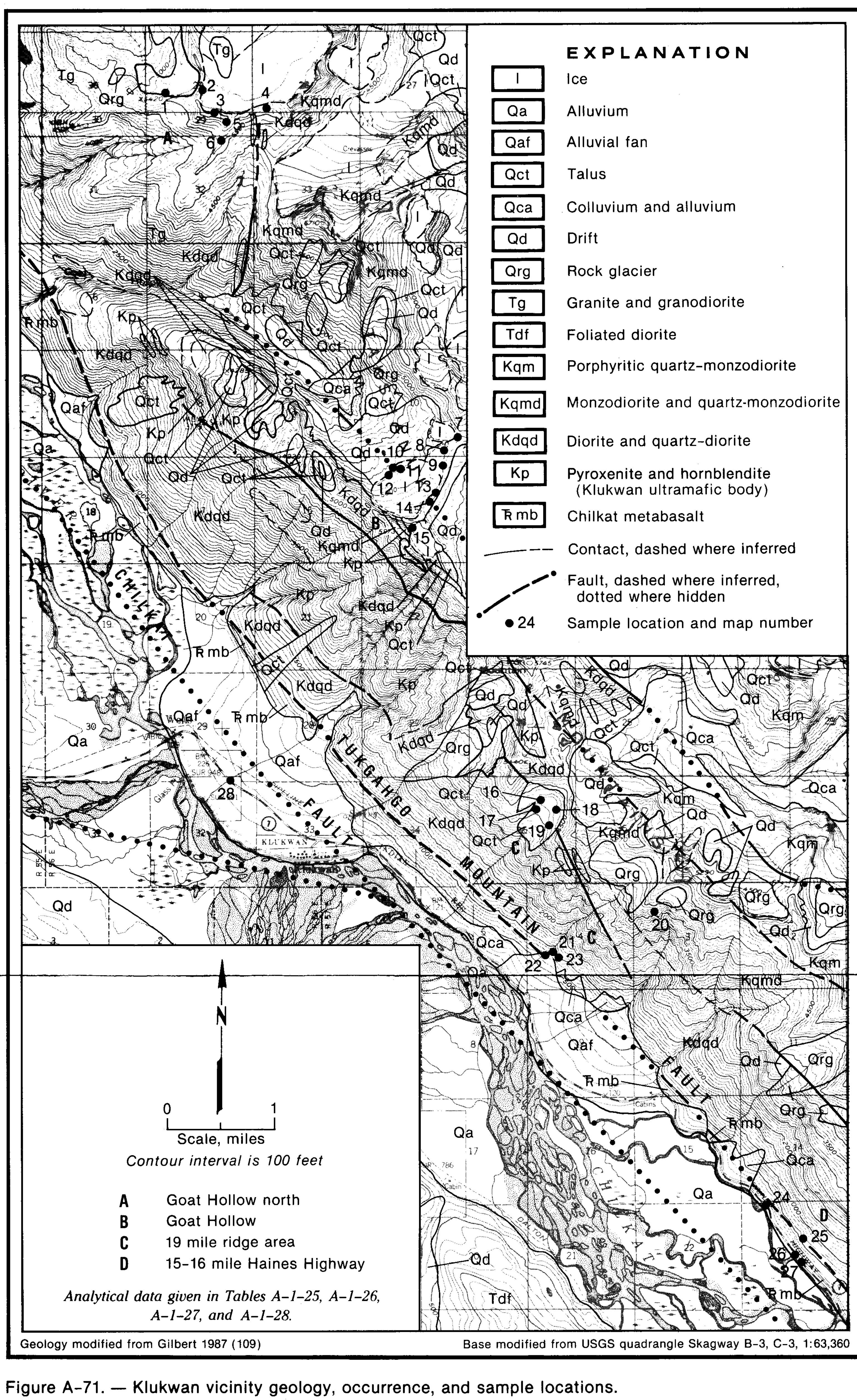


Figure A-71. — Klukwan vicinity geology, occurrence, and sample locations.

Table A-9.—Summary of Klukwan investigations by area (Key to abbreviations at beginning of appendix A-1, table A-1-70)

Area	Figure	Sample map numbers and sample types	Sample results	Comments
Canyon 9	A-67	19–31 4 bedrock; 4 PC; 5 float; 4 SS	A SS sample assayed 0.003 oz/st Au and 0.002 oz/st Pt; while a PC sample assayed 0.0021 oz/st Pt and 0.0022 oz/st Pd. Samples of diorite assayed up to 4,000 ppm Cu and 0.002 oz/st Au.	The likely source for the Pt,Pd,Au mineralization is ultramafic rock or mineralized zones related to the ultramafic. However, only diorite (Kgd) is mapped or reported in this canyon. The source of the mineralization presents an excellent exploration target. In places this canyon is full of steep dangerously loose rubble and caution should be exercised.
4700 ft elevation stained zone	A-68	46–47 7 bedrock; 1 soil	A high-grade grab sample assayed 6.2% Cu while a 10 ft long sample assayed 0.35% Cu. Samples assayed up to 0.003 oz/ st Au and one sample assayed 0.003 oz/st Pd.	Iron-stained zone up to 20 ft thick and thousands of feet long is less resistant to weathering and forms a ledge that is soil and rubble covered. Zone consists of altered and sheared hnbd pyroxenite that contains both vein and magmatic cp.
Canyon 8	A-67 A-68	39 3 float; 1 PC	No significant mineralization found.	
Canyon 7	A-67 A-68	50–57 4 bedrock; 1 float	Samples of hnbd pyroxenite containing disseminated chalcopyrite assayed up to 990 ppm Cu and 0.003 oz/st Au.	
Canyon 6	A-68	50–57 1 bedrock; 6 float 5 SS	Sample of hnbd pyroxenite and grabbo with cp contained up to 2,800 ppm Cu and 0.001 oz/st Au.	
Canyon 5	A-68	58–70 3 bedrock; 10 float; 5 PC; 6 SS	Float samples of hnbd pyroxenite or gabbro with cp contained up to 2,500 ppm Cu and 0.005 oz/st Au. Of 11 SS and PC samples one contained 0.00072 oz/st Pd.	
Canyon 4	A-68	71–81 11 bedrock; 9 float; 2 PC; 1 SS	Samples of hnbd pyroxenite contained up to 3,100 ppm Cu and one sample contained a trace of Pd. A 20 ft long sample of massive magnetite contained 46.2% Fe.	Portions of this canyon are rich in magnetite. Copper or precious metal concentrations were not associated with the iron rich portions of this canyon.
Ridge above Canyon 3 4 and 5	A-68	82–88 7 bedrock	A sample of ml stained diorite contained 4,000 ppm Cu and 0.009 oz/st Au while the pyroxenite contained up to 78 ppm Cu.	The upper portion of the ultramafic appears layered from a distance. These layers appear to strike in a northwesterly direction and dip into the mountain. However, the layers are not apparent from observations made on layers themselves.
Canyon 3	A-69	89–118 13 bedrock; 10 float; 11 SS	Values up to 0.013 oz/st Au, 0.001 oz/st Pt, 0.0024 oz/st Pd, and 2,500 ppm Cu were found in bedrock, float, or SS samples. Most of the values were found in hnbd pyroxenite or pyroxenite.	A number of samples contained Au, Pt, or Pd and some of these were in place. This area is worthy of more detailed examination to delineate the areas of precious metal mineralization and determine if higher grade areas exist. In general, the precious metal mineralization was associated with chalcopyrite mineralization and not with the magnetite.
Basalt Unit below Canyon 2	A-69	119–125 6 bedrock; 2 float	Samples of basalt contained up to 295 ppm Cu, 7% Fe, 500 ppm V, and 2.76% Ti.	These samples did not indicate any significant mineralization within the basalt unit.
Canyon 2	A-68	126–166 35 bedrock; 27 float; 7 PC; 15 SS; 2 bulk	Values of up to 0.019 oz/st Au, 0.031 oz/st Pt, and 0.011 oz/st Pd was found in SS, PC, float and bedrock samples (mostly of hnbd pyroxenite with cp). Up to 4.1% Cu was found in bedrock and float samples (mostly of hnbd pyroxenite). A float sample of hnbd gabbro, location 145, sample 1S018, assayed 0.010 oz/st Au, 0.031 oz/st Pt, 0.001 oz/st Pd, and 2,800 ppm Cu.	A zone of intermittent Cu mineralization located near the basal contact of the ultramafic extends from Canyon 1 to Canyon 2. Another zone of Cu mineralization is located in the upper part of Canyon 2. Figure A-5 shows the locations of these zones. Some portions of these zones contain low Au, Pt, Pd mineralization. These areas are worthy of more detailed examination. The float sample 1S018, is worthy of follow up. The hnbd gabbro at the top contact above Canyon 2 may be the source of this float.
Canyon 2 North Side	A-69	131–134 4 float; 5 SS	Float and SS samples contained up to 0.019 oz/st Au, 0.001 oz/st Pt, and 0.001 oz/st Pd. Float samples of hnbd pyroxenite contained up to 1,020 ppm Cu.	
Canyon 2 South Side	A-69	135–139 4 bedrock; 1 SS	Bedrock samples of hnbd pyroxenite contained up to 0.0001 oz/ st Pt and 1,230 ppm Cu.	

Table A-9.—Summary of Klukwan investigations by area—Continued

Area	Figure	Sample map numbers and sample types	Sample results	Comments
Canyon 2 lower copper area	A-69	144 4 bedrock: 3 float; 1 bulk	Cu ranged form 495 to 1,100 ppm while Fe ranged from 13.7% to 25.5% in samples of mag hnbd pyroxenite. 0.0005 oz/st Au and 0.0010 oz/st Pt were detected in the 193 lb. bulk sample.	Sampling indicates Au, Pt, and Pd are sparse in this iron rich section of the copper zone that extends from Canyon 1 to Canyon 2.
Canyon 2 upper copper area	A-69	150–166 18 bedrock; 13 float; 1 PC 1 SS; 1 bulk	15 of 34 samples contained Au, Pt, or Pd usually in amounts well below 0.01 oz/st. A high grade grab sample of a copper-rich area assayed 0.014 oz/st Pt, 0.011 oz/st Pd, and 4.1% Cu. Most of the samples taken were of hnbd pyroxenite with varying amounts of mag and cp.	Sparse sampling indicates that this copper zone may average 750–1,000 ppm Cu with some sections running significantly higher. The combined Au, Pt, Pd may average less than 0.001 oz/st.
Canyon 1	A-69	167–196 68 bedrock; 12 float; 5 PC; 8 SS; 4 bulk	Bedrock samples of mostly hnbd pyroxenite with mag, cp, and occasionally bn assayed up to 0.0022 oz/st Au, 0.0085 oz/st Pt, 0.0085 oz/st Pd, and 8,300 ppm Cu. Some float, PC, and SS samples contain low Au, Pt, Pd values and up to 4,850 ppm Cu. Some samples of hnbd diorite or gabbro float with cp contain low Au, Pt, Pd values.	Portions of a zone of intermittent Cu mineralization extending from the south side of Canyon 1 to Canyon 2 contain low Au, Pt, and Pd. Figure A-5 shows the location of this zone. Float, PC, and SS samples taken well above this zone contain low Au, Pt, and Pd values and significant copper indicating potential for mineralized zones in the upper portions of this canyon.
Canyon 1 South Side	A-69	174–176 20 bedrock; 3 bulk	18 of 20 bedrock samples contained Au, Pt, Pd and up to 8,300 ppm Cu.	Sparse sample data indicate the copper zone on the south side of Canyon 1 may average up to 1,500 ppm Cu and 0.002 oz/st combined Au, Pt, Pd.
Canyon 1 North Side	A-69	177–184 41 bedrock	15 of 41 bedrock samples contained up to 0.003 oz/st Au, 0.002 oz/st Pt, and up to 6950 ppm Cu.	Sparse sample data indicate this portion of the copper zone may average up to 1,500 ppm Cu and less than 0.001 oz/st combined Au, Pt, Pd
Canyon 1 above the copper zone	A-69	185–196 7 bedrock; 10 float; 3 PC; 4 SS	Samples contained up to 0.003 oz/st Au, 0.005 oz/st Pt, 0.007 oz/st Pd and up to 4,850 ppm Cu.	
Southern Area	A-70	197–221 30 bedrock; 15 float; 1 SS	A sample of hnbd diorite (sample 198) with po and cp taken near the ultramafic diorite contact contained 0.004 oz/st Au and 4,620 ppm Cu. Vein samples of hydrothermal rock with bn, cp, and ml assayed up to 0.14 oz/ st Au, 0.003 oz/st Pt, 0.008 oz/st Pd, and up to 6.5% Cu.	The most interesting aspects of this area are veins (probably formed from residual fluids from the ultramafics) that occupy shear zones that strike north to northwesterly and dip steeply. These veins pinch and swell and are very irregularly mineralized. This area is worthy of examination for structural controls that might concentrate these residual hydrothermal deposits.
South Canyon	A-65	9–18 8 float; 2 PC; 3 SS	Samples of diorite float containing veins of cp and bn up to 0.1 ft thick contained up to 0.156 oz/st Au and 2.95% Cu. Note: PC samples 7 and 8 taken at streams located just north of the South Canyon contain up to 0.0035 oz/st Au.	A brief examination of the area above the canyon (where the float was found) at elevations of 4,500 to 5,000 ft revealed nearly in place (sample 17) diorite with ml and bn in mafic segregations. This area is worthy of detailed examination.

PROSPECTS AND OCCURRENCES BETWEEN KLUKWAN AND HAINES

INTRODUCTION

This section covers the prospects and occurrences located in the Takshanuk Mountains between Haines and 14 miles north of Haines along the Haines Highway (fig. A-1, Nos. 31-34.) Figure A-72 shows the area geology and prospect sample locations. The area consists of northwesterly trending metabasalt to the west and a series of granodiorite, monzonite, and diorite intrusives with basalt roof pendants. To the south, the Haines mafic/ultramafic complex intrudes the basalt and some of the intrusive rocks to the east.

The prospects and occurrences in this area consist of gold-copper-bearing quartz veins that are hosted in basalt and intrusive rocks. The Twelve Mile gold-copper prospect was discovered prior to 1919, while the Chilly and Mount Ripinski occurrences were discovered by this study. The latter two occurrences contain low amounts of platinum and palladium. While samples values indicate potential for gold deposits, the values and extent of the examined veins was insufficient to consider economic development.

TWELVE MILE GOLD-COPPER PROSPECT

The Twelve Mile gold-copper prospect was first reported on by Eakin (*A-23*) in 1919. Mention is made of gold-bearing bornite-chalcopyrite veins at a location 10 miles from Haines. This is the last mention of this prospect in literature until 1984 when Redman and others (A-47) mention sampling silver-copper-bearing quart veins in this area.

This study found narrow gold-bearing bornite-chalcopyrite quartz-feldspar veins near peak 4,920, at a location about 12 miles north of Haines. These veins are hosted in hornblende diorite and are formed at four locations (fig. A-72). At Figure A-72, locations 1 and 2, the veins are widely scattered in ridge crest rubble crop across the veins strike for a distance of 100 feet. Samples from these veins, that are up to 1.0-foot thick, contained up to 0.514 ppm gold, 66.5 ppm silver, 12.01% copper, 57 ppm arsenic, and 63 ppm bismuth (table A-1-29).

At Figure A-72, location 4, a bornite-chalcopyrite-bearing quartz-feldspar vein that averages less than 0.3 foot thick, strikes 80°, and dips 20° south was traced for an exposed extent of 110 feet along a cliff face. Samples collected from the vein contained up to 0.343 ppm gold and more than 10% bornite-chalcopyrite.

CHILLY OCCURRENCE

Stream sediment samples collected at the mouth of Shakuseyi Creek contained 0.137 and 0.014 ppm gold (fig. A-72, No. 5) and led to more detailed examination of the area in the vicinity of Point Chilly. Four stream sediment samples collected in the Shakuseyi Creek drainage at elevations from 1,700 to 3,600 feet contained from nil to 0.343 ppm gold (fig. A-72, Nos. 13, 14, 22, and 23). Analytical results are in appendix A-1, table A-1-30.

The occurrence area consists of metabasalt roof pendants surrounded by hornblende diorite, granodiorites, and monzonites. There are sporadic quartz veins in the area, mostly in the vicinity of the northwesterly trending Tukgahgo Mountain Fault (fig. A-72). These veins are narrow and discontinuous. Samples collected from the veins contained up to 0.824 ppm gold, 2.7 ppm silver, and 2,140 ppm copper. A sample collected across a vein with visible molybdenite (fig. A-72, No. 10) contained 1,240 ppm molybdenum. Six samples were analyzed for platinum and palladium. They contained from nil to 0.09 ppm platinum, and from 0.004 to 0.04 ppm palladium. An almost universal association of platinum and palladium with ultramafic rocks suggests that the source of platinum-palladium-gold and copper in these veins may be associated with the ultramafic rocks that outcrop several miles to the southeast of this prospect.

This prospect warrants additional examination particularly in the areas of Shakuseyi Creek between the anomalous stream sediment samples.

MOUNT RIPINSKI OCCURRENCE

The Mount Ripinski area consists of northwest-trending metabasalts forming cliffs, thousands of feet high, intruded by the Haines ultramafic and hornblende diorite, which intrudes portions of the Haines ultramafic (fig. A-72). The metabasalts contain sporadic quartz veins, some of which are up to several feet thick, and trend for many hundreds of feet, or more.

Samples were collected from metabasalt cliffs and from rubble beneath these cliffs. These mostly consisted of chalcopyrite-bornite-bearing quartz calcite veins and some chalcopyrite-bearing metabasalt. The chalcopyrite-bearing basalt was found in rubble crop only, and not observed in place. Tan alteration of this metabasalt may indicate its source is the wall rock near quartz veins. The veins contained up to 12.034 ppm gold and 3.97%

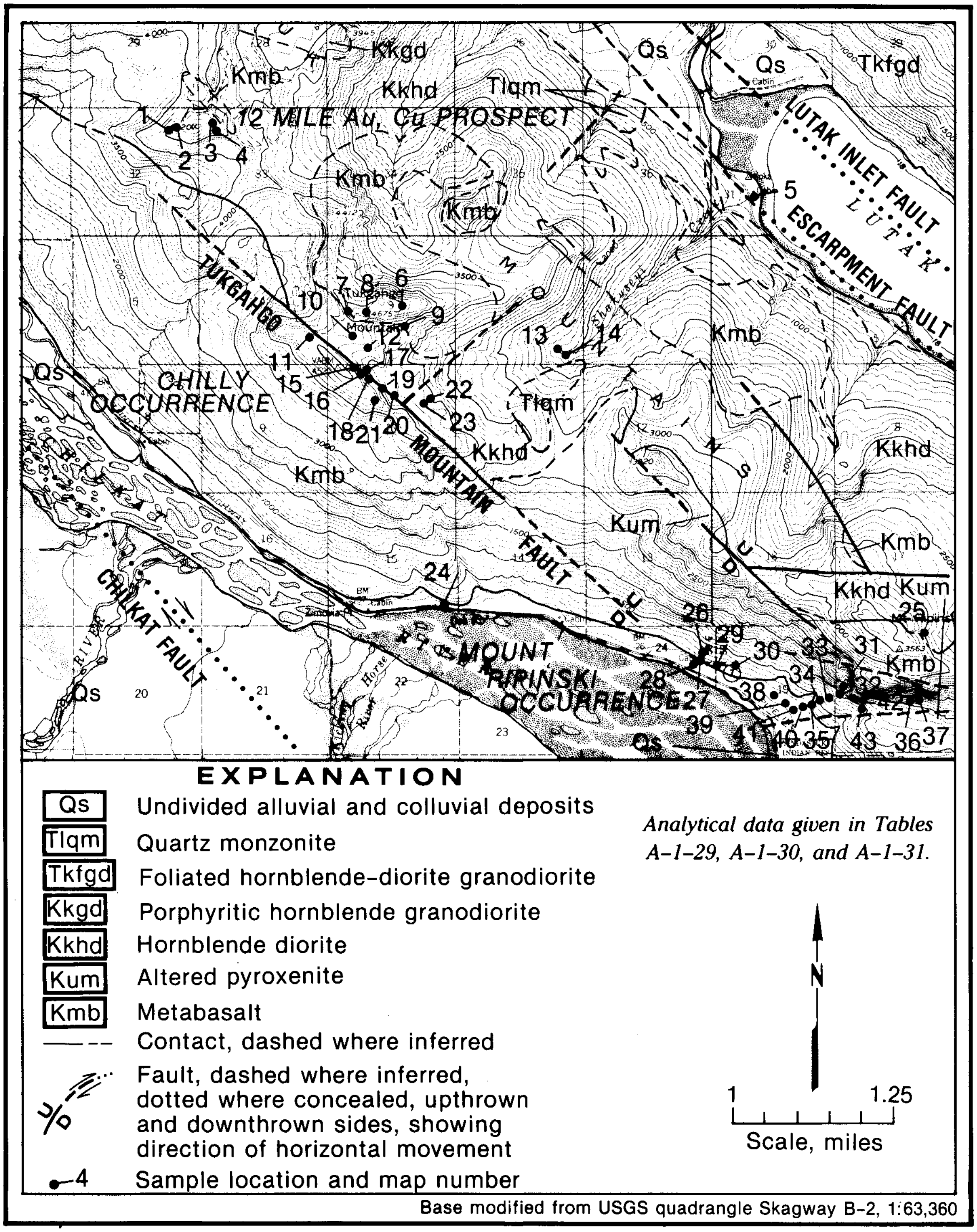


Figure A-72.—Tukgahgo and Ripinski Mountains area showing geology, occurrences, and sample locations.

copper, while the metabasalt contained up to 0.605 ppm gold and 3.50% copper (table A-1-31).

Twelve of the 27 samples (both metabasalt and quartz veins) were assayed for platinum and palladium. The samples contained from 0.01 to 0.06 ppm palladium and one sample contained 0.02 ppm platinum. This may indicate an association with ultramafic rocks in the area, or an ultramafic not exposed at the surface.

Almost all of the quartz veins in this occurrence's vicinity contain low gold values. The area is worthy of examination for higher-grade veins.

HAINES MAFIC/ULTRAMAFIC COMPLEX OCCURRENCE

The Haines ultramafic body is exposed for about 7 miles along the Chilkat Peninsula and north of Haines (fig. A-73.) It consists of pyroxenite that is mostly altered to hornblende. It is very similar to the Klukwan ultramafic, but based on observations of this study, it contains less iron. Although it contains billions of tons of iron resources, these are considered to be too low grade and scattered throughout the ultramafic to be given serious economic consideration.

Samples were collected of various phases of the ultramafic and also of the associated hornblende, plagioclase, thulite, and pegmatite found in fractures in the ultramafic. Stream sediment and beach sands samples were also collected. Figure A-73 shows the sample locations. Samples collected of the ultramafic and pegmatite contained up to 0.068 ppm gold, 790 ppm copper, 0.05 ppm platinum, and 0.05 ppm palladium (table A-1-32). A stream sediment sample collected at the head of the Piedad Road, in a gulch near the City of Haines water source, contained 0.015 ppm gold, 337 ppm copper, 0.02 ppm platinum, 0.025 ppm palladium and 1.4 thorium. Float samples of quartz-feldspar or quartz pyroxene breccia contained up to 9.2 ppm thorium and 2 ppm uranium. The thorium and uranium values are slightly above background.

Reconnaissance samples indicate that the Haines mafic/ultramafic complex may have potential similar to that of the Klukwan mafic/ultramafic complex for platinum group element deposits. It is yet to be demonstrated that economic copper-gold-PGM or gold-PGM deposits exist in the Alaska type zoned mafic ultramafic complexes.

CHILKAT PENINSULA AND ISLANDS AREA

INTRODUCTION

The Chilkat Peninsula and Island area extends from south of the City of Haines to include all the Chilkat Peninsula south to Kataguni Island. Figure A-1 shows the area. During the period 1986 to 1988, personnel from the Bureau and ADGGS studied the mineral development potential of the Chilkat Peninsula and Islands.

LAND STATUS

About 80% of the Chilkat Peninsula and Islands is part of the Chilkat and Chilkat Islands State Parks and not open to mineral entry. The northern portion of the peninsula is dominated by the city of Haines while the central portion of the peninsula is mostly held by private owners. Other holdings in the area belong to the University of Alaska, the Haines Borough, and Alaska State Mental Health Land. Figure A-74 shows the distribution of land holdings in the study area. A small portion of the area is highway right-of-way owned or controlled by the State of Alaska.

PREVIOUS WORK

In 1969, a USGS crew collected bedrock geochemical samples in the Chilkat Peninsula area and reported this work in USGS OFR 406 by Winkler and MacKevett (*A-66*). Additional work in the area was accomplished by the USGS during the early 1980's. The results of all of these USGS efforts are reported in USGS OFR 85-717 (*A-63*), which lists all the prospects, occurrences, claim groups, pertinent geochemical bedrock, and stream sediment samples. Listed in the Chilkat Peninsula and Islands area are the Jadeite claims on Talsani Island and what is now known as the Battery Point gold-copper occurrence. USGS samples from the latter contained 150 ppm chromium, 300 ppm copper, and "some" cobalt and nickel.

During 1978, USGS personnel conducted a brief reconnaissance study of the area and published a geologic map in 1980 (*A-44*).

A preliminary reconnaissance USGS geology map of the Juneau, Taku River, Atlin, and part of the Skagway 1:250,000 quadrangles lists the Chilkat Peninsula as unmapped (*A-8*).

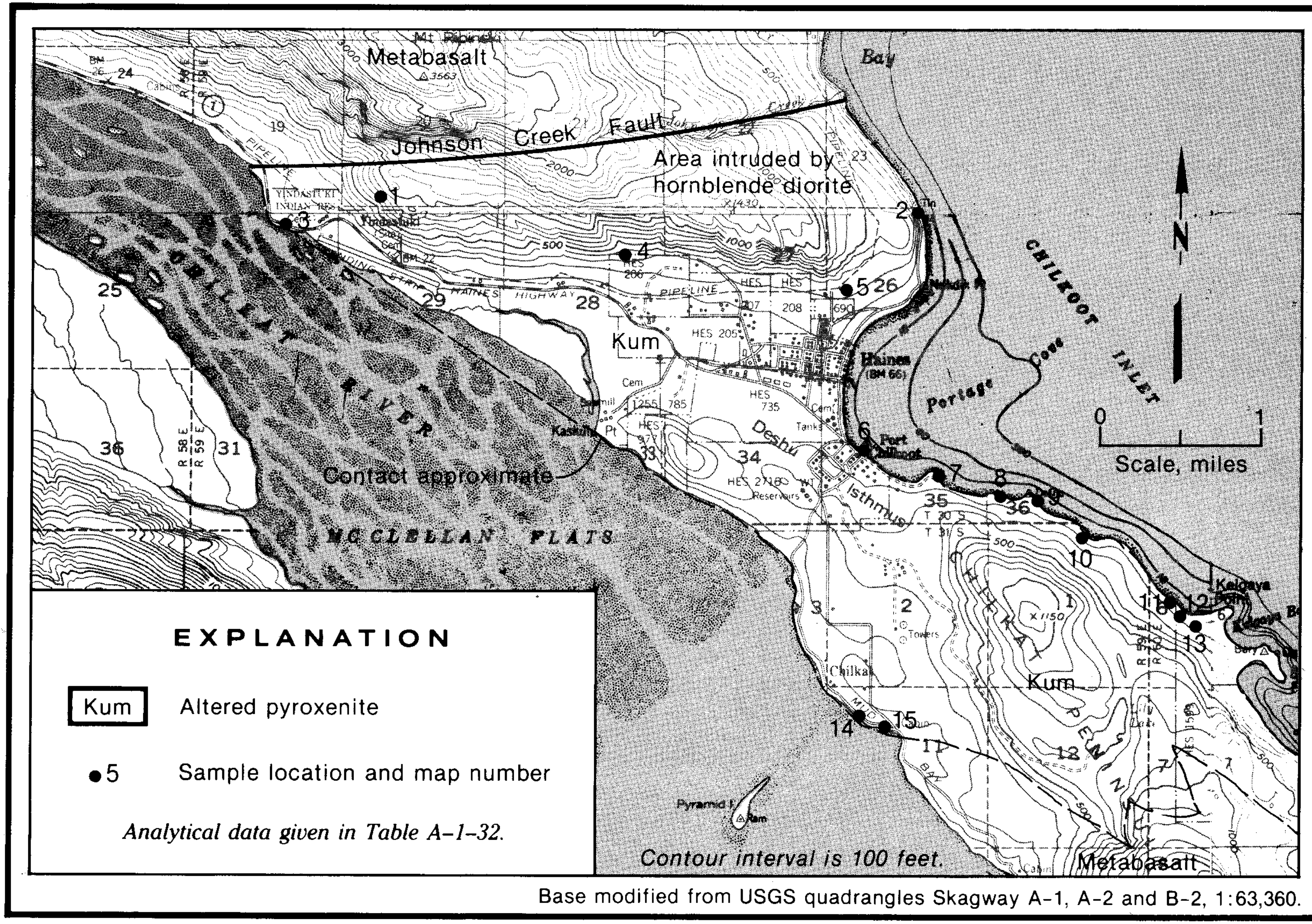


Figure A-73.—Haines mafic/ultramafic complex showing geology and sample locations.

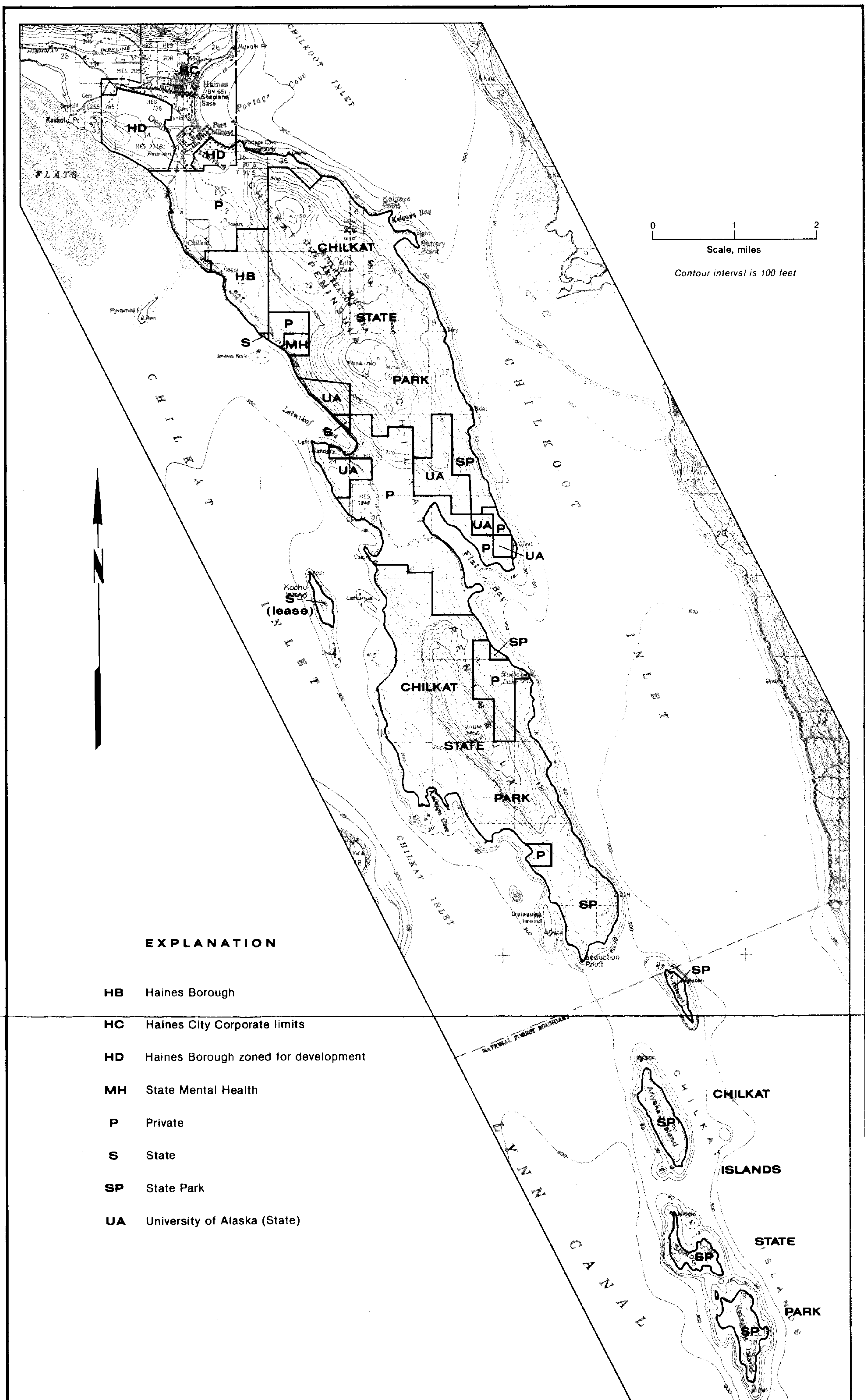


Figure A-74. — Chilkat Peninsula and Islands land status.

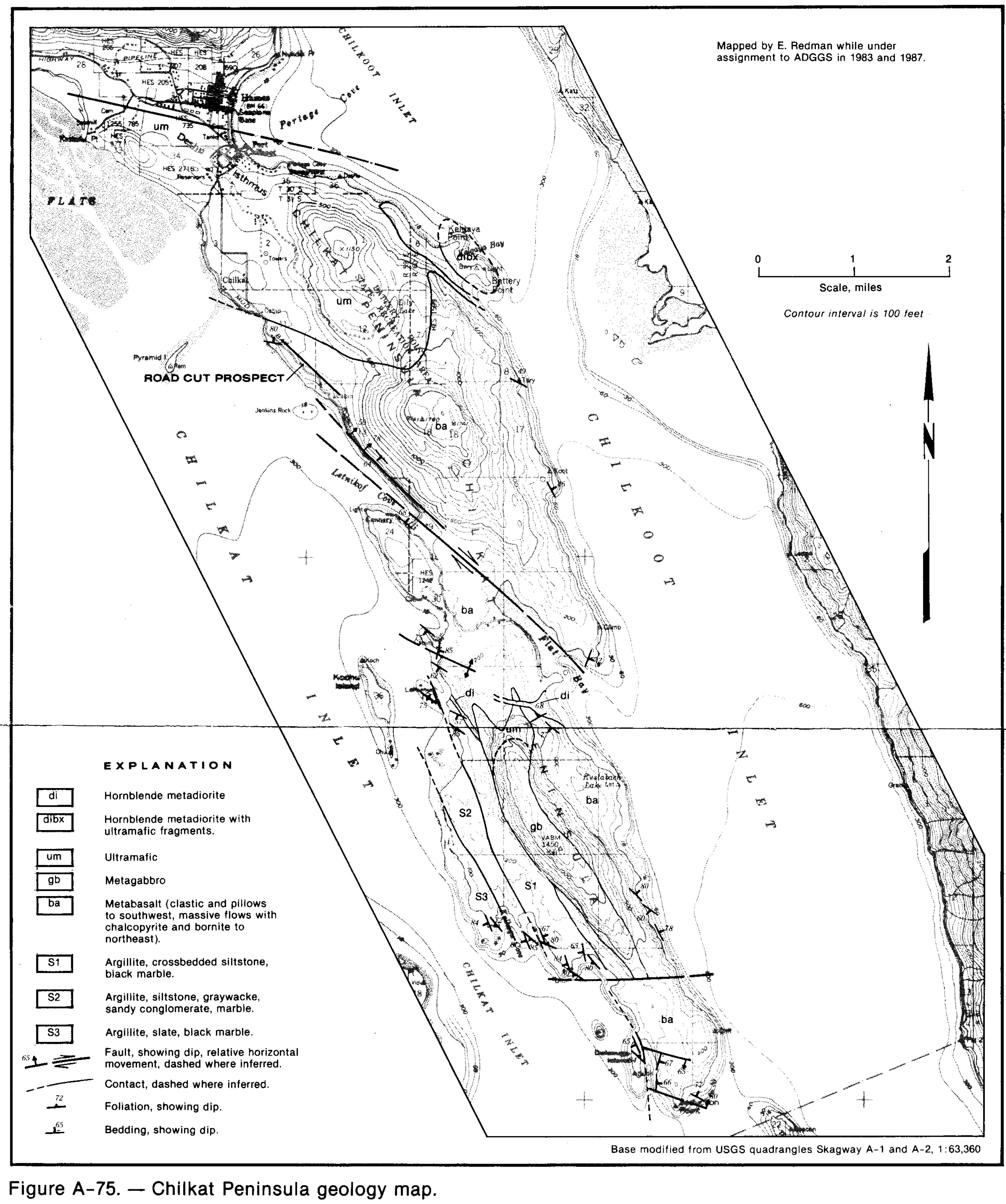


Figure A-75. — Chilkat Peninsula geology map.

Prior to this study the mineral development potential of the Chilkat Peninsula had received little attention from government agencies or private industry. A large portion of the Chilkat Peninsula and Islands was converted to State Parks in 1970, 1975, and 1983.

PRESENT STUDY

Geology

Figure A-75 shows the geology of the Chilkat Peninsula as mapped by the ADGGS during this project. Preliminary work covering the petrology of some of the Chilkat Peninsula rocks was completed by the ADGGS during 1986 (*A-26*).

The Chilkat Peninsula is bounded by the Chilkat and Chilkoot Inlets, which follow major northwest-trending faults. The Chilkat fault is thought to be part of the Denali Fault system. The peninsula is thought to be part of the Alexander Terrane (*A-8*).

The peninsula consists of a northwest-trending, steeply-dipping 10,000-foot-thick sequence of Triassic[8] metabasalt (ba) in contact with metasedimentary (S1-S3) rocks to the west. The basalt flows are massive and amygdaloidal except near the top of the sequence, where pillows have been identified. It has been suggested that the bulk of the basalts are subaerial and the top portion is submarine (*A-44*). The north and central portions of the peninsula have been intruded by ultramafic (um) rocks that form an epidote amphibolite contact aureole in the intruded metabasalt. The ultramafic rocks consist of magnetite-bearing pyroxenite and hornblendite. Hornblende diorite intrudes the basalt south of Flat Bay and is emplaced along many faults in the area. In the vicinity of the metabasalt-metasedimentary contact gabbro (gb) intrudes both rock types.

Rocks of the Chilkat Peninsula have been subjected to regional metamorphism ranging from the zeolite to the greenschist facies of undetermined age (*A-26*).

Diamond Drilling

All the project diamond drilling was on the Road Cut prospect where 980 feet of NQ core was drilled in seven holes through contract by Wink International Geo. Tech. Inc. of Juneau, Alaska. All the holes were inclined at an angle of -45° (approximately.) The drilling took 45 days during July and August. The holes were cored for their entire length and all mineralized sections and some unmineralized sections were analyzed for gold, silver, and copper. The average core recovery was 94%. Samples were collected by splitting NQ core in half with a core splitter. One-half of the core was sent for analysis and the remainder retained.

Geophysics

Almost all the project geophysics was conducted on the Road Cut prospect where 13 lines with a cumulative length of 7,600 feet were surveyed, brushed, and run by one or more of three geophysical techniques: magnetic, radiometric, and electromagnetic. This work was contracted through Salisbury and Associates, Inc., who conducted the geophysical work during September 1986 and through On Line Exploration Services, Inc., who conducted the work during September 1987 (*A-1*, *A-2*, *A-3*, *A-33*).

Magnetic surveys were conducted with two Geometrics G-856 proton precession magnetometers or with two EDA OMNI IV magnetometer/gradiometers. The electromagnetic surveys, including Vertical Loop EM, Resistivity, and VLF-EM Surveys, were conducted with Phoenix VLF-2, Crone Geophysics VLF-EM, Geonics EM-31, and a Max-Min unit. A Geometrics G-410 differential gamma-ray spectrometer with a 21 inch crystal was used for the radiometric survey.

The geophysical surveys conducted in 1986 were correlated with known prospect geology, plotted, and the most promising identified anomalies were drilled during the 1987 drilling program. The 1987 geophysical work was correlated with surface and diamond drill hole geology and combined with the 1986 geophysics. Specific results are discussed in more detail in the Road Cut prospect section.

In addition to the above work, two magnetic lines, totalling 880 feet, were run across the eastern part of the Chilkat fault 1.5 miles south from the Road Cut prospect.

Anomalous Levels

Table A-10 lists the anomalous metal values used in the cooperative Bureau and ADGGS reports covering the Skagway B-3 and B-4 quadrangles (*A-55*). These are the thresholds adopted by this study. The elements and corresponding rock types used in this study are underlined.

[8] Recent fossil age data indicates the rocks may be Cretaceous in age (*9*).

Table A-10.—Anomalous and highly anomalous threshold values for trace metals in rocks and stream sediments from the Skagway quadrangle, Alaska (values in ppm). Elements and values used in this report are underlined.

Element	Argillaceous Rocks		Meta-Sediments (Schists)		Carbonates		Mafic Igneous Rocks		Vein Quartz		Stream Sediments	
	A[1]	HA[2]	A	HA	A	HA	A	HA	A	HA	A	HA
Au	Any	1.0	Any	1.0	Any	1.0	Any	1.0	Any	1.0	Any	0.1
Ag	0.6	3.0	0.5	3.0	1.0	3.0	0.5	3.0	0.6	3.0	0.5	1.0
Zn	200	500	150	500	150	500	160	500	160	500	200	700
Cu	100	400	150	400	75	400	180	400	150	400	100	150
Pb	35	200	50	200	30	200	25	200	50	200	50	100
Co	25	150	50	150	30	150	80	150	80	150	50	N/A[3]
Ba	2500		500		500		1000		1000		1000	2000
W	5		5		5		5		5		5	N/A
Mo	10		10		10		10		10		10	N/A
Sn	10		10		10		10		10		10	500
As	200		200		200		200		200		200	N/A
Ni	100		100		100		100		100		100	400
Bi	N/A		N/A		N/A		N/A		N/A		N/A	N/A
Sb	100		100		100		100		100		100	

[1] Anomalous.
[2] Highly anomalous.
[3] Not applicable.
Source: reference A-55.

PROSPECTS AND OCCURRENCES

This study identified six gold-copper prospects or occurrences in the Chilkat Peninsula and Islands area[9]. Their locations are shown in Figure A-74 and their sample results are given in appendix A-1. All are hosted in metabasalt and the Road Cut, Road Cut II, Zinc Beach, Shikosi Island, and Islands copper prospects or occurrences are fault- or shear-controlled and are located adjacent to major faults. The Battery Point occurrence may represent syngenetic gold-copper mineralization in basalt.

Road Cut Prospect

History—Bureau Investigation

A recently blasted and excavated road cut, located 3.1 miles south from Haines on the Mud Bay road, was examined by Bureau personnel in 1986. This examination found gold-copper mineralization buried under the road cut rubble in what is now known as the Road Cut prospect. Figure A-77 shows its location.

With the permission of the Alaska Department of Transportation, the Road Cut mineralized zone was excavated by hand and exposed intermittently through the rubble for 180 feet along strike. Investigations were hampered by the roadway fill and the newly paved Mud Bay Road to the west and by the roadway or surficial cover to the north and south. Samples collected during 1986 and geologic mapping indicated that a 128-foot length of the zone averaged 14 ppm gold and 4.25% copper across a 1.2-foot width. Figure A-78 shows the prospect and the exposed mineralized zone, herein called the gold-copper mineralized zone. Appendix A-1, table A-1-35 gives the analytical results.

Average grades for portions of the mineralized zone were high enough to encourage economic development if sufficient tonnage could be delineated. Because bedrock exposures are limited, a program including trenching, geophysics, and finally diamond drilling was initiated.

To trace the Road Cut mineralization where it extends under cover and to investigate the vicinity for similar zones, magnetic, radiometric, and electromagnetic geophysical techniques were employed. In September 1986, ten lines were run across the Road Cut structure employing one or more of the above techniques. These lines totaled 4,170 linear feet and explored the Road Cut structure for a distance of 1,000 feet along strike and 830 feet across structure. Three anomalous zones, that potentially could have been caused by sulfide mineralization, were detected by the geophysical surveys. These anomalies included the Road Cut gold-copper mineralized zone itself, and locations 70 and 120 feet to the east of the Road Cut mineralized zone. Figure A-79 shows these anomalies.

[9] The Battery Point occurrence was previously reported as a chromium-copper occurrence.

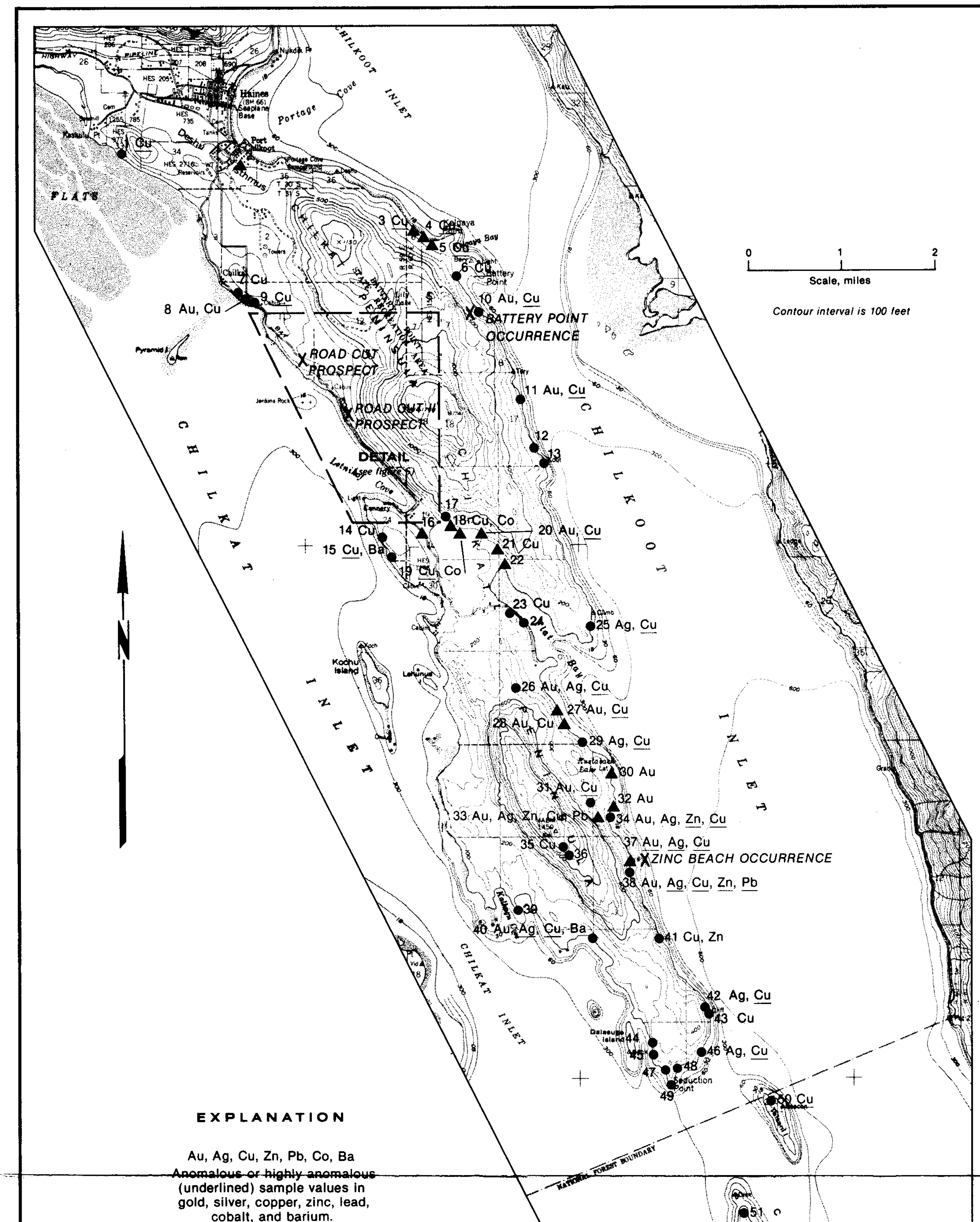


Figure A-76. — Chilkat Peninsula sample and prospect location map.

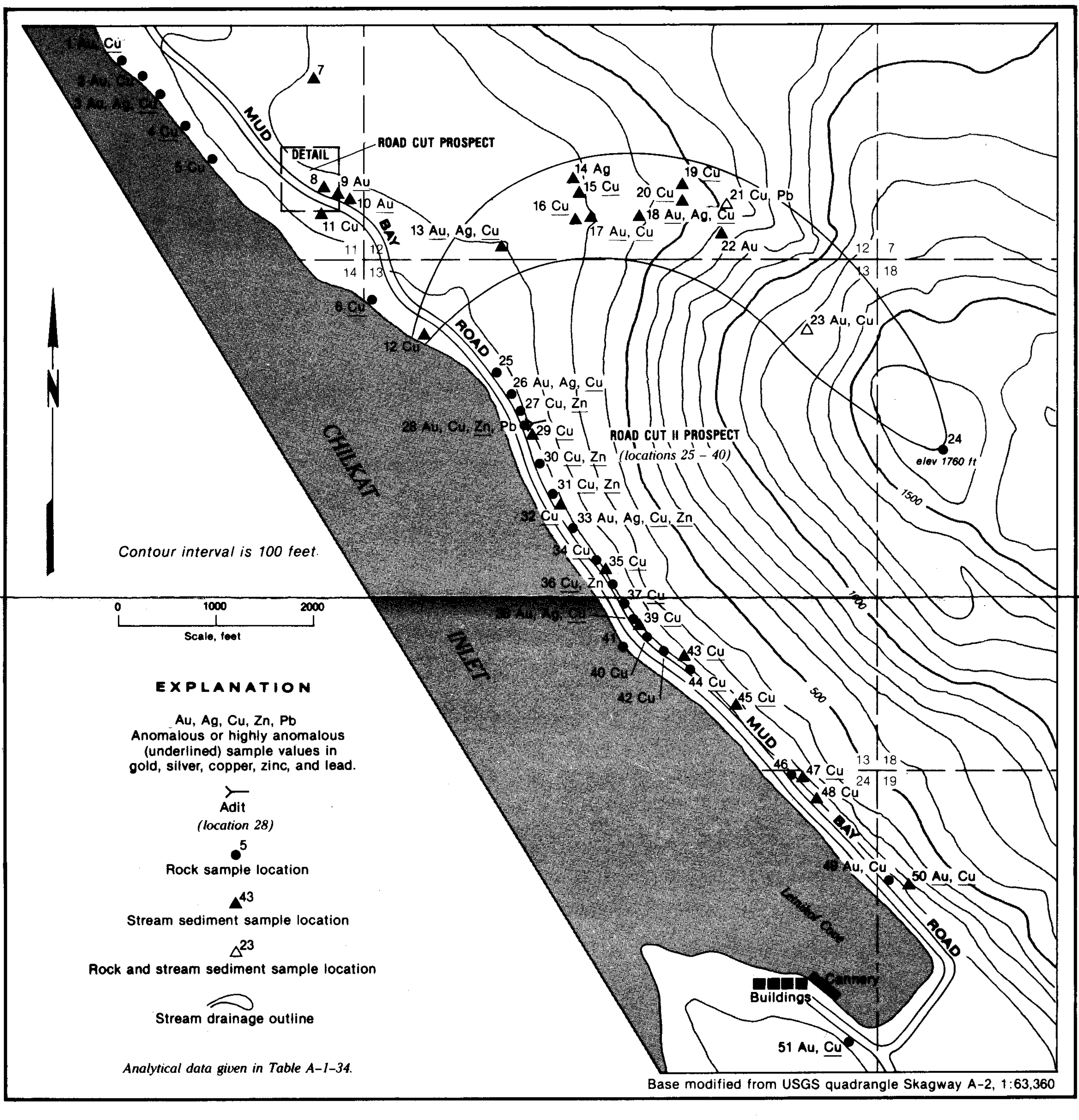


Figure A-77. — Road Cut prospect location map, Road Cut II sample location map and other sample locations.

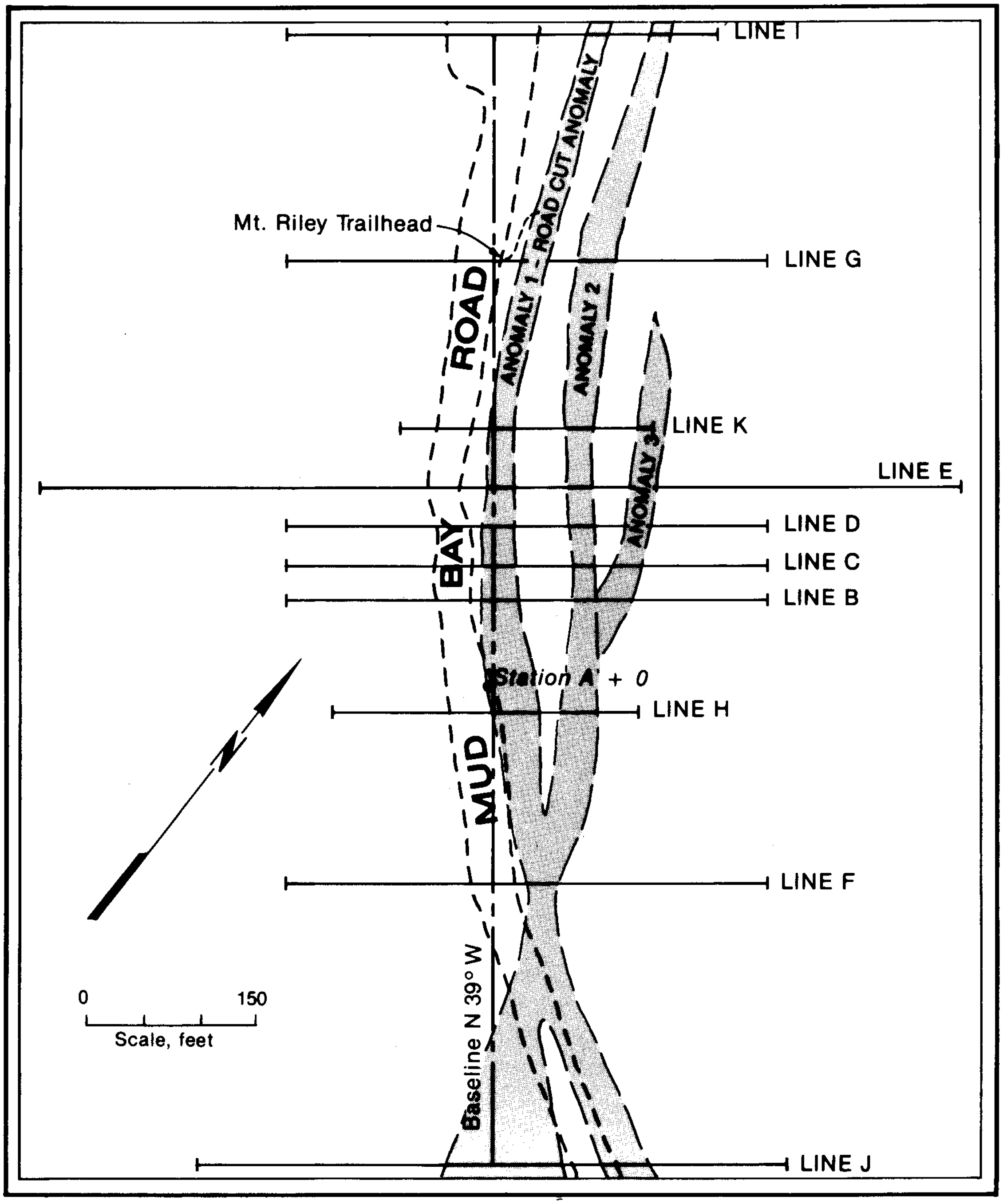


Figure A-79.—1986 Road Cut prospect geophysics summary (A-1).

To examine and evaluate the Road Cut gold-copper mineralized zone at depth, where it is under cover, and to examine the geophysical anomalies, a drilling and trenching program was initiated during 1987 (figs. A–80 and A–81). Seven holes were drilled with a total footage of 980 feet, that explored the Road Cut mineralized zone for 600 feet along strike, 200 feet across structure and to a depth of 170 feet below the surface. Six trenches, up to 6 feet deep and 20 feet long, were dug to explore the zone where it is covered by rubble and fill in the road cut. Figure A–78 shows the diamond drill hole and trenching locations; Figure A–82 shows the trench profiles, while figures A–83—A–87 show the diamond drill hole profiles. Appendix A–1, tables A–1–35 and A–1–36 give the analytical results.

In September 1987, after the drilling and trenching program was completed, additional geophysical surveys were conducted over the prospect. Previous surveys were extended to the east, north, and south. An additional 3,430 feet of line was run to extend the previous years grid to 1,700 feet along strike. Figure A–88 shows the 1987 geophysical lines and results.

Prospect Description

Geologic—Structural Setting

The Road Cut prospect mineralization is hosted in a thick sequence of metabasalt that is within 0.25 mile of an ultramafic intrusive. The mineralization is fault-controlled and is contained within a fault zone that is up to 40 feet thick, trends 320° to 325° and dips steeply to the northeast. This fault is herein called the Road Cut fault. The fault zone consists of silicified, brecciated and sheared metabasalt, and locally sheared and brecciated diorite that was intruded adjacent to, or within, the fault zone. Hydrothermal solutions mineralized the shear zone, which consists of a low sulfide zone with relatively low copper-gold values and a gold-copper mineralized zone that contains the best copper-gold values.

The better-grade gold-copper mineralized zone is mostly exposed on the surface and is intersected by diamond drill hole (DDH) 1 only (figs. A–78, A–82, and A–85.) The lower-grade remainder of the Road Cut fault zone is under cover and is intersected by DDH 1-DDH 5 and DDH 7 (figs. A–78 and A–83—A–87.) For resource discussion purposes, the Road Cut fault zone, excluding the gold-copper mineralized zone, will be called the DDH zone. Both the gold-copper mineralized zone and the DDH zone are discussed below.

Gold-Copper Mineralized Zone

The gold-copper mineralized zone is exposed for 227 feet along strike in shallow trenches through the road cut rubble. This is shown in Figure A–78, sample lines 5–36. Its eastern boundary is the hanging wall of the Road Cut fault. At most locations it contains a 0.2- to 3.5-foot-thick quartz-calcite zone with up to 75% combined pyrite and chalcopyrite and from 0.8 to 33.26 ppm gold. The remainder of the width of the gold-copper mineralized zone consists of a copper-bearing shear zone composed of silicified metabasalt with from 0.06% to 3% chalcopyrite, up to 5% pyrite, and at most locations from 0.07 to 0.14 ppm gold. The western boundary of the Road Cut gold-copper mineralized zone is formed by a poorly mineralized, poorly silicified portion of the Road Cut fault zone that consists of brecciated or unbrecciated metabasalt. At most locations this rock was less resistant than the gold-copper mineralized zone. When the road cut was blasted it was shattered to a greater depth than the gold-copper mineralized zone. To expose it would require excavation that was beyond the means of this program to accomplish.

To the south, the gold-copper mineralized zone decreases greatly in copper and gold content and disappears under cover at sample line 36. At depth, the gold-copper mineralized zone was only located in DDH 1. The zone is 4 feet wide and averages 0.67 ppm gold and 980 ppm copper (values reach 1.61 ppm gold and 1.84% copper) to a depth of 25 feet below the outcrop. To the north, past sample line 4, the gold-copper mineralized zone was not exposed in DDH 4, DDH 5, DDH 6, or the sample line 1 trench. In sample line 2 and 3 trenches, gold-copper mineralization of the type found in the gold-copper mineralized zone was exposed (up to 10.8 ppm gold and 1.15% copper) for narrow widths. However, it was well easterly (up to 20 feet) of the northward projection of the gold-copper mineralized zone and this mineralization was not detected along its northward projection in DDH 6.

Samples were collected at 32 locations along the 227-foot-long surface exposure of the gold-copper mineralized zone. Figure A–78 shows the sample locations, and Figure A–87 the sample details. Appendix A–1 contains the analytical results. Values ranged up to 33.26 ppm gold and 22.7% copper. The best portion of the zone is the 91.5-foot strike length that extends from sample line 7 to 21. The high-sulfide part of this best portion, across an average width of 1.2 feet, averages 15.44 ppm gold, 31.9 ppm silver, and 4.78% copper. At a 3-foot mining width, it averages 6.14 ppm gold, 13.5 ppm silver, and 1.99% copper. The 227-foot length of the zone, exposed between sample line 4 and 36, averages 3.01 ppm gold, 5.9 ppm silver, and 0.8% copper across a 3-foot mining width.

DDH Zone

The DDH zone is located under road fill and cover at most locations. It is intersected in DDH 1-DDH 5 and DDH 7 for a strike length of 590 feet and to a depth of 125 feet. It strikes 320°, dips from 70° to 75° to the northeast, and ranges in width from 12 to 40 feet. It consists of silicified, and in places pyritized, brecciated metabasalt, and in places brecciated diorite. Its chalcopyrite content is sparse at most locations, but locally contains above 0.06% chalcopyrite. Areas with above 0.06% chalcopyrite in the DDH zone are indicated on the figures as the copper-bearing shear zone. At some locations the higher copper values correlate with higher gold values.

The best gold-copper values found by diamond drilling the Road Cut fault are found in DDH 1 (fig. A-85) where an 18-foot interval across the fault zone (58 feet down the hole) averages 0.49 ppm gold and 348 ppm copper. Values in this hole range up to 5.93 ppm gold and 1.84% copper. This hole was collared to intercept the downward projection of the best gold-copper mineralization exposed by surface trenching at a depth of 25 feet. A 4-foot-thick section of this hole averages 980 ppm copper and, for discussion purposes, is included in the gold-copper mineralized zone. The remaining 14-foot-thick portion of the fault zone intersected in DDH 1 is included in the DDH zone and averages 0.48 ppm gold and 268 ppm copper. DDH 1 does not intersect the western side or footwall of the Road Cut fault zone which is projected to be located 5 feet west of the DDH 1 collar.

DDH 3 intersects the Road Cut fault zone directly below DDH 1 at a depth of 125 feet below the surface. Values across the 25-foot-wide zone range up to 1.85 ppm gold and 134 ppm copper, and average 0.45 ppm gold and 31 ppm copper. Gold and copper values in the fault zone between surface sample line 17, DDH 1, and DDH 3 fall off sharply at depth. Maximum copper values drop from 6.88% on the surface to 1.84% in DDH 1 to 134 ppm in DDH 3. Maximum gold values drop from 6.75 ppm to 5.93 ppm to 1.85 ppm. This is a drop in copper values of over 50,000% while gold values fall off by a factor of 360%.

Figure A-80.—Trenching with a backhoe at the Road Cut gold-copper prospect. This prospect was discovered by Bureau personnel at a location 3 miles south of Haines during 1986 (J. Still, photographer).

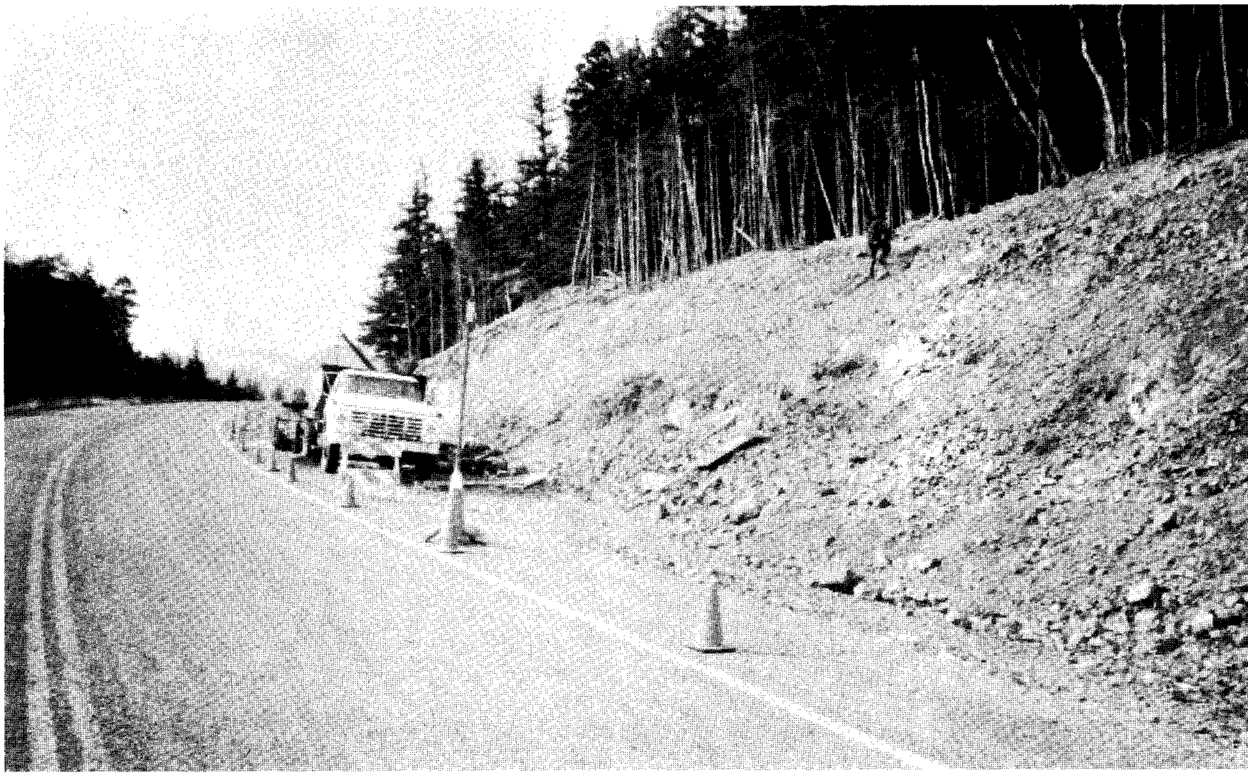


Figure A-81.—Diamond drilling the Road Cut prospect during 1987. Above, drilling off a flat bed truck to intercept the down dip extension of the Road Cut mineralization at a depth of 20 feet below the surface. Below, this hole is inclined at 45° and was drilled to intercept the down dip extension of the Road Cut mineralized zone at a depth of 120 ft below the surface (J. Still, photographer).

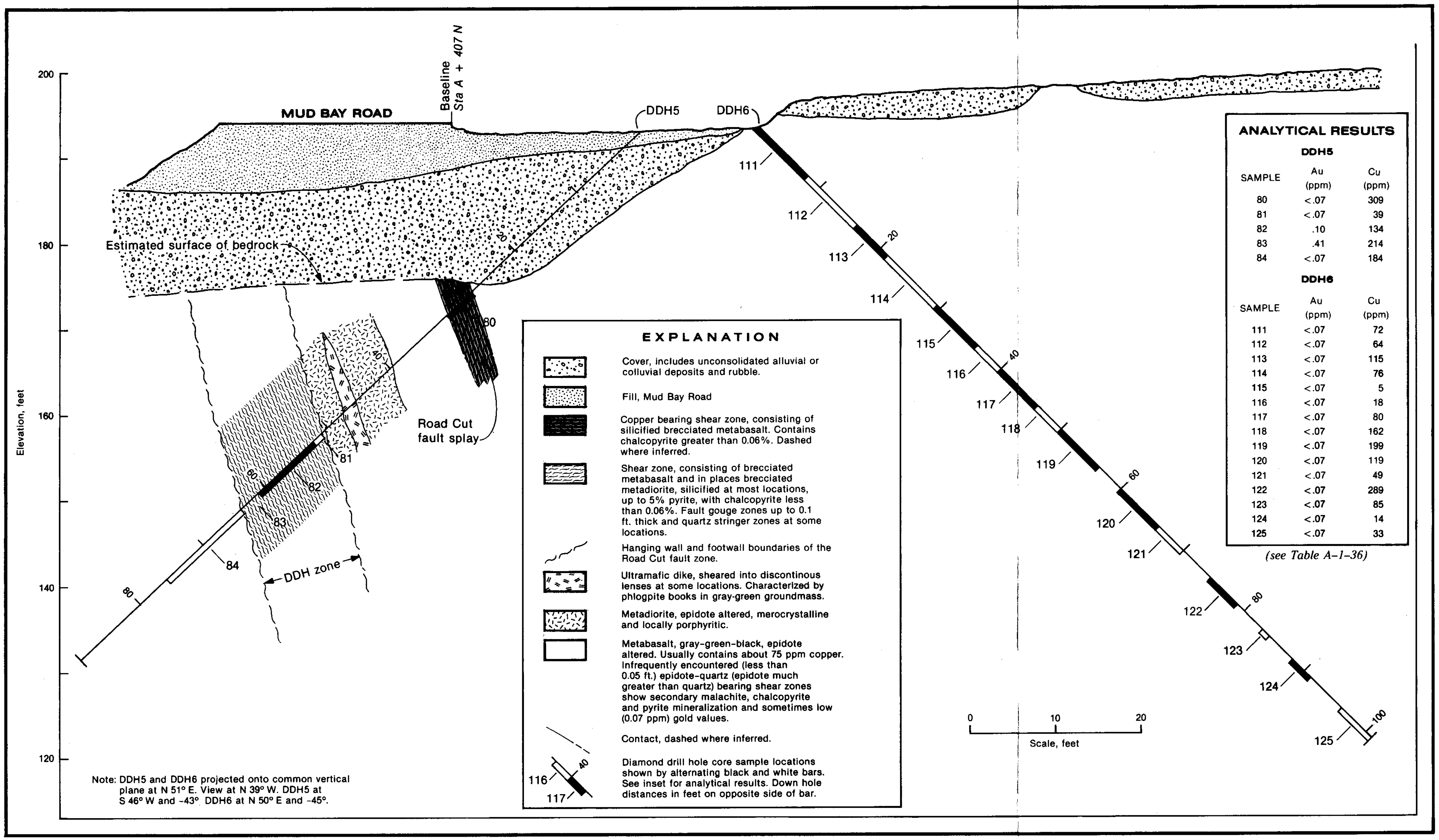
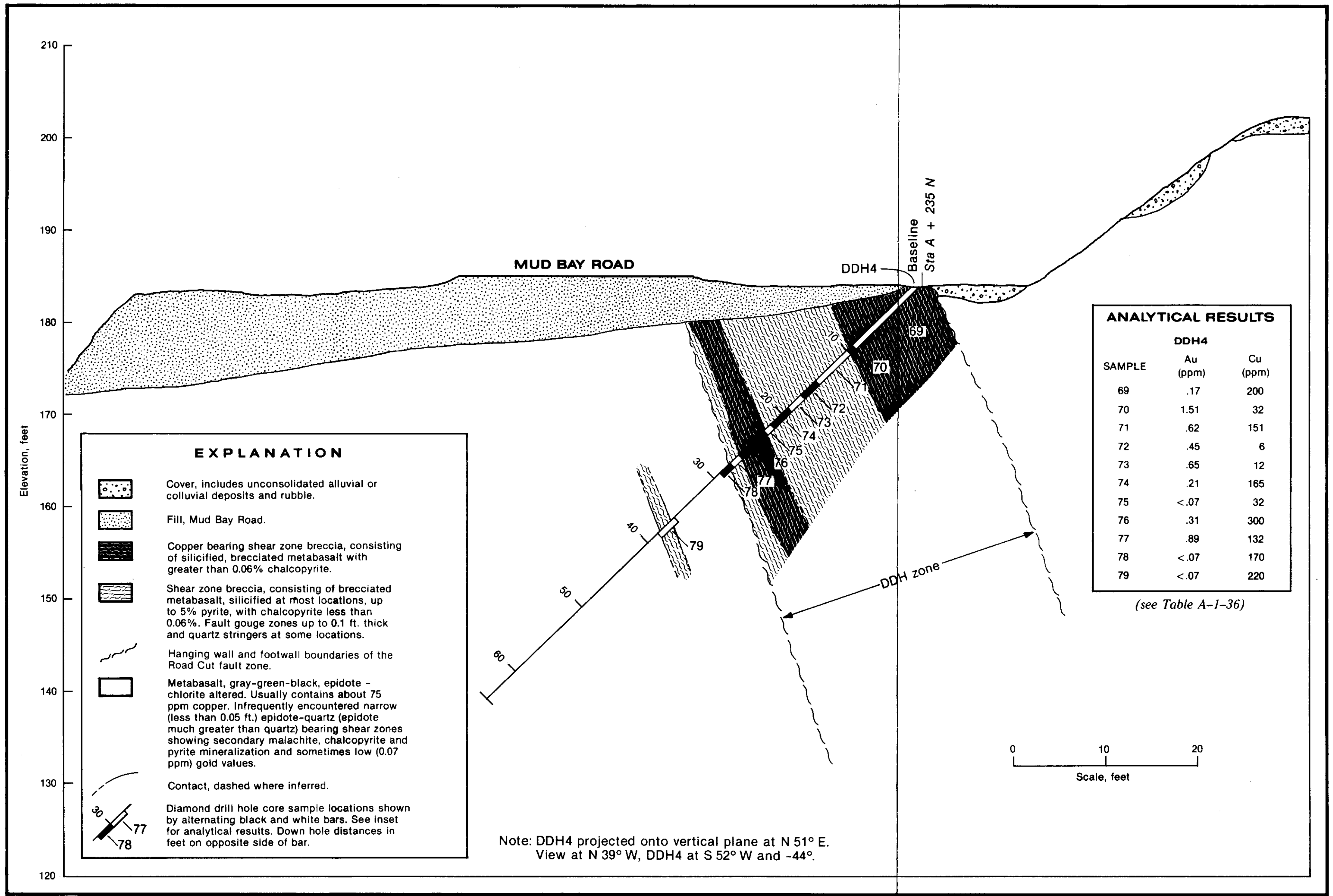


Figure A-83. — Road Cut prospect vertical cross section XS-1, showing diamond drill holes 5 and 6.



SAMPLE	Au (ppm)	Cu (ppm)
69	.17	200
70	1.51	32
71	.62	151
72	.45	6
73	.65	12
74	.21	165
75	<.07	32
76	.31	300
77	.89	132
78	<.07	170
79	<.07	220

Figure A-84. — Road Cut prospect vertical cross section XS-2, showing diamond drill hole 4.

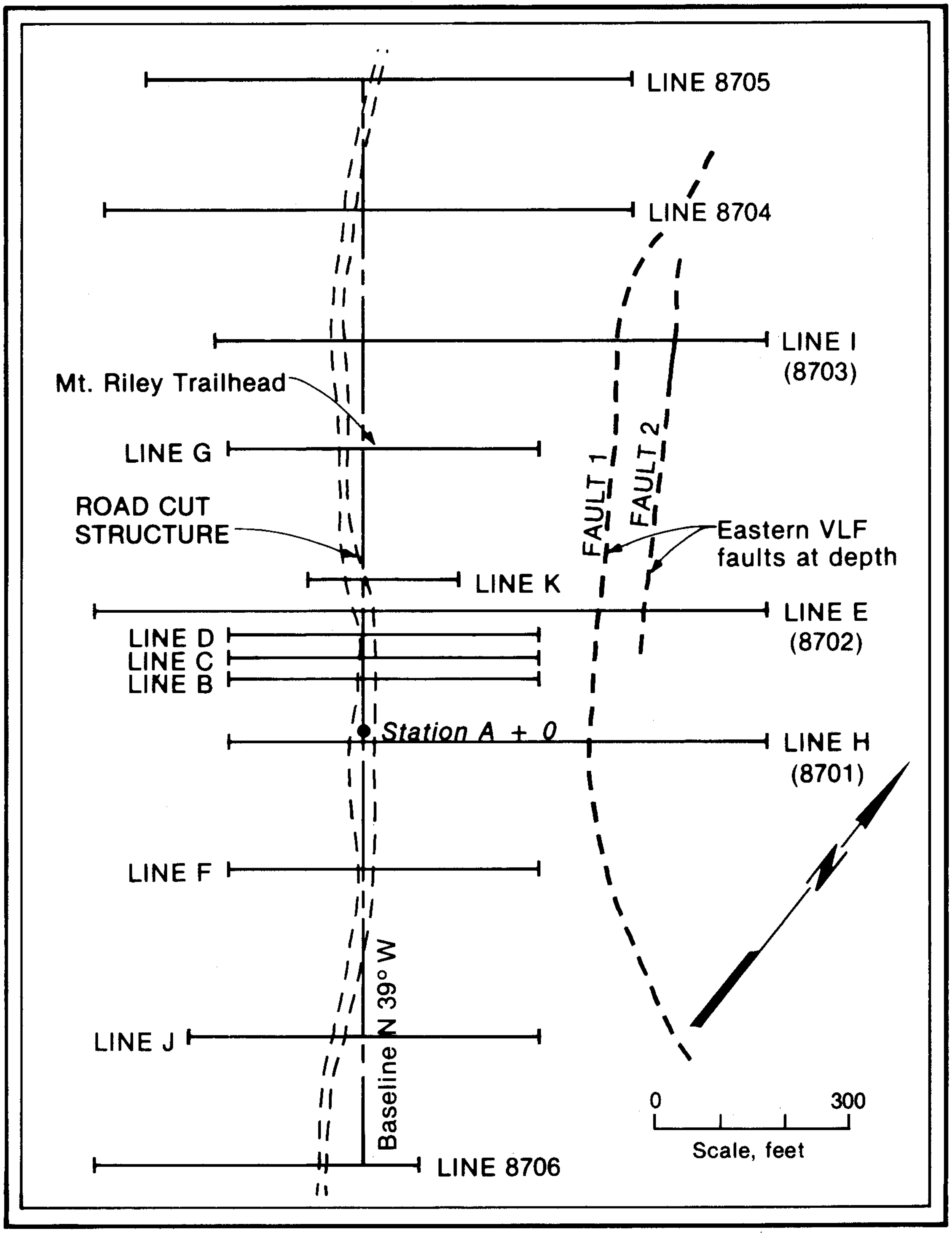


Figure A-88.—1987 Road Cut prospect geophysics summary (A-3).

DDH 2 intersects the Road Cut fault zone 167 feet southerly from DDH 3 at a depth of 93 feet below the surface where the zone is 40 feet wide. Here sample values range from 5 to 162 ppm copper and from less than 0.07 to 0.24 ppm gold and average 56 ppm copper and 0.09 ppm gold.

DDH 7 is the southernmost hole and is located 325 feet from DDH 1. It intersects the Road Cut fault zone at a depth of 85 feet where the zone is 30 feet wide. Gold was not detected in this zone and copper values ranged from 3 to 114 ppm. However, at a distance of 30 feet across structure in a southwesterly direction, a 10-foot-wide shear zone was penetrated by the drill hole. This zone contains values up to 0.34 ppm gold and 258 ppm copper, and averages 0.24 ppm gold and 169 ppm copper. This may be a splay from the Road Cut fault zone or a parallel shear. Other samples in DDH 7, collected from more massive metabasalt, contain up to 400 ppm copper and 0.21 ppm gold.

DDH 4, located 90 feet northerly from DDH 3, is collared within the Road Cut fault zone and intersects it for a width of 24 feet, until it penetrates the footwall of the fault zone. Values range up to 1.51 ppm gold and 300 ppm copper, and average 0.42 ppm gold and 157 ppm copper. The eastern boundary of the Road Cut fault was not determined at this location. While sample line 2 and 3 trenches, located to the north and south of DDH 4, exposed shear zones and narrow gold-copper mineralization, the road cut adjacent to DDH 4 was not mineralized nor significantly sheared. Indications are that the hanging wall portion of the shear zone splays to the east and mineralization becomes intermittent. This mineralization is not detected along its projected strike in DDH 6.

DDH 5 is located 265 feet from DDH 1 and was collared in surficial cover consisting of boulders and clay that extended down the hole for 25 feet of difficult drilling. Two mineralized fault zones were intersected: one is 4 feet thick and the other, located 17 feet across structure, is 12 feet thick. The former contains less than 0.07 ppm gold and 309 ppm copper across its width, while the latter contains up to 0.41 ppm gold and 214 ppm copper, and averages 0.16 ppm gold and 142 ppm copper. Indications are that the Road Cut fault zone splays into separate zones at this location. However, core recovery was only 86% in this hole and the mineralized zones could be more extensive. Also, mineralization might exist between DDH 5 and DDH 6.

DDH 6 was collared in bedrock 12 feet to the east of DDH 5 to intersect gold-copper mineralized zones exposed in sample line 2 and 3 trenches, and to test the 1986 geophysics that indicated the Road Cut fault zone was located 40 feet east of the base line at this location (fig. A-79). The metabasalts intersected in DDH 6 were fairly massive and copper values ranged from 5 to 289 ppm. Gold was not detected.

In summary, the DDH zone (the Road Cut fault zone excluding the gold-copper mineralized zone) ranges in thickness from 12 to 40 feet, and has been traced along strike for 590 feet and to a depth of 125 feet below the surface. It is open along strike to the north, south, and at depth. Average DDH zone values range from 0.48 ppm gold and 268 ppm copper to less than 0.07 ppm gold and 31 ppm copper.

DDH 1 and sample line 17 are in the approximate center of the best mineralization found in the Road Cut fault zone by this study. To the north, south, and at depth copper values drop off sharply from several percent to less than 200 ppm and gold values drop from 5-15 ppm to less than a few tenths of a ppm.

Geophysics

The 1986 geophysics program defined three anomalous areas whose source was potentially a sulfide-bearing zone or a shear zone. Figure A-79 shows the 1986 geophysical grid relative to the base line and the gold-copper mineralized zone. The anomalous areas are as follows:

1. The Road Cut anomaly reflects the gold-copper mineralized zone where it is exposed in surface trenches between lines H and E. The most important aspect of this anomaly is a magnetic low. Hydrothermal solutions that form such mineralized zones destroy magnetite and this lowers the magnetic properties of the rock in the vicinity of such mineralized zones. To the north and south the anomaly curves to the east of the base line.
2. The second anomaly, located 70 feet east of the base line is characterized by a magnetic low similar in character and intensity to the Road Cut anomaly.
3. The third anomaly, located 120 feet east of the base line, is characterized by low resistivity and definable electromagnetic anomalies (VLF and VLEM).

Detailed information on these anomalies is contained in reports by the geophysical contractors (*A-33*, *A-1*, *A-2*, *A-3*).

Diamond drilling tested the above three anomalies in 1987.

DDH 2 tested the second anomaly, while DDH 3 tested the second and third anomalies. A significant zone of mineralization or shear was not found in the vicinity of either anomaly. A narrow gulch filled with water-saturated clay is a likely explanation for the third anomaly. The source of the second anomaly may be the result of a dipole effect between the Road Cut fault zone and the dikes to the east.

DDH 5, DDH 6, and DDH 7 test the Road Cut anomaly where it bends to the east of the base line. These indicate the Road Cut fault zone straddles the base line to the south, and bends slightly to the west of the base line to the north. This deviation between drill hole data and geophysics might be explained by the lack of dikes in the vicinity of DDH 5 and DDH 6, and the corresponding absence of a dipole effect.

Figure A–88 shows the details of the 1987 geophysics program. The 1987 program extended the 1986 grid to the north, south, and east. It revealed that the Road Cut fault continues beyond the boundaries of the grid, a distance of 1,700 feet or more. To the east, at a distance of 350 and 420 feet from the base line, two faults (1 and 2, fig. A–88) were defined by both electromagnetics (VLF) and magnetics. These are similar in character to the anomaly over the Road Cut fault.

Resources

The 227-foot-long by 3-foot-wide gold-copper mineralized zone contains the highest-grade material exposed on this prospect to date. The best-grade material is located in the 47 feet between sample lines 13 and 21, where the sulfide-rich quartz-calcite portion of the zone averages 0.57 ounce/ton gold, 1.27 ounce/ton silver, and 7.46% copper over a 1.2-foot thickness. A 3-foot mining width averages 0.23 ounce/ton gold, 0.56 ounce/ton silver, and 3.09% copper. This 47-foot portion represents only a few hundred tons across a 3-foot mining width.

The gold-copper mineralized zone was intercepted at a depth of 25 feet below the surface in DDH 1, but was not intercepted in DDH 3 at a depth of 125 feet below the surface. The 227-foot length of the gold-copper mineralized zone on the surface averages 0.09 ounce/ton gold, 0.17 ounce/ton silver, and 0.8% copper across a 3-foot mining width. In DDH 1 the gold-copper mineralized zone averages 0.02 ounce/ton gold and 0.1% copper across a 4-foot width. If the surface grade and width extend downdip for a distance halfway to the DDH 3 intercept (12.5 feet) and the DDH 3 grade and width extend from halfway to the surface and to halfway to DDH 3 (50 feet), the indicated resources would be as follows:

700 tons at 0.09 ounce/ton gold, 0.17 ounce/ton silver, and 0.8% copper at a 3-foot width (this includes the highest-grade 47 feet previously described);

4,729 tons at 0.02 ounce/ton gold and 0.1% copper at a 4-foot width.

The DDH zone (Road Cut fault zone excluding the gold-copper mineralized zone) has been traced for 1,700 feet along strike by drilling and geophysics. At depth, drilling established that the zone continues to a depth of 125 feet. It is inferred that it extends past this to a depth of at least one-half its strike length or 850 feet. The DDH zone averages about 25 feet in width. This zone contains an inferred 3 million tons of resources. Based on diamond drilling along a strike length of 590 feet and to a depth of 125 feet, the average grade would be estimated at 0.008 ounce/ton gold (however, the unexplored portions of this zone may or may not exceed this estimate.) This tonnage is in addition to the resources of the gold-copper mineralized zone.

To constitute economic mineralization for vein gold deposits such as those previously discussed, it is estimated that the grades and tonnages would at least have to be in the approximate range of 100,000–3 million tons at 0.6 ounce/ton–0.2 ounce/ton gold (*A-4*). This estimate assumes mining is by underground methods.

Land Status

The Mud Bay Highway right-of-way contains all of the Road Cut mineralized zone, as it is now defined by trenching and diamond drilling. The mineral rights to this land are controlled by the State of Alaska. The mineral rights to land adjacent to the highway in the vicinity of the Road cut are owned by the Federal Government and the State of Alaska. According to Alaska State Division of Lands and Bureau of Land Management officials the lands are closed (March 23, 1988) to mineral entry. The surface rights to this land are under Haines Borough, private, and State of Alaska control. A state mineral claim (Riley 1) was staked over the Road Cut prospect in 1986. Its validity is in question according to State officials.

Conclusions

Although sufficient grade of material within the Road Cut fault zone was not found to constitute an economic deposit, sufficient grades for small tonnages have been found that encourage further examination of the unexplored 1,100-foot length of the fault zone that has not been explored by drilling but has been explored by geophysics. Also, the data generated encourage tracing and physical testing of the Road Cut fault zone beyond its presently known 1,700-foot length.

Geophysics indicates targets for physical testing, additional geophysics, and soil sampling to the east of the Road Cut fault zone (fig. A–88, faults 1 and 2).

If mineral deposits are discovered in the Road Cut prospect area, land status and ownership problems would have to be resolved before they could be developed.

Road Cut II Prospect

The Road Cut II prospect mineralization is located 1 mile southerly from the Road Cut prospect between the 4- and 5-mile signs along the Mud Bay Road (fig. A–77). At most locations a cliff consisting of metabasalt, or at some locations diorite, forms the east edge of the roadway. This is a fault escarpment from a split along the eastern edge of the Chilkat fault whose topographic lineament is expressed by the Chilkat Inlet and Chilkat River. The mineralization consists of epidote-altered metabasalt and epidote bands up to 2-feet thick that contain pyrite, chalcopyrite, and locally sphalerite. Samples were collected on the east side of the road through shallow excavations in the roadway rubble and at a few bedrock exposures. These contained up to 0.21 ppm gold, 2.5 ppm silver, 0.69% copper, and 1.83% zinc (table A–1–34, locations 25–40). These were mostly collected from better-grade material. Samples were limited to the eastern fault margin (east side of the road) because roadway fill, marine sediments and the waters of the Chilkat Inlet hamper examination of the main fault zone itself.

Two 440-foot-long magnetic lines were run over the beach and road and then up the escarpment forming the eastern edge of the Chilkat fault split near the 5-mile sign (5 miles from Haines along the Mud Bay Road). Here a prominent magnetic low indicates a fault zone striking 323° located about 35 feet east of the roadway; details are contained in the contractors report (*A-3*).

An old adit, located several hundred feet southeast of the 4-mile road sign, penetrates the metabasalt about 30 feet. Examination revealed that it was not driven on mineralized rock, but a band of metabasalt adjacent to it contains chalcopyrite.

Spotty gold-copper-zinc mineralization that extends along the eastern edge of the road for at least 1 mile, between the 4- and 5-mile signs, encourages examination of Chilkat fault splits at this location and at others on the Chilkat Peninsula. The Road Cut fault may split off the Chilkat fault in the Road Cut II prospect vicinity and the two mineralized zones may be continuous.

Zinc Beach Occurrence

The Zinc Beach occurrence is located 1.5 miles south of Flat Bay on the east side of the Chilkat Peninsula in an area of metabasalt. It is located on a north-northwest striking lineament that is likely a splay off the fault that runs through Flat Bay (figs. A–75 and A–76). Analytical results are in appendix A–1, table A–1–33, locations 37 and 38.

Two stream sediment samples were collected from a dry stream that drains the above mentioned lineament. They contained up to 0.583 ppm gold, 1.0 ppm silver, 162 ppm zinc, and 164 ppm copper. A soil sample collected in the roots of a tree contained 0.019 ppm gold, 240 ppm zinc, and 460 ppm copper. Samples from brecciated sphalerite-bearing basalt boulders up to 1 foot thick and 2 feet long contained up to 6.230 ppm gold, 13.0 ppm silver, 27.0% zinc, 2,600 ppm copper, 13 ppm tungsten, and 50 ppm arsenic. The source of these boulders is likely the above mentioned lineament or cliffs adjacent to it.

Iron-stained metabasalt rubble crop with chalcopyrite, pyrite, and malachite in a quartz knot contained 0.446 ppm gold, 220 ppm zinc, and 8,400 ppm copper. The source of the rubble crop was an iron-stained shear zone near the top of a basalt cliff near the beach.

A stream sediment sample collected at a location 0.8 mile northerly from Zinc Beach, and along the fault trend that includes Zinc Beach, contained 0.024 ppm gold, 1.5 ppm silver, 3,000 ppm zinc, 1,150 ppm copper, and 580 ppm lead (fig. A–76, No. 33). This fault trend is a target for detailed examination.

Battery Point Occurrence

The Battery Point occurrence is located on the east side of the Chilkat Peninsula, about 0.5 mile south of Battery Point where a 100-foot-high metabasalt cliff has a few patches of malachite stain (fig. A–76). Select samples of metabasalt from the cliff and float below it, containing disseminated chalcopyrite, contained up to 0.510 ppm gold and 2,650 ppm copper (table A–1–33). A 100-foot-long random chip of metabasalt with disseminated chalcopyrite contained 290 ppm copper and less than 0.07 ppm gold. Some of the copper mineralization may be primary. This occurrence is located near an ultramafic-basalt contact, as is the Road Cut prospect.

Shikosi Island Occurrence

The Shikosi Island occurrence is located on the north end of Shikosi Island and consists of a narrow epidote-altered silicified shear zone that contains chalcopyrite and chalcopyrite hosted in metabasalt (fig. A–76, No. 45). Samples collected from this zone contain up to 0.050 ppm gold, 6.7 ppm silver, 3,000 ppm zinc, and 2.74% copper (table A–1–33). This shear zone approximately aligns with similar mineralization found at the Islands Copper prospect described below.

Islands Copper Occurrence

The Islands copper occurrence is located on the south end of Kataguni Island (fig. A-76, Nos. 48-52). The mineralization is located in metabasalt sea cliffs up to 50 feet high that contain numerous narrow shear zones at various orientations. Some of the shears are silicified and contain copper or copper-zinc mineralization. Samples collected from these 0.2- to 1.4-foot-thick shear-controlled veins contain up to 2.540 ppm gold, 22.5 ppm silver, 6.9% copper, and 2.14% zinc (table A-1-33).

Talsani Island Jadeite Occurrence

A jadeite occurrence has been reported on Talsani Island (*A-63*, *A-61*). The area was briefly investigated and jadeite was not found. However, some epidote-rich bands in metabasalt were anomalous in copper (fig. A-76, No. 43, table A-1-33).

Anomalous Areas

To follow up discoveries of gold-copper mineralization in the Chilkat Peninsula, examinations were made in the vicinity of major Chilkat Peninsula fault systems. This consisted of sampling mineralized rock and collecting stream sediment samples. Figures A-76 and A-77 show the locations of samples and anomalous samples (fig. A-76, Nos. 1-9, 11-36, 39-51, and 53-55; fig. A-77, Nos. 1-24 and 41-51.) Sixty-six rock, 5 pan concentrate, 46 stream sediment, and 1 soil sample were collected. Of these 120 samples, 79 are anomalous in gold, silver, copper, or zinc. Samples contain up to 0.790 ppm gold, 5.7 ppm silver, 1.23% copper, and 3,000 ppm zinc. Appendix A-1 table A-1-33 and A-34 give the analytical results. There is pervasive gold-copper mineralization in the Chilkat Peninsula mineralized zones; the largest portion of the anomalous samples collected border the fault that cuts the middle of the Peninsula at Letnikof Cove and Flat Bay. Areas with a significant clustering of anomalous or highly anomalous samples are as follows:

1. The Road Cut prospect and Mount Riley gulch area. Here stream sediment samples, collected in intermittent drainages just east of the Road Cut gold-copper mineralized zone (fig. A-77, Nos. 9 and 10) and a series of samples collected in the streams and gulches that drain the northwest side of Mount Riley (fig. A-77, Nos. 12-23) are anomalous or highly anomalous in gold and copper. These samples contain up to 0.31 ppm gold and 611 ppm copper. This in conjunction with geophysical anomalies greatly encourages examination of areas to the east of the Road Cut prospect (marine clays and gravels overlay portions of the area described and it can not be ruled out that these gravels may be the source of the gold in some of the stream sediment samples).

2. A series of narrow gulches drain the southwest side of Mount Riley between the Road Cut II prospect and south to Letnikof Cove. Stream sediment samples collected from these gulches are anomalous in copper or copper and gold (fig. A-77, Nos. 29, 32, 35, 39, 43, 45, 47, 48, and 50.) These samples contain up to 465 ppm copper and 0.790 ppm gold. The drainage area of the streams from which these samples were collected is very limited and provides an excellent exploration target.

3. Stream sediment samples collected from the area that drains the south side of Mount Riley (fig. A-76, Nos. 18-21) are anomalous in copper and gold. They contain up to 0.07 ppm gold and 286 ppm copper.

4. Bedrock float and stream sediment samples collected along the east side of the Chilkat Peninsula are anomalous in gold, silver, copper, and zinc (fig. A-76, Nos. 4-6, 11, 25, 27-34, 41, 43, and 46). The samples contain up to 0.114 ppm gold, 2.5 ppm silver, 5,300 ppm copper, and 3,000 ppm zinc.

CONCLUSIONS

1. Examination of the Road Cut prospect did not reveal an economic deposit. However, it did reveal sufficient tonnages and grades to encourage additional examination along its defined structure, parallel structures, and to determine its extent beyond its present known limits.

2. Samples collected from prospects, bedrock locations, and from streams indicate that gold-copper mineralization (and locally zinc mineralization) is pervasive in the shear and fault zones of the Chilkat Peninsula. A number of these samples indicate areas with important exploration potential for fault-controlled gold-copper mineralization.

3. Most of the Chilkat Peninsula and Islands area is part of a State Park or restricted in some other way, and not open to mineral entry. If this land remains closed to mineral entry there can be no exploration for mineral deposits nor development of such if any are discovered.

OTHER PROSPECTS AND OCCURRENCES

Occurrences and prospects at locations not previously covered are discussed in this section.

MOUNT SELTAT OCCURRENCE

Mount Seltat is located in the northwestern part of the study area on the Alaska-British Columbia border, 10 miles north of the Pleasant Camp border station (fig. A-1, No. 1). Figure A-89 shows sample locations and the occurrence geology. The area consists of metamorphosed basalts, other volcanics, and sediments with thick sequences of marble. In adjacent areas of British Columbia these rocks are intruded by granitic rocks and the resulting base metal silver skarns have been long known, prospected, and drilled (fig. A-28, E). On the Alaska side of the border, diorite dikes indicate that similar intrusions may be at depth.

Reconnaissance sampling of Mount Seltat indicates silver-bearing skarn mineralization containing pyrrhotite, magnetite, chalcopyrite, sphalerite, and galena. Most of this mineralization was found in the talus piles that drain the north and south sites of the rugged eastern ridge of Mount Seltat. The source of the mineralized float appears to be brown-black manganese-stained bands that outcrop between elevations of 4,000 and 6,000 feet on the east ridge of Mount Seltat. Some rock climbing would be required to reach these bands.

Float and rubble crop samples of skarn or massive sulfides from this occurrence contained up to 0.137 ppm gold, 173.1 ppm silver, 4.13% zinc, 8,400 ppm copper, 2.60% lead, and 1,285 ppm tungsten (table A-1-37).

The work of this study indicates the Mount Seltat area is a continuation of the Rain Hollow base metal-silver skarn area in British Columbia and has potential for similar deposits.

IRON BRIDGE PROSPECT

The Iron Bridge prospect is located just northeast of the junction of Nataga Creek and the Kelsall River (fig. A-1, No. 2). During the 1970's a logging road was built across the Kelsall River and the area north and east of this bridge was logged. Mr. Jones, a local prospector, prospected the cuts in the newly built logging roads and discovered copper mineralization in the metamorphosed volcanics and sediments in this area.

During 1988, Bureau crews investigated the area roads, which are now thickly overgrown with devils club, nettles, alder, and spruce. Shallow trenches and stock piles of malachite-stained silicified rocks were uncovered. Samples contained up to 0.041 ppm gold, 5.6 ppm silver, and 2,960 ppm copper (table A-1-38).

LEBLONDEAU SKARN AND VEIN OCCURRENCES

The LeBlondeau skarn and vein occurrences area is located on the south side of the Tsirku River in the vicinity of the 4-mile-long retreating LeBlondeau Glacier (fig. A-1, No. 25). The snout of this glacier is the site of some limited placer activity and placer claims are reported. Figure A-80 shows the area, sample locations, and geology.

A reconnaissance of the area revealed gold mineralized float near the glacier's snout and follow up examination revealed gold-bearing quartz veins in an area exposed within the last 2 years by the retreating glacier. Near the head of the glacier a chalcopyrite-magnetite skarn was discovered.

The float samples were found in the vicinity of the glaciers snout. One 3-inch by 6-inch banded calcite sample with pyrite and galena contained 87.155 ppm gold, 96.7 ppm silver, 1,019 ppm zinc, and 1.64% lead (fig. A-90, No. 2) (table A-1-39). Another similar sample at the same location contained 4.731 ppm gold and greater than 1,000 ppm arsenic.

Irregular quartz veins, up to 0.8 foot wide and 50 feet long, bearing pyrrhotite, were found near the face of the retreating glacier (fig A-90, Nos. 1 and 4). These veins cut bedding and are hosted in dikes and metachert. Samples collected from the veins contain up to 1.561 ppm gold, 2.3 ppm silver, and 251 ppm cobalt.

At elevations between 3,800 feet and 5,200 feet, on the west wall of the LeBlondeau Glacier, a magnetite-chalcopyrite skarn outcrops near a diorite marble contact (fig. A-90, Nos. 7-13). This skarn is characterized by massive magnetite lenses up to 10 feet across with associated grossularite garnets, epidote, and marble. Chalcopyrite and pyrite are present in small amounts. Samples collected from this skarn contained up to 0.068 ppm gold, 4 ppm silver, 1,070 ppm zinc, 8,540 ppm copper, 620 ppm cobalt, 3 ppm tungsten, 35 ppm tin, and 92 ppm nickel.

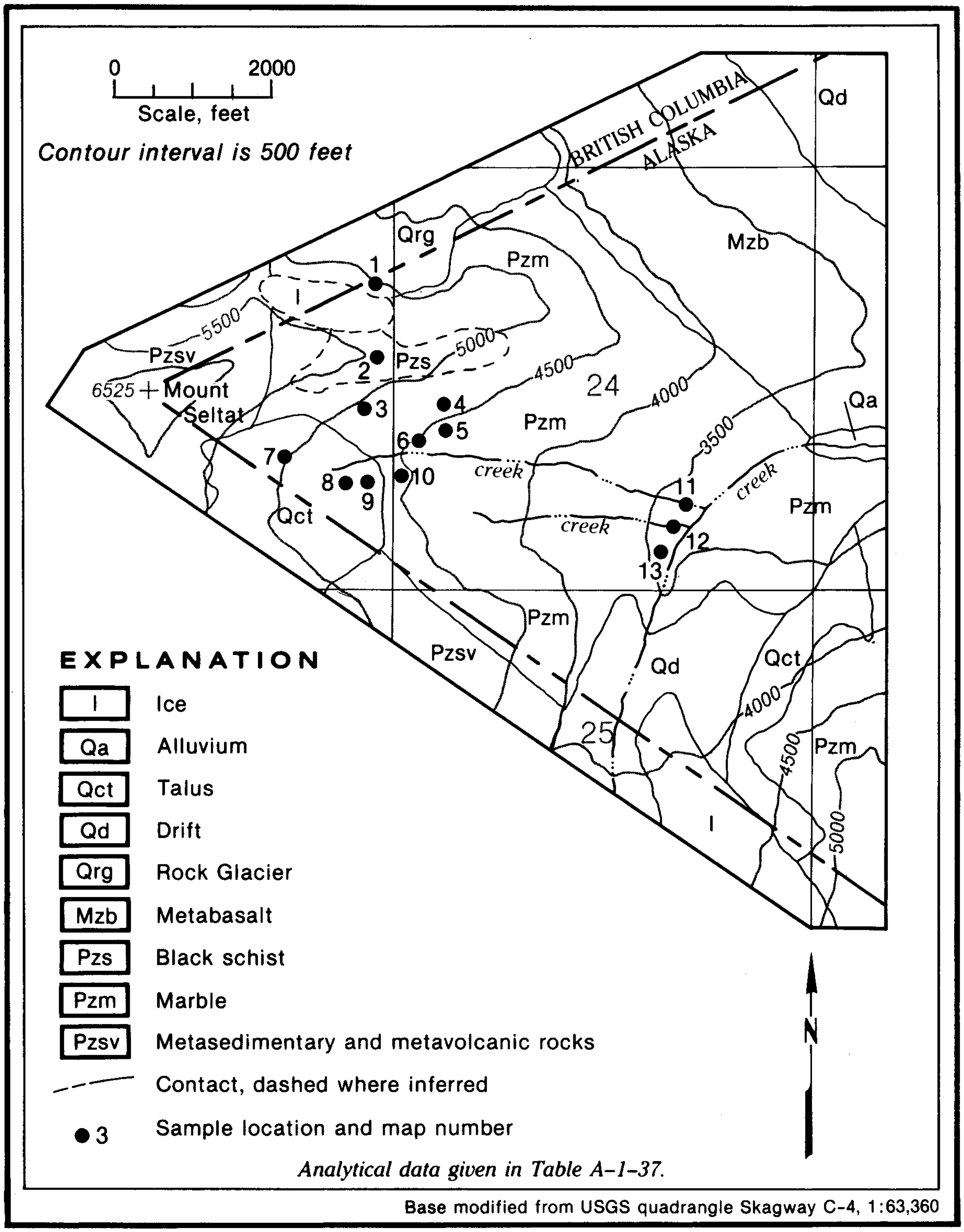


Figure A-89.—Mount Seltat occurrence showing geology and sample locations.

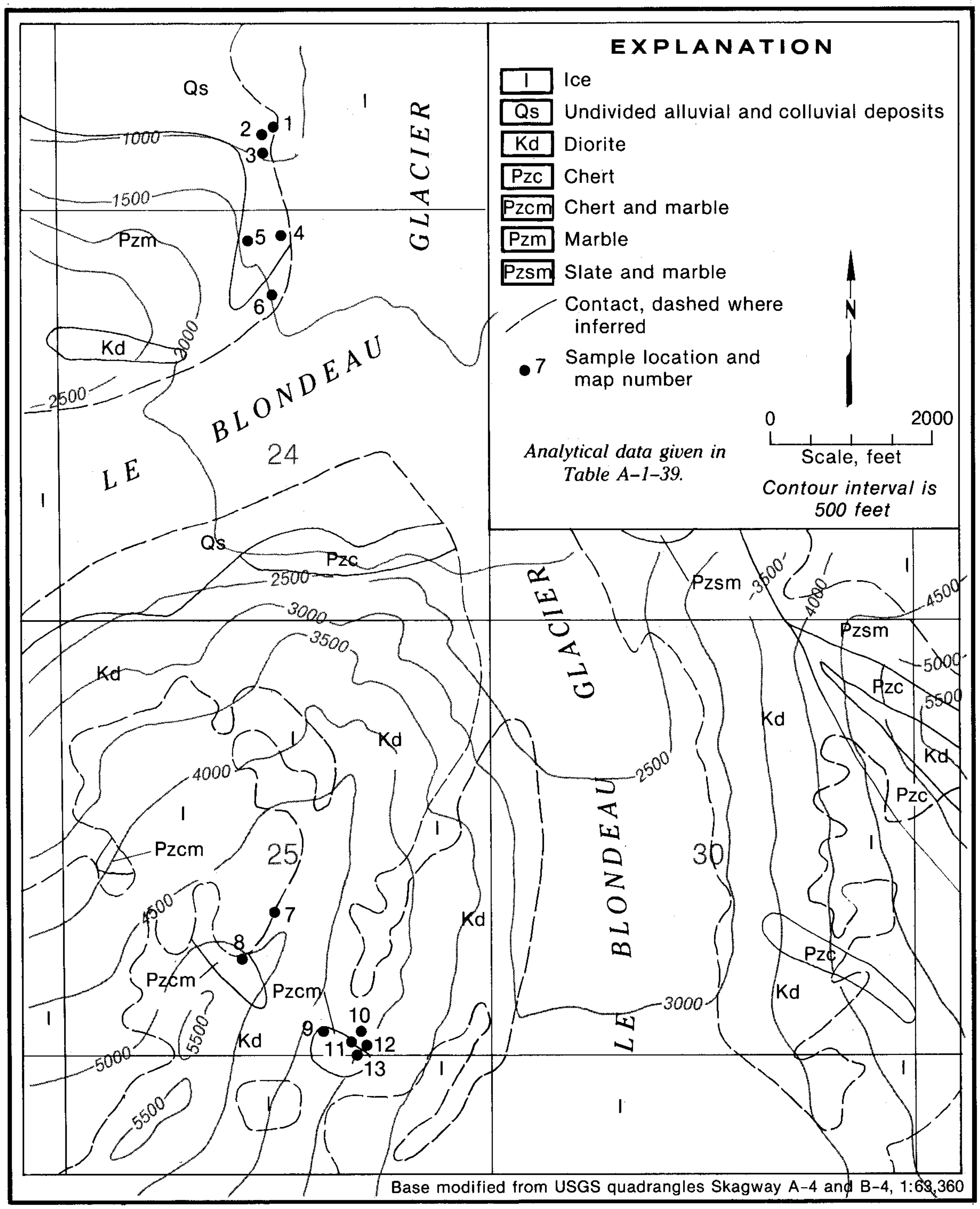


Figure A-90.—Le Blondeau Glacier area showing geology, occurrences and sample locations.

REFERENCES

A-1. Adler, K.M. Geophysical Data Review—Haines Road Cut Prospect, Skagway A-2 quad, Alaska. On-Line Exploration Services, Inc., Dec. 1986, 8 pp.; available from BuMines, AFOC, Juneau, AK.

A-2. Adler, K.M., and K.P. Adler. Haines Road Cut Project, 1987 Geophysical Survey. On-Line Exploration Services, Inc., Sept., 1987, 83 pp.; available from BuMines, AFOC, Juneau, AK.

A-3. Adler, K.M. Haines Road Cut Project, 1987 Geophysical Survey. Update. On-Line Exploration Services, Inc., Jan. 20, 1988, 20 pp.; available from BuMines, AFOC, Juneau, AK.

A-4. Baggs, D.W., and G.E. Sherman. Feasibility of Economic Zinc, Copper, Silver and Gold Mining in the Porcupine Mining Area of the Juneau Mining District, Alaska. BuMines OFR 15-87, 1987, 28 pp.

A-5. Beatty, W.B. Geology of the Placer Deposits of Porcupine, Alaska. B.S. Thesis, Univ. of WA, Seattle, 1937, 97 pp.

A-6. Berg, H.C. Significance of Geotectonics in the Metallogenesis and Resource Appraisal of Southeastern, Alaska. U.S. Geol. Surv. Circ. 804-B, 1978, 163 pp.

A-7. Boyle, R.W. The Geochemistry of Gold and Its Deposits. Geol. Surv. Canada Bull. 180, 1979, 584 pp.

A-8. Brew, D. A., and A. B. Ford. Preliminary Reconnaissance Geologic Map of the Juneau, Taku River, Atlin, and Part of the Skagway 1:250,000 Quadrangles, Southeastern Alaska. U.S. Geol. Surv. Open File Rep. 85-395, 1985, 23 pp.

A-9. Brew, D.A., and S.M. Karl. A Reexamination of the Contacts and Other Features of the Gravina Belt, Southeastern Alaska. U.S. Geol. Surv. Circ. 1016, 1988, pp. 143-146.

A-10. Brew, D.A., and R.P. Morrell. Intrusive Rock Belts of Southeastern Alaska, a Progress Report. U.S. Geol. Surv. Circ. 804-B, 1978, 163 pp.

A-11. Brobst, D.A., and W.P. Pratt. United States Mineral Resources. U.S. Geol. Surv. Prof. Paper 820, 1973, 722 pp.

A-12. Brooks, A.H. A Reconnaissance From Pyramid Harbor to Eagle City, Alaska. Ch. in 21st Annual Report of the United States Geological Survey, Part II. U.S. Geol. Surv., 1900, pp. 331-440.

A-13. ———. Report on Progress of Investigations of Mineral Resources of Alaska in 1912. U.S. Geol. Surv. Bull. 542-A, 1913, p. 43.

A-14. Brooks, A.H. and S.R. Capps. Mineral Industry of Alaska, 1922. U.S. Geol. Surv. Bull 755-A, 1924, p. 25.

A-15. Bundtzen, T.K. Placer Geology of the Porcupine Mining District, Skagway B-4 Quadrangle, Alaska. AK Div. of Geol. and Geophys. Surv. Public Data File 86-27, 1986, 26 pp.

A-16. Bundtzen, T.K., and K.H. Clautice. Prospect Examination of the Golden Eagle Lode-gold Prospect Near Porcupine, Skagway B-4 Quadrangle, Alaska. AK Div. of Geol. and Geophys. Surv. Public Data File 86-18, 1986, 7 pp.

A-17. Clark, A.L., and W.R. Greenwood. Geochemistry and Distribution of Platinum Group Metals in Mafic to Ultramafic Complexes of Southern and Southeastern Alaska. Sec. in Geological Survey Research, 1972, Chapter C. U.S. Geol. Surv. Prof. Paper 800-C, 1972, pp. C157-C160.

A-18. Cobb, E. H. Summaries of Data and Lists of References to Metallic and Selected Nonmetallic Mineral Occurrences in the Skagway Quadrangle, Alaska. U.S. Geol. Surv. Open File Rep. 81-82A, 1981, 10 pp.

A-19. ———. Summaries of Data and Lists of References to Metallic and Selected Nonmetallic Mineral Occurrences in the Skagway Quadrangle, Alaska. U.S. Geol. Surv. Open File Rep. 81-82B, 1981, 9 pp.

A-20. Dawson, G.M. Report on an Exploration in the Yukon District, N. W. T. and Adjacent Northern Portion of British Columbia. Geol. Surv. of Canada Annual Rep., v. III, Rep. B, 1888, 243 pp.

A-21. Dawson, R.C. Personal communication, 1987; available from BuMines, AFOC, Juneau, AK.

A-22. Dederer, A.H. Personal communication, 1987; available from BuMines, AFOC, Juneau, AK.

A-23. Eakin, H. M. The Porcupine Gold Placer District, Alaska. U.S. Geol. Surv. Bull. 699, 1919, 29 pp.

A-24. Forbes, R.B. A Preliminary Report on the Geologic Setting and Petrology of the Metavolcanic Rocks in the Northwestern Part of the Skagway B-4 Quadrangle, Southeastern Alaska. BuMines Contract report, 1986, 43 pp.; available from BuMines, AFOC, Juneau, AK.

A-25. ———. Personal communication, 1985; available from BuMines, AFOC, Juneau, AK.

A-26. ———. Preliminary Petrography of the Country Rocks Adjacent to the Road Cut Lode, Haines Area, Southeast Alaska. Unpublished report, 1988, 3 pp.; available from BuMines, AFOC, Juneau, AK.

A-27. Gilbert, W.G., L. Burns, E.C. Redman, and R.B. Forbes. Preliminary Bedrock Geology and Geochemistry of the Skagway B-3 Quadrangle, Alaska. AK Div. of Geol. and Geophys. Surv. Rep. Invest. 87-2, 1987, scale 1:40,000, 1 sheet.

A-28. Greatlander Shopping News. The Story of Placer Mining on Porcupine Creek, Alaska. Anchorage, AK., Jan. 19, 1977, v. 9, No. 3, 4 pp.

A-29. Henry J. Kaiser Company. Report to the Iron Ore Company of Alaska. Undated, 260 pp.; tonnage and grade data available from BuMines, AFOC, Juneau, AK.

A-30. Hoekzema, R.B., S.A. Fechner, and T. Bundtzen. Distribution, Analysis, and Recovery of Placer Gold From the Porcupine Mining Area, Southeast Alaska. BuMines OFR 89-86, 1986, 49 pp.

A-31. Holdsworth, P. (ed.). Business Plan for Exploration and Development of Marmot Claims. Private report for ALYU Min. Corp., Haines, AK, 1977; available from BuMines, AFOC, Juneau, AK.

A-32. Koshman, P.N., and T.A. Yugay. The Causes of Variation in Fineness Levels of Gold Placers. Geochemistry International, 1972, pp. 481-484 (Translated in english from Geokhimixa *6*, pp. 750-753).

A-33. Kruger, F.G. Untitled report covering geophysics conducted on the Road Cut prospect. Salisbury and Assoc., Inc., 1986, 3 pp.; available from BuMines, AFOC, Juneau, AK.

A-34. MacIntyre, D.G., and T.G. Schroeter. Mineral Occurrences in the Mt. Henry Clay Area. Sec. in Geologic Fieldwork, 1984. British Columbia Ministry of Energy, Mines, and Petroleum Resources, Paper 1985-1, 1985, pp. 365-379.

A-35. MacKevett, E.M., Jr. Analyses of Samples and Preliminary Geologic Summary of Barite-Silver-Base Metal Deposits Near Glacier Creek, Skagway B-4 Quadrangle, Southeast Alaska. U.S. Geol. Surv. Open File Rep. 500, 1971, 8 pp.

A-36. MacKevett, E.M., Jr., E.C. Robertson, and G.R. Winkler. Geology of the Skagway B-3 and B-4 Quadrangles, Southeastern Alaska. U.S. Geol. Surv. Prof. Paper 832, 1974, 33 pp.

A-37. Mann, D.H. Wisconsin and Holocene Glaciation in Southeast Alaska. Ch. in Hamilton, T.D., K.M. Reed, and R.M. Thorson (ed.), Glaciation in Alaska, the Geologic Record. AK Geol. Soc., 1986, pp. 237-261.

A-38. Manuel, R.C. Personal communications, 1983-1985; available from BuMines, AFOC, Juneau, AK.

A-39. Mertie, J.B. Lode Mining in the Juneau and Ketchikan Districts. U.S. Geol. Surv. Bull. 714, 1921, pp. 105-113.

A-40. Metz, P.A., and D.B. Hawkins. A Summary of Gold Fineness Values from Alaska Placer Deposits. Miner. Ind. Res. Lab., Univ. AK, Rep. 45, 1981, 63 pp.

A-41. Moiser, E.L. Use of Emission Spectroscopy for Semiquantitative Analysis of Trace Elements and Silver in Native Gold. Ch. in Ward, F. N., (ed.), New and Refined Methods of Trace Element Analysis Useful in Exploration. U.S. Geol. Surv. Bull. 1408, 1975, pp. 97-105.

A-42. Palmer, Merrill. Personal communications, 1983-1988; available from BuMines, AFOC, Juneau, AK.

A-43. Peterson, D., C.C. Hawley, and J.A. Robson. Haines Barite Report. Private report prepared for Southeast Minerals, 1982; available from BuMines, AFOC, Juneau, AK.

A-44. Plafker, G., and T. Hudson. Regional Implications of Upper Triassic Metavolcanic and Metasedimentary Rocks of the Chilkat Peninsula, Southeast Alaska. Can. Jour. of Earth Sci., v. 17, No. 6, 1980, pp. 183-191.

A-45. Redman, E. Reconnaissance Geology of the Glacier Creek Area, Skagway B-4 Quandrangle, Alaska. Contract report through C.C. Hawley and Assoc., 1983, 5 pp.; available from BuMines, AFOC, Juneau, AK.

A-46. Redman, E., W.G. Gilbert, B.K. Jones, D.S. Rosenkrans, and B.D. Hickok. Preliminary Bedrock Geologic Map of the Skagway B-4 Quadrangle, Alaska. AK Div. of Geol. and Geophys. Surv. Rep. Invest. 85-6, 1985, scale 1:40,000.

A-47. Redman, E., R.M. Rethorford, and B.D. Hickok. Geology and Geochemistry of the Skagway B-2 Quadrangle, Alaska. AK Div. of Geol. and Geophys. Surv. Rep. Invest. 84-31, 1984, 34 pp.

A-48. Robertson, E.C. Magnetite Deposits Near Klukwan and Haines, Alaska. U.S. Geol. Surv. Open File Rep. 132, 1956, 37 pp.

A-49. Roppel, P. Julian. Porcupine. The Alaska Journal, v. 5, No. 1, 1975, pp. 2-10.

A-50. Rosenkrans, D.S., and B.K. Jones. Jarvis Glacier Project—1985 Annual Progress Report. Unpublished Kennecott report, 1985, 30 pp.; available from BuMines, AFOC, Juneau, AK.

A-51. Smith, P. S. Fineness of Gold from Alaska Placers. U.S. Geol. Surv. Bull. 910-C, 1941, pp. 147-269.

A-52. Stewart, B.D. Notes on Placer Operations in Porcupine District, Skagway Precinct. AK Territorial Dept. Mines Misc. Rep. MR-109-1, 1926, 6 pp.

A-53. Still, J.C. Copper, Gold, Platinum, and Palladium Sample Results from the Klukwan Mafic/Ultramafic Complex, Southeast Alaska. BuMines OFR 21-84, 1984, 53 pp.

A-54. ———. Stratiform Massive Sulfide Deposits of the Mt. Henry Clay Area, Southeast Alaska. BuMines OFR 118-84, 10 pp.

A-55. ———. Gold-Copper Mineralization of the Chilkat Peninsula and Islands. BuMines OFR 49-88, 1988, 39 pp.

A-56. Still, J.C., W.G. Gilbert, W.G. Forbes, and K.R. Weir. Final Report of Stream-sediment, Float, and Bedrock Sampling in the Porcupine Mining Area, Southeast Alaska, 1983-1985. BuMines OFR 36-87, 1987, 34 pp.

A-57. Still, J.C., K.W. Weir, W.G. Gilbert, and E.C. Redman. Stream-sediment, Float, and Bedrock Sampling in the Porcupine Mining Area, Southeast Alaska. BuMines OFR 173-84, 1985, 9 pp.

A-58. ———. Stream-sediment, Float, and Bedrock Samples in the Porcupine Mining Area, Southeast Alaska. BuMines OFR 173-84, 1985, 20 pp., 1 sheet.

A-59. Taylor, H.P., and J.A. Noble. Origin of Magnetite in the Zoned Ultramafic Complexes of Southeastern Alaska. Sec. in Magmatic Ore Deposits—a Symposium. Economic Geology Monograph 4, 1969, pp. 209-230.

A-60. Tyrrell, J.B. A Reconnaissance Survey of the Southwestern Portion of the Yukon District. Geol. Surv. of Canada Annual Rep., v. XI, Rep. A, 1898, pp. 36-46.

A-61. U.S. Bureau of Mines. Alaska 1:250,000 Scale Quadrangle Map Overlays Showing Mineral Deposit Locations, Principle Minerals, and Number and Type of Claims. BuMines OFR 20-73, 1980, 153 overlays.

A-62. ———. Unpublished Mine Production Reports, 1985; available from BuMines, AFOC, Juneau, AK.

A-63. Wells, D.E., T.L. Pittman, D.A. Brew, and S.L. Douglas. Map and Description of the Mineral Deposits in the Juneau, Taku River, Atlin, and Part of the Skagway Quadrangles. U.S. Geol. Surv. Open File Rep. 85-717, 1986, 332 pp.

A-64. Wells, R.R., and R.L. Thorne. Concentration of Klukwan, Alaska, Magnetite Ore. BuMines IC 4984, 1953, 15 pp.

A-65. Williams, J. A., ———. Report for the Year 1960. AK Div. of Mines and Geol. Ann. Miner. Rep., 1960, 76 pp.

A-66. Winkler, G.R., and E.M. MacKevett, Jr. Analysis of Bedrock and Stream-sediment Samples from the Haines-Porcupine Region, Southeastern Alaska. U.S. Geol. Surv. Open File Rep. 406, 1970, 90 pp.

A-67. Wright, C.W. The Porcupine Placer District, Alaska. U.S. Geol. Surv. Bull. 236, 1904, 35 pp.

APPENDIX A-1

Analytical Results

Analytical Results Table Abbreviations

Sample Type Abbreviations

C	continuous chip	PC	pan concentrate
CC	chip channel	RC	random chip
CH	channel	S	select
Rep or CR	representative chip	SC	spaced chip
F	float	SS	stream sediment
G	grab	MTS	metallurgical test sample

Lithologic and Mineralogic Abbreviations

aspy	arsenopyrite	gn	galena	po	pyrrhotite
az	azurite	hem	hematite	py	pyrite
bms	banded massive sulfide	jm	jamesonite	qz	quartz
		mag	magnetite	S	sulfur
bn	bornite	meta	metamorphosed	sl	sphalerite
calc	calcite	ml	malachite	st	stained
cp	chalcopyrite	mn	manganese	sulf	sulfide
ep	epidote	mo	molybdenite		
fe	iron	mv	metavolcanic		
fest	iron-stained	mz	monzonite		

Additional Abbreviations

dissem	disseminated	DDH	diamond drill hole	NA	not applicable
w/	with	—	not analyzed	el	elevation
Tr	trace	N	nil	> or G	greater than
		<	less than	SL	sea level

Note: 1986–1987 sample analysis by a commercial laboratory in Lakewood, Colorado.

1983–1985 sample analysis by Bureau Research Center in Reno, Nevada, and by a commercial laboratory in Lakewood, Colorado.

Supplementary Analyses

Note: Analyses consisted of 32 element analysis by plasma and/or by neutron activation; As by colorimetry; La, Ce, Y, and Ba by x-ray fluorescence; and Pt and Pd by fire assay ICP.

Sample Details

Au, Pt, and Pd analyses were by Fire Assay—Atomic Absorption (FA-AA), Inductively Coupled Argon Plasma Spectroscopy (ICP) or Fire Assay (FA).

Ag, Cu, Fe, V, and Ti analyses were by Atomic Absorption or X-ray fluorescence.

Where a number of analyses for either Au, Pt, and Pd were completed for a sample, the value estimated to be most accurate from available data is given.

Sample analyses were by Bureau Research Center in Reno, Nevada; TSL Laboratories in Spokane, Washington; and Bondar-Clegg, Inc., of Lakewood, Colorado.

Units of measure abbreviation used: ppm = parts per million, L0.0003 = not detected above the lower limit of detection, that is, 0.0003 ounce/ton, G10.00 = greater than 10.00%, — = not analyzed.

Table A-1-1.—Main Deposit (figs. A-7—A-11)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	5S156	—	CR	N	0.2	78	26	2	24	0.05	—	—	—	N	32	—	N	pillow metabasalt
2	4S014	—	R	0.035	6.3	3500	62	3200	27	1.10	—	N	N	N	N	N	N	greenschist w/dissem gn
2	4S015	—	R	.450	103.9	430	160	1.60%	N	52.60	—	N	N	N	N	N	N	barite w/sl,gn
3	4S017A	—	G	N	.5	270	67	110	87	.18	—	N	N	N	30	N	N	metabasalt
3	4S017B	1.0	C	1.340	45.4	3900	1470	1.65%	N	42.00	—	N	N	N	9	N	N	barite at contact w/metabasalt
3	4S017C	—	G	2.920	155.4	430	1830	4.60%	N	51.00	—	N	N	N	N	N	N	barite zone w/gn,sl
3	4S017D	7.0	C	1.020	75.6	250	830	1.33%	N	53.00	—	N	N	N	N	N	N	barite zone w/gn,sl
3	4S017E	5.0	C	.590	138.1	260	310	1.94%	N	51.00	—	N	N	700	N	N	N	barite zone w/gn,sl
3	4S017F	5.0	C	1.340	255.4	1420	1200	2.90%	N	46.00	—	N	N	500	N	N	N	barite zone w/gn,sl
3	4S017G	5.0	C	9.980	356.5	290	930	9000	11	27.70	—	N	N	4000	N	N	N	barite gossan zone
3	4S017H	4.5	C	.160	150.6	6600	1420	5.70%	N	46.00	—	N	N	N	N	N	N	barite zone
3	4S017I	4.5	C	.009	2.5	3300	1600	350	21	6.10	—	N	N	N	20	N	N	greenstone
3	4S017J	—	G	.041	1.1	1950	150	230	90	.52	—	N	N	N	20	N	N	metabasalt
4	4S019	1.0	C	1.520	258.8	7.60%	1510	7.20%	N	42.00	—	N	N	N	N	N	N	barite w/sl,gn
4	3S118	—	MTS	.171	34.3	1.56%	2400	4.98%	N	48.40	—	—	—	—	—	—	—	barite w/az,ml,gn
5	4S018A	6.0	CR	N	.8	2180	120	280	39	.70	—	N	N	N	10	N	N	greenstone
5	4S018B	2.0	C	N	1.0	2.65%	210	830	30	1.40	—	N	N	N	N	N	N	black-gray fine grained rock
5	4S018C	3.0	C	.377	3.3	1610	230	780	N	42.00	—	N	N	N	10	N	N	banded barite w/gn,sl
5	4S018D	3.0	C	.800	19.1	1510	1630	3000	N	45.00	—	N	N	N	N	N	N	banded barite w/gn,sl
5	4S018E	2.0	C	.680	138.9	1430	1390	1.93%	N	42.00	—	N	N	N	N	N	N	banded barite w/gn,sl
5	4S018F	20.0	SC	.740	109.5	1610	1270	1.21%	N	45.00	—	N	N	N	N	N	N	banded barite w/gn,sl
5	4S018G	6.0	CR	N	1.2	—	—	4100	N	.72	—	N	N	N	9	N	N	laminated lmst
6	5S334	5.0	CR	.040	13.0	520	127	3350	33	.02	N	N	N	N	20	N	N	altered pillow basalt
7	5S335	4.0	CR	N	1.1	1540	124	266	30	.78	N	N	N	N	20	N	N	altered pillow basalt in schist
7	5S336	5.0	CR	.015	1.1	4080	189	265	51	.82	N	N	N	N	20	N	N	altered pillow basalt to schist
8	5S337	2.0	CR	N	1.0	1150	74	151	20	.61	N	N	N	N	20	N	N	altered pillow basalt to schist
9	5S338	4.0	CR	.020	.8	41	12	304	9	.34	N	N	N	N	8	N	N	schist w/remnant pillows
10	5S339	4.0	CR	.010	N	78	28	26	15	.23	N	N	N	N	20	N	N	qz-sericite schist w/py
11	4S001	15x25	G	N	N	280	44	24	6	.06	—	N	N	N	20	N	N	ash w/small lens of chert
12	4S002	100.0	CR	N	N	790	64	65	82	.04	—	N	N	N	N	N	N	altered pillow basalt
13	4S003	.3	R	N	5.4	47	91	7800	N	.01	—	N	N	N	20	N	N	qz-calc vein w/gn
14	4S004	.4	S	N	23.5	29	21	3.40%	N	.02	—	N	N	N	N	N	N	qz-calc vein w/gn
15	4S010	.7	C	.730	124.8	420	1220	9900	N	45.20	—	N	N	300	N	N	N	fest barite zone
15	4S011	6.0	CR	N	1.0	3.30%	2330	82	96	.14	—	N	N	N	100	N	N	schist
15	4S012	3.0	CR	.044	11.4	1390	360	870	15	4.50	—	N	N	N	10	N	N	white schistose talc and yellow-st qz
16	4S005	50.0	CR	N	N	880	88	330	62	.10	—	N	N	N	20	N	N	greenstone w/py
17	4S006	30.0	CR	N	N	1010	260	63	66	.17	—	N	N	N	40	N	N	qz-mica schist and greenstone
18	4S007	8.0	SC	N	0.5	140	71	60	13	0.14	—	N	N	N	20	N	N	white qz-sericite schist
19	4S023	.6	C	N	1.1	1080	430	150	39	.28	—	N	N	N	N	N	N	geothite cemented mica-schist conglomerate
19	4S024	—	G	N	.7	110	30	42	14	.16	—	N	N	300	N	N	N	mica-schist /qz-sericite schist w/py
20	3S112	—	MTS	0.171	12.3	N	100	800	N	56.50	—	—	—	—	—	—	—	sandy barite

Table A-1-1.—Main Deposit (figs. A-7—A-11)—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
21	3S258	—	MTS	.137	35.0	4.64%	8700	5300	N	43.40	—	—	—	—	—	—	—	sericite altered andesite w/py
22	4S027A	1.5	C	.050	4.4	160	79	280	35	1.38	—	N	N	N	10	N	N	chlorite-sericite schist
22	4S027B	3.4	C	.350	23.6	320	160	1720	N	50.00	—	N	N	N	9	N	N	barite and gossan w/greenschist
22	4S027C	3.0	C	.560	29.8	4400	1330	2770	N	54.00	—	N	N	N	N	N	N	barite w/some sulf
22	4S027D	4.0	C	.202	12.7	2320	140	750	17	12.80	—	N	N	400	20	N	N	barite,schist,gossan,qz
22	4S027E	2.0	C	.008	1.1	700	690	53	52	1.16	—	N	N	N	20	N	N	qz-mica schist
23	4S026A	2.5	C	—	—	270	31	N	27	.32	—	N	N	N	N	N	N	meta-andesite or metabasalt
23	4S026B	1.6	C	—	—	190	48	82	29	1.17	—	N	N	N	30	N	N	fault gouge
23	4S026C	2.5	C	N	1.4	270	360	200	43	1.52	—	N	N	N	20	N	N	meta-andesite or metabasalt w/fault gouge,gossan
23	4S026D	7.0	C	.670	19.9	1230	840	2050	N	52.00	—	N	N	N	N	N	N	barite w/sulf
23	4S026E	1.5	C	.062	13.2	1210	420	700	30	.78	—	N	N	N	10	N	N	barite lens in greenstone,schist
23	4S026F	.5	C	.160	18.8	62	35	640	11	13.90	—	N	N	N	N	N	N	greenstone or schist
24	3S106	.2	S	N	6.1	7.80%	8900	4600	8	45.00	—	—	—	—	—	—	—	barite w/dissem sl,cp,gn,py
24	3S107	3.0	C	.607	14.1	3.70%	1.20%	4700	17	22.00	—	—	—	—	—	—	—	barite w/dissem sl,cp,gn,py
24	3S107B	2.0	C	.043	17.1	1900	1100	2200	4	40.00	—	—	—	—	—	—	—	gossan
24	3S107C	5.0	C	Tr	116.6	2.10%	6500	5200	6	38.00	—	—	—	—	—	—	—	barite w/sl,cp,gn,py
24	3S108	.4	S	.343	147.4	3.00%	1.80%	1800	7	42.00	—	—	—	—	—	—	—	barite w/sl,cp,ml
25	4S025A	.5	C	N	.4	730	27	230	18	3.20	—	N	N	300	40	N	N	greenstone
25	4S025B	2.8	C	.012	1.9	1410	120	49	N	29.20	—	N	N	N	N	N	N	massive barite
25	4S025C	.8	C	N	.4	1010	43	86	15	9.70	—	N	N	N	60	N	N	banded barite
25	4S025D	.15	C	N	1.2	1100	130	42	N	43.00	—	N	N	N	N	N	N	barite
26	4S008	—	G	N	.8	3900	200	100	46	.44	—	N	N	N	10	N	N	gray schist
27	4S009	—	G	N	N	720	83	45	86	.21	—	N	N	N	30	N	N	altered porphyritic andesite
28	4S016	6.0	CR	N	.8	6800	910	120	110	.36	—	N	N	N	N	N	N	metabasalt
29	5S365	3.0	CR	N	.5	970	237	57	66	—	—	—	—	—	—	—	—	metabasalt
30	4S013	6.0	C	N	N	310	39	49	74	.10	—	N	N	N	20	N	N	meta-andesite
31	5S320	2.0	CR	N	N	157	30	10	31	.017	N	N	N	N	30	N	2000	pillow metabasalt

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-2.—Mount Henry Clay prospect (figs. A-13—A-15)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	4S198	—	R	N	N	—	—	—	—	N	—	—	—	—	—	—	—	foliated diorite
2	4S102	0.5	F	—	—	50	17.	22	N	50.000	—	—	—	—	—	—	—	barite w/sparse sulf
2	4S103	.5	F	—	—	6.30%	1.93%	2540	N	29.900	—	—	—	—	—	—	—	barite w/cp,py,sl
2	4S104	.6	F	—	—	4.50%	5300	2690	26.	17.200	—	—	—	—	—	—	—	barite w/cp,sl
2	4S105	—	SS	—	—	490	200	53	51	.154	—	—	—	—	—	—	—	
3	4S100	1.0	CR	—	—	3.20%	2020	6600	N	8.500	—	—	—	—	—	—	—	felsite sulf boulder w/ barite,cp,sl
3	4S101	.6	CR	—	—	5.50%	1.23%	4.40%	N	20.400	—	—	—	—	—	—	—	qz-barite w/po,sl,gn
4	4S099	1.8	CR	—	—	4.10%	5200	800	26	11.000	—	—	—	—	—	—	—	felsite sulf boulder w/ barite,cp,sl
4	3S352	.3	F	Tr	6.9	18.00%	3600	97	66	.400	—	N	N	N	N	N	N	chloritic phyllite w/sl,cp
4	3S353	—	F	Tr	Tr	3000	550	60	33	.340	—	N	N	N	10	N	N	chloritic phyllite w/ az,sl,cp,py
5	4S197	10.0	CR	N	N	—	—	—	—	.086	—	—	—	—	—	—	—	fest greenschist
6	3S378	—	G	N	N	510	65	1300	22	.030	—	N	N	N	10	N	N	altered tuff w/mag,sulf
7	3S377	5.0	SC	Tr	Tr	620	33	1400	29	.070	—	N	N	N	N	N	N	argillite w/sulf
7	5S356	6.0	CR	N	N	850	32	2	33	—	—	—	—	—	—	—	—	metabasalt
7	5S357	6.0	CR	N	.5	735	143	42	12	—	—	—	—	—	—	—	—	agglomerate
7	5S358	1.5	CR	N	.3	26	11	7	1	—	—	—	—	—	—	—	—	siliceous tuff
8	5S359	2.0	CR	0.015	1.3	810	233	173	10	—	—	—	—	—	—	—	—	shale
9	5S354	5.0	CR	.025	.5	258	61	91	7	—	—	—	—	—	—	—	—	fest meta-andesite
9	5S355	5.0	CR	N	N	263	13	23	23	—	—	—	—	—	—	—	—	fest meta-andesite w/ 0.05 ft py bands
10	5S353	4.0	CR	N	.7	170	96	60	20	—	—	—	—	—	—	—	—	greenschist
11	5W875	.5	R	N	N	58	154	22	19	—	—	—	—	—	—	—	—	qz vein
12	5S352	5.0	CR	.005	.7	32	14	32	N	—	—	—	—	—	—	—	—	shale
13	3S349	—	F	Tr	Tr	N	12	160	18	1.250	—	N	N	N	9	N	N	sericite phyllite w/py
13	3S350	—	F	.340	.3	3400	220	3300	N	47.000	—	N	N	N	N	N	N	barite w/sl,gn,py
13	3S351	—	F	Tr	Tr	N	5700	51	15	.400	—	N	N	N	10	N	N	qz-calc vein in phyllite w/cp
14	3S347	—	F	.680	82.0	9600	600	3700	N	38.000	—	N	N	N	N	N	N	banded barite w/sl,gn
15	3S341	—	CR	N	3.4	280	170	43	15	.020	—	N	N	N	N	N	N	fest schist w/py
15	3S342	—	F	Tr	Tr	N	19	30	18	11.400	—	N	N	300	30	N	N	muscovite schist w/barite,py
15	3S343	—	F	Tr	24.0	64	1.	N	23	.160	—	N	N	N	10	N	N	qz and phyllite
15	3S344	—	G	Tr	Tr	N	51	39	26	.020	—	N	N	N	N	N	N	phyllite w/mag
15	3S345	—	SS	—	—	300	170	54	34	.140	—	N	N	N	30	N	N	
15	3S346	—	F	Tr	3.4	5.	140	N	12	.070	—	N	N	N	8	N	N	muscovite phyllite w/py
16	3S271	—	SS	Tr	Tr	910	240	47	47	.250	—	N	N	N	20	N	N	
16	4S029	.3	F	.024	42.4	2.90%	2800	440	8	40.000	—	N	N	N	9	N	N	barite w/cp,sl
17	3S317	—	G	Tr	Tr	410	670	110	N	.110	—	N	N	N	10	N	N	silicified tuff w/ml,cp
17	3S318	—	F	Tr	14.0	1.30%	700	5000	N	49.000	—	N	N	N	9	N	N	bms w/barite,sl,gn,py
17	3S381	.05	F	Tr	17.0	470	5.20%	49	48	.030	—	N	N	N	N	N	N	chloritic phyllite w/ 0.05 ft band of cp,ml
17	3S382	3.0	F	Tr	Tr	360	2200	40	46	.040	—	N	N	N	10	N	N	same boulder as above w/py,cp
18	3S379	0.1	RC	Tr	Tr	520	3.50%	52	76	0.070	—	N	N	N	60	N	N	cp,py,qz-calc band
18	3S380	10.0	RC	N	N	200	380	41	50	.010	—	N	N	N	N	N	N	chloritic phyllite w/py,mag
19	3S316	—	F	0.170	Tr	8.1%	3500	9200	N	40.000	—	N	N	N	9	N	N	barite boulder w/sl,cp,gn,py
19	4S028	—	G	N	N	460	74	N	21	.220	—	N	N	N	20	N	N	greenstone w/py

Table A-1-2.—Mount Henry Clay prospect (figs. A-13—A-15)—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
20	3S315	.6	F	Tr	34.0	850	2.20%	210	53	.090	—	N	N	N	100	N	N	bms w/cp,py
20	3S322	—	F	N	3.4	660	46	N	N	.070	—	N	N	N	9	N	N	chloritic phyllite w/py
20	3S383	.8	F	Tr	10.0	1600	8000	200	64	.020	—	N	N	700	N	N	N	massive py w/cp,calc
21	3S319	.25	F	0.170	Tr	29	160	490	20	.180	—	N	N	N	N	N	N	meta-andesite tuff w/py
21	3S320	—	F	4.110	62.0	7.60%	5300	6500	N	41.000	—	N	N	N	20	N	N	bms w/barite,sl,gn,cp,py
21	3S321	—	F	Tr	21.0	35.00%	3600	1600	N	16.800	—	N	N	N	20	N	N	bms w/barite,sl,cp,py
22	3S313	—	F	Tr	3.4	450	31	89	N	.130	—	N	N	N	N	N	N	altered silicified andesite w/ py
22	3S314	—	F	N	27.0	3.30%	840	1.20%	N	45.000	—	N	N	N	N	N	N	barite boulder w/sl,gn
23	3S310	.6	F	Tr	27.0	10.90%	1.10%	2700	N	40.000	—	N	N	1000	10	N	N	banded barite w/sl,cp,gn
23	3S311	1.3	F	N	3.4	260	33	31	N	.100	—	N	N	N	N	N	N	altered tuff w/py
23	3S312	.8	F	Tr	27.0	10.00%	400	6100	N	41.000	—	N	N	N	N	N	N	bms w/barite,sl,gn,py
24	3S309	—	F	Tr	27.0	8.00%	5900	8400	N	44.000	—	N	N	N	8	N	N	banded barite w/sl,cp,gn
25	3S291	2.0	F	Tr	21.0	8.30%	1.10%	3700	N	34.000	—	N	N	400	30	N	N	chloritic phyllite w/ barite,sl,cp
25	3S292	1.0	F	Tr	24.0	21.00%	8700	1500	N	20.900	—	N	N	N	10	N	N	bms w/barite,sl,py,cp
26	3S308	.8	F	.340	14.0	5000	5300	36	N	3.300	—	N	N	N	N	N	N	calc boulder w/barite,cp,sl
27	3S281	6.0	F	Tr	65.0	33.00%	2.50%	1100	N	5.000	—	N	N	600	N	N	N	bms w/barite,sl,cp,gn,py
27	3S289	1.0	F	Tr	24.0	30.00%	9800	940	N	4.300	—	N	N	900	50	N	N	bms w/barite,sl,cp,py
27	3S290	1.0	F	Tr	21.0	20.00%	7000	160	100	.650	—	N	N	600	N	N	N	bms w/barite,sl,cp,py
28	3S279	—	S	Tr	38.0	1.50%	7.40%	61	N	.060	—	N	N	N	10	N	N	cp lens in qz-calc vein
29	3S280	—	RC	N	N	630	250	32	15	.300	—	N	N	N	N	N	N	chloritic phyllite w/hem
30	3S278	2.4	F	.690	34.0	30.00%	3.10%	1400	N	4.500	—	N	N	1000	30	N	N	bms w/barite,sl,py,cp
30	3S339	1.5	F	Tr	62.0	37.00%	2800	3000	N	4.800	—	N	N	600	40	N	N	bms w/barite,sl,py,cp
30	3S340	2.4	F	Tr	45.0	29.00%	1.60%	2500	N	12.800	—	N	N	800	30	N	N	bms w/barite,sl,py,cp
30	4S030	1.0	F	N	N	250	37	N	N	49.000	—	N	N	N	N	N	N	barite
30	4S031	.75	F	N	115.3	3.70%	12.50%	650	27	.340	—	N	N	N	N	N	N	massive cp,sl boulder
30	4S032	1.8	F	.200	38.9	24.40%	5800	1.50%	N	19.100	—	N	N	900	10	N	N	bms w/barite
31	3S287	—	F	Tr	Tr	26	N	N	N	49.000	—	N	N	N	N	N	N	barite boulder
31	3S288	1.0	F	Tr	45.0	38.00%	8700	530	N	5.900	—	N	N	700	30	N	N	bms w/barite,sl,cp,py
31	4S112	3.0	F	.240	28.8	21.10%	2.00%	900	7	2.110	—	N	300	700	300	N	3000	bms boulder w/sl,cp
31	4S113	.4	F	N	1.9	750	310	84	24	8.800	—	N	N	600	300	N	4000	white-gray schist
32	3S282	1.2	F	.340	44.0	44.00%	1.50%	1600	N	2.900	—	N	N	400	N	N	N	bms w/barite,sl,cp
32	3S283	—	F	Tr	17.0	4.40%	1900	90	N	16.300	—	N	N	300	50	N	N	bms w/barite,sl,py,cp
32	3S284	—	F	Tr	51.0	31.00%	4800	1700	N	8.900	—	N	N	N	30	N	N	bms w/barite,sl,py,gn,cp
33	3S293	—	F	Tr	48.0	28.00%	3.20%	660	N	12.700	—	N	N	700	20	N	N	bms w/barite,sl,cp
34	3S305	—	F	.023	5.3	91	1.40%	N	N	5.600	—	N	N	N	9	N	N	barite-calc boulder w/cp,py,ml
35	3S294	—	F	Tr	3.4	670	83	N	15	0.020	—	N	N	N	9	N	N	chloritic phyllite w/py,mag
36	3S286	—	F	Tr	Tr	980	80	120	19	.790	—	N	N	N	N	N	N	chloritic phyllite w/py
36	3S285	—	F	Tr	24.0	5400	1.80%	990	35	1.680	—	N	N	300	60	N	N	chloritic phyllite w/ barite,cp,py,ml
37	3S270	—	F	0.023	N	1100	210	42	31	.060	—	N	N	N	20	N	N	
38	3S276	—	F	—	—	2050	2.50%	—	3	—	—	—	—	—	—	—	—	altered tuff w/cp,sl,ml
38	3S277	—	F	Tr	Tr	380	210	N	N	45.000	—	N	N	N	8	N	N	barite boulder w/py
39	3S275	—	F	Tr	17.1	240	2.20%	N	N	.160	—	N	N	N	N	N	N	silicified tuff w/cp

Table A-1-2.—Mount Henry Clay prospect (figs. A-13—A-15)—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
40	3S326	—	F	Tr	65.0	4.60%	8.00%	74	17	.090	—	N	N	N	30	N	N	chloritic phyllite w/ qz bands,cp,sl
41	3S325	—	F	N	3.4	130	1700	N	N	34.000	—	N	N	N	N	N	N	barite boulder w/cp,mag
42	3S324	—	F	N	Tr	360	33	43	24	.010	—	N	N	N	40	N	N	chloritic phyllite w/mag
43	3S328	—	F	Tr	3.4	1000	690	N	N	10.900	—	N	N	N	10	N	N	barite boulder w/sl,cp
44	3S327	—	F	N	Tr	4.60%	1300	74	30	26.000	—	N	N	N	N	N	N	banded barite w/sl,cp,ml,mag
45	3S274	—	F	N	N	12	570	N	N	14.000	—	N	N	N	N	N	N	qz-barite w/cp,ml
46	3S411	—	F	Tr	1.0	190	2.10%	47	17	.120	—	—	—	—	—	—	—	chloritic phyllite w/qz,py,cp
46	3S412	—	F	Tr	Tr	130	290	N	N	49.000	—	—	—	—	—	—	—	barite
46	4S106	2.0	RC	0.204	1.3	120	150	N	N	.080	—	N	50	400	9	N	N	qz-barite vein
46	4S107	6.0	RC	N	N	210	63	N	39	.052	—	N	N	500	100	N	2000	massive meta-andesite
46	4S108	1.5	RC	N	.6	190	310	N	5	25.300	—	N	30	400	20	N	N	three barite veins 0.3 ft thick
47	3S272	2.0	G	Tr	Tr	170	610	N	10	14.600	—	N	N	N	8	N	N	calc,qz,barite lens w/cp,ml
47	3S272A	—	F	N	6.9	130	140	N	35	.320	—	N	N	N	10	N	N	chloritic phyllite w/py
47	4S111	.3	F	N	N	90	26	20	6	.046	—	N	N	N	N	N	N	qz-barite w/greenschist
48	3S410	—	G	Tr	Tr	190	26	66	21	.030	—	—	—	—	—	—	—	chloritic phyllite
48	4S109	3.0	RC	N	N	140	39	20	48	.030	—	N	N	400	90	N	2000	meta-andesite
48	4S110	5.0	C	N	N	370	47	N	46	.098	—	N	N	N	70	N	2000	fest greenschist
49	5S306	20.0	CR	.025	.7	150	32	58	9	.560	N	N	N	N	20	N	N	fest sericite schist w/py
49	5S307	.25	C	N	.7	112	18	105	4	N	N	N	N	N	N	N	N	qz-calc vein
49	5S308	20.0	CR	N	N	136	27	51	27	.032	N	N	N	N	20	N	1000	meta-andesite
50	5S309	3.0	CR	.030	.9	735	121	372	16	.206	N	N	N	N	20	N	N	fest slate
51	5S310	—	G	N	N	200	15	42	19	.116	N	N	N	N	N	N	N	greenstone,meta-andesite

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-3.—Hanging Glacier prospect (fig. A-21)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	3S153	2.0	C	N	0.8	5	5	33	N	0.010	—	N	50	N	20	N	N	fe-st qz vein w/chlorite
2	3S149	3.0	G	N	15.2	2100	10	1.20%	N	54.000	—	N	N	N	N	N	N	barite w/gn,sl
3	3S154	2.5	C	1.029	58.3	9.50%	3600	2.30%	14	8.400	—	N	N	N	N	N	N	qz-calc w/barite,sl,gn,cp,py
3	3S155	2.0	CR	1.575	15.11	4.10%	1300	1600	22	7.000	—	N	N	N	8	N	N	brown schist w/barite,sl,cp,gn,py
3	3S156	3.0	C	N	16.0	2.10%	140	9000	18	2.700	—	N	N	N	N	N	N	rock w/qz-calc veins w/sl,gn, py
4	3S157	—	F	N	.9	N	45	81	43	.210	—	N	N	N	20	N	N	altered andesite w/qz,py, epidote
4	3S158	—	F	N	.7	N	35	N	42	.300	—	N	N	N	20	N	N	fest chloritic phyllite w/py
5	3S150	—	S	Tr	174.9	6100	10	1.50%	N	11.000	—	N	60	N	10	N	N	qz-barite w/gn,sl
5	3S151	—	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	schist w/py,ml
5	3S152	—	G	—	113.1	2400	33	120	22	.110	—	N	N	N	20	N	N	altered andesite w/chlorite, epidote,sl,ml
5	4S063A	3.5	C	.023	13.2	280	19	1230	37	7.100	—	N	N	N	20	N	N	yellow schist w/barite,sl,gn
5	4S063B	3.5	C	N	28.9	1540	14	1750	29	12.900	—	N	N	N	20	N	N	50% schist,50% barite
5	4S063C	—	G	N	.6	650	33	41	8	.188	—	N	N	N	10	N	N	shale
5	4S064A	1.0	G	N	N	210	64	22	87	.300	—	N	N	N	40	N	N	meta-andesite
5	4S064B	9.5	SC	N	96.9	840	420	1280	20	19.500	—	N	N	N	N	N	N	yellow schist w/barite
5	4S064C	1.0	CH	N	5.8	1710	120	80	38	1.580	—	N	N	900	30	N	N	black shale
6	3S144	—	G	N	12.1	6	25	950	15	.710	—	N	N	N	N	N	N	silicified tuff
6	3S145	—	G	N	N	110	130	380	97	.040	—	N	N	N	10	N	N	chlorite altered andesite
7	3S146	—	S	N	133.4	5200	120	6900	21	9.200	—	N	N	N	10	N	N	phyllite w/barite,sl,gn
7	3S147	—	G	N	N	48	57	120	62	.070	—	N	N	N	20	N	N	phyllite w/py
7	3S148	—	G	N	198.9	2100	110	6500	25	42.000	—	N	N	N	N	N	N	barite w/sl,gn
8	4S065	—	G	N	.4	180	42	26	44	.058	—	N	N	N	20	N	N	fest greenstone w/py
9	4S066	—	G	N	N	100	44	18	84	.038	—	N	N	N	30	N	N	meta-andesite
10	4S067	8.0	SC	N	N	110	15	N	10	3.300	—	N	N	N	10	N	N	fest schist w/barite
11	4S068	—	G	N	N	150	16	N	63	.046	—	N	N	N	N	N	N	meta-andesite,greenstone

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-4.—Cap prospect (fig. A-22)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	3S126	—	G	N	0.6	1	66	120	100	0.240	—	—	—	—	—	—	—	metabasalt
2	4S033	6.0	CR	N	.9	1040	140	130	130	.400	—	N	N	N	20	N	N	greenstone
3	4S034	6.0	CR	0.084	9.3	250	66	88	35	7.400	—	N	N	600	30	N	N	fest qz sericite schist
4	4S035	1.5	CR	.052	22.9	340	31	N	N	55.000	—	N	N	N	9	N	N	barite w/py,sl
5	4S036A	—	G	N	N	—	29	22	90	.380	—	N	N	N	30	N	N	altered basalt w/some sulf
5	4S036B	1.0	C	.039	2.9	180	82	41	48	17.800	—	N	N	500	20	N	N	black shale
5	4S036C	.8	C	N	2.2	270	33	30	21	1.460	—	N	N	N	40	N	N	dike
5	4S036D	—	G	.008	15.8	780	82	95	27	2.200	—	N	N	700	20	N	N	fest schist
5	4S036E	7.0	SC	.120	62.2	810	20	640	N	53.000	—	N	N	N	N	N	N	barite w/py
5	4S036F	—	G	.129	14.9	88	34	30	N	3.100	—	N	N	500	10	N	N	fest qz sericite schist w/py
6	3S123	1.5	C	.093	23.3	590	89	270	41	10.000	—	—	—	—	—	—	—	altered tuff w/py
7	3S121	8.0	C	1.371	227.7	1800	10	700	N	50.000	—	—	—	—	—	—	—	barite,qz w/sulf
8	3S122	—	S	—	82.3	2000	53	390	N	39.000	—	—	—	—	—	—	—	barite,qz,py,sl
9	4S038	40.0	CR	.450	140.2	1130	11	570	N	18.100	—	N	N	400	8	N	N	qz-sericite schist w/barite lens
10	3S124	—	S	.626	157.7	1.10%	150	3300	N	37.000	—	—	—	—	—	—	—	barite w/td,sl,gn
11	3S127	8.0	C	N	8.1	25	5	40	19	20.000	—	—	—	—	—	—	—	phyllite w/py
11	3S128	5.0	RG	.007	16.3	530	12	150	16	8.900	—	—	—	—	—	—	—	fest schist w/py
12	4S037	1.0	C	.082	21.7	3300	31	130	N	51.000	—	N	N	N	N	N	N	barite
13	4S041A	2.0	CR	.040	73.2	1700	190	380	N	15.800	—	N	N	300	10	N	N	barite w/py
13	4S041B	2.0	C	.022	14.1	98	43	53	25	1.000	—	N	N	300	30	N	N	qz-mica schist w/abundant py
14	4S042	—	S	N	131.7	4400	460	1170	N	34.000	—	N	N	400	30	N	N	barite w/sl,gn
15	3S125A	.8	C	N	15.1	1100	65	180	77	1.300	—	—	—	—	—	—	—	phyllite w/sulf
15	3S125B	—	G	Tr	13.7	N	30	N	10	.970	—	—	—	—	—	—	—	phyllite w/py
16	4S039	6.0	CR	.074	8.2	130	13	60	N	1.760	—	N	N	300	8	N	N	qz-sericite schist
17	4S040	10.0	CR	.009	2.3	66	9	30	7	2.200	—	N	N	N	N	N	N	qz-sericite schist

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-5.—Nunatak prospect (fig. A-21)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
12	4S047	20.0	C	0.340	136.4	3900	140	6300	N	31.000	—	N	N	300	10	N	N	barite zones
12	4S048	—	G	.033	46.4	8000	600	1.00%	N	17.400	—	N	N	600	N	N	N	barite zone w/gn
12	4S049	—	G	.320	18.4	8100	110	360	N	1.890	—	N	N	400	9	N	N	qz-sericite schist w/sl
12	4S050	.6	C	Tr	52.9	1.23%	1280	8000	N	47.700	—	N	N	300	N	N	N	banded barite w/sl,gn
13	4S051	—	G	N	N	450	90	68	70	.230	—	N	N	N	30	N	N	meta-andesite
13	4S052	.5	C	N	N	370	34	53	42	.150	—	N	N	N	30	N	N	qz-sericite schist w/py
14	4S043	—	G	.007	1.0	1280	21	18	36	.370	—	N	N	N	50	N	N	metabasalt
14	4S044	—	F	2.580	335.3	2.38%	1820	2.00%	N	48.000	—	N	N	1000	20	N	N	barite w/sl,gn
14	4S045	75.0	RC	.150	21.7	110	18	170	N	29.600	—	N	N	N	N	N	N	barite (outcrop and float)
14	4S046	7.5	CR	N	120.3	1410	85	1180	N	43.000	—	N	N	N	N	N	N	barite w/sulf bands

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-6.—Little Jarvis Glacier prospect (fig. A-24)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	4S146	0.75	CH	0.072	1.5	13.60%	1710	3.80%	43	N	—	N	N	N	N	N	N	barite bed w/sl in greenschist
1	4S147	—	CR	.225	.8	710	42	260	57	0.11	—	N	N	N	20	N	N	greenschist
2	4S148	1.0	R	.039	N	1060	73	530	15.1	N	—	N	N	N	20	N	N	jasper
3	4S202	1.0	CR	.190	8.0	940	78	160	46	.18	—	N	N	N	N	N	N	sericite schist w/sl,gn
4	4S200	1.5	C	.018	N	530	31	180	N	.22	—	N	N	N	N	N	N	barite lens
4	4S201	—	CR	.133	11.8	3.50%	1130	1.73	39	.49	—	N	N	N	N	N	N	schist, barite w/sl,gn
5	4S199	5.0	CR	.345	1.1	3.10%	1900	1.23	N	1.44	—	N	N	2000	80	N	N	gossan band w/some py

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-7.—Jarvis Glacier Gulches prospect (fig. A-25)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	3E022	—	F	N	0.6	N	120	48	110	0.54	—	N	N	N	100	N	N	metabasalt
2	3S189	—	F	0.019	N	360	94	40	44	.05	—	N	N	N	20	N	N	metatuff w/py
3	3S190	—	F	.034	N	N	50	N	38	.02	—	N	N	N	20	N	N	calc breccia
3	3S191	—	SS	N	N	N	98	55	53	.02	—	N	N	N	40	N	N	
3	3S192	—	F	N	N	N	210	45	73	N	—	N	70	N	20	N	N	qz vein w/py
4	3S193	—	SS	N	N	N	140	100	78	.02	—	N	N	N	30	N	N	
4	3S194	—	SS	N	N	N	130	120	82	.03	—	N	N	N	20	N	N	
5	3S195	—	F	N	2.2	6.50%	3400	77	56	.03	—	N	N	N	N	N	N	qz breccia w/sl,cp,po
5	3S196	—	F	N	N	N	320	39	53	N	—	N	30	N	30	N	N	qz vein w/cp
6	3S197	—	F	N	1.2	N	720	51	230	N	—	N	200	N	N	N	N	qz vein w/po,cp
7	3S199	—	SS	N	N	N	170	170	91	.02	—	N	N	N	30	N	N	
8	3E016	—	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	meta-andesite w/py
9	3S229	—	F	N	.7	N	660	330	200	N	—	N	N	N	N	N	N	metasediment w/sulf
9	3S230	—	F	N	.4	N	320	51	110	.02	—	N	N	N	N	N	N	calc-qz phyllite w/py
10	3S198	—	F	.942	20.3	7.90%	4.60%	710	130	.14	—	N	N	N	N	N	N	gossan w/sulf-core of sl,cp
11	3S200	—	F	N	N	N	120	85	7.1	N	—	N	200	N	N	N	N	jasper
11	3S201	—	F	.012	1.0	5100	520	110	20	N	—	N	N	N	20	N	N	gossan w/qz,sulf
11	3S202	—	F	N	N	N	210	190	120	N	—	N	N	N	30	N	N	limey meta-andesite w/py,cp
12	3S227	—	G	.014	N	N	59	N	6.4	N	—	N	N	N	9	N	N	qz-calc vein
12	3S228	—	G	.030	N	N	65	44	16	N	—	N	N	N	10	N	N	altered rock w/py
13	3S224	—	G	N	N	N	26	N	3.2	N	—	N	20	N	10	N	N	graphitic gossan w/calc
13	3S225	—	G	.032	N	N	190	80	60	N	—	N	N	N	N	N	N	qz-calc altered sediment
13	3S226	—	G	N	N	N	140	56	50	N	—	N	N	N	N	N	N	calc
14	3S218	0.4x2	G	N	1.0	N	790	110	50	N	—	N	N	N	N	N	N	qz gossan w/py,cp
14	3S219	.5x2	G	N	N	46	700	13	11	N	—	N	N	N	N	N	N	calc-qz breccia w/po,cp
14	3S220	—	F	—	—	N	330	N	41	N	—	N	60	N	20	N	N	qz vein w/cp
14	3S221	—	RG	.024	N	N	46	130	86	N	—	N	N	N	N	N	N	chlorite altered andesite
14	3S223	.4	G	N	1.0	N	52	50	13	N	—	N	N	N	N	N	N	calc w/py
15	3S222	—	G	.037	N	N	40	34	21	N	—	N	N	N	20	N	N	metasediment
16	3S204	—	G	N	.6	250	870	170	84	N	—	N	N	N	N	N	N	gossan in altered andesite
17	3S205	.4	G	.416	25.0	N	980	120	160	N	—	N	N	N	N	N	N	qz w/sulf
17	3S206	.4	G	.077	18.5	5.40%	470	3000	49	N	—	N	N	3000	N	N	N	sulf zone w/py,sl,gn
18	3S207	.5	G	.163	11.6	17.80%	5700	230	110	N	—	N	N	N	N	N	N	calc-qz zone w/sl,cp,py
18	3S208	.5	C	.027	3.5	6400	2000	90	31	N	—	N	20	N	N	N	N	calc-qz zone w/sl,cp,py
18	3S209	—	RG	—	—	5200	3100	—	35	—	—	N	N	N	10	N	N	gossan zone in altered andesite
18	3S210	.3	C	.011	2.5	2000	1.30%	140	41	.18	—	N	N	N	N	N	N	chloritic phyllite w/cp
19	4S166	.7	C	N	1.2	—	—	—	—	N	—	—	—	—	—	—	—	rich band of po
20	4S165	.6	C	.019	2.0	—	—	—	—	N	—	—	—	—	—	—	—	rich band of po w/cp
21	4S161	0.45	C	.049	1.4	—	—	—	—	.02	—	—	—	—	—	—	—	qz vein w/po,cp
21	4S162	—	CR	.012	.4	—	—	—	—	N	—	—	—	—	—	—	—	meta-andesite /metabasalt
22	4S164	0.15	G	.025	1.1	—	—	—	—	.01	—	—	—	—	—	—	—	metasediment w/po
23	4S163	—	CR	.017	.6	—	—	—	—	N	—	—	—	—	—	—	—	po portion of silicified rock
24	3S259	0.2	G	—	.5	44	74	7	12	—	—	N	N	300	N	N	N	qz vein w/py
24	3S260A	0.5	C	N	4.6	6.10%	7600	160	110	N	—	N	N	N	N	N	N	massive po w/sl,cp

Table A-1-7.—Jarvis Glacier Gulches prospect (fig. A-25)—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
24	3S260B	2.5	G	N	.9	2700	570	89	29	N	—	N	N	N	N	N	N	schistose tuff w/sulf
24	3S261A	0.5	C	N	2.0	2.00%	3300	150	110	N	—	10	N	N	N	N	N	qz rich phyllite w/po,sl,cp
24	3S261B	2.0	C	N	1.2	9300	1000	130	52	N	—	20	N	N	N	N	N	altered tuff and gossan w/sulf
24	3S262A	—	G	N	N	8100	58	65	45	N	—	N	N	N	30	N	N	chloritic phyllite w/sulf
24	3S262B	6.0	C	N	N	1600	490	120	49	N	—	N	N	N	N	N	N	chloritic phyllite w/sulf
24	3S262C	1.5	C	N	.5	4000	920	100	62	N	—	N	N	N	N	N	N	limey meta-andesite w/py
24	3S262D	1.0	C	.127	3.5	1900	810	100	9.6	N	—	N	500	N	N	N	N	gossan,qz and sulf
24	3S262E	—	G	N	.4	890	510	110	38	N	—	N	N	N	N	N	N	chlorite altered andesite
24	3S263	0.7	F	—	1.1	1.57%	5600	11	122	—	—	N	N	N	N	N	N	barite w/qz,po,sl,cp
25	3E012	—	G	N	.4	N	680	170	81	N	—	N	N	N	20	N	N	meta-andesite w/py
26	3E013	—	G	N	N	N	81	240	75	N	—	N	N	N	N	N	N	meta-andesite w/py
27	3S212	—	F	N	0.8	N	180	270	150	N	—	N	N	N	N	N	N	meta-andesite w/mag,sulf
28	3S211	—	G	—	1.5	47	52	32	113	—	—	N	N	N	N	N	N	py lens up to 0.2 ft across
29	3S264	—	G	0.014	.4	N	270	75	25	0.04	—	N	N	N	N	N	N	altered tuff
29	3S266	—	G	N	N	N	47	97	65	.07	—	N	N	N	40	N	N	meta-andesite
30	3S265	—	G	N	N	N	92	160	41	N	—	N	N	N	10	N	N	metasediment
31	3S267	—	F	N	N	N	13	49	N	N	—	N	N	N	8	N	N	qz breccia w/py
32	3S268	0.5	F	.103	.6	N	510	49	15	N	—	N	N	N	N	N	N	qz vein w/cp,po
33	3S269	—	F	N	.4	1.20%	240	1000	23	.10	—	N	N	N	N	N	N	metasediment w/cp,py,sl
34	3E015	—	G	N	N	N	59	74	44	N	—	N	N	N	N	N	N	chlorite altered andesite w/py
35	3E014	—	G	N	N	N	92	160	41	N	—	N	N	N	N	N	N	chlorite altered andesite w/py

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-8.—Boundary occurrence (fig. A-26)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	4S053	2.0	C	N	N	150	110	N	60	0.09	—	N	N	N	20	N	N	greenstone
2	4S054	—	G	N	N	130	70	41	N	.18	—	N	N	N	8	N	N	quartzite,calc,schist,barite
2	4S055	—	F	N	0.9	280	410	53	74	.53	—	N	N	N	80	N	N	schist
2	4S056	—	G	N	N	45	9	22	N	.20	—	N	N	400	N	N	N	sericite schist
2	3E030	—	G	N	N	51	110	N	N	.08	—	—	—	—	—	—	—	fest phyllite w/py
3	4S057	—	G	N	N	27	14	N	N	.035	—	N	N	N	N	N	N	rubble,qz-calc vein
3	4S058	—	G	0.012	1.2	57	960	26	330	.041	—	N	N	N	200	N	N	rubble,qz-calc vein w/0.4 ft po lens
3	4S059A	—	C	N	N	21	14	N	N	47.0	—	N	N	N	N	N	N	barite in white phyllite
3	4S059B	—	G	N	N	53	8	N	8	2.98	—	N	N	300	10	N	N	white phyllite
3	4S060	—	C	N	N	110	150	30	58	.118	—	N	N	N	30	N	N	greenstone
4	4S061	—	F	N	N	67	N	22	N	.193	—	N	N	300	N	N	N	schist,qz-calc,0.25 ft blebs of sulf

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-9.—Summit Creek zinc occurrence (fig. A-27)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	5S225	—	SS	0.020	0.7	730	99	13	16	0.222	N	N	N	N	20	N	N	
2	5S228	0.3	CR	N	N	47	15	5	8	.013	N	N	N	N	10	N	N	vuggy qz-calc vein
2	5S229	2.0	CR	N	N	98	37	N	29	.020	N	N	N	N	10	N	N	dike
2	5W807	5.0	CR	N	.8	105	29	11	N	.210	N	N	N	N	N	N	N	slate w/sulf
3	6S399	6.0	CR	.103	1.2	480	54	10	7	—	—	—	—	—	—	—	—	slate w/fest
4	6S449	—	F	N	.6	225	83	10	10	.262	—	—	—	—	—	—	—	fest gossany slate w/py
4	6S450	—	F	N	.9	225	84	9	9	.375	—	—	—	—	—	—	—	slate
5	6S398	6.0	CR	N	.8	380	43	4	5	—	—	—	—	—	—	—	—	slate w/fest
6	6U6316	—	CR	N	N	124	5	9	—	—	—	—	—	—	—	—	—	dike w/py
7	6U6315	—	CR	N	1.0	230	23	10	—	—	—	—	—	—	—	—	—	fest slate w/calc
8	6S448	6.0	CR	N	.5	105	79	11	6	.318	—	—	—	—	—	—	—	slate w/py
9	5W995	5.0	CR	N	.3	86	24	14	3	.390	N	N	N	N	N	N	N	slate
10	5W994	—	G	N	N	209	61	17	2	.049	N	N	N	1000	100	N	N	gossan on slate
11	5W993	—	SS	.005	N	48	9	12	N	.014	N	N	N	N	N	N	N	
12	5W996	—	F	N	.3	7	4	9	N	N	N	N	90	N	40	N	N	qz
13	6U6317	—	S	N	.2	380	33	11	—	—	—	—	—	—	—	—	—	fest slate
14	6S400	2.0	F	N	.4	129	33	7	N	—	—	—	—	—	—	—	—	slate w/fest
15	6W1547	5.0	SC	N	.4	94	34	12	2	.290	—	—	—	—	—	—	—	slate w/sulf,fest,white-st
16	6S401	—	CR	N	.4	129	48	4	2	—	—	—	—	—	—	—	—	slate w/fest
17	5W858	2.5	F	N	N	21	6	3	8	.186	N	N	40	N	N	N	N	qz boulder
18	6W1548	.1	G	N	1.1	92	18	10	4	.260	—	—	—	—	—	—	—	slate w/sulf,fest
19	5W857	—	SS	.005	.4	570	84	14	16	.168	N	N	N	N	30	N	N	
20	6W1545	3.0	CR	.068	.4	62	69	33	4	.340	—	—	—	—	—	—	—	slate
21	6W1544	2.0	S	N	.9	42	57	31	3	.370	—	—	—	—	—	—	—	slate w/sulf,fest
22	6W1549	.1	F	N	N	40	20	3	3	N	—	—	—	—	—	—	—	qz-calc vein w/sulf
23	6W1546	.5	F	N	1.6	570	66	14	5	.160	—	—	—	—	—	—	—	slate w/sulf
24	5S226	—	SS	.010	1.2	1190	103	8	15	.195	N	N	N	N	20	N	N	
25	5W975	—	SS	N	.5	535	70	10	14	.166	N	N	N	N	20	N	N	
26	6S413	.2	F	N	.5	2.48%	98	10	4	.130	—	—	—	—	—	—	—	qz-calc vein w/blebs of sl,py
27	6S404	.3	F	.686	380.9	1.40%	320	4.10%	2	.024	—	—	—	—	—	—	—	qz-calc vein w/bands of gn,cp
28	6S405	.2	F	.068	3.5	380	30	189	15	.062	—	—	—	—	—	—	—	dike w/0.1 ft band of qz-calc w/py,sl
29	6S406	—	F	N	1.6	33	25	42	10	.100	—	—	—	—	—	—	—	slate w/0.075 ft band of py
30	6S414	sample missing																
31	6S415	.2	F	.377	1.3	82	700	12	34	N	—	—	—	—	—	—	—	massive po and py
32	5G2632	—	SS	N	.6	1100	110	13	7	.192	N	N	N	N	30	N	N	
33	5S227	—	SS	N	N	1150	9	11	N	.017	N	N	N	N	N	600	N	
34	6S416	4.0	CR	N	.4	152	60	8	7	.410	—	—	—	—	—	—	—	slate w/py
35	6U6355	—	S	N	1.2	100	20	6	N	.310	—	—	—	—	—	—	—	fest slate
36	6U6354	—	S	N	0.3	15	24	6	N	0.210	—	—	—	—	—	—	—	fest slate
37	6U6353	—	S	N	.4	130	43	16	6	.390	—	—	—	—	—	—	—	slate w/fest
38	6U6352	—	S	N	.3	194	11	7	2	.210	—	—	—	—	—	—	—	slate
39	6U6350	—	S	N	2.4	344	60	7	9	.210	—	—	—	—	—	—	—	slate
39	6U6351	—	S	N	N	830	41	2	35	.008	—	—	—	—	—	—	—	sandstone w/po

Table A-1-9.—Summit Creek zinc occurrence (fig. A-27)—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
40	6W1565	10.0	SC	N	.5	240	74	18	5	.224	—	—	—	—	—	—	—	slate w/fest
41	6W1564	10.0	SC	N	.6	142	32	60	3	.217	—	—	—	—	—	—	—	slate w/limey slate,fest
42	6W1563	10.0	SC	N	.8	235	80	22	2	.221	—	—	—	—	—	—	—	fest slate
43	6W1562	10.0	SC	N	3.4	555	90	64	4	.267	—	—	—	—	—	—	—	slate w/some lmst,qz and fest
44	6S388	—	CR	N	1.7	290	54	11	6	—	—	—	—	—	—	—	—	fest slate w/sparse py
45	6W1611	.2	F	N	.9	98	25	7	1	.231	—	—	—	—	—	—	—	slate w/sulf,fest
46	5G2630	—	SS	N	.4	850	102	13	9	.220	N	N	N	N	100	N	N	
47	6S389	.4	F	N	.3	295	6	5	2	—	—	—	—	—	—	—	—	qz-calc vein
48	6W1612	10.0	SC	N	2.1	186	64	8	1	.247	—	—	—	—	—	—	—	slate w/fest
49	6W1613	10.0	SC	N	.6	268	77	3	3	.159	—	—	—	—	—	—	—	slate w/fest
50	6S462	10.0	CR	N	.5	204	115	7	6	.250	—	—	—	—	—	—	—	slate w/sparse py
51	6W1610	10.0	SC	N	.5	51	49	12	5	.703	—	—	—	—	—	—	—	slate w/fest
52	5G2631	—	SS	N	.6	1620	78	33	13	.100	N	N	N	N	100	N	N	
53	6S421	.2	CR	N	N	90	22	N	5	.013	—	—	—	—	—	—	—	qz-calc vein w/vugs
53	6S422	10.0	CR	N	1.6	170	40	49	2	.082	—	—	—	—	—	—	—	fe-st slate w/sulf
54	6W1558	5.0	CR	N	.7	218	59	6	3	.210	—	—	—	—	—	—	—	slate
55	6W1556	.2	F	N	N	170	38	N	6	.020	—	—	—	—	—	—	—	qz w/dike,sulf and fest
55	6W1557	—	F	N	.6	160	24	3	2	.200	—	—	—	—	—	—	—	fest slate
56	6S463	10.0	CR	N	.9	485	80	8	6	.426	—	—	—	—	—	—	—	slate w/sparse py,fest
56	6S464	—	CR	0.210	3.0	1375	31	67	16	.013	—	—	—	—	—	—	—	12 vuggy qz ladder veins in dike
56	6S465	.2	S	1.030	5.4	107	37	56	11	.015	—	—	—	—	—	—	—	select of above veins
57	6W1555	1.5	F	N	.4	138	50	8	7	.130	—	—	—	—	—	—	—	slate w/sulf
58	6W1554	2.0	CC	N	1.5	1280	118	108	19	.170	—	—	—	—	—	—	—	fault gouge in slate w/some dike, sulf,qz
59	6W1553	.5	F	N	N	100	102	5	27	.035	—	—	—	—	—	—	—	dike w/sulf
60	6S500	4.0	CR	N	.6	1.20%	27	13	16	.120	—	—	—	—	—	—	—	calc fest cemented talus
61	6S420	20.0	CR	N	.4	384	48	6	5	.260	—	—	—	—	—	—	—	fest slate w/py
62	6S391	10.0	CR	N	.7	315	42	9	3	—	—	—	—	—	—	—	—	slate w/fest
63	6S390	—	SS	N	.5	1.94%	50	12	65	—	—	—	—	—	—	—	—	
64	6S419	.3	CR	.068	N	304	152	12	3	.170	—	—	—	—	—	—	—	gossan zone in slate
65	6S418	.3	CR	N	N	124	34	11	10	.100	—	—	—	—	—	—	—	fest vuggy qz w/py,sl
66	6S417	—	CR	N	.2	102	7	26	N	N	—	—	—	—	—	—	—	qz veins 0.05 ft to 0.1 ft thick w/sparse py
67	6W1550	.5	G	.068	N	9	10	N	5	.022	—	—	—	—	—	—	—	qz vein w/sulf,fest
67	6W1551	.3	CC	N	N	3	6	2	2	N	—	—	—	—	—	—	—	qz vein w/sulf,fest
67	6W1552	5.0	CR	.068	N	22	13	5	2	.097	—	—	—	—	—	—	—	slate

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-10.—Golden Eagle prospect (fig. A-32—A-37)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
									Figure A-32									
45	4S138	—	SS	0.031	N	200	33	N	18	0.092	—	—	—	—	—	—	—	
64	5W814	0.2	C	1.600	0.5	57	22	21	27	.201	—	N	N	N	10	N	N	qz vein w/sulf
65	5S255	—	S	.015	.3	56	21	11	3	.310	N	N	N	N	20	N	6000	select py in slate
66	5S253	.2	C	.050	N	26	64	3	16	.030	—	N	80	N	40	N	10000	qz vein w/10% py
66	5S254	5.0	CR	N	N	101	15	16	19	.093	N	N	N	N	N	N	N	dike
67	5S256	.3	C	N	N	21	10	11	2	.020	N	N	N	N	N	N	N	qz vein w/30% py
68	5S257	—	CR	N	N	41	2	4	N	.012	N	N	N	N	N	N	N	qz vein w/50% py
68	5S258	8.0	CR	N	N	80	67	5	31	.218	N	N	N	N	40	N	N	dike
69	5W815	.5	F	.010	N	388	57	17	9	.173	—	N	N	N	20	N	N	cemented slate gravel
69	4S139	18 yds	Sluiced	57.290	6.9	490	120	430	65	.191	—	N	N	800	100	N	N	18 yds. w/coarse Au out
69	4S140	5x20	PC	.189	.5	430	160	43	43	.171	—	N	N	N	60	N	N	
69	4G227C	—	G	N	.6	44	35	12	6	—	—	7	—	N	17	—	N	slate
69	4G227D	—	G	N	N	65	17	4	18	—	—	2	—	N	11	—	N	felsic dike
69	4G227E	—	G	N	.1	15	12	3	2	—	—	2	—	N	7	—	N	qz vein in felsic dike
70	4S143	—	PC	.269	.5	390	37	24	20	.168	—	N	N	N	40	N	N	
86	5S274	.3	C	.015	N	165	11	2	6	.032	N	N	20	N	10	N	3000	qz lens in dike
86	5S275	1.5	CR	N	N	108	29	7	21	.128	N	N	N	N	20	N	N	dike
87	5S276	.4	C	N	N	50	51	5	16	.025	N	N	N	N	N	N	N	qz-calc lens in dike
88	4S132	—	G	5.538	.9	73	6	N	28	.011	—	N	N	700	20	N	N	fest qz w/sulf
88	4S133	—	SS	.058	N	290	59	N	57	.126	—	N	N	400	60	N	N	
88	5W816	—	SS	.020	N	210	44	7	14	—	—	—	—	—	—	—	—	
88	5W817	.2	S	.015	.7	205	20	19	30	.240	—	N	N	N	90	N	N	py rich bands in slate
88	5W818	—	SS	N	N	229	46	6	15	.100	—	N	N	N	30	N	N	
88	5W819	5.0	CR	N	N	208	133	11	10	—	—	—	—	—	—	—	—	slate w/sulf
									Figure A-33									
1	5S141	3.0	CR	N	0.2	82	38	4	13	0.224	N	N	N	N	20	N	N	dike
2	5S142	6.0	CR	0.020	1.0	147	53	12	6	.169	N	N	N	N	8	N	N	slate w/some py and qz
3	5S089	.5	CC	N	N	2280	5	4	N	.014	—	N	N	N	N	N	N	qz-ankerite vein
3	5S090	.5	CR	N	.5	61	13	5	4	—	—	—	—	—	—	—	—	slate
3	5S091	—	G	N	.2	123	18	7	37	—	—	—	—	—	—	—	—	dike
4	5S143	.3	CC	N	.3	362	5	2	2	.154	N	N	N	N	N	N	N	qz vein
5	5S144	2.0	C	N	.5	36	57	3	2	.800	N	N	N	N	10	N	N	slate
6	5S145	.1	CC	1.890	.2	34	3	2	31	.033	N	N	N	N	N	N	N	qz vein w/py
7	5S146	.3	CC	4.240	.6	21	8	N	12	.076	N	N	N	N	8	N	N	qz vein w/py
8	5S147	—	CR	.005	.5	197	82	6	19	.290	N	N	N	N	N	N	N	dike
9	5S148	.2	CC	.040	.3	4.43%	17	2	4	.054	N	N	20	N	10	N	N	qz vein w/sl
10	5S149	10.0	CR	.005	.4	158	40	4	3	.440	N	N	N	N	N	N	N	slate
11	5W941	10.0	CR	.205	N	135	35	10	16	.144	—	N	N	N	10	N	N	dike
12	5W939	.3	CC	36.620	2.6	9600	4	6	54	.058	N	N	400	2000	N	N	N	qz vein in dike w/py,sl
13	5W940	5.0	CR	.030	.4	59	35	4	5	.360	—	N	N	N	N	N	N	slate
14	5W938	.4	CC	22.220	1.3	20	2	4	45	.070	N	N	N	1000	N	N	N	qz vein w/sulf
15	5W942	3.0	CR	.005	N	116	28	10	14	.200	—	N	N	N	N	N	N	dike

Table A-1-10.—Golden Eagle prospect—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
								Figure A-33—Continued										
16	5W937	.3	CC	.090	.2	57	5	2	6	.021	N	N	800	3000	N	N	N	qz vein w/sulf
17	5W935	.3	CC	N	N	159	3	2	2	.007	N	N	20	N	N	N	N	qz vein w/sulf in dike
17	5W936	.3	S	18.580	1.0	24	3	8	85	.017	N	N	N	N	8	N	N	select of 935
								Figure A-34										
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	FIGURE NO. A-26
18	5S140	1.4	CR	0.095	0.3	42	40	3	10	0.130	—	N	N	N	N	N	N	dike w/py
19	5S139	.05	CR	.065	.2	21	26	4	5	.149	—	N	N	N	N	N	N	slate w/py
20	5S138	—	CR	.010	.5	74	48	4	5	.200	—	N	N	N	N	N	N	slate
21	5S137	1.0	CC	.020	.2	367	24	3	25	.095	—	N	N	N	20	N	N	fault gouge
22	5S136	9.0	CR	.005	.4	112	39	4	7	.231	—	N	N	N	N	N	N	slate and fault gouge
23	5S086	.35	CC	.245	.2	24	2	4	36	.013	—	N	100	500	10	N	N	qz vein w/1 in py crystals
23	4S135	.25	CH1	82.130	17.1	39	20	N	32	N	—	N	N	400	30	N	N	qz vein w/1 in py crystals
23	4S136	.35	G	1.501	N	16	8	N	130	N	—	N	N	3000	N	N	N	qz vein w/1 in py crystals
24	5S088	.6	CR	.010	N	39	N	3	2	.169	—	N	N	N	N	N	N	dike
25	5S087	.6	CR	.065	.8	110	58	11	4	.233	—	N	N	N	10	N	N	slate
26	5S135	2.0	CR	.010	.2	131	22	4	20	.079	—	N	N	N	10	N	N	dike
27	5S133	.7	CC	1.210	.6	121	341	2	85	.012	—	N	80	N	N	N	N	qz vein w/py,sl,cp
27	5S134	.2	CC	.435	3.4	1.14%	1360	5	13	N	—	N	N	N	N	N	N	select of 133
28	5S132	7.0	CR	.025	.5	151	40	7	5	.231	—	N	N	N	N	N	N	slate
29	5S131	2.0	CR	.045	.3	212	31	3	10	.092	—	N	N	N	N	N	N	dike w/py
30	5S130	15.0	CR	.175	.7	144	41	8	8	.220	—	N	N	N	N	N	N	slate w/py rich bands
31	5S085	2.0	CR	.030	.5	93	53	12	4	.218	—	N	N	N	10	N	N	slate
32	5S128	6.0	CR	.005	.7	53	72	6	8	.201	—	N	N	N	N	N	N	slate w/py
33	5S084	.35	CC	5.230	1.3	19	1	2	44	N	—	N	200	800	10	600	N	qz vein w/py
33	5S129	.35	CC	18.860	3.5	21	2	6	61	.009	—	N	300	800	N	N	N	qz vein w/py
34	5S127	1.0	C	.170	.3	48	35	2	12	.133	—	N	N	N	N	N	N	dike w/sulf
35	5W934	.5	R	.015	.8	113	50	5	5	.197	—	N	N	N	10	N	N	slate w/large py crystals
36	5W933	.05	R	.030	.6	118	43	10	10	.450	—	N	N	N	10	N	N	slate w/band of py
37	5W932	5.0	R	.055	.4	93	30	6	N	.184	—	N	300	N	30	N	N	slate w/thin bands of sulf
38	5W931	.1	R	4.590	1.5	745	9	6	12	.026	—	N	40	N	10	N	N	qz vein w/sulf
38	4S137	.1	G	2.474	.7	260	11	N	45	N	—	N	N	700	50	N	N	qz vein w/sulf
39	5W930	.2	CC	.025	.4	32	5	2	5	.006	—	N	N	N	30	N	N	vuggy qz vein w/large py crystals
40	4W929	.1	S	2.650	2.6	42	48	31	18	.213	—	N	N	N	N	N	N	slate w/py,select of 928
41	5W928	5.0	C	.095	.5	85	42	7	4	.189	—	N	90	N	50	N	N	slate w/py
42	5W927	2.0	CC	.255	1.4	153	425	2	9	.023	—	N	30	N	7	N	N	qz vein w/cp,sl
43	5W925	4.0	C	.160	.2	156	38	5	20	.081	—	N	N	N	40	N	N	dike w/sulf
44	5W926	.4	CC	4.660	.4	251	10	2	1	.009	—	N	N	N	N	N	N	qz vein w/sulf

Table A-1-10.—Golden Eagle prospect—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
									Figures A-35 and A-37—Continued									
46	5W811	5.0	CR	N	N	120	14	3	11	0.076	N	N	N	N	N	N	N	dike w/slate and sulf
47	5W810	.5	C	0.005	N	83	25	8	13	.104	N	N	N	N	10	N	N	fault gouge of dike and slate
48	4S142	.3	C	5.637	1.1	2.04%	31	N	200	N	—	N	N	900	100	N	N	qz vein w/sl,py
49	5W813	.1	S	.725	.3	87	10	19	10	.010	N	N	40	N	10	N	N	py rich bands in slate
50	5W812	15.0	CR	.020	.4	43	32	13	7	.184	N	N	N	N	10	N	N	slate w/py
51	4S141	.5	C	.345	N	26	10	N	52	N	—	N	N	500	20	N	N	qz vein w/py
52	4S124	1.5	C	.023	N	280	31	N	6	.420	—	N	N	N	20	N	N	slate
53	4S123	.8	C	N	N	560	11	N	N	.016	—	N	N	N	20	N	N	qz lens at contact
54	4S122	10.0	SC	5.150	.7	240	100	N	37	.310	—	N	N	N	40	N	N	dike w/qz stringers
55	4S126	.3	C	.007	N	2710	8	N	N	.041	—	N	N	N	N	N	N	qz vein
56	4S125	.3	CC	.075	N	51	9	N	6	N	—	N	N	N	20	N	N	qz vein w/sulf
57	4S127	—	C	1.957	N	26	10	N	N	N	—	N	N	N	20	N	N	qz vein w/sulf
58a	4S121	.9	CC	N	N	1730	20	N	14	.019	—	N	N	300	20	N	N	qz w/aspy and creek sand
58b	4S134	—	C	20.350	3.3	300	42	N	20	.028	—	N	N	500	100	N	N	qz w/sulf
58c	4S128	.2	CR	27.530	4.8	820	20	N	21	.013	—	N	N	2000	50	N	N	qz w/boxworks
58d	4S130	—	G1	58.370	10.3	510	16	N	140	.016	—	N	N	2000	50	N	N	aspy and S
58e	4S130A	—	G5	31.100	6.9	1320	21	57	110	.018	—	N	N	4000	30	N	N	S and aspy
58f	4S129	—	G1	71.360	20.6	800	36	N	40	.013	—	N	N	500	70	N	N	sl and S
58g	4S131	—	G	.738	N	160	17	N	N	N	—	N	N	300	10	N	N	vuggy qz
58h	5S151	1.5	CC	11.930	2.4	211	5	10	12	.017	N	N	N	N	20	N	N	qz w/py
58i	5S152	1.2	C	48.860	3.8	875	5	8	24	.016	N	N	N	N	70	N	N	50% sulf from back of vug
58j	5S153	2.0	CR	.060	.2	845	21	4	3	.510	N	N	N	N	20	N	N	slate
58k	5S154	3.0	CR	.560	N	219	24	4	25	.360	N	N	N	N	10	N	N	dike
58l	5S155	1.0	S	75.430	9.1	86	34	14	83	.105	N	N	N	600	90	600	N	qz w/py,sl,S
59	4S120	1.0	C	N	N	450	58	N	46	.530	—	N	N	N	30	N	N	fest orange rock
60	4S119	1.5	C	.009	N	140	79	N	14	.430	—	N	N	N	20	N	N	slate w/fest qz stringers
61	4S118	2.0	C	.011	N	93	59	19	10	.500	—	N	N	N	20	N	N	slate
62	5S251	20.0	SC	.015	.4	84	29	14	3	.310	N	N	N	N	20	N	4000	slate w/py
63	5S252	6.0	CR	N	N	142	21	2	25	.052	N	N	N	N	10	N	N	dike
									Figure A-36									
71	5S260	5.0	CR	N	N	108	73	8	32	0.096	N	N	N	N	30	N	N	dike w/py
72	5S259	.35	CC	0.030	N	21	3	5	5	.016	N	N	60	400	20	500	1000	qz vein w/py
73	5S261	7.0	CR	.005	N	108	33	4	6	.300	N	N	N	N	20	N	3000	slate w/py
74	5S268	5.0	CR	.075	N	88	43	9	10	.500	N	N	N	N	30	N	7000	slate w/py
75	5S266	.3	CC	N	N	101	3	31	2	.015	N	N	N	N	N	N	N	qz vein
76	5S265	.3	C	N	N	23	4	2	3	.014	N	N	N	N	N	N	N	qz vein
77	5S264	.4	C	N	N	35	1	3	2	.005	N	N	N	N	N	N	N	qz vein
78	5S263	.4	CR	N	N	35	3	6	2	.019	N	N	N	N	N	N	N	qz vein
79	5S267	12.0	CR	N	N	127	63	14	33	.087	N	N	N	N	40	N	N	dike w/py
80	5S262	.3	C	N	N	21	3	7	4	.024	N	N	N	N	N	N	N	qz vein
81	5S273	22.0	CR	.450	N	107	36	7	9	.330	N	N	N	300	30	N	4000	slate
82	5S271	.5	C	N	N	31	10	3	3	.019	N	N	N	N	N	N	N	qz vein

Table A-1-10.—Golden Eagle prospect—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
Figure A-36—Continued																		
83	5S270	.2	C	.020	N	52	35	5	5	.046	N	N	30	N	20	N	9000	qz vein
84	5S272	1.8	CR	N	N	70	54	6	29	.143	N	N	N	N	N	N	N	dike
85	5S269	.3	C	.050	N	49	7	8	4	.011	N	N	N	N	20	N	9000	qz vein

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-11.—McKinley Creek Falls prospect (fig. A-38)

Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
				Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
4S189	2.5	G2	4.830	1.3	280	42	N	31	0.119	—	N	N	N	20	N	N	lmst band w/py,sl
4S190	—	G	1.369	.5	650	57	N	89	.036	—	N	N	N	40	N	N	3 qz veins w/sulf
4S191	.4	FG	8.959	2.4	9.50%	41	N	230	.018	—	N	N	800	40	N	N	qz w/py,sl,in tan-orange dike
4S192	.4	FS	1.669	.81	3.40%	41	N	20	.172	—	N	N	700	30	N	N	sl rich grab from qz vein in dike
4S192A	—	SS	.028	N	240	31	N	22	.102	—	—	—	—	—	—	—	
4S193A	—	SS	.048	N	310	45	20	47	.095	—	—	—	—	—	—	—	

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-12.—Annex No. 1 prospect (fig. A-39)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	5S214	—	S	0.020	N	465	26	36	26	0.030	N	N	30	N	10	N	N	vuggy qz vein w/py
1	5S215	1.0	CR	.075	N	137	77	9	26	.219	N	N	N	N	10	N	N	dike w/py
1	5S216	—	CR	.055	N	615	33	12	30	.176	N	N	N	8000	10	N	N	dike and qz w/py
1	5S217	.05	CR11	4.140	9.0	265	5	4	2	.081	N	N	N	N	N	N	N	vuggy qz vein
1	5S218	—	S	.230	.2	580	28	17	23	.237	N	N	N	N	N	N	N	slate w/py
1	5S219	1.0	CR	.005	N	177	72	N	25	.049	N	N	N	N	40	N	N	brecciated dike in fault zone
1	5S220	.4	S	.230	.3	13	5	5	15	.450	N	N	N	N	10	N	N	slate w/py
2	5S221	.5	CR	.015	N	59	10	N	6	.006	N	N	30	N	N	N	N	vuggy qz vein w/py
2	5S222	—	CR	.315	1.2	61	69	29	32	.260	N	N	N	N	40	N	N	slate w/ + 20% py
2	5S223	.7	CR	.145	N	6	N	N	3	.008	N	N	60	N	10	N	N	vuggy qz w/slate,py and S
2	5S224	—	S	.150	N	840	155	12	147	.270	N	N	N	N	N	N	N	gossan
3	5W803	.1x.3	CR	5.345	1.7	32	5	19	2	.031	N	N	30	N	N	N	N	6 qz veins
3	5W804	20.0	SC	.055	.2	38	11	6	2	.410	N	N	N	N	N	N	N	slate
3	5W806	.4	G	.420	N	15	3	10	78	.083	N	N	N	2000	40	N	N	qz and dike w/sulf
4	5W800	.3	C	.700	.8	188	21	24	7	.050	N	N	100	N	N	N	N	qz vein w/sulf
4	5W801	.05	C	3.860	1.4	166	18	20	5	.035	N	N	70	N	N	N	N	qz vein w/sulf
4	5W802	.4	C	.220	.2	116	21	12	9	.080	N	N	40	N	8	N	N	qz vein w/sulf
4	5W805	—	SS	N	N	100	44	3	11	.089	N	N	N	N	20	N	N	
4	5W1000	.3	R	3.125	1.6	71	2	100	4	.020	N	N	20	N	N	N	N	qz vein float w/sulf

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-13.—Wolf Den prospect (fig. A-40)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	7W1733	0.3	CC	3.394	2.3	3550	8	14	1	—	—	—	—	—	—	—	—	qz vein in dike w/aspy,py, fest, gossan
2	7W1734	.3	CC	.583	.5	210	4	7	3	—	—	—	—	—	—	—	—	qz vein in dike w/aspy,py, fest, gossan
3	7S613	.15	CH1	1.417	—	225	5	37	1	—	—	—	—	—	—	—	—	qz vein in dike w/15% py,aspy
4	7W1735	.03	S	7.028	5.3	685	26	42	9	—	—	—	—	—	—	—	—	aspy veinlet in dike w/gossan
5	7S612	.3	CH	1.783	—	575	4	N	6	—	—	—	—	—	—	—	—	qz vein in dike w/15% py,aspy
6	7W1736	—	SS	.206	1.4	785	126	13	25	—	—	—	—	—	—	—	—	
7	7S614	5.0	CR	.103	—	225	56	7	7	—	—	—	—	—	—	—	—	slate w/py bands
7	7S615	.2	F	.171	—	20000	34	645	22	—	—	—	—	—	—	—	—	qz vein in dike w/sl,gn,py

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-14.—Quartz Swarm prospect (fig. A-41)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	4S117	—	F	N	N	260	150	31	78	0.050	—	N	N	400	80	N	3000	dike w/dissem po + sparse cp
1	4S114A	3.0	C	N	N	220	73	N	24	.094	—	N	N	500	70	N	N	3 qz veins 50% of sample
1	4S114B	3.0	C	N	N	240	100	N	N	.071	—	N	N	400	60	N	800	40% qz
1	4S114C	2.5	CR	0.007	N	71	37	N	31	.017	—	N	60	400	20	N	N	qz vein sparse calc w/sulf
1	4S114D	4.5	CR	.015	N	260	110	N	N	.041	—	N	N	400	90	N	2000	qz veins 0.2 ft and 0.8 ft knot of po
1	4S114E	3.0	C	—	—	83	15	N	N	—	—	N	20	500	10	N	N	irregular qz vein
1	4S114F	1.5	C	N	N	390	110	N	57	.118	—	N	N	N	100	N	2000	fest slate
1	4S114G	1.0	C	N	N	130	26	N	N	.017	—	N	40	400	10	N	N	qz vein
2	4S115A	—	C	N	N	19	8	N	N	.007	—	N	N	400	10	N	N	
2	4S115B	—	C	N	N	20	9	N	N	.027	—	N	N	500	10	N	N	
2	4S115C	—	C	N	N	25	10	N	N	N	—	N	N	300	9	N	N	
3	4S116A	2.1	CR	N	N	76	7	N	N	N	—	N	N	N	N	N	N	qz vein w/calc
3	4S116B	1.6	C	N	N	20	9	N	N	.062	—	N	N	500	10	N	N	qz vein
3	4S116C	1.1	C	N	N	35	10	N	N	.010	—	N	60	700	20	N	N	qz vein
3	4S116D	.9	C	N	N	14	9	N	N	.017	—	N	20	500	10	N	N	qz vein
3	4S116E	2.0	C	N	N	260	96	N	45	.142	—	N	N	400	200	N	N	dike
3	4S116F	1.8	C	N	N	46	38	N	N	N	—	N	30	400	20	N	N	qz vein
4	5S111	.75	CC	N	0.2	44	33	3	10	—	—	—	—	—	—	—	—	qz vein w/5% calc
4	5S112	4.0	CR	N	N	128	91	7	35	—	—	—	—	—	—	—	—	metabasalt w/calc inclusion
4	5S113	.8	CC	N	N	30	30	9	6	—	—	—	—	—	—	—	—	qz vein w/5% calc
4	5S114	4.0	CR	N	N	96	67	16	29	—	—	—	—	—	—	—	—	metabasalt
4	5S115	1.0	CC	N	N	48	38	5	9	—	—	—	—	—	—	—	—	qz vein w/5% calc
4	5S116	—	S	N	.2	40	33	14	12	—	—	—	—	—	—	—	—	select qz w/mo
4	5W910	1.0	CR	N	N	43	26	9	18	—	—	—	—	—	—	—	—	metabasalt
4	5W911	1.8	C	N	.2	4	5	6	N	—	—	—	—	—	—	—	—	qz vein
4	5W912	7.0	CR	N	.2	56	91	4	29	—	—	—	—	—	—	—	—	metabasalt w/sulf
4	5W913	.3	C	N	N	2	3	11	N	—	—	—	—	—	—	—	—	qz vein
4	5W914	.3	C	N	N	7	10	5	2	—	—	—	—	—	—	—	—	qz vein
4	5W915	1.0	CR	N	.2	42	81	15	24	—	—	—	—	—	—	—	—	metabasalt w/sulf
4	5W916	1.0	C	N	.4	6	5	6	1	—	—	—	—	—	—	—	—	qz vein
4	5W917	2.0	CR	N	.2	56	46	7	23	—	—	—	—	—	—	—	—	metabasalt
5	4S167	0.8	C	0.023	N	240	25	N	N	—	N	N	N	N	N	N	N	qz vein
6	5S100	.2	CC	N	0.6	46	13	4	2	—	—	—	—	—	—	—	—	qz vein
6	5S101	17.0	CR	N	.4	95	62	7	10	—	—	—	—	—	—	—	—	slate w/some 0.05 ft qz stringers
6	5S102	.3	CC	N	.4	27	14	5	2	—	—	—	—	—	—	—	—	qz vein
6	5S103	—	CR	N	.4	245	67	2	8	0.118	—	N	N	N	8	N	N	slate
6	5S104	.7	CC	N	.4	54	22	3	5	—	—	—	—	—	—	—	—	qz vein
6	5S105	.5	C	N	.2	70	22	4	3	—	—	—	—	—	—	—	—	qz vein w/calc
6	5S106	—	CR	N	.5	113	67	9	6	—	—	—	—	—	—	—	—	slate
6	5S107	.6	CC	N	.6	12	2	15	2	—	—	—	—	—	—	—	—	qz vein
6	5S108	9.0	CR	N	.2	67	87	8	6	—	—	—	—	—	—	—	—	slate
6	5S109	1.0	C	N	N	26	7	6	N	—	—	—	—	—	—	—	—	qz vein
6	5S110	.05	C	.035	2.4	125	64	33	15	.059	—	N	N	N	10	N	N	qz vein w/py

Table A-1-14.—Quartz Swarm prospect (fig. A-41)—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
6	5W901	—	G	N	.5	151	64	15	8	—	—	—	—	—	—	—	—	slate w/sulf
6	5W902	.4	C	N	N	37	10	27	N	—	—	—	—	—	—	—	—	qz vein
6	5W903	1.0	CR	N	N	25	8	8	2	—	—	—	—	—	—	—	—	qz veins
6	5W904	2.0	CR	N	.4	150	61	14	16	—	—	—	—	—	—	—	—	fest slate
6	5W905	17.0	CR	N	.3	63	98	8	10	—	—	—	—	—	—	—	—	slate w/sulf
6	5W906	1.0	C	N	N	8	6	5	1	—	—	—	—	—	—	—	—	qz vein
6	5W907	6.0	CR	N	N	98	77	7	9	—	—	—	—	—	—	—	—	slate w/sulf
6	5W908	.7	C	N	N	13	6	6	N	—	—	—	—	—	—	—	—	qz vein
6	5W909	5.0	CR	.005	N	76	30	17	4	.129	—	N	N	N	10	N	N	slate
7	5S092	.5	C	N	.2	21	12	4	3	—	—	—	—	—	—	—	—	qz vein
7	5S093	—	CR	N	N	46	13	3	25	—	—	—	—	—	—	—	—	dike
7	5S094	—	G	N	.2	48	73	4	18	—	—	—	—	—	—	—	—	banded silicified rock
7	5S095	.3	C	N	.3	84	17	5	17	—	—	—	—	—	—	—	—	qz vein
7	5S096	—	G	N	.2	82	52	5	21	—	—	—	—	—	—	—	—	silicified and marbleized sediments
7	5S097	—	G	N	.2	127	47	6	38	—	—	—	—	—	—	—	—	banded silicified sediment w/po
7	5S098	.4	C	N	.3	57	43	6	13	—	—	—	—	—	—	—	—	qz vein w/po
7	5S099	—	CR	.090	N	89	73	7	16	.300	—	N	N	N	N	N	N	silicified green sediment

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-15.—Big Boulder Quartz Ledge prospect (figs. A-42, A-43)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	5S313	1.0	C	N	0.3	21	9	99	3	0.008	N	N	N	N	N	N	N	qz
2	5S314	5.0	C	N	1.1	30	9	163	3	N	N	N	N	N	N	N	N	felsite and qz vein
3	5S315	8.0	CR	0.005	.4	37	15	66	7	N	N	N	N	N	10	N	N	felsite and qz vein
4	5S316	4.0	CR	N	1.8	97	5	308	2	.007	N	N	N	N	N	N	N	felsite and qz vein
5	5S317	2.0	CR	N	N	12	8	12	4	N	N	N	N	N	N	N	N	qz and felsite vein
6	5M893	11.0	C	N	N	29	9	3	1	.006	—	N	N	N	10	N	N	felsite and qz vein
7	5M894	10.0	C	.005	N	43	8	8	N	N	N	N	N	N	N	N	N	felsite and qz vein
8	5M890	10.0	C	N	N	31	9	6	4	.026	—	N	N	N	10	N	N	qz and felsite vein
9	5M892	10.0	C	N	N	32	5	7	5	N	—	N	N	N	N	N	N	felsite and qz vein
10	5M891	10.0	C	N	N	28	8	2	2	N	—	N	N	N	N	N	N	felsite and qz vein
11	5W852	6.0	C	N	N	10	7	17	1	.005	N	N	N	N	N	N	900	qz and felsite vein
12	5W853	4.5	C	N	N	20	23	3	3	N	N	N	100	500	20	700	N	qz and felsite vein
13	5W854	5.7	C	N	N	7	5	9	3	.007	N	N	40	300	N	N	N	qz and felsite vein
14	5W855	1.0	C	N	N	27	8	6	2	N	N	N	30	N	N	N	N	qz vein
14	5W856	1.5	C	N	.2	21	13	12	4	.009	N	N	N	N	N	N	N	felsite
15	5S050	13.0	SC	N	.2	62	52	14	2	—	—	—	—	—	—	—	—	felsite
16	5S051	4.0	SC	N	N	33	24	15	4	—	—	—	—	—	—	—	—	qz vein fest some sulf
17	5S052	4.0	C	N	N	22	6	4	N	—	—	—	—	—	—	—	—	fest qz
18	5S053	.1	G	N	.2	26	33	20	1	—	—	—	—	—	—	—	—	qz, felsite contact zone
19	5S054	.1	G	N	N	68	11	13	2	—	—	—	—	—	—	—	—	qz vein w/py
	Not on map 20 ft above adit in trench																	
	5S055	10.0	SC	N	.3	19	25	18	2	—	—	—	—	—	—	—	—	fest qz and felsite

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-16.—Lost Silver Ledge prospect (figs. A-45—A-47)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	5S361	—	S	0.650	545.2	1.17%	5330	4.06%	1	—	—	—	—	—	—	—	—	select qz-calc vein w/jm,gn,ml
2	5W862	0.4	G	N	.2	337	33	51	13	0.252	N	N	N	N	20	N	N	qz,lmst sl,dike w/sulf
3	5W878	1.1	C	.025	2.0	860	177	254	51	—	—	—	—	—	—	—	—	dike w/sulf
3	5W879	.3	C1	2.170	871.6	282	1.43%	6.10%	4	—	—	—	—	—	—	—	—	jm w/some qz,py
3	5S332	.3	CR	6.150	410.8	211	6020	19.90%	4	N	N	N	N	N	30	N	N	qz vein w/jm
3	5S333	.07	CR1	4.190	560.2	1540	1.70%	42.50%	2	—	—	—	—	—	—	—	—	jm
4	5W877	2.0	CR	N	N	585	85	27	5	—	—	—	—	—	—	—	—	dolomite w/qz veins
5	5S362	.5	CR	.015	5.1	160	82	101	28	—	—	—	—	—	—	—	—	qz,slate,lmst and gossan
6	5M897	.2x.6	C	1.320	392.9	1940	1620	8.80%	4	N	N	N	N	N	N	N	10000	4 qz veins w/gn,sl
7	5M898	1.5	C	.095	346.0	2.53%	396	4.36%	4	.005	N	N	20	N	N	N	N	qz vein w/gn,sl,ml
8	5S331	1.2	CC	.100	696.0	1.93%	311	8.60%	2	N	N	N	30	500	N	N	50000	qz vein w/gn
9	5S329	.4	C	.060	626.1	4.89%	189	6.90%	2	.007	N	N	N	N	N	N	2000	qz vein w/gn
10	5S330	.85	CC	.0953	423.1	1.87%	77	39.30%	3	N	N	N	30	N	8	N	N	qz vein w/gn
11	5S328	.9	C	.050	467.0	7810	19	5.30%	2	N	N	N	N	N	N	N	N	qz vein w/gn
12	5W881	.5	C	N	7.5	133	32	585	2	—	—	—	—	—	—	—	—	qz vein w/gn
13	5W880	.6	C	.120	915.1	1.09%	2430	27.40%	3	—	—	—	—	—	—	—	—	qz vein w/gn
13	5W882	.1	S	2.1202	452.5	7.40%	1.24%	7500	1	—	—	—	—	—	—	—	—	qz vein w/jm,gn,sl
14	5S363	.15	CR	.055	83.3	7960	40	35.90%	N	—	—	—	—	—	—	—	—	qz-calc vein w/gn
14	5S364	.5	CR	N	8.4	795	19	925	N	—	—	—	—	—	—	—	—	fest qz-calc vein w/gn
15	5W863	—	CR	.330	417.3	1.88%	1110	6.90%	3	N	N	N	N	N	N	N	3000	11 qz veins w/gn,sl,cp,py
15	5W864	—	S	.5852	912.6	8340	3720	36.20%	4	N	N	N	N	N	N	N	6000	gn w/ml
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	FIGURE NO. A-34
16	5S366	.7	CC	N	.8	60	5	96	3	—	—	—	—	—	—	—	—	qz-calc vein w/py
16	5S367	.7	CC	N	N	55	2	30	1	—	—	—	—	—	—	—	—	qz-calc vein w/py
16	5S368	.8	CC	N	.6	26	5	82	5	—	—	—	—	—	—	—	—	qz-calc vein w/py
16	5W887	.4	C	N	3.0	107	3	62	2	—	—	—	—	—	—	—	—	qz-calc vein w/py
16	5W886	.35	C	N	.6	1090	5	74	3	—	—	—	—	—	—	—	—	qz-calc vein w/py
16	5W885	.5	CR	N	1.4	1370	7	184	4	—	—	—	—	—	—	—	—	qz-calc vein w/py
16	5W884	.3	S	.010	3.1	54.50%	87	72	1	—	—	—	—	—	—	—	—	sl w/some qz
16	5W883	.5	C	.010	8.9	13.50%	56	835	2	—	—	—	—	—	—	—	—	qz vein w/sl,py
17	5M895	.3x.4	F	.040	2.2	790	12	860	1	N	N	N	20	N	N	N	N	qz vein w/sulf
17	5M896	.6x.4	F	N	N	1.95%	5	6	4	N	N	N	20	N	N	N	N	qz vein w/sl,py
17	5W859	.1	F	N	N	20	22	18	5	N	N	N	70	400	10	N	N	qz vein w/sulf
17	5W860	.5	F	.005	34.3	1.20%	5	4580	2	N	N	N	30	N	N	N	N	qz vein w/gn,sl,py
17	5W861	.4	F	N	7.4	1730	2	1410	3	N	N	N	N	N	N	N	N	qz vein w/gn,sl,py

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-17.—Tsirku silver occurrence (fig. A-48)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	6S490	0.3	R	0.068	41.0	2700	28	4680	1	0.016	—	—	—	—	—	—	—	qz vein in dolomite w/gn
2	6W1591	.15	RC	.380	653.5	18.40%	198	6.20%	18	—	—	—	—	—	—	—	—	qz vein in dolomite w/gn,sl, gossan,fest
3	6W1592	.3	F	.055	24.0	3305	9	2780	1	.013	—	—	—	—	—	—	—	qz w/gn,sl
4	6S489	.2	RC	.295	73.0	174	12	1.53%	2	—	—	—	—	—	—	—	—	qz vein w/gn

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-18.—Merrill's silver prospect (fig. A-49)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	5S377	5.0	SC	N	1.8	1590	58	280	40	—	—	—	—	—	—	—	—	dike
1	5S378	—	S	0.295	89.3	13.00%	710	1.34%	24	—	—	—	—	—	—	—	—	qz-calc vein w/gn,green mica
1	5S379	.3	CR	.025	8.3	5020	169	765	19	—	—	—	—	—	—	—	—	qz vein w/py and sericite
2	3S237	.1	CH	.023	1.3	1.01%	16	410	N	N	N	—	—	—	—	—	—	qz vein w/sl,gn,py,ml
2	3S238	.2	CH	N	.6	1.02%	16	410	N	N	N	—	—	—	—	—	—	argillite
3	3S239	.1	C	.059	3.5	7700	89	280	N	N	N	—	—	—	—	—	—	qz-calc w/sl,py
4	3S235	.5	CH	.343	610.3	5400	30	15.70%	N	N	N	—	—	—	—	—	—	qz gossan breccia w/gn
4	3S236	.4	G	.471	22.2	1.89%	170	5500	68	N	N	—	—	—	—	—	—	argillite w/sl,gn
5	5S380	.2	CR	.035	97.7	2240	26	1.95%	1	—	—	—	—	—	—	—	—	qz-calc vein w/gn,sl
5	5S381	.5	C	.175	129.9	2.42%	11	2.77%	N	—	—	—	—	—	—	—	—	qz-calc vein w/gn,sl
5	5S382	—	G	.005	4.3	700	6	760	N	—	—	—	—	—	—	—	—	dolomite
5	3S240	.1	C	.010	253.7	5700	24	3.90%	N	0.010	N	—	—	—	—	—	—	qz vein w/gn,sl
6	3S241	—	R	N	.8	59	N	190	N	.030	N	—	—	—	—	—	—	qz w/sulf
6	3S242	.2	R	—	96.0	5.80%	1640	1.37%	N	N	N	—	—	—	—	—	—	qz-calc breccia w/gn,sl

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-19.—Glacier Creek prospect (fig. A-50)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	3S028	—	S	0.590	3.0	130	550	140	11	—	—	—	—	—	—	—	—	lmst w/py
2	8W1852	0.7	CH	N	2.5	820	52	109	4	0.110	—	—	—	—	—	—	—	lmst w/sulf,fest
3	8W1853	.5	CH	.035	.3	1100	117	16	4	N	—	—	—	—	—	—	—	lmst w/sulf,fest
Not on map																		
4	8S1066	1.0	CR	.007	1.3	325	126	12	11	.370	—	—	—	—	—	—	—	fault zone in slate and lmst w/ py,fest

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-20.—Clair Bear prospect (fig. A-51)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	4S095	.4	F	N	1.7	69	2160	30	1040	N	—	N	600	600	700	1000	N	massive py + sparse cp
1	4S096A	.7	F	.028	56.2	50	1450	22	1070	N	—	N	700	N	800	N	7000	massive sulf w/po,py,cp
1	4S096B	.3	F	N	N	150	120	N	69	.016	—	N	N	400	300	N	2000	dike
2	5S288	6.0	CR	N	N	72	13	6	12	0.080	N	N	N	N	8	N	N	meta-andesite porphyry
3	5S286	1.8	CR	N	N	28	100	9	26	.023	N	N	N	N	60	N	N	fest dike
4	5S289	10.0	CR	N	N	12	11	7	2	.043	N	N	N	N	N	N	N	marble
5	5S287	.15	CC	0.015	.9	30	2290	8	905	.012	N	N	N	N	40	N	N	sulf lens w/po,cp
6	4S098	1.5	C	N	N	95	63	N	63	.025	—	N	N	1000	200	N	N	dike
7	4S097	.3	C	N	1.1	110	1330	22	490	.013	—	N	N	300	400	N	3000	sulf lens w/po,py,cp

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-21.—Porcupine roof pendant occurrence (fig. A-52)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	5S293	—	SS	N	N	32	32	8	18	0.019	N	N	N	N	30	N	N	
2	5S292	0.3	F	6.330	18.2	83	515	8	117	.024	N	N	100	N	N	N	N	gossan w/20% py
3	7S632	.5	S	N	.3	21	152	3	14	—	—	—	—	—	—	—	—	diorite and slate w/po,py
3	7S633	.1	CH	N	.2	20	85	3	5	—	—	—	—	—	—	—	—	vein w/qz,biotite,plag,py,po
4	7W1757	1.0	CR	N	1.1	60	270	12	—	—	—	—	—	—	—	—	—	fest diorite w/sulf
5	7W1758	.5	CR	.068	.7	192	190	6	—	—	—	—	—	—	—	—	—	diorite w/sulf
6	7S636	3.0	CR	N	.1	75	7	5	2	—	—	—	—	—	—	—	—	zone of garnets,calc,qz
7	7S634	2.0	CR	N	.4	78	192	6	18	—	—	—	—	—	—	—	—	diorite and marble w/py,po
7	7W1761	1.0	G	N	.4	66	230	4	—	—	—	—	—	—	—	—	—	greenstone w/qz veinlets and py
8	7S635	2.0	CR	N	.9	28	87	5	9	—	—	—	—	—	—	—	—	skarn zone w/qz,po,py
8	7W1759	—	S	N	.4	19	72	7	—	—	—	—	—	—	—	—	—	sulf rich zone in diorite
8	7W1760	—	Soil	N	.3	78	77	2	—	—	—	—	—	—	—	—	—	

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-22.—Shannon prospect (fig. A-53)

Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
7S616	1.0	RC	N	—	92	189	N	3	—	—	—	—	—	—	—	—	skarn zone,garnets,hornblende, po
7S617	2.0	CR	N	—	600	158	17	2	—	—	—	—	—	—	—	—	fe gossan
7S618	—	CR	N	—	415	720	5	141	—	—	—	—	—	—	—	—	skarn zone,hornblende w/py,po
7S619	.2	CR	N	—	134	205	2	2	—	—	—	—	—	—	—	—	hornblende-garnet skarn w/po
7W1737	5.0	G	N	0.7	19	134	N	1	—	—	—	—	—	—	—	—	gossan in diorite
7W1738	—	S	0.068	1.3	19	56	3	1	—	—	—	—	—	—	—	—	white crystals in leached pocket w/gossan
7W1739	1.5	G	.068	1.3	20	370	N	4	—	—	—	—	—	—	—	—	yellow gossan
7W1740	.5	G	N	1.2	21	3400	N	245	—	—	—	—	—	—	—	—	py w/fest diorite

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-23.—Results of reconnaissance and channel placer sampling in the Porcupine mining area (fig. A-2)

Sample No.	Drainage	Sample type	Sample size (yd^3)	Grade (oz/yd^3Au)	Comments[1]
1	Big Boulder	Sluice	0.1	trace[2]	Alluvial gravel. Fair sample location.
2	do	do	0.1	trace	Do.
3	Little Boulder	do	0.1	trace	Do.
4	Tributary of Chilkat River	do	0.1	trace	Do.
5	do	do	0.1	trace	Alluvial fan. Fair sample location.
6	Jarvis Glacier	do	0.1	none	Alluvial gravel. Fair sample location.
7	Little Jarvis Glacier	do	0.1	trace	Do.
8	Glacier	do	0.1	trace	Do.
9	Porcupine	do	0.1	trace	Alluvial bar. Fair sample location.
10	Klehini	do	0.1	trace	Alluvial fan. Fair sample location.
11	do	do	0.1	trace	Alluvium. Fair sample location.
12	Glacier	do	0.1	trace	Do.
13	do	do	0.1	trace	Do.
14	do	do	0.1	trace	Do.
15	Christmas	Pans	0.05	0.0510	Bedrock. Excellent sample location.
16	do	Sluice	0.1	0.0260	Alluvial gravel on bedrock. Excellent sample location.
17	Christmas	Sluice	0.1	0.0102	Alluvial gravel. Good sample location.
18	do	do	0.1	0.0030	Alluvial gravel on bedrock. Good sample location.
19	Glacier	do	0.1	none	Alluvium. Fair sample location.
20	do	do	0.1	none	Alluvium and till. Fair sample location.
21	do	do	0.1	none	Alluvium. Fair sample location.
22	Marble	Hydraulic concentrator	0.1	none	Do.
23	Porcupine	do	0.1	0.0011	Alluvial fan material. Fair sample location.
24	do	do	0.1	0.0032	Do.
25	do	do	0.1	0.0017	Alluvial fan material. Poor sample location.
26	do	Sluice	0.1	trace	Alluvium. Fair sample location.
27	do	do	0.1	trace	Do.
28	do	Hydraulic concentrator	0.1	trace	Alluvium. Good sample location.
29	do	do	0.1	0.0020	Do.
30	do	do	0.1	0.0109	Do.
31	do	do	0.1	trace	Do.
32	do	do	0.1	0.0273	Alluvium on a bench. Excellent sample location.
33	Porcupine	Hydraulic concentrator	0.1	0.0181	Alluvium on a bench. Excellent sample location.
34	do	do	0.1	0.0062	Do.
35	do	do	0.1	0.0580	Do.
36	do	do	0.1	0.0421	Do.
37	do	do	0.1	trace	Bench alluvium. Excellent sample location.
38	do	do	0.1	0.0081	Do.
39	do	do	0.1	0.0040	Alluvium. Good sample location.
40	do	do	0.1	0.0052	Do.
41	do	do	0.1	0.0014	Do.
42	do	do	0.1	0.0004	Alluvium on bench. Good sample location.
43	do	do	0.1	trace	Do.
44	do	do	0.1	trace	Do.
45	do	do	0.1	0.0013	Do.
46	do	do	0.1	trace	Do.
47	do	do	0.1	0.0092	Do.
48	do	do	0.1	0.0017	Do.
49	do	do	0.1	0.0012	Do.
50	Porcupine	Hydraulic concentrator	0.1	0.0065	Alluvium on a bench. Good sample location.
51	do	do	0.1	0.0015	Do.
52	do	Sluice	0.1	0.0008	Stream alluvium. Fair sample location.

See footnotes at end of table.

Table A-1-23.—Results of reconnaissance and channel placer sampling in the Porcupine mining area (fig. A-2)—Continued

Sample No.	Drainage	Sample type	Sample size (yd^3)	Grade ($oz/yd^3 Au$)	Comments[1]
53	do	Hydraulic concentrator	0.1	0.0035	Alluvium on a bench. Good sample location.
54	do	do	0.1	0.0162	Do.
55	do	do	0.1	0.0373	Alluvium. Good sample location.
56	do	do	0.1	0.0222	Do.
57	do	do	0.1	0.0123	Do.
58	do	do	0.1	0.0013	Do.
59	do	do	0.1	0.0095	Duplicate of sample No. 56.
60	do	do	0.1	0.0007	Alluvium. Good sample location.
61	do	do	0.1	0.0144	Alluvium on bench. Good sample location.
62	do	do	0.1	0.0210	Do.
63	do	do	0.1	0.0069	Do.
64	do	Pan	NA	NA	Bench. Gold on bedrock.
65	do	Hydraulic concentrator	0.1	0.0161	Bench alluvium. Excellent sample location.
66	do	do	0.1	0.0420	Do.
67	Porcupine	Hydraulic concentrator	0.1	none	Alluvium and colluvium on bench. Good sample location.
68	do	do	0.1	trace	Do.
69	do	do	0.1	0.0005	Alluvium on bench. Good sample location.
70	do	do	0.1	0.0014	Do.
71	do	do	0.1	0.0139	Alluvium on bench. Excellent sample location.
72	do	do	0.1	0.0132	Do.
73	do	(3) Pans	NA	NA	Do.
74	do	Hydraulic concentrator	0.1	trace	Bench alluvium. Good sample location.
75	do	do	0.1	trace	Do.
76	do	do	0.1	trace	Do.
77	do	Sluice	0.1	0.0027	Alluvial bar. Good sample location.
78	do	Hydraulic concentrator	0.2	trace	Alluvium on bench. Poor sample location.
79	do	Sluice	0.1	trace	Alluvium on bench. Fair sample location.
80	do	do	0.1	0.0041	Alluvial bar. Fair sample location.
81	do	do	0.1	trace	Alluvial bar. Poor sample location.
82	Tributary of McKinley	Pans	0.04	0.0081	Alluvium on bedrock. Excellent sample location.
83	McKinley	Sluice	0.1	0.0035	Alluvial bar. Fair sample location.
84	McKinley	Sluice	01	0.0099	Alluvium on bedrock. Good sample location.
85	do	do	0.1	trace	Colluvium on bedrock. Poor sample location.
86	do	do	0.1	0.0539	Alluvium on bedrock. Excellent sample location.
87	do	do	0.1	0.0094	Alluvial bar. Good sample location.
88	do	do	0.1	0.0009	Alluvium on bench. Good sample location.
89	do	do	0.1	0.0162	Do.
90	McKinley	do	0.1	0.0014	Alluvial bar. Fair sample location.
91	do	Pan	NA	NA	Gold from quartz vein.
92	do	Sluice	0.1	0.0057	Alluvial bar. Good sample location.
93	do	do	0.1	0.0006	Alluvium and bedrock. Good sample location.
94	do	do	0.1	trace	Alluvial bar. Fair sample location.
95	do	do	0.1	trace	Alluvium and colluvium. Poor sample location.
96	do	do	0.1	trace	Do.
97	do	do	0.1	0.0007	Do.
98	do	do	0.1	trace	Do.
99	Cahoon	do	0.1	0.0450	Alluvium on bedrock. Good sample location.
100	do	do	0.1	0.0020	Alluvium and colluvium. Fair sample location.
101	Cahoon	Pans	003	trace	Alluvium and colluvium. Fair sample location.
102	do	Sluice	0.1	trace	Alluvium and colluvium. Good sample location.
103	do	do	0.1	trace	Alluvium on bedrock. Good sample location.
104	do	do	0.1	0.0006	Do.
105	do	do	0.1	none	Alluvium and colluvium. Fair sample location.

See footnotes at end of table.

Table A-1-23.—Results of reconnaissance and channel placer sampling in the Porcupine mining area (fig. A-2)—Continued

Sample No.	Drainage	Sample type	Sample size (yd^3)	Grade (oz/yd^3Au)	Comments[1]
106	do	do	0.1	none	Do.
107	do	do	0.1	trace	Do.
108	Tributary of Porcupine	do	0.1	none	Do.
109	Porcupine	do	0.1	trace	Alluvial bar. Good sample location.
110	do	do	0.1	none	Alluvium and colluvium. Fair sample location.
111	do	do	0.1	none	Do.
112	do	do	0.1	none	Alluvium and till. Fair sample location.
113	Cottonwood	do	0.1	trace	Alluvium. Good sample location.
114	do	do	0.1	0.0005	Alluvium in fan. Good sample location.
115	do	do	0.1	trace	Do.
116	Nugget	do	0.1	0.0138	Alluvial bar (till?). Poor sample location.
117	do	Pan	0.05	trace	Colluvium. Poor sample location.
118	Nugget	Sluice	0.2	trace	Alluvial fan. Poor sample location.
119	do	do	0.1	trace	Alluvium. Fair sample location.
120	do	do	0.1	trace	Alluvium on bedrock. Poor sample location.
121	do	do	0.1	trace	Do.
122	do	Pans	0.1	0.0006	Alluvium on bedrock. Fair sample location.
123	do	Sluice	0.1	0.0007	Do.
124	do	Rock	NA	NA	Calcite vein.
125	do	Sluice	0.1	0.0006	Alluvium and colluvium. Fair sample location.
126	do	do	0.1	trace	Do.
127	Little Salmon	do	0.1	trace	Alluvial bar. Fair sample location.
128	do	do	0.1	trace	Bench gravel on gray clay. Good sample location.
129	do	do	0.1	trace	Alluvial bar. Fair sample location.
130	Salmon	do	0.1	trace	Do.
131	do	do	0.1	none	Alluvial bar. Poor sample location.
132	Summit	Pans	0.025	none	Alluvium on bedrock. Poor sample location.

NA—Not applicable.

[1] Comments include a description of the geology of the sample site and an evaluation of the site based on the following criteria:

Excellent: Bedrock reached, little water in hole. Good location for gold to accumulate. Likely high graded sample in excess of average value of gravels in immediate area.

Good: Bedrock reached, may have water in hole, fair to good area for gold to accumulate. Likely representative of value of gravels in immediate area.

Fair: Bedrock not reached and/or poor location for gold to accumulate. May underestimate value of gravels in immediate area.

Poor: Bedrock not reached and water in hole. Bad location for gold to accumulate. Likely underestimates value of gold.

[2] Trace—less than 0.0001 oz/yd^3 Au recovered.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton) Au	Pt	Pd	Analyses[3] (units as shown) Ag	Cu ppm	Fe %	V ppm	Ti %	Comments
					(fig. A-65)						
1	J82-289 2S078	PC	L0.0003	L0.002	L0.002	L0.003	115	19.00	1272	1.32	
	J82-290 2S079	SS	L0.0003	L0.002	L0.002	L0.003	58	6.20	320	0.84	
2	J81-1049 1S185	SS	L0.0002	L0.0009	L0.0009	L0.0009	77	7.00	300	0.60	
	J81-1050 1S186	PC	L0.0002	L0.0009	L0.0009	0.008	43	—	—	—	
3	J82-808 2S270	PC	L0.0001	L0.001	L0.001	—	—	—	—	—	
	J82-809 2S271	SS	L0.0002	L0.0003	L0.0003	0.006	57	2.75	397	2.16	
4	J82-806 2S268	PC	0.0002	L0.001	L0.001	—	—	—	—	—	
	J82-807 2S269	SS	L0.0002	L0.0003	L0.0003	0.006	79	2.60	332	1.63	
5	J81-180 1S033	SS	—	—	—	L0.003	79	L10.00	940	0.60	
	J81-181 1S034	Float	0.000*	L0.001	L0.001	L0.003	12	G10.00	2370	1.00	Mag pyroxenite boulder
	J81-182 1S035	Float	0.000*	0.001	0.001	L0.003	61	10.00	795	0.70	Pyroxenite
6	J82-868 20889	PC	L0.001	L0.001	L0.001	—	—	—	—	—	
	J81-1051 1S187	SS	L0.0003	L0.0009	L0.0009	0.017	83	—	—	—	
	J81-1052 1S189	PC	L0.0002	0.0009	L0.0009	L0.0009	42	—	—	—	
7	J82-869 20890	PC	0.0035	L0.001	L0.001	—	—	—	—	—	
	J82-870 20891	SS	L0.0004	L0.0006	L0.0006	—	—	—	—	—	
8	J82-871 20439	PC	0.0018	L0.001	L0.001	—	—	—	—	—	
	J82-872 20440	SS	L0.0002	L0.0003	L0.0003	—	—	—	—	—	
					South Canyon (figs. A-65, A-67)						
9	J82-700 2S165	SS	L0.0002	L0.0003	L0.0003	0.006	99	1.60	287	0.90	
10	J82-699 2S164	Float grab	0.077	L0.0003	L0.0003	0.408	10200	1.00	174	0.51	Diorite with 0.01 ft thick fracture filled with cp and bn
11	J82-698 2S163.	Float grab	0.012	L0.0003	L0.0003	0.111	7400	1.30	156	0.44	Diorite fracture coated with ml and cp
12	J82-697 2S162	SS	0.000*	L0.0003	L0.0003	0.006	106	1.20	190	1.16	
13	J82-696 2S161	Float grab	L0.0002	L0.0003	L0.0003	0.029	2300	2.80	440	1.56	Hnbd diorite with ml stain and cp
14	J82-695 2S160	Float grab	0.019	L0.0003	L0.0003	0.087	6000	2.70	400	1.28	Diorite with ml stain and cp
15	J82-689 2S154	Float grab	0.156	L0.0003	L0.0003	0.437	24600	1.15	165	0.52	Granodiorite with bn and az coating fractures

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton) Au	Pt	Pd	Analyses[3] (units as shown) Ag	Cu ppm	Fe %	V ppm	Ti %	Comments
South Canyon (figs. A-65, A-67)—Continued											
	J82-692 2S157	Float grab	0.035	L0.0003	L0.0003	0.102	29500	1.30	30	0.05	Qtz diorite with az and cp coating fractures
	J82-693 2S158	PC	L0.0001	L0.001	L0.001	—	—	—	—	—	
	J82-694 2S159	SS	L0.0002	L0.0003	L0.0003	—	—	—	—	—	
16	J82-690 2S155	PC	0.0015	L0.0003	L0.0003	—	—	—	—	—	
	J82-691 2S156	PC	L0.0001	L0.0003	L0.0003	—	—	—	—	—	
17	J82-902 20893	Float grab	0.004	L0.001	L0.001	0.108	6050	2.55	362	1.14	Near in place, diorite with ml and bn in mafic segregations
18	J82-900 20768	Float grab	L0.0002	L0.0003	L0.0003	0.006	16	1.75	134	0.13	Iron-stained altered siltstone with calc and qz stringers and veinlets
Canyon 9 (figs. A-65, A-67)											
19	J81-1047 1S183	SS	0.003	0.002	L0.0009	L0.0009	105	7.00	300	0.6	
	J81-1048 1S184	PC	L0.0002	L0.0009	L0.0009	0.003	71	7.00	300	0.4	
	J82-288 2S077	SS	L0.0002	L0.0009	L0.0009	L0.003	145	5.40	240	0.8338	
20	J82-287 2S076	Float grab	L0.0002	L0.0009	L0.0009	L0.003	105	3.00	127	0.3856	Diorite with disseminated po
21	J82-286 2S075	Float grab	L0.0002	L0.0009	L0.0009	0.006	1700	6.30	173	0.1871	Silicified diorite with disseminated po and cp
	J82-285 2S074	SS	L0.0002	L0.0009	L0.0009	0.003	100	5.30	226	0.7146	
22	J82-284 2S073	PC	L0.0002	L0.0009	L0.0009	L0.003	72	6.70	306	0.6693	
23	J82-283 2S072	Float grab	L0.0002	L0.0009	L0.0009	L0.003	205	0.29	L10	0.0120	Qz vein 0.3 ft thick with ml stain
24	J82-282 2S071	Float grab	0.002	L0.0009	L0.0009	0.041	2200	5.90	480	0.2238	Iron-stained diorite with disseminated po and cp
25	J82-281 2S070	SS	L0.0002	L0.0009	L0.0009	L0.003	165	6.50	313	0.9397	
26	J82-280 2S069	PC	L0.0002	0.0021*	0.0022*	L0.003	91	7.80	360	0.8072	
27	J82-279 2S068	Float grab	0.002	L0.0009	L0.0009	0.012	4000	7.60	240	0.8258	Fine grained diorite rock with disseminated po and cp
28	J82-278 2S067	Chip 0.1 ft	L0.0002	L0.0009	L0.0009	L0.003	9	0.54	L10	0.560	Qz vein in fault
	J82-277 2S066	Chip 0.1 ft	L0.0002	L0.0009	L0.0009	L0.003	27	4.15	100	0.4262	Fault gouge
29	J82-276 2S065	Chip 0.4 ft	L0.0002	L0.0009	L0.0009	L0.003	110	4.20	120	0.4509	Fault gouge and iron-stained diorite
30	J82-275 2S064	PC	L0.0002	L0.0009	L0.0009	L0.003	88	6.00	220	0.4749	

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton) Au	Pt	Pd	Analyses[3] (units as shown) Ag	Cu ppm	Fe %	V ppm	Ti %	Comments
			Canyon 9 (figs. A-65, A-67)—Continued								
31	J82-899 20767	Grab	L0.0002	L0.001	L0.001	0.006	28	0.55	20	0.050	Fine grained "aplitic" rock with less than 3% mafics
			Area east of Canyon 9 (figs. A-67, A-68)								
32	J82-291 2S080	PC	L0.0003	L0.002	L0.002	L0.003	29	39.20	2271	1.0800	
	J82-292 2S081	SS	L0.0003	L0.002	L0.002	L0.003	49	14.00	793	0.9797	
33	J82-293 2S082	PC	L0.0004	L0.002	L0.002	L0.003	25	39.30	2284	1.2190	
	J82-294 2S083	SS	L0.0003	L0.002	L0.002	L0.003	37	7.40	386	0.9557	
	J82-799 2S261	PC	L0.0001	L0.001	L0.001	—	—	—	—	—	
	J82-800 2S262	SS	L0.0002	L0.0003	L0.0003	0.006	44	1.90	339	2.00	
34	J82-801 2S263	PC	L0.0002	L0.001	L0.001	—	—	—	—	—	
	J82-802 2S264	SS	—	—	—	0.006	31	1.35	376	2.09	
35	J82-803 2S265	SS	L0.0008	L0.001	L0.001	—	—	—	—	—	
36	J82-804 2S266	PC	0.0003	L0.001	L0.001	—	—	—	—	—	
	J82-805 2S267	SS	L0.0002	L0.0003	L0.0003	0.006	29	4.20	575	1.84	
			Upper portions of Canyons 8, 7, and 6 (figs. A-67, A-68)								
37	J82-897 20765	Grab	L0.0002	L0.0003	L0.0003	0.015	1000	5.60	220	1.89	Porphyritic hnbd pyroxenite with trace cp
	J82-898 20766	Float grab	L0.0002	L0.0003	L0.0003	0.006	960	4.55	276	1.86	Mag, pyx, hornblendite with ml and traces of cp, near in place
38	J82-295 2S084	Grab	L0.0003	L0.002	L0.002	L0.003	31	16.80	1379	1.5112	Hnbd pyroxenite and mag
39	J82-296 2S085	PC	L0.0003	L0.002	L0.002	L0.003	135	18.00	1272	1.2308	
	J82-297 2S086	Float grab	L0.0003	L0.002	L0.002	L0.003	170	11.60	1112	1.2967	Fragments of hnbd pyroxenite and mag
	J82-298 2S087	Float grab	L0.0003	L0.002	L0.002	L0.003	145	20.30	2031	1.9167	Hnbd pyroxenite ml stained and mag
	J82-299 2S088	Float grab	L0.0003	L0.002	L0.002	L0.003	150	21.00	2111	2.1072	Hnbd pyroxenite and mag
40	J82-889 20757	Float grab	L0.0002	L0.0003	L0.0003	0.006	69	1.45	206	0.79	Near in place coarse grained diorite
41	J81-1194 1D095	Grab	L0.0002	L0.001	L0.001	L0.20	115	G10.00	800	0.6	
42	J82-890 20758	Float grab	L0.0002	L0.0003	L0.0003	0.006	89	2.35	242	0.81	Near in place rock containing 20% qz,30% feldspar, 40% pyx

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton)			Analyses[3] (units as shown)					Comments
			Au	Pt	Pd	Ag	Cu ppm	Fe %	V ppm	Ti %	
			Upper portions of Canyons 8, 7, and 6 (figs. A-67, A-68)—Continued								
42	J81–1195 1D097	Grab	L0.0002	L0.001	L0.001	L0.20	690	G10.00	800	0.70	Hnbd pyroxenite with ml staining
43	J82–891 20759	Grab	0.001	L0.0003	L0.0003	0.006	1650	4.15	330	2.20	Mag pyroxenite from contact with diorite/gabbro
44	J82–896 20764	Float grab	L0.0002	L0.0003	L0.0003	0.058	440	3.65	410	0.85	Near in place rubble crop of iron stained zone showing carbonate alteration
45	J82–895 20763	Chip 20 ft	L0.0002	L0.0003	L0.0003	0.006	705	4.90	425	1.90	Hnbd pyroxenite with traces of ml and cp
46	J81–1041 1S177	Grab	0.003	L0.001	L0.001	L0.200	1550	8.00	500	0.60	Hnbd pyroxenite with mag, cp, and ml, forms iron-stained band up to 20 ft across
	J81–1042 1S178	Grab	L0.0002	L0.001	L0.001	L0.200	175	8.00	500	0.50	Same band as above, hnbd pyroxenite and mag
47	J81–1035 1S171	Grab .04 ft	—	—	—	L0.200	62000	10.00	500	0.60	Same band as above, cp vein in hnbd pyroxenite
	J81–1036 1S172	Grab	0.003	L0.001	L0.001	L0.200	6500	8.00	500	0.80	Same band as above, higher grade
	J81–1037 1S173	Rep chip 10 ft long	L0.0002	L0.001	L0.001	L0.200	3500	8.00	500	0.60	Same band as above, sample taken across band
	J81–1038 1S174	Grab	L0.0002	L0.001	0.003	L0.200	1850	8.00	500	0.70	Sample taken 50 ft below 1S173; po, cp, and ml in hnbd pyroxenite
	J81–1039 1S175	0.5 ft chip 5 ft long	L0.0002	L0.001	L0.001	L0.200	18000	7.00	400	0.60	Same band as above, higher grade portions, po,cp,ml in hnbd pyroxenite
	J81–1040 1S176	Soil sample	0.002	L0.001	L0.001	0.020	530	7.00	500	0.4	Same band as above, iron-stained soil
48	J82–828 20842	Float grab	0.001*	L0.0003	L0.0003	0.012	880	5.15	397	1.93	Mag pyroxenite with ml and disseminated cp, near in place
49	J82–734 2S198B	Grab	L0.0002	L0.0003	L0.0003	0.006	32	5.85	1040	1.84	Hnbd pyroxenite
	J82–735 2S199	Grab	L0.0002	L0.0003	L0.0003	0.006	490	5.65	890	2.03	Hnbd pyroxenite with disseminated cp
	J82–736 2S200	Grab	L0.0002	L0.0003	L0.0003	0.006	358	6.35	950	2.04	Hnbd pyroxenite with disseminated cp, ml, and mag
	J82–827 20841	Grab	0.003	L0.0003	L0.0003	0.017	990	5.80	450	2.74	Mag pyroxenite with ml and cp
			Canyon 6 (fig. A-68)								
50	J82–875 20451	SS	L0.0004	L0.0006	L0.0006	—	—	—	—	—	
51	J82–232 2S022	Float grab	L0.0002	L0.0009	L0.0009	0.009	980	5.60	942	1.21	Hnbd pyroxenite with bleb of cp
52	J82–881 20457	SS	L0.0002	L0.0003	L0.0003	—	—	—	—	—	

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton)			Analyses[3] (units as shown)					Comments
			Au	Pt	Pd	Ag	Cu ppm	Fe %	V ppm	Ti %	
					Canyon 6 (fig. A-68)—Continued						
52	J82-882 20458	Float grab	L0.0002	L0.0003	L0.0003	0.012	1010	4.90	605	1.51	Hnbd mag pyroxenite with traces of ml and cp, sample high-graded
53	J82-876 20452	SS	L0.0004	L0.0006	L0.0006	—	—	—	—	—	
	J82-877 20453	Float grab	0.001	L0.0003	L0.0003	0.41	2800	3.05	385	1.10	Gabbro with trace of cp, ep, and ml
53	J82-884 20460	Float grab	L0.0002	L0.0003	L0.0003	0.006	470	2.55	415	1.30	Pyx "segregations" bearing calc and cp in foliated gabbro, high-graded
54	J82-883 20459	Float grab	0.001*	L0.0003	L0.0003	0.020	1590	5.50	695	2.55	Mag hnbd pyroxenite with trace ml and cp. Sample high-graded
55	J82-878 20454	SS	L0.0004	L0.0006	L0.0006	—	—	—	—	—	
56	J82-885 20461	Float grab	0.001	L0.0003	L0.0003	0.012	1400	7.65	870	2.01	Mag hnbd pyroxenite with trace cp and ml. Sample high-graded
57	J82-879 20455	SS	L0.0004	L0.0006	L0.0006	—	—	—	—	—	
	J82-880 20456	Grab	L0.0002	L0.0003	L0.0003	0.006	206	2.85	376	1.04	Gabbro
					Canyon 5 (fig. A-68)						
58	J81-1045 1S181	PC	L0.0002	L0.001	L0.001	L0.0009	125	10.00	600	0.06	
	J81-1046 1S182	SS	L0.0002	L0.001	L0.001	0.003	225	8.00	400	0.04	
59	J82-244 2S034	Float grab	L0.0003	L0.002	L0.002	0.015	500	15.40	1098	1.18	Hnbd mag pyroxenite and ml and cp
60	J82-242 2S032	SS	L0.0003	L0.002	L0.002	L0.003	210	11.20	743	0.99	
	J82-243 2S033	PC	L0.0003	L0.002	0.00072	0.003	130	23.50	1538	1.43	
61	J82-241 2S031	PC	L0.0003	L0.002	L0.002	0.003	160	24.50	1449	1.24	
62	J82-239 2S029	Float grab	L0.0003	L0.0009	L0.0009	0.006	640	7.00	936	1.07	Hnbd pyroxenite with cp and ml stain
62	J82-240 2S030	SS	L0.0003	L0.0009	L0.0009	0.032	155	4.10	644	0.99	
63	J82-230 2S020	PC	L0.0003	L0.0009	L0.0009	L0.003	150	9.00	1573	1.38	
	J82-231 2S021	Float grab	0.003	L0.0009	L0.0009	0.012	525	6.00	954	1.05	Hnbd pyroxenite with disseminated cp and ml
	J82-237 2S027	SS	L0.0003	L0.0009	L0.0009	0.003	215	4.20	656	0.98	
	J82-238 2S028	Float grab	L0.0003	L0.0009	L0.0009	0.026	2500	4.60	432	0.79	Gabbro with cp and ml

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton) Au	Pt	Pd	Ag	Analyses[3] (units as shown) Cu ppm	Fe %	V ppm	Ti %	Comments
			Canyon 5 (fig. A-68)—Continued								
64	J82-236 2S026	Float grab	0.005	L0.0009	L0.0009	0.015	1750	6.60	930	1.08	Hnbd pyroxenite with cp and ml
65	J82-233 2S023	Float grab	L0.0003	L0.0009	L0.0009	0.009	1850	4.60	819	1.17	Hnbd pyroxenite with bleb of cp
	J82-235 2S025	Float grab	0.003	L0.0009	L0.0009	0.012	880	6.60	999	1.13	Hnbd pyroxenite with ml stain
66	J82-234 2S024	SS	L0.0003	L0.0009	L0.0009	0.003	245	4.20	729	0.97	
67	J82-262 2S051	Rep grab	L0.0003	L0.002	L0.002	0.006	1250	10.30	533	0.74	Pyroxenite-diorite contact zone. Iron-stained hnbd diorite with disseminated po, cp
68	J82-260 2S049	Float grab	L0.0003	L0.002	L0.002	0.009	800	14.00	1192	1.13	Hnbd pyroxenite with po, cp
	J82-261 2S050	Grab	L0.0003	L0.002	L0.002	L0.003	20	11.70	979	1.29	Hornblendite with po
69	J82-259 2S048	SS	L0.0003	L0.002	L0.002	L0.003	115	10.80	1032	1.10	
70	J82-255 2S044	Float grab	L0.0003	L0.002	L0.002	0.012	955	14.20	1005	1.17	Hnbd pyroxenite with cp alteration along fracture which contains ml stain and cp
	J82-256 2S045	Grab	L0.0003	L0.002	L0.002	0.003	730	12.70	1324	1.14	Hnbd pyroxenite with ml stain and cp
	J82-257 2S046	PC	L0.0003	L0.002	L0.002	0.003	135	23.60	2204	1.37	
70	J82-258 2S047	Float grab	L0.0003	L0.002	L0.002	L0.006	560	14.00	1305	1.24	Iron-stained hnbd pyroxenite boulder with mag
			Canyon 4 (fig. A-68)								
71	J82-716 2S181	Float grab	L0.0002	L0.003	L0.003	0.009	450	5.40	995	1.03	Hnbd pyroxenite with disseminated cp
72	J82-273 2S062	0.25 ft Chip 6 ft long	L0.0002	L0.0009	L0.0009	L0.003	395	7.10	420	0.688	Banded hnbd diorite with po and cp
	J82-274 2S063	Grab	L0.0002	L0.0009	L0.0009	L0.003	425	9.40	460	0.708	Higher grade portion of above sample
	J82-715 2S180	Float grab	L0.0002	L0.0003	L0.0003	0.006	405	1.60	520	1.32	Hnbd diorite with ep and cp
73	J82-272 2S061	Float grab	L0.0002	L0.0009	L0.0009	L0.003	850	5.00	253	0.5475	Diorite with ml stain
73	J82-712 2S177	Float grab	L0.0002	L0.0003	L0.0003	0.023	1130	1.25	212	0.57	Diorite with ml stain and cp
	J82-713 2S178	PC	L0.0001	L0.001	L0.001	—	—	—	—	—	
	J82-714 2S179	Grab	L0.0002	L0.0003	L0.0003	0.006	27	2.70	445	0.89	Hnbd gabbro with ep
74	J82-271 2S060	1 ft Chip 20 ft long	L0.0003	L0.002	L0.002	0.003	13	46.20	2837	2.89	Massive magnetite
	J82-857 20877	Rep grab	L0.0002	L0.0003	L0.0003	0.006	43	7.15	1300	5.65	Massive magnetite
75	J82-270 2S059	Float grab	L0.0003	L0.002	L0.002	L0.003	8	21.30	1598	1.55	Iron-stained hnbd pyroxenite

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton)				Analyses[3] (units as shown)				Comments
			Au	Pt	Pd	Ag	Cu ppm	Fe %	V ppm	Ti %	
					Canyon 4 (fig. A-68)—Continued						
76	J82-268 2S057	Float grab	L0.0003	L0.002	L0.002	0.012	410	12.40	946	0.87	Pyroxenite with ml stain and cp
	J82-269 2S058	Grab	L0.0003	L0.002	L0.002	0.003	230	10.40	852	1.01	Ep along fracture in pyroxenite with py and cp
	J82-858 20878	Rep grab	L0.0002	L0.003	L0.003	0.006	13	G10.00	620	2.23	Hnbd pyroxenite with 10-15% mag
77	J82-726 2S191	SS	L0.0002	L0.003	L0.003	—	—	—	—	—	
78	J82-267 2S056	Float grab	L0.0003	L0.002	L0.002	0.003	82	5.55	413	0.61	Diorite with ml stain
79	J82-263 2S052	PC	L0.0003	L0.002	L0.002	0.087	24	33.50	2611	1.89	
	J82-264 2S053	Float grab	L0.0003	L0.002	L0.002	0.012	820	11.80	1332	1.35	Hnbd pyroxenite with ml stain and cp
	J82-265 2S054	0.25 ft chip 4 ft long	L0.0003	L0.002	L0.002	0.003	18	16.30	1585	1.26	Iron-stained mag pyroxenite
	J82-266 2S055	Float grab	L0.0003	L0.002	L0.002	0.017	1000	17.50	1865	1.49	Mag pyroxenite with ml stain and disseminated cp
80	J82-859 20879	Rep grab	0.0003	L0.003	L0.003	0.006	63	4.65	1120	3.25	Mafic to ultramafic dike rock, orange weathering with mag and carbonate stringers
81	J82-727 2S192	Rep grab	L0.0002	L0.0003	0.000*	0.017	1000	5.40	1030	1.81	Hnbd pyroxenite with cp
	J82-860 20880	Grab	L0.0002	L0.0003	L0.0003	0.052	3100	4.15	380	2.63	Higher grade hnbd pyroxenite with cp
					Ridge above Canyons 3, 4, 5 (figs. A-68, A-69)						
82	J82-888 20756	Grab	L0.0002	L0.0003	L0.0003	0.006	6	6.60	605	2.05	Pyroxenite
83	J82-887 20754	Grab	L0.0002	L0.0003	L0.0003	0.006	8	7.25	590	1.26	Pyroxenite
84	J82-894 20762	Grab	0.009	L0.0003	L0.0003	0.076	4000	1.35	264	0.84	Diorite with ml stain
85	J82-886 20753	Grab	L0.0002	L0.0003	L0.0003	0.006	142	1.65	246	0.95	Diorite with ep
86	J82-892 20760	Grab	L0.0002	L0.0003	L0.0003	0.006	185	0.80	57	0.24	Anorthosite dike
87	J82-893 20761	Grab	L0.0002	L0.0003	L0.0003	0.006	78	1.65	144	0.61	Medium gray quartzite?
88	J82-787 2S249	Grab	0.001	L0.0003	L0.0003	0.006	71	1.70	320	0.81	Hnbd diorite with ep,chl alteration
					Canyon 3 (figs. A-68, A-69)						
89	J82-861 20881	Grab	L0.0002	L0.0003	L0.0003	0.006	72	2.45	435	1.20	Hnbd gabbro with mag and po
	J82-862 20882	Grab	L0.0002	L0.0003	L0.0003	0.006	61	3.30	410	1.94	Basalt
90	J82-822 20835	Grab	0.003	L0.0003	L0.0003	0.006	90	3.25	318	1.19	3 ft wide mafic dike
91	J82-225 2S015	SS	L0.0003	L0.0002	L0.0002	L0.003	26	6.60	1184	1.04	

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton)				Analyses[3] (units as shown)				Comments
			Au	Pt	Pd	Ag	Cu ppm	Fe %	V ppm	Ti %	
						Canyon 3 (fig. A-69)—Continued					
92	J82-832 20847	Grab	L0.0003	L0.0003	L0.0003	0.006	255	1.95	295	1.40	Iron-stained gabbro with po
93	J82-224 2S014	SS	L0.0002	L0.0009	L0.0009	L0.003	27	10.60	1359	1.09	
94	J82-223 2S013	SS	L0.0002	L0.0009	L0.0009	L0.003	38	7.00	1047	0.95	
95	J81-1217 1S210	SS	L0.0002	L0.0009	0.0010*	L0.012	65	8.00	400	0.30	
	J81-1219 1S212	Float grab	L0.0032	0.001	00.002	L0.20	450	8.00	500	0.60	Hnbd pyroxenite with ml stain and cp
96	J82-222 2S012	SS	L0.0002	L0.0009	L0.0009	0.055	36	6.00	894	0.96	
97	J82-221 2S011	SS	L0.0003	L0.002	L0.002	0.003	52	5.20	757	0.95	
98	J82-220 2S010	Float grab	0.002	L0.0009	0.0024	0.085	495	7.20	1005	1.01	Hnbd pyroxenite with ml stain and cp
99	J82-218 2S008	Float grab	0.013	L0.0009	L0.0009	0.029	1000	8.00	1128	1.15	Do.
	J82-219 2S009	Float grab	L0.0003	L0.002	L0.002	0.003	23	18.40	1986	1.79	Mag pyroxenite
100	J82-217 2S007	SS	L0.0002	L0.0009	0.0010	0.003	47	4.10	745	0.82	
101	J82-867 20888	Float grab	L0.0004	L0.0006	L0.0006	0.006	18	G 10.00	2730	2.88	Chips of mag from 3000 ft elevation to 1500 ft elevation Canyon 3
102	J82-216 2S006	SS	L0.0002	L0.0009	L0.0009	0.003	41	5.20	877	0.85	
103	J82-214 2S004	SS	L0.0003	L0.002	L0.002	0.003	34	6.40	855	0.83	
	J82-215 2S005	Float grab	L0.0002	L0.0009	L0.0009	0.012	820	8.10	1042	1.04	Mag & pyroxenite with ml stain and cp
104	J82-843 20860	Float grab	0.001	L0.0003	L0.0003	0.015	2500	8.00	268	1.10	Mag pyroxenite with ml stain and cp
105	J82-213 2S003	SS	L0.0003	L0.002	L0.002	0.003	55	4.00	844	0.89	
106	J82-211 2S001	Grab	L0.0002	L0.0009	0.0018	0.012	700	8.60	1160	1.18	Mag pyroxenite with ml and cp
107	J82-212 2S002	Grab	0.0008	L0.0009	L0.0009	0.041	2500	7.65	1065	1.36	Brecciated pyroxenite with cp
108	J82-821 20834	Float grab	0.000*	0.001	L0.0003	0.006	21	7.60	800	1.61	Red weathering pyroxenite
109	J82-844 20861	Float grab	L0.0002	L0.0003	L0.0003	0.006	31	G 10.00	306	6.29	Mag rubble
110	J82-845 20862	Grab	L0.0002	L0.0003	L0.0003	0.006	109	3.25	344	1.35	Hnbd gabbro
111	J82-846	Grab	L0.0002	L0.0003	L0.0003	0.017	610	6.55	820	1.86	Hnbd pyroxenite with ml stain 20863 and cp
112	J82-869 20889	PC	—	—	—	—	—	—	—	—	
113	J82-866 20887	Grab	L0.0004	L0.0006	L0.0006	0.006	17	9.75	1386	1.61	Mag hnbd pyroxenite

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton) Au	Pt	Pd	Ag	Analyses[3] (units as shown) Cu ppm	Fe %	V ppm	Ti %	Comments
					Canyon 3 (fig. A-69)—Continued						
114	J82-850 20867	Chip	L0.0002	L0.0003	L0.0003	0.006	435	7.45	675	2.00	Hnbd pyroxenite with ml stain
115	J82-849 20866	Float grab	0.001	0.001*	0.001	0.009	910	7.60	845	1.96	Hnbd, mag pyroxenite with cp, ml,ep, and iron stain
116	J82-848 20865	Grab	L0.0002	L0.0003	L0.0003	0.006	840	6.70	815	4.80	Plag hornblendite with sulfides, iron, and ml stain
117	J82-865 20886	Grab	L0.0002	L0.0003	L0.0003	0.006	358	G10.00	655	1.70	Pyroxenite with ml stain and cp
118	J82-226 2S016	Soil sample	L0.0002	L0.0009	L0.0009	L0.003	22	6.40	905	1.00	
	J82-227 2S017	1 ft chip 15 ft long	L0.0002	L0.0009	L0.0009	0.003	11	6.40	938	0.99	Hnbd pyroxenite
119	J82-856 20876	Grab	L0.0002	L0.0003	L0.0003	0.006	86	2.50	465	1.64	Basalt with pyrrhotite
120	J82-830 20845	Float grab	L0.0002	L0.0003	L0.0003	0.006	129	4.20	410	1.66	Hydrothermally altered basalt
121	J82-776 2S228	Rep chip	L0.0002	L0.0003	L0.0003	0.006	295	3.80	286	0.99	Meta basalt
122	J81-179 1S032	Float grab	L0.0002	L0.001	L0.001	L0.2	110	7.00	420	0.60	Near in place basalt with po
	J82-765 2S227	Rep chip	L0.0002	L0.0002	L0.0003	0.006	78	3.05	565	2.76	Meta basalt
123	J82-764 2S226	Rep chip	L0.0002	L0.0003	L0.0003	0.006	19	0.95	273	0.52	Meta basalt
124	J82-763 2S225	Rep chip	L0.0002	L0.0003	L0.0003	0.006	65	1.35	317	1.65	Meta basalt
125	J82-762 2S224	Rep chip	L0.0002	L0.0003	L0.0003	0.006	174	3.95	500	2.66	Meta basalt with sulfides
					Canyon 2 (fig. A-69)						
126	J82-175 1S028	PC	0.000*	0.001*	L0.001	L0.200	82	G10.00	760	0.60	
	J82-176 1S029	SS	0.000*	0.001*	L0.001	L0.200	66	G10.00	900	0.80	
	J82-177 1S030	Float grab	0.000*	L0.001	L0.001	L0.200	9	2.00	140	0.08	Qz boulder with py and po
126 thru 147	J81-178 1S031	Float grab	0.000*	L0.002	L0.002	L0.200	21	G10.00	2540	0.80	Composite of mag float from 825 ft elevation to 1575 ft elevation in Canyon 2
					Canyon 2 (fig. A-69)						
127	J81-173 1S026	PC	L0.0002	L0.001	L0.001	L0.200	82	G10.00	1650	0.80	
	J81-174 1S027	SS	0.000*	L0.001	L0.001	L0.200	101	G10.00	740	0.70	
128	J81-171 1S024	SS	L0.0002	L0.001	L0.001	L0.200	84	G10.00	795	0.80	
	J81-172 1S025	Float grab	0.000*	L0.001	L0.001	L0.200	7	3.00	93	0.02	Qz boulder with sulfides
129	J81-170 1S023	SS	0.000*	0.001*	L0.001	L0.200	71	G10.00	801	0.70	
130	J82-670 2S135	Rep chip	L0.0002	L0.0003	L0.0003	0.006	54	2.35	300	1.29	Ep diorite

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton)			Analyses[3] (units as shown)					Comments
			Au	Pt	Pd	Ag	Cu ppm	Fe %	V ppm	Ti %	
North Side Canyon 2 (fig. A-69)											
131	J82-725 2S190	SS	L0.0002	L0.0003	0.001*	—	—	—	—	—	
132	J82-723 2S188	SS	L0.0002	L0.0003	0.001*	—	—	—	—	—	
	J82-724 2S189	Float grab	0.002	0.001	0.001	0.015	900	5.40	726	1.65	Hnbd pyroxenite with cp
	J82-229 2S019	SS	L0.0002	L0.0009	L0.0009	0.003	330	55.00	741	0.99	
	J82-669 2S134	Float grab	L0.0002	L0.0003	L0.0003	0.006	495	1.50	1020	1.82	Hnbd pyroxenite with cp
133	J82-228 2S018	SS	L0.0002	L0.0009	L0.0009	0.006	370	5.60	849	1.04	
	J82-722 2S187	Float grab	0.019	L0.0003	L0.001*	0.015	1020	4.70	1025	1.27	Fine grained pyroxenite with hem and cp
	J82-668 2S133	Float grab	L0.0002	L0.0003	L0.0003	0.006	410	6.80	1300	2.13	Pyroxenite with ml stain
134	J82-721 2S186	SS	L0.0002	L0.0003	L0.0003	—	—	—	—	—	
South Side Canyon 2 (fig. A-69)											
135	J82-823 20836	Random chip	L0.0002	L0.0003	L0.0003	0.012	1170	6.45	565	1.01	Mag hornblendite with ml stain & cp
136	J82-824 20837	Grab	L0.0002	0.001*	L0.0003	—	—	—	—	—	Mag hnbd pyroxenite with ml and cp
137	J82-847 20864	SS	L0.0004	L0.0006	L0.0006	—	—	—	—	—	
138	J82-825 20838	Grab	L0.0002	0.001*	L0.0003	0.006	341	7.40	480	1.64	Mag pyroxenite
139	J82-826 20839	Random chip	L0.0002	L0.0003	L0.0003	0.023	1230	7.45	685	2.03	Pyroxenite with ml stain
Canyon 2 (fig. A-69)											
140	J82-168 1S021	PC	0.000*	0.001*	0.002*	L0.200	66	G10.00	1230	1.6	
140	J82-169 1S022	SS	L0.0002	L0.001	L0.001	—	—	—	—	—	—
	J82-671 2S136	Rep chip	L0.0002	L0.0003	L0.0003	0.015	1250	3.40	625	2.02	Hnbd pyroxenite with ml and cp
141	J82-854 20874	Float grab	0.001	0.001*	0.000*	0.020	1340	7.20	710	2.16	Hnbd pyroxenite with ml
	J82-855 20875	Float grab	L0.0002	L0.0003	0.001*	0.015	1540	7.65	625	1.26	Hnbd pyroxenite with ml and cp
142	J81-166 1S019	High-grade grab	0.002	0.001*	0.001*	L0.200	11300	10.00	625	0.60	Pyroxenite with cp and ml
	J81-167 1S020	SS	L0.0002	0.001*	L0.001	L0.200	97	G10.00	815	0.80	
143	J82-672 2S137	PC	0.0003	L0.001	L0.001	—	—	—	—	—	
	J82-254 2S043	PC	L0.0003	L0.002	L0.002	0.003	36	43.50	269	1.55	

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton)				Analyses[3] (units as shown)				Comments
			Au	Pt	Pd	Ag	Cu ppm	Fe %	V ppm	Ti %	
						Canyon 2 Lower Copper Area (fig. A-69)					
144	J82-245 2S035	Random chip 100 ft long	L0.0003	L0.002	L0.002	0.006	540	18.50	1216	1.22	Mag hnbd pyroxenite with cp
	J82-246 2S036	Grab	L0.0003	L0.002	L0.002	0.012	850	13.70	1046	1.08	Mag hnbd pyroxenite with cp
	J82-247 2S037	Random grab 100 ft long	L0.0003	L0.002	L0.002	0.017	585	19.70	1305	1.26	Mag hnbd pyroxenite with cp
	J82-248 2S038	Float grab	L0.0003	L0.002	L0.002	0.017	730	16.50	1081	1.12	Mag hnbd pyroxenite with cp near in place
	J82-249 2S039A	Float grab	L0.0003	L0.002	L0.002	0.017	1100	16.20	1056	1.07	Mag hnbd pyroxenite with cp near in place
	J82-250 2S039B	Float grab	L0.0003	L0.002	L0.002	0.009	495	17.30	1183	1.17	Mag hnbd pyroxenite with bleb of cp
	J82-251 2S040	Random chip 175 ft long	L0.0003	L0.002	L0.002	0.009	950	14.80	1022	0.99	Mag pyroxenite with cp
	J82-810 2S272	Bulk 193 lb	0.0005	0.0010	—	0.018	850	25.50		1.54	Mag hnbd pyroxenite with cp
						Canyon 2 (fig. A-69)					
145	J81-164 1S017	SS	L0.0002	0.002*	L0.001	0.300	130	10.00	695	0.60	
145	J81-165 1S018	Float grab	0.010	0.031	0.001*	L0.200	2800	7.00	255	0.40	Hnbd gabbro with knot of cp
146	J82-252 2S041	Grab	L0.0003	L0.002	L0.002	0.023	1150	15.60	1092	0.98	Mag pyroxenite with ml stain & cp
	J82-253 2S042	Grab	L0.0003	L0.002	L0.002	0.023	870	15.90	995	1.0.	Mag pyroxenite with ml stain & cp
147	J81-161 1S014	Grab	0.000*	L0.001	L0.001	L0.200	455	2.00	231	0.20	Shear zone pinch and swell with calc, qz, and cp
147	J81-162 1S015	PC	L0.0002	0.001*	L0.001	L0.200	48	G10.00	1330	0.04	
	J81-163 1S016	SS	L0.0002	L0.001	L0.001	—	—	—	—	—	
148	J82-675 2S140	Grab	L0.0002	L0.0003	L0.0003	0.006	154	1.25	265	0.54	Schistose mafic xenolith ± 50 ft across
	J82-820 20833	Grab	L0.0002	L0.0003	L0.0003	0.006	305	0.50	37	0.14	Anorthosite cobble from within schistose mafic xenolith ± 50 ft across. Some cp, hem, and mag
	J82-851 20869	Grab	L0.0002	0.001*	L0.0003	0.006	183	1.45	191	0.71	Schistose mafic xenolith from above
149	J82-310 2S099	Float grab	L0.0002	L0.001	0.004	0.070	12500	3.50	333	0.49	Qz feldspar in pyroxenite with cp

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton)			Analyses[3] (units as shown)					Comments
			Au	Pt	Pd	Ag	Cu ppm	Fe %	V ppm	Ti %	
					Canyon 2 upper copper area (fig. A-69)						
150	J81-160 1S013	Float grab	0.001	L0.001	L0.001	L0.200	2150	G10.00	750	0.80	Hnbd pyroxenite with ml stain po and cp
	J82-710 2S175	SS	L0.0002	L0.0003	L0.0003	0.006	102	4.15	695	1.26	
	J82-711 2S176	Rep chip	L0.0002	L0.0003	L0.0003	0.006	22	G10.00	1630	3.12	Mag pyroxenite with hem
	J82-841 20858	PC	L0.0001	0.001	L0.001	—	—	—	—	—	
151	J81-158 1S012A	Rep chip	0.000*	L0.001	L0.001	L0.200	49	8.00	560	0.04	Iron-stained mafic dike
	J81-159 1S012B	Grab	L0.0002	L0.001	L0.001	L0.200	21	10.00	705	0.50	Fault gouge
	J82-759 2S221	Float grab	L0.0002	L0.0003	L0.0003	0.047	1530	9.50	2300	3.85	Mag pyroxenite with cp
	J82-760 2S222	Bulk high grade 189 lb	0.0017	L0.0003	—	0.017	1820	19.50		1.13	Bulk sample of hnbd pyroxenite with mag, cp, and ml, float and in place
152	J82-704 2S169	Float grab	L0.0002	L0.0003	L0.0003	0.006	331	5.70	100	1.43	Dunite
153	J82-709 2S174	Float grab	L0.0002	L0.0003	L0.0003	0.006	1500	4.75	875	2.63	Pyroxenite with cp
154	J82-708 2S173	Float grab	L0.0002	L0.0003	L0.0003	0.006	420	5.20	905	1.68	Coarse grained pyroxenite with mag and cp
155	J82-705 2S170	Chip 0.2 ft long	L0.0002	L0.0003	L0.0003	0.006	31	0.70	585	0.10	Anorthosite dike
	J82-706 2S171	Grab	L0.0002	L0.0003	L0.0003	0.006	14	8.50	1200	1.79	Mag pyroxenite
	J82-707 2S172	Float grab	L0.0002	L0.0003	L0.0003	0.006	730	4.35	855	1.80	Hnbd pyroxenite with cp
156	J82-853 20873	Float grab	0.001	L0.0003	L0.0003	0.006	840	2.80	116	2.40	Coarse grained hnbd pyroxenite with blebs of cp
157	J82-839 20856	Float grab	L0.0002	L0.0003	L0.0003	0.006	22	G10.00	310	3.94	Segregation of massive mag in hnbd pyroxenite
	J82-840 20857	Rep chip 100 sq ft	L0.0002	0.001*	L0.0003	0.006	289	5.95	600	1.71	Hnbd pyroxenite with some ml and cp
158	J82-719 2S184	Float grab	L0.0002	L0.0003	L0.0003	0.009	690	4.90	815	1.59	Pyroxenite with ml and cp
	J82-720 2S185	Chip 1 ft long	L0.0004	0.002	0.001*	0.026	2230	2.05	168	0.08	Qz feldspar vein with blebs of cp
159	J81-155 1S009	Grab	0.000*	L0.001	0.001*	L0.200	1770	10.00	560	0.30	Mag pyroxenite with po and cp at adit
	J81-156 1S010	Grab	0.000*	L0.001	L0.001	L0.200	16	G10.00	1910	0.80	Mag pyroxenite at adit
	J81-157 1S011	Chip 2.2 ft long	L0.0002	L0.001	L0.001	L0.200	190	5.00	410	0.02	Pegmatite pyroxenite at adit
160	J82-703 2S168	Random grab	L0.0002	L0.0003	L0.0003	0.006	105	1.70	320	0.46	Hnbd gabbro

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton) Au	Pt	Pd	Ag	Analyses[3] (units as shown) Cu ppm	Fe %	V ppm	Ti %	Comments
			Canyon 2 upper copper area (fig. A-69)—Continued								
161	J82–308 2S097	High-grade grab	L0.0004	0.014	0.011	0.143	41000	12.90	766	1.08	Pyroxenite with ep and cp
	J82–309 2S098	Grab	L0.000*	L0.001*	0.0003	0.015	950	11.70	1078	2.15	Pyroxenite with cp
162	J82–852 20871	Grab	L0.0002	L0.0003	L0.0003	0.006	17	5.45	127	1.34	Coarse grained hnbd pyroxenite with mag
163	J82–701 2S166	Chip 1.0 ft long	L0.0002	L0.0003	L0.0003	0.006	5	0.25	70	0.05	Anorthosite dike
	J82–702 2S167	Rep chip 5 ft long	L0.0004	L0.0006	L0.0006	0.006	15	G10.00	2000	4.07	Mag pyroxenite
164	J82–306 2S095	Float grab	L0.0002	L0.001	L0.001	0.012	1400	13.20	1193	1.32	Mag pyroxenite with cp
	J82–307 2S096	Float grab	0.001*	L0.002	L0.002	0.017	1000	21.50	2458	2.13	Mag pyroxenite with cp
165	J82–303 2S092	Grab	L0.0003	L0.002	L0.002	0.023	1500	14.10	1112	1.15	Mag pyroxenite with cp
	J82–304 2S093	Grab	L0.0002	0.001*	0.002*	0.003	490	12.90	1059	1.10	Mag pyroxenite with cp
	J82–305 2S094	Float grab	0.003	0.001*	0.001*	0.017	730	19.50	1885	1.67	Mag pyroxenite with cp
166	J82–302 2S091	Float grab	0.001*	L0.002	L0.002	0.012	430	26.30	2258	2.36	Mag hnbd pyroxenite with cp
			Canyon 1 (fig. A-69)								
167	J82–322 2S111	SS	L0.0002	0.001*	0.002*	L0.003	155	10.90	1096	1.23	
168	J82–321 2S110	SS	L0.0002	0.001*	0.002*	L0.003	150	16.30	1422	1.24	
169	J82–656 2S121	PC	L0.0001	L0.001	L0.001	—	—	—	—	—	
170	J82–337 2S120	SS	0.002	L0.0003	L0.0003	0.009	350	7.50	613	0.94	
171	J82–320 2S109	SS	L0.0002	L0.001	0.001	0.003	120	10.00	1015	1.12	
172	J82–717 2S182	High-grade bulk sample	0.0005	0.0003	—	0.018	1300	19.40	—	1.26	Near in place float, hnbd pyroxenite with cp
	J82–718 2S183	Float grab	L0.0004	0.001*	0.002	0.006	9	1.60	95	0.05	Gabbro with pyrite
	J82–657 2S122	PC	L0.0001	L0.001	L0.001	—	—	—	—	—	
173	J82–316 2S105	Float grab	0.001	0.0003	0.0003	0.035	3200	5.70	224	0.616	Gabbro with ml and cp in mafic band
			South side Canyon 1 (fig. A-69)								
174	J81–1224 1S217	High grade grab	0.0022	0.0015	0.0014	L0.20	3000	10.00	500	0.05	Pyroxenite with cp, bn, and mag
	J82–300 2S089	Rep chip 1 ft long	0.0002	0.0016	0.0004	0.015	1100	13.20	1119	1.094	Pyroxenite with cp, bn, and mag
	J82–313 2S102	0.5 ft chip 20 ft long	0.0006	0.002	0.003	0.012	1000	12.60	1119	1.04	Pyroxenite with cp, bn, and mag
174	J82–314 2S103	Chip 1 ft long	0.0009	0.0016	0.002	0.032	2200	13.20	745	1.186	Pocket of cp and bn mineralization

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton) Au	Pt	Pd	Analyses[3] (units as shown) Ag	Cu ppm	Fe %	V ppm	Ti %	Comments
			South side Canyon 1 (fig. A-69)—Continued								
174	J82-315 2S104	Rep grab 36 sq ft	L0.0004	L0.0006	L0.0006	0.017	1450	13.60	1159	0.982	Pyroxenite with cp, bn, and mag
	J82-728 2S193s	Bulk sample	0.0009	0.0005	—	0.022	1300	19.70	—	1.16	55 lb bulk sample, same as 2S089
	J82-729 2S194s	Bulk sample	0.0006	L0.0003	—	0.018	1400	19.10	—	1.13	18 lb higher grade portion of 2S193
	J81-1228 1S221A	.25 ft chip 12 ft long	L0.0002	L0.0009	L0.0009	L0.200	450	10.00	600	0.60	Hnbd pyroxenite with cp
	J81-1229 1S221B	Chip 8 ft long	0.0003*	L0.0009	L0.0009	0.30	900	8.00	600	0.40	Hnbd pyroxenite with cp
175	J82-676 2S141	.5 ft chip 12 ft long	0.0003	0.0015	0.001	0.012	1115	4.90	910	1.82	Pyroxenite with cp
	J82-677 2S142	.5 ft chip 4 ft long	L0.0002	L0.0003	L0.0003	0.006	68	2.10	230	0.91	Gabbro/diorite
	J82-678 2S143	.25 ft chip 2.5 ft long	L0.0002	L0.0003	L0.0003	0.006	345	2.90	360	1.36	Fault zone sheared diorite, fault gouge with ep
	J82-679 2S144	.5 ft chip 10 ft long	0.0004	0.0015	0.0004	0.012	1120	5.15	850	1.86	Pyroxenite with cp
	J82-680 2S145	1 ft chip 15 ft long	0.0006	0.0016	0.0016	0.006	785	5.30	1000	2.60	Pyroxenite with cp
	J82-681 2S146	1 ft chip 11 ft long	0.0003	0.0019	0.0016	0.006	950	5.40	1000	1.87	Pyroxenite with cp
	J82-682 2S147	1 ft chip 9 ft long	0.001	L0.0003	L0.0003	0.006	555	4.90	700	1.16	Pyroxenite with cp
176	J81-1225 1S218	Chip 5 ft long	0.0010	0.0021	0.0038	L0.200	8000	7.00	500	0.06	Pyroxenite with cp, bn, and mag
	J81-1226 1S219	High-grade grab	0.0016	0.0071	0.0055	L0.200	5600	7.00	400	0.30	Pyroxenite with cp, bn, and mag
	J82-311 2S100	High-grade grab	0.0012	0.0073	0.0067	0.105	6700	8.50	793	0.70	Pyroxenite with cp and bn (replicate 1S219)
	J82-312 2S101	Chip 5 ft long	0.0008	0.0006	0.0003	0.055	4000	8.40	912	1.106	Approx. replicate 1S218
	J82-730 2S195	High-grade grab 16 lb	0.0014	0.0085	0.0085	0.099	8300	3.10	600	0.93	Sample approx. replicate 1S219
	J82-761 2S223	High-grade grab 16 lb	0.0004	0.0015	0.0004	0.012	1430	6.10	805	1.51	Sample approx. replicate 1S219
	J81-1227 1S220	3 ft chip 70 ft long	L0.0002	L0.0009	L0.0009	L0.200	430	8.00	500	0.40	Pyroxenite with sparse cp
			North side Canyon 1 (fig. A-69)								
177 thru 178	J82-317 2S106	Random grab 12 sq ft area	L0.0002	0.001*	0.002*	0.015	1500	11.90	1108	1.18	Hnbd pyroxenite with ml stain, cp, and mag
	J82-318 2S107	Chip .5 ft long	L0.0002	0.001*	L0.001	0.017	1300	13.00	1116	1.25	Hnbd pyroxenite with cp,ml stain, and mag
	J82-319 2S108	Grab	L0.0002	L0.001	L0.001	0.012	740	12.95	1062	1.13	Hnbd pyroxenite with cp, ml stain, and mag

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton)				Analyses[3] (units as shown)				Comments
			Au	Pt	Pd	Ag	Cu ppm	Fe %	V ppm	Ti %	
					North side Canyon 1 (fig. A-69)—Continued						
	J82-323 2S112A	.5 ft chip 6 ft long	L0.0002	0.001*	L0.001	L0.003	300	8.40	611	1.00	Hnbd pyroxenite with cp and ep
	J82-324 2S112B	Chip 1.1 ft long	L0.0002	0.001*	0.001*	L0.003	610	6.50	963	1.02	Iron-stained fine grained rock with cp
	J82-325 2S112C	.5 ft chip 9 ft long	L0.0002	0.001*	0.001*	0.009	840	11.80	1214	1.27	Hnbd pyroxenite with mag and cp
	J82-326 2S113A	.5 ft chip 11 ft long	L0.0002	0.001*	0.001*	0.006	570	7.50	768	1.06	Hornblendite with cp and po
	J82-327 2S113B	.5 ft chip 7 ft long	0.001	L0.002	L0.002	0.012	1200	12.50	1091	1.28	Hornblendite with cp and po
	J82-328 2S114A	.5 ft chip 5 ft long	L0.0002	0.001*	0.001*	0.006	800	9.80	844	1.01	Hornblendite with cp and po
	J82-329 2S114B	.5 ft chip 4.6 ft long	L0.0002	0.001*	L0.001	0.009	1150	11.10	1062	1.19	Hnbd pyroxenite with cp
177 thru 178	J82-330 2S115A	.5 ft chip 10 ft long	L0.0002	L0.001	0.001*	0.012	1150	12.60	1107	1.13	Hnbd pyroxenite with cp
	J82-331 2S115B	.5 ft chip 10 ft long	L0.0002	L0.001	0.001*	0.015	1600	13.30	1019	0.89	Hnbd pyroxenite with cp
	J82-332 2S116	.5 ft chip 6 ft long	L0.0002	0.001*	0.002*	0.015	1550	12.90	992	0.87	Hnbd pyroxenite with cp
	J82-333 2S117	.5 ft chip 4 ft long	L0.0002	0.002*	0.002*	0.008	840	11.50	986	0.89	Hnbd pyroxenite with cp
	J82-334 2S118A	1 ft chip 18 ft long	L0.0002	0.002*	0.002*	0.003	430	8.80	673	0.82	Hnbd diorite with ep and cp
	J82-335 2S118B	1 ft chip 16 ft long	L0.0002	0.002*	0.002*	0.003	195	6.50	506	0.56	Hnbd diorite with ep
	J82-336 2S119	Grab	L0.0002	L0.0003	L0.0003	0.006	1250	13.90	872	1.23	Hnbd pyroxenite with ep and cp
	J82-741 2S205	1 ft chip 17 ft long	L0.0002	L0.0003	L0.0003	0.006	1150	5.50	1000	1.81	Hnbd pyroxenite with cp
	J82-742 2S206	1 ft chip 20 ft long	L0.0002	L0.0003	L0.0003	0.012	1050	5.40	940	1.50	Hnbd pyroxenite with cp
178	J82-684 2S149	1 ft chip 9 ft long	L0.0002	L0.0003	L0.0003	0.006	890	4.70	960	1.42	Pyroxenite with po and cp
	J82-685 2S150	1 ft chip 15 ft long	—	—	—	—	—	—	—	—	Pyroxenite with po and cp
	J82-686 2S151	1 ft chip 15 ft long	0.003	L0.0003	L0.0003	0.023	1670	6.30	1110	1.57	Pyroxenite with cp
	J82-687 2S152	Rep chip 8 ft long	0.001	L0.0003	L0.0003	0.017	1440	5.10	825	1.66	Pyroxenite with cp
	J82-688 2S153	Grab	0.001	L0.0003	L0.0003	0.009	1470	5.60	880	1.98	Hnbd pyroxenite with cp
179	J82-683 2S148	Grab	L0.0002	L0.0003	L0.0003	0.006	1200	4.40	655	2.86	Hnbd pyroxenite with cp
180	J82-743 2S207	1 ft chip 11 ft long	L0.0002	L0.0003	L0.0003	0.012	1130	5.15	900	1.27	Hnbd pyroxenite with ml, cp, and ep
	J82-746 2S208	1 ft chip 7 ft long	L0.0002	L0.0003	L0.0003	0.015	880	6.80	1140	1.35	Hnbd pyroxenite with ml and cp
	J82-744 2S207A	High-grade Grab	L0.0002	L0.0003	L0.0003	0.642	6950	3.85	655	0.88	Hnbd pyroxenite with coarse cp

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton) Au	Pt	Pd	Ag	Analyses[3] (units as shown) Cu ppm	Fe %	V ppm	Ti %	Comments
			North side Canyon 1 (fig. A-69)—Continued								
	J82–745 2S207B	Grab	L0.0002	L0.0003	L0.0003	0.044	3050	4.00	660	1.07	Hnbd pyroxenite with coarse cp
180	J82–747 2S209	1 ft chip 12 ft long	L0.0002	L0.001	L0.001	0.023	1300	6.35	1080	1.80	Hnbd pyroxenite with ml and cp
	J82–748 2S210	1 ft chip 6 ft long	L0.0002	L0.0003	L0.0003	0.008	1420	6.00	1120	1.59	Pyroxenite with ml and cp
	J82–749 2S211	1 ft chip 10 ft long	L0.0002	L0.0003	L0.0003	0.015	1390	5.85	1110	1.90	Pyroxenite with ml and cp
181	J82–750 2S212	1 ft chip 20 ft long	L0.0002	L0.0003	L0.0003	0.015	955	5.65	990	1.39	Pyroxenite with ml and cp
	J82–751 2S213	Rep chip 2 ft long	L0.0002	L0.0003	L0.0003	0.023	1630	5.60	950	2.07	Pyroxenite with ml and cp
	J82–752 2S214	1 ft chip 9 ft long	L0.0002	L0.0003	L0.0003	0.012	720	5.65	1020	1.47	Hnbd pyroxenite with cp
	J82–753 2S215	1 ft chip 14 ft long	L0.0002	L0.0003	L0.0003	0.006	1180	6.65	1050	1.73	Hnbd pyroxenite with cp
	J82–754 2S216	1 ft chip 25 ft long	L0.0002	L0.0003	L0.0003	0.006	910	6.30	1130	1.63	Hnbd pyroxenite with cp
182	J82–758 2S220	Grab	L0.0002	L0.0003	L0.0003	0.020	1670	5.85	1090	1.60	Hnbd pyroxenite with cp
183	J82–756 2S218	1 ft chip 20 ft long	L0.0002	L0.0003	L0.0003	0.006	378	7.50	715	1.53	Hnbd pyroxenite with cp
	J82–757 2S219	Grab	L0.0002	L0.0003	L0.0003	0.009	399	5.60	690	1.32	Hnbd pyroxenite with cp
184	J82–755 2S217	Grab	L0.0002	L0.0003	L0.0003	0.006	52	6.05	1000	1.32	Hnbd pyroxenite
			Canyon 1 (figs. A-69, A-70)								
185	J81–1236 1S228	Float grab	L0.0002	L0.001	L0.001	L0.20	730	8.00	500	0.30	Pyroxenite with ml and cp
	J81–1237 1S229	SS	L0.0002	L0.001	L0.001	0.020	88	6.00	400	0.30	
186	J82–658 2S123	PC	L0.0001	L0.001	L0.001	—	—	—	—	—	
	J82–659 2S124	Float Grab	L0.0002	L0.0003	L0.0003	0.012	900	5.40	820	2.06	Pyroxenite with ml and cp
	J82–660 2S125	Float Grab	L0.0002	L0.0003	0.001*	0.023	1360	6.10	885	2.16	Pyroxenite with ml and cp
187	J81–1235 1S227	SS	0.002*	0.005*	0.007	0.041	84	7.00	500	0.40	
188	J82–667 2S132	SS	L0.0002	L0.0003	L0.0003	0.006	130	3.80	850	1.68	
189	J81–1233 1S225	Float Grab	0.003	L0.001	L0.001	L0.200	2200	4.00	200	0.08	Gabbro with disseminated po and cp
	J82–1234 1S226	Grab	L0.0002	L0.001	L0.001	L0.200	860	8.00	300	0.01	Iron-stained pyroxenite with po and cp
	J82–665 2S130	Float Grab	L0.0002	L0.0003	L0.0003	0.009	1375	4.60	815	2.12	Pyroxenite with disseminated cp
	J82–666 2S131	PC	L0.0001	0.004	L0.001	—	—	—	—	—	
190	J82–663 2S128	PC	0.0002	L0.001	L0.001	—	—	—	—	—	
	J82–664 2S129	Float Grab	L0.0002	L0.0003	L0.0003	0.012	1720	4.40	725	2.39	Hnb pyroxenite with cp and ml

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton) Au	Pt	Pd	Ag	Analyses[3] (units as shown) Cu ppm	Fe %	V ppm	Ti %	Comments
			Canyon 1 (figs. A-69, A-70)—Continued								
191	J81-1230 1S222	Float Grab	L0.0002	L0.0009	L0.0009	L0.200	240	10.00	800	0.80	Hnbd pyroxenite with ml
192	J81-1231 1S223	Float Grab	0.0003*	L0.0009	L0.0009	L0.200	960	7.00	300	0.40	Hnbd diorite with po and cp
	J81-1232 1S224	SS	0.0002	L0.0009	L0.0009	0.047	43	7.00	500	0.40	
193	J82-661 2S126	Float Grab	L0.0002	L0.0003	L0.0003	0.038	4850	3.10	610	1.55	Hnbd pyroxenite with cp and ep
	J82-662 2S127	Float Grab	L0.0002	L0.0003	L0.0003	0.035	3600	3.05	570	1.37	Hnbd pyroxenite with cp and ep
194	J82-833 20848	High-grade grab	L0.0002	L0.0003	L0.0003	L0.006	1760	4.00	307	1.54	Hnbd-pyx gabbro with ml
	J82-834 20849	Grab	L0.0002	L0.0003	L0.0003	0.006	4800	0.60	53	0.06	Feldspathic dike rock with ml stain
194	J82-835 20850	High-grade grab	L0.0002	L0.0003	L0.0003	0.006	625	4.05	480	1.78	Plagioclase hnbd pyroxenite with cp,po, and py
195	J82-836 20851	High-grade grab	L0.0002	L0.0003	L0.0003	0.006	452	3.30	475	1.05	Plagioclase hnbd gabbro with cp,po, and ml
196	J82-837 20853	Grab	L0.0002	L0.0003	L0.0003	0.006	23	8.20	480	1.80	Fine grained sill, andesitic?
	J82-838 20854	Grab	L0.0002	L0.0003	L0.0003	0.006	9	6.80	399	2.03	Hnbd pyroxenite with mag
			Southern area								
197	J82-786 2S248	Grab	L0.0002	L0.0003	L0.0003	0.006	38	5.55	775	1.13	Hnbd pyroxenite with mag
198	J82-789 2S251	Grab	0.004	L0.0003	L0.0003	0.029	4620	4.10	265	0.99	Altered hnbd diorite with disseminated cp and po. Alteration clinozoisite and chlorite
199	J82-788 2S250	Float grab	L0.0002	L0.0003	L0.0003	0.006	17	3.20	865	1.64	Hornblendite with ep and mag
	J82-791 2S253	Float grab	L0.0002	L0.0003	L0.0003	0.006	16	G10.00	1240	2.92	Mag pyroxenite
200	J82-790 2S252	SS	L0.0002	L0.0003	L0.0003	—	—	—	—	—	
201	J82-731 2S196	Chip .3 ft long	L0.0002	L0.0003	L0.0003	0.006	41	0.65	65	0.08	Altered plagioclase with ep and chl
	J82-732 2S197	Grab	L0.0002	L0.0003	L0.0003	0.006	200	2.80	450	0.82	Hnbd diorite with ep and cl
202	J82-733 2S198	Float Grab	L0.0002	L0.0003	L0.0003	0.006	8	9.35	2100	2.36	Mag pyroxenite
203	J82-301 2S090	Grab	L0.0003	L0.002	0.0004	0.006	720	7.50	606	0.803	Ep hnbd diorite with chl and cp
204	J82-864 20885	Grab	L0.0002	L0.0003	L0.0003	0.006	72	1.40	65	2.43	Hnbd pyroxenite dike in foliated hnbd diorite country rock
205	J82-863 20884	Grab	L0.0002	L0.0003	L0.0003	0.006	92	2.25	255	1.09	Hnbd diorite
206	J82-772 2S234	Chip .7 ft long	L0.0002	L0.0003	L0.0003	0.006	45	0.15	20	0.06	Hydrothermal vein rock in shear zone
206	J82-773 2S235	Chip 1 ft long	L0.0002	L0.0003	L0.0003	0.006	160	3.45	316	1.12	Prochlorite, ep, and clinozoisite altered hnbd diorite

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton)			Analyses[3] (units as shown)					Comments
			Au	Pt	Pd	Ag	Cu ppm	Fe %	V ppm	Ti %	
			Canyon 1 (figs. A-69, A-70)—Continued								
207	J82-776 2S238	Chip 1 ft long	0.002	0.000*	0.001	0.038	47000	2.85	373	0.37	Hydrothermal vein rock consisting of plagioclase replaced by sericite ep, ml, hem, cp, and bn
	J82-777 2S239	Grab	L0.0002	L0.0003	L0.0003	0.023	3800	2.45	520	1.17	Mafic segregation around 2S238 vein. Hornblendite with chl and ep alteration and cp
	J82-778 2S240	Chip .5 ft long	0.001	0.001	L0.0003	0.280	58500	2.75	260	0.18	Hydrothermal vein rock consisting of ep,tr bn, cp, and hem
	J82-779 2S241	Grab	—	—	—	0.006	4650	2.40	470	0.78	Altered hnbd diorite. Plagioclase to clinozoisite with ep, tr, and cp
	J82-780 2S242	High grade grab	0.14	L0.0003	L0.0003	0.320	30000	0.80	37	1.69	Higher grade portion of 2S238
208	J82-774 2S236	Float Grab	L0.0002	L0.0003	L0.0003	0.006	98	3.25	350	1.60	Iron-stained hydrothermal rock
	J82-775 2S237	Float Grab	L0.0002	L0.0003	L0.0003	0.006	341	2.70	442	1.55	Hnbd diorite with ml and cp
	J82-781 2S243	Chip .5 ft long	0.005	L0.0003	L0.0003	0.554	65000	3.60	445	1.12	Hydrothermal vein rock with ml, cp, and bn
209	J81-1197 1D106	Float grab	0.166	L0.0003	L0.0003	1.900	39000	7.00	600	0.40	Hydrothermal rock with ml and cp
210	J82-782 2S244	Grab	0.005	L0.0003	L0.0003	0.006	400	1.80	210	0.66	Calcite and chalcedony from iron stained zone
	J82-783 2S245	Chip .5 ft long	0.120	0.001*	L0.0003	0.219	1000	3.00	285	0.61	Hydrothermal rock, mostly limonite with cp, po, and ep
210	J82-784 2S246	Chip 1 ft long	0.090	L0.0003	L0.0003	0.125	19600	4.40	380	0.69	Hydrothermal rock with ml, az, qz, and cp
211	J82-831 20846	Float Grab	L0.0002	L0.0003	L0.0003	0.006	37	2.40	184	0.19	Altered fine grained iron stained volcanic rock
212	J82-874 20868	Grab	L0.0002	L0.003	L0.003	0.006	158	2.90	329	1.28	Iron-stained altered hnbd diorite
213	J82-767 2S229	Chip 20 ft long	L0.0002	L0.0003	L0.0003	0.006	156	2.80	201	0.53	Fine grained hnbd diorite
	J82-768 2S230	Chip 1.5 ft long	L0.0002	L0.0003	L0.0003	0.006	13	0.25	20	L0.05	Hydrothermal vein rock
	J82-769 2S231	Chip 1.5 ft long	L0.0002	L0.0003	L0.0003	0.006	138	3.35	272	1.15	Ep hnbd gabbro with po
213	J82-770 2S232	Chip 1 ft long	0.030	0.002	0.005	0.671	31500	0.50	22	0.06	Hydrothermal vein with bn,cp, and ml
	J82-771 2S233	Chip .5 ft long	0.02	0.003	0.008	0.108	12600	0.65	50	0.06	Hydrothermal vein with bn, cp, and ml
214	J82-829 20843	Grab	L0.0002	L0.0003	L0.0003	0.006	293	3.10	300	1.13	Foliated hnbd diorite
215	J82-785 2S247	Grab	0.005	L0.0003	L0.0003	0.105	4230	1.00	190	0.57	Hydrothermal ep vein rock with ml and az

See footnotes at end of table.

Table A-1-24.—Klukwan assay data (figs. A-65—A-70)—Continued

Map number	Lab & field sample number	Sample type[1] & length (ft)	Analyses[2] (oz/ton)				Analyses[3] (units as shown)				Comments
			Au	Pt	Pd	Ag	Cu ppm	Fe %	V ppm	Ti %	
			Canyon 1 (figs. A-69, A-70)—Continued								
216	J82-737 2S201	Float grab	L0.0002	L0.0003	L0.0003	0.006	194	2.70	380	1.07	Ep hnbd diorite
	J81-1198 1D110	Float grab	0.010	L0.001	L0.001	0.200	9800	8.00	400	0.40	Hydrothermal rock with ml, cp, and bn
217	J82-738 2S202	Float grab	L0.0002	L0.0003	L0.0003	0.006	1770	3.10	450	1.29	Ep hnbd gabbro
	J82-739 2S203	Float grab	L0.0002	L0.0003	L0.0003	0.006	470	2.45	360	1.08	Hnbd diorite with ml
	J82-740 2S204	Float grab	L0.0002	L0.0003	L0.0003	0.006	870	2.65	400	0.85	Hnbd diorite with ml
218	J82-792 2S254	Float grab	0.004	L0.0003	L0.0003	0.038	5200	3.90	570	2.42	Hornblendite with cp and ml
	J82-793 2S255	Float grab	L0.002	L0.0003	L0.0003	0.085	580	5.15	405	1.90	Iron-stained hydrothermal rock
	J82-794 2S256	Float grab	0.004	L0.0003	L0.0003	0.032	2200	4.50	770	2.46	Iron-stained hydrothermal rock, clinozoisite ep, and hnbd with cp and po
219	J82-798 2S260	Chip .2 ft long	0.001	L0.0003	L0.0003	1.37	560	1.65	19	0.14	Qz vein with py,cp,po hosted in hnbd pyroxenite
220	J82-795 2S257	Grab	0.003	L0.0003	L0.0003	0.131	10000	2.60	480	1.89	Hornblendite with ml and cp
	J82-796 2S258	Grab	L0.0002	L0.0003	L0.0003	0.006	68	2.75	313	1.03	At hnbd diorite/hnbd pyroxenite contact
221	J82-797 2S259	Grab	L0.002	0.000*	0.001*	0.017	1120	G10.00	1580	4.95	Hnbd diorite with mag and ml stain

[1] SS —Stream sediment sample. PC —Panned concentrate sample. Rep—Representative.
For example: chip 5 ft long means a continuous chip sample 5 ft long; 0.5 ft chip 12 ft long means a 0.5 ft spaced chip sample 12 ft long.

[2] Au, Pt, and Pd analyses were by Fire Assay—Atomic Absorption, (FA-AA). Inductively Coupled Argon Plasma Spectroscopy, (ICP) or Fire Assay (FA). Ag, Cu, Fe, V, and Ti analyses were by Atomic Absorption or X-ray fluorescence.

[3] Where a number of analyses for either Au, Pt, and Pd were completed for a sample, the value estimated to be most accurate from available data is given.

NOTE.—Sample analyses were by the Bureau of Mines Research Center in Reno, Nevada, TSL Laboratories in Spokane, Washington, and Bondar-Clegg Inc. of Lakewood Colorado.

Units of measure abbreviation used:
ppm means parts per million
L0.0003 means not detected above the lower limit of detection, that is, 0.0003 oz./ton
G10.00 means greater than 10.00%
— means not analyzed

Mineral abbreviations used:

az	—	azurite	mag	—	magnetite
bn	—	bornite	ml	—	malachite
calc	—	calcite	mo	—	molybdenite
chl	—	chlorite	plag	—	plagioclase
cp	—	chalcopyrite	po	—	pyrrhotite
ep	—	epidote	py	—	pyrite
hem	—	hematite	pyx	—	pyroxene
hnbd	—	hornblende	qz	—	quartz

Table A-1-25.—Goat Hollow north occurrence (fig. A-71)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	6S0498	—	R-CR	N	N	12	32	3	1	0.076	—	—	—	—	—	—	—	porphyritic granodiorite
2	6W1621	50.0	SC	N	N	121	21	N	N	.086	—	—	—	—	—	—	—	diorite
3	5G2625	—	R-G	N	N	28	225	N	N	—	—	—	—	—	—	—	—	leucocratic granodiorite
3	6S0407	—	S	N	N	50	130	9	3	—	—	2	—	—	—	—	—	granite porphyry w/bn,ml
4	5G2624	—	R-G	0.750	34.9	68	7.10%	25	2	—	—	—	—	—	—	—	—	mafic inclusions w/ml in qz-monzodiorite
4	7W1720	.5	R-G	N	1.1	18	2750	7	—	—	—	—	—	—	—	—	—	diorite bands in ultramafic w/ cp,ml
4	7W1721	1.0	CR	.068	3.2	32	5850	6	—	—	—	—	—	—	—	—	—	diorite bands in ultramafic w/ cp,ml
5	6S0408	—	S	N	1.6	80	4200	3	7	—	—	2	—	—	—	—	—	fracture in granite w/ml,az,bn
5	6S0409	100.0	CR	N	N	232	128	3	6	—	—	2	—	—	—	—	—	granite porphyry
5	6S0410	—	S	N	.2	32	1060	3	4	—	—	2	—	—	—	—	—	granite porphyry w/ml,az,bn
6	6U6360	—	S	N	N	200	150	N	9	.043	—	—	—	14	—	—	—	oxidized qz-monzonite

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-26.—Goat Hollow occurrence (fig. A-71)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
7	5G2575	—	G	0.025	3.0	208	1.88%	8	18	—	—	—	—	—	—	—	—	foliated diorite and pyroxenite
8	6W1625	0.7	R-G	N	21.0	95	3.28%	4	32	N	—	—	—	—	—	—	—	ep knot in diorite w/sulf
9	6W1626	.6	R-G-S	15.052	54.2	1052	1.80%	5	10	N	—	—	—	—	—	—	—	sulf knot in diorite w/visible Au
10	6S0497	—	F-S	.068	N	60	6300	N	70	0.040	—	—	—	—	—	—	—	granodiorite w/ml,az
11	6W1627	.4	F-G	.171	.3	22	690	5	8	.072	—	N	—	—	—	—	—	vein (qz-calc-feldspar)
12	6W1628	.5	F-G	N	1.1	104	4110	N	15	N	—	—	—	—	—	—	—	hornblendite w/ml
12	6U6361	—	F-S	N	.2	66	780	N	10	.063	—	—	—	2	—	—	—	hornblende diorite w/ml
13	5G2549	—	R-G	.210	1.4	79	5390	11	7	.037	N	—	—	—	—	—	—	monzodiorite w/ml,cp
14	7W1743	.2	R-G	N	2.2	78	5900	N	12	—	—	—	—	—	—	—	—	diorite w/bn,ml pods
15	7W1741	.5	G	.720	4.1	70	1.20%	2	15	—	—	—	—	—	—	—	—	diorite gneiss w/cp,ml,fest
15	7W1742	—	R-S	.068	1.1	31	2600	N	16	—	—	—	—	—	—	—	—	feldspar veinlets in ultramafic w/bn,ml

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-27.—Nineteen Mile Ridge occurrence (fig. A-71)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Pt ppm	Pd ppm	
16	8H4325	—	F	N	N	8	9	4	1	N	—	—	—	—	—	—	—	qz vein
17	8H4326	—	F	0.005	0.1	70	115	4	15	0.014	—	—	—	—	—	—	—	altered gneiss
18	8W1889	—	F	.273	5.3	410	2270	443	12	.010	—	—	—	—	—	N	0.006	diorite w/ep,cp,ml
19	8W1890	—	F	.068	2.0	140	3580	72	10	.016	—	—	—	—	—	N	.004	diorite w/ep,ml,sulf
19	8W1891	0.25	F	.237	6.3	120	1.34%	52	12	.006	—	—	—	—	—	N	.015	mafic zone in diorite w/bn,ml, fest
20	8W1892	.1	F	2.430	18.9	142	3.84%	21	20	.079	—	—	—	—	—	N	.015	mafic zone in diorite w/bn,ml, fest
20	8H4327	.05	F	.177	5.6	82	1.21%	2	14	.080	—	—	—	—	—	N	.006	diorite gneiss w/az,ml,sulf
21	6W1561	.2	G	.171	1.2	75	5750	435	27	.017	—	—	—	—	—	—	—	diorite w/cp,bn
22	6S0447	—	SS	N	.2	63	93	2	13	.020	—	—	—	—	—	—	—	
23	6S0444	.5	G	N	3.2	76	3010	10	20	.014	—	—	—	—	—	—	—	diorite w/dissem cp,ml
23	6S0445	—	S	.068	3.5	30	6300	13	9	.014	—	—	—	—	—	—	—	ep altered diorite w/dissem cp, ml
23	6S0446	6.0	CR	N	.2	69	104	7	14	.022	—	—	—	—	—	—	—	diorite w/ep alteration

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-28.—Fifteen-Sixteen Mile Haines Highway occurrence (fig. A-71)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Pt ppm	Pd ppm	
24	6W1602	1.0	C	N	N	30	46	N	2	0.003	—	—	—	—	—	—	—	qz vein in metabasalt
24	7S0582	.8	C	N	N	88	86	N	13	—	—	—	—	—	—	—	—	qz-calc vein w/fest,sulf
24	7S0583	.8	C	N	0.2	44	31	6	3	—	—	—	—	—	—	—	—	qz-calc vein
24	7S0584	.4	C	N	N	33	18	3	3	—	—	—	—	—	—	—	—	qz-calc vein
24	7S0585	.75	C	N	N	22	34	N	6	—	—	—	—	—	—	—	—	qz-calc vein w/fest
25	8S1052	.2	CR	0.007	.1	25	153	N	9	N	—	—	—	—	—	—	—	metabasalt w/chert bands
26	5G2576	—	C	.120	1.6	1190	2200	12	30	—	—	—	—	—	—	—	—	qz vein
26	6W1603	.4	C	N	N	47	86	N	7	.012	—	—	—	—	—	—	—	qz vein w/sulf
26	6W1604	.5	S	N	.2	147	410	2	72	.007	—	—	—	—	—	—	—	metabasalt w/sulf
26	6W1605	.25	R-G	N	1.0	142	3990	3	26	—	—	—	—	—	—	—	—	metabasalt w/calc vein,cp
26	7W1714	.05	C	.068	1.6	170	2050	N	—	—	—	—	—	—	—	—	—	calc-qz vein w/py,cp
27	6W1619	.5	CC	.686	1.5	1.85%	1560	66	18	.006	—	—	—	—	—	—	—	qz vein w/cp,ml
27	7W1715	.2	C	.651	2.3	1.20%	2000	12	—	—	—	—	—	—	—	—	—	qz-calc vein w/cp,sl,py,ml
	Klukwan Fan																	
28	8S1031	—	SB	N	N	40	88	4	35	.006	—	—	—	—	—	0.100	0.020	16 pans run in sluice box

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-29A.—Twelve Mile gold-copper prospect (fig. A-72)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	7S0594	0.05	R-S	0.137	6.6	2	1.35%	N	31	0.002	N	N	N	47	3	9	19	qz vein w/ml,az,bn
2	7S0590	—	R-S	.068	2.5	12	5550	N	97	.054	N	N	N	13	1	3	N	qz w/bn,cp,ml,hornblende granite
2	7S0591	.8	CR	.068	13.0	4	1.50%	N	85	.051	N	1	N	21	1	17	23	qz vein w/ml,bn,cp
2	7S0592	.2	R-CR	.514	48.0	58	9.50%	15	18	.058	N	7	N	15	3	63	127	qz w/bn,ml
2	7S0593	.3	R-S	.377	66.5	101	2.01%	5	43	.019	N	7	N	57	7	61	155	qz vein in joint w/bn,ml
2	7W1718	.3	R-C	.411	29.0	10	4.60%	N	—	—	—	—	—	—	—	—	—	qz-feldspar vein w/bn,ml
2	7W1719	.6	R-C	.377	8.3	24	1.40%	N	—	—	—	—	—	—	—	—	—	qz-feldspar vein w/bn,ml
3	7S0595	.3	R-S	N	1.4	26	3450	N	46	.008	N	N	N	33	1	3	5	qz vein w/fest,ml,cp
3	7S0596	.05	R-S	.651	37.0	66	9002	4800	32	.031	N	N	N	23	N	59	11	qz vein w/diorite,cp,ml
3	7S0597	.07	R-CR	.308	4.9	50	1.10%	10	33	.026	N	N	N	N	N	19	13	shear w/ml
4	7S0598	.3	CR	.343	5.5	4	1.55%	20	54	.043	N	N	N	27	1	3	13	qz vein w/bn,cp,ml
4	7S0620	.75	CH	N	—	61	1600	3	2	—	—	—	—	40	—	—	—	qz vein w/feldspar,ml,bn
4	7S0621	.15	CH	.274	—	66	1.00%	3	6	—	—	—	—	33	—	—	—	qz vein w/feldspar,ml,bn
4	7S0622	.2	CH	.240	—	21	>2.00%	5	2	—	—	—	—	20	—	—	—	qz vein w/feldspar,ml,bn
4	7S0623	.15	CH	.137	—	17	1.70%	N	2	—	—	—	—	22	—	—	—	qz vein w/feldspar,ml,bn
4	7S0624	.4	CH	.240	—	13	1.15%	4	1	—	—	—	—	12	—	—	—	qz vein w/feldspar,ml,bn
4	7S0625	1.0	CH	N	—	11	1950	N	1	—	—	—	—	11	—	—	—	qz vein w/feldspar,ml,bn

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-29B.—Twelve Mile gold-copper prospect supplementary analyses (fig. A-72)
(ppm unless marked %)

Map No.	1	2	2	3	3	4	4	4	4	4	4
Sample No.	0594	0590	0593	0596	0597	0598	0620	0621	0622	0623	0624
Cr	175	129	149	95	23	125	—	—	—	—	—
U	<10	<10	<10	<10	<10	<10	—	—	—	—	—
Te	11	28	<10	25	<10	<10	—	—	—	—	—
Se	<5	<5	<5	11	<5	<5	—	—	—	—	—
V	17	30	7	125	142	8	—	—	—	—	—
Fe	.39%	1.13%	1.33%	3.38%	2.82%	.47%	—	—	—	—	—
Be	<1	<1	<1	<1	1	<1	—	—	—	—	—
Nb	6	8	3	30	39	5	—	—	—	—	—
Rb	<8	35	23	26	29	69	—	—	—	—	—
Sr	47	423	97	155	708	244	—	—	—	—	—
Ta	<8	27	31	<8	<8	29	—	—	—	—	—
Ce	—	—	—	—	—	—	6	28	13	<5	<5
Dy	—	—	—	—	—	—	<1	3	<1	<1	<1
Er	—	—	—	—	—	—	<100	<100	<100	<100	<100
Eu	—	—	—	—	—	—	<1	1	<1	<1	<1
Gd	—	—	—	—	—	—	<200	<200	<200	<200	<200
Ho	—	—	—	—	—	—	<1	<1	<1	<1	<1
La	—	—	—	—	—	—	6.2	14.1	13.7	3.0	2.4
Lu	—	—	—	—	—	—	<.1	.4	<.1	<.1	<.1
Nd	—	—	—	—	—	—	<10	12	<10	<10	<10
Pr	—	—	—	—	—	—	<50	<52	<50	<50	<50
Sc	—	—	—	—	—	—	.85	4.05	.20	.32	.17
Sm	—	—	—	—	—	—	.4	3.6	.2	.2	.2
Tb	—	—	—	—	—	—	<1	<1	<1	<1	<1
Th	—	—	—	—	—	—	10.0	2.7	6.6	1.6	1.5
Tm	—	—	—	—	—	—	<.5	<.5	<.5	<.5	<.5
U	—	—	—	—	—	—	3	2	2	1	<1
Yb	—	—	—	—	—	—	<.5	2.1	<.5	<.5	<.5
Y	—	—	—	—	—	—	—	<5	<5	<5	<5

NOTE.—Key to abbreviations at beginning of appendix.

Supplementary analyses consisted of element analysis by plasma and/or by neutron activation; As by colorimetry; La, Ce, Y.

Table A-1-30.—Chilly occurrence (fig. A-72)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Pt ppm	Pd ppm	
5	7W1695	—	SS	0.137	N	46	99	N	—	—	—	—	—	—	—	—	—	
5	8S1032	—	SS	.014	0.1	56	95	3	8	0.039	—	—	—	—	—	—	—	
6	8W1873	0.1	R-G	.022	.7	3	486	2	1	N	—	—	—	—	—	—	—	qz vein w/py,fest
7	8W1870	.2	CH	.006	.1	12	15	5	N	.029	—	—	—	—	—	—	—	qz vein w/py,gossan
8	8W1872	.15	CH	.011	.2	14	149	3	4	.034	—	—	—	—	—	—	—	qz vein w/py,fest,hem
9	8W1871	.4	F-G	.098	.1	2	97	2	N	.025	—	—	—	—	—	—	—	qz-feldspar vein
10	8W1866	.1	CH	.019	.1	2	6	3	N	.023	—	—	—	—	—	—	—	qz vein w/py,fest
10	8W1867	.2	CH	.411	1.3	9	23	51	3	.072	—	1240	—	—	—	N	0.004	qz vein w/py,fest,mo
10	8W1868	.25	CH	.824	2.7	5	6	25	4	.071	—	—	—	—	—	N	.004	qz vein w/py,fest
10	8W1869	—	G	.058	.1	41	26	5	4	.073	—	—	—	—	—	—	—	diorite near vein swarm
11	8S1088	.3	R-S	.026	.3	3	1456	3	2	N	—	—	—	—	—	0.040	.030	qz-feldspar vein w/cp,ml
12	8W1865	.05	R-CH	.018	.1	15	19	3	2	.014	—	—	—	—	—	—	—	qz vein w/py,fest
13	7S0669	—	SS	N	.2	38	125	3	8	.032	—	—	—	—	—	—	—	
13	7S0670	5.0	R-CR	N	N	28	6	2	N	.190	—	—	—	—	—	—	—	qz rich dike w/dissem sulf
14	7W1778	—	SS	.343	.1	91	62	14	6	—	—	—	—	—	—	—	—	
14	7W1779	—	S	N	N	42	40	2	2	—	—	—	—	—	—	—	—	diorite w/ml,fest
15	8S1079	.3	R-CR	.010	.3	15	595	4	2	.003	—	—	—	—	—	N	.004	qz-feldspar vein w/sulf
15	8S1080	15.0	CR	N	.1	9	189	3	N	N	—	—	—	—	—	—	—	qz-feldspar segregation in diorite
15	8S1081	.3	CR	N	N	19	86	2	4	N	—	—	—	—	—	—	—	vuggy qz vein
16	8S1082	.2	CC	.009	.1	12	485	3	3	.016	—	—	—	—	—	.090	.040	qz vein in metabasalt
17	8S1083	.2	CR	.027	.5	8	2140	2	10	N	—	—	—	—	—	.025	.070	qz vein w/fest,py,cp,ml
18	8S1084	—	R-CR	.008	.1	69	118	4	71	N	—	—	—	—	—	—	—	qz-metabasalt breccia w/py
18	8S1085	.8	R-CR	.008	.1	72	102	2	24	N	—	—	—	—	—	—	—	fest chlorite altered zone w/ qz,py
19	8S1086	.2	R-CR	.008	.1	43	303	5	16	N	—	—	—	—	—	N	.008	qz vein w/cp,sulf
20	8S1087	.2	R-CR	.007	N	15	165	3	6	N	—	—	—	—	—	—	—	qz vein w/cp,ml
21	8S1089	.1	R-CR	N	.1	37	103	9	17	.003	—	—	—	—	—	—	—	qz vein w/py,cp
22	7S1002	—	SS	N	.5	104	320	8	11	.024	—	—	—	—	—	—	—	
23	7W1805	—	SS	.171	.1	42	148	3	8	.022	—	—	—	—	—	—	—	

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-31.—Mount Ripinski occurrence (fig. A-72)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Pt ppm	Pd ppm	
24	7W1702	5.0	SC	0.274	1.6	53	6000	N	—	—	—	—	—	—	—	—	—	metabasalt w/ep,dissem cp,ml
25	8S1098	—	SS	.013	N	64	276	7	25	—	—	—	—	—	—	—	—	
25	8S1099	.3	R-S	.118	.1	47	89	3	8	—	—	—	—	—	—	—	—	qz-calc vein
26	8S1024	—	F-G	.012	N	40	121	4	12	0.071	—	—	—	—	—	—	—	qz-calc vein
27	8S1027	—	F-S	.012	.7	16	3000	N	4	N	—	—	—	—	—	N	0.025	altered metabasalt w/ml,az
28	8S1028	—	F-S	.024	.5	18	3200	N	1	N	—	—	—	—	—	N	.020	altered metabasalt w/cp,qz,ml
29	8S1026	.2	F-S	.036	1.1	20	1300	N	5	N	—	—	—	—	—	N	.015	qz vein w/cp
30	8S1025	—	F-S	.045	1.4	25	2600	N	9	N	—	—	—	—	—	0.020	.035	qz-feldspar w/cp,ml,metabasalt breccia
31	8W1847	—	F-G	.605	12.8	38	2.64%	3	13	N	—	—	—	—	—	N	.025	metabasalt w/bn,cp,ml,fest,qz
32	8W1844	—	F-G	.283	12.4	67	3.50%	6	15	N	—	—	—	—	—	N	.030	metabasalt w/bn,ml,fest
32	8W1845	—	F-G	.072	.4	62	4870	2	21	N	—	—	—	—	—	—	—	metabasalt w/bn,ml,fest
32	8W1846	.1	F-CH	2.440	16.9	21	3.82%	4	6	.074	—	—	—	—	—	N	.030	qz vein w/bn,ml,fest
33	8W1842	.05	F-CH	2.920	3.4	43	2.46%	4	7	.008	—	—	—	—	—	N	.060	qz veinlet w/cp,ml,fest
33	8W1843	.8	F-CH	.033	1.9	60	6300	16	7	N	—	—	—	—	—	—	—	qz vein w/cp,ml,fest
34	8W1841	—	F-G	.119	3.2	22	9100	3	3	N	—	—	—	—	—	N	.010	sheared metabasalt w/bn,ml,fest
35	8W1840	.7	F-C	.317	2.4	68	8220	2	12	N	—	—	—	—	—	N	.010	metabasalt-qz breccia w/bn
36	8W1862	1.0	CH	12.034	2.0	10	54	14	12	N	—	—	—	—	—	N	.035	qz vein w/fest,py
37	8W1863	1.2	CH	.312	4.7	22	1951	6	6	N	—	—	—	—	—	N	.020	qz vein w/cp,py,fest,ml
38	8S1041	.3	F-G	.021	.2	28	300	N	13	N	—	—	—	—	—	—	—	qz vein w/po,cp
39	8S1042	.6	F-S	.030	.9	20	3100	N	8	N	—	—	—	—	—	N	.010	qz vein w/cp,ml,ribbon texture
40	8W1848	.4	F-G	N	.1	21	1895	N	4	N	—	—	—	—	—	—	—	qz-metabasalt breccia w/cp
41	8S1043	1.0	F-G	.053	1.8	20	4400	3	12	N	—	—	—	—	—	N	.025	metabasalt w/ep,dissem cp,ml
42	8S1074	.3	CR	.005	N	64	32	5	22	N	—	—	—	—	—	—	—	calc vein in shear zone
42	8S1075	.6	CR	.013	.1	27	108	2	9	N	—	—	—	—	—	N	.008	qz-calc vein w/bn,cp
42	8S1076	.2	CR	N	.1	19	115	2	7	N	—	—	—	—	—	N	.010	qz-calc vein
42	8S1077	1.0	R-CR	.017	.4	38	2124	3	12	N	—	—	—	—	—	N	.010	qz-calc vein w/ml,cp,bn
43	8S1078	.2	R-CR	.129	5.9	60	3.97%	5	124	N	—	—	—	—	—	N	.015	massive cp in qz vein

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-32A.—Haines ultramafic occurrence (fig. A-73)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	8W1864	—	G	0.023	0.1	18	38	3	30	0.018	—	0.050	0.028	—	—	—	—	ultramafic
2	8S1044	40.0	CR	.012	N	48	27	N	30	N	—	.030	.020	—	—	—	—	ultramafic w/mag
3	8S1022	30.0	R-CR	.010	N	42	137	3	24	.018	—	.040	.045	—	—	—	—	ultramafic w/mag
3	8S1023	30.0	R-S	.007	N	76	105	4	20	.003	—	N	.008	—	—	—	—	pegmatite-feldspar veins
4	8S1067	.8	F-CR	N	.1	21	17	8	1	.012	—	N	N	—	—	—	—	qz-feldspar vein
4	8S1068	—	SS	.015	.1	59	337	5	32	N	—	.020	.025	—	—	—	—	
4	8S1069	.3	F-G	.006	.1	56	70	3	14	.075	—	N	.004	—	—	—	—	qz-ultramafic breccia w/po,py, fest
5	8S1073	2.0	CR	.007	.1	20	47	3	9	N	—	—	—	—	—	—	—	gabbro
6	8S1090	—	Sand	N	N	32	35	9	8	.025	—	N	.010	—	—	—	—	beach sand,ultramafic (west)
6	8S1091	—	Sand	N	N	33	36	9	7	.033	—	N	.006	—	—	—	—	beach sand,ultramafic (east)
6	8W1877	—	F-G	.064	.1	15	44	4	6	.004	—	—	—	—	—	—	—	thulite from beach gravel
7	8W1832	—	G	.011	N	58	360	3	26	.006	—	.050	.050	—	—	—	—	ultramafic w/mag
8	8W1856	—	G	N	.2	22	355	4	31	.038	—	.050	.045	—	—	—	—	ultramafic w/cp,ml,biotite
9	8W1855	—	G	N	.1	67	210	3	30	.010	—	.020	.025	—	—	—	—	ultramafic w/ml,cp
10	8W1854	—	G	N	N	40	36	3	33	.066	—	.015	.025	—	—	—	—	ultramafic w/biotite
11	7S0572	—	SS	N	N	60	190	6	28	—	—	—	—	—	—	—	—	
12	7W1705	—	SS	N	N	59	265	11	—	—	—	—	—	—	—	—	—	
13	7S0571	—	SS	N	N	65	170	8	21	—	—	—	—	—	—	—	—	
14	7S0586	3.0	CR	N	N	53	206	28	39	.036	—	—	—	—	—	—	—	white felsic dike
14	7S0587	—	R-S	N	N	43	274	22	29	.043	—	—	—	—	—	—	—	felsic dike and altered ultramafic w/py,fest
14	7S0588	.5	S	N	N	17	461	34	9	.013	—	—	—	—	—	—	—	felsic vein w/py,fest knot
14	F8095	—	S	N	.1	30	790	N	24	N	—	—	—	—	—	—	—	ultramafic w/dissem cp,ml
14	F8096	30.0	SC	N	.2	29	782	2	20	.017	—	—	—	—	—	—	—	ultramafic
14	F8097	30.0	SC	.068	.1	36	248	N	21	.026	—	—	—	—	—	—	—	ultramafic
14	F8098	—	S	N	.1	36	769	N	26	.007	—	—	—	—	—	—	—	ultramafic w/cp,ml
14	F8099	—	S	N	.1	42	490	N	25	.080	—	—	—	—	—	—	—	qz-breccia w/po,cp
15	7S0679	30.0	CR	N	.1	34	207	3	21	—	—	—	—	—	—	—	—	ultramafic w/ep,cp,py

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-32B.—Haines ultramafic occurrence supplementary analyses (fig. A-73)
(ppm unless marked %)

Map No.	4	4	4	6	6	14	14	14
Sample No.	1067	1068	1069	1090	1091	0586	0587	0588
Cr	—	—	—	—	—	37	25	35
U	—	—	—	—	—	<10	<10	<10
Te	—	—	—	—	—	25	<10	<10
Se	—	—	—	—	—	<5	<5	<5
V	—	—	—	—	—	338	161	36
Fe	—	—	—	—	—	7.96%	4.26%	1.75%
Be	—	—	—	—	—	2	2	2
Nb	—	—	—	—	—	42	22	12
Rb	—	—	—	—	—	93	107	68
Sr	—	—	—	—	—	272	1,012	69
Ta	—	—	—	—	—	<8	<8	25
Ce	15	15	11	21	21	—	—	—
Dy	<1	4	4	2	2	—	—	—
Er	<100	<100	<100	<100	<100	—	—	—
Eu	<1	<1	1	1	1	—	—	1
Gd	<200	<200	<200	<200	<200	—	—	—
Ho	<1	<1	<1	<1	<1	—	—	—
La	17.0	5.5	3.6	9.4	10.0	—	—	—
Lu	<.1	.4	.4	.3	.3	—	—	—
Nd	<10	<10	<10	11	12	—	—	—
Pr	<50	<50	<50	<50	<50	—	—	—
Sc	1.60	68.90	81.50	28.10	27.30	—	—	—
Sm	1.0	3.3	3.3	3.0	3.1	—	—	—
Tb	<1	<1	<1	<1	<1	—	—	—
Th	9.2	1.4	0.7	1.7	1.9	—	—	—
Tm	<.5	<.5	<.5	.6	.8	—	—	—
U	2	<1	<1	<1	<1	—	—	—
Yb	<.5	1.9	1.6	1.7	1.8	—	—	—

NOTE.—Key to abbreviations at beginning of appendix.

Supplementary analyses consisted of element analysis by plasma and/or by neutron activation; As by colorimetry; La, Ce.

Table A-1-33A.—Chilkat Peninsula and Islands (fig. A-76)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
1	1617	0.2	S	N	0.2	46	785	N	25	—	—	—	—	—	—	—	—	ultramafic w/cp
2	1786	—	SS	N	N	21	12	N	6	0.042	—	—	—	—	—	—	—	el 100 ft
3	0572	—	SS	N	N	60	190	6	28	—	—	—	—	—	—	—	—	el 60 ft
4	1705	—	SS	N	N	59	265	11	—	—	—	—	—	—	—	—	—	el 100 ft
5	0571	—	SS	N	N	65	170	8	21	—	—	—	—	—	—	—	—	el 50 ft
6	1704	.5	F–G	N	.4	8	1750	N	—	—	—	—	—	—	—	—	—	qz vein in ultramafic w/cp,ml
7	0586	3.0	CR	N	N	30	176	2	15	.037	—	—	—	—	—	—	—	felsic dike in fest brecciated zone
7	0587	.5	S	N	N	32	235	3	18	.044	—	—	—	—	—	—	—	felsic dike w/fest,py
7	0588	—	S	N	N	13	390	6	8	.014	—	—	—	—	—	—	—	felsic vein w/py
8	8095	—	S	N	.1	30	790	N	24	N	—	—	—	—	—	—	—	ultramafic w/dissem cp
8	8096	30.0	SC	N	.2	29	782	2	20	.017	—	—	—	—	—	—	—	ultramafic w/cp
8	8097	30.0	SC	0.068	.1	36	248	N	21	.026	—	—	—	—	—	—	—	ultramafic
8	8098	—	S	N	.1	36	769	N	26	.007	—	—	—	—	—	—	—	ultramafic w/cp
8	8099	—	S	N	.1	42	490	N	25	.080	—	—	—	—	—	—	—	qz breccia w/po,cp
9	0679	30.0	CR	N	.1	34	207	3	21	—	—	—	—	—	—	—	—	ultramafic w/cp,py
9	1616	10.0	SC	N	.2	37	590	N	32	—	—	—	—	—	—	—	—	ultramafic w/cp,mag
							Battery Point Occurrence (map No.10)											
10	0425	—	S	.510	N	28	920	2	11	N	—	—	—	—	—	—	—	metabasalt w/cp,ml
10	0426	—	S	.380	N	32	430	2	11	N	—	—	—	—	—	—	—	metabasalt w/cp,ml
10	0427	100.0	RC	N	N	44	290	N	15	N	—	—	—	—	—	—	—	metabasalt w/cp,ml
10	0569	1.0	S	N	N	38	400	N	16	—	—	—	—	—	—	—	—	metabasalt w/dissem cp
10	0570	—	S	.068	N	10	2650	N	7	—	—	—	—	—	—	—	—	metabasalt breccia w/qz,ep,cp, ml,az
10	1703	.5	S	N	.3	20	1850	N	—	—	—	—	—	—	—	—	—	metabasalt w/ep,cp,ml
11	0459	—	S	.100	.3	21	2570	10	10	.004	—	—	—	—	—	—	—	metabasalt w/ep,cp,ml
12	6347	—	S	—	N	70	108	4	28	N	—	—	—	—	—	—	—	metabasalt w/ep,dissem sulf,mag
13	6346	—	S	—	N	73	83	N	25	N	—	—	—	—	—	—	—	metabasalt w/ep
14	1787	2.0	C	N	.1	82	311	N	23	.013	—	—	—	—	—	—	—	shear zone w/metabasalt and metasediments w/ml,fest
15	1794	.15	C	N	.3	57	496	6	22	.170	—	—	—	—	—	—	—	metabasalt w/fest,calc,cp
16	0677	—	SS	N	N	85	46	6	17	.070	—	—	—	—	—	—	—	el 40 ft
17	0691	3.0	CR	N	.1	80	91	4	25	N	—	—	—	—	—	—	—	metabasalt w/ep,py
18	0690	—	SS	N	.1	86	107	13	57	.017	—	—	—	—	—	—	—	el 190 ft
19	0689	—	SS	N	.2	81	286	7	100	.024	—	—	—	—	—	—	—	el 190 ft
20	0688	—	SS	.068	.1	93	167	11	32	.048	—	—	—	—	—	—	—	el 120 ft
21	0687	—	SS	N	N	70	112	2	16	.052	—	—	—	—	—	—	—	el 80 ft
22	0680	—	SS	N	N	93	52	7	14	.080	—	—	—	—	—	—	—	el 20 ft
23	1706	1.0	G	N	N	66	194	N	—	—	—	—	—	—	—	—	—	metabasalt w/ep,cp
24	1010	.4	CR	N	N	10	9	5	N	.024	—	—	—	—	—	—	—	qz-feldspar band in shear in diorite
25	0678	3.0	CR	N	.6	68	1370	4	26	—	—	—	—	—	—	—	—	metabasalt w/qz,ep,cp
26	1588	—	G	N	0.3	48	134	4	35	—	—	—	—	—	—	—	—	metabasalt w/sulf

Table A-1-33A.—Chilkat Peninsula and Islands (fig. A-76)—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
Battery Point Occurrence (map No. 10)—Continued																		
26	1589	0.5	C	0.010	.6	27	345	9	58	0.004	—	—	—	—	—	—	—	qz knot in fault w/sulf
26	1590	—	G	.020	.2	17	2370	6	12	.025	—	—	—	—	—	—	—	metabasalt w/ep,sulf,cp,ml
27	1008	—	SS	—	N	106	136	11	30	.039	—	—	—	—	—	—	—	el 25 ft
27	1009	—	SS	.023	N	120	157	12	40	.041	—	—	—	—	—	—	—	el 20 ft
28	0548	—	SS	.068	.3	102	139	18	34	—	—	—	—	—	—	—	—	el 10 ft
29	1601	1.0	F-CR	N	1.2	46	2110	N	8	.005	—	—	—	—	—	—	—	qz vein w/cp,ml,py,fest
29	1689	—	F-G	N	.2	5	2200	3	5	—	—	—	—	—	—	—	—	qz vein w/cp,ml,py,fest
29	0547	—	F-S	N	.2	8	1850	4	5	—	—	—	—	—	—	—	—	qz vein w/cp,ml,py,fest
29	1005	.2	CH	.114	1.7	76	5300	N	15	N	—	—	—	—	—	—	—	qz vein w/py,cp
29	1006	.2	CR	N	N	4	36	3	N	N	—	—	—	—	—	—	—	qz vein w/sparse sulf
29	1007	.4	CH	.006	.1	9	310	3	2	N	—	—	—	—	—	—	—	qz vein w/sparse py,cp
30	1813	—	SS	.008	.1	132	57	14	14	.077	—	—	—	—	—	—	—	el SL
31	1039	5.0	CR	N	N	96	9	N	6	.011	—	—	—	—	—	—	—	chert and metabasalt w/sparse sulf
31	1822	—	SS	.035	.1	148	460	7	32	.033	—	—	—	—	—	—	—	el 250 ft
32	1814	—	SS	.012	.1	156	65	8	13	.047	—	—	—	—	—	—	—	el SL
33	1038	—	SS	.024	1.5	3000	1150	580	13	.056	—	—	—	—	—	—	—	el 230 ft
34	1815	.4	F-G	.063	1.2	560	3600	10	52	N	—	—	—	—	—	—	—	qz-metabasalt vein w/cp,py
35	0478	1.0	CR	N	.3	127	295	16	30	.005	—	—	—	—	—	—	—	metabasalt w/py,fest
36	0477	—	G	N	.2	38	175	5	30	.006	—	—	—	—	—	—	—	metabasalt w/py
Zinc Beach Occurrence (map Nos. 37-38)																		
37	1798	—	SS	.583	1.0	130	154	8	25	.019	—	—	—	—	—	—	—	el 5 ft
37	1817	—	SS	.028	.1	162	164	11	32	.025	—	—	—	—	—	—	—	el 5 ft
37	1818	—	Soil	.019	.5	240	460	7	17	.042	—	—	—	—	—	—	—	el 6 ft
37	1819	.3	F-G	.027	N	1480	23	5	16	N	—	—	—	—	—	—	—	metabasalt-calc vein w/sl
38	1600	1.0	F-G	.103	2.1	9120	7630	15	28	.003	—	—	—	—	—	—	—	qz-metabasalt breccia w/cp,sl, sulf
38	1799	1.0	F-G	.411	3.4	1.04%	8465	37	27	.014	—	—	—	—	—	—	—	qz-metabasalt breccia w/cp,sl, sulf
38	1816	.4	F-G	6.230	13.0	27.00%	2600	36	194	N	—	—	—	—	—	—	—	sl rich zone in breccia
38	1821	.3	R-G	.446	8.3	220	8400	19	44	N	—	—	—	—	—	—	—	metabasalt w/gossan,cp,py,ml, qz knot
38	1070	.2	CR	.005	N	161	50	4	10	.057	—	—	—	—	—	—	—	fest shear zone in metabasalt
39	0479	4.0	CR	N	.2	119	49	14	16	.063	—	—	—	—	—	—	—	black-gray slate
40	1608	—	G	.140	5.7	68	1.23%	18	25	.271	—	—	—	—	—	—	—	sulf knot in hornfels w/ml
40	1609	5.0	CR	N	N	105	143	8	35	.149	—	—	—	—	—	—	—	hornfels near metabasalt contact
41	1599	.3	G	N	.4	223	360	7	40	.004	—	—	—	—	—	—	—	metabasalt w/sulf
42	1598	.2	S	N	1.4	79	4750	N	32	—	—	—	—	—	—	—	—	metabasalt w/ep,cp
43	1597	.2	S	N	N	14	370	N	4	.003	—	—	—	—	—	—	—	metabasalt w/ep,cp
44	1717	20.0	RC	N	.2	126	131	N	—	—	—	—	—	—	—	—	—	metabasalt w/py,po
45	1716	5.0	SC	N	.1	36	57	N	—	—	—	—	—	—	—	—	—	metabasalt w/sulf
46	1596	.25	S	N	2.5	10	3910	3	3	—	—	—	—	—	—	—	—	metabasalt w/ep,cp
47	1606	0.5	G	N	N	65	34	3	24	0.063	—	—	—	—	—	—	—	fest ankerite in metabasalt

Table A-1-33A.—Chilkat Peninsula and Islands (fig. A-76)—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
Zinc Beach Occurrence (map Nos. 37–38)—Continued																		
48	1595	.2	F–G	N	N	110	45	3	14	—	—	—	—	—	—	—	—	qz-calc vein in metabasalt w/ml
49	1607	1.7	CC	N	0.2	42	26	7	5	—	—	—	—	—	—	—	—	red chert in metabasalt
50	0428	.5	S	N	.2	8	1920	N	4	N	—	—	—	—	—	—	—	metabasalt w/ep,qz,cp
51	1800	.3	C	N	.1	38	70	3	5	.068	—	—	—	—	—	—	—	metabasalt contact w/metabasalt w/calc
Shikosi Island Occurrence (map No. 52)																		
52	1820	.5	G	.050	2.4	3000	1.06%	N	18	N	—	—	—	—	—	—	—	metabasalt flow w/cp,ep,py,ml
52	1902	8.0	CR	N	N	24	430	2	34	N	—	—	—	—	—	—	—	altered zone in metabasalt w/cp,py,ml
52	1103	.4	S	.036	6.7	14	2.74%	3	28	N	—	—	—	—	—	—	—	ep,silica band in metabasalt w/cp
53	1803	.4	C	N	.1	98	221	N	18	N	—	—	—	—	—	—	—	metabasalt shear zone w/ep,py,fest
54	1804	.5	G	N	3.2	95	7420	2	48	N	—	—	—	—	—	—	—	metabasalt w/ep,cp,py,fest
55	1802	6.0	G	N	.1	44	24	24	5	.047	—	—	—	—	—	—	—	fest dike w/py in pillow metabasalt
Island Copper Occurrence (map Nos. 56–60)																		
56	1003	.2	S	.100	22.5	406	6.78%	6	41	N	—	—	—	—	—	—	—	silicified zone in metabasalt w/ep,cp,py
56	1004	.25	CC	.930	4.1	181	4.60%	23	15	.001	—	—	—	—	—	—	—	ep vein in metabasalt w/cp,py,ml
56	1806	4.0	CR	.070	.2	64	906	N	11	N	—	—	—	—	—	—	—	metabasalt w/ep,ml,cp,py,fest
56	1807	.2	CH	N	12.5	396	6.90%	N	139	.001	—	—	—	—	—	—	—	ep vein in metabasalt w/cp,py,ml
56	1808	.3	CH	N	1.2	107	1.34%	43	23	.001	—	—	—	—	—	—	—	ep vein in metabasalt w/cp,py,ml
56	1809	.25	CH	N	8.6	75	5.45%	27	23	.001	—	—	—	—	—	—	—	ep vein in metabasalt w/cp,py,ml
56	1810	.2	CH	N	1.1	65	1.32%	35	13	.001	—	—	—	—	—	—	—	ep vein in metabasalt w/cp,py,ml
57	1001	.6	CC	N	N	21	6	N	31	N	—	—	—	—	—	—	—	ep silicified zone in metabasalt w/py,cp,ml,sl
58	0696	.4	CC	N	.8	1660	2070	3	27	N	—	—	—	—	—	—	—	silicified ep shear zone in metabasalt w/py,cp
58	1012	.2	S	.031	13.7	1.00%	5.01%	6	56	.014	—	—	—	—	—	—	—	ep,cp,py in metabasalt shear
59	0694	1.0	CR	N	.3	101	479	6	58	N	—	—	—	—	—	—	—	metabasalt w/ep,py
59	0695	.6	CR	N	1.2	386	2.48%	35	49	.005	—	—	—	—	—	—	—	metabasalt w/ep,qz,cp,py
59	0697	1.4	CC	N	4.2	468	1.46%	5	58	N	—	—	—	—	—	—	—	qz-ep lens in metabasalt w/py,cp
59	0698	.3	CC	N	2.5	128	1.21%	18	42	N	—	—	—	—	—	—	—	ep silicified zone in metabasalt w/py,cp
59	0699	.5	CC	.100	1.5	122	7200	9	55	N	—	—	—	—	—	—	—	ep silicified zone in metabasalt w/py,cp,bn,sl

Table A-1-33A.—Chilkat Peninsula and Islands (fig. A-76)—Continued

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %) Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm	X-ray Ba %	Spectrographic (ppm) W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	Lith. & Remarks
Island Copper Occurrence (map Nos. 56–60)—Continued																		
59	1013	.2	CR	.142	.5	8000	1700	28	42	.011	—	—	—	—	—	—	—	qz vein w/ep,cp,py,sl
59	1014	.3	CR	.927	.4	5750	680	13	25	.006	—	—	—	—	—	—	—	qz-ep vein w/py,cp,sl
60	1801	.5	C	2.540	1.1	2.14%	1950	7	21	.015	—	—	—	—	—	—	—	qz-calc breccia in metabasalt w/cp,py,sl,ml

Table A-1-33B.—Chilkat Peninsula and Islands supplementary analyses (fig. A-76) (ppm unless marked %)

Map No.	7	7	7	38	56	56	56	56	56	59
Sample No.	0586	0587	0588	1799	1044	1807	1808	1809	1810	0695
Cd	<1	<1	<1	45	<1	1	<1	<1	<1	<1
Mn	1,034	704	360	855	1,032	1,032	1,247	1,006	692	1,000
Cr	37	25	35	127	155	143	99	157	183	97
L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
W	<10	<10	<10	<13	<10	<11	<10	<10	<10	<10
Ta	25	<10	<10	<21	<10	<15	<10	<10	<10	<10
Se	<5	<5	<5	<5	<5	67	<5	29	8	39
V	338	161	36	57	396	291	448	471	237	295
Fe	7.96%	4.26%	1.75%	4.53%	>10%	>10%	8.37%	>10%	5.81%	>10%
Be	2	2	2	<1	<1	<1	<1	<1	<1	<1
Li	4	12	<1	6	8	10	13	8	9	6
Nb	42	22	12	11	67	50	80	84	33	51
Rb	93	107	68	<8	<8	<8	<8	<8	<8	9
Sr	272	1,012	69	9	499	292	394	511	208	334
Ta	<8	<8	25	10	<8	<8	<8	<8	<8	13
Al	7.68%	8.16%	7.38%	1.29%	5.49%	4.97%	6.62%	6.68%	3.92%	3.82%
Mg	3.54%	2.59%	.30%	.81%	.13%	.71%	.51%	.15%	.27%	.11%
Ca	4.65%	4.84%	.44%	3.66%	8.15%	4.99%	7.82%	9.53%	4.51%	6.08%
Na	2.34%	2.78%	3.36%	.19%	.32%	.30%	.32%	.40%	.19%	.30%
K	2.51%	2.06%	2.51%	.08%	<.05%	.06%	<.05%	.06%	<.05%	.06%

NOTE.—Key to abbreviations at beginning of appendix.

Supplementary analyses consisted of element analysis by plasma and/or by neutron activation.

Table A-1-34.—Road Cut II and other area analytical results (fig. A-77)
(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au	Ag	Cu	Zn	Pb	Co	Ba	Remarks
1	0543	S	NA	0.24	0.3	640	103	5	31	—	metabasalt w/fest,ml
2	0544	CR	0.7	.14	.3	345	57	4	14	—	green fault gouge & fest metabasalt
2	0545	S	NA	.07	<.1	240	50	4	17	—	ml st metabasalt ep & qz stringers
3	1688	G	2	.38	1.2	6,900	66	<2	14	—	metabasalt w/ep,cp,ml,fest
4	0581	S	NA	<.07	.4	1,750	84	<2	36	—	metabasalt w/ep,cp
5	0546	S	NA	<.07	<.1	385	30	4	11	—	metabasalt w/ml
6	1687	G	1.5	.10	.1	1,150	13	5	5	—	ep knots w/cp,ml,fest
7	1782	SS	NA	<.07	.1	35	75	6	13	680	el 200 ft
8	0551	PC	NA	<.07	.1	14	39	5	47	—	el 175 ft
8	0552	SS	NA	<.07	.2	35	62	21	50	—	el 175 ft
8	0553	SS	NA	<.07	<.1	58	92	7	15	—	el 175 ft
9	0554	SS	NA	.07	<.1	90	80	15	16	—	el 160 ft
10	0555	SS	NA	.07	<.1	62	100	13	14	—	el 150 ft
10	0556	SS	NA	.31	<.1	93	83	26	16	—	el 150 ft
11	0549	PC	NA	<.07	.1	73	44	3	18	—	el 140 ft
11	0550	SS	NA	<.07	.4	129	105	17	26	—	el 140 ft
12	1686	SS	NA	<.07	.1	134	104	11	21	—	el Sea level
13	0559	PC	NA	<.07	.1	32	27	2	20	—	el 200 ft
13	0560	SS	NA	.10	.5	79	76	13	21	—	el 200 ft
13	0561	PC	NA	<.07	.1	101	42	4	17	—	el 200 ft
13	0562	SS	NA	.21	.3	162	68	17	23	—	el 200 ft
14	1795	SS	NA	<.07	.5	89	83	9	12	240	el 300 ft
15	1796	SS	NA	<.07	<.1	379	71	7	45	220	el 300 ft
15	1797	SS	NA	<.07	<.1	303	64	10	23	240	el 300 ft
16	0692	SS	NA	<.07	.1	242	59	11	23	280	el 260 ft
17	0557	PC	NA	.17	<.1	158	56	5	18	—	el 310 ft
17	0558	SS	NA	.07	<.1	310	95	16	30	—	el 310 ft
17	0693	SS	NA	<.07	.1	611	71	13	47	200	el 300 ft
18	0682	SS	NA	.24	.5	207	91	27	23	160	el 375 ft
19	0686	SS	NA	<.07	<.1	228	171	11	28	270	el 460 ft
20	0683	SS	NA	<.07	<.1	361	97	9	33	210	el 440 ft
21	0567	SS	NA	<.07	<.1	240	80	28	33	—	el 550 ft
21	0568	CR	4	<.07	<.1	114	44		23	—	ultramafic
21	0684	CR	1	<.07	.2	179	87	83	28	310	metabasalt w/qz stringers
21	0685	SS	NA	<.07	<.1	323	106	8	30	230	el 490 ft
22	0566	SS	NA	.07	<.1	60	43	16	19	—	el 600 ft
23	0564	SS	NA	.10	.1	245	63	23	27	—	el 1200 ft
23	0565	CR	2	<.07	<.1	140	35	4	12	—	metabasalt w/sparse sulf,py,cp
24	0563	CR	8	<.07	<.1	19	22	<2	11	—	metabasalt
25	1713	G	.2	<.07	<.1	56	100	<2	—	—	fest zone in metabasalt w/sulf
26	0666	S	.5	.07	.7	2,200	32	<2	4	<20	qz-ep lens in metabasalt w/py,cp
27	0667	CR	.4	<.07	.1	300	1,750	<2	30	<20	ep rich metabasalt w/cp,sl
27	0668	S	NA	<.07	.1	270	3,000	<2	26	<20	ep metabasalt rubble w/qz stringers w/cp,sl,py
28	1776	C	.2	.10	.1	200	385	3	70	—	fest ep zone in metabasalt w/py,sl,cp
28	1777	CC	.15	<.07	<.1	50	740	27	18	—	shear zone in metabasalt w/calc,sl,fest
29	1783	SS	NA	<.07	.1	237	155	12	23	360	el 100 ft
30	1775	S	.3	<.07	.3	710	8,000	<2	23	—	qz-ep veinlets in metabasalt w/cp,sl,py
31	0665	CR	2	<.07	.2	510	1	<2	15	<20	metabasalt w/qz-ep stringers w/cp
31	1774	C	.4	<.07	.4	1,900	1.83%	<2	29	—	qz-ep veinlet in metabasalt w/cp,sl,py
32	1784	SS	NA	<.07	.2	192	168	8	26	210	el 75 ft
33	0664	CH	0.2	0.17	2.5	6,950	56	2	13	<20	qz-ep lens in metabasalt w/cp
33	1712	C	1	.10	.2	275	1.05%	<2	—	—	qz-calc zone in metabasalt w/ep,py,sl,cp
33	1772	CR	.4	<.07	.8	2,000	2,000	<2	20	—	qz-ep veinlets in metabasalt w/sl,cp
33	1773	G	.5	<.07	<.1	94	114	<2	19	—	sl veinlet in ep zone in metabasalt
34	0663	CR	3	<.07	.1	500	54	4	12	<20	metabasalt w/qz-ep stringers w/cp,py
35	1785	SS	NA	<.07	.1	243	84	7	50	320	el 95 ft
36	1771	G	.1	<.07	.4	1,750	450	<2	18	—	qz-ep veinlets in metabasalt w/cp,sl
37	1770	C	5	<.07	.4	1,900	74	<2	21	—	ep zone in metabasalt w/cp,some qz

Table A-1-34.—Road Cut II and other area analytical results (fig. A-77)—Continued
(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au	Ag	Cu	Zn	Pb	Co	Ba	Remarks
38	1711	G	.4	.21	.6	2,800	32	3	—	—	fault zone in metabasalt w/cp,py,ml,fest
39	1788	SS	NA	<.07	<.1	465	97	8	26	260	el 50 ft
40	0673	CR	1	<.07	.3	254	43	4	37	—	tan st qz-calc altered metabasalt w/py,cp
41	0672	CR	5	<.07	.1	95	47	3	23	—	ultramafic
42	0674	CR	3	<.07	.2	190	122	5	30	—	tan & gray schist
43	1789	SS	NA	<.07	.3	210	108	24	30	150	el 160 ft
44	0675	S	1	<.07	.4	1,170	84	<2	35	—	ep altered zone in metabasalt w/cp
45	1790	SS	NA	<.07	.1	340	65	17	8	150	el 150 ft
46	0676	C	.75	<.07	.1	148	61	3	23	—	hem st silicified metabasalt dike w/some py,cp
47	1791	Soil	NA	<.07	.3	327	69	2	30	190	el 150 ft
48	1792	SS	NA	<.07	.2	125	60	15	35	110	el 90 ft
49	0681	CR	3	.07	.2	158	66	5	10	—	ep altered dike in black metabasalt w/cp
49	1710	CR	5	<.07	<.1	215	83	2	—	—	green schist ep zone in metabasalt w/sulf
50	1793	SS	NA	.79	.2	227	64	10	18	340	el 200 ft
51	1707	C	1.6	.07	<.1	1,750	10	<2	—	—	ep zone in metabasalt w/cp,ml,py
51	1708	G	.3	<.07	<.1	465	74	<2	—	—	fault zone in metabasalt w/calc,ep,gouge,py,fest
51	1709	G	NA	<.07	<.1	2,250	33	<2	—	—	metabasalt w/sulf,cp

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-35A.—Road Cut prospect surface analytical results (figs. A-78, A-82)
(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au	Ag	Cu	Zn	Pb	Co	Ba	Remarks
1a	1677	SC	5.0	<0.07	<0.1	420	71	14	21	—	metabasalt w/calc veinlet,ml
1b	1678	SC	5.0	<.07	<.1	164	54	<2	19	—	metabasalt
2a	0538	C	.6	<.07	.3	380	98	6	—	—	sheared metabasalt and fault gouge
2b	0537	CR	10.0	.07	.2	570	62	6	—	—	metabasalt
2c	0536	CH	.4	6.69	10.0	1.15%	73	17	—	—	fault zone w/cp,py,ml,gouge and qz eyes
2d	0535	C	7.0	.07	<.1	140	38	5	—	—	metabasalt in fault zone
2e	0534	CH	.1	10.80	5.9	5,900	53	11	—	—	qz-calc vein w/py,cp,fest,fault gouge
3a	1679	CC	.05	.58	5.4	1.05%	59	22	191	—	sulf-qz veinlet w/py,cp,ml,fest
3b	1680	SC	8.5	<.07	<.1	76	70	4	27	—	metabasalt w/calc veinlets
3c	1681	C	1.0	.55	4.6	1.15%	65	10	19	—	metabasalt w/ml,fest,cp
3d	1682	C	1.0	<.07	.1	335	89	6	30	—	metabasalt
4a	1631	CH	.2	.62	1.0	1,120	23	7	54	250	qz-calc brecciated metabasalt w/cp,py,ml
5a	1632	CH	.4	7.99	20.0	4.61%	50	32	196	50	qz w/cp,py,ml
5b	0541	C	2.0	<.07	.1	60	74	5	—	—	metabasalt
5c	0540	C	5.5	<.07	<.1	53	60	6	—	—	altered metabasalt
5d	0542	S	.5	28.42	22.0	4.67%	33	22	—	—	brecciated metabasalt w/qz-calc,cp,py
5e	0539	CC	2.5	.14	.2	79	64	7	—	—	sheared metabasalt w/sparse qz and sulf
6a	1684	C	.4	6.93	2.1	1,600	26	12	88	—	qz-metabasalt w/cp,py
6b	1685	SC	5.0	.10	.2	138	76	10	32	—	metabasalt
7a	1633	CC	.9	.65	1.0	1,060	39	2	47	240	altered metabasalt w/cp,py
7b	1634	CH	.2	4.94	20.0	4.88%	36	14	113	15	qz w/cp,py
7c	1635	CH	1.1	19.89	22.0	2.24%	20	4	120	<5	qz w/metabasalt w/cp,py in bands and blebs
8a	1636	CC	1.0	.86	.6	2,000	48	<2	17	210	metabasalt
8b	1637	CH	.9	9.29	25.0	2.76%	22	18	71	50	fest qz w/cp,py
8c	1638	CC	1.0	.14	<.1	5,400	104	4	40	340	metabasalt
9a	0476	CC	1.0	.42	.5	3,375	42	4	63	180	fest shear or gossan zone w/cp
9b	0475	CC	1.1	2.72	24.0	4.28%	52	17	101	—	qz-calc zone w/cp
10a	1655	CC	.7	.07	<.1	320	64	5	22	330	metabasalt
10b	1656	CC	.7	6.72	11.0	5,400	20	5	113	70	altered metabasalt,qz w/cp,py
10c	1657	CC	1.3	.34	1.1	2,100	40	3	23	330	altered metabasalt w/cp,py
10d	1658	CC	.15	<.07	<.1	30	30	4	7	350	metabasalt breccia w/calc,qz
11a	1653	CC	.7	4.97	2.3	4,400	52	5	54	370	metabasalt w/one 0.01 ft band of cp,py
11b	1654	CH	1.9	2.16	2.3	470	40	5	40	20	qz-calc, metabasalt w/cp,py
12a	1584	CC	1.0	.65	2.0	1,330	56	8	43	330	fest altered metabasalt
12b	1583	CC	1.6	16.94	26.0	8,370	24	8	165	—	fest altered metabasalt w/ cp,py,ml
13a	1652	CC	1.6	33.12	79.5	3.77%	24	5	137	<5	qz-calc w/cp,py
14a	1582	CC	1.1	7.71	8.5	3,340	41	5	56	150	fest altered metabasalt w/ cp,py,ml
14b	1581	CC	.4	19.65	42.2	10.70%	46	14	88	—	fest altered metabasalt w/ cp,py,ml
15a	1650	CC	1.5	17.90	24.0	1.26%	44	3	50	10	altered metabasalt,qz w/cp,py,0.1 ft fault gouge
15b	1651	CH	.3	15.33	56.6	6.44%	73	15	157	20	qz,cp,py,ml w/fest metabasalt
16a	0458	CC	1.0	2.40	26.0	22.70%	76	10	30	—	cp, py
16b	0457	CC	1.5	3.57	9.0	3.09%	57	7	66	120	altered metabasalt w/qz,cp,py
16c	0456	RC	1.0	.86	7.3	1.17%	110	3	71	120	gossan and fault gouge
16d	0455	RC	4.0	<.07	<.2	475	54	2	30	530	ultramafic dike,ep,phlogopite,sparse cp
16e	0454	RC	3.0	<.07	<.2	28	72	4	25	390	fine grained mafic-ultramafic rock

Table A-1-35A.—Road Cut prospect surface analytical results (figs. A-78, A-82)—Continued
(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au	Ag	Cu	Zn	Pb	Co	Ba	Remarks
16f	0453	RC	3.0	<.07	<.2	37	43	17	8	920	porphyritic metadiorite
17a	0580	CR	1.0	0.24	1.0	1,250	74	2	35	—	metabasalt
17b	0579	CH	.7	<.07	.4	605	37	<2	11	—	metabasalt w/qz-calc
17c	0578	CH	.5	6.75	30.0	6.88%	37	8	69	—	qz-calc w/metabasalt,cp,py
17d	0577	CH	.3	.72	3.4	4,450	67	5	40	—	metabasalt
17e	0576	CH	.9	2.78	12.0	2.58%	49	5	86	—	qz-calc w/cp,py,metabasalt
17f	0575	CR	3.0	<.07	<.1	965	70	2	29	—	ultramafic w/phlogopite
17g	0574	CR	3.0	<.07	<.1	90	57	4	19	—	metabasalt
17h	0573	CC	15.0	<.07	<.1	32	40	4	6	—	porphyritic metadiorite
18a	0492	CC	1.4	16.90	37.0	3.30%	38	7	80	<5	altered metabasalt,qz-calc w/cp,py
18b	0493	CC	1.7	1.71	2.4	4,450	70	8	36	30	altered metabasalt w/cp,py
19a	1647	CC	1.4	.34	.4	470	52	2	40	90	altered metabasalt w/cp,py
19b	1648	CH	1.1	16.80	40.5	8.36%	58	10	85	10	qz-calc w/py,cp,0.001 ft fault gouge
19c	1649	CC	1.0	5.01	3.1	2,300	78	4	35	130	altered metabasalt w/cp,py,veinlet of qz
19d	0487	CC	1.0	<.01	<.2	220	45	5	25	550	ultramafic dike w/2 in phlogopite
20a	0469	CC	1.5	.10	.4	765	94	3	40	80	metabasalt
20b	0468	CH	.7	30.51	61.7	10.90%	55	10	99	—	cp,py w/qz,and 0.05 ft fault gouge
20c	0467	CC	1.6	9.19	16.0	1.11%	58	4	63	150	qz-calc,altered metabasalt w/cp,py
20d	0466	CC	1.5	.27	.4	730	67	3	34	390	ultramafic w/phlogopite
21a	0473	CC	1.0	.31	.8	640	37	6	20	—	metabasalt
21b	0472	CC	.5	33.26	62.7	10.60%	45	8	114	—	qz-calc w/cp,py
21c	0471	CC	3.0	10.05	24.0	2.01%	40	6	46	90	altered metabasalt w/cp,py
21d	0470	CC	2.5	<.07	.2	360	38	3	18	110	ultramafic
22a	1643	CC	1.0	.07	<.1	78	110	3	40	50	metabasalt
22b	1644	CC	.9	.93	.7	400	66	4	19	<5	altered metabasalt w/cp,py
22c	1645	CH	.7	4.83	22.5	5.04%	88	8	40	20	qz w/cp,py,0.1 ft of fest fault gouge
22d	1646	CC	1.0	.17	<.1	310	60	2	27	<5	metabasalt
23a	1570	RC	2.0	.14	.2	245	111	19	43	170	sheared ultramafic w/cp,py,fest
23b	1571	CH	.25	18.03	35.0	6.90%	42	14	53	—	qz-calc w/cp,py
24a	1639	CC	.5	.34	.2	180	68	4	42	100	metabasalt w/cp,py
24b	1640	CC	.5	.89	5.0	4,900	35	3	53	200	qz w/cp,py
24c	1641	CH	.1	1.34	2.7	2,600	48	9	62	70	fault gouge
24d	1642	CC	1.0	<.07	<.1	240	72	3	25	80	metabasalt
25a	1578	CC	1.0	<.07	.2	112	74	16	32	120	fest altered metabasalt w/cp,py
25b	1577	CC	.6	1.65	1.8	1,660	69	7	52	110	fest altered metabasalt w/ cp,py,ml
25c	1576	CC	1.0	.31	.4	250	76	30	30	190	altered metabasalt
26a	1569	CH	1.1	3.02	9.9	1.58%	34	11	89	130	shear zone,cp,fest,ml
26b	1568	RC	5.0	<.07	.2	81	72	17	28	120	ultramafic
26c	1567	RC	10.0	<.07	<.2	47	28	15	7	990	silicified zone in ultramafic
26d	1566	SC	18.0	<.07	<.2	82	39	46	17	110	ultramafic
27a	1575	CC	.8	5.97	3.5	405	53	13	93	140	qz-altered metabasalt w/cp,py
27b	1574	CC	.6	22.05	20.0	1,365	62	18	118	—	fest altered metabasalt w/cp,py
28a	0527	CC	1.3	.07	<.1	240	92	2	33	260	metabasalt
28b	0526	CC	2.0	2.91	2.6	300	78	<2	45	110	fest greenstone w/sulf
28c	0525	CC	1.7	.17	<.1	530	120	4	32	200	brecciated metabasalt w/0.4 ft of fault gouge
29a	1573	CC	1.2	.89	1.2	400	100	5	42	150	fest altered metabasalt
29b	1572	CC	1.0	.31	.4	460	102	5	39	220	fest altered metabasalt
30a	0523	CC	.7	.07	<.1	370	98	9	37	180	fest altered metabasalt
30b	0522	CC	1.2	.38	.4	320	60	6	60	190	fest metabasalt w/calc
30c	0521	CC	1.4	1.47	.8	20	44	20	95	230	fest altered metabasalt w/fault gouge

Table A-1-35A.—Road Cut prospect surface analytical results (figs. A-78, A-82)—Continued
(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au	Ag	Cu	Zn	Pb	Co	Ba	Remarks
31a	1659	CC	1.5	0.10	<0.1	26	34	3	17	150	metabasalt breccia w/qz-calc,some sulf
32a	0488	RC	2.8	.16	.2	13	27	6	24	130	metabasalt breccia w/qz-calc,some sulf
33a	1580	CC	2.0	<.07	3.6	220	75	17	28	130	altered metabasalt w/some fest
33b	1579	CC	3.0	<.07	.3	45	78	13	27	210	fest altered metabasalt
34a	0532	CC	2.3	1.65	1.0	95	28	2	47	140	qz-calc zone w/py,fault gouge
34b	0531	CC	2.0	.27	<.1	41	56	7	24	140	fest fault gouge,qz,calc,sparse py
35a	0530	CC	.7	.58	.5	35	20	2	60	100	fest fault gouge,qz,calc,sparse py
35b	0529	CC	3.0	.93	.2	160	24	3	35	80	qz-calc,zone w/brecciated altered metabasalt,sparse py
35c	0528	CC	1.2	<.07	<.1	110	84	2	30	70	altered metabasalt
36a	1683	CC	3.0	1.71	1.0	179	23	10	55	—	altered metabasalt w/py,fest
37a	0474	RC	1.5	.07	.3	357	139	6	67	90	metabasalt

Table A-1-35B.—Road Cut prospect, surface sample supplementary analyses (figs. A-78, A-82)
(ppm unless marked %)

Map No.	5a	7b	5b	10b	15a	19b	22c	24b
Sample No.	1632	1634	1637	1656	1650	1648	1645	1640
L	12	14	4	3	3	18	7	3
Fe	15%	10%	15%	10%	3%	15%	5%	3%
W	3	3	2	3	2	3	3	3
Cd	<20	<20	<20	<20	<20	<20	<20	<20
Mn	300	500	500	1,500	700	300	700	1,000
V	50	15	70	70	70	50	70	70
Zr	<10	<10	<10	<10	<10	<10	<10	20
B	10	10	10	<10	<10	10	10	<10
Be	<1	<1	<1	<1	<1	<1	<1	<1
La	20	20	20	<20	<20	<20	<20	<20
Nb	<10	<10	<10	<10	<10	<10	<10	<10
Sc	5	<5	5	7	<5	5	5	10
Sr	<100	<100	<100	100	<100	<100	<100	100
Y	<10	<10	20	20	<10	<10	10	10
Ca	.05%	.50%	<.05%	5%	.70%	.30%	2%	3%
Mg	.15%	.20%	.15%	.70%	.30%	.20%	.50%	.70%
Ti	.07%	.07%	.10%	.10%	.07%	.07%	.10%	.20%
Na	.15%	<.15%	.20%	.30%	.30%	.20%	<.15%	.50%
K	<.50%	<.50%	<.50%	<.50%	<.50%	<.50%	<.50%	.50%
Si	30%	30%	30%	30%	30%	30%	30%	30%
Al	1%	1%	1%	2%	1%	1%	2%	2%
Pt	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Pd	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01

NOTE.—Key to abbreviations at beginning of appendix.

Supplementary analyses consisted of element analysis by plasma and/or by neutron activation; and Pt and Pd by fire assay ICP.

Table A-1-36.—Road Cut DDH analytical results
(All values in ppm unless marked %)

Sample No	Depth From	Depth To	Interval	Au	Ag	Cu	Zn	Pb	Co	Remarks
					DDH1 (see fig. A-85)					
1	2.00	5.00	3.00	2.64	0.8	3,100	86	3	27	metabasalt w/qz,calc,cp,py
2	5.00	10.00	5.00	.07	.1	285	69	2	28	metabasalt w/qz,calc,cp,py
3	10.00	15.00	5.00	<.07	<.1	155	42	<2	19	metabasalt w/ep
4	15.00	20.00	5.00	<.07	<.1	290	79	<2	30	metabasalt w/ep
5	20.00	26.00	6.00	.14	<.1	82	82	<2	35	metabasalt w/qz-calc
6	26.00	28.00	2.00	.07	<.1	29	73	<2	27	metabasalt w/qz-calc
7	28.00	28.30	0.30	.10	<.1	12	100	<2	38	metabasalt w/qz-calc,fest
8	28.30	29.50	1.20	.10	<.1	70	69	<2	31	metabasalt w/qz-calc
9	29.50	32.00	2.50	.89	.7	565	47	<2	35	metabasalt-qz breccia w/cp,py
10	32.00	32.60	0.60	.75	1.6	370	30	2	84	fault zone w/qz breccia,cp,py
11	32.60	32.80	0.20	.24	18.0	1.84%	29	2	21	qz-breccia zone w/cp
12	32.80	35.00	2.20	<.07	<.1	230	68	<2	30	metabasalt w/qz-calc,cp,py
13	35.00	36.00	1.00	1.61	<.1	295	70	<2	46	metabasalt w/qz,cp,py
14	36.00	38.50	2.50	5.93	1.7	99	10	<2	107	qz-calc breccia w/py,cp
15	38.50	40.00	1.50	.10	.1	107	20	<2	7	qz-calc breccia w/cp,py
16	40.00	40.80	0.80	.07	<.1	97	30	<2	12	metabasalt breccia w/qz
17	40.80	45.50	4.70	<.07	<.1	74	40	<2	17	metabasalt w/ep
18	45.50	50.50	5.00	<.07	<.1	61	43	<2	18	metabasalt w/ep
19	50.50	57.50	7.00	<.07	.1	64	32	<2	13	metabasalt w/ep
20	57.50	60.00	2.50	<.07	<.1	33	26	<2	9	chert-ep w/hem st
					DDH2 (see fig. A-86)					
21	27.00	27.40	0.40	<0.07	<0.1	37	—	—	—	metabasalt w/qz-calc,py,cp
22	30.60	31.40	0.80	<.07	.2	14	—	—	—	metabasalt w/ep,cp,py
23	82.90	84.00	1.10	<.07	<.1	205	—	—	—	metabasalt w/ep,cp,py
24	103.50	104.50	1.00	.14	<.1	29	—	—	—	silicified zone w/cp,py
25	104.50	105.10	0.60	<.07	<.1	20	—	—	—	metabasalt
26	105.10	107.00	1.90	.07	<.1	24	—	—	—	metabasalt-ep breccia w/cp,py
27	107.00	109.30	2.30	<.07	<.1	55	—	—	—	metabasalt w/qz,py,cp
28	109.30	110.00	0.70	<.07	<.1	13	—	—	—	sheared metabasalt w/gouge
29	110.00	114.60	4.60	.07	.2	11	—	—	—	silicified zone w/py,cp
30	114.60	117.00	2.40	<.07	.1	122	—	—	—	ultramafic w/phlogopite
31	117.00	119.60	2.60	.10	<.1	39	—	—	—	ultramafic w/phlogopite
32	119.60	122.50	2.90	.07	<.1	46	—	—	—	silicified breccia w/py,cp
33	122.50	124.25	1.75	<.07	<.1	24	—	—	—	silicified breccia w/py,cp
34	124.25	126.00	1.75	.07	<.1	34	—	—	—	silicified breccia w/py,cp
35	126.00	130.00	4.00	.07	<.1	70	—	—	—	metabasalt breccia w/qz,po,py
36	130.00	131.40	1.40	.10	<.1	111	—	—	—	metabasalt breccia w/qz,py,cp
37	131.40	133.20	1.80	.24	<.1	37	—	—	—	silicified breccia w/po,py
38	133.20	135.00	1.80	<.07	<.1	74	—	—	—	metabasalt breccia w/qz,py,cp
39	135.00	138.00	3.00	.10	<.1	5	—	—	—	metabasalt breccia w/qz,py,cp
40	138.00	141.00	3.00	.31	1.4	26	—	—	—	metabasalt breccia w/qz,py,cp
41	141.00	146.40	5.40	<.07	.2	162	—	—	—	metabasalt w/qz,py,cp
42	146.40	149.10	2.70	.24	<.1	16	—	—	—	metabasalt breccia w/qz,cp,py
43	149.10	153.00	3.90	<.07	<.1	171	—	—	—	metabasalt
44	163.00	165.00	2.00	<.07	<.1	95	—	—	—	metabasalt w/ep,py
					DDH 3 (see fig. A-85)					
45	57.40	58.40	1.00	<0.07	0.2	650	—	—	—	ep-qtz w/cp,py
46	58.40	60.00	1.60	<.07	.2	360	—	—	—	metabasalt w/ep,dissem py,cp
47	60.00	63.00	3.00	<.07	.2	80	—	—	—	metabasalt w/qz stringers
48	90.00	92.50	2.50	<.07	.1	31	—	—	—	metabasalt w/ep,qz
49	190.60	193.20	2.60	<.07	.2	25	—	—	—	metabasalt breccia w/qz,py
					DDH3 (see fig. A-85)					
50	193.20	196.50	3.30	<.07	.1	77	—	—	—	metabasalt w/sparse qz,py
51	196.50	198.50	2.00	.07	<.1	13	—	—	—	metabasalt w/qz,py

Table A-1-36.—Road Cut DDH analytical results—Continued
(All values in ppm unless marked %)

Sample No	Depth From	Depth To	Interval	Au	Ag	Cu	Zn	Pb	Co	Remarks
					DDH3 (see fig. A-85) —Continued					
52	198.50	200.30	1.80	.27	.3	34	—	—	—	metabasalt w/qz breccia,py
53	200.30	202.30	2.00	.55	.7	21	—	—	—	metabasalt-breccia w/qz,py
54	202.30	204.70	2.40	.17	.3	13	—	—	—	metabasalt-breccia w/qz,py,cp
55	204.70	205.20	0.50	.07	.3	4	—	—	—	metabasalt w/py
56	205.20	208.80	3.60	.72	.6	14	—	—	—	metabasalt-breccia w/qz,py,cp
57	208.80	211.90	3.10	1.85	1.3	31	—	—	—	metabasalt-breccia w/qz,py,cp
58	211.90	215.00	3.10	.45	.6	24	—	—	—	metabasalt-breccia w/py,cp
59	215.00	217.00	2.00	.41	.6	52	—	—	—	metabasalt w/qz,py
60	217.00	219.00	2.00	<.07	.2	134	—	—	—	metabasalt w/qz,py
61	219.00	224.00	5.00	<.07	.2	45	—	—	—	metabasalt w/qz,py
62	224.00	226.20	2.20	<.07	.2	16	—	—	—	metadiorite w/some py
63	226.20	228.50	2.30	<.07	.2	320	—	—	—	metabasalt w/ep,py,cp
64	228.50	230.00	1.50	<.07	.2	240	—	—	—	metabasalt w/ep,py,cp
65	230.00	235.00	5.00	<.07	.2	280	—	—	—	metabasalt w/ep,py,cp
66	235.00	237.00	2.00	<.07	.1	142	—	—	—	metabasalt w/ep,cp,py
67	237.00	242.00	5.00	<.07	.1	54	—	—	—	metabasalt w/ep,py,cp
68	273.00	275.00	2.00	.34	.7	400	—	—	—	metabasalt w/qz,py,cp
					DDH4 (see fig. A-84)					
69	0.00	9.00	9.00	0.17	0.5	200	—	—	—	metabasalt-breccia w/qz,py,cp
70	9.00	10.00	1.00	1.51	.9	32	—	—	—	metabasalt w/qz,py,cp
71	10.00	14.70	4.70	.62	.5	151	—	—	—	metabasalt-breccia w/qz,py
72	14.70	17.00	2.30	.45	.4	6	—	—	—	silicified breccia w/py,cp
73	17.00	19.00	2.00	.65	.4	12	—	—	—	silicified breccia w/py,cp
74	19.00	21.50	2.50	.21	.3	165	—	—	—	metabasalt-breccia w/qz,py,cp
75	21.50	22.50	1.00	<.07	.1	32	—	—	—	breccia zone w/py,cp
76	22.50	26.20	3.70	.31	.5	300	—	—	—	metabasalt-breccia w/qz,py,cp
77	26.20	27.50	1.30	.89	1.7	132	—	—	—	silicified zone w/py,cp
78	27.50	29.00	1.50	<.07	.2	170	—	—	—	metabasalt w/qz,cp,py
79	36.00	38.30	2.30	<.07	.1	220	—	—	—	metabasalt-breccia w/qz,py,cp
					DDH5 (see fig. A-83)					
80	27.00	31.00	4.00	<0.07	<0.2	309	57	—	—	metabasalt w/qz,py,cp
81	51.00	52.40	1.40	<.07	.2	39	37	—	—	silicified metabasalt w/py,cp
82	52.40	61.00	8.60	.10	<.2	134	56	—	—	metabasalt w/qz,py,cp
83	61.00	64.00	3.00	.41	1.0	214	65	—	—	metabasalt w/qz,py
84	64.00	76.00	12.00	<.07	.3	184	60	—	—	metabasalt w/ep,py
					DDH6 (see fig. A-83)					
111	0.00	8.00	8.00	<0.07	<0.2	72	39	—	—	metabasalt w/ep,qz,py
112	8.00	16.00	8.00	<.07	<.2	64	41	—	—	metabasalt w/ep,qz,sulf
113	16.00	21.00	5.00	<.07	<.2	115	38	—	—	metabasalt w/ep,qz
114	21.00	29.50	8.50	<.07	<.2	76	49	—	—	metabasalt w/cp,mylonite
115	29.50	36.00	6.50	<.07	<.2	5	59	—	—	metabasalt w/qz,ep
116	36.00	40.00	4.00	<.07	<.2	18	53	—	—	metabasalt w/qz,ep
117	40.00	46.00	6.00	<.07	<.2	80	56	—	—	metabasalt
118	46.00	50.00	4.00	<.07	<.2	162	43	—	—	metabasalt w/ep,cp
119	50.00	56.00	6.00	<.07	<.2	199	59	—	—	metabasalt w/qz,ep,sulf
120	60.00	66.00	6.00	<.07	<.2	119	49	—	—	metabasalt w/ep,qz,cp,py
121	66.00	70.00	4.00	<.07	<.2	49	46	—	—	metabasalt w/qz,ep,cp
122	74.50	79.00	4.50	<.07	<.2	289	44	—	—	metabasalt w/ep,qz,cp
123	83.00	84.00	1.00	<.07	<.2	85	46	8	—	metabasalt w/ep,qz,cp,py,sl
124	88.00	91.00	3.00	<.07	<.2	14	29	—	—	metabasalt-ep-qz
125	96.00	101.00	5.00	<.07	<.2	33	46	—	—	metabasalt w/qz,ep,cp
					DDH7 (see fig. A-87)					
85	64.90	65.40	0.50	<0.07	0.3	400	29	—	—	metabasalt w/ep,qz,py,cp
86	80.00	81.00	1.00	<.07	<.2	182	22	—	—	metadiorite w/metabasalt w/py,cp
87	92.00	94.00	2.00	.14	<.2	50	36	—	—	metabasalt w/ep,py,cp

Table A-1-36.—Road Cut DDH analytical results—Continued
(All values in ppm unless marked %)

Sample No	Depth From	Depth To	Interval	Au	Ag	Cu	Zn	Pb	Co	Remarks
				DDH7 (see fig. A-87) —Continued						
88	94.00	100.00	6.00	<.07	.2	132	43	—	—	metabasalt w/qz,py,cp
89	100.00	101.50	1.50	<.07	<.2	46	88	—	—	metabasalt w/qz
90	101.50	105.00	3.50	<.07	<.2	12	30	—	—	metabasalt w/qz,gouge,py,cp
91	105.00	110.00	5.00	<.07	.4	17	24	—	—	metabasalt w/qz,gouge,py,cp
92	110.00	115.00	5.00	<.07	<.2	79	74	—	—	metabasalt w/qz,py,cp,metadiorite
93	115.00	120.00	5.00	<.07	.3	50	67	—	—	metabasalt w/qz,py,cp,metadiorite
94	120.00	125.00	5.00	<.07	<.2	12	82	—	—	metabasalt w/qz,py,cp,metadiorite
95	125.00	126.90	1.90	<.07	<.2	34	50	—	—	metabasalt-breccia w/qz,py,cp
96	126.90	128.50	1.60	<.07	<.2	12	80	—	—	metabasalt-metadiorite mylonite
97	128.50	130.00	1.50	<.07	.3	3	84	—	—	metadiorite-breccia w/py,cp
98	130.00	135.00	5.00	<.07	.3	114	82	—	—	metadiorite-breccia w/py,cp
99	135.00	136.50	1.50	<.07	.3	19	66	—	—	metadiorite-breccia w/py,cp
100	136.50	140.00	3.50	<.07	.3	68	30	—	—	metadiabase w/ep,qz
101	140.00	145.00	5.00	<.07	.3	28	45	—	—	metabasalt w/ep,py,cp
102	145.00	149.50	4.50	.07	.3	123	56	—	—	metabasalt w/ep,qz,py,cp,hem
103	149.50	150.50	1.00	.21	.2	268	53	—	—	metabasalt w/ep,py,cp
104	150.50	155.00	4.50	<.07	<.2	192	86	—	—	metadiabase w/py,cp
105	170.00	175.00	5.00	.17	<.2	258	106	—	—	metabasalt-breccia w/ep,py,cp
106	175.00	180.00	5.00	.34	<.2	113	97	—	—	metabasalt w/ep,qz,py,cp,hem
107	180.00	182.00	2.00	.14	<.2	85	104	—	—	metabasalt-breccia w/qz,py,cp
108	184.50	189.00	4.50	<.07	<.2	151	95	—	—	metabasalt w/ep,py,cp
109	189.00	195.00	6.00	.07	<.2	103	87	—	—	metadiabase w/ep,py,cp,hem
110	200.00	202.50	2.50	.07	<.2	199	63	—	—	metadiabase w/dissem py,cp

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-37.—Mount Seltat occurrence (fig. A-89)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	8W1882	—	R–G	0.008	13.4	2800	93	2400	10	0.002	1285	—	—	—	—	—	—	skarn w/sl
1	8W1883	—	R–G	.013	5.5	120	3430	41	11	.011	14	—	—	—	—	—	—	lmst w/ml,sulf
1	8W1884	—	R–G	.054	16.7	4.13%	70	764	16	N	4	—	—	—	—	—	—	skarn w/massive sl,mnst
1	8W1885	0.5	R–G	.072	173.1	2.16%	1742	.60%	19	N	58	—	—	—	—	—	—	lmst skarn w/gn,py,sl,mn
2	8W1886	—	R–G	.017	2.1	1000	57	252	25	N	3	—	—	—	—	—	—	skarn
3	8S1096	—	R–G	.020	3.7	1.55%	4120	12	59	.018	—	—	—	—	—	—	—	skarn w/gr,qz-calc,ml,az,sl
4	7W1754	.5	G	N	.4	63	45	7	—	—	—	—	—	—	—	—	—	fe-st qz-mica zone w/sulf
5	8W1880	—	R–G	.025	53.5	146	5970	85	15	.018	—	—	—	—	—	—	—	skarn w/bn,cp,ml,fest
6	7W1755	.2	R–G	.137	72.7	1150	6950	660	—	—	—	—	—	—	—	—	—	lmst w/bn,ml,sl,cp
7	7W1756	—	R–G	N	3.0	1.60%	164	79	—	—	—	—	—	—	—	—	—	skarn w/sl
8	7S0631	.4	F–G	N	11.0	183	8400	N	79	—	—	—	—	N	—	—	—	0.5x0.5 ft boulder of po,cp
9	7S0630	.5	F–G	N	1.1	20	655	N	68	—	—	—	—	50	—	—	—	1.0x2.5 ft boulder of po
10	7S0629	.4	F–G	N	.8	20	645	3	23	—	—	—	—	18	—	—	—	0.5x0.8 ft boulder of po w/ marble
11	8W1888	—	SS	N	N	50	29	8	3	.074	—	—	—	—	—	—	—	
12	8W1887	—	SS	.015	.1	40	21	8	1	.064	—	—	—	—	—	—	—	
13	8H4324	—	F–S	.005	.9	50	71	39	4	.310	—	—	—	—	—	—	—	altered diorite

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-38.—Iron Bridge prospect (fig. A-1, No. 2)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
2	8S1092	0.5	R–CR	0.041	5.6	127	2960	5	36	0.01	—	—	—	—	—	—	—	fest silicified metasediment w/ml
2	8S1093	.3	R–S	N	1.7	13	1915	2	16	N	—	—	—	—	—	—	—	silicified rock w/cp,ml
2	8W1874	—	F–G	.011	1.9	22	1227	4	20	N	—	—	—	—	—	—	—	fest qz w/sulf

NOTE.—Key to abbreviations at beginning of appendix.

Table A-1-39.—Le Blondeau skarn and vein occurrences (fig. A-90)

Map No.	Sample No.	Sample Size Feet	Sample Type	Fire Assay Au ppm	Atomic Absorption (ppm unless marked %)					X-ray Ba %	Spectrographic (ppm)							Lith. & Remarks
					Ag ppm	Zn ppm	Cu ppm	Pb ppm	Co ppm		W ppm	Mo ppm	Sn ppm	As ppm	Ni ppm	Bi ppm	Sb ppm	
1	8S1100	0.3	CR	1.561	1.5	10	1184	60	251	N	—	—	—	—	—	—	—	qz vein w/po
1	8S1101	.3	CR	.025	N	24	133	3	29	0.005	—	—	—	—	—	—	—	qz vein w/po
1	8S1102	—	SS	.011	.1	56	132	7	19	.030	—	—	—	—	—	—	—	
2	5W0997	.4	F-G	N	.4	15	70	9	7	—	N	—	—	—	—	—	—	slate w/sulf
2	5W0998	—	SS	.025	N	40	39	8	26	.026	N	N	N	N	N	N	N	
2	7W1660	.6	F-G	4.731	4.6	36	148	17	26	.033	—	—	—	G 1000	—	—	—	calc vein w/py
2	8G6207	—	C	.322	.3	61	148	13	64	.003	—	—	—	—	—	—	—	silicified lmst-greenstone shear w/po
2	8G6208	—	F-G	87.155	96.7	1019	221	.64%	5	.003	—	—	—	—	—	—	—	banded qz-calc w/py,gn,sl
3	8W1897	—	F-G	N	N	33	89	N	14	.013	—	—	—	—	—	—	—	hornblendite w/py
3	8W1898	—	F-G	N	N	23	188	2	18	.024	—	—	—	—	—	—	—	green intrusive w/sulf
4	8G6209	.8	RC	.761	.7	23	270	39	52	N	—	—	—	—	—	—	—	qz vein w/po,py
4	8G6210	.8	RC	1.151	2.3	33	782	186	89	.004	—	—	—	—	—	—	—	qz vein w/po,py
5	8W1899	—	F-G	.008	.1	13	143	4	14	.069	—	—	—	—	—	—	—	intrusive w/po,fest
6	8G6211	.8	RC	.050	9.8	33	658	90	98	N	—	—	—	—	—	—	—	qz vein w/py
7	7W1744	1.2	C	.068	10.8	1.15%	8000	N	141	—	—	—	—	—	—	—	—	skarn in lmst w/cp,ml,fest,ep, garnets
7	7W1745	1.8	C	.171	7.7	225	2700	5	60	—	—	—	—	—	—	—	—	ep,garnet rich band w/cp,ml
8	7W1746	1.0	G	N	.3	141	158	43	10	—	—	—	—	—	—	—	—	fest diorite w/py
8	7S0626	—	R-G	N	—	40	78	N	2	—	—	—	—	10	—	—	—	skarn zone,red-tan garnet
9	6S0505	—	CR	.068	.3	1070	380	2	16	N	—	—	—	—	—	—	—	ep-qz skarn
9	6S0506	.2	CR	.068	.7	280	895	6	340	N	2	—	N	—	28	—	—	po,py rich lens in skarn zone
9	6S0507	—	CR	.068	3.0	660	825	5	1	N	—	—	—	—	—	—	—	gossan
10	6S0508	—	CR	N	.2	50	37	2	13	.018	—	—	—	—	—	—	—	diorite
11	6S0509	.3	R-CR	.068	4.0	335	8540	14	490	N	3	—	15	—	69	—	—	po,cp
11	6S0510	—	R-S	.068	2.4	570	5040	7	620	N	2	—	30	—	52	—	—	mag w/po,cp
11	6S0511	.6	R-CR	.068	1.6	790	3430	3	152	.007	3	—	35	—	49	—	—	po-mag skarn w/cp
12	6S0501	—	R-CR	N	.8	750	1150	6	260	N	—	—	—	—	—	—	—	mag-py skarn w/ep
12	6S0502	.5	R-CR	N	2.0	920	1835	6	182	N	3	—	20	—	92	—	—	mag-po skarn
12	6S0503	—	R-CR	N	.3	285	69	6	12	.003	—	—	—	—	—	—	—	mag
12	6S0504	.5	R-CR	N	.4	770	995	6	132	N	2	—	30	—	48	—	—	mag skarn w/cp,po,py
12	6S0512	—	R-CR	N	N	43	33	7	2	N	—	—	—	—	—	—	—	marble w/garnets,ep
12	6S0516	—	G	N	.2	5	15	4	N	N	—	—	—	—	—	—	—	marble
13	6S0517	—	SS	N	N	115	98	6	17	.017	—	—	—	—	—	—	—	

NOTE.—Key to abbreviations at beginning of appendix.

APPENDIX A–2
METALLURGICAL TEST RESULTS

This section is adapted from metallurgical test reports by Lawrence L. Brown of the Bureau's Albany Research Center.

RESULTS OF METALLURGICAL TESTS ON BARITE SAMPLES FROM THE MAIN DEPOSIT AND MOUNT HENRY CLAY PROSPECT

Five samples were collected along the Windy Craggy structure in southeast Alaska during the 1983 field season. Three of the samples were from the Main Deposit and two were from the Mount Henry Clay prospect. These samples were processed at the Bureau's Albany Research Center. The Alaska Field Operations Center (AFOC) and Albany Research Center (ALRC) sample identification numbers are as follows:

	AFOC	ALRC	
Main Deposit	3S112	ME 1536	
	3S118	ME 1537	PS 1790
	3S258	ME 1538	PS 1791
Mount Henry Clay prospect	3S323A	ME 1539	PS 1792
	3S323B	ME 1540	

Mineralogical Characteristics

Main Deposit

Sample 3S112 (ME 1536). This sample is a white, porous, coarsely crystalline, sugary textured, considerably dissolved/leached (weathered), friable barite. Approximately 20% of the barite and/or other minerals once contained have been dissolved away. Very minor, random iron oxide stain is present. No sulfides minerals were observed.

Sample 3S118 (ME 1537). This sample is a variably weathered and altered, sugary textured, equigranular, massive barite containing random dark bands of mixed sulfide minerals and magnetite representing about 20% of the sample. Most of the bands are thin and discontinuous, but in some areas they are up to an inch or more thick. The thick bands contain barite mixed with variable amounts of galena and magnetite with minor pyrite, sphalerite, and covellite. Where the specimens show weathering and alteration, some of the barite and all of the sulfide minerals have been altered and leached away, resulting in considerable porosity and leaving crystal molds and scattered magnetite grains. Some of the porous areas contain considerable anglesite, and at least two unidentified secondary copper-bearing minerals, one of which may be ktenasite ($(Cu, Zn)_5(SO_4)_2(OH)_6.6H_2O$.) In the altered areas limonite emphasizes the layering.

Polished surface and SEM examinations of areas selected for high sulfide content (i.e. the dark thick bands) show that in addition to the galena, magnetite, and covellite, a fair amount of very fine grained anglesite is present, filling cracks in the barite and closely associated with the covellite. Approximate amounts of each mineral over several areas are as follows: barite 45%, galena 20%, magnetite 15%, anglesite 10%, and covellite 10%.

Considerable liberation of the samples minerals would be accomplished at 65 mesh; 100 mesh provides more complete liberation with minor locking to finer sizes.

Sample 3S258 (ME 1538). This sample is a sugary textured, equigranular, massive banded/bedded barite. The banks are generally dark and contain concentrations of honey colored sphalerite with variable pyrite and small amounts of bornite and galena. The grain size of the sulfide minerals ranges down from about that of the barite to much finer sizes. Some of the exposed surfaces and fracture surfaces are iron oxide stained. Thin layers of muscovite/sericite occur on some fractures parallel to the apparent bedding. A few random solution channels are also present.

Polished surface, SEM, and SEM-EDAX examinations show that in addition to the minerals mentioned above, the sample contains variable amounts of celsian, covellite, and tennantite. The celsian contains only 0.9% K. The tennantite is a zincian variety with the following analyses: 42.3% copper, 8.6% zinc, 14.2% arsenic, 6% antimony, and 28.9% sulfur.

Approximate amounts of each mineral over several areas is as follows: barite 54%, celsian 15%, sphalerite 10%, pyrite 10%, bornite 5%, covellite 3%, galena 2%, and tennantite 1%.

Practical liberation of the mineral components would be at about 100 mesh. Some locking would be evident even at finer sizes.

Mount Henry Clay Prospect

Sample 3S323A (ME 1539). This sample is a medium- to fine-grained, sugary textured, equigranular, bedded mixture of light yellow to dark brown sphalerite, associated with pyrite and barite with some scattered chalcopyrite and small veins of calcite. The bedding is not selective, and layers contain variable amounts of barite and the sulfide minerals. A few random veins or fracture fillings of mixed pyrite and chlorite were noted. Variable amounts of iron oxide minerals are present on fracture surfaces. It appears that deposition was nearly contemporaneous.

Polished surface, SEM, and SEM-EDAX examinations show that minor amounts of quartz and galena are present in addition to the above mentioned minerals. The matrix appears to be sphalerite and there are no intercrystalline intergrowths of sulfide in one another or in the barite crystals. Chalcopyrite is the finest grained on average; there is some very fine-grained pyrite present. The large pyrite crystals show considerable fracturing. Approximate amounts of each mineral over several areas are as follows: sphalerite 47%, pyrite 25%, barite 15%, chalcopyrite 5%, calcite 5%, quartz 2%, and galena 1%.

Good liberation should be achieved at 65 mesh with better liberation through 100 mesh.

Sample 3S323B (ME 1540). This sample is a massive, large to medium crystalline, grey to white barite containing variably abundant small lenses, veins, and smears of very fine grained chlorite with accompanying small euhedral to subhedral crystals of magnetite. Some small magnetite crystals are scattered in the barite. A trace of pyrite is also present. No other sulfides were observed. Minor iron oxide minerals are present.

SEM micrographs and element display maps are filed with the original of this report and are available for reference.

Beneficiation Characterization

Head analysis of the samples are shown in table A-2-1. Zinc analyses ranged from 0.01% to 21.2%; copper ranged from 0.01% to 1.15%; cobalt and gold were negligible; and significant silver values (about 1 ounce/ton) were found in three of the samples.

Sample 3S112 (ME 1536) from the Main Deposit and sample 3S323B (ME 1540) from the Mount Henry Clay prospect are high-grade barite. The 1979 Mineral Commodity Profile on barite gives specifications for barite according to its different uses. These are:

1. weighing mud:
   - 90% to 95% minus 325 mesh
   - specific gravity of 4.2 or higher
   - free of soluble salts
   - low percentage of iron oxide
2. chemical manufacturing:
   - minimum 94% $BaSO_4$
   - maximum 1% Fe_2O_3
   - maximum 1% $SrSO_4$
   - trace F
   - size range of 4 to 20 mesh
3. glass manufacturing:
   - minimum 95% $BaSO_4$
   - maximum 2.5% SiO_2
   - maximum 0.15% Fe_2O_3
   - preferred size range of 30 to 140 mesh

Tables A-2-2 and A-2-3 show the results of sizing samples 3S112 and 3S323B on 28 and 150 mesh and comparing analyses with the above specifications. Only the minus 150 mesh fractions, ground to minus 325 mesh and leached in water, exceeded specifications. The other size fractions very nearly met specifications, and additional tests would be necessary to determine whether they could be sufficiently upgraded.

Tables A-2-4 to A-2-7 show the results of flotation studies on samples 3S118 (ME 1537), 3S258 (ME 1538), and 3S323A (ME 1539). The objective was selective flotation to produce a barite product and a sulfide product.

Tables A-2-4, A-2-6, and A-2-7 describe methods in which $CuSO_4$ was used as an activator for sphalerite prior to sulfide flotation with a xanthate collector and silica flotation with an amine collector. Barite remained in the nonfloat tailings. Recovery of zinc in the sulfide products ranged from 87% to 99%, and recovery of Ba in the nonfloat barite products ranged from 89% to 90%. The specific gravity of the barite product was 4.3 g/cc in two of the tests and 3.7 g/cc in the other.

Table A-2-5 describes a study on sample 3S258 (ME 1538) in which sulfides were floated with $CuSO_4$ and a xanthate collector, and then barite was floated with $Na_2O.SiO_2$ and a petroleum sulfonate type promoter. Recovery of zinc was 98% in the sulfide float product, and Ba recovery was 94% in the two barite float products.

The results reported here are the best to date, but they should not be regarded as the best obtainable. No attempts have been made to optimize conditions, reagent selection, or reagent addition.

Table A-2-1.—Head analyses

Sample		Location	Analysis, %												Analysis, oz/st			
AFOC No.	ME No.		Ba	Ca	Cu	Co	Fe_2O_3	Total Fe	Pb	S	SO_4	SiO_2	Sr	Zn	Pt	Pd	Au	Ag
3S112	1536	Main Deposit	56.5	0.07	0.01	L0.005	0.64	0.48	0.08	14.3	39.0	1.54	0.10	L0.01	L0.001	L0.001	0.005	0.36
3S118	1537	Main Deposit	48.4	.41	.24	L.005	.41	1.51	4.98	13.4	34.4	6.27	.09	1.56	L .001	L .001	.005	1.00
3S258	1538	Main Deposit	43.4	.44	.87	L.005	4.19	4.17	.53	17.5	31.1	4.44	.06	4.64	L .001	L .001	.004	1.02
3S323A	1539	Mt. Henry Clay	11.9	1.58	1.15	.005	18.80	14.60	.17	32.0	7.3	5.40	.04	21.20	L .001	L .001	.006	1.22
3S323B	1540	Mt. Henry Clay	54.3	.86	.01	L.005	.63	.59	L.02	14.1	38.2	3.81	.42	L.01	L .001	L .001	L .0008	L .04

NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-2.—Analysis of sized fractions of sample 3S112 (ME 1536) from the Main Deposit

Size Fraction	Analysis, %								
	Ba	SO_4	$BaSO_4$[1]	Fe_2O_3	Total Fe	$SrSO_4$	F	SiO_2	Specific Gravity, g/cc
Plus 28 mesh	57.2	40.4	97.7	0.31	0.29	1.13	0.19		4.5
Chemical-grade barite specifications		G94.0	L1.00		L1.00	trace			
28 by 150 mesh, unleached	57.9	40.9	98.9	.24	.22			0.29	4.5
28 by 150 mesh, H_2SO_4 leached[2]				.20	.14				
28 by 150 mesh, HCl leached[2]				.21	.15				
Glass-grade barite specifications			G95.0	L.15				L2.50	
Minus 150 mesh, ground to minus 325 mesh and leached[3]	56.0	39.7	95.9	.88					4.5
Weighting mud barite specifications									G4.2

[1] Average value calculated from the Ba and SO_4 analyses.
[2] 10% acid, 3.5 hour, 25% pulp density, agitation.
[3] Tap water leach, 50°C, 5 hour, 5% pulp density, agitation. H_2O—soluble weight loss of 0.4%.
NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-3.—Analysis of sized fractions of sample 3S323B (ME 1540) from the Mount Henry Clay prospect

Size Fraction	Analysis, %								
	Ba	SO_4	$BaSO_4$[1]	Fe_2O_3	Total Fe	$SrSO_4$	F	SiO_2	Specific Gravity, g/cc
Plus 28 mesh	53.6	38.4	92.2	0.56	0.48	1.43	0.71		4.3
Chemical-grade barite specifications			G94.0	L1.00		L1.00	trace		
28 by 150 mesh	55.0	39.4	94.6	.50	.49			2.82	4.4
Glass-grade barite specifications			95.0	L.15				L2.50	
Minus 150 mesh, ground to minus 325 mesh and leached[2]	55.2	39.1	94.4	.52					4.6
Weighting mud barite specifications									G4.2

[1] Average value calculated from the Ba and SO_4 analyses.
[2] Tap water leach, 50°C, 5 hour, 5% pulp density, agitation. Magnetite (0.2%) collected on the magnetic stirring bar and was removed before chemical analysis. H_2O—soluble weight loss of 0.4%.
NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-4.—Results of flotation of sample 3S118 (ME 1537) from the Main Deposit

Metallurgical Results

Product	Weight, percent	Analysis, %					Distribution, %				
		Ba	SO_4	Pb	Zn	SiO_2	Ba	SO_4	Pb	Zn	SiO_2
Pb sulfide float	10.1	31.2	22.4	15.0	12.4	L0.05	6.4	6.6	32.7	80.3	0.0
Zn sulfide float	2.8	38.2	26.5	14.4	4.0	2.90	2.2	2.2	8.7	7.2	1.5
Silica float	1.5	39.0	26.2	9.7	1.6	8.40	1.2	1.2	3.1	1.5	2.3
Barite tailings[1]	85.6	51.5	35.8	3.0	.2	6.10	90.2	90.0	55.5	11.0	96.2
Composite or total	100.0	48.9	34.0	4.6	1.6	5.40	100.0	100.0	100.0	100.0	100.0
Head		48.4	34.4	5.0	1.6	6.30					

Test Procedure

Reagents	Condition	Pb Sulfide float	Condition	Condition	Zn Sulfide Float	Condition	Silica float
$CuSO_4$			0.1 lb/st				
Potassium amylxanthate	0.05 lb/st			0.05 lb/st			
Frother	0.05 lb/st						
Amine Promoter						0.1 lb/st	
pH (natural = 5.8)	5.8		6.0	6.0		6.1	
Time (minutes)	1	4	10	1	2	3	2

[1] Specific gravity 4.3 g/cc.

NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-5.—Results of flotation of sample 3S258 (ME 1538) from the Main Deposit

Metallurgical Results

Product	Weight, percent	Analysis, %			Distribution, %		
		Ba	SO_4	Zn	Ba	SO_4	Zn
Sulfide float	18.0	5.9	4.8	23.9	2.4	2.9	97.7
Barite float I	73.2	55.1	38.1	.1	91.0	92.2	1.7
Barite float II	3.6	42.5	26.3	.3	3.5	3.1	.2
Tailings	5.2	26.2	10.3	.3	3.1	1.8	.4
Composite or total	100.0	44.3	30.2	4.4	100.0	100.0	100.0
Head		43.4	31.0	4.6			

Test Procedure

Reagents	Condition	Condition	Sulfide Float	Condition	Condition	Barite Float I	Condition	Barite Float II
$CuSO_4$	0.5 lb/st							
Potassium amylxanthate		0.1 lb/st						
Frother		.05 lb/st						
$Na_2O.SiO_2$				4 lb/st				
Petroleum sulfonate promoter					2 lb/st		1 lb/st	
pH (natural = 6.2)	5.9	6.2		9.3	9.2		8.9	
Time (minutes)	10	1	4	2	2	3	2	3

NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-6.—Results of flotation of sample 3S258 (ME 1538) from the Main Deposit

Metallurgical Results

Product	Weight, percent	Analysis, %				Distribution, %			
		Ba	SO_4	Zn	SiO_2	Ba	SO_4	Zn	SiO_2
Sulfide float	19.4	17.1	7.7	22.9	2.4	7.2	4.8	97.5	12.7
Silica float I	2.1	34.4	24.4	1.4	11.7	1.6	1.6	.6	6.7
Silica float II	1.5	28.2	19.6	.7	17.9	.9	.9	.2	7.3
Barite tailings1	77.0	53.8	37.4	.1	3.5	90.3	92.7	1.7	73.3
Composite or total	100.0	45.9	31.1	4.6	3.7	100.0	100.0	100.0	100.0
Head		43.4	31.1	4.6	4.4				

Test Procedure

Reagents	Condition	Condition	Sulfide Float	Condition	Sulfide Float I	Condition	Silica Float II
$CuSO_4$	0.5 lb/st						
Potassium amylxanthate		0.1 lb/st					
Frother		.05 lb/st					
Amine Promoter				0.1 lb/st		0.01 lb/st	
pH (natural = 5.9)	5.6	5.9		6.4		6.6	
Time (minutes)	1	10	5	3	3	3	3

[1] Specific gravity 4.3 g/cc.

NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-7.—Results of flotation of sample 3S323A (ME 1539) from the Mount Henry Clay prospect

Metallurgical Results

Product	Weight, percent	Analysis, %				Distribution, %			
		Ba	SO_4	Zn	SiO_2	Ba	SO_4	Zn	SiO_2
Sulfide float I	61.3	1.3	1.0	29.0	1.5	6.4	6.8	84.1	16.9
Sulfide float II	6.3	5.6	4.2	49.7	2.6	2.9	2.9	14.8	3.0
Silica float	.9	24.2	16.9	2.8	17.4	1.8	1.7	.1	2.9
Barite tailings1	31.5	34.9	25.4	.7	13.3	88.9	88.6	1.0	77.2
Composite or total	100.0	12.4	9.0	21.2	5.4	100.0	100.0	100.0	100.0
Head		11.9	7.3	21.2	5.4				

Test Procedure

Reagents	Condition	Condition	Sulfide Float I	Condition	Sulfide Float II	Condition	Silica Float
$CuSO_4$	1 lb/st						
Potassium amylxanthate		0.1 lb/st		0.1 lb/st			
Frother		.05 lb/st		.05 lb/st			
Amine Promoter						0.5 lb/st	
pH (natural = 5.9)	6.6	6.7		7.2		7.4	
Time (minutes)	10	1	7	1	4	3	2

[1] Specific gravity 3.7 g/cc.

NOTE.—Key to abbreviations at beginning of appendix A-1.

RESULTS OF METALLURGICAL TESTING OF THE WINDY CRAGGY DEPOSIT SAMPLE

The Windy Craggy Deposit is located in Canada along the same geologic trend that contains the Main Deposit and Mount Henry Clay prospect. It contains 300 million tons of material averaging 1.52% copper and 0.08% cobalt. During 1982 a test sample was collected from the Windy Craggy Deposit diamond drill cores and supplied to ALRC for testing. The AFOC sample number is 2S417 and the ALRC numbers are ME 1463 and PS 1651.

Mineralogical Characterization

The sample, as received, was crushed to minus 0.5 inches and represents a massive sulfide deposit consisting essentially of pyrrhotite with small to very small amounts of randomly dispersed pyrite, chalcopyrite, quartz, siderite, ferromagnesian silicate minerals, chlorite, and iron oxide minerals as inclusions and small veins.

Polished surface, SEM, SEM-EDAX, and microprobe examinations show that the scattered pyrite is partly and variably cobaltiferous, varying from grain to grain and within grains. It appears to be sulfur deficient with the deficiency apparently related to the cobalt content. It also appears to be zoned relative to the cobalt content, which averages about 2% and ranges from 0.1% to 5% cobalt. The pyrite ranges in size from less than 10 to about 100 micrometers with an average of 20 to 30 micrometers. There is a tendency for the pyrite to be agglomerated and some mounted fragments showed up to 15% pyrite while others contained very little pyrite. Pyrrhotite contains from 0.13% to 0.33% cobalt. The chalcopyrite content is less than that of the pyrite. It is associated both with the pyrite and as separate small crystals included in pyrrhotite. Grain sizes are similar to those of the pyrite. No precious metal-containing minerals were observed.

As will be seen in the following beneficiation results, the minerals are not liberated from each other at any practical size and no concentration of metals of any consequence was produced.

Beneficiation Characterization

After petrographic specimens were selected, the remainder to the sample was crushed to minus 0.25 inch and split for head analysis and beneficiation tests. The head sample contained 0.46% copper, 0.01% nickel, 0.21% cobalt, 55.3% iron, 0.03% zinc, 0.02% arsenic, 35.1% sulfur, <0.01 ounce/ton platinum, <0.02 ounce/ton palladium, <0.004 ounce/ton gold, and <0.01 ounce/ton silver. Precious metals analyses were done at Reno Research Center and the other analyses were done at ALRC.

A series of tests were done on 1-kg splits to try to selectively concentrate the copper and cobalt values. Table A-2-8 contains the results. Sizing, selective flotation, and magnetic separation were tried with little success. Copper was concentrated by flotation with recoveries up to 90%, but the grade was low (generally 1% to 2% copper). Cobalt concentration was not successful: grades of concentrates that were produced by flotation and/or magnetic separation were essentially the same as that of the head, and consequently recoveries were nearly the same as the weight distributions in a test (no concentration).

As stated earlier, SEM and microprobe data show that cobalt is concentrated in pyrite in solid solution. However, it also occurs in pyrrhotite, and because pyrrhotite is the predominant mineral, a pyrite-pyrrhotite separation would result in about 50% of the cobalt reporting to each fraction.

The attached metallurgical balance shows the procedures and results of a flotation test in which a bulk sulfide flotation scheme produced a rougher concentrate and a scavenger concentrate that were combined and subjected to a selective cleaner flotation step in which pyrrhotite was depressed by $KMNO_4$. The cleaner concentrate represented 45% of the sample weight and contained 84% of the copper at a grade of 0.95% copper and 55% of the cobalt at a grade of 0.23% cobalt.

A cursory chlorine-oxygen leach on Windy Craggy complex sulfide, ALRC sample number ME-1463, was conducted at RRC. Analysis of the test products are shown in table A-2-9. Table A-2-10 shows the metals distribution. The chlorine-oxygen test was conducted at 110 °C and 50 psig with O_2. The chlorine source was HCl and $CaCl_2$. An excess of hydrochloric acid was used and oxidation of iron sulfide to sulfate resulted in 20% of the iron going into solution. With additional tests, good copper and cobalt extractions could be achieved without leaving iron in solution. Methods for recovering copper and cobalt from solution could be developed. However, in view of the low grade nature of this ore, it is unlikely that any hydrometallurgical approach for recovering values from this ore would be economical.

Table A-2-8.—Results of flotation of sample 2S417 (ME 1463-9) from the Windy Craggy Deposit

Grind: Initial: -0.25 inch Addition: none	Final: +100 mesh -400 mesh 100% -500 mesh 100%	0% Percent solids: 50	Time: 10+5 minutes

Metallurgical Results

Product	Weight, percent	Analysis, percent				Distribution, percent			
		Cu	Co	Fe	S	Cu	Co	Fe	S
Cleaner concentrate	44.8	0.95	0.23	57.8	38.7	83.6	55.1	47.2	52.7
Cleaner tailings	39.9	.19	.19	57.8	35.7	14.8	40.6	42.0	43.3
Scavenger tailings	15.3	.05	.05	38.6	8.6	1.6	4.3	10.8	4.0
Composite or total	100.0	.51	.19	54.9	32.9	100.0	100.0	100.0	100.0
Head		.46	.21	55.3	35.1				

Test Procedure

Reagents	Condition (lb/st)		Rougher flotation	Condition	First scavenger flotation	Condition	Second scavenger flotation	Condition	Cleaner flotation
Sodium isobutyl xanthate		0.3		0.4 lb/st		0.4 lb/st			
Frother		.05				.05 lb/st			
$CuSO_4$	0.8								
$KMnO_4$								0.2 lb/st	
pH (natural = 6.6)	6.1	6.3	6.7	6.8	7.0	7.1	7.1	6.6	6.9
Time (minutes)	3	1	4.5	1	3.25	1	3.75	1	2.5

NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-9.—Analysis, percent

	Cu	Co	Zn	Fe	$SO_4^{=}$	So	$S^{=}$	Ca
Filtrate, g/l	2.3	0.80	5.1	6.1	45	—	—	1.4
Wash, g/l	.34	.12	10	11	11	—	—	1.0
Residue, %	.024	.028	L.001	43.3	14.8	17.0	2.79	5.0

RESULTS OF METALLURGICAL TESTING OF KLUKWAN SULFIDE SAMPLES

Metallurgical test samples were collected from canyons 1 and 2 of the Klukwan mafic-ultramafic complex. These were processed by ALRC. The sample numbers are as follows:

AFOC	ALRC
2S182	ME 1454-1
2S193	ME 1455-2
2S194	ME 1456-2
2S195	ME 1457-2
2S222	ME 1458-2
2S272	ME 1459-1

Samples including the composite sample of 2S193, 2S194, and 2S195 were stage crushed to minus 0.25 inch after visual examination and removal of petrographic specimens. The crushed samples were blended and split into test samples and analytical samples, which were submitted to ALRC analytical laboratory for base metal and sulfide analysis and to the ALRC analytical laboratory for precious metal analyses. Test samples were rod milled and bulk floated in either a Denver 1 kg or Agitair 10 kg flotation machine.

Procedures and results are summarized in the tables. In each test, a rougher and a scavenger bulk sulfide float was done with potassium amyl xanthate collector and a frother. Although both copper and precious metals contents are low, samples responded well to bulk flotation. Copper recoveries ranged from 57% to 76% despite sample grades 0.08 to 0.34. The precious metals reported to concentrates in tests producing sufficient concentrate for analysis.

Table A-2-10.—Distribution, percent

	Cu	Co	Zn	Fe	$SO_4^{=}$	S^{total}	Ca
Filtrate	46.5	40.8	G6	10.3	15.8	4.9	2.2
Wash	49.1	43.7	87	10.6	27.6	8.4	11.3
Residue	4.4	15.5	L7	79.1	56.6	86.7	86.5

NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-11.—Sample number ME 1454-1—AFOC number 2S182—Location: Klukwan

Grind: Initial: -0.25 inch	Final: +100 mesh -400 mesh 31%	0% Percent solids: 50	Time: 25 minutes

Metallurgical Results

Product	Weight, percent	Analysis, percent					Analysis, Ounce/Ton				Distribution, %				
		Cu	Co	Fe	S	Ni	Pt	Pd	Au	Ag	Cu	Co	Fe	S	Ni
Rougher concentrate	2.3	3.33			2.93		L0.001	L0.001	L0.0008	0.40	53.5			82.8	
Scavenger concentrate	1.2	.72			.36		.025	.006	.003	.12	6.2			4.9	
Tailings	96.5	.06			.01		.001	L.001	L.0008	L.04	40.3			12.3	
Composite or total	100.0	.14			.08						100.0	100.0	100.0	100.0	100.0
Head analysis		.13		19.4	.08		L.002	L.002	L.0004	L.01					

Test Procedure

Reagents	Condition	Rougher Flotation	Condition	Scavenger Flotation
Potassium amylxanthate	0.1 lb/st		0.05 lb/st	
Frother	.05 lb/st			
pH (natural = 9.3)	9.4		9.3	9.2
Time (minutes)	1.5	1	1	1

NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-12.—Sample number ME 1455-56-57-2—AFOC number 2S193-94-95—Location: Klukwan

Grind: Initial: -0.25 inch	Final: -150 mesh	100% Percent Solids: 50	Time: stage ground

Metallurgical Results

Product	Weight, percent	Analysis, percent					Analysis, Ounce/Ton				Distribution, %				
		Cu	Co	Fe	S	Ni	Pt	Pd	Au	Ag	Cu	Co	Fe	S	Ni
Rougher concentrate	1.0	23.8			17.4		0.055	0.056	0.037	0.089	70.0			87.5	
Scavenger							.009	.005	.003	.12					
concentrate	2.6	.81			.45		.006	.023	.000	L.02	6.2			6.0	
Tailings	96.4	.084			.013						23.8			6.5	
Composite or total	100.0	.34			.20						100.0	100.0	100.0	100.0	100.0
Head analysis							L.002	L.002		L.01					

Test Procedure

Reagents	Condition	Rougher Flotation	Condition	Scavenger Flotation
Potassium amylxanthate	0.1 lb/st		0.05 lb/st	
Frother	.05 lb/st		.025 lb/st	
pH (natural = 10.3)	10.3	10.2	10.2	10.2
Time (minutes)	1.5	3	2	2.5

NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-13.—Sample number ME 1458-2—AFOC number 2S222—Location: Klukwan

Grind: Initial: -0.25 inch	Final: -150 mesh	100% Percent Solids: 50	Time: stage ground

Metallurgical Results

Product	Weight, percent	Analysis, percent					Analysis, Ounce/Ton				Distribution, %				
		Cu	Co	Fe	S	Ni	Pt	Pd	Au	Ag	Cu	Co	Fe	S	Ni
Rougher concentrate	1.0	6.60			6.34		0.078	0.150	0.279	0.91	54.6			81.8	
Scavenger concentrate	1.7	.47			.25		.007	.007	.006	.06	6.6			5.2	
Tailings	97.3	.048			.010		L.0004	L.0006	.003	L.02	38.8			13.0	
Composite or total	100.0	.12			.08						100.0	100.0	100.0	100.0	100.0
Head analysis		.082		19.5	.07		L.002	L.002	.001	L.01					

Test Procedure

Reagents	Condition	Rougher Flotation	Condition	Scavenger Flotation
Potassium amylxanthate	0.1 lb/st		0.05 lb/st	
Frother	.05 lb/st		.025 lb/st	
pH (natural = 10.0)	10.2	10.1	10.1	10.1
Time (minutes)	2	2	2	2

NOTE.—Key to abbreviations at beginning of appendix A-1.

Table A-2-14.—Sample number ME 1459-1—AFOC number 2S272—Location: Klukwan

Grind: Initial: -0.25 inch	Final: +100 mesh -400 mesh 31%	0.1% Percent Solids: 50	Time: 25 minutes

Metallurgical Results

Product	Weight, percent	Analysis, percent					Analysis, Ounce/Ton				Distribution, %				
		Cu	Co	Fe	S	Ni	Pt	Pd	Au	Ag	Cu	Co	Fe	S	Ni
Rougher concentrate	3.4	1.38			0.90		0.007	0.006	0.045	0.35	52.8			79.5	
Scavenger concentrate	1.6	.26			.08		.003	.002	L.0008	.045	4.5			2.6	
Tailings	95.0	.04			.007		L.001	L.001	L.0008	.04	42.7			17.9	
Composite or total	100.0	.089			.04						100.0	100.0	100.0	100.0	100.0
Head analysis		.085		25.5	.05		L.002	L.002	.001	L.01					

Test Procedure

Reagents	Condition	Rougher Flotation	Condition	Scavenger Flotation
Potassium amylxanthate	0.1 lb/st		0.05 lb/st	
Frother	.05 lb/st			
pH (natural = 9.3)	9.4		9.4	9.3
Time (minutes)	1.5	1.5	2	0.5

NOTE.—Key to abbreviations at beginning of appendix A-1.