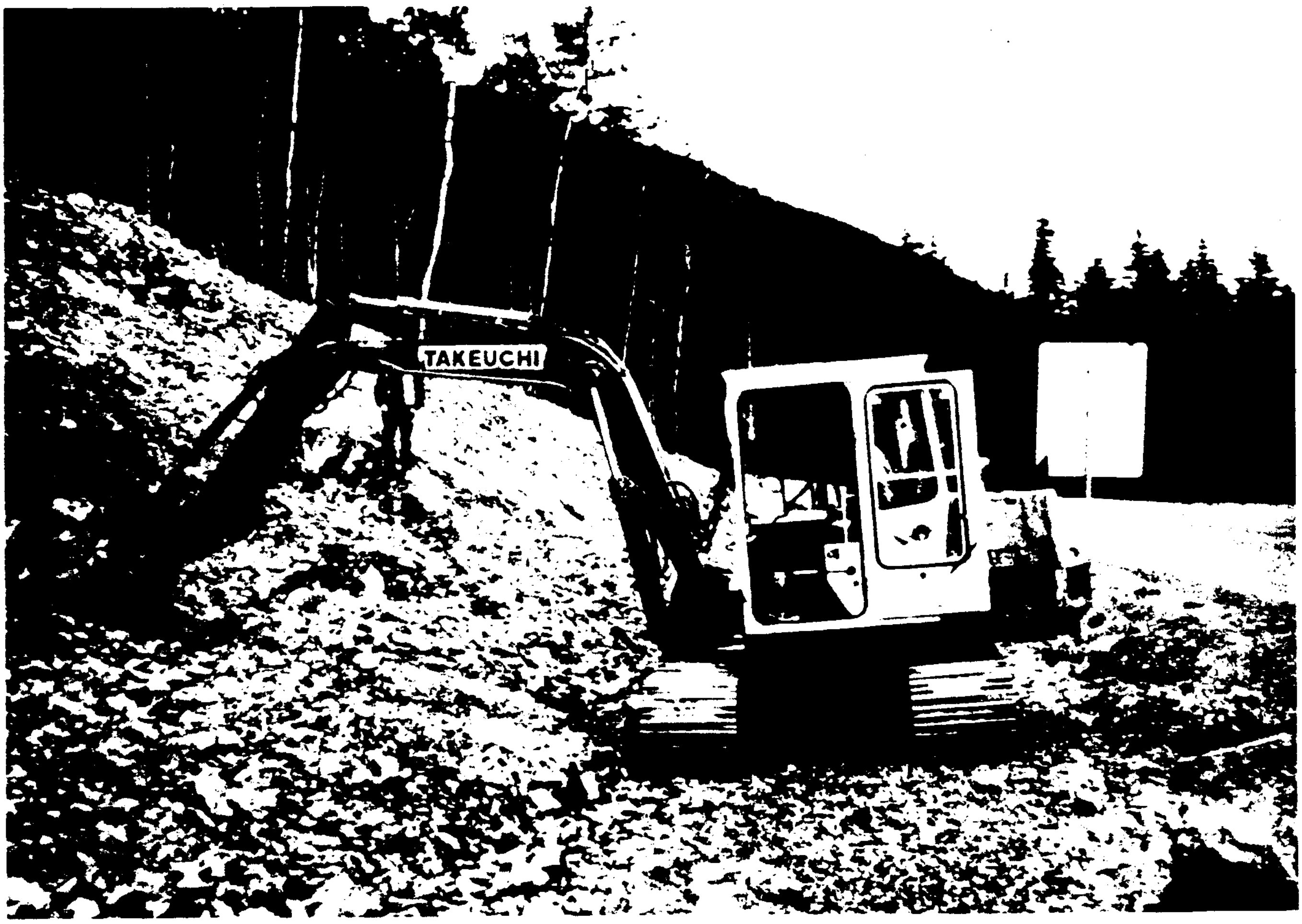
GOLD-COPPER MINERALIZATION OF THE CHILKAT PENINSULA AND ISLANDS

By Jan C. Still



Subsurface exploration of the Road Cut Prospect.

UNITED STATES DEPARTMENT of the INTERIOR
Donald P. Hodel, Secretary
BUREAU of MINES
T S Ary, Director

OFR 49-88

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UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

ft - foot

in. - inch

oz/ton - troy ounce per short ton

ppm - part per million

ppb - part per billion

% - percent

Note: 34.286 ppm = 1 oz/ton

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By Jan C. Still[1]

ABSTRACT

As part of a cooperative project during 1986 and 1987, personnel from the U.S. Bureau of Mines and State of Alaska Division of Geological and Geophysical Surveys studied the mineral development potential of the Chilkat Peninsula and Islands, Alaska, as part of the larger Juneau Mining District study. About 4/5 of the area is within the Alaska State Chilkat and Chilkat Islands State Parks and not open to mineral entry. This study located four new (or previously unreported) gold-copper prospects. One of these, the Road Cut prospect, was examined by trenching, drilling and geophysics. While sufficient grades and tonnages were not delineated by this work to constitute an economic deposit, they are sufficient to encourage exploration for such in the prospect vicinity. Of 112 reconnaissance rock, stream sediment, and pan concentrate samples collected at scattered locations (not from prospects or occurrences) in the Chilkat Peninsula and Islands, 79 were anomalous in gold, silver, copper, or zinc. Newly discovered mineralization and anomalous reconnaissance sample values indicate that the Chilkat Peninsula and Islands could be an important target for the exploration of fault-controlled gold-copper deposits, but present land status prevents mineral exploration in most of the area.

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INTRODUCTION

The mineral development potential of the Chilkat Peninsula and Islands area in Southeast Alaska has been studied as a cooperative effort with the State of Alaska Division of Geological and Geophysical Surveys (ADGGS) as part of the larger Juneau Mining District study. This four-year study, originally planned to be completed in 1988, will be finalized with a complete report in 1989. Figure 1 shows the location of the Chilkat Peninsula and Islands area within Alaska and the Juneau Mining District; Figure 2 shows the location relative to the Juneau gold belt and the Porcupine mining area. The latter two areas are centers of gold exploration and mining activity.

As part of the Chilkat Peninsula and Islands study, Bureau of Mines (Bureau) and ADGGS crews collected rock, soil, stream sediment, and pan concentrate samples. The area was geologically mapped, prospects were examined, and the newly discovered Road Cut prospect was trenched, diamond drilled and explored geophysically.

ACKNOWLEDGMENTS

A special thanks goes to Mayor Henderson and the staff at the Haines Borough, to Haines City Administrator Walt 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 area.

Acknowledgment is given to Bureau employee Kevin R. Weir, who worked as a laborer, sampler, and field and office technician on the Chilkat Peninsula and Islands project. Mr. Weir has studied geology, prospecting, and mining on his own and on the job for over 15 years. With this self-learned knowledge he participated in the discoveries of the Road Cut, Road Cut II, and Islands Copper prospects or occurrences. In addition, he prepared all the analytical tables and area sampling maps used in this report. Mr. Weir has a detailed knowledge of all the data and information contained herein.

PHYSIOGRAPHY AND CLIMATE

The physiography of the area is moderate with some steep sea cliffs near the coastline and moderate slopes reaching a maximum elevation of 1,760 ft at the summit of Mount Riley. The area is below timberline and lush forests and dense brush predominate throughout. At most locations small streams drain the hills and travel in a more or less straight line from the ridge crests to salt water. The average annual precipitation is 60 in. with the heaviest rain months being September, October and November. Snow falls during December, January, February, and March. Almost all snow disappears from the most sheltered portions of the area by the middle of July.

ACCESS

At its widest point the Chilkat Peninsula is 2 1/4 miles across. No point within the area is more than 1 1/8 miles from salt water. Chilkoot Inlet is to the east and Chilkat Inlet is to the west. The port city of Haines occupies the north end of the peninsula and its road system extends 10 miles south, mostly along the west side of the Peninsula, to a State campground located at Lehuna Island. To the south, Haines connects with Seattle, Washington, and most towns in southeast Alaska via the Alaska State Ferry System. To the north Haines connects with Anchorage via the Alcan Highway.

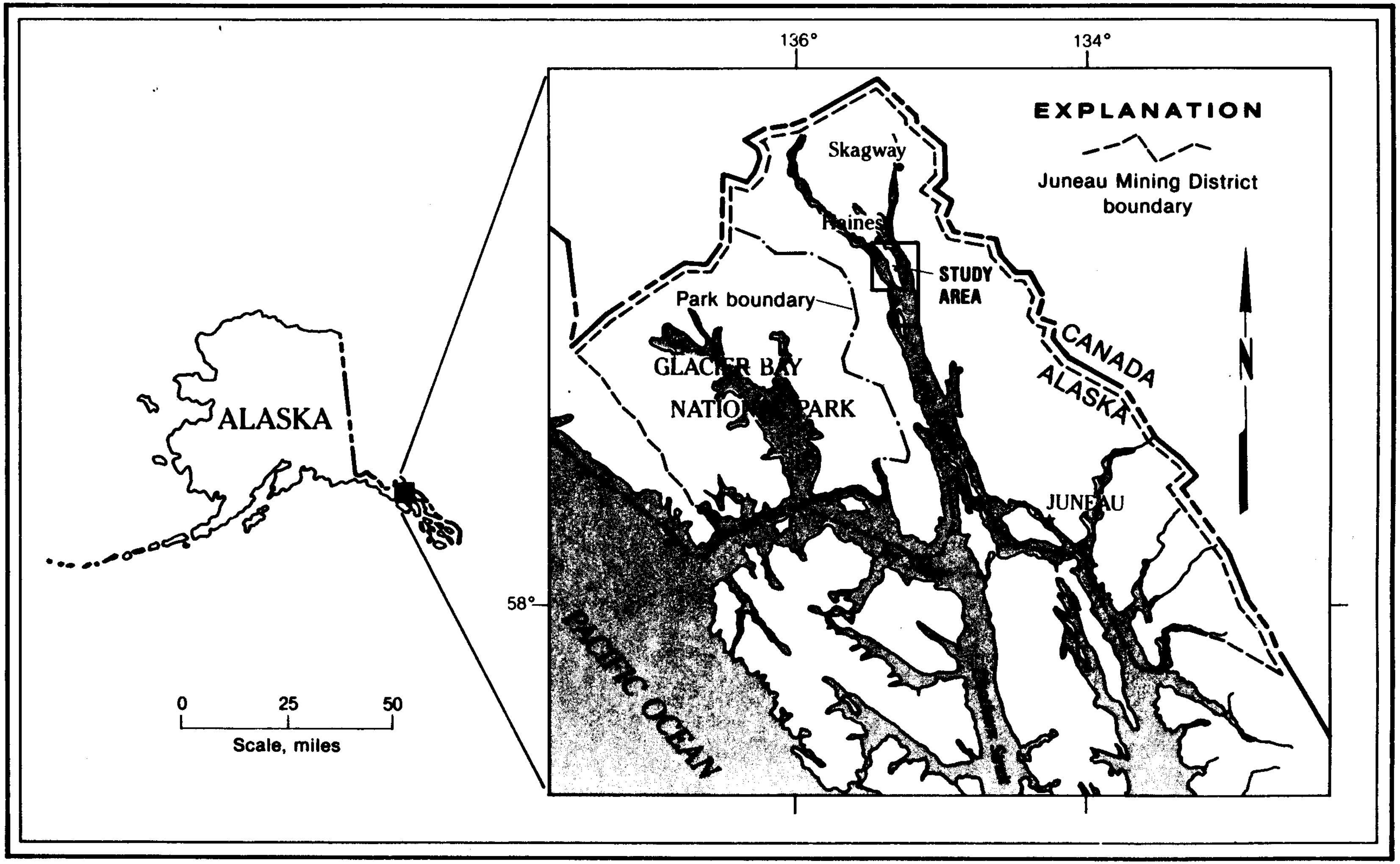

Figure 1.— Location of the Chilkat Peninsula and Islands study area.

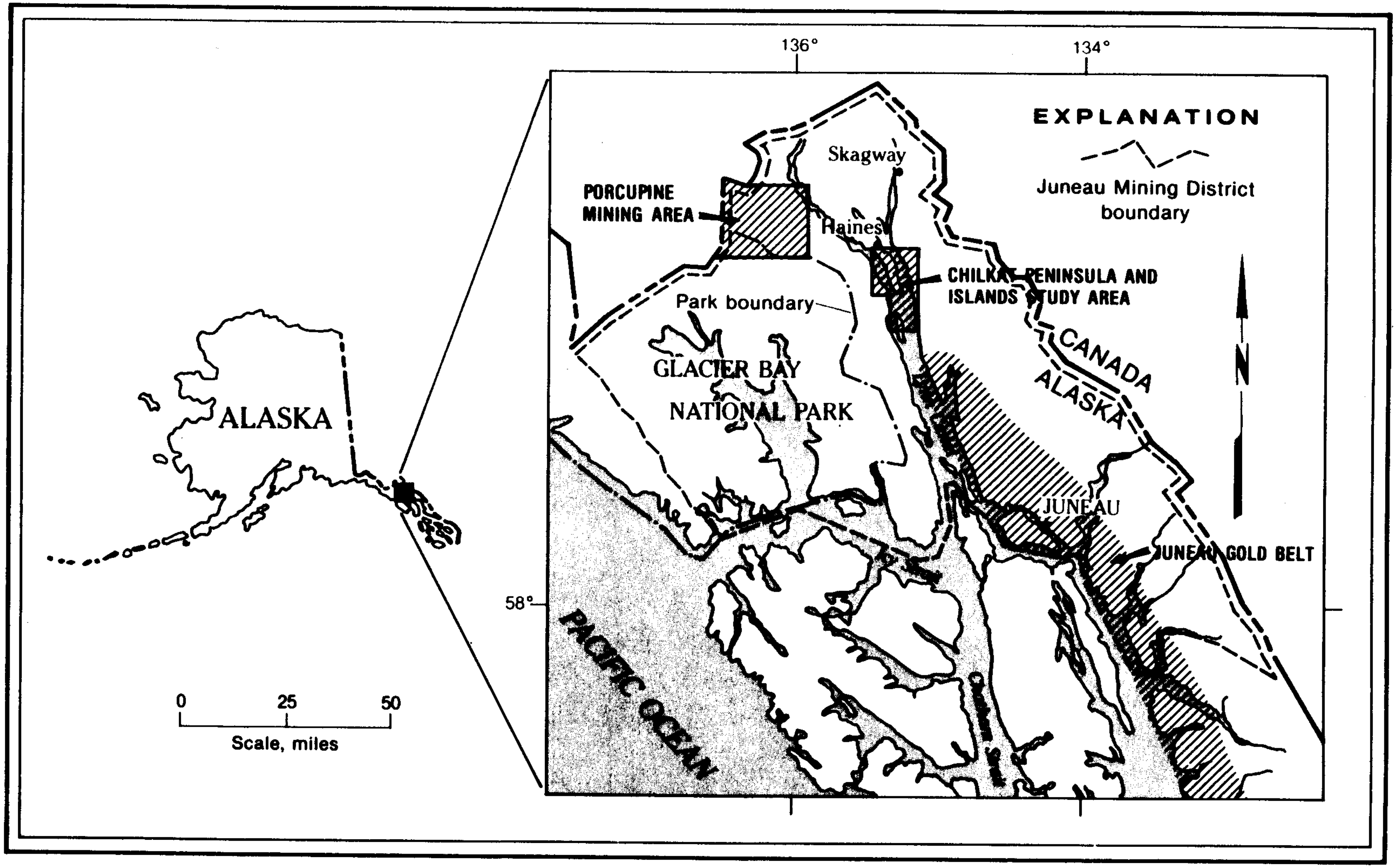

Figure 2.— Location of the Chilkat Peninsula and Islands study area relative to the Juneau gold belt and the Porcupine mining area.

LAND STATUS

About 4/5 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 3 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 U.S. Geological Survey (USGS) crew collected bedrock geochemical samples in the Chilkat Peninsula area and reported this work in USGS OFR 406 by Winkler and MacKevett (1). 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 (2) which lists all the prospects, occurrences, claim groups and 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 (3).

A preliminary reconnaissance USGS geology map lists the Chilkat Peninsula as unmapped.

Prior to this study (1986, 1987) 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 4 shows the geology of the Chilkat Peninsula as mapped by ADGGS during this project. Preliminary work covering the petrology of some of the Chilkat Peninsula rocks was completed by ADGGS during 1986 (4).

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 (5).

The peninsula consists of a northwest-trending, steeply-dipping 10,000-ft-thick sequence of Triassic 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 (3). 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 (4).

Sampling

Four types of materials were collected for analysis: stream sediment, soil, pan concentrate, and rock (rock samples consisted of bedrock material unless otherwise noted). Rock samples were of several types including channel, chip channel, continuous chip, spaced chip, representative chip, random chip, grab, and select. Grab samples are randomly collected outcrop or float materials and select samples are grab samples of specific material. Random chip samples consist of small rock fragments broken randomly from outcrop while representative chip samples are used to characterize an outcrop. Spaced chip samples are composed of a series of rock fragments taken at a designated interval and continuous chip samples consist of a continuous series of rock fragments taken from the outcrop. Chip channel samples are taken over a relatively uniform width and depth across the outcrop, while channel samples are from a uniform 4 in. wide by 2 in. deep cut across the outcrop. Diamond drill hole (DDH) 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.

All samples were prepared and analyzed for gold, silver, copper, lead, zinc, and cobalt by a commercial laboratory in Denver, Colorado. The results are in Appendix A. Some samples were also analyzed for barium. Some of the drill hole samples were not analyzed for lead or cobalt. Further analysis of selected samples or groups of samples was conducted for a variety of elements. These are noted in the analytical tables and the additional results are contained in Appendix B.

Stream sediment samples were dried and screened, with the minus-80-mesh fraction being retained for analysis. After panning in the field the pan concentrate samples were pulverized to a nominal minus-150-mesh. Rock samples were crushed to minus-10-mesh, then using standard splitting techniques a 250 gram aliquot was pulverized to a nominal minus-150-mesh.

An atomic absorption spectrophotometer technique, using sample aliquots of 0.5 gram, was used for determination of silver, copper, lead, cobalt and zinc. The sample was put into solution using a hot extraction HNO_3-HCl technique.

In the case of stream sediment, pan concentrate and rock samples, a 20 gram split, if available, was analyzed for gold using a fire assay-atomic absorption spectrophotometer technique.

Diamond Drilling

All the project diamond drilling was on the Road Cut prospect where 980 ft of NQ core was drilled in seven holes through contract[1] 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%.

Geophysics

Almost all the project geophysics was conducted on the Road Cut prospect where 13 lines with a cumulative length of 7,600 ft 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 (6, 7, 8, 9).

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 spectometer with a 21 in. 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 ft, were run across the eastern part of the Chilkat fault 1.5 miles south from the Road Cut prospect.

Establishment of Anomalous Levels

The location and definition of geochemical anomalies requires the comparison of analyzed values for stream sediment and bedrock samples with normal or worldwide average abundances of the target elements, as adjusted for local or regional background levels. Table 1 lists the abundance of various elements in the earths crust (10, 11, 12). This study generated insufficient data to establish anomalous element levels for the rocks of the Chilkat Peninsula and Islands. The types of bedrock and stream sediment samples necessary to determine normal background metal values were not systematically collected. This study's sampling program concentrated on following up mineralized trends and the samples generally reflect this in values elevated above the expected normal background.

[1]Bureau use of contractor or brand name equipment does not imply Bureau endorsement.

TABLE 1. - Average abundance of analyzed trace elements in the earths crust, soil, and selected rock types (values in ppm).

Element	Crust	Soil	Shale	Lime-stone	Basalt	Grano-diorite
Au	0.004	-	0.004	0.005	0.004	0.004
Ag	.070	0.100	.050	1.000	.100	.070
Zn	70.000	60.000	100.000	25.000	100.000	60.000
Cu	55.000	25.000	50.000	15.000	100.000	30.000
Pb	12.500	19.000	20.000	8.000	5.000	15.000
Co	25.000	9.100	20.000	4.000	50.000	10.000
Ba	425.000	580.000	700.000	100.000	250.000	500.000
W	1.500	-	2.000	.500	1.000	2.000
Mo	1.500	1.000	3.000	1.000	1.000	1.000
Sn	2.000	1.300	4.000	4.000	1.000	2.000
As	1.800	7.200	15.000	2.500	2.000	2.000
Ni	75.000	19.000	70.000	12.000	150.000	20.000
Bi	.170	-	.180	-	.150	-
Sb	.200	.660	1.000	-	.200	.200

Source: references 10, 11, 12.

However, anomalous threshold limits were generated and the results published for State of Alaska and Bureau work in the nearby studies of the Porcupine mining area (13) and the Skagway B-3 quadrangle (14). These studies used the same analytical techniques as this study and considered crustal abundance, results of large-scale geochemical sampling studies in nearby areas of the Juneau Mining District, and metal value histograms of samples collected in the Skagway B-3 and B-4 quadrangles.

Table 2 lists anomalous threshold values for stream sediment samples reported in Glacier Bay, Tracy Arm-Fords Terror and the Porcupine Mining Area (13, 15, 16, 17).

Table 3 lists the anomalous metal values used in the cooperative Bureau and ADGGS reports covering the Skagway B-3 and B-4 quadrangles (13). These are the thresholds adopted by this study. The elements and corresponding rock types used in this study are underlined.

PROSPECTS AND OCCURRENCES

This study identified four[3] gold-copper prospects or occurrences in the Chilkat Peninsula and Islands area. Their locations are shown in figure 5 and their sample results are given in Appendix A and B. All are hosted in metabasalt and the Road Cut, Road Cut II and Islands copper prospects 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 the author 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 6 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 ft 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-ft length of the zone averaged 14 ppm gold and 4.25% copper across a 1.2-ft width. Figure 7 shows the prospect and the exposed mineralized zone, herein called the gold-copper mineralized zone.

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 ft and explored the Road Cut structure for a distance of 1,000 ft along strike and 830 ft across

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

TABLE 2. - Anomaly threshold values for trace metal concentrations in stream sediment samples taken from Glacier Bay, Tracy Arm-Fords Terror, and Porcupine mining area (values in ppm).

Element	Glacier Bay	Tracy Arm-Fords Terror	Porcupine
Au	0.050	0.100	any
Ag	.500	.70	0.50
Zn	200.000	200.000	200.000
Cu	150.000	100.000	100.000
Pb	50.000	50.000	50.000
Co	70.000	-	50.000
Ba	-	-	1,000.000
W	-	-	5.000
Mo	7.000	10.000	10.000
Sn	10.000	10.000	10.000
As	200.000	300.000	200.000
Ni	150.000	150.000	100.000
Bi	-	-	-
Sb	-	-	100.000(any)

Source: references 13, 15, 16, 17.

TABLE 3. - Anomalous and highly anomalous threshold values for trace metals in rocks an 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 13.

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 ft to the east of the Road Cut mineralized zone. Figure 8 shows these anomalies.

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. Seven holes were drilled with a total footage of 980 ft, that explored the Road Cut mineralized zone for 600 ft along strike, 200 ft across structure and to a depth of 170 ft below the surface. Six trenches, up to 6 ft deep and 20 ft long, were dug to explore the zone where it is covered by rubble and fill in the road cut. Figure 7 shows the diamond drill hole and trenching locations; figure 9 shows the trench profiles, while figures 10-14 show the diamond drill hole profiles.

In September of 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 ft of line was run to extend the previous years grid to 1,700 ft along strike. Figure 15 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 1/4 mile of an ultramafic intrusive. The mineralization is fault-controlled and is contained within a fault zone that is up to 40 ft thick, trends N35^{o} to 40^{o}W 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 (see figs. 7, 9, and 12). The lower-grade remainder of the Road Cut fault zone is under cover and is intersected by DDH 1-DDH 5 and DDH 7 (see figs. 7 and 10-14). 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 ft along strike in shallow trenches through the road cut rubble. This is shown in Figure 7, sample lines 5-36. Its eastern boundary is the hanging wall of the Road Cut fault. At most locations it contains a 0.2 ft to 3.5 ft 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

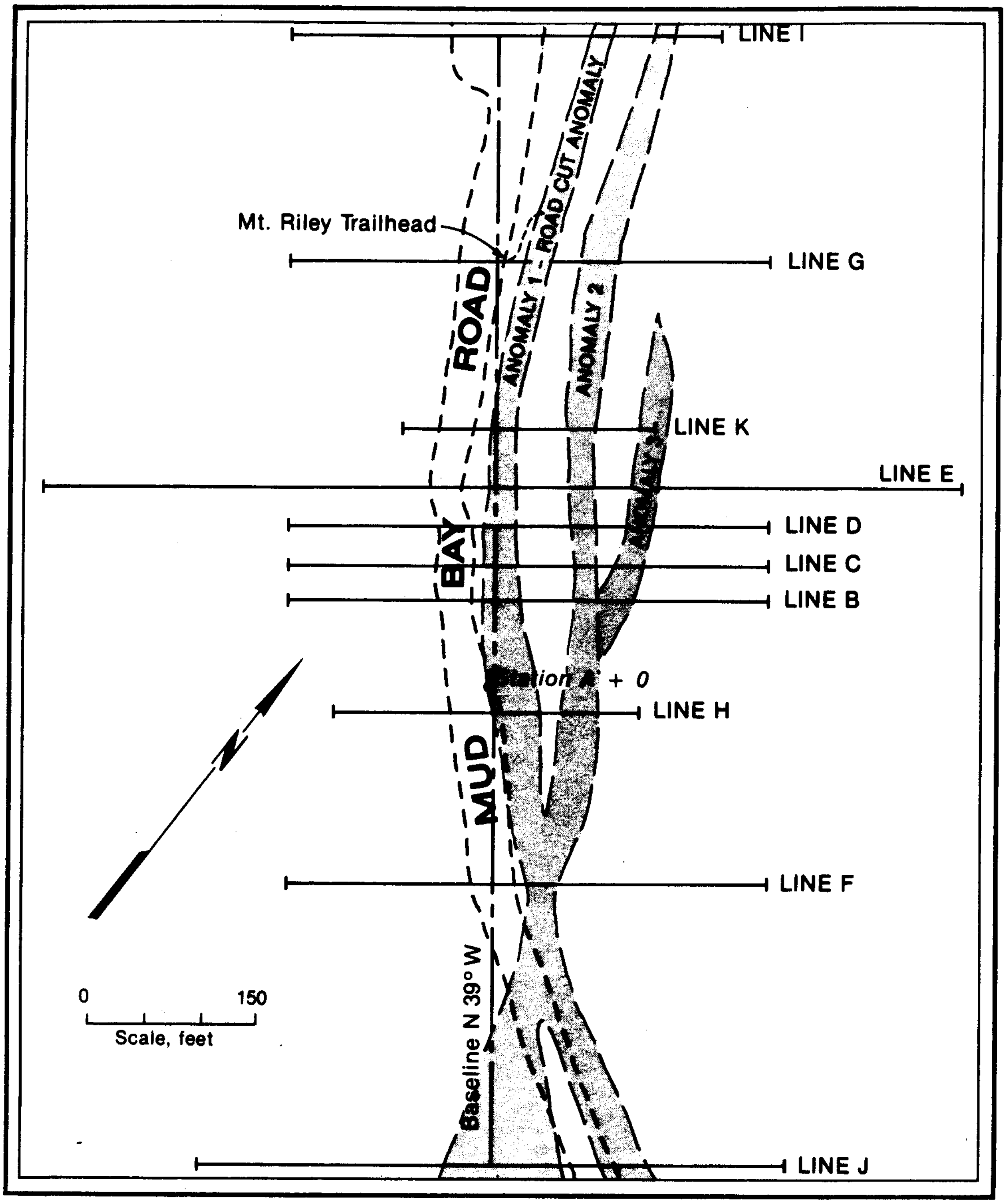

Figure 8.— 1986 Road Cut geophysics summary (7), Dec. 18, 1986.

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 ft 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 ft 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 ft) 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 ft-long surface exposure of the gold-copper mineralized zone. Figure 7 shows the sample locations and figure 9 the sample details. Appendix A and B contain 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 ft 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 ft, averages 15.44 ppm gold, 31.9 ppm silver and 4.78% copper. At a 3 ft mining width, it averages 6.14 ppm gold, 13.5 ppm silver and 1.99% copper. The 227 ft 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 ft 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 ft and to a depth of 125 ft. It strikes N40^{o}W, dips from 70^{o} to 75^{o} to the northeast, and ranges in width from 12 to 40 ft. 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. 12) where an 18 ft interval across the fault zone (58 ft 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 ft. A 4-ft-thick section of this hole averages 980 ppm copper and, for discussion purposes, is included in the gold-copper mineralized zone. The remaining 14-ft-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 ft west of the DDH 1 collar.

DDH 3 intersects the Road Cut fault zone directly below DDH 1 at a depth of 125 ft below the surface. Values across the 25-ft-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. Copper values drop from 6.88% on the surface to 1.84% in DDH 1 to 134 ppm in DDH 3. 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%.

DDH 2 intersects the Road Cut fault zone 167 ft southerly from DDH 3 at a depth of 93 ft below the surface where the zone is 40-ft-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 ft from DDH 1. It intersects the Road Cut fault zone at a depth of 85 ft where the zone is 30-ft-wide. Gold was not detected in this zone and copper values ranged from 3 to 114 ppm. However, at a distance of 30 ft across structure in a southwesterly direction, a 10-ft-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 ft northerly from DDH 3, is collared within the Road Cut fault zone and intersects it for a width of 24 ft, 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 ft from DDH 1 and was collared in surficial cover consisting of boulders and clay that extended down the hole for 25 ft of difficult drilling. Two mineralized fault zones were intersected: one is 4 ft thick and the other, located 17 ft across structure, is 12 ft 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 ft 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 ft east of the base line at this location (fig. 14). The metabasalts exposed 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 ft, and has been traced along strike for 590 ft and to a depth of 125 ft 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 8 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 ft 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 ft 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 (6, 7, 8, 9).

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 15 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 ft or more. To the east, at a distance of 350 and 420 ft from the base line, two faults (1 and 2, fig. 15) were defined by both electromagnetics (VLF) and magnetics. These are similar in character to the anomaly over the Road Cut fault.

Resources

The 227-ft-long by 3-ft-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 ft between sample lines 13 and 21, where the sulfide-rich quartz-calcite portion of the zone averages 0.57 oz/ton gold, 1.27 oz/ton silver, and 7.46% copper over a 1.2 ft thickness. A 3 ft mining width averages 0.23 oz/ton gold, 0.56 oz/ton silver, and 3.09% copper. This 47 ft portion represents only a few hundred tons across a 3 ft mining width.

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

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

4,729 tons at 0.02 oz/ton gold and 0.1% copper at a 4 ft width.

The DDH zone (Road Cut fault zone excluding the gold-copper mineralized zone) has been traced for 1,700 ft along strike by drilling and geophysics. At depth, drilling established that the zone continues to a depth of 125 ft. It is inferred that it extends past this to a depth of at least half its strike length or 850 ft. The DDH zone averages about 25 ft in width. This zone contains an inferred 3 million tons of resources. Based on diamond drilling along a strike length of 590 ft and to a depth of 125 ft, the average grade would be estimated at 0.008 oz/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 oz/ton - 0.2 oz/ton gold (18). This estimate assumes mining is by underground methods.

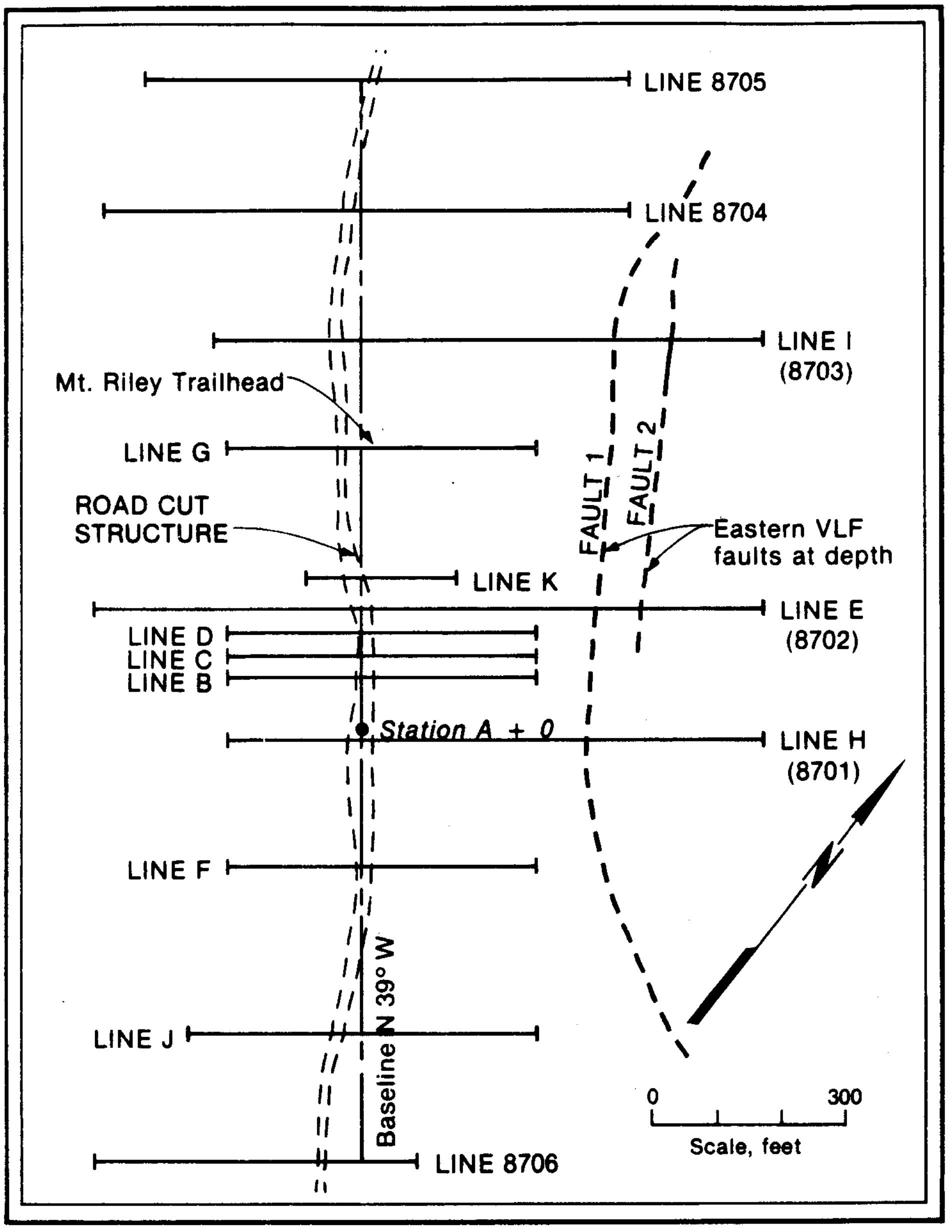

Figure 15.— 1987 Road Cut geophysics summary (9).

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 ft 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 present known 1,700 ft length.

Geophysics indicates targets for physical testing, additional geophysics, and soil sampling to the east of the Road Cut fault zone (fig. 15, fault 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 one mile southerly from the Road Cut prospect between the 4 and 5 mile signs along the Mud Bay Road (fig. 6). 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 ft 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. 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-ft-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 N37°W located about 35 ft east of the roadway; details are contained in the contractors report (9).

An old adit, located several hundred ft southeast of the 4 mile road sign, penetrates the metabasalt about 30 ft. 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.

Battery Point Occurrence

The Battery Point occurrence is located on the east side of the Chilkat Peninsula, about 1/2 mile south of Battery Point where a 100-ft-high metabasalt cliff has a few patches of malachite stain (fig. 5). Select samples of metabasalt from the cliff and float below it, containing disseminated chalcopyrite, contained up to 0.51 ppm gold and 2,650 ppm copper. A 100-ft-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.

Islands Copper Occurrence

The Islands copper occurrence is located on the south end of Kataguni Island (fig. 5, map nos. 48-52). The mineralization is located in metabasalt sea cliffs up to 50 ft 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-ft-thick shear-controlled veins contain up to 2.54 ppm gold, 22.5 ppm silver, 6.9% copper, and 2.14% zinc.

Talsani Island Jadeite Occurrence

A jadeite occurrence has been reported on Talsani Island (2, 19). The area was briefly investigated and jadeite was not found. However, some epidote-rich bands in metabasalt were anomalous in copper (see fig. 4, sample location 43).

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 5 and 6 show the locations of samples and anomalous samples (fig. 5, map nos. 1-47; fig. 6, map nos. 1-24 and 41-51). Sixty-six rock, 5 pan concentrate, 40 stream sediment, and 1 soil sample were collected. Of these 112 samples, 79 are anomalous in gold, silver, copper, or zinc. Samples contain up to 0.79 ppm gold, 5.7 ppm silver, 1.23% copper, and 1.02% zinc. 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 Mt. Riley gulch area. Here stream sediment samples, collected in intermittent drainages just east of the Road Cut gold-copper mineralized zone (fig. 6, map nos. 9 and 10) and a series of samples collected in the streams and gulches that drain the northwest side of Mt. Riley (fig. 6, map 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 Mt. 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. 6, map nos. 29, 32, 35, 39, 43, 45, 47, 48, and 50). These samples contain up to 465 ppm copper and 0.79 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 Mt. Riley (fig. 5, map 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. 5, map nos. 3-16, 11-13, 23-31, and 34-39). The samples contain up to 0.58 ppm gold, 2.5 ppm silver, 8,465 ppm copper, and 1.02% zinc. Map locations 30 and 31 are particularly noteworthy. At location 31 a metabasalt boulder containing chalcopyrite and sphalerite assayed 0.41 ppm gold, 1.2 ppm silver, 8,465 ppm copper, and 1.02% zinc. At location 30 a stream sediment sample from a drainage below a narrow gulch contained 0.58 ppm gold, 1.0 ppm silver, and 154 ppm copper.

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.

REFERENCES

1. Winkler, G.R., and E.M. MacKevett, Jr. Analyses of Bedrock and Stream Sediment Samples from the Haines-Porcupine Region, Southeast Alaska. U.S. Geol. Surv. Open File Rep. 406, 1970, 91 pp.

2. 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, 1985, 232 pp.

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

4. Forbes, R.B. Preliminary Petrography of the Country Rocks Adjacent to the Road Cut Lode, Haines Area, Southeast Alaska. Unpublished Report, 3 pp; available at Juneau BuMines library.

5. 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, 2 sheets.

6. Kruger, F.G. Untitled report covering geophysics conducted on the Road Cut Prospect Salisbury and Associates, Inc., 1986, 3 pp; available at Juneau BuMines library.

7. Adler, K.M. Geophysical Data Review - Haines Road Cut Prospect, Skagway A-2 Quadrangle, Alaska. On-Line Exploration Services, Inc., December, 1986, 3 pp; available at Juneau BuMines library.

8. Adler, K.M., and K.P. Adler. Haines Road Cut Project, 1987 Geophysical Survey. On-Line Exploration Services, Inc., September, 1987, 8 pp; available at Juneau BuMines library.

9. Adler, K.M., and K.P. Adler. Haines Road Cut Project, 1987 Geophysical Survey. Update. On-Line Exploration Services, Inc., January 20, 1988, 20 pp; available at Juneau BuMines library.

10. Rankama, K., and T.G. Sahama. Geochemistry. Univ. Chicago Press, 1950, 911 pp.

11. Connor, J.J., and H.T. Shaklette. Background Geochemistry of Some Rocks, Soils, Plants and Vegetables in the Conterminous United States. U.S. Geol. Surv. Prof. Paper 574-F, 1987, 168 pp.

12. Levinson, A.A. Introduction to Exploration Geochemistry. Univ. of Calgary, Alberta, 1980, 924 pp.

13. Still, J.C., W.G. Gilbert and R.B. Forbes. 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.

14. 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. Geol. and Geophys. Surv. Rep. Invest. 87-2, 1987, 2 sheets.

15. Still, J.C., K.R. 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.

16. Brew, D.A., D.J. Grybeck, B.R. Johnson, R.C. Jachens, A. Kimball and J.C. Still. Mineral Resources of the Tracy Arm-Fords Terror Wilderness Study Area and Vicinity, Alaska. U.S. Geol. Surv. Open File Rep. 77-649, 1977, 282 pp.

17. Brew, D.A., D.J. Grybeck, A. Griscom, D.F. Barnes, A. Kimball and J.C. Still. Mineral Resources of the Glacier Bay National Monument Wilderness Study Area, Alaska. U.S. Geol. Surv. Open File Rep. 78-494, 1978, 670 pp.

18. 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, 28 pp.

19. U.S. Bureau of Mines, Alaska 1:250,000 Scale Quadrangle Map Overlays Showing Mineral Deposits locations, Principal Minerals, and Number and Type of Claims. BuMines OFR 20-73, 1980, Skagway sheet.

APPENDIX A

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
CR - representative chip	SC - spaced chip
F - float	SS - stream sediment
G - grab	

Lithologic and Mineralogic Abbreviations

az - azurite	hem - hematite	py - pyrite
calc - calcite	mag - magnetite	qz - quartz
cp - chalcopyrite	meta - metamorphosed	sl - sphalerite
ep - epidote	ml - malachite	st - stained
fe - iron	po - pyrrhotite	sulf - sulfide
fest - iron-stained		

Additional Abbreviations

dissem = disseminated	DDH = Diamond Drill Hole	NA = Not Applicable
w/ = with	- = Not Analyzed	el = Elevation

Note: 1986-1987 Sample analyses by a commercial laboratory in Lakewood, Colorado.

Table A-1.- Chilkat Peninsula and Islands analytical results (see fig. 5)

(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Ba[3]	Remarks
1	1617	S	0.2	<0.07	0.2	785	46	<2	25	-	ultramafic w/cp
2	1786	SS	NA	<.07	<.1	12	21	<2	6	420	el 100 ft
3	0572	SS	NA	<.07	<.1	190	60	6	28	-	el 60 ft
4	1705	SS	NA	<.07	<.1	265	59	11	-	-	el 100 ft
5	0571	SS	NA	<.07	<.1	170	65	8	21	-	el 50 ft
6	1704[4]	GF	.5	<.07	.4	1,750	8	<2	-	-	qz vein in ultramafic w/cp,ml
7	0586[4]	CR	3	<.07	<.1	176	30	2	15	368	felsic dike in fest brecciated zone
7	0587[4]	S	.5	<.07	<.1	235	32	3	18	439	felsic dike w/fest,py
7	0588	S	NA	<.07	<.1	390	13	6	8	135	felsic vein w/py
8	8095	S	NA	<.07	.1	790	30	<2	24	<20	ultramafic w/dissem cp
8	8096	SC	30	<.07	.2	782	29	2	20	170	ultramafic w/cp
8	8097	SC	30	.07	.1	248	36	<2	21	260	ultramafic
8	8098	S	NA	<.07	.1	769	36	<2	26	70	ultramafic w/cp
8	8099	S	NA	<.07	.1	490	42	<2	25	800	qz breccia w/po,cp
9	0679	CR	30	<.07	.1	207	34	3	21	-	ultramafic w/cp,py
9	1616	SC	10	<.07	.2	590	37	<2	32	-	ultramafic w/cp,mag
10	0425	S	NA	.51	<.2	920	28	2	11	<20	metabasalt w/cp,ml
10	0426	S	NA	.38	<.2	430	32	2	11	<20	metabasalt w/cp,ml
10	0427	RC	100	<.07	<.2	290	44	<2	15	<20	metabasalt w/cp,ml
10	0569	S	1	<.07	<.1	400	38	<2	16	-	metabasalt w/dissem cp
10	0570	S	NA	.07	<.1	2,650	10	<2	7	-	metabasalt breccia w/qz,ep,cp,ml,az
10	1703	S	.5	<.07	.3	1,850	20	<2	-	-	metabasalt w/ep,cp,ml
11	0459	S	NA	.10	.3	2,570	21	10	10	40	metabasalt w/ep,cp,ml
12	6347	S	NA	-	<.2	108	70	4	28	<20	metabasalt w/ep,dissem sulf,mag
13	6346	S	NA	-	<.2	83	73	<2	25	<20	metabasalt w/ep
14	1787	C	2	<.07	.1	311	82	<2	23	130	shear zone w/metabasalt & sediments w/ml,fest
15	1794	C	.15	<.07	.3	496	57	6	22	1,700	metabasalt w/fest calc,cp
16	0677	SS	NA	<.07	<.1	46	85	6	17	700	el 40 ft
17	0691	CR	3	<.07	.1	91	80	4	25	<20	metabasalt w/ep,py
18	0690	SS	NA	<.03	.1	107	86	13	57	170	el 190 ft
19	0689	SS	NA	<.07	.2	286	81	7	100	240	el 190 ft
20	0688	SS	NA	.07	.1	167	93	11	32	480	el 120 ft
21	0687	SS	NA	<.07	<.1	112	70	2	16	520	el 80 ft
22	0680	SS	NA	<.07	<.1	52	93	7	14	800	el 20 ft
23	1706	G	1	<.07	<.1	194	66	<2	-	-	metabasalt w/ep,cp
24	0678	CR	3	<.07	.6	1,370	68	4	26	-	metabasalt w/qz,ep,cp
25	1588	G	NA	<.01	.3	134	48	4	35	-	metabasalt w/sulf
25	1589	C	.5	.01	.6	345	27	9	58	40	qz knot in fault w/sulf
25	1590	G	NA	.02	.2	2,370	17	6	12	250	metabasalt w/ep,sulf,cp,ml
26	0548	SS	NA	.07	.3	139	102	18	34	-	el 10 ft
27	1601	CRF	1	<.07	1.2	2,110	46	<2	9	50	qz vein w/cp,ml,py,fest
27	1689	GF	NA	<.07	.2	2,200	5	3	5	-	qz vein w/cp,ml,py,fest
27	0547	SF	NA	<.07	.2	1,850	8	4	5	-	qz vein w/cp,ml,py,fest
28	0478	CR	1	<.01	.3	295	127	16	30	50	metabasalt w/py,fest
29	0477	G	NA	<.01	.2	175	38	5	30	60	metabasalt w/py
30	1798	SS	NA	.58	1	154	130	9	25	190	el 10 ft
31	1600[4]	CF	1	.10	2.1	7,630	9,120	15	28	30	metabasalt-qz breccia w/cp,sl,sulf
31	1799	CF	1	.41	1.2	8,465	1.02%	37	27	10	duplicate of sample above
32	0479	CR	4	<.01	.2	49	119	14	16	630	black-gray slate

Key to abbreviation on page 20.

See footnotes at end of appendix.

Table A-1.- Chilkat Peninsula and Islands analytical results (see fig. 5)
(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Ba[3]	Remarks
33	1608	G	NA	0.14	5.7	1.23%	68	18	25	2,710	sulf knot in hornfels w/ml
33	1609	CR	5	<.07	<.2	143	105	9	35	1,490	hornfels near metabasalt contact
34	1599	G	.3	<.07	.4	360	223	7	40	40	metabasalt w/sulf
35	1598	S	.2	<.07	1.4	4,750	79	<2	32	-	metabasalt w/ep,cp
36	1597	S	.2	<.07	<.2	370	14	<2	4	30	metabasalt w/ep,cp
37	1717	RC	20	<.07	.2	131	126	<2	-	-	metabasalt w/py,pc
38	1716	SC	5	<.07	.1	57	36	<2	-	-	metabasalt w/sulf
39	1596	S	.25	<.07	2.5	3,910	10	3	3	-	metabasalt w/ep,cp
40	1606	G	.5	<.07	<.2	34	65	3	24	630	fest ankerite in metabasalt
41	1595	GR	.2	<.07	<.2	45	110	3	14	-	qz-calc vein in metabasalt w/ml
42	1607	CC	1.7	<.07	.2	26	42	7	5	-	red chert in metabasalt
43	0428	S	.5	<.07	.2	1,920	8	<2	4	<20	metabasalt w/ep,cz,cp
44	1500	C	.3	<.07	.1	70	38	3	5	680	metabasalt contact w/metabasalt w/calc
45	1503	C	.4	<.07	.1	221	98	<2	18	<20	metabasalt shear zone w/ep,py,fest
46	1504	G	.5	<.07	3.2	7,420	95	2	48	<20	metabasalt w/ep,cp,py,fest
47	1502	G	6	<.07	.1	24	44	24	5	470	fest dike w/py in pillow metabasalt
48	1003	S	.2	.10	22.5	6.78%	406	6	41	<20	silicified zone in metabasalt w/ep,cp,py
48	1004[4]	CC	.25	.93	4.1	4.60%	181	23	15	13	ep vein in metabasalt w/cp,py,ml
48	1506	CR	4	.07	.2	906	64	<2	11	<20	metabasalt w/ep,ml,cp,py,fest
48	1507[4]	CH	.2	<.07	12.5	6.90%	396	<5	139	10	ep vein in metabasalt w/cp,py,ml
48	1508[4]	CH	.3	<.07	1.2	1.34%	107	43	23	11	ep vein in metabasalt w/cp,py,ml
48	1509[4]	CH	.25	<.07	8.6	5.45%	75	27	23	9	ep vein in metabasalt w/cp,py,ml
48	1510[4]	CH	.2	<.07	1.1	1.32%	65	35	13	9	ep vein in metabasalt w/cp,py,ml
49	1001	CC	.6	<.07	<.1	6	21	<2	31	<20	ep silicified zone in metabasalt w/py,cp,ml,sl
50	0696	CC	.4	<.07	.5	2,070	1,660	3	27	<20	silicified ep shear zone in metabasalt w/py,cp
51	0694	CR	1	<.07	.3	479	101	6	58	<20	metabasalt w/ep,py
51	0695[4]	CR	.6	<.07	1.2	2.48%	386	35	49	46	metabasalt w/ep,cz,cp,py
51	0697	CC	1.4	<.07	4.2	1.46%	468	5	58	<20	qz-ep lens in metabasalt w/py,cp
51	0698	CC	.3	<.07	2.5	1.21%	128	18	42	<20	ep silicified zone in metabasalt w/py,cp
51	0699	CC	.5	.10	1.5	7,200	122	9	55	<20	ep silicified zone in metabasalt w/py,cp,bn,sl
52	1501	C	.5	2.54	1.1	1,950	2.14%	7	21	150	qz-calc breccia in metabasalt w/cp,py,sl,ml

Key to abbreviation on page 20.

Table A-2.- Road Cut II and other area analytical results (see fig. 5)

(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Ba[3]	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 & cz 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	1752	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	<2	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	9	26	210	el 75 ft

Key to abbreviation on page 20.

Table A-2.- Road Cut II and other area analytical results (see fig. 6)

(All values in ppm unless marked %

Map No.	Sample No.	Sample Type	Width (ft)	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Ba[3]	Remarks
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 cz
38	1711	G	.4	.21	.6	2,900	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

Key to abbreviation on page 20.

Table A-3.- Road Cut Prospect surface analytical results (see figs.7 and 9)
(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Ba[3]	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	10.90	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 [4]	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/sparce qz and sulf
6a	1684	C	.4	6.93	2.1	1,600	26	12	28	-	qz-metabasalt w/cp/py
6b	1685	SC	5.0	.10	.2	138	76	10	32	-	metabasalt
7a	1633 [4]	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 [4]	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 [4]	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	1521 [4]	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	.96	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
16f	0453	RC	3.0	<.07	<.2	37	43	17	8	920	porphyritic metadiorite

Key to abbreviation on page 20.

Table A-3.- Road Cut Prospect surface analytical results (see figs.7 and 9)
(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Ba[3]	Remarks
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	6.89%	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[4]	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	0497	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[4]	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[4]	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

Key to abbreviation on page 20.

Table A-3.- Road Cut Prospect surface analytical results (see figs. 7 and 9)
(All values in ppm unless marked %)

Map No.	Sample No.	Sample Type	Width (ft)	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Ba[3]	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	29	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

Key to abbreviation on page 20.

Table A-4.- Road Cut DDH analytical results

DDH1 (see fig. 12)

(All values in ppm unless marked %)

Sample No.	Depth From	Depth To	Interval	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Remarks
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	39	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	.99	.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.13)

Sample No.	Depth From	Depth To	Interval	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Remarks
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

Key to abbreviation on page 20.

Table A-4.- Road Cut DDH analytical results

DDH3 (see fig. 12)

(All values in ppm unless marked %)

Sample No.	Depth From	Depth To	Interval	Au [1]	Ag [2]	Cu [2]	Zn [2]	Pb [2]	Co [2]	Remarks
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
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
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	1.55	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. 11)

Sample No.	Depth From	Depth To	Interval	Au [1]	Ag [2]	Cu [2]	Zn [2]	Pb [2]	Co [2]	Remarks
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

Key to abbreviation on page 20.

Table A-4.- Road Cut DDH analytical results

DDH5 (see fig. 10)

(All values in ppm unless marked %)

Sample No.	Depth From	Depth To	Interval	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Remarks
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. 10)

Sample No.	Depth From	Depth To	Interval	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Remarks
111	0.00	8.00	8.00	<0.07	<0.2	72	39	-	-	metabasalt w/ep/cz/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/cz
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/cz/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/cz/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

Key to abbreviation on page 20.

Table A-4.- Road Cut DDH analytical results

DDH7 (see fig. 14)

(All values in ppm unless marked %)

Sample No.	Depth From	Depth To	Interval	Au[1]	Ag[2]	Cu[2]	Zn[2]	Pb[2]	Co[2]	Remarks
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	152	22	-	-	metadiorite w/metabasalt w/py/cp
87	92.00	94.00	2.00	.14	<.2	50	36	-	-	metabasalt w/ep/py/cp
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	83	-	-	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 mylorite
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	65	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	265	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

Key to abbreviation on page 20.

Appendix A Footnotes

[1] Au analyses were by fire assay-inductively coupled plasma analysis (ICP).

[2] Ag, Cu, Pb, Zn and Co analyses were by atomic absorption spectrophotometry (AAS).

[3] Ba analyses were by X-ray diffraction.

[4] Additional analyses for these samples are contained in Appendix B.

APPENDIX B

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.

Table 5-1.- Chilkat Peninsula and Islands supplimentary analysis (see fig. 5)

Map No....	7	7	7	31	48	48	48	48	48	51
Sample No.	0586	0587	0588	1799	1004	1807	1808	1809	1810	0695
Cu.........	206	274	461	8,465	>2%	>2%	1.34%	>2%	1.32%	>2%
Pb.........	28	22	34	37	23	<5	43	27	35	35
Zn.........	53	43	17	1.02%	181	396	107	75	65	386
Mo.........	1	<1	<1	7	5	9	5	11	1	71
Ag.........	<.50	<.50	<.50	1.20	4.10	12.50	1.20	8.60	1.10	1.20
Cd.........	<1	<1	<1	45	<1	1	<1	<1	<1	<1
Ni.........	15	19	7	13	11	37	13	17	17	13
Co.........	39	29	9	27	15	139	23	23	13	49
Mn.........	1,034	704	360	555	1,032	1,032	1,247	1,006	692	1,000
Cr.........	37	25	35	127	155	143	99	157	183	97
U.........	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
W.........	<10	<10	<10	13	<10	11	<10	<10	<10	<10
As.........	9	10	<5	50	<5	8	<5	<5	11	<5
Ta.........	25	<10	<10	21	<10	15	<10	<10	<10	<10
Bi.........	15	<2	3	5	<2	<2	3	<2	<2	<2
Se.........	<5	<5	<5	<5	<5	67	<5	29	8	39
V.........	338	161	36	57	396	291	448	471	237	295
Sn.........	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sb.........	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
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
Ba.........	368	439	135	10	13	10	11	9	9	46
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%

All values in ppm unless marked %.
Key to abbreviation on page 20.

Table B-2.- Road Cut Prospect / surface sample supplimentary analysis (see figs. 7 and 9)

Map No....	5a	7b	5b	10b	15a	19b	22c	24b
Sample No.	1632	1634	1637	1656	1650	1648	1645	1640
Au.........	12	14	4	3	3	18	7	3
Ag.........	15	15	20	20	30	20	15	5
Cu.........	>2 %	>2 %	2 %	7,000	10,000	>2 %	>2 %	5,000
Pb.........	10	10	10	<10	10	<10	10	10
Zn.........	<200	<200	<200	<200	<200	<200	<200	<200
Mo.........	<5	<5	<5	<5	<5	<5	<5	<5
Fe.........	15 %	10 %	15 %	10 %	3 %	15 %	5 %	3 %
Hg.........	3	3	2	3	2	3	3	3
Ni.........	74	108	36	38	32	50	32	30
Co.........	200	100	100	100	50	100	70	70
Cr.........	300	150	300	200	150	200	200	200
Cd.........	<20	<20	<20	<20	<20	<20	<20	<20
As.........	1,500	3,000	500	200	1000	5,000	2,000	700
Sb.........	200	<100	<100	<100	<100	<100	<100	<100
Mn.........	300	500	500	1,500	700	300	700	1000
V..........	50	15	70	70	70	50	70	70
Bi.........	20	<10	<10	<10	<10	<10	<10	<10
Sn.........	<5	<5	<5	<5	<5	<5	<5	<5
Zr.........	<10	<10	<10	<10	<10	<10	<10	20
B..........	10	10	10	<10	<10	10	10	<10
Ba.........	50	15	50	70	10	10	20	200
Be.........	<1	<1	<1	<1	<1	<1	<1	<1
La.........	20	20	20	<20	<20	<20	<1	<1
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

All values in ppm unless marked %.
Key to abbreviation on page 20.