MINERAL LAND ASSESSMENT OF THE WEST PORTION OF WESTERN CHICHAGOF ISLAND, SOUTHEAST ALASKA

By J.C. Still and K.R. Weir, Alaska Field
Operations Center, Juneau, Alaska

* Open File Report 89-81

UNITED STATES DEPARTMENT OF THE INTERIOR

James G. Watt, Secretary

BUREAU OF MINES

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MINERAL LAND ASSESSMENT OF THE WEST PORTION OF WESTERN CHICHAGOF ISLAND, SOUTHEAST ALASKA

by

Jan C. Still[1] and Kevin R. Weir[2]

ABSTRACT

The Bureau of Mines in 1978 and 1979 surveyed the mineral potential of the west portion of western Chichagof Island as one part of the examination of the western Chichagof and Yakobi Islands wilderness study area, Tongass National Forest, Southeast Alaska. The study included literature and claims records search, field examinations of the reported mines, prospects or claims and field evaluation of geochemical anomalies noted by the Geological Survey during concurrent investigations. Two types of mineralized zones were found. One is east of the head of Slocum Arm where a 2 by 6 mile area, called the Slocum Arm molybdenum area, is estimated to have moderate potential for the development of porphyry or vein type molybdenum deposits. The second, called the West Coast gold area, an 8 by 27 mile area extending from near the head of Slocum Arm northward to Goulding Harbor, is estimated to have moderate potential for the development of fault controlled gold-silver lode deposits. The center of mining activity within this area of moderate potential is a 5 by 6 mile zone of estimated high mineral potential for the same type of gold-silver deposits. This zone surrounds Doolth Mountain and is called the Doolth Mountain area. It contains 52 patented

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claims and all the measured, inferred, hypothetical and marginal reserves; 715,000 oz. gold and 203,000 oz. silver. Almost the entire recorded mineral production of the study area was from this zone; 793,000 oz. gold and 233,000 oz. silver produced between 1906 and 1943 mostly from the Chichagoff* and Hirst-Chichagof Mines.

INTRODUCTION

Authorization and Purpose of Study

In accordance with the provisions of the Wilderness Act (Public Law 88-577, September 3, 1964) and the Joint Conference Report on Senate Bill 4, 88th Congress, the U.S. Geological Survey and the U.S. Bureau of Mines** have been conducting mineral surveys of wilderness and primitive areas. The act provides that areas under consideration of wilderness designation be studied for suitability for incorporation into the wilderness system. The mineral surveys constitute one aspect of the suitability studies. This report presents the results of a mineral survey of some national forest lands (Tongass National Forest) in the west portion of western Chichagof Island within the 633 square mile West Chichagof - Yakobi Islands wilderness study area, Southeast Alaska. This area was being considered for wilderness designation. The area was closed to mineral entry as part of a two year Secretarial withdrawal, on December 5, 1978. Public Law 96-487 (December 2, 1980) rescinded the withdrawal, again opening the area to mineral entry, but also created wilderness status for almost all of the west portion of western Chichagof Island. The area designated as wilderness will be opened to mineral entry until December 31, 1983 under the Wilderness Act of 1964 (88 577).

* Chichagof (or "ff") is spelled with the single "f" when referring to geographic or geologic names. Names of prospects and mines are found with both the single and double "f".

** Referred to as Bureau of Mines in text and BuMines in reference section

The area studied is about 35 miles northwest of the town of Sitka and 75 miles west of the town of Juneau in southeastern Alaska. Figure 1 shows the area location.

Scope

The western Chichagof - Yakobi Islands wilderness study area was divided into two sections for field study and for report presentation. This report covers the gold mines and prospects within the West Coast gold area and the molybdenum occurrences in the Slocum Arm molybdenum area, all located within the west portion of western Chichagof Island. Figure 1 shows these areas and their location within the larger wilderness study area. Another report (Kimball, Rataj, 1981) will cover the gold, nickel-copper-cobalt and other occurrences within the remainder of the wilderness study area. It also covers some minor occurrences and geochemical anomalies mostly within the Goon Dip Greenstone in the southeast part of the west portion of western Chichagof Island.

Setting

The west portion of western Chichagof Island is within the Tongass National Forest and is bounded on the southwest by the Pacific Ocean. The area is approximately 30 miles long by 10 miles wide.

The topography of the area is moderately rugged with high peaks and ridges at about 3000 feet in the interior of the island, separated by river valleys and lakes at near sea level elevations. The coastline is particularly irregular, consisting of a myriad of small islands, peninsulas, fiords, and rocks. The weather in the study area is typically maritime and extremely wet. Temperature extremes are moderate by proximity to the ocean, but low clouds, fog and light rain are typical at sea level

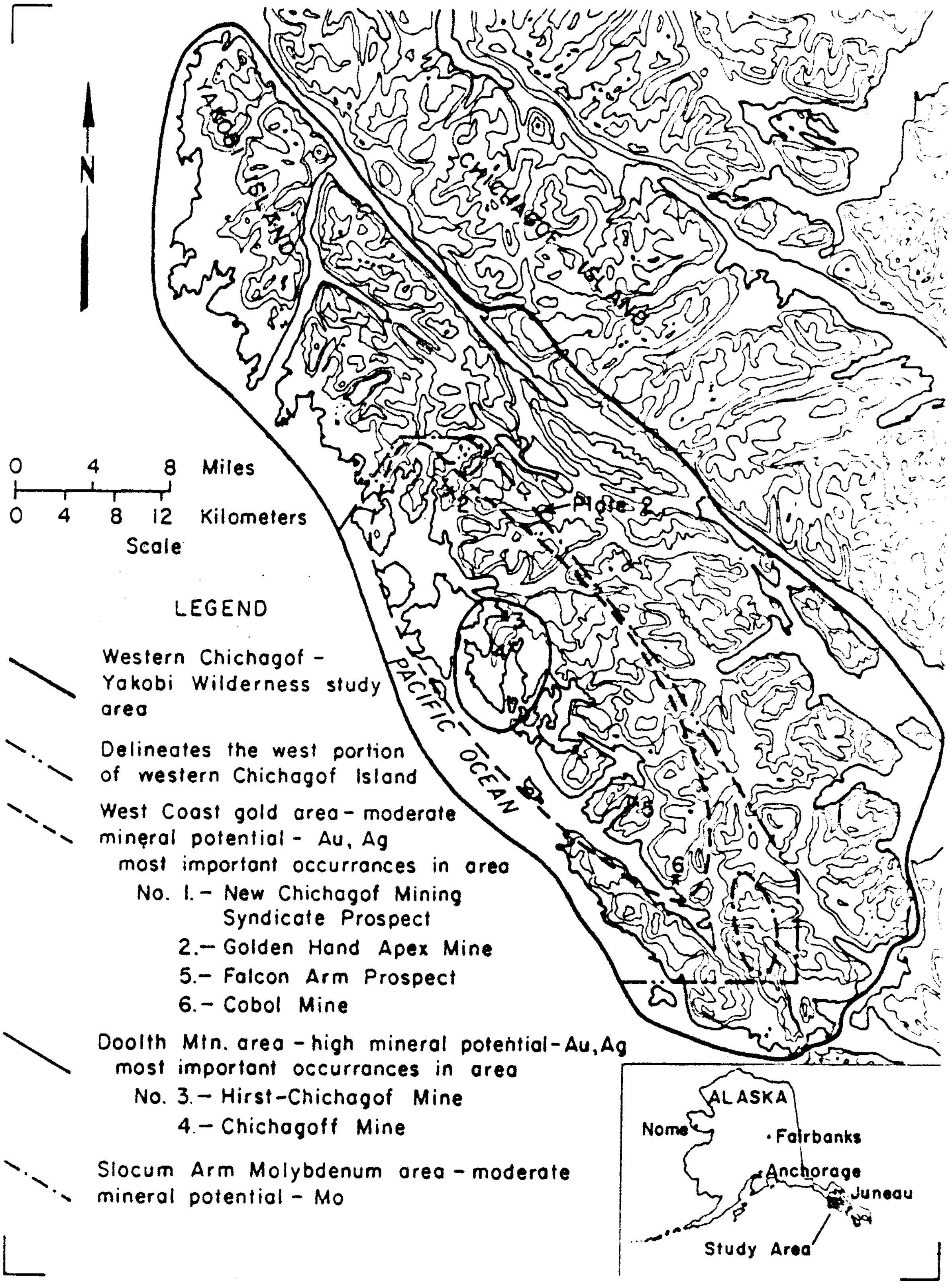


FIGURE 1. - Showing the study area location, west portion of western Chichagof Island and the West Coast gold, Doolth Mountain and Slocum Arm molybdenum areas covered by this study.

throughout the year with added freezing rain and snow in the winter months. The large number of fiords and inlets allows easy access to the shoreline for small boats except along the outermost coastline, which is exposed to the ocean swells. The ridgetops are generally rounded and easily traversed on foot. Due to the heavy rainfall, vegetation is extremely dense between sea level and about 2000 feet. Access to this area is difficult and time consuming.

Previous Studies

Gold was discovered within the area in 1905 near the head of Klag Bay. U.S. Geological Survey publications on the mineral deposits and geology of the district begin in 1905 with a report by C.W. Wright. Detailed descriptions of subsequent mining and prospecting activity are provided by the following publications: Knopf, 1912; Overbeck, 1919; Buddington, 1925; Reed and Coats, 1941; Rossman, 1955; and Loney and others, 1975.

U.S. Bureau of Mines publications on the mineral deposits of the area include reports on the Chichagof mining district (Thorne, 1967; Metz, 1978), Chichagoff mine (Smith, 1916; Humphrey, 1936), Hirst-Chichagof Mine (Humphrey, 1936, 1938), and the Slocum Arm molybdenum deposit (Thorne, 1952).

The Territory of Alaska Department of Mines engineers examined mineral deposits in the area, resulting in reports beginning in 1918 and continuing until 1959.

Unpublished reports by Alaska-Juneau Gold Mining Company engineers and various prospectors and engineers working in the area are available at the U.S. Bureau of Mines Library in Juneau.

Acknowledgements

The efficient and skillful support provided by P. Johnson and E.N. Davis, owner and operator, respectively, of the M/V Mowich is gratefully acknowledged. The skill and judgement of Eagle Air helicopter pilots C.M. Wilkerson and T. Freeburg is most appreciated. I. Miller of the Sitka Historical Society provided documents of the Chichagoff Mining Company and the Hirst-Chichagof Mining Company for research purposes. Information on mineral deposits of the area was provided by various miners and prospectors, including J. Breseman, J. and N. Brockway, J. Ballard, F. Branson, M. Lynch, A. and L. Parker and O. Lillegraven.

Analytical support was provided by the following U.S. Geological Survey Branch of Exploration Research personnel: J.D. Hoffman, C. Forn, G.W. Day, J.C. Lucus and F.N. Ward.

Sample preparation was by D. King, petrographic studies were by W.L. Gnagy and fire assays were by C.W. Merrill, Jr. and K. Weir. Additional analyses were done by the U.S. Bureau of Mines Reno Research Center, Skyline Labs, Wheatridge, CO., and Barringer Research, Inc., Wheatridge, CO.

Present Studies

The present study of the west portion of western Chichagof Island embraces pre-field, field and post-field activity consituting research of known data, on-site collection of new data and synthesis of both into a public report.

The pre-field activity consisted of claims records and literature research; contact with exploration companies, consultants and prospectors; cooperative work with the U.S. Geological Survey regarding local and regional geology; and identification of geochemically anomalous areas.

The information thus obtained on deposits, prospects, claims, anomalous areas and stained zones was synthesized to identify important field targets.

During field studies on-site examinations of claims, prospects, mines, workings, stained zones, and geochemically anomalous localities were made. Also, geological and engineering mapping and quantitative sampling was done in detail at most sites.

Post-field work consisted of synthesizing information generated during the field study with that of previous studies. Additional information has been drawn from previous studies, mine reports, and from claim owners. In addition to the references cited, past reports have been freely drawn upon. Where there was sufficient data, resource estimates were made using the Bureau of Mines Mineral Availability System (MAS) computer analysis. The final product for the mineral land assessment is this report with engineering back-up data.

Thirty person weeks in June, July and August, of 1978 and May, June, July, August and September of 1979 were spent conducting field studies. Base camps for the two man crew making the field examinations were located on the 40 foot charter boat M/V Mowich (11.5 weeks), at an old cabin on Lake Anna (2 weeks), and in Sitka (1.3 weeks). About half the field days a skiff was utilized for transportation, while a Sitka based helicopter called by radio was utilized the rest of the time.

During the two field seasons of this study over two miles of underground workings in more than 50 adits were examined and in most cases mapped and sampled. Gold prospect pits and trenches were most often flooded, sloughed, or badly overgrown and often could not be found. Old underground workings were found in most cases to be accessible and afforded the best and often the only exposures of the gold occurrences.

Sampling

Sample Types

About 1300 representative rock samples were obtained from mined material, veins, mineralized zones, mineral-stained areas and anomalous sample sites on the surface, in open cuts and in underground workings. Representative samples were of four types: 1) channel sample - moiled across a measured width; 2) chip sample - uniform-sized chips taken continuously along a measured line; 3) spaced-chip sample - chip samples taken at a uniform interval along a measured line; and 4) composite grab sample - random or select fragments composited from a small estimated or measured area. Grab samples composed of single rock fragments, usually float, were sometimes collected as well.

Petrographic specimens were obtained from many of the sample sites to establish rock type and mineralogy. About 70 stream sediment samples were collected to serve as geochemical indicators or were taken at or near specific sites for back-up or verification of previously obtained anomalous samples.

Sample Tables and Analyses

Samples were analyzed by the U.S. Geological Survey and Barringer Research, Inc. Method of analysis, elements sought and the lower limit of detection are given in Table 1. In addition, U.S. Bureau of Mines laboratories in Reno and Juneau provided analyses for gold and silver by fire assay. The lower limit of detection for fire assay analysis is 0.005 oz. per ton for gold and 0.1 oz. per ton silver; however, in some instances, about half of these amounts can be estimated on a reasonable basis.

Spectrographic analyses (spec.) utilize 10 milligrams of sample,

TABLE 1. - Methods of sample analysis, elements sought and lower limit of detection.

U.S. Geological Survey Branch of Exploration Research Analyses

1. Thirty-one element Semiquantitative Spectrographic Analysis

Element	Detection limit, %	Element	Detection limit, ppm	Element	Detection limit, ppm
Fe	0.05	Mn	10	Mo	5
Mg	.02	Ag	0.5	Nb	20
Ca	.05	As	200	Ni	5
Ti	.002	Au	10	Pb	10
		B	10	Sb	100
		Ba	20	Sc	5
		Be	1	Sn	10
		Bi	10	Sr	100
		Cd	20	V	10
		Co	5	W	50
		Cr	10	Y	10
		Cu	5	Zn	200
		La	20	Zr	10
				Th	100

2. Atomic Absorption analysis

Element	Detection limit, ppm	Element	Detection limit, ppm
Cu	5	Zn	5
Pb	5	Au	0.05 (may be higher for samples weighing less than 10 grams)

Barringer Research, Inc., analyses

1. Atomic absorption

Element	Detection limit, ppm	Element	Detection limit, ppm
Cu	1	Mo	1
Pb	1	Au	0.02
Zn	1		

2. Colorimetric analysis for W, detection limit of 4ppm; for WO_3, 5ppm

while atomic absorption analyses (AAS) require 10 grams. Fire assay uses an assay-ton or nearly 30 grams of sample and is considered the most reliable of the three methods for gold and silver determination. Gold and silver values provided by fire assay are expressed in troy ounces per ton. Atomic absorption values for gold and silver are expressed in parts per million (ppm).

The atomic absorption type gold analysis developed by the U.S. Geological Survey, and used for analysis of some Bureau of Mines samples in this study, is intended for rapid reconnaissance analysis of samples containing small amounts of gold, but is not considered suitable for detailed evaluation of gold properties. Where gold content was greater than 0.1 oz. gold per ton, the U.S. Geological Survey atomic absorption gold analysis was found to give significantly higher values than the corresponding fire assay. Checks against standards and replicate samples fire assayed at the Bureau of Mines Reno Laboratory confirmed that the U.S. Geological Survey atomic absorption values were inflated. However, the U.S. Geological Survey atomic absorption values are reported because they detect gold below the lower limit of fire assay methods and because some grab samples (not to be used in detailed evaluations) were not fire assayed.

Tables of analytical results that accompany individual prospect descriptions in the text report sample values for the elements considered important for the particular type of deposit sampled. Symbols used in the tables are defined as follows:

G	Greater than value shown
H	Interference
-	Not looked for
N or Nil	Not detected at limit of detection
L or Tr	Detected but below limit of determination
INS	Indicates insufficient sample for analysis

Mining Activity

Both the Chichagoff and Hirst-Chichagof mines at Doolth Mountain were discovered in 1905. The Chichagoff mine, initially financed on high grade gold ore float, operated from 1906-1942 while the Hirst-Chichagof mine operated from 1922-1943. They jointly produced 791,000 oz. gold and 233,000 oz. silver from over 740,000 tons of ore. Four other mines in the study area produced from a few to 1,450 oz. of gold and a small amount of silver.

Mining Claims

At the Sitka Recording District office a search was made of claims records that date back to 1890. Certificates of location and any affidavits of annual assessment work for all recorded claims in the study area were examined. More than 1200 mining claims were staked in the study area and 52 of these located in the Doolth Mountain area are patented.

The courthouse records show more claims than were actually found in the field. Claim locations sometimes reference a mountain or bay with a local name that has not been preserved. Monuments of possible workings on the old claims may have been obliterated. Many claims are relocations of formerly held ground. The distribution of claims within the study area is shown on plate 1.

AREAS, MINES, PROSPECTS, and OCCURRENCES

West Coast Gold Area

Introduction

The West Coast Gold Area is 8 miles wide by 28 miles long and is characterized by gold-quartz occurrences along a series of northwesterly striking, steeply dipping shear zones within graywacke, schist and marble. The western boundary is the Pacific Ocean and the eastern boundary is the eastern contact of the Whitestripe Marble. To the east past the Whitestripe Marble the rock type and structure change substantially. The northern boundary is drawn to include the most northwesterly similar gold occurrences in the vicinity of Goulding Harbor and Pinta Bay and the southern boundary includes the occurrences at the abandoned townsite of Cobol.

The highly mineralized Doolth* Mountain area is located in the middle of the West Coast gold area, while the remainder of the area is divided between the Pinta Bay area to the north and the Cobol area to the south. Plate 2 shows the spatial location of the areas and lists the individual occurrences.

There are numerous gold occurrences within the West Coast gold area and approximately 1200 mining claims (Plate 1) have been recorded. Most of the production and prospecting activity occurred between 1905 and 1943. Production from the area is 793,000 oz. gold and 233,000 oz. silver. Most of the claims and almost all the production and estimated reserves and marginal reserves are from the Doolth Mountain area.

* A Tlingit Indian name meaning plentiful and abundant

Geological Setting

The geological setting of the West Coast gold area consists of a series of three northwest striking, southwest dipping bedded units ranging in age from Triassic to late Cretaceous. From oldest to youngest (east to west), the series consists of the Whitestripe Marble (Trw), the Kelp Bay Schist (Kkb) and the Sitka Graywacke (Ks). Cutting these units and forming the major control on ore deposition are a series of strong northwesterly-striking, steeply southwesterly dipping faults that generally strike more northerly and dip more steeply than the enclosing rocks. Many of these faults have known strike lengths in excess of several miles and at least one traverses the length of the West Coast gold area. Plate 2 shows the area geology and selected faults. They are part of the larger Sitka fault system and indications are that movement occurred on them from 25 million years to 45 million years ago (Loney 1975, p. 71). Loney (1975, p. 94) suggests Tertiary plutonism as a source for the hydrothermal gold solutions. Geology and faults are shown on plate 2.

Ore Deposits

The ore deposits, as exposed by mining activity in the Doolth Mountain area, consist of hydrothermal gold bearing quartz veins deposited along the major faults or splits off the major faults. The ore contains 2 to 3 percent sulfides (pyrite, arsenopyrite, galena, sphalerite and chalcopyrite) and gold in the form of tiny specks in the quartz and less frequently in the sulfides. About 70-90 percent of the recovered gold was free milling and the remainder was recovered in the sulfide concentrate.

About 40 percent of the silver was extracted from the concentrates. The ore gangue minerals are quartz and calcite. Hydrothermal alteration products are sericite and chlorite. In places, the graywacke wall rock is silicified and pyritized.

The tabular but irregular ore shoots have a long dimension down the rake toward the south and a short dimension along strike. Ore zone widths to 15 feet, strike lengths to 700 feet and vertical heights to 1900 feet are known. The ore shoots exposed in the mines are scattered along the faults so that they occupy less than one-fourth of the fault area exposed by mine development. One 14 foot wide stope at the Chichagoff Mine averaged 6 oz. gold per ton; however, the ore zones in the area averaged about 5 feet in width and the average recovered tenor was about 1 oz. gold per ton and 0.25 oz. silver per ton.

The mineralization in the gold prospects and occurrences in the Pinta Bay and Cobol area are in most cases similar to that of the mines described above but in general are not as persistent. Some prospects also have significantly greater amounts of arsenic, lead, zinc or tungsten associated with the gold values.

Doolth Mountain Area

Introduction

Within the West Coast gold area the center of mining activity and production is at Doolth Mountain. The Doolth Mountain area, (delineated on plate 2) approximately 5 by 6 miles, contains 52 patented claims and most of the 1150 unpatented claims in the West Coast gold area. Almost all the production of 793,000 oz. gold and 233,000 oz. silver in the area came from the Chichagoff and Hirst-Chichagof Mines.

The locations of mines and prospects within the Doolth Mountain Area are shown on plate 2. Those with the most evident mineralization will be discussed first and those with the least available information will be relegated to a table.

In general, the mines and most highly mineralized kprospects are not found along the same fault, but are located across the northwest fault trend from each other, in a north-south direction.

Chichagoff Mine

Introduction - History

The Chichagoff Mine is located on Doolth Mountain on the Chichagof fault, which has a traceable strike length of at least 12 miles. Plate 2 shows its location along the fault and Plate 3 shows the claim configuration.

In 1905, John Newell and Ralph Young, discovered gold bearing quartz float in a creek near the head of Klag Bay. Later that year, at an elevation of 275 feet, a quartz outcrop was found that was so rich the ore was sacked and shipped to the Tacoma Smelter and the proceeds used to finance a mill and further mining. This mine was initially called the DeGroff. By 1907, two mortars, plates and Wilfley concentrators were installed and by 1909 a Lane slow-speed mill was added (Reed and Coats, 1941, p. 87).

In 1906 the Golden Gate Mine was discovered at an elevation of 1200 feet along the Chichagof Fault. Later, a 10 stamp mill (called the Golden Gate mill) was installed about 1000 feet northerly from the DeGroff mill.

In 1909 the DeGroff and Golden Gate interests installed a power plant at Sisters Lake and by 1912 both companies were consolidated into the Chichagoff Mining Company. By 1915 the mill was expanded to 15 stamps, a tube mill was installed and by 1916 flotation equipment was added.

In 1920, 114 people were employed both underground and on the surface by the Chichagoff Mining Company.

In 1923 the Chichagoff Development Company took over the mine. By then the mine was developed to the 900 foot level and the 1100 foot level had been reached. At that time the ore was being extracted by overhand stoping with most of the stopes being timbered. In narrow stopes, the waste was blasted first and then used for fill. The wider ore shoots were timbered with square sets. By 1923, the Chichagoff mill had 20 stamps and a capacity of 100 tons per day. Sea water was used throughout the mill and ore was processed by amalgamation, table concentration and flotation (Bauman 1924, p. 876-879).

Mine records indicate that in 1925 a cyanide plant was installed that was later converted into a flotation mill.

In 1927, the mine was reorganized as the Chichagoff Mines Ltd. and in 1935, as the Chichagoff Mining Company.

By 1942, when the mine was closed, stoping had reached the 2100 foot level and the number 6 shaft had reached a depth of 2200 feet. Plate 4 shows the mine levels and stopes.

The property is covered by 29 patented claims and currently the feasibility of reopening the mine is under study.

Production

From 1906-1942 the Chichagoff Mine produced gold each year. By 1942 over 600,000 tons (recorded production-596,478 tons but records are incomplete) had been mined with an extraction of 660,000 oz. of gold and over 200,000 oz. of silver. In the most productive years, 1918 to 1921, production averaged 76,000 oz. gold per year from ore with an average grade of 2.12 oz. of gold recovered per ton. In 1938, 13,599 tons of ore was mined with a recovery of 4,896 ounces of gold. Average recovered tenor of the ore based on the years with known ore and gold production was 1.09 oz. gold per ton, or an in place value of about 1.20 oz. gold per ton (tailings average 0.11 ounces gold per ton). Records are incomplete, but in the years 1939-1942 apparently little ore was mined and most production came from rerunning tailings (about 71,000 tons of tailings with 6219 oz. gold recovered). From 1942 to 1973 small amounts of tailings were reworked. Table 2 lists the mine production from 1906-1970.

Structure

The width of the Chichagof fault zone exposed by underground workings ranges from a few inches to 20 feet. It is recognized underground by a series of strong shears containing fault gouge and brecciated graywacke or crushed to ribbon to massive quartz, while on the surface it is most often recognized by a linear depression.

The average strike of the Chichagof Fault on the main mine level is N40°W and it dips 70°SW. However, the fault has a distinct warp and dips to the northeast below the 1900 foot mine level. Mine workings explore the fault for 4800 feet horizontally and 4300 feet vertically. The wall rock consists of massive or shaly graywacke, at an average strike and dip of N58°W and 68°SW (Reed and Coats, 1941, p. 94), with shaly graywacke predominating in the vicinity of the fault.

Table 2. - Chichagoff Mine gold production (Chichagoff Mine records)

Year	CRUDE ORE PRODUCED - TONS		CONCENTRATES PRODUCED		RECOVERED IN BULLION
	Ore	Old Tailings etc.	Dry Tons	Gold (ounces)	Gold (ounces)
1906	60	-	-	-	350*
1907	1,353	-	-	-	3,196*
1908	2,071		65	959	1,809
1909	744	-	-	-	991*
1910	4,283	-	-	1.646	6,138
1911	10,577	-	258	1,335	6,571
1912	22,290	-	625	2,412	9,035
1913	22,000	-	644	2,629	8,738
1914	24,584	-	681	2,918	12,207
1915	33,850	-	563	3,672	40,847
1916	36,822	-	-	3,609	35,846
1917	38,794	-	-	238	39,319
1918	33,978	-	812	5,427	54,777
1919	42,187	-	1,084	6,962	82,143
1920	33,243	-	820	6,837	76,250
1921	33,855	-	1,313	6,677	64,667
1922	38,307	-	1,093	4,980	43,165
1923	11,079	-	460	3,161	22,660
1924	38,267	-	433	1,249	14,107
1925	62,350	-	481	1,456	14,910
1926	25,906	-	428	-	17,025*
1927	NA	NA	NA	NA	70
1928	347	-	-	-	121
1929	1,971	-	-	-	1,231
1930	NA	NA	NA	NA	439
1932	25,000	-	188	968	12,056
1933	4,986	-	86	-	5,761*
1934	NA	NA	NA	-	4,650*
1935	12,854	-	171	481	3,752
1936	est 13,000	-	101	271	4,146
1937	7,321	-	164	396	2,050
1938	13,599	-	113	488	4,408
1939	-	9,900	198	934	-
1940	-	25,450	509	1,941	266
1941	-	35,500	900	3,078	-
1942	600	2	99	287	352
1944	est 200	-	-	-	22
1950	-	537	9	188	209
1951	-	100	20	143	8
1952	clean-up	-	-	-	19*
1954	do	-	-	-	76*
1955	do	-	-	-	38*
1970		2000			188*
Total	596,478	73,487	12,318	65,342	594,613

*Total production, concentrate value not given

Total gold production with corresponding recorded mine tonnage - 647,708 ounces

Average recovered grade over the life of the mine $\frac{647,708}{596,478}$ = 1.09 oz. gold per ton

Total production 659,955 oz. gold

The small difference in attitude of the fault and wall rock bedding results in subparallel splitting into the hanging wall of the fault along the bedding and into the footwall of the fault against the bedding (Reed and Coats, 1941, p. 65). On a small scale, the closely spaced series of small splits are a good host for the deposition of ore, while on the larger scale ore shoots are localized near major splits. The footwall ore shoot (see plate 4) diverges 60 feet into the footwall from the main fault, while the Big Croppings split (see plate 5) diverges over 80 feet into the hanging wall of the main fault .

Within the area of the Chichagoff claim group subparallel splits or faults are explored by near surface workings or at depth by a 1550 foot long crosscut off the main mine level and by a 625 foot long crosscut off the 400 foot mine level. Figure 2 shows the near surface workings and the crosscuts relative to the location of the main Chichagof fault.

Ore Shoots

The ore shoots consist of hydrothermal gold bearing quartz veins deposited along the Chichagof and subsidiary faults and they may occupy all or only a small part of the fault zone width. They form tabular but irregular bodies and have a long dimension down the rake towards the south and a short dimension along strike. Ore shoot widths to 15 feet, strike lengths to 700 feet and vertical heights to 1800 feet are known. The average ratio of ore shoot strike length to vertical height is about 1 to 2.5. Plate 4 shows the underground workings and the locations of the ore shoots (stoped areas). Five large ore shoots were recognized during mining. These are the DeGroff (includes the footwall split of the DeGroff), Golden Gate, Temby, Rust, and the Temby-Rust. The Temby-Rust consists of the scattered stopes below the 1000 foot level that are erratic extensions of the Rust and Temby ore shoots. Only the DeGroff and Golden Gate ore shoots extend to the surface.

Some of these ore shoots are blunt at their ends and others thin out gradually. Most of the quartz contains gold but it is reported by Reed and Coats (1941 p. 38) that in the lower levels of the mine there are considerable quantities of quartz that carry too little gold to be regarded as ore.

The ore shoots most often contain ribbon quartz in which the banding is composed of graphite and sheared graywacke; locally, however, ore may consist of white massive quartz. Sulfides constitute less than 2 percent of the ore and are predominately pyrite with very minor arsenopyrite, sphalerite, chalcopyrite and galena. The gangue minerals are quartz and calcite, while sericite and chlorite constitute the hydrothermal alteration products. In places the wall rock is silicified and pyritized and may contain graphite.

Gold is found as isolated particles in the quartz, in the ribbon structure or more rarely intergrown with the sulfides. About 10 percent of the recovered gold was from the sulfide concentrate. Gold is occasionally found in fault gouge and rarely in the graywacke. One small stope consisted of fault gouge, fragments of graywacke, gold and sulfides with little if any visible quartz. One 14 foot wide stope averaged 6 oz. of gold per ton, while the average tenor for the life of the mine was 1.20 oz. gold per ton.

Mine Developement

Mine development along the Chichagof Fault consists of a main haulage level drift at an elevation of 60 feet driven mostly along the fault for 4950 feet (see plate 4). Off this level the #1 shaft reaches the lower levels of the DeGroff oreshoot, the #2 shaft reaches to the 700 level and a long raise reaches the Golden Gate ore shoot at the Golden Gate #4 drift. The Golden Gate #1-4 drifts and workings were driven early in the life of the mine. Access to the lower levels of the mine was provided by the #3 shaft reaching from the 700 level to the 1200 level, by the #4 shaft from the 1200 to the 1900 level, by the #5 shaft from the 1900 to the 2000 level (eventually stoped out) and by the #6 shaft from the 1900 to the 2200 level. This inefficient haulage system was a serious impediment to exploration and production from the lower levels of the mine.

On the surface, exploration along the fault was confined to trenches and pits along the Big Croppings, a few pits and trenches located between the Big Croppings and the Mine Portal, and a few trenches and a short adit on the Rising Sun and Over the Hill Claims.

The main exploration effort into the footwall portion of the Chichagof Fault consisted of two crosscuts, one driven 1550 feet off the main haulage level and the other driven 625 feet off the 400 level. About 1600 feet of drifting a short shaft and some mining occurred off these crosscuts. Figure 2 shows these crosscuts.

On the surface, short exploration adits were driven on the Aurum #2 and #4 Claims, the Sitka Claims, the Big 4 Claim and the Aurum #13 Claim where two adits (the OB and Wet Feet) were driven near sea level.

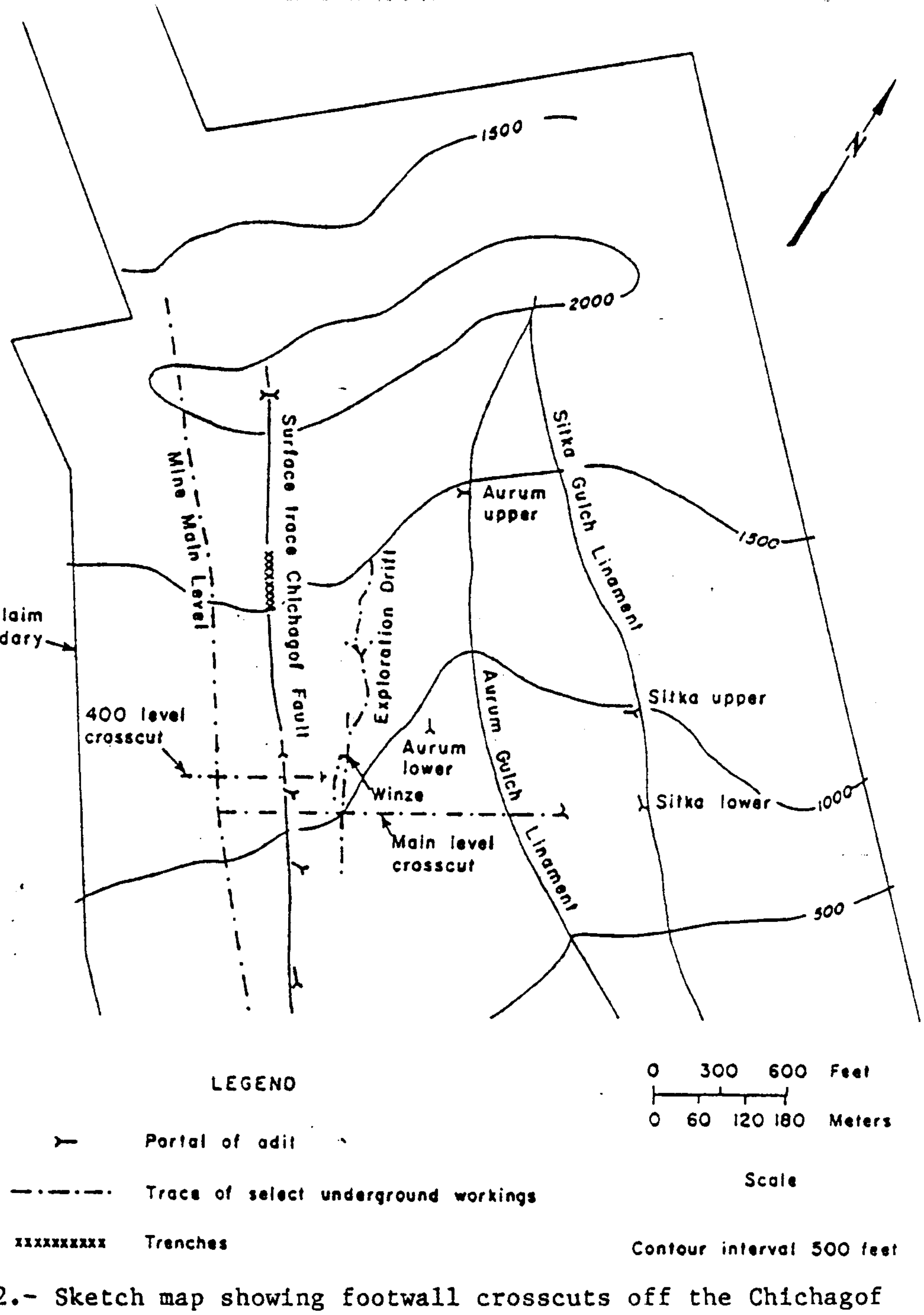


FIGURE 2.- Sketch map showing footwall crosscuts off the Chichagof Fault and near surface workings on the Chichagoff claim group and showing the relationships between near surface workings and mine workings.

Present Investigations

Along the Chichagof Fault

All the mine workings below the main haulage level are flooded. The partly caved portal to this level has a large volume of water coming from it and is currently inaccessible. The four Golden Gate crosscuts to and drifts along the Chichagof Fault are accessible for a distance of 80 to 500 feet along the fault. The adit and most of the old pits along the Big Croppings vein are caved, but the veins are accessible in outcrop and a few pits. Figure 3 shows quartz float from the Big Croppings veins. On the Rising Sun and Over the Hill claims, a short adit near the Chichagof Fault and a trench where the fault crosses Doolth Mountain are open. Plate 5 shows the locations of these mine workings and table 3 summarizes the results of the field investigations. Immediately following this table are the figures for the workings discussed. Assay data is in Appendix A.

Sampling and investigation of mine workings and outcrops along the Chichagof Fault revealed the following:

1. Gold mineralization is pervasive along the fault. Almost all of the samples taken along the fault contain some gold. Generally, samples taken of quartz veins contain much more gold than those taken of fault gouge which in turn contain much more than those taken of the graywacke wall rock. Significant gold mineralization (above 0.1 oz. gold per ton) was found in the Golden Gate # 1,2, and 3 drifts, on 3 of the 4 Golden Gate dumps, in the Big Croppings area and in the Rising Sun adit.
2. There was sufficent data to estimate reserves for the Golden Gate #3 and the Big Croppings area. The latter may be economic.

Table 3. - Examination and information on workings along the Chichagof Fault and within the Chichagoff Claim group. Assay data given in Appendix A.

Claim name and prospect workings or occurrence found during this study (unless noted otherwise)	Elevation (feet)	Plate, Figure or Table (T) no.	Disc. text pg. no.	Comments
Young #2 Claim Mine main haulage level portal	60	Pl. 3, #26	19	Fairly large volume of water streaming from partly caved portal and held by dam near portal. Dam must be eliminated to gain access to mine.
Young #3 Claim Golden Gate #4 cross-cut and drift	680	Pl.3 #30 Pl.5 T-A-1	19	Access along drift requires climbing over numerous caves. Access past 500 feet from portal is judged dangerous. Fault contains only stringer zones of quartz. Samples of fault zone contain only traces of gold while a grab sample of quartz on the dump assayed 2.27 oz. gold per ton.
Golden Run Fraction Claim Golden Gate #3 cross-cut and drift	940	Pl.3 #29 Pl.5 Fig. 4 T-A-2	19 & 23	Accessable to 360 feet past portal to where rotten timbers support large blocks and further access is dangerous. Some portions of back along drift caved to 15 feet above rail but still accessible. Drift exposed quartz vein along Chichagof fault that averaged 0.12 oz. gold per ton across a 3 foot mining width for 180 feet. Sufficient data for reserves, see text. Select dump sample of quartz assayed 0.97 oz. gold per ton.
Golden Gate #2 crosscut and drift	1100	Pl. 3 #28 Pl. 5 T-A-2	19	Accessable to 240 ft. past portal (just past filled chute) where drift caved tight. Sample across Chichagof fault stringer zone ran 4 ppm gold across 3 foot width. Quartz dump sample assayed 0.045 oz. gold per ton.
Golden Horn Lode Claim Golden Gate #1 cross-cut and drift	1190	Pl. 3 #27 Pl. 5 T-A-1	19	Drift stoped out, access over fill in stope to about 80 feet past portal where no floor in adit and stoped to surface. Quartz float on stope floor assayed 1.38 oz. gold per ton.

Table 3. Continued

Claim name and prospect workings or occurrence found during this study (unless noted otherwise)	Elevation (feet)	Plate, Figure or Table (T) No.	Disc. text pg. no.	Comments
Golden Horn Lode Claim Surface outcrop Chichagof Fault and vein at stope edge	1300	Pl. 5 T. A-1	24	Chichagof fault and vein exposed at stope edge. Sample 8S153B (0.9 foot) taken of quartz vein at southern stope edge assayed 3.09 oz. gold per ton.
Big Croppings adit	1500	Pl. 5 fig. 5	22	Portal of adit is caved tight. According to 1913 dated company reports values in adit are: 0.07 oz. gold per ton across 3 1/2 feet of quartz and 0.23 oz. gold per ton across 2 feet of quartz.
Golden Horn Lode and Golden Gate Lode Claims Big Croppings veins - surface outcrops and exposures in pits	1450 - 1650	Pl. 3 #31 Pl. 5 Fig. 5 T. A-3	19 & 22-24	Two large persistent veins exposed in outcrops and pits (most pits are sloughed and overgrown) vein shown on early company maps and pits shown on 1911 dated patent maps. The Big Cropping area not mentioned in mine reports or literature after 1913. The west vein is a hanging wall split off the Chichagof fault and joins the east vein at an elevation of 1675 feet. USBM sampling indicates that east vein averages 0.23 oz.gold per ton across a 3 ft. width for 372 feet while the west vein averages 0.28 oz. gold per ton across a 4.5 foot width for 288 feet. Sufficient data for reserve calculations, see text.
Over the Hill Claim Trench at Chichagof Fault notch. Note: an adit shown on patent maps on the south side of the fault notch was searched for and not found	2000	Pl. 3 #33 Pl. 5 T. A-1	19	Walls of fault may be sloughed into notch and sample may not be in place. Sample 9S425D contained 200 ppm arsenic and no other significant metal values.
Rising Sun Claim Rising Sun adit	1850	Pl. #32 Pl. Fig. 6 T. A-4	19	Northerly striking and shallow dipping quartz vein, 30°SW,exposed on cliff and explored by 20 foot adit and trench-ledge. Samples contain up to 0.11 oz.gold per ton

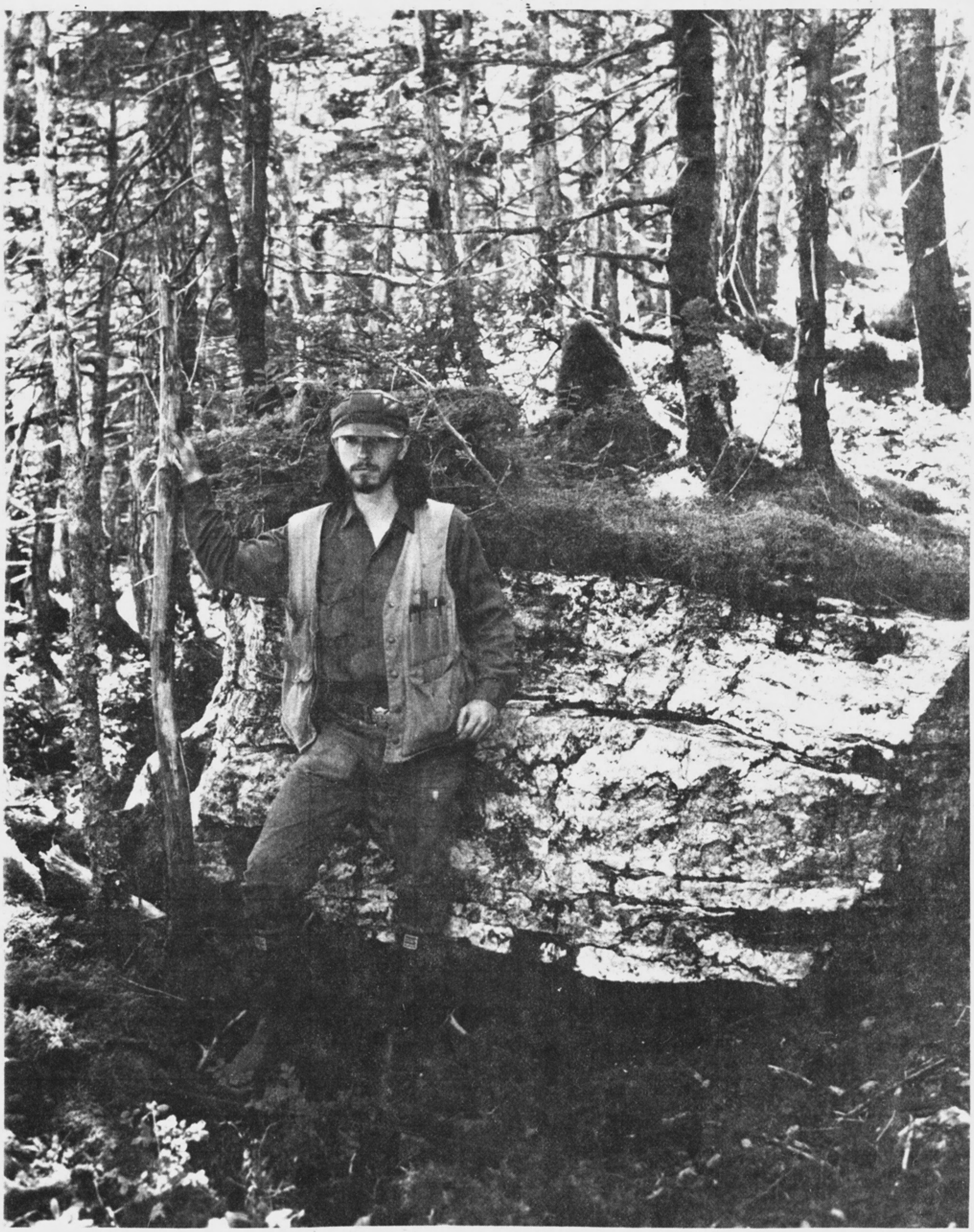


Figure 3. - Quartz float from the Big Croppings veins. A 5-foot sample across this vein (9S055) assayed 0.19 oz. gold per ton and 0.3 oz. silver per ton and contained no other significant metal values.

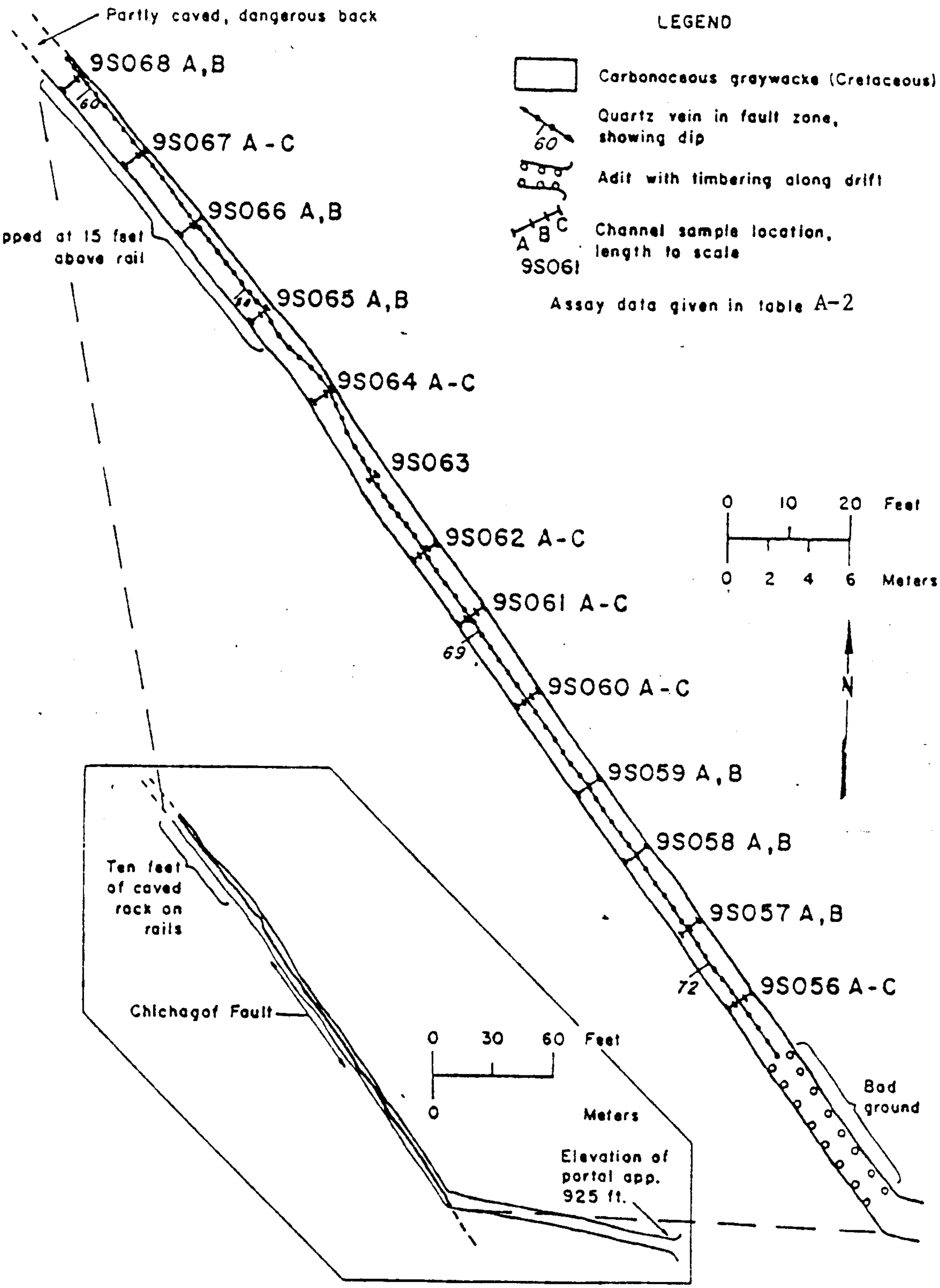


FIGURE 4.- Golden Gate No. 3 drift showing the 240 foot long section mapped and sampled during by this study (Mapped by J. Still and K. Weir, May 1979)

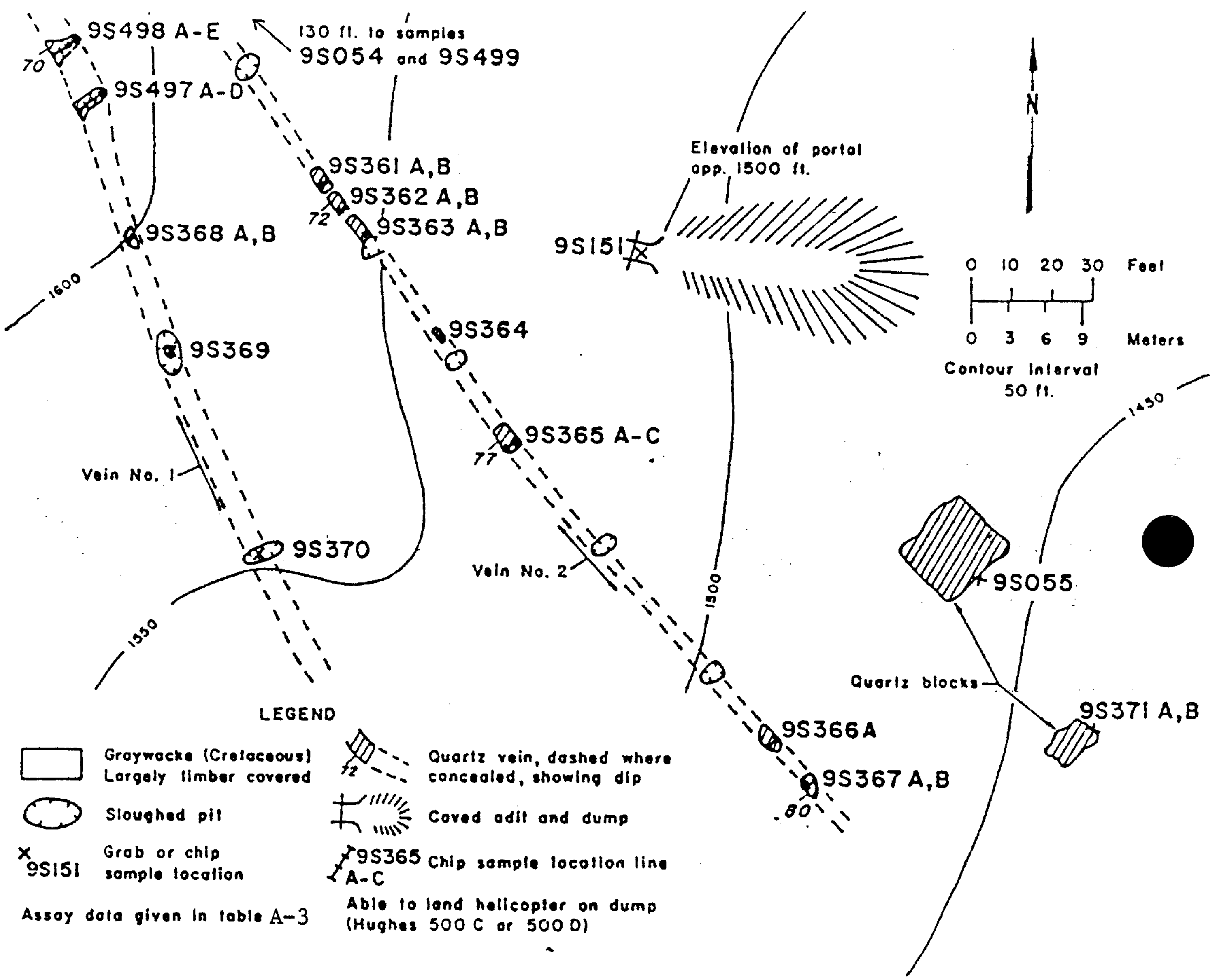


FIGURE 5.- Big Croppings veins, sample locations, See plate 5 for mine map showing extent of veins. (Mapped by J. Still and K. Weir, July 1979)

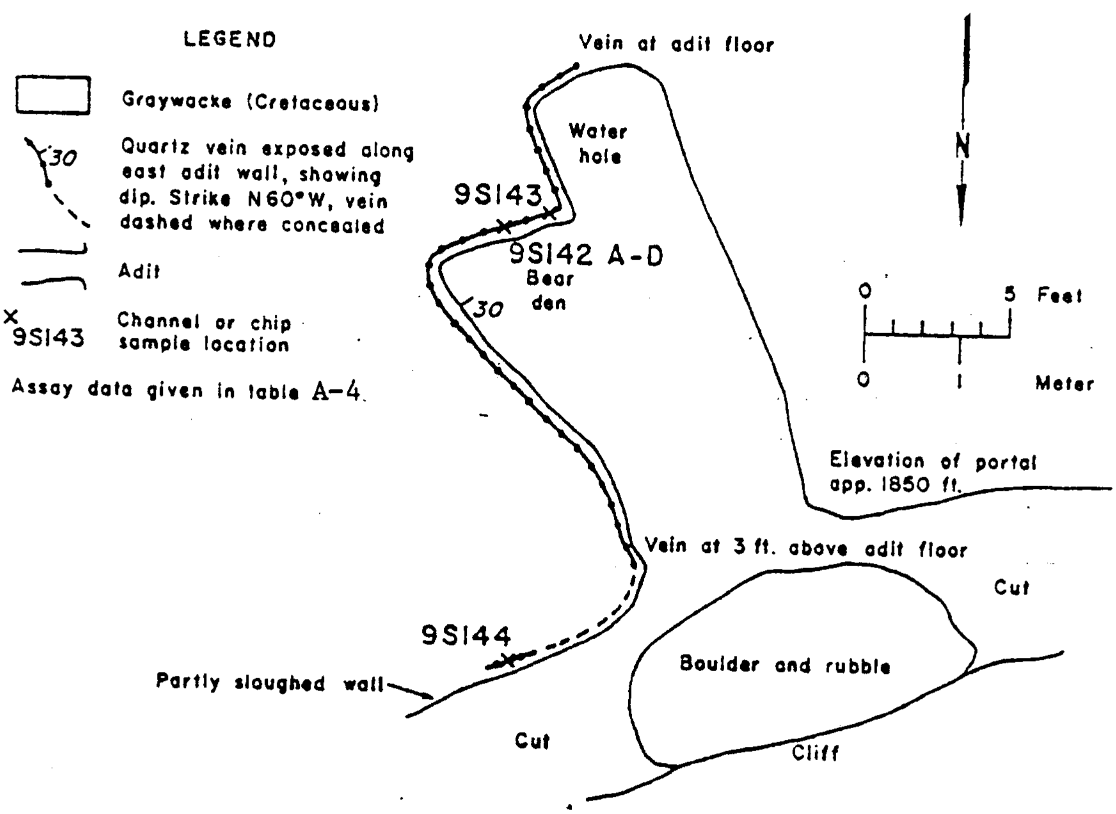


FIGURE 6. - Rising Sun adit, sample locations. (Mapped by J. Still and K. Weir, June 1979)

3. The mine workings are in reasonably good shape considering they have been open for 60-70 years.

Within the Chichagoff Claim Group but not on the Chichagof Fault

This section covers investigations of workings within the Chichagoff claim group but not on the Chichagof fault. Six adits (elevations from near sea level to 1300 feet) were investigated and only one (the upper Sitka) was caved. Plate 3 shows the adit locations. Significant gold values (+0.1 oz. gold per ton) were found in five of the six adits investigated. Table 4 summarizes the results of the field investigation and other data. Immediately following this table are figures for the workings discussed. Assay data is in Appendix A. These investigations revealed the following:

Significant gold values (up to 6.7 oz. gold per ton) are found in quartz veins found throughout the claim area. The Aurum and Sitka workings are located in or near deep gulches that are probably fault related.

The Aurum and Sitka near surface workings may expose fault zones intercepted by the 1550 foot long crosscut off the main level and the 625 long crosscut off the 440 level. Figure 2 shows the relationship between the underground workings and the near surface adits. The Lower Aurum adit may be located on or near a fault zone intercepted 550 feet along the main level crosscut. About 1600 feet of drifting, a short shaft, and some mining occurred along this zone but details are lacking. According to Reed and Coats (1941 p. 95), this zone converges with the Chichagof fault at greater depth.

Table 4. - Examination and information on prospects workings and outcrops not on the Chichagof Fault but within the Chichagoff Claim group. Assay data in Appendix A.

Claim name and prospect workings or occurrence found during this study (unless noted otherwise)	Elevation (feet)	Plate, figure or table (T.) No.	Disc. text pg. No.	Comments
Aurum #13 Claim OB prospect, adit and surface trench. First 110 feet on Aurum #13 Claim, last 110 feet on Pluto Claim	10	Pl. 3 #40 Fig. 7 T. A-5	20 & 25 53-56	A 250 foot long adit exposes a northwesterly striking southwesterly dipping fault zone with quartz and a strong split off the Chichagof Fault striking N10°W and dipping 75°E and containing ribbon quartz up to 1.42 feet thick and values (Roehm,1947)up to 0.36 oz. gold per ton. This N10°W fault is exposed in the portion of the adit on the Pluto claim but the structure is strong and probably continues into the Aurum #13 claim. Workings discussed in text under McKallick Chichagoff claim group.
Wet Feet adit*	5 ±	Pl. 3 #39		One hundred fifty foot long drift along narrow steeply dipping, northwesterly striking fault zone. Last 40 feet follows fault gouge zone up to a few tenths of a foot thick with sparse quartz. Two samples of this zone contained no significant metal values while a quartz sample off the dump assayed 53 ppm gold.
Aurum #4 Claim Aurum lower adit	890	Pl. 3 #35 Fig. 2 Fig. 8 T. A-6	20 & 25	Seventeen foot long drift exposing NW at 70°SW fault zone containing quartz veins. Values up to 3.19 oz. gold per ton across 0.67 foot thick vein and high grade select dump assayed 6.515 oz. gold per ton. Located just west of large fault gulch and about 650 feet from Chichagof fault. This may be the same fault as exposed in crosscut 550 feet from the main level and on which 1600 feet of drifting and some mining occurred.

*Prospect workings are often referred to with the prospect name, i.e., the Wet Feet adit is part of the Wet Feet Prospect.

Table 4. Continued.

Claim name and prospect workings or occurrence found during this study (unless noted otherwise)	Elevation (feet)	Plate, figure or table (T.) no.	Disc. text pg. no.	Comments
Aurum #2 Claim Aurum upper adit	1300	Pl. 3 #34 Fig. 2 Fig. 9 T. A-7	20 & 25	Fifteen foot long drift exposes fault zone that strikes NE and dips 40°NW and contains quartz veins up to 1.3 feet thick.Samples assay up to 0.355 oz. gold per ton and G10,000 ppm arsenic. Located under waterfall at head of deep gulch mentioned above.
Sitka #2 Claim Sitka lower adit	700	Pl. 3 #37 Fig. 10 T. A-8	20 & 25	Fifty-eight foot long drift along narrow fault zone striking NW and dipping 60°SW. Three of four samples taken of fault zone assayed nil gold while one assayed 0.25 ppm gold and 700 ppm arsenic. Located 1650 feet from the Chichagof Fault at the west edge of a deep gulch. According to Reed and Coats (1941 p.95) this zone correlates with the "Mundy shear zone found along main level crosscut.
Sitka Quartz Claim Sitka Upper adit	990	Pl. 3 #36 Fig. 11 T. A-8	20 & 25	Northwesterly striking adit caved tight at portal. Overbeck (1919 p.119) reports it to be 150 feet long and to expose a shear zone with sparse quartz. Dump sample of quartz assayed 0.47 oz. gold per ton. Samples of NE striking quartz stringers near portal assayed up to 6.7 oz gold per ton across 0.25 feet. 1600 feet from Chichagof fault and located in deep gulch. May correlate with "Mundy" shear zone found 1550 feet along the Main level crosscut.
Big Four Claim Big Four adit	300-400	Pl. 3 #38		Adit shown on Big 4 claim patent survey map, briefly searched for and not found during this study

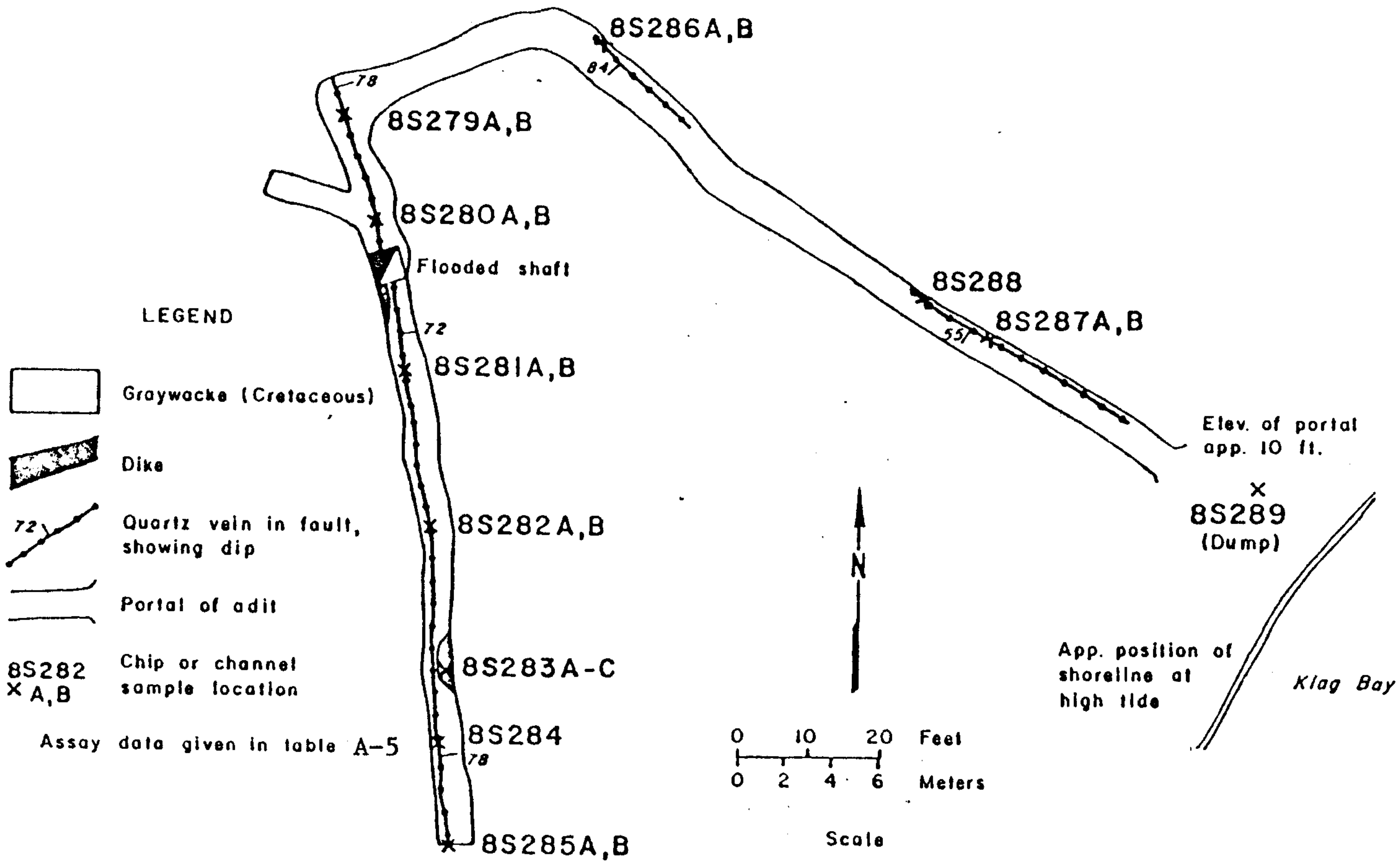


FIGURE 7.- OB Adit, sample locations. (Mapped by J. Still and K. Weir August 1978)

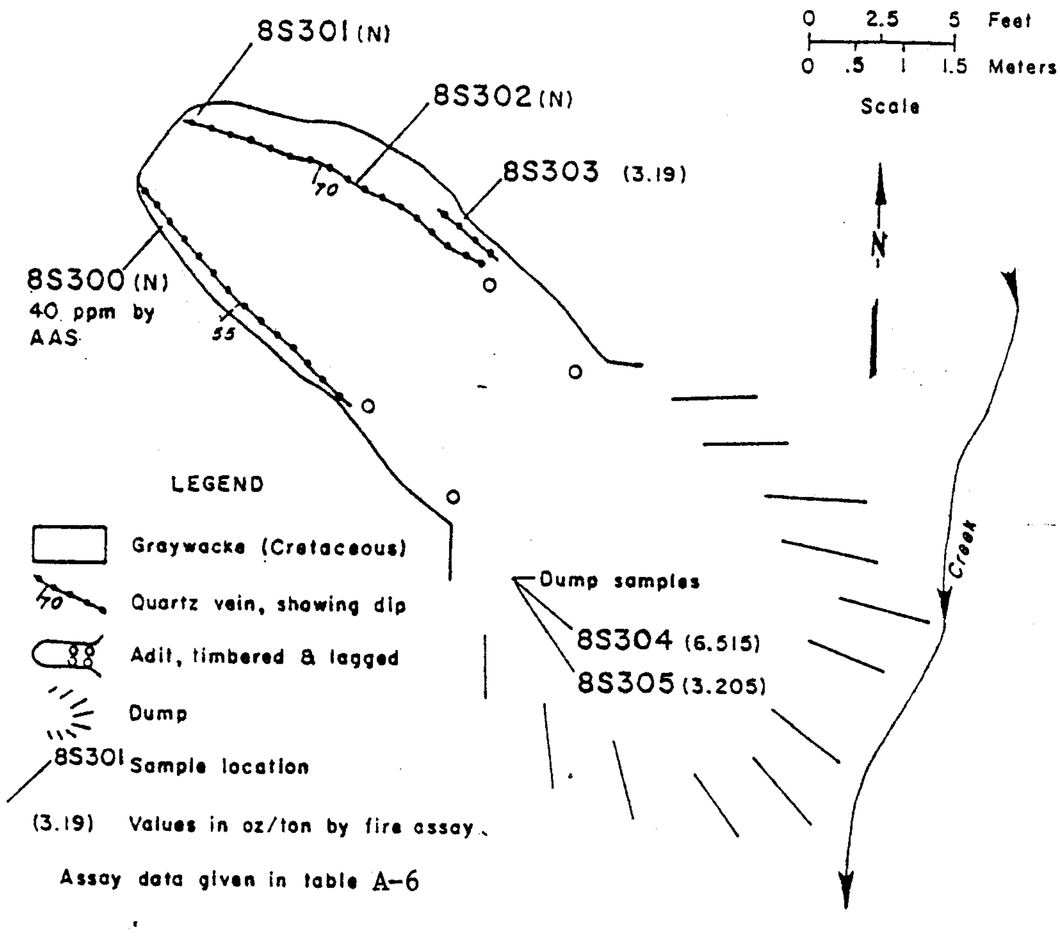


FIGURE 8._ Aurum lower adit, sample locations. (Mapped by J. Still and K. Weir August 1978)

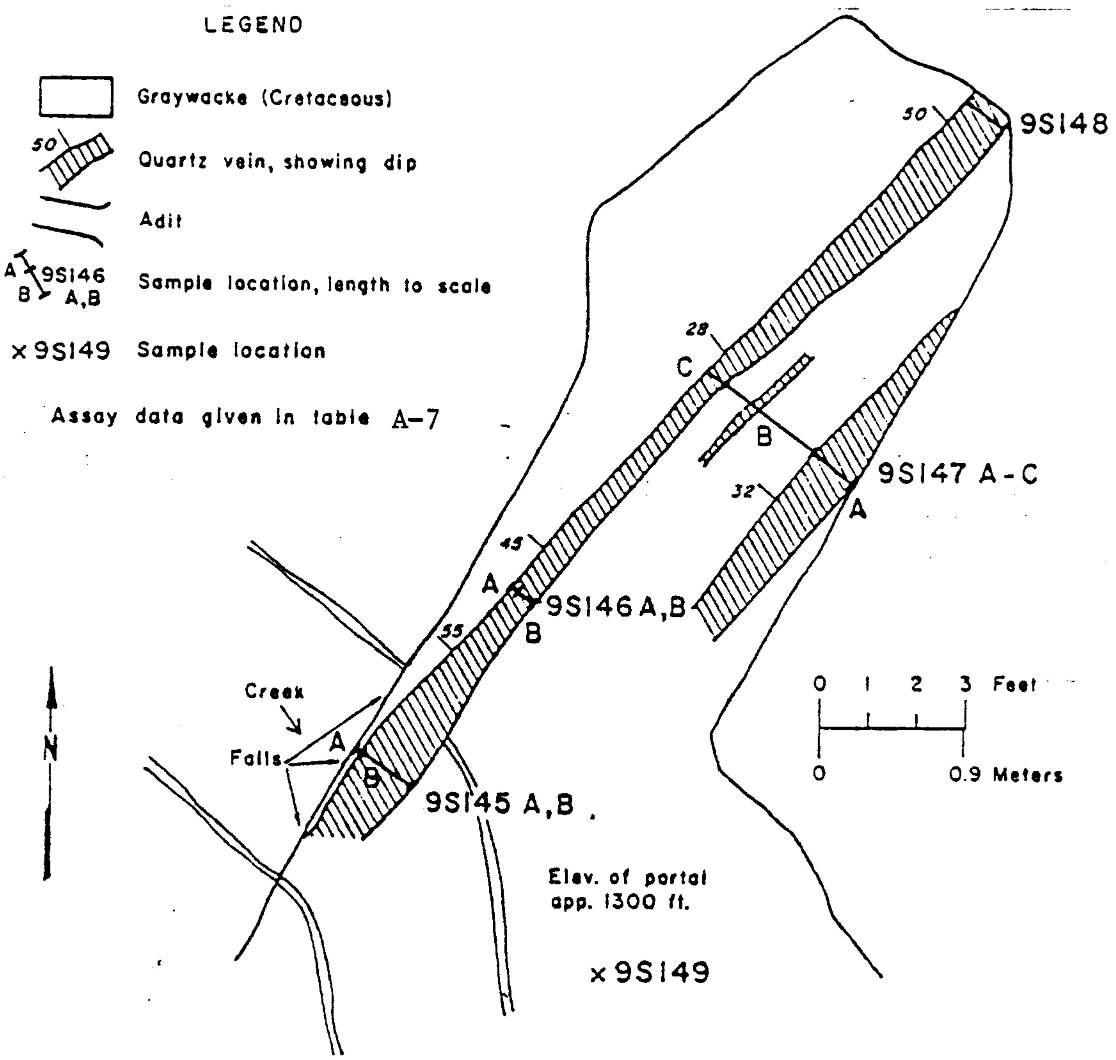


FIGURE 9.- Aurum upper adit, sample locations. (Mapped by J. Still and K. Weir June 1979)

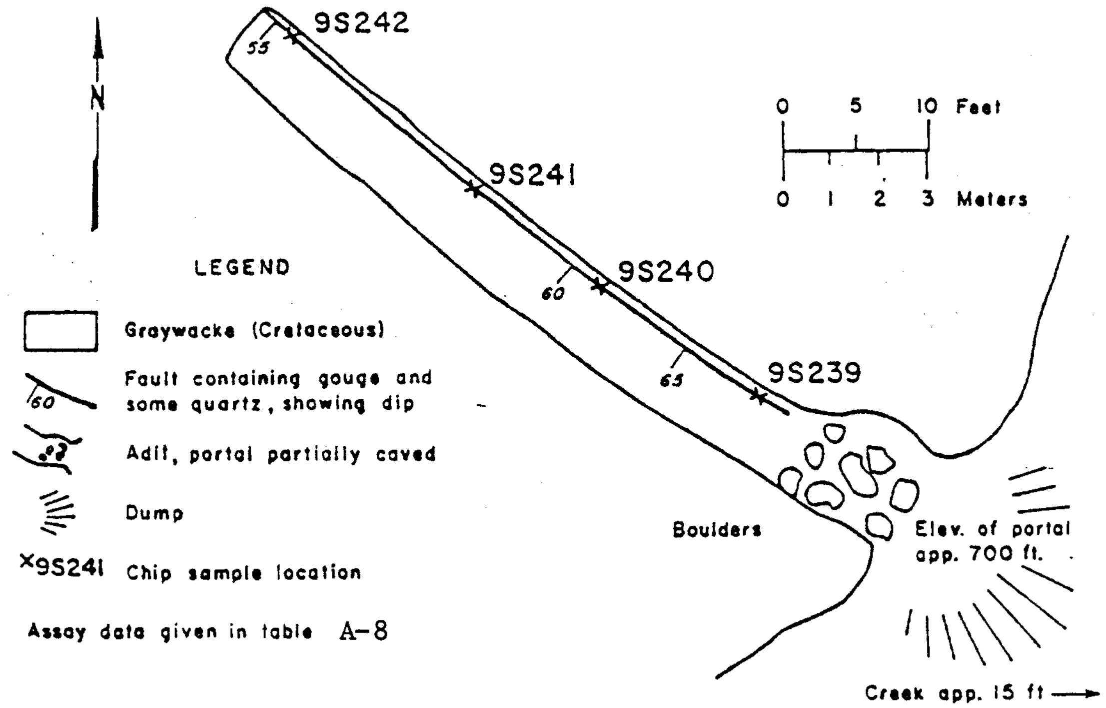


FIGURE 10.-Sitka lower adit, sample locations. (Mapped by J. Still and K. Weir July 1979)

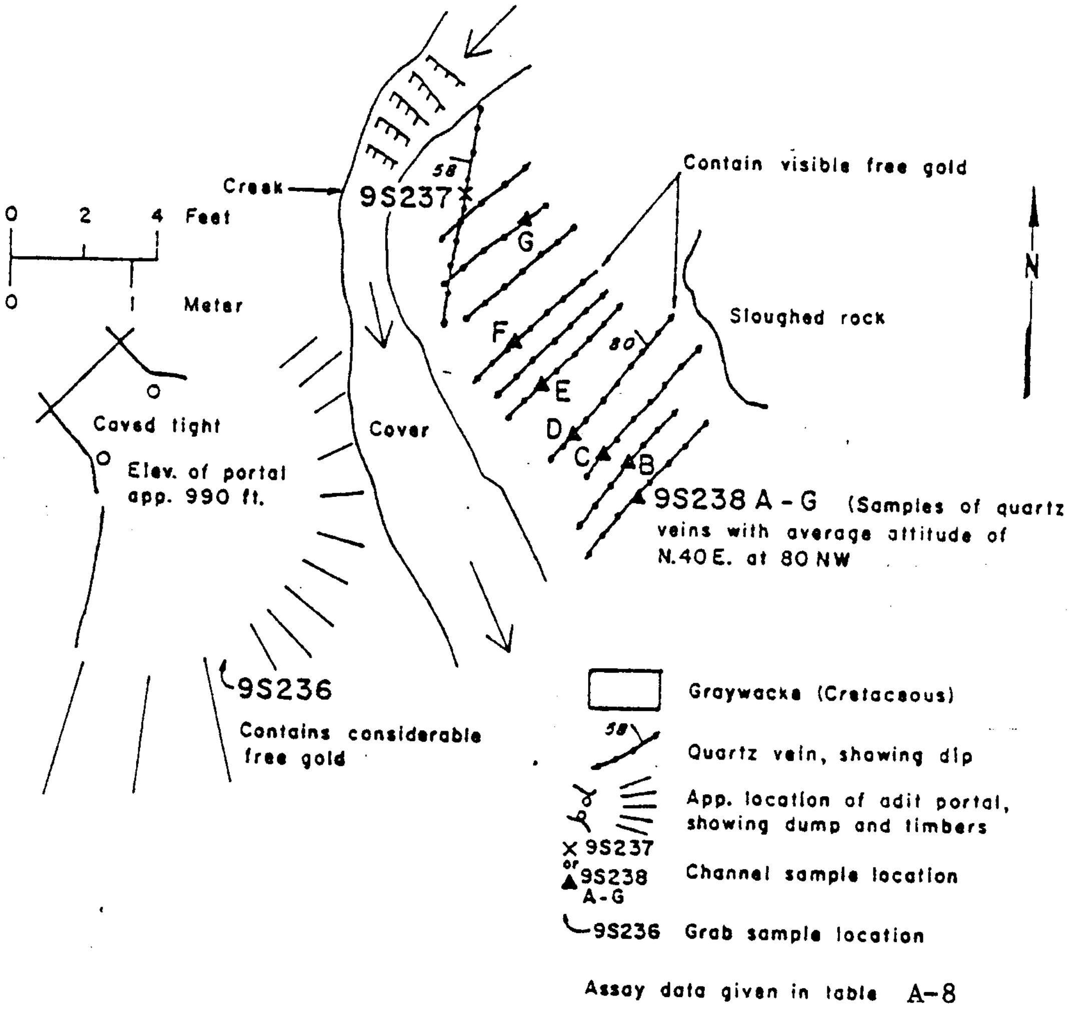


FIGURE 11. Sitka upper adit and outcrop, sample locations. (Mapped by J. Still and K. Weir, July 1979)

Mine Dump and Tailings

A brief investigation was made to estimate the grade of the mine dump and tailings. Thirty-eight shovel samples 1/2 foot in depth and weighing 15-20 pounds each were taken in 4 sample lines across the mine dump. Thirty-six shovel and Shelby tube (3 inch) tailings samples were taken to a depth of 1 to 1-1/2 feet in 3 lines across the tailings to the mean low tide line. Figure 12 shows the location of the sample lines on an aerial photograph and figure 13 shows the sampling detail. Tables A-9 and A-10 give the assay results. Much more extensive investigation of the tailings and dump are necessary to accurately determine tonnage and grade.

Resources

Resource estimates for the Chichagoff claim area were made based on Bureau of Mines sampling of lode veins, dump and tailings, and mine records. Economic viability was roughly estimated based on the following:

1. Inflation in the price of gold from 1940 to 1980 is 18-20 times while the inflation in operating and capital mine costs is somewhat less. Material can be mined at a profit in 1980 with a lower grade than required in 1940. In its last several years of operation, the Chichagoff Mine operated on ore from below the 1600 foot level with an inefficient hoisting system with a recovery of 0.31 oz. gold per ton.
2. The Bureau of Mines Minerals Availability System section ran an order-of-magnitude economic analysis of the Chichagoff Mine based on 235,000 short tons of ore being located above the main haulage

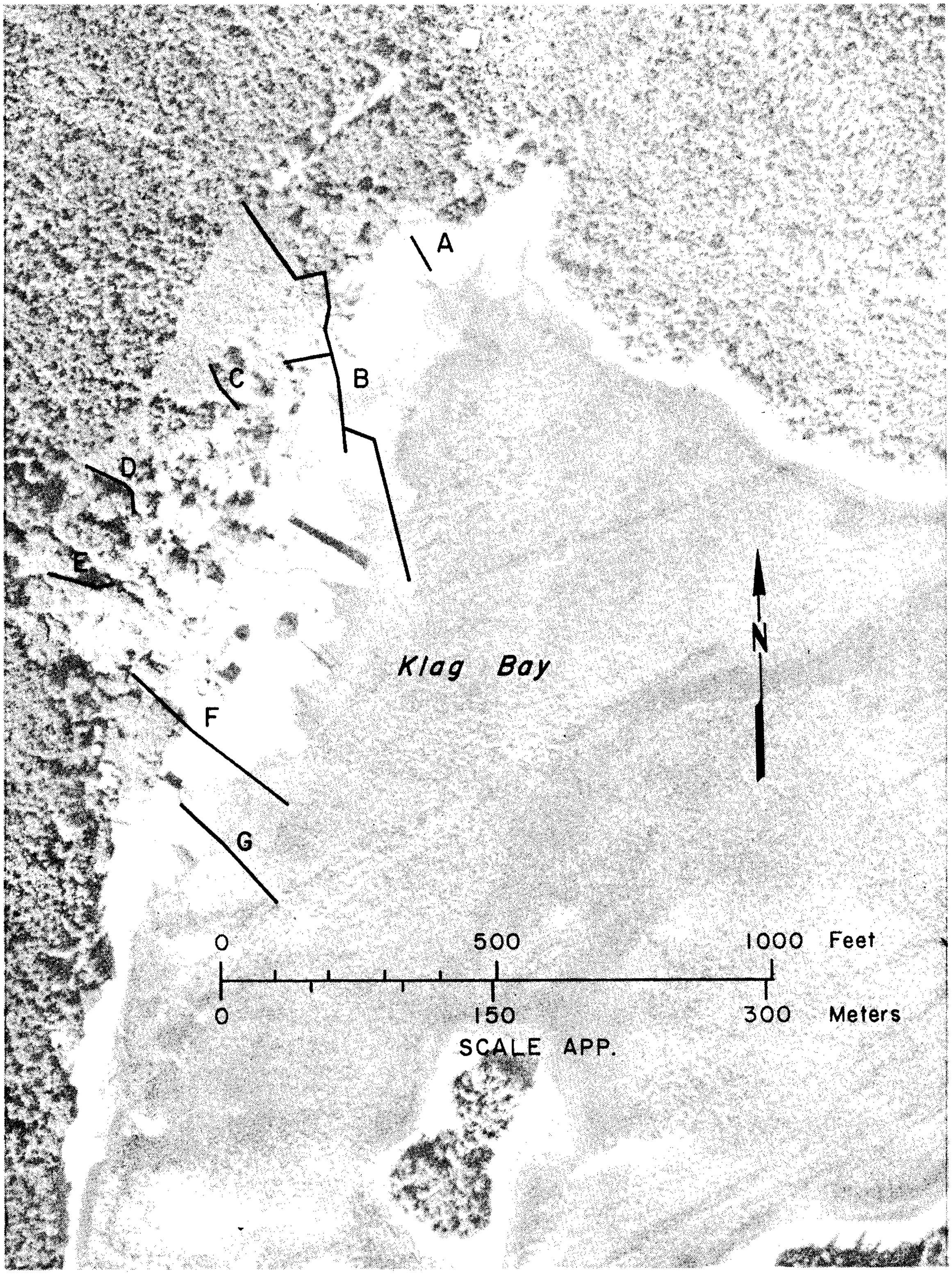


Figure 12. - Aerial photograph showing Chichagoff dump and tailings sample line locations.

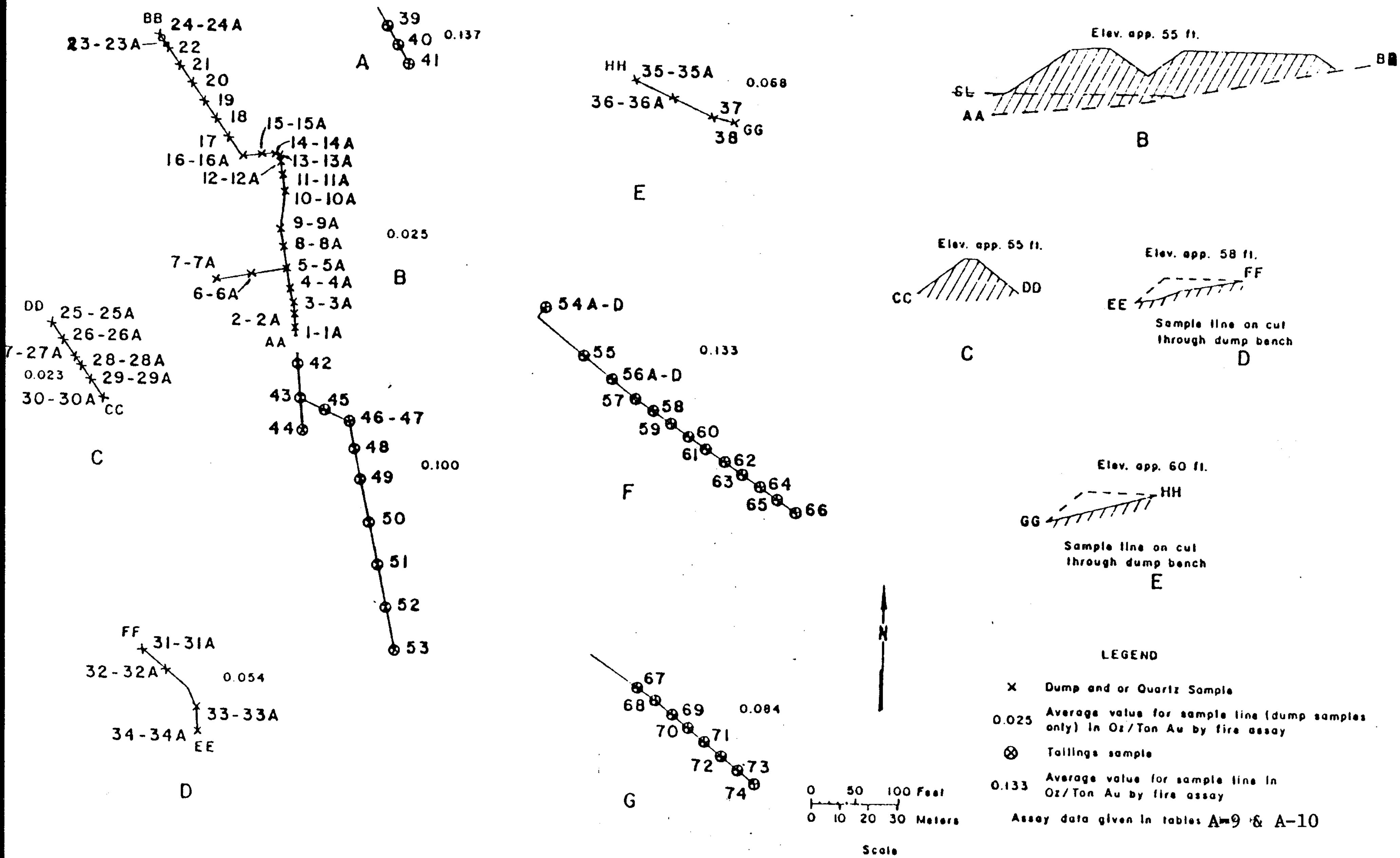


FIGURE 13.--Chichagoff dump and tailings sample line detail. (Mapped in 1979 by J. Still and K. Weir)

level that averaged 0.28 oz. gold per ton with a recovery of 85 percent. An eight year mine life was assumed. The gold price necessary for the property to break even was $513.00 per oz. at a zero percent rate of return.

Following are the Chichagoff claim area resource estimates made by this study and the basis for each estimate. Resource and reserve definitions are found in appendix C.

1. Big Croppings area: Two veins are located between 1450 and 1650 foot elevation along the Chichagof fault. Between 1906 and 1913 an adit and a series of trenches were driven or cut across the veins. The adit is now tightly caved and most of the trenches are sloughed and overgrown. Figure 5 shows the veins as exposed in 1979 and sample locations, while plate 5 shows the extent of the vein and location of the underground workings according to old mine maps. According to mine maps the veins join at an elevation of about 1675 feet. Twenty-two samples were taken in 12 lines at locations where the veins outcrop and in a few pits. Vein widths ran to 7.9 feet and grades to 0.78 oz. gold per ton (for an 1.8 foot width). Table A-3 gives the analytical results. Based on mine records and exposures in outcrops and pits, the west vein (shown as #1 in figure 5) is estimated to have a strike length of 288 feet and the east vein (shown as #2 in figure 5) a strike length of 372 feet. Vein depth is estimated at 1.25 times greater than the strike length (one half the average 1 to 2.5 ratio of ore zone strike length to vertical height) and for the purpose of reserve calculations it is assumed the vein has

a 3 foot width where it is only partially exposed. The western vein has an estimated average mining width of 4.5 feet and the eastern an average mining width of 3.0 feet. Inferred marginal reserves for both veins are: 80,000 tons at 0.25 oz. gold per ton (20,000 oz. gold) and 0.08 oz. silver per ton (6,400 oz. silver).

2. Golden Gate #3: A quartz vein on the Chichagof Fault is exposed for a strike length of over 200 feet in the Golden Gate #3 drift. Figure 4 shows the drift and sample locations and Table A-2 gives the analytical results. Although at places the drift has caved to a height of 15 feet above the drift floor - access is reasonably safe to 240 feet. Thirty-one samples were taken across 13 sample lines spaced at approximately 15 foot intervals along the vein. The maximum vein width was 1.32 feet, where it was also the highest grade, 0.94 oz. gold per ton. For a distance of 180 feet along strike the vein averaged (26 samples in 11 lines) 0.12 oz. gold per ton at a 3 foot mining width. Using an estimated ore zone vertical height of 300 feet there are 13,500 tons of inferred subeconomic resources at an average grade of 0.12 oz. gold per ton (1,620 oz. gold) and 0.04 oz. silver per ton (540 oz. silver).

3. Unmined area explored by underground workings: Only 23 percent of the area explored by underground workings along the Chichagof Fault was mined. This area is delineated on plate 4. This area was explored by drifts that have a vertical spacing from 100 feet to 600 feet or greater. Early in the life of the mine,

mine records (Miller, dated 11/6/1913) indicate a cut off grade of about 0.3 oz. gold per ton. Later records (1930's) indicate that to justify stope development an area had to average 0.3 oz. gold per ton. Leasing problems (25 percent royality) arose when the rich Rust ore shoot was mined on the Over the Hill claim. There are reports of hangingwall and footwall ore zones that parallel each other at a sufficent distance apart to be missed in a drift width. Stopes either ended at blunt edges or graded or narrowed to an assay wall. Significant gold mineralization (above 0.1 oz. gold per ton) was found in all the mine workings examined along the Chichagof Fault and the sampled edge of a stope ran over one ounce per ton (3 foot mining width). The Big Croppings ore zone that ran 0.25 oz. gold per ton was not mined. It is important to note that the mine dump averages at least 0.04 oz. gold per ton while the tailings ran over 0.1 oz. gold per ton.

Based on the above, it is estimated that a cutoff grade halo exists around the stopes and that ore zones such as the Big Croppings veins are located in the area explored by underground workings but not mined. The mining width would range from 3 to 15 feet. It is estimated that 23 percent (percent of explored mine area that was stoped) of this unmined area averages at least 1/4 of the average grade mined from the stopes over the life of the mine. The marginal inferred reserves are: 155,000 tons at 0.30 oz. gold per ton (46,500 oz. gold) and 0.09 oz. silver per ton (13,950 oz. silver) above the main haulage level. 308,000 tons at 0.30 oz. gold per ton (92,400 oz. gold) and 0.09 oz. silver per ton (27,720 oz. silver) below main haulage level.

4. Claim area not explored, or with very limited exploration underground: For the purpose of explanation, this area is divided into two parts. The first area is along the Chichagof Fault outside the area explored by underground workings as shown on plate 4. It extends below the lowest mine level mined (2700 feet below sea level) and includes the areas just beyond the rich Rust and Temby ore shoots and the area below the Golden Gate and DeGroff ore shoots. Mine records indicate little exploration occurred during the life of the mine and there were some leasing problems. The second area consists of the fault zones subparallel to the Chichagof Fault that traverse the 29 mine claims. Some of these fault zones are exposed by near surface workings containing significant gold values. The OB workings open ground along a hanging wall split to the west of the Chichagof Fault and the Aurum and Sitka workings, containing in place gold values up to 6.7 oz. gold per ton, explore ground to the east of the Chichagof Fault. The Aurum and Sitka workings are on or near fault zones that may be opened up by a crosscut driven 1550 feet to the east off the main mine level. Over 1600 feet of drifting and some mining occurred in the zone that correlates with the Aurum lower adit on the surface (see figure 2.)

Based on the above it is estimated that significant ore shoots are located along the Chichagof Fault in the area without underground exploration and in fault zones subparallel to the Chichagof Fault that traverse the 29 patented Chichagoff Claims. The mining widths would range from 3 to 15 feet. It is estimated that the average grade of these ore shoots is 1/2 the average grade mined over the life of the Chichagoff Mine and the tonnage is 1/2 million tons or: 500,000 tons hypothetical reserves at 0.6 oz. gold per ton (300,000 oz. gold) and 0.18 oz. silver per ton (90,000 oz. silver).

5. Chichagoff tailings: (figure 12 and 13 and table A-1) Over the mine life somewhat less than 600,000 tons of tailings were produced. Between 1939 and 1940, approximately 71,000 tons of tailings were processed by the mine with a recovery of 6219 oz. of gold. Between 1945 and 1973 small amounts of tailings were also processed. The bulk of the tailings are located in the tide flats or littoral zone. In 1967 the claim owners drilled 15, 4-inch power auger holes to a depth of 4 feet in the littoral zone and split and mixed the material from the 15 holes. This sample assayed 0.14 oz. gold per ton. The Bureau of Mines took 36 Shelby tube and shovel samples along 4 sample lines, (see p. 21 for sampling details) that averaged 0.11 oz. gold per ton. In 1980, D.G. Bryant, Inc., (Lynch, 1981) sampled the tailings by driving 17 holes (up to 25 feet deep) into, and sometimes through, the tailings. The gold occurs predominately as very fine grained native gold interlocked with sulfide and quartz and sampling to depth did not reveal any preferential concentrations. They estimate 456,000 measured tons of reserves

at an average grade of 0.1105 oz. gold per ton in the tide flats (50,000 oz. gold). It is estimated that the average silver grade would be 0.03 oz. silver per ton (14,000 oz. silver). A small additional tonnage is on the beach and over 100,000 tons are scattered along the bottom of Klag Bay and may not be recoverable.

6. Chichagoff dump: (figure 12 and 13 and table A-10) The dump extends 900 feet in a northerly direction from the mine portal to just below the mean high tide line. It is up to 400 feet wide and 60 feet high and has an almost impenetrable brush covering. The extent of back fill underground is not known and it is not clear what portion of the underground workings the dump represents. Thirty-six dump samples were taken in four sample lines (see p.21for sampling details) that averaged 0.04 oz. gold per ton.(The quartz samples from the dump often contained much higher gold values than did the dump samples.) These samples represent the surface of the dump at only a few locations and are insufficient to accurately estimate the average grade for the dump. The contours of the land prior to the dump are not known and without this knowledge it is impossible to accurately estimate the dump tonnage without drilling or digging pits. It is roughly estimated that the dump contains 200,000 tons of material at an average grade of about 0.04 oz. gold per ton and 0.012 oz. silver per ton. These would be subeconomic inferred resources.

Hirst-Chichagof Mine

Introduction - History

The Hirst-Chichagof mine is located on Doolth Mountain on the Hirst Fault which is almost parallel to, and approximately 3600 feet northeast of, the Chichagof Fault. It has a traceable strike length of at least 8.5 miles. Plate 2 shows its location along the fault. This mine is very similar to the Chichagoff Mine in terms of structure and ore zones.

The Hirst-Chichagof Mine was discovered in 1905 by Peter Romanoff, Andrew Dixon and Bernard Hirst. In 1918, the Hirst-Chichagof Mining Co. was formed and by 1920, three drifts had been started and mill equipment consisting of 10 stamps, a jaw crusher, ore feeder, amalgamation plates, and assay equipment were delivered to the mine site.

By 1922, mining had started above the main level on the #1 ore shoot and this ore was being processed in the newly completed mill. By 1925, the No. 2 ore shoot was found on the main level and the #3 ore shoot was found above the main level. Plate 6 shows selected mine workings.

From 1924-1927 the #1 and 2 shafts were sunk, and in 1929 arrangements were made to utilize power from the Sisters Lake powerhouse. From 1930 to 1933 the #3 shaft was raised from the 500 foot to the main level and was sunk to the 1900 foot level (lowest mine level) by 1941. In 1932 a flotation circuit was installed at the mill (Reed and Coats, 1941, p. 103).

In 1939 the Kay ore shoot was found 4600 feet along the main level drift on the Kay Split of the Hirst Fault. From 1939 to the end of 1941 a 500 level drift along the Kay Split to the Kay ore shoot was driven and a winze and raise reached the main level on the Kay ore shoot.

Because of shortages of men and equipment created by L208, the mine closed in 1942. It was reopened briefly in 1943 and attempts were made to reopen it in 1946 and 1950 but the workings and mill had deteriorated so that conditions were reported as unfavorable [1942 and 1943 mine reports (Miller, 1980), 1946 and 1950 newspaper reports].

Production

From 1922 to early 1943 the Hirst-Chichagof Mine produced gold each year and by 1943 over 140,000 tons (records incomplete) had been mined with an extraction of about 131,000 oz. gold and 33,000 oz. silver. Production in 1941 was 7089 oz. of gold from 10,419 tons of ore and in 1942 it was 4442 oz. gold from 3584 tons of ore. About 30 percent of the gold and 40 percent (1934-1942) of the silver were produced from concentrates. Average tenor of the ore based on the years with known ore and gold production was 0.86 oz. gold per ton extracted or an in place value of about 1.0 oz. gold per ton (tailings run 0.14 oz. gold per ton). In 1950, 57 oz. of gold was recovered from tailings and in 1954, 67 oz. of gold was recovered from mill clean-up. Table 5 lists the mine production from 1922 to 1954.

Structure

The width of the Hirst-Chichagof Fault ranges from a few feet to 50 feet. The average strike on the main level of the mine is about N30°W and the dip is 75° SW. At most locations the fault is very similar to the Chichagof Fault. The major exceptions are as follows:

1. At several locations the Hirst Fault disperses into a zone up to 50 feet thick, consisting of a series of weak shears. The most important such location is where the main level mine workings

TABLE 5. - Hirst-Chichagof Mine production (Bureau of Mines records)

				Concentrates Produced					Recovered in Bullion	
	Dry Tons				Gross Metal Content					
Year	Ore	Old Tailings etc	Treatment	Dry Tons	Gold (oz)	Silver (oz)	Copper (lbs)	Lead (lbs)	Gold (oz)	Silver (oz)
1922	?		Am	-	-				566	241
1923	560		Am	-	-				315	102
1924	5,600		AmGr CtSm	84	512	-	-	-	2,468	591
1925	4,120	(wet)	do.	165	1,003	352	-	-	5,241	1,098
1926	4,657	(wet)	do.	70					3,193	699
1927	5,040		do.	165	1,590	254	-	-	5,176	1,117
1928	?		do.	?	405?	133	-	-	2,916	634
1929	2,100		do.	95	548	229			2,095	440
1930	1,760		do.	14	53	22	-	-	440	144
1931	12,584		AmGrCtFloCtSm	67	482	198	-	-	5,782	1,432
1932	9,283		do.	150	1,975	685	-	-	2,829	585
1933	?		?	?	?				5,117	?
1934	12,382	1085	AmFlo CtSm	?	?				4,404	1,120
1935	11,606		do.	299	3,650	1,205	460	126	6,854	1,461
1936	8,460		do.	643	2,811	937	130	184	4,616	970
1937	14,504		do.	417	3,522	1,293	580	276	9,187	2[illegible]
1938	11,464		do.	736	7,309	2,517	918	1,348	9,036	1,[illegible]
1939	11,090		do.	525	4,844	1,848	1,470	228	8,955	1,932
1940	12,620		do.	415	3,756	1,491	1,371	12	6,982	1,560
1941	10,419		do.	289	1,993	908	922	300	5,096	1,106
1942	3,584		do.	110	726	331	298	46	3,716	809
1943	534		do.	36	359	110	113	-	417	98
1950		Clean-up	Am	-					57	12
1954		Clean-up	Am	-					67	
Total	142,367			4,280	35,538	12,513	6,262	2,520	95,525	20,270
Total Gold Production with corresponding recorded Mine tonnage					35,133				86,802	

Average recovered grade over the life of the mine $\frac{121,935}{142,367}$ oz. gold = 0.86 oz. gold per ton

Total Production 131,063 oz. gold and 32,733 oz. silver lose the Hirst Fault and follow the Kay Split into the Hirst hanging wall at a distance of about 2800 ft from the mine portal.

2. The Kay Split is reported to be not as strong as the Hirst Fault. A significant ore shoot, the Kay ore shoot, is found at a distance of 2200 feet along the Kay split. It is located about 200-300 feet into the hanging wall of the Hirst fault and serves as an indication that important ore zones may exist on splits some distance from major faults.

3. Aplite dike material forms the footwall and in some places the hanging wall in a significant portion of the mine. At other locations shaly graywacke or less often massive graywacke forms the hanging wall and foot wall. The average strike of the graywacke is N65° W and the dip is 64° SW (Reed and Coats 1941, p. 107).

The Hirst Fault has a warp or bend that is recognizable from the 180 through the 700 foot level and according to Reed and Coats (1941, p. 110) it is related to ore deposition.

Ore Zones

The ore zones consist of gold bearing quartz veins deposited along the Hirst Fault or Kay Split that are in general very similar to those at the Chichagoff Mine. The quartz veins may occupy all or only a small part of the fault zone width. They form tabular but irregular zones that have a long dimension down the rake towards the south and a short dimension along strike. Ore zone widths to 10 feet, strike lengths to 425 feet and vertical heights to 1900 feet are known. The average tenor for the life of the mine was about 1.00 oz. gold per ton. Plate 6 shows the underground

workings and locations of the ore shoots. There are 5 ore shoots, four of these are designated by number, one by name - the Kay ore shoot. Some of the ore bodies are blunt at their edges and others thin out gradually to an assay wall. Most often ore zones consist of ribbon quartz but at places quartz is white and massive with no layers.

Sulfides constitute less than 3 percent of the ore and consist predominately of pyrite and arsenopyrite and rarely sphalerite, galena and chalcopyrite. There is more arsenopyrite in the Hirst ore than Chichagoff ore. The ore gangue minerals are quartz and calcite, while hydrothermal alteration products are sericite and chlorite. In places the wall rock is silicified or pyritized. Graphite is found in the graywacke wall rock, fault gouge and in ribbons in the quartz itself.

Reed and Coats (1941, p. 114) reporting on microscopic work by American Cyanamid and Chemical Corporation on ore from the Hirst-Chichagof Mine indicates that the order of deposition of sulfides is as follows: pyrite is the first metallic mineral deposited, with the possible exception of arsenopyrite whose relationship in the deposition sequence is not known, sphalerite appears to have followed pyrite in the sequence of deposition and to have preceded galena, chalcopyrite and gold. Galena seems to bear the same age relationship to the enclosing minerals as the gold.

Gold is found in isolated particles in the quartz, in the graphitic ribbon structure in quartz or more rarely interwoven in the sulfides. Gold is occasionally found in the fault gouge and more rarely in the graywacke or aplite dike material.

Mine Development

Mine development along the Hirst Fault consist of a 90 foot elevation main haulage drift that reaches the Hirst Fault at a distance 950 feet from the portal and follows it for 1950 feet to where it veers off into the hanging wall of the Hirst fault to follow the Kay split. Plate 6 shows the mine workings. Off this main level a raise reaches the 250 and 450 foot elevation drifts on the #1 ore shoot, the #1 shaft reaches the 300 level, a raise reaches the # III ore shoot, and the #3 shaft reaches the bottom of the mine at the 1900 level (1800 feet below sea level). The #2 shaft reaches from the 300 to the 500 level.

Mine development along the Kay Split consists of a main level drift driven 2800 feet to within several hundred feet of a breakout on the Klag Bay side of Doolth Mountain, a 500 foot level drift to the Kay ore shoot and a shaft from the main level to the 500 level of the Kay ore shoot.

Surface development on the north side of Doolth Mountain is restricted to some pits and cuts located from above the main level to where the #1 ore shoot outcrops. On the south side of Doolth Mountain, development along the Hirst Fault is absent and development along the Kay split consists of trenches and pits exposing a quartz vein from an elevation from 100 to 150 feet along the Rarus Isis claims sideline (plate 3, location 17). The only information on this quartz vein is in a 1939 mine report and subsequent correspondence indicating the grade of the outcrop could not be found (Sorenson, 1939).

Mine development not on the Hirst Fault or Kay Split consists of the following: a short adit was driven on the Elsinor claim, an adit and several trenches are located on the Bear Extension claim, and adits are located on Johanna, Glengary and Sunday Queen claims. Underground a 550 foot long crosscut was driven into the footwall of the Hirst Fault and a 660 foot long crosscut was driven into the hanging wall of the Kay Split. A 230 foot long and 35 foot long drift were driven off the latter crosscut along faults that may roughly correlate with near surface workings on the Johanna and Glengary Claims. Figure 14 shows the relationship between the 660 foot long crosscut workings and near surface workings.

Present Investigations

Along the Hirst Fault and Kay Split

Field investigation of the main haulage level and the 250 foot elevation crosscut drift revealed the following (see Plate 6):

1. The main level haulage drift is caved tight about 850 feet from the portal just before it reaches the Hirst Fault. As some water is running through the cave undoubtedly all the underground workings below the main level are flooded.
2. The 250 foot elevation crosscut drift has a bad roof 150-200 feet from the portal and appears caved further back.

Several tons of caved rock were excavated to clear an entrance past the caved portal of the 450 foot elevation drift to gain access to examine the mine workings in the vicinity of the #1 ore shoot. These are accessable to 290 feet past the portal where downed timbers and a cave prevent further access (see fig. 15). The connecting raise from the main haulage level occurs at a distance of 285 feet from the portal and is open at least to a depth of 75 feet. Samples taken of the #1 ore shoot (Plate 6) along this drift but outside of the stoped area contained up to 1.688 oz.

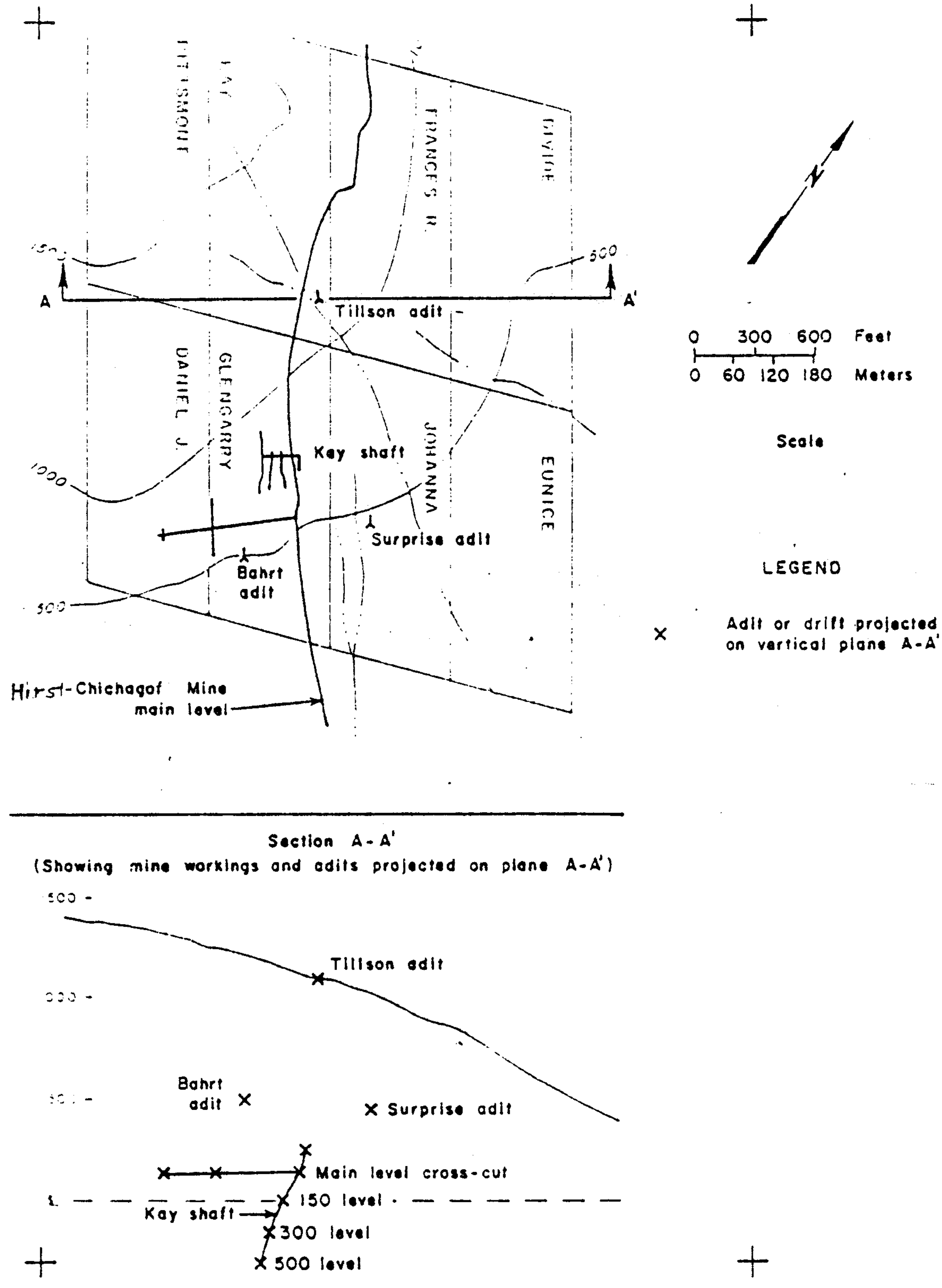


FIGURE 14.- Sketch map of the Kay Split, Hirst-Chichagof mine, showing the hanging wall crosscut off the main level drift and near surface workings. Section shows the relationship between near surface workings and mine workings

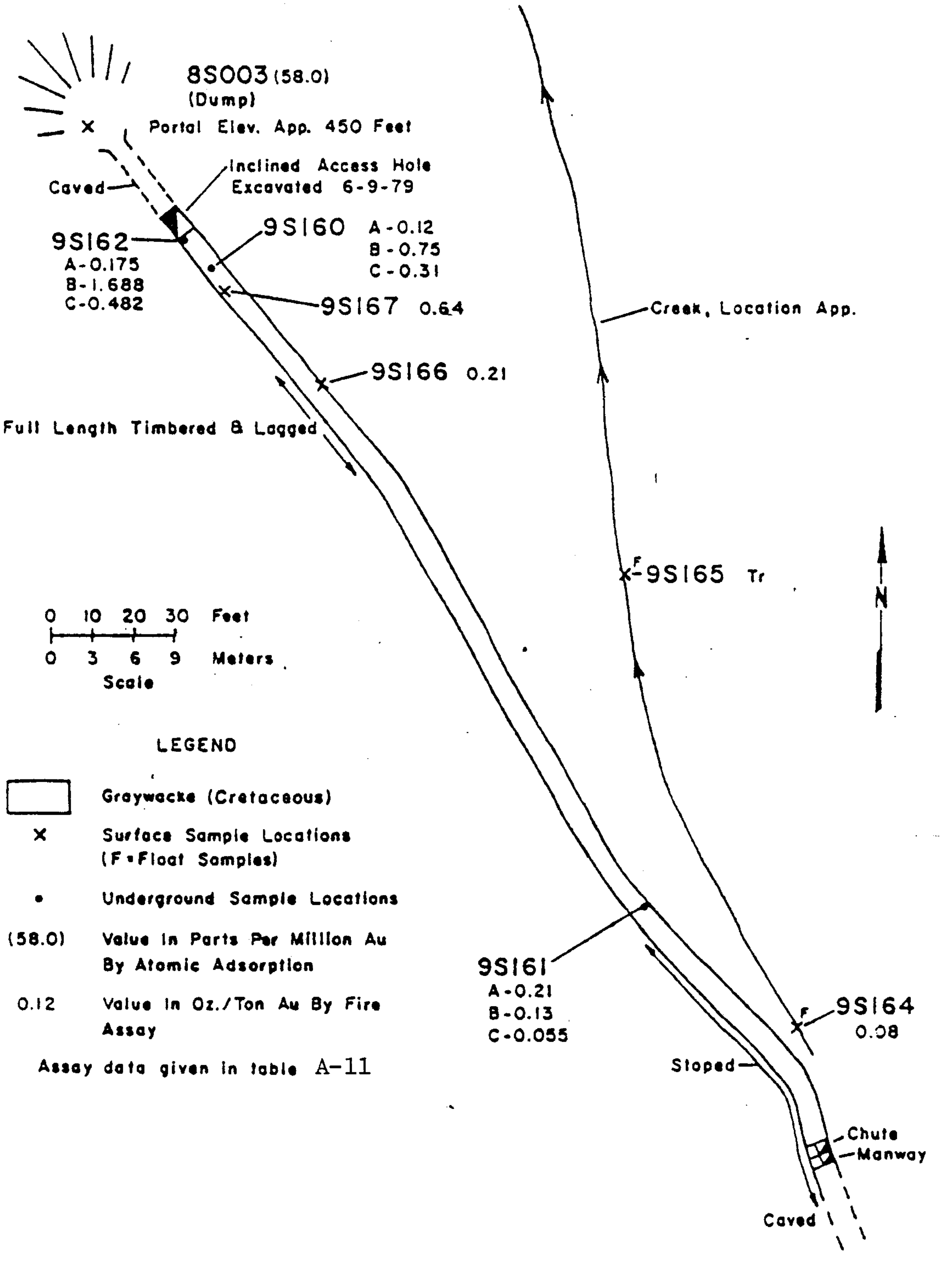


FIGURE 15.-Accessible portion of Hirst-Chichagof 450 foot elevation drift, sample locations. (Mapped by J. Still and K. Weir June 1979)

gold per ton (1.3 foot channel). Pits located on structure and above the drift were overgrown and sloughed and quartz fragments dug from them contained up to 0.64 oz. gold per ton. Figure 15 shows the drift and surface pits and table A-11 gives the analytical results.

The quartz vein reported in 1939 mine correspondence, to outcrop along the Rarus Isis claim sideline along the Kay Split, was not examined in the field because this information was not gained until late in 1979, after the field time alloted for this project had been completed (plate 3 location 17).

Within the Original Hirst Claim Group but not along the Hirst Fault or Kay Split

Field work and other information on the near surface occurrences within the Hirst-Chichagof claim group, but not on the Hirst Fault, are summarized in table 6. Plate 3 shows the locations of these workings and figures 16 to 20 are detailed maps of the occurrences while the analytical results are located in appendix A. These investigations revealed the following.

Gold is found in quartz veins found throughout the claim area. Of the workings examined the Bahrt adit located on the Glengarry claim contains the most significant gold values.

The 140 foot long Bahrt drift exposes a north to northwesterly striking, narrow fault zone containing quartz that dips about 48° to the southwest. Figure 19 shows the adit. The wall rock is massive solid graywacke and there is little fault gouge along the margins of the quartz vein. Northeasterly striking, northwesterly dipping stringer zones are found at the portal and near the end of the adit. The quartz vein is up

Table 6. - Examination and information on prospects, workings and outcrops not on the Hirst Fault but within the Hirst-Chichagof Claim group. Assay data in Appendix A.

Claim name and prospect workings or occurrence found during this study (unless noted otherwise)	Elevation (feet)	Plate, figure or table (T.) no.	Disc. text pg. No.	Comments
Elsinor Claim Elsinor adit	50	Pl. 3 #11 Fig. 16 T. A-12		A 105 foot long drift located 600 feet east of the Hirst fault exposes a fault zone (strikingN58° E and dipping 65°NW) that contains up to 2 feet of quartz near the portal. At about 6 feet from the portal is a 9 foot wide zone of quartz cemented, brecciated gray-wacke that trends N15°E. Values in drift up to 0.03 oz. gold per ton, nil on dump.
Sunday Queen Claim Sunday Queen adit	900 ±	Pl. 3 #12 Fig. 17 T. A-12		A 27 foot long drift exposes a narrow, NW striking quartz vein in massive greenstone that pinches out 8 feet from the portal. No significant metal values in adit or dump. 1200 feet NE of Hirst fault.
Lena Claim Kay pits	1500 ±	Pl. 3 #13		Reed (1941 p. 117-118) describes a quartz vein up to 2 1/2 feet thick that strikes N7°W and dips 55°W as exposed in three prospect pits. BuMines examination found 12 pits aligned at N7°W for a distance of 450 feet. Almost no quartz found in-place because the pits are sloughed and overgrown. Samples of quartz float assayed up to 0.5 ppm gold. About 1200 feet SW of the Hirst Fault.
Bear Extension Claim Tillson adit	1100 ±	Pl. 3 #14 Fig. 14 T. A-14	35	A 95 foot long drift exposes two NW striking SW dipping fault zones containing quartz veins up to 1.1 foot thick. Samples from the veins assay up t 0.015 oz. gold per ton, 0.1 oz. silver per ton and 1500 ppm arsenic. Samples from two pit dumps (8S306 & 307) located just NW from the adit assayed up to 0.6 ppm gold and 1000 ppm arsenic.

Table 6. Continued

Claim name and prospect workings or occurrence found during this study (unless noted otherwise)	Elevation (feet)	Plate, figure or Table (T.) no.	Disc. text pg. no.	Comments
Glengarry Claim Bahrt adit and pit	500 ±	Pl. 32 #15 Fig.14 Fig. 14 T. A-15	34 & 35	A 140 foot long drift (and flooded shaft) exposed a NW striking SW dipping fault zone in massive solid graywacke that contains up to 0.95 feet of quartz. Samples of the vein assay up to 0.67 oz. gold per ton and 0.2 oz. silver per ton. A high grade dump sample with pyrite, galena and sphalerite assayed 0.16 oz. gold per ton, 0.1 oz. silver per ton, 1900 ppm lead and 1100 ppm zinc. May correlate with fault exposed in hanging wall crosscut of the Hirst-Chichagof Mine.
Johanna Claim Surprise adit	450±	Pl. 3 #16 Fig. 13 Fig. 19 T. A-16		An 80 foot long drift exposes a northerly striking SW dipping fault zone that contains quartz up to 1.10 foot thick. Samples from the vein and adit dump contain no significant metal values.

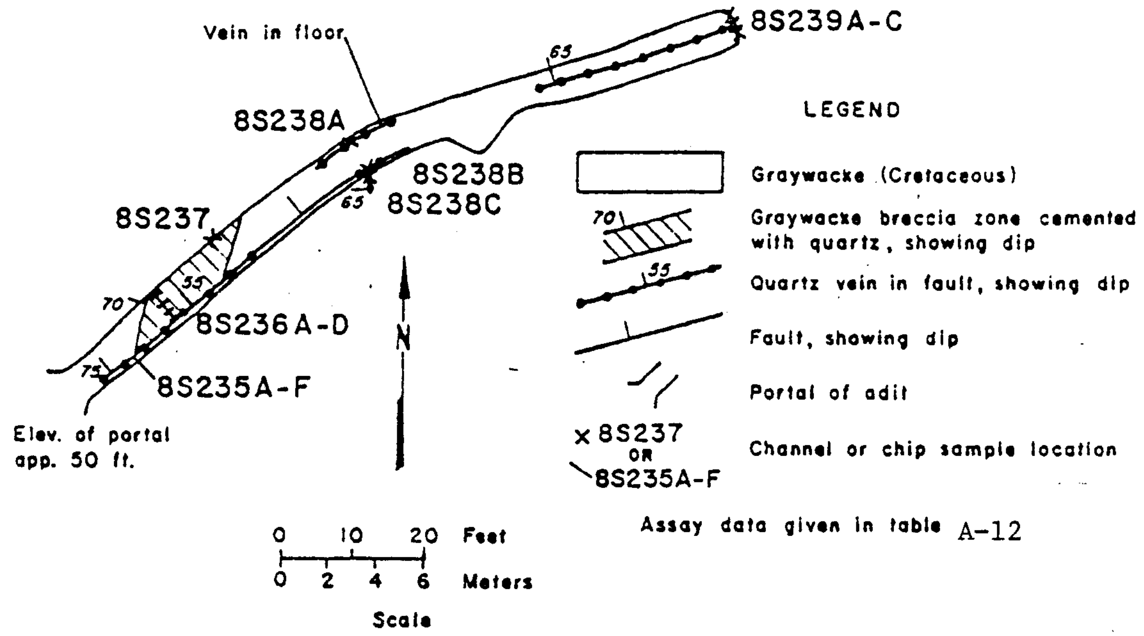


FIGURE 16.-Elsinor adit, sample locations (Mapped by J. Still and K. Weir August 1978)

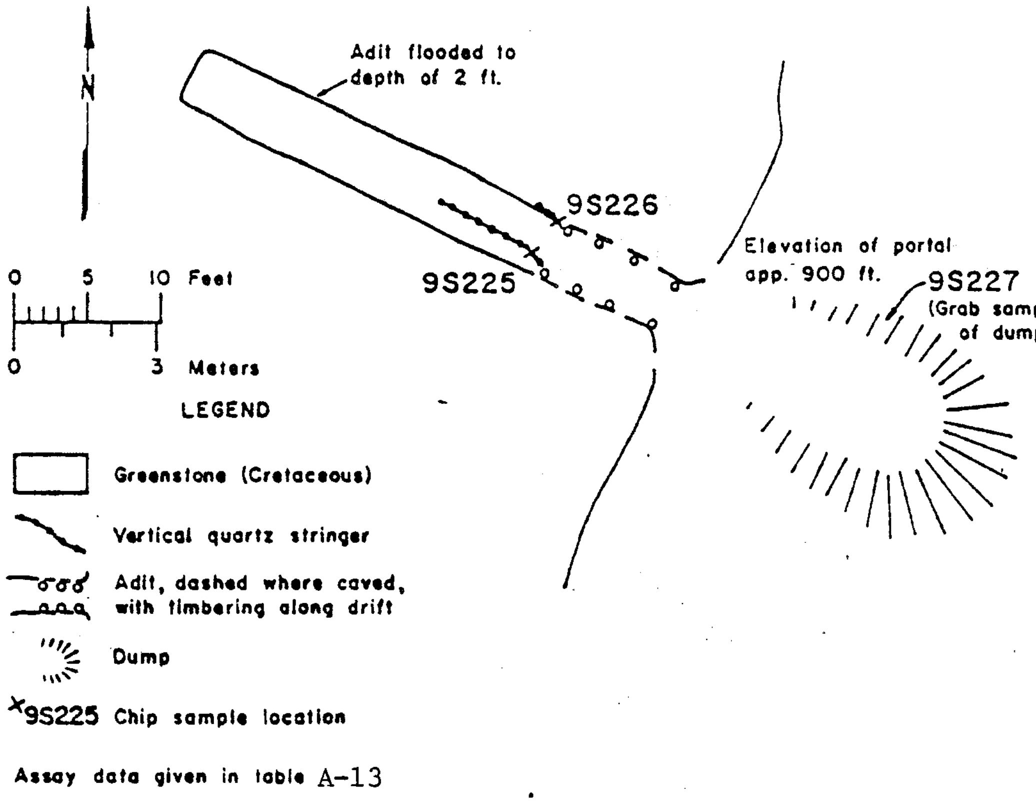


FIGURE 17.-Sunday Queen adit, sample locations. (Mapped by J. Still and K. Weir, June 1979)

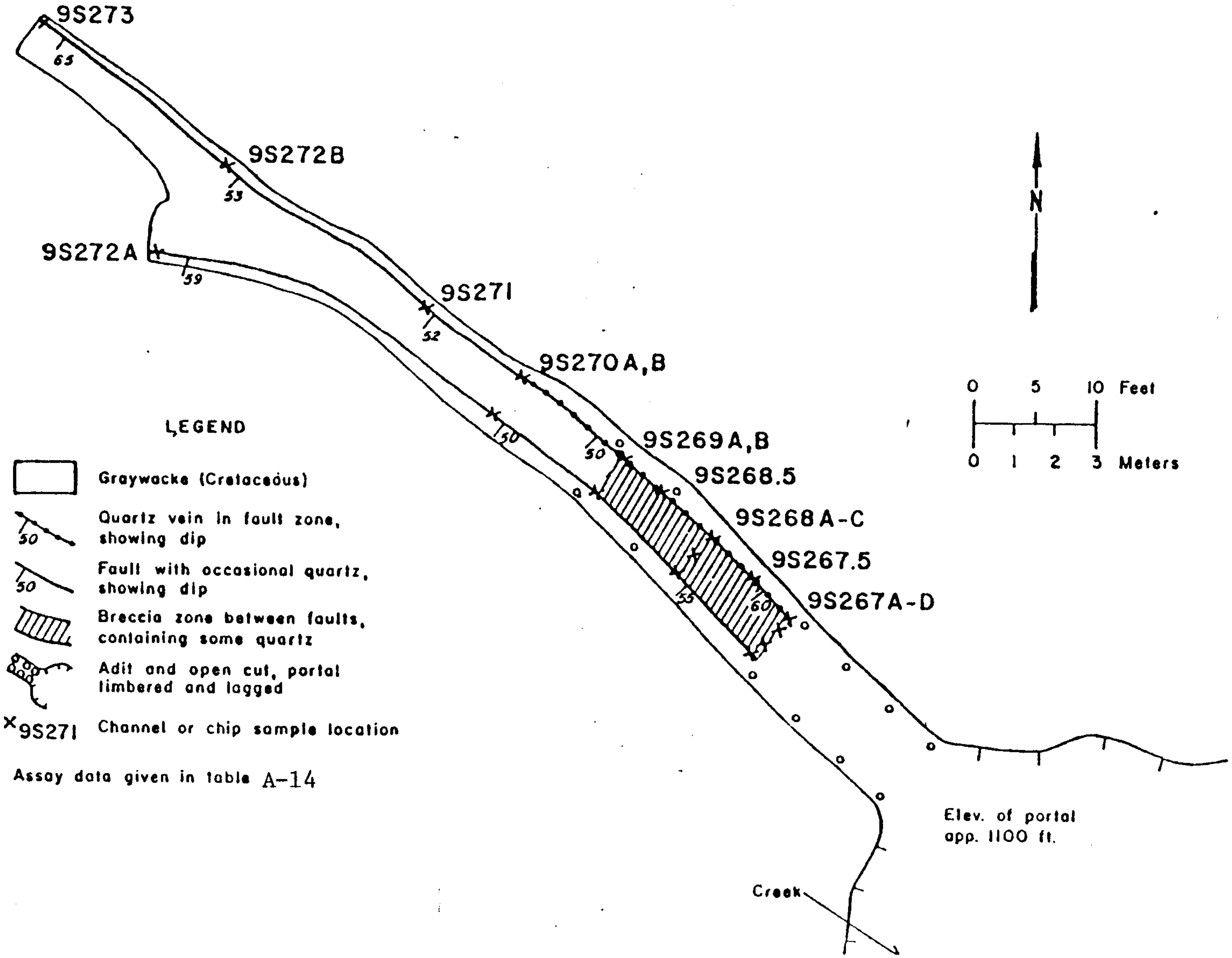
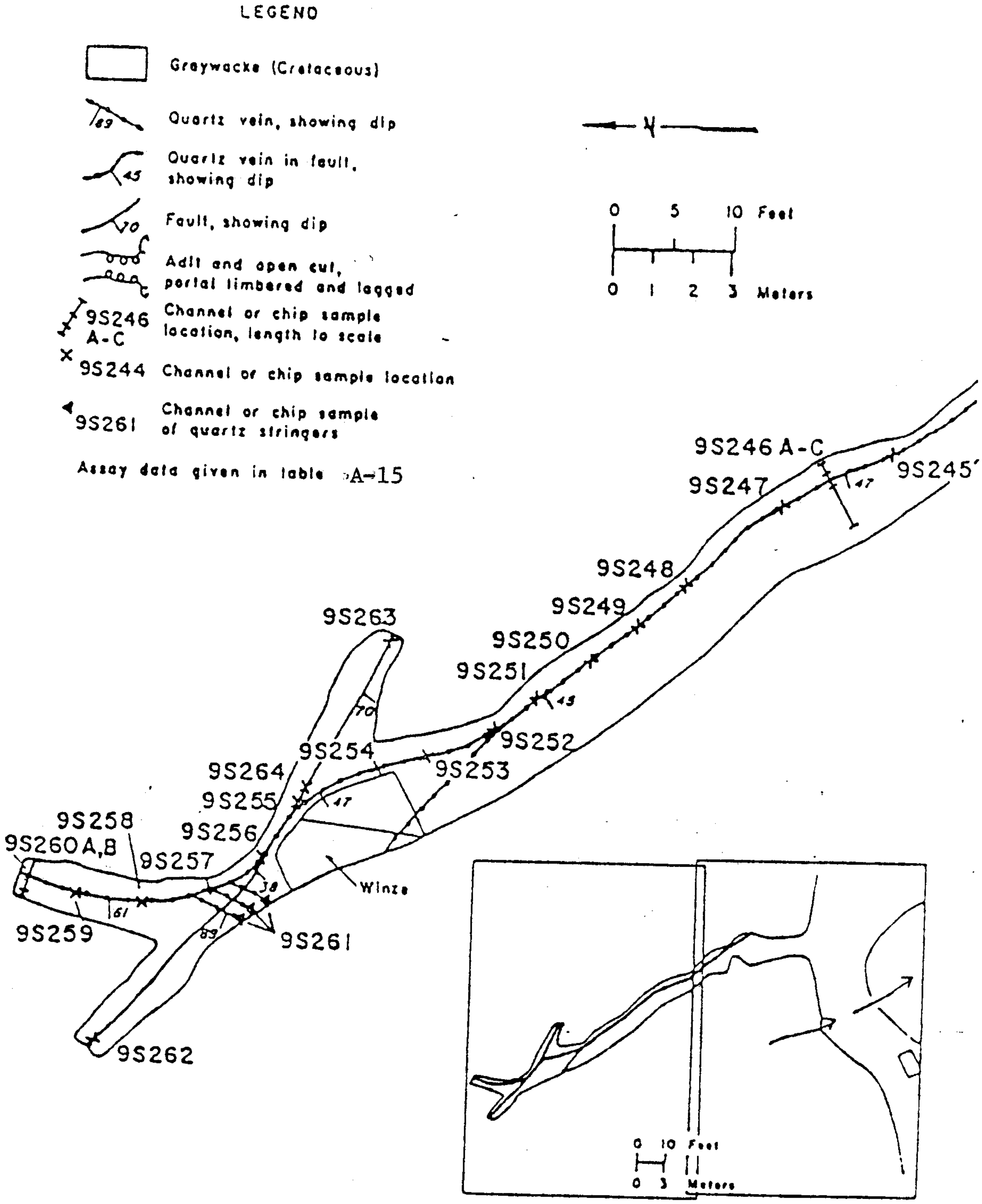


FIGURE 18.-Tillson adit, sample locations. (Mapped by J. Still and K. Weir, July 1979)


LEGEND
Graywacke (Cretaceous)
Quartz vein, showing dip
Quartz vein in fault, showing dip
Fault, showing dip
Adit and open cut, portal timbered and lagged
9S246 A-C
Channel or chip sample location, length to scale
9S244
Channel or chip sample location
9S261
Channel or chip sample of quartz stringers
Assay data given in table A-15
N
0 5 10 Feet
0 1 2 3 Meters
9S246 A-C
9S245
9S247
9S248
9S249
9S250
9S251
9S252
9S253
9S263
9S254
9S264
9S255
9S258
9S256
9S260A,B
9S257
9S259
9S261
9S262
Winze
0 10 Feet
0 3 Meters

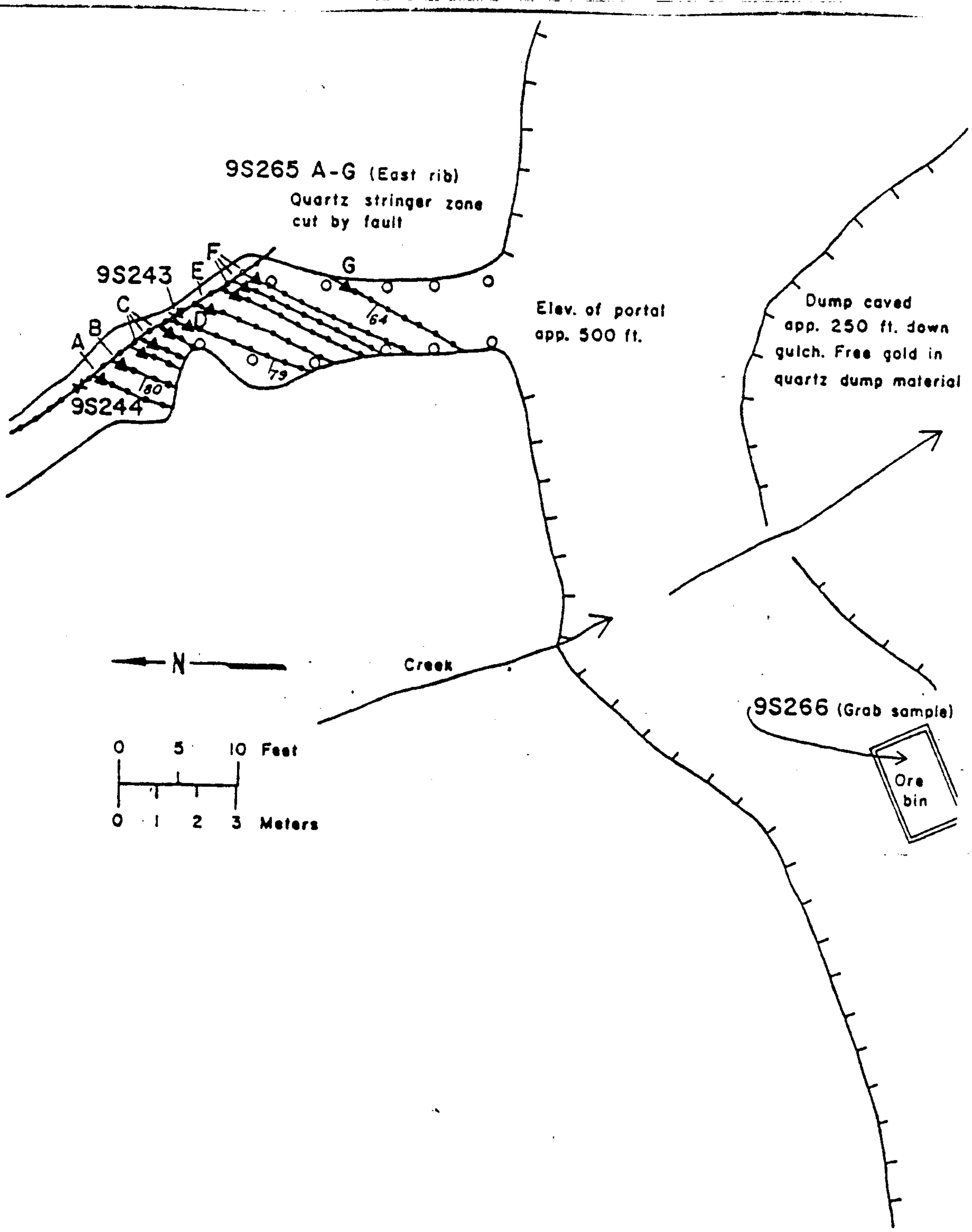


FIGURE 19.-Bahrt adit, sample locations. (Mapped by J. Still and K. Weir, July 1979)

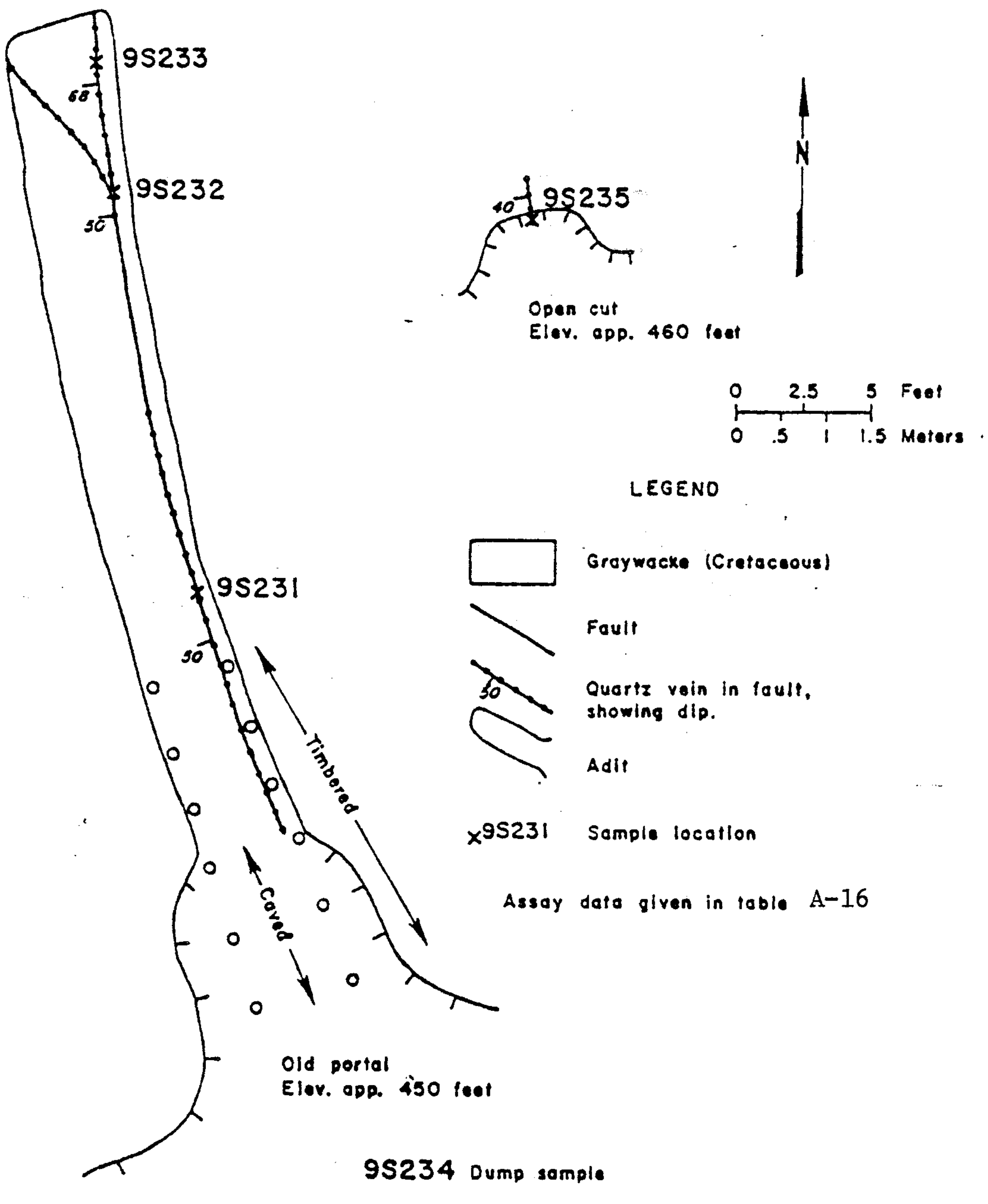


FIGURE 20.-Surprise adit, sample locations. (Mapped by J. Still and K. Weir, July 1979)

to 0.95 feet thick and contains up to 0.67 oz. gold per ton (a 0.4 foot channel). Table A-15 gives the assay data. This adit roughly correlates with a fault zone located 350 feet below and 430 feet along the main level crosscut off the Kay Split. However, the dips do not correlate. The Tillson adit located at 1100 feet elevation also approximately aligns with the Bahrt. Figure 14 is a sketch showing the near surface workings relative to the underground crosscut.

Mine Dump and Tailings

A brief investigation was made to roughly estimate the grade of the mine dump and tailings. Thirteen shovel samples 1/2 foot deep and weighing 15-20 pounds each were taken in 2 sample lines across part of the top and down one side of the dump. A chainsaw was needed to clear these sample sites on the dump . Eleven shovel and Shelby (3 inch dia.) tube samples were taken to a depth from 1 to 1 1/2 feet in 3 lines across the tailings to the low tide line. Figure 21 shows the sample lines on an aerial photograph and figure 22 shows the sampling detail. Tables A-17 and A-18 give the sample results. Much more extensive investigation of the tailings and dump is necessary to accurately determine tonnage and grade.

Resources

Resource estimates for the Hirst-Chichagof claim area (1938 configuration, plate 3) were made based on mine records and Bureau of Mines sampling and mapping of lode veins, dump and tailings. Economic viability estimates were based on the same order-of-magnitude criteria as used in the evaluation of the Chichagoff Mine (page 21). It is important to note that

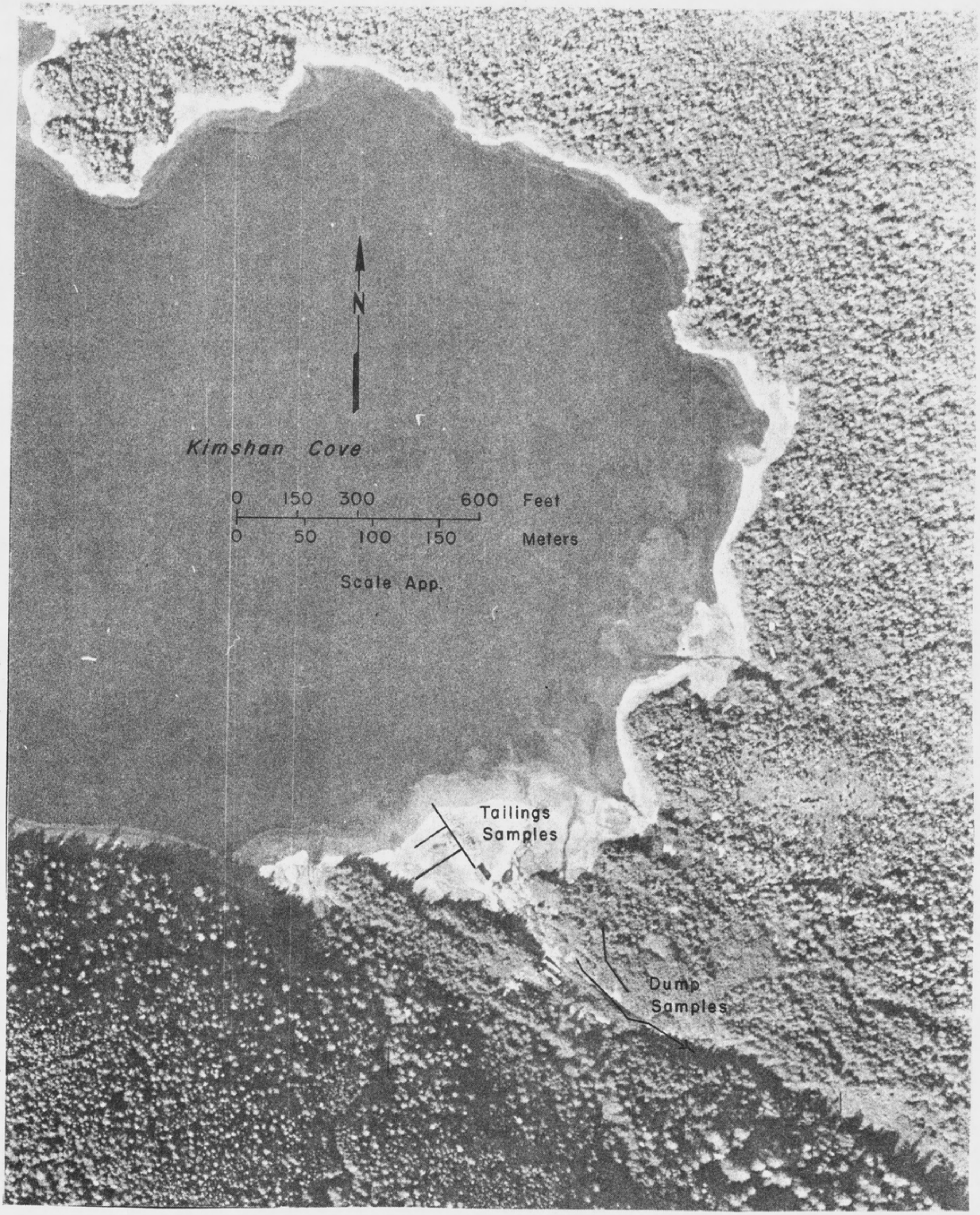


Figure 21. - Aerial photograph of Hirst-Chichagof dump and tailings showing sample line locations.

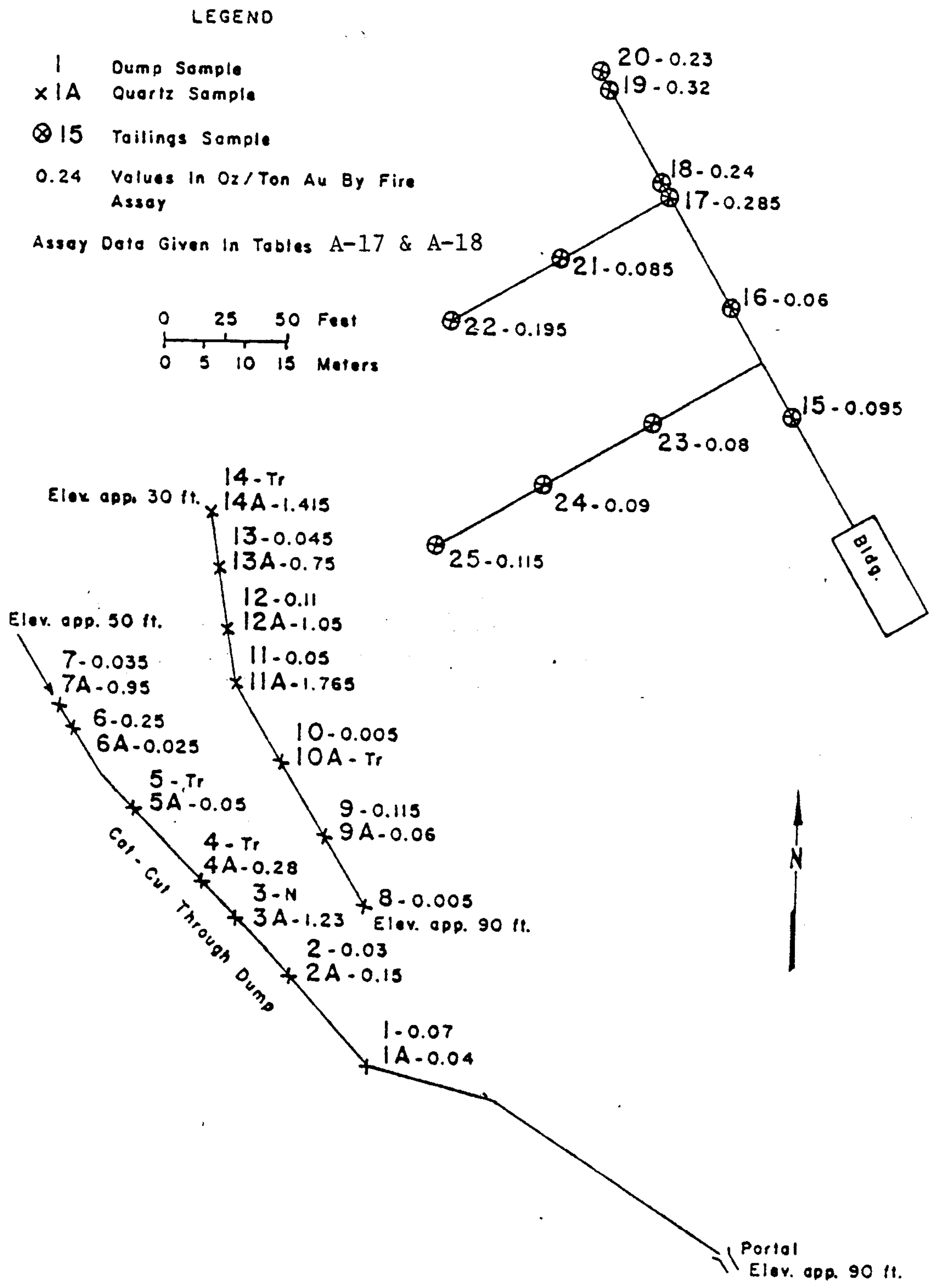


FIGURE 22.-Hirst-Chichagof dump and tailings sample line detail. (Mapped by J. Still and K. Weir in 1979)

significant portions of the Hirst Fault and the Kay Split that were once held by the Hirst-Chichagof Mining Company are not now held by active claims. Following are the Hirst-Chichagof Claim area resource estimates made by this study and the basis for each estimate.

1. Kay ore shoot: The Kay ore shoot is located 4600 feet from the main level portal and is developed by a shaft from the main level to the 500 level and by drifts on the 500, 300, 150 and main levels. Plate 6 shows the Kay ore shoot. It was discovered along the main level drift in 1939 and the only information on it is from old mine reports and telegrams dated 1939, 1940 and 1941 (Sorenson 1939-1941). These records indicate the following:

   A) The ore zone was not delineated at depth.

   B) The ore shoot was fairly high grade as indicated by the following information extracted or quoted from 1939-1941 dated mine reports (Sorenson, 1939-1941):

      - Shaft values from 0 to 25 feet from main level 25 feet at 12 inches quartz at $37 (1.06 oz. gold per ton)

      - 150 level, shaft sump at bottom, quartz 1 foot wide at $10 per ton (0.29 oz. gold per ton)

      - 150 level drift from 101-123 feet from shaft 22 feet at 20 inch wide quartz at $66.97 (1.9 oz. gold per ton)

      - 300 level drift, 195 feet from shaft, 35 foot length at 18 in wide quartz at $200 (5.7 oz. gold per ton)

      " We are now in fairly high grade ore out there (Kay 300 level) and the mill feed is quite high, suggest we continue for the rest of July and probably all of August to mill ore from the Kay 300 only. This will, I think, put our bank balance in pretty good shape."

      - 500 level, seventy feet beyond winze 5 inches of quartz in face that runs over 1.7 oz. gold per ton.

In general these records indicate that at least a portion of the Kay shoot ran well above the average mine grade.

C) There was some stoping on the Kay 500,300 and 150 levels in 1941. In July 1941 stoping was halted on the 500 level because of a severe labor shortage. In 1943, the mine was closed.

The Kay ore shoot is inferred to be similar to the #4 ore shoot and to continue from the 500 level (400 feet below sea level) to the 1900 foot level (1800 feet below sea level). The mining width would exceed 3 feet. It is estimated to contain 80,000 tons of inferred reserves at 1.00 oz. (the mine average) gold per ton (80,000 oz. gold) and 0.25 oz. silver per ton (20,000 oz. silver).

2. Unmined area explored by underground workings: Less than 10 percent of the area explored by underground workings along the Hirst Fault and Kay Split was mined. It is estimated from mine records that the cut-off grade was about 0.2 to 0.3 oz. gold per ton. There is considerable quartz showing on mine maps of the main level along the Kay Split that was not mined. A mine report dated Oct. 13, 1939, reports a large quartz outcropping at an elevation of 100 to 150 feet along the Kay Split on the Rarus Isis Claims sideline. Considerable effort was expended by the mine to clear this outcropping, but subsequent reports indicating grade of the quartz could not be found. Samples taken in the 450 foot elevation drift of an unstoped quartz vein contained up to 0.5 oz. gold per ton across a 3.8 foot width.

It is estimated that a cutoff grade halo exists around stopes and that ore zones undiscovered or unrecognized by previous mining activity are located in the area explored by undergound workings but not mined. Mining width would exceed 3 feet. It is estimated that this amounts to 1/2 the tonnage mined over the life of the mine at 1/4 the average grade for the life of the mine or 70,000 tons of inferred marginal reserves at an average grade of 0.25 oz. gold per ton (17,500 oz. gold) and 0.06 oz. silver per ton (4,200 oz. silver).

3. Unexplored portion of the Hirst Fault: Within the original claim group (Pl. 2) at least 5500 feet of the Hirst Fault is unexplored by mine workings. This includes the area on the Bertha Claim from the beach to where the fault is intercepted by the main level cross-cut and the area on the Frances, Johanna and Isis Claims where the main level drift "lost" the Hirst Fault and follows the Kay Split. Exploration along 5000 feet of the Hirst Fault and Kay Split resulted in the discovery of 5 major ore shoots with a production of 131,000 oz. of gold and 33,000 oz. of silver. Only one of these ore shoots out crops.

   Hypothetical reserves, with a mining width exceeding three feet, in the unexplored 5500 feet of the Hirst fault are: 100,000 tons at 1.00 oz. gold per ton (100,000 oz. gold) and 0.25 oz silver per ton (25,000 oz. silver).

4. Hirst tailings (figures 21 and 22 and table A-17): The Hirst tailings are located on the beach, tide flats, and past the low tide line. The bulk of the material is located on the tide flats in the littoral zone. From May 1932 to about June 1933 the mill operated on tailings. In 1950, fifty-seven ounces of gold was recovered from tailings and clean-up. Eleven Bureau of Mines tailings samples in three lines averaged 0.14 oz. gold per ton. Based on the assumption that gold

values continue to depth and that at least 1/2 of the original 140,000 tons of tailings has not been reprocessed and is at practically accessable locations to mining, the inferred marginal reserve is 70,000 tons of tailings at 0.14 oz. gold per ton (9800 oz. gold) and 0.03 oz. silver per ton (2100 oz. silver).

5. Hirst Dump (figures 21 and 22 and table A-18): The dump extends 400 feet in a northeasterly direction from the main level portal. It extends from an elevation of 90 feet to about 20 feet and is about 400 feet wide. It has an almost impenetrable brush covering. It is not clear what portion of the underground workings this dump represents. Thirteen USBM dump samples were taken in two sample lines that average 0.04 oz. gold per ton. Samples of quartz were also taken at most sample localities and most often these samples contained much higher gold values than the dump samples. These samples represent the surface of the dump at only a few locations and are insufficient to accurately estimate the average grade for the whole dump. The contours of the land before the dump are not known and without this knowledge it is impossible to accurately estimate the dump tonnage without drilling or digging pits. It is roughly estimated that this dump contains 70,000 tons at an average of about 0.04 oz. gold per ton and 0.01 oz. silver per ton. This would be an inferred subeconomic resource.

Alaska Chichagoff Mine

Introduction - History

The Alaska Chichagoff Mine is located near sea level on the west side of Klag Bay along a fault zone that can be traced for at least one mile. This fault zone is 2800 feet southwest of, and about parallel to, the

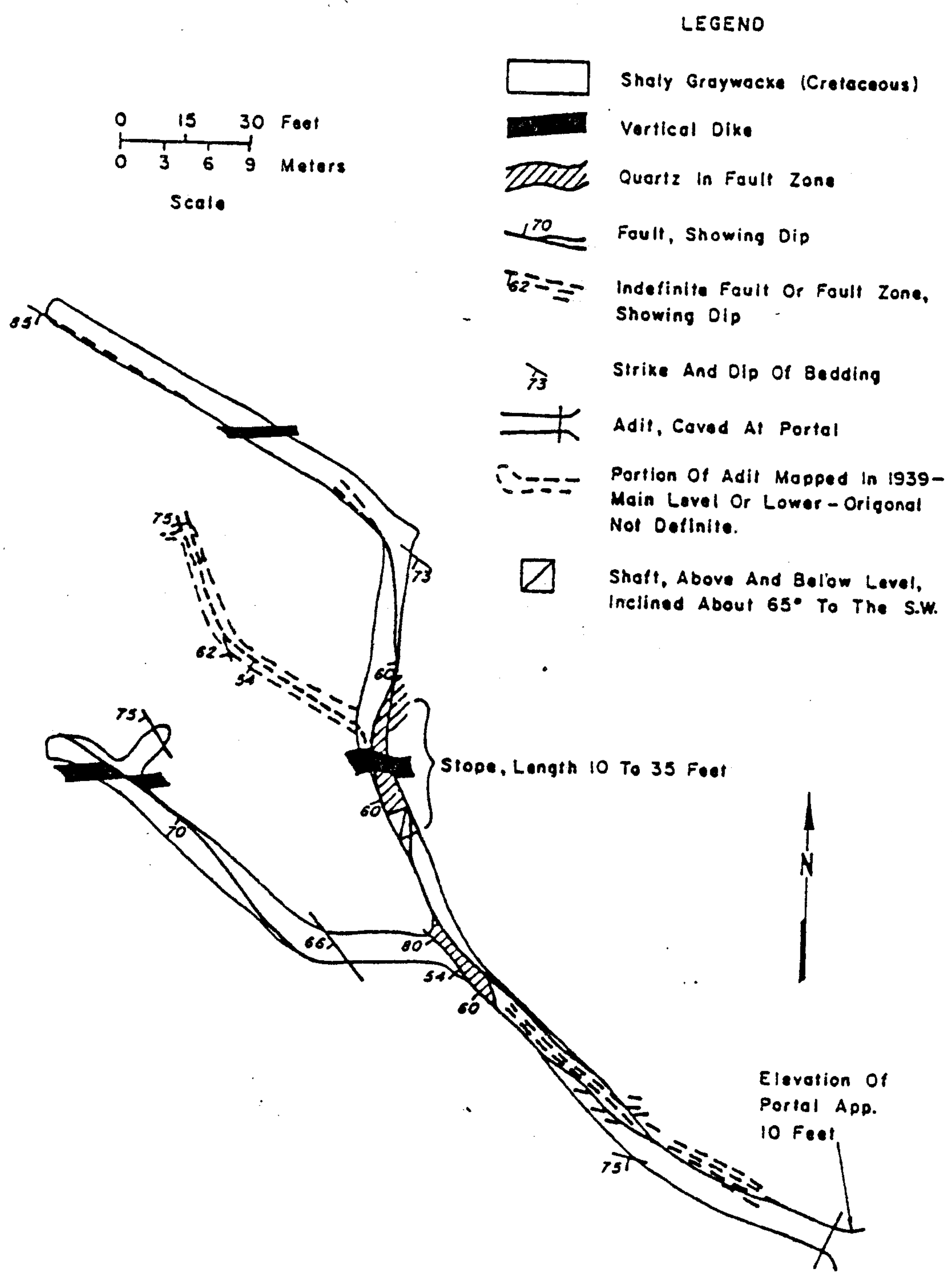


FIGURE 23.-Alaska Chichagoff Mine workings, sample locations. (modified from Reed and Coats 1941, p. 121)

Chichagof Fault. Plate 2, #31 shows the mine and fault location and plate 3, I shows the claim configuration.

The first recorded activity on this property was in 1928 by Mike McKallick. It was later (1930?) purchased by Nick Bez. By 1930, a 30 foot drift had been driven at an elevation of 500 feet and a drift had been started on the same structure near sea level. In 1931 the mine was incorporated into the Alaska Chichagoff Mining Company and consisted of 14 claims reaching across the Doolth Mountain peninsula. A test shipment of ore was made in 1932. In 1936 the property was optioned by the Chichagoff Mining Company and it is reported in a July 15, 1936, Chichagoff Mine report that 660 tons to date had been mined from the property with an average recovery of 1.0 oz. gold per ton. A 1939 dated map of the prospect (figure 23) by Reed and Coats (1941, p. 131) indicated 310 feet of drift along a north to northwesterly striking fault zone, another 90 feet of drifting along a northwest split off the above zone and 110 feet of drifting along another northwest striking fault zone to the south. A shaft from the surface reaches the drift at a distance of 140 feet from the portal and a 22 foot long by 125 foot high stope is located off the north side of the shaft. Reed and Coats (1942 p. 130) report that just past the shaft the drift contains quartz 5 feet wide for 20 feet. From Reed and Coats description, the character of the ore and ore zone (120 feet high by 10 to 30 feet long) are similar to those at the Chichagoff Mine.

There is little information on the prospect after 1939, however, annual assessement work on the Memont, Viola and Dumont claims is recorded to 1976.

Present Investigations

Investigations of the Alaska Chichagoff Mine indicated that the mine portal was caved tight but the shaft was open. An attempt to clear the portal indicated the adit may be backfilled. A sample of quartz containing gold from the dump assayed 36 ppm gold and 150 ppm silver. A series of sloughed pits extend from the shaft along structure to over an elevation of 100 feet. Quartz fragments from one pit assayed 0.45 ppm gold while a quartz block from a nearby stream assayed 0.70 ppm gold.

At an elevation of 550 feet on the Dumont claim a 25 foot long adit was found driven along a weak northwesterly striking fault zone in massive graywacke. Plate 3, #44 shows the adit location. Samples taken of the fault zone contained no significant metallic mineralization but a sample of quartz fragments on the dump assayed 1.5 ppm gold.

At an elevation of 525 feet just to the east of the above adit an open cut at a waterfall in a small creek exposes a fault zone striking N28°W and dipping 68°SW. A 0.25 foot wide sample of quartz in the fault zone assayed 0.55 ppm gold while 0.15 feet of fault gouge assayed 0.15 ppm gold.

Conclusions

Past production of 660 oz. of gold, similarities between character of the ore and the ore zone to that of the nearby Chichagoff Mine and the finding of low gold values north of the mine along structure to an elevation of 550 feet, encourage exploration of this prospect.

Jumbo Mine

Introduction-History

The Jumbo Mine is located on a fault zone that is traceable for at least one mile and is 3200 feet southwest of and parallel to the Chichagof Fault. Plate 3 shows the claims and mine workings and plate 2 shows the fault.

This prospect was discovered in 1909 at the high tide line where 1450 oz. of gold (L. Parker, 1980) were mined from a high grade pocket. Between 1909 and 1912, four claims were staked along the structure from Klag Bay to Ogden Passage. In 1917 it is reported (Overbeck, 1919, p. 118) that the richest ore and free gold specimens in the district were found at the Jumbo Mine. In 1921 the Jumbo claim had a 50 foot shaft, a 45 foot adit and 35 feet of drift which exposed a quartz stringer on the beach cliff near the original discovery. In 1921 a 1/2 ton test mill was installed on the property and a little ore run through it.

From 1924 to 1926 the Klag Bay Mining Company optioned the property and a short distance from the beach on the Jumbo claim sank a 400 foot inclined shaft from which were turned a 200 and 400 foot level. The 200 foot level was driven 50 feet S53°E and 200 feet N53°W from the shaft and the 400 foot level was driven 230 feet southeast and about 1100 feet northwest from the shaft. On the Gold Reef claim another shaft was sunk to a depth of 230 feet with two short levels turned from it. The Klag Bay Mining Co. also dug numerous pits along the structure across the Jumbo, Minnesota and Gold Reef claims (Reed and Coats, 1941, p. 127).

Pits and trenchs dug in 1930-1931 exposed the structure on the Minnesota claim. A crude sketch of these trenches and pits was included in a 1931 report by Nelson (PE 114-6). It indicates that for a distance of 336 feet along strike 18 samples were taken with values up to 0.07 oz. gold per ton, quartz thicknesses up to 1.5 foot and an average value of

0.025 oz. gold per ton and an average thickness of 1.03 feet of quartz.

These claims remained active until 1947 and in 1975 they were restaked and are active today.

Present Investigation

Investigation of this prospect in 1978 and 1979 revealed on the Jumbo claim a 48 foot drift near sea level, two flooded shafts (one in the adit) and a number of sloughed pits extending to the Minnesota Claim. Plate 3 shows the location of the workings. On the Minnesota claim at an elevation of 100 feet a series of trenches (and a small flooded shaft) exposing a quartz vein up to 2.0 feet thick were found. On the Gold Reef Claim a flooded shaft and a series of sloughed trenches were found.

The 48 foot long drift near sea level exposes a narrow fault zone striking N50°W and dipping 55° SW that contains quartz in places and brecciated graywacke, and fault gouge. Figure 24 shows the adit and table A-19 gives the analytical results. Samples across the fault zone contained up to 0.15 oz. gold per ton (0.4 feet across quartz and graywacke).

The Minnesota claim trenches are shown in figure 25. They expose a 0.65 to 2 foot thick vein of ribbon quartz that follows a N35° W striking and 58°SW dipping fault zone for a strike distance of 90 feet. Table A-20 gives the assay data. Five sample lines were taken across the vein and the values ranged from 0.01 to 0.035 oz. gold per ton. These values compare well with those obtained in 1931 from these same trenches.

A sample of quartz containing sulfides from the Gold Reef shaft dump (plate 3,#47) assayed 0.015 oz. gold per ton while a sample from the Jumbo shaft dump (plate 3,#45) assayed 0.20 ppm gold and L <50 ppm) tungsten.

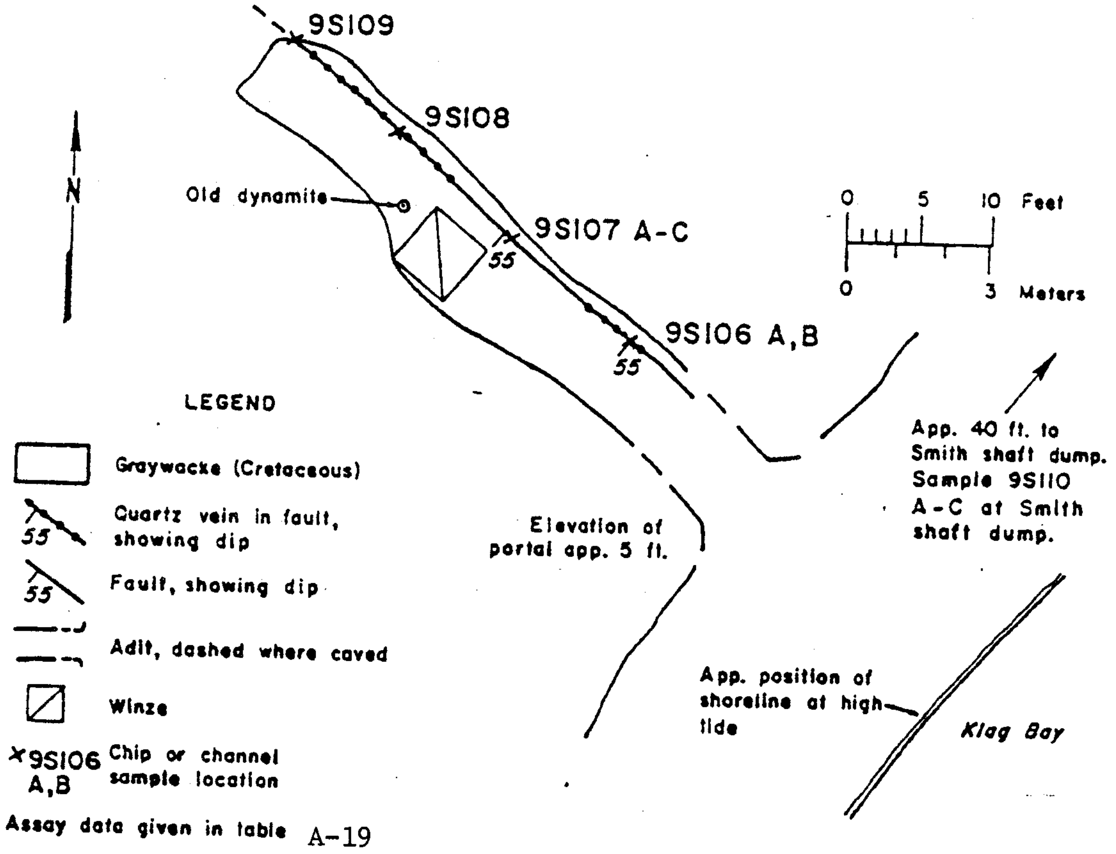


FIGURE 24.- Smith adit on Jumbo Claim showing sample locations. (Mapped by J. Still and K. Weir, June 1979)

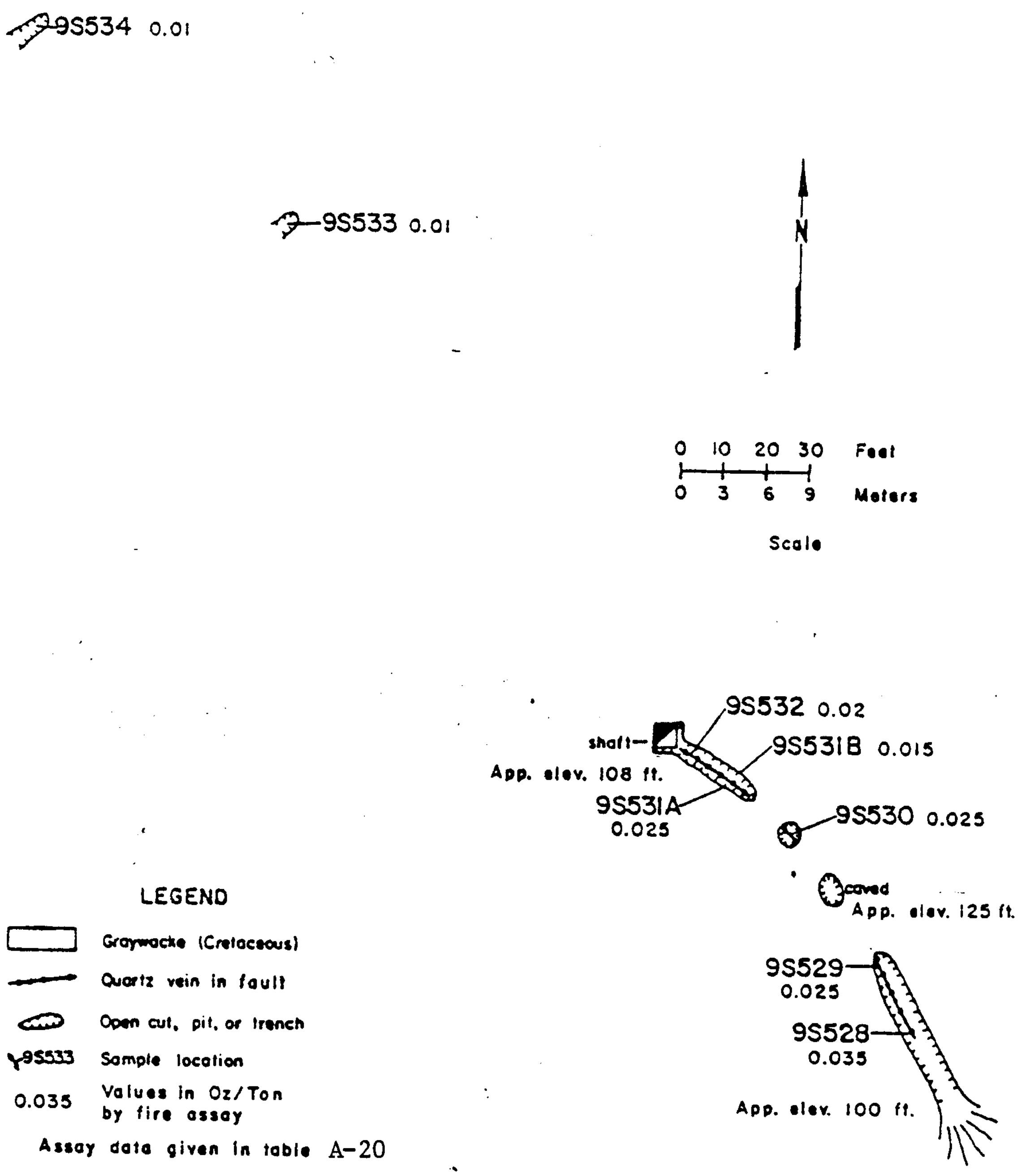


FIGURE 25.-Minnesota Claim trenches sample locations. (Mapped by J. Still and K. Weir August 1979)

Conclusions

This prospect is shrouded by mystery. There is over 1600 feet of drifting on the prospect that is now inaccessable because of flooded shafts and there is neither information on the character or grade of mineralization found in these drifts nor on what grade and quantity of ore the company felt was necessary to justify mining. The highest grade sample (located in the 48 foot long drift) obtained by this study was only 0.15 oz. gold per ton.

Results from surface sampling on the Minnesota claim trenches were persistent but very low grade (up to 0.07 oz. gold per ton).

Although the low grades of mineralization found by this study and apparent negative results of underground exploration do not encourage exploration on this property, the apparent persistency of structure for 3000 feet and reported rich ore near the beach encourage some additional examination.

Baney Prospect

Introduction-History

The Baney Prospect is located near the southern tip of the Doolth Mountain peninsula in a flat swampy area where a series of pits, trenches, and a shaft driven in the 1930's (the shaft and most workings are now flooded) expose or exposed both a northwesterly and a northeasterly striking fault zone in graywacke that contains quartz. Plate 2, #46 shows the prospects location.

Prior to 1931 W.P. Baney staked the four Ora claims on the property now known as the Baney. According to a 1931 report (Nelson, 1931) the prospect consists of open cuts in the bottom of a drained swampy basin where a northwesterly quartz vein in a graywacke shear has been exposed and traced for 300 feet showing widths from 3 to 36 inches. The quartz shows some pyrite and occassionally small amounts of galena.

By 1938 (Reed and Coats, 1941 p. 120) workings, consisting of cuts, pits, trenches, and a 22 foot deep (flooded) shaft, extended over a distance of 600 feet and exposed both a fault striking N55°W and dipping 50° to 70° SW and a fault striking N60°E and dipping 85°NW. One 14-inch thick veinlet in the N60°E fault is reported to carry 0.5 oz. gold per ton. Figure 26 shows Reed's map of the prospect.

Assessment work is recorded on some of those claims to 1958.

Present Investigations

Investigations of the claims in 1978 revealed that all the workings along the northwesterly striking zone are sloughed or flooded while a portion of the northeasterly striking zone was above the water level and exposed or could be dug out. Figure 26 shows the sample locations and table A-21 gives the analytical results.

The northeasterly striking zone is exposed at one outcrop and was further exposed by digging small pits in the bottom of an old sloughed trench at four locations. These exposures revealed quartz up to 0.96 foot thick and some fault gouge along side the quartz. The fault zone strikes N45° to 50°E and dips 85°NW to vertical. Samples taken across the fault zone contain from nil to 0.15 oz. gold per ton, from 2 to 3200 ppm tungsten, up to 0.1 oz. silver per ton, 1000 ppm arsenic, and 50 ppm lead.

A dump of quartz vein material up to 1 foot thick is located by an old cabin. A sample (8S046) of quartz containing arsenopyrite, galena

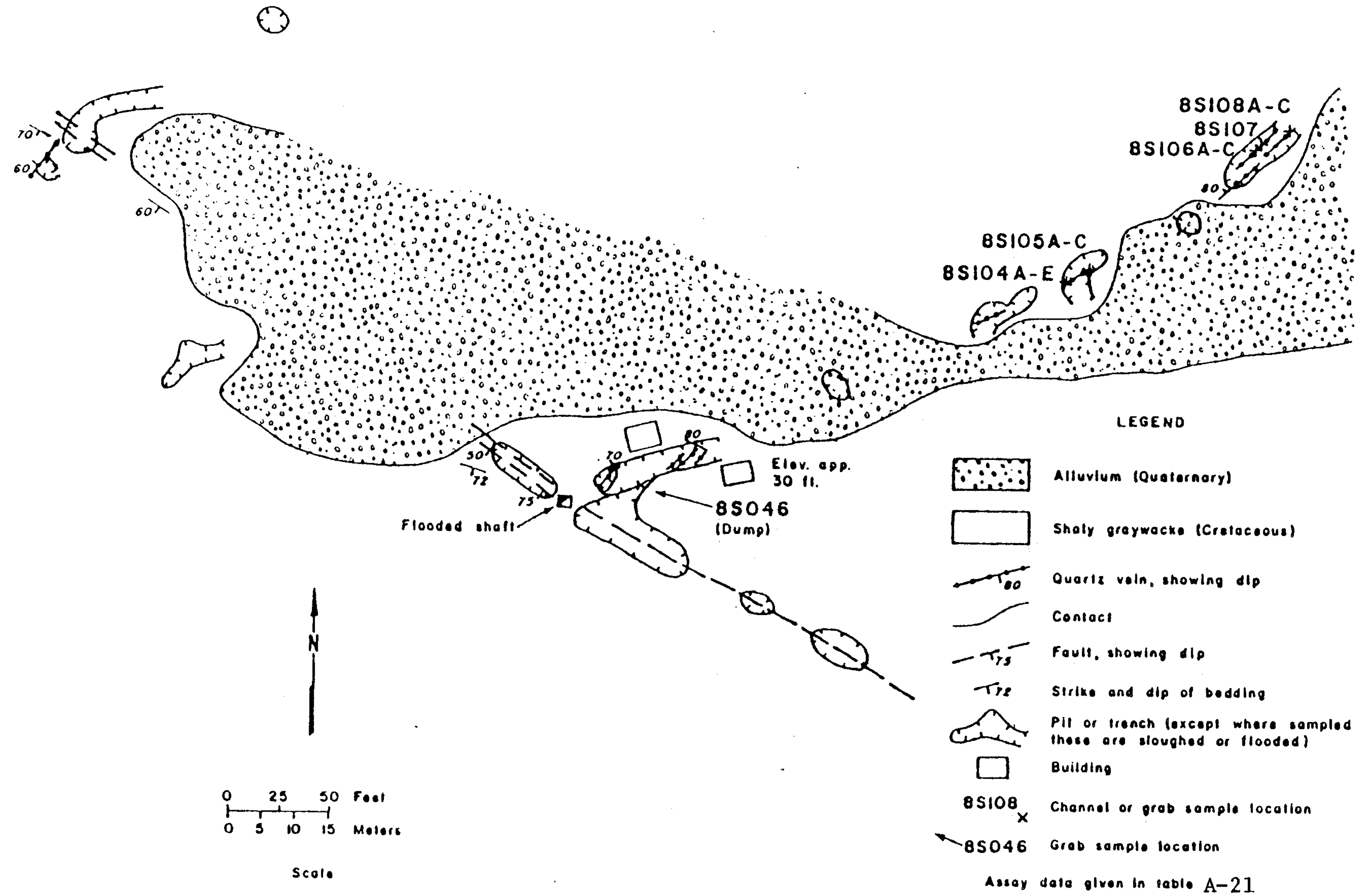


FIGURE 26.-Baney Prospect, sample locations. (Modified from Reed and Coats, 1941, fig. 14 p. 120)

and specks of gold in the quartz ribbon and in the quartz assayed 2.76 oz. gold per ton and 1.6 oz. silver per ton, 3000 ppm arsenic and 300 ppm lead.

Conclusions

The 1931 information that a quartz vein 3 to 36 inches in width was exposed for 300 feet along strike combined with the 2.76 oz. gold per ton dump sample and tungsten values up to 0.32 percent in the northeasterly striking fault, encourage additional exploration of this prospect.

McKallick Lode Prospect

The McKallick prospect is located on the north side of a small lake one mile east of the Hirst-Chichagof Mine along a fault zone that extends in graywacke at least 3 miles. Plates 2, #18 and 3, #1 show the prospect location. The workings consist of two adits, both apparently on the same structure, one driven 50 feet at an elevation of 675 feet and the other driven 40 feet at an elevation of 776 feet. A 1936 dated claim map (Roehm 1936, PE 114-6) shows both adits and Reed and Coats (1941 p.135) report that Mike McKallick owned 8 claims extending from this prospect along structure to Black Bay. Figure 27 is a map of the workings showing sample locations and table A-23 gives the analytical results.

The lower adit exposes a fault zone striking N30°W and dipping 57°SW that contains only a little quartz. The best sample across it assayed 0.08 oz. gold per ton (0.4 feet of quartz). The upper adit exposes a strong fault zone striking N20°W and dipping 70°SW occupied for about 15 feet by a quartz lens up to 8 feet thick. Samples taken across this lens where it is 5.2 feet thick assayed 0.24 oz. gold per ton for a 2.3 foot section and from 0.01 to 0.07 oz. gold per ton for the remaining

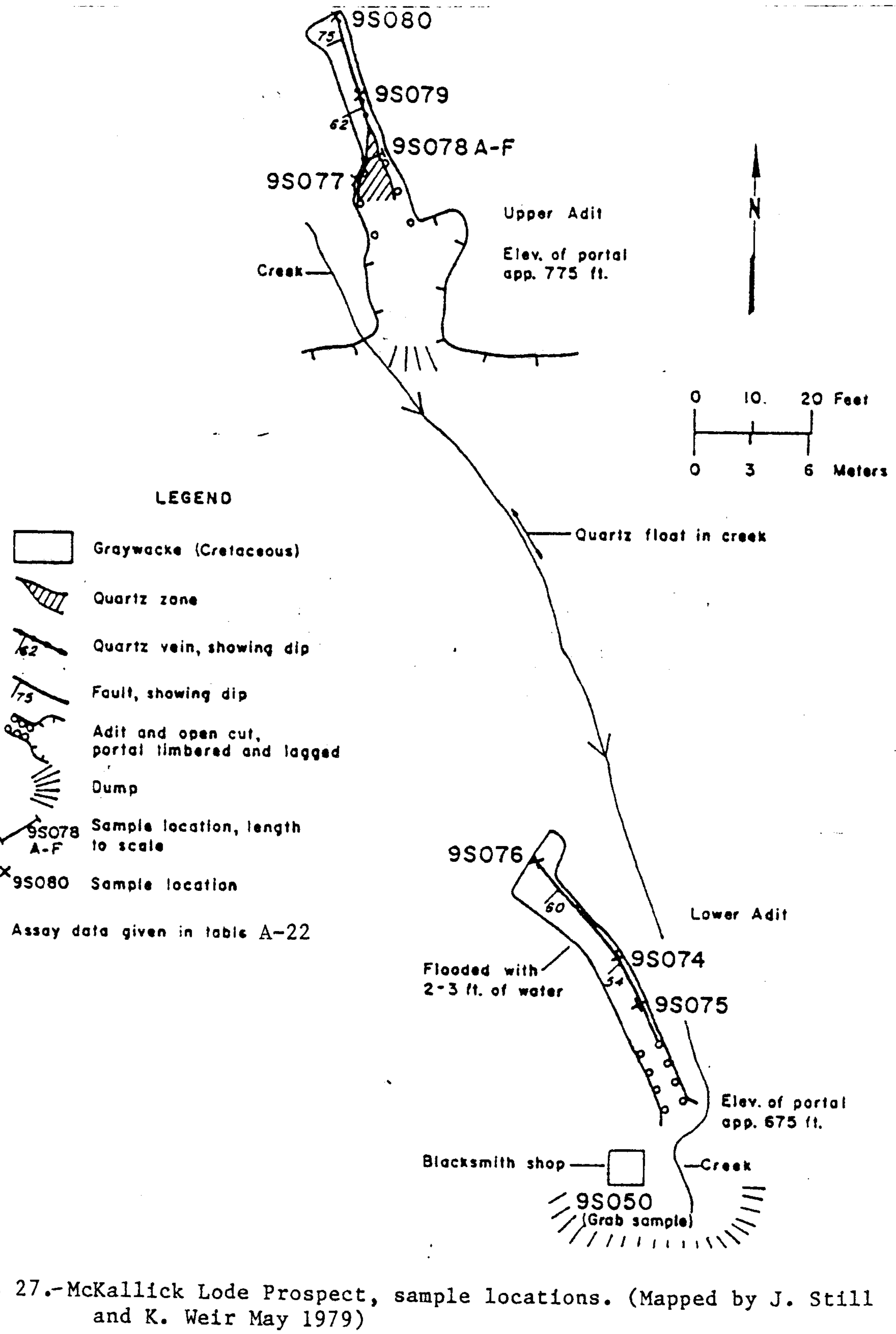


FIGURE 27.-McKallick Lode Prospect, sample locations. (Mapped by J. Still and K. Weir May 1979)

2.9 feet. Samples from both adits contained up to 0.3 oz. per ton silver, 10,000 ppm arsenic, 970 ppm lead, and 1100 ppm zinc.

The persistence of gold values and the width of the vein on this prospect encourage additional prospecting in the vicinity of the workings and along the fault on which they are located.

Hansen and Bolshan Prospect

Introduction - History

The Hansen and Bolshan Prospect is located on the east side of Elbow Passage on a split off a major fault that extends along Elbow Passage. Plate 2, #49 shows the prospect location.

The only information in literature on this prospect is from Reed and Coats (1941 p.119) and it is as follows. The prospect was probably staked in 1934 and development as of 1939 consisted of a 29 foot deep shaft located 15 feet above sea level and several prospect pits exposing faults extending from the shaft for 400 feet toward Lake Anna. The shaft is sunk in a 1 to 3 foot thick fault zone that strikes N48°W and dips 84°SW. The shaft bottom contains ribbon quartz up to one foot thick containing small cubes of pyrite. A few hundred feet northeast from the shaft a 6 to 12 inch thick quartz vein occupying a joint has been uncovered that strikes N40°E and dips 70°NW and is reported to be of high grade.

Present Investigation

Investigation of the prospect in 1978 and 1979 indicated that the shaft is flooded and the prospect pits are sloughed and heavily overgrown with brush and timber. Figure 28 is a map of the prospect and table A-23 gives the analytical results. Two samples were taken at the shaft dump,

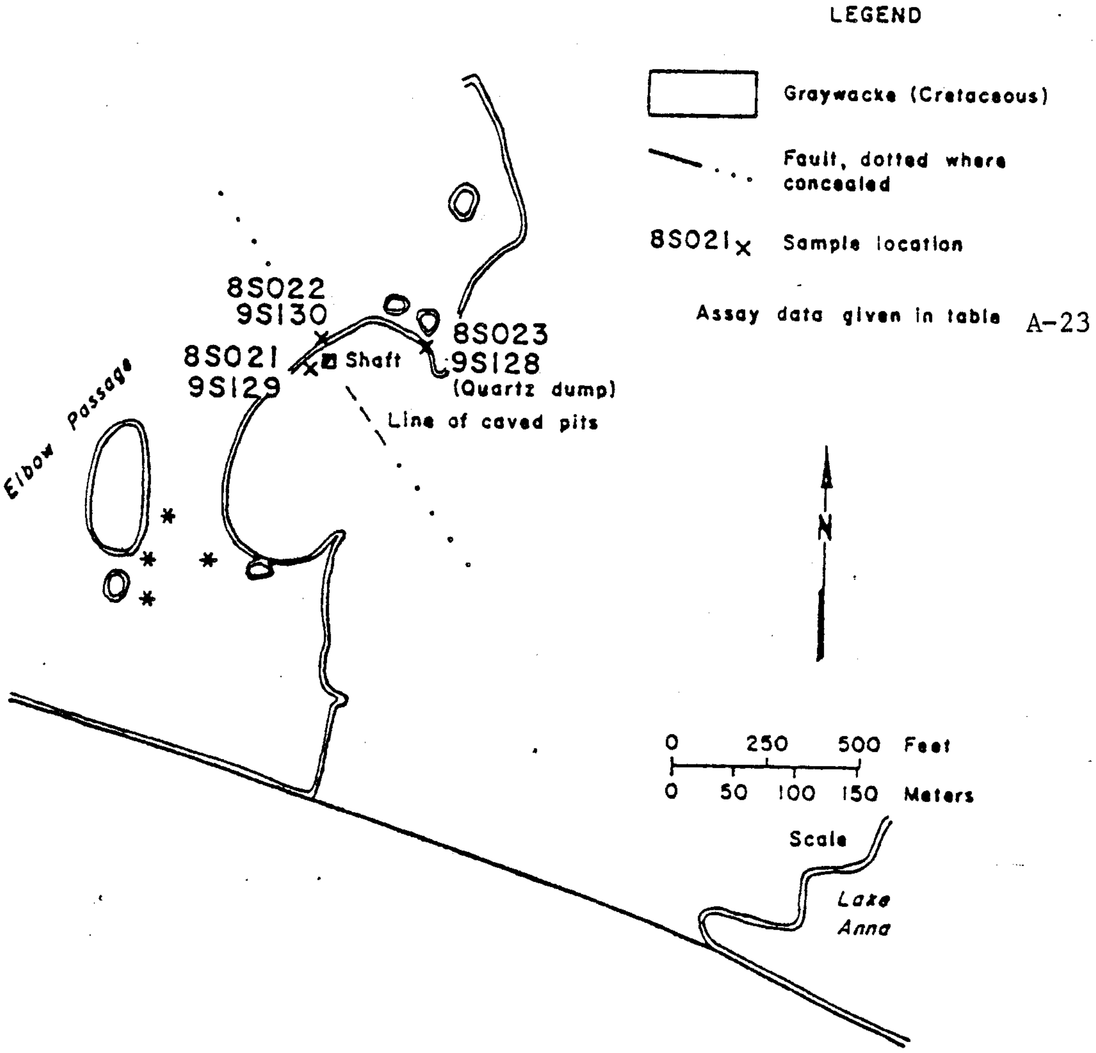


FIGURE 28.- Hansen and Bolshan Prospect, sample locations. (Mapped by J. Still and K. Weir, June 1979)

one of quartz assayed 0.35 ppm gold and another of quartz containing galena, sphalerite, and specks of free gold assayed 1.67 oz. gold per ton. Samples of a 0.05 foot thick quartz vein (joint filling) located 7 feet westerly from the shaft and striking N55°E and dipping 80°NW assayed from 0.23 to 0.285 oz. gold per ton.

At a location about 200 feet easterly from the shaft a quartz dump is strewn along the beach. Here vuggy crystaline quartz blocks containing pyrite and a little galena may be representative of a northeast striking joint described by Reed and Coats (1941, p. 119). Samples from the dump assayed up to 0.915 oz. gold per ton.

Conclusions

Low relief and location so close to water hampers prospecting on this property. However, persistent high gold values and a reported one foot thick vein of ribbon quartz in the shaft encourages further exploration of the prospect and the faults and joints located in the vicinity.

Chichagoff Prosperity

Introduction-History

The Chichagoff Prosperity Prospect is located on the south side of Kimshan Cove along a fault zone 3200 feet west of the Hirst Fault and less than 2000 feet east from the trace of the Chichagof fault. Plate 2 ,#23 shows its location along the fault and plate 3, E shows the claims and workings.

In 1910 Knopf (1912 p. 25) listed the Monte Cristo prospect at the location now known as the Chichagoff Prosperity. By 1931 the property consisted of nine claims and was known as the Chichagoff Prosperity. By early 1938 development on the prospect consisted of a 45 foot adit, a 150 foot adit ending at a shaft and a prospect pit at an elevation of 69 feet. Plate 3 shows the location of these workings.

In 1938 the Hirst-Chichagof Mining Company optioned the property and extended the adit 40 feet and sunk a 150 foot shaft and drifted on the 150 foot level for 235 feet on a quartz vein. Hirst-Chichagof mine reports (Sorenson, 1938-1939) on the prospect are as follows: (Figure 29 shows this adit)

Nov 27, 1938: Now sinking on 10 to 14 inches of quartz, assays show from 0.11 to 0.49 oz. gold per ton.

Jan 19, 1939: Shaft completed (150 feet), quartz in shaft from 2 in. to 36 in. wide, average value generally under 0.3 oz. gold per ton.

March 2, 1939: Drifted 235 feet on vein from bottom of shaft, vein pinched down to crack in rock to the north and south, considerable quartz in shaft and in greater part of drift but very low gold values.

Near the surface and upper tunnel fairly good assays but never over 0.3 oz. gold per ton in lower drift or in lower hundred feet of shaft.

The claims were surveyed for patent in 1937.

Present Investigation

Investigation of this property in 1978 and 1979 revealed the 150 foot long adit was open, the 69 foot elevation pit was open and the 45 foot long adit (most northerly on plate 3,#20) was caved at the portal and both winzes flooded. Plate 3 shows the workings.

A short shaft was dug past the cave of the 45 foot long adit (plate 3,#20). It exposes a N40°W striking and 60°SW dipping fault zone up to 8 feet across which contains veins and lenses of quartz up to 1.7 feet

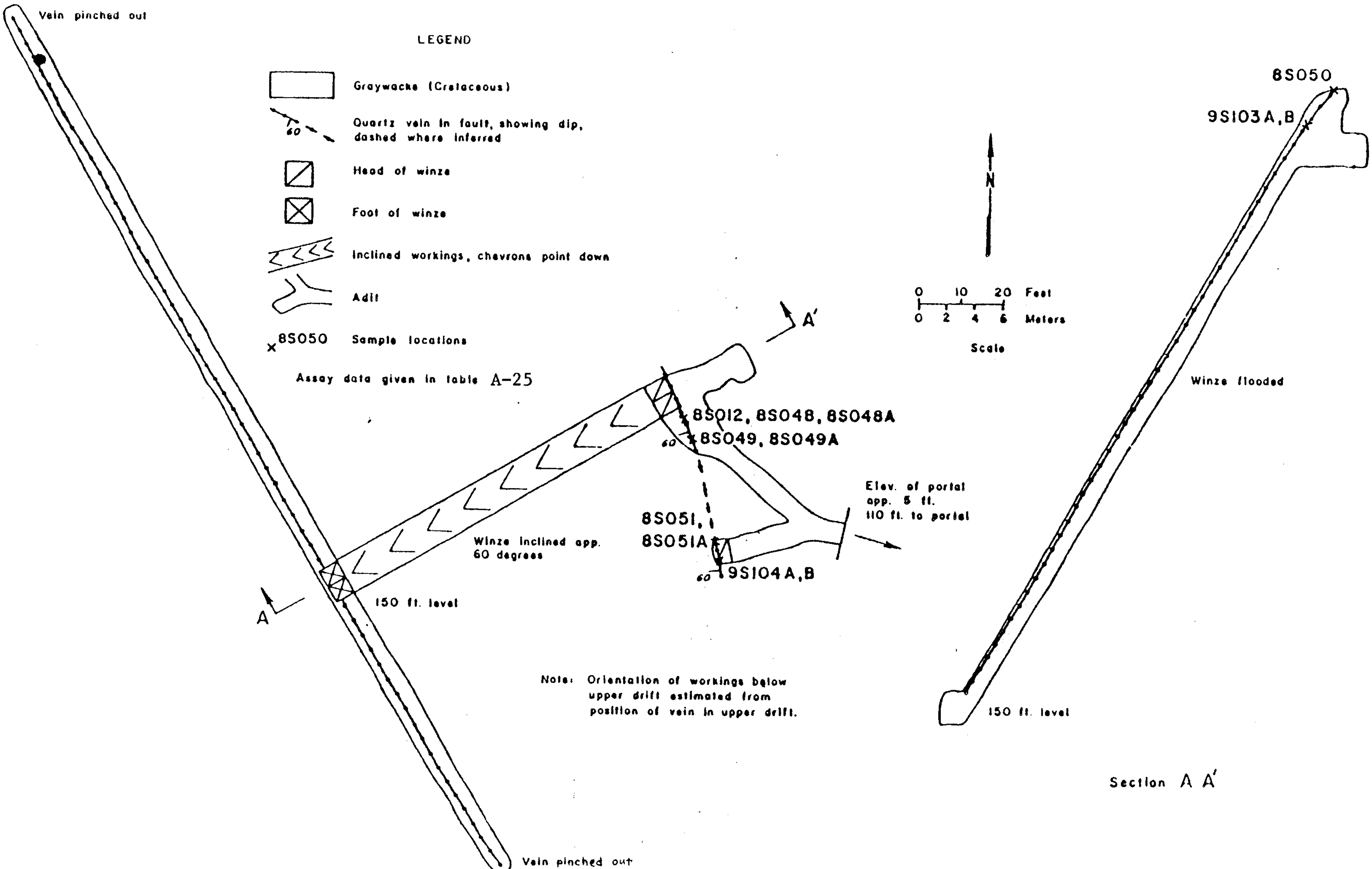


FIGURE 29.-Chichagoff Prosperity main adit, sample locations. (Mapped by J. Still and K. Weir, May 1979; modified from R , and Coats, 1941 pl. 30 and from Hirst-Chichagof mine reco

thick. Figure 30 shows the configuration of these veins and lenses and Table A-24 gives the assay results. Samples across these veins and lenses contain from nil to 0.49 oz. gold per ton (across 0.35 feet of quartz), up to 0.1 oz. silver per ton, and no other significant metallic values.

The northen portion of the 150 foot adit (plate 3,#22) was remapped and sampled. Figure 29 shows the adit and Table A-25 gives the analytical results. A quartz vein exposed at the southern most shaft extends to the northern most shaft. This vein strikes about N15° to 30°W and dips 60° to 65° SW. It ranges in thickness from 0.15 to 2.8 feet and 6 samples from it assay nil to 0.695 oz. gold per ton and contain up to 0.2 oz. silver per ton, 1500 ppm arsenic, 400 ppm lead, 1300 ppm zinc and L tungsten.

The 69 foot elevation pit contains a N20°W striking, 60°SW dipping 2.0 foot thick quartz vein that assayed 0.4 ppm gold, L arsenic, and L tungsten.

Conclusions

The quartz bearing fault zones exposed in the two adits and in the pit may well be on different structures.

Although most of the gold values reported in the shaft and 150 foot level drift and those taken by this study are low, some are of high enough grade (up to 0.49 oz. gold per ton in the shaft and 0.695 oz. gold per ton in the upper drift) and the quartz vein persistent enough to attract further exploration of this structure.

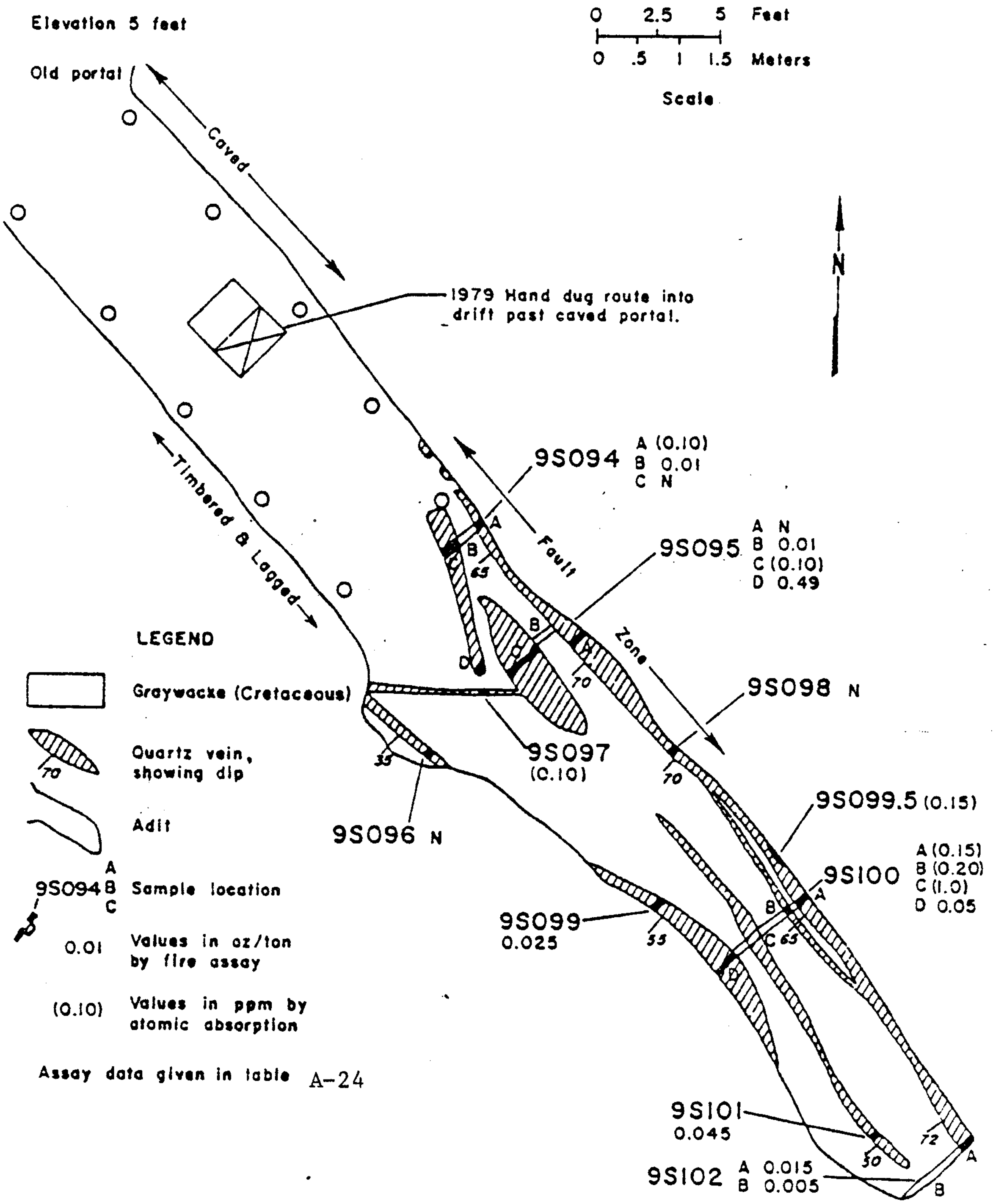


FIGURE 30.-Chichagoff Prosperity northern adit sample locations. (Mapped by J. Still and K. Weir, May 1979)

American Gold Company Prospect

Introduction-History

The American Gold Co. Prospect, discovered in 1934, is located on the east side of Doolth Mountain one mile south of the Chichagoff Mine along or near a prominent fault zone that can be traced from sea level to over the top of the Doolth Mountain Ridge. Plate 2,#38 shows its location along the fault.

In 1934 Mike McKallick discovered a narrow quartz vein at an elevation of about 550 feet on which he staked the Golden Slipper Claim and 66 other claims in the vicinity. In 1935 the property was optioned and dropped by the Chichagoff Mining Company. By 1938 only 21 of these claims were held and the property had been taken over by the American Gold Company.

According to 1936 and 1937 examinations of the prospect by Roehm (Roehm, 1936 and 1937 PE 114-6), the underground workings consist of an adit at an elevation of 500 feet, with a crosscut and two drifts that expose three structures. The 90 foot long eastern most drift exposes a N70°W striking and 73°SW dipping fault zone containing a little quartz and some faulted dike blocks. The crosscut exposes a N45°W striking and 61°SW dipping quartz vein that is 2 to 6 inches thick. For 60 feet the west drift exposes a fault zone striking N37°W and dipping 70°SW that contains some quartz and faulted dike. Samples taken of the fault zone in the eastern drift contain up to 0.10 oz. gold per ton (across 4 inches). A sample taken of the quartz vein exposed in the crosscut between drifts (4 inches) assayed 0.10 oz. gold per ton. Samples taken of the fault zone in the western drift contain from trace to 0.18 oz.

gold per ton (across 4 inches). Figure 31 is a 1939 dated map of the adit described above from the Chichagoff mine files which shows a shaft in the west drift.

According to Roehm (1936 and 1937, PE 114-6) the fault zone quartz vein is exposed on the surface above the drift by stripping and shallow open cuts for 300 feet. The quartz varies in width from 2 to 10 inches and visible gold can be seen in several places. An 8 inch sample across the vein assayed 0.04 oz. gold per ton.

Present Investigation

Field examination of the prospect indicated the 500 foot elevation adit was caved about 35 feet past the portal and an open cut was found on the surface exposing a narrow quartz vein about 60 feet above the adit. Figure 31 shows the locations of samples taken from the workings and Table A-26 gives the analytical results.

The 560 foot elevation open cut was sloughed and overgrown but exposed in the sidewall was a 0.06 foot thick quartz vein striking N-S and dipping 60° W that contained specks of free gold. It assayed 0.06 oz. gold per ton. Underground a sample (8S172) taken of a 0.2 thick quartz vein in the west rib of the western drift assayed 2.42 oz. gold per ton, 0.4 oz. silver per ton, and 1000 ppm arsenic. A high grade grab sample of quartz from the dump assayed 0.90 oz. gold per ton, 0.6 oz. silver per ton, 200 ppm arsenic, 230 ppm lead and 290 ppm zinc.

Conclusions

The sample values reported from 1936 and 1937 investigations of the prospect are fairly low. However, the few samples taken during this study contained fairly good values and the 1936 report indicating a narrow

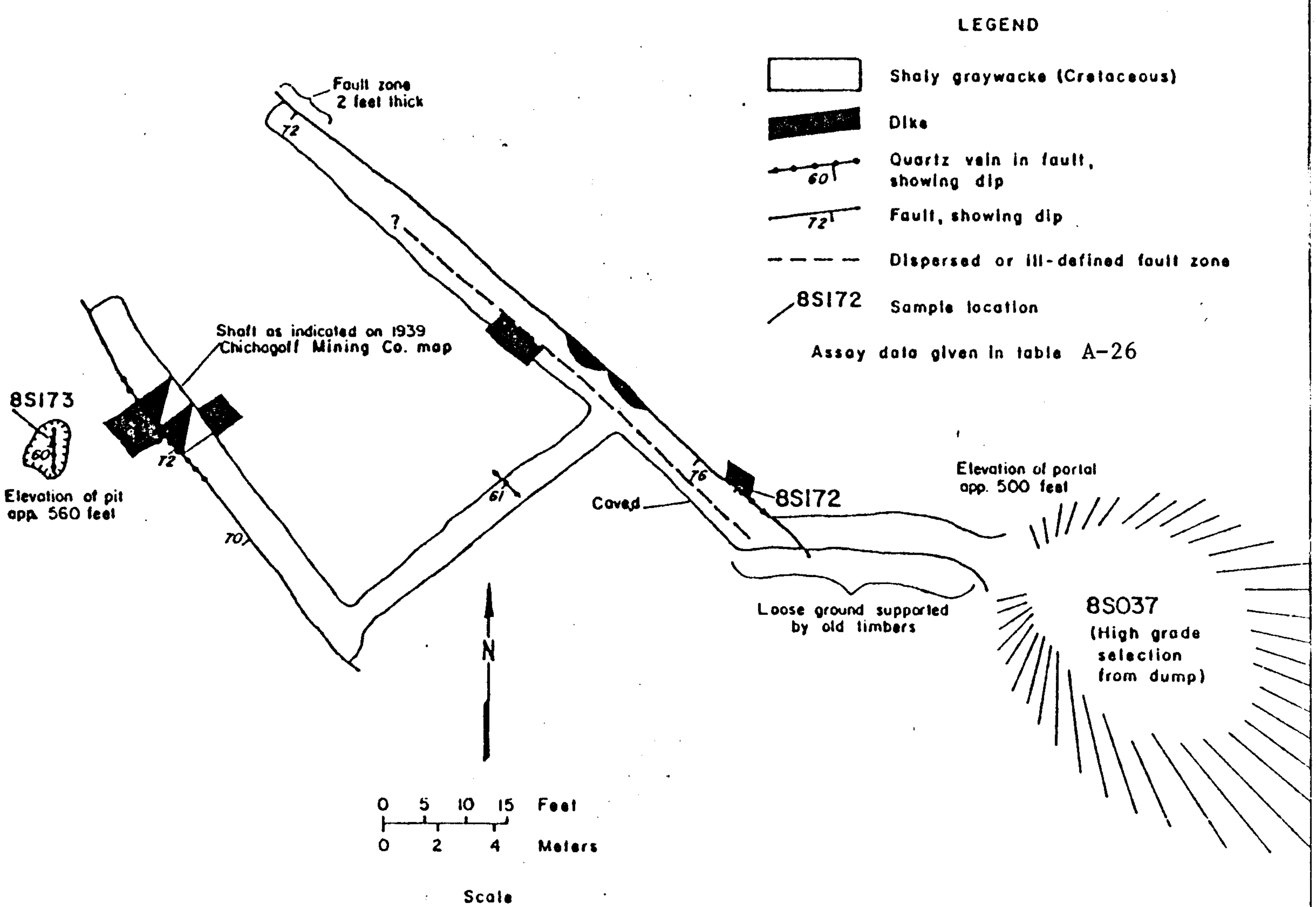


FIGURE 31.–American Gold Company adit, sample locations. (Modified from Chichagoff mine map dated 1939)

quartz vein exposed on the surface for over 300 feet indicate the prospect and the fault which it is on are worthy of additional exploration.

Flora Prospect

The Flora Prospect is located at an elevation of 700 feet on the southeast side of Doolth Mountain 1800 feet southwest from the Chichagof fault. Plate 3, #42 shows its location. The property was staked in 1905 and surveyed for patent in 1911. By 1939 development consisted of a 90 foot long adit.

Investigation of the property in 1978 revealed a 90 foot long adit at an elevation of 700 feet exposing a N22°W striking, 60°SW dipping fault zone along which a quartz vein up to 2.85 feet thick was located. Figure 32 is a map of the adit and table A-27 gives the analytical results. Samples of the quartz vein contained from nil to 0.10 oz. gold per ton and up to 0.1 oz. silver per ton.

McKallick Chichagoff Claim Group

Introduction-History

The McKallick Chichagoff claim group as recorded in 1938 is located between the Chichagoff Mine claim group and that of the Alaska Chichagoff Mine. Plate 3, H shows the location of these claims.

According to a 1931 Alaska Juneau Report (Nelson, 1931),the McKallick Prospect consisted of 9 claims with exposures at elevations of 900 and 1000 feet and a 30 foot adit at 500 feet. On each of the above, a few inches of quartz with very low assays were found. At an elevation of 60 feet, a quartz vein associated with an aplite dike was found that was trenched and an adit started beneath.

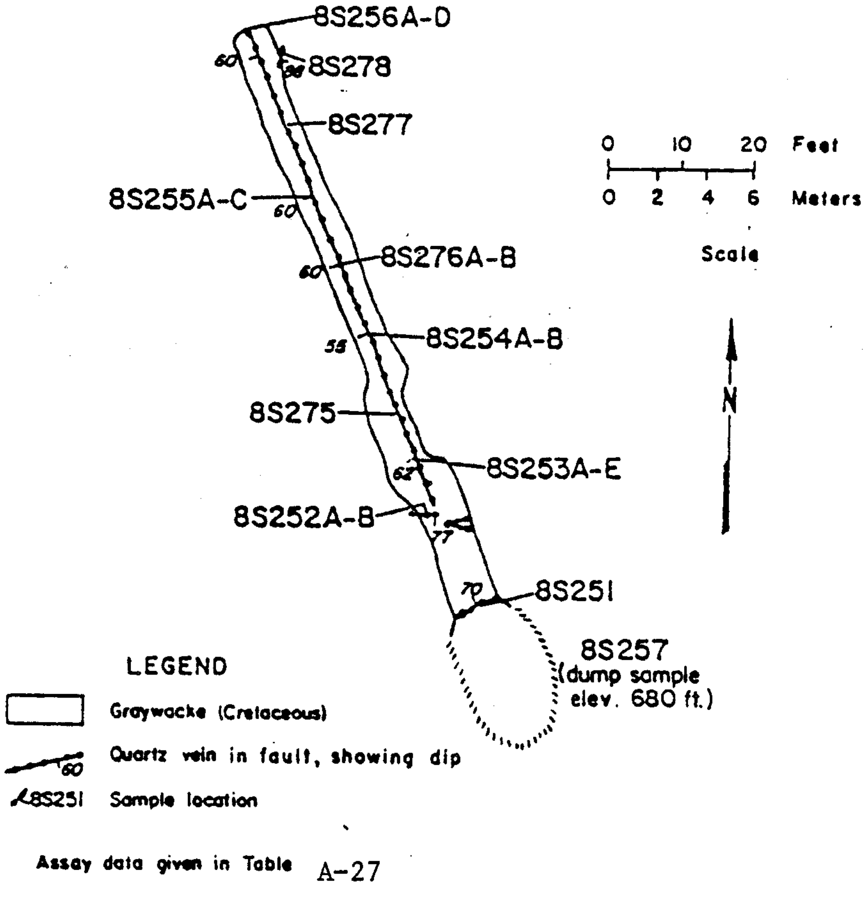


FIGURE 32.-Flora adit map, sample locations. (Mapped by J. Still and and K. Weir August 1978)

By 1938 (Reed and Coats, 1941, p.132) this property consisted of 16 claims known as the McKallick Chichagoff Mines, Inc., extending between the Chichagoff and Alaska Chichagoff Mines, surrounded the patented Flora claim and extending from the Klag Bay to Ogden Passage. At an altitude of about 250 feet on the Lillian and Princela claims a quartz vein occupying a northeasterly striking joint is exposed by a trench and several pits extending a distance of 300 feet.

In 1939 and 1940 the Pluto and Vulcan claims were staked south of the Aurum #13 over the Lillian and Princela claims. By 1947 according to Roehm, (Roehm 1947) development on these claims consisted of eight open cuts above the beach exposing a N10° to 26°W striking, 83°NE to 85°SW dipping fault zone containing up to 15 inches of banded quartz exposed for 160 feet, with values ranging from trace to 0.09 oz. gold per ton. Underground this vein is exposed in a drift for 115 feet in a 255 foot long adit. Values underground along the drift ranged from 0.06 to 0.34 oz. gold per ton for a width of 12 inches. From the drift a 25 foot winze follows the vein. Quartz from this winze contains visible gold. Samples of banded quartz, fault gouge and schist ranging in width from 10 to 22 inches and taken in the bottom 7 feet of the winze by Roehm assayed from nil to 0.36 oz. gold per ton and average 0.14 oz. gold per ton across a average width of 1.75 feet.

The currently active OB claim is now located in the approximate location of the old Lillian claim.

Present Investigation

Field investigation of the McKallick Chichagoff claim group in 1978 and 1979 revealed the following: A 250 foot long adit with flooded winze

was found on the beach and 60 feet above a series of sloughed and muck filled trenches were located. At an elevation of 250 feet a quartz vein following a northeasterly striking joint is exposed in partly sloughed trenches and pits for about 250 feet. The 500 elevation adit described in 1931 was briefly searched for, but not found.

The 250 foot long adit was mapped and sampled, figure 7. The first 110 feet of the adit are located on the patented Aurum #13 claim. A 35 foot long crosscut extends to the edge of the Aurum #13 claim and drifts along the active OB claim for 110 feet.

The drift exposes a ribbon quartz vein up to 1.42 feet thick located along a strong fault zone striking N7°W and dipping 78°E. Samples of ribbon quartz and fault gouge up to 1.42 feet thick assay from nil to 0.2 oz. gold per ton, and contain up to 1500 ppm arsenic, table A-5. A dike located in the footwall of the drift near the shaft reappears in the hanging wall about 50 feet along the drift probably indicating a horizontal fault displacement of 50 feet.

The Lillian and Princela trench is located at an elevation of 235 to 275 feet and partly exposes a 0.11 to 0.9 foot thick quartz vein along a N40°E striking and 70°NW dipping joint. Figure 33 shows the trench and table A-28 gives the analytical results. In general, the vein walls are very solid; however, fault gouge was noted at one location where the vein contained sparse galena and pyrite. Ten of 11 samples across the vein contain a trace to 0.08 oz. gold per ton and up to 0.1 oz. silver per ton, and 125 ppm lead. Significant quantities of other metallic metals are absent.

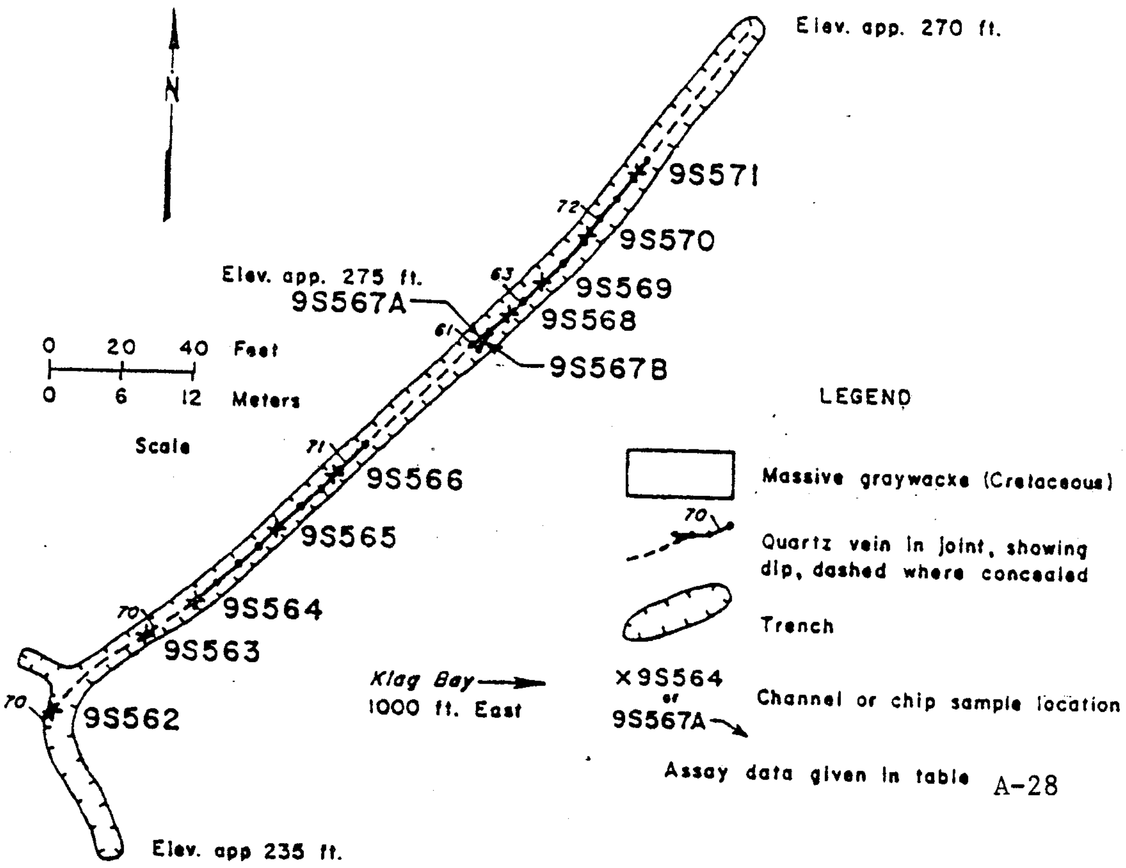


FIGURE 33. Lillian and Princella Prospect trench, sample locations.
(Mapped by J. Still and K. Weir August 1979)

Conclusions

The vein exposed in the drift on the OB claim is probably a hanging wall split off the Chichagof fault. Gold values as reported on the surface, (trace to 0.09 oz. gold per ton) in the drift (nil to 0.2 oz. gold per ton) and in the shaft (nil to 0.36 oz. gold per ton) may be increasing. Strong, persistent structure in proximity to the Chichagoff Mine and increasing values with depth encourage further exploration along this structure both on the OB and on the patented Chichagoff Mine claims.

The northeasterly striking joint filling located at an elevation of 250 feet is somewhat unique as the joint fillings usually found in this district contain little or no gold.

Bauer Prospect

Introduction-History

The Bauer prospect is located in graywacke on the east side of Herbert Graves Island on, or very near, the trace of the Chichagof fault. Plate 3, #26 shows its location along the fault.

According to a 1931 dated report of the Alaska Juneau Mine (Nelson, 1931) the prospect consists of 4 claims called the Radio Group and are owned by J. Bauer and J. Sonini. Two adits have been driven on the claims. One is at an elevation of 135 feet that follows a shear zone containing a 2 to 3 inch quartz stringer for 20 feet, and the other located on the beach, follows a shear in graywacke for 108 feet where 2 to 3 inches of quartz are encountered for 32 feet. Three samples taken at 5 foot intervals in the upper adit assayed from 0.01 to 0.92 oz. gold per ton, while 5 samples taken of quartz in the last 32 feet of the lower adit assayed from 0.01 to 0.06 oz. gold per ton.

By 1939, Reed and Coats (p. 135) described the lower adit as being 467 feet long and the upper adit, at an elevation of 160 feet, as being 25 feet long. The upper adit is described as being located on a fault zone striking N71°W and dipping 70°NE to 70°SW with a 6 foot thick dike containing pyrite and arsenopyrite on the southwest side of the fault.

Assessment work recorded in 1950 indicates that five open cuts were dug on the prospect starting at 650 feet from tidewater. The claims are currently active.

Present Investigation

Investigation of the prospect in 1978 and 1979 revealed the lower adit had been driven to 610 feet, the upper adit was caved and a series of trenches, some open and some caved, extended from an elevation of 250 to 385 feet.

The lower adit follows a series of southwesterly dipping shears in a general northwesterly direction for 610 feet. Figure 34 shows the adit location. Dikes containing some arsenopyrite and sulfides is encountered at several locations in the adit. Quartz in places up to 1.0 foot thick is exposed in only a small portion of the adits length and assays of these veins range from nil to 0.04 oz. gold per ton. Figure 35 is a map of the adit showing sample locations and table A-29 gives the analytical results. Samples taken in the adit contain up to 0.04 oz. gold per ton, 0.1 oz. silver per ton, G 10,000 ppm arsenic and L tungsten.

The upper adit is caved and a dump sample of quartz and dike containing free gold assayed 4.5 ppm gold, G 10,000 ppm arsenic and L (<50 ppm) tungsten.

The location of the trenches is shown on figure 34 and table A-30 gives the analytical results. The lower pit is sloughed and muck-filled

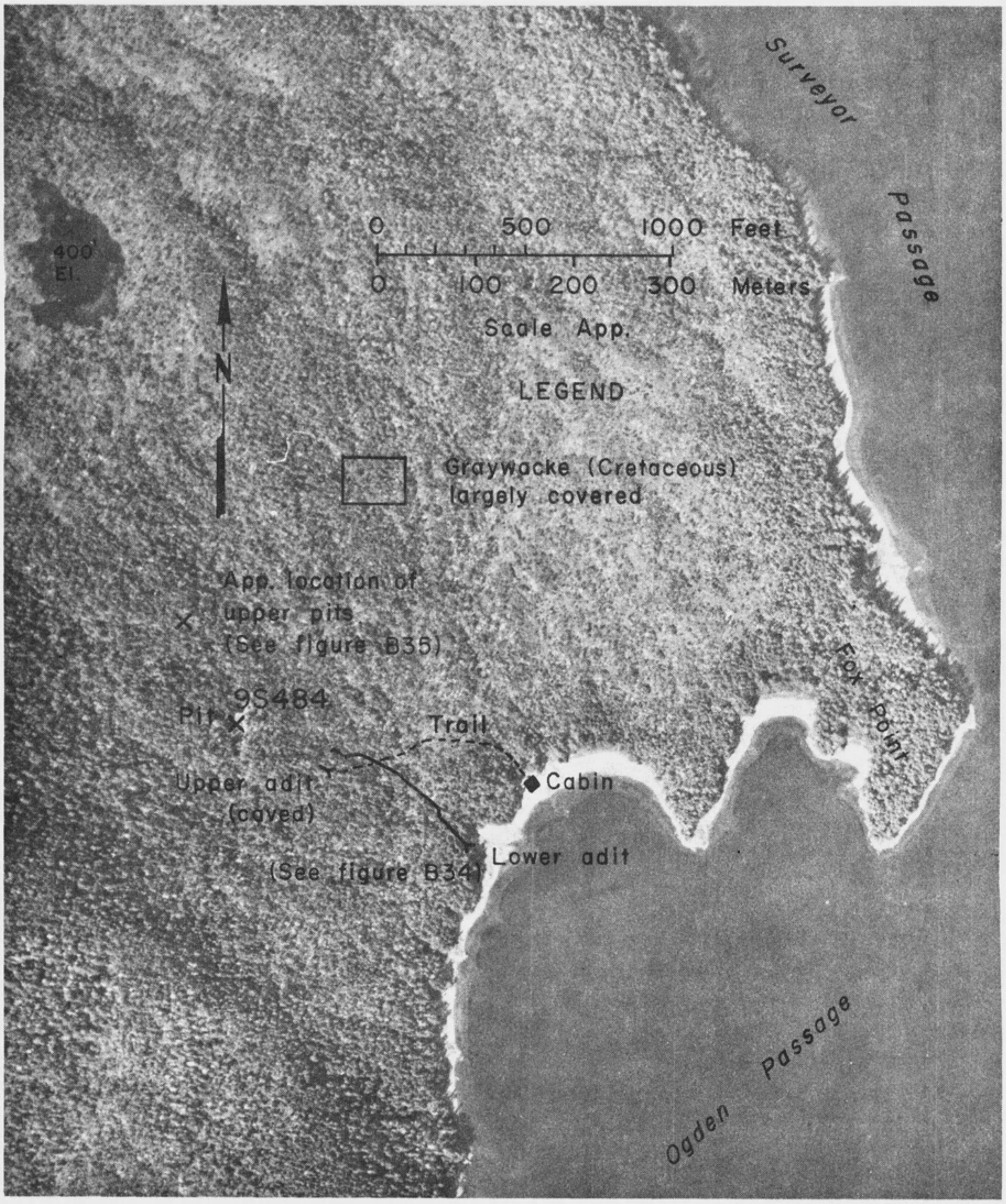


Figure 33. - Aerial photograph of workings on the Bauer Prospect showing sample locations.

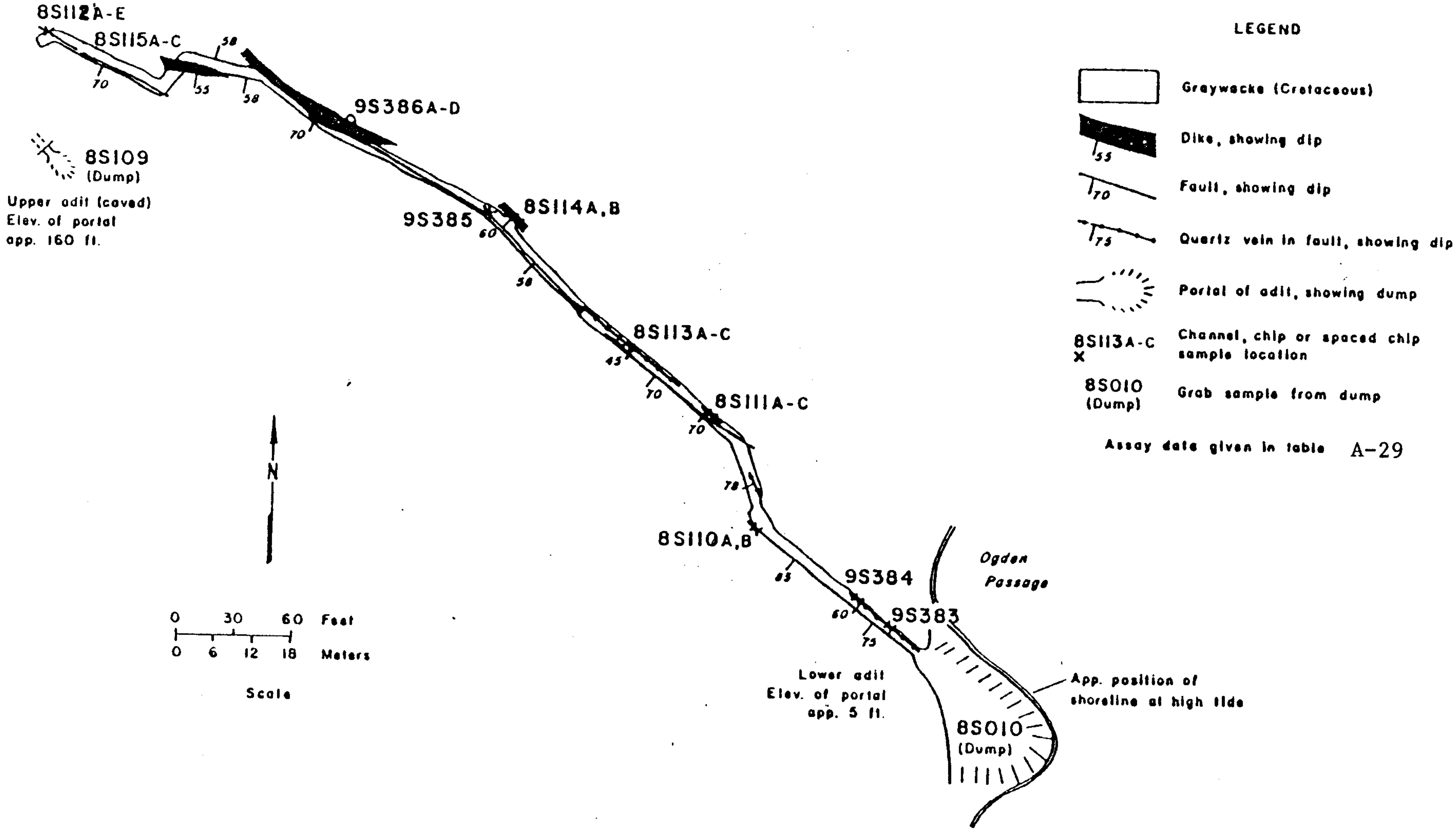


FIGURE 35. Bauer lower adit and upper adit, sample locations. (Mapped by J. Still and K. Weir May 1979 and modified from Reed and Coats, 1941 fig. 21)

and a grab of quartz float in the pit assayed 0.16 oz. gold per ton and 10,000 ppm arsenic. Details of the upper pits are shown in figure 36. They expose a N44° to 53°W striking and 80° to 85°SW dipping dike in graywacke with some fault gouge along its margins. Samples of the dike, fault gouge, graywacke, and northeasterly striking quartz stringers contain up to 0.02 oz. gold per ton, 0.1 oz. silver per ton, and 1500 ppm arsenic.

Conclusions

The lower adit is about 150 feet across structure from the upper adit. The lower adit and the upper pits may or may not be on the same structure. The 610 feet of lower adit and the surface trenches do not intersect a zone of significant gold quartz mineralization. However, the 160 foot elevation upper adit is reported to contain at least a 10 foot length of quartz that assays from 0.01 up to 0.92 oz. gold per ton. This and proximity of the workings to the Chichagof fault encourages exploration on this prospect.

Hodson Prospect

Introduction-History

The Hodson prospect is located about 1200 feet southwest of the Hirst Fault at elevations of 1250 to 1600 feet in graywacke on the north side of Doolth Mountain. Plate 3,#18 shows its location.

Prior to 1937 the property now known as the Hodson prospect consisted of the Brown Bear and Mother Lode Claims. In 1937, the Hirst-Chichagof Mine optioned the prospect and by 1939 had completed a diamond drilling project, but the results were not made public.

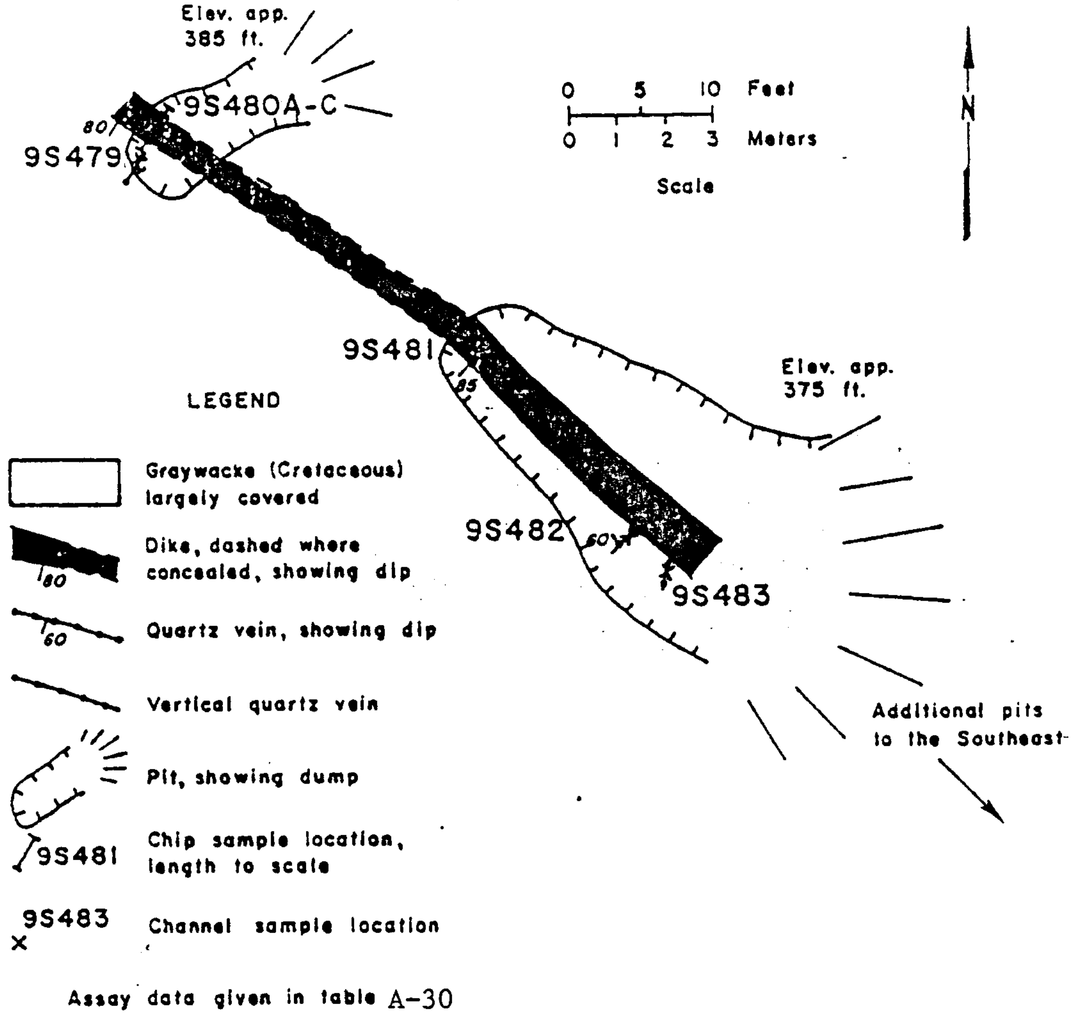


FIGURE 36. Bauer upper pits, sample locations (Mapped by J. Still and K. Weir, August 1979)

By 1939, according to Reed and Coats (1941 p.117), the property consisted of several prospect pits located over a horizontal distance of 200 feet. Quartz up to 2 feet thick is exposed in the pits and the vein follows a fault zone that strikes about N50°W and dips 70°SW. It is reported that the fault zone is traceable for some distance to the northwest and to the southeast.

In a May 28, 1939, mine report, (Sorenson, 1938-1939) plans were made to crosscut to the Hodson structure from the Hirst-Chichagof Mine, but this project was never started because of labor shortages. By 1940 a prospect drift on this property at an elevation of 1250 feet was well underway. A Nov. 17, 1940, mine report states that the drift has been on quartz with an average width from 6 to 12 inches for 20 feet with an average assay value of 0.29 oz. gold per ton. Further work on the Hodson drift is reported in March and April 1941 mine reports.

A claim notice found on the prospect was dated July 1947 - 1948 indicating an ammendment of a 1928 dated claim.

Present Investigation

Field investigation of the Hodson prospect revealed a 235 foot long adit at an elevation of 1250 feet, a prospect pit and outcrop at an elevation of 1500 feet, and a series of sloughed prospect pits extending in a line 260 feet northwesterly. Figure 37 is a map showing the prospect workings.

The adit exposes a narrow, N40°W striking, 50°SW dipping fault zone for 120 feet containing some quartz, and dike in its footwall. Figure 38 is an adit map and table A-31 gives the analytical results. Samples were taken along the fault zone at approximately 15 foot intervals and

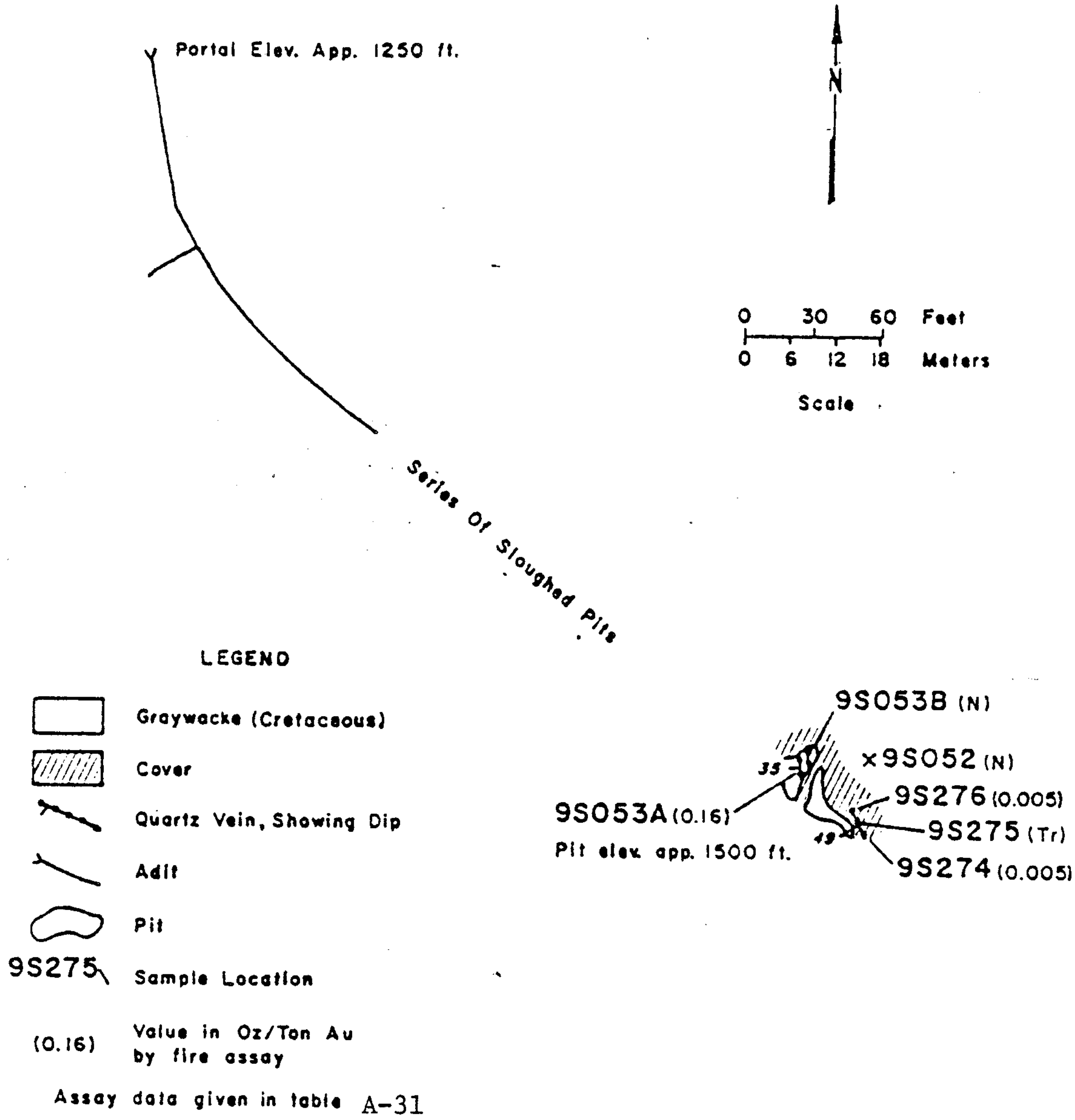


FIGURE 37.- Hodson Prospect, showing adit and details of trench sampling. (Mapped by J. Still and K. Weir, July 1979)

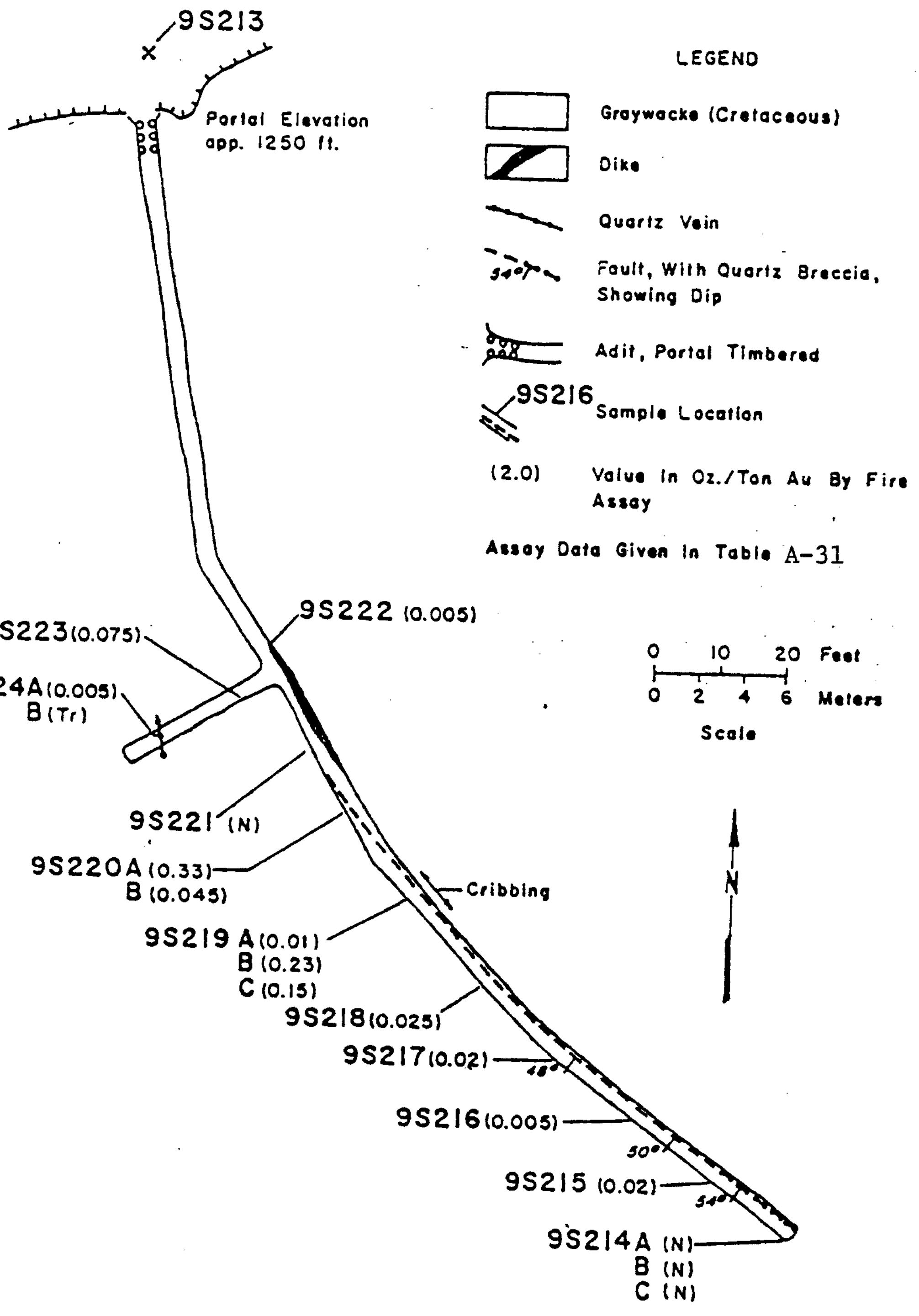


FIGURE 38.- Hodson adit, sample locations. (Mapped by J. Still and K. Weir, June 1979)

Table 7. - Remainder of occurrences in the Doolth Mountain area

Pl.2 or Pl.3 location number	Name of prospect or occurrence	Location	Source of info.	App. B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
Pl. 2 #19 Pl. 3 #7	Marinovich Prospect	1600 ft. east of the main portal Hirst-Chichagof Mine along a stream gulch	This study (Reed,and Coats,1941 p. 134)		A 30 foot long adit at S50°E in a creek bed exposes a weak narrow fault zone with sparse quartz. Samples of fault breccia and quartz contained no significant metal values. A NE trending 15 ft. long open cut just across the creek from the above adit exposes another weak fault zone with some quartz striking N64°E and dipping E88°SE. Samples of the zone contained no significant metal values.
Pl. 2 #22 Pl.3 #19	Fitz Island occurrence	N. side Fitz Island	This study		More than 12 quartz veins up to 1.3 ft. thick are exposed in a distance of 50 feet along a beach cliff. They strike N10°-30°W and dip steeply to the west. Samples from 12 veins assayed nil to 0.10 ppm gold. A vein located 7 west of the above veins assayed 1.5 ppm gold. The samples contained no other significant metal values.
Pl.2 #24 Pl.3 #23	Gloria B. Prospect	South end of a small lake	This study Reed and Coats,1941 p. 133)		An open cut located near an old log structure exposes dike up to 2 feet thick and a little quartz on dike fractures. Samples of dike and quartz contained no significant metal values. Exposed near a creek bed is a 10 foot long by 5 foot wide partially exposed block of chert. A spaced chip sample across the block assayed 0.1 oz. silver per ton.
Pl. 2 #25 Pl.3 #24 & 25	Basoiniuer Prospect	1/2 mile south of Fitz Island	This study		Trenches (Pl 3 #24 and #25) on two claims (patented) are mostly sloughed and overgrown and in their sloughed condition do not expose any significant quartz, dike, or fault zone. Samples were taken of sparse dike and quartz on dumps at both locations and contained traces of gold and silver.

Table [illegible] (Continued)

Pl.2 or Pl.3 location number	Name of prospect or occurrence	Location	Source of info.	App. B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
Pl. 2 # 27 Pl. 3 #3,4,5 & 6	Helen Chichagoff Prospect	Along or near Chichagof Creek	This study Roehm,1936		Four adits 10 to 20 feet in length expose northwesterly steeply dipping fault zones containing a little quartz. Plate 3 locations #3, 4,5,&6. The adit at location 4 is mostly caved and is reported to contain a shaft. Sample of the fault zones and dumps for adits at location #3,4, and 5 contined up to 0.02 oz. gold per ton trace of silver, and 700 ppm arsenic while the adit at location #6 contained no significant metal values. Roehm 1936, reports samples of quartz from the location #3 adit contained up to 0.02 oz. gold per ton and 4.4 oz. silver per ton
Pl.2 # 34 Pl.B2 #48	Power Line Prospect	East side of Klag Bay near its head	This study	Fig. B-1 Table B-1	A 50 foot long trench continuous with a 50 foot long drift and cross-cut exposes a weak fault with sparse quartz.Samples of fault zone in the drift contain no significant metal values. A 0.3 foot grab of sulfide bearing dike exposed in trench assayed 0.52 oz. gold per ton, 0.2 oz. silver per ton, 10,000 ppm arsenic and 690 ppm lead. This area may be worthy of more detailed examination.
Pl.2 # 36 Pl. B2 #50	Handy Prospect	East side of Klag Bay across from the Chichagoff Mine	This study	Fig. B-2 Table B-2	Eighty foot long drift with flooded winze exposes 3 NW striking SW dipping fault zones that contain a little quartz. Samples of the veins and fault zones contained from nil to 0.12 oz. gold per ton. The Alaska No. One claim patent map shows 5 shallow diamond drill holes This work was accomplished between 1945 and 1953 but the results are not available. This area may be worthy of more detailed examination

Table 7. (Continued)

Pl.2 or Pl.3 location number	Name of prospect or occurrence	Location	Source of info.	App. B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
Pl. 2 # 35 Pl. 3 #51	Andy Prospect	East side of Klag Bay across from the Chichagoff Mine	This study (Reed, and Coats, 1941 p. 129)		A 57 foot long drift exposes a weak fault zone striking N75°W and dipping 75°SW containing a little quartz. A sample of the fault zone and quartz off the dump contained no significant metal values. Two quartz veins(striking N10°E and dipping 75°W) separated by 1/2 foot of graywacke and 0.5 and 0.6 foot thick exposed on the beach 120 feet south of Andy adit contained L tungsten values.
Pl.3 #49	Chichagoff Ext #2 Prospect	Small island in middle of Klag Bay across from the Chichagoff Mine	This study		Property consists of two flooded shafts and a sloughed trench. Two samples of quartz float in the vicinity assayed a trace of silver.
Pl. 2 # 36 Pl. 3 #52	Chichagoff King Prospect	SE of the Chichagoff Mine between Klag Bay and a large lake	This study Reed and Coats, 1941, p. 129	Fig. B-3 Table B-3	Reed and Coats (1941 p.129) reports north-westerly striking quartz veins up to 3 ft.thick exposed in a series of trenches for up to 140 feet, all located near the southeast end line of the Andy claim. BuMines investigation of the area revealed three partly sloughed trenches exposing northwesterly and northeasterly striking quartz veins up to 1.3 feet thick. Samples of these veins contained up to 0.03 oz. gold per ton, trace of silver and 1000 ppm arsenic. Considerable diamond drilling was completed on the prospect but the results are not known. The area is approximately aligned with the Chichagof fault and is worthy of more detailed examination.

Table 7. (Continued)

Pl.2 or Pl.3 location number	Name of prospect or occurrence	Location	Source of info.	App. B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
Pl. 2 #37 Pl. 3 #53	Hill and Berkland Prospect	East side of Klag Bay	This study (Reed and Coats, 1941, p. 128)		A 50 foot drift and open cut just north of drift portal exposes two weak fault zones one striking N40°W and dipping 60°NE and another striking N15°W and dipping 65°NE that contain a little quartz. A 0.7 foot thick quartz vein in the open cut and quartz off the dump contained no significant metal values.
Pl.2 #39	Hanlon Prospect	East side of Herbert Graves Island	This study (Reed and Coats, 1941 p. 132	Fig. B-4 Table B-4	Open cut in beach cliff exposes a northwesterly striking fault zone containing quartz and a series of northeasterly steeply dipping joints containing quartz. A sample of the fault controlled quartz venins assay a trace of silver, 1000 ppm arsenic and L (50 ppm) tungsten, while samples of the joints contain traces of silver and L tungsten. About 100 feet northwest of the open cut is a sloughed trench. Quartz float from the trench contained pyrite and arsenopyrite. Several hundred feet northeasterly along the beach from the Hanlon prospect a 0.8 foot thick quartz vein striking N30°W with a vertical dip assayed 0.01 oz. gold per ton and 0.2 oz. silver per ton.
Pl. 2 #40	West of Drip Point occurrence	East side of Herbert Graves Island	This study		A N10°E striking 60°NW dipping quartz vein up to 0.5 foot thick exposed on the beach contained sulfides and galena,and assayed 140 ppm lead.
Pl.2 #41	McKallick Placer Prospect	West side of Ogden Passage	This study Reed and Coats,1941 P.124-125	Fig. B-5 Table B-5	Reed and Coats (p.125) reports an eluvial gold deposit consisting of angular gold mostly with attached quartz up to 2mm long. He suggests that the gold source is a nearby lode deposit concealed by dense vegetation and swamps. A sample taken by this study of stream detritus in the area assayed 0.11 oz. gold per ton. The area may be worthy of additional investigation.

Table 7. (Continued)

Pl.2 or Pl.3 location number	Name of prospect or occurrence	Location	Source of info.	App. B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
Pl.2 #42	Klag Prospect	West side of Ogden Passage at an elevation of 130 feet.	This study		A 10 foot long drift and open cut near an old cabin exposes a .05 foot thick shear in graywacke that strikes N30°E and dips 85°NW. A pit 150 feet to the north exposes a few quartz stringers in graywacke. Samples of the shear and of quartz fragments from the pit contained no significant metal values.
Pl. 2 #43	Woll Prospect	West side of Lake Anna	This study (Reed, and Coats, 1941 p. 121	Fig. B-6 Table B-6	The Woll prospect workings are scattered along the west side of Lake Anna and the three adits. The trenches were sloughed and a sample of quartz float from the #1 trench contained no significant metal values. The adits expose north or northwest striking fault zones containing dike or quartz. Samples from the #1 adit contained up to 5 ppm gold while those from the #3 adit contained up to 0.01 oz. per ton gold. The #2 adit exposes a fault zone containing up to 0.67 thick quartz for 50 feet. Four of 5 samples taken across the zone contained from nil to 0.005 oz. gold per ton while one sample assayed 0.51 oz. gold per ton across a 0.5 foot width.
Pl.2 #44	Lake Anna Prospect	West side of Lake Anna at south end of passage between Lake Anna and Klag Bay	This study (Overbeck 1919 p. 120)	Fig. B-7 Table B-7	Eighty foot long drift exposes a N25°W striking and vertically dipping fault zone that consists of about 4 feet of crushed graywacke with a narrow quartz vein exposed on both walls of the drift. Samples taken of quartz in the adit contain up to 0.005 oz. gold per ton, 0.3 oz. silver per ton, 440 ppm copper and 1800 ppm zinc. Overbeck (1919 p.120) reports rich specimens of gold came from this prospect.

Table 7. (Continued)

Pl.2 or Pl.3 location number	Name of prospect or occurrence	Location	Source of info.	App. B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
Pl. 2 #45	Rose Point occurrence	North end of Klag Island	This study		A quartz vein striking N25°E, dipping 75°NW, 0.5 foot thick, and exposed on the beach contained L gold by atomic absorption.
Pl. 2 #47	Vein Point occurrence	Small Island in Ogden Passage	This study		A quartz vein striking N40°E, dipping 60°NW, 0.35 foot thick and exposed at the beach contained galena. A sample at the vein assayed 7ppm silver, 1590 ppm lead, 1500ppm arsenic,and 340 ppm zinc,
Pl. #48	Little Island Prospect	Little Island in Elbow Passage	This study		A 3 foot wide trench exposes steeply dipping quartz veins that strike both northwesterly and northeasterly for about 15 feet. Near the trench quartz blocks are strung out along the beach. The quartz is well brecciated and ribboned. Eleven in place samples of the veins and brecciated graywacke and quartz assay from nil to trace of gold and silver. A grab sample from a quartz block on the beach containing chalcopyrite and sphalerite assayed 0.01 oz. gold per ton, trace of silver, 2700 ppm copper, and 3100 ppm zinc.

contained from nil to 0.33 oz. gold per ton, up to a trace of silver, 10,000 ppm arsenic, and L tungsten.

The 1500 foot elevation pit exposes an ill-defined structure. The southern most quartz vein is up to 2 feet thick and strikes about N10°W, dips 35°SW and is exposed for about 12 feet. Samples across it contain up to 0.005 oz. gold per ton and a trace of silver. Two parallel veins separated by 3 feet of graywacke in the north side of the pit strike N15°W, dip 35°SW, are 0.6 and 0.9 feet thick and assay nil and 0.16 oz. gold per ton contain up to 0.3 oz. silver per ton and contain no other significant metal values.

Conclusions

The structure intercepted underground is almost certainly not that exposed in the prospect pits. Only a few of the samples taken on this prospect contain significant gold values (up to 0.33 oz. gold per ton). Apparently the Hirst-Chichagof Mining Company was interested enough in the prospect to plan a crosscut from the mine to intercept the structure at depth, a plan never carried out because of a shortage of labor. The prospect and the structure it is on are worthy of more detailed examination.

Remainder of the Occurrences in the Doolth Mountain Area

Table 7 contains information on the less well known occurrences in the Doolth Mountain area and plates 2 and 3 show their location. Figures and tables are located in Appendix B. Of particular interest is the little known Power Line adit (plate 3,#48) where a sample of dike containing sulfides assayed 0.52 oz. gold per ton. Also of interest is the Chichagoff King claim (plate 3, #52) on the trace of the Chichagof Fault, where pits and trenches expose a fault zone containing quartz with low gold values for a considerable distance.

High gold values are found in numerous prospects located along the north to south aligned Doolth Mountain Peninsula, while most of the prospects located along the same faults on the east side of Klag Bay (plate 2 #27,34,35,36,37,45), the west side of Lake Anna (plate 2 #43,44), or the east side of Herbert Graves Island (plate 2, #39, 40) have no or very low gold values.

Pinta Bay Area
(Northern portion West Coast gold area)

Introduction

The Pinta Bay area extends from Black Bay to Goulding Harbor and its gold prospects are located in schist and graywacke (KKb unit) and marble (Whitestripe Marble, Trw unit).

The locations of mines and prospects within the Pinta Bay area are shown on plate 2. Those with the most evident mineralization will be discussed first and those with the least available information will be relegated to a table. Tables of analyses are located in appendix A.

Golden Hand Apex Mine

Introduction-History

The Golden Hand Apex Mine is located 3/4 mile southeast from the head of Pinta Bay along a northwest striking fault zone containing gold bearing quartz veins. Plate 7 shows the prospect on an aerial photograph. It is located on or near a major fault (Islas Bay Fault) that traverses the inland portion of the West Coast gold area.

The Golden Hand Apex Mine was first staked in 1921 as the Brown Bear group (Stewart 1921, p.44). In 1921 and 1922 the vein was exposed for several hundred feet along its outcrop, and a crosscut was driven 60 feet below that intersected the vein at 110 feet. It was reported (Stewart 1922 p.64) that the vein averaged 2 feet thick where exposed and "contains free gold, some specimens yielding high assays." The 1921 and 1922 report of the Territorial Mine inspector are the only published information on this prospect. According to Sitka claim records, this prospect was restaked in 1930 and 1933 as the Georgia and Gold Brick claims and a winze was sunk on the vein underground. Assessment work was completed in 1938, 1947, and 1949. Local prospectors report that a two-pound gold brick was produced from a gold bearing quartz boulder found in a stream gulch just below the prospect. In 1976 Floyd Branson (Juneau), Wes Brown (Sitka) and Bill Hollowell (Sitka) staked the Golden Hand Apex claims on this prospect and these claims are currently active.

Present Investigation

In 1978 this prospect was located, via a poor trail from the head of Pinta Bay, and briefly investigated. A 140 foot long crosscut, an 85 foot drift and a 150 foot long caved trench were located. These workings were mapped and sampled. Figure 39 is a map of the prospect and table A-32 gives the analytical results. Underground, the only sample containing significant gold values was of a 0.2 foot maximum thickness quartz vein in the footwall of the fault zone that assayed up to 0.18 oz. gold per ton (sample #2D and 3). However, a sample of quartz float (sample #13) from the caved trench contained 14 ppm gold indicating more detailed work was necessary.

During a brief assessment visit to the claims in 1979 Floyd Branson and Wes Brown exposed several feet of quartz in the 150 foot long caved trench. As a result, they discovered and mined 20 pounds of quartz containing an estimated 4 ounces of gold from a 3 foot long by 0.2 foot thick zone located in the footwall of the vein. Figure 40 shows Floyd Branson examining a high grade gold specimen from the footwall of the Golden Hand Apex vein.

A few days after the discovery the prospect was jointly examined by Floyd Branson and the personnel of the Bureau of Mines and later by the Bureau of Mines personnel alone. Twenty-three feet of quartz vein were exposed by clearing part of the trench, portions of the adit were scrubbed down, seven more sloughed pits were found up to 1000 feet along structure to the southeast and the high grade gold zone was found to extend to depth.

As it is now known, the prospect consists of hydrothermal quartz veins located along a fault zone in graywacke or graphitic schist that strikes N25°-40°W and dips 70°SW. Alteration along the fault zone consists of sericitization, chloritization and some silicification. The vein consists predominately of quartz with some calcite, chlorite and sericite. Sulfides constitute less than one percent of the quartz vein material and consist of pyrite, pyrrhotite and arsenopyrite. Samples taken underground contain up to 2000 ppm arsenic, 190 ppm copper, 110 ppm zinc and 40 ppm lead while those on the surface contain up to 500 ppm arsenic, 90 ppm copper, 20 ppm lead and 95 ppm zinc. Table A-32 gives the analytical results. With the exception of gold and silver the veins carry very little metallic mineralization.

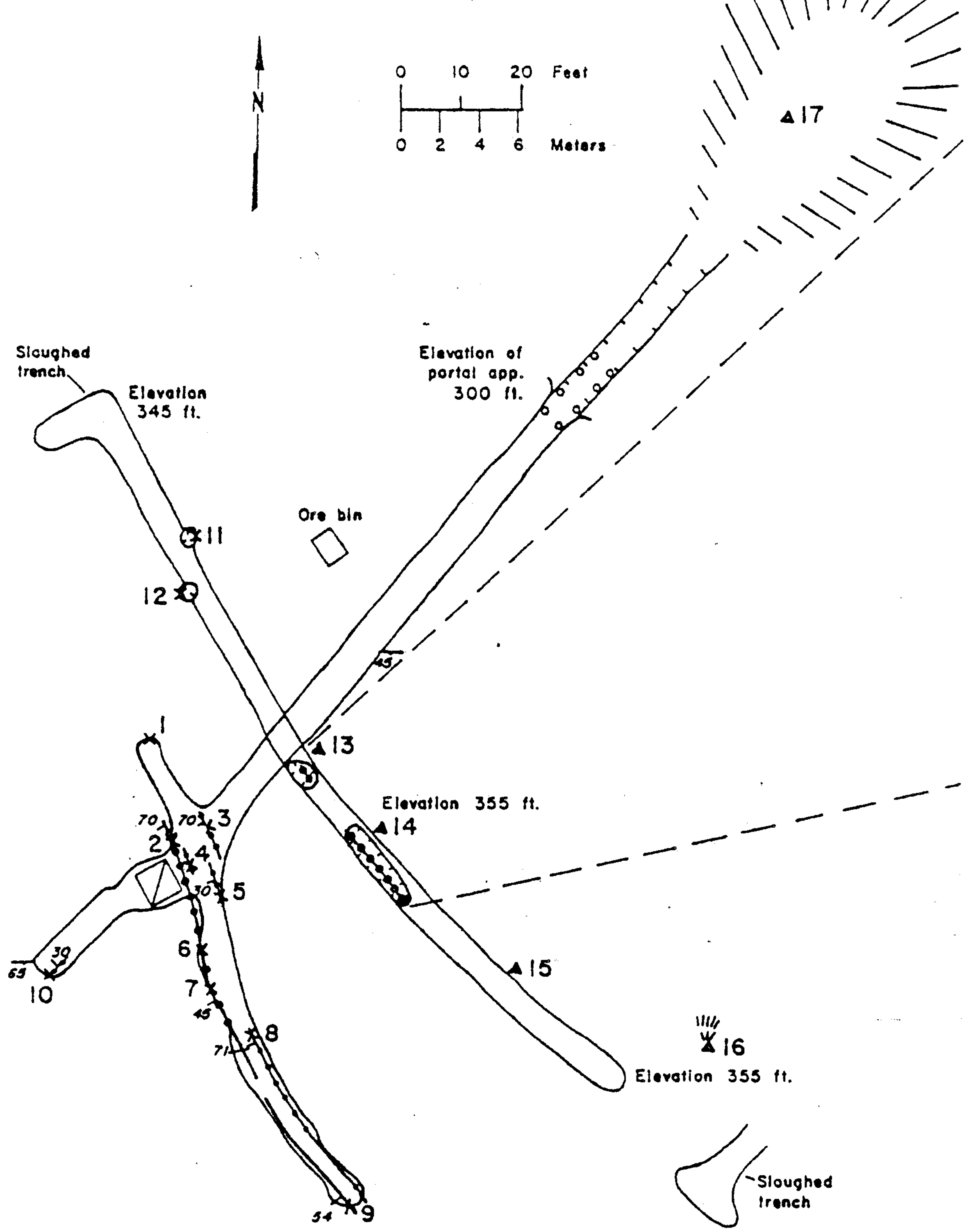
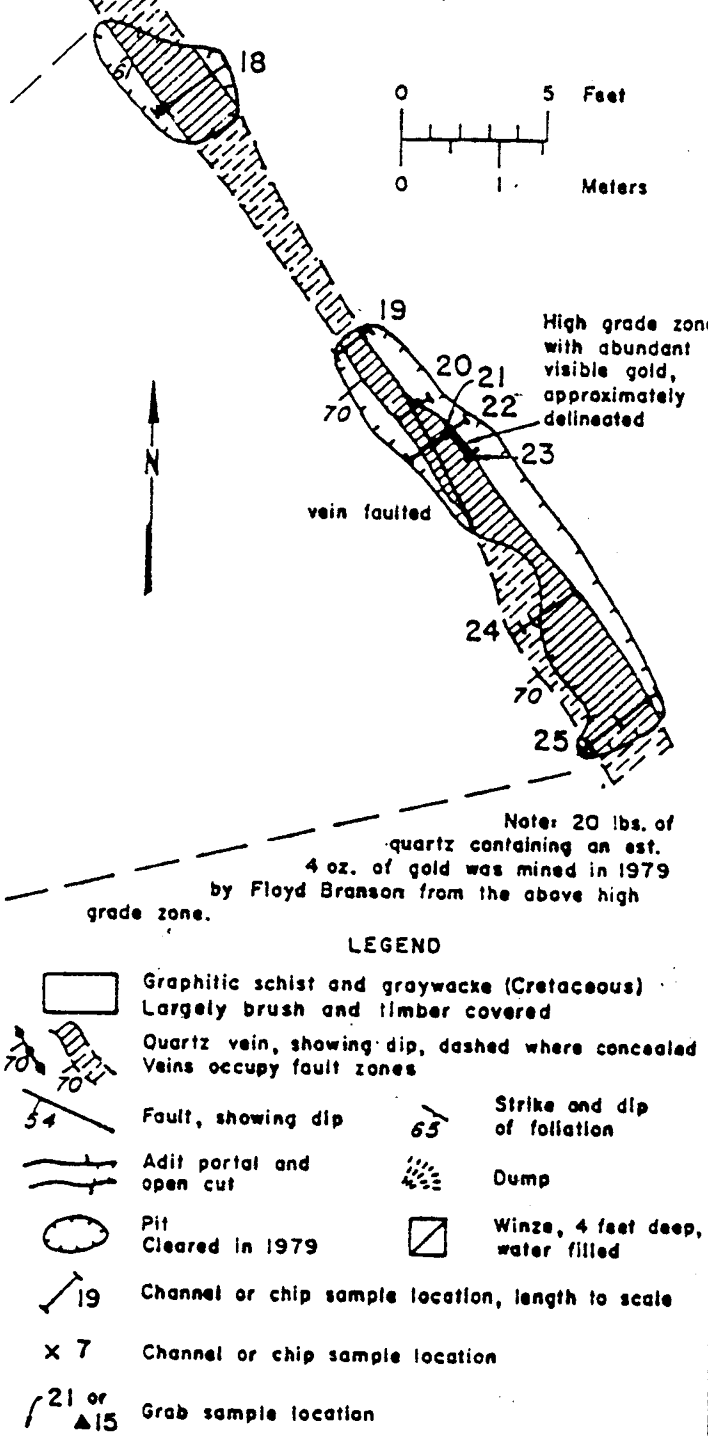


FIGURE 39.- Golden Hand Apex Mine showing workings and sample locations (Mapped by J. Still and K. Weir 1978 and 1979 field seasons)



Additional assay data given in table A-32

Map No.		Gold Assays Sample length, ft.	Fire assay ounces/ton	AAS, ppm
Underground samples				
1	A	0.5	N	0.10
	B	3.5	N	L
2	A	1.9	N	N
	B	2.9	N	.20
	C	1.0	.005	L
	D	0.2	.12	23.0
3		0.2	.18	3.6
4	A	2.6	N	—
	B	0.25	N	—
5	A	1.7	N	L
	B	0.4	.015	.50
	C	1.0	.01	.95
	D	0.4	.01	.75
	E	1.0	N	.10
	F	1.0	N	N
6		0.7	N	.20
7		0.5	N	.35
8		2.17	N	.10
9	A	5.1	N	N
	B	0.63	N	.45
	C	0.33	N	.20
	D	0.75	N	N
10		0.1	N	.30
Surface samples				
11		1.2	.08	2.4
12		0.35	.58	36.0
13		–	N	14.0
14		–	.07	1.5
15		–	.005	.70
16		–	.055	.95
17		–	–	.10
18	A	0.3	.10	–
	B	0.25	.20	–
	C	2.3	.05	–
	D	0.4	.01	–
19	A	0.45	N	–
	B	0.65	.03	–
	C	0.25	T	–
20	A	1.0	.93	–
	B	0.5	6.27	–
21		–	498.88	16,000
22	A	0.5	N	.60
	B	0.35	N	.70
	C	0.7	.005	.75
	D	0.5	8.58	3.30
	E	0.5	.07	.25
23		0.2	186.74	8,000
24	A	0.6	N	.20
	B	0.3	.02	.80
	C	2.0	.29	5.0
25	A	–	N	.15
	B	1.2	.09	2.7
	C	1.3	.36	10.0
	D	0.5	.03	.90

Figure 39. - continued

Figure 40. - Floyd Branson examining high grade gold ore from the footwall of the Golden Hand Apex vein. A 0.2 by 3 foot zone in the footwall of the vein to his left yielded 20 pounds of quartz containing an estimated 4 oz. of gold. A high-grade BuMines sample from the zone assayed 498.88 oz. gold per ton.

Portions of the fault zone are exposed for 85 feet along the drift. The largest vein exposed in the drift is up to 1.0 foot thick, is in the hanging wall of the fault zone and pinches out to the south and runs into the crosscut wall to the north. Figure 41 shows this vein just south of the winze. Four samples taken across this vein assayed from nil to 0.35 ppm gold. The only significant values underground were of a 0.2 foot maximum thickness quartz vein in the foot wall of the fault zone that assayed 0.12 and 0.18 oz. gold per ton (samples 2D and 3). This may correlate with a high grade gold zone located 55 feet above in the foot-wall of the vein exposed in the trench.

The fault zone is exposed for 23 feet in two pits separated by 8 feet of cover located within an older 150 foot long caved trench. A quartz vein up to 2.9 feet thick is exposed for the length of the pits. Six sample lines taken across this vein range in value from 0.006 to 1.53 oz. gold per ton over a 3 foot mining width and average 0.34 oz. gold per ton.

Located in the footwall of the above vein is an irregular high grade zone approximately 3 feet long by 0.2 feet thick that in places contains abundant free gold (20 lb of quartz containing an estimated 4 oz. gold was mined from this zone in 1979). A high grade grab sample of the zone assayed 498.88 oz. gold per ton while a representative sample assayed 186.74 oz. gold per ton. A 0.5 foot sample that contained this zone assayed 8 oz. gold per ton.

Conclusions

While the gold values from the quartz veins exposed in the drift are not significant, those from the surface quartz veins are. The high grade

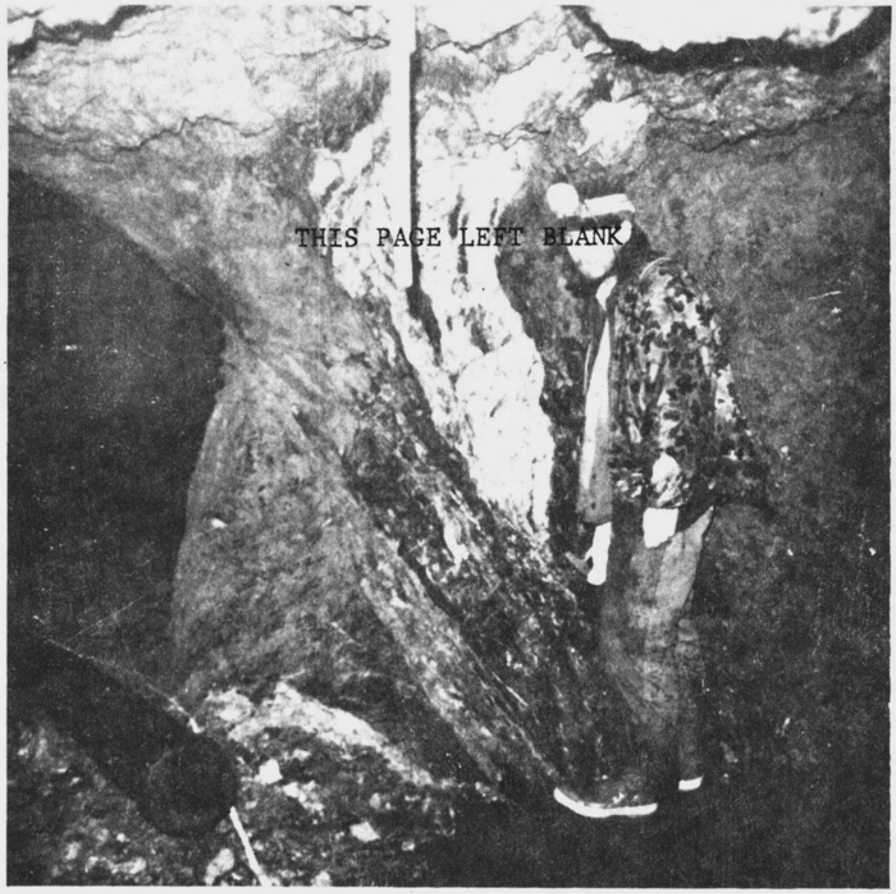


Figure 41. - Underground in the Golden Hand Apex adit showing the Golden Hand Apex vein at a location approximately down dip from the 0.2 by 3 foot high-grade zone on the surface. A sample across this vein (8S129E) assayed 0.1 ppm gold.

gold zone may contain significant quantities of gold and may be an indication of other rich zones or pockets of ore along the fault. The quartz vein exposed in the pits has good values and is not delineated to the north or south and at only one location, the drift, at depth.

The major fault zone that this mine is located on, or near, traverses the inland portion of the West Coast gold area. This fault zone has had little prospecting although it is an obvious exploration target.

New Chichagof Mining Syndicate Prospect

Introduction-History

The New Chichagof Mining Syndicate prospect is located about 1/2 mile east of the head of Pinta Bay along a northeasterly striking fault zone cutting diorite and a sequence of marble, shale, and greenstone. Plate 7 shows its location. Gold is found in quartz cemented limestone breccia.

In 1932, J. Nieland discovered and staked this property and by 1934 the property was in the hands of the New Chichagof Mining Syndicate. Plate 8 is modified from a geology and sample location map prepared by Roehm and shows the workings as of 1936 (Roehm, 1936, PE 114-3). It shows 4 adits and a series of pits and trenches that trace a fault zone for over 1000 feet. Samples taken in the lower adit (map # 4) across breccia zones located 480 and 560 feet from the portal assayed 0.40 oz. gold per ton across 99 inches and a trace of gold across 70 inches. A 9 foot sample of mixed quartz and limestone taken from the footwall to the hanging wall of the #2 adit assayed 0.26 oz. gold per ton. The highest grade surface samples were in F outcrop and D-cut. The former assayed

0.52 oz. gold per ton across a 2 foot width and the latter assayed 0.36 oz. gold per ton across 8.8 feet.

By 1939 the 4 adits had a length as follows: lower adit (map #4) 750 feet long, upper adit (map #3) 140 feet long, southern crosscut (map #1) and northern cross cut (map #2) both 20 feet long. Between 1938 and 1975 there was no reported activity on the prospect. In 1976 the property was restaked and is currently active. In 1979 a new pit was dug exposing mineralization 20 feet east of the old line of trenches (identified by sample # 9S575 on Plate 8).

Structure and Geology

The following description of the prospects structure and geology is based on previous descriptions by Roehm (1936), Reed and Coats (1941) and on this study.

The prospect is located along a fault zone that strikes about N30°E and dips 65° to 80° to the west. The fault zone cuts limestone or marble, shale, greenstone, and diorite. Underground it varies in width from a few inches to over 9 feet and is recognized at different locations by a strong shear surface, fault gouge, and quartz limestone breccia. On the surface the fault zone is mostly undercover, however in places it is recognized by a slight depression, or in the northern portion of the prospect, by a well defined gulch.

Alteration of the fault zone and wall rock takes the form of silicification, sericitization and pyritization. The gold was seen as tiny specks within the quartz cement of the limestone breccia.

Present Investigation

A fair foot trail reaches the prospect from the head of Pinta Bay. Of the four adits on the property only the upper (map #33) adit is not caved at the portal. Figure 42 modified from Reed and Coats (1941) shows the geology of both the upper and lower adits and the sample locations in the upper adit.

The gold bearing quartz limestone breccia is mostly in the east rib of the upper drift and its full width is not delineated at most locations. Eleven sample lines were taken across the fault zone exposed for 110 feet in the upper adit. Table A-33 gives the assay results. It runs 0.24 oz. gold per ton at a four foot mining width for its entire 110 foot length and a 30 foot long portion of the 110 foot length averages 0.64 oz. gold per ton over a 4.2 foot mining width. This approximately agrees with average values obtained by previous investigators (Nelson 1936, Racey 1938).

Most of the pits shown in plate 8 are now sloughed and overgrown. Those that were open and exposed mineralized zones were sampled. Plate 8 shows the sample locations and tables A-34 and A-35 give the analytical results. The most significant values were found in F outcrop where a 5.3 foot thick zone of quartz limestone breccia averaged 0.32 oz. gold per ton. It is interesting to note that the 1979 pit dug by claim owner Floyd Branson located 20 feet from the surface trace of the fault zone contained a small amount of gold (0.005 oz. gold per ton) in a limestone breccia.

Conclusions

The highest grade gold mineralization is exposed at the surface in

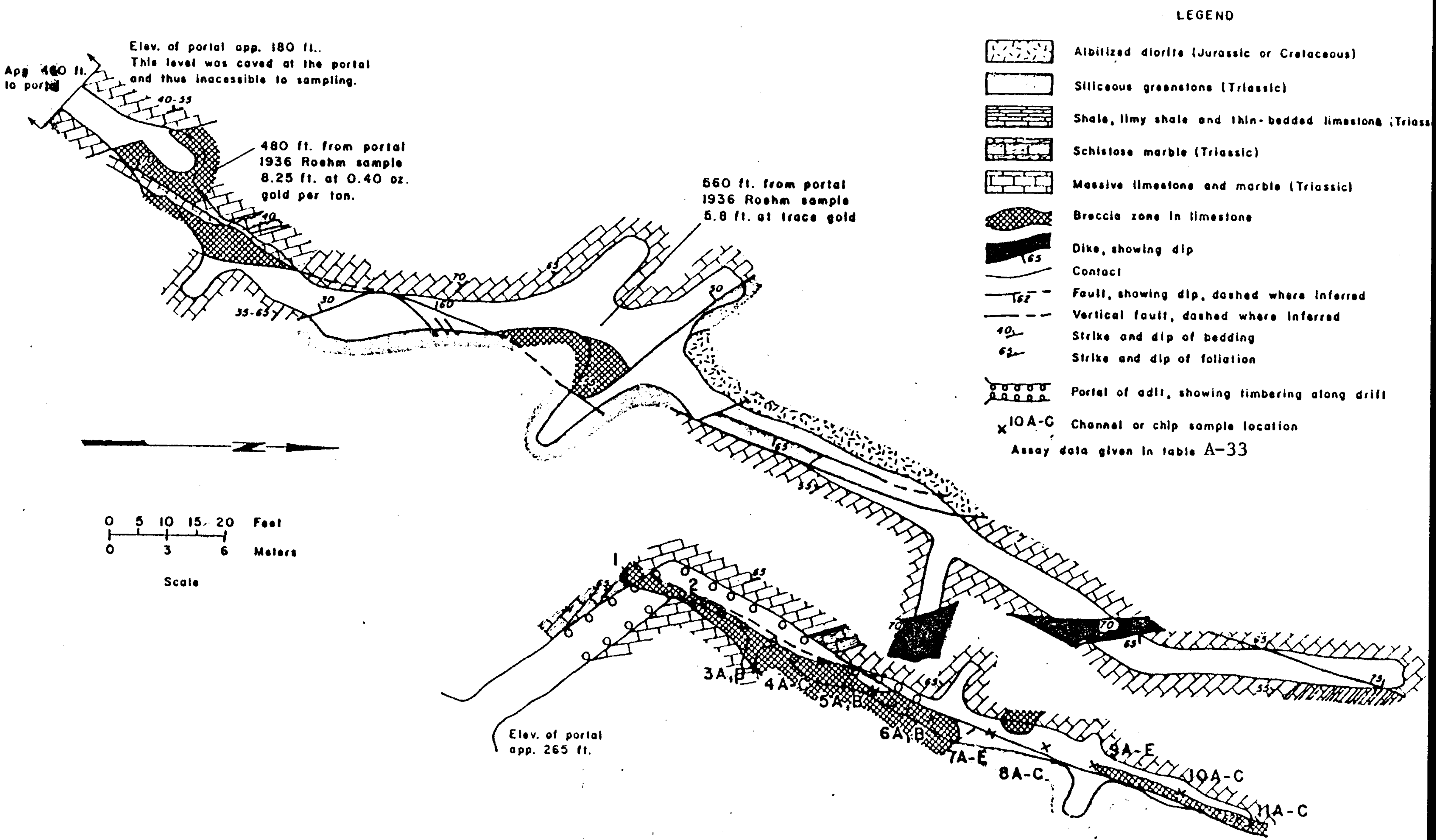


FIGURE 142.-New Chichagof Mining Syndicate Prospect showing the underground workings and sample locations. (Modified from Reed and Coats,1941, Plate 32, upper adit mapped by J. Still and K. Weir, July 1978)

D cut and F outcrop (elevation 310 ft.) in the upper adit (elevation 260 ft) and 480 feet from the portal of the lower adit (elevation 190 ft). These exposures are consistent with a significant ore body raking south west along the fault in the direction of the dip of the limestone; however, the deposit may consist of irregular pods and lenses. Further work is necessary to determine the configuration, extent, and grade of the zone.

Whitestripe Silver-Lead-Zinc-Gold Prospect

Introduction

A silver, lead, zinc, gold prospect is located on both the east and west sides of the Whitestripe Marble unit (Trw) about 1 mile north of Whitestripe Lake. Plate 2, #7, shows its location. It was discovered by Bureau of Mines personnel as a result of examination of an iron stained zone. Here the Whitestripe Marble forms a high mountain ridge with the Goon Dip Greenstone (Trg) forming the east contact and the schist unit (Kkb) forming the western contact.

Present Investigations

The east side of the Whitestripe Marble forms a 1500 foot high cliff, with the marble greenstone contact located about 1/2 way down the cliff face. Plate 9 is an aerial photograph showing the area and sample locations and Table A-36 gives the analytical results. A fault zone striking N70°E displaces the marble, and just south of this fault a gossan zone is located on top of the marble cliff at an elevation of 1800 feet. About 100 feet below this gossan at an elevation of 1700 feet a 2 x 2 foot gossan pod is located on a steep marble cliff with another small gossan zone about 10 feet above. Further down the cliff face, at an elevation of about 1000 to 1300 feet, is a large iron stained zone greatly obscured by brush that may be more than 50 feet across. Figure 43 shows the helicopter on the Whitestripe Marble at an elevation of 1800 feet just above the 1700 foot elevation gossan pods.

Stream sediment and float (9S576-578) samples taken at elevations from 240 to 250 feet along the Goon Dip River below the east side of the Whitestripe Marble contain up to 0.3 ppm gold, 45 ppm lead and 1450 ppm copper. Grab samples 9S572 and 9S581 taken of the 1800 foot elevation gossan zone on top of the marble cliff contain up to 0.01 oz. gold per ton and 0.1 oz. silver per ton.

The 2 x 2 foot gossan zone at an elevation of 1700 feet (9S553) contained massive sulfides about one foot under a gossan cover. It consisted predominately of galena with subordinate anglesite, cerussite, and goethite. A grab sample of the sulfides assayed 9.6 oz. silver per ton, 10 percent lead, 2.4 percent zinc and 0.05 oz. gold per ton.

Investigations on the west side of the Whitestripe Marble were confined to elevations from 1000 feet to 1500 feet in a narrow, probably fault formed, gulch that trends N60°W and cuts the schist (Kkb) unit. Seven stream sediment, float and in place samples (9S555-9S561) were taken along this gulch. Four samples contained up to 0.3 ppm gold and five contained 10 - 150 ppm lead.

Conclusions

The small pod of massive sulfides found at the 1700 foot elevation contains high grade silver and lead mineralization that may be indicative of significant massive sulfide mineralization in the marble or near the marble greenstone contact. The large iron stained zone exposed at the

Figure 43. - Photograph of the Jet Ranger (helicopter) on the Whitestripe Marble at an elevation of 1800 feet just above a 1700 foot elevation high-grade lead sulfide pod.

marble greenstone contact below this pod is worthy of detailed examination in spite of the inhospitable terrain.

Gold is persistently found in stream sediment and rock samples taken on both sides of the Whitestripe Marble. Examination of the area for vein or breccia zone gold deposits is warranted.

Cox Brothers Prospect

The Cox Brothers prospect is located near the head of Goulding Harbor on the northwest side by a small island. A map of this prospect dated 1928 by the Alaska Juneau Gold Mining Company shows three claims along a structure striking about N30°W with open cuts or pits located near the beach, at 160, 240, 250, 280, 500, and 550 foot elevations. Figure 44 shows the 1928 map. Values range 0.03 oz. gold per ton to 0.3 oz. gold per ton for widths of 2 to 7 feet.

Another prospect, discovered in 1910 and called the Princess Pinder, is described as being located near the beach and consisting of a 7 foot face of quartz with a N40°W trend and assaying $10 per ton. This prospect description closely resembles the Cox Brothers; the Princess Pinder may be the same prospect. There is no new information after 1928 on either prospect.

The prospect was briefly visited by Bureau of Mines personnel in 1978 and 1979. A search was made of the heavily overgrown area from sea level to an elevation of over 500 feet and fragments of a trail, a pit at the 160 foot elevation and a short adit on the beach were found.

The 160 foot elevation pit in a schist country rock, partly exposes 5.5 feet of a quartz-albite zone trending N60°W that contains traces of chalcopyrite, pyrrhotite, and pyrite. One 2.7 foot chip sample partly

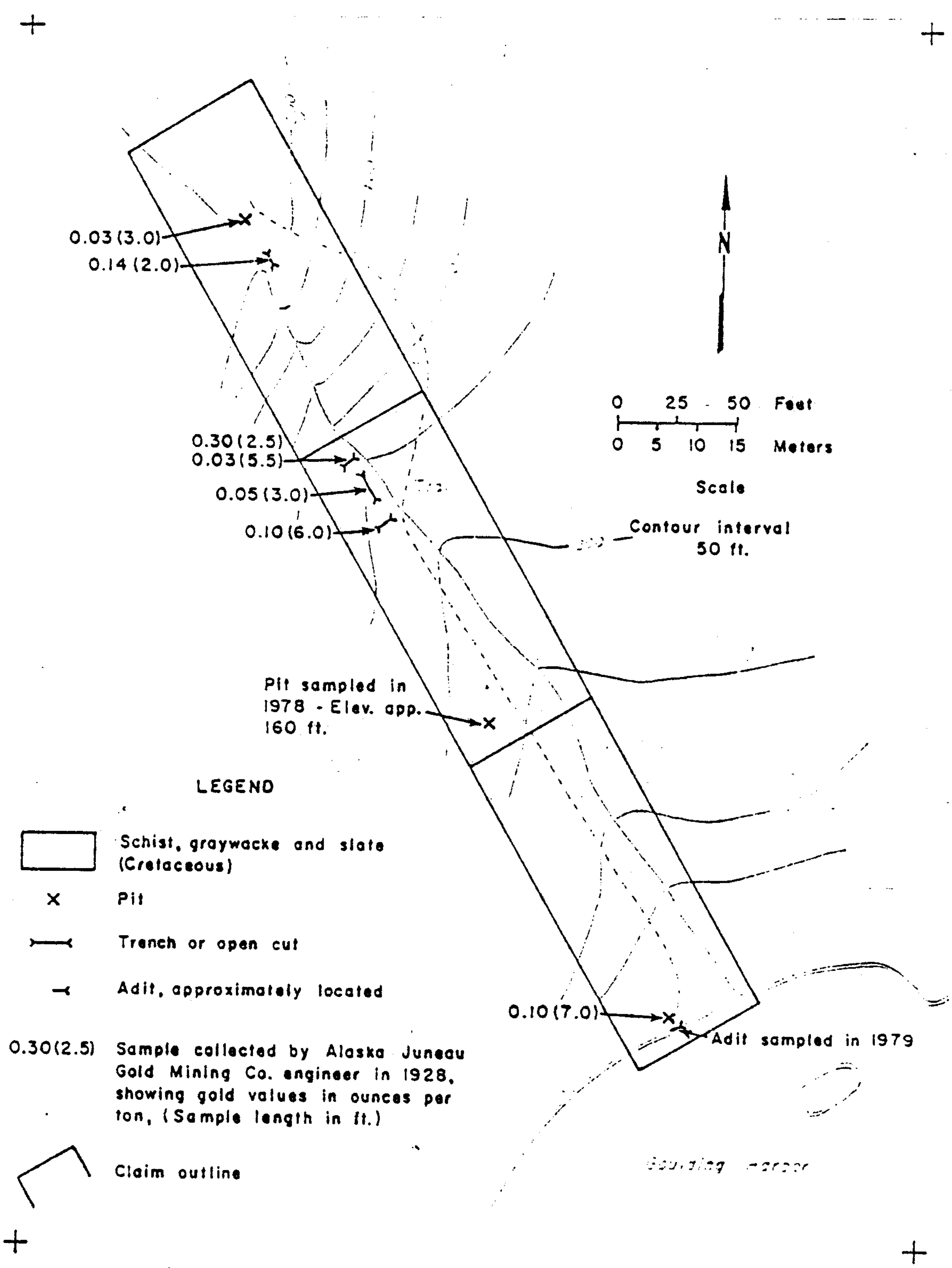


FIGURE 44. Cox Brothers Prospect, sample locations. (Modified from Alaska Juneau Gold Mining Company map dated 1928)

across the zone assayed 0.1 oz. gold per ton and a trace of silver while a 2.75 foot chip sample across the remainder of the zone assayed 0.01 oz. gold per ton, a trace of silver, 6300 ppm copper and 850 ppm zinc.

A 16 foot adit trending S66°W located on the beach in slate exposes 10 feet of an irregular zone of limey quartzite. A 0.7 foot chip sample of a quartz knot in the face assayed a trace of gold while a 10 foot long one foot interval spaced chip sample across the quartzite zone assayed 0.1 ppm silver.

The values reported from this prospect by the Alaska Juneau Gold Mining Company indicate that examination is warranted to find the remainder of the old workings.

Golden Hand Prospect

In 1937 the Golden Hand claims were located just to the east and north of the property now known as the Golden Hand Apex Mine. The area consists predominately of limestone intruded by quartz diorite with faults near the contact and in the limestone.

According to Reed and Coats (1941 p. 130-137) who visited the area in 1938, prospect pits expose the limestone-diorite contact, and fault zones in the limestone. Reed and Coats visited pits at elevations of 420, 305 and 100 feet. These pits are shown as "x" (on the original topographic base) on Plate 2 and the 100 foot elevation pit is shown on plate 7.

The 100 foot elevation pit was examined and found during this study and the other pits were briefly searched for, but not found. The following descriptions for the 420 foot and 305 foot elevation pits are from Reed and that of the 100-130 foot elevation pit is from this study.

The 420 foot elevation pit exposes a limestone diorite contact which forms a minor fault that strikes N30°W and dips 86°SW. Quartz and quartz limestone breccia are found in the limestone and a few specks of gold were seen in the quartz.

Several pits are located at an altitude of about 305 feet. One pit exposes quartz diorite and the others limestone. The limestone is cut by weak faults at N14°E and vertical along which brecciated rock is cemented by calcite and quartz.

A pit at 100-130 feet elevation is located in a small creek bed along the trail to the Golden Hand Apex Mine. In 1979 the Golden Hand #1 claim was staked over this pit. The pit exposed an ill-defined fault zone containing quartz and calcite in schistose limestone. A 2 foot sample taken across this zone assayed 0.045 ppm gold.

Remainder of the Occurrences in the Pinta Bay Area

Table 8 contains information on the less well known or important occurrences in the Pinta Bay area and plate 2 shows their location. Appendix B contains the figures and tables of analysis. The Congress (plate 2,#8) copper and Triplet Island (plate 2,#10) zinc prospects are indications of base metal mineralization in the area but are not well enough known to determine their importance. Also of interest are a series of stream sediment and float samples containing gold taken under a large, but recent (1975), landslide exposing over 1000 feet of bedrock on Mt. Lydonia (plate 2,#14).

Table 8. - Remainer of occurrences in the Pinta Bay area

Pl. 2 location number	Name of prospect or occurrence	Location	Source of info.	App.B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
5	West side Pinta Bay occurrence	West side of Pinta Bay	This study		Large quartz blocks up to 2 feet thick very near in place. A random chip of the blocks assayed L tungsten.
6	East side Pinta Bay occurrence	East side of Pinta Bay	This study		Quartz vein 0.8 foot thick striking N50°E and dipping 72°N in schist assayed L tungsten. A northwesterly striking fault zone through schist and limestone and containing quartz was sampled and found to contain no significant metal values.
8	Congress Prospect	Southwest side of Hill Island	This study Reed, and Coats 1941 p. 140	Fig. B-8 Table B-8	A 25 foot adit and outcrop up to 12 feet across expose a silicified iron stained zone of green-stone that contains chalcopyrite, pyrrhotite, sphalerite and galena. Measured BuMines sample across the zone contain up to 0.58% copper, 0.086% zinc, 3 ppm silver and 150 ppm cobalt. Although this zone may be of limited extent the area warrants more thorough examintaion for base metal deposits. Staked in 1916.
9	Senate Copper Prospect	South end of Hill Island	This study		Samples taken of iron stained graywacke con-tained no significant metal values.Staked 1916.
10	Triplet Island Prospect	Triplet Island locat-ed in Portlock Harbor (1500 feet long by 300 feet wide)	This study		Several iron stained zones up to 20 feet wide in schist that follow the schistosity strike northwesterly and dip steeply to the southwest are exposed along the beach. Samples from these zones contain up to 760 ppm copper, 760 ppm zinc, 2 ppm silver, 0.05 ppm gold and 50 ppm molybdenum. An iron stained zone located at the south end of the island contained a 0.1 foot thick by 10 foot long lens of sphalerite that followed the schistosity. A sample across it assayed 35% zinc, 0.15% lead, 0.11% copper and 20 ppm silver. The small size of the island and its isolated location hinders explorations of interesting mineralization. The Small Island #1 claim was staked in the vicinity in 1921.

Table 8. (Continued)

Pl. 2 location number	Name of prospect or occurrence	Location	Source of info.	App.B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
11	Didrickson Bay occurrence	East side of the mouth of Didrickson Bay	This study		Large northeasterly striking, steeply dipping quartz veins up to 1.3 feet thick, prominently exposed on the beach. Samples across these veins contained no significant metal values. Calcium Carbonate Time Claim staked in 1956.
12	Northwest peak Mount Lydonia occurrence (el 2329 ft.)		This study Follow-up of USGS rock geo-chemical anomaly		0.4 and 0.75 foot long samples across iron stained silicified phyllite contained 0.1 ppm and L (.05) ppm gold.
13	North Herbert Graves Island occurrence		This study		Northerly striking, westerly dipping quartz vein containing pyrrhotite and chalcopyrite, 0.15 foot chip sample across vein contained 220 ppm copper.
14	Mt. Lydonia landslide occurrence	West face of Mt. Lydonia	This study		A huge rock and mud slide (1975?) cleaned a portion of the west side of Mt. Lydonia exposing about 1000 vertical feet of bedrock. Three stream sediment and two samples of quartz fragments taken below the new bedrock exposure contained up to 0.9 ppm gold. A prospector (Floyd Branson, 1979) reported panning gold from newly exposed quartz veins. A favorable area for prospecting.
15	Northwest side Black Bay occurrence	Near mouth of Black Bay	This study		A 0.6 foot chip across iron-stained greenstone contained 0.3 ppm gold.

Table 8. (Continued)

Pl. 2 location number	Name of prospect or occurrence	Location	Source of info.	App.B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
16	North Side of Black Bay occurrence.		This study		Float samples of quartz and silicified schist-ose rock with sulfides contained no significant metal values. The following claims were located on the north side of Black Bay: Disc. on the 1st Teer (1920), Winther (1933), Rainbow (1933) and Eagle (1935).
17	Mouth of Black Bay occurrence	South side of the mouth of Black Bay	This study		Samples of north to northwesterly striking quartz veins up to 0.8 foot thick contained no significant metal values.

Cobol Area
(Southern portion of the West Coast gold area)

Introduction

The Cobol area extends from the south end of Slocum arm to Lake Anna. The gold prospects in the area are located in graywacke and graphitic schist (Kkb and Ks units). Plate 2 shows the area. The most evident mineralization is found at the Cobol mine which had a small production and the Falcon Arm prospect. Less well known prospects are relegated to a table.

Cobol Mine

Introduction-History

The Cobol Mine is located on the east side of Slocum Arm just north of the old townsite of Cobol. It is along a prominent northerly striking and steeply dipping fault zone in graywacke that can be traced for at least two miles. Plate 2 #68 shows the mine location along the fault. The characteristics of the structure, mineralization and country rock are very similar to the mines in the Doolth Mountain area. Plate 10 shows the mine workings.

In 1925 George Bolyan and Frank Cox staked eight claims known as the Slocum Gunther on a north striking gold bearing fault zone. J.G. Shepard, who visited the property in 1926 as a representative of the Territory of Alaska, Department of Mines described the discovery vein as follows: the quartz vein is exposed in a deep gulch for 140 feet and averages 10 inches in width. Free gold is apparent throughout the outcrop and quartz boulders up to 18 inches thick near the northwest end of the exposed vein are impregnated with free gold(Stewart 1931, p.29). In 1926 the property was optioned and the 900 foot elevation upper adit was started about 150 feet below the discovery and a shaft was started on the discovery vein.

The first few blasts triggered a boulder slide that covered the discovery vein.

By 1928 the property reverted back to the original owners and the upper adit was extended to 470 feet and a lower adit started at an elevation of 550 feet. By 1939 the property was renamed the Cobol mine, the upper adit was 540 feet long, the lower adit 1330 feet long and a surface and aerial tram reached the lower adit. In 1948, a small mill was installed near the lower adit and this adit advanced another 100 feet. Between 1948 and 1959 the lower adit was advanced another 170 feet to its present length of 1600 feet, and the upper adit to 550 feet. The mine workings are shown on Plate 10.

Between 1926 and 1959 some production was realized from the mine. A small stope in the upper adit and a zone taken out with a winze in the lower adit were both reported to contain high grade material. It is roughly estimated that at least 100 oz. of gold were mined.

Present Investigation

The mine is located on a strong north striking, vertically dipping fault zone that forms a deep gulch from an elevation of 900 feet to an elevation of over 1700 feet. This zone has a width up to 20 feet and is recognized underground at places by prominent shear walls, fault gouge, crushed and brecciated wall rock, quartz or dike. A large portion of the fault zone is occupied by an aplite dike that is up to 15 feet wide, some of which has been dragged in the fault zone and broken into lenses. Gold bearing quartz veins occupy portions of the fault zone.

These quartz veins have a ribbon texture and are up to 1.7 feet thick. Gold is visible in small specks along the graphite ribbon texture and finely disseminated in tiny fractures in the quartz. In the quartz, sulfides are sparse but occasional pyrite and rarely galena were observed. Much greater concentrations of pyrite were observed in the wall rock and particularly the dike. Alteration of the fault zone material and the wall rock is in the form of sericitization, chloritization and silicification.

Development on this property consists of a 1600 foot long adit driven at an elevation of 550 feet, a 550 foot long adit driven at an elevation of 900 feet, a winze in the lower adit (500 ft. el.) and a stope in the upper adit (900 ft. el) and at an elevation of 1000 feet a reported shallow shaft in a high grade zone now covered by a boulder slide. The winze, stope, and shaft were opened to mine high grade ore. Plate 10 shows the workings. The lower adit winze is 15 feet long by 3 feet wide and about 6 feet deep while the upper adit stope is 10 feet long by 4 feet wide by 17 feet above the drift floor. Except for a section of downed timber near the end of the lower adit, both adits are in a good state of repair.

A crusher and an amalgam plate are set up in a small building at the lower adit.

Access to the mine workings is by a trail from the beach. The old aerial tramway is down and the surface tram is in a bad state of repair.

A cabin is located at an elevation of 800 feet along the trail, another cabin is located at the lower adit portal and several buildings in various state of repair are located at the beach.

Both adits were sampled and the last 500 feet of the lower adit and 350 feet of the upper adit were mapped and sampled in more detail. Plate

11 shows both adits and the sample locations and Tables A-37 and A-38 give the assay results.

In the upper adit several quartz veins were sampled with 26 sample lines. Most of the samples contain gold, however, the only significant values were found in and near the old stope where a 57 foot long zone averaged 0.28 oz. gold per ton across a three foot mining width. Assays of samples in this section contain up to 3.65 oz. gold per ton across a 0.7 foot width.

Quartz was sparse in the lower adit. A quartz lens reported to be of high-grade was mined out and all that remains is a shallow, water-filled winze. J. Roehm investigated the properrty in 1947 (Roehm 1947 p. 6-7) when the drift face had reached the location where the winze was sunk. He reported that free gold was noted across the width of the face, which consisted of crushed quartz and fractured dike material. Assays from this zone are reported to run up to 7 oz. gold per ton. A 2.7 foot long sample of dike material at the present face which is located 100 feet past the winze contained 0.04 oz. gold per ton. A large portion of the samples taken in the lower adit contained gold in trace amounts.

Other than gold, metallic mineralization in the Cobol mine is sparse. Samples taken in both adits contain up to 0.2 oz. ton silver, 700 ppm arsenic, 480 ppm copper, 430 ppm lead, 110 ppm zinc and 50 ppm tungsten.

A series of float, stream sediment and a very few in place samples were taken in the gulch that represents a surface expression of the fault that is exposed by the underground workings. Samples taken in this gulch are shown in plate 10 and table A-39 gives the assay returns.

Investigations in the vicinity of the shaft located in the gulch at an elevation of 1000 feet and reported by Shepard in 1926 (Stewart, 1931. p.24) to be sunk on a high grade quartz vein containing much fine visible free gold, revealed large boulders covering the area. However, quartz float found just below the boulder slide contained much visible fine gold and assayed 8.74 oz. gold per ton. Quartz float samples taken at elevations of 1500 and 1675 feet in the gulch contained 1.04 oz. gold per ton and 0.12 oz. gold per ton respectively.

Conclusions

This property has potential for economic gold deposits, particularly in the area between the mineralized zone previously exposed below the 1000 foot elevation rock slide and its apparent continuation in the upper adit stope and lower adit winze. Also the area unexplored by underground workings to the north of the present workings has potential.

Falcon Arm Prospect

Introduction-History

The Falcon Arm Prospect is located south of the head of Falcon Arm. Plate 2, #66 shows the prospect location and figure 45 is an aerial photograph showing locations of the mine workings.

The property was first staked in 1916 and by 1921 was taken over by the Falcon Mining Company. By 1938, four adits with lengths of 3010 feet, 55 feet, 45 feet and 20 feet located at elevations from 180 to 1600 feet were driven on the property and a number of buildings were constructed on the beach. The 3010 foot long adit was driven at an elevation of 180 feet across structure to intersect fault zones and dikes found by near

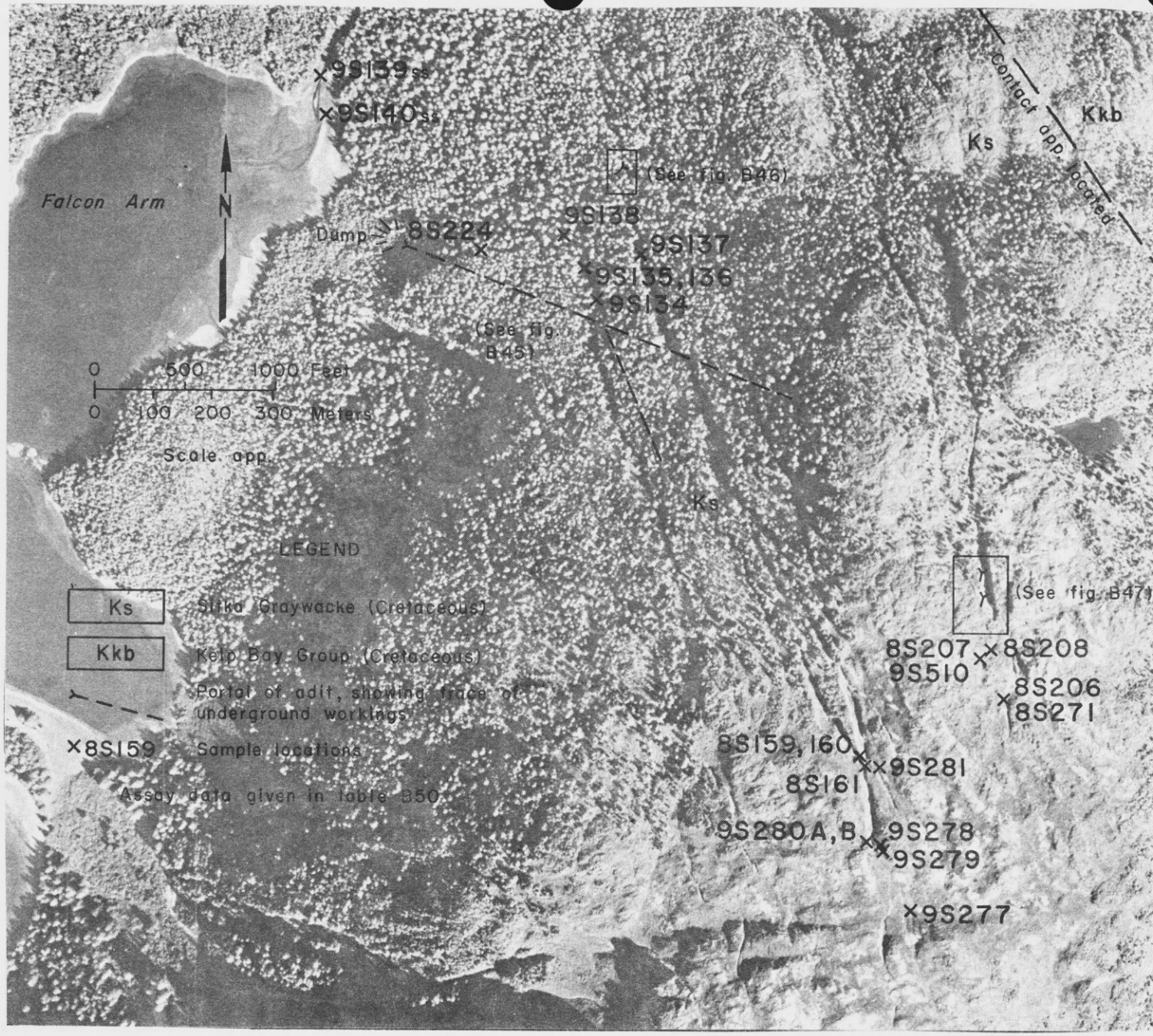


Figure 45. - Aerial photograph showing Falcon Arm prospect

surface workings. There is no new information in the literature on this prospect after 1938.

Present Investigations

A brief reconnaissance examination was made of the Falcon Arm 180 foot elevation adit in 1978. The portal was reached by bushwacking from the beach. To gain access it was necessary to climb over a large cave a short distance from the portal. The backside of the cave appeared very unsafe and only a very brief inspection was made of the adit.

The adit runs S60°E for 2260 feet crosscutting structure and about 1200 feet from the portal a drift runs southward along a fault zone. This drift is caved about 40 feet past the split. A 1938 map and description of this adit by Reed and Coats (1941, p. 118) indicate that the crosscut intersects dikes up to 30 feet thick and cuts numerous faults (mostly weak). Some of these faults carry quartz up to 4 inches thick and the drift extends a distance of 750 feet. Figure 46 shows the adit. Four samples were taken along the crosscut and only one contained gold (0.1 ppm). Table A-40 gives the analytical results. However, the adit walls are heavily plastered with grime and little geology could be observed. A quartz sample off the dump assayed 4 ppm gold, 7 ppm silver, 1000 ppm arsenic and 1400 ppm lead.

Figure 45 shows the location of the 400 foot elevation adit well hidden in a deep brushy gulch located in heavy timber. It can be reached from the head of Falcon Arm by bushwacking or by a very tight helicopter landing on the roof of an old cabin located just above the adit gulch. The adit is driven 20 feet into the side of a partly exposed dike located in schist and graywacke. The dike strikes N30°W and dips 77°SW and is over 20 feet thick. Silicified dike and a little quartz were found along the east dike margin. Figure 47 is a sketch map of the adit, and table A-41 gives the analytical results. Samples taken in the adit did not contain gold, while those taken of the silicified dike and quartz along the narrow graywacke dike contact contained up to 0.25 oz. gold per ton, and 700 ppm arsenic. It is probable that this dike was intersected by the 180 foot elevation adit at a point 1450 feet from the portal.

By far, the most significant values were found in the upper workings located at an elevation of 1500 to 1600 feet in a deep gulch about 4000 feet southeast of the 180 foot elevation portal. They consist of two adits and a pit dug during this study. Figures 45 and 46 show these workings and sample locations and table A-42 gives the analytical results.

The lower adit consists of 30 feet of crosscut and 45 feet of drift along a narrow northerly striking and westerly dipping fault zone. The only sample to contain significant gold values was a 0.5 foot chip of fault gouge and quartz that assayed 0.49 oz. gold per ton, 0.6 oz. silver per ton, 6000 ppm zinc, 2500 ppm lead and 2000 ppm arsenic.

The upper adit intersects a dike and fault zone exposed on the surface. It is driven along a northerly striking westerly dipping fault zone and intersected faulted blocks of dike at two locations. Samples from this adit contain up to 0.2 ppm gold, 0.2 oz. silver per ton, and 2000 ppm arsenic.

Quartz blocks up to 1.2 feet thick containing galena, sphalerite, arsenopyrite and pyrite were found scattered along the stream gulch below an elevation of 1575 feet. Five samples of these blocks assayed from 0.05 to 2.16 oz. gold per ton, from 0.4 to 3.0 oz. silver per ton,

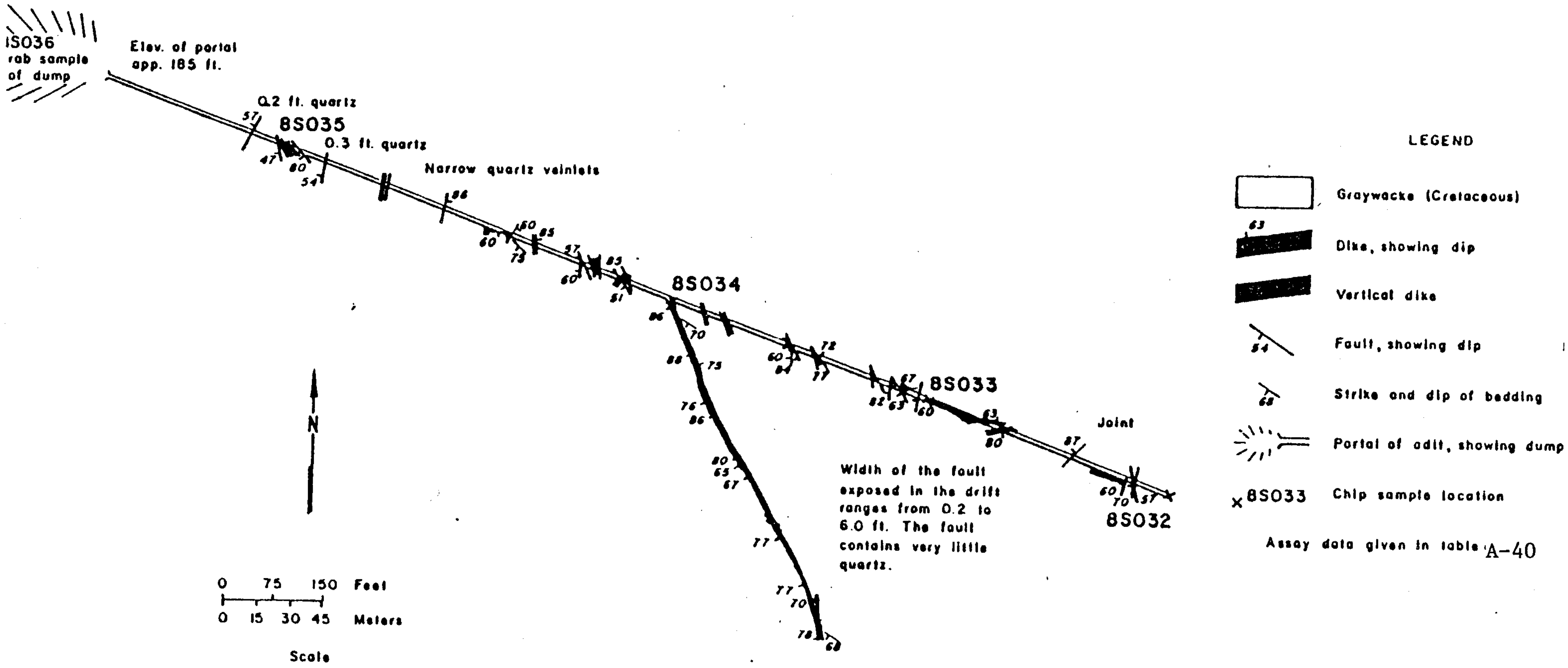


FIGURE. 46.-Falcon Arm 180 foot elevation adit, sample locations,
(Modified from Reed and Coats, 1941 pl 29)

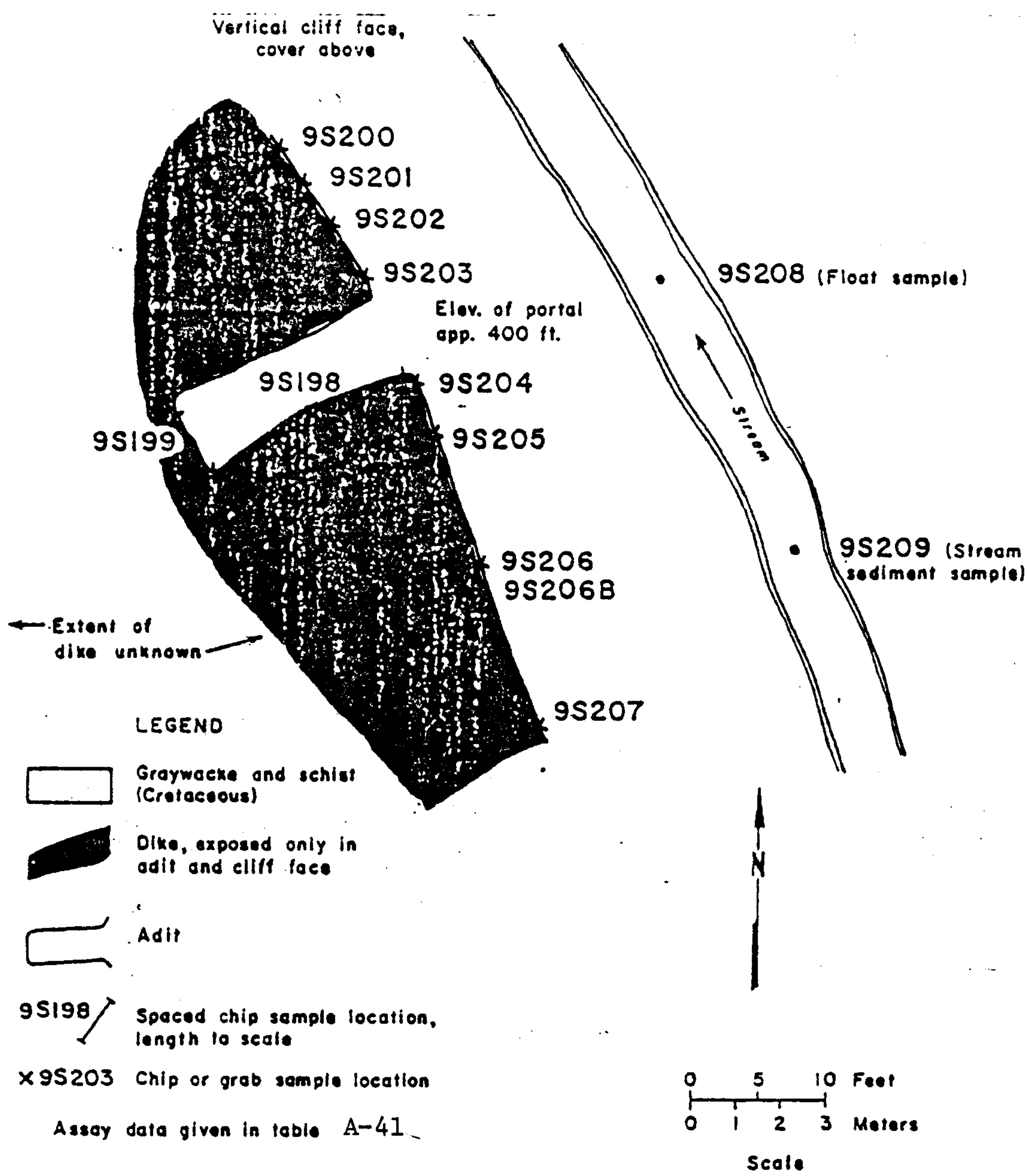


FIGURE 47.-Falcon Arm 400 foot elevation adit, sample locations
(Mapped by J. Still and K. Weir, June, 1979)

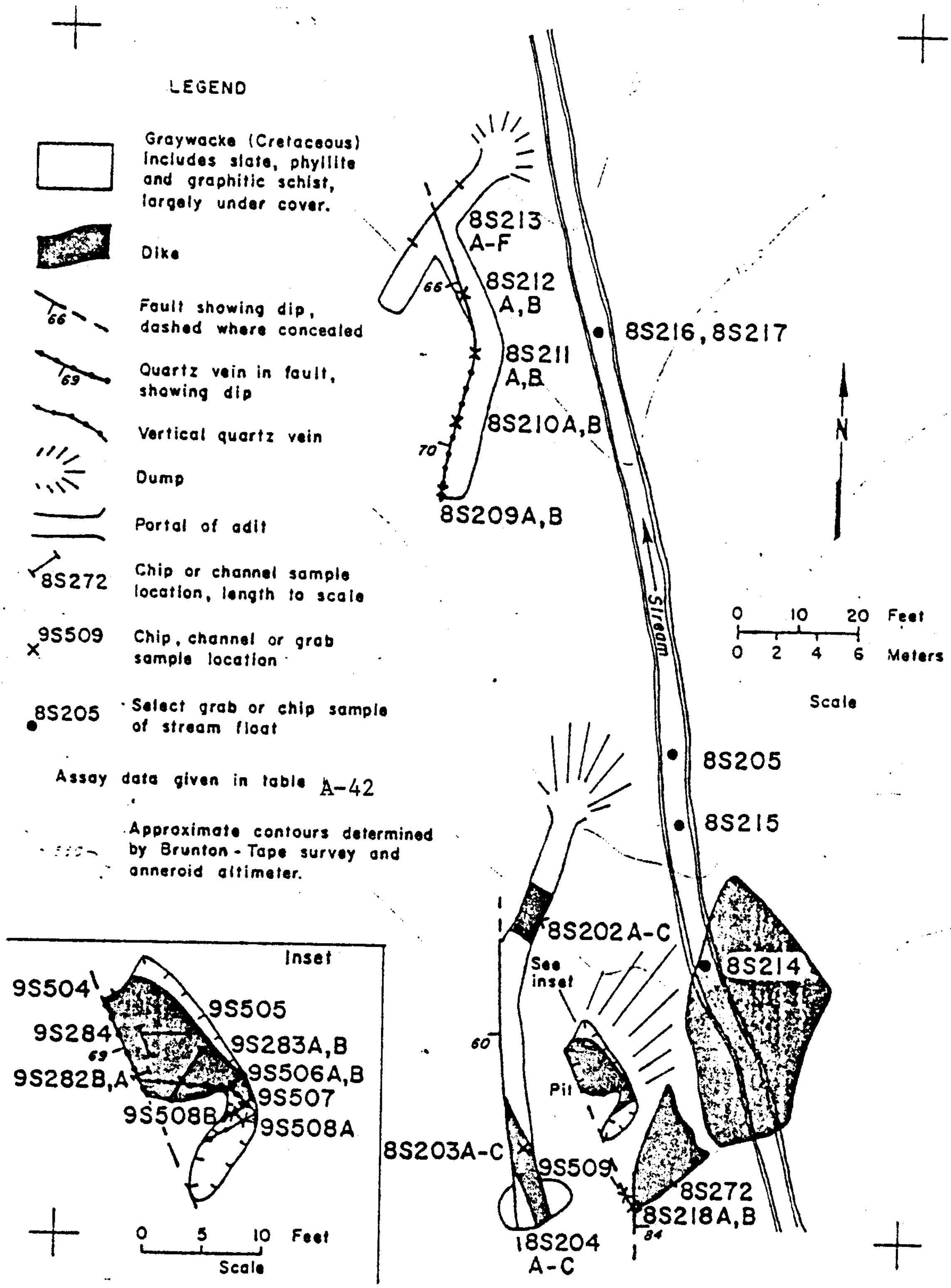


FIGURE 48.- Falcon Arm upper workings, sample locations (Mapped by J. Still and K. Weir - 1978 and 1979 field seasons)

Figure 49. - The 1585 foot elevation pit dug on the Falcon Arm Prospect to locate the source of gold-rich quartz float. Samples taken across a narrow quartz vein that runs from below the rock hammer to the middle of the shovel assays from 0.49 to 1.70 oz. gold per ton.

from 2800 to 26,000 ppm lead, from 1400 to 33,000 ppm zinc and from 7000 to G 10,000 ppm arsenic. Since nothing was exposed which matched the magnitude of this quartz or the mineralization, a pit was dug on the trace of a fault at an elevation of 1585 feet in an attempt to discover the source.

The 8 x 20 foot pit partly exposes a dike whose west margin is a fault contact with graywacke. This contact strikes N25°W and dips 69°SW. Quartz veins are found along the fault and running across the dike. The quartz veins and to a much lesser extent the dike contains galena, arsenopyrite, pyrite, and sphalerite. Alteration products in the dike and fault zone consist of sericite, chlorite and silicified dike. Four samples from 0.3 to 0.7 feet long taken of a quartz vein that runs from the fault across the dike (9S282A, 283A, 506A and 507A) contain from 0.49 to 1.7 oz. gold per ton and values of other metallic minerals similar to those found in the quartz float mentioned above. The dike contained up to 0.015 oz. gold per ton, 0.1 oz. silver per ton, and 3000 ppm arsenic and 360 ppm zinc. Figure 49 is a photograph showing this pit.

Samples taken 10 feet south of the pit along a fault containing some quartz assay up to (9S509) 0.72 oz. gold per ton and samples taken of the dike at the same location contain up to 0.005 oz. gold per ton, trace of silver and 1500 ppm arsenic.

Reconnaissance sampling was done on other fault zones and dikes in the general prospect area. Figure 45 shows the location of these samples ranging in elevation from 400 to 1900 feet, and table A-43 gives the analytical results. Most of these samples contained low gold values (up to 1.5 ppm) and up to a trace of silver and 1500 ppm arsenic.

Two stream sediment samples (95139 and 140) taken near sea level from the main drainage of the area failed to show any significant metal values.

Conclusions

The upper workings contain significant gold values and are located on a fault controlled gulch that extends at least 5000 feet. The 180 foot elevation crosscut does not extend to the down dip projection of the upper workings. These workings are worthy of more detailed prospecting as is the remainder of the structure on which they are located.

Remainder of the Occurrences in the Cobol Area

Table 9 contains information on the less well known occurrences in the Cobol area and Plate 2 shows their location. Appendix B contains the figures and tables of analysis. Of interest are the Anderson (plate 2,#52) and Flat Top Mountain (plate 2, #53 and 54) prospects. Samples from the former assayed up to 0.05 oz. gold per ton and 5000 ppm arsenic while those from the latter assayed up to 2 ppm gold and 10,000 ppm arsenic. Also of significance is a 5.5 foot long sample of altered andesite taken above Fords Arm (plate 2,#55) that assayed 0.02 oz. gold per ton and 0.01 oz. silver per ton.

Slocum Arm Molybdenum Area

Introduction-History

The Slocum Arm Molybdenum Area is located just south of the West Coast gold Area 1.5 miles east of Hidden Cove. Plate 2 delineates the area and shows its geology. It consists of a Triassic greenstone unit

Table 9. - Remainder of the occurrences in the Cobol area

Pl. 2 location Number	Name of propsect or occurrence	Location	Source of info.	App. B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
50	South of Mt. Freeburn occurrence	Iron stained gulch about one mile south of the summit of Mt. Freeburn	This study		A select sample of iron stained schist assayed 30 ppm molybdenum, L silver, L tungsten and 1500 ppm barium.
51	Aksala Prospect	West side of the north end of the Sister L. Anna L. narrows	This study		A sloughed trench was found near the beach and probably near in place quartz blocks containing sulfides are located in the littoral zone. A sample of quartz float assayed 0.05 oz. gold per ton, trace silver, and 2000 ppm arsenic. Staked in 1948.
52	Anderson Prospect	North side of Sisters L. along the Hirst Fault	This study Reed and Coats 1941 p. 124		Located in schist. Reed reports an open cut exposing a N10°W to 25°E striking 72°SE to 75°SW dipping fault zone that contains quartz up to 1 foot thick and a 36 foot adit exposing a fault zone striking N12°W and dipping 72°SW that carries up to 2 feet of quartz and fault gouge. BuMines investigation revealed the adit was caved tight and the open cut mostly caved. A fault zone exposed in the open portion of the caved trench strikes N40°E and dips vertical and contains 0.7 feet of quartz and 0.3 feet of gouge. The quartz assayed 0.05 oz. gold per ton and 5000 ppm arsenic while the gouge assayed 0.1 ppm gold, trace of silver and 1000 ppm arsenic. A sample of quartz from the open cut dump assayed 0.20 ppm gold and 200 ppm arsenic while a select sample of graywacke containing sulfides assayed 1.5 ppm gold and 300 ppm arsenic. Quartz from the adit dump assayed 0.2 ppm gold and 200 ppm arsenic. This prospect and the trace of the Hirst fault are worthy of more detailed examination.

Pl. 2 location Number	Name of propsect or occurrence	Location	Source of info.	App. B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
53	Flat Top Mtn Prospect Sea Level occurrence	South side of Sisters Lake	This study		A sample of quartz float on the beach near where the Chichagof and Hirst faults cross Flat Top Mountain assayed 2 ppm gold and 1000 ppm arsenic.
54	Flat Top Mtn Prospect, upper workings	Flat Top Mtn	This study		A northwesterly striking,steeply dipping fault zone is exposed in a vague pit at an elevation of 1600 feet on the north face of Flat Top Mountain. A 0.05 foot sample of the gouge assayed 1000 ppm chromium and 200 ppm nickel. A sample of quartz float from a caved pit at 165 foot elevation assayed 2 ppm silver and 200 ppm arsenic. A series of claims staked across Flat Top Mtn. in 1946 and 1950 along the major fault that traverses the mountain.
55	2235 Foot Elevation Peak occurrence	About 2 1/2 miles westerly from Fords Arm	This study		Samples taken across a cover surrounded out-cropping of iron stained altered andesite assayed:(1) random grab-1 ppm gold (2) 9 foot long 1 foot spaced chip-nil (3) 5.5 foot long 1 foot spaced chip-0.02 oz. gold/ton and 0.1 oz. per ton silver. The iron stained zones in this area are worthy of detailed examination.
56	West Side Sister Lake occurrence	West side of Sisters Lake	This study		A large number of quartz veins up to 1.3 foot thick that strike N60°-70°E and dip 73°-85°N are exposed in the littoral zone. Four samples across selected veins assayed up to 130ppm lead and 3 ppm silver.
57	Small island east of Shale Island occurrence	Island between Smooth & Rough Channel	This study		A 0.4 foot chip sample across a quartz-filled joint striking N34°E and dipping 63°NW assayed (AAS) 21 ppm gold. Sample contained no other significant metal values and contained nil gold and silver twice by fire assay.

Table 9. - (Continued)

Pl. 2 location Number	Name of propsect or occurrence	Location	Source of info.	App. B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
58	Rough Channel Island occurrence	Island between Rough and Smooth Channels	This study		A 0.35 foot chip across a quartz filled joint striking N50°E and dipping 55°N assayed 0.20 ppm gold.
59	Northeast end of Fords Arm occurrence		This study		A stream sediment sample taken at a creek near sea level contained L. gold. Another stream sediment sample taken at an elevation of 100 ft contained no significant metal values. Leather Neck, Chuck and Anita claims staked in 1946.
60	Northwest of Elf Cove occurrence	Southeast end of small lake	This study		A sample of dike exposed along the trace of a prominent fault zone contained no significant metal values. Chichagof Star Claim staked in 1929 and Luck Lode #1 in 1978.
61	Chichagof Star Prospect	At or near Elf Cove	This study		Samples of quartz float from a stream and a stream sediment sample contained no significant metal values.
62	Southeast end of Sisters Lake occurrence		This study		Stream sediment sample contained 0.05 ppm gold.
63	Deuce Island occurrence	South of Khaz Bay	This study		A fault zone striking N70°E and dipping 50°N is exposed on the beach and contains two quartz veins 0.3 & 0.4 foot thick and a 1 foot thick dike. the dike assayed 0.5ppm gold while one quartz vein assayed 0.15 ppm gold. A 0.3 foot iron stained quartz vein striking N70°E and dipping vertical assayed 1.35ppm gold and 1 ppm silver. A grab sample of a 2 x 40 foot lens of iron-stained greenstone containing sulfides and chalcopyrite assayed 400 ppm gold (AAS) and 670 ppm copper. This sample was rerun by (AAS) and fire assay with the following results: 0.2 ppm gold by AAS and nil gold by repeated fire assay

Table 9. - (Continued)

Pl. 2 location Number	Name of propsect or occurrence	Location	Source of info.	App. B fig. or table #	Description of prospect, workings or occurrence, sample results and comments
64	Island Southeast of Deuce Island	Khaz Bay	This study		The following were exposed on the beach: 0.7 foot thick striking EW and dipping 52°N ribbon quartz vein; 1.4 foot thick dike striking N37°E and dipping 38°NW with 0.1 to 0.35 thick quartz veins along its margines. Samples of the veins contained no significant metal values.
65	Eldorado Placer Prospect	South east end of Fords Arm	This study	Fig. B-9 Table B-9	Eleven pan concentrate and stream sediment samples across the placer basin near sea level contained from nil to 0.90 ppm gold by (AAS). Twelve 6 pound samples across the basin were concentrated and fire assayed and values ranged from nil to 0.0005 oz. gold per ton. Better placer gravels may be located up the creek.
67	North of Cobol occurrence	2390 foot elevation peak east of Slocum Arm	This study		A prominent fault gulch is exposed across the 2390 foot elevation peak. It contains dike up to 7 foot thick and fault gouge up to 1.8 foot thick. A 7 foot long 1/2 foot spaced chip sample across the dike contained 0.05 ppm gold.
69	North Side Island Cove occurrence		This study		Samples taken across graywacke-schist contact exposed on the beach assayed from nil to 0.15 ppm gold. A sample of a 1 foot thick dike striking N20°W & dipping 68°W contained L tungsten.

(Trg) intruded by a discordant Tertiary granodiorite body (Tf).

In 1943 George Bolyan discovered the Slocum Arm molybdenum deposit and in 1952 George Bolyan and his partner Frank Cox staked it with the Moly #1 and #2 claims. Later in 1952 the property was examined by R. Thorne and R. Maloney of the Bureau of Mines who reported the main mineralized zone consisted of a series of ten molybdenum bearing quartz stringers up to 1 foot thick in a sheared zone of graywacke up to 50 feet thick. Analysis of the quartz veins revealed 0.1 to 1 percent molybdenum and a flotation test indicated a very fine grind was necessary to produce a marketable concentrate.

In 1967 the property was restaked by John, Margaret and Katherine Ballard. Plate 12 shows the claims locations. John Ballard wrote a report on the prospect dated 1968 titled "Slocum Arm Molybdenum Prospect". He describes the original claims as being located on a N22°E striking 50°-60°SE dipping major fault zone cutting greenstone that forms a sheared zone 60 feet thick in the hanging wall of the fault at an elevation of 650 feet. This sheared zone contains numerous veins and veinlets containing molybdenum. He further describes tracing the fault over the crest of the mountain ridge to where it intersects another fault zone, striking northwest and dipping steeply to the northeast, which is occupied by a large dike in a strongly metamorphosed zone of altered schistose rock carrying traces of molybdenum mineralization. These claims are currently active.

Present Investigation

Brief examination of the prospect and vicinity revealed the following: molybdenum bearing quartz stringers in a shear zone located in the most southern claim; molybdenum bearing dikes, fault gouge and quartz float from an elevation of 1700 to 2400 feet along the claims; molybdenum bearing quartz veins, dike, and greenstone located about 1000 feet east of the claims in the vicinity of a 2380 ft. elevation peak; and a sample of the Tertiary diorite intrusive 4000 feet east of the claims contained 10 ppm molybdenum. Plate 12 is a geology sample location map of the area and Table A-44 gives the analytical results.

On the most southern claim (Mt. Rinehart Moly Lode) molybdenum quartz stringers were found in a shear zone in the hanging wall of a northeasterly striking southeasterly dipping fault zone in greenstone from an elevation of 700 to 980 feet. The fault forms a deep gulch and plate 12 shows the location and figures 50 and 51 are sketches of the gulch showing the quartz stringers at the two best exposures. Table A-44 gives the analytical results. Samples taken of quartz stringers ranging in thickness from 0.1 to 1.6 feet thick, contain up to 6500 ppm molybdenum and 590 ppm copper. These quartz stringers are composed of quartz, prehnite, and chlorite, with molybdenite and sparse chalcopyrite and pyrite. The quartz stringers at the lower gulch outcrop strike northeasterly and dip southeast while those at the upper gulch outcrop strike north to northeasterly and dip to the east. At the lower exposure the mineralized shear zone is up to 50 feet thick. Cover prevents determination of its thickness at other locations in the gulch.

The steeply dipping, northwesterly striking fault that traverses the longest line of claims is mostly undercover; however, examination from an elevation of 1700 to 2400 feet revealed molybdenum mineralization in intermediate dikes (up to 140 ppm), fault gouge (11 ppm), and quartz float

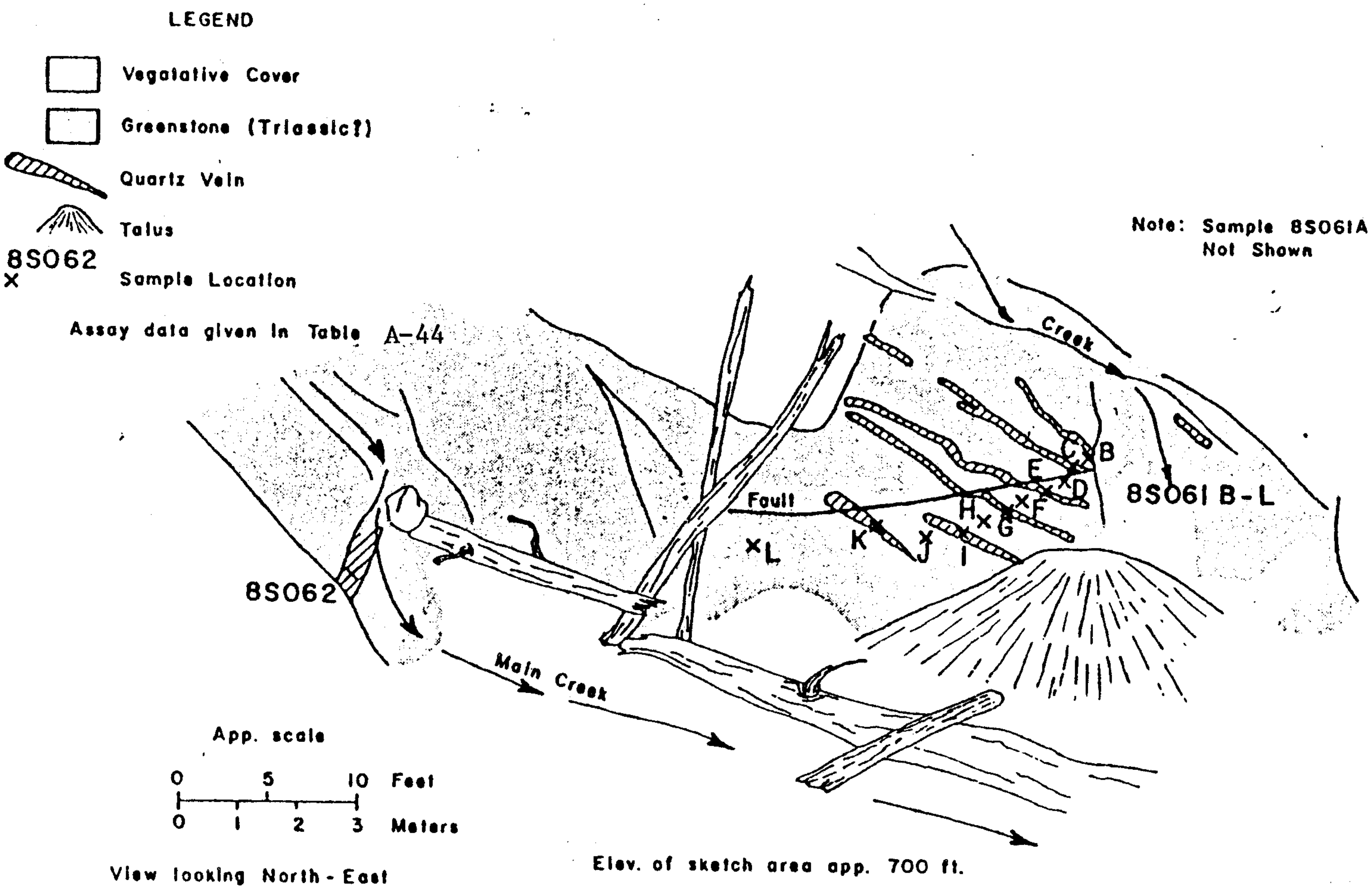


FIGURE 50.-Slocum Arm Molybdenum Prospect lower gulch outcrop sketch, sample locations (Mapped by J. Still and K. Weir, July 1978)

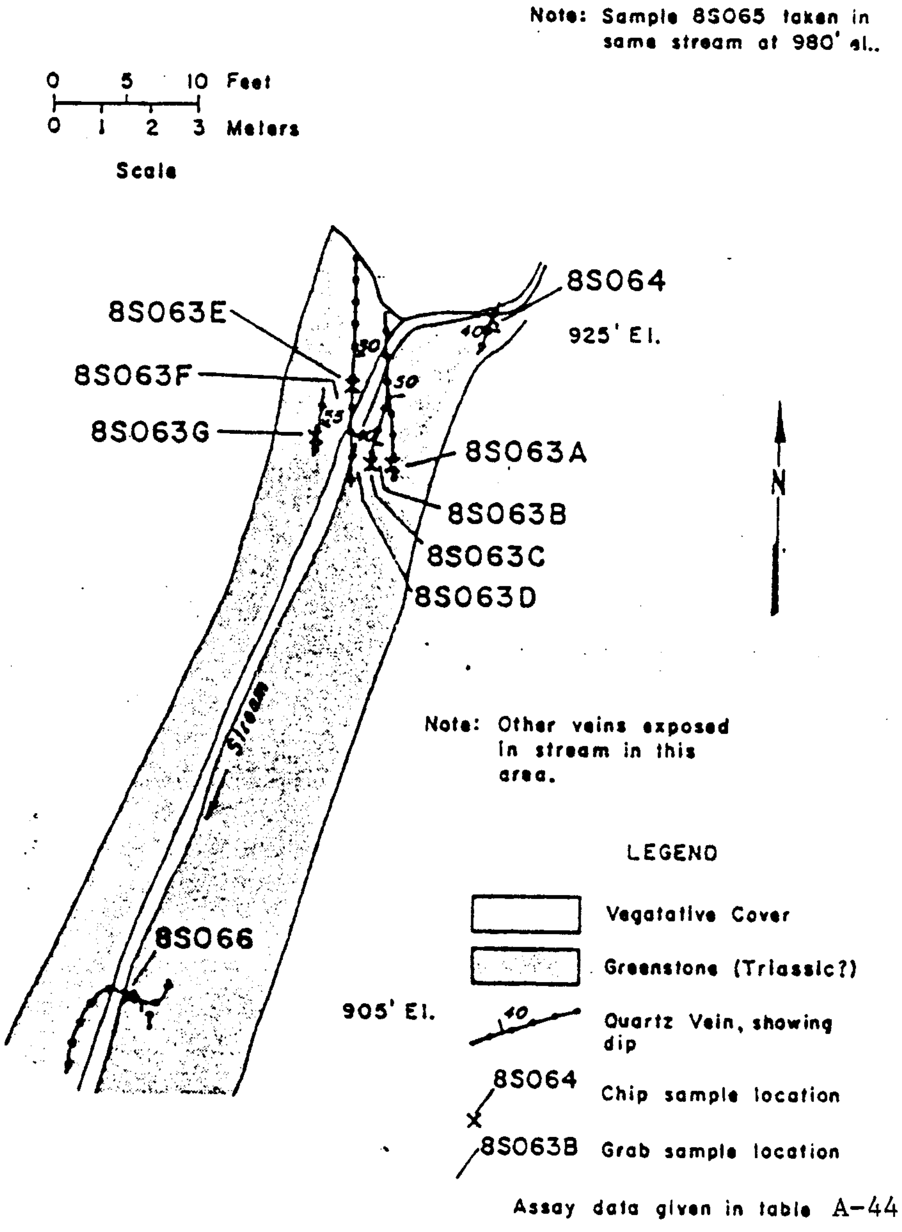


FIGURE 51. Slocum Arm Molybdenum prospect upper gulch outcrop sketch, sample locations. (Mapped by J. Still and K. Weir, July 1978)

(up to 220 ppm).

The area of greenstone in the vicinity of peak 2380, located about 1000 feet east of the claims was examined. Here a series of westerly striking steeply dipping quartz veins in greenstone up to 0.5 foot thick contain up to 5400 ppm molybdenum. A sample of a fresh felsic dike contained up to 190 ppm molybdenum, while a sample of a dioritic sill contained 280 ppm molybdenum. The greenstone contained up to 32 ppm molybdenum.

Molybdenum bearing quartz veins were also found east of peak 2516 (sample #16 and #17) and a sample of the discordant granodiorite intrusive located 4000 feet east of the claims contained 10 ppm molybdenum.

Conclusion

A brief examination revealed molybdenum mineralization in quartz veins, in shear zone quartz stringers in fault gouge, in an assortment of dikes, in greenstone and in a Tertiary granodiorite intrusive, scattered across an area greater than a square mile. Berg (1979) reports an association between Tertiary intrusives and stockwork or porphyry type molybdenum deposits in Southeast Alaska.

Other Investigations

Orange Gulch Gold, Silver, Zinc, Molybdenum Occurrence

The Orange Gulch occurrence was discovered by this study in a deep, cliff - surrounded brushy, brightly iron stained mountain gulch. Plate 2, #72 shows the location. The gulch is controlled by a fault contact between the Mesozoic (MzPzu) unit and the Triassic Goon Dip greenstone (Trg). The discordant Tertiary granodiorite intrusive (Tfd) associated with the Slocum Arm molybdenum occurrences is exposed about 3500 feet to the southwest.

Investigation of the area was hampered by steep, rotten cliffs and thick brush. However, brief investigation of the area revealed a variety of anomalous metals in various rock types. Figure 52 is an aerial photograph of the area showing sample locations and geology and figure 53 shows more detailed sampling. Tables A-45 and A-46 give the analytical results. Fault gouge from the steeply dipping northwesterly striking fault zone contained up to 3400 ppm zinc, 3 ppm silver and 100 ppm molybdenum. Samples of quartz, dike, and phyllite contain up to 0.02 oz. gold per ton and 0.1 oz. silver per ton by fire assay and up to 12 ppm gold and 7 ppm silver by atomic absorption and spectrographic analyses. Spotty gold values may account for poor correlation between fire assay and atomic absorption gold values. Samples from the area also contained up to 5000 ppm barium, 30 ppm tin, 200 ppm arsenic, 1000 ppm vanadium, and 340 ppm copper.

A sample of fault gouge taken 2 1/4 miles to the northwest near the same fault (MzPzu-Trg) contact (plate 2,#73) contained 3 ppm silver, 220 ppm zinc, 50 ppm molybdenum and 700 ppm vanadium. This sample was taken within the large block of USHK claims.

Although none of the metal values from this area are spectacularly high, their variety and persistence greatly encourages additional examination of this little explored area.

CONCLUSIONS-SUMMARY

This report presents the results of a U.S. Bureau of Mines mineral

Figure 52. - Aerial photograph showing Orange Gulch gold, silver, zinc occurrence, sample locations.

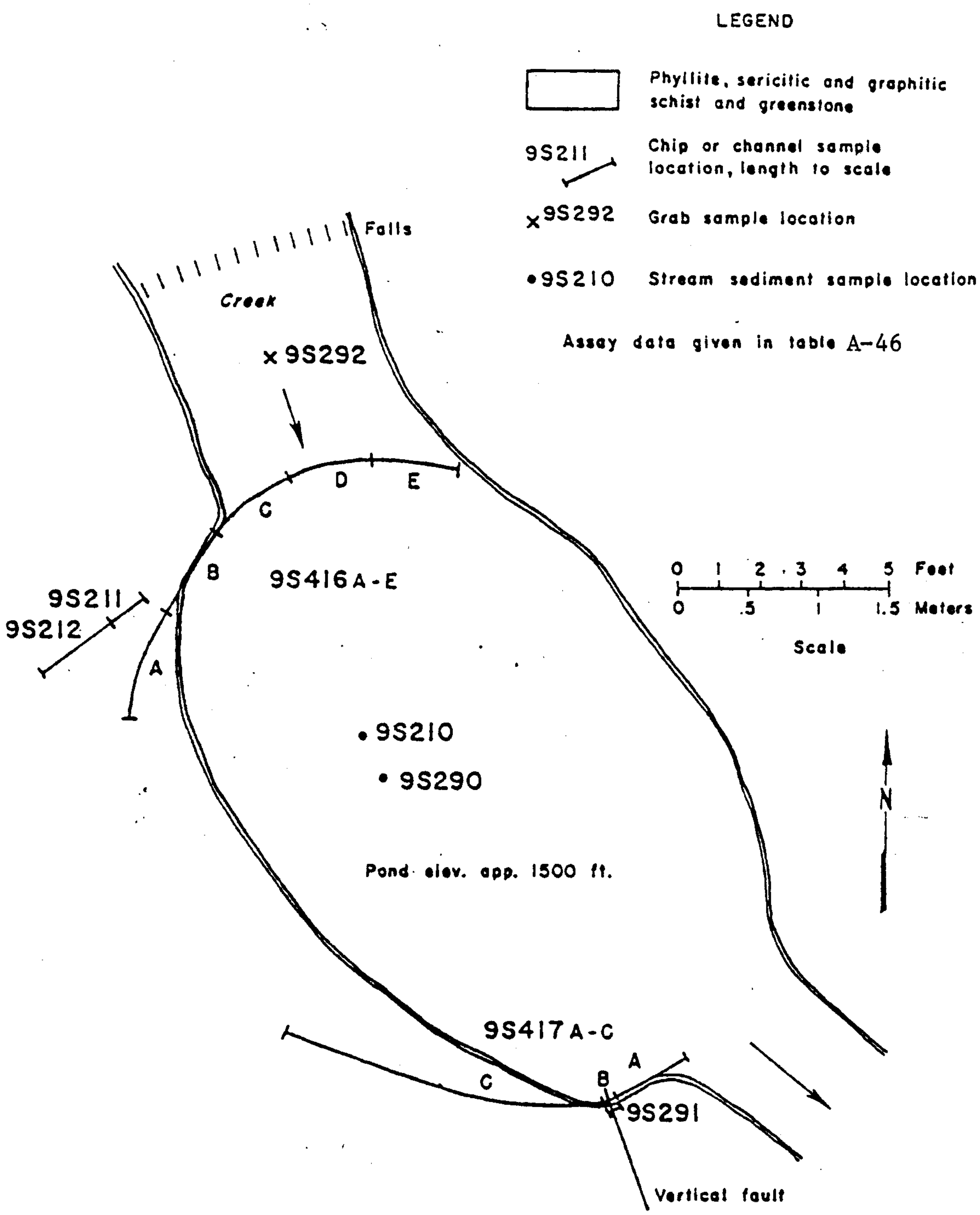


FIGURE. 53.-Orange Gulch pond sketch, sample locations (Mapped by J. Still and K. Weir, July 1979)

survey of national forest land (Tongass National Forest), within the west portion of western Chichagof Island. Figure 1 shows the area studied and its location within the 633 square mile western Chichagof and Yakobi Islands wilderness study area, Southeast Alaska. The study was conducted to inventory mineral resources and to determine mineral potential. Almost all of the west portion of western Chichagof Island is now designated as wilderness (Public Law 96-487, December 2, 1980); however, it is open to mineral entry until December 31, 1983.

The Bureau of Mines survey was coordinated with a U.S. Geological Survey study in the same area, primarily concerned with regional geology and geochemical sampling. Bureau of Mines studies consisted of literature and claims records research; field examinations of mines, prospects, claims and geochemical anomalies; mapping of mineral related structural trends; resource estimates; and economic evaluations.

Based on criteria of production, claim and prospect density, known resources, similar deposit type, and geochemical anomalies, one area of high mineral potential and two areas of moderate mineral potential were delineated within the west portion of western Chichagof Island by this study. The identification of these areas is based mostly on Bureau of Mines field examinations in 1978 and 1979 and studies of previous work by the Bureau of Mines, Alaska Territorial Department of Mines, U.S. Geological Survey and private companies. Some geological and geochemical data generated by the U.S. Geological Survey during a concurrent study of the area was also used. These areas are shown on figure 1 and are as follows:

1. West Coast gold area (8 X 27 miles): This area is characterized by hydrothermal gold-quartz occurrences along a series of northwesterly striking, steeply dipping, shear zones in bedded rock. The western boundary is the Pacific Ocean and the eastern boundary is the eastern contact of the Whitestripe Marble (see plate 2). To the east, past the Whitestripe Marble, the rock type and structure change substantially. The northern boundary is drawn to include the most northwesterly similar gold occurrences in the vicinity of Goulding Harbor and Pinta Bay and the southern boundary includes the occurrences at the abandoned townsite of Cobol. Its most favorable occurrences are the New Chichagof Mining Syndicate Prospect, Falcon Arm Prospect, Golden Hand Apex Mine and Cobol Mine. The mines were small producers. This area is estimated to have moderate potential for the development of fault controlled gold-silver lode deposits.
2. Doolth Mountain area (5 X 6 miles): The most highly mineralized portion of the West Coast gold area and its center of mining activity is designated the Doolth Mountain area. It was delineated to include four mines (inactive), eight prospects with the most evident mineralized material and related structure, a large number of prospects and occurrences, and potential extensions of mineralized zones along faults. It contains most of the 1150 unpatented claims in the West Coast gold area, 52 patented claims, and all of the measured, inferred and hypothetical and marginal gold and silver resources of the study area. Almost all of the production of 793,000 oz. gold and 233,000 oz. silver in this area came from the Chichagoff and Hirst-Chichagof Mines and

they contain all the measured, inferred and hypothetical reserves and marginal reserves of 716,000 oz. gold and 203,000 oz. silver. Most of the production and mining activity occurred between 1905 and 1943. This area is estimated to have high potential for the development of fault controlled gold-silver deposits.

3. Solcum Arm molybdenum area (2 X 6 miles): Twelve claims are recorded in this area and 10 are currently active. Molybdenum mineralization, probably associated with a diorite intrusive, was first discovered in 1942 and is known to exist in a variety of rock types scattered across an area greater than a square mile. The area is extended to include mineralized fault and contact zones. It is estimated to have moderate potential for the development of porphyry or vein type molybdenum deposits.

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Appendix A. Assay data tables (except remainder of occurrence tables)

TABLE A-1. Assay data [illegible]den Gate area map samples

		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S013	Grab	-		Nil	Nil	0.1	N	200	5	5	30	N	Quartz in fault zone
8S014	Dump Select Grab	-		2.27	0.8	130.0	30.0	200	30	400	300	N	Quartz on dump
8S015	Cont. Chip	2.0	61	Nil	Tr	0.20	N	N	30	20	80	N	Fault zone & quartz stringers
9S054	Grab	-		0.19	.2	5.5	N	N	5	5	5	N	Quartz block in pit 1/2 thick
8S072	do.	-		1.38	1.0	63.0	15.0	L	5	90	15	L	Quartz vein on floor
8S073	do.	-		Nil	Nil	0.30	0.7	N	40	25	100	L	Wall rock from 8S072
8S074	Dump Select Grab	-		.49	.1	20.0	15.0	L	L(5)	45	10	L	Quartz on dump
8S075	Grab	-		No Assay		.10	N	N	25	20	80	L	Graywacke on dump
8S076A	Chip	3.0	91	No Assay		4.0	2.0	L	30	30	90	L	Qtz. str, in fault zone & Gwk
8S076B	do.	0.7	21	Nil	Nil	1.0	.05	200	L(5)	10	10	L	Quartz vein
8S076C	do.	2.8	85	Nil	Nil	N(.05)	N	N	25	20	80	L	Wall rock from 8S076B
8S077	do.	0.9	27	.05	Tr	2.0	2.0	700	25	25	85	L	Fault gouge
8S078	Dump Select Grab	-		.045	Tr	.7	L	L	L(5)	5	L(5)	L	Quartz on dump
8S079	Dump Grab	-		.02	Tr	.50	L	N	25	20	80	N	Graywacke on dump
8S082	Dump Select Grab	-		.97	.3	64.0	3.0	1500	10	150	55	50	Quartz on dump
8S083	Grab	-		.10	.1	.25	15.0	N	25	20	95	N	Graywacke on dump
8S153A	Chip	0.75	23	No Assay		.45	N	3000	200	20	90	N	Fault gouge
8S153B	do.	0.9	27	3.09	1.0	130.0	20.0	7000	70	380	55	N	Quartz vein and graywacke
8S153C	do.	0.9	27	No Assay		4.0	3.0	1000	30	80	30	N	Quartz breccia & some Gwk
9S144	Grab	-		.015	.1	-	-	-	-	-	-	-	Quartz vein not in place
9S424	Float	-		No Assay		N(.05)	N	N	50	25	80	N	Quartz, graywacke, dike
9S425A	Chip	0.19	6	No Assay		N(.05)	N	N	60	30	140	N	Fault zone
9S425B	Channel	1.7	52	No Assay		N(.05)	N	N	60	25	120	N	do.
9S425C	do.	1.9	58	No Assay		N.(05)	N	N	60	25	120	N	do.
9S425D	do.	1.95	59	No Assay		N(.05)	N	200	65	20	120	N	do.
9S425E	do.	0.05	1.5	No Assay		N(.05)	N	N	15	15	30	N	do.
9S499	Chip	0.45	1.4	.10	Tr	4.0	.5	N	10	35	20	N	Quartz and sulfides

Qtz = Quartz   Gwk = Graywacke   Str = Stringers

TABLE A-2.- Assay data, Golden Gate No. 3 drift, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S056A	Chip	0.83	25	Nil	Nil	0.20	N	N	65	H 20	90	N	Shaly graywacke
9S056B	Channel	1.32	40	0.94	0.5	92.0	5	500	L(5)	140	65	N	Quartz & crushed quartz vein
9S056C	Chip	1.10	34	.03	.3	1.0	N	N	30	15	80	N	Graywacke and sulfides
9S057A	Channel	1.0	30	.29	.3	-	-	-	-	-	-	-	Quartz breccia,25% graywacke
9S057B	Chip	2.8	85	.02	.2	-	-	-	-	-	-	-	Graywacke
9S058A	Channel	0.4	12	.10	.2	5.0	0.5	200	5	15	25	N	Quartz breccia,15% graywacke
9S058B	Chip	2.6	79	Nil	.1	0.20	N	N	35	20	95	N	Graywacke
9S059A	Channel	0.4	12	.14	.1	6.5	3	700	15	H 20	50	N	Fault Gouge & Quartz vein
9S059B	Chip	3.7	113	Nil	Tr	.30	N	N	40	15	95	N	Graywacke & quartz stringers
9S060A	Channel Chip	1.3	40	Nil	Tr	-	-	-	-	-	-	-	Graywacke
9S060B	Channel	0.5	15	.07	.3	-	-	-	-	-	-	-	Quartz vein & fault gouge
9S060C	Cont. Chip	4.0	122	Nil	Tr	-	-	-	-	-	-	-	Graywacke
9S061A	Chip	1.70	52	.01	.2	.80	N	700	25	20	65	N	Graywacke & quartz vein
9S061B	Channel	0.55	17	.66	.2	39.0	5	200	15	70	50	N	Quartz vein, some graywacke
9S061C	Chip	2.50	76	Nil	Tr	.10	N	N	35	20	110	N	Graywacke & quartz vein
9S062A	Channel	1.0	30	.05	.1	4.0	1	200	35	H 20	75	N	Breccia-Gwk-fault gouge&quartz
9S062B	do.	0.5	15	1.18	.4	61.0	7	N	5	H 45	35	N	Quartz vein,25% graywacke
9S062C	Chip	2.8	85	.03	Tr	3.0	N	N	35	20	95	N	Graywacke
9S063	Channel	0.7	21	.55	.2	30.0	3	1500	20	H 45	30	N	Quartz vein, some graywacke
9S064A	do.	1.2	37	Nil	Tr	-	-	-	-	-	-	-	Fault gouge,graywacke,some qtz
9S064B	do.	0.55	17	.30	.1	-	-	-	-	-	-	-	Quartz vein,10% graywacke
9S064C	Chip	1.2	37	Nil	Tr	-	-	-	-	-	-	-	Graywacke
9S065A	do.	1.90	58	.02	.2	.50	N	N	35	20	90	N	Fault gouge,graywacke & quartz
9S065B	Channel	0.85	26	.24	.3	15.0	3	N	40	10	80	N	Quartz vein
9S066A	Cont. Chip	3.7	113	.02	.2	.90	N	1500	40	20	95	N	Graywacke, quartz & breccia
9S066B	Channel	0.7	21	.25	.3	26.0	3	N	5	H 40	30	N	Quartz vein,15% graywacke
9S067A	Chip	3.5	107	.01	.2	.30	N	700	40	15	100	N	Graywacke,fault gouge,some qtz
9S067B	Channel	0.4	12	.23	.3	13.0	3	N	5	70	55	N	Quartz vein
9S067C	Chip	0.5	15	.04	.2	2.5	5	700	5	150	75	N	Graywacke,qtz.vein,fault gouge
9S068A	do.	2.8	85	.005	.2	-	-	-	-	-	-	-	Graywacke qtz.str. fault gouge
9S068B	Channel	1.0	30	.03	.4	-	-	-	-	-	-	-	Some quartz, 60% graywacke and fault gouge

TABLE A-3. - Assay data, Big Croppings veins, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S054	Grab	0.5	15	0.19	0.2	5.5	N	N	5	5	5	N	Quartz,graywacke,breccia
9S055	Cont. Chip	5.0	152	.19	.3	8.5	N	N	15	N (5)	5	N	Quartz float,5'x20'x20'
9S151	Chip	0.8	24	.285	.1	21	N	200	L(5)	5	L(5)	N	Quartz float
9S361A	do.	0.85	26	.18	Tr	-	-	-	-	-	-	-	Quartz vein
9S361B	do.	2.0	61	.22	Tr	-	-	-	-	-	-	-	Quartz vein
9S362A	do.	0.5	15	.065	Tr	-	-	-	-	-	-	-	Ribbon quartz
9S362B	do.	1.8	55	.78	.4	-	-	-	-	-	-	-	Ribbon quartz
9S363A	do.	1.6	49	.51	Tr	-	-	-	-	-	-	-	Quartz vein
9S363B	do.	1.2	37	.05	Tr	-	-	-	-	-	-	-	Quartz vein
9S364	do.	1.8	55	.015	.1	-	-	-	-	-	-	-	Quartz (part of vein)
9S365A	do.	0.5	15	.03	Tr	-	-	-	-	-	-	-	Ribbon quartz
9S365B	do.	3.2	98	.325	.1	-	-	-	-	-	-	-	Massive & ribbon quartz
9S365C	do.	0.5	15	.04	.1	-	-	-	-	-	-	-	Ribbon quartz
9S366A	do.	3.6	110	.315	.1	-	-	-	-	-	-	-	Ribbon and massive quartz
9S367A	do.	0.5	15	.27	Tr	-	-	-	-	-	-	-	Ribbon quartz and sulfides
9S367B	do.	2.2	67	.15	Tr	-	-	-	-	-	-	-	Massive and ribbon quartz
9S368A	do.	0.4	12	.015	Tr	-	-	-	-	-	-	-	Quartz vein
9S368B	do.	1.9	58	.01	Tr	-	-	-	-	-	-	-	Quartz vein
9S369	do.	0.4	12	.005	.1	-	-	-	-	-	-	-	Quartz (part of vein)
9S370	Grab	-		.215	Tr	-	-	-	-	-	-	-	Quartz fragment in pit
9S371A	Chip	0.7	21	.115	Tr	4.5	0.5	N	5	5	10	N	Ribbon quartz / quartz block not
9S371B	do.	3.6	110	.175	Tr	6.0	N	N	N (5)	L(5)	L(5)	N	Ribbon quartz / in place 5x8x12
9S497A	do.	2.3	70	.12	Tr	16.0	.5	1500	5	10	5	N	Massive,some ribbon quartz
9S497B	do.	2.5	76	.57	.2	10.0	1.0	1000	5	10	5	N	Ribbon quartz
9S497C	do.	2.5	76	.10	.1	3.2	1.0	N	5	L(5)	10	N	Ribbon quartz
9S497D	do.	0.6	18	.05	.1	1.5	N	N	5	5	10	N	Ribbon quartz, fault gouge
9S498A	do.	2.7	82	.51	.2	-	-	-	-	-	-	-	Ribbon quartz 9S498 A-E
9S498B	do.	3.0	91	.30	.2	-	-	-	-	-	-	-	Ribbon quartz

TABLE A-3.- Assay data, Big Croppings veins, samples (cont.)

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S498C	Chip	0.1	3	0.10	0.1	-	-	-	-	-	-	-	Fault gouge
9S498D	do.	1.6	49	.09	.1	-	-	-	-	-	-	-	Quartz,graywacke
9S498E	do.	0.55	17	.10	.1	-	-	-	-	-	-	-	Rotten quartz
9S499	do.	0.45	14	.10	Tr	4.0	0.5	N	10	35	20	N	Quartz and sulfides (float)

TABLE A-4. - Assay data, Rising Sun adit - Over the Hill trench (Chichagof Fault notch)

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million AA	Spec	Spec	AA	AA	AA	Spec	
Sample	Type	Feet	CM	AU	AG	AU	AG	AS	CU	PB	ZN	W	Description
9S142A	Chip	0.7	21	Tr	0.1	0.10	N	N	50	20	110	N	Graywacke and sulfides
9S142B	Channel	0.5	15	0.05	.1	2.0	.5	200	10	10	30	N	Quartz vein and sulfides
9S142C	do.	0.1	3	.11	.2	4.0	1	700	25	H 20	110	N	Fault gouge,quartz,sulfides
9S142D	Chip	0.7	21	.025	Tr	.80	.5	300	40	20	95	N	Graywacke and sulfides
9S143	Channel	0.7	21	.015	Tr	-	-	-	-	-	-	-	Quartz vein
9S144	Grab	-	-	.015	.1	-	-	-	-	-	-	-	Quartz vein (not in place)

TABLE A-5. - Assay data, OB adit, samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S279A	Chip	0.71	21	Nil	Nil	0.60	N	N	40	H 35	80	N	Quartz and fault gouge
8S279B	do.	3.33	101	Nil	Nil	.25	N	N	50	20	100	N	Graywacke and fault gouge
8S280A	do.	1.1	34	Nil	Nil	.70	N	N	50	35	110	N	do.
8S280B	do.	1.3	40	0.20	Tr	2.8	10	N	25	H 300	100	N	Quartz vein,some fault gouge
8S281A	do.	0.54	16	.03	Tr	1.25	.5	N	50	H 70	90	N	Fault gouge & quartz
8S281B	do.	0.33	10	Tr	Tr	.20	1	1000	15	H 90	80	N	Quartz veins & fault gouge
8S282A	do.	2.3	70	Nil	Nil	.75	N	N	55	H 20	70	N	Graywacke and quartz
8S282B	do.	2.38	73	.02	Tr	1.05	N	N	50	H 30	70	N	Graywacke and fault gouge
8S283A	do.	2.1	64	Nil	Nil	.30	.5	N	45	15	65	N	Dike
8S283B	Channel	1.1	34	.06	0.1	1.50	.5	1500	25	H 70	95	N	Qtz crushed,qtz&Gwk & flt. G.
8S283C	do.	0.7	21	Nil	Nil	.30	.5	N	45	H 30	50	N	Fault gouge and graywacke
8S284	Chip	1.67	51	.10	Tr	2.0	.5	N	20	H 70	80	N	Quartz,fault G & graywacke
8S285A	do.	4.0	122	Nil	.1	N	.5	N	50	15	100	N	Graywacke and some quartz
8S285B	do.	1.42	43	Nil	Tr	.75	.5	N	20	H 90	90	N	Quartz and fault gouge
8S286A	do.	3.7	113	Nil	Tr	N	N	N	40	10	80	N	Graywacke
8S286B	do.	0.33	10	Nil	Tr	N	N	N	20	H 10	80	N	Quartz vein and fault gouge
8S287A	do.	0.8	24	Nil	.1	N	N	N	30	10	70	N	Quartz,graywacke&fault gouge
8S287B	do.	1.4	43	Nil	.1	N	N	N	25	5	90	N	Graywacke,fault G.&some qtz
8S288	do.	0.25	8	Nil	Nil	N	N	N	20	N(5)	40	N	Quartz vein
8S289	Select Dump Grab	-	-	.12	.1	4.60	1	N	10	H 130	90	N	Quartz from dump

flt = fault G = gouge

TABLE A-6. - Assay data, Aurum lower adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S300	Chip	0.92	28	Nil	Nil	40.0	N	N	30	5	85	N	Fault quartz,mineralized gouge,vein graywacke
8S301	do.	0.15	5	Nil	Nil	0.2	N	N	20	H 15	50	N	Quartz vein and breccia
8S302	do.	0.1	3	Nil	Nil	0.4	0.5	N	15	H 15	30	N	Quartz vein
8S303	do.	0.67	20	3.19	1.0	60.0	10.0	N	10	H 940	160	N	Quartz vein and sulfides
8S304	Select Dump Grab	-	-	6.515	1.8	200.0	15.0	N	10	H 500	320	N	Quartz and Galena
8S305	do.	-	-	3.205	1.2	100.0	15.0	N	5	1900	400	N	do.

TABLE A-7. - Assay data, Aurum upper adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S145A	Channel	0.1	3	0.105	0.1	4.0	0.5	G 10,000	50	15	95	L	Fault gouge, quartz breccia, hanging wall
9S145B	do.	1.3	40	.05	Tr	0.50	N	10,000	N	L	5	N	Quartz vein -arsenopyrite
9S146A	do.	0.1	3	Tr	Tr	.55	N	700	55	25	120	N	Fault gouge and graywacke
9S146B	do.	0.4	12	.355	.1	17.0	3	G 10,000	10	20	25	N	Quartz vein, fault gouge, footwall
9S147A	do.	1.13	34	.05	.1	-	-	-	-	-	-	-	Quartz and sulfides
9S147B	Chip	2.4	73	.02	.1	-	-	-	-	-	-	-	Graywacke, fault gouge,quartz
9S147C	Channel	0.35	11	.22	.2	-	-	-	-	-	-	-	Quartz, some fault gouge
9S148	do.	1.0	30	.04	.1	-	-	-	-	-	-	-	Quartz,sulfides,arsenopyrite
9S149	Dump Grab	-	-	.04	.1	2.0	N	10,000	L	5	15	N	Quartz, arsenopyrite
8S299	Stream sediment	-	-	-	-	.85	N	N	50	25	90	N	In deep gulch below adit not shown on map

TABLE A-8. - Assay data, Sitka upper adit - Sitka lower adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
Upper adit area samples													
9S236	Dump	0.2	6	0.47	0.2	-	-	-	-	-	-	-	Quartz, Au and graywacke
9S237	Chip	0.2	6	.02	.2	-	-	-	-	-	-	-	Quartz vein breccia
9S238A	Channel	0.1	3	.20	.2	-	-	-	-	-	-	-	Quartz vein
9S238B	do.	0.2	6	Nil	Nil	-	-	-	-	-	-	-	do.
9S238C	do.	0.25	8	Nil	Nil	-	-	-	-	-	-	-	do.
9S238D	do.	0.25	8	6.735	1.6	100	70	700	10	880	570	N	Quartz vein, Au, Pb, pyrite, chalcopyrite
9S238E	do.	0.15	5	Tr	Tr	-	-	-	-	-	-	-	Quartz vein
9S238F	do.	0.1	3	Nil	Nil	-	-	-	-	-	-	-	do.
9S238G	do.	0.1	3	.015	Tr	-	-	-	-	-	-	-	do.
Lower adit samples													
9S239	Chip	0.4	12	Nil	Nil	0.25	N	700	5	15	35	N	Quartz,fault gouge graywacke
9S240	do.	0.4	12	Nil	Nil	-	-	-	-	-	-	-	Fault gouge,graywacke
9S241	do.	0.25	8	Nil	Nil	-	-	-	-	-	-	-	Fault gouge,quartz,breccia
9S242	do.	0.43	13	Nil	Nil	-	-	-	-	-	-	-	Fault gouge,some quartz breccia

TABLE A-9. - Assay data Chichagoff tailings samples

Map No.	Sample	Type	Sample Length Feet	Cm	Oz./Ton Fire Assay Au	Ag	Description
39	9S035	Tailings	0.5	15	0.1	0.2	Shovel
40	9S036	do.	1.0	30	.18	.3	do.
41	9S037	do.	1.0	30	.13	.2	do.
42	9S030	do.	1.0	30	.08	.2	do.
43	9S031	do.	1.0	30	.11	.2	do.
44	9S032	do.	1.0	30	.09	.2	do.
45	9S033	do.	1.0	30	.08	Tr	do.
46	9S034	do.	1.0	30	.18	.3	do.
47	9S327	do.	1.8	55	.15	.1	Shelby tube
48	9S326	do.	1.8	55	.08	Tr	do.
49	9S325	do.	1.7	52	.09	Tr	do.
50	9S324	do.	1.8	55	.06	Tr	do.
51	9S323	do.	1.7	52	.09	Tr	do.
52	9S322	do.	1.7	52	.075	Tr	do.
53	9S321	do.	1.7	52	.11	Tr	do.
54A	9S415A	do.	2.0	61	.23	.1	Channel in bluff
54B	9S415B	do.	2.0	61	.13	Tr	do.
54C	9S415C	do.	1.9	58	.28	.2	do.
54D	9S415D	do.	0.8	24	.22	.1	Shovel
55	9S414	do.	0.8	24	.155	.1	do.
56A	9S328A	do.	1.5	46	.14	Tr	Channel in bluff
56B	9S328B	do.	1.5	46	.06	Tr	do.
56C	9S328C	do.	1.5	46	.065	Tr	do.
56D	9S328D	do.	1.72	52	.16	Tr	Shelby Tube
57	9S311	do.	1.8	55	.115	Tr	do.
58	9S312	do.	1.9	58	.11	Tr	do.
59	9S313	do.	1.8	55	.175	.1	do.
60	9S314	do.	1.0	30	.185	.1	Shovel
61	9S315	do.	1.7	52	.115	Tr	Shelby Tube
62	9S316	do.	1.8	55	.145	.1	do.
63	9S317	do.	1.8	55	.105	.1	do.
64	9S318	do.	1.8	55	.105	.1	do.
65	9S319	do.	1.8	55	.115	.1	do.
66	9S320	do.	1.8	55	.09	Tr	do.
67	9S304	do.	1.0	30	.08	Tr	Shovel
68	9S303	do.	1.0	30	.075	Tr	do.
69	9S302	do.	.75	23	.08	Tr	Shelby Tube
70	9S301	do.	1.9	58	.085	Tr	do.
71	9S300	do.	1.8	55	.10	.2	do.
72	9S299	do.	1.8	55	.09	Tr	do.
73	9S298	do.	1.8	55	.08	Tr	do.
74	9S297	do.	1.75	53	.08	Tr	do.

TABLE A-10. - Assay data, Chichagoff dump. samples

Map No.	Sample	Type	Analysis Sample Length Feet	Cm	Oz./Ton Fire Assay Au	Ag	Description
1	9S029	Dump	0.5	15	0.04	0.2	Graywacke and quartz
1A	9S029A	Select qtz	-		.02	.2	Quartz
2	9S028	Dump	.5	15	.01	.2	Graywacke and Quartz
2A	9S028A	Select qtz	-		.01	.1	Quartz
3	9S011	Dump	.5	15	.01	Tr	Graywacke and quartz
3A	9S011A	Select qtz	-		.06	Tr	Quartz
4	9S012	Dump	.5	15	.02	Tr	Graywacke and quartz
4A	9S012A	Select qtz	-		.21	.3	Quartz
5	9S013	Dump	.5	15	.025	.1	Graywacke and quartz
5A	9S013A	Select qtz	-		.105	.1	Quartz
6	9S020	Dump	.5	15	.01	.1	Graywacke and quartz
6A	9S020A	Select qtz	-		.90	.5	Quartz
7	9S021	Dump	.5	15	.035	.2	Graywacke and quartz
7A	9S021A	Select qtz	-		.06	.3	Quartz
8	9S014	Dump	.5	15	.04	.3	Graywacke and quartz
8A	9S014A	Select qtz	-		.22	.4	Quartz
9	9S015	Dump	.5	15	.05	.2	Graywacke and quartz
9A	9S015A	Select qtz	-		.01	.1	Quartz
10	9S016	Dump	.5	15	.05	.2	Graywacke and quartz
10A	9S016A	Select qtz	-		.065	.4	Quartz
11	9S017	Dump	.5	15	.005	.1	Graywacke and quartz
11A	9S017A	Select qtz	-		.32	.4	Quartz
12	9S018	Dump	.5	15	.01	.2	Graywacke and quartz
12A	9S018A	Select qtz	-		.102	.4	Quartz
13	9S019	Dump	.5	15	.035	.2	Graywacke and quartz
13A	9S019A	Select qtz	-		.45	.8	Quartz
14	9S038	Dump	.5	15	Nil	.2	Graywacke and quartz
14A	9S038A	Select qtz	-		.01	.2	Quartz
15	9S039	Dump	.5	15	Nil	.2	Graywacke and quartz
15A	9S039A	Select qtz	-		.03	.2	
16	9S040	Dump	.5	15	Nil	.2	Graywacke and quartz
16A	9S040A	Select qtz	-		Nil	Tr	
17	9S406	Dump	1.0	30	.09	.2	Graywacke and quartz
18	9S407	do.	1.0	30	.01	.2	do.
19	9S408	do.	1.0	30	.07	Tr	do.
20	9S409	do.	1.0	30	Tr	Tr	do.
21	9S410	do.	1.0	30	Nil	Nil	do.
22	9S411	do.	1.0	30	.04	Tr	do.
23	9S412	do.	.5	15	.05	Tr	do.
23A	9S412A	Select qtz	-		.03	Tr	
24	9S413	Dump	.5	15	.01	Tr	Graywacke and quartz
24A	9S413A	Select qtz	-		Tr	Tr	Quartz
25	9S022	Dump	.5	15	.005	.1	Graywacke and quartz
25A	9S022A	Select qtz	-		.06	.1	Quartz
26	9S023	Dump	.5	15	.035	.2	Graywacke and quartz
26A	9S023A	Select qtz	-		.035	.1	Quartz
27	9S024	Dump	.5	15	.06	.2	Graywacke and quartz
27A	9S024A	Select qtz	-		.12	.3	Quartz

TABLE A-10. - Assay data, Chichagoff dump. samples (cont.)

Map No.	Sample	Type	Analysis: Sample Length Feet	Cm	Oz./Ton Fire Assay Au	Ag	Description
28	9S025	Dump	0.5	15	0.01	0.3	Graywacke and quartz
28A	9S025A	Select qtz	-		.01	.1	Quartz
29	9S026	Dump	.5	15	.01	.2	Graywacke and quartz
29A	9S026A	Select qtz	-		.12	.2	Quartz
30	9S027	Dump	.5	15	.01	.2	Graywacke and quartz
30A	9S027A	Select qtz	-		.03	.2	Quartz
31	9S045	Dump	.5	15	.19	.3	Graywacke and quartz
31A	9S045A	Select qtz	-		.03	.3	Quartz
32	9S046	Dump	.5	15	.02	.3	Graywacke and quartz
32A	9S046A	Select qtz	-		.04	.3	Quartz
33	9S047	Dump	.5	15	.005	.2	Graywacke and quartz
33A	9S047A	Select qtz	-		No Assay		Quartz
34	9S048	Dump	.5	15	Nil	Nil	Graywacke and quartz
34A	9S048A	Select qtz	-		.01	.2	Quartz
35	9S041	Dump	.5	15	.23	.3	Graywacke and quartz
35A	9S041A	Select qtz	-		.09	.2	Quartz
36	9S042	Dump	.5	15	.04	.3	Graywacke and quartz
36A	9S042A	Select qtz	-		.23	.3	Quartz
37	9S043	Dump	.5	15	Tr	Tr	Graywacke and quartz
38	9S044	Dump	.5	15	Tr	Tr	do.

TABLE A-11. - Assay data, Hirst-Chichagof 450 foot elevation drift and surface, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S160A	Chip	1.7	52	0.12	0.1	4.5	3	1000	85	20	130	N	Graywacke fault gouge
9S160B	do.	1.7	52	.75	.8	39.0	15	2000	30	40	40	N	Quartz some fault gouge
9S160C	do.	2.1	64	.31	.2	12.0	3	10000	15	35	35	N	Quartz vein
9S161A	do.	0.05	1.5	.21	Tr	6.5	3	1000	70	25	80	L	Fault gouge
9S161B	Channel	1.13	34	.13	Tr	4.5	2	2000	15	10	40	N	Quartz
9S161C	do.	0.93	28	.055	.1	2.0	N	2000	25	10	65	N	Quartz fault gouge
9S162A	Chip	0.3	9	.175	.1	7.0	7	2000	90	40	160	L	Fault gouge and graywacke
9S162B	do.	1.3	40	1.688	.3	56.0	100	2000	20	60	25	L	Quartz,some fault gouge and graywacke
9S162C	do.	0.4	12	.482	.2	17.0	15	5000	35	20	45	L	Fault gouge,& quartz breccia
9S164	Float	0.3	9	.08	.1	3.5	N	500	10	10	10	N	Quartz from creek above pits
9S165	Chip	0.65	20	Tr	Tr	0.60	N	200	N(5)	N(5)	5	N	Quartz float
9S166	Grab	-	-	.21	Tr	5.5	N	700	L(5)	10	10	N	Quartz fragments dug from pit
9S167	do.	-	-	.64	.2	30.0	15	700	L(5)	20	10	N	do.
8S003	do.	-	-	No Assay		58.0	5	N	30	35	15	L	Quartz float

TABLE A-12. - Assay data Elsinor adit, samples

		Analysis												
				Oz./Ton		Parts per Million								
		Sample Length		Fire Assay		AA	Spec	Spec	AA	AA	AA	Spec		
Sample	Type	Feet	cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description	
8S235A	Chip	0.4	12	0.01	.1	0.9	N	N	60	10	130	N	Graywacke	
8S235B	do.	0.8	24	.015	Tr	.5	N	N	25	L	35	N	Quartz vein and graywacke	
8S235C	do.	0.42	13	.15	Tr	.6	N	N	10	10	70	N	Graywacke	
8S235D	do.	0.69	21	Nil	Nil	.1	N	N	10	5	25	N	Quartz vein and breccia	
8S235E	do.	3.0	91	Nil	Nil	.4	1.0	N	45	15	95	N	Graywacke and some quartz	
8S235F	do.	0.46	14	Nil	Nil	.25	N	N	20	5	30	N	Quartz vein	
8S236A	do.	1.2	37	.02	Tr	1.10	N	N	20	5	45	N	Quartz,graywacke,breccia zone	
8S236B	do.	2.4	73	.03	Tr	1.10	N	N	35	5	45	N	do	
8S236C	do.	2.1	64	Nil	.1	.4	.5	N	30	10	75	N	Graywacke	
8S236D	Channel	0.26	8	Nil	.1	.4	N	N	10	N	10	N	Quartz vein	
8S237	Chip	1.9	58	Nil	Nil	.1	N	500	10	N	5	N	Irregular quartz vein	
8S238A	do.	0.7	21	Nil	Nil	.1	N	L	10	H 10	15	N	do	
8S238B	do.	0.7	21	Nil	Nil	.4	N	300	20	5	30	N	Quartz vein and fault gouge	
8S238C	Channel	0.2	6	Nil	Nil	N	N	N	10	H 10	10	N	Quartz vein	
8S239A	Chip	1.0	30	Nil	Nil	N	N	N	20	10	55	N	Graywacke and some quartz	
8S239B	do.	0.2	6	Nil	.4	N	N	500	20	5	30	N	Quartz vein on fault	
8S239C	do.	2.0	61	Nil	Nil	.5	N	N	35	10	70	N	Graywacke	
8S240	Dump Grab	-	-	Nil	.1	N	N	N	10	10	N	N	Quartz	Taken of Elsinor adit dump not shown on map
8S241	do.	-	-	Nil	Nil	.12	N	N	35	10	95	N	Graywacke	

TABLE A-13. - Assay data, Sunday Queen adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S225	Chip	0.025	0.8	Nil	Nil	N	N	N	15	15	65	N	Quartz vein,graywacke
9S226	do.	0.05	1.5	Nil	Nil	-	-	-	-	-	-	-	Quartz vein,greenstone
9S227	Dump	-	-	Nil	Nil	-	-	-	-	-	-	-	Quartz

TABLE A-14. - Assay data, Tillson adit, samples

Sample	Type	Analysis: Sample Length, Feet	Sample Length, Cm	Oz./Ton Fire Assay, Au	Oz./Ton Fire Assay, Ag	Parts per Million: AAS Au	Spec Ag	Spec As	AAS Cu	AAS Pb	AAS Zn	Spec W	Description
9S267A	Channel	0.7	21	Tr	Tr	0.15	N	1500	L(5)	5	10	N	Brecciated quartz vein
9S267B	do.	1.8	55	Tr	Tr	.15	N	1500	60	20	150	N	Brecciated graywacke & quartz
9S267C	do.	1.2	37	Tr	Tr	.10	N	700	20	10	70	N	Brecciated graywacke and some quartz
9S267D	do.	0.9	27	Nil	Nil	.10	N	1500	L(5)	5	25	N	Quartz vein,brecciated quartz graywacke
9S267.5	do.	1.2	37	Tr	Tr	-	-	-	-	-	-	-	Brecciated quartz vein
9S268A	Chip	2.3	70	Tr	Tr	-	-	-	-	-	-	-	Graywacke,quartz,fault gouge
9S268B	Channel	2.1	64	Tr	Tr	-	-	-	-	-	-	-	Graywacke and quartz
9S268C	do.	1.0	30	Tr	Tr	-	-	-	-	-	-	-	Quartz vein
9S268.5	do.	1.1	34	Tr	Tr	-	-	-	-	-	-	-	do.
9S269A	Chip	0.8	24	Tr	Tr	.20	.5	1000	30	20	90	N	Fault gouge
9S269B	Channel	0.6	18	Tr	Tr	.10	N	1500	N(5)	30	25	N	Brecciated quartz vein
9S270A	Chip	1.4	43	Tr	Tr	-	-	-	-	-	-	-	Graywacke fault zone
9S270B	Channel	0.4	12	0.015	Tr	-	-	-	-	-	-	-	Quartz vein & fault gouge
9S271	do.	0.3	9	Nil	Tr	-	-	-	-	-	-	-	Fault gouge,some crushed qtz
9S272A	do.	0.2	6	Tr	0.1	-	-	-	-	-	-	-	Fault gouge and graywacke
9S272B	do.	0.4	12	Tr	.1	-	-	-	-	-	-	-	Fault gouge little quartz
9S273	do.	0.3	9	Tr	Tr	-	-	-	-	-	-	-	Fault gouge

Dumps located northwest of Tillson adit (not shown on Map)

8S306	Select Grab	.5	15	No Assay	.60	N	500	L(5)	65	10	N	Dump float quartz
8S307	do.	.35	11	No Assay	.55	N	1000	10	90	10	N	do.

TABLE A-15. - Assay data, Bahrt adit samples (cont.)

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S265B	Channel	0.35	11	0.05	0.1	-	-	-	-	-	-	-	Quartz vein & some wall rock
9S265C	Chip	2.5	76	.145	Tr	-	-	-	-	-	-	-	Qtz vein 0.8' thick 1/2 GWK
9S265D	Channel	0.6	18	Nil	Tr	-	-	-	-	-	-	-	Quartz vein and wall rock
9S265E	do.	0.3	9	Tr	Tr	-	-	-	-	-	-	-	do.
9S265F	Chip	2.8	85	.05	Tr	-	-	-	-	-	-	-	Quartz stringer zone and wall rock
9S265G	Channel	1.6	49	Nil	Nil	-	-	-	-	-	-	-	Quartz vein
9S266	Ore bin Grab	-	-	.16	.1	8.5	10	N	35	1900	1100	N	Quartz vein,GWK and sulfides

TABLE A-15. - Assay data Bahrt adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AA	Spec	Spec	AA	AA	AA	Spec	
Sample	Type	Feet	cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S243	Channel	0.25	8	0.12	0.1	-	-	-	-	-	-	-	Quartz vein and wall rock
9S244	do.	0.1	3	.025	Tr	-	-	-	-	-	-	-	do.
9S245	do.	0.1	3	.03	.1	-	-	-	-	-	-	-	do.
9S246A	Chip	3.5	107	Nil	Nil	0.10	N	N	25	15	90	N	Graywacke wall rock (HW)
9S246B	Channel	0.95	29	.11	Tr	4.5	N	N	15	10	240	N	Quartz vein and wall rock
9S246C	Chip	1.0	30	Nil	Nil	.20	N	N	25	15	90	N	Graywacke wall rock (FW)
9S247	Channel	0.9	27	.10	Tr	-	-	-	-	-	-	-	Quartz vein, sulfide and wall rock
9S248	do.	0.2	6	.05	.1	-	-	-	-	-	-	-	Quartz vein and wall rock
9S249	do.	0.9	27	.25	.1	-	-	-	-	-	-	-	do.
9S250	do.	0.85	26	.07	Tr	-	-	-	-	-	-	-	do.
9S251	do.	0.6	18	.11	.1	-	-	-	-	-	-	-	do.
9S252	do.	0.4	12	.67	.1	-	-	-	-	-	-	-	Quartz vein and wall rock GWK and sulfides
9S253	do.	0.8	24	.54	.2	-	-	-	-	-	-	-	do.
9S254	do.	0.6	18	.61	.1	-	-	-	-	-	-	-	Quartz vein and wall rock
9S255	do.	1.0	30	.12	Tr	-	-	-	-	-	-	-	Quartz vein and wall rock GWK and sulfides
9S256	do.	0.6	18	.13	Tr	-	-	-	-	-	-	-	do.
9S257	do.	0.25	8	.19	.1	-	-	-	-	-	-	-	Brecciated quartz vein zone
9S258	do.	1.3	40	.245	Tr	-	-	-	-	-	-	-	Quartz GWK breccia zone vein
9S259	do.	1.35	41	.005	Tr	-	-	-	-	-	-	-	Quartz vein and wall rock on floor,not all of vein
9S260A	do.	0.33	10	.10	Tr	3.5	N	N	35	10	65	N	Quartz vein and wall rock
9S260B	Chip	2.7	82	Tr	Tr	.20	N	N	20	15	75	N	Graywacke and quartz veins
9S261	do.	3.0	91	.02	.1	-	-	-	-	-	-	-	4 quartz veins to 0.35' thick
9S262	Channel	1.0	30	Tr	.1	-	-	-	-	-	-	-	Fault gouge graywacke
9S263	do.	0.13	4	Nil	Nil	-	-	-	-	-	-	-	Fault gouge and GWK & quartz
9S264	Chip	0.7	21	.03	.1	-	-	-	-	-	-	-	Quartz vein and calcite (fault disturbance)
9S265A	do.	0.6	18	.06	Tr	-	-	-	-	-	-	-	Quartz,GWK,and sulfides

(HW) = Hanging Wall
(FW) = Foot Wall

TABLE A-21. - Assay data, Surprise adit, samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S231	Chip	0.4	12	Nil	Nil	N(.05)	N	N	10	H 15	35	N	Quartz vein,graywacke
9S232	do.	0.75	23	Nil	Nil	-	-	-	-	-	-	-	do.
9S233	Channel	0.6	18	Nil	Nil	-	-	-	-	-	-	-	do.
9S234	Dump	-	-	Nil	Nil	-	-	-	-	-	-	-	Quartz calcite
9S235	Chip	1.10	34	Nil	Nil	N(.05)	N	700	5	H 10	40	N	Quartz vein,some graywacke

TABLE A-17. - Assay data, Hirst Chichagof tailings, samples

Map No.	Sample	Type	Sample Length Feet	Sample Length Cm	Oz./Ton Fire Assay Au	Oz./Ton Fire Assay Ag	Parts per Million AAS Au	Parts per Million Spec Ag	Parts per Million Spec As	Parts per Million AAS Cu	Parts per Million AAS Pb	Parts per Million AAS Zn	Parts per Million Spec W	Description
15	9S170	Tailings	1.0	30	0.095	0.1	4.0	3.0	200	20	15	30	N	Shovel
16	9S171	do.	1.0	30	.06	.2								do.
17	9S172	do.	1.0	30	.285	.1								do.
18	9S357	do.	1.9	58	.24	.1								Shelby tube
19	9S173	do.	1.0	30	.32	.1								Shovel
20	9S358	do.	1.8	55	.23	.1								Shelby tube
21	9S359	do.	1.8	55	.085	Tr								do.
22	9S360	do.	1.0	30	.195	Tr								Shovel
23	9S174	do.	1.0	30	.08	Tr								do.
24	9S175	do.	1.0	30	.09	Tr								do.
25	9S176	do.	1.0	30	.115	Tr								do.

TABLE A-18. - Assay data, Hirst-Chichagof dump samples

Map No.	Sample	Type	Sample Length Feet	Cm	Analysis Oz./Ton Fire Assay Au	Ag	Description
1	9S343	Dump	0.5	15	0.07	Tr	Graywacke and quartz
1A	9S343A	Select quartz	-	-	.04	Tr	
2	9S344	Dump	0.5	15	.03	Tr	Graywacke and quartz
2A	9S344A	Select quartz	-	-	.15	Tr	
3	9S345	Dump	0.5	15	Nil	Nil	Graywacke and quartz
3A	9S345A	Select quartz	-	-	1.23	0.3	
4	9S346	Dump	0.5	15	Tr	Tr	Graywacke and quartz
4A	9S346A	Select quartz	-	-	.28	.1	
5	9S347	Dump	0.5	15	Tr	Tr	Graywacke and quartz
5A	9S347A	Select quartz	-	-	.05	Tr	
6	9S348	Dump	0.5	15	.25	Tr	Graywacke and quartz
6A	9S348A	Select quartz	-	-	.025	Tr	
7	9S349	Dump	0.5	15	.035	Tr	Graywacke and quartz
7A	9S349A	Select quartz	-	-	.95	.3	
8	9S350	Dump	0.5	15	.005	.1	Graywacke and quartz
9	9S351	do.	0.5	15	.115	Tr	Graywacke and quartz
9A	9S351A	Select quartz	-	-	.06	Tr	
10	9S352	Dump	0.5	15	.005	Tr	Graywacke and quartz
10A	9S352A	Select quartz	-	-	Tr	Tr	
11	9S353	Dump	0.5	15	.05	Tr	Graywacke and quartz
11A	9S353A	Select quartz	-	-	1.765	.4	
12	9S354	Dump	0.5	15	.11	.1	Graywacke and quartz
12A	9S354A	Select quartz	-	-	1.05	.2	
13	9S355	Dump	0.5	15	.045	Tr	Graywacke and quartz
13A	9S355A	Select quartz	-	-	.75	.1	
14	9S356	Dump	0.5	15	Tr	Tr	Graywacke and quartz
14A	9S356A	Select quartz	-	-	1.415	.3	

TABLE A-19. - Assay data, Smith adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S106A	Chip	0.4	12	0.15	Tr	-	-	-	-	-	-	-	Quartz and graywacke
9S106B	do.	0.4	12	.05	Tr	-	-	-	-	-	-	-	Fault gouge
9S107A	do.	0.3	9	Nil	Nil	0.20	N	N	15	25	L	N	Quartz vein
9S107B	Channel	1.0	30	.07	Tr	4.0	15	N	50	20	L	N	Breccia GWK and quartz pyrite
9S107C	do.	0.9	27	Nil	Nil	.10	N	N	25	15	N	N	Fault gouge,breccia graywacke some quartz
9S108	do.	0.7	21	.09	Tr	-	-	-	-	-	-	-	Graywacke,quartz,fault gouge
9S109	do.	0.8	24	Nil	Nil	-	-	-	-	-	-	-	Fault gouge,quartz,fault gouge
9S110A	H. G. Grab	up to 1.2	37	.03	Tr	1.5	2.0	N	10	10	25	N	Quartz,sulfides & graywacke
9S110B	Dump Grab	0.8	24	Nil	Nil	.10	N	N	10	10	10	N	Quartz vein,30% graywacke breccia sulfides
9S110C	do.	-	-	.03	Tr	1.5	3.0	200	5	30	40	N	Graywacke with quartz stringers,sulfides

TABLE A-20. - Assay data, Minnesota Claim trenches, samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S528	Channel	1.9	58	0.035	0.1	-	-	-	-	-	-	-	Ribbon quartz vein
9S529	do.	0.88	27	.025	Tr	-	-	-	-	-	-	-	do.
9S530	do.	1.2	37	.025	Tr	-	-	-	-	-	-	-	do.
9S531A	Chip	1.3	40	.025	Tr	0.70	0.5	N	10	5	5	N	do.
9S531B	Channel	0.4	12	.015	Tr	2.7	1.0	N	35	40	65	N	Fault gouge
9S532	do.	2.0	61	.02	Tr	.70	N	N	10	10	10	N	Ribbon quartz vein
9S533	do.	0.65	20	.01	Tr	-	-	-	-	-	-	-	Quartz, fault gouge
9S534	Grab	-	-	.01	Tr	-	-	-	-	-	-	-	Quartz

TABLE A-21. - Assay data, Baney Prospect, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	Color-metric*	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Pb	Zn	W	W	Description
8S046	Select Grab	1.0	30	2.76	1.6	190	50	3000	300	65	<4	L	Quartz, Au and sulfides
8S104A	Channel	1.2	37	Nil	Tr	0.3	L	L	40	30	6	L	Graywacke, fault gouge, veinlets of sulfides
8S104B	do.	0.55	17	Nil	Nil	.15	N	1000	L	L	<4	L	Quartz vein
8S104C	do.	0.3	9	Nil	Nil	.10	N	300	25	10	3200	1000	Quartz stringer in graywacke
8S104D	do.	0.6	18	Nil	Nil	.20	N	500	10	5	16	100	Quartz vein
8S104E	do.	0.4	12	Nil	Nil	.20	L	700	20	10	8	L	Graywacke
8S105A	do.	1.63	50	Nil	Tr	N	L	N	10	30	6	L	do.
8S105B	do.	1.96	60	0.06	Tr	.80	N	300	L	5	6	L	Quartz vein
8S105C	do.	0.9	27	Nil	Tr	1.5	L	L	10	25	16	L	Graywacke
8S106A	do.	0.83	25	Nil	Nil	N	N	L	15	50	6	L	do.
8S106B	do.	0.5	15	.005	Tr	1.0	L	1000	50	35	<4	L	Quartz vein
8S106C	do.	1.0	30	Nil	Nil	N	N	N	15	55	4	L	Graywacke
8S107	do.	0.5	15	-	-	4.0	N	500	L	5	-	L	Quartz vein
8S108A	do.	0.6	18	Nil	Tr	N	N	N	15	40	16	L	Graywacke
8S108B	do.	0.5	15	.15	0.1	8.5	0.7	700	15	20	535	1000	Quartz vein
8S108C	Grab	-	-	.02	Tr	3.0	N	1000	15	40	400	70	Graywacke

* Barringer Research Inc.

TABLE A-22. - Assay data, McKallick Lode Prospect, samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S050	H.G.Dump	-	-	0.5	0.2	2.0	N	N	20	260	130	N	Quartz
9S074	Channel	0.34	10	Nil	Nil	0.15	N	N	20	15	95	N	Fault gouge and iron stain
9S075	do.	0.07	2	Nil	Nil	.05	N	N	10	H 30	35	N	Quartz vein
9S076	do.	0.4	12	.08	.3	.05	N	N	15	H 10	45	N	Quartz
9S077	do.	0.8	24	.01	.2	1.0	0.5	1500	20	130	140	N	do.
9S078A	Chip	0.7	21	.01	.2	.80	2	700	25	970	1100	N	do.
9S078B	Channel	1.2	37	.01	.2	.90	2	1500	20	20	85	N	do.
9S078C	do.	0.3	9	.07	.2	2.0	1	N	100	65	190	N	Fault gouge some quartz
9S078D	Chip	2.3	70	.24	.2	13.0	N	N	15	550	350	N	Quartz
9S078E	do.	0.7	21	.05	.2	3.0	1	10,000	15	350	600	N	Quartz,25% graywacke
9S078F	do.	0.3	9	.03	.3	1.5	3	5000	40	90	180	N	Fault gouge and wall rock
9S079	Channel	0.23	7	.05	.2	1.5	2	1000	25	120	120	N	Quartz and fault gouge
9S080	do.	0.25	8	.02	.3	.90	2	700	35	30	100	N	Fault gouge,graywacke,quartz

TABLE A-23. - Assay data, Hansen and Bolshan Prospect, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S021	Chip	0.05	1.5	0.285	Tr	8.5	L	L	15	15	15	L	Quartz vein
8S022	Select Dump Grab	-	-	-	-	0.35	.7	L	10	55	30	L	Quartz
8S023	Dump Grab	-	-	-	-	9.5	N	L	L(5)	10	5	L	do.
9S128	do.	-	-	.915	0.1	30	N	N	20	60	60	N	Quartz and galena
9S129	Channel	0.5	15	.23	Tr	6.5	0.5	N	5	25	10	N	Quartz vein
9S130	Dump Grab	-	-	1.67	.2	63	15	N	10	250	35	N	Quartz, Au, Pb, Zn

TABLE A-24. - Assay data, Chichagoff Prosperity northern adit, samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S094A	Channel	0.35	11	Nil	Nil	0.1	N	N	15	5	25	N	Quartz vein
9S094B	do.	0.8	24	0.01	0.1	.4	N	N	30	10	100	N	Fault gouge brecciated GWK
9S094C	do.	0.8	24	Nil	Tr	N	N	N	10	N(5)	10	N	Quartz,10% graywacke
9S095A	do.	0.65	20	Nil	Tr	N	N	N	5	H 5	15	N	Quartz vein
9S095B	do.	0.8	24	.01	Tr	.15	N	N	25	15	65	N	Fault gouge,brecciated graywacke some quartz
9S095C	Chip	1.7	52	Nil	Tr	.10	N	N	15	10	10	N	Quartz
9S095D	Channel	0.35	11	.49	Tr	N	N	N	10	5	30	N	Quartz,fault gouge,graywacke
9S096	do.	0.35	11	Nil	Tr	-	-	-	-	-	-	-	Quartz
9S097	do.	0.25	8	Nil	Tr	.10	1	N	160	10	30	N	Quartz vein some sulfides
9S098	do.	0.5	15	Nil	Tr	-	-	-	-	-	-	-	Quartz vein some fault gouge
9S099	do.	0.8	24	.025	Tr	.90	N	N	15	10	45	N	Quartz vein some graywacke
9S099.5	do.	0.15	5	Nil	Nil	.15	1	N	180	40	10	N	Quartz lens
9S100A	do.	0.6	18	Nil	.1	.15	N	N	30	20	90	N	Fault gouge,quartz,graywacke
9S100B	Chip	0.45	14	Nil	Nil	.20	N	N	20	15	75	N	Quartz vein , graywacke
9S100C	do.	1.8	55	Nil	Nil	1.0	7	N	25	10	55	N	Quartz vein, graywacke
9S100D	do.	1.0	30	.05	Tr	.25	N	N	N(5)	5	15	N	Quartz vein,some graywacke
9S101	Channel	0.3	9	.045	Tr	2.0	0.5	N	10	5	45	N	Quartz,some graywacke
9S102A	do.	0.75	23	.015	Tr	-	-	-	-	-	-	-	Graywacke,fault gouge,quartz
9S102B	Chip	2.9	88	.005	Tr	-	-	-	-	-	-	-	Graywacke,some quartz

TABLE A-25. - Assay data, Chichagoff Prosperity, main adit, samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S012	Chip	0.5	15	Nil	Nil	0.6	L	1500	10	H 20	15	N	Stringer zone
8S048	do.	0.65	20	0.03	0.1	1.0	N	N	30	5	10	N	Quartz vein
8S048A	Grab	-		Nil	.2	N	N	N	15	15	95	N	Graywacke (wall rock)
8S049	Chip	0.15	5	Nil	.1	.25	N	300	20	H 25	65	N	Quartz and fault gouge
8S049A	Grab	-		.04	.1	N	N	N	25	20	110	N	(wall rock)
8S050	Chip	2.8	85	.01	.1	.30	5.0	200	5	10	15	L	Quartz vein
8S051	do.	2.0	61	.22	.2	9.0	1.5	700	15	280	500	L	do.
8S051A	do.	3.0	91	Nil	Nil	.40	N	N	25	15	100	N	(wall rock)
8S053	Chip	2.0	61	No Assay		.40	N	L	10	10	25	L	Pl.3 loc. #21 quartz vein in pit striking and dipping N20°W @ 60°SW
9S103A	Channel	0.18	5	.05	.1	1.5	0.5	500	35	20	65	N	Fault gouge and quartz
9S103B	Chip	1.10	34	Nil	Tr	.25	N	500	10	10	20	N	Quartz vein and graywacke
9S104A	do.	0.75	23	.02	Tr	.60	N	N	5	20	75	N	Quartz vein fault gouge and graywacke
9S104B	Channel	0.35	11	.695	.1	33.0	7.0	500	10	400	1300	N	Fault gouge and quartz

NOTE: 8S048 contained 2000 ppm Molybdenum by spec

TABLE A-26. - Assay data, American Gold Company adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S037	Select Dump	-	-	0.9	0.6	36	15	200	15	230	290	N	Quartz,dike,pyrite, galena and gold
8S172	Chip	0.2	6	2.42	.4	65	5	1000	10	150	120	N	Quartz vein and dike
8S173	Grab	0.06	1.8	.06	.2	1.5	10	N	5	30	35	N	Quartz vein

TABLE A-27. - Assay data, Floria adit, samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S251	Chip	0.3	9	Nil	Nil	L	N	N	30	20	65	N	Quartz vein
8S252A	Grab	-	-	Nil	Nil	0.3	N	N	15	10	20	N	Graywacke,both sides 8S252B
8S252B	Chip	1.9	58	0.02	0.1	.5	0.5	N	10	30	L(5)	N	Quartz vein and sulfides
8S253A	do.	1.58	45	.08	Tr	3.5	2	N	70	30	130	N	Graywacke
8S253B	do.	2.9	88	Nil	Nil	.3	N	N	15	5	15	N	Quartz vein
8S253C	do.	0.92	28	.08	Tr	3.5	3	N	80	20	120	N	Graywacke,fault gouge &quartz
8S253D	do.	2.33	71	Nil	Nil	.5	N	N	20	L(5)	25	N	Quartz vein
8S253E	do.	0.3	9	Nil	Nil	L	N	N	55	15	100	N	Graywacke , fault gouge, a little quartz
8S254A	do.	0.2	6	.05	Tr	1.9	.5	N	40	15	85	N	Fault gouge
8S254B	do.	0.7	21	Nil	Tr	.4	N	N	45	H 5	30	N	Quartz vein
8S255A	do.	0.3	9	.01	Tr	.8	N	N	65	20	90	N	Fault gouge
8S255B	do.	0.5	15	.01	Tr	.5	N	N	10	L(5)	5	N	Quartz vein
8S255C	do.	0.3	9	.1	Tr	4.5	3	N	75	30	120	N	Graywacke and fault gouge
8S256A	do.	3.9	119	Nil	Nil	L	N	N	65	20	130	N	Graywacke
8S256B	do.	0.4	12	Nil	Nil	.2	N	N	65	H 20	110	N	Fault gouge & quartz
8S256C		2.1	64	Nil	Nil	.9	.5	N	80	H 40	150	N	Graywacke
8S256D	Chip	0.3	9	Nil	Nil	.2	N	N	40	H 20	50	N	Irregular quartz vein
8S257	Select Dump Grab	-	-	.01	Tr	2.0	.5	N	20	H 10	15	N	Quartz, some graywacke, from dump
8S275	Chip	0.92	28	.01	Tr	.3	N	N	25	H 15	40	N	Quartz vein fault gouge quartz breccia
8S276A	Channel	1.0	30	.01	Tr	4.6	.5	N	30	H 10	30	N	Quartz vein
8S276B	Chip	0.3	9	Nil	Nil	N	N	N	45	H 20	110	N	Fault gouge and graywacke
8S277	do.	0.8	24	.04	Tr	1.3	N	N	30	H 30	45	N	Quartz vein & quartz breccia
8S278	do.	0.6	18	.02	Tr	1.5	.5	N	10	H 5	25	N	Irregular quartz vein

TABLE A-28. - Assay data, Lillian and Princela trench, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S562	Channel	0.11	3.4	0.015	Tr	-	-	-	-	-	-	-	Quartz vein
9S563	do.	0.45	13.7	Tr	Tr	-	-	-	-	-	-	-	do.
9S564	do.	0.3	9	Tr	Tr	-	-	-	-	-	-	-	do.
9S565	do.	0.8	24	Tr	Tr	-	-	-	-	-	-	-	do.
9S566	Chip	0.5	15	.01	Tr	-	-	-	-	-	-	-	do.
9S567A	do.	0.35	10.7	.015	.1	0.6	N	N	10	125	15	N	do.
9S567B	do.	0.25	8	Nil	Tr	N	N	N	5	25	10	N	Quartz vein and sulfides
9S568	do.	0.46	14	.08	Tr	.4	N	N	5	80	5	N	Quartz vein and galena
9S569	do.	0.9	27	.01	.1	-	-	-	-	-	-	-	Quartz vein
9S570	do.	0.34	10	.01	Tr	-	-	-	-	-	-	-	do.
9S571	do.	0.35	11	.005	.1	-	-	-	-	-	-	-	do.

TABLE A-29. - Assay data, Bauer, lower and upper adits, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S010	Select Dump Grab	-	-	-	-	4.5	L	7000	5	65	55	N	Mostly quartz off dump
8S109	do.	-	-	-	-	4.5	1.0	G10000	10	35	45	L	Quartz and dike (upper adit)
8S110A	Chip	3.75	114	-	-	N	L	L	55	20	95	N	Graywacke
8S110B	do.	0.67	20	-	-	N	N	N	40	20	95	N	Quartz vein
8S111A	do.	4.0	122	-	-	N	L	N	55	15	100	N	do.
8S111B	Channel	0.6	18	-	-	0.2	0.7	L	10	20	60	N	Quartz vein,dike,graywacke
8S111C	Chip	0.9	27	-	-	N	L	N	40	15	100	N	Graywacke and fault gouge
8S112A	Channel	0.75	23	-	-	N	L	N	40	15	85	N	Graywacke
8S112B	do.	0.13	4	-	-	N	3.0	N	20	15	65	L	Quartz and graywacke
8S112C	1/2 ft. Chip	4.6	140	-	-	N	L	N	40	15	95	N	Graywacke
8S112D	Channel	0.06	1.8	-	-	.15	3.0	L	35	H140	40	L	Quartz vein
8S112E	1/4 ft. Chip	7.0	213	-	-	N	L	N	45	15	95	N	Graywacke
8S113A	Chip	1.8	55	-	-	N	L	N	45	20	110	N	do.
8S113B	Channel	1.0	30	-	-	N	L	N	35	20	75	L	Quartz vein and fault gouge
8S113C	Chip	0.9	27	-	-	N	L	N	50	15	120	N	Graywacke and fault gouge
8S114A	do.	0.2	0.6	-	-	.95	N	G10000	L	10	35	N	Quartz vein
8S114B	do.	1.0	30	-	-	1.5	L	G10000	35	10	65	L	Quartz stringer zone and fault gouge
8S115A	1/4 ft. Chip	6.0	183	-	-	.6	N	1500	15	20	55	L	Dike
8S115B	Chip	0.2	6	-	-	N	L	N	45	15	100	N	Silicified fault gouge
8S115C	1/4 ft. Chip	3.2	98	-	-	N	L	N	60	15	95	N	Graywacke
9S383	Channel	0.05	1.5	0.005	Tr	-	-	-	-	-	-	-	Quartz vein and sulfides
9S384	Chip	0.75	23	Nil	Nil	-	-	-	-	-	-	-	Ribbon quartz, fault gouge, 50% graywacke
9S385	do.	0.7	21	Nil	Nil	-	-	-	-	-	-	-	Quartz and graywacke
9S386A	do.	0.5	15	Nil	Nil	-	-	-	-	-	-	-	Graywacke fault zone, dike and quartz
9S386B	do.	2.1	64	.04	.1	-	-	-	-	-	-	-	Dike
9S386C	do.	2.7	82	.03	.1	-	-	-	-	-	-	-	do.
9S386D	do.	0.27	8	.01	Tr	-	-	-	-	-	-	-	Mineralized graywacke

TABLE A-30. - Assay data Bauer upper pits, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S479	Channel	0.15	4.6	Nil	Nil	0.2	N	N	10	5	15	N	Quartz vein
9S480A	Chip	0.4	12	Nil	Nil	.2	N	N	40	15	65	N	Graywacke
9S480B	do.	2.4	73	0.01	Tr	.6	N	700	35	10	45	N	Dike
9S480C	do.	0.35	11	.01	Tr	.65	N	1000	40	20	90	N	Graywacke & fault gouge
9S481	do.	2.7	82	Nil	Tr	.25	N	1500	30	5	50	N	Dike
9S482	do.	0.1	3	Nil	Nil	N	N	N	20	20	50	N	Quartz vein and gossin
9S483	do.	0.15	4.6	.02	0.1	N	3.0	N	15	15	25	N	Quartz vein
Bauer lower pit sample													
9S484	Grab	-	-	.16	Tr	2.7	N	10,000	5	60	10	N	Quartz from pit

TABLE A-31. - Assay data, Hodson Prospect trench and adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S052	Pit Dump	-	-	Nil	Nil	N	N	N	L(5)	N(5)	5	N	Quartz
9S053A	Chip	0.6	18	0.16	0.3	4.5	N	N	5	N(5)	10	N	do.
9S053B	do.	0.9	27	Nil	Nil	0.30	N	N	L(5)	N(5)	5	N	do.
9S213	Dump	-	-	Nil	Nil	-	-	-	-	-	-	-	do.
9S214A	Chip	0.6	18	Nil	Nil	N	N	N	15	H 20	40	N	Fault gouge,quartz,graywacke
9S214B	do.	0.1	3	Nil	Nil	.25	N	1000	25	15	80	L	Quartz , graywacke
9S214C	do.	2.0	61	Nil	Nil	N	N	N	45	20	110	N	Graywacke , quartz
9S215	Channel	0.6	18	.02	Tr	1.0	N	2000	20	25	90	L	Fault gouge,brecciated quartz
9S216	do.	0.45	14	.005	Tr	-	-	-	-	-	-	-	do.
9S217	do.	0.9	27	.02	Tr	-	-	-	-	-	-	-	do.
9S218	do.	0.35	11	.025	Tr	-	-	-	-	-	-	-	Fault gouge,quartz,graywacke
9S219A	Chip	1.0	30	.01	Tr	2.0	N	10,000	30	15	85	L	Fault gouge,graywacke some quartz
9S219B	Channel	0.15	4.5	.23	Tr	9.0	N	5,000	5	15	15	N	Quartz vein
9S219C	do.	1.3	40	.015	Tr	.35	N	500	25	15	80	L	Fault gouge,graywacke
9S220A	do.	0.2	6	.33	Tr	-	-	-	-	-	-	-	Quartz
9S220B	do.	0.15	4.5	.045	Tr	-	-	-	-	-	-	-	Fault gouge
9S221	do.	0.35	11	Nil	Nil	N	N	200	25	10	70	N	Dike
9S222	do.	0.5	15	.005	Tr	-	-	-	-	-	-	-	do.
9S223	do.	0.9	27	.075	Tr	-	-	-	-	-	-	-	Quartz and fault gouge
9S224A	Chip	0.65	20	.005	Tr	-	-	-	-	-	-	-	Fault gouge,quartz HW
9S224B	do.	0.2	6	Tr	Nil	-	-	-	-	-	-	-	Quartz footwall
9S274	do.	2.0	61	.005	.1	-	-	-	-	-	-	-	Quartz vein
9S275	do.	0.9	27	Tr	Tr	-	-	-	-	-	-	-	do.
9S276	do.	3.5	107	.005	Tr	-	-	-	-	-	-	-	Quartz zone

TABLE A-32. - Assay data, Golden Hand Apex Mine, samples

Map No.	Sample	Type	Analysis: Sample Length: Feet	Cm	Oz./Ton Fire Assay: Au	Ag	Parts per Million: AAS Au	Spec Ag	Spec As	AAS Cu	AAS Pb	AAS Zn	Spec W	Description
1	8S134A	Chip	0.5	15	Nil	Nil	0.1	N	N	190	H 20	75	N	Graywacke
1	8S134B	do.	3.5	107	Nil	Nil	L	N	N	75	H 20	70	N	do.
2	8S133A	do.	1.9	58	Nil	Nil	N	N	N	95	30	90	N	Graywacke and gouge
2	8S133B	do.	2.9	88	Nil	Nil	.2	N	N	70	H 20	40	N	Quartz mostly & graywacke
2	8S133C	do.	1.0	30	0.005	0.1	L	N	N	80	25	100	N	Graywacke and gouge
2	8S133E	do.	0.2	6	.12	.1	23	7	2000	45	H 30	65	N	Quartz vein and sulfides
3	8S471	Channel	0.2	6	.18	Tr	3.6	0.5	1500	75	20	70	N	Quartz vein
4	8S550A	Chip	2.6	79	Nil	Nil	-	-	-	-	-	-	-	do.
4	8S550B	Channel	0.25	8	Nil	Nil	-	-	-	-	-	-	-	do.
5	8S129A	Chip	1.7	52	Nil	.1	L	N	N	70	40	95	N	Graywacke
5	8S129B	do.	0.4	12	.015	.1	.5	N	N	15	H 35	60	N	Quartz vein and graywacke in shear zone
5	8S129C	do.	1.0	30	.01	Tr	.95	N	N	40	H 30	95	N	Graywacke and quartz
5	8S129D	do.	0.4	12	.01	Tr	.75	N	N	70	30	110	N	Fault gouge
5	8S129E	Channel	1.0	30	Nil	Nil	.1	N	N	60	H 20	20	N	Quartz vein
5	8S129F	Chip	1.0	30	Nil	Nil	N	N	N	50	30	90	N	Fault gouge and graywacke
6	8S129.5	do.	0.7	21	Nil	Nil	.2	N	N	150	H 20	35	N	Quartz vein
7	8S130	do.	0.5	15	Nil	Nil	.35	N	N	50	H200	25	N	do.
8	8S131A	do.	2.17	66	Nil	Nil	.1	N	N	75	35	100	N	Graywacke
8	8S131B	do.	0.17	5	Nil	Nil	1.0	N	500	35	H 25	25	N	Quartz vein
8	8S131C	do.	3.6	110	Nil	Nil	N	N	N	70	40	80	N	Graywacke
9	8S132A	do.	5.1	155	Nil	Nil	N	N	N	60	30	100	N	do.
9	8S132B	do.	0.63	19	Nil	Nil	.45	N	N	65	40	95	N	Graywacke and fault gouge
9	8S132C	do.	0.33	10	Nil	Nil	.2	N	N	150	H 30	50	N	Graywacke,calcite,quartz
9	8S132D	do.	0.75	23	Nil	Nil	N	N	N	80	40	80	N	Graywacke
10	8S135	do.	0.1	3	Nil	Nil	.3	N	N	100	25	85	N	Quartz vein

TABLE A-32. - Assay data, Golden Hand Apex Mine, samples (cont.)

Map No.	Sample	Type	Sample Length Feet	Sample Length Cm	Analysis: Oz./Ton Fire Assay Au	Oz./Ton Fire Assay Ag	Parts per Million AAS Au	Spec Ag	Spec As	AAS Cu	AAS Pb	AAS Zn	Spec W	Description
11	9S470	Chip	1.2	37	0.08	Tr	2.4	N	N	40	10	45	N	Schist some quartz
12	9S469	Channel	0.35	11	.58	0.1	36.0	5	200	25	10	25	N	Quartz vein N30°W @ vert.
13	8S136	Grab	-	-	Nil	Nil	14	3	N	50	10	15	N	Quartz from trench
14	8S137	do.	-	-	.07	.1	1.5	N	N	30	5	10	N	do.
15	8S138	do.	-	-	.005	.1	0.7	N	N	20	5	5	N	do.
16	9S551	do.	-	-	.055	.1	.95	N	N	35	25	10	N	Quartz from trench dump
17	8S126	Select Grab	-	-	-	-	.1	N	N	70	5	10	N	Quartz from adit dump
18	9S468A	Channel	0.3	9	.10	Tr	-	-	-	-	-	-	-	Quartz lens
18	9S468B	Chip	0.25	8	.20	Tr	-	-	-	-	-	-	-	Graywacke,schist,quartz
18	9S468C	do.	2.3	70	.05	Tr	-	-	-	-	-	-	-	Quartz vein
18	9S468D	do.	0.4	12	.01	Tr	-	-	-	-	-	-	-	Schist
19	9S547A	do.	0.45	14	Nil	Nil	-	-	-	-	-	-	-	Graywacke
19	9S547B	do.	0.65	20	.03	Tr	-	-	-	-	-	-	-	Quartz vein
19	9S547C	do.	0.25	8	Tr	Tr	-	-	-	-	-	-	-	Fault gouge
20	9S467A	Channel	1.0	30	.93	.1	-	-	-	-	-	-	-	Quartz vein
20	9S467B	do.	0.5	15	6.27	1.0	-	-	-	-	-	-	-	Schist some quartz
21	9S466	High Grade Grab	-	-	498.88	79.4	16,000	2,000	N	15	15	10	N	Quartz and visible Au
22	9S546A	Channel	0.5	15	Nil	Nil	.6	N	N	75	25	85	N	Graywacke
22	9S546B	do.	0.35	11	Nil	Nil	.7	N	N	30	20	20	N	Quartz vein
22	9S546C	do.	0.7	21	.005	Tr	.75	N	N	50	25	35	N	Quartz and graywacke
22	9S546D	do.	0.5	15	8.58	1.3	3.3	30	700	30	15	30	N	Quartz vein
22	9S546E	do.	0.5	15	.07	Tr	.25	N	N	100	20	160	N	Graywacke
23	9S545	Rep. Grab	0.2	6	186.74	30.3	8,000	500	N	25	10	15	N	Quartz and visible Au
24	9S465A	Channel	0.6	18	Nil	Nil	.2	N	N	40	10	25	N	Quartz
24	9S465B	do.	0.3	9	.02	Tr	.8	N	N	90	20	85	N	Schist lens
24	9S465C	do.	2.0	61	.29	.1	5	N	500	65	10	70	N	Quartz vein
25	9S464A	Grab	-	-	Nil	Nil	.15	N	N	60	10	60	N	Schist
25	9S464B	Channel	1.2	37	.09	Tr	2.7	N	500	35	10	20	N	Quartz and fault gouge
25	9S464C	do.	1.3	40	.36	.1	10	3.0	500	35	5	10	N	Quartz vein
25	9S464D	do.	0.5	15	.03	Tr	.9	N	N	90	15	95	N	Schist

TABLE A-34. - Assay data, New Chichagof Mining Syndicate Prospect, underground, samples

			Analysis											
					Oz./Ton		Parts per Million							
Map			Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
No.	Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
1	9S573	Chip	2.0	61	0.06	0.1	-	-	-	-	-	-	-	Quartz limestone breccia
2	9S574	do.	0.8	24	.32	.2	-	-	-	-	-	-	-	do.
3A	8S122A	do.	4.7	143	.77	.3	4.5	N	N	5	10	10	N	do.
3B	8S122B	do.	0.04	12	Nil	Tr	N	N	N	5	H 80	10	N	Gray Marble
4A	8S123A	do.	1.7	52	.3	.1	7.5	3.0	N	40	H 25	40	N	Gray greenstone
4B	8S123B	do.	0.1	3	.11	.1	3.0	N	N	50	H 25	70	N	Fault gouge
4C	8S123C	do.	3.3	101	42	.1	15.0	N	N	10	10	60	N	Quartz limestone breccia
5A	8S124A	do.	0.83	25	.08	.1	1.0	N	N	60	25	65	N	Fault gouge & quartz vein
5B	8S124B	do.	3.0	91	1.0	.3	42.0	N	N	15	10	60	N	Quartz limestone breccia
6A	8S116A	do.	2.0	61	.21	Tr	8.0	N	N	20	20	160	N	do.
6B	8S116B	do.	3.13	95	.12	Tr	5.5	N	N	10	H 65	35	N	Fault zone, limestone
7A	8S117A	do.	1.7	52	.10	.1	3.5	N	N	15	H 35	20	N	Quartz stringer in breccia, greenstone
7B	8S117B	do.	1.2	37	.19	.1	10.0	2.0	N	10	10	40	N	Breccia
7C	8S117C	do.	0.7	21	.70	.1	30.0	2.0	N	25	10	55	N	Fault gouge
7D	8S117D	do.	0.4	12	.06	.1	.60	2.0	N	1000	H 40	130	150	Quartz limestone breccia
7E	8S117E	do.	0.6	18	.08	.3	2.0	15.0	N	7900	H 50	440	100	Fault gouge
8A	8S118A	do.	3.5	107	.08	Tr	2.0	N	N	50	H 55	15	N	Silicified greenstone
8B	8S118B	do.	1.4	43	.05	Tr	3.0	N	N	20	10	10	N	Breccia silica zone
8C	8S118C	do.	1.0	30	Nil	Nil	0.10	N	N	30	20	35	N	Greenstone and fault gouge
9A	8S119A	do.	3.71	113	Nil	Nil	1.0	N	N	10	H 55	25	N	Limestone and quartz
9B	8S119B	do.	0.6	18	.02	Tr	1.5	N	N	10	15	20	N	Quartz vein
9C	8S119C	do.	0.3	9	Nil	Nil	.25	N	N	5	15	10	N	Fault gouge
9D	8S119D	do.	0.7	21	Nil	Nil	.30	N	N	65	20	40	N	Greenstone
9E	8S119E	do.	3.0	91	Nil	Nil	N	N	N	65	25	60	N	do.
10A	8S120A	do.	1.2	37	Nil	Tr	.05	N	N	5	H 60	10	N	Black greenstone
10B	8S120B	do.	2.1	64	Nil	Nil	8.0	N	N	15	H 20	15	N	Limestone breccia and quartz
10C	8S120C	do.	0.6	18	Nil	Nil	.35	N	N	70	20	50	N	Greenstone and fault gouge
11A	8S121A	do.	2.75	84	Nil	Nil	N	N	N	10	H 80	20	N	Limestone
11B	8S121B	do.	0.3	9	.28	.1	9.5	2.0	N	75	20	60	N	Quartz vein and fault gouge
11C	8S121C	do.	0.5	15	Nil	Nil	.20	N	N	35	20	40	N	Greenstone

TABLE A-33. - New Chichagof Mining Syndicate Prospect, 1933 and 1934

	Analysis				
		Oz./Ton			
	Sample Length	Fire Assay			
Sample	Feet	Au	Ag	Location	Description
Samples by B.D. Stewart 1933					
1	8.0	Tr	Tr	G-Cut	Shattered material east side of cut
2		Tr	Tr	do.	Random pieces from solid rib, east of sample No. 1.
3	2.0	0.22	0.30	F - Outcrop	Firm exposure,east wall
4	2.0	.52	.40	D - Cut	Soft crumbly material,west wall
5	2.0	.06	.30	do.	Medium firm material,east wall
6	3.0	.6	.30	C - Cut	Shattered material across full face
7	9.0	.26	.40	No. 2 Tunnel	Footwall to hanging wall
8	2.0	.04	.20	do.	Hanging wall - section of
Samples by B.B. Neiding 1934					
1	13 in.	0.02	-	Open Cut No. 8	Mixed quartz and gouge
2		Nil	-	Open Cut No. 7	do.
3	10 in.	.02	-	Open Cut No. 6	Limy quartz
4	14 in.	Tr	-	Open Cut No. 5	do.
5	106in.	.36	-	Outcrop F	do.
6	142in.	.06	-	Open Cut No. 3	do.
7		.40	-		Soft two samples
8	110in.	.10	-	No. 2 Tunnel	Limy quartz

TABLE A-35. - Assay data, New Chichagof Mining Syndicated Prospect, surface samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S006	Select Dump	-	-	-	-	13.0	N	N	5	10	10	L	Quartz , feldspar ?
8S007	do.	-	-	-	-	13.0	N	N	L	H 25	20	N	Quartz
9S399	-	-	-	-	-	N	N	N	50	15	55	N	Stream sediment
9S400	Dump	-	-	Tr	0.4	N	N	N	10	30	10	N	Limestone, quartz, calcite
9S401	do.	-	-	Nil	Nil	2.5	N	N	10	10	15	N	Limestone breccia
9S402	do.	-	-	0.07	.2	-	-	-	-	-	-	-	Calcite in marble
9S403A	Chip	0.8	24	Nil	Nil	0.05	N	N	10	H 20	10	N	Limestone breccia
9S403B	Channel	0.55	17	Nil	Nil	.35	N	N	10	15	5	N	Crushed limestone
9S404A	Chip	1.3	40	.03	.1	-	-	-	-	-	-	-	Quartz breccia
9S404B	do.	2.2	67	.01	.1	-	-	-	-	-	-	-	Limestone. quartz breccia
9S405A	do.	2.5	76	.285	Tr	-	-	-	-	-	-	-	Quartz, limestone breccia
9S405B	do.	2.8	85	.35	Tr	-	-	-	-	-	-	-	do.
9S405C	do.	1.15	35	.04	Tr	-	-	-	-	-	-	-	do.
9S405D	do.	2.45	75	Tr	Tr	.90	N	N	10	H 10	15	N	do.
9S575	do.	1.8	55	.005	.1	-	-	-	-	-	-	-	Limestone breccia

TABLE A-36. - Assay data aerial photograph, Whitestripe Silver, Lead, Zinc, Gold Propsect, samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S552	Grab	-	-	-	-	0.05	N	N	50	30	75	N	Iron-stained limestone
9S553	Grab	-	-	0.053	9.4	1.05	300.0	1500	1200	100000	24,000	N	Gossan in limestone
9S555	Stream sediment	-	-	-	-	.1	N	N	100	H 45	95	N	-
9S556	Chip	0.1	3	-	-	N	N	N	55	140	115	N	Quartz and calcite
9S557	Float	-	-	-	-	.05	N	N	100	65	50	N	Limestone breccia, quartz, pyrite and chalcopyrite
9S558	1/4 foot Chip	5.2	158	-	-	.1	N	N	125	H 50	65	N	Calcite layer and sulfides
9S559	Stream sediment	-	-	-	-	N	N	N	35	H 35	65	N	-
9S560	Float	-	-	-	-	N	N	N	55	50	75	N	Quartz and graywacke
9S561	Stream sediment	-	-	-	-	.3	N	N	90	150	115	N	-
9S572	Grab	-	-	.01	0.1	.55	N	N	110	15	60	N	Gossan near in place
9S576	Stream sediment	-	-	-	-	L	N	N	75	20	50	N	-
9S577	do.	-	-	-	-	.3	N	N	70	45	50	N	-
9S578	Grab float	-	-	-	-	L	N	N	1450	20	125	N	Greenstone and sulfides
9S580	Stream sediment	-	-	-	-	.15	N	N	60	20	40	N	-
9S581	Grab	-	-	-	-	N	N	N	80	H 20	55	N	Limestone & gossan fm trench

TABLE A-37. - Cobol Mine, lower adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S026	Chip	2.7	82	0.04	Tr	2.5	N	300	130	15	45	L	Dike
8S027	do.	1.7	52	Tr	Tr	N	N	N	35	20	85	N	Graywacke
8S029	do.	4.7	143	Nil	Nil	N	N	N	35	25	75	N	do.
8S030	Grab	-	-	Nil	Nil	N	N	N	5	25	45	N	Quartz in fault
8S317A	do.	0.17	5	.21	Tr	0.20	N	N	15	10	40	N	Dike
8S317B	Chip	0.06	2	.01	Tr	1.5	0.5	300	40	H 25	70	N	Graywacke,fault gouge, dike
8S317C	do.	3.62	110	Nil	Nil	L	N	N	20	H 15	55	N	Dike and quartz, calcite
8S317D	do.	1.08	33	.01	Tr	1.10	.5	1500	40	H 20	80	N	Graywacke and quartz veins
8S318A	do.	0.88	27	Nil	0.2	L	N	N	25	H 15	60	N	Dike
8S318B	do.	0.1	3	.23	Tr	6.5	.5	N	70	20	80	N	Quartz, fault gouge, graywacke
8S318C	do.	1.75	53	Nil	.1	.10	N	N	20	H 15	55	N	Dike and quartz veinlets
8S318D	do.	2.0	61	Nil	Tr	L	N	N	50	H 20	90	N	Graywacke and quartz veins
8S319A	do.	1.21	37	Nil	Nil	L	N	N	60	H 20	80	N	Quartz veins and graywacke
8S319B	do.	1.56	48	Nil	Tr	.15	N	N	130	H 20	85	N	Graywacke, quartz & fault gouge
8S319C	do.	9.21	281	Nil	Nil	N	N	N	45	H 15	55	N	Dike,fault gouge
8S319D	do.	2.08	63	Nil	Nil	.2	N	N	45	H 20	85	N	Graywacke,fault gouge & quartz
8S319.1	do.	0.15	5	Nil	Tr	.2	N	N	15	H 10	25	N	Quartz lens
8S320A	do.	0.1	3	Nil	Nil	L	N	N	80	H 25	55	N	Quartz,graywacke & fault gouge
8S320B	do.	3.9	119	Nil	Nil	L	N	N	55	H 20	60	N	Dike
8S320C	do.	1.0	30	Nil	Nil	.2	N	N	45	15	100	N	Graywacke,fault gouge & quartz
8S321A	do.	0.3	9	Nil	Nil	.7	N	N	45	H 25	95	N	Graywacke and fault gouge
8S321B	do.	5.6	171	Nil	Tr	L	N	N	25	H 10	65	N	Dike
8S321.5	do.	2.0	61	Nil	Nil	N	N	N	5	H 430	20	N	Quartz lens
8S321.7	do.	0.2	6	.01	Tr	.3	N	N	15	H 60	30	N	do.
8S322A	do.	0.9	27	Nil	Tr	L	N	N	40	20	90	N	Graywacke and fault gouge
8S322B	do.	4.8	146	Nil	Tr	L	N	N	30	H 20	70	N	Dike
8S323A	do.	0.3	9	Nil	Nil	.2	N	N	25	H 20	55	N	Quartz vein and fault gouge

TABLE A-37. - Cobol Mine, lower adit, samples (cont.)

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S323B	Chip	4.7	143	Nil	Nil	0.3	N	N	50	H 15	70	N	Dike
8S324A	do.	0.35	11	0.01	Tr	.7	N	N	40	H 25	75	N	Fault gouge and quartz stringers
8S324B	do.	4.5	137	0.01	Tr	.85	N	N	30	H 30	65	N	Dike
8S325A	do.	2.5	76	Nil	Tr	N	N	N	45	20	90	N	Graywacke
8S325B	do.	0.8	24	Nil	Tr	.25	N	N	45	20	90	N	Fault gouge
8S325C	do.	6.4	195	Nil	Tr	.15	N	N	35	15	70	N	Dike
8S326A	do.	0.8	24	Nil	Tr	.2	N	N	50	20	95	N	Fault gouge and graywacke
8S326B	do.	4.0	122	Nil	Nil	L	N	N	40	H 15	65	N	Dike and quartz stringers
8S327A	do.	1.6	49	.07	Tr	1.0	N	300	40	15	90	N	Fault gouge and graywacke
8S327B	do.	6.6	201	Nil	Tr	L	N	N	25	H 15	60	N	Dike
8S328	do.	5.0	152	Nil	Tr	L	N	N	50	H 15	75	N	Graywacke, fault gouge, brecciated zone
8S329	do.	1.5	46	Nil	Nil	N	N	N	50	H 15	100	N	Graywacke,fault gouge, quartz stringers
8S330	do.	0.14	4	Nil	0.1	N	N	N	15	H 15	35	N	Quartz vein
8S331	do.	0.25	8	Nil	.1	N	N	N	15	H 10	35	N	do.
8S332	do.	0.15	5	Nil	Tr	N	N	N	20	H 15	45	N	do.
8S333A	do.	1.08	33	Nil	Tr	N	N	N	45	15	95	N	Graywacke
8S333B	do.	0.88	27	Nil	Tr	N	N	N	25	10	60	N	Dike
8S333C	do.	0.15	5	Nil	Nil	N	N	N	60	25	100	N	Graywacke,fault gouge, dike
8S333D	do.	2.48	76	Nil	Nil	N	N	N	25	H 20	60	N	Dike
8S333E	do.	0.67	20	Nil	Nil	N	N	N	55	20	90	N	Graywacke
8S334A	do.	1.8	55	Nil	Nil	N	N	N	50	20	110	N	Graywacke, fault gouge zone and a little quartz
8S334B	do.	0.4	12	Nil	Tr	N	N	N	30	H 15	55	N	Dike (silicified)
8S334C	do.	3.0	91	Nil	Tr	N	N	N	40	20	65	N	Dike
8S335	do.	2.0	61	Tr	Tr	.25	N	N	60	H 65	85	N	Graywacke and fault gouge
8S336A	do.	0.9	27	Nil	Nil	N	N	N	5	H 10	15	N	Irregular quartz lens
8S336B	do.	0.05	1.5	Nil	Nil	.2	N	N	15	H 30	45	N	Fault gouge and graywacke
8S336C	do.	0.2	6	Tr	Tr	.3	N	N	20	H 20	10	N	Quartz vein
8S337	do.	4.41	134	Nil	.1	.1	N	N	55	20	90	N	Graywacke
8S338	do.	2.83	86	Nil	.1	.5	N	N	30	10	55	N	Mineralized dike
8S339A	do.	0.2	6	Nil	.1	N	N	N	40	H 15	50	N	Quartz lens
8S339B	do.	0.25	8	Nil	Tr	.7	N	N	55	H 20	75	N	Fault gouge and graywacke
8S340	0.25ft Chip	2.0	61	Nil	Tr	N	N	N	20	H 10	60	N	Zone of graywacke and quartz stringers

TABLE A-38. - Assay data Cobol Mine upper adit, samples

		Analysis											
		Sample Length		Oz./Ton		Parts per Million							
				Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S088A	Chip	1.35	41	0.15	0.1	7.0	L	N	25	20	55	N	Dike
8S088B	do.	0.6	18	.04	.1	0.05	N	N	25	25	70	N	Fault gouge
8S088C	do.	2.9	88	Nil	Nil	N	0.5	N	50	25	60	N	Graywacke
8S088.5A	do.	1.0	30	Nil	.1	.2	N	N	20	25	55	N	Dike
8S088.5B	Channel	0.7	21	.18	.1	9.5	N	N	10	10	30	L	Quartz vein
8S088.5C	Chip	2.6	79	Nil	Nil	.15	L	N	35	25	90	L	Graywacke
8S089A	do.	1.0	30	Nil	Nil	.6	L	N	40	20	50	L	Dike
8S089B	do.	4.0	122	Nil	Nil	.1	N	N	35	20	85	N	Graywacke and dike
8S090A	do.	1.4	43	Nil	Nil	.15	L	N	35	15	55	N	Dike
8S090B	do.	0.3	9	.04	Tr	5.5	N	N	50	25	80	N	Fault gouge
8S090C	Channel	0.3	9	.70	.1	25.5	10.0	N	40	20	30	L	Quartz vein
8S090D	Chip	3.9	119	Nil	Nil	N	N	N	35	20	85	N	Graywacke
8S091A	do.	2.2	67	Nil	Nil	N	N	N	30	20	60	N	Dike
8S091B	do.	2.0	61	.02	Tr	.8	.5	N	45	25	90	N	Graywacke
8S092A	do.	2.4	73	Nil	Nil	.3	L	L	30	20	60	50	Dike
8S092B	Channel	0.6	18	.22	.1	6.5	.2	N	15	30	45	N	Quartz
8S092C	Chip	0.25	8	.08	.1	2.0	.7	N	55	20	95	N	Fault gouge
8S092D	do.	0.55	17	Nil	.1	N	N	N	60	25	90	N	Graywacke, quartz stringers
8S093A	do.	1.1	34	.005	.1	.55	N	N	50	20	85	N	do.
8S093B	do.	1.7	52	Nil	.1	.5	N	N	10	15	25	N	Quartz vein
8S093C	do.	1.7	52	.005	.1	.1	N	N	25	20	60	N	Dike
8S093D	do.	0.6	18	Nil	Nil	N	N	N	30	15	85	N	Fault gouge
8S094A	do.	1.1	34	.005	.1	.4	N	N	35	15	55	N	Dike
8S094B	do.	0.33	10	.40	.1	16.0	3.0	N	15	20	50	N	Quartz vein
8S094C	do.	1.83	56	Nil	.1	.1	N	N	25	20	60	N	Dike
8S094D	do.	2.75	84	.01	.2	.7	L	N	50	25	90	N	Graywacke
8S095A	do.	1.31	40	Nil	Nil	.2	.5	N	20	20	60	N	Dike

TABLE A-38. - Assay data Cobol Mine upper adit, samples (cont.)

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S095B	Chip	0.17	5	0.03	0.1	1.0	0.7	L	40	H 30	90	L	Quartz vein
8S095C	do.	1.0	30	.03	.1	1.5	L	L	20	15	50	N	Dike
8S095D	do.	0.17	5	.18	Tr	8.5	1.5	L	90	H 25	60	N	Quartz vein
8S095E	do.	4.0	122	Tr	Tr	0.35	L	N	25	20	60	N	Dike
8S095F	do.	2.54	77	Nil	.1	.3	N	N	25	15	55	N	do.
8S095G	do.	1.3	40	Tr	Tr	.4	L	N	35	20	80	L	Graywacke
8S096A	do.	1.5	46	.045	Tr	2.5	1.0	700	30	100	75	L	Quartz vein
8S096B	do.	3.5	107	Nil	Nil	.3	L	N	25	25	55	N	Dike
8S096C	do.	4.73	144	Nil	Nil	N	L	N	45	20	95	N	Graywacke
8S096D	do.	1.57	48	Nil	Nil	N	L	N	45	20	90	N	do.
8S097A	Grab	-	-	Nil	Nil	N	N	N	15	15	60	N	Dike
8S097B	Chip	0.13	4	.105	.1	2.5	L	L	65	15	85	N	Graywacke
8S097C	do.	0.8	24	.13	Tr	2.5	L	700	150	25	70	L	Dike and sulfides
8S097D	do.	1.0	30	1.07	.1	56.0	7.0	500	45	15	50	N	Dike,fault gouge,graywacke
8S097E	do.	4.25	130	.005	.1	.9	L	N	25	20	65	N	Dike, quartz, & graywacke
8S097.5A	Channel	1.0	30	.14	.2	5.5	.7	500	240	30	90	N	Graywacke &quartz stringers
8S097.5B	do.	0.7	21	3.65	Tr	200.0	15.0	L	100	35	45	L	Quartz vein
8S097.5B2	do.	0.9	27	1.875	.4	92.0	10.0	L	55	15	30	L	Same quartz vein 8S097.5B but 2 ft higher on vein
8S097,5C	do.	0.6	18	.11	Tr	3.5	L	N	60	20	85	N	Fault gouge
8S097.5D	Chip	1.7	52	.01	Tr	.3	.5	L	30	10	60	N	Dike
8S098A	do.	0.9	27	.27	Tr	8.0	L	N	200	15	90	N	Graywacke & quartz stringer
8S098B	do.	0.5	15	.56	Tr	33.0	2.0	N	480	25	100	L	Graywacke and dike
8S098C	do.	0.55	17	1.595	.1	82.0	15.0	N	10	15	25	L	Quartz and Carb. met.
8S098D	do.	0.2	6	Nil	Tr	2.5	.5	N	45	20	95	L	Fault gouge
8S098E	do.	1.2	37	Samp. missing		6.0	.7	200	40	15	65	N	Dike
8S098F	do.	1.2	37	Nil	Tr	.35	N	N	10	15	80	L	Graywacke (carbonaceous)
8S098G	do.	0.4	12	Nil	Nil	.05	N	N	25	15	60	N	Hydrothermal rock
8S098.5A	do.	0.3	9	.15	Tr	3.0	.5	N	60	15	75	N	Gray & black gouge

TABLE A-38. - Assay data, Cobol Mine upper adit, samples (cont.)

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S098.5B	Chip	0.8	24	0.28	Tr	10.0	5.0	N	5	5	15	L	Quartz vein
8S098.5C	do.	0.15	5	.005	Tr	1.5	L	L	45	20	80	L	Gray and black gouge
8S098.7A	do.	1.0	30	.10	0.1	4.0	N	N	L	10	20	L	Quartz vein
8S098.7B	do.	0.1	3	Nil	Nil	N	L	N	55	20	90	N	Gouge
8S099A	do.	1.17	36	Nil	Nil	0.15	L	N	35	25	80	N	Graywacke
8S099B	do.	0.9	27	.08	Tr	4.0	0.5	N	40	25	75	N	Gouge,quartz & graywacke
8S099C	do.	2.83	86	Nil	Nil	.2	.5	N	25	20	65	N	Dike and quartz vein
8S100A	do.	0.6	18	Nil	Nil	.5	N	N	70	20	95	N	Gouge, graywacke and quartz stringer
8S100B	Channel	0.6	18	Nil	Nil	.35	N	N	15	20	45	N	Quartz vein
8S100C	Chip	3.3	101	Nil	Tr	N	N	N	40	20	55	N	Dike
8S101A	do.	1.5	46	Nil	Tr	.1	L	N	50	20	90	N	Fault gouge,quartz, graywacke
8S101B	do.	3.67	112	Nil	Tr	.05	L	N	45	20	55	N	Dike and quartz vein
8S102A	Channel	0.3	9	Nil	Tr	.25	N	200	15	20	55	N	Quartz stringer zone,breccia
8S102B	do.	0.25	8	Nil	Tr	.1	N	L	50	H 25	65	N	Fault gouge
8S102C	Chip	2.2	67	.005	.1	N	L	N	35	20	60	N	Dike
8S102D	do.	0.8	24	.005	.1	N	L	N	55	H 25	80	N	Fault gouge, 0.05 foot quartz stringer
8S102E	do.	4.0	122	Nil	Tr	N	N	N	55	15	55	N	Dike
8S103A	do.	0.4	12	Nil	Tr	N	L	N	40	20	95	N	Graywacke
8S103B	do.	0.6	18	.06	Tr	.4	N	N	20	20	65	N	Fault gouge and quartz vein
8S103C	do.	2.2	67	Nil	Nil	.6	N	N	45	20	80	N	Dike
8S103D	Channel	1.0	30	Nil	Nil	.4	2.0	N	20	15	60	N	Black fault gouge
8S342A	Chip	1.1	34	.575	.1	16.0	.5	N	5	50	40	N	Quartz vein
8S342B	Grab	0.6	18	Nil	.1	.2	N	N	60	H 15	50	N	Dike and fault gouge
8S343	Chip	0.6	18	.21	.2	7.0	N	N	40	15	50	N	Quartz vein
8S344	do.	1.3	40	.02	Tr	3.0	1.0	N	60	H 15	65	N	Quartz vein and graywacke
8S345A	do.	0.25	8	.37	.1	15.0	.5	N	10	H 15	25	N	Quartz vein
8S345B	do.	1.0	30	Nil	Tr	.6	N	N	45	20	80	N	Graywacke and some dike fault gouge

TABLE A-38. - Assay data, Cobol Mine upper adit, samples (cont.)

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S346A	Chip	0.67	21	0.02	Tr	1.0	N	500	20	10	30	N	Quartz vein some graywacke
8S346B	do.	0.4	12	.04	Tr	1.5	N	N	25	H 20	55	N	Dike fault gouge
8S347	do.	3.0	91	.075	Tr	4.5	N	300	35	H 25	55	N	Quartz, fault gouge, graywacke and some dike
8S348A	do.	0.85	26	.04	Tr	1.5	N	N	45	H 20	70	N	Graywacke, fault gouge, dike and quartz
8S348B	do.	0.56	17	Tr	Tr	0.4	N	200	15	H 15	20	N	Quartz and some graywacke

TABLE A-39. - Assay data, Cobol Mine, surface samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S031	Grab					29.0	3.0	300	110	40	70	N	Quartz from mill feed,mill at lower adit,not shown on map
8S158	1/2 foot Chip	7.0	213	-	-	N	N	N	40	20	60	N	Dike
8S179A	Chip	2.5	76	Nil	Nil	N	N	N	40	15	45	N	Breccia,dike and quartz
8S179B	do.	2.6	79	Nil	Nil	L	N	N	20	20	55	N	Dike
8S179C	do.	0.2	6	Nil	Nil	N	N	N	15	H 40	25	N	Quartz,graywacke vein
8S179D	do.	1.3	40	Nil	Nil	0.10	N	N	55	H 25	70	N	Graywacke,quartz stringer zone
8S180	Grab	-	-	Nil	Nil	L	N	N	L	5	5	N	Quartz float
8S181	1/4 foot Chip	3.25	99	Nil	Nil	L	N	N	15	10	35	N	Dike
8S341	Select Dump	-	-	Nil	0.1	1.55	N	700	20	H 15	10	N	Dump-quartz lower adit
8S349	Grab	-	-	Nil	Nil	.30	N	N	5	H 10	10	N	Quartz float
8S350	do.	-	-	0.79	.4	33.0	2.0	N	15	10	10	N	do.
8S351	Chip	1.13	34	Nil	Nil	L	N	N	20	10	50	N	Dike
8S352	Grab	-	-	Nil	Tr	L	N	N	5	5	10	N	Quartz float
9S180	do.	0.4	12	Nil	Tr	N	N	200	N	L	10	N	do. 950 ft elevation
9S181	do.	0.1	3	8.74	1.3	250.0	N	N	N	40	15	N	do. &visible Au 975 ft. elev.
9S185	do.	-	-	Tr	Tr	.40	N	N	15	5	35	N	Graywacke,qtz,dike float 1175'
9S186	do.	0.3	9	Nil	Tr	N	N	N	45	5	40	N	Quartz graywacke float 1225'
9S187	do.	7.5	229	.01	Tr	.20	N	N	15	10	35	N	Dike and sulfides 1375'
9S189	do.	-	-	Nil	Nil	.05	N	N	35	H 10	70	N	Contact/graywacke, dike, Ca, quartz 1400'
9S190	do.	-	-	1.04	Tr	N	N	N	10	H 15	35	N	Qtz, graywack,dike float 1410'
9S192	do.	-	-	Nil	Nil	.10	N	N	N	L	15	N	Quartz float 1600'
9S195	do.	-	-	.12	Tr	.40	N	N	5	5	5	N	do. 1675'
9S197	do.	-	-	Nil	Nil	N	N	N	5	5	20	N	do. 1750'

TABLE A-39. - Assay data, Cobol Mine, surface samples (cont.)

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S182	Stream sediment	-	-	-	-	0.10	N	N	35	30	75	N	Below rock slide
9S183	do.	-	-	-	-	.05	N	N	60	35	170	N	Above rock slide
9S184	do.	-	-	-	-	L	N	N	65	40	150	N	1175 foot elevation
9S188	do.	-	-	-	-	L	N	N	60	35	180	N	1380 do. do.
9S191	do.	-	-	-	-	N	N	N	60	35	120	N	1420 do. do.
9S193	do.	-	-	-	-	N	N	N	100	100	150	N	1600 do. do.
9S194	do.	-	-	-	-	.50	N	N	55	25	85	N	1675 do. do.
9S196	do.	-	-	-	-	N	N	N	25	20	60	N	1750 do. do.

TABLE A-40. - Assay data, Falcon Arm 180 foot elevation adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S032	1/4 foot Chip	6.2	188	Nil	Nil	0.10	N	N	50	25	130	N	Graywacke
8S033	Chip	0.5	15	Nil	Nil	N	N	N	20	H 25	80	N	Fault gouge
8S034	do.	1.0	30	Nil	Nil	N	N	N	35	25	95	N	do.
8S035	do.	0.4	12	Nil	Nil	N	L	L	5	50	55	N	Fault,quartz stringer zone
8S036	Select Dump Grab	-	-	-	-	4.0	7.0	1000	L	1400	220	N	Quartz from dump

TABLE A-41. Assay data, Falcon Arm 400 foot elevation adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S198	1/2 foot Chip	17.0	518	Nil	Nil	N	N	200	5	15	45	N	Dike
9S199	do.	5.0	152	Nil	Nil	N	N	N	10	20	50	N	Dike some quartz
9S200	Grab	0.35	11	Nil	Nil	-	-	-	-	-	-	-	Silicified dike
9S201	do.	-	-	0.01	Tr	-	-	-	-	-	-	-	do.
9S202	do.	-	-	.02	Tr	-	-	-	-	-	-	-	do.
9S203	do.	-	-	.01	Tr	-	-	-	-	-	-	-	do.
9S204	do.	-	-	.25	Tr	N	N	700	L	20	55	N	do.
9S205	do.	-	-	.05	Tr	-	-	-	-	-	-	-	do.
9S206	Chip	0.35	11	.09	Tr	-	-	-	-	-	-	-	do.
9S206B	do.	0.1	3	Nil	Nil	-	-	-	-	-	-	-	Graywacke at contact
9S207	do.	0.4	12	.02	Tr	N	N	200	5	30	35	N	Dike and quartz
9S208	Float	-	-	Nil	Nil	N	N	N	30	5	30	N	Dike
9S209	Stream sediment	-	-	-	-	L	N	N	75	50	170	N	-

TABLE A-42. - Assay data, Falcon Arm upper workings, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S202A	Chip	1.8	55	Nil	0.1	N	N	N	50	20	110	N	Graywacke
8S202B	do.	2.1	64	NIl	.1	N	N	N	15	H 15	55	N	Dike
8S202C	do.	2.5	76	Nil	.1	N	N	N	40	25	110	N	Graywacke
8S203A	Channel	1.7	52	Nil	.1	L	0.5	700	25	10	45	N	Iron-stained dike & fault gouge
8S203B	Chip	1.5	46	Nil	.2	N	N	N	50	30	120	N	Graywacke
8S203C	do.	1.5	46	Nil	.2	0.2	N	2000	20	H 20	30	N	Dike
8S204A	do.	5.75	175	Nil	.1	L	.5	N	60	25	130	N	Graywacke
8S204B	do.	2.7	82	Nil	.2	.15	.5	2000	10	15	30	N	Dike
8S204C	do.	6.0	183	Nil	.1	N	N	N	50	25	120	N	Graywacke
8S205	High grade Float grab	-	-	2.16	2.6	88.0	150.0	G 10,000	10	9500	16,000	N	Quartz and galena
8S209A	Chip	3.94	120	Nil	Tr	N	.5	N	40	25	110	N	Graywacke
8S209B	do.	0.3	9	Nil	Tr	.15	.5	1000	45	H 25	95	N	Fault gouge and quartz
8S210A	do.	0.7	21	Nil	Tr	N	1.0	N	55	H 30	130	N	Graywacke and quartz
8S210B	do.	0.5	15	0.03	.3	1.3	20.0	1000	40	2000	450	N	Fault gouge and quartz
8S211A	do.	2.6	79	Nil	Nil	.15	1.0	200	55	H 30	100	N	Graywacke and quartz
8S211B	do.	0.5	15	.49	.6	17.0	30.0	2000	25	2500	6000	N	Fault gouge and quartz
8S212A	do.	2.0	61	Nil	Nil	.1	N	N	45	H 40	130	N	Graywacke
8S212B	do.	1.2	37	Nil	Nil	.4	.5	1500	35	H 25	90	N	Fault gouge and quartz
8S213A	do.	1.5	46	Nil	Nil	L	N	N	35	H 25	90	N	Graphitic schist
8S213B	do.	0.2	6	Nil	Nil	L	N	N	20	H 75	85	N	Quartz vein and fault gouge
8S213C	do.	3.6	110	Nil	Nil	N	N	N	45	20	100	N	Graphitic schist
8S213D	do.	0.2	6	Nil	Nil	N	N	N	40	H 30	95	N	Fault gouge and quartz
8S213E	do.	2.8	85	Nil	Nil	L	N	N	30	20	90	N	Graphitic schist
8S213F	do.	3.9	119	Nil	Nil	N	N	N	35	20	100	N	do.
8S214	Float chip	0.8	24	.05	.5	3.0	30.0	7000	5	4800	870	N	Quartz vein and galena
8S215	Float grab	0.7	21	1.13	3.0	54.0	70.0	10,000	10	26,000	33,000	N	do.
8S216	do.	-	-	.20	.8	10.0	30.0	7000	10	4800	1400	N	do.
8S217	do.	1.2	37	.10	.4	2.0	100.0	10,000	5	2800	2800	N	Quartz vein

TABLE A-42. - Assay data, Falcon Arm upper workings, samples (cont.)

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S218A	Grab	-	-	Nil	0.1	0.3	0.5	N	15	H 95	85	N	Quartz lens in fault gouge
8S218B	Chip	1.25	38	Nil	Tr	.1	.5	N	50	H 80	140	N	Fault gouge and quartz
8S272	do.	5.2	158	0.005	Tr	.25	.5	1500	15	20	65	N	Dike
9S282A	Channel	0.4	12	1.70	3.3	-	-	-	-	-	-	-	Quartz vein
9S282B	do.	0.45	14	.02	Tr	-	-	-	-	-	-	-	Fault gouge and graywacke
9S283A	do.	0.7	21	.49	1.5	15.0	50.0	200	10	12,000	17,000	N	Quartz lens, dike
9S283B	Chip	3.2	98	Tr	Tr	.2	.5	3000	10	90	360	N	Silicified dike
9S284	do.	1.9	58	Tr	Tr	-	-	-	-	-	-	-	Quartz and dike
9S504	do.	1.0	30	.01	Tr	-	-	-	-	-	-	-	Silicified dike
9S505	do.	3.8	116	Nil	.1	-	-	-	-	-	-	-	Dike some quartz
9S506A	Channel	0.3	9	1.10	1.1	-	-	-	-	-	-	-	Quartz vein and galena
9S506B	Chip	2.2	67	.015	Tr	-	-	-	-	-	-	-	Dike
9S507	Channel	0.3	9	1.025	1.9	-	-	-	-	-	-	-	Quartz vein,galena,sphalerite
9S508A	Chip	0.4	12	Nil	.1	-	-	-	-	-	-	-	Quartz vein
9S508B	do.	0.3	9	Nil	Nil	-	-	-	-	-	-	-	do.
9S509	Channel	0.3	9	.72	1.0	-	-	-	-	-	-	-	Quartz lens, fault gouge

TABLE A-43. - Assay data, Aerial photograph, Falcon Arm Prospect, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S159	Grab	-	-	-	-	0.4	N	200	20	15	60	N	Dike
8S160	Chip	2.0	61	-	-	.4	N	1000	25	15	55	N	do.
8S161	Float Grab	-	-	-	-	.05	N	N	40	10	75	N	Quartz
8S206	Chip	1.2	37	0.01	0.2	.65	1.0	5000	5	110	75	N	do.
8S207	Float Grab	-	-	Nil	.1	N	N	200	15	35	40	N	Quartz,dike, sulfides
8S208	do.	-	-	Nil	.1	.2	1.0	2000	5	35	15	N	Quartz
8S224	Chip	6.0	183	Nil	Nil	1.5	N	1500	15	20	30	N	Dike
8S271	Grab	-	-	.12	Tr	N	10.0	5000	20	150	4200	N	Quartz and galena
9S134	Float	-	-	Nil	Nil	.2	N	1500	10	10	50	N	Dike and sulfides
9S135	Chip	0.3	9	Nil	Nil	N	N	N	25	20	85	N	Fault zone,quartz,calcite, fault gouge,dike,graywacke
9S136	do.	-	-	Nil	Nil	N	N	N	20	H 20	50	N	Dike
9S137	do.	-	-	Nil	Nil	5.5	N	1000	10	10	35	N	Dike and sulfides
9S138	Float	-	-	.05	Tr	.25	N	200	25	15	55	N	Quartz and pyrite
9S139	Stream sediment	-	-	-	-	N	N	N	35	25	95	N	-
9S140	do.	-	-	-	-	N	N	N	70	35	100	N	-
9S277	float	-	-	Tr	.1	N	N	1500	L	10	20	N	Quartz and galena el. 1900'
9S278	Channel	0.2	6	Tr	.1	.15	N	2000	L	40	20	N	Quartz lens el. 1850'
9S279	Float	-	-	Nil	.1	.1	N	700	5	15	30	N	Quartz and sulfides el.1840'
9S280A	1/2 foot Chip	3.5	107	Tr	Tr	.05	N	500	55	15	50	N	Dike and sulfides el. 1800'
9S280B	Chip	0.5	15	Tr	Tr	N	N	200	10	15	60	N	Dike el. 1800'
9S281A	do.	0.75	23	Tr	Tr	N	N	300	50	15	130	N	Fault gouge & dike el. 1775'
9S510	High Grade Grab	-	-	Nil	Nil	-	-	-	-	-	-	-	Pit dump high grade grab

TABLE A-44. - Assay data, Slocum Arm Molybdenum Prospect, samples

Map No.	Sample	Type	Sample Length Feet	Sample Length Cm	PPM AAS* Mo	USGS Parts per Million Spec Mo	AAS Cu	Spec W	AAS Au	Spec Ag	Spec As	Description
1	9S450	Float	-	-	99	30	10	N	N	N	N	Quartz, molybdenite
	9S451	1 ft. chip	8.0	244	12	N	40	N	N	N	N	Dike
	9S452	Float	-	-	220	100	850	N	N	N	N	Quartz, molybdenite, copper
2	9S463	Channel	0.5	15	200	10	100	N	N	N	N	Quartz vein, sulfides
3	9S458	Chip	-	-	640	500	145	N	N	N	N	Quartz vein, molybdenite
	9S459	Grab chip	0.4	12	5400	G2000	130	N	N	N	N	do.
4	9S460	1/2 ft. chip	8.0	244	280	200	50	N	N	N	N	Diorite, sulfides
5	9S457	Chip	0.75	23	950	500	45	N	N	N	N	Quartz vein, molybdenite
	9S477A	1 ft. chip	19.0	579	-	10	170	N	N	N	N	Greenstone
	9S477B	do.	20.0	610	32	20	160	N	N	N	N	do.
6	9S454	Chip	0.4	12	230	200	40	N	N	N	N	Quartz vein
7	9S456	do.	0.4	12	980	500	30	N	N	N	N	Quartz vein, sulfides
8	9S453	do.	0.3	9	82	50	90	N	0.05	N	N	do.
9	9S455A	1/2 ft. chip	13.0	396	190	100	35	N	N	N	N	One dike
	9S455B	do.	21.0	640	170	100	30	N	N	N	N	
10	9S461	Channel	0.16	5	41	5	800	N	N	N	N	Quartz vein, copper
11	9S462	Chip	0.15	5	820	300	200	N	N	N	N	Quartz vein, sulfides
12	9S449	Stream sediment	-	-	-	N	165	N	N	N	N	-
	9S447	Float	-	-	220	100	20	N	N	N	N	Quartz, molybdenite
	9S448	do.	-	-	26	5	30	N	N	N	N	Quartz, sulfides
13	9S445	Channel	0.3	9	11	N	30	N	N	N	N	Fault gouge
	9S446	Float	-	-	44	20	15	N	N	N	N	Quartz, sulfides
14	9S444	Stream sediment	-	-	-	7	190	N	N	N	N	-
15	9S442	1/2 ft. chip	6.0	183	140	N	30	N	N	N	N	Dike
	9S443A	do.	5.5	168	20	N	40	N	N	N	N	Dike (gray)
	9S443B	do.	6.0	183	17	N	100	N	N	N	N	Dike (? green)
16	9S473	Chip	0.8	24	21	N	145	N	N	N	N	Quartz vein, sulfides
17	9S474	Channel	0.25	8	119	100	155	N	N	N	N	do.

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TABLE A-44. - Assay data, Slocum Arm Molybdenum Prospect, samples (cont.)

Map No.	Sample	Type	Sample Length Feet	Sample Length Cm	Analysis PPM AAS* Mo	Analysis USGS Parts per Million Spec Mo	AAS Cu	Spec W	AAS Au	Spec Ag	Spec As	Description
17	9S475	Channel	0.15	5	4200	2000	55	N	N	N	N	Quartz vein, molybdenite
18	9S476	Grab	-	-	39	10	10	N	N	N	N	Granitic rock
19	8S068	do.	-	-	<30	15	L	N	N	N	N	Quartz boulder
20	8S067	Chip	0.4	12	<30	30	L	L	N	N	N	Quartz vein
21	8S054	do.	0.7	21	-	N	L	N	0.10	N	N	Dike or silicified zone
22	8S065	do.	0.8	24	-	100	15	L	N	L	500	Quartz vein
23	8S063A	do.	0.26	8	140	150	45	L	N	N	N	do.
	8S063B	Grab	-	-	<30	15	140	N	N	N	N	Greenstone
	8S063C	Chip	0.38	12	90	100	70	L	N	N	N	Quartz vein
	8S063D	Grab	-	-	<30	10	190	N	N	N	N	Greenstone
	8S063E	Chip	1.0	30	690	700	590	N	N	N	N	Quartz vein
	8S063F	Grab	-	-	30	15	190	N	N	N	N	Greenstone
	8S063G	Chip	0.5	15	<30	30	95	L	N	N	N	Quartz vein
	8S064	do.	0.95	29	2100	2000	110	L	N	L	N	do.
	8S066	Channel	1.6	49	30	70	55	L	N	N	N	do.
24	9S295	Chip	0.25	8	6500	2000	110	N	N	N	N	do.
25	8S061A	Channel	0.1	3	190	300	110	N	N	L	N	do.
	8S061B	1/2 ft. chip	2.0	61	<30	20	130	N	N	N	N	Greenstone
	8S061C	Channel	0.33	10	<30	50	55	L	N	N	N	Quartz vein
	8S061D	1/2 ft. chip	2.6	79	<30	20	85	N	N	N	N	Greenstone
	8S061E	Channel	0.13	4	300	500	60	L	N	N	N	Quartz vein
	8S061F	1/2 ft. chip	2.2	67	40	50	150	N	N	N	N	Greenstone
	8S061G	Channel	0.4	12	3000	G2000	120	N	N	N	N	Quartz vein
	8S061H	1/2 ft. chip	4.5	137	30	50	100	N	N	N	N	Greenstone
	8S061I	Channel	0.2	6	6000	G 2000	55	N	N	N	N	Quartz vein
	8S061J	1/2 ft. chip	5.0	152	50	150	95	L	N	N	N	Greenstone
	8S061K	Channel	0.32	10	3300	G 2000	100	N	N	N	N	Quartz vein
	8S061L	1 ft. chip	17.5	533	60	100	190	N	N	N	N	Greenstone
25	8S062	Cont. chip	1.0	30	80	100	L	L	N	N	N	Quartz vein in creek
26	8S087	Random chip	-	-	-	N	230	N	N	0.5	N	Fault zone,greenstone,sulfides
27	8S058	do.	-	-	<30	N	210	N	N	L	N	Sparse quartz & pyrite in graywacke
28	8S059	Float grab	-	-	<30	15	60	N	N	N	N	Quartz
29	8S060	do.	-	-	1200	700	L	N	N	N	N	do.

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TABLE A-45. - Assay data, Aerial photograph, Orange Gulch, samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	Mo	Cu	Pb	Zn	V	Description
8S183	Chip	0.75	23	-	-	N	1.0	15	30	10	270	1000	Quartz stringer in greenstone
8S184	Grab	-	-	-	-	N	1.0	N	160	15	65	700	Greenstone,pyrite,copper
8S185	Chip	2.7	82	-	-	N	1.0	10	140	15	35	1000	Iron-stained greenstone
8S260	Grab	-	-	-	-	N	0.5	20	20	10	5	200	Graphite
8S261	Float Grab	-	-	-	-	0.1	3.0	50	70	H 15	400	1000	Brecciated material,graphite
8S262	do.	-	-	-	-	N	N	N	340	15	40	200	Amphibolite and sulfides
8S263	do.	-	-	Nil	Nil	4.8	N	N	45	5	30	70	Green dike and sulfides
8S264	Chip	3.33	102	-	-	N	.5	30	15	5	30	300	Quartz vein
8S265	do.	0.75	23	-	-	N	.7	15	80	H 15	190	200	Quartz and fault gouge
8S266	Stream sediment	-	-	-	-	N	2.0	100	160	30	370	1000	-
8S267	do.	-	-	-	-	N	2.0	100	190	25	420	1000	-
8S268	do.	-	-	-	-	N	2.0	100	120	15	260	1000	30ppm Sn by Spec
8S269	Float Grab	-	-	-	-	N	N	N	100	5	80	70	Silicified schist & sulfides
8S270	Chip	2.2	67	-	-	N	N	N	20	L	25	30	Qtz vein in amphibolite dike
9S285	Grab	-	-	Nil	Tr	N	N	N	50	10	40	100	Iron-stain zone
9S286	Stream sediment	-	-	-	-	N	N	20	220	30	190	300	-
9S287	Float	-	-	0.02	0.1	N	N	N	L	5	10	10	Quartz
9S288	Chip	1.85	56	Nil	Tr	N	2.0	50	65	H 15	290	1000	Fault gouge and quartz zone
9S289	Grab	-	-	Nil	Tr	N	5.0	10	15	10	60	200	Phyllite and sulfides
9S419	do.	-	-	Nil	Nil	N	7.0	100	170	15	170	1000	Silicified phyllite &sulfides
9S420A	Chip	2.4	73	Nil	Nil	N	7.0	100	25	15	70	2000	Layered phyllite
9S420B	do.	2.7	82	Nil	Nil	N	3.0	100	25	10	50	1000	do.
9S421	Stream sediment	-	-	-	-	N	2.0	50	160	30	320	1000	-
9S422	do.	-	-	-	-	N	N	20	Ins	Ins	Ins	500	-
9S423	Chip	0.3	9	Nil	Nil	N	3.0	70	80	15	120	700	Fault gouge

TABLE A-46. - Assay data, Orange Gulch pond, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	Mo	Cu	Pb	Zn	V	Description
9S210	Stream sediment	-	-	-	-	Ins	N	50	150	30	250	300	-
9S211	Chip	1.0	30	Nil	Nil	N	N	N	N	10	15	20	Phyllite,quartz & sulfides
9S212	do.	2.0	61	Nil	Nil	12.0	N	15	55	10	120	700	Silicified, altered phyllite sulfides
9S290	Stream sediment	-	-	-	-	N	3.0	100	Ins	Ins	Ins	1000	-
9S291	Channel	0.3	9	Nil	Nil	N	3.0	100	130	25	3400	1000	Fault gouge
9S292	Grab	-	-	Nil	Tr	N	N	N	100	5	55	50	Quartz lens and sulfides
9S416A	Chip	3.0	91	Nil	Nil	N	2.0	70	55	15	100	500	Ironstained phyllite&sulfides
9S416B	do.	2.2	67	Nil	Nil	N	N	N	45	10	50	100	do.
9S416C	do.	2.2	67	Nil	Nil	N	N	N	35	10	80	100	Cherty gray phyllite
9S416D	do.	2.0	61	Nil	Tr	N	N	N	35	10	70	100	do.
9S416E	do.	2.1	64	Tr	Tr	N	N	10	70	10	120	100	do.
9S417A	do.	2.0	61	Nil	Nil	N	2.0	100	120	15	800	1000	Iron stained phyllite&sulfides
9S417B	do.	0.3	9	Nil	Nil	N	3.0	100	140	20	2500	1000	Fault gouge &phyllite breccia
9S417C	do.	2.0	61	Nil	Nil	N	3.0	70	80	20	320	1000	Phyllite

APPENDIX B. Remainder of occurrence figures and assay data tables

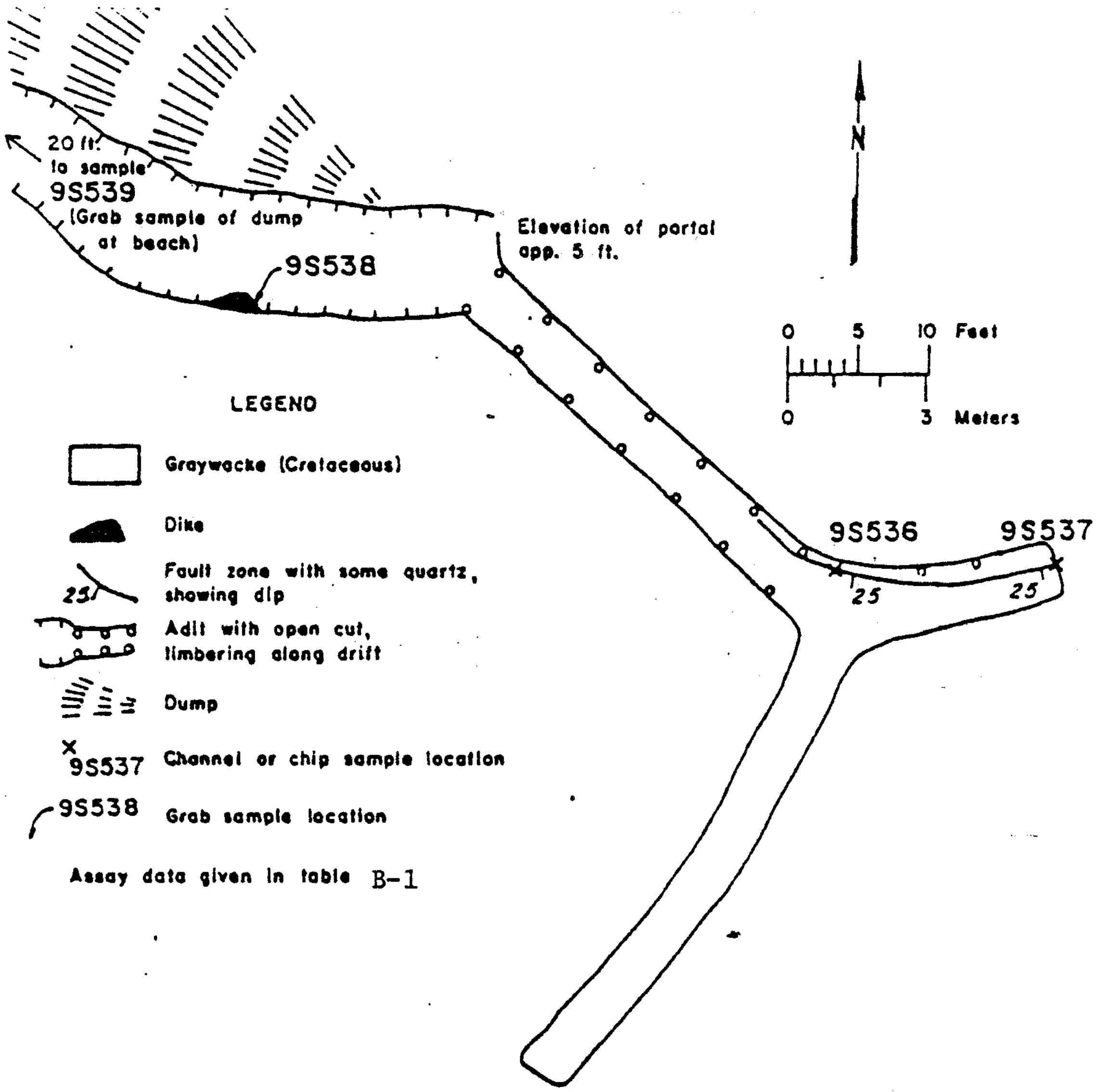

FIGURE B-1. Powerline adit, sample locations (Mapped in July 1979 by J. Still and K. Weir)

TABLE B-1. - Assay data, Power Line adit, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S536	Channel	0.45	14	Nil	Nil	-	-	-	-	-	-	-	Fault gouge and quartz
9S537	do.	0.35	11	Nil	Nil	1.1	N	N	55	20	120	N	do.
9S538	Grab	0.3	9	0.52	0.2	20.0	3.0	10,000	5	690	25	N	Quartz and dike, sulfides
9S539	Dump Grab	-	-	.005	Tr	0.2	N	N	25	25	60	N	Dike and quartz, sulfides

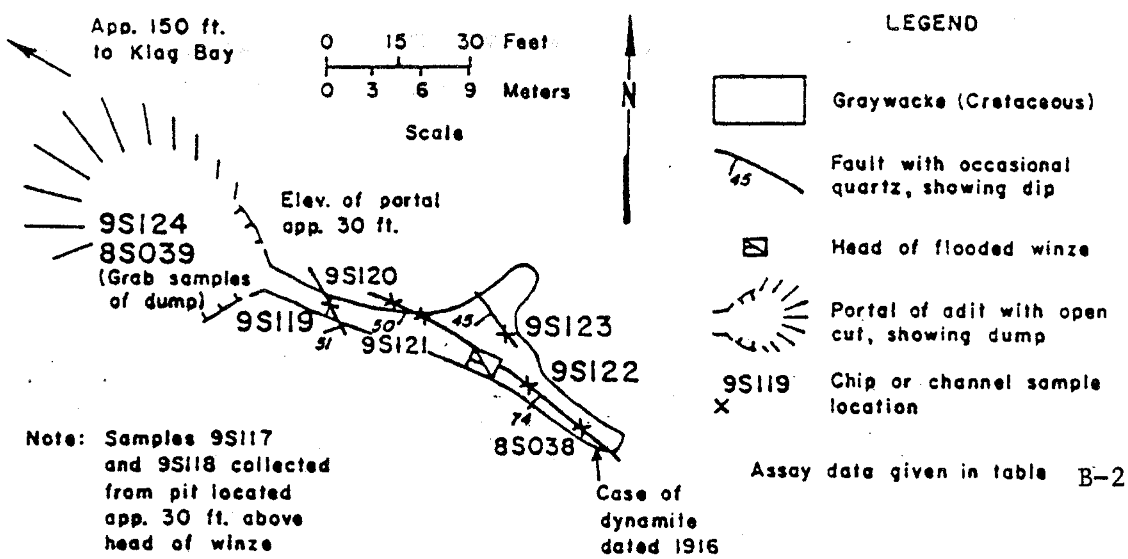

FIGURE B-2. Handy adit and pit, sample locations (Mapped in 1979 by J. Still and K. Weir)

TABLE B-2. - Assay data, Handy adit

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S038	Chip	0.3	9	0.03	Tr	1.5	0.7	N	5	20	25	L	Quartz
9S117	do.	0.4	12	Nil	Nil	-	-	-	-	-	-	-	Fault gouge some quartz
9S118	Channel	0.56	17	Nil	Nil	-	-	-	-	-	-	-	GWK,fault gouge,some quartz
9S119	do.	0.3	9	.12	Tr	-	-	-	-	-	-	-	Quartz,fault gouge,graywacke
9S120	Chip	0.3	9	Nil	Nil	-	-	-	-	-	-	-	Quartz,calcite,graywacke
9S121	do.	0.3	9	Nil	Nil	0.10	N	N	15	20	65	N	Quartz, calcite vein
9S122	do.	0.2	6	Nil	Nil	.10	1.0	N	15	H 35	60	N	Quartz,fault gouge,graywacke
9S123	Channel	0.2	6	Nil	Nil	-	-	-	-	-	-	-	Ribbon quartz, fault gouge
9S124	Dump Grab	0.3	9	Nil	Nil	-	-	-	-	-	-	-	Quartz
8S039	do.	-	-	-	-	N	N	N	5	10	25	N	do.

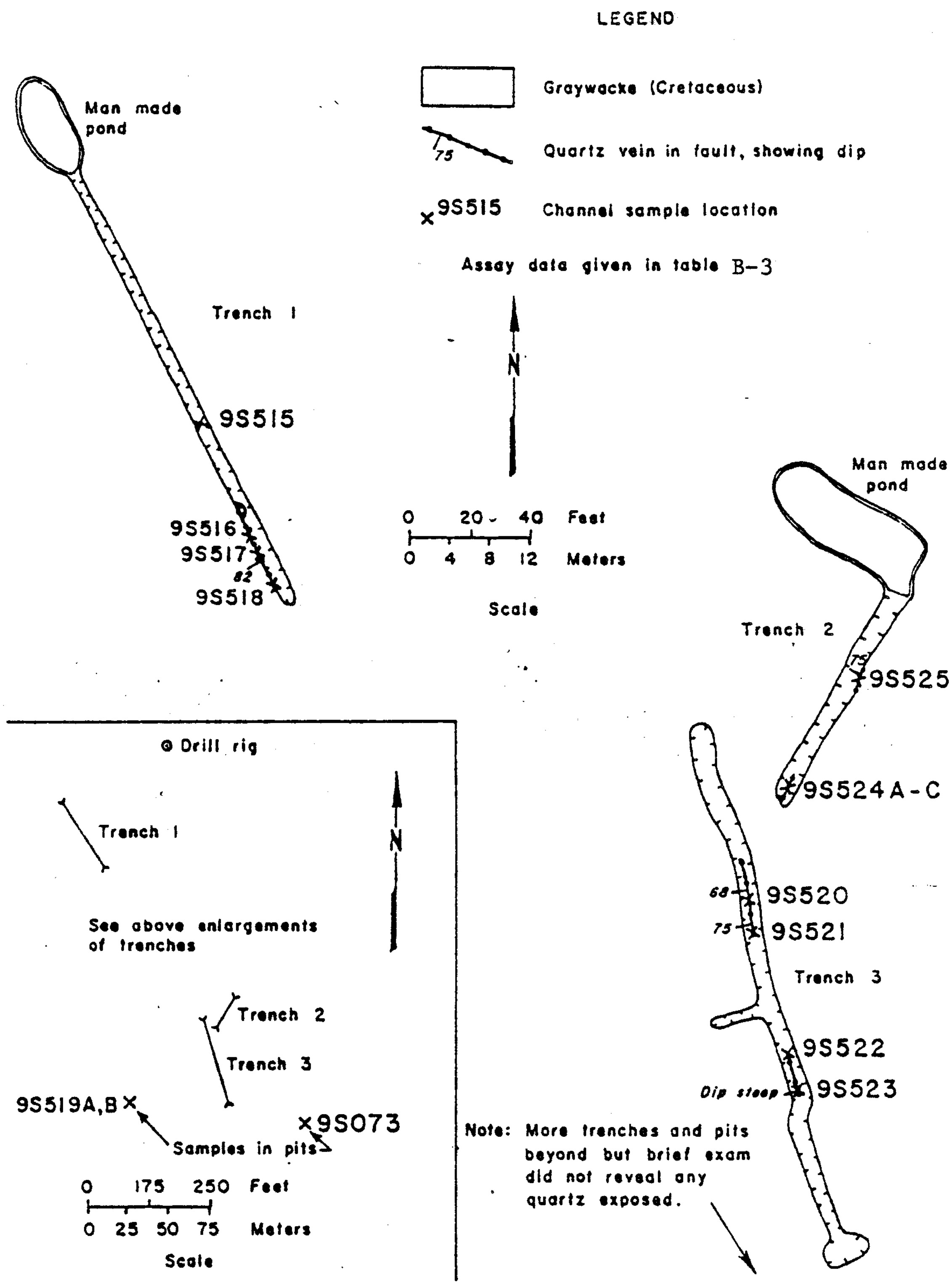

FIGURE B-3. Chichagoff King Prospect, sample locations (Mappped in 1979 by J. Still and K. Weir)

TABLE B-3. - Assay data Chichagoff King also Chichagoff Ext. No. 4, samples

		Analysis											
		Sample Length		Oz./Ton Fire Assay		Parts per Million							
						AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
9S515	Chip	0.9	27	Nil	Nil	-	-	-	-	-	-	-	Quartz vein
9S516	do.	0.5	15	Tr	Tr	0.1	N	N	15	30	25	N	do.
9S517	Channel	0.65	20	Tr	Tr	-	-	-	-	-	-	-	Quartz and ribbon quartz
9S518	Chip	0.5	15	Nil	Nil	-	-	-	-	-	-	-	Quartz
9S519A	Channel	0.12	4	0.03	Tr	N	N	N	L	5	15	N	Quartz vein
9S519B	do.	0.35	11	Nil	Nil	N	N	N	L	L	5	N	do.
9S520	Chip	1.0	30	Nil	Nil	.9	N	1000	5	10	5	N	Quartz vein, ribbon quartz
9S521	do.	1.3	40	.01	Tr	-	-	-	-	-	-	-	Quartz vein
9S522	do.	2.4	73	.02	Tr	-	-	-	-	-	-	-	do.
9S523	do.	0.9	27	Tr	Tr	-	-	-	-	-	-	-	do.
9S524A	Channel	0.7	21	Tr	Tr	-	-	-	-	-	-	-	Quartz vein
9S524B	Chip	0.6	18	.01	Tr	-	-	-	-	-	-	-	Graywacke lens
9S524C	Channel	0.4	12	Nil	Nil	-	-	-	-	-	-	-	Quartz vein
9S525	do.	0.2	6	Nil	Nil	-	-	-	-	-	-	-	do.
9S073	Grab	-	-	-	-	.30	N	N	5	10	20	N	Quartz float in sloughed pit

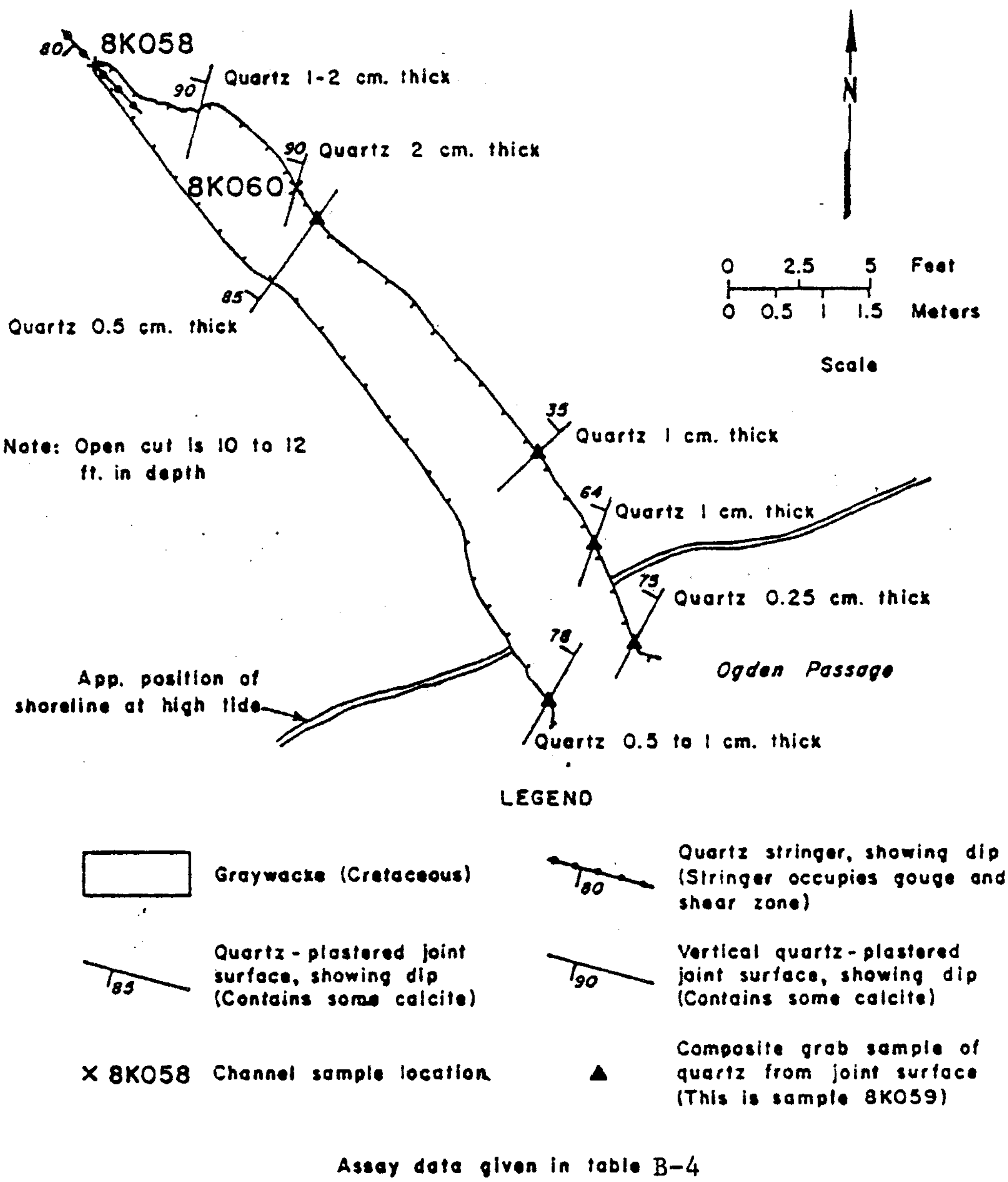

FIGURE B-4. Hanlon Prospect sample locations (Mapped in 1978 by A. Kimball and J. Rataj)

TABLE B-4. - Assay data, Hanlon Prospect

		Analysis						
		Sample Length		Oz./Ton Fire Assay		Spec	Spec	
Sample	Type	Feet	Cm	Au	Ag	As	W	Description
				Open Cut				
8K058	Channel	0.25	8	Nil	Tr	1000	L	Quartz stringer in gouge and shear zone in graywacke w/pyrite
8K059	Composit Grab	-	-	Nil	Tr	N	L	Qtz w/some calcite forming veneer on joint surface w/some pyrite
8K060	Channel	0.06	2	Nil	Tr	N	N	Quartz veneer on joint surface
				Beach Float				
8K061	Grab	-	-	0.01	Tr	1000	L	Quartz w/pyrite from vein at least 0.3ft thick; contains partings of sheared graywacke
8K061X	Replicate of above sample	-	-	-	-	1000	L	

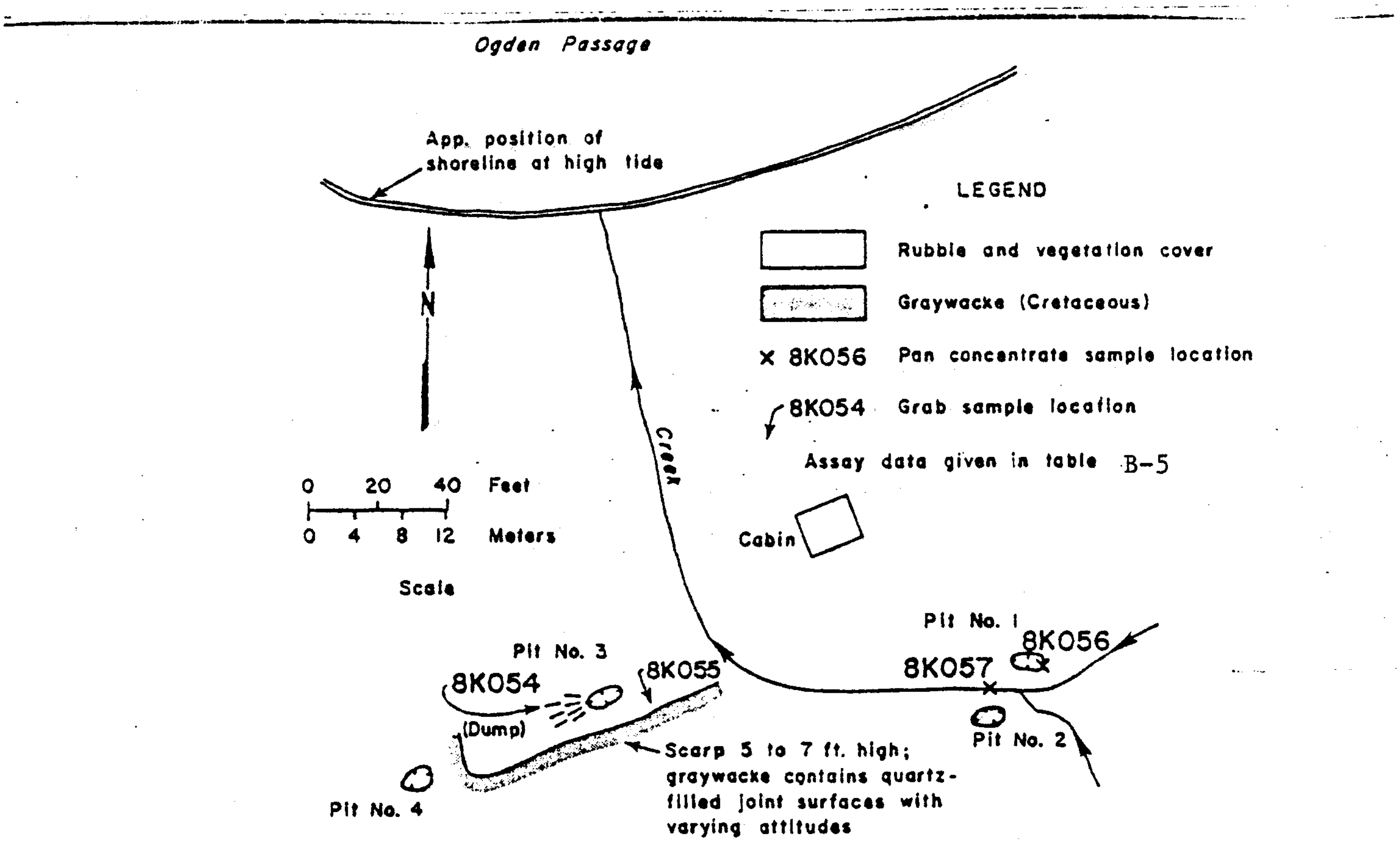

FIGURE B-5. McKallick Placer Prospect sample locations (Mapped in 1978 by A. Kimball and J. Rataj)

TABLE B-5. - Assay data, McKallick Placer Prospect

Sample	Type	Analysis PPM Spec W	Analysis PPM AAS Au	Analysis Oz./Ton Fire Assay Au	Analysis Oz./Ton Fire Assay Ag	Description
8K054	Grab	Nil	Nil	Nil	Tr	Dump material from pit No. 3
8K055	Select Grab	L	Nil	0.01	Tr	Quartz from joint surfaces in graywacke
8K056	Pan concentrate	Nil	Nil	Nil	Tr	Material in pit No. 1
8K057	do.	Nil	4.5	.11	Tr	Stream detritus

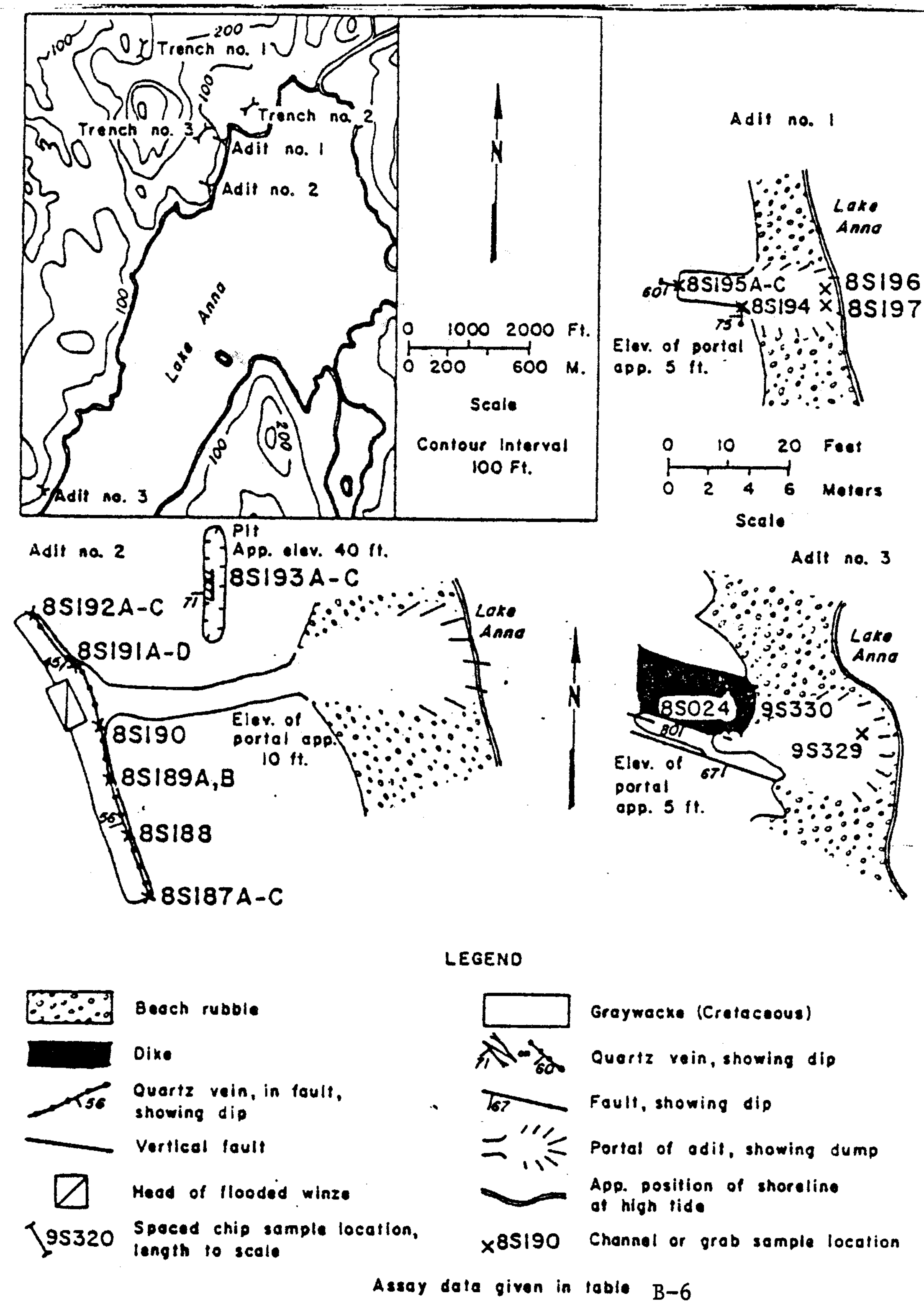

FIGURE B-6. Woll Prospect, sample locations (Mapped in 1978 by J. Still and K. Weir)

TABLE B-6. - Assay data, Woll Prospect, samples

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S024	Chip	0.1	3	-	-	N(.05)	N	L	10	15	20	N	Quartz
8S287A	do.	2.3	70	Nil	Tr	N(.05)	N	N	45	20	110	N	Graywacke
8S187B	do.	0.67	20	Nil	Tr	0.10	N	N	15	H 25	70	N	Quartz vein and fault gouge
8S187C	do.	1.83	56	Nil	Tr	N(.05)	N	N	45	20	110	N	Graywacke
8S188	do.	0.5	15	Nil	Tr	N(.05)	N	N	15	H 15	35	N	Quartz vein
8S189A	do.	0.5	15	0.51	0.4	26	7.0	N	10	1000	280	N	do.
8S189B	do.	0.5	15	Nil	Tr	L(.05)	N	N	50	H 25	110	N	Fault gouge
8S190	do.	0.5	15	Nil	Tr	.15	N	N	50	H 30	75	N	Quartz vein and fault gouge
8S191A	do.	1.3	40	Nil	.1	N(.05)	N	N	55	20	120	N	Graywacke
8S191B	do.	0.5	15	Nil	.1	L(.05)	N	N	55	25	150	N	Fault gouge
8S191C	do.	1.6	49	Nil	.1	N(.05)	N	N	40	20	110	N	Graywacke
8S191D	do.	0.25	8	Nil	.1	N(.05)	N	N	45	H 20	110	N	Fault gouge
8S192A	do.	1.0	30	Nil	.1	N(.05)	N	N	65	H 25	90	N	Graywacke
8S192B	do.	0.27	8	.005	.3	N(.05)	N	N	40	H 25	75	N	Fault gouge and quartz
8S192C	do.	1.42	43	Nil	Nil	N(.05)	N	N	40	20	100	N	Graywacke
8S193A	do.	0.2	6	Nil	.1	L(.05)	N	N	30	15	55	N	Quartz vein, fault gouge
8S193B	do.	0.5	15	Nil	.1	L(.05)	N	N	5	L(5)	10	N	do.
8S193C	do.	1.2	37	Nil	Tr	N(.05)	N	N	5	L(5)	15	N	do.
8S194	do.	0.3	9	Nil	.1	N(.05)	N	N	25	H 65	55	N	Quartz vein
8S195A	do.	0.5	15	Nil	.1	N(.05)	N	N	45	20	110	N	Graywacke and fault gouge
8S195B	do.	0.25	8	Nil	.1	N(.05)	N	N	15	H 30	30	N	Quartz vein
8S195C	do.	0.5	15	Nil	Nil	N(.05)	N	N	55	20	110	N	Graywacke
8S196	Dump Grab	-	-	-	-	L(.05)	5.0	N	710	280	130	N	Quartz
8S197	do.	-	-	-	-	N(.05)	N	N	45	20	100	N	Graywacke
9S329	Dump	-	-	.01	Tr	N(.05)	N	N	5	H 10	10	N	quartz and dike
9S330	1' Chip	8.0	244	.01	Tr	N(.05)	N	N	30	15	50	N	Dike

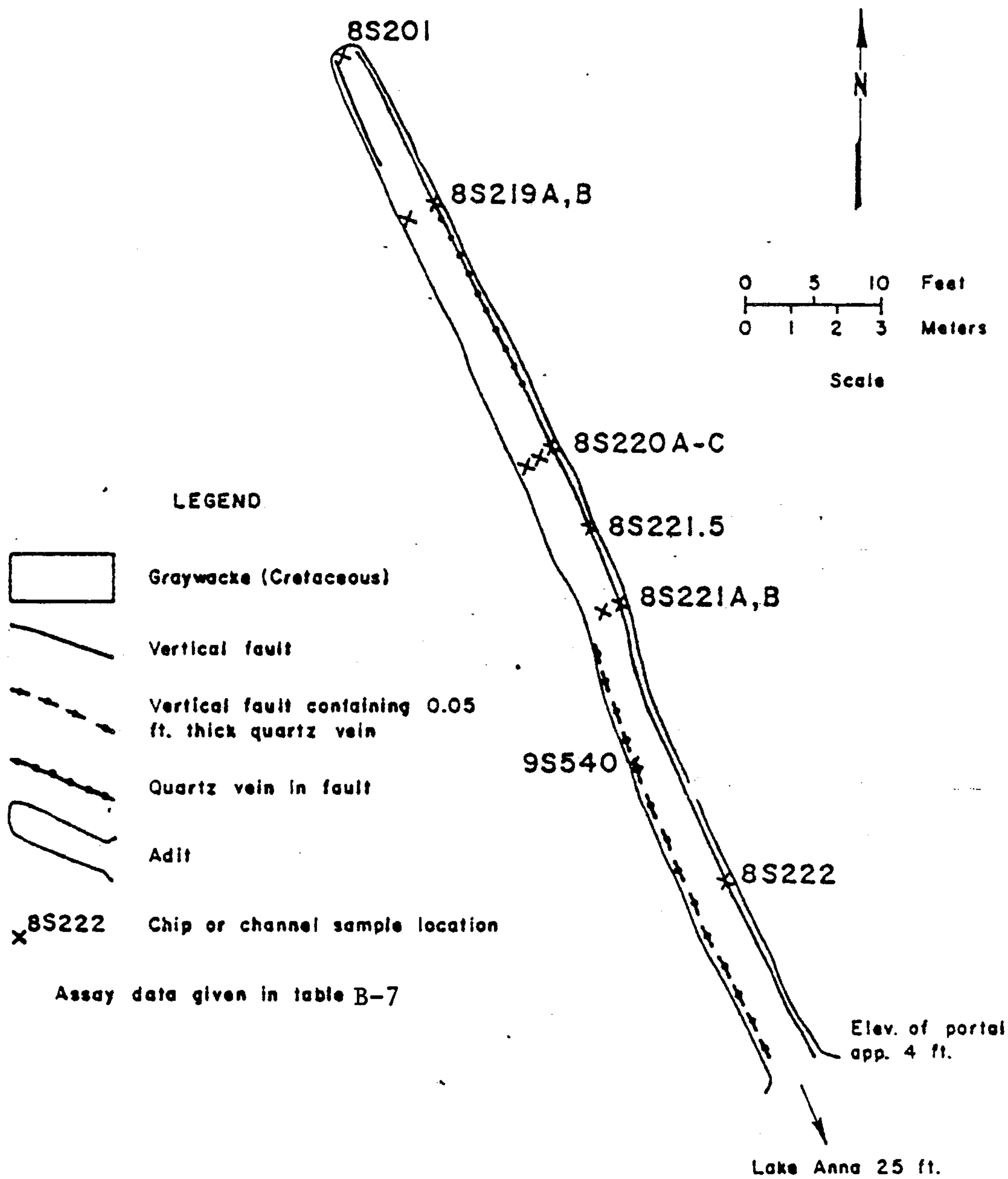

FIGURE B-7. Lake Anna adit, sample locations (Mapped in July 1978 by J. Still and K. Weir)

TABLE B-7. - Assay data, Lake Anna adit

		Analysis											
				Oz./Ton		Parts per Million							
		Sample Length		Fire Assay		AAS	Spec	Spec	AAS	AAS	AAS	Spec	
Sample	Type	Feet	Cm	Au	Ag	Au	Ag	As	Cu	Pb	Zn	W	Description
8S201	Chip	2.6	79	Nil	Nil	N	N	N	35	H 25	95	N	
8S219A	do.	1.8	55	Nil	0.3	L	N	N	55	30	110	N	Graywacke and quartz
8S219B	do.	1.17	36	Nil	.3	0.10	N	N	35	H 40	100	N	Quartz,graywacke,breccia
8S220A	do.	1.2	37	Nil	.1	N	N	N	35	25	90	N	Graywacke
8S220B	do.	0.7	21	Nil	Tr	L	N	N	45	35	180	N	Fault gouge and quartz
8S220C	do.	0.7	21	Nil	Tr	.25	0.5	N	440	30	1800	N	Graywacke, quartz vein
8S221A	do.	2.0	61	Nil	Tr	N	N	N	40	H 20	110	N	Fault gouge and quartz
8S221B	do.	2.2	67	Nil	.1	.05	N	N	180	H 20	450	N	Fault gouge,graywacke,breccia
8S221.5	do.	0.5	15	Nil	Nil	L	N	N	15	H 10	65	N	Quartz vein
8S222	do.	3.92	119	Nil	Nil	.05	N	N	80	H 25	130	N	Quartz stringers, graywacke
9S540	Channel	0.05	1.5	0.005	Tr	-	-	-	-	-	-	-	Quartz vein

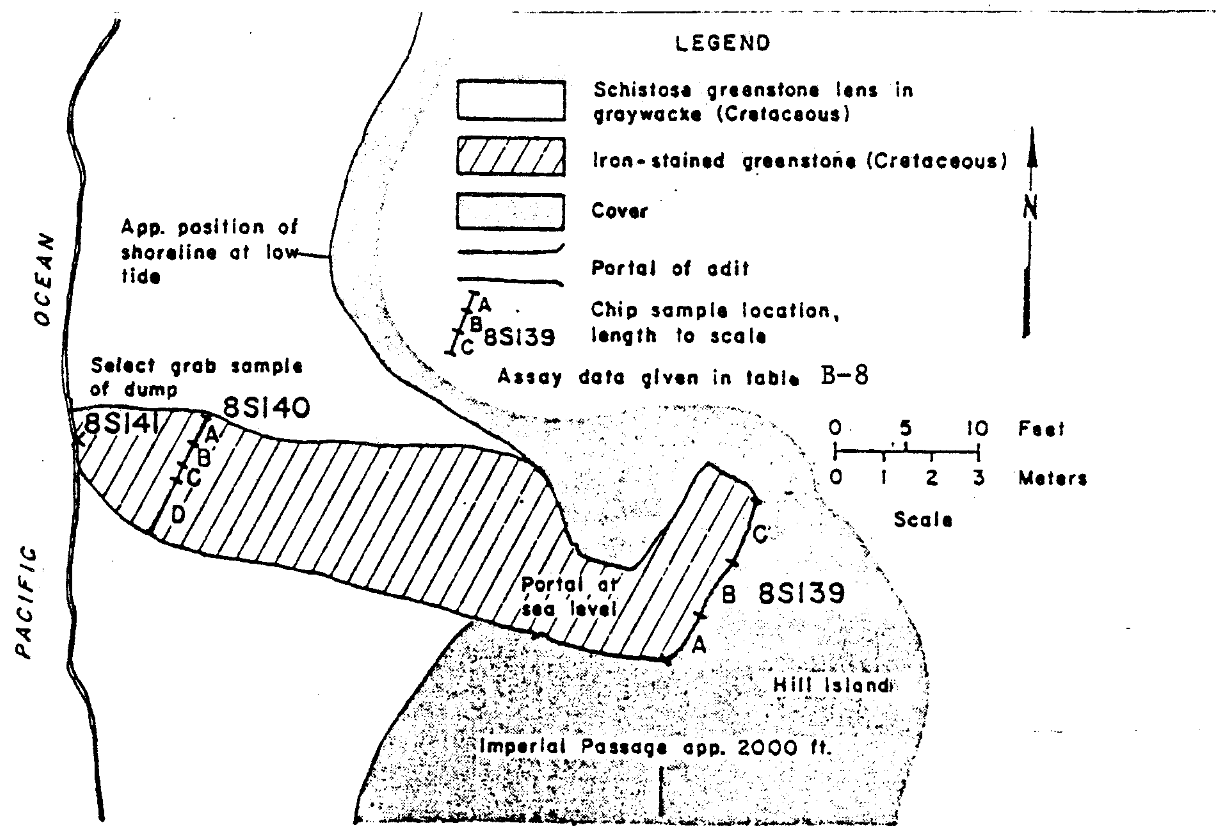

FIGURE B-8. Congress adit, sample locations (Mapped in July 1978 by J. Still and K. Weir)

TABLE B-8. - Assay data, Congress adit and area

		Analysis							
		Sample Length		Parts per Million					
				AA	AA	AA	AA	Spec	
Sample	Type	Feet	cm	Cu	Pb	Zn	Au	Ag	Description
8S139A	Chip	4.0	122	3500	30	840	N(.05)	1.0	Silicified greenstone, schist & sulfides
8S139B	do.	4.0	122	3000	30	450	N(.05)	1.0	do.
8S139C	do.	4.5	137	4900	30	340	N(.05)	1.0	do.
8S140A	do.	1.8	55	100	20	100	N(.05)	N	do.
8S140B	do.	1.6	49	5800	30	790	N(.05)	3.0	do.
8S140C	do.	1.1	34	3700	30	860	N(.05)	3.0	do.
8S140D	do.	4.2	128	3100	30	480	N(.05)	N	do.
8S141	High grade Grab	-	-	5200	35	360	0.10	7.0	do.

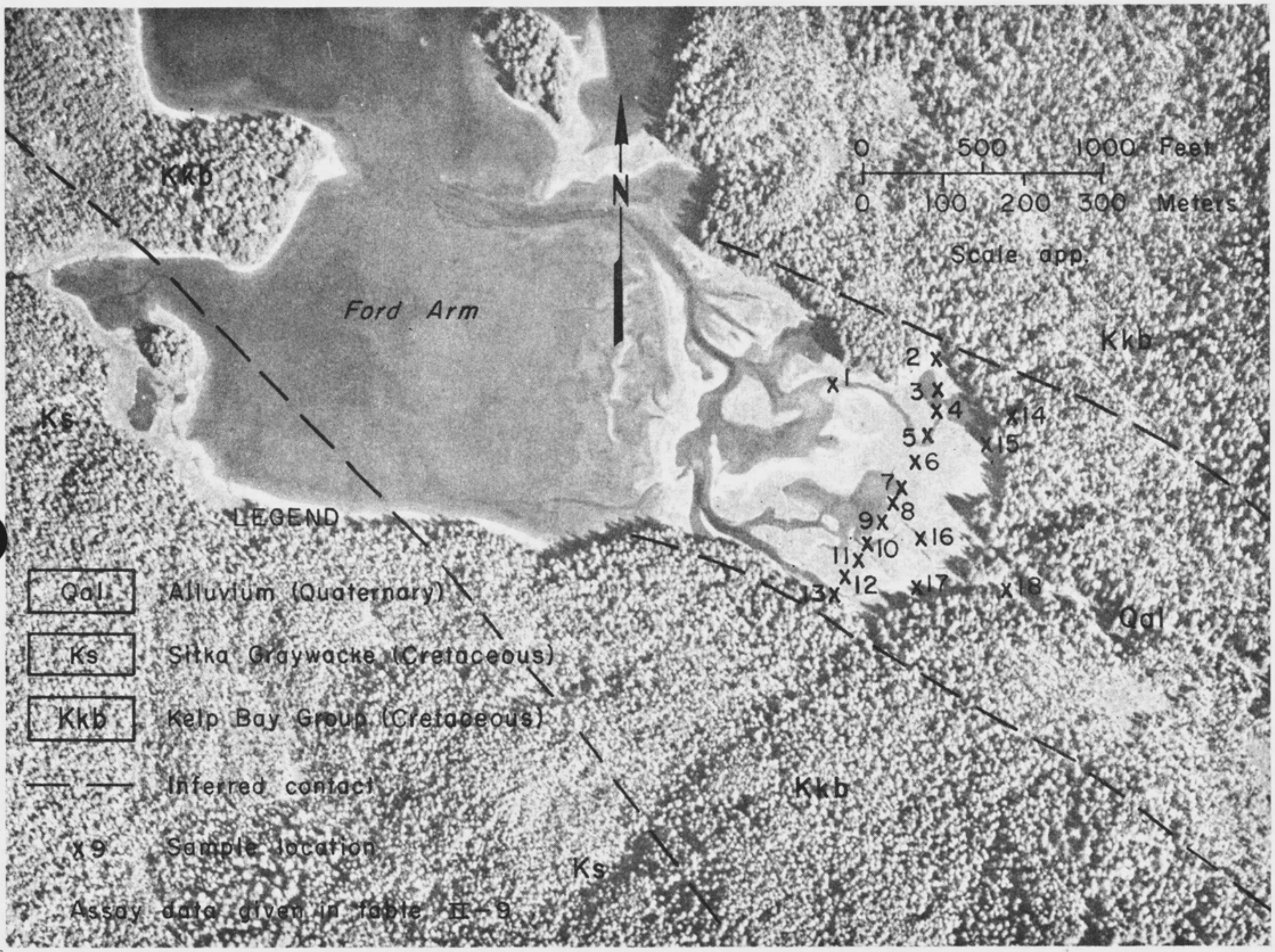

Figure B-9. - Eldorado Placer Prospect, sample locations.

TABLE B-9. - Aerial photograph, Eldorado Placer Prospect, samples

Map No.	Sample	Type	Approx Wt	Oz./Ton Fire Assay Au	Oz./Ton Fire Assay Ag	Parts per Million AA Au	Spec Ag	Spec As	AA Cu	AA Pb	AA Zn	Spec W	Description
1	8S362SS	Stream sediment		-	-	N(.05)	N	N	25	15	75	N	Sand
	8S363PC	Pan concentrate		-	-	0.90	N	N	20	15	60	N	do.
2	9S485	3/4ft. shovel	6 lbs.	Nil	Nil	-	-	-	-	-	-	-	Sand and Gravel
3	9S486	do.	6 lbs.	0.0005	Tr	-	-	-	-	-	-	-	Sand
4	9S487	do.	6 lbs.	Tr	Tr	-	-	-	-	-	-	-	do.
5	9S488	do.	6 lbs.	Nil	Nil	-	-	-	-	-	-	-	do.
6	9S489	do.	6 lbs.	Nil	Nil	-	-	-	-	-	-	-	do.
7	9S490	do.	6 lbs.	Tr	Tr	-	-	-	-	-	-	-	do.
8	9S491	do.	6 lbs.	.0003	Tr	-	-	-	-	-	-	-	do.
9	9S492	do.	6 lbs.	.0001	Tr	-	-	-	-	-	-	-	do.
10	9S493	do.	6 lbs.	Tr	Tr	-	-	-	-	-	-	-	do.
11	9S494	do.	6 lbs.	Nil	Nil	-	-	-	-	-	-	-	do.
12	9S495	do.	6 lbs.	Nil	Nil	-	-	-	-	-	-	-	do.
13	9S496	do.	6 lbs.	Tr	Tr	-	-	-	-	-	-	-	do.
14	8S360PC	Pan concentrate		-	-	N	N	N	30	20	100	N	do.
15	8S361PC	do.		-	-	L	N	N	25	15	90	N	do.
16	8S359SS	Stream sediment		-	-	N	N	N	30	15	65	N	do.
17	8S353SS	do.		-	-	.6	N	N	55	50	80	N	do.
	8S354SS	do.		-	-	N	N	N	40	20	60	N	do.
	8S355PC	Pan concentrate		-	-	N	N	N	35	20	95	N	do.
18	8S356PC	do.		-	-	N	N	N	35	15	75	N	do.
	8S357SS	Stream sediment		-	-	N	N	N	45	15	55	N	do.
	8S358PC	Pan concentrate		-	-	.6	N	N	Ins	Ins	Ins	N	do.

Ins - Insufficient sample

Principles of a Resource/Reserve Classification For Minerals

By the U.S. Bureau of Mines and
the U.S. Geological Survey

GEOLOGICAL SURVEY CIRCULAR 831

A revision of the classification system published as U.S. Geological Survey Bulletin 1450–A

1980

Principles of a Resource/Reserve Classification for Minerals

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INTRODUCTION

Through the years, geologists, mining engineers, and others operating in the minerals field have used various terms to describe and classify mineral resources, which as defined herein include energy materials. Some of these terms have gained wide use and acceptance, although they are not always used with precisely the same meaning.

Staff members of the U.S. Bureau of Mines and the U.S. Geological Survey collect information about the quantity and quality of all mineral resources, but from different perspectives and with different purposes. In 1976, a team of staff members from both agencies developed a common classification and nomenclature, which was published as U.S. Geological Survey Bulletin 1450-A—"Principles of the Mineral Resource Classification System of the U.S. Bureau of Mines and U.S. Geological Survey." Experience with this resource classification system showed that some changes were necessary in order to make it more workable in practice and more useful in long-term planning. Therefore, representatives of the U.S. Geological Survey and the U.S. Bureau of Mines collaborated to revise Bulletin 1450-A.

Long-term public and commercial planning must be based on the probability of discovering new deposits, on developing economic extraction processes for currently unworkable deposits, and on knowing which resources are immediately available. Thus, resources must be continuously reassessed in the light of new geologic knowledge, of progress in science and technology, and of shifts in economic and political conditions. To best serve these planning needs, known resources should be classified from two standpoints: (1) purely geologic or physical/chemical characteristics—such as grade, quality, tonnage, thickness, and depth—of the material in place: and (2) profitability analyses based on costs of extracting and marketing the material in a given economy at a given time. The former constitutes important objective scientific information of the resource and a relatively unchanging foundation upon which the latter more variable economic delineation can be based.

The revised classification system, designed generally for all mineral materials, is shown graphically in figures 1 and 2 (see page 5); its components and their usage are described in the text. The classification of mineral and energy resources is necessarily arbitrary, because definitional criteria do not always coincide with natural boundaries. The system can be used to report the status of mineral and energy-fuel resources for the Nation or for specific areas.

RESOURCE/RESERVE DEFINITIONS

A dictionary definition of resource, "something in reserve or ready if needed," has been adapted for mineral and energy resources to comprise all materials, including those only surmised to exist, that have present or anticipated future value.

Resource.—A concentration of naturally occurring solid, liquid, or gaseous material in or on the Earth's crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible.

Original Resource.—The amount of a resource before production.

Identified Resources.—Resources whose location, grade, quality, and quantity are known or estimated from specific geologic evidence. *Identified resources* include economic, marginally economic, and subeconomic components. To reflect varying degrees of geologic

(**Identified Resources** – Continued)

certainty, these economic divisions can be subdivided into *measured, indicated,* and *inferred.*[1]

Demonstrated. – A term for the sum of *measured* plus *indicated.*

Measured. – Quantity is computed from dimensions revealed in outcrops, trenches, workings, or drill holes; grade and(or) quality are computed from the results of detailed sampling. The sites for inspection, sampling, and measurement are spaced so closely and the geologic character is so well defined that size, shape, depth, and mineral content of the resource are well established.

Indicated. – Quantity and grade and(or) quality are computed from information similar to that used for measured resources, but the sites for inspection, sampling, and measurement are farther apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for measured resources, is high enough to assume continuity between points of observation.

Inferred. – Estimates are based on an assumed continuity beyond measured and(or) indicated resources, for which there is geologic evidence. *Inferred resources* may or may not be supported by samples or measurements.

Reserve Base. – That part of an identified resource that meets specified minimum physical and chemical criteria related to current mining and production practices, including those for grade, quality, thickness, and depth. The *reserve base* is the in-place demonstrated (measured plus indicated) resource from which reserves are estimated. It may encompass those parts of the resources that have a reasonable potential for becoming economically available within planning horizons beyond those that assume proven technology and current economics. The *reserve base* includes those

[1]The terms "proved," "probable," and "possible", which are commonly used by industry in economic evaluations of ore or mineral fuels in specific deposits or districts, have been loosely interchanged with the terms *measured, indicated,* and *inferred.* The former terms are not a part of this classification system.

(**Reserve Base** – Continued)

resources that are currently economic (*reserves*), marginally economic (*marginal reserves*), and some of those that are currently subeconomic (*subeconomic resources*). The term "geologic reserve" has been applied by others generally to the *reserve-base* category, but it also may include the *inferred-reserve-base* category; it is not a part of this classification system.

Inferred Reserve Base. – The in-place part of an identified resource from which inferred reserves are estimated. Quantitative estimates are based largely on knowledge of the geologic character of a deposit and for which there may be no samples or measurements. The estimates are based on an assumed continuity beyond the reserve base, for which there is geologic evidence.

Reserves. – That part of the reserve base which could be economically extracted or produced at the time of determination. The term *reserves* need not signify that extraction facilities are in place and operative. *Reserves* include only recoverable materials; thus, terms such as "extractable reserves" and "recoverable reserves" are redundant and are not a part of this classification system.

Marginal Reserves. – That part of the reserve base which, at the time of determination, borders on being economically producible. Its essential characteristic is economic uncertainty. Included are resources that would be producible, given postulated changes in economic or technologic factors.

Economic. – This term implies that profitable extraction or production under defined investment assumptions has been established, analytically demonstrated, or assumed with reasonable certainty.

Subeconomic Resources. – The part of identified resources that does not meet the economic criteria of reserves and marginal reserves.

Undiscovered Resources. – Resources, the existence of which are only postulated, comprising deposits that are separate from identified resources. *Undiscovered resources* may be postulated in deposits of such grade and physical location as to render them economic, marginally economic, or subeconomic. To reflect varying degrees of geologic certainty,

(**Undiscovered Resources**—Continued)
undiscovered resources may be divided into two parts:

Hypothetical Resources.—Undiscovered resources that are similar to known mineral bodies and that may be reasonably expected to exist in the same producing district or region under analogous geologic conditions. If exploration confirms their existence and reveals enough information about their quality, grade, and quantity, they will be reclassified as identified resources.

Speculative Resources.—Undiscovered resources that may occur either in known types of deposits in favorable geologic settings where mineral discoveries have not been made, or in types of deposits as yet unrecognized for their economic potential. If exploration confirms their existence and reveals enough information about their quantity, grade, and quality, they will be reclassified as identified resources.

Restricted Resources/Reserves.—That part of any resource/reserve category that is restricted from extraction by laws or regulations. For example, *restricted reserves* meet all the requirements of reserves except that they are restricted from extraction by laws or regulations.

GUIDELINES FOR CLASSIFICATION OF MINERAL RESOURCES

1. All naturally occurring metals, nonmetals, and fossil fuels in sufficient concentration can be classified in one or more of the categories.

2. Where the term *reserves* is used alone, without a modifying adjective such as indicated, marginal, or inferred, it is to be considered synonymous with the demonstrated-economic category, as shown in figure 1.

3. Definitions of resource categories can be modified for a particular commodity in order to conform with accepted usage involving special geological and engineering characteristics. Such modified definitions for particular commodities will be given in forthcoming government publications.

4. Quantities, qualities, and grades may be expressed in different terms and units to suit different purposes, but usage must be clearly stated and defined.

5. The geographic area to which any resource/reserve estimate refers must be defined.

6. All estimates must show a date and author.

7. The *reserve base* is an encompassing resource category delineated by physical and chemical criteria. A major purpose for its recognition and appraisal is to aid in long-range public and commercial planning. For most mineral commodities, different grades and tonnages, or other appropriate resource parameters, can be specified for any given deposit or area, or for the Nation, depending on the specific objectives of the estimators; therefore, the position of the lower boundary of the reserve base, which extends into the subeconomic category, is variable, depending on those objectives. The intention is to define a quantity of in-place material, any part of which may become economic, depending on the extraction plans and economic assumptions finally used. When those criteria are determined, the initial reserve-base estimate will be divided into three component parts: reserves, marginal reserves, and a remnant of subeconomic resources. For the purpose of Federal commodity assessment, criteria for the reserve base will be established for each commodity.

8. *Undiscovered resources* may be divided in accordance with the definitions of *hypothetical* and *speculative resources,* or they may be divided in terms of relative probability of occurrence.

9. *Inferred reserves* and the *inferred reserve base* are postulated extensions of reserves and of the reserve base. They are identified resources quantified with a relatively low degree of certainty. Postulated quantities of resources not based on reserve/reserve-base extensions, but rather on geologic inference alone, should be classified as undiscovered.

10. Locally, limited quantities of materials may be produced, even though economic analysis has indicated that the deposit would be too thin, too low grade, or too deep to be classified as a reserve. This situation might arise when the production facilities are already established or when favorable local circumstances make it possible to produce material that elsewhere could not be extracted profitably. Where such production is taking place, the quantity of in-place material shall be included in the reserve base, and the quantity that is potentially producible shall be included as a reserve. The profitable production of such materials locally, however, should not be used as a rationale in other

areas for classifying as reserves, those materials that are similar in thickness, quality, and depth.

11. Resources classified as reserves must be considered economically producible at the time of classification. Conversely, material not currently producible at a profit cannot be classified as reserves. There are situations, however, in which mining plans are being made, lands are being acquired, or mines and plants are being constructed to produce materials that do not meet economic criteria for reserve classification under current costs and prices, but would do so under reasonable future expectations. For some other materials, economic producibility is uncertain only for lack of detailed engineering assessment. The marginal-reserves category applies to both situations. When economic production appears certain for all or some of a marginal reserve, it will be reclassified as reserves.

12. Materials that are too low grade or for other reasons are not considered potentially economic, in the same sense as the defined resource, may be recognized and their magnitude estimated, but they are not classified as resources. A separate category, labeled *other occurrences,* is included in figures 1 and 2.

13. In figure 1, the boundary between *subeconomic* and *other occurrences* is limited by the concept of *current or potential feasibility of economic production,* which is required by the definition of a resource. The boundary is obviously uncertain, but limits may be specified in terms of grade, quality, thickness, depth, percent extractable, or other economic-feasibility variables.

14. Varieties of mineral or energy commodities, such as bituminous coal as distinct from lignite, may be separately quantified when they have different characteristics or uses.

15. The amount of past cumulative production is not, by definition, a part of the resource. Nevertheless, a knowledge of what has been produced is important to an understanding of current resources, in terms of both the amount of past production and the amount of residual or remaining in-place resource. A separate space for cumulative production is shown in figure 1. Residual material left in the ground during current or future extraction should be recorded in the resource category appropriate to its economic-recovery potential.

16. In classifying reserves and resources, it is necessary to recognize that some minerals derive their economic viability from their coproduct or byproduct relationships with other minerals. Such relationships must be clearly explained in footnotes or in an accompanying text.

17. Considerations other than economic and geologic, including legal, regulatory, environmental, and political, may restrict or prohibit the use of all or part of a deposit. Reserve and resource quantities known to be restricted should be recorded in the appropriate classification category; the quantity restricted and the reason for the restriction should be noted.

18. The classification system includes more divisions than will commonly be reported or for which data are available. Where appropriate, divisions may be aggregated or omitted.

19. The data upon which resource estimates are based and the methods by which they are derived are to be documented and preserved.

RESOURCES OF (commodity name)

[A part of reserves or any resource category may be restricted from extraction by laws or regulations (see text)]

AREA: (mine, district, field, State, etc.) UNITS: (tons, barrels, ounces, etc.)

Cumulative Production	IDENTIFIED RESOURCES			UNDISCOVERED RESOURCES	
	Demonstrated		Inferred	Probability Range (or)	
	Measured	Indicated		Hypothetical	Speculative
ECONOMIC	Reserves		Inferred Reserves		
MARGINALLY ECONOMIC	Marginal Reserves		Inferred Marginal Reserves		
SUB-ECONOMIC	Demonstrated Subeconomic Resources		Inferred Subeconomic Resources		

Other Occurrences	Includes nonconventional and low-grade materials

Author: Date:

FIGURE 1.—Major elements of mineral-resource classification, excluding *reserve base* and *inferred reserve base*.

RESOURCES OF (commodity name)

[A part of reserves or any resource category may be restricted from extraction by laws or regulations (see text)]

AREA: (mine, district, field, State, etc.) UNITS: (tons, barrels, ounces, etc.)

Cumulative Production	IDENTIFIED RESOURCES			UNDISCOVERED RESOURCES	
	Demonstrated		Inferred	Probability Range (or)	
	Measured	Indicated		Hypothetical	Speculative
ECONOMIC	Reserve Base		Inferred Reserve Base		
MARGINALLY ECONOMIC					
SUB-ECONOMIC					

Other Occurrences	Includes nonconventional and low-grade materials

Author: Date:

FIGURE 2.—*Reserve base* and *inferred reserve base* classification categories.

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