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REPORT ON

ADMIRALTY-ALASKA NICKEL-COPPER DEPOSIT

FUNTER BAY, ALASKA

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ADMIRALTY-ALASKA NICKEL-COPPER-COBALT DEPOSIT

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C O N T E N T S

	Page
INTRODUCTION	1
ACKNOWLEDGMENTS	2
LOCATION AND ACCESSIBILITY	2
PHYSICAL FEATURES AND CLIMATE	4
HISTORY	4
REGIONAL GEOLOGY	5
Paragenetic History	6
MINERAL DEPOSIT	7
General	7
Rock Types	8
Description and Origin	12
Alteration Aureole	13
Structure	16
Character of the Mineralization	18
Exploration and Sampling	22
Assays and Reserves	26
CONCLUSIONS AND RECOMMENDATIONS	28

A P P E N D I X

Core Logs.

M A P S
&
I L L U S T R A T I O N S

#F1 - Isometric Block Diagram of Funter Deposit.
F2 - Underground Geology (F2a) Surface Geology.
F3 - Regional Geological & Claim Map
F4 - Assay Map
F5 - Sketch of Sulphide Occurrences
F6 - Cross Sections to accompany F2
F7 - Regional Fault Map

R E P O R T

on

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INTRODUCTION:

The writer spent approximately 2-1/2 months, commencing February 11th, 1954, at the Funter Bay deposit. During this time underground diamond drilling, designed to test the copper-nickel-cobalt deposit, was actively in progress, and 14 drill holes, totalling about 1355' were completed. Partial results of several holes, totalling some 350', completed after the writer left the property, have been made available.

Drill core was logged and underground geology mapped. Due to an unusually heavy snowfall the older upper workings could not be examined, but those surface outcrops free of snow were.

Specimens and samples were taken from various parts of the deposit. Splits of the latter have been made available to both W. S. Pekovich andto the U. S. Bureau of Mines at Juneau for checking purposes. Under agreement no drill core was sampled by the writer; however, small samples of various rock types encountered in the cores were retained for petrographic study. These specimens were relatively unmineralized, and in most cases were fragments or small splits of broken core. As a total of about 18" such material was retained recovery was not noticeably effected.

It must be remarked that geological information

concerning the property is still far from complete. However, the writer feels assured that all concrete information available has been incorporated in this report, and any discrepancies which may arise have as yet no obvious foundation. Geological information, beyond the scope of the usual property examination report, is offered here only because it is felt that much of it may be utilized in future ore search.

ACKNOWLEDGMENTS:

The present drilling program was undertaken by W. S. Pekovich, Manager of Admiralty-Alaska Gold Mining Company, and was under the immediate voluntary supervision of the U.S. Bureau of Mines at Juneau, to whom special acknowledgment is due. Work was carried out as under the terms of D.M.E.A. Contract IDM-E 143.

Both the U.S.G.S. and Territorial Department of Mines have cooperated in the present development and have offered helpful suggestions.

Acknowledgment is also due Rado Pekovich, General Foreman and watchman at the Admiralty-Alaska property, for his assistance. Brian J. Burley, graduate petrologist at the University of British Columbia helped with the identification of minerals in thin section, and made several spectrographic and X-ray determinations.

LOCATION AND ACCESSIBILITY:

The property is in the Admiralty Mining District at longitude 134° 51' 30"W., latitude 58° 14' 15"N. It is on the south side of Funter Bay along the west coast of Mansfield Peninsula which forms the northern extremity of Admiralty Is-

land (see enclosed Map F3).

Funter Bay is 18 miles west of Juneau by airline and 55 miles by boat, and is adjacent to a coastwise steamship lane. Thebay is well protected, and has a harbor suitable for boats of any size. (1) At present, large boats have to dock across the bay at a fish cannery, although during high tide some success may be achieved by docking at a recently erected fishermen's wharf on the Admiralty-Alaska side.

Most of the Admiralty-Alaska buildings are in a state of complete disrepair, although several, including a small bunkhouse, could be renovated.

Access to the deposit from the beach is afforded by 3000'± narrow gouge railway route running southeasterly across a flat to the base of Robert Barron Mountain, then by 1-1/2 mile ± trail terminating at the 6-man mine camp at 1450' elevation. A small areal tramway is used to transport supplies from the railway terminus to the camp.

The property is on the War Eagle Extension #2 mineral claim, which is one of a group of 20 claims staked around the nickel deposit. These have been surveyed and approved for patent, which is expected to be issued this summer. A total of 120 claims, 10 of them patented, are held by Admiralty-Alaska in the area.

(1) S.P. Holt & J.M. Moss,
R.I. Bulletin 3950, Nov. 1946. pp 2.

PHYSICAL FEATURES AND CLIMATE:

"Admiralty is one of the larger islands of Southeastern Alaska. Its maximum dimensions slightly exceed 90 by 20 miles. Inland channels between the islands and the mainland as well as between the islands themselves are the result of glacial action, which is also reflected in the topography of the land area. Robert Barron Peak, just back of Funter Bay, is an elongated mass that rises abruptly from a nearly flat bench of glacial moraine to an altitude of more than 3,000 feet.

The area is covered with a virgin stand of hemlock and spruce with diameters as great as 2 feet. Because of the trees, the underbrush of salmonberry and devil club is not dense except where heavy slides have occurred.

Occasional outcrops of rock occur below 1,800 ft., but most of the mountainside is covered by talus.

The climate in the Funter Bay area is similar to that of Juneau, where annual precipitation averages 83 inches, including 109 inches of snow. The mean annual temperature over a period of 43 years is 42.1°F. At sea level the temperature seldom drops to 0°F. in the winter, and snow rarely remains long except at high elevations. Year-around mining can be done." (2)

As much as 6 feet of snow accumulated at the deposit during February and March of 1954.

HISTORY AND PRODUCTION:

The property has a long and varied history.

"The Admiralty-Alaska Gold Mining Co. acquired the property as a lode-gold prospect in 1918. The Mertie nickel-copper lode was discovered in 1919 and named for J. B. Mertie, Jr. of the Federal Geological Survey, one of the discoverers.

Henry M.Eakin, consulting geologist, was engaged by the company to investigate both the gold and the nickel-copper potentialities of the property. As a result of his examination, the Mertie lode was explored by 9 diamond-drillholes and a 126-foot crosscut adit. The material produced in driving the adit was used in mill tests, and the concentrates obtained were utilized in smelter tests." (3)

(2) - Ibid pp. 3
(3) - Ibid pp. 3

During the period 1919 to 1954 the property was examined by engineers too numerous to mention here. Besides Eakin, Dr. J. C. Reed of the U.S.G.S. examined and described the property several times. Many theories were advanced concerning the shape of the deposit. However, it was not until 1946 that a transit survey by the U.S. Bureau of Mines showed the deposit, at least on the surface, in its proper perspective.

U nfortunately, results of early work by Eakin and others, including geological maps and core logs, are no longer available and in their place exists a confused picture of these important features. The climax (and perhaps the end?) to this confusion came with the dumping of the old core so that the boxes could be used for the present program. From a geological standpoint this was inexcusable as the core, though partially disarranged, was still of value for comparison of rock types, if not for actual metal content.

REGIONAL GEOLOGY:

> "The country around Funter Bay is underlain by a thick sequence of metamorphic rocks. The age of these rocks is not definitely known, but on a map compiled by Buddington and Chapin they are designated as "Paleozoic sediments and volcanics." The sequence includes both sedimentary and igneous rocks, the latter being partly extrusive and partly intrusive types. All these rocks have undergone intense dynamic and igneous metamorphism, by which their original characteristics have been largely obscured or obliterated.
>
> The phyllite and the greenstone are in part interbedded, and some layers of both are discontinuous. Much of the discontinuity appears to be due to structural movements, but it is doubtless due in part to differences in original discontinuities of the strata and the intrusive bodies."(4)

(4) Reed, John C. Ni-Cu Deposit at Funter Bay, Admiralty Island, Alaska, U.S.G.S. Bull. 936-O, 1942.

REGIONAL GEOLOGY: contd.

Faulting is common in the region. Readily recognizable, on theground and from air photos, are several distinct systems, the most notable in the Funter area being a northeasterly striking group believed to be near vertical, and a northwesterly striking group of bedding faults parallel or cutting at a slight angle thefoliation of the schists. (See map). Prominent surface depressions mark the surface traces of some of these faults and several of the main ones have apparently been named by Eakin, i.e. "Patterson and Otter Creek" faults.

PARAGENETIC HISTORY:

In a simplified form the following age relations are recognized. Special attention is paid to dyke and sill-like bodies which have and will help solve structural problems.

(1) Dynamic metamorphism of Paleozoic sediments and volcanics and associated folding. Production of an anticline in the Funter area, the axial plane of which strikes northwest and plunges southeast at a low angle (see plate 51 U.S.G.S. Bulletin 936 - F3 enclosed). Included in the sediments affected were small sill-like felsitic bodies now highly altered and showing foliation similar to the enclosing schists.

(2) Barren Bull quartz "squeezed out" during dynamic metamorphism and now found chiefly along planes of foliation as irregular lenticular bodies.

(3) Hydrothermal gold-bearing quartz veins injected dominantly along a well defined northeasterly trending joint system dipping steeply to the northwest.

(4) Steep westerly striking andesitic dykes of the "Rudder" type. Elsewhere, chiefly in the underlying albitic greenstone schists and phyllites, diorites, trachyte and hornblende (?) lamprophyre dykes.

(5) Intrusion of olivine gabbro pipe with related thermal alteration of surrounding aluminous quartz-muscovite schists to produce a feldspar - cordierite hornfels. Reaction of gabbro with wall rocks producing various basic and acidic phases herein grouped under "Intrusive Complex". Deuteric alteration within gabbro mass.

(6) Precipitation of "magmatic" or disseminated-type sulphides.

(7) Intrusion along primary joints in the gabbro of granitic to aplitic dykes with the associated small scale alteration of the gabbro on either wall to a dioritic type. (This alteration is rarely the case with true aplite dykes).

(8) Replacement by later mineralizing solutions of both gabbro and schists, forming the more massive type copper-nickel sulphide bodies, and late calcite with slightly nickeliferous pyrite.

(9) Well marked but small scale faulting of schists and gabbro pipe.

(10) Near surface oxidation of gabbro with leaching of nickel.

MINERAL DEPOSIT:

General:

The deposit as indicated to date is in theform of a mineralized olivine gabbro pipe plunging at a varying

but generally low angle to the southeast.

The pipe, thought to be controlled by a similarly plunging fold in the schists and phyllites which enclose it, has been partially tested along its plunge for 600'. A well developed zone of alteration surrounding the deposit is recognized. Fairly continuous sulphide concentrations of both replacement and magmatic origin are found both within the pipe or in the schists near the contact. Faulting, with displacements not exceeding 150', has cut the pipe into several blocks.

The deposit appears to be widening out somewhat at depth where a related but sparsely mineralized basic intrusive complex caps the gabbro. Here also the dimensions of the alteration aureole increase.

Although assays covering recent drilling are not yet available, the overall grade of the deposit is still about that indicated by earlier work, i.e. about 1% combined nickel-copper. Small but recoverable amounts of cobalt are present. About 500,000 tons of mineralized gabbro is indicated to date, or about 1500 tons per vertical foot. The grade could be increased by 50 to 70% by selective mining of 1/3 to 1/2 of the pipe. The deposit should continue on in depth until seriously faulted off, or until intersecting diorite commonly associated with such deposits.

Rock Types:

Only the major rock types encountered have been examined by the writer, and the petrological study was far from exhaustive. However, it was complete enough to classify the following:

(1) Country Rock: This is dominantly a quartz-muscovite schist. Chlorite and graphitic or argillaceous schists and phyllites are common. The gabbro is so far restricted to this unit.

(2) Basic Intrusive: This is dominantly a medium grained olivine gabbro, although gradations in composition and grain size are present. A specimen of the gabbro taken from lower drift near survey station #93 is described as follows:

Slide #2. A dark, equigranular, igneous-textured, unfoliated rock with average specific gravity of 3.1 (5) and grain size greater than 4 millimeters. The main minerals present are -

(1) Olivine - - - - - - 2 V = 90°, i.e. Chrysolite
(2) Pyroxene - - - - - - 2 V = 55°, (B+) i.e. Augite
(3) Amphibole - - - - - 2 V = 80°, (B-), small extinction angle, pleochroic light to med. brown.

Its composition is close to Tschermakite or Hastingsite.

Amphibole is commonly replaced by chlorite or metallics so that only residual cleavage remains.

(4) Plagioclase - positive relief, close to labradorite.
(5) Biotite - common variety.
(6) Chlorite - ultra blue bi-refringence.
(7) Metallics - appear to have attacked the olivine - may be residual magnetite in part.

The rock is an olivine rich gabbro composed of 40% plagioclase, 40% olivine, and the rest by the remaining constituents.

Other types include the following:

Al Medium grained granitic dyke cutting olivine gabbro - prominent near survey station 193. Composed of:

(1) Albitic plagioclase and some orthoclase.
(2) Quartz - common, intergrown grachically with the feldspar.
(3) Extensive Chlorite and carbonate alteration.

The rock could be classed as an aplite. The contact with the wallrock is distinct. The wallrock gabbro

(5) S.G. test by U.S.B.M. Juneau

is altered locally to a dioritic type presumably due to contamination, and grades over on both sides to an olivine gabbro. (This alteration is rarely the case with true aplites).

#1 - "Rudder" dyke exposed in south crosscut near U13 collar.

This rock is light greyish brown fine-grained dyke rock cutting a hornfels. It has a marked chilled margin and is unfoliated. Pyritic mineralization is common. Pyrrhotite may be present. In thin section it is a felted aggregate of feldspar laths, with carbonate alteration, a few grains of quartz, and an unidentified isotropic mineral. The feldspar (making up 70% of the rock) is most commonly untwinned, or twinned on the Carlsbad law, but occasionally albite twinning may be seen. Relief is about that of balsam indicating andesine. Included as large blebs in the matrix is a colorless isotropic mineral with a low positive relief. It is now extensively altered by carbonate. Small prisms of epidote occur as alteration products (?) of the feldspar.

The rock is thought to be an altered andesite, i.e. a meta-andesite.

#2 - Section of drill core from medium grained dioritic type rock composing central 80 feet of hole U10. Lighter colored than basic rock encountered elsewhere, due to excess plagioclase. Composed of -

(1) Olivine - (B-), 2 V = 80° - probably hyalosiderite strongly fractured with small amount of serpentinization.

(2) Pyroxene - (B+), 2 V = 50° - close to Augite
(3) Plagioclase - X ∧ 010, ⊥a, 30°, i.e. Bytownite.

(4) Chlorite, carbonate, and biotite plus metallics. Paragenesis olivine → plagioclase → augite.

The rock should be called a leuco-olivine-gabbro. A useful local field name would be "white gabbro."

#3 Section of drill core from fine-grained dioritic type taken in U7, directly above U10, at 192 feet. Similar in appearance but finer-grained than #2 above. Composed of -

(1) 2 varieties of Pyroxene (40%)
(a) Hypersthene - parallel extinction, 2 V = 90°, faintly pleochroic with X and Y pinkish grey and Z colorless.
(b) Augite - 45° extinction, (B+) ophitically enclosed plagioclase.

(2) Olivine - 5% or less. 2 V = 90° indicated Mg rich variety.

(3) Plagioclase 40%, $X^1 \wedge 010$, $+ a$, $= 36^\circ$, i.e. An_{74} or Bytownite.
(4) Talc 10% - may be nickelian type as indices are slightly high for normal talc.
(5) Metallics 5%.

The rock is a Eucrite i.e. intermediate between a Norite and a Gabbro. This is thought to be the result of contamination of a gabbro by a nearby wallrock or inclusion and is believed genetically related to #2.

#D This is a section of drill core taken about 15' along U1. It is representative of the coarse grained feldspar type common as an alteration aureole surrounding the pipe. Perfectly developed feldspar grains up to 1/4 inch in diameter and showing Carlsbad twinning are common and in some cases make up as much as 50% of the rock mass. Fine-grained grayish brown material alternates in bands with the grayish white feldspar. This banding is parallel to the foliation of the schists and is believed to be the remains of sedimentary banding.

In the only thin section prepared to date only a small amount of the feldspar is shown. It is so highly altered that identification is difficult. It is tentatively called orthoclase chiefly from megascopic examination of the remainder of the core.

Bands of quartz and a mineral which shows Sectorial twinning and has low relief are present. The latter has been altered by sericite. Nevertheless it has the distinctive appearance of Cordierite and as such the rock is termed a feldspar-cordierite hornfels.

The hornfels is believed to have developed by the thermal alteration of the schistose equivalent of a siliceous argillite. This is a type occurrence. Cordierite has often been quoted as present in the thermal metamorphic aureole of gabbros or norites intruding siliceous, argillaceous rocks.

A section of the Brown Sill, of some use as a marker horizon, showed it to be composed of a foliated aggregate of quartz, albite, chlorite and muscovite.

The locations of the rock types described are shown on cross-sections accompanying this report.

DESCRIPTION AND ORIGIN:

The whole gabbro pipe or enriched portions of it are considered as being of possible commercial value.

From one contact near its eastern and upper extremity the mineralized gabbro deposit was believed to be in theform of a sill and later exploration was directed with this in mind. Results of several holes designed to intersect it along its proposed extension were not encouraging. The one hole which did intersect the body would probably not have done so had it ran true to its original survey and not wandered upward an appreciable amount. It was not until the U. S. Bureau of Mines made a proper survey (published 1946) that the deposit was shown in its true perspective. All other contacts so far observed cut across the attitude of the schists rather than paralleling it as did the upper contact.

Results of all work to date indicate the deposit is in the form of a pipe: There is still no real evidence to the contrary (see Diagram #1 Pocket). Similar bodies could well lie along regional strike to the northwest or southeast, but as yet these have not been found.

The gabbro shows, in most cases, a darkening and slight decrease in grain size near its contact. In the central portion of the deposit grain size up to 1/2 inch is occasionally evident, although the average is about 2 millimeters.

Within the intrusive, and especially near its contacts, rock gradations occur. To date this is evident only in drill holes U3 and U7 where fine-grained rock units occur. These include the basalt, eucrite, white gabbro (?), brecciated hornfels inclusions, and extensively altered silifiied material. All

are thought to be largely near-contact phases resulting from contamination of the gabbro. Banding resembling flow lines is present in some of the darker material.

The gabbro is well jointed; but in so many directions that dominant sets have not yet been recognized (see Map #2). Talc seams are common along some joints.

Elongated or "tear-drop" blebs of calcite rimmed by white talc are a common feature in the gabbro, especially in the core of U3 and U7. The blebs are often lineated and in many cases partially replaced by copper-nickel-iron sulphides. Although they are distinctly amygdaloidal in appearance, they probably represent some form of deuteric or alteration of feldspar or olivine. Within the pipe carbonatization is widespread.

Small unoriented inclusions of hornfels and undigested (?) quartz gobs are common within 20 feet of the contact.

Medium to fine-grained white or light brown aplite dykes as described under "Rock Types" are occasionally found both within the gabbro and surrounding hornfels. They are never more than several inches in width and have altered the gabbro within an inch of the contact to a rock resembling a diorite. Where clearly observed in the lower crosscut one of these dykes appears to occupy a single and remarkably flat-surfaced primary joint in the gabbro and has an attitude paralleling the underlying schist contact.

THE ALTERATION AUREOLE:

Of no small importance to the understanding and solution

of various problems connected with the Funter pipe is the feldspar-cordierite alteration aureole surrounding it. Where encountered in former drill holes this rock was sometimes logged as a gneiss, or considered part of the intrusive. Besides the presence of cordierite, previously described, which would tend to prove the case, the following is offered as further evidence to confirm its existence:

(1) All diamond drill core obtained by drilling away from the deposit and across strike of the schists showed a gradational change from hornfels to quartz-muscovite and/or chlorite schists. This change was also noted in the crosscut where an increase in feldspar grain size was evident as the pipe was neared. In most cases the zone can be recognized as extending 40 feet away from the pipe (more or less depending on country rock, size of pipe, etc.).

(2) Holes U6, U12 and U13, driven parallel or at a small angle to the foliation, showed similar gradation.

(3) Within several feet of the gabbro contact the banding in the hornfels, striking toward the gabbro, is often completely but gradationally obscured and in its place over small areas an igneous textured brown biotite-bearing rock resembling a diorite has developed.

(4) The rock is not present in any of the major surface outcrops examined by the writer and has not been previously mapped or described. (6) However, as thesurface contact areas cannot be observed because of excessive weathering or overburden, it may still exist as a narrow ring.

(6) Personal communication with Pete Sainsbury, U.S.G.S.Juneau, who is also of the opinion that the alteration aureole exists, indicated that the highly weathered "footwall" schists first

Interesting to note, in view of #4 last, is the apparent increase in size of this aureole on the 1450' or lower level. Other factors considered, this is believed to reflect an increase in size of the intrusive.

To save time, most diamond drill holes were stopped on entering hornfels showing a constant banding attitude. Unoriented hornfelsic inclusions near the contact are common. In this case, the large feldspar grains are usually lacking - perhaps explainable by some theory of progressive metamorphism.

In many instances the hornfels, as well as the unaffected schists, show very small values in copper and nickel. This can easily be explained by their relative proximity to the mineralized gabbro as will be shown later.

Assuming the aureole theory to hold, the position of the hornfels has helped provide a workable solution to the faults so far encountered.

Pyrite alteration parallels the hornfels in most respects, but as small amounts are scattered throughout the entire Funter area, localization is more difficult. According to W. S. Pekovich, Eakin considered "silicified caps" extending along regional strike to the northwest and southeast to be alteration due to underlying gabbro. These have not yet been investigated.

Thus it is recommended that these easily recognizable alteration effects be kept in mind with regards future ore search.

(6 contd. from p. 14) encountered near the upper Mertie Adit could be of this type.

S T R U C T U R E

The major structural control of the Funter pipe is believed to be a fold in the schists plunging to the southeast at an angle not exceeding 30^{0}. This has an easterly component slightly greater than that shown by Reed for his regional fold axis and lineation in the schists (See Map F3). Intersection of the fold by small faults may have helped localize the intrusive gabbro.

Surface and underground information is not nearly complete enough to prove the above. It is partly inferred from the observed relations of minor related folds. One such feature, called the "Tugger Fold", as shown in Section AA^{1}, appears to constrict the intrusive. However, it is so complicated by small scale faulting and quartz injections that its exact relation could not be shown. Small, near isoclinal folds, as mapped in the crosscut, are common.

A slight steepening of dip near the intrusive is general on the surface and underground. No important change in strike has yet been noticed, although it has been suggested by core of several drillholes.

Linear structure and the attitude of the small folds has not been clearly observed. Thermal metamorphism around the pipe has probably altered the former.

Small scale faulting is common over the entire area. Of greatest magnitude are a series of strike faults which dip steeply to the east (See Map F1). Gouge zones produced within the basic body give an exaggerated idea of their

movement. However, they do cut the pipe into a number of blocks and offer drilling difficulties.

The "West Fault" - which is near-vertical strike fault, relatively displaces the northeast side between 15 and 30 feet to the southeast with the horizontal component believed to exceed the vertical. This is indicated by a number of factors, none of which can as yet be mathematically measured. As such these include displacement of the Rudder dyke, whose exact attitude is not yet known, the hornfels zone, as indicated in U4 and U5, the Brown Sill, and the inferred base of the pipe. On the fault surface mullion structure either pitches at a very low angle to the southeast or is horizontal.

The "East Fault", which is the largest so far encountered, is evident only from drill holes, and when tapped cut off the water flow of the West Fault.

The strike of this fault is indicated to be N20°W, or parallel to the West Fault, and to dip easterly at about 60°. It is thought to be a normal fault with slight relative southeastern displacement of the east side. Its displacement is thought to be slightly less than the assumed diameter of the intrusive in this locality, i.e. 100'±.

Holes U2, U3, U7 and U10 penetrated the East Fault. U1 and U14 could not get through it. In all cases, with the exception of U10, the gabbro intrusive, as previously known, was not present on the other side. In its place was either feldspar-cordierite hornfels or the fine-grained intrusive complex as already described and shown on the included maps and cross-sections. U10 was designed to pick up the

faulted extension(?) and did so proving that displacement was not too great. It ran through the side of the pipe without encountering any serious faulting.

A regional fault picture, as prepared from air photos by M. Mihelich, U.S.B.M., Juneau, is included here (See Map F7). It represents surface traces of assumed faults as indicated by topographic features. It should be stated here that by underground exploration on the Admiralty-Alaska property several of these surface features have been proven to be the surface representations of faults encountered, and as such may be useful in predicating such features.

Other faults as mapped are not too important. A near flat-lying, gougeless fault(?) associated with the Tugger Fold, may have some significance.

CHARACTER OF THE MINERALIZATION

The ore deposit as now known cannot be classified as being "typically magmatic" in origin. Two, and possibly three, types of mineralization are recognized. All involve related minerals deposited during and following the solidification of the gabbro.

The most common is the disseminated type believed to be late magmatic in origin. Small irregularly shaped blebs of pyrrhotite with minor chalcopyrite and pentlandite is interstically distributed among the silicates of the gabbro. In local areas these may make up to 50% of the total rock volume.

The second type appears as circular or almond shaped gobs of pyrrhotite and pentlandite with an ever-present

rim of chalcopyrite. These may reach an inch in diameter.

The third type consists of distinct veinlets and irregular shaped gobs of the same sulphides, somewhat, although not totally, restricted to the contact areas.

In view of the following observations, there can be little real doubt that the third important type is of anything but late replacement origin.

(1) The aplitic dykes within the gabbro were obviously intruded after it had solidified sufficiently to permit formation of the joints they now occupy. These dykes, although generally only slightly mineralized themselves, seem to have dammed migrating ore solutions. In frequent cases they are distinctly veined and replaced by the common sulphides.

(2) Dioritic and hornfels wall rock inclusions have been replaced by gobs and stringers of massive sulphide.

(3) The hornfels itself has been well mineralized by replacement within several feet of the contact - so much so that it often shows better values than the nearby gabbro. This distinctive mineralization, in very small amounts, can be traced through the hornfels and into the surrounding schists. The Brown Sills are likewise veined and replaced.

The massive "Tugger High-grade" exposed only in the back at Station 194, is believed to be largely of replacement origin and to underly the pipe. As shown in section it appears near the crest of a complicated fold where structural conditions favorable to its emplacement were available. Al-

though not thoroughly tested as yet, it appears saucer shaped from the meagre information available. At least 200 tons of massive sulphide is contained in the body. The mass is composed of about 80% pyrrhotite, 10% chalcopyrite, 3-5% pentlandite, and 1% pyrite. The remainder consists, where seen near its lower content, of unreplaced or "undigested" fragments of the Brown Sill, on which it bottoms, and gobs of quartz. Small amounts of calcite are present and magnetite is reported.

The fresh pyrrhotite (which is often polarized and is highly magnetic) has a slight pinkish tinge, weathers rapidly, and if exposed to slight heat takes on an irridescence similar to bornite (peacock copper). Chalcopyrite and pentlandite are intimately mixed with it, although small veins of pure chalcopyrite are common. Small stringers of slightly nickeliferous pyrite, along with calcite, occupy several of the maze of exceptionally well developed joints in the body. Bands or veinlets of this massive type sulphide appear on both sides of the contact.

The second or almond-shaped type is present throughout the whole deposit. The disconnected blebs, ranging in size from minute specks to three inches in diameter show no apparent concentration except in a few areas near the lower contact.

Close examination shows the blebs to be composed mainly of pyrrhotite with small amounts of pentlandite, and an ever-present rim of chalcopyrite with minute veinlets penetrating inward. Usually in any one area the chalcopyrite rim is constantly thickest in one given direction. This is true even

of similar blebs scattered through the hornfels and schist.

Interesting and perhaps of some significance is the relation of these sulphide blebs to the talc rimmed calcite nodules described previously. Where both occur in the same area they possess common elongation and lineation and one is seldom present without some evidence of the other. A good case could probably be presented to show that this second type is also of replacement origin.

The first (or Sudbury?) type is similar mineralogically to the above types, but the disseminated blebs are distinctly interstitial to the silicate minerals and have no common shape. This type is tentatively classed as being of late magmatic origin and probably constitutes the first sulphides deposited during a long and continuous mineralizing period with no sharp line appearing between it and the replacement processes.

A remarkable lineation of types 1 and 2 occurs within the gabbro. As this may be a key in the search for enriched sections of the pipe, it should be mentioned here.

The enclosed sketch (F5) shows such lineation as it appears on the south wall of the drill cut near station 193.

This lineation appears primary in all respects but this does not exclude extenuation by later replacement as previously described. A petrofabric study would be necessary to prove similar orientation of the silicates within the relatively fine-grained mass.

Rudimentary banding of type 1 sulphide marks the higher grade sections of the pipe. Where exposed about 50'

east of the West Fault in the lower crosscut a zone of these disseminated sulphide bands, which make up about 50% of the rock volume, strikes easterly or parallel to the axis of the pipe and appears to have a steep dip. However, most bands within the zone dip at a low angle to the south. Similar material has been picked up in the lower 1/3 section of U1[4], in U8 and in U9, and as such seems to indicate a continuous enriched zone near the bottom centre of the pipe in which the grade is more than double the average found elsewhere.

The source of the cobalt is not yet known. In a mineralographic study of specimens from the Upper Mertie no cobalt mineral was mentioned.(7) Cobalt bloom is not evident.

According to recent reports mercury has shown up spectrographically in "Funter Ore."

EXPLORATION AND SAMPLING

Assay results of the recently completed drilling programme are not yet available. Core logs prepared by the writer are enclosed with this report and only a short description is given here.

In general, core recovery was good as most of the holes were short and in good ground.

Hole U1, horizontal and bearing easterly, was abandoned in the East Fault after contacting the hornfels at 6'.

Hole U2, at + 32°, directly above U1, was in gabbro until it encountered the East Fault at about 17'. It went

(7) Worcester, John, Examination of and Flotation Experiments on a Nickel Ore from Alaska: M.I.T. 1930.

through thefault, picked up hornfels on the other side, and was stopped in it at 46.4'.

U3, horizontal and bearing northeasterly, collared in gabbro but lost it on crossing the East Fault at 17'. In its place it encountered rock types not yet described in the area. These have been grouped under the term "Related Intrusive Complex" as previously described. It is only slightly mineralized. Hornfels was encountered at about 77' and the hole was stopped at 81'.

U4, U5 and U6 were collared in hornfels and showed gradation from it to quartz-mica schist. U4 and U5 crossed the West Fault with U5 picking up the Brown Sill on the east side of it.

U7 lost the gabbro on crossing the East Fault at 11'. It encountered the Intrusive Complex, including numerous hornfelsic breccia inclusions, and was abandoned in silicified material at 214'.

U8 and U9, and U11, were drilled through the lower portion of the pipe and showed the projected contacts, as had been mapped, to be true. They were stopped on entering the hornfels. U11 is considered as having encountered the displaced eastern extension of the Rudder dyke (See Cross-sections).

U10, bearing easterly at -28°, and under U7, was designed to probe for the faulted extension of the mineralized gabbro. The gabbro was encountered on the east side of the fault. At about 85'a gradation to sparsely mineralized white gabbro, as described, appeared. This continued to about 140' where it graded back to normal dark gabbro. The hornfels con-

tact was encountered at about 202' and the hole stopped in hornfels at 215'.

U10, at 202', is believed to have gone through the northern side of the pipe and the rock encountered is believed to be related to that of U3 and U7 above.

U12, U13 and U15, drilled from the South Crosscut, were designed to test orebodies reported from results of previous drilling. No gabbro was encountered although specks of copper-nickel sulphides related to the overlying deposit were seen.

U14 was designed to cut the pipe near its centre, and at the same time to test for a westward extension of the Tugger Highgrade. The Brown Sill was encountered at about 20', the pipe at about 29', the hornfels at 118', and the East Fault at 142'. The fault could not be penetrated and the hole was abandoned.

All holes up to U13 were surveyed in with a transit by the U.S. Bureau of Mines with the writer's help. In addition, surface drill hole #4, which was the only surface hole to intersect the pipe, was resurveyed. It had never been assigned the same attitude twice, and was the basis for much unnecessary confusion and argument. It was surveyed only after blasting away the slumped surface rock and following it for six feet from overburden into solid rock. It was found to run approximately east and to be inclined upward at 2°13'. The fact that the crosscut, which was supposed to parallel this hole, did not intersect the indicated gabbro for an additional 200' can best be explained by the hole wandering upwards. This

idea is helped by the previously unrecognized upward component at the collar. Logging of this core by George Gates (8) showed banding attitudes as high as 65° to occur in the "gneiss"? near the end of the hole. As banding in the hornfelses of the crosscut is considerably lower than this, the general belief that the hole wandered upward is strengthened.

Gates reported about 90' of gabbro in hole #4. Assays, however, show 140' of mineralized material. It is the writer's contention that much of the earlier work did not differentiate between this slightly mineralized igneous appearing hornfels and gabbro; again much confusion can and has developed.

Sampling of the lower crosscut by St. Eugene consisted of fifteen 6' vertical chip samples taken every 6' along the wall (See Map #F4). Small blocks about 3/4" in diameter were taken every 2" down the side. Any material lost by shattering was caught by a large canvas on the floor. Vertical samples were taken as the general lineation of the sulphides appeared to be near horizontal. In addition a large chip sample of the Tugger Highgrade was obtained. Splits and assay results have been forwarded to W. S. Pekovich and to the Bureau of Mines at Juneau.

(8) Log available through courtesy U.S.B.M. Juneau.

ASSAYS AND RESERVES

Assay results of the recently completed drilling programme are not yet available.

Of 24 known drill holes to date, only 2 (#4 and U14) have intersected and gone through arepresentative section of the deposit. Hole #1 went through the pipe but started in highly oxidized and possibly leached material. 8 holes (#2, 9, U4, U5, U6, U12 and U15) did not encounter the gabbro. The remainder started within the intrusive and values are not representative, as present information shows sulphide distribution not to be homogeneous. Thus U8 and U9 will indicate higher values from an enriched lower central zone while U3 and U7 will indicate lower values from an upper sparsely mineralized section.

Admiralty-Alaska drill-hole and lode analyses had an invariably high nickel-copper ratio. In view of a large amount of evidence showing the ratio to be almost unity, the Company assays should not be correlated with others in computing grade.

Thus it may be seen that at the present time an average assay does not exist.

From visual examination and comparison with drift sampling a maximum overall grade of 71.3% combined copper-nickel is to be expected west of the East Fault.

The 15 drift samples and the first 5' of U1 (total 95') gave an average value of 0.563 copper, 0.516 nickel, 0.045 cobalt, and traces of gold and silver. The best central 36' section gave copper 0.935, nickel 0.805, and a probable cobalt content of 0.05.

U14 should show about the same range in values with the first 45 feet being the best.

The overall average willprobably be the same as that of the Upper Mertie adit, i.e. 1% combined Nickel-Copper. Most of the material so far encountered east of the East Fault will not average 0.5% combined Copper-Nickel unless there has been a sudden inconspicuous change in mineralogy. U10 may show several sections averaging 1% or better, but it did not intersect any of the high grade variety.

The possibility of a small portion of the nickel being held in the olivine has not been investigated by the writer, but cannot be dismissed.

Assuming an average diameter of 100', about 300,000 tons of 1% Copper-Nickel ore, including some mineralized schist, is indicated as lying west of the East Fault. A probable 200,000 tons of lower grade material is partially indicated to the east.

By selective mining of about 1/3rd of the gabbro in the western block the grade could probably be increased by 50-70%.

The deposit extends through a proven vertical range of at least 330'. This would indicate about 1500 tons per vertical foot.

With the inclusion of the fine-grained basic intrusives the size of the pipe in the eastern block may be greatly increased. This can only be proven by crosscutting through the East fault and drilling across the faulted extension of the pipe. There is no information as yet to suggest that the pipe

will not continue in depth or that it is not part of a larger underlying intrusion.

CONCLUSIONS AND RECOMMENDATIONS

The pipe-shaped Funter Nickel Deposit, as shown to date, contains about 500,000 tons of 1% combined Copper-Nickel "ore". The grade can be increased somewhat by selective mining. Exploration has not delimited the extension of the deposit, and there is reason to believe that it may widen at depth.

The extension should be drilled from a point far enough beyond the East Fault to give information as to its true width and value. If the crosscut is extended to the northeast following U7, drilling should be done at intervals along it. From a point about 50' along U7, a drill hole bearing S70-75° E and inclined at -25° should stay in the pipe a considerable distance but the grade of such a hole would not be representative. A thorough geological check should be made of all outcrops in the area and especially of "gabbro outcrops" reported elsewhere on the propety.

Jas. J. McDougall

Vancouver, B. C.
May 25th, 1954

CORE LOGS OF FUNTER BAY DRILLING

FEBRUARY-MAY, 1954

GENERAL AND INCOMPLETE -

(Full log available at later date when assays sections are known)

Log and Interpretation by writer.

Assays to date by U. S. B. M. Juneau.

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DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL HOLE NO. U1

SHEET NUMBER 1 SECTION FROM ____ TO ____ STARTED ____

LATITUDE N 9847.13 DATUM ____ COMPLETED ____

DEPARTURE E 10408.87 BEARING S51°19'E ULTIMATE DEPTH 31.1

ELEVATION 1478.65 DIP 0° PROPOSED DEPTH ____

Depth Feet	Formation	Cu	Ni	Co
0 - 5.5	Slightly Mineralized Gabbro	0.19	0.29	
6.5	Approx. Hornfels Contact			
5.5 - 10.8	Slightly mineralized hornfels - may include slight amount gabbro due to irregular contact.	0.11	0.13	
10.8 - 15.8	do do do do do	0.29	0.14	
15.8 - 20.8	Hornfels	0.09	0.05	
20.8 - 30.0	do			
30.0 - 31.1	Fault gouge - poor recovery Slight water flow.			

Abandoned due to bad ground.

INTERPRETATION:
Away from pipe contact at a low angle.

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL — HOLE NO. U2

SHEET NUMBER 2 — SECTION FROM ____ TO ____ — STARTED Feb. 1954

LATITUDE N 9847.35 — DATUM ____ — COMPLETED ____

DEPARTURE E 10408.71 — BEARING S 51° 19'E — ULTIMATE DEPTH 46.4

ELEVATION 1472.92 — DIP +32° 44' — PROPOSED DEPTH ____

Depth Feet	Formation	Cu	Ni	Co
0 - 3.5	Slightly mineralized gabbro	0.05	0.24	
3.5 - 11.8	" " "			
11.8 - 12.0	Quartz stringer at 38° (x to core axis)			
12 - 17.8	Slightly mineralized gabbro, quartz breccia & quartz stringers at 35°.			
17.8 - 19.8	Fault gouge - fair flow of water at 17.8			
19.8 - 46.4	Pyritic feldspar-cordierite hornfels with numerous quartz stringers - Banding 23 to 50° chlorite and brown mica increasing near end of hole.			

STOPPED AT 46.4

INTERPRETATION:
Lost south-east side of pipe due to faulting.

x Angle to core axis used throughout.

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL — HOLE NO. U3

SHEET NUMBER 3 — SECTION FROM ____ TO ____ — STARTED Feb. 1954

LATITUDE N 9859.09 — DATUM ____ — COMPLETED ____

DEPARTURE E 10403.12 — BEARING N41° 24'E — ULTIMATE DEPTH 80.3

ELEVATION 1469.02 — DIP 0° — PROPOSED DEPTH ____

Depth Feet	Formation	Cu	Ni	Co
0 - 5.0	Mineralized Gabbro	0.57	0.67	
5.0 - 10.0	do do	0.61	0.61	.02
10.0 - 15.0	do do	0.27	0.27	
15.0 - 17.6	do do	0.23	0.37	
17.6 - 22.4	Poor Recovery of slightly mineralized norite and slight quartz - all in broken ground (East Fault).			
22.4 - 27.2	Highly altered fine-grained intrusive complex- basaltic and silicic types. Very slightly mineralized.			
27.2 - 37.2	Largely altered basalt slightly disseminated pyrite and pyrrhotite	0.12	0.05	
37.2 - 50(?)	do do do do	0.05	0.05	
52.0	Talc rimmed calcite gobs to 1/4" replaced by pyrite and pyrrhotite - slight amount chal- copyrite.			
52.0 - 77.5	Basaltic Complex, becoming finer - grained.			
77.5	Contact hornfels, banding 30-40°			
77.5 - 80.5	do do do 30-35°			

STOPPED AT 80.5 Ft.

INTERPRETATION: Ran through upper northern side of pipe after penetrating near contact faulted extension.

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL HOLE NO. U4

SHEET NUMBER 4 SECTION FROM TO STARTED

LATITUDE N 9849.19 DATUM COMPLETED

DEPARTURE E 10392.38 BEARING S70° 23' W ULTIMATE DEPTH 59'

ELEVATION 1469.05 DIP +1°08' PROPOSED DEPTH

Depth Feet	Formation	Cu	Ni
0 - 2.7	Feldspar-Cordierite hornfels - slightly mineralized, banding at 45°	0.14	0.16
2.7 - 7.7	do do do	0.11	0.05
7.7 - 12.7	do do do	.05	0.05
12.7 - 30.3	do do do		
30.3	Fault, water in hole		
30.3 - 59	Hornfels less distinct, grading to quartz-mica schist, banding at 45°. Slightly pyrite and pyrrhotite.		

STOPPED at 59 feet.

No important mineralization.

INTERPRETATION:
Directed away from pipe

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL HOLE NO. U5

SHEET NUMBER 5 SECTION FROM ____ TO ____ STARTED ____

LATITUDE N 9849.16 DATUM ____ COMPLETED ____

DEPARTURE E 10396.34 BEARING S68°49'W ULTIMATE DEPTH 80'

ELEVATION 1466.19 DIP -60°36' PROPOSED DEPTH ____

Depth Feet	Formation	Cu	Ni
0 - 30	Feldspar-Cordierite Hornfels - very slight mineralized. Banding 75-80°, numerous quartz stringers.		
30.0 - 50	As above - grading to quartz-mica schist. Brown sill from 40 to 41.8 with contact at 85° ±.		
50.0 - 62	25% recovery due to West Fault at 58(?)		
62.0 - 80	Quartz-Mica schist, foliation at 80°.		

STOPPED at 80'.

No important mineralization.

INTERPRETATION:
Directed away from pipe

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL HOLE NO. U6

SHEET NUMBER 6 SECTION FROM TO STARTED

LATITUDE N 9847.42 DATUM COMPLETED

DEPARTURE E 10402.75 BEARING S20°30'E ULTIMATE DEPTH 187'

ELEVATION 1465.00 DIP -55°48' PROPOSED DEPTH

Depth Feet	Formation
0 - 80.9	Feldspar-cordierite hornfels grading at about 65' into a quartz-mica schist. Banding of foliation 32-40°.
80.9 - 187	Quartz-mica schist with associated chlorite, talc(?) quartz stringers, etc.

HOLE STOPPED at 187'.

No important mineralization encountered.

INTERPRETATION:

Directed away from pipe

Drilled by U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL HOLE NO. U 7

SHEET NUMBER 7 SECTION FROM TO STARTED

LATITUDE N 9852.66 DATUM COMPLETED

DEPARTURE E 10408.43 BEARING N68°06'E ULTIMATE DEPTH 214.2

ELEVATION 1469.54 DIP 0° PROPOSED DEPTH

Depth Feet	Formation
0 - 10.5	Mineralized Gabbro
10.5	East Fault - much water.
10.5 - 214.2	Highly altered intrusive complex, alternating basalts, eucrite, silicified wallrock breccia, numerous quartz stringers, etc. Talc rimmed calcite gobs weakly replaced in part by pyrrhotite-chalcopyrite-pyrite-Banding 36-60°.

Abandoned at 214.2 feet in highly silicified broken (?) ground.

Indicative but no important mineralization east of fault.

INTERPRETATION:

Picked up near-contact faulted extension more along strike (or bearing) of pipe than U3. Indications are that wallrock almost reached near top of pipe.

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL HOLE NO. U8

SHEET NUMBER 8 SECTION FROM ____ TO ____ STARTED ____

LATITUDE N 9861.25 DATUM ____ COMPLETED ____

DEPARTURE E 10393.87 BEARING N23°32'W ULTIMATE DEPTH 49.6

ELEVATION 1469.54 DIP 0° PROPOSED DEPTH ____

Depth Feet	Formation
0 - 37.7	Well mineralized gabbro - becoming finer grained near contact. Small 3" inclusion at 24'.
37.7	Contact hornfels.
37.7 - 49.6	Slightly mineralized hornfels, small sulphide gobs, banding at 0°. 1-1/2" aplitic dyke at 43'.

Stopped in slightly mineralized feldspar-cordierite hornfels.

Grade similar to that shown in the near parallel drift.

INTERPRETATION:

Short hole across high grade section near central base of pipe.

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY HUNTER NICKEL HOLE NO. U9

SHEET NUMBER	9	SECTION FROM	TO	STARTED	
LATITUDE	N 9860.76	DATUM		COMPLETED	
DEPARTURE	E 10394.09	BEARING	N23°32'W	ULTIMATE DEPTH	57.5
ELEVATION	1465.92	DIP	-32°07	PROPOSED DEPTH	

Depth Feet	Formation
0 - 16.3	Well mineralized gabbro
16.3 - 20.3	Numerous inclusions of hornfels in slightly mineralized gabbro
20.3	Approximate contact hornfels.
20.3 - 57.5	Hornfels containing several quartz veins and numerous quartz stringers. Banding 25-30°.

STOPPED at 57.5. No important mineralization beyond.

INTERPRETATION:

Short hole through bottom of pipe.

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL — HOLE NO. U10

SHEET NUMBER 10 — SECTION FROM ____ TO ____ — STARTED ____

LATITUDE N 9852.96 — DATUM ____ — COMPLETED April 12/54

DEPARTURE E 10408.15 — BEARING N65°01'E — ULTIMATE DEPTH 216'

ELEVATION 1467.18 — DIP -27°51' — PROPOSED DEPTH ____

Depth Feet	Formation
0 - 20	Mineralized gabbro
20.0 - 25	East Fault
25.0 - 85	Mineralized Gabbro
85.0 - 145	Weakly mineralized "White gabbro".
145.0-202	Mineralized "normal" gabbro
202	Contact feldspar-cordierite hornfels
202.0-216	Feldspar-cordierite hornfels

STOPPED at 216 ft.

INTERPRETATION:

Picked up faulted extension of pipe showing very slightly mineralized "white gabbro" central portion. Ran through north-central side of pipe without encountering high grade type sulphides.

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FOSTER NICKEL HOLE NO. U11

SHEET NUMBER 11 SECTION FROM TO STARTED

LATITUDE N 9857.76 DATUM COMPLETED

DEPARTURE E 10393.64 BEARING N46°0'W ULTIMATE DEPTH 28.4

ELEVATION 1465.87 DIP -50° PROPOSED DEPTH

Depth Feet	Formation
0 - 11	Very well mineralized gabbro; Small dioritic band at 10'.
11-	Contact feldspar-cordierite hornfels.
11.0 - 19.5	Hornfels - slightly mineralized.
19.5 - 23.9	Rudder dyke - contact believed E.W. & near vertical
23.9 - 28.4	Hornfels - banding at 45°.

STOPPED at 28.4

INTERPRETATION:

Ran through lower southern side of pipe as predicted by well defined contacts.

Drilled by: U.G.M.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL HOLE NO. U12

SHEET NUMBER 12 SECTION FROM ____ TO ____ STARTED ____

LATITUDE N 9906.97 DATUM ____ COMPLETED ____

DEPARTURE E 10202.53 BEARING Approx. South ULTIMATE DEPTH 158'

ELEVATION 1468.61 DIP ± 10-30' PROPOSED DEPTH ____

Depth Feet	Formation
0 - 47	Followed former percussion drill hole. Collared in Rudder Dyke.
47.0 - 158	Weak hornfels grading into quartz-mica schist. Numerous quartz veins some showing pyrrhotite with slight chalcopyrite near their contact. Also slight pyrrhotite in hornfels and schist. Banding and foliation at low angle (0-20°?) to core. Reaming at intervals along old hole failed to indicate gabbro. No important mineralization. Stopped in massive quartz vein after penetrating it 8(?) feet. INTERPRETATION: Directed away from and under the pipe.

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL HOLE NO. U13

SHEET NUMBER 13 SECTION FROM ____ TO ____ STARTED ____

LATITUDE Practically same as U12 DATUM ____ COMPLETED ____

DEPARTURE ____ BEARING ____ ULTIMATE DEPTH 12' (??)

ELEVATION ____ DIP ____ PROPOSED DEPTH ____

Depth Feet	Formation
0 - 5 (-)	Rudder dyke - increase in grain size near centre.
5 - 12	Feldspar-Cordierite hornfels.

Directed to test width of Rudder Dyke

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL — HOLE NO. U14

SHEET NUMBER 14 — SECTION FROM ____ TO ____ — STARTED ____

LATITUDE N 9942.32 — DATUM ____ — COMPLETED ____

DEPARTURE E 10210.43 — BEARING N68°03'E — ULTIMATE DEPTH 142.3

ELEVATION 1472.62 — DIP ±29°03' — PROVED DEPTH ____

Depth Feet Approx. only.	Formation
0 - 29	Feldspar-Cordierite Hornfels. Norm Sill/s encountered at about 20'.
29	Gabbro contact.
29.0 - 30	Mineralized gabbro.
30	Fault (exposed in drift - a strike fault dipping 75° East)
30.0 - 118	Mineralized gabbro. 30 - 75' - well mineralized - estimate 1.8% Cu-Ni. 75-118' - estimate 1% Cu-Ni.
118	Feldspar-cordierite-hornfels
118.0 - 142	" " " - indication of faulting at 130'±
142.3	Fault.

Abandoned in East Fault at 142.3

INTERPRETATION:

Passed through pipe a little north of its centre.

Drilled by: U.C.E.M.

PROPERTY	FUNTER NICKEL		HOLE NO. U15
SHEET NUMBER	15	SECTION FROM TO	STARTED MAY, 1954
LATITUDE	N 9955.69	DATUM	COMPLETED
DEPARTURE	E 10206.09	BEARING N15°E± .	ULTIMATE DEPTH 263.0
ELEVATION	1539.0	DIP + 15° 35'	PROPOSED DEPTH

Depth Feet | Formation

Reported to have not intersected gabbro.

INTERPRETATION:

Below and away from pipe.

xInclination at 260' is + 27°.

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL HOLE NO. U16

SHEET NUMBER 16 SECTION FROM TO STARTED May, 1954

LATITUDE N 9932.50 DATUM COMPLETED

DEPARTURE E 10295.21 BEARING S1°15'E ULTIMATE DEPTH 68.0

ELEVATION 1471.3 DIP +29°43' PROPOSED DEPTH

Depth Feet	Formation
0 - 19.4	Altered schist - contact
19.4 - 39.6	Norite, -20% Sulphide decreasing gradually
39.6 - 44.3	Contact phase
44.3 - 55.0	Andesite dyke
55.0 - 68.0	Black granulite

XHoles 15, 16, 17, 18 and 19 as reported by U.S.B.M. Juneau, May 24, 1954

Granulite probably the equivalent of hornfels.

Received too late to incorporate in present report.

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL — HOLE NO. U17

SHEET NUMBER 17 — SECTION FROM ___ TO ___ — STARTED ___

LATITUDE N 9934.42 — DATUM ___ — COMPLETED ___

DEPARTURE E 10295.33 — BEARING S5° 27'E — ULTIMATE DEPTH 66.3

ELEVATION 1472.69 — DIP ? Unknown-presumed at -450?? — PROPOSED DEPTH ___

Depth Feet	Formation
0 - 8.5	Massive sulphide
8.5 - 44.0	Norite progressively decreasing sulphide from +50% to 0%
44.0 - 51.1	Contact phase.
51.1 - 57.3	Andesite dyke (Rudder dyke??)
57.3 - 66.3	Black granulite

Drilled by; U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY FUNTER NICKEL — HOLE NO. U18

SHEET NUMBER 18 — SECTION FROM ____ TO ____ — STARTED MAY, 1954

LATITUDE N 9940.95 — DATUM ____ — COMPLETED ____

DEPARTURE E 10292.31 — BEARING N13°23' — ULTIMATE DEPTH 32.0

ELEVATION 1473.06 — DIP -44°41' — PROPOSED DEPTH ____

Depth Feet	Formation
0 - 2.2	Massive sulphide
2.2 - 7.2	Norite + 10% sulphide
7.2 - 12.2	Norite + 50% sulphide
12.2 - 16.8	Norite + 10% sulphide
16.8 - 19.5	Norite - 10% sulphide
19.5 - 32.0	Black granulite

Drilled by: U.S.B.M.

DIAMOND DRILL RECORD

PROPERTY PUNTAR NICKEL — HOLE NO. U19

SHEET NUMBER 19 — SECTION FROM ___ TO ___ — STARTED ___

LATITUDE N 9941.43 — DATUM ___ — COMPLETED MAY, 1954

DEPARTURE E 10292.37 — BEARING N10°56'W — ULTIMATE DEPTH 13.4

ELEVATION 1472.77 — DIP +29°40' — PROPOSED DEPTH ___

Depth Feet	Formation
0 - 4.6	Massive sulphide
4.6 - 7.0	10% sulphide
7.0 -13.4	Granulite