GEOLOGICAL CONSULTING REPORT 6
BEAR, BE, BW CLAIMS
OMINECA MINING DIVISION
N.T.S. 94D2W

82-309-10369

CONSULTANT: J.R. WOODCOCK CONSULTANTS LTD

Geological Consultanting Report

on the

BEAR, BE, BW Claims

located in the

Omineca Mining Division

N.T.S.: 94-D-2W

56°07' North and 126°53' West

Owner: Canadian Nickel Company Limited
80 - 10551 Shellbridge Way
Richmond, British Columbia
V6X 2W8

Consultant: J.R. Woodcock Consultants Ltd.
806-602 West Hastings Street
Vancouver, British Columbia

Authors: E.J. Debicki

&

J.R. Woodcock

May 6, 1982

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Location, Access and Physiography

The BEAR, BE and BW claims are located about 154 km north of Smithers, British Columbia on Tsaytut Spur which forms the drainage divide between the Driftwood and Bear-Sustut River systems (Fig. 1).

The claims are accessible by helicopter from Smithers, British Columbia. A gravel landing airstrip is situated about 11 km north of claims. Aircraft on floats can land within 3 km of the main ridge on Bear Lake to the east. The Fort St. James-Dease Lake railway passes within 5 km of the claims on the east shore of Bear Lake. Rail construction was abandoned north of Bear Lake and the existing line is presently not in use beyond Takla Landing.

The claims cover glaciated, alpine terrain, on an elongate, northwest trending, relatively flat-topped ridge, between 1225 to 1885 meters above sea level. The ridge zone is covered by a thin veneer of grassy, alpine soil and scattered spruce thickets which give way to spruce forests below 1825 meters.

Property

The property consists of 51 claims recorded between September 18, 1972 and September 10, 1973 and an additional 2 claims (18 units) recorded on July 8, 1981. All claims are in good standing and are listed below. Canadian Nickel Company Limited is owner and operator of the BEAR, BE and BW claims (Fig. 2).

TABLE 1

LIST OF CLAIMS - BEAR/BE/BW CLAIMS

CANADIAN NICKEL COMPANY LIMITED

Claim Name	Record Number	Claims	Units	Record Date	Due Date
BEAR 3-14	117491-117502	12		Sept. 18, 1972	Sept. 18, 1983
BEAR 25	117513	1		Sept. 18, 1972	Sept. 18, 1983
BEAR 26	117514	1		Sept. 18, 1972	Sept. 18, 1982
BEAR 27	117515	1		Sept. 18, 1972	Sept. 18, 1983
BEAR 28	117516	1		Sept. 18, 1972	Sept. 18, 1982
BEAR 29	117517	1		Sept. 18, 1972	Sept. 18, 1983
BEAR 30	117518	1		Sept. 18, 1972	Sept. 18, 1982
BEAR 31	117519	1		Sept. 18, 1972	Sept. 18, 1983

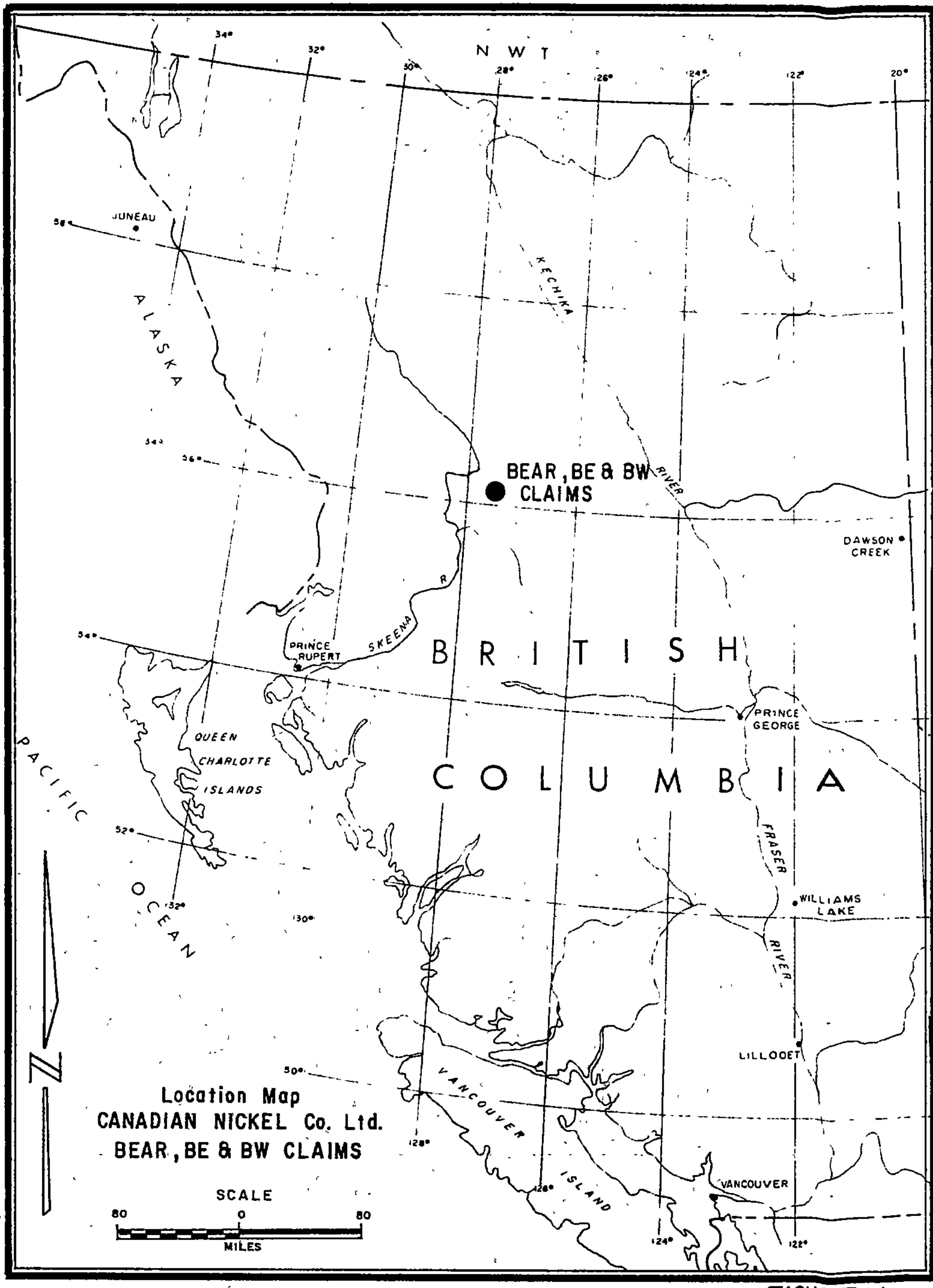

N W T
ALASKA
JUNEAU
KECHIKA
RIVER
BEAR, BE & BW
CLAIMS
DAWSON
CREEK
SKEENA
R
PRINCE
RUPERT
BRITISH
COLUMBIA
PRINCE
GEORGE
QUEEN
CHARLOTTE
ISLANDS
PACIFIC
OCEAN
FRASER
RIVER
WILLIAMS
LAKE
LILLOOET
VANCOUVER
ISLAND
VANCOUVER
Location Map
CANADIAN NICKEL Co. Ltd.
BEAR, BE & BW CLAIMS
SCALE
80
0
80
MILES

FIGURE 1

Claim Name	Record Number	Claims	Units	Record Date	Due Date
BEAR 41-50	117529-117538	10		Sept. 18, 1972	Sept. 18, 1982
BEAR 55-70	126657-126672	16		July 31, 1973	July 31, 1982
BEAR 78	127596	1		Aug. 10, 1973	Aug. 10, 1982
BEAR 80	127598	1		Aug. 10, 1973	Aug. 10, 1982
BEAR 110	127627	1		Aug. 10, 1973	Aug. 10, 1982
BEAR 118	127441	1		Sept. 10, 1973	Sept. 10, 1982
BEAR 120	127443	1		Sept. 10, 1973	Sept. 10, 1982
BEAR 122	127445	1		Sept. 10, 1973	Sept. 10, 1982
BE	2843	1	9	July 8, 1980	July 8, 1982
BW	2844	1	9	July 8, 1980	July 8, 1982
		53	18		

NOTE: BEAR claims are 2 Post Claims
BE, BW claims are Mineral Claims (Modified Grid System)

Property History

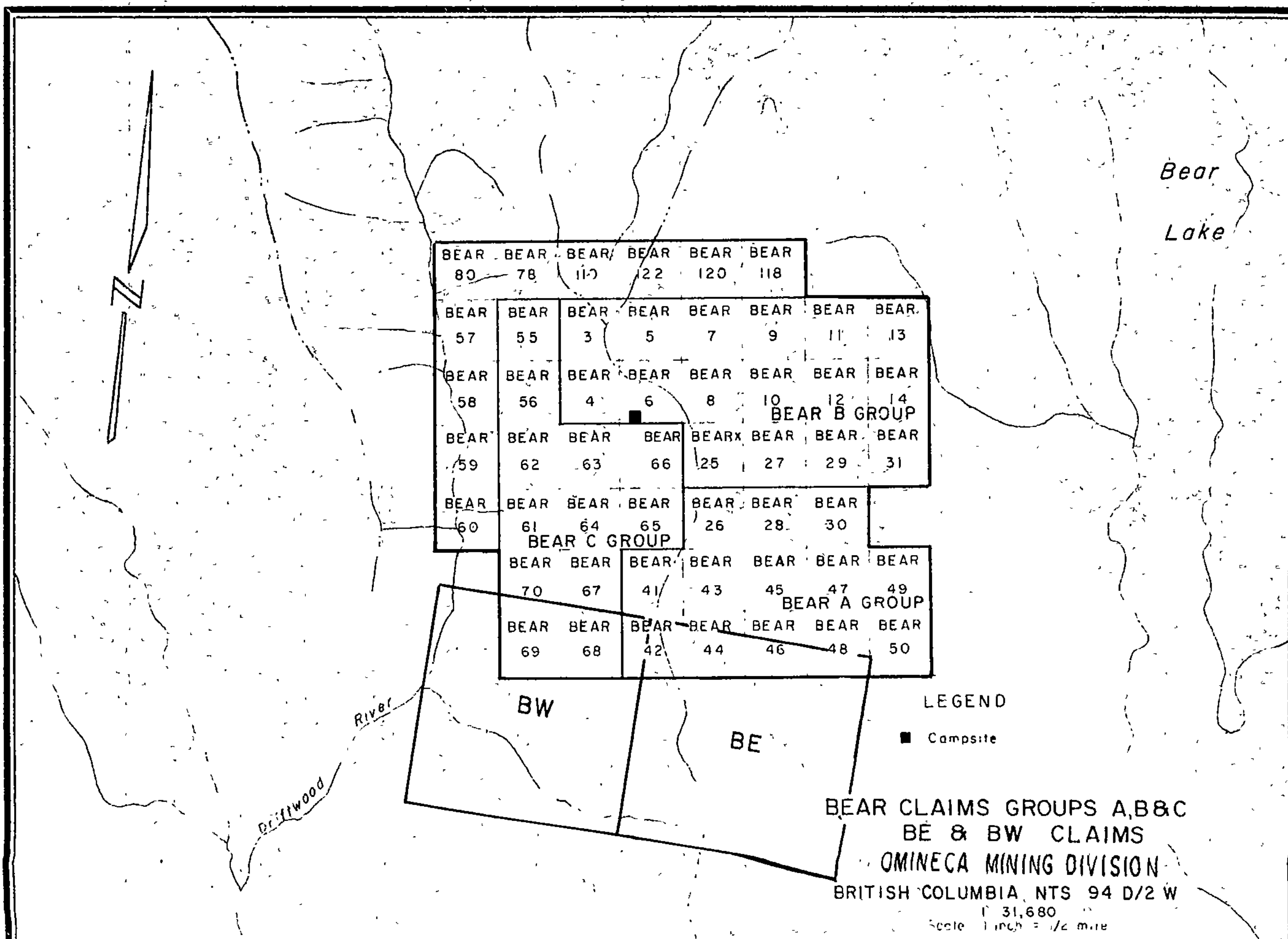
The BEAR claims were staked by Canadian Nickel Company Limited (Canico) on the basis of chalcopyrite and molybdenite mineralization discovered during a regional porphyry copper exploration program in 1972. A limited surface exploration program was undertaken in 1973 and the results were reported by Gidluck (1973) as assessment report # 4648 and Hunter (1975) as assessment report # 5269. A diamond drill program consisting of 1,265 meters in ten holes between July 8 and September 5, 1974 was reported by Gidluck (1974) as assessment report # 5236. No further work was completed until July 8, 1980 when a lithogeochemical orientation survey was completed. Results of the 1980 work were reported by Peto (1980) as assessment report # 8335.

During 1981, a surface program consisted of refurbishing and extending the 1973-1974 grid to its present size totalling 21.8 km (13.3 miles) of line. Geological, geochemical and geophysical surveys were carried out during the period July 13 to August 7, 1981. The results of that work were reported by Peto and Krause (1981) filed as an assessment report.

The BEAR-BE-BW work to date has outlined significant porphyry copper-molybdenum mineralization.

Work Summary

J.R. (Dick) Woodcock, a recognized porphyry expert, of J.R. Woodcock Consultants Ltd. was contracted in early September 1981 to carry out an evaluation of the geotechnical data on the BEAR-BE-BW claims. The purpose of the contract was to arrive at conclusions on the economic



BEAR CLAIMS GROUPS A,B&C
BE & BW CLAIMS
OMINECA MINING DIVISION
BRITISH COLUMBIA NTS 94 D/2 W
1" 31,680
Scale 1 inch = 1/2 mile

potential and make recommendations for further work on the BEAR porphyry copper-molybdenum prospect. This contract work included a field examination on September 22, 1981 accompanied by P. Peto and H.R. Butler of Canadian Nickel, examination of core specimens, petrographic studies of thin sections, a study of drill logs and assay results and a study of geotechnical reports prepared by previous Canico workers. A report submitted by J.R. Woodcock, dated November 1981, outlines the findings of the contract work. That report is provided herewith in its entirety as Appendix A, and forms the basis of this assessment report.

Regional and Property Geology

The regional and property geology are covered by Woodcock (Appendix A) and in a previous assessment report by Peto and Krause (1981).

Results - J.R. Woodcock Contract Study

Specific details of the geology of Intrusive Complex, alteration and mineralization, geochemical and geophysical results and drill results are contained in the J.R. Woodcock report, attached as Appendix A.

Map 1, Geology Map, scale 1:5,000 (back pocket) provides reference for grid locations, rock types and locations of boreholes 54301 to 54310 referred to in the J.R. Woodcock report (Appendix A).

Conclusions and Recommendations

Conclusions and recommendations are contained in the J.R. Woodcock report, attached as Appendix A.

References

Carter, N. (1974), Geology & Geochronology of Porphyry Copper & Molybdenum Deposits in West-Central, B.C. (unpublished PhD Thesis, U. of B.C.)

Gidluck, M.J. & Krause, B.R. (1973), Report on Geological, Geochemical & Geophysical Surveys Conducted on the Bear Claims A, B & C - 1973; B.C. Dept. of Mines Assessment Report # 4648.

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(1981), Rock Alteration Study of the BEAR Claims, B.C. Dept. of Mines Assessment Report # 8335.

& Krause, B.R. (1981), Geological, Geochemical and Geophysical Report on the Bear Claims, Groups A, B & C and BE, BW Claims, B.C. Dept. of Mines Assessment Report.

Tipman, R. (1975), Flotation Tests on Bear Lake, B.C. Drill Cores (Company Report).

Tipper, H.W. & Richards, T.A. (1976), Jurassic Stratigraphy & History of North-Central B.C.: G.S.C. Bulletin 270.

ITEMIZED COST STATEMENT

BEAR, BE, AND BW CLAIMS

Geological Surveys

Labour (salaries and benefits)

E.J. Debicki-April 12, 1982 (report writing)	1 day @ $300.00	$	300.00
I. McCaskill (drafting)	1 day @ 162.00		162.00

Consultant Services

J.R. Woodcock Consultants Ltd.		7,595.29
	Total	$8,057.29

EJD/cb
May 6, 1982

J.R. WOODCOCK CONSULTANTS LTD.
806 - 602 WEST HASTINGS STREET
VANCOUVER, B.C., CANADA V6B 1P2
TELEPHONE: (604) 685-6720

Inv. 77-81

INVOICE
(FEES)

CLIENT ~~Canadian Nickel Co.~~
PROJECT Bear Lake
EXPLANATION

DATE SUBMITTED November 30, 1981
PERIOD COVERED Aug. - Nov. '81

DATE 1981	DESCRIPTION		ALLOCATION Sub-Project	Category	AMOUNT
	J. R. Woodcock				
..g. 31 - Oct. 3	Review core and data	1 1/2 days			
..pt. 13	At Canadian Nickel office	1 day			
..pt. 22	Field visit	1 day			
..t. 4-24	Work on report & petrography	4 1/4 days			
..t. 25-Nov. 21	Studies & report	6 1/4 days			
		14 days @ $500			$ 7,000.00
	E. McCallum				
~~..t. 23-Nov. 9~~	~~Report & Correspondance~~	~~22 1/2 @ $15~~			337.50

60808-12030-545

APPROVED J.R. Woodcock

TOTAL $7,337.50

INVOICE No #77-81

Nov. 30/81

J.R. WOODCOCK CONSULTANTS LTD.
806 - 602 WEST HASTINGS STREET
VANCOUVER, B.C., CANADA V6B 1P2
TELEPHONE: (604) 685-6720

Inv. #78-81

INVOICE
(DISBURSEMENTS)

CLIENT Canadian Nickel Co.

PROJECT Bear Lake

DATE SUBMITTED ~~November 30, 1981~~

PERIOD COVERED Oct. - Nov. '81.

EXPLANATION

DATE 1981	DESCRIPTION	ALLOCATION Sub-Project	Category	AMOUNT
Oct. 6	J. R. Woodcock - Expense Report #27-81			$ 24.00
Oct. 20	Coots Petrographic - #1134			120.00
Oct. 31	Western Reproducers - Inv. H66378			25.19
Oct. 30	E. Chong - portion - draughting			57.60
Nov. 20	Western Reproducers #66603			14.10
Nov. 20	Vancal Reproductions - #89183			4.62
	Sub. Total Disbursements			245.51
	Plus 5% on Disbursements			12.28

60803-12050-545

TOTAL $ 257.79

APPROVED J R Woodcock

INVOICE No. #78-81

AUTHOR'S QUALIFICATIONS

I, EDWARD J. DEBICKI, of the City of Richmond, in the Province of British Columbia, HEREBY CERTIFY:

1. THAT I reside at 11351 Seahurst Road, Richmond, British Columbia, V7A 3P3.
2. THAT I am a graduate of McMaster University, Hamilton, Ontario, with a degree of Bachelor of Science (1971).
3. THAT I am District Geologist, B.C. and Yukon, with Canadian Nickel Company Limited (subsidiary of Inco Metals Company) of Copper Cliff, Ontario, POM 1NO.
4. THAT I have practised my profession as a geologist since 1971, having worked in Ontario, Quebec, the Northwest Territories, Yukon Territory and British Columbia.
5. THAT I have visited the property discussed in this report and that the work described in this report was carried out under my supervision on behalf of Canadian Nickel Company Limited.
6. THAT I am a Associate Member of the Geological Association of Canada and a member of the Canadian Institute of Mining and Metallurgy.

DATED at Richmond, British Columbia, this 13th day of April, 1982.

Edward J. Debicki

APPENDIX A

BEAR CLAIMS

Bear Lake Project

Omineca Mining Division, B.C.

94-D-2W

for

CANADIAN NICKEL COMPANY

by

J.R. Woodcock Consultants Ltd.

November, 1981

BEAR CLAIMS

Bear Lake Project

Omineca Mining Division

B.C. 94D-2

for

CANADIAN NICKEL COMPANY

by

J. R. WOODCOCK

J. R. Woodcock Consultants Ltd.
806-602 West Hastings St.
Vancouver, B.C.

November, 1981

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THE BEAR LAKE PORPHYRY COPPER

INTRODUCTION

The Bear claims are located 90 miles north of Smithers on Tsyatut Spur west of Bear Lake at an elevation of 5500 feet. The Fort St. James - Dease Lake railway lies along the ~~west~~ east side of Bear Lake, only three miles east of the mineralized stock. This railway, fully constructed, has not been used. The present access to the claims must be by helicopter or by float-equipped aircraft to Bear Lake.

The property was discovered by Canico in 1972, during a regional exploration program for porphyry copper deposits. A surface evaluation program consisting of grid preparation, geological mapping, goechemical sampling, induced polarization and magnetometer survey were conducted by a Canico crew from July to August, 1973. A drill crew with B.B.S.1 drilled 3804 feet in seven holes and 385 feet supplementary winkie drilling in three holes from July 3 to September 7, 1974.

On July 7, 1980, a Canico field crew collected rock geochemical samples for an orientation survey and results of this were described by Peter Peto, October, 1980. Subsequently, Peto studied the rock alteration from surface and drill core specimens and this alteration study is described in the report of February 5th, 1981.

This present report is based on Woodcock's field examination of the property on September 22, 1981, accompanied by Peter Peto and ~~Hayden~~ Butler and also on examination of a skeleton core selection from holes 2, 4, and 8, petrographic studies of a number of thin sections from the Intrusive Complex, a study of the drill logs and the assay results by Hunter, and a study of the geotechnical reports made by prior workers on the claims. This is not an exhaustive report on the property or a complete study of all data. It dwells on topics which will likely be of interest to further exploration of the property. Reference must be made to the various geotechnical maps of previous workers and the reports listed in the bibliography.

THE INTRUSIVE COMPLEX

Before reviewing the rock types and their nomenclature, a few comments are necessary on classification of igneous rocks. The system adopted by Hunter, (1973) is based on the American classification scheme, whereas the system preferred by Peto is that recommended by the International Union of Geological

Sciences. I agree with Peto that the classification of the International Union of Geological Sciences is more systematic and may be preferable, especially if one breaks down the granite zone into granite and monzogranite as Peto has done. However, we must accept the fact that most of the porphyry copper and porphyry molybdenite studies and publications have been done by geologists from western North America and any porphyry, copper geologist who reads the report will be appraising it in the context of this North American knowledge. Therefore, I suggest that, for most of the rock types, the North American classification be maintained.

The core, except for skeleton selection of specimens, has been destroyed for analytical purposes.

After examining the skeleton core specimens from holes 2, 4, and 8, I attempted to sort out some of the igneous rocks with a limited amount of petrography. The following descriptions and names of rock types from the Intrusive Complex are based on the exmaination of the skeleton specimens, the limited petrography, Hunter's drill logs, and some of Peto's descriptions.

Granodiorite

In holes 54302 and 54304, Hunter logged quartz monzonite and quartz monzonite porphyry. Much of the porphyry is crowded with phenocrysts and, in places, the fine-grained matrix is difficult to discern. Three specimens which appeared, in hand specimen, to be equi-granular were examined in thin section. These include 54302-131 and 54304-70 (logged as quartz monzonite by Hunter) and 54302-300 (logged as quartz monzonite porphyry by Hunter).

Thin section examination shows that these rocks are essentially equi-granular, but contain some interstitial quartz and K-feldspar. The predominant mineral in the rock is coarse-grained plagioclase forming 50%-60%. Hornblende and biotite are present in equal proportions for those rocks with a low mafic content (4% total), but predominantly hornblende for those rocks with a higher mafic content (10%). Much of the mafic mineral is the coarser crystal size; however, some finer flakes are associated with the interstitial material. Quartz is generally present in fairly coarse crystals that are spacially associated with the interstitial quartz-K-feldspar. This coarser quartz forms 8%-12% of the rock.

The interstitial material forms 6%-25% of the rock and in the lower percentages is predominantly quartz whereas in the higher percentages it is about 60% quartz and 40% alkali feldspar.

The K-feldspar can be present in fairly coarse crystals and forms up to 20%; however, in most specimens it is mainly present in the interstitial material. Generally when the rock has a high content of coarse K-feldspar, the interstitial material is scarce and predominantly quartz. The high plagioclase to alkali feldspar ratio, the high quartz content and the equigranular texture places this rock in the granodiorite range.

Quartz Latite Porphyry

This rock unit, called quartz monzonite porphyry by Hunter and monzogranite porphyry by Peto, forms some of the central part of the Igneous Complex and also the large porphyry dyke extending southward from the Complex. It is characterized by megacrysts of pink feldspar.

The following description is largely based on a thin section examination of surface specimen (W81-481) from 15+00N, 7+60E. Specimens P.P.R. 150, 155, and 156 from the southern dyke are the same rock type.

The megacrysts of K-feldspar form 5 to 10% of the rock and these occur within a matrix which in itself is crowded porphyry containing about 57% phenocrysts. The phenocrysts of the crowded porphyry also have two size ranges. Most of the phenocrysts belong to the larger size range with plagioclase crystals up to 3 mm long and quartz phenocrysts up to 5 mm across. The large quartz phenocrysts are characteristically resorbed and embayed. The second group of phenocrysts includes quartz, plagioclase, and some biotite; crystals are about 0.3 mm across.

Phenocryst content of the rock is about: 8% K-feldspar megacrysts, 32% plagioclase, 14% quartz, and 6% biotite.

The matrix of this crowded porphyry would definitely be aphanitic; the crystal size for specimen W481 is about 0.01 mm; the matrix, which forms about 40 to 45% of the rock, is about half quartz and half alkali feldspar.

The matrix of this rock is finer grained than normally found in the porphyries of copper deposits and molybdenite deposits and because of this I have changed the name from quartz monzonite porphyry (which denotes the correct mineralogical composition) to quartz latite porphyry.

Quartz Monzonite Porphyry

Two surface samples were examined and these have been called quartz monzonite porphyry. W81-483 is from 16+20N, 8+30E. The following description is largely based on this section. Another surface specimen at 10N-15E (A) is a similar porphyry. Both of these rocks lack the K-feldspar megacrysts in the thin sec-

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tion and in hand specimen. Whether or not such megacrysts are present in the outcrops is not known. The rock is about 56% phenocrysts and about 44% matrix and again is a crowded porphyry. The phenocryst contents of the rock is as follows: 36% plagioclase, 6% K-feldspar, 8% quartz, 4% biotite, and 2% hornblende.

The matrix has a crystal size of approximately 10 times that of the quartz latite porphyry, with predominant crystal size of 0.1 mm. The matrix is about half quartz and half K-feldspar.

Transition and Other Porphyries

Two thin sections from hole 54308 (85' and 105') were examined. These porphyries have a similar phenocryst content to the crowded part of the quartz latite porphyry and the quartz monzonite porphyry. The matrix, however, has a crystal size closer to the quartz latite porphyry, but the texture is more similar to the granular texture found in the matrix of the quartz monzonite porphyry. Whether or not these are transition types of rocks or additional types of dyke rocks is not known. Note also that some of the dykes encountered in the drill holes(e.g. hole 54303) are barren whereas others are mineralized with copper and molybdenum (e.g. upper part of hole 54308). These porphyries could probably be sorted out with additional field observations and thin section work.

Monzonite

Much of the Intrusive Complex, which has no obvious free quartz in hand specimen, has been called syenodiorite by Hunter and monzodiorite by Peto. Three specimens from drill core of hole 54308 (25', 255', 395') were examined in the thin section. These specimens do resemble, in thin section and in hand specimen, the so-called granodiorite (Hunter's quartz monzonite).

The main differences are as follows:

1. The monzonite has a darker colour; this is because the mafic minerals are smaller and more widely scattered. Also much of the plagioclase has been sericitized and altered to a dirty clay material, adding to the dark appearance of the rock.

2. The mafic minerals again include biotite and hornblende (about 15% or more); however, in this case the biotite forms over three-quarters of the mafic minerals.

3. The rock is again predominantly plagioclase; however, the plagioclase is more lath shaped than equi-dimensional with fewer of the well zoned crystals found in the granodiorite.

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4. K-feldspar is considerably more abundant and exists as poikilitic patches, containing other minerals such as partially replaced plagioclase.

5. The quartz again is somewhat interstitial but considerably less abundant than in the granodiorite (7% in section 54308 - 25').

Monzonite is a suitable name for this rock; however, the terms syenodiorite and monzodiorite are also applicable. In British Columbia the term syenodiorite generally connotates an alkalic type of copper deposit versus the calc-alkalic types. This prospect has some characteristics of calc-alkalic porphyry coppers as well as a few features of the syenodiorite or alkalic types. This includes the presence of abundant molybdenite and the presence of abundant quartz-rich igneous rocks even though the mineralized monzonite itself is somewhat silica deficient.

Biotite Hornfels

Part of the igneous-appearing dark rock of hole 54304 has been logged as biotite diorite. Examination of specimens from 290' and 317' show that this is a biotite hornfels and therefore a metamorphosed zenolith. This rock is very dark in colour compared to any of the other igneous rock and this is caused by the large content of coarse secondary biotite flakes scattered throughout and forming up to 40% of the rock. The remainder of the rock is largely plagioclase. There is some general lineation of the plagioclase laths and the biotite flakes.

The thin section from 290' shows an altered fragment which is rich in sericite and opaques. The section from 317' is cut by a veinlet of fine-grained material which runs at right angles to the crude lineation. This could be a mylonite zone or some sort of a quartz-rich introduction.

Alaskite or Pink Granite

The rock labelled pink granite by Hunter is characterized by abundant perthitic K-feldspar, forming more than two-thirds of the rock. The remainder of the rock is quartz and plagioclase; a few specs of biotite are present. The rock is essentially equi-granular. Two sections from hole 54302 were examined (117' and 404.7'). In places, the mafic minerals that were present have been completely altered to carbonate plus muscovite. The rock could be called granite or more properly alaskite because of its lack of mafic minerals and its high content of perthitic K-feldspar.

Quartz-Feldspar-Porphyry Dykes

These dykes, called quartz monzonite porphyry by Hunter, are considerably different than the other crowded porphyries of the Complex in that the phenocrysts are less abundant and more widely scattered and the rock is a lighter grey colour.

Thin section examination shows this is also a unique rock of the Intrusive Complex and different than any of the other igneous intrusions. The rock is 40% to 50% phenocrysts and these phenocrysts are generally euhedral and are floating in a matrix that has a somewhat mixed texture. The phenocrysts are predominantly plagioclase with lesser quartz and minor biotite and hornblende and an occasional crystal of K-feldspar.

The texture of the matrix is also unique. It has a large range in crystal sizes, but with two predominant sizes. The coarser crystals are quartz, forming about 50% of the matrix and the finer-grained matrix consists of quartz (about 60%) and K-feldspar (about 40%). The texture is one of interlocking crystals.

The overall composition of this unusual rock (based on an examination of section 54032-409.5') is approximately 37% plagioclase, 12% K-feldspar, 48% quartz, 2% biotite and 2% hornblende. I prefer to retain the name quartz feldspar porphyry for these dykes.

Leucocratic Porphyry

In several places Hunter logs a light coloured rock as "Alaskite". This is the rock that I logged a leucocratic porphyry and noted that, in general, it occurs adjacent to the quartz feldspar porphyry dykes. However, this cannot be certain as only a skeleton selection of core specimens remains.

Thin section examination shows that it is quite similar to the quartz feldspar porphyry in that the phenocrysts are scarce and even more widely scattered than in the quartz-feldspar porphyry. Also the phenocrysts are euhedral and well formed. The matrix again is quite variable in texture with great range in size of the interlocking quartz and of the quartz feldspar mixtures. The matrix could almost be described as seriate. The rock does differ from the grey porphyry in composition in that it has a larger ratio of K-feldspar to quartz within the matrix.

This rock could be an alteration by some sort of recrystallization process of the outer parts of the porphyry dykes. Such alteration would probably be of the deuteric nature. Until more information is available, I would prefer to retain the name leucocratic porphyry and await further observations on its relationship to the dykes of grey quartz-feldspar porphyry.

ALTERATION AND MINERALIZATION

Notes on the alteration studies are presented in Appendix I, which briefly summarizes the observations made on available thin sections from the Intrusive Complex. Note that all of the available thin sections, both core specimens and surface specimens are from the eastern part of the Intrusive Complex. At the time of this study there were no available specimens from the western part of the stock and therefore one cannot draw firm conclusions about the asymmetry or lack of alteration for this western part of the stock.

The results of the alteration studies have been reviewed and an attempt has been made to draw trends of alteration. For this purpose, the rock types have been grouped and so that observations on alteration can be confined to one rock type.

Monzonites

The best mineralization and the most intense alteration occurs in the monzonite. For the purposes of a comparison there are only three sites available and these include surface specimen W81-486 (15+00N, 7+6E), hole 54302 (300' and 340') and hole 54308 (25', 215', 255', 395', 415', 535').

Specimen W81-486 is essentially unaltered. However, it does have somewhat different mineralogical composition than the rest of the monzonites.

The two specimens from hole 54302 have some biotite alteration in the hornblende and in veinlets that cross plagioclase crystals. The plagioclase is fresh with very little sericite or clay alteration and secondary K-feldspar appears to be absent.

The six specimens from hole 54308 show good hydrothermal alteration related to quartz veinlets. This alteration includes abundant K-feldspar and secondary fine-grained biotite associated with quartz veinlets. Biotite also occurs as veinlets, with or without carbonate, and as replacements of hornblende crystals. The plagioclase throughout the section is slightly sericitized and intensely sericitized adjacent to the quartz-K-feldspar veinlets.

Thus one can see that this limited information demonstrates an increasing alteration towards the good mineralization of hole 54308 compared with essentially no mineralization or alteration in the northeast part of the stock.

Granodiorite

The granodiorite should be considered next as it is a similar

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equi-granular rock. For this, specimens from P.P.R. 157, 158, hole 54302 (131' and 280') and hole 54304 (70', 90', 270', 356', 396') are considered.

Starting from the north again, sections at 54302 (131' and 280') are essentially fresh with only a little clay on the plagioclase. The section from 54302 - 495', however, does have some secondary biotite and some secondary K-feldspar and also some sericitization of plagioclase adjacent to a quartz veinlet.

The granodiorite in the specimens from hole 54304 does have hydrothermal alteration, generally associated with the quartz veinlets. This alteration is similar to the alteration found in the monzonite of hole 54308, but is not quite as intense. One might attribute this lesser alteration to the more silicious nature of granodiorite versus the monzonite. However, the amount of copper and molybdenum in hole 54304 is less than in hole 54308 and therefore these specimens may be away from the local center of mineralization.

There are two surface specimens of granodiorite near the collar of hole 543010 (P.P.R. 157, 158) these are essentially fresh specimens with little or no alteration.

Porphyries

No attempt has been made to sort out alteration trends in the porphyries and the dykes. A few comments, however, are warranted.

a. Good quartz stockwork with K-feldspar selvages and some molybdenite mineralization occurs east of camp at approximately 7+00N, 8+50E. This is in a porphyry and the porphyry may be the quartz monzonite.

b. Parts of the specimens of quartz latite porphyry in the southern dyke (P.P.R. - 150, 155, 156) show fairly pervasive alteration of the plagioclase phenocrysts to some clay and sericite. This is accompanied by alteration of the mafic minerals to chlorite, carbonate, opaques. Some of this alteration could be deuteric rather than later hydrothermal.

c. Some of the quartz feldspar porphyry dykes, with essentially unaltered plagioclase phenocrysts, show secondary biotite in fractures etc.

d. One of the dykes (54304-486) shows quartz veinlets with K-feldspar selvages and with unusual biotite alteration of plagioclase.

e. Some of the porphyries (hole 54303) are barren whereas other

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porphyry dykes (upper part of hole 54308) are mineralized with copper and molybdenum.

Chlorite Alteration

In most places, the chlorite alteration replaces biotite (even the secondary biotite) and also the primary hornblende. This chlorite alteration also occurs in the quartz latite porphyry of a southern porphyry dyke. It is late, it could be propylitic. No attempt has been made to establish its distribution or trends.

Sulphides

Sulphide mineralization includes pyrite, chalcopyrite and molybdenite. This mineralization has been mentioned in other reports and only a few comments will be made here. The chalcopyrite and the molybdenite, along with some pyrite, occur together in quartz veinlets. Thus the copper and the molybdenum appear to be contemporaneous. This is supported by the rock geochemical maps which show the co-extensive copper and molybdenum anomalies without a copper halo around the molybdenum. The molybdenite appears to occur only in the quartz veinlets and there is little or no molybdenite paint in fractures by itself.

Pyrite also occurs in these chalcopyrite-molybdenite-quartz veinlets. However, the induced polarization maps to indicate a probable pyrite halo which lies on the outer parts and also outside of the mineralized zone. This is supported by the field observations which show pyrite lenses and veinlets in the hornfels east of hole 54308.

GEOCHEMICAL AND GEOPHYSICAL RESULTS

Observations

The geochemical (rock geochemistry) and the induced polarization results show the classical pattern of a low in the center and the anomalous highs around it--the so-called doughnut pattern. Several comments can be made on the features of these patterns.

1. Geochemical anomalies of both copper and molybdenum in the rock are quite similar in overall distribution and in the distribution of the local highs within this anomaly. The low in the center of this anomaly is over the center acidic part of the Intrusive Complex. There is no good halo effect of copper surrounding molybdenum. This could

be expected from observations on mineralization in the core; in most places, the copper and the molybdenum occur in the same quartz veinlets.

2. The zinc pattern from the rock geochemistry shows a halo surrounding a broad low or negative anomaly and this halo is definitely asymmetrical, being adjacent to the copper-molybdenum patterns on the east but lying a long distance away from the system on the west.

3. The soil geochemistry gives a somewhat different pattern than the rock geochemistry. Anomalous molybdenum and copper values occur over the stock and extend onto the adjacent hornfels. The peak of this anomaly, however, lies over the eastern part of the Intrusive Complex. This is best demonstrated by the molybdenum in soil which has a less erratic geochemical pattern than the copper. Many of the higher values of molybdenum (> 200 ppm) occur in an area centered on hole 54308 and extending northeasterly and southerly from this area. Thus, it appears that, in this case, the soil geochemistry has given a fairly good reflection of the mineralized area and has demonstrated the asymmetry of the mineralization better than the rock geochemistry.

4. The induced polarization also shows a low in the center and a surrounding high reflecting a pyrite halo. This pattern is somewhat asymmetric and this asymmetry is best reflected in the apparent resistivity. The resistivity high is co-extensive with the geochemical low but extends westward from it a short distance. This "pyrite halo" lies outside of the geochemical anomaly on the west whereas it is stronger on the east side and is superimposed on the outer parts of the copper-molybdenum anomaly.

5. This asymmetry is also reflected in the hornfels halo as outlined by Peter Peto. The hornfels halo within the volcanic rocks is considerably wider on the east side of the stock than it is on the west side of the stock.

6. This place is appropriate to make a few comments on the magnetic picture. This has been contoured with most of the contours trending at right angles to the cross lines. There is no good reflection of the intrusive rock types, excepting that in the northern area of the survey there are generally higher magnetic values than in the southern area. Whether the northerly trending texture, as revealed by the contours, is real and reflects the northerly striking strata, or whether it is merely the result of the tendancy of most geologists to draw contours at right angles to cross lines is not known.

It is important to note that, in the field, monzonite is quite

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highly magnetic whereas the quartz monzonite is non-magnetic. This has not been reflected in the magnetometer survey and I am somewhat skeptical of whether or not the magnetometer was functioning properly.

The Asymmetry

The Intrusive Complex, in general, consists of acid igneous rocks (porphyries and granodiorite) surrounded by monzonite. The patterns for the rock geochemistry and copper and of molybdenum, show the classical doughnut shape, nicely centered on the central acid igneous rocks. There are, however, a number of geochemical and geophysical patterns which demonstrate asymmetry to the system with better values along the east side.

There are a number of possible explanations for this asymmetry and for the better copper-molybdenum obtained in some of the drill holes on the east:

1. Generally one should consider the classical halo and mineralized zones as having somewhat the shape of the capping of a tooth. The thicker values occur near the apex of a stock and the mineralized zones decrease in thickness and intensity downward along the sides of the stock. Thus the asymmetry of the geochemical and geophysical patterns could occur by having the western part of the system uplifted along a northerly trending fault.

2. Such an effect might also be obtained by tilting the system to the east and bringing the lower western parts nearer to the surface. The fact that many of the dykes within the Intrusive Complex dip approximately 60° west and some of the strata mapped south of the system dip about 40° east might indicate a tilt of the stock and the strata towards the east. This could account for part of the asymmetry. However, such tilting should expose the underlying stock. This should make the surface trace of this stock be an ellipse oriented east-west rather than north-south.

3. The third possibility is some sort of structural preparation or control of the ground adjacent to the eastern margin on a stock. This could include fracture preparation of the ground, reentrants in the contact of the Intrusive Complex, or even some unroofed satellitic stock lying to the east of the presently exposed Intrusive Complex.

DRILL RESULTS

Following is a brief review of the assay results and some observations on the distribution of metal values. This review starts

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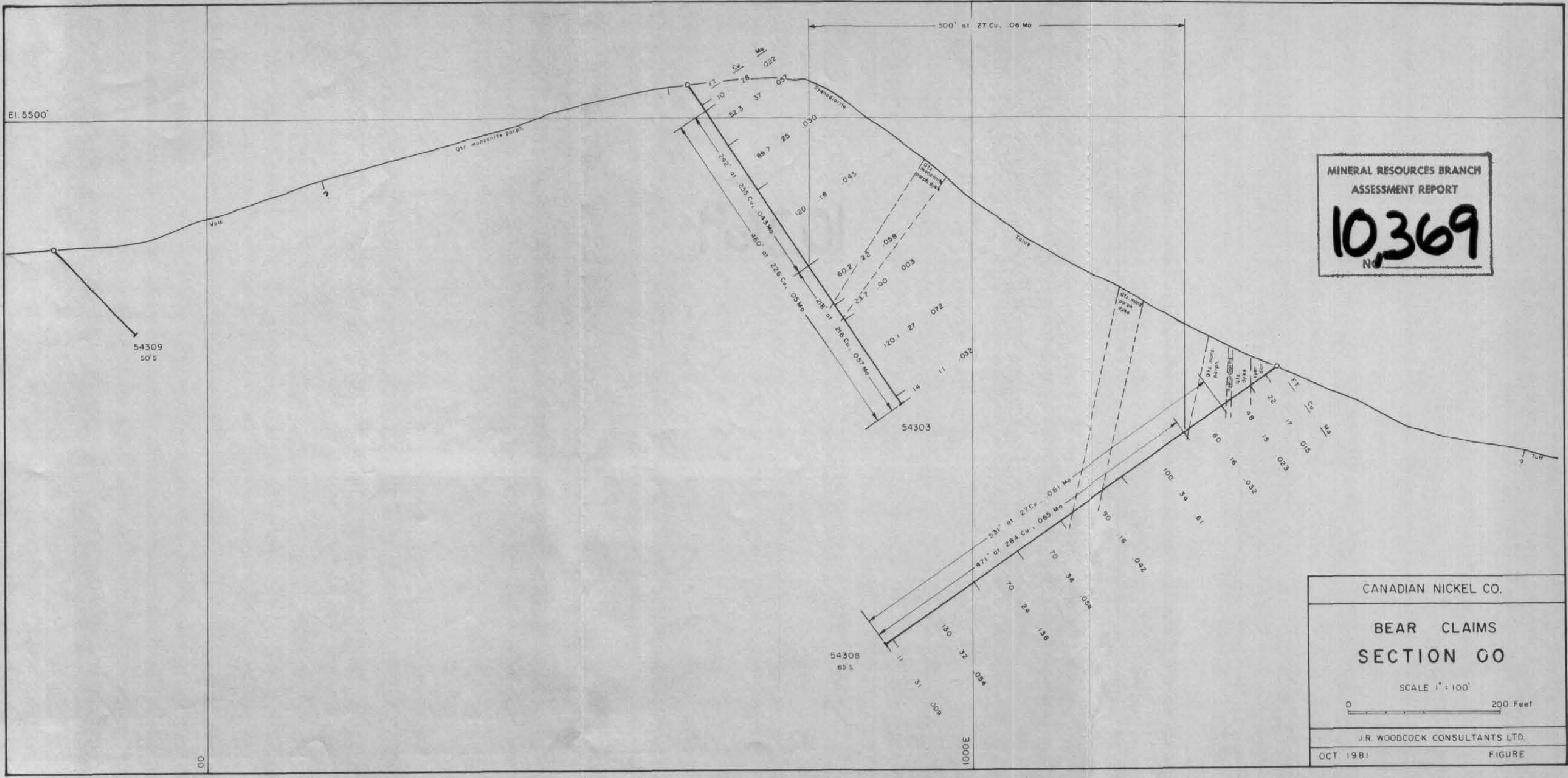

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 10,369

CANADIAN NICKEL CO.

BEAR CLAIMS

SECTION 00

SCALE 1" = 100'

0 — 200 Feet

J.R. WOODCOCK CONSULTANTS LTD.

OCT. 1981 FIGURE

on the southeast corner of the Intrusive Complex where the best values have been obtained. An attempt is made to use the rock nomenclature established by my petrography and to re-interpret the drill logs accordingly.

Drill Holes 54303 and 54308.

These two drill holes encountered the best copper and molybdenum values and therefore some of their features should be summarized:

a. The holes are in the eastern part of the Intrusive Complex, largely in monzonite. In this area, monzonite seems to project westerly into the central porphyry part of the stock, this complexity has been partially interpreted as a fault by Peto. Drill hole 54308 is collared in the monzonite and drills westerly towards the center of the stock but remains in monzonite throughout. Drill hole 54303 is collared above and west of drill hole 54308 and it drills easterly. It also remains in monzonite throughout.

b. These holes did encounter some quartz-feldspar porphyry dykes. Some of these (e.g. hole 54303) are barren. However, some of these (e.g. the upper part of hole 54308) are as well mineralized as the adjacent monzonite. Thus there may be at least two stages of these porphyry dykes, one pre-mineralization and one post-mineralization.

c. In my averaging I have included porphyry dykes as it is doubtful that these could be excluded in a mining operation. My estimated averages are reproduced in accompanying Figure 1.

d. The averages show that 471 feet in the lower part of hole 54308 grades 0.284% Cu plus 0.065% Mo and this includes a section at the bottom (11 feet) which contains 0.31% Cu and 0.009% Mo. The logs show that this bottom section is cut by numerous pegmatic dyklets in contrast to the upper sections. Therefore, one cannot conclude that this is the end of the mineralization in this hole or that the mineralization is petering out.

e. The lower 218 feet of hole 54303 grades 0.216% Cu plus 0.057% Mo. Above this the values are somewhat lower.

f. If one assumes a vertical mineralized section and uses the better grade lower parts of holes 54303 and 54308, then this section would be about 500 feet wide with an average grade of 0.27% Cu plus 0.06% Mo.

Drill Hole 54305

This drill hole lies 600 feet north of hole 54308. It is collared in the central acid part of the Intrusive Complex and drills easterly into the monzonite. The assay results areaas follows:

17 to 464 (447 feet) -- 0.013 Cu, 0.008 Mo
464 to 552 (88 feet) -- 0.08 Cu, 0.015 Mo
552 to 711 (59 feet) -- 0.135 Cu, 0.028 Mo

There does seem to be an increase towards the end of the hole with higher values in Cu and in Mo and this increase correlates somewhat with the change from porphyry and granodiorite to monzonite.

Drill Hole 54304

Diamond drill hole 54304 is 600 feet south of hole 54308. The drill logs indicate that it is mainly granodiorite with two short sections of hornfels (275.8 to 329 and 336 to 361).

The assay results can be summarized as follows:

19 to 204 (185 feet) -- 0.19 Cu, 0.022 Mo
214 to 305 (101 feet) -- 0.23 Cu, 0.057 Mo
305 to 351 (46 feet) -- 0.13 Cu, 0.023 Mo
351 to 421 (70 feet) -- 0.24 Cu, 0.055 Mo
421 to 503 (82 feet) -- 0.14 Cu, 0.027 Mo

There does seem to be a central section with grades comparable to that of holes 54303 and 54308 to the north, excepting that the hornfels part (305 to 351') has lower values.

Drill Hole 54301

This hole was collared in monzonite and drilled easterly towards the porphyry center. Most of the core in the hole is logged as monzonite. Note that this hole drills into one of the small local copper-molybdenum highs in the litho chemistry map. The assay results are summarized as follows:

35 to 255 (190 feet) -- 0.13 Cu, 0.019 Mo
225 to 387 (162 feet) -- 0.16 Cu, 0.038 Mo
387 to 440 (53 feet) -- 0.05 Cu, 0.02 Mo

There does not seem to be any trend or increase towards the acid center and there is no obvious relationship to rock type as most of rock is monzonite.

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Drill Hole 54309

This hole was drilled from the western side easterly towards the stock; however, it remained in volcanics throughout (10' to 150'). Copper values were in the order of 0.05% and molybdenum values were in the order of 0.004% with no obvious trends in either metal. There does seem to be a reentrant of the volcanic rocks protruding eastward into the stock complex. The lithochemical maps indicate a geochemical low in this area. However, this is based on an extrapolation of the surrounding values; there are actually no samples near the drill hole.

Drill Hole 54306

This hole, also on the east side of the stock, collars in the volcanics and drills westward into the monzonite. Copper values in the volcanics are generally less than 0.05% whereas the copper values in the monzonite are generally between 0.1 and 0.15%. Molybdenum values show no good correspondence to rock type, but are low (0.005 to 0.025% Mo).

Drill Hole 5430~~6~~2

This hole is situated in the northeast part of the stock. According to the geological map and the logs the hole is collared in porphyry-granodiorite and stays in this rock throughout. It is poorly mineralized and the mineralization shows no definite trend. Copper throughout is about 0.1%. The molybdenum in the upper 400 feet is about 0.15% Mo and in the lower 100 feet is about 0.02% Mo.

Drill Hole 54307

Four drill holes were collared in the western part of the stock. These will be reviewed starting on the north and working southward.

Hole 54307 is collared in porphyry, drills westerly and remains in porphyry throughout (157 feet). Note that the hole is practically outside of the geochemical anomalies for copper and molybdenum. Copper values are in the order of 0.05% and molybdenum values are in the order of 0.006%. Note that the map shows this in an area of monzonite and in the vicinity of a porphyry dyke.

Drill Hole No. 10 (54310)

According to the geological map this is a short drill hole collared west of the south porphyry dyke and drilling easterly

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into this dyke. The hole only went to 38 feet with rock recovered between 32 and 38 feet. The upper 5 feet of this intersection probably is monzonite. The molybdenum content of the lower 1 foot is 0.001%.

Note that this hole is placed on the edge of the copper geochemical anomaly, just off the southwest edge of a local copper-molybdenum high.

Summary of Drill Results

In conclusion, the best mineralization occurs in the monzonite and in holes 54303 and 54308 in the east part of the stock. At this place, there is some complexity in the contact between the central acidic part of the stock and the surrounding monzonite. Good mineralization is also found in the monzonite for about 200 feet in hole 54304 to the south; but the values have decreased in hole 54305 to the north.

In the northeast part of the Intrusive Complex (holes 54306 and 54302) the values are much lower. The four short holes drilled in the west part of the Complex failed to intersect good grades, even though one of the holes (54302) crossed a local copper-molybdenum lithochemical high.

CONCLUSIONS

1. Mineralization on the Bear Lake property is associated with the Intrusive Complex which is about one mile long and one-half mile wide and is composed of a variety of igneous rocks including equi-granular types (monzonite, granodiorite, and alaskite) plus a variety of quartz-feldspar-porphyries. This stock or Intrusive Complex does have somewhat of a zonal picture with the more acidic porphyries predominantly in the center and separated from the volcanic rocks by quart-deficient monzonite. However, the textural differences in these various rock types imply a number of intrusions rather than a stock, zoned in place by crystallization.

2. The geochemical and geophysical maps show patterns with the classical doughnut shape. However, some patterns are asymmetric and indicate preferable targets in the east part of the Intrusive Complex. The limited alteration study supports this trend.

3. Mineralization includes copper and molybdenum both of which have largely formed contemporaneously. They occur in the same quartz veinlets. The best copper-molybdenum values over a significant intersection are about 0.25% Cu plus 0.06% Mo.

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4. This deposit has some characteristics of the calc-alkalic porphyry coppers and some characteristics of the alkalic copper deposits of British Columbia. The quartz-rich nature of many of the intrusions and the high content of molybdenum are characteristic of the calc-alkalic porphyry-copper deposits whereas the quartz-deficient monzonite, which hosts most of the mineralization, the lack of abundant pyrite with the mineralization, the lack of abundant sericite in the system, and the presence of hydrothermal alteration which is mainly K-feldspar plus biotite are charactertistic of the alkalic or diorite copper deposits.

The high Mo to Cu ratio is unusual for North America. The few deposits which have similar high ratios include Brenda in British Columbia and Mt. Tolman in Washington.

5. The best metal sections obtained were in holes 54308 and 54300.[3] These include a section approximately 500 feet across (assuming vertical dip and north-south strike) with an average assay of 0.27% Cu plus 0.06% Mo. Hole 54304, collared 600 feet south of hole 54303, encountered about 170' of similar grade mineralization. Hole 54305, collared about 600' north of hole 54308, encountered lower, but significant values.

The remainder of the drill holes in the western and north-eastern parts of the Intrusive Complex had low values.

One should compare this mineralization with typical porphyry copper grades in British Columbia. The following grades are copied from the report by M.J. Gidluck, October 10, 1974:

Mines and Deposits	M.T.	Cu.	Mo.
Brenda	154	0.18	0.043
Endako	194	--	0.086
Gibralter	358 (4 pits)	0.373	0.01
Granisle	75	0.43	--
Adanac	104	--	0.096
Valley Copper	1,000	0.46	--
Casino	179	0.37	0.023
Highmont	150	0.284	0.031

6. If one assumes a vertical zone of mineralization which is 500 feet wide along section 00 (holes 54303 and 54308) with 170 feet of similar grade mineralization in hole 54304, but extending only one half the distance northward to 54305 (where the mineralization is lower grade), then one could estimate in the order of 30,000 tons per vertical foot of the good material. This would indicate a deposit of limited size compared to other porphyry copper. However, as suggested above, this better mineralized zone has not been delimited on the west, on the east, on the south or downward.

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7. The intersection quoted for holes 54303 and 54308 is very good compared to the values for many porphyry copper deposits in British Columbia. It is likely that some structural complexity has caused these better grades and the trend to increasing hydrothermal alteration in this area. However, whether this complexity is fracture preparation, irregularities in the intrusive contact or even an unroofed satellitic intrusion is unknown.

   The attitude of the mineralization, is unknown. The dip of the mineralization is unknown; even the dip of the stock is unknown, although Peto suspects that it may dip steeply to the west. One suspects a northerly or northeasterly strike parallel to the eastern contact of the stock; however, the drill results do not necessarily support this conclusion; the mineralized zone could also extend westward from hole 54303 around the southern end of the acidic center into the overburden area between holes 54303, 54309, 54304. The mineralization of hole 54308 has also not been delimited to the east.

RECOMMENDATIONS

1. The good grade mineralization found in holes 54303 and 54308 must be delimited by further drilling. For this purpose, a Long Year Super 38 is recommended, using BQ or NQ core. This drill would be capable of going to 2000 feet if necessary.

2. The limits and attitudes of the mineralized zone on section 00 should be established. For this purpose, one could drill a hole inclined about 45° east and collared between 300 to 400 feet west of the collar of hole 54303. The advantage of this set up is that one could then drill a hole inclined 45° south to determine whether the mineralization passes around the south side of the acidic central part of the Intrusive Complex. These two holes would also investigate the area of widespread overburden mentioned under "CONCLUSIONS". The second possibility is to set the drill up near or at the collar of hole 53408. This hole, presently at 630', could be extended to 1200'. As the original hole is drilled with A core size and the new holes will drill with B or Q core size, it may be necessary to re-drill the original hole or to ream it and extend it. These two alternatives should be investigated as to relative costs. In re-drilling the hole, one would have the advantage of a second intersection in the vicinity of the highest grade hole. This would be important to a geologist on the job who is trying to estimate grades of molybdenum and copper. From the same site, another inclined hole could be drilled easterly to delimit the mineralized zone on its east. The depth of this hole will depend on the estimates of field geologist of the molybdenum and copper content. Another intersection could be obtained from this same collar below

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the present hole 54308 with an inclination of 60° to 70° westerly. Such a hole should be in the order of 1200'. The advantage of drilling from this site is that one would start at a lower elevation and presumably intersect less of the relatively barren, acidic central part of the Intrusive Complex.

3. The results of the drilling along section 00 will determine the location of subsequent holes. However, for the purpose of budget estimates, I will suggest another east-west section of drill holes 400' to 600' to the north and another section about 600' to the south (along the same section as hole 54304). If topography will permit, it will be best to collar these holes near the foot of the step cliffs rather than on top of the hill.

4. For the purposes of the budget, one should allow a minimum of 3000' for section 00; 2000' for section 4 + 00 north; and about 2000' for section 6 + 00 south. Minimum footage contracted for should be about 6000'; minimum budget should allow for 7000' with the option of increasing it to 10,000' in the first season should enough encouragement be obtained in the initial 6000' or 7000'.

5. In conjunction with the drilling to delimit the better grade mineralization in the vicinity of hole 54308, one must give some further consideration to the remainder of the Intrusive Complex. Although the drilling done in the northeast and the western parts of the Intrusive Complex have been discouraging, the drilling has not been sufficient to completely write off this part of the property. Further appraisal of the data should be part of the program. Additional rock geochemistry and possibly even a selected few shallow drill holes may be necessary.

6. Following are a few suggestions on exploration techniques for porphyry deposits:

   a. Generally rock geochemistry is preferred to soil geochemistry if sufficient outcrops are available. In places on tops of mountains felsenmeer can sometimes also be used. Rock geochemistry is less subject to a number of weathering variables and it is generally more definitive in pointing to a target.

   b. When collecting rock chip samples from the surface, always retain a good hand specimen. This can then, if needed, be used for further examination of the rock types or for petrographic work. Such specimens should be saved until work on the property has been completed as they are as valuable as core.

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c. A geochemical map should always have the values, even if there are symbols for various value ranges. This allows an exploration geochemist or geologist to readily detect mistakes in analytical analyses; it allows other geologists to interpret the values according to their own methods; and it is required when submitting such reports for assessment work.

d. In porphyry-copper exploration, rock types and the alteration are very important. Even the experienced porphyry copper geologist often misnames or misinterprets such features until he can check them by some petrographic work. Thus it is necessary to split the core and retain half the core rather than analyze the complete core retaining only a skeleton selection. Splitting of the core need not introduce sampling errors if it is done carefully. Moreover, should a deposit of possible ore grade be encountered, the initial drilling will be checked by considerable more drilling with a greater core size. For this subsequent drilling, all of the core can be used for analyses and extraction tests.

November 9, 1981

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APPENDIX I

NOTES FROM ALTERATION STUDIES

Borehole 54302 @ 101.6'

Section 54302-101.6': Probably a leucocratic porphyry or possibly a quartz-feldspar porphyry dyke. Plagioclase is altered to kaolinite plus sericite varying in places from low to almost complete alteration. A quartz veinlet is present and it may have some associated secondary hydrothermal K-feldspar; however, this could also be late magmatic K-feldspar. There is minor secondary fine-grained biotite. About 60% of the biotite has been altered to chlorite plus calcite plus opaques.

Section 54302-117': Alaskite. In places there is slight alteration of the plagioclase to sericite plus clay.

Section 54302-131': Granodiorite. All of the minerals are fresh including the plagioclase, biotite, and hornblende.

Section 54302-280': This is hornfels containing fragments. It is in contact with some granodiorite which has minor clay dusting on the plagioclase.

Section 54302-201': Alaskite. Cut by quartz veinlets and stained in the lab by H.F. There is some sericite-clay alteration on some of the plagioclase.

Section 54302-284.4': This is from a quartz-feldspar porphyry dyke. The plagioclase is nearly all fresh. There is some biotite alteration of hornblende and there is up to 25% alteration of biotite and up to 100% alteration of hornblende to chlorite.

Section 54302-300': Monzonite with fresh plagioclase. The K-feldspar throughout is magmatic. There is some fine-grained biotite in places. Part of it is along fractures which cross plagioclase crystals and part of it is the replacement of hornblende. The primary biotite and most of the hornblende is fresh and has not been chloritized.

Section 54302-340': Monzonite. One end of the section, where there are some quartz veinlets, has been stained with H.F. The other end of the section shows magmatic K-feldspar and fresh plagioclase. The hornblende is largely replaced by fine-grained biotite.

Section 54302-359.5': This is a quartz-feldspar-porphyry dyke. Most of the phenocrysts of plagioclase, hornblende, and biotite are all fresh. At one end of the section there is some secondary, fine-grained biotite which occurs along fractures, around some of the plagioclase phenocrysts, and within some of the matrix.

Section 54302-404.7': This is alaskite with local, low to moderate, kaolinite-sericite alteration of some of the plagioclases. There are also some local patches of muscovite-calcite. These are probably altered biotite crystals.

Section 54302-409.5': This is probably a quartz-feldspar-porphyry dyke. The plagioclase has minor clay-sericite alteration in places and some of the biotite and hornblende phenocrysts are altered slightly to chlorite.

Section 54302-428': This is monzonite with fresh plagioclase and biotite and is also altered to fine-grained biotite in other places. There is no chlorite alteration of the mafic minerals.

Section 54302-495': Probably granodiorite generally with fresh plagioclase. This plagioclase has minor sericite with clay alteration near quartz veinlets. Fine-grained biotite occurs in a fracture which crosses a plagioclase phenocryst; it also replaces some of the hornblende. K-feldspar replaces part of the plagioclase. Abundant fine-grained biotite in one end of the sections is associated with K-feldspar and both of these appear to be hydrothermal. There is a crushed zone or veinlet with fine-grained biotite and some fine-grained (or crushed) K-feldspar with abundant carbonate.

Section 54304-70': Granodiorite. Some rims of K-feldspar on plagioclase crystals may be late magmatic. Quartz veinlets occur with associated K-feldspar. There is minor sericitization of plagioclase near the quartz veinlets. There is some biotite alteration of hornblende and minor chloritization of biotite.

Section 54304-90': Granodiorite which is generally fresh. There is minor clay dusting and some scattered sericite on the plagioclase crystals and the hornblende is partly altered to secondary biotite. One end of the section has an area of secondary K-feldspar which has no associated quartz veinlet. There is, however, abundant secondary biotite and some sericitization of the plagioclase near this K-feldspar.

Section 54304-270': Granodiorite which has fairly pervasive and widespread slight alteration of the plagioclase to sericite-clay. Much of the hornblende has been altered to secondary fine-grained biotite and much of the biotite is altered to chlorite. A veinlet of quartz-sulphide-carbonate with irregular selvages of K-feldspar and sericitized plagioclase cuts the section.

Section 54304-290': This is biotite hornfels which is described elsewhere.

4-317'

Section 54304-317: This is also biotite hornfels.

Section 54304-356': Granodiorite with generally fresh unaltered crystals. This is cut by a K-feldspar-pyrite veinlet. Adjacent to the veinlet the plagioclase is sericitized and the biotite is altered to chlorite.

Section 54304-396': This is granodiorite cut by some mylonite (?) veinlets. A biotite veinlet cuts the section and adjacent to it the plagioclase is altered. The sericitization of plagioclase is low away from the veinlets.

Section 54304-454': This is an unusual rock and could be a completely altered fine-grained hornfels:

Section 54304-486': A quartz-feldspar porphyry dyke with an erratic matrix (variations in crystal size). In places the plagioclase phenocrysts are altered to secondary biotite and clay. This is very unusual and is the only section noted with secondary biotite alteration of plagioclase. Quartz veinlets with coarse K-feldspar selvages and with some carbonate occur. Biotite and biotite after hornblende are largely altered to chlorite.

Section 54308-25': Monzonite with good hydrothermal alteration. There is a quartz veinlet with associated K-feldspar; however, in large parts of the section there are late magmatic, poikilitic crystals. The plagioclase generally has slight alteration to sericite-clay, but this is moderate to high near the quartz veinlet. (Moderate alteration would be 30 to 50%). There is secondary biotite with carbonate in a veinlet. Some of the hornblende crystals have been completely replaced by biotite, carbonate and opaques. The biotite and hornblende are altered to chlorite in a few places.

Section 54308-85': Quartz latite porphyry - quartz monzonite porphyry with matrix slightly coarser than the quartz latite. A quartz veinlet contains some secondary K-feldspar and this K-feldspar also replaces the adjacent parts of plagioclase crystals. The plagioclase crystals are moderately to highly altered to sericite plus kaolinite near the vein, but, this decreases to unaltered crystals away from the vein. Biotite is completely altered to chlorite and some carbonate near the veinlet and moderately to highly altered in the rest of the section. The hornblende and also some of the secondary biotite in veinlets is also altered to chlorite and carbonate.

Section 54308-105': This is the same as the quartz latite-quartz monzonite porphyry of section at 85 feet but the biotite is largely fresh. There is less secondary K-feldspar, but more alteration of plagioclase to sericite. The sericite also occurs in the veinlet. Hornblende has been altered to biotite and this in turn has been altered to chlorite.

Section 54308-215': This is monzonite and it is unusual in that the plagioclase crystals have been completely altered to kaolinite plus some carbonate. The plagioclase of the matrix has been altered to kaolinite, carbonate and sericite. The large poikilitic K-feldspar crystals are late magmatic; however, the K-feldspar also occurs as a selvage to quartz veinlets. Biotite veinlets are present as well as quartz-K-feldspar-carbonate-pyrite veinlets.

Section 54308-255': This is a monzonite cut by a veinlet of quartz-carbonate-K-feldspar-pyrite. Adjacent to the veinlet, the plagioclase has been sericitized. There is secondary biotite replacing much of the hornblende. Near the veinlet the biotite and hornblende are chloritized, but, throughout the rest of the section, the biotite is mostly fresh.

Section 54308-395': Monzonite cut by a veinlet of quartz-K-feldspar-sulphide plus biotite. The K-feldspar in the veinlet is very coarse grained. Throughout the section there is carbonate-sericite-chlorite alteration in patches. In places in the section there is low to moderate alteration of the plagioclase to sericite plus carbonate.

Section 54308-415': This is monzonite with patches of secondary K-feldspar. The plagioclase is highly altered to sericite. Biotite with some quartz occurs in veinlets and the secondary biotite is partly altered to chlorite.

Section 54308-535': This is a monzonite which is cut by a veinlet of quartz-K-feldspar-sulphide-carbonate, also containing some chloritized secondary biotite. There is abundant secondary biotite in one end of the section and some of this is chloritized.

Section 54308-630': Granophyre from core logged as pegmatitic stringers. The granophyre is in contact with monzonite and both are cut by quartz veinlets. These quartz veinlets have associated K-feldspar and secondary biotite. The plagioclase in the monzonite is sericitized.

Section W81-481': This is a surface specimen from the intrusive complex collected at 15+00N, 7+6E. It is the quartz latite porphyry specimen on which the classification has been based. It resembles the rocks collected in the southern dyke. Whether or not the dyke passes through this area of the stock or whether or not this is typical of most of the central stock is not known. Most of the phenocrysts of biotite, plagioclase and hornblende are fresh; however, a few plagioclase phenocrysts are partially sericitized. Some of the hornblende is altered to biotite and some of the biotite is altered to chlorite plus carbonate.

Section W81-483': This is another specimen of the porphyry collected at 16+20N, 8+30E. It is a crowded porphyry and, because of its fine-grained phaneritic matrix, it is called quartz monzonite porphyry. The large K-feldspar megacrysts do not show up in the hand specimen or the thin section. The only alteration is in some hornblende which has gone to biotite and some biotite which has gone to chlorite.

Section W81-486': This could be monzonite. However, it has less K-feldspar and more interstitial quartz than normal and therefore is approaching the granodiorite. It is essentially unaltered. (15+00N/7+60E)

Section 10N - 15E (A): This is another section of the quartz monzonite porphyry. It is in contact with alaskite (?). There is no hydrothermal alteration.

Section 10N - 15E (B): This is probably alaskite cut by a quartz veinlet. Much of the hornblende is altered to biotite and some of the biotite has been chloritized. The plagioclase is sericitized.

Section 25N - 10E: This is a contact between basalt and tuff. Both have been metamorphosed to biotite hornfels.

P.P.R.-150: This is the specimen collected from the dyke extending (37+00S/2+50E).

south from the main intrusive complex. It is part of the series of samples and specimens collected by Peto for the rock geochemistry study. The rock is the quartz latite porphyry with a very fine-grained matrix. The plagioclase phenocrysts throughout the section shows pervasive alteration to low or moderate amounts of sericite and clay. The mafic minerals are completely altered to chlorite, carbonate and opaques.

P.P.R.-155: This is also the quartz latite porphyry with the fine-grained aphanitic matrix. The plagioclase phenocrysts are fresh but the mafics are mostly altered to chlorite plus opaques. (19+00S/4+00E)

P.P.R.-156: This is the quartz latite porphyry. Most of the plagioclase phenocrysts are fresh; however, some are partly altered to sericite. The mafics vary in alteration from slight to high in chlorite plus opaques. (14+00S/4+50E)

P.P.R.-157: Probably granodiorite, but less interstitial quartz than the core specimens that have been examined. There is minor chlorite alteration of the mafic minerals; however, the plagioclase is fresh. (11+00S/5+00E)

P.P.R.-158: Granodiorite generally with fresh plagioclase but with some sericitization of plagioclase in parts of section. Some of the hornblende is altered to biotite and subsequently to chlorite. (9+00S/3+00E)

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
10,369

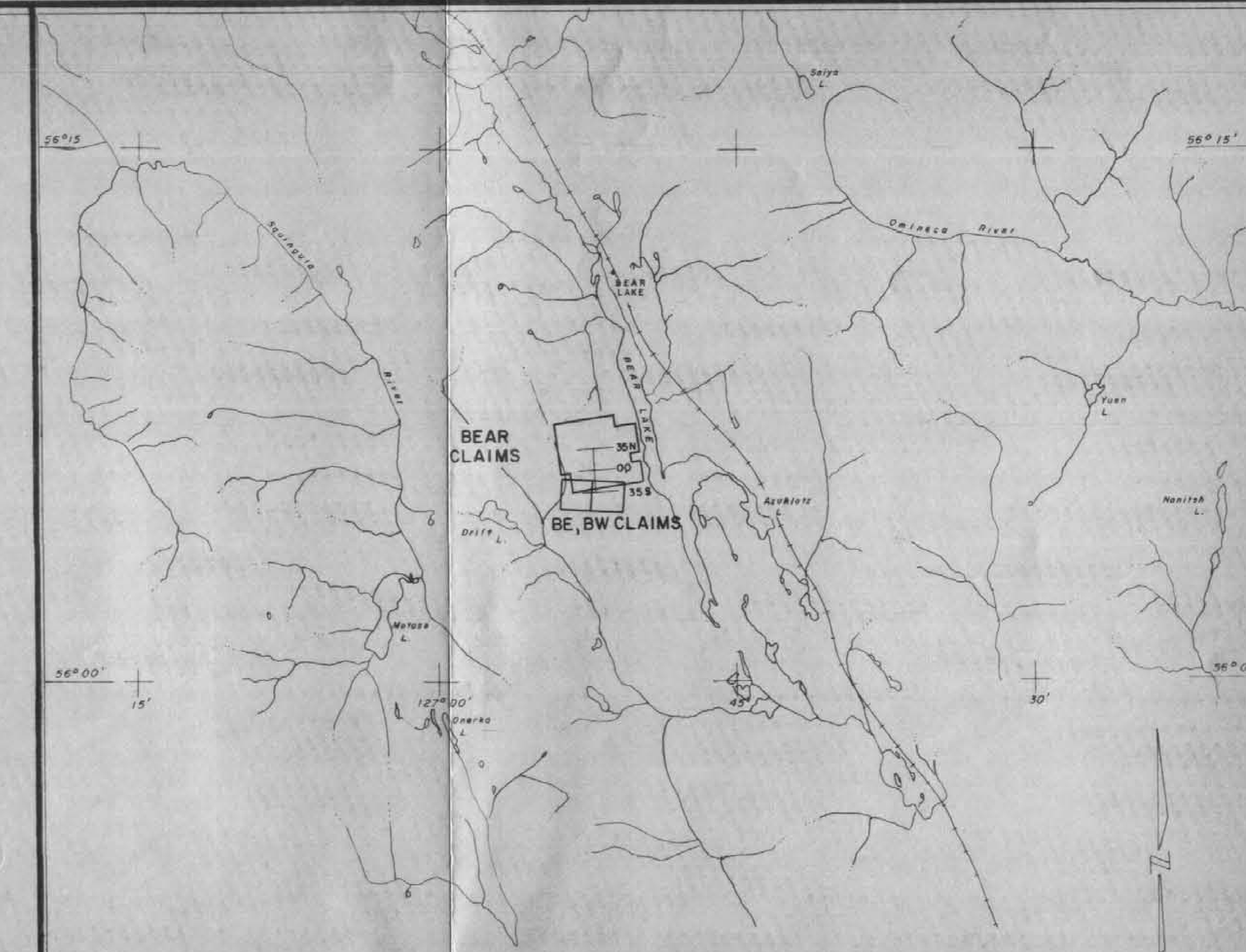
Quarterly of the Colorado School of Mines
Volume 50, Number 1

CLASSIFICATION OF IGNEOUS ROCKS

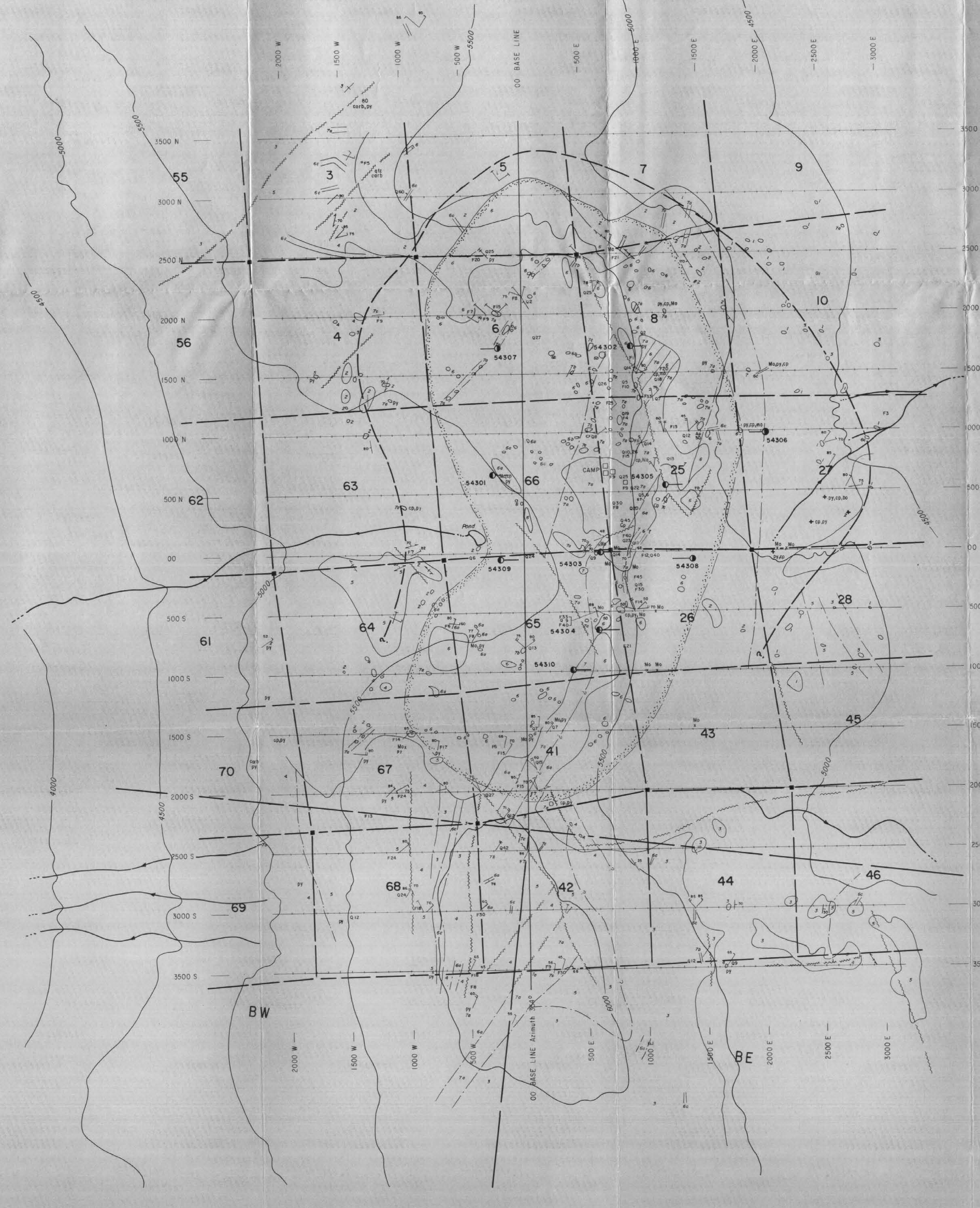
Russell B. Travis

ESSENTIAL MINERALS	POTASH FELDSPAR > ⅔ TOTAL FELDSPAR			POTASH FELDSPAR ⅓ – ⅔ TOTAL FELDSPAR			PLAGIOCLASE FELDSPAR > ⅔ TOTAL FELDSPAR						LITTLE OR NO FELDSPAR		SPECIAL TYPES
							POTASH FELDSPAR >10% TOTAL FELDSPAR	POTASH FELDSPAR <10% TOTAL FELDSPAR							
								SODIC PLAGIOCLASE		CALCIC PLAGIOCLASE					
	QUARTZ >10%	QUARTZ <10% FELDSPATHOID <10%	FELDSPATHOID >10%	QUARTZ >10%	QUARTZ <10% FELDSPATHOID <10%	FELDSPATHOID >10%	QUARTZ >10%	QUARTZ >10%	QUARTZ <10% FELDSPATHOID <10%	QUARTZ <10% FELDSPATHOID <10%		FELDSPATHOID >10% PYROXENE >10%	CHIEFLY PYROXENE AND/OR OLIVINE	CHIEFLY FERRO-MAGNESIAN MINERALS AND FELDSPATHOIDS	
CHARACTERIZING ACCESSORY MINERALS	CHIEFLY: HORNBLENDE, BIOTITE, PYROXENE, MUSCOVITE ALSO: SODIC AMPHIBOLES, AEGIRINE, CANCRINITE, SODALITE, TOURMALINE			CHIEFLY: HORNBLENDE, BIOTITE, PYROXENE ALSO: SODIC AMPHIBOLES, AEGIRINE			CHIEFLY: HORNBLENDE, BIOTITE, PYROXENE (IN ANDESITE) ALSO: PYROXENE, FELDSPATHOID, SODIC AMPHIBOLES			CHIEFLY: PYROXENE, URALITE, OLIVINE ALSO: HORNBLENDE, BIOTITE, QUARTZ, ANALCITE, AEGIRINE, SODIC AMPHIBOLES			CHIEFLY: SERPENTINE, IRON ORE ALSO: HORNBLENDE, BIOTITE	HORNBLENDE BIOTITE IRON ORE	
COLOR INDEX	10	15	20	20	25	30	20	20	25	50		60	95	55	
AVERAGE CHEMICAL COMPOSITION (DALY) SiO_2	71.5	60.4	56.0	66.8	57.0	54.1	65.3	61.0	58.2	48.6		47.4	41.1	42.0	
Al_2O_3	14.0	17.0	19.2	15.8	17.1	21.0	16.1	16.2	17.0	16.8		15.4	4.8	17.9	
Fe_2O_3	1.5	2.7	2.9	2.3	3.4	1.8	2.1	2.5	3.2	4.8		4.9	4.0	5.7	
FeO	1.4	2.9	1.6	1.3	3.6	3.3	2.3	3.8	3.7	6.0		5.4	7.1	5.7	
MgO	0.6	1.8	0.6	1.0	2.3	1.1	1.7	2.8	3.5	5.1		5.0	32.2	3.4	
CaO	1.6	3.7	2.0	2.8	5.4	3.2	3.9	5.4	6.3	8.9		9.7	4.4	10.3	
Na_2O	3.4	4.2	8.5	3.7	4.7	6.2	3.8	3.4	3.5	3.7		3.8	0.5	8.0	
K_2O	4.3	5.1	5.3	4.2	3.7	5.9	2.7	2.1	2.1	1.9		3.5	1.0	2.4	
PHANERITIC — EQUIGRANULAR Batholiths, lopoliths, stocks, large laccoliths, thick dikes, and sills.	GRANITE ALASKITE—few dark minerals GRAPHIC GRANITE—graphic texture ALKALI GRANITE—abundant albite and sodic amphibole or pyroxene CHARNOCKITE—with orthopyroxene LUXULLIANITE—tourmalinized	SYENITE QUARTZ SYENITE—a little quartz ALKALI SYENITE—no plagioclase except albite PULASKITE—a little nepheline NORDMARKITE—a little quartz LARVIKITE—with "blue" feldspar SHONKINITE—abundant FeMg minerals	NEPHELINE SYENITE LEUCITE SYENITE—pseudoleucite only feldspathoid SODALITE SYENITE—sodalite only feldspathoid FOYAITE—abundant feldspar MALIGNITE—abundant FeMg minerals DITROITE—with nepheline and sodalite	QUARTZ MONZONITE (ADAMELLITE)	MONZONITE	NEPHELINE MONZONITE	GRANODIORITE	QUARTZ DIORITE (TONALITE)	DIORITE	GABBRO GABBRO—with clinopyroxene NORITE—with orthopyroxene OLIVINE GABBRO—with olivine TROCTOLITE—olivine and plagioclase only ANORTHOSITE—plagioclase only QUARTZ GABBRO—with quartz	DIABASE (Dolerite of British) Phaneritic diabasic texture, normally medium or fine-grained	THERALITE ESSEXITE NEPHELINE GABBRO TESCHENITE—analcite only feldspathoid OLIVINE THERALITE—with olivine	PERIDOTITE PERIDOTITE—clinopyroxene and olivine HARZBURGITE—orthopyroxene and olivine PICRITE—pyroxene and olivine with some plagioclase DUNITE—olivine only PYROXENITE—pyroxene only SERPENTINE (SERPENTINITE)—chiefly serpentine	MISSOURITE—pyroxene, olivine, and pseudoleucite IJOLITE—pyroxene and nepheline FERGUSITE—pyroxene and pseudoleucite UNCOMPAHGRITE (MELILITE PYROXENITE)—pyroxene and melilite	PEGMATITE—phanerocrystalline, normally silicic, dike rock (or small irregular mass) having a conspicuously coarser texture than parent. APLITE—phanerocrystalline rock having sugary (fine-grained allotriomorphic-granular) texture. LAMPROPHYRES—dark dike rock with conspicuous FeMg phenocrysts and/or FeMg minerals in groundmass.
PORPHYRITIC — PHANERITIC GROUNDMASS Laccoliths, dikes, sills, plugs, small stocks, margins of larger masses.	GRANITE PORPHYRY	SYENITE PORPHYRY	NEPHELINE SYENITE PORPHYRY	QUARTZ MONZONITE PORPHYRY	MONZONITE PORPHYRY	NEPHELINE MONZONITE PORPHYRY	GRANODIORITE PORPHYRY	QUARTZ DIORITE PORPHYRY	DIORITE PORPHYRY	GABBRO PORPHYRY		THERALITE PORPHYRY	PERIDOTITE PORPHYRY KIMBERLITE—peridotite porphyry or breccia		
PORPHYRITIC — APHANITIC GROUNDMASS Dikes, sills, laccoliths, surface flows, margins of larger masses, welded tuffs.	RHYOLITE PORPHYRY	TRACHYTE PORPHYRY	PHONOLITE PORPHYRY	QUARTZ LATITE PORPHYRY	LATITE PORPHYRY	NEPHELINE LATITE PORPHYRY	DACITE PORPHYRY		ANDESITE PORPHYRY	BASALT PORPHYRY		TEPHRITE PORPHYRY	LIMBURGITE PORPHYRY		
APHANITIC — MICROCRYSTALLINE Dikes, sills, surface flows, margins of larger masses, welded tuffs.	RHYOLITE	TRACHYTE	PHONOLITE LEUCITE PHONOLITE (Leucite trachyte)—leucite only feldspathoid TINGUAITE—abundant aegirine WYOMINGITE—leucite and phlogopite	QUARTZ LATITE (DELLENITE)	LATITE (TRACHY-ANDESITE)	NEPHELINE LATITE	DACITE		ANDESITE	BASALT OLIVINE BASALT—with olivine ANALCITE BASALT—with analcite QUARTZ BASALT—with quartz OCEANITE—with abundant olivine		TEPHRITE LEUCITE TEPHRITE—leucite only feldspathoid BASANITE—with olivine LEUCITE BASANITE—with olivine and leucite	LIMBURGITE	NEPHELINITE—pyroxene and nepheline LEUCITITE—pyroxene and leucite MELILITITE—pyroxene and melilite OLIVINE NEPHELINITE (NEPHELINE BASALT)—pyroxene, nepheline, and olivine ETC.	TRAP—dark-colored aphanitic rock. FELSITE—light-colored aphanitic rock.
APHANITIC — GLASSY Surface flows, margins of dikes and sills, welded tuffs.	OBSIDIAN—black PITCHSTONE—resinous VITROPHYRE—porphyritic PERLITE—concentric fractures PUMICE—finely cellular, light colored SCORIA—coarsely cellular, dark colored			Normally it is not possible to determine the composition of these rocks. They are customarily designated by the names at the left of this column. Basic glass is rare so rocks named, except scoria, will normally be silicic. If the approximate composition (by close association) or silica content (by refractive index or analysis), can be determined, the name may be prefixed by the name of the appropriate aphanitic rock, for example, "trachyte obsidian," or "latite vitrophyre." In general, scoria is basic, basic obsidian is called "tachylite", and spherulitic tachylite is "variolite."											

FREQUENCY OF OCCURRENCE:
This size type indicates COMMON ROCKS.
This size type indicates UNCOMMON ROCKS.
This size type indicates RARE ROCKS.



Location Map
BEAR CLAIMS, GROUPS A,B&C, BE, BW CLAIMS
Omineca Mining Division, British Columbia
NTS. 94/D
SCALE 1:250,000



LEGEND

EOCENE — KASTBERG INTRUSIONS

926 | 7 | Monzogranite dykes - 7a Quartz-feldspar porphyry, 7b Quartz porphry, 7c Aplite

BABINE (?) INTRUSIONS

925 | 6 | Monzodiorite stock - 6a Monzodiorite, 6b Quartz monzodiorite, 6c Plagioclase porphyry.

MIDDLE JURASSIC — HAZELTON GROUP (VOLCANIC HOST ROCK)

913 | 5 | Felsophyric flows (rhyolite)
910 | 4 | Vesicular, melanophyric flows (andesite)
912 | 3 | Volcaniclastic greywackes, breccias (rhyodacite)
905 | 2 | Crystal-lithic tuff (lapilli tuff)

UPPER TRIASSIC — TAKLA (?)

907 | 1 | Greenschist (metabasalt)

- Geological Contact - defined, assumed (approximate)
- Outcrop
- Fault
- Strike and Dip of Bedding inclined, vertical, dip unknown
- Strike and Dip of Foliation (schistosity) - inclined, vertical, dip unknown
- F15 Fracture, Fracture Density (F) = fractures/meter
- Q25 Quartz Veining, Quartz veins, veinlets (vlts) Density (Q) = vlts/meter
- Dyke
- Drainage
- 5000 Elevation Contour (in feet)
- x Float
- ■ Claim Post
- Cp Chalcopyrite
- Py Pyrite
- Mo Molybdenite
- Monzodiorite-volcanic Contact Zone
- Limit of bio-hornfels zone (approx.)
- 54307 Diamond Drill Hole and Number

SCALE
100 0 100 200 300 400 500
METRES

NOTE:
Geology based on mapping by E. Hunter (Conico), 1973 with additional mapping and modifications by P. Peto, R. Arthur 1981
Grid co-ordinates are Imperial (feet)

Canadian Nickel Company Limited		Copper Cliff, Ontario POM 1NO	
GEOLOGY MAP		SHEET 1	FIGURE
Project: BEAR, BE, BW CLAIMS		Area: OMINECA MINING DIVISION, BC.	
Supervisor: E.J. Debicki	Instrument:	Survey date: July /81	
Compiled by: P. Peto, R. Arthur	Drawn by: RMK	Date drawn: Sept. /81	Revised:
Scale: 1:5000	File:	N.T.S. 94 D 2 W	