

Prop. Sub.
Mt. Davidson

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MEMO TO: Dr. A. E. Aho
Mr. A. Kulan
Mr. R. E. G. Davis

FROM: E. O. Chisholm

DATE: December 15, 1966.

The attached information regarding an interesting porphyry copper occurrence on Mount Davidson near Squamish was given to me by Lee Gauvreau, a promotional engineer for Grasset Lake. Lee showed me some samples of the material which contained 1/2 inch blebs of bornite and some chalcopryrite in a sericitized monzonite or alaskaite. The ~~similar monzonite~~ which is the host rock of the deposit was apparently overlooked by the major mining companies in their search for porphyry copper. I will keep an eye on this situation in case it develops any major potentials.

SMALL 1/4 MILL
(2-1/2 MONZONITE)
STOCK

Discovery In B.C. Of Copper-Moly For Grasset Lake

Development of a large tonnage, low grade copper-molybdenum deposit is the goal of Grasset Lake Mines in a program just nicely getting under way on a recently-acquired property in British Columbia.

In preparation for an induced polarization survey, crews are busy laying out a grid system on the ground, covering the area believed to include a favorable geological feature.

This geological feature is described as a monzonite porphyry plug, well altered by quartz and sericite, intruding an area of biotite granite. The porphyry intrusive is mineralized by disseminated blebs of bornite, chalcopyrite and molybdenite. The mineralization is marked by an absence of pyrite or pyrrhotite. Where exposed on surface, it is apparent that leaching has taken place, leaving rusty stains to mark the remnants of the original mineralization. The porphyry mass has been traced on surface over a length of 2,400 ft. and across widths up to 1,300 ft. Another exposure some 1,000 ft. to the north suggests possible continuity in this direction, L. F. Gauvreau, president, commented.

Some 16 individual but narrow veins of quartz, heavily mineralized, occur within the main porphyry mass, but these are looked upon as possible sweeteners and not as prime sources of copper or molybdenum. Grasset Lake intends to examine the main mass with a view to determining overall average grade and tonnage, except that if a specific area appears more interesting as a smaller but higher grade section, it may be considered separately.

Gold And Silver

A number of samples taken from the deposit have returned values ranging between 0.2% and 0.9% copper, and 0.015% and 0.09% molybdenite (MoS_2). In addition, gold content ranges from 15¢ to 40¢ per ton and silver between 0.5 and 2.0 ozs. per ton.

The showing lies on the east slope of Mount Davidson, at an elevation between 4,500 ft. and 5,000 ft. above sea level. The area is not covered with overburden, Mr. Gauvreau commented, and should lend itself to exploration without undue difficulty. It lies about three miles east of Salmon Inlet, an extension of Jervis Inlet, about 12 miles due west of Britannia Beach. Electric power and tidewater are within three miles of the property.

Grasset Lake purchased a 51% interest in the original group of eight claims covering the showing. It also holds an option on a further 41% interest and has first right of refusal of the vendors' interest of 8%. In addition, it staked 16 adjoining claims, bringing the total group to 24 claims. Crews are currently staking additional ground, to cover the possible extension of the zone to the northwest.

The induced polarization survey is expected to pinpoint definite drill targets and may pick up possible concentrations of mineralization at greater depth. It is anticipated that an extensive drilling program will be required, possibly starting this year, regardless of the outcome of the geophysical work.

All required assessment work has been completed on Grasset Lake's Nevada property, a low grade gold-silver proposition and work has been suspended. This project may remain in abeyance in view of the program anticipated in British Columbia.

No further work is planned for the immediate future on ground held in Pardee Twp., Northwestern Ontario. A deep hole, to 1,450 ft., was completed, cutting two favorable zones but failing to find copper-nickel values. The property is held in good standing. Developments at neighboring properties are to be watched.

Grasset Lake has about \$80,000 cash in its treasury. Options are outstanding on two blocks of 100,000 shares each, at prices of 40¢ and 50¢ per share, respectively. Of the 5,000,000 authorized shares, 2,465,005 are issued.

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GRASSET LAKE MINES LIMITED

ZEL GROUP

MOUNT DONALDSON

BRITISH COLUMBIA

TORONTO, ONTARIO
November 8, 1966

R. BRUCE GRAHAM, Ph.D., P. Eng.
Consulting Geologist

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY.....	(i)
INTRODUCTION.....	1
LOCATION AND ACCESS.....	1
PROPERTY.....	1
TOPOGRAPHY.....	2
PREVIOUS WORK.....	2
REGIONAL GEOLOGY.....	3
GEOLOGY OF THE PROPERTY.....	3
STRUCTURE.....	4
SULPHIDE MINERALIZATION.....	5
CONCLUSIONS.....	8
RECOMMENDATIONS.....	9
ESTIMATE OF COST.....	10
CERTIFICATE.....	11

S U M M A R Y

The Grasset Lake Mines, Zel Group, consists of 24 contiguous claims situated twelve miles north-northeast^{ly} from Britannia Beach, British Columbia.

A copper-bearing muscovite granite mass in biotite granite has been traced for a length of 2,400 feet and a width of 1,200 feet. The long axis of this mass strikes north north-west and is still open to the north.

Field observations suggest that the muscovite granite has been barely unroofed by erosion and that it extends laterally in depth and to the north beyond its presently known limits.

The copper mineralization occurs as disseminations and in quartz veins. The copper minerals are chalcopyrite, bornite and chalcocite (?) with associated malachite. Low values in molybdenite and silver are consistently present.

Leaching has been extensive but it is unlikely that this will extend to appreciable depths.

In view of the large volume of copper-bearing material present, it is recommended that a program be instituted in order to determine the average tenor of this deposit.

As a first step it is recommended that an induced polarization survey be carried out. In view of the fact that the only sulphide mineralization present is copper sulphide, it is regarded that an indication of as little as 2 to 3% total sulphides would be significant. This program should be followed up by diamond drilling if positive results are obtained from the induced polarization survey.

GRASSET LAKE MINES LIMITED

ZEL GROUP

MOUNT DONALDSON

BRITISH COLUMBIA

INTRODUCTION

The Grasset Lake Mines Limited, Zel Group, was visited by the writer on October 28th and 29th, 1966. The examination was aided by helicopter which facilitated the examination of various points of interest on the property. Due to the limited time available, only a partial examination of Zel I, 2, 3, 4, 5, 9, 10, 19, and 20 was possible. Background information was obtained from:

Leszczyszyn, W., Geologic Report on the Zel Group,
August 23rd, 1965.

Leroy, O.E., Preliminary Report on a Portion of
the Main Coast of British Columbia
and Adjacent Islands, Can. Dept.
Mines, Geol. Surv. Branch. No. 996,
1908.

Ann. Rept., Geol. Surv. Can., Vol. III, Pt. II,
p. 102R, 1887-1888.

LOCATION AND ACCESS

The Zel Group is situated on Mount Donaldson, approximately 35 air miles north north-west of Vancouver. Access was gained by helicopter from Britannia, 12 miles distant. Access may also be gained via Salmon Inlet and the logging road along Sechelt Creek, which is fed by Slippery Creek, flowing out of Slippery Lake located in the central part of the property.

PROPERTY

The property consists of 24 contiguous claims numbered Zel 1 to Zel 24 inclusive.

TOPOGRAPHY

The maximum relief on the claims is 2,500 feet. Mount Donaldson with an elevation of 5000 feet and a second peak a mile to the north west with an elevation of 5,500 feet are the highest points on the property.

Four lakes are present. Slippery Lake, at an elevation of 3,800 feet, is the largest and measures approximately 1,800 feet by 700 feet. Smithe Lake lies 1,700 feet to the west at an elevation of 4,600 feet and measures 1000 feet by 600 feet. A small lake at an elevation of 4,300 feet lies 800 feet north of Slippery Lake and is 200 feet in diameter. Two other lakes in the south-west corner of the claim group lie at an elevation of 4,500 feet and are respectively 700 feet and 200 feet in diameter. These lakes are glacial depressions with relatively steep walls and rounded ridges.

There is sparse stunted spruce and cedar growth on the ridges. Below 4,600 feet there is sporadic but locally fairly dense growth of spruce, cedar and balsam.

PREVIOUS WORK

Copper was discovered in the vicinity of Mount Donaldson about 1874. Work was carried out intermittently between 1877 and 1883 during which time three adits were driven on vein-type copper deposits. One adit is located on the west shore of Smithe Lake. This adit was driven for a length of 88 feet and the reported average grade from the vein is 8.26% Cu, 2.9 oz. Ag per ton, and 0.10% molybdenum for an average width of 2.8 feet.

The second adit lies 1,600 feet to the north at an elevation of 4,350 feet. This adit was driven along a vein similar to that in the previously described adit. The average tenor of this vein is not known. The third adit was not located.

In addition to the above, some trenching and stripping has been

carried out on two veins 800 to 900 feet north of Slippery Lake.

REGIONAL GEOLOGY

The bedrock formations of the area comprise part of the coast range batholith. They are leucocratic plutonic rocks of Cretaceous age and earlier.

GEOLOGY OF THE PROPERTY

The major rock unit on the property is biotite granite. This granite weathers grey. On the fresh surface it is friable, light grey in colour, and coarse grained. It consists of 50% grey feldspar, 40% quartz, and 10% biotite.

An area of hornblende diorite covering 1000 square feet, is situated on a ridge west of Slippery Lake. The hornblende diorite has either been assimilated by the granite or stems from a deeper magmatic core.

Extending north from Smithe Lake is a grey, equigranular, medium grained quartz-feldspar-muscovite or sericite rock. For descriptive purposes this rock will be referred to as muscovite granite. This interesting formation has not been delimited. Its long axis has been traced north north-west for 2,400 feet from the south shore of the lake and is still open to the north. At Smithe Lake it had a horizontal width of 1,200 feet. It has been observed through a vertical range of 650 feet.

The weathered surface is grey, and is characteristically pitted. The pits comprise 5 to 10% of the surface area and vary from 1/8 to 1/2 inch in diameter. The pits visible on the weathered surface are also present within the rock itself, imparting a somewhat porous texture. The pits are for the most part stained brown, but in some instances staining

is absent. Tallas at the foot of a cliff at the north west side of Mount Donaldson consists of relatively unweathered blocks. Pitting here is insignificant but blebs of partially to completely oxidized chalcopyrite and bornite occur instead.

The proportion of minerals present in the muscovite granite is:

Biotite	1 to 2%
Muscovite or Sericite	10%
Grey Feldspar	60%
Quartz	25 to 30%

Locally, 20% muscovite as books up to $\frac{1}{2}$ inch across are disseminated through the rock. The muscovite is frequently chloritized, stained brown, and contains minor finely disseminated chalcopyrite.

Aplite and dacite are characteristic minor intrusives. These dykes occur up to 2000 feet in length.

Quartz veins present on the property favour three directions, viz., striking east-west and dipping steeply south, striking east-west and dipping 40° to 65° north, and striking north and dipping 0° to 20° west.

In addition to the above, several quartz masses were observed. These are best developed at the north end of Mount Donaldson and at the north-west end of Smithe Lake.

STRUCTURE

Two sets of pronounced jointing have been developed in the biotite granite. One set strikes east-west plus or minus 15° and the other strikes between north 20° east and north 50° east. The former dips steeply north and the latter steeply north-west.

An aureole of contact breccia surrounds the muscovite granite. The contact breccia consists of blocks of biotite granite incorporated in the muscovite granite, the latter being finer grained than the main muscovite granite mass. In addition to the above are areas in the quartz masses in which a breccia structure is developed, the fragments being biotite granite and the matrix white quartz. Isolated areas of contact breccia within the muscovite granite are also present. This is suggestive that the muscovite granite has been barely unroofed..

Adjacent to the contact breccia is a zone of hybrid granite in which the feldspar is brown and both muscovite and biotite are present along with 40% to 50% quartz. This grades into normal biotite granite which becomes progressively more jointed peripherally away from the muscovite granite.

Associated with the jointing are dyklets and veinlets of quartz and aggregates of quartz and fine feldspar. These are more resistant to weathering than the enclosing biotite granite and impart a ribbed effect to the weathered surface.

SULPHIDE MINERALIZATION

The sulphide mineralization observed is comprised of chalcopyrite, bornite and chalcocite (?). Malachite and hematite are alteration products. Leszczyszyn reports pyrite, but none was observed by the writer. Assays show low but consistent amounts of molybdenite and silver.

The copper mineralization is confined mainly to the muscovite granite, although malachite staining in the biotite granite has been observed. In the latter instance the malachite stain is associated with the quartz and quartz feldspar injections associated with the jointing north of Slippery Lake.

The copper mineralization in the muscovite granite is best exposed on the tallus slope extending for 400 feet along the northeast end of Mount Donaldson on the west shore of Smithe Lake. Typically there is 2% to 3% chalcopyrite and bornite with possibly some minute grains of chalcocite. The chalcopyrite predominates. Locally muscovite books are developed up to $\frac{1}{2}$ inch in diameter which are somewhat chloritized, brown stained and containing fine chalcopyrite. These minerals occupy nuclear positions in brown stained areas. Away from the tallus slope only weathered surfaces are exposed, locally polished by glaciation. Here rust and malachite stain occur on fractures and joint planes. In places the fracture contain vugs lined with muscovite. As previously described, the granite is vuggy, and many, but not all, of the vugs, are iron stained. Samples chipped from the surface show trace amounts of chalcopyrite, bornite and possibly chalcocite in some of the iron-stained vugs.

The matrix of the contact breccia shows similar evidence of sulphide mineralization.

Random chip samples taken along a traverse extending for 1,500 feet from the north end of Smithe Lake to the north end of the summit of Mount Donaldson assayed 0.12% Cu, 0.017% MoS₂, 0.15 oz. per ton Ag and a trace of Au.

Five samples taken by Leszczyszyn from various horizons near and away from the adit vein at Smithe Lake gave the following results:

<u>Sample No.</u>	<u>Cu %</u>	<u>Mo%</u>
1	0.15	0.01
2	0.18	0.01
3	0.18	0.01
4	0.21	0.01
5	trace	trace

Samples 2, 3 and 4 were in close proximity to the adit vein at Smithe Lake.

Samples submitted by L. F. Gauvreau from the tallus slope area and near the adit vein gave the following results:

Description	%Cu	Assay Results		
		%MoS ₂	Au Oz/Tn	Ag Oz/Tn
Sample of Barren looking rock (inclusion) in muscovite granite with 1% limonite blebs and stains. Tallus	0.32	0.055	0.005	0.05
Sample of hybrid granite 3 to 4 feet from foot wall of adit vein. Visual molybdenite, 6% limonite blebs and stains with chalcopyrite	0.58	0.15	0.05	2.10
Sample from hanging wall adjacent to adit vein. 10% sulphides with some molybdenite	2.35	2.08	0.002	1.0
Sample from adit dump, bornite in quartz and muscovite granite	8.00	trace	0.015	2.70
5% limonite as blebs and stains in altered muscovite granite. No visible molybdenite. Tallus	0.19	0.01	trace	trace
6% sulphides and limonite. Sulphide mainly chalcopyrite with some bornite. 30' N. of adit	0.87	0.01	0.005	0.15
6% limonite blebs with chalcopyrite, bornite and malachite. Tallus	0.37	0.08	0.005	0.45

The copper mineralization contained in the veins occurs in both the muscovite granite and the biotite granite. These veins were not investigated in detail as the main purpose of the examination was to get as broad a picture as possible of the property during the time available. The following description is summarized from the report by Leszczyszyn.

Three sets of veins have been recognized on the property. These sets strike respectively east-west, dipping steeply south; east-west, dipping 40 to 65° north; and north-south and dipping 20° west.

The first described set is best developed on the property and is ex-

posed as four veins on the bluff west of Smithe Lake. Others occur west of Slippery Lake. The second set is exposed on the saddle north-east of Slippery Lake. The third set occurs just off the south-west end of Smithe Lake.

The longest strike length that has been recognized is approximately 900 feet, but generally the strike length is 300 feet or less. The veins vary in width but are mainly less than one foot wide.

The quartz in the veins is dominantly milky and translucent. Vugs and cavities are prevalent. These vugs contain copper minerals, muscovite flakes and are generally lined with stubby transparent quartz crystals. Muscovite is a characteristic accessory. The copper bearing minerals are, in decreasing order of abundance, bornite, chalcocite, cuprite, chalcopryrite, malachite and azurite. Molybdenite is also present.

CONCLUSIONS

An area of muscovite granite containing disseminated chalcopryrite and bornite with minor molybdenite, and chalcocite (?) and silver has been observed along a length of 2,400 feet, across a width of 1,200 feet, and vertically for 650 feet. The northern limit of this area has not yet been determined.

Copper bearing quartz veins are also present in the muscovite granite and in the biotite granite to the north-west of the muscovite granite.

The iron staining in cavities in the muscovite granite at and near the weathered surface strongly suggests that the copper mineralization has been leached from the surface. Leaching, if it once existed, has been removed by glaciation. It is probable that current leaching will only extend to a depth of five to ten feet. That leaching does occur is supported by the fact that in the material in the talus slope at the base of the

cliff on the west shore of Smithe Lake, the cavities are mainly filled with oxidized copper sulphides. The cliff face from which the tallus is derived has been protected to a greater degree from weathering and would more nearly represent fresh unleached material. Sampling here suggests tenors in the order of 0.5 % copper compared to 0.1 % copper from weathered surfaces.

The occurrence of isolated areas of contact breccia suggests that the muscovite granite has been barely unroofed by erosion.

The ribbing effect imparted to the biotite granite by quartz feldspar aggregates some 2,400 feet north-west of Smithe Lake could have its origin in the muscovite granite and is suggestive that the muscovite granite would plunge to the north. The presence of malachite along the joint planes associated with these injections and the copper bearing quartz veins further support this hypothesis.

The interpretation placed on the above observations indicates that the copper bearing muscovite granite could spread laterally at depth beyond its presently known limits.

A program is warranted on this large volume of copper-bearing material to determine the average tenor beneath any possible leaching effects.

RECOMMENDATIONS

As a first step it is recommended that an induced polarization survey be carried out. In view of the fact that the only sulphide mineralization present is copper sulphide, it is regarded that an indication of as little as 2% to 3% total sulphides would be significant.

This program should be followed by diamond drilling if positive results are obtained from the induced polarization survey.

An area 2000 feet wide extending north north-west for 3000 feet

from the north shore of Smithe Lake and south south-east for 1000 feet should be covered by this survey.

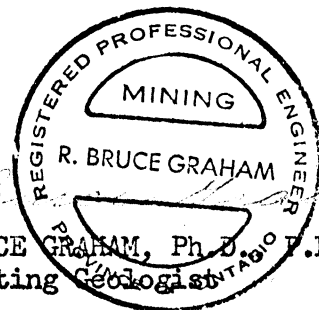
The induced Polarization survey should then be followed by a drill program. The extent of this program will to a large degree be contingent on the results of the geophysical survey. It is anticipated that a minimum preliminary program of 3,000 to 5,000 feet will be required, and financial provision should be made for such a program.

ESTIMATE OF COST

Survey Control	\$ 500.00	
Induced Polarization Survey	2,500.00	
Contingency for Diamond Drill Program, Preliminary Test - 3000 to 5000 feet	30,000.00	to 50,000.00
	<hr/>	<hr/>
TOTAL:	<u>\$ 33,000.00</u>	<u>to \$53,000.00</u>

Toronto, Ontario
November 8, 1966

R. Bruce Graham
R. BRUCE GRAHAM, Ph.D., P.Eng.,
Consulting Geologist



C E R T I F I C A T E

GRASSET LAKE MINES LIMITED

ZEL GROUP

MOUNT DONALDSON

BRITISH COLUMBIA

I, R. Bruce Graham, of the City of Toronto, County of York, Province of Ontario, hereby certify:

1. THAT I am a geologist and reside at 54 St. Leonard's Avenue, Toronto, Ontario.
2. THAT I received my technical training at the University of Manitoba (B.Sc.) and the University of Toronto (M.A., Ph.D.)
3. THAT I have been practicing my profession as a geologist for over twenty years.
4. THAT I am not an officer of the company, that I have no direct or indirect interest whatsoever in the mining claims, the subject of this report, nor do I have any direct or indirect interest in the securities of the company.
5. THAT the accompanying report is based on a personal examination of the property October 28th and 29th, 1966, and on the following:

Leszczyszyn, W., Geologic Report on the Zel Group,
August 23rd, 1965.

Leroy, O.E., Preliminary Report on a Portion of
the Main Coast of British Columbia
and Adjacent Islands, Can. Dept.
Mines, Geol. Surv. Branch. No. 996,
1908.

Ann. Rept., Geol. Surv. Can., Vol. III, Pt. II,
p. 102R, 1887-1888.

Dated at Toronto, Ontario,
November 8, 1966.

