

REPORT ON THE GEOLOGICAL SURVEY

of the

MAMIT LAKE MINING LTD. (N. P. L.) PROPERTY

Mamit Lake, B. C.

Nicola Mining Division
and
KAMloops Mining Division

Under Option to and Work Done by or on Behalf of

TECK CORPORATION LTD.

by

G. D. Ulrich, B.A. Sc.
and
J. M. Carr, P. Eng.

Claims: Nicola M.D.: MLM 12-15, 28, 30, 51-62, 67-75, 77-79, 81-84, 89-91,
93, 95, 97, 98, 100-102, 118, 119, 131-135, 137, 139,
146-149, 1-30, 33, 35, 45-50, 59-66; GCM 8-11, 24,
26, 47-52, 55, 56, 101-117, 120-130, 141, 143, 145,
Lee 6, Dude 5-6, Ed 1-5

Kamloops M.D.: MLM 136, 138, 140, GCM 142, 144

Location: Mamit Lake, B. C.
Lat. $50^{\circ}25' N$ Long. $120^{\circ}50' W$

July 20, 1972

Vancouver, B. C.



INTRODUCTION

The following report is based on field work carried out by consultants to Teck Corporation Ltd. during the 1972 field season. The work was completed on a 160 claim group in the Mamit Lake area of southern British Columbia owned by Mamit Lake Mining Ltd. (N.P.L.) and presently under option to Teck Corporation Ltd.

The programme consisted of detailed geological mapping with emphasis on alteration and structures. The nomenclature used for describing the lithic units was that generally accepted locally and based on the nomenclature developed by Dr. Northcote of the B. C. Dept. of Mines.

The programme was directed by Dr. J. M. Carr and supervised by R. Hindson of Teck Corporation Ltd. Field mapping was carried out by G. D. Ulrich, geologist, and G. Davidson, assistant, of W. Meyer & Associates Ltd.

LOCATION AND ACCESS

Teck Corporation Ltd. holds under option 160 contiguous mineral claims in the Mamit Lake area of southern British Columbia. The group covers an area of approximately 10 square miles on the west side of Mamit Lake in the Nicola and Kamloops Mining Divisions centered around Lat. $50^{\circ}25'$ N, Long. $120^{\circ}50'$ W.

The claim area is accessible by major highways to Merritt and north by 18 miles of good gravel road to the north end of Mamit Lake. From the turn-off at Mamit Lake the property is approximately 1/4 mile west. A system of 4-wheel drive roads on the property permits good access from the lake.

CLAIMS

A complete list of the 160 claims on which work is being applied is tabulated in Appendix 1. They include 155 claims in the Nicola Mining Division and 5 claims in the Kamloops Mining Division.



GEOLOGY

General

The property is underlain by the Gulchon Creek batholith and the Nicola Group. The eastern contact between the main batholithic mass and the Nicola Group occurs on the property. The "Gump Lake" phase of the batholith intrudes the Nicola further east on the claims.

The batholith was emplaced 198[±]8 years ago having an age of approximately Upper Triassic (B. C. Dept. of Mines, Bull. 56, 1969). It is a semi-concordant, composite pluton with several nearly concentric phases. The intrusion supposedly took place as a series of intrusions of a slowly crystallizing magma over a short period of time. Roof stoving of overlying rocks by the outer phases is evident. The phases become more acidic towards the core. This effect is due to contamination of the outer phases by basic rocks and fractional crystallization, leaving a more siliceous melt after each intrusive pulse of crystals and magma. The "Gump Lake" phase is a late siliceous phase which intrudes outside the contaminated rim of the main batholithic mass.

The Nicola Group (Triassic) is intruded by the batholith. On the property the Nicola has been metamorphosed due to the heat of the intrusion. The sedimentary rocks, mostly quartz-rich sandstones, have been granitized to form quartz-diorite and quartzite. The volcanics, originally massive basalt and andesite, have been dioritized to form a large area of hornblende diorite.

Lithology

The bedrock was mapped at a scale of 1" = 400' using the nomenclature of K. E. Northcote (B. C. Dept. of Mines, Bull. 56, 1969). The map units are described below:

1. Nicola Group (Triassic)

(a) Diorite (dioritized volcanics)

A large area of medium to fine grained diorite occurs in the southern part of the property. It is considered to be metamorphosed basalt or andesite of the Nicola Group. A gradational contact exists between the medium-grained diorite of the Nicola volcanics and the coarser grained diorite of the intrusive "Hybrid" phase.

The rocks of this unit have a composition of 40 - 60% dark plagioclase, 40 - 60% hornblende, little or no quartz, occasional biotite plates and 10 - 15% magnetite. The texture of the rock is allotriomorphic granular. The plagioclase is subhedral; the hornblende is anhedral and interstitial to the feldspar.

(b) Quartzite (granitized sediments)

North of the dioritized volcanics an area of metamorphosed sandstone occurs contacting the "Hybrid" phase of the Gulchon Creek batholith to the west and the "Gump Lake" phase to the east. The sediments appear to be part of the Nicola Group. The contacts are sharp with this unit and in some places they are associated with faulting. Between the "Gump Lake" and the sediments a thin area of quartz-biotite schist occurs. This is considered to be part of the "Hybrid" phase.

The quartzite is usually composed of 80% fine grained (medium sand size) sub-rounded quartz grains, some feldspar and biotite and a matrix which is either siliceous or calcareous. Other areas within the unit are more feldspar rich and better called graywacke. Sometimes biotite forms up to 15% of the rock giving it a definite granitic texture. These granitized sediments vary in texture and composition and are hard to distinguish from intrusive that is contaminated with siliceous material.

Wherever intrusives contact the sandstone, concentrations of pyrite occur in the sediments. The mineralization is disseminated and believed to be sedimentary iron remobilized by the fluids associated with the intrusive. The "Fiddler Prospect" is such a situation, where some chalcopyrite is associated with the pyrite.

Gulchon Creek Batholith (Upper Triassic)

2. "Hybrid" Phase

(a) Diorite, quartz diorite, granodiorite

The "Hybrid" phase forms the margin of the batholith. On the property it is, in part, a coarse grained hornblende diorite which grades into fine to medium grained dioritized volcanics to the east, and it is, in part, a medium grained, mafic-rich granodiorite or quartz diorite, commonly with fine grained inclusions of partly assimilated wall rocks.

This main variety of the "Hybrid" phase contains approximately 30% mafics; hornblende: biotite is 2:1. Orthoclase varies between 0 and 5%, quartz between 0 and 10% and magnetite between 5 and 10%. Plagioclase forms up to 70% of the mineralogy. Occasionally pyrite and chalcopyrite are found as accessory minerals.

(b) Quartz diorite (quartz rich variety)

A distinct unit which is considered to be a variety of the "Hybrid" phase consists of dyke-like bodies in the Nicola sediments which have been contaminated with siliceous material. They vary in grain size and texture but are all quartz diorite. They are generally fine grained granitic rocks with a hypidiomorphic granular texture, but in places the biotite forms a schistosity parallel to the contacts with the sediments.

This variety commonly contains 20 - 40% quartz, 10 - 30% mafics with 40 - 50% plagioclase and 1% or less orthoclase. The mafic mineralogy varies between all hornblende and all biotite.

3. "Highland Valley" Phase - "Gulchon" Variety

The "Gulchon" variety of the "Highland Valley" phase occurs on the western extremities of the property in contact with the "Hybrid" phase. It is a medium grained biotite-hornblende granodiorite. It is more siliceous and coarser grained than the "Hybrid" and shows no signs of contamination.

The "Gulchon" variety contains 18 - 25% mafics. Hornblende:biotite is between 1:1 and 1:2. Magnetite varies between 4 and 7%. The mafics show a distinct fairly fine grained regular distribution with seldom any clots or accumulations. Quartz makes up 10 to 15% of this variety, plagioclase 45 - 50%, orthoclase 5 - 10%. The potassium feldspar is always interstitial to the plagioclase. The quartz has a distinct closed interstitial shape, and is called "wedge" quartz.

4. "Gump Lake" Phase

The "Gump Lake" phase intrudes outside the concentric phases of the batholith in a large north-trending body 5 miles long by at least 2 miles at its widest. It contacts several units to the west including the Nicola volcanics and sediments, "Hybrid" and "Witches Brook". Where it contacts



the volcanics, recrystallization of the diorite is evident. The "Witches Brook" is younger than the "Gump Lake" and the contacts between them are sharp, unaltered and unmineralized. The eastern contact of the "Gump Lake" phase is not exposed and it is believed to be a fault contact parallel to or along a major structure through Mamit Lake.

The "Gump Lake" phase resembles the central "Bethsaida" phase except that the "Gump Lake" is foliated and contains some inclusions of diorite. It is a coarse grained porphyritic granodiorite with large phenocrysts of plagioclase and quartz. Mafic minerals form about 8 - 15% of this phase with hornblende: biotite being about 1:1; magnetite forms about 1 - 3% of the rock. The mafics are irregularly distributed forming coarse grained euhedral crystals. This phase commonly contains 25% quartz, 8 - 15% potassium feldspar, and 40 - 50% plagioclase. Quartz is present as large eyes which are often broken up and drawn out in the foliation. Plagioclase is subhedral to anhedral and very coarse grained; the potassium feldspar is present only as an anhedral interstitial mineral.

5. "Witches Brook" Phase

The "Witches Brook" phase occurs on the property as dykes and small plugs which cut all the other units. It is a fine grained biotite-hornblende granodiorite. It resembles the coarse grained "Bethlehem" phase of the main intrusive body in composition and texture. It may likely be a fine grained variety of this phase.

The "Witches Brook" contains 10 - 15% mafics, 3% magnetite, 20 - 25% quartz, 8 - 15% potassium feldspar and 45 - 55% plagioclase. Hornblende: biotite is about 1:1. The hornblende is often porphyritic with inclusions of plagioclase. Medium grained mafic crystals and clumps of crystals as well as very fine grained mafics are irregularly distributed giving the rock a distinct fabric. The rock is granular with fine grained interstitial quartz and potassium feldspar. Plagioclase is fine to medium grained, slightly porphyritic and subhedral to euhedral.

Structure

1. Jointing

Regional joints which predominate on the property vary from the north



to the south. In the north two well defined sets have orientations of 030/90 and 120/90. These are joints in the "Gump Lake" phase and appear to be late fractures related to the intrusive. These joints appear to have little economic interest except in one location where the east-west joints are associated with very minor molybdenite mineralization. In the south, the regional jointing trends are 010/90 and 100/90. The 010/90 joints are very strong and probably related to the major uplift of the Gulchon Plateau to the west. Joints which have orientations 100/90 to 130/90 are sometimes associated with shearing and possible strike slip faults rather than the horst and graben structure striking north. These easterly striking joints and minor shears are occasionally associated with minor copper mineralization.

2. Faulting

One large regional fault appears to follow Mamit Lake and the Gulchon Creek valley. Evidence for this is reflected in jointing in outcrops observed, air photo linears and in the regional airborne magnetometer survey. North trending linears are common to the east of the property, along with north trending joints. Gulchon Creek north of the lake is reflected as a linear aeromagnetic low which is several miles long. No other major regional structures were detected in the area.

Small scale faults occur on the property. They are usually expressed by topographic depressions and parallel jointing in nearby outcrops. Wide shear zones 15 to 20' wide are common but seldom seen in outcrop.

Some northerly trending faults occur in the "Fiddler Prospect" area. These appear to have little offset but have greatly sheared the rock. Pyrite and Ilmonite are commonly associated with these faults. Further possible faulting is evident north of here offsetting the western "Gump Lake" contact. South of the Fiddler along Duputs Creek some minor faults were found.

In the south part of the property an area mapped as "Hybrid" near Mamit Lake is well sheared along 120/66N to 74S fractures. This shearing may be related to faulting but it may also be related to an intrusive to the east of here under Mamit Lake or under the western shore of the lake. There is minor copper mineralization associated with the fractures.

Alteration and Mineralization

Hydrothermal alteration is present in places on the property but no areas were found with any considerable amount of alteration. The most common secondary products are epidote and chlorite. These minerals or other alteration minerals are indicated on the geological map where they were found.

Three types of sulphide mineralization were found on the property:

- (1) Chalcopyrite on fractures in fresh diorite near granodiorite dykes
- (2) Disseminated pyrite in sandstone near the intrusive
- (3) Massive molybdenite in a fracture in the "Gump Lake" phase

The areas of minor copper and molybdenum mineralization found could not be related to any major zones of alteration. Instead they appear to be either in fresh rock or near shears in locally altered rock.

CONCLUSIONS

1. The property is underlain by rocks of the Guichon Creek batholith and the Nicola Group.
2. Where considerable outcrop occurs the ground is of little economic interest.
3. A large area on the east side of the property is devoid of outcrop. The economic potential of these claims cannot be evaluated by a surface geological inspection.



G. D. Ulrich, B.A. Sc.

J. M. Carr, P. Eng.

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Appendix 2

Appendix 3

Appendix 4