3820

Geochemical Survey

Geophysical Survey

and

Geological Survey

on the

FH 1-6, FH 9-10, FH 14-18, FH 20, FH 22 and

Foghorn Fraction

Mineral Claims

51°32'N 119°55'W

82 M /12 W

R.C. Heim, P.Eng.
J.D. Knauer, Geochemist
J.T. Walker, Geophysicist
G.D. Belik, Geologist

Noranda Exploration Company, Limited

Kamloops Mining Division

July 18, 1972 - July 31, 1972

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Geochemical Survey
Geophysical Survey
and Geological Survey
of the
FH 1-6, FH 9-10, FH 14-18, FH 20, FH 22 and
Foghorn Fraction Mineral Claims
Noranda Exploration Company, Limited

INTRODUCTION:

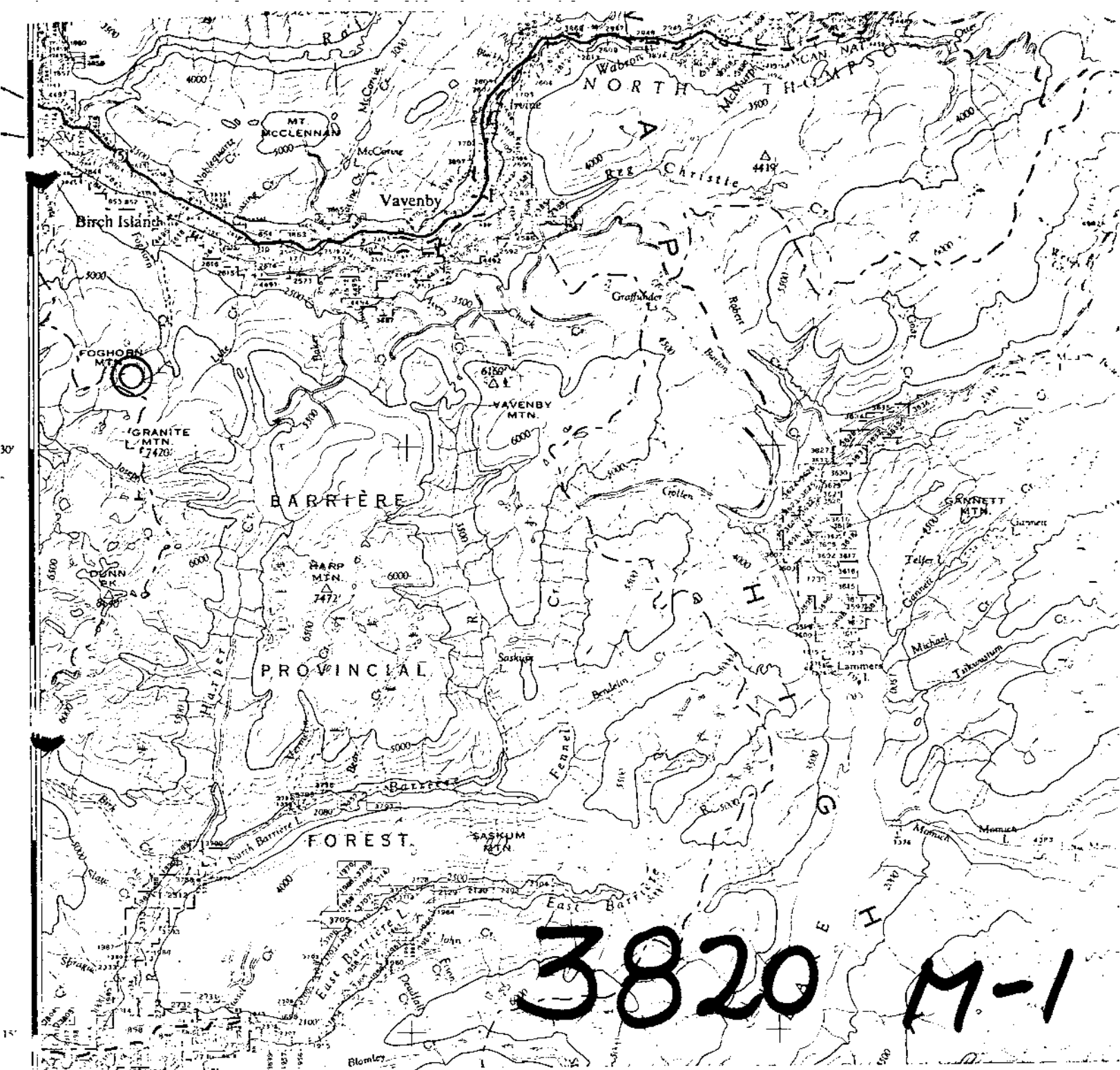
The claims referred to in this report are registered in the name of Noranda Exploration Company, Limited (No Personal Liability) under option from L. Harrison. The names and record numbers of the mineral claims are:

Mineral Claims	Record Numbers
FH 1-6 inclusive	65664-65669 inclusive
FH 9-10 inclusive	65672-65673 inclusive
FH 14-18 inclusive	65677-65681 inclusive
FH 20	65683
FH 22	65685
Foghorn Fraction	65742

The surveys described in this report were conducted within the boundaries of the above listed mineral claims. Their boundaries and claim names are shown in Drawing No. 6.

The claims are located approximately 5 miles south of Birch Island, British Columbia near the headwaters of Foghorn Creek. The property was formerly known as the Lydia and has been prospected intermittently since 1915. Access to the property is by four wheel drive road south from Birch Island up Foghorn Creek.

Elevation of the surveyed area ranges from 5200 to 6300 feet. Relief is gentle to moderate with steep cliffs to the east and northeast along Foghorn Creek. Forest cover is heavy on the slopes and lighter with some alpine meadow in the plateau.



3820 M-1

NORANDA EXPLORATION COMPANY, LIMITED

LOCATION MAP

FOGHORN CLAIMS

KAMLOOPS MINING DIVISION

1" = 4 Miles

82M/12W

FIG. A

Between July 18, 1972 and July 31, 1972, geochemical, geophysical and geological surveys were conducted after the necessary line preparation was completed. Geochemical and geophysical surveys were carried out by a Noranda Exploration Company, Limited crew of 4 men under the direction of R.C. Heim, P.Eng., J.D. Knauer, Geochemist and J.T. Walker, Geophysicist. The geology was surveyed by G.D. Belik, Geologist.

GRID PREPARATION:

In order to carry out the Geochemical and Geophysical Surveys, existing lines were cleaned out, re-chained and flagged with 100-foot stations. In addition, six intermediate lines were chained and flagged for the more detailed magnetometer survey.

GEOCHEMICAL SOIL SURVEY:

All soil samples were analyzed for copper, zinc and molybdenum in the Noranda Exploration Company, Limited laboratory located at 1050 Davie Street, Vancouver 5, B.C., analyst, Evert vanLeeuwen.

Sampling Method:

Samples were obtained by digging holes with a shovel, to depth at which the visible grey C horizon or sub-outcrop was encountered. The C horizon was sampled or the B-C horizon depending on soil development at each sample location. The samples were placed in "Hi Wet Strength Kraft 3 1/2" x 6 1/8" Open End" envelopes and the grid station was marked on the envelopes with indelible felt pens. Soil samples were taken at 200-foot intervals along the grid lines.

Laboratory Determination Method:

The samples are first hung in a drying cabinet for a period of 24 to 48 hours. The sampled material is then screened and sifted to obtain a -80 mesh fraction.

The determination procedure for total copper, zinc and molybdenum is as follows: 0.200 grams of the -80 mesh material is digested in 2 ml. of $HClO_4$ and 0.5 ml. of HNO_3 for approximately four hours. Following digestion each sample is

diluted to 5 ml. with demineralized H_2O. A Varian Techtron Model AA-5 Atomic Absorption Spectrophotometer was used to determine the parts per million copper, zinc and molybdenum content in each sample.

The theory of Atomic Absorption Spectrophotometry is fully described in the literature and will not be described in this report.

Presentation of Results:

Results of this survey are presented in Drawings No. 1 and No. 2 of this report; plan maps (scale: 1 inch equals 400 feet) showing copper, zinc and molybdenum determinations in parts per million. Copper values greater than 145 p.p.m. (solid lines) and 245 p.p.m. (dashed lines) have been outlined in Drawing No. 1. Zinc values greater than 165 p.p.m. have been outlined in Drawing No. 2. Molybdenum values are presented in Drawing no. 1.

Discussion of Results:

Copper determination values show a background of less than 60 p.p.m. to apparent anomalous values ranging from 150 p.p.m. to 1200 p.p.m. Zinc values range from a background of less than 100 p.p.m. to apparent anomalous values greater than 175 p.p.m. Results for copper and zinc indicate the areas of interest to be in the southeast portion of the surveyed grid. Molybdenum was not considered to be an important associated element with copper and zinc in this survey as there were no values greater than 2 p.p.m.

An orientation survey over portions of the area to be covered by soil sampling indicated the C horizon would give the most consistent results. Profile sampling indicated further that the B horizon was often quite thin and hard to recognize, making it difficult to differentiate it from the richly organic A_3 horizon. This might lead to inconsistent results. Sub-outcrop was encountered in many holes on the more level portions of the grid indicating shallow overburden. More transported and probably deeper overburden was evident on the steeper slopes.

The favorable geological units containing Cu mineralization have corresponding anomalous Cu values associated with them. The larger anomalous areas along the steep southeastern slopes may be down slope migration of Cu ions from the mineralized rock units to the northwest.

No further soil geochemistry is recommended in this immediate area.

MAGNETOMETER SURVEY:

The magnetometer survey was carried out utilizing a Fluxgate Magnetometer (Model MF-2, Serial No. 002193). The instrument was manufactured by Scintrex Limited, 222 Snidercroft Road, Concord, Ontario. The instrument is designed to read the vertical component of the earth's magnetic field.

Nine lines of detail survey, totalling 7,900 feet, were conducted using a line spacing of 100 feet with a reading interval of 25 feet along lines.

Method:

For this survey a control station was established and the latitude controls of the instrument adjusted so that a zero reading was obtained on the most sensitive scale prior to beginning the survey. During the course of the survey control station readings were recorded and used to compensate for diurnal change. Normal field procedures were followed during the survey, recording the magnetometer reading, line, station location and time of reading.

Presentation of Results:

Results of the survey are presented in Drawing No. 3 of this report, a magnetic contour map at a scale of 1 inch equals 100 feet. The isomagnetic contour lines are shown at 200 gamma intervals.

Discussion of Results:

Magnetic relief varies from 0 to 2,900 gammas with a background ranging between 600 to 800 gammas. Two small magnetic dipoles are indicated with a third suggested at the eastern edge of the surveyed grid. These dipoles may suggest small discrete (possibly pyrrhotite rich) bodies or may represent a single unit displaced by faulting.

GEOLOGY:

The FH claims were examined by G.D. Belik during the latter part of July. Mapping was done on a scale of 1" = 400' and geologic data were plotted using the survey grid for control. Outcrop is relatively abundant along Foghorn Creek and along bluffs above Foghorn Creek in the northeast corner of the map-area. Elsewhere outcrop is scarce with exposures generally being confined to soil holes and trenches.

The area has been glaciated but thick accumulations of glacial debris are not in evidence. Many areas are deeply weathered and above an elevation of 6100' alpine meadows prevail.

Map - unit 1

Map - unit 1 is located along the southeast margin of the map-area. It is comprised of a medium grey to green quartz-feldspar-chlorite gneiss. The gneiss contains 10%-20% quartz, 30%-50% feldspar and 10%-20% chlorite. Biotite and sericite are also present with the amount of biotite tending to increase towards the northwest. Actinolite is present as fracture coatings near the contact with unit 3a.

Within the gneiss are irregular bodies, inches to several feet in diameter, of medium crystalline, light to medium green diorite to quartz diorite with about 10% quartz, 40%-60% feldspar and 20%-30% chlorite with hornblende and actinolite. Most of the hornblende is partly or completely altered to chlorite.

Map - unit 2

Two small lenses of brown to light green quartz-feldspar-sericite phyllite occur in the southeast corner of the map-area. The cleavage is only weakly developed and the rocks generally have a brown weathering feldspathic matrix with quartz augen. Sericite was the only mica observed and occurs along the cleavage planes.

Map - unit 3

The rocks of map - unit 3 have been divided into two units. Unit 3a consists of medium to dark green quartz-chlorite-sericite schists, white to light green quartzite and quartz-feldspar-chlorite gneiss. The schists are dense and siliceous with visible quartz and feldspar augen. Near the contact with unit 1 the schists often grade into gneiss which is of similar appearance to those common to map - unit 1. Discontinuous beds and lenses of quartzite occur near the contact with map - unit 4. The quartzites are white to medium green in color and generally contain more than 80% quartz. Sericite and chlorite are present in amounts up to 10% and define a rough foliation which is parallel to the enclosing schists.

Unit 3b has been exposed by trenching and consists of dense, dark grey to green, laminated hornfels. The rock is generally composed of greater than 60% amphibole with about 10% sulphide in the forms of pyrrhotite, pyrite and chalcopyrite. Quartz, epidote, chlorite and biotite are present in amounts up to 30%. The contact between unti 3b and unit 4 is sharp and well-defined but the contact between unit 3a and 3b was not directly observed.

Map - unit 4

Map - unit 4 consists of light to medium green quartz-sericite-chlorite schist, quartz-sericite schist, brown weathering carbonate and carbonate-sericite schist and graphitic slate with minor amounts of white to grey quartzite. The schists are generally well foliated and dip to the northwest at moderate angles. Within the carbonate members, graphitic slates and quartzite are found. The quartzite is present as small discontinuous lenses and irregular pods which appear to be replacement in origin.

Map - unit 5

Map - unit 5 occupies an area within map - unit 4 and consists of quartz-sericite-chlorite schist. The chlorite occurs finely disseminated throughout the

rock giving it a peppered appearance. Pyrite occurs in close association with the chlorite and often pyrite grains with a halo of chlorite were observed.

Map - unit 6

Map - unit 6 is of a similar appearance to the rocks of map - unit 3a and consists of medium to dark green quartz-chlorite-sericite schist with lesser amounts of quartz-feldspar-chlorite gneiss. The gneiss contains visible quartz and feldspar augen. Some stretched lithic fragments of the same composition as the rest of the rock were observed.

Map - unit 7

Numerous discontinuous dykes of quartz-feldspar porphyry were seen along the eastern edge of the property. These rocks are a pale grey to cream yellow in color and contain about 15% quartz and 20%-35% feldspar as phenocrysts in a pale grey to cream yellow aphanitic groundmass. These dykes are elongate in a north to northwesterly direction and continue only a short distance along strike. Fracturing is generally well developed with the most common orientation paralleling the dyke walls. The feldspar phenocrysts are partly or completely altered to clay minerals with an increase in intensity of alteration towards the wall rocks.

Structure:

All rock types, with the exception of the quartz-feldspar porphyry dykes are foliated. This cleavage is moderate to well developed and dips north to northwest at moderate angles. Small crenulations are developed on the cleavage planes, the axes of which plunge west to northwest at shallow to moderate angles.

Small scale folding was found to be only locally developed. The folds are asymetric with rounded hinges. The fold axes plunge west to northwest at shallow to moderate angles. Within map - unit 4 quartz boudinages are locally abundant.

Alteration:

Silicification

Within the upper part of map - unit 3a thin beds and lenses of quartzite, up to 20 feet in thickness, are developed. The quartzites are massive and resistant and locally contain abundant chalcopyrite. Textures seen within the quartzite suggest that they have formed by the silicification of pre-existing schists. Minor quartzite was also seen within the carbonate members of map - unit 4.

Chloritization

Most of the chlorite seen within the schists and gneisses was formed during the regional metamorphism of pre-existing rocks. However, chlorite as fracture coatings, disseminated grains and irregular patches was also noted and was found to be especially common within the schists of map units 4 and 5. Pyrite is often found in close association with these "secondary" chlorites and in some cases, pyrite with chlorite halos was seen.

Mineralization

Minerals of economic importance seen on the property are, in order of abundance, chalcopyrite, malachite, azurite and arsenopyrite. Pyrite is ubiquitous and pyrrhotite is found within map - unit 3a and 3b.

Chalcopyrite occurrences are generally restricted to the upper members of map - unit 3 a and to map - unit 3b. It was found to be the most abundant within the silicified zones of map - unit 3a where it occurs disseminated, in brown weathering carbonate lenses which parallel the foliation, in quartz veins, as irregular veinlets and in fractures along with chlorite. Only two fracture sets were found to be mineralized and have average orientations of $12^{\circ}/70^{\circ}$E and $350^{\circ}/90^{\circ}$. In map - unit 3b chalcopyrite occurs along fractures, as disseminations and in thin seams parallel to the foliation.

CONCLUSIONS AND RECOMMENDATIONS:

Copper mineralization was found to be mainly restricted to map - units 3a and 3b. This "favorable" horizon has been adequately tested by soil geochemistry, a magnetometer survey, diamond drilling, trenching and underground exploration. Chalcopyrite was found to be locally abundant but nowhere was there sufficient tonnage to constitute ore. Further exploration is not considered necessary at this time.

Respectfully submitted,

R.C. Heim, P.Eng.

J.D. Knauer
Geochemist

J.T. Walker
Geophysicist

G.D. Belik
Geologist

August 31, 1972

Statement of Qualifications

I, James D. Knauer of the City of Vancouver, Province of British Columbia do certify that:

1. I have been an employee of Noranda Exploration Company, Limited since August, 1964.

2. I am a graduate of the University of New Mexico with a Bachelor of Science Degree in Geology.

3. I am a member of the Geochemical Society.

4. I have held the position of Geochemist for Noranda Exploration Company, Limited, British Columbia since June, 1965.

Dated at Vancouver
this 31st day of
August, 1972

James D. Knauer
Geochemist
Noranda Exploration Company, Limited
(No Personal Liability)

Statement of Qualifications

I, James T. Walker of the City of Vancouver, Province of British Columbia do certify that:

1. I have been an employee of Noranda Exploration Company, Limited since May, 1958.

2. I have held the position of Geophysicist for Noranda Exploration Company, Limited, British Columbia since June, 1965.

3. I am a member of the Canadian Institute of Mining and Metallurgy.

Dated at Vancouver
this 31st day of
August, 1972

James T. Walker
Geophysicist
Noranda Exploration Company, Limited
(No Personal Liability)

Statement of Qualifications

I, Gary D. Belik of the City of Vancouver, Province of British Columbia do certify that:

1. I have been an employee of Noranda Exploration Company, Limited since May, 1970.

2. I am a graduate of the University of British Columbia with a Bachelor of Science Degree in Geology.

3. I have held the position of Geologist with Noranda Exploration Company, Limited, British Columbia since May 1970.

Dated at Vancouver
this 31st day of
August, 1972

Gary D. Belik

Geologist

Noranda Exploration Company, Limited
(No Personal Liability)

Cu > 145 ppm

Cu ≥ 245 ppm

3820

M-2

Profiles

To accompany Geochemical Report by R. C. Helm, P. Eng., and J. D. Knauer Geochemist, on the FH 1-4, 6, 9, 15-18 and 20 Mineral Claims

Kamloops Mining Division Dated: August 31, 1972

Base Map: Lockwood Survey Corporation - Map No. 71-251

REVISED	FOGHORN
	SOIL SURVEY
	Ppm Total Cu
	Ppm Total Mo
	PROJECT:
PROJ. Nº 1037	SURVEYED BY: DATE:
N.T.S. 82 M/12W	DRAWN BY: SCALE: 1" = 400'
DWG. Nº 1	NORANDA EXPLORATION CO. LTD.
	OFFICE: VANCOUVER

145 ppm²

Profiles

#1 #2

SOIL - from old hole - 20N - 8W

To accompany Geochemical Report by W.C. Heim, P.Eng., and J.D. Knauer Geochemist, on the FH 1-4, 6, 9, 15-18 and 20 Mineral Claims

Kamloops Mining Division. Dated August 31, 1972

Base Map: Lockwood Survey Corporation - Map No. FI-251

REVISED	FOGHORN
	SOIL SURVEY Ppm Total Zn
	PROJECT:
PROJ. Nº 1037	SURVEYED BY: DATE:
N.T.S. 82 M/12W	DRAWN BY: SCALE: 1" = 400'
DWG. Nº 2	NORANDA EXPLORATION CO. LTD.
	OFFICE: VANCOUVER

FH-9

FH-20

FH-2

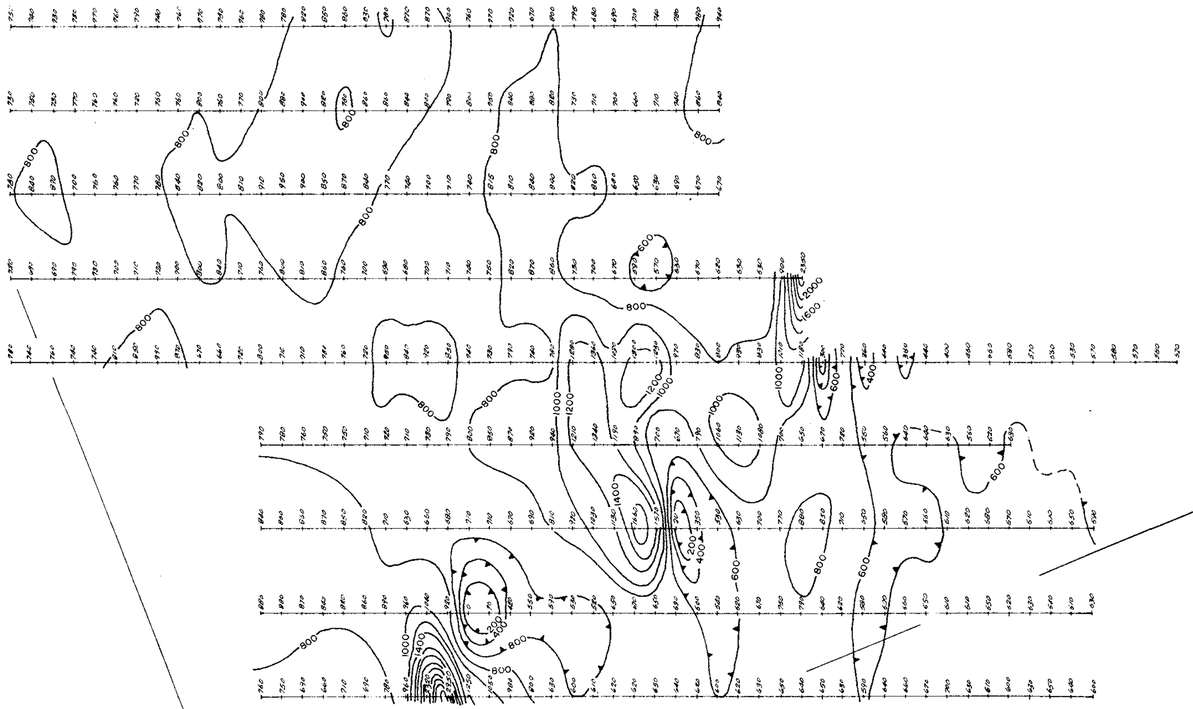
FH-1

FH-3

FH-18

FH-4

FH-16



32 N

31 N

30 N

29 N

28 N

27 N

26 N

25 N

24 N

10 W

8 W

6 W

4 W

2 W

0 W

2 E

To accompany Geophysical Report by R.C.Heim, P.Eng., and J.T.Walker, Geophysicist, on the FH-2 and FH-3 M.C.'s.

Kamloops Mining Division August 31, 1972

J.J.Walker

R.C.Heim

REVISED	FOGHORN
	MAGNETOMETER SURVEY
	CONTOUR MAP
	CONTOUR INTERVAL - 200 gammas INSTRUMENT - Scintrex MF-2
	DATUM - 50,000 gammas
	PROJECT:
PROJ. Nº 1037	SURVEYED BY: DATE: 1972
N.T.S. 82 M/12 W	DRAWN BY: SCALE: 1" = 100'
DWG. Nº 3	NORANDA EXPLORATION CO. LTD.
	OFFICE: VANCOUVER

LEGEND

- 7 — Quartz feldspar porphyry
- 6 — Med to dk green qtz – chlorite – sericite – schist, qtz – feldspar – chlorite gneiss
- 5 — Speckled qtz – sericite – chlorite schist
- 4 — Lt to med green qtz – sericite – chlorite – schist, qtz sericite schist; brown weathering carbonate and carbonate – sericite schist, graphitic slate, white to grey quartzite
- 3a, 3b — Med to dk green qtz – chlorite – sericite schist, white to lt green quartzite, qtz – feldspar – chlorite gneiss
  3b Banded hornfels
- 2 — Brown to lt green qtz – feldspar – sericite phyllite
- 1 — Qtz – feldspar – sericite gneiss; med crystalline dacite to quartz diorite

Foliation
Lineation
Fracture mineralized with chalcopyrite
Geological boundary (assumed)
Fault
Fault (assumed)
Outcrop
Outcrop area
Area of subcrop
Soil hole with outcrop
Soil hole with subcrop
728-7-30-2 Sample location number
Adit
Section location

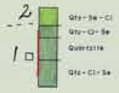
To accompany Geological Report by R.C. Heim, P.Eng., and G.D. Belik, Geologist, on the FH 1-5, 9, 10, 14-18, 20, 22 and Foghorn Fr. Mineral Claims.

Kamloops Mining Division August 31, 1972

Base Map: Lockwood Survey Corporation - Map No. 71-251

REVISED	FOGHORN
	GEOLOGY
PROJ. Nº 1037	PROJECT:
N.T.S. 82 M/12W	SURVEYED BY: G. Belik DATE:
DWG. Nº 4	DRAWN BY: SCALE: 1" = 400'
	NORANDA EXPLORATION CO. LTD. OFFICE: VANCOUVER

SECTION I



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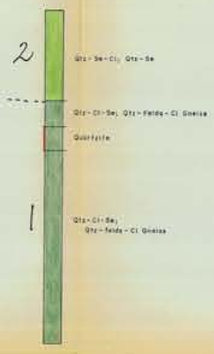

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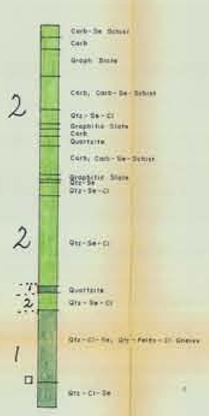
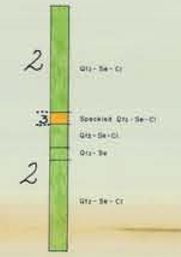


SECTION IV



6000'
5900'
5800'
5700'
5600'

3 LITHOLOGIES COMMON TO UNIT 5

2 LITHOLOGIES COMMON TO UNIT 4

1 LITHOLOGIES COMMON TO UNIT 3&4

□ ADIT ENTRANCE

I SECTION MINERALIZED WITH CHALCOPYRITE

To accompany Geological Report by R.C. Helm, P. Eng., and G.O. Belik, Geologist, on the FH 1-6, 9, 10, 14-18, 20, 22 and Foghorn Fr. Mineral Claims

Kamloops Mining Division August 31, 1972

REVISED	FOGHORN
	STRATIGRAPHIC SECTION A-B
PROJ. Nº 1037	PROJECT:
N.T.S. 82 M/12W	SURVEYED BY: G. Belik DATE: Aug 1972
DWG. Nº 5	DRAWN BY: SCALE: 1" = 50'
	NORANDA EXPLORATION CO. LTD.
	OFFICE: VANCOUVER

FH-1 FH-2 FH-3 FH-4 FH-5 FH-6 FH-7 FH-8 FH-9 FH-10 FH-11 FH-12 FH-13 FH-14 FH-15 FH-16 FH-17 FH-18 FH-19 FH-20 FH-21 FH-22 FH-23 FH-24 FH-25 FH-26 FH-27 FH-28 FH-29 FH-31 FH-32 FH-33 FH-34 FH-35 FH-36 FH-37 FH-38

FOGHORN FR

Base Map Lockwood Survey Corporation - Map No. 71-251

To accompany combined report by R.C.Heim, P.Eng., J.T.Walker, Geophysicist, J.D.Knauer, Geochemist and G.D.Belik, Geologist on the FH Group.

Kamloops Mining Division August 31, 1972

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3820 MAP #7

REVISED	FOGHORN
	CLAIM MAP
	PROJECT:
PROJ. Nº 1037	SURVEYED BY: DATE: 1972
N.T.S. 82 M/12 W	DRAWN BY: SCALE: 1" = 400'
DWG. Nº 6	NORANDA EXPLORATION CO. LTD.
	OFFICE: VANCOUVER