

93!
2W 1/2
3E 1/2
6E 1/2
7W 1/2

812770

R E P O R T

on

MAGNETIC SURVEY of
HEATH COPPER PROPERTY

SENATE MINING & EXPLORATION LTD.

Egil Livgard, P. Eng

August, 1971

C O N T E N T S

INTRODUCTION	1
SUMMARY	2 & 3
CONCLUSIONS	4
COST OF SURVEY	5
PROPERTY	6
LOCATION AND ACCESS	6
TOPOGRAPHY	7
HISTORY	7
GEOLOGY AND PHOTOINTERPRETATION	8 & 9
MAGNETIC SURVEY	
Instrument	9
Gridsystem	9 & 10
Procedure	10 & 11
Interpretation	11 - 13
APPENDIX	
Readings	
Certificate	
Location Map	6A
Claim Map	6B
Magnetic Map	1" = 400'

INTRODUCTION

The writer was asked by SENATE MINING & EXPLORATION LTD. to carry out geological mapping and magnetic surveying on parts of its Heath Copper property in accordance with recommendations by the company's consulting geologist, Dr. R. H. Seraphim. The survey and mapping was conducted during July, 1971 and the costs were applied as assessment work.

The following is a report on the procedures and results of that magnetic survey.

SUMMARY

The property consists of 83 claims near Nation Mountain in the Omenica Mining Division. A magnetic survey was carried out on all or part of 24 of these claims.

The surveyed area lies on the south slope of Nation Mountain and is underlain by diorite, some syenite and quartz-feldspar dykes. The rocks have been lightly to extremely heavily altered primarily by feldspathization. In the centre of the claims a topographic "low" area has few outcrops, most of which show strongly shattered altered and oxidized rocks which contain copper stain and lenses, stringers and disseminated chalcopyrite.

A grid system was established over the claims with the baseline running north and south. Stations were established along the baseline every 400 feet and crosslines turned off at right angles. The crosslines were run out east and west and stations established every 200 feet. Magnetic readings were taken every 100 feet along all lines. 112,000 feet was surveyed.

The readings were adjusted, converted to gammas and plotted on a map and contoured every 1,000 gammas.

The survey confirmed a northwest striking zone 2,000 to 2,400 wide, running through the centre of the claims and

revealed a magnetic low area in the centre of this zone at its intersection with a fracture zone outlined on the areal photographs. This low magnetic intensity area coincides with a topographic "low" area in which the rocks are particularly heavily altered and contain copper mineralization.

The magnetic survey has narrowed down the primary exploration target from a sprawling soil geochemical anomaly covering 16 claims to an area approximately 3,600 feet by 2,400 feet.

CONCLUSIONS

The magnetic survey has extensively outlined the geology as mapped on the ground and outlined on aerial photos. The primary exploration target on the property has been narrowed down from a sprawling geochemical anomaly covering 16 claims to an area on the central zone (1) extending approximately from line 0 to line 3,600 north and being about 2,400 feet wide. This zone is an area of magnetic low at the intersection of several magnetic trends. It is considered a very favourable target and an induced polarization survey of about 6 to 8 line miles should be conducted to attempt to outline sulphide mineralization.

COST OF SURVEY

WAGES:

Benito D'Andrea

June 29th to July 20th, 1971 22 days @ \$ 20 per day (+\$ 10)	\$ 450.00
--	-----------

Ian Heyes

June 29th to July 20th, 1971 22 days @ \$ 20 per day (+\$ 10)	450.00
--	--------

Egil Livgard

June 29th to July 20th, 1971 22 days @ \$ 100 per day	\$ 2,200.00
--	-------------

July 20th to 30th, 1971 10 days - reports and maps @ \$ 100 per day	<u>1,000.00</u>
---	-----------------

	3,200.00
--	----------

3/4 of \$ 3,200 allotted to mag survey (1/4 of \$ 3,200 allotted to geology)	2,400.00
---	----------

food and camp supplies	300.00
helicopter to and from property	500.00
travel	<u>200.00</u>

	1,000.00
--	----------

5/6 of \$ 1,000 allotted to mag survey (1/6 of \$ 1,000 allotted to geology)	830.00
---	--------

	<u>\$ 4,230.00</u>
--	--------------------

of which \$ 3,600 is claimed
as assessment work

PROPERTY

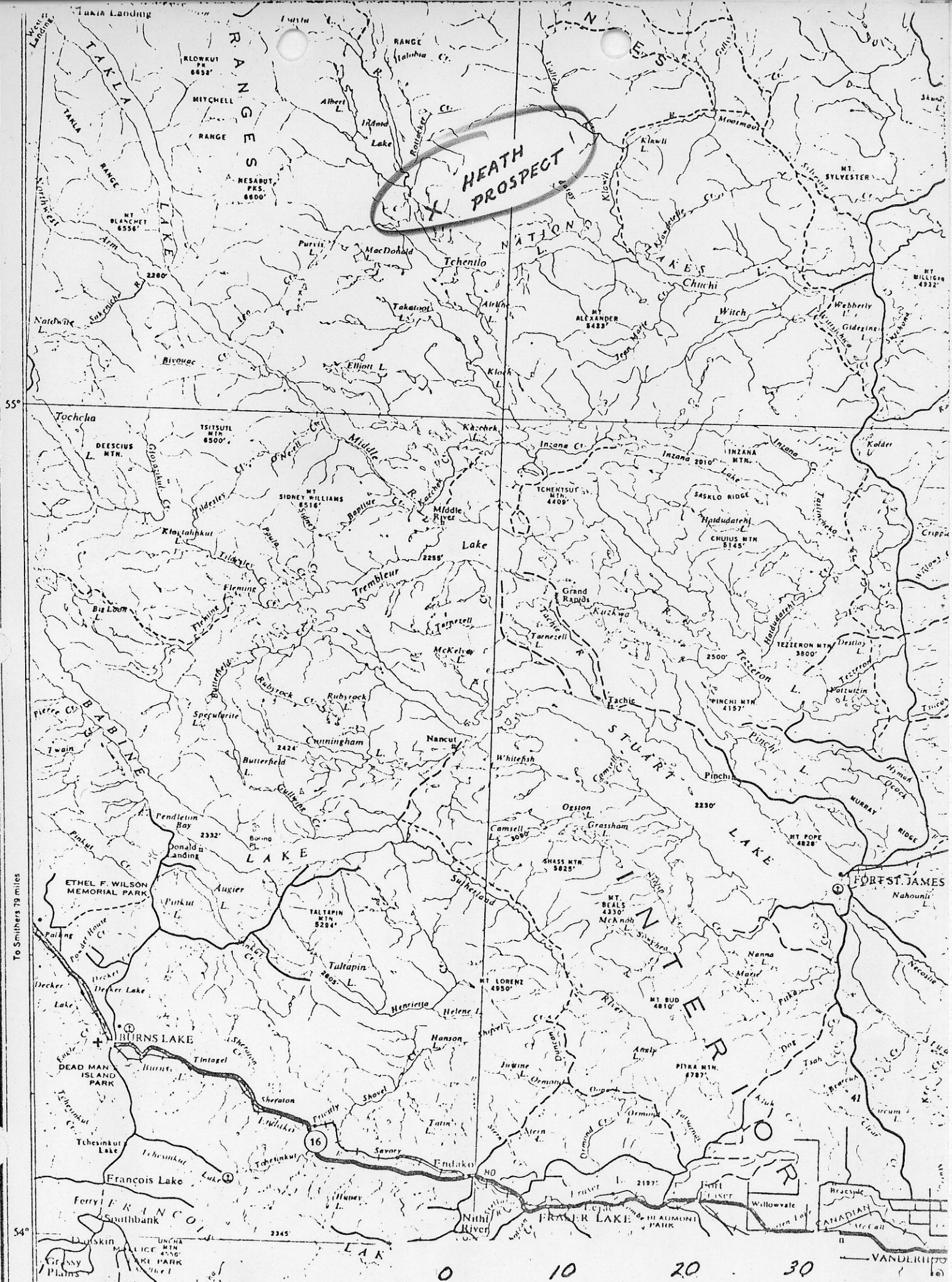
The property consists of 83 contiguous claims partly under option to and partly owned by the company.

The survey was carried out on Heath M.C.# 1, 2, 4-11 and N.S. M.C.# 18, 19, 36, 37, 44-47 and to a smaller extent on Heath M.C.# 20, N.S. # 1, 20, 21, 38 and 39.

8 claimposts being the # 1 posts of 15 of the above claims were located in the field and tied in to the grid-system. The claims appear to be well and correctly staked and no open fractions were located.

LOCATION AND ACCESS

The property is located on the south slopes of Nation Mountain near Tchentlo Lake, 65 air miles northwest of Fort St. James, B.C. in the Omenica Mining Division. The property can be reached by fixed wing aircraft or helicopter from Fort St. James, 65 miles away or from Germansen Landing, 40 miles away which is connected to Fort St. James by road. The nearest road is 40 miles away and the nearest railway, when the P.G.E. extension is completed to Takla Lake this year, will be 20 miles away.



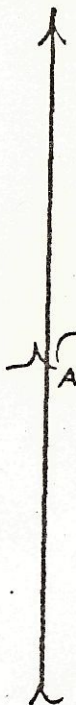
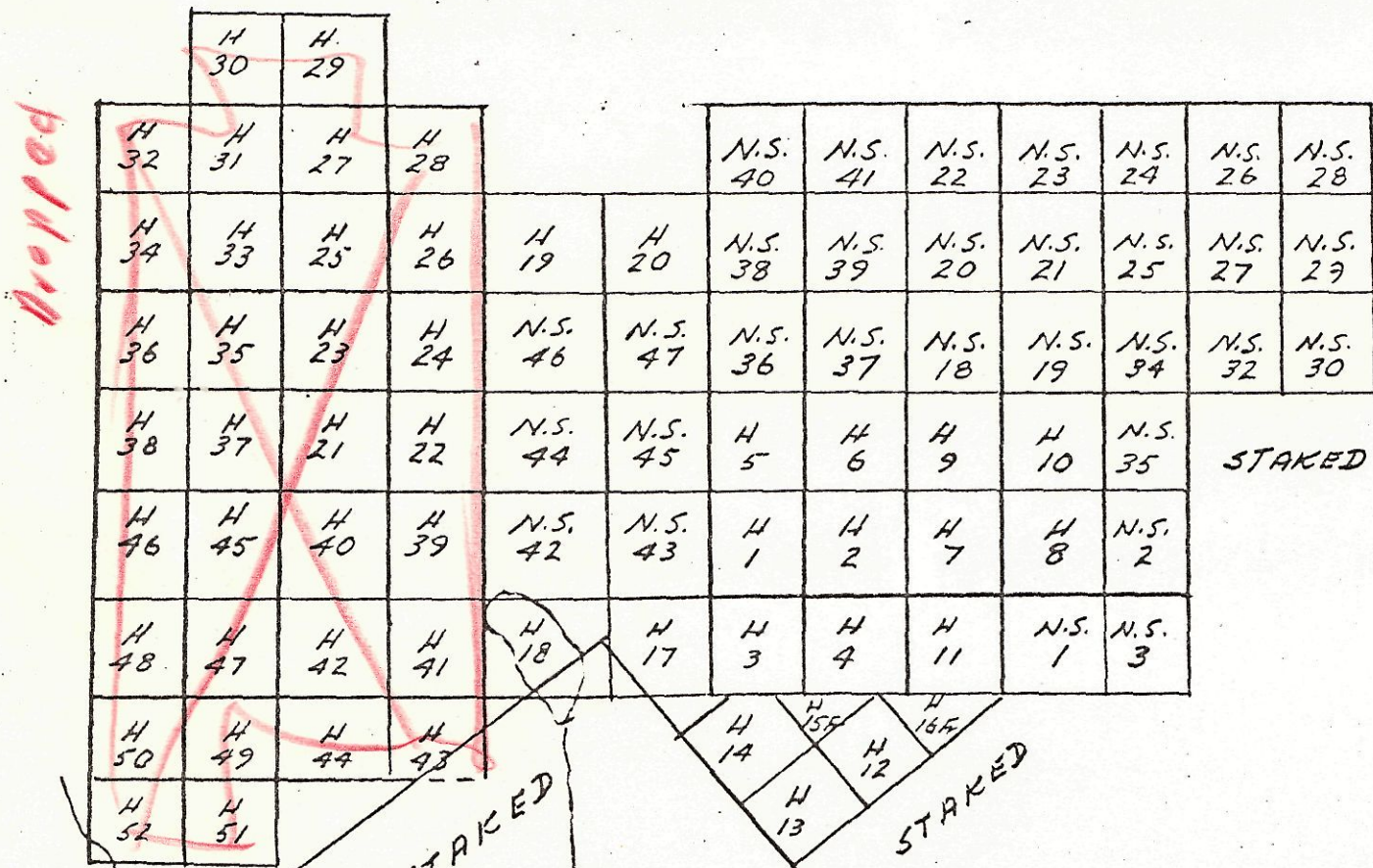
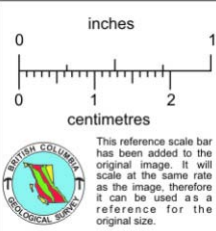
HEATH PROSPECT

55°

To Smithers 79 miles

54°

0 10 20 30 VANDERLIP



TCHENTLO
LAKE



HEATH & N.S.
CLAIMS
TCHENTLO LAKE
OMINECA M.D.
1" = 3000'
Jan/70 R.H.B.

TOPOGRAPHY

The property stretches from Tchentlo Lake at 2,800 foot elevation to Nation Mountain at about 5,000 foot elevation. Half the claims cover relatively flat ground and the other half are on the south slope of Nation Mountain. The slopes are forest covered. The primary exploration area lies in a topographic "low" on the hillside and has a relatively gentle relief with little outcrop.

HISTORY

The property was first located by the prospector, Colin Campbell, by use of stream silt sampling. Geo-chemical soil surveys have subsequently outlined anomalous copper content in the soil over an area of more than 800 acres. Geological mapping and trenching has located and exposed wide spread chalcopyrite mineralization. The present geological mapping and magnetic survey has been carried out on and around the above soil anomaly and copper mineralization.

GEOLOGY AND PHOTOINTERPRETATION

The property covers rocks of the Hogem Batholith. In the claim area mapped, these consist largely of diorite and its altered varieties and of a syenite plug or plugs and feldspar and quartz-feldspar porphyry dykes as well as some granite and possible granodiorite on the periphery.

On the basis of photointerpretation, geological mapping and the present magnetic survey, the structure has been interpreted as consisting of a northwest striking zone 2,000 to 2,400 feet wide. This zone is either bound by two faults or it is a wide fault or shear zone. The primary exploration target lies within this zone at a point where a 3,200 wide fracture zone crosses it in a WNW direction. This fracture zone is evident on air photographs but less evident on the ground. Faults or fractures striking E-W also crossing this zone, have been located on air photographs and are represented on the ground by topographically low areas generally occupied by creeks.

The primary exploration target has relatively few outcrops and these outcrops consist of diorite which has been very heavily altered primarily by feldspathization, and of syenite and some feldspar and quartz-feldspar dykes. The rocks are generally heavily oxidized and shattered, frequently showing copper stain, lenses, stringers

and specks of chalcopyrite. Surrounding the primary exploration target the rocks -- diorite -- show a very extensive and intense alteration to K-feldspar and also epidote.

MAGNETIC SURVEY

Instrument

The instrument used for the survey was a sharp magnetometer PMF-3 serial no. 41018.

The instrument has a central zero point so both positive and negative readings can be read directly. The instrument has five scales: the 3k scale which allows readings to 3,000 gamma; the 10k scale with readings to 10,000 gamma; the 30k scale with readings to 30,000 gamma; the 100 k scale with readings to 100,000 gamma, and the 300 k scale which permits readings to 300,000 gamma. With practise, the instrument can be read to the nearest 10 gamma on the 3k scale and correspondingly to 1,000 gamma on the 300k scale.

Gridsystem

An old gridsystem extending for a total of 18,300 feet was used as the basis for the present gridsystem. The baseline running north-south was extended to the north, re-measured and re-cut. The line was marked by blazes and flagging. Stations were established along the baseline at

intervals of 400 feet by use of tape. Old crosslines at 400 foot intervals were re-measured, re-cut and extended. New crosslines were turned off at right angles at each 400 foot station by the use of a prism. The cross lines, going east-west, were run by compass, cut out and marked by blazes and flagging. Stations were established at 200 foot intervals on the crosslines by the use of tape. A total of 96,400 feet of new gridsystem lines were thus established. Of this, 72,600 feet was on the Mountain group of claims and 13,800 feet on the Heath group of claims. The old re-measured and re-cut lines consist of 17,000 feet on the Heath group of claims and 1,300 feet on the Mountain group of claims.

Procedure

Latitude adjustment was made at an arbitrary point near camp. The instrument was adjusted to read zero gamma at this point. This point plus station 00 on the baseline were read three times daily during the survey to check diurnal variations. The baseline was surveyed first and the survey lines were then checked back to the baseline as they were done. Readings were taken at 100 foot intervals along the baseline, along all new and old crosslines and along some north-south lines on the western extremity of the gridsystem. The readings were taken at each station and at 100 foot intermediate stations, established by pacing. Readings were taken at waistheight facing east at all times and recorded.

The arbitrarily chosen point zero latitude control turned out to be at a point of relatively high magnetic intensity and the majority of readings were therefore negative. The readings recorded were later adjusted by +10,000 gamma plus the diurnal adjustment to give generally positive values and plotted on a map of the grid system and claims as gammas. The scale of the map is 400 feet to the inch. The readings were contoured at each 1,000 gammas based on known geology and geological photointerpretation.

Interpretation

The survey revealed features which correspond very well to the mapped geology and to the air photo interpretation.

A general northwesterly trend can be noted through the centre of the area and to the west.

1. The central northwest trend is about 2,000 to 2,400 feet wide and conforms to a zone outlined on the photographs and mapped on the ground as a zone of shearing or faulting. It is bounded by highly altered and fractured rocks with scattered copper mineralization. The primary exploration target lies within this zone. It is topographically of gentler relief and contains few outcrops. The zone lies between 400 East and 2800 East on line 1200 South and between 1600 West and 400 East on 4400 North. The magnetic

intensity within the zone particularly between lines 0 and 3400 North is generally lower but with some scattered high readings. The contouring shows greater complexity in the magnetic intensity within the zone than without. The rocks within the zone consist generally of highly altered and oxidized diorite and some syenite. Chalcopyrite occurs in some of these outcrops either disseminated or as lenses or stringers on fractures. The central magnetic low may be interpreted as possibly being an effect of the introduction of hydrothermal fluids or mineralizing agents altering or moving or removing the basic magnetite in the diorite. The diorite in this area frequently contains strongly oxidized material believed to be from pyrite changed from the original disseminated magnetite. A tendency to a rim like effect of higher intensity is apparent. The higher intensity on the edge of the zone coincides, where there is outcrop, with chloritized diorite high in magnetite content. These rocks also contain some lenses of chalcopyrite.

2. The northwest trending feature to the west located approximately at 3000 West on line 800 North and at 4200 West on line 4400 North is probably caused by faulting and accompanying changes in rock type on each side of the fault. Rocks immediately to the east are mapped as lightly altered diorite while rocks immediately to the west are mapped as strongly altered diorite with very heavy feldspathization and syenitic rocks. These latter rocks show

a lower magnetic intensity than the lighter altered diorite.

3. Between the two northwest trending zones the magnetic variations are quite large possibly corresponding to wide variations in the mapped alteration in the diorite. A northwest trend occurs here also.

4. East of the central zone the magnetic variations are more gradual corresponding to less alteration of the diorite. High magnetic readings on the northeast edge appear to coincide with a change in rock type to a fine to medium grained granite.

5. Possible structural trends can also be noted striking N65°W through line 1200 South 2600 East to 2400 North 4000 West and through 1200 North 4200 East to 4400 North 600 West. These two lines and the area between them has been interpreted on the aerial photos as a zone of strong fracturing. This zone also encompasses the primary central exploration target.

6. Two other trends striking north of east may be of significance, one extending from line 3600 North on the east to line 2600 North on the west and the other from line 2600 North on the east to 1400 North on the west. These lines correspond to occasional topographic low areas and traverse the central area.

Respectfully submitted,

Egil Livgard, P. Eng.

Vancouver, Canada