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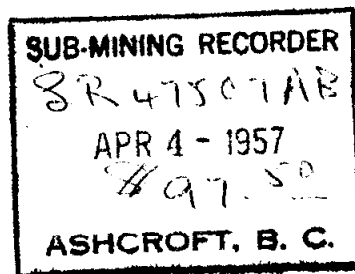
GEOPHYSICAL REPORT
MAGNETOMETER SURVEY
LODGE GROUP OF CLAIMS

18 miles S.E. of Ashcroft
~~50⁰, 121⁰ N.W.~~

by

GEORGE E. APPS, B.A.Sc.
for W. M. Sirola, P.Eng.

June 1956 to February 1957.



Telephone: TAtlow 4577-8
PAcific 5035

NORTHLODGE COPPER MINES LIMITED

DONALD F. FARRIS
President

Suite 303 - 1075 Melville Street
~~*Ste 206* 478 W Pender Street~~

VANCOUVER B. C.
5,

8th March, 1957.

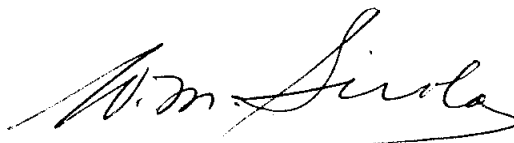
Chief Gold Commissioner,
Department of Mines,
VICTORIA, B.C.

Dear Sir,

I hereby state that I am a Professional
Geological Engineer registered in the Province of
British Columbia.

The Northlodge magnetic survey was carried
out under my supervision, and the results as outlined
in Mr. Apps' report are accurate and correct.

Yours truly,
NORTHLODGE COPPER MINES LIMITED,



W. M. SIROLA, P.Eng.,
Chief Geologist.

WMS:pcl

RECAPITULATION OF LINE CUTTING COSTS

KRAIN, D W, NORTHLODGE, BEAVER, OTRIDER, & HAT GROUPS

JUNE 1956 to MARCH 15 1957

JUNE 1956	<u>Base Line Survey</u> :	Surveyor 9 shifts @ \$15.00	\$135.00
		Helper 9 shifts @ 14.00	126.00
	<u>Line Cutting</u> :	Labour 43 shifts @ 14.00	602.00
JULY 1956	<u>Base Line Survey</u> :	Surveyor 14 shifts @ 15.00	210.00
		Helper 14 shifts @ 14.00	196.00
	<u>Line Cutting</u> :	Labour 79 shifts @ 14.00	1106.00
AUGUST 1956	<u>Line Cutting</u> :	Labour 27 shifts @ 14.00	378.00
SEPTEMBER 1956	<u>Base Line Survey</u> :	Surveyor 5 shifts @ 15.00	75.00
		Helper 5 shifts @ 14.00	70.00
	<u>Line Cutting</u> :	Labour 8 shifts @ 14.00	112.00
OCTOBER 1956	<u>Base Line Survey</u> :	Surveyor 3 shifts @ 15.00	45.00
		Helper 3 shifts @ 14.00	42.00
NOVEMBER 1956	<u>Line Cutting</u> :	Labour 16 shifts @ 14.00	224.00
MARCH 1957	<u>Line Cutting</u> :	Labour 2 shifts @ 14.00	28.00
<u>CONTRACTED LINE CUTTING :</u>			
	F. Cooke Jr.	Aug, Sept, 1956	783.49
	Scheuerman & Karhoffer,	Aug, Sept 1956	2118.99
	G Haddrell	Nov. /56 to Jan. 157	1472.04
<u>ENGINEERING & SUPERVISION</u>			
		20 days @ \$30.00 - - - - -	600.00

TOTAL COST \$8547.52

Total Line Cut- 457,000 ft.
 Cost per 1000 ft * \$18.70 (includes Base Line Surveys
 Cost per mile - 99.00)

DISTRIBUTION OF COST TO PROPERTIES & CLAIMS

PROPERTY	FOOTAGE CUT	COST	CLAIMS COVERED	COST PER CLAIM COVERED
NORTHLODGE	153,600	\$2872	39	\$73.60
KRAIN	39,600	741	8	92.60
D W	19,100	357	5	71.40
BEAVER	130,200	2435	43	54.20
OTRIDER	97,000	1814	41	44.25
HAT	10,000	187	6	31.20
TROJAN	7,000	122	-	-

GC Appr

NORTHLODGE COPPER MINES LIMITED

MAGNETOMETER SURVEY

G. E. APPS

February, 1957

NORTHLIDGE COPPER MINES LIMITED

COST OF MAGNETOMETER SURVEY OF THE NORTHLIDGE PROPERTY

Surveying and Line Cutting (as preceding)	\$2872.00
Magnetometer Field Work	
40 shifts @ \$14.00	560.00
Calculations and Plotting	
20 shifts @ 14.00	280.00
Drafting	
10 shifts @ 15.00	150.00
Engineering and Supervision	
10 days @ 30.00	300.00
	<hr/>
TOTAL COST	\$4162.00

COST PER CLAIM (39 claims) = \$107.

GE [Signature]

C O N T E N T S

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<i>AD</i> Profile, Iona Zone - following	Page 2
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M A P S I N P O C K E T

- AB* 300 Scale Map of Magnetic Values
- AD* 300 Scale Contoured - west sheet
- AD* 300 Scale Contoured - east sheet

MAGNETOMETER SURVEY * LODGE GROUP OF CLAIMS

NORTHLODGE COPPER MINES LIMITED

Introduction

The Lodge group is a group of 39 claims in the Highland Valley, southwest of Ashcroft, B.C. This group adjoins the Bethlehem property to the south and the Trojan property to the north, both of which contain mineral deposits (copper) which promise to be commercial. The Lodge group is almost entirely covered by overburden, which is in most places too heavy to penetrate by hand or bulldozer trenching. A geochemical (soil sampling) survey of part of the group was largely ineffective because of the depth and nature of the overburden.

In May 1956 McPhar Geophysics Ltd. were commissioned to carry out experimental geophysical work in the Highland Valley to determine the effectiveness of self-potential, ground electromagnetic, and ground magnetometer survey methods in the exploration for copper deposits of the type known to exist in the Highland Valley area. Traverses were run over known mineralized zones on the Bethlehem, Bethsaida and Trojan properties.

Following is part of the "Summary and Recommendations" from McPhar Geophysics Ltd. report on this test work. (1.)

(1) McPhar Geophysics Ltd. "Report on the Experimental Geophysical Survey", NORTHLODGE COPPER MINES LTD., by R. A. Bell, Geologist and F. W. McCamus, Geophysicist, June 19, 1956.

"The limited amount of magnetometer work indicates a very close correlation between mineralization and low magnetic intensity. The following explanation of the magnetic results is postulated. The magnetic susceptibility is probably a function of the magnetite content of the igneous rocks. Thus over the quartz diorite the magnetic intensity is greater than over the granite since the more basic quartz diorite probably has a somewhat greater magnetite content and therefore a higher susceptibility. In the mineralized zones the magnetic intensity of the barren sections corresponds to that obtained over the quartz diorite. In the mineralized sections however, there apparently has been sufficient alteration to oxidize the magnetite to hematite, thereby greatly reducing the magnetic susceptibility and giving rise to the magnetic lows revealed by the magnetometer traverses.

Thus of the three geophysical methods, the ground magnetometer seems to be most suitable for locating copper deposits of the Highland Valley type."

Map No. 1 shows a vertical section of the Iona zone, Bethlehem Copper property, and the magnetometer profile over this section.

Survey Procedure

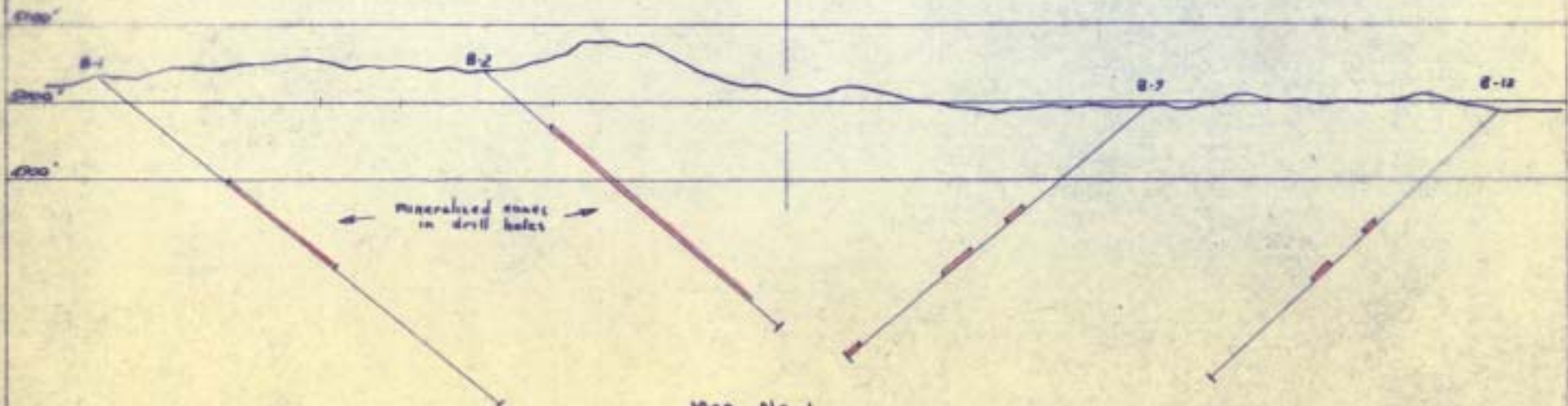
Line cutting for a magnetometer survey on the Lodge group was started late in June 1956, and the magnetometer field work was started in July. East-west lines were chosen for the survey, as these are normal to the assumed strike of the geologic structures in the area.

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NO. 107 MAP #1

NORHLIDGE COPPER MINES LTD.
IONA ZONE - BETHLEHEM COPPER PROPERTY
SECTION & MAGNETOMETER PROFILE

MAGNETOMETER PROFILE LINE 72-N 1" = 250 gammas.



MAP. No 1.
SECTION ALONG LINE 72 N, IONA ZONE, BETHLEHEM COPPER MINES LTD.
SCALE: 1" = 200'

from McPHAR DWG. MISS. 4282.
G.E.A.

Two north-south base lines totalling 10,900 ft. were surveyed with transit and chain and east-west lines were turned off at 800 ft. intervals. The east-west lines were run as picket lines and stations set at 100 ft. intervals (horizontal) with chain and clinometer. These lines were tied in to existing survey stations on the location lines of the claims. The stations on the lines were marked with the footage east or west of the base line and with the line number.

Picket lines were filled in at 400 ft. intervals on the northern part of the property when a large anomaly was indicated on the northwest part of the group. A total of 138,200 ft. of picket lines were out on the property. Several thousand feet were cut on the adjoining Trojan property to supplement the work.

A "Radar" magnetometer was used for most of the surveys. In this instrument two small magnets are suspended from a horizontal wire which is fixed at one end. Torsion can be applied through a micrometer screw moving against a lever fixed to the other end of the wire. Torsion is applied until the magnets are in a horizontal or null position, indicated by a needle being opposite a mark on the scale. In this position the horizontal component of the earth's magnetic field is cancelled out and the resulting torsion is proportional to the vertical component of the field. Readings are taken from the micrometer screw.

The scale constant of the instrument is 23 gammas per scale division, and it can be read to one scale division.

The field procedure is to first establish base stations on

on the base line. The initial base station, 180 line, was tied in to the ground magnetometer survey of the Bethlehem property being done by American Smelting and Refining Co. personnel. The base lines were re-run at least twice to ensure accuracy of the base stations.

Magnetometer readings were then taken at the 100 ft. stations along the picket lines. The first reading is taken at the base station (on the base line). Readings are then taken at all stations going out on the line and every 5th station is re-read coming back to the base station, which is also re-read. This circuit is made in about 2 or 3 hours. On long lines 2000 to 3000 ft. are done as one circuit and then the remainder of the line is run, tying in to the last station (or several stations) of the first circuit.

At each station the reading is taken three times, the needle being moved off centre between each reading. The line and station, magnetometer reading, and time are recorded in the field notes.

Calculations

The value for a station is found by adding or subtracting the scale constant times the difference in reading between the station and the base station to the known value of the base station. For example:

152 LINE BASE STATION, READING 854, VALUE 1148 ^x

152 LINE 100 W READING 853, VALUE 1125 ^x (1)

152 LINE 200 READING 843, VALUE 895 ^x (2)

(1) difference in reading x scale constant = 1 x 23 = 23
value of station 1148 - 23 = 1125

(2) difference in reading x scale constant = 11 x 23 = 253
value of station 1148 - 253 = 895

Limits of Accuracy

Check readings taken coming back on a line are generally within 2 scale divisions of the original reading. When these check readings are more than 3 scale divisions different, the line, or part of a line, is re-run with the magnetometer. Thus the maximum error should be 3 scale divisions, or allowing 1 scale division for the limit of accuracy in reading the instrument, 4 scale divisions or 92 gammas. Probable error where readings check within one or two scale divisions would be less than 50 gammas.

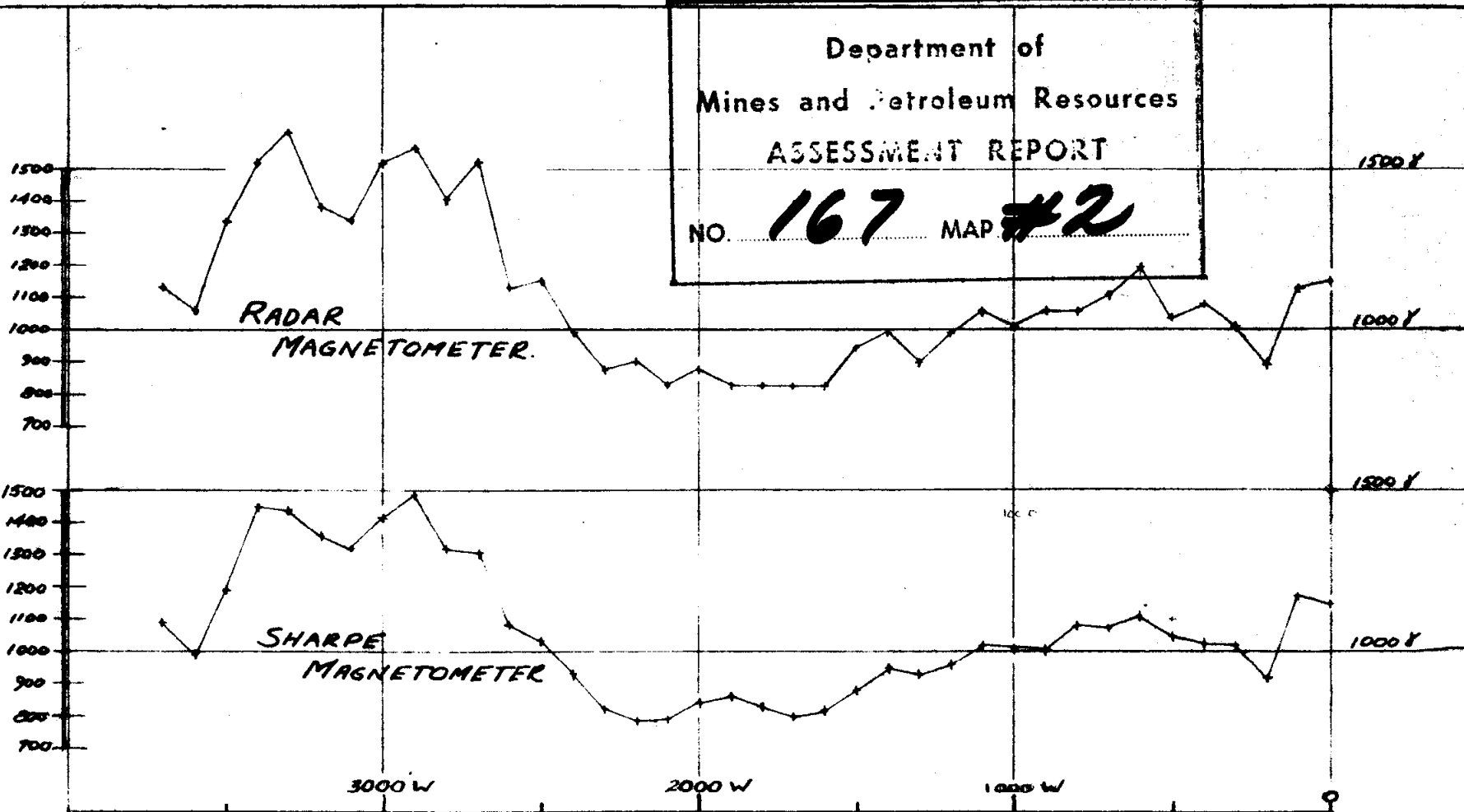
Errors can be attributed to diurnal variation of the earth's magnetic field, temperature effect on the instrument, and the lack of extreme sensitivity of the instrument. Diurnal and temperature effect are kept at a minimum by running circuits that take only 2 to 3 hours to complete. The lack of extreme sensitivity in the instrument makes it impractical to attempt to further correct these effects.

Some of the work has been checked with a Sharpe Model A-2 magnetometer which is well compensated for temperature changes and can be read accurately to 4 gammas. Several of the lines on the northern part of the property have been run with this instrument only.

Following is a comparison of readings and values on line 152-W, taken with both the Radar and Sharpe instruments:

<u>Station</u>	<u>SHARPE MAGNETOMETER</u>			<u>RADAR MAGNETOMETER</u>			<u>Difference</u>
	<u>Reading</u>	<u>Check</u>	<u>Value</u>	<u>Reading</u>	<u>Check</u>	<u>Value</u>	
Base	43.9	43.8	1148	854	853	1148	---
100 W	44.8		1165	853		1125	40 +
200 W	31.0		909	843	842	895	14 +
300 W	36.8		1017	848		1010	7 +
400 W	36.9		1019	851		1079	60 +
500 W	38.5		1048	849		1033	15 +
600 W	41.5		1104	856		1194	90 +
700 W	39.4		1065	852	852	1102	37 +
800 W	40.0		1076	850		1056	20 +
900 W	35.9		1000	850		1056	56 +
1000 W	36.1	35.6	1004	848		1010	6 -
1100 W	36.9		1019	850		1056	47 -
1200 W	33.6		957	847	847	987	30 -
1300 W	31.8		924	843		895	29 +
1400 W	32.9		944	847		987	43 -
1500 W	29.1		874	845		941	67 +
1600 W	25.8		813	840		826	13 -
1700 W	24.8		795	840	840	826	31 -
1800 W	26.2		821	840		826	5 -
1900 W	28.0		854	840		826	28 +
2000 W	27.1	27.0	837	842		872	35 -
2100 W	24.2		784	840		826	42 -
2200 W	23.9		778	843		895	117 -
2300 W	26.1		819	842		872	53 -
2400 W	32.0		928	847		987	59 -
2500 W	37.5		1031	854		1148	117 -
2600 W	39.9		1074	853		1125	51 -
2700 W	52.1		1300	870	870	1516	216 -
2800 W	53.0		1316	865		1401	85 -
2900 W	62.0	62.4	1483	872		1562	79 -
3000 W	58.1		1411	870		1516	105 -
3100 W	52.5		1307	862		1332	25 -
3200 W	55.0		1353	864	864	1378	25 -
3300 W	59.9		1444	874		1608	164 -
3400 W	60.1		1448	870		1516	68 -
3500 W	46.3		1192	862		1332	140 -
3600 W	35.1		985	850		1056	71 -
3700 W	40.4		1083	853	854	1125	42 -

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 NO. **167** MAP **#2**



— NORTH LODGE LINE 152-W —
 PROFILE OF MAGNETIC VALUES
 obtained from readings with
 SHARPE A 2 AND RADAR MAGNETOMETERS.

Horizontal Scale: 1" = 500 ft
 Vertical Scale 1" = 500 gammas.

Results

Values in gammas at each station were plotted on a claim map at 300 ft. to the inch, and were contoured. These are shown on the maps accompanying this report.

The magnetic values range from 1000 to 2000 gammas over most of the property with northerly trending bands of lower intensity. One small high anomaly which reaches 12,000 gammas exists southeast of Bose Lake.

A large area of low (- 1000 gammas) magnetic intensity was found in the northwestern part of the Lodge group. This is about 4000 ft. long on the Lodge claims, with a width of up to 2000 ft. This low anomaly continues south on to the Beaver Group of claims and, following a 1000 ft. gap, continues to the northern boundary of the Lodge group.

Lines were cut to fill in between the 800 ft. lines on the northern part of the property. Magnetometer readings on these lines supported the general magnetic picture given by the survey at 800 ft. line spacing, and it was therefore considered unnecessary to cover the entire property at 400 ft. line spacing.

Interpretation

The magnetic intensity is believed to be closely related to the magnetite content of the underlying rocks. Areas of low magnetic values therefore may be underlain by some other rock than the normal quartz diorite, or by a rock in which the magnetite has been destroyed by alteration.

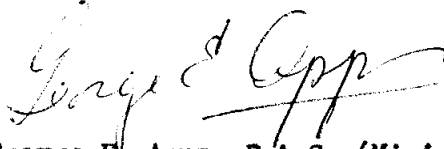
The important known mineralized areas in the Highland Valley (Bethlehem, Trojan, Krain) are characterized by the presence of rocks intrusive into the quartz diorite and by alteration (chlorite and kaolin) of these rocks and the quartz diorite. The younger intrusive rocks and the solutions giving alteration and mineralization have apparently come in on the same zones of weakness. These known mineralized areas are all in areas of relatively low magnetic intensity.

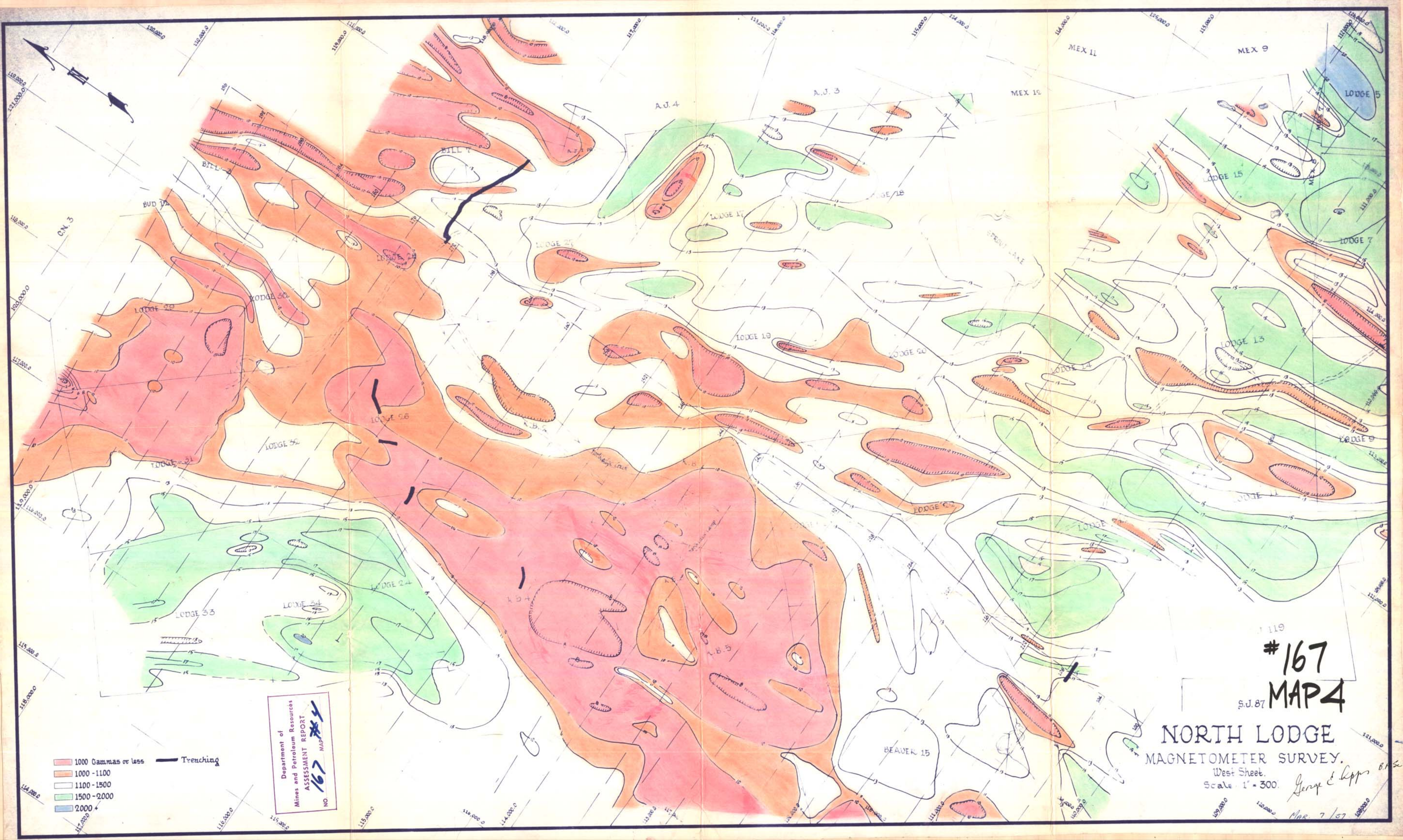
One diamond drill hole was drilled under the high anomaly south of Bose Lake. A phase of the quartz diorite locally high in magnetite content was found, but no significant copper mineralization was associated.

Conclusions

A ground magnetometer survey has shown a large low magnetic anomaly on the northwestern part of the Lodge Group of claims. Similar anomalies exist over the known mineralized zones of the "Bethlehem" type in the Highland Valley, and are presumably caused by the presence of intrusive rocks of lower than normal magnetite content and by the destruction of magnetite by the alteration associated with the mineralization.

This anomalous area is a promising target for further exploration work in the search for copper orebodies in the Highland Valley.


George F. Apps, B.A.Sc. (Mining),
Engineer in Charge.



- 1000 Gammas or less
 - 1000 - 1100
 - 1100 - 1500
 - 1500 - 2000
 - 2000
- Trenching

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NO.

#167
MAP 4
S.J. 87
NORTH LODGE
MAGNETOMETER SURVEY.
West Sheet.
Scale 1" = 300.
George & Lipp
Mar. 7/57



#167
MAP 5

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 167 MAP #5

**NORTH LODGE
MAGNETOMETER SURVEY**

EAST SHEET
SCALE: 1"=300'

Lang & Apps
B.A.Sc. (Mining)
ENGINEER IN CHARGE

MAR. 7 / 57

- S.J.119
- 1000 Gammas or less
 - 1000 - 1100
 - 1100 - 1500
 - 1500 - 2000
 - 2,000 +

S.J.118
Diamond Drill Hole