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GEOPHYSICAL REPORT

on the

GROUND MAGNETIC SURVEY

of the

-KINGFISHER PROPERTY

MABLE LAKE AREA, B.C.

Latitude: 50°44'N - Lonitude 118°44'W

Vernon Mining Division

N.T.S. 82L/10 & 15

on behalf of

COLBY MINES LTD. (N.P.L.)

CLAIM NAME	RECORD NUMBER	ANNIVERSARY
FX #2	16230	April 18
FC #11 FR	16517	June 12
FX #21	16561	July 28
FX #22	16562	July 28

by:

P.P. NIELSEN, B.Sc., Geophysicist

NIELSEN GEOPHYSICS LTD.

March, 1977

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INTRODUCTION

During the period from October 20 to October 30, 1976 a detailed ground magnetometer survey was executed on the Kingfisher property in the Vernon Mining Division on behalf of Colby Mines Ltd.

A vertical force fluxgate magnetometer was used on a pre-cut grid (in feet) resulting in a total of 5670 line metres being surveyed. Three intermediate lines each 76.2 metres long were installed by the operator who is also the author of this report.

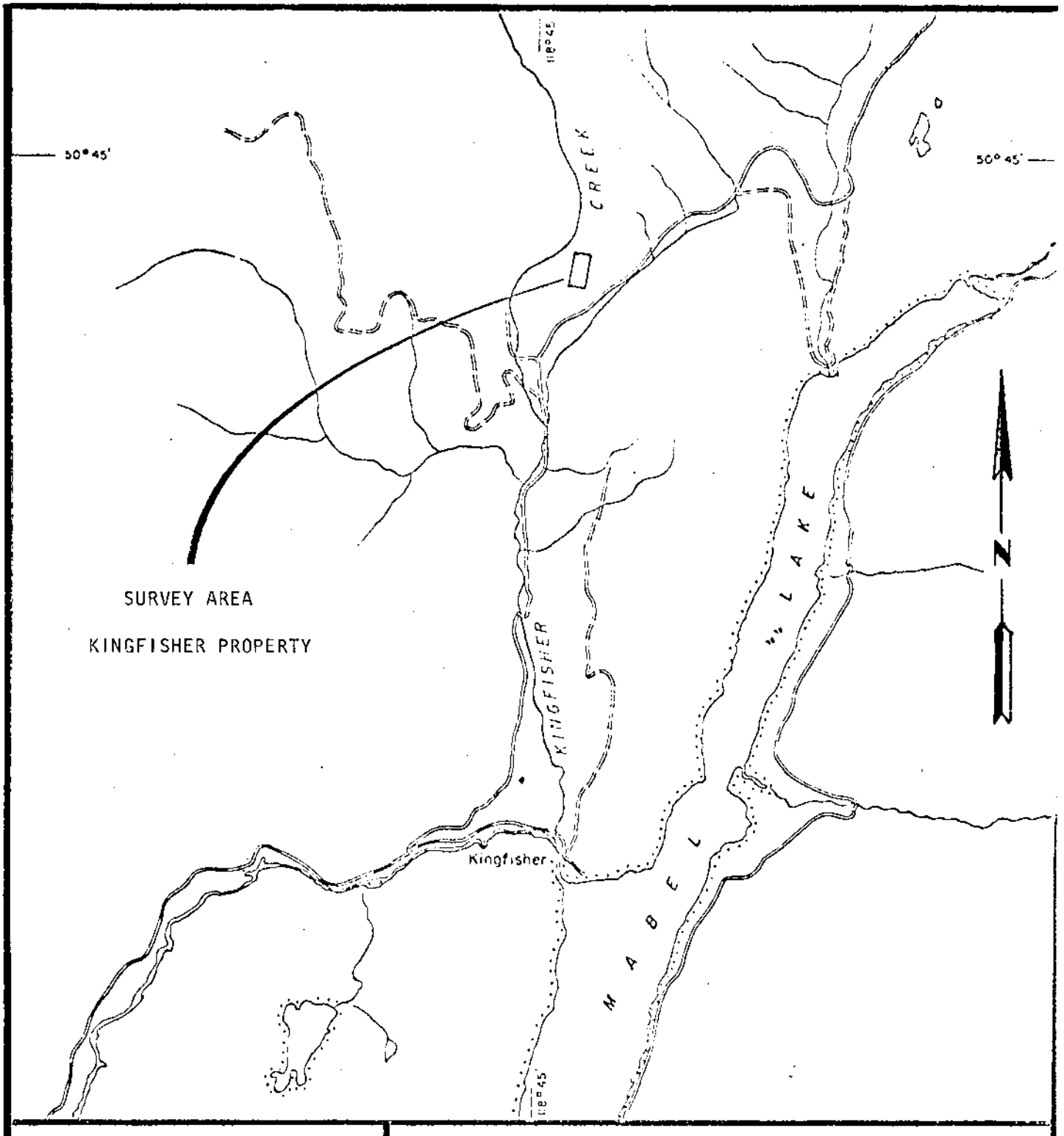
On December 4 and December 6, 1976 a portion of this grid was re-surveyed using a total field nuclear precession magnetometer for comparison purposes. A total of 1418 line metres was surveyed.

A total of six man days was required to complete the field investigations covering 7088 metres of grid lines. The purpose of the surveys was to delineate zones of pyrrhotite which are known to be associated with sphalerite and galena. This information assisted in the planning and execution of a drill program which was being carried out at the time.

LOCATION AND ACCESS

The Kingfisher (formerly called the Black Jack) property is located west of Mabel Lake in the Vernon Mining District at 50°44'N latitude and 118°44'W longitude.

The claims are situated on the north branch of Kingfisher Creek 15 km north of the Mabel Lake Road which is accessed from Enderby 48 km to the west. Local access to most parts of the claim group is good, consisting of logging roads, trench & drill-site access roads, and cut grid lines.



COLBY MINES LTD.

LOCATION MAP

KINGFISHER PROPERTY

VERNON MINING DIVISION BRITISH COLUMBIA

4 0 4 8

SCALE IN MILES

A. P. Nielsen

TOPOGRAPHY AND GROUND CONDITIONS

The claims on which the work was carried out lie between 730 m and 885 m A.S.L. in the Kingfisher Creek valley and are on the east slope of a low inter-valley ridge.

Topography is moderate over most of the grid although some very steep slopes and bluffs exist locally.

Overburden consists of equal proportions of glacial and colluvial material and appears not to exceed 30 m in thickness. Outcrops, some mineralized, are numerous providing good geological control.

Vegetation consists of thick stands of cedar, spruce, hemlock, white pine, and birch. Although underbrush is not severe, dense tree coverage makes linecutting necessary for optimum survey coverage and control.

The early portion of the present magnetometer work was done before the first snow fall of the year, although the last day of the survey (i.e. December 6, 1976) found the area covered by 15 cm of wet snow resulting in hazardous walking conditions on the northwest section of the grid where steep, slippery slopes were encountered.

GRID INSTALLATION

The grid used had been installed in 1974 and was recently re-habilitated for the present work. Intermediate pickets were installed for a station interval of 7.6 m (25 feet) and three short lines were installed between L5+00S and L8+00S for a line spacing of 15.3 m (50 feet) between Stn. 1+00E and Stn. 3+50E.

GEOLOGY

(after Trygve Hoy, B.C. Department of Mines and Petroleum Resources-Geological Field Report, 1975)

Regional

The property is within the Shuswap Complex, a high-grade metamorphic belt of rocks in the Columbian orogen of Southeastern B.C. The Rocks in the area have been assigned to the Monashee Group, a heterogeneous package of Proterozoic and Early Paleozoic age comprising gneisses, schists, and layers of marble and quartzite.

Local

The present survey work was confined to what is called the Ridge Zone which consists of complexly folded and faulted beds of marble, calc-silicate gneiss and quartzite up to several hundred metres thich generally striking N20^{O}E and dipping 50^{O}E. A number of north-trending quartz feldspar porphyry dikes from 5 to 10 metres wide cut across these layered rocks.

The structure of the area is dominated by four northwest-trending faults separating the layered rocks into five distinct blocks. These faults cut across an earlier foliation which strikes north-northeast and dips at varying angles to the southeast. The foliation is parallel to sub-parallel with layering. Mineral lineations contained within the foliation plunge to the southwest.

Two types of folding are recognized in the area. The first type is tight to isoclinal, plunging to the southwest, parallel to the mineral lineations. The second type is more open with a variable attitude.

Mineralization in the Ridge Zone occurs in quartzite and marble which has been complexly faulted and folded. To date, the thicker mineralized zones seem to occur within the tighter folds. Pyrrhotite is usually dissemenated through or is immediately adjacent to the pods, lenses and stringers of sphalerite and galena mineralization.

GROUND MAGNETOMETER SURVEY

Comment

A total of 5670 line metres was magnetically surveyed over lines spaced 100 feet apart at an average station interval of 7.6 metres. Intermediate stations 3.8 and 1.9 metres were read over some steep magnetic gradient sections of the lines.

In order to determine whether portions of the folded rocks containing pyrrhotite might exhibit primarily a horizontal magnetic component which would not be detected by the vertical force fluxgate method, a total field nuclear precession instrument was run over the north end of the grid (L6+00N to L14+00N inclusive) for comparison studies.

Instruments Used

A McPhar Model M-700 Fluxgate magnetometer was used for the vertical force portion of the survey. It is hand held and levelled using a bubble level on the instrument face.

The unit measures the relative vertical force variations of the earth's magnetic field displayed in gammas (γ) on a meter having five ranges for a total of $\pm$ 100,000 γ.

For the comparison study a McPhar GP-70 Nuclear (proton) magnetometer was used. This instrument measures the absolute total earth's magnetic field with output displayed digitally on the face of the instrument. The instrument is hand held and the sensor can be either mounted on a staff or on a back-pack type harness.

TREATMENT OF DATA

The readings and time of readings were recorded in a metal-free field book and transferred to a planimetric map for contouring after the necessary diurnal and day-to-day corrections were made.

The scale of the values and contour maps of the Vertical Field magnetic survey is 1:1,000. Due to the large magnetic relief, a logarithmic contour interval above estimated background was used. That is, the contours are 200, 400, 800, 1600 gammas etc. Areas less than - 200 ɣ are shown "ticked" and areas greater than + 400ɣ are shown "hachured".

The magnetic values are relative to the absolute value of the vertical field which is unknown at this location. However, the background absolute value of the total field for this area is estimated to be 58,400 gammas.

DISCUSSION OF RESULTS AND INTERPRETATION

A. Vertical Field Survey

The relative magnetic values vary from -12,340 γ at L11N; Stn 0+12.5W to 5,740 γ on the same line at Stn 0+25E resulting in a maximum vertical field relief of 18,080 γ over the survey grid. This high relief is due to outcropping bands of pyrrhotite striking along the baseline and dipping steeply (50° - 70°) to the southeast. The pyrrhotite body in this area appears to be normally polarized. Recent drilling of this feature has discovered significant thicknesses of sphalerite-galena mineralization in association with pyrrhotite.

Numerous dipolar magnetic anomalies were observed throughout the survey grid. Generally they exhibit an elongation parallel to the baseline direction (057°) and suggest a complexly folded and faulted bed of pyrrhotite as the cause of these magnetic features. Trenching and drilling information has proven this complexity and it appears that many of the pyrrhotite zones are either overturned or are reversely magnetically polarized. Thus, although the magnetics have been of great assistance in locating the surface trace of the mineralized zones, dip interpretations can be quite erroneous. Known dikes observed from drill cores have also complicated the magnetic picture.

The dipolar anomalies between Line 3S and 8S are due to faulted and folded beds of pyrrhotite-sphalerite striking north-easterly and dipping about 50° to the southeast. The drill information has proven this dip although the interpretation from the mangetics would be that the dip should be the exact opposite (i.e to the northwest).

One must conclude, therefore, that the pyrrhotite in this area has been subjected to reverse magnetic polarization.

The magnetic high elongated along Line 8N and the one along Line 8S are interpreted to be caused by a change in strike direction possibly related to folding of the mineralized bed.

B. Total Field Test Survey

The above mentioned complexity of the mineralization, particularly the folding and faulting, led to the decision to carry out a test using a portable total field magnetomter over the same grid in which the vertical field survey was executed. It was felt that the folding could result in zones of economically significant mineralization having no apparent or meaningful magnetic response. That is, the vertical magnetic component could be negligible at certain locations along the folds.

The survey was started at the most northerly cut line (L14N) and ended at L6N when it became unsafe to proceed due to weather conditions and when it became apparent that the total field results were virtually no different from the vertical field results.

The northern lines were run further to the west resulting in the detection of what could be another zone of pyrrhotite-sphalerite-galena off the present grid in the vicinity of L11N; station 5W.

CONCLUSIONS AND RECOMMENDATIONS

The magnetometer survey has resulted in a clearer, but by no means complete, understanding of the Kingfisher property. Magnetics have proven to be a fast, relatively inexpensive geophysical tool for locating drill-holes for the proving of Zn - Pb tonnage and grade.

A comparison of the present vertical force results with the contour map of the magnetometer survey carried out in 1973 over a larger area using a different grid-line orientation and wider sampling interval clearly shows that it is necessary to carry out a very detailed survey using accurately located grid-lines and stations.

The total field test survey did not add significantly to the interpretation of the magnetics but did partially delineate a new magnetic feature to the west of the present area under investigation.

All dipolar anomalies drilled thus far have been due to pyrrhotite which has been accompanied by significant thicknesses and grades of sphalerite-galena mineralization.

It is therefore recommended that all dipoles should be drilled and that the entire property should be magnetically surveyed using a coarse cut grid initially with detailed coverage to follow in areas of interesting magnetic response.

Future magnetic surveys on the property should be carried out using a total field instrument primarily because of its faster read-out time and higher accuracy-objectivity characteristics. Presently available instruments appear to be capable of handling the steep magnetic gradients thus far encountered.

Respectfully submitted,

P.P. Nielsen, B.Sc.,
Geophysicist.

PERSONNEL

NIELSEN GEOPHYSICS LTD.

P.P. Nielsen - Geophysicist and Magnetometer Operator

COLBY MINES LTD.

J. O'Neill - Grid Line Rehabilitator

K.L. DAUGHTRY & ASSOCIATES LTD.

W.R. Gilmour - Draftsman

E. Kimball - Typist

STATEMENT OF COSTS

Field Survey (October 20 to October 30, 1976)

Wages:	P.P. Nielsen 4.33 days @ $150/day	$ 649.50	
	J. O'Neill 2 days @ $60/day	120.00	
Expenses:	Magnetometer rental	198.00	
	Truck rental, gas	92.80	
	Room & board	60.00	
	Telephone	7.00	
		$1,127.30	$1,127.30

Compilation of Results:

Wages:	P.P. Nielsen 1.67 days @ $150/day	250.50	
	W.R. Gilmour 1 day @ $100/day	100.00	
Expenses:	Draughting, printing	54.00	
	Secretarial	20.00	
		$ 424.50	424.50
		TOTAL	$1,551.80

STATEMENT OF AUTHOR'S QUALIFICATIONS

I DO HEREBY STATE:

1. I am the author of this report and carried out the work described herein.

2. I have been actively and responsibly involved in all aspects of mining geophysics in Canada, the United States, Africa and Australia over the past 12 years.

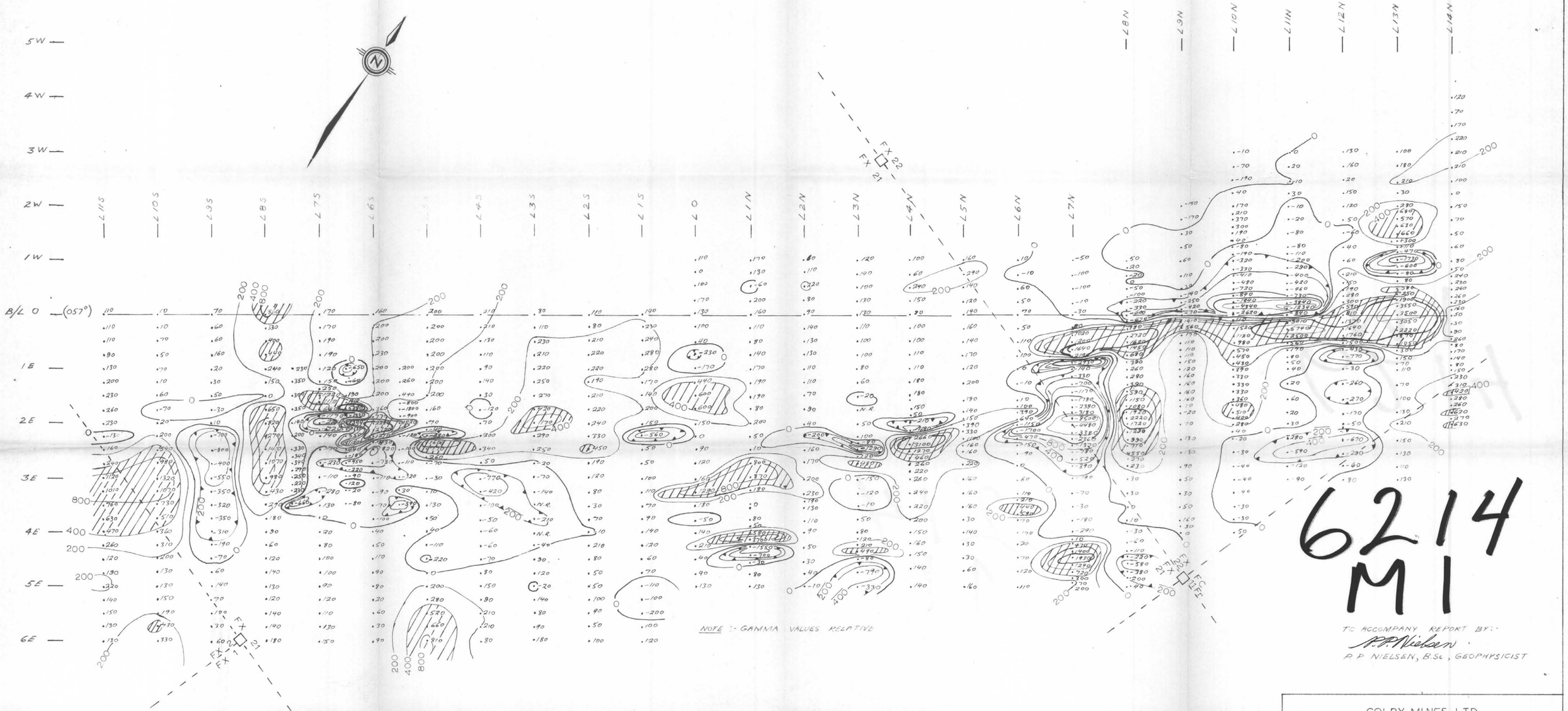
3. I graduated with a B.Sc. degree in Geophysics from the University of B.C. in 1969.

4. I am President of Nielsen Geophysics Ltd. with business address at #205 - 2910-30th Avenue, Vernon, B.C. V1T 2B7

5. I am a member of the S.E.G., CIMM and the B.C.G.S.

Signed P.P. Nielsen

Date Mar 19/1977



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M1

TO ACCOMPANY REPORT BY:-

P.P. Nielsen

P.P. NIELSEN, B.Sc., GEOPHYSICIST

INSTRUMENT USED :- McPHAR M-700 VERTICAL FORCE FLUX-GATE MAGNETOMETER

CONTOUR INTERVAL :- LOGARITHMIC

MAG. LOW

MAG. HIGH

CLAIM POST & LINES

COLBY MINES LTD.

KINGFISHER PROPERTY

MABEL LAKE AREA, B.C.

VERTICAL FIELD INTENSITY GROUND MAGNETOMETER SURVEY VALUES & CONTOUR MAP

VERNON M.D. N.T.S. 82L/10E15

NIELSEN GEOPHYSICS LTD.
VERNON, B.C.

FEB. 1977 SCALE 1:1000 BY:-PN

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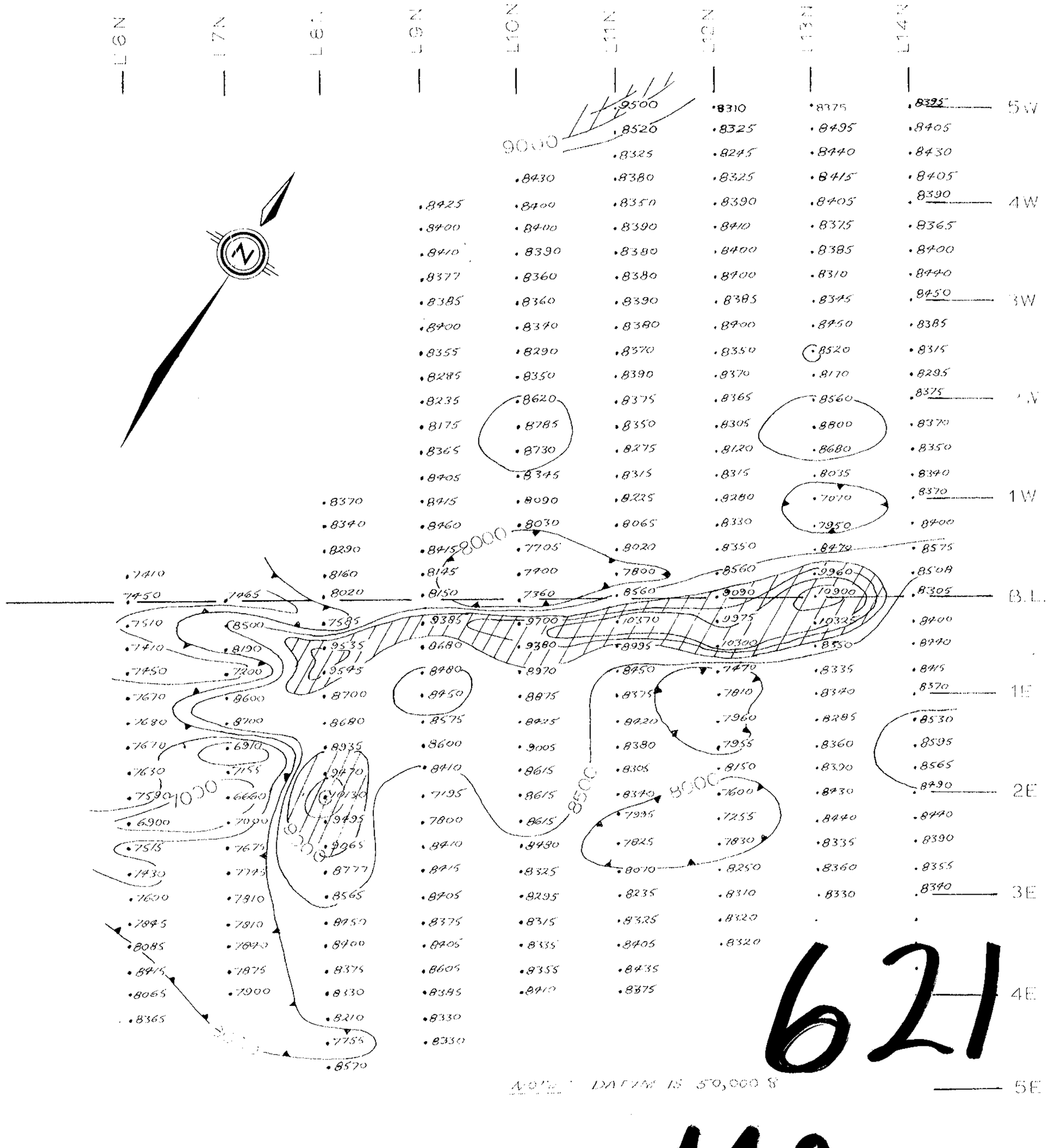
METRES



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M2

TO ACCOMPANY REPORT BY
P.R. Nielsen
P. R. NIELSEN, B. Sc., GEOPHYSICIST.

ARBITRARY VALUE OF LARGE TOTAL FIELD ANOMALY 58,400 GAMMAS

INSTRUMENT USED: McPHAR GP-70 PROTON MAGNETOMETER

CONTOUR INTERVAL: 500 G

AREAS OF LOW OVER 58,500 G

AREAS GREATER THAN 59,000 G

COLBY MINES LIMITED

KINGFISHER PROPERTY

MABEL LAKE AREA, B.C.

TOTAL FIELD INTENSITY

C.V.D. MAGNETOMETER TEST SURVEY

VERNON M.D. N.T.S. 82L/10 815

N. E. L. SEN GEOPHYSICS LTD.
VERNON, B.C.

FEB. 1977 SCALE 1" = 400' B.Y. P.N.

0 10 20 30 40 50
METRES