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KOULOMZINE, GEOFFROY, ~~REDACTED~~ & CO.

SUCCESSORS TO TECHNICAL-COUNSEL LIMITED
GEOPHYSICAL AND GEOLOGICAL PROSPECTING

H. KOULOMZINE, L. Sc. Ing. ENSP
PARIS & STRASBOURG UNIVERSITIES

P. R. GEOFFROY, M. E.
ECOLE POLYTECHNIQUE PARIS

~~REDACTED~~ RESEARCH SC.
MONTELEONE UNIVERSITY STRASBOURG
PROFESSOR LAND SURVEYOR



010

VAL D'OR, Que.

Report on the Magnetometer Survey

of the property of

FREDERICK MINING & DEVELOPMENT LIMITED

Echo and McAree Townships

District of Kenora - N. W. Ontario

by

T. Koulomzine, L.Sc., Ing. ENSP. &

P. R. Geoffroy, M.E.

February - April 1950.

INTRODUCTION

The property covered by the present report consists of 21 mining claims numbered KRL-23,106 to KRL-23,123 incl. and KRL-22,735 to KRL-22,737 incl. a total of 838.23 acres. The ground adjoins on the northwest the Newlund Mines, a gold prospect where a program of underground development is presently under way. The claims occupy the entire lot 8, Concession II, as well as portions of lots 7 and 9, Concession II, and of lots 8, 9 and 10, Concession I, Echo Township. Finally, one claim is located in the adjoining McAree Township.

The Frederick holdings are fairly easy of access and can be reached either by motor road leading to the shaft of Newlund Mines, which is less than half a mile from the boundary, or by another road going to old lumber camps located on the south shore of Kathlyn Lake. The main highway between Sioux Lookout and Dryden passes about 2 miles southeast from the property.

The ground is almost entirely covered by overburden with some 180 acres lying under the waters of Crossecho Lake. Therefore, the aim of the survey was to outline the geological structure masked by the mantle of glacial drift and locate the areas most likely to present conditions favorable to the localization of ore deposits.

GENERAL GEOLOGY

The general geology of the district is described in a report prepared by M.E.Hurst, entitled "Geology of the Sioux Lookout Area" and issued as part VI of the Forty-first Annual Report of the Ontario Department of Mines.

Map 41-h attached to this report is drawn at a scale of $1\frac{1}{2}$ miles per inch and is of a rather sketchy nature. It shows the property as occupying part of a three-mile wide greenstone belt which is flanked on both sides by greywacke sediments and intruded by algomian granites and porphyries.

The general area contains a number of iron formation belts and pyrite deposits; one of the latter, the North Pines Mines, located 17 miles from the Frederick Mining and Development property, was worked years ago and several hundred thousand tons of pyrite ore were mined. Although the mine was primarily a pyrite producer the ore contained small amounts of copper and zinc.

The Newlund Mine adjoining the Frederick claims, was discovered after the report and map mentioned above have been issued by the Ontario Department of Mines. There are no publications describing the geology of the Newlund, but we understand that the gold deposition is present in the form of tension veins located at right angles to the general trend of tension veins located at right angles to the general trend of a granodiorite sill interstratified in a complex of greenstones and other diorite, granodiorite and porphyritic sills and dykes.

A few tests that we made on rock samples coming from the Newlund indicate that both the intrusives and the greenstones are magnetic in varying degrees and, therefore, on the strike of the Newlund property conditions are such that magnetometer measurements could be expected to be helpful in outlining the general structure, but would not show a clear-cut distinction between the individual greenstone belts and the intrusive dykes and sills.

Our survey was performed in winter, and it was not possible for us to supplement the geophysical work by any adequate examination of rock outcrops which are very few indeed. We have noticed some 1) on the shores of Crossecho Lake, 2) near station 6 south Line 10 + 50 East, 3) and just east of the eastern boundary of claim KRL-23, 111.

The major part of the property is covered by low spruce bush and some alders. The northern boundary is on a high sand and boulder ridge.

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The major part of the property is covered by low spruce bush and some alders. The northern boundary is on a high sand and boulder ridge.

RESULTS OF THE SURVEY

All the results of the survey are gathered on a 200-foot-to-the-inch map attached to this report. Technical details concerning the establishment of the network of picket lines and the performance of the measurements are to be found in the Appendix, while the geological interpretation of the results is given hereafter.

From the magnetic point of view the property can be divided into three main areas presenting different magnetic and, in all probability, geological conditions. The main section of the ground north of line a, b, c, shows, except for two well-defined magnetic bands, generally uniform and low magnetic readings. South of this line the magnetic conditions apparently correspond to those present at Newlund, the ground being underlain by a complex of more or less parallel magnetic bands. The results of the survey on the three southern claims indicate a still different structure characterized by the fact that the trend of the formations is N 10° E instead of N 70° E.

NORTH ZONE

Outside of the two prominent magnetic belts the northern part of the property is magnetically uniform with the readings being low denoting that the area is underlain by non-magnetic greenstones or possibly sediments. . The overburden is deep and this makes it almost impossible to determine by the study of the profiles whether the non-magnetic areas are underlain by non-magnetic greenstones, sediments or granitic intrusives. The fact that two magnetic belts, each more than one mile long, are interstratified in the non-magnetic area would suggest that the rocks underlying the northern part of the property are more likely to be volcanics or sediments rather than intrusives.

Nevertheless, the disappearance of magnetic belt M₂ and its slight band to the north may be interpreted as an indication that the western part of the non-magnetic belt, marked "Zone G" on the map, could be underlain by granite.

Magnetic Belts M₁ and M₂

These two parallel belts are respectively 600 and 500 feet wide and show magnetic maxima varying between 500 and 4,600 gammas. Prior to the performance of the detail measurements it was thought that they represented either bands of magnetic volcanics or sill-like intrusive bodies of

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RESULTS OF THE SURVEY

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Nevertheless, the disappearance of magnetic belt M_2 and its slight bend to the north may be interpreted as an indication that the western part of the non-magnetic belt, marked "Zone G" on the map, could be underlain by granite.

Magnetic Belts M_1 and M_2

These two parallel belts are respectively 600 and 500 feet wide and show magnetic maxima varying between 500 and 4,600 gammas. Prior to the performance of the detail measurements it was thought that they represented either bands of magnetic volcanics or sill-like intrusive bodies of

magnetic diorites or peridotites. Detail measurements that we did on 13 profiles crossing these magnetic belts indicated the extreme complexity of the magnetic bands causing the anomalies; furthermore, we were able to determine that the magnetization of the individual belts is not uniform as is usually the case when intrusives are encountered. It has been found that several of the magnetic zones show a strongly magnetic core, either in the middle or on the side of the belt, with the magnetization gradually diminishing towards the contact. All these conditions lead us to interpret belts M₁ and M₂ as being caused either by sedimentary lenticular iron formations or by bands of magnetic mineralization which could be either magnetite or magnetic sulphides.

The analytical study of a number of detail magnetometer profiles gives the following determinations of the depth of overburden and the width of the individual magnetic lenses causing the anomalies:

	<u>Depth of overburden</u>	<u>Width of magnetized zone</u>
L 24 E 10 N	162	210 ft.
L 27 E 10 N	131	240 ft.
L 9 E 17 N	78 to 110	148-144 ft.
L 15 E 15 N	78	144 ft.
L 21 E 30 N	53	?

Cross-fracturing

The same determinations show that there exists a conspicuous change in the intensity of magnetization and in the depth of overburden on both sides of a line that we have marked as F₁. West of this line the overburden is not only thicker but the magnetization of the same belts is from 3 to 4 times stronger than east of the line. Such a condition can be caused either by a vertical fault bringing to surface different parts of magnetite iron formation lenses or by magnetic mineralization being controlled by the fault and being more intense west of it. There is no doubt that the immediate vicinity of this cross-fracture should be explored by diamond-drilling. Because of the great depth of overburden east of this assumed fault, any diamond-drilling should be done west of it.

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L 21 E 30 N	53	?

Cross-fracturing

The same determinations show that there exists a conspicuous change in the intensity of magnetization and in the depth of overburden on both sides of a line that we have marked as F_1F_1 . West of this line the overburden is not only thinner but the magnetization of the same belts is from 3 to 4 times stronger than east of the line. Such a condition can be caused either by a vertical fault bringing to surface different parts of magnetite iron formation lenses or by magnetic mineralization being controlled by the fault and being more intense west of it. There is no doubt that the immediate vicinity of this cross-fracture should be explored by diamond-drilling. Because of the great depth of overburden east of this assumed fault, any diamond-drilling should be done west of it.

CENTRAL ZONE

As already mentioned, this zone is underlain by a complex series of magnetic belts and probably intrusive sills similar to those present at the neighbouring Newlund Mine. It must be emphasized that the complexity of the structure in this zone is such that it seems futile to outline all the individual magnetic belts. At the neighbouring Newlund Mine there does not seem to be any particular relationship between the ore deposition and the shape of the granodiortie sill in which the ore zone is found. It is probable that eventually, when the mine will be better known, it will be determined that the fracture zone is controlled by minor folds of the sill which have not as yet been recognized. If such is the case, the most favourable conditions for ore deposition at Frederick would be near the western boundary of claims KRL-23, 112 and KRL-23, 114 where the formation starts to bend to the south. It is probable that a much better interpretation of the structure of the central part of the property could be possible after a few drill holes are put down and a definite correlation is made between the individual magnetic bands and the formations that cause them.

SOUTH ZONE

The south zone covers claims KRL-22,735 to KRL-22,737. As already mentioned, the magnetically indicated strike of the formations, on these claims, forms an angle of 60° with the strike present in the northern part of the property. The change of strike is undoubtedly due to the large mass of granite intruding the southwestern shore of Crossecho Lake. The two southern claims have been surveyed magnetically in 1946 by Geosurveys Limited and the results of their measurements are incorporated on our map. Geosurveys have interpreted the lower readings in the central part of the claims to correspond to a dyke of quartz porphyry. We have no reason to change materially this interpretation and have indicated on the map as Zone P₁ the area probably underlain by the quartz porphyry. A study of outcrops made by Geosurveys show that the high magnetic readings on both sides of the porphyry are obtained over intermediate coarse grained lava containing disseminated shreds of sulphide. This area should be examined in the spring by surface trenching.

The quartz porphyry may well be a favourable host-rock to gold-bearing quartz veins, and some diamond drilling could be done to investigate the contacts between the greenstones and the quartz porphyry. The most interesting area could be along the line where the strike of the formations changes.

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The axis of the bend passes through the corner between claims KRL-22,735 and KRL-23,114. It extends into the adjoining McCombe claims that seem to warrant a careful investigation.

SUMMARY AND RECOMMENDATIONS

The magnetometer survey was instrumental in outlining the general geological structure of the property and showed the existence of anomalies that may possibly be due to magnetic sulphides. It also indicated the presence of an assumed cross-fracture and of a change in the strike of the formations between the extreme south claims and the main part of the property. Unfortunately, the axis of this band lies almost entirely on neighbouring claims, which have not been surveyed.

We recommend that the next step of the exploration program consist of cross-sectional drilling of the strong magnetic anomalies immediately west of the assumed cross-fracture F_1F_1 and of a section along, or near, the western boundary of claim KRL-23,114, where the complex of magnetic volcanics and intrusive sills essentially identical with the rocks present at the Newlund is affected by a slight bending that may have produced ore bearing fracturing.

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The axis of the bend passes through the corner between claims KRL-23,735 and KRL-23,114. It extends into the adjoining McComb claims that seem to warrant a careful investigation.

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Thompson

APPENDIX

TECHNICAL DETAILS OF THE MAGNETOMETER SURVEY

Network of Picket Lines.

The network of picket lines used in our survey was established in such a manner that magnetic profiles be more or less at right angles to the general trend of the formations. The entire survey was started from the southwest corner of claim KRL-23,111 which itself was established on the ground by careful chainage of a quarter of a mile from the survey post located at the southeast corner of the same claim. The base line was started at an angle of approximately N 45° E and the exact position of this base line was established by chaining intersections of it with the two northsouth Government survey lines separating lots 6, ans 7, and 8 and 9. A series of approximate boundary lines were established on the ground wherever necessary, i.e. where the boundary did not coincide with Government survey lines.

Ordinary picket lines were started at 300-foot intervals and at right angles to the base and the ends of all the picket lines have been located by means of chaining their intersections with the Government survey lines forming the boundaries of the properties or with the approximate boundaries established on the ground. All the chainages determining the position of the network of the picket lines have been plotted on our map. In addition to that we have plotted the boundaries of the claims as determined by their respective positions as parts of the Government survey lots.

The work of line cutting was done between February 8th and March 16th and therefore, the numbered pickets had to be planted into the snow and will undoubtedly fall down this coming spring. In order to preserve the network it would be necessary to replant the pickets into the ground as soon as the frost is gone.

Magnetometer Survey

Magnetometer measurements on the property were performed between February 25th and March 18th. The measurement stations established and the readings performed can be classified as follows:

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APPENDIX

TECHNICAL DETAILS OF THE MAGNETOMETRIC SURVEY

Network of Picket Lines.

The network of picket lines used in our survey was established in such a manner that magnetic profiles be more or less at right angles to the general trend of the formations. The entire survey was started from the southwest corner of claim KAL-23,111 which itself was established on the ground by careful chainage of a quarter of a mile from the survey post located at the southeast corner of the same claim. The base line was started at an angle of approximately N 45° E and the exact position of this base line was established by chaining intersections of it with the two north-south Government survey lines separating lots 6, and 7 and 8 and 9. A series of approximate boundary lines were established on the ground wherever necessary, i.e. where the boundary did not coincide with Government survey lines.

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Magnetometer Survey

Magnetometer measurements on the property were performed between February 25th and March 18th. The measurement stations established and the readings performed can be classified as follows:

Base stations	3	
Ordinary stations	1168	
Detail stations on intermediate lines	222	
Detail stations on lines of main network	<u>125</u>	
Total number of new stations	1518	1518
Stations of 1946 survey plotted on map		<u>217</u>
Total number of stations on map		1789
Check measurements on bases	58	
Check measurements on ordinary stations	<u>64</u>	
Total number of new magnetometer measurements performed	1840	

The survey was done with a Ruska magnetometer measuring the variations of the vertical component of the earth's magnetic field. The instrument was set for precision work, with its scale constant set at 15.9 gammas per scale division, while its temperature coefficient was kept at zero.

In the course of the field work certain errors are introduced into the results by diurnal magnetic variations. These were minimized by checking at regular time intervals of about 3 hours at previously established magnetic base stations and the daily variation observed was distributed proportionately to time between stations taken during the day.

Calculations show that the mean quadratic error of the check measurements taken on ordinary measurement stations is ± 9.7 gammas. This is an excellent precision taking into consideration that most of the check measurements were performed in the course of the detail work done over profiles showing high magnetic readings.

All the magnetic values plotted on the accompanying map are expressed in gammas (1 gamma 1/100,000 Gauss, C.G.S.) and referred to an arbitrarily chosen base station located on L 15/0. This base station was considered to have a value of -100 gammas. The absolute value of the vertical component of the earth's magnetic field at this base station is of about 59,500 gammas.

The map attached to this report is drawn both in profiles and in contours. The contours have been coloured

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Base stations	3	
Ordinary stations	1168	
Detail stations on intermediate lines	222	
Detail stations on lines of main network	<u>125</u>	
Total number of new stations	1518	1518
Stations of 1946 survey plotted on map		<u>271</u>
Total number of stations on map		1789
Check measurements on bases	58	
Check measurements on ordinary stations	<u>64</u>	
Total number of new magnetometer measurements performed	1640	

The survey was done with a Huska magnetometer measuring the variations of the vertical component of the earth's magnetic field. The instrument was set for precision work, with its scale constant set at 15.9 gammas per scale division, while its temperature coefficient was kept at zero.

In the course of the field work certain errors are introduced into the results by diurnal magnetic variations. These were minimized by checking at regular time intervals of about 3 hours at previously established magnetic base stations and the daily variation observed was distributed proportionately to time between stations taken during the day.

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and give a general picture of the magnetic pattern. The more detailed interpretation of the position of the magnetic contacts and the determinations of depths and widths of the magnetic belts causing the high readings was done by the study of magnetic profiles which have been drawn at a scale of 1,000 gammas to the inch.

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HOULOMINE, GEOFFROY & COMPANY

Statement to be attached to form 14 Report of work on Claims NKL-23,106 to NKL-23,123 incl. and NKL-22,735.

Type of Instrument - Huska vertical force magnetometer.

Employee	Address	Period employed in connection with Frederick Mining & Development Limited properties	Total man days
T.Houlomzine,	Val d'Or, Que.	March 14-17, 1950 April 1-15, 1950	18
P.R. Geoffroy,	Val d'Or, Que.	April 10-15, 1950	6
Mrs. J. Chouinard,	Val d'Or, Que.	March 25-April 15/50	18
R. Brewer,	Bourlamaque, Que.	April 4-15, 1950	10
P. Scherbak,	Val d'Or, Que.	April 10-15, 1950	6
M. Ferderber,	Val d'Or, Que.	February 8-March 27/50	45
R. Dufour,	Val d'Or, Que.	February 8-March 27/50	45
P.E. Simard,	Val d'Or, Que.	February 8-March 27/50	<u>45</u>
On entire group of ^{X.H.} 18 mining claims			193 man days
or 772 days of assessment work credit.			

KOULOMZINE, GEOFFROY & COMPANY

Statement of data referring to geophysical
survey performed on
the property of
FREDERICK MINING & DEVELOPMENT LIMITED

Type of instrument used: Ruska vertical force magnetometer.
Scale constant 15.9.

Total number of stations established
Magnetometer 1518

Total number of miles of picket lines cut 24.16 miles
other lined cut (concession
lines, claim boundaries etc.) 4.00 miles
28.16 miles

Breakdown of man days required for survey.

a) Line cutters 3 men R. Dufour - chief line cutter	87 man days
b) Instrument operators & technical assistants 2 men M. Ferderber - operator	48 " "
c) Consultants (1) field work 1 man T. Koulomzine, Geophysicist in charge (11) office work 2 men T. Koulomzine, P. R. Geoffroy,	4 " " 12 " "
d) Draftsmen 3 men T. Koulomzine, R. Brewer, P. Scherbak,	24 " "
e) Calculation of field notes Mrs. J. Chouinard Typing of report " "	16 " " 2 " "
	<hr/>
TOTAL	193 " "

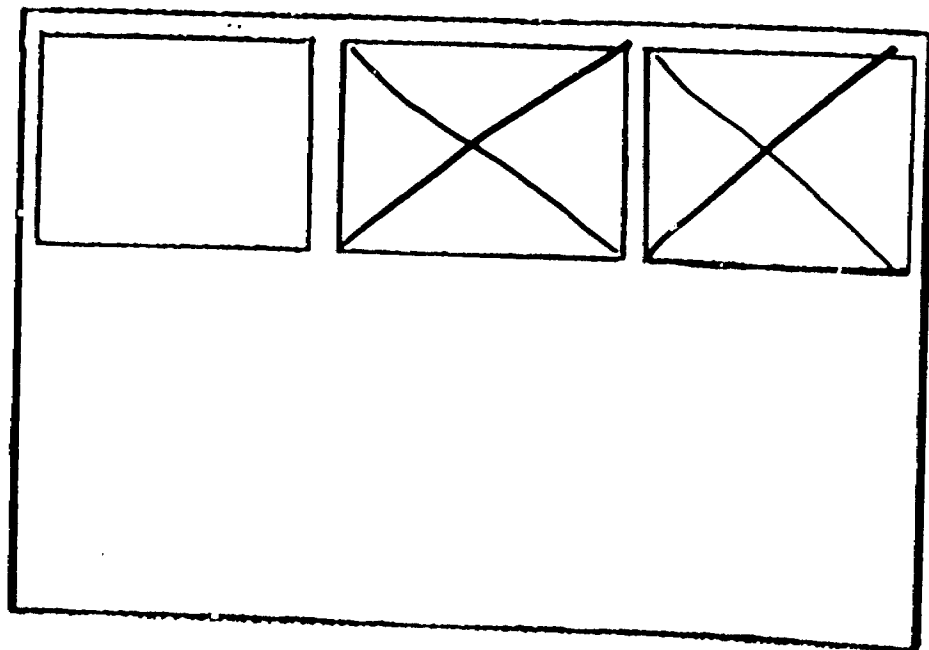
KOULOMZINE, GEOFFROY & CO

T. Koulomzine
5

SEE ACCOMPANYING
MAP(S) IDENTIFIED AS

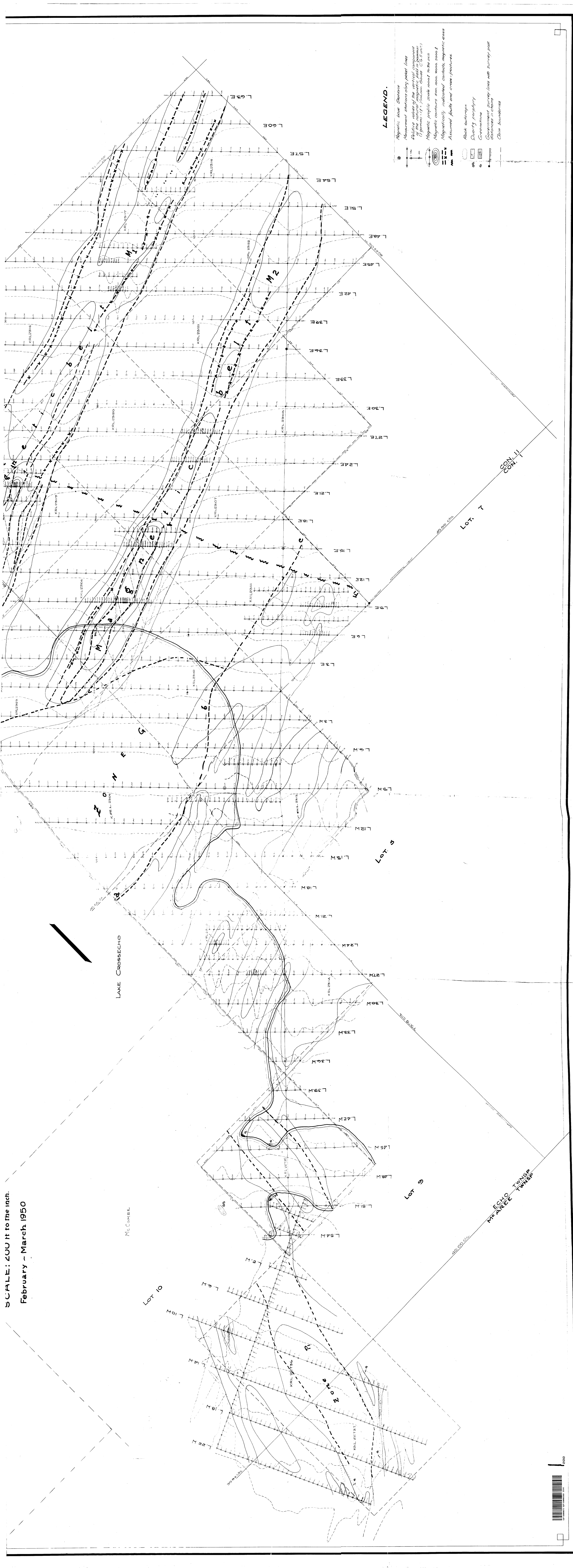
52 F/16 NW-0039-B1 #1

LOCATED IN THE MAP
CHANNEL IN THE FOLLOWING
SEQUENCE (X)



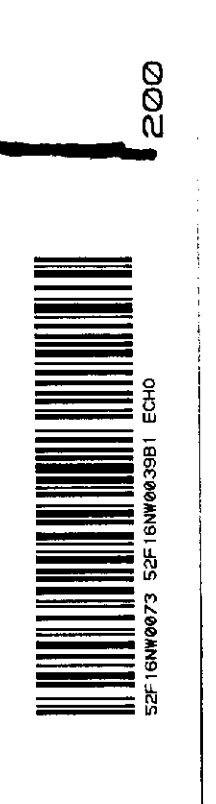
SCALE: 200 ft to the inch.

February - March 1950



LEGEND.

- Magnetic contour lines
- Measurement stations (dots)
- Positive values of the vertical component (dots)
- Negative values of the vertical component (dots)
- Magnetic profile (solid line)
- Magnetic contours (dashed line)
- Magnetically indicated contacts, magnetic axes
- Assumed faults and cross-structures
- Rock outcrops
- Quarry property
- Greenstone
- Government survey lines with survey post distances in chains
- Claim boundaries



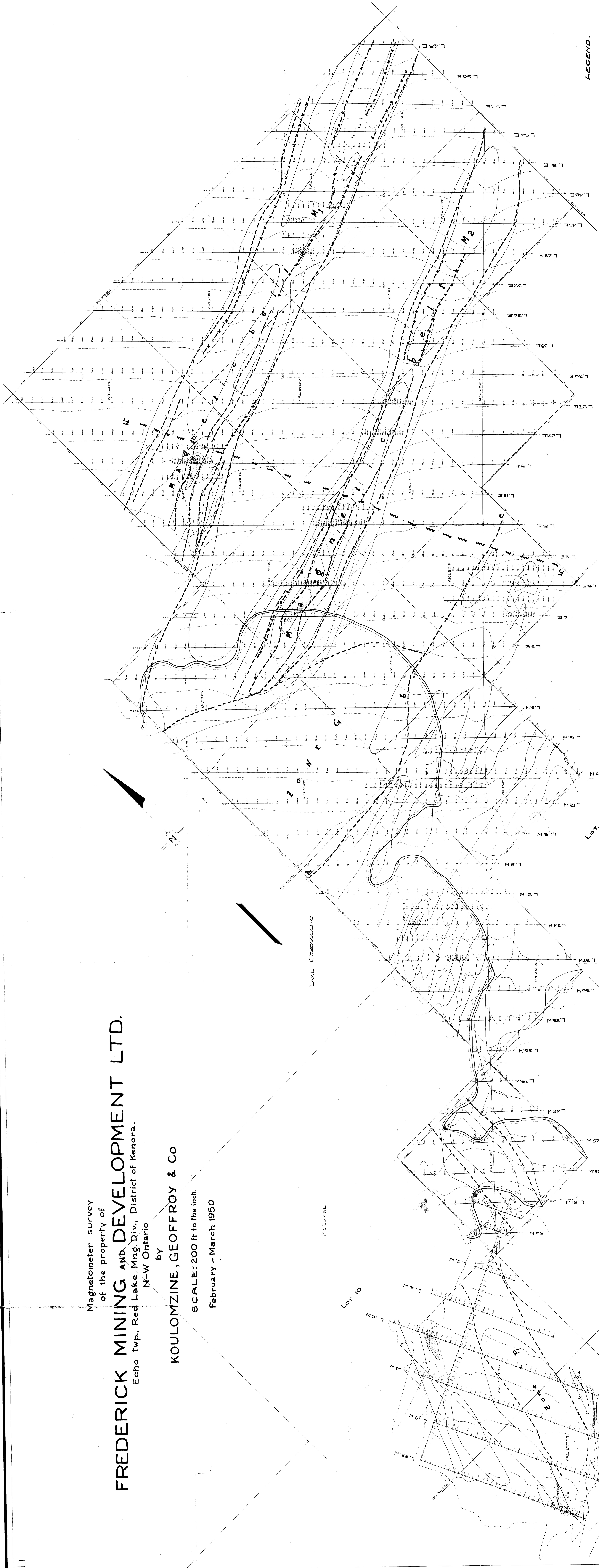
12000

52 F/16 NW-0039-81 #1

Magnetometer survey
of the property of
FREDERICK MINING AND DEVELOPMENT LTD.
Echo twp., Red Lake/Mng. Div., District of Kenora.
N-W Ontario

by
KOULOMZINE, GEOFFROY & CO

SCALE: 200 ft to the inch.
February - March 1950



LEGEND.