52K15NW0032 2.1337 FREDART LAKE

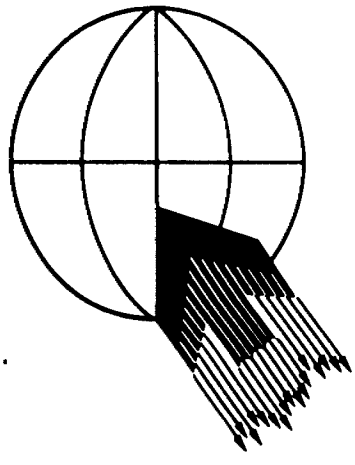
010

AIRBORNE ELECTROMAGNETIC SURVEY

ROXMARK MINES LIMITED

BELANGER TWP. AREA, ONTARIO

FILE NO: 14023



Questor Surveys Limited, 20 Canso Rd., Rexdale, Ontario, Canada.

INTRODUCTION

This report contains our interpretation of the results of an airborne electromagnetic survey flown in the Belanger Twp. Area, Ontario on August 10 and 11, 1972. A brief description of the survey procedure together with recommendations for ground follow-up is included.

The survey totalled 13 line miles and was performed by Questor Surveys Limited. The survey aircraft was a Skyvan CF-OSL and the operating base was Red Lake, Ontario.

The area outline is shown in a 1:125,000 map at the end of this report. This is part of the Trout Lake - Birch Lake Sheet, Preliminary Geological Map No. P 406.

MAP COMPILATION

The base map is an uncontrolled mosaic constructed from Ontario Department of Lands & Forests 1" = 1/4 mile photographs. The mosaic was reproduced at a scale of 1" equals 1320 feet on stable transparent film from which white prints can be made.

Flight path recovery was accomplished by comparison of the prints of the 35mm film with the mosaic in order to locate the fiducial points. These points are approximately one mile apart.

DATA PRESENTATION

The symbols used to designate the anomalies are shown in the legend on each map sheet, and the anomalies on each line are lettered in alphabetical order in the direction of flight. Their locations are plotted with reference to the fiducial numbers on the analog record.

A sample record is included to indicate the method used for correcting the position of the E.M. Bird and to identify the parameters that are recorded.

All the anomaly locations, magnetic correlations, conductivity-thickness values and the amplitudes of channel number 2 are listed on the data sheets accompanying the final maps.

GENERAL INTERPRETATION

The INPUT system will respond to conductive overburden and near-surface horizontal conducting layers in addition to bedrock conductors. Differentiation is based on the rate of transient decay, magnetic correlation and the anomaly shape together with the conductor pattern and topography.

Power lines sometimes produce spurious anomalies but these can be identified by reference to the monitor channel.

Railroad and pipeline responses are recognized by studying the film strips.

Graphite or carbonaceous material exhibits a wide range of conductivity. When long conductors without magnetic correlation are located on or parallel to known faults or photographic linears, graphite is most likely the cause.

Contact zones can often be predicted when anomaly trends coincide with the lines of maximum gradient along a flanking magnetic anomaly. It is unfortunate that graphite can also occur as relatively short conductors and produce attractive looking anomalies. With no other information than the airborne results, these must be examined on the ground.

Serpentinized peridotites often produce anomalies with a character that is fairly easy to recognize. The conductivity which is probably caused in part by magnetite, is fairly low so that the anomalies often have a fairly large response on channel #1; they decay rapidly, and they have strong magnetic correlation. INPUT E.M. anomalies over massive magnetites show a relationship to the total Fe content. Below 25 - 30%, very little or no response at all is obtained, but as the percentage increases the anomalies become quite strong with a characteristic rate of decay which is usually greater than that produced by massive sulphides.

Commercial sulphide ore bodies are rare, and those that respond to airborne survey methods usually have medium to high conductivity. Limited lateral dimensions are to be expected and many have magnetic correlation caused by magnetite or pyrrhotite. Provided that the ore bodies do not occur within formational conductive zones as mentioned above, the anomalies caused by them will usually be recognized on an E.M. map as priority targets.

SURVEY PROCEDURE

Terrain clearance was maintained as close to 400 feet as possible, with the E.M. Bird at approximately 150 feet above the ground. A normal S-pattern flight path using approximately one mile turns was used. The equipment operator logged the flight details and monitored the instruments.

A line spacing of 1000 feet was used.

INTERPRETATION AND RECOMMENDATIONS

The trend of anomalies which extends from intercept 18A to intercept 36A inclusive, is thought to be due to an iron formation. It will be noted on Ontario Department of Mines, Preliminary Geological Map. No. P 406, that sulphides is indicated in the vicinity of intercepts 31A, 31B, 31C, 32A and 32B. The conductor displays a good E.M. response and has good magnetic correlation. The anomalies have a relatively broad E.M. response in relation to their amplitudes. This could be an indication of either of two things. First, the conductor is at depth or second, it is a wide zone. The latter is thought to be the cause of the broad response.

A second group of anomalies, intercepts 15A, 16A and 17A, which are situated at the extreme west end of the claim blocks, could have interesting possibilities. They display good E.M. responses and have flanking magnetic

correlation. The zone appears to be isolated from the previously mentioned iron formation. Referring to Map No. P 406, metavolcanics with some metasediments have been indicated. Ground follow-up on this conductor is suggested.

QUESTOR SURVEYS LIMITED

R. de Carle

R. de Carle

Geophysicist

APPENDIX

EQUIPMENT

The aircraft are equipped with Mark VI INPUT (R) airborne E.M. systems and Barringer AM-104 or AM-101A proton precession magnetometers. Radar altimeters are used for vertical control. The outputs of these instruments together with fiducial timing marks are recorded by means of galvanometer type recorders using light sensitive paper. Thirty-five millimeter continuous strip cameras are used to record the actual flight path.

(I) BARRINGER/QUESTOR MARK VI INPUT (R) SYSTEM

The Induced Pulse Transient (INPUT) system is particularly well suited to the problems of overburden penetration. Currents are induced into the ground by means of a pulsed primary electromagnetic field which is generated in a transmitting loop around the aircraft. By using half sine wave current pulses and a loop of large turns-area, the high output power needed for deep penetration is achieved.

The induced current in a conductor produces a secondary electromagnetic field which is detected and measured after the termination of each primary pulse. Detection is accomplished by means of a receiving coil towed behind the aircraft on four hundred feet of cable,

and the received signal is processed and recorded by equipment in the aircraft. Since the measurements are in the time domain rather than the frequency domain common to continuous wave systems, interference effects of the primary transmitted field are eliminated. The secondary field is in the form of a decaying voltage transient originating in time at the termination of the transmitted pulse. The amplitude of the transient is, of course, proportional to the amount of current induced into the conductor and, in turn, this current is proportional to the dimensions, the conductivity and the depth beneath the aircraft.

The rate of decay of the transient is inversely proportional to conductivity. By sampling the decay curve at six different time intervals, and recording the amplitude of each sample, an estimate of the relative conductivity can be obtained. By this means, it is possible to discriminate between the effects due to conductive near-surface materials such as swamps and lake bottom silts, and those due to genuine bedrock sources. The transients due to strong conductors such as sulphides exhibit long decay curves and are therefore commonly recorded on all six channels. Sheet-like surface materials, on the other hand, have short decay curves and will normally only show a response in the first two or three channels.

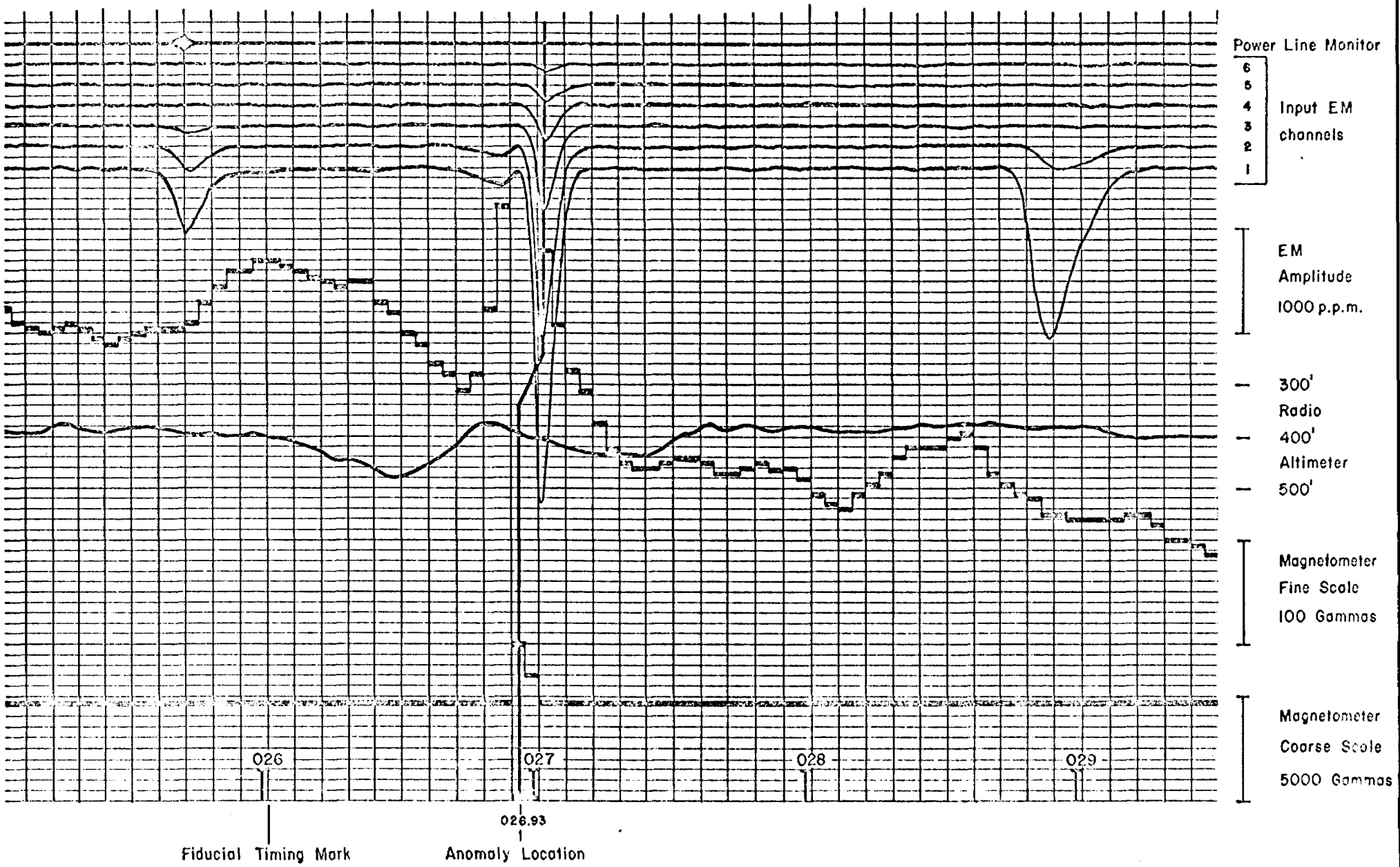
The samples, or gates, are positioned at 260, 480, 755, 1100, 1575 and 2100 micro-seconds after the cessation of the pulse. The widths of the gates are 225, 225, 320, 410, 500 and 540 micro-seconds respectively.

For homogeneous conditions, the transient decay will be exponential and the time constant of decay is equal to the time difference at two successive sampling points divided by the log ratio of the amplitudes at these points.

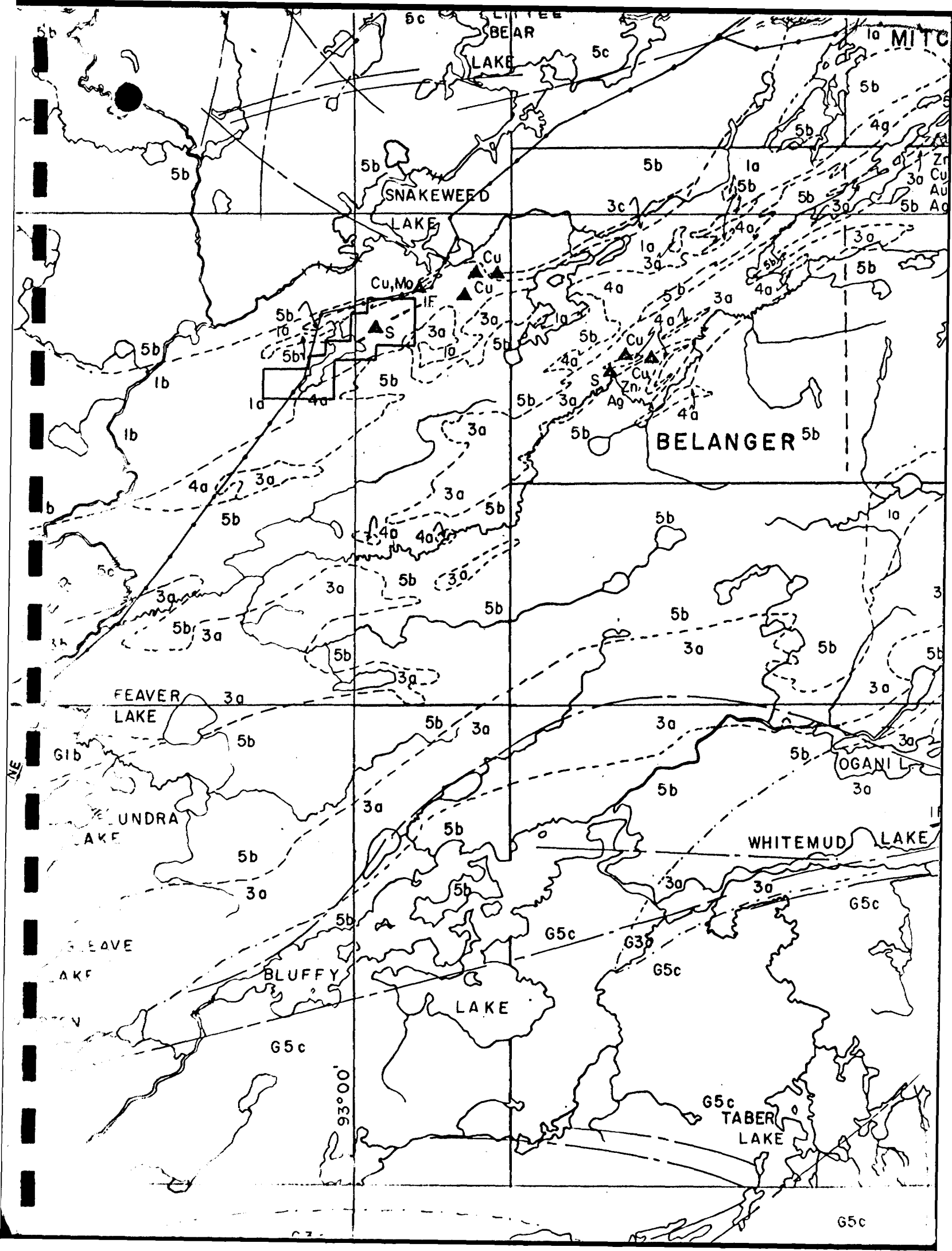
(II) BARRINGER AM-104 OR AM-101A PROTON PRECESSION MAGNETOMETER

The magnetometers which measure the total magnetic field have a sensitivity of 5 gammas and a range from 20,000 gammas to 100,000 gammas.

Because of the high intensity field produced by the INPUT transmitter, the magnetometer results are recorded on a time-sharing basis. The magnetometer head is energized while the transmitter is on, but the read-out is obtained during a short period when the transmitter is off. Using this technique, the head is energized for 1.15 seconds and then the transmitter is switched off for 0.15 seconds while the precession frequency is being recorded and converted to gammas. Thus a magnetic reading is taken every 1.3 seconds.



Representative INPUT, Magnetometer and Altimeter Recording


LITTLE BEAR LAKE
SNAKEWEED LAKE
BELANGER
FEAVER LAKE
UNDRA LAKE
BLUFFY LAKE
WHITEMUD LAKE
OGANI L
TABER LAKE
93°00'
Cu
Cu,Mo
Zn
Ag
Au
S
5b
5c
1a
1b
3a
3c
4a
4g
G1b
G3b
G5c

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900

GEOPHYSICAL – GEOL
TECHNICAL D...

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey: Airborne EM and Magnetometer

Township or Area: Belanger Township

Claim holder(s): Roxmark Mines Ltd.
Ste. 310 - 55 Yonge St., Toronto

Author of Report: R. de Carle

Address: 20 Canso Road, Rexdale, Ontario

Covering Dates of Survey: Aug. 10 & 11th, 1972
(linecutting to office)

Total Miles of Line cut:

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

DAYS per claim

Geophysical
--Electromagnetic:
--Magnetometer:
--Radiometric:
--Other:
Geological:
Geochemical:

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer: Electromagnetic: 17 Radiometric:
(enter days per claim)

DATE: Oct. 22, 1973 SIGNATURE: J. A. Larkin
Author of ~~Report~~ or Agent

PROJECTS SECTION

Res. Geol.: Qualifications: 2,467

Previous Surveys: L.D. 2.1287 assaying 63.2573 ground and Airborne mag & EM diff instruments performed 1969

Checked by: date:

GEOLOGICAL BRANCH

Approved by: date:

GEOLOGICAL BRANCH

Approved by: date:

OFFICE USE ONLY

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
KRL	61797
KRL	61798
KRL	61801
KRL	61802

1.7 x 40 = 68 ÷ 4 =
17 days but go for 20 days.

If space insufficient, attach list

TOTAL CLAIMS: 4

Show instrument technical data in each space for type of survey submitted or indicate "not applicable"

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS

Number of Stations _____ Number of Readings _____

Station interval _____

Line spacing _____

Profile scale or Contour intervals _____

(specify for each type of survey)

MAGNETIC

Instrument _____

Accuracy - Scale constant _____

Diurnal correction method _____

Base station location _____

_____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency _____

(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

_____

Base station value and location _____

_____

Elevation accuracy _____

INDUCED POLARIZATION – RESISTIVITY

Instrument _____

Time domain _____ Frequency domain _____

Frequency _____ Range _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

_____

Corrections made _____

_____

RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

_____

Additional information (for understanding results) _____

_____

_____

AIRBORNE SURVEYS

Type of survey(s) EM and MAG

Instrument(s) Mark VI INPUT and AM-104 Proton Magnetometer
(specify for each type of survey)

Accuracy AM-104 has a 5 gamma sensitivity
(specify for each type of survey)

Aircraft used Skyvan CF-OSL

Sensor altitude 150 feet

Navigation and flight path recovery method Visual Navigation Utilizing 1/4 mile photos.
Flight path 35 mm strips used to plot path on mosiac

Aircraft altitude 400 feet Line Spacing 1000 feet

Miles flown over total area 450 line miles Over claims only ~~13~~ line miles

1.7 & 2 approx

allow 2 × 40 = 80 ÷ 4 = 20 days

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken _____

_____

_____

Total Number of Samples _____

Type of Sample _____
(Nature of Material)

Average Sample Weight _____

Method of Collection _____

_____

Soil Horizon Sampled _____

Horizon Development _____

Sample Depth _____

Terrain _____

_____

Drainage Development _____

Estimated Range of Overburden Thickness _____

_____

_____

SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis _____

_____

_____

_____

General _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ANALYTICAL METHODS

Values expressed in: per cent ☐
p. p. m. ☐
p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)

Others _____

Field Analysis (_____ tests)

Extraction Method _____

Analytical Method _____

Reagents Used _____

Field Laboratory Analysis

No. (_____ tests)

Extraction Method _____

Analytical Method _____

Reagents Used _____

Commercial Laboratory (_____ tests)

Name of Laboratory _____

Extraction Method _____

Analytical Method _____

Reagents Used _____

General _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

13S 14N 17S 16N 21S 20N 25S 22N 24N 25S 26N 27S 28N 29S 30N 31S 32N 33S 34N 35S 36N 37S 38N

Scale
1" = 1/4 Mile

63378
63379
62935
62933
62931
61795
61798
63383
62929
61806

Legend

- 6 Channel Anomaly
- 5 Channel Anomaly
- 4 Channel Anomaly
- 3 Channel Anomaly
- 2 Channel Anomaly
- 1 Channel Anomaly
- 20 Direct Magnetic Correlation
- MP30 Flanking Magnetic Correlation
- Limits of Conductive Overburden

QUESTOR SURVEYS LIMITED
Airborne VLF Input Survey

BELANGER TWP. AREA

Scale—1":320 feet

Drawn By	JDD
Dates Flown	August 08/11/1972
Flight Path Recovery	P.K.
Data Reduction	P.K.
Completed	September 1972
Checked	M.S.
File No.	6023

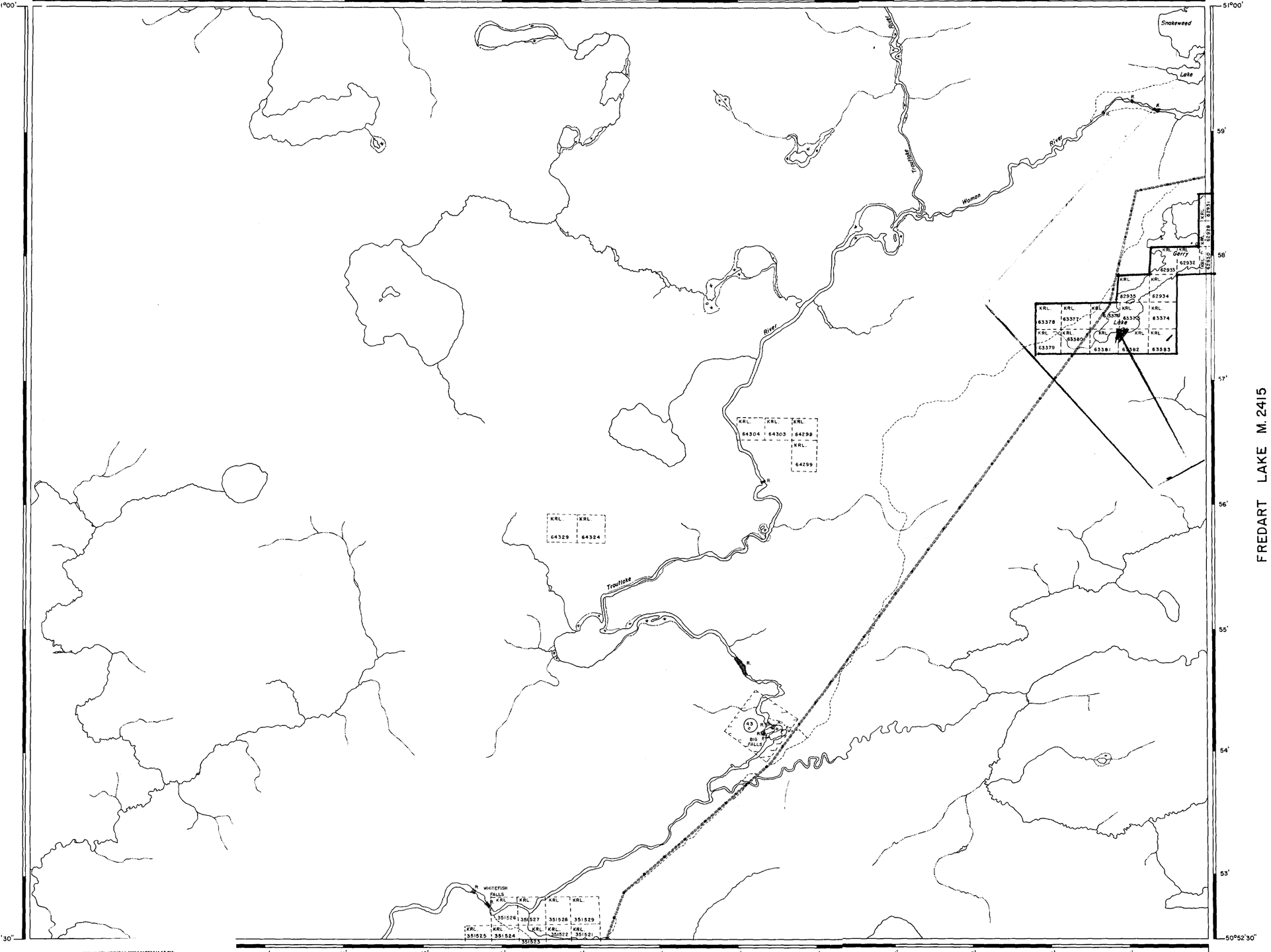
JOYCE RIVER M.2439

SOUTH OF OTTER RIVER M.1772

FREDART LAKE M.2415

KARAS LAKE M.2144

93°15' 93°00' 51°00'



59' 58' 57' 56' 55' 54' 53' 50°52'30"

12' 11' 10' 9' 8' 7' 6' 5' 4' 3' 2' 1' 93°00'

2°30"

9

200

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508931

AREA OF

GERRY LAKE

DISTRICT OF
KENORA
(PATRICIA PORTION)

RED LAKE
MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

PATENTED LAND	(P)
CROWN LAND SALE	C.S.
LEASES	(L)
LOCATED LAND	
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	

NOTES

100' R/W to Dept. of Highways & H.E.P.C. trans. line - Files: 119040 & 102046 shown thus:

400' surface rights reservation along the shores of all lakes and rivers.

Areas withdrawn from staking under Section 43 of the Mining Act. R.S.O. 1970.

	File	Date	Disposition
(43 O)	163474	25/8/70	S.R.O.

· MINING LANDS ·
DATE OF ISSUE
NOV 2 1973
MINISTRY
OF NATURAL RESOURCES

2.1337

NATIONAL TOPOGRAPHIC SERIES 52 K

PLAN NO. M-2438

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

Little Bear Lake Area (M-2472)

Gerry Lake Area (M-2438)

Slate Lake Area (M-2412)

Bluffy Lake Area (M-2414)

93°00'

92°45'

51°00'

50°52'30"

Stonewood Lake

Fredart Stream

Fredart Lake

BELANGER TWP.

FOR STATUS REFER TO TWP. PLAN M.1868

BOWERMAN TWP.

FOR STATUS REFER TO TWP. PLAN M.2145

Wenasaga R.

64 M

63 M

62 M

61 M

59 M

58 M

57 M

12 M + 3 ch

11 M

10 M

9 M

8 M

7 M

5 M

4 M

59'

58'

57'

56'

55'

54'

53'

52'

51'

50'

49'

48'

47'

46'

AREA OF

FREDART LAKE

DISTRICT OF
KENORA
(PATRICIA PORTION)

RED LAKE
MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

PATENTED LAND	(P)
CROWN LAND SALE	C.S.
LEASES	(L)
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	

NOTES

100' R/W to Dept. of Highways & H.E.P.C. trans. line - File: 119040 shown thus: ———

400' Surface Rights Reservation around all Lakes and Rivers.

MINING LANDS
DATE OF ISSUE
[illegible] 1973
BRANCH
OF [illegible] RESOURCES

FILE-2.1337.

NATIONAL TOPOGRAPHIC SERIES 52 K

PLAN NO. M-2415

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

508924

52K15NW0032 2.1337 FREDART LAKE

210