

NORMAN-0022

Load: 16/35 mm

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63-821

MAGNETOMETER SURVEY
CLEVELAND COPPER CORPORATION
MIDDLE AND NORTH GROUPS
NORMAN TOWNSHIP
PROVINCE OF ONTARIO

REPORT NO. 5657

September 30, 1956.

Geo-Explorers Ltd., Toronto, Ontario.

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MAGNETOMETER SURVEY
CLEVELAND COPPER CORPORATION
MIDDLE AND NORTH GROUPS
NORMAN TOWNSHIP
PROVINCE OF ONTARIO
REPORT NO. 5657

SUMMARY

One very slight indication of mineralization was encountered in the survey of the middle group.

Follow up work in the form of electrical surveying is recommended.

INTRODUCTION

Cleveland Copper Corporation acquired two additional blocks of ground on the east side of the Sudbury Basin. A magnetometer survey was carried out to locate any sulphides that may be present.

LOCATION AND ACCESS

The north group is accessible by the road to the Milnet Mines from the town of Capreol. The middle group can be reached by driving from the north group to a bridge and crossing the bridge on foot and walking another half mile.

The relative location of the two properties can be seen on the reference map attached to the geophysical map.

THEORY OF SURVEY

Varying amounts of magnetite in different rocks near the earth's surface produce measureable differences in the earth's magnetic field. By measuring these differences the underlying rock structure can often be inferred even though covered with overburden.

Occasionally the structure containing the sulphides can be determined from the magnetometer survey. The results can also be used as a guide to the presence of pyrrhotite and varying rock types.

METHOD OF SURVEY

For the middle group the base line was cut with a transit and picket lines turned off at 300 foot intervals going east west.

On the north group north south lines were cut as the structure was changing strike almost to the east west in this area.

GEOPHYSICAL INTERPRETATION

Middle Group

The contacts have been located approximately from the magnetic results; between an area of granite gneiss on area of anorthosite, and another area of granite which appears to be of a different age than the granite gneiss.

One zone which might be of interest economically has been located. It could be another zone similar to one located on the group to the south but it does not look as impressive.

The shape of the anorthosite could be produced by faulting or it could be a widening of the intrusive. There is no evidence to suggest which is correct.

North Group

There is a slight difference in the contour pattern to the south and to the north which in conjunction with the outcrop data suggests the presence of a contact between granite and granite gneiss.

There is also a very weak northwest magnetic trend which might have a slight significance and could be caused by mineralization. This is shown as zone B on the map.

CONCLUSIONS AND RECOMMENDATIONS

Middle Group

If the results of drilling on the zone on the south group are good then further drilling should be conducted on the zone A shown in this map. For the present however the only follow up exploration I can recommended is an electrical survey to check for the presence of sulphides.

This is the most inexpensive method to check for

sulphides and is the only exploration warranted at the present.

North Group

The property appears to be underlain mainly with granite and granite gneiss with a slight possibility that zone B might be important. At the present time the only follow up work that can be recommended is an electrical survey.

RESPECTFULLY SUBMITTED,



D. J. Salt,
Geophysical Consultant.

APPENDIX

Distribution of Time Spent on Survey

Middle Group

Line Cutter's foreman

Mr. Emery Christie, P. O. Box 452, Noranda, Quebec 10 days

Line Cutters

Mr. Felix Vanasse, Rouyn, Quebec 5 days

Mr. Gillies Hanbury, McWatters, Quebec 10 days

Mr. Lynam Vanasse, Rouyn, Quebec 5 days

Mr. L. Kearney, Clericy, Quebec 5 days

Mr. C. Samson, Clericy, Quebec 5 days

Instrument Operator

Mr. Donald Wathen, P. O. Box 452, Noranda, Quebec 12 days

Assistant

Mr. L. Kearney, Clericy, Quebec 12 days

Geophysicist

Mr. D. J. Salt, 307 Eilerslie Ave., Willowdale, Ontario
Days of work in field 2 days
Days of work in office 3 days

Draftsman

Miss M. Groulx, 224 - 9th Street, Noranda, Quebec 4 days

Mrs. A. K. Krawec, 36 Perreault, St. E., Rouyn, Quebec 4 days

Mrs. P. Tays, 36 - 15th Street, Noranda, Quebec 4 days

Typist

Miss M. Bibeau, 271-B Main Street, Rouyn, Quebec 1 day

Total

82 days

Total time applicable to Assessment work

82 man days x factor 4 = 328 man days or one year's
work.

APPENDIX

Distribution of Time Spent on Survey

North Group

Line Cutter's foreman

Mr. Emery Christie, P. O. Box 452, Noranda, Quebec 10 days

Line Cutters

Mr. Felix Vanasse, Rouyn, Quebec 5 days

Mr. Gillies Hanbury, McWatters, Quebec 10 days

Mr. Lynam Vanasse, Rouyn, Quebec 5 days

Mr. L. Kearney, Clericy, Quebec 5 days

Mr. C. Samson, Clericy, Quebec 5 days

Instrument Operator

Mr. Donald Wathen, P. O. Box 452, Noranda, Quebec 12 days

Assistant

Mr. L. Kearney, Clericy, Quebec 12 days

Geophysicist

Mr. D. J. Salt, 307 Ellerslie Ave., Willowdale, Ontario

Days of work in field 2 days

Days of work in office 2 days

Draftsman

Miss M. Groulx, 224 - 9th Street, Noranda, Quebec 4 days

Mrs. A. K. Krawec, 36 Perreault St. E., Rouyn, Quebec 4 days

Mrs. P. Tays, 36 - 15th Street, Noranda, Quebec 4 days

Typist

Miss M. Bibeau, 271-B Main Street, Rouyn, Quebec 1 day

Total

81 days

Total time applicable to Assessment work

81 man days x factor 4 = 324 man days or one year's
work.

APPENDIX

Data Pertinent to Survey

Middle Group

Miles of Line Surveyed 10.11

No. of Readings taken 535

Instrument Used: Watt vertical force variometer with a
sensitivity of 22.6 gammas per division.

Base Stations: L 5+N and L ON on the baseline.

To obtain approximate value of the earth's magnetic
field add 59,600 gammas.

North Group

Miles of Line Surveyed 6.76

No. of Readings taken 390

Instrument Used: Watt vertical force variometer with a
sensitivity of 22.6 gammas per division.

Base Stations: L O and L 27W on the main baseline and
L 12E on the north baseline.

To obtain approximate value of the earth's magnetic
field add 59,600 gammas.

MARSHALL & COMPANY
CLEVELAND COLLEGE COMPANY, LTD.
5471 CROWN
NORMAN TOWNSEND
BOYERS OF OTTAWA

REPORT NO. 5659

September 6, 1956.

Geo-Explorers Ltd., Toronto, Ontario.

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MAGNETOMETER SURVEY
CLEVELAND COPPER CORP. LTD.
SOUTH GROUP
NORMAN TOWNSHIP
PROVINCE OF ONTARIO
REPORT NO. 5659

SUMMARY

An interpreted mineralized contact zone has been located 3900 feet long. Testing of this zone by drilling and prospecting is recommended.

INTRODUCTION

Cleveland Copper Corporation acquired a block of favourable ground on the east side of the Sudbury Basin. A magnetometer survey was carried out to locate any sulphides that may be present.

LOCATION AND ACCESS

The property is accessible by road from the town of Capreol. For its location see figure 1.

THEORY OF SURVEY

Varying amounts of magnetite in different rocks near the earth's surface produce measurable differences in the earth's magnetic field. By measuring these differences the underlying rock structure can often be inferred even though covered with overburden.

Occasionally the structure containing the sulphides

can be determined from the magnetometer survey. The results can also be used as a guide to the presence of pyrrhotite and varying rock types.

In this area the sulphides are usually magnetic due to their pyrrhotite content. The pyrrhotite is nearly always associated with the ore.

METHOD OF SURVEY

A north south base line was cut with a transit and picket lines turned off at 300 foot intervals.

Stations were read at 100 foot intervals except where high values necessitated closer spacing.

In addition a gossan zone in the southeast corner of the property had lines cut across it at fifty foot intervals and detail readings were taken at 25 foot intervals. Unfortunately in doing the survey some confusion existed as to the area covered by claim 97177 and some more property was surveyed than was necessary.

GEOPHYSICAL INTERPRETATION

The gossan zone tested with the magnetometer showed the gossan to be closely associated with the magnetic highs.

In figure 2 the actual gossan exposed is shown by heavy brown lines and the interpreted outline of the gossan shown in light brown.

This gossan zone lies on a line of magnetic anomalies shown as Zone C. These anomalies are almost certain to be

caused by mineralization and the zone of interpreted mineralization extends for 3900 feet. In places this zone is 400 feet wide.

Near Line 27N the values become rather low and it is suspected that a fault cuts across this part of the zone though no displacement is evident.

A north south fault is also suspected following the line of lows in the southeast corner and its possible extension is shown in the northeast corner.

To the east and west of this zone are noticeably different magnetic values and patterns. It appears likely therefore that the mineralized zone C is a contact zone lying between two different rock types.

Anomalies D, E, F, G, H, J and K may be caused by sulphides and should be examined on the surface. Unfortunately, anomalies D to H inclusive lie on or near the property boundaries and therefore may not be worth testing until some agreement could be made with owners of the adjoining property.

CONCLUSIONS AND RECOMMENDATIONS

Zone C should be crosssectioned by drilling. Two crosssections shown as AA and BB should be drilled. Drilling should be conducted from west to east.

It is quite possible that other areas in this zone may warrant drilling but before drilling any more than the two crosssections further prospecting and mapping should be carried out on the zone.

If crosssections A and B give encouragement then possibly resistivity work should be conducted on the zone to locate any massive concentrations. At the same time the minor anomalies could also be tested.

RESPECTFULLY SUBMITTED,



D. J. Salt,
Geophysical Consultant.

APPENDIX

Line Detail Survey

Line Cutters

Mr. Felix Vanasse, Bays, Quebec. 7 days
Mr. Kenneth Dufresne, 226 - 5th Street, Montreal, Que. B. C. 7 days
Mr. Lynn Vanasse, Bays, Quebec. 7 days

Transit Operator

Mr. Emery Christie, P. O. Box 452, Montreal, Quebec. 10 days

Aligner Operator

Mr. Sidney Correll, 8873, St. Stephen, New Brunswick. 4 days

Assistant

Mr. L. Kearney, Clercy, Quebec. 4 days

Geophysicists

A. H. Clark, 2011 Allison Rd., Vancouver, B. C. 1 day
D. J. Salt, 307 Gillespie Ave., Millville, Ontario. 3 days

Truckist

Miss M. Brown, 271-5 Main St., Bays, Quebec. 1 day

Driver

Mrs. W. M. Tys, 45, 15th Street, Montreal, Quebec. 2 days
Mrs. A. Kravco, 3000 Avenue St. M., Bays, Quebec. 3 days

42 man days

Total time available for assessment work

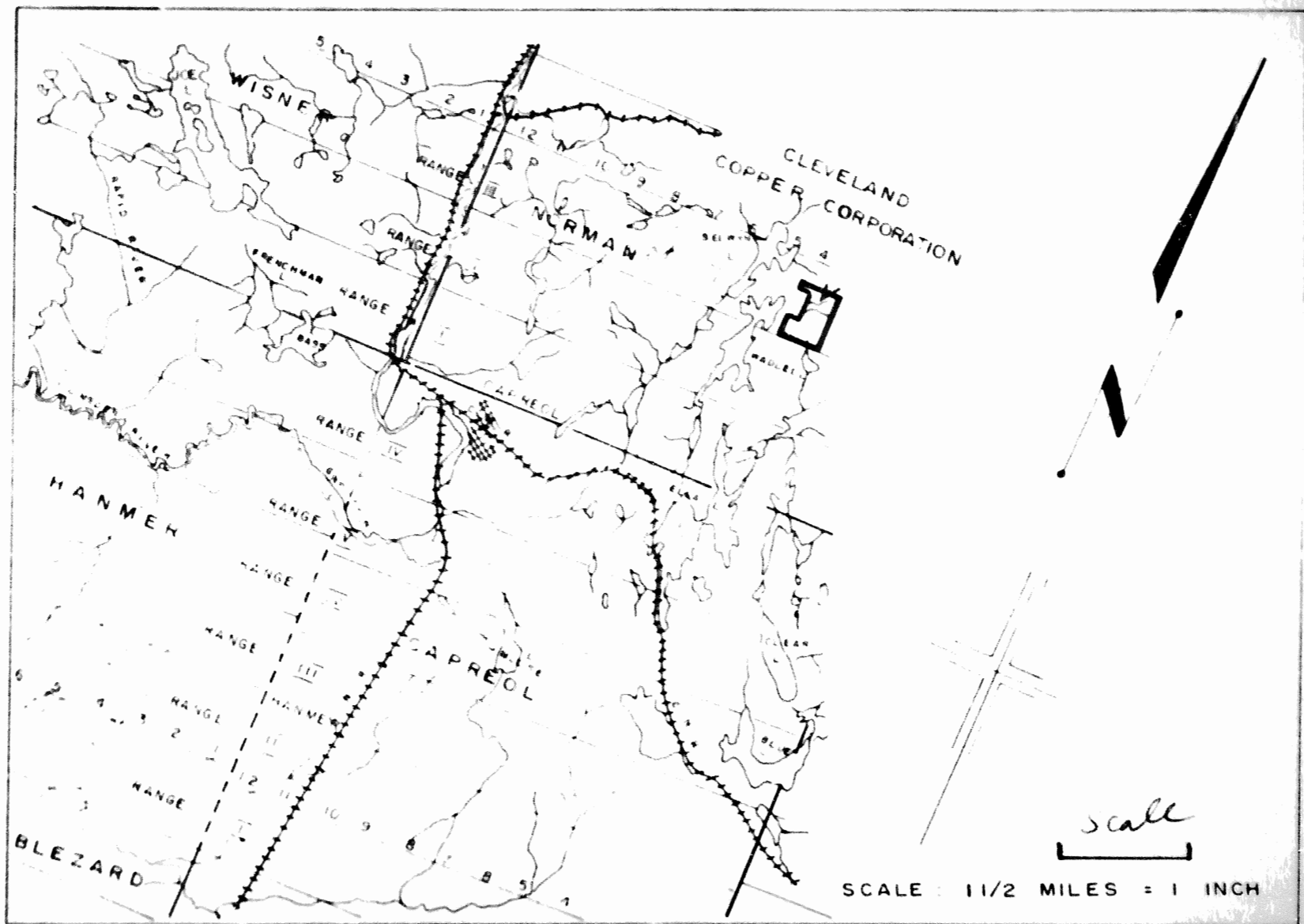
42 x factor 4 = 168 man days

APPENDIX

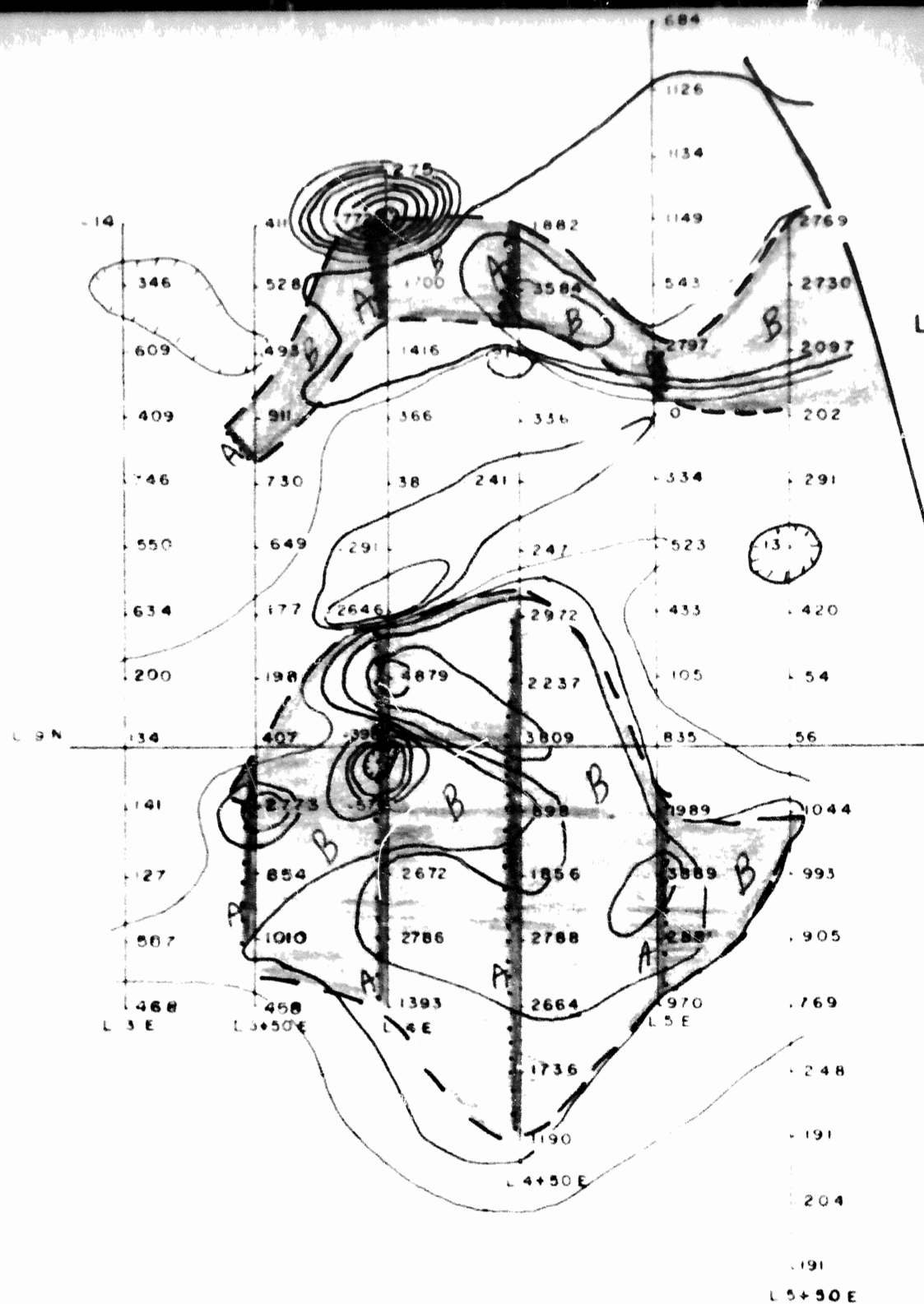
Miles of Geophysical Work 6.40
No. of Readings taken 112
Instrument used: watt vertical force variometer with a
scale constant of 22.6 gammas per division.

Base Stations: Line 00 on Base Line
Line 3H on baseline north of Skymer Lake.

To obtain approximate value of earth's vertical field
aid 59,600 gammas.

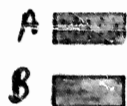


LOCATION MAP



LEGEND

OBSERVED GOSSAN
INTERPRETED GOSSAN ZONE



ELECTROMAGNETIC SURVEY
CLEVELAND COPPER CORP. LTD.
NORMAN TOWNSHIP
PROVINCE OF ONTARIO

REPORT NO. 5682

December 17, 1956.

Geo-Explorers Ltd., Toronto, Ontario.

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ELECTROMAGNETIC SURVEY
CLEVELAND COPPER CORP. LTD.
NORMAN TOWNSHIP
PROVINCE OF ONTARIO
REPORT NO. 5682

SUMMARY

One drill hole is recommended to test one conductor. Further geophysical work is recommended.

INTRODUCTION

A magnetometer survey conducted on the north group of Cleveland Copper was not very successful in locating sulphides. Some work done on adjoining claims made this property look a little more promising and accordingly an electromagnetic survey was conducted on the group.

LOCATION AND ACCESS

This was covered in report no. 5657.

THEORY OF SURVEY

When an electrical conducting body is placed in an alternating magnetic field, small eddy currents of electricity are induced in the conductor.

For the special case where the magnetic field direction is horizontal and the conductor an almost vertical lens of sulphide ore, the eddy currents flow very nearly around the circumference of the ore body. These eddy currents set up their own magnetic field. If this field can be measured the

presence of a sulphide deposit can be detected. Fig. 1 shows a schematic diagram of the magnetic fields and the eddy current in an ore body.

If a plane coil of wire is placed in an alternating magnetic field, an alternating voltage is generated in the coil. The magnitude of the voltage depends on the angle between the plane of the coil and the direction of the field. When the coil is parallel to the magnetic field, the coil voltage is zero. Consequently if such a coil is rotated in a magnetic field until the voltage is zero the coil is then parallel to the magnetic field and the field direction can be determined. In practice the detector coil is influenced by both the exciting field and the secondary field and the coil position at zero induced voltage gives the direction of the resultant of the two fields. As a conductor is approached and crossed the dip of the detector coil will change from one side of horizontal to the other, being zero directly over the top of the conductor as shown in Fig. 2. If one direction of dip be taken as positive and the other negative a dip profile will appear as shown in Fig. 2.

The magnitude of the dips depends on the conductivity of the ore bodies and on the distance of the exciting loop from the conducting body. A broad conductor or a series of

conductors complicates the simplified picture used as an illustration.

METHOD OF SURVEY

The transmitter was set up at several points on the picket lines and readings taken on the adjoining lines.

The same picket lines were used as were used for the magnetometer survey.

The instrument used was a vertical coil transmitter with dip angle detector.

GEOPHYSICAL INTERPRETATION

There are several weak conductors indicated. The one conductor at A is the strongest and should be drilled.

Conductor B is weaker than A and its extension west from Line 0 to Lines 3 and 6W is questionable.

There are two possible northwest trends as shown. I do not feel that these can be called conductors but they might show up as conductors if lines were cut across them and an electromagnetic survey done.

The possible trend of a dike which might parallel these trends is also shown in the same map.

CONCLUSIONS AND RECOMMENDATIONS

It is recommended that further lines be cut as shown on the accompanying map and more electromagnetic and magnetic work be conducted on this area.

- 4 -

One hole is recommended to test conductor A but this could be delayed until the geophysical work on the new lines is completed.

RESPECTFULLY SUBMITTED,



D. J. Salt,
Geophysical Consultant.

APPENDIX

The drill hole should be collared at 600 feet south on line 21W bearing south with a dip of 45°. The total length is 550 feet.

On the survey 8.25 miles of picket line was read for a total of 442 stations.

The Time Spent on Survey may be distributed as follows:

Instrument man

Mr. R. H. Tays, 36 - 15th Street, Noranda, Quebec
December 4, 1956 to December 12, 1956 8 days

Instrument Helpers

Mr. Lorenzo Dumont, Montbrun, Quebec
December 4, 1956 to December 12, 1956 8 days

Mr. Gillies Hanbury, McWatters, Quebec
December 4, 1956 to December 12, 1956 8 days

Geophysicist

Mr. D. J. Salt, 307 Eilerslie Ave., Willowdale, Ont.
December 4, 1956 to December 14, 1956 - Office work 2 days

Drafting

Miss J. Bibeau, 271-B Main Street, Rouyn, Quebec
December 12, 1956 to December 17, 1956 2 days

Typist

Miss M. Bibeau, 271-B Main Street, Rouyn, Quebec
December 12, 1956 to December 17, 1956 1 day

29 man days

Time applicable for assessment work

29 man days x factor 4 = 116 man days

GEO-EXPLORERS LTD.

ROOM 11 - 18 TORONTO STREET

TORONTO, ONTARIO

PHONE EM. 4-5910

December 17, 1956.

In Account with:

Cleveland Copper Corp. Ltd.,
Suite 700,
455 Craig Street West,
Montreal, Quebec.

Re: Geophysical Survey, North Group, Norman Twp.

8.25 miles at \$75.00 per mile

\$618.75

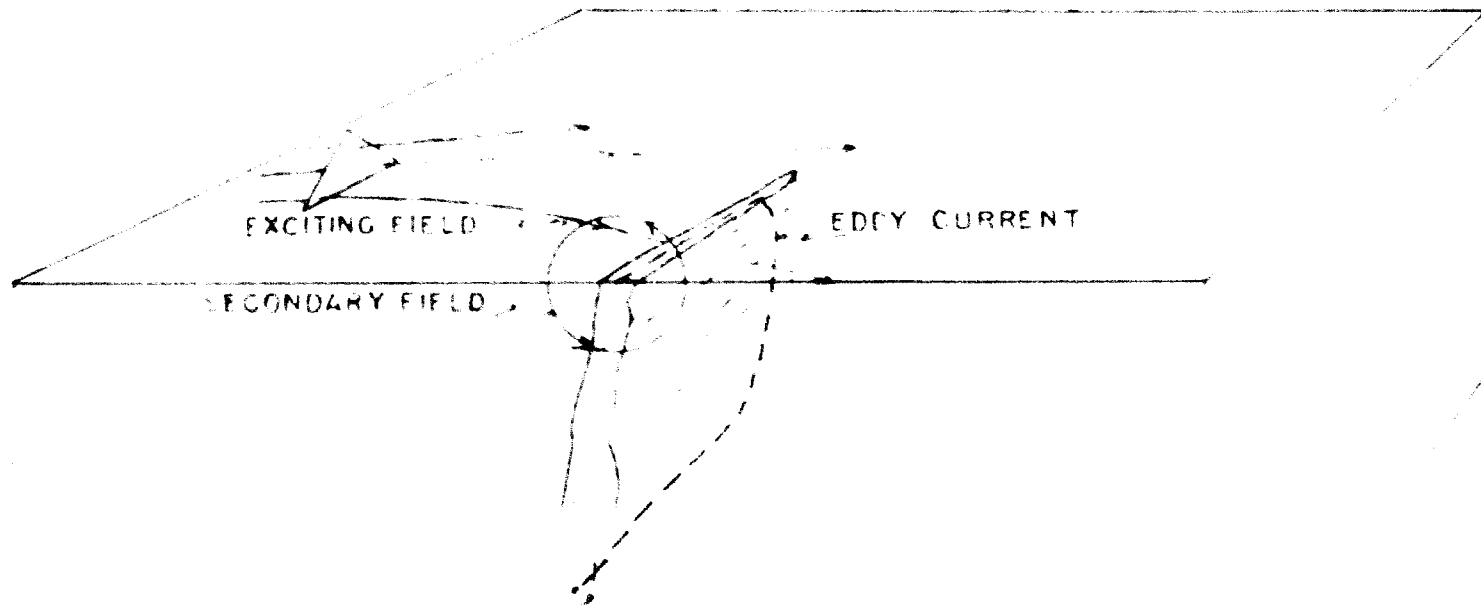
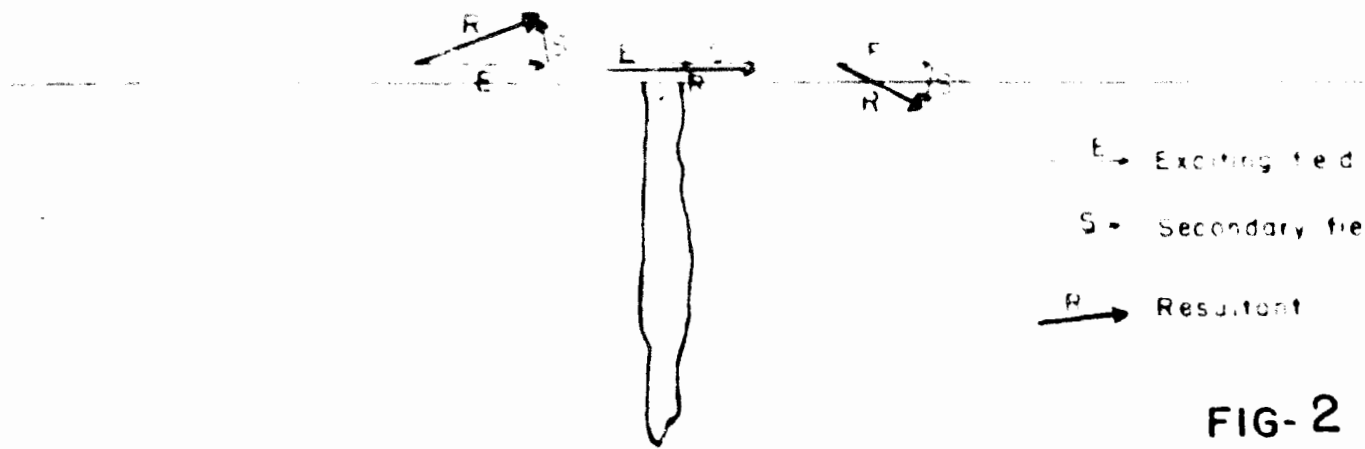


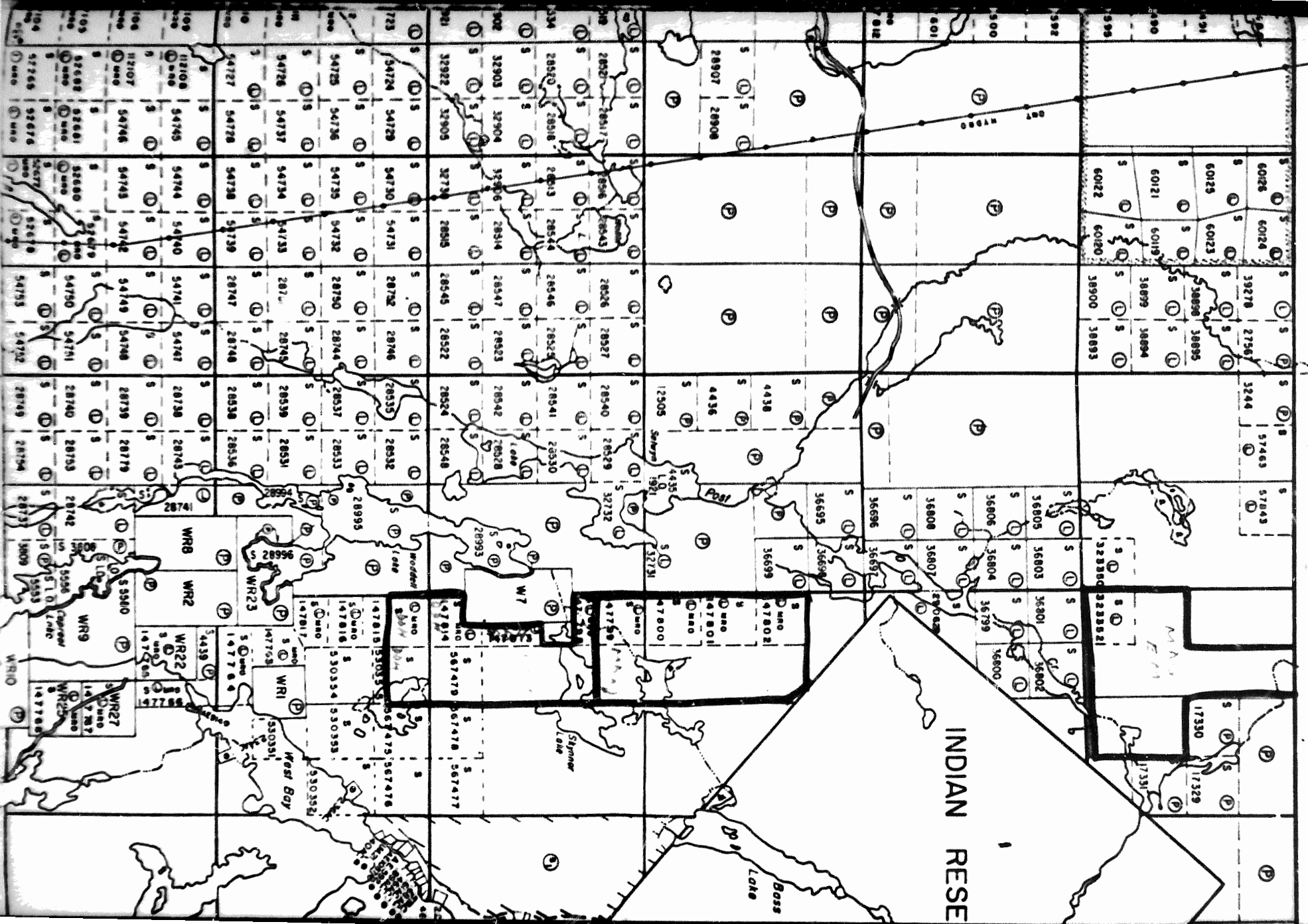
FIG-1



- E - Exciting field
- S - Secondary field
- R - Resultant

FIG-2

PARKIN TP. - M.1049



THE TOWNSHIP OF
OF

NORMAN

DISTRICT OF
SUDBURY

Scale
1" = 40 Chs.

SUDBURY
MINING DIVISION

SCALE: 1-INCH=40 CHAINS

VI

V

IV

III

II

I

Wisner Twp.

Rathbun Twp.

INDIAN RESERVE

NO. 11

Bass Lake

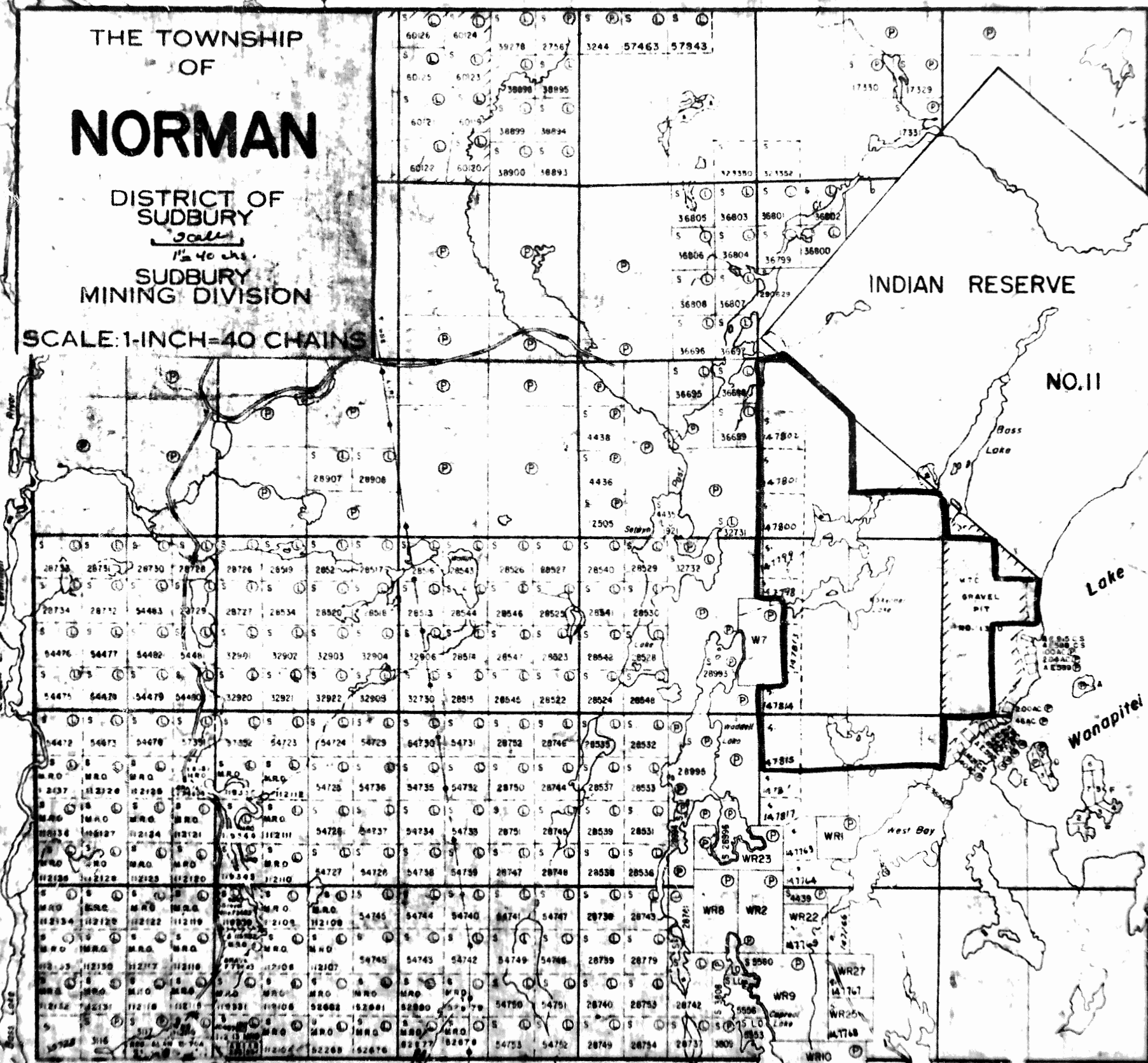
Lake

Wanapitei

West Bay

TOWN OF CAPREOL

12 11 10 9 8 7 6 5 4 3 2 1

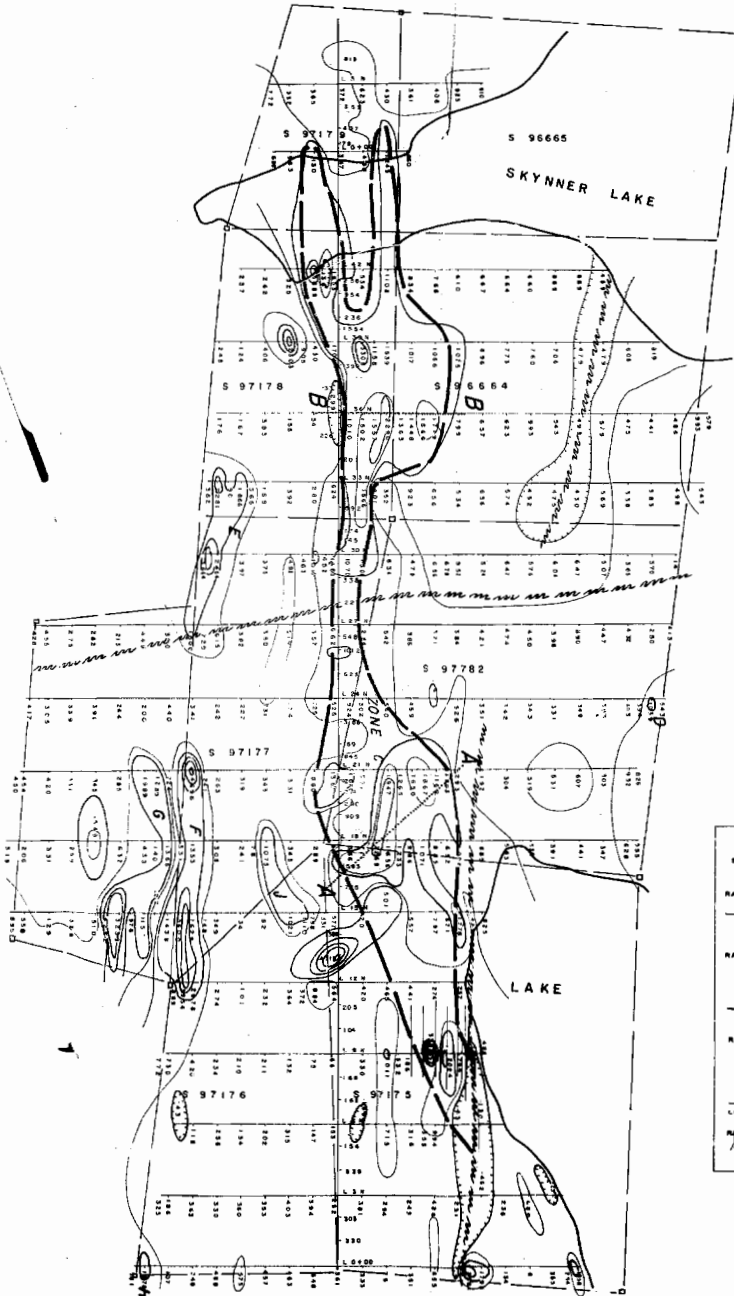
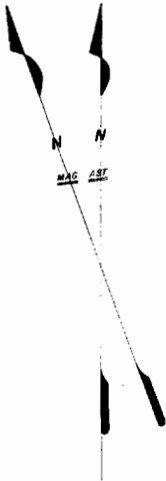


MAGNETOMETER SURVEY CLEVELAND COPPER CORPORATION

NORMAN TOWNSHIP

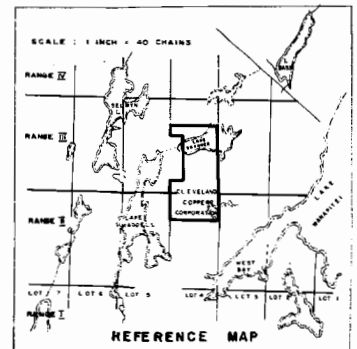
PROVINCE OF ONTARIO

SEPTEMBER 8, 1956



LEGEND

- MAGNETIC FIELD IN GAMMAS
- CONTOUR INTERVAL
 - 1 000 GAMMAS
 - 500 GAMMAS
- INTERPRETED FAULT
- RECOMMENDED CROSSSECTIONS A



PRESENTED BY:
GEO-EXPLORERS LIMITED
D. J. Salt
D. J. SALT
GEOPHYSICAL CONSULTANT

MAGNETOMETER SURVEY CLEVELAND COPPER CORPORATION

MIDDLE GROUP

NORMAN TOWNSHIP

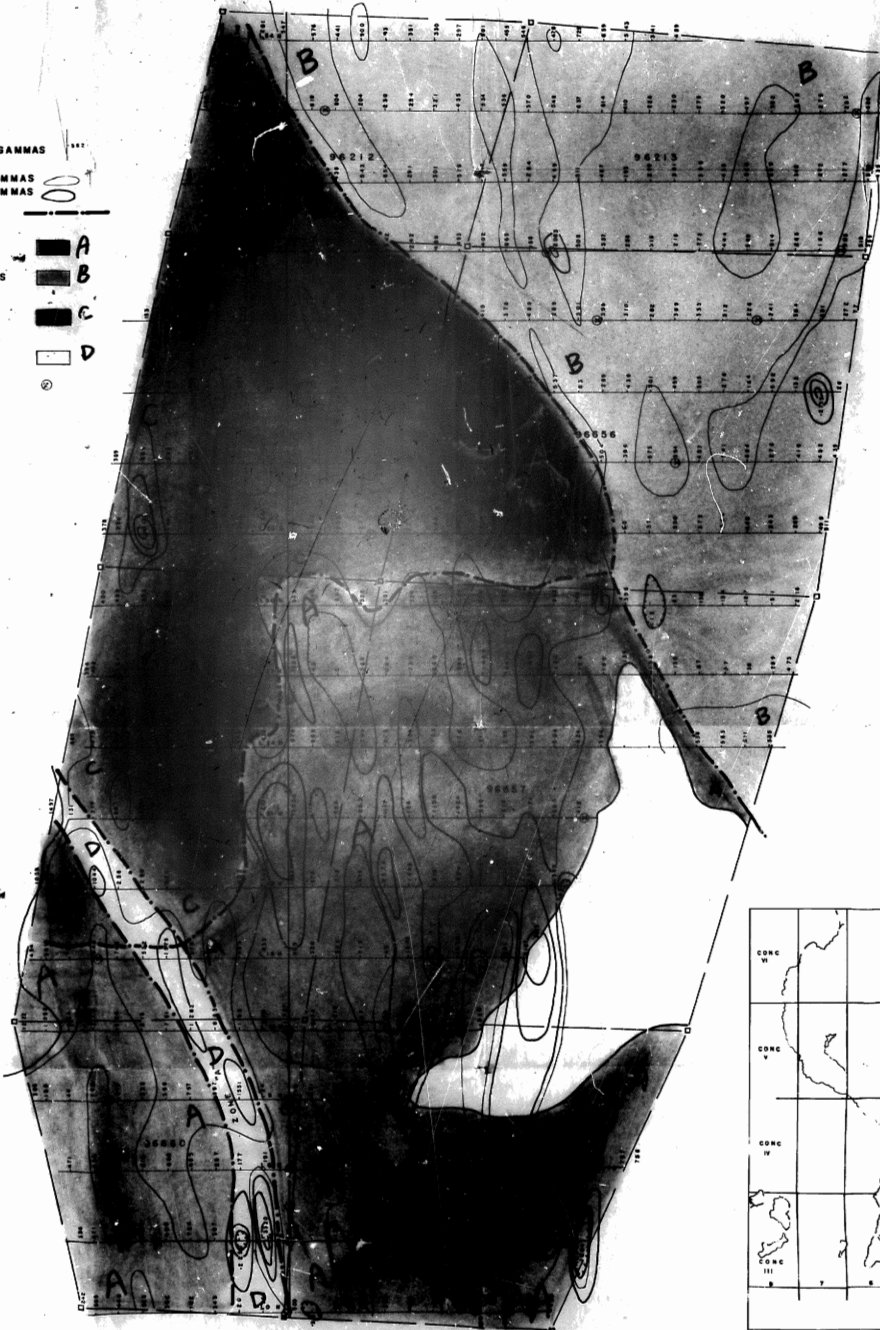
PROVINCE OF ONTARIO

SEPTEMBER 15, 1956

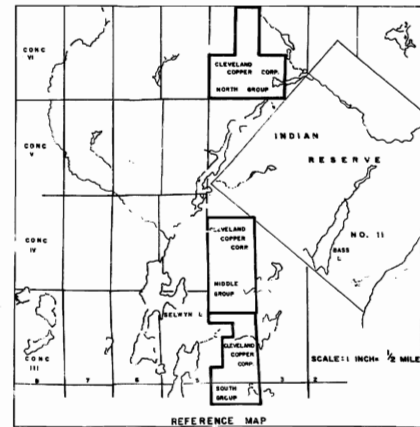


LEGEND

VERTICAL MAGNETIC FIELD IN GAMMAS	
CONTOUR INTERVAL 500 GAMMAS	
CONTOUR INTERVAL 1000 GAMMAS	
INTERPRETED CONTACT	
INTERPRETED GRANITE	A
INTERPRETED GRANITE GNEISS	B
INTERPRETED MORITE	C
POSSIBLE MINERALIZED ZONE	D
OUTCROP	



PRESENTED BY:
GEO-EXPLORERS LIMITED
D. J. Salt
D. J. SALT
GEOPHYSICAL CONSULTANT



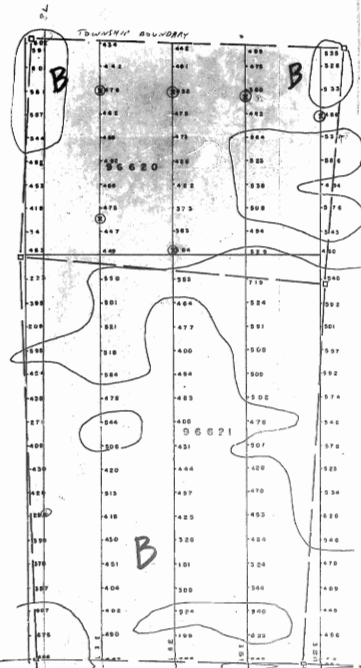
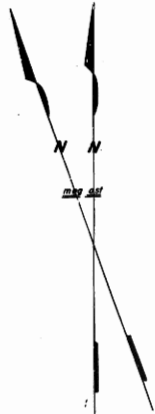
MAGNETOMETER SURVEY CLEVELAND COPPER CORPORATION

NORTH GROUP

NORMAN TOWNSHIP

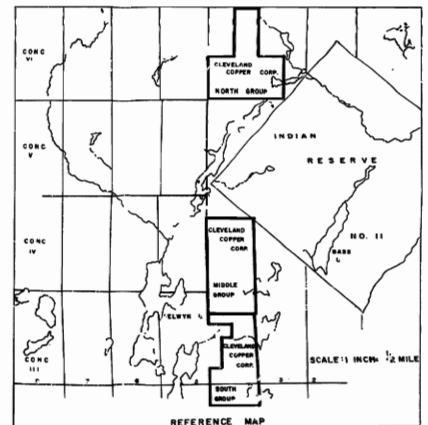
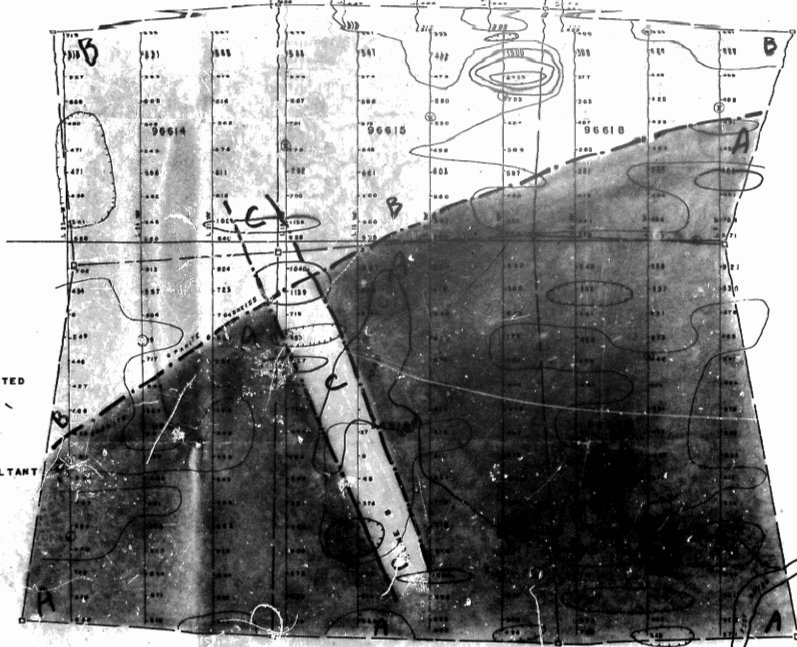
PROVINCE OF ONTARIO

SEPTEMBER 15, 1956



LEGEND

- VERTICAL MAGNETIC FIELD IN GAMMAS
- CONTOUR INTERVAL 500 GAMMAS
1000 GAMMAS
- INTERPRETED CONTACT
- INTERPRETED GRANITE
- INTERPRETED GRANITE GNEISS
- POSSIBLE MINERALIZED ZONE
- OUTCROP
- A
- B
- C



PRESENTED BY:
GEO-EXPLORERS LIMITED
D. J. SALT
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GEOPHYSICAL CONSULTANT

NORMAN-0022 #3

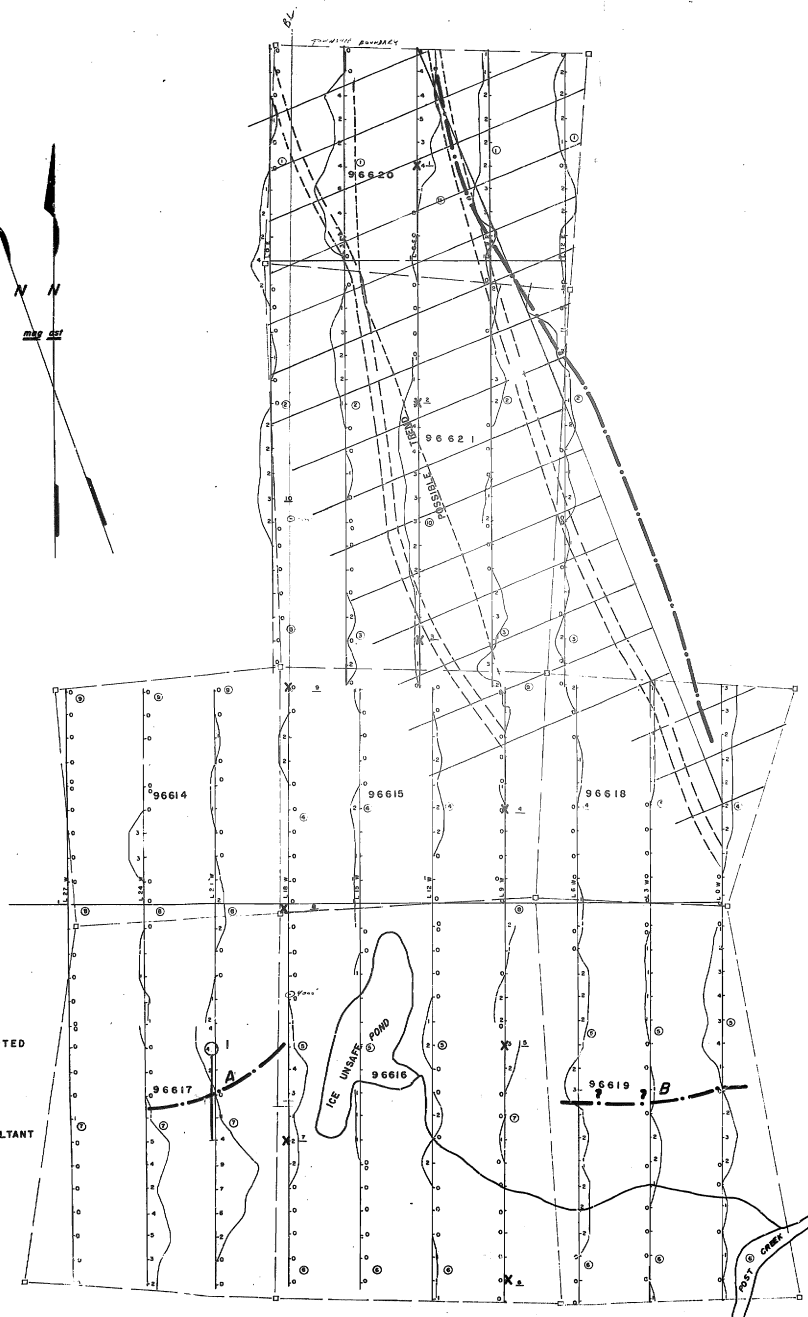
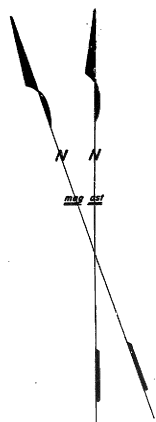
ELECTROMAGNETIC SURVEY CLEVELAND COPPER CORP. LTD.

NORTH GROUP

NORMAN TOWNSHIP

PROVINCE OF ONTARIO

DECEMBER 15, 1956



LEGEND

- DIP OF FIELD IN DEGREES ↗
- SCALE OF PROFILES 1 inch = 10 degrees ~
- INTERPRETED CONDUCTOR —•—
- QUESTIONABLE " " " —?—
- TREND - - - - -
- POSSIBLE DIKE = = = = =
- RECOMMENDED DRILL HOLE ○—
- RECOMMENDED PICKET LINES —

PRESENTED BY:
GEO-EXPLORERS LIMITED

D. J. SALT
D. J. Salt
GEOPHYSICAL CONSULTANT

