RECONNAISSANCE GEOLOGICAL NOTES

on

CIRCULAR AEROMAGNETIC ANOMALY

MAP 2255G, SPANISH SHEET

Districts of Algoma and Manitoulin, Ontario

March 14, 1964

G. E. Parsons

RECONNAISSANCE GEOLOGICAL NOTES

on

CIRCULAR AEROMAGNETIC ANOMALY

Map 2255G, Spanish Sheet

Districts of Algoma and Manitoulin, Ontario

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1. GENERAL

Location and Access - This anomaly is centered at about twelve miles southwest of Massey in the North Channel of Lake Huron. An all-weather road leads south from this town to the north shore of the North Channel. There are two jumping-off points to the islands from this road, - McBean Harbour and Solomon Point. Boats are available for rent at the former locality.

Purpose and Scope of Investigation - This ground check was prompted in order to determine the type of intrusion and its probable potential as an exploration target. The possibility existed that the anomaly was caused by an alkaline-carbonatite type complex and hence could contain columbium and related mineral deposits. Its distinct circular outline suggested this; however, its size (six miles in diameter) indicated it might be caused by a granite and/or normal syenite plug.

The writer and an assistant spent three days in the area, - March 5, 6 and 7; the investigation was terminated when the plug was definitely proved to be a granitic type, and also because of poor ice conditions.

Conditions at Time of Investigation - The weather was highly variable with temperatures ranging from below zero to above freezing. The winds were strong and near gale proportions on one day.

The ice conditions were reported to be the worst for several years. Open water existed in two places west of Croker Island, in several places north of Fox Island, and was general around South and North Benjamin Islands. The water level was low and currents in the Channel tend to weaken the ice and demand caution in travelling over it. The local people familiar with the situation report the direction and intensity of these currents vary with the wind directions, so that care must be taken under such conditions.

Rock is abundant on the islands and, although there was one foot of snow in the bush, outcrops clear of snow were reasonably plentiful along the shores and especially on southern exposures at the time of the investigation.

2. GEOLOGY

The intrusions in the circular anomaly are definitely granitic and syenitic types. The country rocks are quartzites of Lorraine-type (Huronian) plus some paragneisses.

The quartzites are exposed along the north shore of the North Channel, on the small islands between that shore and Fox Island, on the north shore of the main bay on the west side of Croker Island, and on the small island just west of Croker Island. An isolated area of quartzite was also found with granite on the north shore of Fox Island. These quartzites are exceptionally pure and white in colour except on the north shore of the North Channel where there is some reddening.

The larger island one-half mile west of the centre of Croker Island is highly contorted paragneiss cut by granite and felsite dikes.

The intrusive rocks, which are definitely post-quartzite and hence post-Huronian, may be divided into three main types:-

- felsite and some pegmatites (youngest)
- granite
- syenite (oldest).

The syenites were observed as the dominant rock in the north and east parts of Croker and southeast part of Fox Islands. They are generally fine to medium-grained and equigranular. Porphyritic phases are locally present. These syenites are quite dark and are characterized by a high percentage of biotite, - up to 75%. The felspar is light green to slightly pink in colour. The outcrops are characterized by a flat-type of spalling that at first glance suggests foliation. These syenites are cut by granite and felsite; the latter is often in a box-work pattern of intersecting dikes.

The granites are the dominant rock type on Fox Island and on a group of islands and now-exposed reefs extending southeast from this island. Another mass is present in the southwest part of Croker Island. It is a very coarse-grained rock and at times distinctly porphyritic. The felspars are generally salmon-pink in colour but light transparent types are present as well as zoned crystals. Felspars up to one-half inch in length are common. The quartz content varies up to 15% and the biotite content is generally about 5%.

The rock type called felsite is a rather fine-grained pink dike rock very low in biotite or other ferromagnesian minerals. Locally it becomes distinctly pegmatitic and coarse-grained. It cuts all rocks as dikes striking and dipping in all directions. These dikes vary from a few inches to ten feet in width.

3. RADIOACTIVITY

All the exposures of intrusive rocks are radioactive, - generally two to three times background using an Electronic Associates geiger counter. The dikes of felsite tended to be more radioactive than the other types. One such dike on the northeast shore of Croker Island gave readings up to 2000 c/m or approximately eight times background. This dike strikes N 45° E magnetic, dips vertically and was about ten feet wide. There was some quartz veining with some coarse pyrite in the dike. Although the radioactivity was strongest on the west side of the dike, no apparent difference in mineralogy was noted. A ten-pound sample was chipped across the dike and this gave only slight evidence of radioactivity when checked with a sensitive C A E scintillometer.

4. SAMPLES

Eleven samples of rock types were collected and examined macroscopically in the office. A few grains of magnetite were detected in samples of biotite-rich syenite and this rock, or phases of this rock, appear to be responsible for the magnetics.

No fluorescent minerals were detected in any of the specimens when placed under an ultra-violet mineral lamp.

In sample No. 1 taken from the radioactive felsite mentioned under "Radioactivity", no minerals were noted to explain the radioactivity except possibly a few small black semi-platy-like grains.

Two samples (Nos. 1 and 5) were submitted to X-Ray Assay Laboratories who scanned them semiquantitatively for uranium, thorium, columbium, tantalum, rare earths, berylium and tin; they detected none. Sample No. 1 was a ten-pound sample from the radioactive felsite dike noted above, and sample No. 5 was of a dark biotite-rich syenite that is the rock-type indicated to be causing the higher magnetics.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.

This three-day field check of parts of the circular aeromagnetic anomaly and also the examination and assaying of samples taken indicate:-

(1) the anomaly is caused by a granite-syenite type intrusive plug of Post-Huronian age and not an alkaline-carbonatite type;

(2) the higher magnetics are caused by a biotite-rich syenite;

(3) radioactivity is present but no more than to be expected with an acid-type intrusion;

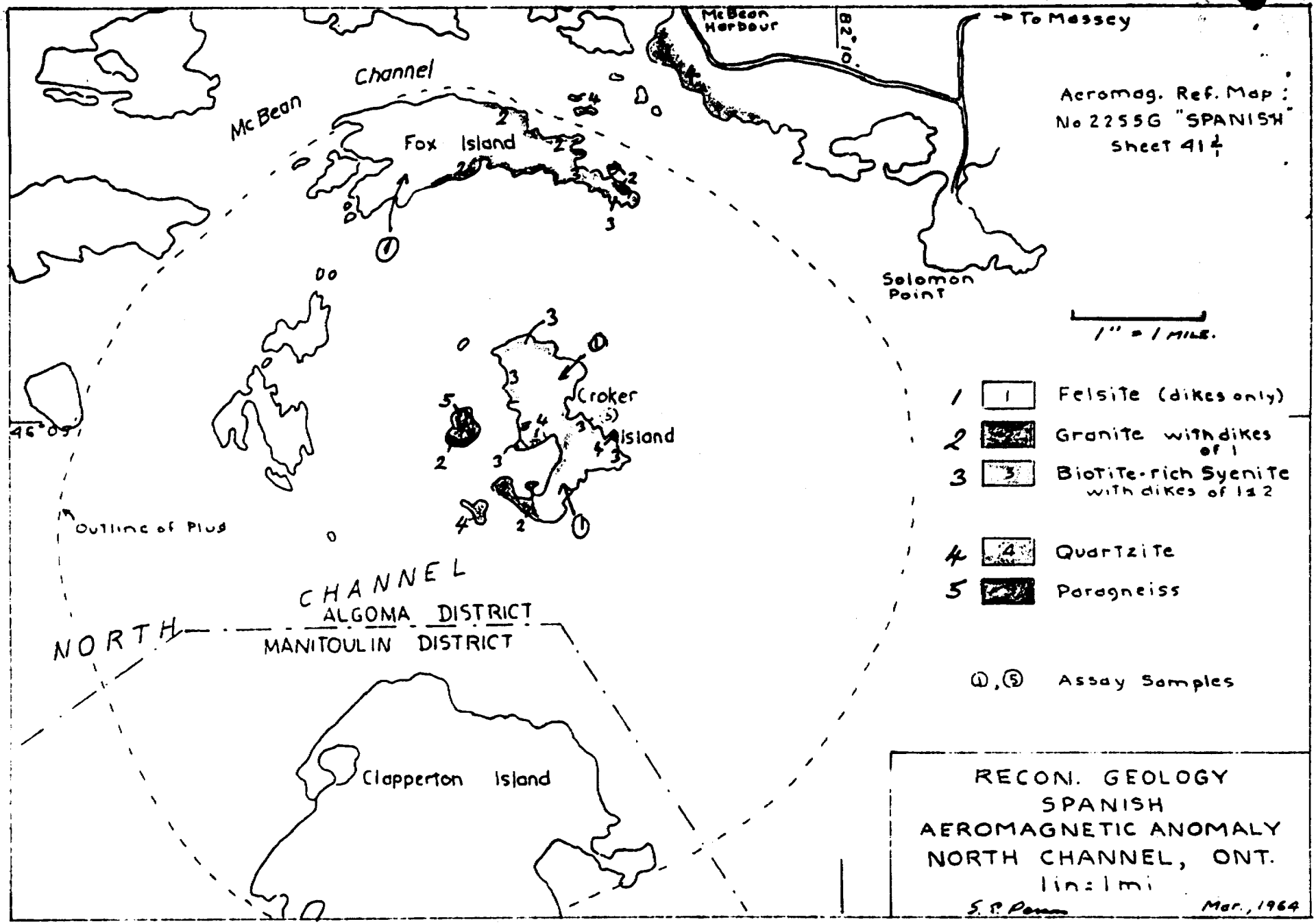
(4) no evidence of economic mineralization.

We can definitely conclude that columbium mineralization of the pyrochlore-type is highly improbable. Columbite-tantalite is possible in a granitic structure of this type but was not detected and probably is not present. This structure has probably no more potential than other Post-Huronian granite plugs.

The investigation was of a limited type and further checking could still reveal something of interest; however, the geological evidence to date does not give much hope for this occurring. The writer would give the structure a low priority as an exploration target.

Toronto, Ont.
March 14, 1964

G. E. Parsons


McBean Harbour
82° 10'
→ To Massey
McBean Channel
Fox Island
Solomon Point
Aeromag. Ref. Map:
No 2255G "SPANISH"
Sheet 41 ¼
1" = 1 MILE.
Croker Island
46° 09'
Outline of Plug
NORTH CHANNEL
ALGOMA DISTRICT
MANITOULIN DISTRICT
Clapperton Island
1 Felsite (dikes only)
2 Granite with dikes of 1
3 Biotite-rich Syenite with dikes of 1 & 2
4 Quartzite
5 Paragneiss
①, ⑤ Assay Samples
RECON. GEOLOGY
SPANISH
AEROMAGNETIC ANOMALY
NORTH CHANNEL, ONT.
1 in : 1 mi
S. P. Penn
Mar., 1964

REPORT ON

THE INTERPRETATION OF AN AIRBORNE MAGNETIC SURVEY

OVER PART OF

THE NORTH CHANNEL,

LAKE HURON, ONTARIO,

for

WORLD MINING CONSULTANTS LIMITED

by

HUNTEC LIMITED,

TORONTO, ONTARIO

MAY, 1964

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020C

INTRODUCTION

On March 8th and 9th, 1964, an aeromagnetic survey was carried out by Huntec Limited for World Mining Consultants Limited. The survey was carried out in the North Channel of Lake Huron and covered Fox Island, North and South Benjamin Islands and Croker Island.

SURVEY SPECIFICATIONS

The survey was performed with a Super G Bell helicopter, registration CF-HER, equipped with a magnetometer, radio-altimeter and a 35 mm. aerial camera. The magnetometer was installed in the "bird", and towed on a 100-foot cable below the helicopter. A flight line spacing of 400 feet was used. The lines were flown in a north-south direction over Fox Island and in an east-west direction over North and South Benjamin Islands and over Croker Island. Four control lines were flown as follows: one in an east-west direction over Fox Island, one in a northeast-southwest direction over North and South Benjamin Islands and two in a north-south direction over Croker Island.

The helicopter operated so that the "bird" had a mean terrain clearance of 100 feet. Vertical control was provided by an APN-1 radio altimeter which recorded the ground clearance of the helicopter continuously on a Texas Instruments Corporation 4.75 inch chart recorder. The chart speed was 3 inches per minute and the sensitivity was such that a full scale deflection was equivalent to a terrain clearance variation of 400 feet.

The flight pattern of the helicopter was recorded by vertical photographs, using a Canadian Applied Research Limited Mark VIII, 35 mm. aerial camera with a wide angle lens (18 mm.) making exposures at 0.75 second intervals. All charts were related to the positioning film by means of a fiducial number produced simultaneously with every tenth camera exposure.

The magnetometer survey was performed with a Gulf Research and Development Company Mark III fluxgate magnetometer, recording variations in the total intensity of the earth's magnetic field.

The resolution and noise-level of the magnetometer were such that variations of 1.5 gamma were readable. The magnetic data were recorded on a 10 inch Leeds and Northrop rectilinear chart recorder. The sensitivity was set at 1200 gamma full-scale with a 1000 gamma step interval. The fiducial points, control line intersections and datum lines are all shown on the charts. In addition, the position of every tenth photo frame is indicated by a sharp jog in the magnetic profile.

Base maps at a scale of 1 inch to 400 feet were prepared from an uncontrolled mosaic. The photography for the mosaic was taken during the first week in March 1964.

The magnetic data are presented in the form of contours of total magnetic intensity referred to an arbitrary datum. A contour interval of 25 gamma has been used in areas of low and medium magnetic intensity, with suitable larger intervals in areas of high magnetic intensity.

The interpretation of the magnetometer survey is presented on the same base map at a scale of 1 inch to 400 feet.

ACCOMPANYING MAPS

Ozalid copies of the airborne magnetometer and interpretation maps at a scale of 1 inch to 400 feet are enclosed in the map pocket of this report.

PURPOSE OF THE SURVEY

The survey was carried out over a ring-like magnetic anomaly outlined by a recent aeromagnetic map (Map 2255G) jointly published by the Geological Survey of Canada and the Province of Ontario Department of Mines.

From the detailed information of the helicopter-borne magnetometer survey and a ground geological check of the area by G. E. Parsons it was hoped to determine the type of intrusive causing the anomaly and its probable potential as an exploration target.

The distinct circular outline of the anomaly suggested that the structure might be identified with an alkaline-carbonatite intrusive complex and hence could contain columbium and related mineral deposits.

LIST OF BASIC MAGNETIC DATA FORWARDED UNDER SEPARATE COVER

1. Airborne magnetometer maps on Cronaflex film at a scale of 1 inch to 400 feet.

2. Interpretation maps on Cronaflex film at a scale of 1 inch to 400 feet.

3. Two rolls of 35 mm. positioning film.

4. Separate envelopes for each survey line containing airborne magnetometer, radio altimeter records and the intercept tapes.

5. Flight reports.

KNOWN GEOLOGY

Some general geological information was obtained from the preliminary map No. P. 105, Espanola Sheet, Geological Compilation series, Sudbury Mining Division, published by the Ontario Department of Mines. Preliminary Map No. P. 105 indicates that Pre-Huronian, older granitic rocks (gneiss, granite, basic intrusive, etc. (Algoman?)) are exposed over the survey area.

A reconnaissance ground check was carried out by G. E. Parsons on March 5-7, 1964 over part of the survey area in order to obtain detailed geological information about the intrusive. The results of this ground check have already been submitted (Ref. 3).

The country rocks were found to be Lorraine-type (Huronian) quartzites plus some paragneisses. "The intrusive rocks, which are definitely post quartzite and hence post Huronian, may be divided into three main types:

(a) Felsite and pegmatites (youngest)

(b) Granite

(c) Syenite (oldest)

These syenites are quite dark and are characterized by a high percentage of biotite -- up to 75%".

Rock samples were collected and macroscopic examination revealed grains of magnetite in the biotite-rich syenite. This rock, or phases of this rock, appeared to be partly responsible for the magnetics.

INTERPRETATION

QUANTITATIVE INTERPRETATION

(a) Depth Determination

The one-half slope method of quantitative analysis was used to determine the parameters of the sources of the anomalies (Ref. 1).

In this method the points of half-maximum slope are empirically related to the depth of the dike-like body so oriented in space that it produces a symmetrical anomaly. If the anomaly is not quite symmetrical, the two flanks of the anomaly may be processed independently and the results averaged. Under the best circumstances it is a rule of thumb method which can be in error by 50% or more.

Altogether eighteen depth calculations were carried out and the results are presented on the interpretation maps, and in the form of a table in the Appendix showing the depth below the ground surface of the causative body, width, susceptibility contrast and the grade of the depth determination.

Grade (A) stands for a good depth determination. Grade (B) is given when slight ambiguity is observed in choosing the characteristic points. Grade (C) indicates that some extraneous factor comes into effect which may cause a relatively large error in the depth calculation but it is estimated to be within the allowable error. A depth determination is graded questionable (?) when the calculated depth could be perfectly valid or completely false. The present survey gave no determinations that could be graded A, B, or C.

(b) Susceptibility Contrast Calculation

The susceptibility contrast is calculated from the following formula:

$$\Delta k = \frac{\Delta T_o}{4 T C \tan^{-1} \frac{m}{h}}$$

where

Δk = susceptibility contrast i c.g.s. units

ΔT_o = the intensity of the anomaly at the centre of the dike

T = total intensity of the earth's magnetic field

C = factor, function of the dip of the dike, azimuth and inclination of the earth's magnetic field

m = half width of the dike

h = depth to top of the dike from the plane of observation

Since C cannot be calculated because of the dip of the dike is not known, it is assumed here to be unity; hence the calculated susceptibility contrast represents a minimum value.

The one-half slope method gives only the depth to magnetic body; the width of the dike is estimated as the distance between inflection points on the anomaly. This assumption is valid in the case of a narrow dike.

Considering the above limitation it has to be noted that the calculated susceptibility contrasts are subject to error and they are only indications of order of magnitude.

(c) Summary of Depth Calculations

The quantitative analyses indicate an outcropping or very thinly covered Precambrian surface. All of the magnetic bodies appear to come to this surface.

It is believed that depth determinations resulting in depths greater than fifty feet below ground surface are in error due to invalid basic assumptions.

The width of the dikes are estimated only. The widths indicated on the maps and in the Appendix are probably larger than their true widths.

GEOLOGICAL INTERPRETATION

A. General

The circular anomaly investigated is located near the southern edge of the Precambrian Shield in the North Channel of Lake Huron. The anomaly exhibits certain characteristics commonly associated with alkaline-carbonatite intrusive complexes such as the Firesand River and Nemegosenda Lake intrusives (Ref. 2). There are, however, two principal differences:

(a) The diameter of the usual alkaline-carbonatite intrusive is approximately two to four miles. The anomaly being investigated has a diameter of six miles.

(b) Most alkaline-carbonatite intrusives are characterized by distinct magnetic lows, surrounded by weakly magnetic rims. A radial fault pattern is often evident. The anomaly being investigated exhibits these characteristics in minor degree only.

As a result of the ground geological investigation (Ref. 3) and the aeromagnetic survey, it is concluded that the magnetic anomaly is caused by a granite-syenite intrusive.

B. North Sheet

The North Sheet covers Fox Island, which contains the northern rim of the anomaly. The ground geological investigation found that Lorraine-type quartzite forms the country rock on the small island in the northeast

corner of the sheet. Small outcrops of quartzite were observed on the north shore of Fox Island also. The remainder of the area examined is underlain by granite and biotite-rich syenite.

The magnetic interpretation is done by correlation of the magnetic contours with the mapped geology. An attempt has been made to extrapolate beyond the areas mapped and to infer certain changes within the areas mapped, that were not observed on the ground.

The region of low magnetic relief both north and south of the granitic-syenitic member is most probably underlain by quartzite.

The contact between granite and biotite-rich syenite could not be detected magnetically, though some faulting had been inferred at the junction of these rock types.

The narrow, magnetic zones giving rise to the circular anomaly appear to lie within all of the above-mentioned country rocks. They are clearly magnetite-rich zones, though their geological identification is not known. Since they appear to cut all other country rocks, they may be late, magnetite-rich intrusions. Alternatively, they could be alteration zones produced by the interaction of the intrusives and the pre-existing country rocks.

A number of other dike-like anomalies appear in the quartzites south of the granitic member and strike either east-west or northeast-southwest. They are believed to have a cause similar to the above, possibly influenced by synchronous structural deformation. This may apply also to

a small group of dike-like anomalies which strike northeast in the extreme southeast corner of the sheet.

The extensive area of low magnetic relief between the two granitic members, in the west part of the sheet, is believed to be occupied by quartzite. Two explanations for this are possible:

(a) The intrusion may not have reached the Precambrian surface. Later erosion may have removed some of the Huronian quartzite, leaving a shallow remnant between the two granitic members.

(b) The granitic-syenitic magma may have been intruded in the form of ring-dikes around a pre-existing structure in the quartzites.

The presence of intrusive material in the centre of the magnetic anomaly tends to support the former alternative.

Two main directions of faulting are observed, one in a northeast and one in a northwest direction. The distribution of these faults is not consistent with a simple radial fault pattern.

C. South Sheet

(a) East Half

The east half of the south sheet covers Croker Island and two smaller islands to the west.

The country rock appears to be Lorraine quartzite, intruded by granite, syenite and diabase dikes.

The large magnetic anomaly complex in the northeast corner of the sheet is believed to be caused by biotite-rich syenite. The magnetic anomalies southwest of the large anomaly complex are thought to have the same origin, though the syenite contains less magnetite.

The geological investigation showed granite in the southeastern part of Croker Island. The magnetic response of this rock is not sufficiently different from that of the syenite to allow accurate definition of the contact.

Northwest-southeast striking dike-like anomalies are interpreted as diabase dikes. One northeast-southwest striking anomaly appears to be caused by a similar dike at depth.

(b) West Half

The west half of the south sheet covers North and South Benjamin Island.

From the magnetic evidence it seems that North and South Benjamin Island are composed of granite which has intruded quartzite. By extrapolation from the other sheets, it would appear that the anomaly complex in the north and northwestern part of the sheet is occupied by granitic or syenitic intrusive rock.

The main directions of faulting in the south sheet are northeast and northwest.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The reconnaissance geological and aeromagnetic studies carried out in this area have identified the rocks causing the circular anomaly on G.S.C. Map 2255G as granitic and syenitic intrusives.

The country rock surrounding and included within the main intrusive complex is quartzite of the Lorraine type. The quartzite is generally pure and unaltered.

Among the intrusive rocks identified on the ground and interpreted from the magnetics are the following:

1. Granite. This rock has a variable magnetite content, generally between 0.1 and 0.5 per cent by volume.
2. Syenite and biotite-rich syenite. In places the biotite-rich syenite is quite dark and could contain as high as 75 per cent biotite. This rock is believed to be the cause of the higher intensity anomalies, particularly in the east half of the south sheet. Even here, the magnetite content need only be of the order of 1 to 2 per cent.
3. Felsite and pegmatite. These rocks are indistinguishable magnetically from the granite.
4. Dike-like zones of unknown geological identification. These occur mainly on the north sheet and are believed to represent late, magnetite-rich intrusions or alteration zones along the

perimeter of the main intrusive complex. Other dike-like anomalies of non-circular type may have the same identification.

5. Northwest striking diabase dikes. Some dike-like anomalies in the south sheet are believed to be caused by diabase dikes of the late Precambrian type found elsewhere along the north shore of Lake Huron.

The main directions of faulting are found to be northwest and northeast, with minor faulting in an east-west direction. The fault pattern is not of the radial type, typical of other alkaline-carbonatite intrusive complexes.

The magnetic and geological evidence suggests strongly that the circular anomaly is of granitic-syenitic composition rather than of the alkaline-carbonatite type.

It is not impossible that interesting mineralization could be associated with this structure. However, it is the opinion of the writers that considering all of the evidence, it rates a low priority as an exploration target.

If further work is done in the area of this anomaly, some attention should be paid to the origin of the narrow, dike-like magnetic anomalies

outlined on the magnetic interpretation maps. It is most probable that if interesting mineralization is present in the area, it will be associated with the magnetite-rich parts of the intrusive.

Respectfully submitted,

HUNTEC LIMITED,

F. L. Jagodits, P.Eng.,
Project Geophysicist.

Norman R. Paterson, P.Eng.,
Project Director.

Toronto, Ontario,

May, 1964.

REFERENCES

1. Leo J. Peters — The direct approach to magnetic interpretation and its practical application; Geophysics, Vol. 14, No. 3, July, 1949.

2. G. E. Parsons — Niobium-Bearing Complexes East of Lake Superior; Ontario Department of Mines, Geological Department, No. 3, 1961.

3. G. E. Parsons — Reconnaissance geological notes on circular magnetic anomaly Map 2255G, Spanish Sheet, Districts of Algoma and Manitoulin, Ontario, March, 1964.

APPENDIX

TABLE OF DEPTH DETERMINATIONS

TABLE OF DEPTH DETERMINATIONS

Anomaly No.	Depth In Feet	Width In Feet	Susceptibility Contrast in c.g.s. units	Grade
1	110	800	0.0026	?
2	90	420	0.0025	?
3	110	750	0.0026	?
4	30	320	0.0018	?
5	30	400	0.0017	?
6	0	200	0.0028	?
7	80	250	0.0024	?
8	170	380	0.0016	?
9	50	440	0.0011	?
10	180	760	0.0021	?
11	80	400	0.0008	?
12	130	460	0.0013	?
13	0	200	0.0011	?
14	110	500	0.0012	?
15	50	360	0.0008	?
16	10	400	0.0005	?
17	20	480	0.0010	?
18	20	300	0.0010	?

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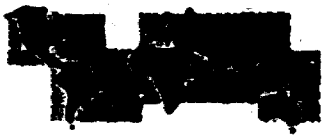

STEVEN LOW
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Vice-President
In Charge of Explorations

HECTOR H. COLGAN
Secretary-Treasurer

9th Floor, 88 University Avenue, Toronto 1, Canada • Telephone 366-3966

May 11, 1964.

Mr. D.P. Douglass,
Deputy Minister,
Department of Mines,
Province of Ontario,
Parliament Buildings,
Toronto 2, Ontario.

Dear Mr. Douglass:

I hand you herewith one copy of the final report on the interpretation of an airborne magnetic survey of the North Channel Anomaly prepared for us by Huntec Limited. We have only received three copies of the said report, one of which we need for our office files and one which will be kept in the field. The moment we receive additional copies, we shall forward you two extra copies for your files.

For your information, we intend to put two prospectors in the field on these islands for a period of one month to check reports of several copper bearing dykes. The prospectors' reports together with detailed geological mapping would be required before a decision can be made for the next stage which includes diamond drilling. When that stage is reached, we shall make a detailed programme and submit it to your Department for approval.

FILE UNDER:— (Respectfully yours,
WORLD MINING CONSULTANTS LIMITED)

Steven Low

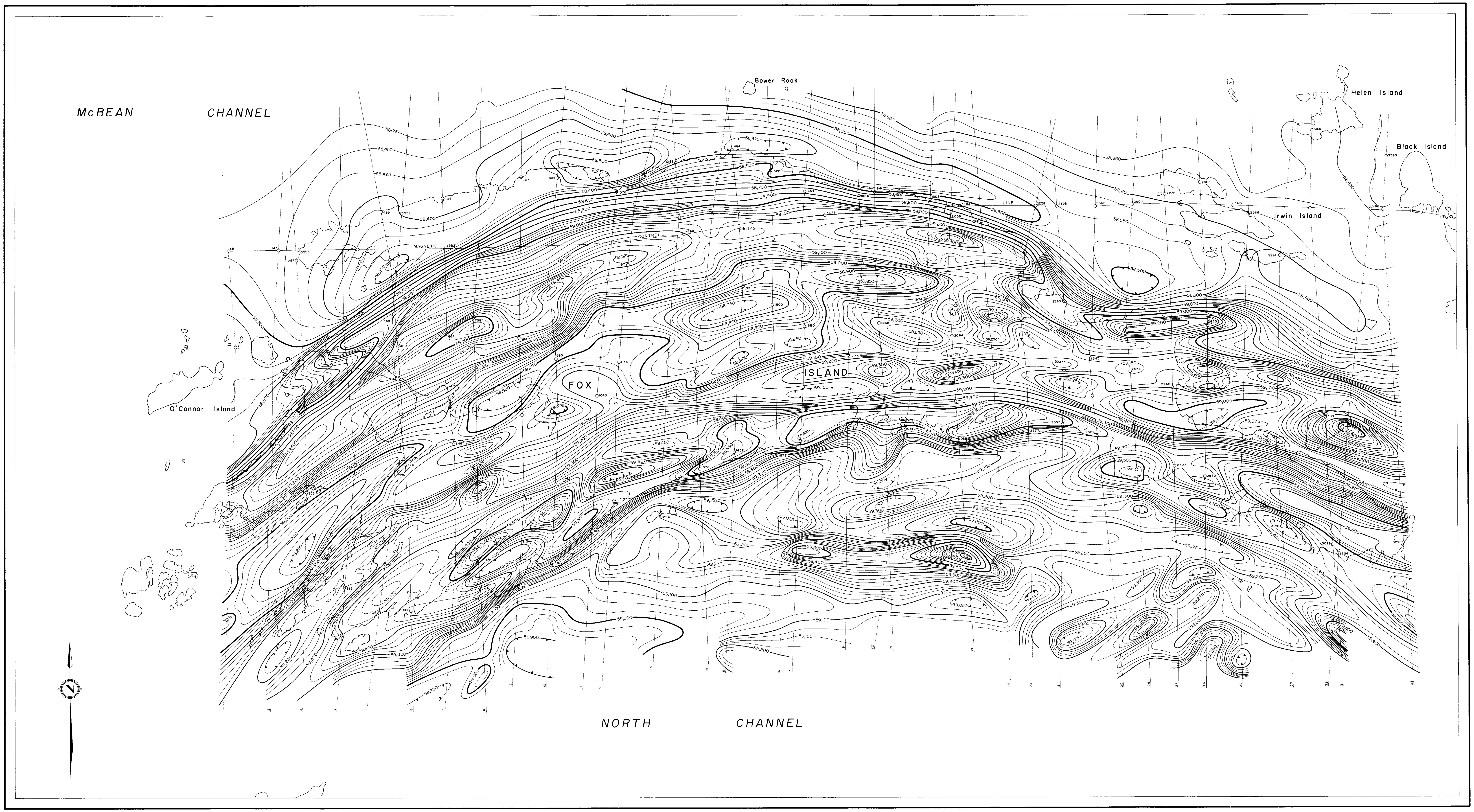
STEVEN LOW.
President.

SL/jp

FRECHETTE Is. - 0014, #1

WORLD MINING CONSULTANTS LIMITED
AIRBORNE MAGNETOMETER SURVEY

NORTH SHEET



CONTOUR INTERVAL .... 25 GAMMA
MEAN FLIGHT LINE SPACING .... 400 FEET
MEAN TERRAIN CLEARANCE (BIRD) .... 100 FEET
500 GAMMA CONTOUR
100 GAMMA CONTOUR
50 GAMMA CONTOUR
25 GAMMA CONTOUR
MAGNETIC LOW
FIDUCIAL POINTS 3690
FLIGHT LINES

MANITOULIN ISLAND

SCALE

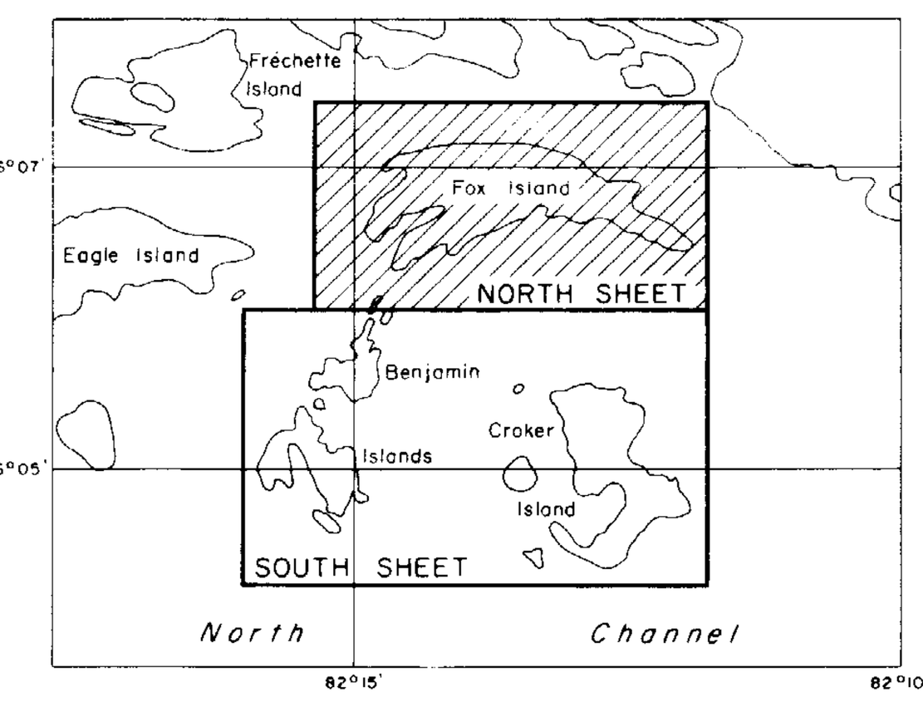
400 FEET 0 400 800 1200 1600 2000 FEET

1 Inch to 400 Feet

HUNTEC LIMITED
TORONTO, CANADA

Flown and Compiled by
HUNTING SURVEY CORPORATION LIMITED
TORONTO, CANADA

FRECHETTE Is. - 0014, #1.



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FRECHETTE IS. - 0014, #2

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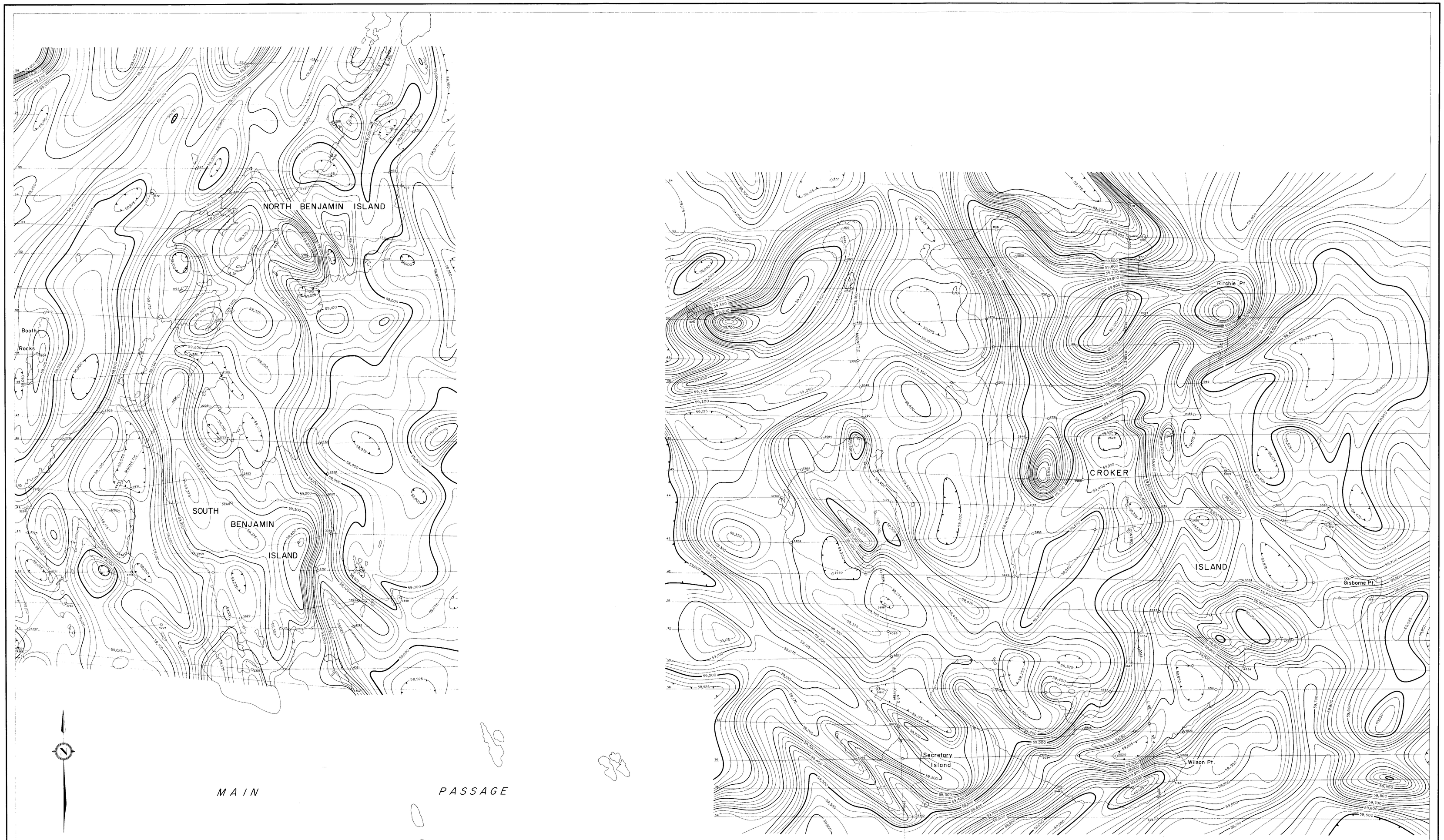
AIRBORNE MAGNETOMETER SURVEY

SOUTH SHEET



CONTOUR INTERVAL ..... 25 GAMMA
MEAN FLIGHT LINE SPACING ..... 400 FEET
MEAN TERRAIN CLEARANCE (BIRD) ..... 100 FEET
500 GAMMA CONTOUR
100 GAMMA CONTOUR
50 GAMMA CONTOUR
25 GAMMA CONTOUR
MAGNETIC LOW
FIDUCIAL POINTS ..... 3990 ⊙
FLIGHT LINES

MANITOULIN ISLAND

SCALE

400 FEET 0 400 800 1200 1600 2000 FEET

1 Inch to 400 Feet

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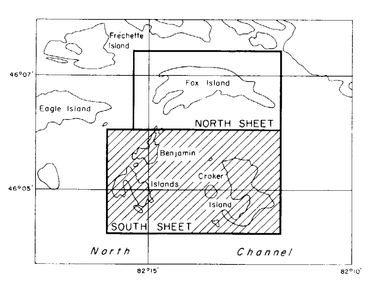


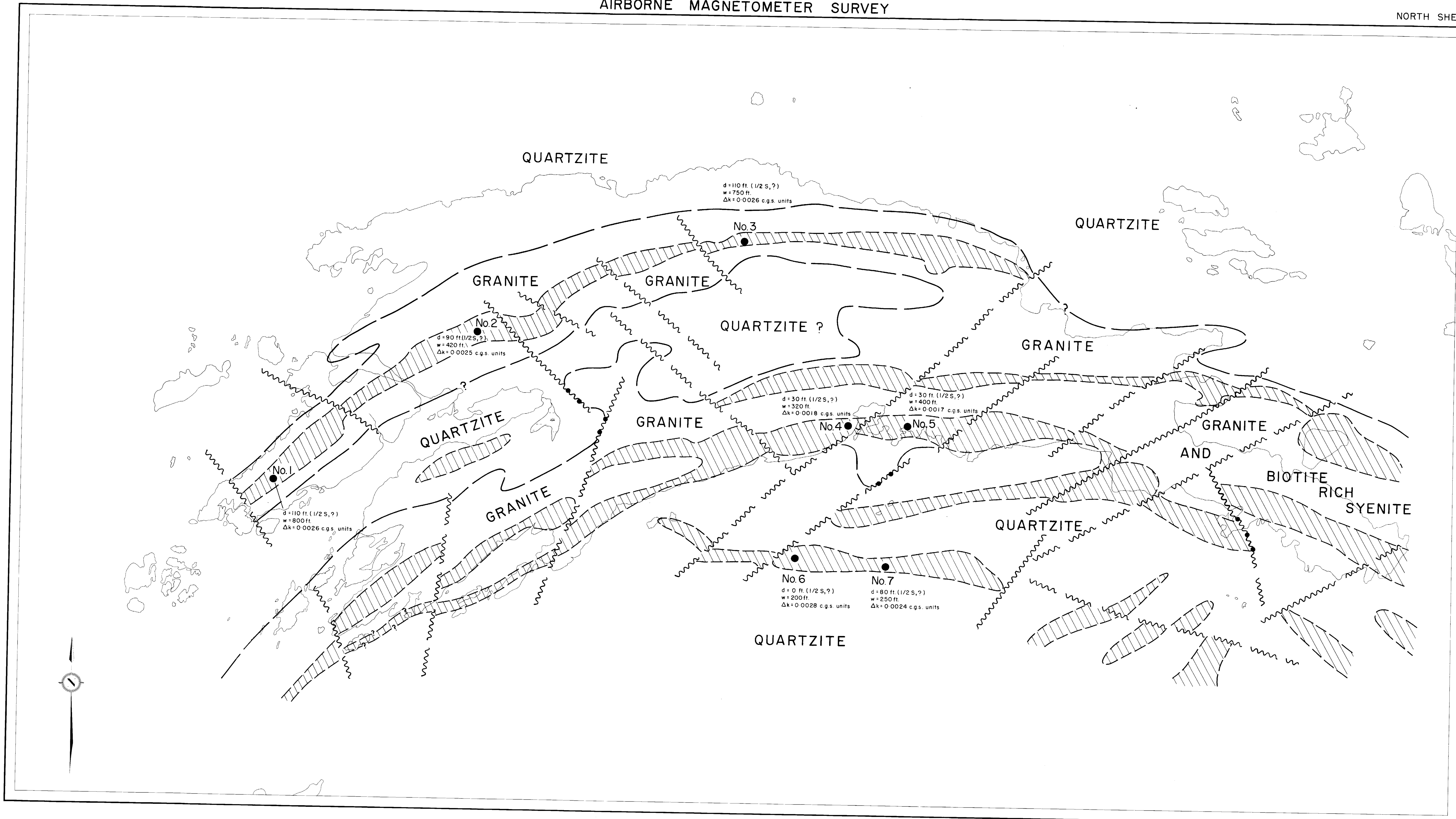
FRECHETTE Is. - 0014, #3.

INTERPRETATION MAP

WORLD MINING CONSULTANTS LIMITED

AIRBORNE MAGNETOMETER SURVEY

NORTH SHEET



LEGEND

Geological contact

Possible geological contact

Fault contact

Possible fault contact

Fault

Possible fault

Magnetite enriched zones within intrusion

Possible diabase dikes

Possible diabase dikes at depth

No. 3 d = 30 ft. (1/2 S, ?) — Depth below ground followed by applied method and grade

w = 320 ft. — Total width

Δk = 0.0018 c.g.s. units — Susceptibility contrast in c.g.s. units

MANITOULIN ISLAND

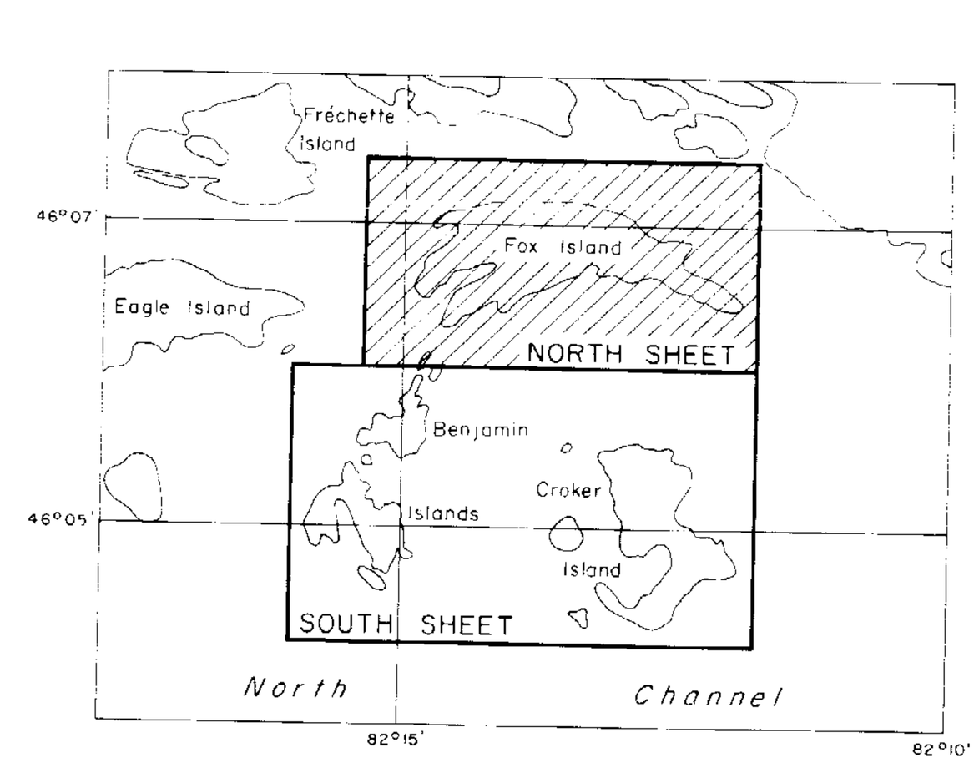
SCALE

400 0 400 800 1200 1600 2000 FEET

1 Inch to 400 Feet

HUNTEC LIMITED
TORONTO, CANADA

FRECHETTE Is. - 0014, #3



220

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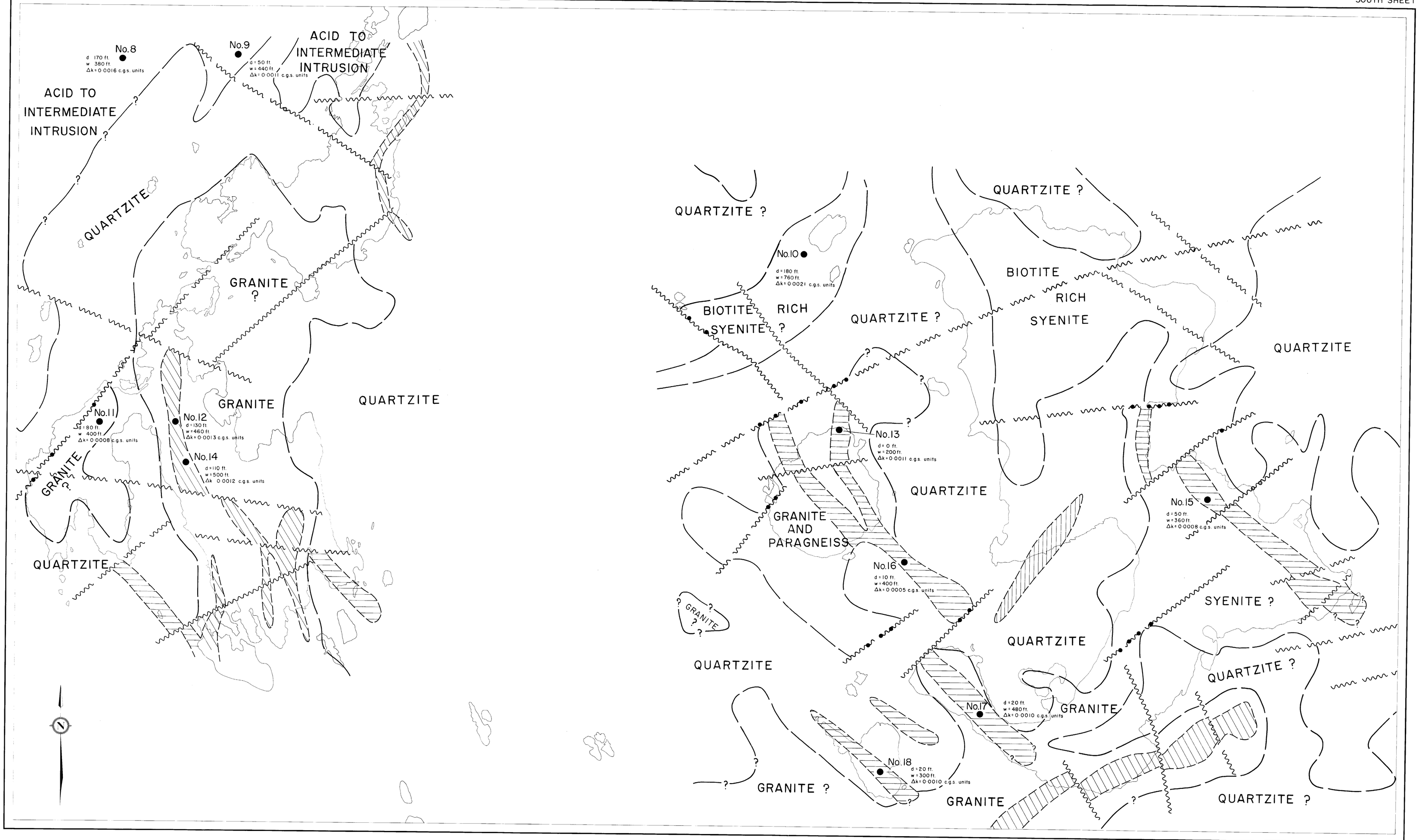
WORLD MINING CONSULTANTS LIMITED

AIRBORNE MAGNETOMETER SURVEY

INTERPRETATION MAP

SOUTH SHEET



LEGEND

- Geological contact
- ? Possible geological contact
- Fault contact
- Possible fault contact
- Fault
- Possible fault
- Magnetite enriched zones within intrusion
- Possible diabase dikes
- Possible diabase dikes at depth
- No.3 d = 30 ft. (1/2 S, 9) — Depth below ground followed by applied method and grade
- w = 320 ft. — Total width
- Δk = 0.0018 c.g.s. units — Susceptibility contrast in c.g.s. units

MANITOULIN ISLAND

SCALE

400 FEET 0 400 800 1200 1600 2000 FEET

1 Inch to 400 Feet

HUNTEC LIMITED
TORONTO, CANADA

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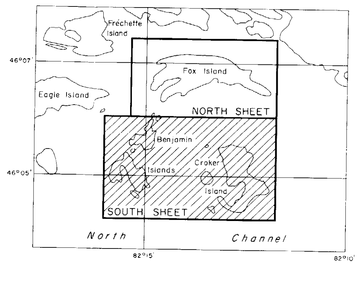
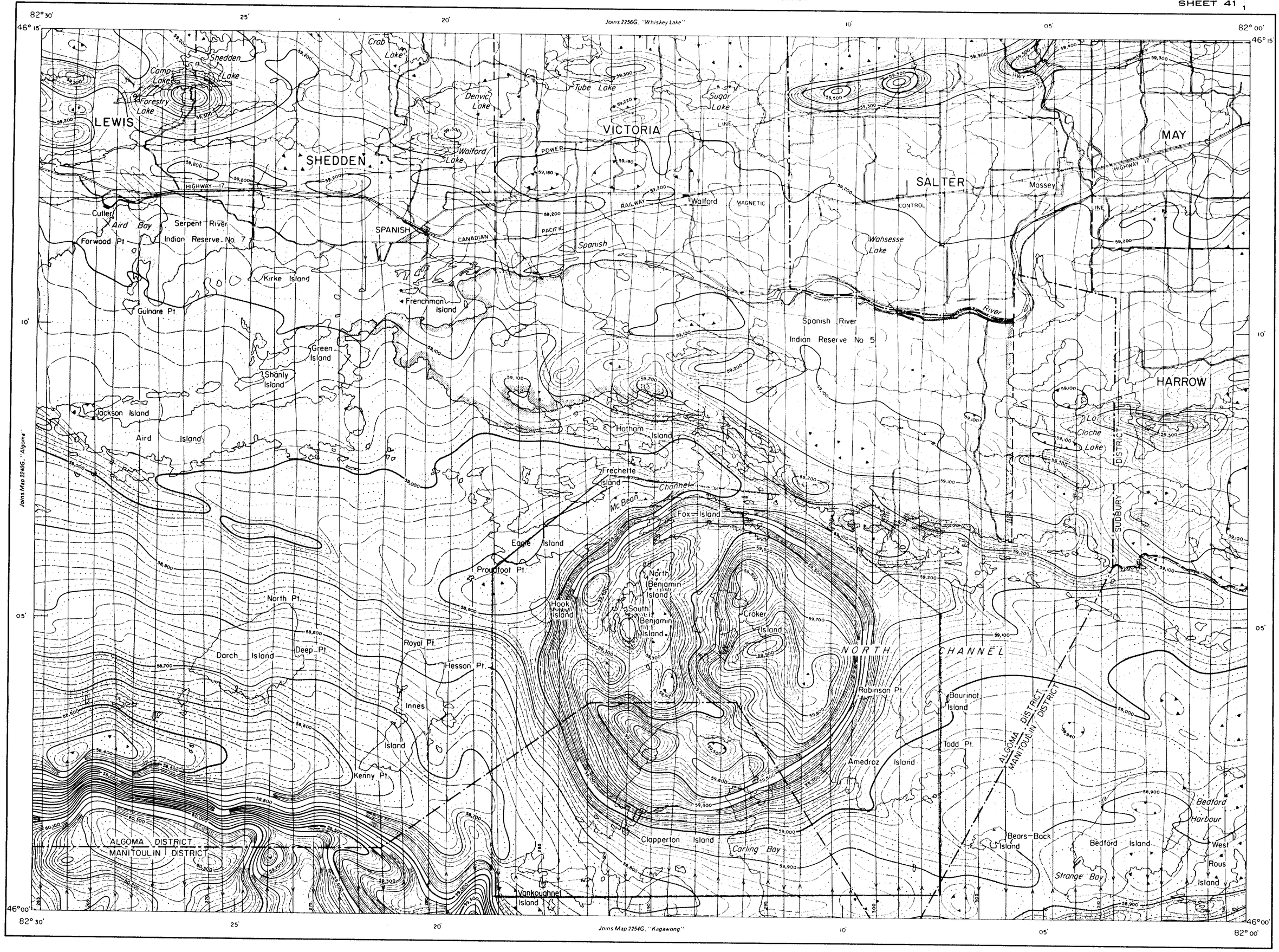


AEROMAGNETIC SERIES

PROVINCE OF ONTARIO
DEPARTMENT OF MINES

DEPARTMENT OF MINES AND TECHNICAL SURVEYS
GEOLOGICAL SURVEY OF CANADA

SHEET 41 J 1



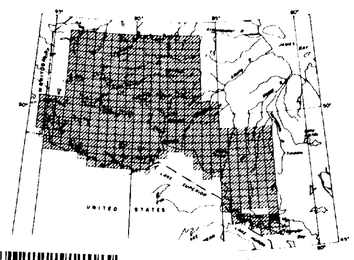
MAP 2255 G

SPANISH

ALGOMA, SUDBURY and MANITOULIN DISTRICTS
ONTARIO

Scale: One Inch to One Mile = $\frac{1}{63,360}$

1 1/2 0 1 2 3 Miles



ISOMAGNETIC LINES (absolute total field)

500 gammas
100 gammas
20 gammas
10 gammas
Magnetic depression

Flight lines
Flight altitude 1000 feet above ground level

Airborne Magnetic Survey, October 1962 to May 1963 by Spartan Air Services Ltd.

No correction has been made for regional variation.

The planimetry for this map was obtained from topographical map sheets published by the Department of Mines and Technical Surveys and the Ontario Department of Lands and Forests.

The magnetic data on this map were compiled from information recorded along the flight lines shown. The anomalies expressed by the magnetic contours are dependent on the variable magnetic intensities of the underlying rocks, and may be due to conditions near, or at unknown depths below the surface. High magnetic anomalies normally indicate the presence of basic rocks, such as diabase, gabbro, or serpentine, which have a relatively high iron content, but in special instances may be due, or partly due, to concentrations of magnetic ore minerals. By means of the magnetic anomalies, various rock bodies or structural features, such as faults or folds, may be traced into, or across, areas of few or no outcrops. In many instances, however, no interpretation of particular anomalies may be possible without further geological information.

GEOPHYSICS PAPER 2255

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ONTARIO
SHEET 41 J 1

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