DIGHEM^{II} SURVEY

OF

FOGHORN MOUNTAIN, BRITISH COLUMBIA

FOR

BARRIER REEF RESOURCES LTD.

BY

DIGHEM LIMITED

TORONTO, ONTARIO
JUNE 15, 1979

D. C. FRASER
PRESIDENT

Z. DVORAK
GEOPHYSICIST

SUMMARY

A DIGHEM^{II} airborne electromagnetic/resistivity/magnetic survey totalling 236 line-kilometres was flown in May 1979 for Barrier Reef Resources Ltd, over an area near Foghorn Mountain in British Columbia.

The environment within the survey area varied from quite conductive, with well defined EM anomalies, to quite resistive, practically lacking any anomalies.

Several targets were located which appear to warrant ground exploration. They have weak to moderate conductances.

The large topographic relief in the survey area resulted in large stresses being applied to the bird during the contour flying. These stresses produced noise on the standard coil-pair channels. The whaletail coil-pair channels are fairly immune to the bird stress and were used to identify spurious responses. This is one of the major advantages which results from the two orthogonal coil-pairs of DIGHEM^{II}. The survey data illustrate that other products unique to the DIGHEM^{II} system (e.g., the resistivity map) are quite helpful in the evaluation of the EM anomalies.

Dighem Limited

SUITE 4900 TORONTO-DOMINION CENTRE TORONTO, CANADA M5K 1E8
TEL. (416) 362-3878 TELEX 06-219566

June 18, 1979

To Whom It May Concern:

The DIGHEM^{II} airborne survey flown in May 1979 over the Foghorn Creek claim block of Barrier Reef Resources Ltd. was supervised by Douglas C. Fraser, Professional Engineer of the Province of Ontario. Mr. Fraser has been registered with the Association of Professional Engineers of the Province of British Columbia but his non-resident licence has lapsed. Mr. Fraser's qualifications are on record with the Association.

Yours very truly,

DIGHEM LIMITED

D. C. Fraser
President

DCF/hmt

Dighem Limited

D116-2

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TEL. (416) 362-3878 TELEX 06-219566

Invoice No. 79-23
June 18, 1979

Barrier Reef Resources Ltd. (N.P.L.)
Suite 904
675 West Hastings Street
Vancouver, British Columbia
V6B 1N2

In Account With

DIGHEM LIMITED

TO:

Dighem flying of agreement
dated March 14, 1979

Ferry and mobilization	$ 1,000.00
Survey charges, 231 line-km @ $57.00/line-km	13,167.00
	14,167.00
Less, progress payment	1,420.00
Net, this invoice	$12,747.00

DIGHEM LIMITED

D. C. Fraser
President

DCF/hmt

Job 116

Client
Project
Voucher No.
Approved
Date Paid June 21/79

ELECTROMAGNETICS/RESISTIVITY/MAGNETICS
for metal ore, gravel, permafrost, soils

BARRIER REEF RESOURCES LTD. (N.P.L.)
904—675 WEST HASTINGS STREET, VANCOUVER, B.C. V6B 1N2
TELEPHONE 688-3584

FOGHORN CREEK CLAIM BLOCK

June 1979

CLAIM NO.	RECORD NO.	NO. OF UNITS	ASSESSMENT ANNIVERSARY
FH 2	65665	1	August 11, 1981
" 4	65667	1	" " "
" 18	65681	1	" " "
" 20	65683	1	" " "
LH 1	1310	1	July 27, 1979
" 2	1311	1	" " "
" 3	1312	1	" " "
" 4	1313	1	" " "
RH 1	1306	1	" " "
RH 2	1307	1	" " "
RH 3	1308	1	" " "
RH 4	1309	1	" " "
FOGGY 1	1677	20	January 5, 1980
2	1678	20	" " "
3	1679	20	" " "
4	1680	12	" " "
5	1681	15	" " "
6	1682	12	" " "
7	1683	20	" " "
8	1684	2	" " "
9	1685	20	" " "
10	1686	12	" " "

LOCATION MAP

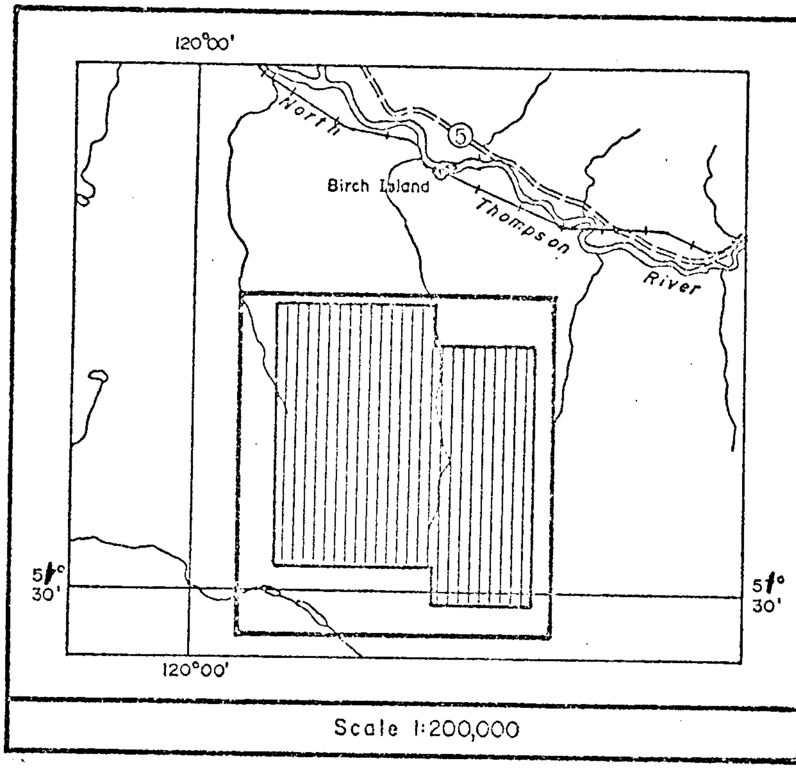

Figure 1. The survey area.

INTRODUCTION

A DIGHEM^{II} survey of 236 line-km was flown for Barrier Reef Resources Ltd. between May 1 and May 18, 1979, over an area near Foghorn Mountain, British Columbia (Figure 1). The Lama C-GDEM jet helicopter flew with an average airspeed of 100 km/h and EM bird height of 35 m. Ancillary equipment consisted of a Geometrics 803 magnetometer with its bird at an average height of 55 m, a Sperry radio altimeter, Geocam sequence camera, Barringer 8-channel hot pen analog recorder, and a Geometrics G-704 digital data acquisition system with a Cipher 70 7-track 200-bpi magnetic tape recorder. The analog equipment recorded four channels of EM data at approximately 900 Hz, two ambient EM noise channels (for the standard and whaletail receivers), and one channel each of magnetics and radio altitude. The digital equipment recorded the EM data with a sensitivity of 0.2 ppm/bit, and the magnetic field to one gamma/bit.

The Appendix provides details on the data channels, their respective noise levels, and the data reduction procedure. The quoted noise levels are generally valid for wind speeds up to 20 km/h. Higher winds may cause the system to be grounded because excessive bird swinging produces difficulties in flying the helicopter. The swinging results from the 5 m^2 of area which is presented by the bird to broadside gusts. The DIGHEM system nevertheless can be flown under wind conditions that seriously degrade other AEM systems.

DATA PRESENTATION

DIGHEM electromagnetic responses fall into two general classes, discrete and broad. The discrete class consists of sharp well defined anomalies from discrete conductors such as sulfide lenses and steeply dipping sheets of graphite and sulfides. The broad class consists of wide anomalies from conductors having a large horizontal surface such as flatly dipping graphite or sulfide sheets, saline water-saturated sedimentary formations, conductive overburden and rock, and geothermal zones. A vertical conductive slab with a width of 200 m would straddle these two classes.

The vertical sheet (half plane) model is the most common model used for the analysis of discrete conductors. All anomalies plotted on the electromagnetic map are interpreted according to this model. The following section entitled Discrete conductor analysis describes this model in detail, including the effect of using it on anomalies caused by broad conductors such as conductive overburden.

The conductive earth (half space) model is the most suitable model for broad conductors. Resistivity contour maps result from the use of this model. Resistivity contour maps should be prepared when the EM responses predominantly are of the broad class. A later section entitled Resistivity mapping describes the method further, including the effect of using it on anomalies caused by discrete conductors such as sulfide bodies.

Discrete conductor analysis

The EM anomalies appearing on the electromagnetic map are interpreted by computer to give the conductance (i.e., conductivity-thickness product) in mhos of a vertical sheet model. DIGHEM anomalies are divided into six grades of conductance, as shown in Table I. The conductance in mhos is the reciprocal of resistance in ohms.

Table I. EM Anomaly Grades

Anomaly Grade	Mho Range
6	$\geq$ 100
5	50 - 99
4	20 - 49
3	10 - 19
2	5 - 9
1	$\leq$ 4

The mho value is a geological parameter because it is a characteristic of the conductor alone; it generally is independent of frequency, and of flying height or depth of burial apart from the averaging over a greater portion of the conductor as height increases.* Small anomalies from deeply buried strong conductors are not confused with small anomalies from shallow weak conductors because the former will have larger mho values.

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* This statement is an approximation. DIGHEM, with its short coil separation, tends to yield larger and more accurate mho values than airborne systems having a larger coil separation.

Conductive overburden generally produces broad EM responses which are not plotted on the EM maps. However, patchy conductive overburden can yield discrete-like anomalies with a conductance grade (cf. Table I) of 1, or even of 2 for highly conducting clays. The anomaly shapes from the multiple coils often allow surface conductors to be recognized, and these are indicated by the letter S on the map. The remaining grade 1 and 2 anomalies could be weak bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: DIGHEM's New Insco copper discovery (Noranda, Quebec) yielded a grade 4 anomaly, as did the neighbouring copper-zinc Magusi River ore body; Mattabi (copper-zinc, Sturgeon Lake, Ontario) and Whistle (nickel, Sudbury, Ontario) gave grade 5; and DIGHEM's Montcalm nickel-copper discovery (Timmins, Ontario) yielded a grade 6 anomaly. Graphite and sulfides can span all grades but, in any particular survey area, field work may show that the different grades indicate different types of conductors.

Strong conductors (i.e., grades 5 and 6) are characteristic of massive sulfides or graphite. Moderate conductors (grades 3 and 4) typically reflect sulfides of a less massive character or graphite, while weak bedrock conductors (grades 1 and 2) can signify poorly connected graphite or heavily disseminated sulfides. Grade 1 conductors may not respond to ground EM equipment using frequencies less than 2000 hz.

The presence of sphalerite or gangue can result in ore deposits having weak to moderate conductances. As an example, the three million ton lead-zinc deposit of Restigouche Mining Corporation near Bathurst, New Brunswick, yielded a well defined grade 1 conductor. The 10 percent by volume of sphalerite occurs as a coating around the fine grained massive pyrite, thereby inhibiting electrical conduction.

On the electromagnetic map, the actual mho value and a letter are plotted beside the EM grade symbol. The letter is the anomaly identifier. The horizontal rows of dots, beside each anomaly symbol, indicate the anomaly amplitude of the flight record. The vertical column of dots gives the estimated depth. In areas where anomalies are crowded, the identifiers, dots and mho values may be obliterated. The EM grade symbols, however, will always be discernible, and the obliterated information can be obtained from the anomaly listing appended to this report.

The purpose of indicating the anomaly amplitude by dots is to provide an estimate of the reliability of the conductance calculation. Thus, a conductance value obtained from a large ppm anomaly (3 or 4 dots) will be accurate whereas one obtained from a small ppm anomaly (no dots) could be inaccurate.

The absence of amplitude dots indicates that the anomaly from the standard (coaxial maximum-coupled) coil is 5 ppm or less on both the inphase and quadrature channels. Such small anomalies could reflect a weak conductor at the surface, or a stronger conductor at depth. The mho value and depth estimate will illustrate which of these possibilities best fits the recorded data. The depth estimate, however, can be erroneous. The anomaly from a near-surface conductor, which exists only to one side of a flight line, will yield a large depth estimate because the computer assumes that the conductor occurs directly beneath the flight line.

Flight line deviations occasionally yield cases where two anomalies, having similar mho values but dramatically different depth estimates, occur close together on the same conductor. Such examples illustrate the reliability of the conductance measurement while showing that the depth estimate can be unreliable. There are a number of factors which can produce an error in the depth estimate, including the averaging of topographic variations by the altimeter, overlying conductive overburden, and the location and attitude of the conductor relative to the flight line. Conductor location and attitude can provide an erroneous depth estimate because the stronger part of the conductor may be deeper or to one side of the flight line, or because it has a shallow dip.

A further interpretation is presented on the EM map by means of the line-to-line correlation of anomalies. This provides conductor axes which may define the geological structure over portions of the survey area.

The majority of massive sulfide ore deposits have strike lengths of a few hundred to a few thousand feet. Consequently, it is important to recognize short conductors which may exist in close proximity to long conductive bands. The high resolution of the DIGHEM system, and the line-to-line correlation given on the EM map, are especially important for a proper strike length evaluation.

DIGHEM electromagnetic maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a followup program. The actual mho values are plotted for those who wish quantitative data. The anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of conductors in terms of length, strike direction, conductance and depth. The accuracy is comparable to an interpretation from a ground EM survey having the same line spacing.

An EM anomaly list attached to each survey report provides a tabulation of anomalies in ppm, and in mhos and estimated depth for the vertical sheet model. The anomalies are listed from top to bottom of the map for each line.

The EM anomaly list also shows the conductance in mhos and the depth for a thin horizontal sheet (whole plane) model, but only the vertical sheet parameters appear on the EM map. The horizontal sheet model is suitable for a flatly dipping thin bedrock conductor such as a sulfide sheet having a thickness less than 50 feet. The list also shows the resistivity and depth for a conductive earth (half space) model, which is suitable for thicker slabs such as thick conductive overburden. In the EM anomaly list, a depth value of zero for the conductive earth model, in an area of thick cover, warns that the anomaly may be caused by conductive overburden. Since discrete bodies normally are the targets of EM surveys, local base (or zero) levels are used to compute anomaly amplitudes rather than true zero levels. The use of local base levels may distort the horizontal sheet and conductive earth parameters. True zero levels, however, are used for resistivity mapping, discussed below.

Resistivity mapping

Areas of widespread conductivity have been encountered while surveying for base metals. In such areas, anomalies can be generated by decreases of only 20 feet in survey altitude, as well as by increases in conductivity. The typical flight record in conductive areas is characterized by inphase and quadrature channels which are continuously active; local peaks reflect either increases in conductivity of the earth or decreases in survey altitude. For such conductive areas, apparent resistivity contour maps can aid the interpretation of the airborne data. The advantage of the contour maps is that anomalies caused by altitude changes are considerably reduced, and the contours reflect mainly those anomalies caused by conductivity changes. In areas of widespread conductivity, many anomalies on the EM map may be caused by altitude variations. The majority of these "anomalies" are flagged by S or S? (see map legend). A more quantitative approach is to prepare a resistivity contour map. Such a map improves the interpreter's ability to differentiate between conductive trends in the bedrock and those patterns typical of conductive overburden. Discrete conductors will appear as narrow lows on the contour map and broad conductors will appear as wide lows.

Conductive overburden diminishes the ability of an EM system to effectively explore the bedrock. For example, the lower the resistivity of the cover, the more active the EM channels, and the less the likelihood of recognizing that a particular anomaly might be caused by a bedrock conductor. As a general rule of thumb, the effectiveness of the DIGHEM system for base metal exploration is given in Table II.

Table II. Influence of Conductive Cover On Base Metal Surveys.

Resistivity	Exploration effectiveness at 900 hz
> 300 ohm-m	excellent
100 to 300	good
30 to 100	moderate
< 30	poor

Apparent resistivity maps should be constructed when the exploration effectiveness (Table II) is moderate to poor, because the contour patterns can be helpful in differentiating between bedrock and overburden conductors. Wide resistivity lows may be caused by broad (e.g., flatly dipping) bedrock conductors or by conductive overburden. The two can only be differentiated on the basis of the resistivity contour patterns coupled with knowledge of the geology. For example, a wide east-west resistivity low might suggest the existence of a bedrock conductor in an area of flatly dipping stratigraphy which strikes east-west, whereas it would be suspect if the geological strike was north-south.

X-type electromagnetic responses

DIGHEM^{II} maps contain x-type EM responses in addition to EM anomalies. An x-type response is below the noise threshold of 2 ppm, and reflects one of the following: a weak conductor near the surface, a strong conductor at depth (e.g., 300 to 400 feet below surface), or noise. Those responses that have the appearance of valid bedrock anomalies on the flight profiles are mentioned in the report. The others should not be followed up unless their locations are of considerable geological interest.

The thickness parameter

DIGHEM^{II} can provide an indication of the thickness of a steeply dipping conductor. The ratio of the anomaly amplitude of channel 24/channel 22 generally increases as the apparent thickness increases, i.e., the thickness in the horizontal plane. This thickness is equal to the conductor width if the conductor dips at 90 degrees and strikes at right angles to the flight line. This report refers to a conductor as thin when the thickness is likely to be less than 3 m, and thick when in excess of 10 m. Thick conductors can be high priority targets because most massive sulfide ore bodies are thick, whereas non-economic bedrock conductors are usually thin. An estimate of thickness cannot be obtained when the strike of the conductor is subparallel to the flight line, when the conductor has a shallow dip, or when the anomaly amplitudes are small.

Reduction of conductive overburden response

The DIGHEM^{II} system yields four channels which generally are free of the response of conductive overburden. These are the inphase differences channel 33, the quadrature differences channel 34, and the two anomaly recognition functions of channels 35 and 36. Channels 35 and 36 are used to trigger the conductance channel 37 which identifies discrete conductors.

Discrete conductors usually occur in the bedrock, such as sulfides or graphite, rather than in the overburden, such as conductive clay. Only discrete conductors are plotted on the EM map. Broad (i.e., non-discrete) conductors are not plotted on this map, but are identified by lows on the resistivity contour map.

Reduction of magnetite response

Magnetite produces a form of geological noise on the inphase channels of all EM systems. Rocks containing as little as 1% magnetite can yield negative inphase anomalies. When magnetite is widely distributed throughout a survey area, the inphase EM channels may continuously rise and fall reflecting variations in the magnetite percentage, flying height, and overburden thickness. This can lead to difficulties in recognizing deeply buried bedrock conductors, particularly if conductive overburden also exists. However, the response of magnetite generally vanishes on the inphase differences channel 33. This feature can be a significant aid in the recognition of conductors which occur in rocks containing accessory magnetite.

CONDUCTORS IN THE SURVEY AREA

The survey area is characterized by large topographic variations. Contour flying of the topography caused large stresses to be applied to the bird. This, in turn, produced noise and drift on the channels of the standard coil-pair. The whaletail coil-pair is fairly immune to this stress. Consequently, channels 24 and 25 (see Appendix) of the whaletail coil-pair were used in part to identify and delete spurious responses on the standard channels 22 and 23. Occasionally, the stresses did cause drift in the whaletail channels. In these cases, the resistivity had to be corrected manually.

Group 1

These grade 1 to 3 anomalies occur in an arcuate pattern and reflect a conductive body that has produced a prominent low resistivity zone. The EM responses suggest that the conductor may be folded or be a part of a plunging syncline. Alternatively, the resistivity pattern may reflect the outcrop pattern of a dissected dipping conductive formation.

Group 2

This grade 1 anomaly and the associated x-type responses occur along the margin of a 170 ohm-m resistivity low. This short conductor appears slightly magnetic at its east end.

Group 3

A short, slightly magnetic bedrock conductor is indicated by several grade 1 anomalies. It is associated with an elongated low resistivity zone that occurs at the eastern end of a prominent magnetic trend.

Group 4

This grouping yielded no clearly discernible responses on the standard coil-pair. However, the resistivity map shows a distinct resistivity low which illustrates the advantage of the whaletail coil-pair and the resistivity presentation of DIGHEM^{II}. This zone is wide (e.g., 100 m) and poorly conductive but could represent mineralization of interest.

Respectfully submitted,

DIGHEM LIMITED

D. C. Fraser
President

Z. Dvorak
Geophysicist

/hmt

Four map sheets accompany this report:

Electromagnetics	1 map sheet
Total magnetic field	1 map sheet
Enhanced magnetic field	1 map sheet
Resistivity	1 map sheet

A P P E N D I X

THE FLIGHT RECORD AND PATH RECOVERY

The flight record is a roll of chart paper containing the geophysical profiles. The profiles are generated by computer at a scale identical to the geophysical maps. The flight record contains up to 16 channels of information, as follows:

Channel Number	Parameter	Scale units/mm	Noise
20	magnetics	10 gamma	2 gamma
21	altitude	10 feet	5 feet
22	standard* coil-pair inphase	1 ppm	1-2 ppm
23	standard coil-pair quadrature	1 ppm	1-2 ppm
24	whaletail** coil-pair inphase	1 ppm	1-2 ppm
25	whaletail coil-pair quadrature	1 ppm	1-2 ppm
28	ambient noise monitor (standard receiver)	1 ppm	0 ppm
29	ambient noise monitor (whaletail receiver)	1 ppm	0 ppm
31	sums function inphase***	1 ppm	1-2 ppm
32	sums function quadrature***	1 ppm	1-2 ppm
33	differences function inphase	1 ppm	1-2 ppm
34	differences function quadrature	1 ppm	1-2 ppm
35	first anomaly recognition function	1 ppm	1-2 ppm
36	second anomaly recognition function	1 ppm	1-2 ppm
37	conductance	1 mho	
40	log resistivity	.03 decade	

* coaxial
** horizontal coplanar
*** generally not plotted

The log resistivity scale of 0.03 decade/mm means that the resistivity changes by an order of magnitude in 33 mm. The resistivities at 0, 33, 67 and 100 mm up from the bottom of the chart are respectively 1, 10, 100 and 1000 ohm-m.

The fiducial marks on the flight record represent points on the ground which were recognized by the aircraft navigator. Continuous photographic coverage allowed accurate photo-path recovery locations for the fiducials, which were then plotted on the geophysical maps to provide the track of the aircraft.

The fiducial locations on both the flight records and flight path maps were examined by a computer for unusual helicopter speed changes. Such changes often denote an error in flight path recovery. The resulting flight path locations therefore reflect a more stringent checking than is provided by standard flight path recovery techniques.

The following brief description of DIGHEM^{II} illustrates the information content of the various profiles.

The DIGHEM^{II} system has two transmitter coils which are mounted at right angles to each other. (The transmitted frequency is given in the Introduction.) Thus, the system provides two completely independent surveys at one pass. In addition, the flight chart profiles (generated by computer) include an inphase channel and a quadrature channel which essentially are free of the response of conductive overburden. Also, the EM channels may indicate whether the conductor is thin (e.g., less than 3 m), or has a substantial width (e.g., greater than 15 m). Further, the EM channels include a channel of resistivity and another of conductance. A minimum of 10 EM channels are provided. The DIGHEM^{II} system therefore gives information in one pass which cannot be obtained by any other airborne or ground EM technique.

Figure A1 shows a DIGHEM^{II} flight profile over the massive pyrrhotite ore body in Montcalm Township, Ontario. It will serve to identify the various channels.

The two upper channels (numbered 20 and 21) are respectively the magnetics and the radio altitude. Channels 22 and 23 are respectively the inphase and quadrature of the coaxial coil-pair, which is termed the standard coil-pair. This coil-pair is equivalent to the standard coil-pair of all inphase-quadrature airborne EM systems. Channels 24 and 25 are the inphase and quadrature of the additional coplanar coil-pair which is termed the whaletail coil-pair.

Channels 31 and 32 are inphase and quadrature sums functions of the standard and whaletail channels; they provide a condensed view of the four basic channels 22 to 25. The sums channels normally are not plotted.

Channels 33 and 34 are inphase and quadrature differences functions of the standard and whaletail channels. The differences channels are almost free from the response of conductive overburden. Channel 37 is the conductance. The conductance channel essentially is an automatic anomaly picker calibrated in conductance units of mhos; it is triggered by the anomaly recognition functions shown as channels 35 and 36.

Channel 40 is the resistivity, which is derived from the whaletail channels 24 and 25. The resistivity channel 40 yields data which can be contoured, and so the DIGHEM^{II} system yields a resistivity contour map in addition to an electromagnetic map, a magnetic contour map, and an enhanced magnetic contour map. The enhanced magnetic contour map is similar to the filtered magnetic map discussed by Fraser.*

Figure A2 presents the DIGHEM^{II} results for a line flown perpendicularly to the Montcalm ore body. Channel 20 shows the 175 gamma magnetic anomaly caused by the massive pyrrhotite deposit. For the EM channels, the following points are of interest:

1. On channels 22-25 and 31-34, the ore body essentially yields only an inphase response. The quadrature response is almost completely caused by conductive overburden (which also gives a small inphase response). The hachures show the EM response from the overburden. The overburden response vanishes on the difference EM channels, as can be seen by comparing the quadrature channels 25 and 34. This is an important point to note because DIGHEM^{II} is the only EM system which provides an inphase channel and a quadrature channel which are essentially free of conductive overburden response.

2. The whaletail anomaly of channel 24 has a single peak. This shows that the conductor has a substantial width. If the width had been under 3 m, the conductor would have produced a weak m-shaped anomaly on channel 24.

3. The ore body yields a resistivity of 5 ohm-m in a background of about 200 ohm-m (cf. channel 40). A dipole-dipole ground resistivity survey with an a-spacing of 50 m showed a similar background, but the ore body gave a low of only 53 ohm-m

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* Cdn. Inst. Mng., Bull., April 1974.

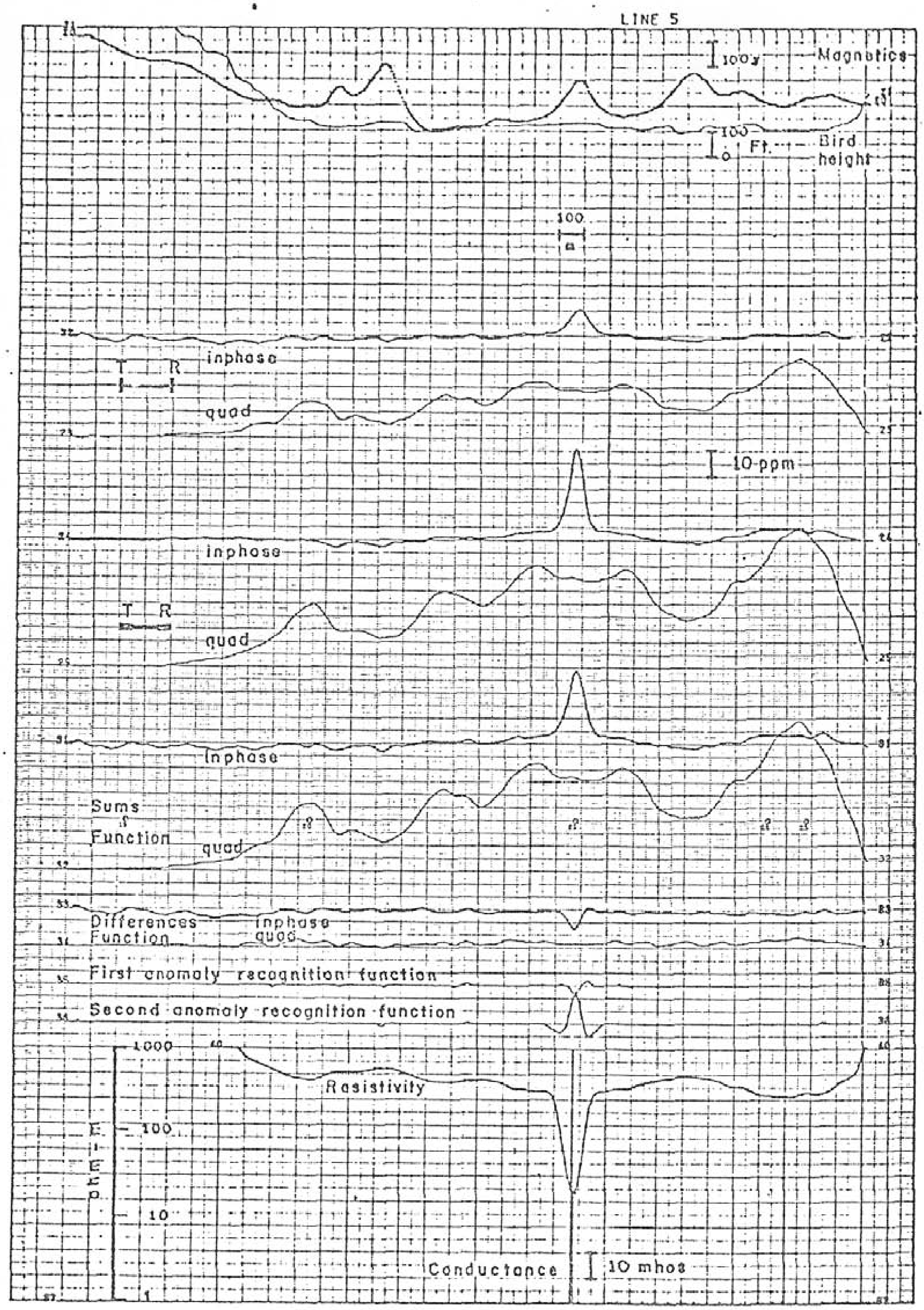


Fig. A1. Flight over Montcalm deposit, with line parallel to strike.

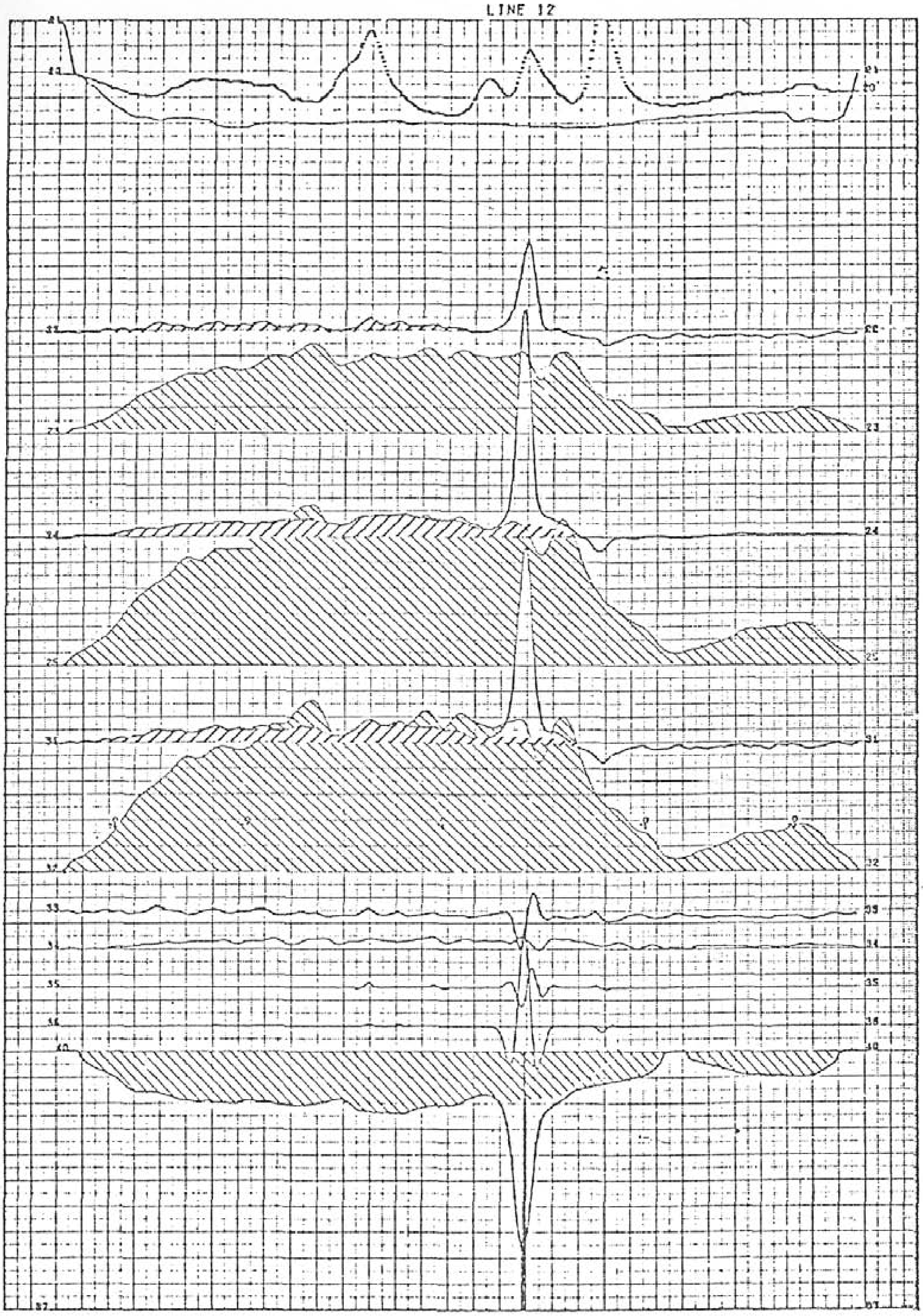


Fig. A2. Flight over Montcalm deposit, with line perpendicular to strike.

because of the averaging effect inherent in the ground technique.

4. The ore body has a conductance of 330 mhos according to its EM response on this particular flight line. The conductance channel 37 saturates at 100 mhos, and so the deposit is indicated by a 100-mho spike.

Figure A1 illustrates the DIGHEM^{II} results for a line flown subparallel to the ore body. The ore body anomaly is small on the standard coil-pair (channel 22) but shows up strongly on the whaletail coil-pair (channel 24).

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEET
1A	12	32	37	79	5	0	1	119	52	31
1B	5	6	9	16	5	39	1	277	67	143
1C	5	11	12	28	4	38	1	221	92	97
1D	4	5	2	11	4	77	1	303	177	136
1E	4	3	0	1	7	176	2	613	47	467
1G	7	13	22	41	5	0	1	150	58	40
2A	12	21	27	45	6	0	2	124	42	25
2B	6	13	18	33	4	0	1	152	67	37
2C	21	23	66	66	13	0	3	121	14	53
3A	8	8	7	1	12	102	3	405	21	303
3C	5	5	4	3	7	106	2	476	44	352
3D	0	7	3	31	1	10	1	113	669	0
4A	4	6	12	15	5	41	1	282	66	148
4B	4	10	9	24	3	0	1	180	129	48
4D	2	2	1	1	6	150	1	630	91	449
4E	3	2	0	1	6	199	2	648	72	482
16A	1	10	4	21	1	0	1	117	469	0
17C	2	8	3	12	2	9	1	201	277	41
17D	2	5	0	7	1	0	1	216	460	21
18A	1	6	0	10	1	0	1	138	693	0
29B	0	2	1	2	1	0	1	502	1034	0

* ESTIMATED DEPTH MAY BE UNRELIABLE BECAUSE THE STRONGER PART OF THE CONDUCTOR MAY BE DEEPER OR TO ONE SIDE OF THE FLIGHT LINE, OR BECAUSE OF A SHALLOW DIP OR OVERBURDEN EFFECTS.

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

DIGHEM^{II} SURVEY

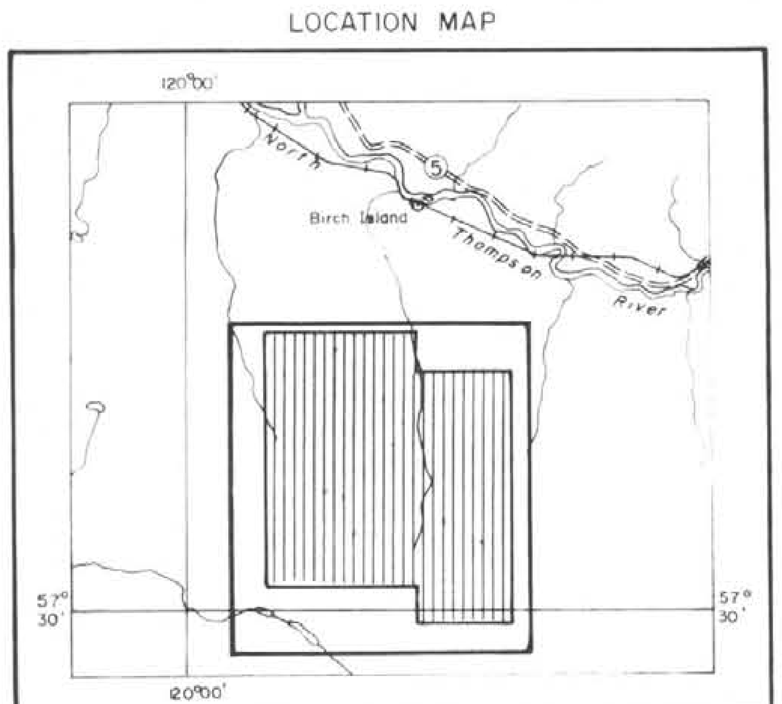
FOGHORN MOUNTAIN, B.C.

RESISTIVITY

FOR

BARRIER REEF RESOURCES
LTD. (N.P.L.)

LOCATION MAP



Scale 1:200,000

Flight line

Fiducials and numbers

Scale 1:20,000

1 0 1 2 Km

LEGEND

Contours in ohm - m at eight intervals per decade

100
75
56
42
31
23
17
13
10

Note

The numbers face in the direction of increasing value.

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

DIGHEM II SURVEY

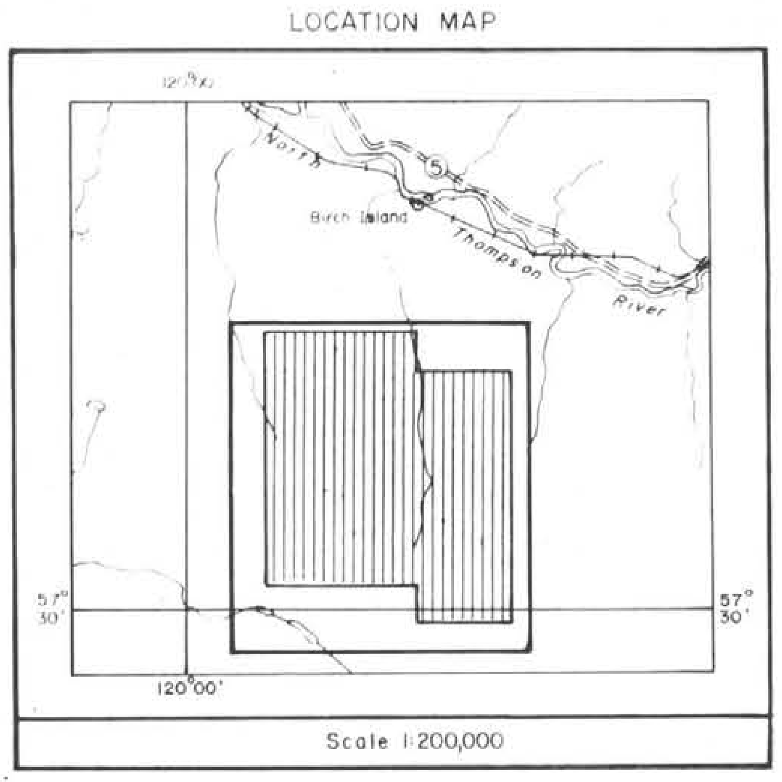
FOGHORN MOUNTAIN, B.C.

MAGNETICS

FOR

BARRIER REEF RESOURCES LTD. (N.P.L.)

LOCATION MAP



Scale 1:200,000

Flight line

1252

Fiducials and numbers

1256

Scale 1:20,000

1 0 1 2 Km

ISOMAGNETIC LINES

(total field)

1000 .... 1000 gammas

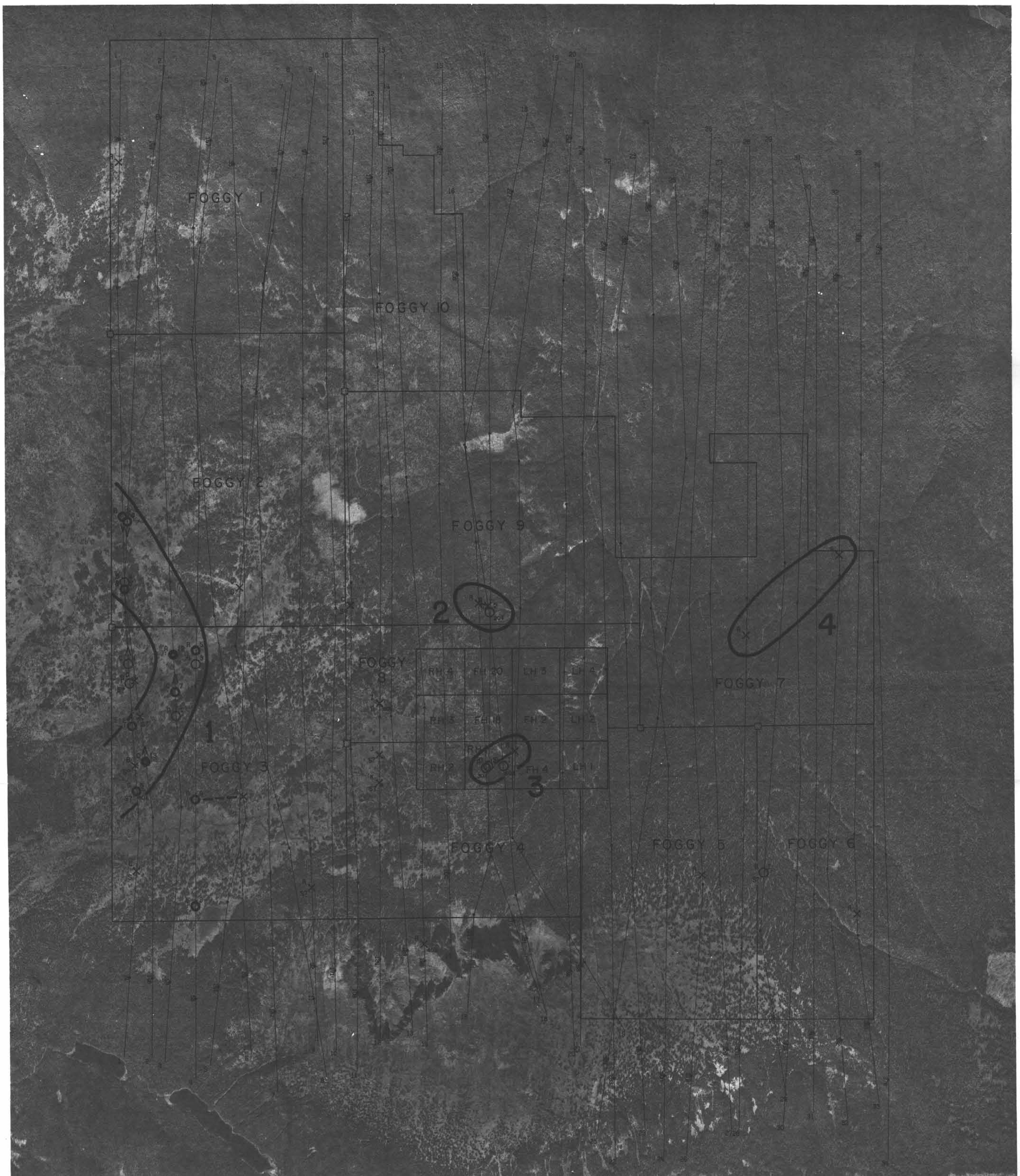
200 .... 200 gammas

.... 50 gammas

.... 25 gammas

.... magnetic depression

Magnetic Inclination within the survey area : 73°



REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

DIGHEM^{II} SURVEY

FOGHORN MOUNTAIN, B.C.

ELECTROMAGNETICS

FOR

BARRIER REEF RESOURCES LTD. (N.P.L.)

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 7404

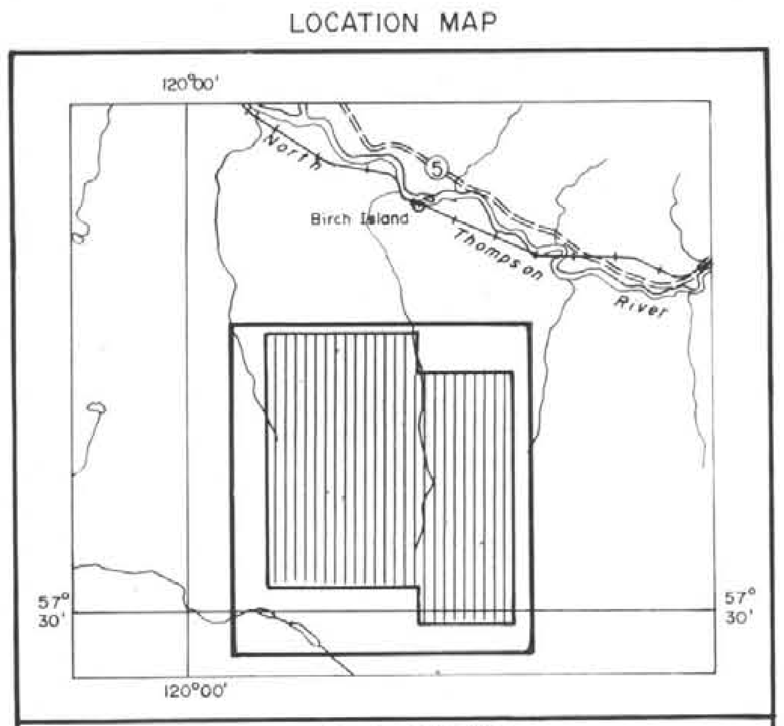
Flight line

Fiducials and numbers

Scale 1:20,000

1 0 1 2 Km.

LOCATION MAP



Scale 1:200,000

ANOMALY GRADE	EM GRADE SYMBOL	MHO RANGE
6	●	≥ 100
5	✹	50 — 99
4	●	20 — 49
3	◉	10 — 19
2	O	5 — 9
1	○	≤ 4
	×	Possible conductor

DIGHEM anomalies are divided into six grades of conductivity – thickness product. This product in mhos is the reciprocal of resistance in ohms. The mho is a measure of conductance, and is a geologic parameter. Most swamps yield Grade 1 anomalies but highly conducting clays can give Grade 2 anomalies. The multi - coil anomaly shapes often allow surface conductors to be recognized, and these are indicated by the letter S on this map. The remaining Grade 1 and 2 anomalies could be weak bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: The ore bodies of the Magusi River camp yield Grade 4 anomalies, while Mattabi and Whistle give Grade 5. Graphite and sulphides can span all grades but, in this survey area, field work may show that the different grades indicate different types of conductors.

identifier → c 38 ← mho value

Inphase and Quadrature of max-coupled coil is greater than
- 5 ppm
- 10 ppm
- 15 ppm
- 20 ppm

Depth is greater than
- 50 feet
- 100 feet
- 150 feet
- 200 feet

Refer to list of anomalies in survey report for the actual ppm values for all coils, and for conductor depths.

The actual mho value is plotted beside the EM grade symbol. The letter is the anomaly identifier. The horizontal rows of dots indicate anomaly amplitude on the flight record, and the vertical column gives the estimated depth. This depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or conductive overburden effects.

—	Conductor axis
S	Probable surface response
S?	Possible surface response
L	Probable line (power, telephone, pipe, or fence)
L?	Possible line
?	Questionable anomaly
◉	Apparent thickness > 10 m
<	Dip
100γ	Direct magnetic correlation of 100 gammas
100γN	Conductor is on the flank of a 100 gamma magnetic anomaly located to the north

DIGHEM maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a followup program. The actual mho values are plotted for those who wish quantitative data. The anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of all conductors in terms of length, strike direction, conductance and depth. The accuracy is comparable to an interpretation from a ground EM survey having the same line spacing.

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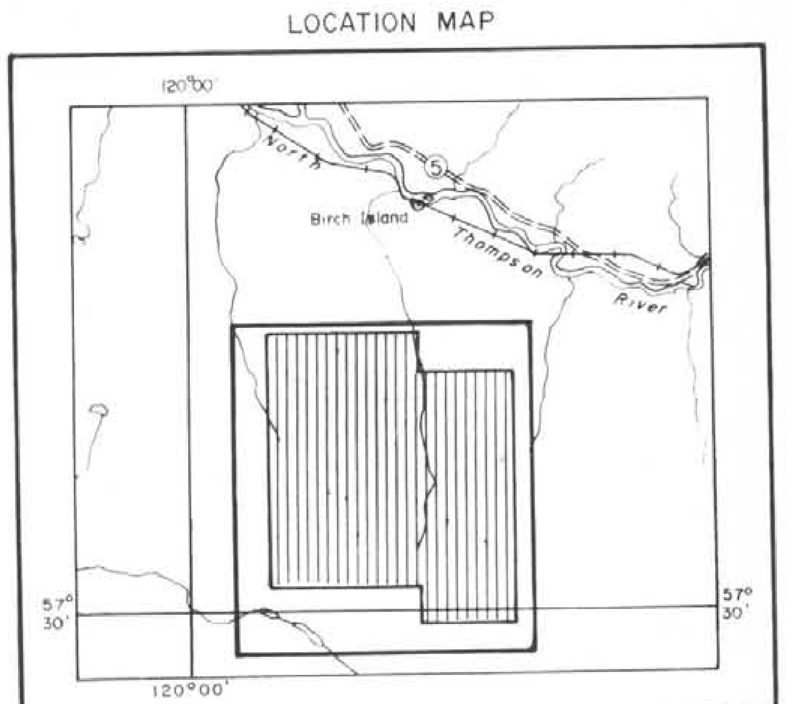
LOCATION MAP



Scale 1:200,000

DIGHEM^{II} SURVEY

FOGHORN MOUNTAIN, B.C.

ENHANCED MAGNETICS

FOR

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Scale 1:20,000

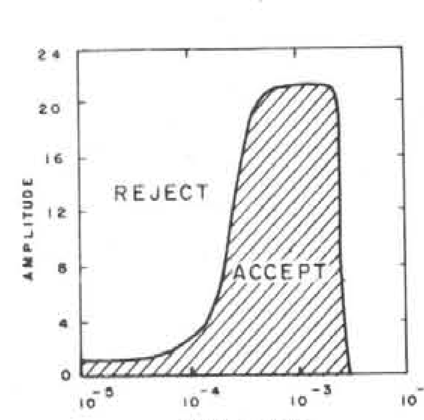
1 0 1 2 Km

ISOMAGNETIC LINES
(enhanced field)

5000 .... 5000 gammas
1000 .... 1000 gammas
.... 200 gammas
.... 100 gammas
.... magnetic depression

Flight line

Fiducials, and numbers



Frequency response of magnetic operator