

05/87

**GEOPHYSICAL REPORT**

**ON**

**HORIZONTAL LOOP ELECTROMAGNETIC AND MAGNETIC SURVEYS**

**OVER**

**THE RED CLAIMS**

**HAWTHORN BAY, BABINE LAKE AREA**

**OMINECA MINING DIVISION**

**BRITISH COLUMBIA**

**RED CLAIM** : 18.3 km due north of Topley Landing  
 : 54° 59' North Latitude  
 : 126° 07' West Longitude  
 : N.T.S. 93L/16E

**WRITTEN FOR** : ANGLO CANADIAN MINING CORPORATION  
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**DATED** : March 25, 1986



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Ministry of Energy, Mines and Petroleum Resources

ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TYPE OF REPORT/SURVEY(S) Magnetic and Geophysical EM	TOTAL COST \$19,101.00
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AUTHOR(S) David G. Mark SIGNATURE(S) [Signature]

DATE STATEMENT OF EXPLORATION AND DEVELOPMENT FILED May 30 YEAR OF WORK 1986

PROPERTY NAME(S) Red Claims

COMMODITIES PRESENT Copper

B.C. MINERAL INVENTORY NUMBER(S), IF KNOWN None known

MINING DIVISION Omineca NTS 93L/16E

LATITUDE 54° 59' north LONGITUDE 126° 07' west

NAMES and NUMBERS of all mineral tenures in good standing (when work was done) that form the property [Examples: TAX 1-4, FIRE 2 (12 units); PHOENIX (Lot 1706); Mineral Lease M 123; Mining or Certified Mining Lease ML 12 (claims involved)]:

Red 1 - 20 units, Red 2 - 10 units

FILMED

OWNER(S) (1) Anglo Canadian Mining Corp.

(2) GEOLOGICAL BRANCH ASSESSMENT REPORT

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OPERATOR(S) (that is, Company paying for the work) (1) Anglo Canadian Mining Corp.

(2) 14,778

MAILING ADDRESS #713-744 W. Hastings St. Vancouver, B.C., V6C 1A5

SUMMARY GEOLOGY (lithology, age, structure, alteration, mineralization, size, and attitude): The claims are underlain by a sequence of intercalated, well-bedded dark grey tuffs & argillaceous sedimentary rocks which strike N to NE, dip moderately NW, and is of lower Jurassic age. It is the basal part of the Hazelton group. Mineralization is massive pyrrhotite-pyrite. It also occurs as blebs, disseminations and fracture-fillings.

REFERENCES TO PREVIOUS WORK Carter, N.C. - Geological Report, Red Claim, May 1985; Rainboth & Brace - Geophysical-Geochemical Report, Hay A & B Claim Groups, Assess. Report 4189, 1972; Suzuki & Yokohama - IP & Mag Survey, Trek Claims, Assess. Report 893, 1967

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	COST APPORTIONED
<b>GEOLOGICAL (scale, area)</b>			
Ground			
Photo			
<b>GEOPHYSICAL (line-kilometres)</b>			
Ground			
Magnetic	13.2 km	Red 1 and Red 2	
Electromagnetic	14.7 km	Red 1 and Red 2	12,921.00
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
<b>GEOCHEMICAL (number of samples analysed for ....)</b>			
Soil			
Silt			
Rock			
Other			
<b>DRILLING (total metres; number of holes, size)</b>			
Core			
Non-core			
<b>RELATED TECHNICAL</b>			
Sampling/assaying			
Petrographic			
Mineralogic			
Metallurgic			
<b>PROSPECTING (scale, area)</b>			
<b>PREPARATORY/PHYSICAL</b>			
Legal surveys (scale, area)			
Topographic (scale, area)			
Photogrammetric (scale, area)			
Line/grid (kilometres)	17.2 km	Red 1 and Red 2	6,180.00
Road, local access (kilometres)			
Trench (metres)			
Underground (metres)			
			<b>TOTAL COST \$19,101.00</b>

FOR MINISTRY USE ONLY	NAME OF PAC ACCOUNT	DEBIT	CREDIT	REMARKS:
Value work done (from report)				
Value of work approved				
Value claimed (from statement)				
Value credited to PAC account				
Value debited to PAC account				
Accepted Date	Rept. No.			Information Class

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### SUMMARY

Ground horizontal loop electromagnetic and magnetic surveys were carried out during February, 1986 on the Red claims located just northeast of Hawthorn Bay on Babine Lake, 18.3 km due north of Topley Landing, B.C. The terrain of the property is moderately sloped and the vegetation consists of moderately dense coniferous trees with thick underbrush in places. Much of the property has been logged. Access can be gained by 2-wheel drive vehicle.

The property is principally underlain by a Lower Jurassic sequence of intercalated, well-bedded dark grey tuffs, andesites, and argillaceous sedimentary rocks of the basal Hazelton Group. The northern part is intruded by a medium-grained diorite of the Omineca intrusions. Two of five drill-holes on the property encountered massive pyrrhotite-pyrite mineralization and the three remaining holes encountered blebs, disseminations and fracture-fillings of the same mineralization.

The purpose of the work was to locate massive sulphides that is hopefully mineralized with gold/silver values.

The electromagnetic survey, which totalled 14.7 km, was carried out with an Apex Parametrics MaxMin II electromagnetometer in the horizontal loop mode. The coil spacing was 100 m, the reading interval, 25 m, and five frequencies read, 222, 444, 888, 1,777 and 3,555 Hz. In some places, the reading interval was reduced to 12.5 m. The EM readings were profiled and interpreted where possible for location, dip, depth to top, and conductivity-thickness.

The magnetic survey, which totalled 13.2 km, was carried out with a proton precession magnetometer by taking readings every 12.5 m on 100- and 200-m separated lines. The readings were diurnally corrected, plotted on 1:2,500 maps and contoured at a 100-gamma interval.

### CONCLUSIONS

1. The horizontal loop EM survey has revealed several conductive zones on the Red claims varying in strength from very weak to very strong. All strike generally in a northeasterly direction. At least three or four are probably reflecting massive sulphides which in the general area are known to contain gold and/or silver values. Though minimal gold and silver mineralization has been discovered to date on the property, this is not surprising since all previous exploration was directed towards porphyry copper mineralization such as occurs within the nearby Granisle Mine.
2. The strongest conductor, labelled I, occurs within the northern part of the property, has a minimum length of 1,200 m, and is open to both the northeast and to the southwest. Related to it are two sub-parallel conductors labelled II and III, each of which is 100 to 150 m from I. Conductor III correlates with the very strong IP anomaly B which was partially drill-tested and revealed some sulphides. Conductor I occurring to the north of IP anomaly B, because of its strong conductivity, very likely is reflecting massive sulphides. The northeastern part correlates with a magnetic high suggesting pyrrhotite may be part of the sulphides.
3. Conductor VII, not as strong as I, correlates with IP anomaly A which was drill-tested to reveal massive sulphides, including pyrrhotite. Conductor VII correlates directly with a strong magnetic anomaly. Its minimum length is also 1,200 m being open to the northeast and to the southwest.
4. Conductor VI is of similar conductivity and length as VII and is sub-parallel to it 250 m to the northwest.
5. There is not a direct correlation between the ground results and the airborne EM anomaly. Conductor V could be

the ground response to the same conductor but is located 125 m to the southeast.

6. The magnetic survey has outlined areas of stronger response indicating intermediate to basic volcanics. Quieter areas indicate sedimentary bedrock and/or acidic volcanics.



### RECOMMENDATIONS

The EM survey has revealed very positive results that definitely should be diamond drilled for massive sulphides containing gold and silver mineralization. At least six holes are warranted with two or three for conductor I.

It would be highly preferable to carry out further EM and magnetic work since there is some doubt as to how the conductors are connected from one line to the next. Most of the survey lines are 200 m apart. Further work would also optimize the drill targets.

Of strong importance is to map the previous drill holes onto the present grid. Though it is felt the IP anomalies are located correctly, this would ensure the proper location. If the IP anomalies are mapped differently, then the geophysics interpretation could be changed.

Geologic mapping should also be carried out especially in the area of the conductors. Considering the extensive overburden cover, the amount of geologic mapping that can be done could be quite limited.

PROPOSED BUDGET

The estimated costs of continuing the exploration on the Red claim property is broken into three phases. The first phase is essentially preparation for drill-testing, the second phase is the drill-testing, and the third phase is further drilling, if warranted by the results of the drill-testing.

PHASE I

- Survey ties of old drill holes with existing grid.
- Geologic mapping and prospecting around conductor targets.
- Detail geophysics and linecutting where warranted.
- Surveying in of proposed drill hole locations for new program.
- Preparation of road access to drill sites.
- Clearing drill sites.

Allow \$35,000

PHASE II

1800 ft. (550 m) of diamond drilling at \$25/ft. (\$82/meter).

\$45,000

PHASE III

Additional diamond drilling contingent on drilling and assay results from Phase II.

\$70,000

TOTAL: \$150,000

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**INTRODUCTION**

This report discusses the survey procedure, compilation of data, interpretation methods, and the results of a horizontal loop electromagnetic (EM) survey and a magnetic survey carried out over a portion of the Red claims located just northeast of Hawthorn Bay, on the northeast side of Babine Lake, in north central British Columbia.

The surveys were supervised by the writer. The field supervisor was Marc Beaupre, geophysical technician, and his helper was Guy Dion, geophysical technician. Gerard Auger, owner of the property, cut the lines for the geophysics and oriented the geophysics crew in the field.

The surveys were carried out during the period of February 1st to 15th, 1986. The number of kilometers of magnetic survey totalled 13.2 and that of the electromagnetic survey totalled 14.7.

The purpose of the EM survey was to locate and map the extent of massive sulphide zones hopefully mineralized with gold and/or silver. Previous drilling has intersected at least one zone. The purpose of the magnetic survey was to determine whether any of the conductive zones were magnetic and therefore whether the causative source may be pyrrhotite. Its purpose was also to aid in mapping lithology on the property.

The work was done on the recommendation of N.C. Carter, Ph.D., consulting geological engineer to Anglo Canadian Mining Corporation. Much of the following description of the property is taken from a report on the Red 1 claim authored by Carter dated May 24, 1986.

#### PROPERTY AND OWNERSHIP

The property consists of two claims containing 30 units as described below and as shown on Map #2.

<u>Claim Name</u>	<u>Record No</u>	<u>No of Units</u>	<u>Expiry Date</u>
Red 1	6248	20	May 30, 1986
Red 2	7490	10	Feb. 27, 1987

The Red 2 claim was staked while the EM and mag surveys were in progress.

The claims are owned by Gerard Auger of Kamloops, B.C. and are being optioned to Anglo Canadian Resource Corporation of Vancouver, B.C.



### LOCATION AND ACCESS

The Red claims are located at the north end of Hawthorn Bay, which is on the northeast side of Babine Lake, and 18.3 km (11.4 miles) due north of Topley Landing, which is on the southwest shore of Babine Lake. The closest main town is Smithers which is located 68.5 km S20°W of the Red claims.

The geographical coordinates are 54° 59' north latitude and 126° 07' west longitude.

Access is gained by travelling to Topley on Highway 16 west from Prince George, a distance of 262 km, or east from Smithers, a distance of 119 km. One then travels north to Topley Landing a distance of 43 km. Just north of Topley Landing, Northwood operates a barge for its logging trucks across Babine Lake to Nose Bay. The Red claims are 17 km north of Nose Bay. Two-wheel drive vehicle is quite adequate.

### PHYSIOGRAPHY

The property is found within the physiographic unit known as the Nechako Plateau, which is the northern part of the Interior Plateau System. The Nechako Plateau is an area of low relief with great expanses of flat or gently rolling country. The plateau surface lies between 1,000 and 1,500 meters elevation.

The plateau was occupied by ice, which, in moving across it, marked the surface with thousands of grooves and drumlin-like ridges which are parallel to the ice flow. The ice moved southeasterly within the Babine Lake valley. Numerous depressions left on the plateau surface after the ice retreat are now occupied by myriads of lakes. Glacial drift is widespread and a high percent-

age of bedrock is obscured.

Elevations on the Red claims vary from 760 meters a.s.l. at the southwestern corner of the property to 1,230 meters a.s.l. along the northeastern edge. The property sits on a southwesterly-facing slope.

The main water sources would be an unnamed creek flowing southerly along the western edge of the property and another flowing southwesterly across the southeastern corner.

The area is moderately forested with fir, spruce and poplar with the underbrush varying from light to heavy. Much of the property has been logged.

#### HISTORY OF PREVIOUS WORK

The following is quoted from Carter's report.

"Earliest work in the area of the present claim took place in the mid-1960's following recognition of the potential of porphyry copper mineralization at the Granisle and Bell deposits and elsewhere in the Babine Lake area.

"The Granby Mining Company Ltd. held a number of claims which included part of the area of the present RED 1 claim in the mid-1960's. Work included prospecting, geophysics and limited diamond drilling in an area 1 km north of the RED 1 claim north boundary (Carter, 1966).

"Much of the present claim area was included in a larger block acquired by Bethex Explorations Ltd. in 1966. Work done that year included extensive Induced Polarization and magnetometer surveys,

followed in 1967 by 9 diamond drill holes totalling 963 metres (Carter, 1968).

"The claims lapsed and were relocated in 1972 as the Hag claims (Canadian Superior Exploration Limited) and the R claims (Quintana Minerals Corporation). The present claim was covered more or less equally by the aforementioned claims. Canadian Superior conducted confirmatory IP surveys based on the earlier Bethex work and more extensive magnetometer and soil geochemical surveys. Quintana carried out some rock geochemistry."

"The RED 1 mineral claim was located by the present owner May 29, 1984.

"Work since that time, carried out by the author, [Carter], has included re-logging and some sampling of available drill cores from the 1967 Bethex drilling and a re-interpretation of available reports which are listed in the Selected References Section."

In early 1985, Aerodat Limited carried out a combined airborne magnetic, VLF-EM and coaxial/coplanar EM surveys.

### GEOLOGY

The following is also quoted from Carter's report.

#### (a) Regional

"The Babine Lake area is within the Intermontane tectonic belt, which is underlain principally by Mesozoic layered rocks the most widespread in this area being volcanic and sedimentary rocks of the Jurassic Hazelton Group. These are intruded by plutonic rocks

of various ages including lower Jurassic Topley intrusions, Omineca intrusions of early Cretaceous age, late Cretaceous rhyolite and granodiorite porphyries and Babine intrusions of early Tertiary age.

"The best known style of mineralization in the Babine Lake area is porphyry copper mineralization associated with small stocks and dyke swarms of biotite-feldspar-porphyry of the Babine intrusions. Copper-molybdenum mineralization is also known to occur in late phases of the Topley intrusions and in late Cretaceous granodiorite porphyries. Other deposit types include narrow veins with base and precious metal values, which commonly occur marginal to porphyry deposits, and disseminated copper mineralization in Hazelton Group volcanic rocks.

"The only known example of massive sulphide mineralization is that seen in drill cores on the RED 1 claim.

(b) Property

"Limited bedrock exposure and diamond drill core indicates the RED 1 claim to be underlain principally by a sequence of intercalated, well bedded dark grey tuffs and argillaceous sedimentary rocks which strike north to northeast and dip moderately northwest. This sequence is believed to be of lower Jurassic age and is the basal part of the Hazelton Group. This same sequence is known to include acid fragmental rocks several kilometres west (Carter, 1973).

"A medium-grained diorite intrusive, with lesser porphyritic phases, part of the Omineca intrusions, cuts the layered sequence near the north boundary of the claim (Carter, 1968). Outcrops of older Topley intrusions are known 5 kilometres southeast of the claims."



(c) Mineralization

"Area 'A' was tested by three vertical diamond drill holes, as shown on Figure 4. All holes intersected interbedded tuffs and graphitic sediments, containing sections of stringer and massive sulphides. Sulphide content varies from 20% to massive and consists principally of pyrrhotite and pyrite and some chalcopyrite. Some banding was noted and this appears to be conformable with layering in host rocks at 30° to core surfaces."

"Area 'B' was tested by two holes (figure 4). DH 4 was drilled southeast at -45° to a depth of 114 metres and intersected interbedded argillaceous siltstone and greywacke with some graphitic sections. Minor pyrite was noted. DH 5, drilled northeast at -45° to a depth of 79.9 metres, intersected diorite intrusive into the same sedimentary sequence as in DH 4. Disseminated and fracture filling pyrite and pyrrhotite were noted in the graphitic sections.

"Other mineralization known in the area of the claim includes a 0.3 metre wide quartz-carbonate vein with galena, sphalerite and chalcopyrite in greywacke exposed in a creek 1 km northeast of the northwest corner of the claim (Carter, 1966)."

INSTRUMENTATION AND THEORY

(a) MaxMin Electromagnetic Survey

A MaxMin II portable 2-man electromagnetometer, manufactured by Apex Parametrics Ltd. of Toronto, Ontario was used for this survey. This instrument is designed for measuring the electromagnetic field which results from a conductive body; that is a structure which conducts electricity better than barren rock-types do. This particular instrument has the advantage of flexibility over

most other EM units in that it can operate with different modes and frequencies as well as having a variety of distances between transmitter and receiver. Five frequencies can be used (222, 444, 888, 1777 and 3555 Hertz) and six different coil separations (25, 50, 100, 150, 200 and 250 meters).

In all electromagnetic prospecting, a transmitter induces an alternating magnetic field (called the primary field) by having a strong alternating current move through a coil of wire. This primary field travels through any medium and if a conductive mass such as a sulphide body is present, the primary field induces a secondary alternating current in the conductor and this current in turn induces a secondary magnetic field. The receiver picks up the primary field and, if a conductor is present, the secondary field. The fields are expressed as a vector which has two components, the in-phase (or real) component and the out-of-phase (or quadrature) component. The results are expressed as the percent deviation of each component from what the values would be if no secondary field (and therefore no conductor) was present.

Since the fields lose strength proportionally with the distance they travel, a distant conductor has less of an effect than a close conductor. Also, the lower the frequency of the primary field, the further the field can travel and therefore the greater the depth penetration.

The MaxMin II EM unit can vary the strength of the primary field and so use different separations between transmitter and receiver coils, change the frequency of the primary field for varying depth penetrations, and use three different ways of orienting the coils to duplicate the survey in three styles so that more accuracy is possible in the interpretation of the data.

The use of the MaxMin II electromagnetometer allows for better

discrimination between low conductive structures such as clay beds and barren shear zones and more conductive bodies like massive sulphide mineralization. It also gives several different types of data over a given area so that statistical analysis can result in less error in the interpretation.

(b) Magnetic Survey

The magnetic survey was carried out with a model MP-2 proton precession magnetometer, manufactured by Scintrex Limited of Concord, Ontario. This instrument reads out directly in gammas to an accuracy of  $\pm 1$  gamma, over a range of 20,000 - 100,000 gammas. The operating temperature range is  $-35^{\circ}$  to  $+50^{\circ}$  C, and its gradient tolerance is up to 5,000 gammas per meter.

Only two commonly occurring minerals are strongly magnetic, magnetite and pyrrhotite; magnetic surveys are therefore used to detect the presence of these minerals in varying concentrations. Magnetic surveys are also useful as a reconnaissance tool for mapping geologic lithology and structure since different rock types have different background amounts of magnetite and/or pyrrhotite.

SURVEY PROCEDURE

The survey grid was cut out as shown on the claim map (#2) and on the survey maps (#3, 4 and 5). First the base line was put in at a direction of northeast-southwest. Then the survey lines were put in at a perpendicular direction to the baseline, that is, northwest-southeast, and at a 200-meter interval. As the survey progressed, some fill-in 100-meter lines were cut out in anomalous areas.

For the electromagnetic survey, the slope separation between the

transmitter and receiver was measured to an accuracy of  $100 \text{ m} \pm 0.3 \text{ m}$ . Readings were taken every 25 m, except where the EM field changed rapidly, then the readings were taken every 12.5 m.

The receiver operator read and recorded the in-phase and out-of-phase responses. Calibration and phase mixing tests were also conducted three times a day and the appropriate corrections made when necessary.

All five frequencies were read by the receiver operator, which were 222, 444, 888, 1777, and 3555 Hz.

A total of 14.7 km of electromagnetic survey was carried out.

For the magnetic survey, readings of the earth's total magnetic field were taken at the 25 m stations along the survey lines. Over some anomalous areas, the reading interval was reduced to 12.5 m.

The diurnal variation was monitored in the field by the closed loop method to enable the variation to be removed from the raw data prior to plotting. A total of 13.2 km were surveyed.

#### COMPILATION OF DATA AND INTERPRETATION METHODS

##### (a) MaxMin Electromagnetic Data

The EM data were profiled on a base survey plan at a scale of 1:2,500. The in-phase data and the out-of-phase data of two frequencies were profiled; 444 Hz on one copy of the base (Map 3) and 1777 Hz on a second copy of the base (Map 4). The plotting point is taken at the mid-point between the transmitter and the receiver. The vertical scale used for both the in-phase and out-of-phase data was 1 cm = 10%.



Quantitative interpretation was carried out wherever anomalous readings (and thus, conductors) were encountered. All five frequencies were plotted at an exaggerated vertical scale in order to facilitate comparison and curve matching with type-curves. These plots were strictly working copies and therefore are not given as part of this report. Type-curves are produced either by computer models or actual scale models tested under laboratory conditions. The type-curves used were those published by the Geological Survey of Finland. The quantitative interpretation included:

- (1) the location of the top of the conductor,
- (2) the depth to the top of the conductor,
- (3) the dip of the conductor, and
- (4) the conductivity-thickness of the conductor.

Conductivity-thickness is always described as a product since a poorly conductive, thick conductor can give the same EM profile as a highly conductive, thin conductor.

The EM-mapped conductors have been divided into 2 classes, definite conductors, and possible conductors. Often, very little quantitative information can be interpreted from the possible conductors, usually because of noise problems.

The trace of the top of each conductor has been drawn on all 3 plans (Maps 3, 4 and 5), including the magnetic contour map, in order to facilitate easy correlation. The definite conductor is drawn in solid, and the possible conductor, dashed. For the same reason the peaks of the magnetic highs have been shown on the EM profile maps as a large asterisk.

(b) Magnetic Data

The data was first diurnally corrected and then plotted on the

same base line as that for the EM profiles. The value of 58,000 gammas was subtracted from each reading so that only the last 3 digits at all data points needed to be plotted. The data was then contoured at an interval of 100 gammas.

#### INTERPRETATION PITFALLS

One of the main problem with EM surveying is conductive overburden. If the overburden thickness is uniform, then the problem is minimized. The conductive overburden causes the in-phase and out-of-phase profiles to separate from each other and away from the zero line as well as alters the amplitude of the negative peak for both the in-phase and out-of-phase. One therefore moves the zero line to correlate with the background reading of the in-phase profile and/or the out-of-phase profile and then uses special quantitative interpretation procedures. The EM profiles indicate the southwestern and southeastern parts of the survey area are underlain with conductive overburden. This has affected interpretation on lines 4+00S, 2+00S and 0+00, as well as the southeastern ends of lines 2+00N, 4+00N, 6+00N, 7+00N and 8+00N. The overburden depth on 2+00S seemed to be deepest which resulted in no quantitative interpretation for this line.

More difficult problems are produced, however, if the thickness of the conductive overburden undulates, or if there exists a buried bedrock trough, or ridge. This can produce an EM profile similar in shape to that over a normal conductor. However, this feature will become minimal at lower frequencies, and, therefore, this type of "false conductor" can be sorted out.

The dip of the conductor is probably the most difficult piece of information to interpret from the EM profiles. The major cause is non-uniform conductive overburden which tends to affect the shape

(from which the dip is taken) of the EM profile over a conductor. Another cause of the problem is 2 closely spaced conductors, as occurs on this survey, so that one affects the shape of the other.

Another problem is geological noise which is produced from such features as faults, fracture zones, contacts, and graphitic horizons. This can also affect the shape of the EM profile over a conductor.

In some cases, an interpretation can be carried out using 2 different models. Both models have been interpreted, and under "Discussion of Results", the preferred model only is given. The most common problem was deciding whether the causative source was one wide conductor, or two narrow conductors. Often the interpretation for each case produced similar results (i.e. similar dip, similar depth-to-top).

## DISCUSSION OF RESULTS

### (a) PREVIOUS SURVEYS

#### i) IP-Resistivity

As mentioned above, Bethex carried out the first IP survey in 1966 and discovered two main IP anomalies that were labelled A and B, respectively. Canadian Superior followed up on the Bethex work in 1972 by verifying and carrying out detail work on anomaly B.

Anomaly A is about 1,100 m long by up to 400 m wide striking in a northeasterly direction. It consists of an IP high correlating with a resistivity low. The resistivity ( $\rho_a/2\pi$ ) reaches a low of 15 ohm-feet (or,  $\rho_a = 29$  ohm-meters), and the IP reaches a high

of 6% frequency effect with a background of about 1%. Bethex also calculated metal factors for the survey which simply is designed to show the correlation of IP highs with resistivity lows. For anomaly A, the metal factor reached a high of 410.

Anomaly A is composed of a northeast and a southwest component which Bethex labelled A' and A", respectively. A' strikes north-northeast and correlates with a magnetic high (magnetic survey also done by Bethex). A" strikes perhaps in a similar direction but does not correlate with a magnetic high. It would appear therefore that magnetic and/or pyrrhotite occurs with the causative source of A' but not with A". This was confirmed by the drill-testing done by Bethex in 1967.

Holes #2 and #3 were drilled within anomaly A' and encountered a significant amount of massive pyrrhotite and pyrite as well as graphitic sediments. Hole #1, which drill-tested A", encountered a relatively minor amount of pyrrhotite and pyrite as well as some graphite. A" is much stronger than A' and yet encountered a relatively minor amount of sulphides. However, hole #1 was drilled to only 39.4 m whereas holes 2 and 3 were drilled to 152.1 and 136.4 m, respectively. It is apparent, therefore, that A" should be drill-tested more thoroughly since it's causative source was not adequately explained.

Southeast of anomaly A (which Bethex has called zone C) is a northeast-striking zone of magnetic highs correlating with resistivity highs. The likely causative source is an intrusive or volcanic rock-type, probably intermediate to basic in composition.

Anomaly B is an easterly-striking zone 700 m long and up to 300 m wide. The survey by Bethex resulted in resistivity values as low as 3 ohm-feet ( $\rho_a/2\pi$ ) which is 6 ohm-meters ( $\rho_a$ ). The IP values were as high as 11% and the resulting metal factor values were

as high as 2,400. The survey by Canadian Superior using different survey parameters obtained similar results. However, one ultra-low resistivity value of 1 ohm-feet resulted in a metal factor of 7,200. This is an isolated value and is the result of a significantly low resistivity value rather than a significantly high IP value.

Canadian Superior ran one north-south cross-line over anomaly B. This showed the causative source to be about 50 m north of the east-west indicated location as well as to be relatively narrow, possibly a vein-type sulphide zone.

The magnetic survey done by Bethex showed no correlation with any significant magnetic highs.

Bethex drill-tested the zone with holes #4 and #5, drilled southeasterly and northeasterly, respectively. Disseminated and fracture-filling pyrite and pyrrhotite with some graphite were noted in the holes. The amount of mineralization encountered does not adequately explain the anomaly. In fact, noting the location of the drill holes, it would appear the causative source was missed. Bethex should have run a number of north-south cross-lines before drilling, especially considering the strike-length of the anomaly occurs along one survey line. The causative source could be a significant distance away from and sub-parallel to this survey line. The cross-line done later by Canadian Superior, as mentioned above, indicated a 50 m displacement to the north, but, only at this location.

The resistivity survey by Canadian Superior shows a northwesterly-trending contact to the west of anomaly B. The northeast side of the contact has values above 100 ohm-feet, with most values in the range of 300 to 500 ohm-feet. Southwest of the contact are values below 100-ohm-feet with most values in the range of 40 to



60 ohm-feet. The report on the survey (Rainboth and Brace) interpreted the southwest lower resistivity side to be caused by Sustut-type sediments, such as greywackes, argillites, mudstones and siltstones. The northeast higher resistivity side is probably caused by andesitic tuffs of the Hazelton Group. The two drill holes within anomaly B, which occurs within the high resistivity area for the most part, verified the interpretation. Hole #4 encountered andesite tuff up to a depth of 43 m. However, hole #5, encountered a medium-grained diorite grading into a hornblende-feldspar porphyry up to a depth of 20.6 m which, nevertheless, would also cause a resistivity high. The rest of both holes encountered alternating argillaceous siltstone and greywacke.

ii) Airborne Surveys (Magnetics, Horizontal Loop EM & VLF-EM)

The 1985 survey by Aerodat shows a good conductor located about mid-way between IP-resistivity anomalies A and B and striking northeasterly. However, the closest conductor revealed by the ground survey by Geotronics was conductor V located about 125 m to the southeast. Furthermore, where Geotronics obtained a good conductor within the northern part of the survey area, the airborne survey did not pick up anything. Neither did it respond to IP-resistivity anomaly A where massive sulphides are known to occur and where the ground EM survey did not respond.

As a result, one has to wonder whether the survey was done in the correct place. This is further questioned by the following.

1. Very old air photographs were used. Logging roads and logged-off areas that were put in at least as far back as the '60's are not shown. This, therefore, may have contributed to the airborne survey possibly being done in the wrong area.
2. The airborne magnetic survey can only be generally correlated with the ground survey. It is felt that the results of



the two surveys should correlate to a much better degree.

3. Similarly the airborne VLF-EM results correlate only marginally with the ground EM.

The results are therefore considered to be of limited value to the exploration of the property. Even if the survey was carried out in the correct location, the conclusion is the same because of the poor correlation of the airborne results with the ground results as well as with the known mineralization.

### iii) Government Aeromagnetic Survey

The magnetic field in the general area of the Red claims is highly variable with numerous highs occurring throughout. The probable cause of the highs is basic volcanics.

A magnetic high occurs across the northern part of the property. A 'tongue' from this high extends across the southeastern part of the property as well. As mentioned above, the highs are probably reflecting basic volcanics. The rest of the property has a relatively quiet magnetic field and is therefore probably underlain by sediments and volcanics containing little magnetite.

To the immediate southeast of the property is a northeasterly-striking band of three strong "thumbprint" magnetic highs. These are probably caused by cappings of Tertiary basalt.

Two lineations of magnetic lows occur across the property, one striking northwesterly and the other, northeasterly. They cross near the southern boundary. The lineations are indicative of regional fault-systems.

(b) GROUND EM SURVEY

The MaxMin horizontal loop EM survey has revealed eight separate conductive zones, each of which have been labelled by the Roman numerals I through to VIII.

Conductor I has by far the best conductivity of all the conductors. It has a minimum length of 1,200 m being open to both the northeast and to the southwest. However, to the southwest on line 2+00S, conductor I is reduced to the status of a possible conductor with poor conductivity. At least a partial cause of this is the deeper overburden. At the northeastern end on line 8+00N, the conductor may also be weakening though in this area, the conductivity appears to be variable. However, from lines 2+00N to 7+00N, conductor I has good to very good conductivity. This is very suggestive of massive sulphides as the causative source.

The strike of conductor I from the southwest end to line 4+00N is east-northeasterly. Then from 4+00N to 6+00N, the strike sharply changes to easterly or east-southeasterly (further detailing would determine the correct strike in this area). On lines 6+00N to 8+00N, the strike changes to northeasterly. What likely changes the strike in the area of line 5+00N so dramatically is either folding or faulting. The same change is also seen on the two sub-parallel conductors, II and III.

The magnetic correlation also appears to be related to the strike change. The southwestern part of the conductor up to line 4+00N correlates with magnetic background. The northeastern part from line 5+00N correlates with a broad magnetic high. The high may be caused by pyrrhotite related to the conductor though it appears more likely to be caused by a rock unit, possibly intermediate to basic volcanics, or perhaps, the diorite encountered in the Bethex drill hole #5.

As shown on Map #6, conductor I occurs at least 100 m north of IP anomaly B. However, since the IP-resistivity surveys and the diamond drilling have yet to be field-verified onto the present grid system, there is some doubt as to the correct location of the previous work related to the 1986 work. (Due to the snow cover at the time of the EM and magnetic surveys, the drill holes and many of the roads could not be mapped in.) Therefore, it is quite possible that the causative source of the IP and EM surveys is the same. In support of this, the north-south IP line done by Canadian Superior in 1972 appears certain that it would have crossed conductor I, and yet there is no response in this area. However, in support of the anomalies being correctly located as shown, is that, (1) conductor III correlates quite closely with anomaly B, and (2) conductor VII with its correlating 1986 magnetic high correlates closely with IP anomaly A with its correlating 1966 magnetic high.

The quantitative interpretation is given as follows:

Model: Thin plane conductor  
Location: 2+00N, 6+60W  
Depth: approx. 10 m  
Dip: 30° max. SE

Model: Thin plane conductor  
Location: 3+00N, 6+40W  
Depth: approx. 15 m  
Dip: Changing from approx. 75° SE near surface to approx. 40° SE at depth  
Conductivity-thickness: 700 mhos (222 Hz) to 548 mhos (444 Hz)

Model: Thin plane conductor  
Location: 4+00N, 6+00W  
Depth: approx. 15 m  
Dip: 60 to 75° SE  
Conductivity-thickness: 500 mhos (222 Hz) to 250 mhos (888 Hz)

Model: Three thin plane conductors  
Location: 5+00N, 3+50W to 4+50W  
Depth: ?  
Dip: southeasterly

Model: Two thin plane conductors  
Location: 6+00N, 3+30W  
Depth: 10 m ?  
Dip: ?

Model: Thin plane conductor  
Location: 7+00N, 3+05W  
Depth: approx. 10 m  
Dip: 75° SE or greater  
Conductivity-thickness: 300 mhos (222 Hz) to 180 mhos (888 Hz)

Model: Thin plane conductor  
Location: 8+00N, 3+20W  
Depth: approx. 22 m  
Dip: approx. 75° SE  
Conductivity-thickness: 57 mhos (444 Hz) to 75 mhos (888 Hz)

It was difficult to be very precise in the interpretation due to conductive overburden and/or the effect of nearby conductors.

In summary, the depth to the top of the conductor varies from about 10 m to 22 m. The dip, for the most part appears to be 60 to 75° to the southeast. However, on lines 5+00N and 6+00N, it was difficult to ascertain the correct dip though it is assumed to be to the southeast as well. The faulting or folding in this area may have affected the dip (and made the interpretation difficult as well).

The model used on all lines is a thin plane conductor (or vein). However, on many of the lines, it appears the causative source is at least two thin plane conductors. On line 5+00N, there seems to be up to four conductors.

Conductors II and III, as mentioned above, sub-parallel conductor I, and therefore appear to be related to it. The conductivity of both varies from medium to poor. Conductor II is at least 500 m long and conductor III is at least 1,400 m long being open to the northeast as well as to the southwest.

Most of conductor II is considered to be definite, but most of the conductor III is considered to be possible. Neither conductor has a strong enough response to give quantitative information.

As mentioned above, conductor III correlates directly with IP anomaly B (as seen on Map #6). In addition, the northeastern part partially correlates with magnetic highs. Considering the results of drill holes 4 and 5, the causative sources of conductors II and III may be weak sulphide zones. Alternatively, they could be caused by fault, shear, contact zones, and/or graphitic sediments.

Lines 2+00N and 3+00N show a 300 m southerly-trending splay from conductor III. It is considered definite, but of poor conductivity. On line 2+00N, there is a correlation with a magnetic high. The causative source could be the same as that for the main part of conductor III.

Conductors IV and V are possibly the same conductor though the in-between line of 4+00N shows no conductor response. The strike in both cases is northeasterly. Conductor V is at least 400 m long and conductor IV is at least 300 m long being open to the northeast. The conductivity, for the most part, of both conductors is poor.

However, the conductivity for conductor V improves enough to allow for some quantitative interpretation. It appears to be a thin plane conductor that dips very approximately 30° to the northwest. The depth to top appears to be about 15 m.

The profiles for conductor V on lines 2+00S and 0+00 show deeper overburden to the northwest. This suggests that the causative source is related to a fault, (or it could be the fault itself), that is, one that causes a bedrock-drop to the northwest. Conduc-



tor V could be the ground response of the airborne EM conductor.

Conductor VI strikes in an average direction of northeasterly. It is considered for the most part to be a definite conductor with poor conductivity though parts of it have medium conductivity.

On lines 2+00S, 0+00 and 2+00N, the conductor correlates directly with a narrow magnetic high of low amplitude. This suggests that the causative source of at least part of the conductor is pyrrhotite, especially considering this is the causative source of nearby conductor VII. Otherwise the causative source may be the same as for the other conductors (except conductor I), that is, weak sulphide zones, geological structure, and/or graphitic sediments.

The response of conductor VI was not considered strong enough to give any quantitative interpretation. However, there is a northerly-trending splay to conductor VI occurring on line 8+00N at 1+85E. It is interpreted to be a thin plane conductor dipping approximately 40° E. It's depth to top is about 30 m. The conductivity-thickness is 23 mhos taken from the 888 Hz profile.

Conductor VII correlates directly with IP-resistivity anomaly A as well as with a very strong lineal-shaped magnetic anomaly. This is to be expected since anomaly A was drill-tested in 1967 and encountered massive pyrrhotite-pyrite. This is therefore the almost definite causative source of conductor VII.

The correlating magnetic anomaly occurs only on lines 2+00S to 2+00N (and possibly 4+00N) with the strongest part of line 2+00N reaching a high of 1,400 gammas above background. On all other lines there is no magnetic correlation with conductor VII (however, no magnetic readings were taken on line 4+00S). On these same lines, the conductor is also reduced to the status of pos-



sible conductor. This suggests that the conductivity is due almost entirely to pyrrhotite-pyrite.

On lines 6+00N and 8+00N, the causative source may be geological structure perhaps containing some sulphides, but certainly no significant amount of pyrrhotite.

On line 2+00N, the conductivity is strong enough to give some quantitative information. The source is considered to be a thin plane conductor dipping approximately 50° to the northwest. The depth to top is about 20 m. The conductivity is considered to be medium in strength.

Conductor VIII is a definite/possible conductor striking northeasterly with a minimum length of 200 m. It is open to the southwest. It is considered to be a poor conductor but the response on line 4+00S is strong enough to give tentative quantitative information. It dips 65 to 75° southeast and has a depth to top of about 25 m. The conductivity quite possibly may improve to the southwest.

(c) MAGNETIC SURVEY

The correlation of the magnetic survey with the horizontal loop EM conductors has been discussed above. Additional comments are given as follows.

The background appears to be about 58,000 gammas which has been subtracted from each reading. Most of the survey area, other than the northern and southern parts have a background magnetic field. This suggests the underlying rock-types are predominantly sediments, or, perhaps, acidic volcanics.


The southern section consists of a series of northeasterly-trend-

ing magnetic highs. Two of these each correlate directly with EM conductors VI and VII and thus the causative source is likely pyrrhotite. As mentioned above, the strongest anomaly (1,400 gammas) was drill-tested and encountered massive pyrrhotite-pyrite.

The southeastern-most anomaly does not correlate with an EM conductor and thus the causative source is probably basic volcanics, perhaps, Tertiary basalt.

The northern section consists of a series of low amplitude magnetic highs. The causative sources are probably intermediate to basic volcanics and/or diorite intrusives, each of which was encountered in drill holes 4 and 5, respectively. However, some pyrrhotite was encountered as well which could be at least a partial cause of the magnetic highs.

Respectfully submitted,  
GEOTRONICS SURVEYS LTD.



David G. Mark,  
Geophysicist

March 25, 1986

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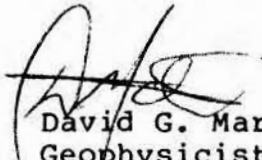
GEOPHYSICIST'S CERTIFICATE

I, DAVID G. MARK, of the City of Vancouver, in the Province of British Columbia, do hereby certify:

That I am a Consulting Geophysicist of Geotronics Surveys Ltd., with offices located at #403-750 West Pender Street, Vancouver, British Columbia.

I further certify:

1. I am a graduate of the University of British Columbia (1968) and hold a B.Sc. degree in Geophysics.
2. I have been practising my profession for the past 18 years and have been active in the mining industry for the past 21 years.
3. I am an active member of the Society of Exploration Geophysicists and a member of the European Association for Exploration Geophysicists.
4. This report is compiled from data obtained from a magnetic survey and a MaxMin II electromagnetic survey carried out over the Red claims in the Babine Lake area, B.C. from February 1st to 15th, 1986 by a 2-man crew under my supervision and under the field supervision of Marc Beaupre, geophysical technician, with Guy Dion, geophysical technician.
5. I have no direct or indirect interest in Anglo Canadian Mining Corporation, nor in the Red claims, nor do I expect to receive any interest as a result of writing this report.

  
David G. Mark  
Geophysicist

March 25, 1986

AFFIDAVIT OF EXPENSES

I, David G. Mark, Manager of Geotronics Surveys Ltd., certify that linecutting, a magnetic survey, and a MaxMin II electromagnetic survey were carried out from February 1st to 15th, 1986, over the Red claims, located to the immediate north of Hawthorn Bay, on Babine Lake in the Omineca Mining Division of British Columbia to the value of the following:

FIELD:

A. Linecutting (G. Auger Explorations)	
17,200 m at \$258/km	\$ 4,437
Room and board	760
Truck rental and gas	891
Survey supplies	92
	<u>6,180</u>

FIELD:


B. Geophysics	
Mob-Demob, Vancouver to Topley Landing	\$ 1,700
2-man geophysics crew, 103 hours at \$45/hour	4,635
Instrument rental, 2 weeks at \$300/week	600
Room and board	866
Truck rental and gas	800
	<u>8,601</u>

OFFICE:

*(work done from Feb 15<sup>th</sup> to Mar 25<sup>th</sup> / 86)*

Senior Geophysicist, 30 hours at \$45/hour	1,350
Junior Geophysicist, 8 hours at \$35/hour	280
Geophysical Technician, 50 hours at \$25/hour	1,250
Drafting and printing	1,290
Typing, compilation and photocopying	150
	<u>4,320</u>

Total	<u>\$19,101</u>
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 \_\_\_\_\_  
 David G. Mark, Manager  
 Geophysicist

March 25, 1986

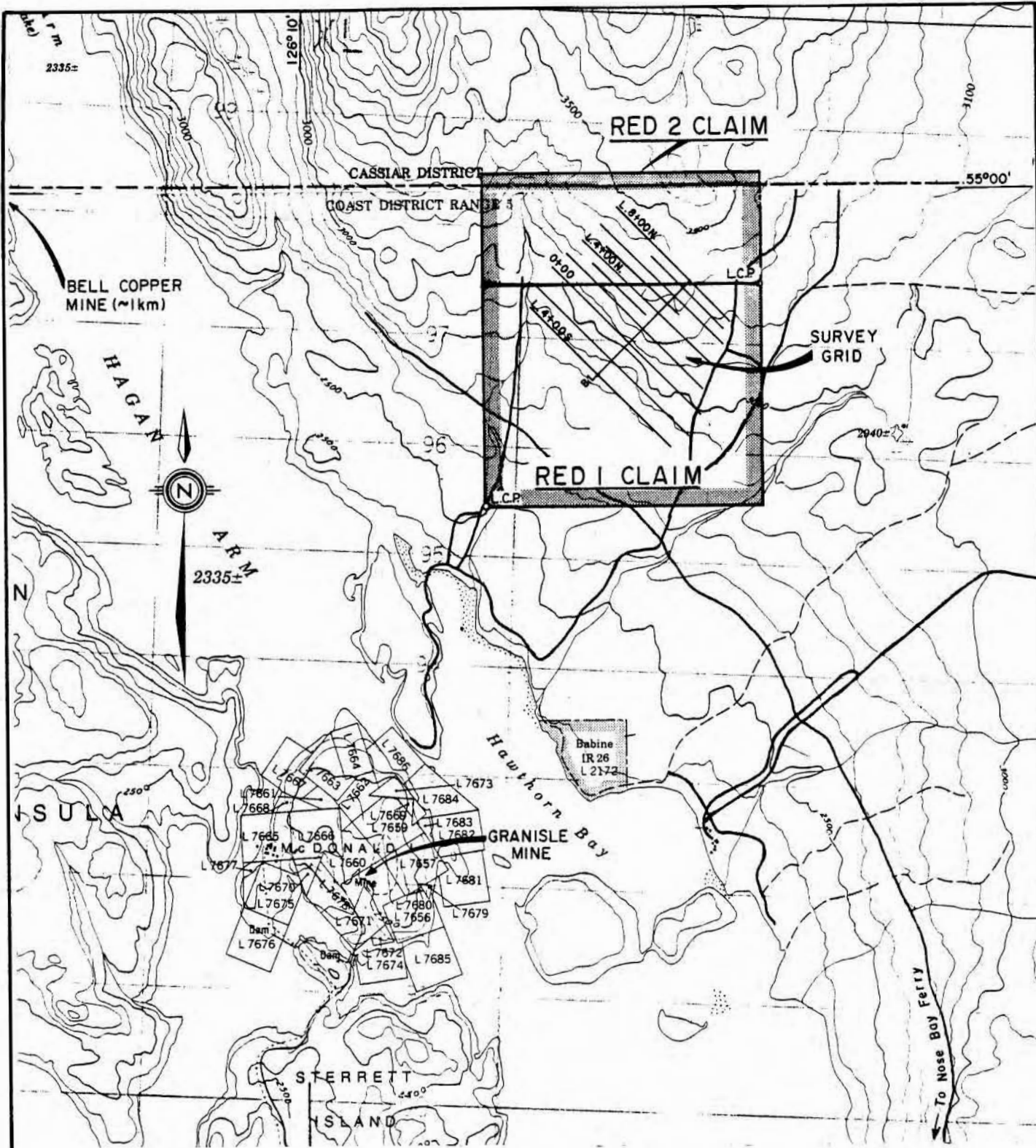




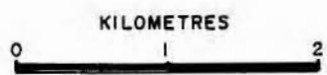
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**ANGLO CANADIAN MINING CORPORATION**  
**RED CLAIM GROUP**  
 HAWTHORN BAY, BABINE LAKE AREA  
 OMINECA M.D., B.C.

*LOCATION MAP*

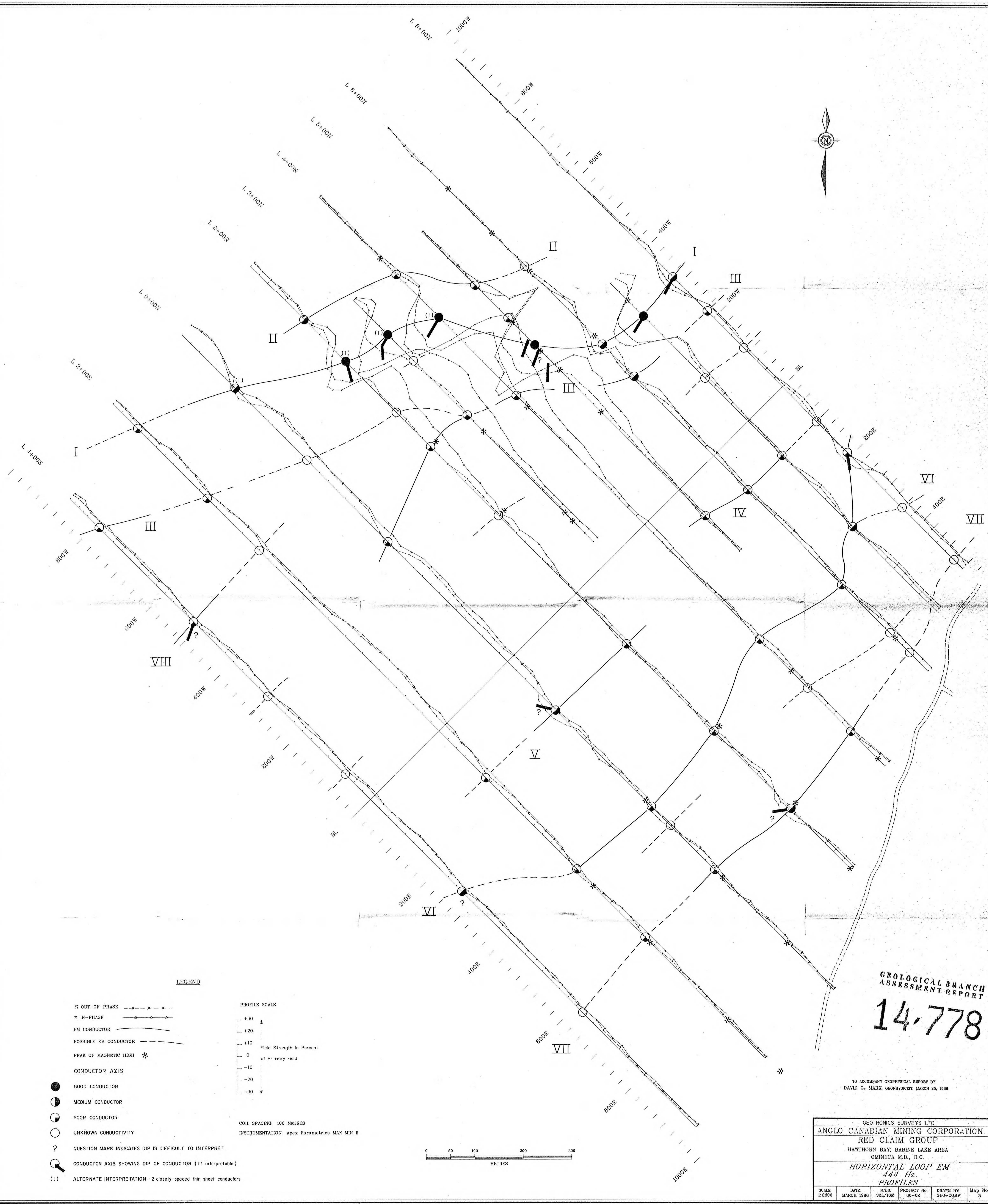
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RED CLAIM GROUP				
HAWTHORN BAY, BABINE LAKE AREA OMINECA M.D., B.C.				
<b>CLAIM MAP</b>				
SCALE: 1:50,000	DATE MARCH, 1986	N.T.S. 93L/16E	PROJECT No. 86-02	MAP No. 2

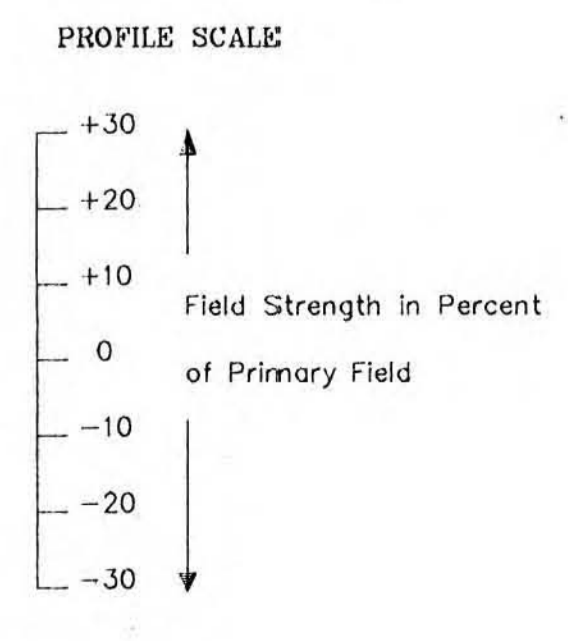






**LEGEND**

- % OUT-OF-PHASE - - - - -
- % IN-PHASE - - - - -
- EM CONDUCTOR ————
- POSSIBLE EM CONDUCTOR - - - - -
- PEAK OF MAGNETIC HIGH \*
- CONDUCTOR AXIS
- GOOD CONDUCTOR
- ◐ MEDIUM CONDUCTOR
- ◑ POOR CONDUCTOR
- UNKNOWN CONDUCTIVITY
- ? QUESTION MARK INDICATES DIP IS DIFFICULT TO INTERPRET.
- ⤵ CONDUCTOR AXIS SHOWING DIP OF CONDUCTOR (if interpretable)
- (1) ALTERNATE INTERPRETATION - 2 closely-spaced thin sheet conductors



COIL SPACING: 100 METRES  
 INSTRUMENTATION: Apex Parametrics MAX MIN II



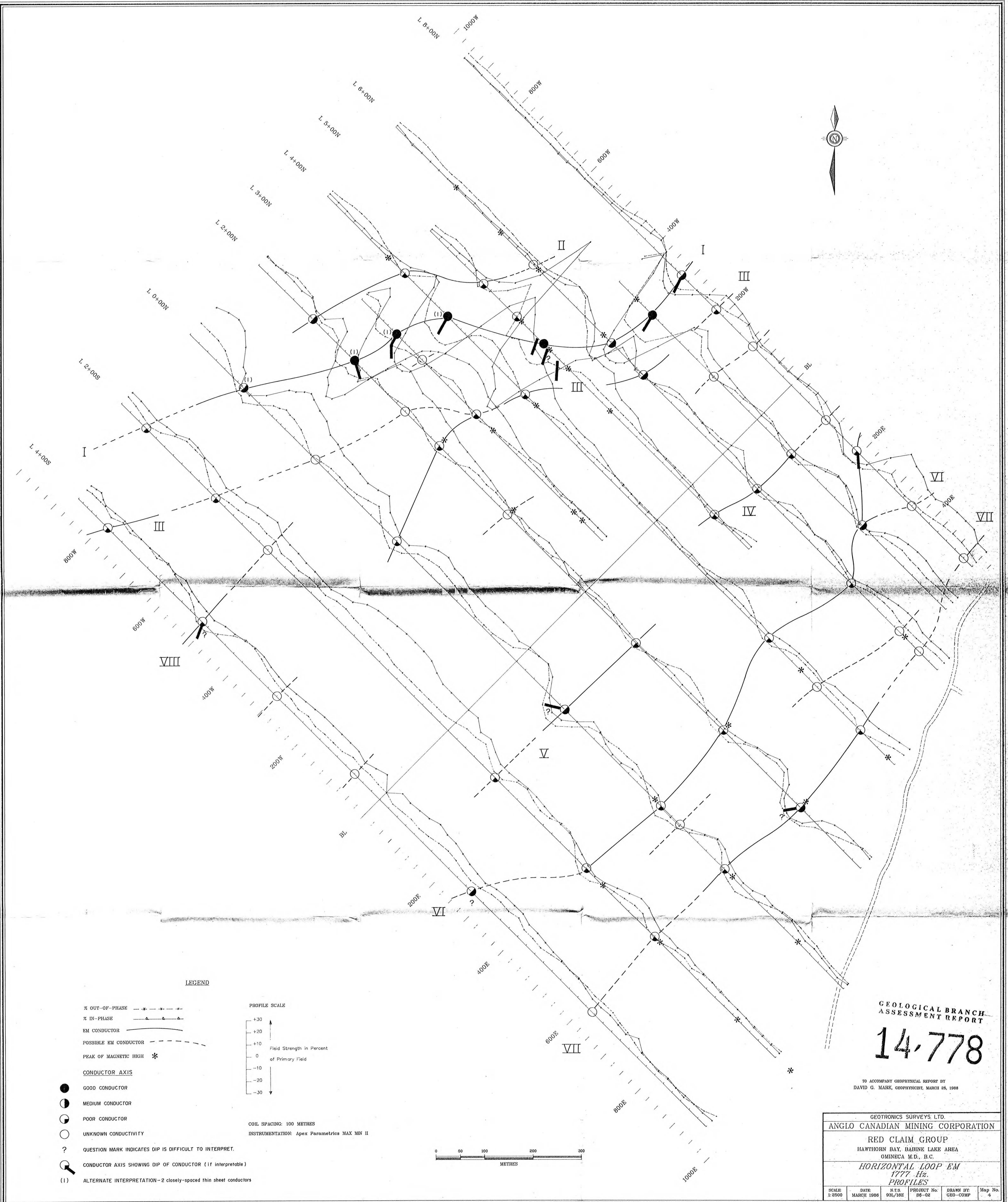
**GEOLOGICAL BRANCH  
 ASSESSMENT REPORT**

**14-778**

TO ACCOMPANY GEOPHYSICAL REPORT BY  
 DAVID G. MARK, GEOPHYSICIST, MARCH 26, 1988

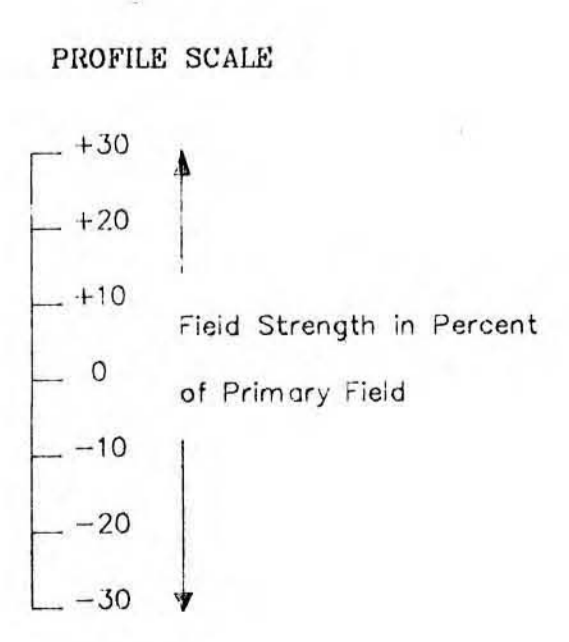
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ANGLO CANADIAN MINING CORPORATION					
RED CLAIM GROUP					
HAWTHORN BAY, BABINE LAKE AREA					
OMINECA M.D. B.C.					
HORIZONTAL LOOP EM					
444 Hz.					
PROFILES					
SCALE	DATE	METRES	PROJECT No.	DRAWN BY	Map No.
1:2500	MARCH 1988	931/18E	88-02	GEO-COMP	3



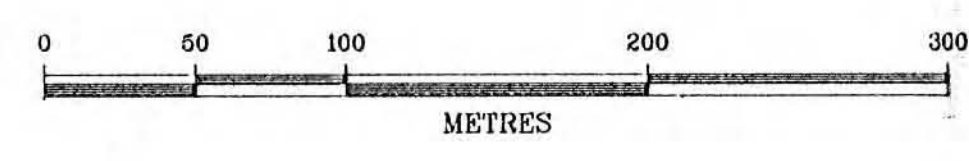


LEGEND

- ⊘ OUT-OF-PHASE
- ⊙ IN-PHASE
- EM CONDUCTOR
- - - POSSIBLE EM CONDUCTOR
- \* PEAK OF MAGNETIC HIGH
- CONDUCTOR AXIS
- GOOD CONDUCTOR
- ◐ MEDIUM CONDUCTOR
- ◑ POOR CONDUCTOR
- UNKNOWN CONDUCTIVITY
- ? QUESTION MARK INDICATES DIP IS DIFFICULT TO INTERPRET.
- ⤴ CONDUCTOR AXIS SHOWING DIP OF CONDUCTOR (if interpretable)
- (1) ALTERNATE INTERPRETATION - 2 closely-spaced thin sheet conductors



COIL SPACING: 100 METRES  
INSTRUMENTATION: Apex Parametrics MAX MIN II



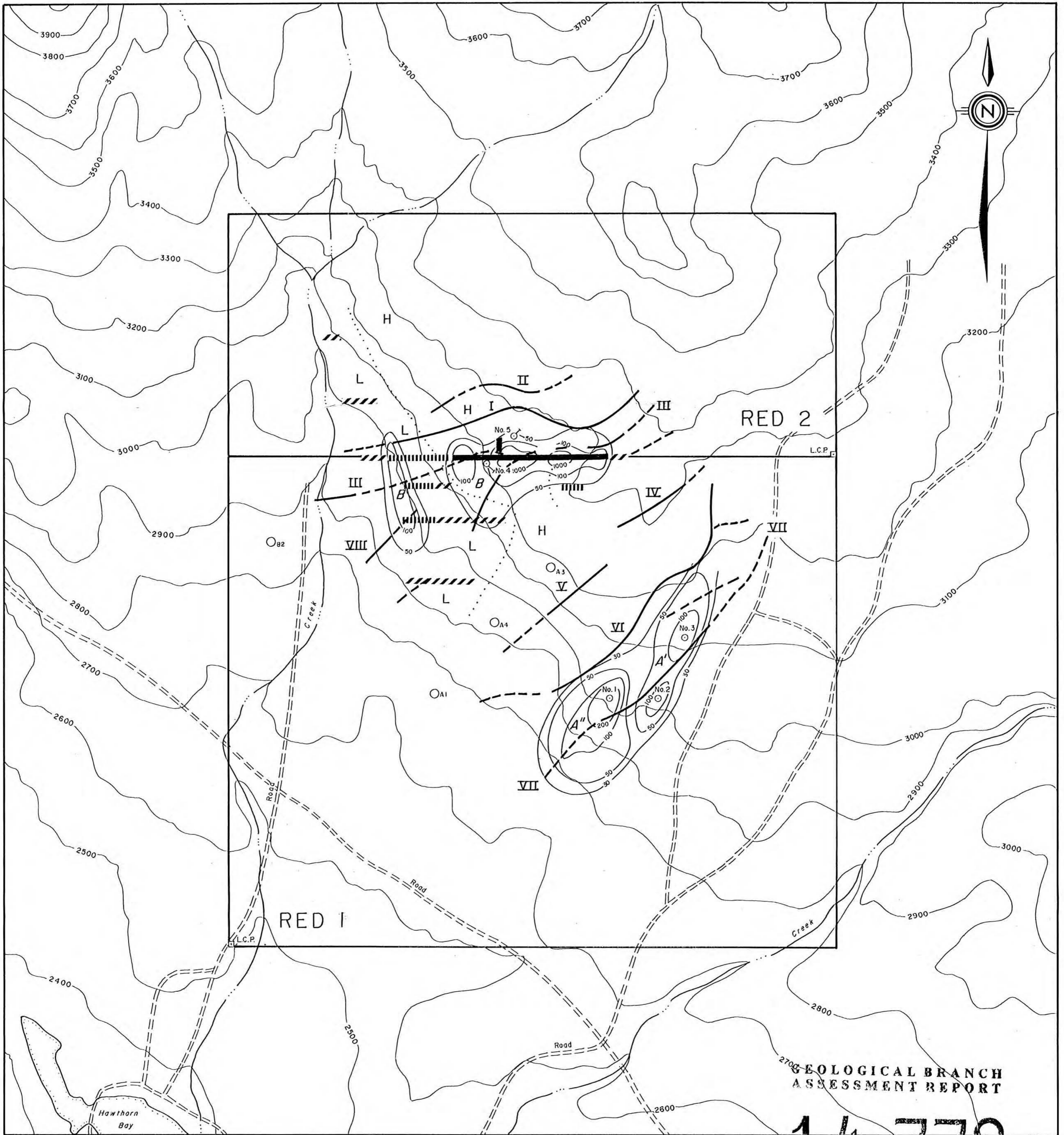
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ASSESSMENT REPORT

14,778

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DAVID G. MARK, GEOPHYSICIST, MARCH 26, 1986

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ANGLO CANADIAN MINING CORPORATION					
RED CLAIM GROUP					
HAWTHORN BAY, BABINE LAKE AREA					
OMINECA M.D., B.C.					
HORIZONTAL LOOP EM					
1777 Hz.					
PROFILES					
SCALE	DATE	N.T.S.	PROJECT No.	DRAWN BY	Map No.
1:2500	MARCH 1986	93L/ARE	86-02	GEO-COMP	4





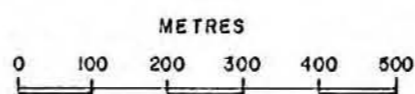
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ASSESSMENT REPORT

14,778

**LEGEND**

- |                                       |  |                                       |                        |
|---------------------------------------|--|---------------------------------------|------------------------|
| <u>1966 I.P. - RESISTIVITY SURVEY</u> |  | <u>1985 AIRBORNE EM SURVEY</u>        |                        |
|                                       | METAL FACTOR CONTOURS                  |                                       | AIRBORNE EM CONDUCTORS |
| <u>1967 DRILLING</u>                  |  | <u>1986 HORIZONTAL LOOP EM SURVEY</u> |                        |
|                                       | DRILL HOLE                             |                                       | DEFINITE CONDUCTOR     |
| <u>1972 I.P. - RESISTIVITY SURVEY</u> |  |                                       | POSSIBLE CONDUCTOR     |
|                                       | DEFINITE ANOMALY (METAL FACTOR)        |                                       |                        |
|                                       | PROBABLE ANOMALY (METAL FACTOR)        |                                       |                        |
|                                       | POSSIBLE ANOMALY (METAL FACTOR)        |                                       |                        |
|                                       | RESISTIVITY LOW (below 100 ohm - ft.)  |                                       |                        |
|                                       | RESISTIVITY HIGH (above 100 ohm - ft.) |                                       |                        |

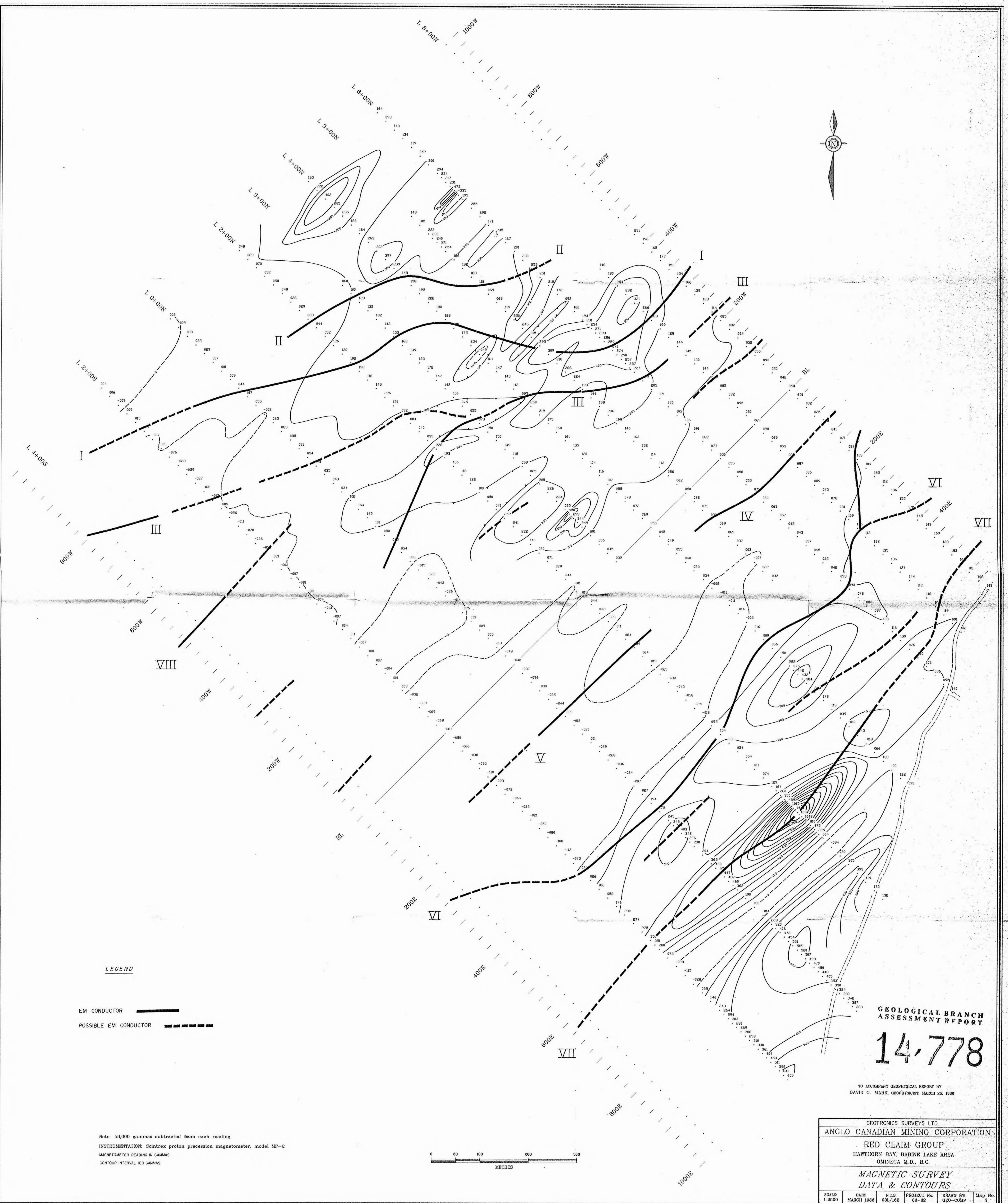
Note: Work from 1966 to 1972 has yet to be field-verified onto present grid system.



TO ACCOMPANY GEOPHYSICAL REPORT BY DAVID G. MARK, GEOPHYSICIST, MARCH 25, 1986.

GOTRONICS SURVEYS LTD.				
ANGLO CANADIAN MINING CORPORATION				
RED CLAIM GROUP				
HAWTHORN BAY, BABINE LAKE AREA				
OMINECA M.D., B.C.				
<b>COMPILATION MAP</b>				
SCALE: 1: 10,000	DATE: MAY, 1986	N.T.S. 93L/16E	PROJECT No. 86-02	MAP No. 6





**LEGEND**

- EM CONDUCTOR
- POSSIBLE EM CONDUCTOR

Note: 58,000 gammas subtracted from each reading  
 INSTRUMENTATION: Scintrex proton precession magnetometer, model MP-2  
 MAGNETOMETER READING IN GAMMAS  
 CONTOUR INTERVAL 100 GAMMAS



**GEOLOGICAL BRANCH  
 ASSESSMENT REPORT**

**14,778**

TO ACCOMPANY GEOPHYSICAL REPORT BY  
 DAVID G. MARK, GEOPHYSICIST, MARCH 28, 1988

GEOTRONICS SURVEYS LTD.				
ANGLO CANADIAN MINING CORPORATION				
RED CLAIM GROUP				
HAWTHORN BAY, BABINE LAKE AREA				
OMINECA M.D., B.C.				
<b>MAGNETIC SURVEY DATA &amp; CONTOURS</b>				
SCALE 1:2500	DATE MARCH 1988	N.T.S. 031/10E	PROJECT No. 88-02	Map No. 5