Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3348 MAP

REPORT ON
AIRBORNE GEOPHYSICAL SURVEYS
ANYOX AREA, BRITISH COLUMBIA
ON BEHALF OF
HOGAN MINES LIMITED

by

Richard O. Crosby, B.Sc., P.Eng.

and

John P. Steele, B.Sc.

August 31, 1971

CLAIMS:
(see next page)

LOCATION:
About 65 miles northeast of
Prince Rupert, British Columbia
Skeena Mining Division
128° 55°

DATES:
July 19 to July 24, 1971

RECORDED MINERAL CLAIMS

Name of Claim	Record Numbers
CM 1 to 24	21556D to 21579D
CM 26 to 43	28298B to 28315B
CM 44 to 77	28528B to 28561B
CM Fr.	28562B
CM 1 Fr.	28563B
CM 2 Fr.	28564B
CM 3 Fr.	28565B
PAUL Fr.	31661H
DOUG Fr.	31662H
RON Fr.	31663H
NORM Fr.	31664H
TOM Fr.	31665H
FRED Fr.	31666H
BARRY Fr.	31667H
DELTA Fr.	31668H
Mineral Lease 95	

CROWN GRANTED MINERAL CLAIMS

Name of Grant	Lot Number
Red Jacket	1991
Red Wing	1992
Red Fraction	1993

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SUMMARY

Helicopter-borne electromagnetic and magnetometer surveys have been executed over approximately 7 square miles in the Anyox area, British Columbia. Seven conductive zones and several magnetic features have been revealed.

Recommendations for ground follow-up have been made.

REPORT ON AIRBORNE GEOPHYSICAL SURVEYS ANYOX AREA, BRITISH COLUMBIA ON BEHALF OF HOGAN MINES LIMITED

INTRODUCTION

On July 19 through 24, 1971 airborne geophysical surveys were executed on behalf of Hogan Mines Limited in the Anyox area, British Columbia covering approximately 7 square miles.

The airborne survyes included electromagnetic and magnetic measurements. The former employed a Scintrex TAR-1 Turair electromagnetic unit and the latter a Scintrex MAP-2 nuclear resonance, total intensity magnetometer.

Appendices 'A', 'B' and 'C', attached, give full details of the airborne geophysical equipment and the ancillary equipment employed, as well as the survey techniques and the treatment of the data resulting from these surveys. A Bell 206 - Jet Ranger helicopter, on charter from Okanagan Helicopters, was employed as the basic transport vehicle both to lay the Turair "loop" and to execute the surveys.

The electromagnetic survey lines were flown at a nominal 1/8 mile line interval. Flight navigation and flight path recovery have been based upon a photomosaic of the area on the scale of 1 inch = 1500 feet.

The magnetometer sensor and the Turair "birds" were flown separately, the former 50 feet below the helicopter and the latter 100 feet below the helicopter. The Turair "loop" was deployed by helicopter in the areas of least topographic relief: Bonanza Creek, Cascade Creek and the shore of Granby Bay.

The purpose of the present programme was to map the distribution of subsurface conductors in the survey area where the targets of interest are massive metallic sulphides.

The electromagnetic data provide the basic information relating to the possible presence of such bodies. The purpose of the magnetometer survey is primarily one of correlation with the electromagnetic conductors and secondarily to infer geological structure.

The total magnetic field in the area measures approximately 58,000 gammas. The inclination of the total field is approximately 74 degrees and the declination is 23 degrees east of geographical north.

PRESENTATION OF DATA

The results of the geophysical surveys are presented on Plates 2 and 3, on the scale of 1 inch = 1500 feet. Some topographic features and flight lines are shown on the plates. Plate 2 shows the electromagnetic results. The electromagnetic conductors locations are shown along with their interpreted subsurface depth, magnetic association (if any) and conductivity-thickness (σt) product. These conductors are coded as shown in appendix 'A'. Plate 3 shows the magnetic contours, contoured at an interval of 100 gammas or less according to magnetic relief.

The original geophysical data were recorded on two dual trace Moseley recorders: electromagnetic amplitude ratio and phase difference on one trace and magnetometer and altimeter records on the second trace. Fiducial marks representing a navigational photograph per mark were recorded on each trace to enable correlation of all the data and to locate geophysical features on the ground. The original traces were recorded on the following scales:

Turair	1 inch = 1.0% - amplitude ratio
	1 inch = .5° - phase difference
Magnetometer	1 inch = 100 gammas
Altimeter	As shown on calibration included with original data.

GEOLOGY

The survey area is underlain by rocks of Mesozoic age. In the southern part of the survey area, along the shore of Granby Bay and in an area below Tauw Creek in the middle of the survey area granitic intrusive rocks belonging to the series of Coast Range Intrusions are found. Volcanic rocks, chiefly andesitic pillow lavas, are found in the western part of the survey area and in the eastern part adjacent, to the west, to the granitic rocks. The central portion of the area contains sedimentary rocks, chiefly argillites, in a basin structure underlain by the volcanic rocks except where the sediments have been intruded by one large and several small granitic stocks.

The sedimentary and volcanic rocks in the central portion of the survey area are extensively folded in anticlinal and synclinal structures striking primarily in a northeast-southwest direction. Faulting is previlent as well.

Economic mineralization consisting of fine grained massive to disseminated pyrrhotite with small sections of chalcopyrite and minor pyrite has been located and mined in four areas in the vicinity of the survey area. In all instances the mineralization has been found in schist zones in the volcanic rocks adjacent to the volcanic-sediment contact.

DISCUSSION OF RESULTS

Anomalous electromagnetic conduction has been located in seven places within the survey area. In all cases the electromagnetic responses are weak and poorly defined.

The magnetometer survey has outlined one 300 gamma feature centred on Showings Creek, several smaller features and two major gradients.

Near the eastern ends of lines 12 and 14 (zone A), weak electromagnetic responses have been obtained. These have been interpreted to lie near surface and to have conductivity-thickness (σt) products of 50 mhos. These conductors are associated with a magnetic gradient which has been interpreted as probably reflecting the volcanic-sediment contact (see Plate 4). Although such anomalous electromagnetic response was not obtained on line 13 the responses on lines 12 and 14 have been correlated because turbulence on line 13 was of large enough intensity to have masked any such response.

Lines 10 through 15 have exhibited wide anomalous electromagnetic responses (zone B) in the centre of the survey area (see Plate 2). These responses are located on the flank of the magnetic feature centred on Showings Creek and on the magnetic gradient parallel to Tauw Creek. As well, they are located along the strike of the Bonanza Mines dike swarm and along a mapped north-south fault. Quantitative determinations of the depth and conductivity-thickness product of these responses are not possible because of their weakness although the width of the responses would indicate a large subsurface depth to the conductive material.

On survey line ("Mine Line") was flown so as to traverse both the Bonanza and Double Ed showings along Bonanza Creek. No anomalous electromagnetic responses were obtained over these showings as excessive topographic relief resulted in the loop being layed so that Bonanza showing lay within the "blind zone" and the "Mine Line" passed too far to the north of the Double Ed showing.

A magnetic gradient has been revealed along the length of Tauw Creek which probably represents topographic relief within the creek valley. Three interruptions of magnetic pattern have been interpreted as probably reflecting fault traces.

CONCLUSIONS AND RECOMMENDATIONS

The electromagnetic responses located by this survey are of small amplitude and consequently further investigations are required to determine their significance.

As no calibration responses were obtained over known areas of economic mineralization along Bonanza Creek because of their proximity to the transmitting loop and as the conductivity-thickness product calculated for zone A is unreliable, again because of loop proximity, it is difficult to assess the significance of the conductors of zone A without follow-up work on the ground. However their association with an inferred geological contact would indicate that this follow-up is warranted.

The zone B responses are situated in a location potentially favourable for mineralization because of the proximity to the interpreted edge of the body causing the magnetic response centred on Showings Creek and because of the geological structural features in this location. However the low conductivity-thickness product and the width of the conductive zones within zone B may indicate conductive layers within the sediments. Ground follow-up of zone B is warranted to ascertain the cause of the anomalous conduction.

A ground Turam survey should be conducted as the ground electromagnetic follow-up procedure because of the excessive topographic relief in the vicinity of zones A and B. As well, a ground magnetometer survey should be conducted over the same grids to assist in conductor location. If the results of these surveys as well as geological reconnaissance of the areas prove favourable then diamond drilling may be warranted.

Respectfully submitted,

SEIGEL ASSOCIATES LIMITED

Richard O. Crosby

Richard O. Crosby, B.Sc., P.Eng.
Geophysicist

John P. Steele

John P. Steele, B.Sc.
Geophysicist

Vancouver, B. C.
August 31, 1971

SUB-MINING RECORDER
RECEIVED
1971
M.R. 62102E, 633
VANCOUVER, B. C.

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

MINERAL ACT

FORM B

Affidavit on Application for Certificate of Work

I, D. A. McLeod, (Name.) 1010-789 W. Pender St. (Address.) Vancouver 1, B.C.

Free Miner's Certificate No. 104847

Date issued June 1st, 1971.

Agent for Interplex Mining & Industrial Ltd. (Name.) 2405 West Broadway, (Address.) Vancouver, B.C.

Free Miner's Certificate No. 108208

Date issued October 6th, 1971.

make oath and say:—

I have done, or caused to be done, work on the CM 1-24, CM 26-43, CM 44-77, CM Fraction, Mineral Lease 95, CM 1 to CM 3 Fr., Paul, Doug, Ron, Norm, Tom, Fred, Barry & Delta Fractions Mineral Claim(s)

Record No.(s) 21556B-21579B, 28298E-23315E, 28528E-28561E, 28562E-28565E, 31661H-31668H

situate at Bonanza and Tauw Creeks, Anyox, B.C.

in the Skeena Mining Division, to the value of at least $11,135.04 ~~one hundred dollars~~, since the 19th day of July, 1971

The following is a detailed statement of such work:—
(Set out full particulars of the work done in the twelve months in which such work is required to be done.)

An airborne turair and airborne magnetic survey was conducted over the entire claims and fractions and mineral lease 95 by Seigel Associates Ltd., as per included report by R.O. Crosby, P. Eng. and J.P. Steele, B.Sc.

Apply 3 years work to Mineral Lease 95

Apply 2 years work to CM 1-8, CM 26-33, CM 39 & 40

Apply 1 years work to CM 9-24, CM 34-38, CM 41-77, CM Fraction., CM 1 Fr.--CM 3 Fr. , Paul Fr., Doug Fr., Ron Fr., Norm Fr., Fred Fr., Barry Fr., Delta Fr., Tom Fr.

That I have not and will not use the work declared herein in any way for the purposes of obtaining tax exemption on a Crown-granted mineral claim under the terms of the *Taxation Act*.

SWORN and subscribed to at Vancouver, B.C.
this 8th day of November.
1971, before me—
* [signature]

D. A. McLeod

* This affidavit may be taken by a person empowered to take affidavits by the *Evidence Act* of British Columbia.

C/W# 53548/653

DOMINION OF CANADA:
PROVINCE OF BRITISH COLUMBIA.
TO WIT:

In the Matter of a geophysical survey on behalf of Hogan Mines Limited

I, L. A. Merrifield for Seigel Associates Limited

of 750 - 890 West Pender Street, Vancouver

in the Province of British Columbia, do solemnly declare that airborne geophysical surveys have been executed on some CM, REB, PAUL, DOUG, RON, NORM, TOM, FRED, BARRY and DELTA claims between July 19 to July 24, 1971. The following expenses were incurred:

(1)	Wages:			
	J. Steele	5 days @ $50.00/day	$250.00	
	C. Mohagen	5 days @ $35.00/day	175.00	
	B. Paradis	5 days @ $27.50/day	137.50	
	H. Winzeler	5 days @ $27.50/day	137.50	
				$700.00
(2)	Transportation on the job	28 hours helicopter		7,000.00
(3)	Food & living expenses			649.00
(4)	Use of geophysical equipment	5 days @ $60.00/day		300.00
	Cost of supplies - wire			1,200.00
(5)	Paid to Seigel Associates Limited to cover geophysicist's supervision calculating, plotting and fairdrawing data and preparation of final reports.			1,286.04
				$11,135.04

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the City of Vancouver, in the Province of British Columbia, this 21st day of September, 1971, A.D.

L. A. Merrifield

L. Hughes Sub-mining Recorder

A Commissioner for taking Affidavits within British Columbia or
A Notary Public in and for the Province of British Columbia.

APPENDIX 'A'

SURVEY EQUIPMENT AND PROCEDURES

TURAIR

Semi-Airborne Electromagnetic System - Scintrex TAR-1

In the application of electromagnetic prospecting methods, it has long been recognized that, other things being equal, much greater exploration depths can be attained with systems employing a fixed source than with systems where both source and receiver are moved in unison. For example, a large conducting body which would already be undetectable at a depth of 60 m by any surface moving source (horizontal loop) system, could be detectable by a fixed-source method to a depth of as much as 200 m.

Most present-day airborne electromagnetic systems are of the moving source type, and although such systems have tangible advantages over the ground versions, it appears difficult to increase their useful penetration substantially beyond their present range. Under very favourable conditions the better moving source AEM systems may reach exploration depths of as much as 100 m or in exceptional cases 125 m below the ground surface. This is sufficient for many search problems but in some areas the geologic and topographic conditions necessitate a much deeper penetration to conduct meaningful mineral surveys.

The foregoing considerations have led to development of Turair method for the purpose of deep electromagnetic exploration. The system, which can be described as a fixed source, semi-airborne, gradient measuring device, employs a large transmitting loop on the ground as a primary source. The horizontal gradients of amplitude and phase of the vertical or horizontal magnetic field are measured from the air, along traverse lines across the source and perpendicular to the regional geological strike.

The Turair method, because of its semi-airborne character, is particularly suitable for the detailed, deep investigation of structures having geologically favourable characteristics, or a magnetic expression suggesting favourable geology. Because of its potential depth of exploration, it can be successfully employed in areas of deep sedimentary cover, deep weathering, or tall tree cover (tropical area), or in areas where shallower exploration has been established the presence of ore deposits and a deeper search is desired. It is, because of its fixed source configuration, less affected by near-surface conduction and can be applied with a very low exciting frequency (e.g. 200 Hz or less). Finally, as a helicopter-borne system it can operate in mountainous topography. Terrain clearance has far less effect on the exploration depth of the Turair system than it has in moving source methods and it can penetrate deep talus cover and valley fillings.

Economic ore deposits may have strike lengths less than 200 m. If we want to search for such targets, particularly at greater depths, line spacing should not be much greater and for the average survey line spacings of 200 m (or one-eighth mile) should be considered optimum. In fact, larger line spacings do not represent significant savings, because of the reduction of measurable profile from one loop layout. The largest primary loop that can efficiently be laid out (by helicopter) is 3 X 5 km. Under average conditions some 400-500 line km of profile at 200 m intervals can be surveyed from this source, the total operation covering approximately one day's field work.

EQUIPMENT

The Scintrex Turair is a fixed source, semi-airborne electromagnetic system designed for helicopter operation.

The system embodies a fixed transmitter on the ground and a receiver carried in the helicopter. The size of the transmitting loop is guided by geological conditions and the character of the survey. A typical loop size would be e.g. a square, 3 miles on each side--other shapes and sizes can be used. The loop can be laid out from a truck or by helicopter. For airborne placement a special dispensing device is used which can feed out continuously, several miles of wire. The present system utilizes a 400 Hz primary field, excited by means of a 15 kw motor driven generator which supplies a current of 4-10 amperes into the transmitting loop. The system can operate at any other desired frequency depending on the geological conditions in the survey area.

The receiver system comprises 2 horizontal coplanar or 2 vertical coaxial air-cored coils, rigidly mounted 4.5 m apart in a "bird". This bird is towed approximately 30 m below the helicopter by means of a cable which also carries the electrical signals from the bird. The horizontal coplanar coil system is the one preferably used. In areas where conducting overburden, etc. might tilt the primary electromagnetic field from a mainly vertical to a more horizontally directed one, the vertical coaxial coil system may have to be used. The present Turair receiving system is designed to detect signals stronger than 1 V in the coils (phase lock principle). The system has a noise level of less than 3 V. In this way, from a 3 km x 3 km loop, energized by 4 amperes, an area of about 55 square km can be covered in a region underlain by e.g. 100 m or more of overburden or deep weathering of moderate conductivity.

The quantities measured with this dual coil (gradient) measuring electromagnetic system include the ratio of the field strength and the phase differences of the alternating magnetic field at the two coils. The changes in amplitude ratio and phase difference are expressed in percent and degrees respectively. The sensitivities of the system are 0.1 percent and 0.1 degrees respectively.

Both parameters are recorded in analogue form on a dual channel recorder. Digital output can be employed as well. The recorder scale sensitivities can be set to meet all kinds of survey conditions. (e.g. Deep-seated targets give generally lower responses than near surface ones.

Therefore, in geological conditions where 100 m or more of sediments are present, higher scale sensitivities are utilized than in areas where strong responses are expected).

Flying towards or away from the loop the strength of the field detected at the coils changes gradually but considerably. For this reason, a switch connected to the signal detector amplifier is manually activated to keep the amplified output of the preamplifiers within the signal strength limitations necessary for the equipment operation. These switching markers are shown on the recorder charts as short duration "spikes" with appropriate notation and are easy to interpret as such.

At one or more points during each flight, the scale sensitivities and zero levels are checked by means of calibration and zeroing signals respectively. The reference or zero level for each Turair electromagnetic trace is an arbitrary one, and is obtained empirically from the regional level of each section of a trace between the switching markers. There levels may drift slowly during a flight because of temperature changes. The drifts are very gradual and are readily distinguishable from local changes due to conductors of a geologic origin.

Since the gradients of the signals recorded close (i.e. within about 175 m) to the loop sides are too strong, it is not possible to distinguish field changes due to conductors of geologic origin lying in these "blind zone" regions. From a statistical point of view the chances of missing a significant conductor in these "blind zone" regions are very small, since these regions constitute only about 8% of the area surveyed from each loop.

The amplitude ratio and phase difference are recorded in such a way that flying "towards" the loop using the horizontal coplanar coil system, a normal anomaly shows a positive sign (i.e. upward deflection) for the former and a negative sign (i.e. downward deflection) for the latter parameter. While flying "away" from a loop these signs are reversed. Reversed anomalies can also be the results of particular geometric situation, e. g. when the source is located on the hanging wall side of a flatly dipping conductor (Bosschart, 1964, p. 22 and figure 9). Man-made disturbances including power lines, pipe lines, metal fences, railways, etc. may cause spurious anomalies. The former are recognizable as such when they appear as cyclic noise of irregular shape and phase relationship. Non-energized, grounded power lines (e.g. 3 phase systems) sometimes give rise to anomalies that are more difficult to identify. Such indications as well as those from pipe lines and metal fences, etc. are however, of short duration and can be distinguished from most geologic sources except for very narrow, near-surface conductors. In some instances, ground investigation may be necessary in order to resolve the ambiguity of possible sources. Although the airborne geophysical crew attempts to note visible man-made conductors of the above type, the ground moves so rapidly at the low flight elevation employed that 100% recognition of such sources cannot always be expected from the air.

The normal terrain clearance of the bird is 30-60 m depending on the surface topography, tree cover, etc. with the helicopter 30 m above. The established useful depth of detection of the system for moderate-to-large conducting bodies, i.e. 300 m or more in plan length, is at least 175 m sub-bird under conditions of low extraneous geologic noise, i.e. where the general level of conductivity of the overburden and rock types of the area is low. The useful depth of detection of the system is therefore, at least 125-150 m beneath the ground surface under these conditions.

PRESENTATION OF RESULTS

The electromagnetic records are interpreted to determine the presence of conducting bodies and to obtain some information relating to their character. The intervalometer time marks are synchronized with the positioning camera film strip and thereby permit the relating of the conductors with appropriate ground locations. The terrain clearance is obtained from the altimeter data, presented in the form of side pen markers whose separation is nearly proportional to the helicopter terrain clearance.

A plan is prepared, either using a subdued photmosaic ("greyflex") or an overlay from a mosaic or topographic plan as base. The flight path of each survey line is obtained by means of "tie points", which are features on the mosaic or topographic plan, identified on the positioning camera film. The flight path is interpolated between these tie points.

INTERPRETATION

Where field distortion occurs the curves indicate the location and the depth of the main current flow. The "current axis" is well defined when the current is concentrated, for instance, in thin, steeply dipping conductors. In wide, banded conductors, or in horizontal conductors such as overburden, the current is usually more dispersed and the anomalies yield less positive information.

(a) Peak Locations

The peak location of the amplitude ratio (using the horizontal coplanar coil system or the cross-over in case the vertical coaxial coil system is used) is shown on the plan by a circle in the appropriate location. In the case of broad conductors or closely spaced multiple conductor zones there may be more than one peak, in which event all major peaks are shown. A conductor which is likely man-made is indicated by an X rather than by a circle.

As a rule the current axis is located right below the maximum field strength ratio deflection or the maximum phase anomaly, for the horizontal coplanar receiving coil system (Vertical Field). For the vertical coaxial coil system (Horizontal Field), the current axis is located right below the inflection point of the anomaly. Its depth under the traverse is indicated by the shape of the anomaly.

(b) Depth and Conductor Width

The "half width", i.e. the distance between the points of half the maximum response amplitude is for simple line current sources, using the horizontal coplanar coils, approximately equal to the depth of the source under the detector. In case the vertical coaxial system is used the peak to peak separation is for tabular bodies equal to 1.15 times the depth of the source under the detector. Flat-lying conductors (e.g. overburden) characteristically give rise to very large half widths, combined with rather irregular curve shapes. Here the half width may reflect the conductor width rather than the depth and the latter can usually not be determined. In cases where the conductivity zone is interpreted to have appreciable width, the separation between the edges is indicated on the plan by an open bar symbol along the flight line. Well defined peaks within this zone should be marked, and if possible interpreted as individual anomalies. The subsurface depth of the current axis (subtract detector altitude) is marked on the lower left of the peak location circle.

(c) Conductor Grading

Field strength ratio and phase difference anomaly amplitudes are dependent on the overall geometry as well as on target size and σt value. Their primary significance is in the degree of certainty they lend to detectability and quantitative interpretation. For the purpose of amplitude grading three categories are used: Category 1, fully shaded; Category 2, half shaded; and Category 3, unshaded.

(d) Conductivity-Thickness Factor

The field strength ratios and phase differences provide a measure of the conductivity of the conducting bodies, i.e. good conductors are characterized by field strength distortion combined with relatively little phase shifting, whereas poor conductors affect the phase rather than the strength of the resultant field.

For an accurate grading the conductivity-thickness factor (σt value) of individual conductors can be derived from the calculated in-phase and out-of-phase components, taking into consideration the exciting frequency and the strike length of conductor, by means of the diagram described below. The σt value is then marked on the upper-right side of the peak location circle.

Large, highly conducting bodies such as massive sulphides or graphite and seawater, etc., generally have high σt values. Moderate conductors will have σt values between 10 to 100 mhos. Poorly conducting bodies (e.g. most overburden and some sulphide and graphitic zones) will have σt values of less than 10 mhos. In areas where there is a clear differentiation in conductivity between the targets of potential economic interest and other possible conductors, the σt values may form the main basis for discrimination. When the conductivity ranges of economic and non-economic overlap, the σt value cannot, of course, be rigidly relied upon.

Diagram for the Evaluation of Conductivity-Thickness (σt) Factors

This diagram has been prepared from data obtained in model studies (R. A. Bosschart: "Analytical Interpretation of Fixed Source Electromagnetic Prospecting Data") and is valid for Tabular steeply dipping 'Thin' Conductors.

To obtain the conductivity-thickness factor for a conductor system the amplitude-ratio and phase difference are plotted on abscissa and ordinate respectively and a line is drawn through the resultant point and the origin. Where this line intersects the curve corresponding to the interpreted strike length of the anomaly system one interpolates between the values of conductivity-thickness, in mhos, shown on the upper bounding curve.

Example:	Amplitude Ratio	0.7%
	Phase difference	0.2°
	Interpreted strike length of system	1000 meters
	Conductivity-thickness value (σt)	120 mhos

(e) Current Pattern

To obtain the projection of the current pattern, the anomalies are connected between lines, using depth σt values and other characteristics of the curves as criteria. The strike of the formation, if known, is also taken into consideration.

(f) Magnetic Correlation

Where magnetic data are available, preferably from a coincident magnetometer recording, any correlating magnetic expression is noted for the pertinent conductor peak. A conductor peak with direct magnetic correlation is indicated by a double concentric circle.

Location of a conductor on the flank of a magnetic anomaly is indicated by means of one half of a concentric circle on the side of the magnetic high.

The significance of direct or flank correlation depends on the search problem. In the former case the magnetic and conductive properties may be coincident or belong to two narrow adjoining zones. In the latter case the conductor may be located at the contact of a wider magnetic formation. In case of direct coincidence, the magnetic value is marked on the lower right side of the peak location circle.

REDUCTION OF DATA

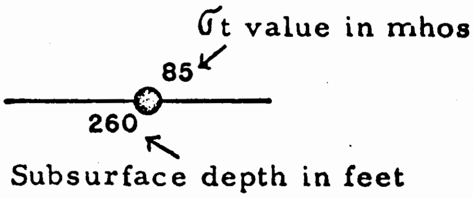
Upon completion of a flight, the film is developed and the actual path of the aircraft is plotted on a base map. This is accomplished by comparing film points with the base map planimetry. For any given point, the appropriate fiducial number is placed on the base map (or photo laydown). The actual flight path is produced by joining the fiducial points.

Where field results are desired, anomalies are chosen and are assigned appropriate fiducial numbers. The anomalies are then transferred to their correct position on the base map.

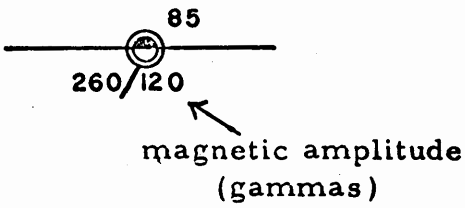
Flight lines and fiducial numbers are finally presented on a greyflex which is made using the photomosaic as a base.

In the case of EM or radiometric results the anomalies are plotted on the greyflex as boxes with symbols representing anomaly grade of amplitude (as noted on the legend accompanying each map). Anomaly "systems" are then outlined at which stage a geophysical interpretation can be made.

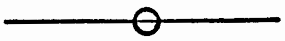
* (Bosschart, 1964, p. 22 and figure 9) Analytical Interpretation of Fixed Source Electromagnetic Prospecting Data.



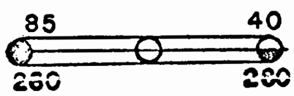
Category one, no magnetic correlation



Category two, magnetic correlation



Category three, no magnetic correlation, anomaly too weak or insufficiently defined for quantitative determinations.

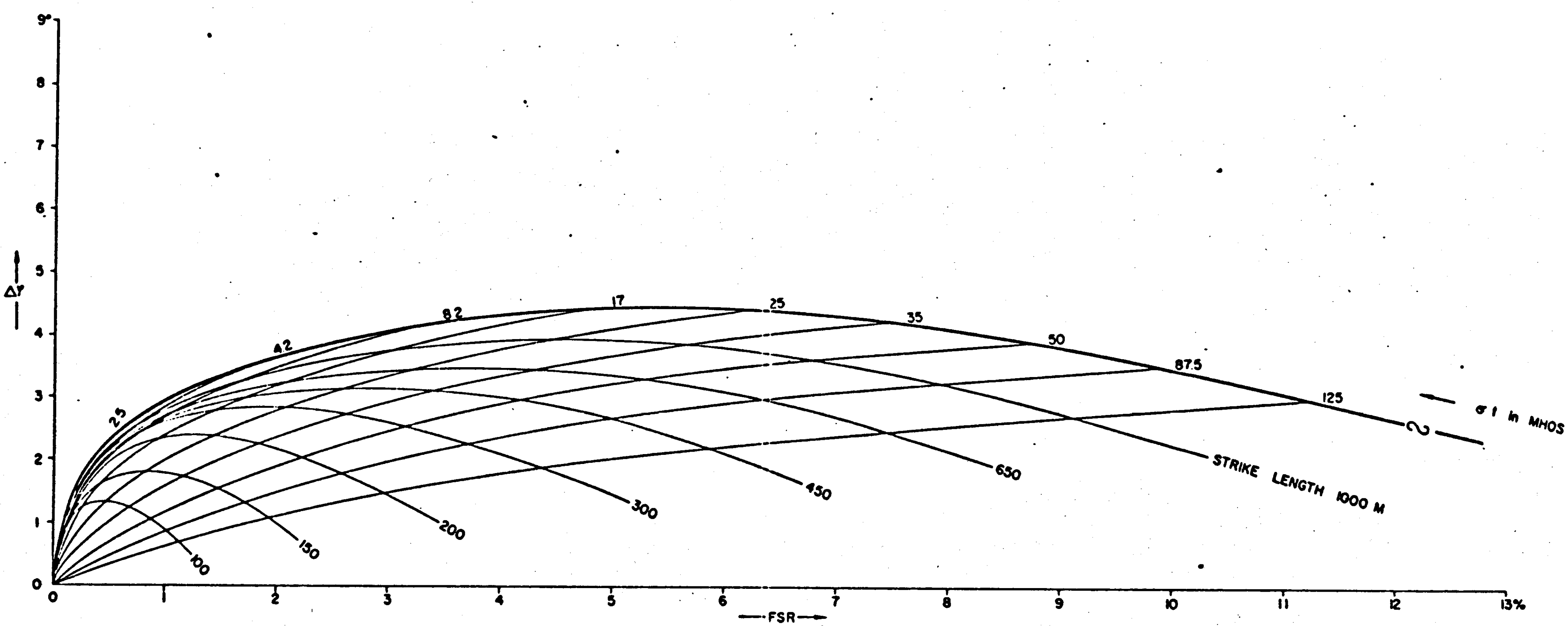


Wide conductive zone, banded (three marked)

Category three, reversed current flow, magnetic correlation

Probably man-made conductor.

EXAMPLES OF CONDUCTOR CODING



TURAIR
400 CPS
RESPONSE / SIZE DIAGRAM
TABULAR "THIN" CONDUCTOR

APPENDIX 'B'

MAGNETOMETER - MAP-2

The MAP-2 is a lightweight, one gamma airborne proton-precession magnetometer with a range of 20,000 to 100,000 gammas and an automatic five digit visual display. This new instrument has several significant advantages over other instruments of this type besides its compact size and light weight.

One of its most interesting features is that, unlike other airborne magnetometers which have to be switched manually from one narrow (usually 4000 - 6000 gammas) range to another, the MAP-2 tracks automatically over its full 80,000 gamma range.

This advantage is particularly significant in surveys flown at low terrain clearances in areas of high magnetic relief, conditions which are common in mineral prospecting.

The instrument is of compact modular design (1/2 standard rack size) and has both digital and analogue outputs. The analogue outputs are either 100 or 1000 gammas full scale, with automatic stepping. During each step, an indication of the new stepping level is recorded, providing a permanent reference identifying each step.

The measuring sequence can either be sequentially triggered internally throught its own programmer or initiated by a suitable command pulse.

In addition while on internal triggering, the instrument provides an external output command pulse enabling other instrumentation to be synchronized with the magnetometer.

SPECIFICATIONS - MAP-2

Range:	20-100.000 gammas (world-wide) continuous range (automatic tracking)
Sensitivity:	± 1 gamma (fully automatic)
Accuracy:	± 1 gamma
Sampling Rate:	Automatic standard 1 second, with provision for external triggering from other equipment with minimum 1 second intervals.
Readout-Visual:	Digital Display by 5 incadescent, 7 bar display lights
Digital Data Output:	BDC 1-2-4-8 DTL, TTL Compatible
Analog Data Output:	5 V full scale for 1000 gammas, 100 gammas; 1 gamma resolution
External Trigger:	Requirement: +4 V to 0 transition (as slave)
Tigger Output:	+4 V to 0 transition at start of cycle (as master)
Power Requirements:	24-30V DC, 3.2 A max.
Temperature Range:	-30 to +50 degrees C
Dimensions and Weights:	Console 8 1/2" X 5 1/4" X 13" (half-rack) (21 1/2 cm X 13 1/2 cm X 33 cm) 12 lbs. (5.4 kg) Tow Bird 7" X 23" (18 cm X 58 cm) 20 lbs. (9 kg)

APPENDIX 'C.'

ANCILLARY EQUIPMENT

1. Altimeter

A Bonzer, high frequency solid state radioaltimeter is employed to continuously indicate the mean terrain clearance of the helicopter or other transporting aircraft. The altimeter is installed in the aircraft (unless otherwise indicated) so that the elevation of the sensing birds (electromagnetic or magnetic) will be less by the usual vertical displacement of these birds below the aircraft.

The output of the Bonzer may be expressed in analogue form on a suitable graphic recorder, or may be, for convenience, converted to a semi-digital form on a recorder side pen. In the latter event the altimeter record is a series of spaced pulses whose separation is proportional to the mean terrain clearance.

2. Positioning Camera

A Vinten Mark 3 16 mm positioning camera is employed with a wide angle lens. Photographs of the ground are taken with sufficient frequency to give a complete record of the flight path of the aircraft or helicopter. The frequency of exposure is controlled by the intervalometer referred to below.

3. Intervalometer

A Scintrex IA-2 intervalometer provides regularly spaced timing pulses which drive the positioning camera exposure mechanism and produces synchronous "fiducial marks" on the side pen of the geophysical graphic recorder or recorders. Because of the synchronization of the geophysical traces and the positioning camera it is then possible to relate the geophysical events of interest to their proper ground location. The timing pulse frequency may be adjusted in accordance with the ground speed of the aircraft so that an adequate flight path record is obtained.

DOMINION OF CANADA:
PROVINCE OF BRITISH COLUMBIA.
TO WIT:

In the Matter of a geophysical survey on behalf of Hogan Mines Limited

I, L. A. Merrifield for Seigel Associates Limited

of 750 - 890 West Pender Street, Vancouver

in the Province of British Columbia, do solemnly declare that airborne geophysical surveys have been executed on some CM, PAUL, DOUG, RON, NORM, TOM, FRED, BARRY, DELTA and MINERAL LEASE 95, claims between July 19 to July 24, 1971. The following expenses were incurred:

(1)	Wages:			
	J. Steele	5 days @ $50.00/day	$250.00	
	C. Mohagen	5 days @ $35.00/day	175.00	
	B. Paradis	5 days @ $27.50/day	137.50	
	H. Winzeler	5 days @ $27.50/day	137.50	
				$700.00
(2)	Transportation on the job	28 hours helicopter		7,000.00
(3)	Food & living expenses			649.00
(4)	Use of geophysical equipment	5 days @ $60.00/day		300.00
	Cost of supplies - wire			1,200.00
(5)	Paid to Seigel Associates Limited to cover geophysicist's supervision calculating, plotting and fairdrawing data and preparation of final reports.			1,286.04
				$11,135.04

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

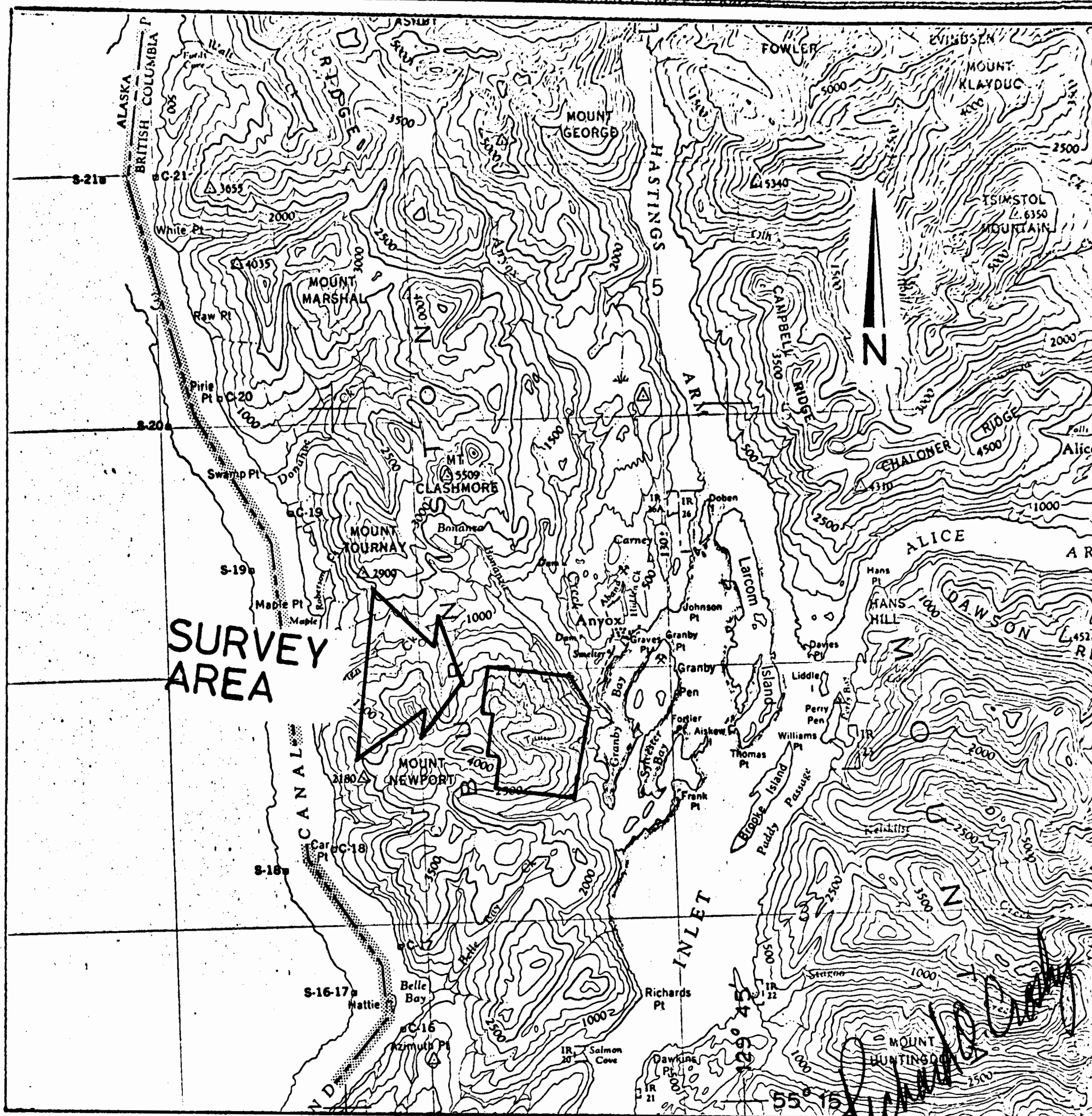
Declared before me at the City of Vancouver, in the Province of British Columbia, this 8th day of November, 1971, A.D.

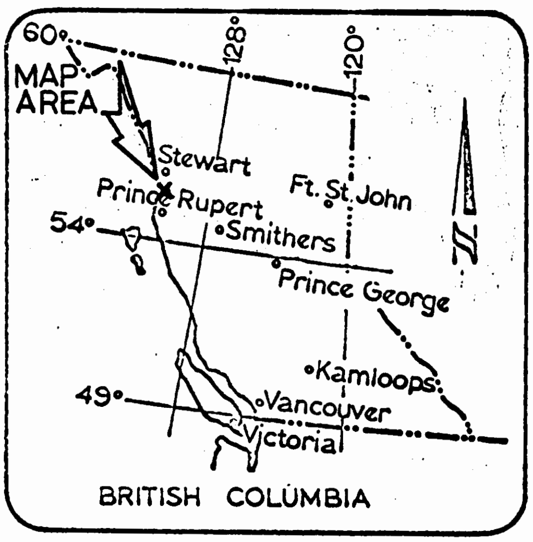
L. A. Merrifield

J. Phillips

A Commissioner for taking Affidavits for British Columbia or
A Notary Public in and for the Province of British Columbia.

SUB-MINING RECORDER





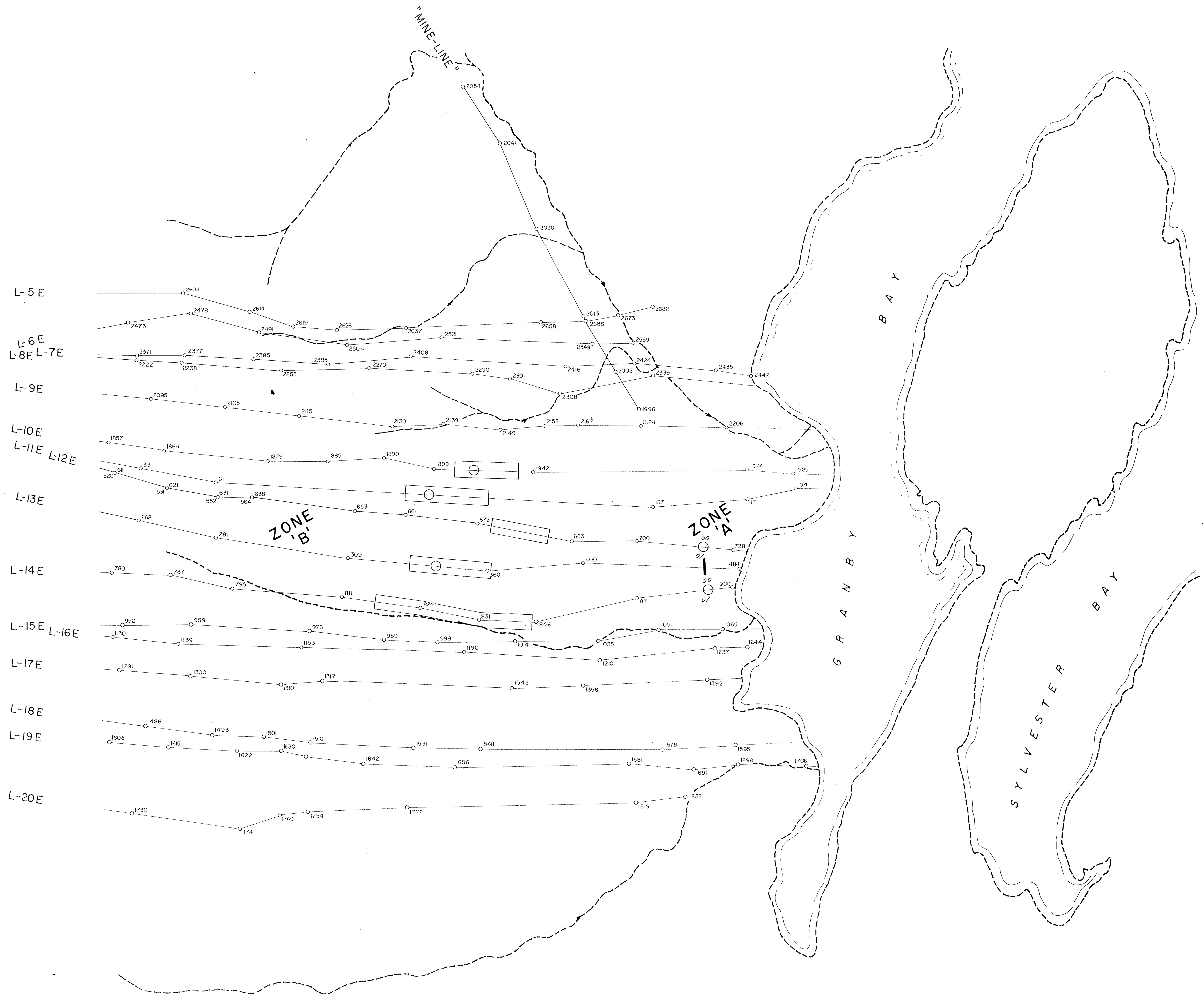
HOGAN MINES LTD.

LOCATION MAP
TAUW CREEK AREA, ANYOX B.C.

SCALE 1 : 250,000 — 4 miles 0 4 miles

Survey by
SEIGEL ASSOCIATES LIMITED
AUGUST 1971

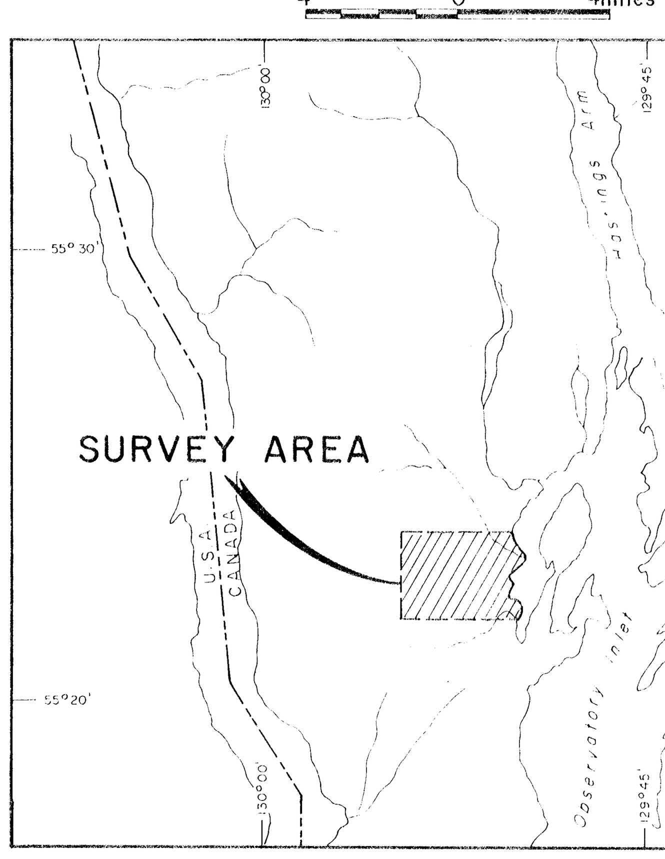
PLATE 1



LOCATION MAP

SCALE: 1 inch = 4 MILES

4 0 4miles



LEGEND

DRAINAGE

RIVER

ELECTROMAGNETIC CONDUCTORS

NORMAL CURRENT FLOW		REVERSED CURRENT FLOW
NO MAGNETIC ASSOCIATION — CATAGORY THREE	SUBSURFACE DEPTH	NO MAGNETIC ASSOCIATION — CATAGORY TWO
COINCIDENT MAGNETIC RESPONSE — CATAGORY TWO	MAGNETIC AMPLITUDE	COINCIDENT MAGNETIC RESPONSE — CATAGORY THREE
FLANKING MAGNETIC RESPONSE TO WEST — CATAGORY ONE	CONDUCTIVITY x THICKNESS	FLANKING MAGNETIC RESPONSE TO EAST — CATAGORY ONE
INSUFFICIENTLY DEFINED FOR QUANTITATIVE DETERMINATIONS		INSUFFICIENTLY DEFINED FOR QUANTITATIVE DETERMINATIONS
CONDUCTIVE ZONE		INTERPRETED CONDUCTOR AXIS

TO ACCOMPANY A GEOPHYSICAL REPORT
BY R.O. CROSBY AND J.P. STEELE DATED AUG. 31, 1971

PLATE 2

HOGAN MINES LIMITED

ANYOX AREA, BRITISH COLUMBIA

AIRBORNE GEOPHYSICAL SURVEY

FLIGHT LINES AND ELECTROMAGNETIC CONDUCTOR LOCATION

APPROX. SCALE 1 inch = 1500 feet

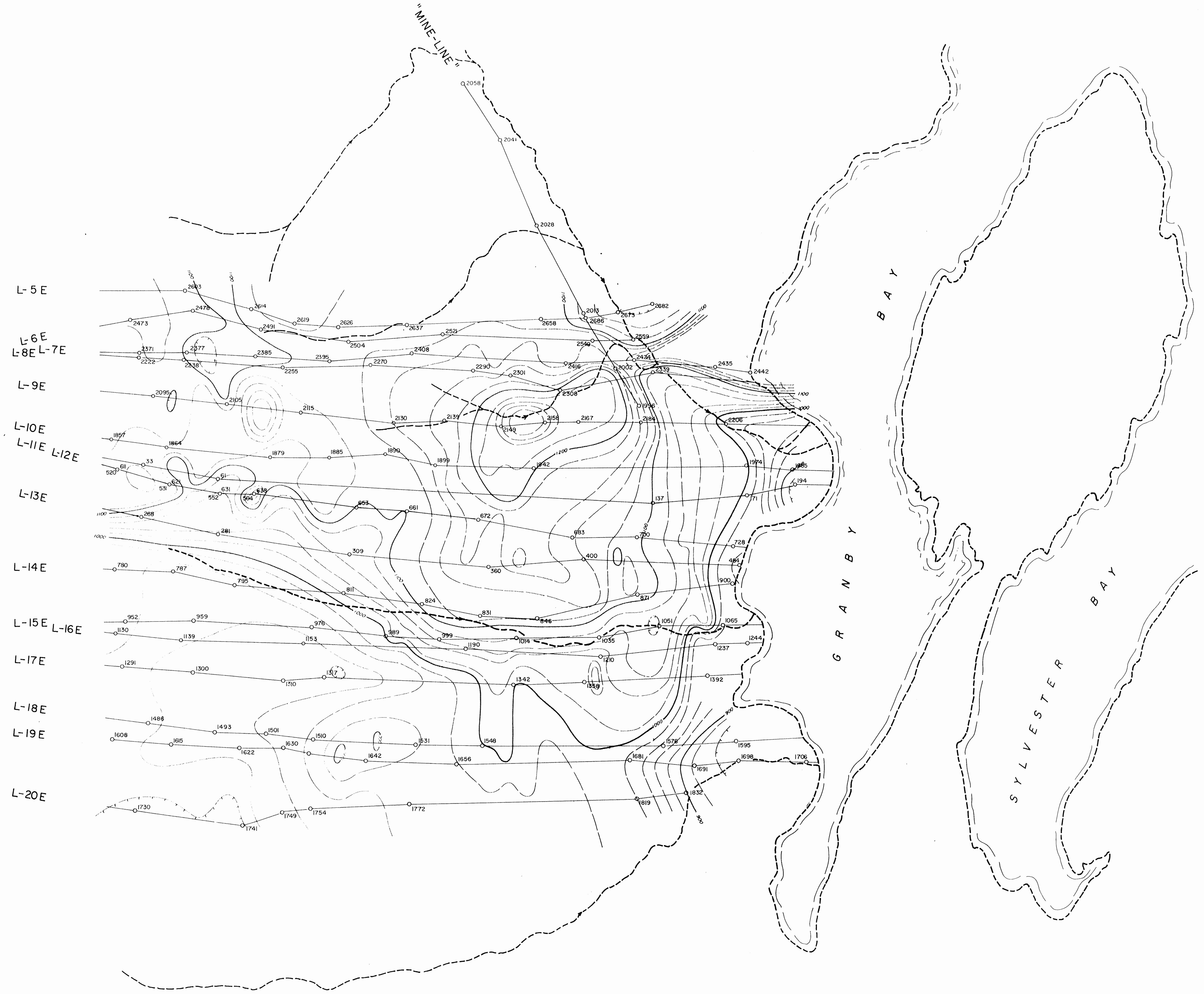
0 3000 6000 feet

SURVEY BY SEIGEL ASSOCIATES LIMITED

FLOWN AND COMPILED JULY-AUGUST 1971

Richard O. Crosby

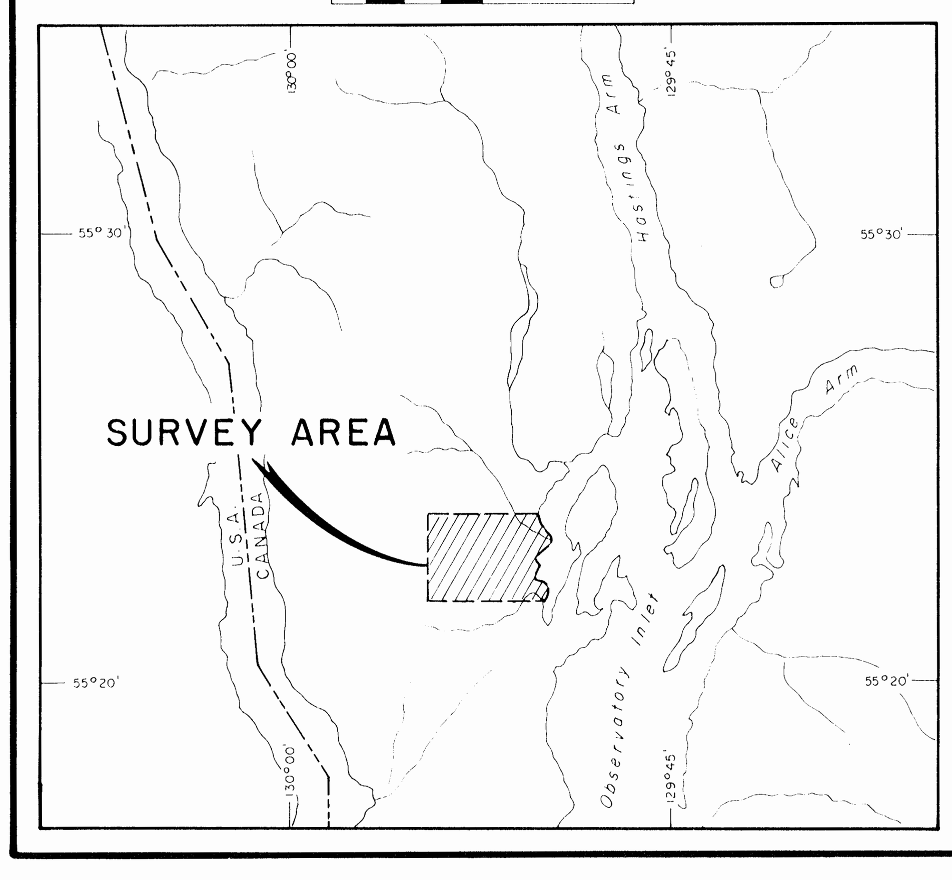
SHEET 1 OF 1



LOCATION MAP

SCALE : 1 inch = 4 MILES

4 0 4miles



LEGEND

L-5E 1730 FLIGHT LINE, FLIGHT LINE NUMBER AND NUMBERED FIDUCIAL POINTS

1000 GAMMA ISOMAGNETIC CONTOUR INTERVAL

100 GAMMA ISOMAGNETIC CONTOUR INTERVAL

20 GAMMA ISOMAGNETIC CONTOUR INTERVAL

MAGNETIC LOW

MEAN AIRCRAFT TERRAIN CLEARANCE - 400 FEET

MEAN FLIGHT LINE SPACING - 600 FEET

BASE INTENSITY 57,000 GAMMAS

DRAINAGE

TO ACCOMPANY A GEOPHYSICAL REPORT BY R.O. CROSBY AND J.P. STEELE DATED AUG. 31, 1971

PLATE 3

HOGAN MINES LIMITED

ANYOX AREA, BRITISH COLUMBIA

AIRBORNE GEOPHYSICAL SURVEY

MAGNETIC CONTOUR PLAN

APPROX. SCALE 1 inch = 1500 feet

0 3000 6000 feet

SURVEY BY SEIGEL ASSOCIATES LIMITED

FLOWN AND COMPILED JULY-AUGUST 1971

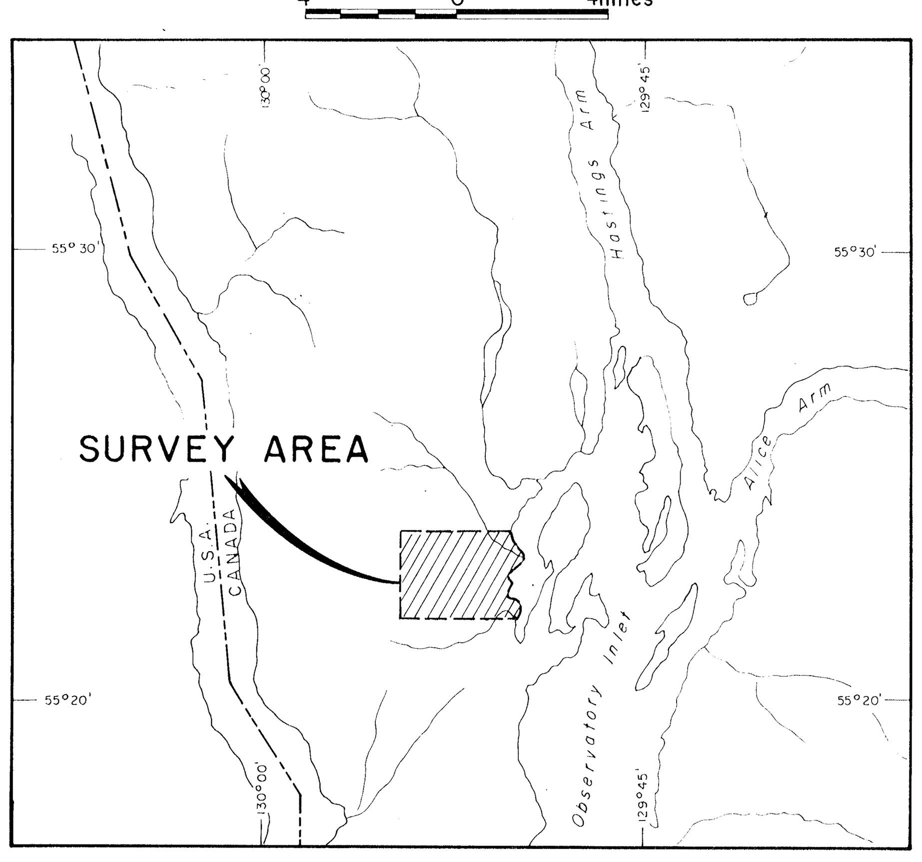
Richard O. Crosby

SHEET 1 OF 1

LOCATION MAP

SCALE 1 inch = 4 MILES

4 0 4 miles



LEGEND

PROBABLE FAULT

PROBABLE GEOLOGICAL CONTACT

CLAIM BOUNDARY

TO ACCOMPANY A GEOPHYSICAL REPORT
BY R.O. CROSBY AND J.P. STEELE DATED AUG. 31, 1971

PLATE 4

HOGAN MINES LIMITED

ANYOX AREA, BRITISH COLUMBIA

AIRBORNE GEOPHYSICAL SURVEY

MAGNETIC INTERPRETATION
AND CLAIM LOCATION

APPROX. SCALE 1 inch = 1500 feet

0 3000 6000 feet

SURVEY BY SEIGEL ASSOCIATES LIMITED

FLOWN AND COMPILED JULY-AUGUST 1971

SHEET 1 OF 1