REPORT ON

AIRBORNE GEOPHYSICAL SURVEYS

RUTH MINERAL CLAIMS

TAKLA LAKE AREA, B. C.

on behalf of

McINTYRE MINES LIMITED

by

RICHARD O. CROSBY, B.Sc., P.Eng.

Ruth 1	422 (9)	9 Units
Ruth 2	423 (9)	9 Units
Ruth 3	424 (9)	18 Units
Ruth 4	425 (9)	18 Units

LOCATION: About 120 kms. east of Smithers, B. C.

NTS 93 N

February 25 - March 10, 1977

Vancouver, B. C.

TABLE OF CONTENTS

MAPS

SUMMARY:

Combined airborne magnetic and electromagnetic surveys have been executed over the Ruth Mineral Claims in the Takla Lake Area, British Columbia.

The magnetic cap correlates with the mapped geology and indicates numerous northeast trending faults which have not been previously mapped.

Most of the electromagnetic responses are deemed to arise from graphitic sediments and conductive fault zones; however, eight conductors are well isolated and have coincident magnetic anomalies which suggest that they are favourable for massive sulphide mineralization.

These have been recommended for ground follow-up.

REPORT ON
AIRBORNE GEOPHYSICAL SURVEYS
RUTH MINERAL CLAIMS
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ON BEHALF OF
MCINTYRE MINES LIMITED

INTRODUCTION:

During the period February 25 through March 10, 1977, a helicopter borne electromagnetic survey was conducted over a portion of central British Columbia on behalf of McIntyre Mines Ltd.

The area of survey (Plate 1) was a rectangular shaped zone extending north and northwesterly from Takla Lake and lying roughly midway between the northern part of the lake and the Omineca River. Survey lines were oriented northeast and measured 18 kilometers in length in the extreme south and decreased in length in the northern edge of the survey area. Survey altitude was 250 feet mean terrain clearance.

The electromagnetometer and ancillary equipment was mounted in a Bell 206B Jet Ranger provided by Northern Mountain helicopters. The project supervision was under the direction of Mr. Ronald F. Sheldrake who also acted as Geophysicist/Navigator. Twenty-two flights totalling 37.2 hours were required to complete the survey.

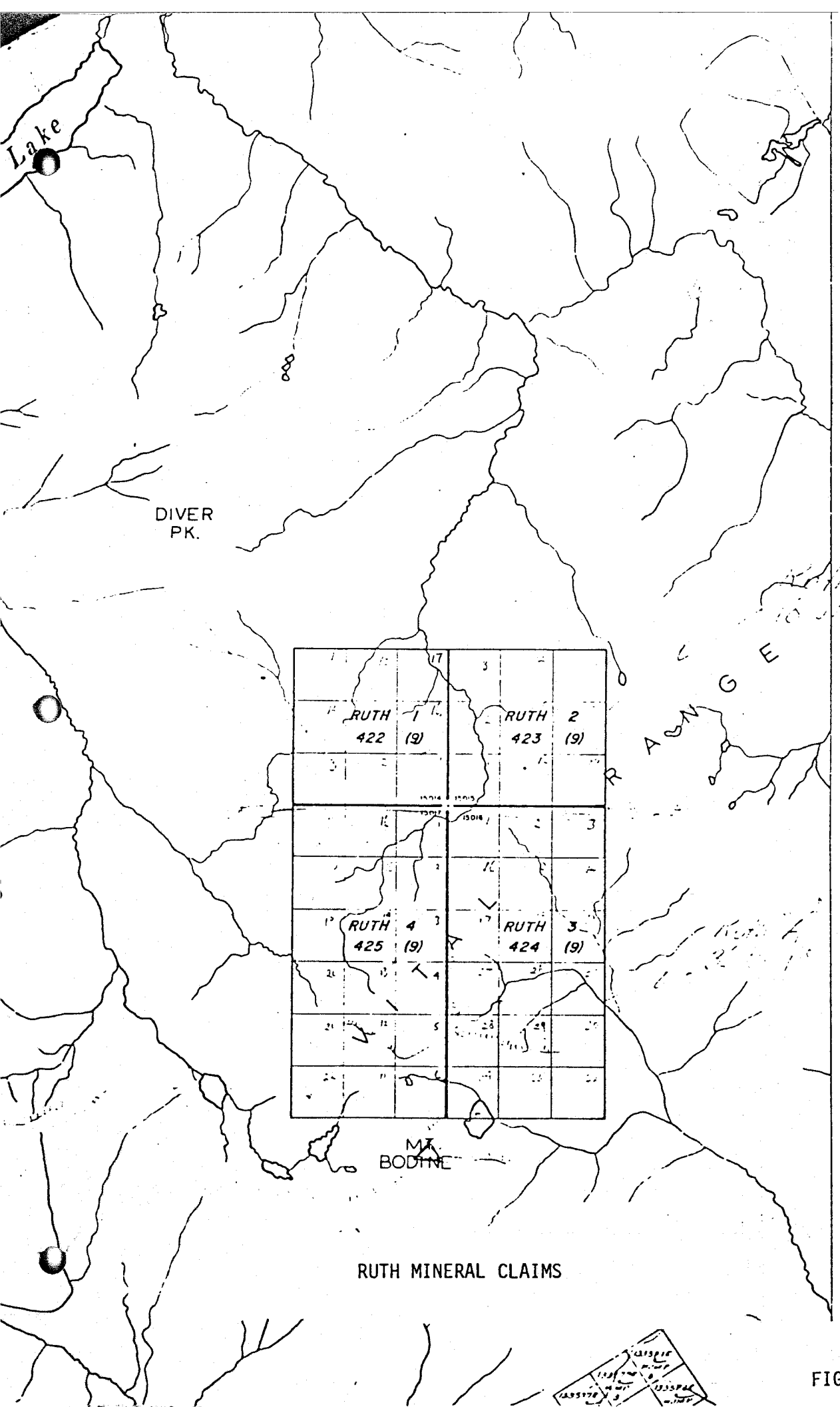
The purpose of the magnetometer survey was to provide a map of the magnetic character of the rocks in the survey area. In general, magnetic maps can be interpreted to reveal areas underlain by different rock types, lineaments which may be due to faulting and the location of ore bodies which contain higher percentages of magnetic or pyrrhotite than the surrounding rocks.

Electromagnetic methods detect massive sulphide bodies by measurement of the secondary electromagnetic field produced by eddy currents induced by a transmitted or primary electromagnetic field. In this survey a rigid boom, in and out-of-phase method was employed using two coaxial coils, one for transmitting and the other for receiving and mounted in a "bird" towed below the aircraft. The presence of a sub-surface conductor will be indicated by abnormal in and out-of-phase responses. The ratio of the in-phase response to the out-of-phase response is a measure of the conductivity/thickness ratio of the body. Highly conducting bodies such as massive sulphides or graphite are expected to have ratios in excess of 3.0 while shear zones, overburden conductors and other geological conductors commonly have ratios of 1.0 or less. These ratios may be used as a guide to distinguishing between the sources of conductors, however the possibility that a low ratio conductor may contain sulphides can never be completely discounted.

A Scintrex HEM-801 electromagnetic unit was used for the electromagnetic survey and a Scintrex MAP-2 nuclear resonance, total intensity magnetometer was used for the magnetic survey. Appendix 'A' gives full details of the geophysical and ancillary equipment employed as well as the methods of compiling data resulting from these surveys.

GEOLOGY

The geology of the survey area and its surroundings is shown partially on MAP 8448 Takla, Cassiar District, British Columbia, Department of Mines and Resources. In addition McIntyre Mines has made available to the author copies of a Generalized Geology Map dated August 20, 1976.



RUTH MINERAL CLAIMS

FIGURE 1

The survey area is underlain by Upper Paleozoic foliated argillites, siltstones, greywackes and quartz-eye chlorite schists, sericite schists, chloritized andesites, altered basic volcanics and a silicified zone which perhaps were originally rhyolite or calcite.

A complex volcano clastic sequence of the Lower Jurassic Hazelton Group rocks are found in fault contact along the western side of the survey area. Two small stocks of intrusives are also mapped. The eastern boundary of the area is in fault contact with Middle Traissic serpentines, serpentinized peridotite and ultramafic border phases mainly related to the Cache Creek Group.

Mineralization in the area is reported to be massive sulphides in the chlorite and sericite schists.

PRESENTATION OF DATA

The EM and magnetometer data are presented with altimeter and fiducial recordings on a six channel recorder.

Two channels of magnetometer data at full scales of 1,000 gammas and 100 gammas are shown on the upper channels. The two center channels show the in-phase and out-of-phase data at full scale ranges of 100 parts per million. The fifth channel and the last one used records the altimeter out put. Fiducial marks a indicated along the lower edge of the recorder chart.

The results of the geophysical surveys are presented on Plates 1 and 2, on a scale of 1:30,000'. Plate 1 shows the electromagnetic conductors and claim group and Plate 2 shows the magnetic contour plan contoured

with a magnetic contour interval of 20 gammas and the geophysical interpretation.

DISCUSSION OF RESULTS (PLATE 2)

In the survey area the intensity of the earths total magnetic field is 58,200 gammas. The inclination of the total field vector is 75.2° North.

The magnetic contour plan is dominated by an area of intense positive anomalies located along the eastern edge of the survey and labelled "C". This magnetic pattern represents the ultramafic border phases of the Cache Creek Group.

The remainder of the countour map is relatively free of anomalies except in the area of Mt. Bodine located between Lines 13 and 21 in the central portion of the area immediately west of Mt. Bodine.

Three main conductive zones were recorded in the survey area. These zones generally are interpreted as representing graphite horizons and/or conductive overburden; however, several conductors within these zones are recommended for ground follow-up surveys in order to determine their sources.

CONCLUSIONS AND RECOMMENDATIONS

Numerous conductors have been recorded by the survey flying. These generally are large areas of conductive overburden, graphitic sediments, and conductive faults, and can thus be eliminated as representing metallic sulphide targets.

A few isolated conductors however must be considered as priority targets and warrant immediate follow-up electromagnetic surveys.

Ground follow-up should consist of geological investigations in the target areas. The vertical loop electromagnetic method may be used to locate conductors on the ground.

		CONDUCTORS RECOMMENDED FOR GROUND FOLLOW-UP					
CONDUCTOR NUMBER PLATE 2	LOCATION	FIDUCIAL NUMBER	IN-PHASE AMP	CHAR. RATIO I.P:O.O.P.	MAGNETIC COINCIDENT ANOMALY (gammas)	DEPTH FEET	REMARKS
1.	L-23E	1271	5	0.5	-		
2.	L-18.5E	1992	30	2.3	-	100	Isolated
3.	L-29E	316	32	1.6	-	100	Good shape
4.	L-30W	622	41	1.1	-	100	Graphite?
5.	L-34W	2819	8	2.0	-	100	
6.	L-33E	2356	10	2.0	-	100	Priority target isolated
7.	L-36W	3638	25	1.6	50	100	Graphite?
		3644	20	1.2	10	100	Priority target
8.	L-41E	1132	30	1.0	350	100	Low priority

Respectfully submitted,

RICHARD O. CROSBY & ASSOCIATES

Richard O. Crosby

RICHARD O. CROSBY, B.Sc., P.Eng.

ASSESSMENT DETAILS:

RUTH 1 - 4 MINERAL CLAIMS

LOCATION:		Takla Lake Area, B. C.	
CLIENT:		McIntyre Mines Ltd.	
TYPE OF SURVEY:		Airborne Magnetic-Electromagnetic	
OPERATING MAN DAYS:	14	DATE STARTED:	February 25, 1977
CONSULTING MAN DAYS:	10	DATE FINISHED:	March 10, 1977
COMPILING MAN DAYS:	30	AREA OF SURVEY:	13,500 hectares
DRAFTING MAN DAYS:	8	KILOMETERS OF SURVEY:	600
TOTAL MAN DAYS:	62		

CONSULTANT:

Richard O. Crosby, 422 - 510 West Hastings Street, Vancouver, B. C.

FIELD PERSONNEL:

Ronald F. Sheldrake, Geophysicist, 422 - 510 West Hastings Street, Vancouver, B. C.

Scintrex Ltd., Electronic Technician, 222 Snidercroft Road, Concord, Ontario

DRAFTSMEN:

Centa Enterprises,

Northern Mountain Helicopters provided a BELL 206 B Helicopter.

RICHARD O. CROSBY & ASSOCIATES LTD.

Richard O. Crosby

RICHARD O. CROSBY
Geophysicist

CERTIFICATION:

I, Richard O. Crosby, of the City of Vancouver, Province of British Columbia, hereby certify as follows:

1. I am a Consulting Geophysicist with offices at 422 - 510 West Hastings Street, Vancouver, B. C.

2. I am a Registered Professional Engineer of British Columbia. I graduated from Washington State University in 1951.

3. I have practiced my profession for 23 years.

4. I have no interest, direct or indirect, in the mineral claims discussed in this report, or the securities of McIntyre Mines Limited or its affiliates, nor do I expect to receive any.

5. I did not examine the permit area, but I am not aware of any claim conflict and believe that the data presented herein is reliable.

DATED at VANCOUVER, BRITISH COLUMBIA, this 11th day of October, 1977.

Richard O Crosby

RICHARD O. CROSBY, B.Sc., P.Eng.

APPENDIX 'A'

DESCRIPTION OF AIRBORNE SYSTEMS

ELECTROMAGNETIC SYSTEM - SCINTREX HEM-801

Equipment

The Scintrex HEM-801 is a solid state, fixed-configuration, electromagnetic system especially designed for helicopter transport, It consists of two coaxial coils, one serving as transmitter and the other as receiver, which are mounted, 30 feet apart, in a rigid "bird" with their axes horizontal and in the direction of flight. The bird is towed approximately 100 feet below the helicopter, by means of a suitable cable which also carry electrical signals and power to and from the bird.

The system operates at 980 Hertz. Changes in the alternating magnetic field at the receiver coil are observed and these changes are converted into two components, one whose phase is the same as that of the transmitted signal (the "Out-of-Phase" component). These changes are expressed in terms of the normal undistorted primary field. They are so small as to be expressed usually in parts-per-million or p.p.m.

The In-Phase and Out-of-Phase variations are presented in graphic form on two channels of a recorder. The full scale chart width employed is commonly 1000 p.p.m., although in areas of low geologic noise levels 500 p.p.m. may be employed. At one or more points during each flight the scale sensitivity is checked by means of calibration signals, usually 100 p.p.m. on each trace.

The reference or "zero" level for each EM trace is an arbitrary one and is obtained empirically from the regional level of each trace. These levels may drift slowly during a flight because of temperature and humidity changes affecting the bird dimensions. These drifts are very gradual and are readily distinguishable from much quicker, local changes due to conductors of a geologic origin. Similarly, severe turbulence effects sometimes introduce low-order, primarily in-phase disturbances which are of such short period that they may also readily be distinguished from the effects of geologic conductors.

Man-made disturbances are often to be seen, including power lines, pipe lines, metal fences, railways, etc. The former are generally recognizable as such because they usually show through as cyclic noise of irregular shape and phase relationship. Non-energized, grounded power lines (e.g., 3 phase systems) may also give rise to proper conductor indications, however. Such indications, as well as those from pipe lines and metal fences, etc., are usually of short duration and can be distinguished from proper geologic sources except for very narrow, near-surface lenses. In some instances ground investigation may be necessary in order to resolve the ambiguity of possible source. Whereas the airborne geophysical crew attempts to note visible man-made conductors of the above types, the ground moves by so rapidly at the low flight elevation employed that 100% recognition of such sources cannot be expected from the air.

The normal terrain clearance of the bird is 100 feet - 200 feet depending on the surface topography and tree cover, etc., with the helicopter 100 feet above. The established useful depth of detection of the system

for moderate-to-large conducting bodies is about 350 feet 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 between 150 feet and 250 feet beneath the ground surface under these conditions.

Interpretation of Results

The EM records are interpreted to determine the presence of conducting bodies and to obtain some information relating to their character. The intervalometer time marks (see below) are synchronized with the positioning camera film strip (also see below) and thereby permit the relating of the conductors with appropriate ground locations. The altimeter data indicate, for each conductor, what the terrain clearance was at the time of the detection.

A plan is prepared, either using a subdued photo-mosaid ("graflex") 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 which are also recognizable on the positioning camera film. The flight path is interpolated between these tie points.

For each conductor the following quantities are measured and recorded.

a) Half width. This is the distance between the points of half the maximum conductor disturbance. For a very thin, steeply dipping body or pipe line, etc., the half width will be about 1.6 times

its depth below the bird. If the bird is at a mean conductor clearance of 150 feet the half width would be about 250 feet. Larger half widths reflect either more deeply buried, or more likely, thicker conductors.

Flat-lying conductors (e.g., overburden) characteristically give large half widths.

b) Peak Location. The in-phase conductor peak location 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. If a conductor is of short half width there may be no room for a half width bar and only the peak circle will be shown. A conductor which is likely man-made will be indicated by an X rather than by a circle.

c) In-Phase and Out-of-Phase Amplitudes. These amplitudes are scaled from the EM traces and noted in parts per million. On the flight plan, opposite each peak location (circle) will be given the peak in-phase amplitude and the ratio of peak in-phase to peak out-of-phase response (see below).

d) Conductor Coding. Conductor intersections are coded in electrical categories 1, 2 and 3, based on the in-phase amplitude but taking into account the terraine clearance. For tabular bodies such as sheet-like ore deposits, strata bound conductors and overburden, their response drops off almost in accordance with the inverse cube power of the elevation. Assuming an average 50 feet of overburden, a category 1 conductor has a peak in-phase response equivalent to

350 p.p.m. or over a 100 feet bird terrain clearance. A category 2 conductor has a peak in-phase response under similar conditions of between 100 p.p.m. and 350 p.p.m. A category 3 conductor has an equivalent peak in-phase response of less than 100 p.p.m.

The respective peak circles are shaded to reflect their electrical category 1 fully shaded, category 2 half shaded and category 3 unshaded.

For each conductor peak the ratio of peak in-phase to peak out-phase amplitude is calculated and plotted on the plan. This ratio is indicative of conductivity-size factor for the conductor. Large, high conducting bodies such as massive sulphides or graphite and seawater, etc., generally have ratios of 3 or over. Moderate conductivity-size bodies will have ratios between 1 and 3. Poor conductivity bodies (e.g., most overburden and some sulphide and graphitic zones) will have ratios of less than 1. In areas where there is a clear differentiation in conductivity between the targets of potential economic interest and other possible conductors, the ratio is a diagnostic feature. In some areas, however, there is an overlap of conductivity ranges and then the ratio cannot be too rigidly relied upon.

Where magnetic data is available, preferably from a coincident recording magnetometer, any correlating magnetic activity will be noted for the pertinent conductor peak. A conductor peak with apparently direct magnetic correlation will be indicated by a double concentric circle. Althoug a conducting body which is appreciably magnetic is more likely to be a sulphide body than one

which is non-magnetic, there are many very important base metal ore bodies which are quite non-magnetic.

MAGNETOMETER - SCINTREX MAP-2

The Scintrex Map-2 nuclear resonance airborne magnetometer is based on a Newmont modification of a Varian Associates magnetometer and is produced under license to both companies. It is a very light weight, solid state unit, especially designed for use in a helicopter or light fixed-wing aircraft where weight is an important consideration.

Its cycle period is 1.1 seconds. Each cycle it measures the total intensity of the earth's magnetic field and this quantity, in gammas, is recorded, in analogue form, on a suitable graphic recorder. The full scale sensitivity is usually 100 gammas and the recorder automatically steps. In very active areas a full scale sensitivity of 1000 gammas.

The magnetic sensing head may be on a cable as much as 100 feet below the aircraft or, in some installations, may be rigidly attached to the aircraft on a suitable boom.

The intrinsic noise level of each reading is about 1 gamma.

ANCILLARY EQUIPMENT

1. Altimeter

A Bonzer, high frequency solid state radio altimeter 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 geophysicla 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.

RUTH MINERAL CLAIMS

STATEMENT OF COSTS

Airborne Electromagnetic Survey, Takla Lake Area, B.C. for McIntyre Mines Limited, February 25 - March 10, 1977.

Overall area - 43,560 hectares(168.2 sq. miles).

R.O. Crosby & Associates (as per attached invoices):		
Deposit	$15,000.00	
May 12	17,620.00	
June 30	3,151.45	
Oct. 21	500.00	$ 36,271.45
Helicopter: Northern Mountain Helicopters		13,917.75
Fixed Wing: Northern Thunderbird (support aircraft)		608.00
Travelling: Personnel, Air Taxi		368.54
Accomodation: Motels, Hotels, Lodge		1,387.07
Equipment: Deakin Equipment		1,375.55
Rentals: Radio, Licence.		1,029.92
Report Preparation Cost:		
Reproduction, materials		930.41
Technical supplies - Neville Crosby & Assoc.		479.86
		$ 56,368.55

Total Area Flown: 43,560 hectares (168.2 sq. miles)

Area of Ruth claims (total of 54 units) 1,350 hectares

Assessment allowance (ten times claim area 13,500 hectares.

Dollar allowance, maximum $= \frac{13,500}{43,560} \times \$56,368.55 =$ $ 17,469.59

Applied (3 years @ $5,400.00/year) = $ 16,200.00
as per report on area by R.O. Crosby & Assoc. dated October 11, 1977.

MT. BODINE

LEGEND

CONDUCTOR

A 20/16/150 — alphabetic order W-E on each line; in-phase amplitude; ratio (in-phase/quad); magnetic correlation in gamma

conductor zone — conductor center

CATEGORY

1 — no ratio

2 — ratio below 10

3 — ratio greater than 10

without / with magnetic correlation

L-23W — flight path; flight line number, flight direction, fiducial point with numbers

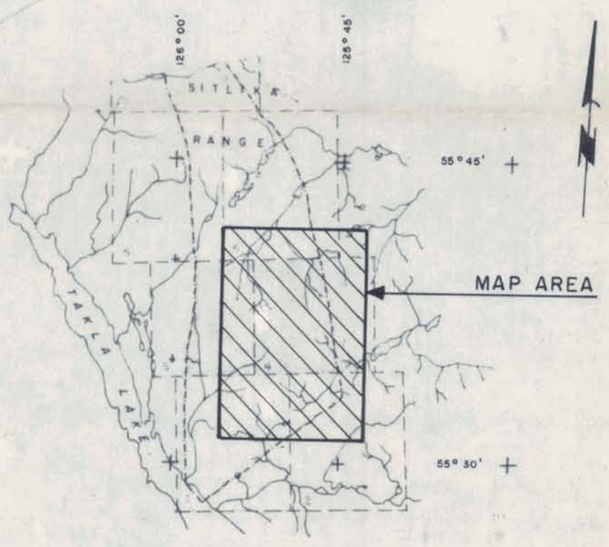
drainage

TO ACCOMPANY A REPORT BY R.O. CROSBY P. ENG.

Richard O. Crosby

LOCATION MAP

SCALE: 1 inch = 4 miles



RICHARD O. CROSBY & ASSOCIATES LTD. VANCOUVER, B.C.

McINTYRE MINES LIMITED
AIRBORNE MAGNETOMETER SURVEY
TAKLA PROJECT, B.C.

OMINECA MINING DIVISION, B.C.

N.T.S. 93M, 93N

SCALE: 1 inch = ½ mile (1600 m.)

1320 0 2640 5280 FT.

400 0 800 1600 m.

JOB No. 10577 | DATE: | PLATE I

MT. BODINE

INTERPRETATION LEGEND

CONDUCTIVE ZONE

12 CONDUCTOR RECOMMENDED FOR GROUND FOLLOW UP

INTERPRETED FAULT

LEGEND

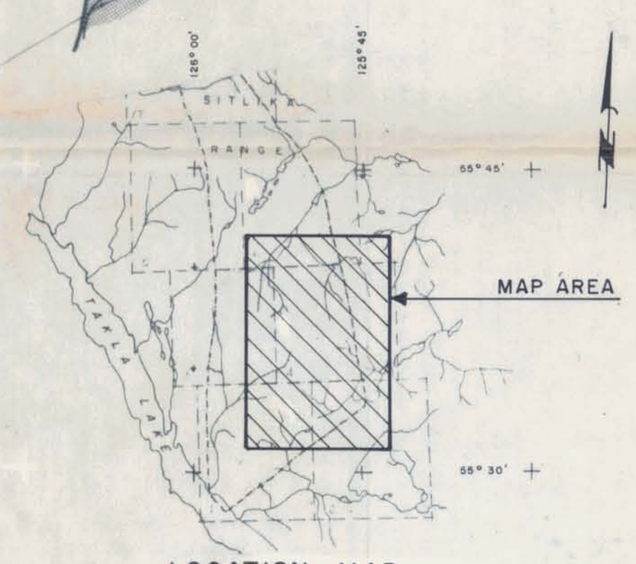
500 GAMMA CONTOUR INTERVAL
100 GAMMA CONTOUR INTERVAL
20 GAMMA CONTOUR INTERVAL
MAGNETIC LOW
L-23W FLIGHT PATH; FLIGHT LINE NUMBER, FLIGHT DIRECTION, PICKED FIDUCIAL POINTS
DRAINAGE

INSTRUMENTATION
SCINTREX MAP 2
BONZER ALTIMETER

BASE LEVEL ARBITRARY

TO ACCOMPANY A REPORT BY R.O. CROSBY P.ENG

Richard O. Crosby



LOCATION MAP

SCALE: 1 inch = 4 miles

RICHARD O. CROSBY & ASSOCIATES LTD. VANCOUVER, B.C.

McINTYRE MINES LIMITED
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TAKLA PROJECT, B.C.

OMINECA MINING DIVISION, B.C.

N.T.S. 93M, 93N

SCALE: 1 inch = ½ mile (1600 m.)

1320 0 2640 5280 FT.
400 0 800 1600 m.

JOB No. 10577 | DATE: | PLATE II