Assessment Report

Airborne INPUT Electromagnetic & Magnetometer Survey

East & West Imperial Group

(East Imperial 1138(4); West Imperial 1139(4))

Nanaimo Mining Division

92F/2E, 92F/1W

49°06'N 124°30'W

For

Imperial Metals Corporation

By

Stephen P. Quin, B.Sc., ARSM

Mining Geologist

Imperial Metals Corporation

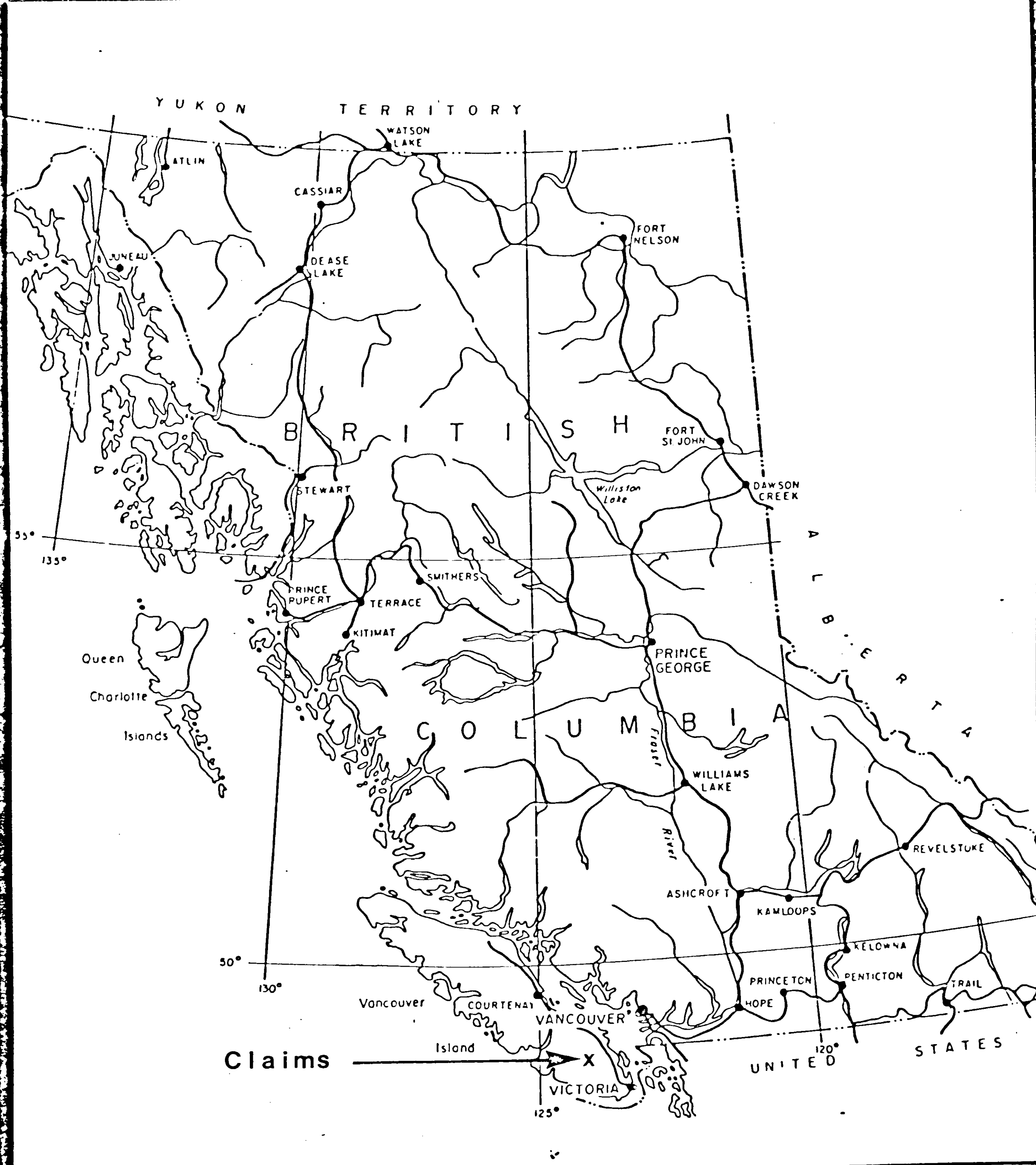
Robert DeCarle B.A.Sc.
Chief Geophysicist

Questor Surveys Limited

March 1983

Table of Contents

List of Illustrations



600 Kilometres	**IMPERIAL METALS CORPORATION**
	Property Location Map
	GREEN IMPERIAL
	Nanaimo Mining Division — Figure 1
	S P QUIN B.Sc., ARSM. — 24 March 1983

1. Introduction

Imperial Metals Corporation owns two mineral claims at the head of the Nanaimo River, South-Central Vancouver Island, B.C. See Figure 1.

On July 9, 1982 Imperial contracted Questor Surveys to fly a Helicopter-borne INPUT EM and Magnetometer survey over the claim block, totaling 65 line kilometres.

2. The Property

The claim block consists of 2 adjoining modified grid claims, at the head of the Nanaimo River.

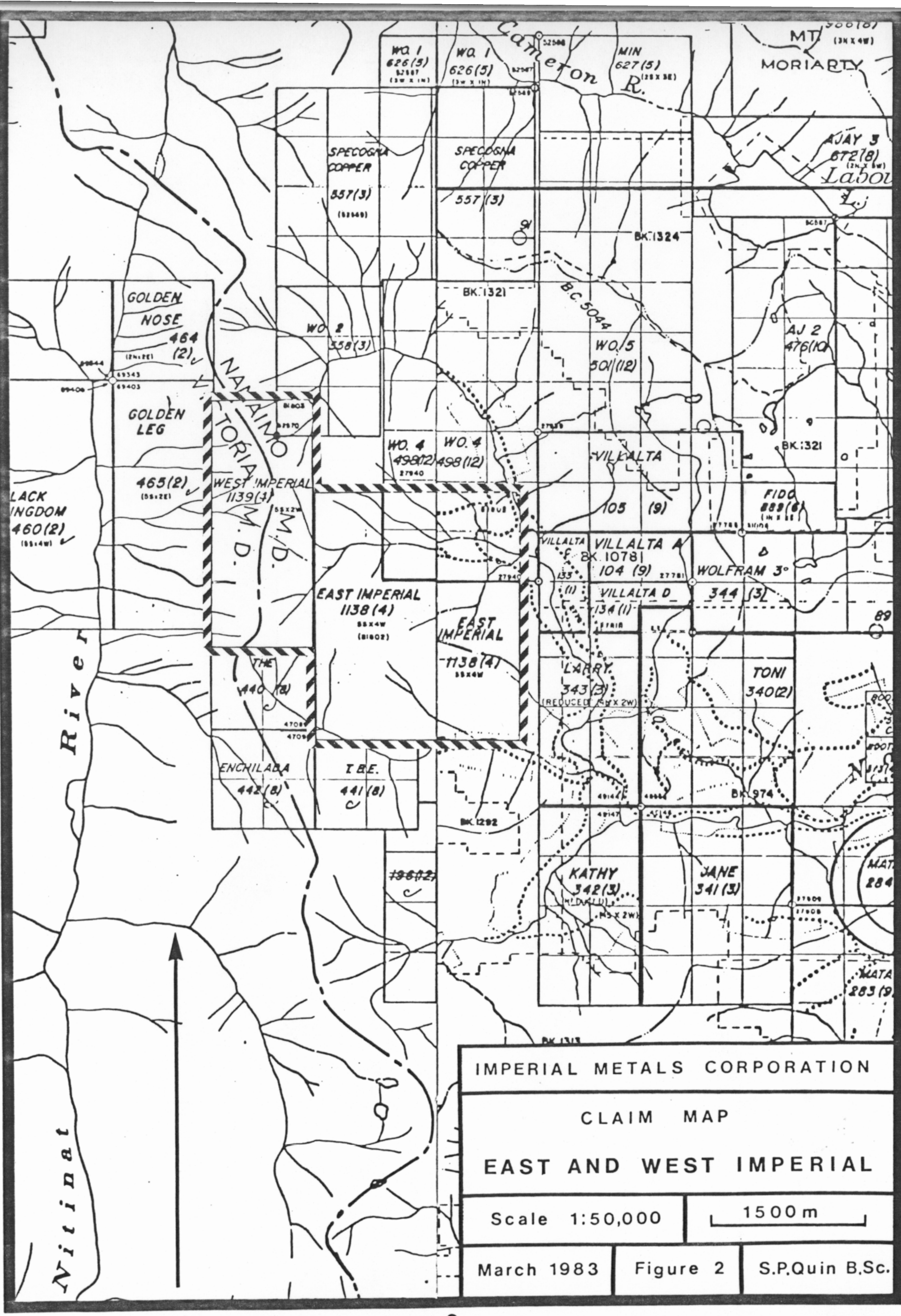
Name	Units	Record No.
East Imperial	20	1138(4)
West Imperial	10	1139(4)

See Figure 2.

3. Itemized Cost Statement

65 line km of airborne INPUT EM & Magnetometer;

Survey	$7,748.99
Mobilization Fee	1,583.92
Total	$9,322.21


IMPERIAL METALS CORPORATION
CLAIM MAP
EAST AND WEST IMPERIAL
Scale 1:50,000
1500m
March 1983
Figure 2
S.P.Quin B.Sc.
Cameron R.
MT. MORIARTY
MIN 627(5)
WO. 1 626(5)
SPECOGNA COPPER 557(3)
AJAY 3 672(8)
BK.1324
BK.1321
B.C.5044
GOLDEN NOSE 464 (2)
GOLDEN LEG 465(2)
LACK INGDOM 460(2)
WO 2 558(3)
WO. 5 501(12)
AJ 2 476(10)
BK.321
NANAIMO M.D.
VICTORIA M.D.
WO. 4 498(12)
VILLALTA 105 (9)
FIDO 889(6)
WEST IMPERIAL 1139(4)
EAST IMPERIAL 1138 (4)
VILLALTA A BK.1078 104 (9)
VILLALTA D 134 (1)
WOLFRAM 3 344 (3)
THE 440 (8)
LARRY 343 (3)
(REDUCED)
TONI 340(2)
ENCHILADA 442 (8)
T.B.E. 441 (8)
BK.974
BK.1292
KATHY 342(3)
JANE 341 (3)
MATA 283 (9)
BK.1313
River
Nitinat

4. Statement of Qualifications

I, Stephen Paul Quin, of 1504 - 1260 Nelson Street, Vancouver, B.C. state that

a) I am a permanent employee of Imperial Metals Corporation with offices at suite 3104 - 1055 Dunsmuir Street, Vancouver, B.C.

b) I graduated from the Royal School of Mines, London, Great Britain, with a Bachelor's Honours degree in Mining Geology in 1980.

c) I have been employed by Imperial Metals Corporation predecessor, Invex Resources Ltd., for a period of two-and-a-half years, since graduation.

28 February 1983.

Stephen P. Quin B.Sc., ARSM
Mining Geologist

NAME	:	ROBERT J. deCARLE
OCCUPATION	:	Chief Geophysicist
EDUCATION	:	Graduated from Lakehead University in 1967 receiving a Mining Technology Diploma. Michigan Technological University - B.A.Sc. in Geophysics, 1970.
PROFESSIONAL AFFILIATIONS	:	Society of Exploration Geophysicists Canadian Institute of Mining & Metallurgy Canadian Exploration Geophysical Society (KEGS)
EXPERIENCE	:	1965 — Summer spent with Noranda Mines Ltd., as underground scram helper.
	:	1966 — Summer spent with Anaconda American Brass carrying out electromagnetic and magnetic surveys in Ontario.
	:	1967-69 — Summers spent with Hudson Bay Exploration and Development Co., as a geophysical technician and prospector.
	:	1970-Present — Joined Questor Surveys Limited as a Geophysicist. Responsible for reduction of airborne data both in the field and in-house. Also carried out interpretation and report writing. Became Chief Geophysicist in 1975, responsible for all data reduction personnel, geophysicistts and geologists associated with airborne surveys.
COUNTRIES WORKED IN	:	Canada, United States, South Africa.
LANGUAGES SPOKEN	:	English, French.
PASSPORT #	:	FB 334746 Expires June 16, 1986.

5. Geophysical Report

The complete report by R. DeCarle, of Questor Surveys, on the East & West Imperial claims is included here.

FILE COPY

HELICOPTER INPUT E.M. SURVEY

IMPERIAL METALS CORPORATION

IMPERIAL EAST AND WEST AREA

VANCOUVER ISLAND, B.C.

FILE NO: 24H35F,G SEPTEMBER, 1982

Questor Surveys Limited, 6380 Viscount Road, Mississauga, Ontario L4V 1H3

CONTENTS

INTRODUCTION

This report contains the results of a helicopter MK VI INPUT survey flown in the Imperial East and Imperial West areas on Vancouver Island, British Columbia, on July 9, 1982.

A brief description of the survey procedure is included.

The survey mileage was 65 line kilometres and the survey was performed by QUESTOR SURVEYS LIMITED. The survey aircraft was a Bell 205 Helicopter C-GLMC and the operating base was Nanaimo, British Columbia.

The area outline is shown on a 1:50,000 map at the end of this report. This is part of the National Topographical Series, sheet numbers 92F/1 and 92F/2.

The following were the personnel involved with the airborne survey:

Pilot	- Dan Davis
Navigator	- Bill Smith
Operator	- Dennis Borsoi
Engineer	- Laughin Currie
Geophysicist	- Robert de Carle

SURVEY PROCEDURE

Terrain clearance was maintained as close to 122 metres as possible, with the E.M. Bird at approximately 45 metres above the ground. Rough terrain could be a factor for the helicopter not being at 122 metres. A normal S-pattern flight path using approximately one half kilometre turns was used. Consecutive lines were flown in alternate directions for the sole purpose of interpreting dipping conductors. This phenomenon will be dealt with later.

A line spacing of 150 metres was used over the entire survey area with an approximate east-west flight direction.

The equipment operator logged the flight details and monitored the instruments. It was the responsibility of the geophysicist to maintain and check the ground magnetic station, Geometrics G-806, which was recording the daily diurnal changes. The results of these recordings have been included in the final shipment.

MAP COMPILATION

The base map for navigation and flight path recovery was supplied to the contractor by the client. These mylars were at a scale of approximately 1:10,000. The final map was reproduced at a scale of 1:10,000 on stable transparent film from which white prints can be made. A copy of the map layout is located on each sheet using topographical reference numbers. The map sheet is a 4.5 minute photographic quadrangle.

Flight path recovery was accomplished by comparison of the 35mm half frame film with the mosaic in order to locate the fiducial points. Most picked points are between 400 and 600 metres depending on the difficulty of the area, some picked points are much in excess of this figure.

DATA PRESENTATION

The results of the INPUT survey are presented to the client in the following manner:

- a blank 4.5 minute photographic base at a scale of 1:10,000;
- a photographic base showing combined INPUT anomalies, half peak width of channel 2, conductive overburden, selected targets, skew classification and flight lines at a scale of 1:10,000;
- a clear overlay showing the contoured form of the total magnetic field at a scale of 1:10,000.

See Appendix for a comprehensive description of the interpretational approach used in helicopter INPUT surveys.

QUESTOR's conventional form for presenting the helicopter INPUT data on a base map is as follows and is self-explanatory:

DECAY INTERVAL CLASSIFICATION:

1 Channel (340 microseconds)

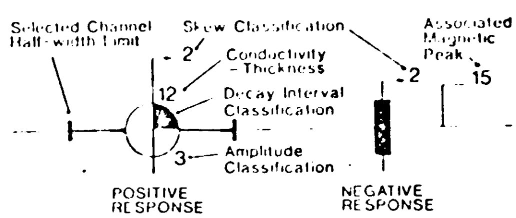
2 Channel (540 microseconds)

3 Channel (940 microseconds)

4 Channel (1,240 microseconds)

5 Channel (1,740 microseconds)

6 Channel (2,340 microseconds)



RESULTS

The survey block is located approximately 42 kilometres west of Nanaimo, British Columbia, just to the east of the Nitinat River and to the north of the Nanaimo River.

The writer is not aware of the geology within this survey block.

Very few anomalies were intercepted in the block and those that have been plotted on the map are certainly within the noise envelope of 15 P.P.M. There is one area, however, which may have possibilities. Line 60020 on flight 106 was scrubbed because of poor navigation. However, two very weak anomalies were intercepted. When the line was reflown in the proper location, these anomalies were not picked up. I, therefore, spotted the two anomalies on the map as lone intercepts and it is in this area where a ground reconnaissance could be carried out. It should be understood though that this area is considered a low priority target.

R.J. de Carle

R.J. de Carle,
Chief Geophysicist.


Imperial West
Imperial East
NANAIMO
River
Creek
BK 1078
BK 1321
BK 1292
BK 1100
BK 1313
BK 1008
BK 1000
BK 974
BK 145
BK 140
BK 139
Mount Hooper
1491
1319
1327
1062
COWICHAN LAKE
LAND DISTRICT
86
87
88
389000m. E.
124°30'
391000m. E.
92
93
94
Nitinat 13 km

APPENDIX

EQUIPMENT

The helicopter is equipped with a Mark VI INPUT (R) E.M. system and Sonotek P.M.H. 5010 Proton Magnetometer. Radar altimeters are used for vertical control. The outputs of these instruments together with fiducial timing marks are recorded by means of galvanometer type recorders using light sensitive paper. Thirty-five millimeter half frame cameras are used to record the actual flight path.

BARRINGER/QUESTOR MARK VI INPUT (R) SYSTEM

The Induced Pulse Transient (INPUT) system is particularly well suited to the problems of overburden penetration. Currents are induced into the ground by means of a pulsed primary electromagnetic field which is generated in a transmitting loop around the helicopter. By using half sine wave current pulses and a loop of large turns-area, the high output power needed for deep penetration is achieved.

The induced current in a conductor produces a secondary electromagnetic field which is detected and measured after the termination of each primary pulse. Detection is accomplished by means of a receiving coil towed behind the helicopter on two hundred and fifty feet of cable, and the received signal is processed and recorded by equipment in the helicopter. Since the measurements are in the time domain rather than the frequency domain common to continuous wave systems, interference effects of the primary transmitted field are eliminated. The secondary field is in the form of a decaying voltage transient originating in time at the termination of the transmitted pulse. The amplitude of the transient is, of course, proportional to the amount of current induced into the conductor and, in turn, this current is proportional to the dimensions, the conductivity and the depth beneath the helicopter.

The rate of decay of the transient is inversely proportional to conductivity. By sampling the decay curve at six different time intervals, and recording the amplitude of each sample, an estimate of the relative conductivity can be obtained. By this means, it is possible to discriminate between the effects due to conductive near-surface materials such as swamps and lake bottom silts, and those due to genuine bedrock sources. The transients due to strong conductors such as sulphides exhibit long decay curves and are therefore commonly recorded on all six channels. Sheet-like surface materials, on the other hand, have short decay curves and will normally only show a response in the first two or three channels.

The samples or gates are positioned at 340, 540, 840, 1240, 1740 and 2340 micro-seconds after the cessation of the pulse. The widths of the gates are 200, 200, 400, 400, 600 and 600 micro-seconds respectively.

For homogeneous conditions, the transient decay will be exponential and the time constant of decay is equal to the time difference at two successive sampling points divided by the log ratio of the amplitudes at these points.

SONOTEK P.M.H. 5010 PROTON MAGNETOMETER

The magnetometers which measure the total magnetic field have a sensitivity of 1 gamma and a range from 20,000 gammas to 100,000 gammas.

Because of the high intensity field produced by the INPUT transmitter, the magnetometer results are recorded on a time-sharing basis. The magnetometer head is energized while the transmitter is on, but the read-out is obtained during a short period when the transmitter is off. The precession frequency is being recorded and converted to gammas during the 0.2 second interval when there is no power in the transmitter loop.

For this survey, a lag factor has been applied to the data. Magnetic data recorded on the analogue records at fiducial 10.00 for example would be plotted at fiducial 9.95 on the mosaics.

DATA SYMBOLOGY

The symbols used to designate the anomalies are shown in the legend on each map sheet and the anomalies on each line are lettered in alphabetical order in the direction of flight. Their locations are plotted with reference to the fiducial numbers on the analog record.

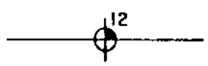
A sample record is included to indicate the method used for correcting the position of the E.M. Bird and to identify the parameters that are recorded.

All the anomaly locations, magnetic correlations, conductivity-thickness values and the amplitudes of channel number 2 are listed on the data sheets accompanying the final maps.

POSITIVE ANOMALY SYMBOL

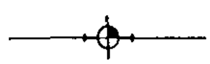
A symbol ascribed to spatially represent the position of peak response amplitude from a conventional secondary field direction. The convention is based on the response type most frequently detected with the geometrical configuration of the system.

CONDUCTIVITY-THICKNESS



A numerical value based on a ratio between early and late channel amplitudes. It normalizes the DECAY INTERVAL CLASSIFICATION against the AMPLITUDE CLASSIFICATION to derive a value based on the temporal rate of decay of the secondary field.

SELECTED CHANNEL HALF WIDTH LIMIT

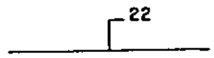


A planimetric representation of the profile-derived half-width of a positive response. It may also be used to indicate the group half-width of multiple responses.

NEGATIVE ANOMALY SYMBOL

A symbol ascribed to spatially represent the position of peak response amplitude from a reverse secondary field direction-(see POSITIVE ANOMALY SYMBOL)

ASSOCIATED MAGNETIC PEAK



A symbol ascribed to spatially represent the position and magnitude of a magnetic susceptibility anomaly proximate to a recognized conductivity anomaly. For purposes of plotting simplifications, only positive monopoles and the positive component of dipolar responses are mapped in this manner.

GENERAL INTERPRETATION

The INPUT system will respond to conductive overburden and near-surface horizontal conducting layers in addition to bedrock conductors. Differentiation is based on the rate of transient decay, magnetic correlation and the anomaly shape together with the conductor pattern and topography.

Power lines sometimes produce spurious anomalies but these can be identified by reference to the monitor channel.

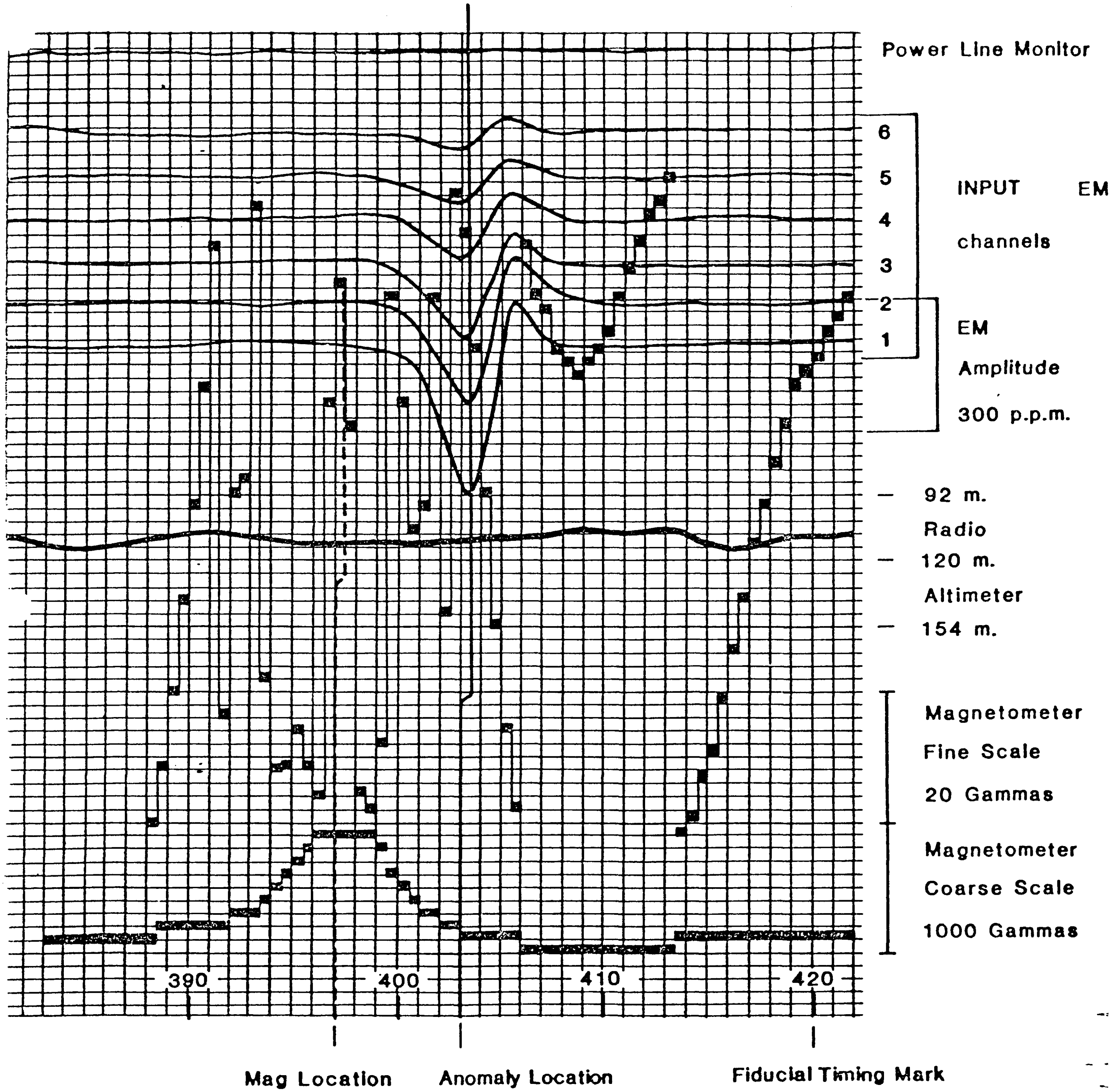
Railroad and pipeline responses are recognized by studying the film strips.

Graphite or carbonaceous material exhibits a wide range of conductivity. When long conductors without magnetic correlation are located on or parallel to known faults or photographic linears, graphite is most likely the cause.

Contact zones can often be predicted when anomaly trends coincide with the lines of maximum gradient along a flanking magnetic anomaly. It is unfortunate that graphite can also occur as relatively short conductors and produce attractive looking anomalies. With no other information than the airborne results, these must be examined on the ground.

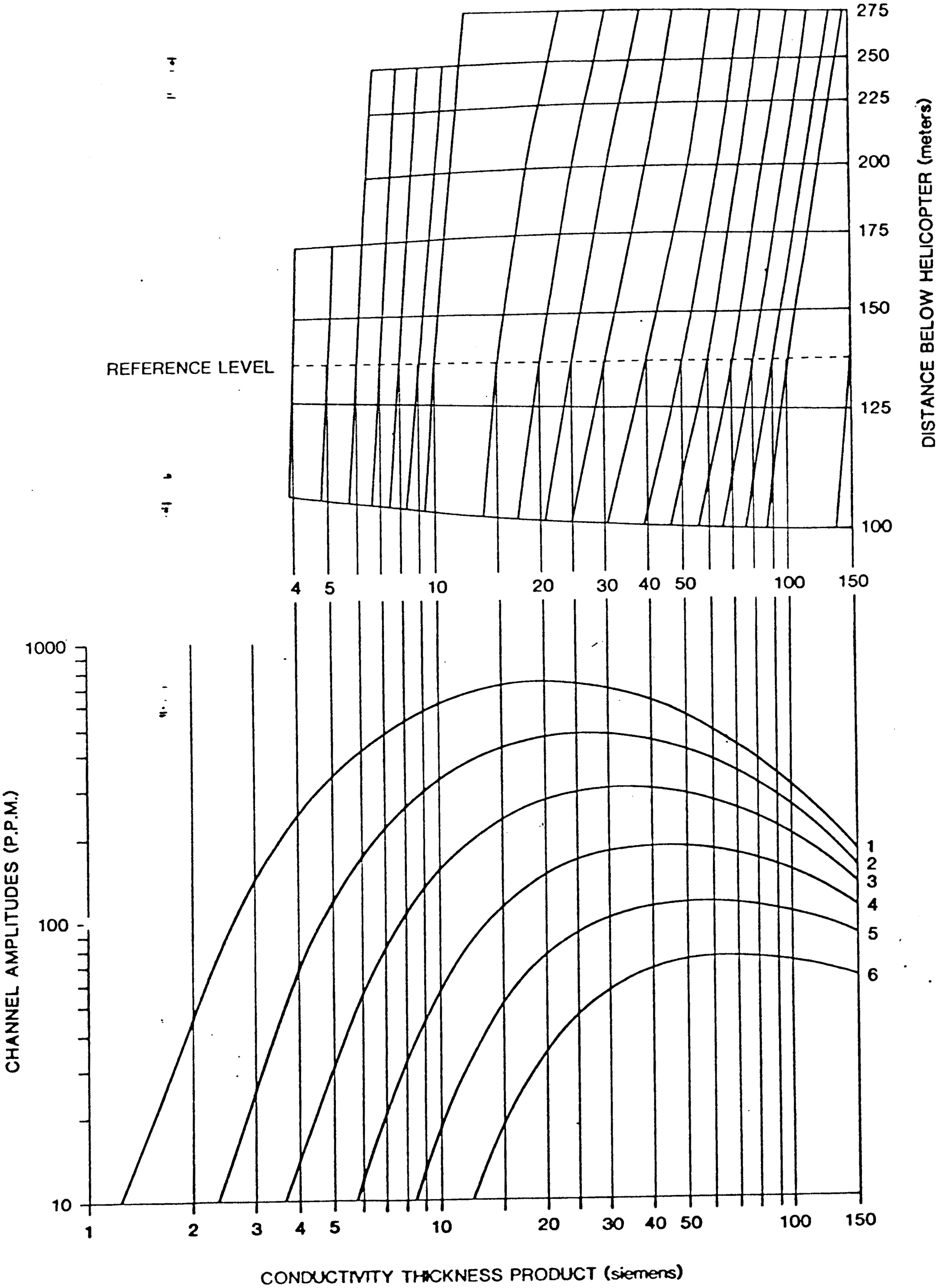
Serpentinized peridotites often produce anomalies with a character that is fairly easy to recognize. The conductivity which is probably caused in part by magnetite, is fairly low so that the anomalies often have fairly large response on channel # 1, they decay rapidly and they have strong magnetic correlation. INPUT E.M. anomalies over massive magnetites show a relationship to the total Fe content. Below 25-30%, very little or no response at all is obtained but as the percentage increases the anomalies become quite strong with a characteristic rate of decay which is usually greater than that produced by massive sulphides.

Commercial sulphide ore bodies are rare and those that respond to helicopter survey methods usually have medium to high conductivity. Limited lateral dimensions are to be expected and many have magnetic correlation caused by magnetite or pyrrhotite. Provided that the ore bodies do not occur within formational conductive zones as mentioned above, the anomalies caused by them will usually be recognized on an E.M. map as priority targets.

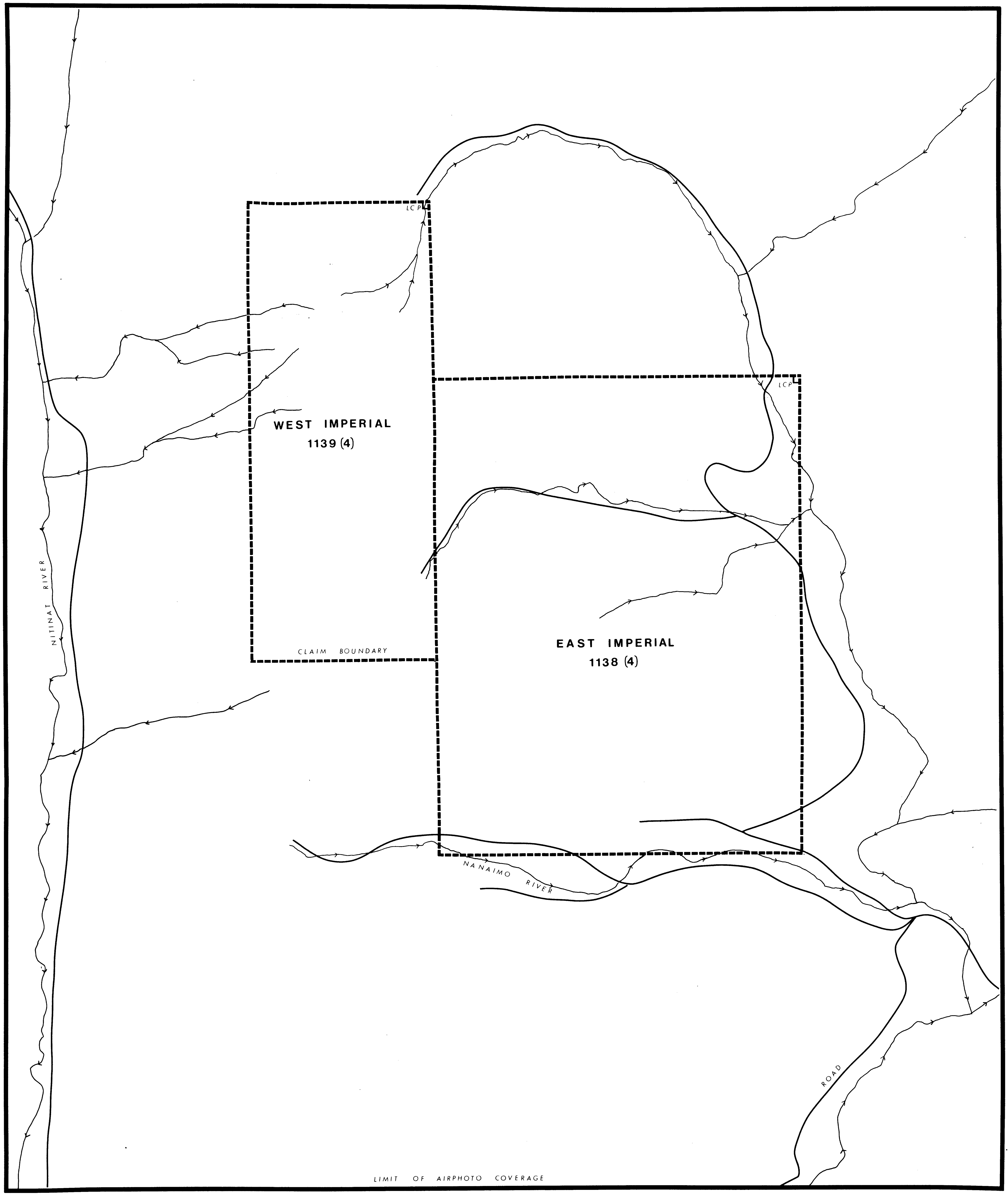


Representative INPUT Magnetometer and Altimeter Recording

HELICOPTER INPUT
VERTICAL HALF PLANE
CONDUCTIVITY / DEPTH NOMOGRAM



ANOMALY	FIDUCIAL	CHANNELS	HALF WIDTH LEFT	RIGHT	HW	AMPLITUDE CLASS	SKEW	SIG-T	ASSOCIATED MAG POSITION	MAGNETIC VALUE
60020A	40.32	2	-	-	-	1	-	NC	-	-
60020B	40.48	2	-	-	-	1	-	NC	-	-
60020C	50.90	1	-	-	-	-	-	NC	50.95	8
60050A	66.45	2	-	-	-	1	-	NC	-	-
60050B	66.70	2	-	-	-	1	-	NC	-	-
60160A	149.85	1	-	-	-	-	-	NC	-	-
60171A	151.35	2	-	-	-	1	-	NC	-	-
60171B	152.15	1	-	-	-	-	-	NC	151.85	80
60171C	153.05	1	-	-	-	-	-	NC	-	-
60190A	158.65	2	-	-	-	1	-	NC	158.80	18
60220A	169.95	2	-	-	-	1	-	NC	-	-



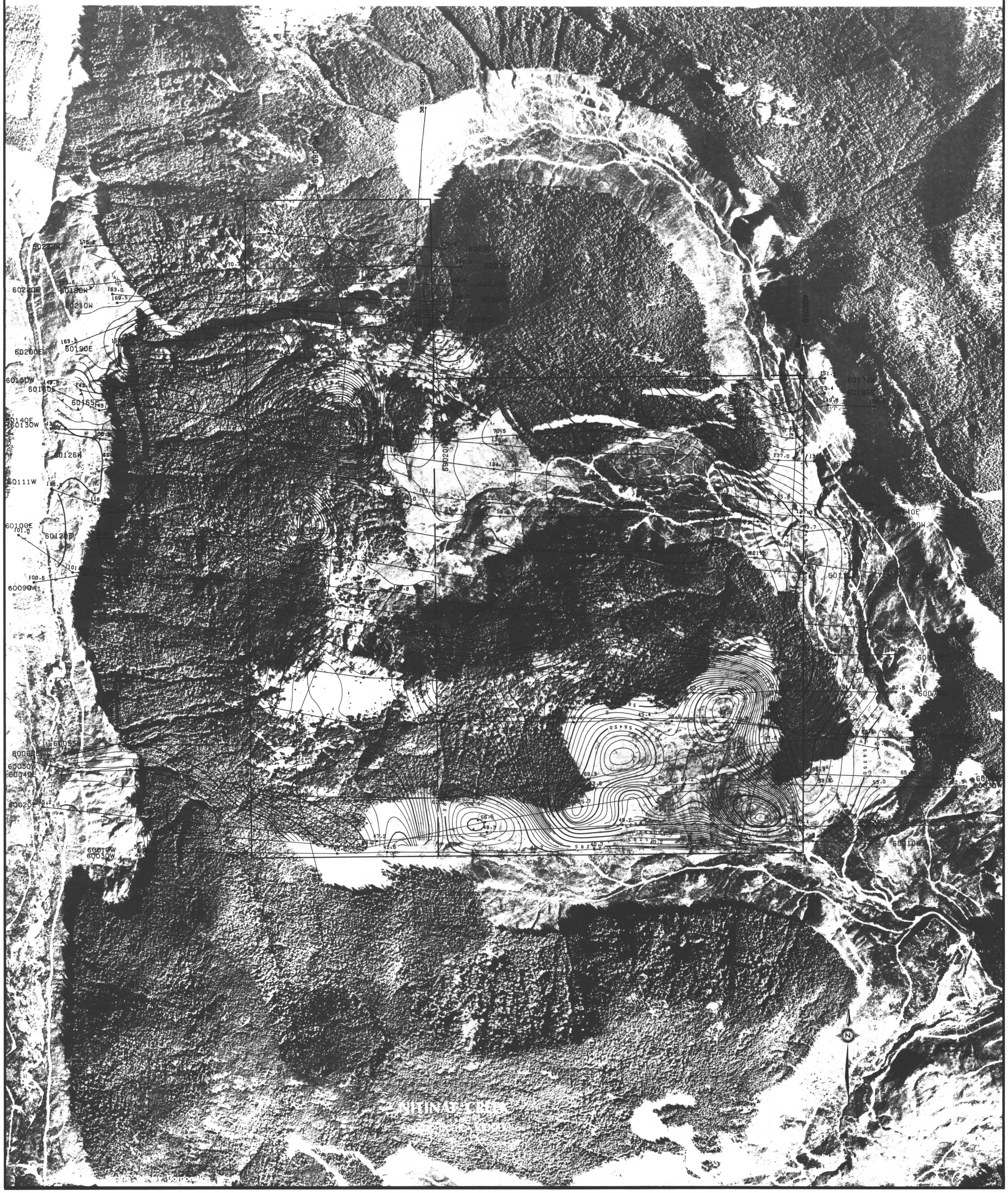
GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,080

IMPERIAL METALS CORPORATION		
Claim Map EAST & WEST IMPERIAL		
NANAIMO MIN. DIV.	S.P. QUIN B.Sc.	MARCH 1983
1 Km Scale 1:10,000		

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,080



INPUT

DECAY INTERVAL CLASSIFICATION

1 Channel (340 microseconds)
2 Channel (540 microseconds)
3 Channel (840 microseconds)
4 Channel (1240 microseconds)
5 Channel (1740 microseconds)
6 Channel (2340 microseconds)

Selected Channel Half-width Limit · Skew Classification · Conductivity - Thickness · Decay Interval Classification · Amplitude Classification · Associated Magnetic Peak · POSITIVE RESPONSE · NEGATIVE RESPONSE

AMPLITUDE CLASSIFICATION (UNCORRECTED FOR ALTITUDE)

Class 1 (<100 ppm)
Class 2 (100-199 ppm)
Class 3 (200-399 ppm)
Class 4 (400-1000 ppm)
Class 5 (>1000 ppm)

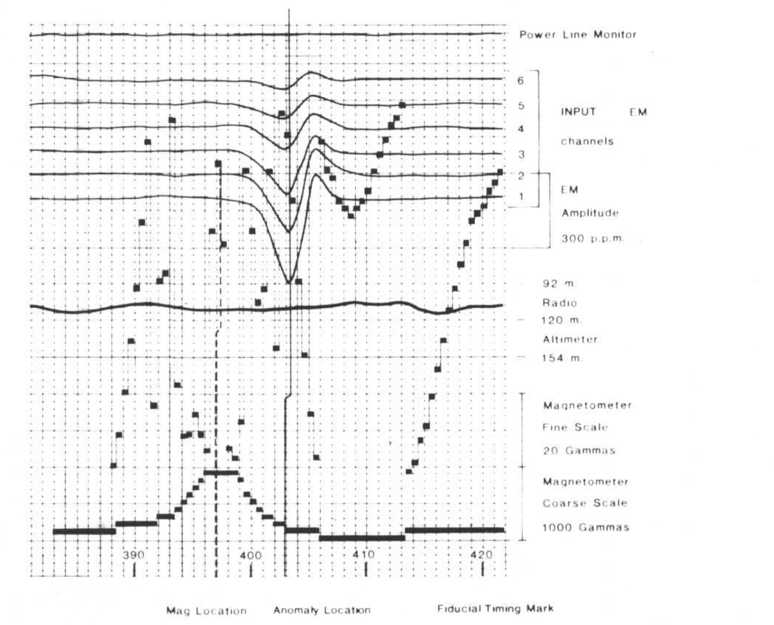
SKEW CLASSIFICATION (DIP INDICATION)

Class 1 <.25 subfiducial
Class 2 .25 - .49 subfiducial
Class 3 .50 - .74 subfiducial
Class 4 <.74 subfiducial
(Arrow indicates skew direction)

10 GAMMA CONTOUR LINE
50 GAMMA CONTOUR LINE
500 GAMMA CONTOUR LINE
(1 GAMMA = 1 NANOTESLA IN SI UNITS)
MAGNETIC DEPRESSION

INTERPRETATION

Conductor Axis, with reference number (good definition)
Conductor Axis, with reference number (poor definition)
Vertical Conductor
Conductor Dip
Selected Zone, with reference number
Surficial Conductivity
Fault Zone



Representative INPUT Magnetometer and Altimeter Recording

DESCRIPTIVE NOTES

The aircraft is equipped with the Barringer/Questor Mark VI INPUT* airborne E.M. System and the Sonotek PMH 5010 Proton Precession Magnetometer and Sonotek SDS-1200 Series Data Acquisition System. The INPUT* system will respond to conductive overburden and near-surface horizontal conducting layers in addition to bedrock conductors. Discrimination of conductors is based on the rate of transient decay, magnetic correlation and the anomaly shape, together with the conductor pattern and topography.

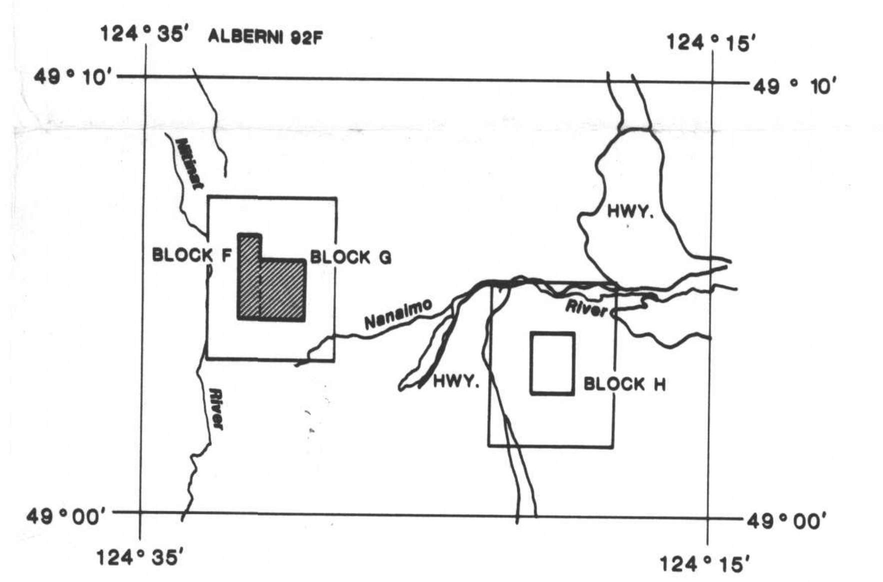
* Registered Trade Mark of Barringer Research Limited

INTERPRETATION REFERENCES

Becker, A., Gauvreau, C., and Collett, L.S.
1972: Scale Model Study of Time Domain Electromagnetic Response of Tabular Conductors; Canadian Mining and Metallurgical Bulletin, Volume 65, No. 725, p. 90-96.

Dyck, A.V., Becker, A., and Collett, L.S.
1974: Surficial Conductivity Mapping with the Airborne INPUT* System; Canadian Mining and Metallurgical Bulletin, Volume 67, No. 744, p. 104-109.

Lazenby, P.G.
1973: New Developments in the INPUT* Airborne E.M. System; Canadian Mining and Metallurgical Bulletin, Volume 66, No. 732, p. 96-104.



"Figure 4"

Approx Scale 1: 10000

HELICOPTER MK VI INPUT® SURVEY
(Horizontal Coil)
TOTAL MAGNETIC INTENSITY SURVEY

IMPERIAL METALS CORPORATION

IMPERIAL EAST and WEST

Province of BRITISH COLUMBIA

FILE NO.	SHEET NO.	DATE	DRAWN BY
24H35F,G	1 of 1	July, 1982	Dataplotting Services Inc.

Questor Surveys Limited
Mississauga, Ontario Canada