

84-958-12826

GEOPHYSICAL REPORT  
ON A RECONNAISSANCE  
AIRBORNE VLF-ELECTROMAGNETOMETER  
AND  
MAGNETOMER SURVEY  
M #1 - #6 MINERAL CLAIMS  
SKEENA MINING DIVISION  
GRAHAM ISLAND, QUEEN CHARLOTTE ISLANDS, BRITISH COLUMBIA

LOCATION

NTS 103-F- 8W/9W  
LATITUDE 53° 30'N  
LONGITUDE 132° 20'W

DATES OF WORK: April 16 - August 3, 1984

by

James S. Christie, Ph.D.

October 31, 1984

*owner/operator*

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

**12,826**

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## INTRODUCTION

JMT Services Corp. contracted Western Geophysical Aero Data Ltd. to conduct a reconnaissance airborne magnetometer and VLF-electromagnetometer survey across the M#1-6 claims on the central of Graham Island. The survey totalled 4.5 kilometres in length and was flown on April 21, 1984.

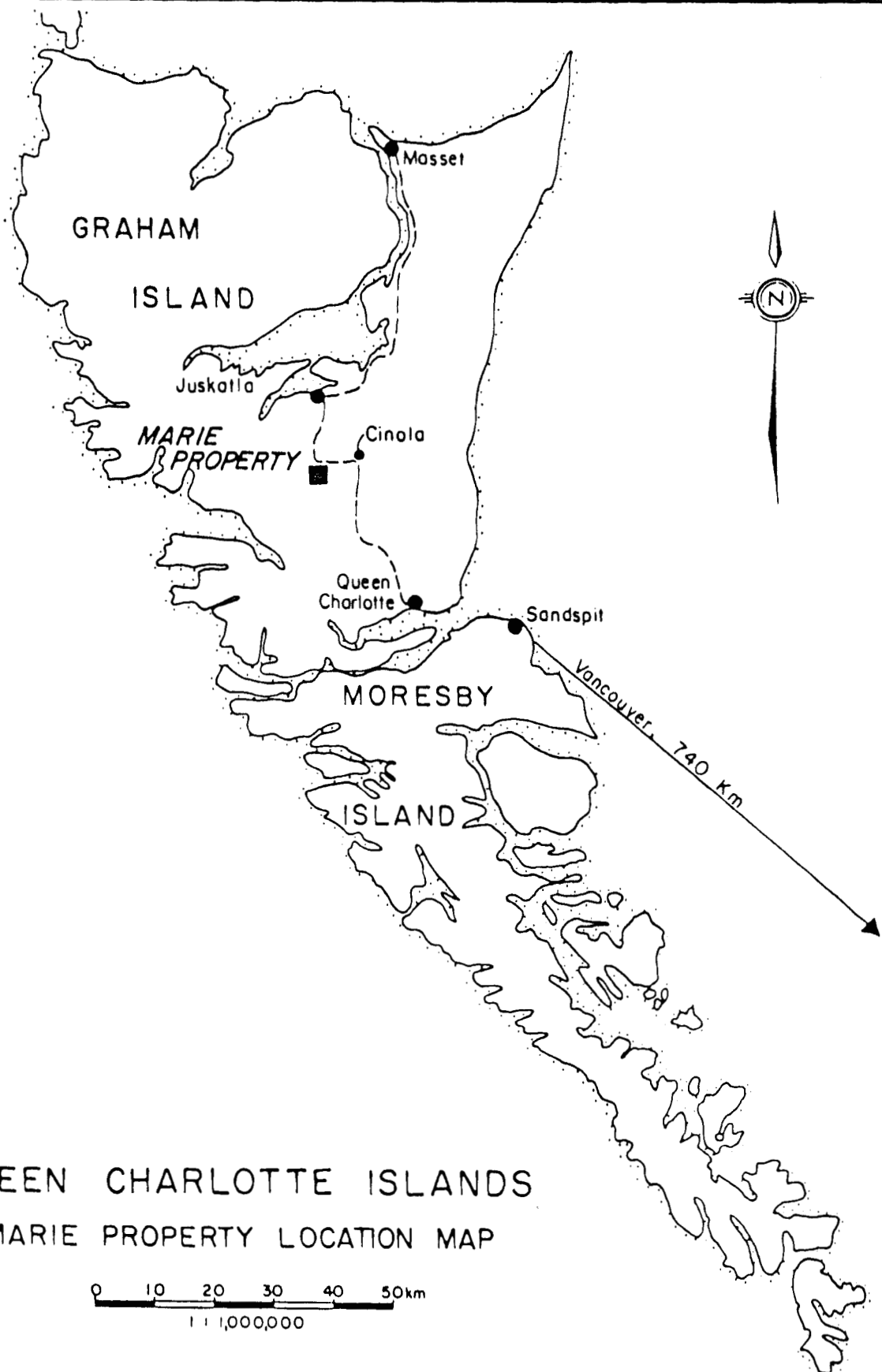
Reconnaissance geochemical sampling has uncovered widespread anomalous arsenic and minor gold geochemistry in the area. It was the intention of this survey to assess the effectiveness of airborne geophysics as a means of assisting in geological interpretation of the area as well as highlighting any anomalous responses which may be associated with the observed mineralization.

## LOCATION AND ACCESS

The property is located on central Graham Island, in the Queen Charlottes, some 740 km northwest of Vancouver. The islands may be reached by daily P.W.A. jet service from Vancouver, or twice weekly ferry service from Prince Rupert. The claims are located on the upper drainage of Gold Creek which includes the rolling terrain between Shiela, Pam and Marie Lakes and the steep hill lying immediately west of Shiela Lake. It is accessible by road by driving south from Juskatla along MacMillan Bloedel's main haulage road 20 kilometres to Branch 30 which cuts through the centre of the property to the east side of Shiela Lake. Surveys in the area indicate plans by MacMillan Bloedel to build roads around and onto the hill west of Shiela Lake probably within a few years. Presently the road has been built to the creek flowing north out of Shiela Lake and the right-of-way has been felled for about 300 metres northwest.

## TOPOGRAPHY AND VEGETATION

Gold Creek Valley is 1500 metres wide east of Marie Lake but widens to an area of flat terrain between Marie, Pam and Shiela Lakes. This low lying land is variably covered in hemlock-spruce forests and cedar-cypress swamps. The steep hill west of Pam Lake is heavily timbered with mature hemlock-spruce. A minor amount of second growth, **about fifteen years old, covers the southeast portion of the claims.** Much of the claims area probably will be logged by MacMillan Bloedel over the next few years.



QUEEN CHARLOTTE ISLANDS  
MARIE PROPERTY LOCATION MAP

0 10 20 30 40 50km  
1:1,000,000

FIGURE 1

MINERAL CLAIMS

The M claims were staked by James S. Christie in July 1982 to restake the abandoned Marie Claim group. Abandonment and restaking were undertaken to consolidate the claim area and establish a common Record Date for the property.

TABLE I. PERTINENT CLAIM DATA

<u>NAME</u>	<u>RECORD DATE</u>	<u>EXPIRY</u> <u>YEAR</u>	<u>STAKER</u>	<u>RECORD NO.</u>
M1	Aug. 4/82	1985	James S. Christie	3529 (8)
M2	"	1987	"	3530 (8)
M3	"	1986	"	3531 (8)
M4	"	1989	"	3532 (8)
M5	"	1993	"	3533 (8)
M6	"	1986	"	3534 (8)

HISTORY

Parts of the present property were first staked in May of 1978 after prospecting work and reconnaissance geochem sampling in 1977 and early 1978 had indicated an area around Marie and Shiela Lakes to have strong zones of silicifications associated with sulfide mineralization and highly anomalous gold, arsenic, mercury geochemistry. Additional staking was done in June 1978, August 1978, October 1978 April 1979, August 1979 and August 1980 as work progressed on the property. In July of 1982 a decision was made to abandon and restake the entire property in order to simplify maintenance of the claims which had six different Record Dates. All claims were formally abandoned and the M (#1-#6) claims staked covering the areas of interest. The Record Date is August 4, 1982 for the entire property.

The Property was optioned by Chevron Standard Limited in 1978 and in 1979 a contract was given to JMT Services Corp. to complete a programme of geological mapping and grid geochemistry. Mapping showed that large portions of the claim block are underlain by Tertiary volcanics of the Masset Formation, lying unconformably on poorly exposed Mesozoic argillites and sandstones cut by diorite. Zones of sulfide

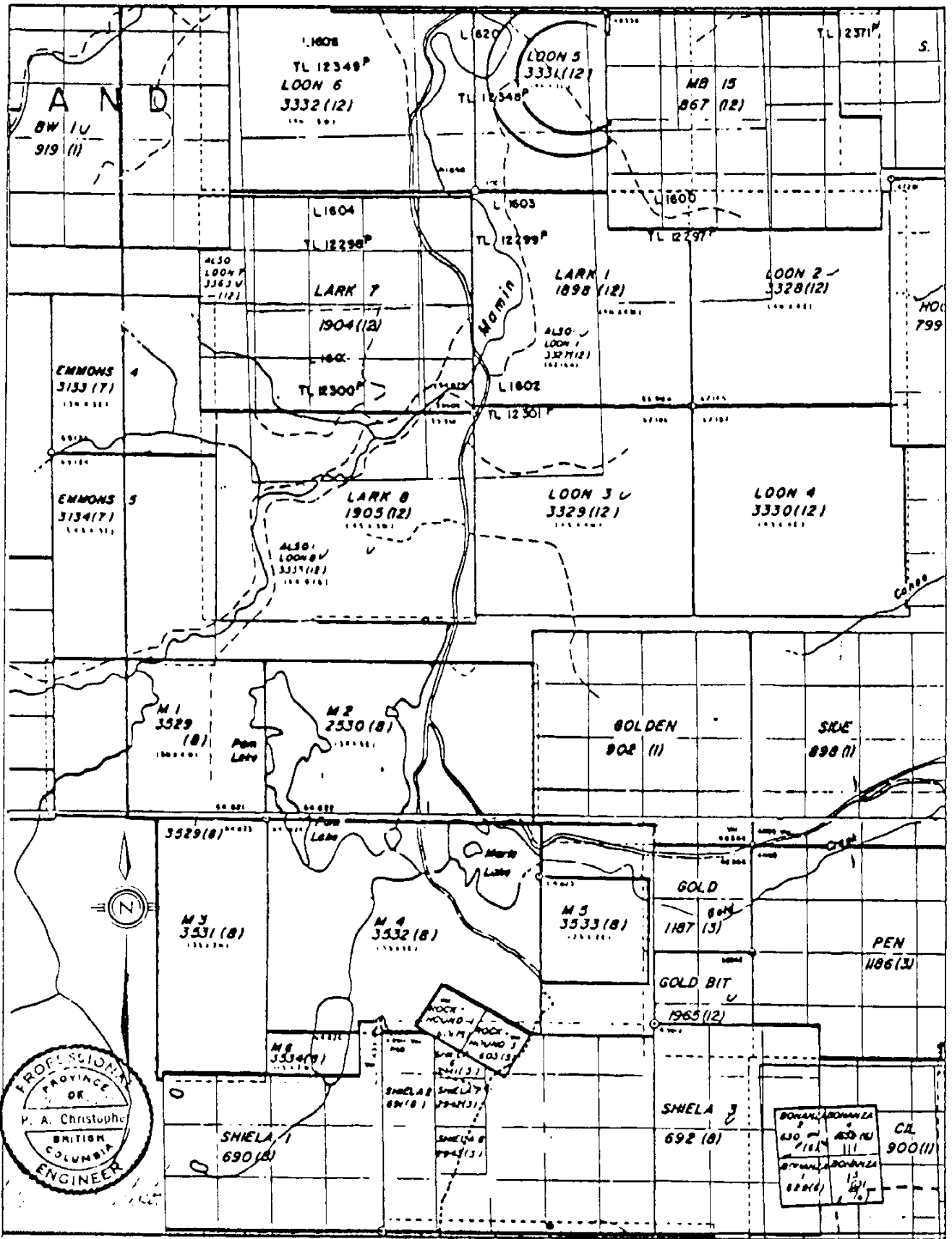


Figure 2: MARIE PROPERTY CLAIM MAP - M #1 - #6 MINERAL CLAIMS

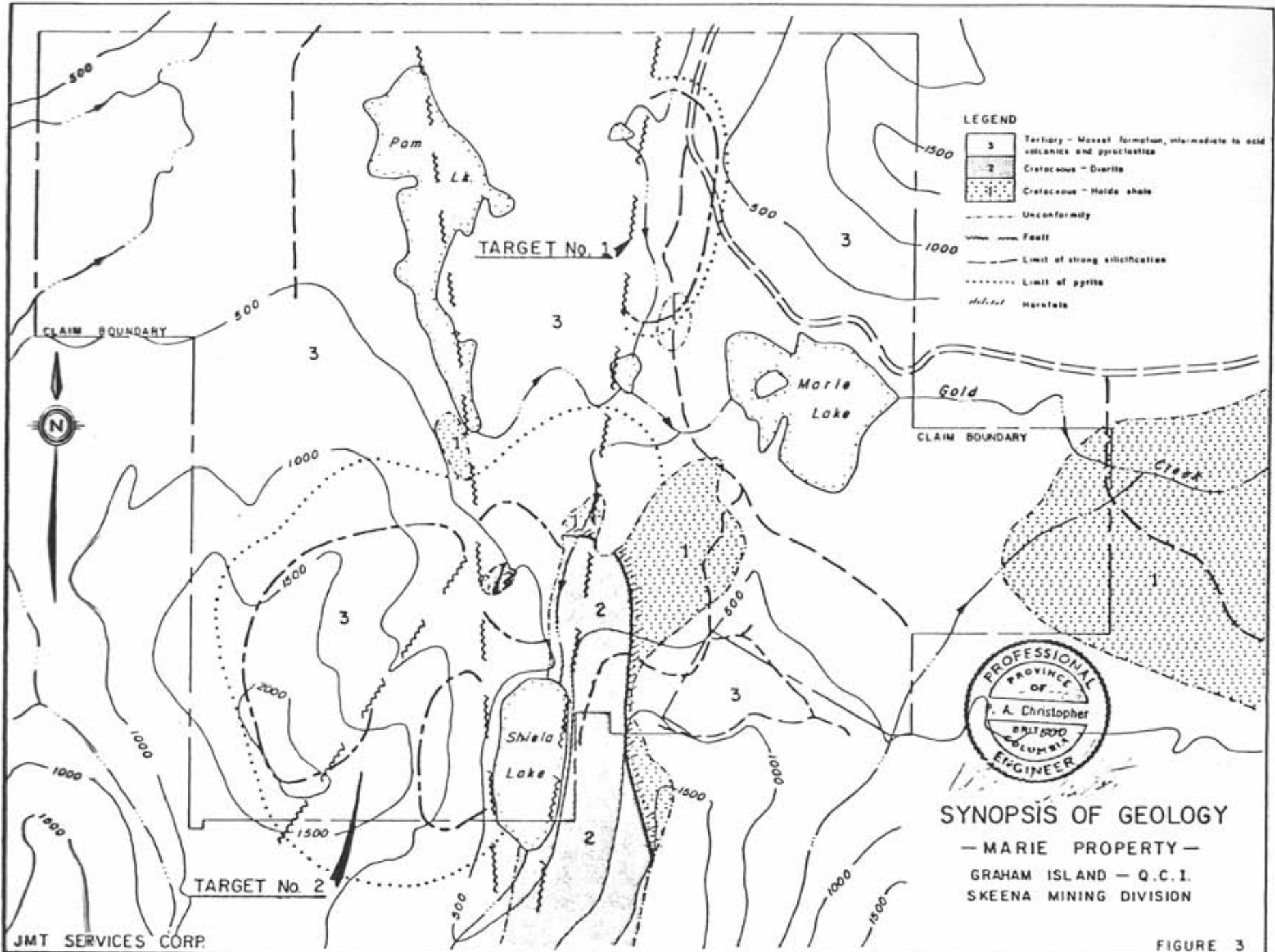
mineralization associated with weak to strong silicification and bleaching were mapped within both the volcanics and sediments at a number of locations. Large arsenic, mercury and gold soil anomalies were shown to be associated with these sulfide zones. The Tertiary unconformity was believed to play an important role in the control and localization of mineralization.

In October 1979, Chevron mobilized a percussion drill to the Charlottes for work on two other properties, but made a decision to drill a series of 6 holes along a logging road which cut through one of the anomalous areas identified previously. Two of the holes encountered 60 foot intercepts of anomalous gold-arsenic geochemistry which are of considerable interest but no follow-up work was ever done.

In 1980 Chevron geologists completed a limited programme of detailed geological mapping and rock chip sampling in a small area northwest of Shiela Lake. A number of light coloured rhyolitic dykes containing sulfides were mapped in the areas with anomalous geochemistry. Chevron conducted additional geological and geochemical surveys in the northwest part of the property in 1980 and 1981 prior to terminating their option in 1982. No work has been done since that date.

#### GENERAL GEOLOGY

The Queen Charlotte Islands are part of the Insular Belt of the Canadian Cordillera. They are separated from the Pacific Ocean floor by the Queen Charlotte Transform Fault. The area is included within the Pacific Continental Shelf physiographic region and has been divided into the Queen Charlotte Ranges, Skidegate Plateau and Queen Charlotte Lowlands. The boundaries between the physiographic units follow major northwest trending fault zones. The Queen Charlotte Ranges are underlain by a varied assemblage of mainly Mesozoic volcanic, plutonic, sedimentary and metamorphic rocks. The Skidegate Plateau is underlain in



JMT SERVICES CORP.

FIGURE 3



large part of Neogene intermediate to acidic volcanic rocks and the Charlotte Lowlands are underlain by the same Neogene volcanic and sedimentary formation with a cover of Quarternary drift. The area of main interest for precious metals is near the faulted boundary of the Skidegate Plateau and Charlotte Lowlands. The general geology of the Queen Charlotte Islands has been mapped and reported on by A. Sutherland-Brown in British Columbia Department of Mines Bulletin No. 54 (1968).

#### LOCAL GEOLOGY

A synopsis of local geology is shown on Figure 3. A dominant feature is the flat lying Tertiary unconformity between acid to intermediate Masset volcanics and pyroclastics and underlying marine sediments of Mesozoic age. A small dioritic stock cuts the sediments in the southern part of the property and has given rise to narrow hornfels zones along its contacts. The sedimentary succession consists of medium to thick bedded shales and calcareous sandstones of the Haida Formation, with dip angles varying from moderate to steep. The sediments and volcanics are cut by a number of light coloured sulfide bearing rhyolitic dykes in the areas examined. Two strong sub-parallel northerly trending faults have been mapped cutting through the claim area. These could be important controls of mineralization on the property and may have produced permeability needed to channel mineralized solutions.

Outcrops in the previous drilled area are variably silicified, pyrite mineralized and veined with chalcedonic veinlets. Drill holes were spotted in the general area of coincident hydrothermal alteration and anomalous geochemistry but the areas designated as Target I, a faulted extension of the drilled area, and Target II, a concentrically altered area were not percussion drill tested because of difficult access. The setting of mineralization on the MARIE property is similar to the Consolidated Cinola Mines Ltd. Property where reserves of 41 million metric tonnes of 0.067 oz/tonne gold have been reported (1982/83 Canadian Mines Handbook). Mineralization occurs along a faulted contact between Haida shale and overlying volcanoclastics in association with rhyolite dykes or sills.

AIRBORNE VLF-ELECTROMAGNETIC AND MAGNETIC SURVEY

This survey system simultaneously monitors and records the output signal from a proton precession magnetometer and two VLF-EM receivers installed in a bird designed to be towed 100 feet below a helicopter. A gimbal and shock mounted TV camera, fixed to the helicopter skid, provides input signal to a video cassette recorder allowing for accurate flight path recovery by correlation between the flight path cassette and air photographs of the survey area. A KING KRA-10A radar altimeter allows the pilot to continually monitor and control terrain clearance along any flight path.

Continuous measurements of the earth's total magnetic field intensity and of the total horizontal VLF-EM field strength of two transmission frequencies are stored in three independent modes: an analogue strip chart recorder, digital magnetic tapes and a digital video recovery system. A three-pen analogue power recorder provides direct, unfiltered recordings of the three geophysical instrument output signals. A Hewlett-Packard 9875 tape drive system digitally records all information as it is processed through an on-board micro-computer. The magnetic and electromagnetic data is also processed through the onboard micro-computer, incorporating an analogue to digital converter and a character generator, then superimposed along with the date, real time and terrain clearance upon the actual flight path video recording to allow exact correlation between geophysical data and ground location. The input signals are averaged and updated on the video display every second. Correlation between the strip chart, digital tape and the video flight path recovery tape is controlled via fiducial marks common to all systems. Line identification, flight direction and pertinent survey information are recorded on the audio track of the video recording tape.

### DATA PROCESSING

Field data is digitally recorded, with the time of day fiducial, on magnetic cassettes in a format compatible with the Hewlett-Packard 9845 computer. The recovered flight path locations are digitized and the field data is processed to produce plan maps of each of the parameters. A variety of formats are available in which to display this data.

Total field intensity magnetic information is routinely edited for noise spikes and corrected for any diurnal variations recorded on a base magnetometer located in the survey area.

Total field intensity VLF-EM signals are sensitive to topographic changes and sensor oscillation. Oscillation effects can be reduced by filters tuned to the dominant period. Long period effects attributable to topography can be removed by high pass filtering the planimetric data.



### DISCUSSION OF RESULTS

Two test lines with northerly orientation as shown on the enclosed profiles (pocket) were run. The magnetic data and VLF-EM data are presented on the same profile.


The magnetic profiles display field intensities in the range of 56,300 to 56,650 gammas and indicate moderate magnetic gradients on the property. TL-1 indicates a gentle rise to the north which likely reflects a change in lithology on crossing the Shiela-Pam Lake fault shown on Figure 3. Field intensities along TL-2 are fairly uniform but about 200 gammas higher than much of TL-1 indicating a probable magnetic high associated with the area of strong silicification and anomalous geochemistry (Figure 3). This may be indicative of the presence of an intrusive body beneath the alteration system.

Two VLF-EM frequencies were monitored during this survey; those corresponding to the Seattle, Wash. and the Culter, Main transmitters. Neither data set shows any clearly defined, high amplitude anomalous trends although both frequencies are shown numerous weak anomalies with the Seattle data being the noisier of the two. It is probable that the EM anomalies are related to Shiela-Pam Lake fault zone or zones along TL-1. Along TL-2 the main response on both channels occurs in the south corresponding to the alteration system, weakening in less altered Masset volcanics to the north. The anomalous response probably corresponds to fracturing within the alteration zone rather than disseminated sulfides observed on surface.

### CONCLUSIONS

Two test lines of airborne MAG and VLF-EM have indicated that a magnetic high and anomalous VLF-EM response may correlate with the alteration system on the M claims. Test results are sufficiently interesting to indicate that a more comprehensive airborne survey should provide useful information with regards to the geology, alteration and structure.

Respectfully submitted

  
James S. Christie, Ph.D.

COST BREAKDOWN

This test survey was completed at the time 5 other surveys were in progress. Since it was done very quickly only direct costs are included. Items such as travel to the Charlottes, meals and accommodation and other support costs and incidentals have not been added.

PERSONNEL

J. S. Christie, geologist	½ April 13, Oct. 31	\$375.00
M. McDermott, technician	April 21 ½ day	56.00
D. Hrynyk, technician	April 21 ½ day	56.00
Queen Charlotte Helicopters	.4 hours @ \$528.00	211.20
Fineline Drafting		90.00
Data Processing and plotting		112.00
Report typing and duplication		<u>50.00</u>
		<u>\$950.20</u>

INSTRUMENT SPECIFICATIONSBARRINGER AIRBORNE MAGNETOMETER

MODEL: Nimbin M-123  
 TYPE: Proton Precession  
 RANGE: 20,000 to 100,000 gammas  
 ACCURACY:  $\pm 1$  gamma at 24 V d.c.  
 SENSITIVITY: 1 gamma throughout range  
 CYCLE RATES:  
     Continuous 0.6, 0.8, 1.2 and 1.9 seconds  
     Automatic 2 seconds to 99 minutes in 1 second steps  
     Manual Pushbutton single cycling at 1.9 seconds  
     External Actuated by a 2.5 to 12 volt pulse longer than 1 millisecond.

OUTPUTS:  
     Analogue 0 to 99 gammas or 0 to 990 gammas  
             - automatic stepping  
     Visual 5 digit numeric display directly in gammas

EXTERNAL  
 OUTPUTS:  
     Analogue 2 channels, 0 to 99 gammas or 0 to 990 gammas at 1 m.a. or 1 volt full scale deflection.  
     Digital BCD 1, 2, 4, 8 code, TTL compatible.

SIZE: Instrument set in console  
       30 cm X 10 cm X 25 cm

WEIGHT: 3.5 Kg

POWER  
 REQUIREMENTS: 12 to 30 volts dc, 60 to 200 milliamps maximum.

DETECTOR: Noise cancelling torroidal coil installed in airfoil.

INSTRUMENT SPECIFICATIONSSABRE AIRBORNE VLF SYSTEM

Source of Primary Field: VLF radio stations in the frequency range of 14KHz to 30 KHz.

- Type of Measurement: -Horizontal field strength
- Number of Channels: -Two; Seattle, Washington at 24.8 KHz  
-Cutler, Maine at 17.8 KHz
- Type of Sensor: -Two ferrite antennae arrays, one for each channel, mounted in magnetometer bird.
- Output: -0 - 100 mV displayed on two analogue meters ( one for each channel)  
-recorder output posts mounted on rear of instrument panel
- Power Supply: -Eight alkaline 'AA' cells in main instrument case (life 100 hours)  
-Two 9- volt alkaline transistor batteries in bird (life 300 hours)
- Instrument Console: -Dimensions -30 cm x 10 cm x 25 cm  
-Weight - 3.5 Kg.

Instrument Specifications

FLIGHT PATH RECOVERY SYSTEM

i) T.V. Camera:

Model: RCA TC2055 Vidicon  
 Power Supply: 12 volt DC  
 Lens: variable, selected on basis of expected terrain clearance  
 Mounting: Gimbal and shock mounted in housing, mounted on helicopter skid

ii) Video Recorder:

Model: Sony SLO - 340  
 Power Supply: 12 volt DC / 120 volt AC (60Hz)  
 Tape: Betamax  $\frac{1}{2}$ " video cassette - optional length  
 Dimensions: 30 cm x 13 cm x 35 cm  
 Weight: 8.8 Kg  
 Audio Input: Microphone in - 60 db low impedance microphone  
 Video Input: 1.0 volt P-P, 75 $\Omega$  unbalanced, sync negative from camera

iii) Altimeter:

Model: KING KRA-10A Radar Altimeter  
 Power Supply: 27.5 volts DC  
 Output: 0-25 volt ( 1 volt / 1000 feet) DC signal to analogue meter, 0-10 v (4mv/ft) analogue signal to microprocessor  
 Mounting: fixed to T.V. camera housing, attached to helicopter skid





## Instrument Specifications

### DATA RECORDING SYSTEM

#### i) Chart Recorder

Type: Esterline Angus Miniservo III Bench AC  
Ammeter - Voltmeter Power Recorder

Model: MS 413B

Specification: S-22719, 3-pen servo recorder

Amplifiers: Three independent isolated DC amplifiers  
(1 per channel) providing range of  
acceptable input signals

Chart: 10 cm calibrated width Z-fold chart

Chart Drive: Multispeed stepper motor chart drive,  
Type D850, with speeds of 2,5,10,15,30  
and 60 cm/hr. and cm/min.

Controls: Separate front mounted slide switches for  
power on-off, chart drive on-off, chart  
speed cm/hr.- cm/min. Six position chart  
speed selector, Individual front zero  
controls for each channel.

Power Requirements: 115/230 volts AC at 50/60Hz (Approximately 30 W.

Writing System: Disposable fibre tipped ink cartridge;  
(variable colors)

Dimensions: 38.6 cm x 16.5 cm x 43.2 cm

Weight: 9.3 kg.

#### ii) Digital Video Recording System

Type: L.M. Microcontrols Ltd. Microprocessor  
Control Data Acquisition System

Model: DADG - 68

Power Requirements: 10 - 14 volts DC, Maximum 2 amps.

Input Signal: 3,0 - 100 mvolt DC signals  
1,0 - 25 volt DC signals

Microprocessor: Motorola MC-6800

CRT Controller: Motorola MC-6845

Character Generator: Motorola MCM-6670

Analogue/Digital  
Convertor: Intersil 7109

Multiplexer: Intersil IH 6208

Digital Clock: National MM 5318 chip  
9 volt internal rechargeable nickle-  
cadmium battery

Fiducial Generator: internally variable time set controls  
relay contact and audio output

Dimensions: 30 cm x 30 cm x 13 cm

Weight: 3 kg.



DATA RECORDING SYSTEM (CON'T)iii) Digital Magnetic Tape

Type: Hewlett Packard cartridge tape unit

Model: 9875A

Power Requirements: 24 volt d.c.

Data Format: HP's Standard Interchange Format (SIF)

Tape Cartridge: HP 98200A 225K byte cartridge compatible with HP Series 9800 desktop computers.

Tape Drive: Dual tape drives providing up to 8 hours continual recording time.

Controller: Internal micro-computer provides 23 built in commands.

: External computer generated commands.

## STATEMENT OF QUALIFICATIONS

I, James S. Christie of Vancouver, British Columbia, do hereby certify that:

1. I am a Professional Geologist residing at 3921 West 31st Avenue, Vancouver, B.C., V6S 1Y4.
2. I am a graduate of the University of British Columbia, B.Sc., Honours Geology, 1965; Ph.D. Geology, 1973;
3. I have practised my profession as a mining exploration geologist, continuously since 1965.
4. I am a Fellow of the Geological Association of Canada.
5. I am a Member of the Geological Society of America.
6. This report is based on my personal knowledge of the district, and mapping of the geology at the property.



James S. Christie, Ph.D.

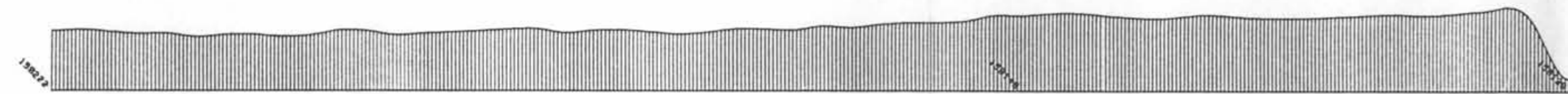
CUTLER  
+ 5%  
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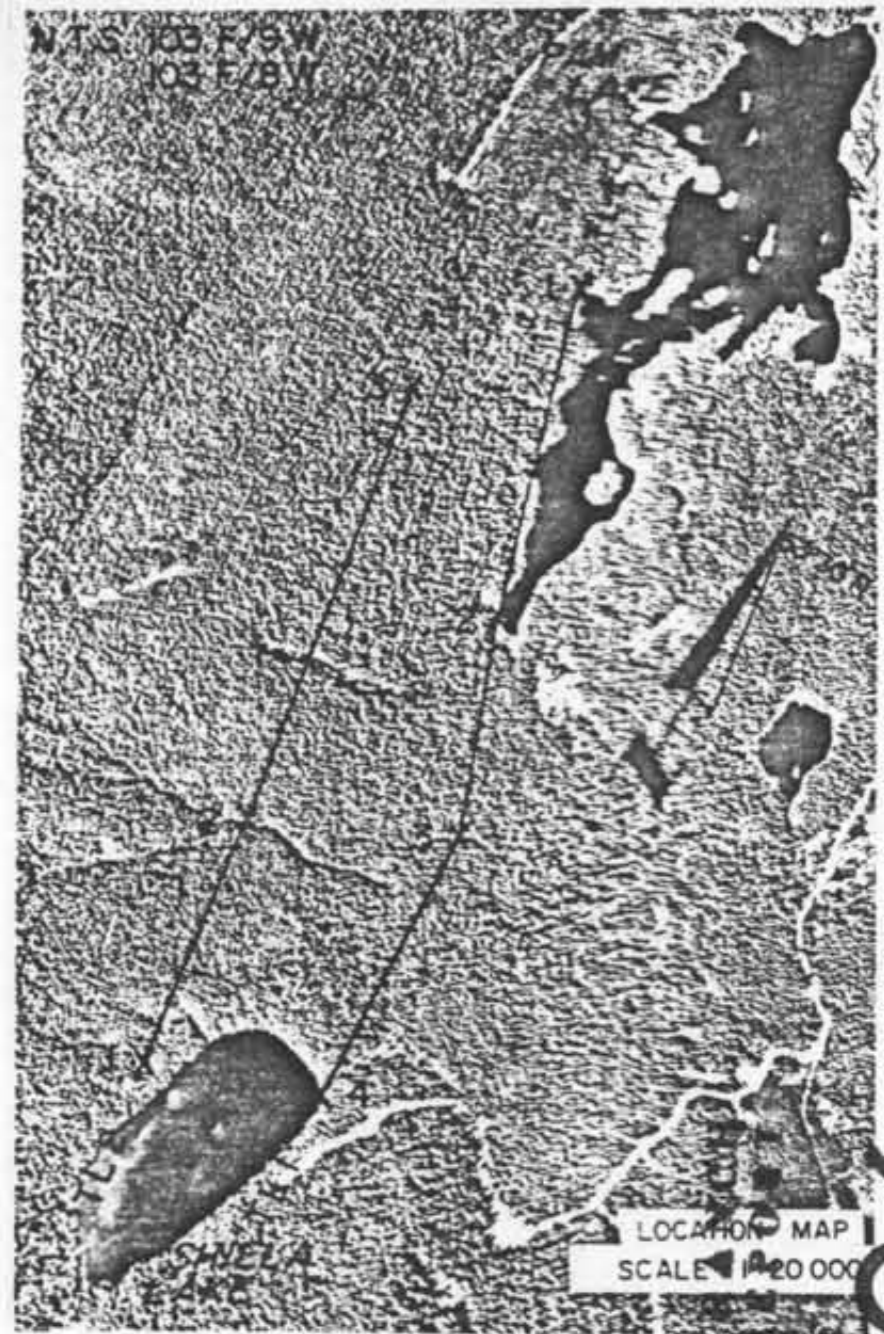
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MAG  
+ 100  $\lambda$   
0  
- 100  $\lambda$



TL 2 (56400λ)



AIRBORNE MAG & EM PROFILES  
CENTRAL GRAHMAN ISLAND  
QUEEN CHARLOTTE ISLAND

TEST LINE

GEOLOGICAL  
ASSESSMENT

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 Western  
Geophysical  
Aero Data Ltd.

CUTLER

+ 5%  
0  
- 5%



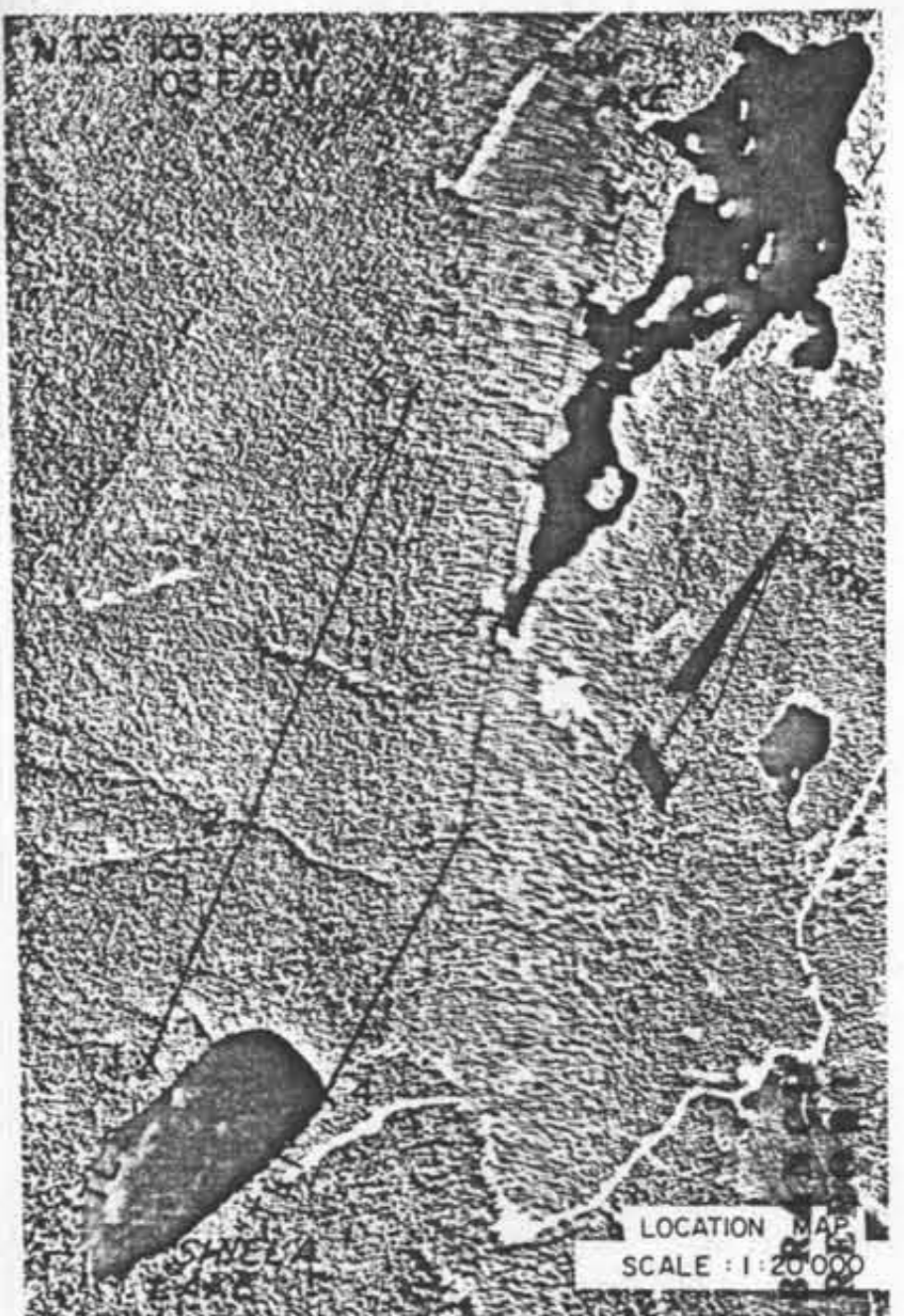
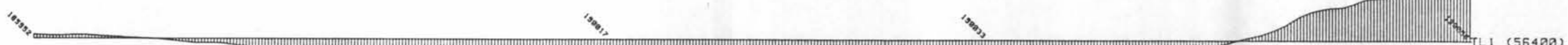
SEATTLE

+ 5%  
0  
- 5%



MAG

+ 100  $\lambda$   
0  
- 100  $\lambda$



AIRBORNE MAG & EM PROFIL  
CENTRAL GRAHMAN ISLAND  
QUEEN CHARLOTTE ISLAND

TEST LINE 1

GEOLOGICAL ASSESSMENT

12,826

*Western  
Geophysical  
Aero Data Ltd.*