

MANNY CONSULTANTS LTD.

Geophysical Report
on an
Airborne VLF-EM & Magnetometer Survey

MA & SA Claims, Similkameen M.D.
Latitude 49°20'N Longitude 120°11'W
N.T.S. 92 H/8E

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Geophysicist
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Consulting Geophysicist

DATE OF WORK: October 23, 1981

DATE OF REPORT: January 11, 1982

WESTERN GEOPHYSICAL AERO DATA LTD.
ASSESSMENT REPORT
10,019
NO.

part 2 of 2



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INTRODUCTION

Western Geophysical Aero Data Ltd. conducted an airborne magnetometer and VLF-electromagnetometer survey across a group of claims located southwest of the gold producing Giant Mascot mine. The survey was undertaken with the intent of detecting and locating any anomalous magnetic and/or conductive responses which might be reflecting a geological environment favorable for similar mineralization to that observed to the northeast.

The entire survey totalled some 177 line kilometers of which 28 kilometers were used to cover the SA and MA claims. This portion of the survey was conducted on behalf of Manny Consultants Ltd.

PROPERTY

The property area surveyed is registered to Mr. E. Amendologine of Manny Consultants Ltd. as described below and illustrated on the Location and Claim Map Figure 1.

<u>Claim Name</u>	<u>Record Number</u>	<u>Units</u>
MA	1293 (11)	8 full, 6 fractions
SA	1294 (11)	4 full, 6 fractions

These claims were staked at the same time as the 4 claims to the immediate south and a report on one of the claims by A.F. Roberts, P.Eng. suggests that it's legal corner post is actually positioned 600 meters southwest of the location shown on the government claim map. If this information is correct it is very possible the L.C.P. defining the MA and SA claims is similarly displaced and would substantially increase the size of the MA and SA claims as described by the government claim map.

LOCATION AND ACCESS

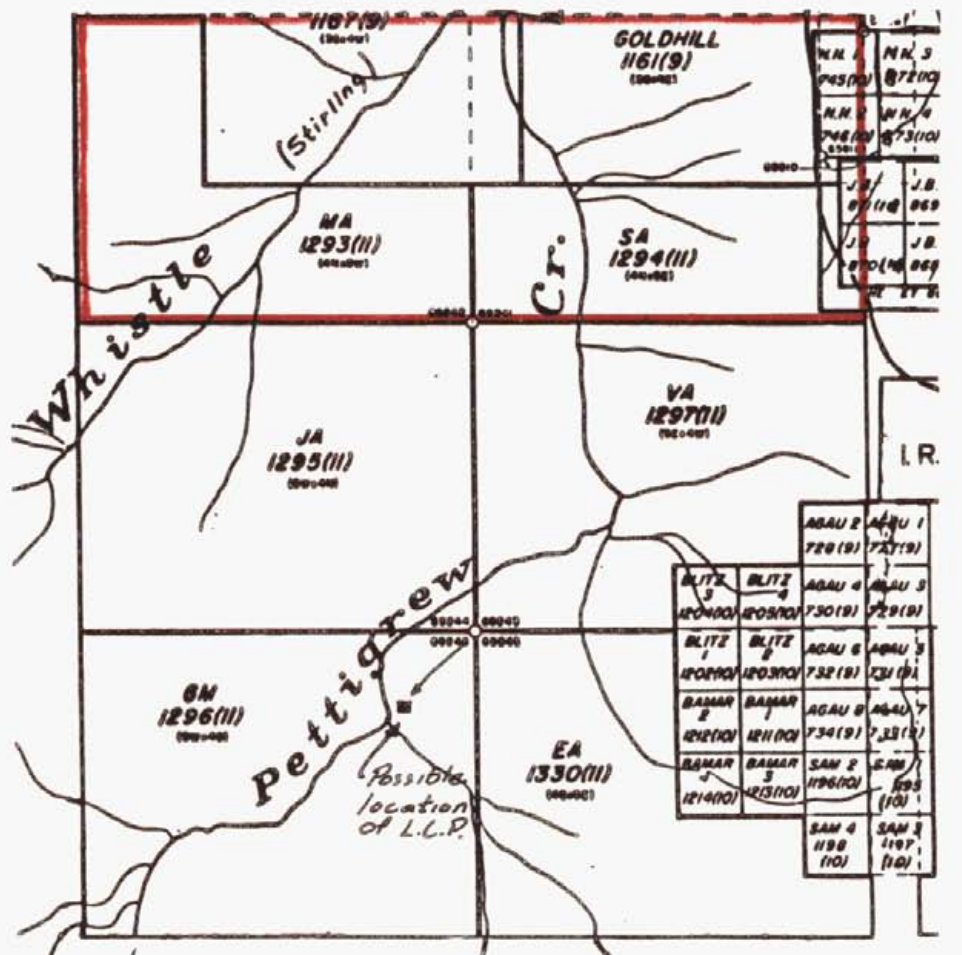
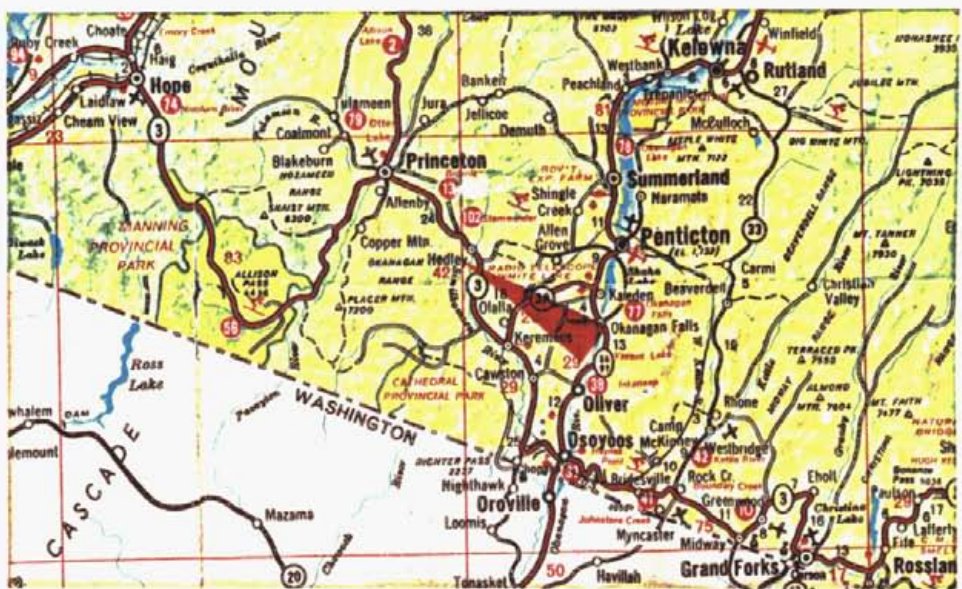
The MA and SA claims are located approximately 7 kilometers west-southwest of Hedley, B.C. in the Similkameen Mining Division and NTS 92 H/8E. The approximate geographical co-ordinates are latitude $49^{\circ}20'N$, longitude $120^{\circ}11'W$.

A well maintained gravel road, which intersects B.C. highway #3 at a point approximately 3 kilometers northwest of the town of Hedley, passes across the claims area. Numerous logging roads in the area provide 4-wheel drive access to various areas on the claims.

GENERAL GEOLOGY

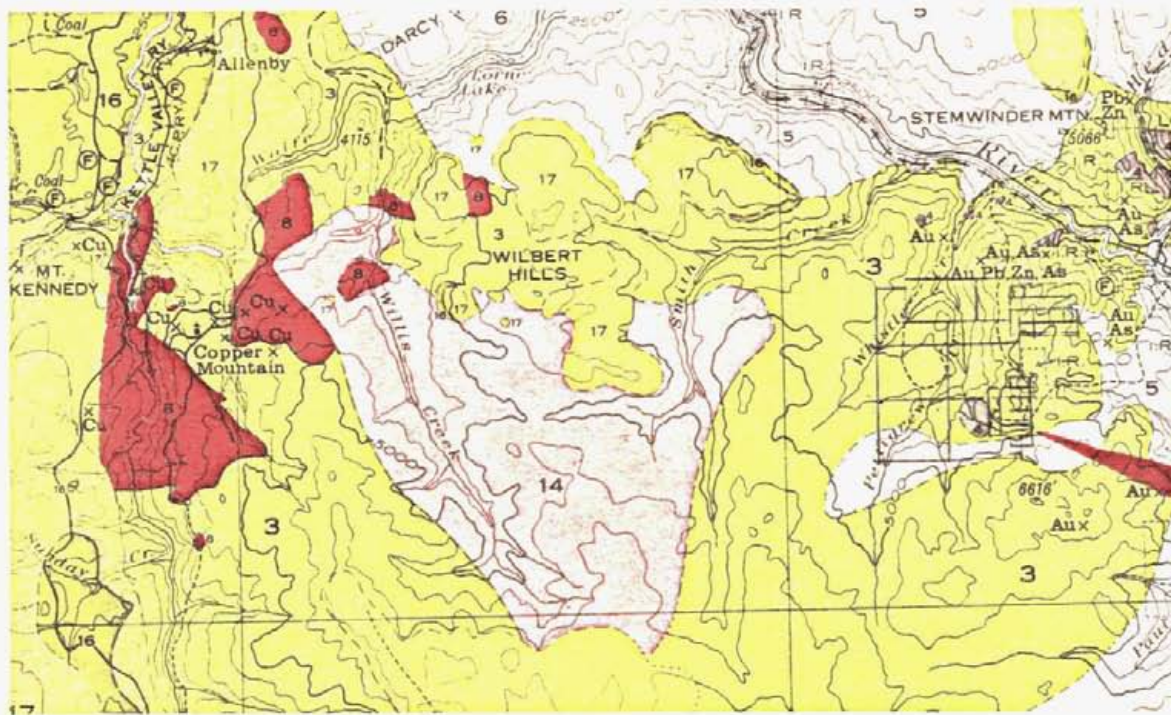
The survey area is outlined on the Geological Survey of Canada's map 888A which depicts the surface geology as mapped by H.M.A. Rice, 1939, 1941 and 1944 and is presented in this report as Plate 1. The majority of the area is mapped as Nicola Group rocks (3) which is a large and varied assemblage consisting mainly of many colored volcanic rocks ranging from porphyritic and non-porphyritic dacite to basalt. Interbedded with the lavas are belts and lenses of sedimentary and pyroclastic rocks. The largest of these, in the vicinity of Hedley, is host to the most important gold mines in the area. Most of the Nicola rocks are not strongly metamorphosed but they are in places sheared into chlorite and sericite schists.

One of the three recognized types of Coast intrusions is mapped across the southern claims of the survey area. The rocks (5) are characteristically acidic, with plenty of visible free quartz and are described as a grey, slightly gneissic granodiorite. Also present in this area is a roughly circular shaped, ultrabasic intrusive body (4) composed of peridotite, pyroxenite and gabbro. This rock type is believed to be the oldest intrusive of any size in the map area; it



MANNY CONSULTANTS LTD.
 MA & SA CLAIMS
 LOCATION AND CLAIMS MAP





SURVEYED CLAIMS

LOCAL GEOLOGY

is however probably closely related to the Coast intrusions.

SURVEY GRID

This survey is a portion of a larger survey which encompassed areas to the south of the MA and SA claims. The survey grid was initially outlined on a photomosaic base and consisted of thirty-one east-west trending lines spaced at two hundred meter intervals. Lines 23 through 31 covered the MA and SA claims and their actual positions, as defined by the video flight path and data recovery tape, are illustrated on Figure 2.

PREVIOUS WORK

Other than a cursory geological inspection of the EA claim to the south as reported on by A.F. Roberts (May 27, 1981), no exploration activity is known of by the authors to have been conducted in the area.



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 50 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 Bonzer 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 two independent modes: an analogue strip chart recorder and a digital video recovery system. A three-pen analogue power recorder provides direct, unfiltered recordings of the three geophysical instrument output signals. Correlation between the strip chart and the video flight path recovery tape is controlled via fiducial marks common to both systems. 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 real time and terrain clearance upon the actual flight path video recording to allow exact correlation between geophysical data and ground location. An optional time-averaging filter of 1, 2, 3, 4 or 5 seconds is available on the VLF-EM data to provide more easily contourable values in noisy areas. The continuous input magnetic signal is processed at the maximum A/D converter rate, averaged and updated on the video display every second. Line identification, flight direction and pertinent survey information are recorded on the audio track of the video recording tape.

DISCUSSION OF RESULTS

I Overall Survey Grid

The total field intensity magnetic data is presented in contour form over a photomosaic base of the survey grid as Figure 2 and can be compared to the geological information shown on Plate 1. The majority of the grid is mapped as Nicola Group rocks (3) and exhibits a background magnetic field intensity of approximately 57,000 gammas. In the southeast portion of the map area, along a tributary of Pettigrew Creek, a roughly circular outcrop of peridotite, pyroxenite gabbro (4) is reflected as a low in the magnetic field (line 8 - Figure 3). This magnetic low extends to the southeast, possibly indicating an unmapped extension of the gabbro intrusion in the same direction. The geologically mapped Coast Intrusive unit (5) in the southwest section of the survey grid appears to be reflected by higher magnetic values (approximately 57,200 gammas) as illustrated on line 7, Figure 4. Similar magnetic values are observed along the eastern border of the survey grid, possibly reflecting a similar intrusive presently unmapped by surface geology.

Along the western edge of the low magnetic trend believed related to the gabbro intrusion a roughly circular shaped magnetic high is observed centered on line 11 (Figure 5). This anomaly is reflecting a zone of high magnetic susceptibility materials, possibly a dioritic phase in an alteration zone around the gabbro intrusion. Similarly high magnetic values are observed to the south on lines 3, 2 and 1 and could be related to the same feature.

No strong VLF-EM anomalies were located across the survey grid which could be interpreted as the response to a near surface, highly conductive body. A number of narrow and weak field strength increases are scattered across the

grid as shown on the interpretation map, Figure 2. These anomalies likely reflect small, slightly conductive, near surface features such as minor faults or contact zones.

II MA and SA Claims

These claims are presently mapped as being underlain entirely by Nicola Group Volcanics and the magnetic data supports this interpretation. If the legal corner post is positioned as suggested in the property description of this report, the SA claim would cover the northern edge of a magnetic high (line 21 - Figure 6) believed to represent an unmapped Coast Intrusive unit.

All but one of the unexplained VLF-EM anomalies observed across the survey grid as shown on Figure 2 occur on the MA and SA claims. The responses are all very weak and reflections of surface or near surface, weak conductive units. The anomalies are all of similar character and amplitude to those located on line 25 as illustrated in Figure 7 of this report.

SUMMARY AND RECOMMENDATIONS

During October, 1981 an airborne magnetic and VLF-electromagnetic survey was flown across a group of six claims southwest of Hedley, B.C. The survey was flown with the intent of assisting geological mapping and directing further exploration activity to the most favorable geological environments. Of the 177 line kilometers surveyed, 28 kilometers were flown across the MA and SA claims.

It is apparent that the total magnetic field intensity measurements can be used to map the three geological environments known in the area. Based on the magnetic results it appears that the small gabbro intrusion mapped in the southeast section of the grid actually extends to the southeast and is open in that direction. A similar magnetic response occurs 1.5 kilometers west of the known gabbro intrusion and may be reflecting another, presently unmapped unit. A strong magnetic high, which is presently unexplained, borders the western edge of the southeast trending gabbro intrusion. This response may be reflecting a dioritic phase of an alteration zone surrounding the intrusion.

The relatively large Coast Intrusion in the southwest section of the grid displays a magnetic signature of approximately 200 gammas above the intensity of the surrounding Nicola Group Volcanics. A similar response occurs along the eastern border of the survey area and could be indicating another occurrence of this rock unit.

The MA and SA claims are underlain entirely by Nicola Group Volcanic rocks. If the legal corner post describing these claims is positioned southwest of the location shown on the government claim map, the SA claim would partially cover a magnetic high believed to represent an unmapped Coast Intrusive unit.

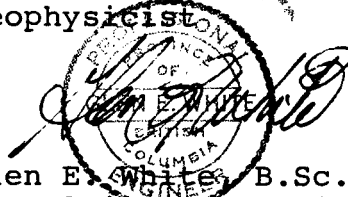
Numerous weak VLF-EM responses occur across the claims area. The responses are originating from surface or very near surface, weakly conductive units. Due to the easy access in this area a quick ground inspection with the intent of identifying the causative features is recommended.

The mineral rights in the area to the south of the EA and GM claims are presently unclaimed and appear to cover southeasterly extensions of the interesting magnetic anomalies observed. It is recommended that this area be explored further.

Respectfully submitted,



E. Trent Pezzot, B.Sc.,
Geophysicist



Glen E. Whites, B.Sc., P.Eng.,
Consulting Geophysicist



Instrument Specifications

SABRE AIRBORNE MAGNETOMETER

Type: Proton Precession

Range: 20,000 gammas to 75,000 gammas

Repetition Rate: Approximately 1 second or 3 seconds selected by toggle switch

Output: Designed to operate into any potentiometric chart recorder with 0 to 0.1 volt scale

Display: Digital dial plus analogue meter

Period: Meter records last 1000 λ , 2000 λ , 5000 λ , of total field depending on scale selected. Zeroing system allows chart recording pen to be positioned anywhere on paper, so that if the pen is centred, the resulting scales that can be selected are + 500 λ , + 1000 λ , or + 2500 λ . These scales are standard but virtually all others can be provided.

Resolution: Resolution of the instrument itself is better than 1 gamma. Ultimate resolution depends on the accuracy of the chart recorder.

Detector: Kerosene filled coil approximately 9 cm x 8 cm in diameter.
Inductance - 60 millihenries
Resistance - 7.5 ohms
Weight - 2.2 Kg.

Operating Temperature: Instrument - -10°C to $+60^{\circ}\text{C}$
Detector - -40°C to $+60^{\circ}\text{C}$

Dimensions: Instrument Console - 30 cm x 10 cm x 25 cm
Towed Bird - 1.7 m x 21 cm diameter

Weight: Instrument Console - 3.5 Kg.
Towed Bird - 30 Kg.
(VLF-EM antennae system housed in bird with magnetometer detector)

Power Source: Two 12 volt, 28 amp-hour lead acid batteries (gelled electrolyte)



Instrument SpecificationsSABRE AIRBORNE VLF SYSTEM

- Source of Primary Field: VLF radio stations in the frequency range of 14 KH_z to 30 KH_z .
- Type of Measurement: - Horizontal field strength
- Number of Channels: - Two; Seattle, Washington at 18.6 KH_z
- Annapolis, Maryland at 21.4 KH_z
- 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

DATA RECORDING SYSTEM

i) Chart Recorder

Type: Esterline Angus Miniservo III Bench AC Ammeter -
Voltmeter Power Recorder
Model: MS 413 B
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 2-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 50/60 H_z (Approx-
imately 30 VA)
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 d c signals
1, 0 - 25 volt d c signal
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

Instrument SpecificationsFLIGHT PATH RECOVERY SYSTEMi) 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 to housing
- housing bolted to helicopter skid

ii) Video Recorder:

Model: Sony SLO - 340
Power Supply: 12 volt dc / 120 volt AC (60 H_Z)
Tape: Betamax ½" 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 Ω unbalanced, sync negative
from camera

iii) Altimeter:

Model: Bonzer Mk 10 Radar Altimeter
Power Supply: 12 - 25 volts dc
Output: 0 - 25 volt (1 volt / 1000 feet) dc signal split
to microprocessor and analogue meter
Mounting: fixed to T.V. camera housing, attached to helicopter
skid

COST BREAKDOWN

<u>PERSONNEL</u>	<u>PRODUCTION</u>	<u>DATES</u>	<u>TOTAL</u>
J. Behenna	Survey Preparation	Oct. 12-16	\$ 100.00
J. Miller & J. Harrington	Survey	Oct. 23	\$ 300.00
J. Behenna	Data Recovery	Nov. 11-13, 16	\$ 150.00
J. Behenna	Report Preparation	Jan. 12-14	\$ 50.00
Helicopter			\$ 550.00
Equipment Lease			\$ 100.00
Vehicle Rental			\$ 25.00
Meals			\$ 21.00
Airphotography			\$ 4.00
Mosaic Construction			\$ 100.00
Photographics			\$ 200.00
Interpretation and Report			\$ 400.00
Drafting and Materials			\$ 170.00
Report Reproduction			\$ <u>80.00</u>
Total			\$2,250.00

STATEMENT OF QUALIFICATIONS

NAME: PEZZOT, E. Trent

PROFESSION: Geophysicist - Geologist

EDUCATION: University of British Columbia -
B.Sc. - Honors Geophysics and Geology

**PROFESSIONAL
ASSOCIATIONS:** Society of Exploration Geophysicists

EXPERIENCE: Three years undergraduate work in
geology - Geological Survey of Canada,
consultants.

Three years Petroleum Geophysicist,
Senior Grade, Amoco Canada Petroleum
Co. Ltd.

Two years consulting geophysicist,
Consulting geologist - B.C., Alberta,
Saskatchewan, N.W.T., Yukon, western
U.S.A.

Two years geophysicist with Glen E.
White Geophysical Consulting & Ser-
vices Ltd.

STATEMENT OF QUALIFICATIONS

NAME: WHITE, Glen E., P.Eng.

PROFESSION: Geophysicist

EDUCATION: B.Sc. Geophysicist - Geology
University of British Columbia.

PROFESSIONAL ASSOCIATIONS: Registered Professional Engineer,
Province of British Columbia.

Associate member of Society of Exploration Geophysicists.

Past President of B.C. Society of Mining Geophysicists.

EXPERIENCE: Pre-Graduate experience in Geology -
Geochemistry - Geophysics with Anaconda
American Brass.

Two years Mining Geophysicist with
Sulmac Exploration Ltd. and Airborne
Geophysics with Spartan Air Services
Ltd.

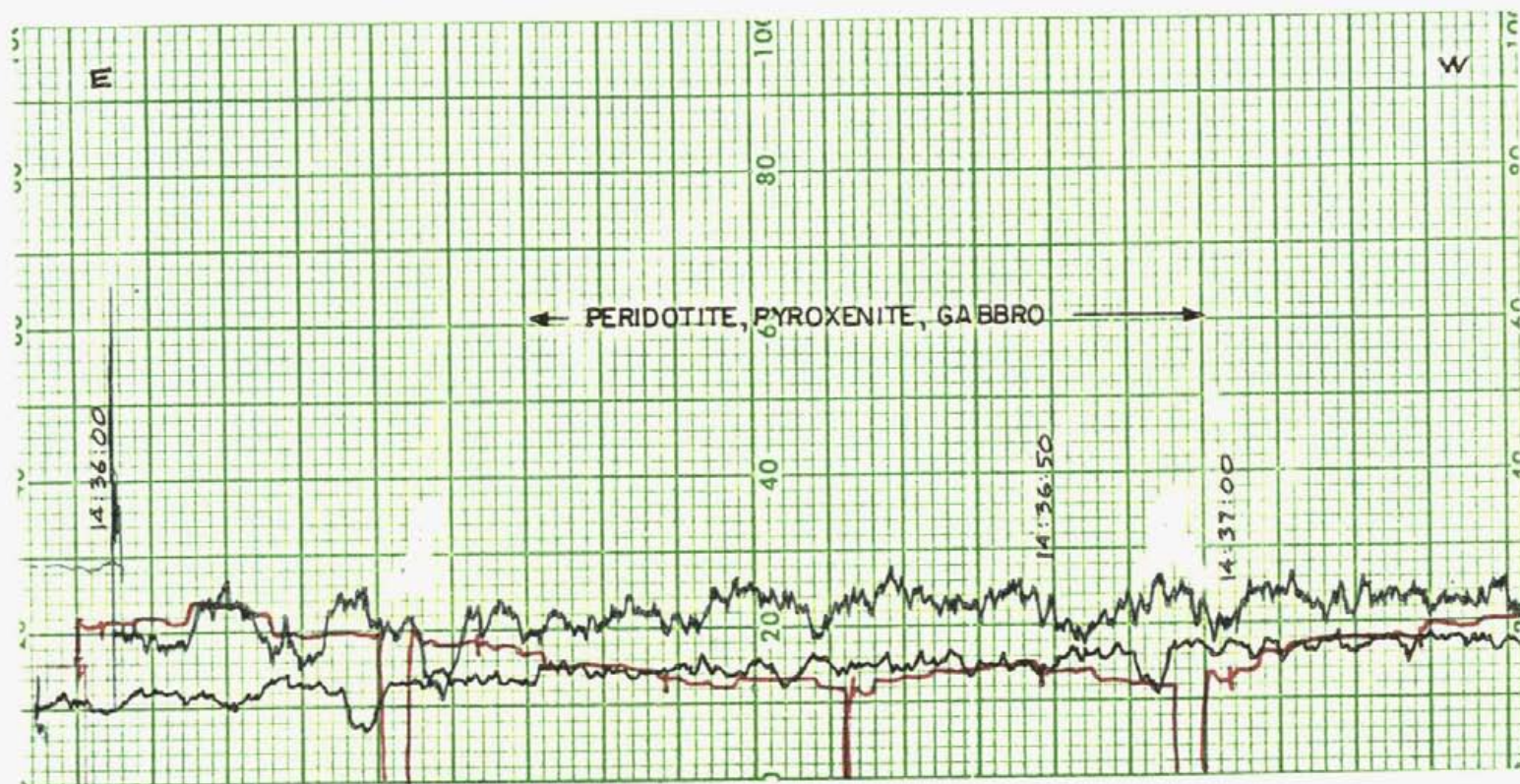
One year Mining Geophysicist and Technical
Sales Manager in the Pacific
north-west for W.P. McGill and Associates.

Two years Mining Geophysicist and
supervisor Airborne and Ground Geophysical
Divisions with Geo-X Surveys
Ltd.

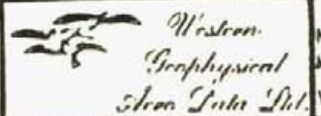
Two years Chief Geophysicist Tri-Con
Exploration Surveys Ltd.

Eleven years Consulting Geophysicist.

Active experience in all Geologic provinces
of Canada.



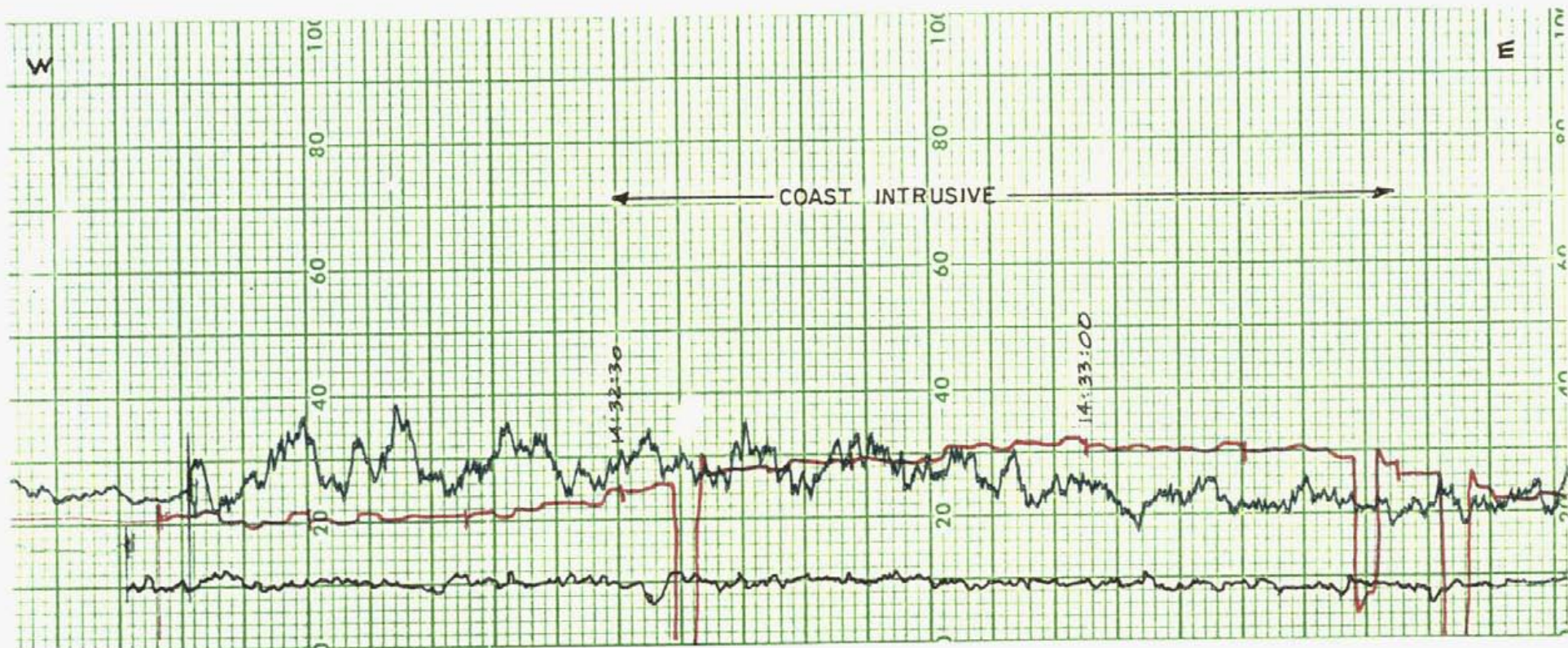
MANNY CONSULTANTS LTD.
LINE 8



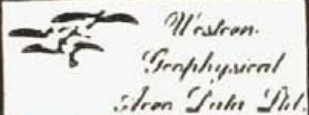
MAGNETOMETER BASE VALUE = 56600
 MAGNETOMETER VERTICAL SCALE 1 cm = 200 gammas
 VLF-EM VERTICAL SCALE 1 cm = 10%

MAGNETOMETER : RED
 VLF-EM (SEATTLE) : BLUE
 VLF-EM (ANNAPOLIS) : BLACK

FIG. 3

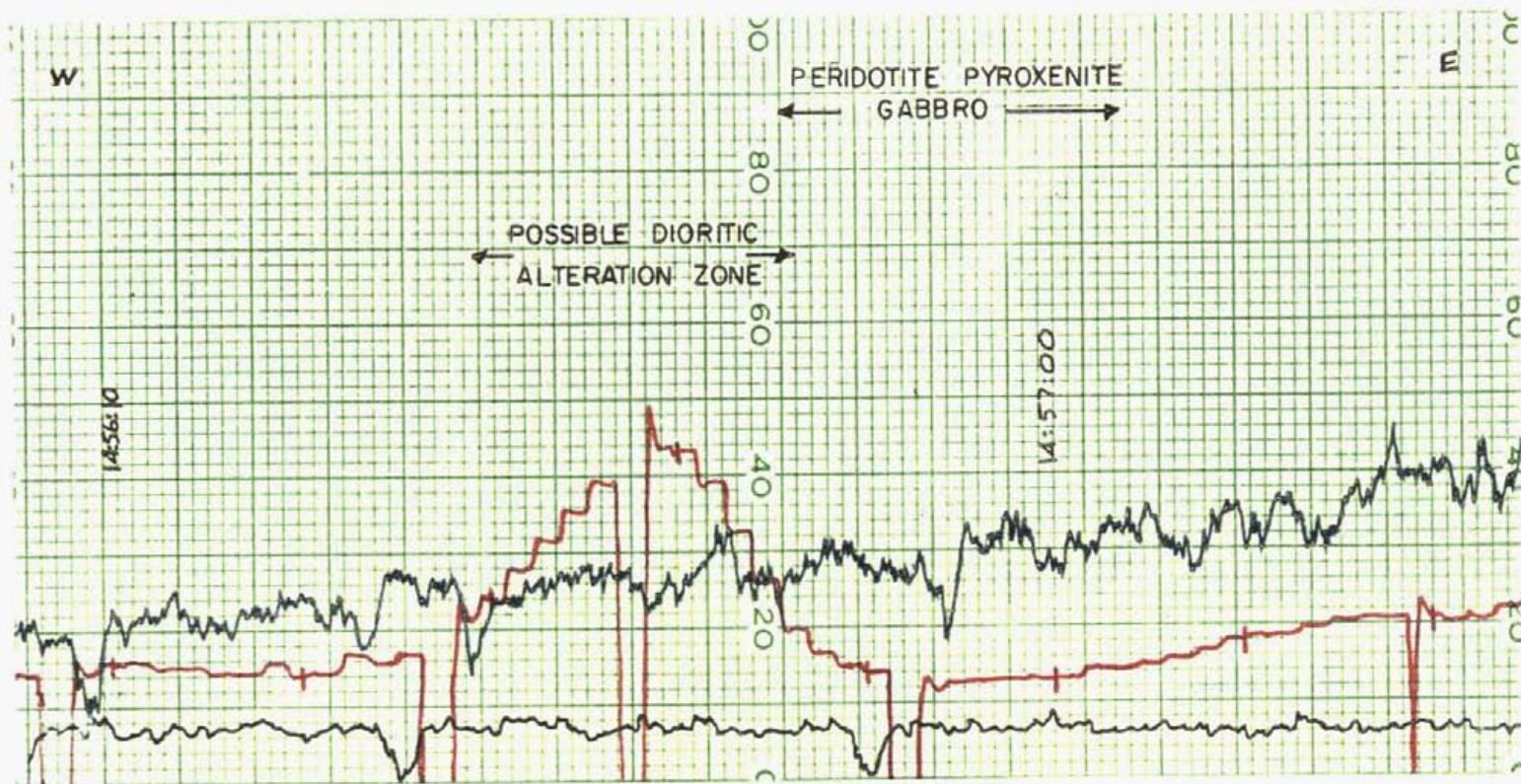


MANNY CONSULTANTS LTD.
LINE 7

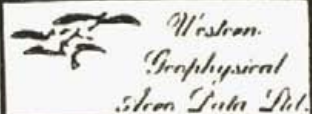


MAGNETOMETER BASE VALUE = 56600
MAGNETOMETER VERTICAL SCALE 1cm = 200 gammas
VLF-EM VERTICAL SCALE 1cm = 10%

MAGNETOMETER : RED
VLF-EM (SEATTLE) : BLUE
VLF-EM (ANNAPOLIS) : BLACK



MANNY CONSULTANTS LTD.
LINE 11

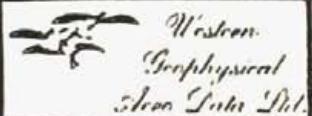


MAGNETOMETER BASE VALUE = 56600
MAGNETOMETER : VERTICAL SCALE 1cm = 200 gammas
VLF-EM : VERTICAL SCALE 1cm = 10%

MAGNETOMETER : RED
VLF-EM (SEATTLE) : BLUE
VLF-EM (ANNAPOLIS) : BLACK

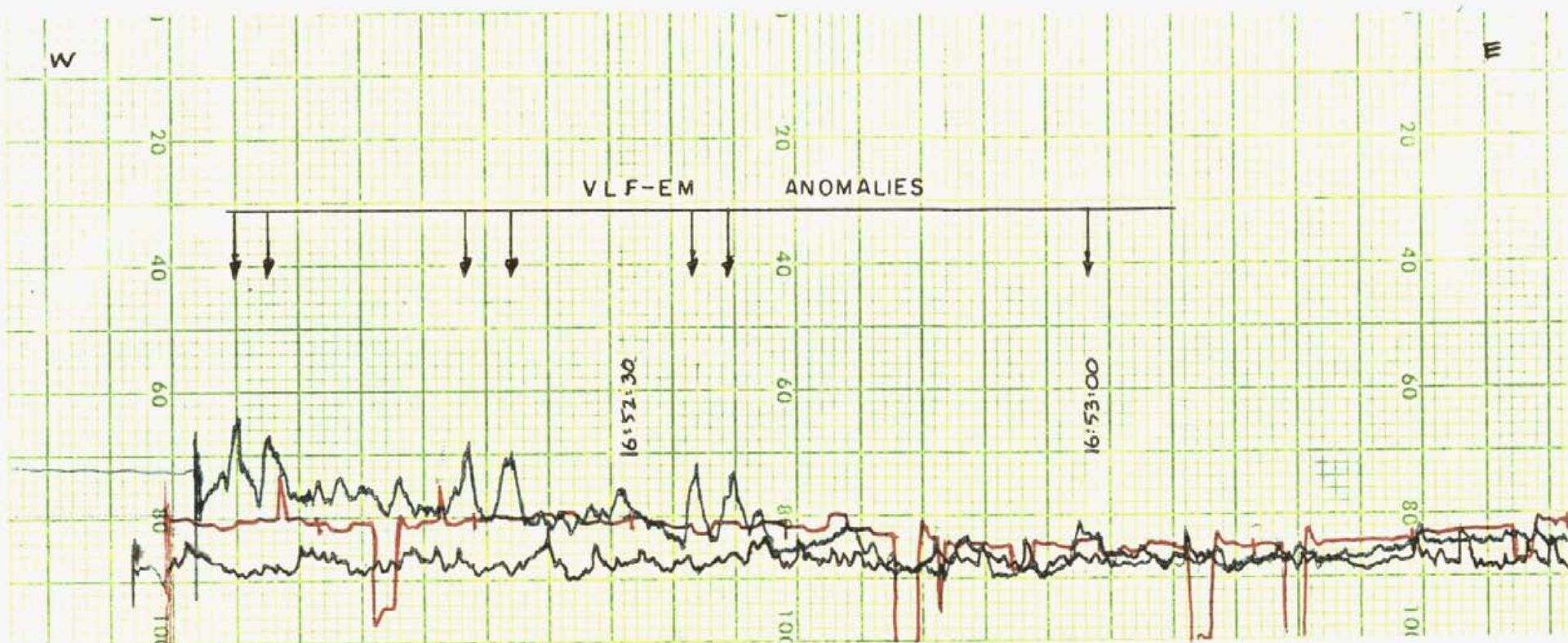


MANNY CONSULTANTS LTD.
LINE 21

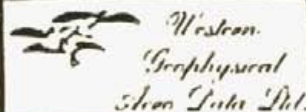


MAGNETOMETER BASE VALUE = 56600
MAGNETOMETER VERTICAL SCALE 1cm = 200 gammas
VLF-EM VERTICAL SCALE 1cm = 10%

MAGNETOMETER : RED
VLF-EM (SEATTLE) : BLUE
VLF-EM (ANNAPOLIS) : BLACK



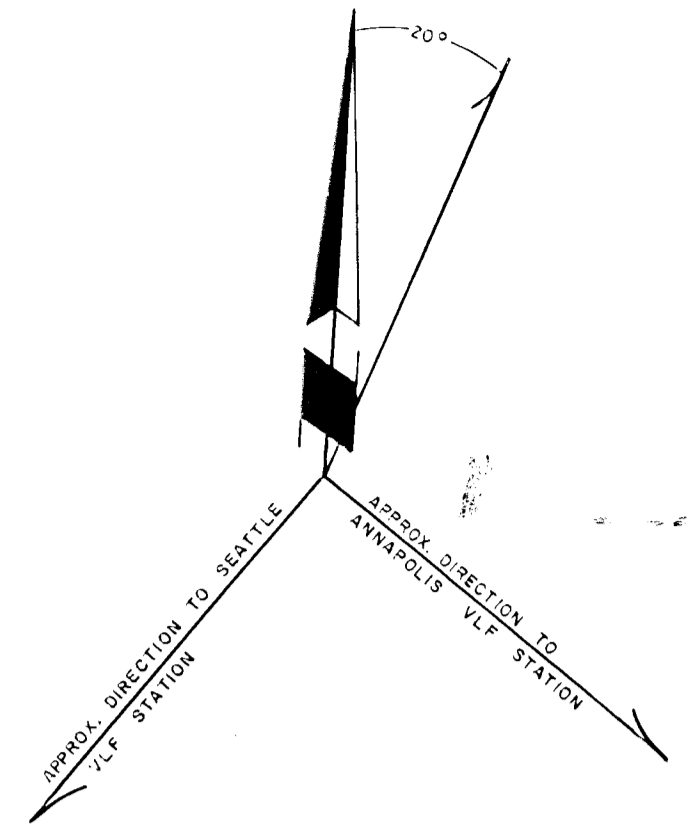
MANNY CONSULTANTS LTD.
LINE 25



MAGNETOMETER BASE VALUE = 56600
MAGNETOMETER : VERTICAL SCALE 1cm = 200 gammas
VLF-EM : VERTICAL SCALE 1cm = 10%

MAGNETOMETER : RED
VLF-EM (SEATTLE) : BLUE
VLF-EM (ANNAPOLIS) : BLACK

FIG. 7



LEGEND:

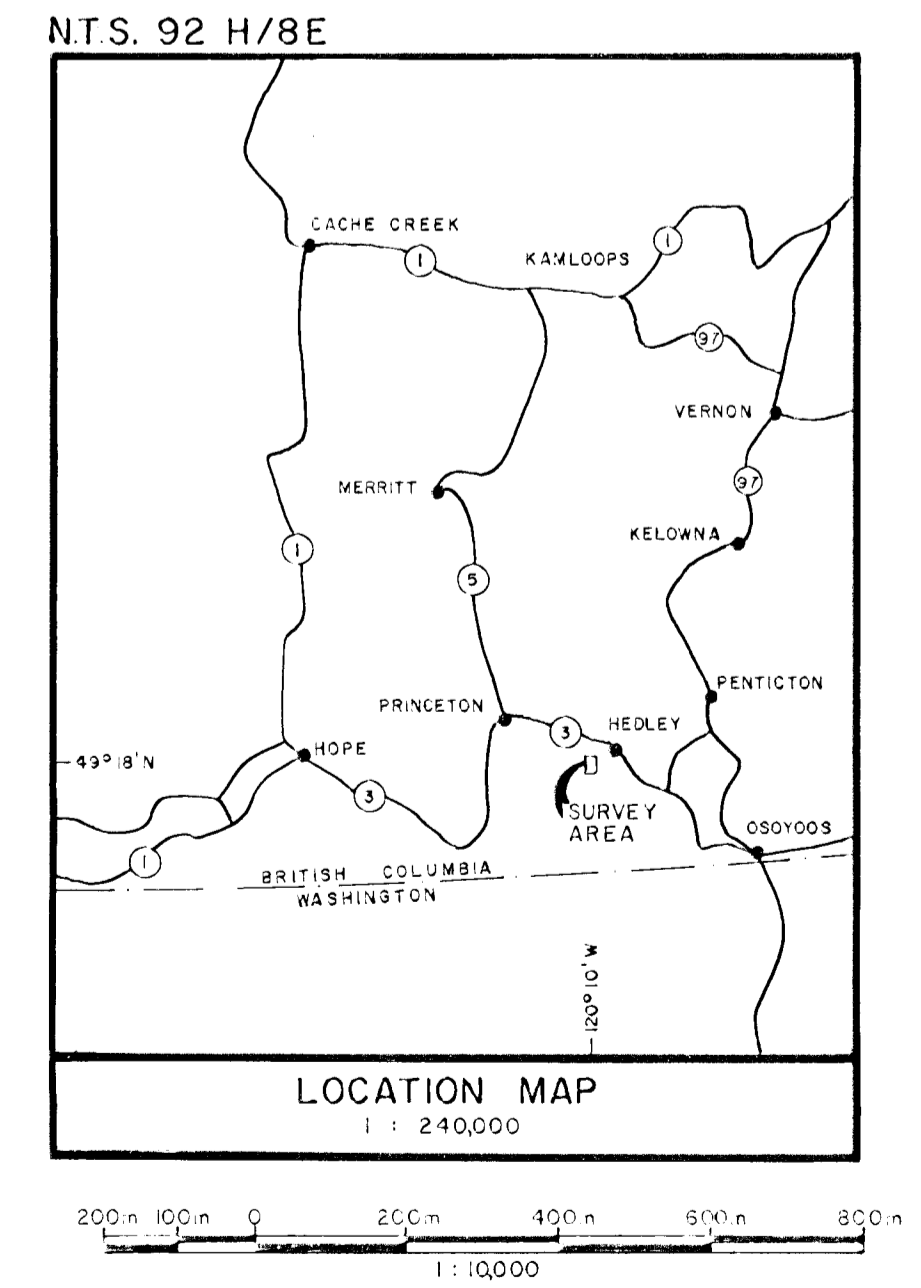
- FLIGHT LINES
- 5 SECOND INTERVAL
- CLAIM BOUNDARIES
- TOTAL FIELD MAGNETIC INTENSITY CONTOURS - γ mG
- VLF-EM ANOMALIES - % INCREASE ABOVE BACKGROUND
- MA & SA CLAIMS

INSTRUMENTS:

- SABRE AIRBORNE MAGNETOMETER
- SABRE AIRBORNE VLF-ELECTROMAGNETOMETER
- (1) SEATTLE, WASHINGTON - 18.6 KHZ
- (1) ANNAPOLIS, MARYLAND - 21.4 KHZ

MIN. INDUSTRIES BRANCH
 RECORD REPORT
10,019

part 2 of 2



MANNY CONSULTANTS LTD
 MA & SA CLAIMS
 SIMILKAMEN MINING DIVISION - BRITISH COLUMBIA

**AIRBORNE MAGNETOMETER AND
 VLF - ELECTROMAGNETOMETER SURVEY
 GEOPHYSICAL INTERPRETATION MAP**

Interpreted By: E.F.P.	Checked By: E.F.P.
Drawn By: N.L.P.	Date: JAN. 92
Drawn By: E.F.P.	Fig. No. 2

