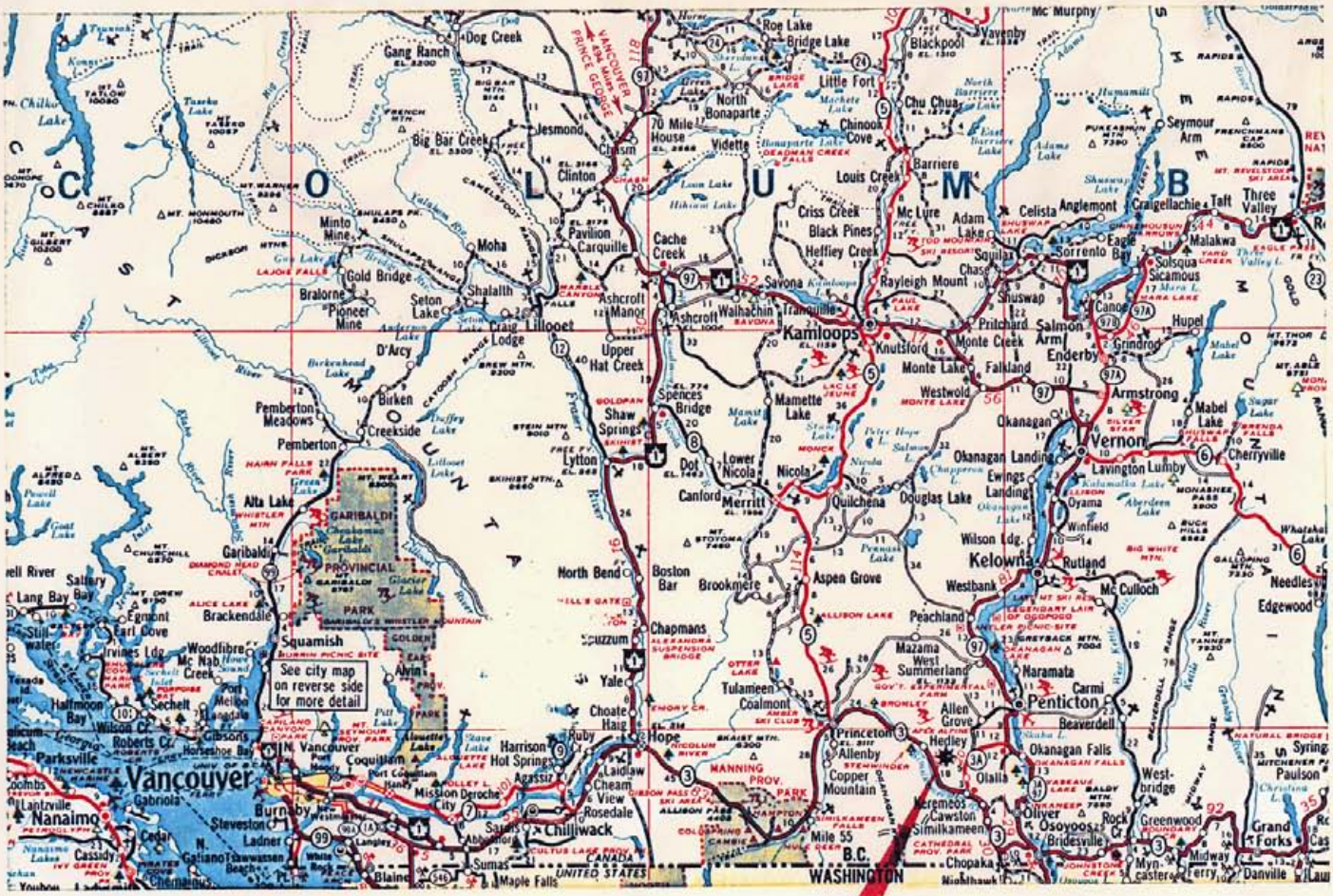
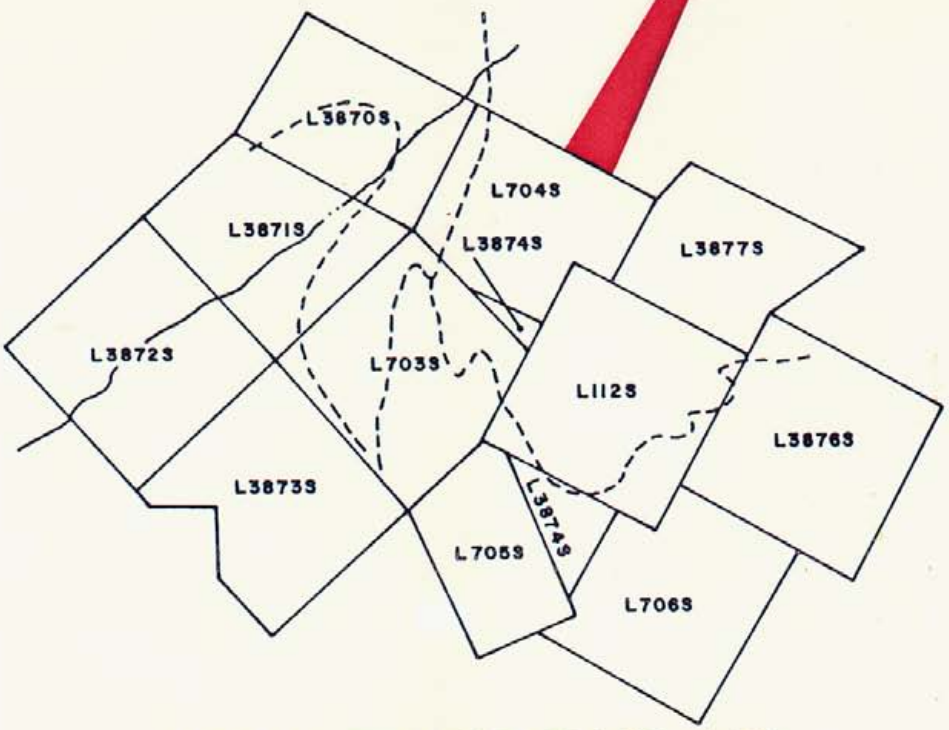
6274-9

GEOPHYSICAL REPORT '77-#159-#
GROVE EXPLORATIONS LTD.

French Mine claims, Hedley, B.C., Hedley
Mining Division
Lat. 49°20'N Long. 120°01'W N.T.S. 92 H/8

AUTHOR: Glen E. White, B.Sc., Geophysicist
DATE OF WORK: September 13-19, 1976
DATE OF REPORT: October 7, 1976





GROVE EXPLORATIONS LTD.

FRENCH PROPERTY

LOCATION AND CLAIM MAP

Glen E White
geophysical consulting
services ltd

SCALE : 1" = 40 MILES

OCT. 1, 1976
FIG. 1

C O N T E N T S

Illustrations

M-1 -
M-2
M-3

M-4 - Geology IP Chargeability & PART 2

M-5 - VLF-EM & IP Resistivity

INTRODUCTION

During the period September 13-19, 1976, Glen E. White Geophysical Consulting & Services Ltd. conducted a program of linecutting, electromagnetometer and induced polarization surveying on a group of crown grant mineral claims known as the "French Mine" claims. The survey was conducted on behalf of Grove Exploration Ltd. to try and locate any extension of the original mineral deposit.

PROPERTY

The property consists of some 13 contiguous crown grant mineral claims as illustrated on Figure 1.

LOCATION AND ACCESS

The property is located some 4 miles southeast of HEDLEY, B.C. west of Winters Creek and immediately north of the Indian Reserve land, Latitude 49°20'N, Longitude 120°01'W, N.T.S. 92 H/8.

Access to the property is by gravel road to the 3910 portal from the Hedley - Nickel Plate road.

GENERAL GEOLOGY

This property is generally referred to in the B.C. Department of Mines literature as the Oregon claims or French Mine. Mining of the mineral zone was undertaken

by Kelowna Mines Kedley Ltd. from 1950 - 55 and by Cariboo Gold Quartz Mining Company Ltd. as the French Mines Ltd.

A general geological description of the mine can be found in the B.C. Minister of Mines and Petroleums Resources Annual Report 1960. The mine is in a solient of the Nicola group of Triassic age which extends about a mile southwest ward into younger granodiorites of Jurassic age described as the Coast Intrusives. The Nicola group consists of a band of limy strata up to 60 feet wide between fine-grained dark coloured tuffs. Locally the limestone has been replaced by silica. The ore consists of bornite, chalcopyrite, arseno-pyrite and pyrrhotite in a gangue of metamorphosed limestone consisting of quartz, garnet and epidote. The axis of the ore body trends northwest and plunges to the southeast and is flat lying for most of its length and may possibly be controlled by an overturned nappe-type fold.

SURVEY SPECIFICATIONS

Survey Grid

The baseline was surveyed at a bearing of S 65° E for a distance of some 4000 feet. Lines 2W, 0, 4E, 8E, 16E, 24E and 40 E were turned off at right angles and numbered at 100 foot intervals. Some 5 miles of survey grid was established.

Electrode Array

The data was obtained using the "three electrode" array. This array consists of one current (C_1) and two potential electrodes (P_1 and P_2) which are moved together along the survey line at a fixed distance apart which is known as the "a" spacing. The second current electrode is placed at "infinity". This survey was conducted with an "a" spacing of 300 feet.

Induced Polarization

The equipment used on this survey was the Huntec pulse-type unit. Power was obtained from a Briggs and Stratton motor coupled to a 2.5 KW 400 cycle, three phase generator, providing a maximum of 2.5 KW D.C. to the ground. The cycling rate is 1.5 seconds "current on" and 0.5 seconds "current off", the pulse reversing continuously in polarity. Power was transmitted to the ground through two potential electrodes, P_1 and P_2.

The data recorded in the field consists of careful measurements of the current (I) in amperes flowing through electrodes C_1 and C_2, the primary voltage (V_p) appearing between electrodes P_1 and P_2 during the "current on" part of the cycle, and the secondary voltage (V_s) appearing between electrodes P_1 and P_2 during the "current off" part of the cycle.

The apparent chargeability (M') in milliseconds, is calculated by T_p ($M_1 \not + 2M_2 \not + 4M_3 \not + 8M_4$) = M', where T_p is the basic integrating time in tenths of seconds. M_1, M_2, M_3 and M_4 are the chargeability effects at various times on the voltage decay curve following switch off of the transmitter, measured as a percentage of the primary voltage, V_p recorded during the "current on" time. By the use of these factors, one can gain an estimate of the decay curve in terms of chargeability for the given time T_p. This gives a quantitative value to the data measured.

The apparent resistivity, in ohm-feet, is proportional to the ratio of the primary voltage to the measured current, the proportionality factor depending on the geometry of the electrode array used. The chargeability and resistivity obtained are called "apparent" as they are values which that portion of the earth sampled by the array would have if it were homogeneous. As the earth sample is usually inhomogeneous, the calculated apparent chargeability and apparent resistivity are functions of the actual chargeabilities and resistivities of the rocks sampled and of the geometry of the rocks.

Electromagnetometer Survey

This survey was conducted using a Ronka EM-16 V.L.F. electromagnetometer. This instrument acts as a receiver only. It utilizes the primary electromagnetic fields generated by VLF marine communication stations. These stations operate at a frequency between 15-25 KHZ, and have a vertical antenna-current resulting in a horizontal primary field. Thus, this VLF - EM measures the dip-angle of the secondary field induced in a conductor.

For maximum coupling, a transmitter station located in the same direction as the geological strike should be selected, since the direction of the horizontal electromagnetic field is perpendicular to the direction of the transmitting station.

Readings were taken at 50 foot intervals and the data filtered in the field by the operator as described by D. C. Fraser, Geophysics Vol. 34, No. 6 (December 1969). The advantage of this method is that it removes the dc and attenuates long spatial wave lengths to increase resolution of local anomalies, and phase shifts the dip-angle data by 90 degrees so that crossovers and inflections will be transformed into peaks to yield contourable quantities.

DISCUSSION OF RESULTS

The induced polarization chargeability data is illustrated in Figure 2. A high of 11.3 milliseconds was reached above a background of some 2.5 milliseconds. The survey located a pronounced NW-SE trend which increases in intensity to the SE. This trend direction coincides with the known plunge of the original ore body.

The resistivity data is depicted on Figure 3 and varied from a low of 2100 ohm-feet to a high of 23,600 ohm-feet in the area of the old workings. The apparent resistivity data indicates shallow overburden conditions and for the most part is reflecting the physical characteristics of the bedrock. The areas of high resistivity, 7500 - 10,000 ohm-feet and over, likely reflect areas of limestone.

The V.L.F. electromagnetometer survey located a strong NE-SW trending conductor which reached a high of 48° filtered dip angle. This conductive feature likely reflects a fault zone with possible associated mineralization.

Correlation of the induced polarization and electromagnetometer data is illustrated on the interpretation map, Plate 4. The strong electromagnetic conductor B-B' shows excellent correlation with a low resistivity linear C-C'. These features would appear to regresent a major

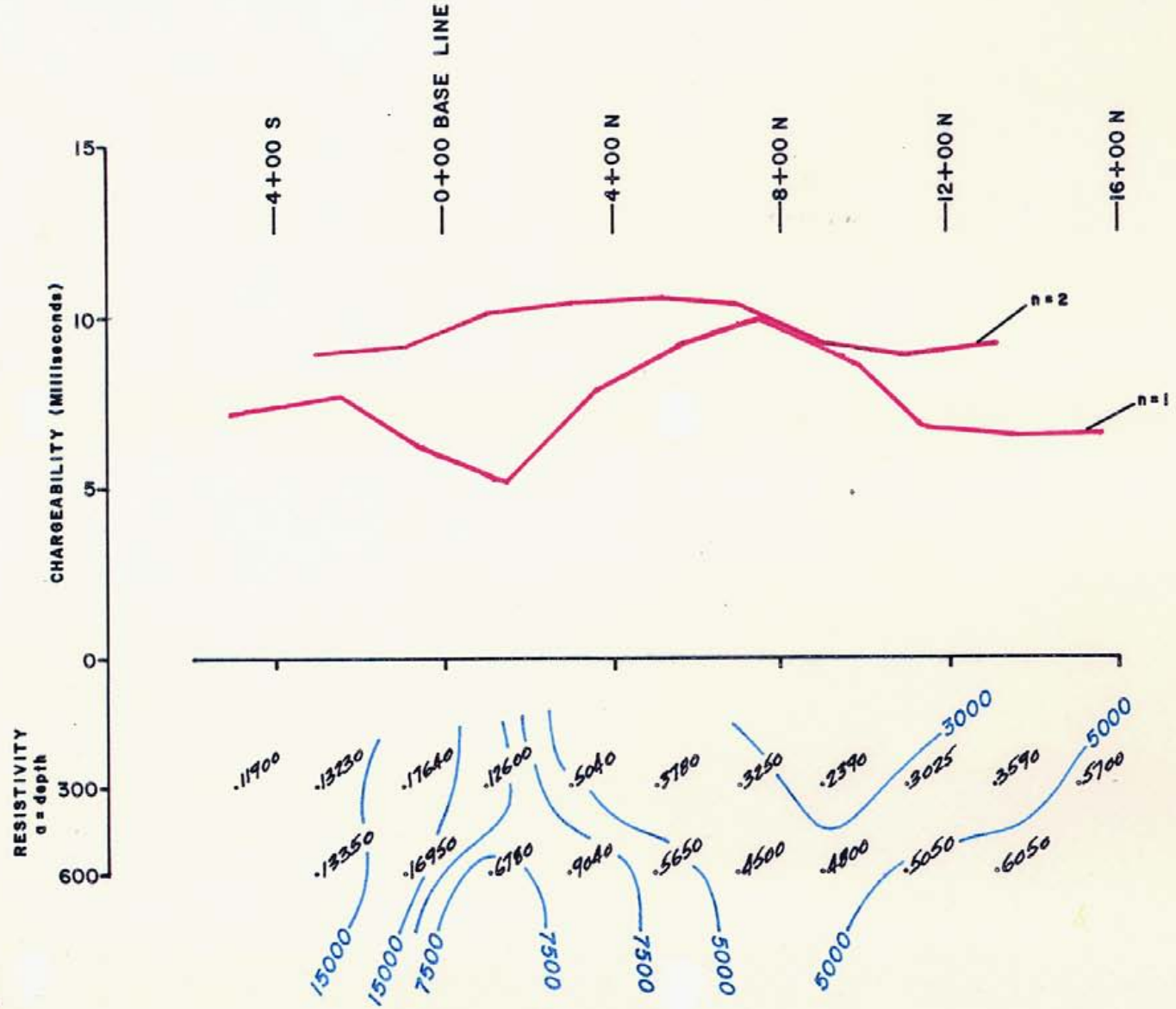
fault linear which possibly offsets the limestone beds (resistivity highs) and appears to have a possible parallel fault A-A'. The chargeability data increases in intensity to the SE in association with high resistivity values and may have been offset by linear A-A'. The chargeability anomaly extends some 3 claim lengths and is open to the NW and SE. It is likely caused by a halo of disseminated mineralization along the periphery of more intensity metamorphosed zones.

Detailed induced polariation surveying was conducted on lines 4E, and 16E with a = 300 and n = 2 and on line 24E with n = 2 and 3. This information is illustrated on Plates 1 - 3 inclusive. On all the lines there is a definite increase in chargeability with depth towards the southeast. Plate 1 shows a broad high centered over 4N at n = 2 which is over the area of the old stoops. Line 16E is particularly interesting as the resistivity increases with depth at 0 $\neq$ 00 and the chargeability response increases to some 15 milliseconds. Line 24E shows a definite increase in response at all separations towards 4S.

GROVE EXPLORATIONS LTD.

DETAILED INDUCED POLARIZATION PROFILES

LINE 4+00 E



Glen E Wells
geophysical consulting
services ltd

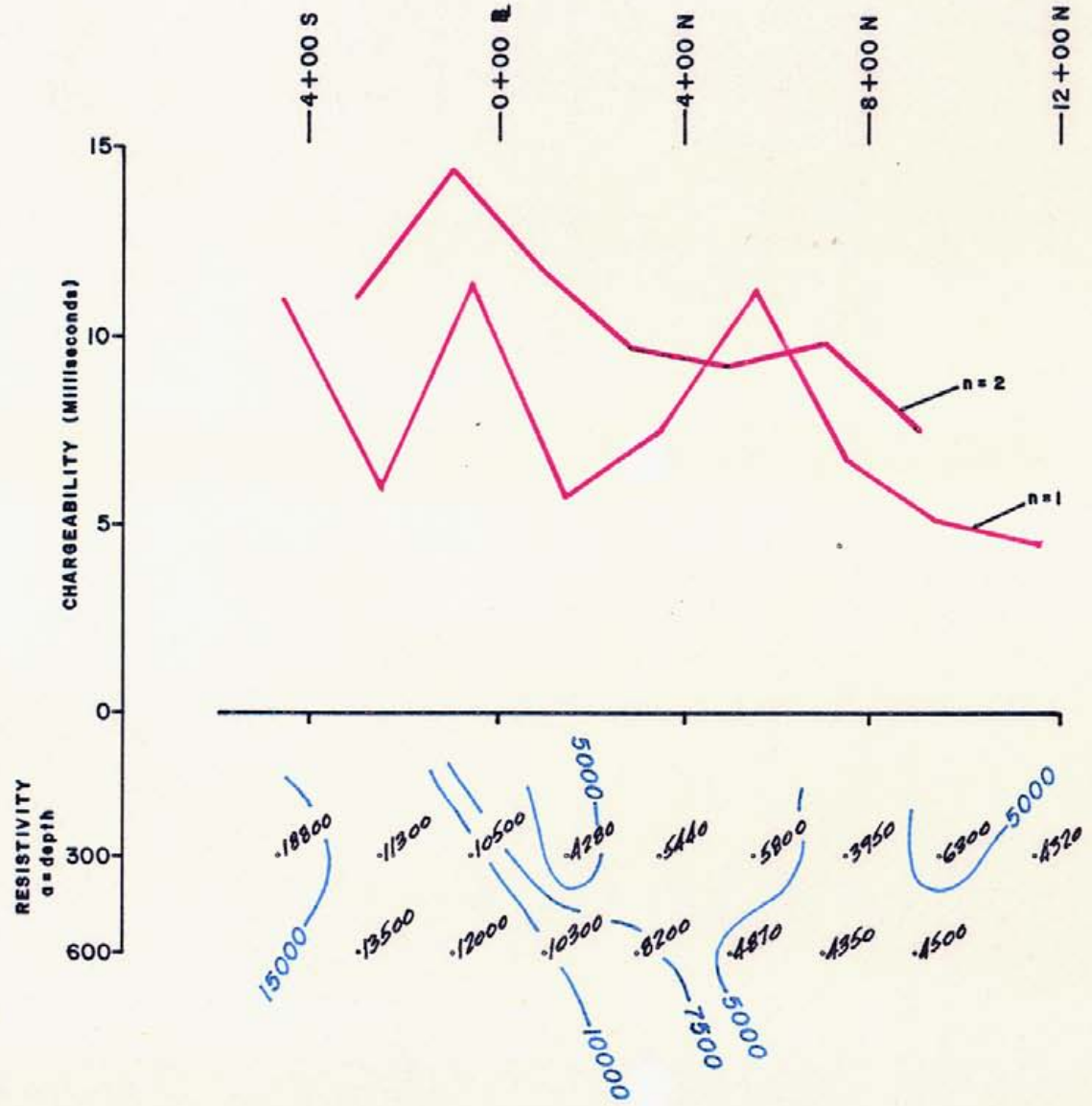
SCALE 1" = 400'

OCT 1, 1976
PLATE 1

GROVE EXPLORATIONS LTD.

DETAILED INDUCED POLARIZATION PROFILES

LINE 16+00 E



Glen E. Watts
geophysical consulting
services ltd

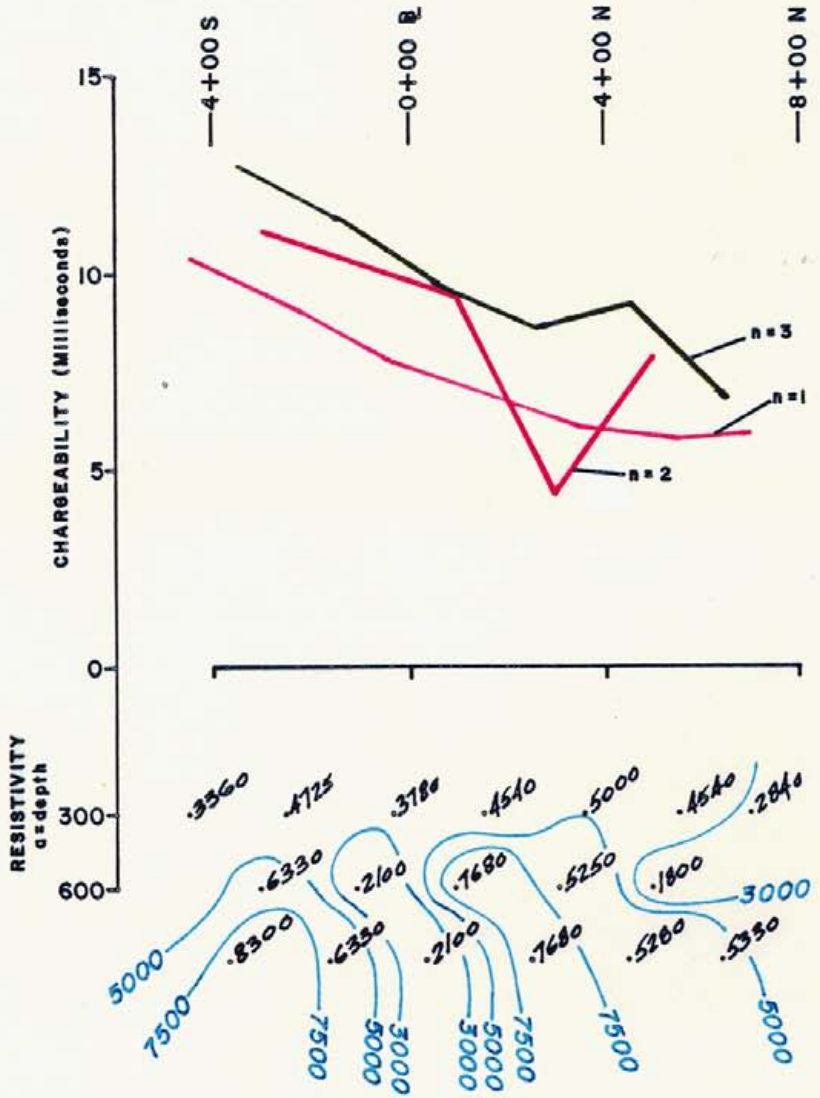
SCALE: 1" = 400'

OCT 1, 1976
PLATE 2

GROVE EXPLORATIONS LTD.

DETAILED INDUCED POLARIZATION PROFILES

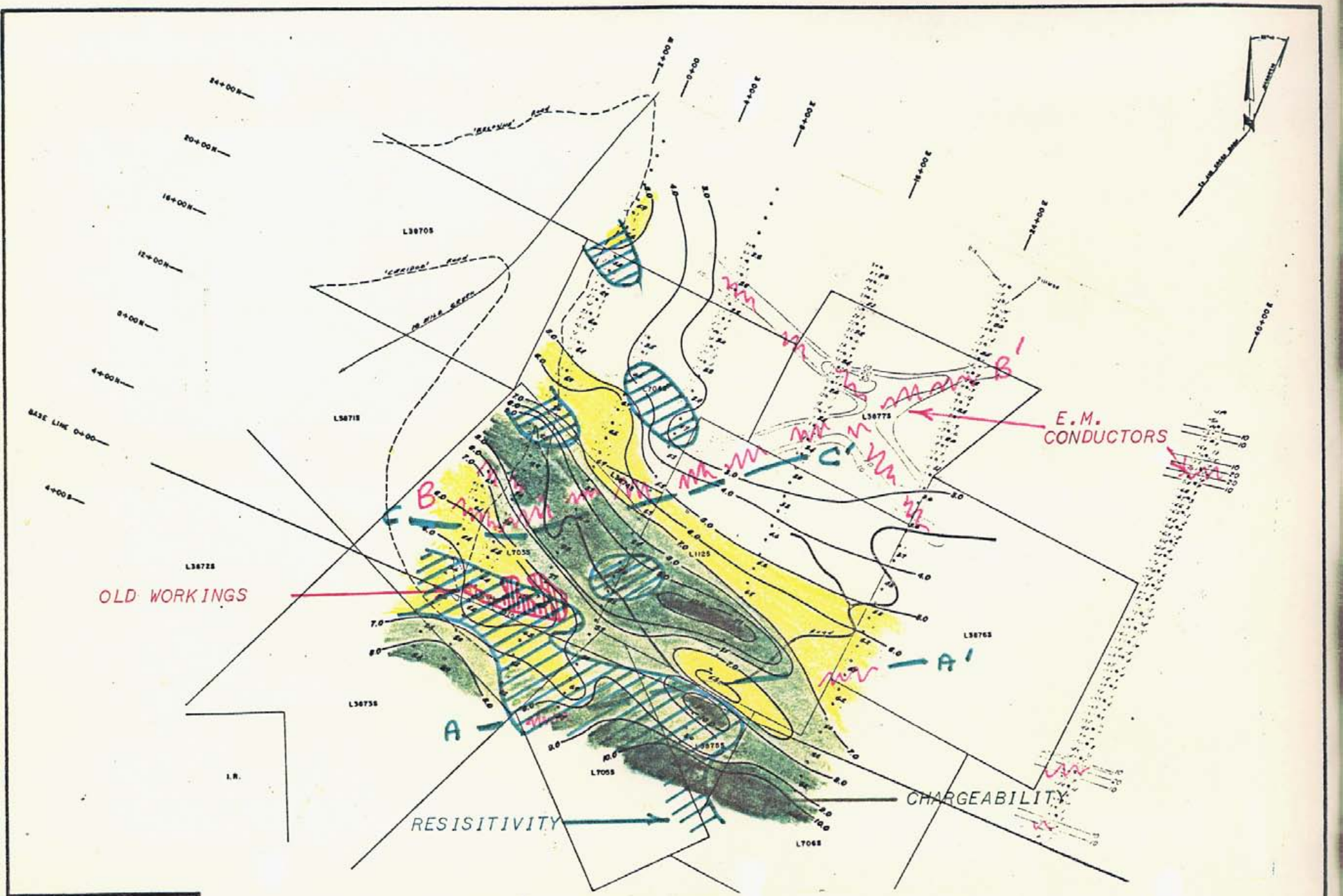
LINE 24+00 E



Glen E. Wilcox geophysical consulting services ltd

SCALE : 1" = 400'

OCT 1, 1976
PLATE 3



Geo E Wilcox geophysical consulting services ltd

INTERPRETATION MAP

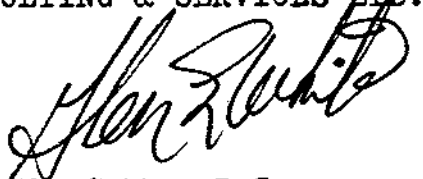
PLATE 4

CONCLUSION AND RECOMMENDATIONS

During September 1976, a program of VLF electromagnetometer and induced polarization surveying were conducted over the old French Mine property, Hedley area B.C., on behalf of Grove Explorations Ltd.

The surveys located a well defined chargeability anomaly which appears to be associated with the old workings. This anomaly follows a zone of high resistivity which has been interpreted as limestone. This zone trends NW-SE parallel to the plunge of the original workings and increases in intensity to the SE. A strong NE-SW directed electromagnetic conductor was located which likely reflects a major fault zone which has controlled the faulting in the mine area. Thus the trend of the induced polarization chargeability and resistivity data in conjunction with the inferred fault offsets would suggest that a continuation of the French ore zone may possibly be found to the SE. A target of definite interest is that at 16E-1S which shows a strong increase in chargeability response with depth along the limestone-tuff contact.

Respectfully submitted,
GLEN E. WHITE GEOPHYSICAL
CONSULTING & SERVICES LTD.



Glen E. White B.Sc.
Geophysicist

A P P E N D I X

Instrument Specifications

INDUCED POLARIZATION SYSTEM

A. Instruments

(a) Type - pulse

(b) Make - Huntec

(c) Serial No. - transmitter #107 - receiver #3016

B. Specifications

(a) Size and Power - 2.5 KW

(b) Sensitivity - 300 x 10.5 volts

(c) Power Sources - 2.5 KW 400 cycle - three-phase generator

(d) Power by JLO motor, 5.2 K.P. @ 3,600 R.P.M.

(e) Timing - electronic, remote and direct.

(f) Readings - (i) amps (ii) volts primary and secondary

(g) Calculate (i) Resistivity - ohm-feet
(ii) Chargeability - milliseconds

C. Survey Procedures

(a) Method - power supplied to mobile probe along TW 18 stranded wire from stationary set-up.

(b) Configuration - Pole-dipole (three electrode array) Plot point midway between C_1 and P_1.

D. Presentation

Contour Maps (i) Chargeability - milliseconds

(ii) Resistivity - ohm-feet

A P P E N D I X

Instrument Specifications

ELECTROMAGNETOMETER

A. Instrument

(a) Type - Geonics VLF - EM
(b) Make - Ronka Em 16

B. Specifications

Measurement

(i) Utilizes primary fields generated by VLF marine communication stations, measures the vertical field components in terms of horizontal field present.

(ii) Frequency range 15-25 KHZ

(iii) Range of measurement - in phase = 150% or = 90°
- quadrature = 40%

(iv) Method of reading - null detection by earphone, real and quadrature from mechanical dials.

(v) Accuracy - = 1% resolution

C. Survey Procedures

Method (a) Select closest VLF station perpendicular to traverse lines.
(b) In-phase dial measures degree of tilt from vertical position.
(c) Quadrature dial calibrated in percent - null.
(d) Station plot - plot values read at station surveyed.
(e) Manually filter dip-angle data.

STATEMENT OF QUALIFICATIONS

Name: WHITE, Glen E.

Profession: Geophysicist

Education: B.Sc. Geophysics - Geology
University of British Columbia

Professional Associations: Associate member of Society of Exploration Geophysicists.

Active member B.C. Society of Mining Geophysicists.

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

Two years Mining Geophysicist with Sulmac Explorations 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.

Five years Consulting Geophysicist.

Active experience in all Geologic provinces of Canada.

COST BREAKDOWN

Personnel	Dates Worked	Wages	Total
T. Ashworth	September 13-19/76	$95/day	$665.00
C. Ashworth	"	80/day	560.00
J. Behenna	"	70/day	490.00
C. Beach	"	67/day	469.00
Meals and Accomodations			640.00
Instrument Lease - I.P. and E.M.			680.00
Vehicle			280.00
Materials			30.00
Drafting Interpretation and Report			850.00
Total			$4664.00

120°01'

49°20'

32+00 N
28+00 N
24+00 N
20+00 N
16+00 N
12+00 N
8+00 N
4+00 N
BASE LINE 0+00
4+00 S

2+00 W
0+00
4+00 E
8+00 E
16+00 E
24+00 E
40+00 E

'KELOWNA' Road
'CARIBOO' Road
10 MILE CREEK

L3870S
L3871S
L3872S
L3873S
L3874S
L3875S
L3876S
L3877S
L704S
L703S
L705S
L706S
L1125

PORTAL 3910 ADIT
EL 3920 ±

Road

I.R.

22°18'
MAGNETIC
TO JIM CREEK 4KM.

LEGEND

- Contour Line, Contour Interval : 3,4,5,6,7,8,9,10 Milliseconds
- Stations
- Outline of Claims
- Claim Posts
- Unpaved Roads

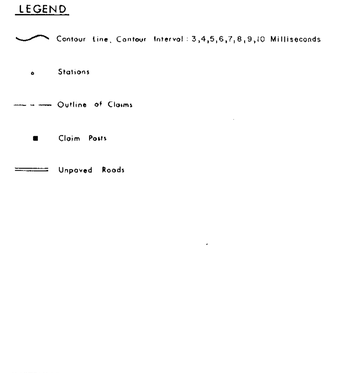
INSTRUMENT HUNTEC 2.5 KW TIME DOMAIN
(a = 300')

C2 ← I
C1 P2 V
Pole Dipole P1

CHARGEABILITY KEY

10 — Milliseconds
9 — "
8 — "
7 — "
5 — "

N.T.S. 92 H/8



LOCATION MAP
SCALE 1" = 4 MILES APPROX

300 150 0 300 600 900
1" = 300'

6274 part 1
M-1

GROVE EXPLORATIONS LTD.

FRENCH PROPERTY

OSOYOOS MINING DIVISION -- BRITISH COLUMBIA

GEOPHYSICAL MAP
INDUCED POLARIZATION
PERCENT CHARGEABILITY (Milliseconds)

Glen E. White
geophysical consulting
& services ltd.

INTERPRETED BY: G.E.W.	
DRAWN BY: T.M.	
CHECKED BY:	
DATE: OCT. 1, 1976	
FIG. No.: 2	

To Accompany Geophysical Report on
THE FRENCH PROPERTY
Date Oct. 1/76
By GLEN E WHITE - B.Sc., P.Eng., GEOPHYSICIST

120°01'

49°20'

32+00 N
28+00 N
24+00 N
20+00 N
16+00 N
12+00 N
8+00 N
4+00 N
BASE LINE 0+00
4+00 S

2+00 W
0+00
4+00 E
8+00 E
16+00 E
24+00 E
40+00 E

'IKELOUNA' Road
'CARIBOO' Road
IO MILE CREEK

L3870S
L3871S
L3872S
L3873S
L3874S
L3875S
L3876S
L3877S
L703S
L704S
L705S
L706S
L1112S
I.R.

PORTAL 3910 ADIT
EL 3920 ±

3000 5000 7500 10000 15000

22°18
MAGNETIC
TO JIM CREEK WEST

LEGEND

- Contour Line, Contour Interval : 3000,5000,7500,10,000,15,000 ohm feet
- Stations
- Outline of Claims
- Claim Posts
- Unpaved Roads

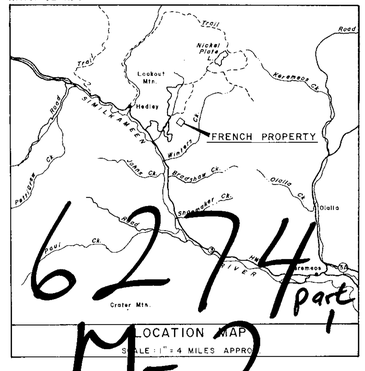
INSTRUMENT HUNTEC 2.5 KW TIME DOMAIN (a = 300')

C2 — I — C1 Pole Dipole
V — P2 P1

RESISTIVITY KEY

15000 ohm feet
10000 " "
7500 " "
5000 " "
3000 " "

N.T.S. 92 H/8



LOCATION MAP
SCALE 1" = 4 MILES APPROX

300 150 0 300 600 900
1" = 300'

6274 part
M-2

GROVE EXPLORATIONS LTD.

FRENCH PROPERTY

OSOYOOS MINING DIVISION — BRITISH COLUMBIA

GEOPHYSICAL MAP
INDUCED POLARIZATION
APPARENT RESISTIVITY (ohm feet)

Glen E. White geophysical consulting services ltd.

INTERPRETED BY : G.E.W.
DRAWN BY : T.M.
CHECKED BY :
DATE : OCT. 1, 1976
FIG. No. : 3

To Accompany Geophysical Report on
THE FRENCH PROPERTY
Date --- Oct. 4/76
By GLEN E. WHITE - B.Sc. - GEOPHYSICIST

120°01'

49°20'

32+00N
28+00N
24+00N
20+00N
16+00N
12+00N
8+00N
4+00N
BASE LINE 0+00
4+00S

2+00W
0+00
4+00E
8+00E
16+00E
24+00E
40+00E

'KELOWNA' Road
'CARIBOO' Road
16 MILE CREEK

L3870S
L3871S
L704S
L3877S
L3874S
L703S
L1112S
L3876S
L3872S
L3873S
I.R.
L3875S
L705S
L706S

PORTAL 3910 ADIT
EL 3920 ± 5'

Road

DIP
Filtered

22°18'
MAGNETIC
To JIM CREEK 8 MILES

LEGEND

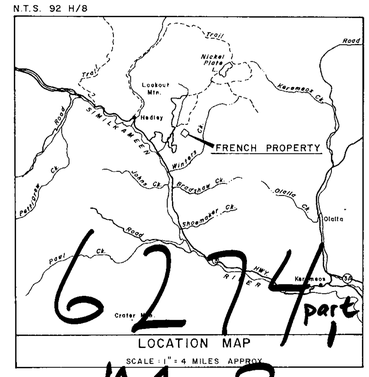
- Contour Line, Contour Interval: 10, 20, 30 Percent
- Stations
- Outline of Claims
- Claim Posts
- Unpaved Roads

INSTRUMENT: RONKA EM-16

DIP ANGLE KEY

30 — Percent
20 — "
10 — "

N.T.S. 92 H/8



LOCATION MAP
SCALE: 1" = 4 MILES APPROX.

6274 part 1

M3

300 150 0 300 600 900
1" = 300'

GROVE EXPLORATIONS LTD.

FRENCH PROPERTY

OSOYOOS MINING DIVISION — BRITISH COLUMBIA

GEOPHYSICAL MAP

ELECTROMAGNETOMETER — FILTERED DIP ANGLE (Percent)

Glen E. White geophysical consulting & services ltd.

INTERPRETED BY: G.E.W.	
DRAWN BY: T.M.	
CHECKED BY:	
DATE: OCT. 1, 1976	
FIG. No.: 4	

To Accompany Geophysical Report on
THE FRENCH PROPERTY
Date - - OCT. 1/76
By GLEN E. WHITE - B.Sc. GEOPHYSICIST