Part 1 of 2

~~GEOPHYSICAL REPORT~~

On An

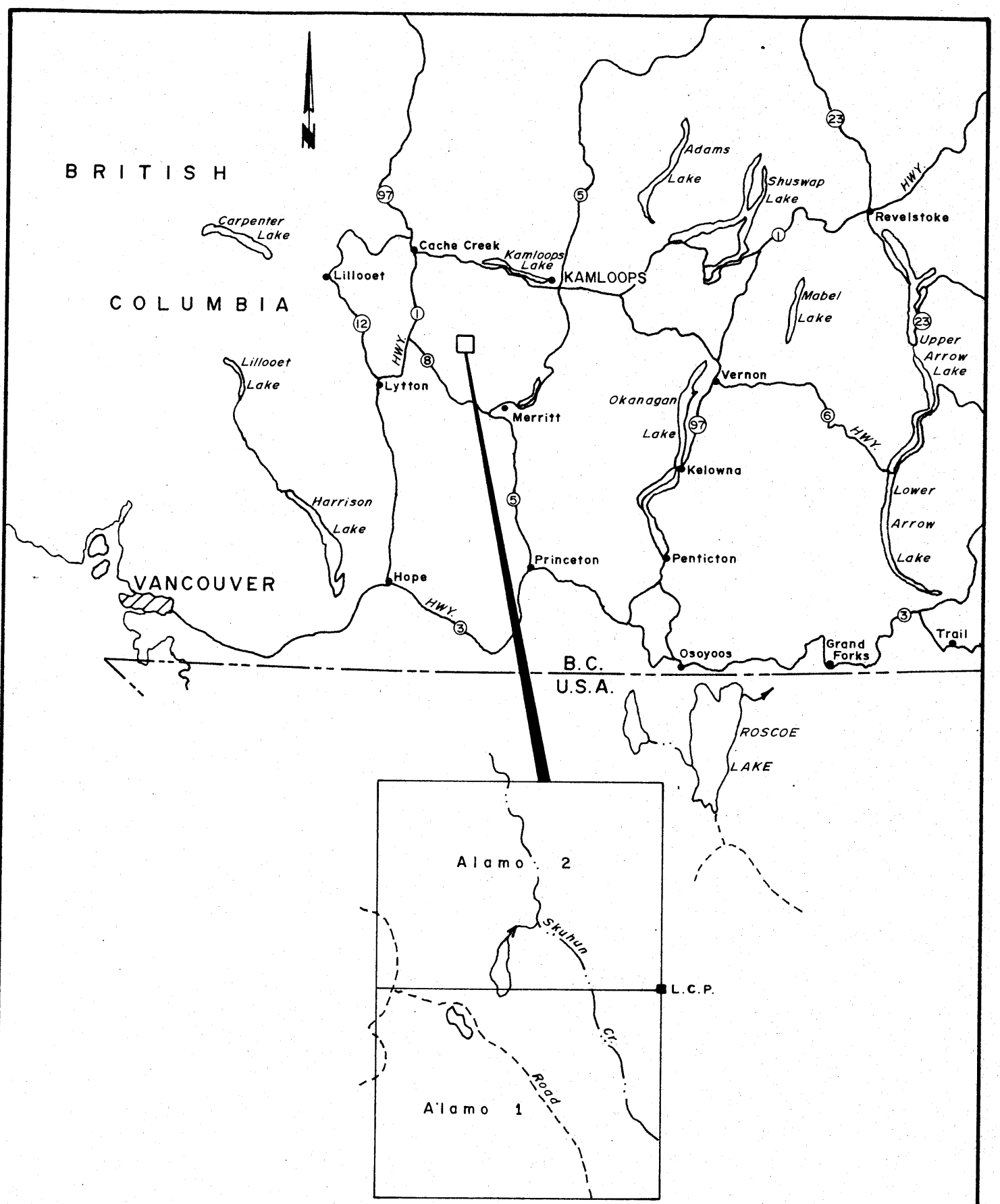
INDUCED POLARIZATION SURVEY
GRANGES EXPLORATION AB

'77-#461-# 6571

Alamo mineral claims, Highland Valley area, Nicola Mining Division, B.C.
Lat. 50°22'N Long. 120°59'W N.T.S. 92 I/7W

AUTHOR: Glen E. White, B.Sc., P. Eng.
DATE OF WORK: May 29 - June 4, 1977
DATE OF REPORT: June 22, 1977

Ref.



GRANGES EXPLORATION AB.

ALAMO CLAIMS

LOCATION AND CLAIM MAP

Glen E. Wilson
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Scale : 1" = 40 Miles

JUNE 13, 1977
FIG. 1

C O N T E N T S

Illustrations

INTRODUCTION

The area now covered by mineral claim Alamo 1 was examined in part by a limited frequency induced polarization survey during the late 1960's and a small % frequency effect anomaly was detected. The survey described in this report was undertaken to try and further delineate this anomaly.

PROPERTY

The property consists of mineral claims Alamo 1 and 2 comprising some 40 contiguous claim units as illustrated on Figure 1.

LOCATION AND ACCESS

The Alamo mineral claims are located 7 miles due west from the southern tip of Mamit Lake on the Highland Valley Plateau at an elevation of some 5200 feet A.S.L., Latitude 50°22'30"N, Longitude 120°59'W, N.T.S. 92 I/7.

Access to the property is by bush road up Skuhun Creek which crosses the Spences Bridge-Merrit road, Highway #8, some 26 km from Spences Bridge.

GENERAL GEOLOGY

The mineral claims lie in a physiographic region known locally as the Highland Valley which is characterized by rounded hills up to 6000 feet in elevation and moderately broad valleys. Geologically the area is underlain by a multiphase acid plutonic intrusion termed the Highland Valley batholith which contains Canada's largest open pit porphyry copper mines. Locally the claims area is mapped as underlain by the Bethsaida phase,a relatively young central core phase of the batholith, described as a biotite quartz monzonite. The general Highland Valley area is covered with a mantle of pleistocene glacial till.

SURVEY SPECIFICATIONS

Survey Grid

The survey grid was established previous to the induced polarization survey and consists of east-west directed lines turned off every 400 feet or 800 feet from a north-south baseline. The lines were numbered at 100 foot intervals. Some 8.5 miles of surveying were conducted.

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 400 feet.

Induced Polarization Unit

The equipment used on this survey was the Huntec pulse-type unit. Power was obtianed 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 ratios M_1, M_2, M_3 and M_4 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 $T_p (M_1 + 2M_2 + 4M_3 + 8M_4) = M'$, 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 during pulse off time, 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.

DISCUSSION OF RESULTS

The induced polarization chargeability and apparent resistivity data are illustrated on Figures 2 and 3 respectively.

Figure 2 shows a small chargeability anomaly located at 12E on lines 4N and 8N which gave a single reading high of 10.1 milliseconds above a background of some 2.5 milliseconds. This anomaly coincides with the small previously located frequency effect anomaly and would suggest a weak chargeable source. The apparent resistivity data shows a number of pronounced resistivity low troughs which trend southeastward through the survey area. One such feature passes through the area of the small anomalous chargeability response on lines 4N and 8N. These resistivity features likely reflect variations in the overburden type and depth to bedrock. The resistivity low troughs may also relate to underlying structure zones which have become more conductive due to deformation and rock decomposition.

A limited amount of detailing with a 200 foot array separation on lines 0 and 8N yielded only background responses which suggest that there may be in the order of 100 - 200 feet of overburden in various areas. The detail profiling on line 4N detected the strongest responses with the 400 foot separation which suggests

8W 4W B.L. 4E 8E 12E 16E 20E 24E 28E

Scale: 1" = 200' Approx.

Road Outcrop Creek Road

Ma (Milliseconds)

Pa (Ohm Feet)

a = 200' n = 1

a = 400' n = 1

a = 400' n = 1.5

a = 200' n = 1

a = 400' n = 1

a = 400' n = 1.5

DIPOLE LENGTH

D.C. PULSE I.P.; (CHARGEABILITIES FOR COMPLETE CYCLE)

CHARGING TIME 1.42 Sec.
OFF-TIME .58
DELAY TIME 15 Msec.
INTEGRATION TIME 20 Msec.

Line N°. 4N

Glen E. White geophysical consulting & services ltd.

Job N°:

Date 2/6/77

Dipole (a) 400'

Client Grange Exploration 46

Area Alamo Extension

Survey P-DP

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA GLEN E. WHITE

Plate 1

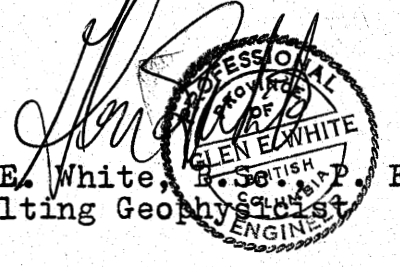
that the anomaly may possibly be caused by ionic polarization at a clay-gravel interface. A second interpretation, which is the most probable, is that the weak chargeability response is caused by minor amounts of mineralization associated with structure zones as traced by the resistivity low trends.

CONCLUSIONS AND RECOMMENDATIONS

During the later part of May and early June 1977, a program of induced polarization surveying was conducted on the Alamo 1 and 2 mineral claims on behalf of Granges Exploration Ltd.

The survey detected a weakly anomalous chargeability response on line 4N. This feature lies within a south-east trending resistivity low trough and may possibly be caused by minor fracture controlled mineralization. Thus, on the basis of this induced polarization survey, the strength and lateral extent of the weak chargeability ano aly would preclude any further work within the immediate survey area.

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



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

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 - 8 H.P. Briggs and Stratton @ 3000 R.P.M.

(e) Timing - electronic, remote and direct.

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

(g) Calculate (i) Resistivity - ohm-meters (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-meters (ohm-feet)

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.

Vice-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 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.

Six years Consulting Geophysicist.

Active Experience in all Geologic provinces of Canada.

COST BREAKDOWN

Personnel	Date	Wages	Total
C. Candy	May 29-June 4/77	$110/day	$770.00
L. Durkin	"	85/day	595.00

Materials and sundry	70.00
Meals and Accomodations	350.00
Instrument Lease	595.00
Vehicle	280.00
Interpretation Maps and Reports	850.00
Total	$3510.00

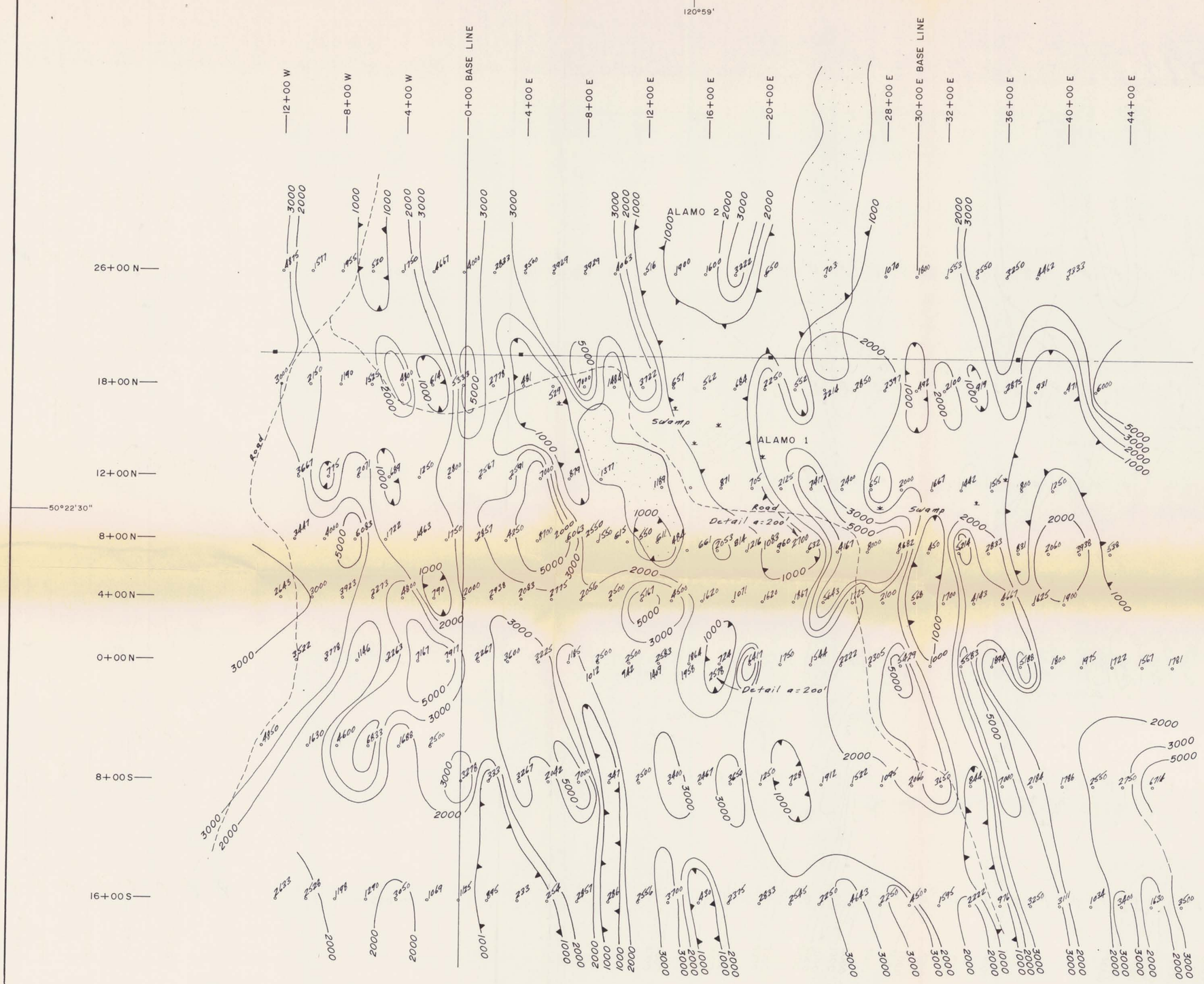
Additional cost of two men supplied by Granges Exploration A.B. to complete this Induced Polarization Survey:

D.F. Pasco, May 29th-31st., June 1st-3rd 6 days @ $65.03/day	$ 390.18
A. Cudworth, May 29th-31st., June 1st-3rd 6 days @ $54.45/day	$ 326.70
	$ 716.88

Dated November 10th, 1977

H.H. Shear, (P. Eng)
Project Geologist

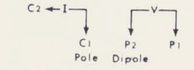
Part 1 of 2



LEGEND

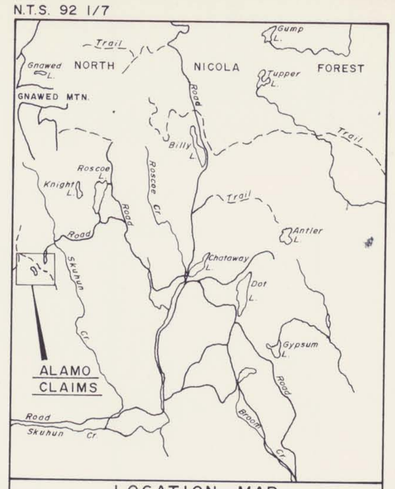
- Contour Line, Contour Interval: 1000, 2000, 3000, 5000 ohm feet
- Stations
- Outline of Claims
- Claim Posts
- Unpaved Roads

INSTRUMENT HUNTEC 2.5 KW TIME DOMAIN (a=400')



RESISTIVITY KEY

N.T.S. 92 I/7



LOCATION MAP
SCALE: 1" = 2 MILES APPROX.

400 200 0 400 800 1200
1" = 400'

GRANGES EXPLORATION AB.

ALAMO CLAIMS

NICOLA 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:	JUNE 13, 1977
FIG. No.:	3

To Accompany Geophysical Report on
THE ALAMO CLAIM GROUP
Date June 13th, 1977
By GLEN E. WHITE, B.Sc., P.Eng., GEOPHYSICIST

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA GLEN E. WHITE

6571
part 1

Part 1 of 2

120°59'

50°22'30"

12+00 W | 8+00 W | 4+00 W | 0+00 BASE LINE | 4+00 E | 8+00 E | 12+00 E | 16+00 E | 20+00 E | 28+00 E | 30+00 E BASE LINE | 32+00 E | 36+00 E | 40+00 E | 44+00 E

26+00 N | 18+00 N | 12+00 N | 8+00 N | 4+00 N | 0+00 N | 8+00 S | 16+00 S

ALAMO 2

ALAMO 1

Road

Swamp

Detail a=200'

4.0

6.0

23°00'
MAGNETIC

LEGEND

- Contour Line, Contour Interval : 4.0, 6.0 Milliseconds
- Stations
- Outline of Claims
- Claim Posts
- Unpaved Roads

INSTRUMENT HUNTEC 2.5 KW TIME DOMAIN (a = 400')

C2 ← I — V

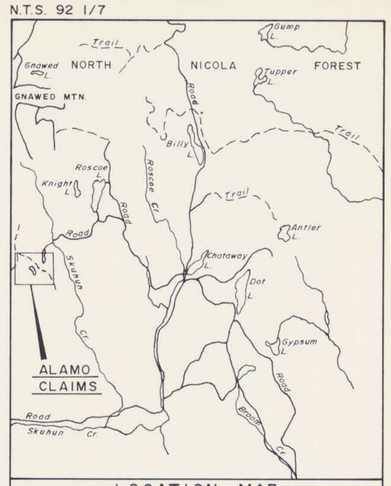
C1 Pole — P2 Dipole — P1

CHARGEABILITY KEY

6.0 — Milliseconds

4.0 — "

N.T.S. 92 I/7



LOCATION MAP
SCALE : 1" = 2 MILES APPROX.

400 200 0 400 800 1200
1" = 400'

6571 part 1

To Accompany Geophysical Report on
THE ALAMO CLAIM GROUP
Date June 27/77
By GLEN E WHITE [illegible] GEOPHYSICIST

GRANGES EXPLORATION AB.

ALAMO CLAIMS

NICOLA 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 :	JUNE 13, 1977
FIG. No. :	2