4789

GEOPHYSICAL REPORT
GROUNDSTAR RESOURCES LTD.

INDUCED POLARIZATION, MAGNETOMETER AND ELECTROMAGNETOMETER SURVEYS

Excel and Excelsior claims, Nimpkish Lake area,
Vancouver Island, B.C.
Lat. 50°25'N Long. 126°58'W N.T.S. 92 L/7

AUTHOR: Glen E. White, Geophysicist
P. ENG: E. D. Cruz
DATE OF WORK: October 21-28/73, Nov. 22, 23/73
DATE OF REPORT: December 6, 1973

92L/7W

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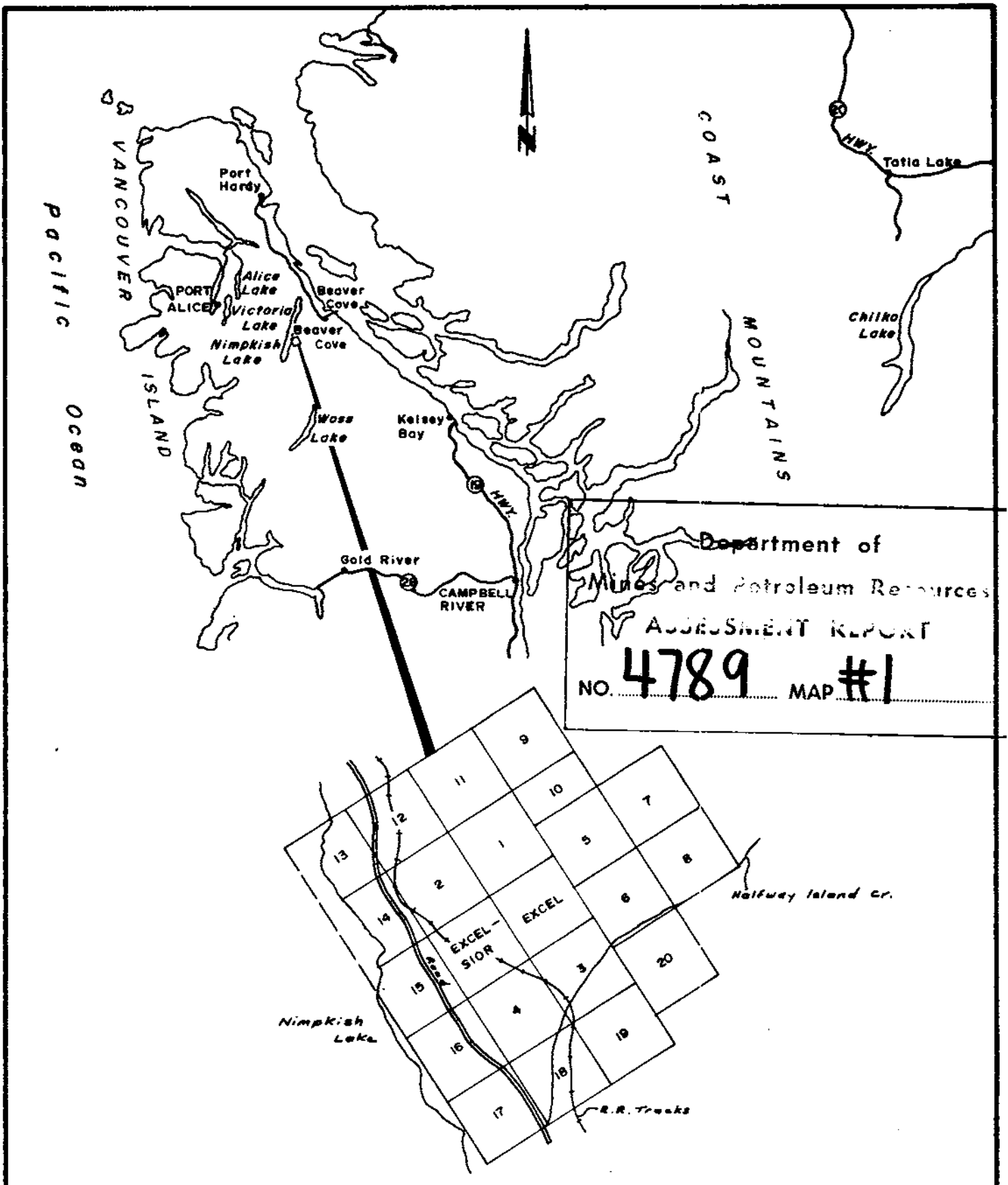
92L/7W



GROUNDSTAR RESOURCES LTD.

EXCEL & EXCELSIOR CLAIMS

LOCATION AND CLAIMS MAP

SCALE : LOCATION MAP 1" = 34 MILES APPROX. CLAIMS MAP 1/2" = 1500 APPROX.

Glen & Watt geophysical consulting services ltd

DEC. 6, 1978

FIG. 1

C O N T E N T S

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.....Cont....

Illustrations

INTRODUCTION

During the periods October 21-28 and November 22 and 23, 1973, Glen E. White Geophysical Consulting and Services Ltd. conducted a program of induced polarization and electromagnetometer surveying over the Excel and Excelsior claims, Nimpkish Lake area, Nanaimo Mining Division, B.C., on behalf of Groundstar Resources Ltd. The surveys were conducted under the supervision of Manny Consultants Ltd. The magnetometer survey was carried out by Manny Consultants personnel and is included in this report.

The purpose of the exploration program was to try and trace several veins of copper-bearing mineralization following a possible limestone-granite contact and to test the property on a reconnaissance basis for other possibly mineralized areas.

PROPERTY

The property consists of 22 contiguous claims, Excel, Excelsior, and claims 1-20 as illustrated in Figure 1.

LOCATION AND ACCESS

The property is located on the eastern shore of Nimpkish Lake, some 12 miles south of Port McNeil, along the new North Island Highway, Vancouver Island, Nanaimo Mining Division, B.C., Latitude 50°25'N, Longitude 126°58'W, N.T.S. 92 L/7.

Access to the property is by the newly paved North Island Highway which traverses the westernmost claims, parallel to the shore of Nimpkish Lake.

PHYSIOGRAPHY

The Nimpkish Lake area lies in the west coast rain forest belt and is covered by tall stands of balsam, hemlock and cedars. The buckbrush, consisting largely of salal and blueberries, varies from sparce in the timbered areas to dense in areas of second growth. Topography varies from moderate to steep precipitous cliffs.

The general geology of the area consists of Upper Triassic Quatsino limestone and Parson Bay Formation of up to some 3000 feet thick overlying, apparently conformably, the Karmutsen Volcanics. The above lithologic units have been intruded by a boss of the Coast Intrusion in the area of Halfway Island Creek. These intrusions are middle to late Jurassic and vary in composition from gabbro to quartz monzonite.

SURVEY SPECIFICATIONS

Survey Grid

The survey grid was established by personnel of Manny Consultants Ltd. and consisted of NNW-SSE directed lines turned off at right angles from a WWS-EEN orientated baseline.

Some 8.1 line miles of magnetometer surveying, 3.2 of electromagnetometer surveying and 5.9 line miles of induced polarization, including 1.1 line miles of detail work, were completed.

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 V.L.F. - 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 tne 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.

Magnetometer Survey

The magnetometer survey was conducted using a Scintrex MF-1 Fluxgate magnetometer. This instrument measures the vertical component of the earth's magnetic field to an accuracy of 10 gammas. Corrections for diurnal variation were made by tying into previously established base stations at intervals not exceeding one and one half hours. Readings were taken at 100 foot intervals along the traverse lines.

Induced Polarization Survey

(a) 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 (C_2) is placed at "infinity". For this survey an electrode spacing a = 200 feet, n = 1 was used for reconnaissance surveying. Detailing was completed with a = 200, n = 2 and 3.

(b) Equipment

The equipment used on this survey was the Huntec pulse-type unit. Power was obtained from a JLO 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 pulses reversing continuously in polarity. Power was transmitted to the ground through two current electrodes C_1 and C_2, and measurements taken across two potential electrodes, P_1 and P_2.

The data recorded in the field consist 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_a), in milliseconds, is calculated by dividing the secondary voltage by the primary voltage and multiplying by 400, which is the sampling time in milliseconds of the receiver unit. 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 sampled 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 these rocks.

DATA PRESENTATION

The data accompanying this report is as contour maps at a scale of 1" = 400 feet as follows:

Figure 2 - Electromagnetometer - filtered dip-angle %
3 - Magnetometer - vertical magnetic intensity (gammas)
4 - Induced Polarization - chargeability - milliseconds
5 - Induced Polarization - apparent resistivity - ohm-feet

DISCUSSION OF RESULTS

The filtered inphase V.L.F. electromagnetometer data is shown in Figure 2. The survey located a moderately strong electromagnetic conductor trending generally east-west along the baseline. This conductor may be following a geological contact or structure. A small but strong conductor running from 2E to 2W was also delineated. The very strong electromagnetic response on line 16W can likely be attributed to the railway tracks.

The magnetometer data, Figure 3, is dominated by the band of magnetic highs and lows which trend northeastward to the baseline from the southwest corner of the survey area and then eastward along the baseline. This zone may possibly represent pyrometamorphism of the limestone along an intrusive contact. Away from this zone, the map shows broad changes in magnetic intensity around 700 gammas in the north and south portions of the grid. The northwestern edge of the survey area shows a higher plateau level of some 1100 gammas.

Correlation of the electromagnetometer and magnetometer data indicates that the electromagnetic conductors lie along the northern flanks of magnetic highs. The electromagnetic high trending from 2E to 4W lies just north of the strong dipole magnetic anomaly on line 0.

The apparent resistivity data, Figure 5, has been contoured logarithmically due to the large difference in maximum and minimum values. The high resistivity values can largely be attributed to the poor soil cover and underlying limestone which is a poor ionic conductor. The prominent resistivity low which trends from the southwest corner eastward along the baseline, follows the long electromagnetic conductor trend and the band of magnetic highs and lows. This zone may possibly represent a fault zone or possibly a change in rock type.

The chargeability map, Figure 4, shows a large chargeability feature to the north of the baseline and two small satellite anomalies to the south. The small anomaly in the south trending from 16W to 12W is directly associated with veins of copper-bearing mineralization. The second anomaly, principally on line 0 at 5S, is very intense and is coincident with the previously mentioned magnetic dipole and the strong electromagnetic conductor. This anomaly is quite probably due to a lens of sulphide mineralization. The large chargeability anomaly varies from a broad response in the northeast to a more linear response in the west of the survey area. This anomaly is in an area of high resistivity and a plateau of some 700 gammas magnetic intensity. Field correlation indicated that this is largely an area, at surface, of barren limestone which shows various degrees of recrystallization and alteration.

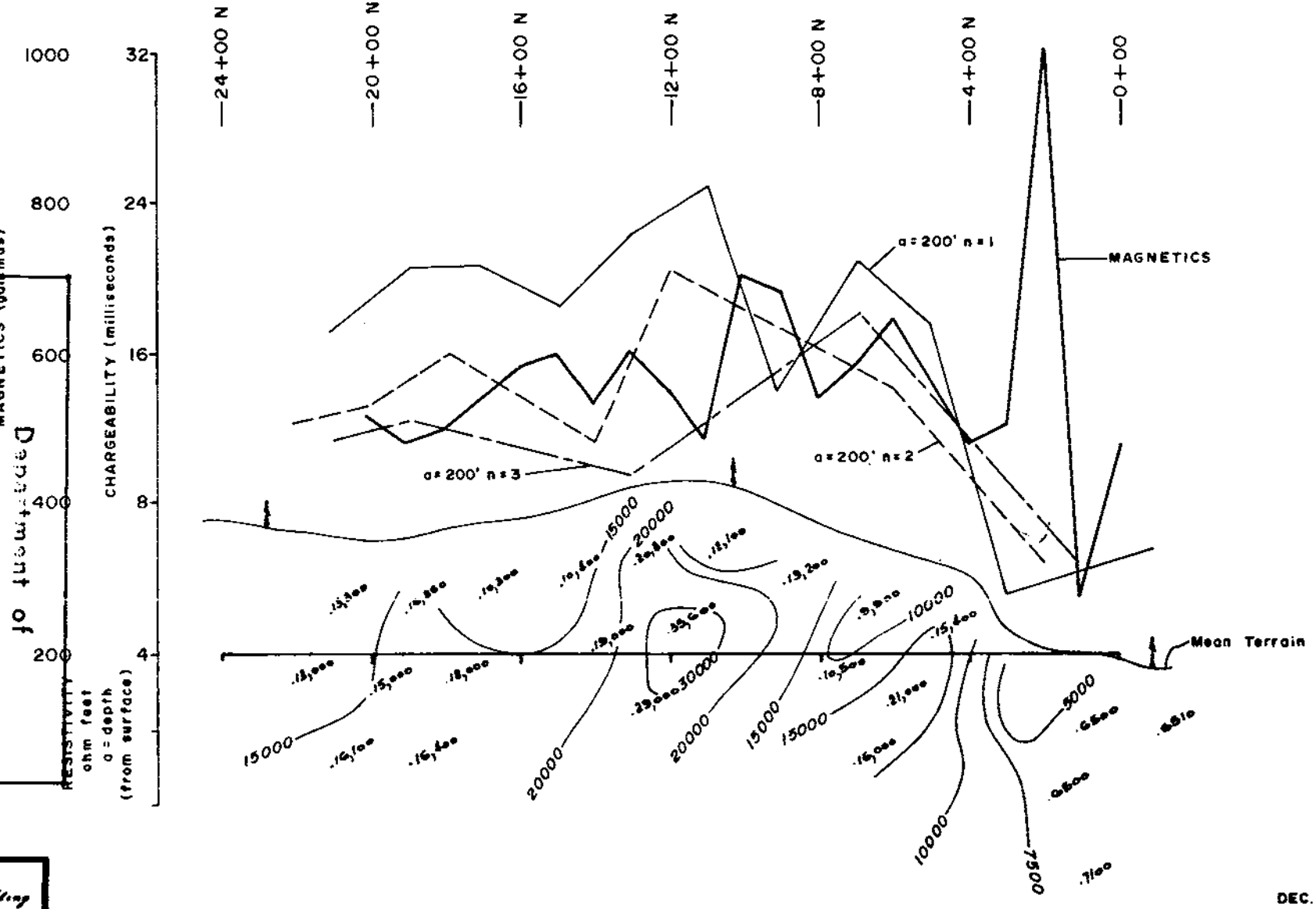
Plate 1 shows the various induced polarization array separations and magnetic profile along line 16E. The first separation, a = 200, n = 1, shows a generally high response whereas separations n = 2 and 3 have much lower values. The 400 and 600 foot separations show coincident peaks with the 200 foot separation at stations 12N and 7N respectively. The high at 7N has slightly lower resistivity values. Thus, the high background response on the first separation may in part be due to the high resistance and impurities, possibly graphite associated with the limestone, whereas the anomalous values at 7N and 12N with the larger separations, may possibly indicate a true chargeability source.

GROUNDSTAR RESOURCES LTD.

COMPOSITE PROFILES

IP & MAGNETICS

LINE 16+00 E



Glen E. White
geophysical consulting
services ltd.

Scale : 1" = 400'

DEC. 6, 1973
PLATE I

CONCLUSIONS AND RECOMMENDATIONS

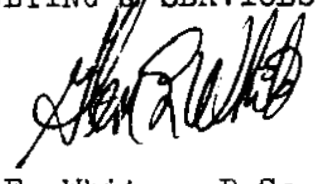
During the month of October and late November, a program of electromagnetometer, magnetometer and induced polarization surveying was completed over the Excel, Excelsior and 1-20 claims Nimpkish Lake area, B.C.

The survey located a band of magnetic highs and lows and electromagnetic conductors which trend northeast from the southwest corner of the survey area and then eastward along the baseline. This zone may possibly be due to a separate lithologic unit. However, it likely reflects a contact metasomatic zone between the limestone and a boss of the coast intrusions, accompanied by faulting and shearing.

The two small chargeability anomalies to the south of the baseline would appear to be associated with sulphide mineralization. The broad chargeability high may possibly be reflecting mineralization of interest under a shallow limestone cap. This would best be tested on line 12W where the chargeability pattern is more linear and the topography is less severe.

Thus, it is recommended that the area of the 2 satellite chargeability features, one extending from line 16W to 12W and the other on line 0, and possibly the southwest extension of the broad chargeability high should be further examined. The method of investigation can best be determined by the supervisory geological engineer due to problems with access and terrain.

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



Glen E. White B.Sc.
Geophysicist

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. Two years Consulting Geophysicist. Active experience in all Geologic provinces of Canada.

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.

A P P E N D I X

Instrument Specifications

MAGNETOMETER

A. Instrument

(a) Type - Fluxgate

(b) Make - Sharpe MF-1

B. Specifications

(a) Measurement - Vertical Magnetic Field

(b) Range - ±100 K gammas in 5 ranges

(c) Sensitivity - Maximum 20 gammas per scale division

(d) Accuracy - ±10 gammas

C. Survey Procedures

(a) Method - One and one half hour loops

(b) Corrections - (i) Base

(ii) Diurnal

(c) Station relationship - each station read for intensity of vertical magnetic field.

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 #207

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 H.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

C E R T I F I C A T E

I, Ernesto D. Cruz, DO HEREBY CERTIFY AS FOLLOWS:

(1) That I am a Consulting Mining Engineer and reside at 8596 Terrace Dr., Delta, B.C.

(2) That I am a Graduate of Mapua Institute of Technology Phillipines (B.A.Sc.) and University of Washington (M.A.Sc.) in the Faculty of Mining Engineering.

(3) That I am a registered P. ENG in the Association of Professional Engineers in the province of British Columbia.

(4) That I have practised geological engineering for ten (10) years.

(5) That I have reviewed a report dated December 6, 1973 based on work conducted by Glen E. White Geophysical Consulting and Services Ltd. under the supervision of Glen E. White, B.Sc., Geophysicist, and concur with the findings therein.

(6) That this report consists of 11 typewritten pages and four maps.

(7) That I have no interest directly or indirectly in the Excel, Excelsior claims or the securities of Groundstar Resources Ltd. nor do I expect to acquire or receive any.

DATED at Vancouver, British Columbia, this 6th day of December, 1973.

ERNEST[illegible]RUZ, P. ENG

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
ERNESTO D. CRUZ

Ernesto D. Cruz, P. ENG

DOMINION OF CANADA:
PROVINCE OF BRITISH COLUMBIA.
TO WIT:

In the Matter of GEOPHYSICAL SURVEYS
EXCEL, EXCELSIOR CLAIMS

Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 4789

I, Glen E. White

of Glen E. White Geophysical Consulting and Services Ltd.

in the Province of British Columbia, do solemnly declare that the costs for the above surveys were as follows:

PERSONNEL	PERIOD	WAGES	TOTAL
G. E. White geophysicist	Nov. 22, 23/73	$100/day	$200.00
T. Ashworth	Oct. 21-28/73	60/day	480.00
C. Ashworth	"	60/day	480.00
A. Poile	"	44/day	352.00
B. Renaud	"	44/day	352.00
T. Baldry	Nov. 22, 23/73	50/day	100.00

Meals and Accomodations	640.00
Instrument Lease - I.P.	250.00
E.M.	80.00
Vehicle plus gas	223.59
Ferry Costs	26.00
Air Freight - equipment	42.60
Interpretation Maps and Reports	510.00
TOTAL	$3736.19

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the City of Vancouver, in the Province of British Columbia, this 10th day of December 1973, A.D.

Glen E. White

J. Pickens

A Commissioner for taking Affidavits for British Columbia or A Notary Public in and for the Province of British Columbia.

Sub-mining Recorder

126°58'

50°25'

23°00'

MAGNETIC

LEGEND

Contour Line Contour Interval: 400, 600, 800, 1000, 1200
1400, 1600 Gammas

Stations

Outline of Claims

Claim Posts

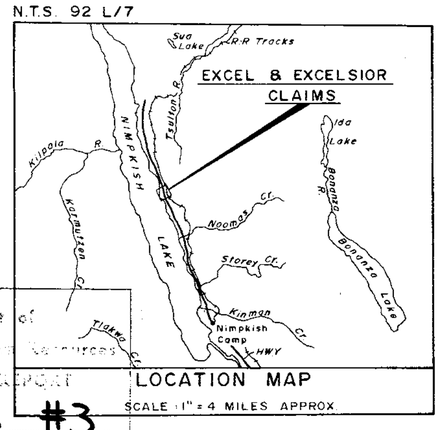
Unpaved Roads

INSTRUMENT : SCINTREX MF-I FLUXGATE

MAGNETIC KEY

1200 Gammas
1000 "
800 "
600 "
400 "

N.T.S. 92 L/7



LOCATION MAP

SCALE 1" = 4 MILES APPROX.

Department of Mines & Petroleum Resources
ASSESSMENT REPORT
NO. 4789 MAP #3

400 0 400 800 1200
1" = 400'

NOTE: MAGNETIC DATA COLLECTED BY: MANNY CONSULTANTS LTD.

4789 M3

To Report on THE EXCEL & EXCELSION CLAIM GROUP
Date December 6, 1973
By GLEN E WHITE - B.Sc. - GEOPHYSICIST

GROUNDSTAR RESOURCES LTD.
EXCEL & EXCELSIOR CLAIMS
NANAIMO MINING DIVISION — BRITISH COLUMBIA

GEOPHYSICAL MAP
VERTICAL MAGNETIC INTENSITY
(Gammas)

Glen E. White geophysical consulting & services ltd.

INTERPRETED BY: G.E.W.
DRAWN BY:
CHECKED BY:
DATE: DEC. 6, 1973
FIG No: 3

126°58'

50°25'

23°00'

MAGNETIC

To JIM CREEK WASH

LEGEND

- Contour Line. Contour Interval : 6, 12, 18 Percent
- Stations
- Outline of Claims
- Claim Posts
- Unpaved Roads

DIP ANGLE KEY

18 — Percent
12 — "
6 — "

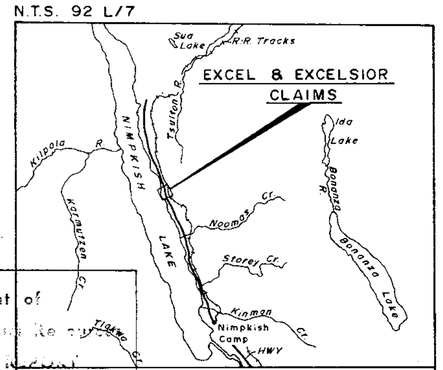
24+00 W
20+00 W
16+00 W
12+00 W
8+00 W
4+00 W
0+00
4+00 E
8+00 E
12+00 E
16+00 E

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
8+00 S
12+00 S
16+00 S
20+00 S
24+00 S
28+00 S

EXCEL
EXCELSIOR
R.R. Tracks

1 2 3 4 5 6 7 8 9 10 11 12 18 19 20

N.T.S. 92 L/7



LOCATION MAP

SCALE : 1" = 4 MILES APPROX

400 0 400 800 1200

1" = 400'

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 4789 MAP #2

4789
M2

To Accompany Geophysical Report on
THE EXCEL & EXCELSIOR CLAIM GROUP
Date December 1973
By GLEN E. WHITE B.Sc. Geophysicist

GROUNDSTAR RESOURCES LTD.

EXCEL & EXCELSIOR CLAIMS

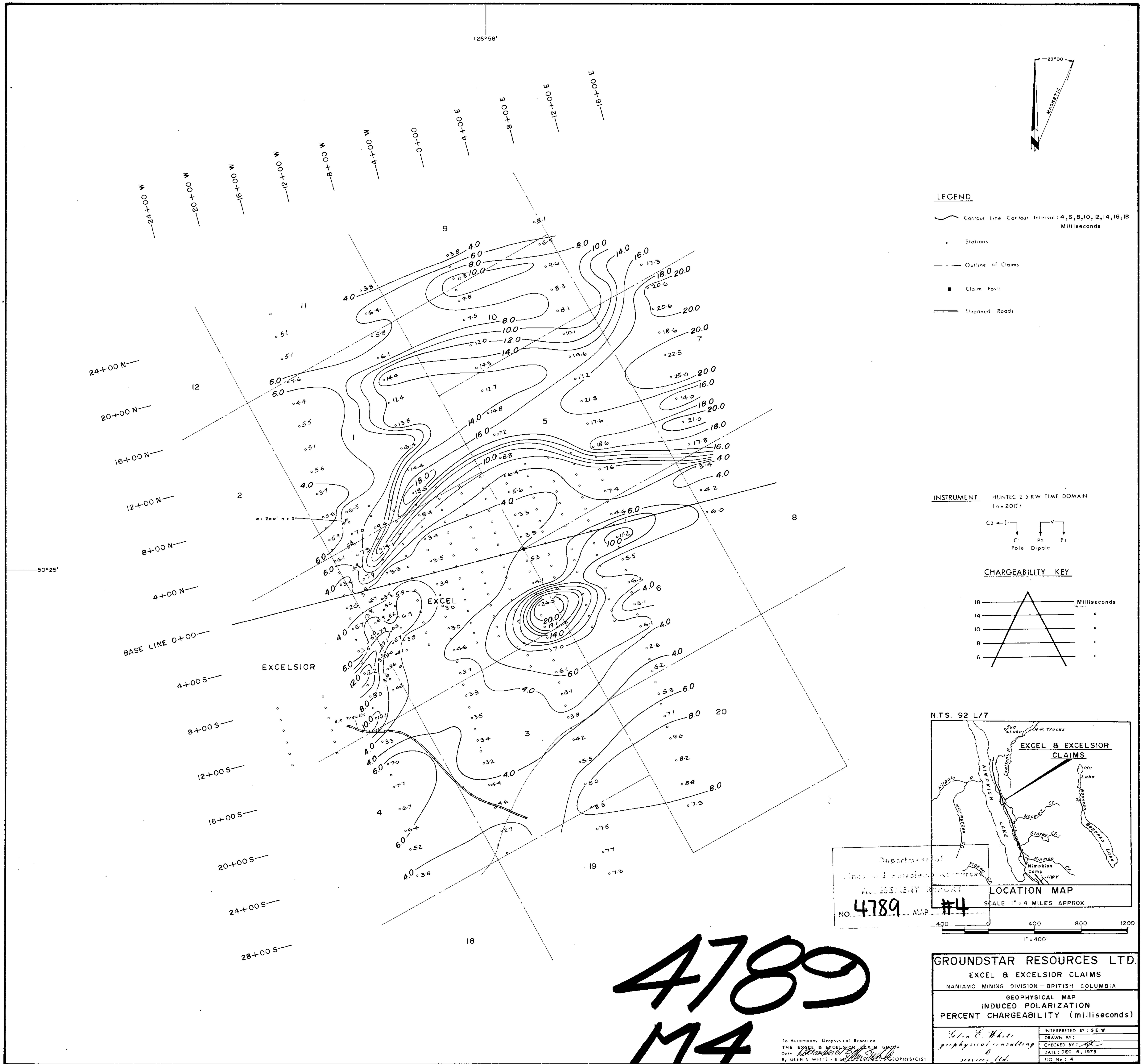
NANAIMO MINING DIVISION — BRITISH COLUMBIA

GEOPHYSICAL MAP

ELECTROMAGNETOMETER FILTERED DIP ANGLE (Percent)

Glen E. White geophysical consulting & services ltd.

INTERPRETED BY : G.E.W.	
DRAWN BY :	
CHECKED BY :	
DATE : DEC. 6, 1973	
FIG No. : 2	



126°58'
50°25'
24+00 W
20+00 W
16+00 W
12+00 W
8+00 W
4+00 W
0+00
4+00 E
8+00 E
12+00 E
16+00 E
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
8+00 S
12+00 S
16+00 S
20+00 S
24+00 S
28+00 S
EXCEL
EXCELSIOR
R.R. Tracks
a = 200' n = 2
23°00'
MAGNETIC
LEGEND
Contour Line Contour Interval: 4, 6, 8, 10, 12, 14, 16, 18 Milliseconds
Stations
Outline of Claims
Claim Posts
Unpaved Roads
INSTRUMENT
HUNTEC 2.5 KW TIME DOMAIN (a = 200')
C2
I
V
C1 Pole
P2 Dipole
P1
CHARGEABILITY KEY
18 Milliseconds
14
10
8
6
N.T.S. 92 L/7
Sua Lake
R.R. Tracks
EXCEL & EXCELSIOR CLAIMS
Ida Lake
Kilpala R.
NIMPKISH LAKE
Noomas Cr.
Storey Cr.
Kinman Cr.
Nimpkish Camp
HWY
Bonanza Lake
LOCATION MAP
SCALE 1" = 4 MILES APPROX.
Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 4789 MAP #4
400 0 400 800 1200
1" = 400'
GROUNDSTAR RESOURCES LTD.
EXCEL & EXCELSIOR CLAIMS
NANAIMO MINING DIVISION – BRITISH COLUMBIA
GEOPHYSICAL MAP
INDUCED POLARIZATION
PERCENT CHARGEABILITY (milliseconds)
To Accompany Geophysical Report on
THE EXCEL & EXCELSIOR CLAIM GROUP
By GLEN E. WHITE - B.Sc. GEOPHYSICIST
Glen E. White geophysical consulting & services ltd.
INTERPRETED BY: G.E.W.
DRAWN BY:
CHECKED BY:
DATE: DEC. 6, 1973
FIG. No.: 4
4789
M4

126°58'

23°00'

MAGNETIC

LEGEND

Contour Line. Contour Interval: 5000, 7500, 10000
15000, 30000, 50000 ohm feet

Stations

Outline of Claims

Claim Posts

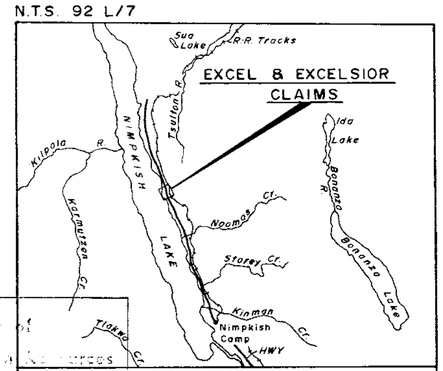
Unpaved Roads

NOTE: Contoured Logarithmically at ohm feet levels.

RESISTIVITY KEY

30000 ohm feet
15000 " "
10000 " "
7500 " "
5000 " "

N.T.S. 92 L/7



LOCATION MAP

SCALE 1" = 4 MILES APPROX

1" = 400'

ASSESSMENT REPORT NO. 4789 MAP #5

GROUNDSTAR RESOURCES LTD.

EXCEL & EXCELSIOR CLAIMS

NANAIMO 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:	
CHECKED BY:	
DATE: DEC. 6, 1973	
FIG. No.: 5	

To Accompany Geophysical Report on
THE EXCEL & EXCELSIOR MINERAL CLAIM GROUP
Date January 23, 1974
By GLEN E. WHITE - B.S. - GEOPHYSICIST

4789
M5