92H/12E

# REPORT ON INDUCED POLARIZATION AND MAGNETOMETER SURVEYS ON SOME IDA CLAIMS PORT HARDY AREA, BRITISH COLUMBIA ON BEHALF OF PERRY, KNOX, KAUFMAN, INC.

by

P. J. Fominoff, B.A.Sc.

and

Jon G. Baird, B.Sc., P.Eng.

November 18, 1970

CLAIMS:

| Name | |
|---|---|
| IDA | 70, 72, 74, 76, 78 - 88, 90, 81 398-404, 408, 412, 414, 416, 418, 420, 422 - 424, 426 |

LOCATION:

Port Hardy area, British Columbia
North Shore of Holberg Inlet
Nanaimo Mining Division
127° 50° NE

DATES:

October 6 to October 22, 1970

## TABLE OF CONTENTS

## SUMMARY

The present induced polarization survey has revealed three zones of increased chargeability on adjacent parts of survey lines 2000' to 2500' apart. These responses could arise from significant volumes of rock containing from 2% to greater than 5% by volume of metallically conducting material such as sulphides, graphite or other minerals known to give increased induced polarization responses.

The magnetometer survey has revealed responses typical of ground magnetic surveys over extrusive rocks. Aside from one possible area of increased magnetic intensities, no interpretations of contacts or structure are possible from the present data.

Since the high chargeability sources approach the ground surface, geological and geochemical studies should be carried out to determine if the increased chargeabilities may arise from base metal type mineralization. If these studies are favourable diamond drilling may be warranted. One drill hole, 300' in minimum length, is herein proposed based upon the geophysical results alone.

# REPORT ON INDUCED POLARIZATION AND MAGNETOMETER SURVEYS ON SOME IDA CLAIMS PORT HARDY AREA, BRITISH COLUMBIA ON BEHALF OF PERRY, KNOX, KAUFMAN, INC.

## INTRODUCTION

During the period October 6 to October 22, 1970, a geophysical field party under the direction of Mr. Tony Guernier, executed an induced polarization survey in the Port Hardy area, British Columbia on behalf of Perry, Knox, Kaufman, Inc.

The property lies on the north shore of Holberg Inlet about 4 miles northwest of Coal Harbour and is reached by helicopter from the Port Hardy airport. Glacial drift and forest cover most of the surface of the property and topographic relief is moderate. As usual for this area in the fall of the year, heavy rain was experienced throughout the survey.

The claims covered, in whole or part, by this survey are listed on the title page of this report and are shown on Plate 2 on a scale of 1" = 1500'.

Seigel Mk VII time-domain (pulse-type) induced polarization equipment has been employed on this property. The transmitting unit had a rating of 2.5 kilowatts and equal on and off times of 2.0 seconds. The receiving unit was a remote, ground-pulse type triggered by the rising and falling primary voltages set up in the ground by the transmitter. The integration of the transient polarization voltages takes place for 0.65 seconds after a 0.45 second delay time following the termination of the current on pulse.

The purpose of an induced polarization survey is to map the subsurface distribution of metallically conducting mineralization beneath

the grids covered. In the present area such mineralization could include chalcopyrite, molybdenite, pyrite and other metallic sulphide minerals. Metallic minerals such as graphite and magnetite as well as non-metallic minerals such as chlorite and sericite can give responses not always distinguishable from sulphide mineralization.

The three electrode array was employed for the survey. For this electrode array, one current electrode and two potential electrodes traverse the profiles with an interelectrode spacing called "a". The second or "infinite" current electrode is placed a distance greater than 5a from the measuring point which is defined as the midpoint between the moving current electrode and the near potential electrode. For the reconnaissance survey observations were taken for a = 400' and 800'. Station intervals were 200'. In areas of increased chargeabilities detail observations were taken with a = 200' and 100'.

A Scintrex MF-1 magnetometer was used for the magnetic survey. This is a vertical force fluxgate instrument with a reading accuracy of ± 5 gammas on the finest scale. For this survey base level corrections were made by referring to a fixed base station. Diurnal corrections were made by continually reading a fixed base station magnetometer. Readings were taken each 100' along the survey lines.

For the present survey, three lines oriented north-south were cut and two were chained. The third was chained at the time of the survey. The distance between Lines A and B was 2000' while Lines B and C were 2500' apart. In all, about 5.2 line miles of induced polarization surveying and 4.5 line miles of magnetometer surveying were carried out. The magnetometer survey of the south end of L C was curtailed due to flooding.

GEOLOGY

Government mapping reveals that the southern part of the survey area is underlain by rocks of Upper Triassic or Jurassic Bonanza Subgroup which consists of volcanic flows and breccias with some sediments. The northern part of the area is believed to be underlain by intrusive rocks of the Coast Intrusions. These two rock types meet along an east-west contact near the centre of the property. Since the volcanic rocks often have pyritic zones, induced polarization anomalies from such sources are not uncommon in the Port Hardy area.

The target of the present survey was a large tonnage, low grade type deposit of copper sulphide mineralization which might occur within the intrusive or volcanic rocks.

DISCUSSION OF RESULTS

Plate 3, on the scale of 1" = 500' shows the chargeability results in profile form. The vertical scale is 1" = 10.0 milliseconds. Symbols explained in the legend have been used to differentiate between observations taken with different electrode spacings.

Plate 4 shows the resistivity profiles on a scale of 1" = 500'. The vertical scale is 2" = 1 logarithmic cycle with the line trace taken as 1000 ohm-meters. An example of this scale is shown on the Plate.

Plate 5, also on the scale of 1" = 500' shows the magnetic profiles. The vertical scale is 1" = 500 gammas.

The chargeability results for the north part of the grid indicate that the background values are less than 10.0 milliseconds and generally average about 7.0 milliseconds. With this background a uniform subsurface distribution of 1% by volume of metallically conducting mineralization

would be expected to add approximately 10.0 milliseconds to the background level. Since deposits of low concentrations of base metal sulphides of sufficient dimensions may have economic significance, areas exhibiting chargeabilities in excess of 10.0 milliseconds may be worthy of further investigation.

A broad zone exhibiting chargeability responses in excess of 10.0 milliseconds occurs on Line A from 10 S to 33 S. The peak chargeability amplitude on the 200' electrode spacing profile is 28.0 milliseconds. These profiles are interpreted to indicate a source containing about 2.5% by volume of metallically conducting material. The source is interpreted to approach to within about 50' and probably closer to the ground surface and to extend to 500' or more below surface.

On Line B, chargeability increases ranging up to peak values in excess of 50.0 milliseconds occur from about 20 S to 35 S. The character of the profiles for four electrode spacings is interpreted to arise from a source about 500' in width, centred about 30 S and dipping steeply northwards. The concentration of metallically conducting material is about 5% or more by volume. The depth to the source is not likely more than 15'.

Further chargeability increases occur south of 12 S on Line C. The 100' and 200' spacing profiles suggest a complicated distribution of small, near surface sources. The 400' electrode spacing profile suggests two larger bodies, one between 12 S and 19 S and the other extending from 29 S beyond the south end of the line. A more quantitative interpretation of these responses would be possible if 50' electrode spacing observations were taken on Line C and if flanking lines were surveyed.

The observed resistivities range from about 200 to 4,000

ohm-meters while the average resistivities are between about 1500 and 2000 ohm-meters. On the north parts of the profiles resistivities and chargeabilities increase with increasing electrode separation which suggests that a layer of lower resistivity and chargeability, probably overburden, overlies a higher resistivity and chargeability horizon, probably bedrock. A profile using one additional electrode spacing would be necessary to allow an interpretation of the depth of the overburden.

The increased chargeability zones on Lines B and C are accompanied, at least in part, by decreased resistivities while there is no resistivity correlation for the chargeability increases on L A. These resistivity decreases could be caused by an increased metallically conducting content of the rock, a change in rock types at about 25 S or possibly by fracturing or alteration of the rocks south of 25 S on Lines B and C.

Since the chargeability and resistivity characteristics in the anomalous zones on the three survey lines are somewhat different and because of the wide interline spacing, a line-to-line correlation of the anomalous zones would have to be substantiated by intermediate traverses or some other ancillary information.

The magnetic profiles show very narrow, steep gradients with relief of 500 gammas between stations 100' apart not uncommon. These profiles are quite typical of ground magnetometer surveys over extrusive rocks which often have irregular distributions of magnetite.

An attempt has been made to filter out the high frequency distortions likely due to small, near surface sources in order to enhance lower frequency responses which may be more indicative of important changes in the character of the bedrocks. Since the amplitude of the high frequency "noise" is equal to or greater than that of the expected

low frequency "signal", it is not considered worthwhile to apply statistical techniques. The smoothed profiles shown on Plate 5 have therefore been drawn simply by mentally averaging the surrounding values.

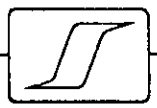
The most pronounced feature of the smoothed profiles is a magnetic high of about 1000 gammas amplitude centred near 5 S on L B which may correlate with a similar increase near the baseline on L C. There are no magnetic responses which can be said to correlate to the bodies causing the increased chargeability responses although the magnetic distortions between 25 S and 35 S on L B may arise in part from minerals such as pyrrhotite or magnetite which may contribute to the increased induced polarization responses.

## CONCLUSIONS AND RECOMMENDATIONS

The present induced polarization survey has revealed three zones, one on each survey line, which exhibit chargeability responses which could arise from subsurface concentrations of from 2% to greater than 5% by volume of metallically conducting material such as sulphides, graphite or other minerals known to give induced polarization responses. While the increased chargeability zones are adjacent to each other, further data on intermediate lines would be required to allow a definite line-to-line correlation.

A magnetometer survey has revealed that the rocks underlying the grid exhibit locally varying magnetic susceptibilities typical of volcanic rocks. One possible zone of increased magnetic intensities has been noted.

None of the chargeability, resistivity or magnetic results reveal an east-west intrusive-volcanic contact believed to occur near



the centre of the property.

Since the sources of the increased chargeability responses are interpreted to approach the ground surface, it is recommended that geological and geochemical studies be carried out to determine if the present responses may be due to base metal type sulphides. If these investigations are favourable, trenching or diamond drilling may be warranted. On the basis of the geophysical data alone, the following would appear to be the optimum drill hole:

| COLLAR | DIRECTION | DIP | MINIMUM DEPTH |
|---|---|---|---|
| L B, 27 S | South | -45° | 300' |

If an initial drill hole shows favourable results, additional drilling can be recommended from the present data although prior induced polarization surveying on intermediate lines may be advisable.

Respectfully submitted,

SEIGEL ASSOCIATES LIMITED

P. J. Fominoff per Roc

P. J. Fominoff, B.A.Sc.
Geophysicist

Jon G. Baird per Roc

Jon G. Baird, B.Sc., P.Eng.
Consulting Geophysicist

Vancouver, B. C.
November 18, 1970

DOMINION OF CANADA:

PROVINCE OF BRITISH COLUMBIA.

TO WIT:

**In the Matter of** a geophysical survey on behalf of Perry, Knox and Kaufman, Inc.

I, L. A. Merrifield for Seigel Associates Limited

of 750 - 890 West Pender Street, Vancouver

in the Province of British Columbia, do solemnly declare that an induced polarization survey has been executed on some IDA claims, Holberg Inlet, Port Hardy area, British Columbia between September 28 to November 25, 1970.

| | | | | |
|---|---|---|---|---|
| (1) | Wages: | | | |
| | T. Guernier | 15 1/2 days @ $35.00/day | $542.50 | |
| | G. Budgell | 15 1/2 days @ $27.50/day | 426.25 | |
| | R. Paradis | 15 1/2 days @ $27.50/day | 426.25 | |
| | W. Murray | 15 1/2 days @ $27.50/day | 426.25 | |
| | H. Winzeler | 15 1/2 days @ $27.50/day | 426.25 | |
| | | | $2,247.50 | $2,247.50 |
| (2) | Transportation & shipping to the job | | | 357.00 |
| (3) | Transportation on the job | | | 83.90 |
| (4) | Food & living expenses | | | 934.03 |
| (5) | Use of geophysical equipment | 15 1/2 days @ $30.00/day | | 465.00 |
| (6) | Magnetometer survey - 5.7 line miles | | | 399.00 |
| (7) | Paid to Seigel Associates Limited to cover geophysicist's supervision, calculating, plotting and fairdrawing data and preparation of final reports. | | | 1,933.74 |
| | | | | $6,420.17 |

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 30th day of March, 1971, A.D.

L. A. Merrifield

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

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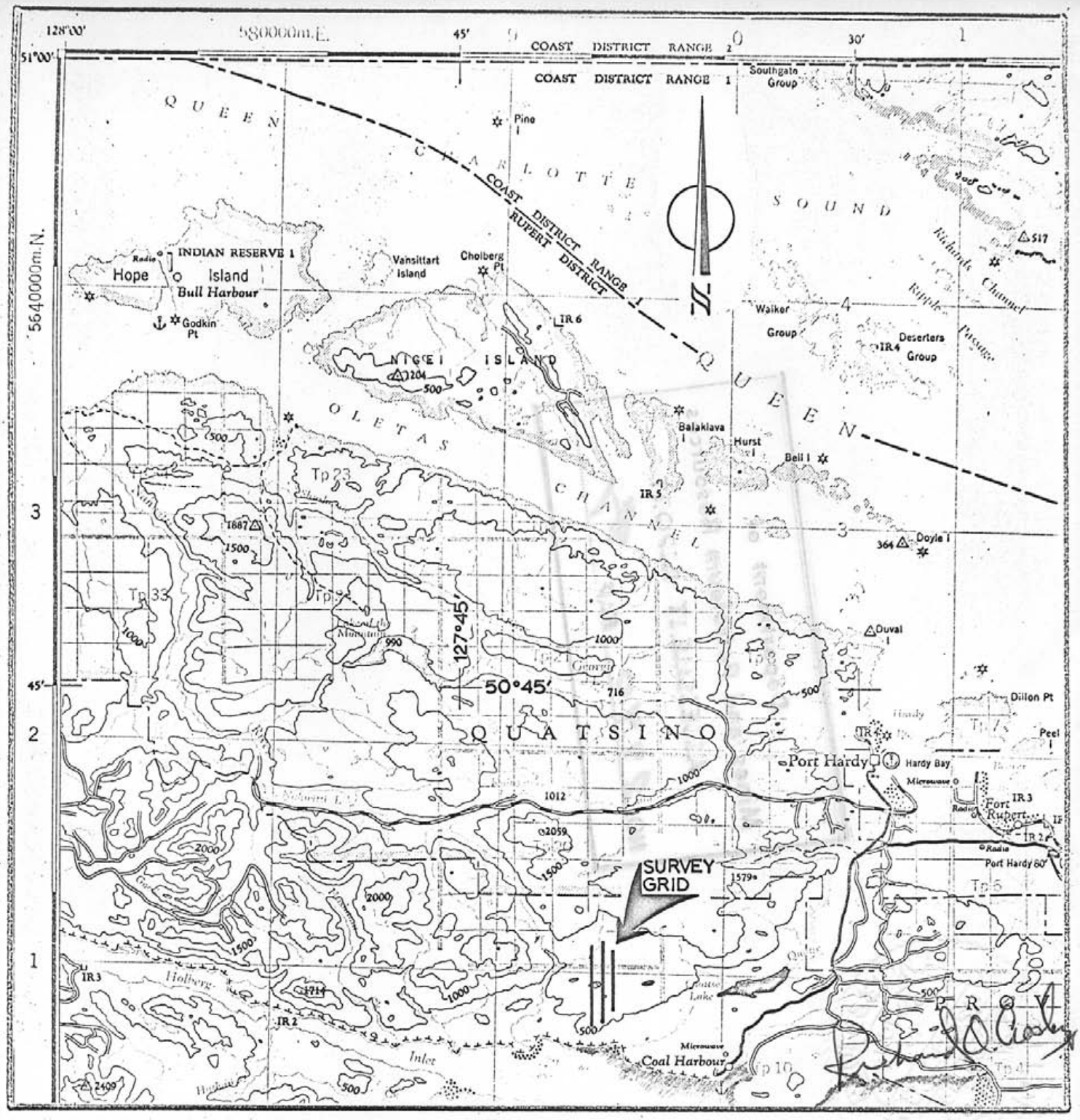
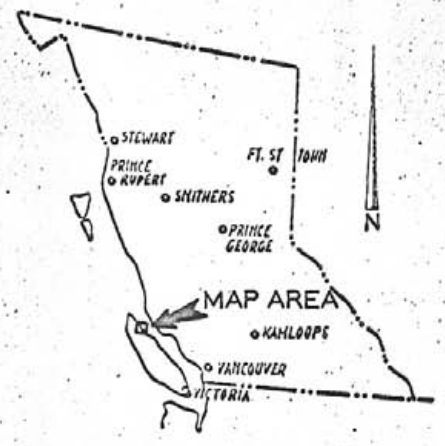
Sub-mining Recorder




PERRY, KNOX, KAUFMAN INC.

# LOCATION MAP

## HOLBERG INLET

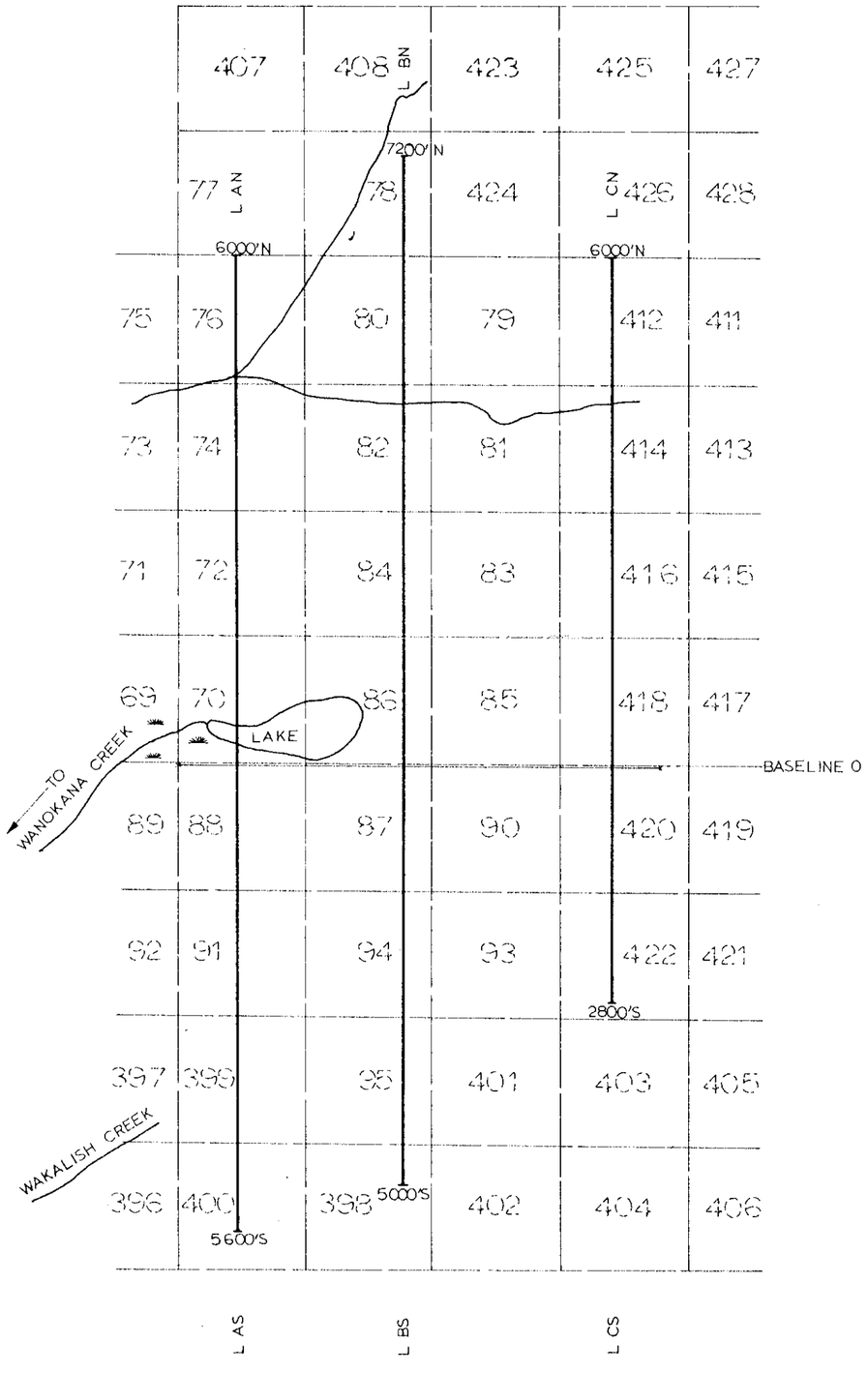
PORT HARDY AREA, BRITISH COLUMBIA

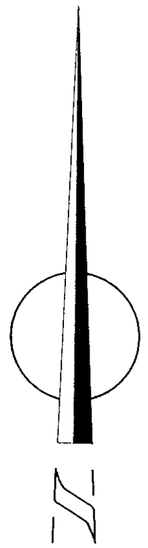
4 miles 0 4 miles

Survey by
SEIGEL ASSOCIATES LTD.
October 1970

PLATE 1

IDA CLAIMS



# 2940 M-2

PLATE 2

PERRY, KNOX, KAUFMAN, INC.

HOLBERG INLET

PORT HARDY AREA BRITISH COLUMBIA

GRID AND CLAIMS

SCALE: 1" = 1500'

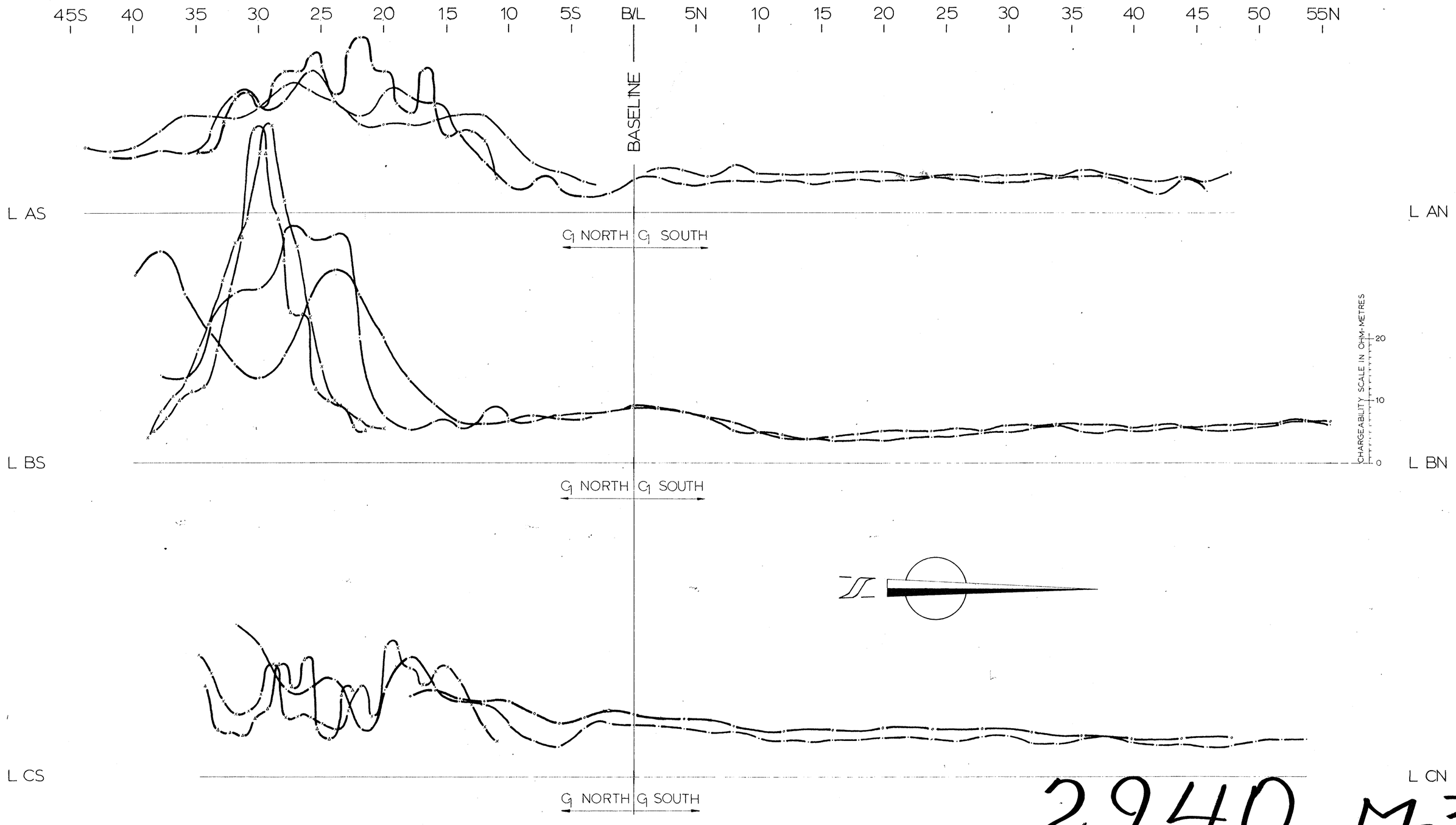
1500' 0 1500' 3000'

SURVEY BY SEIGEL ASSOCIATES LTD OCTOBER 1970

Richard A. Seigel



TO ACCOMPANY A GEOPHYSICAL REPORT BY
P.J. FOMINOFF AND J.G. BAIRD, DATED NOVEMBER 18, 1970




## LEGEND

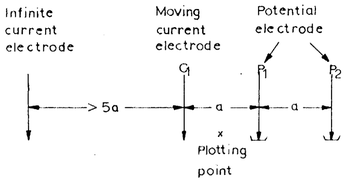
CHARGEABILITY SCALE 1" = 10 MILLISECONDS

ELECTRODE SPACING
- a = 800'
- a = 400'
- a = 200'
- a = 100'

## NOTES

SCINTREX MK VII IP INSTRUMENTATION

THREE ELECTRODE ARRAY




G1 NORTH OR SOUTH OF ARRAY AS INDICATED

INTERLINE SPACING TO SCALE

TO ACCOMPANY A GEOPHYSICAL REPORT BY
P.J. FOMINOFF AND J.G. BAIRD, DATED NOVEMBER 18. 1970



2940 M-3

PLATE 3

PERRY, KNOX, KAUFMAN, INC.

HOLBERG INLET

PORT HARDY AREA BRITISH COLUMBIA

# INDUCED POLARIZATION SURVEY

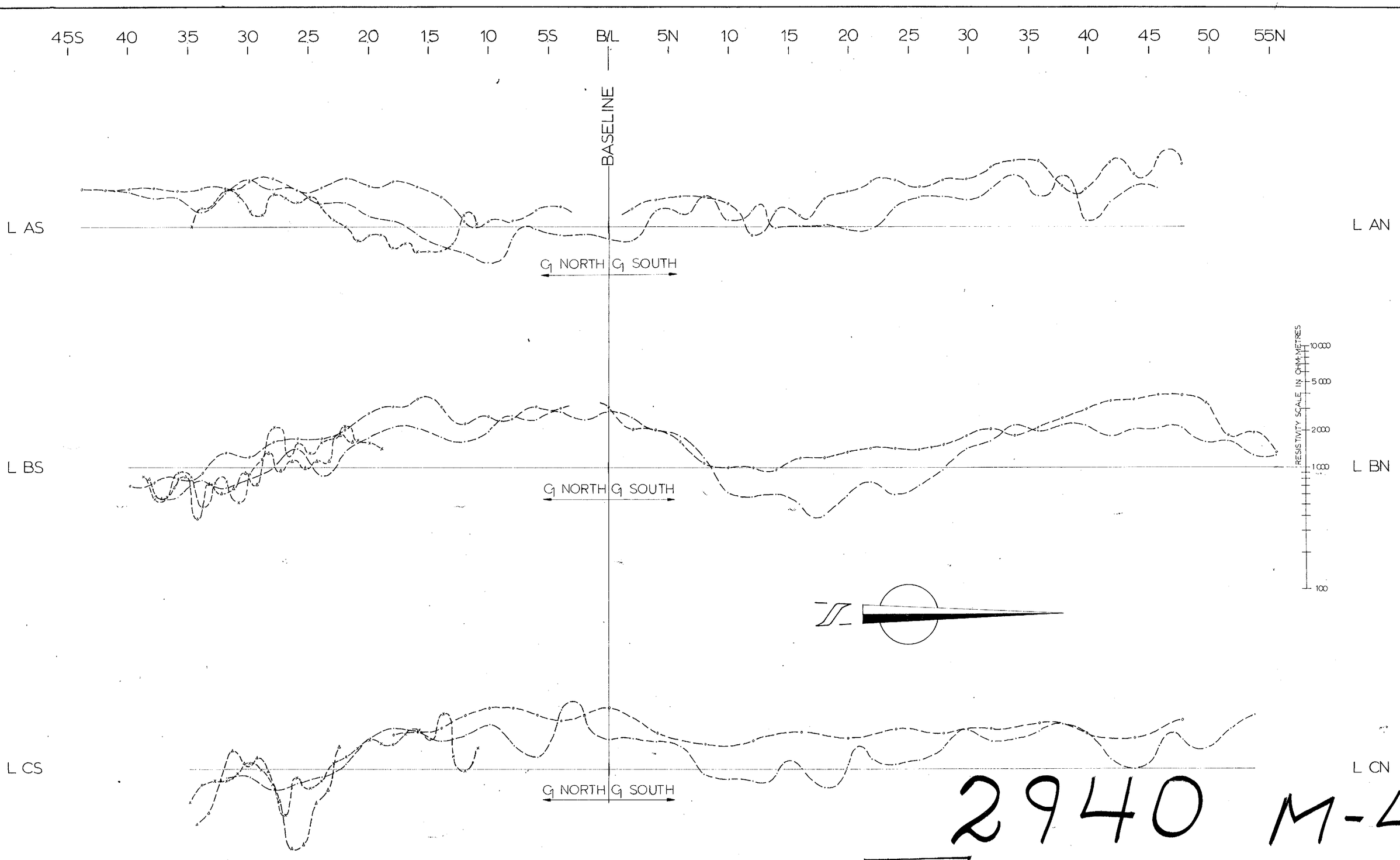
## CHARGEABILITY PROFILES

SCALE: 1" = 500'

500 0 500 1000

SURVEY BY SEIGEL ASSOCIATES LTD. OCTOBER 1970

Richard O. Crosby




## LEGEND

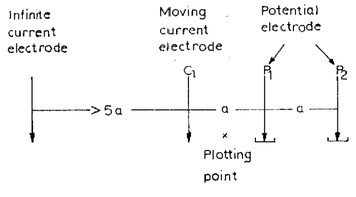
RESISTIVITY SCALE 2" = 1 LOGARITHMIC CYCLE WITH LINE TRACE TAKEN AS 1000 OHM-METRES

ELECTRODE SPACING
- a = 800'
- a = 400'
- a = 200'
- a = 100'

## NOTES

SCINTREX MK VII IP INSTRUMENTATION

THREE ELECTRODE ARRAY




G1 NORTH OR SOUTH OF ARRAY AS INDICATED

INTERLINE SPACING TO SCALE

TO ACCOMPANY A GEOPHYSICAL REPORT BY
R.J. FOMINOFF AND J.G. BAIRD, DATED NOVEMBER 18, 1970



2940 M-4

PLATE 4

PERRY, KNOX, KAUFMAN, INC.

HOLBERG INLET

PORT HARDY AREA BRITISH COLUMBIA

INDUCED POLARIZATION SURVEY

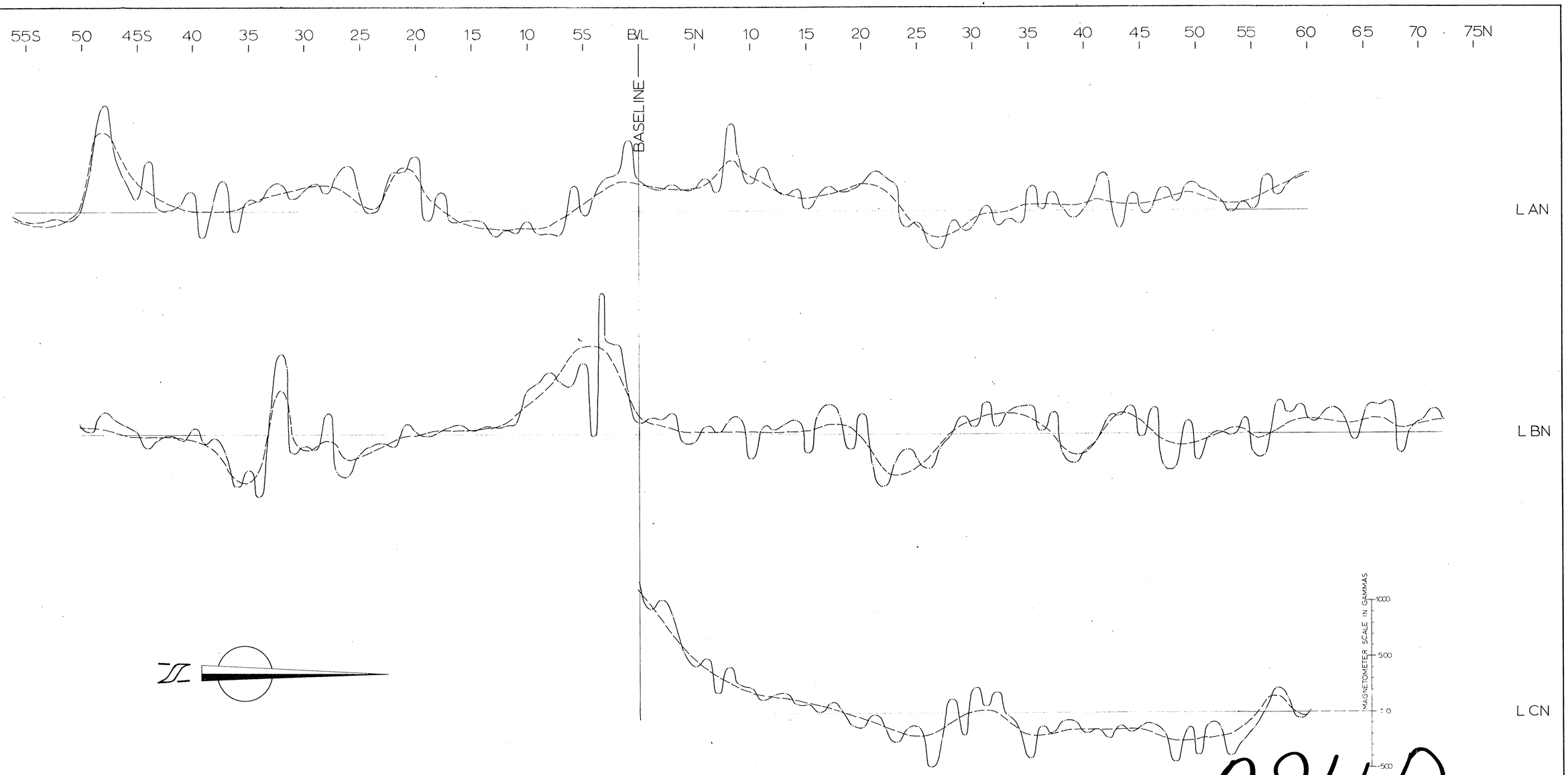
RESISTIVITY PROFILES

SCALE: 1" = 500'

500 0 500 1000

SURVEY BY SEIGEL ASSOCIATES LTD. OCTOBER 1970

Richard O. Crosby




## LEGEND

MAGNETOMETER SCALE 1" = 500 GAMMAS

OBSERVED PROFILES

SMOOTHED PROFILES

## NOTES

SCINTREX MAGNETOMETER MF 1

PLATE 5

PERRY, KNOX, KAUFMAN, INC.

HOLBERG INLET

PORT HARDY AREA BRITISH COLUMBIA

# MAGNETOMETER SURVEY

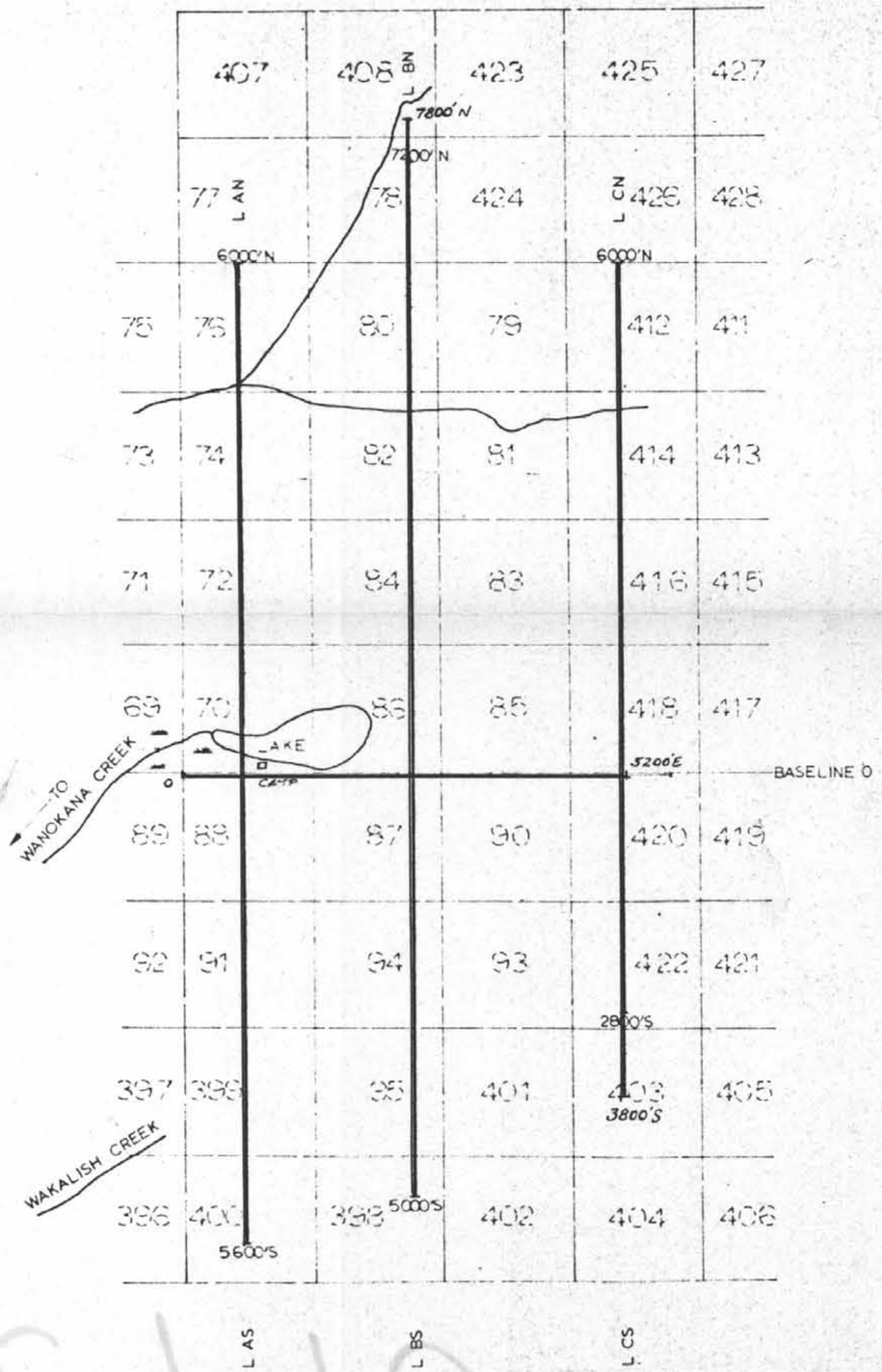
SCALE: 1" = 500'

500 0 500 1000

SURVEY BY SEIGEL ASSOCIATES LTD. OCTOBER 1970

TO ACCOMPANY A GEOPHYSICAL REPORT BY
P.J. FOMINOFF AND J.G. BAIRD, DATED NOVEMBER 18, 1970

IDA CLAIMS




LINE CUTTING

—— EXTENT OF GRID



2940 M-6

PERRY, KNOX, KAUFMAN, INC.

HOLBERG INLET
PORT HARDY AREA BRITISH COLUMBIA

GRID AND CLAIMS

SCALE: 1" = 1500'

15,00' 0 15,00' 3000'

J.A. KNOX
OCTOBER, 1970