

REPORT ON
INDUCED POLARIZATION SURVEY
IN THE
POWELL RIVER AREA, B.C.
FOR
EXPLORATION COMPANY OF CANADA LIMITED
BY
CANADIAN AERO MINERAL SURVEYS LIMITED

92F15
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GEOPHYSICAL REPORT - INDUCED POLARIZATION SURVEY
OK GROUP OF CLAIMS, POWELL RIVER AREA, 50°124°SW
BY

CANADIAN AERO MINERALS SURVEYS, LTD.

W. Schuur, B.Sc., M.Sc., and J.R. Irvine, B.Sc.

FOR

AMERICAN SMELTING AND REFINING CO.

October 3 - November 10, 1967.

Owner of Claims: Guaranty Trust Co. of Canada.

1573

REPORT ON
INDUCED POLARIZATION SURVEY
IN THE
POWELL RIVER AREA, B.C.
FOR
ASARCO EXPLORATION COMPANY OF CANADA LIMITED
BY
CANADIAN AERO MINERAL SURVEYS LIMITED
Project No. 8304

AMERICAN SMELTING AND REFINING COMPANY
ROOM 504-535 THURLOW ST.
VANCOUVER 5, B. C.

INVOICE

CANADIAN AERO MINERAL SURVEYS LTD.

BOX 468
R.R. 5, OTTAWA
HUNT CLUB ROAD

STATEMENT OF EXPENDITURES

DATE SHIPPED INVOICE DATE Nov. 29, 1967 INVOICE NO. 1196 OUR ORDER NO. 8304
 SHIPPED TO ASARCO EXPLORATION CO. OF CANADA LTD.,
 SOLD BY Suite 840,
 OUR ORDER NO. 20 King Street West,
 8304 TORONTO 1, Ontario.
 SOLD TO

ATTENTION: Mr. B. Nicholls

QUANTITY	DESCRIPTION	PRICE	SALES TAX	TOTAL
Final Billing - I.P. Survey - Powell River.				
<u>MOBILIZATION</u> - Oct. 2 - Oct. 3/67				
(A)	Engineer's wages: 2 days @ \$100.00/day			\$ 200.00
(B)	Labourer's wages" @ costs + 10%			70.40
(C)	Room and Board			30.50
(D)	Travel costs - 107 miles @ .20/mile	\$21.40		
	Ferry		\$10.50	31.90
<u>DEMOBILIZATION</u> - Nov. 10/67				
(A)	Engineer's wages:			100.00
(B)	Labourer's wages			41.80
(C)	Room and Board			23.00
(D)	Travel costs - 97 miles @ .20/mile	\$19.40		
	Ferry		\$ 7.00	26.40
<u>WORKING DAYS</u> - 25 @ \$4,500.00/month				
	2 @ \$225.00/day			450.00
<u>SEVERE WEATHER DAYS</u> - 5 @ \$100.00/day				
				500.00
<u>LABOURER'S WAGES</u> - @ cost +10%				
				1,653.30
<u>GROCERIES & CAMP SUPPLIES</u> @ cost				
				213.63

PAID DEC 18 1967

Correct
 AMERICAN SMELTING AND REFINING COMPANY
 ROOM 504-535 THURLOW ST.
 VANCOUVER 5, B. C.

Nov. 29, 1967

Invoice No. 1196

Our order No. 8304

Asarco Exploration Co. of Canada Ltd.,
Suite 840,
20 King Street West,
TORONTO 1, Ontario.

ATTENTION: Mr. B. Nicholls

Final Billing - I.P. Survey - Powell River cont'd.

<u>LOCAL TRANSPORTATION</u> - 170 miles @ .20/mile	34.00
ADVANCE TO ASARCO EMPLOYEE (E. Galata) - <i>Collected (E.G.)</i> <i>(in final settlement)</i>	22.00
	<u>\$7,896.93</u>
	<u>22.00</u>

Net - 7874.93

(Signature)
79-67-7.

Conrad
(Signature)
AMERICAN SMELTING AND REFINING COMPANY
ROOM 504-535 THURLOW ST.
VANCOUVER 5, B. C.
PAID PER 18 1967

921

SATURN MINING & EXPLORATION SERVICES LTD.

#510 - 350 West Hastings Street

Vancouver 1, B.C.

Phone 688-199

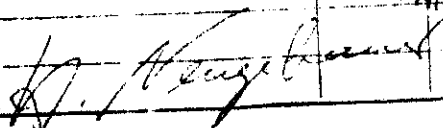
OUR NUMBER	65963
DATE	Oct 16/67
CUSTOMER'S ORDER	
SALESMAN	
TERMS	
F. O. B.	

SOLD TO American Smelting & Refining
504 - 535 Thurlow St
Van B.C.

SHIPPED TO _____ VIA _____

ADDRESS _____

INVOICE	Line cutting contract Jewell River Area 107600 ft = 20.3 miles @ \$125 per mile	2537.50
	Pass deposit	1000.00
	Field Charge	1537.50


 PAID TO 10/16/67



Correct
 AMERICAN SMELTING AND REFINING COMPANY
 ROOM 504-535 THURLOW ST.
 VANCOUVER 5, B. C.

REPORT ON

INDUCED POLARIZATION SURVEY

IN THE

POWELL RIVER AREA, B.C.

FOR

ASARCO EXPLORATION COMPANY OF CANADA LIMITED

BY

CANADIAN AERO MINERAL SURVEYS LIMITED

Project No. 8304

OTTAWA, Ontario,
November 27, 1967.

John R. Irvine,
Geophysicist.

W. Schuur, M.Sc.,
Geophysicist.

The following are the educational and professional statistics
of: John L Irvine, 380 Hunt Club Road, Ottawa, Ontario.

Born: January 30, 1940, in Vernon, B.C.

EDUCATION:

High School: Vernon Jr. Matric, 1958

University of B.C. 1958 - 1964, B.Sc., Specialization

Geophysical Geology.

EXPERIENCE:

May 1962 - September 1962 -- Hudson's Bay Oil & Gas. Student Trainee
On oil exploration.

May 1963 - September 1963 -- Canadian Nickel Company, Student
in mining exploration. Geophysicist.

May 1964 - October 1964 -- Kerr Addison Mines Ltd. Geophysicist in
mining exploration.

January 1965 - Sept. 1965 -- Prospecting geophysics. Geophysicist.

October 1965 - present -- Canadian Aero Mineral Surveys Limited. Geophysicist.

I certify that the above data are as stated.

John L. Irvine.

The following is a brief statement of the educational and professional statistics of: Willem Schuur, 116 Chesterton Dr., Ottawa 5, Ontario

Born: August 6, 1935

EDUCATION:

High School: Gymnasium Ede, Netherlands - 1953

State University of Utrecht - 1953-1956 B.Sc., Geology
1956-1959 M.Sc., Geophysics

Thesis: 1) Structural Control of Greek Chromite Deposits.
2) Determination of Electrical Conductivity of Earth's Interior by Magnetotelluric methods.
3) Design and Instrumentation of Demagnetization Equipment with Special Application for Palaeomagnetic Research.

EXPERIENCE:

1959-1962	Seismograph Service (England) Limited.
Dec. 1959- June 1960	Junior Computer, Nigeria, Western Region.
July 1960- May 1962	Computer in Spain.
1962-1965	Geological Service of Surinam, S.A.
July 1962- March 1964	Geophysicist.
March 1964- May 1965	Chief Geophysicist.
1965-present	Canadian Aero Mineral Surveys Ltd. - Geophysicist.

T A B L E O F C O N T E N T S

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	A). Equipment
	B). Field Procedure
	C). Data Presentation.

Accompanying this Report:-

- #1 - Apparent chargeability Contour Map
scale 1" = 400' (1 sheet).
- #2+3 Combined apparent chargeability and
apparent resistivity profile
presentation horizontal scale
1" = 200' (2 sheets).

REPORT ON
INDUCED POLARIZATION SURVEY
FOR
ASARCO EXPLORATION COMPANY OF CANADA LIMITED

I. INTRODUCTION

In the period from October 3, until November 10, 1967, Canadian Aero Mineral Surveys Limited carried out an induced polarization survey in the Powell River area, B.C. on behalf of Asarco Exploration Company of Canada Limited. A total of approximately 21 line miles was surveyed.

II. DISCUSSION OF RESULTS

The I.P. survey carried out in the Powell River area, B.C. used a reconnaissance spacing of 200 feet with readings obtained along the survey lines at 200' intervals. Detailing was carried out in some areas with a 100' spacing and a reading interval of 100 feet.

Although a contour map was prepared, it should be pointed out that the contours are not wholly reliable due to the fact that the line spacing of 300 feet was too large compared with the 200' spacing and the 200' reading interval used.

Background chargeabilities varied somewhat due to changes in the thickness of cover and also in the type of bedrock encountered. Background readings in general tended to be in the order of 2-4 milliseconds. Readings above 6.0 milliseconds were considered anomalous and on this basis five anomalous zones were outlined. They are labelled from A through E and will be discussed in this order.

Anomalous Zone "A"

This is the northernmost anomalous zone in the area surveyed and is still open both to the north and to the southeast. Results indicate a fairly large zone of response material with a very strong zone in the center. No detailing was carried out over this anomaly, but obtained I.P. responses certainly warrant follow-up by drilling. Since no dip could be assessed on this anomaly, the best drill hole location appears to be at 79E, 140N, to be drilled vertically for 200'. If further testing is considered, another hole should be collared at 75E, 124N, to be drilled vertically for 200'.

Anomalous Zone "B"

This anomaly is of a different nature from the rest in the survey area, as it is a long narrow band only, whereas the other three zones are wide and extensive zones, with local zones of high response within. "B" exhibits sufficiently high amplitudes to warrant further follow-up by drilling. It is recommended to collar a hole at 59E on line 132N, to be drilled west along the line at 45° for 300'.

Anomaly "C"

This is the smallest of all the anomalies detected and is based on readings at two stations on one single line only. It could conceivably be joined up with zone "B", but for topographical reasons no readings could be obtained in the area separating "C" and "B". Unless this connection can be established by geological methods, no drilling can be recommended.

Anomaly "D"

Zone "D" is of good size and character and is completely outlined in this survey. Unfortunately, due to severe weather and poor ground conditions, it was not possible to do any detail work across this zone. As a result no indication of dip could be obtained. However, further follow-up by drilling is recommended at the following locations: collar at 76N, 81E, drill west along the line at 45° for 300' to test the eastern zone. For the central zone collar at 77E, 68N and drill west along the line at 45° for 300'. The small anomaly in the western part of the zone could be tested from 69E, 76N, to be drilled west along the line at 45° for 300'.

Anomalous Zone "E"

The extensive zone of anomalous responses in the far south of the survey area has been labelled as "E". It covers an area of 4,000' wide and over 7,000' long and is still open to the south. Within this zone a total of four bands can be distinguished, with responses of more than 12.0 milliseconds. Pyrite and molybdenite mineralization was noticed in the field within zone "E" III. Detail work across "E" III indicated a northeasterly dip of the responsive structure. This dip was interpolated for the other structures as well, so all drilling is recommended towards the southwest. Five drill holes are suggested to test the main anomalous features of zone "E" as follows:

"E I": collar at 76E, 37N, drill S30°W at 45° for 300'.

"E II": collar at 69E, 37N, drill S30°W at 45° for 300'.

"E III": collar at 62E, 37N, drill S30°W at 45° for 300'.

"E III": collar at 52E, 52N, drill W. along line at 45°
for 350'.

"E IV": collar at 50E, 21N, drill $S30^{\circ}W$ at 45° for 300'.

III. CONCLUSIONS AND RECOMMENDATIONS

Five zones of anomalous polarization responses were mapped. Of these, four appear to be of major interest, while the fifth, "C", probably can be linked up with zone "B". Detailing was carried out over zone "E" only and dip indications have been interpolated to other zones as well, whenever profile shape appeared to support this. Drillhole locations on zone "B" are suggested based on a vertical source, while for zone "A" the source material was interpreted to be sufficiently wide to permit vertical drillholes. It is very likely that the vast amount of geological information on the property, which was not available to the authors of this report, will change the concepts of geometry as expressed in this report and thus a review of drill hole positions should be carried out using this geological information. Based on the I.P. data the following drill holes are recommended"

Zone "A": collar at 79E, 140N, drill vertically for 200'.

collar at 75E, 124N, drill vertically for 200'.

Zone "B": collar at 59E, 132N, drill west along the line at 45°
for 300'.

Zone "D": collar at 76N, 81E, drill west along the line at 45°
for 300'.

collar at 68N, 77E, drill west along the line at 45°
for 300'.

Zone "E I": collar at 37N, 76E, drill S30°W at 45° for 300'.

"E II": collar at 37N, 69E, drill S30°W at 45° for 300'.

"E III": collar at 37N, 62E, drill S30°W at 45° for 200'.

collar at 52N, 52E, drill W along the line at 45°
for 300'.

Zone "E IV": collar at 21N, 50E, drill S30°W at 45° for 300'.

Respectfully Submitted,

OTTAWA, Ontario,
November 27, 1967.

John R. Irvine,
Geophysicist.

W. Schuur, M.Sc.,
Geophysicist.

APPENDIX I

A. EQUIPMENT

The equipment used by Canadian Aero Mineral Surveys Limited is the high sensitivity D.C. pulse-type I.P. unit Mk. V, built by Sharpe Instruments Limited. A current on-time of 1.5 seconds and a measuring time of 0.5 seconds are employed. A choice of 3 power units is available with this equipment, of respectively 1.2 k.w., 2.5 k.w. and 7.5 k.w. output to match requirements in specific areas. For surveys requesting a very high stable power source a 10 k.w., Volkswagen engine driven, power unit is also available.

B. FIELD PROCEDURE

All electrode configurations in common use in resistivity surveying like dipole-dipole, two array, three array, Wenner and Schlumberger configuration, can be used for DC induced polarization surveying. Canadian Aero Mineral Surveys Limited preferably uses the three array because of low coupling effect and high effective penetration. With this array one current electrode is placed at "infinity", a distance of at least 5 times the maximum spacing used during the survey from any survey station. The other current electrode and the two potential electrodes are equally spaced in line along the survey traverses.

In many areas high resistive bedrock is overlain by good conducting soils, which effectively prevent current to enter the

bedrock. To be able to obtain information about bedrock, spacings used have to be 20 and more times the depth of the overburden. In such cases, using any of the usual arrays, it is not possible to detect the presence of small or moderate sized bodies. Under these circumstances the gradient or rectangle method is both feasible and desirable. It reduces the effect of masking, retains a high degree of resolution and has good depth penetration. With this method, the two current electrodes are placed along a traverse at a mutual distance of 4000' or more. The potential electrodes are kept within the middle third of the current electrode spacing. For each current electrode set-up a rectangle of dimensions $1/3 \times 1/4$ the current electrode spacing is surveyed. For the gradient array method the potential electrode spacing is usually kept within $1/20$ of the current electrode spacing.

For the other electrode configurations the electrode spacing depends primarily on required depth of penetration and size of body expected. Most common spacings for reconnaissance survey with the three array are the 400' and 200'. Readings are normally taken at 200' intervals along the lines, but in areas of interest this interval is reduced to 100'. In some cases anomalous areas are further detailed using additional spacings - 800', 400', 200', 100' and 50' - to provide information as regards the change of electrical properties with depth.

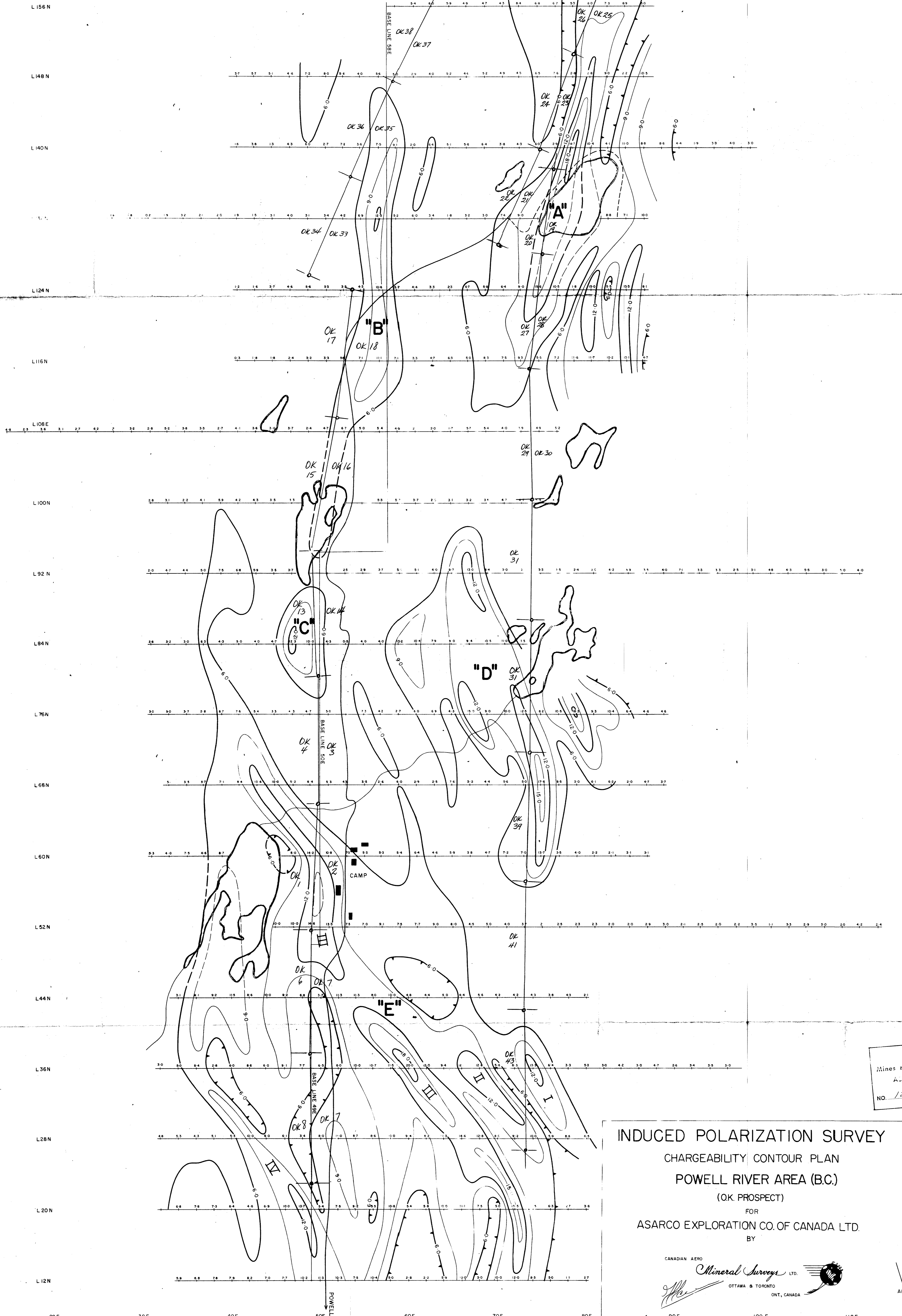
At each observation point both the primary voltage - steady state voltage - and secondary voltage - transient voltage or overvoltage - are observed. The primary voltages are converted.

by formula to apparent resistivities expressed in units of ohm meters. Secondary voltages are measured by integration and divided by their corresponding primary voltages to obtain the apparent chargeabilities. The chargeability expressed in units of milli-volt seconds per volt or milliseconds is the I.P. characteristic of the medium.

C. DATA PRESENTATION

Results are presented as combined apparent resistivity and apparent chargeability profiles. Resistivities are plotted at a logarithmic scale of 2" = 1 cycle. Apparent chargeabilities are plotted at a scale of 1" = 5 milliseconds. Apparent chargeability readings obtained with the reconnaissance spacing are also presented on a contour map. For the surveys done with the gradient method, contouring is done separately for each block, due to irregularities in the current distribution in the various blocks. For all other electrode configurations contouring is done continuously over the entire survey area.

15E 25E 35E 45E 55E 65E 75E 85E 95E 105E 115E



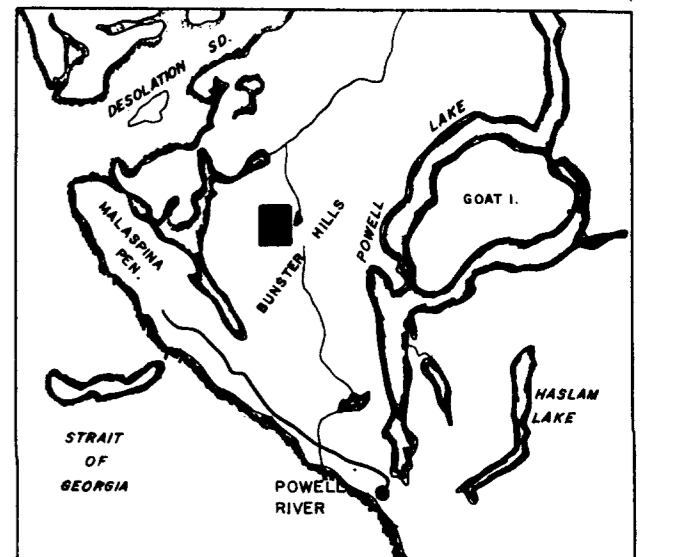
Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 1573 MAP 1

INDUCED POLARIZATION SURVEY
CHARGEABILITY CONTOUR PLAN
POWELL RIVER AREA (B.C.)
(OK. PROSPECT)
FOR
ASARCO EXPLORATION CO. OF CANADA LTD.
BY

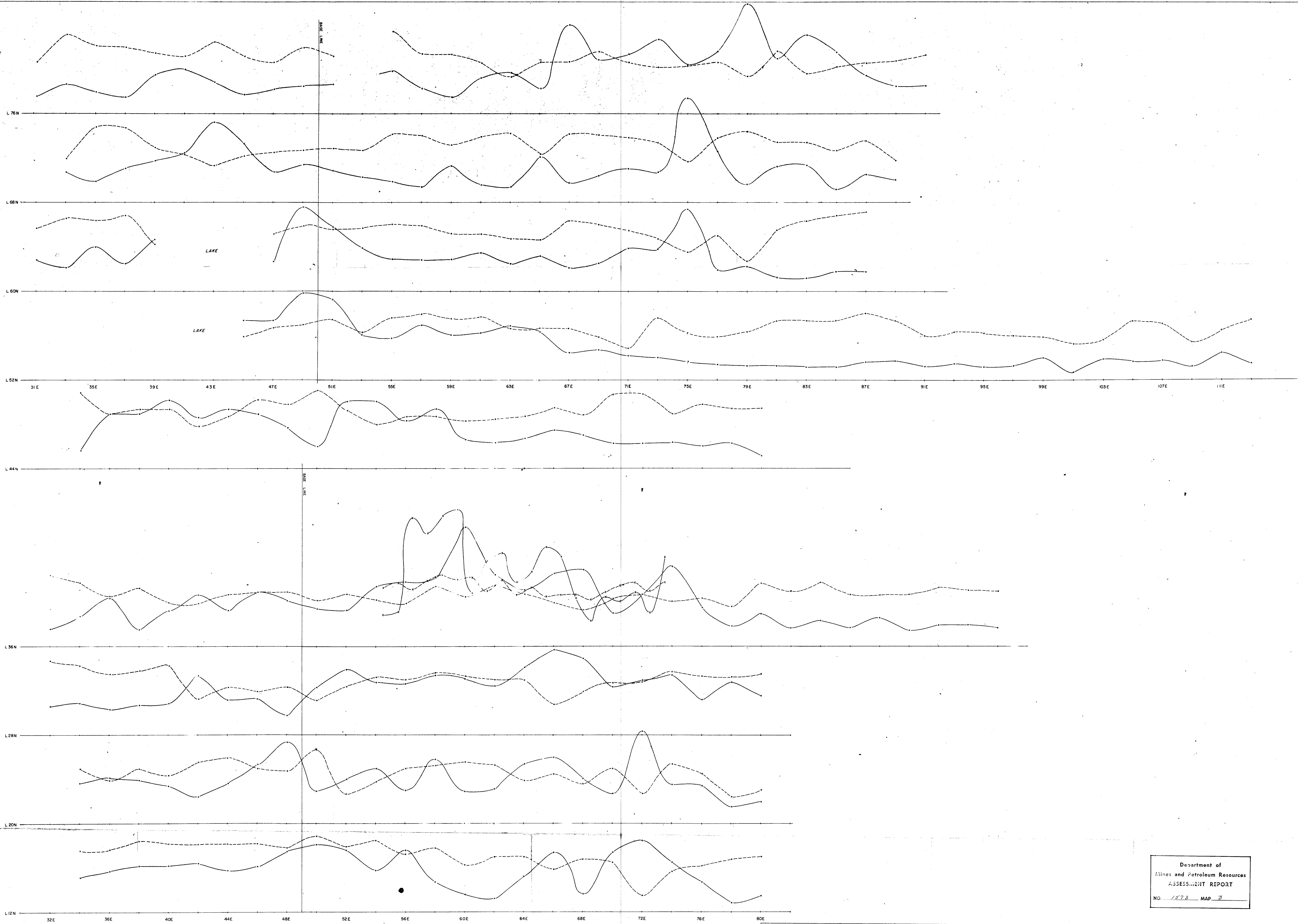
LEGEND
ELECTRODE CONFIGURATION 3 ARRAY
ELECTRODE SPACING 200 FEET
CONTOUR INTERVAL 3 MILLISECONDS
INDEX CONTOUR ————
INTERMEDIATE CONTOUR ————

SCALE
1 INCH = 400 FEET

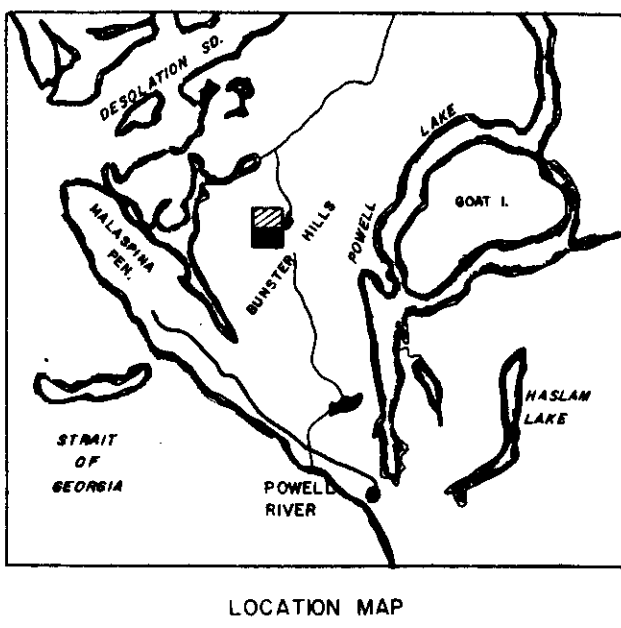
CANADIAN AERO
Mineral Surveys LTD.
OTTAWA & TORONTO
ONT., CANADA



1573



Department of
 Mines and Petroleum Resources
 ASSESSMENT REPORT
 NO. 1573 MAP 3



INDUCED POLARIZATION SURVEY
 PROFILE PRESENTATION
 POWELL RIVER AREA (B.C.)
 (OK. PROSPECT)

FOR
 ASARCO EXPLORATION CO. OF CANADA LTD.
 BY

CANADIAN AERO
Mineral Survey LTD.
 OTTAWA & TORONTO
 ONT., CANADA

LEGEND
 ELECTRODE CONFIGURATION..... 3 ARRAY
 ELECTRODE SPACING..... 200 FEET
 CHARGEABILITY..... x
 RESISTIVITY..... o

SCALE
 APPARENT CHARGEABILITY..... T=5.0 MILLISECOND
 APPARENT RESISTIVITY..... 2^{1/2} CYCLE (100-1000 Ω·m)
 SCALE 1 INCH = 200 FEET
 NOTE LINES NOT SPACED TO SCALE

1573