

757

REPORT ON  
AN INDUCED POLARIZATION SURVEY

near  
SMITHERS, BRITISH COLUMBIA

FOR  
MOLYMINES EXPLORATION LIMITED

BY  
HUNTEC LIMITED  
TORONTO, ONTARIO  
SEPTEMBER, 1965

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Claims surveyed

Miles surveyed

Personnel employed on survey

*#1* Map showing relation of survey lines  
to claims: Scale 1 inch to 500 feet

APPENDIX II

Detail profiles of chargeability and  
resistivity - Lines C, F, I and L.  
Scale: 1 inch to 100 feet

ACCOMPANYING MAPS

MAP POCKET

*#2* I. P. Reconnaissance Chargeability  
Contour Map

Scale: 1 inch to 200'

*#3* I. P. Reconnaissance Resistivity  
Contour Map

- do -

*#4* Interpretation Map

*#5* I. P. Chargeability,  
Resistivity with  
Interpretation

1 inch to 100'

## INTRODUCTION

Between July 30th and August 13th, 1965, an Induced Polarization survey was carried out by Hunttec Limited for Molymines Exploration Limited. The survey area was covered by a group of 8 mineral claims (Huber 1 to 4 inclusive and Mineral Hill 1 to 4 inclusive) located approximately 30 miles east of Smithers, British Columbia (54°, 126°, N.W.).

The geophysical crew was managed by Mr. A.R. Dodds, assisted by Mr. B.T. Howes, both of Hunttec Limited. Molymines were represented by Mr. W.D. Yorke-Hardy, and provided three field helpers. Drafting and typing were done at the Toronto office of Hunttec Limited.

The I.P. survey consisted of 7.09 miles of readings taken at 200-foot intervals, with 100-foot fill-in readings where required, using the electrode configuration known as the "three-electrode array". An electrode separation of 200 feet was used, with 100 feet between the potential electrodes. In addition, parts of four lines were detailed, using electrode separations of 50 feet and 100 feet.

The reconnaissance data are presented in the form of contoured maps, using a scale of 1 inch to 200 feet and a contour interval

of 2.5 milliseconds for chargeability. A logarithmic contour interval is used for resistivity. Data on the detailed lines are presented in the form of profiles, using a distance scale of 1 inch to 100 feet. Vertical scales are 1 inch to 4 milliseconds and 2 inches per logarithmic cycle for chargeability and resistivity respectively.

### PURPOSE OF SURVEY

A study of rocks in outcrop and shallow trenches revealed widespread mineralization with sulphides, including molybdenite. The object of the I.P. survey was to outline areas underlain by rocks containing higher percentages of total sulphides, on the theory that the molybdenite content may vary with that of total sulphides.\*

\* Personal communication - W.M. Sharp, Consulting Geologist,  
Molymines Exploration Limited

SURVEY SPECIFICATIONS

The Hunttec pulse-type I. P. instrument is similar in design and operation to that described by R. W. Baldwin in "A Decade of Development in Overvoltage Surveying", A. I. M. E. Transactions, Vol. 214, 1959. Power is obtained from a gasoline 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.

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  $P_1$  and  $P_2$  during the "current on" part of the cycle, and the secondary voltage ( $V_s$ ) appearing between  $P_1$  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-meters, is proportional to the ratio of the primary voltage to the measured

current, the proportionality constant depending on the geometry of the array used. The resistivity and chargeability obtained are called "apparent" as they are values which that part of the earth sampled would have if it were homogeneous. As the earth sampled is usually inhomogeneous, the calculated apparent resistivity and apparent chargeability are functions of the actual resistivity and chargeability and of the geometry of the rocks.

The electrode configuration used for this survey was the "three-electrode array". For this array one current electrode,  $C_1$ , and the two potential electrodes,  $P_1$  and  $P_2$ , are moved in unison along the survey lines. The spacing of these electrodes determines the depth penetrated. The second current electrode,  $C_2$ , is placed an infinite distance away which, in practice, is about ten times the distance between  $C_1$  and  $P_1$ . The I. P. measurement is plotted halfway between  $C_1$  and  $P_1$ .

INTERPRETATION

The survey shows that the rocks under most of this area respond quite strongly to the I. P. method. Only to the south do the chargeability values drop sufficiently to indicate barren rock. The low values in this part of the area are doubtless caused partly by overburden, but this overburden would have to be very thick, at least 200 feet, if it were to cause readings as low as this over rocks as responsive as those further north.

The readings within the responsive zone vary considerably, with several trends of particularly high chargeability values. These are shown on the interpretation map as zones of particular interest. Detailing with closer electrode separations on Lines C, F, I and L indicates that these trends are not as simple as they may appear from the reconnaissance contours. They are zones in which the rocks are, on average, more chargeable, but it is evident that within them the mineralization, if this is the cause of the I. P. response, is by no means homogeneous but broken up into pods or veins. Because of this complexity, and the fact that the more general zones of interest are so close together, it is not possible to locate them exactly.



Contamination between the effects of adjoining zones may cause the locations of the zones on the interpretation map to be as much as 100 feet away from their true position. Locations shown under the detail profiles are rather more accurate, but the interpretation under these is still not unique.

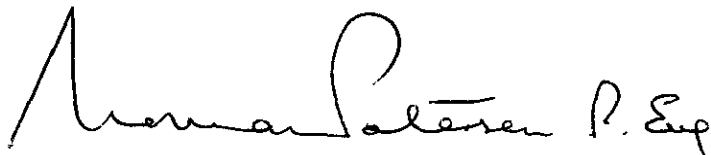
It is considered most probable that the high chargeabilities encountered in this area are caused, for the most part, by sulphide mineralization. No other possible sources of I. P. anomalies were observed in the area, and mineralization was widespread in outcrop.

Variations in resistivity primarily reflect changes in overburden thickness, but may be of assistance in tracing geological contacts in places.

## SUMMARY AND RECOMMENDATIONS

The I. P. survey over this area indicated a widespread region of high chargeability values. Inside this region several particularly high trends showed up, and these are interpreted as being complex. The source is expected to be shallow in all cases, and for the most part approaching within 50 feet of surface.

It is recommended that these highly anomalous trends be investigated by trenching or drilling. If drilling is considered more favourable, it is suggested that a number of shallow holes, of 100 to 200 foot length, be drilled on each anomaly, rather than a few deep holes. Initially these drill-holes should be located on the basis of the detail profiles, since these permit greater accuracy and sensitivity in positioning the cause of the anomaly.



For Andrew R. Dodds, B.Sc.  
Geophysicist

APPENDIX I

Claims Surveyed:

The survey area was covered by 8 mineral claims, as follows:

Huber 1 to 4 inclusive, and

Mineral Hill 1 to 4 inclusive.

Miles Surveyed:

The I. P. survey consisted of two parts :

- (a) Reconnaissance - covering all lines once with one electrode separation.
- (b) Detail - covering selected parts of lines with various electrode separations.

	<u>Miles</u>	<u>Readings</u>
Reconnaissance	7.09	223
Detail	<u>1.19</u>	<u>83</u>
Total	8.28	306

Personnel Employed on Survey:

<u>Name</u>	<u>Occupation</u>	<u>Address</u>	<u>Dates</u>
A. R. Dodds	Geophysicist	1450 O'Connor Drive, Toronto 16, Ontario.	July 30th - August 13th, 1965 August 17, 18, 1965 September 10, 1965
B. T. Howes	Geophysical Operator	- do -	July 30 - Aug. 13/65
T. Bower	Geophysical Helper	Smithers, B. C.	- do -
E. Fuller	- do -	- do -	- do -
P. Huber	- do -	- do -	Aug. 2 - 13, 1965
Mrs. P. Ryan	Drafting	1450 O'Connor Drive Toronto 16, Ontario	September 30, October 1, 4, 5, 6, and 8, 1965
	Typing	- do -	

30+00 — NE

20+00 —

18+00 —

12+00 —

6+00 —

0+00 —

6+00 —

12+00 — SE

HUBER 4

HUBER 3

MINERAL HILL 3

MINERAL HILL 4

MINERAL HILL 2

MINERAL HILL 1

HUBER 2

HUBER 1

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 NO. **757** MAP **#1**

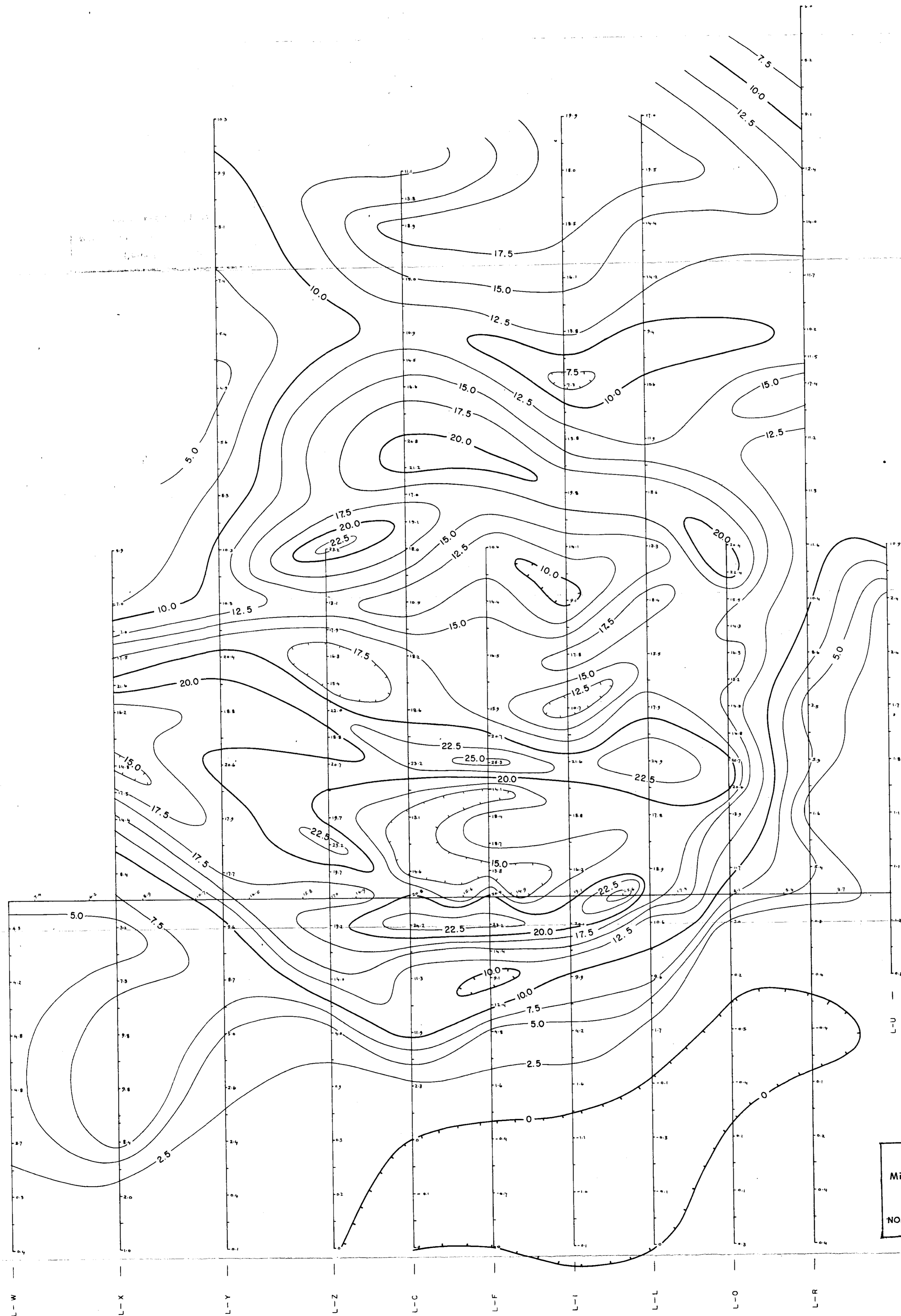
MOLYMINES EXPLORATION LIMITED

Claim map showing

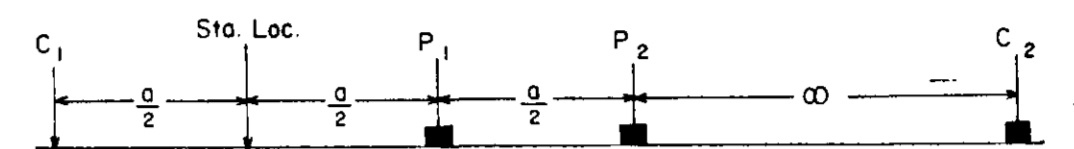
LOCATION OF SURVEY LINES

1 inch = 500 feet

32+00 NE  
 30+00 NE  
 28+00 NE  
 26+00 NE  
 24+00 NE  
 22+00 NE  
 20+00 NE  
 18+00 NE  
 16+00 NE  
 14+00 NE  
 12+00 NE  
 10+00 NE  
 8+00 NE  
 6+00 NE  
 4+00 NE  
 2+00 NE  
 0+00  
 2+00 SW  
 4+00 SW  
 6+00 SW  
 8+00 SW  
 10+00 SW  
 12+00 SW



POLE-DIPOLE (or "abnormal 3-Electrode") ARRAY



MOLYMINES EXPLORATION LIMITED  
 RECONNAISSANCE INDUCED POLARIZATION SURVEY  
 SMITHERS B.C.  
 APPARENT CHARGEABILITY CONTOURS

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 NO. 757 MAP #2

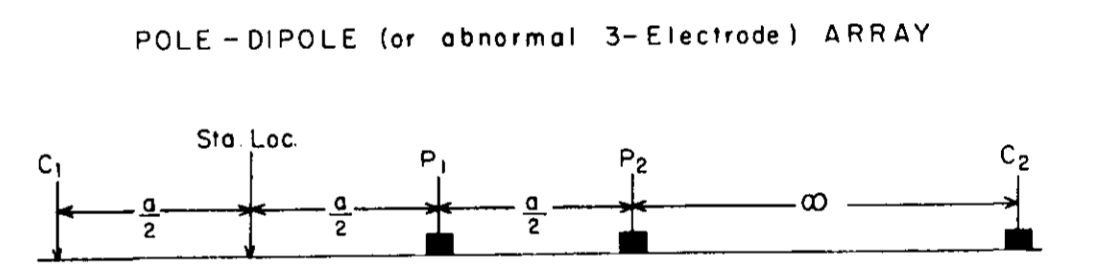
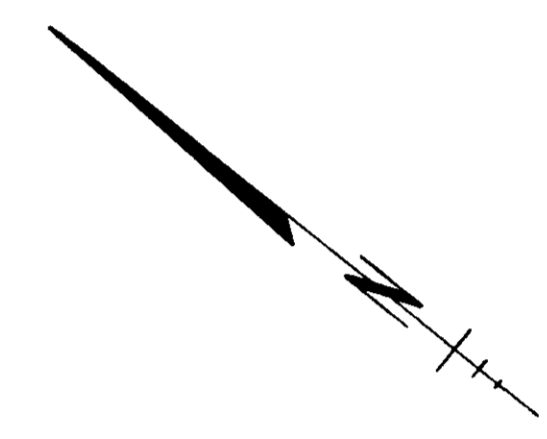
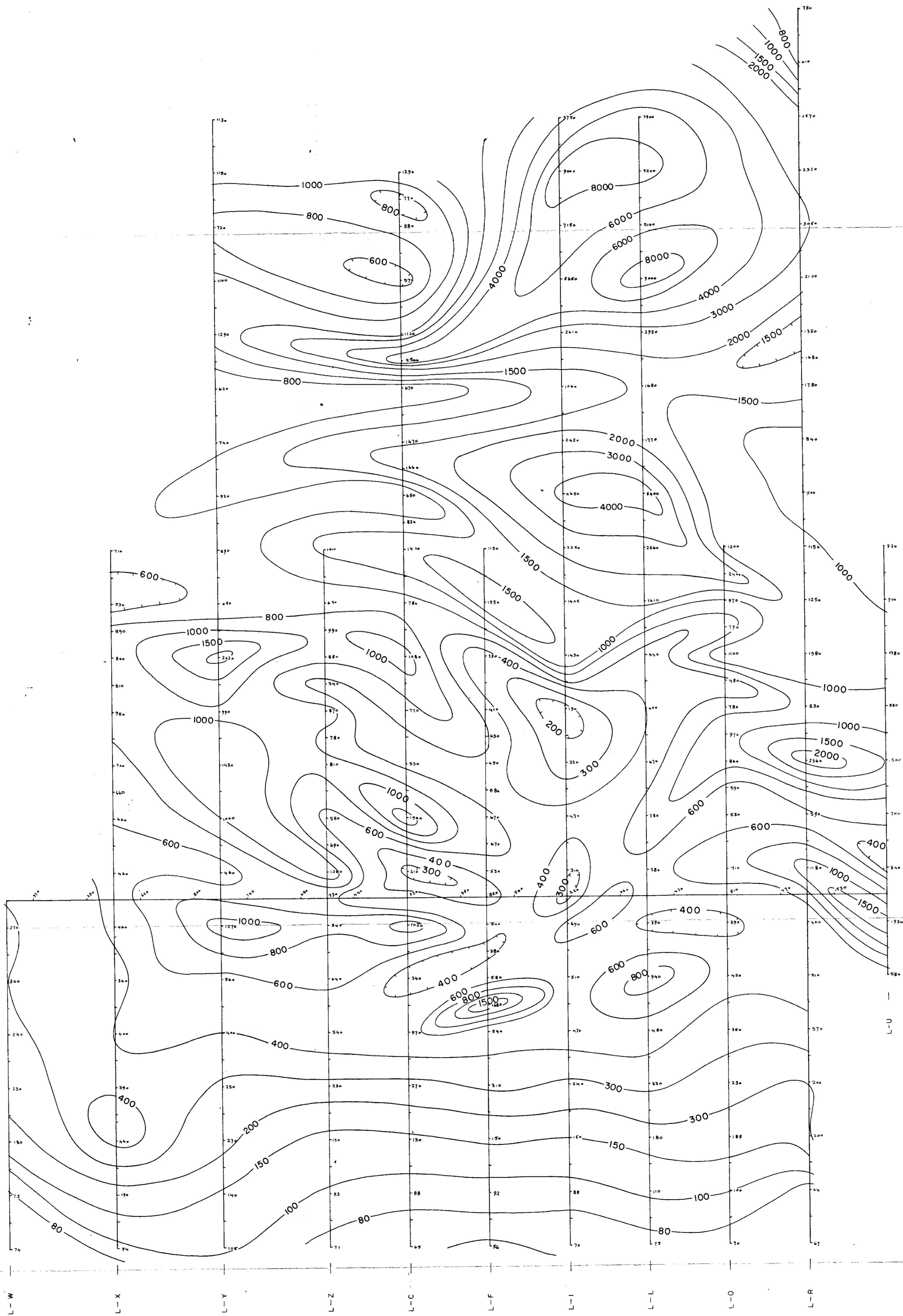
CONTOUR INTERVAL : 2.5 milliseconds

SCALE : 1 inch = 200 feet

757 (MI)

HUNTEC LIMITED, Toronto, Canada - October 1965  
*Andrew R. Dodds*  
 Andrew R. Dodds, B. Sc., Geophysicist

32+00 NE —  
 30+00 NE —  
 28+00 NE —  
 26+00 NE —  
 24+00 NE —  
 22+00 NE —  
 20+00 NE —  
 18+00 NE —  
 16+00 NE —  
 14+00 NE —  
 12+00 NE —  
 10+00 NE —  
 8+00 NE —  
 6+00 NE —  
 4+00 NE —  
 2+00 NE —  
 0 + 00 —  
 2+00 SW —  
 4+00 SW —  
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 8+00 SW —  
 10+00 SW —  
 12+00 SW —



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MOLYMINES EXPLORATION LIMITED  
 RECONNAISSANCE INDUCED POLARIZATION SURVEY  
 SMITHERS, B.C.  
 APPARENT RESISTIVITY CONTOURS

CONTOURS AT (logarithmic intervals) 60, 80, 100,  
 150, 200, 300, 400, 600, 800 etc. ohm-meters

SCALE: 1 inch = 200 feet

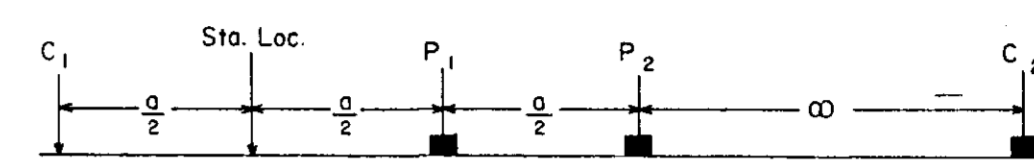
757 (M2)

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*Andrew R. Dodds*  
 Andrew R. Dodds, B.Sc., Geophysicist

32+00NE  
30+00NE  
28+00NE  
26+00NE  
24+00NE  
22+00NE  
20+00NE  
18+00NE  
16+00NE  
14+00NE  
12+00NE  
10+00NE  
8+00NE  
6+00NE  
4+00NE  
2+00NE  
0+00  
2+00SW  
4+00SW  
6+00SW  
8+00SW  
10+00SW  
12+00SW



POLE-DIPOLE (or "abnormal 3-Electrode") ARRAY



LEGEND

- Zone of major interest
- Outer limit of zone of interest
- Possible outer limit of zone of interest

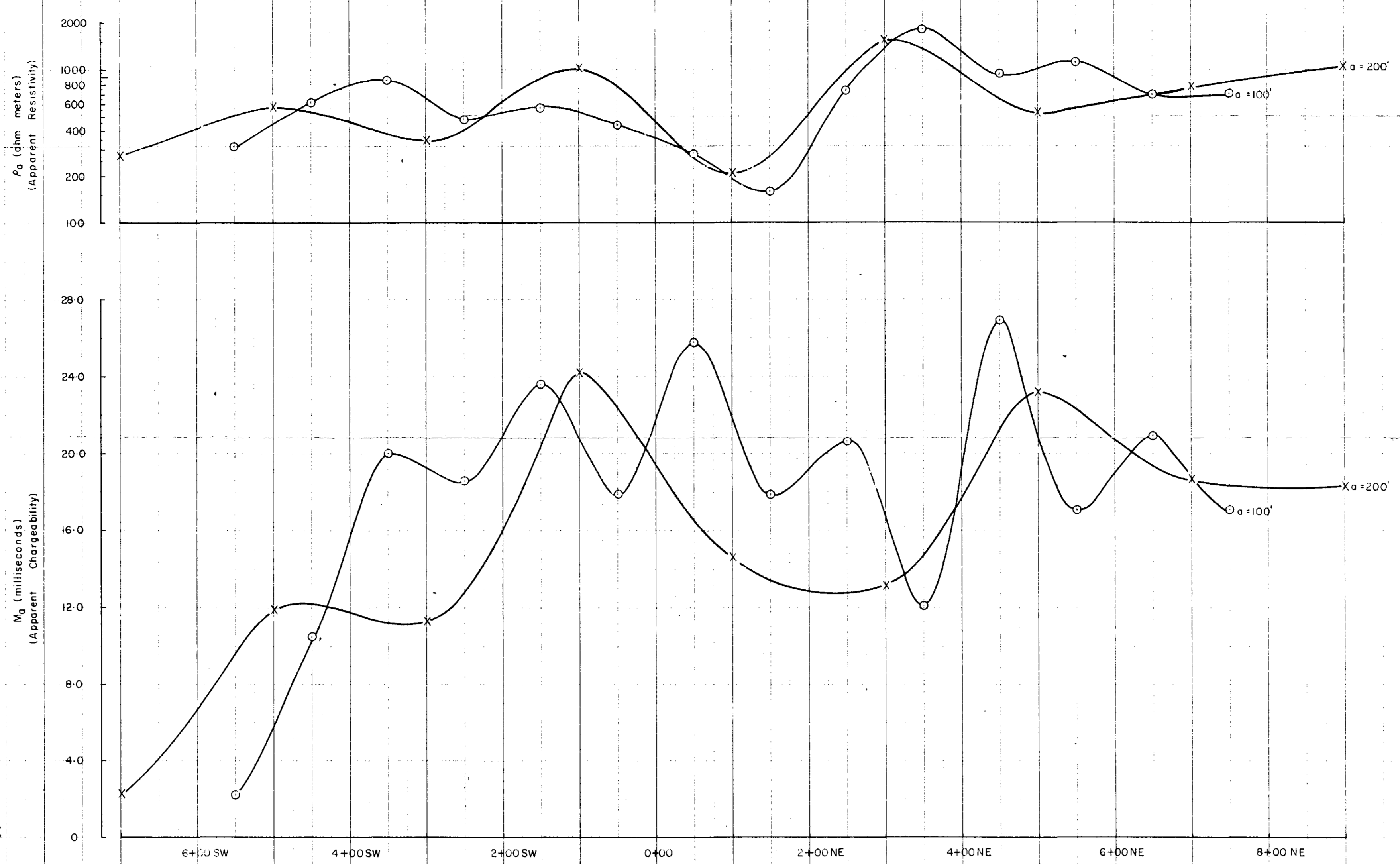
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APPARENT CHARGEABILITY CONTOURS

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ASSESSMENT REPORT  
NO. 757 MAP #4  
WITH INTERPRETATION  
CONTOUR INTERVAL: 2.5 milliseconds  
SCALE: 1 inch = 200 feet

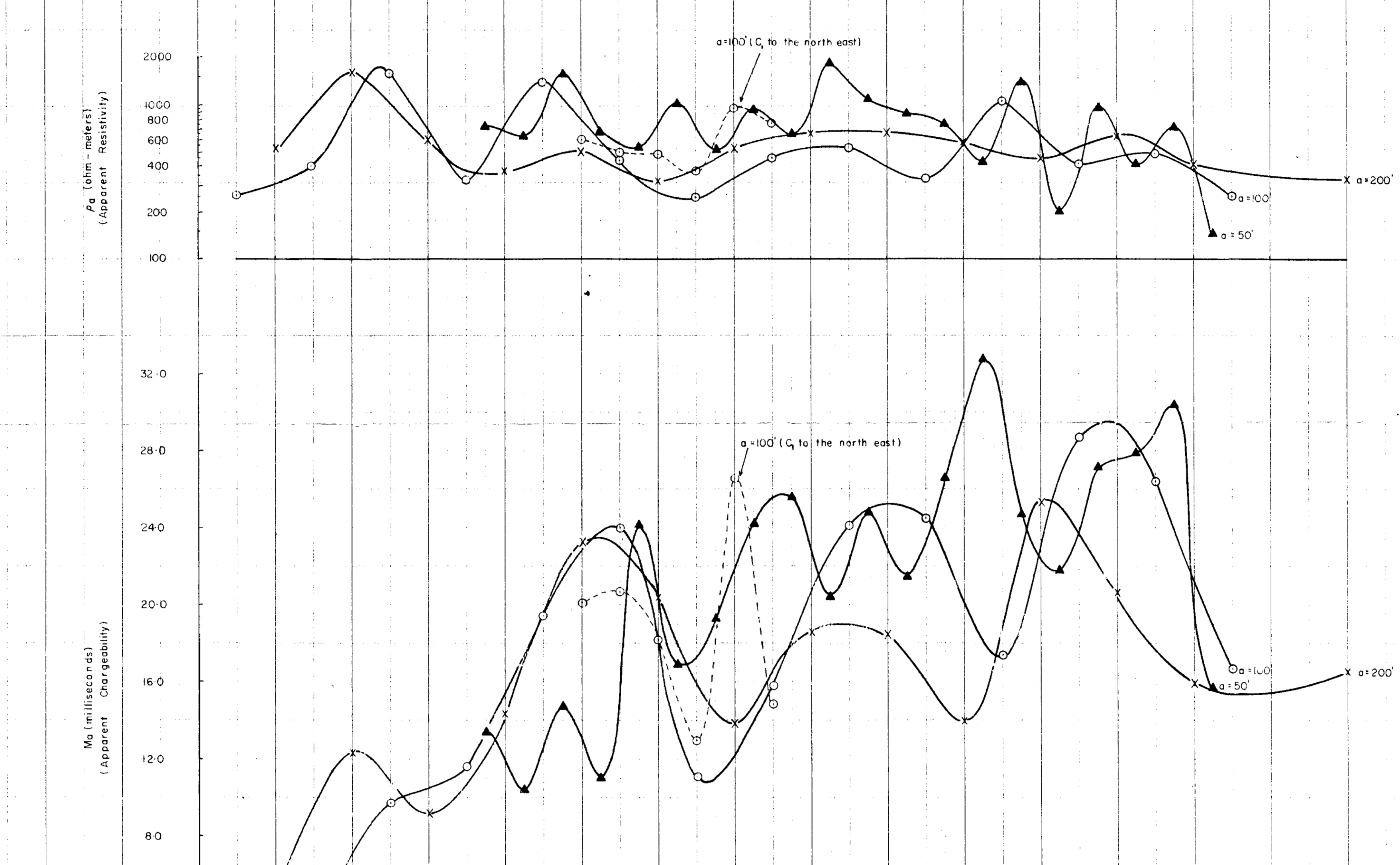
757  
M3

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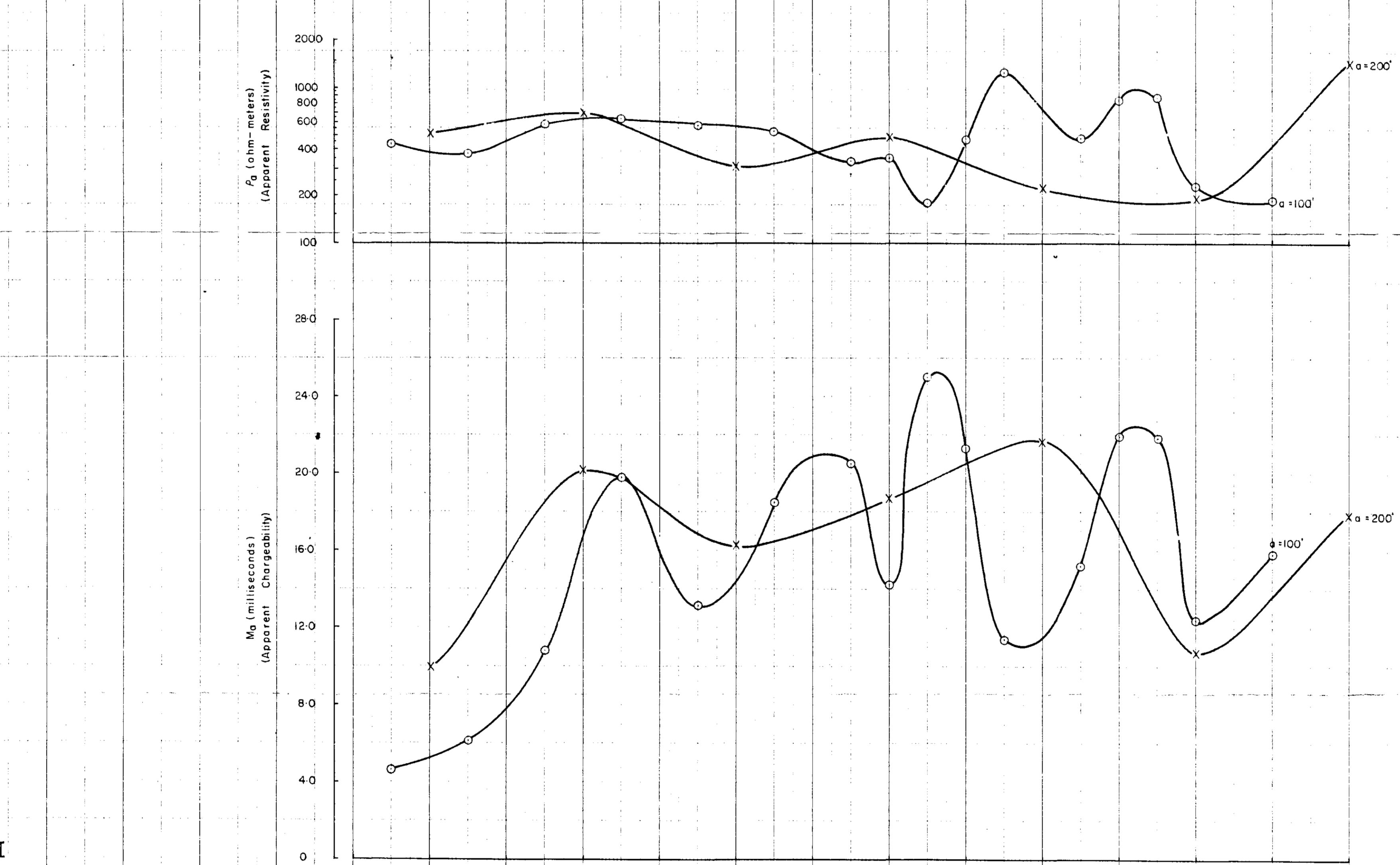




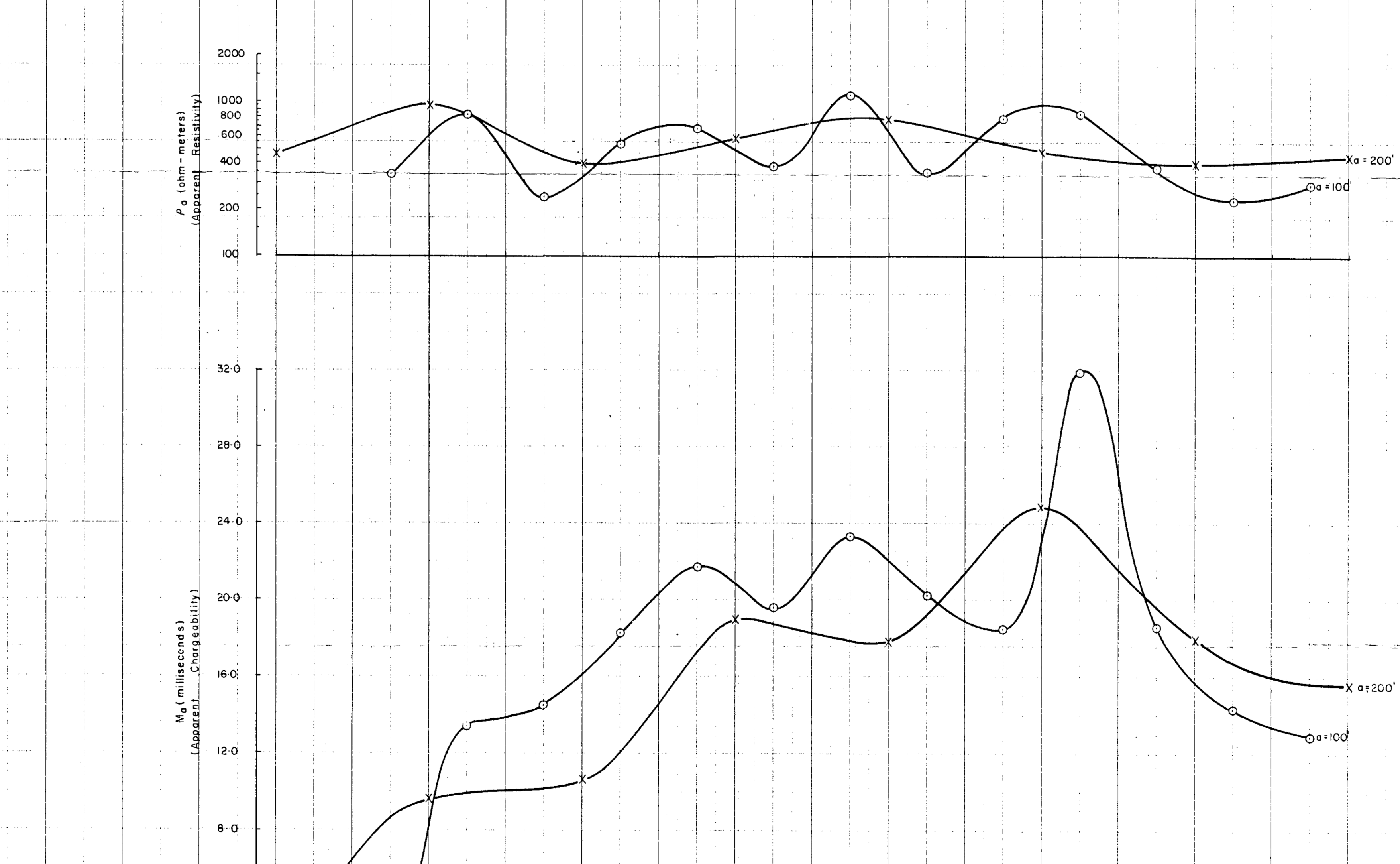
LINE C



LINE F



LINE I



LINE L

MOLYMINES EXPLORATION LIMITED

INDUCED POLARIZATION SURVEY

SMITHERS B.C.

DETAIL SURVEY

PROFILES OF

APPARENT CHARGEABILITY, APPARENT RESISTIVITY

WITH INTERPRETATION

HORIZONTAL SCALE - 1 inch = 100 feet

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POLE-DIPOLE (or "normal 3-Electrode") ARRAY

INTERPRETATION LEGEND

▨ ZONE OF INTEREST

▩ ZONE OF MAJOR INTEREST

757 (14)