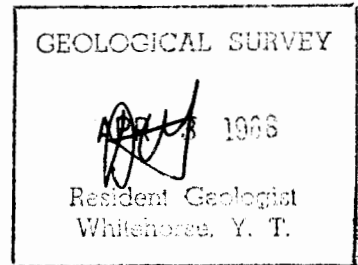


REPORT ON  
AN INDUCED POLARIZATION (I.P.) SURVEY  
WHITEHORSE AREA, YUKON TERRITORY

FOR

ALICE LAKE MINES LIMITED  
VANCOUVER, BRITISH COLUMBIA.



BY

EAGLE GEOPHYSICS LIMITED  
REXDALE, ONTARIO

September, 1967.

This report has been examined by  
the Geological Evaluation Unit.  
Approved as to technical worth by:

*D. C. Funder*  
RESIDENT GEOLOGIST

Approved as to cost in the amount  
of: \$ 8600

*R. E. Redden*  
RESIDENT MINING ENGINEER

Accepted as reprobation work  
under Section 53(4) Yukon Quartz  
Mining Act.

*[Signature]*  
COMMISSIONER OF YUKON

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Induced Polarization Survey 1" = 400 feet.	<u>MAP POCKET</u> Map No. E-111-1

### INTRODUCTION

Between May 15th and June 1st, 1967, Eagle Geophysics Limited carried out an Induced Polarization (I.P.) survey on a property held by Alice Lake Mines Limited and located in the Whitehorse area, Yukon Territory.

The survey was conducted along east-west handcut lines, which were turned off every 1,500 feet from a north-south baseline, and chained and picketed at 100 foot intervals.

Measurements of apparent chargeability (the I.P. response parameter) were made using the "three electrode array" method of surveying with a basic electrode separation of 400 feet and a basic station interval of 100 feet. Simultaneous measurements of apparent resistivity were also made.

In addition to the above two "expander arrays" were done at suitable locations to assist in estimating the depth of overburden, while three ground magnetic profiles were run over interpreted significant areas.

The data is presented in profile form on a plan map of the property, Map No. E-111-1. The chargeability readings are at a scale of 1" to 10 milliseconds while the resistivity scale is 1" to 200 ohm-metres.

PROPERTY AND LOCATION

The property is situated in the Whitehorse Mining Division of the Yukon Territory, and consists of the following mineral claims:

Laura	1 to 26 inclusive
	27 to 34 inclusive
Moon	3 to 22 inclusive

The property lies about 14 miles south south-west of the town of Whitehorse and can be reached in either of two ways:

- (a) by a two wheel drive vehicle to mile 5 on the Carcross Highway
- (b) by a six mile drive along the old Carcross road with a four-wheel drive vehicle, the turnoff to which is about 12 miles south of Whitehorse on the Alaska Highway.

PURPOSE

The purpose of the survey was to try and detect by the Induced Polarization technique the presence of any mineralization that might occur due to the favourable geological environment of the property.

GEOLOGICAL ENVIRONMENT

For a general description of the geology of this area the reader is referred to: (a) Memoir 312 of the Geological Survey of Canada, "Whitehorse Map-Area Yukon Territory" 105D by J. O. Wheeler, and (b) Paper 63-41 of the Geological Survey of Canada, "Copper and Iron Resources, Whitehorse Copper Belt, Yukon Territory" by E. D. Kindle.

The property lies in the southern portion of the Whitehorse Copper Belt and is entirely drift covered. The thickness of overburden is thought to vary from a few feet in the north to over two hundred feet in the south.

The claim groups are supposedly underlain by Triassic Volcanic and Marine Sedimentary rocks of the Lewes River Group and by Jurassic marine and non-marine coarse grained sedimentary rocks of the Laberge group. Cretaceous Coast Intrusions outcroppings, i.e. hornblende granite, quartz diorite, etc. occur to the north and west of the property.

### SURVEY SPECIFICATIONS

The Induced Polarization (I.P.) Survey was carried out using a pulse-type system manufactured by Hunttec Limited of Toronto, Ontario. Measurements with this system are made in the time domain.

The system consists basically of three units, a receiver, a transmitter and a motor-generator. The transmitter, which provides a maximum of 7.5 kw. d.c. to the ground, obtains its power from the 7.5 kw. 400 cycle three phase generator driven by a gasoline engine. The cycling rate of the transmitter is 1.5 seconds "current on" and 0.5 seconds "current off", the pulses reversing continuously in polarity. 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 the potential electrodes,  $P_1$  and  $P_2$ , during the "current on" part of the cycle and a secondary or overvoltage ( $V_s$ ) appearing between  $P_1$  and  $P_2$  during the "current off" part of the cycle. The apparent chargeability ( $M_a$ ) 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 ( $\rho_a$ ) in ohm-metres is proportional to the ratio of the primary voltage and the measured current, the proportionality factor depending on the geometry of the array used. The chargeability and resistivity obtained are called apparent as they are values which that portion of the earth sampled would have if it were homogeneous. As the earth sampled is usually inhomogeneous the calculated apparent chargeability and resistivity are functions of the actual chargeability and resistivity of the rocks.

The survey was carried out using the "three electrode array" method of surveying. In this method the current electrode  $C_1$  and the two potential electrodes  $P_1$  and  $P_2$  are moved in unison along the survey lines. The spacing between these three electrodes is kept constant for each traverse at a distance roughly equal to the depth to be explored by that traverse. The second current electrode  $C_2$  is kept fixed at "infinity".

Thus, on a "three electrode array" traverse with an electrode spacing of 400 feet, a body lying at a depth of 200 feet will produce a strong response, whereas the same body lying at a depth of 400 feet will only just be detected. By running subsequent traverses at different electrode spacings more precise estimates can be made of depth, width, thickness and percentages sulphides of causative bodies located by the I.P. method.

The "three electrode array" method with a 400 foot electrode separation was used over the claim groups in order to detect and outline possible zones of mineralization. Initially two "three array expanders" were done to assist in determining overburden thickness and ascertaining the best possible electrode separation to be used on the survey. The expander technique consists of making measurements of resistivity and chargeability at the same station using varying electrode separation (in this case 25, 50, 75, 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000 feet respectively), then determining the depth to the interface assuming two layered earth in the portion surveyed.

The magnetic profiles were run using a Sharpe MF-1 fluxgate magnetometer. This instrument measures variations in the vertical component of the earth's

magnetic field to an accuracy of  $\pm 10$  gammas. Corrections for diurnal variations of the earth's field were made by tying-in to previously established base stations at intervals not exceeding two hours.

INTERPRETATION PROCEDURES

Induced Polarization interpretation procedures have been most completely developed in situations of mineralized horizontal layering where the electrode separations used are small compared with the lateral extent of the mineralized bodies. Geologically the porphyry coppers of large lateral extent are practical examples where such interpretation procedures can be used to good advantage.

For more confined bodies, where the electrode separations used are often large compared with the lateral extent of the bodies themselves, the complex problem of resolving the combined effects of depth, width, dip and true chargeability of steeply dipping bodies together with the physical characteristics of overburden and country rocks has only recently been studied in detail. The results of this work are as yet unpublished. The interpreter must therefore use empirical solutions plus experience gained from surveys over known ore bodies in similar geological conditions to assist in his interpretation.

The interpretation submitted on the accompanying map outlines certain possible zones which could be caused by disseminated sulphide mineralization. However as I.P. measurements are volume sampling measurements, the possible causative bodies are probably narrower and less well located than the zones outlined on the map.

### DISCUSSION OF RESULTS

The I.P. survey as performed with a 400 foot electrode separation using the "three electrode array" on lines 1,500 feet apart indicated a variable chargeability background, above which several possible anomalous conditions exist, as shown on the accompanying map.

The chargeability background drops from 18 milliseconds in the northern part of the property to 3 milliseconds in the south. This appears to be a direct result of overburden cover which increases from nearly nothing in the north to some 200 feet in the southernmost portion of the property.

"Three array expanders" were performed on Line 0 at 5+00E and on Line 15 S at 80+00 E respectively to determine the depth of overburden. The resistivity measurements showed the existence of two resistivity layers, the depth to the second layer, a layer of lower resistivity, being 46 and 96 feet respectively at the above locations. The chargeability results in both cases indicated an increase in chargeability with depth.

A test line was run over the known granite-limestone contact about half-a-mile north of the northern boundary of the property, where New Imperial Mines Limited are reported to have a 900,000 ton ore body. Two chargeability highs were located on the line, both back of the intrusive contact. One was obtained over limestone outcroppings, while the other was obtained over calc-silicate outcroppings which appeared to contain finely disseminated pyrite.

These anomalies were similar to those obtained on the western extremities of Lines 15S and 30S. However, a subsequent check on the existing claim posts showed that these anomalies lay just off the western edge of the property on ground held by Wolf Creek Mines Limited.

Vertical component magnetic profiles run over and near the anomalous conditions on Lines 0, 15S, 30S and the test line showed very little relief except for a small magnetic high directly over the granite-limestone contact on the test line. This would suggest the absence of sufficient magnetite to produce anomalies in this area, thus negating the use of a magnetic survey in the direct search for mineralization.

Although in the writer's opinion no significant anomalies have been detected on the property so far, this in no way detracts from the potential of the property because large tonnage overbodies could lie between lines 1,500 feet apart and not have been detected by the Survey.

SUMMARY AND RECOMMENDATIONS

From May 15th to June 1st, 1967, Eagle Geophysics Limited carried out an Induced Polarization survey over a property held by Alice Lake Mines Limited.

The I.P. survey indicated varying chargeability background above which several possible anomalous zones could exist.

A test line run over a known granite-limestone contact in the close vicinity of the property gave two anomalies similar to those obtained on the western ends of Lines 15S and 30S. These latter anomalies were then found to lie just off the property.

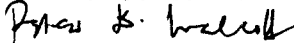
Magnetic profiles run over Lines 0, 15S, 30S and the test line showed that no magnetic relief was associated with the chargeability highs and known mineralization, thus negating use of magnetometer as a tool in the direct search for mineralization.

Although in the writer's opinion no significant anomalies have been detected on the property to date, this should in no way detract from its potential because of the possibility that large tonnage bodies could lie between lines 1,500 feet apart and not have been detected by the survey.

It is therefore recommended that because of (1) the thickness of overburden cover and (2) the need to detect low grade mineralization, ~~that~~ the property be eventually surveyed on lines 500 feet apart using the Induced Polarization technique, a deep penetration technique capable of detecting low grade mineralization.

Respectfully submitted,

EAGLE GEOPHYSICS LIMITED

  
Peter E. Walcott, P.Eng.

Geophysicist

Rexdale, Ontario.

September, 1967.

APPENDIX

(i)

COST OF SURVEY

From May 15th to June 1st, Eagle Geophysics Limited provided a geophysicist, a geophysical operator, a 7.5 kw I.P. unit and a four-wheel drive truck at \$250.00 per day.

Draughting and interpretation charges were extra, therefore the total cost of all services provided by Eagle Geophysics Limited was \$5,695.00.

(ii)

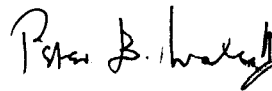
PERSONNEL EMPLOYED ON SURVEY

<u>Name</u>	<u>Occupation</u>	<u>Address</u>	<u>Dates</u>
Peter E. Walcott	Geophysicist	Eagle Geophysics Ltd P.O.Box 125 Rexdale, Ontario.	15th May to June 1st, 1967, inclusive 16th June, 5, 17, 18 September, 1967
J. Lloyd	"	"	15th May to June 1st, 1967, inclusive.
G. MacMillan	Geophysical Operator	"	15th May to June 1st, 1967, inclusive.
B.R.Patnode	Geophysical helper	Quatsino Copper-Gold Mines, Limited. 326, 736 Granville St, Vancouver 2, B.C.	16th to 19th May, 1967.
J. Baker	"	"	17th May to June 1st, 1967.
P. Moore	"	"	20th to 31st May, 1967.
V. Pashniak	"	"	1st June, 1967.
D. Grant	Draughting	Eagle Geophysics Ltd P.O.Box 125, Rexdale, Ontario.	26, 27, 28 and 30th September, 1967.
Mrs. D. Longman	Typist	"	26th September, 1967.

CERTIFICATION

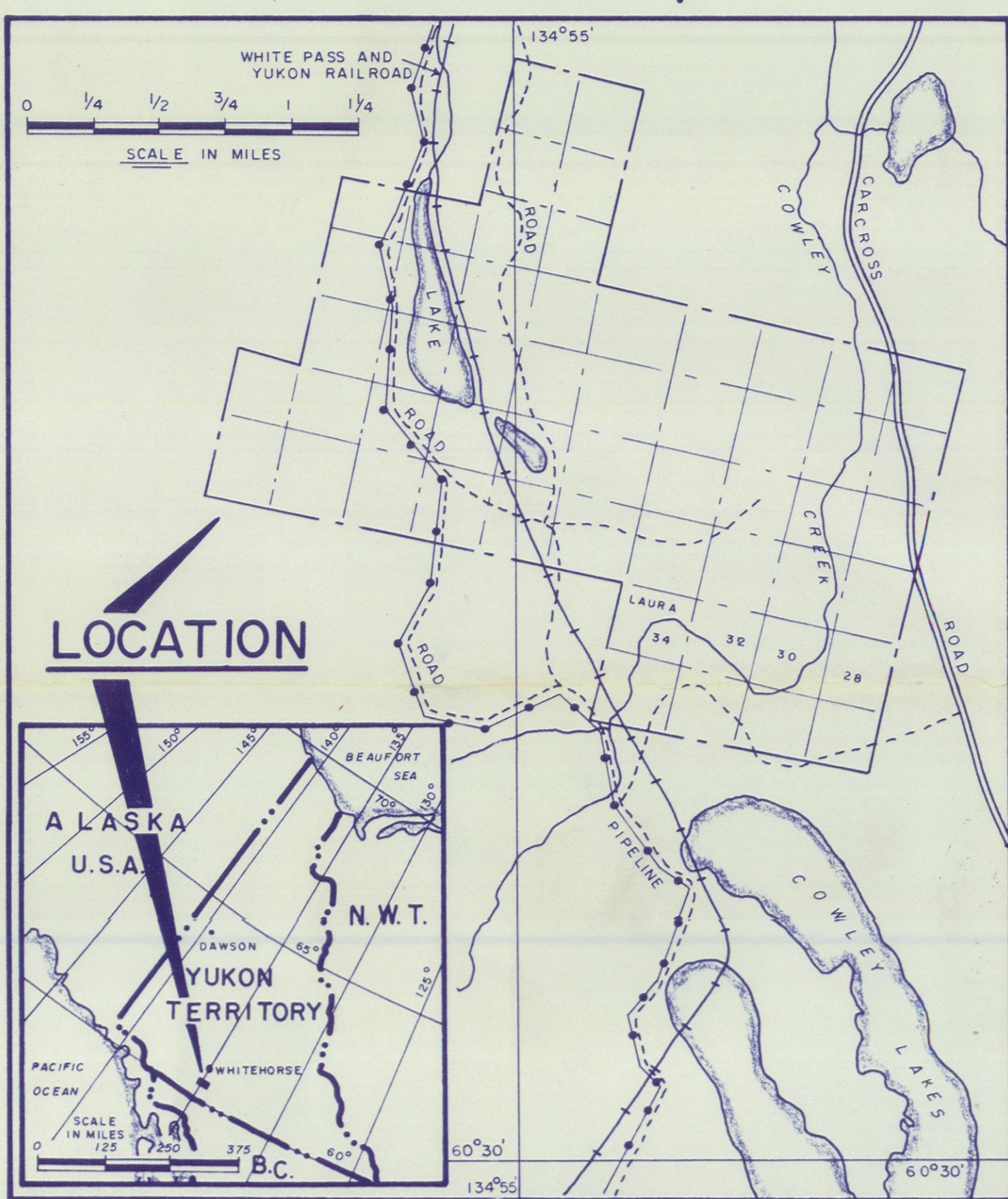
I, Peter E. Walcott of the city of Weston, Ontario, hereby certify that:

1. I was born in Barbados, W.I. - March 22nd, 1939.
2. I am a graduate from the University of Toronto in 1962 with a B.A.Sc. in Engineering Physics, Geophysics Option.
3. I have been practising my profession for the last five years.
4. I am a member of the Association of Professional Engineers of Ontario, the Society of Exploration Geophysicists and the European Association of Exploration Geophysicists.
5. I have no shares of Alice Lake Mines Limited, nor do I expect to receive any.



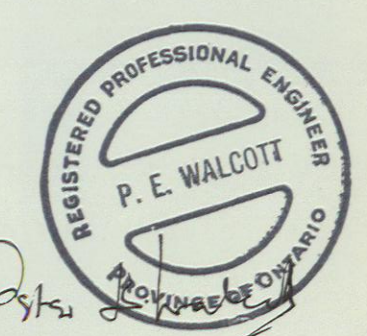
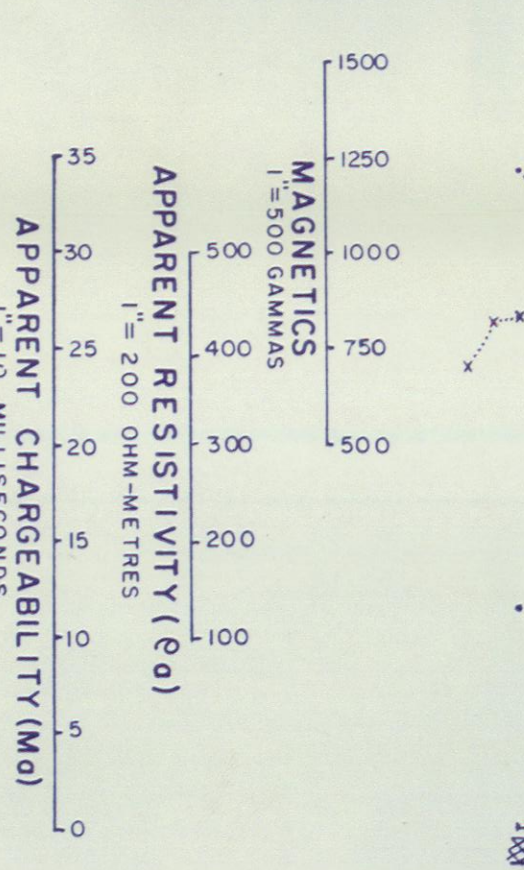
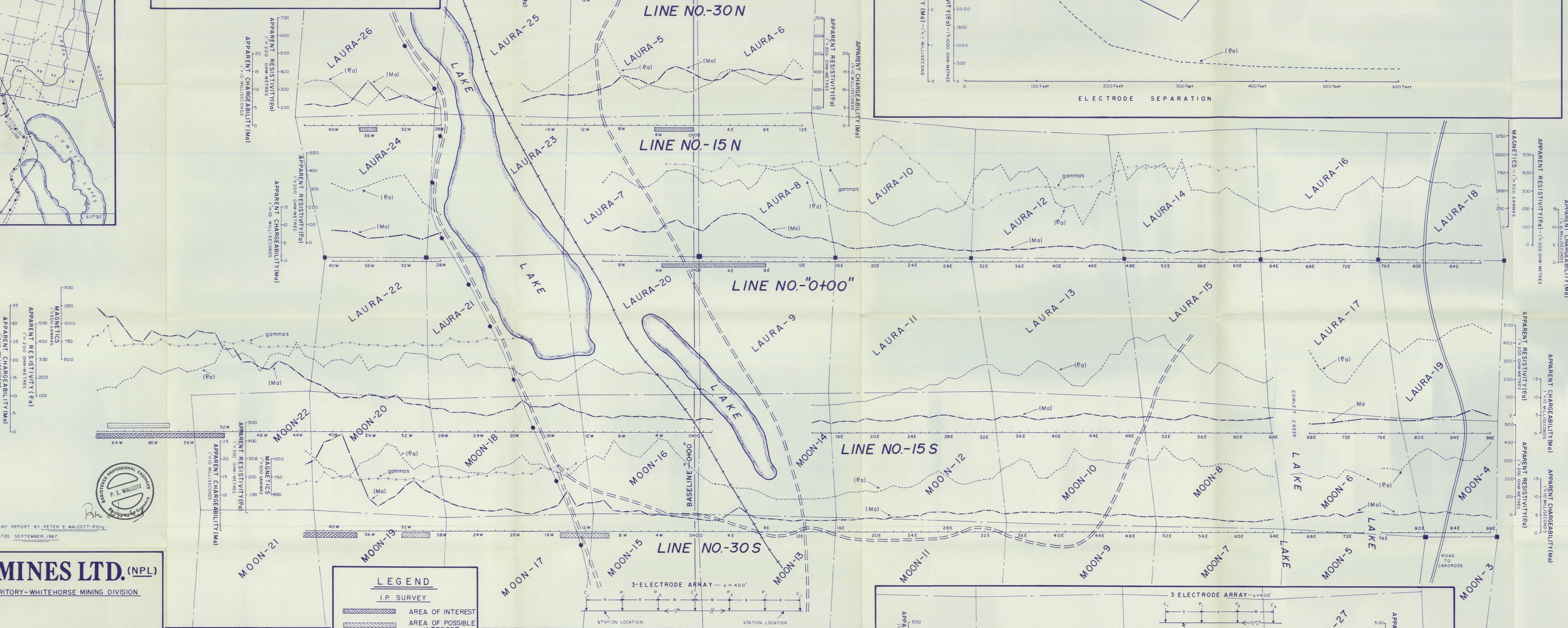
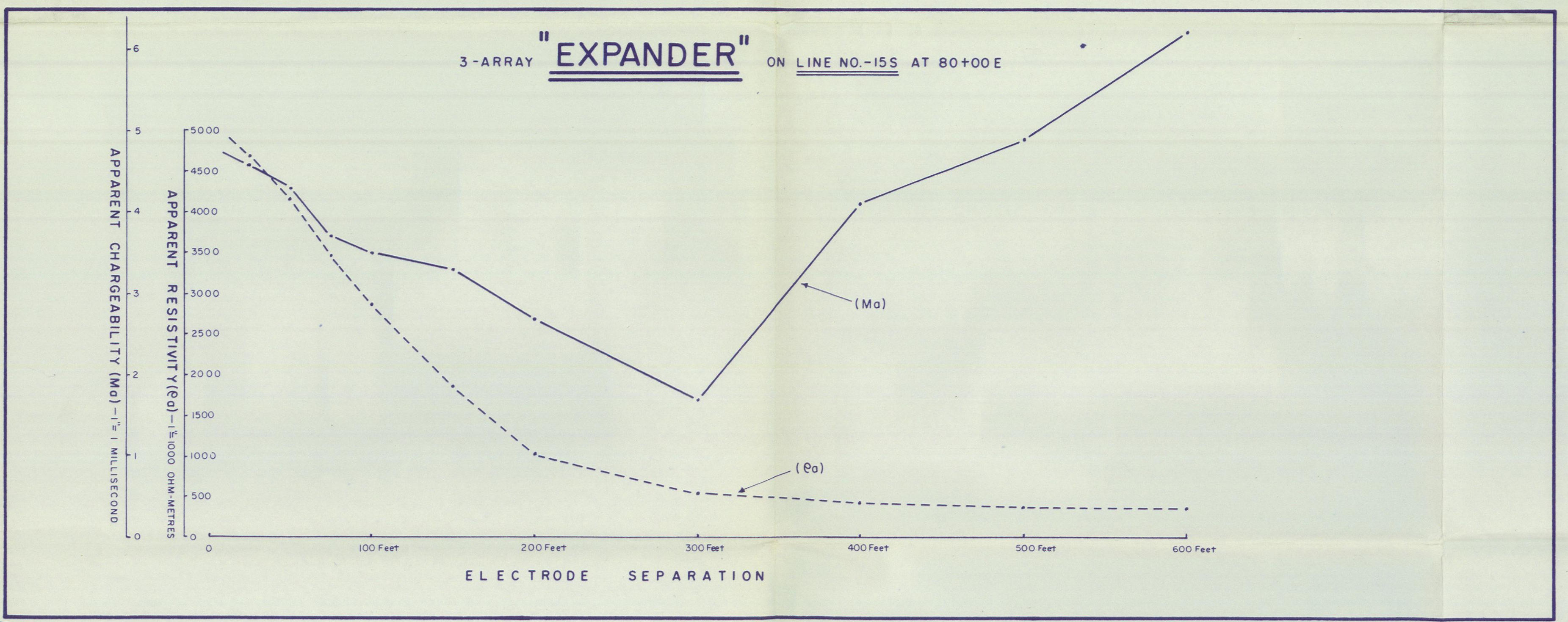
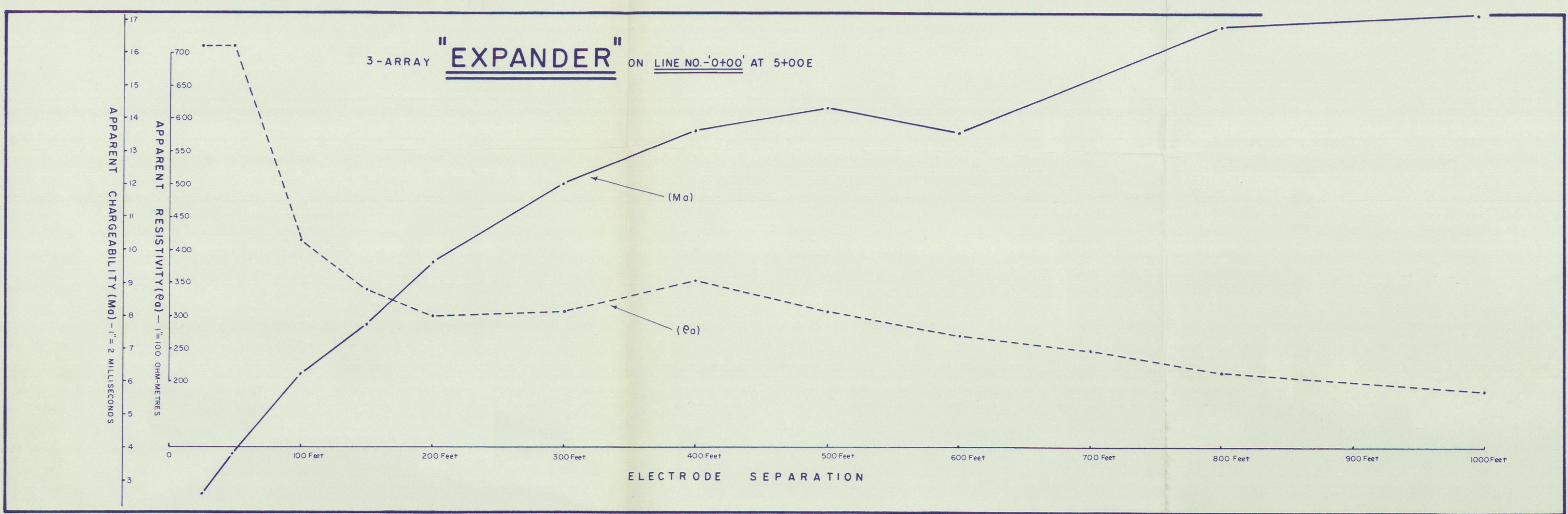
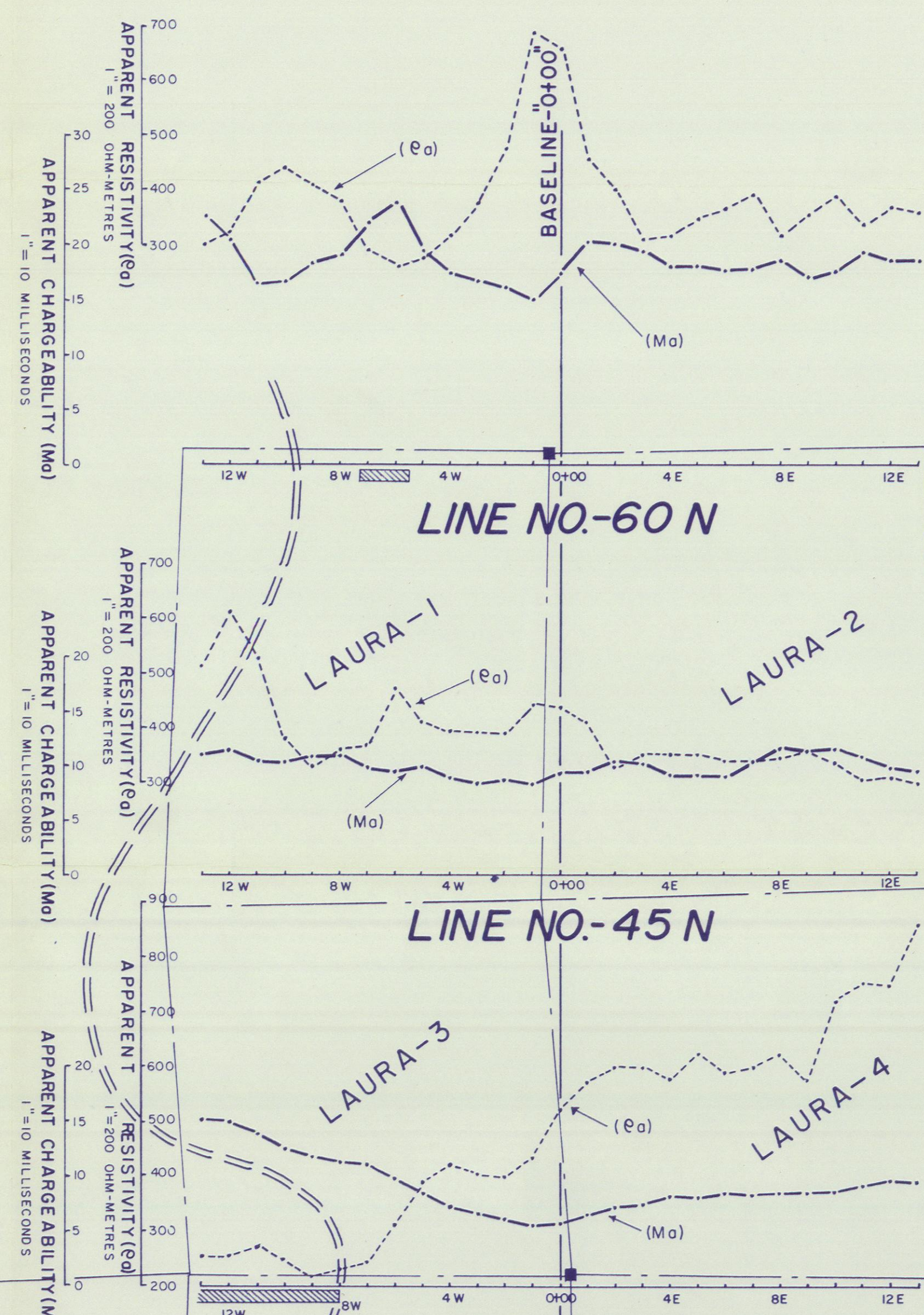
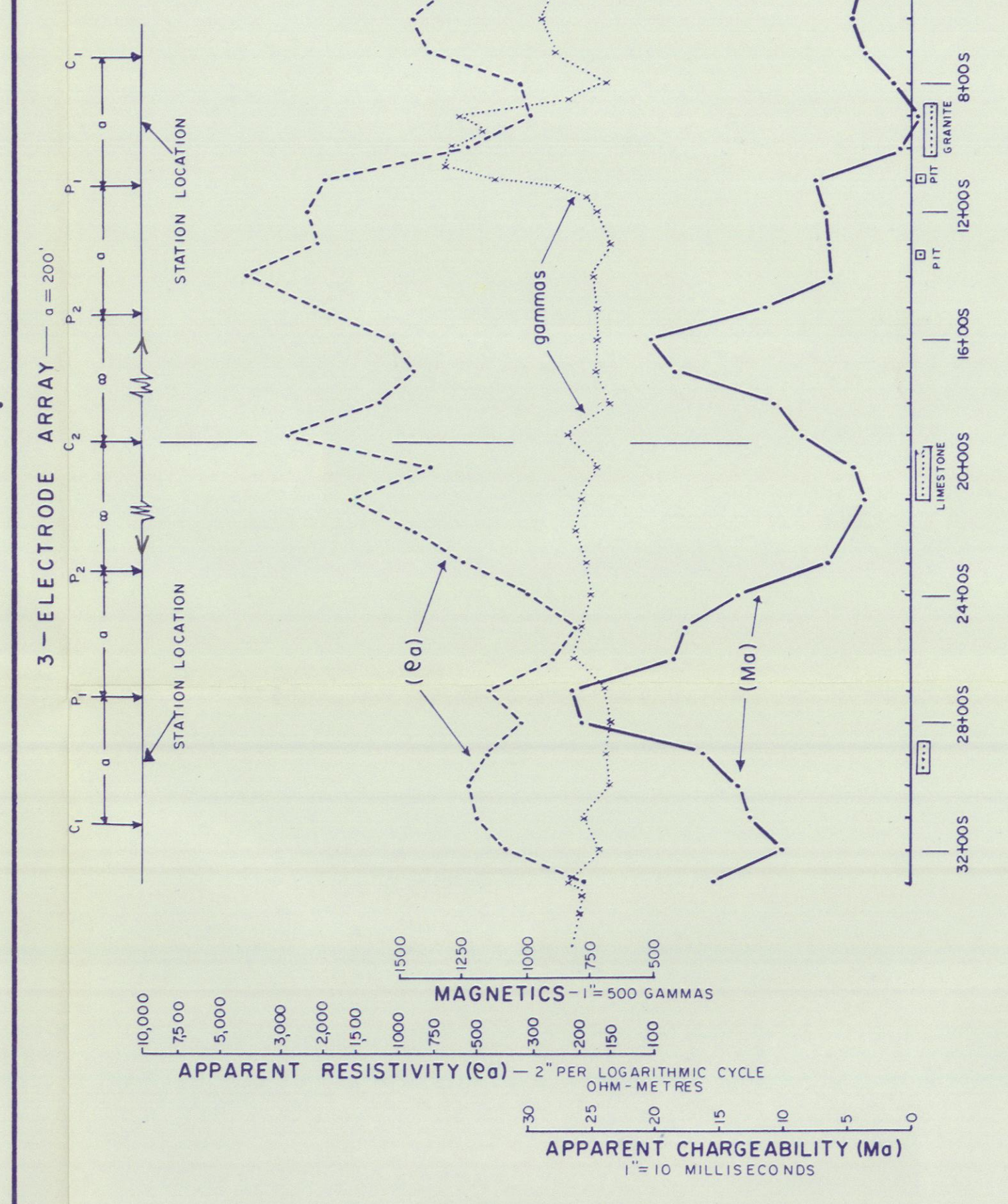
Peter E. Walcott, P.Eng.

September 19th, 1967.



LOCATION

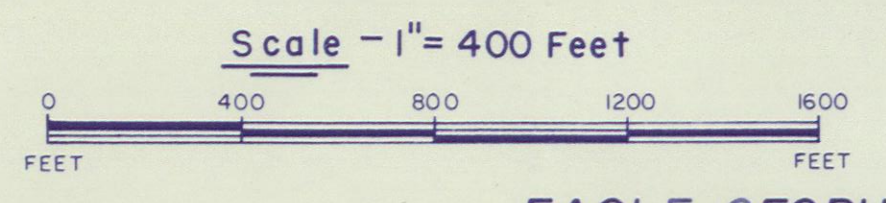
**TEST LINE**



TO ACCOMPANY REPORT BY PETER E WALCOTT-P.E.  
DATED SEPTEMBER, 1967

**ALICE LAKE MINES LTD. (NPL)**  
COWLEY PARK PROPERTY-YUKON TERRITORY-WHITEHORSE MINING DIVISION.

**INDUCED POLARIZATION SURVEY**  
APPARENT CHARGEABILITY(Ma) AND APPARENT RESISTIVITY(ρa) PROFILES



EAGLE GEOPHYSICS LIMITED  
MAY-1967

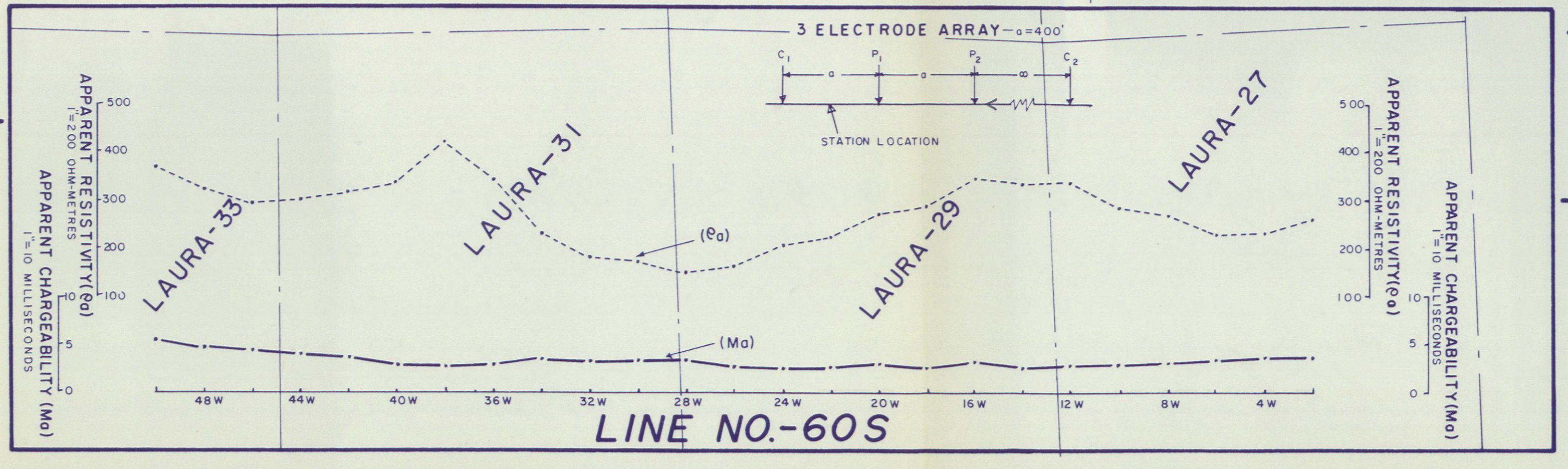
**LEGEND**

I.P. SURVEY

- AREA OF INTEREST
- AREA OF POSSIBLE INTEREST

**SYMBOLS**

- CLAIM POST AND CLAIM BOUNDARY
- RAILROAD
- PIPELINE
- ROAD
- OUTCROP



MAP NO.-E-III-1