1842

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LIST OF ILLUSTRATIONS

MAPS

Induced Polarization Survey Maps - attached

Line ON	Line 64S
Line 8S	Line 72S
Line 16S	Line 80S
Line 24S	Line 88S
Line 32S	Line 24S (100')
Line 40S	Line 24S (200')
Line 48S	Line 48S (100')
Line 56S	Line 49+25S (100')
	Line 49 +25S (200')

Maps in Envelope:

Induced Polarization Survey Maps - 68-61
Magnetometer Survey Maps - 68-61M

GEOSEARCH CONSULTANTS LIMITED

INTRODUCTION

Variable frequency induced polarization and magnetometer surveys were carried out for Ashland Oil and Refining Company on the Blue Jay group of claims, Nicola Mining Division, British Columbia, in November 1968. The property is located 14 miles by road south of Merritt. It is accessible from Highway No. 5, from which numerous truck roads traverse the property.

The purpose of the induced polarization survey was to locate sulphide zones which might prove to be base metal deposits of economic importance. The magnetometer survey was carried out in order to assist with the geological interpretation. No strong I.P. anomalies were located; however, a few slightly anomalous areas were defined.

The accompanying maps show the area surveyed and the results obtained.

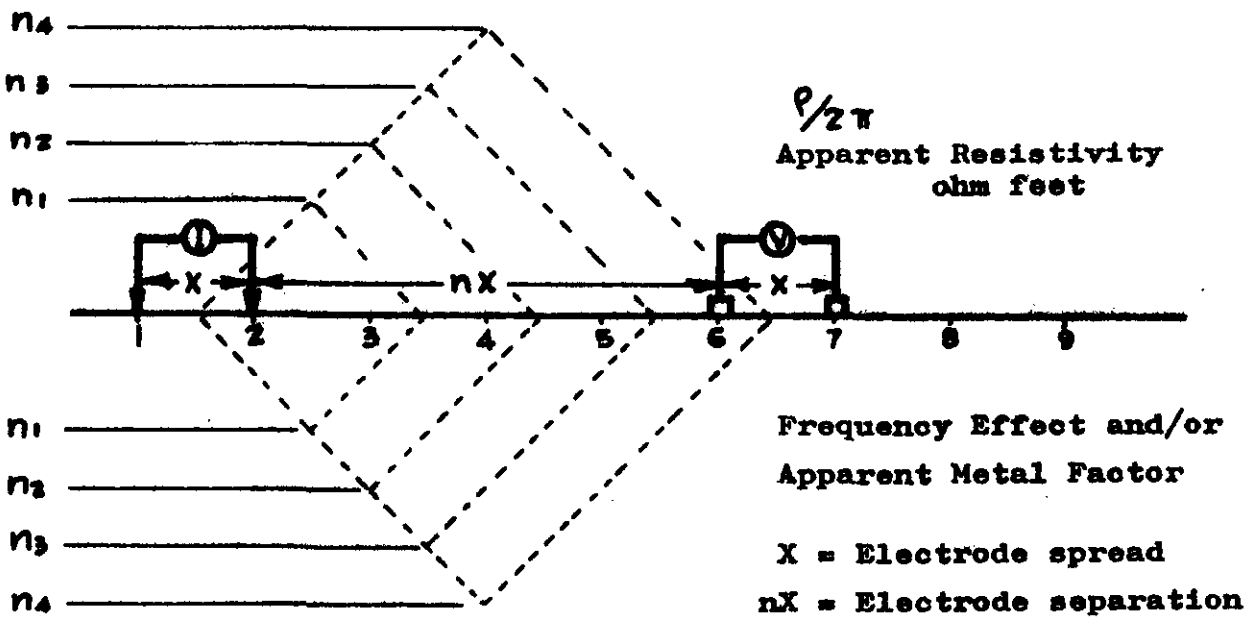
THE INDUCED POLARIZATION METHOD

Induced Polarization surveys have gained widespread acceptance in recent years among mining exploration geologists and geophysicists in the continuing search for mineral deposits. Although Schlumberger recognized polarisation effects as early as 1920 it wasn't until the late forties that any application of the phenomena was made in North America.

Induced polarization effects or "over voltage effects" are established whenever current is caused to flow across an interface between ionic and electronic conducting mediums, as in the case when current is passed through a volume of rock which contains metallic minerals such as most sulphides, graphite, magnetite and certain other oxides. Two field techniques have been developed to measure this phenomena and are usually referred to as the Transient or D.C.I.P. and the Variable Frequency or A.C.I.P. In the transient method a steady current is made to flow between current electrodes over a short period of time and then abruptly interrupted. The polarization effects are then measured over a short interval while the voltages decay slowly. This is also referred to as the "Time Domain" method.

During the present survey the second technique was used in which sinusoidal current at two low but well separated frequencies (0.31 and 5 cps) was passed through the current electrodes and the ground. The impedance of a system which can be polarized will vary with frequency and therefore if the ground can be polarized the impedances measured will vary with the various frequencies used. This "Frequency Effect" can be expressed as $\frac{R_1 - R_2 \times 100}{R_1}$ where R_1 and R_2 are the apparent resistivities at the lower and higher frequencies respectively.

During the present survey the Eltran electrode array was used which is illustrated in the accompanying diagram. In this procedure current is applied to the ground at two electrodes at a distance X apart. The potentials are measured at two other points also X feet apart and separated by a distance N times X. Measurements are made along a line keeping all electrodes in line at one or more separations or values of n.



ELTRAN ARRAY SHOWING PLOTTING POSITION

Both the apparent resistivity and frequency effect are measured for each change in electrode separation. These measurements are plotted as profiles or contoured sections, with the values being plotted at the intersection of grid line from the centre of the current electrodes and the centre of the potential electrodes. The resistivity values are shown above the line and the frequency effect and/or "metal factor" below the line.

The "Metal Factor" can be defined as $\frac{FE \times 1000}{Ra}$ and is often useful in that I.P. effects are emphasized, particularly where concentrated and conducting sulphides are expected.

The choice of electrode spacing (X) depends on the size of the body which can be expected and the depth of penetration desired. Penetration can also be achieved by measuring increasing values of n (1, 2, 3, 4, 5, and 6) however the time and expense involved may suggest increased values for X as a more practical approach.

Measurements of two or more values of n give a varying penetration and therefore are useful in estimating changes in I.P. effects and resistivity with depth . The "contoured profiles" should not however be considered true sections of the electrical properties of the ground below the survey line.

Metallic minerals are not the only causes of I.P. effects. A number of possible contributory agents have been established, such as some types of clay minerals, however many I.P. anomalies are as yet unexplained. The method, nevertheless, can be a valuable exploration tool when used in particular applications where its higher costs relative to other geophysical methods is justified.

MAGNETOMETER SURVEY

The magnetometer survey was carried out with an ABEM Model MZ-4 magnetometer with a constant of 10.7 gammas per scale division. The instrument measures the vertical component of the earth's magnetic field.

Readings were taken along lines 800 feet apart at 200 foot intervals. Diurnal corrections were made by repeated reading of base stations at regular time intervals.

The readings on Map 68-61M have been plotted in gammas above or below an arbitrary base. Each reading has been rounded off to 5 gamma increments. The map has been contoured at 200 gamma intervals.

RESULTS

The induced polarization survey indicates that the area has very low resistivity. In some cases, especially over the open pastures, even though an alternator was used with a maximum voltage of 830 volts, it was impossible to obtain the required 45 microamperes between the two receiving electrodes for a valid observation. In this case the P.E. readings tend to be lower than normal or impossible to obtain, especially with the larger electrode spacings. These effects are most noticeable along the east portions of line 0 to 24S.

The "metal factor" values have not been calculated. The low resistivities would result in very high values which, in many cases, would be misleading.

The "possible anomalous areas" as indicated on Lines 32S, 40S, 56S and 88S, are all P.E. anomalies and lack significant resistivity drops, some even correlate with resistivity highs. The most interesting anomaly appears to be on Line 32S from 300 to 600 feet east of the base line, in view of the possibility that it

may be on strike with the main north showing on Line 48S.

Some detail work was done with 100 and 200 foot electrode separations on Lines 24S and 48S over the showing. No significant anomalous readings were obtained.

The magnetometer survey indicates that the area has fairly high magnetic relief. The granodiorite and related intrusives appear to be highly magnetic. An east-west striking fault appears to occur between Lines 32S and 40S.

RECOMMENDATIONS

Considering that the I.P. Survey did not indicate anomalies over the known mineralisation, and that the indicated "possible anomalous areas" lack the patterns of typical valid I.P. anomalies, no drilling based on the results of this survey is recommended.

The magnetometer survey results should be used in conjunction with the geological mapping which may help to determine drilling locations based on the geology.

Respectfully submitted,

GEOSEARCH CONSULTANTS LIMITED

J. A. Woodard

J. A. Woodard, P. Eng.,
Consulting Geophysicist.

JAW/om

ASSESSMENT WORK DETAILS

Field Work - November 15 - November 26, 1968

Operator - F. Scott, Don Mills, Ontario -	3	8	hr.	days	
Operator - J. Woodard, Scarborough, Ont. -	4½	"	"	"	
Operator - Robert Lee, Toronto, Ontario -	8½	"	"	"	
Helper - Doug Dick, Thicket Portage, Man. -	8½	"	"	"	
Helper - George Dick, Thicket Portage, Man. -	8½	"	"	"	
Helper - Edward Cook, Thicket Portage, Man. -	8½	"	"	"	
Helper - William Cook, Thicket Portage, Man. -	8½	"	"	"	

Draughting Consulting & Compilation - Nov.19 - December 11, 1968.

Fenton Scott, Don Mills, Ontario -	1	"	"	"
J. A. Woodard, Scarborough, Ontario -	12½	"	"	"
Total -	63½	"	"	"

J. A. Woodard

J. A. Woodard, P. Eng.

EQUIPMENT DESCRIPTION

AHEM Model MZ-4 Magnetometer, Serial No. 4575
Constant 10.7 g./s.d.

McPhar Model P 650 Induced Polarisation Unit
Motor generator No. 6677
Receiver No. 6634
Transmitter No. 6624

GEOSEARCH CONSULTANTS LIMITED

CERTIFICATION:-

To whom it may concern:-

I, Fenton Scott, of the Borough of North York in the Province of Ontario, certify that:-

1. I am a geophysicist and geologist, residing at 17 Malabar Place, Don Mills, Ontario.
2. I graduated from the University of New Brunswick in Geology in 1948, and have practised this profession continuously since that time.
3. I am a registered Professional Engineer in the Province of Ontario, a Fellow of the Geological Association of Canada and a member of the Canadian Institute of Mining and Metallurgy.
4. I have not, nor do I expect to receive any interest in the property described herein or in the securities of Ashland Oil and Refining Company.
5. The information in this report is based on a three day visit to the property and on observations by qualified technicians in my employ with between five and fifteen years experience in geolphysical exploration.

Dated the 14th day of May 1969.

Fenton Scott, M.Sc.

REGISTERED PROFESSIONAL ENGINEER
MINING
FENTON SCOTT
PROVINCE OF ONTARIO

2 134 [illegible]

GEOSEARCH CONSULTANTS LIMITED
FORMERLY MOREAU, WOODARD & COMPANY LIMITED
SUITE 315, 77 YORK STREET, TORONTO 1, ONTARIO
Telephone (416) 363-4097 • Cable GEOSERVE, TORONTO

DEC 24 1968

INVOICE

December 13, 1968

Ashland Oil and Refining Company
Suite 400, 736 8th Ave. S. W.
Calgary, Alta.

Geophysical Surveys - Blue Jay Property, Aspen Grove, B. C.

16 miles magnetometer survey @ $50.00 per mile ...	$800.00	
less ½ mile re: IP anomaly checking	25.00	$775.00
15.6 miles IP 300' spreads @ $400 per mile	6,240.00	
0.4 miles IP 200' spreads @ $500 per mile	200.00	
0.6 miles IP 100' spreads @ $600 per mile	360.00	
	6,800.00	
less credit for 14 days saved: 14 x 150 x 6800/8000	1,785.00	5,015.00

Mobilization and Demobilization Expenses

Plane fares	1,310.00	
Train fares	136.00	
Meals, hotel, taxis while travelling	163.25	
	1,609.25	
less expenses for one non-essential man	182.00	1,427.25
(No charge for men's wages while travelling)		
Truck rental charges		192.00
Total		$7,409.25

VENDOR NO. 2 134 [illegible] 130710 001 PURCHASING 7459 - 1

PAID
CHEQUE # 9888
Imperial Bank of Canada
Limited Agent Account
DATE Dec 19/68
APPROVED DATE 12-19-68
APPROVED DATE

PHONE 542-8360

VERSATILE
MINING SERVICES LTD.

INVOICE No. 5135

R.R. 3,
VERNON, B.C.

COPY

DATE November 30th 1968

TO: Ashland Oil Refinery Company,
736 8th Ave. S.E.
Calgary, Alta.

Re: Project #108 Aspen Grove I.P.

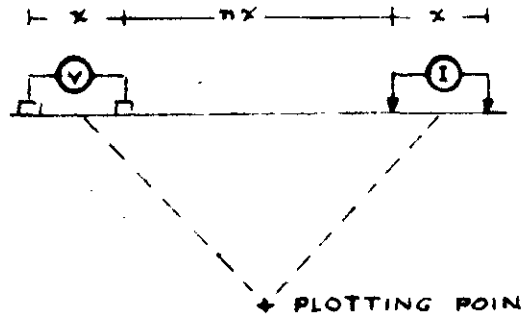
1.	Labor:		
	2 men 22 days @ 37.50/d		1,650.00
2.	Rentals		
	Chainsaw 22 days @ 5/d or 50/m	50.00	50.00
	Truck 22 days @ 10/d		220.00
	Camper 15 days @ 8/d		120.00
	Other Equipment Bruntons, Chains, etc.		50.00
3.	Expenses:		
	Telephone calls	43.20	
	Ingelby Motors	18.00	
	J. R. Eaton Expenses	51.95	
	M.McCrory Expenses	92.75	
	Grass lands Hotel	105.25	
	Groveries @ 4/m/d	120.00	
	Laths, etc.	28.00	
		459.15	459.15
4.	Truck Mineage to job site from Revelstoke & Return 448 Miles @ 12¢/m		53.76
	Total herein		$ 2,602.91

PAID
Cheque # 9889

VENDOR NO. 2 132/904 132710 001 2603-1

APPD 12-19-68

ELECTRODE CONFIGURATION



n4 ———————————————

n3 ———————————————

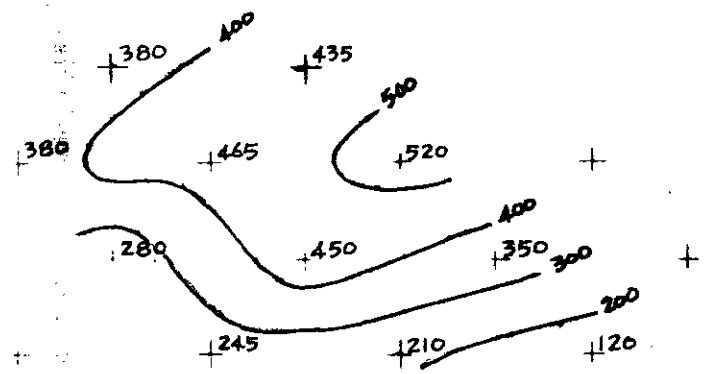
n2 ———————————————

n1 ———————————————

INDUCED POLARIZATION SURVEY

BY

GEOSEARCH CONSULTANTS LTD.



APPARENT RESISTIVITY

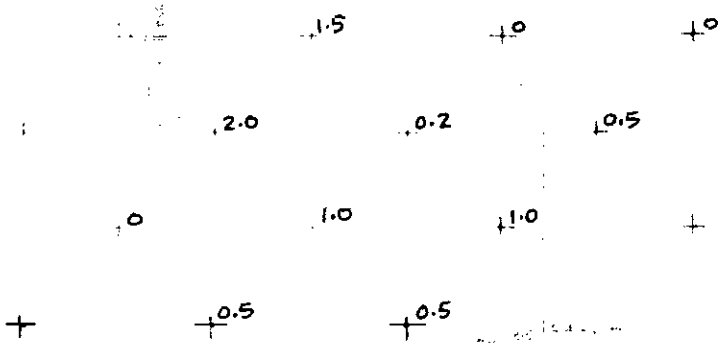
METAL FACTOR + FREQ. EFFECT

n1 ———————————————

n2 ———————————————

n3 ———————————————

n4 ———————————————



LINE 485 (100')

ANOMALOUS AREA

DEFINITE ▬▬▬▬

PROBABLE ▬ ▬ ▬ ▬

POSSIBLE ▪▪▪▪▪▪▪

FREQUENCIES: 0.3 & 5.0 Hz

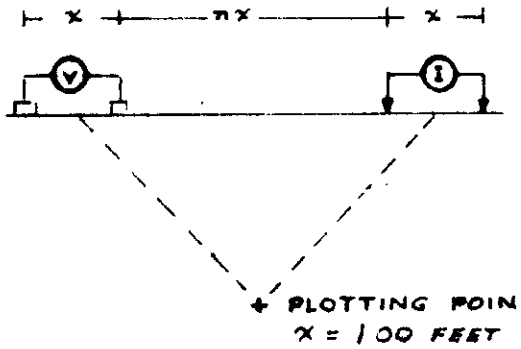
ASHLAND OIL & REFINING COMPANY

ASPEN GROVE PROPERTY

MERRITT AREA, B.C.

SCALE 1 INCH = 100 FEET

ELECTRODE CONFIGURATION



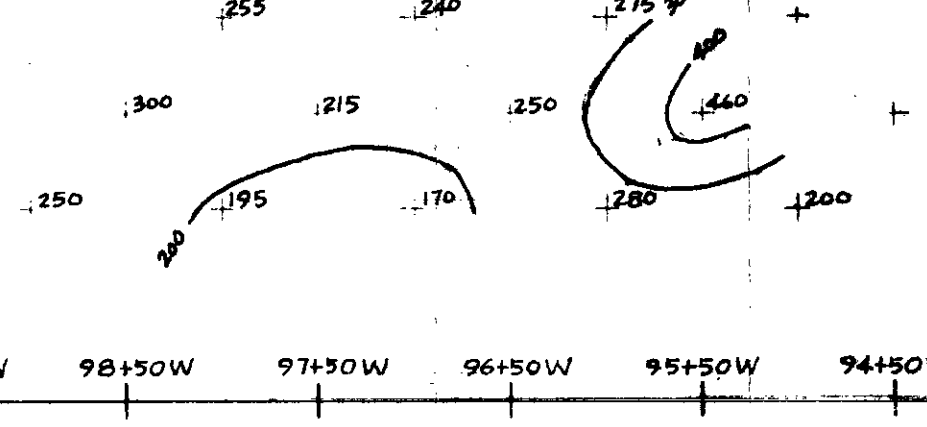
INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.

n 3 ———————————

n 2 ———————————

n 1 ———————————

APPARENT RESISTIVITY

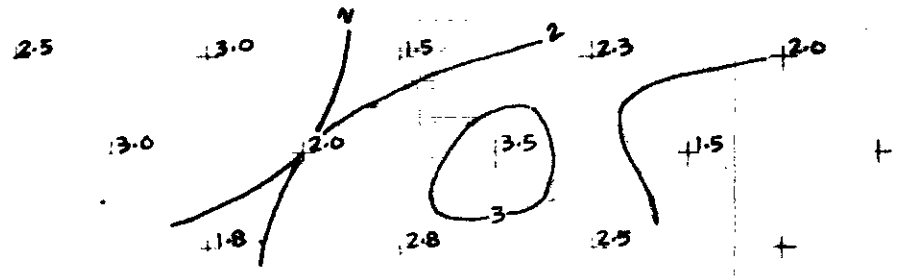


METAL FACTOR + FREQ. EFFECT

n 1 — — — — — — — —

n 2 - - - - - - - - -

n 3 ———— - - - - - -



ANOMALOUS AREA

DEFINITE ——————

PROBABLE - - - - -

POSSIBLE ••••••••

FREQUENCIES: 0.3 & 5.0 Hz.

ASHLAND OIL & REFINING COMPANY

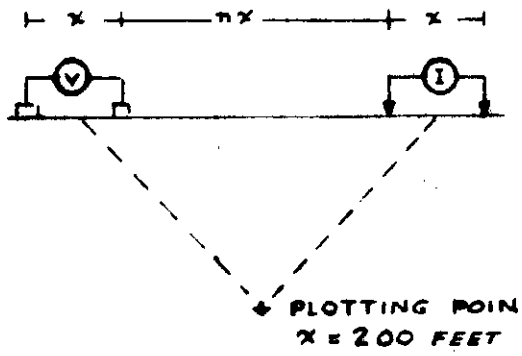
ASPEN GROVE PROPERTY

MERRITT AREA, B.C.

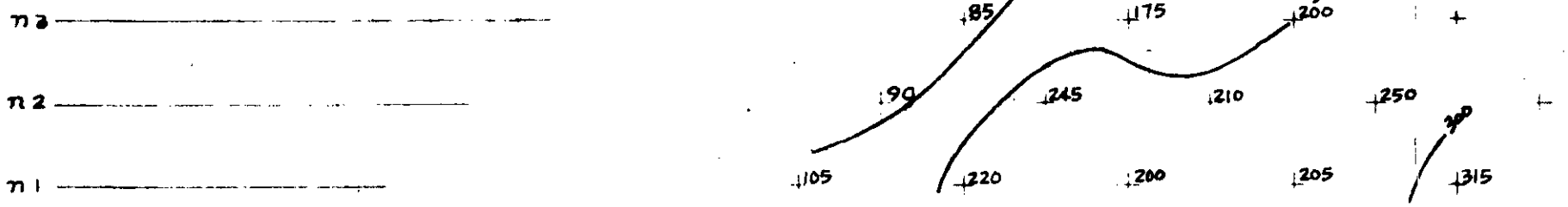
SCALE: 1 INCH = 100 FEET

LINE 49+25S (100')

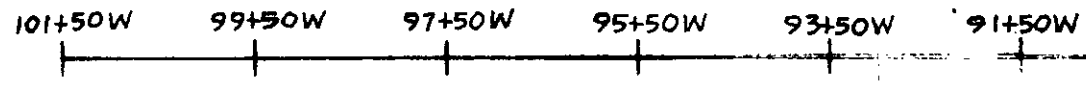
ELECTRODE CONFIGURATION



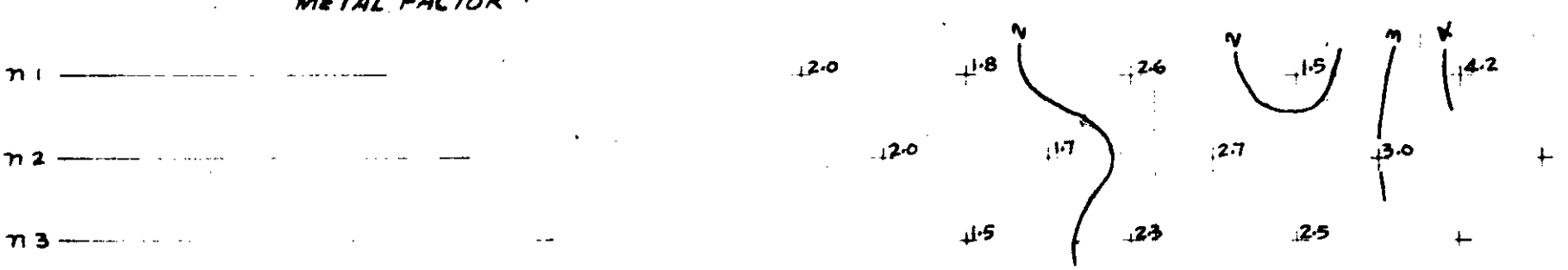
INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.



APPARENT RESISTIVITY



METAL FACTOR + FREQ. EFFECT



ANOMALOUS AREA

DEFINITE ——————

PROBABLE - - - - -

POSSIBLE .....

FREQUENCIES: 0.3 & 5.0 Hz.

ASHLAND OIL & REFINING COMPANY

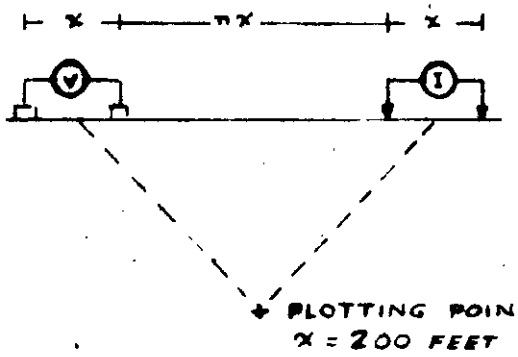
ASPEN GROVE PROPERTY

MERRITT AREA, B.C.

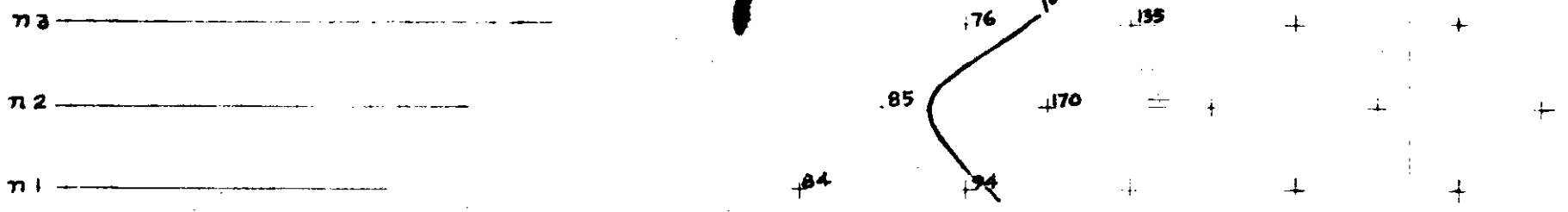
SCALE: 1 INCH = 200 FEET

LINE 49+25 S (200')

ELECTRODE CONFIGURATION

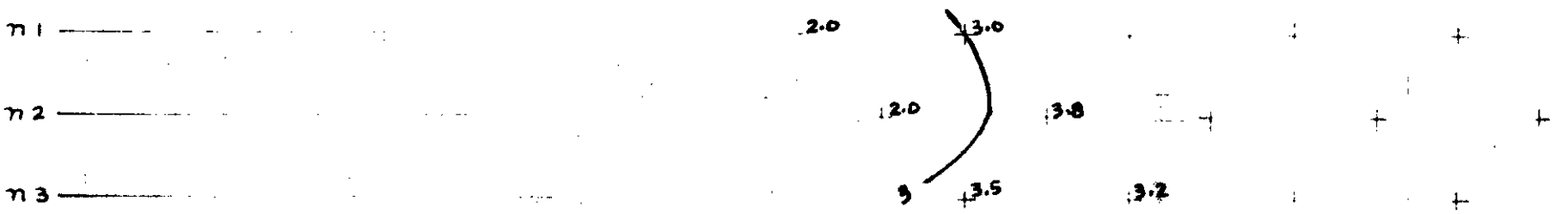


INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.



APPARENT RESISTIVITY

METAL FACTOR + FREQ. EFFECT



ANOMALOUS AREA

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 1.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

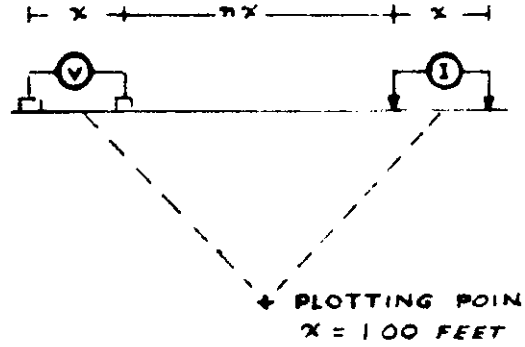
ASPEN GROVE - PROPERTY

MERRITT AREA, B.C.

SCALE - 1 INCH = 200 FEET

LINE 124S (200')

ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY

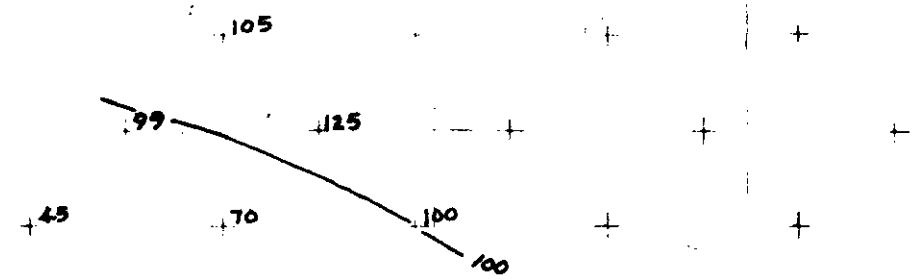
GEOSEARCH CONSULTANTS LTD.

n 3 ——————————

n 2 ——————————

n 1 ——————————

APPARENT RESISTIVITY

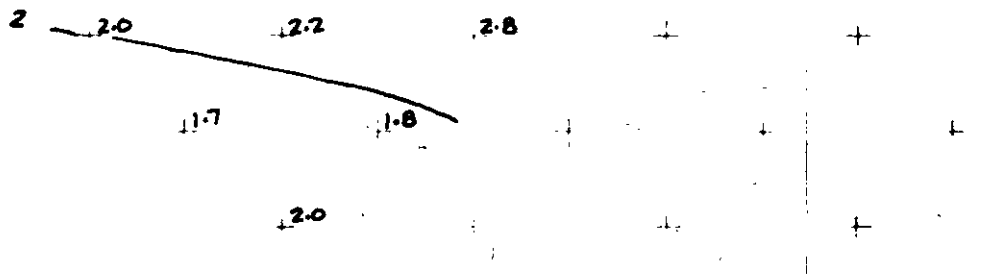


METAL FACTOR + FREQ. EFFECT

n 1 ——————————

n 2 ——————————

n 3 ——————————



ANOMALOUS AREA

DEFINITE ——————

PROBABLE - - - - -

POSSIBLE .....

FREQUENCIES: 0.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

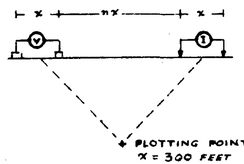
ASPEN GROVE PROPERTY

MERRITT AREA, B.C.

SCALE : 1 INCH = 100 FEET

LINE 245 (100')

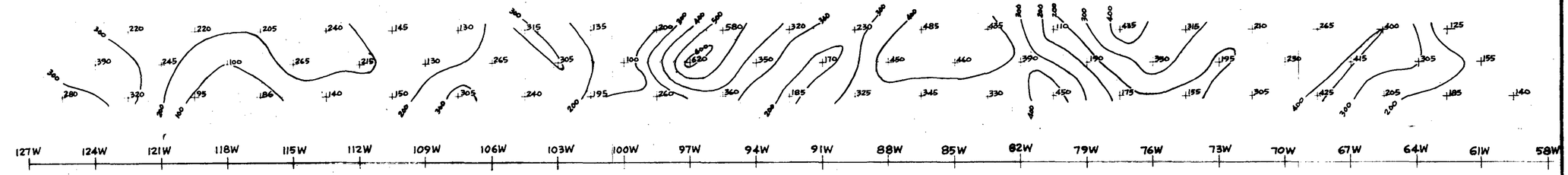
ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.

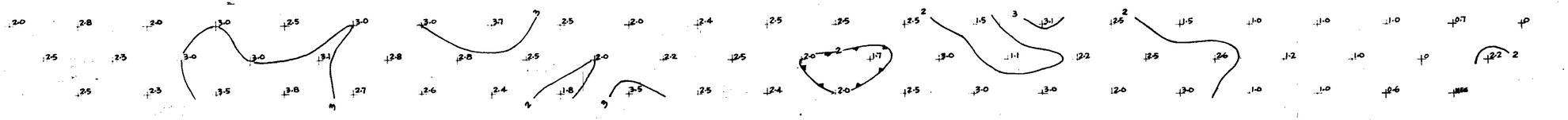
n 3 ——— ·····
n 2 ———
n 1 ———

APPARENT RESISTIVITY



METAL FACTOR + FREQ. EFFECT

n 1 ———
n 2 ———
n 3 ——— ·····



ANOMALOUS AREA
DEFINITE ———
PROBABLE - - - - -
POSSIBLE ·····

FREQUENCIES: 0.3 & 5.0 Hz

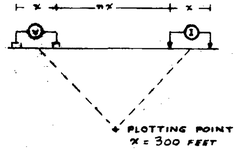
ASHLAND OIL & REFINING COMPANY

ASPEN GROVE PROPERTY
MERRITT AREA, B.C.
SCALE 1 INCH = 300 FEET

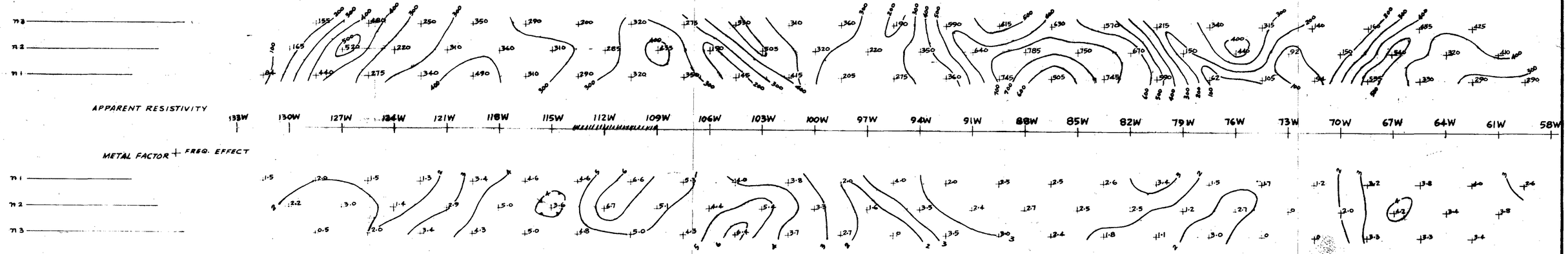
LINE 805

1842

ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.



LINE 88S

ANOMALOUS AREA
DEFINITE
PROBABLE
POSSIBLE

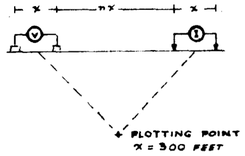
FREQUENCIES: 0.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

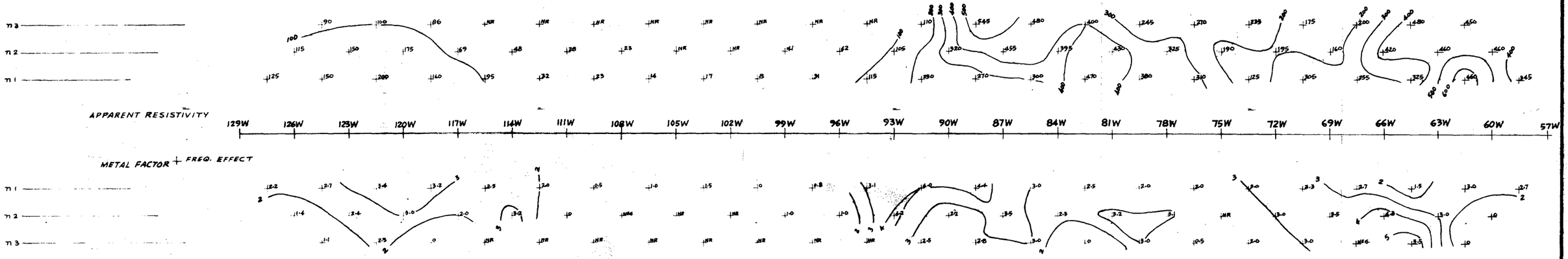
ASPEN GROVE PROPERTY
MERRITT AREA, B.C.
SCALE : 1 INCH = 300 FEET

1842

ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.



LINE 64S

ANOMALOUS AREA
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

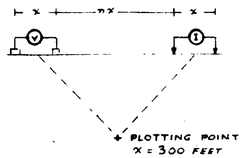
ASPEN GROVE PROPERTY

MERRITT AREA, B.C.

SCALE: 1 INCH = 300 FEET

1842

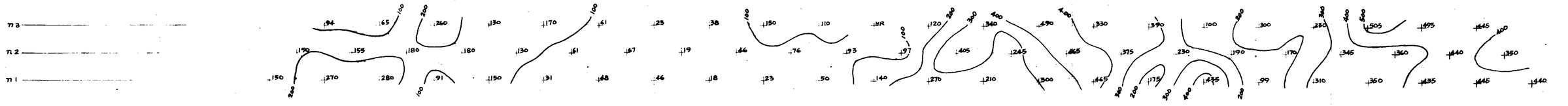
ELECTRODE CONFIGURATION

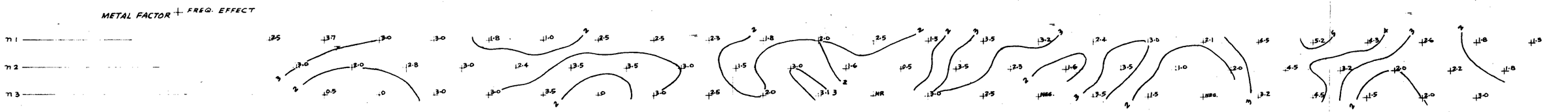


INDUCED POLARIZATION SURVEY

by

GEOSEARCH CONSULTANTS LTD.





LINE 72S

ANOMALOUS AREA

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

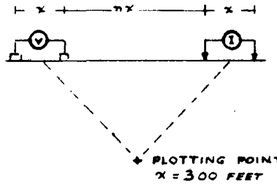
ASPEN GROVE PROPERTY

MERRITT AREA, B.C.

SCALE: 1 INCH = 300 FEET

1842

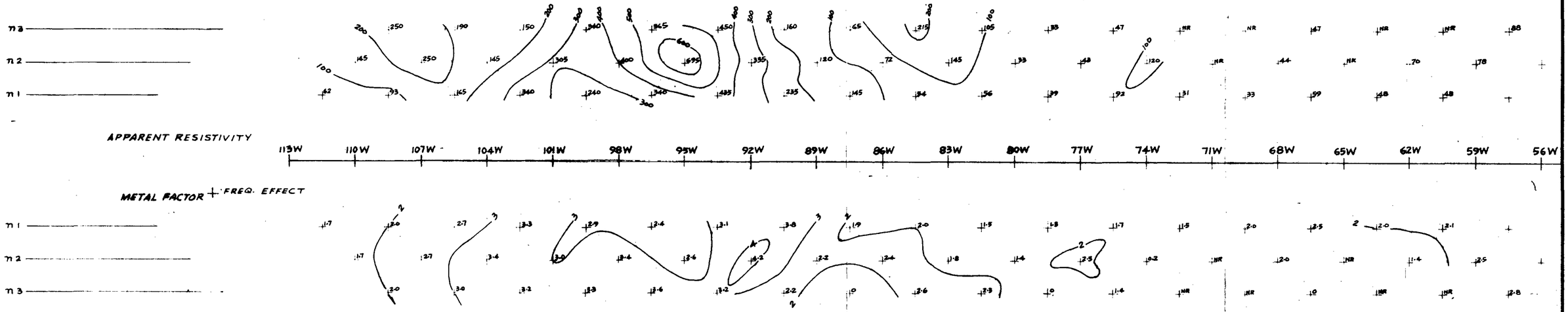
ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY

by

GEOSEARCH CONSULTANTS LTD.



LINE O

ANOMALOUS AREA

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.3 & 5.0 Hz.

ASHLAND OIL & REFINING COMPANY

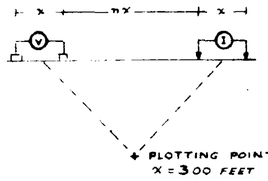
ASPEN GROVE PROPERTY

MERRITT AREA, B.C.

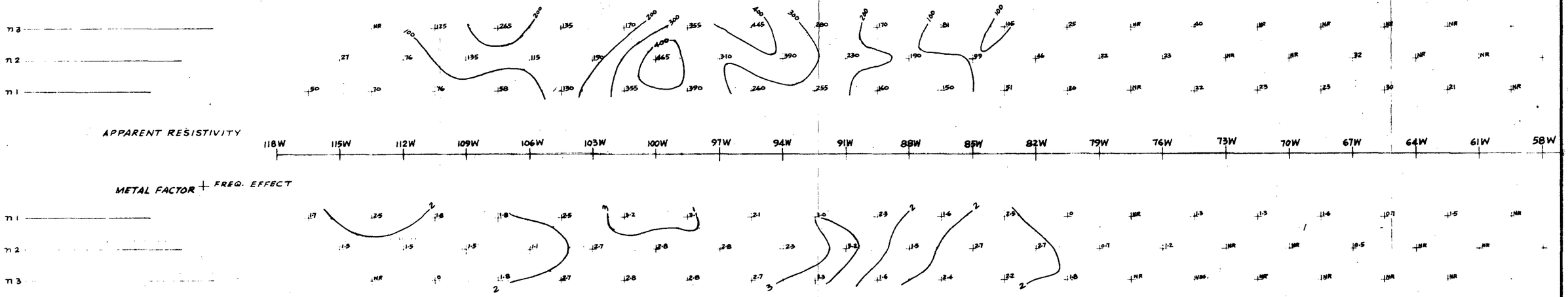
SCALE : 1 INCH = 300 FEET

1842

ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.



LINE 8S

ANOMALOUS AREA

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

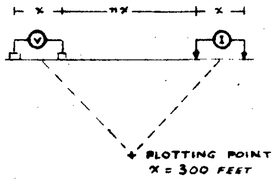
ASPEN GROVE PROPERTY

MERRITT AREA, B.C.

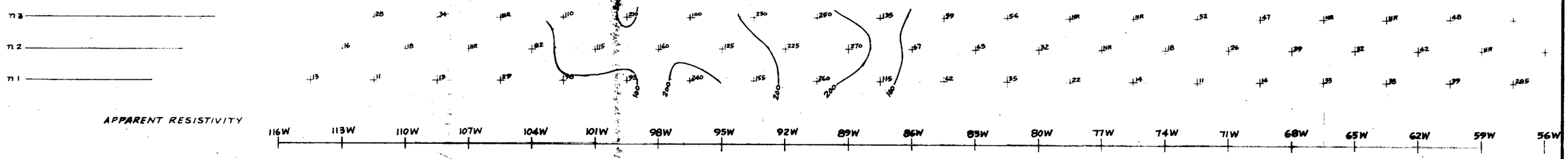
SCALE 1 INCH = 300 FEET

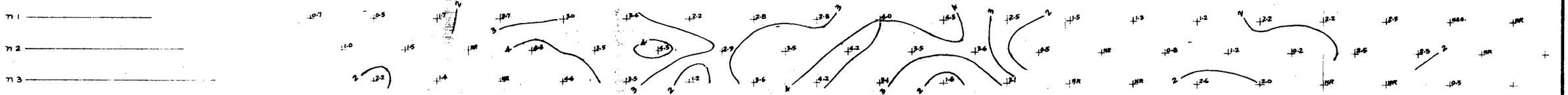
1842

ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.





LINE 16S

ANOMALOUS AREA
DEFINITE
PROBABLE
POSSIBLE

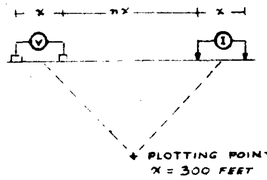
FREQUENCIES: 0.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

ASPEN GROVE PROPERTY
MERRITT AREA, B.C.
SCALE - 1 INCH = 300 FEET

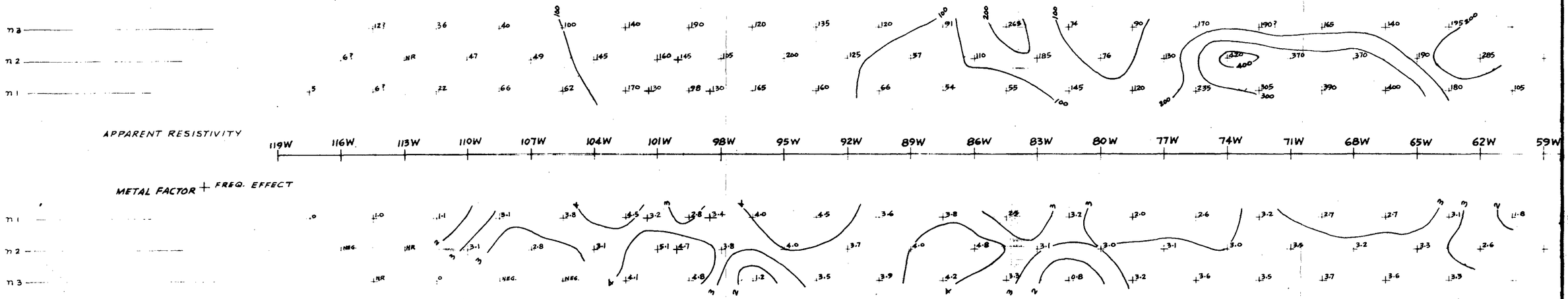
1842

ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY

GEOSEARCH CONSULTANTS LTD.



ANOMALOUS AREA

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 1.5 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

ASPEN GROVE PROPERTY

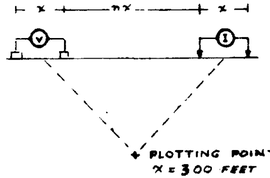
MERRITT AREA, B.C.

SCALE 1 INCH = 3,000 FEET

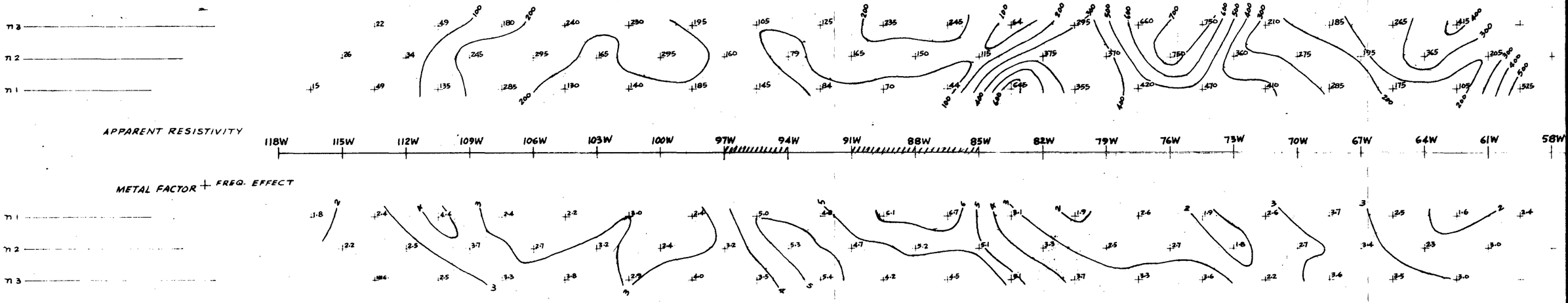
LINE 24S

1842

ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.



LINE 3325

ANOMALOUS AREA
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

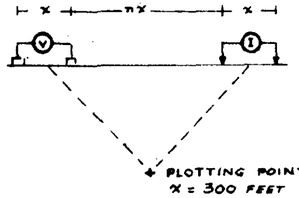
ASPEN GROVE PROPERTY

MERRITT AREA, B.C.

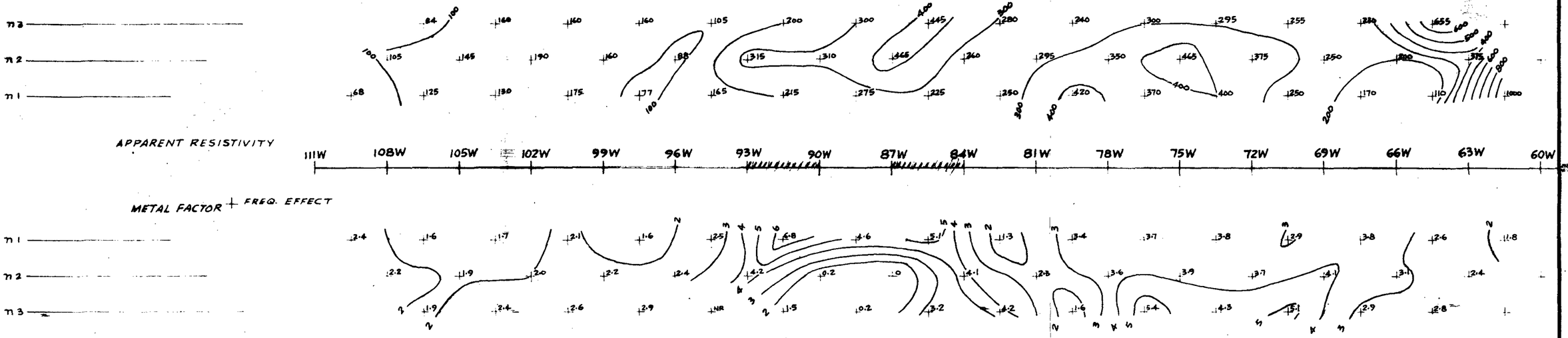
SCALE: 1 INCH = 3 [illegible] FEET

1842

ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.



LINE 40S

ANOMALOUS AREA

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

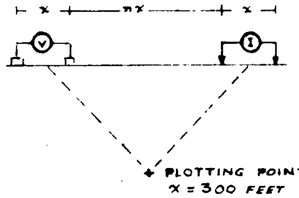
ASPEN GROVE PROPERTY

MERRITT AREA, B.C.

SCALE: 1 INCH = 300 FEET

1842

ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY

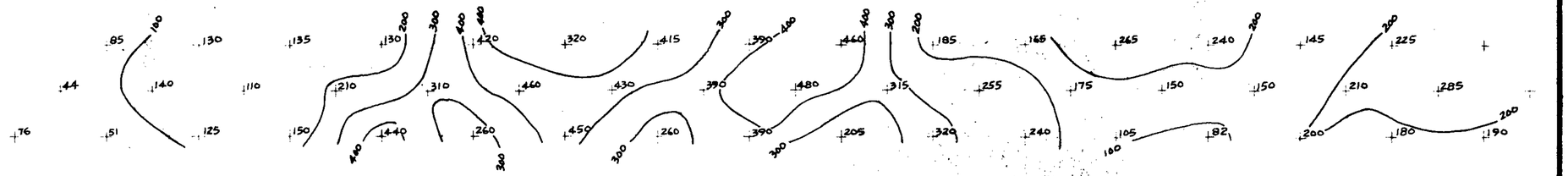
BY

GEOSEARCH CONSULTANTS LTD.

n 3 ——————

n 2 — — — —

n 1 — — — —



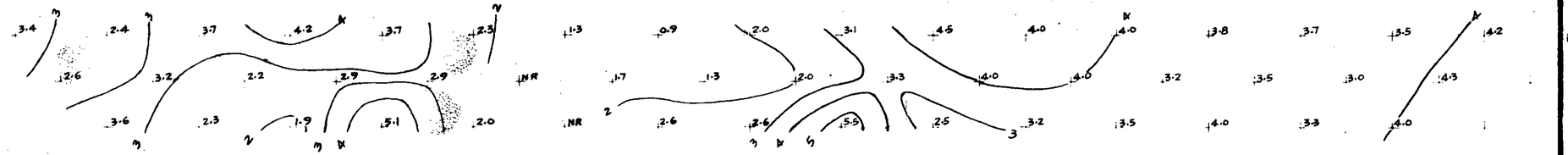
APPARENT RESISTIVITY

METAL FACTOR + FREQ. EFFECT

n 1 — · — · — · —

n 2 — · — · — · —

n 3 — · — · —



ANOMALOUS AREA

DEFINITE ——————

PROBABLE — — — —

POSSIBLE ••••••••

FREQUENCIES: 0.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

ASPEN GROVE PROPERTY

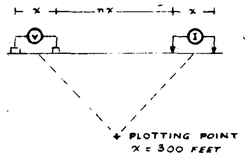
MERRITT AREA, B.C.

SCALE 1 INCH = 300 FEET

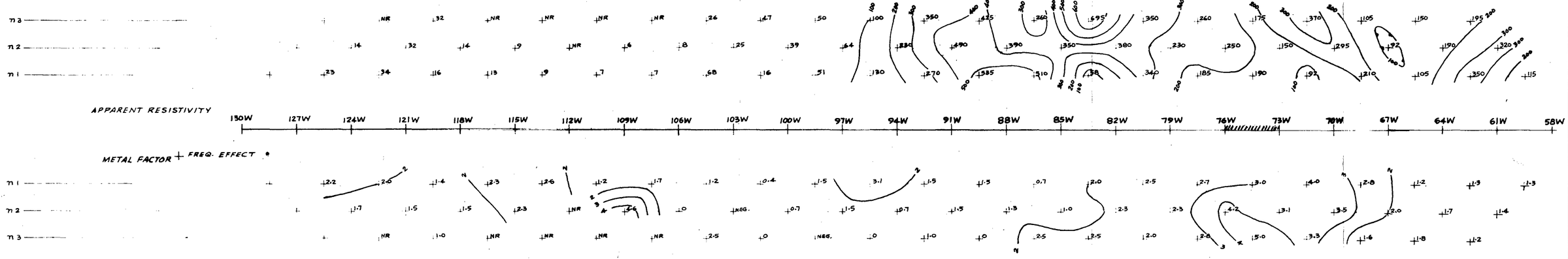
LINE 48S

1842

ELECTRODE CONFIGURATION



INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.



LINE 56S

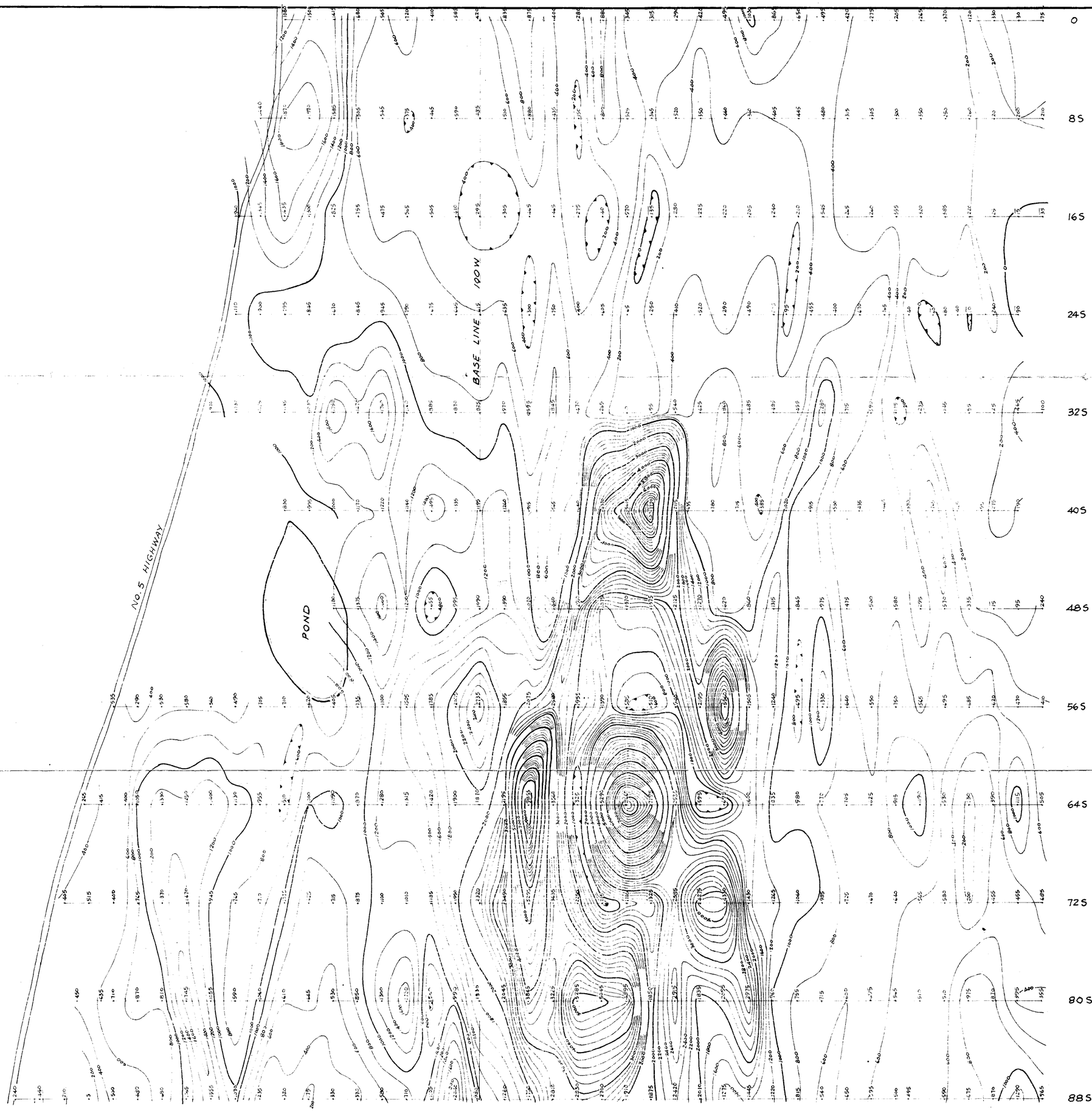
ANOMALOUS AREA
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 1.3 & 5.0 Hz

ASHLAND OIL & REFINING COMPANY

ASPEN GROVE PROPERTY
MERRITT AREA, B.C.
SCALE: 1 INCH = 300 FEET

1842



READINGS IN GAMMAS

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 1842 MAP #1

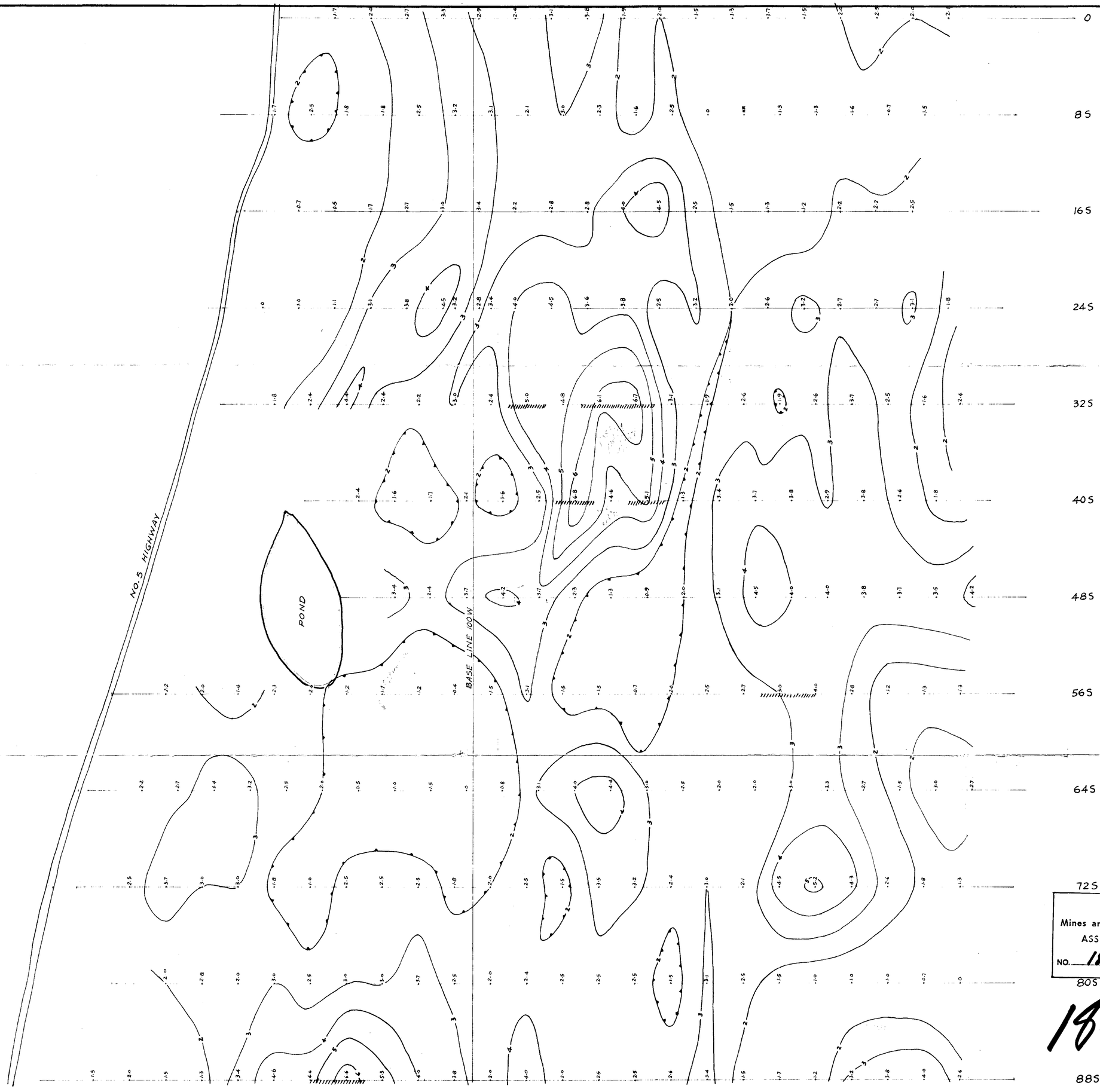
To Accompany Report
By J. A. Woodard
December 1968
Blue Jay 1-24
Blue Jay 1-5 Frs.
Bee 1-10
Nicola Mining Division

1842

MAGNETOMETER SURVEY
BY
[illegible] GEOPHYSICAL CONSULTANTS LTD.
FOR
ASHLAND OIL & REFINING COMPANY
BLUE JAY CLAIMS
NICOLA MINING DIVISION
BRITISH COLUMBIA
SCALE 1 INCH = 200 FEET

DRAWN BY: J.J.K.
DATE: DEC. 1968

(1)
68-61M



21168 H	21169 H	21170 H	21171 H	21527 N C	21528 N C
21165 H	21665 P / 21167 H	20156 D	20155 D	30044 E	30045 E
20164 D	20163 D	20154 D	20153 D	30042 E	30043 E
21664 P	21557 P	20556 D		30040 E	30041 E
20162 D	20161 D				
20160 D	20159 D	20152 D	20151 D	30038 E	30039 E
20158 D	20157 D	20150 D	20149 D	30036 E	30037 E

BASE LINE

CLAIM MAP SCALE: 1 INCH TO 1500 FT.
(IDEALIZED)

READINGS - FREQUENCY EFFECT, N1, 300' DIPOLES
//////////// - POSSIBLE ANOMALOUS AREA (FROM SECTIONS)

To Accompany Report
By J. A. Woodard
December 1968
Blue Jay 1-24
Blue Jay 1-5 Frs.
Bee 1-10
Nicola Mining Division

INDUCED POLARIZATION SURVEY
BY
GEOSEARCH CONSULTANTS LTD.
FOR
ASHLAND OIL & REFINING COMPANY

BLUE JAY CLAIMS
NICOLA MINING DIVISION
BRITISH COLUMBIA

SCALE: 1 INCH = 400 FEET

(2)

DRAWN BY: J.W.
DATE: DEC. 1968

68-61