APPENDIX V

GEOPHYSICAL REPORT - ELECTRO-MAGNETIC SURVEY

As of the time of compilation of this Assessment Report, the report on the Electro-Magnetic Survey had not been received from the contractor. It will be forwarded as soon as it is received by Pamicon Developments Ltd.

T. C. Scott, Geologist
PAMICON DEVELPMENTS LTD.

APPENDIX IV

GEOPHYSICAL REPORT

on the

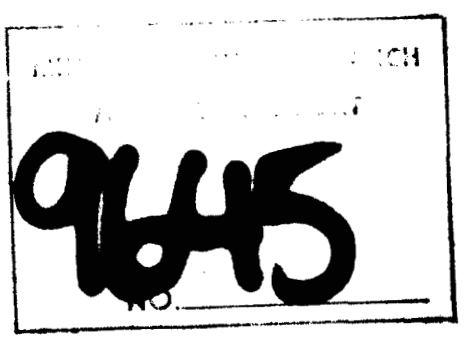
INDUCED POLARIZATION SURVEY

on the

EAGLEHEAD PROPERTY, LIARD M.D., B.C.

58°30'N Latitude
129°10'W Longitude
N.T.S. 104I/6E & 104I/11E

part 2
of 2



on behalf of

NUSPAR RESOURCES LTD.

in joint venture with

ESSO MINERALS CANADA

CLAIMS

EAGLE 47 - 51, 91, 96, 97, 112 - 116, 118, 120 - 127, 133, 135

FOX 2 and 3

by
NIELSEN GEOPHYSICS LTD.
Vernon, B.C.

February, 1982

To Accompany Assessment Report on Eaglehead Property
by C.K. Ikona, P. Eng. and T.C. Scott, Geologist
Pamicon Developments Ltd., February 12, 1982

TABLE OF CONTENTS

INTRODUCTION

During the period from August 13 to September 29, 1982, an Induced Polarization survey was carried out on the Eaglehead Property of Nuspar Resources Ltd. in joint venture with Esso Minerals Canada.

The areas covered consisted of intermediate lines of a previous survey, a new grid at different line orientation over the "Bornite Zone", and two traverses over the easterly end of the property in an area not known to have been geophysically surveyed.

The purpose of the survey was to more accurately define previous I.P. results to assist in a drill programme then being performed and to test for extensions or new zones of mineralization to the east of the main area of exploration.

The progress of the survey was hampered by inclement weather, some poorly cut survey lines, poor electrode contacts at the ends of the lines and by a motor-generator break-down.

The work was performed by Nielsen Geophysics Ltd. with two assistants provided by the property managers, Pamicon Development Ltd., who also provided camp support and local transportation.

A total of 13.2 line-kilometres using four dipole - dipole electrode separations was surveyed.

LOCATION AND ACCESS

The property is located approximately 48 km east of the community of Dease Lake, B.C. The claims cover the valley along Eaglehead Creek and Hard Creek.

Access is by fixed wing float plane to Eaglehead Lake and thence by helicopter to the camp which is located at the divide separating Eaglehead and Hard Creeks.

Local access is by helicopter and on foot.

CLAIMS

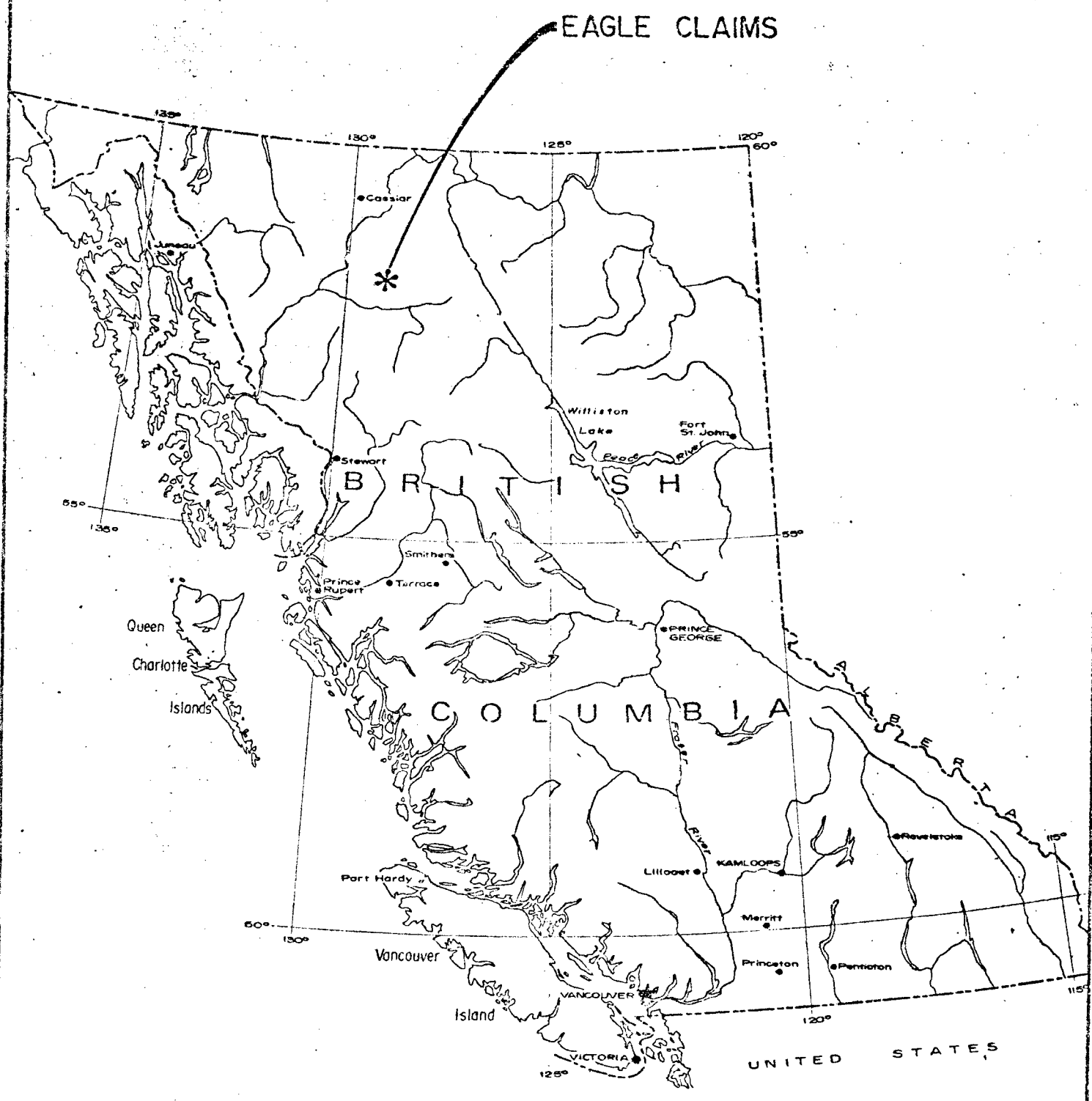
The claims covered by this report and owned by Nuspar Resources Ltd. are as follows.

EAGLE47 - 51, 91, 96, 97, 112 - 116, 118, 120 - 127, 133 and 135
FOX 2 and 3

The record numbers, anniversary dates and location are covered in the accompanying report by C. Scott (January, 1982).

PREVIOUS WORK

A great deal of work has been carried out over the past 19 years by various individuals and companies.



NUSPAR RESOURCES LTD.

EAGLE CLAIMS, LIARD M.D., B.C.

LOCATION MAP

SCALE

Km. 100 50 0 100 200 300 400 Km.

Miles 100 50 0 100 200 Miles

ALTAIR drafting services ltd.

It consists of geological mapping and prospecting, geochemical soil and silt sampling, line-cutting, diamond drilling and geophysics.

The geophysics included a ground magnetometer survey, Induced Polarization, and some electromagnetics.

For a detailed account of the history of and technical investigations carried out on the property, the reader is referred to past Assessment reports, G.S.C. and B.C. Department of Mines reports and reports presently being written by Pamicon Development Ltd. on behalf on the owners.

GENERAL GEOLOGY - See "Geochemical Assessment Report on the Eaglehead Property" by Alex Burton, P.Eng., September, 1979.

"A Jurassic granodiorite batholith intrudes the Sinemurian Jurassic Inklin Formation, the Upper Triassic Sineva limestone Formation, and the Upper Triassic Kutcho Formation."

The intruded rocks include limestone, argillite, siltstone, greywacke, arenite and volcanics.

The intrusive rocks vary from diabase dikes to the main mass, granodiorite. Diorite occurs as a minor border phase.

Mineralization, which has been encountered primarily in drill holes spotted on Induced Polarization anomalies, consists of pyrite, chalcopyrite, bornite, specularite, magnetite, sphalerite and molybdenite.

The mineralized zone follows the overburden covered valley with steeply dipping lenses of relatively long strike length (compared to width) occurring

within this feature.

Along the "U"-shaped valley floor outcrops are very sparse.

The I.P. Survey lines run across this valley and are terminated up the slope in apparently barren outcrop.

The mineralized zones as seen from drilling results to date appear to be complicated by dike intrusions and faulting.

THE GRID

The I.P. survey covered by this report was executed over three different grids.

The first area consisted of lines installed between existing lines spaced 800 feet apart on a bearing on N45^{o}E. These lines were numbered in conformance with the existing grid i.e. L100E, L108E, L166E L124E and L132E, but were chained and the stations numbered in metric. That is, the station interval was approximately the same except that chainage between pickets was 60 metres rather than 200 feet. A portion of L96E was rehabilitated and re-surveyed for correlation with the previous I.P. survey.

The second portion of the survey was done on a new grid which overlapped the grid discussed above over the "Bornite Zone" but at a different orientation. Lines were cut 100 metres apart on a true N - S bearing. The station interval was 50 metres.

Finally, two lines, L96mE and L100mE which were part of a geochemical grid installed on the FOX 2 and 3 claims east of the "Bornite Zone" were tested with

Induced Polarization.

All lines were installed and/or rehabilitated by the owners of the property.

The location of these lines and the claims are shown on the compilation map in the accompanying report by C. Scott, Pamicon Development Ltd. (See Fig. 3 Accompanying Report)

THE INDUCED POLARIZATION SURVEY

General Comments

Most of the present I.P. coverage was executed over the "Bornite Zone" to more accurately define previous I.P. anomalies and to assist a drilling programme which was then being carried out.

Lines 2mE, 5mE, 7mE and 9mE (metric) were installed and surveyed at an angle of 45 degrees to the old, original grid lines in an attempt to achieve better resolution and continuity of the previous anomalies.

The two traverses to the east of the "Bornite Zone" on the FOX 2 and 3 claims were surveyed to check a rather complex geochemically anomalous pattern. The two particular lines run were chosen primarily because of their length and accessibility.

Line 96mE was terminated to the north due to "white-out" conditions whereby the helicopter could no longer be used to transport the crew and equipment safely.

Survey Specifications

The survey was carried out using similar instrumentation and electrode

configurations to the previous I.P. coverage.

At the request of the client, the six lines on the old grid were surveyed using a 60 metre 'a' spacing to conform with the 200 foot 'a' spacing carried out by Peter E. Walcott and Associates Ltd. in 1979. The apparent resistivity data was calculated and plotted using units of $\rho_a/2\pi$ ohm-feet.

Over the remaining lines an 'a' spacing of 50 metres was used and the apparent resistivity is expressed in ohm-metres.

The instrumentation consisted of a frequency domain receiver, transmitter, and motor-generator manufactured by Phoenix Geophysics Ltd. of Willowdale, Ontario.

The transmitter (IPT-1) was powered by a 3KVA, 400 Hz motor-generator (MG-3) using operating frequencies of 0.25 and 4.0 Hz. Current was injected into the ground at two steel electrodes C1 and C2 (distance 'a').

The receiver (IPV-1) is an extremely stable, sensitive potentiometer which was tuned to the pre-selective transmitter frequencies and measured the voltages across the potential electrodes P1 and P2 (distance 'a').

The electrode configuration used was "dipole-dipole" for 'n' values of 1, 2, 3 and 4.

As illustrated in the appendix, the array can be increased or decreased to provide for various depths of investigation by using multiples ('n' values of 1, 2, 3 and 4) of the distance between the current (C1-C2) or potential electrodes (P1-P2) referred to as the "electrode" or 'a' separation.

The data recorded in the field consisted of the current (I) flowing through C1 and C2, the voltage appearing across P1 and P2 at the low frequency, and the

"percentage apparent frequency effect" appearing between P1 and P2 which is directly measured by the receiver and displayed on a meter.

$$\% \text{ F.E.} = \frac{(\text{Pa LOW} - \text{Pa HIGH}) \times 100}{\text{Pa HIGH}}$$

The apparent resistivity (Pa) is proportional to the ratio of the measured voltage at the receiver to the current observed at the transmitter. A proportionality constant (k) is used whose value is determined by the geometry of the array and the units (ohm-feet or ohm-metres) desired.

$$\text{Pa} = \frac{kV}{I}$$

A third parameter called the "metal factor" was calculated by dividing the apparent frequency effect by the apparent resistivity and multiplying by 1,000.

$$\text{M.F.} = \frac{\text{F.E.}}{\text{Pa}} \times 1{,}000$$

The values of ρa, F.E. and M.F. are plotted on three separate graphs, in a two dimensional array for each survey line. These values from each measurement are plotted at the intersection of 45 $^{\circ}$ lines from the centre point of C1-C2 and P1-P2. (See Appendix.) The horizontal row of values made with "n = 1" is made with a constant separation, and therefore represents a constant depth of detection. The other rows of values represent successively deeper zones. These two dimensional data plots, called "pseudo-sections", are contoured, and

different patterns result from different geometries. However, they should not be considered vertical sections of the electrical properties of the ground as resistivities, geometries, etc. also affect the depth of investigation.

Interpretation of the contour patterns is made from experience, theoretical patterns and computer modelling.

Discussion of Results

The "pseudo sections" discussed below should be contoured at appropriate 'n' values in conjunction with previous I.P. studies, geology, geochemistry and drilling results presently being compiled.

A brief line by line account of the present survey results is as follows.

LINE 100E - No outstanding features are observed on the $\rho_a/2\pi$ or F.E. plots. Resistivity contrasts are not outstanding with values ranging from 222 ohm-feet at the north end of the line to a moderate high of 1,579 ohm-feet at the south. F.E. highs are in the order of two times background level.

A fairly significant M.F. anomaly occurs at the north end of the line indicating a dike-like polarized body dipping steeply to the north.

The single F.E. high value of 7.4 at the south could represent mineralization but more coverage in that direction is required.

The F.E. - M.F. anomaly at the n = 3 and 4 spreads centred at station 5.1N correlates well with mineralization observed in a nearby drill-hole.

LINE 108E - No outstanding anomalies are discernable on this line.

LINE 116E - A deep (n = 3 and 4) mineralized zone likely occurs between 6.3N and 6.9N.

A weak F.E. anomaly is observed at 8.4N to 10.6N but has good M.F. definition.

The very low F.E.s from 11.4N to 15.0N are thought to be the result of faulting and/or dike intrusions. All F.E. readings above 3.0 could be caused by sulphides.

LINE 124E - The most interesting feature on this line is the extremely high F.E. anomaly between 7.2N and 9.3N. The two high F.E. values (20) were double-checked and are supported by surrounding anomalous readings although resistivities are not as low as would be expected for such high F.E.s.

The contrasting very low F.E.s to the south are difficult to interpret but are believed to be valid in that the same phenomenum is seen to occur on adjacent Line 132E.

The M.F. contour of 8.0 extends over a distance of 530 metres. This feature, backed by the corresponding anomaly on L132E, suggests that a very large, deep polarized body is the causative source.

LINE 132E - The along-line width of the F.E. anomaly is in excess of 500 metres. As mentioned above, there is an excellent correlation with the anomaly on adjacent Line 124E. As a check on the high values obtained the section of line from stations 9.6N to 15.0 was re-run on a different

day with excellent repeatability of readings.

The following Lines overlap the first three lines discussed above over the "Bornite Zone". A full interpretation will be carried out upon completion of compilation of drill-hole data in collaboration with the project geologist. Dike intrusion and faulting complicate the picture.

LINE 2mE - All F.E. values above 9.0 are considered anomalous. The "pant-leg" F.E. feature at Stn 5.25N is due to a vertical "dike-like" body with an apparent width of 50 metres.

LINE 5mE - Three anomalies above 9.0 F.E. are observed on this line. The large anomaly from 6.5N to 10.0N correlates well with the "Bornite Zone" as presently defined by drilling with the central portion exhibiting good, low ρ_a coincidence.

LINE 7mE - The "Bornite Zone" is also reflected in the main F.E. anomaly observed on this line from Stn. 6.0N to 9.0N. Again, high M.F.s (low ρ_a s) coincide. A steep northerly dip is indicated.

At the northern extremity of the line, another anomaly is appearing but is not closed off.

LINE 9mE - F.E. values above 9.0 are considered anomalous. In the case of

the anomaly centred at Stn. 8.0N., which is believed to represent the "Bornite Zone", the 8.0 M.F. contour is thought to closely define the zone. A northerly dip is again suggested.

The other narrow, less well defined anomalies on these lines should be correlated from line-to-line on a plan map to determine their attitude and geometry.

The results of these lines (2mE, 5mE, 7mE, and 9mE) show a much higher resolution and have a higher level of F.E.s than those observed on the old N45 E grid surveys.

The following two lines were surveyed a considerable distance east of the main area of interest. Because of the water-saturated overburden, only F.E. values above 7.0 are of interest.

LINE 96mE - This line started at the south over a wide meadow from Stn. 11.0N to 15.0N. The anomaly centred at Stn. 13.0N could be related to mineralization observed in an outcrop along the creek adjacent to this line. The wide anomaly from Stn. 16.0N to 21.0N occurs on higher, tree-covered ground where the overburden is believed to be quite minimal in thickness as indicated by the higher ρ_a s in this region.

The anomaly at the north end of the line is still open to the north and coincides with a water-soaked meadow.

It was here that the season's work was terminated due to adverse

weather conditions.

LINE 100mE - This line was surveyed before the northerly end of L96mE and is 400 metres east of that line. The low ρ_a s (less than 750 ohm-metres) are interpreted due to water-saturated overburden over the broad meadow. The 8.0 M.F. contour from Stn. 10.5N to 15.0N accurately delineates the extent of the wettest section of this meadow. The relatively low F.E. values suggest that either the causative sources of the L96mE anomalies are cut off between the two lines or that they strike at an acute angle to the line surveyed.

CONCLUSIONS AND RECOMMENDATIONS

The new grid lines at 45 degrees to the old grid appear to more accurately define the "Bornite Zone".

Other sub-parallel anomalies were observed, some of which are no doubt related to sulphides.

The data is likely complicated by "dike-like" intrusions (seen in drill-holes) and by faulting.

A very large, moderately deep body of high chargeability was partially delineated on L124E and L132E and is still open to the east. Because this feature was not observed on the old survey and due to the lateral dimensions and high amplitude responses, many stations were re-surveyed and the values confirmed. This anomaly should be checked by a vertical of high-angle drill-hole next season.

The anomalies detected on L96mE (FOX 2 and 3 claims) should be defined by further I.P. coverage and tested by drilling.

Respectfully submitted,

P.P. Nielsen

P.P. Nielsen, B.Sc.,
Geophysicist

STATEMENT OF QUALIFICATIONS

I DO HEREBY STATE THAT:

1. I am the author of this report and did carry out the geophysical survey described herein.
2. I have been actively and responsibly involved in all aspects of mining geophysics in Canada, the United States, Africa and Australia over the past sixteen years.
3. I graduated with a B.Sc. degree in Geophysics from the University of B.C. in 1969.
4. I am the President of Nielsen Geophysics Ltd. with business address at #205 - 2910 - 30th Ave., Vernon, B,C.
5. I am a member of the S.E.G., C.I.I.M.,and the B.C.G.S.

PERSONNEL

The I.P. Survey was performed using a crew of three men.

NIELSEN GEOPHYSICS LTD.

P. Nielsen, Geophysicist and I.P. Operator	28 days
R. Klanjscek, I.P. Operator	28 days

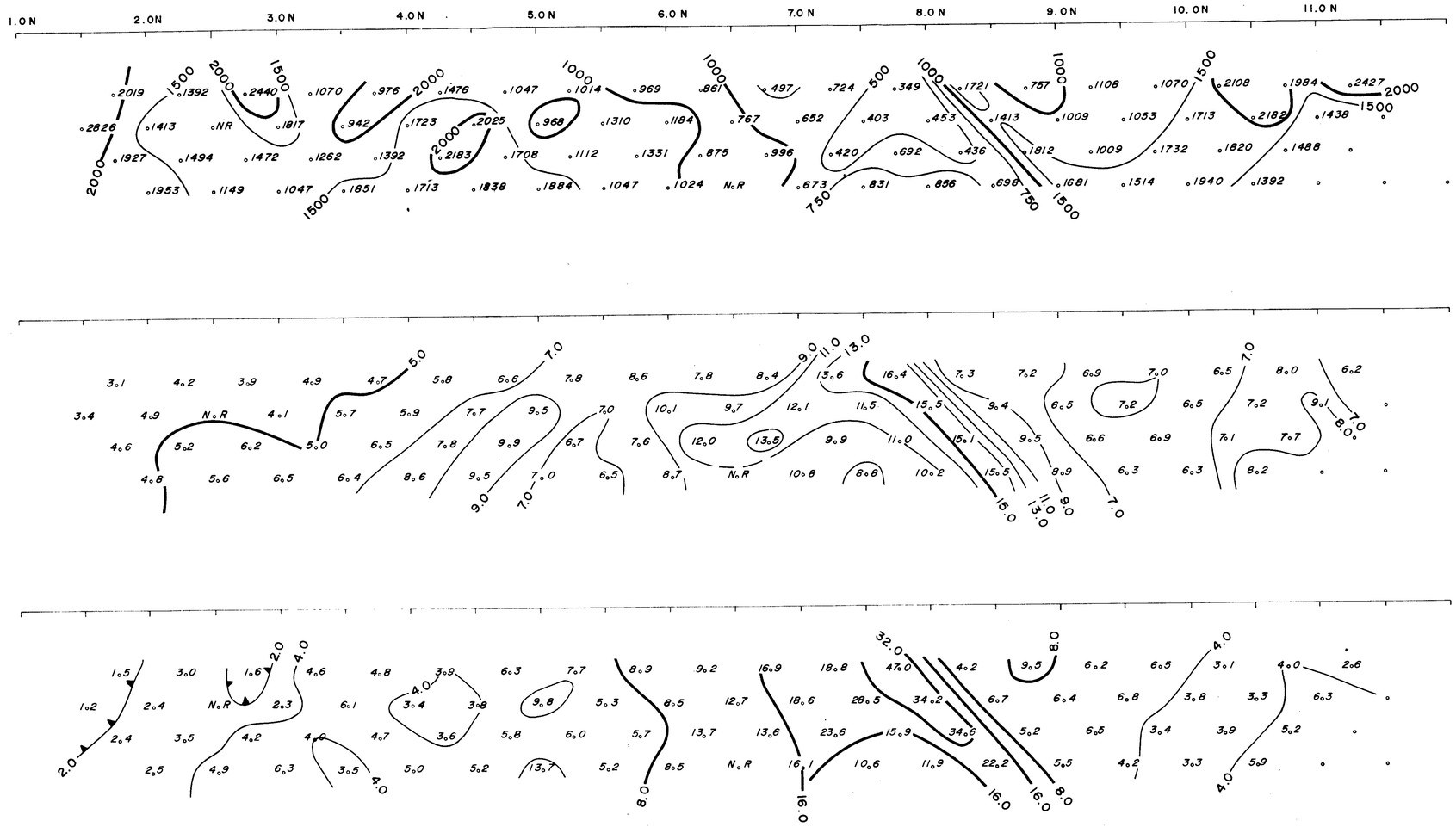
NUSPAR RESOURCES LTD. - ESSO MINERALS CANADA

R. Juneau	22 days

COSTS

The following is a breakdown of Nielsen Geophysics Ltd. charges for performing the work discussed within this report.

1. Personnel	
(a) P. Nielsen, Geophysicist and I.P. Operator 28 days @$250/day	$ 7,000.
(b) R. Klanjscek, I.P. Operator 28 days @$165/day	4,620.
2. Equipment	
(a) I.P. Unit - 28 days @$155/day	4,340.
(b) Electromagnetic Unit - 3 days @$90/day	270.
3. Mobilization - Demobilization	
(a) Transportation	1,060.
(b) Food and Accomodation	360.
4. Office - Report, telephone, etc.	875.
TOTAL	$18,525.



NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

EAGLE CLAIMS

DIPOLE - DIPOLE ARRAY
a = 50 METRES

Part 2 of 2

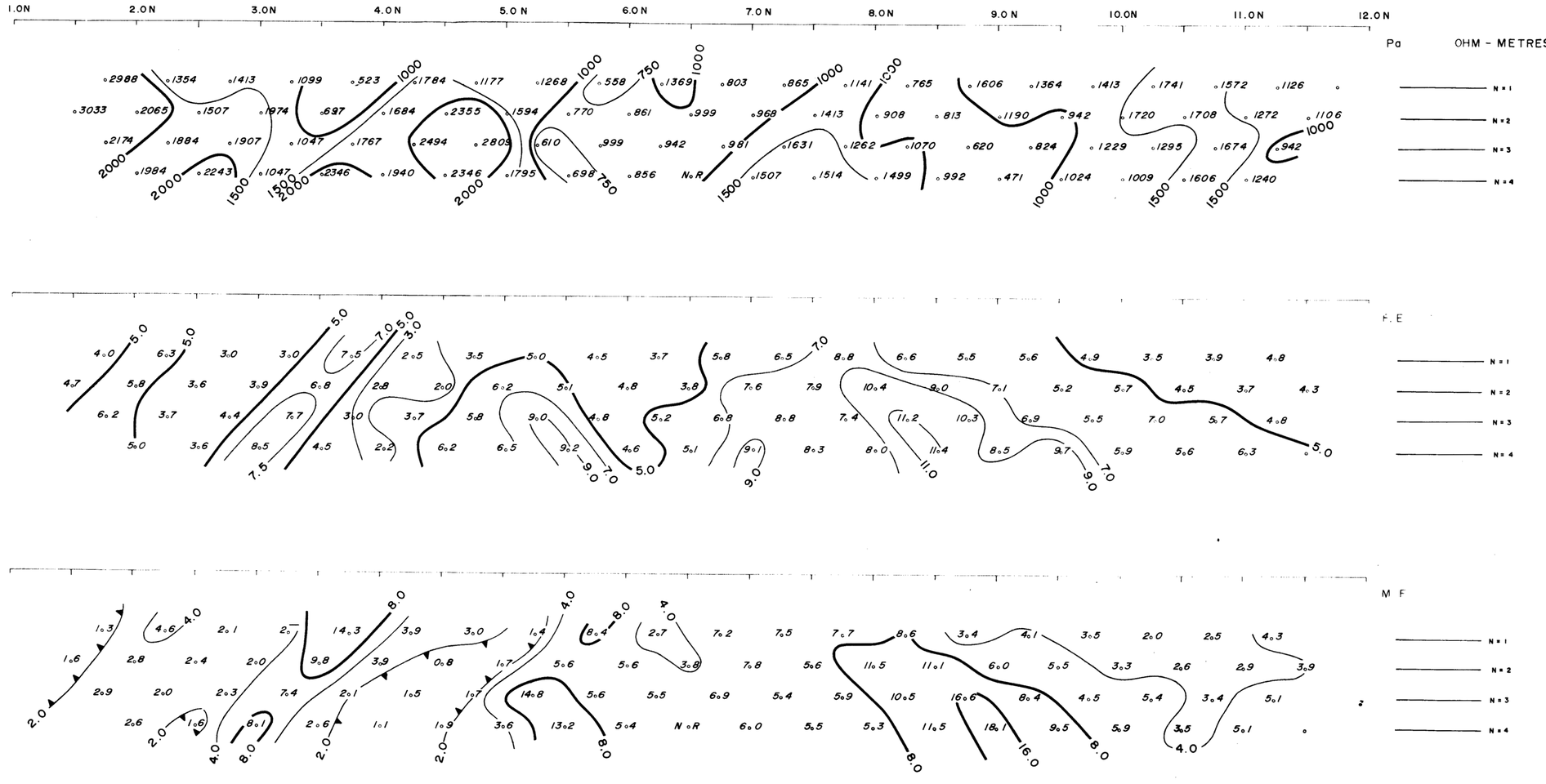
L - 7m E

SCALE : ONE INCH TO 50 METRES

50 25 0 50 100 150

— Prepared by —

NIELSEN GEOPHYSICS LTD.
VERNON, B.C.



NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

EAGLE CLAIMS

DIPOLE - DIPOLE ARRAY
a = 50 METRES

Part 2 of 2

L-9m E

SCALE : ONE INCH TO 50 METRES

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— Prepared by —
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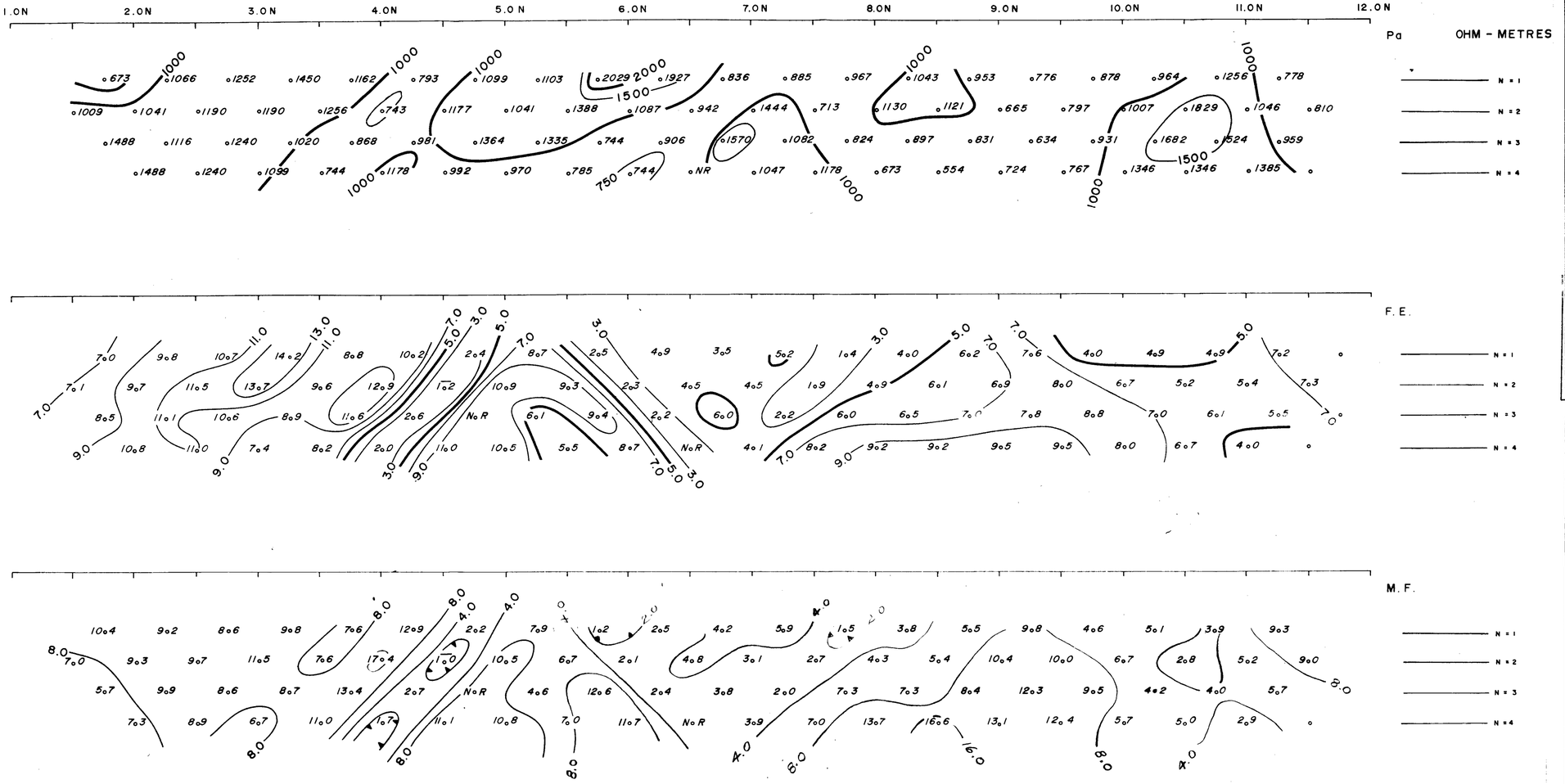


NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

EAGLE CLAIMS

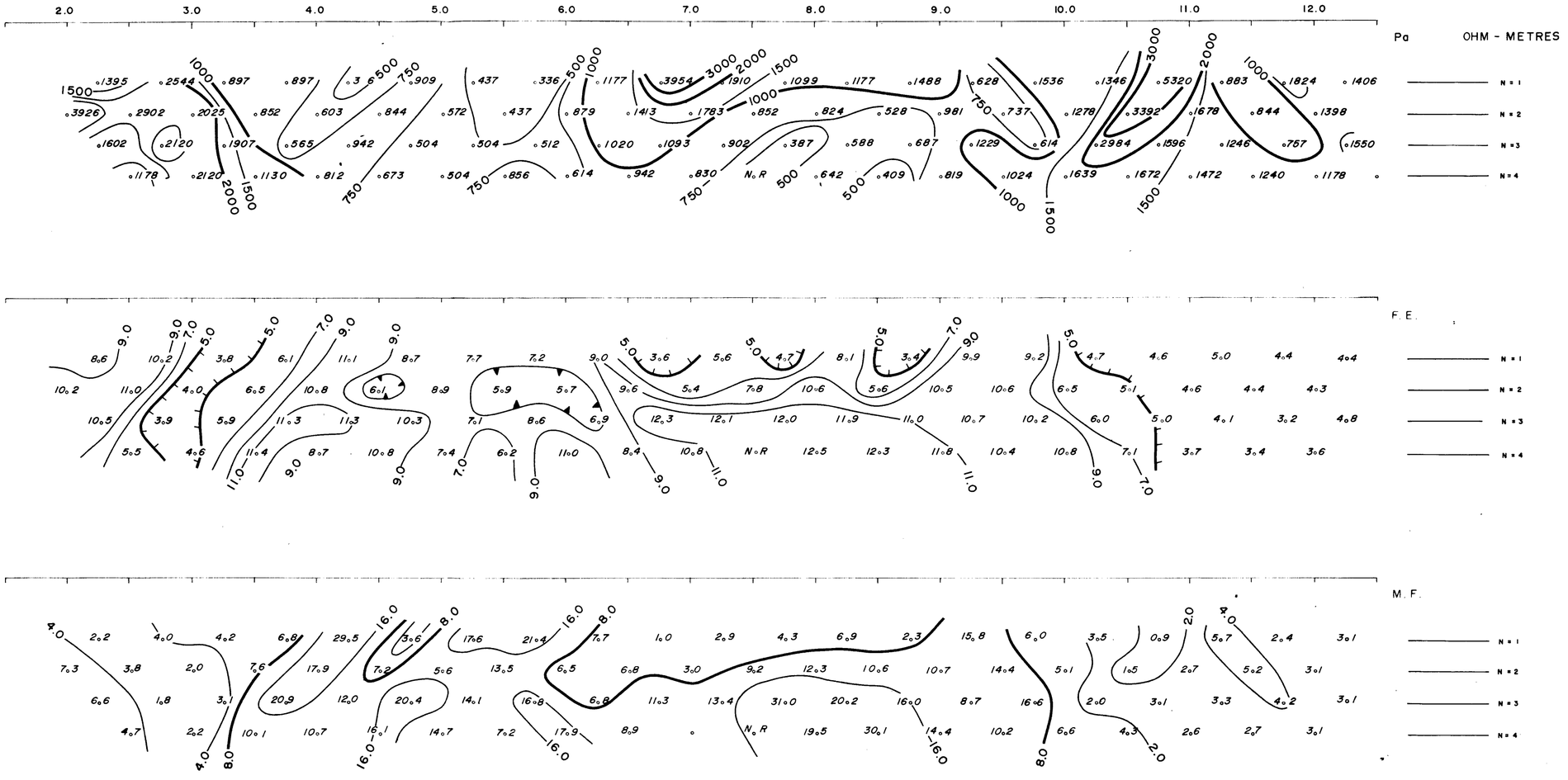
DIPOLE - DIPOLE ARRAY
a = 50 METRES

part 2 of 2

SCALE : ONE INCH TO 50 METRES

50 25 0 50 100 150

— Prepared by —
NIELSEN GEOPHYSICS LTD.
VERNON, B.C.



NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

EAGLE CLAIMS

DIPOLE - DIPOLE ARRAY
a = 50 METRES

part 2 of 2

L - 5m E

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
9645
NO.

SCALE : ONE INCH TO 50 METRES
50 25 0 50 100 150

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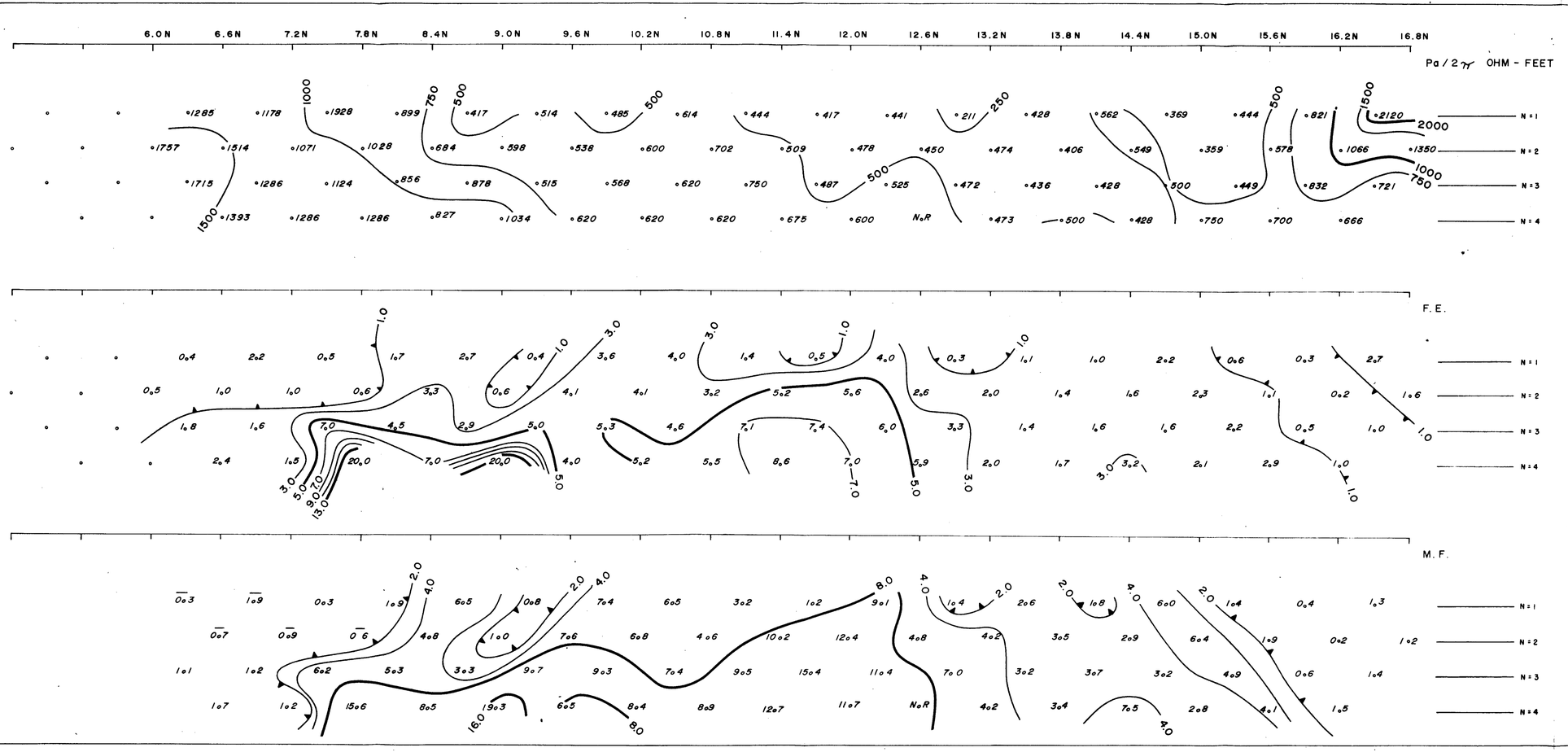
VERNON, B.C.



NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

EAGLE CLAIMS

DIPOLE - DIPOLE ARRAY
a = 60 METRES

L-124 E

part 2 of 2

SCALE : ONE INCH TO 60 METRES

60 30 0 60 120 METRES
200 100 0 200 400 FEET

— Prepared by —
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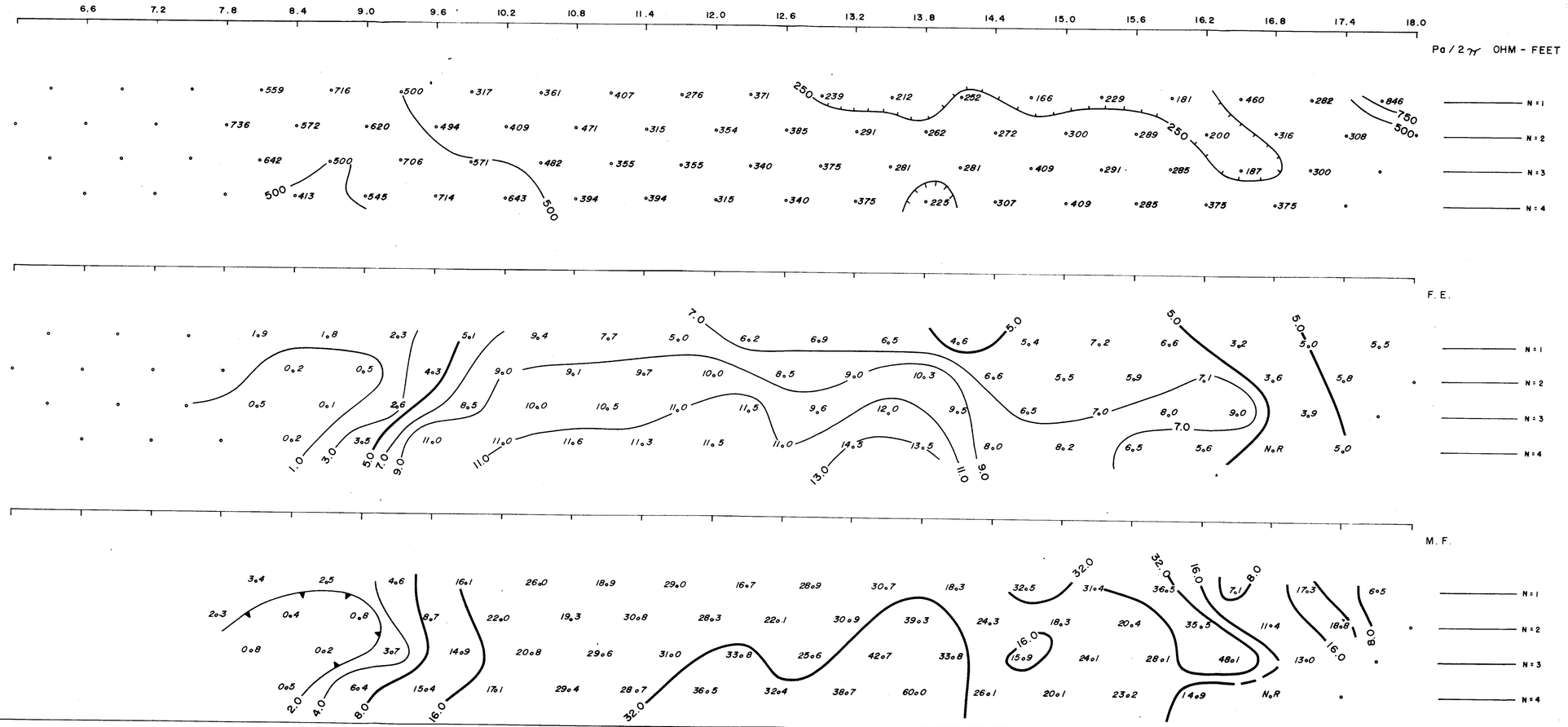
VERNON, B.C.



NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

EAGLE CLAIMS

DIPOLE - DIPOLE ARRAY
a = 60 METRES

L-132 E

part 2 of 2

SCALE : ONE INCH TO 60 METRES

60 30 0 60 120 METRES
200 100 0 200 400 FEET

— Prepared by —
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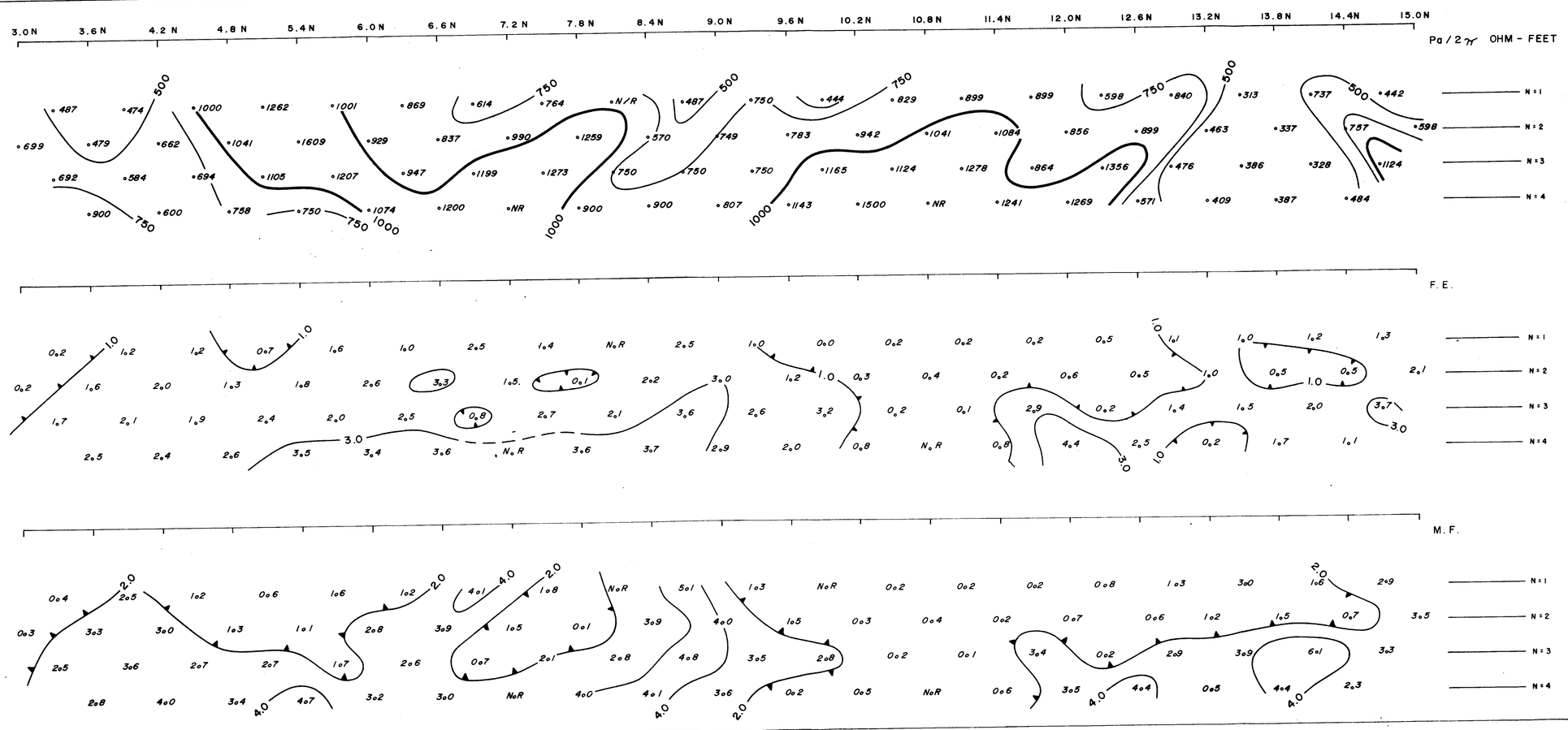
VERNON, B.C.



NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

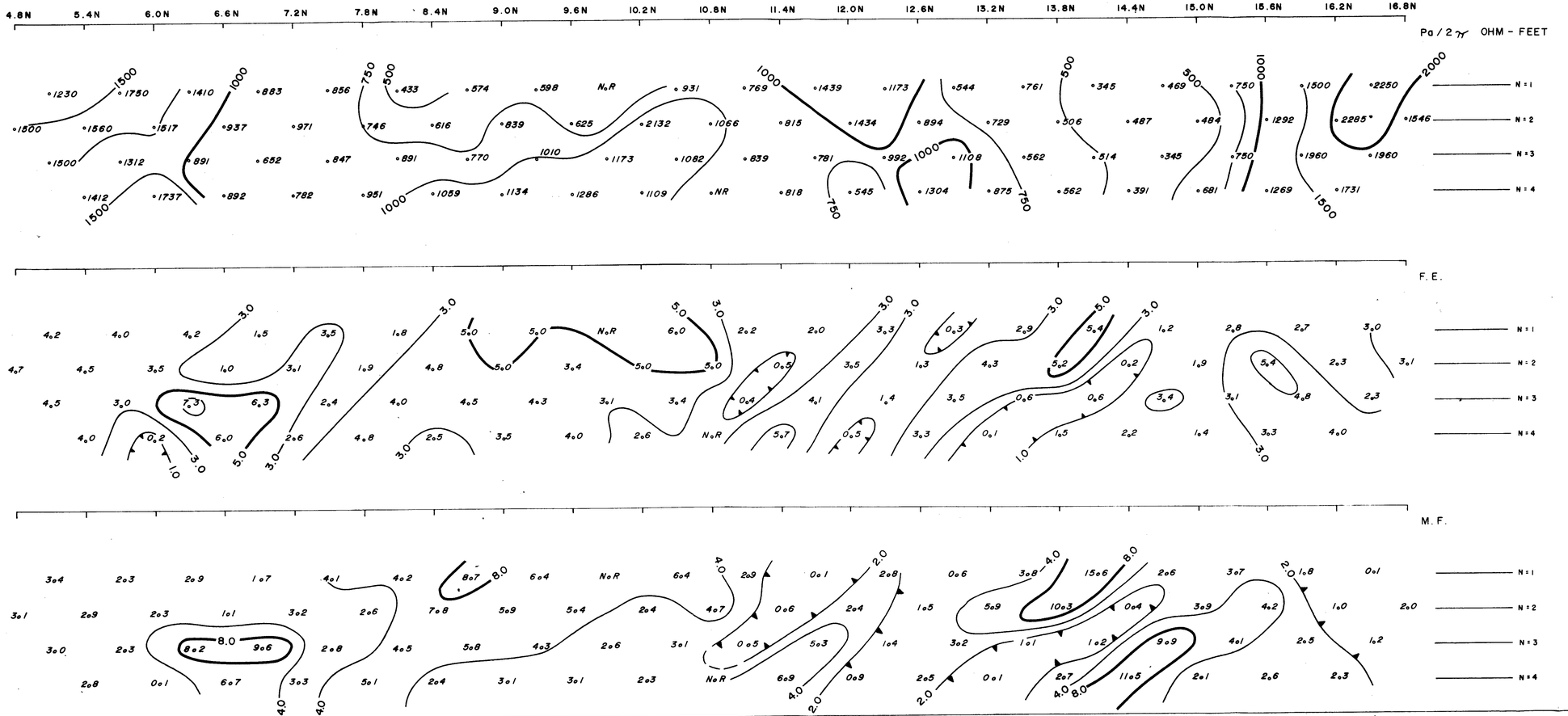
EAGLE CLAIMS

DIPOLE - DIPOLE ARRAY
a = 60 METRES

SCALE : ONE INCH TO 60 METRES

60 30 0 60 120 METRES
200 100 0 200 400 FEET

—Prepared by—
NIELSEN GEOPHYSICS LTD.
VERNON, B.C.



NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

EAGLE CLAIMS

DIPOLE - DIPOLE ARRAY
a = 60 METRES

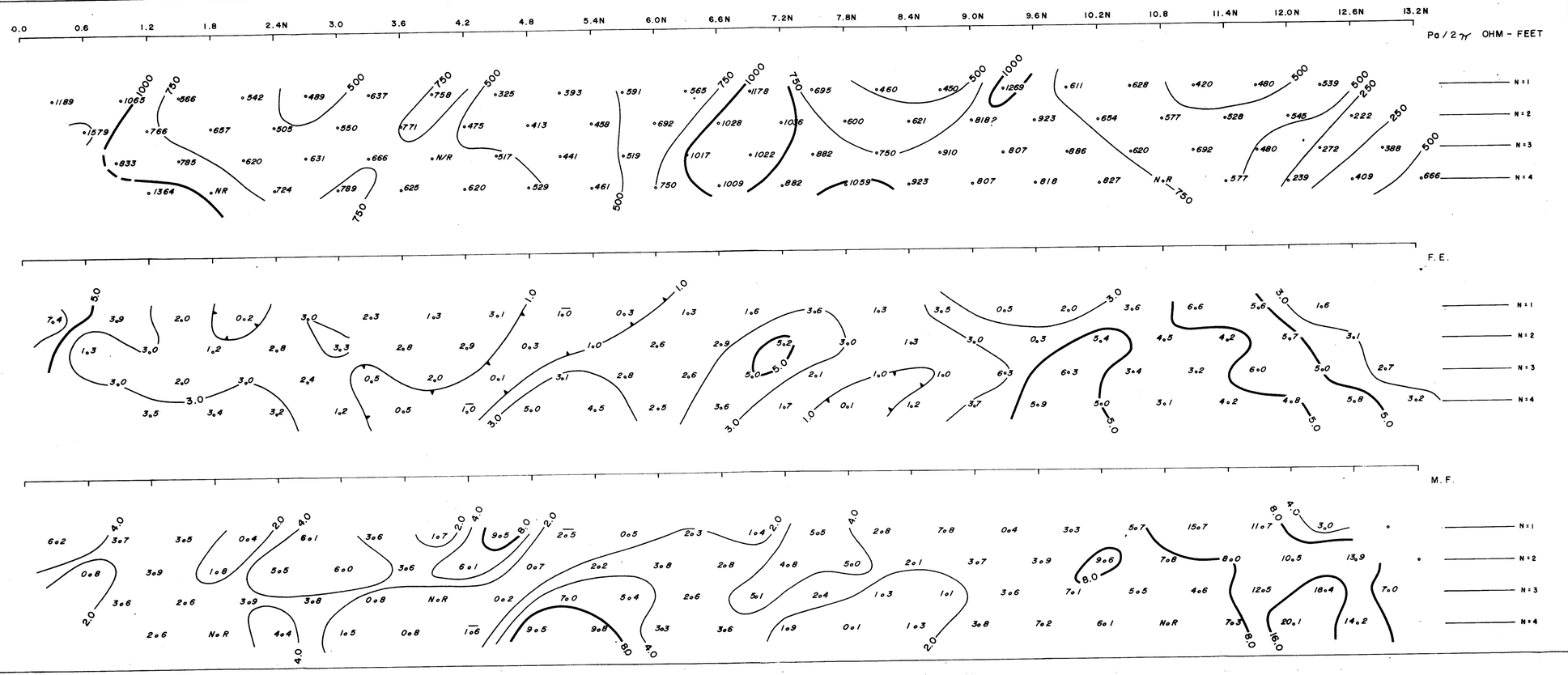
L - 116 E

Part 2 of 2

SCALE : ONE INCH TO 60 METRES

60 30 0 60 120 METRES
200 100 0 200 400 FEET

— Prepared by —
NIELSEN GEOPHYSICS LTD.
VERNON, B.C.



NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

EAGLE CLAIMS

DIPOLE - DIPOLE ARRAY
a = 60 METRES

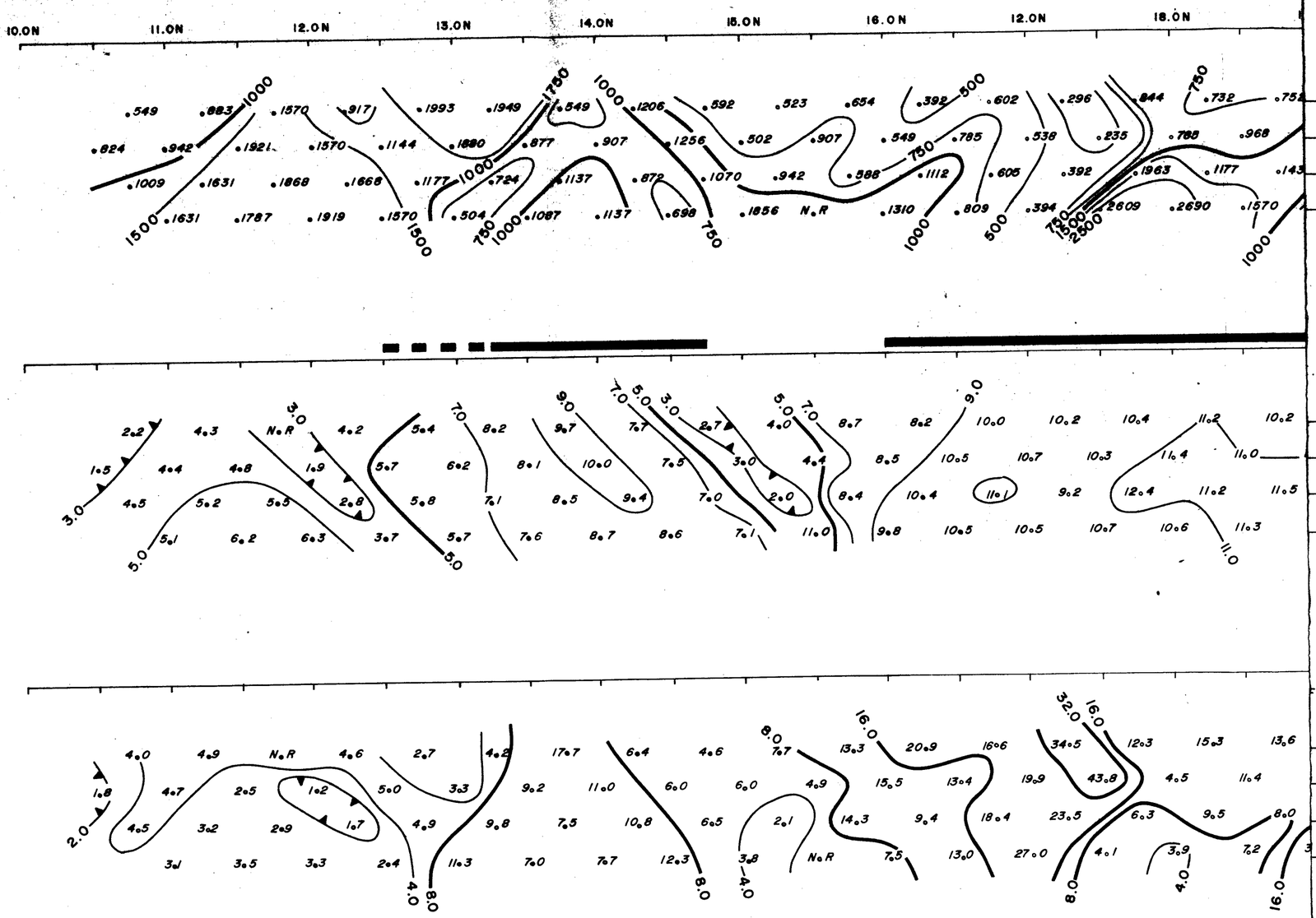
L-100 E

Part 2 of 2

SCALE : ONE INCH TO 60 METRES

60 30 0 60 120 METRES
200 100 0 200 400 FEET

— Prepared by —
NIELSEN GEOPHYSICS LTD.
VERNON, B.C.



NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

EAGLE CLAIMS

DIPOLE - DIPOLE ARRAY
a = 50' METRES

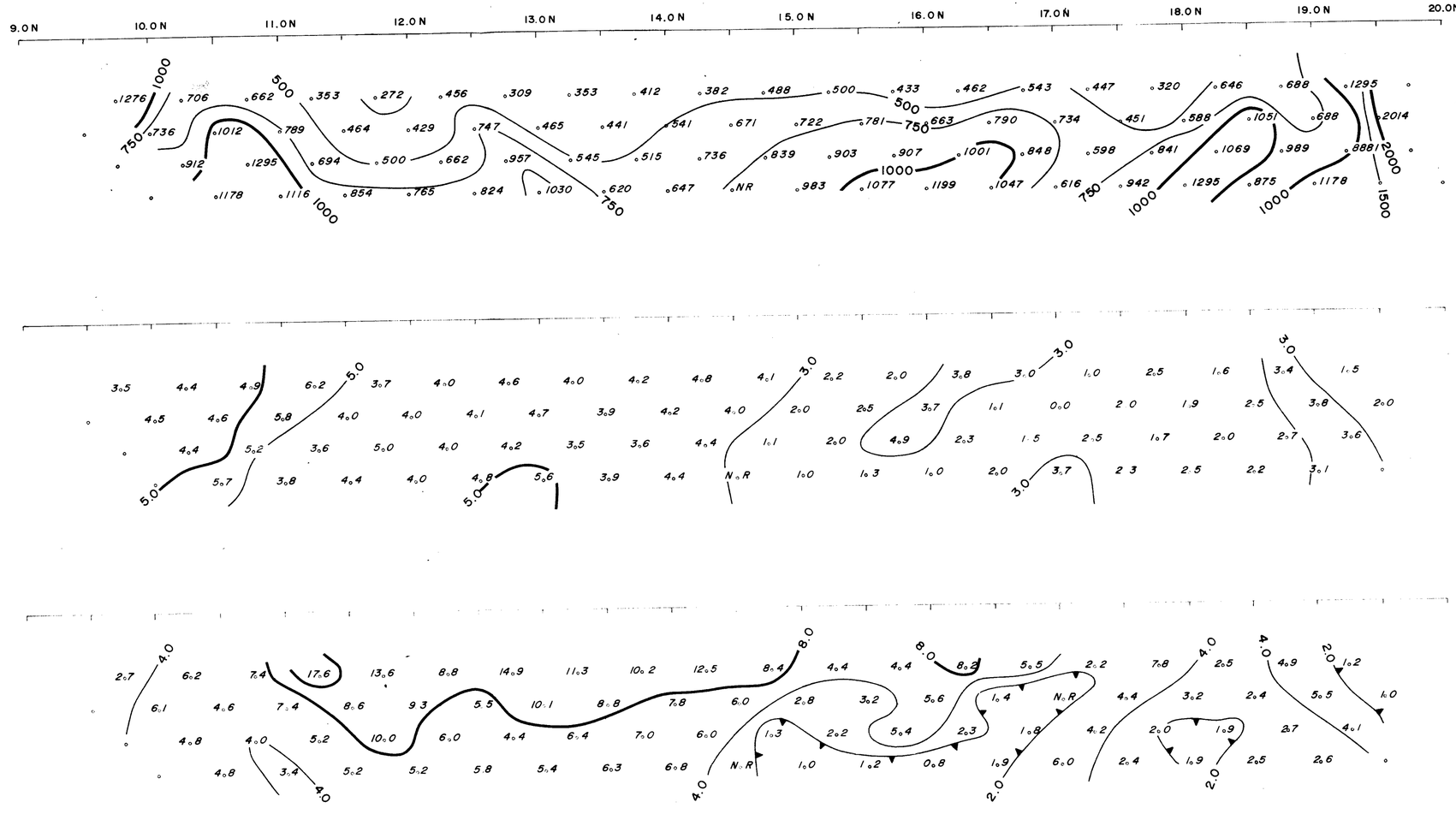
Part 2 of 2

L - 96m E

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 9645

SCALE : ONE INCH TO 50 METRES
50 25 0 50 100 150

— Prepared by —
NIELSEN GEOPHYSICS LTD.
VERNON, B.C.



NUSPAR RESOURCES LTD.
&
ESSO MINERALS CANADA
JOINT VENTURE

EAGLE CLAIMS

DIPOLE - DIPOLE ARRAY
a = 50 METRES

L - 100 m E

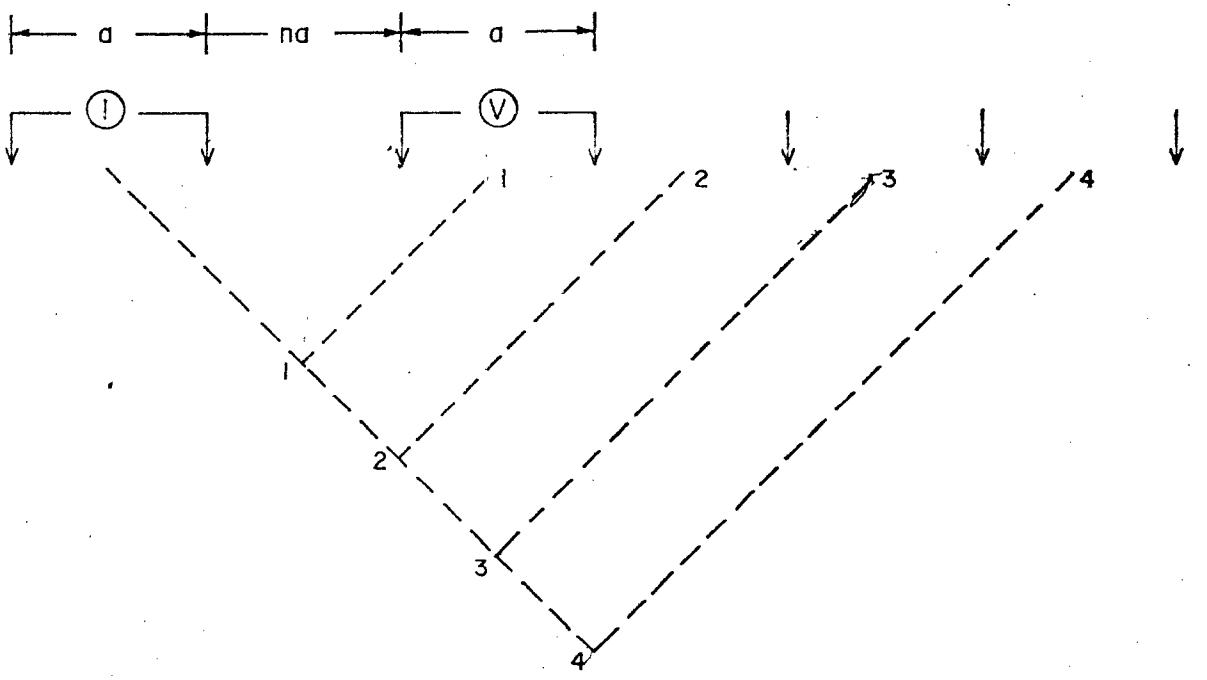
part 2 of 2

SCALE : ONE INCH TO 50 METRES

50 25 0 50 100 150

— Prepared by —
NIELSEN GEOPHYSICS LTD.
VERNON, B.C.

DIPOLE – DIPOLE ARRAY



ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE