KENNCO EXPLORATIONS, (WESTERN) LIMITED

REPORT ON INDUCED POLARIZATION

AND RESISTIVITY SURVEY

G.C., HAB & BUY M.C.'S

Liard M.D., British Columbia

57° 131°SE

By: P.G. Hallof, Ph.D.
R.A. Bell, Ph.D.

September 13/61

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REPORT ON THE INDUCED POLARIZATION
AND RESISTIVITY SURVEY
ON THE G. C. - HAB - BUY CLAIMS
LAIRD MINING DIVISION, B. C.

FOR 104G/3W, 4E

KENNCO EXPLORATIONS (WESTERN) LIMITED

BY

P. G. HALLOF, PH. D.

AND

R. A. BELL, PH. D.

DATE STARTED - JUNE 30, 1961

DATE COMPLETED - SEPTEMBER 15, 1961

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McPHAR GEOPHYSICS LIMITED

NOTES ON THE THEORY OF INDUCED POLARIZATION AND THE METHOD OF FIELD OPERATION

Induced Polarization as a geophysical measurement refers to the blocking action or polarization of metallic or electronic conductors in a medium of ionic solution conduction.

This electro-chemical phenomenon occurs wherever electrical current is passed through an area which contains metallic minerals such as base metal sulphides. Normally, when current is passed through the ground, as in resistivity measurements, all of the conduction takes place through ions present in the water content of the rock, or soil, i.e. by ionic conduction. This is because almost all minerals have a much higher specific resistivity than ground water. The group of minerals commonly described as "metallic", however, have specific resistivities much lower than ground waters. The induced polarization effect takes place at those interfaces where the mode of conduction changes from ionic in the solutions filling the interstices of the rock to electronic in the metallic minerals present in the rock.

The blocking action or induced polarization mentioned above, which depends upon the chemical energies necessary to allow the ions to give up or receive electrons from the metallic surface, increases with the time that a d.c. current is allowed to flow through the rock; i. e. as ions pile up against the metallic interface the resistance to current flow increases. Eventually, there is enough polarization in the form of excess ions at the interfaces to effectively stop all current flow through the metallic particle. This polarization takes place at each of the infinite number of solution-metal interfaces in a mineralized rock.

When the d. c. voltage used to create this d. c. current flow is cut off, the Coulomb forces between the charged ions forming the polarization cause them to return to their normal position. This movement of charge creates a small current flow which can be measured on the surface of the ground as a decaying potential difference.

From an alternate viewpoint it can be seen that if the direction of the current through the system is reversed repeatedly before the polarization occurs, the effective resistivity of the system as a whole will change as the frequency of the switching is changed. This is a consequence of the fact that the amount of current flowing through each metallic interface depends upon the length of time that current has been passing through it in one direction.

The values of the "metal factor" or "M. F. " are a measure of the amount of polarization present in the rock mass being surveyed. This parameter has been found to be very successful in mapping areas of sulphide mineralization, even those in which all other geophysical methods have been unsuccessful. The induced polarization measurement is more sensitive to sulphide content than other electrical measurements because it is much more dependent upon the sulphide content. As the sulphide content of a rock is increased, the "metal factor" of the rock increases much more rapidly than the resistivity decreases.

Because of this increased sensitivity, it is possible to locate and outline zones of less than 10% sulphides that can't be located by E. M. Methods. The method has been successful in locating the disseminated "porphyry copper" type mineralization in the South-western United States.

Measurements and experiments also indicate that it should be possible to locate most massive sulphide bodies at a greater depth with induced polarization than with E. M.

Since there is no I. P. effect from any conductor unless it is metallic, the method is useful in checking E. M. anomalies that are suspected of being due to water filled shear zones or other ionic conductors. There is also no effect from conductive overburden, which frequently confuses E. M. results. It would appear from scale model experiments and calculations that the apparent metal factors measured over a mineralized zone are larger if the material overlying the zone is of low resistivity.

Apropos of this, it should be stated that the induced polarization measurements indicate the total amount of metallic constituents in the rock. Thus all of the metallic minerals in the rock, such as pyrite, as well as the ore minerals chalcopyrite, chalcocite, galena, etc. are responsible for the induced polarization effect. Some oxides such as magnetite, pyrolusite, chromite, and some forms of hematite also conduct by electrons and are metallic. All of the metallic minerals in the rock will contribute to the induced polarization effect measured on the surface.

In the field procedure, measurements on the surface are made in a way that allows the effects of lateral changes in the properties of the ground to be separated from the effects of vertical changes in the properties. Current is applied to the ground at two points a distance (X) apart. The potentials are measured at two other points (X) feet apart, in line with the current electrodes. The distance between the nearest current and potential electrodes is an integer number (N) times the basic distance (X).

The measurements are made along a surveyed line, with a constant distance (NX) between the nearest current and potential electrodes. In most surveys, several traverses are made with various values of (N); i.e. (N) = 1, 2, 3, 4, etc. The kind of survey required (detailed or reconnaissance) decides the number of values of (N) used.

In plotting the results, the values of the apparent resistivity and the apparent metal factor measured for each set of electrode positions are plotted at the intersection of grid lines, one from the center point of the current electrodes and the other from the center point of the potential electrodes. The resistivity values are plotted above the line and the metal factor values below. The lateral displacement of a given value is determined by the location along the survey line of the center point between the current and potential electrodes. The distance of the value from the line is determined by the distance (NX) between the current and potential electrodes when the measurement was made.

The separation between sender and receiver electrodes is only one factor which determines the depth to which the ground is being sampled in any particular measurement. These plots then, when contoured, are not section maps of the electrical properties of the ground under the survey line. The interpretation of the results from any given survey must be carried out using the combined experience gained from field, model and theoretical investigations. The position of the electrodes when anomalous values are measured must be used in the interpretation.

In the field procedure, the interval over which the potential differences are measured is the same as the interval over which the electrodes are moved after a series of potential readings has been made. One of the advantages of the induced polarization method is that the same equipment can be used for both detailed and reconnaissance surveys merely by changing the distance (X) over which the electrodes are moved each time. In the past, intervals have been used ranging from 100 feet to 1000 feet for (X). In each case, the decision as to the distance (X) and the values of (N) is largely determined by the expected size of the mineral deposit being sought, the size of the expected anomaly and the speed with which it is desired to progress.

McPHAR GEOPHYSICS LIMITED

REPORT ON THE
INDUCED POLARIZATION & RESISTIVITY SURVEY
ON THE G.C. - HAB - BUY CLAIMS
LAIRD MINING DIVISION, B.C.
FOR
KENNCO EXPLORATIONS (WESTERN) LIMITED

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1. INTRODUCTION

At the request of Mr. Hal Fleming, geophysicist for the company, an induced polarization and resistivity survey has been carried out on part of the Galore Creek Claim Group on behalf of Kennco Explorations (Western) Limited. The property is about 54 miles southwest of Telegraph Creek in the Laird Mining Division of B.C. The latitude and longitude co-ordinates of the S.E. Corner of the quadrilateral are 57° - 131°.

Previous geologic examination of the property has revealed widely scattered chalcopyrite occurrences in the limited outcrop visible. The induced polarization survey was planned to cover the property in an attempt to outline zones of more concentrated metallic mineralization. Because of the very rugged terrain, the survey was limited to parts of the G.C., Hab, and Buy Claims. The measurements were made during July, August, and September of 1961.

2. PRESENTATION OF RESULTS

The induced polarization and resistivity results from the survey on the Galore Creek Claim Group are shown on the following data plots in the accompanying booklet. The results are plotted in the manner described in the notes preceding this report.

Line K	d. c. and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-1
Line 288 + 90N	d. c. and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-2
Line 281 + 60N	d. c. and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-3
Line 272N	d. c. and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-4
Line B	.31 and 5. 0 cps	300' Spreads	Dwg. I. P. 2835-5
Line C	.31 and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-6
Line A	.31 and 5. 0 cps	300' Spreads	Dwg. I. P. 2835-7
Line D	.31 and 5. 0 cps	300' Spreads	Dwg. I. P. 2835-8
Line G	.31 and 5. 0 cps	300' Spreads	Dwg. I. P. 2835-9
Line F	.31 and 5. 0 cps	300' Spreads	Dwg. I. P. 2835-10
Line E	.31 and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-11
Line H	.31 and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-12
Line H	d. c. and 5. 0 cps	200' Spreads	Dwg. I. P. 2835-13
Line 216N	.31 and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-14
Line 216N	d. c. and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-15
Line 208N	.31 and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-16
Line 200N	.31 and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-17
Line 200N	d. c. and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-18
Line 192N	.31 and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-19
Line 184N	.31 and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-20
Line 176N	.31 and 5. 0 cps	400' Spreads	Dwg. I. P. 2835-21

Line 168N	d.c. and 5.0 cps	400' Spreads	Dwg. I.P. 2835-22
Line 160N	.31 and 5.0 cps	400' Spreads	Dwg. I.P. 2835-23

Enclosed with this report is Dwg. Misc. 4665, a plan map of the Galore Creek Area. The definite and possible induced polarization anomalies are indicated by solid and broken bars respectively on this plan map as well as the data plots. These bars represent the surface projection of the anomalous zones as interpreted from the location of the transmitter and receiver electrodes when the anomalous values were measured.

Since the induced polarization measurement is essentially an averaging process, as are all potential methods, it is frequently difficult to exactly pinpoint the source of an anomaly. Certainly, no anomaly can be located with more accuracy than the spread length; i.e. when using 400' spreads the position of a narrow sulphide body can only be determined to lie between two stations 400' apart. In order to locate sources at some depth, larger spreads must be used, with a corresponding increase in the uncertainties of location. Therefore, while the center of the indicated anomaly probably corresponds fairly well with source, the length of the indicated anomaly along the line should not be taken to represent the exact edges of the anomalous material.

3. DISCUSSION OF RESULTS

The results will be discussed line by line, starting with the northernmost line. The order in which the lines are discussed is not necessarily the chronological order in which they were done, and is certainly not the order of importance.

The grid is somewhat irregular, since in many places it was necessary to place the lines in a spot compatible with the topography rather than on a grid. Some of the lines are shorter than would otherwise be desirable, for the same reason. Frequently, an increase in the measured IP effect has been found at the end of a line. If the anomaly has been left incomplete, it is because the rugged topography made it impractical to extend the line farther.

Line K

This line is short (3200') and not much data is presented. However, there is a small increase in the IP effects measured near the center of the line. The source seems to be located at 12E to 16E.

Line 288 + 90N

The increased IP effects on the east end of this line are even smaller than those measured on Line K. However, as in all of the results here, even these small magnitude anomalies have been indicated since they could be of importance. The line would have to be extended to completely evaluate the anomaly.

Line 281 + 60N

This line is longer than the two to the north, and more data has been taken. There is a low magnitude, but definite anomaly at 154E on this line. The magnitude and shape of the anomalous pattern suggests a narrow source with a true IP effect much greater than the apparent values measured using 400' spreads. The source seems to be narrow, shallow, and near vertical, so the line should be surveyed with shorter spreads to better locate and evaluate the zone.

Line 272N

The resistivity level on this line is relatively high, as it has been on all the lines to the north. However, at the western end of the line, the resistivity values decrease sharply. In addition, there is a large increase in the IP effects for these same readings. The line was terminated because of the topography. However, because of the apparent importance of this anomaly, this line should be extended at some future time. Even a few measurements west of station 146E would be of great use in evaluating the anomaly.

Line B

The resistivities decrease on the western end of this line also. The IP effects increase, but neither change is as great as on Line 272N. However, the small increase on Line B could represent the edge of a larger anomaly to the west. Therefore, this line should be extended to the west also, if it is at all possible.

Line C

The weak anomaly found on the western end of the lines farther north is centered at 28W on Line C. The source seems to be at least 400' wide, and the apparent IP effects are only slightly above background. In addition, there is a narrow, stronger anomaly at 16W. The source of this anomaly seems to be tabular, and dipping, since the pattern is asymmetric. The best estimation for the dip would be to the west.

Since this source appears to be narrow, and shallow, the line should be repeated using shorter electrode separations to better evaluate the anomaly. This anomaly is of particular importance, because it was measured using .31 and 5.0 cps. The lines to the north were surveyed using d.c. and 5.0 cps, and from similar mineralization, the effects using this larger frequency difference would be expected to be two to three times larger.

<u>Line A</u>

There are two weak anomalies on this line. However, they correlate with the two anomalous zones located to the north and therefore have been marked. The eastern anomaly is shallow, but the western anomaly was located with the larger electrode separations, indicating that the source is at some depth.

<u>Line D</u>

This line did not extend far enough west to pick up both zones, but a weak anomaly was located at 6W to 9W that correlates with the eastern zone. The anomaly is not complete, and the line should be extended to the east to complete the pattern.

<u>Line G</u>

There are no large anomalous effects measured on this line, except that the IP values increased on the eastern end of the line. The resistivities on this line, and on Line D, are very uniform and the level is somewhat lower than farther to the north.

Line F

These results are very similar to those on Line G, with an increase in the measured IP effects at the eastern end of the line.

Line E

A large magnitude anomaly was located on Line E, centered at 16W to 20W. The western edge of the anomaly is very sharp, while the eastern edge is less distinct. Since the source is shallow, the maximum values were measured for the first separation. The line should be re-surveyed with shorter electrode separations. With shorter spreads, the zone will be better located and the position, attitude, etc. of the source can be better predicted.

Line H

The results from this line, when 400' spreads were used, were very similar to those on Line E. The anomaly was re-checked using 200' spreads, and the anomaly was still more definite. The source appears to be more than 200' wide, and to still be shallow. In addition, there is some indication of another source at depth to the west.

Line 216N

This line is quite long, because the topography permitted the extension of the line to the east. Several anomalous zones were located by the survey. The most definite anomalies are located at 200E, and at 288E to 292E. The anomalies to the east are considerably outside of the zone covered by the rest of the survey, and therefore suggest new areas of interest.

The anomaly at 200E correlates with a much weaker anomaly to the south on Line 208N. The pattern on Line 216N suggests a narrow, near vertical zone with some depth to the top.

Line 208N

This line is short, and the IP effects increase at both ends of the line. Therefore, it would be necessary to extend the line in both directions to completely evaluate the importance of the anomalies.

Line 200N

This was the first of several long lines that crossed the area of interest just north of the glacier. There are several areas where weak anomalies are higher than background. The most important is probably that at 180E to 184E, and it should be checked with shorter spreads. This zone gave the expected two to three fold increase in the measured IP effect, when the frequencies used were changed from .31 and 5.0 cps to d.c. and 5.0 cps.

Line 192N

The results along this line are uniformly low, except for a slight increase in the IP effects at the ends of the lines.

Line 184N

The IP effects measured on this line are much larger in magnitude than those on Line 192N. There are strong shallow anomalies centered at 152E to 156E and at 228E. The zone at 152E to 156E seems to be more than 400' wide, while that at 228E seems to be narrower. Both of the zones should be checked using shorter spreads.

In addition, there are several other zones of larger than background IP effects that should be investigated further.

Line 176N

The definite IP anomalies on Line 184N are also present on this line. The western zone seems to be broad, while those to the east are narrower. The line should be extended to the east to complete the anomaly at the end of the line.

Line 168N

On this line, there were some measurements in the middle of the line that could not be made due to the glacier. However, definite anomalies were obtained on both sides of the glacier. These correlate with the zones that have been traced on the lines to the north.

The most interesting anomaly is at 156E to 160E. There is a large magnitude anomaly there, that appears to have a shallow source. This zone should be checked using shorter spreads.

Line 160N

Some measurements could not be made in the center of this line due to the glacier; however, there is an anomaly at depth to the east, and definitely anomalous values near the east edge of the glacier.

4. CONCLUSIONS AND RECOMMENDATIONS

When the anomalies discussed above on the various lines are plotted on the plan map, Misc. 4665, it can be seen that they correlate well. The continuous length of the zones is unusual, since the scale is 1" = 1000 feet. At places, the IP anomaly correlates with known outcrops of copper bearing mineralization. The first drilling on the anomaly at 152E to 156E on Line 184N shows a considerable amount of copper bearing mineralization as the source of that anomaly. Therefore, it must be assumed that all of the zones are of great interest.

The anomalous zones themselves are of varying character, with some of the anomalies strong and definite and others weak and uncertain. The areas of most interest, in terms of the strength of the IP anomalies, have been listed below.

a) Line 184N, 152E to 156E and Line 176N, 160E to 164E.

b) Line 184N, 208E; Line 176N, 204E; and Line 168N, 156E to 160E.

c) Line 184N, 228E.

d) Line E, 16W to 20W and Line H, 16W to 20W.

e) Line C, 16W.

f) Line 272N, 146E.

In these areas, additional induced polarization work would be necessary in order to completely evaluate the anomalies. Many of the zones appear to be shallow using 400' spreads, so shorter spreads are indicated. Also, a line spacing of 800' is too much for drilling, so that intermediate lines would be desirable in the areas of maximum interest. Finally, an attempt should be made to extend those lines that show an anomaly at the end. Even a few additional measurements would be of use in determining the importance of these anomalies.

McPHAR GEOPHYSICS LIMITED

Philip G. Hallof,
Geophysicist.

Robert A. Bell,
Geologist.

Dated : September 13, 1961.

ASSESSMENT DETAILS

SPONSOR: Kennco Explorations (Western) Limited

MINING DIVISION: Laird

PROVINCE: British Columbia

LOCATION: Galore Creek Area

TYPE OF SURVEY: Induced Polarization

OPERATING MAN DAYS: 47-1/2

EQUIVALENT 8 HR. MAN DAYS: 61-1/4

CONSULTING MAN DAYS: 7.0

DRAUGHTING MAN DAYS: 8-1/2

TOTAL MAN DAYS: 76-3/4

DATE STARTED: June 30, 1961

DATE FINISHED: September 15, 1961

NUMBER OF STATIONS OCCUPIED: 307

NUMBER OF OBSERVATIONS MADE: 1,408

MILES OF LINE SURVEYED: 22.74

CONSULTANTS:
P. G. Hallof, 5 Minorca Place, Don Mills, Ontario
R. A. Bell, 12 Cottonwood Drive, Don Mills, Ontario

FIELD TECHNICIANS:
J. Peaver, Bancroft, Ontario
R. Fernholme, 467 Vaughan Road, Toronto, Ontario

DRAUGHTSMEN:
F. R. Peer, 38 Torrens Avenue, Toronto 6, Ontario
R. MacKenzie, 55 Shannon Drive, Scarborough, Ontario

McPHAR GEOPHYSICS LIMITED

Philip G. Hallof

Philip G. Hallof,
Geophysicist.

Dated : September 13, 1961.

SUMMARY OF COSTS

FIELD CREW - (2 men)

Time

47-1/2 days Operating	@ $170.00/day	$ 8,075.00
29-1/2 days Travel and Bad Weather	@ $ 50.00/day	1,475.00

Expenses

Airfare - 2/3 Total Round Trip - 2 men	$392.00	
Air Express Charge - Equipment	227.99	
Meals & Accommodation (including travel expenses)	128.20	
Telephone and Telegraph	46.48	794.67
		$10,344.67

McPHAR GEOPHYSICS LIMITED

Philip G. Hallof,
Geophysicist.

Dated : September 13, 1961.

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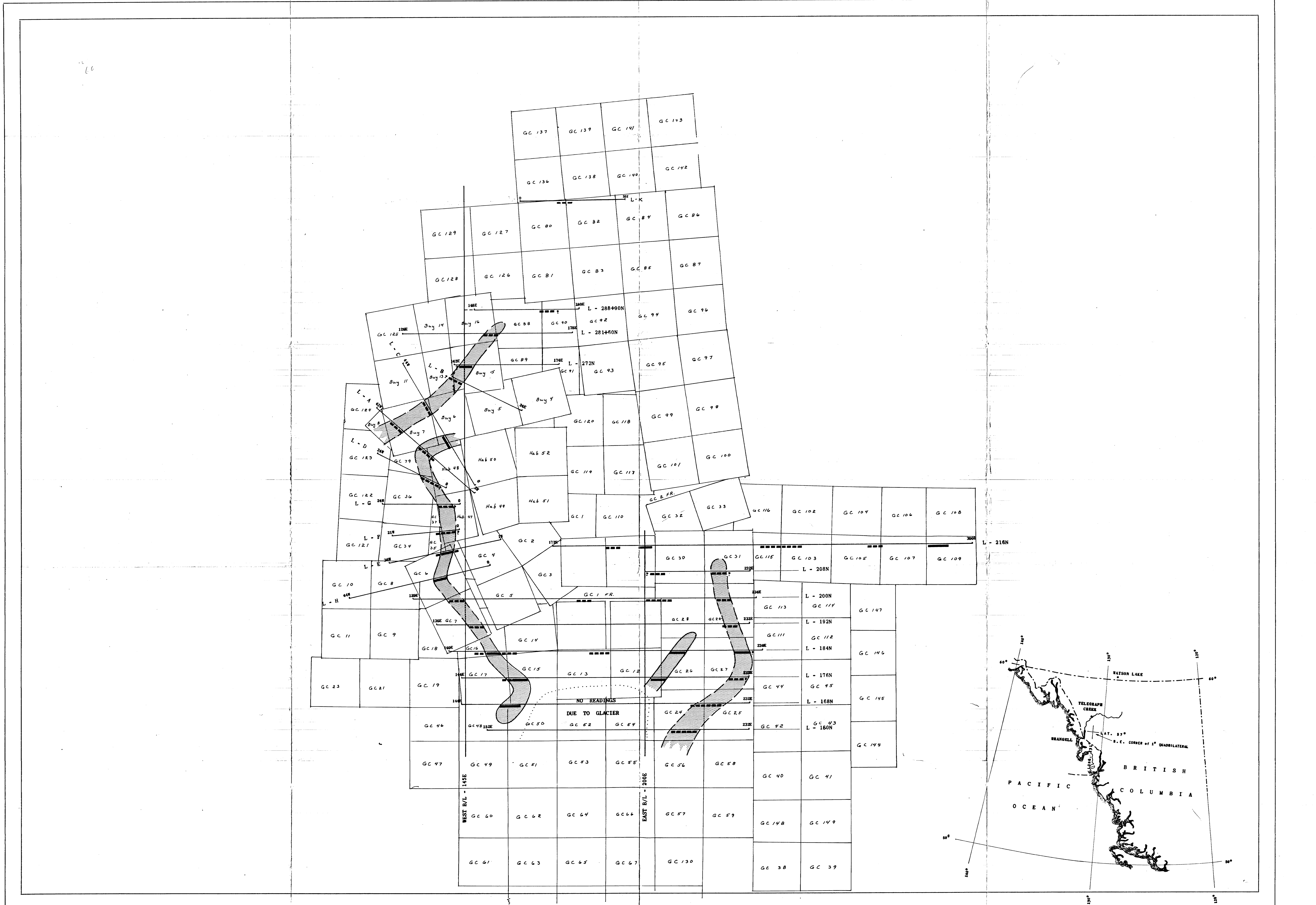
INDUCED POLARIZATION AND RESISTIVITY SURVEY
LOCATION MAP



KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

SCALE

One Inch – One Thousand Feet

DRAWN F.S.P.
DATE SEPT. 1961
APPROVED
DATE 9/13/61

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DWG. MISC. 4665

KENNCO EXPLORATIONS, (WESTERN) LIMITED

REPORT ON INDUCED POLARIZATION AND

RESISTIVITY DATA PLOTS

G.C., HAB & BUY M.C.'S

Liard M.D., British Columbia

57° 131°SE

By: P.G. Hallof, Ph.D. September 13/61

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1 of 2

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INDUCED POLARIZATION AND
RESISTIVITY DATA PLOTS
ON THE G.C. - HAB - BUY CLAIMS
LAIRD MINING DIVISION, B.C.
FOR

KENNCO EXPLORATIONS (WESTERN) LIMITED

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104G/3W, 4E

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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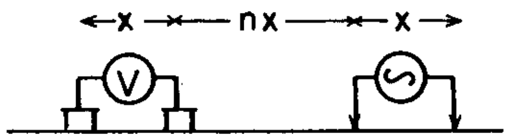
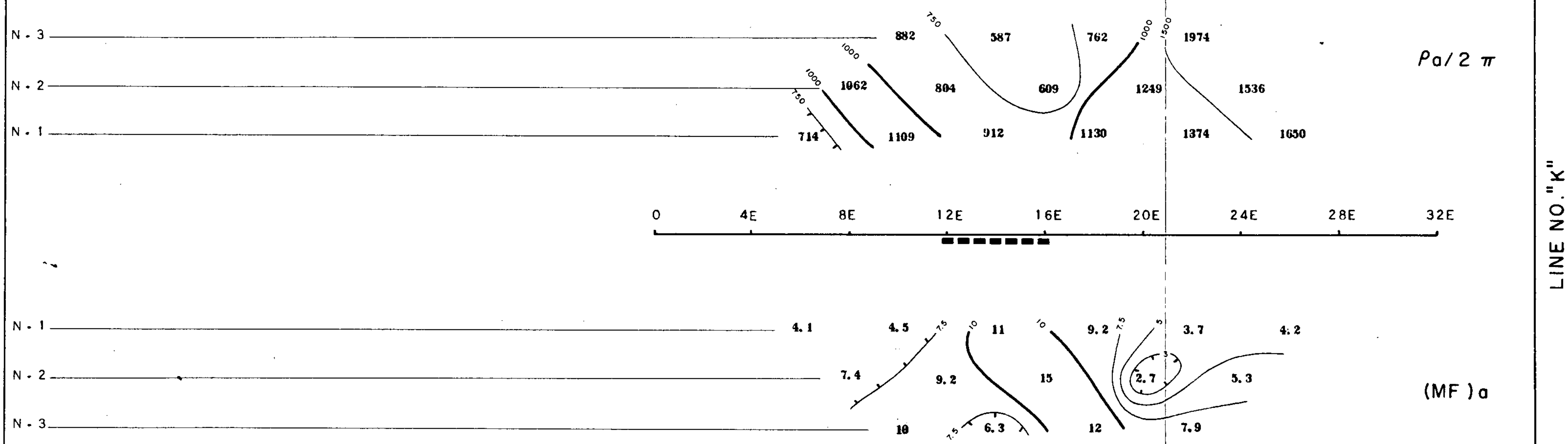


ELECTRODE CONFIGURATION

X = 400



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GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 400 Feet

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY D.C.-5 CPS

DATE SURVEYED JULY 1961

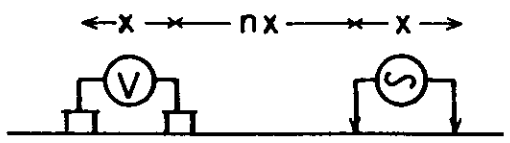
APPROVED PH

DATE 9/13/61

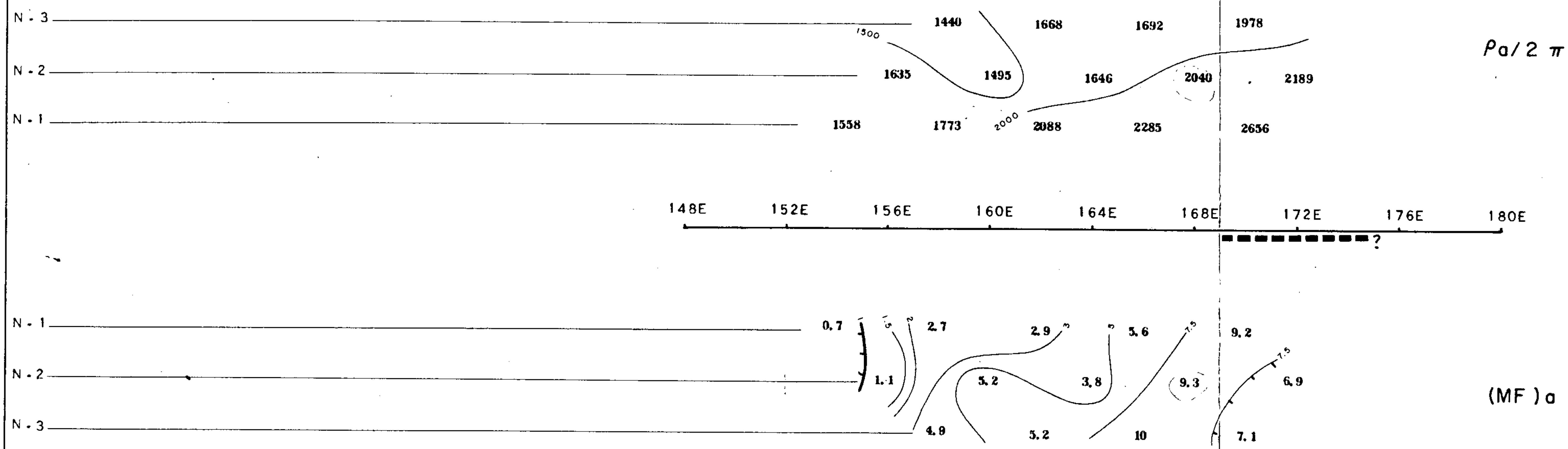
DWG. NO.-I.P.-2835-2

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



LINE NO. 288+90N



KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale - One inch = 400 Feet

ANOMALOUS ZONE ▬▬▬

POSSIBLE ANOMALOUS ZONE ▬ ▬ ▬

NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY D.C.–5 CPS

DATE SURVEYED JULY 1961

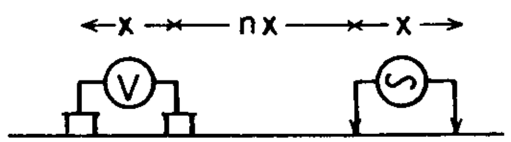
APPROVED PH

DATE 9/13/61

DWG. NO.-I.P.-2835-3

McPHAR GEOPHYSICS LIMITED

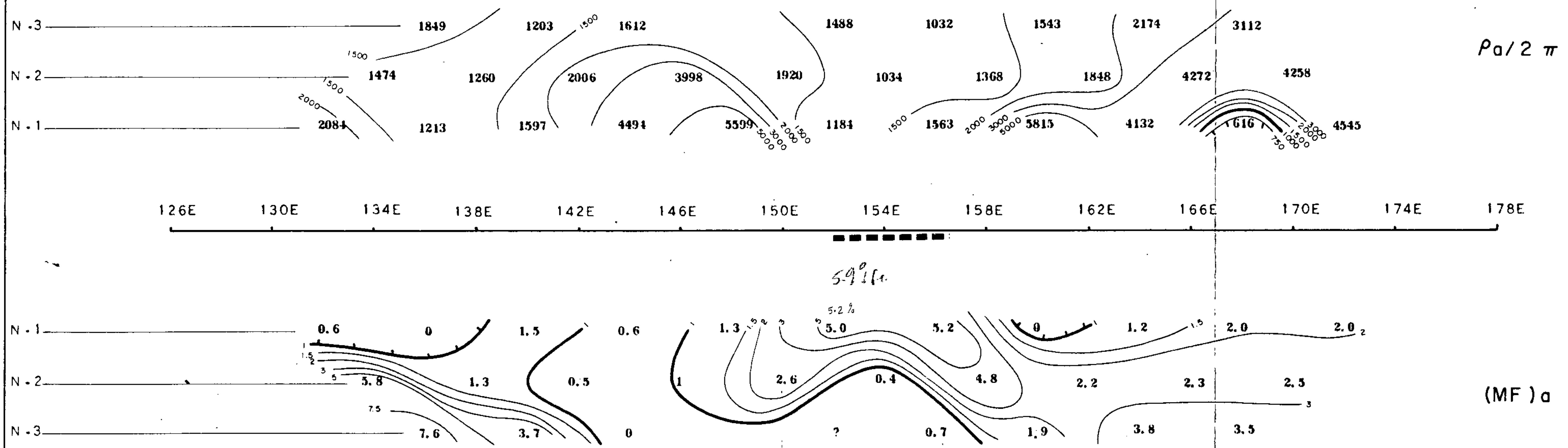
INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X · 400

LINE NO. 281 + 60 N



KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch=400 Feet

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY D.C.-5 CPS

DATE SURVEYED JULY 1961

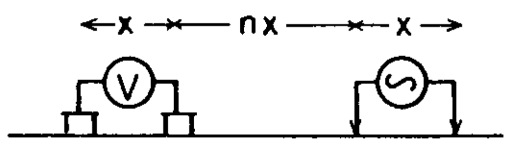
APPROVED P.H.

DATE 9/13/61

DWG. NO.-I.P.-2835-4

McPHAR GEOPHYSICS LIMITED

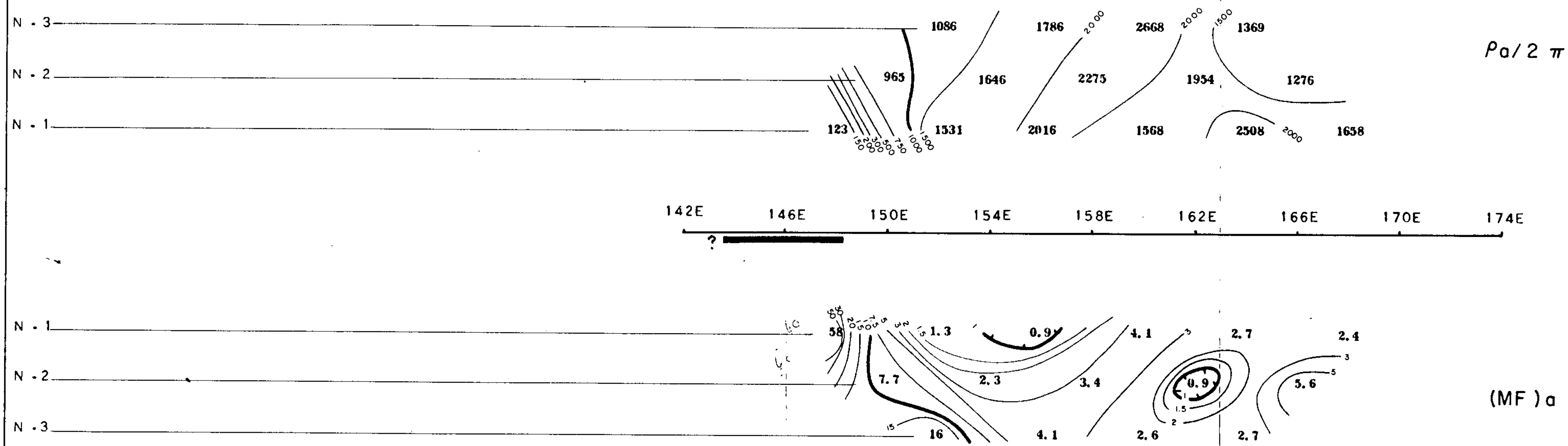
INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X = 400

LINE NO. 272 N



KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 400 Feet

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY D.C.-5 CPS

DATE SURVEYED JULY 1961

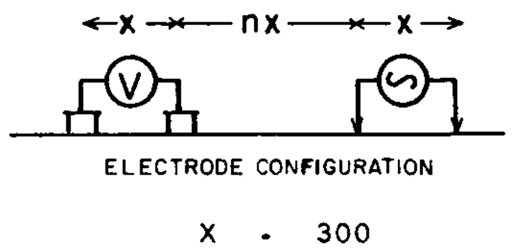
APPROVED [signature]

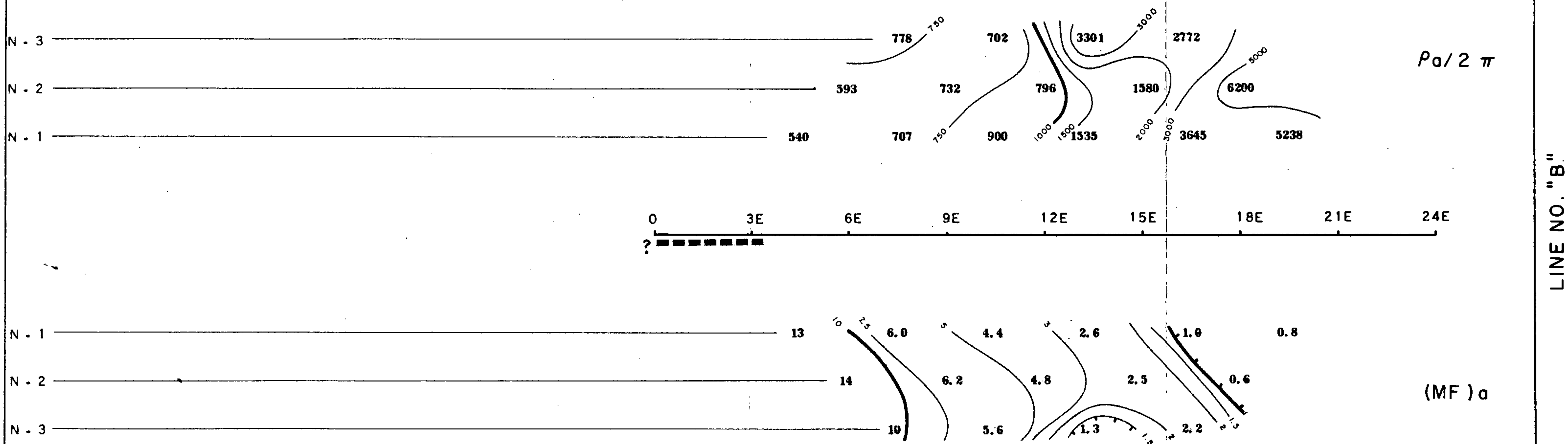
DATE 9/13/61

DWG. NO.-I.P.-2835-5

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY





FREQUENCY 25-5 CPS

DATE SURVEYED JULY 1961

APPROVED [signature]

DATE 9/13/61

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale – One inch = 300 Feet

ANOMALOUS ZONE ▬▬▬

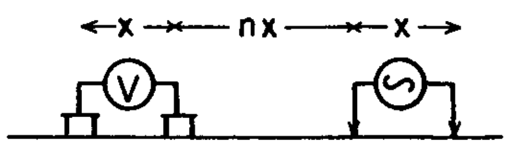
POSSIBLE ANOMALOUS ZONE ▬ ▬ ▬

NOTE
LOGARITHMIC CONTOUR INTERVAL

DWG. NO.-I. P.-2835-6

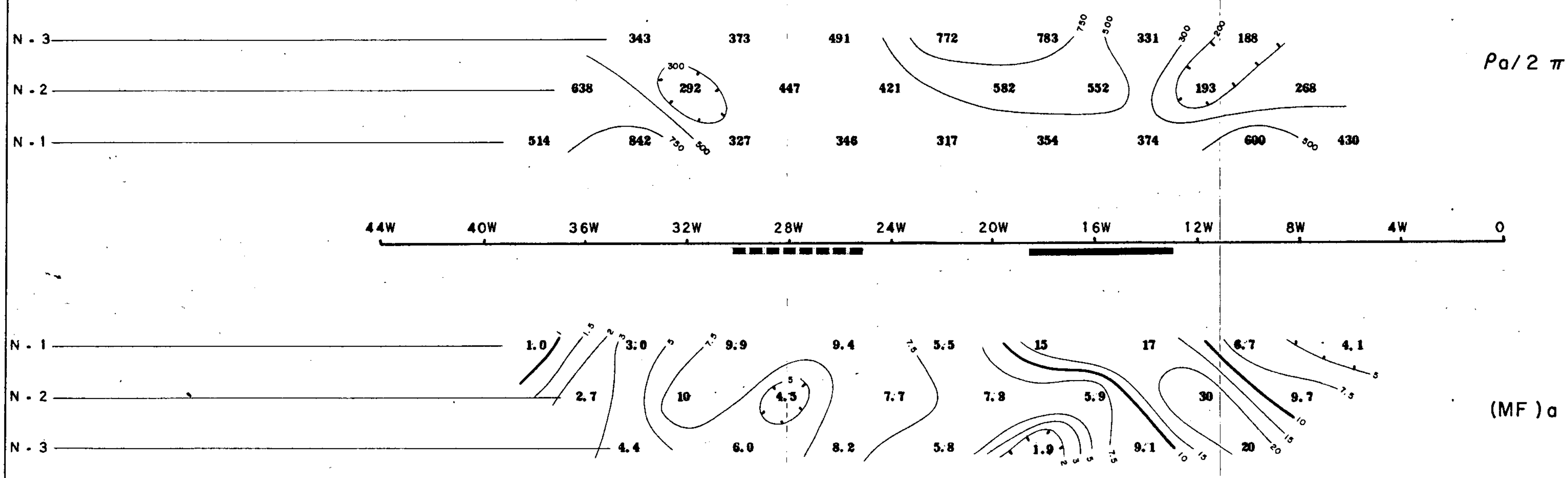
McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X = 400



LINE NO. "C"

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 400 Feet

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE

LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 2.5–.5 CPS

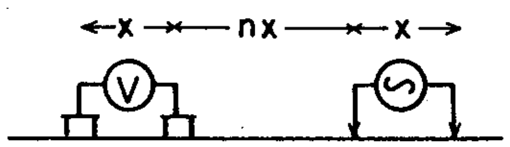
DATE SURVEYED JULY 1961

APPROVED P.H.

DATE 9/13/61

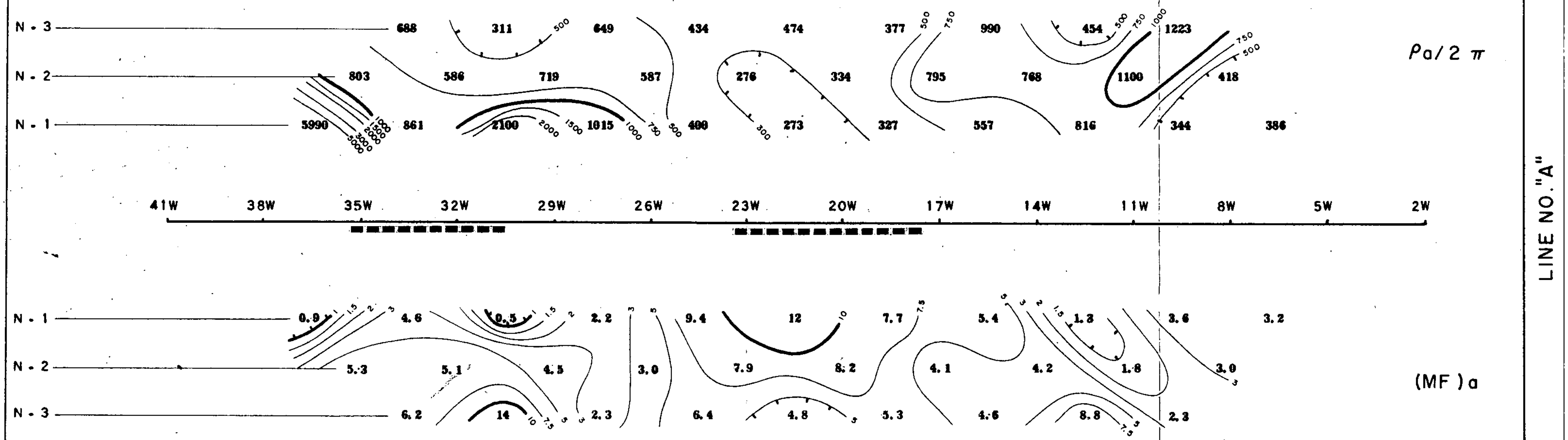
McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X = 300



FREQUENCY 25-5 CPS

DATE SURVEYED JULY 1961

APPROVED [signature]

DATE 9/13/61

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale - One inch = 300 Feet

ANOMALOUS ZONE ▬▬▬

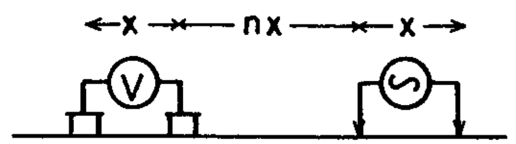
POSSIBLE ANOMALOUS ZONE ▬ ▬ ▬

NOTE
LOGARITHMIC CONTOUR INTERVAL

DWG. NO.–I.P.–2835–8

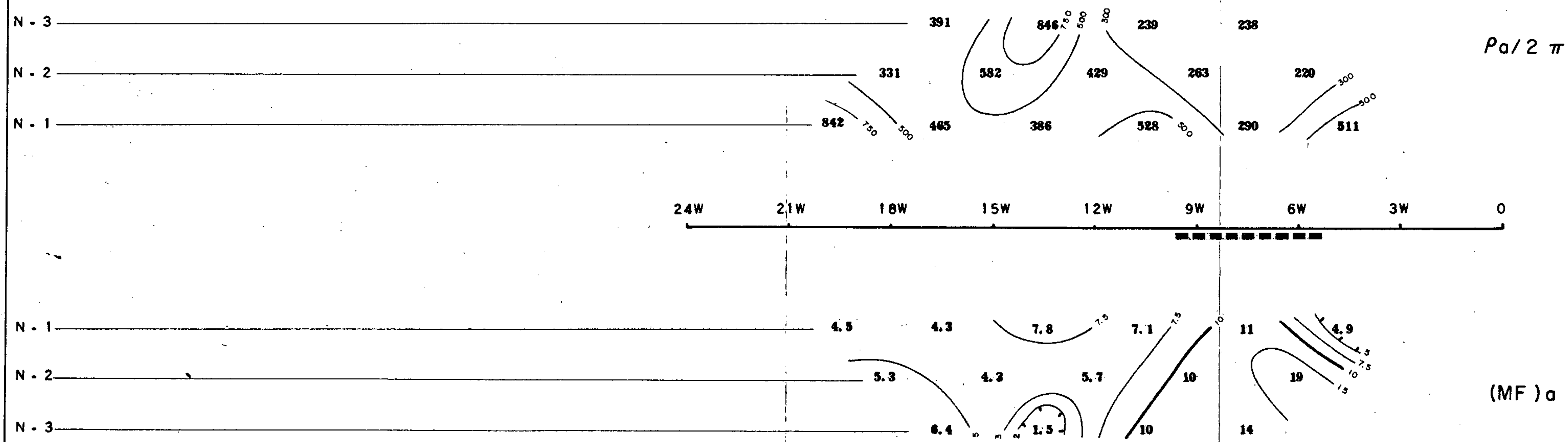
McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X = 300



LINE NO. "D"

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale – One inch = 300 Feet

ANOMALOUS ZONE ▬▬▬▬

POSSIBLE ANOMALOUS ZONE ▬ ▬ ▬

NOTE

LOGARITHMIC CONTOUR INTERVAL

FREQUENCY .25–5 CPS

DATE SURVEYED JULY 1961

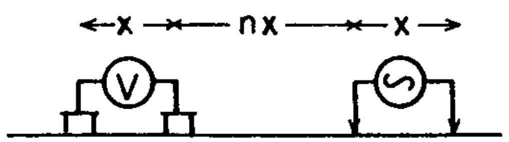
APPROVED PH

DATE 9/13/61

DWG. NO.-I.P.-2835-9

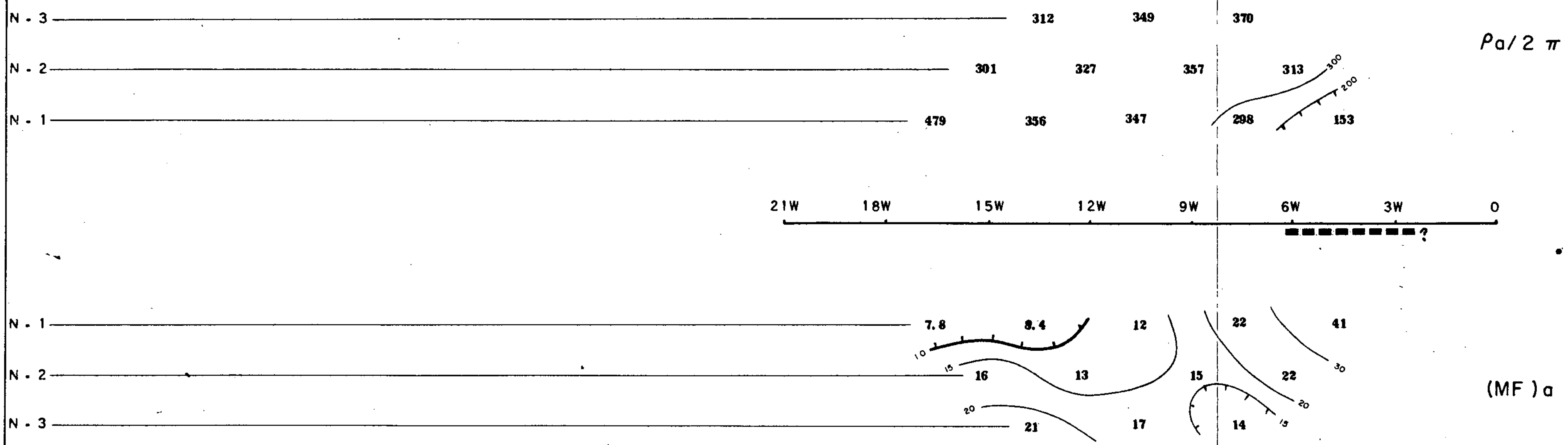
McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X = 300



LINE NO. "G"

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 300 Feet

ANOMALOUS ZONE ▬▬▬

POSSIBLE ANOMALOUS ZONE ▬ ▬ ▬

NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 2.5–5 CPS

DATE SURVEYED JULY 1961

APPROVED PH

DATE 9/13/61

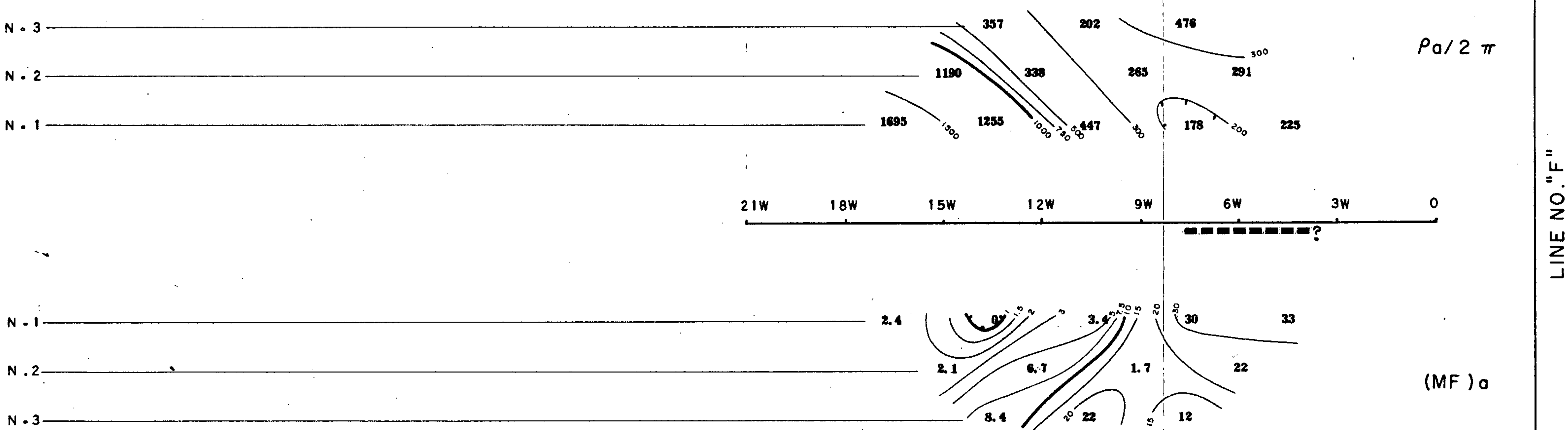
DWG. NO.-I.P.-2835-10

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY

ELECTRODE CONFIGURATION

X = 300



FREQUENCY 25-5 CPS

DATE SURVEYED JULY 1961

APPROVED PH

DATE 9/13/61

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 300 Feet

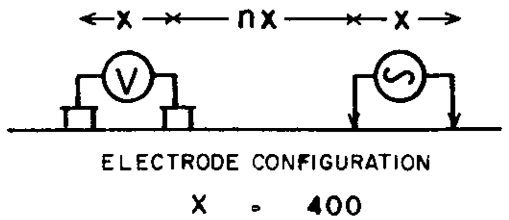
ANOMALOUS ZONE

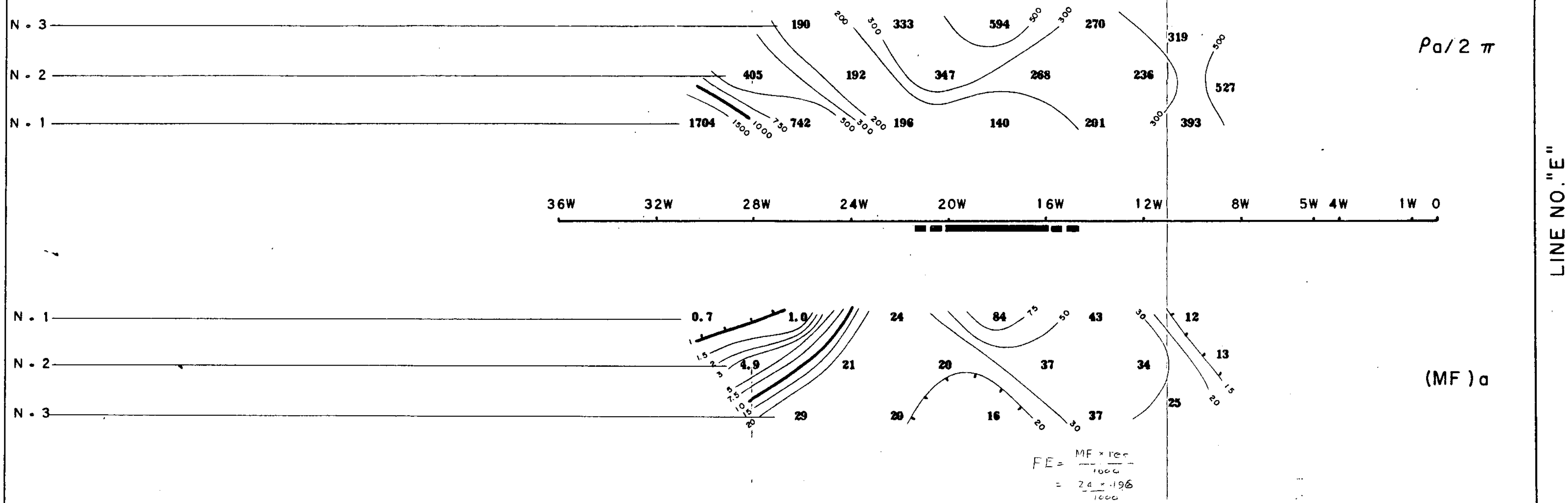
POSSIBLE ANOMALOUS ZONE

NOTE
LOGARITHMIC CONTOUR INTERVAL

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY





KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch=400 Feet

ANOMALOUS ZONE
POSSIBLE ANOMALOUS ZONE
NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 25–5 CPS

DATE SURVEYED JULY 1961

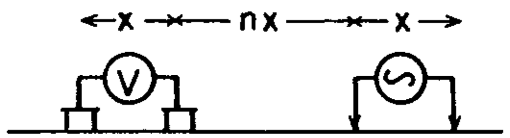
APPROVED PH

DATE 9/13/61

DWG. NO.-I. P.-2835-12

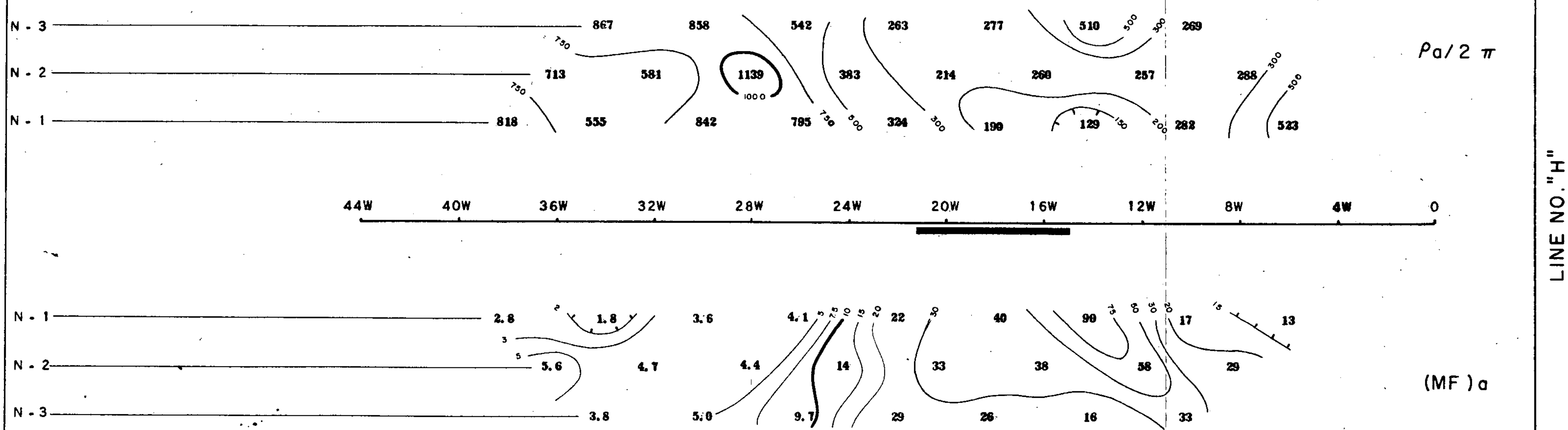
McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X = 400



KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale— One inch = 400 Feet

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE
LOGARITHMIC CONTOUR INTERVAL

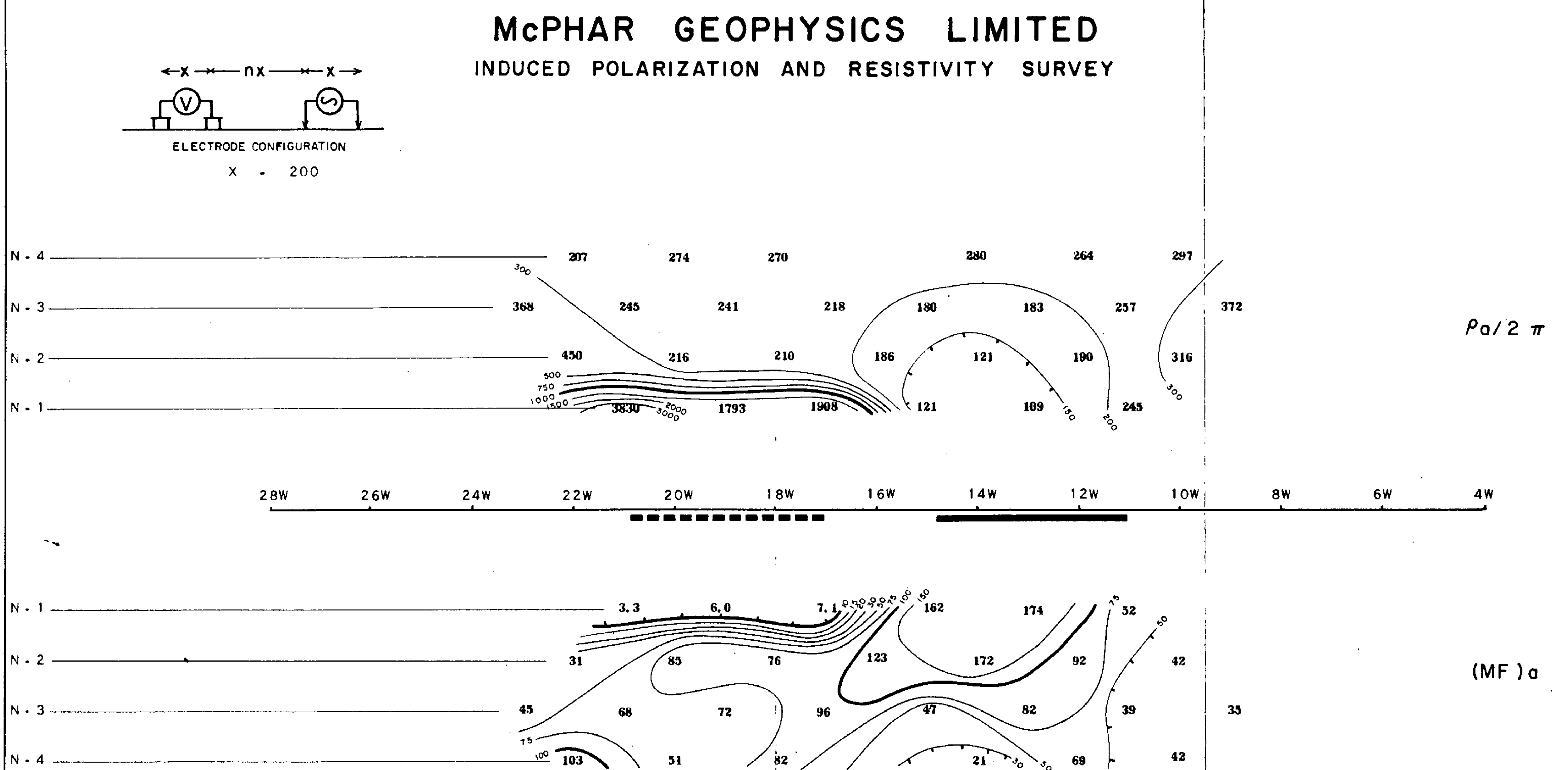
FREQUENCY 2.5–5 CPS

DATE SURVEYED JULY 1961

APPROVED PH

DATE 9/13/61

DWG. NO.-I.P.-2835-13



KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 200 Feet

ANOMALOUS ZONE
POSSIBLE ANOMALOUS ZONE
NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY D.C.-5 CPS
DATE SURVEYED JULY 1961
APPROVED
DATE 9/13/61

DWG. NO.-I.P.-2835-14

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY

ELECTRODE CONFIGURATION

X = 400

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 400 Feet

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 2.5-.5 CPS

DATE SURVEYED JULY 1961

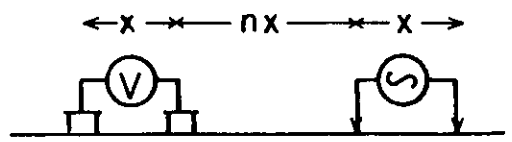
APPROVED [signature]

DATE 9/13/61

DWG. NO.-I.P.-2835-15

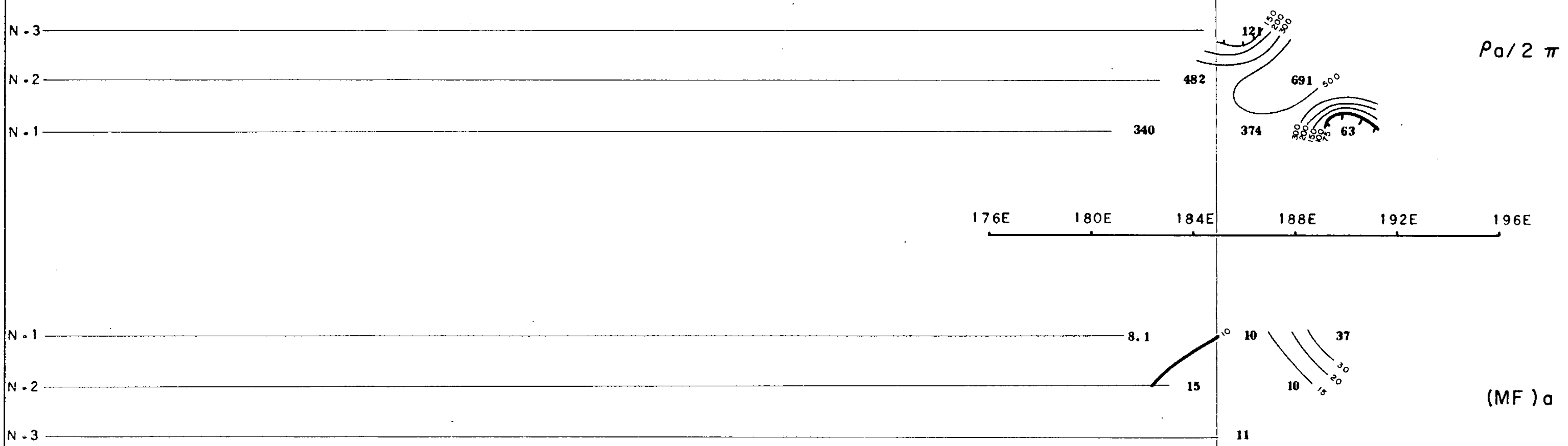
McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X = 400



LINE NO. 216 N

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 400 Feet

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY D.C.-5 CPS

DATE SURVEYED JULY 1961

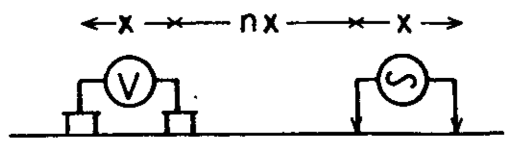
APPROVED PH

DATE 9/13/61

DWG. NO.-I.P.-2835-16

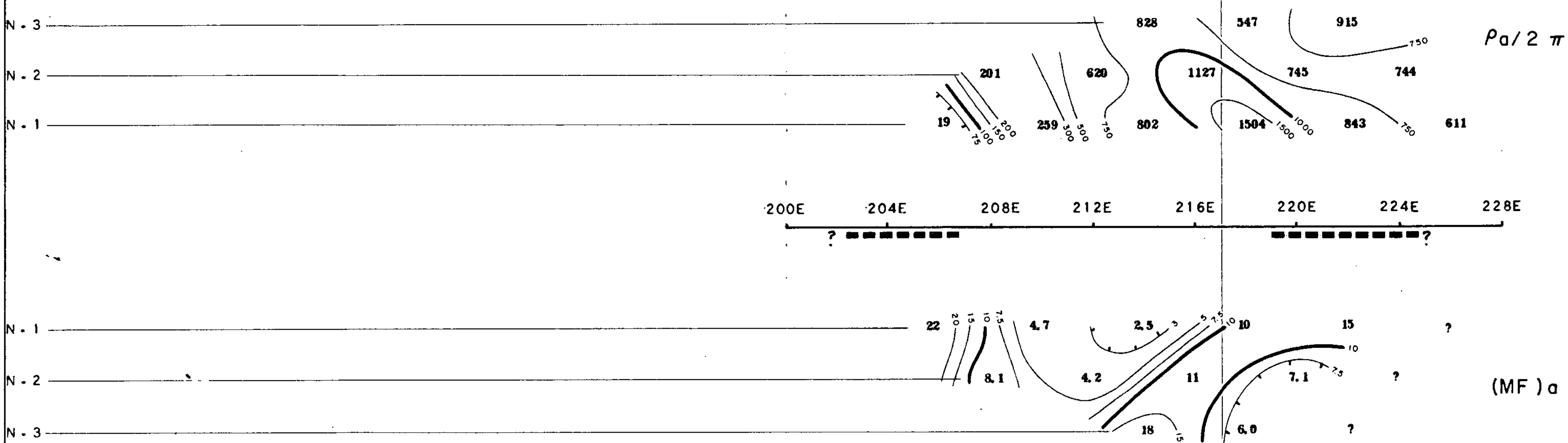
McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X = 400



LINE NO. 208 N

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 400 Feet

ANOMALOUS ZONE ▬▬▬

POSSIBLE ANOMALOUS ZONE ▬ ▬ ▬

NOTE

LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 2.5–.5 CPS

DATE SURVEYED JULY 1961

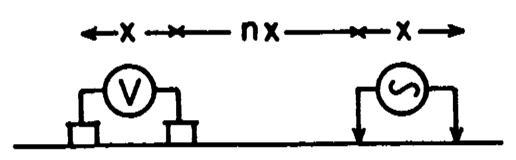
APPROVED PH

DATE 9/13/61

DWG. NO.-I.P.-2835-17

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION
X - 400

M2

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale— One inch = 400 Feet

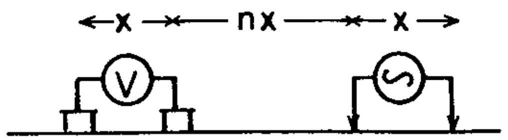
ANOMALOUS ZONE ———
POSSIBLE ANOMALOUS ZONE – – –
NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY .25-5 CPS
DATE SURVEYED JULY 1961
APPROVED PH
DATE 9/13/61

DWG. NO.-I.P.-2835-18

McPHAR GEOPHYSICS LIMITED

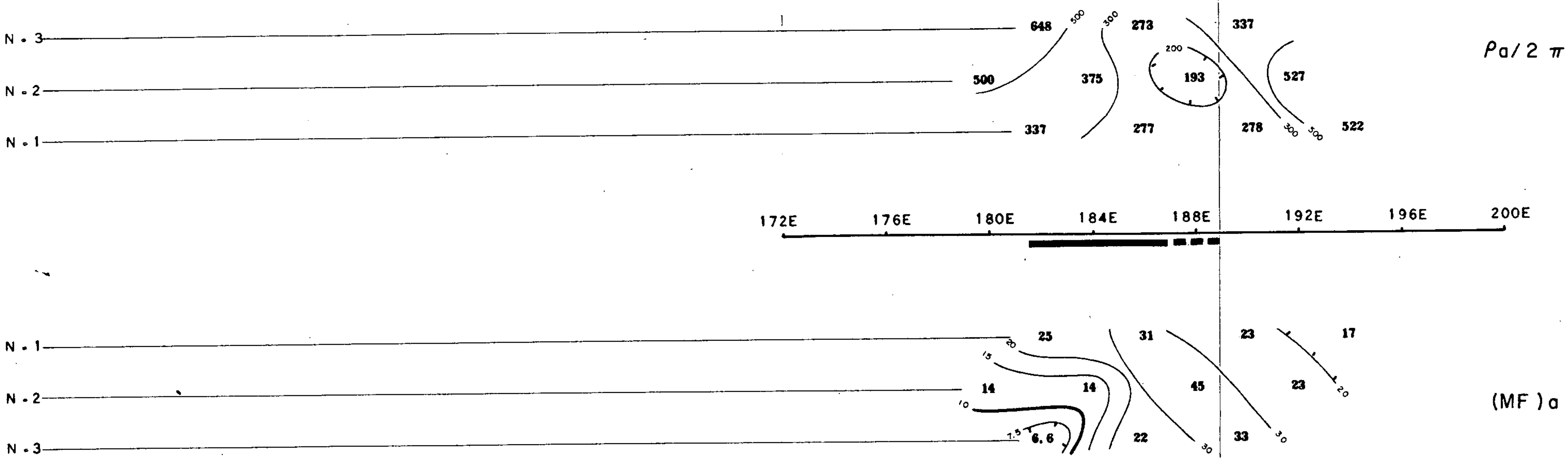
INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X = 400

LINE NO. 200 N



FREQUENCY DC-5 CPS

DATE SURVEYED JULY 1961

APPROVED [signature]

DATE 9/13/61

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 400 Feet

ANOMALOUS ZONE ▬▬▬

POSSIBLE ANOMALOUS ZONE ▬ ▬ ▬

NOTE
LOGARITHMIC CONTOUR INTERVAL

DWG. NO.-I.P.-2835-19

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY

ELECTRODE CONFIGURATION

X = 400

LINE NO. 192N

M3

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 400 Feet

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 2.5-.5 CPS

DATE SURVEYED JULY 1961

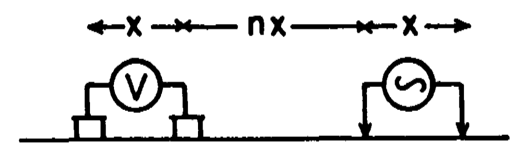
APPROVED

DATE 9/13/61

DWG. NO.-I.P.-2835-20
McPHAR GEOPHYSICS LIMITED
INDUCED POLARIZATION AND RESISTIVITY SURVEY
ELECTRODE CONFIGURATION
X = 400
N = 3
N = 2
N = 1
Pa/2 π
(MF) a
LINE NO. 184 N
KENNCO EXPLORATIONS (WESTERN) LIMITED
GALORE CREEK—LAIRD MINING DIVISION, B.C.
Scale—One inch=400 Feet
ANOMALOUS ZONE
POSSIBLE ANOMALOUS ZONE
NOTE LOGARITHMIC CONTOUR INTERVAL
FREQUENCY 25-5 CPS
DATE SURVEYED JULY 1961
APPROVED
DATE 9/13/61

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X = 400

LINE NO. 176N

M5

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale—One inch = 400 Feet

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 2.5-.5 CPS

DATE SURVEYED JULY 1961

APPROVED PH

DATE 9/13/61

DWG. NO.-I.P-2835-22

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale— One inch = 400 Feet

ANOMALOUS ZONE
POSSIBLE ANOMALOUS ZONE
NOTE
LOGARITHMIC CONTOUR INTERVAL

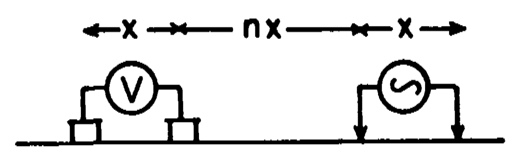
FREQUENCY D.C.-5 CPS
DATE SURVEYED JULY 1961
APPROVED
DATE 9/13/61

DWG. NO.-I.P.-2835-23

371

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X - 400

LINE NO. 160N

M7

KENNCO EXPLORATIONS (WESTERN) LIMITED

GALORE CREEK—LAIRD MINING DIVISION, B.C.

Scale- One inch = 400 Feet

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE
LOGARITHMIC CONTOUR INTERVAL

FREQUENCY .25-5 CPS

DATE SURVEYED JULY 1961

APPROVED PH

DATE 9/13/61