REPORT ON THE
INDUCED POLARIZATION
AND RESISTIVITY SURVEY
ON THE
NORTH FARRELL GRID
TULLAH AREA, TASMANIA
FOR
ELECTROLYTIC ZINC COMPANY
OF AUSTRALASIA LIMITED

(EL11/62)

174002

McPHAR GEOPHYSICS

NOTES ON THE THEORY, METHOD OF FIELD OPERATION, AND PRESENTATION OF DATA FOR THE INDUCED POLARIZATION METHOD

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 appreciably reduce the amount of 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 per cent frequency effect or F. E. are a measurement of the polarization in the rock mass. However, since the measurement of the degree of polarization is related to the apparent resistivity of the rock mass it is found that the metal factor values or M. F. are the most useful values in determining the amount of polarization present in the rock mass. The MF values are obtained by normalizing the F. E. values for varying resistivities.

The induced polarization measurement is perhaps the most powerful geophysical method for the direct detection of metallic sulphide mineralization, even when this mineralization is of very low concentration. The lower limit of volume per cent sulphide necessary to produce a recognizable IP anomaly will vary with the geometry and geologic environment of the source, and the method of executing the survey. However, sulphide mineralization of less than one per cent by volume has been detected by the IP method under proper geological conditions.

The greatest application of the IP method has been in the search for disseminated metallic sulphides of less than 20% by volume. However, it has also been used successfully in the search for massive sulphides in situations where, due to source geometry, depth of source, or low resistivity of surface layer, the EM method can not be successfully applied. The ability to differentiate ionic conductors, such as water filled shear zones, makes the IP method a useful tool in checking EM anomalies which are suspected of being due to these causes.

In normal field applications the IP method does not differentiate between the economically important metallic minerals such as chalcopyrite, chalcocite, molybdenite, galena, etc., and the other metallic minerals such as pyrite. The induced polarization effect is due to the total of all electronic conducting minerals in the rock mass. Other electronic conducting materials which can produce an IP response are magnetite, pyrolusite, graphite, and some forms of hematite.

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 in distance (X) apart. The potentials are measured at two other points (X) feet apart, in line with the current 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, apparent per cent frequency effect, 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. (See Figure A.) The resistivity values are plotted above the line as a mirror image of the metal factor values below. On a second line, below the metal factor values, are plotted the values of the per cent frequency effect. In some cases the values of per cent frequency effect are plotted as superscripts of the metal factor value. In this second case the frequency effect values are not contoured. 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. The 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 results, model study results and theoretical investigations. The position of the electrodes when anomalous values are measured is important 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 25 feet to 2000 feet for (X). In each case, the decision as to the distance (X) and the values of (n) to be used 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.

The diagram in Figure A demonstrates the method used in plotting the results. Each value of the apparent resistivity, apparent metal factor, and apparent per cent frequency effect is plotted and identified by the position of the four electrodes when the measurement was made. It can be seen that the values measured for the larger values of (n) are plotted farther from the line indicating that the thickness of the layer of the earth that is being tested is greater than for the smaller values of (n); i. e. the depth of the measurement is increased. When the F. E. values are plotted as superscripts to the MF values the third section of data values is not presented and the F. E. values are not contoured.

The actual data plots included with the report are prepared utilizing an IBM 360/75 Computer and a Calcomp 770/763 Incremental Plotting System. The data values are calculated, plotted, and contoured according to a programme developed by McPhar Geophysics. Certain symbols have been incorporated into the programme to explain various situations in recording the data in the field.

The IP measurement is basically obtained by measuring the difference in potential or voltage (ΔV) obtained at two operating frequencies. The voltage is the product of the current through the ground and the apparent resistivity of the ground. Therefore in field situations where the current is very low due to poor electrode contact, or the apparent resistivity is very low, or a combination of the two effects; the value of (ΔV) the change in potential will be too small to be measurable. The symbol "TL" on the data plots indicates this situation.

In some situations spurious noise, either man made or natural, will render it impossible to obtain a reading. The symbol "N" on the data plots indicates a station at which it is too noisey to record a reading. If a reading can be obtained, but for reasons of noise there is some doubt as to its accuracy, the reading is bracketed in the data plot ( ).

In certain situations negative values of Apparent Frequency Effect are recorded. This may be due to the geologic environment or spurious electrical effects. The actual negative frequency effect value recorded is indicated on the data plot, however the symbol "NEG" is indicated for the corresponding value of Apparent Metal Factor. In contouring negative values the contour lines are indicated to the nearest positive value in the immediate vicinity of the negative value.

The symbol "NR" indicates that for some reason the operator did not attempt to record a reading although normal survey procedures would suggest that one was required. This may be due to inaccessible topography or other similar reasons. Any symbol other than those discussed above is unique to a particular situation and is described within the body of the report.

METHOD USED IN PLOTTING DIPOLE-DIPOLE INDUCED POLARIZATION AND RESISTIVITY RESULTS

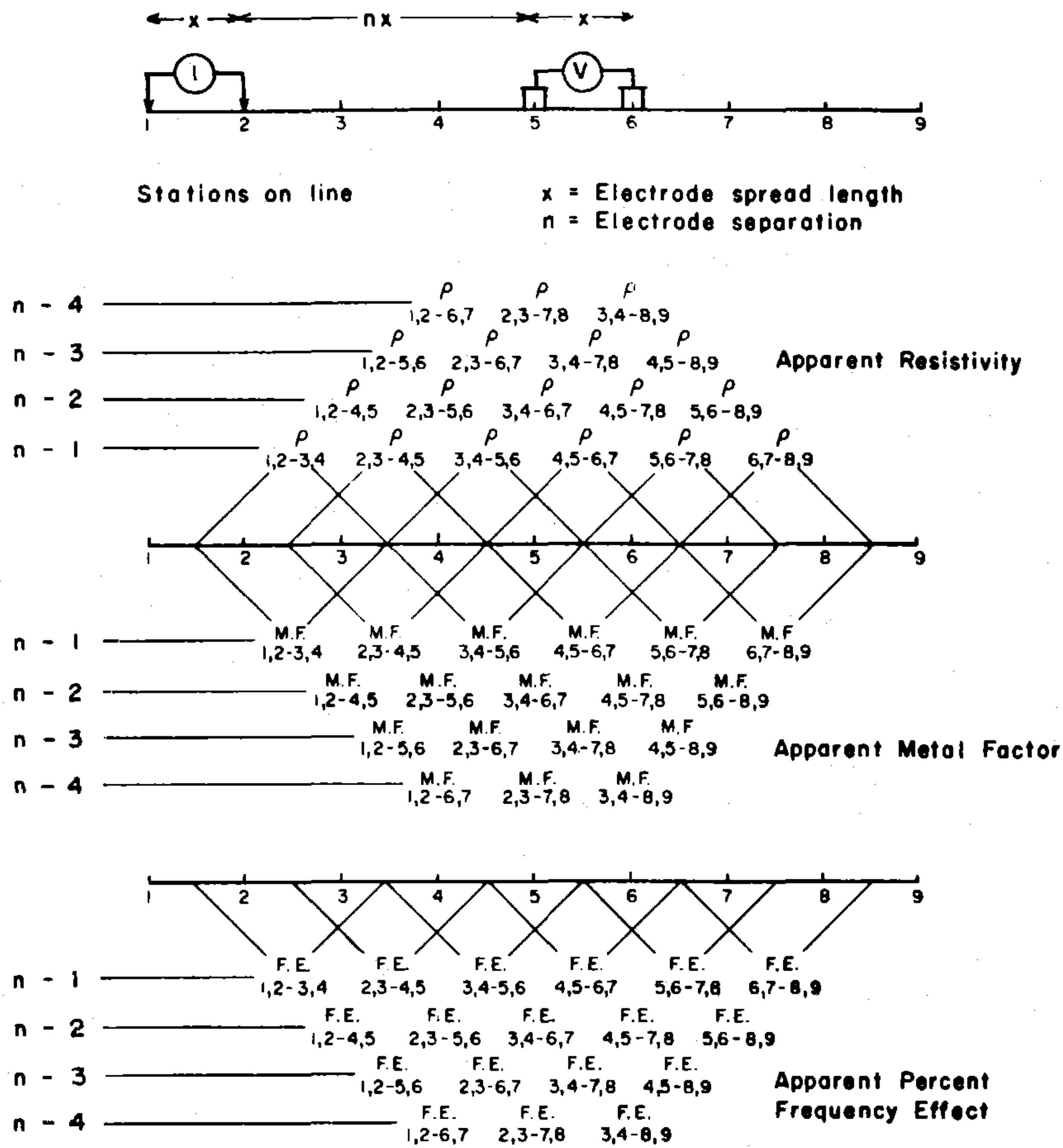

Fig. A

McPHAR GEOPHYSICS

REPORT ON THE INDUCED POLARIZATION AND RESISTIVITY SURVEY ON THE NORTH FARRELL GRID TULLAH AREA, TASMANIA FOR ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

1. INTRODUCTION

At the request of Electrolytic Zinc Company of Australasia Limited we have completed a brief induced polarization and resistivity survey in the Tullah Area, Tasmania. The four lines surveyed cross the Farrell Shear north of the North Farrell Shaft.

At the old Farrell Mine, the massive galena ore occurred as pods and veins along the Farrell Shear. The ore had widths of six inches to six feet, with ore shoots having strike lengths of 500 feet. The host rocks were black slates, containing disseminated pyrite.

Previously a self-potential survey and a Turan electromagnetic survey had been completed on the grid north of the North Farrell Shaft. Anomalies were located by both types of surveys, and several holes have been drilled in the area.

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2. PRESENTATION OF RESULTS

The induced polarization and resistivity results are shown on the following enclosed data plots. The results are plotted in the manner described in the notes preceding this report.

Line	Electrode Intervals	Dwg. No.
123N	100 feet	IP 5466-1
121N	100 feet	IP 5466-2
119N	100 feet	IP 5466-3
117N	100 feet	IP 5466-4

Also enclosed with this report is Dwg. I.P.P. 2854, a plan map of the North Farrell Grid at a scale of 1" = 200'. 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 100' spreads the position of a narrow sulphide body can only be determined to lie between two stations 100' 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 centre 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.

The topographic information shown on Dwg. I.P.P. 2854, and the geophysical information, have been taken from maps supplied by the staff of Electrolytic Zinc Company of Australasia Limited.

3. DISCUSSION OF RESULTS

The known mineralization at the Farrell Mine was massive; however, the zones were very narrow. As explained in the Appendix to this report, only weak apparent IP effects can be expected if relatively large electrode intervals are used in the survey. This would be the case, even using 100' electrode intervals, on the North Farrell Grid.

As explained in the Appendix, the narrow source can be better located, and evaluated, using shorter electrode intervals. However, if there is considerable overburden, or a well developed weathered layer, the depth to the top of the source will determine the minimum electrode interval that can be used.

The presence of disseminated pyrite in the black slate country rocks in the Tullah Area will definitely complicate the interpretation of the data. The true IP effects from this weak metallic mineralization will be less than the true IP effects from the massive ore. However, the widths of the pyritic slate bands will be greater than the widths of the ore zones; the apparent IP effects measured using 100' electrode intervals may be greater for the pyritic slate bands. (See Appendix).

Line 123N

This survey on this line gives a broad anomaly that extends from

107+50E to 111+50E. The edges of the anomaly are relatively weak and could be due to pyrite in the slates. There is a stronger, narrow, anomaly centred at 109+00E to 109+50E. This could be due to a narrow source of more concentrated metallic mineralization. It would have to be checked using shorter electrode intervals. (See Appendix).

Line 121N

Some of the IP measurements on this line were not reliable, due to noise. There is a shallow, narrow source at 108+00E to 109+00E that could be checked using 50' electrode intervals. It could be due to a very narrow zone of massive sulphide mineralization rather than to a wider zone of pyritic slate.

Line 119N

On this line, the IP anomaly centred at 108+50E correlates with those located on the lines to the north. The IP anomaly here is considerably weaker than to the north. The weak IP effects extend for a considerable distance to the east. There is an increase in the IP effects at depth, at about 113+00E to 114+00E.

These effects could represent an increase in the concentration of sulphide mineralization at depth in this area. The measurements should be extended to the east to complete the anomalous pattern.

Line 117N

The anomaly correlating with the main anomalous zone is centred at 107+00E to 108+00E. This is the weakest anomaly of those measured.

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This would indicate that the concentration of mineralization in Zone A is increasing to the north.

There is a second anomaly at depth, to the east, on this line also. The source is centred, at considerable depth, at 110+00E to 111+00E. This anomaly has been correlated with the less definite anomaly on Line 119N, to form Zone B.

Since the n = 3 and n = 4 measurements are anomalous, the source is at considerable depth, perhaps as much as 200' to the top. In order to better evaluate the source, the measurements would have to be repeated using X = 150' and X = 200'. If the patterns are not definite, the measurements should be repeated with the electrode sites shifted one-half interval.

4. CONCLUSIONS AND RECOMMENDATIONS

IP anomalies were measured on each of the four lines surveyed on the North Farrell Grid. As shown on the plan map (Dwg. I.P.P. 2854) the anomalies can be correlated into zones. Zone A correlates with the S.P. and E.M. anomalies previously located. It seems to be the northern extension of the Farrell Shear.

D.D.H. T.P.133 and D.D.H. T.P.134 seem to have adequately tested Zone A. The two holes did not intersect sulphide mineralization, but they did intersect the lode shear. The holes did intersect black slates, with pyrite. If the core from these holes is available, laboratory measurements would indicate the magnitude of the IP effects in the slate.

If a narrow zone, six inches to six feet, of massive sulphide mineralization is present within Zone A, measurements with very short electrode intervals could perhaps separate the anomalies from the two sources. There is no evidence of depth in the 100' spread data. The holes already drilled may have missed a narrow zone of sulphide mineralisation that is present; however, it would have to have a limited strike length.

Zone B, at depth to the east, is much less definite than Zone A. If mineralization in this position could be of possible interest, further work would be warranted so that a drill test can be planned.

McPHAR GEOPHYSICS PTY. LTD.

P. G. HALLOF
REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

Philip G. Hallof,
Geophysicist.

E. Burnside,
Geophysicist.

Dated: June 26, 1970

APPENDIX

THE INTERPRETATION OF INDUCED POLARIZATION ANOMALIES FROM RELATIVELY SMALL SOURCES

The induced polarization method was originally developed to detect disseminated sulphides and has proven to be very successful in the search for "porphyry copper" deposits. In recent years we have found that the IP method can also be very useful in exploring for more concentrated deposits of limited size. This type of source gives sharp IP anomalies that are often difficult to interpret.

The anomalous patterns that develop on the contoured data plots will depend on the size, depth and position of the source and the relative size of the electrode interval. The data plots are not sections showing the electrical parameters of the ground. When the electrode interval (X) is appreciably greater than the width of the source, a large volume of unmineralized rock is averaged into each measurement. This is particularly true for the large values of the electrode separation (n).

The theoretical scale model results shown in Figure 1 and Figure 2 indicate the effect of depth. If the depth to the top of the source is small compared to the electrode interval (i. e. d X) the measurement for n = 1 will be anomalous. In Figure 1 the depth is 0. 5 units (X = 1. 0 units) and the n = 1 value is definitely anomalous; the pattern on the contoured data plot is typical for a relatively shallow, narrow, near-vertical tabular source. The results in Figure 2 are for the same source with the depth increased to 1. 5 units. Here the n = 1 value is not anomalous; the larger values of (n) are anomalous but the magnitudes are much lower than for the source at less depth.

When the electrode interval is greater than the width of the source, it is not possible to determine its width or exact position between the electrodes. The true IP effect within the source is also indeterminate; the anomaly from a very narrow source with a very large true IP effect will be much the same as that from a zone with twice the width and 1/2 the true IP effect. The theoretical scale model data shown in Figure 3 and Figure 4 demonstrate this problem. The depth and position of the source are unchanged but the width and true IP effect are varied. The anomalous patterns and magnitudes are essentially the same, hence the data are insufficient to evaluate the source completely.

The normal practise is to indicate the IP anomalies by solid, broken, or dashed bars, depending upon their degree of distinctiveness. 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. As illustrated in Figure 1, Figure 2, Figure 3 and Figure 4, no anomaly can be located with more accuracy than the spread length. While the centre of the solid bar indicating the anomaly corresponds fairly well with the source, the length of the bar should not be taken to represent the exact edges of the anomalous material.

If the source is shallow, the anomaly can be better evaluated using a shorter electrode interval. When the electrode interval used approaches the width of the source, the apparent effects measured will be nearly equal to the true effects within the source. When there is some depth to the top of the source, it is not possible to use electrode intervals that are much less than the depth to the source. In this situation, one must realize that a definite ambiguity exists regarding the width of the source and the IP effect within the source.

Our experience has confirmed the desirability of doing detail. When a reconnaissance IP survey using a relatively large electrode interval indicates the presence of a narrow, shallow source, detail with shorter electrode intervals is necessary in order to better locate, and evaluate, the source. The data of most usefulness is obtained when the maximum apparent IP effect is measured for n = 2 or n = 3. For instance, an anomaly originally located using X = 300' may be checked with X = 200' and then X = 100'. The data with X = 100' will be quite different from the original reconnaissance results with X = 300'.

The data shown in Figure 5 and Figure 6 are field results from a greenstone area in Quebec. The expected sources were narrow (less than 30' in width) zones of massive, high-grade, zinc-silver ore. An electrode interval of 200' was used for the reconnaissance survey in order to keep the rate of progress at an acceptable level. The anomalies located were low in magnitude.

The very weak, shallow anomaly shown in Figure 5 is typical of those located by the X = 200' reconnaissance survey. Several anomalies of this type were detailed using shorter electrode intervals. In most cases the detail measurements suggested broad zones of very weak mineralization. However, in the case of the source at 20N to 22N, the measurements with shorter electrode intervals confirmed the presence of a strong, narrow source. The X = 50' results are shown in Figure 6. Subsequent drilling has shown the source to be 12.5' of massive sulphide mineralization containing significant zinc and silver values.

The change in the anomaly that results when the electrode interval is reduced is not unusual. The X = 50' data more accurately locates the narrow source, and permits the geophysicist to make a better evaluation of its importance. The completion of this type of detail is very important, in order to get the maximum usefulness from a reconnaissance IP survey.

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Theoretical Induced Polarization and Resistivity Studies

Scale Model Cases

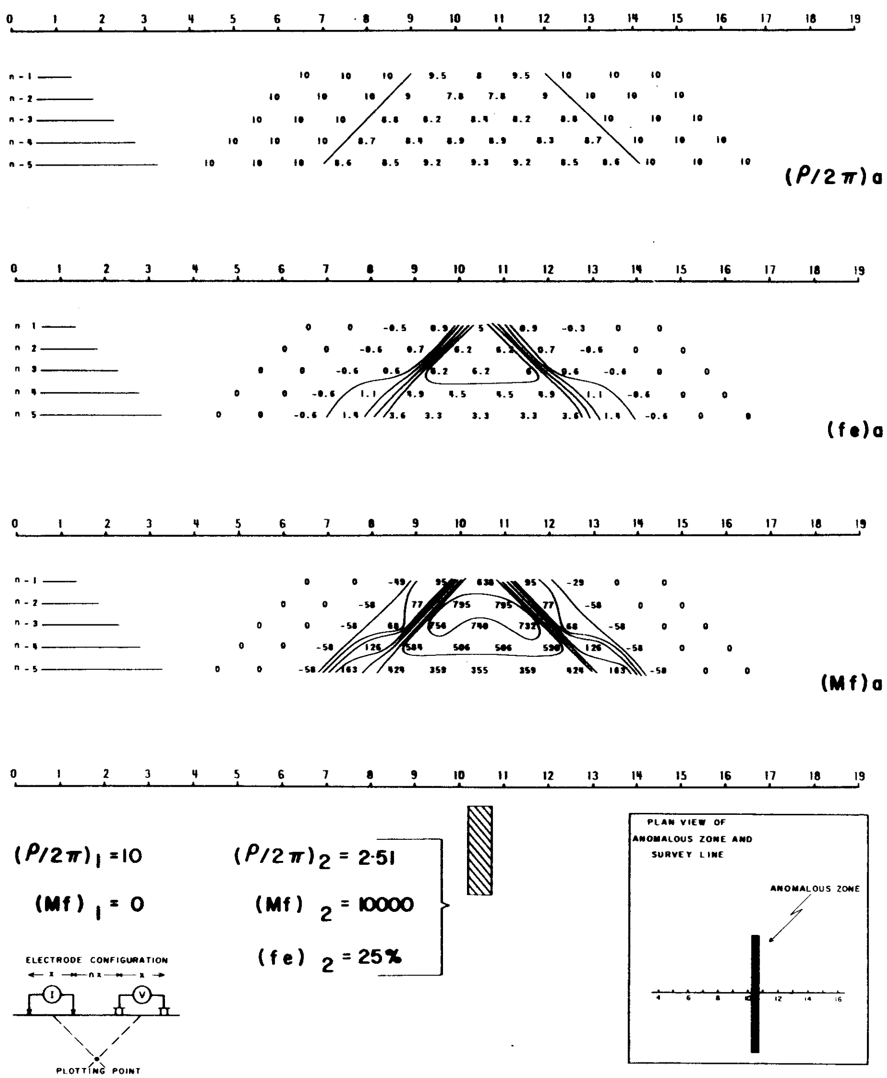

FIG 1

CASE II-0·5-BU-10-a

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Theoretical Induced Polarization and Resistivity Studies

Scale Model Cases

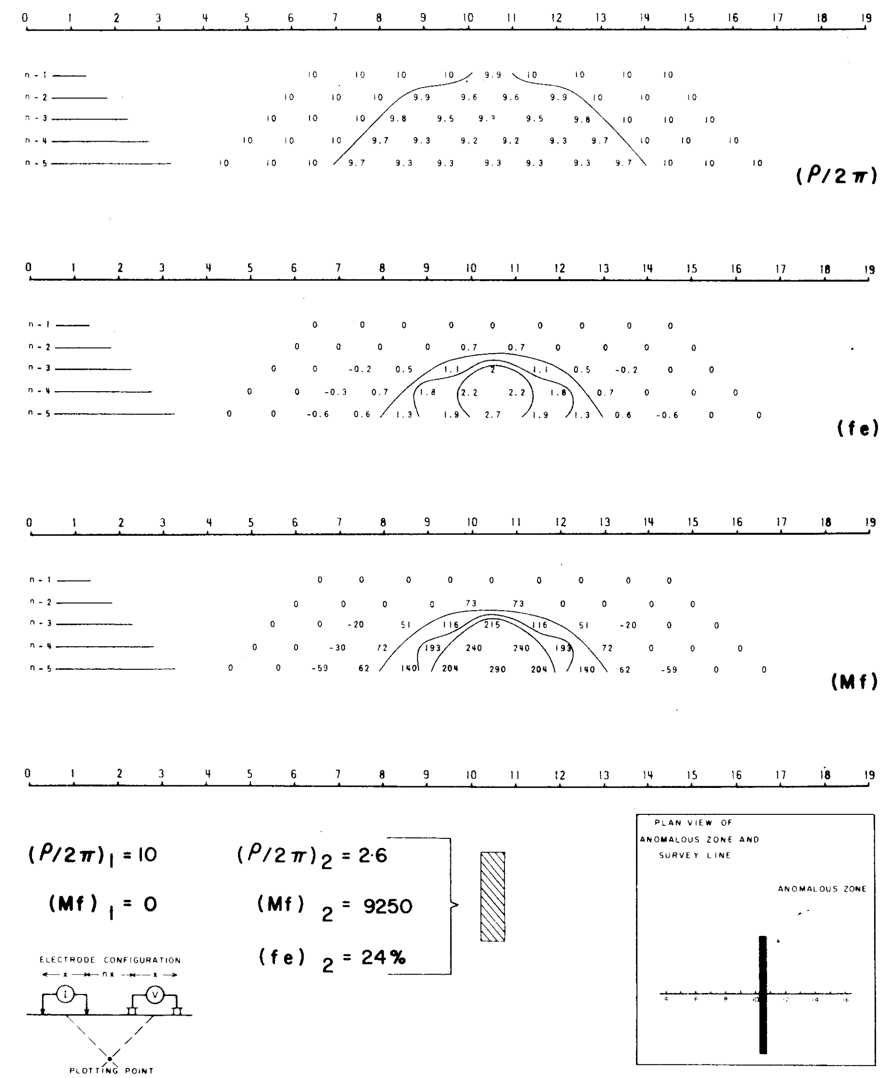

FIG 2

CASE II-1·5-BU-10-a

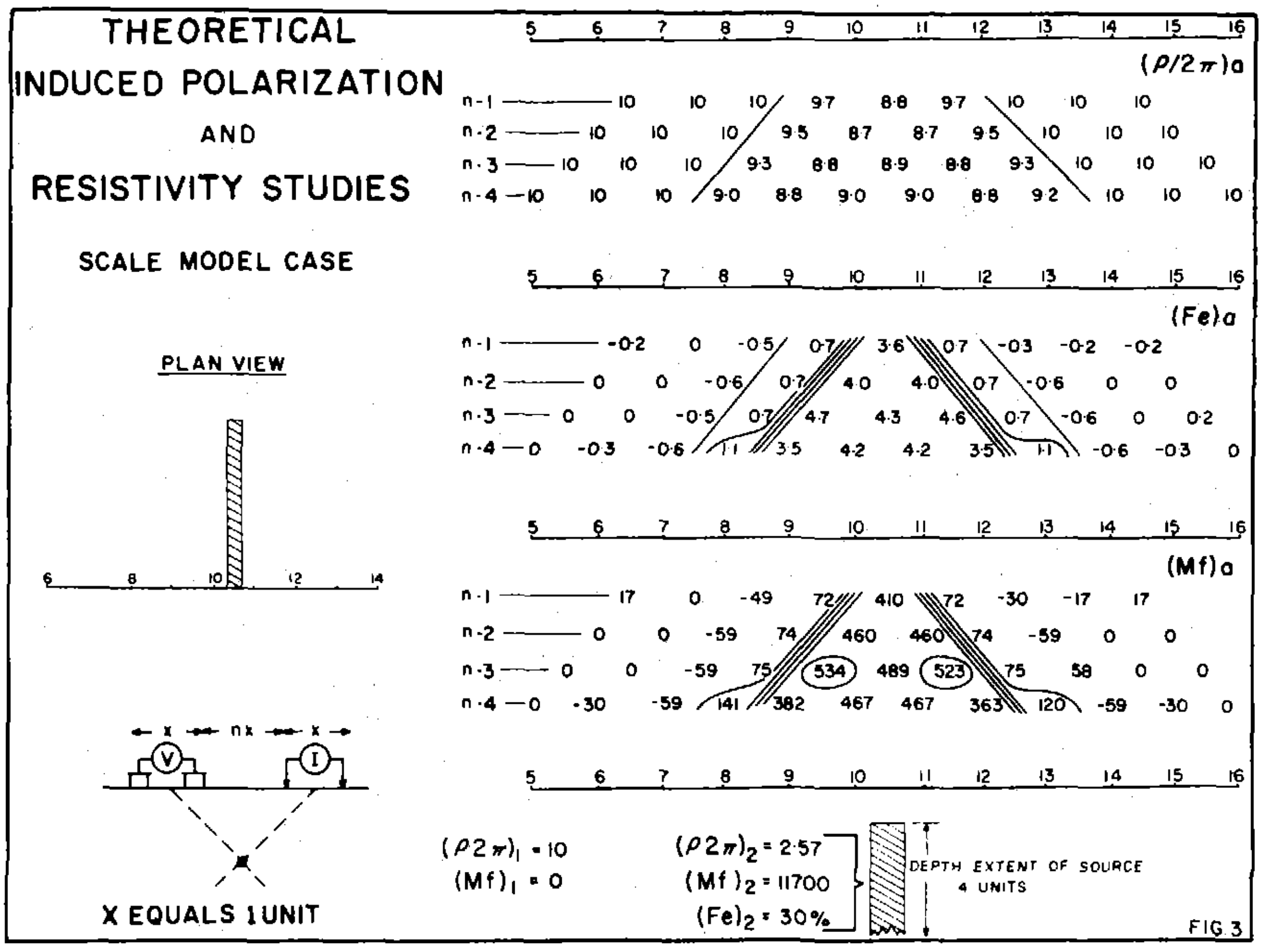
THEORETICAL
INDUCED POLARIZATION
AND
RESISTIVITY STUDIES
SCALE MODEL CASE
PLAN VIEW
X EQUALS 1 UNIT
(ρ/2π)a
n-1 — 10 10 10 9.7 8.8 9.7 10 10 10
n-2 — 10 10 10 9.5 8.7 8.7 9.5 10 10 10
n-3 — 10 10 10 9.3 8.8 8.9 8.8 9.3 10 10 10
n-4 — 10 10 10 9.0 8.8 9.0 9.0 8.8 9.2 10 10 10
(Fe)a
n-1 — -0.2 0 -0.5 0.7 3.6 0.7 -0.3 -0.2 -0.2
n-2 — 0 0 -0.6 0.7 4.0 4.0 0.7 -0.6 0 0
n-3 — 0 0 -0.5 0.7 4.7 4.3 4.6 0.7 -0.6 0 0.2
n-4 — 0 -0.3 -0.6 1.1 3.5 4.2 4.2 3.5 1.1 -0.6 -0.3 0
(Mf)a
n-1 — 17 0 -49 72 410 72 -30 -17 17
n-2 — 0 0 -59 74 460 460 74 -59 0 0
n-3 — 0 0 -59 75 534 489 523 75 58 0 0
n-4 — 0 -30 -59 141 382 467 467 363 120 -59 -30 0
(ρ2π)1 = 10
(Mf)1 = 0
(ρ2π)2 = 2.57
(Mf)2 = 11700
(Fe)2 = 30%
DEPTH EXTENT OF SOURCE
4 UNITS

FIG. 3

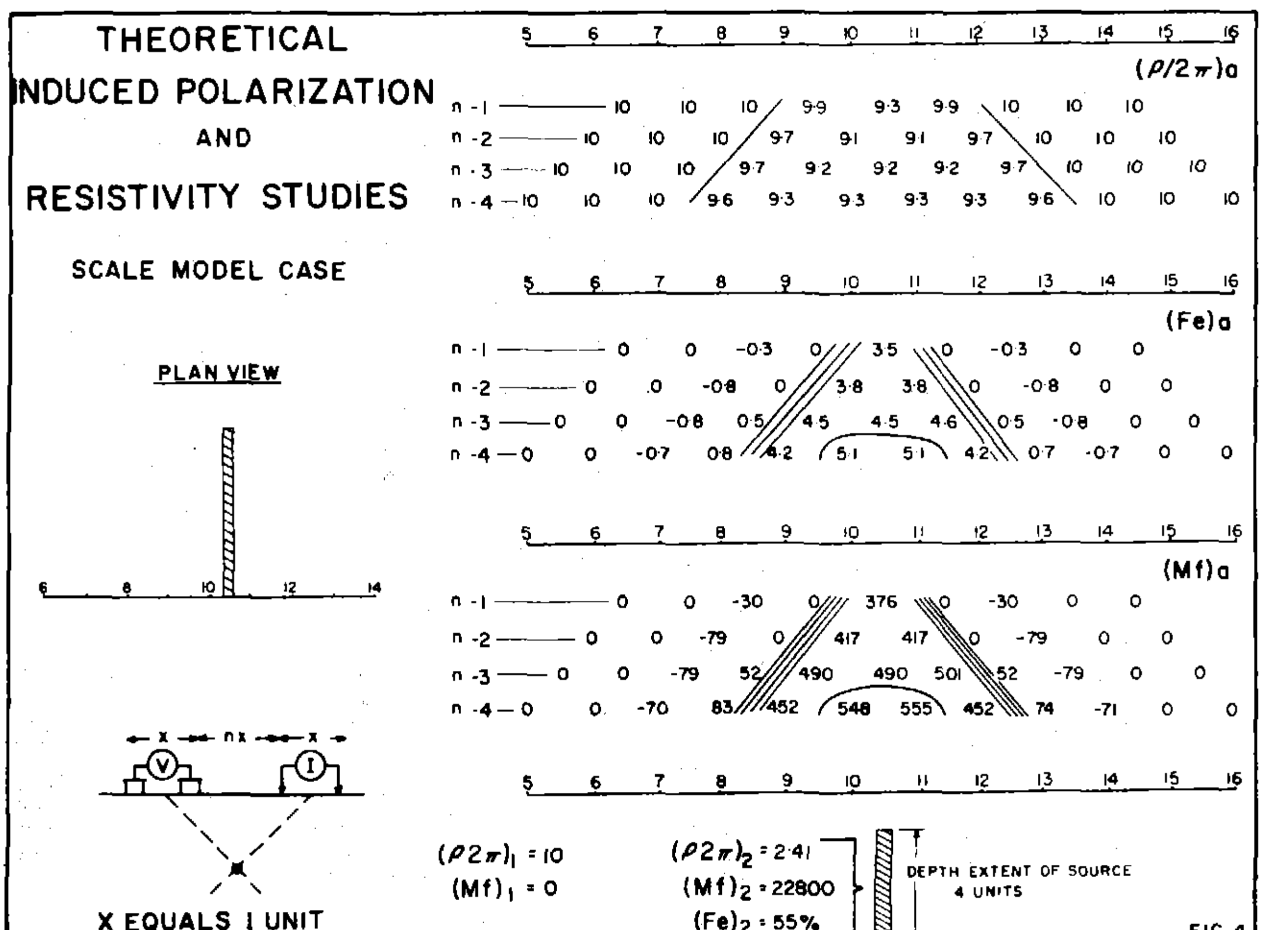
THEORETICAL
INDUCED POLARIZATION
AND
RESISTIVITY STUDIES
SCALE MODEL CASE
PLAN VIEW
X EQUALS 1 UNIT
(ρ/2π)a
n-1 — 10 10 10 9.9 9.3 9.9 10 10 10
n-2 — 10 10 10 9.7 9.1 9.1 9.7 10 10 10
n-3 — 10 10 10 9.7 9.2 9.2 9.2 9.7 10 10 10
n-4 — 10 10 10 9.6 9.3 9.3 9.3 9.3 9.6 10 10 10
(Fe)a
n-1 — 0 0 -0.3 0 3.5 0 -0.3 0 0
n-2 — 0 0 -0.8 0 3.8 3.8 0 -0.8 0 0
n-3 — 0 0 -0.8 0.5 4.5 4.5 4.6 0.5 -0.8 0 0
n-4 — 0 0 -0.7 0.8 4.2 5.1 5.1 4.2 0.7 -0.7 0 0
(Mf)a
n-1 — 0 0 -30 0 376 0 -30 0 0
n-2 — 0 0 -79 0 417 417 0 -79 0 0
n-3 — 0 0 -79 52 490 490 501 52 -79 0 0
n-4 — 0 0 -70 83 452 548 555 452 74 -71 0 0
(ρ2π)1 = 10
(Mf)1 = 0
(ρ2π)2 = 2.41
(Mf)2 = 22800
(Fe)2 = 55%
DEPTH EXTENT OF SOURCE
4 UNITS

FIG. 4

INDUCED POLARIZATION AND RESISTIVITY RESULTS
BATCHELOR LAKE AREA, QUEBEC.

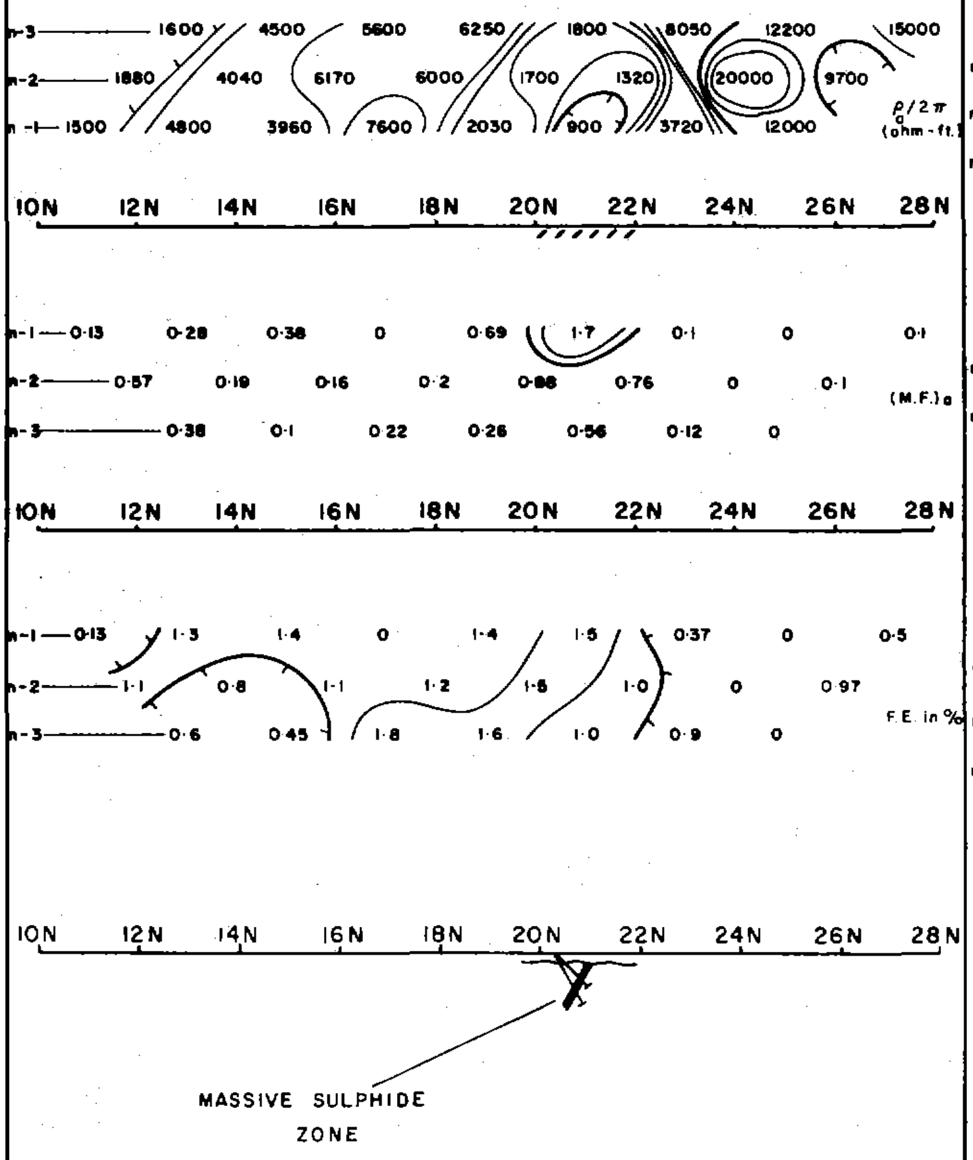

FIG 5

INDUCED POLARIZATION AND RESISTIVITY RESULTS
BATCHELOR LAKE AREA, QUEBEC.

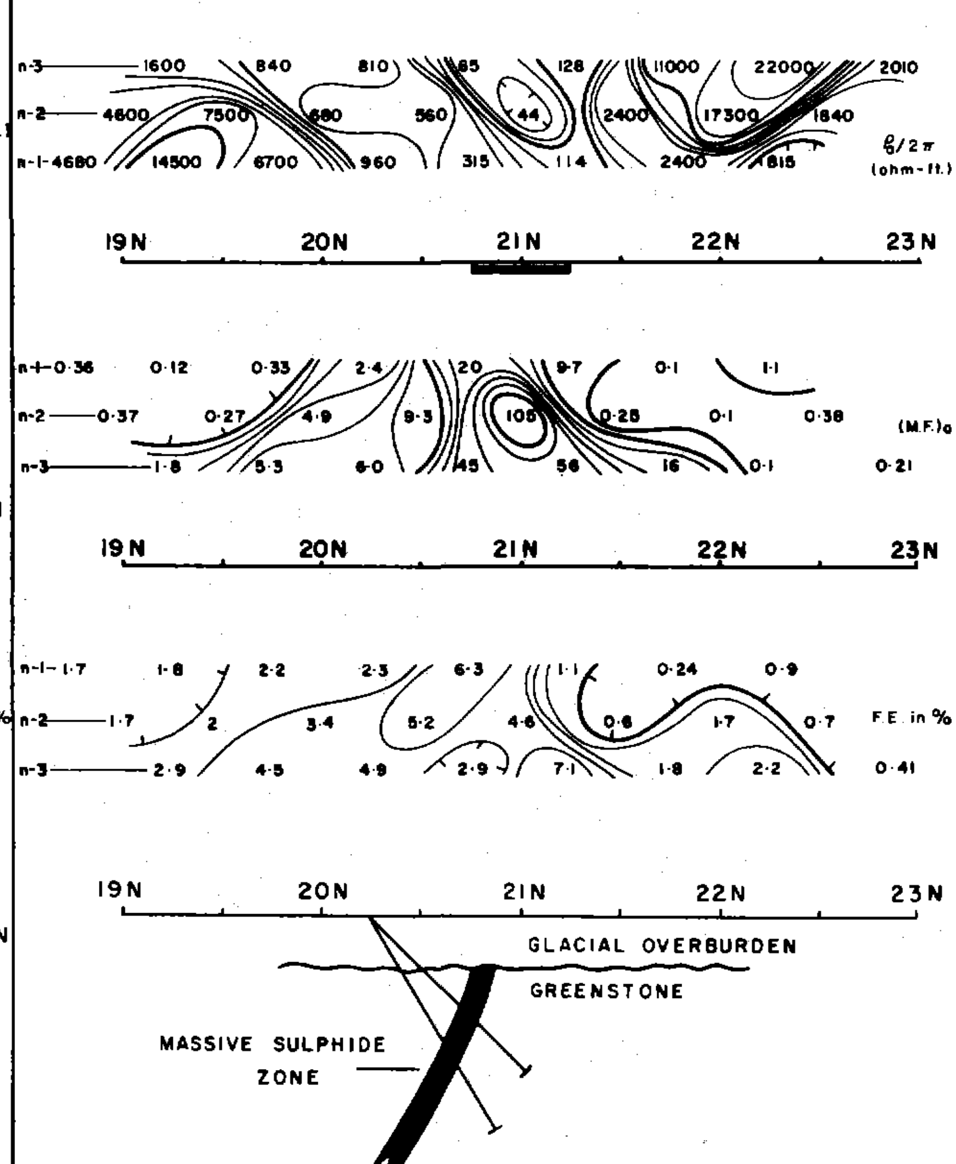

FIG. 6

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Dwg. I.P.P. 2854

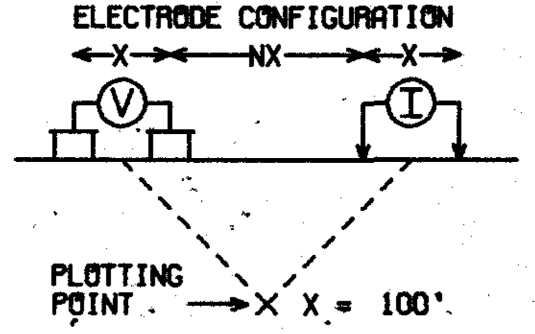
DWG. NO.- I.P.-5466-1

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

NORTH FARRELL GRID, TULLAH AREA
TASMANIA

LINE NO.- 123N

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: JAN 1970

APPROVED:

DATE:

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

174023

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

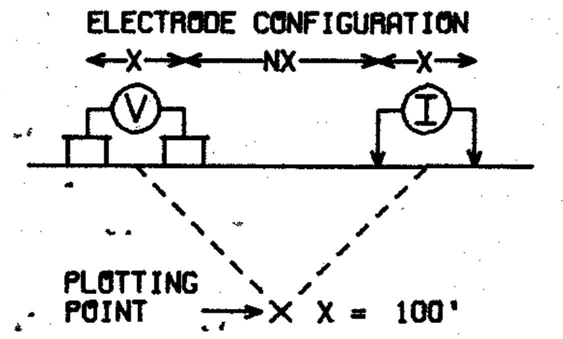
NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5466-2

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

NORTH FARRELL GRID, TULLAH AREA
TASMANIA

LINE NO.- 121N



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: JAN 1970

APPROVED:

DATE:

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

174024

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5466-3

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

NORTH FARRELL GRID, TULLAH AREA
TASMANIA

LINE NO.- 119N

ELECTRODE CONFIGURATION

X = 100'

SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: JAN 1970

APPROVED: P. G. HALLOF

DATE: 6/20/70

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

174025

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5466-4

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

NORTH FARRELL GRID, TULLAH AREA
TASMANIA

LINE NO.- 117N

ELECTRODE CONFIGURATION

PLOTTING POINT X = 100'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: JAN 1970

APPROVED:

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

P. G. HALLOF

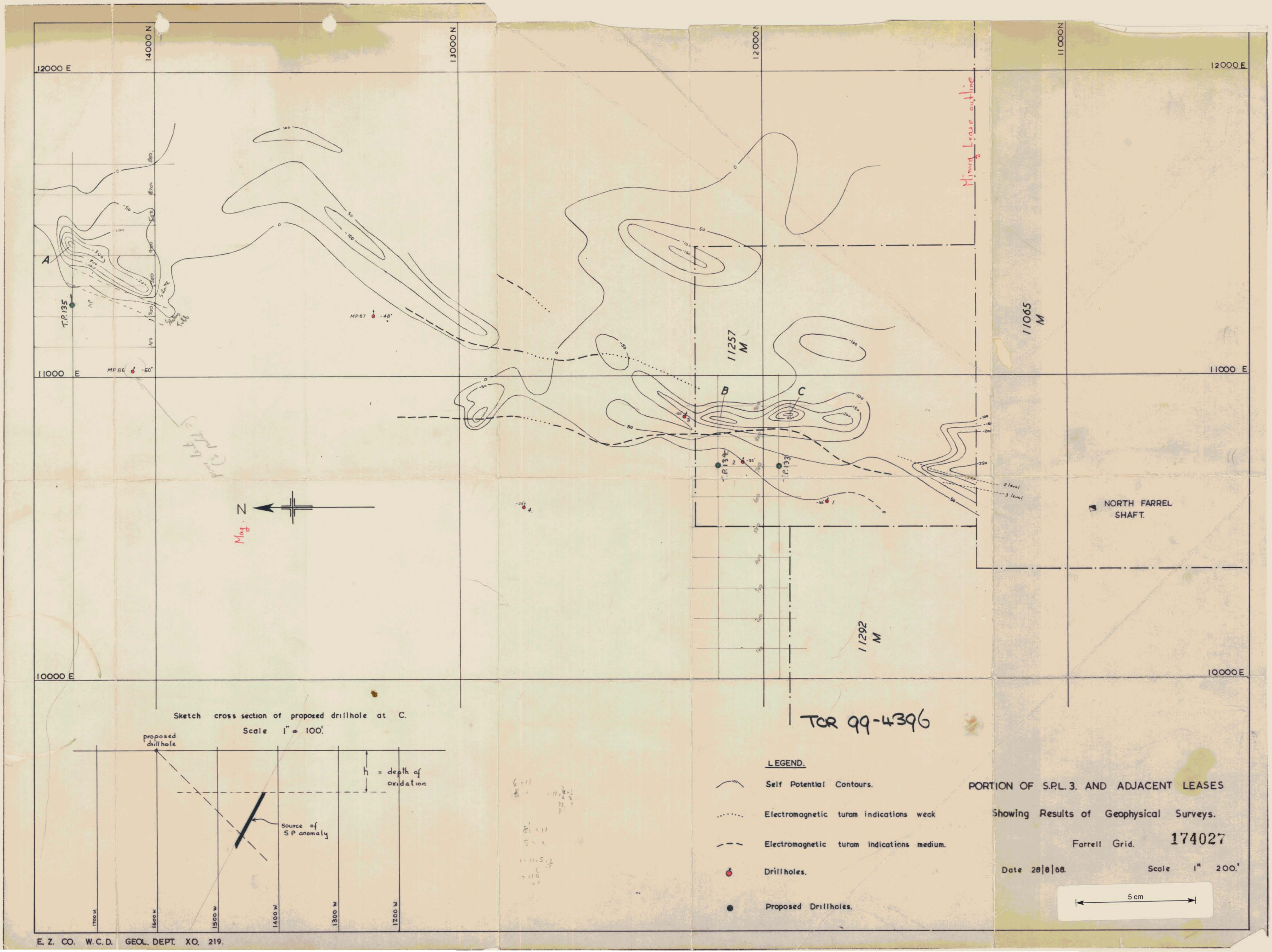
DATE:

174026

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER



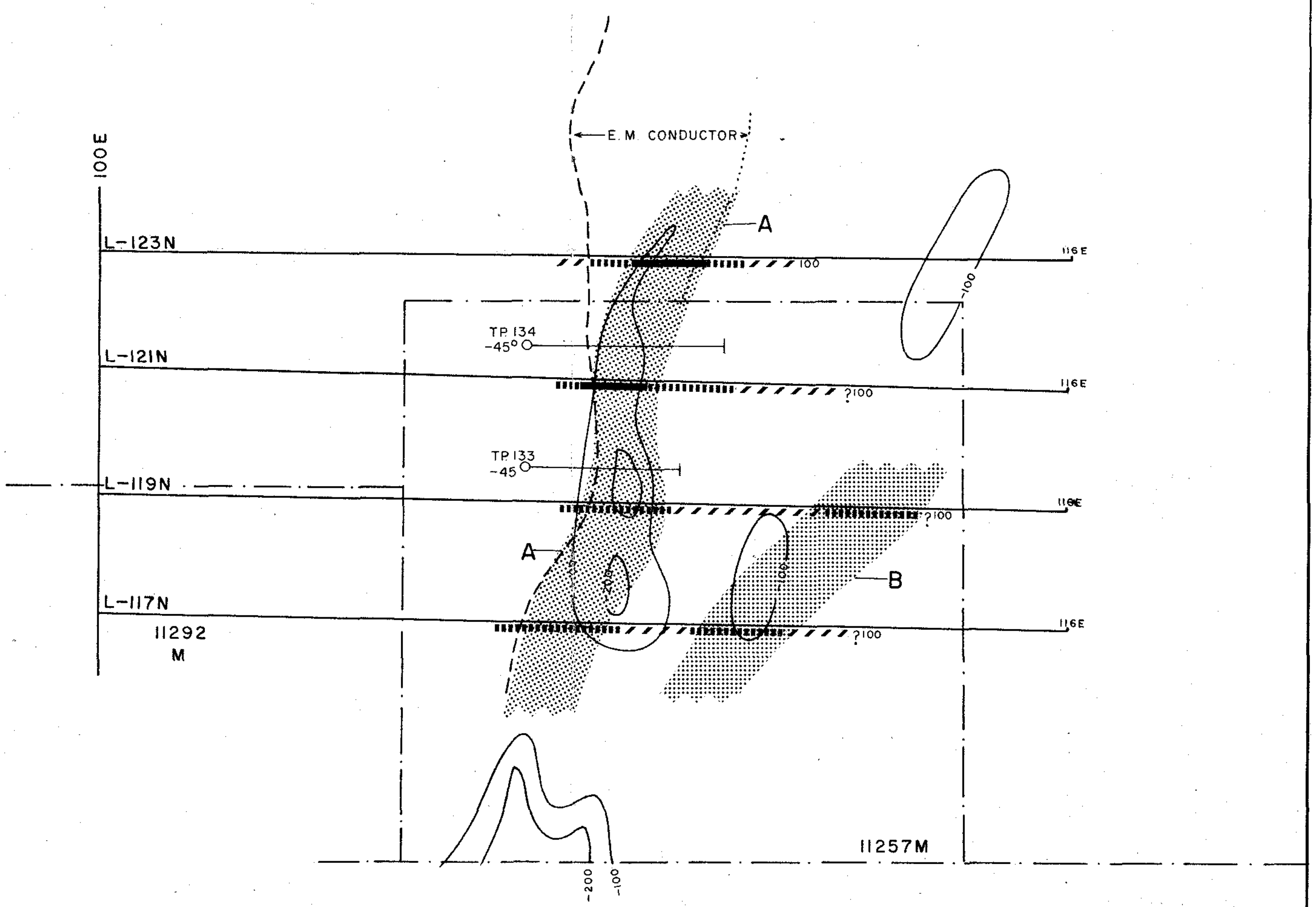
14000 N
13000 N
12000 N
11000 N
12000 E
11000 E
10000 E
A
B
C
T.P.135
MP 87 -48°
MP 86 -60°
11257 M
11065 M
11292 M
Mining Lease outline
NORTH FARREL SHAFT.
N
Mag.
2 level
3 level
T.P.134
T.P.133
Sketch cross section of proposed drillhole at C.
Scale 1" = 100'.
proposed drillhole
h = depth of oxidation
Source of S P anomaly
1700 W
1600 W
1500 W
1400 W
1300 W
1200 W
TCR 99-4396
LEGEND.
Self Potential Contours.
Electromagnetic turam indications weak
Electromagnetic turam indications medium.
Drillholes.
Proposed Drillholes.
PORTION OF S.P.L. 3. AND ADJACENT LEASES
Showing Results of Geophysical Surveys.
Farrell Grid.
174027
Date 28|8|68.
Scale 1" 200.'
5 cm
E. Z. CO. W. C. D. GEOL. DEPT. XO. 219.

DWG. IPP.–2854

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PLAN MAP



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

Numbers at the end of the anomalies indicate spread used.

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

NORTH FARRELL GRID, TULLAH AREA, TASMANIA.

SCALE

1" = 200'

5 cm

174023

DRAWN: P. C.

DATE: JUNE 1970

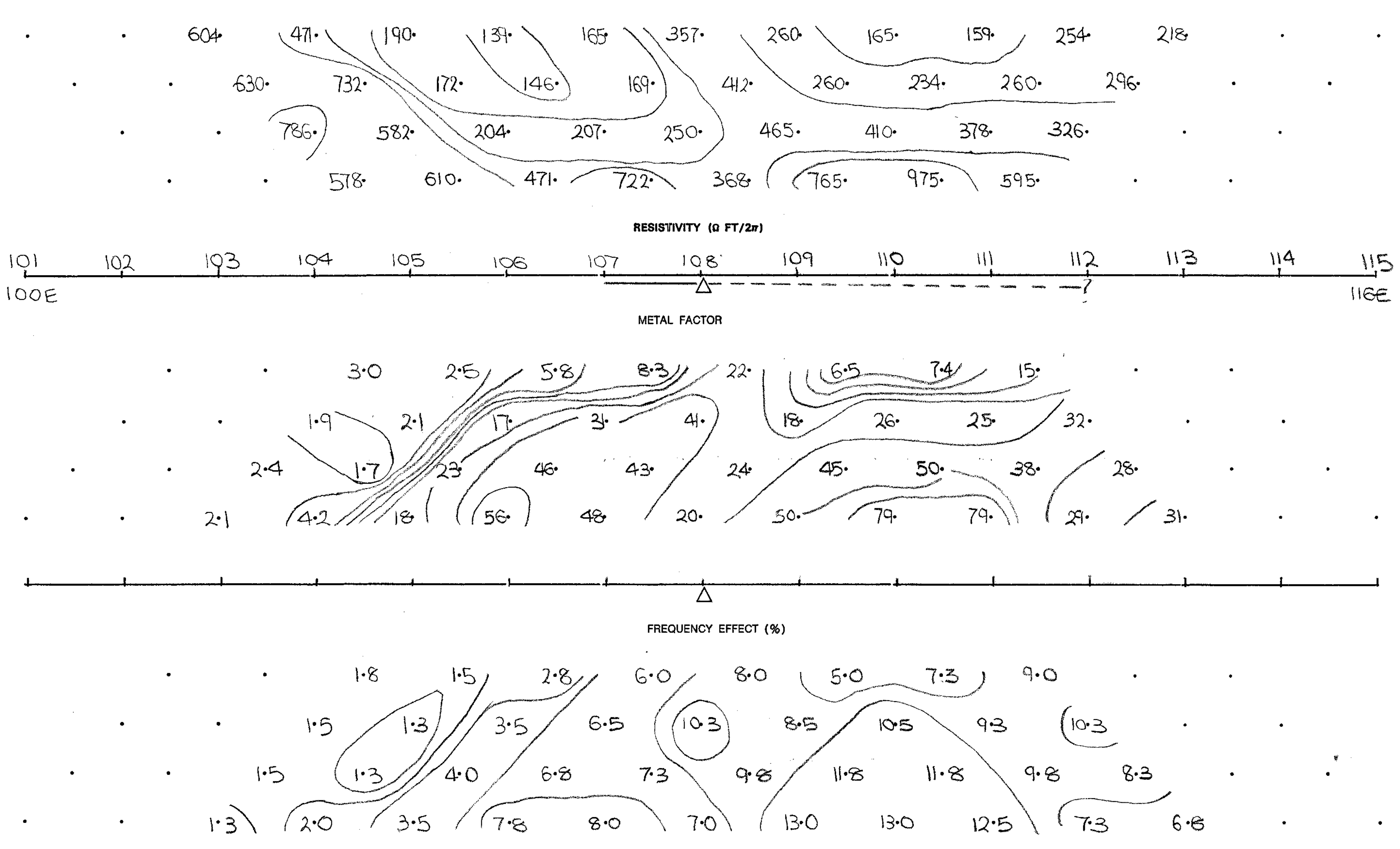
APPROVED:

REGISTERED PROFESSIONAL ENGINEER

P. G. HALLOF

PROVINCE OF ONTARIO

DWG. IPP.–2854



McPHAR 174029

McPHAR GEOPHYSICS PTY. LTD.

I.P. SURVEY

CLIENT EZ

AREA TULLAH GRID

LINE 11700N

SPREAD 100 FT

FREQUENCIES 2·5 & 0·3 Hz

ELECTRODES SINGLE/ALFOIL

Tx SERIAL No.

Rx SERIAL No.

DATE OF SURVEY 21/1/70

PLOTTED BY

FIELD CHECK

INTERPRETATION

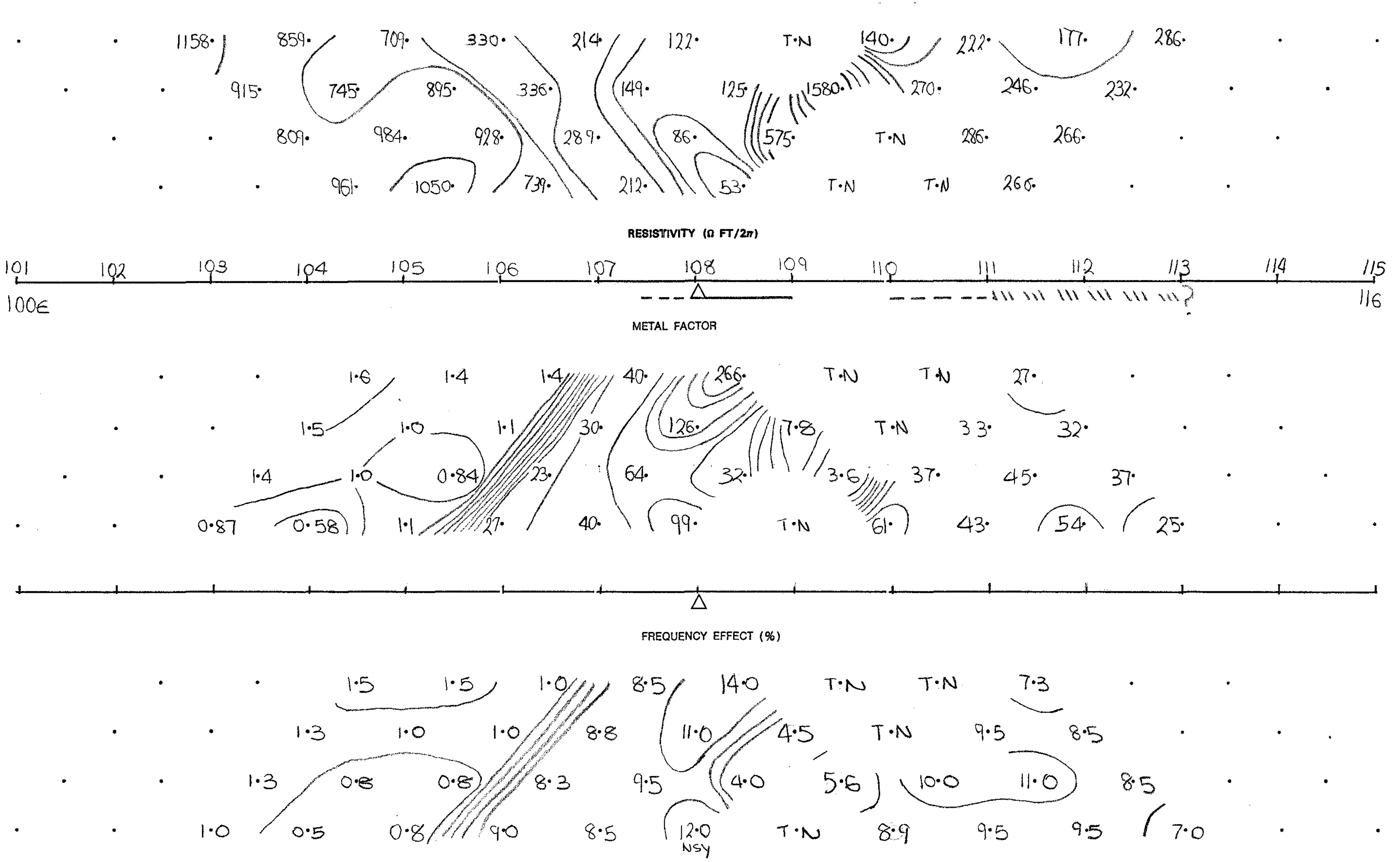
FINAL CHECK

DISTRIBUTED

5 cm

TCR 99-4396

174030



McPHAR

McPHAR GEOPHYSICS PTY. LTD.

I.P. SURVEY

CLIENT EZ

AREA TULLAH GRID

LINE 12100N

SPREAD 100 FT

FREQUENCIES 2.5 , 0.3 Hz

ELECTRODES SINGLE / ALFOIL

Tx SERIAL No.

Rx SERIAL No.

DATE OF SURVEY 20/1/70

PLOTTED BY

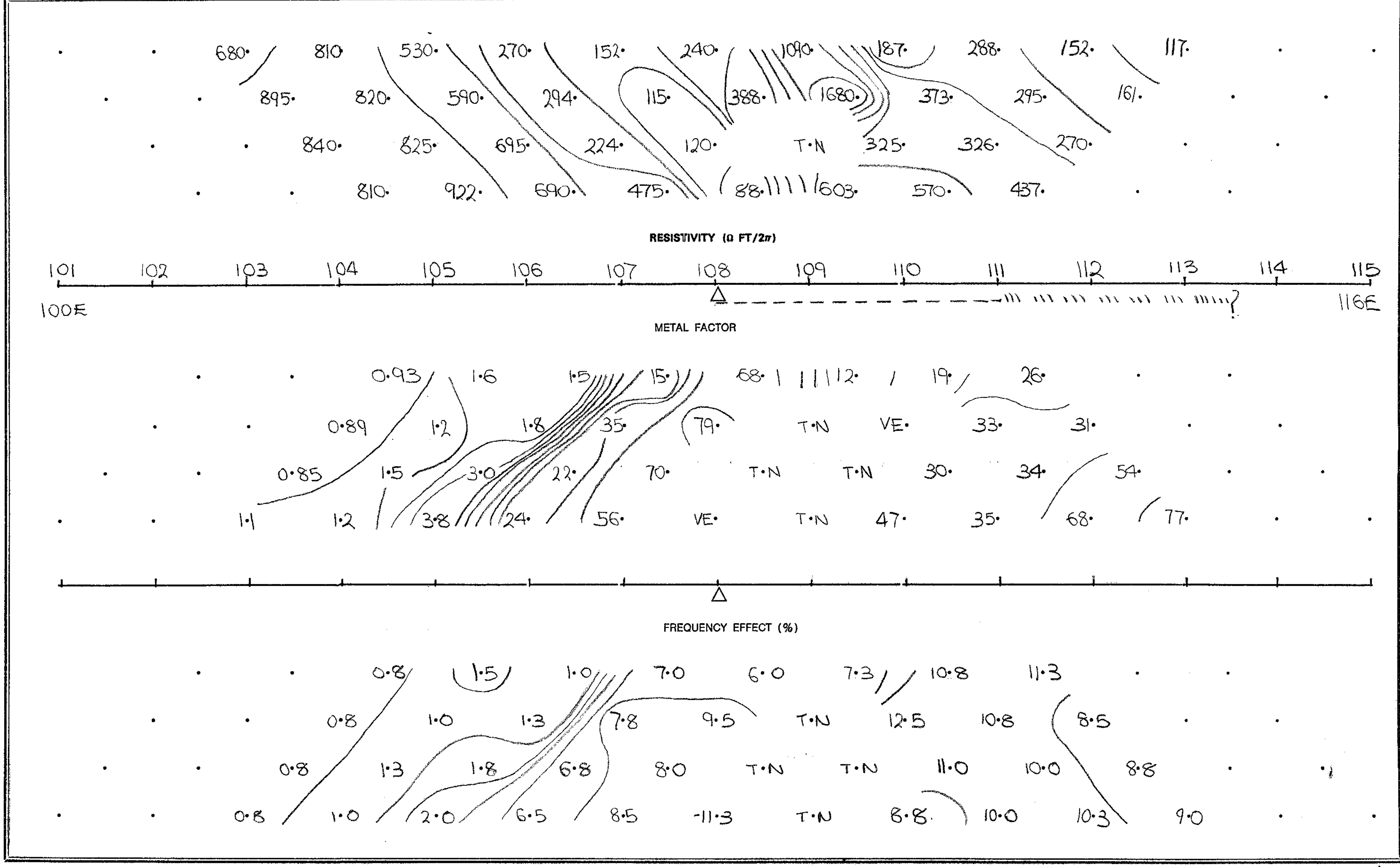
FIELD CHECK

INTERPRETATION

FINAL CHECK

DISTRIBUTED

5 cm



McPHAR

174031

McPHAR GEOPHYSICS PTY. LTD.

I.P. SURVEY

CLIENT E Z

AREA TULLAH

LINE 11900N

SPREAD 100 FT

FREQUENCIES 2·5 & 0·3 Hz

ELECTRODES SINGLE FOIL

Tx SERIAL No.

Rx SERIAL No.

DATE OF SURVEY 20/1/70

PLOTTED BY

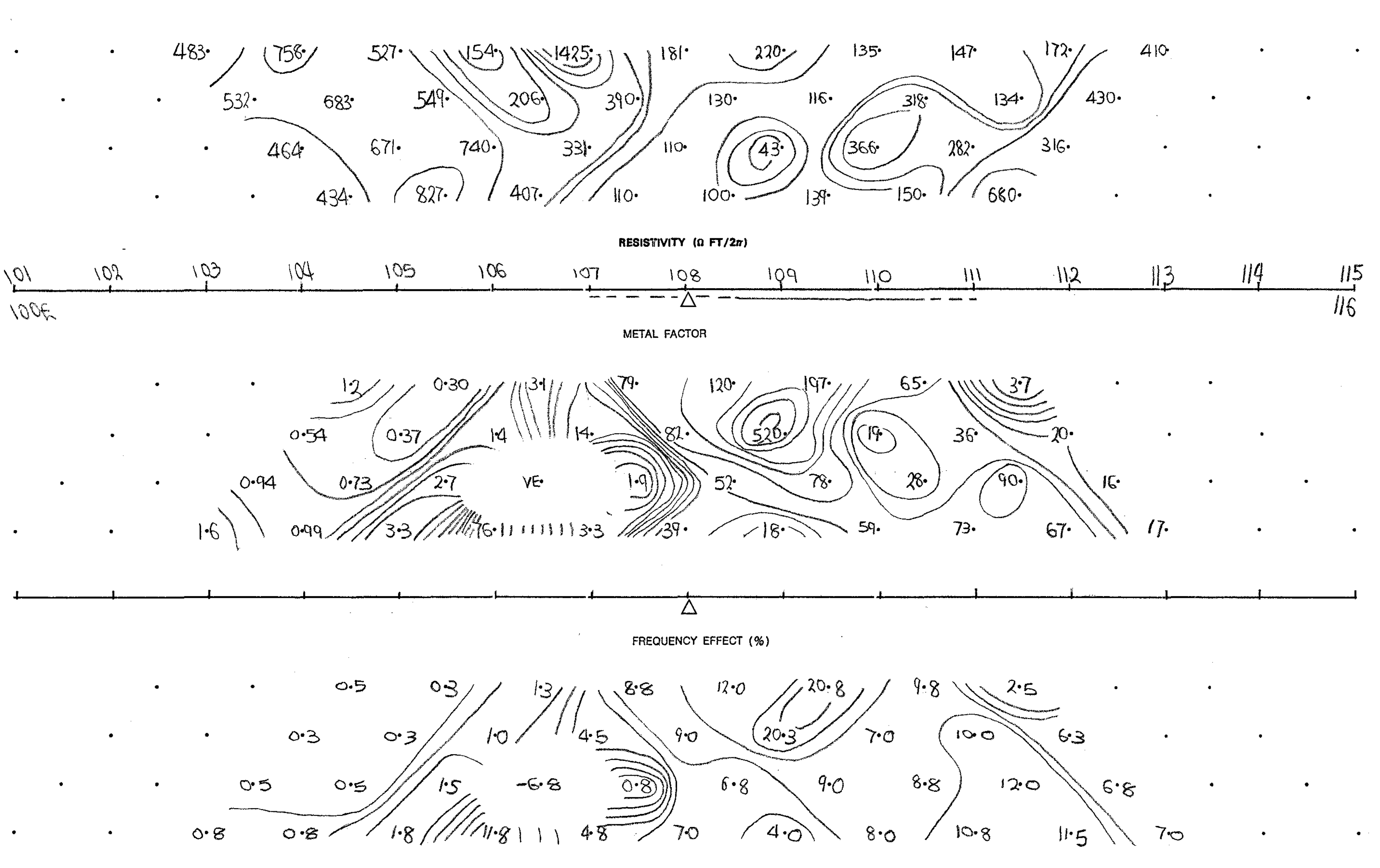
FIELD CHECK

INTERPRETATION

FINAL CHECK

DISTRIBUTED

5 cm



McPHAR 174032

McPHAR GEOPHYSICS PTY. LTD.

I.P. SURVEY

CLIENT EZ

AREA TULLAH

LINE 12300N

SPREAD 100 FT

FREQUENCIES 2.5 + 0.3 Hz

ELECTRODES SINGLE FOIL

Tx SERIAL No.

Rx SERIAL No.

DATE OF SURVEY 19/1/70

PLOTTED BY

FIELD CHECK

INTERPRETATION

FINAL CHECK

DISTRIBUTED

5 cm