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REPORT ON THE INDUCED POLARIZATION AND RESISTIVITY SURVEY ON THE TRIAL HARBOUR GRID ZEEHAN AREA, TASMANIA FOR ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

AMG REFERENCE POINTS ADDED

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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.

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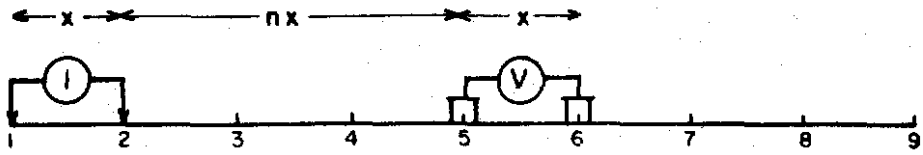
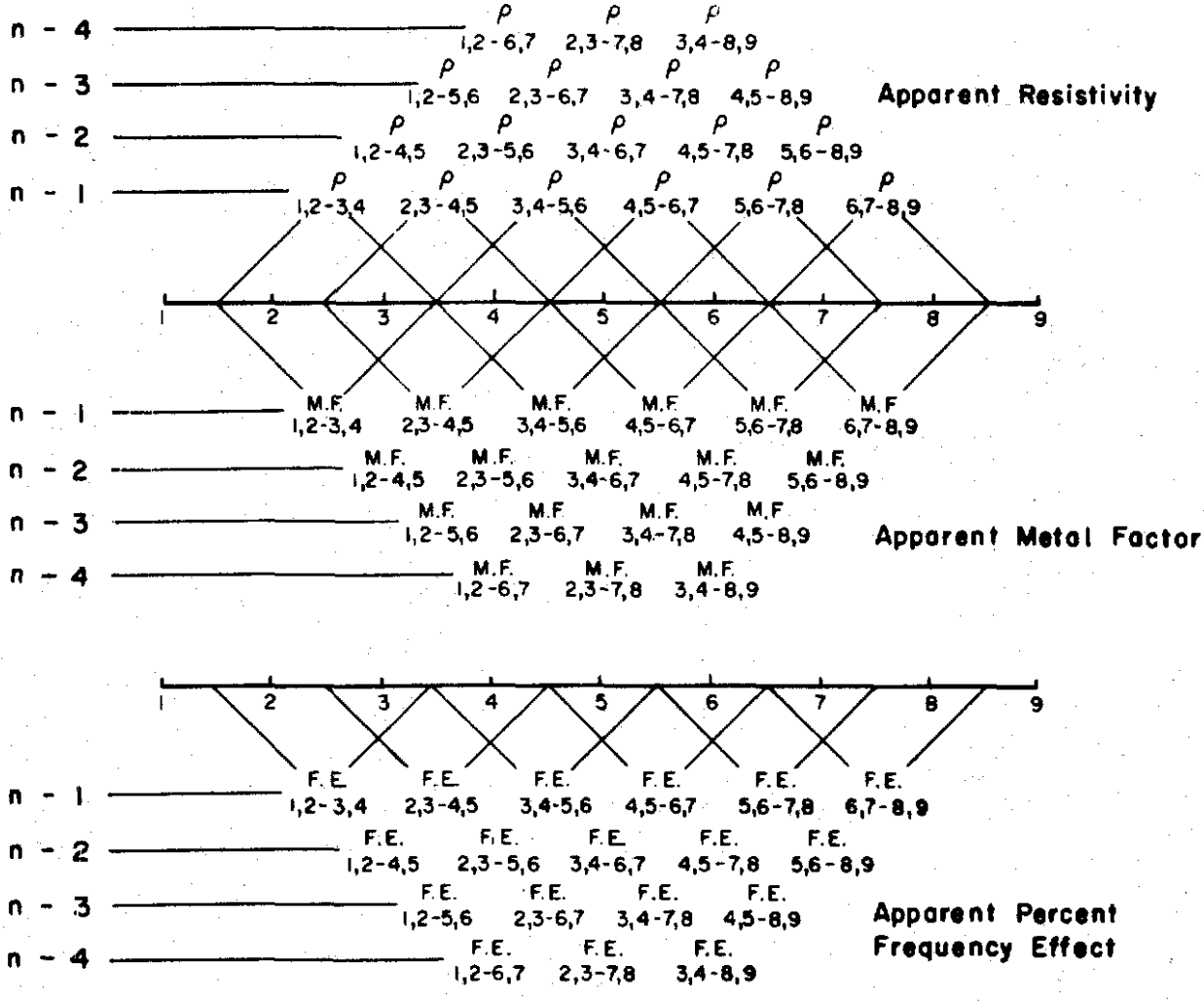
METHOD USED IN PLOTTING DIPOLE-DIPOLE INDUCED POLARIZATION AND RESISTIVITY RESULTS



Stations on line

x = Electrode spread length
n = Electrode separation



5 cm

Fig. A

McPHAR GEOPHYSICS

REPORT ON THE INDUCED POLARIZATION AND RESISTIVITY SURVEY ON THE TRIAL HARBOUR GRID ZEEHAN AREA, TASMANIA FOR ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

1. INTRODUCTION

The Heemskirk-Zeehan Mining Area is one of the most extensively mineralized areas in Australia. The previous mining activity in the area has extracted tin, as well as nickel, copper, lead, zinc and other metals. The mineralization is associated with the Heemskirk Granite, which is of Devonian age. The Trial Harbour Grid lies along the southeast edge of the granite massif.

There are several old mines in the area, and a geochemical survey has indicated numerous anomalies. The induced polarization and resistivity survey was planned in an attempt to locate, and outline, any unknown zones of metallic mineralization that might be present.

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.
5W	200 feet	IP 5473-1
4W	200 feet	IP 5473-2
3W	100 feet	IP 5473-3
2W	100 feet	IP 5473-4
1W	200 feet	IP 5473-5
0+00	200 feet	IP 5473-6
	100 feet	IP 5473-7
(Repeat)	100 feet	IP 5473-8
	50 feet	IP 5473-9
1E	200 feet	IP 5473-10
	100 feet	IP 5473-11
2E	200 feet	IP 5473-12
3E	200 feet	IP 5473-13
	100 feet	IP 5473-14
4E	200 feet	IP 5473-15
	100 feet	IP 5473-16
5E	200 feet	IP 5473-17
	100 feet	IP 5473-18
6E	200 feet	IP 5473-19
	100 feet	IP 5473-20
12E	200 feet	IP 5473-21
18E	100 feet	IP 5473-22

Line	Electrode Intervals	Dwg. No.
19E	200 feet	IP 5473-23
	100 feet	IP 5473-24
19 1/2E	100 feet	IP 5473-25
22E	100 feet	IP 5473-26
24E	200 feet	IP 5473-27
	100 feet	IP 5473-28

Also enclosed with the report is a plan map of the Trial Harbour Grid at a scale of 1" = 400' (Dwg. I. P. P. 4632). The topography and geology shown on Dwg. I. P. P. 4632 have been taken from maps made available by Electrolytic Zinc Company of Australasia Limited. 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 200' spreads the position of a narrow sulphide body can only be determined to lie between two stations 200' 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.

3. GEOLOGY

The Trial Harbour Grid lies in the contact metamorphic zone on the southeast edge of the Devonian Heemskirk Granite intrusive. Cambrian peridotite-gabbro intrusives are also present. The Precambrian (Oonah) and Cambrian (Crimson Creek) formations were clastic sediments that have now been metamorphosed to quartzites, hornfels, etc.

The largest tin mine in the area (Mayne's Mine) was located within the quartzites and shales of the Oonah formation. The tin lode here contained appreciable pyrite, with some chalcopyrite, sphalerite and tetrahedrite. Some of the tin lodes had appreciable strike length, but others had the form of vertical, or plunging "pipes" of ore.

The peridotites have been altered to serpentinite; some portions have been highly silicified. There is widespread mineralization within the serpentinite. Small quantities of rich nickel ore have been found. Concentrations of pyrrhotite and magnetite have also been observed.

4. DISCUSSION OF RESULTS

There is widespread metallic mineralization (sulphides and oxides) in the contact metamorphic zone surrounding the Heemskirk Granite. In addition to the sulphide minerals of economic interest, there are pyrite in the metamorphosed sediments and magnetite and/or pyrrhotite in the serpentinites. It is therefore to be expected, that numerous IP

anomalies would be detected by the survey.

There were two, or more, IP anomalies located on each of the lines surveyed. Some of the anomalies indicate broad zones of weak metallic mineralisation and others suggest narrow sources of metallic mineralization. Some of the IP anomalies correlate with geochemical highs, and others do not. As shown on the plan map, Dwg. I.P.P. 4632, most of the definite anomalies can be correlated into zones.

Zone A

This zone lies along the northwest corner of the grid. The source of the anomaly appears to be within the Conah Formation. The measurements do not extend far enough to the north to complete the anomalous pattern. On Line 4W, the incomplete IP anomaly appears to correlate with a copper, lead, zinc geochemical high.

Since the X = 200' measurements are anomalous for n = 1, the measurements on Line 4W should be repeated, and extended, using 100' electrode intervals.

Zone B

This long zone lies to the south of Zone A. The western portion of the zone lies within the serpentinite; to the east, the source of the IP anomaly lies within the hornfels of the Crimson Creek Formation.

The anomalies that form Zone B, are strong, and definite on several lines. In the interval from Line 3W, 0+00 to Line 5E, 7+00S the anomalous zone generally correlates with geochemical highs.

On Line 2W, the 100' spread measurements show a narrow, shallow source centred at 2+00S to 1+00S. The pattern indicates a narrow source that is less than 100' to the top and correlates with a geochemical high. As explained in the Appendix to this report, the source of this narrow anomaly could be better located, and evaluated, using shorter electrode intervals.

On Line 5E, the anomaly centred at 7+00S lies within the hornfels. There is a weak copper geochemical high in this area. The strongest part of the anomaly is at depth, measured for n = 2, but some of the n = 1 measurements are anomalous. The source could be better located using 50' spreads.

The 200' spread measurements on Line 12E show a strong shallow anomaly at 13+00S. This has been designated as Zone B_2, because of its geological position. The source should be checked using shorter electrode intervals and parallel lines.

Zone C

This discontinuous zone lies to the south of Zone B. It also crosses from the serpentinite into the hornfels. The anomalies that form Zone C, show a source at depth, and lie just to the south of the shallow anomalies that form Zone B. On Line 2W, there is a complex anomaly that may be due to two sources.

The most definite anomalies in Zone C are for Zone C_2 at 12+00S on Line 2E and for Zone C_3 at 11+00S on Line 6E. There are some nickel and zinc anomalies near the first, and a copper high near the second. Since

both sources are shallow (anomalous for n = 1) the anomaly can be better located, and evaluated, using 100' and perhaps even 50' electrode intervals (see Appendix).

Zone D

Zone D lies between Zone A and Zone B. At the eastern end, Zone D_2 lies along the contact between the Precambrian quartzites and the Cambrian hornfels.

The anomaly at the north end of Line 1W is incomplete; however, the copper values are also increasing at the end of the line. The data should be extended using 100' electrode intervals. The anomaly at the north end of Line 2E is also strong and shallow; it is incomplete. There is a slight increase in the lead and copper values over the anomaly.

The most definite anomaly on Zone D_2 is centred at 3+50S on Line 5E. The anomaly is very large in magnitude, but the pattern is not complete. There are no geochemical anomalies at this position, but the source may be at depth. Checks with 50' electrode intervals might better locate the source.

Zone E

Zone E lies at the southern end of all of the lines surveyed at the western end of the grid. The anomaly appears to lie within the Crimson Creek Formation argillites and graywackes. The length of the zone suggests that there may be pyrite and/or graphite, in a sedimentary band. The geochemical sampling does not extend that far. On Line 1E, the measurements should be extended so that the anomaly can be evaluated.

Zone F

Zone F appears to lie within the serpentinite, close to the Oonah Formation contact to the south. At the eastern end, there are geochemical anomalies associated with the shallow IP anomaly.

On Line 3E, the 100' spread data shows a narrow, shallow source centred at 26+00S. There are strong copper, lead, zinc soil anomalies at 27+00S. On Line 4E, the IP anomaly is much the same, and there are also nickel values in the soil.

This anomaly appears to be of great possible importance. The source is narrow, and shallow, from Line 3E to Line 6E. It should be checked using 50' electrode intervals.

Zone G

This discontinuous zone lies within the serpentinite, just to the north of Zone F. The IP anomalies are generally less definite than on Zone F, but there are correlating geochemical highs at several places.

There are several places where the IP anomalies are definite enough to warrant further work.

Zone G_1	Line 0+00, 20+00S	Zn, Ni	check with 50' spreads
Zone G_2	Line 3E, 21+00S	Ni	check with 100' & 50' spreads
Zone G_3	Line 5E, 20+50S	Zn	check with 50' spreads

Zone H

This weak IP zone lies within the serpentinite. The most definite anomaly is a broad, shallow, weak anomaly at Line 5E, 16+00S to 12+00S.

There are definite copper-lead-zinc geochemical anomalies at 13+00S, so further checks with shorter electrode intervals may be warranted.

Zone I

A few reconnaissance lines were surveyed to the east, in the vicinity of the Mayne's Mine workings. There is no geochemical data in this area. At Line 19E, 17+50N and Line 24E, 17+00N, the 100' electrode interval measurements have indicated definite anomalies. The anomalies should be checked using 50' electrode intervals and closely spaced parallel lines should be surveyed.

Zone J

The anomalies that form this zone are more definite than those that form Zone I. The anomalies at 13+50N on Line 19E and 14+50N on Line 24E should be checked using 50' spreads. If the anomalies are confirmed, parallel lines should be surveyed.

Zone K

The IP anomaly centred at 8+00S on Line 22E is one of the largest in magnitude located at Trial Harbour. Zone K has been located only on Line 22E. The anomalous pattern has some width, and it may indicate a complex source. Some of the n = 1 measurements with X = 100' were anomalous, so that checks using X = 50' are indicated. Parallel lines should also be surveyed.

5. CONCLUSIONS AND RECOMMENDATIONS

The induced polarisation and resistivity results from the Trial

Harbour Grid are of great interest. There are numerous zones of metallic mineralization indicated; some correlate with previously located geochemical anomalies. Any, or all, of the zones could be of economic interest. Further work is definitely warranted in several areas.

Zone A

This incomplete anomaly correlates with a geochemical anomaly. The source appears to lie within the Oonah Formation. To the east, the Mayne's Mine ore was in these same rocks.

The anomalous pattern on Line 4W should be completed using 100' electrode intervals. When the exact position of the source is known, a careful geologic examination may reveal the source. If the source is not known, a drill test may be warranted.

Zone B

This is one of the most definite anomalies located at Trial Harbour. At Line 2W, 1+50S the results indicate a narrow, strong source within the serpentinite. There are also geochemical anomalies at this point.

The shallow source could be better located using 50' electrode intervals (see Appendix). On Line 2W, some outcrop is indicated, and trenching might be used to expose the source. An angle drill hole spotted to pass beneath 1+50S, Line 2W at a depth of 100 feet should intersect the source.

On Line 5E at 8+00S to 7+00S, the source of the anomaly is in the hornfels. The IP anomaly is quite definite, and there are some weakly anomalous copper samples at this position. The source should be checked

using 50' spreads. If a drill test is desired, a hole could be drilled at -45° to the north from 9+00S.

Zone C

This discontinuous zone lies within the serpentinite and the hornfels. The two most definite anomalies located with 200' spreads show a shallow source, and should be checked using shorter electrode intervals.

Zone C_2	Line 2E,	13+00S to 11+00S
Zone C_3	Line 6E,	12+00S to 10+00S

If the anomalies are confirmed, a few closely spaced, parallel lines should be surveyed and a geological examination completed. If the source of the IP effects can not be identified, drilling should be considered.

Zone D

Detail has been recommended to check this zone at three points. A geophysical, geochemical and geological evaluation, when the detail is available, may suggest that drilling is warranted.

Zone E

The anomalies that form this zone are not complete. The measurements must be extended so that the anomaly can be evaluated.

Zone F

This is one of the most definite anomalies located on the Trial Harbour Grid. From Line 3E, 26+00S to Line 6E, 27+50S the IP data indicates a narrow, shallow source. There are definite geochemical

anomalies with almost all of the IP anomalies. The source could be better located, and evaluated, using 50' electrode intervals.

If it is desired to drill, before further work is completed, an angle drill hole could be spotted to pass beneath Line 4E, 26+00S at a depth of 100' to 125'. If mineralization of economic interest is intersected, a detailed IP survey, on closely spaced lines, should be completed.

Zone G

Detailed measurements have been recommended at three places on this discontinuous zone. The shallow anomalies all appear to correlate with geochemical highs. Drilling will probably be warranted to test this zone, particularly if mineralization of economic interest is intersected on Zone F.

Zone H

The anomalies that make up this zone are weak, and indefinite. However, at Line 5E, 14+00S a broad, weak, shallow IP anomaly correlates with sharp geochemical highs. Detailed measurements with shorter electrode intervals would be warranted, if mineralization of interest is found elsewhere in the serpentinite at Trial Harbour.

Zone I

This moderate magnitude IP zone lies to the east of the Mayne's Mine Workings. The detailed IP measurements recommended should be completed and geological investigations should be carried out, to determine if drilling is warranted.

Zone J

This zone lies south of Zone I, on the south side of the Mayne's Mine Workings. The IP anomalies are more definite, and detail has been recommended. The two zones should be evaluated in the same manner, to see if drilling is warranted.

Zone K

The anomaly at 8+00S, Line 22E is large in magnitude and complex. The anomaly appears to lie within the argillites and graywackes of the Crimson Creek Formation. However, some serpentinite has also been found in outcrop.

Detailed IP measurements and geological-geochemical investigations are warranted, to determine the possible importance of this strong IP anomaly.

If the results of this first survey on the southeast side of the Heemskirk Granite show any mineralization of possible economic importance, further work in a larger area may be warranted.

McPHAR GEOPHYSICS PTY. LTD.

P. G. HALLOF

Philip G. Hallof,
Geophysicist.

E. Burnside,
Geophysicist.

Dated: July 13, 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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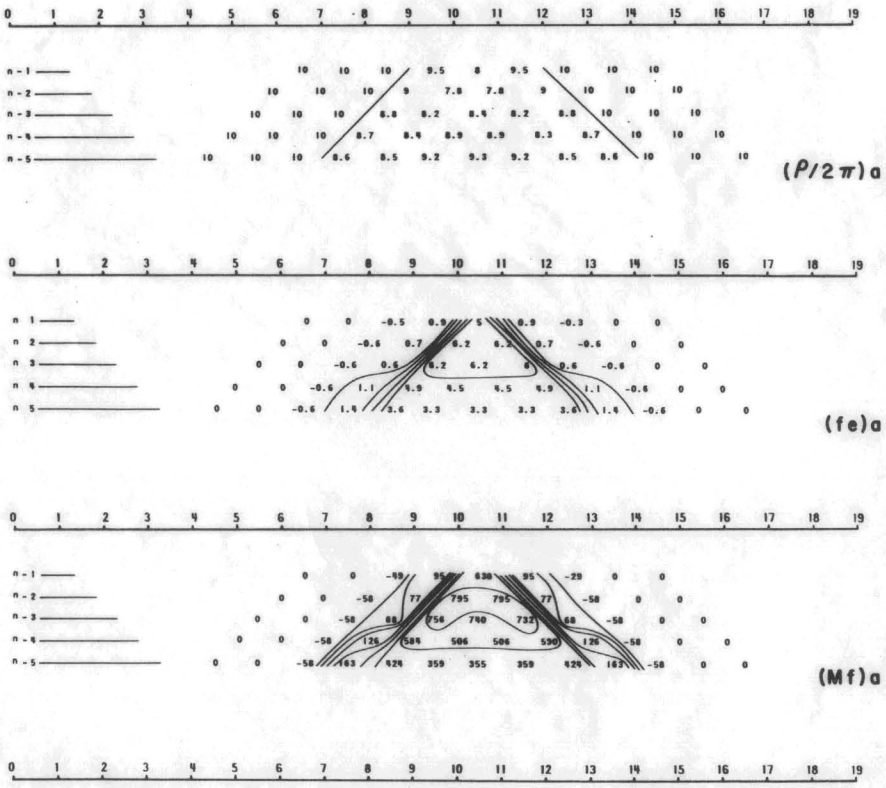
Theoretical Induced Polarization and Resistivity Studies

Scale Model Cases



$(\rho/2\pi)_1 = 10$ $(\rho/2\pi)_2 = 2.51$

$(Mf)_1 = 0$ $(Mf)_2 = 10000$

$(fe)_2 = 25\%$

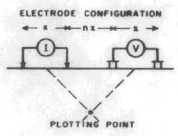
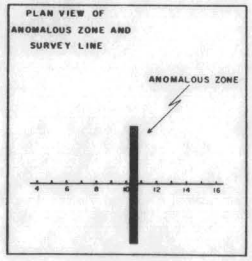


FIG 1



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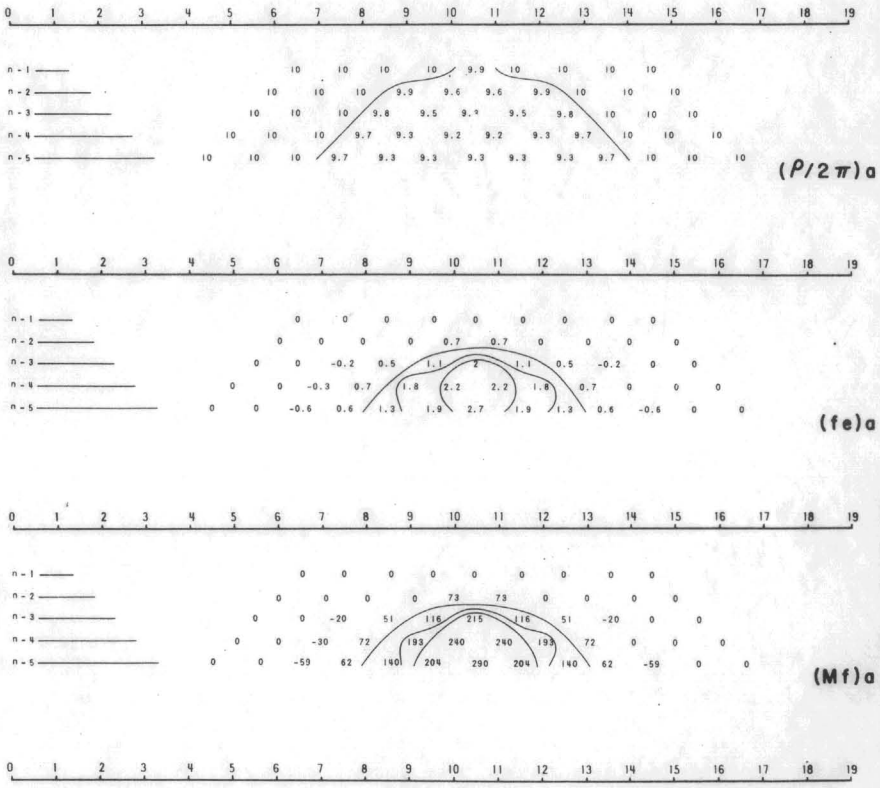
Theoretical Induced Polarization and Resistivity Studies

Scale Model Cases



$(\rho/2\pi)_1 = 10$ $(\rho/2\pi)_2 = 2.6$

$(Mf)_1 = 0$ $(Mf)_2 = 9250$

$(fe)_2 = 24\%$

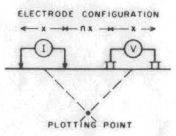
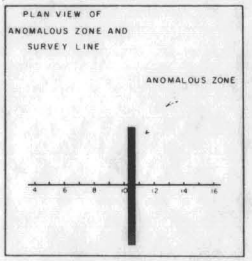


FIG 2



CASE II-1·5-BU-10-a

5 cm

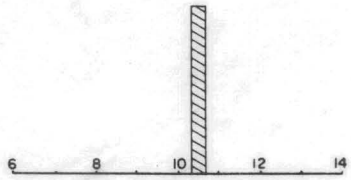
982028

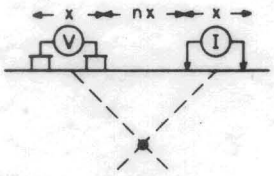
025

THEORETICAL INDUCED POLARIZATION AND RESISTIVITY STUDIES

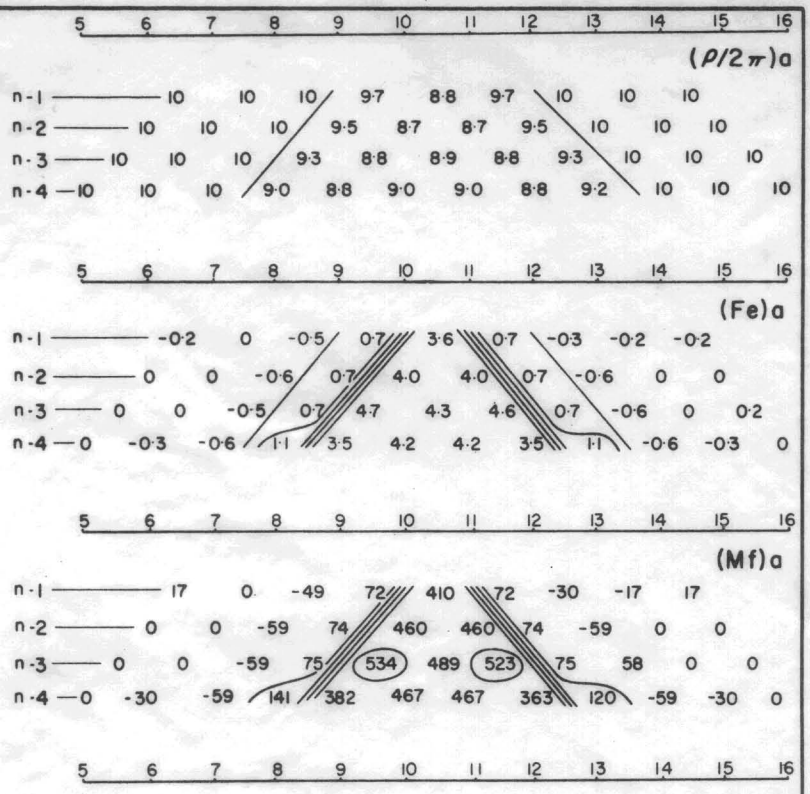
SCALE MODEL CASE

PLAN VIEW





X EQUALS 1 UNIT



$(\rho 2\pi)_1 = 10$
$(Mf)_1 = 0$

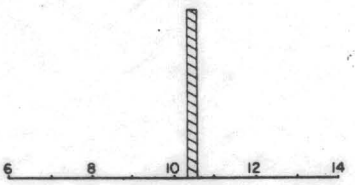
$(\rho 2\pi)_2 = 2{\cdot}57$
$(Mf)_2 = 11700$
$(Fe)_2 = 30\%$

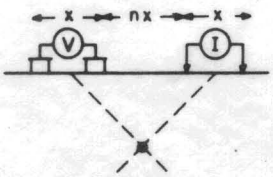
FIG. 3

THEORETICAL INDUCED POLARIZATION AND RESISTIVITY STUDIES

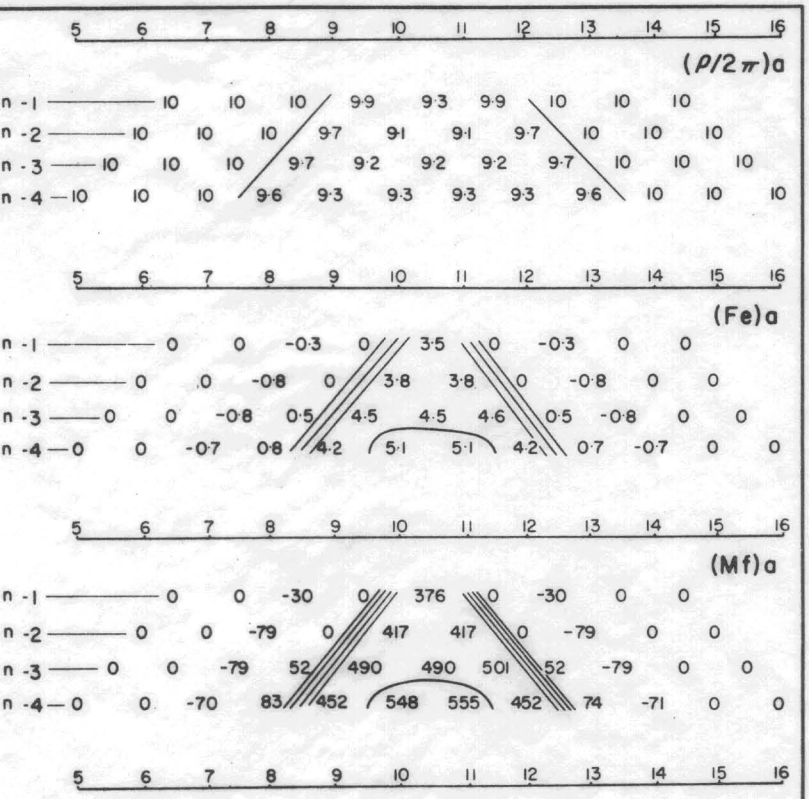
SCALE MODEL CASE

PLAN VIEW





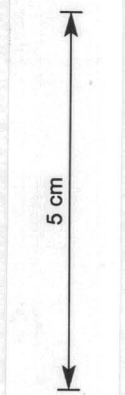
X EQUALS 1 UNIT



$(\rho 2\pi)_1 = 10$
$(Mf)_1 = 0$

$(\rho 2\pi)_2 = 2{\cdot}41$
$(Mf)_2 = 22800$
$(Fe)_2 = 55\%$

FIG. 4



INDUCED POLARIZATION AND RESISTIVITY RESULTS
BATCHELOR LAKE AREA, QUEBEC.

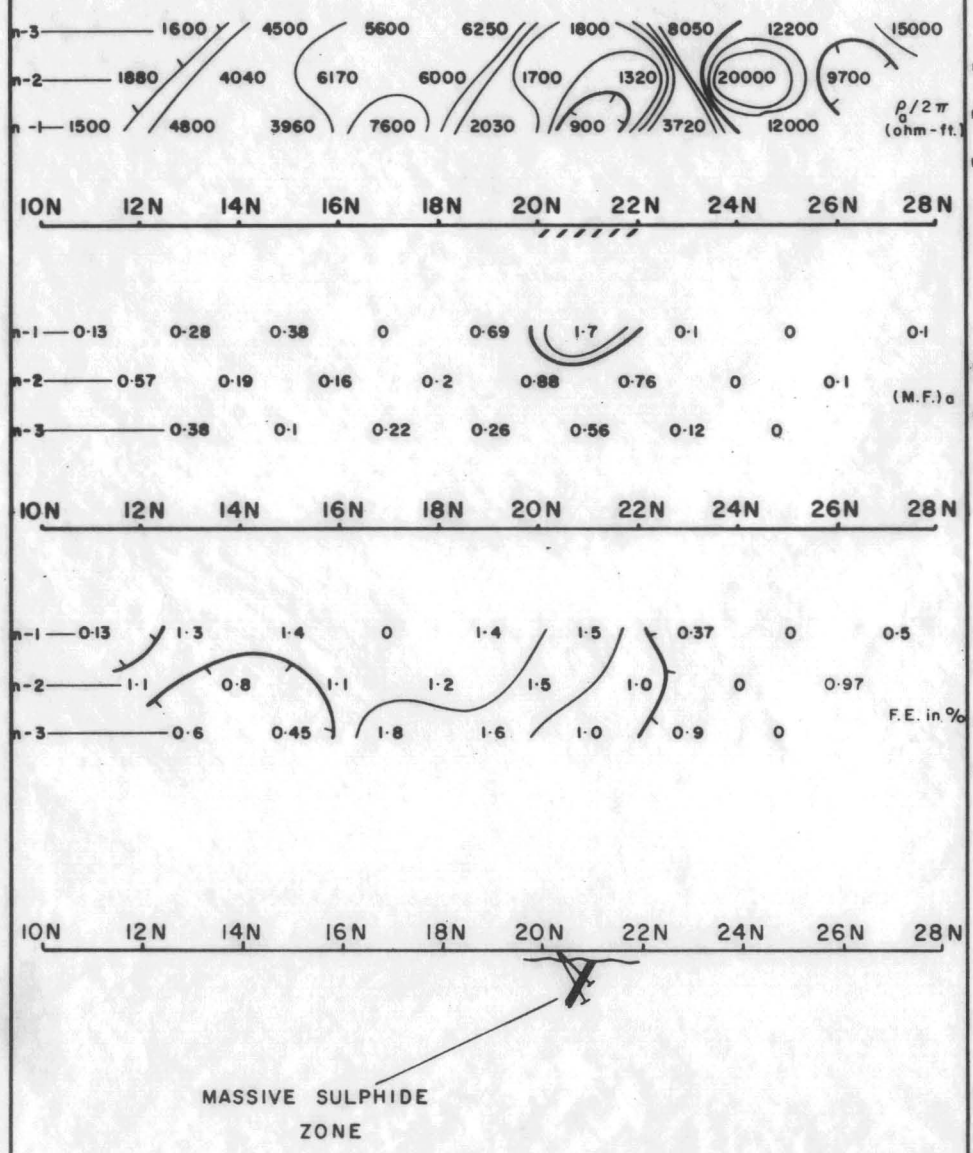


FIG. 5

INDUCED POLARIZATION AND RESISTIVITY RESULTS
BATCHELOR LAKE AREA, QUEBEC.

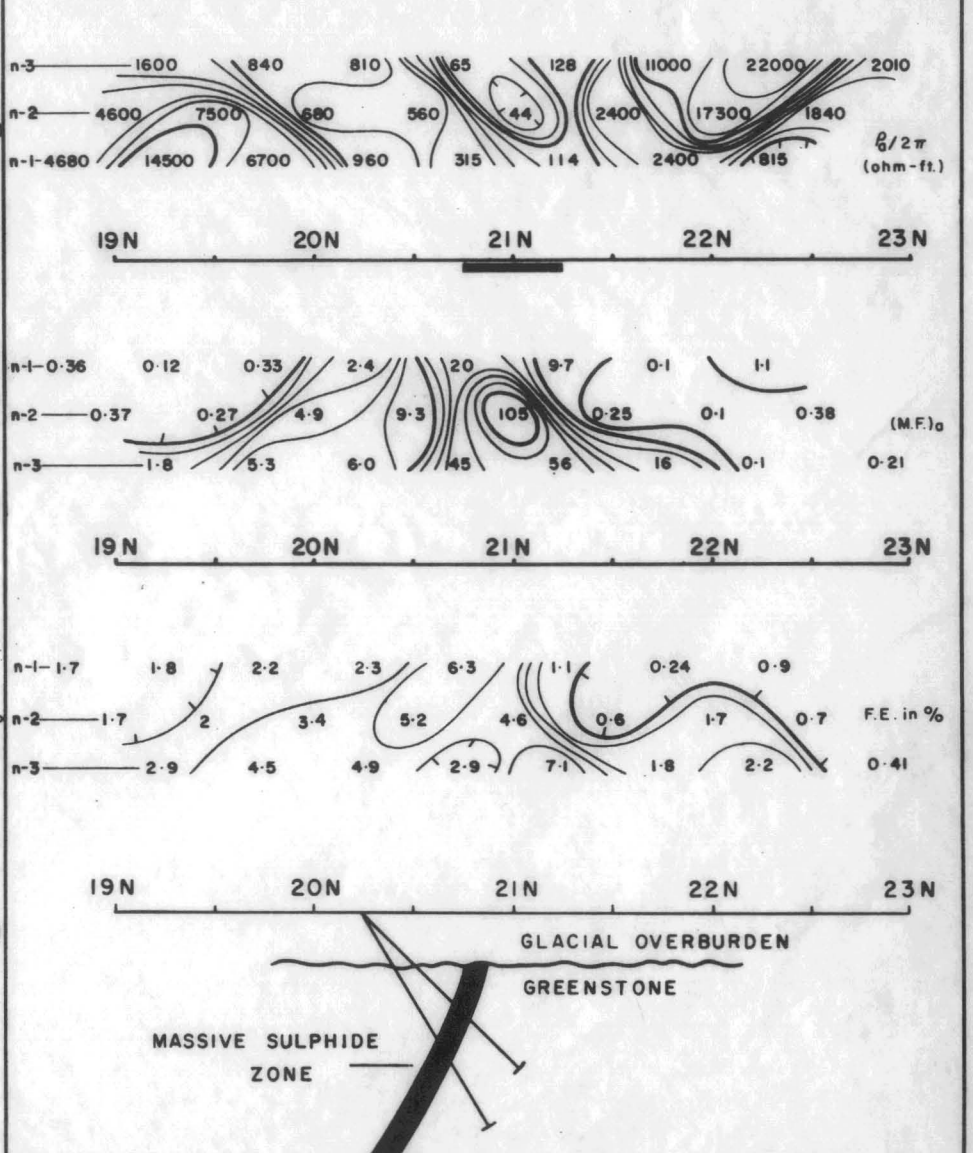


FIG. 6

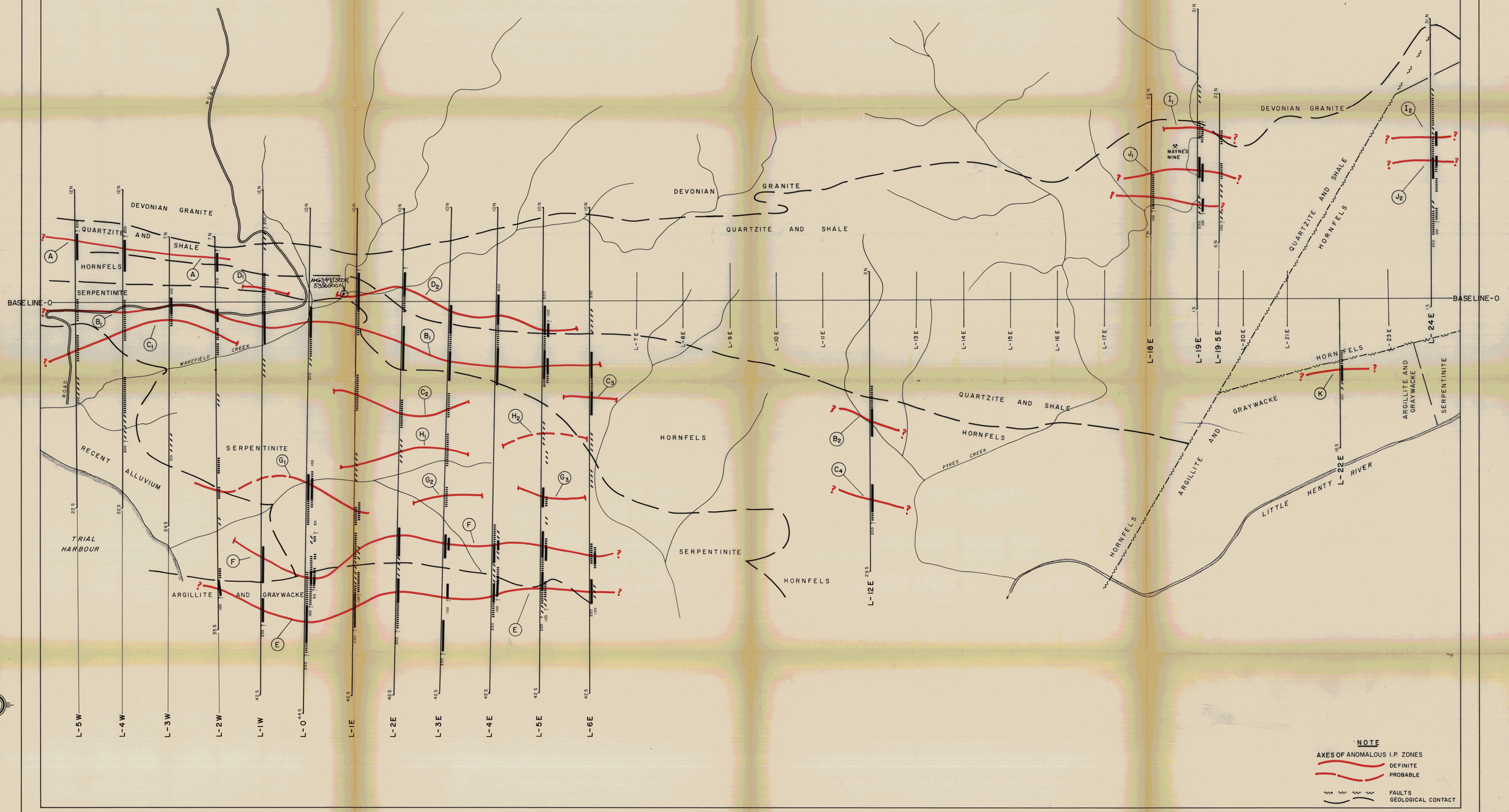
5 cm

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PLAN MAP

McPHAR GEOPHYSICS
INDUCED POLARIZATION AND RESISTIVITY SURVEY
PLAN MAP



NOTE

AXES OF ANOMALOUS I.P. ZONES

DEFINITE

PROBABLE

FAULTS

GEOLOGICAL CONTACT

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

Number at the end of anomaly indicates spread used.

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

TRIAL HARBOUR GRID, ZEEHAN AREA, TASMANIA

SCALE

ONE INCH EQUALS FOUR HUNDRED FEET

AMG REFERENCE POINT ADDED

70-657

982030

DRAWN: V.T.Y.

DATE: JULY 1970

APPROVED:

P.R. HALLOF

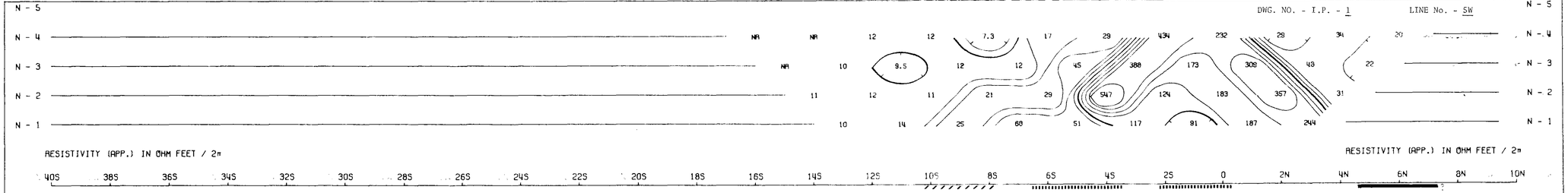
DATE:

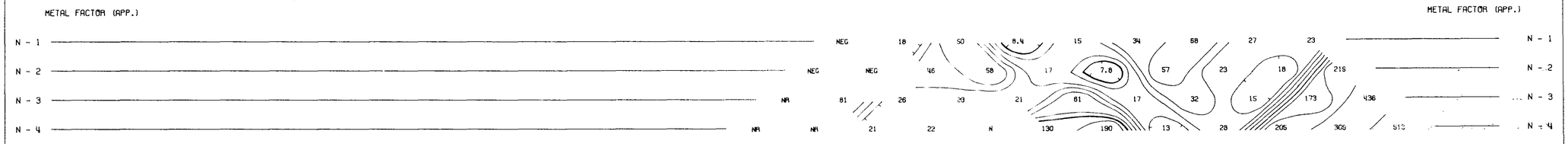
5275

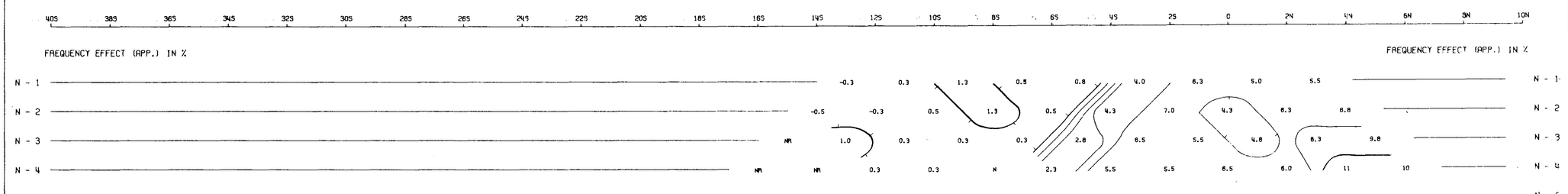
5 cm

DWG. I.P.P.-4632

DWG. NO. - I.P. - 1 LINE No. - 5W







982031 DWG. NO.- I.P.-5473-1

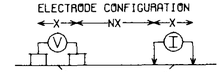
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 5W

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬

PROBABLE ▮▮▮▮▮▮▮▮▮▮

POSSIBLE / / / / / /

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 7/13/70

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

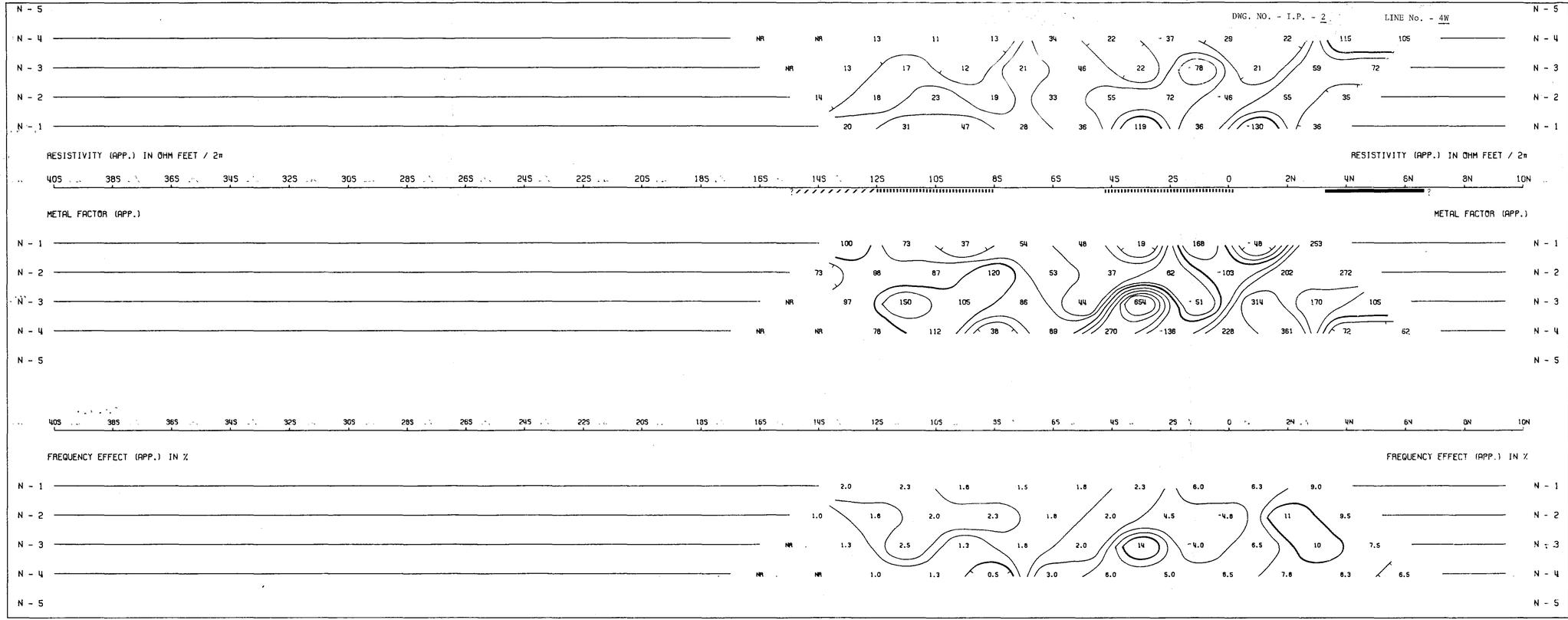
5 cm

McPHAR GEOPHYSICS 5076

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 2 LINE No. - 4W



982032 DWG. NO.- I.P.-5473-2

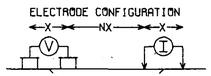
ELECTROLYTIC ZINC COMPANY OF ASIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 4W

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 7/13/71

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

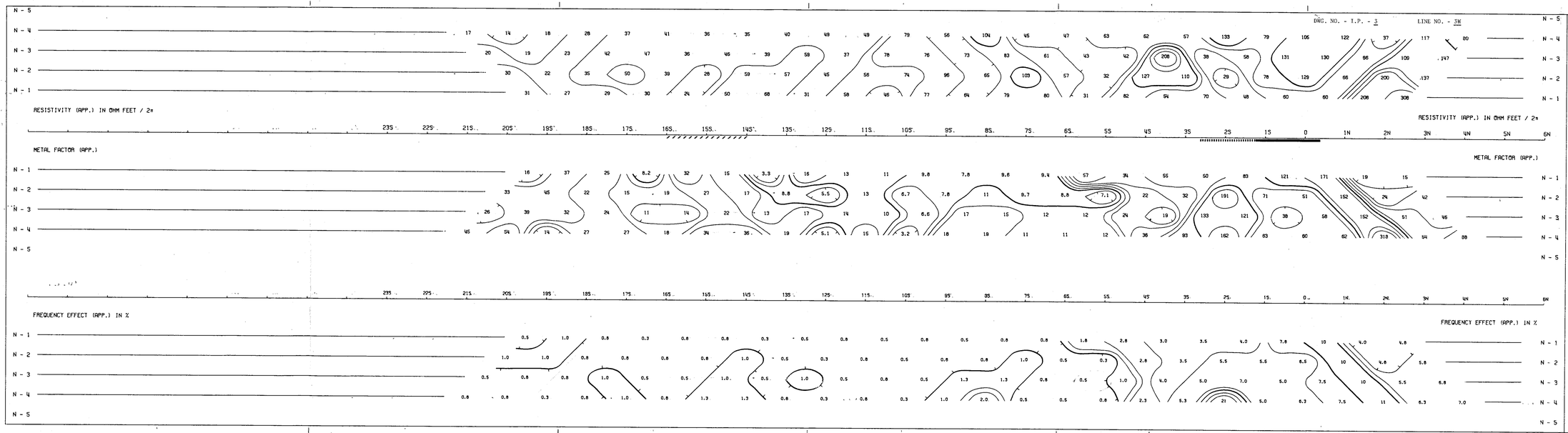
5 cm

McPHAR GEOPHYSICS 5277

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 3 LINE NO. - 3N



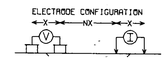
982033 DWG. NO.- I.P.-5473-3

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID
ZEEHAN AREA, TASMANIA

LINE NO.- 3N

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1976

APPROVED:

DATE: 7/13/76

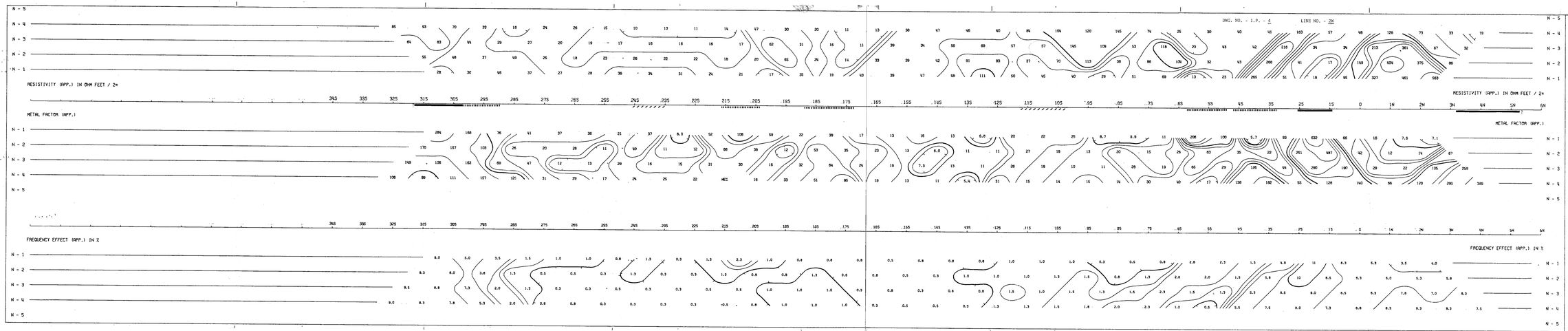
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

5 cm

McPHAR GEOPHYSICS 52?8

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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



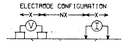
982034 DWG. NO.- I.P.-5473-4

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID
ZEEHAN AREA, TASMANIA

LINE NO.- 2N

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 7/3/70

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

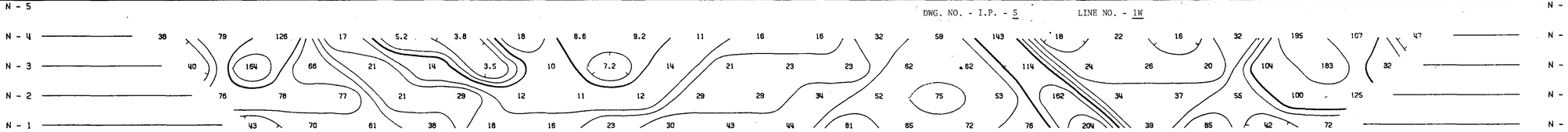
5 cm

McPHAR GEOPHYSICS 5279

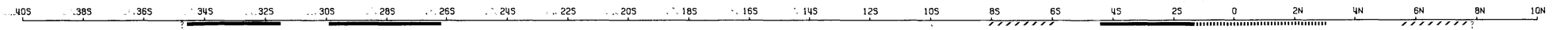
INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 5 LINE NO. - 1W

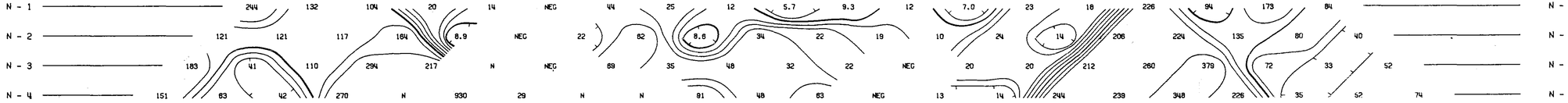


RESISTIVITY (APP.) IN OHM FEET / 2π

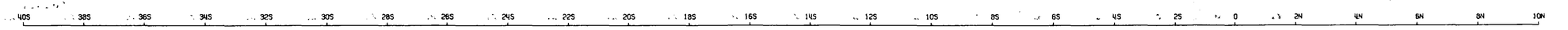


RESISTIVITY (APP.) IN OHM FEET / 2π

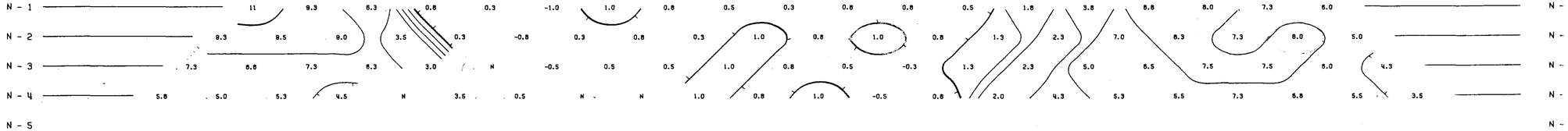
METAL FACTOR (APP.)



METAL FACTOR (APP.)



FREQUENCY EFFECT (APP.) IN %



FREQUENCY EFFECT (APP.) IN %

982035 DWG. NO.- I.P.-5473-5

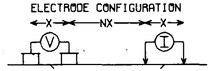
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 1W

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 7/3/70

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

5 cm

McPHAR GEOPHYSICS 5280

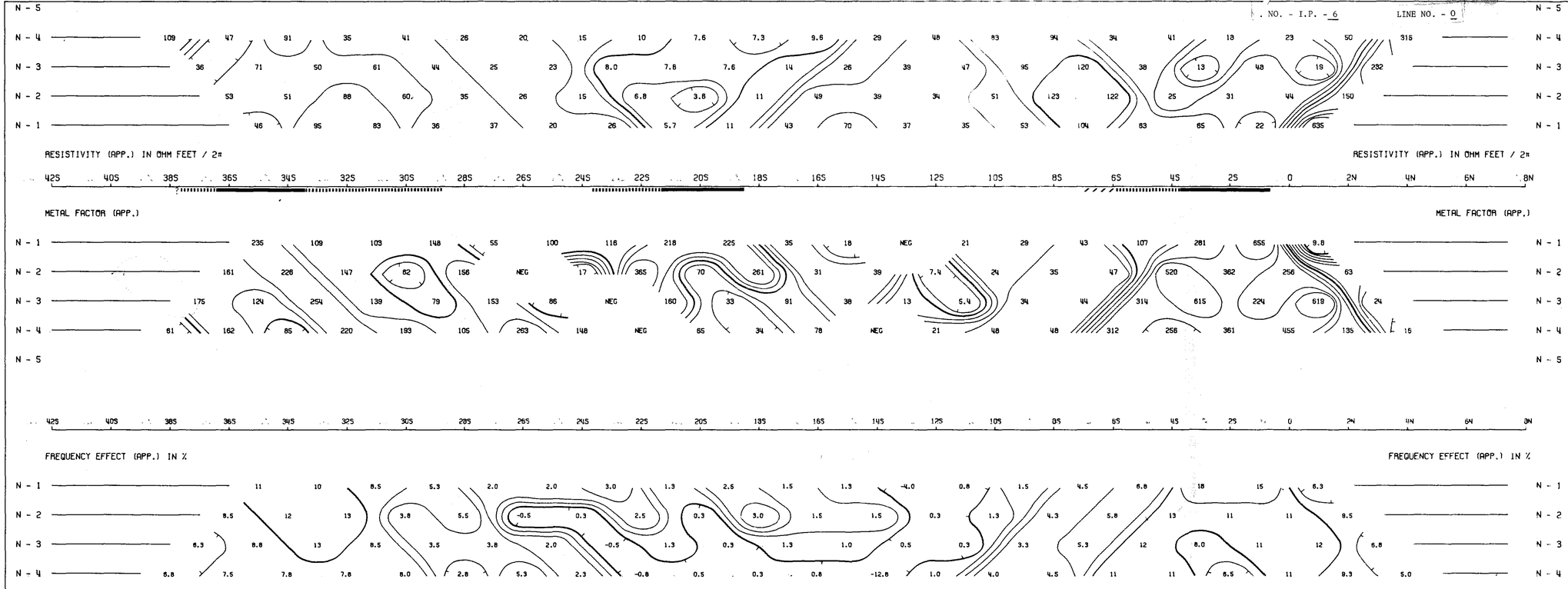
INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

982036

. NO. - I.P. - 6 LINE NO. - 0

DWG. NO.- I.P.- 5473-6



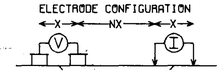
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 0

ELECTRODE CONFIGURATION



PLOTTING POINT X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: JAN 1970

APPROVED:

DATE: 4/3/70

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

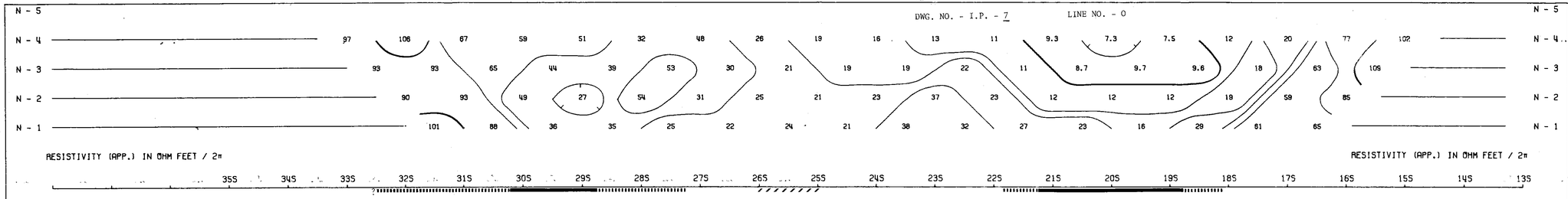
5 cm

McPHAR GEOPHYSICS 5281

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 7 LINE NO. - 0

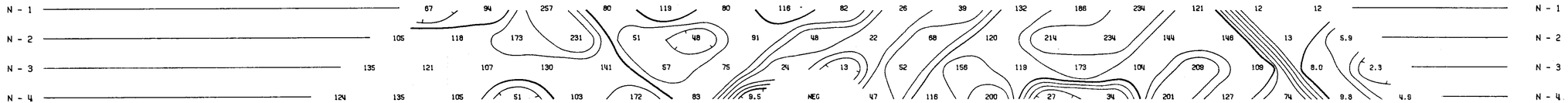


RESISTIVITY (APP.) IN OHM FEET / 2π

RESISTIVITY (APP.) IN OHM FEET / 2π

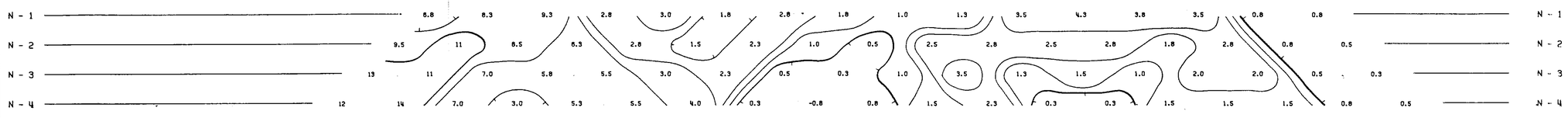
METAL FACTOR (APP.)

METAL FACTOR (APP.)



FREQUENCY EFFECT (APP.) IN %

FREQUENCY EFFECT (APP.) IN %



982037 DWG. NO.- I.P.-5473-7

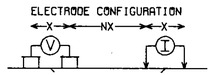
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 0

ELECTRODE CONFIGURATION



PLOTTING POINT → X X = 100'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ——————

PROBABLE ||||||||||||

POSSIBLE / / / / /

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/8/75

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

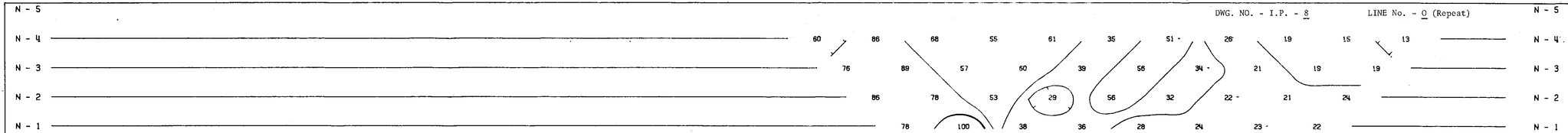
5 cm

McPHAR GEOPHYSICS 5282

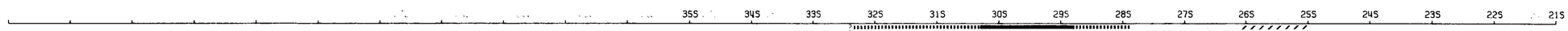
INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 8 LINE No. - Q (Repeat)

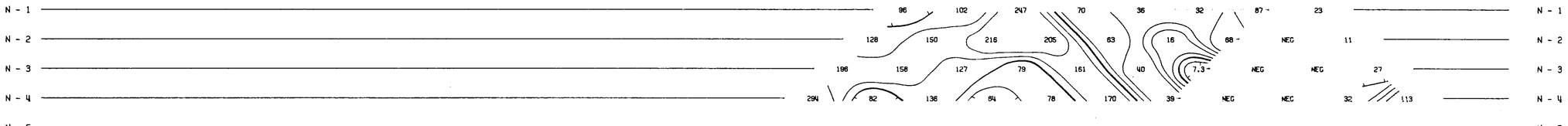


RESISTIVITY (APP.) IN OHM FEET / 2π

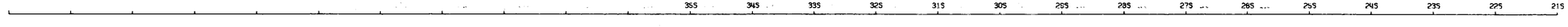


RESISTIVITY (APP.) IN OHM FEET / 2π

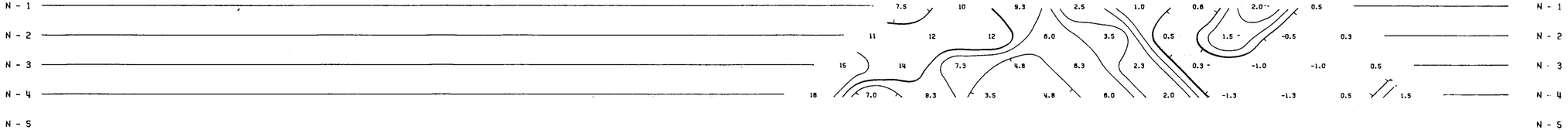
METAL FACTOR (APP.)



METAL FACTOR (APP.)



FREQUENCY EFFECT (APP.) IN %



FREQUENCY EFFECT (APP.) IN %

982038 DWG. NO.- I.P.-5473-8

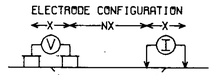
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- Q (REPEAT)

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/3/70

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

5 cm

McPHAR GEOPHYSICS 5283

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

982039

DWG. NO.- I.P.-5473-9

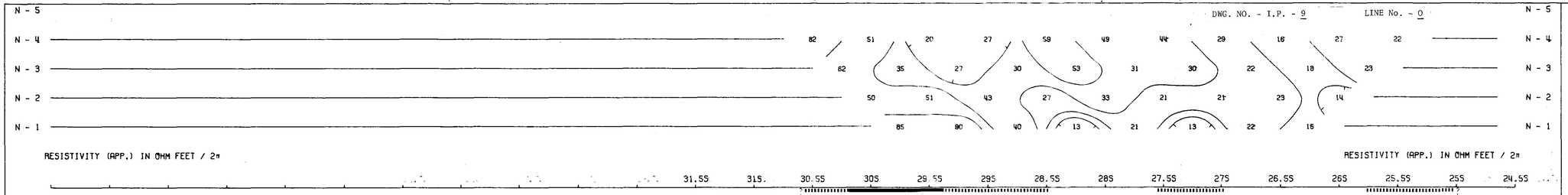
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

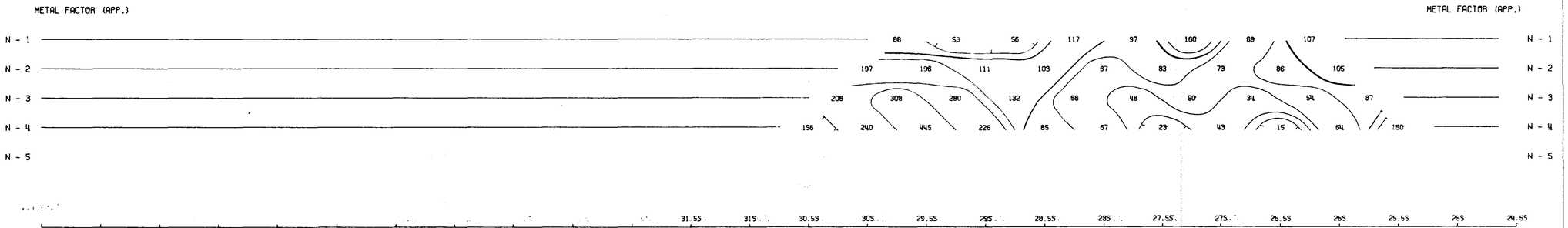
TRIAL HARBOUR GRID

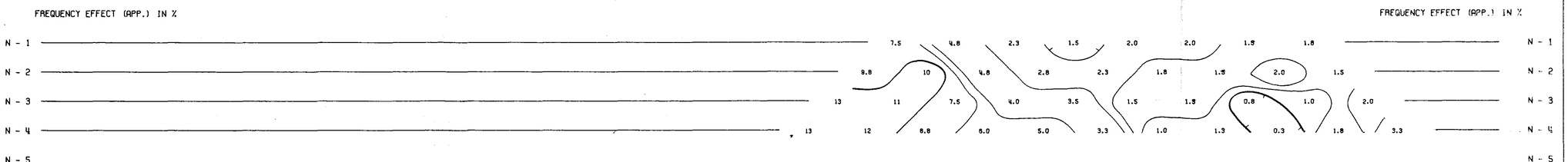
ZEEHAN AREA, TASMANIA

LINE NO.- 0

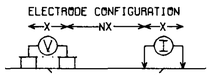
DWG. NO. - I.P. - 9 LINE No. - 0







ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 7/13/70

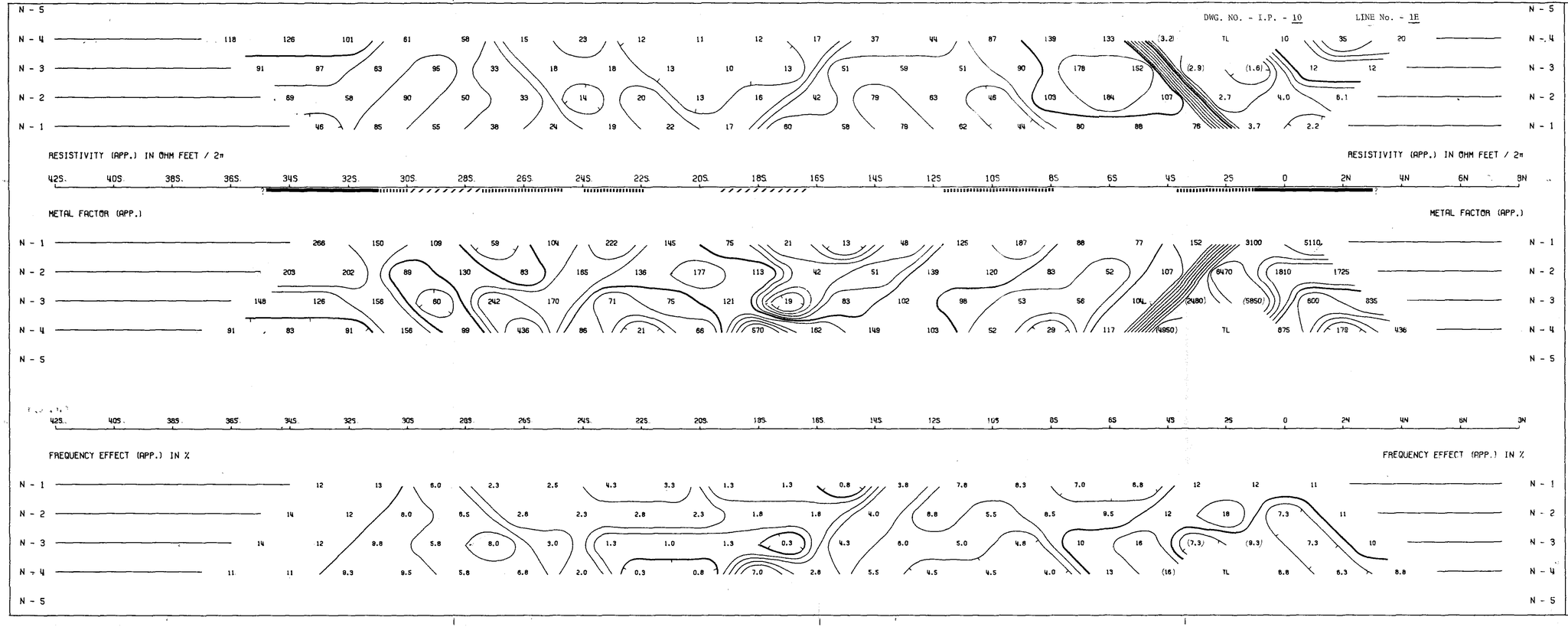
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

5 cm

McPHAR GEOPHYSICS 5294

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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



982040 DWG. NO.- I.P.-5473-10

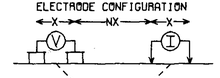
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 1E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 7/1970

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

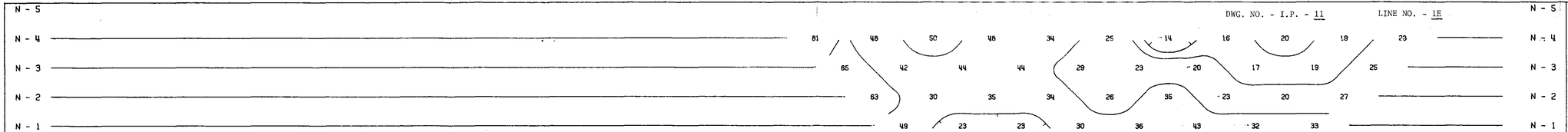
5 cm

McPHAR GEOPHYSICS 5235

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 11 LINE NO. - 1E

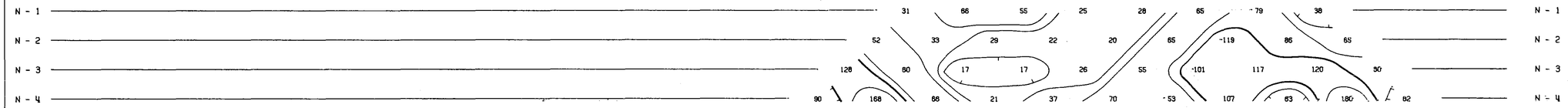


RESISTIVITY (APP.) IN OHM FEET / 2π

RESISTIVITY (APP.) IN OHM FEET / 2π

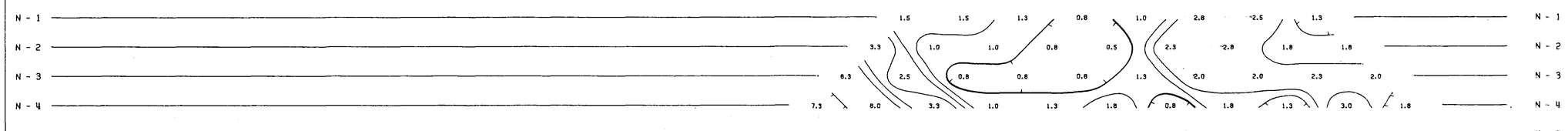
METAL FACTOR (APP.)

METAL FACTOR (APP.)



FREQUENCY EFFECT (APP.) IN %

FREQUENCY EFFECT (APP.) IN %



982041 DWG. NO.- I.P.-5473-11

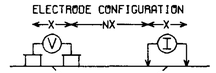
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 1E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/13/70

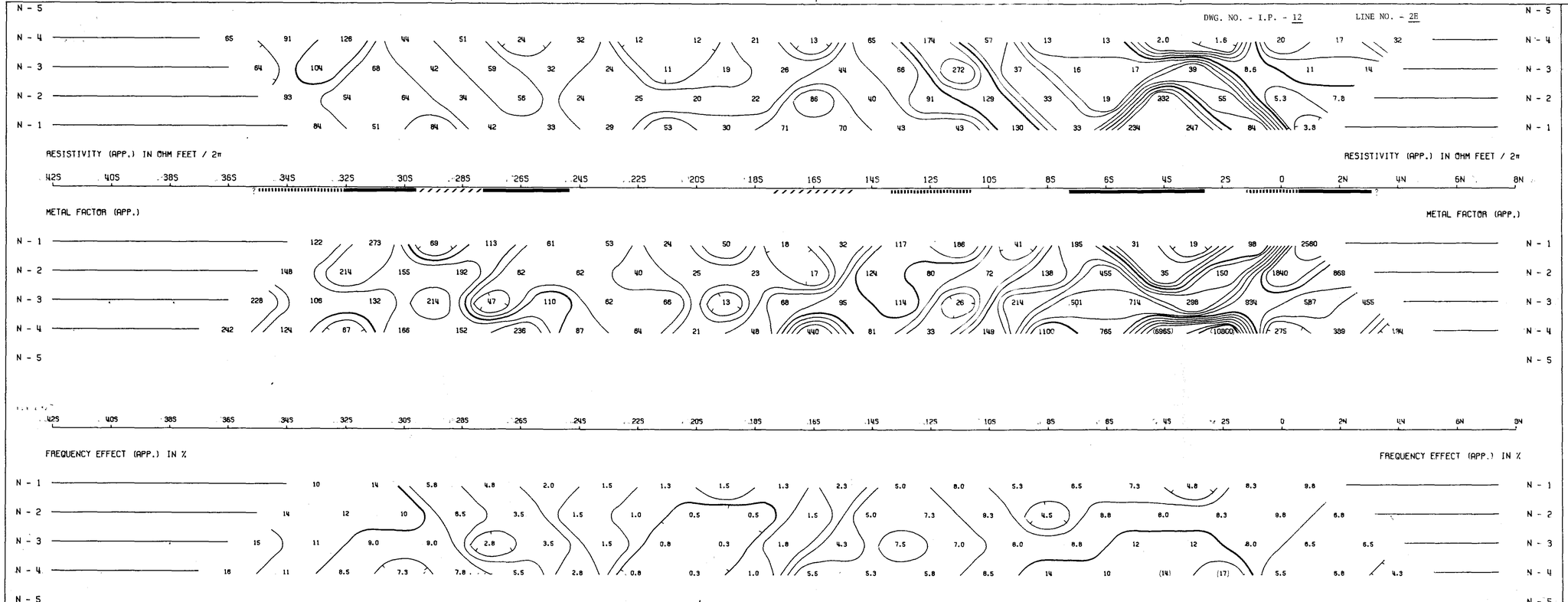
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

5 cm

McPHAR GEOPHYSICS 5286

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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



982042 DWG. NO.- I.P.-5473-12

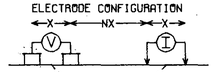
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 2E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 2/13/70

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

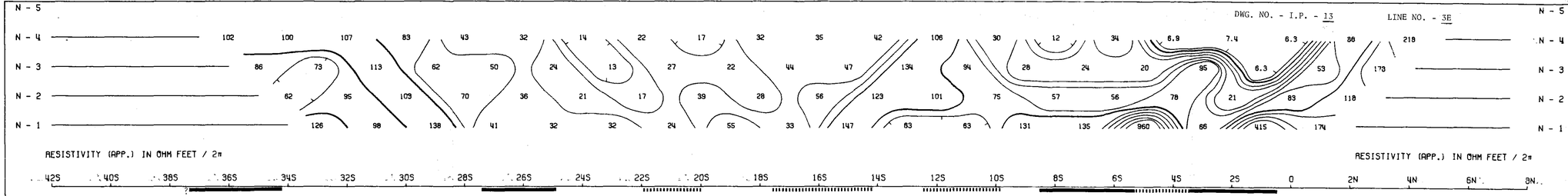
5 cm

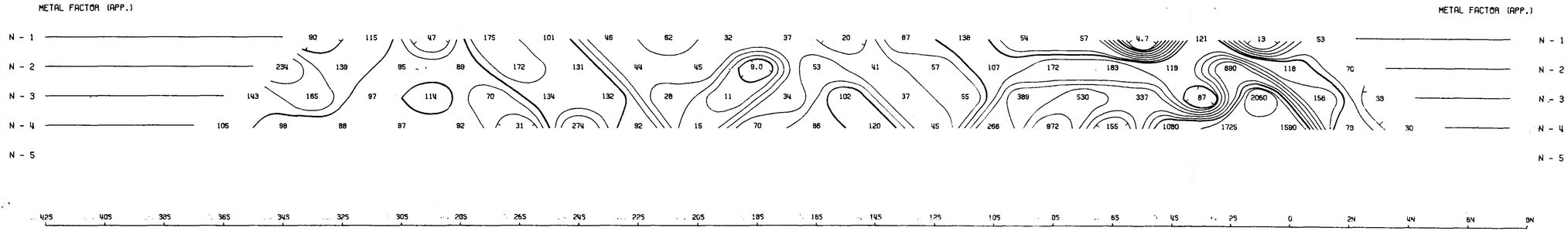
McPHAR GEOPHYSICS 5237

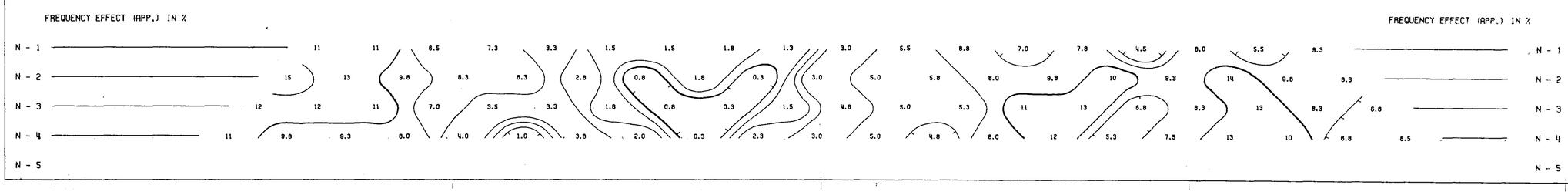
INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 13 LINE NO. - 3E







982043 DWG. NO.- I.P.- 5473-13

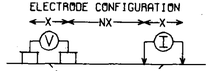
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 3E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 4/3/70

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

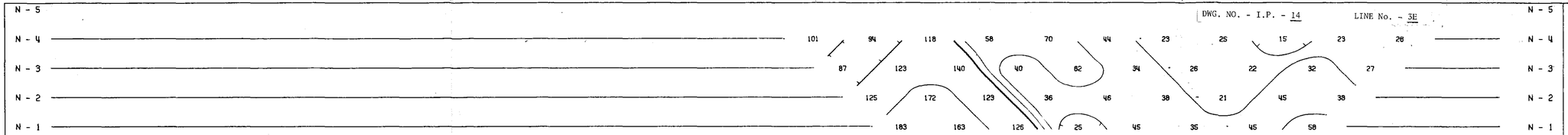
5 cm

McPHAR GEOPHYSICS 5238

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

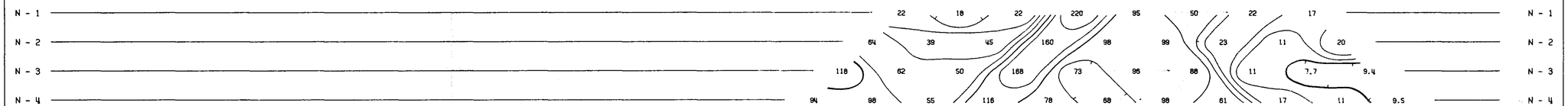
DWG. NO. - I.P. - 14 LINE No. - 3E



RESISTIVITY (APP.) IN OHM FEET / 2π

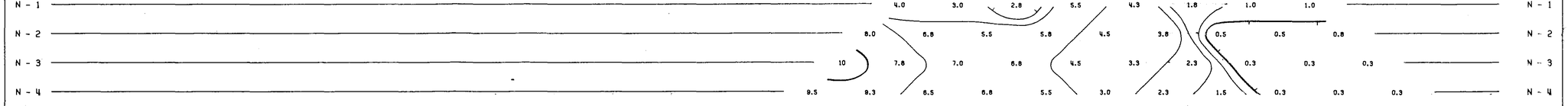
RESISTIVITY (APP.) IN OHM FEET / 2π

METAL FACTOR (APP.)



METAL FACTOR (APP.)

FREQUENCY EFFECT (APP.) IN %



FREQUENCY EFFECT (APP.) IN %

982044 DWG. NO.- I.P.-5473-14

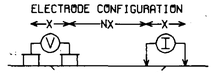
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 3E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ——————

PROBABLE ▪▪▪▪▪▪▪▪▪▪▪▪

POSSIBLE / / / / /

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/8/70

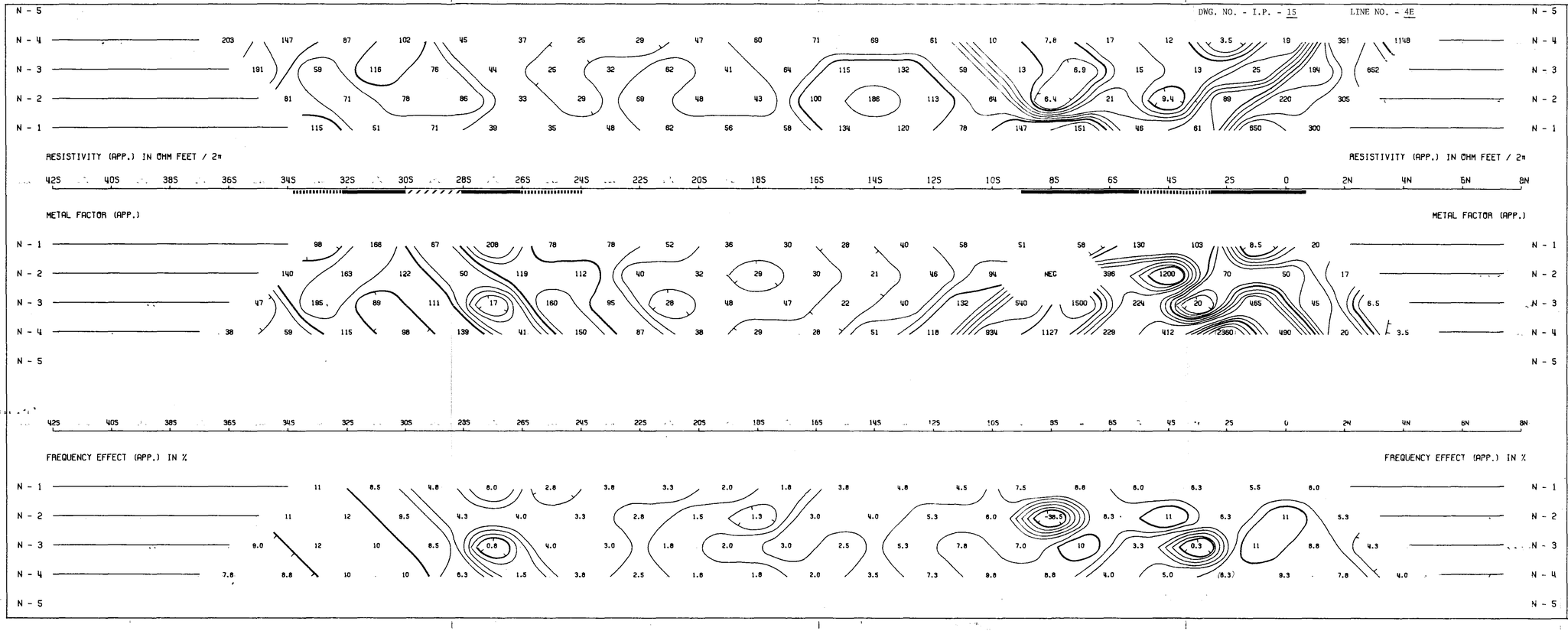
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

5 cm

McPHAR GEOPHYSICS 5229

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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



982045

DWG. NO.- I.P.- 5473-15

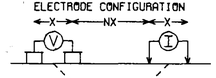
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 4E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 7/8/70

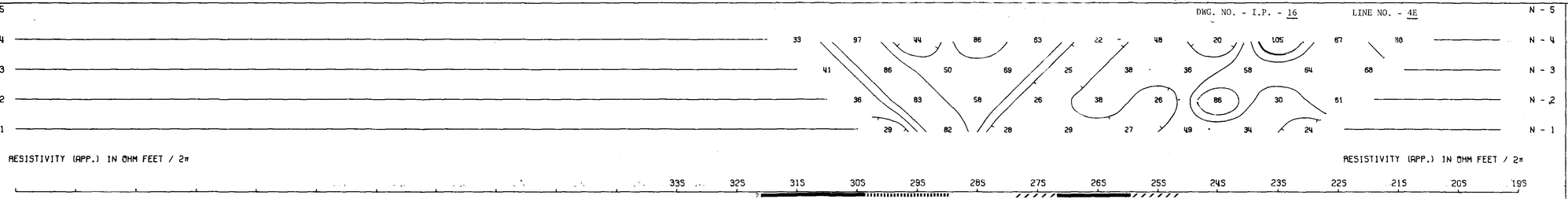
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

5 cm

McPHAR GEOPHYSICS 5290

INDUCED POLARIZATION AND RESISTIVITY SURVEY

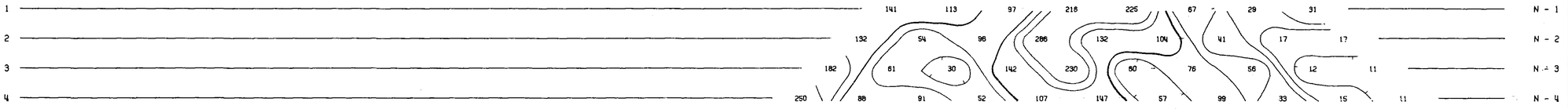
NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER



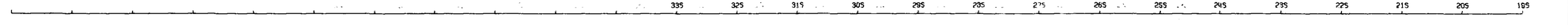
RESISTIVITY (APP.) IN OHM FEET / 2π

RESISTIVITY (APP.) IN OHM FEET / 2π

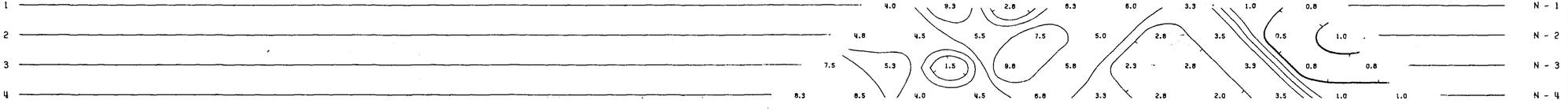
METAL FACTOR (APP.)



METAL FACTOR (APP.)



FREQUENCY EFFECT (APP.) IN %



FREQUENCY EFFECT (APP.) IN %

982046

DWG. NO.- I.P.-5473-16

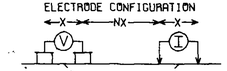
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 4E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/12/70

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

5 cm

McPHAR GEOPHYSICS 5291

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

982047

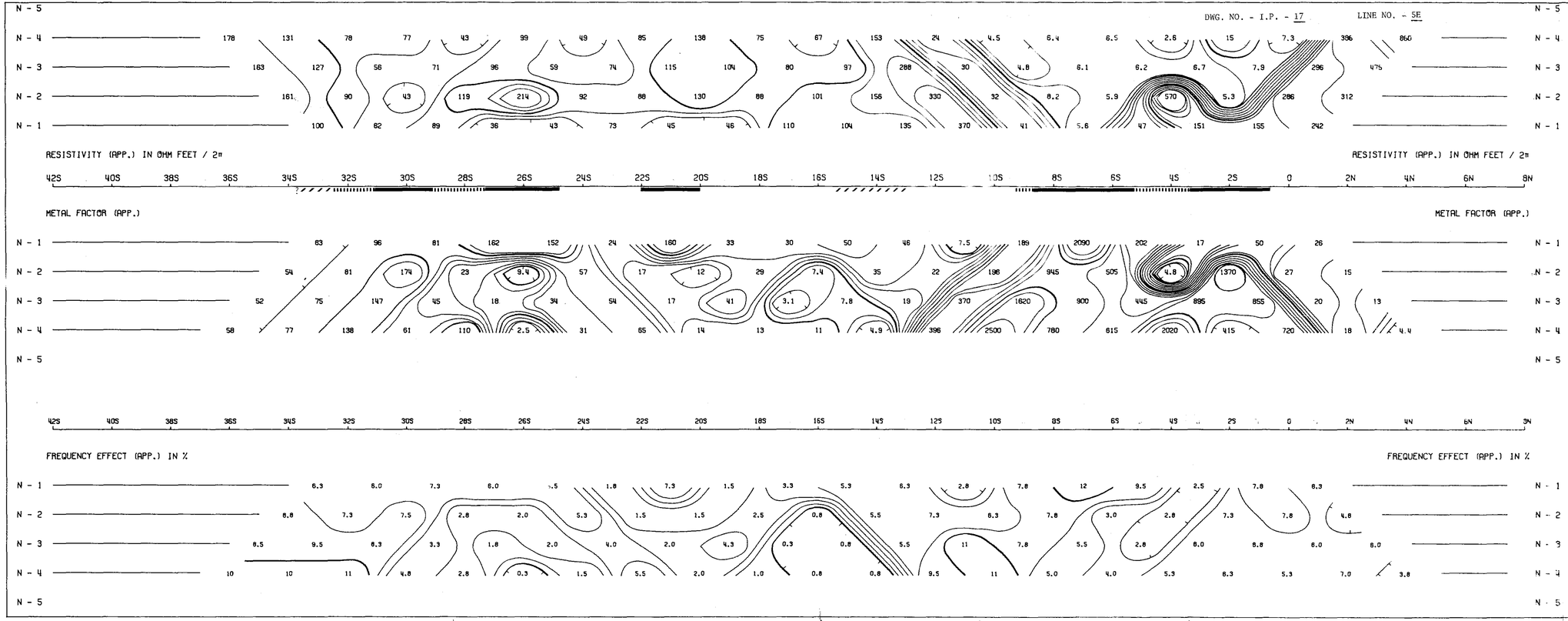
DWG. NO.- I.P.- 5473-17

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

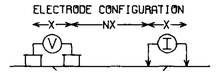
ZEEHAN AREA, TASMANIA

DWG. NO. - I.P. - 17 LINE NO. - 5E



LINE NO.- 5E

ELECTRODE CONFIGURATION



PLOTTING POINT → X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 7/4/70

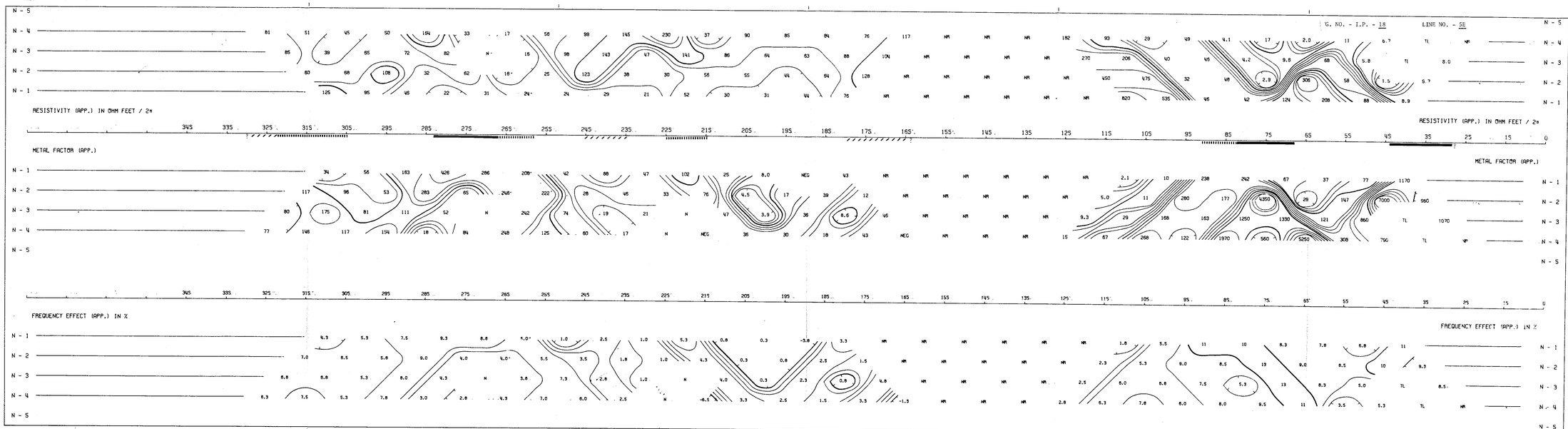
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

5 cm

McPHAR GEOPHYSICS 5292

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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



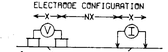
982048 DWG. NO.- I.P.-6473-18

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR AREA
ZEEHAN AREA, TASMANIA

LINE NO.- 5E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/19/70

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

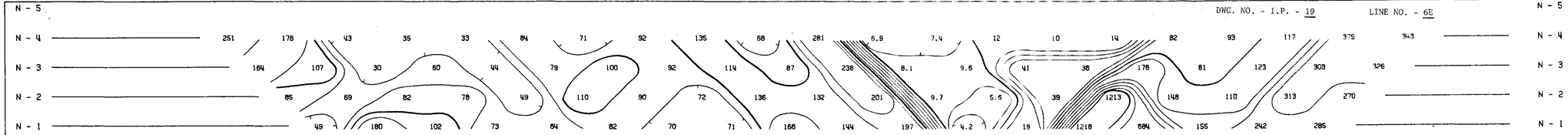
5 cm

McPHAR GEOPHYSICS 5293

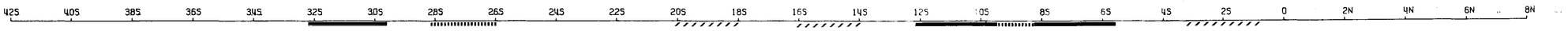
INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 19 LINE NO. - 6E

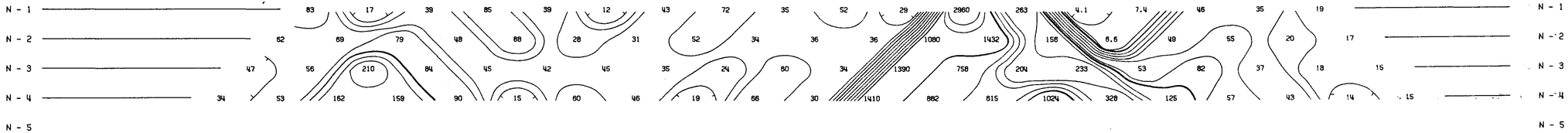


RESISTIVITY (APP.) IN OHM FEET / 2π

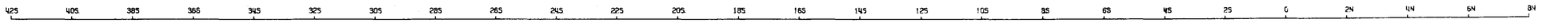


RESISTIVITY (APP.) IN OHM FEET / 2π

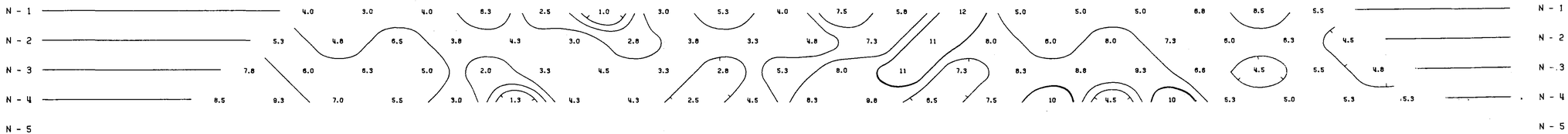
METAL FACTOR (APP.)



METAL FACTOR (APP.)



FREQUENCY EFFECT (APP.) IN %



FREQUENCY EFFECT (APP.) IN %

982049 DWG. NO.- I.P.-5473-19

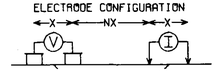
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO. - 6E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ━━━

PROBABLE ┅┅┅

POSSIBLE ⁄⁄⁄⁄⁄

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 7/3/70

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

5 cm

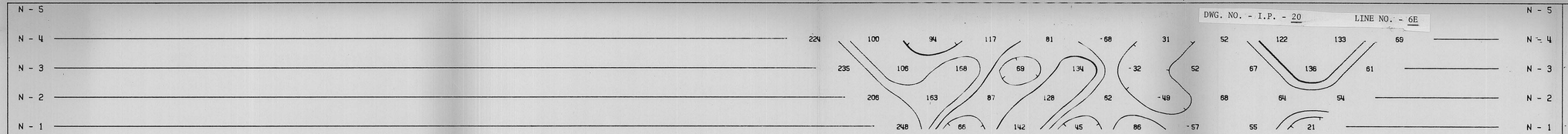
McPHAR GEOPHYSICS 5224

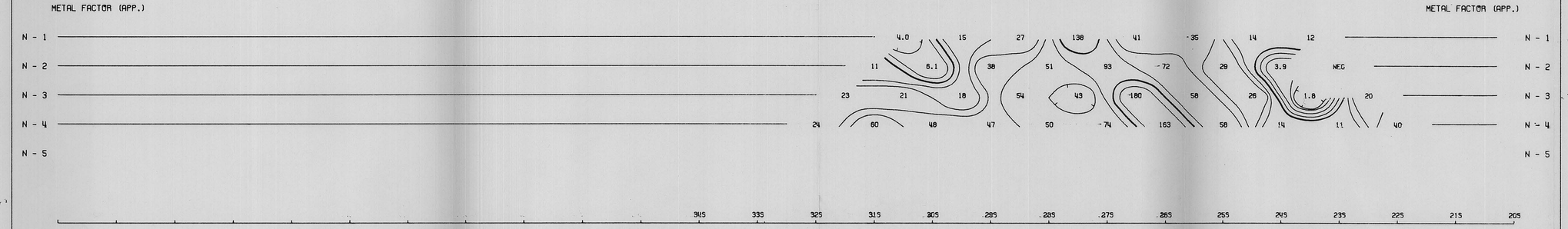
INDUCED POLARIZATION AND RESISTIVITY SURVEY

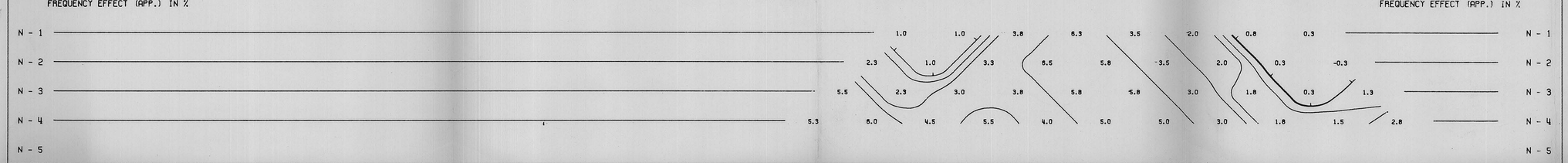
NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

70-657

DWG. NO. - I.P. - 20 LINE NO. - 6E







98050 DWG. NO.- I.P.- 5473-20

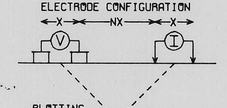
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 6E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/3/70

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

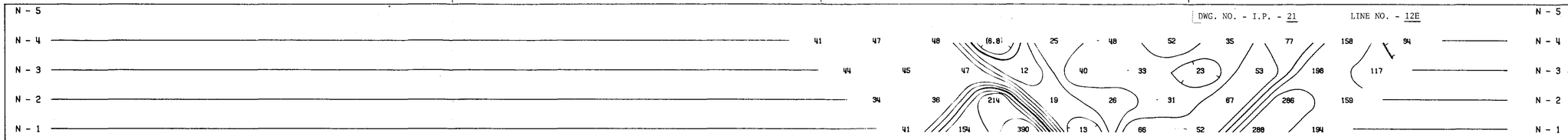
5 cm

McPHAR GEOPHYSICS 5225

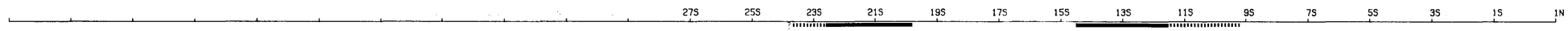
INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 21 LINE NO. - 12E

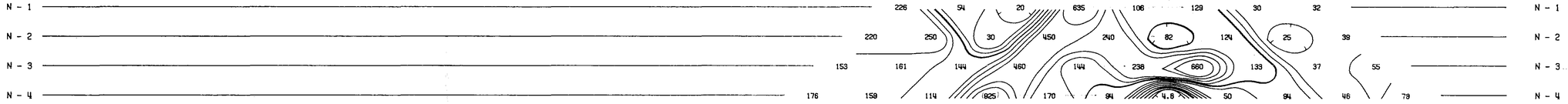


RESISTIVITY (APP.) IN OHM FEET / 2π



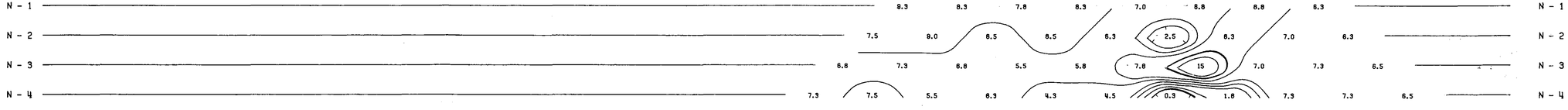
RESISTIVITY (APP.) IN OHM FEET / 2π

METAL FACTOR (APP.)



METAL FACTOR (APP.)

FREQUENCY EFFECT (APP.) IN %



FREQUENCY EFFECT (APP.) IN %

982051 DWG. NO.- I.P.-5473-21

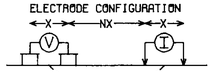
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 12E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: JAN 1970

APPROVED:

DATE: 7/15/70

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

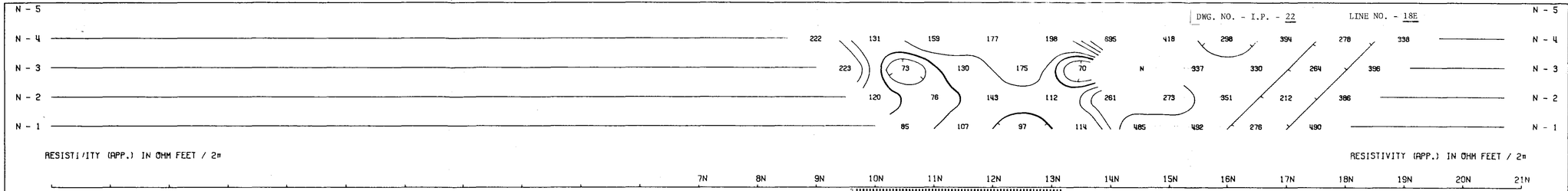
5 cm

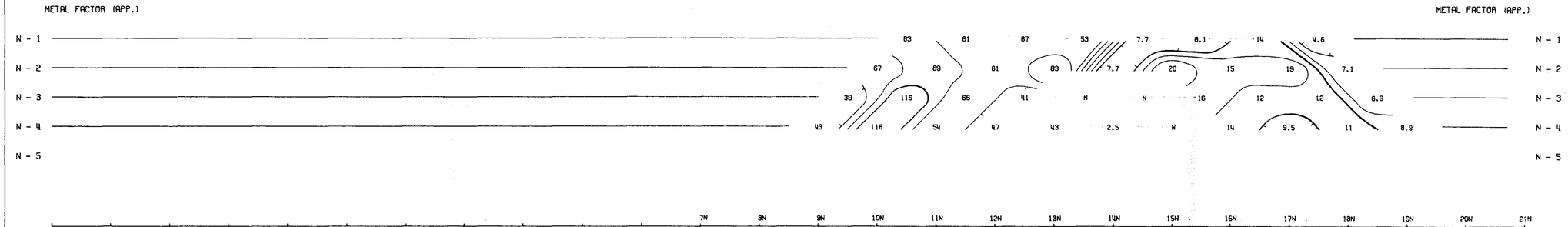
McPHAR GEOPHYSICS 5296

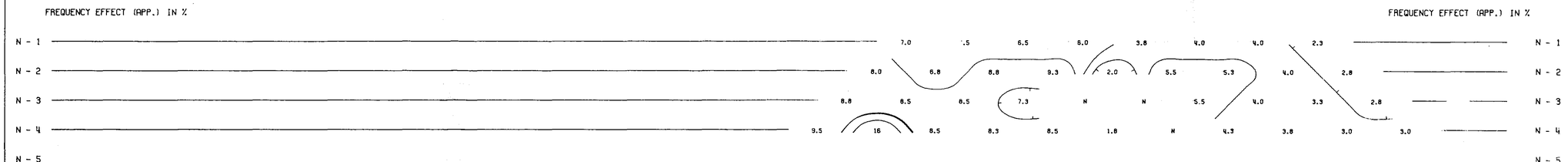
INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 22 LINE NO. - 18E







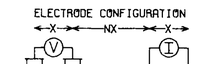
982052 DWG. NO.- I.P.-5473-22

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID
ZEEHAN AREA, TASMANIA

LINE NO.- 18E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/13/78

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

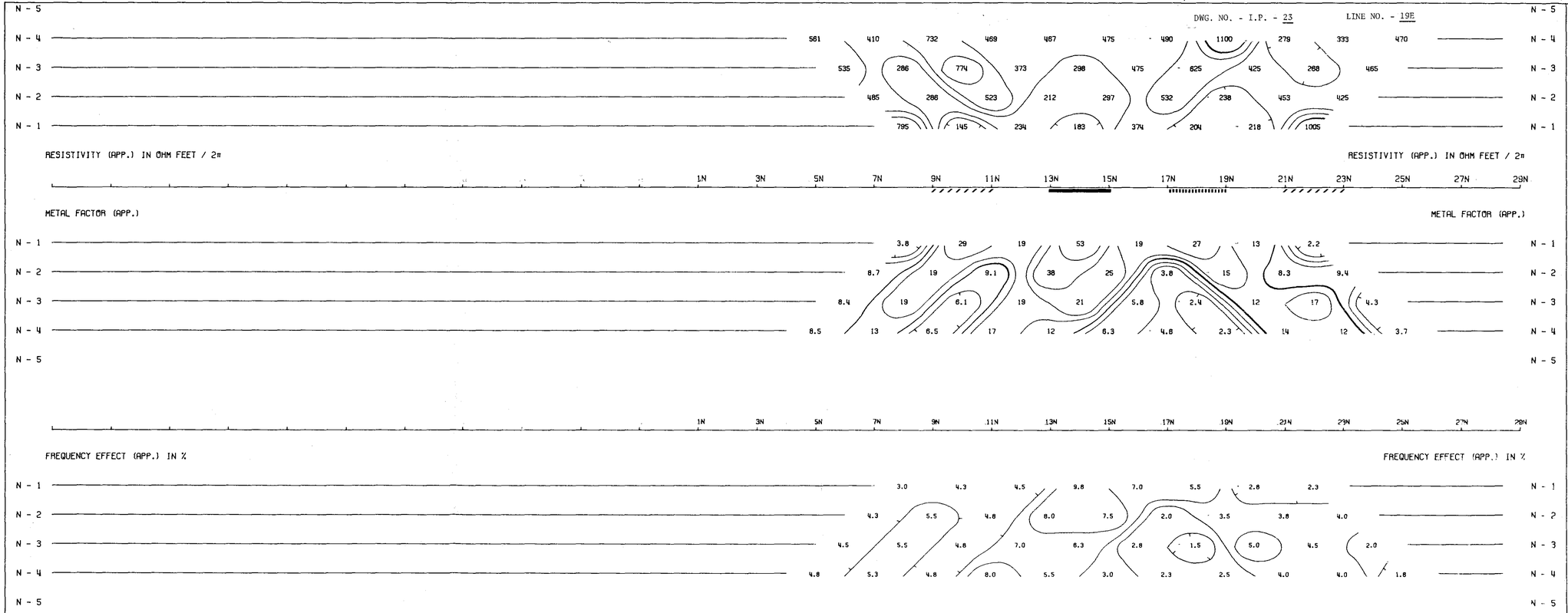
5 cm

McPHAR GEOPHYSICS 5227

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 23 LINE NO. - 19E



982053 DWG. NO.- I.P.- 5473-23

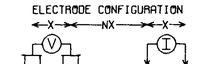
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 19E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: JAN 1970

APPROVED:

DATE: 3/12/70

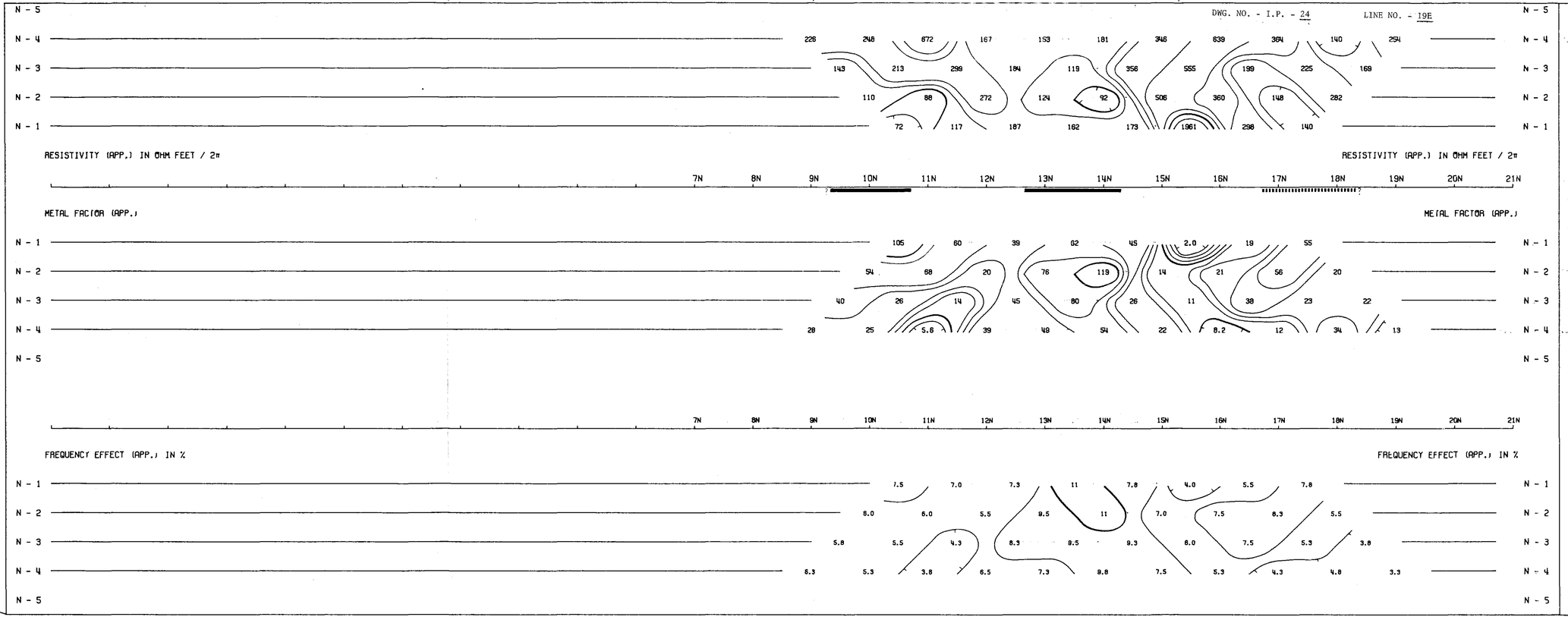
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

5 cm

McPHAR GEOPHYSICS 5238

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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



982054 DWG. NO.- I.P. - 5473-24

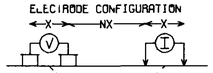
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 19E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/13/70

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

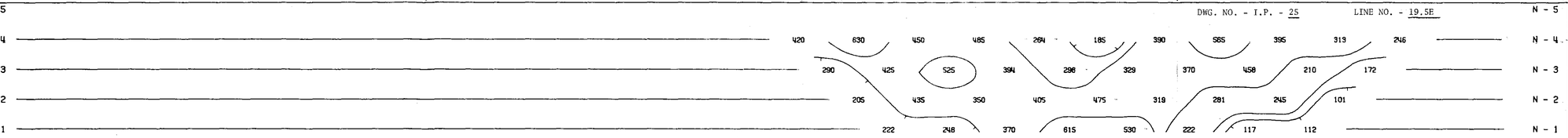
5 cm

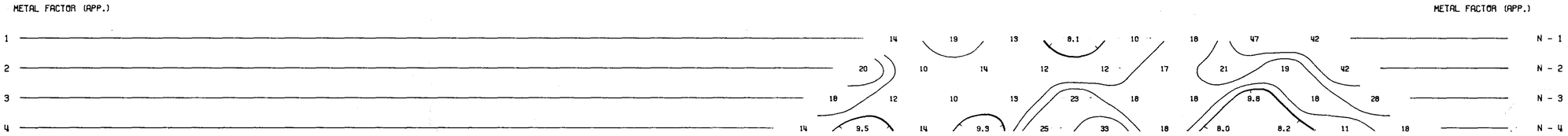
McPHAR GEOPHYSICS 5239

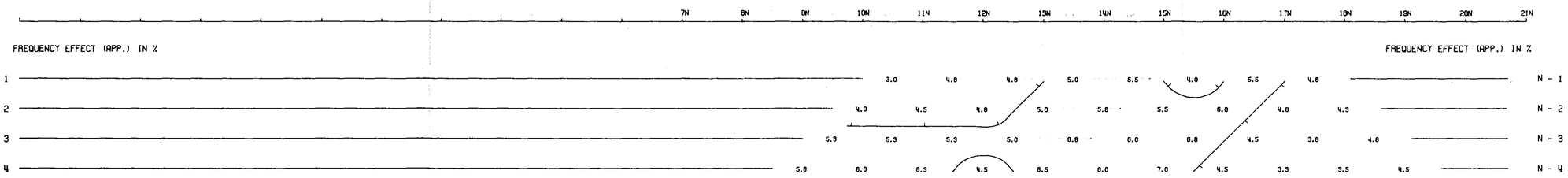
INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. - 25 LINE NO. - 19.5E







982055 DWG. NO.- I.P.- 5473-25

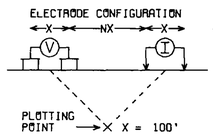
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 19.5E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/12/70

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

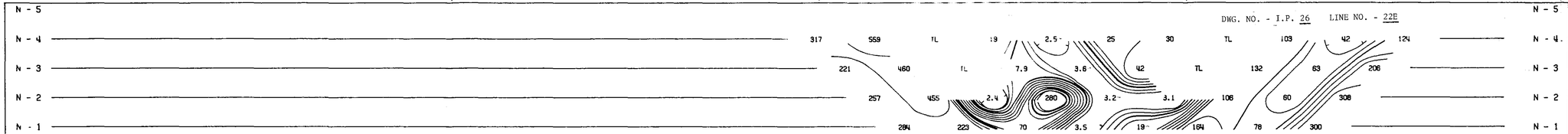
5 cm

McPHAR GEOPHYSICS 5300

INDUCED POLARIZATION AND RESISTIVITY SURVEY

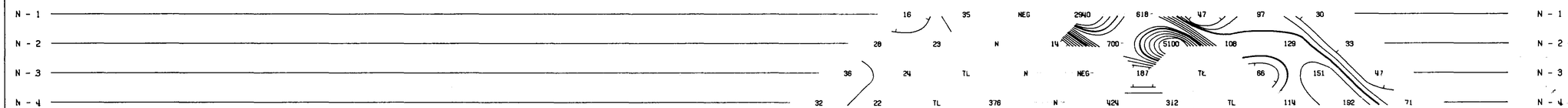
NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

DWG. NO. - I.P. 26 LINE NO. - 22E

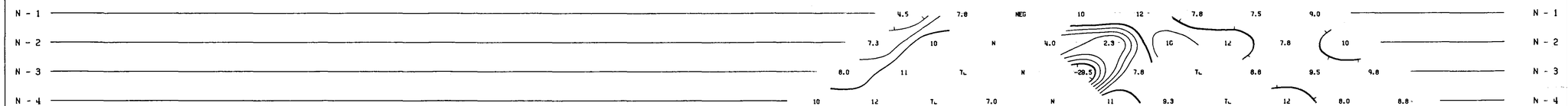


RESISTIVITY (APP.) IN OHM FEET / 2π

METAL FACTOR (APP.)



FREQUENCY EFFECT (APP.) IN %



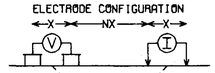
982056 DWG. NO.- I.P.-5473-26

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID
ZEEHAN AREA, TASMANIA

LINE NO. - 22E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: FEB 1970

APPROVED:

DATE: 7/13/70

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

5 cm

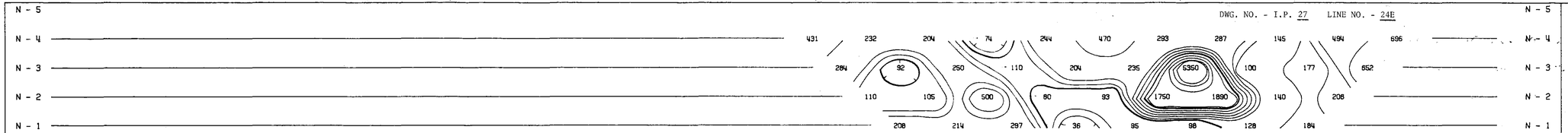
McPHAR GEOPHYSICS 5301

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

982057

DWG. NO. - I.P. 27 LINE NO. - 24E



DWG. NO.- I.P.-5473-27

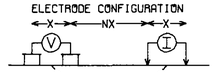
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 24E

ELECTRODE CONFIGURATION



PLOTTING POINT → X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ——————

PROBABLE ||||||||||||

POSSIBLE / / / / /

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: JAN 1970

APPROVED:

DATE: 7/8/70

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

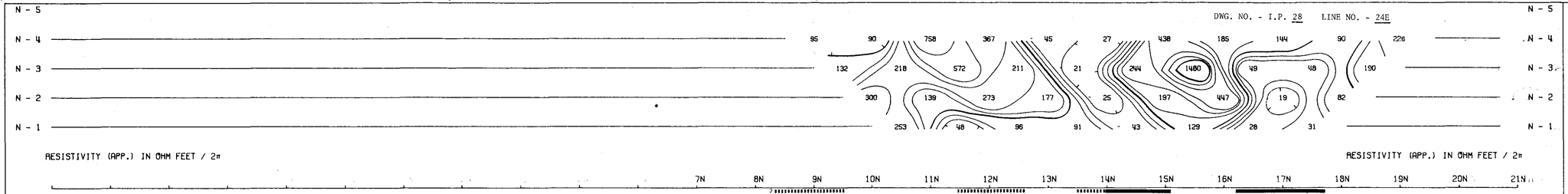
5 cm

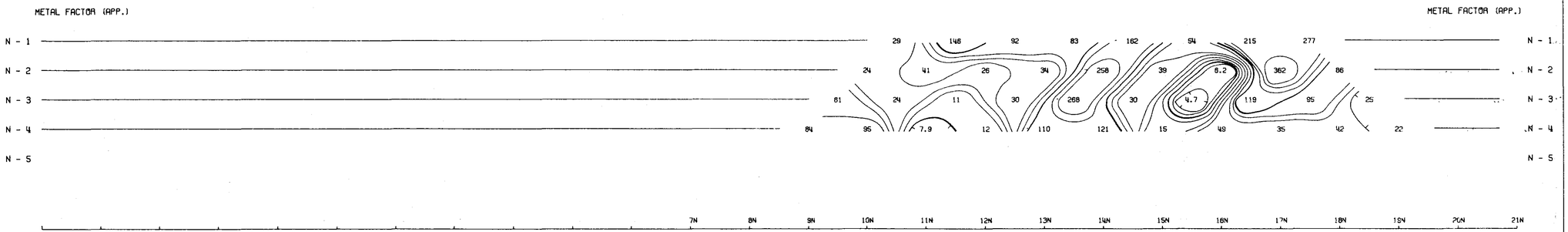
McPHAR GEOPHYSICS 5372

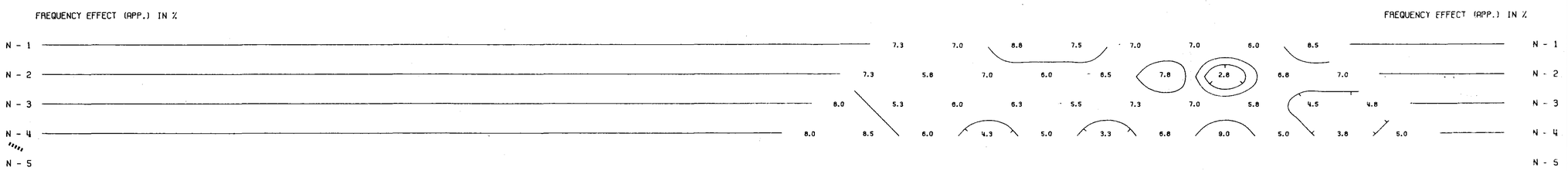
INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

DWG. NO. - I.P. 28 LINE NO. - 24E







982058 DWG. NO.- I.P.-5473-28

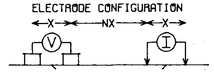
ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

TRIAL HARBOUR GRID

ZEEHAN AREA, TASMANIA

LINE NO.- 24E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-2.5 CPS

DATE SURVEYED: MAR 1970

APPROVED:

DATE: 7/12/70

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

5 cm

McPHAR GEOPHYSICS

5303

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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