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GEOPHYSICS

REPORT ON THE
INDUCED POLARIZATION
AND RESISTIVITY SURVEY
AT
MERRILLT, TASMANIA
FOR

ELECTROLYTIC ZINC COMPANY
AUSTRALASIA LIMITED

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 noisy 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

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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.

FIG
A. Induced polarisation & resistivity results

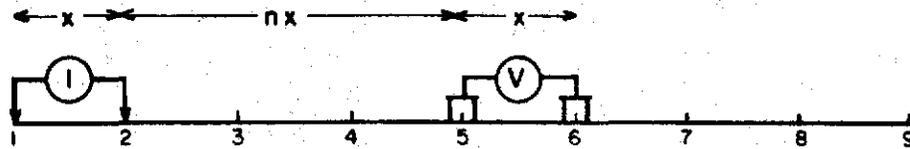
FIG

	Theoretical	induced	Polarisation	& resistivity	studies
1	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	results
6	✓	✓	✓	✓	✓

- Drawings
- 1P 5467-1 Line 10S
 - 1P 5467-2 Line 14S

- Maps
- | | | | |
|---|----------|-----|--------------------|
| 1 | Line 30N | 7 | Line 39N |
| 2 | ✓ 30N(I) | 8 | ✓ 39N(I) |
| 3 | ✓ 33N | 9 | ✓ 42N |
| 4 | ✓ 33N(I) | 10 | ✓ 42N(I) |
| 5 | ✓ 36N | 11 | ✓ 45N |
| 6 | ✓ 36N(I) | 12. | Melba Flat Surface |

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



Stations on line

x = Electrode spread length
 n = Electrode separation

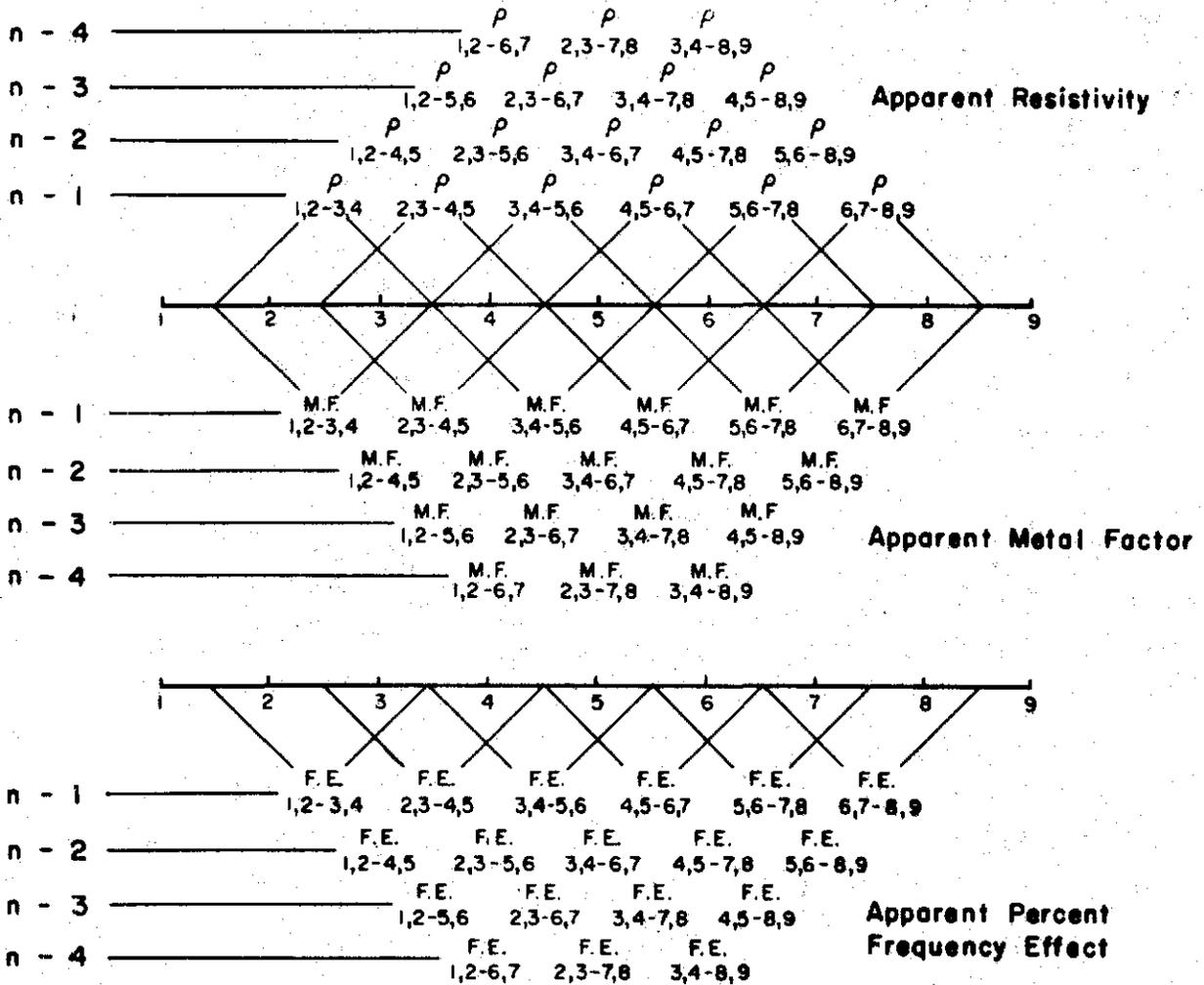


Fig. A

McPHAR GEOPHYSICS
REPORT ON THE
INDUCED POLARIZATION
AND RESISTIVITY SURVEY
AT
MELBA FLAT, TASMANIA
FOR
ELECTROLYTIC ZINC COMPANY
OF AUSTRALASIA LIMITED

1. INTRODUCTION

At the request of Electrolytic Zinc Company of Australasia Limited, an induced polarization and resistivity survey has been completed at Melba Flat, Tasmania.

The rocks in the area are argillites and graywackes of the Cambrian Crimson Creek Formation. In places the argillites contain finely disseminated pyrite.

The IP traverses test lead-zinc geochemical soil anomalies (Dwgs. IP 5467-1 and IP 5467-2). The probable source of the anomalies is small fissure veins of massive galena and sphalerite with minor amounts of pyrite. The induced polarization and resistivity survey was carried out to try to locate the source of any metallic mineralization in the grid area.

2. PRESENTATION OF RESULTS

The induced polarization and resistivity results are shown on

the following data plots in the manner described in the notes preceding this report.

<u>Line</u>	<u>Electrode Intervals</u>	<u>Dwg.No.</u>
10S	100 feet	IP 5467-1
14S	100 feet	IP 5467-2

No plan map is enclosed with this report, since the IP survey was completed to test specific geochemical anomalies only. The definite and possible induced polarization anomalies are indicated by solid and broken bars on 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.

Geological data was provided by professional staff of the Electrolytic Zinc Company of Australasia Limited.

3. DISCUSSION OF RESULTS

IP anomalies were located on both lines of the survey. The anomalies have been related to the magnetic and geochemical profiles which were supplied by Electrolytic Zinc Company of Australasia Limited.

Line 10S

Five anomalies were located on this line. The anomaly from 12+50W to 13+50W is weak and shallow. It correlates with a weak geochemical anomaly for both lead and zinc.

The anomaly from 10W to 11W is shallow but of greater magnitude and correlates with a fairly strong geochemical high for lead. This anomaly should be detailed with shorter electrode intervals. (See Appendix).

The anomaly from 8W to 9W is shallow and weak in magnitude; the source is probably very narrow. The anomaly corresponds with above-average geochemical values for both lead and zinc.

The anomaly from 4W to 5+50W has a weaker extension to 6+50W. The stronger portion of the anomaly corresponds with a geochemical high for lead. The anomaly is poorly defined, as several of the readings are negative; a detailed survey with shorter electrode intervals should aid in interpreting the data.

The last anomaly on the line has a stronger portion from 2W to 3W and a weaker portion from 0 to 2W. The stronger portion suggests a narrow source and correlates with a fairly strong geochemical anomaly for lead. The weaker portion correlates with a very strong lead geochemical anomaly; the pattern of this portion of the anomaly suggests a less concentrated source

than from 2W to 3W. The anomaly from 2W to 3W should be detailed with shorter electrode intervals to better define the source. (See Appendix).

Line 14S

Three anomalies were located on this line. The anomaly from 12+50W to 13+50W is moderately strong and extends to depth. It correlates with high lead values and decreasing zinc values.

A weak anomaly was located from 7W to 8W which extends to some depth. The third anomaly is moderately strong from 2W to 3W and has weak extensions to 1+50W and 3+50W. The anomaly, which is incomplete, correlates with high lead values and with increased zinc values. The line could be extended to the east to better define this anomaly.

4. CONCLUSIONS

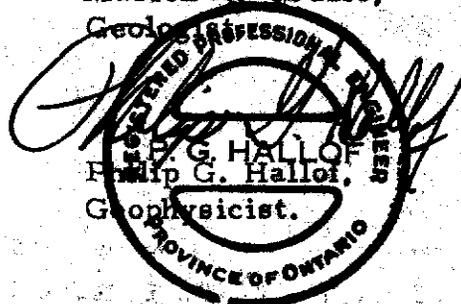
The IP anomalies correlate well with the geochemical anomalies. Several of the anomalies suggest very narrow sources and should be detailed with shorter electrode intervals. (See Appendix). Suggestions for detail work are embodied in the discussion of results.

McPHAR GEOPHYSICS PTY. LTD.

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Geophysicist

Philip G. Hallor
Philip G. Hallor,
Geophysicist.



Dated: June 26, 1970

McPHAR GEOPHYSICS

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. $d \ll X$) 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.

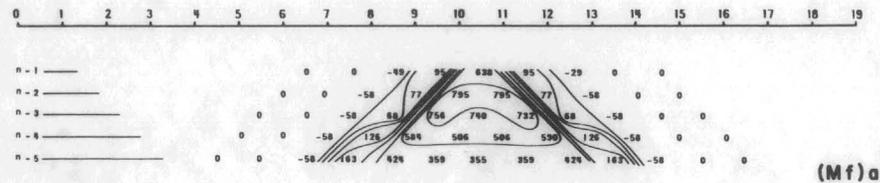
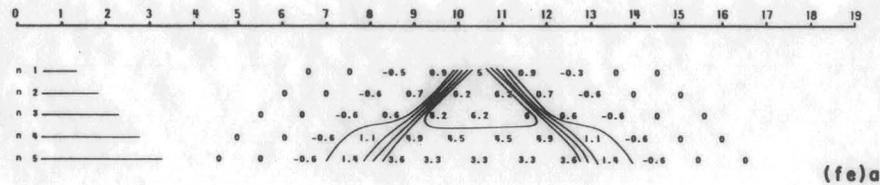
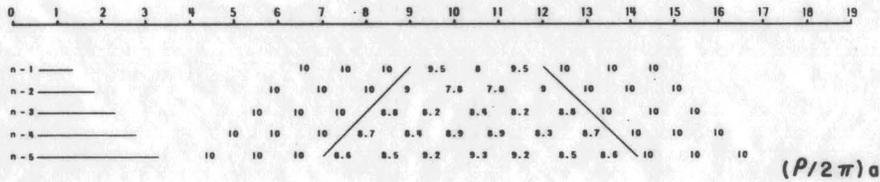
Our experience has confirmed the desirability of doing detail. When a reconnaissance IP survey using a relatively large electrode interval indicates the presence of a narrow, shallow source, detail with shorter electrode intervals is necessary in order to better locate, and evaluate, the source. The 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.

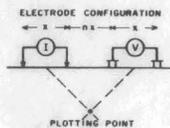
The change in the anomaly that results when the electrode interval is reduced is not unusual. The $X = 50'$ data more accurately locates the narrow source, and permits the geophysicist to make a better evaluation of its importance. The completion of this type of detail is very important, in order to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

McPHAR GEOPHYSICS LIMITED
Theoretical Induced Polarization and Resistivity Studies
Scale Model Cases



$(P/2\pi)_1 = 10$

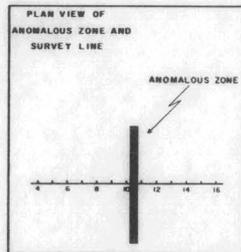
$(Mf)_1 = 0$



$(P/2\pi)_2 = 251$

$(Mf)_2 = 10000$

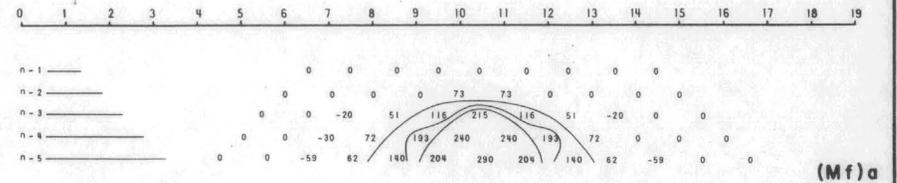
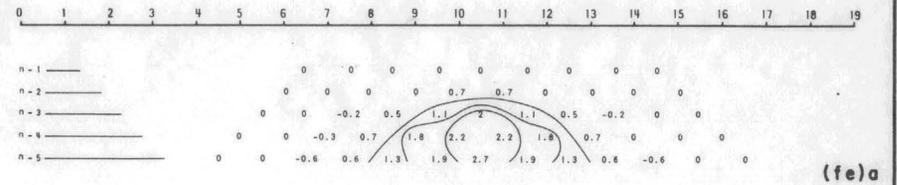
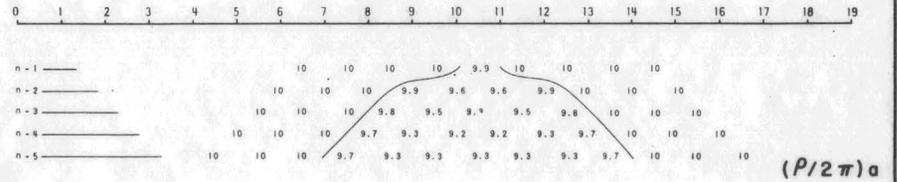
$(fe)_2 = 25\%$



CASE II-0-5-BU-10-a

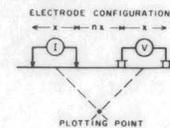
FIG 1

McPHAR GEOPHYSICS LIMITED
Theoretical Induced Polarization and Resistivity Studies
Scale Model Cases



$(P/2\pi)_1 = 10$

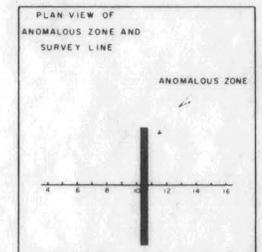
$(Mf)_1 = 0$



$(P/2\pi)_2 = 26$

$(Mf)_2 = 9250$

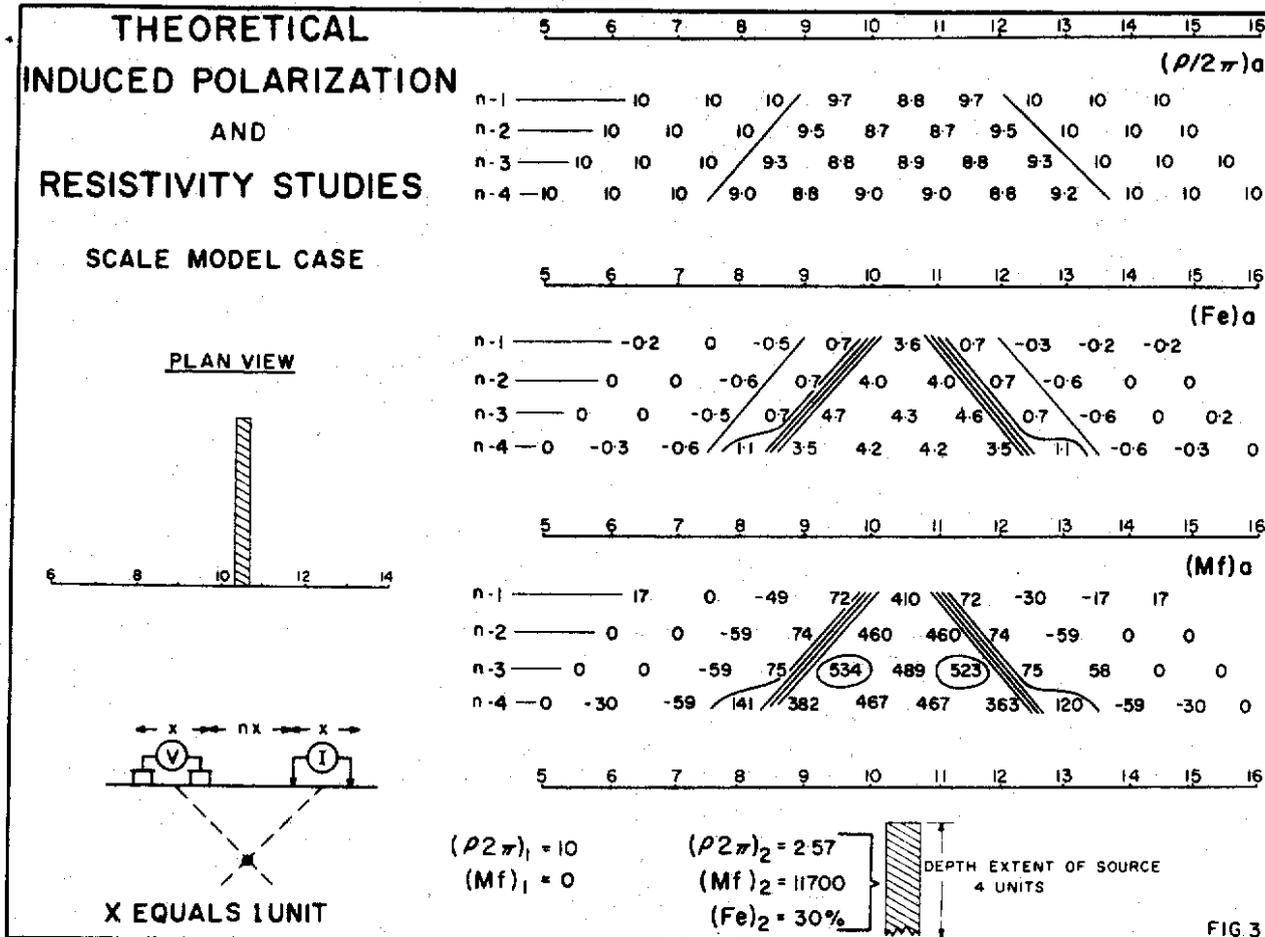
$(fe)_2 = 24\%$



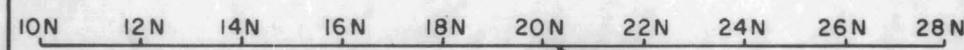
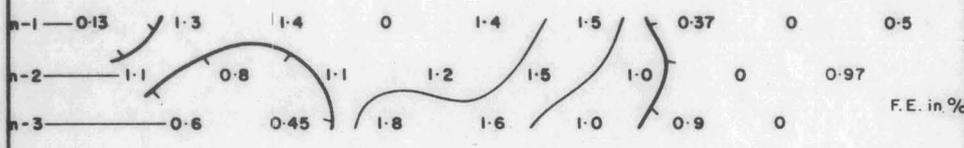
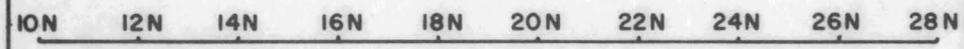
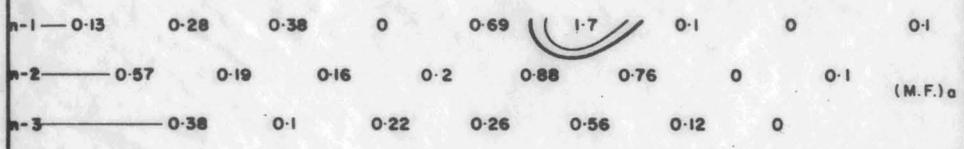
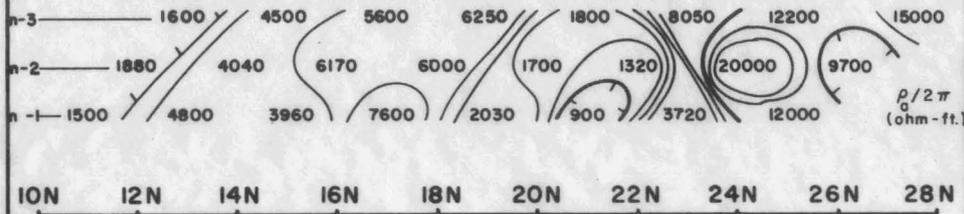
CASE II-15-BU-10-a

FIG 2

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INDUCED POLARIZATION AND RESISTIVITY RESULTS BATCHELOR LAKE AREA, QUEBEC.



MASSIVE SULPHIDE ZONE

FIG. 5

INDUCED POLARIZATION AND RESISTIVITY RESULTS BATCHELOR LAKE AREA, QUEBEC.

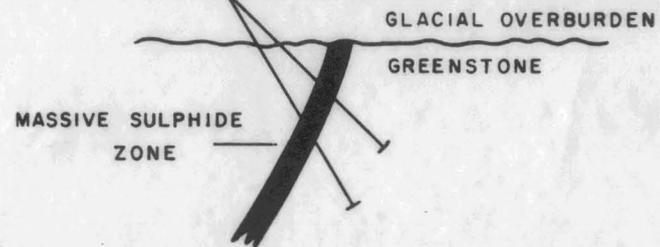
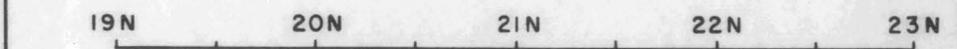
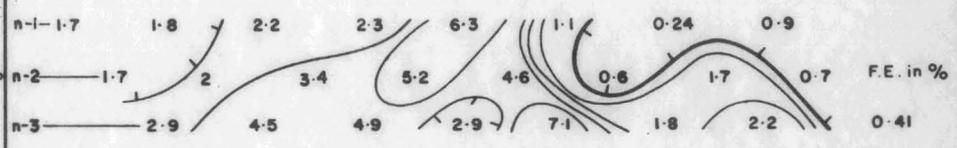
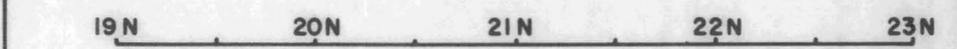
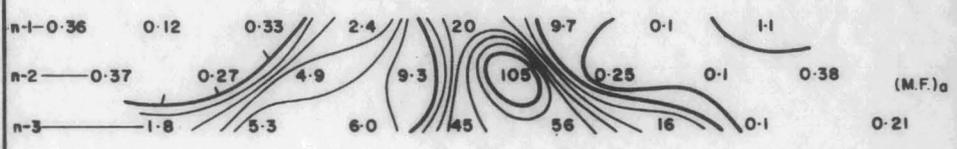
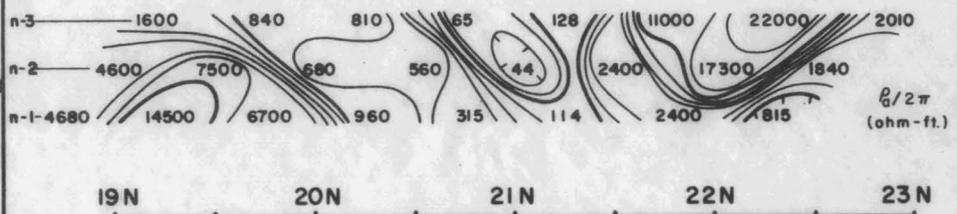
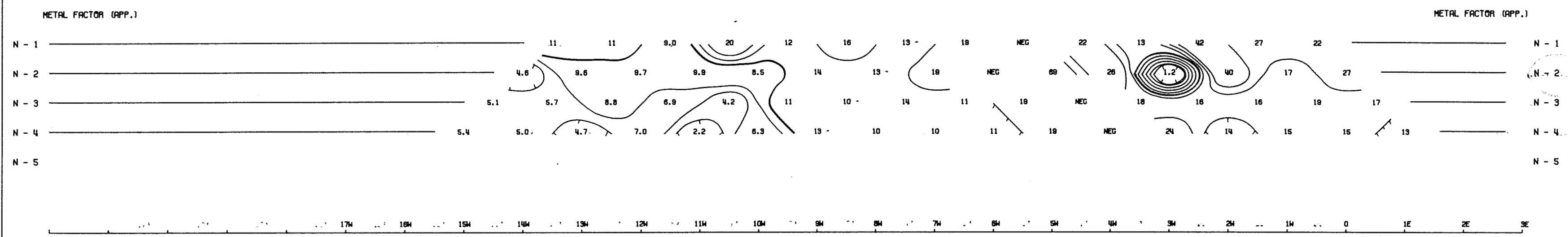
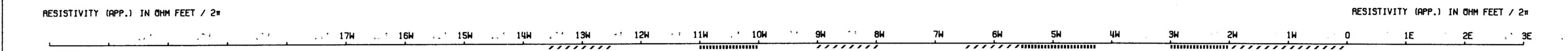
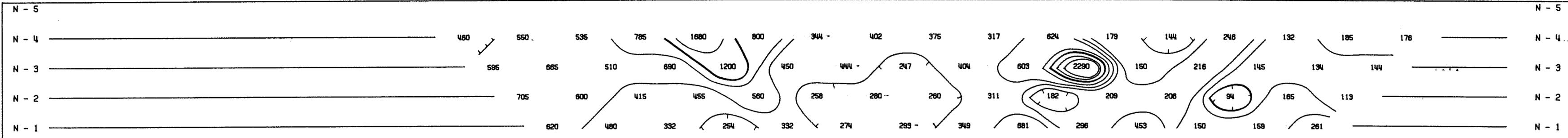


FIG. 6

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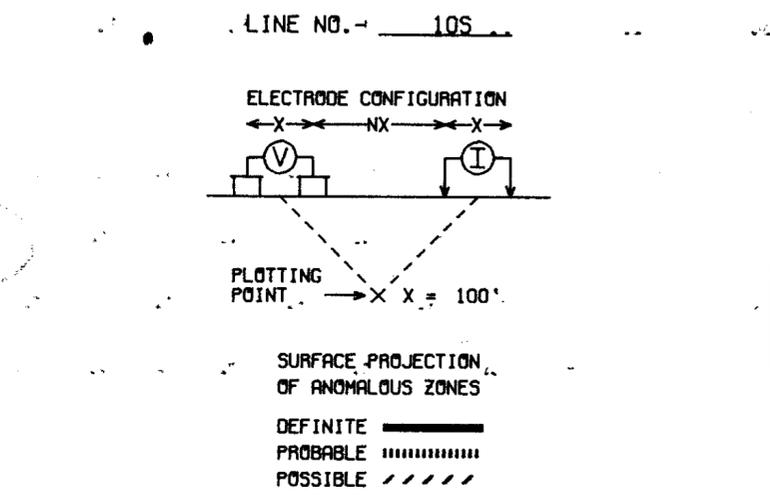
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996020 DWG. NO.- I.P.-5467-1

ELECTROLYTIC ZINC COMPANY OF A'SIA LTD.

MELBA FLAT, TASMANIA



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

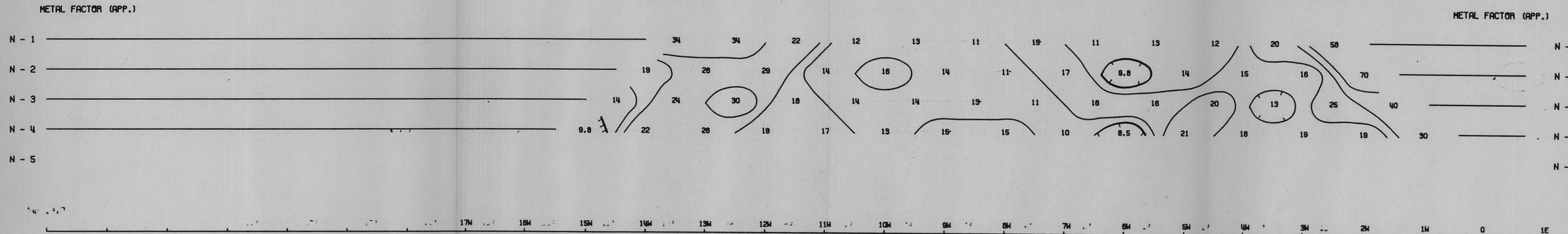
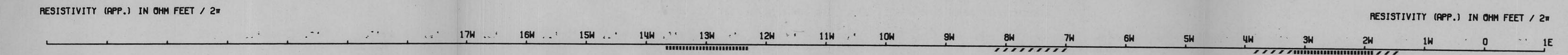
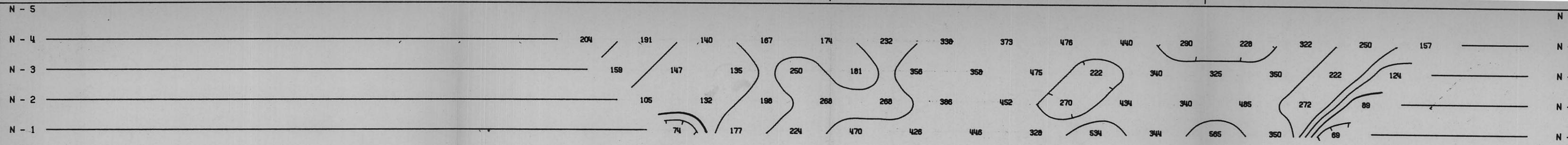
DATE:

5 cm

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 380/75 COMPUTER AND A CALCOMP PLOTTER

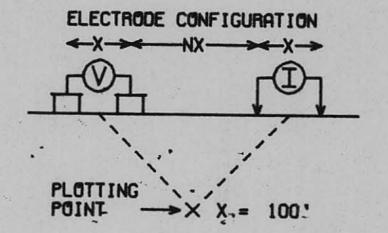


996021 DWG. NO.- I.P.-5467-2

ELECTROLYTIC ZINC COMPANY OF ASIA LTD.

MELBA FLAT, TASMANIA

LINE NO. 145



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

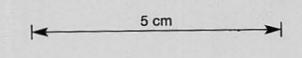
POSSIBLE

FREQUENCIES: 0.31-2.5 CPS DATE SURVEYED: JAN 1970

APPROVED:

DATE: 6/30/70

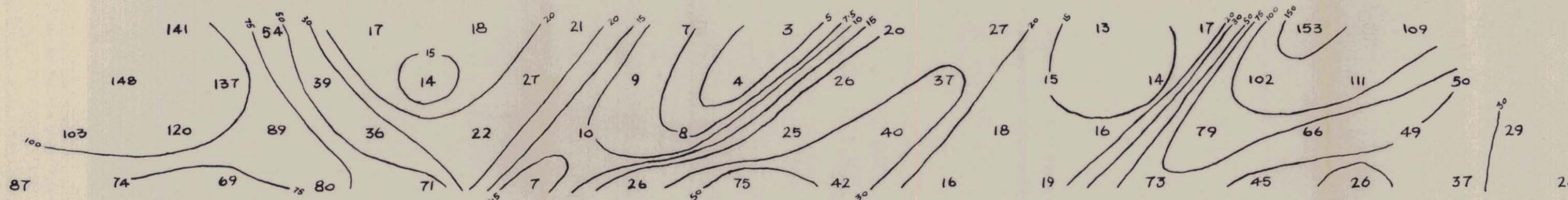
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10



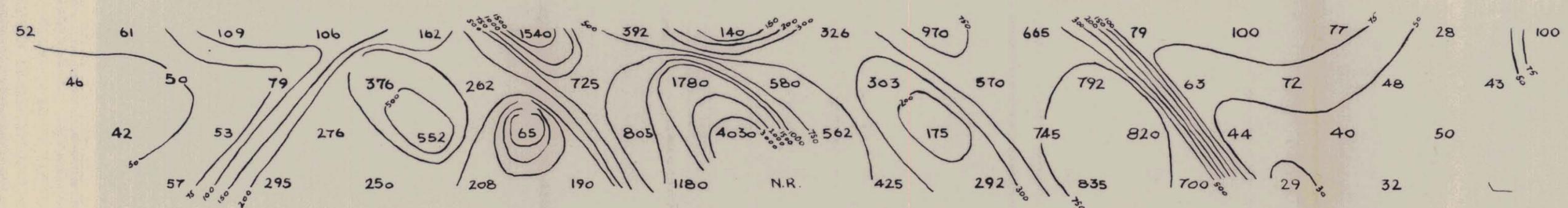
McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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



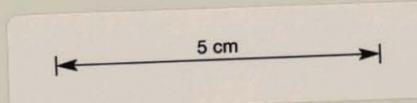
24 E 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 E



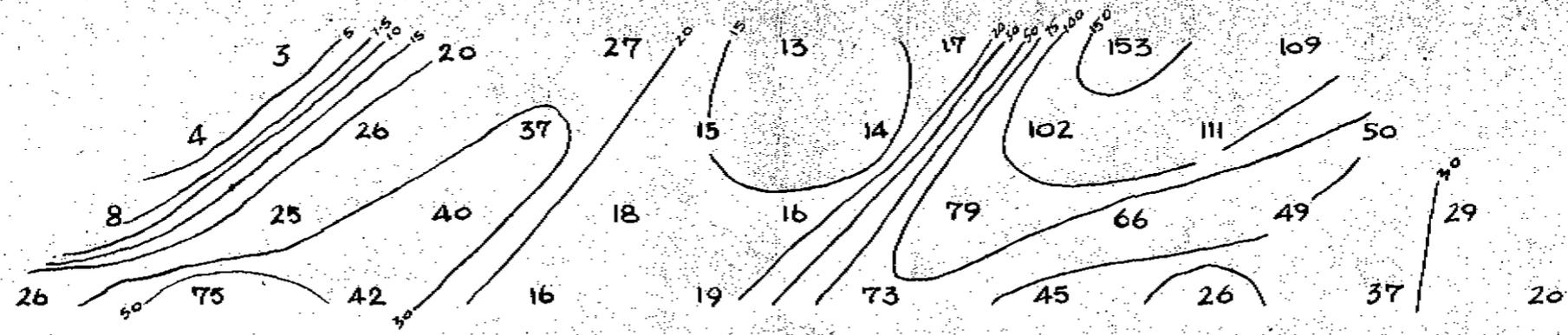
N.R. No Reading

996022

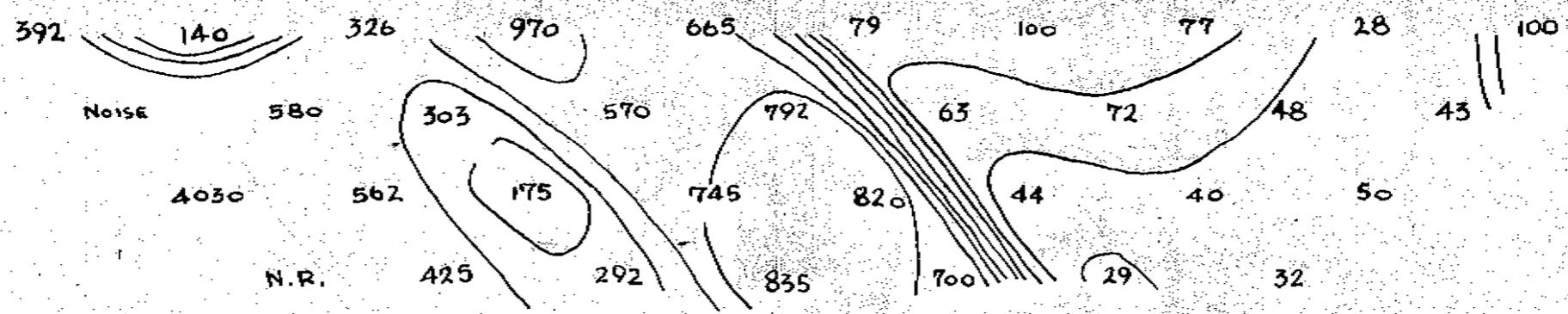
70-643



I. P. SURVEY. 2513
 Melba Flat Area.
 Line 30 N Melba Grid
 100 ft Spreads
 Scale: 100 ft to 1 inch
 Frequency: 2 1/2 + 1/4 c.p.s.
 Survey: BH & E.D.
 Traced: SK. Date 3/62

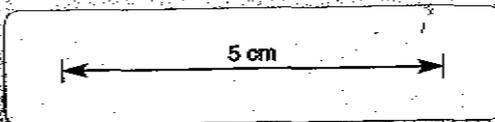


30E 31 32 33 34 35 36 37 38 39 40 41 42E

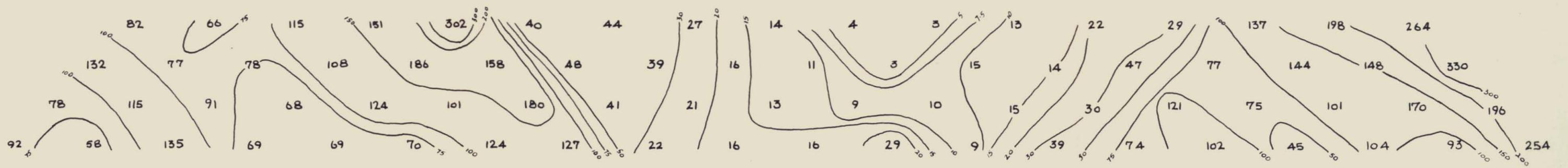


70-643

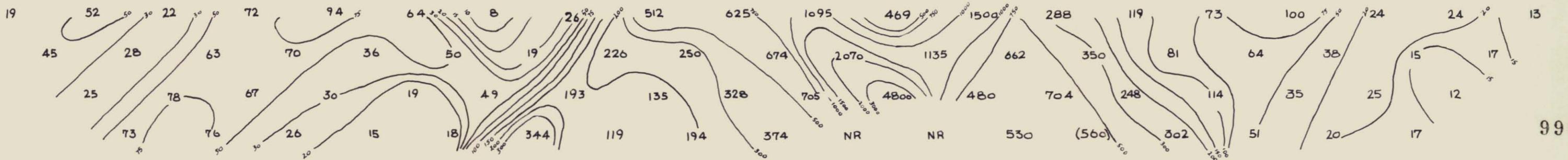
N.R. No Reading.



I.P. SURVEY.2512
 Melba Flats Area.
 Line 30N. Melba Grid.
 100ft Spreads.
 Scale: 100ft to 1inch.
 Frequency: 2 1/2 + 1/4 cps.
 Survey: B.H. & E.D.
 Traced: S.K. Date: 3/62



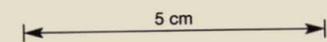
20E 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42E



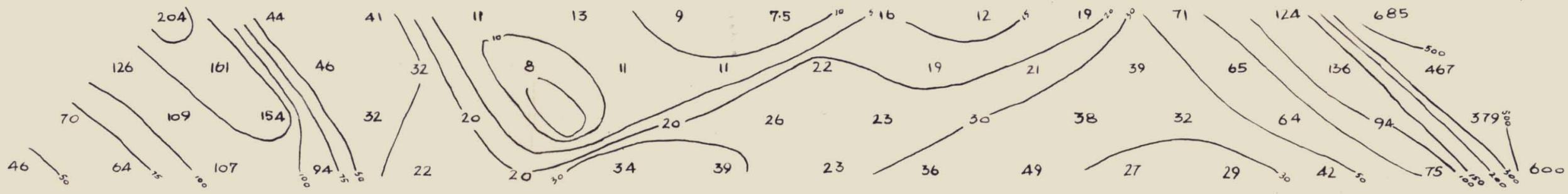
996027

70-643

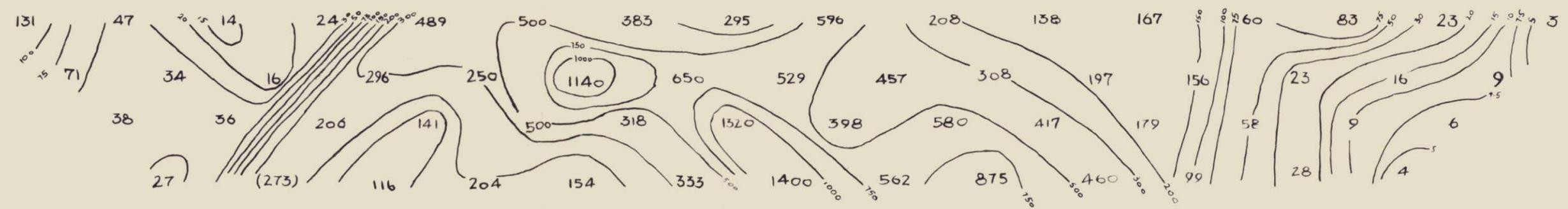
NR. No Reading
 () Indicates high noise level which masks the true frequency effect.



I.P. SURVEY 2517
 Melba Flat Area.
 Line 36 N Melba Grid
 100 ft Spreads
 Scale: 100 ft to 1 inch
 Frequency: 2 1/2 + 1/4 cps
 Survey: B.H. & E.D.
 Traced: S.K. Date: 3/62



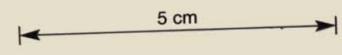
24 E 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 E



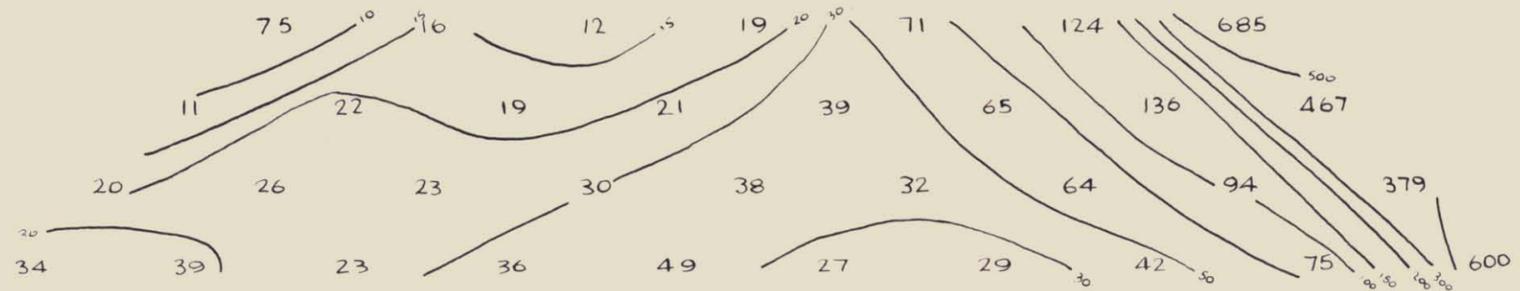
996028

70-643

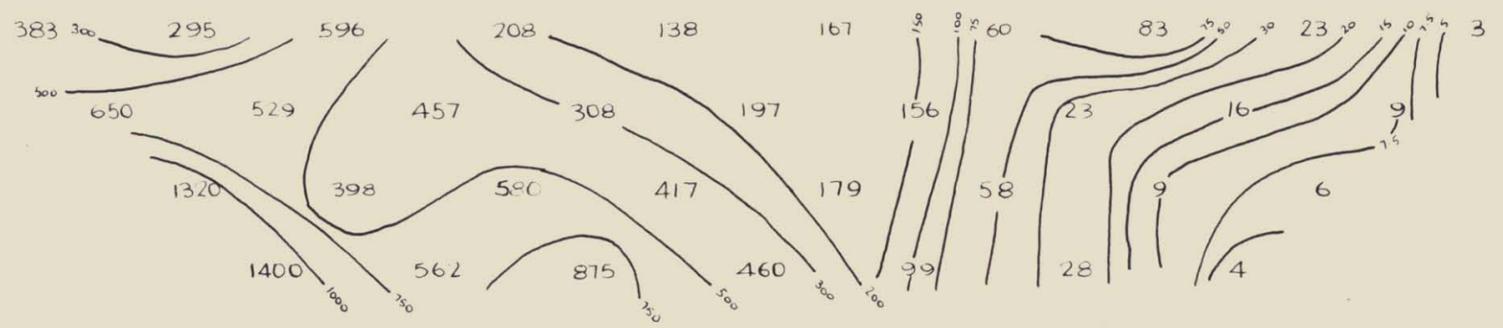
() Indicates high noise level which masks the true frequency effect.



I.P. SURVEY 2519
 Melba Flat Area
 Line 39N Melba Grid
 100 ft Spreads
 Scale: 100 ft to 1 inch
 Frequency: $2\frac{1}{2} + \frac{1}{4}$ cps.
 Survey: BH & ED
 Traced: SK Date: 3/62



30E 31 32 33 34 35 36 37 38 39 40 41 42E

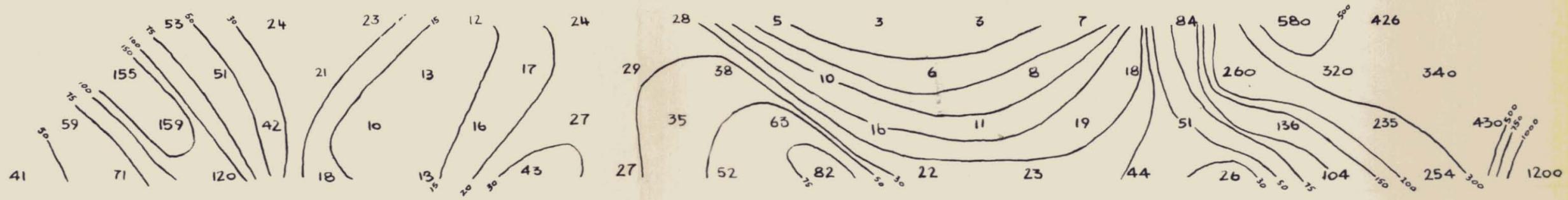


996029

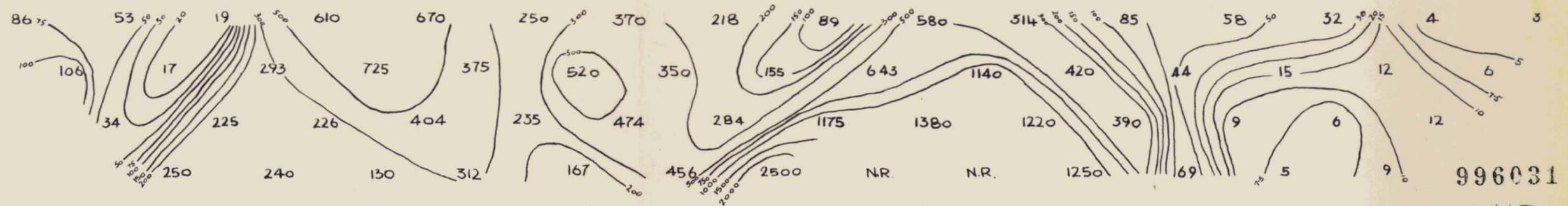
70-643

I. P. SURVEY 2518
 Melba Flat Area.
 Line 39N Melba Grid
 100ft Spreads.
 Scale: 100 ft to 1 inch
 Frequency: 2 1/2 + 1/4 - ps
 Survey: BH & ED
 Traced: VT Date 3/62

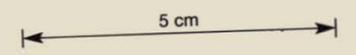




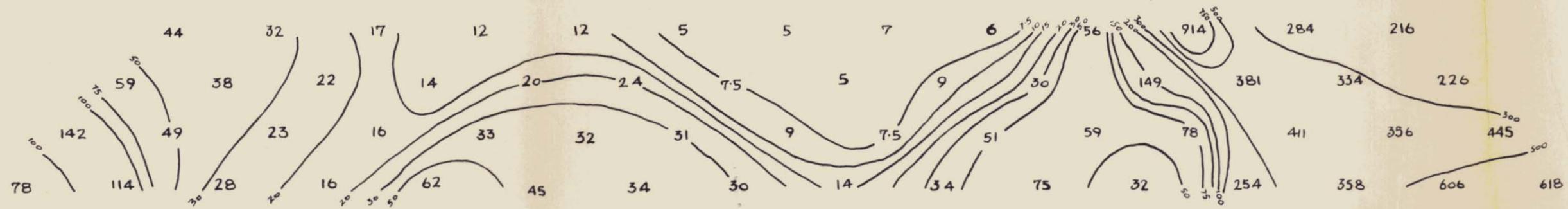
26 E 27 28 29 30 31 32 33 34 35 36 37 38 39 40 E



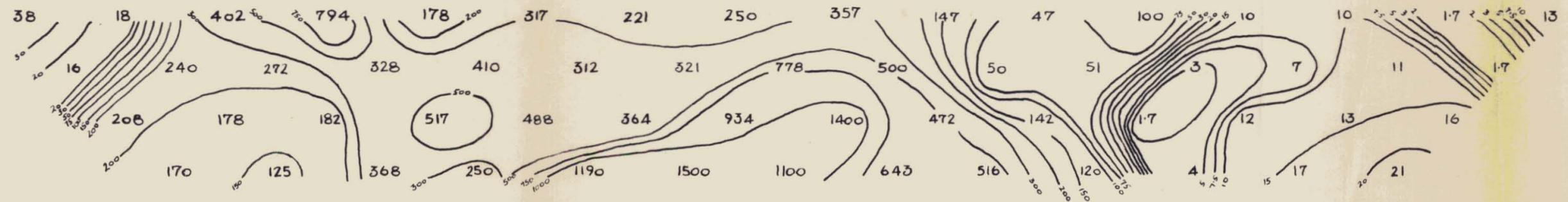
NR. No Reading.



I.P. SURVEY 2521
 Melbu Flat Area
 Line 42N Melbu Grid
 100 ft Spreads
 Scale: 100ft to 1inch
 Frequency: 2 1/2 + 1/4 c.p.s
 Survey: B.H. & E.D.
 Traced: SK. Date 3/62



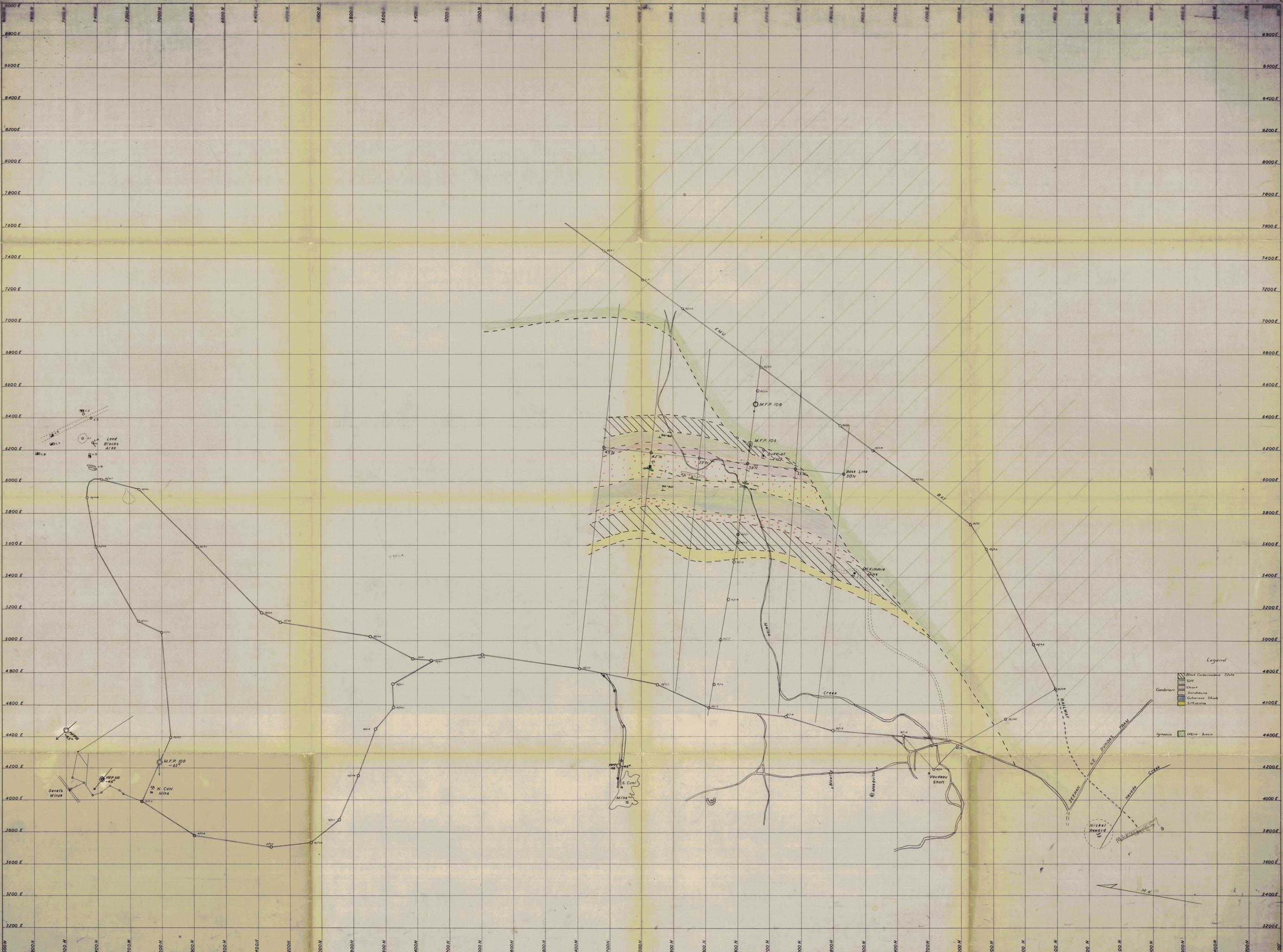
24E 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42E



996032
70-643



I.P. SURVEY. 2522
Melba Flats Area
Line 45N Melba Grid.
100ft Spreads
Scale: 100 ft to 1 inch.
Frequency: 2 1/2 + 1/4 cps.
Survey: BH & ED.
Traced: S.K. Date: 3/62



ELECTROLYTIC ZINC COMPANY OF ASIA
GEOLOGICAL DEPARTMENT

MELBA FLAT AREA

Scale: 1 Inch = 200 Feet

70-643 MELBA FLAT AREA
996033 SURFACE 2511

2511

