67-467.

172001

Q34-

(10)

# REPORT ON INDUCED POLARIZATION AND RESISTIVITY SURVEY IN THE MT. BALFOUR AREA, TASMANIA FOR THE BALFOUR MINING SYNDICATE

GEOPHYSICS

# McPHAR GEOPHYSICS LIMITED

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The diagram in Figure 1 below demonstrates the method used in plotting the results. Each value of the apparent resistivity and the apparent "Metal factor" 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.

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

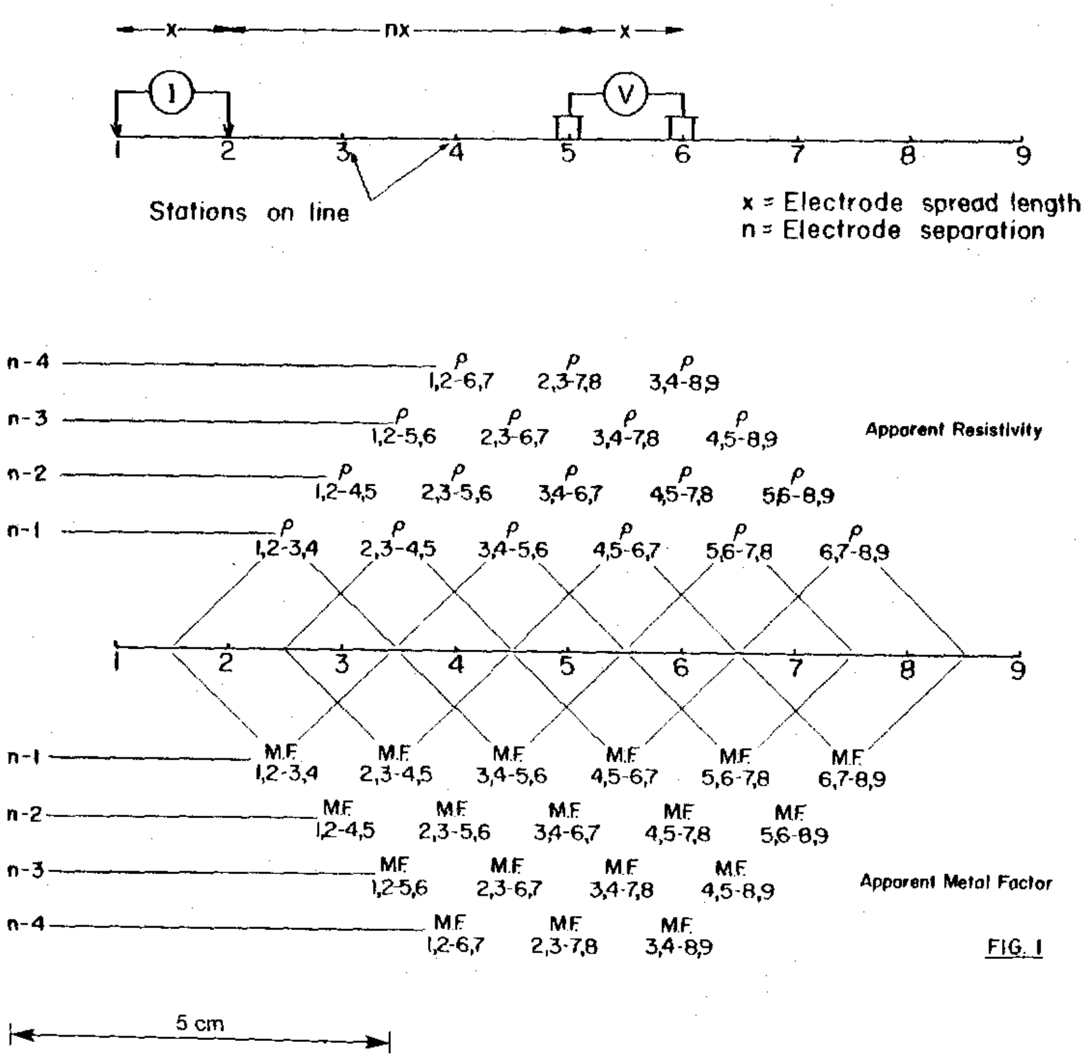



FIG. I

006

McPHAR GEOPHYSICS LIMITED

REPORT ON

INDUCED POLARIZATION

AND RESISTIVITY SURVEY

IN THE

MT. BALFOUR AREA, TASMANIA

FOR

THE BALFOUR MINING SYNDICATE

---

## 1. INTRODUCTION

At the request of Mr. F. C Hudson, we have carried out a combined induced polarization and resistivity survey in the Mt. Balfour area on behalf of the Balfour Mining Syndicate. The property is located in northwestern Tasmania and is of interest because of the presence of numerous tin and copper occurrences.

Alluvial tin deposits were worked prior to 1880 and lode deposits containing tin and tungsten were found about 1890. Copper was first discovered in 1901 at Tin Creek. The tin and tungsten occur in quartz veins, primarily in the granite; pyrite and arsenopyrite are the most abundant metallic minerals with lesser amounts of cassiterite and wolframite. Copper occurs as veins in the Balfour slates and sandstones; pyrite and chalcopyrite are the principal minerals, with minor galena and sphalerite, in a gangue of quartz and dolomite. Small amounts of gold and silver may also be present.

Apparently the copper deposits are all oxidized, with complete leaching to a depth of a few feet or a few tens of feet and partial leaching to over 100 feet.

The induced polarization survey consisted of five small grids of three lines each to test a series of known deposits, plus a single traverse across an interesting magnetic anomaly. Definite anomalies, some of them very strong, were found on each grid and further work is definitely warranted.

## 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.

Area # 1

| Line No. | Spreads | Dwg. No. |
|---|---|---|
| 1 | 200' | IP 2682-1 |
| 2 West Part | 200' | IP 2682-2 |
| 2 East Part | 200' | IP 2682-3 |
| 3 | 200' | IP 2682-4 |

Area # 2

| | | |
|---|---|---|
| 1 | 200' | IP 2682-5 |
| 2 | 200' | IP 2682-6 |
| 3 | 200' | IP 2682-7 |

Area # 3

| Line No. | Spreads | Dwg. No. |
|---|---|---|
| 1 | 200' | IP 2682-8 |
| 2 | 200' | IP 2682-9 |
| 3 | 200' | IP 2682-10 |
| **Area # 4** | | |
| 1 | 200' | IP 2682-11 |
| 2 | 200' | IP 2682-12 |
| 3 | 200' | IP 2682-13 |
| **Area # 5** | | |
| 1 | 200' | IP 2682-14 |
| 2 | 200' | IP 2682-15 |
| 3 | 200' | IP 2682-16 |
| **Area MA** | | |
| 1 | 200' | IP 2682-17 |

Enclosed with this report is Dwg. Misc. 2683, a plan map at a scale of 1" = 2200', showing the location of the various test areas. 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 center of the indicated anomaly probably corresponds fairly well with source, the length of the indicated anomaly along the line should not be taken to represent the exact edges of the anomalous material.

## 3. DISCUSSION OF RESULTS

### a) Area #1, Murray's Reward.

#### Line 1/1

Only weak effects were measured on the southern traverse There is a deep source, or off-the-end effect, at 2E to 4E and an incomplete anomaly at 6W.

#### Line 1/2

On the west section of the line there is a very strong, shallow anomaly at 38W to 40W and apparently a second deep source at 34W to 36W.

The eastern section shows a shallow, definite anomaly at 0 to 2E on strike with the Murray's Reward Mine. While this feature is not strong compared with some of the other anomalies it could still represent a vein of economic size and should definitely be checked with shorter electrode intervals. As shown in the accompanying theoretical cases it is not possible to determine the width of a tabular body if large intervals are used. (See Cases III-AX-dd-1; I-BX-dd-1; IV-BX-dd-1). In such cases it is necessary to reduce the electrode interval until it is about equal to, or less than, the width of the source.

There is also some ambiguity in evaluating a deep source, such as the anomaly at 16W to 18W (compare Cases II-0.5-BU-10-a and II-1.5-BU-10-a). In this instance reducing the electrode interval is of no benefit. Increasing the interval has the effect of averaging the source with a greater volume of barren rock and reduces the magnitude of the anomaly.

High background values suggesting a change in rock type start between stations 6W and 8W and continue to the west end of the line with minor increases at 10W to 12W and 24W to 28W. Within this broad zone there is a deep anomaly at 16W to 18W correlating with the tin workings.

Line 1/3

A shallow, definite anomaly of moderate magnitude is present over the Murray's Reward Mine and an incomplete anomaly was found at 10W.

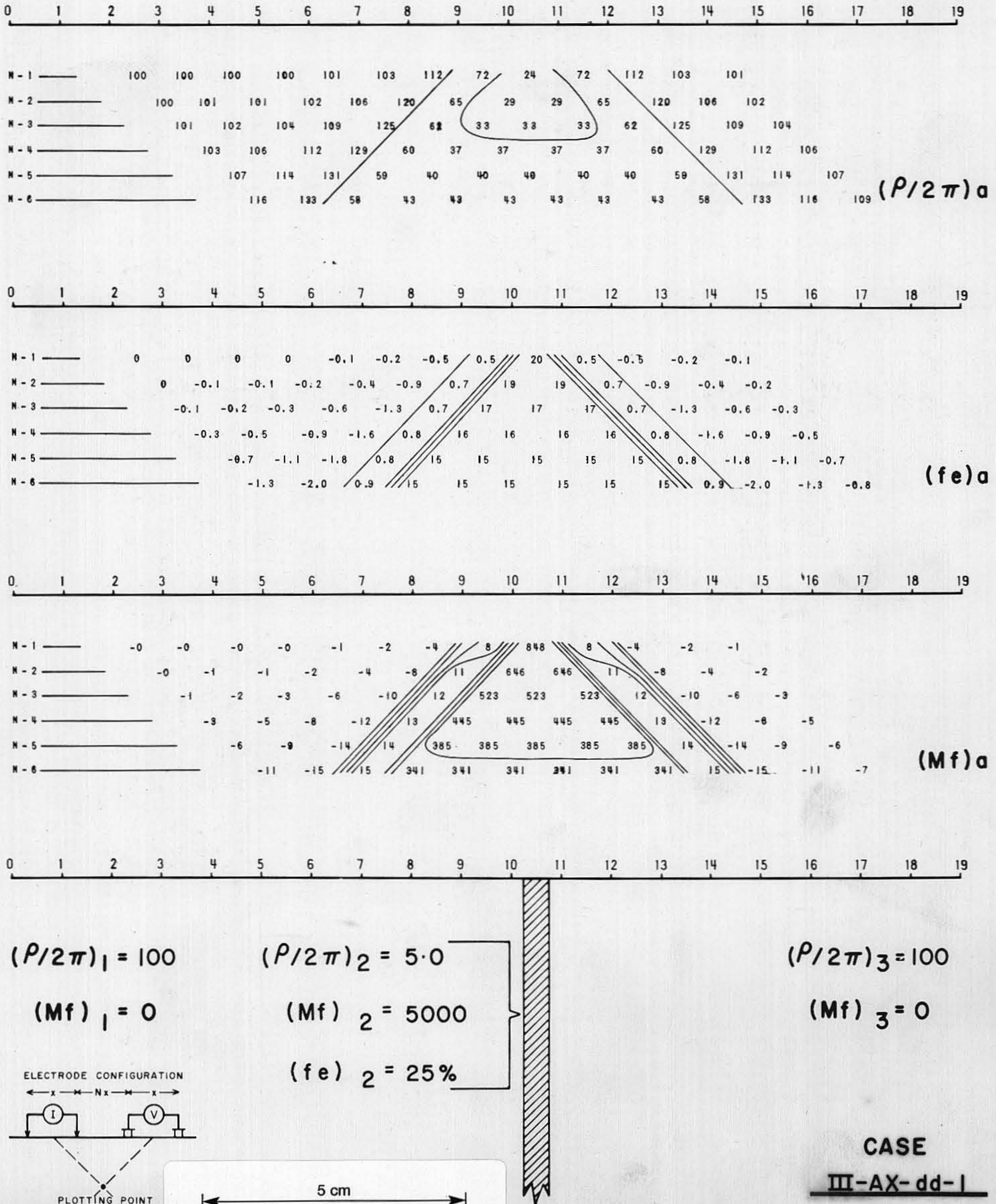
011

172013

# McPHAR GEOPHYSICS LIMITED

## Theoretical Induced Polarization and Resistivity Studies

## Calculated Cases




5 cm

**CASE**

**III-AX-dd-1**

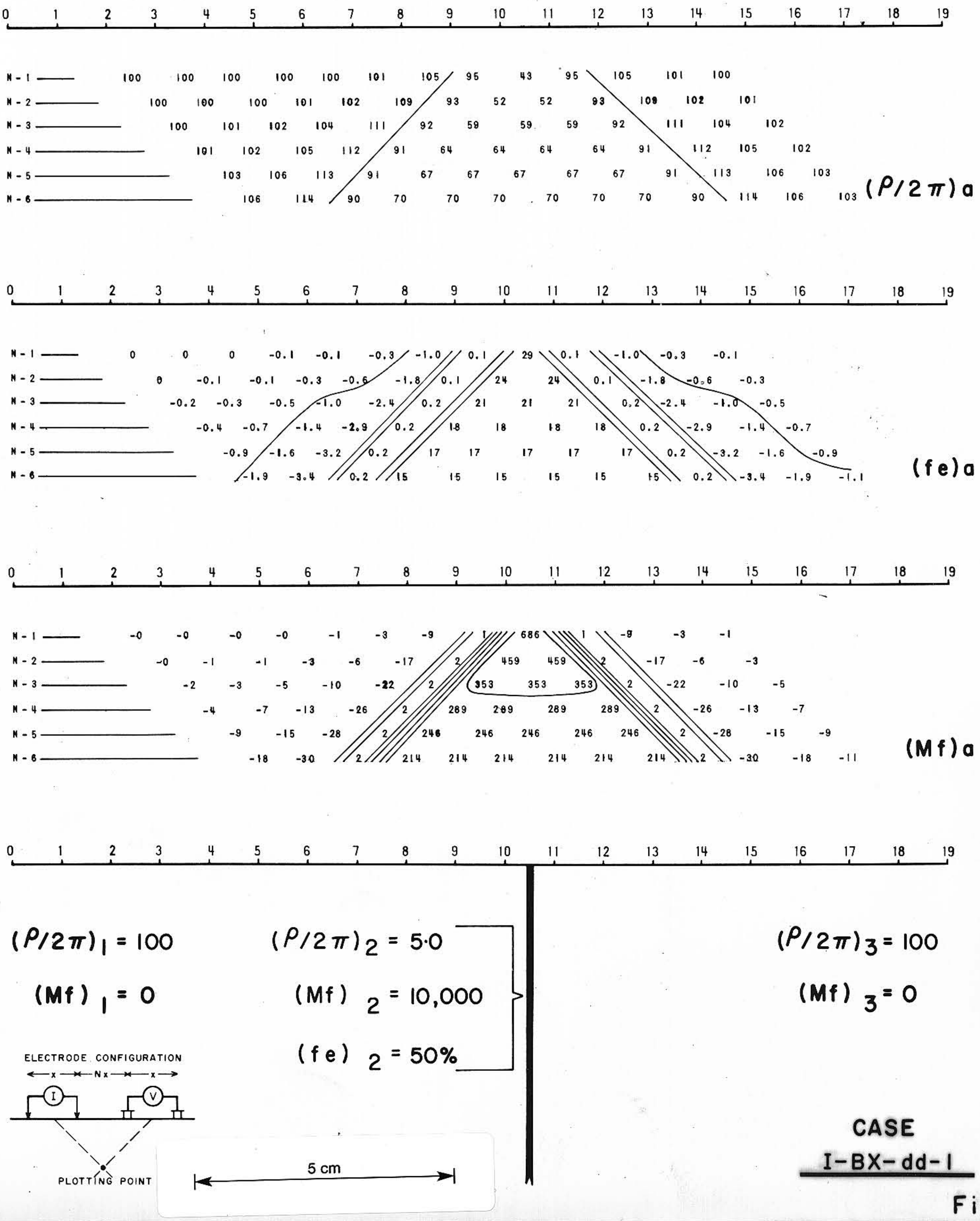
Fig.1

172014

# McPHAR GEOPHYSICS LIMITED

## Theoretical Induced Polarization and Resistivity Studies

## Calculated Cases




**CASE**

**I-BX-dd-1**

Fig.2

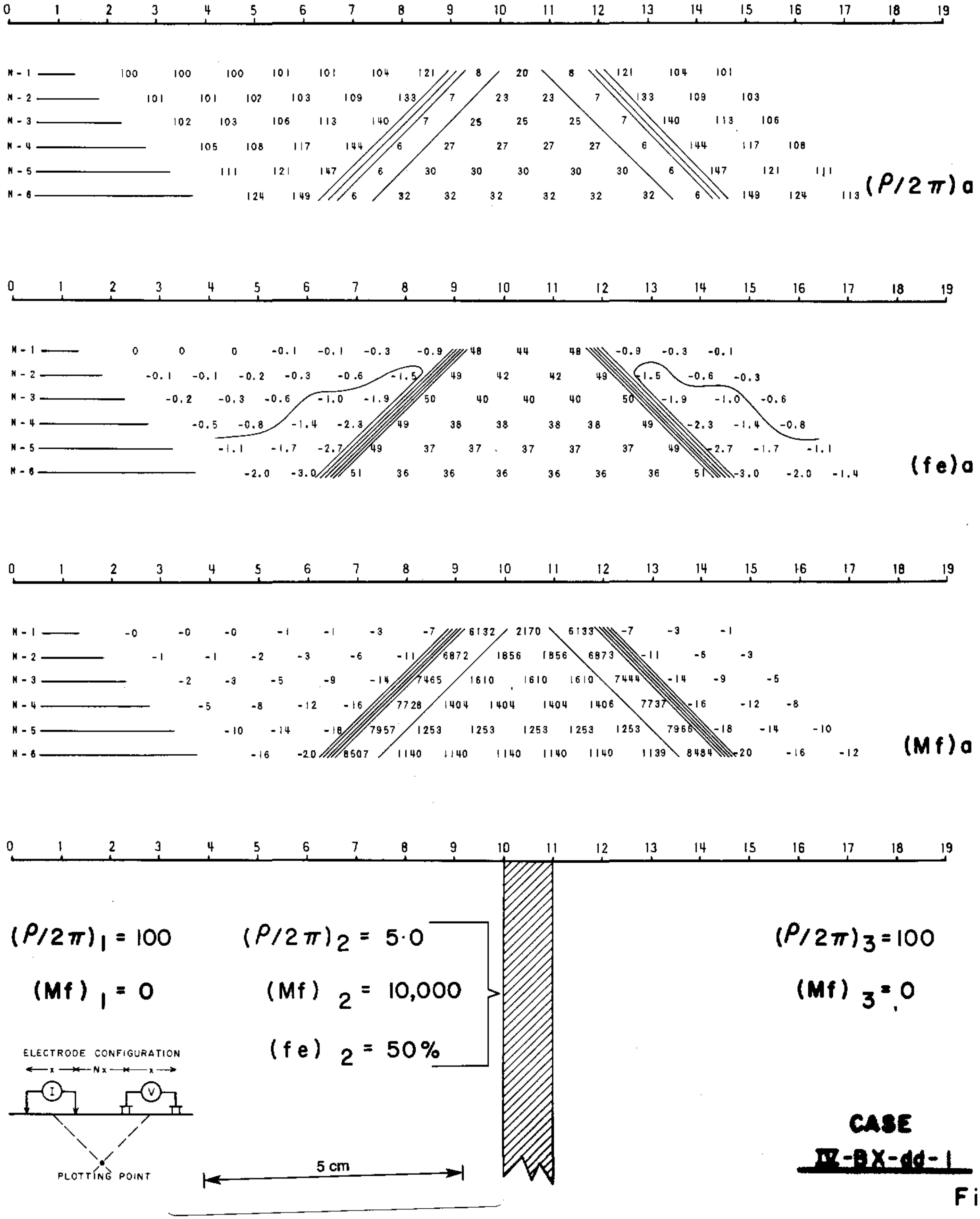
013

172015

# McPHAR GEOPHYSICS LIMITED

## Theoretical Induced Polarization and Resistivity Studies

## Calculated Cases




**CASE**

**IV-BX-dd-1**

**Fig.3**

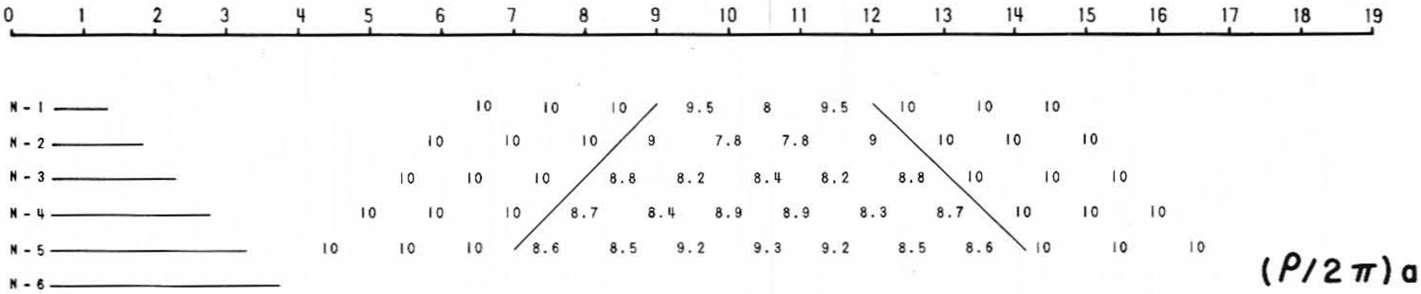
014

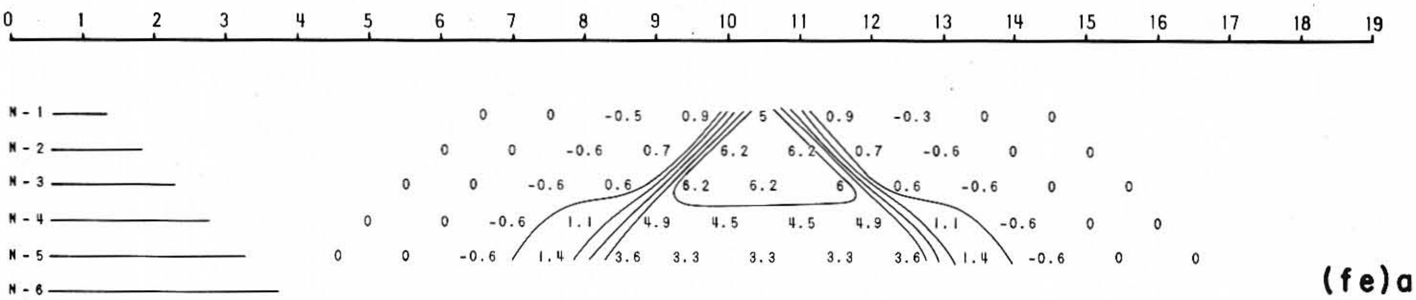
172016

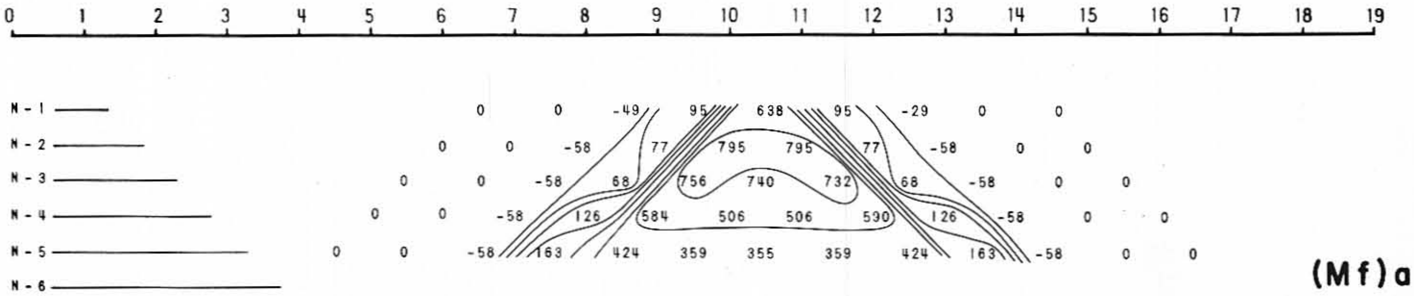
# McPHAR GEOPHYSICS LIMITED

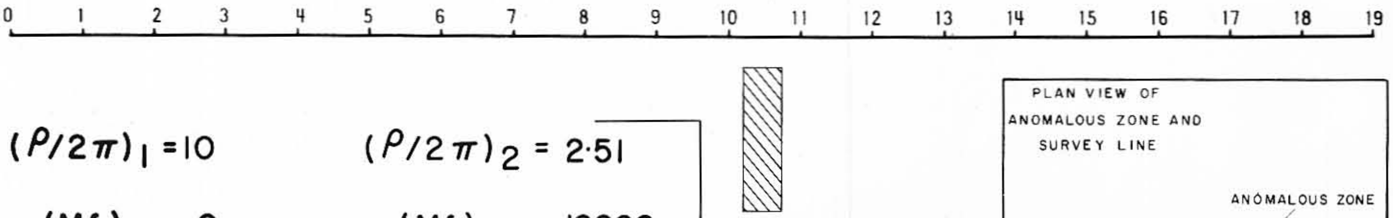
## Theoretical Induced Polarization and Resistivity Studies

## Scale Model Cases



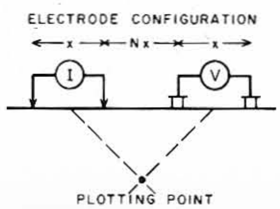



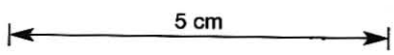



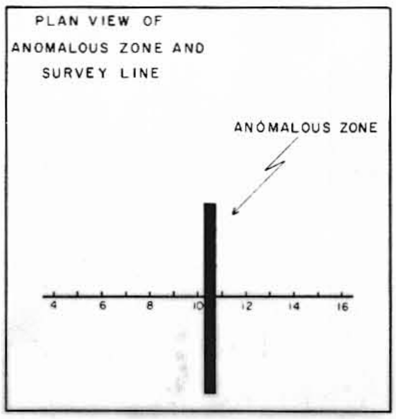

$(\rho/2\pi)_1 = 10$  $(\rho/2\pi)_2 = 2.51$

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

$(fe)_2 = 25\%$



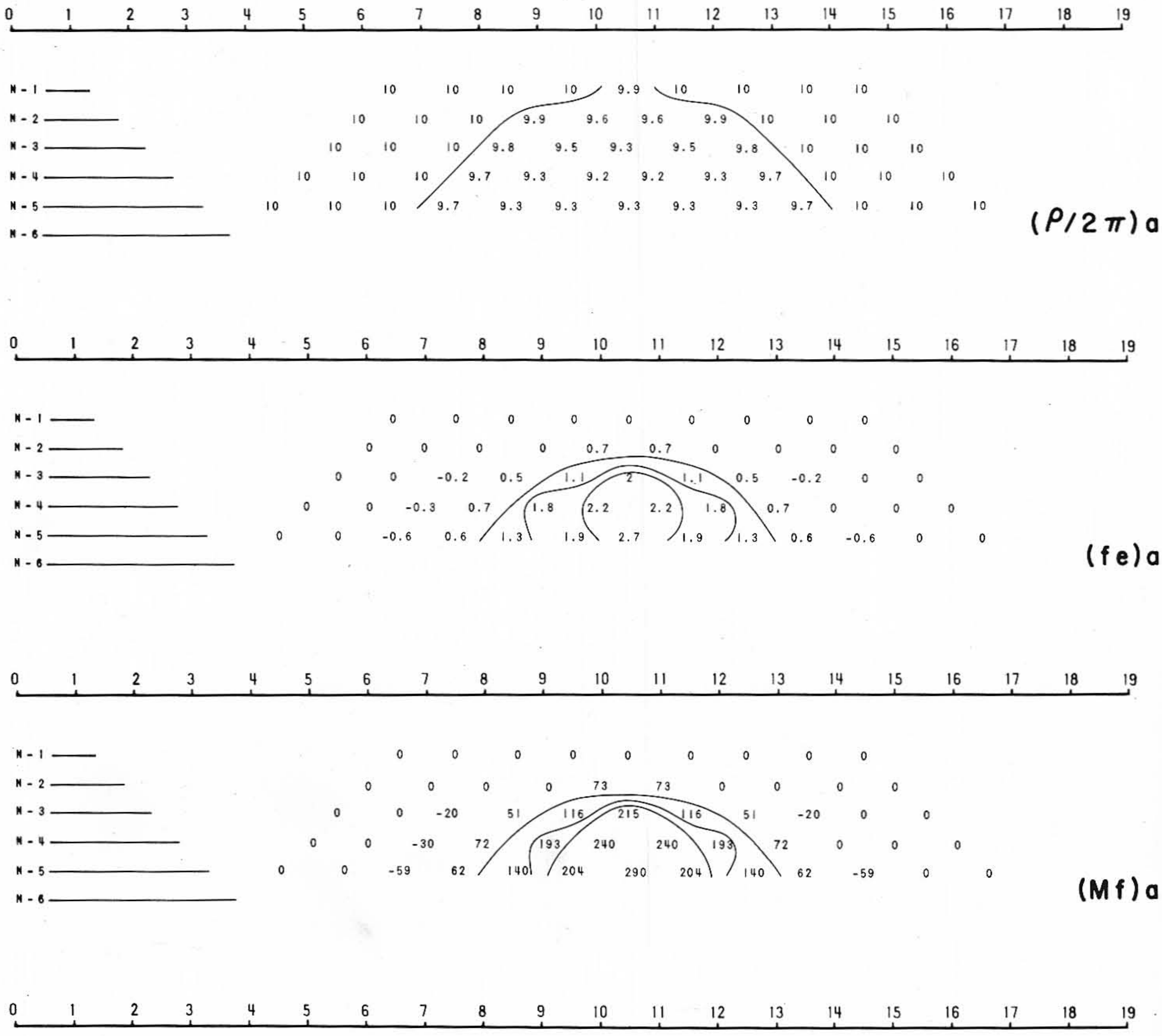

CASE II-0.5-BU-10-a

015

# McPHAR GEOPHYSICS LIMITED

## Theoretical Induced Polarization and Resistivity Studies

## Scale Model Cases



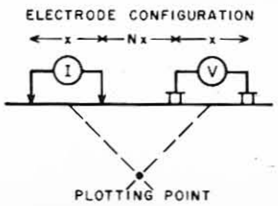

$(\rho/2\pi)_1 = 10$

$(Mf)_1 = 0$

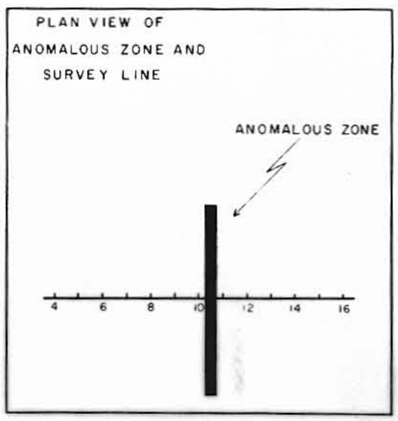
$(\rho/2\pi)_2 = 2{\cdot}6$

$(Mf)_2 = 9250$

$(fe)_2 = 24\%$




5 cm




CASE II-1·5-BU-10-a

b) Area #2; Central Mine.

Line 2/1

This grid is really an extension of the first one. A deep, weak source is present at 4E or 4E to 6E; if this is an extension of Murray's Reward then there must be an offset or change in strike. Above background values are present on the west part of the line, probably representing a change in rock type rather than a concentrated source.

Line 2/2

Deep, weak effects were measured at 6E to 8E, 0 to 4W and at 10W.

Line 2/3

A shallow, definite anomaly coincides with the tin diggings at 12W to 14W; this should also be checked with shorter electrode intervals. Weak effects were measured at 4W to 8W and there are anomalous values at the ends of the line. The traverse should be extended to the east and west to permit evaluation of these features.

c) Area #3

The third test was carried out two miles to the northwest near the Consolidated and Blocks Shaft.

Line 3/1

A low magnitude but definite anomaly occurs at 0 to 2E.

The source is shallow and narrow relative to the electrode spacing and here again detailing with shorter intervals is recommended.

Line 3/2

Weak effects were measured on this traverse but the patterns are not as definite as in the preceding case.

Line 3/3

Three weak anomalies are shown on this traverse but the line should be extended to the east and west.

d) Area #4; The Clump

Line 4/1

Anomalous effects were measured throughout this short line with strong, but incomplete, anomalies at the east and west ends.

Line 4/2

Similar results were obtained on this line and there is also a weak anomaly at 0 to 2W.

Line 4/3

Here the eastern anomaly is much stronger but the western one is weaker. The feature at 0 to 2W is still present but should be detailed with shorter electrode intervals.

e) Area #5

This small grid is immediately south of Murray's Reward but the line direction has been changed to north-south.

Line 5/1

Anomalous effects were measured throughout the traverse, suggesting a broad band of sediments with minor amounts of sulphides. There is some variation in the Metal Factor values which could be caused by narrow concentrated sources; detailing is required for a more complete evaluation.

At the west end of the line there is a strong but incomplete anomaly correlating with a shaft.

Line 5/2

These results are similar except that there is a more definite increase in the Metal Factor values at 0 to 2N in the vicinity of the drill hole. The anomaly at the west end is stronger but still incomplete.

Line 5/3

A strong shallow source occurs at 4S to 6S, just east of the shaft, but the western edge has not been defined. Above background effects were encountered from 6N to 4S; the values are quite uniform and suggest minor dispersed metallics rather than narrow concentrated bands.

f) Area M. A.

A single traverse (M. A. /1) was run across a magnetic anomaly about 1/2 mile northwest of Area #2. The results show a very strong shallow anomaly at 4W to 6W, with weaker extensions well to the east and west. There is also a probable weak source at 4E to 6E. Evidently the magnetic anomaly is centered at station 0 in which case it is not related to the strong IP anomaly. Since we do not have the magnetometer profile we are unable to make a more detailed comparison.

## 4. SUMMARY AND RECOMMENDATIONS

The IP traverses have shown interesting anomalies in all six test areas. Many of these are coincident with workings and therefore are assumed to correlate with known metallic mineral deposits, but in general we do not have sufficient detailed geologic information to permit a thorough analysis of the results. It is concluded therefore that the IP method can be used effectively in this area to locate and delimit the metallic mineral deposits.

Some of the slates undoubtedly contain pyrite and/or graphite and will also give rise to IP anomalies. In the areas surveyed such effects appear to be relatively small (e. g. the broad zone on Line 1/2 from 6W to 32W) unless some of the strong anomalies not obviously related to known mineral deposits are also caused by such sediments.

In general the test lines were short, resulting in several incomplete anomalies and insufficient data on background levels. Several traverses should therefore be surveyed completely across the property. All of the present data was obtained using a 200-foot electrode interval so that it is not possible to evaluate fully a narrow tabular source.

Consequently in a more extensive survey it would be necessary to detail portions of several lines using 100-foot electrode intervals. Frequently this permits closer location of test drill holes and a more efficient use of drilling funds. The cost of the additional geophysical work is more than compensated by the savings in drill footage.

McPHAR GEOPHYSICS LIMITED

Robert A. Bell.

Robert A. Bell,
Geologist.

Philip G. Hallof

Philip G. Hallof,
Geophysicist.

Dated: June 5, 1967

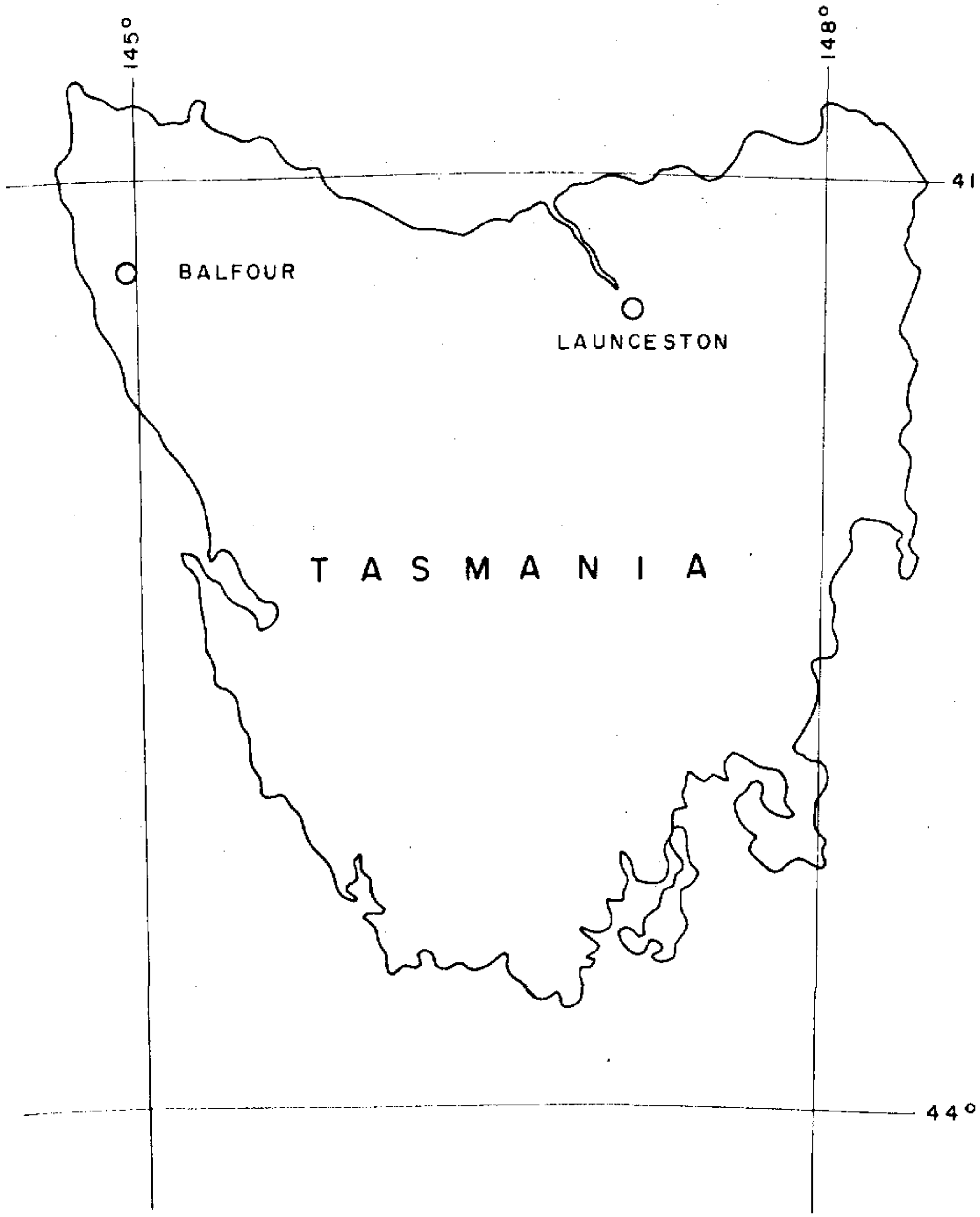
Fig 1

172023

021

# McPHAR GEOPHYSICS LIMITED

## Location map




## BALFOUR MINING SYNDICATE

Balfour area – Tasmania

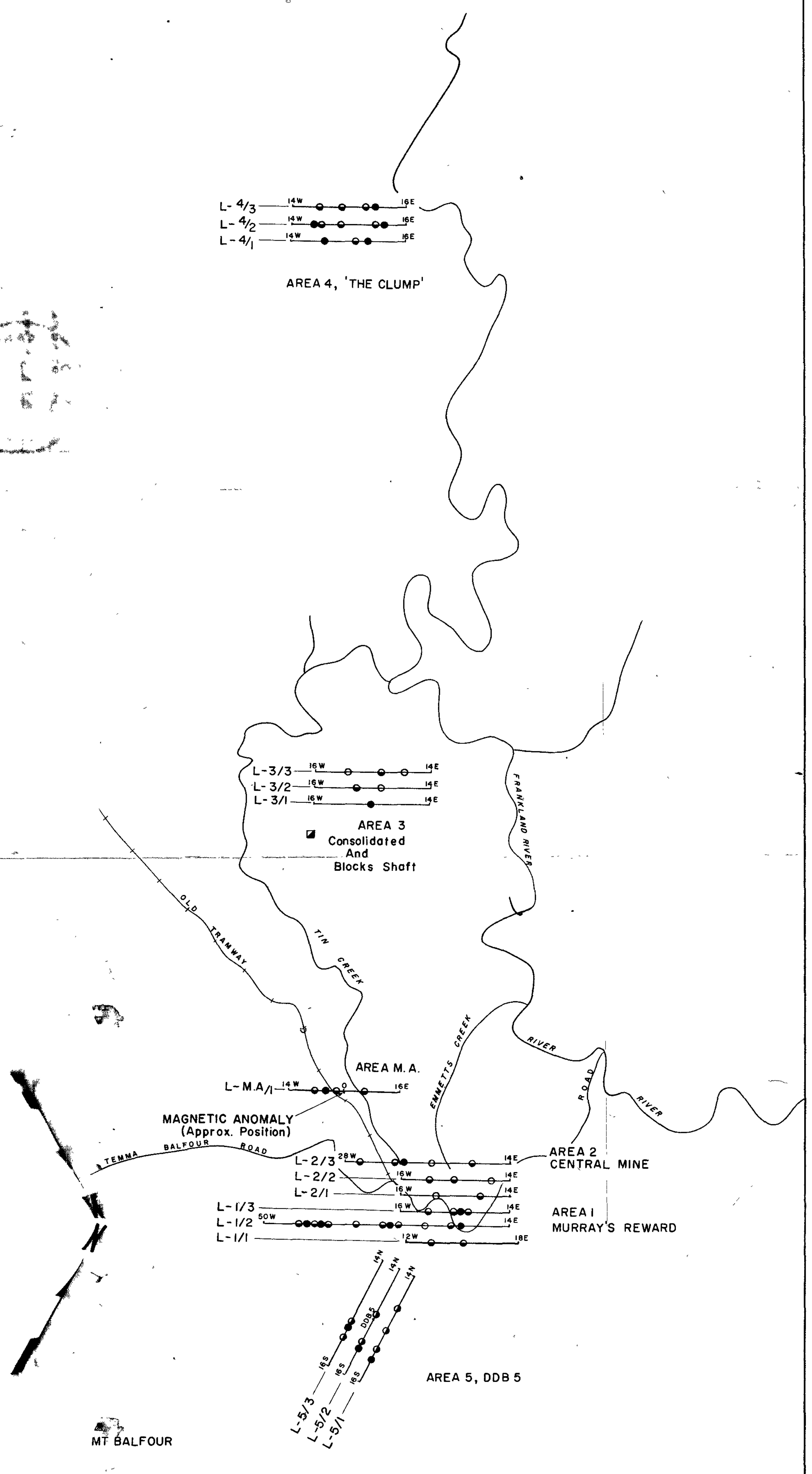
5 cm

Fig. 1

# McPHAR GEOPHYSICS LIMITED

PLAN MAP

022




# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA.

Scale - One inch = 2200 Feet (Approx.)

5 cm

SURFACE PROJECTION OF ANOMALOUS ZONES

| | |
|---|---|
| DEFINITE | ● |
| PROBABLE | ◒ |
| POSSIBLE | ○ |

DRAWN

DATE MAY 1967

APPROVED

DATE

McPHAR GEOPHYSICS LIMITED

DWG. NO. MISC. 2683

022

172024

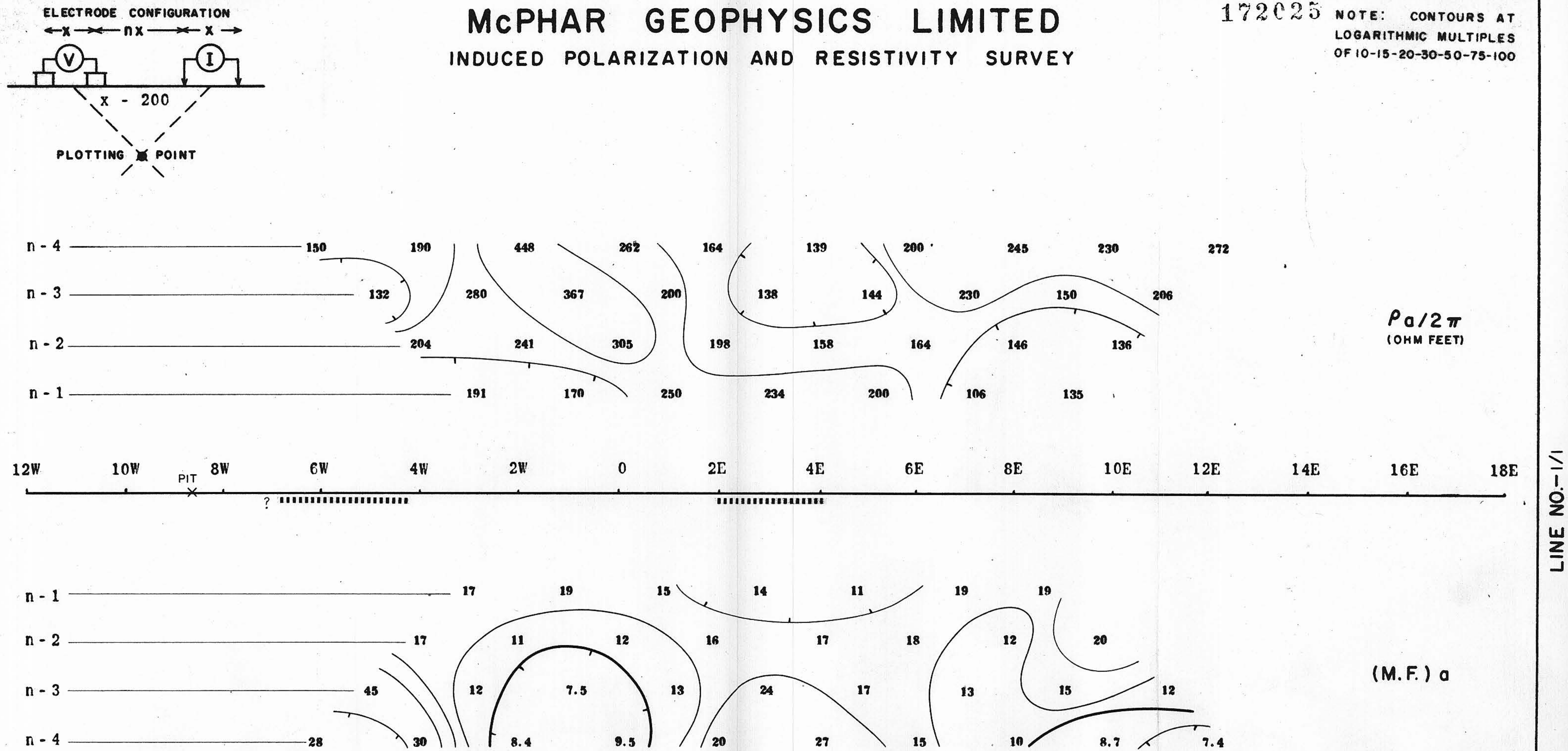
DWG. NO.-I.P.-2682-1

172025

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




5 cm

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

023

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

AREA I, MURRAY'S REWARD

Scale - One inch = 200 Feet

NOTE: LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0.3 & 2.5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 31/5/67

MCPHAR GEOPHYSICS LIMITED

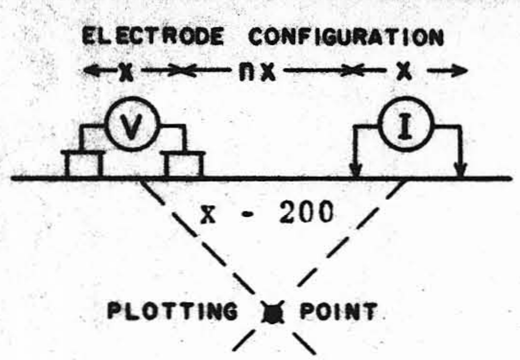
·DWG. NO.-I.P.-2682-2

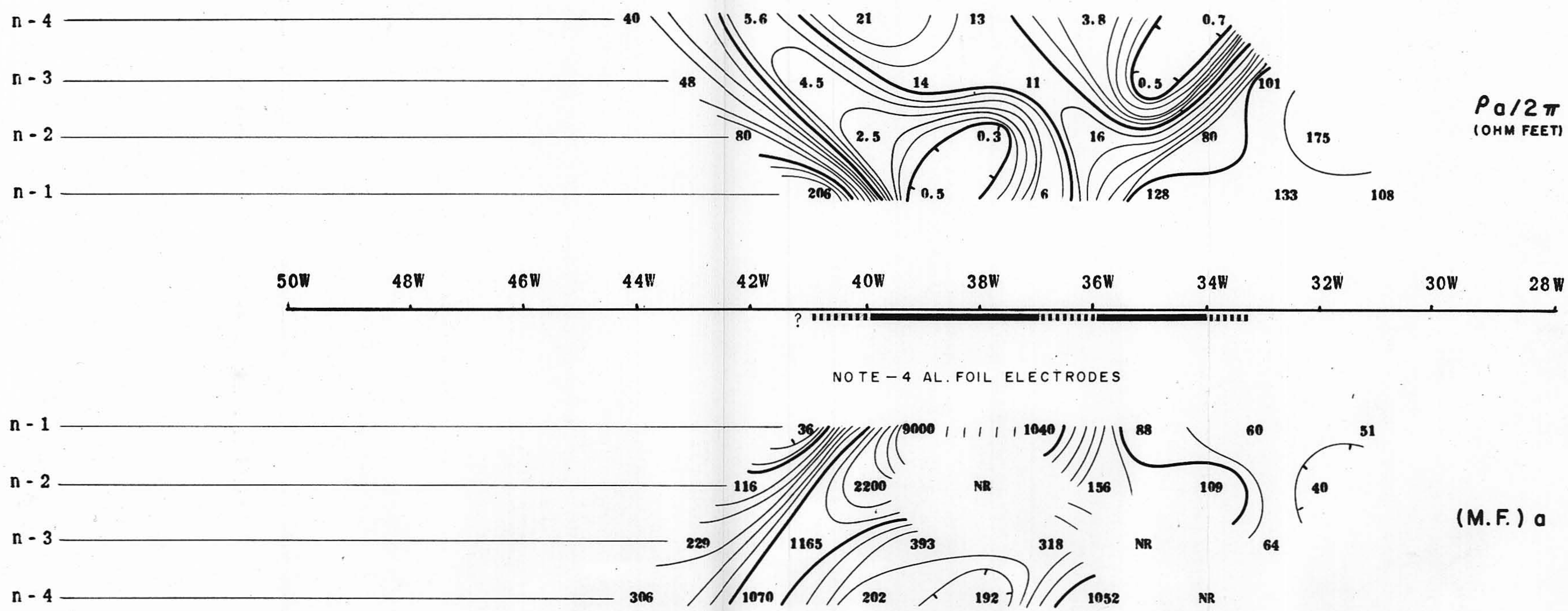
172026

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




LINE NO.-1/2

5 cm

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

AREA I, MURRAY'S REWARD

Scale — One inch = 200 Feet

NOTE LOGARITHMIC CONTOUR INTERVAL

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

024

FREQUENCY 0·3 & 2·5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 3/5/67

McPHAR GEOPHYSICS LIMITED

025

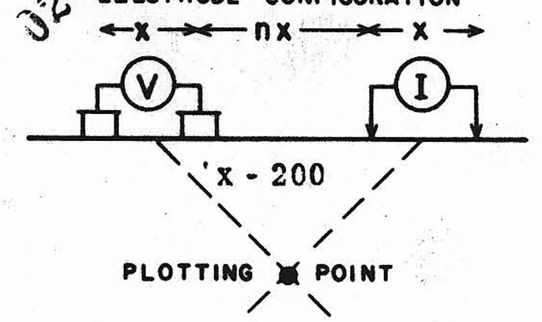
# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

172027

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100

ELECTRODE CONFIGURATION





LINE NO.–1/2

5 cm

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA.

AREA I, MURRAY'S REWARD

Scale—One inch= 200 Feet

NOTE: LOGARITHMIC CONTOUR INTERVAL

SURFACE PROJECTION OF ANOMALOUS ZONES

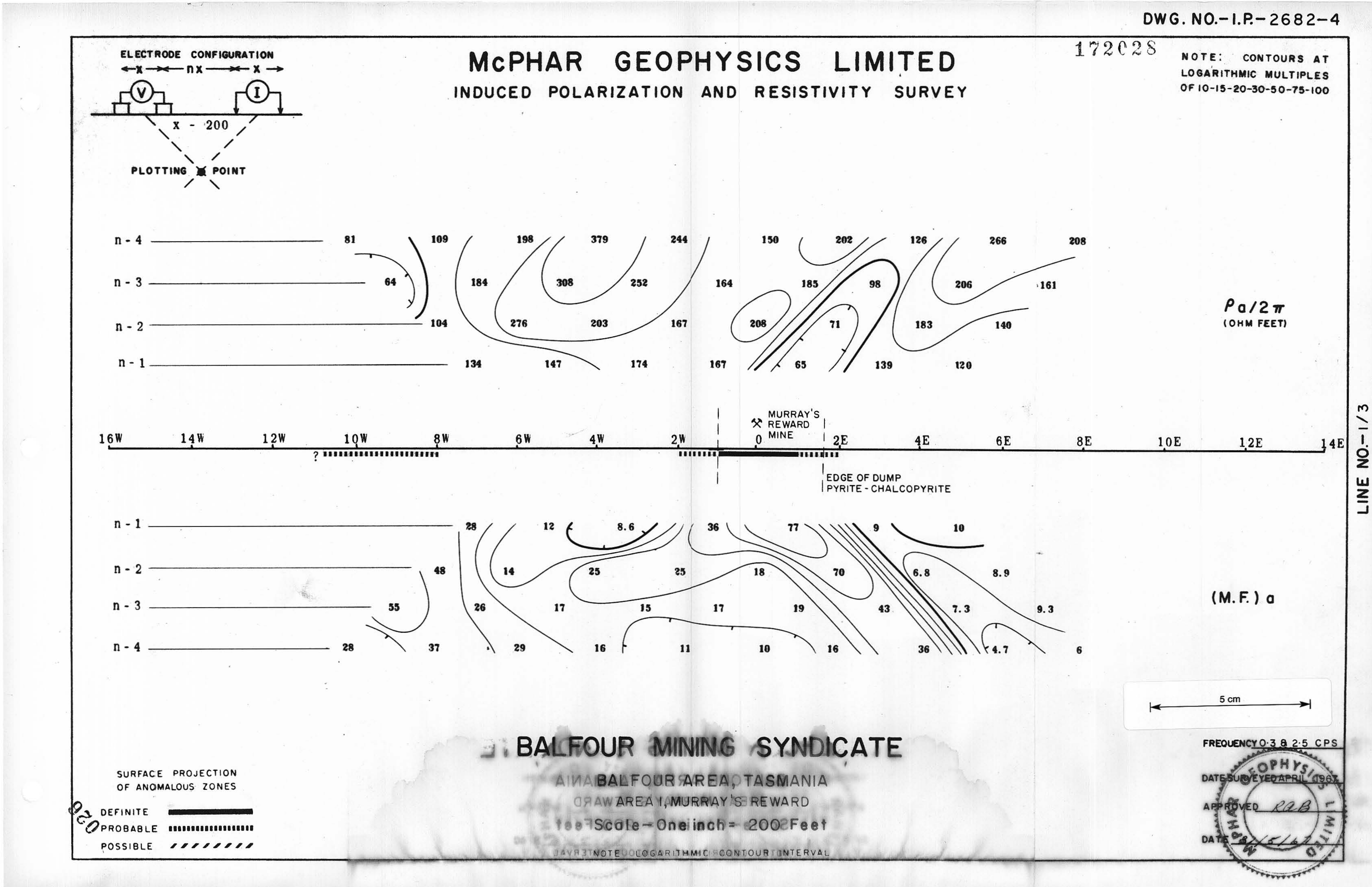
DEFINITE
PROBABLE
POSSIBLE

FREQUENCY 0.3 & 2.5 CPS

DATE SURVEYED

APPROVED RRB

DATE /5/67



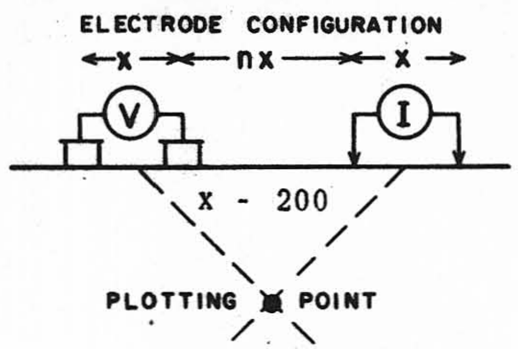
DWG. NO.-I.P.-2682-4
172028
McPHAR GEOPHYSICS LIMITED
INDUCED POLARIZATION AND RESISTIVITY SURVEY
NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100
ELECTRODE CONFIGURATION
x - 200
PLOTTING POINT
ρa/2π (OHM FEET)
(M.F.) a
MURRAY'S REWARD MINE
EDGE OF DUMP
PYRITE - CHALCOPYRITE
LINE NO.- 1/3
5 cm
BALFOUR MINING SYNDICATE
BALFOUR AREA, TASMANIA
AREA I, MURRAY'S REWARD
Scale - One inch = 200 Feet
NOTE LOGARITHMIC CONTOUR INTERVAL
SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE
FREQUENCY 0.3 & 2.5 CPS
DATE SURVEYED APRIL 1963
APPROVED
DATE
McPHAR GEOPHYSICS LIMITED

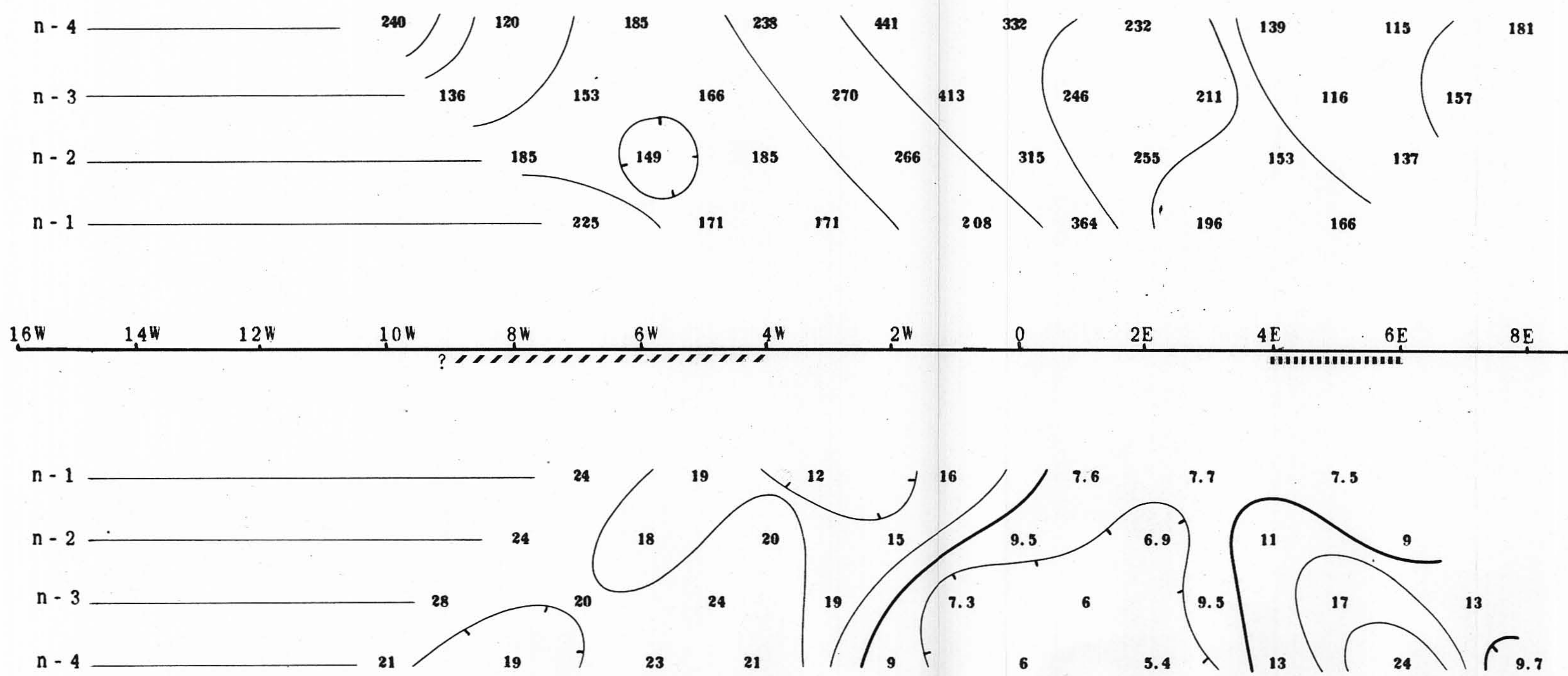
172029

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




LINE NO.-2/1

5 cm

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

027

## BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

AREA 2, CENTRAL MINE

Scale - One inch = 200 Feet

NOTE LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0.3 & 2.5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 8/5/67

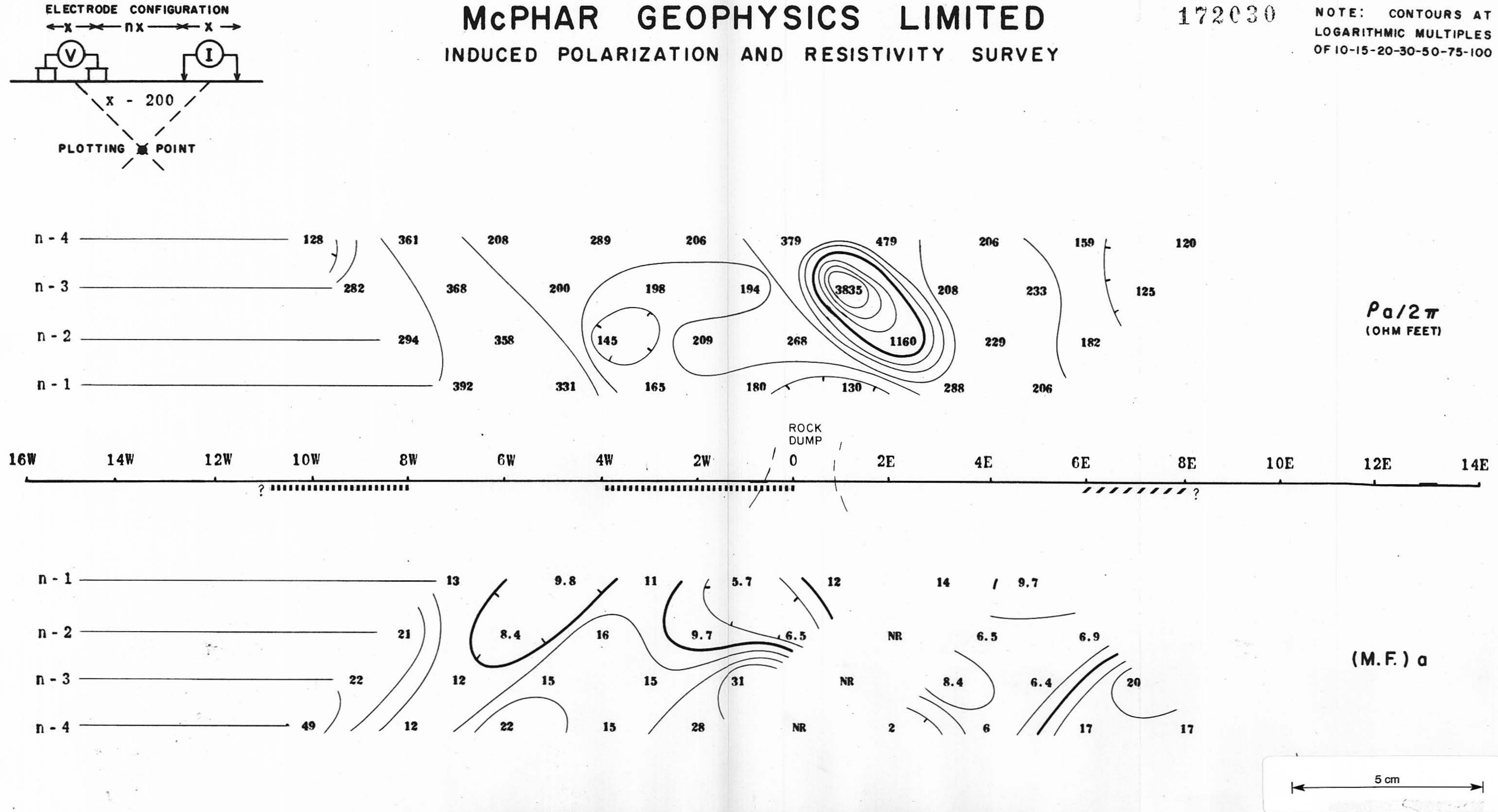
DWG. NO.-I.P.-2682-6

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

172030

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




## BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

AREA 2, CENTRAL MINE

Scale - One inch = 200 Feet

NOTE: LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0.3 & 2.5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 8/5/67

McPHAR GEOPHYSICS LIMITED

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

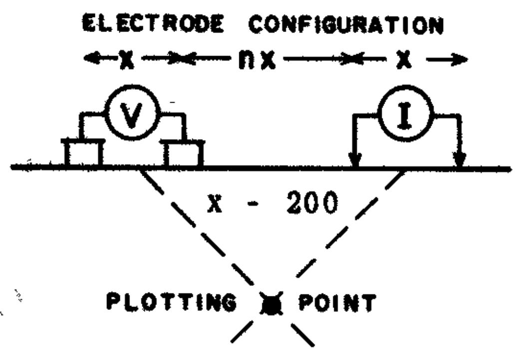
PROBABLE

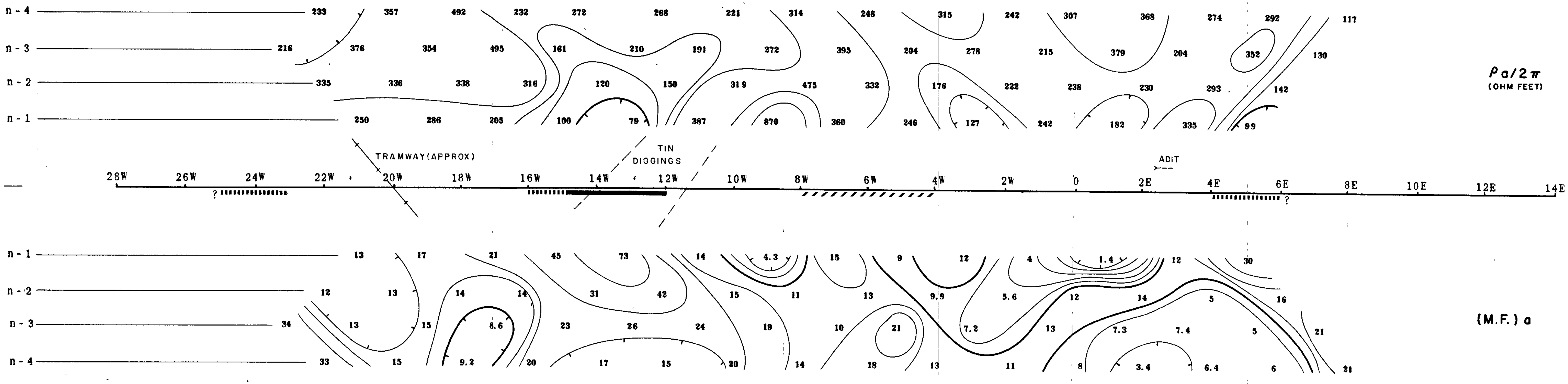
POSSIBLE

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




LINE NO.- 2/3

5 cm

SURFACE PROJECTION OF ANOMALOUS ZONES
- DEFINITE
- PROBABLE
- POSSIBLE

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA
AREA 2, CENTRAL MINE
Scale - One inch = 200 Feet

NOTE LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0.3 & 2.5 CPS
DATE SURVEYED APRIL 1962
APPROVED R.D.B.
DATE 5/62

McPHAR GEOPHYSICS LIMITED

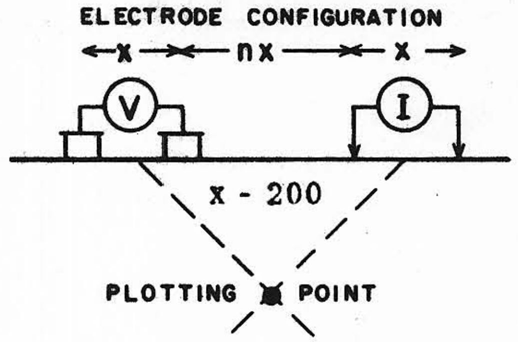
DWG. NO.-I.P.-2682-8

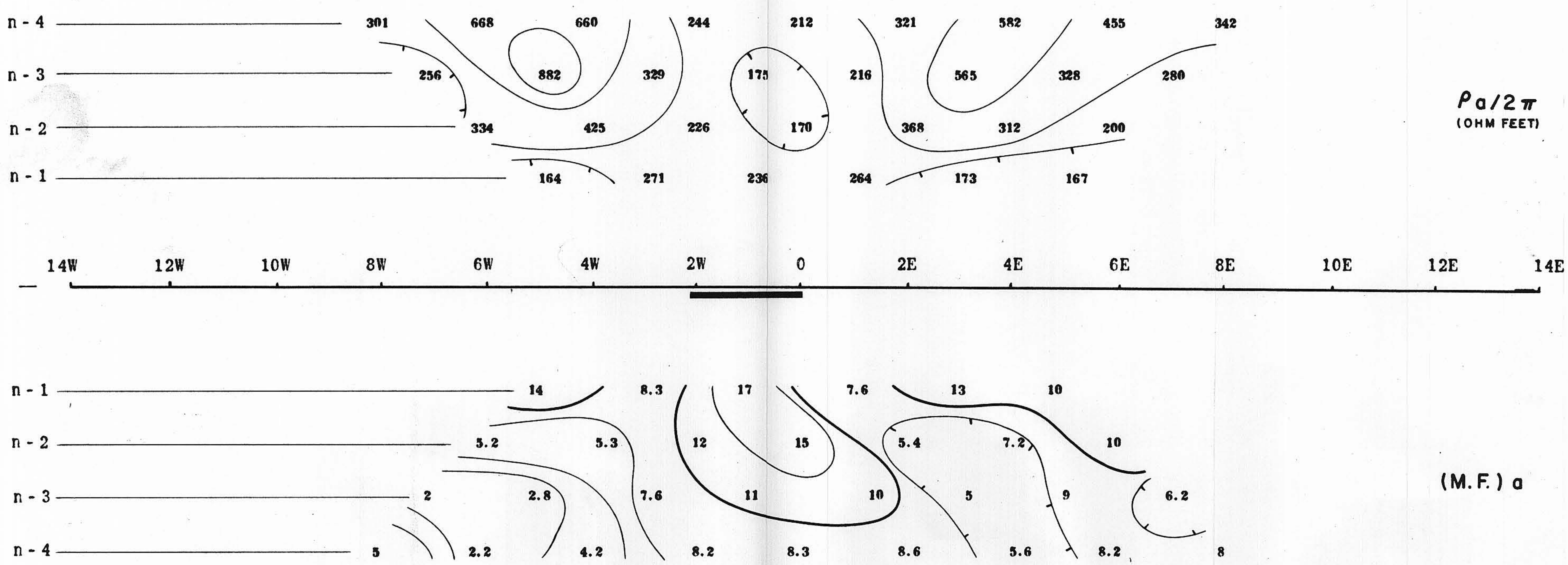
172032

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




LINE NO.- 3/1

5 cm

SURFACE PROJECTION OF ANOMALOUS ZONES

- DEFINITE
- PROBABLE
- POSSIBLE

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

AREA 3

Scale-One inch = 200 Feet

NOTE: LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0.3 & 2.5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 31/5/67

McPHAR GEOPHYSICS LIMITED

030

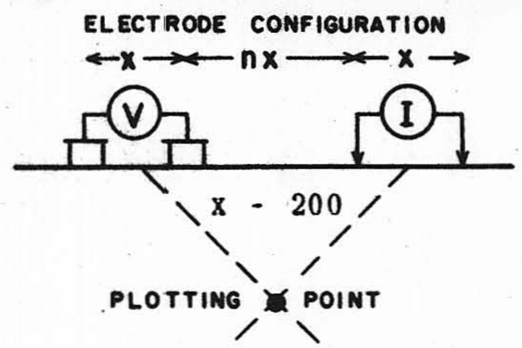
DWG. NO.-I.P.-2682-9

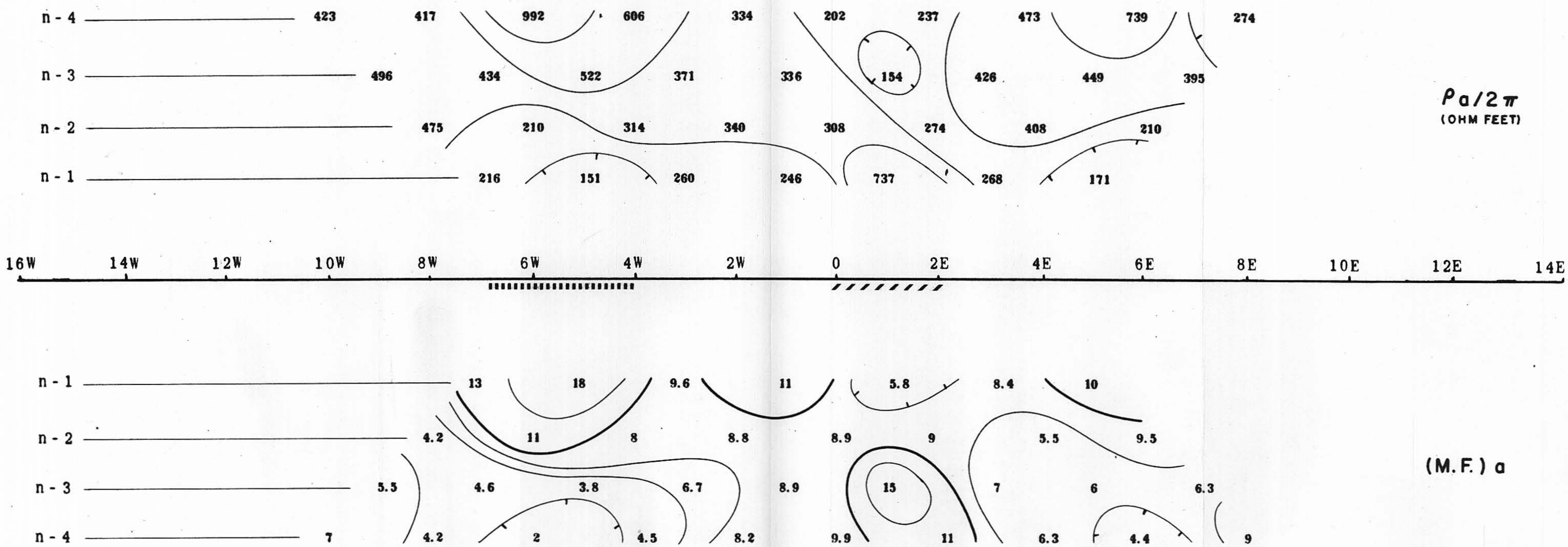
172033

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




LINE NO.- 3/2

5 cm

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

031

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

AREA 3

Scale - One inch = 200 Feet

NOTE: LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0.3 & 2.5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 3/5/67

McPHAR GEOPHYSICS LIMITED

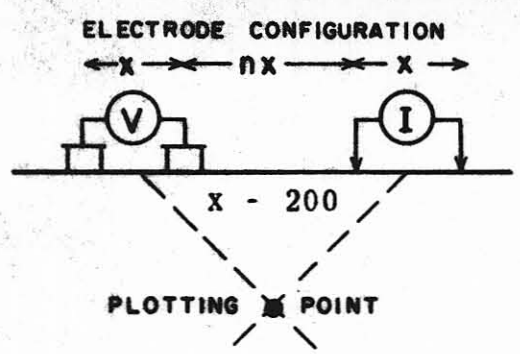
DWG. NO.- I.P.-2682-10

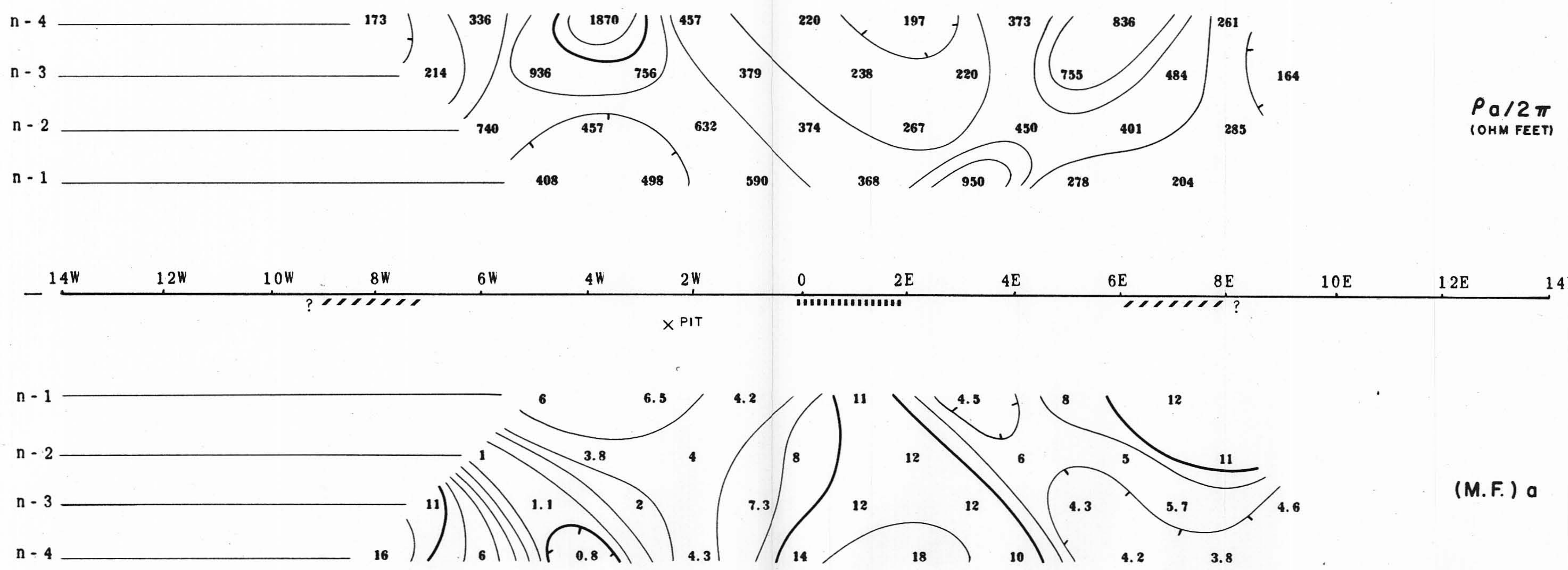
172034

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




LINE NO.- 3/3

5 cm

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

AREA 3

Scale - One inch = 200 Feet

NOTE LOGARITHMIC CONTOUR INTERVAL

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCY 0·3 & 2·5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 31/5/67



039

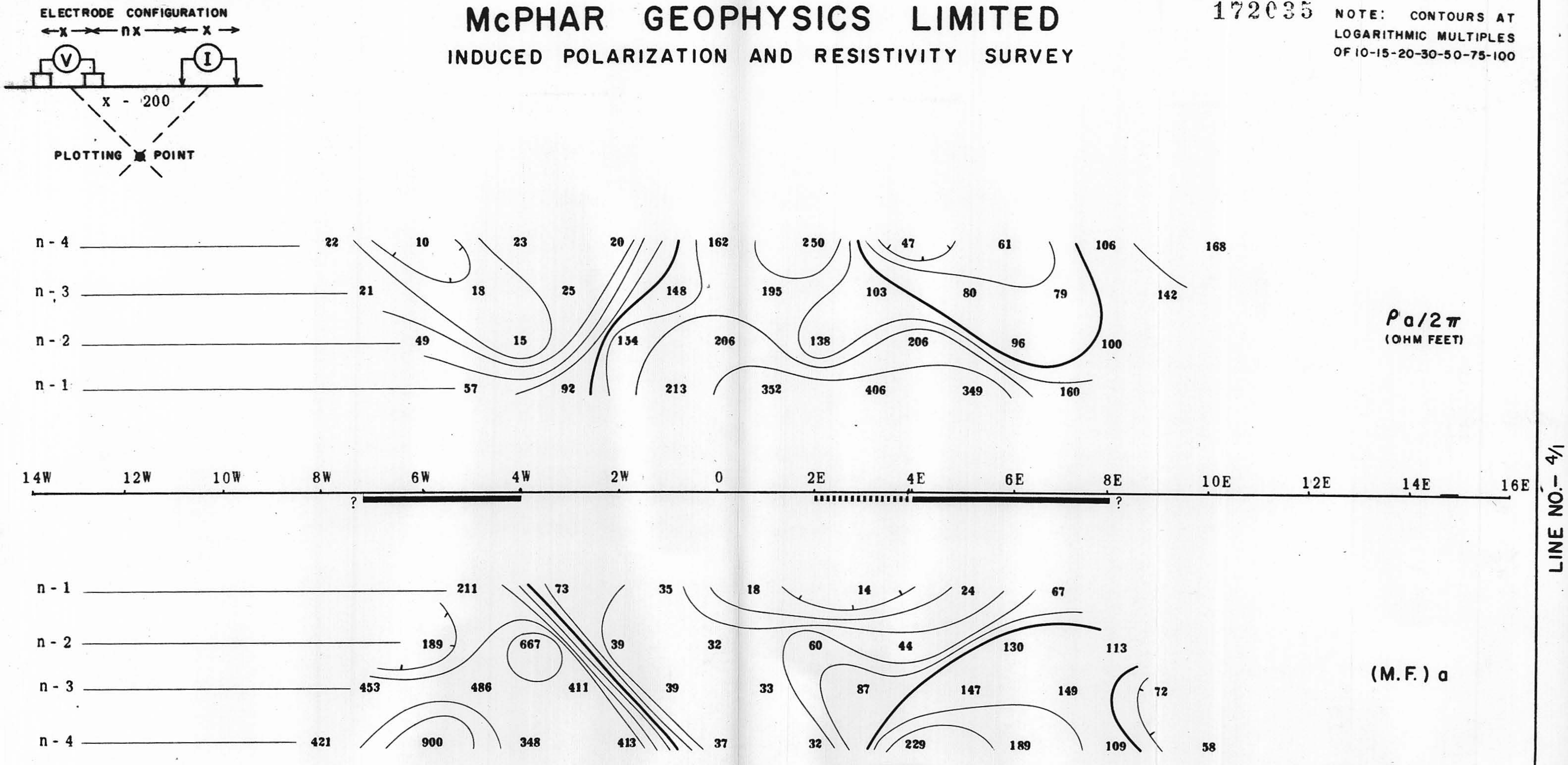
DWG. NO.-I.P.-2682-11

172035

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




5 cm

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

033

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

'AREA 4, 'THE CLUMP'

Scale - One inch = 200 Feet

NOTE: LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0.3 & 2.5 CPS

DATE SURVEYED APRIL 1967

APPROVED KAB

DATE .../5/67

McPHAR GEOPHYSICS LIMITED

DWG. NO.-I.P.-2682-12

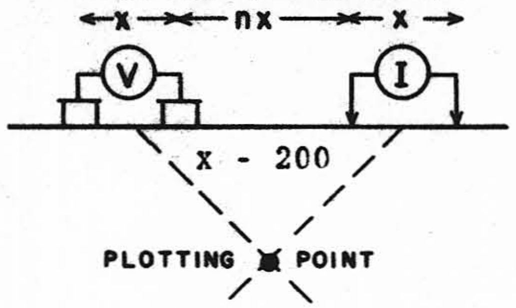
172036

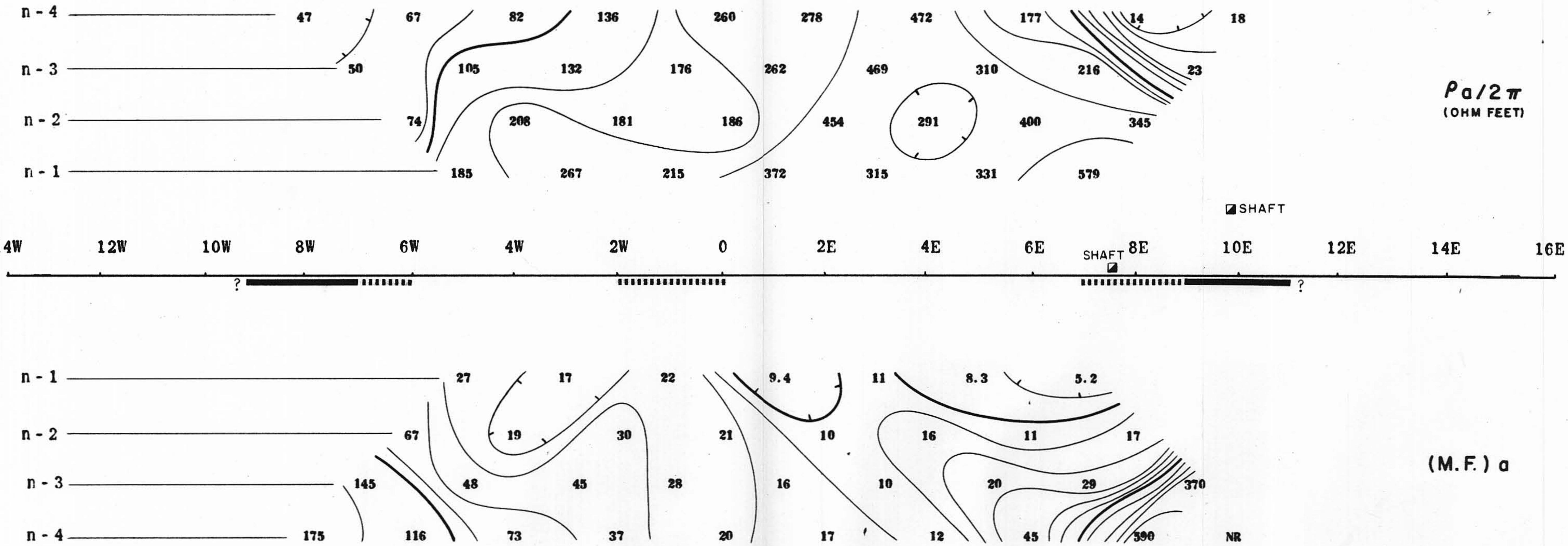
# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100

ELECTRODE CONFIGURATION




LINE NO.- 4/2

5 cm

# BALFOUR MINING SYNDICATE

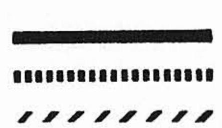
BALFOUR AREA, TASMANIA

AREA 4, 'THE CLUMP'

Scale - One inch = 200 Feet

NOTE: LOGARITHMIC CONTOUR INTERVAL

SURFACE PROJECTION OF ANOMALOUS ZONES




FREQUENCY 0·3 & 2·5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 4/5/67

MCPHAR GEOPHYSICS LIMITED

034

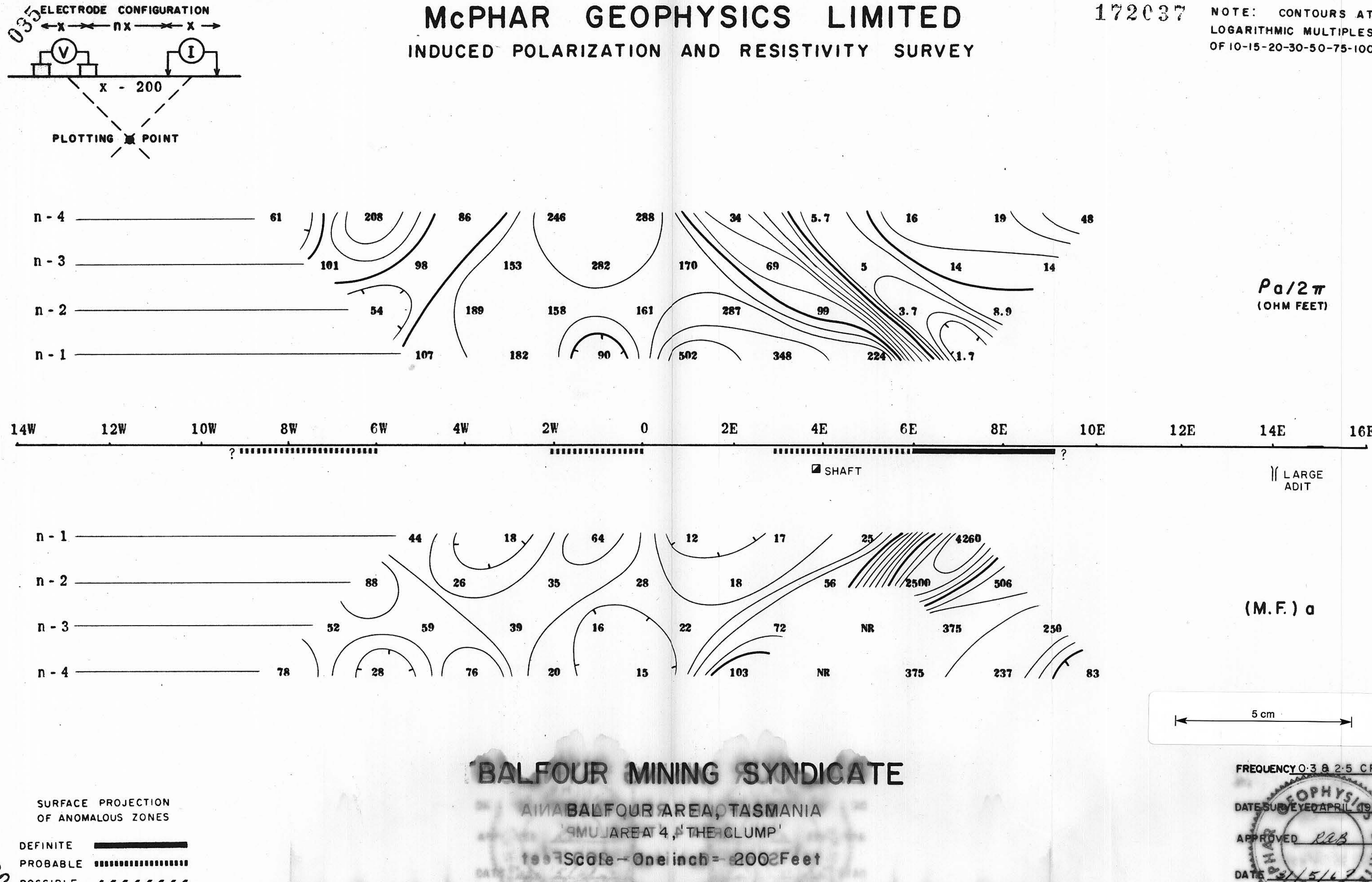
DWG. NO.- I.P.-2682-13

# McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY

172037

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




LINE NO.- 4/3

## BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

'AREA 4, 'THE CLUMP'

Scale - One inch = 200 Feet

NOTE: LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0·3 & 2·5 CPS

DATE SURVEYED APRIL 1967

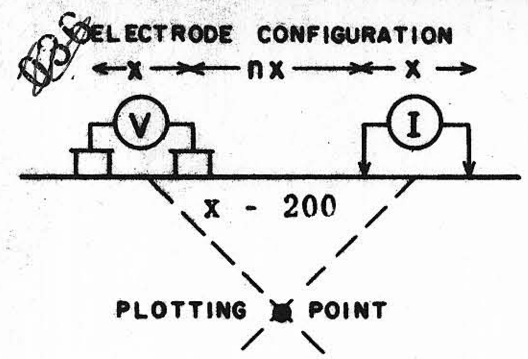
APPROVED RAB

DATE 31/5/67

McPHAR GEOPHYSICS LIMITED

035

DWG. NO.- I.P.-2682-14

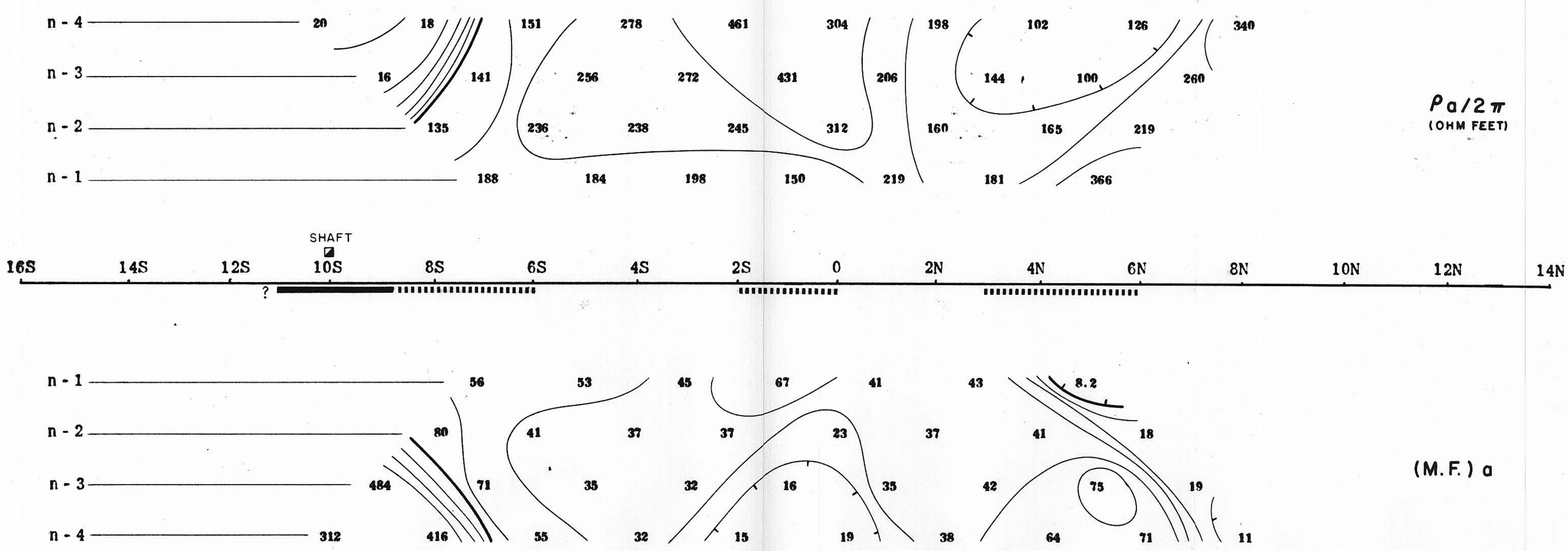



# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

172038

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




LINE NO.- 5/1

5 cm

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

AREA 5, DDB 5

Scale - One inch = 200 Feet

NOTE LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0·3 & 2·5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 31/5/67

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

036

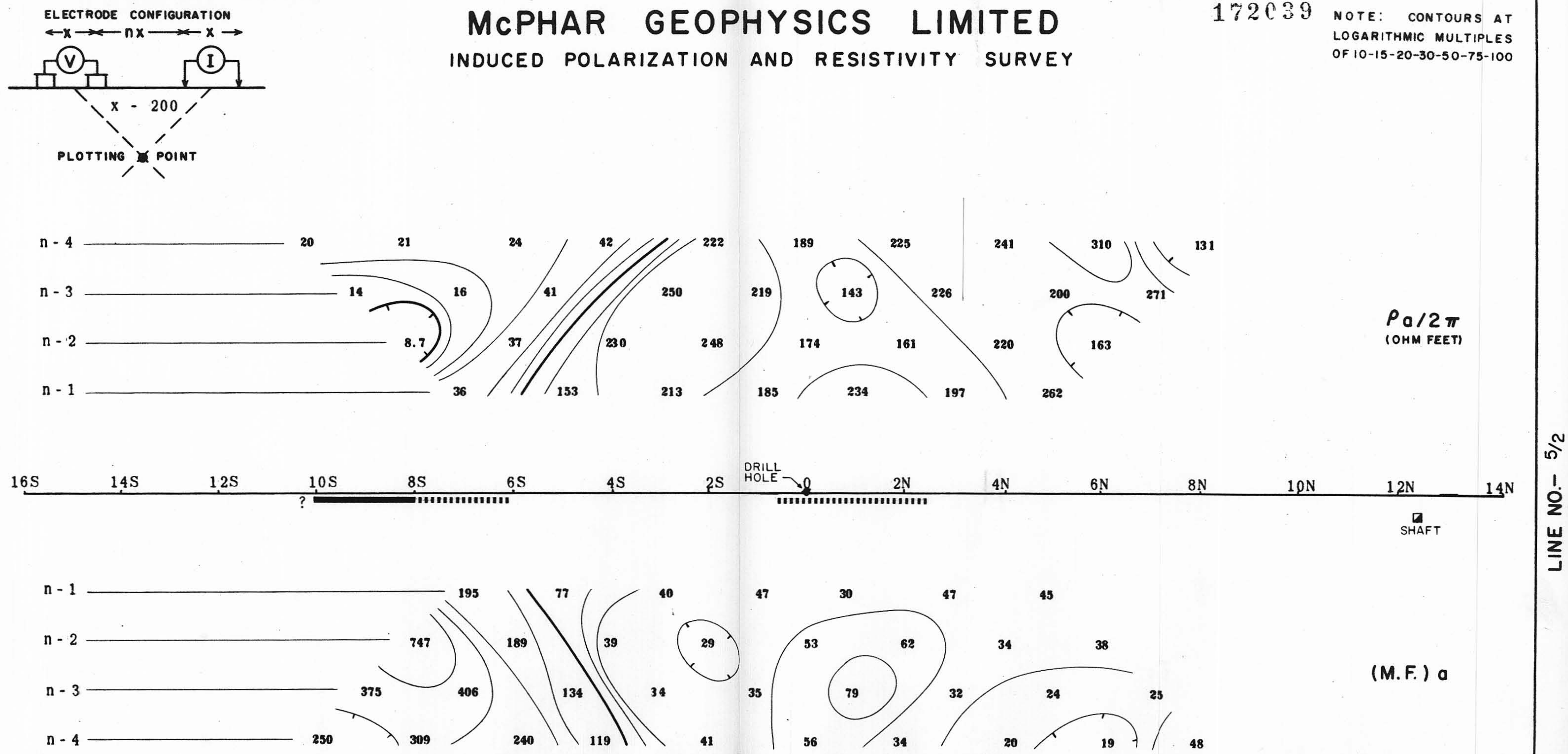
DWG. NO.-I.P.-2682-15

172039

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




5 cm

# BALFOUR MINING SYNDICATE

## BALFOUR AREA, TASMANIA

AREA 5, DDB 5

Scale - One inch = 200 Feet

NOTE: LOGARITHMIC CONTOUR INTERVAL

037

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCY 0·3 & 2·5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 31/5/67

McPHAR GEOPHYSICS LIMITED

DWG. NO.-I.P.-2682-16

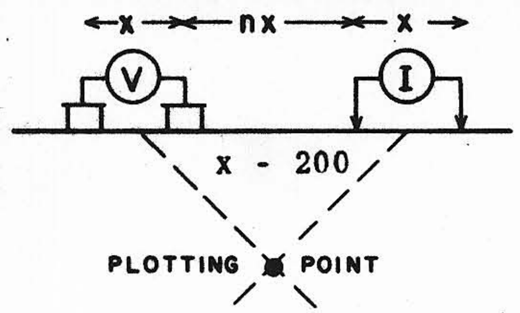
172040

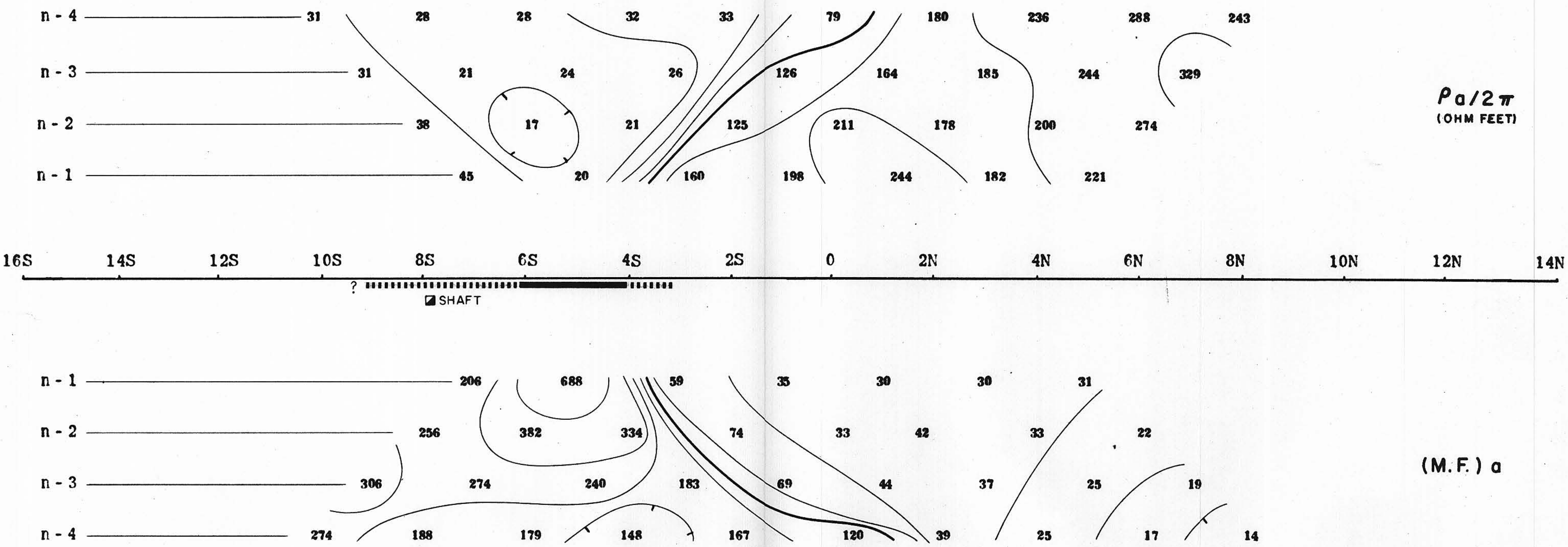
# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100

ELECTRODE CONFIGURATION




LINE NO.- 5/3

5 cm

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

AREA 5, DDB 5

Scale - One inch = 200 Feet

NOTE LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0·3 & 2·5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 8/5/67

McPHAR GEOPHYSICS LIMITED

033

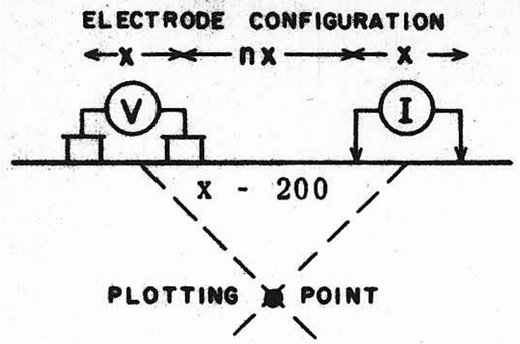
DWG. NO.- I.P.-2682-17

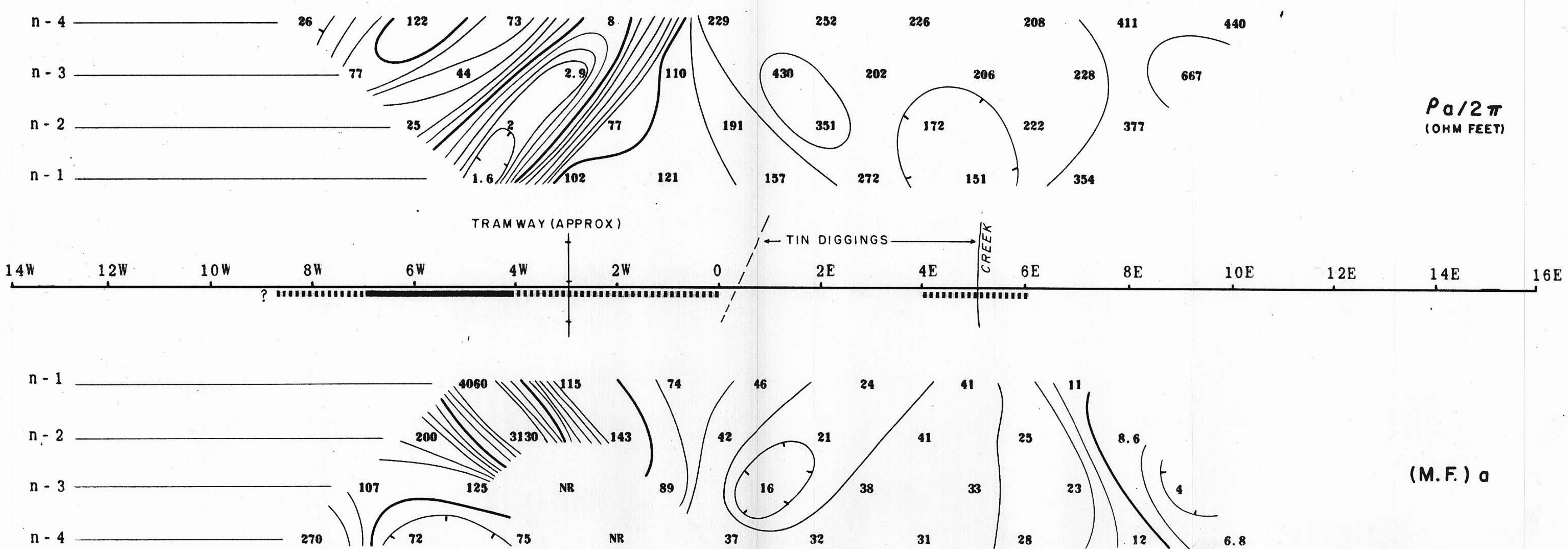
172041

# McPHAR GEOPHYSICS LIMITED

## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: CONTOURS AT LOGARITHMIC MULTIPLES OF 10-15-20-30-50-75-100




LINE NO.- MA/1

5 cm

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

039

# BALFOUR MINING SYNDICATE

BALFOUR AREA, TASMANIA

AREA M. A.

Scale - One inch = 200 Feet

NOTE LOGARITHMIC CONTOUR INTERVAL

FREQUENCY 0·3 & 2·5 CPS

DATE SURVEYED APRIL 1967

APPROVED RAB

DATE 8/5/67