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A REPORT ON AN ELECTRICAL INDUCED POLARIZATION SURVEY OVER THE MT. LIVINGSTONE PROSPECT NEAR RENISON BELL, WEST COAST TASMANIA ON BEHALF OF PACMINEX PTY. LIMITED

75-1073

BY

A.W. HOWLAND-ROSE
MSc, DIC, AMAusIMM, FGS
GEOPHYSICIST

SYDNEY, N.S.W.

FEBRUARY-MARCH, 1975
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OVER THE MT. LIVINGSTONE PROSPECT

NEAR RENISON BELL, WEST COAST TASMANIA

ON BEHALF OF

PACMINEX PTY. LIMITED

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SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.
GEOPHYSICAL CONSULTANTS AND CONTRACTORS

SUMMARY

An induced polarization survey carried out over the Mt. Livingstone area revealed some seven induced polarization responses associated with some conduction with respect to the enclosing rocks, and moderate disturbances in the magnetic field. These anomalies have similar characteristics to those expected from the "type" mineralisation sought, and are therefore recommended for very careful ground follow-up. Those anomalies considered of secondary interest could well represent variants of the "type" mineralisation, and as such, are also recommended for ground follow-up. No drilling recommendations have been made based on the geophysical data alone, as the biassing of all geophysical anomalies should be by geochemical response or geological environment.

1031 WELLINGTON STREET, WEST PERTH, W.A. 6005
TELEPHONE 21 6934. TELEGRAMS "SCINTREX" PERTH

6 TRAMORE PLACE, KILLARNEY HEIGHTS, N.S.W. 2087
TELEPHONE 451 5367. TELEGRAMS "SCINTREX" SYDNEY

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PACMINEX PTY. LIMITED

INTRODUCTION

At the request of Mr. W. Langron, Chief Geophysicist, and Mr. P. Wilkins, Technical Officer for Pacminex Pty. Limited, Scintrex Pty. Ltd. carried out electrical induced polarization surveys in the Mt. Livingstone area near Renison Bell, Tasmania. The field crew was under the immediate direction of Scintrex Staff Geophysicist, Mr. S. Baggott B.App.Sc(Geophys.) with Mr. D. Sarl Geophysical Technician of Pacminex Pty. Limited, assisting. On site geological supervision was provided by Mr. P. MacNamara, Area Geologist. Mr. A.W. Howland-Rose provided such additional technical supervision as was required.

The survey work was carried out on 12 production days between 9th February and 1st March, 1975.

For the geologists' information, a brief description of the two methods used in the area are included in the text.

PRESENTATION OF RESULTS

Plate 1 displays the gradient and pole-dipole electrical induced polarization data over the northern portion of the area between lines 4800N and 5700N, while Plate 2 displays the three traverses read to the south of the area - lines ML19, ML20 and line 4000N. The data is displayed on a horizontal scale of 1:2500, while the vertical scales used are 1 centimetre = 5 milliseconds and a 5 centimetre log scale for resistivity, expressed in ohm-metres.

Plate 3 displays a contour interpretation of the chargeability and apparent resistivity data at a horizontal scale of 1:2500.

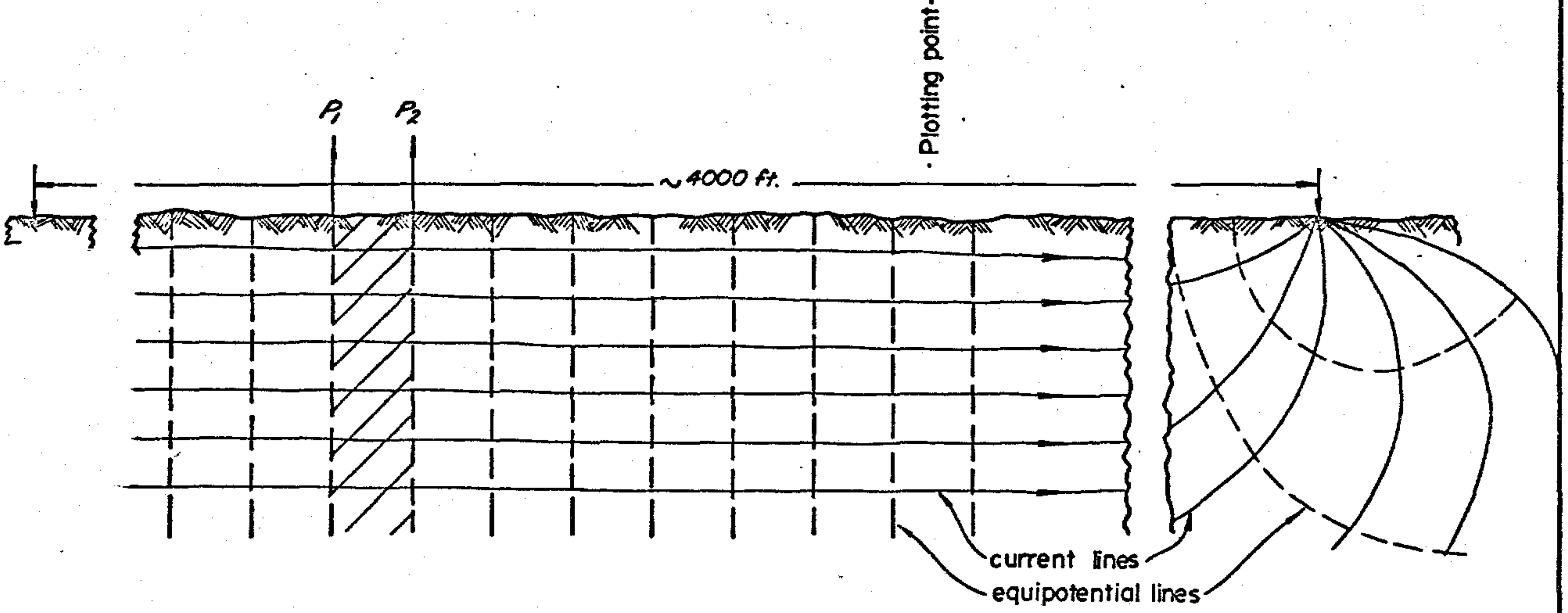
METHODS EMPLOYED

Gradient Array

In the case of the gradient array, positional information is excellent, but depth estimates rely on profile shape and then only give a "maximum depth". An additional inhibiting factor of course is resolution of the potential dipole used. In this survey the potential dipole employed was 25 metres, thus it is not possible to resolve the depth better than "within 12½ metres". Thus, many of the the 25 metre determinations may in fact either outcrop, or lie within a few metres of surface. The plotted position of the data represents a summation of the characteristics of the material immediately below that point between the potential dipoles.

EQUIPOTENTIAL DIAGRAM

GRADIENT ARRAY



SCALE, 1" = 200 ft.

5 cm

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Similarly the width of bodies is not easy to determine for narrow zones having a width less than half the dipole spacing used. Thus, estimated maximum widths are educated guesses at best. However, the wider zones are resolved more accurately.

The attitude of a chargeable zone can only really be gauged with any precison in the centre of the gradient array and providing the body has strongly contrasting resistivity and chargeability characteristics to the enclosing rock units.

All field measurements were taken between slope distances along lines. This will, in steep areas, produce errors in the calculated apparent resistivity data, however, these errors will be arithmetic, and as significant changes in resistivity are logarithmic, this source of error is not significant. In assessing the position of the source in areas of extreme terrain, it does not lie vertically below the plotted position of the anomaly, but normal to the "local slope". All positions in the text refer to source positions normal to the local slope.

Each current dipole block has been contoured separately. As would be expected, the continuity along strike is generally good, especially in the chargeability data. It is worth noting in passing, that although not used in this survey, "end-on" current dipoles blocks cannot be expected to give identical data due to the different base levels of the current dipoles, and, in zones close to the current poles, the data will not sample identical volumes on the overlap between current dipoles. This phenomenon will result in more extreme divergence of data as the current dipole is approached. However, these factors are entirely predictable.

Moving Source Arrays

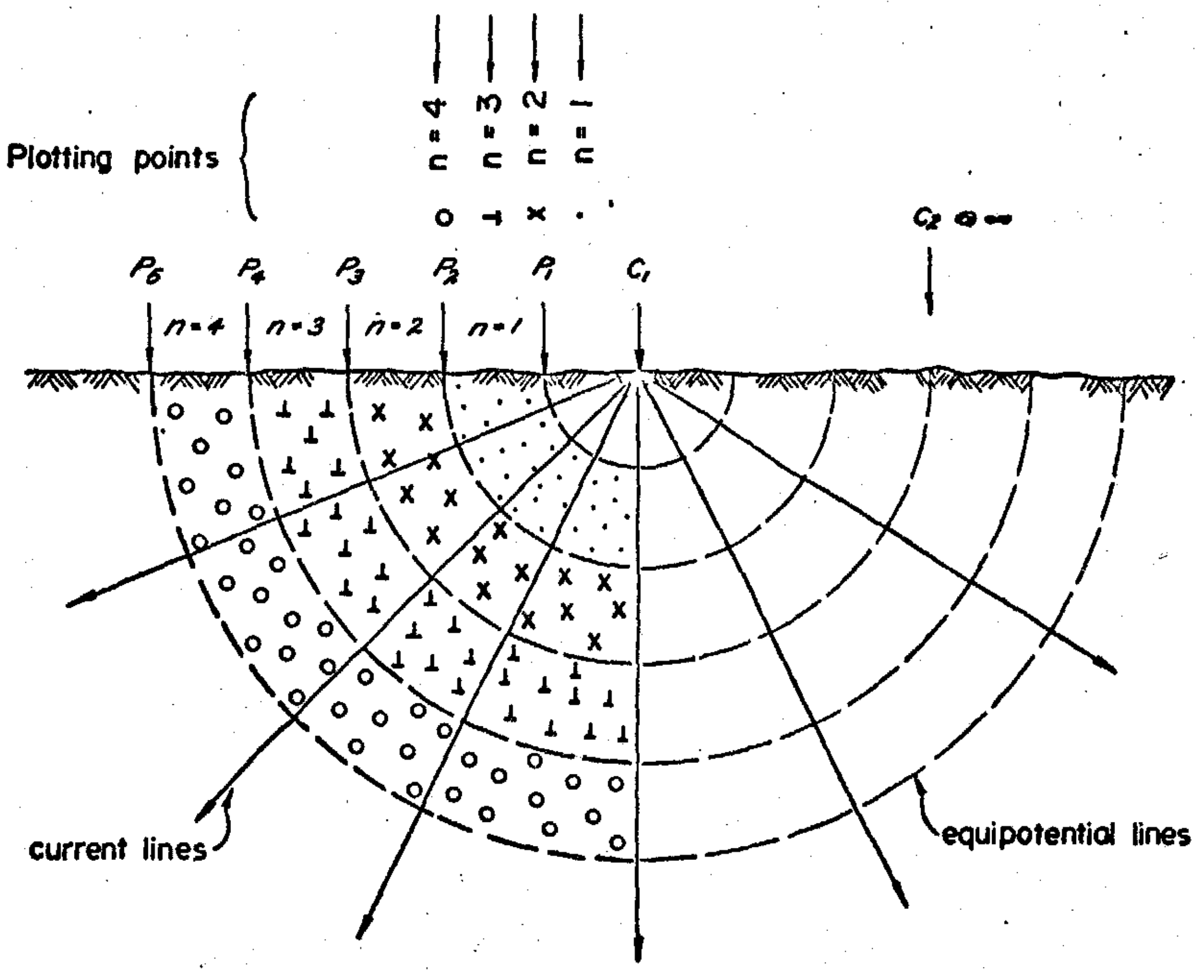
For moving source arrays such as pole-dipole, depth information is excellent but width and attitude are difficult to define with any precision. For multiple sources within the resolution of the electrode geometry, positional information may be difficult to obtain in some instances. For this reason multiple effective spacings are employed.

The plotted position of the data does not represent the characteristics of the material immediately below the point of measurement, but of a complex volume between the potential electrode and its proximity to the current pole. An example is shown in the enclosed figure.

These arrays are materially influenced by near surface variations in oxidation and superficial cover, and of course, as their resolution and penetration are inter-related, an increase in one results in a decrease in the other.

EQUIPOTENTIAL DIAGRAM

POLE-DIPOLE ARRAY



SCALE, 1"=200 ft.

5 cm

Rate of Progress

Progress on the survey was slow, due in part to weather conditions, but mostly due to lack of survey lines and limited availability of field assistants. The latter being due to other requirements of the integrated exploration programme. Normal average productivity in the region is about $1\frac{1}{2}$ kilometres per diem working with a two reading crew.

DISCUSSION OF RESULTS

The survey is discussed by area.

I - NORTHERN AREA, LINES 4800N to 5700N

The two current dipoles employed to energise the grid area for the gradient survey were as follows:

Electrodes	Dipole	Lines Surveyed
4487.5W & 5487.5W on 5500N	1000 metres	5700N, 5600N, 5500N, 5400N, 5300N
5312.5W & 4312.5W on 5000N	1000 metres	5200N, 5100N, 5000N, 4800N.

The potential dipole employed to investigate the primary and secondary potential fields was 25 metres moved at 25 metre station intervals.

In addition to the gradient array work, sections of line 4800N between 5050W & 5200W and 4650W & 4875W, were surveyed using a pole-dipole array of, "a" spacing 25 metres, and n=1 and n=2.

Each line is discussed separately below.

Line 5700N: Background chargeabilities range between 5 and 10 milliseconds between 4900W and 5150W, while resistivities increase from a minimum of 100 ohm-metres at 5150W, increasing rapidly from 250 ohm-metres to over 1200 ohm-metres between 5000W and 4900W. To the west of 5150W, both apparent resistivity and chargeability increase in sympathy, the latter from 10 milliseconds to over 20 milliseconds at 5188W. This sympathetic increase in both chargeability and resistivity clearly infers a disseminated source to the chargeability anomaly. The maximum depth to source at about 5175W is considered to be about 40 metres. The magnetic field recorded over this induced polarization response was low, indicating an absence of magnetic material. Thus the source is either disseminated sulphide and/or graphite.

Line 5600N: An almost identical profile form was observed on this line, showing the geology to be similar. However, the chargeability peak of 20 milliseconds above background centred just east of 5200W occurs some 25 metres east of the highest apparent resistivity recorded. A 50 gamma increase in total field was noted over this chargeability response, inferring some increase in either magnetite or pyrrhotite within the chargeable source material. The maximum depth estimated is 35 metres.

Line 5500N: A generally similar apparent resistivity and chargeability profile form was observed west of 5100W, with a distinct apparent resistivity low of 80 ohm-metres at about 5000W. A substantial and significant anomaly of some 20 milliseconds above background was defined at 5188W. The maximum depth to source is estimated at 25 metres, while the width is about 35 metres. The profile form suggests a steep west dip to the source. The responses described above at 5188W and 5175W are the northern correlatives, while to the south, distinct peaks were recorded at similar grid positions. The anomaly on this line was associated with a marked change in apparent resistivity from about 100 ohm-metres to the east, to over 600 ohm-metres to the west. This is also true on lines 5400N and 5300N. The induced polarization anomaly at 5188N shows no distortion in the magnetic field, inferring the source to be sulphide and/or graphite within only minor pyrrhotite and/or magnetite.

A second response of similar magnitude was recorded on this line at 5312W. There was no depression in the associated apparent resistivity at this point, and no increase in the total magnetic field. The source therefore, is considered to be disseminated sulphides and/or graphite within a resistive host rock. The maximum depth of the source is considered no deeper than 30 metres. This anomaly cannot be traced north or south as no surveying was carried out this far to the west on either line 5400N or 5700N.

Line 5400N: A significant induced polarization anomaly of over 20 milliseconds was recorded at 5188W coincident with a marked depression in L/M ratio (not plotted) and a significant change in resistivity. The source is assessed to have a maximum depth to source of 20 to 25 metres, while the width of the source is significantly less than 20 metres. Some increase in magnetic field was noted over this anomaly of about 100 gammas, but this correlates well with the increase in resistivity and probably infers a function of rock type.

Line 5300N: A 20 millisecond anomaly having similar form to that seen at 5188W on line 5400N, was observed at the same grid position on this line. As on the previous line, an increase in resistivity west of 5162W coincides with an increase in magnetic field intensity, inferring a correlation with rock type rather than with the chargeable source. Some reduction in apparent resistivity at 5162W infers the source to be weakly conductive only.

A very material reduction in apparent resistivity from several hundred ohm-metres to less than 10 ohm-metres was recorded at 5038W coincident with a significant increase in chargeability of about 12 milliseconds. The L/M ratio decreases to 0.5 from 0.8 (not plotted) inferring a near surface source of coarse grain. The width of the source is significantly narrower than the 25 metre dipole used, therefore the actual resistivities within the source are significantly less than 10 ohm-metres. There was no associated distortion in the magnetic field, inferring that the source does not contain either magnetite or pyrrhotite. The source is interpreted to be massive sulphides having very limited strike length - less than 100 metres - as no increase in chargeability was noted on the lines to the north or south, although a reduction in apparent resistivity was seen. Although there is no magnetic response, this anomaly is considered of primary interest as it is of non-formational origin.

Line 5200N: East of 4950W the apparent resistivity background remains at about 1000 ohm-metres while the chargeability background varies about the 10 millisecond level. Within this zone a minor 5 millisecond high occurs coincident with 50% depression in apparent resistivity to 500 ohm-metres at 4888W. The maximum depth of this zone is assessed to be less than the potential dipole employed, namely, less than 25 metres. A significant fall in apparent resistivity at 4988W on line 5300N, together with a sympathetic rise in chargeability is the possible correlative of this anomaly on that line. Unfortunately the anomaly is not closed to the west on that line.

At 4838W a depression in the resistivity data is accompanied by an increase of 200 gammas or so in the total field. There is, however, no accompanying increase in chargeability above background, inferring a possible magnetite and or serpentinite source.

West of 4970W the apparent resistivities fall and apparent chargeabilities rise. This point marks a major rock type change. Apparent resistivity falls in excess of 90% from background at 4988W and 5038W are accompanied by increases in chargeability of 8 - 10 milliseconds above background. A 600 gamma above background total field response was recorded over this zone and the source therefore contains magnetite, as the equivalent pyrrhotite content required to produce the magnetic response would result in a more substantial induced polarization anomaly. However, the conductive and magnetic nature of this response requires very careful ground follow-up.

West of about 5100W the resistivity rises sharply as does the chargeability. This marks a major change in rock type. The source of the anomaly is certainly disseminated sulphides. This response correlates with that observed at 5188W on line 5300N.

Line 5100N: The resistivity and chargeability data on this line show very little correlation in form to the lines to the north or south. This certainly infers that a dislocation such as a major fault may be present whose orientation is sub-parallel to the line. The correlation between lines north and south of this line is in fact excellent. The magnetic data shows good correlation with lines to the south but no correlation whatsoever to the north.

A minor response of 4 milliseconds centred at 4888W is accompanied by an apparent resistivity low of minor importance. This response is not considered significant.

The significance of an increase in chargeability and decrease in apparent resistivity on the most westerly end of line 5100N is difficult to assess as it is open to the west and not seen on either line to the north or south.

Line 5000N: To the west of 4700W the apparent resistivity varies around 400 ohm-metres while the apparent chargeability remains above 10 milliseconds. The major feature on this line is a marked resistivity high of about 3000 ohm-metres between 4606W and 4675W. This marks the position of an extremely resistive rock unit with low intrinsic chargeability.

West of this feature between about 4700W and 4825W, rather low resistivities, moderate chargeabilities and high magnetics, may indicate the presence of serpentinite, or, a less resistive rock unit carrying magnetite.

West of 5000W the chargeability level remains high/normal, while resistivities decrease in a magnetically quiet area. No significant anomalies were identified.

There were no significant anomalies on this line.

Line 4900N: Not surveyed.

Line 4800N: The apparent resistivity data shows an almost identical profile form to that seen 200 metres north on line 5000N. The correlation is as follows:

5000N:	4962W	4888W	4812W	4638W
4800N:	4962W	4862W	4762W	4650W

Interestingly enough this does not conform to the strike observed from the magnetic data which infers a strike as follows:

5000N:	4700W
4800N:	4650W

The distinct and material resistivity anomaly seen centred at

4638N on line 5000N lies east of the magnetic response referred to above, while on this line it is coincident with this resistivity high, There is no clear interpretation of this phenomenon.

Other than a gradual rise in background chargeabilities from about 7-9 milliseconds in the east, to 15-18 milliseconds at 5000W, there are no significant anomalies over this section. However, west of 5088W, and open to the west, a significant chargeability anomaly of some 15 - 20 milliseconds above the high 15 - 18 millisecond background was defined. A very slight increase in magnetic field was observed over this response. A slight reduction in apparent resistivity was noted over this zone to 700 ohm-metres, indicating the source to be very weakly conductive only. The source is not considered characteristic of the type mineralisation sought.

Moving Source Arrays

A pole-dipole array was employed on line 4800N from 5050W to 5200W and between 4650W to 4875W. The current pole was to the east while the infinite electrode was placed at 5000W on line 4200N. The spacing employed was 25 metres at n = 1 and n = 2 with station intervals of 25 metres. The data plotting point was midway between the closest potential and the current pole. The volume sampled, however, is a complex one and is not situated immediately below the plotting point as the previously described gradient array data.

The pole-dipole data clearly confirms the interest of the gradient anomaly located on the western flank of line 4800N. The maximum depth to the source is less than 25 metres. The position of the centre of the source has not been defined as the line was insufficiently cut to the west. However, a gradual increase in sulphides is inferred from 5150W west to 5200W where a 40 millisecond above background anomaly was recorded. The observed resistivities on the pole-dipole data are comparable to that observed with the gradient array data. Both show only weak conduction within the range 300 to 400 ohm-metres.

The eastern section shows a double peak anomaly centred at 4730W which indicates the weak anomaly located at this point on the gradient array comes to within 25 metres of surface and is associated with very weak conduction. This anomaly lies immediately to the west of the resistive rock unit referred to above.

The Contour Interpretation

The resistivity data to the north and south of, but excluding line 5100N, show excellent interline correlation. This strongly suggests an across strike dislocation whose orientation is sub-parallel to line 5100N. This is not a function of the position of current dipoles on adjacent gradient blocks as this occurs between lines 5100N and 5200N.

North of line 5100N the most striking feature is a resistive ridge which marks the western ends of all lines surveyed. The contact between this resistive unit and the more conductive unit, lies some 25 metres east of this resistive ridge. Coincident with this contact, a chargeable response was recorded on lines 5300N to 5600N inclusive.

A chargeable response at 5138N on line 5300N associated with a distinct resistivity low (see above) can be traced as far north as 5400N and as far south as 5200N on the resistivity data. This anomaly therefore occurs within a generally conductive but non-anomalously chargeable rock unit.

Generally the resistivity and chargeability data show quite conformable trends.

Each distinct chargeability and/or resistivity unit represents the characteristics of the rock unit immediately below the point of measurement. Therefore, the rock type boundaries should be drawn parallel to the trends indicated in these maps, north and south of line 5100N.

II - SOUTHERN AREA

The most southerly line surveyed conformable with the main grid was line 4000N. This line was surveyed using a pole-dipole array between 4650W and 5700W. The spacing used was 25 metres with 'n' values of 1 and 2. The data is displayed on Plate 2.

Very low apparent resistivities were observed west of 5450W. The order of the apparent resistivities varies between 2½ ohm-metres and 25 ohm-metres, while the chargeabilities recorded range between 15 and 20 milliseconds, with occasional values as high as 10 milliseconds above this level.

Relatively narrow sources situated at 5588W, 5638W and 5438W give rise to anomalously high resistivity and chargeability responses at these points. The depths are about 25 metres in all three cases.

The entire zone between 5300W and 5700W is considered to be underlain by conductive shales, with minor narrow chargeable zones at the points described above.

Between 5350W and 4950W the apparent resistivities remain a relatively high 200 - 600 ohm-metres, while the apparent chargeabilities vary about a high, but normal, 20 milliseconds. This zone is considered a single rock unit.

Centred at 4888W a substantial well defined 30 millisecond anomaly is interpreted as originating from a body whose maximum depth is less than 25 metres and whose width is of the order of 25 metres positioned vertically below this point. A 90% depression in the apparent resistivity to 40 ohm-metres indicates the source material to be moderately conductive in nature. There is absolutely no distortion in the magnetic field over this induced polarization anomaly, indicating an absence of significant pyrrhotite or magnetite within the source material. The possibility of either graphitic (or less likely, pyritic) shale being the source should be carefully considered.

Line ML-20: This line lies at an angle to the line described above as shown on the diagram on Plate 2.

Between 500S and 175N the line was surveyed using a gradient array whose 1000 metre current dipole was set up on line ML-19 at 387.5N and 587.5S, while the section of the line between 00 and 300N was surveyed using a pole-dipole array using an "a" spacing of 25 metres and n = 1 and n = 2.

High apparent resistivities of 2000 - 4000 ohm-metres were recorded between 125N to 250N. Over this pronounced feature the background chargeabilities remain relatively low for the area, ranging between 8 - 10 milliseconds. Off the end of the line a rapid fall off in resistivity is accompanied by an increase in chargeability, but the line was not surveyed sufficiently far north to close the anomaly off.

Centred at about 113N an anomaly of some 15 milliseconds above background was associated with a depression in apparent resistivity to about 1000 ohm-metres. The maximum depth is interpreted to be no greater than 25 metres. A total magnetic field anomaly of 300 gammas centred at 100N increases the interest of this anomaly, but unfortunately it is a single station reading, there being no 25 metre readings either side. Therefore the source contains either magnetite and/or pyrrhotite, which, together with the depression in apparent resistivity enhances the interest.

Between 050S and 050N a very substantial fall in apparent resistivities was noted on the pole-dipole data to as low as 10 ohm-metres (n=2) and 100 ohm-metres (n = 1) at 00, while the gradient array data showed a fall to 250 ohm-metres. This is interpreted as being caused by a narrow conductor situated at 00, within a broad zone between 050S and 050N where apparent resistivity is about 200 to 300 ohm-metres. In addition, the pole-dipole data infers that this zone is covered by a resistive near surface layer some 10 to 15 metres thick. This could be alluvium or glacial moraine. Gradient array data clearly indicates an increase in chargeability over this zone of about 15 milliseconds peaking at about 012S. A significant 500 gamma increase in total magnetic field at 012S marks this as an anomaly of major interest and follow-up is most strongly recommended as it has all the characteristics of the type mineralisation.

South of the above described anomaly, the chargeability background remains a high 20 to 25 milliseconds, while the resistivity averages about 300 ohm-metres. These characteristics are similar to those observed over shales in the region which, in places, carry disseminated graphite.

Within this unit, a highly significant induced polarization anomaly was defined at 288S. At this point a sharp decrease in apparent resistivity occurs to about 40 ohm-metres, however, as the current dipole employed was 25 metres, the actual resistivity may be 1% to 10% of this figure, depending on the width of the source. As this significant depression in the apparent resistivity is accompanied by a 30 millisecond increase in chargeability above the high background, the anomaly warrants careful investigation. The maximum depth is assessed to be 25 metres, while the width is less than this figure. The anomaly form suggests a steep to moderate north dip. As the magnetic field remains undisturbed over this anomaly, the importance is considered secondary only.

A source off the end of the line has given rise to a material increase in chargeability to 110 milliseconds, a marked depression in apparent resistivity to about 20 ohm-metres and an increase in magnetic field - all the characteristics of the type mineralisation. However, further ground work will be required to delineate the actual source, as array end effects are significant, and the anomaly was not covered in the present survey. The maximum depth appears to be of the order of 25 metres, while the actual position lies south of 500S. Careful follow-up of this response is strongly recommended.

Line ML-19: Only a short section of ML-19 was surveyed using a 25 metre pole-dipole array at n = 1 and n = 2, between 400N and 00N. Nevertheless a clear correlation between ML 19 and ML 20 is visible.

The significant resistivity ridge recorded between 150N and 260N on line ML-20 was again seen between 125N and 275N on ML-19. North and south, the apparent resistivities decrease to 200 - 300 ohm-metres and 80 ohm-metres respectively. Over the ridge, resistivities were as high as 1500 ohm-metres, while apparent chargeabilities remained a relatively low 10 to 12 milliseconds.

The anomaly not closed off at the northern end of line ML-20 was covered on this line. Between 300N and 375N a weakly conductive (250 ohm-metres) zone contains a chargeable source centred at 338N whose maximum depth is interpreted as being about 16 metres, while the width of the source is indeterminate. Although not coincident, a 600 - 700 gamma above background magnetic response over this chargeability anomaly was recorded, and therefore follow-up is most strongly recommended as the source contains magnetite and/or pyrrhotite.

At 112N and 012N, relatively minor chargeability responses were recorded from conductive and magnetic sources at depths interpreted as being of the order of 50 metres. The small magnitude of the response is due to the dilution effect of the non-chargeable near surface material, particularly in the case of 012N. Also, as seen on the corresponding anomalies on line ML-20, there is a resistive surface layer of indeterminate thickness over these zones. Both are strongly recommended for ground follow-up as both have the characteristics of the type mineralisation.

CONCLUSIONS AND RECOMMENDATIONS

1 - The reconnaissance gradient array survey was successful in delineating zones of interest for further study. However, the limited line cutting and limited number of field assistants did not enable the most cost effective

use of this method in the area as a "rapid reconnaissance technique".

2. In the south of the area on the southern ends of lines ML-19 and ML-20 and on the western end of line 4000N, extremely low apparent resistivities were observed which were better investigated by the moving source array used.

3. The L/M ratios (not plotted) are everywhere normal, indicating no material distortion to the decay curve by electromagnetic coupling. Such distortions as are considered due to features of the mineralisation have been noted in the text.

4. A wide variety of induced polarization responses were recorded in the area. Most show some reduction in apparent resistivity relative to background over the maximum induced polarization response. However, with the exception of the southernmost area (ML-19, ML-20, 4000N) the absolute level of the apparent resistivity observed remains high.

5. The contour interpretation of the apparent resistivity data is considered to be a reliable interpretation north of and south of line 5100N, while the apparent chargeability data, reasonably so. The resistivity data represents the characteristics of the rock units immediately below the

point of plotting except on the extremities of the line where volume sampled may show a bias away from the array centre. Therefore the strike directions of the major resistive and conductive units represents the strike of the underlying rock units.

6 - The "type" mineralisation would be expected to show
(i) A significant reduction in apparent resistivity,
(ii) A substantial increase in chargeability, and
(iii) An increase in total magnetic field. Those anomalies showing these characteristics are considered of primary interest, while those showing some of these characteristics are secondary or tertiaty, depending on their degree of similarity. It should be noted that "variants" of the type mineralisation may show reduced conductivity and a reduced distortion in the magnetic field.

7 - A classification of the significant anomalies located, is given below:

NORTHERN AREA

Line	Station	Max. Depth	Cond.	Magnetics	Priority
5600N	5188W	35m	resistive	50 gammas	Tertiary
5500N	5188W	25m	resistive	none	Secondary
5500N	5312W	25m	resistive	none	Tertiary

Line	Station	Max. Depth	Cond.	Magnetics	Priority
5400N	5188W	25m	resistive	none	Secondary
5300N	5188W	25m	resistive	none	Secondary
5300N	5038W	20m	conductive	none	Secondary/ Primary
5200N	4888W	25m	weakly conductive	none	Tertiary
5200N	4988W	25m	conductive	substantial	Secondary
5200N	5038W	?	conductive	substantial	Secondary
4800N	5175W?	25m	weakly conductive	slight	Secondary
4800N	4730W	25m	weakly conductive	flank	Tertiary

SOUTHERN AREA

Line	Station	Max. Depth	Cond.	Magnetics	Priority
4000N	5588W	25m	resistive	none	Tertiary
4000N	5638W	25m	resistive	none	Tertiary
4000N	5438W	25m	resistive	none	Tertiary
4000N	4888W	25m	moderately conductive	none	Secondary
ML-20	113N	25m	weakly conductive	yes	Secondary/ Primary
ML-20*	013S	30m	conductive	600 gammas	Primary
ML-20	288S	25m	conductive	none	Secondary
ML-20	South of 500S ?	25m	conductive	yes	Secondary/ Primary
ML-19	338N	16m	weakly conductive	700 gammas	Primary
ML-19	012N	50m+	conductive	yes	Primary
ML-19	112N	50m	conductive	yes	Primary

8 - As with all geophysical anomalies, regardless of the method or technique used, the bias should be geological and/or geochemical and not "size" of anomaly. Thus, a careful screening of the above anomalies by geochemical sampling on a close spacing over the limits of the anomaly, as well as such detailed geological mapping as the limited outcrop allows, is strongly recommended.

9 - No specific drill hole recommendations are given at this time. However, we will be delighted to make further recommendations after conferring with you, subsequent to your evaluation of the geophysical data in the light of the results of your geochemical sampling programme now being processed.

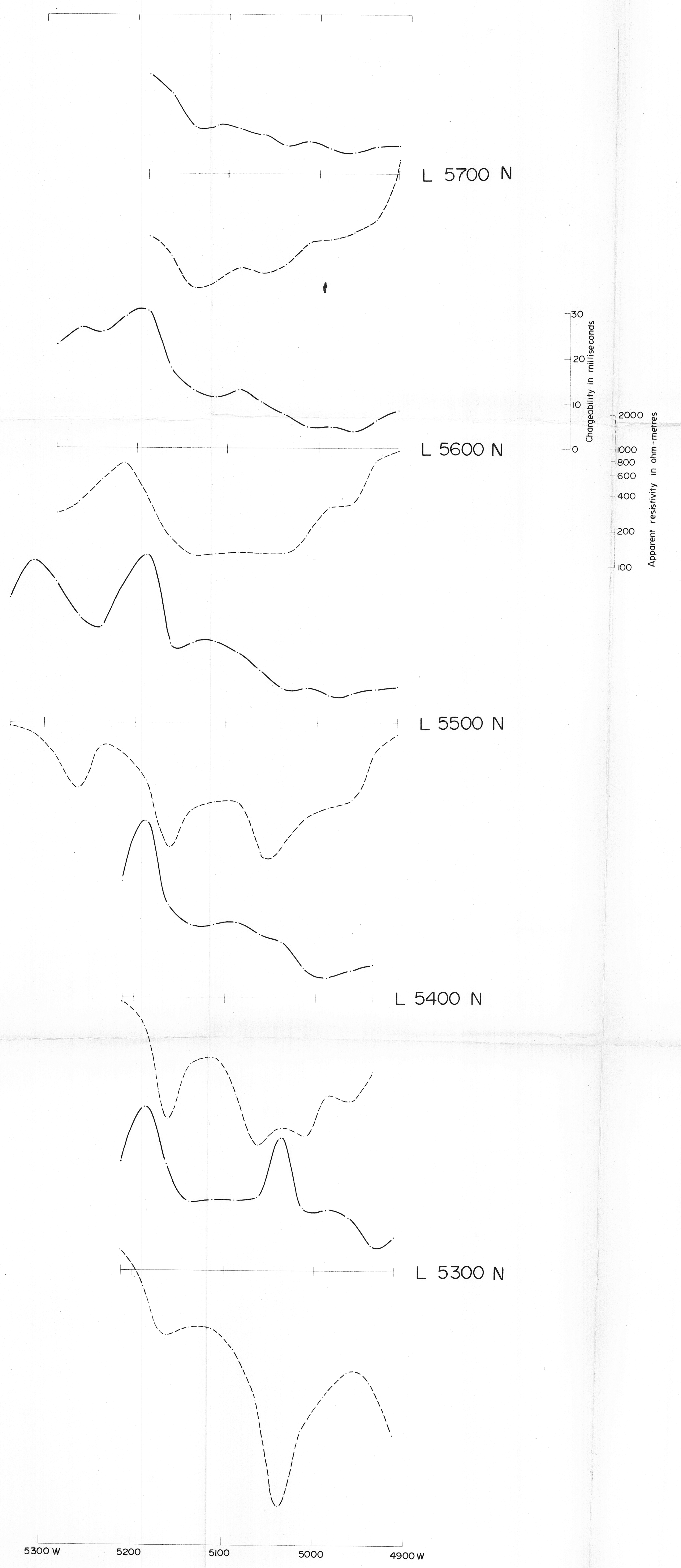
We look forward to discussing the results of this survey with you in due course.

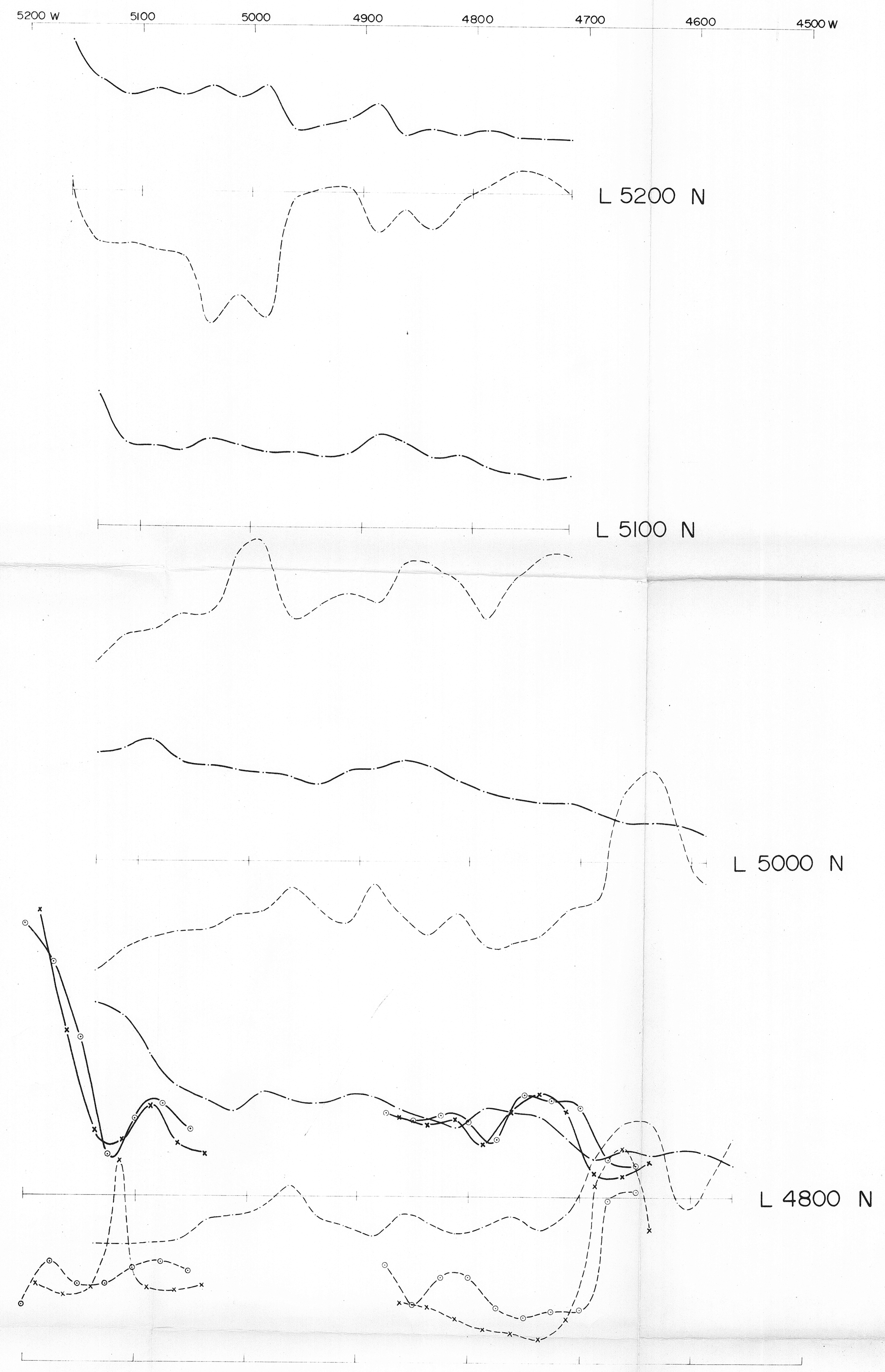
Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

A.W. HOWLAND-ROSE, MSc,DIC,AMAusIMM,FGS.

GEOPHYSICIST





LEGEND

CHARGEABILITY SCALE, 2cm. = 10 Milliseconds
BASE LEVEL, = 0 Milliseconds
SYMBOL, = ·———·———· Gradient
x———x———x n = 1 } Pole-Dipole
⊙———⊙———⊙ n = 2 }

RESISTIVITY SCALE, 5 cm. = 1 Logarithmic cycle
BASE LEVEL, = 1000 Ohm-metres
SYMBOL = ·— — —·— — —· Gradient
x— — —x— — —x n = 1 } Pole-Dipole
⊙— — —⊙— — —⊙ n = 2 }

PACMINEX PTY. LTD.

MT. LIVINGSTONE AREA
WEST COAST, TASMANIA

ELECTRICAL INDUCED POLARIZATION SURVEY
GRADIENT & POLE-DIPOLE ARRAY
DATA PROFILES

75-1073

SURVEYED AND COMPILED BY
SCINTREX PTY. LTD.

FEBRUARY, 1975

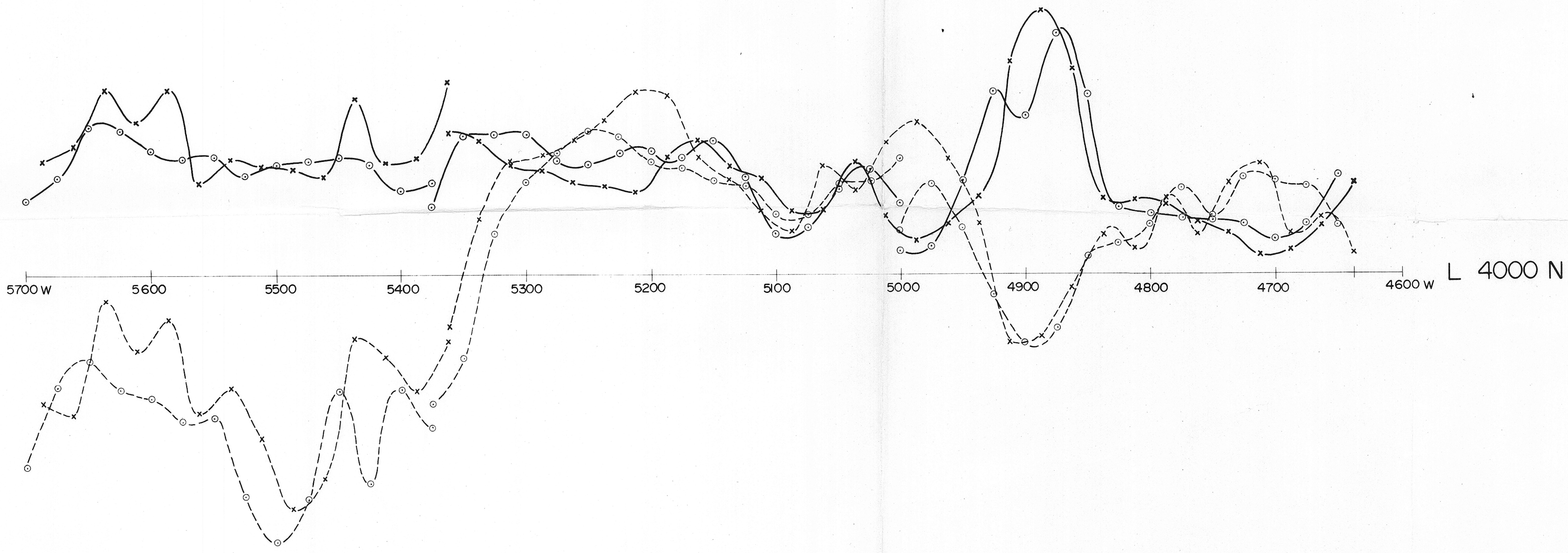
541032

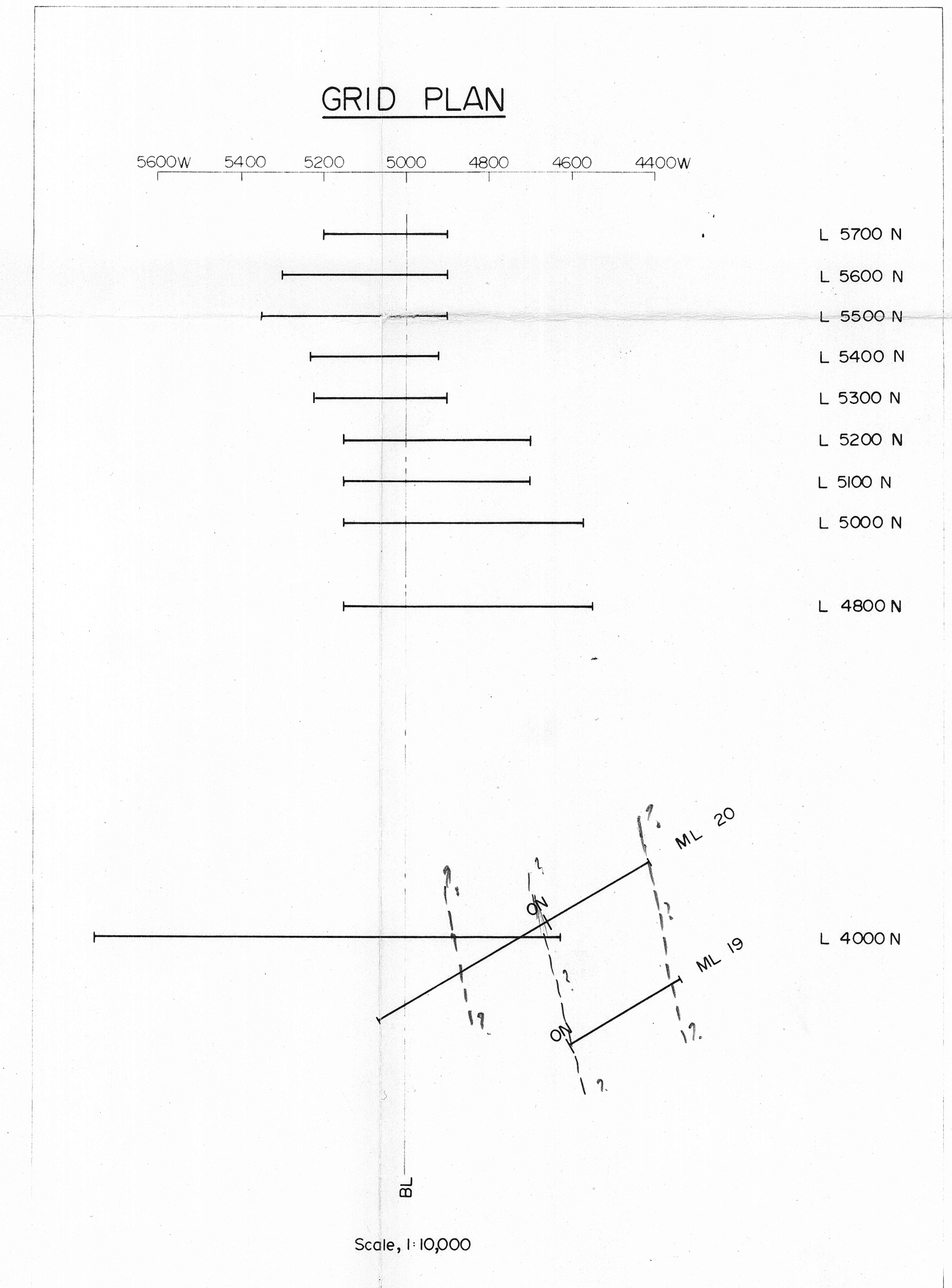
5 cm

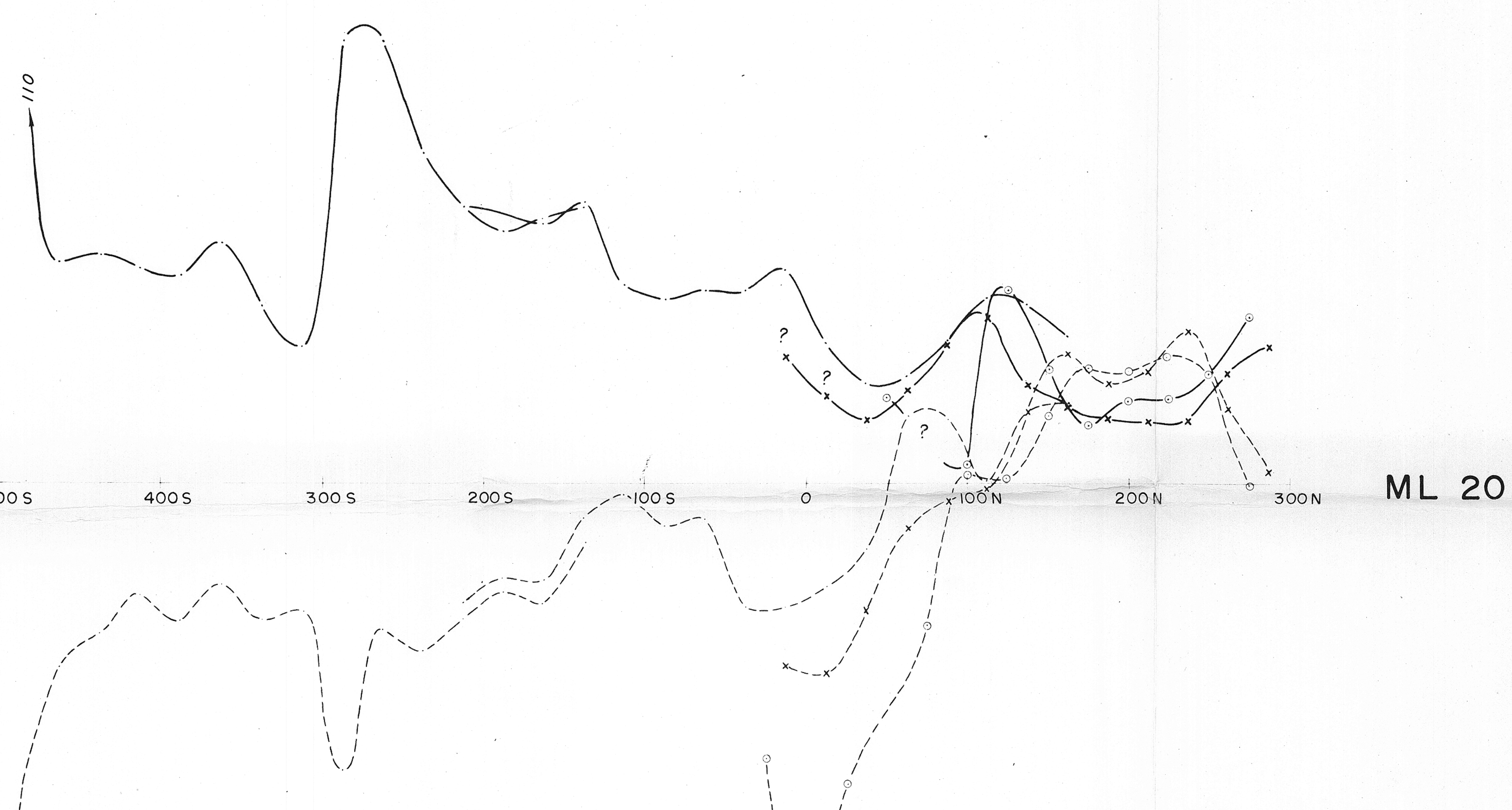
50 25 0 50 100 metres

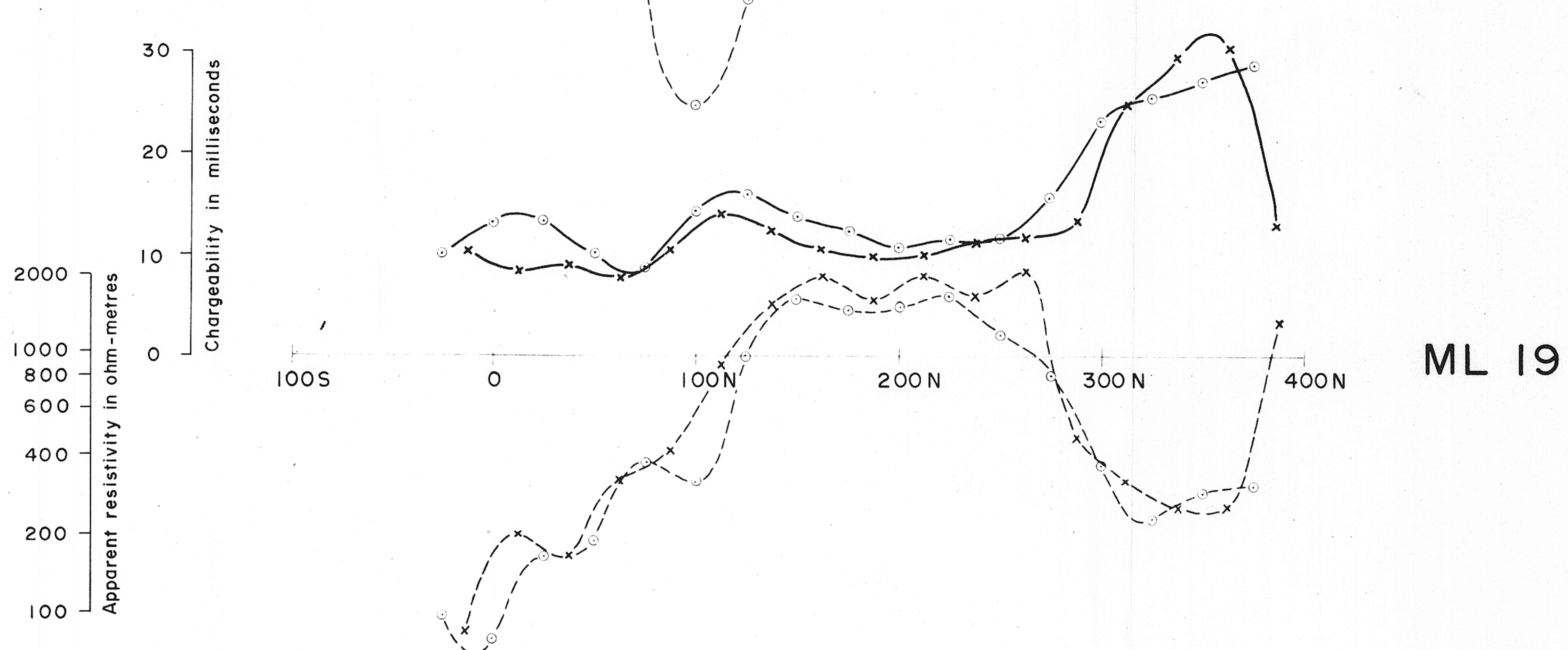
1: 2500

JOB No. TAS. 026 SHEET 1 of 1 PLATE 1 031









LEGEND

CHARGEABILITY SCALE, 2cm. = 10 Milliseconds
BASE LEVEL, = 0 Milliseconds
SYMBOL, = —·—·— Gradient
x——x——x n = 1 } Pole-Dipole
o——o——o n = 2

RESISTIVITY SCALE, 5 cm. = 1 Logarithmic cycle
BASE LEVEL, = 1000 Ohm-metres
SYMBOL = -·-·-·- Gradient
x---x---x n = 1 } Pole-Dipole
o---o---o n = 2

PACMINEX PTY. LTD.

MT. LIVINGSTONE AREA
WEST COAST, TASMANIA

ELECTRICAL INDUCED POLARIZATION SURVEY
GRADIENT & POLE-DIPOLE ARRAY
DATA PROFILES & GRID PLAN

75-1073

SURVEYED AND COMPILED BY
SCINTREX PTY. LTD.

FEBRUARY, 1975

5 cm

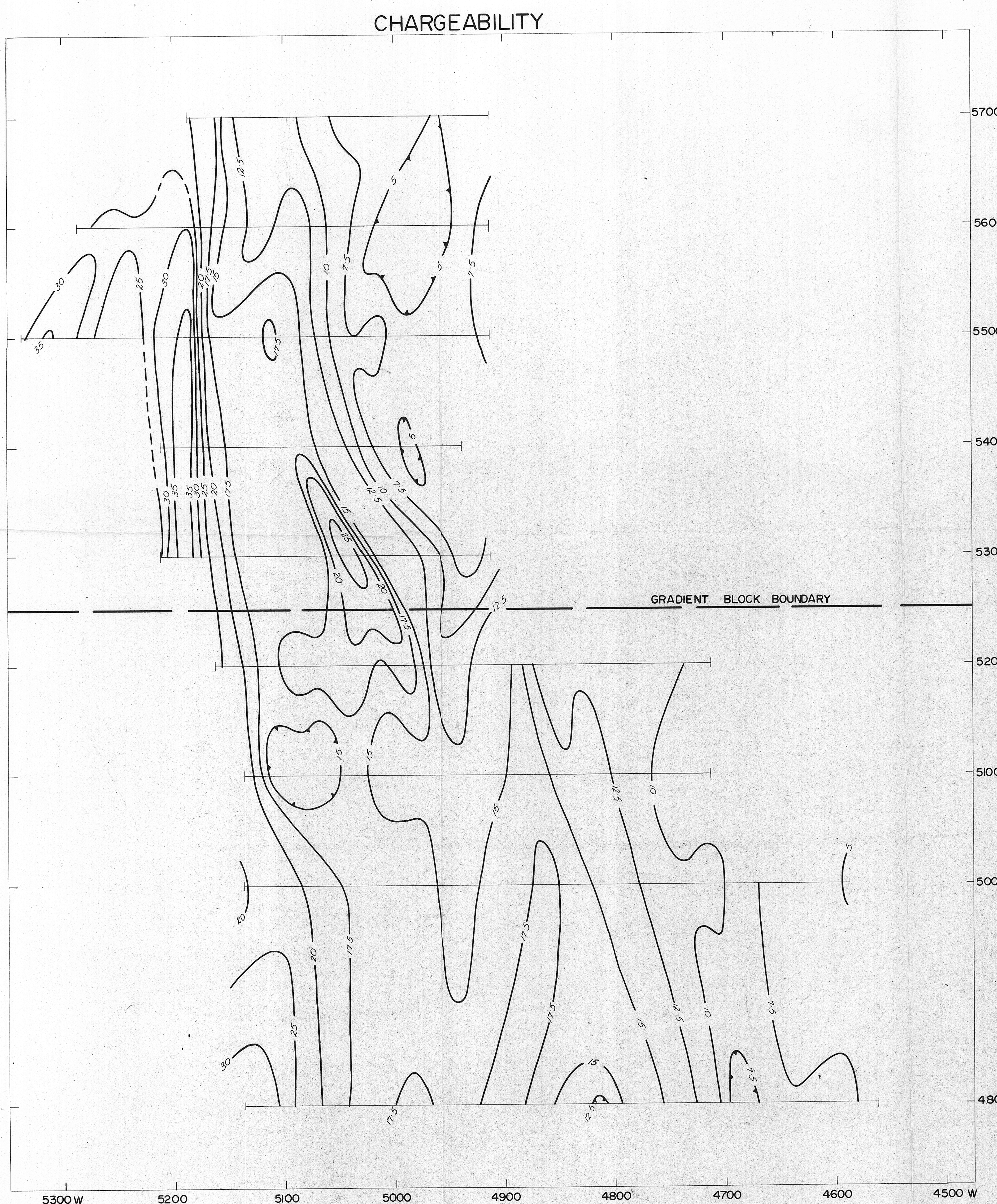
50 25 0 50 100 metres

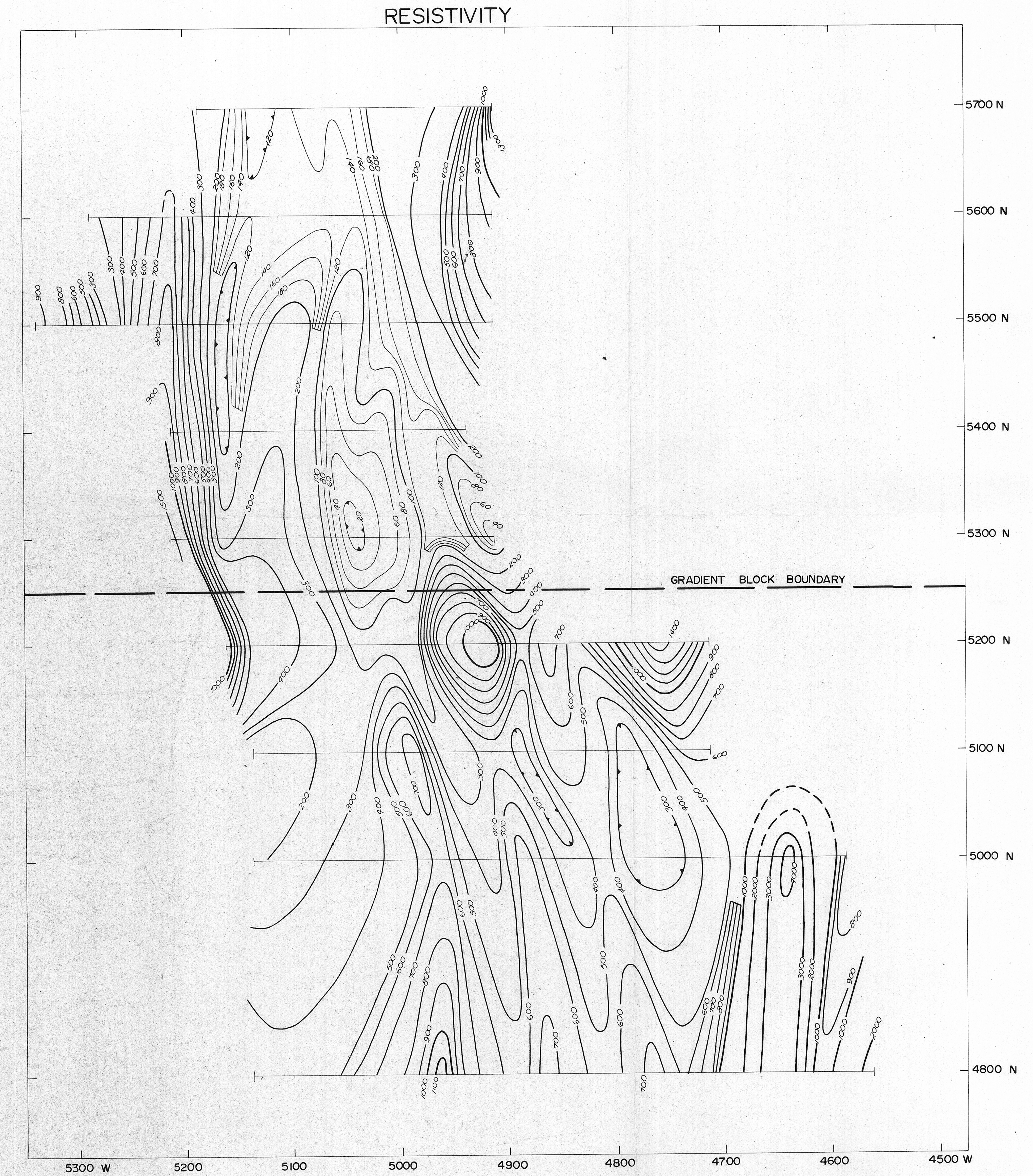
1:2500

541033

JOB No. TAS. 026 SHEET 1 of 1 PLATE 2

032





LEGEND

RESISTIVITY

Contour values in ohm-metres

- 20 ohm-metres
- 100 ohm-metres
- 1000 ohm-metres
- Resistivity low
- Lines surveyed

CHARGEABILITY

Contour values in milliseconds

- milliseconds
- Chargeability low
- Lines surveyed

PACMINEX PTY. LTD.

MT. LIVINGSTONE AREA
WEST COAST, TASMANIA

RESISTIVITY & CHARGEABILITY CONTOUR MAPS

75-1073

SURVEYED AND COMPILED BY
SCINTREX PTY. LTD.

FEBRUARY, 1975

541034

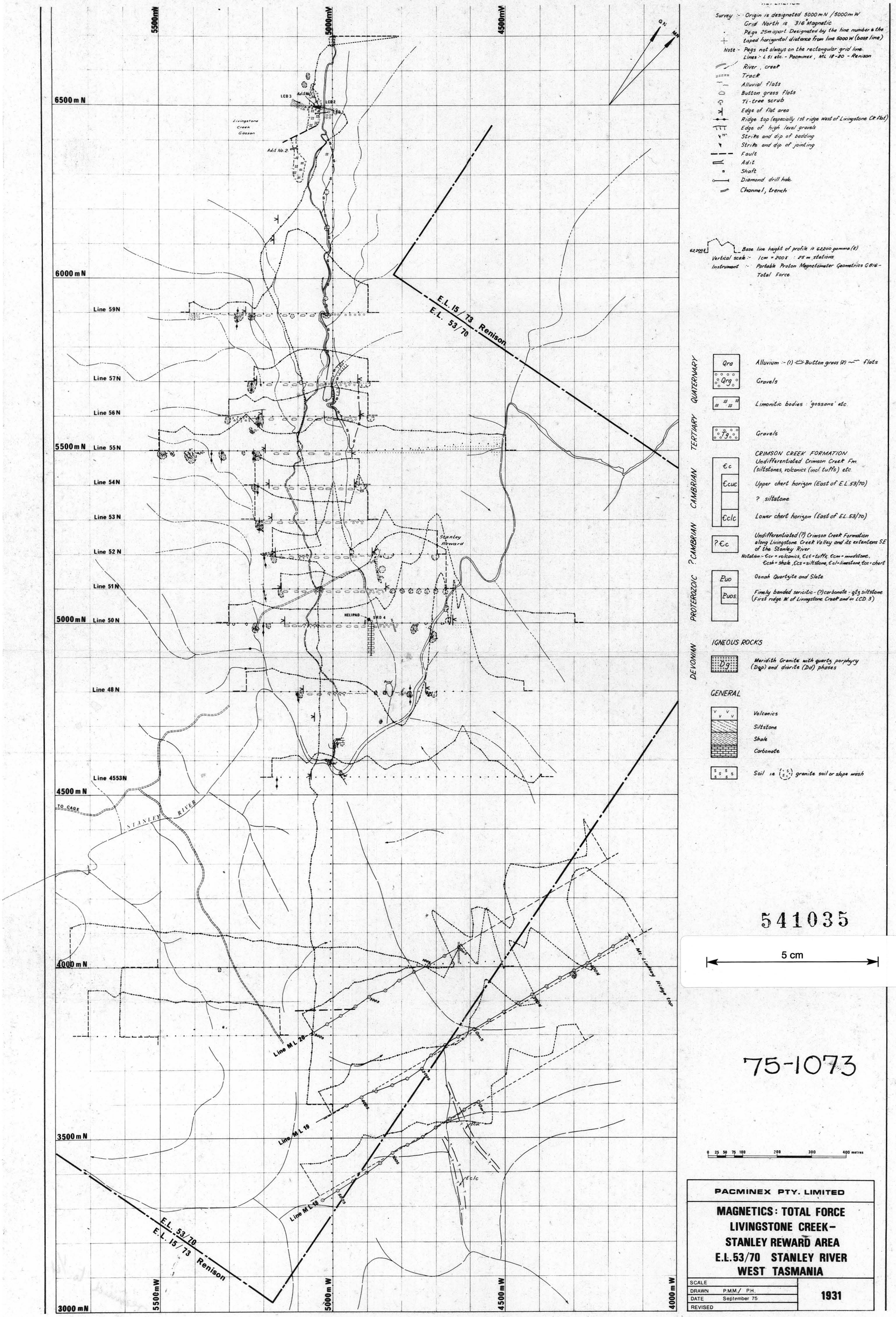
5 cm

50 0 50 100 metres

1 : 2500

JOB No. TAS. 026 SHEET 1 of 1 PLATE 3

033



Survey :- Origin is designated 5000 m N / 5000 m W
Grid North is 316° Magnetic
Pegs 25m apart. Designated by the line number & the taped horizontal distance from line 5000 W (base line)
Note :- Pegs not always on the rectangular grid line.
Lines :- L 51 etc. - Pacminex, ML 18-20 - Renison
River, creek
Track
Alluvial flats
Button grass flats
Ti-tree scrub
Edge of flat area
Ridge top (especially 1st ridge West of Livingstone Ck flat)
Edge of high level gravels
Strike and dip of bedding
Strike and dip of jointing
Fault
Adit
Shaft
Diamond drill hole
Channel, trench
GN
MN
62,200γ
Base line height of profile is 62,200 gamma (γ)
Vertical scale :- 1cm = 200γ : 25 m stations
Instrument :- Portable Proton Magnetometer Geometrics G816 - Total Force
QUATERNARY
Qra Alluvium :- (1) Button grass (2) flats
Qrg Gravels
Limonitic bodies : 'gossons' etc.
TERTIARY
Tg Gravels
CAMBRIAN
CRIMSON CREEK FORMATION
€c Undifferentiated Crimson Creek Fm. (siltstones, volcanics (incl. tuffs) etc.
€cuc Upper chert horizon (East of E.L. 53/70)
? siltstone
€clc Lower chert horizon (East of E.L. 53/70)
? CAMBRIAN
?€c Undifferentiated (?) Crimson Creek Formation along Livingstone Creek Valley and its extentions SE of the Stanley River
Notation :- €cv = volcanics, €ct = tuffs, €cm = mudstone, €csh = shale, €cs = siltstone, €cl = limestone, €cc = chert
PROTEROZOIC
Puo Oonah Quartzite and Slate
Puos Finely banded sericitic - (?) carbonate - qtz siltstone (First ridge W. of Livingstone Creek and in LCD 3)
DEVONIAN
IGNEOUS ROCKS
Dg Meridith Granite with quartz porphyry (Dqp) and diorite (Dd) phases
GENERAL
Volcanics
Siltstone
Shale
Carbonate
Soil i.e. granite soil or slope wash
6500 m N
6000 m N
5500 m N
5000 m N
4500 m N
4000 m N
3500 m N
3000 m N
5500mW
5000mW
4500mW
4000 m W
Line 59N
Line 57N
Line 56N
Line 55N
Line 54N
Line 53N
Line 52N
Line 51N
Line 50N
Line 48N
Line 4553N
Livingstone Creek Gosson
Adit No. 2
LCD 3
LCD 2
Stanley Reward
HELIPAD
E.L. 15/73 Renison
E.L. 53/70
STANLEY RIVER
TO CAGE
Line M L 20
Line M L 19
Line M L 18
Mt. Lindsay Ridge top
€clc
541035
5 cm
75-1073
0 25 50 75 100 200 300 400 metres
PACMINEX PTY. LIMITED
MAGNETICS: TOTAL FORCE
LIVINGSTONE CREEK-
STANLEY REWARD AREA
E.L.53/70 STANLEY RIVER
WEST TASMANIA
SCALE
DRAWN P.M.M./ P.H.
DATE September 75
REVISED
1931

034