FINAL REPORT ON
INDUCED POLARIZATION SURVEYS
ON THE CRIMSON CREEK GRID, NEAR RENISON BELL, TASMANIA

ON BEHALF OF

RENISON LIMITED

PRIVATE AND CONFIDENTIAL

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BY

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SUMMARY

An electrical induced polarization survey utilising a gradient array with pole-dipole detail, revealed very high induced polarization background over most of the rock units in the Crimson Creek grid. Superimposed on this background, both conductive and resistive induced polarization anomalies were defined.

The induced polarization anomalies defined in this survey will require detailed geological evaluation and further detailed geochemistry to gauge their potential economic interest.

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INTRODUCTION

From the 12th to the 20th January, 1974, gradient array reconnaissance electrical induced polarization surveys were carried out over the Crimson Creek grid in the Renison Bell area on behalf of Renison Limited. Additional pole-dipole electrical induced polarization and longitudinal gradient magnetic induced polarization surveys were also carried out over selected targets on this grid.

The survey was under the immediate direction of geophysicist, D. Robson, BSc.,with two assistant operators, while Mr. A.W. Howland-Rose, MSc. provided overall technical supervision and, together with Mr. L.A. Newnham, Chief Geologist for Renison Limited, planned the detailed execution of the geophysical surveys in the area.

A proton precession magnetometer survey was carried out by Renison Limited in the grid area, on lines surveyed with gradient array and along roads in the area. This data was kindly provided by Renison Limited and has been contoured. Rension Limited also provided a geological fact map which covered the area under discussion.

Appendix 'IP' briefly describes the Electrical Induced Polarization methods employed, Appendix 'MIP' describes the Magnetic Induced Polarization system, and Appendix 'IPR-8' describes the operation of the induced polarization receiver used in both methods on this project.

PRESENTATION OF RESULTS

The data profiles are presented in Plate 1 at the horizontal scale of 1:5000, with the grid position being expressed in feet. The vertical scales employed are as follows:

EIP

Resistivity	2 inches = 1 log cycle, expressed in ohm-metres
	(5 centimetres = 1 log cycle)
Chargeability	1 inch = 20 millivolts/volt
	(1 centimetre = 8 millivolts/volt)
Magnetics	1 inch = 200 gammas
	(1 centimetre = 80 gammas)

MIP

M_1 & M_5	1 inch = 10 milligammas/gamma
	(1 centimetre = 4 milligammas/gamma)
H_N	1 inch = 40%
	(1 centimetre = 16%)

Plate 2 displays an interpretation of the magnetic data in contour form, also at the scale of 1:5000.

Plate 3 displays a contour interpretation of the resistivity data, again at the scale of 1:5000.

Plate 4 shows a contour interpretation of the chargeability data in those areas where a clear correlation between adjacent lines can be seen.

Plate 5 depicts an interpretation of the boundaries between underlying rock units as indicated by the magnetic and electrical characteristics of these units.

The basemaps used for the survey were joined diagonally across the grid area. Unfortunately these did not match over critical areas. This join, and the mis-match, are shown on Plates 2 and 3.

On both the electrical and magnetic induced polarization surveys an energising cycle of two seconds on, two seconds off, reverse and repeat, was employed.

The receiver programme selected was mode 2, with three integrations at M_1, M_3 and M_5 being recorded. Only M_3 is displayed in the EIP data profiles, while M_1 and M_5

are shown on the MIP data profiles.

EIP Detail

This was carried out using a pole-dipole array having $n = \frac{1}{2}$, $n = 1$ and $n = 2$ at $a=100$ feet over three zones of interest to obtain depth information and improved resolution than the 100 feet gradient reconnaissance potential dipole afforded.

MIP Detail

Very short dipoles were used on lines 125W and 175W to obtain fundamental information on the mode of decay of the internal polarization currents over a number of anomalies. This data is incomplete due to the very limited time allotted.

The parameters utilised in the MIP data profiles and tables include the following:

1 - The normalised magnetic field H_N is calculated from the primary magnetic field H_P by dividing it by the magnetic field that would be observed for a given current if a uniform medium existed. That is, if uniform conductivity existed in the ground, the value H_N would be 1.00 at all locations. This parameter is a dimensionless quantity and is expressed as a percentage.

2 - The chargeability M is expressed in terms of milligammas per gamma being the ratio of the secondary magnetic field for a particular slice divided by the primary magnetic field.

DISCUSSION OF RESULTS

The current dipoles used in the reconnaissance gradient survey were as follows:

C_1 and C_2 at 3500N and 4500S on line 125W
Lines 110W, 115W, 120W, 125W, 135W

C_1 and C_2 at 3400N and 3800S on line 155W
Lines 145W, 155W, 165W

C_1 and C_2 at 3550N and 2450S on line 185W
Lines 175W, 185W, 195W

The potential dipole used was 100 feet moved at 100 feet intervals, and where necessary to define curve shape, 50 feet intervals.

The apparent resistivities recorded in this survey ranged from less than 10 ohm-metres to in excess of 6000 ohm-metres, but generally were between 500 and 1500 ohm-metres. The background apparent chargeabilities recorded in the area varied between 20 and 30 millivolts/volt which is equivalent to about 13 to 20 milliseconds on the Scintrex IPR-7 receiver previously employed in the area. Therefore the background chargeabilities recorded in the area can be considered to be about twice normal.

The magnetic field in the area has a background which ranges between 62,300 gammas and 62,500 gammas with local magnetic sources showing up to 1000 gamma distortions within this field.

Contour interpretations of the magnetic, apparent resistivity and chargeability data are displayed on Plates 2, 3 and 4 respectively. Although these interpretations cannot be considered unique, the magnetic contour plan approached the ideal, as the magnetometer traverses run along roads and tracks increased the reading density in critical areas.

There are a number of different interpretations of apparent resistivity data. The resistivity data presented in Plate 3 was biased by curve matching between lines and local observed dips and strikes as depicted on the geological fact plan provided by Renison Limited. East of line 135W inclusive, and west of line 175W, the adjusted resistivity contour pattern is considered a reliable one, however, between these lines the picture is complex, and each of a number of interpretations of strike direction is possible.

The one favoured is presented in Plate 3. This interpretation infers a fault which crosses the southern end of line 175W following a grid south-westerly direction, then veers still further east, north of the baseline. The interpretation Plate 5, shows the position of this possible fault in detail.

To the north of the fault, the magnetic, apparent resistivity and apparent chargeability data are conformable, as they are east of line 135W. However, over the central section of line 145W, between the lines to the immediate east and west, the magnetic data does not conform to either the chargeability or the resistivity as contoured. A revision of these contours would allow conformability between these two sets of data. However, if the magnetic anomaly was due to intrusives, conformability would not necessarily be expected. In this vicinity the anomalous magnetic values were on surface.

The various interpreted rock units as shown in Plate 5 are as follows:

South East of Proposed Fault

As - graphitic or pyritic shales - relatively low resistivity and high chargeability.

Aq - quartzite ridge - relatively low chargeability and very high apparent resistivity.

B - sandstones and quartzites with the odd disseminated pyritic or graphitic horizon. Moderate to low chargeability background and background resistivities in the range 1000 to 1500 ohm-metres characterise this zone.

C - graphitic and/or pyritic shales interbedded with more resistive units, often also with pyritic and/or graphitic horizons, but in disseminated form. The electrical characteristics of this division are relatively low apparent resistivities, high chargeability background with conductive and non-conductive, chargeable horizons within this high background.

D - basic tuffs, tuffs and calcareous beds have been variously recorded within this "ridge" of highly electrically resistive material and having a higher than background magnetic response. The chargeability backgrounds within this zone are moderate to low throughout the length of this feature.

E - greywackes and calcareous beds have been recorded over part of this zone. The general characteristics are similar to those of division C, however, the amplitude of the chargeability background is lower.

North and West of the Proposed Fault

F - red siltstones and quartzites. Similar to zone B. The characteristics are relatively high resistivity, averaging about 800 ohm-metres, with a high chargeability background, distributed throughout the unit.

G - graphitic and/or pyritic shales. Low resistivities and high chargeabilities characterise this zone. Shales were recorded in the western section and gossan to the east.

H - sandstones or siltstones (?) carrying some disseminated graphite or pyrite. The characteristics of the unit are high relative apparent resistivity and a high induced polarization background.

I - graphitic shales - low resistivities, higher than background chargeabilities.

J - As H.

K - graphitic and/or pyritic shales - low apparent resistivities with high induced polarization effects. Both shale float and gossans have been recorded along this section.

L - as per J

M - Tuffs, perhaps basic in parts - relatively resistive unit having low induced polarization response.

N - Tuffs, siltstones and greywackes. Relatively resistive but less than M, and of higher chargeability background than M.

O - resistive unit with high chargeability background. Tuffs have been recorded over the strike length of this unit.

P - These magnetic units may either be intrusives or represent basic tuffs carrying magnetite. On line 145W this unit is associated with a highly resistive ridge of background chargeability. Although dip and strikes were recorded, no geological information was recorded on the fact map in the vicinity of this response.

Q - basic tuffs. The low amplitude magnetic responses are put down to basic tuffs within the sequence. The magnetically active zones are usually quite conformable to the resistivity in their vicinity, and generally are somewhat resistive - a characteristic which would be explained by basic tuffs.

A line by line description of the gradient induced polarization is set down below.

Line 110W On a high 20 millivolts/volt background, a sharp response in excess of 40 millivolts/volt was recorded centred at about 050N. The maximum depth to the top of this zone is considered to be less than 10 metres and the width less than 25 metres. The inferred dip is steep. There is no magnetic response over this zone and the EIP decay curve shows only normal decay form.

A 30 millivolts/volt above background anomaly was recorded at 350N. The response comes from a shallow source and has a sharp boundary at 300N to the south, and a gradational one to the north. EIP decay form is again normal.

In both cases some slight reduction in bulk resistivity was noted.

Line 115W A 37 millivolts/volt above background anomaly was recorded centred at 2250S. The inferred dip is steeply to the south and the 90% drop in recorded apparent resistivities indicates a conductive source. The maximum depth is assessed to be less than 30 metres. Shales have been recorded along strike and may well be the source.

Immediately to the north of the above, a highly resistive zone having resistivities of 5000 ohm-metres was recorded. Quartzite recorded in this vicinity probably represents the source material which can be traced west along strike.

Resistivities between 1800N and 500N range between 2000 to 3000 ohm-metres. Unfortunately no rock outcrops were recorded on the geological fact map, either on this line or along strike. A resistive rock such as sandstone or granite may well be the source.

South of the baseline at about 400S and 150S, narrow, shallow steeply dipping chargeable zones were recorded. Somewhat increased conductivity was noted over both zones. There was no recorded magnetic response over this zone. Both shales and gossans were recorded to the east of the line. The source may well be pyritic shales.

At about 300N a broad 150 metre wide zone coincident with a marked decrease in apparent resistivity was recorded. No information is available as to rock type from the geological fact plan, but grid west along strike both shales and gossans have been recorded. The magnetic data indicate a 200 gamma anomaly in the vicinity of this high, Careful ground follow-up is recommended.

Minor chargeability highs of 5 millivolts/volt above background recorded at 750N and 1050N within a high background are not considered of major significance.

Correlation between lines 115W and 110W

The correlation between the induced polarization reponses on these two lines is excellent, both in the resistivity and chargeability data. The equivalent anomalous responses are as follows:

	Line 110W	Line 115W
A	300S	400S
B	050N	150S
C	350N	300N

Line 120W A short line was run over the Poseidon shaft on line 120W. To the extreme south, the shale band previously described for line 115W was located between 2200S and 2450S, where induced polarization responsesin excess of 60 millivolts/volt were recorded coincident with 300 ohm-metre apparent resistivities.

To the immediate north, a high resistivity ridge, presumed to be the equivalent to that determined along strike to the east, was located at 2150S.

To the immediate north of this supposed quartzite ridge, and over the Poseidon shaft, low apparent resistivites coincident with 25 millivolts/volt above background chargeabilities are clearly associated with the Poseidon pyrite-lead-zinc mineralisation. No such pattern was recorded on line 115W, therefore this response must be due to the polarization of the minerals within the orezone. Only a normal decay form was noted.

Line 125W A resistivity and chargeability profile form, broadly similar to that seen on line 115W, was recorded here.

To the south at 2250S an induced polarization response of some 38 millivolts/volt was recorded coincident with a 1000 ohm-metre resistivity low in contrast to a resistivity of 4000 ohm-metres to the immediate north. To the extreme south, a second, higher response of 50 millivolts/volt was defined over a resistive source. Shales have been recorded in the vicinity of the first anomaly described above,and the most likely source is either graphitic and/or pyritic shales.

A broad zone of high resistivities from 2250S of 4000 ohm-metres decreasing to 1000 ohm-metres at 500S is underlain by a resistive rock unit such as sandstone or granite. Within this zone, a 10 millivolts/volt response centred at 1150S coincident with a local resistivity high was recorded. M_5 is slightly smaller than M_1 indicating a larger average grain size near surface for the disseminated sulphide source.

On this line, along strike from the Murchison Mine, a small local resistivity low and an increase in chargeability was recorded at 750S. Hence the response is not considered to be significant.

Centred at 550S a broad induced polarization anomaly of 18 millivolts/volt above background was recorded. The resistivities are slightly higher than background and the EIP decay curve showed only a normal decay form.

At 250S the most significant induced polarization response on this profile was recorded. This anomaly of 60 millivolts/volt shows only normal EIP decay form and coincident with a marked depression in the apparent resistivity profile. This response is probably equivalent to that observed on line 115W at about 250N.

There are no outcrops mentioned in the vicinity of this high or the generally high background recorded either side of this high, but there were numerous gossanous zones recorded to the east and west. Pyritic shales may therefore be the source material.

Utilising the MIP, a small current dipole was set out to obtain the internal decay form from the source of this anomaly. The current dipole was set out as follows: 300E and 300W at 250S. This data is also displayed in Plate 1. Unfortunately time permitted only a very limited investigation, which, on analysis, was not sufficient to arrive at firm conclusions, as the whole of the obviously diagnostic response was not recorded. The important features are:

(i) The normalised horizontal magnetic field H_N, which measures the relative distribution of current in flowing over the section, indicates extremely strong current flows over the southern end of the section read, i.e. 350S and 400S where fields of up to 300% were recorded. This shows very high conductivity in this section.

(ii) The magnetic induced polarization response demonstrates a very strong external field in the area as shown by the positive polarization readings recorded. However, centred at 250S, superimposed on this strong external polarization current, a distinctly more negative response is seen, with M_5 being significantly more negative than M_1. This infers the source to be of larger than normal average grain size and/or intrinsically more conductive in nature. Further work would be required to confirm this interpretation, but this very limited survey undoubtedly enhances the interest of this anomaly.

The most pronounced feature on the resistivity data is the broad resistivity high between about 300N and 1000N. This feature can be traced from line 115W to 175W. The induced polarization background remains a high 30 millivolts/volt over this section.

Line 135W The most characteristic feature of this profile is the very high chargeability backgrounds observed over the whole length of the section surveyed.

The resistivity pattern is, in general, similar to that observed on the previous line, however, in detail there is considerable variation. At 2000S there is a marked resistivity low with an associated chargeability high of 30 millivolts/volt while north and south the resistivities rise to 2000 to 3000 ohm-metres from the 300 ohm-metres recorded at this point.

A second resistivity response centred at 500S associated with anomalous induced polarization values of up to 52 millivolts/volt is estimated to come from a source having a width of less than 20 metres, at a depth of less than 15 to 20 metres. This zone is in close proximity to the position of a marked mine shaft.

A further anomalous response was recorded from a resistive source centred at about 350S. The source is considered to be both shallow and narrow.

No other responses really stand out against the high background.

Line 145W The resistivity profile divides the section into a number of distinct zones. From 2000S to 1250S resistivities remain at 2000 to 3000 ohm-metres with very high induced polarization effects of the order of 40 millivolts/volt. (This unit can be clearly observed on line 115W also) It is understood that quartzites have been recorded within this area, and it is suggested that they may, in parts, also contain disseminated chargeable material such as pyrite and/or graphite.

Between 1250S and about 250N, resistivities range between 300 ohm-metres and 2000 ohm-metres. Within this zone, narrow zones of low resistivity and high chargeability were recorded, the most significant of which was at 350S. It is suggested that each of these zones represents a more conductive shale horizon.

From 250N to 550N a very resistive zone was recorded, and this is most likely a basic tuff zone which is recorded in the area. This zone is also magnetically active and indicates the presence of magnetite or pyrrhotite.

To the north of the surveyed basic tuff, resistivities fall to about 1000 ohm-metres and the background chargeability remains at a 20 millivolts/volt level. The underlying rock types are not known.

Line 155W The general resistivity pattern is very similar to the lines to the immediate east and west. Between 2000S and 1025S the apparent resistivity of 2000 ohm-metres is some ten fold that to the immediate north. The background chargeabilities over this unit are a very high 50 millivolts/volt with a local 20 millivolts/volt high coming from a narrow, shallow, resistive source. This unit is probably resistive sandstones and/or quartzites.

The contact between the resistive unit to the south and the conductive unit to the north is extremely sharp and marked by a local depression in the very high chargeability background. The conductive unit extends from the baseline to 1025S and is again characterised by high chargeabilities of the order of 40 millivolts/volt. A wide local high of 18 millivolts/volt centred at 200S is considered to have a shallow origin and be about 200 feet in width. Sheared shales have been recorded in the vicinity of this anomalous response, and an old mine shaft is present some 500 feet to the east.

Between the baseline and 550N resistivities rise to some 800 ohm-metres and background chargeabilities fall to about 25 millivolts/volt. Basic tuffs have been recorded to the south of this zone, and greywacke/calcareous beds have been recorded along strike. Both rock types would exhibit the geophysical characteristics observed on this line.

Between 550N and 950N resistivities decrease and the background chargeability doubles to a high 49 millivolts/volt. Two separate chargeability peaks at 625N and 875N are associated with low apparent resistivities. To the north, resistivities are variable but always above 1000 ohm-metres with polarization background about 30 millivolts/volt. Tuffs have been recorded from within this zone. The sources for both are considered shallow and within 50 feet of the surface.

Line 165W The resistivity profile shows certain broad similarities with the previous line. The section divides itself into three main zones (i) 2500S to about 1250S resistivities vary between 400 ohm-metres and 2000 ohm-metres, with high background induced polarization effects in excess of 30 millivolts/volt. (ii) 1250S to 250N apparent resistivities remain below 200 ohm-metres with a moderate to high chargeability background ranging from 20 to 30 millivolts/volt. Both the above contain zones of high chargeability with distinct resistivity lows which may be due to pyritic or graphitic shales. These zones are invariably narrow, less than 50 feet in width, and lie within 25 to 40 feet of surface. Such zones were defined as follows: 150N, 150S, 350S, 650S, 1150S and 1550S. (iii) In the last zone, which extends from 250N to 2000N, the apparent resistivities vary between 700 and 1200 ohm-metres while the background chargeability remains between 20 and 30 millivolts/volt.

Geological mapping infers that zone (i) is broadly associated with the shale and quartzites and zone (ii) with the red rock unit and zone (iii) with the argillites.

There is only minor magnetic response over two zones within the supposed argillite section. The section through the redrock unit shows only background magnetic activity.

The very sharp change in apparent resistivity from 100 to 2000 ohm-metres between 1125S and 1800S together with a great disturbance in the dips in this section, together with a general change in format of the resistivity contour plan, suggests the existence of a fault in this vicinity.

Line 175W The resistivity on this line is markedly different to that seen on line 165W, particularly south of the baseline. Extremely low resistivities were recorded of less than 10 ohm-metres at 1050S associated with very high chargeabilities. Quartzite outcrops have been recorded in the vicinity of these low apparent resistivities, but quartzite certainly does not explain the high chargeabilities and low resistivities recorded in this area. Pyritic and/or graphitic shales would, however, explain the high chargeabilities in excess of 50 millivolts/volt and apparent resistivities of less than 30 ohm-metres south of 850S.

As there is a marked discontinuity between the lines to the east and west and because of the very low resistivities recorded over this zone, it is suggested that a fault traverses this line at about 1050S. The proposed position of the fault is shown on Plate 5.

Within this zone between 900S and 1125S, a highly conductive induced polarization anomaly of 80 millivolts/volt was recorded. This zone is about 150 feet in width and has an inferred steep, south dip. On its northern flank it is bounded by a resistive non-polarizable zone, probably quartzite. The detailed pole-dipole data indicates a maximum depth of 25 feet to this zone. The zone is inferred to have a maximum width of 100 feet and gives an apparent intrinsic chargeability response in excess of 140 millivolts/volt (100 milliseconds). The data infers a thin, 20 feet or so, resistive non-chargeable layer over this zone, perhaps alluvium.

The zone was also tested by MIP. The chargeabilities from M_1 and M_5 are plotted on Plate 1, but the whole of this data is set out in table form below. The current electrodes were positioned at 800W and 300E at 1025S.

Station	M_1	M_5	H_N
1100S	+8.8	+7.1	258%
1050S	+7.2	+5.6	140%
1000S	+4.8	+3.1	166%
900S	+6.3	+3.6	260%
850S	+8.0	+5.3	466%
800S	+16.3	+13.2	
750S	+15.2	+13.7	
650S	+6.5	+3.8	
600S	-2.4	+3.7	

550S	+3.5	+2.8

Unfortunately time did not permit a diagnostic examination of this anomaly, however, the work over the main anomaly recorded a very strong return polarization flow as shown by the positive response over the anomalous EIP response. Although the down dip side of the anomaly was not covered, the data clearly demonstrates a negative response to the positive return polarization current, coincident with the EIP high. The M_5 slice is somewhat more negative than the M_1, inferring a marginally coarser than average grain size to the causative graphite and/or sulphide.

A 20 millivolts/volt response centred at 750S is coincident with an increase in apparent resistivity from the background 40 ohm-metres to 400 ohm-metres. The EIP data has a coincident MIP response where M_1 is more negative than M_5. In this case a finer grained mineral assemblage is inferred.

From 1000S to 500N the resistivity varied from less than 10 ohm-metres to in excess of 1000 ohm-metres. The background chargeability ranges from 15 to 18 millivolts/volt. Within this zone two relatively anomalous zones at 300S and 200N coincident with somewhat reduced apparent resistivities were recorded.

North of 500N the resistivities remain at about 1000 ohm-metres while the chargeability background incerases from south to north from 15 to 30 millivolts/volt.

Two local chargeability highs of 24 millivolts/volt and 10 millivolts/volt with coincident resistivity lows were defined at 550N and 1050N. The former is narrow, less than 25 feet in width, has a vertical or steep dip, and the depth to the top of the body is assessed to be less than 20 feet. A short MIP traverse was carried out over this anomaly and this yielded a 15 milligamma/gamma internal polarization current, superimposed on strong positive external return polarization. The maximum depth is inferred to be tens of feet. M_5 gives a larger response than M_1, inferring a coarser grain size. The normalised horizontal magnetic field is stronger outside the source of the polarization.

Line 185W Just as line 175W was markedly different to the lines to the immediate east, south of the baseline, so it is also quite different to the immediate west, further suggesting a dislocation across line 175W, south of the baseline.

The general resistivity pattern is simlar to line 195W but not to 175W, particularly south of the baseline. The apparent resistivities show far less variation over the entire length of the 4000 feet line than seen on any line to the east. The apparent resistivity background varies from 400 to 900 ohm-metres, while the chargeability background ranges from just over 20 millivolts/volt in the north to 30 millivolts/volt in the south.

South of 700S somewhat higher resistivities and apparent chargeabilities were recorded. This feature is reminiscent of that seen on line 165W, but not as pronounced.

The first anomalous induced polarization zone appears from 250N to 700S where values from 20 to 30 millivolts/volt were recorded against background. At 450S slightly lower apparent resistivities were recorded, but on the whole only limited conduction is inferred. The southern margin of this chargeability is sharp and the chargeable material sub-outcrops. There is no magnetic signature over this zone. The source is therefore disseminated chargeable material, either graphite or more likely pyrite, disseminated within an essentially resistive rock type. No outcrops have been recorded, but along strike as gauged from the resistivity contour map, shales have been observed. Therefore graphitic and/or pyritic shales appear to be the source of the anomalous chargeabilities recorded.

Two local chargeability peaks within a broader zone, were defined at 650N and 850N. The dip is estimated, from curve shape, as moderately south and the width of the two zones are consdered to be of the order of 50 feet or less. Between the two peaks, still within the chargeable zone, apparent resistivities are somewhat lower than on either peak, but the impression of the whole zone is that it is essentially from a non-electrically continuous source. Both zones exhibit some minor self potential activity which may indicate limited, narrow interconnection between sulphides and/or graphite across the water table. Detailed pole-dipole data confirms the conclusions made above, and indicate the depth to the top of the chargeable body to be of the order of 70 feet. Narrow, more conductive sections are inferred to exist in the northernmost zone, while the southern zone is inferred to be resistive in nature. There is little outcrop in the area, but up dip of the most northerly zone, gossans have been recorded. Should these yield anomalous geochemical values, this anomaly would then be considered of prime interest. As would be expected from the EIP/MIP test work described elsewhere, the EIP decay curve indicates only normal decays.

North of the above, only a broadly anomalous zone was recorded, the peak of which is situated at about 1500N. A complementary decrease in resistivity was recorded across this zone.

Line 195W Broadly similar form was recorded on this line, to that seen on line 185W, but with a little more variation seen in the apparent resistivity profile, although the same backgrounds were recorded as on line 185W.

Between about 500N and 900S a broad zone containing a number of zones of high chargeability was recorded. At 800S, 250S and 00, these anomalous zones of induced polarization have non-conductive source areas, while at 550S, 150N and 350N the sources are conductive. At 375N the zone has a magnetic signature of 250 gammas and is worth following up. Each of the chargeable zones described above are less than 50 feet in width and have shallow sources, i.e. are less than 50 feet in depth.

The southern section of the line is underlain by redrock while over the above chargeable zone, shales have been recorded. Therefore the source of the above anomalies is probably graphitic and/or pyritic shales.

A substantial, well formed, 20 millivolts/volt zone coincident with a depression in resistivity, was recorded centred at about 700N. The width of this zone is of the order of 100 feet and the apparent dip is steep to the south. Shales have been recorded as float coincident with this response, and are therefore the obvious source of the anomalous induced polarization effects are graphitic and/or pyritic shales.

Two smaller responses of 15 to 10 millivolts/volt were recorded at 1100N and 1400N coincident with minor depression in the resistivity curves. The depths are guesstimated to be within 50 feet of surface and the width of each zone of the order of 80 feet. No outcrops have been recorded on the geological fact plan.

GEOCHEMISTRY

The geochemical survey carried out in the area by a previous lease holder, shows very little correlation with the zones of high chargeability as shown in the present survey. However, the sampling techniques are unknown and the actual sample positions are also unknown. These factors, together with the variable superficial cover in the area would not, in the authors view, be expected to yield geochemical data capable of direct correlation.

A number of geochemical responses in lead do, however, coincide with individual induced polarization highs. In particular the following are worthy of special mention.

Line 195W	at	700N
	at	1100N
Line 185W	at	750N
Line 175W	at	1000S
	at	300S
	at	600N
	at	700N
Line 165W	at	650N
Line 155W	at	650N
Line 125W	at	250S
		050N
Line 115W	at	275N
	at	1050N
Line 110W	at	350N

CONCLUSIONS

1 - The apparent resistivities ranged from 10 ohm-metres to over 5000 ohm-metres. The background, however, can be considered to be 200 to 1200 ohm-metres. These apparent resistivities are considered normal for the area, with the exception of those below 100 ohm-metres.

2 - The background induced polarization effect of 20 to 30 millivolts/volt is twice normal background, and as such, can be considered anomalous. This suggests

a per volume background of some ½% of chargeable material such as pyrite or graphite. However, graphite in very finely divided disseminated form could produce such a background for half this guesstimated percentage.

3 - The decay form of the EIP induced polarization is within "normal" range everywhere. As mentioned in report TAS-019AF, this is considered to be due to the fact that the external current flow would tend to acquire the characteristics of the external medium through which it flows, rather than that of the mineral assemblage which is the stored source of the energy.

4 - The magnetic induced polarization data showed rapid changes in induced polarization effect (M_1 and M_5) and normalised current flow (H_N) but was too limited in its application to yield diagnostic information. Both cases, where $M_5 > M_1$ and where $M_1 > M_5$, were recorded, superimposed on strong external polarization current flows. Further work would be required to ascertain the relevance of the method in differentiating zones which otherwise appear identical, but the work to date is encouraging.

5 - The magnetometer survey revealed a magnetic background

in the area of about 62,500 gammas. Low amplitude anomalies semi-parallel to the strike as gauged from the resistivity data are thought to be magnetic tuff horizons, while more substantial anomalous readings discordant with the preferred strike direction, as determined by resistivity profile matching, could be due to intrusives. None of the magnetically anomalous zones, however, show large anomalous induced polarization responses and all are essentially resistive. Therefore their response is unlike that of the type deposit in the Renison Mine area.

6 - An attempt to delineate rock type boundaries using the properties of apparent resistivity, apparent chargeability and magnetics is presented in Plate 5. For each property, adjacent profiles were curve matched to obtain the best fit. For this reason the interpreted strikes for each property are not always parallel.

The south eastern and north western sectors are considered reliable, but the area along the proposed fault zone is in doubt.

7 - The maximum depths to the top of the sources of the induced polarization anomalies defined in this survey, range from less than 20 feet to about 100 feet. The

The inferred dips are steep to moderate and mostly to the south.

8 - It is not possible to single out anomalous responses of special interest on a basis of the magnetic or electrical properties studied in this report. Obviously the type mineralisation suggests that those responses which are both chargeable and conductive have the most economic potential. However, the few anomalies defined in the present survey suggest very high conductivities, and those that do are inferred to be due to either graphitic and/or pyritic shales.

It must therefore be concluded that further screening of the induced polarization anomalies must be carried out using detailed geology and close spaced, localised geochemical sampling.

RECOMMENDATIONS

1 - No specific diamond drill hole recommendations are made as a result of the survey discussed in this resport, as those anomalous zones being both chargeable and conductive rarely, if ever, have a magnetic signature, and more often than not could be explained by graphitic and/or pyritic shales.

2 - Follow-up geochemical sampling to bedrock, on close-spaced, 50 or 25 feet centres, is recommended over induced polarization anomalies which, from a geological point of view, are deemed of interest. Of these, particular attention should be given to those zones which also exhibit conductivity.

3 - As mentioned elsewhere, magnetic induced polarization tests on known zones both at Renison and other locations, appear to be able to distinguish between massive electrically continuous pyrrhotite and essentially disseminated graphite by examining the internal decay rate of the induced polarization effect. It is therefore suggested that this approach should be tried in this area, after further evaluation over known deposits.

The author strongly recommends that further discussion of these results take place after geological evaluation has been carried out.

Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

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

GEOPHYSICIST

APPENDIX 'I.P.'

INTRODUCTION

For the benefit of those who are unfamiliar with the Induced Polarization method in general, or with the pulse-type method in particular, a few introductory remarks will be directed on the Induced Polarization, or overvoltage, phenomenon. Those who wish a fuller treatment of the subject are directed to Seigel (1962), which paper also includes an extensive list of references.

Induced Polarization in its broadest sense means a separation of charge to form an effective dipolar (polarised) distribution of electrical charges throughout a medium under the action of an applied electric field. When current is caused to pass across the interface between electrolyte and a metallic conducting body, double layers of charge are built up at the interface, in the phenomenon known to electrochemists as "overvoltage". This is the phenomenon which can be utilised for the detection of metallic conducting, rock-forming, minerals such as most sulphides, arsenides, a few oxides and, unfortunately, graphite. In addition, effective dipolar charge distribution occurs to some extent in all rocks, due to ion-sorting in the fine capillaries in which the current is passing.

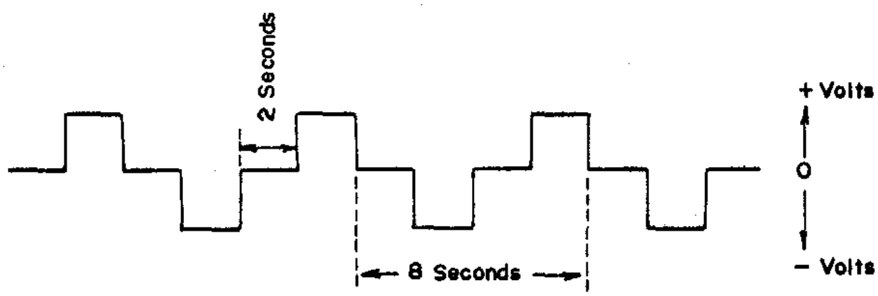
Induced Polarization responses may therefore arise from metallic or non-metallic agencies. Fortunately, the latter generally falls within fairly low and narrow limits. for almost all rock types, although there is still no reliable criterion for differentiating overvoltage responses from graphite and metallic sulphides, or for distinguishing between the responses of one type of sulphide and another. Despite these limitations the Induced Polarization method has amply demonstrated its value in mineral exploration since its initial development as a useful exploration tool in 1948 (ed. Wait, 1959).

DESCRIPTION OF METHOD AND EQUIPMENT

For the present programme the pulse or time domain system was employed, using a Scintrex Induced Polarization unit. The standard current-wave form with the unit is two seconds on-time and two seconds off-time. (see Figure 1). This unit features the Newmont type self-triggered receiver which operates remote from the current transmitting equipment. Three fundamental quantities are measured with this unit - the chargeability of 'M' measurement, the 'L' measurement and the resistivity.

The receiver integrates the area under the decay curve during the time interval from 0.45 seconds to 1.1 seconds

MEASUREMENTS TAKEN



Energising frequency is a square wave having a frequency of 0·125 cps.

FIELD MEASUREMENTS MADE

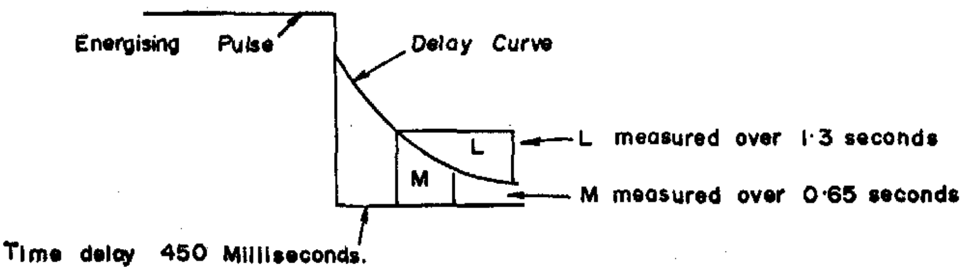


Fig. 1

after termination of the primary current pulse. This integral normalised with respect to its corresponding primary voltage is the chargeability or 'M' measurement, that is, the fundamental Induced Polarization characteristic. It is in units of milliseconds. The Induced Polarization phenomena is dependent on the existence of electronically conducting material within the matrix of ionically conducting material. The chargeability is therefore a measure of the presence of electronically conducting material within the ground being tested.

The second quantity measured is the area over the transient decay curve between 0.45 seconds and 1.75 seconds of the current off-time. This measurement is designated the 'L' measurement and is also in units of milliseconds. The ratio L/M gives a curve factor related to the shape of the transient voltage curve, and is a measure of the rate of decay of the transient voltage. This is of secondary diagnostic value in that the rate of decay of the transient voltage is partially a function of particle size. A large L/M ratio reflects a short time constant, commonly associated with finely disseminated sulphide or graphite, whereas a small L/M ratio reflects the longer time constants associated with the larger sized metallic particles.

The L/M ratio is also effective in determining the presence of electromagnetic coupling effects. With the Scintrex Induced Polarization unit, electromagnetic coupling effects are essentially eliminated by an 0.45 second delay-time following termination of the primary current pulse before measurement of the transient voltage commences. However, in extremely low resistivity areas coupling may occur. Under these conditions the presence of electromagnetic coupling can distort the Induced Polarization response, and it is extremely important to know when this occurs. The presence of such coupling is immediately recognizable from the L/M ratios.

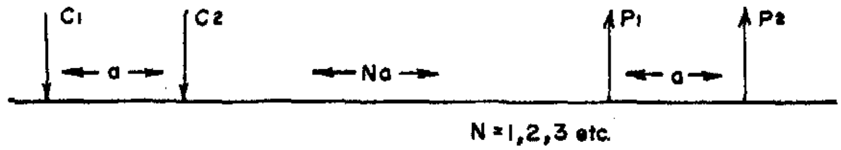
Resistivity measurements are also made as an integral part of all Induced Polarization measurement using the Scintrex Induced Polarization unit. The resistivity values are of primary importance in determining subsurface geological features such as contact zones, faulting, etc., and are of assistance in mapping the geology in general.

Electrode geometries (see Figure 2) utilised in obtaining field measurements are important and no one electrode array is applicable for all conditions. In areas where a low resistivity oxidised surface layer overlies a much higher resistivity freshrock, a high degree of

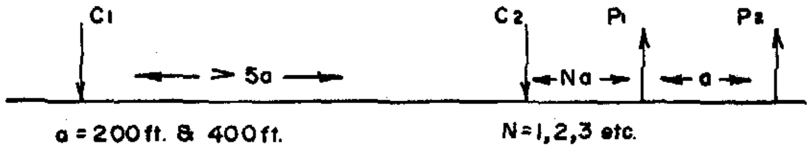
COMMONLY USED ELECTRODE ARRAYS

CLOSE – COUPLED ARRAYS

DIPOLE – DIPOLE



POLE – DIPOLE



GRADIENT ARRAY

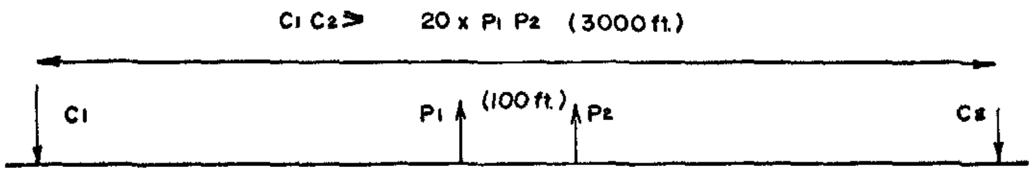


Fig. 2

masking occurs using any of the close-coupled arrays, such as pole-dipole or dipole-dipole. An electrode spacing many times greater than the depth to freshrock must be used in order to obtain responses reasonably representative of the freshrock. With such large electrode spacings the physical properties are effectively averaged over so large a volume that we lose the ability to detect moderate sized bodies of polarizable material. However, under these conditions the gradient array is both feasible and desirable in that it minimises the effects of masking and at the same time has a high degree of resolution for small targets.

In the present areas of investigation, abnormal induced polarization responses may be expected to arise from the electronically conducting sulphide minerals such as pyrite, pyrrhotite, chalcopyrite and pentlandite, plus graphite and magnetite. The response from magnetite has been found to be quite variable and somewhat unpredictable, reflecting the great variation in the mode of electrical conduction in this material. It is not always possible to differentiate between these potential sources of high chargeability from the Induced Polarization and resistivity data alone. Complementary geophysical, geochemical and geological data enable a more complete interpretation to be made of the Induced Polarization data.

REFERENCES

Seigel, 1962 — "Induced Polarization and Its Role in Mineral Exploration" H.O. Seigel, Canadian Mining and Metallurgical Bulletin, April, 1962.

ed. Wait, 1959 — "Overvoltage Research and Geophysical Applications" editor J.R. Wait, Pergamon Press, London, 1959.

APPENDIX 'MIP'

MAGNETIC INDUCED POLARIZATION

The MIP method measures the magnetic response due to the polarization currents flowing in the ground that are made up of the fundamental polarization current within the chargeable body and its return currents. Being able to measure the magnetic field due to the polarization current within the chargeable body a far more fundamental measurement with associated characteristics is obtained. The polarization current within the body is very concentrated and is in the opposite sense to the inducing current and the return current.

The magnetic field due to the inducing current shows where the primary current is flowing and hence where conductive or resistive zones are.

FIELD PROCEDURE

A longitudinal current array is normally applied so that the current is passed along the long axis or strike direction of sulphide bodies likely to be encountered in the survey area. A fixed current electrode configuration is employed with current electrodes separated by 2A where A is the minimum length of bodies desired to locate in the survey area. If there is one well defined horizon of interest then the current electrodes are normally placed reasonably on this line. The cable joining the current electrodes may be the shortest distance between them or when a single well-defined horizon of interest is present, then the current is layed in a U shape avoiding the horizon. In this way the magnetic field from the cable will not obscure the favourable horizon.

With a current electrode separation of 2A, a block about 2A long x A wide may be covered. This is not a rigid limitation, however, and they may be exceeded somewhat providing the magnetic field has an adequate strength.

The horizontal magnetic field at right angles to the current flow is measured, that is, along the direction of the survey line. The distance between stations may vary between 25 and 60 metres depending on the size of body of interest and its depth.

The primary current into the ground is a standard two seconds on-off wave form. Using the IPR-8 receiver, the primary magnetic field H_p due to the primary current I_p flow in the ground is measured. When this is switched off, the decaying secondary current produces a secondary magnetic field H_s. The IPR-8 receiver can measure up to six slices in the decay curve produced by the secondary magnetic field, as shown in Appendix IPR-8. Each slice

is normalised for a standard decay curve, and the primary magnetic field, to give the chargeability parameter.
The chargeability with the induced polarization phenomena is defined as the constant relating the primary to the secondary magnetic field, or current or electric field depending on what measuring technique is applied.

APPENDIX IPR-8

I INTRODUCTION

The basic equipment required for an Induced Polarization survey consists of a transmitter, a receiver, wire and electrodes.

Most time domain induced polarization transmitters transmit square waves with equal "on" and "off" times. Polarity is automatically changed between the pulses. The waveform shown below indicates how the current is usually transmitted. The pulse times range from 1 to 8 seconds.

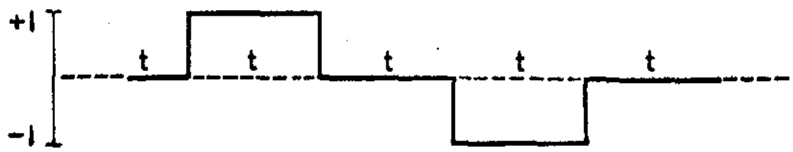


FIGURE 1A

The transmitter is powered by batteries (portable type units or a motor driven generator. Scintrex manufactures various time domain induced polarization transmitters ranging in power from 25 watts to 15 kW. The choice of a transmitter depends on various factors such as: the electrode spacings to be employed, contact resistance and the resistivity of the subsurface. The IPR-8 receiver is designed for use with any time domain induced polarization transmitter.

The IPR-8 time domain induced polarization receiver is of the state-of-the-art design, packaged in a rugged and portable manner. Using integration and automatic normalization, it measures the characteristics of an induced polarization decay curve set up by overvoltage and other effects occurring in rocks. When induced polarization effects (such as due to metallic-non metallic interfaces in rocks) occur, the waveform received at the receiver is not the same square wave as transmitted by the transmitter. The waveform shown below indicates the sort of wave distortion which is caused by the induced polarization phenomena.

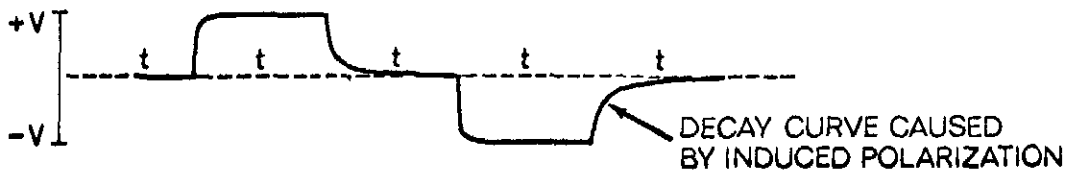


FIGURE 1B

II SPECIFICATIONS

The IPR-8 has the following specifications:

Input Impedance	3 megohms
Primary Voltage (Vp) Range	300 microvolts full scale to 40 volts full scale in 10 ranges
Accuracy of Vp Measurement	±3% of full scale
Vs/Vp Ranges	20 and 100 mV/V full scale
Vs/Vp Accuracy	±3% of full scale
Primary SP Buckout Range	±1 volt
Accuracy of SP Measurement	±3%, ±5 mV
Automatic SP Tracking Range	6 x Vp, maximum ±1 volt
Continuity Meter Reading	0 - 500 k ohms
50 or 60 Hz Powerline Rejection	-50 db (300x)*
Low Pass Filter	6 db/octave with fc = 20 Hz and 12 db/octave with fc = 36 Hz
Required Stability of Transmitter Timing	Need only exceed measuring program selected (1 or 2 seconds)
Operating Temperature Range	-30°C to +60°C
Dimensions	320 mm x 135 mm x 160 mm
Weight, Complete with Lid and Batteries	3.6 kg
Power Supply	4 D cells - Eveready No. 1050 or equivalent; estimated battery life 2 months intermittent duty at 25°C 1 Alkaline cell Eveready No. E91 or equivalent; estimated life 1 year

* 50 or 60 Hz depending on power system.

III QUANTITIES MEASURED BY THE IPR-8

Figure 2 shows the different parameters measured by the IPR-8. The usual measurements are Vp, the received primary voltage and "M", a parameter related to the transient curve. The Vp measurement is used in resistivity calculations while M is the chargeability (induced polarization) parameter. In addition, absolute values of the self-potential (SP) can be measured.

In all cases, the M quantity measured by the IPR-8 is the mean value of the transient voltage over a selected time interval to which the following normalizations have been applied:

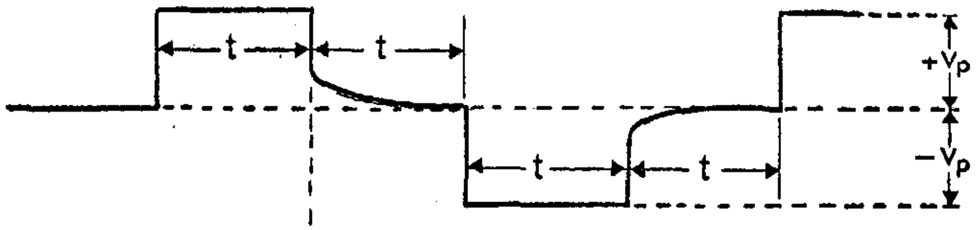
- normalization for the length of the integration interval
- normalization for the primary steady state voltage (Vp)
- normalization for curve shape
- normalization for number of pulses

The units of the quantities measured are, therefore, dimensionless and are normally expressed in "millivolts per volt".

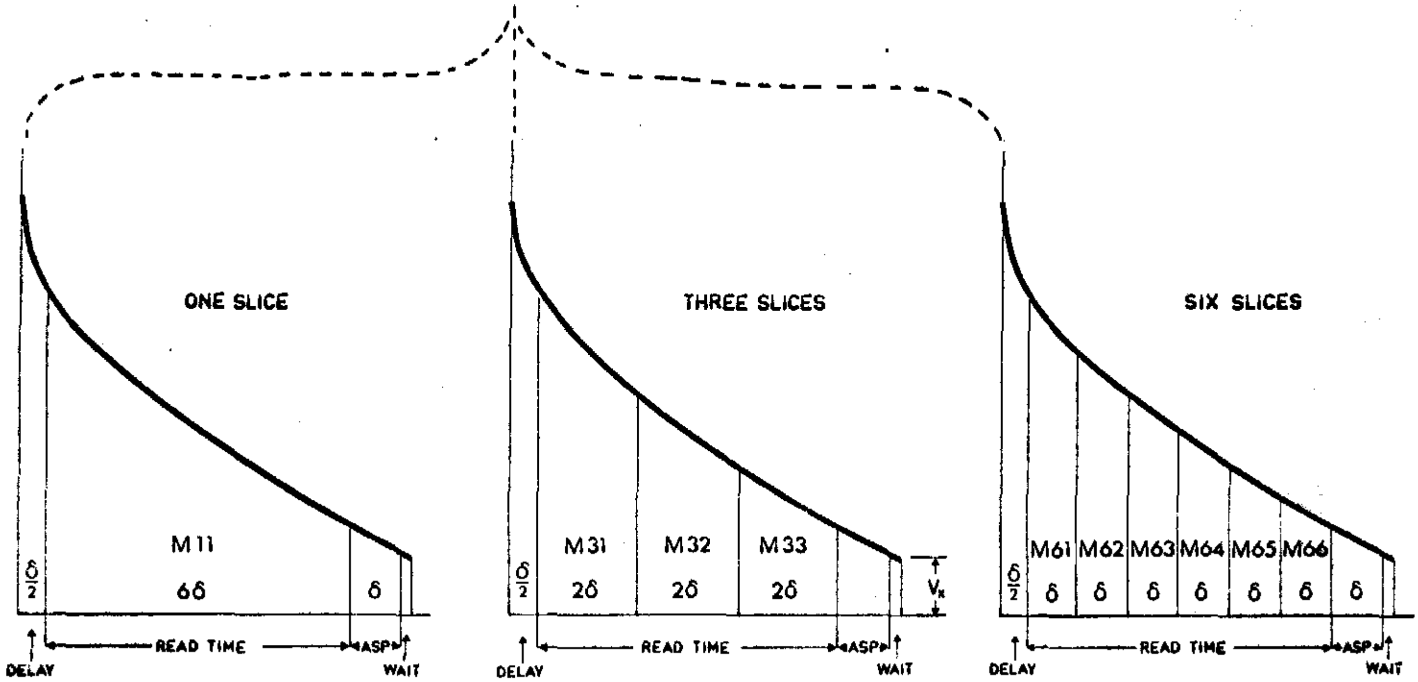
In the various modes of operation the transient voltage following the interruption of the primary current pulse is either integrated over one long period of time or sliced into either 3 or 6 slices. By using 6 slices, a good record of the decay curve shape can be obtained. The 3 slice mode gives some curve shape information and provides an economical standard mode in which to operate. The centre slice of this mode is reasonably close to the measurement made by the Scintrex IPR-7 and other receivers of the "Newmont Type", while the first and last slices can be used for a rapid check of curve shape. A more precise relationship is, however, presented later in this section.

Figure 2 shows the actual times used. For the receiver to operate, the transmitter timing may be any time period of one second or greater (i.e. $t \geq 1$ second) although transmitter and receiver timings of 2 seconds are considered normal for most surveys. Equal on and off timing assures the best noise rejection as the signal is averaged over the longest possible time, and the automatic self-potential adjustment is made closest to the reading time.

With the receiver set at t = 1 second, the decay ($\delta/2$) from the current-off time to the commencement of the measurement is 65 milliseconds and the slice width (δ) is 130 milliseconds. With the receiver set at t = 2 seconds the delay is 130 milliseconds and the slice width is 260 milliseconds. Fuller information on the programs is available from the tables in Figure 2.



WAVE FORM AT INPUT TERMINALS



SECONDARY DECAY CURVE SHAPES AS APPLIED TO THE INTEGRATORS

t sec.	δ	delay time	waiting time	M 11				M 31			M 32			M 33			length
				from	to	mean	length	from	to	mean	from	to	mean	from	to	mean	
1	130	65	25	65	845	455	780	65	325	195	325	585	455	585	845	715	260
2	260	130	50	130	1690	910	1560	130	650	390	650	1170	910	1170	1690	1430	520

t sec.	M 61			M 62			M 63			M 64			M 65			M 66			length
	from	to	mean	from	to	mean	from	to	mean	from	to	mean	from	to	mean	from	to	mean	
1	65	195	130	195	325	260	325	455	390	455	585	520	585	715	650	715	845	780	130
2	130	390	260	390	650	520	650	910	780	910	1170	1040	1170	1430	1300	1430	1690	1560	260

FIGURE 2

PARAMETERS MEASURED WITH TIMES OF RECEIVER PROGRAM IN MILLISECONDS.

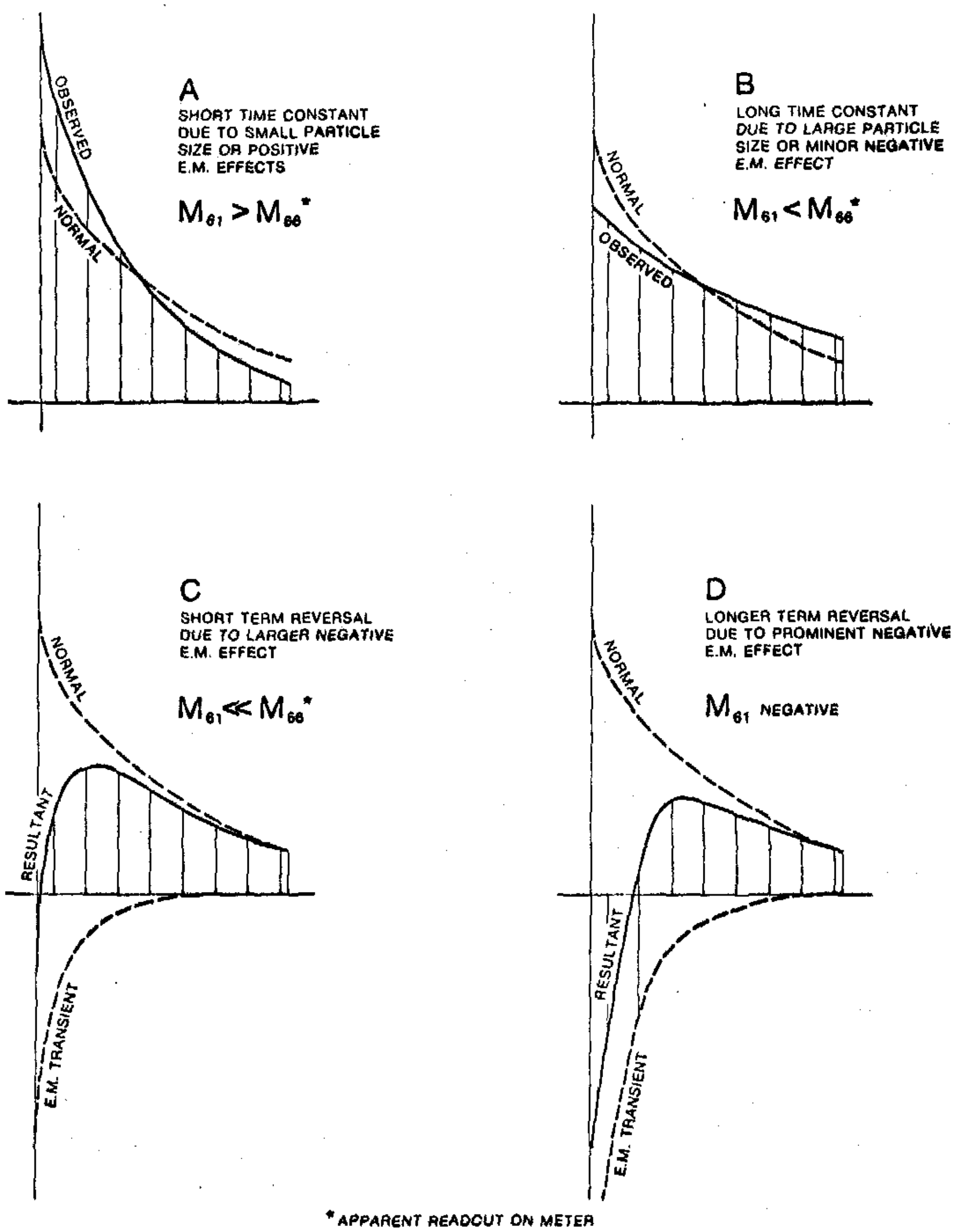


FIGURE 3

THE SIGNIFICANCE OF CURVE SHAPE INFORMATION GAINED USING 6 SLICE READINGS.

Each integration is normalized with respect to the Standard Induced Polarization Decay Curve which has been established by Newmont Exploration Limited. (ref. Dolan and McLaughlin in bibliography) This is achieved by choosing the sensitivities of the integrators so, that if the curve shape is normal, all slices within a given mode show the same amplitude of measurement. A further normalization is built in for the slice width, be it full, one-third or one-sixth of the total integration period. The net effect is that the reading will be the same regardless of the slice measured, providing that a standard transient decay curve form is present and that the same measuring cycle is used for transmitter and receiver (1 second or 2 seconds). Any departure from this standard curve form will be immediately obvious to the operator, without performing any calculations. For instance, a steeper decay will give a higher reading on earlier slices than on later slices. Reconstruction of the actual decay curve is easily effected by using the correction factors given in Table 1.

The shape of a time domain induced polarization decay curve can be altered by electromagnetic or interline coupling, by variations in the average size or degree of interconnection of the metallic particles in the bedrock or by other I.P. sources. Figure 3 illustrates the advantage of breaking the decay curve into slices. Utilizing only one wide slice, there is no indication of the shape of the decay curve. Positive electromagnetic coupling effects or small particle size may give rise to an abnormally short time constant (Case A) which, for multi-slice modes will be indicated by higher normalized readings of the earlier slices with respect to the later slices. An increase in the later slices over the earlier ones (Case B) may imply a longer time constant due to a minor negative EM transient or I.P. responses from large metallic particles, etc. Cases C and D, where the values of the initial slices are considerably reduced or are even negative, show the effect of negative EM transients of increasing amplitude.

A system of symbols has been created to indicate each of the measurable slices.

The general symbol is M_{txy} where:

- t is the timing chosen (i.e. 1 or 2 seconds)
- x is the number of slices in the mode chosen (i.e. 1, 3 or 6)
- y is the number of the slice referred to (i.e. 1, 2, 3, 4, 5 or 6)

Wherever two subscripts only are given, eg. M_{32}, it is understood to apply equally for t = 1 sec. or t = 2 sec.

A chargeability reading is defined by the following formula:

$$M = \frac{V_s \cdot 1000}{V_p} \quad \text{in mV/V}$$

where $$V_s = \frac{\int_{t_1}^{t_2} V_s \, dt}{t_r} + V_x$$

and t_1 = time at beginning of slice

t_2 = time at end of slice

V_x = residual transient voltage at the end of the automatic self potential correction

$t_r = t_2 - t_1$, i.e. the integrating period

Chargeability values, uncorrected for curve shape, can be easily calculated if required. Normalizations for all slices are made using the M_{232} value as reference. In other words, there is no curve shape normalization applied to this slice; the M_{232} readout is, therefore, directly as measured. The same statement holds for the M_{132} slice, however, its value is one-half the value for M_{232} provided that the transmitter timing matches the receiver timing.

To restore the true transient curve shape (M true), the observed M readings (M read) are multiplied by the factors in Table 1.

TABLE 1

$M_{true} = M_{read} \bullet k_1$

Slice	k_1
M_{11}	1.09
M_{31}	1.47
M_{32}	1.00 ← NORMAL
M_{33}	0.81
M_{61}	1.68
M_{62}	1.27
M_{63}	1.06
M_{64}	0.94
M_{65}	0.85
M_{66}	0.78

For the ideal "normal" I.P. transient curve form $M_{2xy} = 2M_{1xy}$ where M_{2xy} is for a 2-second on-off transmitter cycle and M_{1xy} is for a 1-second on-off cycle. The relationship between readings taken with differing transmitter and receiver timings is more complicated, particularly if the curve shapes are not normal.

Table 1 still applies for the case where the transmitting times are longer than the receiving times in order to reconstruct the relative curve shape.

Relationship between IPR-8 and
"Newmont Type" Receiver Measurements

The "Newmont Type" receivers (eg. Scintrex IPR-7) integrate the area under the transient curve from 0.45 seconds to 1.1 seconds. This is then multiplied internally be an instrumental factor to obtain the chargeability M in milliseconds.

For a normal decay curve form, the approximate relationship between the IPR-8 measurements and the Newmont Type chargeability is given by M_{232} (in mV/V) = M_N (in milliseconds) • 0.7.

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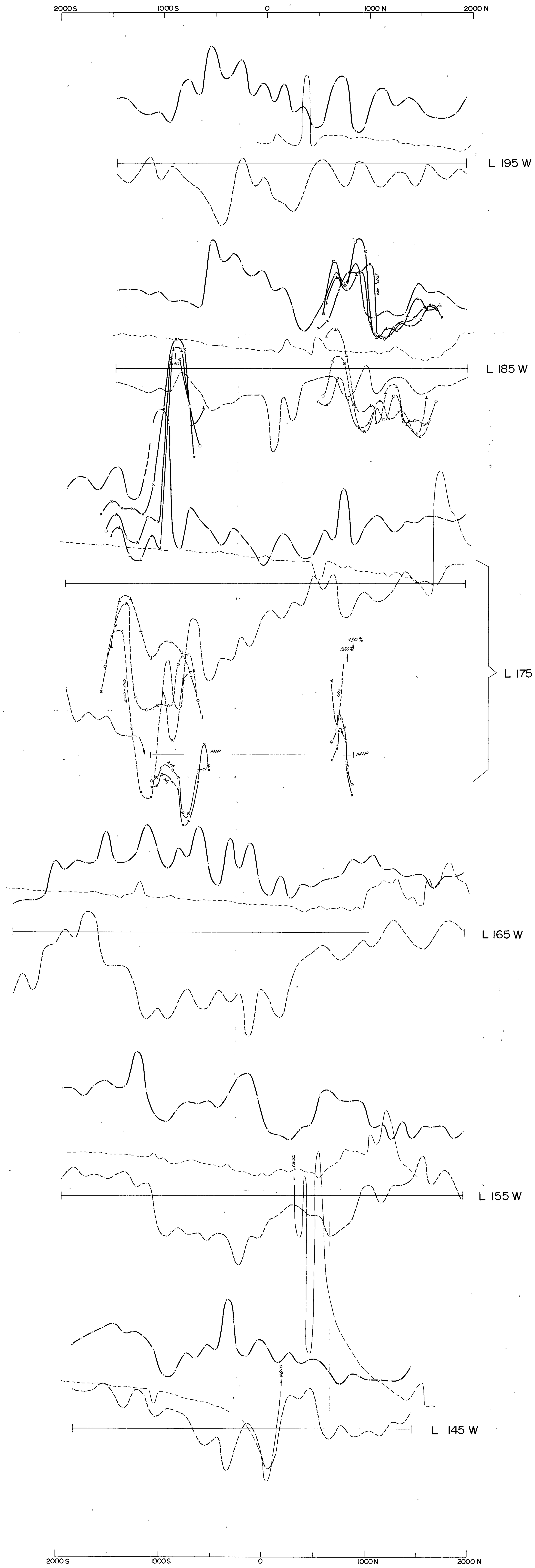
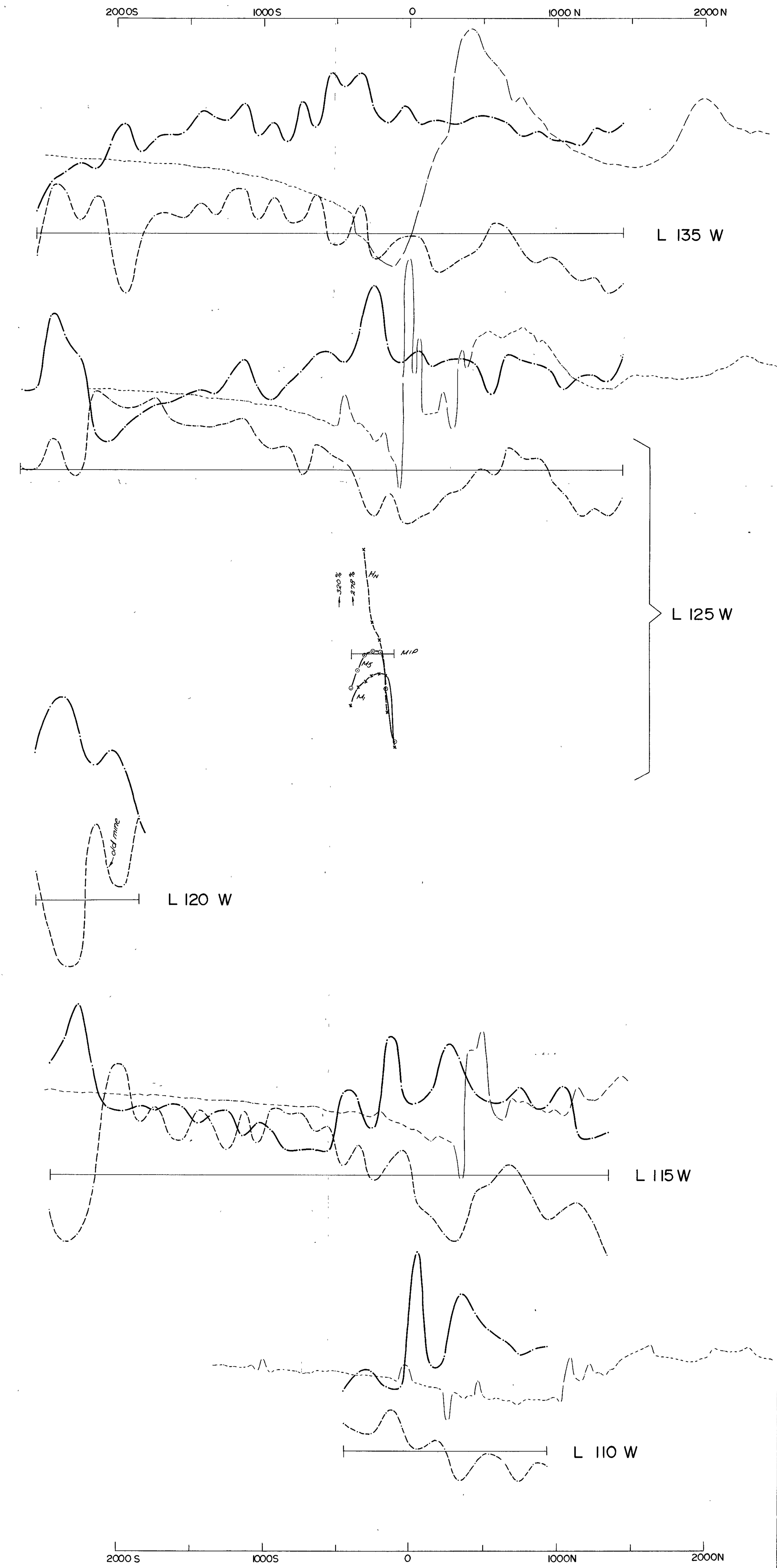
RENISON LIMITED

PLATES 1 to 5

JOB TAS-019C

OPEN FILE





LEGEND

EIP

CHARGEABILITY SCALE: 1 in. = 20 Millivolts/volt
BASE LEVEL = 0 Millivolts/volt
SYMBOL = ————————

RESISTIVITY SCALE: 2in. = 1 Logarithmic cycle
BASE LEVEL = 1000 Ohm-metres
SYMBOL = — — — — —

POLE-DIPOLE
- n = 1/2 ⊥—⊥—⊥
- n = 1 ⊙—⊙—⊙
- n = 2 x—x—x
- a = 100 feet

GRADIENT
·————·

MIP

CHARGEABILITY, M 1in. = 10 milligammas / gamma
BASE LEVEL = 0
Subscript denotes slice presented
SYMBOL = M_1 ·———·———·
M_5 ⊙———⊙———⊙

NORMALIZED MAGNETIC FIELD, H_N
1 in = 40%
BASE LEVEL = 100%
SYMBOL = x——x——x

MAG

MAGNETIC INTENSITY 1in = 200 gammas
BASE LEVEL = 2200 gammas
SYMBOL = ----------

RENISON LIMITED

CRIMSON CREEK GRID
WEST COAST, TASMANIA

DATA PROFILES

ELECTRICAL & MAGNETIC INDUCED POLARIZATION
& MAGNETIC INTENSITY

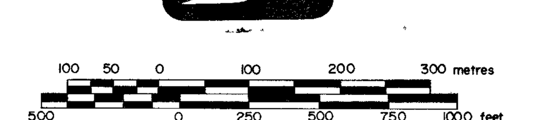
5 cm

SURVEYED AND COMPILED BY
SCINTREX PTY. LTD.

JANUARY, 1974

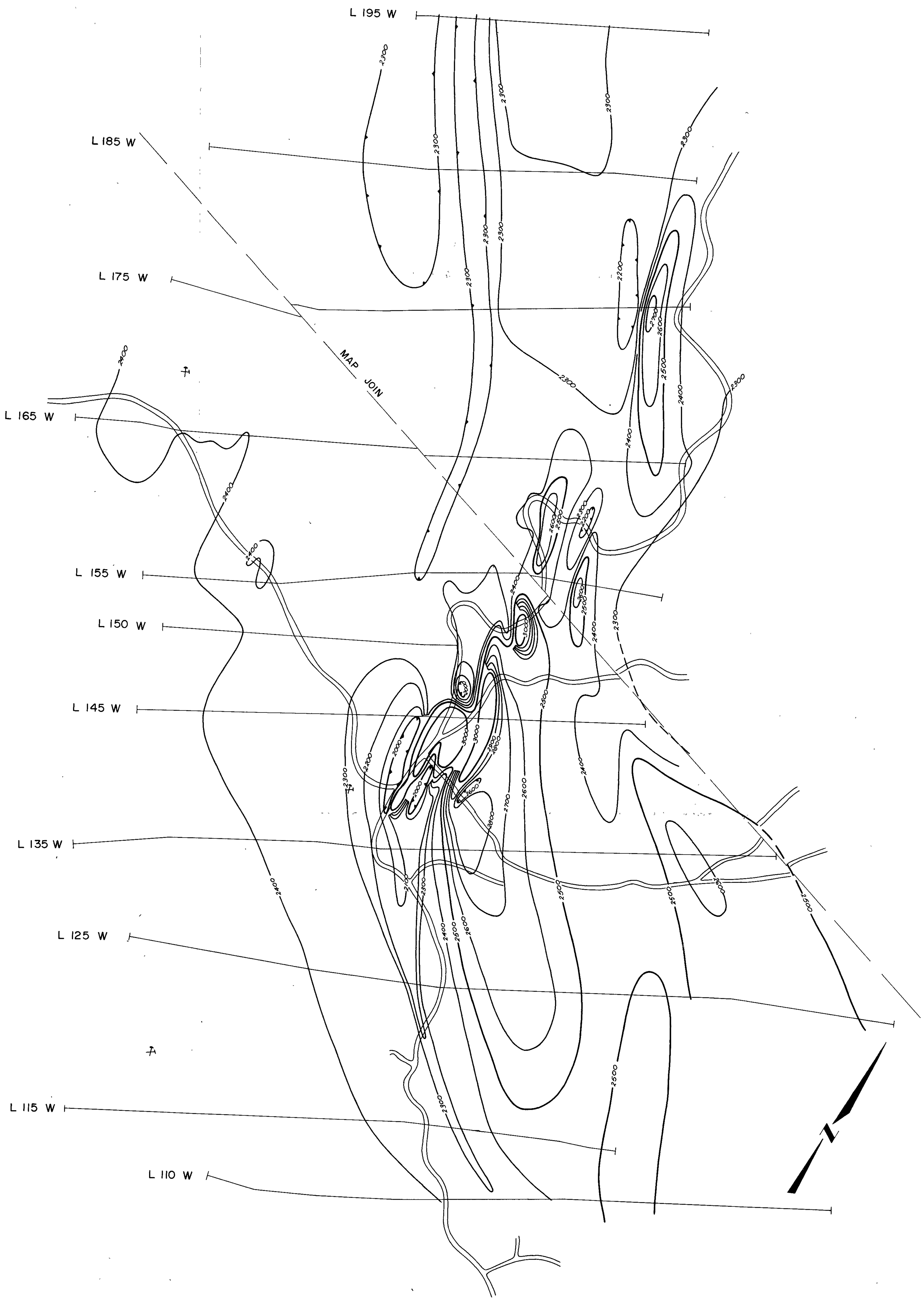
645063

74-989



Scale 1:5000

JOB No. TAS. 019 C SHEET 1 of 1 PLATE 1 1420



LEGEND

- 500 GAMMAS
- 100 GAMMAS
- LINES SURVEYED
- ROAD
- MINE

NB ADD 60,000 GAMMAS

RENISON LIMITED

CRIMSON CREEK GRID
WEST COAST, TASMANIA

MAGNETIC CONTOUR MAP

5 cm

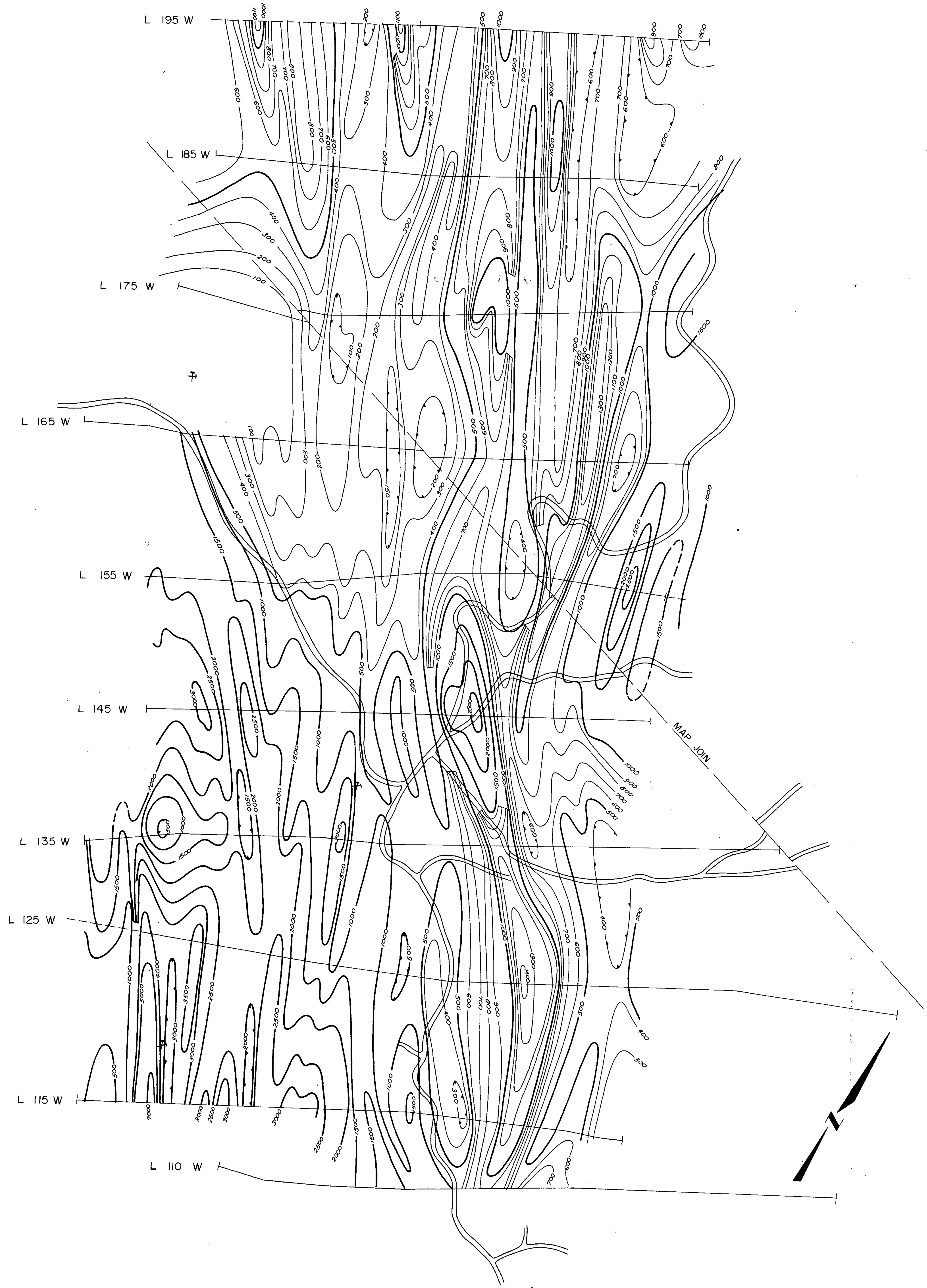
SURVEYED AND COMPILED BY
SCINTREX PTY. LTD.

645064

74-989

100 50 0 100 200 300 metres
500 0 250 500 750 1000 feet
Scale 1:5000

JOB No. TAS. 019 C SHEET 1 of 1 PLATE 2 1421



LEGEND

500 OHM-METRES
100 OHM-METRES
LINES SURVEYED
ROAD
MINE

RENISON LIMITED

CRIMSON CREEK GRID
WEST COAST, TASMANIA

RESISTIVITY CONTOUR MAP

645065

5 cm

SURVEYED AND COMPILED BY
SCINTREX PTY. LTD.

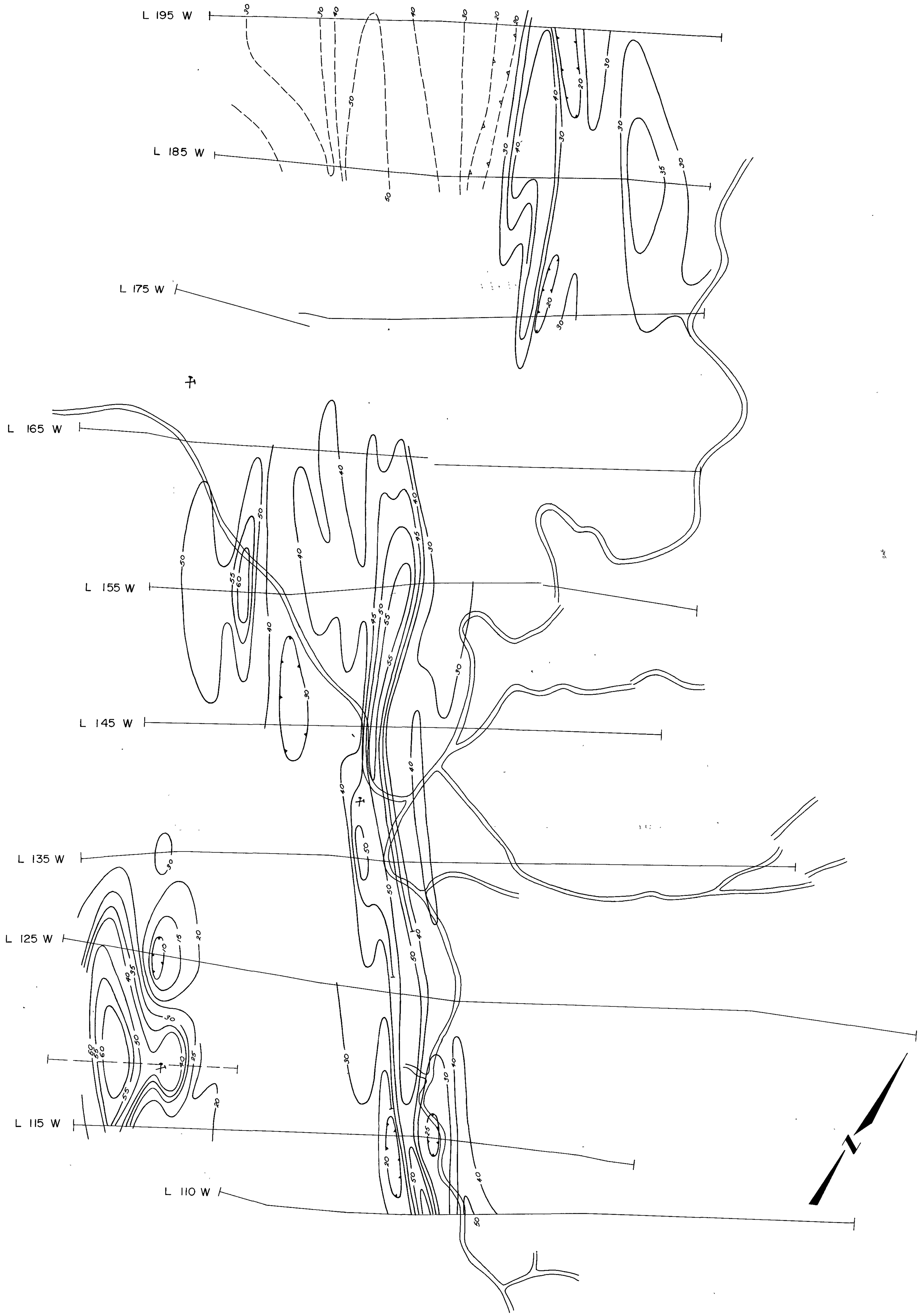
74-989

JANUARY, 1974

100 50 0 100 200 300 metres
500 0 250 500 750 1000 feet

Scale 1:5000

JOB No. TAS. 019 C SHEET 1 of 1 PLATE 3 1422



LEGEND

- 5 MILLIVOLTS / VOLT
- LINES SURVEYED
- ROAD
- MINE
- SIMPLIFIED CONTOURS

RENISON LIMITED

CRIMSON CREEK GRID
WEST COAST, TASMANIA

CHARGEABILITY CONTOUR MAP

645066

5 cm

SURVEYED AND COMPILED BY

SCINTREX PTY. LTD.

JANUARY, 1974

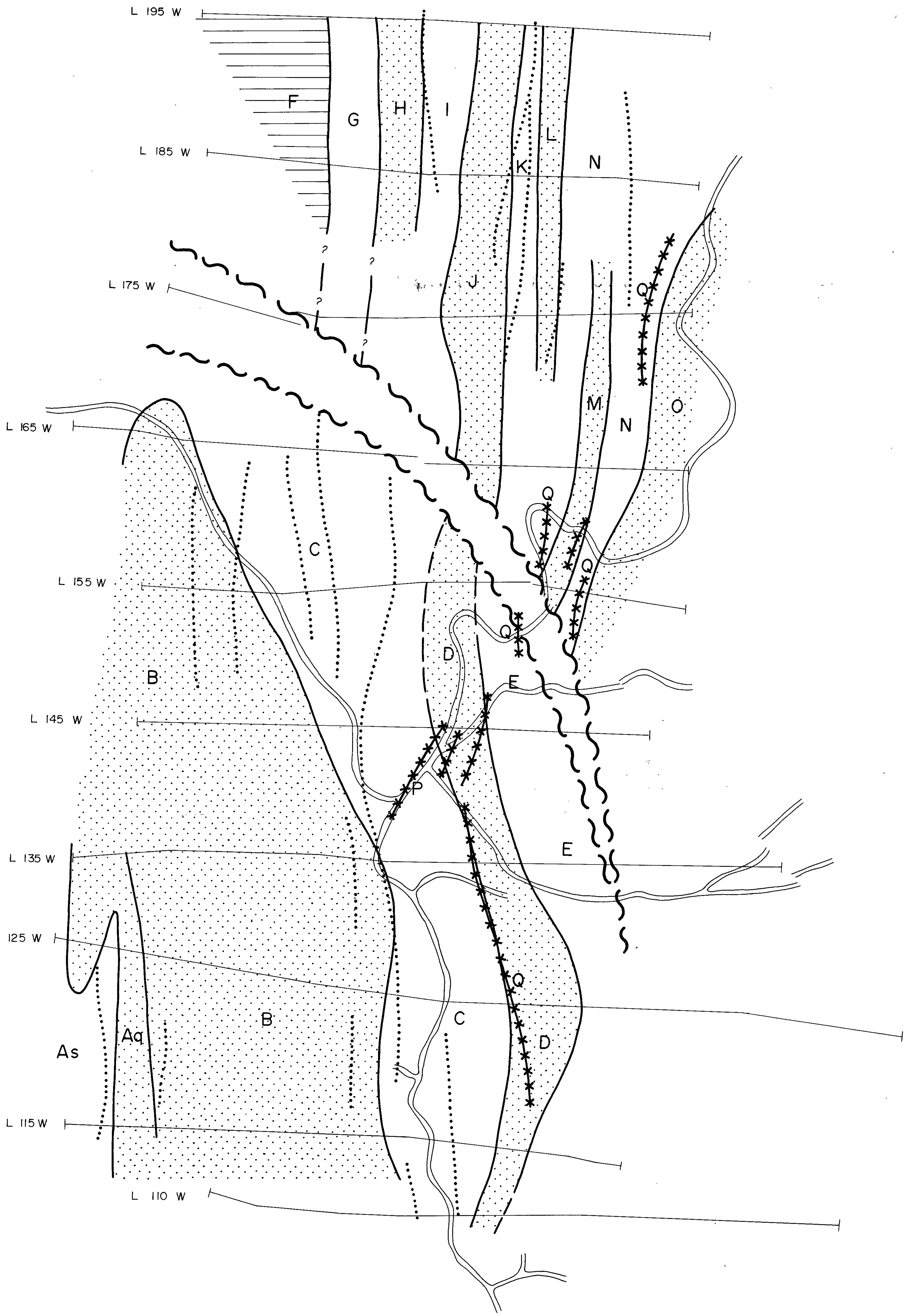
74-989

100 50 0 100 200 300 metres

500 0 250 500 750 1000 feet

Scale 1:5000

JOB No. TAS. 019 C SHEET 1 of 1 PLATE 4 1423



LEGEND

RESISTIVITY HIGH

RESISTIVITY LOW

ZONES OF HIGH CHARGEABILITY BACKGROUND

I P TRENDS

MAGNETIC TRENDS

POSSIBLE FAULT

RENISON LIMITED

CRIMSON CREEK GRID
WEST COAST, TASMANIA

INTERPRETATION PLAN

645067

5 cm

SURVEYED AND COMPILED BY

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74-989

100 50 0 100 200 300 metres

500 0 250 500 750 1000 feet

Scale 1:5000

JOB No. TAS. 019 C SHEET 1 of 1 PLATE 5 1424