000

480001

75-1142

A REPORT ON

GRADIENT ARRAY ELECTRICAL INDUCED POLARIZATION SURVEYS

OVER THE LOYETEA SOUTH AND LOYETEA NORTH PROSPECTS,

EL 19/72, NORTHERN TASMANIA

ON BEHALF OF

C.R.A. EXPLORATION PTY. LIMITED

PRIVATE AND CONFIDENTIAL

A REPORT ON GRADIENT ARRAY ELECTRICAL INDUCED POLARIZATION SURVEYS OVER THE LOYETEA SOUTH AND LOYETEA NORTH PROSPECTS, EL 19/72, NORTHERN TASMANIA

ON BEHALF OF

C.R.A. EXPLORATION PTY. LIMITED

BY

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

SYDNEY, N.S.W. DECEMBER, 1975

TAS - 030B

002

CONTENTS

TRANSPARENCIES HELD

003

480004

SCINTREX PTY. LTD.

Formerly

SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.

GEOPHYSICAL CONSULTANTS AND CONTRACTORS

SUMMARY

Gradient array electrical induced polarization surveys carried out at Loyetea South and Loyetea North have defined a series of induced polarization anomalies all of which are considered to be due to disseminated, or if massive, electrically discontinuous sulphides. The signatures of these anomalies are similar to those which would be expected over lead-zinc mineralisation. A number of these anomalies also lie in close proximity to soil geochemical anomalies which must enhance their economic interest.

Although the results over the South Loyetea grid were more positive, the somewhat smaller amplitude induced polarization responses over the North Loyetea grid should also receive very careful attention, as the size of induced polarization anomalies is never a guide to potential economic interest.

The results are considered highly encouraging.

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

A REPORT ON
GRADIENT ARRAY ELECTRICAL INDUCED POLARIZATION SURVEYS OVER THE LOYETEA SOUTH AND LOYETEA NORTH PROSPECTS, EL 19/72, NORTHERN TASMANIA ON BEHALF OF C.R.A. EXPLORATION PTY. LIMITED

INTRODUCTION

On about twenty one days between 3rd December, 1975 and 22nd December, 1975, gradient array electrical induced polarization surveys were carried out over the Loyetea South and Loyetea North areas on EL 19/72 on behalf of C.R.A. Exploration Pty. Limited. Some additional detailed work was carried out on Loyetea South on the 21st and 22nd December, 1975.

These surveys were performed at the request of Mr. G. Jenke, C.R.A. Geophysicist, in conjunction with Mr. M. Kirton, Chief Geophysicist. The surveys were executed by Scintrex Staff Geophysicist Mr. S. Baggottt, B.App.SC.(Geophys), assisted in the latter portion of the survey by Scintrex staff operator Mr. R. Lindberg. These surveys were under the immediate geophysical direction of Mr. G. Jenke, and the geological evaluation and direction was undertaken by Mr. T.M. Porter, Regional Geologist for the area. The author visited the site on 25th November, 1975.

The objective of the survey was to locate and delineate chargeable sections within the area capable of being caused by lead-zinc and copper-lead-zinc typical of Tasmania's west coast deposits. The salient characteristics of such are chargeability from *either* a resistive or conductive host.

METHOD AND EQUIPMENT

The major components of the equipment used, consisted of two Scintrex IPR-7 induced polarization receivers and a Scintrex 2½ KW time domain transmitter.

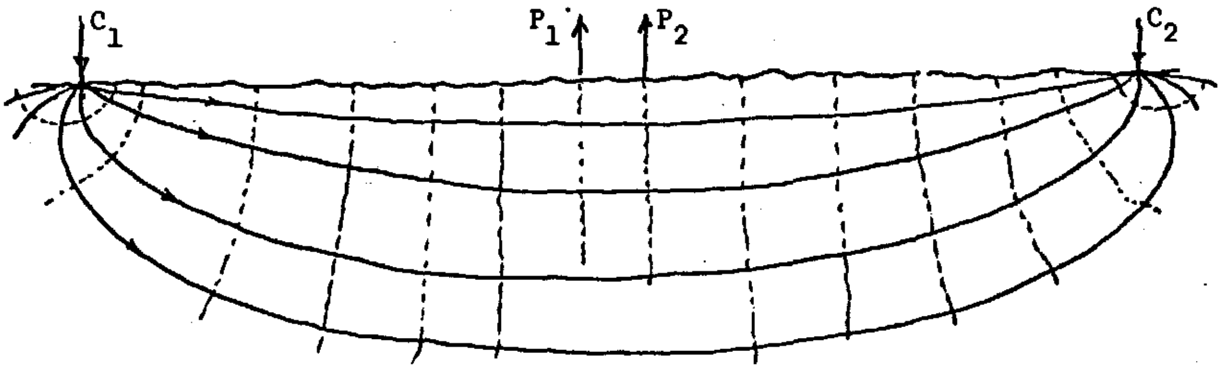
A very simple explanation of the parameters measured in the gradient survey follows. This description is designed specifically for the geologist, in order to give a *visual picture* of the parameters measured.

In the case of the gradient array, the potential dipole records the electrical properties of the material defined by the two equipotential *surfaces* tapped by the potential electrodes. This is diagramatically illustrated in Figure 1(A). This diagram represents a *section*, however, it should be realised that the apparent resistivity measurements also record information *sideways*. For a three dimensional picture of the volume sampled, rotate the section *into* and *out of* the plane of the paper by 90°. Within the centre section of the array the data represents the characteristics of the rock units *immediately below* and *immediately at right angles*

ELECTRICAL PARAMETERS MEASURED

(A) RESISTIVITY MEASUREMENT

(taken during current 'on' time)



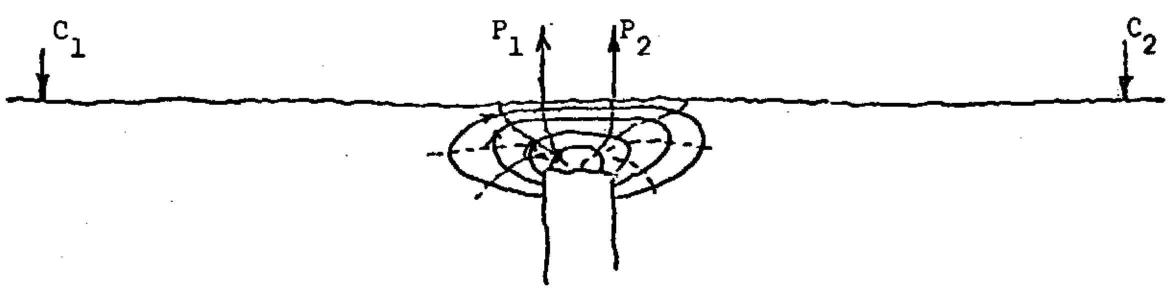
MEASUREMENT REPRESENTS:

ease with which primary current moves through ground

primary current flow
primary equipotential surface

(B) CHARGEABILITY (IP) MEASUREMENT

(taken during current 'off' time)



MEASUREMENT REPRESENTS:

discharge of stored energy

secondary current flow
secondary equipotential surface

FIGURE 1

to the survey line. The degree of *resolution* depends on the potential *dipole width*, the smaller the dipole the greater the resolution. Diagram 2 (the resistivity data) demonstrates the much improved resolution for a 10 metre dipole over that obtained from a 25 metre dipole over a sulphide occurrence whose characteristics will be similar to the target mineralisation. It is important to remember when examining the data that only the *gross* properties are "seen". The potential dipole cannot resolve units whose effective width is less than half the size of that dipole.

The criteria affecting the chargeability reading are somewhat different. In diagram 1B the decay of a chargeable section is shown. The passage of current during the *current-on* phase, during which the resistivity measurement was taken, carried some energy to be stored in the rocks (and sulphides etc), through which it passed. On cessation of this imposed current flow, the energy so stored will discharge (IP). It will set up its own equipotential field as shown in Figure 1B which will be detected by the same two potentials which measured the resistivity. It should be noted that any chargeable source will have a width *greater than* the source due to the curvilinear nature of the discharge of the stored energy. It should be further noted that the volume defined by the *secondary potential field* caused by this discharge is *not necessarily identical* to that defined by the primary equipotential field

IMPORTANCE OF RESOLUTION

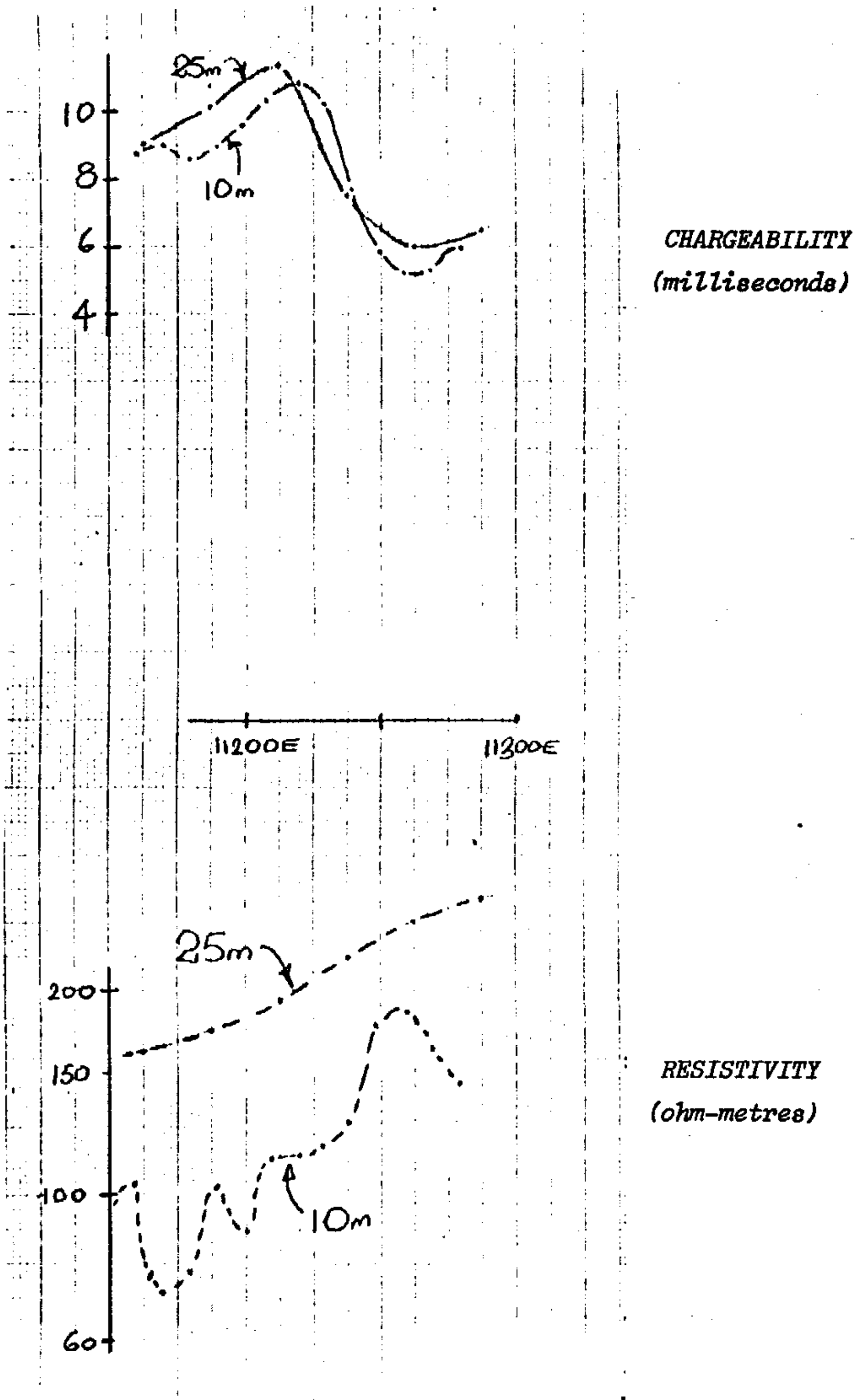


FIGURE 2

Figure 2 shows the differences in resolution *for chargeability* (top profile) over a known sulphide occurrence. The *form* is similar, but the positional information is far superior due to the more frequent reading interval.

In the present survey, anomalous responses due to fences were clearly resolved using a 5 metre dipole in the vicinity of the fence, but appeared as valid responses on the 20 metre dipole. (See Plate 5, Crosby Creek report, TAS-030A)

This array has operational attributes which result in rapid coverage and excellent positional information. However, depth information is not well defined, it being possible only to assess "maximum depths".

With regard to the interpretation of gradient array data the following comments may prove to be of assistance.

In the gradient array the source of the reading lies between the two equipotential surfaces tapped by the two potential pots employed. For the most part then, when working in the centre section of a gradient array, the source will be "immediately below" the potential dipole used. The reliability therefore of *positional information* with gradient array is excellent, however, the depth at which the response occurs is difficult to assess with accuracy. The *maximum depth* can be estimated from a consideration of the profile shape, but the accuracy of this approach will depend on a minimal potential dipole length, and of course sharp boundaries to the body. The *resolution* therefore is not better than half to a quarter of the dipole. Therefore maximum depths of the order of 10 metres may in fact either outcrop or sub-outcrop when a 20 metre potential dipole is used. Some moving source array would be required to obtain an *accurate depth estimate*.

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

The *attitude* of a chargeable zone can only really be gauged with any precision in the centre of the gradient array, and of course where the body has a strongly contrasting chargeability and apparent resistivity to that of 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, but *normal to the "local slope"*. All positions in the text refer to source positions normal to the local slope.

Each current dipole block should be considered separately. As would be expected, the continuity along strike is generally good, especially in the chargeability data. However, *"end on"* current dipole 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.

DISCUSSION OF RESULTS

The data profiles are displayed at the following scales:-

Horizontal	1:2000 (nominal) pot holes used for the potential electrodes being the soil sample positions. The latter have been marked on the data profiles.
Vertical	The resistivity data is displayed on a five centimetre log scale in ohm-metres, while the chargeability used a scale of 1 centimetre = 2½ milliseconds. As the L/M ratios were (with rare exceptions only) normal, these have not been drafted.

The data has not been contoured as individual chargeability and resistivity features can only be traced *clearly* between some sections on some lines, and thus such data would be an inferior guide to strike direction, and the extent of the geological units than the geological mapping already carried out. However, significant points of correlation between lines have been marked on each plate

South and North Loyetea are each separately discussed below.

SOUTH LOYETEA

The data profiles are presented on Plate 1.

The geological strike as ascertained by field mapping is grid north east, with all major boundaries and faults trending sympathetically. However, although the data is not sufficiently diagnositc to be uniquely contoured, interline correlation is seen between some sections, and often such correlations do not agree with the strike inferred by the very limited geological outcrop. Chargeability response has been correlated by anomaly form and the interpreted correlation is shown alphabetically on the profiles, while suggested resistivity correlation is shown by numerals.

LINE 24E

The resistivity is fairly constant, ranging from 1000 ohm-metres to 3000 ohm-metres for the most part, while the background chargeability varied between 7½ to 10 milliseconds.

ZONE 'A':- A 7 to 8 millisecond response was recorded at 4640N (sample 292095) from a source considered to have a maximum depth of the order of 30 metres. The source shows *no resistivity contrast* with the enclosing material, and hence is considered to be either *disseminated* or *electrically discontinuous.* The anomaly is rated of secondary importance. A southerly dip is *inferred.*

ZONES 'C' and 'B':- Anomalous responses of 5 to 6 milliseconds were recorded from sources centred at 4920N and 4860N both from essentially *disseminated* or electrically discontinuous sources at maximum depths of 30 metres.

ZONE 'E':- A fourth anomaly of some significance was defined at grid position 5150N between sample numbers 292120 and 292121, together with an 80% drop in apparent resistivity. The source is considered to have a maximum depth of 40 metres, and the host to the causative mineralisation to be *slightly* more conductive than background. The inferred dip is to the *north(?)*, and slightly (twice background) anomalous lead values were obtained to the south.

ZONE 'F':- A sharp decrease in apparent resistivity to 1000 ohm-metres was recorded at 5270N allied with a slight *increase* in chargeability. The source is considered to be from 20 to 30 metres in depth at most, from a source which is more *conductive* than the enclosing rocks.

LINE 25E

The general correlation of both resistivity and chargeability data is clear, and is definitely grid east-west.

ZONE 'A':- A 5 millisecond chargeability response at grid position 4620N (Sample 290661/2) from a non-conductive source correlates with a similar anomaly on the previous line.

ZONES 'B' and 'C':- were defined on this line at grid positions 4820N and 4920N respectively. On this line the 7 to 8 millisecond anomalies are now seen associated with a 60% and 50% reduction in apparent resistivity, indicating a *weakly conductive* host for the chargeable material.

ZONE 'D':- which on line 24E occurs as a broad zone between 5040N and 5080N and a low amplitude high of 3 milliseconds, is seen on this line at 5000N and 5040N as two shallow, narrow zones within a general resistivity low. These responses are worthy of follow-up as they are associated with high lead values of up to 420ppm as against 40-80ppm background. Although of relatively low *geophysical* priority, their economic interest is much enhanced by the geochemical correlation.

ZONE 'E':- is seen only as a low priority geophysical target on this line as only the decrease in resistivity is significant at 5140N.

ZONE 'F':- The predominant feature of this zone at 5280N is a 60% reduction in resistivity and a slight increase in chargeability of little geophysical interest.

LINE 26E

The profile forms between lines 25E and 26E are of similar general form, and clearly infer the grid east-west strike noted between lines 24E and 25E to continue east.

The range in apparent resistivities and the chargeability background are as observed on the previous two lines, again inferring similar rock units.

ZONE 'A':- A sinlge point, but nevertheless definite response was observed centred at about 4630N in the vicinity of sample numbers 292136/37, from a source considered to have a maximum depth of the order of 20 metres. The absence of any depression in the apparent resistivity data indicates either a disseminated or electrically discontinuous source. A single short spacing *a = 20 metres, n = 2* pole-dipole line was surveyed between sample 292135 and sample 292141. Unfortunately terrain did not permit additional spacings or longer profiling, but it does clearly confirm the interest of this zone. The source is considered to be situated between samples 292138 and 292139 at a depth of less than 10 metres. The displacement of the gradient anomaly down dip may in part be explained by end array displacement of source.

This anomaly clearly correlates with Zone 'A' on line 25E. It is significant that the high geochemical values centred on line 25/5E on samples 293062/3 are also seen , but at much reduced amplitude on lines 25E and 26E - *parallel* to Zone 'A'. The moderate 50°S dip would easily explain the down dip displacement for the geophysical response. This is obviously a target of *prime* importance and follow up is very strongly recommended.

ZONE 'B':- This 7 to 8 millisecond anomaly is centred at 4840N (sample 292147) coincident with a depression in apparent resistivity of about 50% to 1000 ohm-metres. The interpreted maximum depth to the source is 40 metres and the host to the chargeable material is *slightly* more conductive than the enclosing rocks, but the causative material is still considered to be electrically discontinuous and/or disseminated in origin.

ZONE 'C':- is difficult to define as it lies within a zone of high chargeability between Zones 'B' and 'D1'. However, the high 100ppm lead geochemical anomaly at sample number 293110 on line 26/5E is *on strike* as interpreted from the geophysical data. The higher chargeability was observed between 4890N and 4930N with some depression in resistivity.

ZONE 'D1':- This anomaly of some 5 milliseconds at 5000N was recorded on the northern flank of a high chargeability and low resistivity zone which covers the anomalies 'B', 'C' and 'D1', and is itself coincident with relatively low 500 ohm-metre apparent resistivities. (50% below background). The source is guesstimated to have a maximum depth of the order of 30 to 40 metres. The source is again disseminated or electrically discontinuous, but is *weakly* conductive with respect to the enclosing rocks.

The higher geochemical values observed at 5180N are not coincident with any major induced polarization response on either this, or the lines either side. However, Zone 'E' lies on the *geophysical* strike to this response. A shallow westerly pitch could conceivably relate the two.

LINES 27E AND 28E

After the clearly inferred grid east-west strike of lines 24E to 26E inclusive, the complete dissimilarity in profile form on this line indicates a change in strike or a transverse fault through the area. As lines 27E and 28E show similar form and an inferred east-west strike, a transverse fault direction is the preferred interpretation. The suggested resistivity and chargeability correlations are as shown on the data profiles. The chargeability anomalies of most interest are discussed below.

ZONE 'H' and 'I':- These two zones are seen on lines 27E and 28E at 4820N and 4860N, and at 4800N and 4850N respectively. They form the most prominent chargeability anomaly located in the area. The inferred strike is clearly grid east-west between these two lines. Pole-dipole detail has confirmed the interest of these zones on line 27E. The indicated depths to source are for 'H', 50 - 60 metres and for 'I', 20 metres. On line 27E the higher chargeabilities are associated with lower apparent resistivities, inferring weak conduction from within the disseminated and/or, if massive, electrically discontinuous source. On line 28E the zone shows no contrast with the enclosing rocks. Zone 'I' on the other hand shows a weakly conductive source on line 28E, but no contrast with the enclosing material on line 27E.

On line 27E there is no coincident geochemical response, and there is no data on line 28E over the critical sections. On a *geophysical basis alone* the anomalies are judged to be of primary to secondary interest.

Other anomalies on lines 27E and 28E are considered of relatively minor interest, however, the occurrence of significant geochemical soil anomalies clearly enhance them greatly.

ZONE 'J':- A series of high geochemical samples on lines 26/5E, 27/5E and 28E centred at 4920N, 4950N and 4950N to 4970N, are considered to be judged to be the same zone *as indicated by the strike of the major resistivity and chargeability units.* It is perhaps significant that Zone 'J' recorded at 4940N lies coincident with or down dip of these anomalies. The depth is judged to be shallow, less than 20 to 30 metres on both line 27E and 28E, and the source is either disseminated, or if massive, electrically discontinuous. The geophysical response as such is only of tertiary or secondary interest at best, but the coincidental geochemical response must improve their economic potential.

ZONE 'K':- A 3 and 5 millisecond above background response was observed on lines 27E and 28E at 5000N and at 5010N, on the latter with a coincidental fall in apparent resistivity. The profile shape infers (vaguely) a steep north dip, if so, the interest is much enhanced by the strong geochemical response observed coincident with the induced polarization response on line 27E. Generally higher than background geochemical values in lead were also seen over the somewhat larger response to the south. The maximum depth inferred is of the order of 20 to 30 metres.

ZONE 'N':- Broad very low amplitude responses of 2 to 3 milliseconds at 5300N ± 50 metres on line 27E and on line 28E at the same position, are coincident with a series of significant geochemical highs on line 27E. As geophysical responses the zone would be of tertiary interest, but the geochemically anomalous responses clearly enhance their interest- It is worth commenting that narrow "clean" (i.e. lack of disseminated sulphide halo) zones would in fact occur as "small" anomalies. The "size" of an induced polarization response as such is *never* an indication of economic potential. The latter *must always* be judged on its associated geological and/or geochemical environment.

LINE 29E

There is little similarity in profile form to the lines to east or west, thus no correlation with either is possible. There is a vague suggestion of an east west correlation but the features are not diagnostic. The form of each individual induced polarization response is described in detail below.

South of the baseline 5000N, backgrounds remain anomalously high at 12 to 15 milliseconds. As the observed levels to the east and west are lower, it could be that the line is semi-parallel over that section (between 5000N and 4870N) to a more chargeable unit.

ZONE 'P':- The only significant chargeability anomaly was located centred at 5100N (which *perhaps* also occurs on line 30E at 5110N). The source is disseminated sulphides and/or graphite as the apparent resistivity is somewhat higher than background. As there is no coincident geochemical soil anomaly either on this line or on any projected strike direction, the anomaly is of little economic interest.

LINE 30E

Although there is little if any correlation in profile form between lines 29E and 30E , there is a strong suggestion of a grid north-east/south-west strike direction around 5500N between lines 30E and 31E.

ZONE 'Q':- The most significant chargeability response seen on this line, and perhaps in view of its geochemical correlation, in the whole area, was located at sample location 290781/2 (5410N). The 8 milliseconds above background anomaly is not only coincident with a 70% decrease in apparent resistivity to 1000 ohm-metres, but also is coincident with a 390ppm lead soil anomaly. The maximum depth to the top of the chargeable source is assessed to be of the order of 25 to 30 metres. The source cannot be considered "conductive" as such, but it is significantly more conductive than the enclosing rocks. Therefore, if massive, the sulphide source is electrically discontinuous. This anomaly is strongly recommended for further investigation by diamond drilling. The source is inferred to strike north-east to cross line 31E at, or about, 5500N (See below).

ZONE 'R':- A chargeable response of the same order as Zone 'Q', but coincident this time with apparent resistivities of three fold those associated with Zone 'Q', was defined some 40 metres north of Zone 'Q' at 5450N. This anomaly could lie within the disseminated halo around Zone 'Q', or be separate from it. Unlike Zone 'Q', there is no associated soil anomaly.

ZONE 'S':- A sharp and distinct 7½ millisecond anomaly was defined at about 4990N. A coincident low amplitude (170ppm) lead soil anomaly was recorded, with 200ppm values

20 and 40 metres north of the baseline. The maximum depth of this disseminated source is 20 to 40 metres. Careful ground follow-up along and across strike is recommended.

ZONE 'P'(?):- An 8 millisecond above background anomaly was recorded from a resistive source centred at about 5100N. The interpreted "wide" source makes a depth estimate difficult, but the source is no deeper than 50 metres. There is no coincident or on-strike geochemical association.

LINE 31E

The inferred strike is north-east/south-west between lines 30E and 31E. There is only a suggestion of north-east/south-west strike between 31E and 32E.

ZONE 'Q':- The most significant anomaly was about 5 milliseconds above background coincident with a 50% fall in apparent resistivity centred at about 5500N (292333/293010). The maximum depth is assessed to be of the order of 30 metres to this weakly conductive source. To the immediate south of the peak, but still within the anomaly, high (to 390ppm) lead soil geochemical responses were recorded (sample positions 292331 and 292332). This is an extension of the anomaly located on the previous line and is of secondary *geophysical* interest.

Other minor responses 'S'(?) and 'P'(?) are not considered of major interest.

LINE 32E

There is no correlation between this line and those to the east and west.

Assuming the background to be about 10 milliseconds, a number of minor responses were recorded together with three anomalies of secondary interest, each of which is described below.

ZONE 'T':- A 5 to 6 millisecond response was recorded centred at 5500N. The profile form suggests a north dip, while the maximum depth to the source is about 40 metres. If the dip is as indicated, the slightly higher geochemical values observed at about 5425N (maybe?) have significance.

ZONE 'U':- A 4 to 5 millisecond response from a resistive source defined at about 5600N lies in close proximity to an 8 to 10 times background lead soil anomaly. This enhances the interest of this zone. The maximum depth is interpreted to be 40 metres.

LINE 33E

To the immediate north of the 5500N control line chargeability values were 3 to 4 milliseconds above the 12 milliseconds background, with individual minor peaks being recorded at 5525N (V) and 5565N (W). There is no associated geochemical response with Zone 'V' although Zone 'W' was coincident with the commencement of a geochemical anomaly which the survey line did not cover to the north. This anomaly deserves further geochemical and perhaps geophysical follow-up.

CONCLUSIONS AND RECOMMENDATIONS

1 - The inferred strike on lines 24E to 28E inclusive, is grid east-west with a major discontinuity between lines 26E and 27E.

2 - West of line 28E the chargeable sources located in this survey are judged to be lensoidal and of limited (100 to 200 metres) strike length, striking grid east-west, and conformable to the strike *as interpreted* from the resistivity data. A very slight recontouring of the geochemical data produces a conformable picture, however, the reverse does not apply.

3 - A number of chargeability anomalies are either coincident with, or in close proximity to (down dip of), or along the projected strike of significant geochemical soil anomalies. Some detailed assessment of the geological and geochemical setting of each of the chargeability anomalies will have to be made prior to drilling on all but one of the significant

apparent correlations.

4 - One major chargeability and coincident geochemical response located at 5410N (290781/2) on line 30E stands out from all others and is strongly recommended for consideration as a diamond drill target.

5 - A comprehensive summary of all significant induced polarization responses is given below. The grading is assessed *wholly* on their *geophysical merit.* Their grading as possible economic targets is considered to be a matter for *geological assessment.*

Geophysical rating:- Py - primary interest
Sy - secondary interest
Ty - tertiary interest

On strike geochemistry marked *
Close proximity geochemistry marked **
Major coincident geochemistry marked ***

Grid Position	Sample Number	Maximum Depth	Zone	Geophysical Rating
24E/4640N	292095	30 metres	A	Sy
24E/4920N	292109	30 metres	C	Sy
24E/4860N	292106	30 metres	B	Sy
24E/5150N	292120/21	40 metres	E	Sy
24E/5270N	292129	20-30 metres	F	Ty

Grid Position	Sample Number	Maximum Depth	Zone	Geophysical Rating
25E/4620N	290661/62	?	A	Sy
25E/4820N	290651	30 metres	B	Sy
25E/4920N	299947	30-40 metres	C	Sy+
25E/5000N]	299951	20 metres	D	Sy/Ty
]				
25E/5040N]	299953	20 metres	D	Py/Sy*
26E/4630N	292236/7	20 metres	A	Py/Sy**
26E/4840N	292147	40 metres	B	Sy
26E/4900N	292150	?	C	Sy*
26E/5000N	292155	30-40 metres	D1	Sy
27E/4820N	292190/1	60 metres	H	Py/Sy
27E/4860N	292192/3	20 metres	I	Py/Sy
27E/4940N	292197	20-30 metres	J	Ty/Sy**
27E/5000N	292199/200	20-30 metres	K	Ty/Sy**
27E/5300N±50m	292212/14		N	Ty**
28E/4800N	no sample	40 metres?	H	Py/Sy
28E/4850N	no sample	20 metres	I	Py/Sy
28E/4940N	292222	20-30 metres	J	Ty/Sy**
28E/5010N	292225/6	20-30 metres	K	Ty/Sy*
28E/5300N±50m	292238/42		N	Ty**
29E/5100N	292269	40 metres	P	Ty
30E/5410N±	290781/82	25 metres	Q	Py***
30E/5450N	290783/4	25 metres	R	Sy
30E/4990N	290760/1	20-40 metres	S	Sy**
30E/5100N	290766	50 metres?	(P?)	Sy
31E/5500N	292333/010	30 metres	Q	Py/Sy**

Grid Position	Sample Number	Maximum Depth	Zone	Geophysical Rating
32E/5500N	292368	40 metres	T	Sy/Ty
32E/5600N	293035	40 metres	U	Sy/Ty**
33E/5525N	292412/3	30 metres	V	Ty/Sy
33E/5565N	292414/5	?	W	Ty/Sy**

NORTH LOYETEA

The data profiles are presented on Plate 2.

The general geological strike in the area as ascertained from mapping and auger sampling, is grid north-east/south-west. The nature of the resistivity data and chargeability data in the area precluded any truly diagnostic interline correlation. The interpreted correlation between lines is shown on the profiles alphabetically for chargeability and numerically for resistivity.

Each line is discussed separately below.

LINE 18E

This, the most westerly line surveyed, shows no clear correlation with line 19E although the distinct resistivity low centred at 5950N *may* correlate to the low centred at 6010N on line 19E.

This would infer a grid north-east strike between lines 18E and 19E.

ZONE 'A':- A significant 7 - 8 millisecond anomaly was located at about 6100N (sample numbers 292846/8). The source has no resistivity contrast with the enclosing material and is thus interpreted as being disseminated in origin. The profile form suggests a north dip to the source which itself lies in close proximity to two to three times background lead soil values. The maximum depth to source is considered to be of the order of 20 to 25 metres.

ZONE 'B':- A 3 to 4 millisecond anomaly centred at 6180N wholly within a resistive zone, has a profile shape which suggests a shallow north dip. The source is disseminated sulphides (or graphite) at a maximum depth of 20 metres or so.

Abnormally *LOW* chargeability values were recorded either side of the 6000N baseline. At stations 292851 to 292854 the chargeabilty approaches zero. As this lies in the vicinity of a sharp resistivity change and high geochemical values, further careful ground follow-up is recommended.

LINE 19E

There is very little correlation between lines 19E and 18E, however, the resistivity data strongly suggests a grid ENE-WSW strike. The suggested resistivity correlation is shown in numerals on the profile, while the proposed chargeability correlations are shown alphabetically.

ZONE 'C':- The most significant response was of 7 to 8 milliseconds above the background of 3 to4 milliseconds situated within a 70% depression in resistivity centred at 6000N. This characteristic response was clearly seen on line 20E also, almost due east. The maximum depth to the source is difficult to gauge, but is of the order of 40 metres. The response is broad and it is not possible to gauge the attitude. This response is mirrored by the highest (160ppm) soil lead values occurring over the highest chargeability. The secondary to primary geophysical priority is much enhanced by the associated geochemical response and is thus recommended for close ground follow-up.

ZONE 'D':- This anomaly is of the same order as that previously described, *but* is associated with a *more resistive* source, centred at 6060N, and lies within a high geochemical halo (120ppm lead). This may represent the truly disseminated halo around the more massive, *but electrically discontinuous* Zone 'C'.

ZONE 'E':- A very slight increase in chargeability of a few milliseconds above the 3 to 4 millisecond background was noted at 6380N. However, a substantial 90% fall in apparent resistivity over this zone indicates a moderately *conductive* and *chargeable* source. The depth may be as great as 40 metres. From the standpoint of an *induced polarization* anomaly, it is of tertiary interest at best, however, the substantial decrease in apparent resistivity together with the fact that the zone lies within a higher than background lead soil geochemical halo, and only some 30 metres south of a 180 ppm lead peak, enhances the possible economic interest.

This feature was also recorded due east within an enhanced geochemical response. The inferred strike is therefore east-west and not north-east/south-west.

LINE 20E

As mentioned above, the strike between 20E and 19E is grid east-west, while the strike inferred from the resistivity data to the east of this line is grid north-east/south-west. The possible correlation is shown on the profiles.

ZONE 'C':- This response of 7 milliseconds above background shows two peaks at 5980N and 6020N, wholly within a 50% reduction in apparent resistivity to about 1000 ohm-metres. Thus, although the source is weakly conductive the source is considered to be disseminated or, if massive, electrically discontinuous sulphides. The depth to source on the southern flank is estimated to be of the order of 30 metres. The soil geochemistry remains above 160ppm over this response and records a high 250ppm coincident with the highest chargeability reading at 5980N. This anomaly is considered to be of primary interest.

ZONE 'E':- The 90% - 95% decline in apparent resistivity centred at 6360N is accompanied by only slightly higher chargeability. However, as high geochemistry was observed over this section, and particularly over the more resistive rocks either side of the low (less subject to leaching?), this anomaly deserves careful ground follow-up in spite of its tertiary rating as far as geophysical data is concerned.

ZONE 'F':- A relatively minor induced polarization high of some 4 milliseconds above background was defined at 6260N (292854) accompanied by a 40% reduction in apparent resistivity to 2000 ohm-metres. The depth to source of this apparent south dipping source is 30 to 40 metres at most, and while the interest from a soley geophysical standpoint is tertiary or secondary at best, the accompanying high soil geochemistry must much enhance its possible economic interest.

LINE 21E

A tentative correlation between this line and line 20E is suggested on the profiles. The strike appears to be approximately grid north-east. To the east it is not possible to indicate any correlation whatsoever.

ZONE 'C':- Increased chargeability of 3 milliseconds above background together with decreased resistivity may represent the eastern extension of Zone 'C' at 6090N. This response is of tertiary geophysical interest at best. This response lies within generally high soil lead values of the order of 200ppm.

ZONE 'F':- On the junction of two gradient blocks near sample 292763, higher chargeability was recorded. However, as this is a single point anomaly, only additional work would be able to confirm its interest. High geochemical values of up to 300ppm in lead, were recorded some 30 metres north of the source. A south dip, if present, would improve the economic potential of this anomaly.

Higher geochemical soil values to 320ppm centred at 6160N were not reflected by any coincident increase in induced polarization response. However, a slight increase was noted at 6130N.

LINE 22E

In spite of several high lead soil anomalies to 800ppm, no truly significant induced polarization responses were recorded although very minor peaks *may* be related. Should sulphide mineralisation *in-situ* be the source of this geochemical response, then it would have to be narrow and carry minimal dissemination.

ZONE 'M':- Anomalous chargeability values of about 2 to 3 milliseconds above the low 4 millisecond background were observed between 6590N and 6630N. A very minor depression in the somewhat high (2000 ohm-metres) resistivity background was noted. The source is certainly of a disseminated nature and of tertiary to secondary geophysical interest only. Slightly higher than background lead soil values of 110 - 130ppm (as against 65ppm) were observed over the higher induced polarization response. This may increase the potential economic interest.

ZONE 'O':- A very slight 2 millisecond response was observed at 6080N which occurs within an area of generally high (160 ppm ±) lead soil geochemistry. From a geophysical standpoint the anomaly is of tertiary interest at best.

LINE 23E

A minor 3 millisecond response recorded at 6230N interpreted to be caused by a disseminated source at a depth no greater than 20 metres, is not considered significant.

LINE 24E

ZONE 'G':- A single point anomaly of 6 to 7 milliseconds in close proximity to sample 292560 associated with high resistivity, is considered to be of tertiary to secondary interest only. The maximum depth is less than 20 metres and the source is "narrow". No clear correlation with soil geochemistry is seen.

ZONE 'H':- High geochemical values to 400ppm noted just south of the 6500N control line were not found to be coincident with high chargeability. However, higher chargeabilities for some 20 metres either side of 6560N may be related.

LINE 25E

Although the resistivity data does not shown any clear cut correlation with other lines, the chargeability data does suggest a strike similar to that indicated on the geochemical contour plan, i.e. grid north-east/south-west.

ZONE 'G':- A single point 5 to 6 millisecond chargeability response associated with no material change in resistivity, was located centred at 6450N. The narrow disseminated source is interpreted as having a depth of about 20 to 25 metres, and has been correlated with a similar response on line 24E at 6360N.

ZONE 'I':- Two responses of 5 and 3 milliseconds were recorded at 6690N and 6730N associated with no material change in resistivity and considered to be of secondary and tertiary geophysical interest only. However, the extremely high and coincident geochemical lead soil values to 1700ppm associated with the form, mark it out of particular interest. Careful ground follow-up is recommended.

ZONE 'J':- A relatively minor 4 millisecond chargeability response was located at 6810N. There was no material change in apparent resistivity but to the immediate north, lead soil values of up to 490ppm were recorded. The maximum depth to this disseminated, or if massive, electrically discontinuous source, is about 40 metres. Careful ground follow-up of this response is recommended.

LINE 26E

There are two significant induced polarization anomalies which were located on the northern extremity of this line within a generally high geochemical background.

ZONE 'K':- A four millisecond anomaly with no associated resistivity low was recorded at 6940N. This anomaly may be related to Zone 'J' on line 25E if the strike as indicated on the geochemical contour plan is correct. The maximum depth to the disseminated source is estimated to be of the order of 25 metres or so, and there is no clear indication as to possible dip. Soils over this section vary about 170ppm in lead.

ZONE 'L':- This well defined 5 to 7 millisecond above background anomaly was located from a source at or about 6990N within a zone of high lead soil background. A decrease in apparent resistivity infers the source to be weakly conductive relative to the enclosing rock types. The maximum depth is considered to be of the order of 35 metres.

Both Zones 'K' and 'L' warrant careful consideration due to their associated high lead soil backgrounds.

LINES 27E and 28E

There are no significant induced polarization anomalies on either line.

CONCLUSIONS AND RECOMMENDATIONS

1 - The resistivity data permitted only a limited interpretation of the geological strike to be made due to the lack of "marker horizons". In the west the strike direction is clearly grid east-west between lines 19E and 20E, while

to the east of 20E, the strike appears to trend north-east. From 21E to the east, the apparent resistivity shows less and less relief.

2 - Contrary to first impressions there are a number of induced polarization anomalies which although of secondary *geophysical* interest, are, by virtue of their associated geochemical soil values, of prime economic significance. It should be noted that the size of a geophysical response is not nearly as significant as its associated geochemical and structural setting. For instance, lead-zinc rich massive sulphides with little or no disseminated halo and of narrow width, would not be expected to produce "large" anomalies. Thus, even "small" anomalies should be carefully examined with this possibility in mind.

3 - The most significant induced polarization anomalies are listed below. The grading is *wholly geophysical.*

Their possible economic significance must be discussed on purely geological and geochemical grounds.

Geophysical rating:- Py - Primary
Sy - Secondary
Ty - Tertiary

On strike geochemistry marked *

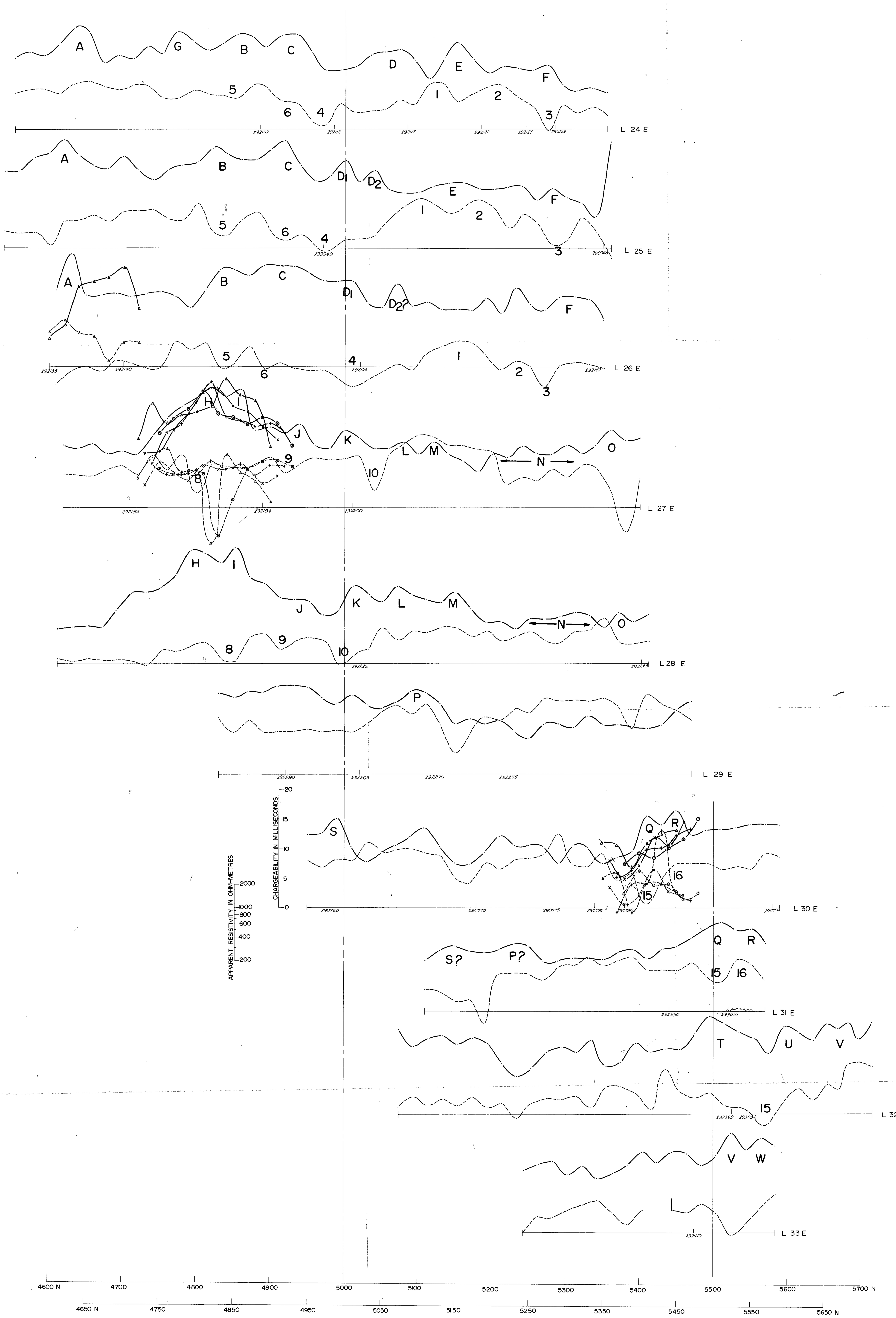
Close proximity geochemistry marked **

Major coincident geochemistry marked ***

Grid Position	Sample Number	Maximum Depth	Zone	Geophysical Rating
18E/6100N	292846/8	25 metres	A	Sy/Py*
18E/6180N	292844	20 metres	B	Sy
19E/6000N	292805/8	40 metres	C	Sy/Py***
19E/6060N	292804	40 metres	D	Sy*
19E/6380N	292788	40 metres	E	Ty**
20E/5980N]]	292868/9	30 metres	C	Py***
20E/6020N]	292866/7	?	C	Sy/Py**
20E/6380N	299848/9	40 metres?	E	Ty**
20E/6260N	299854/5	30-40 metres	F	Sy/Ty*
21E/6090N	292752/3	20 metres	C?	Ty**
21E/6350N	292763	20 metres?	F?	Ty*
22E/6590N/ 6630N	292725/ 292728		M	Ty/Sy*
22E/6080N	292706		O	Ty*
24E/6360N	292560	20 metres	G	Ty/Sy
24E/6560N±20m	292536	20 metres	H	Ty/Sy*
25E/6450N	290700	20 metres	G	Sy
25E/6690N]]	291523	40 metres	[I [	Sy***
25E/6730N]	291525	40 metres	[	Ty*
25E/6810N	292431	40 metres	J	Ty/Sy**
26E/6940N	292445/6	25 metres	K	Sy*
26E/6990N	292443	35 metres	L	Sy/Py

27E and 28E No significant anomalies

1645



LEGEND

CHARGEABILITY IN MILLISECONDS : 2 cm = 5 milliseconds
BASE LEVEL = 0 milliseconds
SYMBOL = ———
n = 1 —Δ— / n = 2 —x— / n = 3 —+— / n = 4 —o— } Pole-Dipole

RESISTIVITY IN OHM-METRES : 5 cm = 1 logarithmic cycle
BASE LEVEL = 1000 ohm-metres
SYMBOL = - - - -
n = 1 --Δ-- / n = 2 --x-- / n = 3 --+-- / n = 4 --o-- } Pole-Dipole

75-1142

C.R.A. EXPLORATION PTY. LIMITED

LOYETEA SOUTH
EL 19/72
NORTHERN TASMANIA

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

SURVEYED & COMPILED BY
SCINTREX PTY. LTD.
DEC. 1975

480041

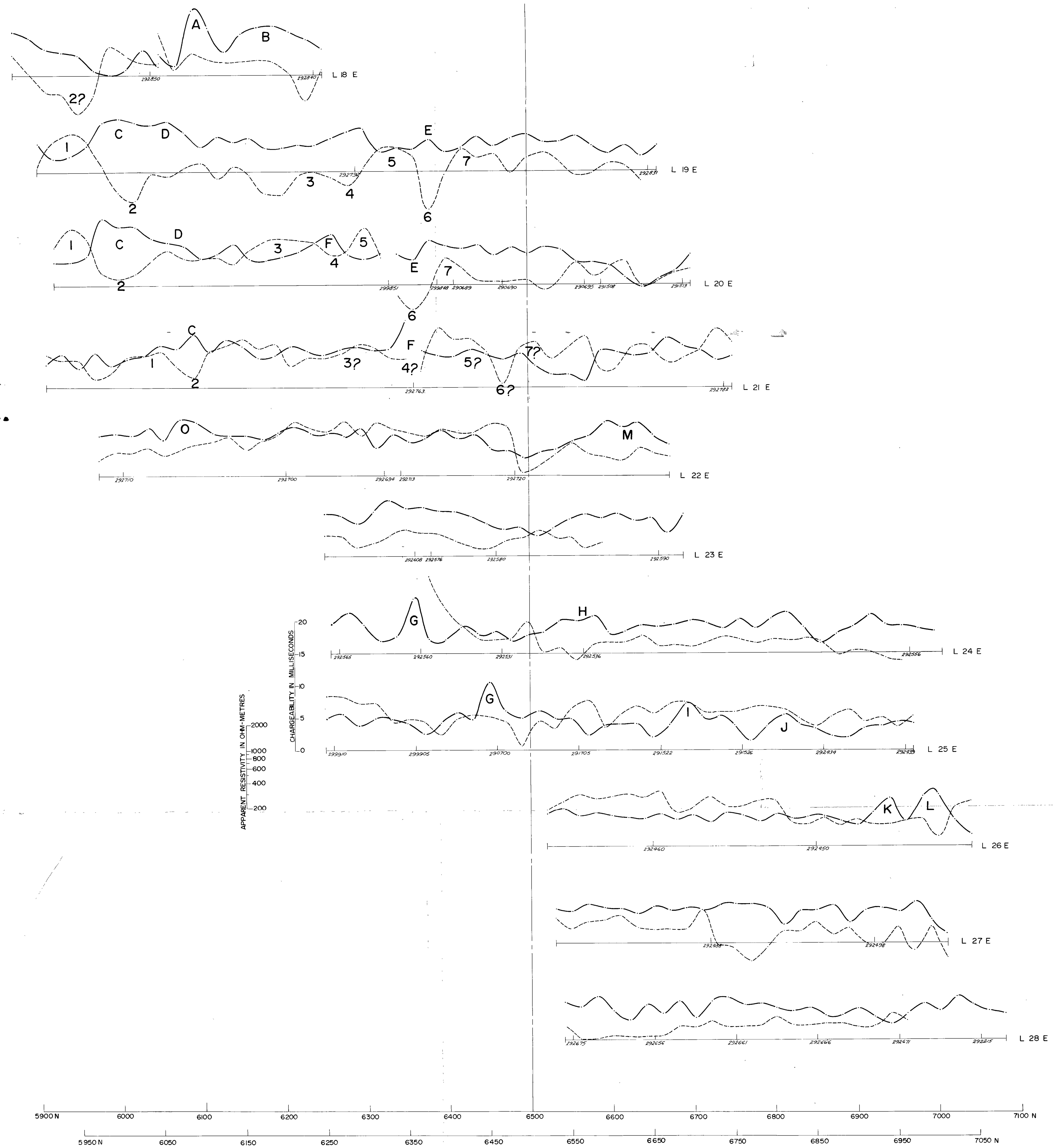
50 0 50 100 150 metres
1 : 2000

5 cm

JOB No. TAS. 030B SHEET 1 of 1 PLATE 1

1645

1646



LEGEND

CHARGEABILITY IN MILLISECONDS : 2 cm. = 5 milliseconds
BASE LEVEL = 0 milliseconds
SYMBOL = ·———

RESISTIVITY IN OHM-METRES : 5 cm. = 1 logarithmic cycle
BASE LEVEL = 1000 ohm-metres
SYMBOL = -·-·-·-

75-1142

C.R.A. EXPLORATION PTY. LIMITED

LOYETEA NORTH
EL 19/72
NORTHERN TASMANIA

GRADIENT ARRAY
ELECTRICAL INDUCED POLARIZATION SURVEY
DATA PROFILES

SURVEYED & COMPILED BY
SCINTREX PTY. LTD.
DEC 1975

480042

50 0 50 100 150 metres

1 : 2000

5 cm

JOB No. TAS. 030 B SHEET 1 of 1 PLATE 2 1646