DEPARTMENT OF MINES
SOUTH AUSTRALIA

INDUCED POLARIZATION AND RESISTIVITY SURVEYS - KIA ORA AND SOUTH DAM PROSPECTS

Caroona and Mongolata 1:63 360 sheets

by

R.G. NELSON

and

W.E. WIGHTMAN
Geophysicists
Exploration Geophysics Section

Rept.Bk.No.72/201
G.S.No.4967
D.M.No.897/72

7th November, 1972

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PLANS

DEPARTMENT OF MINES
SOUTH AUSTRALIA

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INDUCED POLARIZATION AND RESISTIVITY SURVEYS - KIA ORA AND SOUTH DAM PROSPECTS

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ABSTRACT

Resistivity depth probes made at points on a 1500 m grid in the Kia Ora area have been interpreted to give estimates of the depth of burial of granite which is thought to be an extension of the Bendigo granite.

Further to the south, near South Dam, where a rotary drill hole intersected anomalous concentrations of copper (at a depth of 110 m) a short distance above biotite granite, two depth probes and a number of induced polarization traverses have been made. Anomalous zones were detected: these warrant further investigation.

INTRODUCTION

Extensions of the Palaeozoic granite which is exposed at Bendigo (BURRA 1:250 000 sheet) were believed to exist, overlain by alluvium, to the south. It was thought that aeromagnetic anomalies outlined the areas of suspected granite.

A drilling programme was initiated in May, 1972 to determine whether granite underlies these areas and to examine the feasibility of completely grid drilling the prospects (Langsford, 1972). Six holes were drilled (rotary drilling), three in each area. A limit of 120 m maximum depth of hole was imposed.

Of the three holes drilled in the Kia Ora area only one, KR1, intersected weathered granite (at 38 m - total depth of hole, 48 m). KR2 and KR3 passed through a sequence of clays underlying sands and were completed at 120 m without intersecting bedrock.

In the South Dam area drill holes SR1 and SR2 were completed at 120 m in green fossiliferous clays underlying sands and gravels. However, SR3 intersected slightly weathered biotite granite at a depth of 116 m, and in this hole copper anomalies of 250 p.p.m. and 300 p.p.m. were detected at 105-111m.

As a result of this work the following recommendations were made:

(1) that the northern part of the Kia Ora area be tested by rotary drilling to weathered granite on a 1500 m grid;

(2) that the copper anomaly detected in SR3 be investigated more closely.

To aid in siting drill holes in the Kia Ora area it was proposed that a number of resistivity depth probes be made over the 1500 m grid to obtain some estimates of depth to granite under the alluvium.

Induced polarization traverses were recommended for the area around drill hole SR3 to test for possible mineralization.

PREVIOUS GEOPHYSICAL WORK

In 1960 the Bureau of Mineral Resources conducted an air-borne magnetometer survey of the area. Nominal flight line spacing was one mile, and lines were flown at a height of 500 feet above ground level. The contoured map of total magnetic intensity shows two positive magnetic zones, outlined by the 1000 gamma contour lines, which have been interpreted as being due to granite bodies (see Plan No.72-927). The Bendigo granite occurs at outcrop in the northernmost part of the northern magnetic zone. The zones are characterized by steep gradients at the edges rising to a generally smooth plateau of about 1300 gammas which covers most of each area.

Resistivity depth probes had already been made in each area as preliminary investigations before the initial drilling programme (Nelson, 1972). Their interpretation indicated overburden to be generally greater than 25 m and often deeper than 150 m.

FIELD METHODS

(1) Kia Ora Prospect

A base line running north-south and pegged at intervals of 500 m has been established in the area. The starting peg is located on the main Burra-Kia Ora road about 2 km west of Kia Ora homestead and has been assigned arbitrary grid co-ordinates of (10000N, 10000E). Aerial photographs enlarged to a scale of about 1:26 900 were used to establish points on the grid away from the base line.

The method of vertical electrical soundings (VES) was used to estimate depth to granite at various points established on the grid. The VES made in the Kia Ora area are numbered NK1 to NK56 and their positions are shown on Plan No.72-927.

Both the Schlumberger and the equatorial dipole-dipole electrode arrays were used in making the soundings. The equatorial dipole-dipole array is a special case of the azimuthal array (see Plan No.S9364). It can be shown (Al'pin et al., 1966, p.19) that values of apparent resistivity measured by the azimuthal array are equivalent to those measured by the Schlumberger array, provided a horizontally-bedded earth is assumed.

In making the measurements a square wave current was introduced into the ground through the current electrodes by means of a Geoscience Incorporated Induced Polarization transmitter. The potential difference between the potential electrodes was measured using a McPhar P660 Induced Polarization receiver which is capable of measuring signals at frequencies of 3 hz or 0.3 hz. Since it is easier to read signals at 3 hz, this was the frequency used throughout the survey. However, voltages for the last few points in each sounding were also measured at 0.3 hz to test for the so-called "skin effect" (see Kunetz, 1966, p.8).

Values of apparent resistivity were calculated and plotted in the usual way as a function of the current electrode spacing. Standard curves are available for interpreting such resistivity graphs (Orellana and Mooney, 1966).

(2) South Dam Prospect

A base line running north-south and pegged every 500 m has been established. The base line is defined by grid co-ordinate 10000E.=

Rotary drill hole SR3, which intersected granite, has grid coordinates (6500N, 10000E). To test the copper anomaly found in this hole three induced polarization traverses were made along lines 5500N, 6500N and 7500N. Each traverse was 4.4 km long, the middle of each traverse being on the base line at 10000E. The traverse lines were pegged at 150 m spacing using theodolite and chain.

Induced polarization measurements were made in the frequency domain using the polar dipole-dipole configuration and a dipole spacing of 150 m. Readings were made at frequencies of 3 hz and 0.3 hz. Current was introduced into the ground using an Austral Induced Polarization Transmitter and the frequency effects and voltages were measured on a McPhar P660 receiver.

As a consequence of this work four more I.P. traverses were made:

(a) on line 5300; Tx from 10000E to 11200E;
150 m dipole spacing;

(b) on line 5700N; Tx from 10000E to 11200E;
150 m dipole spacing;

(c) on line 5600N; Tx from 10000E to 11200E;
150 m dipole spacing;

(d) on line 5500N; Tx from 10000E to 11200E;
300 m dipole spacing.

Two vertical electrical soundings, SD1 and SD2, were made, one at grid co-ordinates (5500N, 10300E), and one at the site of drill hole SR3.

RESULTS AND INTERPRETATION

(1) Kia Ora Prospect

The results of VES NK3 (made at the site of drill hole

KR1) are shown in Plan No.72-933 together with their interpretation. There is good agreement between the theoretical curve for the interpreted model and the experimental data. If we compare the interpreted model with the drill hole geological log we can see that there is good agreement for the first 20 or 30 m. However, it appears that either there is no resistivity contrast between the clay underlying the sand and gravel bed and the weathered granite, or else that the resistivity contrast between the two is so slight that the effect it must have on the resistivity curve cannot be measured within the limits of experimental error. Accordingly, we would accept a depth to weathered granite of 22 m here and say that the weathered granite has a resistivity of 8.8 ohm metres. It is also worth noting that various combinations of thicknesses and resistivities (with constant conductance) for the sand and gravel layer produce theoretical curves very similar to the one shown and that the values of 8 m and 36 ohm metres were adopted because they gave the best agreement with the drilling data.

The depth of weathering in the granite seems to be of the order of 94 m which seems rather high. No allowance has been made for a continuous increase in the resistivity of the weathered zone (which would seem to be a valid assumption to make) and this may have resulted in an over estimate. The estimate of total depth to fresh granite of 116 m can be checked however, by multiplying the total longitudinal conductance,s, of the section by the average resistivity derived by radial transformation of of the sounding curve (see footnote). This gives an estimated total depth of 12.0 x 7.1 = 85.2 m.

It seems safe, therefore, to conclude that

(a) the resistivity of the sand and gravel section is of the order of 30 - 40 ohm metres,

(b) the resistivity of weathered granite is of the order of 10 ohm metres, and

(c) the depth of weathering may be as much as 60 - 100 metres.

These conclusions have been used to aid in the interpretation of the remaining depth probes done in the Kia Ora area.

The results from interpretations of these are presented in Plan Nos.72-929, 72-931, and 72-932, representing respectively values of total longitudinal conductance,s, depths to weathered granite and depths to unweathered granite. Plan No.72-930 lists the interpretations derived.

In each case the conductance value,s, was derived graphically and can be regarded as an independent estimate of the sum of the conductances of all layers above basement. If the conductance pattern of these layers changes little throughout the area then the S map can be regarded as an expression of basement relief in the area.

It is readily seen that all three maps present a similar

Footnote: It is shown in Al'pin et al., 1966, p.107, that a radial sounding curve for a 3-layer H-type section is characterized by a minimum value of apparent resistivity which is nearly equal to the average longitudinal resistivity for the layers above basement, provided $h_2/h_1 > 3$, compared with a limit of $h_2/h_1 > 9$ for the corresponding Schlumberger curve. See Al'pin et al. for further details.

picture. Two basement highs are prominent on every map, one in the north-east corner running north-south with its axis coincident with line 11500E and finishing near 17500N, and the other trending north-east between grid co-ordinates (16000N, 7000E) and (17500N, 8500E). The first of these coincides with an elongated high in the aeromagnetic contours of the area (see Plan No.72-928): outcrops of granite also occur within it near (21500N, 11500E). The second is characterized by high values for the resistivities of layers interpreted as weathered granite (see results for NK10 and NK15). It is suggested that granite here may have been buried only recently and that it may perhaps have undergone silicification in Tertiary times.

Two more points are worthy of note:

(a) the positions of depth probes where the sand and gravel bed seems to occur are shown on Plan No.72-931. This may be of use if any search is begun for sedimentary uranium deposits;

(b) nearly every resistivity curve shows a sharp turning point just before the curve approaches the 45° asymptote characteristic of an insulating basement. This can be explained by postulating that there is a water-saturated low resistivity layer of weathered granite immediately overlying the fresh granite.

(2) <u>South Dam Prospect</u>

Plan No.72-927 shows the location of I.P. traverses and depth probes in this area.

Values of apparent resistivity, frequency effect and metal factor are presented for each I.P. traverse in Plan Nos.72-934 to

72-936. A word of caution is advisable when considering the interpretation of these results. A fairly high resistivity layer (of about 250 ohm metres) near the surface (possibly calcrete) made it difficult when making the measurements to get more than 2 amperes of current into the ground. At the same time, the low resistivities of the underlying clays meant that the measured signal was very low, particularly for separations of more than 3 dipole spacings between transmitting and receiving electrodes. Under these circumstances it is difficult to achieve a stable null point on the voltmeter potentiometer due to random telluric currents and hence the frequency effects measured at these spacings are in some doubt. If the values of frequency effect shown are expected, an examination of each set of diagrams does reveal anomalous zones which display a fairly consistent north-north-west trend across the grid (see Plan No.72-927). The shapes of the anomaly patterns are reasonably consistent with each other and are similar to those for theoretical case FBC-3 given in Geoscience Incorporated Induced Polarization Resistivity Cross-Sections Vol. II. This corresponds to a finite body of resistivity 10 ohm metres buried under a thickness of overburden equal to the dipole spacing (see Plan No.72-939).

Suggested drill holes to test these anomalies are at grid co-ordinates:

10300E on line 5500N,
10500E on line 5700N,
8800E on line 7500N,
and 9400E on line 6500N,
in that order of priority.

The results of depth probe SD2 made at the site of drill hole SR3 are shown in Plan No.72-937 together with the interpreted model and the drill hole geological log. Agreement is seen to be good. It appears that the fossiliferous clays overlying the granite have higher resistivities than the granite which is surprising, as the granite was reported to be fresh to slightly weathered. It is possible that the granite may be jointed with water saturating the joints. Depth to completely unweathered granite seems to be of the order of 220 m.

Depth probe SD1 was made at co-ordinates (5500N, 10300E) to estimate the depth to granite here. It was run in a north-south direction. The apparent resistivity curve (see Plan No.72-937) is characterized by a sharp trough near the middle of the curve. If this is considered to be due to a low resistivity horizontal bed, then interpretation 'A' holds and the estimated depth to unweathered granite is 64 m. However, there is good reason to suspect that the trough is due to a lateral discontinuity (viz. a low resistivity lens beneath (5600N, 10400E) - see Plan No.72-935). If the trough is treated as being due to this and a thick bed of resistivity 16 ohm metres is assumed (see interpretation 'B' in Plan No.72-937) then a new estimate of the depth is 206 m. This estimate agrees with the estimate of 150 m from theoretical case FBC-3 above.

As the polar dipole - dipole array is a special case of a radial array we can take the average resistivity of the upper layers as being (say) 10 ohm metres (minimum apparent resistivity on I.P. diagram for (5500N, 10300E)), and, multiplying this by S = 12.5 for the total longitudinal conductance, arrive at yet another estimate of 125 m for depth to unweathered granite. A better estimate could be arrived at by using another spread at right angles.

It would be desirable to test the low resistivity lens at (5600N, 10400E), and a drill hole to say 100 m is suggested for this.

CONCLUSIONS AND RECOMMENDATIONS

(1) Kia Ora Prospect

It is believed that the maps presented give a reasonable estimate of basement relief in this area. Errors may arise in places where there is little resistivity contrast between clays and the underlying weathered granite, but overall the pattern seems to be consistent.

(2) South Dam Prospect

Given that there is some doubt about the frequency effect values measured in the I.P. survey due to measured voltages less than lmV there nevertheless seems to be a consistent anomalous trend in a direction north by north-west. The effect is strongest around line 5500N at 10300E. Drill holes have been suggested to test this. Should these drill holes show anomalous copper values, further investigation using I.P. methods is warranted. Some consideration should be given to changing electrode configuration to give stronger signals at the potential electrodes, however. It may be that the use of the time domain technique, measuring and averaging the results of coherent signals, is more suitable in areas such as this.

Any holes that are dilled in either of these areas should be logged geophysically to test for the possibility of uranium mineralization.

RGN,WEW:MFV
7th November, 1972

R.G. NELSON
and
W.E. WIGHTMAN
Geophysicists
Exploration Geophysics Section

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Al'pin, L.M., Berdichevskii, M.W., Vedrinsten, G.A. and Zagarminstr, A.W., 1966. Dipole methods for measuring earth conductivity; (transl. G.V. Keller), Consultants Bureau, New York.

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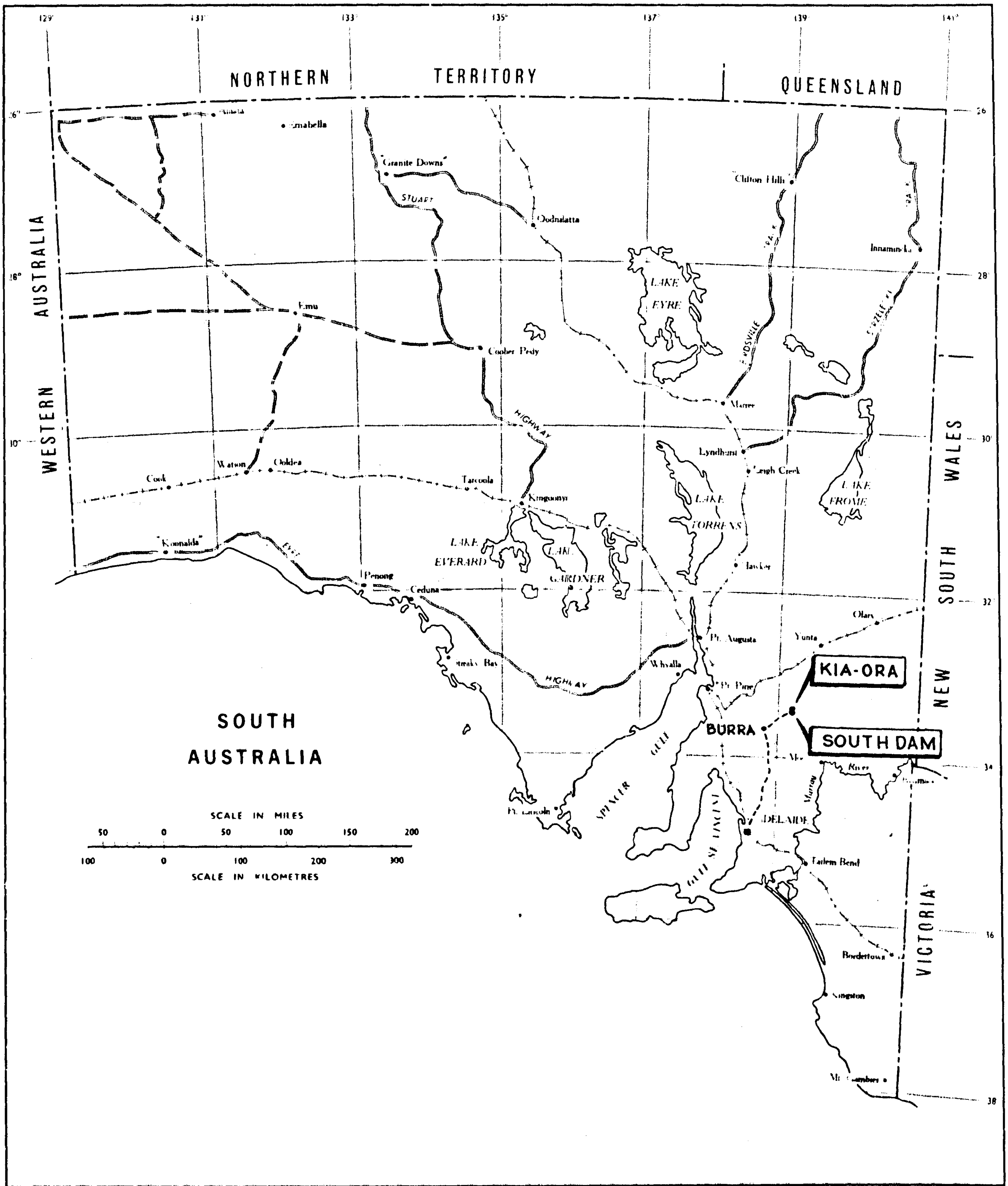


DEPARTMENT OF MINES —— SOUTH AUSTRALIA

Compiled R.J.S.

Drn. L.V.W. Chkd

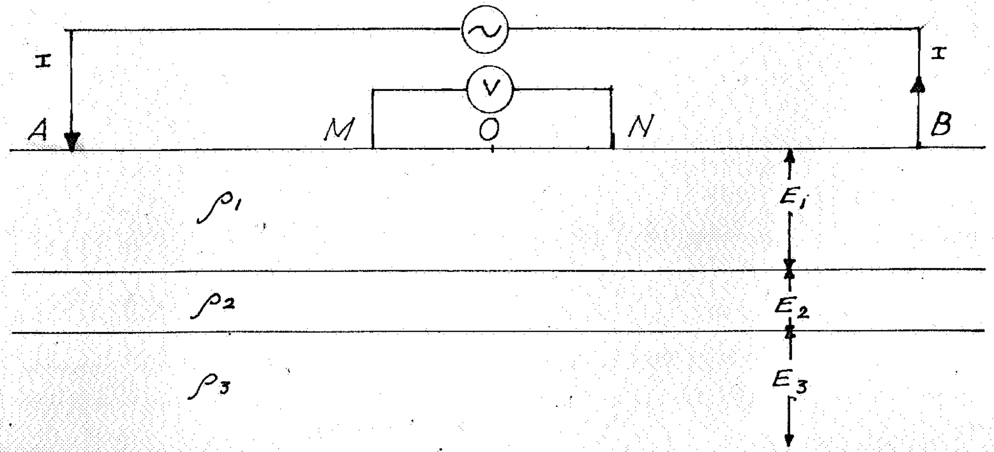
KIA-ORA & SOUTH DAM

LOCALITY PLAN

Date 29 JUN. 1972

Drg No S9894 Ge

SCHLUMBERGER ARRAY



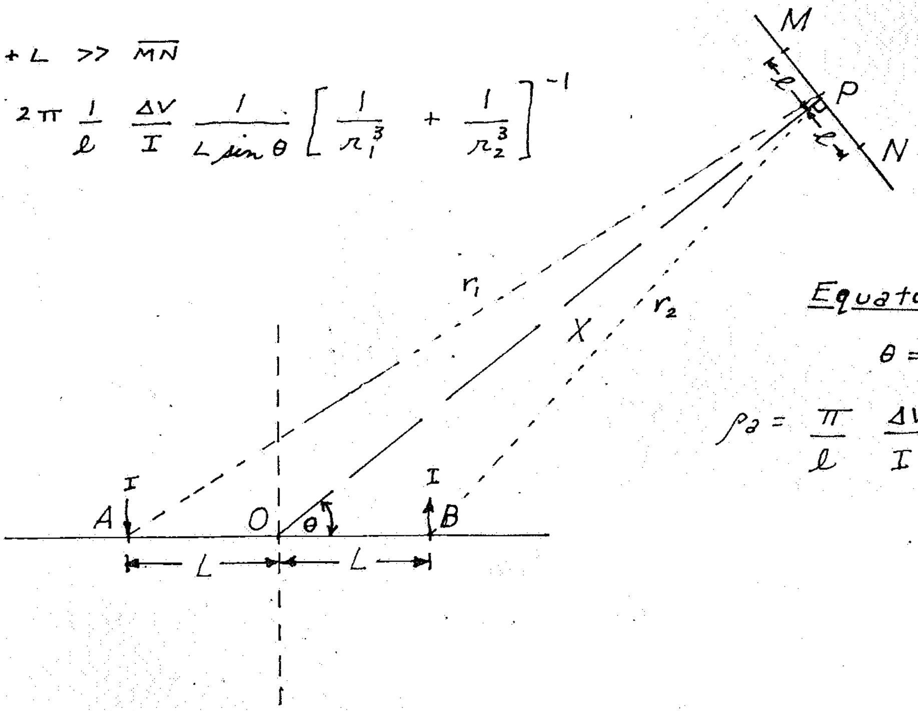
$AB/2 = L$; $L/\overline{MN} > 1 \cdot 5$

$$\rho_a = \pi \frac{\Delta V}{I}\left[\left(\frac{L}{\overline{MN}}\right)^2 - \frac{1}{4}\right]\overline{MN}$$

AZIMUTHAL DIPOLE ARRAY

$X + L >> \overline{MN}$

$$\rho_a \cong 2\pi \frac{1}{\ell}\frac{\Delta V}{I}\frac{1}{L\sin\theta}\left[\frac{1}{r_1^3} + \frac{1}{r_2^3}\right]^{-1}$$



Equatorial case:

$\theta = 90°$

$$\rho_a = \frac{\pi}{\ell}\frac{\Delta V}{I}\frac{(X^2 + L^2)^{3/2}}{L}$$

DEPARTMENT OF MINES – SOUTH AUSTRALIA

Scale:

Compiled: R. G. N.

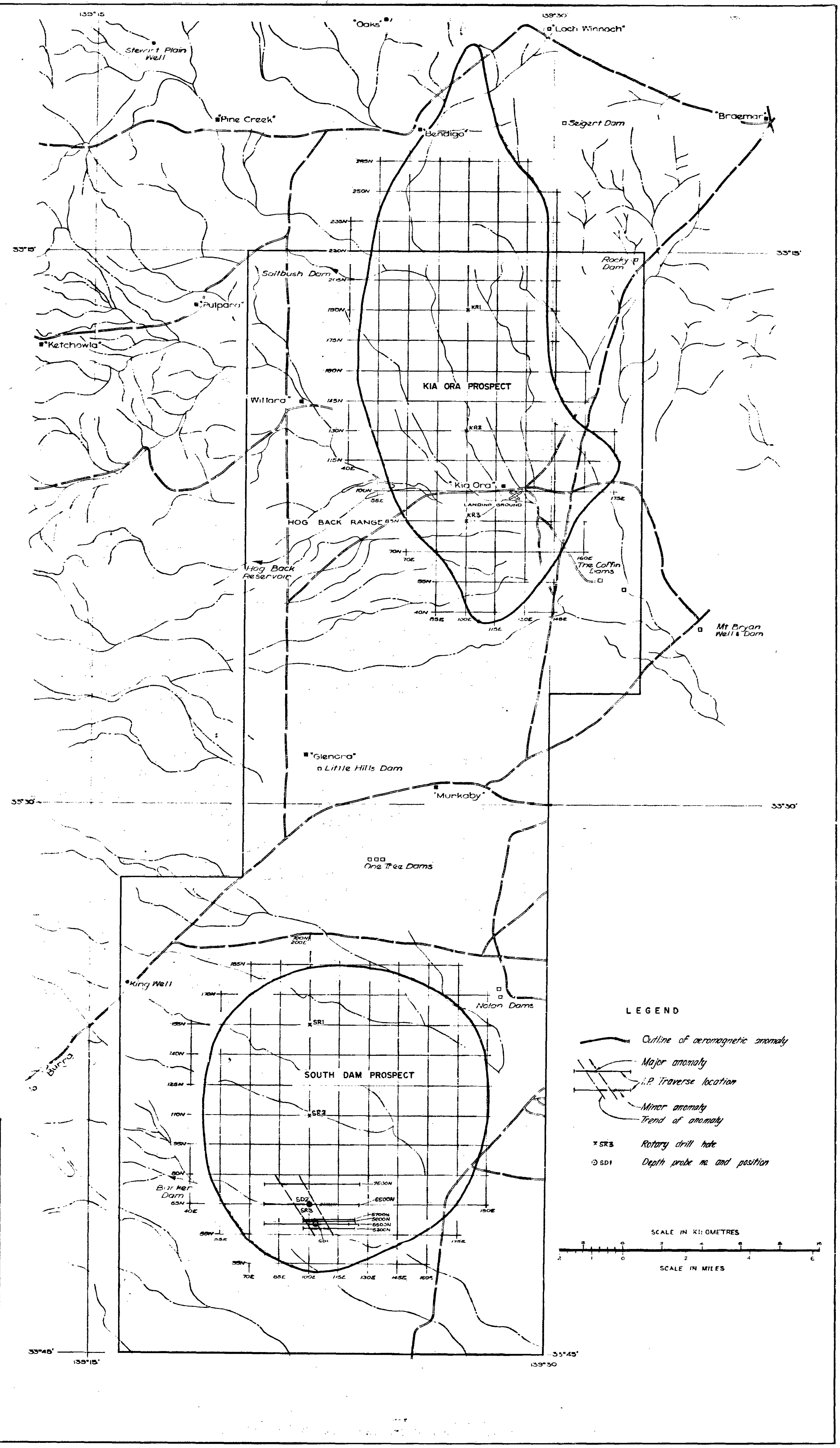
Date: 26 - 7 - 71.

Drn. Ckd.

ELECTRODE ARRAYS.

Drg. No. S9364 Fd-1

1M—2.70 A1810

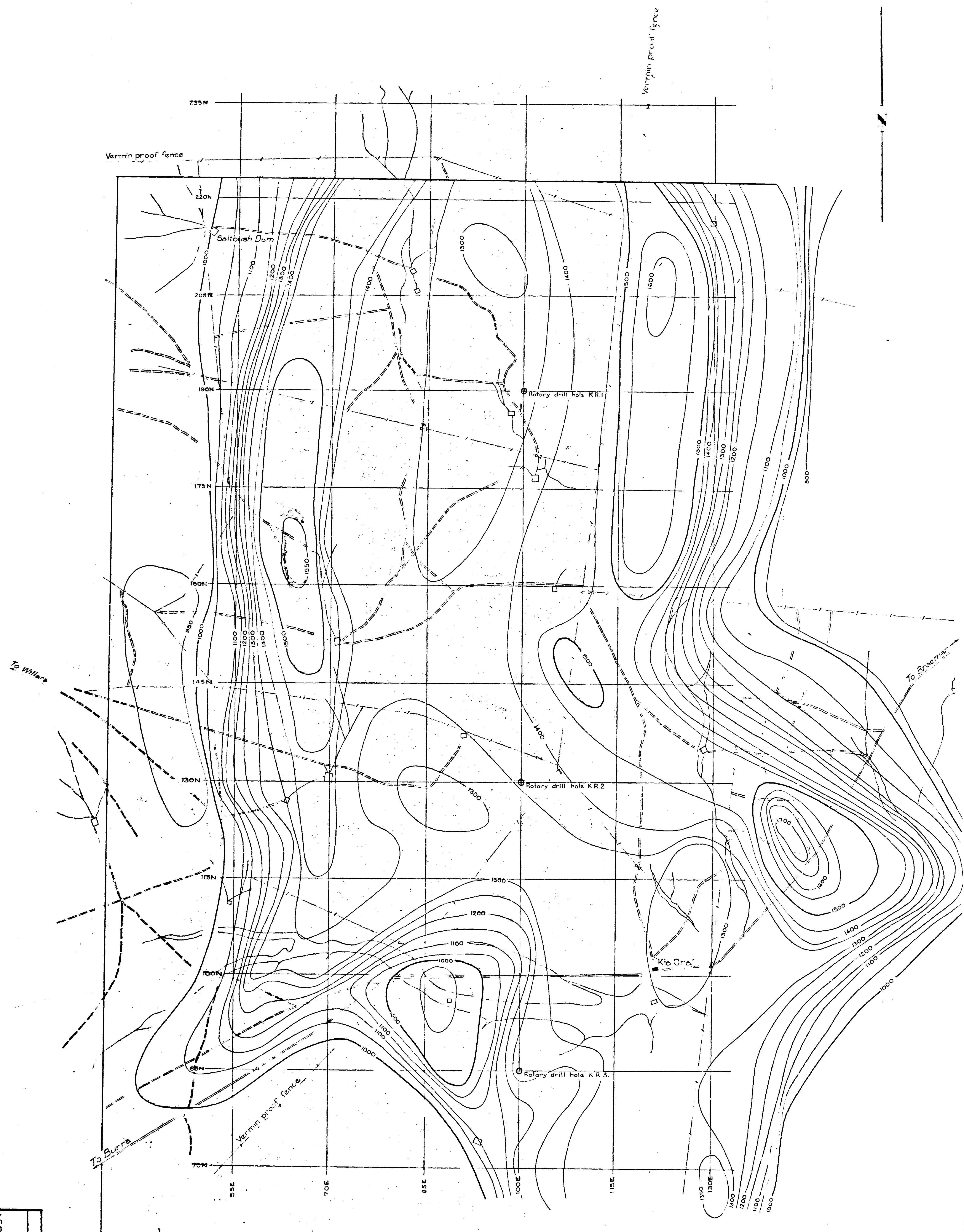


DEPARTMENT OF MINES — SOUTH AUSTRALIA

SOUTH DAM PROSPECT

LOCATION OF I.P. LINES AND DEPTH PROBES

EXPLORATION GEOPHYSICS SECTION	R Nelson GEOPHYSICIST	DRN. R.N. TCD. D.J.M. CKD. A.F.	SCALE: 1:100 000 (orig.) 72-927 Ge
Director of Mines	SUP. GEOPHYSICIST	EXD.	DATE: 26 OCT. 1972



LEGEND

1100 Magnetic Contours (values in gammas)
—— Ephemeral stream
□ Dam
—⋈— Fence with gate
==== Station track
═══ Road with grid
▬▬ Lease boundary

SCALE IN METRES
1000 500 0 500 1000 1500 2000

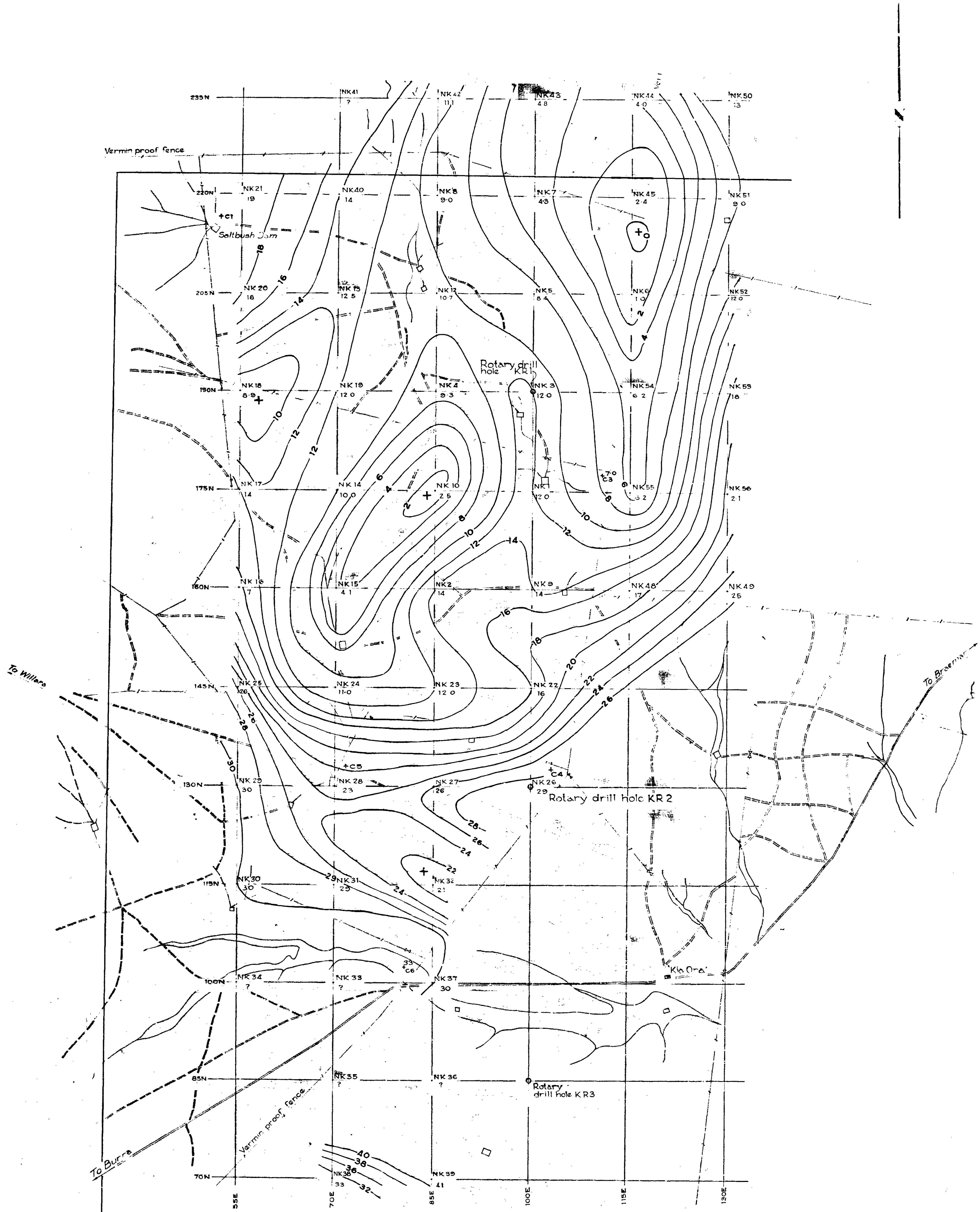
Grid line values are in hundreds of metres.
For location of grid see plan No 72-927

DEPARTMENT OF MINES – SOUTH AUSTRALIA

KIA ORA PROSPECT

AEROMAGNETIC PLAN OF TOTAL INTENSITY

EXPLORATION GEOPHYSICS SECTION	R Nelson GEOLOGIST	Drn. R N Tcd. M A S	SCALE: 1 25,000
Director of Mines	SUP - GEOLOGIST	Ckd. A F Exd.	72-928 Ge DATE: 26th OCTOBER 1972



LEGEND

○	Position of rotary drill hole
· NK29 + C3	Depth probe number and position
───	Ephemeral stream
☐	Dam
─×─	Fence with gate
====	Station track
═══	Road with grid
───	Lease boundary

SCALE IN METRES

1000 500 0 500 1000 1500 2000

Grid line values are in hundreds of metres

For location of grid see plan no 72-927

DEPARTMENT OF MINES – SOUTH AUSTRALIA

KIA ORA PROSPECT
RESISTIVITY SURVEY
CONTOURS OF TOTAL LONGITUDINAL CONDUCTANCE (MHOS)

EXPLORATION GEOPHYSICS SECTION	R Nelson GEOPHYSICIST	Drn. R N	SCALE: 1 25000
		Tcd. C M	72-929
		Ckd.	Ge
Director of Mines	SUP GEOPHYSICIST	Exd.	DATE: 26 October 1972

	55E	70E	85E	100E	115E	130E
235N		NK 41 Pi Ei 100 0·6 33 16·4 34 272 G ∞ –	NK 42 Pi Ei 570 1·0 29 16·7 5·8 61·2 G ∞ –	NK 43 Pi Ei 360 0·7 36 1·5 17 25·5 WG 7 16·8 G ∞ –	NK 44 Pi Ei 103 0·5 5·2 8·2 WG 13·5 30·2 G ∞ –	NK 50 Pi Ei 146 0·5 29 1·0 7·7 8·9 3·2 15·3 WG 30 20 4·2 27 G ∞ –
220N	NK 21 Pi Ei 260 1·5 13 10·8 22·5 11·2 11·5 236 G ∞ –	NK 40 Pi Ei 203 0·5 41 1·6 18 5·7 8 41 WG 13·8 138 G ∞ –	NK 8 Pi Ei 94 0·8 9·4 7·8 WG 25 7·4 2·4 14 G ∞ –	NK 7 Pi Ei 3200 0·4 320 0·9 9·3 17·5 WG 15 3·6 G ∞ –	NK 45 Pi Ei 82 0·5 8·2 10·8 WG 21·3 19·2 G 225 –	NK 51 Pi Ei 60 1·6 6 23 WG 25 103 G ∞ –
205N	NK 20 Pi Ei 62 0·6 12 49 WG 8·3 99 G ∞ –	NK 13 Pi Ei 280 0·6 56 1·2 26 2·1 12 133 19 28 G ∞ –	NK 12 Pi Ei 53 0·2 265 1·5 42 3·8 10 104 G ∞ –	NK 5 Pi Ei 2220 1·2 111 3·2 50 17·4 WG 20 190 G ∞ –	NK 6 Pi Ei 16 0·3 320 1·1 WG 78 74 G ∞ –	NK 52 Pi Ei 102 0·7 20 0·9 26 10·5 WG 15 10·2 4 26·5 G ∞
190N	NK 18 Pi Ei 310 1·5 16 13·5 86 2·3 4·6 5 WG 22 148 G ∞ –	NK 19 Pi Ei 275 0·7 110 0·9 7·5 13 42 6 WG 9 83 G ∞ –	NK 4 Pi Ei 690 0·5 35 0·3 15 1·2 11 6 4·8 23 WG 40 116 G ∞ –	NK 3 Pi Ei 250 1·0 50 1·3 6·2 11·8 72 4·1 WG 9·1 100 G ∞ –	NK 54 Pi Ei 260 0·6 13 6·4 21 3·7 WG 7 39 G ∞ –	NK 53 Pi Ei 210 0·6 21 2·5 5·5 29 WG 30 36 7 33 G ∞ –
175N	NK 17 Pi Ei 310 0·7 31 1·9 13 14 22 8 6·6 54 G 83 –	NK 14 Pi Ei 610 0·7 31 2·5 6·6 3·2 27·5 21·6 WG 9·2 85 G ∞ –	NK 10 Pi Ei 1600 0·4 80 1·2 8·4 3·3 28 7·4 WG 100 40 26 42 G ∞ –	NK 1 Pi Ei 160 2·5 16 1·6 6·6 27 WG 11·1 90 G ∞ –	NK 55 Pi Ei 100 0·5 10 9·0 WG 27·5 24 100 42 30 122 G ∞ –	NK 56 Pi Ei 290 0·4 58 1·5 7·4 22 17·5 3·5 WG 5 90 G ∞ –
160N	NK 16 Pi Ei 840 0·6 42 2·8 4·3 2·0 47 3·1 7·2 115 WG 17·5 39 G ∞	NK 15 Pi Ei 500 0·7 25 1·8 10·8 12·6 WG 58 165 G ∞ –	NK 2 Pi Ei 370 0·7 37 1·4 4·5 4·8 31 13·4 WG 11·7 165 G ∞ –	NK 9 Pi Ei 840 0·8 84 0·6 7·6 4·7 23·8 4·6 1·4 4·2 WG 7·7 80 G ∞ –	NK 48 Pi Ei 1700 0·4 42·5 1·4 9·4 16·5 WG 12·5 192 G ∞ –	NK 49 Pi Ei 94 0·18 19 15·6 3·8 40·5 WG 12·5 165 G ∞ –
145N	NK 25 Pi Ei 300 0·5 30 1·0 14 3·3 6·4 120 WG 16·5 88 G ∞ –	NK 24 Pi Ei 129 0·5 12·9 2·7 1·4 1·8 14·5 30 WG 7·5 55 G 170 –	NK 23 Pi Ei 740 0·6 18·5 1·9 12·4 4·5 70 1·3 7·8 46 WG 45 –	NK 22 Pi Ei 720 0·7 18 2·5 3·8 10·6 11·4 23 WG 12·2 123 G ∞ –		
130N	NK 29 Pi Ei 390 0·5 39 1·7 4·1 0·9 17·4 10·8 6·6 146 WG 24·5 –	NK 28 Pi Ei 280 0·7 56 0·4 38·5 1·0 10 22 6·5 132 WG 68 –	NK 27 Pi Ei 840 0·6 21 1·2 16 7·1 6·7 72 WG 17 17 32 53 G ∞ –	NK 26 Pi Ei 230 1·1 23 1·1 14 3·1 3·4 34 WG 19·5 19 4·5 80 G ∞ –		
115N	NK 30 Pi Ei 181 0·5 18 1·9 6·6 15 8·1 43 5·0 136 G ∞ –	NK 31 Pi Ei 330 0·7 33 2·0 3·8 1·1 15 66 WG 9·8 148 G 440 –	NK 32 Pi Ei 540 0·6 54 1·2 12·8 11·6 2·6 7·3 WG 8·3 200 G ∞ –			
100N	NK 34 Pi Ei 12·8 0·1 256 0·9 17 4·1 10·5 28 57·5 100 10·2 —	NK 33 Pi Ei 640 0·5 32 1·8 13·6 11 38 18·2 63 71·4 6·8 –	NK 37 Pi Ei 180 1·0 36 0·3 21 4·2 4·6 24 27 22·5 4·4 132 G ∞ –			
85N		NK 35 Pi Ei 111 0·6 22·2 2·4 4·8 3·9 3·5 26 10 –	NK 36 Pi Ei 380 0·5 38 1·4 4·1 7·2 24 2·0 31 102 4·8 15 14 –			
70N			NK 38 Pi Ei 220 0·5 44 3·8 6·9 250 ∞ –	NK 39 Pi Ei 190 0·8 19 1·7 4·2 6·3 13·5 22 4·2 160 ∞ –		
	55E	70E	85E	100E	115E	130E

LEGEND

Pi = resistivity of i^{th} layer (ohm metres)

Ei = thickness of i^{th} layer (metres)

i = 1, 2, 3, 4, ...

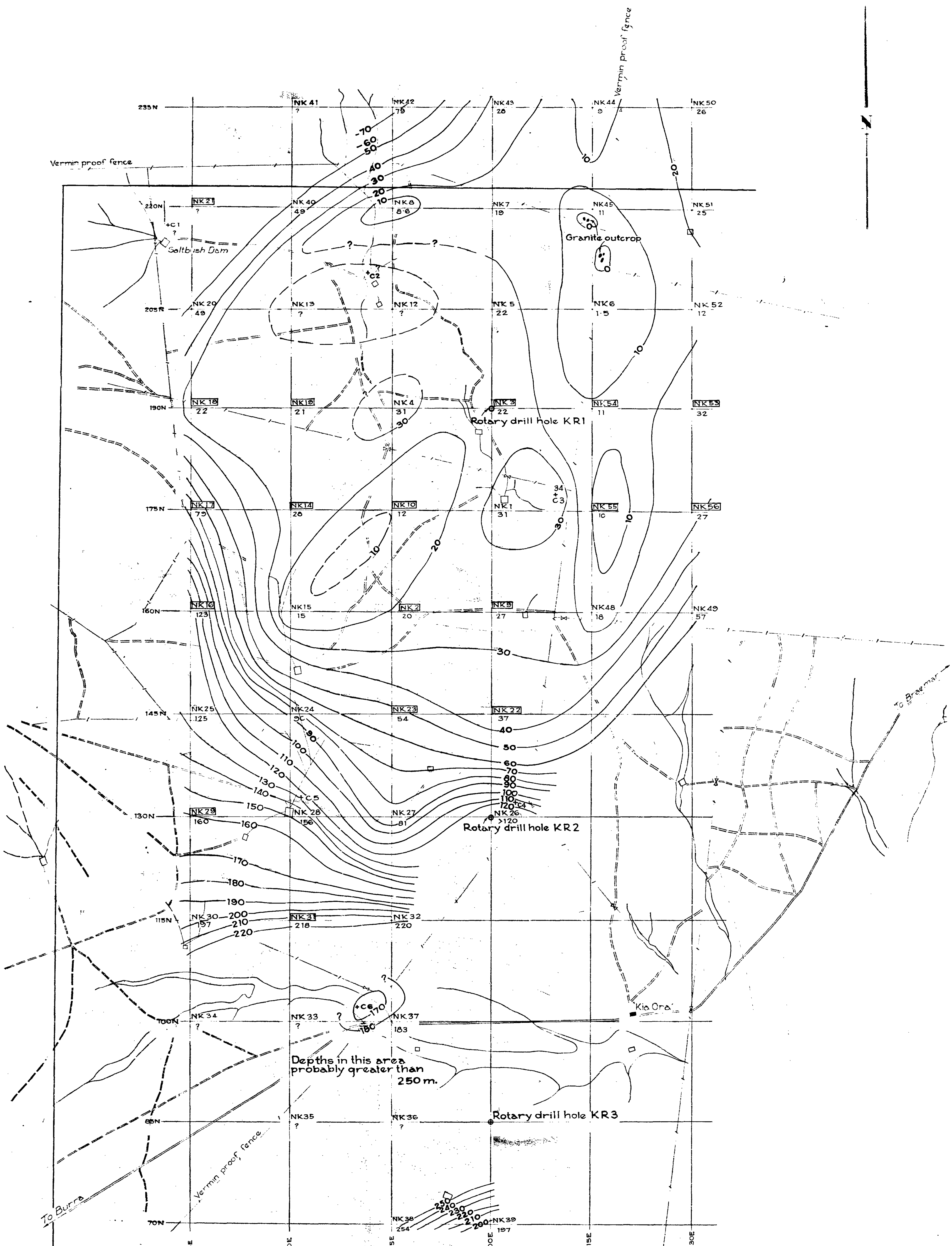
WG = top of weathered granite

G = top of un-weathered granite

DEPARTMENT OF MINES — SOUTH AUSTRALIA

KIA ORA PROSPECT RESISTIVITY SURVEY
INTERPRETATIONS OF DEPTH PROBES

EXPLORATION GEOPHYSICS SECTION	R Nelson GEOPHYSICIST	Drn. R.N. Trd. DWN Ckd. A F Exd.	SCALE: diagrammatic 72-930 Ge DATE: 26 October 1972
Director of Mines	SUPGEOPHYSICIST		



LEGEND

- ⊕ Position of rotary hole
- . NK29 + C4 — Depth probe number and position
- NK3 (boxed) — Depth probe which shows probable sand & gravel sequence at depth

——	Ephemeral stream
☐	Dam
—⋈—	Fence with gate
====	Station track
═══	Road with grid
——	Lease boundary

SCALE IN METRES

1000 500 0 500 1000 1500 2000

Grid line values are in hundreds of metres
For location of grid see plan Nº 72-927

DEPARTMENT OF MINES – SOUTH AUSTRALIA

KIA ORA PROSPECT

RESISTIVITY SURVEY

INTERPRETED DEPTHS TO WEATHERED GRANITE (METRES)

EXPLORATION GEOPHYSICS SECTION	R Nelson GEOPHYSICIST	Drn. R.N. Tcd. G.M. Ckd. A.F.	SCALE: 1 / 250,000 72-931 Ge
Director of Mines	SUP. GEOPHYSICIST	Exd.	DATE: 26 Oct 1972

DEPARTMENT OF MINES — SOUTH AUSTRALIA

KIA ORA PROSPECT

RESISTIVITY SURVEY

INTERPRETED DEPTHS TO UNWEATHERED GRANITE (METRES)

EXPLORATION GEOPHYSICS SECTION	R. Nelson GEOPHYSICIST	Drn. R.N. Trd. G.M. Ckd. A.F.	SCALE: 1 25000 72-932
Director of Mines	SUP GEOPHYSICIST	Exd.	DATE: 26 October 1972 Ge

LEGEND

o	Position of rotary drillhole
NK 29 C3	Depth probe number and position

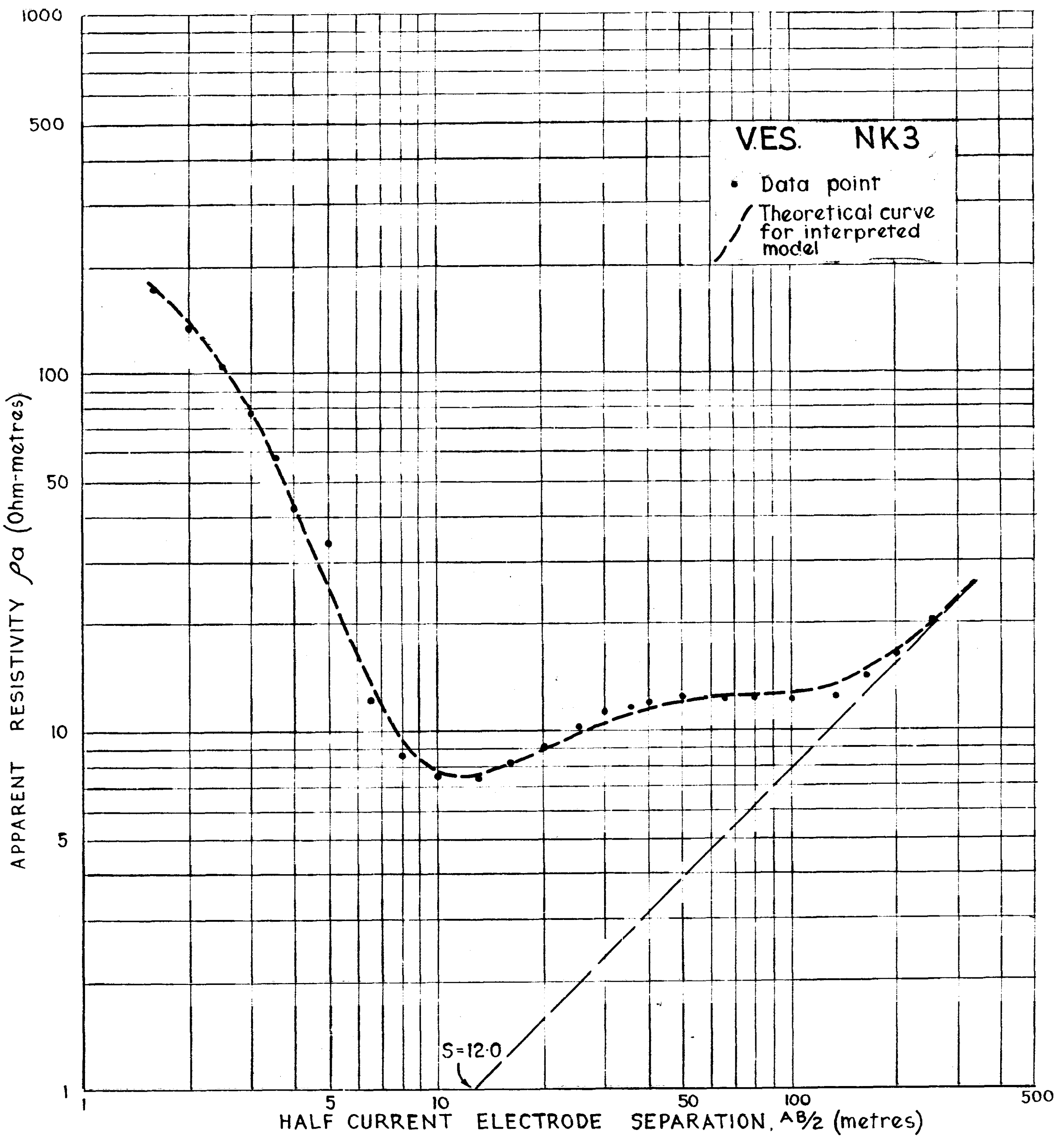
—	Ephemeral stream
☐	Dam
—✕—	Fence with gate
====	Station track
═══	Road with grid
━━	Lease boundary

SCALE IN METRES

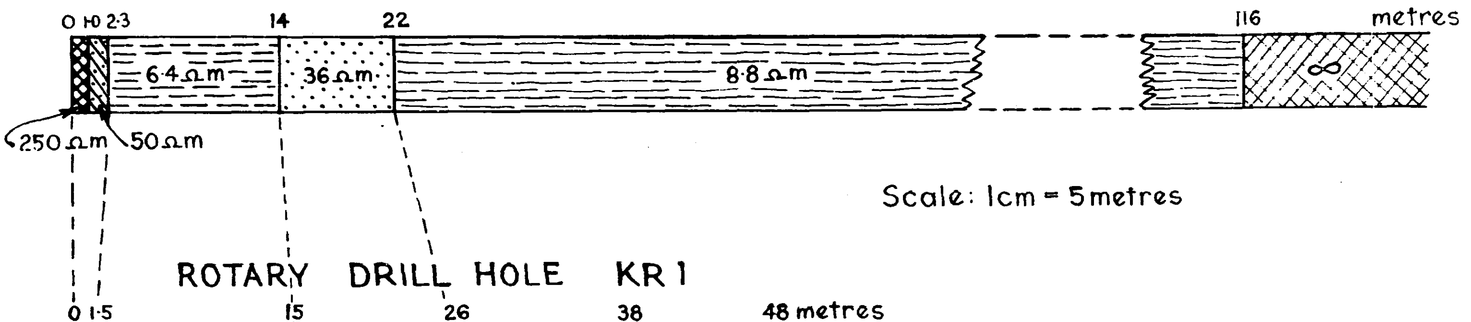
1000 500 0 500 1000 1500 2000

Grid line values are in hundreds of metres

For location of grid see plan no 72-927



DEPTH PROBE INTERPRETATION



Scale: 1cm = 5metres

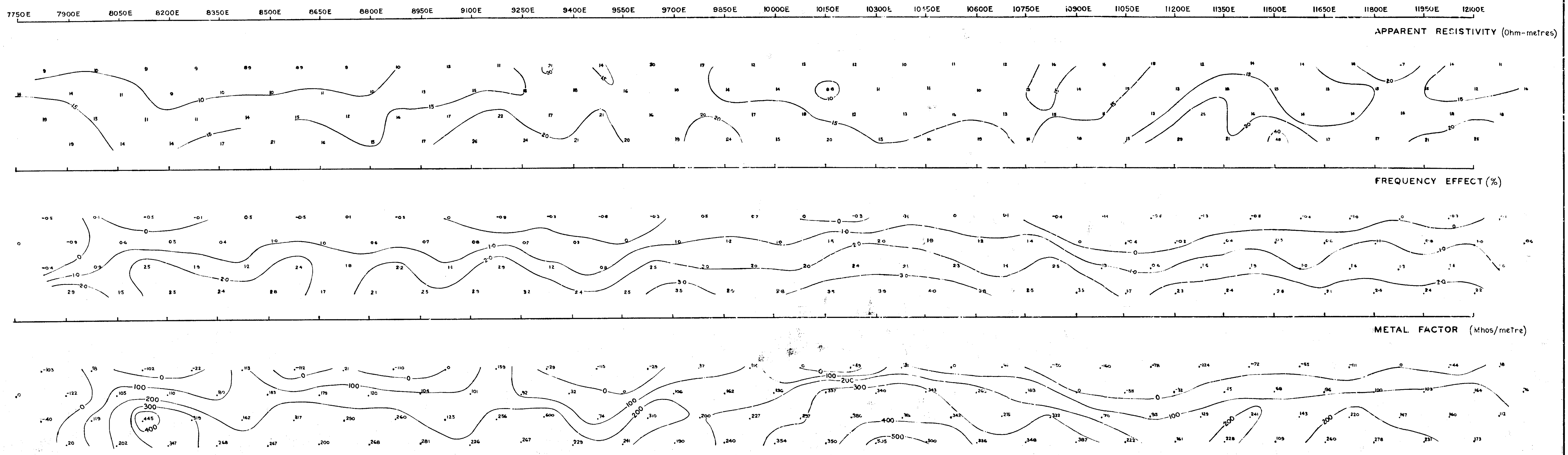
ROTARY DRILL HOLE KR1

DEPARTMENT OF MINES – SOUTH AUSTRALIA

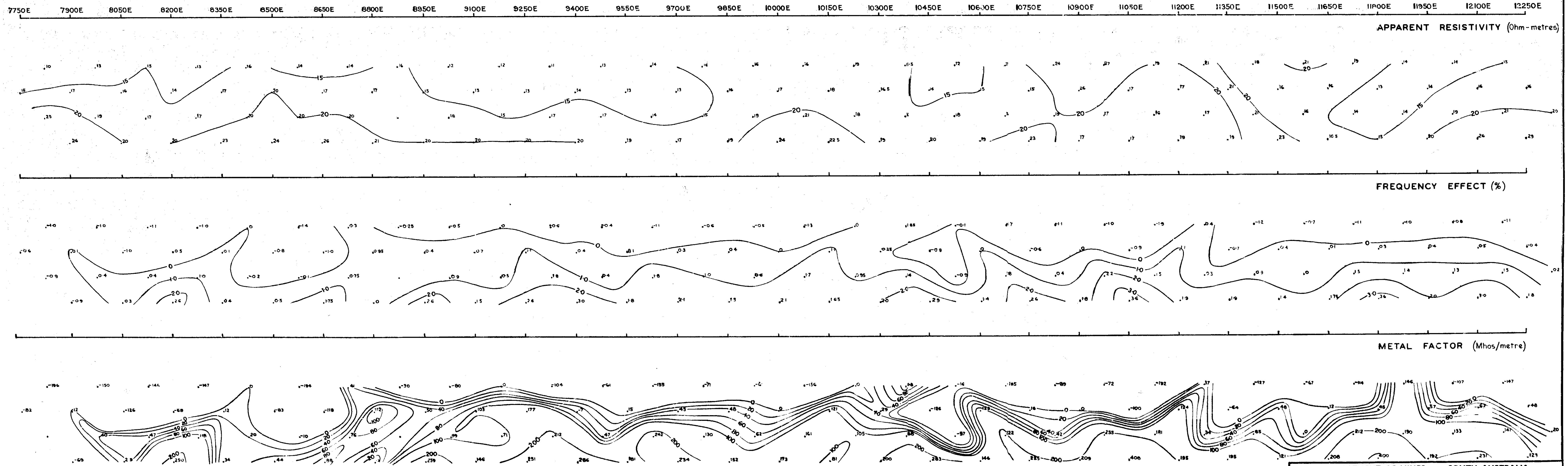
KIA ORA PROSPECT
RESISTIVITY SURVEY
RESISTIVITY DEPTH PROBE
NK3

Compiled: R. Nelson
Drn. A.F. | Ckd. R.N
Scale: Graphical
Date: 26 Oct. 1972
Drg. No. 72-933 Ge

LINE 5500N



LINE 6500N



NOTE : Grid line values are in metres.
For location of grid see drawing no 72-927

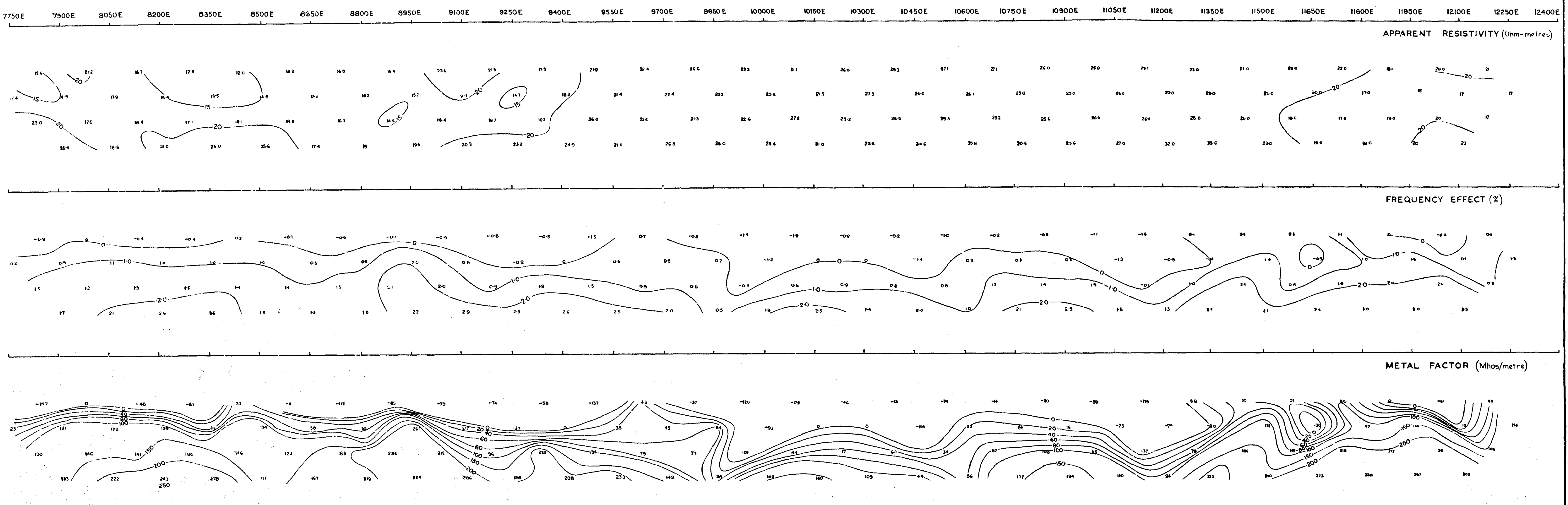
SCALE IN METRES

DEPARTMENT OF MINES — SOUTH AUSTRALIA

SOUTH DAM PROSPECT
INDUCED POLARISATION & RESISTIVITY SURVEY
SECTIONS SHOWING APPARENT RESISTIVITY
FREQUENCY EFFECT & METAL FACTOR
LINES 5500N & 6500N

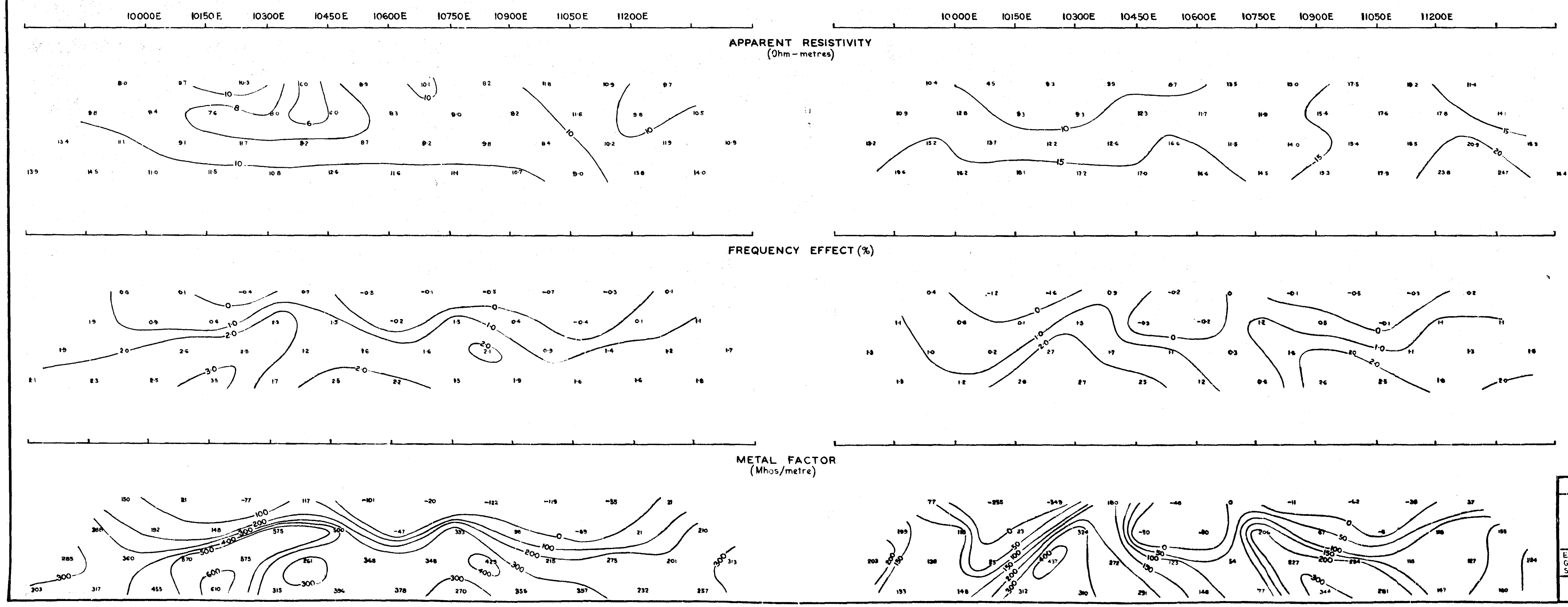
EXPLORATION GEOPHYSICS SECTION	R Nelson GEOPHYSICIST	Drn. R N	SCALE : 1cm = 50m 1:5000
		Tcd. A.F	72-934 Ge
		Ckd.	
Director of Mines	SUP GEOPHYSICIST	Exd.	DATE : 26 October 1972

LINE 7500N



LINE 5600N

LINE 5300N



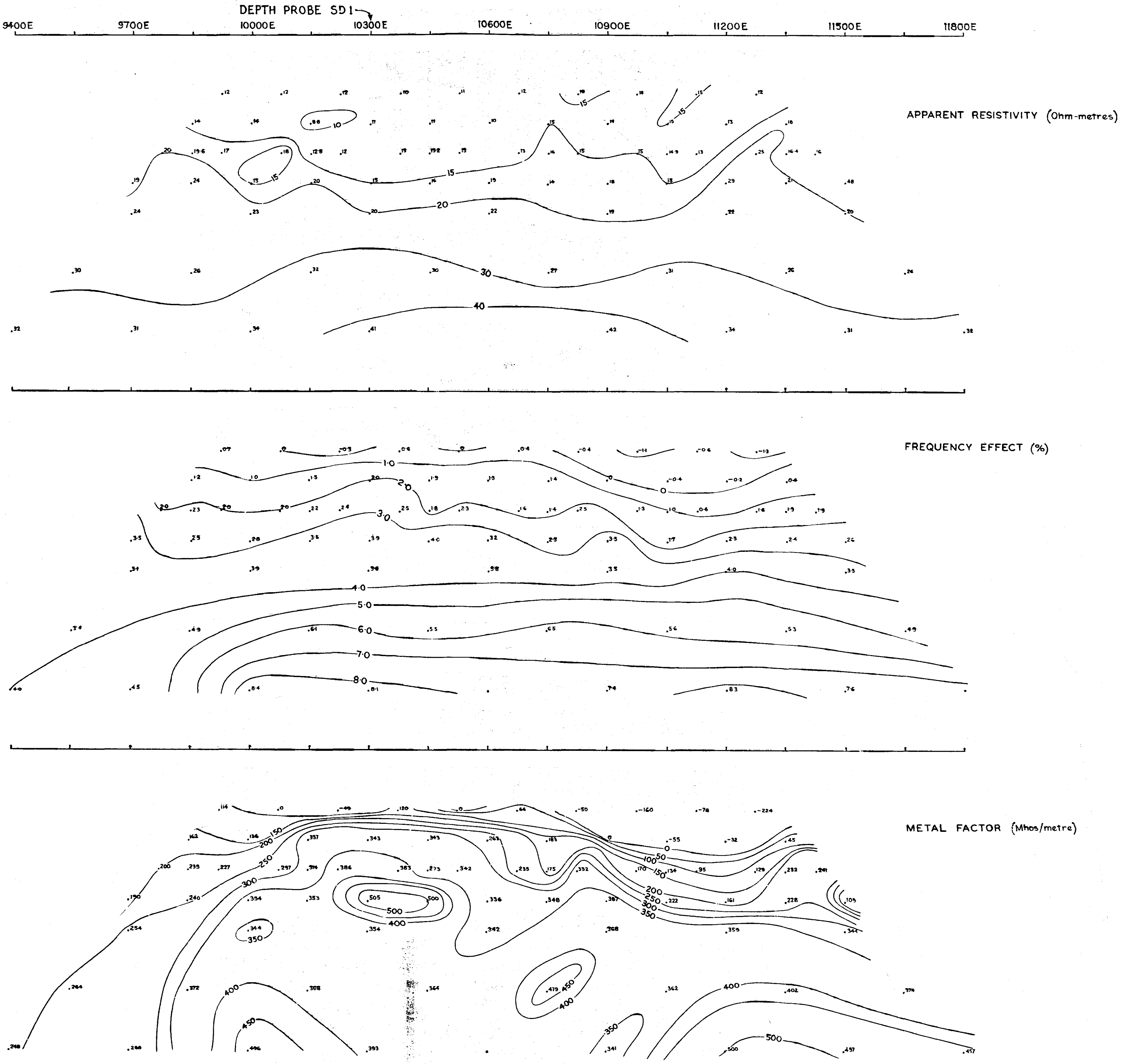
NOTE: Grid line values are in metres
For location of grid see drawing no. 72-927

DEPARTMENT OF MINES – SOUTH AUSTRALIA

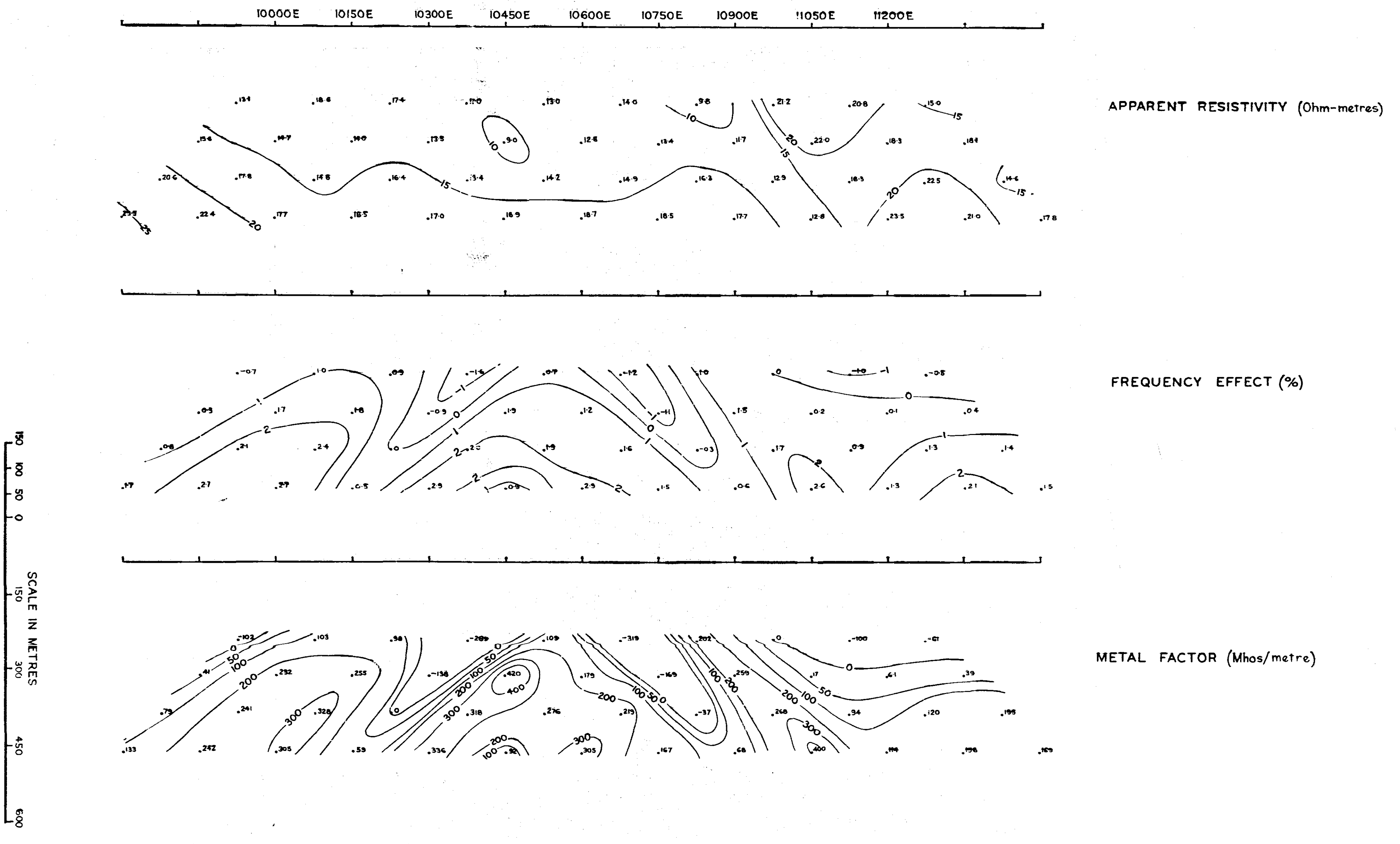
SOUTH DAM PROSPECT
INDUCED POLARISATION & RESISTIVITY SURVEY
SECTIONS SHOWING APPARENT RESISTIVITY
FREQUENCY EFFECT & METAL FACTOR
LINES 7500N, 5600N, 5300N

EXPLORATION GEOPHYSICS SECTION	R Nelson GEOPHYSICIST	Drn. R N	SCALE: 1cm - 50m , 1 5000
		Tcd. A F	72-935 Ge
		Chc.	
Director of Mines	SUP GEOPHYSICIST	Exd.	DATE: 26 October 1972

PT. LINE 5500 (ENLARGEMENT)

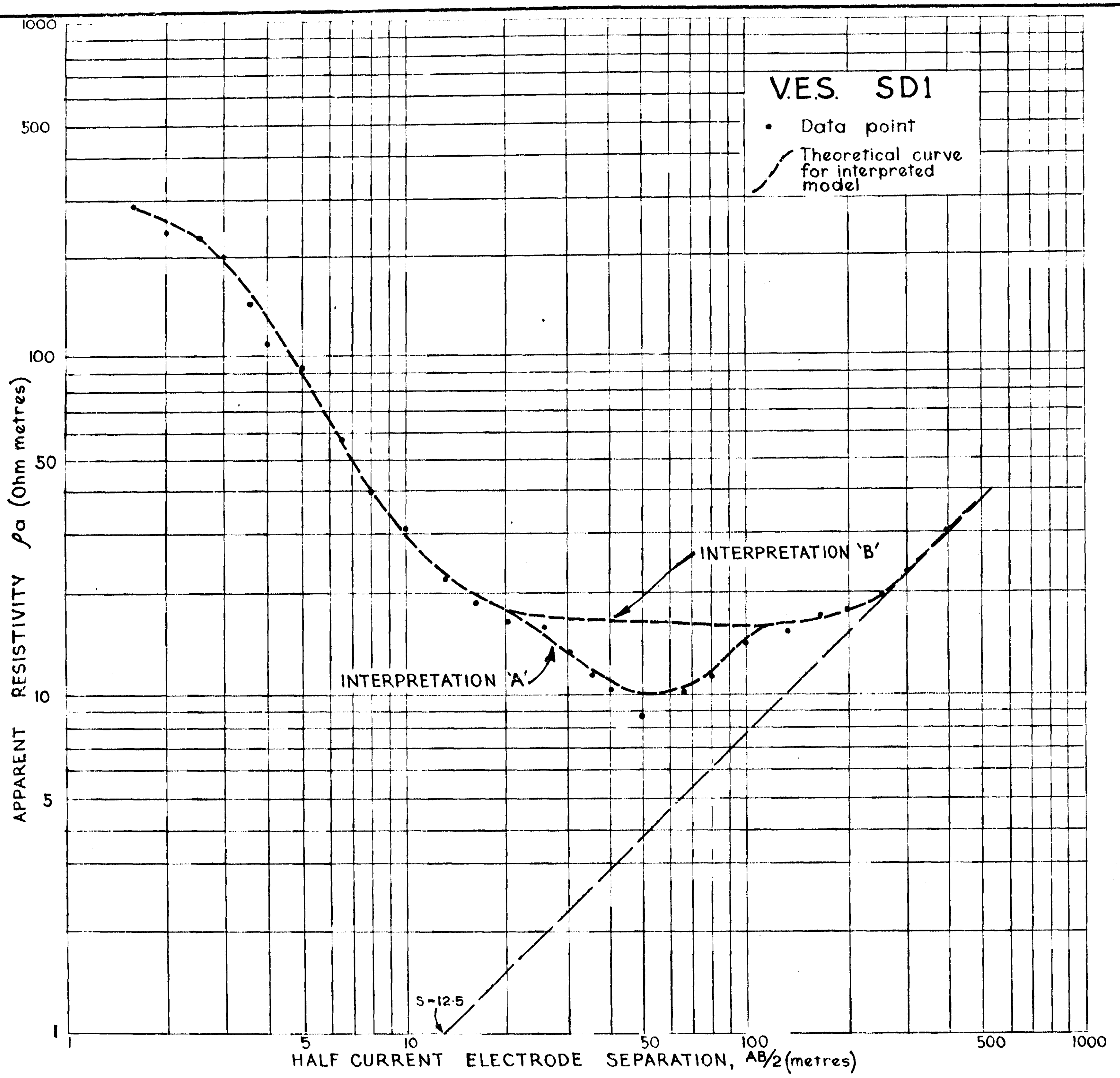


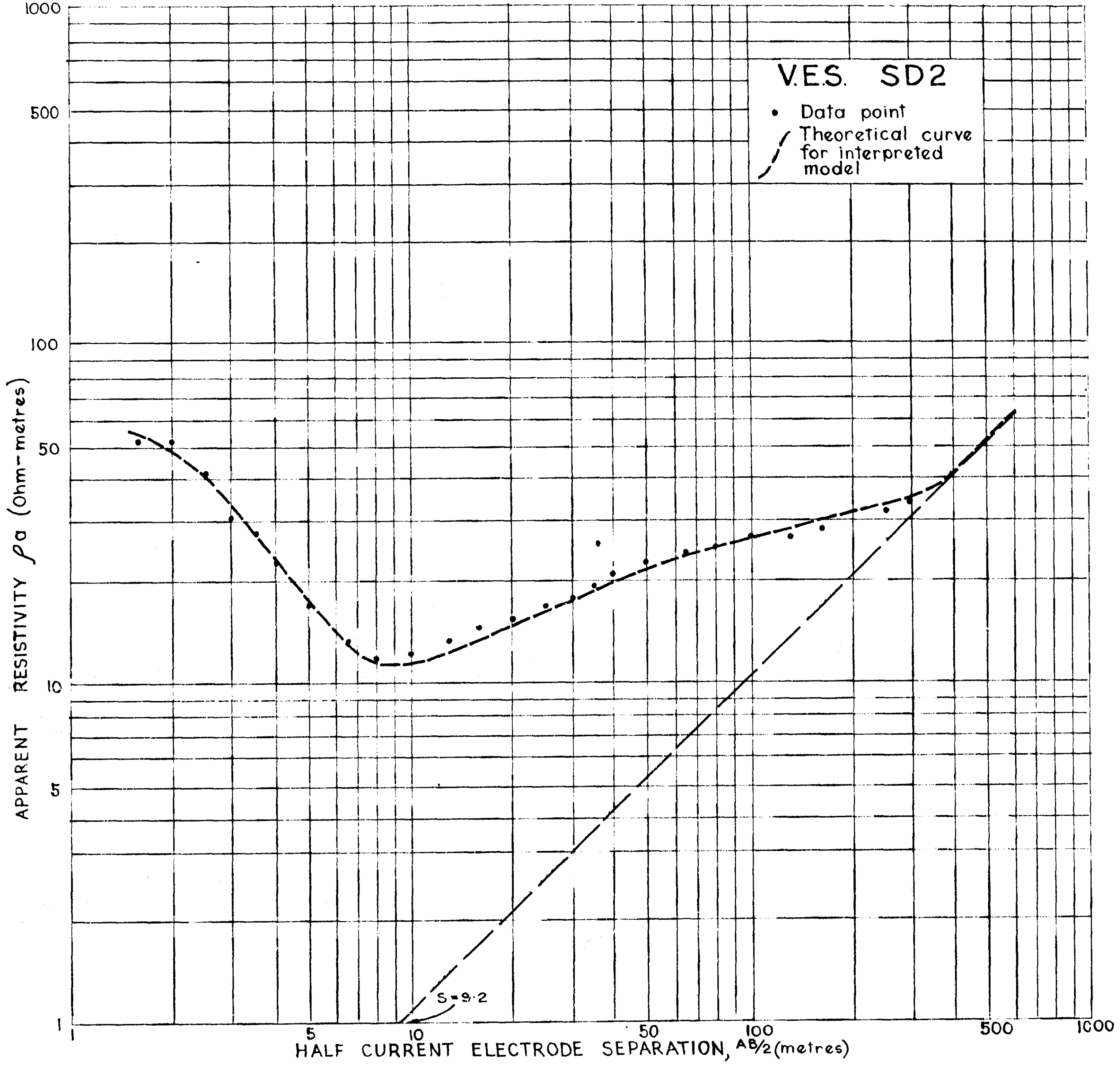
LINE 5700



NOTE: Grid line values are in metres
For location of grid see drawing no 72-927

DEPARTMENT OF MINES — SOUTH AUSTRALIA			
SOUTH DAM PROSPECT INDUCED POLARISATION L RESISTIVITY SURVEY SECTIONS SHOWING APPARENT RESISTIVITY FREQUENCY EFFECT & METAL FACTOR LINES 5500N(ENLG) & 5700N			
EXPLORATION GEOPHYSICS SECTION	R Nelson GEOPHYSICIST	Drn. R.N	SCALE: 1cm=50m . 1:5000
		Tcd. A.F.	72-936 Ge
		Ckd.	
Director of Mines	SUP GEOPHYSICIST	Exd.	DATE: 26 October 1972





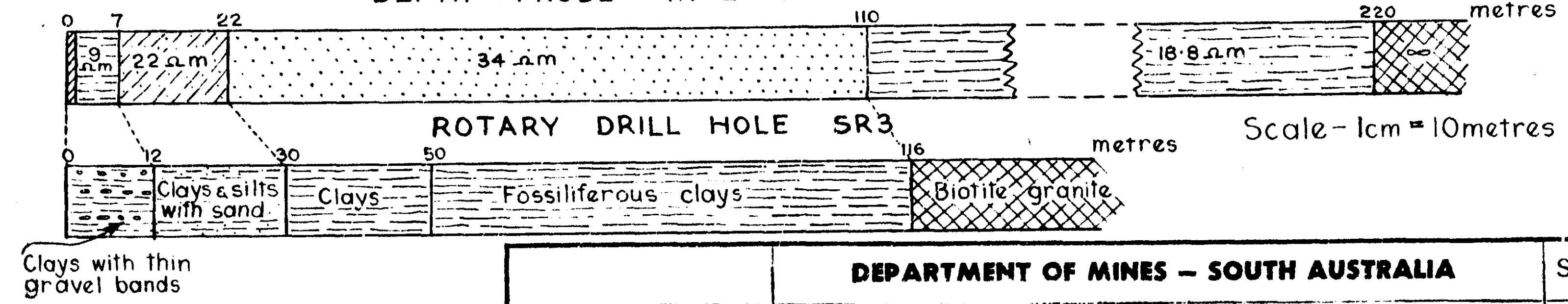
INTERPRETATION 'A'

Layer	Resistivity (Ωm)	Thickness(m)
1	330	1·7
2	33	4·3
3	14·6	16
4	1·6	7
5	98	13
6	3·2	21·6
7	∞	—

INTERPRETATION 'B'

Layer	Resistivity(Ωm)	Thickness(m)
1	330	1·7
2	33	4·3
3	16	200
4	∞	—

DEPTH PROBE INTERPRETATION



Scale - 1cm = 10metres

DEPARTMENT OF MINES – SOUTH AUSTRALIA

Compiled: R. Nelson

Drn. A.F | Ckd. R.N.

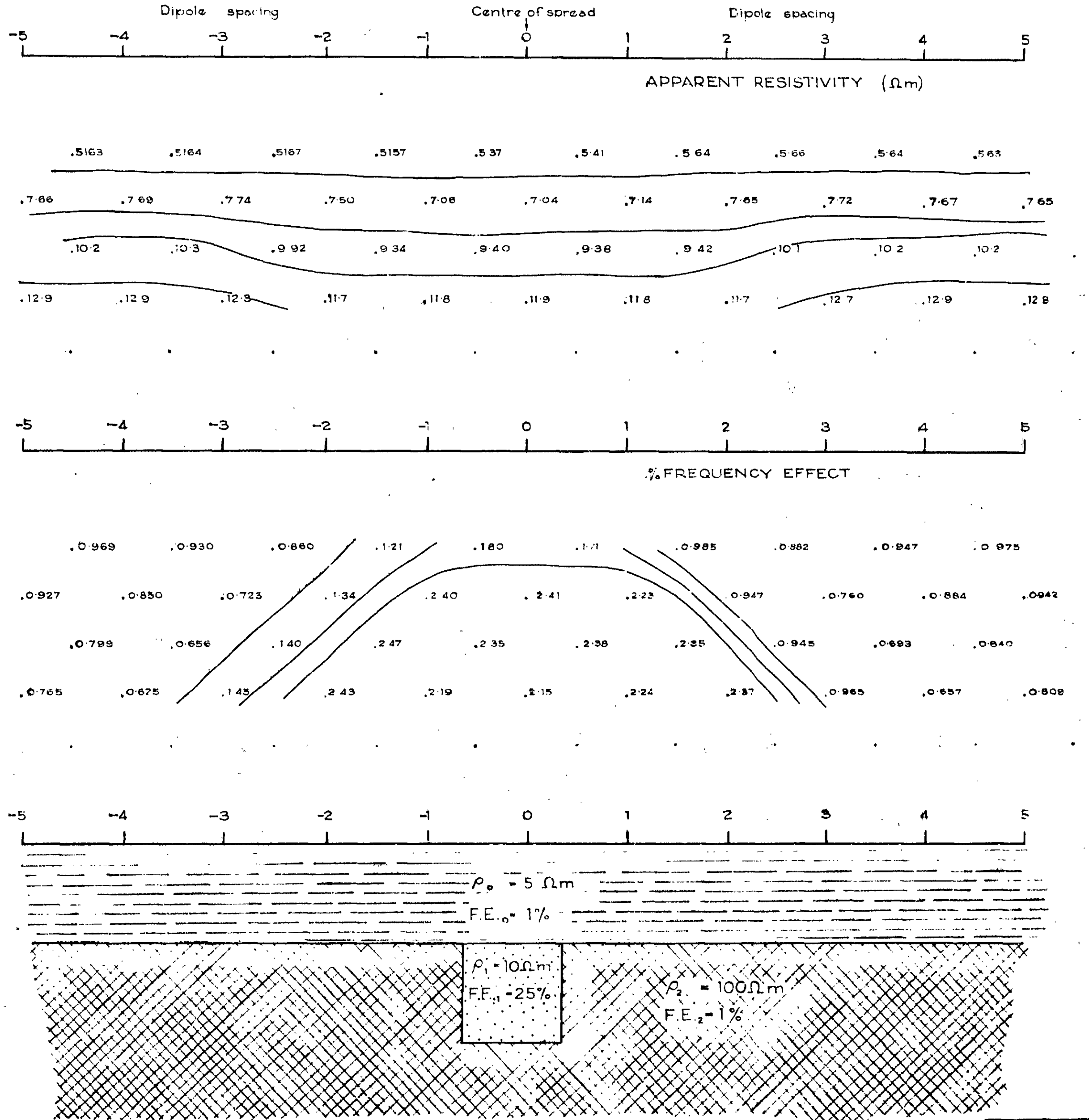
SOUTH DAM PROSPECT
RESISTIVITY SURVEY

RESISTIVITY DEPTH PROBES
SD1 & SD2

Scale: Graphical

Date: 26 Oct. 1972

Drg. No.
72-937 Ge



DEPARTMENT OF MINES – SOUTH AUSTRALIA

CONTOURS OF RESISTIVITY AND FREQUENCY
EFFECT FOR THEORETICAL CASE : FBC-3
GEOSCIENCE INC. VOL. II

EXPLORATION
GEOPHYSICS
SECTION

Director of Mines

Drn. R N
Tcd. G M
Ckd. A F
Exd.

SCALE. 2cms ≡ 1dipole length

72 - 939
MG1

DATE: 23 Oct. 1972