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AN EVALUATION OF GEOPHYSICAL SURVEYS OVER THE AGNEW GRID, HEEMSKIRK GRANITE, E.L. 11/76 AND SPL 129

for

RENISON LIMITED

by

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SUMMARY

A gradient array IP survey was carried out over the Agnew Grid on the Heemskirk Granite in January, 1981. The target sought was tin (cassiterite & stannite) in association with sulphides. The survey used a 20m dipole spacing on lines 100m apart and a number of chargeability anomalies were defined with amplitudes of up to 50-60 mv/v.

A follow-up survey (using gradient array and dipole-dipole IP) was planned to better define the anomalies and to determine their extent, depth, etc. Roberts (1981) listed 12 anomalies for follow-up in order of priority; drilling was planned for anomaly 1. This survey was carried out in December, 1981: the gradient array used a 10m dipole interval and the dipole-dipole array a 30m interval (reading to n=5). Eleven of the twelve anomalies listed by Roberts were detailed with IP, no. 11 being the excluded anomaly. Gradient array and dipole-dipole surveys were carried out over anomalies 1, 2, 4, 5, 7 and 9: only dipole-dipole surveys were carried out over 6, 8, 12 and 10, and only gradient array over anomaly 3.

All of the follow-up gradient array anomalies, in varying degrees, showed the anomalies to be smaller in areal extent than was indicated by the original survey: some anomalies were shown to consist of a number of smaller, separate sources. The dipole-dipole surveys were used to confirm (or otherwise) the gradient array indications and to define the depth, shape and extent of the source. The four such surveys over anomaly 1 (including a 15m dipole survey) defined a (near) outcropping vertical tabular body beneath 650E and 700E perhaps up to 30m wide, with a more restricted, block shaped body below 600E. The source of anomaly 1 has been likened to an inverted gum boot, striking approximately east-west with the toe, beneath 600E, facing west. The shape and extent of the source for anomaly no. 2 is more complex. The gradient array survey defines a boomerang shaped anomaly but no simple source could be interpreted from the dipole-dipole surveys. This was not the case for no. 4, the results of which indicated a near-outcropping vertical dyke probably over 30m wide (with less sulphides than no's 1 or 2).

Anomalies 1 to 4 appear to be due to a Sweeney-style of mineralisation, i.e. a chargeable source, probably sulphides, within a volume of altered rock (which has a lower resistivity). Anomaly 9 may also be included in this group, but the IP resistivity responses are much weaker (and are buried deeper). Anomalies 5, 6 and 12 have chargeable sources within resistive hosts suggesting a different source and/or emplacement to the first group, i.e. sulphides in relatively unaltered granite or in rock enriched with quartz and tourmaline is suggested. Anomaly 10 is similar to this, but has a ring of lower resistivities: an envelope of argillic alteration is suggested. Anomaly 7 has a response which suggests that it is located, at least in part, over sediments. The background chargeability of several anomalies is high, particularly those in the southeast corner of the grid.

Drill hole targets or recommendations for dipole-dipole surveys are given below for each of the anomalies, however only the first three anomalies warrant further investigation purely on the strength of the geophysics (assuming some direct correlation between tin and chargeability). The list is in order of merit of geophysical response. Where the drill hole direction is not specified, it is not indicated (or not obvious) from the geophysical response.

Anomaly 1. (being drilled): The best geophysical target is 30m below 650E/840N.

Anomaly 2. Dipole-dipole surveys on 300E, 400E and 500E to properly define the target, but drilling (from the south) to intersect 30 to 40m beneath 350E/525S would assess the area's potential.

Anomaly 4. A drill hole target 30 to 40m beneath 1450E/840N would test the very good anomaly.

For any of the recommendations listed below to be acted upon, further evidence of the anomaly's prospectiveness is required.

Anomaly 3. Dipole-dipole surveys (with 30m dipoles, read to n=5) are recommeded on lines 1150E and 1200E.

Anomaly 6. A drill hole target is 30 to 40m beneath 1700E/420S.

Anomaly 9. A drill hole target about 100m beneath 1900E/1095N (as outlined by the metal factor pseudo-section).

Anomaly 8. The original gradient array survey gave a good chargeability response beneath 1800E/510S: the follow-up dipole-dipole survey indicated a (resistive) chargeable source at depth beneath 435S. Both targets could be tested by collaring a drill at 1800E/540S and drilling at about 45° to the north for at least 150m. The metal factor parameter highlighted another pocket of (probable) sulphides in a less resistive host, at a shallow depth (less than 30m) beneath 1800E/315S.

Anomaly 5. A dipole-dipole survey on 1700E (centred on 1055N) before siting a drill hole is suggested.

Anomaly 10. A drill hole target is 30 to 40m beneath 2000E/330N.

Anomaly 12. This diffuse anomaly could be tested with a drill hole collared at 500E/360S, dipping 45-50° to the north with a length of at least 120m.

Anomaly 7. Detailed geological mapping (with auger if necessary) to define the granite/sediment contact. Chargeabilities recorded in this area were upto 60+ mv/v, larger than many of the anomalies given higher priority, but anomaly 7 has been listed last since its response suggests that it does not fit the sulphides-within-granite style of mineralisation, which was the primary aim of the survey.

AIM AND INTRODUCTION

The Agnew Grid is located in the south east corner of the Heemskirk Granite, a stanniferous Devonian adamellitic-granite on the West Coast of Tasmania (see Fig. A). Several mines were worked on the Heemskirk fields following the discovery of tin there in 1876. In contrast to the north Heemskirk field, most ore from south Heemskirk has been primary tin. Total production of tin metal up to 1962 was 667.57 tons of which 477.74 tons came from the south Heemskirk field (Blissett, 1962). Production since the closing of the Federation Mine in 1938 has been sporadic and mainly from small detrital or alluvial workings.

The tin occurs mostly as cassiterite, but there are minor amounts of stannite. Blissett (1962) notes that the tin is to be found in quartz-tourmaline or greisen fissure veins, however it has also been found to occur in association with sulphides, e.g. Sweeney's.

The Agnew Grid is situated between the old Sweeney and Globe workings, south of Mt. Agnew. The lines are nominally 100m apart and pegged every 30m; direction is approx NNW-SSE. The grid totals about 42 line-kms and sub-parallels ($\sim 12^{\circ}$ difference) the Federation Grid to the west.

A gradient array IP survey was conducted over the Sweeney's Mine in 1977 (Howland-Rose, 1977a & b). The excellent response (although limited in extent) lead to similar surveys being conducted over the Federation Grid in 1977 and 1979, and over the Agnew Grid in 1981. Anomalies were recorded on both grids: whilst those on the Federation Grid were usually outlined by the 20 mv/v contour or lower (and were all less than 40 mv/v), many on the Agnew Grid were outlined by the 30 mv/v contour and four exceeded 50 mv/v. The results of the Federation surveys have been described by Bishop (1981). This report evaluates the results of the follow-up dipole-dipole and gradient array IP surveys over the anomalies defined by the original reconnaissance survey on the Agnew Grid.

GEOLOGICAL TARGETS

The Agnew Grid has not been mapped in any detail, but Roberts (1981) has produced an interpretive geological map at a 1:25,000 scale (Figure B). This shows that most of the grid covers the older 'red' granite, with the younger 'white' granite restricted to the south east corner of the grid plus a narrow tongue along the granite/sediment contact south of the grid. The characteristics of these two granites have been summarised by Roberts (1980) in 'Notes on Geophysical surveys over Heemskirk Granite , most of which has been included in this report as an appendix.

Roberts (1980) listed the various types of targets sought on the Heemskirk Granite (although written primarily about the Federation Grid, the target types also apply to the Agnew Grid). These targets are summarised below (they have been discussed in more detail in Bishop (1981), with examples drawn from the Federation Grid).

Four types of mineralisation have been recognised; they are (a) stanniferous greisen; quartz, muscovite, topaz and possibly sulphides, with cassiterite. (b) Sericitic alteration; sericite, with possibly haematite/magnetite and sulphides (pyrite, sphalerite) with cassiterite. (c) Quartz-tourmaline alteration dykes (the 'white dykes' of the federation Grid); these quartz/tourmaline/topaz dykes, often with envelopes of argillic alteration, have been the main source of tin on the Federation field, the cassiterite occurring in irregular short Sn-rich shoots. Sulphides (pyrite, sphalerite) may be present. (d) Polymetallic sulphides; Sweeney's, immediately to the West of the Agnew Grid is an example of this type of target and it is the most significant area of mineralisation so far defined on the Heemskirk Granite. Several drill holes have intersected 20 - 30m of approx. 0.5% Sn (best intersection 23m at 1.17% Sn in Swy11), however the mineralisation is extremely irregular and eighteen drill holes have failed to fully define its shape. The tin (cassiterite with some stannite) is associated with various sulphides of which pyrite is the major constituent.

For all targets, the IP/resistivity method is probably the most applicable: mineralised areas containing sulphides should be defined as chargeability anomalies whilst alteration areas should be outlined as resistivity lows, with possibly some IP effect from the clays if no sulphides are present. Experience at Sweeney's and on the Federation Grid has shown that while the gradient array method will define mineralised areas which are relatively close to the surface, follow-up dipole-dipole surveys are needed to check the extent of the anomaly and, if significant, to site drill holes. Also, I have argued elsewhere with examples, (Bishop, 1981) that the gradient array often poorly defines resistivity contrasts and this combined with its lack of depth penetration, means that gradient array surveys may not detect alteration zones capped by fresh granite. Such zones (buried cupolas) may be important targets. However the most promising tin mineralisation so far detected on the Heemskirk Granite is the polymetallic sulphide 'Sweeney's' deposit. Since other significant occurrences, such as the 'Globe' also contained sulphides, it seems possible that economic tin concentrations on the Heemskirk Granite will not be found in a classical greisen style (Taylor, 1979, p45), but rather may occur in association with sulphides. If this is the expectation, then exploration is facilitated by concentrating only in areas with good geophysical responses. This was clearly demonstrated by the gradient array IP survey over Sweeney's which defined a 60 mv/v above background anomaly.

A gradient array IP survey was carried out over the Agnew Grid in January, 1981. The resulting anomalies were graded primarily on their potential for a Sweeney-style of mineralisation. Since Sweeney's response to a gradient array IP survey was over a strike length of possibly less than 50m, even fairly low amplitude anomalies had to be followed up by detailed surveys.

GEOPHYSICAL SURVEYS

IP and magnetic surveys have been carried out over the Agnew Grid.

A gradient array IP survey was carried out by Scintrex using a 20m dipole spacing (and station interval) on lines 100m apart. The survey has been reported by Howland-Rose (1981) who defined nine chargeability anomalies (A to I).

The chargeability and resistivity contour plans from this survey (Figures C and D respectively) show a gradual increase in value to the south. For both parameters, the largest area of higher values is in the south-east corner, i.e. approximately coincident with the extent of the medium/fine grained 'white' granite. An increase in resistivity and chargeability southwards also occurred on the Federation Grid, although there the change was more abrupt. On Federation, these differences had been interpreted (Howland-Rose, 1978: Wells, 1978) as signifying 'red' granite to the south (higher values) and 'white' granite to the north (lower values); that is, the opposite to the Agnew Grid interpretation above. Bishop (1981) thought that the interpretation of Wells (1978) and Howland-Rose (1978) may have been too simplistic, and the contrary correlation here suggests that the granite type cannot be mapped by IP/resistivity surveys.

The magnetic coverage of the Agnew Grid has not been completed, there being no data south of the baseline. North of the baseline, the responses are strong (~100γ) andvariable westwards (this is an eastern continuation of the south-east corner of the Federation Grid), and the data gradually 'quietens' to the east. Roberts (1981) has suggested that, like the IP above, the magnetics may be correlated to the two granite phases; the flatter areas being over 'white' granite (or a thin layer of red) and the noisy areas, the 'red' granite. Bishop (1981) noted that a sharp contrast between 'quiet' and 'noisy' magnetics occurred on the Federation Grid and that the boundary was all within 'red' granite. Thus Roberts' (1981) inter-

pretation suggests that most of the 'red' granite on the central and western parts of the Federation Grid is relatively thin: some drill holes support this hypothesis, but others (e.g. Fed 11) show mostly 'red' granite, (however the top 22.5m of Fed 11 was weathered 'red' granite).

Roberts (1981) also notes that there is a local and subtle break in the 'noisy' magnetic patterns over anomaly no. 1 (see below) which is in the red granite. Roberts (1981) suggested that this may be due to alteration effects breaking down the magnetite. Thus a coincidence of low resistivities with local magnetically quiet areas may indicate altered granite. Unlike the Sweeney or Globe-type of targets which may be relatively high-grade deposits, (economic) alteration style mineralisation (types (a) and (b) in the above section) would be expected to be large, low grade deposits, however the surface expression (geophysical or geological) may not be extensive, particularly if capped by fresh rock.

Roberts (1981) defined twelve areas on the Agnew Grid that were worthy of further investigations. These areas were based on their geophysical and geochemical (tin and base metal) responses and are shown in Figure E. The anomalies were labelled in order of priority and their geophysical and geochemical responses have been summarised by Roberts (1981, Table 1).

Detailed IP surveys, gradient and dipole-dipole array, were carried out over eleven of the twelve areas, the results of these surveys are described below. The gradient array surveys used a 10m dipole spacing and the dipole-dipole surveys, a 30m spacing, except one dipole-dipole survey in area 1 which used a 15m spacing. The coverage of the various surveys over the anomalous areas is listed in Table 1.

The following abbreviations have been used in the report: chargeability anomaly is C.A. and resistivity anomaly is R.A. Often anomalies have been described with respect to background and this has been written as anomaly/background. The 'anomaly' may be a maximum figure (or a minimum for resistivity), but is often a medium value e.g. C.A. 30+/10-12; R.A. -<1000/5000. Chargeabilities

are in mv/v and resistivities in ohm-m.

Area 1.

This was defined by a 50+/15 C.A. on lines 600 and 700E, near 840N; resistivities were <500/1000-2000. There were associated geochemical anomalies (tin and base metal)*. This is the only area for which drilling has been planned in the 1981-82 field season.

The follow-up gradient array IP surveys were carried out on lines 550E, 600E, 650E, 700E, 725E, 750E and 800E (Figures 1a to 1g), and the dipole-dipole surveys on lines 600E, 650E (a 15m, as well as a 30m, dipole survey) and 700E (Figures 1b, 1c, 1d). The former surveys defined an anomalous area measuring perhaps 140m east-west by 60m north-south between lines 550E and 750E. The highest values were recorded on lines 650E and 700E at 840N, where C.A's of 60+/5-15 and R.A's of <500/1000-2000 were obtained.

Better ratios were recorded by the dipole-dipole surveys; line 600E, C.A. 40+/10, R.A. 100-200/1000-2000; line 650E (30m dipole spacing), C.A. 83/<10, R.A. 50/1000 ; line 750E, C.A. 61/<10, R.A. 100-200/1000. Classical 'trouser-leg' shaped pseudo-sections were recorded on each line, but some different shaped sources have been interpreted.

The pseudo-sections of lines 650E and 700E are similar and suggest a very shallow, near vertical, tabular source extending to depth. Figure 1j shows the simplified shape of the 650E and 700E chargeability responses compared with the response of a (model) vertical outcropping, chargeable 'dyke'. The figure shows that the electrode is asymetrically placed into the conductive dyke and this has caused the asymetric pattern in the model's response.

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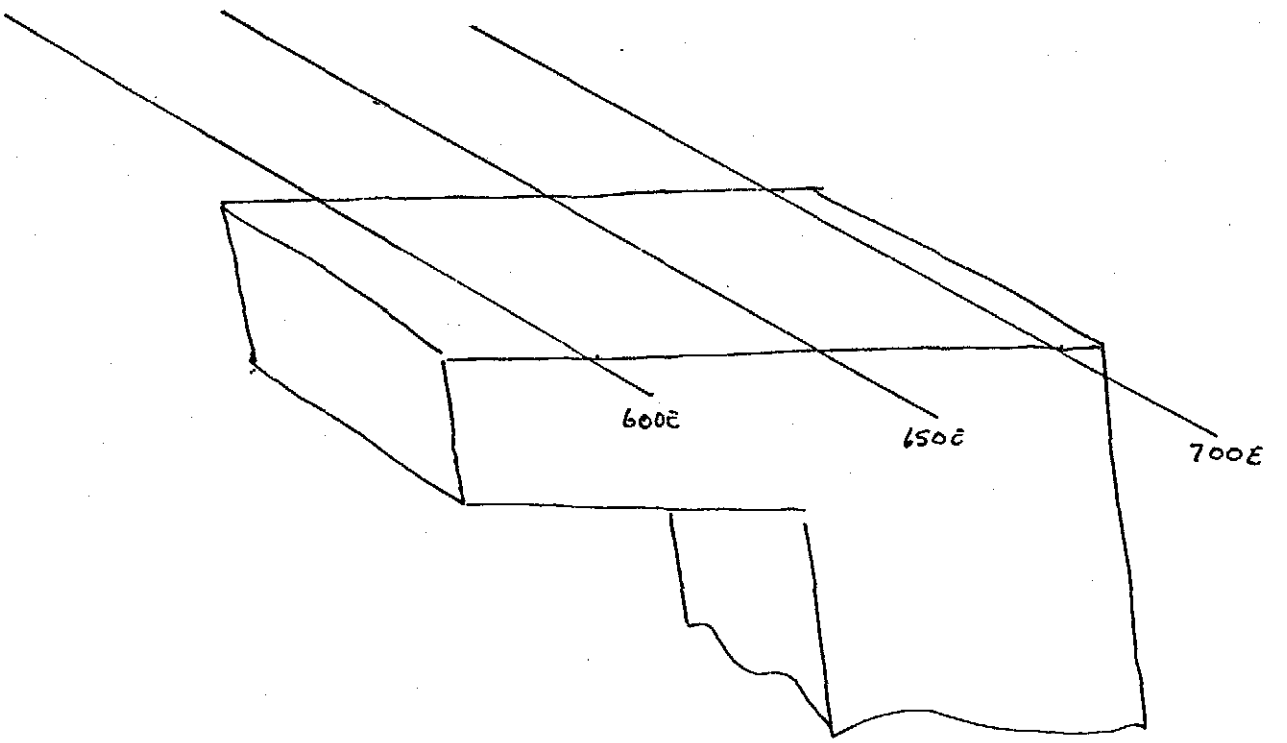
* Comments on associated geochemical anomalies (for all areas) have been drawn from Roberts (1981).

A similar effect can be seen in the 700E pseudo-section (Figure 1d). The line 600E chargeability results do not have the closed-off high values near the surface and a flat lying tabular or block shaped body of limited depth seems a more likely source. (The model shown in Fig. 16, Bishop (1981) is not too dissimilar.) Thus the dipole-dipole results suggest an inverted gum-boot shaped anomaly, the strike of the boot being roughly east-west, with the toe facing (and slightly dipping) west. A sketch is shown below.



Interpretation of dipole-dipole chargeability results
Area 1 (not to scale)

Although all three dipole-dipole sections show well defined resistivity responses, the values, mostly in the hundreds, do not suggest significant amounts of massive sulphides, however they do indicate an extensive area of alteration.

The best target for a drill hole, based on the above geophysical results, is about 30m below 650E/840N.

Area 2.

This area was defined by a 50+/25-35 C.A. on lines 300E and 400E at about 600S (60+mv/v at 300E/590S). There was a slight resistivity decrease (<700/1500) on 400E. There were associated anomalous tin values but no base metals from soil sampling.

Follow-up surveys consisted of gradient array surveys on 250E, 300E, 350E, 400E and 450E (Figures 2a to 2e) and dipole-dipole surveys on 350E, 400E and 570S (i.e. perpendicular to the other surveys (Figures 2c, 2d and 2f). The gradient array surveys recorded maximum 72.4mv/v on line 350E at 545S with the 35mv/v contour covering lines 300E to 400E. The high values on 350E are to the north of those on 300E and 400E, thus defining a boomerang shaped anomaly (Figure 2g). A second anomalous area (C.A. 40/25) was recorded at 350E/660S. These two anomalies have been labelled 2A and 2B respectively, by Howland-Rose (1981b). Area 2A showed a slight resistivity decrease (<500/1000), but not 2B (see Figure 2h).

These two anomalies were confirmed by the dipole-dipole survey on 350E: the much stronger anomaly being at 525S (C.A. 80+/30 with 50+/30 at 675S). The resistivity anomalies were not well defined, and were not coincident; however an extensive and deep-seated decrease at 525S suggests a significant amount of alteration (Roberts (1981) noted that there was no evidence of argillic alteration at the surface within Area 2). On 450E, the chargeablity response is at depth (80mv/v at n=5) and there is a large area of 60+ values with a roughly coincident resistivity low, R.A.

600 (min 357)/1500. The perpendicular dipole-dipole survey along 570S recorded chargeability anomalies beneath 305E and 425E, the former (70/15) a shallow source, the latter stronger (86/30) and deepening. Unfortunately this line was chosen by the field operator (P. Brown, whose excellent rate of progress constantly required more work): the complex 'boomerang' pattern called for two cross lines, one near 540S and another at 600S. As it is, both anomalies (at 305E and at 425E) may be centred up to perhaps 20m to the south (or north, particularly the former, see below). There was no response to the chargeable source some 40-50m to the north on line 350E.

The broad shape of the mineralisation may be summarised as: probably deep (40m) beneath 650-600S on line 450E, shallowing to the north-west through 400E to about 525S on 350E: then possibly continuing the trend to 300E (no dipole-dipole information) or swinging south-west to about 600S on 300E, maintaining the shallow (<30m) depth. The chargeability values (e.g. 80+mv/v) suggest significant sulphides and the large areas of <1000 ohm-m in the dipole-dipole pseudo-section indicate a broad envelope of alteration: more extensive than e.g. the 500 ohm-m contour shown on Figure 2h, since it extends at depth to at least 450E.

Although strongly anomalous, the dipole-dipole pseudo-sections do not show any 'classical' anomalies which can be readily interpreted as simple sources. Rather, a large area appears to be mineralised, or altered, with patches of more concentrated sulphides. Mineralisation at a shallow depth could be tested by drilling to intersect beneath 525S/350E at 30 to 40m. Given the apparently irregular nature and often small size of these targets, dipole-dipole surveys on 400E (30m dipole) and on 450E and 500E (probably 50m dipoles) would allow a more informed drill siting to test the deeper and more easterly extension (or separate source?). Without further surveys, targets would be 90-100m below 450E/600S, drilling from the north and 30-40m below 350E/525S.

Area 3

This was defined by a 30+/15C.A. on lines 1100E and 1200E near 750N, with the 20 mv/v contour encompassing 1000E; resistivities were <500/1500, with <200 ohm-m on 1000E. Low value base-metal anomalies were recorded from the soil sampling, but no tin was detected.

The follow-up surveys consisted of gradient array surveys on lines 1050E, 1100E, 1200E and 1250E (Figures 3a to 3e). These showed area 3 to consist of a series of small, separate chargeable sources between 1050E and 1200E (Figure 3f), although dipole-dipole surveys might show that they were connected at depth. A resistivity low <700 (with local minimum <300/2000) encompasses the 'central' sources near 1150E/800N, see Figure 3g. There were no dipole-dipole surveys.

This anomaly is geophysically, much less prospective than areas 1, 2 or 4; the narrow gradient array chargeability responses do not suggest substantial amounts of mineralisation. If further work was desired, 30m dipole-dipole surveys would be recommended on lines 1,150E and 1,200E centred on 800N and 750N respectively.

Area 4.

This area was defined by low responses on lines 1,400E and 1500E near 840N. The C.A. was 25+/15 on line 1400E: a poor resistivity low (<700/1500) was associated with the chargeability. Tin and base metal anomalies were recorded in soil samples.

Follow-up gradient array surveys were carried out on lines 1350E, 1400E, 1450E and 1500E (Figures 4a to 4d) and a dipole-dipole survey on line 1450E (Figure 4c). The former surveys defined a simple elongate chargeable source between lines 1400E and 1450E near 850N (C.A. 28/10, with a single point 55 mv/v on line 1450E),

with near coincident resistivity lows, 300-500/1000 (see Figures 4e and 4f, respectively).

The dipole-dipole survey, confirmed the simple source. A vertical near-outcropping, tabular source is indicated below 1450E/855N: the width is less than one dipole spacing (30m). The resistivity (R.A. 150/1000) pseudo-section weakly reflects that of the chargeability which has a maximum value of 60 mv/v. Thus, in comparison with the similarly shaped, but wider source at 650E or 700E within anomaly no. 1, lesser concentrations of sulphides and/or alteration are inferred for anomaly 4. The source could be tested by targeting a drill hole to go beneath 1450E/840N at a depth of 30 to 40m.

Area 5.

The anomaly was outlined by a similarly shaped chargeability response to that defining no. 4, but the areal extent was slightly larger. The chargeability response was 25+/15 at 1100E/1050E, with the 22.5 mv/v contour enclosing 1700E and 1800E: there was no resistivity decrease. Anomalous geochemical values (tin and base metal) were recorded but apparently well down slope from the geophysical responses.

Follow-up consisted of gradient array surveys on lines 1650E, 1700E and 1750E (Figures 5a to 5c) and a dipole-dipole survey on line 1700E (Figure 5b). The former confirmed the original survey (see the contour plans of chargeability and resistivity, Figures 5d and 5e respectively). The dipole-dipole survey did not reveal any anomalous areas at depth: a 30+/15 C.A. at n=2 and 3 was poorly defined and resistivities were mostly >1000 ohm-m. The high resistivities associated with the (low) chargeabilities suggests that the source is patchy, disseminated, sulphides in relatively unaltered host rock. If further work was considered warranted, I would recommend a dipole-dipole survey on 1750E before drilling; 1750E has a somewhat better gradient array response that does 1700E.

The gradient array pronounced resistivity lows (~300/1000) on lines 1750E and 1650E (the latter with a coincident chargeability low) are unusual although the original survey defined other examples: they are multi point anomalies and presumably genuine.

Area 6.

This area was defined by broad chargeablity anomalies (max. value 40+mv/v) from about 300S to 450S on lines 1500E to 1800E; several separate sources were indicated from the contouring of the original survey (see Figure C). There was little if any resistivity decrease and values were high (mostly > 3000 ohm-m).

Follow-up consisted of dipole-dipole surveys on 1700E, 1800E and an orthogonal survey along 420S (Figures 5b, 6b and 6c respectively). The latter two surveys were also part of follow-up of area 8. The survey on 1700E recorded a C.A. of 50+/20 with no resistivity anomaly and the 1800E survey recorded a C.A. of 60+/20 also with no resistivity anomaly, although unlike 1700E, a shallow region (beneath 300S) was significantly less than 1000 ohm-m.

The east-west dipole-dipole survey was sited to test the deep seated chargeability anomaly beneath 435S on 1800E. The response obtained suggests that this is a real anomaly, and is not due to interference effects from adjacent near-surface anomalies on line 1800E (see Area 8 below). The 420S survey shows the source to be shallower to the west however, as pointed out by Howland-Rose (1981b), it may be off line (some 20 or so metres): a grid of orthogonal surveys is needed to thoroughly define the shape. The relatively high chargeabilities (40-60 mv/v) recorded on all three surveys indicate a significant amount of chargeable material. The associated high resistivities are unlike most IP/resistivity responses over old prospects on the granite but similar high chargeablity/high resistivity anomalies have been recorded over the Globe Workings (Bishop, 1982, in prep).

Area 7.

This area was defined by a 35+/20 C.A. on lines 2100E and 2200E (max. value 42.5+ mv/v at 2100E/300S). There was no resistivity decrease, values being >1500 to 3000+ ohm-m. Tin and (low) base metal values were recorded from the soil samples. Roberts (1981) suggested that the anomaly may be at the granite contact. Thus the follow-up surveys extended the coverage further to the south.

Follow-up consisted of gradient array surveys on lines 2100E, 2150E and 2200E (Figures 7a to 7c) and dipole-dipole surveys on 2150E (Figure 7b). The former surveys defined a number of separate chargeable sources 40(max. 50+)/25 with a strike length of generally less than 50m (Figure 7d). There were some low resistivities recorded (<500/1000); these were occassionally associated with the higher chargeabilities, but were not coincident (Figure 7c). Both the chargeability and resistivity dipole-dipole pseudo-sections indicate a broad shallow source, or sources, from (approx.) 300S to 400S (R.A. 500/1200; C.A. 50+/25).

The dipole-dipole surveys have not defined the granite/sediment contact suggested by Roberts, however the rapid variations of the gradient array chargeability responses are similar to surveys elsewhere over Crimson Creek sediments. Like Area 6, detailed geological mapping (with shallow auger holes?), together with completion of the magnetic survey should assist the interpretation.

Area 8.

This was defined by a 50+/30 C.A. at 1800E/510S: there was

no resistivity decrease, and values recorded were around 2000 ohm-m. Tin and low base metal values were recorded from the soil samples.

Follow-up consisted of a dipole-dipole survey along 1800E (Figures 6b, 8). The perpendicular survey along 420S over Area 6 was also relevant (Figure 6a). The original gradient array response at 510S was confirmed by the former survey, a shallow (<30m) limited source being suggested. This survey (along 1800E) produced a complex chargeability pseudo-section: the highest values (60+/20-30) at n=3 to 5, were beneath 435S; another deep-seated response was recorded south of 600S. Both of these anomalies (i.e. at 435S and 600S-660S) may be due to interference effects from shallower sources; the former from sources at 730S and 510S and the latter from a source at 510S and a presumed source south of the survey coverage. However chargeable sources at depth are also quite possible, the lack of the gradient array response over 435S merely indicating that array's ability to better respond to shallow sources.

The high background chargeability levels of both (orthogonal) surveys, indicates a widespread area of minor disseminated sulphides (or possibly a higher concentration of mafic minerals) as was suggested by the original gradient array survey (see Figure C).

The lack of any well defined resistivity anomaly (values around 2000 ohm-m) suggests disseminated sulphides with little alteration. Alternatively, the high resistivities may be reflecting a quartz-tourmaline style of alteration as was suggested for Area 6.

Area 9

This area was defined by a 30+/15-20 C.A. at 2000E/1100N; the 27.5 mv/v contour extended to include 1900E. There was no

resistivity decrease, although the values decreased to <700 at the end of the line. Tin and (low) base metal values were recorded from soil samples.

Follow-up surveys consisted of gradient array IP on lines 1900E, 1950E and 2000E (Figures 9a to 9c) with dipole-dipole IP on line 1900E (Figure 9a). The detailed gradient array survey confirmed the original source but also defined a northern shoot on 1950E. Maximum chargeabilities were 35+/20 (Figure 9d): the resistivities, with values of 1500-2000 ohm-m, did not significantly decrease (Figure 9e). The most substantial gradient array chargeability anomaly was on line 1900E; the dipole-dipole survey on this line indicated an extensive, deep zone of mineralisation (C.A. 30/15-20), resistivities dropped to 700-800/1500-2000, in a weak coincidence.

The surveys suggest a broad, deep zone of weakly altered granite, possibly with disseminated sulphides. The anomaly bounds are gradual rather than well defined, but the zone's best development appears to be between 1230N to 1080N, with probably a continuation to the south at greater depth. The zone is roughly flat-topped with a depth below surface of 50 to 60m. Thus a large volume of mineralisation is inferred; but with a low concentration of sulphides and/or only weak alteration. To test the source, a drill hole could be targeted to intersect somewhere between 1200N and 1100N at a depth of about 90m.

Area 10.

This area was defined by a broad, low amplitude C.A. of 22.5+/15 at 2000E/340N: there was no change in the resistivity (with values between 2000 and 3000 ohm-m). Low base metal values, but no tin, were obtained from soil samples.

Anomalies such as this may indicate buried mineralisation and to test this possibility a dipole-dipole IP survey was carried out

along line 2000E (see Figure 9c). A weak C.A. of 30+/20 was defined at 330N (at n=2 and 3): the source is buried to a depth of perhaps 30-40m. High resistivities (~2000 ohm-m) are coincident with the chargeability anomaly, with lower values (500-800) on either side this suggests a quartz-tourmalinised core (+sulphide) with surrounding argillic alteration (?). Whatever the cause, the chargeable source is weak and is not highly prospective if, as was suggested under 'Geological Targets', the best tin occurs with the highest concentrations of sulphides.

Area 11.

This area was defined by a 70+ chargeability reading at 2300E/270N: there was also a coincident resistivity low (<700/2000-3000). Low tin and arsenic values were obtained from soil sampling. The very narrow anomaly suggested an outcropping source and no further geophysical work was proposed. The area will be geologically examined (Roberts, 1981).

Area 12.

This area was defined by a broad, low C.A. (32.5/25) on lines 500E and 600E at around 320S. There was no significant corresponding drop in resistivities (values around 1500 ohm-m). (Low) tin values were recorded from the soil samples.

For similar reasons to area 10, a dipole-dipole survey was carried out, along 500E centred on 300S (Figure 12). The resistivity pseudo-section shows a less-resistive near-surface area from 360S to 240S, but the chargeability pattern (C.A. 25/15) suggests a buried source: the two parameters have apparently responded to separate causes. One possible explanation is surface weathering (not intense) with minor disseminated mineralisation at depth. It does not appear to be a very prospective target for any of the mineralistation styles discussed under 'Geological Targets'.

DISCUSSION

The original gradient array IP survey was undertaken to detect any 'Sweeney-type' deposits on the Agnew Grid. Sweeney's is a poly-metallic disseminated sulphide deposit (with up to 10% total sulphur) lying in an argillic alteration envelope (Roberts, 1980). Two areas of the Agnew Grid were outlined with chargeabilities and areal extent comparable to Sweeney's (60+ mv/v, with a strike length of possibly 80m). Other anomalies gave similar but weaker responses, while some gave weaker but somewhat different responses; all gave chargeability responses. The detailed surveys, described in the previous section, were used to better define the anomalies and outline their extent.

The results from both surveys show that a reconnaissance gradient array IP survey using a 100m line spacing and 20m station spacing is an effective exploration technique on the Heemskirk Granite. Follow-up surveys over the better anomalies were carried out at a 50m line spacing. Either one or both of dipole-dipole and gradient array were used: the former with a 30m dipole, the latter with a 10m dipole. I believe that the dipole-dipole array provided a much better and truer picture of the shape of the mineralisation: for example, some of the detail gradient array surveys showed the original anomalies to consist of a series of discrete sources (e.g. no. 1), while the deeper-looking dipole-dipole surveys often showed that these were continuous at depth.

Howland-Rose (1981b) has suggested that the decay rate* of the IP effect may be diagnostic on the Agnew Grid. Only one example is given (Howland-Rose, 1981b, plate DS-1), but other areas are mentioned: the example given certainly appears to be anomalous. Similar claims about the use of decay rates were made for the results of the Federation survey (Howland-Rose, 1980), however

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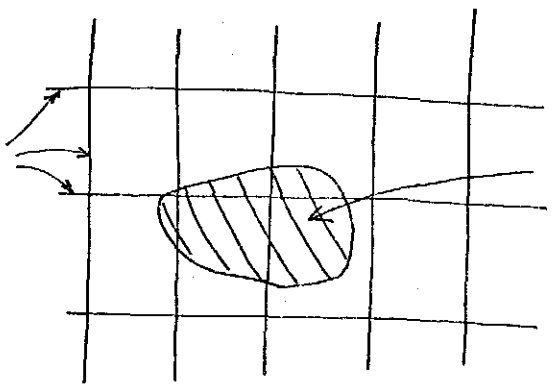
* Decay rate is defined as $$\Delta M = \frac{M_5 - M_1}{M_3} \times 100$$

as noted in Bishop (1981) plotting of ΔM over various zones on the Federation Grid revealed no anomalies or significant patterns. It would require little effort to calculate and plot ΔM from the original and follow-up gradient array IP surveys over the Agnew Grid (and the Federation Grid): this is recommended.

The use of dipole-dipole surveys along the apparent 'strike' of the mineralisation were tried on two anomalies (no's 2 and 6/8). Such surveys are particularly appropriate in isotropic rock such as granite, but have been used effectively elsewhere, particularly along fault controlled structures. (I participated in such a survey, in which the Mt. Bulga copper-lead-zinc deposit near Orange, N.S.W., was defined; Webster, 1966). The 'along-strike' surveys helped to better define the shape of the mineralisation for each area, although not uniquely. Ideally a number of orthogonal lines would be surveyed, possibly with a number of dipole spacings, thus the continuity and shape of the mineralisation could be interpreted. If early drilling on any of these anomalies intersects significant tin values, such surveys are recommended.



The metal factor parameter* was calculated for five of the dipole-dipole surveys (area1 (650E); area 2 (350E); area 6 (1700E); area 8 (1800E); and area 9 (1900E)) to see whether it would be useful in defining the areas of mineralisation.

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* The metal factor as defined in the report is

$$\frac{\text{Chargeability} \times 1000}{\text{Resistivity (ohm-m)}}$$

The metal factor (sometimes called metal conduction factor, or specific capacity) was used initially to overcome the (relative) lessening of the IP effect in areas of lower resistivity, since in such areas, the 'blocking' action of the sulphide grains becomes relatively less important. It is often calculated in frequency domain surveys but rarely in time domain surveys, however it is equally applicable to both domains. Madden and Cantwell (1967) in a major review article felt that "the metal conduction factor.... appears a truer measure of the importance of metallic mineralisation within the rock".

Where the sulphides coincide with the lower resistivities, the metal factor may be expected to enhance the anomalous area, but not to show any unexpected features. Thus on line 650E (Figure 1k) the anomaly/background ratio has been magnified about seven times, but the target has remained unchanged. But where sulphides are associated, but not coincident, with the areas of low resistivity, the metal factor may show additional information. Thus on line 350E (Figure 2i), the metal factor pseudo-section suggests that the southern anomaly is at least as interesting as the northern one; that is, the metal factor has 'corrected for' the lower resistivities (more intense alteration?) of the southern anomaly (350E/675S) which have reduced the IP effect. On 1900E (Figure 9f), the metal factor emphasises that the mineralisation is at depth.

The above three surveys are over anomalies which I have suggested are similar to Sweeney's, i.e. sulphides within predominantly argillic (and/or possibly, sericitic and chloritic) alteration, which gives the lower resistivities. Note that the order of priority is more clearly defined by the metal factor pseudo-section.

Areas 6 and 8 have chargeability anomalies with (mostly) coincident high resistivities; if the style of mineralisation is as for 1, 2, 9, etc, but the alteration is much weaker, then the metal factor will enhance the mineralised areas. If on the other hand, the sulphides in areas 6 and 8 are associated with a resistive style of alteration (e.g. quartz and tourmaline) as has been

supposed, then the metal factor would probably not assist the interpretation. In all likelihood, a variety of mineralisation styles may occur in any one anomalous area, including those of 6 and 8. In area 6 the metal factor is essentially the same as the chargeability pseudo-section, reflecting the fairly uniform resistivities (Figure 6c). The metal factor pseudo-section for area 8 is however quite different to the chargeability (Figure 8): there is little indication of the southern anomaly (1800E/510S) in the metal factor pseudo-section and hence this reinforces the belief that the chargeability anomaly at 435S is not solely due to interference effects between two near-surface anomalies as has been suggested (Howland-Rose 1981b). However it is undoubtedly partly due to the shallow source well defined by the metal factor below 1800E/315S.

CONCLUSIONS

The IP/resistivity surveys have successfully outlined a number of areas of mineralisation/alteration. The detailed surveys described in this report have shown several to be small, separate sources, rather than the single anomaly defined by the original survey (thus justifying the surveying of intermediate lines in each area). These surveys also generally confirmed the original order of priority by Roberts (1981), but some changes are suggested below. Unless otherwise stated, the dipole-dipole results have been used to assess the anomalies.

Areas 1, 2, 3 and 4 have well defined chargeability anomalies with associated resistivity lows. The low resistivities in area 1 (a minimun of 44 ohm-m) suggest much more intense alteration than in the other areas. Area 2 has comparable chargeabilities to 1, but resistivities are nearly an order of magnitude higher (but generally all more deeply seated). Area 2 may have comparable percent sulphides to no. 1. Area 3 cannot be directly compared with 1 or 2 since no dipole-dipole surveys were carried out there,

nevertheless the gradient array data suggests a zone of alteration which is smaller than either 1 or 2 and which contains a lower percentage of sulphides. Results of the gradient array survey over area 4 are perhaps more substantial than those over 3 and the dipole-dipole data certainly indicates a well defined source of (probable) sulphides in an area of alteration. Area 4 is probably a better target than 3. but dipole-dipole surveys are needed over the latter (on lines 1150E and 1200E) before a definite judgement is made.

Area 5 is the first anomaly in the list with a different style of response; it has a definite resistivity high coincident with the chargeability anomaly, with slightly lower resistivities around the anomaly. A core of quartz-tourmaline with some sulphides within a weakly argillised halo is suggested. 5's lower chargeabilities (30+, in the dipole-dipole survey) suggest that this anomaly is a 'step' below areas 1 to 4. Anomaly 6 also has a chargeability anomaly associated with resistivities of 1000-2000 ohm-m. The higher chargeabilities and larger areal extent of 6 compared to 5, suggests that these two should exchage priorities.

Anomaly 7 is a third type of anomaly; it has very variable chargeabilities of quite high value (up to 50 mv/v) with no consistent resistivity response. Mineralisation at the granite contact and/or within the country rock is probable. Thus the mineralisation (i.e. the source(s) of the chargeability responses) may not be one of the types listed under 'Geological Targets'. However the area may be quite prospective for tin in some other style, e.g. skarn mineralisation.

The dipole-dipole survey over area 8 confirmed the position of the original gradient array chargeability anomaly, but down graded its prospectiveness, the dipole-dipole results being less than the 50+ mv/v of the gradient array survey (in contrast to areas 1, 2 and 4). Like areas 5 and 6, the chargeability is associated with high resistivities. Its prospectiveness is perhaps between that of 6 and 5.

Area 9 is probably a weak example of the type 1 to 4 anomalies; i.e. sulphides with (probable argillic) alteration: the resistivity decrease is very slight and chargeabilities are not much more than twice background. However the inferred volume is large and this affects its prospectiveness.

Area 10, like areas 5, 6 and 8 has a volume of high resistivity (1500-2000 ohm-m) coincident with the chargeability high (30+/20). However unlike these anomalies, '10' has definite resistivity decreases (500-900/1000-2000) on either side of the chargeability high. An envelope or halo of argillic alteration around a core of quartz-tourmaline plus sulphides is probable.

Area 12 has an area of slightly lower surface resistivities but the low chargeability anomaly (25+ mv/v) has coincident high-value resistivity (1500 ohm-m), thus it may be grouped with areas 5,6 and 8.

The table below grades the anomalies and classifies them into three types: (A) Sweeney-style (i.e. likelihood of significant sulphides in argillised granite); (B) a Globe or Coleman's style, (i.e. a chargeability high with no corresponding resistivity response): sulphides are probably associated with an enrichment of quartz and tourmaline, and (C) other; the features of which are described in the table. The list is in order or priority.

Area Number	Type
1	A
2	A
4	A
3	A
6	B
9	A
8	B
5	B
12	B
10	C1
7	C2

A: Sulphides within areas of argillic alteration, e.g. Sweeney's: weaker examples, e.g. 9, may have little sulphide.

B: Sulphides (in lower concentration than A) within weakly altered granite or in quartz-tourmaline enriched granite (e.g. parts of the Globe, and Coleman's workings).

C1: A subset of B; an envelope of argillic alteration (lower resistivities) around a core of sulphides in quartz-tourmaline (higher resistivities).

C2: Gradient array IP responses are of short wavelength and variable, with no resistivity lows (dipole-dipole results show a slight decrease near the surface). The responses may be due to sources within the sediments and hence no. 7, not being of the type of target sought, is given lowest priority.

Metal factor pseudo-sections were calculated for several of the dipole-dipole surveys. The parameter is of particular use where sulphides are scattered within areas of argillic (or sericitic and/or chloritic) alteration, i.e. in less resistive areas. It is probably also useful in areas where variable alteration intensity has produced a range of resistivities in the mineralised area. Its use is less clear where sulphides are associated with more resistive alteration; although in areas where there are a variety of alteration styles, the metal factor may be helpful in differentiating the types present. For example, at area 8 where the chargeabilities were mostly associated with high resistivities, the metal factor has accentuated a shallow source of chargeable material that probably occurs within an argillic host (1800E/315S).

RECOMMENDATIONS

Recommendations are made below for further work (including drilling) on two types of anomalies; those which warrant the work purely on the strength of their geophysical responses, i.e. 'stand-alone' anomalies; and those which require additional evidence or encouragement before such undertaking. Recommendations made on anomalies in the former category are labelled group 1 below, while recommendations on the latter are labelled group 2. The anomalies covered by the follow-up surveys on the Agnew Grid are listed below in these groupings in order of priority for further work. This list has been determined using only the geophysical responses, thus the actual order of follow-up will be tempered by geological, geochemical and/or conceptual criteria.

Group 1 Recommendations

Area 1: This area is being drilled as this report is being written (it was stated in the description of this area that the best drill target was about 30m below 650E/840N). If encouraging results are obtained then a dipole-dipole survey is required on 750E (and possibly 800E) and on 550E (and possibly 500E) to define the limits of the mineralisation. If the results are very encouraging, three east-west dipole-dipole lines should be surveyed to define its shape. These could be at 820N, 850N and 880N; the dipole interval might be 50m with possibly larger and smaller distances being tried to obtain information at depth and to obtain better resolution. Applied potential surveys should also be made from the drill holes: potentials should be measured in all the holes as well as on the surface.

Area 2: The gradient array chargeability contour plan (Figure 2g) shows a bommerang shaped body: the dipole-dipole survey on 450E has extended its eastern arm, at depth, to at least 450E, and further surveys are needed on lines 300E, 400E and 500E to properly define the mineralisation's course and limits. Nevertheless the potential of the area can be obtained by drilling targets defined by surveys already carried out. A shallow targ-

et would be 30-40m beneath 350E/525S while a deeper one would be 90-100m beneath 450E/600S. The gradient array chargeability anomaly on 300E is substantial and a third drill hole could be sited on this line from the dipole-dipole survey recommended above.

Area 4: The well defined chargeability/resistivity anomaly on line 1450E can be tested by a drill hole sited to pass 30-40m beneath 1450E/840N. The gradient array chargeability profile suggests that the mineralisation dips near vertically to the north. A similar profile on line 1400E suggests that it dips near vertically to the south. Thus the drilling direction would not be dictated by the geophysics.

Group 2 Recommendations

Area 3: The gradient array surveys of this area suggest smaller volumes of mineralisation than are likely at 1, 2 or 4, however the dipole-dipole survey on 450E in area 2 showed that the gradient array may be a poor indicator of mineralisation at depth. 30m dipole-dipole surveys on lines 1150E and 1200E, centred on 800N and 750N respectively are recommended.

Area 6: Dipole-dipole surveys on 1700E and 420S revealed quite high chargeabilities (55+ mv/v), but there is no corresponding drop in the resistivities. The mineralisation could be tested by a drill hole targeted 30-40m beneath 1700E/420S, however (because of the area's proximity to the granite/sediment contact) detailed geological mapping together with completion of the magnetics is recommended first.

Area 9: A large volume of weak alteration plus some sulphide at depth is inferred from the dipole-dipole survey on 1900E. The metal factor has defined 2 areas of higher concentration. The better one may be tested by drilling to intersect about 100m below 1900E/1095N.

Area 8: A drill collared near 1800E/360S and dipping to the north would test the well-defined metal factor anomaly. The

deep seated chargeability anomaly beneath 435S, and the large gradient array response at 1800E/510S, could be tested by collaring at 1800E/540S and drilling to the north (at a collar angle of about 45°) for at least 150m.

Area 5: The dipole-dipole survey on 1700E has defined a weak but 'drillable' anomaly, however the gradient array response on line 1750E is probably a 'better' anomaly than that on 1700E, and a dipole-dipole survey would be recommended on 1750E (centred on 1055N) before any drilling.

Area 10: A drill hole targeted to pass 30-40m beneath 2000E/330N would test the weak chargeability anomaly.

Area 12: A drill hole collared near 500E/360S and dipping at 45-50° to the north for at least 120m would test the broad chargeability anomaly.

Area 7: This anomaly is listed last since the character of the anomalies and probable position of the contact suggest that the responses are not due to sources within the granite. That is, they are unlikely to be due to any of the target types listed in the report. Nevertheless the anomalies may still be quite prospective; the chargeabilities recorded (60+ mv/v) were larger than several of the areas given higher priority. Detailed geological mapping and completion of the magnetics is recommended.

Also recommended is the calculation and plotting of the chargeability decay parameter ΔM for the Federation and Agnew Grids (to be plotted and contoured on 1:5,000 scale maps).

J.R. BISHOP
JANUARY, 1982.

JRB/amd

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APPENDIX

An extract from

'Notes on Geophysical Surveys over
Heemskirk Granite for Renison Limited'.

by

P.A. ROBERTS
(Sept., 1980)

1. LOCATION

Two areas:

1.1. Federation: ~50 line km of grid, lines spaced 100m, pegs spaced 30m along lines. Surveyed in two stages:

(i) 1977/78 (Scintrex Report Tas-052) gradient array I.P. on original 30 line km + 2.6 line km follow-up,+ magnetics.

(ii) 1979/80 (Scintrex Report Tas-074) gradient array I.P. on 17 new line km (extensions to South and West), + magnetics.

1.2. Sweeneys (Scintrex Report Tas-047 and Tas-050) detailed gradient array I.P. on closely spaced lines and roads, as well as some down-hole surveys + magnetics.

2. AIM OF SURVEYS

To locate hidden or sub-cropping stanniferous mineralization with which sulphides ± hematite/magnetite are associated (i.e. not searching for sulphides as such).

3. GENERAL GEOLOGY

3.1. Two granite phases within Heemskirk Granite

(i) 'Red' Granite. Older, ranges from c.g. to f.g. sometimesporphyritic. Characterized by pink K-feldspar, fresh character of biotite, absence of muscovite, in field.

(ii) 'White' Granite. Younger, ranges from c.g. to f.g., rarely porphyritic. Characterized by white K-feldspar, presence of muscovite (particulary in coarser grained variety), presence of disseminated tourmaline away from intra-granite contact, in field.

A possible third phase is aplite in dykes or irregularly shaped small intrusions. Usually classified with 'white' granite, but mapped by Klominsky as intruding c.g. 'white' granite in places.

Granite Type	Chemistry (from Klominsky, 1972 Ph D thesis)												
	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	H_2O^+	H_2O^-
'Red'	75.2	0.2	12.7	0.6	1.3	0.04	0.3	0.7	2.9	5.2	0.04	0.6	0.3
'White'	74.4	0.2	13.6	0.3	1.5	0.04	0.4	0.8	2.8	5.0	0.10	0.7	0.2

Petrologically: very similar, both vary between granite and adamellite. Distinguished by accessories:

(i) 'Red' - zircon, magnetite, apatite, xenotime, fluorite (sphene, allanite, hematite).

(ii) 'White' - tourmaline, muscovite, fluorite (all introduced rather than primary?)

3.2. Contacts between 'red' and 'white' are sharp but 'white' not generally chilled. Contact commonly associated with high concentration of tourmaline/quartz nodules in both 'red' and 'white'. In general, contacts are near horizontal.

4. TARGET MINERALIZATION

4.1. Stanniferous greisen. Primary target on Federation Plateau; anticipated orebody large (>10 million tonnes, say) and low grade (0.1 - 0.5% Sn). C.g. greisen veins rare and may contain Sn but no sulphide. F.g. greisen veins in granite at Black Face on Federation Plateau: they bulk 0.02 - 0.09% Sn + minor pyrite (1 -2% S) and are, therefore, a sub-grade version of the target. The anticipated shape of such a body is roughly equidimensional but the top may be flat, if controlled by granite contacts.

4.2. Sericitic alteration. Rarely outcropping but shown to be common by diamond drilling. Contains patchy Sn. Mineralogy: sericite ± pyrite (up to 4% S) ± hematite/magnetite ± residual quartz ± sphalerite. Significance of this mineralization type unknown and further work (including drilling) required. May halo a higher grade orebody in pipe or fault-bound situation. Shape is probably roughly equidimensional, or elongate parallel to fault orientation(s).

4.3. Quartz/tourmaline/topaz alteration 'dykes' (so called 'white dykes'). Main source of Sn on Federation Tin Field: cassiterite in central fissures and, to a lesser extent, in tourmalinized granite selvedges, generally in short Sn-rich shoots. May contain pyrite ± sphalerite but not always. Larger bodies generally contain minor sulphide in patches but not usually throughout. Tabular bodies usually near-vertical but drilling at West Federation has shown very shallow dipping 'lode' which appears to have better tonneage potential than the near-vertical 'dykes'. Generally enclosed in argillic alteration envelope.

4.4. Polymetallic sulphide. Main example is Sweeneys, where a significant body of mineralization has been located (sub-economic). Characterized by high sulphide (10% S). Ore mineralogy: pyrite, sphalerite, cassiterite, stannite, arsenopyrite, jamesonite, galena, chalcopyrite. Body appears to be an irregular pipe-shape, sub-vertical towards bottom, flattening towards top, but drilling

results difficult to interpret. Major economic potential. Lies in argillic alteration envelope. Gangue: sericite, chlorite, siderite, quartz.

5. GEOPHYSICAL METHODS

5.1. Gradient array I.P. Used on all areas. Justified by:

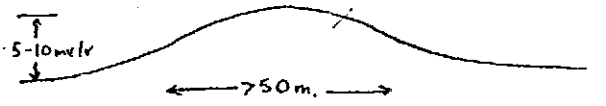
(i) Cost and convenience in rugged terrain.

(ii) Effective at Sweeneys (Scintrex Report Tas-047 and Tas-050).

Reading spacing 10m for maximum resolution.

(i) Sweeneys - chargeability response (≤60mv/v over background), along lines, limited to within ~50m near or over outcropping mineralization. Resistivity reduced to 200Ωm. over mineralization, is unexpectedly high. Chargeability seems best response to look for with reconnaissance methods.

As Sweeney mineralization is the most sulphide-rich, results indicate that reconnaissance work should be along lines spaced 100m maximum. Also follow-up of subtle anomalies necessary particularly those of the form:



(ii) Federation - anomalies smaller (c.f. Sweeneys). Some relate to known mineralization and some known mineralization (e.g. West Federation) not indicated very well (with W. Federation, shallow dip of sulphide zone is probably the reason). Clear response over sericite alteration zones (Fed. 7, E. Federation, Waxman & Westons) and sulphide-bearing tourmaline lodes (e.g. Black Face). Fed. 7 response surprising because of absence of sulphide (alteration from 0 - 44m depth contained <0.1% S).

5.2. Magnetics. Ground proton magnetics. Justified by:

(i) Cheapness of method.

(ii) Presence of hematite/magnetite in alteration/mineralization.

Reading spacing 10m for maximum resolution.

(i) Sweeneys - results obscured by metallic debris. Appears to be 20 - 40% low over mineralization.

(ii) Federation - 'White' granite very flat response. 'Red' granite flat in North part of grid but becomes noisier to south (possibly as 'red' granite thickens reflecting accessory magnetite?) Clear response over sericitic alteration.

5.3. Results on different alteration/mineralization types.

(i) Greisen. Good response at Black Face but may also reflect arsenopyrite-rich zone at North end and argillic alteration (membrane IP effect?)

(ii) Sericitic alteration. Characteristic chargeability/magnetic signature in areas of low magnetic noise (i.e. background ± 10γ). Chargeability response partly due to sericite/clay content.

(iii) Quartz/tourmaline/topaz. Where sulphide associated, chargeability response. Flat-dipping lodes not picked up (limitation of gradient array?).

(iv) Sweeneys. Good chargeability, moderate resistivity responses. Given limited aerial extent of body, reconnaissance for other "Sweeneys" should be on close-spaced lines (≤100m) with follow-up of subtle chargeability responses irrespective of resistivity because of large volume of unmineralized, high resistivity (2000 - 10000Ωm), low chargeability (≤10mv/v) granite "sampled" by gradient array. Magnetics response of limited value but not primary technique.

TABLE 1 - AGNEW GRID DETAILED IP COVERAGE.

Surveyed by : Scintrex
Date : Nov-Dec., 1981
Data in : Scintrex Report TAS-093A and this report (Mitre Geophysics report RN/MG82/03)

Gradient Array Dipole Spacing (& stn spacing) : 10m
Dipole-dipole array dipole spacing : 30m (to n=5)
IP Receiver : IPR-8 (occasionally IPR-10): 2 secs on, 2 secs off.

(Dipole-dipole coverage is defined as being between points with full n=1 to n=5 coverage)

AREA 1

Line	Current electrodes Coverage
Gradient Array	620N and 1120N on 700E
550E	775N - 1005N
600E	755N - 995N
650E	755N - 995N
700E	755N - 995N
725E	755N - 995N
750E	755N - 995N
Dipole-dipole	
600E	765N - 975N
650E	765N - 975N
650E	765N - 975N
650E (15m dipole)	802.5N - 907.5N
700E	765N - 975N

TABLE 1. (Cont.)

AREA 2

Gradient Array	960S & 360S on 350E
250E	785S - 545S
300E	785S - 555S
350E	785S - 525S
400E	785S - 545S
450E	785S - 545S
Dipole-dipole	
350E	705S - 495S
450E	735S - 525S
570S	245E - 455E

AREA 3

Gradient Array	530N & 1030N on 1100E
1050E	695N - 925N
1100E	685N - 925N
1150E	665N - 905N
1200E	665N - 905N
1250N	665N - 895N

AREA 4

Gradient Array	590N & 1090N on 1500E
1350E	725N - 965N
1400E	715N - 955N
1450N	715N - 965N
1500E	685N - 965N
Dipole-dipole	
1450E	765N - 975N

TABLE 1. (Cont.)

AREA 5

Gradient Array	740N & 1240N on 1700E
650E	875N - 1095N
1700E	875N - 1105N
1750E	875N - 1115N
Dipole-dipole	
1700E	855N - 1065N

AREA 6

Dipole-dipole	
1700E	525S - 315S
420S	1695E - 1905E

AREA 7

Gradient Array	600S & 00 on 2150E
2100E	485S - 185S
2150E	485S - 185S
2200E	485S - 185S
Dipole-dipole	
2150E	405S - 195S

AREA 8

Dipole-dipole	
1800E	585S - 225S

AREA 9

Gradient Array	860N & 1360N on 1950E
1900E	985N - 1225N
1950E	985N - 1225N
2000E	985N - 1215N

TABLE 1. (Cont.)

AREA 9 (Cont.)

Dipole-dipole	
1900E	1005N - 1215N

AREA 10

Dipole-dipole	
2000E	225N - 435N

AREA 12

Dipole-dipole	
500E	405S - 195S

787045

13 MAY 1982

MICROFILMED

AN EVALUATION OF GEOPHYSICAL SURVEYS OVER THE AGNEW GRID, HEEMSKIRK GRANITE, E.L. 11/76 AND SPL 129

82-1742

Dept of Mines | A.O. | C.G. | E.O. | D.S.M.E | Registrar
Received 13 MAY 1982
Answered
DEPT. OF MINES
REF. No: 3591/82

VOLUME 2

RN/MG82/03

Figure A Location diagram, 1:50,000
B Interpretive geology, 1:25,000
C Chargeability contours, 1:5,000
D Resistivity contours, 1:5,000
E Anomalous areas, 1:25,000

1a Composite profiles, line 550E
b " " " 600E
c " " " 650E (with Fig. 1a)
d " " " 700E
e " " " 725E
f " " " 750E (with Fig. 1e)
g " " " 800E
h Chargeability contours 1:2,000
i Resistivity contours 1:2,000
j IP model results - vertical dyke
k Dipole-dipole IP results over line 650E

2a Composite profiles, line 250E
b " " " 300E
c " " " 350E (with Fig. 2a)
d " " " 400E
e " " " 450E (with Fig. 2a)
f Dipole-dipole IP results, line 570S
g Chargeability contours 1:2,000
h Resistivity contours 1:2,000
i Dipole-dipole IP results, line 350E

Figure 3a	Composite profiles, line 1050E
b	" " " 1100E
c	" " " 1150E (with Fig. 3a)
d	" " " 1200E
e	" " " 1250E (with Fig. 3a)
f	Chargeability contours, 1:2,000
g	Resistivity contours, 1:2,000
4a	Composite profiles, line 1350E
b	" " " 1400E
c	" " " 1450E (with Fig. 4a)
d	" " " 1500E
e	Chargeability contours, 1:2,000
f	Resistivity contours, 1:2,000
5a	Composite profiles, line 1650E
b	" " " 1700E
c	" " " 1750E (with Fig. 5a)
d	Chargeability contours, 1:2,000
e	Resistivity contours, 1:2,000
6a	— see Fig. 5b (1700E)
b	Composite profiles, line 1800E
c	Dipole-dipole IP results, line 420S
7a	Composite profiles, line 2100E
b	" " " 2150E
c	" " " 2200E
d	Chargeability contours, 1:2,000
e	Resistivity contours, 1:2,000
8.	Dipole-dipole IP results, line 1800E
9a	Composite profiles, line 1900E
b	" " " 1950E
c	" " " 2000E
d	Chargeability contours, 1:2,000
e	Resistivity contours, 1:2,000
f	Dipole-dipole IP results, line 1900E
10.	— see Fig. 9c (2000E)
11.	—
12.	Composite profiles, line 500E

044

787047

St. Dizier Leases

ST. DIZIER

Mt. Heemskirk

Dg
(Heemskirk Granite)

RENISON LTD.
E.L. 11/76

Granville

Harbour

Road

SOUTHERN OCEAN

Tenth

Legion

AGNEW GRID

Federation area

Mt. Agnew

Fault

East Heemskirk Grid

Globe Grid

Federation Grid

Sweeney's Grid

Trial

Harbour

Road

QUEEN HILL

Zeehan

MT LYELL MG. & RLY. Co. Ltd.
S.P.L. 129

Area D

Mt. Zeehan

Trial Harbour

Remine

Little

Henty

River

Firewood siding

Fault

350

LEGEND:

- Permian & younger
- S D — Silurian & Devonian sediments
- OS — Ordovician Sediments
- € — Cambrian sediments & volcanics
- P€ — Precambrian units
- €b — Cambrian basic & ultrabasic
- Dg — Devonian Granite intrusives
- Traverse Line Systems

5 cm

82-1749 (Vol 05 2|2)

MITRE GEOPHYSICS PTY. LTD.

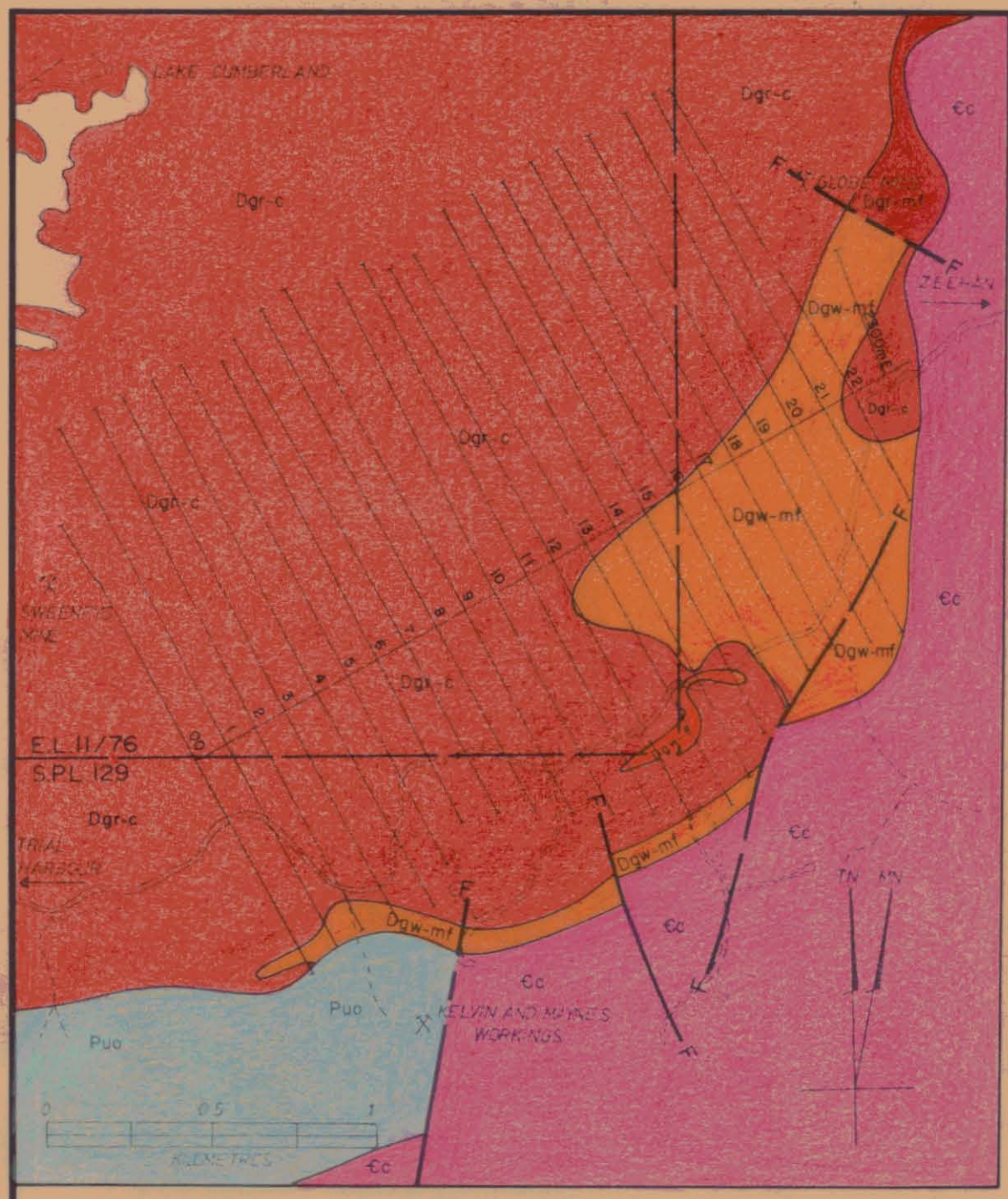
AGNEW GRID

LOCATION PLAN

DRAWN: J.B.	SCALE: 1:50,000	FIG.A
TRACED: T.G.D.S.	DATE: March 1982	

045

7870048



LEGEND

€c	Cambrian Crimson Creek Formation
Puo	Upper Proterozoic Oonah Formation

DEVONIAN HEEMSKIRK GRANITE

Dgr-c	"Red" granite - coarse grained	Dgw-mf	"White" granite - medium/fine grained
Dgr-mf	"Red" granite - medium/fine grained	Dgw-f	Aplite granite

——— Geological contact

F—F Fault

5 cm

82-1749 (Vol 2/2)

MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID

Interpretive Geology

Drawn by P.A.R.	Scale. 1:25,000	FIG. B
Traced by T.G.D.S.	Date. March 1982	

(figure 2 from Roberts, 1981)

Ref. RN/MG 82/03

LAKE

CUMBERLAND

E.L.11/76

S.P.L.129

Gradient block boundary

Gradient block boundary

SURVEY BY: Scintrex, 1981 (TAS-ORIO) Ref: RN/MG82/03

787049

5 cm

COLOUR LEGEND

- >50 mv/v
- 40 - 50
- 30 - 40
- 20 - 30
- 10 - 20
- 0 - 10

82-1742 (Vol 3/3) MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID

CHARGEABILITY CONTOURS

(reconnaissance survey)

DRAWN: Scintrex	SCALE: 1:5000	FIG. C
TRACED: T.G.D.S.	DATE: March 1982	

2744

LAKE

CUMBERLAND

E.L.11/76

S.P.L.129

1 2 3 4 5 6 7 8 9 10 11 12

COLOUR LEGEND

- <200 ohm-m
- 500 - 200
- 1000 - 500
- 2000 - 1000
- 3000 - 2000
- >3000

787050

5 cm

82-1749
CV01 2/2

MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID

RESISTIVITY CONTOURS

(reconnaissance survey)

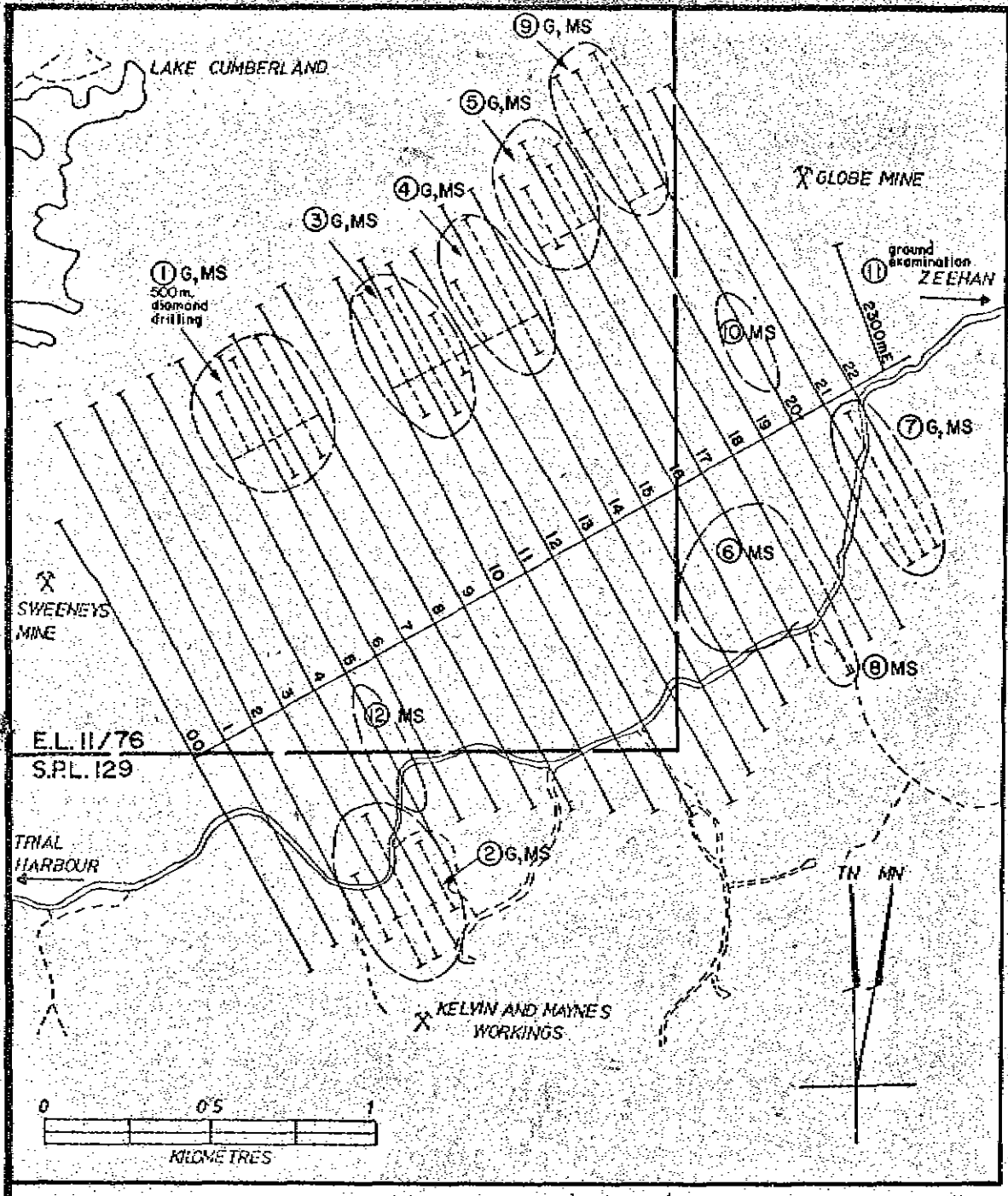
DRAWN: Scintrex	SCALE: 1:5000	FIG. D
TRACED: T.G.D.S.	DATE: March 1982	

SURVEY BY: Scintrex, 1981 (TAS-ORID) Ref: RN/MG82/03

2745

046

787051



LEGEND

② Anomaly number

Proposed new grid line, pegged at 30m. intervals

G Gradient array I.P. recommended

MS Moving source array (pole-dipole or dipole-dipole) I.P. recommended.

5 cm

(figure 7 from Roberts, 1981)

Ref. RN/MG 82/03

82-1749 C\01 8(7)

MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID

Anomalous Areas

Drawn by P.A.R.	Scale. 1:25,000
Traced by T.G.D.S.	Date. March 1982

FIG.E

Geochemistry
P P M

I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (– – –)
RESISTIVITY (Ohm)
CHARGEABILITY (mv/v)
POLE - DIPOLE OR DIPOLE - DIPOLE

Total Magnetic Field (γ)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

550E

650E

Creek

780N 900 1000N

630N 750 900 1050 1110N

1550 1620 1750

78705?

82-1746
(Vol. 2/2)

RENISON LIMITED

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINES 550E, 650E

SECTION LOOKING WEST

SCALE. 1: 2000 METRES

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	

Fig. 1a, 1c

I.P. DATA
CHARGEABILITY & RESISTIVITY
—— Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

Ref RN/M682/03

5 cm

ALTERATION
Quartz and topaz and / or tourmaline
Total tourmalinization, occasionally with hematite
Hydrothermal
Collapse
Breccias
White Alteration Dykes
Argillic alteration
Green alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite
Major lineament
F Fault
Definite
Approximate
Inferred
Geological boundaries

2746

7746

Geochemistry
P P M

600
300
100
50
10

NO ASSAY

(890) 11220ppb (1020)

540S 480S 300S 150S 00 150N 300N 450N 600N 750N 900N 1050N 1140N

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (----)

50 45 40 35 30 20 10 0
5000 4000 3000 2000 1000

POLE-DIPOLE OR DIPOLE-DIPOLE

RESISTIVITY (Ωm)
– n = 1
– n = 2
– n = 3
– n = 4
– n = 5

CHARGEABILITY (mV/V)
– n = 1
– n = 2
– n = 3
– n = 4
– n = 5

Total Magnetic Field (γ)

62 550
62 510
62 470
62 430
62 390
62 350

540S 480S 300S 150S 00 150N 300N 450N 600N 750N 900N 1050N 1140N

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

600 550 500 450 400 350 300 250 200 150 100 50 00

Cs. Rd. Pit in argillized granite Cs. Cs. Cs.

540S 480S 300S 150S 00 150N 300N 450N 600N 750N 900N 1050N 1140N

787053

2747

CVal 3182
82/749

RENISON LIMITED

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 600E

SECTION LOOKING WEST

SCALE. 1: 2000 METRES

40 0 40 80 120

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	
Fig.	1b

I P DATA

CHARGEABILITY & RESISTIVITY

——— Gradient Array

S Anomaly letter number

MAGNETICS

5 cm

Ref RN/MG82/03

GEOCHEMISTRY

Sn
Cu
Pb
Zn
As
W

ALTERATION

Quartz and topaz and/or tourmaline
Total tourmalinization, occasionally with hematite
Hydrothermal
Collapse
Breccias
White alteration "dykes"
Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND

ROCK TYPES

Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite

Major lineament
F F Fault
Definite
Approximate
? Inferred
Geological boundaries

2747

Geochemistry
p.p.m.

I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (– – –)

POLE-DIPOLE OR DIPOLE-DIPOLE
RESISTIVITY (Ωm)
CHARGEABILITY (mV/V)
– n x 1
– n x 2
– n x 3
– n x 4
– n x 5

Total Magnetic Field (X)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

787034

82-1748
(Vol. 2/2)

RENISON LIMITED	DRAWN
AGNEW GRID E.L. 11/76 & S.P.L. 129	TRACED
LINE 700E	DATE
SECTION LOOKING WEST	SCALE 1:2000
SCALE. 1: 2000 METRES	DRAWING No.
0 20 40 60 80 120	Fig. 1d

Ref R1/M082/03

I P DATA
CHARGEABILITY & RESISTIVITY
—— Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

ALTERATION
Quartz and topaz and/or tourmaline
Total tourmalinization, occasionally with hematite
Hydrothermal
Collapse
Breccias
White Alteration Dykes"
Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite
Major lineament
Fault
Definite
Approximate
Inferred
Geological boundaries

2748

5 cm

2748

Geochemistry
P.P.M

I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ωm-METRES (----)
POLE - DIPOLE OR DIPOLE - DIPOLE
RESISTIVITY (Ωm)
n = 1
n = 2
n = 3
n = 4
n = 5
CHARGEABILITY (mv/v)
n = 1
n = 2
n = 3
n = 4
n = 5

Total Magnetic Field (γ)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

725E

750E

Creek

787055

2749

(Vol 2/3)
3-2-1748

RENISON LIMITED

AGNEW GRID. E.L. 11/76 & S.P.L. 129

LINES 725E, 750E

SECTION LOOKING WEST

SCALE, 1: 2000 METRES

DRAWN	
TRACED	
DATE	
SCALE	1: 2000
DRAWING No.	

Fig. 1e, 1f

Ref: RN/MGB2/03

I.P. DATA
CHARGEABILITY & RESISTIVITY
Gradient Array
S Anomaly letter number.

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

ALTERATION
Quartz and topaz and/or tourmaline
Total tourmalinisation, occasionally with hematite
Hydrothermal
Breccias
Collapse
White Alteration Dykes
Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite
Major limestone
F Fault
Definite
Approximate
Interred
Geological boundaries

2749

2749

Geochemistry
P P M

600
300
100
50
10

630S 600S 450S 300S 150S 00 150N 300N 450N 600N 750N 900N 1050N 1140N

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)

50
40
30
20
10
0

RESISTIVITY IN Ohm-METRES (- - - -)

5000
4000
3000
2000
1000
600

Total Magnetic Field (γ)

62 560
62 510
62 470
62 430
62 390
62 350

600

630S 600S 450S 300S 150S 00 150N 300N 450N 600N 750N 900N 1050N 1140N

Topography & Geology

HEIGHT ABOVE SEA LEVEL - (metres)

600
550
500
450
400
350
300
250
200
150
100
50
00

Track Rd Ck Ck Ck Ck

787056

630S 600S 450S 300S 150S 00 150N 300N 450N 600N 750N 900N 1050N 1140N

2750

CVal 2(2)
82-1746

RENISON LIMITED

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 800E

SECTION LOOKING WEST

SCALE 1: 2000 METRES

40 0 40 80 120

5 cm

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	Fig. 1g

I P DATA

CHARGEABILITY & RESISTIVITY

Gradient Array

S Anomaly letter number

MAGNETICS

Ref RN/MG82/03

GEOCHEMISTRY

Sn
Cu
Pb
Zn
As
W

ALTERATION

Quartz and topaz and/or tourmaline

Total tourmalinization, occasionally with hematite

Hydrothermal

Collapse

Breccias

White Alteration Dykes

Argillic alteration

"Green" alteration (sericitized granite) generally with hematite or pyrite

Quartz - mica greisen

Area of tourmaline nodules

LEGEND

ROCK TYPES

Aplite or metagranite

Fine grained

Medium grained

White granite

Porphyritic granite

Medium grained

Coarse grained

Red granite

Major lineament

F F Fault

Definite

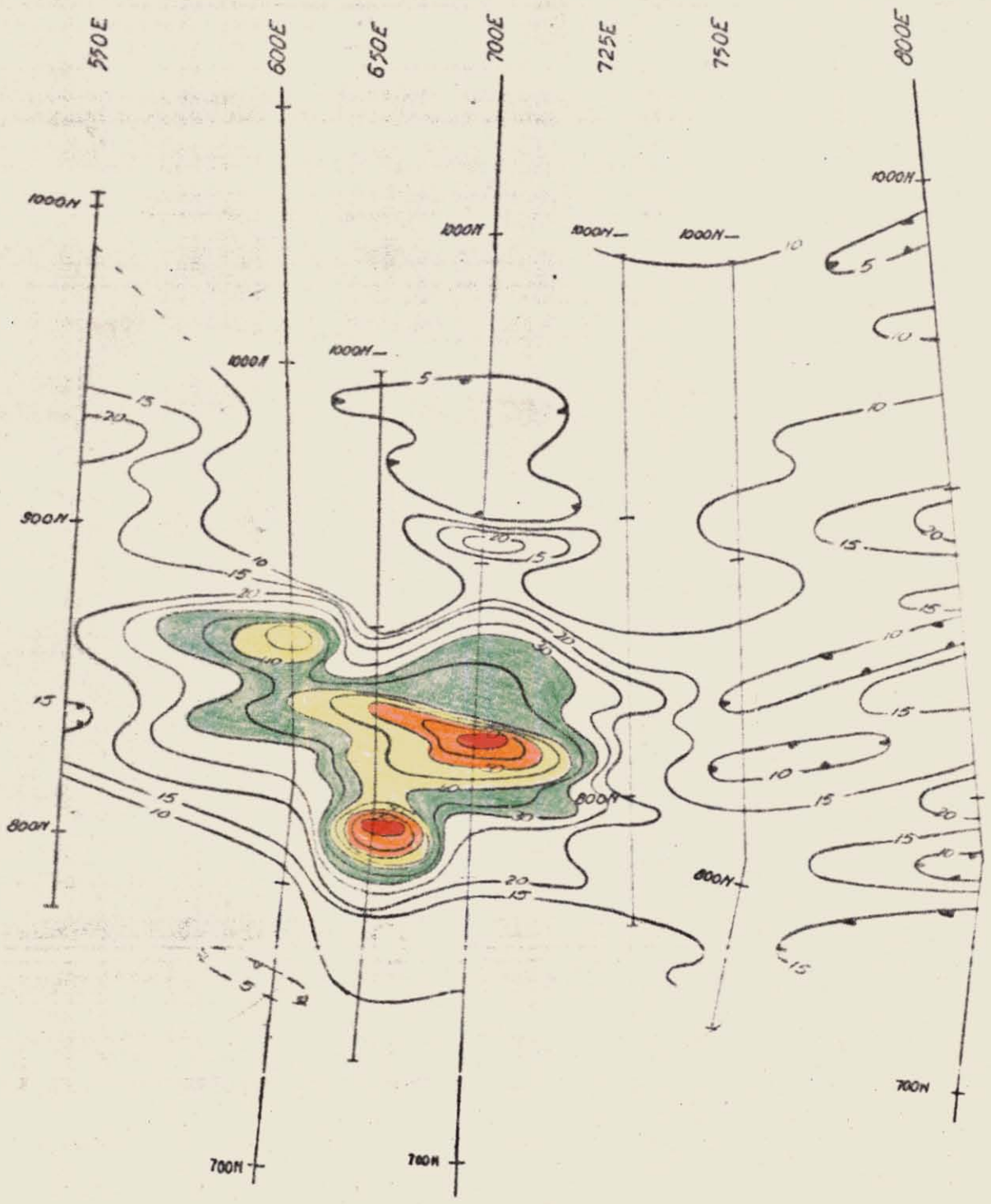
Approximate

Inferred

Geological boundaries

2750

047



Survey by: Scintrex, 1981
dipole spacing (& stn. interval): 10m.

787057

82-1749 (Vol 2/2)

5 cm

(figure from Howland-Rose 1981b) Ref. RN/MG 82/03

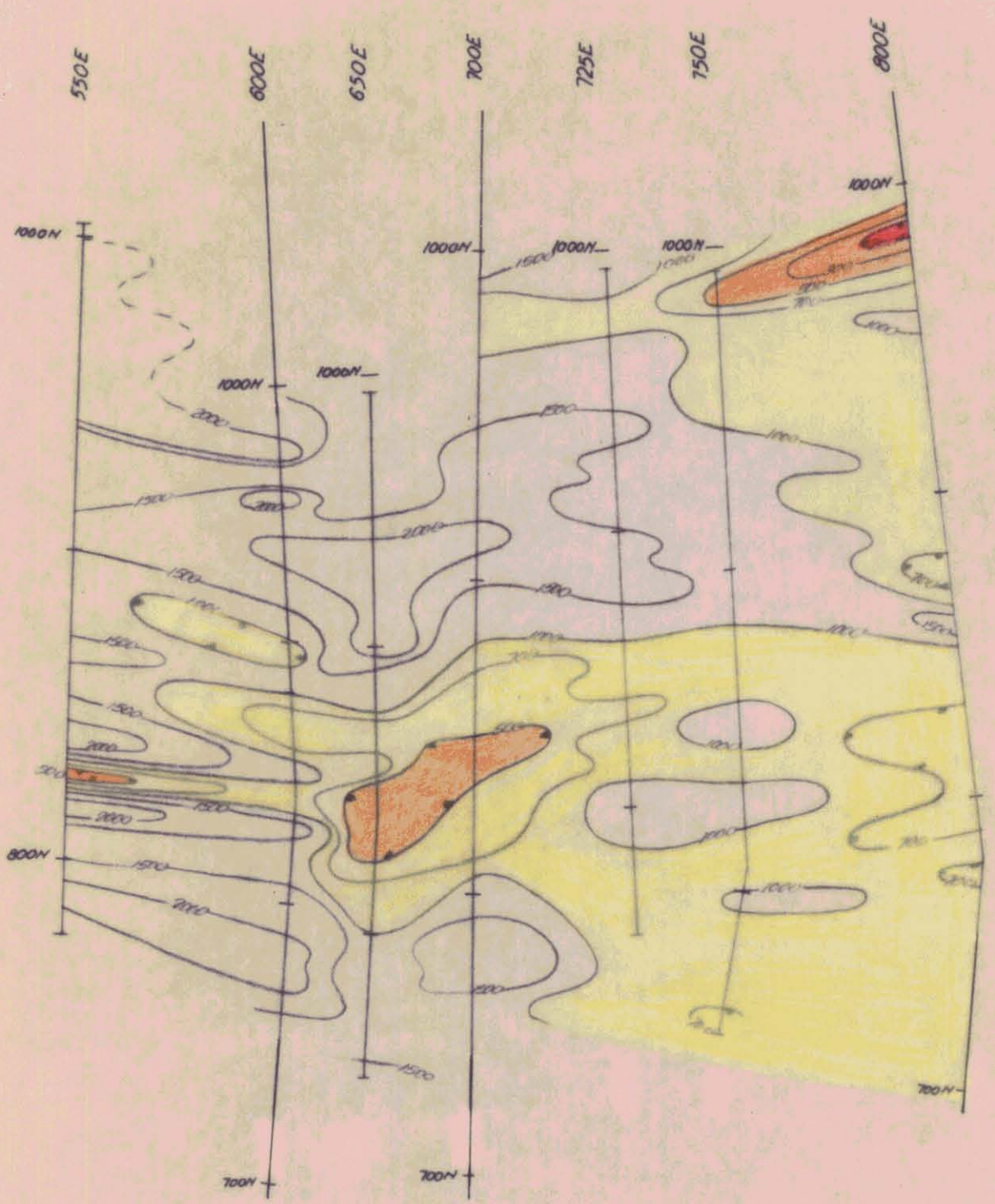
MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA I.

Chargeability Contours

Drawn by Scintrex	Scale 1:2000	FIG. 1h
Traced by T.G.D.S.	Date March 1982	

043



Survey by Scintrex, 1981
dipole spacing (& stn interval) 10m

787058

82-1749 (Vol 2b)

5 cm

(figure from Howland-Rose, 1981b) Ref. RN/MG 82/03

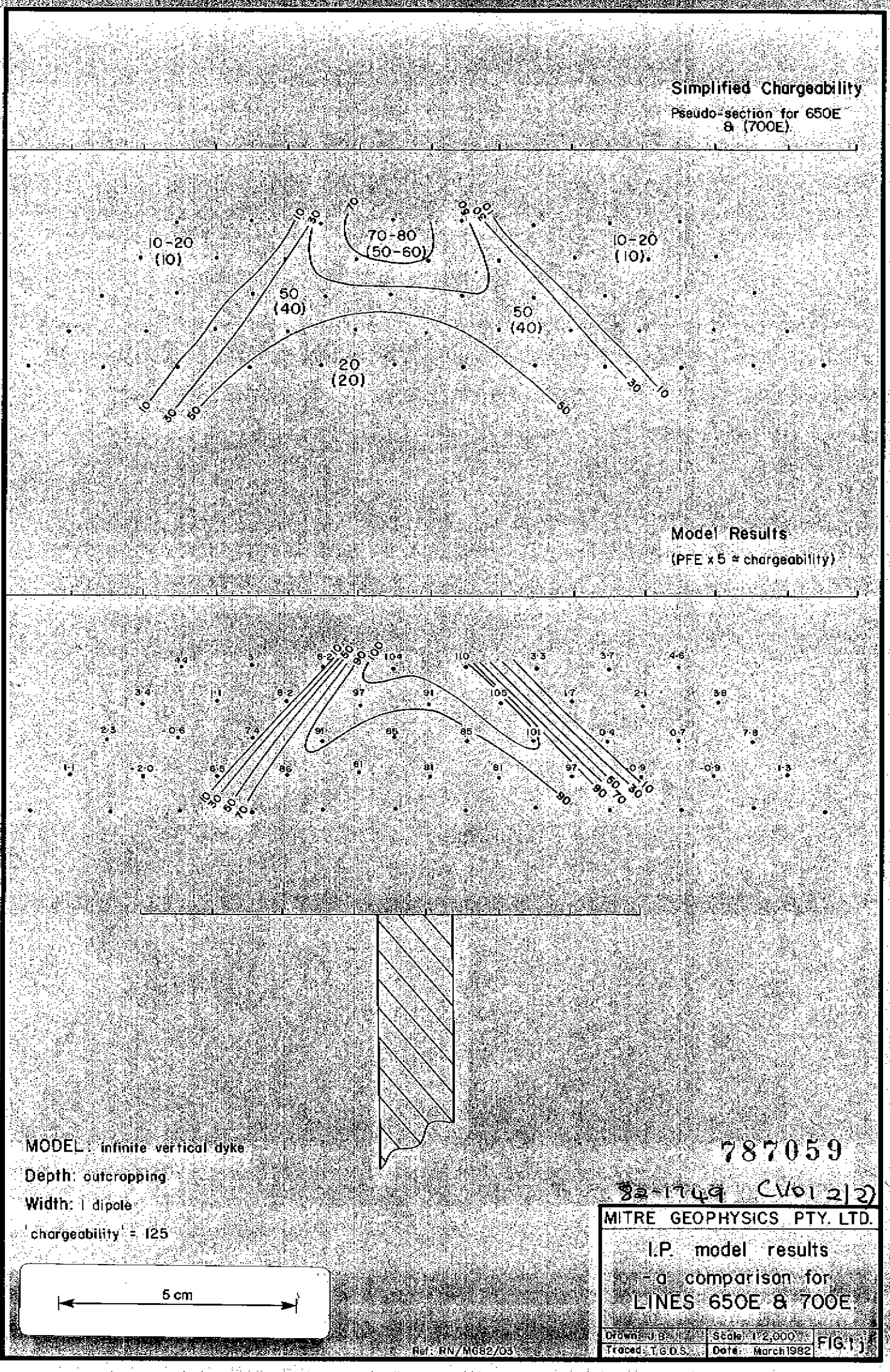
MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA I.

Resistivity Contours

Drawn by Scintrex	Scale 1:2000	FIG. 1i
Traced by T.G.D.S.	Date March 1982	

049



787059

82-1749 (Vol 2)

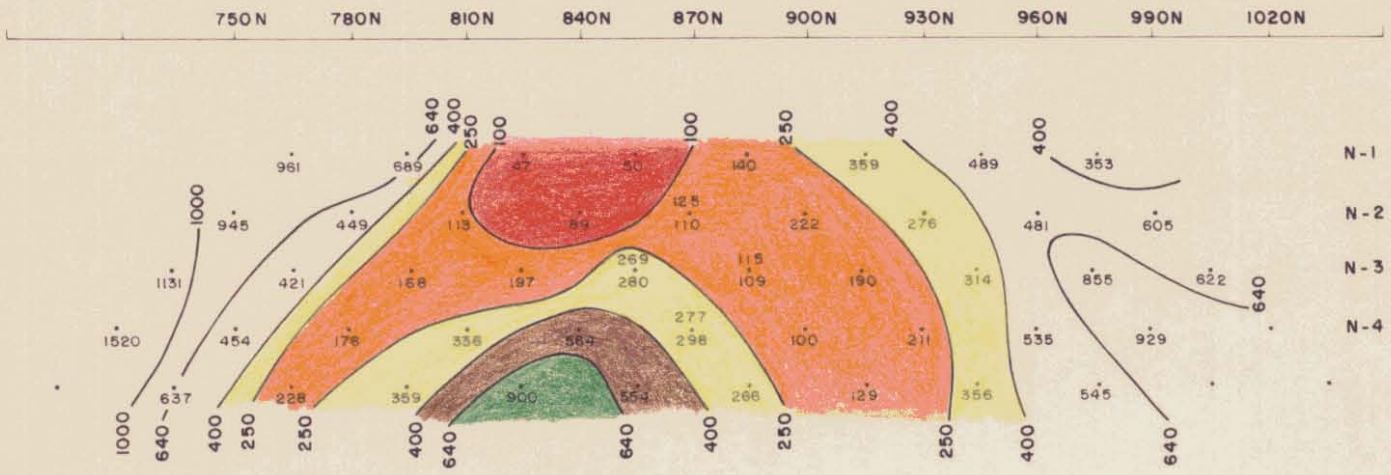
MITRE GEOPHYSICS PTY. LTD.

I.P. model results

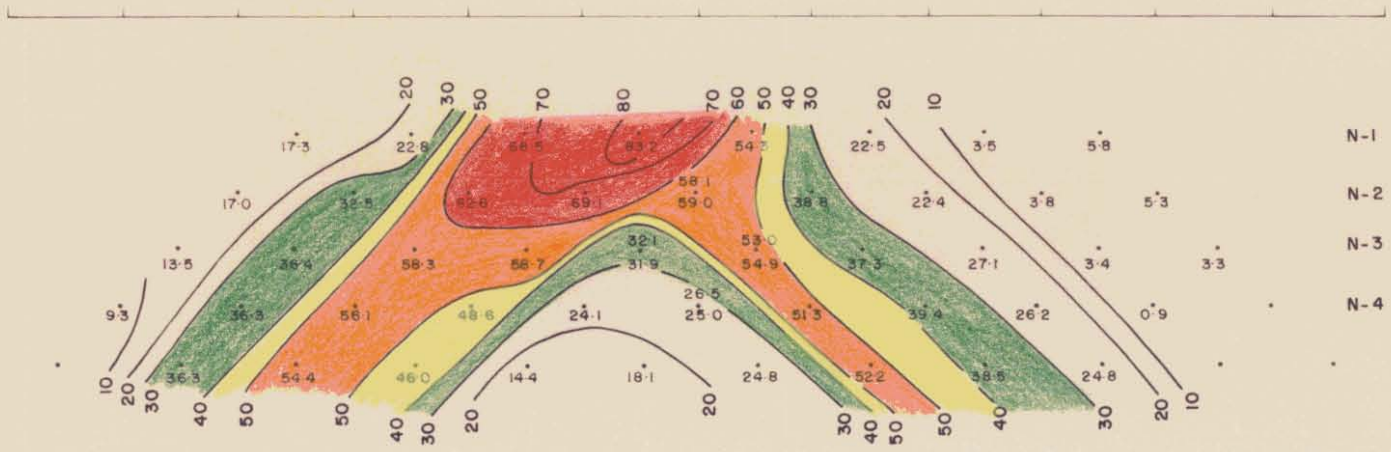
- a comparison for LINES 650E & 700E

Drawn: J.B.	Scale: 1"2,000'	FIG 1
Traced: T.G.O.S.	Date: March 1982	

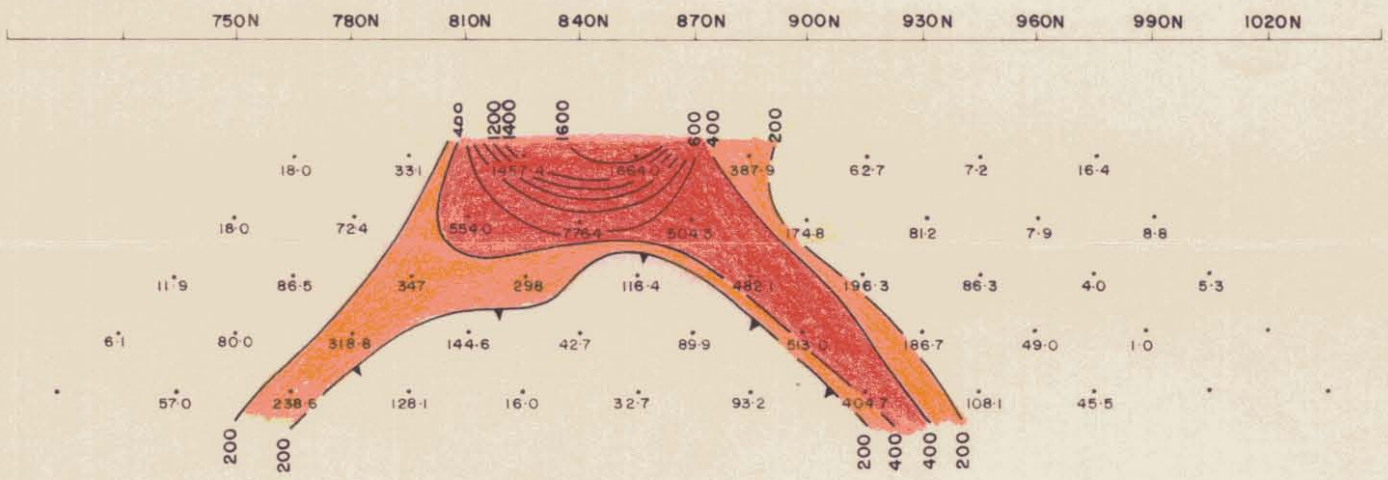
LINE: 650 E.



RESISTIVITY
(ohm-m)



CHARGEABILITY
(mv/v)



METAL FACTOR

Survey by: Scintrex, 1981
dipole spacing: 30m
I.P. receiver: IPR-10
(2secs on 2secs off
M_3 plotted)

Ref. RN/MG82/03

82-1749 (V01 2/2)

87060

MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID

LINE 650E.

dipole-dipole I.P.

Drawn: Scintrex/J.B. | Scale: 1:2000

Traced: T.G.D.S. | Date: March 1982

FIG. 1k

5 cm

Geochemistry

P.P.M.

600
300
100
50
10

7800S 750 600 540S

900S 750 600 450 390S

Cu
Pb
Zn

7800S 750 650 540S

Sample Road

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)

RESISTIVITY IN Ohm-METRES (- - -)

50
40
30
20
10
0

5000
4000
3000
2000
1000

7800S 750 600 540S

900S 750 600 450 390S

7800S 750 650 540S

POLE - DIPOLE OR DIPOLE - DIPOLE

RESISTIVITY (Ωm)

n=1
n=2
n=3
n=4
n=5

CHARGEABILITY (mv/v)

n=1
n=2
n=3
n=4
n=5

Total Magnetic Field (γ)

62 550
62 510
62 470
62 430
62 390
62 350

62 707
63 438
63 610

Topography & Geology

HEIGHT ABOVE SEA LEVEL - (metres)

600
550
500
450
400
350
300
250
200
150
100
50
00

250E

Road
Creek

350E

Creek
Road

450E

Track
Creek
Track
Road

7800S 750 600 540S

900S 750 600 450 390S

.787061

RENISON LIMITED (80-116) (Vol 2)

AGNEW GRID . E.L. 11/76 & S.P.L. 129

LINES 250E, 350E, 450E.

SECTION LOOKING WEST

SCALE. 1: 2000 METRES

0 20 40 60 80 100

5 cm

DRAWN	
TRACED	T.G.D.S.
DATE	APRIL '82
SCALE	1 2000
DRAWING No.	

Fig. 2a,2c,2e

Ref: RN/M062/03.

I P DATA

CHARGEABILITY & RESISTIVITY

—— Gradient Array.

S Anomaly letter number

MAGNETICS

GEOCHEMISTRY

Sn
Cu
Pb
Zn
As
W

LEGEND

ALTERATION

Quartz and topaz and/or tourmaline

Total tourmalinization, accessorily with hematite

Hydrothermal Breccias

Collapse

White Alteration Cycles.

Argillic alteration

"Green" alteration (sericitized granite) generally with hematite or pyrite

Quartz - Mica greisen

Areas of tourmaline nodules

ROCK TYPES

Aplite or microgranite

Fine grained White granite

Medium grained

Porphyritic granite:

Medium grained Red granite

Coarse grained

Major lineament

E F Fault

Definite

Approximate Geological boundaries

Inferred

2751

Geochemistry
P.P.M

600
300
100
50
10

NO ASSAY

7200S 6000 4500S 3000S 1500S 0·0 150N 300N 450N 600N 750N 900N 1050N 1140N

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)

50 40 30 20 10 0

RESISTIVITY IN Ohm-METRES (- - -)

5000 4000 3000 2000 1000 600

63.023
63.043
63.242
63.041
63.439
63.764
64.083
63.995
63.330
63.344
63.075

7200S 6000S 4500S 3000S 1500S 0·0 150N 300N 450N 600N 750N 900N 1050N 1140N

Total Magnetic Field (γ)

62 550
62 510
62 470
62 430
62 390
62 350

7200S 6000S 4500S 3000S 1500S 0·0 150N 300N 450N 600N 750N 900N 1050N 1140N

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

600 550 500 450 400 350 300 250 200 150 100 50 00

Ch Ch Rd Ch Ch Ch Ch

787062

7200S 6000S 4500S 3000S 1500S 0·0 150N 300N 450N 600N 750N 900N 1050N 1140N

RENISON LIMITED 82-1769 (Vol 2 (2))

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 300E

SECTION LOOKING WEST

SCALE, 1: 2000 METRES

0 20 40 60 80 100

5 cm

DRAWN	
TRACED	
DATE	
SCALE	1: 2000
DRAWING No.	

Fig. 2b

I P DATA
CHARGEABILITY & RESISTIVITY
—— Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

LEGEND

ALTERATION
Quartz and topaz and /or Tourmaline
Total tourmalinization, occasionally with hematite
Hydrothermal
Collapse
Breccius
White Alteration Dykes
Argillic alteration
Green alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Areal of tourmaline nodules

ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite

Major lineament
F Fault
Definite
Approximate
Interred
Geological boundaries

Ref: RN/MG82/03

2752

2752

Geochemistry
p. p. m.

I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (- - - -)

Total Magnetic Field (γ)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

Track
Road
Cr

787063

RENISON LIMITED
AGNEW GRID E.L. 11/76 & S.P.L. 129
LINE 400E
SECTION LOOKING WEST
SCALE. 1: 2000 METRES
Fig. 2d

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	

Ref: RN/MG82/05

I P DATA
CHARGEABILITY & RESISTIVITY
Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

ALTERATION
Quartz and topaz and/or tourmaline
Total tourmalinization, occasionally with hematite — White Alteration Types
Hydrothermal
Collapse — Breccias
Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

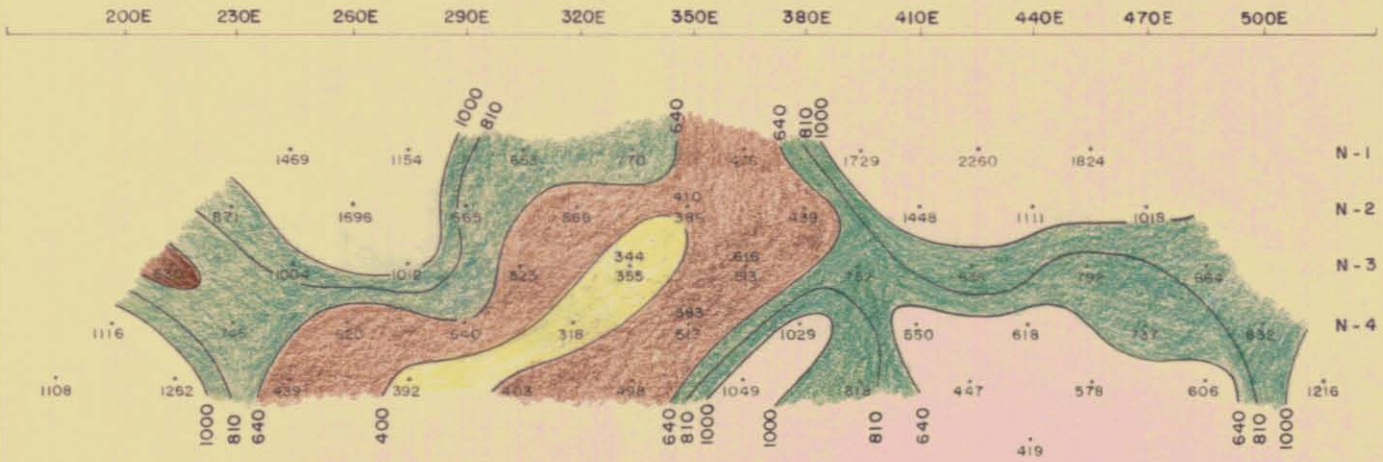
LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained — White granite
Porphyritic granite
Medium grained
Coarse grained — Red granite

Major lineament
F Fault
Definite
Approximate — Geological boundaries
Inferred

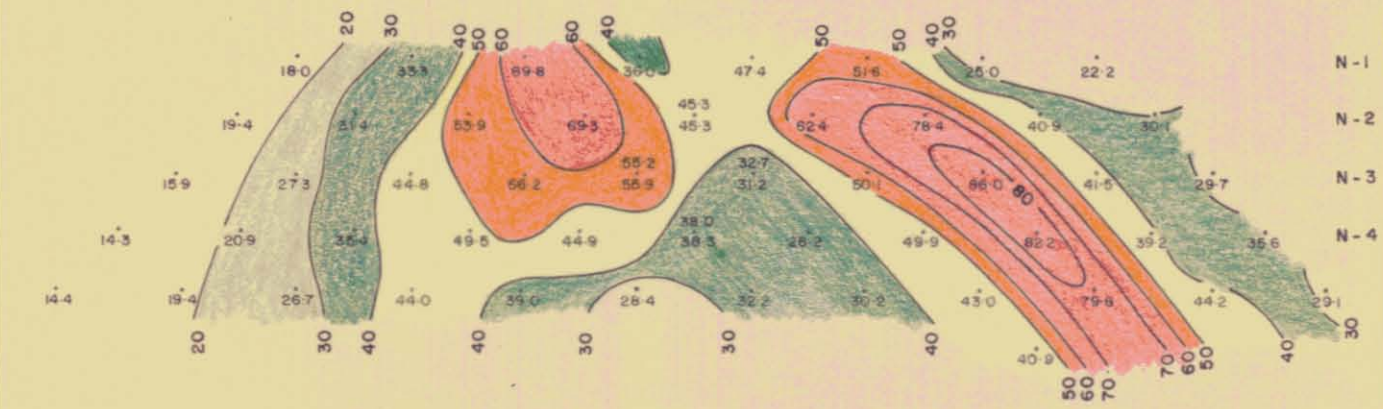
2753

051

RESISTIVITY
(Ohm - m)



CHARGEABILITY
(mv/v)



787064

Survey by: Scintrex, 1981
dipole spacing: 30m
I.P. receiver: IPR-10
(2secs on 2secs off
M_3 plotted)

5 cm

Ref: RN/MG82/03

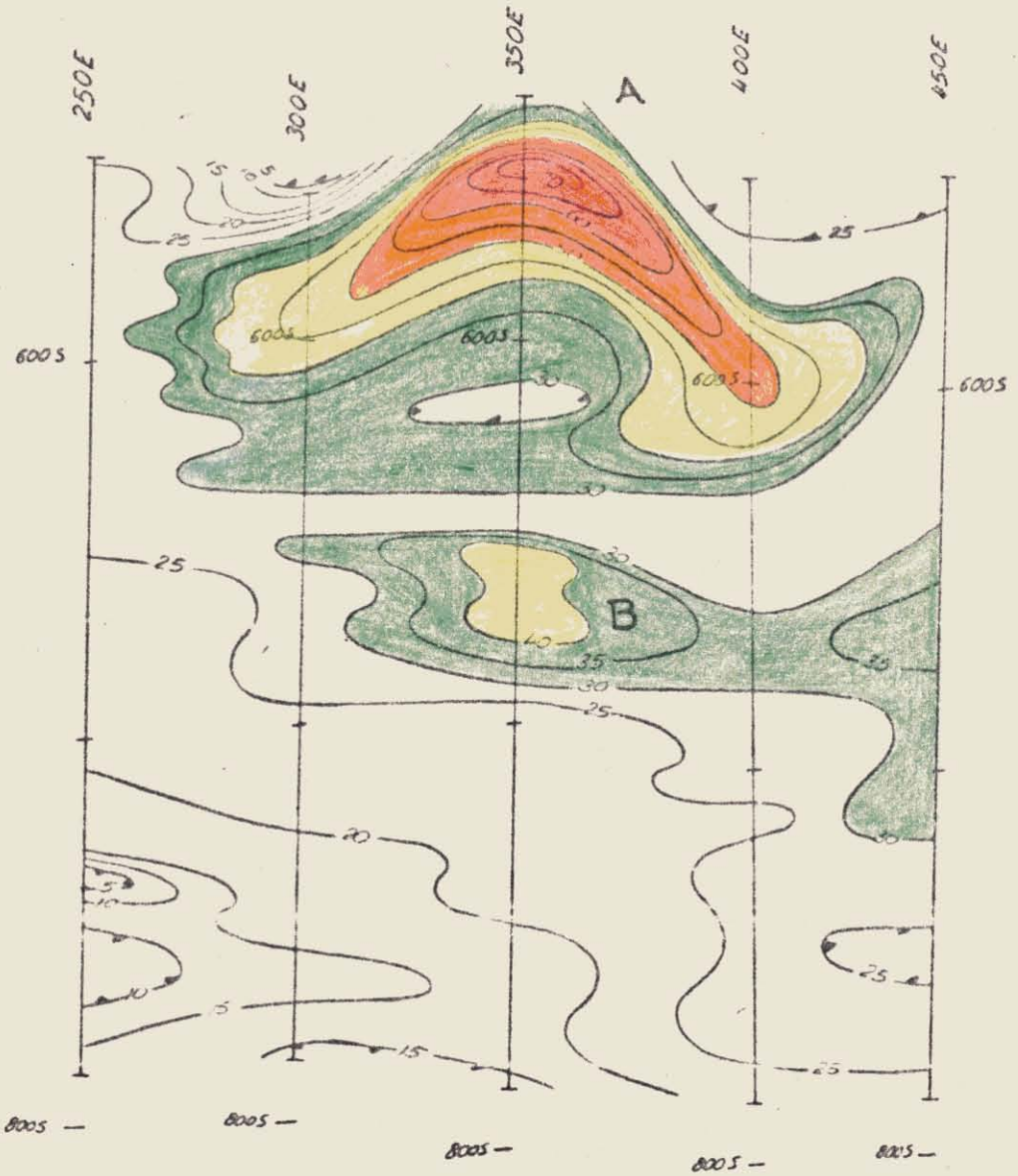
82-1749 (Vol 2/2)

MITRE GEOPHYSICS PTY. LTD.
AGNEW GRID

LINE 570S.
dipole-dipole I.P.

Drawn: Scintrex	Scale: 1:2000	FIG. 2f
Traced: T.G.D.S.	Date: March 1982	

052



787065

Survey by: Scintrex, 1981
dipole spacing (& stn interval): 10m.

5 cm

(figure from Howland-Rose, 1981b)

Ref RN/MG 82/03

82-1749 (Vol 2|2)

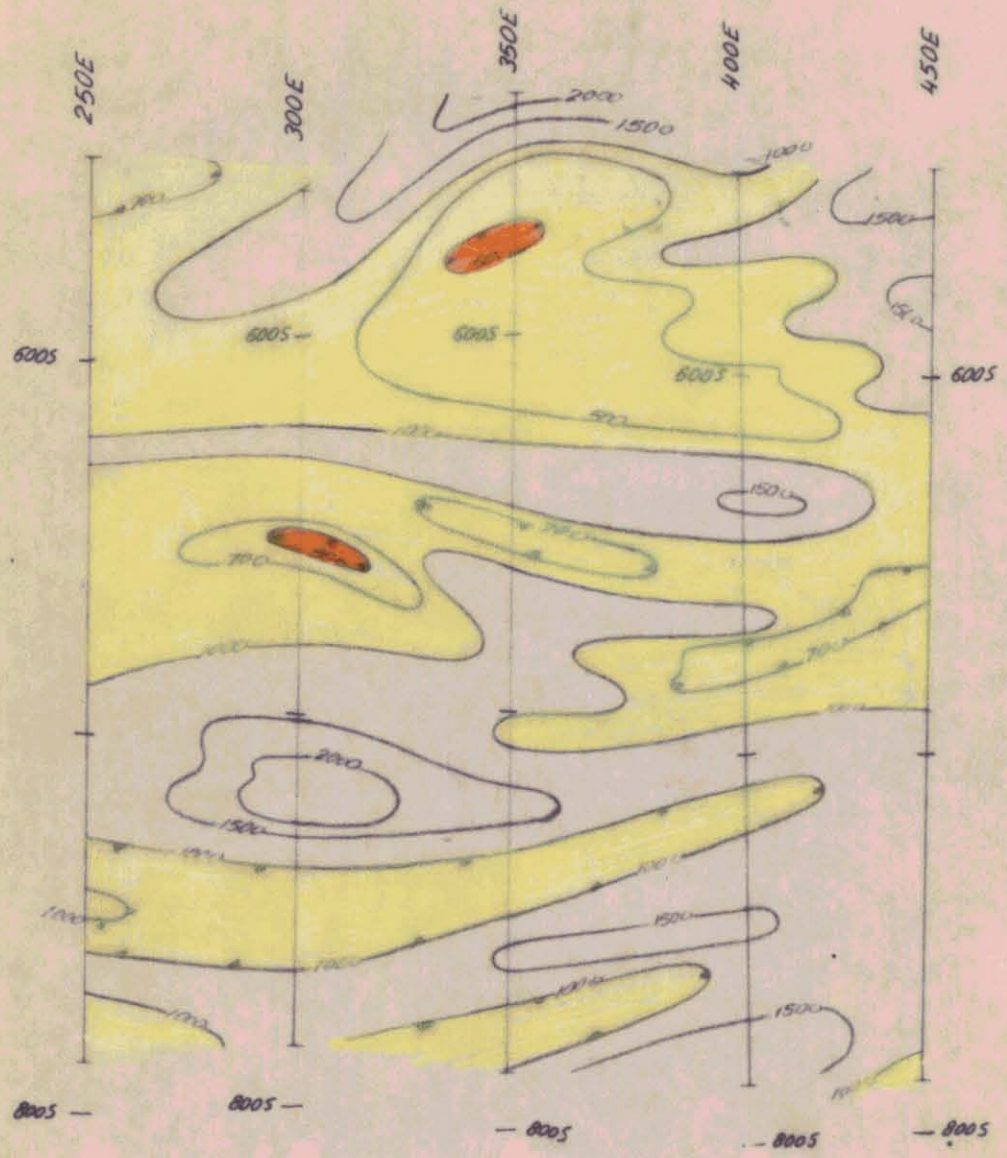
MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA 2

Chargeability Contours

Drawn by Scintrex	Scale 1:2000	FIG 2g
Traced by TGDS	Date March 1982	

053



Survey by Scintrex, 1981
dipole spacing (& stn interval) 10m

5 cm

(figure from Howland-Rose, 1981b)

Ref RN/MG 82/03

787066

82-1749 CV01 2/2)

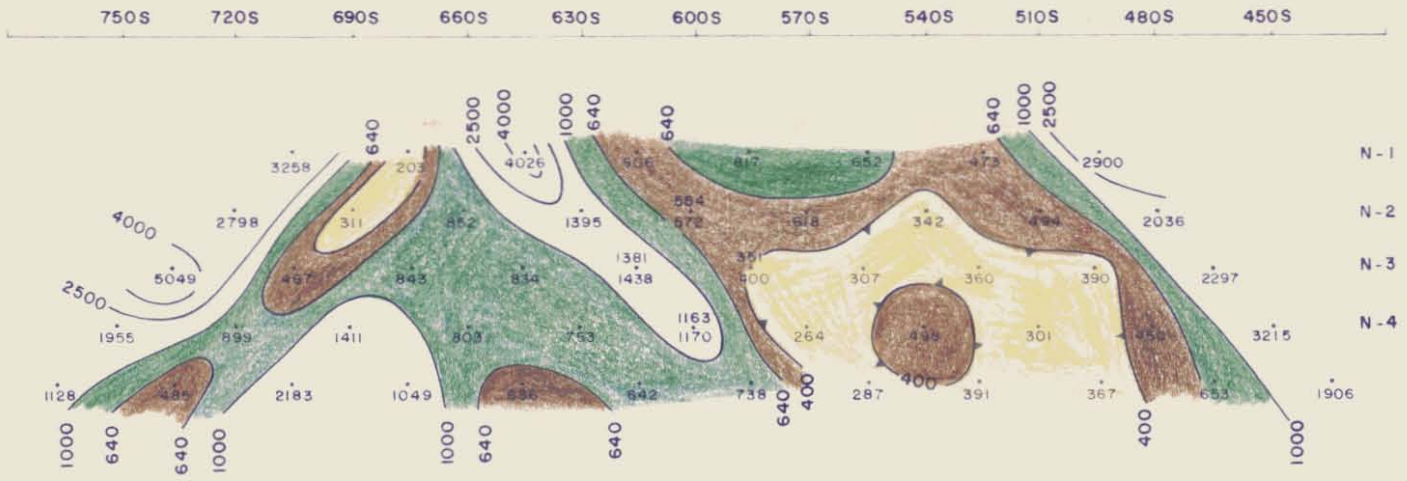
MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA 2

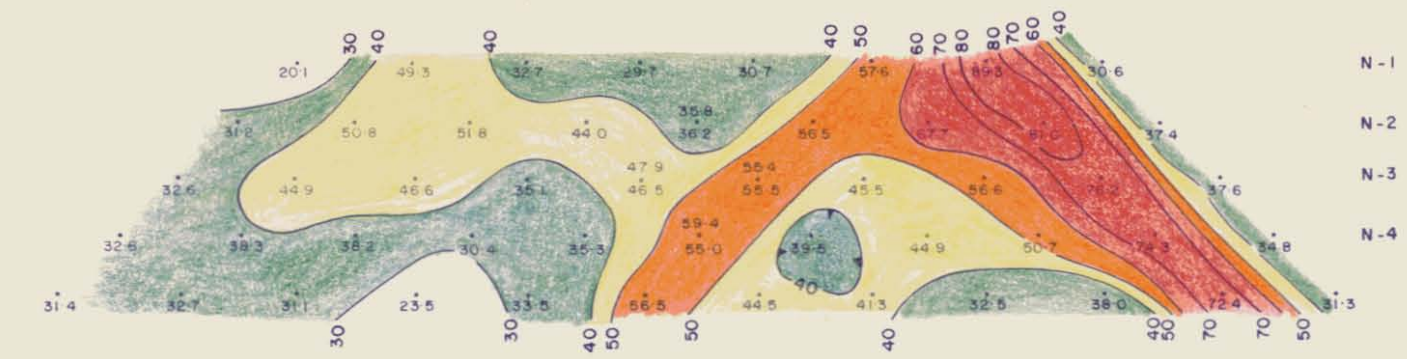
Resistivity Contours

Drawn by Scintrex	Scale 1:2000	FIG. 2h
Traced by T.G.D.S.	Date March 1982	

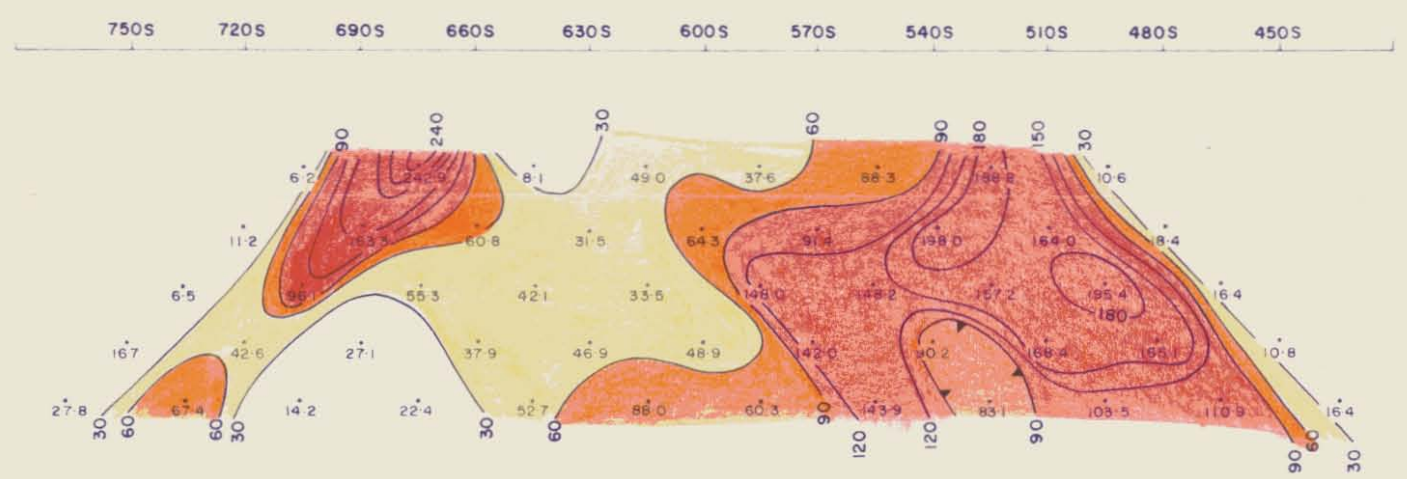
LINE: 350E.



RESISTIVITY
(ohm-m)



CHARGEABILITY
(mv/v)



METAL FACTOR

Survey by Scintrex, 1981
dipole spacing 30m
I.P. receiver IPR-10
(2secs on 2secs off
M_3 plotted)

5 cm

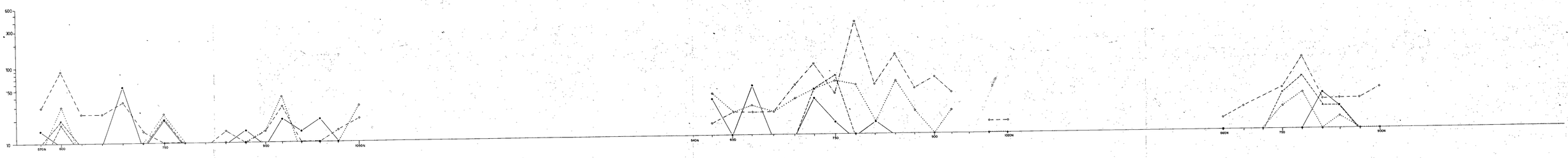
MITRE GEOPHYSICS PTY. LTD.
AGNEW GRID
LINE 350E.
dipole-dipole I.P.

Drawn: Scintrex/J.B.	Scale: 1:2000	FIG. 21
Traced: T.G.D.S.	Date: March 1982	

Ref. RN/MG82/03

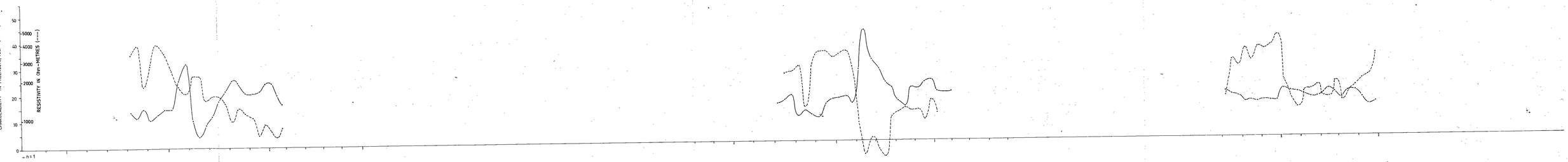
82-1749 (Vol 2/2)
#90187

Geochemistry
P P M



I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (– – –)



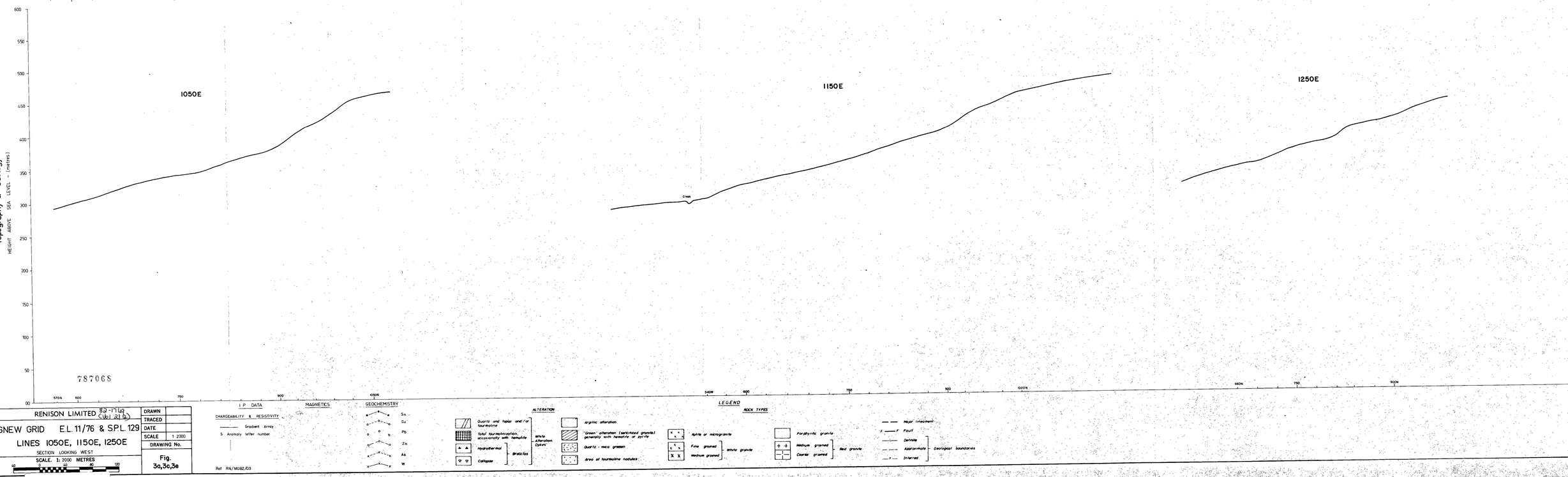
POLE - DIPOLE OR DIPOLE - DIPOLE

RESISTIVITY (in Ω m)
- n = 1
- n = 2
- n = 3
- n = 4
- n = 5

CHARGEABILITY (mv/v)
- n = 1
- n = 2
- n = 3
- n = 4
- n = 5

Total Magnetic Field (γ)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)



787068

I P DATA
CHARGEABILITY & RESISTIVITY
—— Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

Ref RN/MG82/03

ALTERATION
- Quartz and topaz and / or tourmaline
- Total tourmalinization, occasionally with hematite
- Hydrothermal Breccias
- Collapse
- White Alteration Zones
- Argillic alteration
- "Green" alteration (sericitized granite) generally with hematite or pyrite
- Quartz - mica greisen
- Area of tourmaline nodules

LEGEND

ROCK TYPES
- Aplite or microgranite
- Fine grained White granite
- Medium grained
- Porphyritic granite
- Medium grained Red granite
- Coarse grained
- Major lineament
- F Fault
- Definite
- Approximate Geological boundaries
- ? Inferred

RENISON LIMITED 82-1710 (Vol 21)

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINES 1050E, 1150E, 1250E

SECTION LOOKING WEST

SCALE. 1: 2000 METRES

50 0 50 100 150

5 cm

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	

Fig. 3a,3c,3e

2754

2754

Geochemistry
P P M

600
300
100
50
10

810 S | 750S | 600S | 450S | 300S | 150S | 00 | 150N | 300N | 450N | 600N | 750N | 900N | ASSAY MISSING | 1050N | 1170N

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)

50 45 30 20 10 0

RESISTIVITY IN Ohm-METRES (- - -)

5000 4000 3000 2000 1000 600

Total Magnetic Field (γ)

62 500 62 460 62 420 62 380 62 340 62 300

810S | 750S | 600S | 450S | 300S | 150S | 00 | 150N | 300N | 450N | 600N | 750N | 900N | 1050N | 1170N

Topography & Geology

HEIGHT ABOVE SEA LEVEL - (metres)

600 550 500 450 400 350 300 250 200 150 100 50 00

Rd | Ck | Ck

810 S | 750S | 600S | 450S | 300S | 150S | 0.0 | 150N | 300N | 450N | 600N | 750N | 900N | 1050N | 1170N

787069

RENISON LIMITED 52-(7)40 (Vol 2/2)

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 1100E

SECTION LOOKING WEST

SCALE 1: 2000 METRES

40 0 20 40 60 80 100

DRAWN	
TRACED	
DATE	
SCALE	1: 2000
DRAWING No.	
Fig.	3b

I P DATA

CHARGEABILITY & RESISTIVITY

——— Gradient Array

S Anomaly letter number

MAGNETICS

5 cm

Ref RN/MG82/03

GEOCHEMISTRY

Sn
Cu
Pb
Zn
As
W

ALTERATION

Quartz and topaz and/or tourmaline
Total tourmalinisation, occasionally with hematite — White Alteration Dykes
Hydrothermal — Breccias
Collapse
Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND

ROCK TYPES

Aplite or microgranite
Fine grained — White granite
Medium grained — White granite
Porphyritic granite
Medium grained — Red granite
Coarse grained — Red granite

Major lineament
F —— F Fault
Definite — Geological boundaries
Approximate — Geological boundaries
Inferred — Geological boundaries

2755

2755

Geochemistry
P.P.M

600
300
100
50
10

8700S 7500S 6000S 4500S 3000S 1500S 00 1500N 3000N 4500N 6000N 7500N 9000N 10500N 11400N

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)

50
40
30
20
10
0

RESISTIVITY IN Ohm-METRES (- - - -)

5000
4000
3000
2000
1000
600

Total Magnetic Field (γ)

62 500
62 460
62 420
62 380
62 340
62 300

8700S 7500S 6000S 4500S 3000S 1500S 00 1500N 3000N 4500N 6000N 7500N 9000N 10500N 11400N

Topography & Geology

HEIGHT ABOVE SEA LEVEL - (metres)

600
550
500
450
400
350
300
250
200
150
100
50
00

Track Rd Ck Ck Ck

787070

8700S 7500S 6000S 4500S 3000S 1500S 00 1500N 3000N 4500N 6000N 7500N 9000N 10500N 11400N

RENISON LIMITED (82-1748 CVol 2132)

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 1200E

SECTION LOOKING WEST

SCALE, 1: 2000 METRES

60 0 60 80 100

5 cm

DRAWN	
TRACED	
DATE	
SCALE	1: 2000
DRAWING No.	Fig. 3d

I P DATA

CHARGEABILITY & RESISTIVITY

——— Gradient Array

S Anomaly letter number

MAGNETICS

GEOCHEMISTRY

Sn
Cu
Pb
Zn
As
W

ALTERATION

Quartz and topaz and /or tourmaline
Total tourmalinization, occasionally with hematite
Hydrothermal
Collapse
Breccias
White alteration "Dykes"
Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline "nodules"

LEGEND

ROCK TYPES

Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite

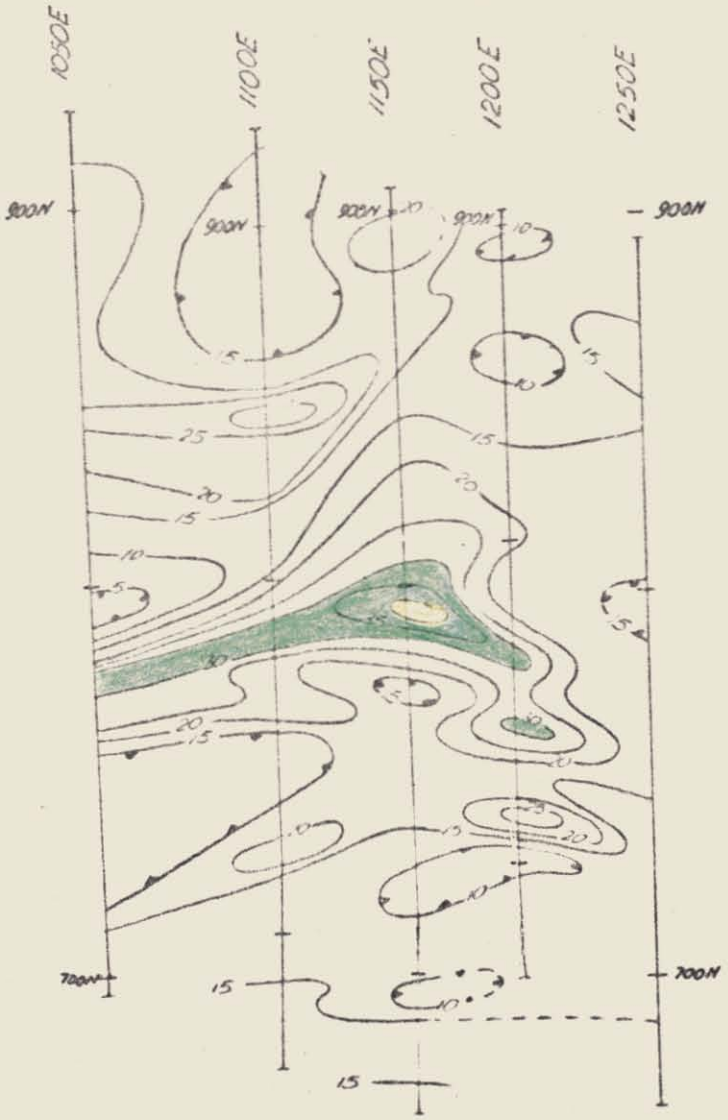
Major lineament
F F Fault
Definite
Approximate
Inferred
Geological boundaries

Ref. RN/MGB2/03

2756

2756

056



Survey by. Scintrex, 1981
dipole spacing (& stn interval). 10m.

787071

82-1749 (Vol 2/2)

5 cm

(figure from Howland-Rose, 1981b)

Ref. RN/MG 82/03

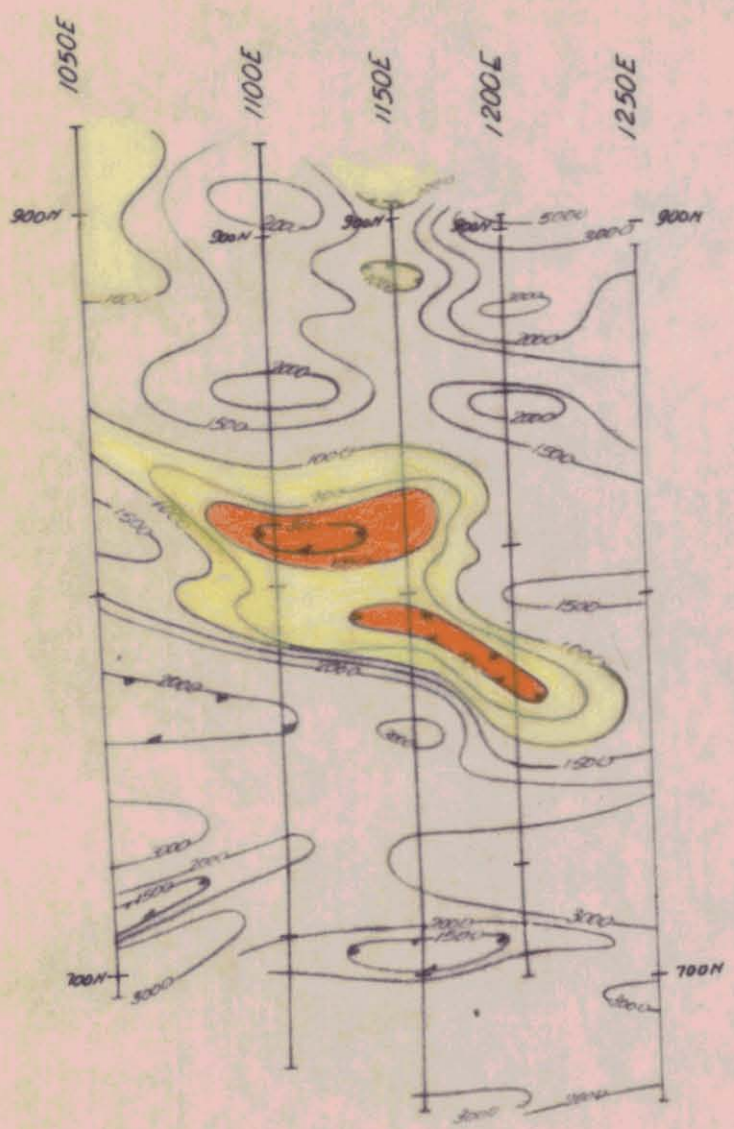
MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA 3

Chargeability Contours

Drawn by Scintrex	Scale 1:2000	FIG. 3f
Traced by T.G.D.S.	Date March 1982	

055



Survey by: Scintrex, 1981
dipole spacing (& stn. interval): 10m.

787072

82-1749 C(101 2/2)

5 cm

(figure from Howland-Rose, 1981b)

Ref. RN/MG 82/03

MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA 3

Resistivity **Contours**

Drawn by Scintrex	Scale. 1:2000	FIG. 3g
Traced by T.G.D.S.	Date. March 1982	

Geochemistry
PPM

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)

RESISTIVITY IN Ohm-METRES (- - -)

RESISTIVITY (Ωm)

POLE - DIPOLE OR DIPOLE - DIPOLE

CHARGEABILITY (mv/v)

Total Magnetic Field (γ)

Topography & Geology

HEIGHT ABOVE SEA LEVEL - (metres)

1350E

1450E

Creek

787073

RENISON LIMITED	DRAWN
AGNEW GRID E.L. 11/76 & S.P.L. 129	TRACED
LINES 1350E, 1450E	DATE
SECTION LOOKING WEST	SCALE 1: 2000
SCALE 1: 2000 METRES	DRAWING No.
	Fig. 4a,4c

I P DATA
CHARGEABILITY & RESISTIVITY
—— Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

ALTERATION
Quartz and topaz and / or tourmaline
Total tourmalinization, occasionally with hematite
Hydrothermal
Collapse
Breccias
White Alteration Dykes
Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite
Major lineament
Fault
Definite
Approximate
Interred
Geological boundaries

Ref: RN/MG82/03

2757

2757

Geochemistry
P P M

600
300
100
50
10

6400S 750S 600S 450S 300S 150S 00 150N 300N 450N 600N 750N 900N 1050N 1170N

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)

50
40
30
20
10
0

RESISTIVITY IN Ohm-METRES (----)

5000
4000
3000
2000
1000
600

Total Magnetic Field (γ)

62500
62460
62420
62380
62340
62300

6400S 750S 600S 450S 300S 150S 00 150N 300N 450N 600N 750N 900N 1050N 1170N

Topography & Geology

HEIGHT ABOVE SEA LEVEL - (metres)

600
550
500
450
400
350
300
250
200
150
100
50
00

Cs Cs Ps Cs Cs

6400S 750S 600S 450S 300S 150S 0.0 150N 300N 450N 600N 750N 900N 1050N 1170N

787074

2758

RENISON LIMITED 82-176 (Vol 3 f 32)

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 1400E

SECTION LOOKING WEST

SCALE. 1: 2000 METRES

40 0 20 40 60 120

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	

Fig. 4b

Ref RN/MGB2/03

I P DATA

CHARGEABILITY & RESISTIVITY

——— Gradient Array

S Anomaly letter number

MAGNETICS

GEOCHEMISTRY

Sn
Cu
Pb
Zn
As
W

ALTERATION

Quartz and topaz and/or tourmaline
Total tourmalinization, occasionally with hematite
Hydrothermal
Collapse
Breccias
White Alteration Cykes:

Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND

ROCK TYPES

Aplite or microgranite
Fine grained
Medium grained
White granite

Porphyritic granite
Medium grained
Coarse grained
Red granite

Major lineament
F Fault
Definite
Approximate
Interred
Geological boundaries

5 cm

2758

2758

Geochemistry
PPM

600 300 100 50 10

7505 6005 4505 3005 1505 00 150N 300N 450N 600N 750N 900N 1050N 1190N

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)

50 40 30 20 10 0

RESISTIVITY IN Ohm-METRES (- - - -)

5000 4000 3000 2000 1000 600

Total Magnetic Field (γ)

62 500 62 460 62 420 62 380 62 340 62 300

7505 6005 4505 3005 1505 00 150N 300N 450N 600N 750N 900N 1050N 1190N

Topography & Geology

HEIGHT ABOVE SEA LEVEL - (metres)

600 550 500 450 400 350 300 250 200 150 100 50 00

RM CK CK CK

7505 6005 4505 3005 1505 00 150N 300N 450N 600N 750N 900N 1050N 1190N

787075

2759

RENISON LIMITED (82-176, CW81 212)

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 1500E

SECTION LOOKING WEST

SCALE. 1: 2000 METRES

60 0 60 80 100

5 cm

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	Fig. 4d

2759

I P DATA

CHARGEABILITY & RESISTIVITY

——— Gradient Array

S Anomaly letter number

MAGNETICS

GEOCHEMISTRY

Sn Cu Pb Zn As W

ALTERATION

Quartz and topaz and/or tourmaline

Total tourmalinization, occasionally with hematite

Hydrothermal

Collapse

Breccias

White alteration Dykes

Argillic alteration

"Green" alteration (sericitized granite) generally with hematite or pyrite

Quartz - mica greisen

Area of tourmaline nodules

LEGEND

ROCK TYPES

Aplite or microgranite

Fine grained

Medium grained

White granite

Porphyritic granite

Medium grained

Coarse grained

Red granite

Major lineament

F —— F Fault

Definite

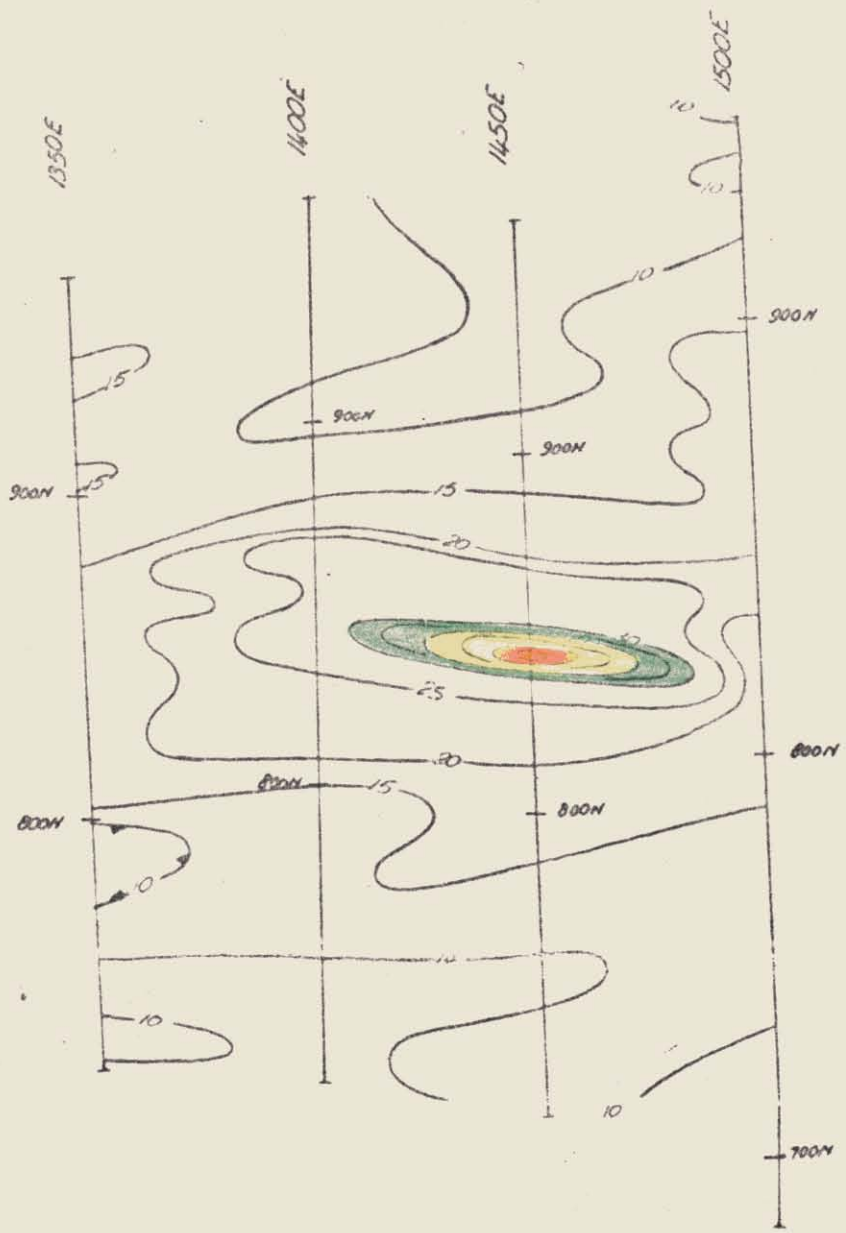
Approximate

Inferred

Geological boundaries

Ref RN/M082/03

057



Survey by: Scintrex, 1981
dipole spacing (& stn interval): 10m.

5 cm

(figure from Howland-Rose, 1981b) Ref. RN/MG 82/03

787076

82-1749 (V01 2|2)

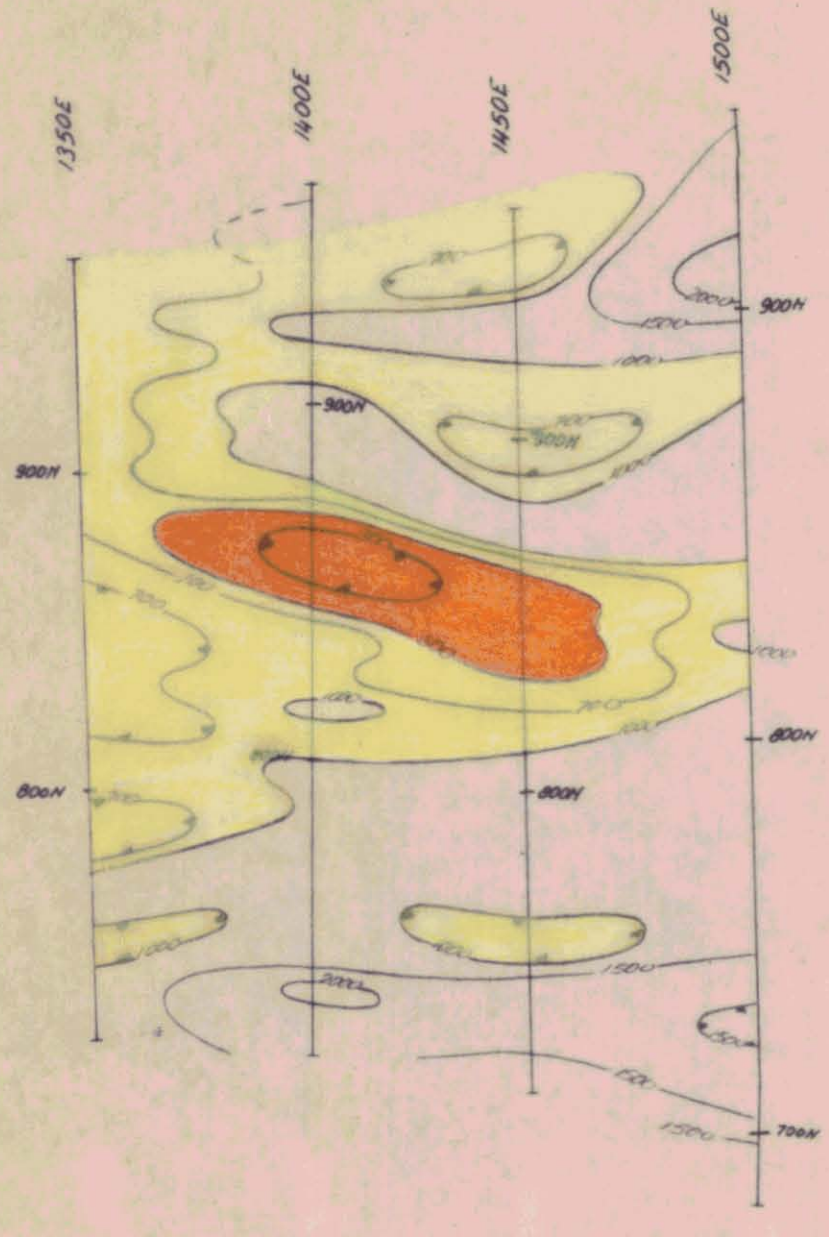
MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA 4

Chargeability Contours

Drawn by Scintrex	Scale 1:2000	FIG 4e
Traced by TGDS	Date March 1982	

058



Survey by Scintrex, 1981
dipole spacing (& stn interval) 10m

5 cm

787077

821749 (Vol 2/a)

MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA 4

Resistivity Contours

Drawn by Scintrex	Scale 1:2000	FIG. 4f
Traced by T.G.D.S.	Date March 1982	

(figure from Howland-Rose (1981b)) Ref. RN/MG 82/03

Geochemistry
P P M

600
300
100
50
10

870N 900 1050 1080N

870 M 900 1080 1110N

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)

RESISTIVITY IN Ohm-METRES (----)

50
40
30
20
10
0

5000
4000
3000
2000
1000

870N 900 1050 1110N

POLE-DIPOLE OR DIPOLE-DIPOLE

RESISTIVITY (Ωm)

n = 1
n = 2
n = 3
n = 4
n = 5

CHARGEABILITY (msec)

n = 1
n = 2
n = 3
n = 4
n = 5

870N 900 1050 1110N

Total Magnetic Field (γ)

600
550
500
450
400
350
300
250
200
150
100
50
00

1650E

1750E

Creek

Creek

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

870N 900 1050 1110N

870N 900 1050 1110N

78707S

2760

RENISON LIMITED (82-760 Vol 2(2))

AGNEW GRID E.L. 11/76 & SPL. 129

LINES 1650E, 1750E

SECTION LOOKING WEST

SCALE. 1: 2000 METRES

0 40 80 120

5 cm

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	

Fig. 5a, 5c

Ref. RN/M082/05

I P DATA

CHARGEABILITY & RESISTIVITY

—— Gradient Array

S Anomaly letter number

MAGNETICS

GEOCHEMISTRY

Sn
Cu
Pb
Zn
As
W

ALTERATION

Quartz and topaz and/or tourmaline
Total tourmalinization, occasionally with hematite
Hydrothermal breccias
Collapse
White alteration Dykes
Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND

ROCK TYPES

Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite

Major lineament
F Fault
Definite
Approximate
Inferred
Geological boundaries

2760

Geochemistry
P.P.M

I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (– – –)

POLE-DIPOLE OR DIPOLE-DIPOLE
RESISTIVITY (Ωm)
– n = 1
– n = 2
– n = 3
– n = 4
– n = 5

POLE-DIPOLE OR DIPOLE-DIPOLE
CHARGEABILITY (ms/v)
– n = 1
– n = 2
– n = 3
– n = 4
– n = 5

Total Magnetic Field (γ)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

660S 600S 450S 300S 150S 0.0 150N 300N 450N 600N 750N 900N 1050N 1170N

Rd Ck Ck Ck Ck

787079

I P DATA
CHARGEABILITY & RESISTIVITY
Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

ALTERATION
Quartz and topaz and/or tourmaline
Total tourmalinization, accessorily with hematite
Hydrothermal
Collapse
Breccias
White Alteration Types
Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND
ROCK TYPES
Aplite or intregranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite
Major lineament
Fault
Definite
Approximate
Inferred
Geological boundaries

RENISON LIMITED 82-1749 C101 212
AGNEW GRID E.L. 11/76 & S.P.L. 129
LINE 1700E
SECTION LOOKING WEST
SCALE. 1: 2000 METRES
40 0 40 80 120
5 cm

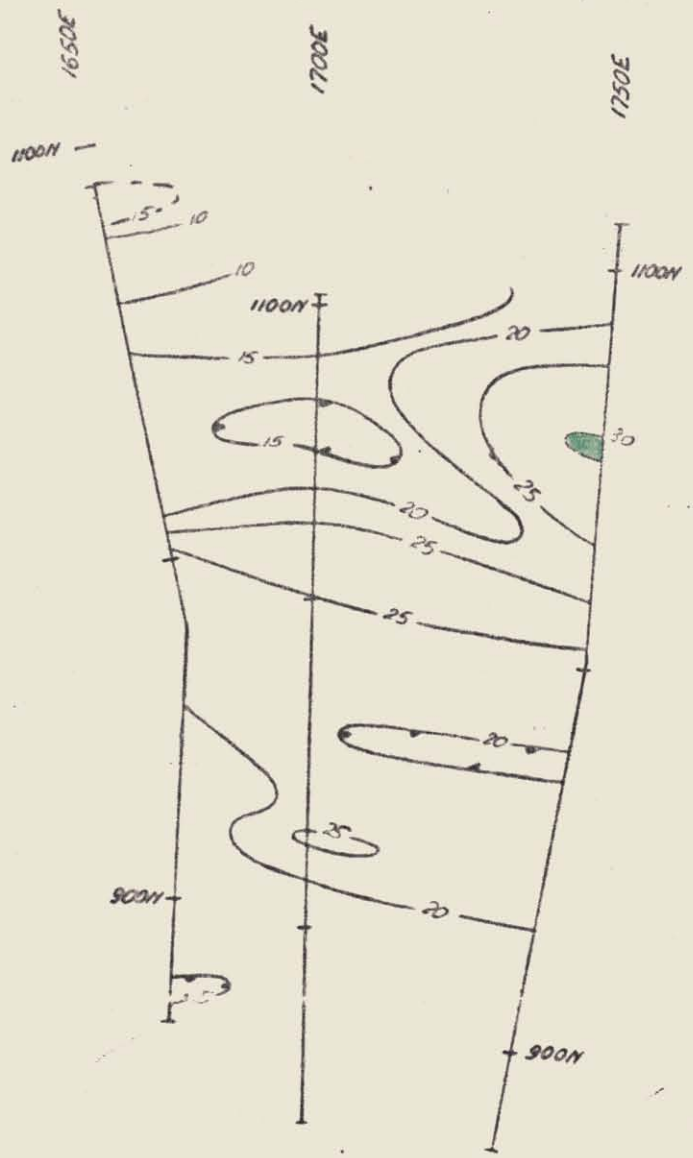
DRAWN
TRACED
DATE
SCALE 1:2000
DRAWING No.
Fig. 5b

Ref RN/MG82/03

2761

2769

053



Survey by: Scintrex, 1981
dipole-spacing (& stn. interval): 10m.

5 cm

(figure from Howland-Rose, 1981b) Ref. RN/MG 82/03

787080

82-174 (Vol 2b)

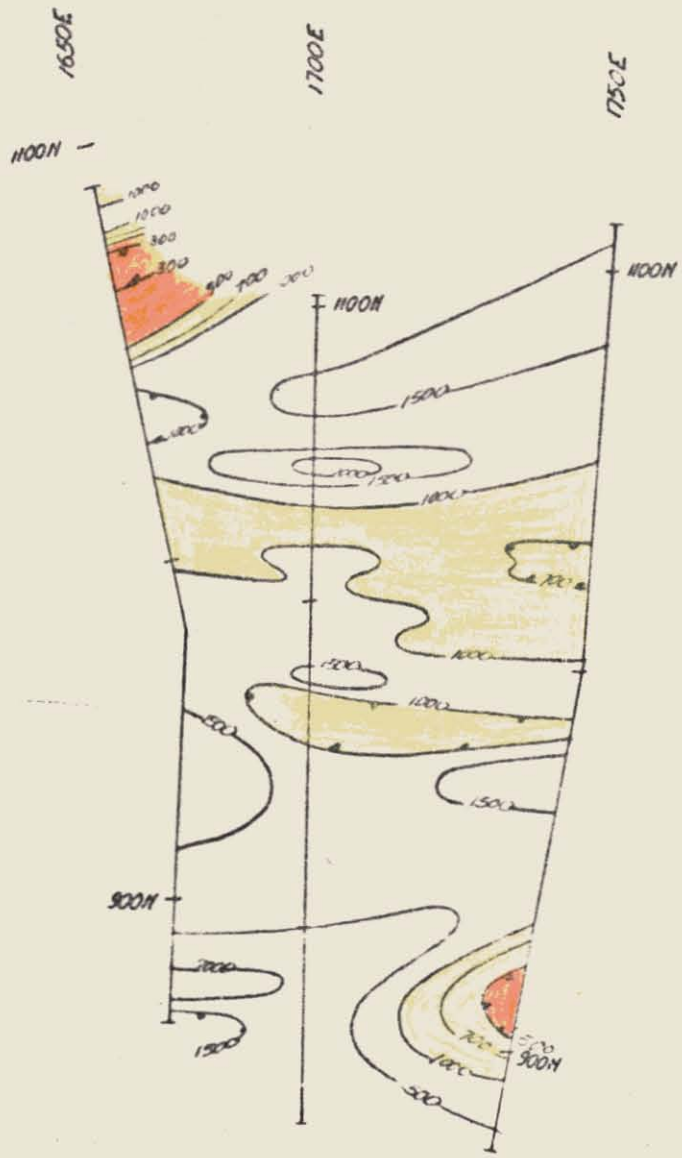
MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA 5

Chargeability Contours

Drawn by Scintrex	Scale 1:2000	FIG. 5d
Traced by TGDS	Date March 1982	

030



Survey by: Scintrex, 1981
dipole spacing (& stn interval): 10m.

787081

82-1749 (Vol 2/2)

5 cm

(figure from Howland-Rose, 1981b) . Ref RN/MG 82/03

MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA 5

Resistivity Contours

Drawn by Scintrex	Scale 1:2000	FIG. 5e
Traced by TGDS	Date March 1982	

Geochemistry
P.P.M.

I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (- - -)

POLE - DIPOLE OR DIPOLE - DIPOLE
RESISTIVITY (Ωm)
CHARGEABILITY (mv/v)

Total Magnetic Field (γ)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

RENISON LIMITED (Con Tuck Cyc) 81(2)

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 1800E

SECTION LOOKING WEST

SCALE 1:2000 METRES

DRAWN	
TRACED	
DATE	
SCALE	1:2000
DRAWING No.	Fig. 6b

I.P. DATA
CHARGEABILITY & RESISTIVITY
——— Gradient Array
5 : Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

ALTERATION
Quartz and topaz and / or tourmaline
Total tourmalinization, accessorily with hematite
Hydrothermal
Collapse
Breccias
White Alteration Dykes
Argillic alteration
"Green" alteration (sericitized gravity) generally with hematite or pyrite
Quartz - mica - greisen
Area of tourmaline nodules

LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite
Major lineament
F Fault
Definite
Approximate
Interred
Geological boundaries

Ref RN/MGRZ/03.

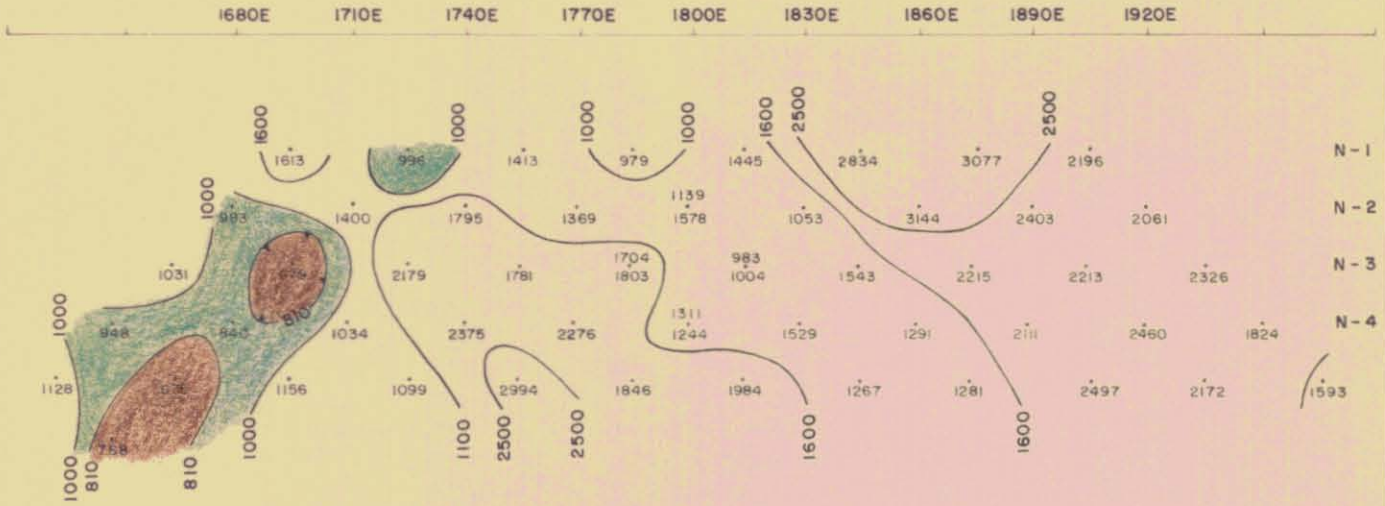
787082

2762

5 cm

051

RESISTIVITY
(Ohm - m)



CHARGEABILITY
(mv/v)

Survey by: Scintrex, 1981
dipole spacing: 30m
I.P. receiver: IPR-10
(2 secs on 2 secs off
M_3 plotted)

5 cm

Ref: RN/MG82/03

787083
82-1749 (Vol 2/2)

MITRE GEOPHYSICS PTY. LTD.
AGNEW GRID
LINE 420S.
dipole–dipole I.P.

Drawn: Scintrex	Scale: 1:2000	FIG. 6c.
Traced: T.G.D.S.	Date: March 1982	

Geochemistry
P P M

I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (- - - -)

Total Magnetic Field (γ)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

787084

2763

RENISON LIMITED (Victoria)

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 2100E

SECTION LOOKING WEST

SCALE. 1: 2000 METRES

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	
Fig. 7a	

I P DATA

CHARGEABILITY & RESISTIVITY

——— Gradient Array

S Anomaly letter number

MAGNETICS

Ref RN/MG82/03

GEOCHEMISTRY

Sn
Cu
Pb
Zn
As
W

ALTERATION

Quartz and topaz and/or tourmaline
Total tourmalinization, occasionally with hematite
Hydrothermal
Collapse
Breccias
White Alteration Dykes

Argillic alteration
"Green" alteration (semi-fluted granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND

ROCK TYPES

Aplite or metagranite
Fine grained
Medium grained
White granite

Porphyritic granite
Medium grained
Coarse grained
Red granite

Major lineament
F — F Fault
Definite
Approximate
Inferred
Geological boundaries

2763

Geochemistry
P P M

I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (- - -)
RESISTIVITY (Ωm)
CHARGEABILITY (ms/v)
POLE - DIPOLE OR DIPOLE - DIPOLE
n = 1
n = 2
n = 3
n = 4
n = 5

Total Magnetic Field (δ)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

787085

5405 450 300 150 60S

RENISON LIMITED (82-1429 Vol 2|2)
AGNEW GRID E.L. 11/76 & S.P.L. 129
LINE 2150E
SECTION LOOKING WEST
SCALE. 1: 2000 METRES
0 40 80 120

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	

Fig. 7b

I.P DATA
CHARGEABILITY & RESISTIVITY
—— Gradient Array
S Anomaly letter number

Ref RN/MG82/03

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

ALTERATION
Quartz and topaz and/or tourmaline
Total tourmalinization, occasionally with hematite
Hydrothermal
Collapse
Breccias
White alteration Dykes
Argillic alteration
'Green' alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite

Major lineament
F —— F Fault
Definite
Approximate
Inferred
Geological boundaries

5 cm

2764

2764

Geochemistry
P P M

I.P. Data
CHARGEABILITY IN MILLIMOLTS/VOLT (——)
RESISTIVITY IN Ohm - METRES (- - - -)

Total Magnetic Field (γ)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

787086

RENISON LIMITED 82-1744 (Vol 2B)
AGNEW GRID E.L. 11/76 & S.P.L. 129
LINE 2200E
SECTION LOOKING WEST
SCALE. 1: 2000 METRES
Fig. 7c

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	

Ref: RN/MG82/03

I.P. DATA
CHARGEABILITY & RESISTIVITY
——— Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

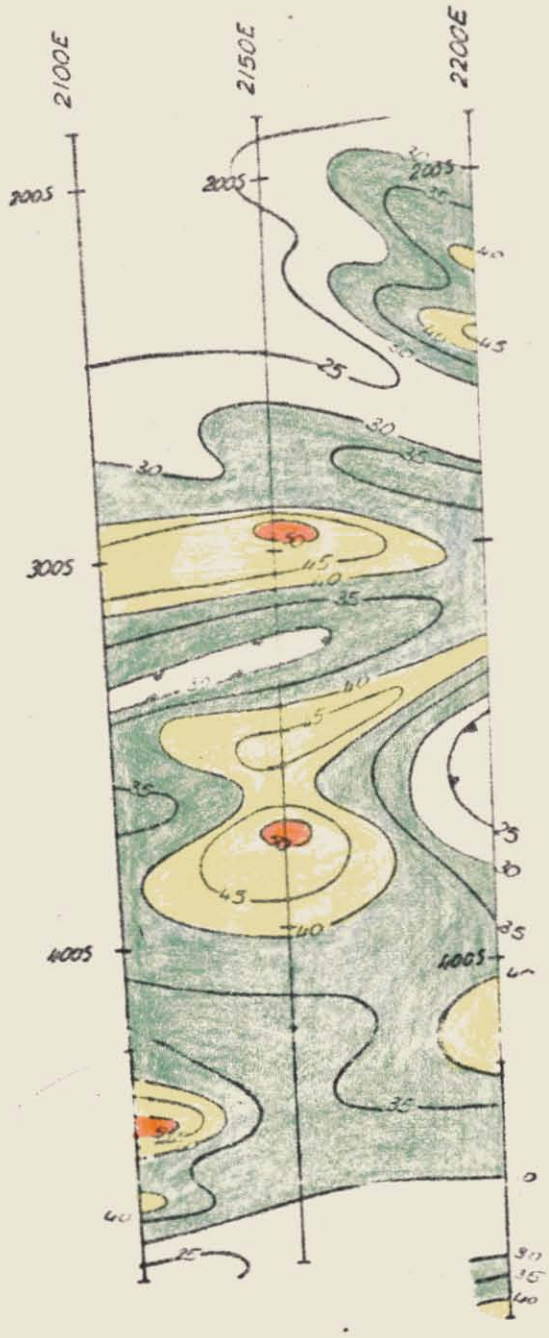
ALTERATION
Quartz and topaz and/or tourmaline
Total tourmalinization, occasionally with hematite
White Alteration Dykes
Hydrothermal
Breccias
Collapse
Argillic alteration
"Green" alteration (sericitized granite), generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Red granite
Medium grained
Coarse grained
Layering
Flow foliation
Schistosity
Approximate
Inferred
Geological boundaries

5 cm

2765

082



Survey by: Scintrex, 1981
dipole spacing (& stn interval): 10m

5 cm

(figure from Howland-Rose 1981b) - Ref RN/MG 82/03

787087
82-1749 (Vol 2/2)

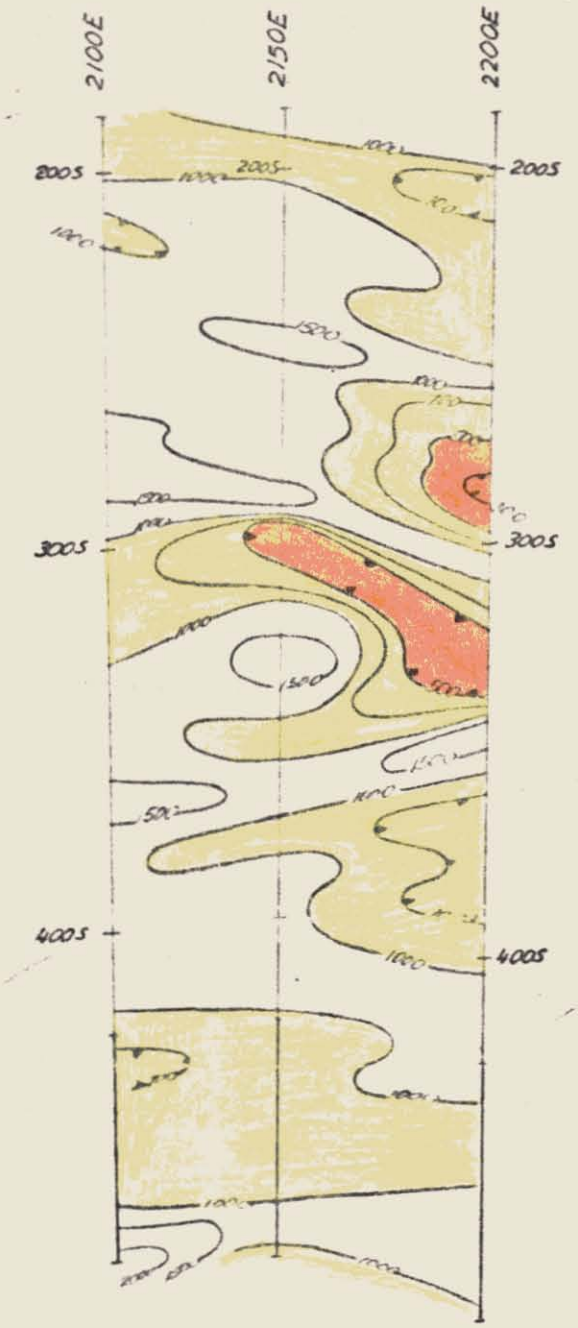
MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID AREA 7

Chargeability Contours

Drawn by Scintrex	Scale 1:2000	FIG. 7d
Traced by T.G.D.S.	Date March 1982	

063



Survey by: Scintrex, 1981
dipole spacing (& stn interval): 10m.

5 cm

(figure from Howland-Rose, 1981b)

Ref. RN/MG 82/03

787088

82-1749 (1101 2/2)

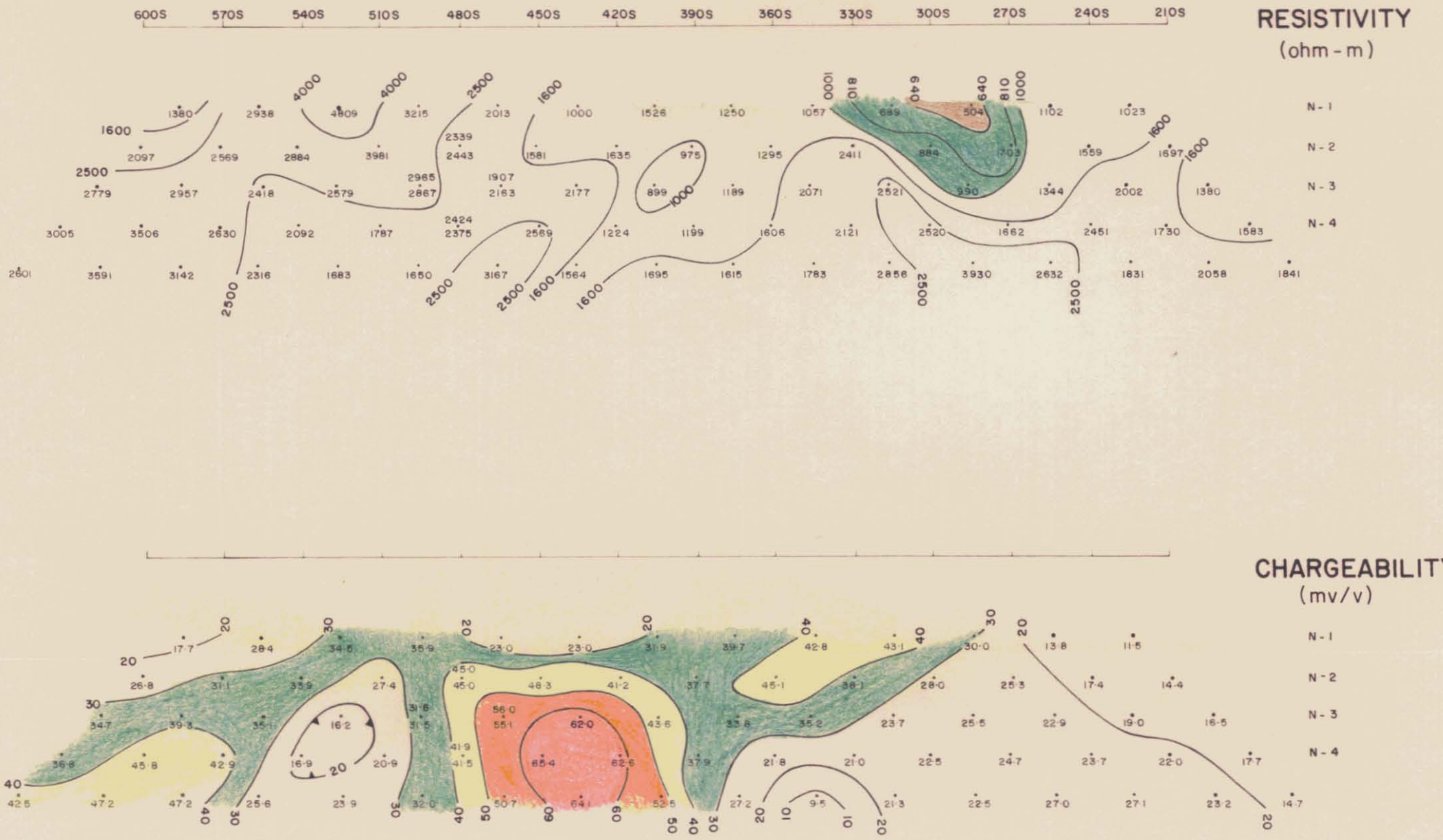
MITRE GEOPHYSICS PTY. LTD.

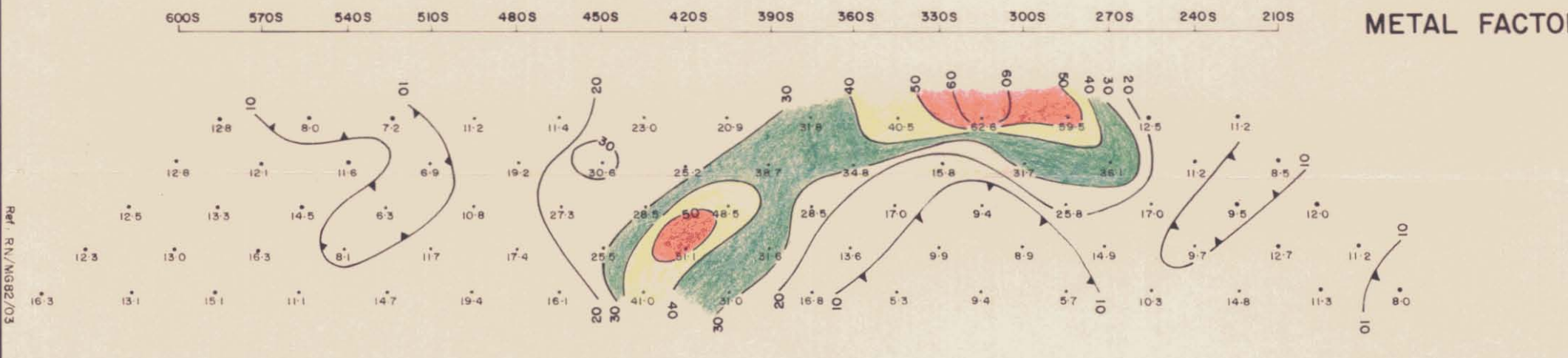
AGNEW GRID
AREA 7

Resistivity Contours

Drawn by Scintrex	Scale 1:2000	FIG. 7a
Traced by TGDS	Date March 1982	

LINE: 1800E.





Ref. RN/NG82/03

MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID

LINE 1800E.

dipole-dipole I.P.

Drawn: Scintrex/JB | Scale: 1:2000

Traced: T.G.D.S. | Date: March 1982 | FIG. 8

82-1749 (Vol 2/2)

78089

5 cm

Survey by: Scintrex, 1981

dipole spacing: 30m

I.P. receiver: IPR-10

(2secs on 2secs off

M_3 plotted)

Geochemistry
P.P.M.

I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (- - - -)

POLE - DIPOLE OR DIPOLE - DIPOLE
RESISTIVITY (Ωm)
CHARGEABILITY (mv/v)

Total Magnetic Field (γ)

Topography & Geology
HEIGHT ABOVE - SEA LEVEL - (metres)

RENISON LIMITED (Vol 13)

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 1900E

SECTION LOOKING WEST

SCALE: 1" = 200 METRES

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	

Fig. 9a

Ref. RN/M062/03

I.P. DATA
CHARGEABILITY & RESISTIVITY
Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

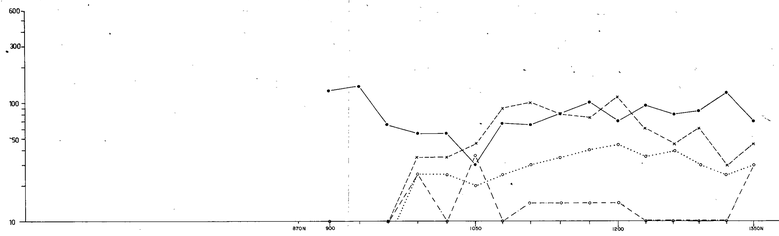
ALTERATION
Quartz and topaz and/or fluorite(?)
Total tourmalinization, occasionally with hematite
Hydrothermal breccias
Carbonate
White Alteration Dykes
Argillic alteration
"Green" alteration, (sericitized) grossular generally with hematite or pyrite
Quartz - mica - greisen
Silica - tourmaline mixtures

LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite
Major lineament
Fault
Definite
Approximately placed
Geological boundaries

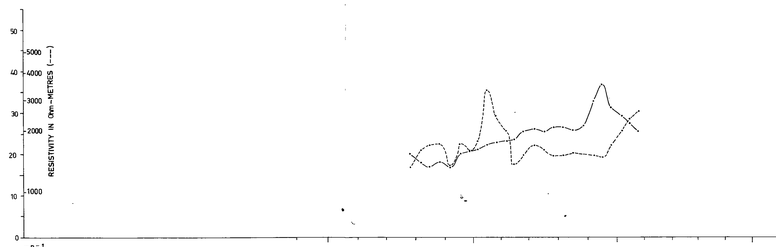
5 cm

2766

Geochemistry
P.P.M



I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (----)

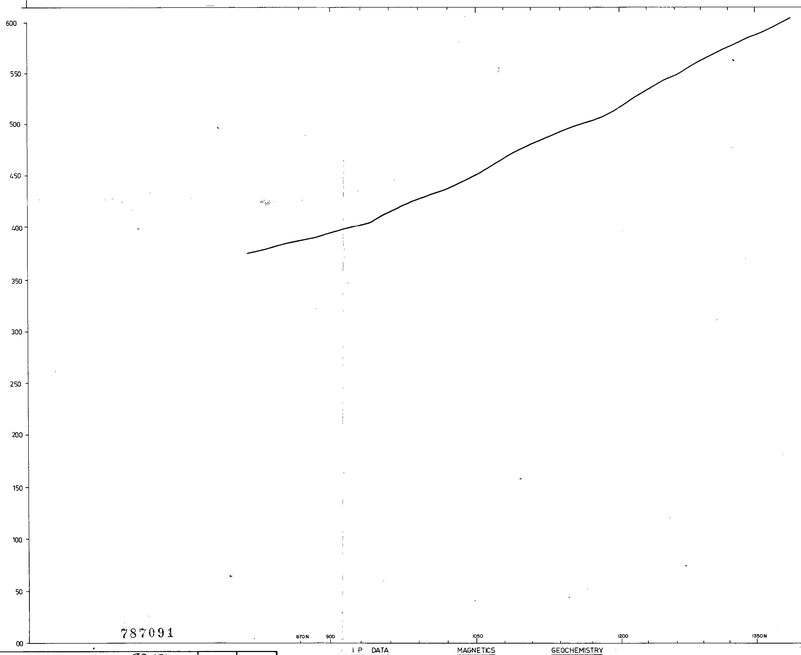


POLE - DIPOLE OR DIPOLE - DIPOLE

RESISTIVITY (Ωm)
— n = 1
— n = 2
— n = 3
— n = 4
— n = 5

CHARGEABILITY (mv/v)
— n = 1
— n = 2
— n = 3
— n = 4
— n = 5

Total Magnetic Field (γ)



Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

787091

1-167

RENISON LIMITED 82-1769 (Vol 3)
AGNEW GRID E.L. 11/76 & S.P.L. 129
LINE 1950E
SECTION LOOKING WEST
SCALE. 1: 2000 METRES
40 0 20 40 60 80 100
5 cm

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	Fig. 9b

I P DATA
CHARGEABILITY & RESISTIVITY
——— Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

ALTERATION
Quartz and topaz and / or tourmaline
Total tourmalinisation, occasionally with hematite
Hydrothermal
Collapse
Breccias
White alteration Dykes
Argillic alteration
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite

Major lineament
F —— F Fault
Definite
Approximate
Inferred
Geological boundaries

Ref RN/MGB2/03

2767

Geochemistry - P.P.M

I.P. Data

CHARGEABILITY IN MILLIVOLTS/VOLT (——)

RESISTIVITY IN Ohm-METRES (– – –)

POLE-DIPOLE OR DIPOLE-DIPOLE

RESISTIVITY (Ωm)

CHARGEABILITY (mV/V)

n = 1 n = 2 n = 3 n = 4 n = 5

Total Magnetic Field (γ)

Topography & Geology

HEIGHT ABOVE SEA LEVEL - (metres)

787092

RENISON LIMITED 80-1764 (Vol 2 (2))

AGNEW GRID E.L. 11/76 & S.P.L. 129

LINE 2000E

SECTION LOOKING WEST

SCALE 1:2000 METRES

DRAWN	
TRACED	
DATE	
SCALE	1:2000
DRAWING No.	

Fig. 9c

I.P. DATA

CHARGEABILITY & RESISTIVITY

Gradient Array

S Anomaly letter number

MAGNETICS

GEOCHEMISTRY

Sn Cu Pb Zn As W

LEGEND

ALTERATION

Quartz and/or tourmaline

Total tourmalinization, occasionally with hematite

Hydrothermal breccias

Collapse

White alteration Green

Argillic alteration

Green alteration (sericitized granite) generally with hematite or pyrite

Diorite - mod. green

Area of tourmalinization

ROCK TYPES

Aplite or microgranite

Fine grained White granite

Medium grained Red granite

Coarse grained

Porphyritic granite

Major lineament

Fault

Definite

Approximate Geological boundaries

Inferred

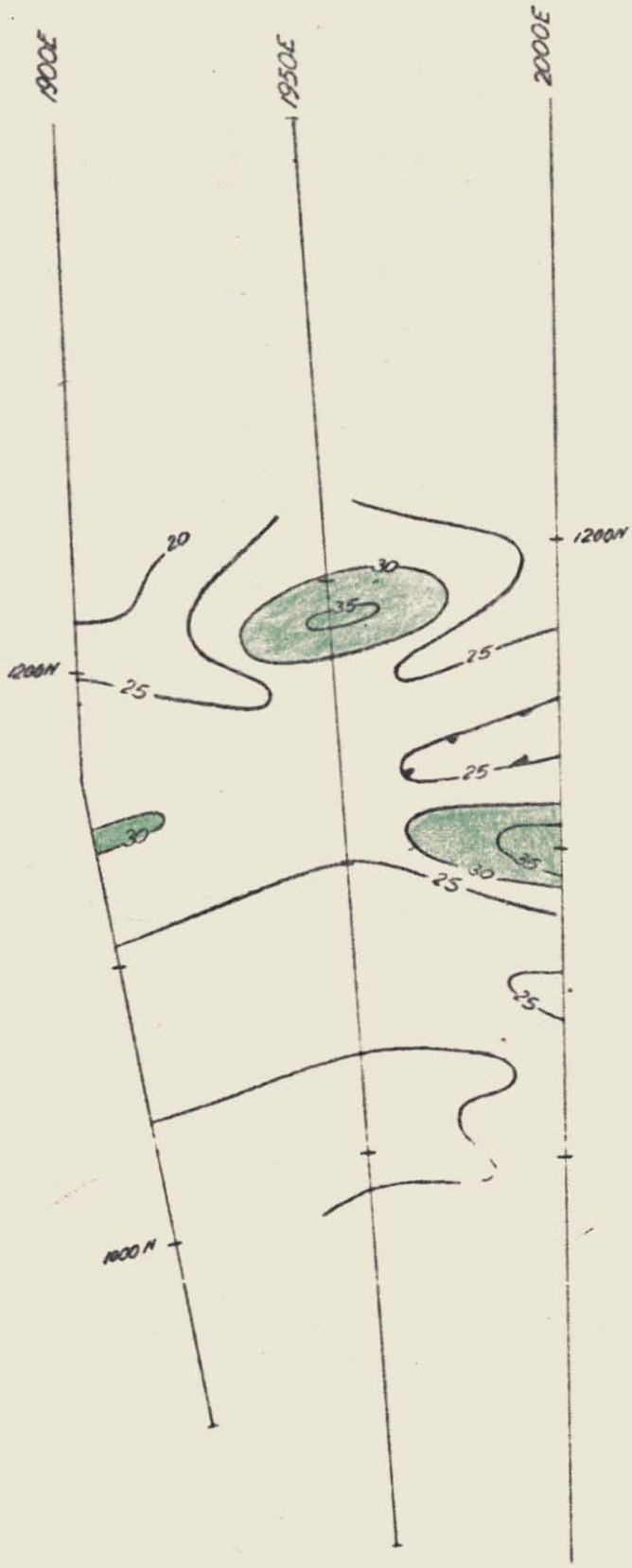
Ref: RN/MGB2/05

5 cm

2768

2768

U65



Survey by: Scintrex, 1981
dipole spacing (& stn. interval): 10m.

787093

82-1749 (W01 2/2)

5 cm

(figure from Howland-Rose, 1981b) Ref. RN/MG 82/03

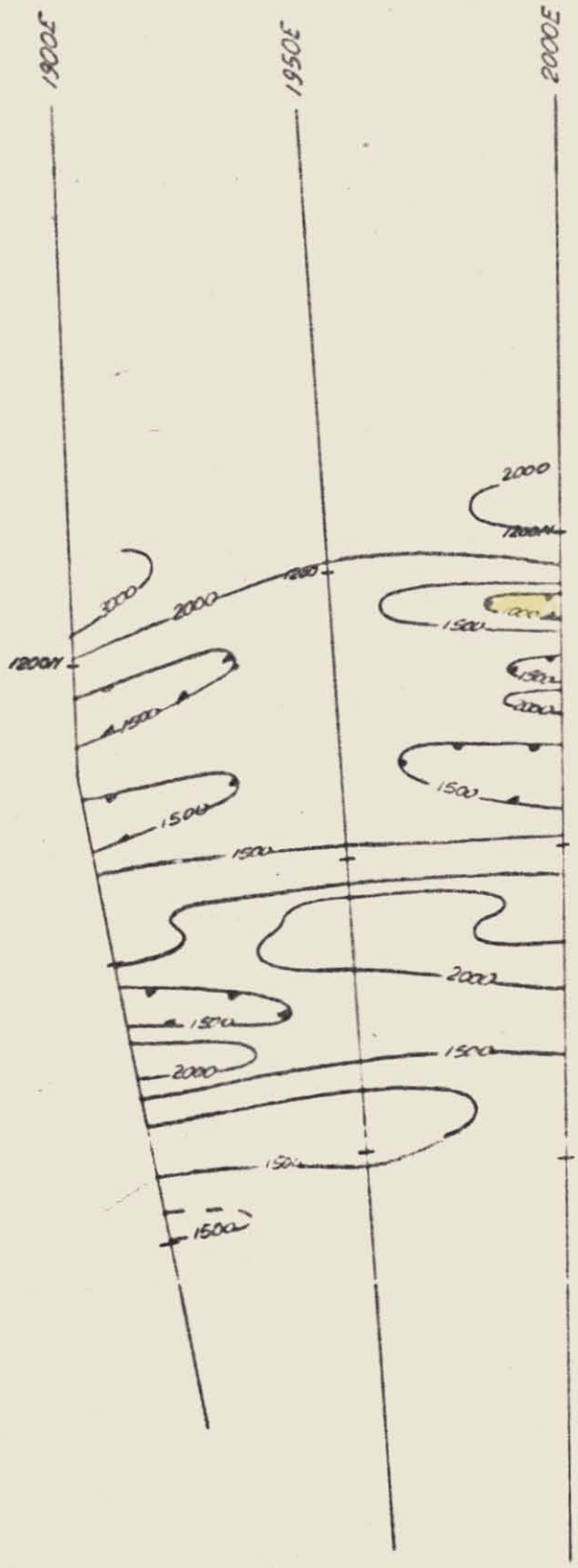
MITRE GEOPHYSICS PTY. LTD.

AGNEW GRID
AREA 9

Chargeability Contours

Drawn by Scintrex	Scale 1:2000	FIG. 9d
Traced by TGDS	Date March 1982	

066



Survey by: Scintrex, 1981
dipole spacing (& stn interval): 10m.

5 cm

(figure from Howland-Rose, 1981b)

Ref RN/MG 82/03

787094

82-1749-C(Vol 2/2)

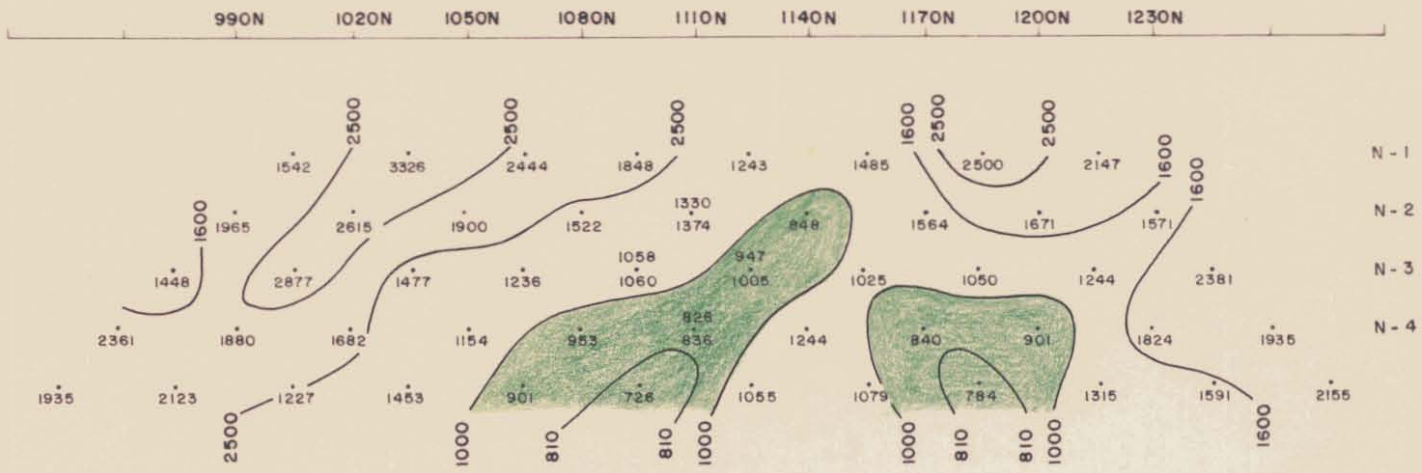
MITRE GEOPHYSICS PTY. LTD.

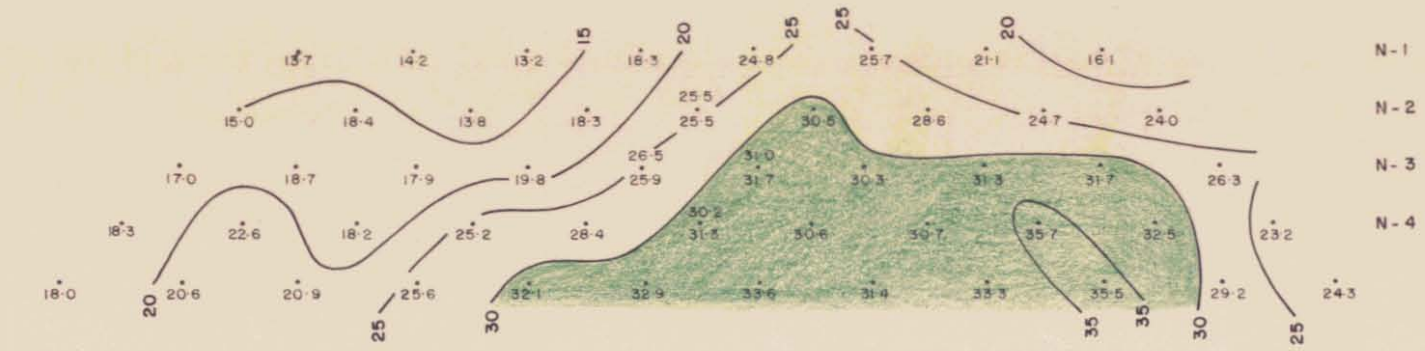
AGNEW GRID
AREA 9
Resistivity Contours

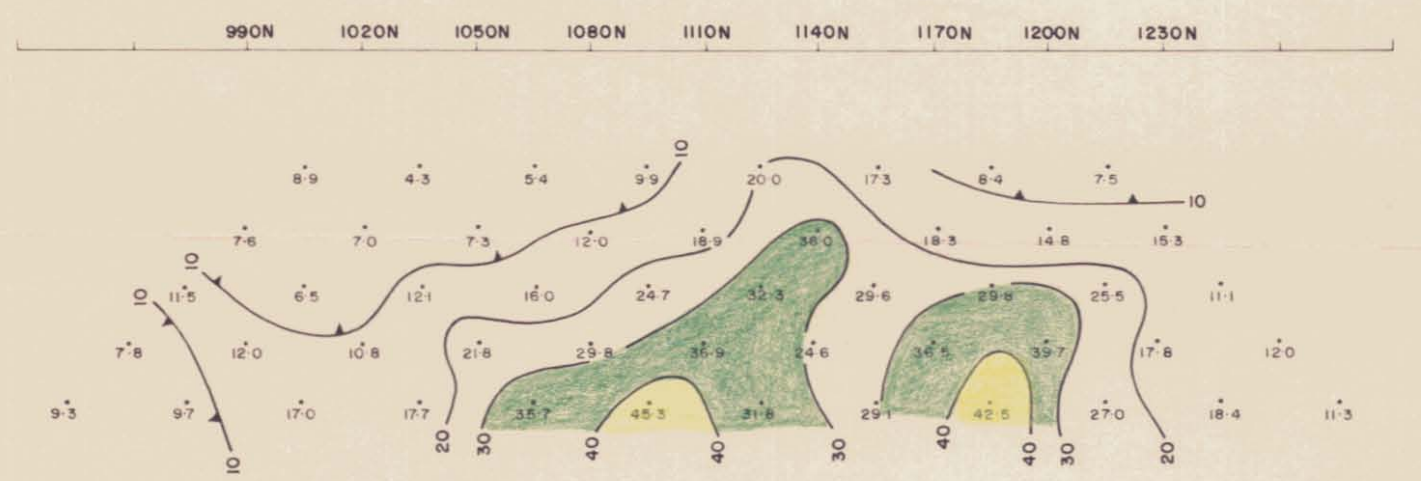
Drawn by Scintrex	Scale 1:2000	FIG 9e
Traced by TGDS	Date March 1982	

067

LINE: 1900E.







Survey by: Scintrex, 1981
dipole spacing: 30m
I.P. receiver: IPR-10
(2secs on 2secs off
M_3 plotted)

5 cm

MITRE GEOPHYSICS PTY. LTD.
AGNEW GRID
LINE 1900E.
dipole-dipole I.P.

Drawn: Scintrex/JB	Scale: 1:2000	FIG. 9f.
Traced: T.G.D.S.	Date: March 1982	

Ref: RN/MG82/03

82-1749 (Vol 2/2)

781095

Geochemistry
P P M

I.P. Data
CHARGEABILITY IN MILLIVOLTS/VOLT (——)
RESISTIVITY IN Ohm-METRES (– – –)

POLE - DIPOLE OR DIPOLE - DIPOLE
RESISTIVITY (Ohm)
n = 1
n = 2
n = 3
n = 4
n = 5

POLE - DIPOLE
CHARGEABILITY (mv/v)
n = 1
n = 2
n = 3
n = 4
n = 5

Total Magnetic Field (γ)

Topography & Geology
HEIGHT ABOVE SEA LEVEL - (metres)

6305 6005 4505 3005 1505 00 150N 300N 450N 600N 750N 900N 1050N 1140N

NO SAMPLE

Trail
Trees
Rd

787096

2769

RENISON LIMITED (82-1749 (Vol 213))
AGNEW GRID E.L. 11/76 & S.P.L. 129
LINE 500E
SECTION LOOKING WEST.
SCALE. 1: 2000 METRES
0 40 80 120

DRAWN	
TRACED	
DATE	
SCALE	1 2000
DRAWING No.	

Fig. 12

Ref. RN/MG82/03

I P DATA
CHARGEABILITY & RESISTIVITY
Gradient Array
S Anomaly letter number

MAGNETICS

GEOCHEMISTRY
Sn
Cu
Pb
Zn
As
W

ALTERATION
Quartz and topaz and/or tourmaline
Total tourmalinization accasionally with hematite
Hydrothermal Breccias
Collapse
Argillic alteration
White Alteration Dykes
"Green" alteration (sericitized granite) generally with hematite or pyrite
Quartz - mica greisen
Area of tourmaline nodules

LEGEND
ROCK TYPES
Aplite or microgranite
Fine grained
Medium grained
White granite
Porphyritic granite
Medium grained
Coarse grained
Red granite
Major lineament
F Fault
Dolerite
Approximate
Inferred
Geological boundaries

5 cm

2769