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ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

West Coast Mines

STERLING VALLEY EXPLORATION LICENCE E.L. 4/73

Progress Report on Activity

July, 1979 - June, 1980

Geological Department

A.J. Mollison

Report No. 133

July, 1980

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SUMMARY OF EXPLORATION ACTIVITY

(refer to plan A4-526-0017 1:50,000 "Work Completed 30.6.'79 - 30.6.'80")

The following work was undertaken between July, 1979 and 30th June, 1980, in the Sterling Valley Exploration Licence.

Western Volcanics & Farrell Slates

Part of the old Sterling Valley Grid was rehabilitated and extended. This grid was geologically mapped, soil sampled and surveyed with dipole-dipole I.P.. A ground magnetometer survey was completed over the grid north of line 3560N. Two diamond drill holes STP 217 and STP 218 were completed in the north-western part of the Exploration Licence.

Eastern Volcanics

A stream sediment sampling/geological mapping programme has been completed over the Eastern Volcanics.

1.0 INTRODUCTION

Exploration Licence 4/73 covers an area of 33sq.km. centred about 6km south of the township of Tullah, on the West Coast of Tasmania. The Sterling Valley has previously been explored by a number of mining companies, including Rio Tinto Australian Exploration, Electrolytic Zinc Co., Pickands Mather International, Asarco, Cominco and Aberfoyle Exploration. Since July, 1979, E.Z. has carried out exploration for a joint venture between Aberfoyle, Getty Oil Development Co. Ltd. and E.Z..

Previous work has been concentrated on the floor of Sterling Valley with E-M, ground magnetics, gravity and soil sampling surveys and diamond drilling being carried out over the Farrell Slates and the adjacent volcanics. Reconnaissance stream sediment sampling and geological mapping has occurred over most of the remainder of the Licence.

This report covers work done at Sterling Valley between July, 1979 and June, 1980 since the commencement of the E.Z., Getty Oil, Aberfoyle Joint Venture and is concerned with:

1. Grid geological mapping, soil sampling and I.P. surveying of the Western Volcanics and Farrell Slates.

2. Diamond drilling in the Western Volcanics and Farrell Slates.

3. Stream sediment sampling and geological mapping of the Eastern Volcanics.

2.0 OBJECTIVES.

The main targets for exploration on E.L. 4/73 are:

1. Massive volcanogenic Pb/Zn/Cu deposits of the Rosebery type associated with sedimentary lenses in the Eastern Volcanics.

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2. Fracture filling, volcanogenic (?) Farrell type Ag-Pb deposits in the Farrell Slates adjacent to the Eastern Volcanics.

3. Replacement Sn deposits of the Renison Bell-Cleveland type (carbonate horizon replacement or structural controlled type) in the Farrell Slates and Western Volcanics.

3.0 PREVIOUS WORK

(refer to the following reports)

1. Cominco Exploration Pty. Ltd.
Progress Report on, Exploration Licence 4/73 Sterling Valley, Tasmania. For six months ending 6.3.1976 (and summarising work carried out in the previous six month period).
D.C. Simpson.

2. Asarco (Australia) Pty. Ltd.
E.L. 4/73 Sterling Valley, Tasmania. Progress Report to June, 1974.
R.G. Barker.

4.0 WESTERN VOLCANICS & FARRELL SLATES

4.1. Work Completed

(Refer to 1:50,000 plan A4-526-0017)

All recutting of lines has been completed with a total of 14.0km being pegged. Permission to cut about 2.0km of line through the Scenic Reserve on the Murchison Highway was not granted by the Department of National Parks and Wildlife.

Geological mapping of the recut grid is complete. Access tracks were also mapped. The mapping has been plotted onto 1:5,000 standard geological plans and reduced onto 1:10,000 scale standard geological plans.

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4.2. Geology

(refer to 1:10,000 plan Ref. No. AO-525-0006)

Previous mapping by Asarco geologists has been compiled onto 1:5,000 and 1:10,000 geological plans. An attempt to apply E.Z. geological terminology to the Asarco and Cominco mapping proved only partly successful because previous workers appear to have attempted chemical classification only. E.Z.'s classification uses both chemical and textural parameters in an attempt to give a genetic (mode of occurrence) classification.

Three different and distinct groups of rocks have been observed from mapping and diamond drilling during the past field season. These groups are listed below from west to east. No stratigraphic order is implied by the listing.

1. Mt. Black Volcanics - felsic - intermediate lavas, pyroclastics and small intrusives (trachytes, andesites and minor dacites).
2. Farrell Slates - subtly graded sequence of greywackes, siltstones and minor shales.
3. Eastern Volcanics - Rhyolitic-dacitic pyroclastics and lavas.

The three units are described in detail below.

1. Mt. Black Volcanics (Western Volcanics)

This name was coined by Braithwaite (1967) but the unit has also been referred to as Episode II volcanics (Freytag pers. commn) and the Western Volcanics (E.Z./Getty field name).

The unit outcrops on the eastern slopes of Mt. Black, but is covered by fluvio-glacial material on the Sterling Valley floor. Further outcrops have been mapped in the Murchison River.

The contact between the Mt. Black Volcanics and the Farrell Slates is completely concealed by overburden, however, recent

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drilling (E.Z./Getty DDH MRP 212 and E Z./Getty/Aberfoyle DDH STP 217) has shown that the contact is faulted.

To the east the Mt. Black Volcanics appear to overlie the Primrose Pyroclastics, host rocks of the Rosebery Orebody.

Mapping of grid lines and recently bulldozed drill track access has shown the Mt. Black Volcanics to consist of fine-coarse grained intermediate pyroclastics and andesitic lavas which contain at least one thin lens of bedded, slumped siltstone. The siltstone was located at 5,374,820mN 383,710mE. The strike was 196° magnetic and dip was 70° W.

Three drill holes have intersected the Mt. Black Volcanics viz MRP 212 (on E.L. 1/62), STP 217 and STP 218. The Mt. Black Volcanics intersected in the holes consisted of coarse-fine grained trachytic, graded pyroclastics, (giving a west facing in STP 218) andesitic-dacitic ashflow pyroclastics (STP 217), fine grained trachytic, vitric, crystal tuffs (MRP 212). Intrusive porphyritic trachytes and microdiorites were also observed. Some of the fine grained porphyritic varieties are thought to be lavas.

A finely bedded unit intersected by STP 218 shows that the tuff is of air-fall origin, but lack of reworking indicates that it is probably sub-aerial.

2. Farrell Slates

The Farrell Slates occur as a poorly outcropping unit in the fluvio-glacial covered Sterling Valley. Isolated outcrops exist on the valley floor, on the Murchison Highway and in the Murchison River. The unit strikes north-north-east and dips and faces west (Freytag pers. commn.). It is separated from the Mt. Black Volcanics by a fault (mentioned above) and to the east interfingers with the Eastern Volcanics. Unlike the Mt. Black Volcanics, the Farrell Slates are strongly cleaved, locally becoming schists and phylites. The main rock types mapped

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consist of greywackes (locally dolomitic) siltstones and minor black shales. These grade downwards into the massive lavas and pyroclastics of the Eastern Volcanics with a gradual increase in primary volcanic material. An outcrop in a cutting on the Murchison Highway consists of a fine grained crystal tuff with interbeds of medium grained crystal, lithic tuffs containing shale fragments, indicating simultaneous volcanism and sedimentation. It appears that this represents the waning cycle of volcanism at the end of the deposition of the massive Eastern Volcanics.

The slates appear to be mainly derived from a rhyolitic volcanic source, although the presence of detrital muscovite indicates some contribution has also been made from the Pre-Cambrian.

Facing evidence from drill holes STP 217 and MRP 212 is inconclusive, with both west and east facings being observed. This can be explained by possible tight folding within the Farrell Slates. Facing evidence from the Murchison Highway (fragments of black shale in an overlying tuff) indicate a west facing in that outcrop. West facings are also indicated by excellent graded bedding on the Murchison Damsite access road.

3. Eastern Volcanics

This unit is fully desribed in Section 5.2..

4. Mineralisation

No significant mineralisation has been observed during surface mapping. Minor silicification was observed in the Mt. Black Volcanics west of the Murchison Highway on line 4520N.

Diamond drilling, however, has intersected significant pyrrhotite, mostly as thin veins but occassionally as massive bands (up to 2m wide) within the Mt. Black Volcanics and Farrell Slates. The pyrrhotite is associated with arsenopyrite, pyrite and minor chalcopyrite and cassiterite with trace stannite, bismuth and

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bismuthenite. Gangue minerals include quartz, fluorite, schorl, topaz, epidote and chlorite. Locally minor galena and sphalerite occur in thin veins within the Mt. Black Volcanics.

Refer to Appenices 3 and 4 for detailed descriptions of the mineralisation.

4.3. Geochemistry

4.3.1. SOIL GEOCHEMISTRY

(refer to 1:10,000 scale Soil Geochemistry plans for Pb - AO-525-0026; Zn - AO-525-0027; Cu - AO-525-0025; Sn - AO-525-0071 and Appendix 2)

Soil sampling of the recut grid has been completed. Only that part of the grid which is not covered by overburden was sampled.

Tin is the most highly anomalous element detected in the Sterling Valley soil geochemical survey. Cominco soil samples over the Farrell Slates showed Sn up to 5000 ppm within a continuous zone of over 100 ppm, 150-200m wide and 1000m long with background values of less than 20 ppm. However, these samples were collected from the weathered bedrock/ fluvioglacial interface which has been subject to sheet erosion by the Sterling River. Such an horizon would be a good site for mechanical concentration.

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E.Z. soil samples have been collected from 'c' horizon insitu soils and are not likely to be enhanced much by gravity concentration of heavy minerals.

Soil samples particularly from the north-west corner of E.L. 4/73 are significantly anomalous in Sn. Assays of 300 and 380 ppm at 3890E and 4040E respectively, on line 4520N, and 350 ppm at 4220E on line 4640N are the highest assays. Frequency distribution plots of all samples analysed for tin show that 50 ppm is an anomalous concentration and over 100 ppm is highly anomalous.

Lead, zinc and copper soil geochemical results are less anomalous than tin. Scattered above background concentrations occur throughout the grid. Most of the high assays occur over the Western Volcanics north of line 1700N. The most significant zone of coincident high lead and zinc values trends north-north-east between lines 2050N and 2840N.

Anomalous values have been tabulated below:

High Lead, Zinc & Copper Values in the Western Volcanics

Line	Zn	Pb	Cu
2360N	220 ppm (4640E)	105 ppm (4640E)	120 ppm (4640E)
"	215 ppm (4700E)	105 ppm (4700E)	110 ppm (4670E)
"			135 ppm (4700E)
2600N	220 ppm (4640E)	105 ppm (4640E)	120 ppm (4760E)
"	245 ppm (4700E)		
2050N	330 ppm (4520E)	110 ppm (4670E)	
"	275 ppm (4550E)		

These high values probably result from the combined effect of a mineralised horizon in the north-north-east trending Western Volcanics and hydromorphic concentration at the base of the western slopes of Sterling Valley.

However, no mineralisation has been observed during mapping.

High Zn values at the western end of lines 3080N, 3560N, 4040N, 4280N and 4520N could be due to contamination from the Murchison Highway.

4.3.2. LITTER GEOCHEMISTRY (Ao HORIZON)
(refer to Appendix 2)
Litter samples (decomposed plant material) were collected at 30m intervals, however, only one in every three samples was assayed. The results of the survey have revealed no obvious anomalies.

4.4. Geophysics

4.4.1. INDUCED POLARISTATION
(refer to 1:10,000 plan Ref. No. AO-525-0024 Induced Polarisation & Pseudo-sections of spreads - Appendix 1)

A dipole-dipole I.P. survey (using 60m dipole) has been carried out over the recut portion of the Sterling Valley Grid. The survey has detailed the western edge of the Farrell Slates, where it contacts the Western Volcanics, along what is probably the northern extension of the Henty Fault.

Extremely high complex chargeability responses were obtained from a linear zone broadly coincident with the Farrell Slates. Resistivities in some cases dropped to below 10 ohm-m.

The most significant anomalies located were defined on lines:
4160N centred at 4730E (N=3)
4280N centred at 4570E (N=3)
4400N centred at 4700E (N=4)
4520N centred at 4640E (N=4) and perhaps
4040N centred at 4760E (N=4)

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In all cases a distinct resistivity low on the N=3 and 4 spacings is flanked by higher resistivities, and also above by higher resistivities. A halo of higher chargeability surrounds the resistivity low. This suggests a massive source surrounded by a disseminated zone, which would have a greater surface area to receive charge. The responses occur in an area covered by fluvio-glacial material. They are coincident with a broad magnetic anomaly and semi-coincident with an E-M conductor. They appear to be about 120m west of the main I.P. response over the Farrell Slates. Preliminary drilling (STP 217) has indicated that the anomalies are probably related to sulphide mineralisation in the Mt. Black Volcanics and/or Farrell Slate in the vicinity of the faulted contact between the two units.

A deep I.P. response centred between 4220E and 4340E on line 4520N was observed associated with a drop in resistivity from 1500 ohm-m to 900 ohm-m. The anomaly occurred over intermediate tuffs within the Mt. Black Volcanics. The anomaly was also seen on detail lines 4400N and 4640N with the anomaly becomming deeper to the north.

Drilling (STP 218) has shown this anomaly to be associated with vein mineralisation containing minor pyrrhotite, arsenopyrite, pyrite, chalcopyrite and cassiterite.

4.4.2. GROUND MAGNETICS

(refer to 1:10,000 Magnetics plan A0-525-0072)

A ground magnetometer survey was completed over the recut grid and some uncut lines, north of line 3560N in conjunction with a survey carried out over the Murchison River Grid (adjoining the northern boundary of E.L. 4/73).

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The survey produced a number of discontinuous north-south trending anomalies which result from sources under fluvio-glacial overburden. One such high on line 4280N centred at 4660E and coincident with a deep I.P. response mentioned above was selected as a drilling target for STP 217. The magnetic data was best fitted by a dipping thick dyke model, thickness 27m centred at 4660E and dipping 45° to the west, at a depth of 55m.

Another coincident weak ground magnetic/I.P. anomaly mentioned above was selected as a target for DDH STP 218 on line 4520E. Modelling of this weak magnetic anomaly was not possible due to the noisy nature of the readings received.

4.5. Drilling

Tracks were constructed to the sites of both drill holes. DDH STP 217 and STP 218 have both been completed.

DDH STP 217 (refer to DDH Summary Sheet A1-526-0012 & Appendix 4) DDH STP 217 was collared on line 4280N at 4565E and was completed at 249.1m. The hole intersected dacitic and andesitic tuffs, lavas and intrusives of the Western Volcanics before passing through a shear zone (probably the Henty Fault) into greywackes and shales of the Farrell Slates. The hole intersected numerous zones of pyrrhotite/arsenopyrite mineralisation which were commonly associated with minor pyrite/chalcopyrite/ cassiterite.

The following zones of tin mineralisation were recorded in STP 217:

Interval (m)	Thickness (m)	Sn ppm (XRF Fusion)	Association
70.0 - 71.0	1.0	2000	pyrite/quartz veining in dacite
78.0 - 79.0	1.0	1000	quartz/carbonate/fluorite veining
92.35 - 93.35	1.0	4950	pyrite/pyrrhotite/quartz in fractured fine grained dacite
93.35 - 105.45	6.8	1410	pyrrhotite/arsenopyrite/ quartz and fluorite
including			
98.65 - 100.7	2.05	2600	massive pyrrhotite/arseno-pyrite
122.0 - 123.6	1.6	1200	vein pyrrhotite, arseno-pyrite, chalcopyrite in quartz/fluorite gangue
145.1 - 151.6	6.5	1350	vein pyrrhotite
including			
149.6 - 151.6	2.0	3100	vein pyrrhotite/arseno-pyrite & chalcopyrite with quartz & fluorite gangue
179.3 - 184.3	5.0	614	minor pyrrhotite on shears

The cassiterite (with minor stannite) mineralisation occurs in association with arsenopyrite, chalcopyrite and broadly with pyrrhotite. Arsenopyrite may show a negative correlation with tin at concentrations above 1%. The cassiterite is also typically associated with a cloudy greenish gangue of mildly stressed fine to medium grained quartz with intergranular fine grained aggregates of green schorl and sporadic patches of fluorite (to 2mm +) clouded with tourmaline inclusions (Cowan; refer Appendix 3 Report C.M.S. 80/5/46). This is typically sheared and banded.

DDH STP 218 (refer to DDH Summary Sheet A1-526-0013 & Appendix 4) DDH STP 218 was collared at 4486N/4190E and completed at a depth of 165.0m. A sequence of trachytic, porphyritic lavas, tuffs and

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bedded tuffs and intrusive, andesitic dykes was intersected by the hole. Thin (less than 2cm wide) chlorite-quartz-sericite veins containing fibrous radiating topaz with fluorite, sulphides and cassiterite occurred from 23.9 to 44.1m and 78.0 to 111.0m. A down hole I.P. survey showed good correlation between chargeability/resistivity responses and the two zones of veining mentioned above. The I.P. anomaly also correlated well with the surface traverse responses.

Analysis of chip samples from the core showed reasonable correlation between Sn, As and Cu. Pb and Zn values were consistantly low. The Sn, As and Cu geochemical peaks also showed good correlation with the down hole I.P. responses. Highest chip sample analysis for Sn was 630 ppm between 80 and 85m within a zone averaging 250 ppm Sn between 80 and 120m. Another zone between 25 and 45m averaged 310 ppm Sn.

4.6. Conclusions

The results of past work and work completed during the period being reported show encouraging signs of tin mineralisation. Drilling and geophysical surveys have both provided evidence to suggest the possible presence of significant mineralisation associated with fracture systems within the Western Volcanics and Farrell Slates. Further detailed work in this area is warranted to test these results and to find their cause.

5.0 EASTERN VOLCANICS

5.1. Work Completed

(Refer to 1:50,000 Work Completed plan A4-526-00 17)

A stream sampling and geological mapping programme has been conducted over the Eastern Volcanics. Samples of stream

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sediments were collected at 250m intervals along streams and at significant stream confluences. A total of 285 samples were collected, sieved to -80 mesh and analysed for Pb, Zn, Cu, Mn and Fe after perchloric/nitric digestion. Selected samples were also analysed for Sn.

5.2. Geology

(refer to 1:10,000 Geology plan AO-525-0055)

Mapping has shown the eastern area of E.L. 4/73 (all the area east of the Sterling Valley floor) to comprise a generally north striking sequence of tuffs and lavas with composition ranging from predominate rhyolites to subordinate andesites. These are bounded to the east by the up-faulted Pre-Cambrian Tyennan Block and to the west by the Farrell Slates. The volcanics have been intruded by the Murchison Granite and by related rhyolitic porphyries. The sequence is overlain unconformably by a coarse polymictic unit containing both volcanic and Pre-Cambrian sedimentary clasts, which underlies the Lower Ordovician Owen Conglomerate and is possibly equivalent to the Jukes Breccia of the Mt. Lyell area.

5.2.1. MINERALOGY

The north striking sequence of acid tuffs and lavas have been referred to in this report as the "Eastern Volcanics". Chemically they can be described as rhyolites or trachy-rhyolites. Lavas are usually quartz-phyric with accessory alkali (K-) feldspar phenocrysts in a devit-rified felsic groundmass. The ground mass is frequently altered with albite, chlorite and sericite being common alteration products.

Magnetite and apatite occur as common accessory phases in both lavas and tuffs. In hand specimen and thin section it is difficult to differentiate between the common

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brecciated lavas and crystal lithic tuffs of this sequence. The tuffs in hand specimen are less porphyritic and display a strong fragmental texture. In thin section pyroclastics are less homogeneous than the brecciated lava fragmentals. Mineralogically, however, the two are very similar.

The Eastern Volcanics are intruded by the Murchison Granite and associated rhyolitic porphyries. Cowan (refer to Appendix 3 - C.M.S. Report 80/2/22) has described the Murchison Granite as: A hornblende-biotite-adamellite. Orthoclase-microperthite and heavily sericitised oligoclase occur in near equant proportions. Subordinate phases are dark green hornblende, extensively chloritised dark brown biotite and quartz. Grains are prismatic and average about 1.5mm diameter. Accessories are magnetite and apatite.

Associated with the granite are porphyritic high level intrusive rhyolites similar in mineral chemistry to the porphyritic lavas described above, but with coarser grain-size and proportionally less ground mass.

Toward the south-east corner of the E.L. 4/73 the proportion of granite-granodiorite and more mafic volcanics increases. Andesitic to dacitic porphyries, replace the rhyolitic intrusives immediately to the east of the Eastern Volcanics sequence.

5.2.2. STRUCTURE

The Eastern Volcanics appear to form a conformable west dipping sequence. However, in closer proximity to the main body of the Murchison Granite the structure becomes more complex. A number of units show a roughly arcuate distribution, suggesting folding. The difference in chemistry between the rhyolitic lavas and tuffs in the

north-west, and the andesitic-dacitic porphyries and granite-granodiorite in the south-east suggests the presence of a fault between the two areas.

A strong photo linear feature between the Pre-Cambrian and Cambrian also suggests a faulted contact between those units.

From the outcrop pattern the contact between the Lower Ordovician Owen Conglomerate and the underlying rocks appears to be shallow dipping and constant. However, structure within the Owen Conglomerate is complex with faulting and folding apparent from the different orientations of strata. This faulting is apparent from air photograph interpretation and from outcrop in the Murchison Gorge area and appears to also occur in the Cambrian rocks adjacent the Owen Conglomerate.

5.2.3. MINERALISATION

Vein infilling Ag-Pb mineralisation and associated pyrite and magnetite appear to be the major mineralisation types. Old workings in the Eastern Volcanics adjacent to the Farrell Slates are of these types. Pyrite and magnetite also occur in the surrounding rocks. Pyrite, magnetite and chalcopyrite are also associated with the rhyolitic lavas close to the Murchison Granite in the H.E.C.'s Sophia Tunnel and throughout the area. Vein galena mineralisation has also been intersected by a drill hole drilled by the H.E.C. to test ground conditions for the north end of the Sophia Tunnel.

5.3. Stream Geochemistry

(refer to Stream Sediment plan Sheets 7 & 8 for Pb & Zn AO-525-0049 & 0091)

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Based on results obtained from the Mt. Murchison drainage survey recently undertaken in E.L. 1/62, Pb and Zn values in excess of 200 ppm are considered weakly anomalous and values in excess of 300 ppm are considered strongly anomalous.

Four drainage systems were found to contain multiple anomalous values. One of these, however, is contaminated by old workings and in another high values coincide with very high manganese, suggesting Pb and Zn is high because of hydromorphic concentration. Overall tin values were very low with a mean of 4 ppm and a maximum of only 36mm. High Pb values at the north end of the Sophia River are probably caused by contamination from an H.E.C. drill hole which intersected small galena veins and which seeps water into the Sophia drainage system.

5.4. Conclusions

The geological mapping and stream sediment sampling carried out to date has revealed no anomaly of primary interest. However, two stream basins contain elevated Pb & Zn values which are unexplained and will require further investigation. These streams drain an area reported to contain a barite lode (Ward 1908) which was not located by the current mapping/sampling programme. The rocks however appear to be unprospective for the types of mineral occurrences being sought. They consist mainly of granites, intrusive rhyolites and subordinate acid and intermediate pyroclastics. Further work will be required to trace the source of this anomalism.

Other anomalies can be adequately explained by contamination from old workings, seepage from a drill hole which intersected mineralisation and scavenging by manganese in a soak area.

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6.0 RECOMMENDATIONS FOR FURTHER WORK

6.1. Western Volcanics

A more detailed ground magnetometer survey over the recut grid mentioned above should be carried out to close-up the previous survey to 10m intervals to allow better interpretation. This should be done in conjunction with a survey on the Murchison River Grid on E.L. 1/62.

A diamond drilling programme totalling 850m is recommended to test the remaining geophysical anomalies which occur in the fluvio-glacial covered area in the north-west corner of the E.L.. It is estimated that 5 holes will be required to adequately cover the remaining anomalies. Drilling should also be designed to provide a detailed section across the Farrell Slates to the 5000E baseline and beyond. This will test the stratigraphy of the Farrell Slates for more calcareous horizons, which may provide a favourable host for replacement type ore bodies.

6.2. Eastern Volcanics

A gossan search to locate and assess all old workings on the E.L. is recommended.

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3. Ward L.K.

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APPENDIX 1

Scintrex Report Tas - 065,

"A report on Dipole-dipole Electrical Induced Polarisation Surveys over the Sterling Valley Grid, near Rosebery, Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited."

January, 1980

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A REPORT ON

DIPOLE-DIPOLE ELECTRICAL INDUCED POLARIZATION SURVEYS

OVER THE STERLING VALLEY GRID

NEAR ROSEBERY, TASMANIA

ON BEHALF OF

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

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A REPORT ON
DIPOLE-DIPOLE ELECTRICAL INDUCED POLARIZATION SURVEYS
OVER THE STERLING VALLEY GRID
NEAR ROSEBERY, TASMANIA
ON BEHALF OF
ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

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GEOPHYSICAL CONSULTANTS AND CONTRACTORS

SUMMARY

A dipole-dipole a = 60, n = 1 to 4 EIP survey carried out over the Sterling Valley grid has revealed a series of complex multiple source anomalies, which for the most part come within 60 metres of surface, and which vary from disseminated to interconnected chargeable material - graphite &/or sulphides.

Of particular interest is a series of conductive chargeable sources, flanked and overlain by chargeable material having a greater resistivity. The source is interpreted as being due to massive graphite &/or sulphides surrounded by a disseminated halo. The anomalies on lines 4040N to 4520N at about 4700E (±) are considered of prime geophysical interest.

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A REPORT ON

DIPOLE-DIPOLE ELECTRICAL INDUCED POLARIZATION SURVEYS OVER THE STERLING VALLEY GRID NEAR ROSEBERY, TASMANIA ON BEHALF OF ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

INTRODUCTION

During the latter part of 1979 a series of a = 60 metres, n = 1 to 4 dipole-dipole traverses were run over the Sterling Valley grid near Rosebery, on behalf of Electrolytic Zinc Company of Australasia Limited. These surveys were carried out at the request of Mr. J. MacDonald, Chief Geologist for Electrolytic Zinc, while field supervision was carried out by Senior Exploration Geologist Mr. J. Mill.

The bulk of the work was carried out by Scintrex operator Mr. T. Von Strokirch B.Sc., in October and November, 1979 with limited extensions by Mr. R. Sims in December, 1979. Table I shows the dates each traverse was completed.

TABLE I

Line	Operator	Date	Set-ups
1050N	T. Von Strokirch	1-10-1979	1
1350N	"	2&3-10-1979	2
1700N	"	5-10-1979	1
2050N	"	8-10-1979	1
2360N	"	29-9-1979	1
2600N	"	14-10-1979	1

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Table I - cont'd

Line	Operator	Date	Set-ups
2840N	T Von Strokirch	13-10-1979	1
3080N	"	12-10-1979	1
3560N	"	9-10-1979	1
4040N	"	15-10-1979	1
4160N	"	16-10-1979	1
4280N	"	16-10-1979	1
4400N	T. Von Strokirch & R. Sims	27-7-1979 & 19-12-1979	2
4520N	T. Von Strokirch	25&26-9-1979	2
4640N	R. Sims	21-12-1979	1

EQUIPMENT

The bulk of these surveys were executed using a 2.5 kilowatt Scintrex Australian transmitter powered by an 8HP Briggs and Stratton motor generator. A 3HP portable unit was available in remote areas. The reciever used was a IPR-8. Both transmitter and receiver used a 2 second square wave programme throughout. While the latter employed a three slice programme, only one slice, M_3, was presented in the data pseudo sections.

DATA PRESENTATION

The standard pseudo section format was used, to which have been added the terrain profiles at the natural scale.

APPENDIX

A very brief and simple description of the method is enclosed as an appendix

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for those unfamiliar with volume from which the data points on the pseudo section are derived.

DISCUSSION OF RESULTS

All 60 metre dipole-dipole profiles have the topography superimposed on the pseudo section at the natural horizontal scale. However, some of the sharper features such as ridges and cliffs which *may* cause or contribute to topographic distortions in the resistivity data will not necessarily show up on this topographic profile, as it was derived from the contour maps of the area.

Comments are restricted to the geophysical data alone, each line being separately discussed.

LINE 1050N *a = 60 metres, n = 1 to 4* *Surveyed 1-10-79*

The terrain rises steeply from the western extremity of the surveyed line at 4610E to 5270E in the east.

The main feature on the resistivity profile was a 3000 ohm-metres ± high situated on the 4730E-4790E dipole. While this may in part be related to a topographic high centred at this dipole, such a feature alone is not wholly responsible. To the immediate west the resistivities are a low 200 ohm-metres± and are accompanied by high background chargeabilities of 30 to 40 millivolts/volt. *Between* the highest and lowest resistivities centred at 4700E±, intermediate resistivities of 500 ohm-metres ± are accompanied by very strong chargeabilities of 80 to 100 millivolts/volt. This comes within 60 metres of surface, and a further extension to the west would probably have confirmed a 'double peak' effect.

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To the east of the high chargeability feature, the chargeability gradually and steadily decreases to about 22 millivolts/volt at 5150E which can be considered background.

Summary ..... A highly chargeable source was located between 4670E and 4730E at a depth less than the dipole used, namely, 60 metres. The intermediate resistivities of 500 ohm-metres ± suggest a disseminated source, either graphite or sulphides. To the immediate west, resistivity falls to 200 ohm-metres ±, while the chargeability decreases to the range 30 to 40 millivolts/volt. This may be due either to a rock type change or larger concentrations of more 'massive' graphite or sulphides which has an effectively lesser surface area. The gradual fall-off in chargeability to the east infers a gradual decrease in chargeable material in that direction.

LINE 1350N *a = 60 metres, n = 1 to 4* *Surveyed 2 & 3-10-79*

A gradual and steady increase in terrain was noted from the western extremity of the line at 4550E to 5330E.

Overall. a significant increase in chargeability was noted between 4760E and 5060E. To the east, backgrounds remain at *about* 20 millivolts/volt ±8 millivolts/volt within resistivities of 1200 ohm-metres ±.

Again a resistive feature at 5030E(±) marks the boundary between the relatively low chargeabilities to the east, and the much higher values to the west. These higher values are accompanied by lower resistivities of 200 ohm-metres ±, inferring a weakly interconnected source. The maximum value at $n = 1$ is centred at 4940E or to the west thereof, and lies within 60 metres of surface. The western

chargeable zone continues as higher chargeabilities of 30 to 50 millivolts/volt accompanied by lower resistivities of 100 to 300 ohm-metres to about 4670E, to the west of which resistivities increase 4 to 5 fold, while chargeabilities decrease dramatically to 7 to 15 millivolts/volt, denoting a dramatic change in rock type.

Summary ..... *In broad outline, subject to the limited western extent of* line 1050N, the *form* of the anomalies on both lines 1350N and 1050N are comparable and infer a continuation of geological units along strike.

The main anomaly occurs as a broad zone *between* 4760E and 4970E. Over this 200 metres (+) width, the resistivities are a low 100 to 300 ohm-metres, while the chargeability reaches over 50 to 90 millivolts/volt in the central section. The source is obviously weakly interconnected sulphides and/or graphite, which at 4910E ±30 metres comes within 60 metres of surface.

The lower resistivity of 100 ohm-metres + on the $n = 4$ readings either side of 4760E indicate greater interconnection between chargeable material to depth which *may?* have possible economic possibilities.

LINE 1700N $a = 60$ *metres,* $n = 1$ *to* 4 *Surveyed 5-10-79*

Between 4400E and 4700E the terrain is just about flat. To the west of 4700E the topography rises gradually to the end of the surveyed line at 5000E.

The main feature observed on this pseudo section is an extremely sharp contact at 4760E. to the west of which resistivities (at depth) are of the order of 2000 ohm-metres, and chargeabilities a relatively low 1 millivolt/volt increasing

west to 17 millivolts/volt at 4400E. This obviously represents a major rock type contact.

It should be noted that the 'bad' chargeability overlaps in the vicinity of this contact are due to the potential dipole being 'over' highly chargeable material to the east of the contact, and 'over' non-chargeable material to the west of it, and are quite normal in such circumstances.

East of 4880E the resistivity falls to between 90 and 22 ohm-metres, and are accompanied by extremely high chargeabilities of 50 millivolts/volt(+), the later *n* values not being obtainable due to insufficient potential drop. This anomaly, while open to the east, lies within 60 metres of surface.

Summary..... A significant rock type change was noted at or just to the east of 4760E. To the west, lower chargeability and higher resistivity contrast with higher chargeability of 10 fold greater to the east, while resistivities to the east are 25% (+) of those observed to the west of the contact. Thus, resistive cover is inferred to 4880E over this zone.

The most significant anomaly is located at 4950E and to the east of this by one dipole. Here, lower resistivities of less than 80 ohm-metres are accompanied by higher chargeabilities of 50 to 70 millivolts/volt. The resistivity decreases to depth. The source is obviously massive graphite and/or sulphide which lies within 60 metres of surface.

A suggested correlation of line 1700N and line 1350N is that 4760E on the former is correlated to 4670E on the latter.

LINE 2050N *a = 60 metres, n = 1 to 4* *Surveyed 8-10-79*

The topography over the section surveyed forms a broad valley with gradual rises east and west of 4670E.

The most striking feature on this profile is a sharp change in chargeability at or east of 4790E. To the immediate west chargeabilities are a very low 1 to 4 millivolts/volt, and gradually increase to the west to 18 millivolts/volt ± at 4400E. The accompanying resistivities are generally about 2000 ohm-metres and show a relatively broad 'low' of about 1200 ohm-metres (±) at 4550e within more resistive material between 5000E and 4500E to the east and west.

To the east of the contact at or east of 4790E the chargeability dramatically increases from 4 millivolts/volt to just under 80 millivolts/volt at 4940E (n = 4), while the resistivity shows a corresponding and sympathetic decrease from 1000 to 2000 ohm-metres in the west, to less than 80 ohm-metres in the east. The *gradual* increase in chargeability from west to east between 4790E and 4970E infers a gradual *increase* in chargeable material, while the gradual decrease in resistivity similarly implies a gradual interconnection between the graphite/sulphide source.

The relatively high n = 1 resistivities of 800 to 400 ohm-metres east of 4850E *together with* a progressive *decrease* in resistivity and *increase* in chargeability infers not only that the more massive graphite/sulphide section lies at depth (120 metres?) but also that the 'disseminated' halo exists not only to the west but also above the body.

Summary ..... Very high chargeability and very low resistivity were noted centred

at about 4970E on the n = 2 to 4 spacings. While the anomaly is open to the east, it is inferred to be surrounded *above* and to the west by a disseminated halo of chargeable material. The source of the most significant anomaly lies about 100 metres ± below 4930E.

The rocks to the west of 4790E are characterised by low chargeabilities and higher resistivities and correlate with similar rocks observed to the west of lines 1700N and 1350N. A suggested correlative for 1700N and 2050N is 4760E on the latter and 4790E on the former.

LINE 2360N *a = 60 metres, n = 1 to 4* *Surveyed 29-9-79*

The topographic profile shows steep slopes from the west of 4700E to 4610E after which gradual slopes were traversed. From 4700E to about 5150E a gradual increase in elevation was noted, after which a steeper gradient was recorded.

The location of the traverses on this line has adequately defined a broad zone of high chargeability between 4910E and 5000E. This broad zone appears to be divided into two distinct zones. The first is a distinct zone situated at 5000E which shows a single peak on n = 1 and double peaks on subsequent n spacings 2 and 3. These values are accompanied by lower resistivities of 470 to 266 ohm-metres as against higher enclosing resistivities of 1400 ohm-metres(+). The source therefore is interpreted as chargeable material within a moderately resistive host at a maximum depth of 60 metres.

The second zone is one of moderate to high chargeability of 25 to 40 millivolts/volt for 2 dipoles (120 metres) west of the distinct single source. Within this at 4820E a 'double peak' effect can be recognised from the western edge, which

to the east, is accompanied by low apparent resistivities of 580 to 250 ohm-metres. Where the two ' double peak legs' meet at n = 4 4910E, an abnormally low apparent resistivity of 80 ohm-metres was recorded.

To the west of the broad chargeable zone resistivities rise rapidly to 5000 ohm-metres plus, while the apparent chargeabilities fall immediately to 6 millivolts/volt(±), indicating a gradual compositional change in the underlying rocks in that direction.

To the east of the broad chargeability high, a distinct decrease in chargeability to 11 millivolts/volt(±) is again accompanied by an increase in resistivity to 2200 to 4000 ohm-metres.

Summary ..... A broad chargeable zone within 4850E to 5000E has two distinct sources, the major one being at 5000E and the second lesser one at 4820E. Both lie within 60 metres of surface and are due to disseminated or weakly chargeable material within rocks of moderately low resistivity (200 to 500 ohm-metres). The form of the response suggests the whole section to be chargeable overall rather than just two distinct sources.

The station at 4790E on line 2050E correlates with 4730E on this line.

LINE 2600N *a = 60 metres, n = 1 to 4* *Surveyed 14-10-79*

The traverse showed steep slopes to the west of 4760E to the end of the line at about 4400E, while to the east the slopes are gentle.

The main feature is a major increase in chargeability east of 4880E where

chargeabilities increase rapidly from 20 millivolts/volt in the west to over 60 millivolts/volt at 4940E. This high chargeability is accompanied by lower resistivities to 200 ohm-metres(±) as against 15 times that observed two dipoles to the west. Unfortunately the source of the chargeability is not defined to the east.

The rocks to the west of the anomalous section all show high backgrounds of 25 millivolts/volt to the end of the surveyed line. This is a distinct difference to the form observed on line 2360N to the south to which it cannot be related *in detail*.

Summary ..... The most significant feature on this line was high chargeabilities of 60 millivolts/volt accompanied by low resistivities of 130 to 323 ohm-metres, which unfortunately is open to the east. The highest chargeability of 80 millivolts/volt was located on n = 1 at 4970E and has a maximum depth of 60 metres.

The background chargeabilities to the west of the anomalous zone are two to three fold higher than observed on lines to the south to which this cannot be related in detail, presumably due to an along strike compositional change.

LINE 2840N *a = 60 metres, n = 1 to 4* *Surveyed 13-10-79*

The topography rises steeply to the west of the river at 4880E while to the east of it, the surveyed traverse remains relatively flat.

Unfortunately, as with line 2600N, the signficant chargeable response occurs on the extreme eastern flank. East of 4940E resistivities are a relatively low

90 to 50 ohm-metres, and are accompanied by strong 55 millivolts/volt(+) chargeabilities. A gradual increase in resistivity is accompanied by decreasing chargeability to 40 millivolts/volt and 20 millivolts/volt in subsequent westerly dipoles infers a gradual rather than sharp contact.

To the west of the anomalous zone for 250 metres of so the backround resistivities range from 1500 to 4000 ohm-metres and the chargeability 18 millivolts/volt(+). Over this section there are no anomalies relative to these backgrounds.

Summary ..... Other than the anomaly located on the eastern end of the surveyed line, no significant anomalies were located.

High chargeabilities of 55 millivolts/volt are accompanied bt low resistivity of less than 90 ohm-metres and indciate a significant source which lies within 60 metres of surface at, or west of 5000E, and is open to the east.

Co-ordinate for co-ordinate, lines 2600N and 2840N correlate.

LINE 3080N *a = 60 metres, n = 1 to 4* *Surveyed 12-10-79*

East of the river at 4910E the topography is relatively flat, while to the west a gradual increase in elevation was observed to 4520E where the traverse ends.

The form of the chargeability data is similar to that described on the previous two lines, namely a distinct chargeability anomaly on the eastern end of the line which is open to the east, and backgrounds of 20 to 22 millivolts/volt to the east.

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In detail the high 50 millivolts/volt anomalies seen on n = 1 to 4 come close to surface at or east of 5000E and are accompanied by low resistivities of 50 to 100 ohm-metres. The source therefore is interconnected sulphide and/or graphite within a conductive host. This shows a *gradual* contact to the more resistive rocks to the west.

Within the 20 to 22 millivolts/volt chargeabilities observed to the east, a higher 26 millivolts/volt response was observed at 4640E n = 4 from resistivities of the order of 1700 ohm-metres(+). The source would be disseminated chargeable material slightly above background. This anomaly is not considered significant.

Summary ..... The only significant chargeability anomaly was located on the eastern end of the surveyed line, and is open to the east. The form of the profile indicates a continuation north, in detail, of the rocks seen on line 2840N.

LINE 3560N *a = 60 metres, n = 1 to 4* *Surveyed 12-10-79*

The topography can be considered flat.

The form of the data profile is different in detail to those observed to the south.

The most significant feature observed on the pseudo section is a distinct contact at, or just east of the river at 4880E. Here, chargeabilities of 50 millivolts/volt(+) are associated with resistivities of 500 ohm-metres(+). There is an indication that as the n = 1 values at 4910E and 4970E are a relatively high 1000 ohm-metres, some local cover may exist over the chargeable source,

which is essentially open to the east. The source lies within 60 metres of surface at 5010E(±).

To the east of the chargeable high, the background resistivities remain a low 250 to 350 ohm-metres(±) which is in contrast to the lines described to the south. The chargeability background varies about the 20 millivolts/volt level, and superimposed on this background a moderate anomaly of 30 millivolts/volt was noted on n = 3 and 4 spacings at about 4580E, which is overlain by only background chargeabilities. The accompanying resistivities are 160 to 280 ohm-metres as against slightly higher than this level above. The depth to source is about 120 metres(±) below 4580E-4610E.

Summary ..... For two dipoles east of 4900E anomalous values in excess of 50 millivolts/volt accompanied by average (for the pseudo section) resistivities were recorded. The source comes within 60 metres of surface and consists of weakly interconnected chargeable material.

A second moderate anomaly was located centred at 4580E-4610E at an estimated depth of the order of 120 metres. Slightly lower resistivities of 160 to 250 ohm-metres accompanied by chargeabilities 50% above the 20 millivolts/volt background infer an increase in chargeable material within a weakly interconnected source.

LINE 4040N *a = 60 metres, n = 1 to 4* *Surveyed 15-10-79*

The topography over the traverse can be considered essentially flat.

From a chargeability point of view the entire section from 4680E to 5000E can

be considered to be anomalous. Additional work would be required to resolve the complex multiple sources present.

One possible interpretation for the observed data is that the 40-56 millivolts/volt chargeability observed from 4880E to 5000E (and open to the east) are associated with higher 1500 ohm-metres resistivities and thus are essentially disseminated. The form of the anomalism suggests either a *shallow* west dip, or alternatively, a *separate* source situated at or about 4790E on the n = 3 and 4. The latter is the favoured interpretation as associated resistivities are 20% or less than those observed to the west.

A second source is indicated at or west of 4610E by higher chargeabilities of 41 millivolts/volt associated with anomalously low resistivities of 60 to 110 ohm-metres. Unfortunately the profile does not extend sufficiently far west to define this response, therefore its significance is difficult to gauge.

Summary ..... The whole traverse can be considered to be anomalously polarizable. Sources west of 4640E and 4910E come within 60 metres of surface, and are, respectively, open to the east and west.

A third source is indicated by values of 60 millivolts/volt± observed at 4790E at a depth of the order of 120 metres. Lower resistivities observed may in part be due to a source close to surface at 4640E±, but may also be due to the deeper source itself.

LINE 4160N *a = 60 metres, n = 1 to 4* *Surveyed 16-10-79*

The topography over this section is flat.

Over the entire section surveyed the data can be considered to be anomalous, with no value being less than 50 millivolts/volt. Also the zone is open to both the east and west.

The resistivity shows a distinct anomaly centred between 4640E and 4790E. Here, 20 ohm-metres values (with values as low as 4 ohm-metres in the centred) were recorded. Higher values on n = 1 clearly infer a more resistive (relatively) cover over the conductor, the maximum depth of which is of the order of 60 metres.

To the west of the conductor a gradual increase in resistivity was recorded, and with it, an increase in chargeability to 75-90 millivolts/volt. The lower resistivities are in part due to lesser surface area for the storage of the IP effect in the conductive section.

Summary ..... From a geophysical point of view, this is one of the most interesting responses in the Sterling Valley. A conductor centred at 4730E ±50 metres on the n = 3 reading is surrounded to the east and west by slightly higher resistivities, and high chargeability. This is interpreted as being due to a massive graphite/sulphide source surrounded by a disseminated halo. Prima facie, an anomaly of possible economic significance.

LINE 4280N *a = 60 metres, n = 1 to 4* *Surveyed 16-10-79*

The topography over this section is flat.

A very similar resistivity pseudo section was recorded over this line to that seen on 4160N. A zone of very low resistivity was noted on n = 3 at 4670E extending for one dipole east and west, to the east and west of which the

resistivity increases significantly. This feature is interpreted as being due to 'massive' sulphides and/or graphite surrounded by a disseminated halo. This is equivalent to the anomaly defined on the previously described line 4160N at 4730E.

To the east, much increased chargeabilities to 144 millivolts/volt were recorded from resistivities of 50 to 500 ohm-metres. The pseudo section dips gently to the west at an angle less than 45^{o} inferring an *actual* shallow dip to the source. Unfortunately the anomaly is not closed to the east. The most conductive/ chargeable section almost certainly comes to the surface off section, east.

Summary ..... The whole section over 360 metres is highly polarizable, and the anomaly is open to the east and west. The prime anomaly of interest was situated at 4670E at 120 metres where 10 ohm-metres resistivities combined with higher chargeabilities and interpreted as being due to a massive sulphide and/or graphite source, surrounded above, east and west by a disseminated halo.

A second source on the eastern flank of the pseudo section shows low 50 to 500 ohm-metres resistivities accompanied by chargeabilities of above 100 millivolts/volt. A disseminated to weakly interconnected graphite source is indicated which dips shallowly to the east.

LINE 4400N *a = 60 metres, n = 1 to 4* *Surveyed 27-7-79 & 19-12-79*

This line shows more similarity to line 2360N than to the line to the immediate south, line 4280N. A sharp contact was observed at about 4700N to the west of which background resistivities of 11 to 13 millivolts/volt were recorded

accompanied by high 2000 ohm-metres+ resistivities. (Presumably this would have been observed on line 4280N had that traverse been run sufficiently far to the west.) At 4700E progressively lower resistivities were observed from 500 to 1000 ohm-metres on surface (n = 1) to 44 ohm-metres on n = 4. This was accompanied by progressively higher chargeability from 20 millivolts/volt on n = 1 to 43-60 millivolts/volt on n = 3. This is interpreted as being due to a 'massive' sulphide or graphite source covered by 80 to 120 metres of more resistive cover. It is similar in form to the low resistivity/high chargeability anomalies located on line 4280N at 4670E and line 4160N at 4730E, but has a more resistive, thicker cover.

The chargeabilities remain anomalous at the eastern end of the surveyed line.

Subsequently this line was extended to the west to 4040E. While the overlap on chargeability shows good correspondence, the resistivity data shows a lower level, presumably due to the presence of the resistivity low at 4310E (on all spacings]

The most significant feature on this extension is the resistivity low referred to above centred at 4310E. Here, apparent resistivities of 800 to 500 ohm-metres were recorded on all spacings from n = 1 to 4 with a progressive decrease with depth. The associated apparent chargeabilities were of the order of 28 millivolts/volt, a two to two and a half fold increase over those to the immediate east, while to the west they increase somewhat to 34 millivolts/volt at 4250E, before decreasing abruptly to 15 millivolts/volt(+) on the next dipole west. This slightly increased chargeability is accompanied by an increase in resistivity by four fold.

The geological interpretation of the above feature is that disseminated sulphides and/or graphite (or mafic minerals) are present within a less resistive rock type, or alternatively sulphides/graphite etc. are weakly interconnected to produce the same feature. The depth to source is less than 60 to 80 metres. The potential economic interest depends on the associated geological/geochemical information, as the changes observed may be purely formational.

Summary ..... The resistivity low of 44 ohm-metres centred on n = 4 at 4700E and accompanied by high chargeability is interpreted as a massive graphite/sulphide source flanked to east and west by a chargeable disseminated sulphide and/or graphite halo. As the surface layers above this response have high resistivity of 500 ohm-metres(+) and low 20 millivolts/volt chargeability, the author would not expect a surface manifestation for this anomaly which is considered of prime interest.

On the extension to the west, a lower resistivity zone of 500 ohm-metres accompanied by higher chargeability of 32 millivolts/volt centred at 4310E. The depth to source is of the order of 60 metres, and the source itself may be either formational or of secondary economic interest being weakly interconnected sulphide/graphite or disseminated material within a less resistive host rock.

LINE 4520N *a = 60 metres, n = 1 to 4* *Surveyed 25 & 26-9-79*

The topography to the east of 4400E is flat while to the west it rises steeply to 4000E, then falls gradually to 3800E.

From the western extremity of the surveyed line at 3860E to about 4100E, high background resistivities of 4000 ohm-metres to 10,000 ohm-metres were accompanied

by background chargeabilities in the range 6 millivolts/volt to 20 millivolts/volt.

Centred at 4280E ±30 metres, a moderate chargeability anomaly of 38 millivolts/volt was defined associated with lower resistivities of 800 to 900 ohm-metres. The source comes to within 60 metres of surface at 4280E and is due to disseminated graphite/sulphide. To the east of the anomaly chargeabilities fall to low levels of 10 millivolts/volt, while to the west they remain high (30 millivolts/volt±), and the resistivities rise three to four fold to 3500 ohm-metres (±). This zone correlates with that described above on the western extension to line 4400N centred at 4310E, and thus may be 'formational' in origin *or* have possible economic interest.

An extension of the significant conductive/chargeable anomaly located on line 4400N has been defined on this line centred at 4640E. Here, on n = 4, resistivities of 174 ohm-metres were recorded with resistivities increasing progressively to reach 350/1100 ohm-metres on n = 1. Also chargeability slightly increases with increasing n values from n = 1 values of 18/28 millivolts/volt to 50 millivolts/volt coincident with the lowest resistivities. Again, a conductor surrounded by disseminated sulphides/graphite is the suggested source. From an examination of lines 4160N to 4520N it would appear a shallow plunge to the north is possible for this source.

In common with the lines described to the south, chargeabilities remain at high levels to the east of this conductor, with values of 40 millivolts/volt(+) being common. However, the apparent resistivities are very considerably higher at 500 to 900 ohm-metres. Thus a disseminated sulphide/graphite origin is inferred.

Summary ..... The conductive/chargeable zone recorded on lines 4400N/4040N was seen also on this line centred on n = 4 at 4640E. Again a conductive chargeable 'core' is seen surrounded by a more resistive chargeable halo. The interpretation of this feature is a 'massive' section of graphite and/or sulphides surrounded by a disseminated chargeable halo. Certainly as the nearer surface values are lower at 18-28 millivolts/volt and the resistivities significantly higher at 350 ohm-metres(+), the source does not come to surface and may be as deep as 120-150 metres to the most conductive source. The anomaly is of prime interest.

Higher chargeabilities and higher resistivities continue to the east and are open. Disseminated graphite and/or sulphides are the suggested source.

LINE 4640N *a = 60 metres, n = 1 to 4* *Surveyed 21-12-79*

This line was added late in December, 1979, and surveyed from 4040E to 4640E.

The resistivity low centred at 4280E on line 4520N was again recorded here on the same co-ordinate, but as a 440 ohm-metres low at n = 4. The near surface apparent resistivity ranged from 1800 to 3000 ohm-metres indicating a *resistive* cover. The associated chargeability, while low at 17 millivolts/volt (+), is *higher* than the 9 to 10 millivolts/volt seen to the immediate east. As on the lines to the south, the resistivities rise to the west in sympathy with chargeability, inferring a disseminated chargeable source of sulphide and/or graphite, or perhaps a greater concentration of mafic minerals. The highest chargeabilities of 31 millivolts/volt were recorded at n = 3 and 4 from 1200 ohm-metres resistivities at about 4100E.

Summary ..... The observed chargeabilities and resistivities on this line suggest only formational features enclosing disseminated graphite and/or sulphides, the latter centred at 4100E±.

The low resistivity/high chargeability feature centred at 4640E on line 4520N was unfortunately not covered on this line.

CONCLUSIONS

Detailed conclusions are made in summary form at the foot of each line description. General conclusions are as follows:

1 - The largest anomalies from a geophysical point of view are those which flank the bulk of the surveyed lines to the east. These are understood for the most part to be graphitic shales.

2 - The most significant anomalies located were defined on lines:-

4160N centred at 4730E (n = 3)

4280N centred at 4670E (n = 3)

4400N centred at 4700E (n = 4)

4520N centred at 4640E (n = 4)

and perhaps

4040N centred at 4760E (n = 4)

In all cases a distinct resistivity low on the n = 3 and 4 spacing is flanked by higher resistivities, *and also above* by higher resistivity, as well as being surrounded by high chargeabilities. The interpretation

is of a *massive* section of graphite and/or sulphide surrounded by a disseminated halo.

On some lines (e.g. 4280N and 4160N) high chargeabilities lie within 60 metres of the surface as anomalous $n = 1$ occur, however, on others (e.g. 4400N and 4520N) a relatively high resistivity, low polarization cover occurs over the conductor. In all cases, however, the most conductive (massive??) section lies beneath a disseminated halo, and thus appears to be a target of potential economic interest.

3 - While the M_1, M_3 and M_5 slices were not plotted, and no significant anomalous decay forms were noted, they were extremely useful for data confirmation, and for monitoring coupling and cable leakage.

4 - It is still recommended that isolated (say 2 and 3) single gradient lines be read over the geologically or geochemically most interesting multiple anomalies defined in this survey in order to precisely define the nature and location of the contacts between each sub-unit.

Respectfully submitted on behalf of:

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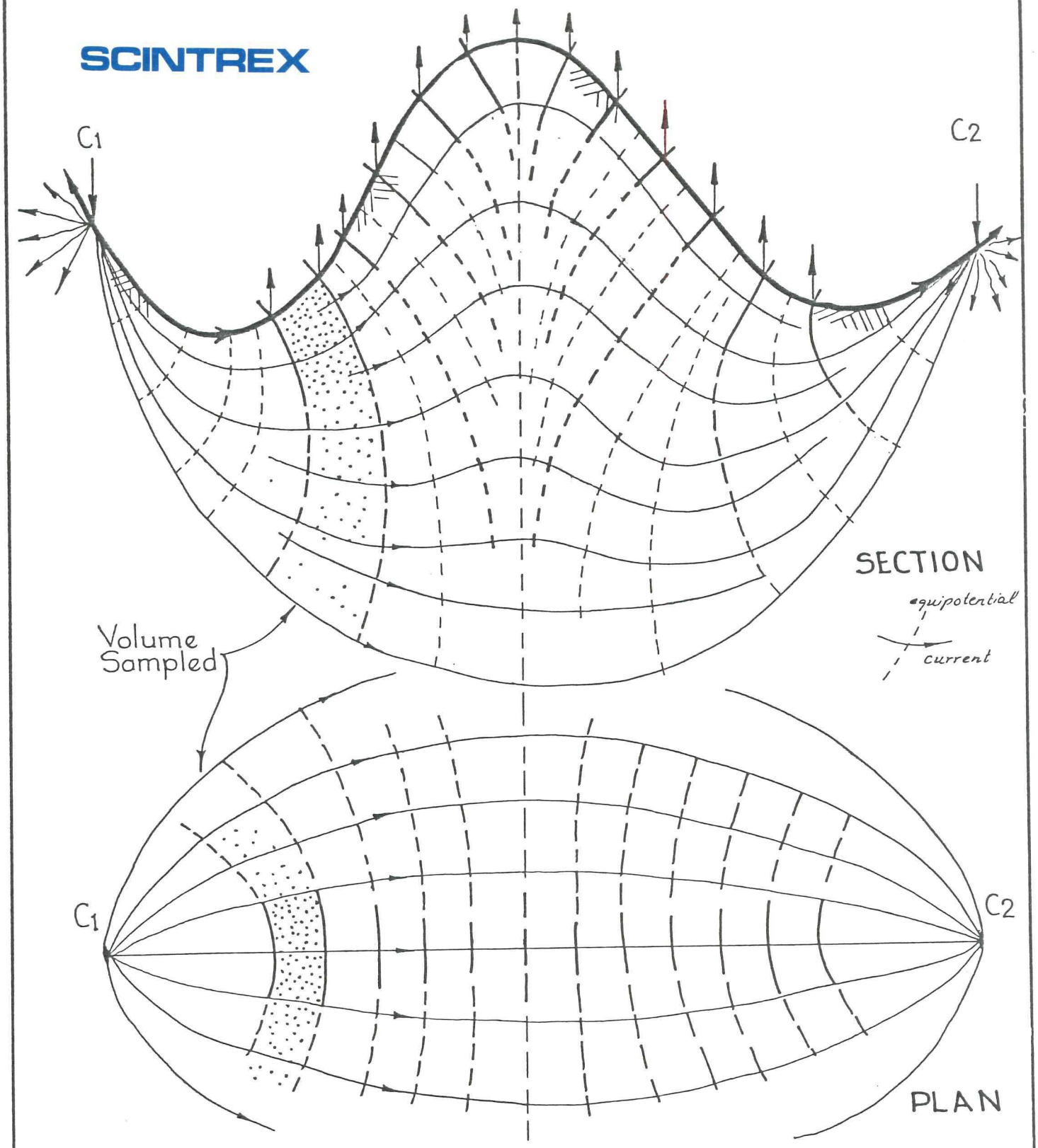
APPENDIX

SOME COMMENTS ON THE GRADIENT ARRAY AND DIPOLE-DIPOLE ARRAYS

In the case of the surveys discussed in this report, it is important that the geologist can relate the geophysical data to the underlying geology if he is to make the best use of this data. It is the author's opinion that *only* the geologist will be able to relate the data to geology. For this reason brief, simple comments follow on the salient features of the gradient array and also the dipole-dipole array with which you may be more familiar. These comments show how the data relates to the volume of underlying rock which influences it.

Gradient Array:- In this array both current electrodes are distant from the potential dipole. Figure 1 displays the salient features of the *primary* current flow and primary equipotential field generated during energisation and shows the influence of terrain on the current paths. From this diagram it can be seen that the *apparent resistivity* measurement is a summation of a volume of material normal to the local slope, *beneath* the surface and at *right angles* to the line.

The apparent resistivity will be *biased by* the influence of each current electrode, but the *relative* values of *adjacent* readings can be considered to be *reliable*. As each electrode is approached,



Diagrammatic Representation of Primary Current and Potential Field in Steep Topography.

FIGURE 1.

the readings become *increasingly biased by* that electrode.

Note particularly that the *source volume* is *normal to slope* and not vertically beneath the potential dipole. Therefore all maximum depths refer to depths below surface *normal to the slope*.

Note also that the volume of material *closest to* the potential electrodes will influence the data most. It is difficult to easily quantify the complex relationship between the volume of material sampled and its distance from the potential dipole.

Figure 2 displays the secondary current pattern generated from the decay of induced polarization effect *within* a chargeable sulphide source, together with the equipotential field generated by that decay. Note that due to the necessarily curved nature of the current flow outside the body, the on-surface manifestation is *wider than* the *source width*. Note also that the volume sampled in the primary potential field (apparent resistivity ρa) is not necessarily the same volume as is the secondary potential field (apparent chargeability *Ma*). This is, of course, true for *any* array.

Dipole-Dipole:- In this array the current dipole is generally small, in this case, 40 metres. Figure 3 displays the current pattern in section and in plan for a dipole-dipole array. The equipotentials P_1 and P_2 tap a volume as shown in this diagramm whose characteristics are read on the n = 1 station and plotted as a single point midway

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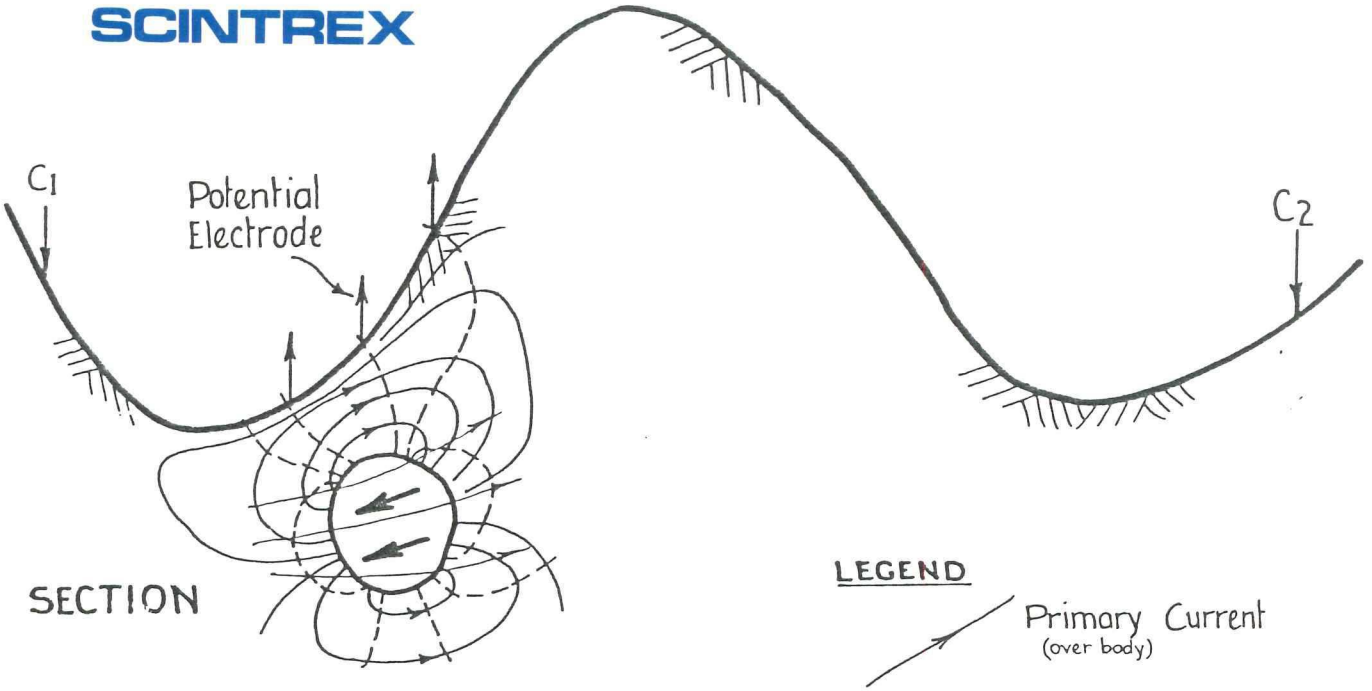


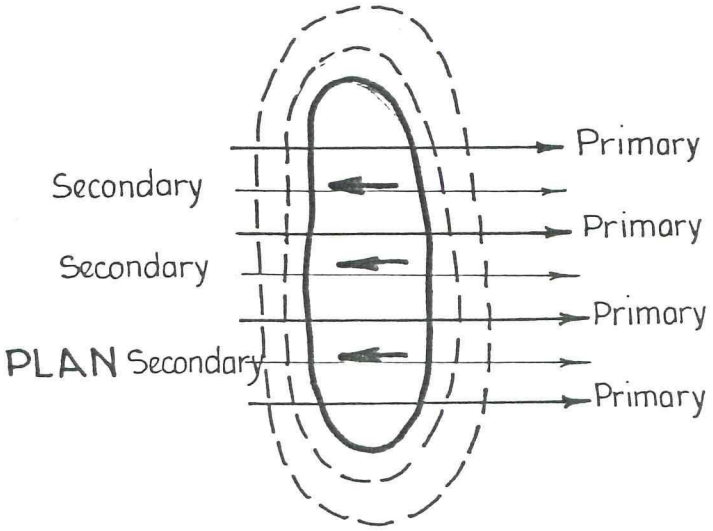
LEGEND

Primary Current (over body)

Internal Polarization (at depth within body)

Secondary Current (I.P)

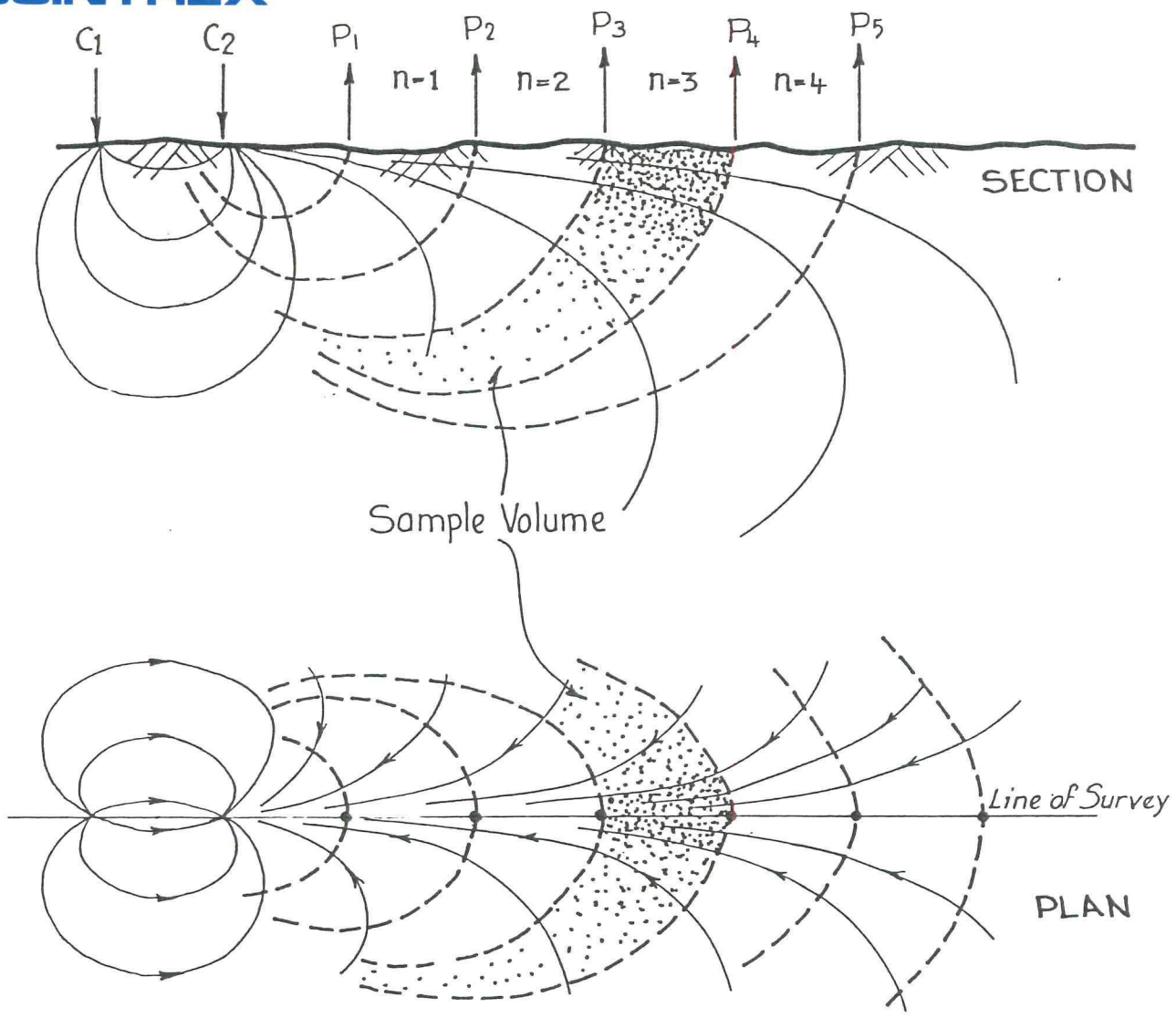
Secondary Potential Field



Diagrammatic representation of secondary current (I.P. effect) and secondary potential field in steep terrain.

FIGURE 2.

SCINTREX



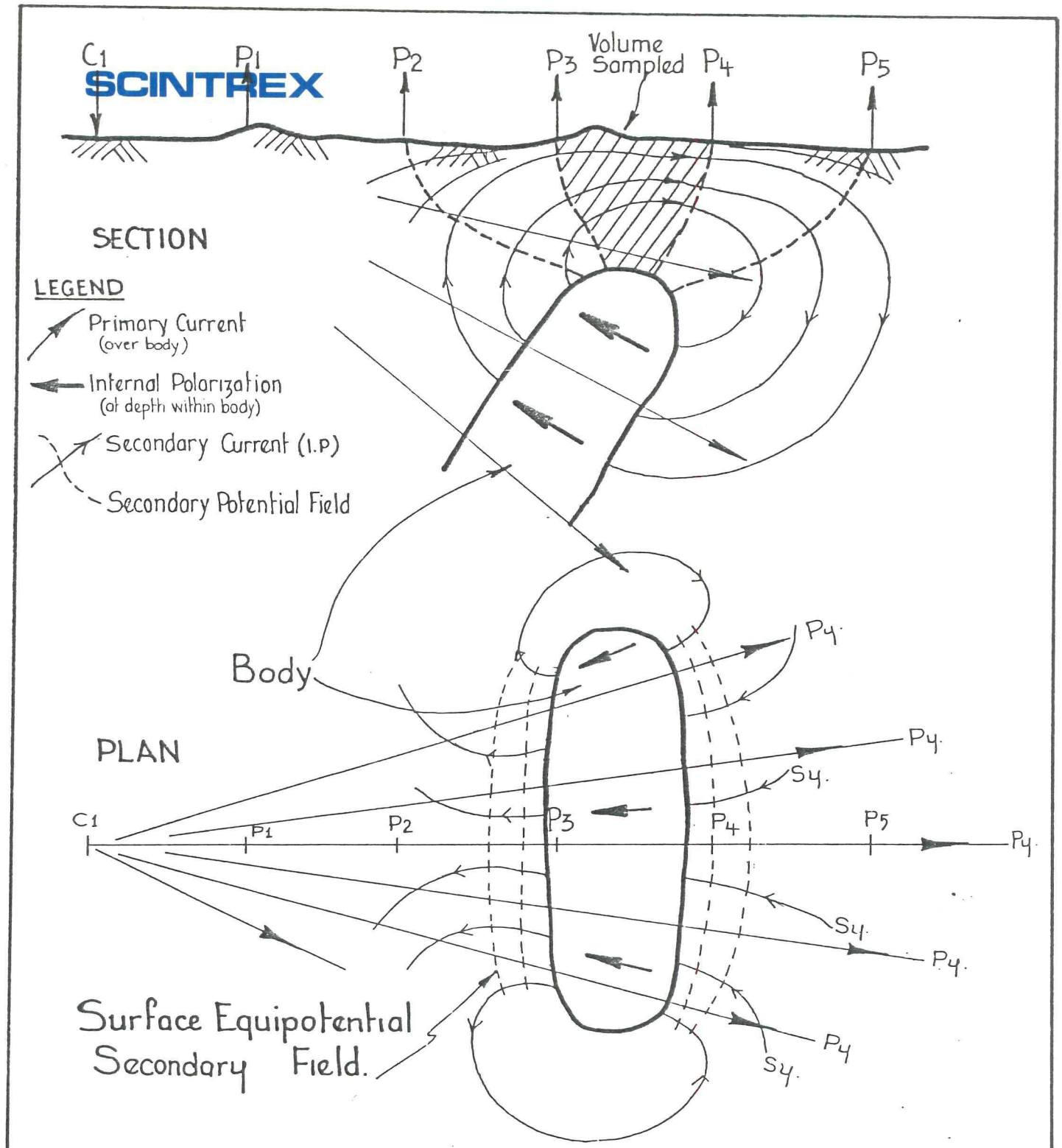
Dipole - Dipole Array
Primary current paths and equipotential field
Showing volumes sampled

FIGURE 3.

between the transmitting dipole C_1 to C_2 and the potential dipole P_1 to P_2. As progressively higher n values are read, a deeper and wider volume of material is sampled, this always being plotted midway between the transmitting and receiving dipole, and at a deeper level in the pseudo-section presentation used in this report. It is *vital* to realise that this data point does not represent the characteristics of the ground at the point plotted, but that of the *total volume* sampled.

A further characteristic of the array is that where the effective spacing ($n \times a$) is greater than the depth to the source, a 'high' (or 'low', depending on characteristics) will occur as each of the dipoles (i.e. transmitting C_1 and C_2, and potential P_1 and P_2) pass over the source of that anomaly. The resultant 45° patterns on the pseudo-section DO NOT represent dip, or even depth extent, but merely represent a complex interface pattern over the source. For a single source, this *double peak effect* can be recognised as it tends to have two maxima displaced by ($n \times a + w$) where w is the width of the source. For multiple bodies this is difficult if not impossible to resolve by dipole-dipole arrays alone.

The enclosed Figure 4 shows the discharge of the energy stored in the body. As can be seen, the area sampled in section is tapped between the equipotentials generated by the discharge of the stored energy. These will not necessarily be of the same form as those for the resistivity data, although they are, for convenience, plotted in the same format as for resistivity. Again, it is vital to note



Current path and secondary equipotential field due to discharge of stored energy (I.P. effect) in the case of Pole-Dipole or Dipole-Dipole.

FIGURE 4.

that they represent the volume sampled as shown in Figure 4, *and not* the characteristics of the point at which they are plotted. Double peaks also occur as each of the two sets of electrodes pass over a source, where $n \times a$ is greater than the depth to source. Where $n \times a$ is less than the depth to source, a single maximum will be produced midway between the energising and measuring dipoles C_1/C_2 and P_1/P_2.

Terrain Effects:- The survey area is steep in many places. The enclosed Table I shows the dipole-dipole array is subject to greater topographic effects. Whereas the location of the gradient anomaly sources can be easily deduced, those for dipole-dipole are far more difficult to compute in difficult terrain. However, in the present case, where the slope was fairly uniform over the section of interest, (even when 'steep') and most sources were not greater than twice the a spacing used, no undue distortion should be present.

Depth to Source:- The depths to source are always taken normal to local slope for both arrays.

TABLE 1
(Table 3.1)

Comparison of IP Survey Electrode Arrays

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(after Sumner, 1972)

	Advantages	Disadvantages	Survey Speed	Signal to Noise	EM Coupling Rejection
Parallel Field Arrays Wenner	Anomalies symmetrical Synchronous detector possible Many case histories available	Requires more wire: larger field crew Poor resolution Unfavourable in capacitive coupling situations	Fair	Good	Fair
Schlumberger	Symmetrical array Synchronous detection possible Fewer men required Works well in layered earth Type curves available	Less horizontal resolution Unsuitable for horizontal profiling Capacitive coupling possible	Fair	Fair	Fair
Gradient	Map interpretation easier Less masking by conductive overburden Penetration good: safer Communications easier Can use two or more receivers Less topographic effect Data easily contoured in plan Useful where difficulty in making good current contacts	Poor resolution with depth Poor in low resistivity areas Geometric factor varies complexly	Good	Fair	Poor
Potential-About a Point					
Three-Array	Good reconnaissance array Fairly good resolution	Asymmetrical More wire needed	Fair	Good	Good
Pole-Dipole, Collinear	Good resolution Good subsurface coverage	Asymmetrical Asymmetrical	Fair	Fair	Fair
Perpendicular Three-Array, Pole-Dipole, Pole-Pole	Virtually eliminates EM coupling	More wire needed	Fair to Poor	Fair	Very Good
Pole-Pole (Two-Array)	Smaller crew needed Less wire needed than for some arrays Good penetration in nonconductive overburden	Susceptible to masking by conductive over-burden	Good	Fair	Poor
PDR (Potential Drop Ratio)	Sensitive to lateral variations "Common mode" noise rejection	Complex interpretation	Fair	Good	Fair
Dipole Field Array					
Dipole-Dipole Collinear	Symmetrical, good resolution Good penetration Less survey wire needed	Slow unless equipment is portable Resistivity topographic effects Interpretation somewhat involved	Fair	Poor	Fair
Dipole-Dipole, Parallel	Special use for EM coupling interpretation	Not used for routine surveying	Poor	Poor	Fair
Down-the-Hole Arrays					
Azimuthal Array (One Potential Electrode Down the Hole)	Fair for exploration purposes Useful in finding the best search direction	Interpretation complex Negative anomalies Strong geometric effects Mainly measures changes in resistivity	Fair	Good	Good
Radial Array (One Current Electrode Down the Hole, mise-à-la-masse)	Good for exploration purposes Useful in finding the best search direction Hole need not stay open	Interpretation complex Negative anomalies Not good for obtaining rock properties	Fair	Good	Good
In-Hole Arrays (More than One Electrode in the Hole)	Good for obtaining rock properties Good for assaying Interpretation simple	Current densities may be too large Possible capacitive coupling problems Not designed for exploration purposes Special equipment, expensive	Good	Fair	Good

Extract from: Geological Survey of Canada - Paper 75-31 "Borehole Geophysics Applied to Metallic Mineral Prospecting: A Review"

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051

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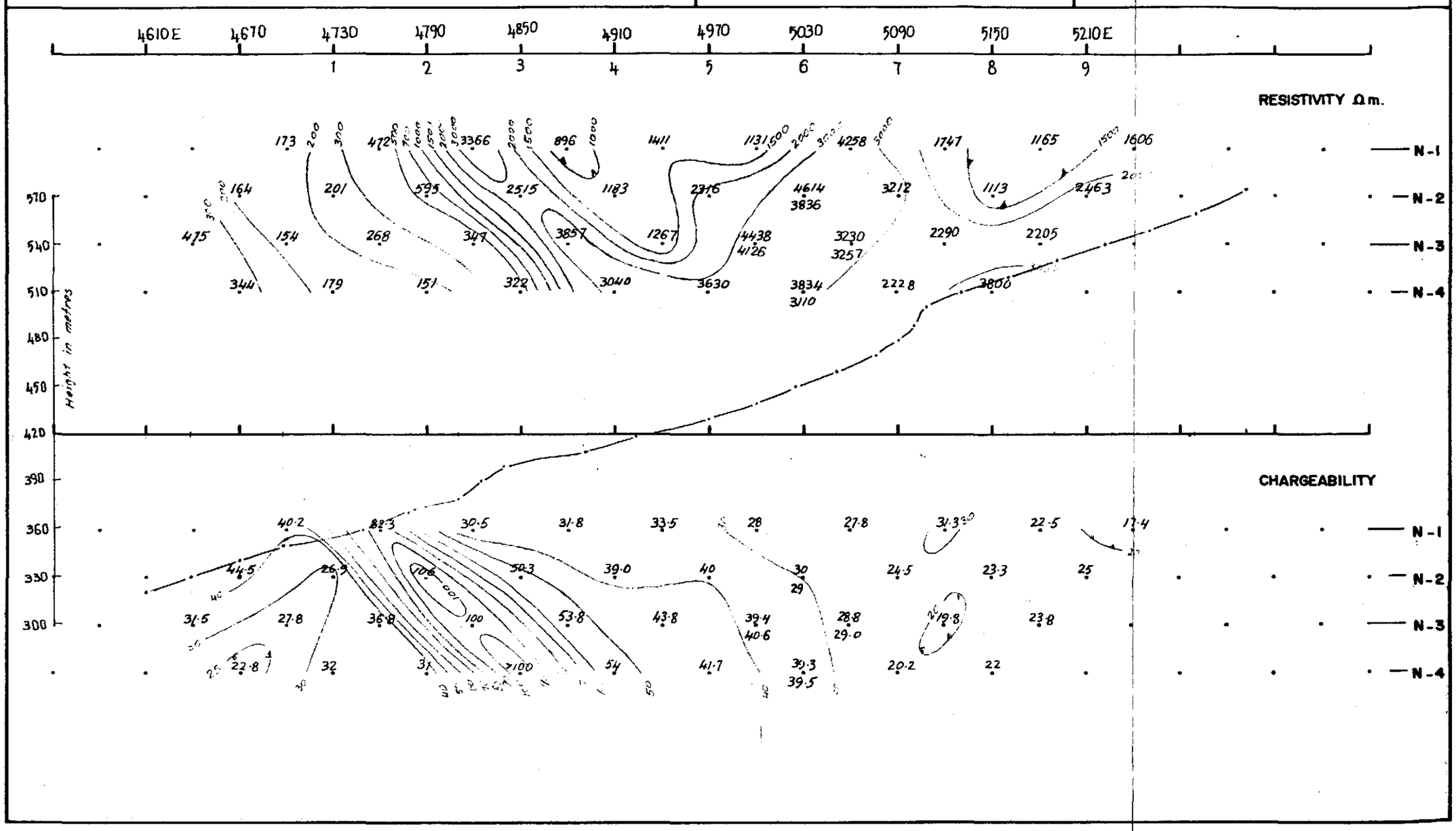
INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 1-10-79	LINE No. 1050 N
PLOTTED BY T.V-S	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60 m	



052

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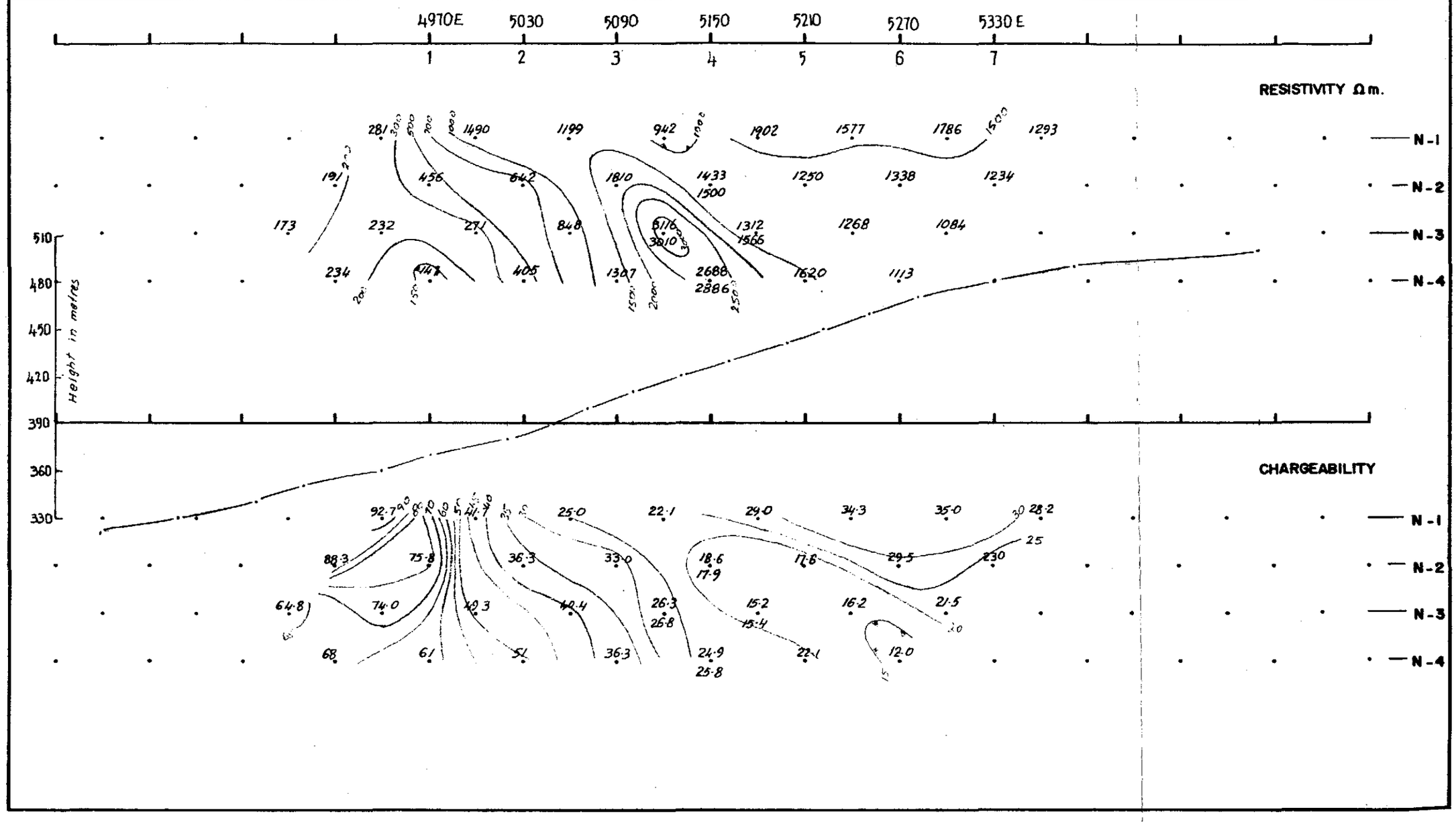
INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 2-10-79	LINE No. 1350N
PLOTTED BY T.Y.S.	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60m	



053

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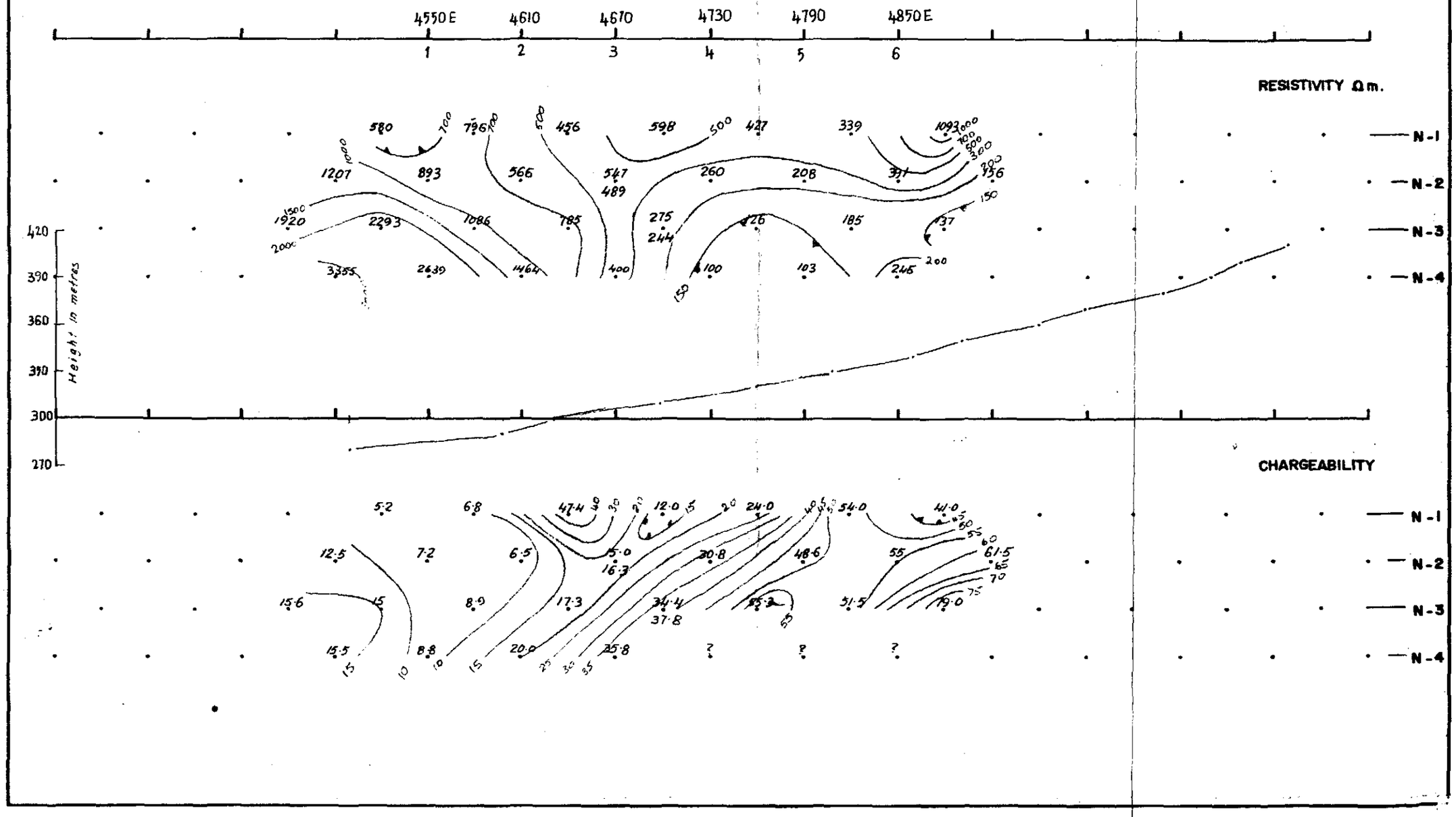
SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 3-10-79	LINE No. 1350N
PLOTTED BY T.Y.S.	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60m	



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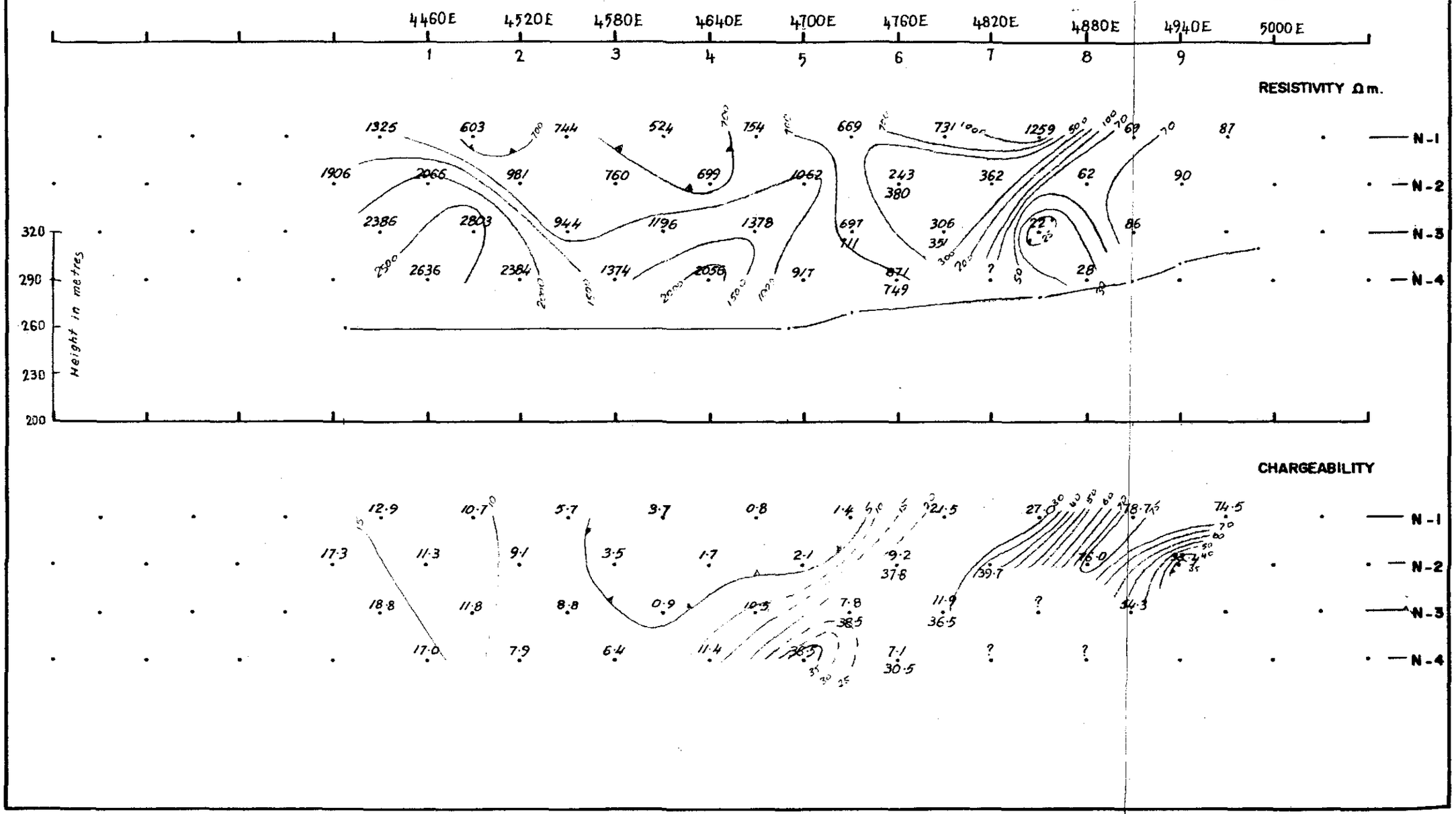
INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE	5-10-79
PLOTTED BY	T.V.S
PULSE	2 Sec
Rx.	
DIPOLE SPACING	60 m
LINE No.	1700 N
PROSPECT	STERLING VALLEY
JOB No.	TAS-065



055

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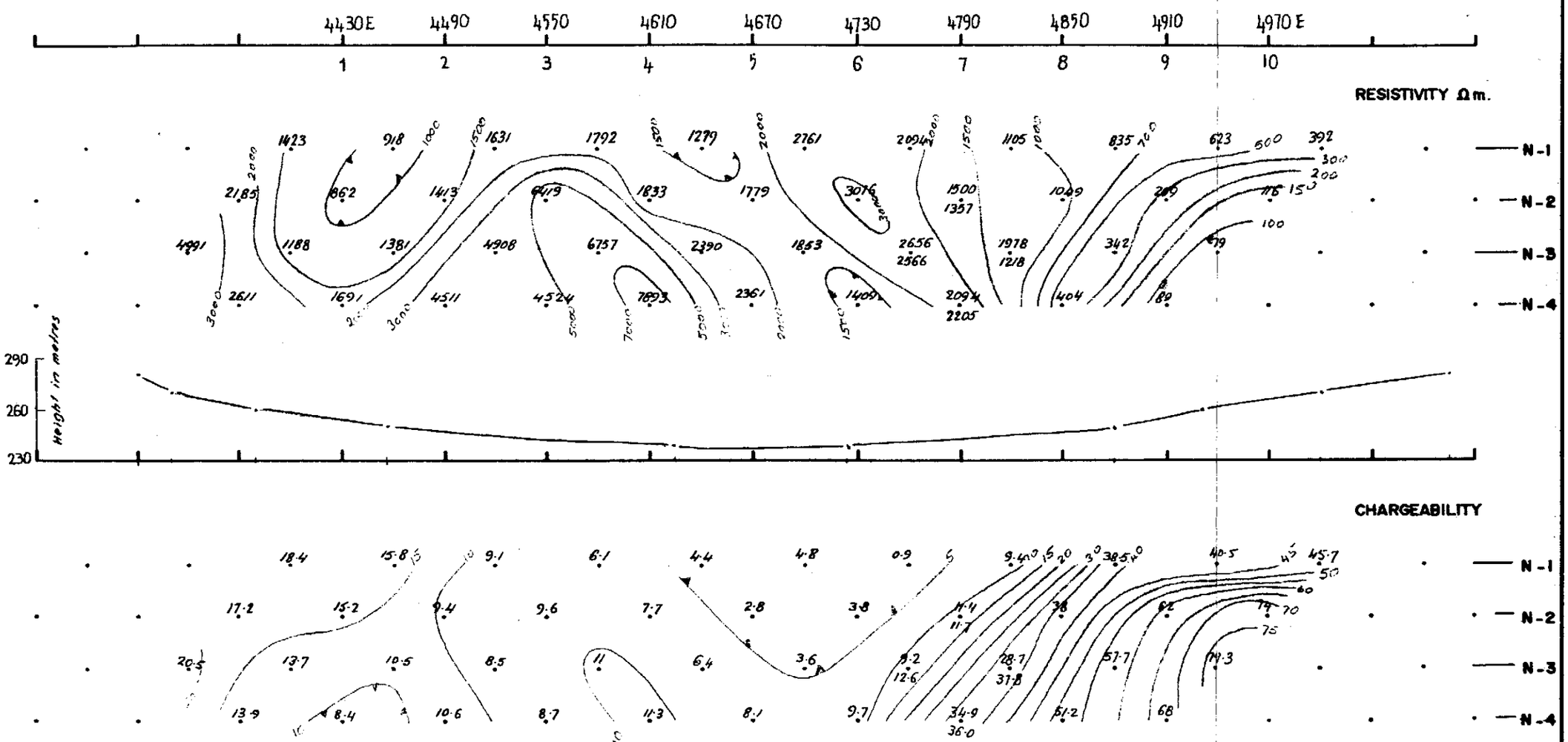
SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 8-10-79	LINE No. 2050 N
PLOTTED BY T.V.S.	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60m	



056

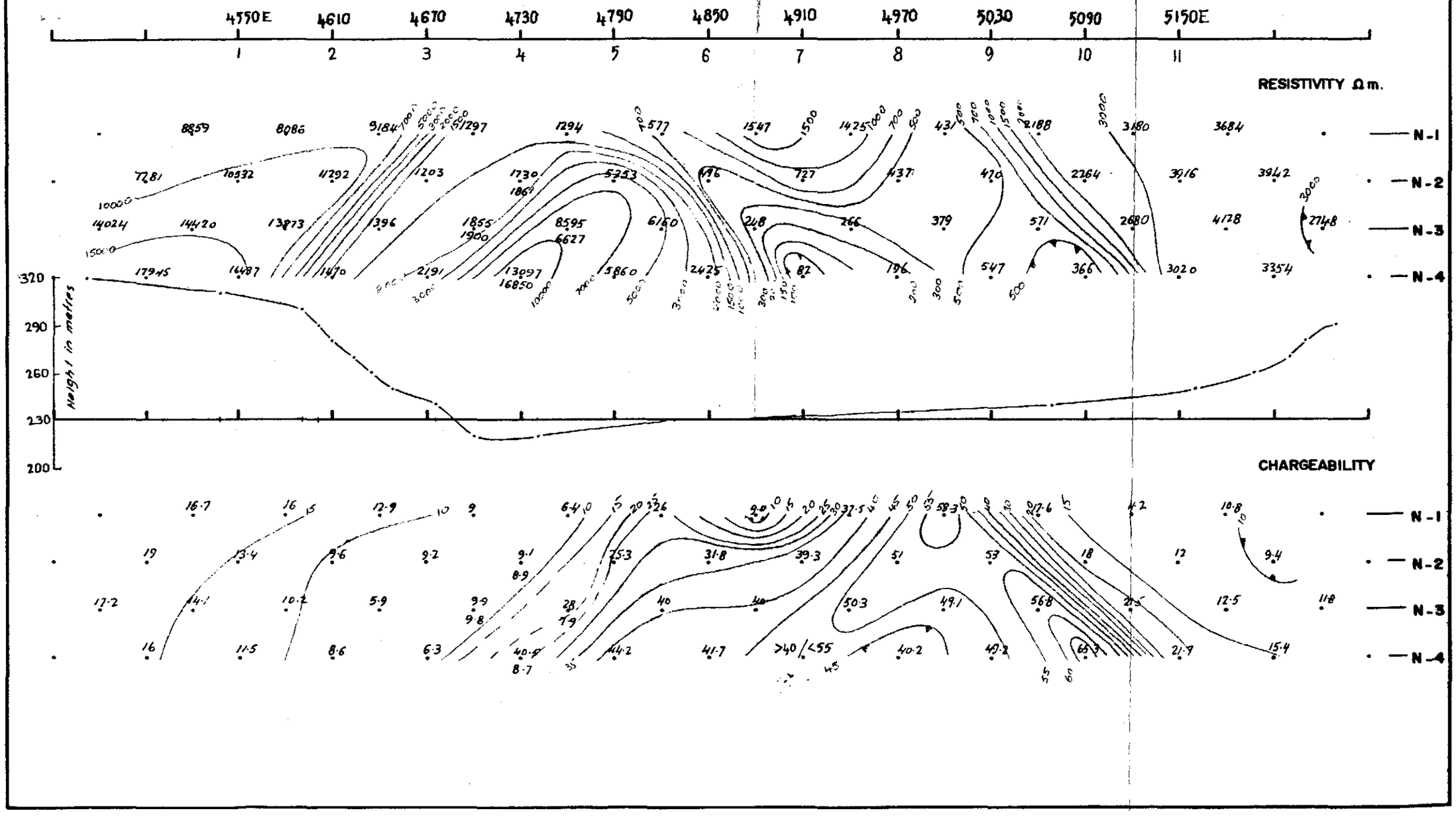
063057

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 29-9-79	LINE No. 2360 N
PLOTTED BY T.V.S.	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60 m	



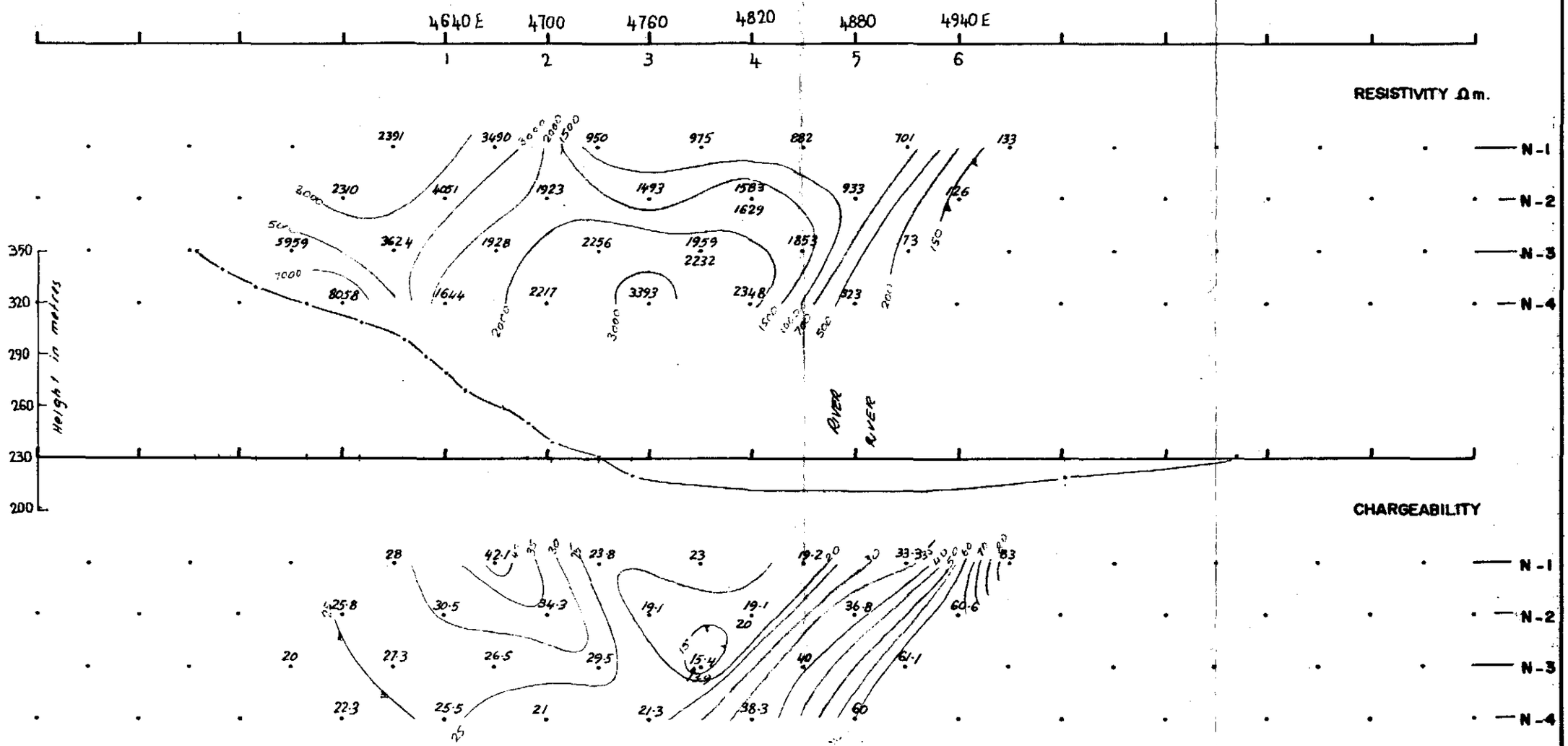
063058

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 14-10-79	LINE No. 2600N
PLOTTED BY T.V.S.	PROSPECT STERLING VALLEY
PULSE 2 Sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60m	



058

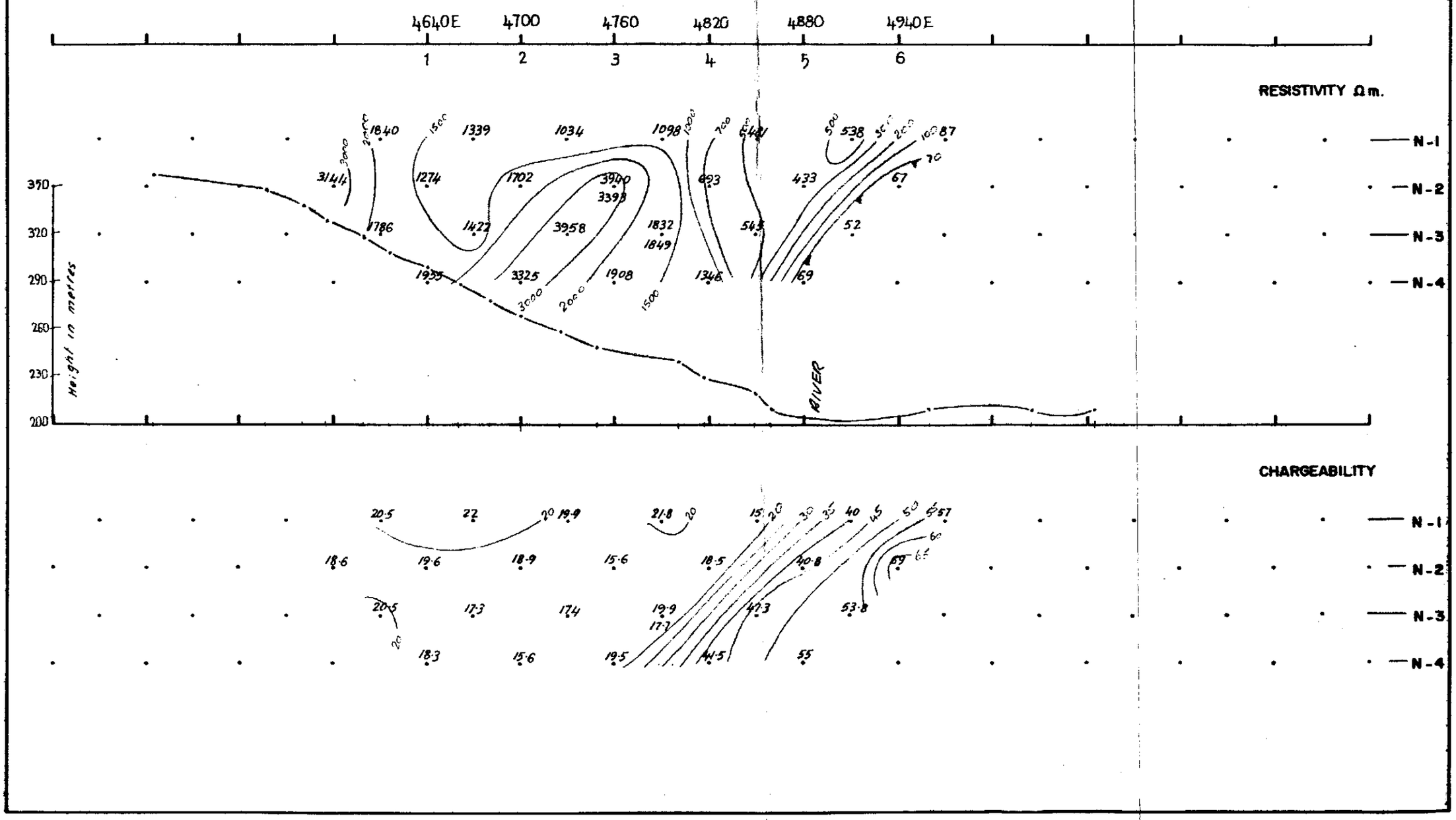
063059

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 13-10-79	LINE No. 2840 N
PLOTTED BY T.V.S.	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60 m	



059

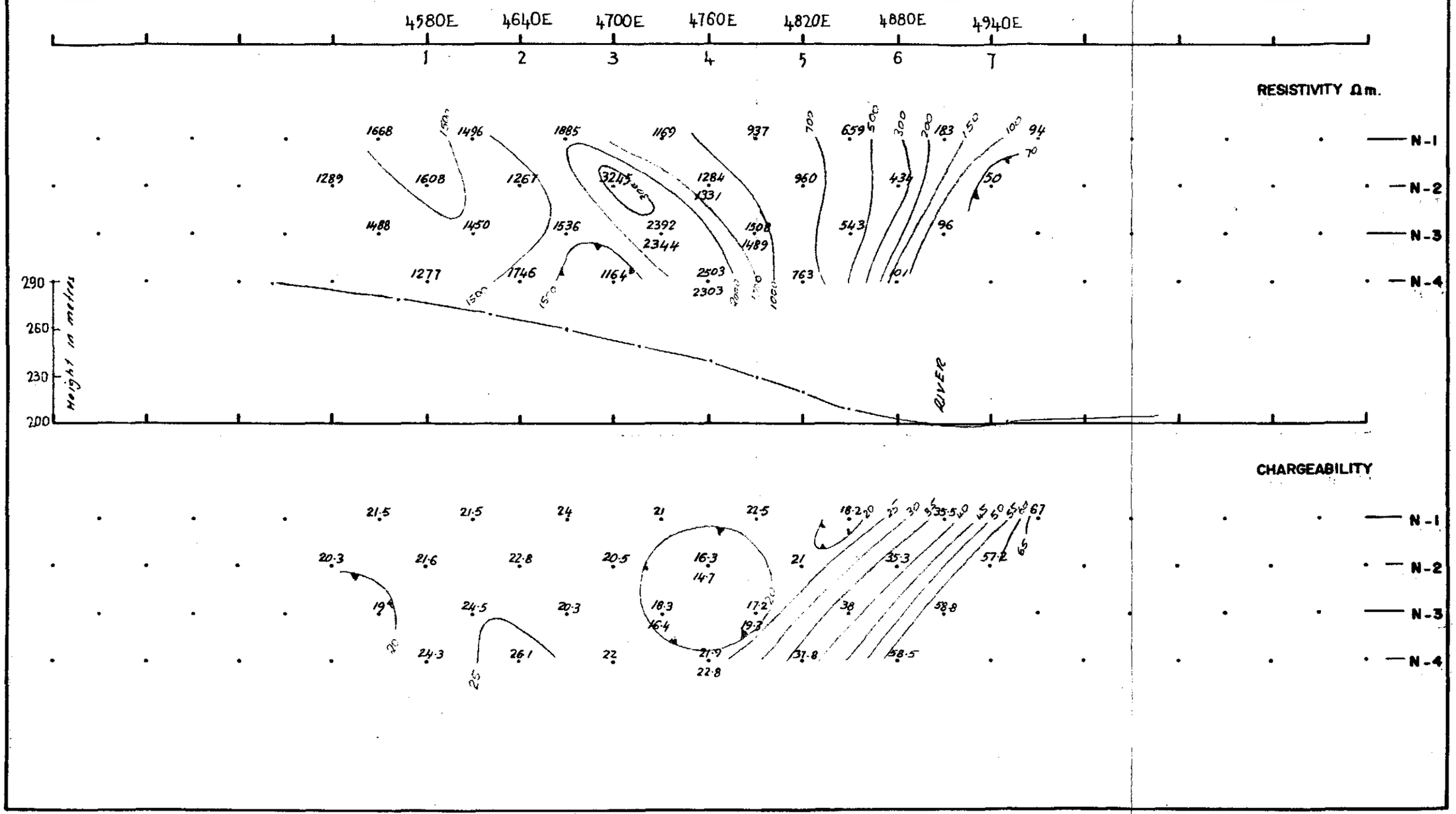
063060

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 12-10-79	LINE No. 3080 N
PLOTTED BY T.V.S.	PROSPECT STERLING VALLEY
PULSE 2 Sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60 m	



060

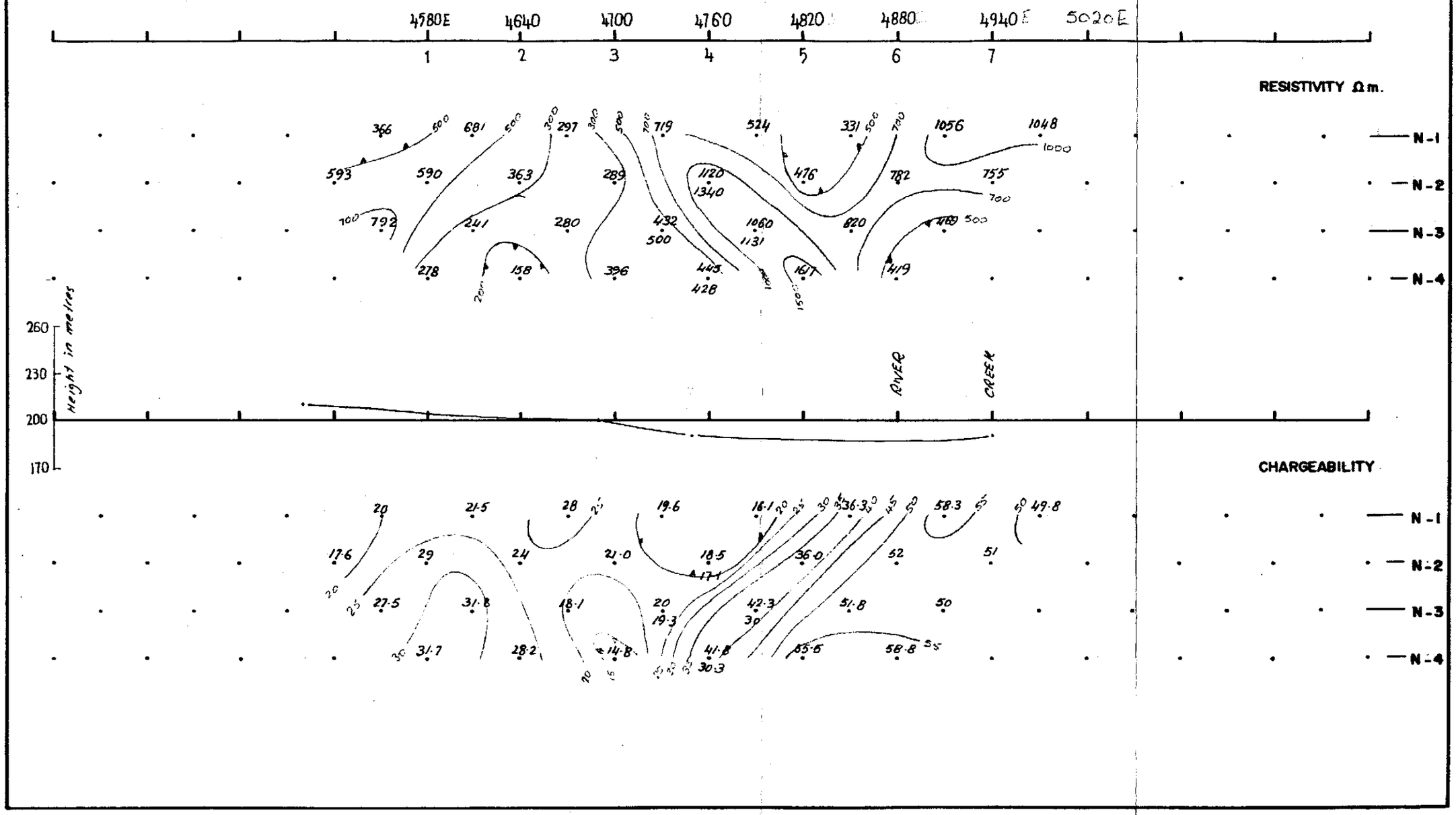
063061

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 9-10-79	LINE No. 3560 N
PLOTTED BY T.V.S	PROSPECT STERLING VALLEY
PULSE 2 Sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60 m	



061

063062

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 15-10-79

PLOTTED BY T.V.S.

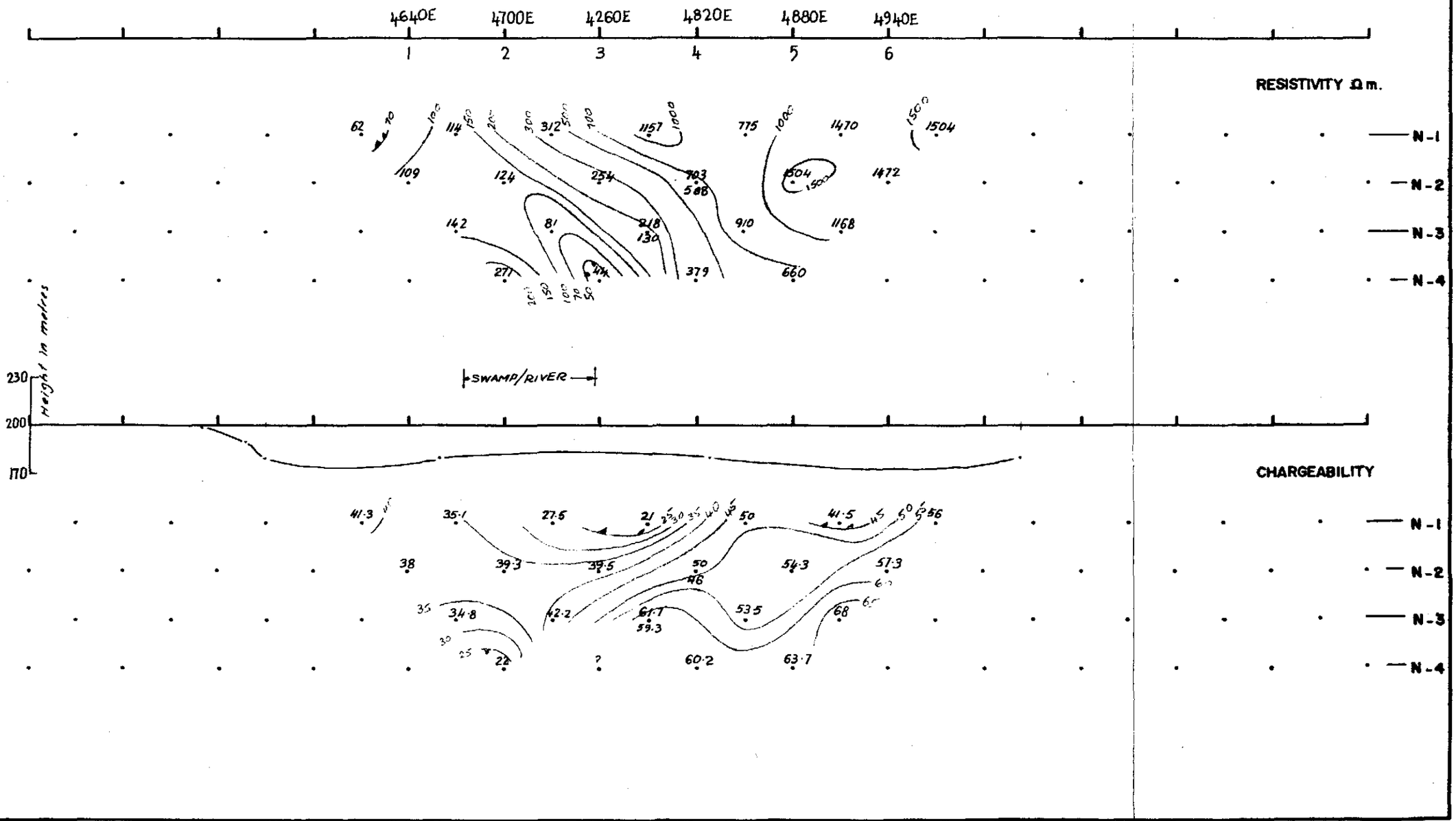
PULSE 2 sec | Rx.

DIPOLE SPACING 60m

LINE No. 4040 N

PROSPECT STERLING VALLEY

JOB No. TAS-065



062

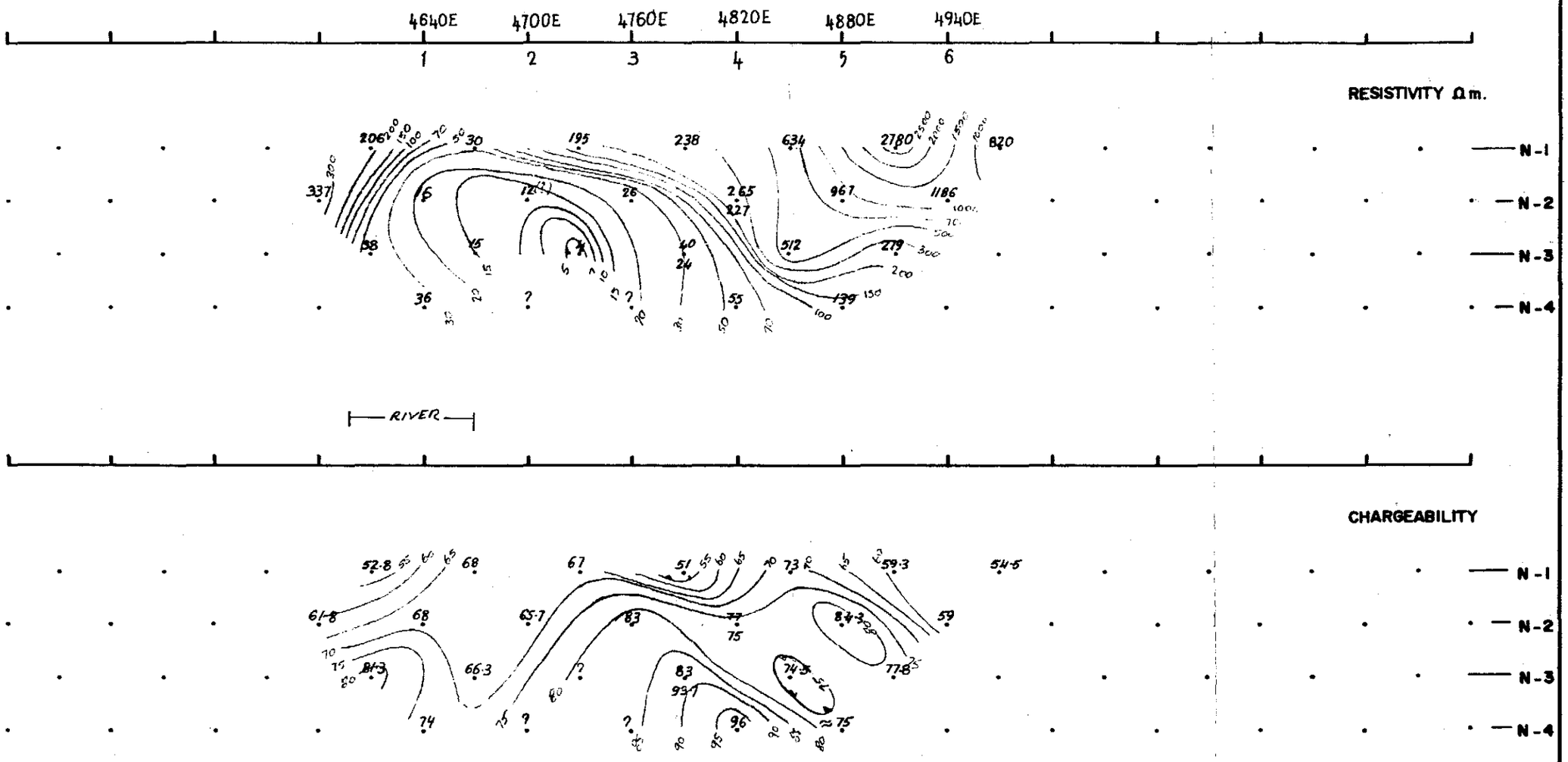
063063

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 16-10-79	LINE No. 4160 N
PLOTTED BY TVS	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60 m	



063

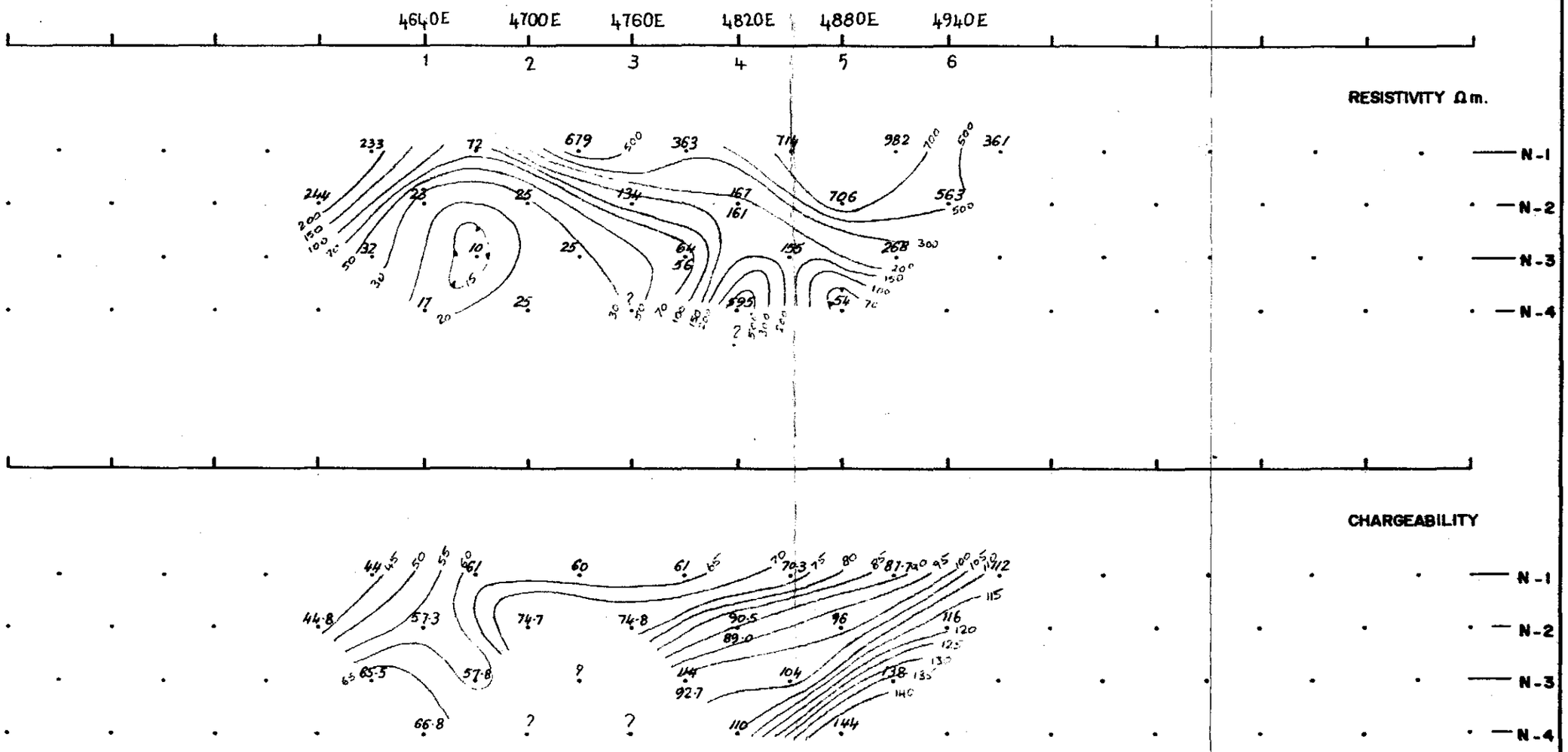
063064

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 16-10-79	LINE No. 4280 N
PLOTTED BY TVS	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60 m	



064

063065

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

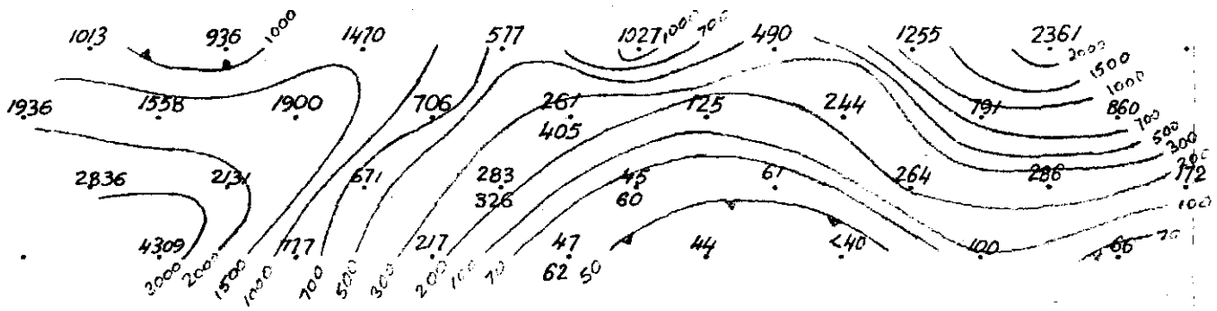
DIPOLE - DIPOLE ARRAY

DATE 27-7-79	LINE No. 4,400 N
PLOTTED BY T.V.S	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60m	

4460E 4520 4580 4640 4700 4760 4820

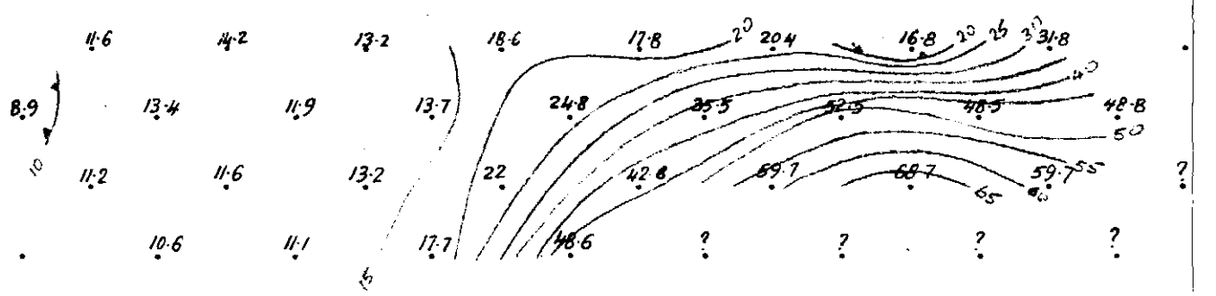
1 2 3 4 5 6 7

RESISTIVITY Ω m.



N-1
N-2
N-3
N-4

CHARGEABILITY



N-1
N-2
N-3
N-4

065

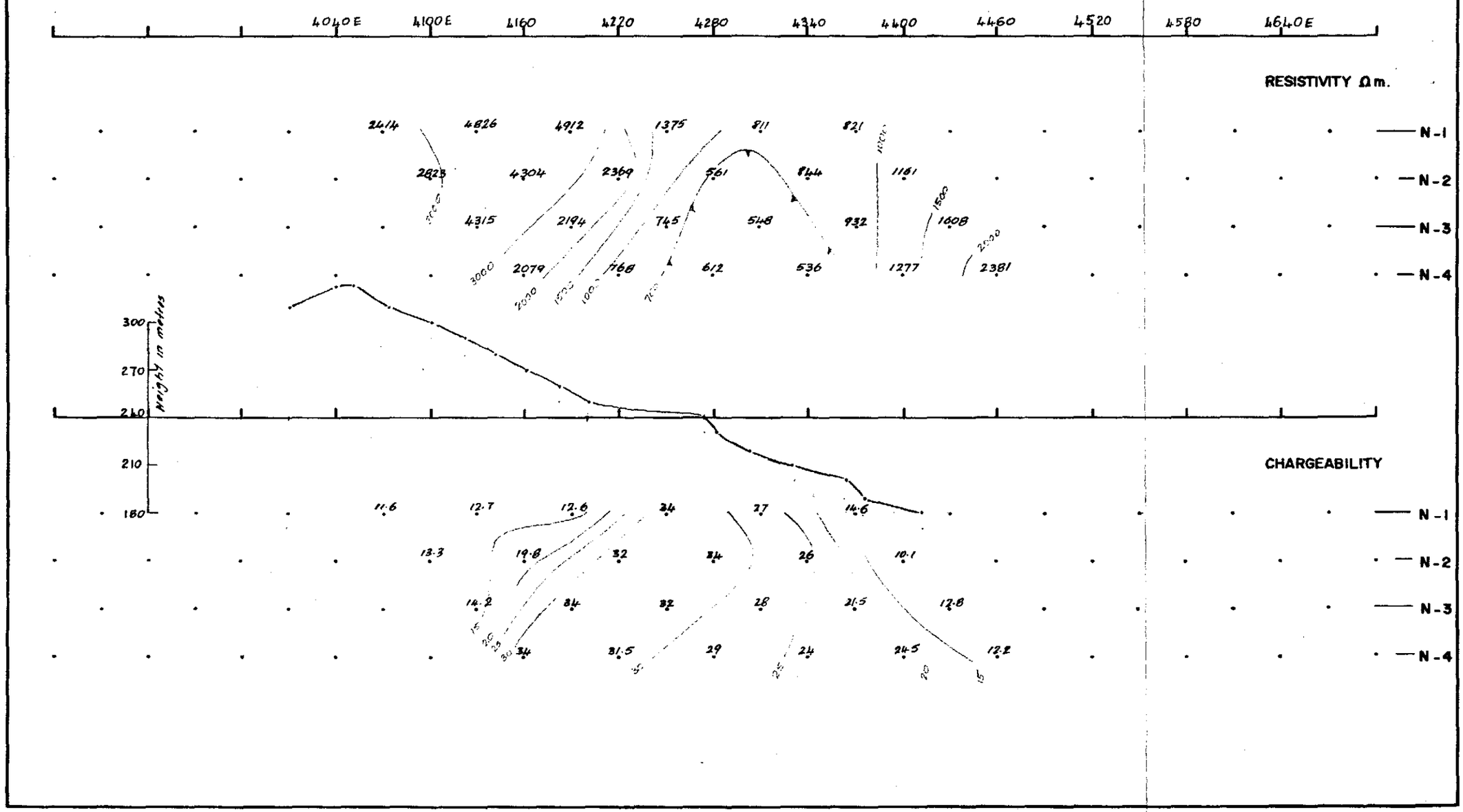
063066

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 19-12-79	LINE No. 4400N
PLOTTED BY G.S./L.K.	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60 m	



066

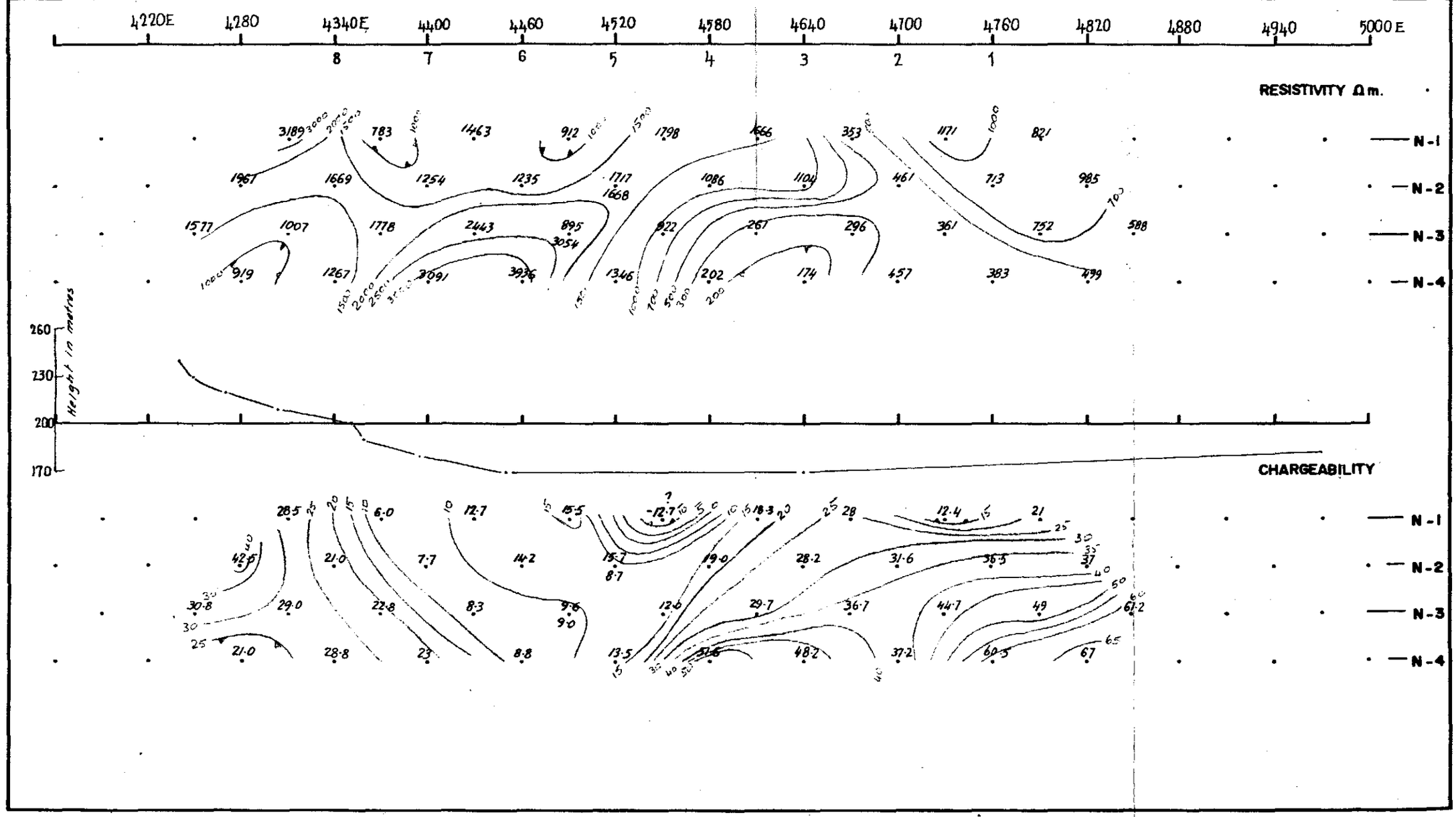
063067

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 25-9-79	LINE No. 4520N
PLOTTED BY T.V.S.	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60m	



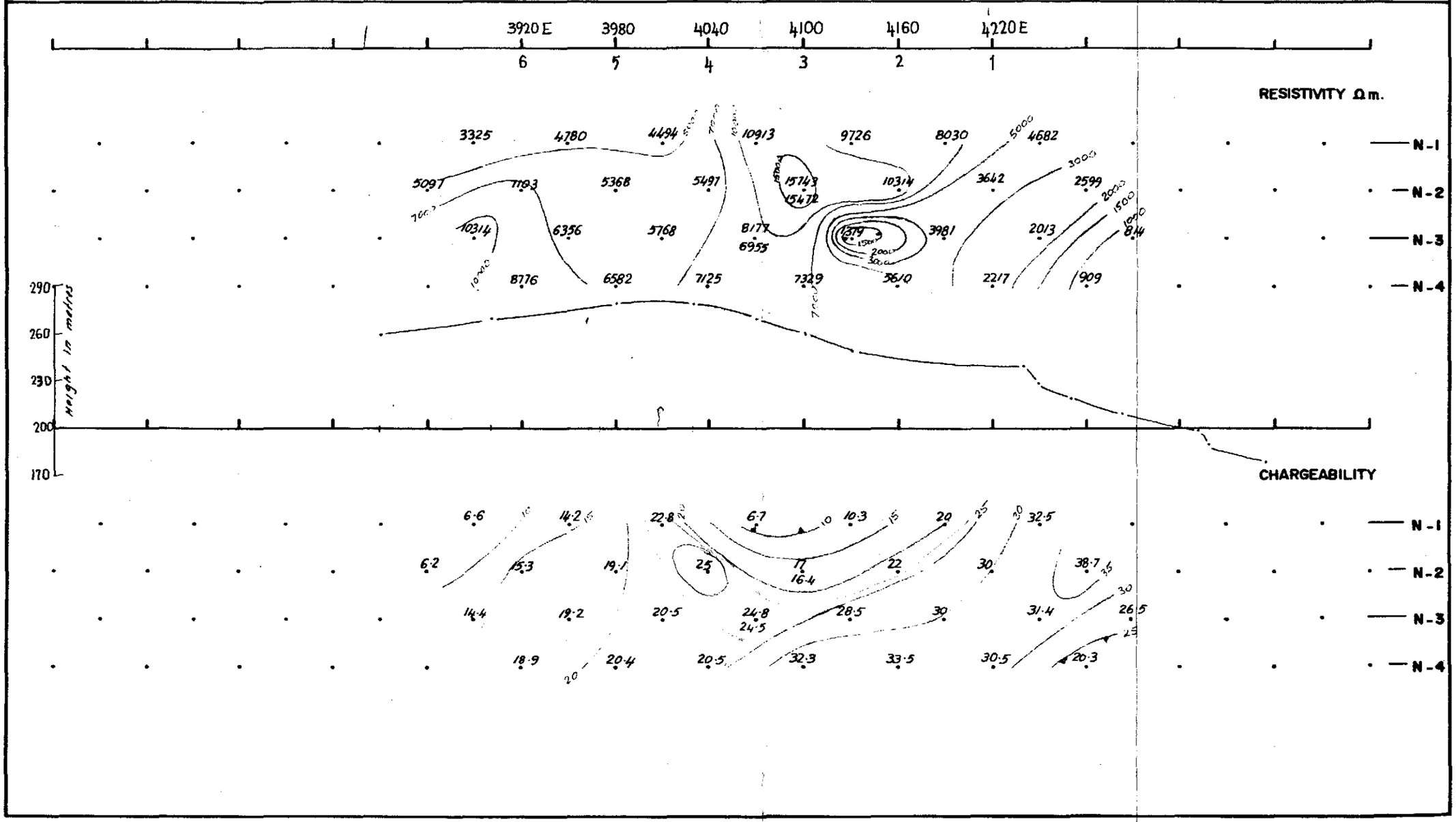
063068

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 26-9-79	LINE No. 4520 N
PLOTTED BY T.V.S.	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60m	



068

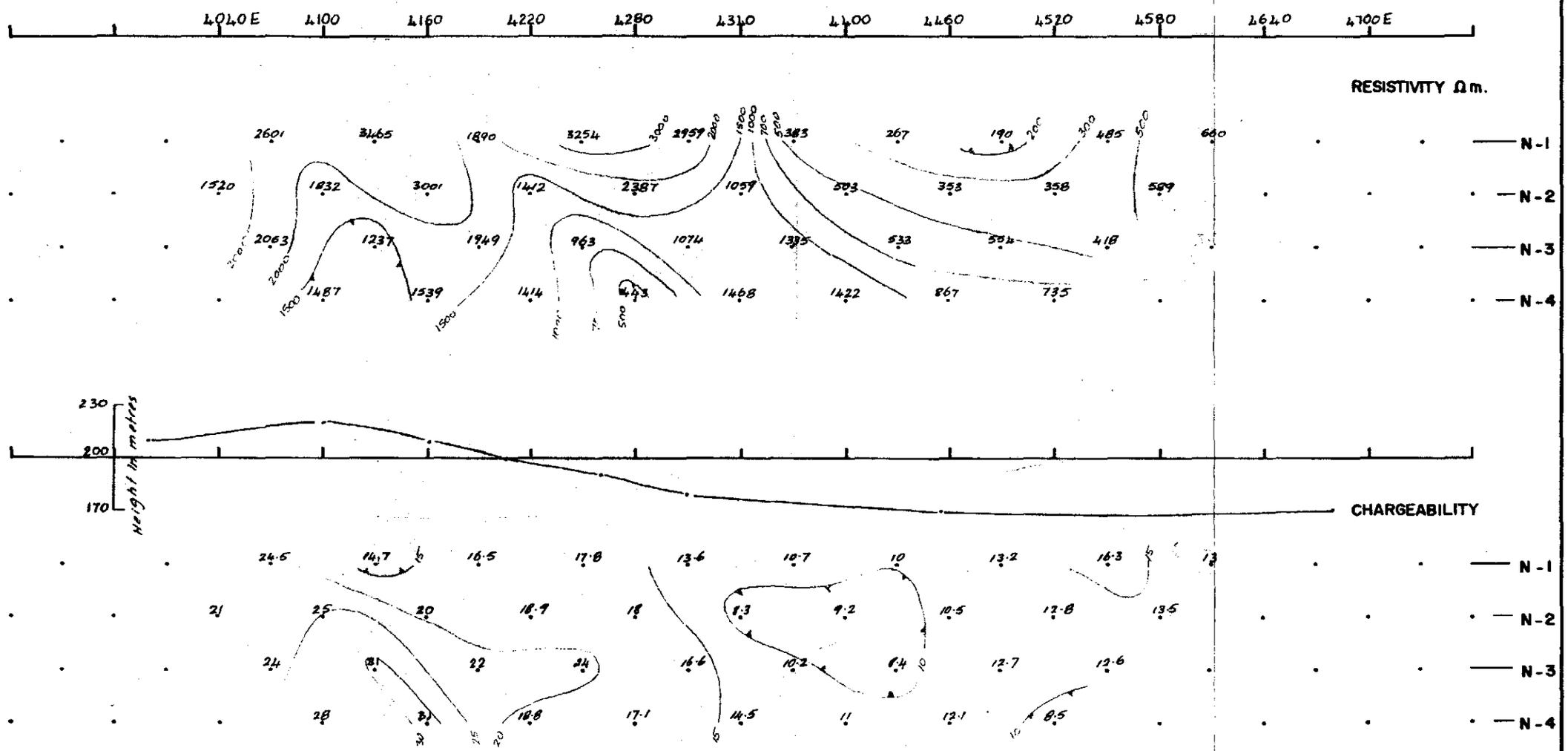
063069

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 21-12-79	LINE No. 4640N
PLOTTED BY G.S./L.K	PROSPECT STERLING VALLEY
PULSE 2 sec / Rx.	JOB No. TAS-065
DIPOLE SPACING 60 m	



APPENDIX 2.

Soil and Litter Geochemistry Data Sheets for the Sterling Valley Grid sampling 30.6.'79 - 30.6.'80

063071

Plotted SM

PROJECT: Sterling Valley

CO-ORDINATES
LINE: 1050N
FROM: 4,490E
TO: 4,670E

SAMPLED BY: MG & NM.
DATE: 27/9/79.

MATERIAL: Soil
DEPTH: C HORIZON.

SOIL

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
26394	1050	4490	30	5	10	X	1400	20	SCRF
95		5200		5	5	X	400	15	CSRFO
96		5500		5	5	X	1550	15	CSRF
97		5800		5	10	5	850	40	CSRFOI
98		6110		5	5	X	800	40	CSRFOG
99		6400		5	5	X	1400	50	CSRFG
26400		4670		10	10	X	2000	45	CSO

020

063072

Plotted Jm

PROJECT: STERLING VALLEY.

CO-ORDINATES
LINE: 1050 N
FROM: 4700 E
TO: 5300 E

SAMPLED BY: MC+WM
DATE: 27/9/79

MATERIAL: SOIL
DEPTH: C HORIZON.

BOOK No
SHEET No
JOB No

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/-	Pb	Zn	Cu	Fe	Mn	Sn	DESCRIPTION
27006	1050	4700	30m	45	25	5	1950	30		CSRF
007		4730		10	15	X	850	30		CSRFO
008		4760		10	15	X	1950	30		CSRF
009		4790		5	10	X	1650	25		SCRFI
010		4820		10	20	5	2750	30	X	CSRFOI
011		4850		5	10	X	740	30	6	CSRFI
012		4880		15	10	X	3150	15	X	CSRF
013		4910		55	45	5	1950	30	X	CSRFI
014		4940		10	15	X	2450	30	X	CSRFI
015		4970		5	20	X	4350	30	1	CSRF
016		5000		20	15	5	2150	20	X	CSOI
017		5030		5	15	X	2500	25		CSOI
018		5060		15	5	X	1300	30		CSRF
019		5090		10	15	X	850	60		CSRF
020		5120		5	5	X	605	50		CSRFOI
021		5150		45	20	5	1650	40		CSRF
022		5180		15	10	X	650	30		CSRF
023		5210		20	5	X	590	60		CSOI
024		5240		35	10	5	870	80		CSRFOI
025		5270		40	20	X	6350	40		CS
27026		5300		60	115	X	5+90%	130		CSRF

120

0630 73

Plotted JM

PROJECT: Sterling Valley.

CO-ORDINATES — LINE: 1350N; FROM: 4310E; TO: 5030E

SAMPLED BY: NM

DATE: 28/9/79.

MATERIAL: Soil

DEPTH: CHORIZON.

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL E/-	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sn	DESCRIPTION
2703 7	1350	4310	30	5	10	X	1300	20		CSRF
38		3340		20	30	X	4000	40		CSRF
39		3370		X	15	X	900	10		CSRF
40		4000		5	20	X	850	10		SCRF
41		4330		5	30	X	610	5		SCRFG
42		4600		10	20	X	535	5		SCRF
43		4900		10	65	X	310	25		CSRF
44		5220		15	55	X	440	90		CSRF
45		5550		10	20	X	950	10		SCRFG
46		5880		25	20	X	1550	10		CSRF
47		6210		5	10	X	670	5		SCRF
48		6540		5	10	X	170	X		SCRF
49		6870		10	30	X	390	20		SCRFG
50		7200		10	20	X	245	15		SCRF
51		7530		30	20	X	4550	20		CSRF
52		7860		5	10	X	210	X		SCRF
53		7990		5	15	X	165	X		SCRF
54		8220		5	10	X	130	X		SCRF
55		8550		5	40	X	350	5		CSRO
56		8880		5	20	X	185	X		SCRF
57		9210		10	15	X	385	X		CSRF
58		9540		5	10	X	270	X	1	CSRF
59		9870		40	1000	10	4000	800	2	CSRF
60		5000		70	65	10	2800	60	X	CSORA
2706 1		5030		40	60	10	1550	40	1	CSO

220

063074

plotted SM

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 1350 N
FROM: 5060 E
TO: 5420 E

SAMPLED BY: NM
DATE: 28/9/79

MATERIAL: Soil
DEPTH: CHORIZON.

BOOK No.
SHEET No.
JOB No.

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/-	Pb	Zn	Cu	Fe	Mn	Sn	DESCRIPTION
27062	1350	5060	20m	15	25	5	31500	20	2	SCRF
63		0900		5	10	x	6100	x	1	CS
64		1200		10	20	x	3550	x	x	SCRF
65		1500		5	10	x	2250	x	x	CS
66		1800		5	5	x	4100	x	2	CS
67		2100		20	55	x	12000	5	x	CSO
68		2400		5	10	x	6700	x	x	CSRF
69		2700		10	15	x	7700	x	x	CS
70		3000		10	20	x	8200	5	x	CSO
71		3300		15	5	x	4450	5	x	CS
72		3600		10	10	x	3350	10	x	CSRFG
73		3900		220	55	5	3800	100	x	CS
27074		5420		40	20	x	36000	40	x	CSRF

073

Plotted SM

063075

SAMPLE: Sterling Valley.

CO-ORDINATES — LINE: 1700 N; FROM: 4220 E; TO: 4790 E

SAMPLED BY: NM

DATE: 1/10/79

MATERIAL: Soil

DEPTH: C HORIZON.

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/-	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sn	DESCRIPTION
2705	1700	4220	20m	10	60	X	5.2	150	2	C
706		250		15	20	X	2.8	80	3	C S RF
707		280		75	40	5	3.1	50	30	C S O
708		310		75	250	50	4.0	250	6	C S
709		340		5	15	X	1.9	50	1	C S O
80		370		5	10	X	3.7	50	20	SC
81		400		5	10	X	5.6	50	30	C S
82		430		30	40	5	4.1	50	50	C S
83		460		10	5	X	9	50	20	SC
84		490		5	10	X	7	60	20	C S O
85		520		5	10	X	7	25	15	SC
86		550		5	10	X	6	20	15	C S O
87		580		10	5	X	5	25	10	SC
88		610		5	5	X	3	15	10	SC
89		640		15	10	X	6	00	20	C S O
90		670		25	25	X	7	20	20	C S O
91		700		5	5	X	3	05	20	SC RF
92		730		5	10	X	7	75	20	C S O
93		760		25	15	X	1.4	00	30	SC
2794		4790		15	15	X	2.6	00	25	SC

074

Plotted Jm

063076

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 1700N
FROM: 5000E
TO: 4820E

SAMPLED BY: NM
DATE: 2/10/79

MATERIAL: Soil
DEPTH: C HORIZON

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/-	Pb	Zn	Cu	Fe	Mn	Sn	DESCRIPTION
28127	1700	5000	3½	55	20	10	6650	80	x	CSO
28		4970		40	10	10	800	20	x	CSCN
29		4940		25	5	10	9500	5	x	CSRF
30		4910		55	x	x	685	x	24	CSRF
31		4880		55	10	x	2650	25	x	SCRF
32		4850		20	15	5	3950	40	x	SCRF
28133		4820		15	x	x	850	15	x	CSO

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

✓

920

Plotted JM

063077

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 2050N
FROM: 4100E
TO: 4250E

SAMPLED BY: WM
DATE: 1/10/79

MATERIAL: Soil
DEPTH: C HORIZON.

SOC. #:
SHEET #:
JOB #:

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL +/-	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sn	DESCRIPTION
27095	2050	4100		100	175	5	4.85%	1550	2	CS
96		4130		110	135	X	4.75%	1150	X	CS
97		4160		5	70	X	3.50%	490	X	CS
98		4190		10	50	X	2.90%	480	2	CS0
99		4220		30	95	25	6.20%	950	1	CS
27100		4250		25	90	X	4.60%	620	2	CS

920

Plotted Jm

0630178

PROJECT: Sterling Valley

CO-ORDINATES
LINE: 2050N
FROM: 4250E
TO: 5000E

SAMPLED BY: WM
DATE: 2/10/79

MATERIAL: Soil
DEPTH: C Horizon

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sn	DESCRIPTION
28101	0	4240	30	25	60	5	4.35%	250	2	CS
02		3110		30	40	5	3.95%	120	3	CS
03		3440		15	55	5	3.45%	165	2	CS
04		3770		25	45	5	2.50%	140	1	CS
05		4000		25	55	5	3.50%	155	1	CS
06		4330		45	70	5	2.50%	215	X	CS
07		4660		95	20	5	1.45%	80	X	CSRF
08		4990		45	130	10	3.10%	550	X	SCRF
09		5320		45	275	20	4.15%	830	X	CS
10		5550		55	330	15	3.75%	690	X	CSRFO
11		5880		25	160	5	1.35%	790	X	SCRF
12		6110		80	50	5	1.00%	1650	X	CSO
13		6440		20	10	X	2.50	60	X	SCORF
14		6770		110	45	15	1.75%	420	X	CS
15		7000		185	70	25	1.05%	215	X	CS
16		7330		35	155	15	2.90%	850	X	SCRF
17		7660		15	X	X	.95	30	X	SC
18		7990		15	5	X	1.55	30	X	SCRF
19		8220		45	55	5	1.55%	100	X	CS
20		8550		45	75	5	2.15%	110	2	CS
21		8880		25	35	5	.75	65	X	CS
22		9210		20	10	X	2.80	40	X	CS
23		9440		15	5	X	.95	55	X	SCRF
24		9770		10	5	X	.65	15	X	CSO
28125		5000		10	15	X	3.55	40	1	CSRF

220

Plotted SM

0063079

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 2050N
FROM: 5030E
TO: 5030E

SAMPLED BY: WM

DATE: 2/10/79

MATERIAL: ~~Ac~~ Soil

DEPTH: C HORIZON.

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES (N/S)	CO-ORDINATES (E/W)	Interval +/-	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sn ppm	DESCRIPTION
26126	2050	5030		5	5	X	1.250	20	X	CS

820

063080

Plotted SM

PROJECT: Sterling Valley.

CO-ORDINATES — LINE: 2360N; FROM: 5390E; TO: 4810E

SAMPLED BY: MG.

DATE: 8/10/79

MATERIAL: Soil

DEPTH: C HORIZON

BOOK Nº

SHEET Nº

JOB Nº

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval + / −	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sn ppm	DESCRIPTION
28134	2360	5390	30	90	110	235	4.60%	330	x	CSRF
35		5360		80	75	355	5.90%	870	x	CS
36		5330		45	35	25	1.80%	225	x	CSRF
37		5300		55	55	20	2.70%	295	x	CSRF
38		5270		140	85	235	4.15%	2150	x	CSRF
39		5240		45	65	80	3.50%	255	x	CSRF
40		5210		55	100	140	6.30%	215	x	CSRF
41		5180		70	135	105	2.80%	200	x	CSRF
42		5150		40	55	40	4.40%	100	x	CSRF
43		5120		15	25	5	7500	30	x	CSRF
****			****							
44		4700		105	215	135	6.35%	2300	x	CSRF
45		6760		105	220	110	5.60%	1750	6	CSRFO
46		6440		65	130	120	5.15%	2650	4	CSRF
47		6120		35	65	20	4.35%	815	10	CSRF
48		5800		45	140	40	6.75%	1050	12	CSRF
49		5550		30	50	15	3.65%	455	14	CSRF
50		5320		20	40	30	5.25%	265	12	CSRF
51		4990		25	50	15	5.35%	245	4	CSRF
52		4660		20	45	15	5.10%	205	2	CSRF
53		4330		35	100	15	7.00%	325	x	CSRF
54		4000		45	195	20	9.00%	810	x	CSRFO
55		3670		30	50	10	5.40%	220	6	CSRF
56		3340		30	95	115	6.55%	800	x	CSRFO
28157		4310		25	85	10	5.15%	330	1	CSRF

620

Plotted Sm

063081

PROJECT: Sterling Valley.

CO-ORDINATES — LINE: 2600 N; FROM: 4550 E; TO: 4430 E

SAMPLED BY: MG.

DATE: 9/10/79

MATERIAL: Soil

DEPTH: C HORIZON.

BOOK Nº

SHEET Nº

JOB Nº

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sn ppm	DESCRIPTION
288158	2600	4850	30m	25	30	5	3.50	50	x	CSO
54		850		105	50	10	10.45%	1700	2	SC
60		820		30	35	x	1.65%	155	3	CSRF
61		790		35	305	60	5.55%	1050	x	CSRF
62		760		15	460	120	7.25%	2500	x	CSRF
63		730		25	175	55	5.20%	950	x	CSRFO
64		700		50	248	60	7.45%	1800	x	CSRF
65		670		70	160	40	6.90%	1050	2	CSRFO
66		640		105	220	95	6.85%	3550	4	CSRF
67		610		80	175	75	6.30%	1800	2	CSRFO
68		580		30	175	55	8.50%	1300	6	CSRF
69		550		35	110	30	7.55%	1400	6	CSRF
70		520		30	145	20	7.80%	850	6	CSRFO
71		490		45	180	35	7.30%	2200	3	CSRF
72		460		60	190	25	6.35%	4300	6	CSRF
288173		4430		55	145	20	7.05%	900	8	SCRF

080

063082

Plotted SM

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 2840N
FROM: 4880E
TO: 4490E

SAMPLED BY: MG

DATE: 9/10/79

MATERIAL: Soil

DEPTH: CHORIZON.

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL 30m	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sn	DESCRIPTION
28174	2840	4880		25	70	15	4.20	1950	4	CSRF
28175		4850		45	100	25	6.20	6700	10	CSRF
28176		4820		40	70	30	4.90	1550	6	CSRF
28177		4790		45	85	15	4.90	21000	8	CSRF
28178		4760		25	170	35	7.00	48500	8	CSRF
28179		4730		35	175	30	5.65	23500	6	CSRF
28180		4700		85	100	15	3.70	11500	6	CSRF
28181		4670		90	75	10	3.25	7400	6	CSRF
28182		4640		105	55	15	1.95	3850	12	CSRF
28183		4610		15	215	20	5.55	18500	4	CSRF
28184		4580		15	155	35	6.70	25000	3	CSRF
28185		4550		5	55	10	6.05	7150	x	CSRF
28186		4520		10	40	10	4.90	2450	2	CSRF
28187		4490		20	90	20	6.40	16500	x	CSRF

T80

0630831

Blatted Soil

PROJECT: Sterling Valley

CO-ORDINATES
LINE: 3080 N
FROM: 4490E
TO: 4340E

SAMPLED BY: WM.
DATE: 15/10/79

MATERIAL: Soil
DEPTH: C HORIZON.

BOOK No.
SHEET No.
JOB No.

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval	Pb ppm	Zn ppm	Cu ppm	F.E. %	Mn ppm	Sn	DESCRIPTION
28501	3080	4490	30m	40	130	60	6.65%	1600		CSRF
02		4460		65	115	55	7.15%	4200		CSRF
03		4430		20	80	15	5.10%	2400	x	CSRF
04		4400		15	170	15	5.90%	8500	x	CSRF
05		4370		40	140	40	6.45%	11500	2	CSRF
28506		4340		45	195	55	7.50%	29500	x	CSRFQ

280

0630841

plotted in

PROJECT: Sterling Valley

CO-ORDINATES
LINE: 3080 N
FROM: 4540 E
TO: 4520 E

SAMPLED BY: NM
DATE: 15/10/79

MATERIAL: Soil
DEPTH: C HORIZON.

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/-	Pb P	Zn P	Cu P	Fe %	Mn P	DESCRIPTION
25188	3080	4880	30m	15	20	5	1.80%	50	CSRF
89		8850		40	75	50	7.50%	1000	CSRF
90		8820		35	70	55	8.15%	490	CSRF
91		7810		60	80	75	8.50%	975	CSRF
92		7760		35	85	75	9.00%	420	CSRF
93		7730		25	40	20	3.55%	95	CSRF
94		7700		15	45	10	3.45%	105	CSRF
95		6770		20	30	5	2.55%	45	CSRF
96		6740		25	55	15	4.40%	135	CSRF
97		6710		15	30	10	2.25%	55	CSRF
98		5680		30	85	15	6.60%	190	CSRF
99		5650		25	40	10	3.60%	100	CSRF
25200		4520		20	30	10	2.55%	110	CSRF

E80

063085

Plotted SM

PROJECT: ~~[redacted]~~ Sterling Valley

CO-ORDINATES — LINE: 3560 N — FROM: 4430 E — TO: 4910 E.

SAMPLED BY: NM. — DATE: 15/10/79

MATERIAL: Soil — DEPTH: C HORIZON.

BOOK N° — SHEET N° — JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval E/-	P.b.p	Z.N.P	C.U.	Fe!	M.N.	Sn	DESCRIPTION
28516	3560	4430	30	20	100	35	61.5%	465	54	CSRF
517		460		70	175	40	43.0%	1200	4	SCRA
518		490		45	110	35	48.5%	235	6	CSRF
519		520		20	40	20	37.5%	90	20	CSRF
520		550		25	55	20	34.5%	135	18	CSRF
521		580		30	80	25	48.0%	115	28	CSRF
522		610		40	45	25	34.0%	140	24	CSRF
523		640		25	40	10	17.0%	75	40	CSRF
524		670		15	40	10	27.0%	55	30	CSRF
525		700		45	235	35	37.5%	200	52	CSRF
526		730		25	65	25	40.5%	155	36	CSRF
527		760		35	85	30	51.0%	135	28	CSRF
528		790		25	95	20	50.0%	185	4	CSRF
529		820		25	105	40	63.0%	170	14	CSRF
530		850		40	45	15	19.5%	430	x	SCRF
531		880		65	55	15	14.0%	600	x	SCRF
24532		4910		45	45	15	80.0	130	x	SC

080

Plotted J.M.

0063086

PROJECT: Sterling Valley

CO-ORDINATES
LINE: 4040 N
FROM: 4670 E
TO: 4550 E.

SAMPLED BY: MG
DATE: 14/10/79

MATERIAL: Soil
DEPTH: Chorizon.

SCC'd N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Total Interval	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	DESCRIPTION
R8511	4040	4670	80	35	40	10	2.70 %	90	C S R F
12		6 40		25	35	5	2.46 %	55	C S R F O
13		6 10		45	60	10	1.70 %	255	C S R F O G
14		5850		220	190	45	5.65 %	685	C S R F
2851 5		4550		140	235	50	5.70 %	1100	C S R F

085

063087

Plotted JM

PROJECT: STERLING VALLEY

CO-ORDINATES
LINE: 4160N
FROM: 4580E
TO: 4490E

SAMPLED BY: MG

DATE: 10/10/79

MATERIAL: Soil

DEPTH: C HORIZON.

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL	Pb%	Zn%	Cu	Fe	Mn	DESCRIPTION
28507	4160	4490	30 m	10	20	5	14.00%	1000	CSRF
08		4550		10	15	X	2450	25	CSRFG
09		4520		10	15	X	5150	25	CSRF
10		4490		130	195	100	59.5%	1300	CSRF

980

063088

Plotted 5m

PROJECT: Sterling Valley.

CO-ORDINATES — LINE: 4280 N — FROM: 4616E — TO: 4460E

SAMPLED BY: WM.

DATE: 16/10/79

MATERIAL: Soil

DEPTH: Chorizon

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES (N) S	(E) W	Interval (E)	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sn	DESCRIPTION
28574	4280	4640	30	30	35	5	1.60%	140	11	C S R F
75		4610		60	50	15	1.45%	630	6	C S R F
76		4580		25	25	X	1.00%	450	1	C S R F
77		4550		20	25	5	3.30%	750	X	C S R
78		4520		70	90	15	5.80%	1600	X	X
79		4490		50	45	10	4.80%	900	X	C S R
28580		4460		65	155	95	6.50%	2850	20	C S R F

280

063089

PROJECT: STERLING VALLEY

CO-ORDINATES
LINE: 4400N
FROM: 4250E
TO:

SAMPLED BY: BILL

DATE: 24/12/79

MATERIAL: SOIL

DEPTH: C HORIZON

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL +/-	Pb P	Zn P	Cu P	Fe	Mn.	Sn		DESCRIPTION
3089	4400	4250	20m	30	50	10	4.15%	260	18	B horizon	C O
09		4220		25	70	10	6.95%	145	44		C RF
10		4190		30	55	10	5.65%	250	42		C O RF
11		4160		25	70	10	4.15%	160	128		C RF
12		4130		65	185	25	4.80%	560	70		C RF
13		4100		30	70	10	3.85%	220	210		C RF
14		4070		25	65	10	5.55%	570	68		C RF
15		4040		25	20	5	1.05%	160	76	B horizon	C RF O S
16		4010		95	85	5	4.65%	370	60		C RF O

880

063090

Plotted SM

PROJECT: Sterling Valley

CO-ORDINATES
LINE: 4400N
FROM: 4610E
TO: 4280E

SAMPLED BY: WM
DATE: 16/10/79

MATERIAL: Soil
DEPTH: C HORIZON.

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/-	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sn ppm	DESCRIPTION
28562	4400	4610	30m	30	60	15	4.40	115	9	SCRF
63		5680		15	15	5	2.05	40	7	CSRF
64		5550		35	25	35	3.70	45	1	CSO
65		5520		25	20	5	4.25	45	4	CRF
66		4910		55	115	15	2.15	765	4	CRF
67		4660		105	145	55	3.35	1200	24	CSO
68		4430		80	135	300	9.00	1900	69	CRF
69		4400		70	135	175	7.55	2800	134	CSRF
70		3710		45	90	75	7.85	1100	112	CSRF
71		3440		30	90	45	7.40	950	84	CSRF
72		3110		35	140	75	8.50	775	132	CSRF
28573		4280		25	100	35	5.80	660	200	CSRF

680

063091

Plotted JM

PROJECT: Sterling Valley

CO-ORDINATES
LINE: 4520N
FROM: 3860E
TO: 3770E

SAMPLED BY: WM.

DATE: 16/10/79

MATERIAL: Soil

DEPTH: C Horizon

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES (N)/S	(E)/W	Interval +/-	Pb ppm	Zn ppm	Cu %	Fe %	Mn ppm	Sn ppm	DESCRIPTION
28558	4520	3860	30	30	150	X	3.65	1100	144	CS RF
59		3830		70	350	10	4.25%	1000	52	CS RF
60		3800		25	250	5	6.10	1250	50	CS O
28561		3770		30	350	20	3.45%	1300	46	CS RF

060

063092

Plotted IM

PROJECT: # Sterling Valley

CO-ORDINATES: 4520N

FROM: 4610E

TO: 3890E

SAMPLED BY: WM

DATE: 16/10/79

MATERIAL: Soil

DEPTH: C Horizon

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/-	P.b.p	Zn p	Cu	Fe %	Mn	So	DESCRIPTION
28533	4520	4610	30	70	115	20	6.60	740	X	CSOG
34		5800		65	80	15	2.25	820	3	SCRFG
35		5550		15	20	5	0.63	60	4	SCRFG
36		6200		45	75	10	1.55	340	6	CSRF
37		4900		85	180	20	2.85	1300	6	CS
38		4600		40	55	15	2.10	205	16	CSRF
39		4300		80	165	20	2.60	1300	6	CSRF
40		4000		35	45	10	2.00	170	6	CSRF
41		3700		65	145	50	7.85	2200	40	CSRF
42		3400		50	75	35	5.50	645	70	CSRF
43		3100		25	75	60	6.05	590	128	CSRF
46		2800		30	65	35	5.65	285	112	CSRF
45		2500		10	20	5	1.25	145	100	CSRF
46		2200		40	60	30	5.70	705	128	CSRF
47		1900		25	45	10	3.20	265	86	CSRF
48		1600		60	L45	20	3.95	540	74	CSRF
49		1300		55	L00	25	2.50	385	46	CSO
50		1000		45	55	15	5.25	350	66	CSRF
51		0700		50	45	70	1.65	175	17	CSO
52		0400		80	30	5	4.45	265	380	CSRF
53		4012		10	10	X	5.30	85	77	CSRF
54		3980		20	20	5	1.60	110	230	CSO
55		9.53		5	5	X	1.25	75	48	C
56		9.20		10	10	X	3.40	70	32	CSRF
28557		3890		25	30	5	1.20	155	300	CS

I60

063093

PROJECT: STERLING VALLEY

CO-ORDINATES
LINE: 4640N
FROM: 4340E
TO: 3980E

SAMPLED BY: BILL.
DATE: 24/12/79.

MATERIAL: SOIL.
DEPTH: C horizon.

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +10	Pb P	Zn P	Cu P	Fe	Mn	Sn	DESCRIPTION
30917	4640	4340	30m	40	40	5	1·35%	90	4	C RF
18		4310		40	50	15	1·85%	225	7	C $ RF
19		4280		30	40	10	4·55%	585	66	C
20		4250		25	25	5	3·60%	370	132	C RF
21		4220		20	70	5	3·50%	850	350	C RF
22		4190		25	30	5	2·50%	470	260	C RF O
23		4160		15	110	15	5·45%	310	50	C O RF
24		4130		55	90	20	5·80%	120	58	C RF
25		4100		80	120	25	6·75%	290	36	C RF
26		4070		140	55	10	3·60%	175	120	C RF O
27		4040		55	50	5	2·20%	150	152	C O RF
28		4010		60	40	10	2·95%	140	68	C RF
29		3980		25	30	5	3·35%	205	78	C RF

092

063094

PROJECT: STERLING VALLEY

CO-ORDINATES
LINE: 46.40N
FROM: 4340E
TO: 3980E

SAMPLED BY: BM
DATE: 24/12/79

MATERIAL: SOIL SAMPLE
DEPTH: C HORIZON

BOOK No
SHEET No
JOB No

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/-	Pb	Zn	Cu	Fe %	Mn	Sn	DESCRIPTION
30917	4640	4340	3	40	40	5	1.35	90	4	C RI
18	4640	4310		40	50	15	1.85	225	7	C S RI
19	4640	4280		30	40	10	4.55	585	66	
20	4640	4250		25	25	5	3.60	370	132	C RI
21	4640	4220		20	20	5	3.50	650	350	C RI
22	4640	4190		25	30	5	2.50	470	260	C RI O
23	4640	4160		75	110	15	5.45	310	50	C O RI
24	4640	4130		55	90	20	5.60	120	55	C RI
25	4640	4100		60	120	25	6.75	290	36	C RI
26	4640	4070		140	55	10	3.60	175	120	C RI O
27	4640	4040		55	50	5	2.20	150	152	C O RI
28	4640	4010		60	40	10	2.95	140	68	C RI
30929	4640	3980		25	30	5	3.35	205	78	C RI

Duplicated

660

063095

PROJECT: STERLING VALLEY. (EXTENSIONS)

CO-ORDINATES
LINE: 4400N
FROM: 4250E
TO: 4010E

SAMPLED BY: BM

DATE: 24-/12/79.

MATERIAL: SOIL SAMPLE

DEPTH: C. HORIZON.

GOC N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/- (M)	Pb ppm	Zn ppm	Cu ppm	Fe %	Mn ppm	Sr ppm	DESCRIPTION
30908	4100	4230	30	30	50	10	4.15%	260	16	Na C HORIZON C CT
09	4400	4220		25	20	10	6.65%	145	44	C KT
10	4400	4190		30	55	10	5.65%	250	42	C C KA
11	4400	4160		25	20	10	4.15%	160	128	C KT
12	4400	4130		65	165	25	4.60%	560	70	C KT
13	4400	4100		50	70	10	3.65%	220	260	C KT
14	4400	4070		25	65	10	5.55%	570	68	C KTO
15	4400	4040		25	20	5	1.05%	160	76	Na C HORIZON C KTOS
30916	4400	4010		95	85	5	4.65%	370	60	C KATS

DCO

063096

PROJECT: STERLING VALLEY J.V.

CO-ORDINATES
LINE: 4640N
FROM: 4340E
TO: 3950E.

SAMPLED BY: WM
DATE: 24/12/79

MATERIAL: leaf litter
DEPTH: leaf litter

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval + (E)	Pb	Zn	W	Fe	Mn
30560	4640	4340	30	20	55	15	5360	415
61		5100						
62		2900						
63		2500		15	45	10	1350	1100
64		2200						
65		1900						
66		1600		15	135	20	1400	700
67		1300						
68		1000						
69		0700		45	45	15	4250	635
70		0400						
30571		4010						
30572		3900		10	30	15	950	800

230

063097

PROJECT: STERLING VALLEY J.V.

CO-ORDINATES
LINE: 4400N
FROM: 4250E
TO: 4,010E

SAMPLED BY: WA
DATE: 24/12/79

MATERIAL: leaf litter
DEPTH: leaf litter

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Increment +/-	Pb	Zn	Cu	Fe	Mn
30551	4400	4250	30	20	85	15	1550	1400
552		2220						
553		1990						
554		1660		15	35	15	4000	1300
555		1330						
556		1000						
557		0770		25	50	20	6650	2000
558		0440						
559		4010		20	45	10	800	740

960

063098

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 1700N.
FROM: 5000E
TO: 4852E 50

SAMPLED BY: wm.
DATE: 21/0/79.

MATERIAL: leaf litter
DEPTH: leaf litter.

GOOX N°
SHEET N°
JOB N°
DESCRIPTION

SAMPLE NUMBER	CO-ORDINATES (N)/S	(E)/W	Interval +/(-)	Pb.	Zn.	Cu.	Fe.	Mn.
26995	1700	5000	30	15	75	30	250	2000
96		4970						
97		4940						
98		4910		20	90	35	240	1850
99		4880		15	80	35	535	1600
27000	1700	4850		10	65	40	265	1400

400

063099

PROJECT: STERLING VALLEY.

CO-ORDINATES
LINE: 2050N
FROM: 4850E
TO: 5030E.

SAMPLED BY: WM.
DATE: 2/10/79

MATERIAL: leaf litter
DEPTH: leaf litter

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES (N) S	(E) W	Interval (+)/-	DESCRIPTION	P.b.	Z.N.	C.U.	F.e.	M.N.
26986	2050	4850	30						
89		8850							
90		9150			10	50	45	240	1750
91		9450							
92		9750							
93		5000			10	70	35	285	530
26994	2050	5030			10	130	35	305	1850

860

063100

PROJECT: STERLING VALLEY.

CO-ORDINATES — LINE: 2050 N. FROM: 4100 E TO: 4820 E.

SAMPLED BY: NM.

DATE: 1/10/79.

MATERIAL: leaf litter

DEPTH: leaf litter.

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL	DESCRIPTION
26963	2050	4100	30m	
64		4130		
65		4160		
66		4190		
67		4220		
68		4250		
69		4280		
70		4310		
71		4340		
72		4370		
73		4400		
74		4430		
75		4460		
76		4490		
77		4520		
78		4550		
79		4580		
80		4610		
81		4640		
82		4670		
83		4700		
84		4730		
85		4760		
86		4790		
26987	2050	4820		

SAMPLE NUMBER	Pb.	Zn.	Cu.	Fe.	Mn.
26963	25	105	40	1.20%	1400
64					
65					
66	5	80	35	850	630
67					
68	15	190	25	4.10%	1200
69	20	100	20	1250	930
70					
71					
72	20	105	40	380	520
73					
74					
75	20	140	60	530	410
76					
77					
78	25	145	30	1500	545
79					
80					
81	20	50	20	465	900
82					
83					
84	10	65	40	300	2800
85					
86					
26987	10	70	30	250	1600

600

PROJECT: STERLING VALLEY.

CO-ORDINATES — LINE: 1700N; FROM: 4220E; TO: 4790E

SAMPLED BY: WM.

DATE: 1/10/79

MATERIAL: leaf litter.

DEPTH: leaf litter.

BOOK N°

SHEET N°

JOB N°

DESCRIPTION

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL +/-	Pb.	Zn.	Cu.	Fe.	Mn.
26943	1700	4220	30	10	35	10	3300	175
44		4250						
45		4280						
46		4310		10	80	20	1250	1000
47		4340						
48		4370						
49		4400		5	75	20	350	1050
50		4430						
51		4460						
52		4490		5	55	15	210	510
53		4520						
54		4550						
55		4580		15	55	25	950	650
56		4610						
57		4640						
58		4670		20	85	25	270	800
59		4700						
60		4730						
61		4760		10	90	20	550	3200
26962	1700	4790		20	70	30	475	2600

100

063102

PROJECT: STERLING VALLEY.

CO-ORDINATES — LINE: 1350 N. FROM: 5060E TO: 5420E

SAMPLED BY: WM.

DATE: 28/9/79

MATERIAL: leaf litter

DEPTH: leaf litter.

BOOK N°

SHEET N°

JOB N°

DESCRIPTION

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/-	Pb	Zn	Cu	Fe	Mn
26930	1350	5060	30					
31		0910						
32		1120		5	55	20	165	465
33		1150						
34		1180						
35		2110		15	95	30	260	1200
36		2140						
37		2170						
26938	1350	5300		15	90	95	270	2100
39		3330		10	80	30	400	2200
40		3360						
41		3390						
26942	1350	5420		5	40	15	125	1300

101

063103

PROJECT: STERLING VALLEY.

CO-ORDINATES — LINE: 1350N; FROM: 4310E; TO: 5030E

SAMPLED BY: WM.

DATE: 28/9/79

MATERIAL: leaf litter

DEPTH: leaf litter.

BOOK Nº

SHEET Nº

JOB Nº

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL +/-	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
26905	1350	4310	30	25	75	30	900	365	
06		3340							
07		3370							
08		4000		15	65	10	430	1500	
09		4330							
10		4660							
11		4990		5	65	20	500	7100	
12		5320							
13		5550							
14		5880		15	50	25	260	2100	
15		6110							
16		6440							
17		6670		15	50	20	380	1000	
18		7000							
19		7330							
20		7660		25	110	30	510	3650	
21		7990							
22		8320							
23		8650		15	50	15	170	4755	
24		8880							
25		9110							
26		9440		05	55	35	900	1250	
27		9770							
28		5000							
26929	1350	5030		10	95	20	185	1250	

102

063104

PROJECT: STERLING VALLEY

CO-ORDINATES — LINE: 1050N; FROM: 5,240E; TO: 5,300E

SAMPLED BY: M.G.

DATE: 27/9/79.

MATERIAL: leaf litter

DEPTH: leaf litter.

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL +/-	Pb	Zn	Cu	Fe	Mn.	DESCRIPTION
26065	1050	5240	30						
66		270							
26067	1050	5300		5	80	20	180	900	

103

063105

PROJECT: STERLING VALLEY.

CO-ORDINATES — LINE: 1050 N — FROM: 4,490E — TO: 5,210E

SAMPLED BY: MG.

DATE: 27/9/79.

MATERIAL: Leaf litter

DEPTH: leaf litter.

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL ⊙/-	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
26040	1050	4490	30	15	65	10	1100	1900	
41		5200							
42		5500							
43		5680		20	60	25	390	4300	
44		6010							
45		6400							
46		6700		15	55	35	1000	5050	
47		7000							
48		7300							
49		7600		15	70	15	620	3000	
50		7900							
51		8200							
52		8500		15	50	20	700	2650	
53		8800							
54		9100							
55		9400		<5	40	20	290	2050	
56		9700							
57		5000							
58		0300		10	125	35	330	2400	
59		0600							
60		0900							
61		1200		25	70	20	305	2700	
62		1500							
63		1800							
26064	1050	5210		20	65	25	265	2250	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 80

104

063106

PROJECT: Sterling Valley

CO-ORDINATES — LINE: 4040N. FROM: 4670E TO: 4550E

SAMPLED BY: MG.

DATE: 10/10/79.

MATERIAL: leaf litter

DEPTH: leaf litter

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval + (E)	Pb	Zn	Cu	Fe	Mn.	DESCRIPTION
28279	4040	4670	30	25	45	15	21.00	1000	
28280		6400							
28281		6100							
28282		5900		40	105	25	1.50%	950	
28283	4040	4550		65	170	35	1.40%	2000	

105

063107

PROJECT: Sterling Valley

CO-ORDINATES
LINE: 4160N.
FROM: 4580E
TO: 4490E

SAMPLED BY: MG.
DATE: 10/10/79.

MATERIAL: leaf litter
DEPTH: leaf litter

BOOK Nº
SHEET Nº
JOB Nº

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
28275	4160	4580	20	30	110	10	900	950	
28276		4550							
28277		4520							
28278	4160	4490		40	65	15	4300	3250	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

901

063108

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 2840N.
FROM: 4880E.
TO: 4490E

SAMPLED BY: MG.
DATE: 9/10/79

MATERIAL: leaf litte
DEPTH: leaf litter

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL + (E)	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
28242	2840	4880	30	15	55	15	2700	690	
243		850							
244		820							
245		790		30	55	15	6000	1200	
246		760							
247		730							
248		700		35	85	10	1.75%	1200	
249		670							
250		640							
251		610		30	105	15	5.00%	2600	
252		580							
253		550							
254		520		50	60	10	3900	570	
28255	2840	4490		115	100	15	1.75%	800	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 36 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

201

063109

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 2600N.
FROM: 4880E
TO: 4430E.

SAMPLED BY: MG:
DATE: 9/10/79.

MATERIAL: leaf litter.
DEPTH: leaf-litter.

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL +0	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
28226	2600	4880	30	15	55	10	750	425	
227		8850							
228		8820							
229		7900		15	70	10	1150	1200	
230		7600							
231		7300							
232		7000		35	140	30	2600	1950	
233		6700							
234		6400							
235		6100		25	75	15	5250	850	
236		5800							
237		5500							
238		5200		25	80	15	1900	1800	
239		4900							
240		4600							
28241	2600	4430		75	100	20	1200	1200	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 80

108

063110

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 2360N
FROM: 5390E
TO: 4310E.

SAMPLED BY: MG.
DATE: 8/10/79

MATERIAL: leaf litter
DEPTH: leaf-litter.

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES (N/S)	CO-ORDINATES (E/W)	Interval + (E)	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
28202	2360	5390	30	15	35	25	4000	950	
03		3600							
04		3300							
05		3000		10	40	10	1100	1000	
06		2700							
07		2400							
08		2100		5	20	15	1000	610	
09		1800							
10		1500							
11		1200		5	25	10	670	260	
12	2360	4700	**						
13		6700							
14		6400		35	90	20	27%	1500	
15		6100							
16		5800							
17		5500		25	85	15	2400	1250	
18		5200							
19		4900							
20		4600		25	75	20	4150	1100	
21		4300							
22		4000							
23		3700		45	65	15	5400	310	
24		3400							
28225	2360	4310		25	75	15	1916%	590	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

60T

063111

PROJECT: Sterling Valley

CO-ORDINATES
LINE: 1700N
FROM: 4820E
TO: 4820E

SAMPLED BY: WM
DATE: 2/10/79

MATERIAL: leaf litter
DEPTH: leaf litter

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES (N/S)	CO-ORDINATES (E/W)	INTERVAL +/-	P.b.	Z.N.	C.u.	Fe.	M.N.	DESCRIPTION
94820	1700	4820		15	55	10	1000	1150	

011

063112

PROJECT: Sterling Valley.

CO-ORDINATES — LINE: 4280 N. FROM: 4640E TO: 4,460E

SAMPLED BY: WM.

DATE: 16/10/79

MATERIAL: leaf litter

DEPTH: leaf litter

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval +/-	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
28642	4280	4640	30m	30	65	10	2250	1900	
43		610		1					
44		580							
45		550		25	70	5	200	1350	
46		520							
47		490							
28648	4280	4460		90	210	20	5300	3150	

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063113

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 4400N
FROM: 4610E
TO: 4280E

SAMPLED BY: WM.
DATE: 16/10/79

MATERIAL: leaf litter
DEPTH: leaf litter

BODY N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL 20	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
28630	4400	4610							
31		5300							
32		5500		20	70	5	3650	750	
33		5200							
34		4900							
35		4600		55	135	30	2400	1400	
36		4300							
37		4000							
38		3700		15	65	10	600	1450	
39		3400							
40		3100							
28641	4400	4280		15	70	10	5250	800	

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063114

PROJECT: Sterling Valley

CO-ORDINATES
LINE: 4520 N
FROM: 3860 E
TO: 3770 E.

SAMPLED BY: WM.
DATE: 16/10/79

MATERIAL: leaf litter
DEPTH: leaf litter

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
28626	4520	3860	30						
27		3830							
28		3800		05	25	X	360	640	
28629	4520	3770		15	40	5	1450	215	

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063115

PROJECT: Sterling Valley

CO-ORDINATES — LINE: 4520 N; FROM: 4610 E; TO: 3890E.

SAMPLED BY: WM

DATE: 16/10/79

MATERIAL: leaf litter

DEPTH: leaf litter

BOOK N°

SHEET N°

JOB N°

DESCRIPTION

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL +10	Pb	Zn	Cu	Fe	Mn
28601	4520	4610	30	35	135	30	10500	30500
02		5800						
03		5500						
04		5200		50	55	10	8500	4350
05		4900						
06		4600						
07		4300		35	70	10	16500	5005
08		4000						
09		3700						
10		3400		35	60	15	32500	8000
11		3100						
12		2800						
13		2500		10	35	10	6500	7700
14		2200						
15		1900						
16		1600		20	60	10	17500	18500
17		1300						
18		1000						
19		0700		15	35	10	7500	12500
20		0400						
21		4010						
22		3980		5	30	5	3005	4300
23		9500						
24		9200						
28625	4520	8900		10	30	5	3000	6005

VII

063116

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 3560N.
FROM: 4430E
TO: 4910E.

SAMPLED BY: NM
DATE: 15/10/79.

MATERIAL: ~~leaf~~ litter
DEPTH: ~~leaf~~ litter

BOOK N°
SHEET N°
JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	Interval	Pb	Zn	Cu	Fe	Mn	DESCRIPTION
28284	3560	4430	30	15	65	15	1.75%	655	
285		460							
286		490							
287		520		20	45	10	515	290	
288		550							
289		580							
290		610		20	45	10	550	285	
291		640							
292		670							
293		700		15	70	20	3800	435	
294		730							
295		760							
296		790		15	50	10	405	320	
297		820							
298		850							
299		880		15	55	5	610	950	
28300	3560	4910		25	55	10	1250	1950	

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063117

PROJECT: Sterling Valley.

CO-ORDINATES
LINE: 3080 N
FROM: 4650 E.
TO: 4340 E.

SAMPLED BY: WM.

DATE: 15/10/79

MATERIAL: leaf litter.

DEPTH: leaf litter

BOOK N°

SHEET N°

JOB N°

SAMPLE NUMBER	CO-ORDINATES N/S	CO-ORDINATES E/W	INTERVAL	DESCRIPTION	Pb	Zn	Cu	Fe	Mn
28257	3080	4650	30		25	55	15	6050	1350
258		4620							
259		4590							
260		4560			25	60	15	5950	1000
261		4530							
262		4500							
263		4470			10	40	10	6050	640
264		4440							
265		4410							
266		4380			15	65	10	5650	550
267		4350							
268		4320							
269		4290			25	55	15	5650	1800
270		4260							
271		4230							
272		4200			25	140	15	2200	1500
273		4170							
28274	3080	4340			40	95	15	1.50%	1550

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APPENDIX 3

C.M.S. Reports

80/2/22 ✓ (19)
80/3/21 ✓ (4)
80/5/46 ✓ (9)
80/6/29 ✓ (7)

063119

FILE: 137

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Electrolytic Zinc Co. of
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10th July, 1980

REPORT CMS 80/6/29

YOUR REFERENCE:	Order No. 900169
DATE RECEIVED:	19th June, 1980
SAMPLE NOS.:	T29517 - T29523
SUBMITTED BY:	A. Mollison
WORK REQUESTED:	Petrology

H.W. Fander, M. Sc.

REPORT CMS 80/6/29

Core Samples T29517 - T29523

All the samples were examined in thin-section, and three polished sections were also prepared, of samples with conspicuous sulphides. The petrology is presented in the accompanying table, and the three polished sections are described below, followed by a summary.

T 29519 (P.S. 32392)
The sulphides in the veins are arsenopyrite, pyrite, traces of pyrrhotite. In the adjacent rock, the sulphide is pyrrhotite, with traces of fine chalcopyrite. Individual cassiterite grains seldom exceed 20μ, and occur in loose clusters of poorly defined crystals.

T 29521 (P.S. 32394)
The vein sulphides are pyrrhotite and arsenopyrite, with very minor chalcopyrite and pyrite. There are many small irregular patches of pyrrhotite and chalcopyrite throughout the rock, as well as isolated larger pyrite euhedra.

T 29523 (P.S. 32396)
The major sulphides are coarse crystals of arsenopyrite and of pyrite, marcasite pseudomorphs after pyrrhotite, and chalcopyrite; there are traces of ?bismuthinite as very small patches. Elsewhere, in the body of the rock, there are small patches of pyrrhotite, chalcopyrite and pyrite. Although no cassiterite was detected in thin-section, it was seen in the polished section, occurring sporadically adjacent to vein sulphides, as small euhedral crystals 10-50μ and as clusters up to 200μ.

Summary

All the rocks may broadly be classified as volcanic, but several are extensively altered and thus difficult to recognise in detail. Pyroclastic rocks are in any case prone to deuteric alteration, and this has been overprinted with a metasomatic phase; sample T 29519 is so thoroughly metasomatised that its original nature is guesswork, but it is presumed to have been a tuff, by analogy with the others. The composition of the rocks seems to have been in the trachytic, i.e. intermediate (feldspathic) range.

Cassiterite, where recognisable, is poorly developed and fine-grained; this mode of occurrence often seems to signify low-temperature formation, and it is of interest to note that the cassiterite is located in the host-rock adjacent to veins rather than in the veins themselves. A few ?cassiterite occurrences were tentatively identified (T29517, T29520); assay data may resolve this.

H.W. Fander, M. Sc.

Sample No.	Rock Type - Composition	Fabric	Minor Minerals	Comments
T 295117 (T.S. 32390) 13.5m	Porphyritic Trachyte. Well-formed, small, single phenocrysts, clusters, of albite, in a very fine matted-fibrous K-feldspar groundmass.	Good, fine flow-alignment, some flow-brecciation. Minor shearing.	Chlorite patches, finely-fibrous to granular secondary epidote.	Unusual rock in this region, but identity clear. No free quartz. May be extrusive or minor/shallow intrusive. Semi-opaque, dark, fibrous ?cassiterite patches.
T 29518 20.0m	Porphyritic Trachyte. Somewhat rounded albite phenocrysts and clusters in fine, typically trachytic K-feldspar groundmass with a few altered ferromagnesian crystals.	Excellent fine flow-banding and alignment.	Leucoxene, chlorite, epidote - secondary. Also epidote-carbonate veins.	Very similar to T 29517, but perhaps tending to a leucocratic trachyandesite. Some deuteric alteration.
T 29519 34.4m	Metasomatised, Mineralised Rock. Parallel bands of chlorite-quartz, sericite (hydromuscovite)-quartz, fibrous-radiating topaz; veins with fluorite-sericite-sulphides-cassiterite.	Banded fabric probably inherited, but all minerals replacive.	Ultrafine carbonate films, fibrous chlorite.	Cassiterite asscattered small crystals 15-100μ, but mainly as clusters of fine, cloudy, semi-opaque grains flanking veins. See separate description.
T 29520 64.6m	Lithic Tuff (?Welded). Mainly fragments of trachytes (variety of fabrics), coarse albite crystals (phenocrysts), scoriaceous altered lavas, all severely altered.	Drawn-out fragments due to plastic deformation/flow. Probably welded, ignimbritic.	Cloudy, fine carbonate and epidote. Chlorite, sericite. Coarser carbonate veins.	Mainly trachytic source, but some probably more acid and more basic, with deuteric alteration. Possible ultrafine cloudy cassiterite.
T 29521 112.1m	Banded Fine Tuff. Broad bands of ultrafine, altered vitric tuff and slightly coarser vitric-crystal tuff; conformable veins of fluorite-hydromuscovite-sulphides.	Mostly extremely fine-grained, but shard textures recognisable.	Sericite adjacent to veins. Fine carbonate throughout.	No cassiterite recognised. Tuff probably of acid to intermediate composition, but most components unidentifiable. See separate description.
T 29522 133.8m	Sheared Lithic Tuff (?Welded). Generally small fragments of trachytes, feldspars, in fine, altered tuff matrix; lenses of carbonate with epidote, chlorite, sulphides = disrupted veins.	Strong preferred orientation, partly primary, partly due to shearing.	Fine, cloudy epidote; fragments of tremolite. Fractures with carbonate.	Components severely altered and poorly identifiable; much finer-grained than T 29520. Evidently partly veined before shearing.
T 29523 (T.S. 32396) 92.6m	Metasomatised ?Porphyry. Partly replaced albite phenocrysts in fine groundmass now composed of epidote, quartz, chlorite, carbonate. Fluorite-sulphide-hydromuscovite-chlorite veins.	Possibly a trachyte originally, but extensively replaced.	Sericite and fluorite adjacent to veins. Epidote-carbonate veins.	Possibly deuterically altered, then veined; no cassiterite detected, but ultrafine cloudy leucoxene-like material could be cassiterite. See separate description.

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063122

Central Mineralogical Services +cl

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14th March, 1980

REPORT CMS 80/2/22

YOUR REFERENCE: Order No. 900126

DATE RECEIVED: 28th February, 1980

SAMPLE NOS.: 29927, 29928, 29934, 29938, 29943, 29944, 29950, 29951, 29954, 29955, 29962, 29968, 29969, 29652, 29654, 29658, 29659, 29660, 29661

SUBMITTED BY: D.K. Brock

WORK REQUESTED: Petrology

H.W. Fander, M. Sc.

Sample No.

REPORT CMS 80/2/22

Notes:

In view of the generally similar nature of many of these rocks, brief descriptions were prepared in tabulated form. These summarise data from stereobinocular and petrological microscopic examination and results of K-staining tests on related offcuts.

As usual, igneous rocks are named on the basis of relict compositional and textural features, with particular emphasis on the phenocrystal phases and the groundmass/matrix. Those rocks with tentative classification are indicated by inverted commas. As is typical of the Mount Read Volcanics, contrasts between the various intermediate (as against rhyolitic) phases are rather subtle and perhaps undue weight is put upon the phenocrystal Na-Ca feldspar and its alteration pattern, which is often the only guide to primary composition.

The bulk of the volcanics can be interpreted as lavas. Several rocks have a pseudo-fragmental appearance in hand specimen, reflecting shearing and/or primary cognate xenolithic features. Trachyandesites are relatively abundant and may represent a local variation on the trachytic-quartz trachytic facies comprising the bulk of recent suites. These trends appear to be subregional within the Mount Read complex. Dacites predominate in some areas, but rhyolites (in the broad sense) appear strictly subordinate.

Specimen 29661 was not examined in polished section as only minor traces of pyrite were detected in the thin-section. Stereobinocular examination of the concordant fluorite veins indicates sparse ultrafine chalcopyrite films on cleavages and microfractures in fluorite.

In ~~29960~~ 29660, the sulphide assemblage (in approximate order of abundance) comprises an- to subhedral pyrite (to 75 μ), galena (max. 60 μ, mean 15-20 μ), sphalerite (sim. galena) and chalcopyrite, with very rare associated blebs (to 25 μ) of tetrahedrite. The bulk occurs as discrete to loosely clustered particles included in marginal zones of the fluorite aggregates. Chalcopyrite and, to a lesser extent, pyrite are partly mobilised into discontinuous films, a few microns in width, penetrating cleavage traces and microfractures in the fluorite. The paragenesis is low-temperature hydrothermal, but pretectonic fluorite is accompanied by minor traces of secondary muscovite and phlogopite.

D. Cowan, B. Sc.

K-Stain	Classification - Composition	Fabric	Accessories	Comments
29927 *strr* K-Negative (T.S. 31020)	Porphyritic "Andesite". Albitised/chlorite- and epidote, feldspar laths, phenocrysts; minor chloritised?pyroxene laths with interstitial chlorite, epidote, microcrystalline albite.	Phenocrysts to 1 mm. Sheared andesitic fabric with fine lenses of chlorite (altered mesostasis).	Leucoxenised primary opaques, rare magnetite. Trace oxidised pretectonic pyrite.	Small-scale chlorite lenses represent sheared, altered mesostasis. No tangible pyroclastic features. Distinct relict andesitic fabric.
29928 *strr* K-Positive	Porphyritic "Quartz Trachyandesite". Sericitised plagioclase, subordinate chloritised amphibole, biotite and ?pyroxene phenocrysts in sericite-stained felsitic quartzofeldspathic groundmass.	Phenocrysts to 1.7 mm, weakly clustered. Incipiently sheared "andesitic" fabric.	Primary magnetite, apatite. Minor sphene after Ti-opaques. Traces secondary biotite.	A felsic intermediate facies (alkali andesite-monzonite). Probably a minor intrusive, but with chilled groundmass. Only accessory quartz.
29934 *strr* K-Positive.	Hybrid Tuff Lava. Pinkish clasts in chlorite-stained matrix lava. Both with epidote-stained/albite pseudomorphed clustered plagioclase phenocrysts, microfelsitic groundmass.	Irregular to angular and lenticular clasts to 1 cm+. Weak flow fabric. Phenocrysts to 2 mm.	Leucoxenised primary opaques and minor trace apatite.	Clasts relatively potassic, with gradational contacts. Hybrid clastic lava (felsic andesite/trachyandesite). Possible vent facies.
29938 *strr* K-Positive	Porphyritic Trachyandesite. Epidote- and carbonate-stained/albitised plagioclase and rare carbonated ?amphibole phenocrysts in sericite-stained microperlitic felsitic groundmass.	Phenocrysts mean 500μ, weakly clustered, weakly flow-orientated.	Primary magnetite. Minor secondary Fe-Mg chlorite.	Plagioclase evidently relatively basic originally (hence trachyandesite as against trachyte). A weakly flow-textured glassy porphyritic lava.
29943 *strr* K-Positive	Porphyritic "Rhyolite". Heavily sericitised ?albite, sparse corroded quartz, occasional phlogopitised and chloritised/epidotised ?amphibole phenocrysts in chlorite/sericite-stained microfelsite.	Phenocrysts to 2 mm, weakly clustered/orientated. Groundmass streaky.	Sparse leucoxenised opaques.	Probably strictly rhyodacitic. Streaky groundmass, but devoid of fragmental features. Fine chlorite in groundmass partly after biotite alteration.
29944 *strr* K-Positive	Porphyritic Rhyolite. Incipiently sericite-stained albite and sparse quartz phenocrysts in sericite-stained, weakly sheared, felsitic groundmass with recrystallized quartz spherulites.	Phenocrysts to 1.5 mm, weakly clustered. Faint fragmental fabric reflects shearing.	Semi-pervasive cloudy epidote on perlitic microfractures. Disseminated primary magnetite.	Essentially similar to 29943. Weakly amygdaloidal (quartz, minor epidote) and devoid of tangible primary pyroclastic features.
29950 *strr* K-Negative	Porphyritic Dacite. Weakly sericitised oligoclase (near albite) and disseminated corroded quartz phenocrysts in thoroughly sericite-stained microcrystalline quartzofeldspathic groundmass.	Feldspar phenocrysts to 1.5 mm, weakly clustered. Mildly sheared, weakly xenolithic.	Minor chlorite (in part after primary ?biotite phenocrysts). Disseminated primary magnetite.	Verges on a sodic rhyolite. Sparse cognate xenoliths (trend tuff lava). No tangible pyroclastic features. Quartz possibly xenocrystal in part.
29951 *strr* K-Negative	Porphyritic Dacite. Weakly sericite-stained oligoclase (near albite) phenocrysts in sericite-stained microgranular to microlitic groundmass.	Feldspar phenocrysts mean 500μ to 1.5 mm, weakly clustered. Mildly sheared.	Minor chlorite (sim. 29950) and carbonate. Disseminated magnetite, rare quartz microphenocrysts.	Very similar to 29950, but with slightly coarser groundmass and almost devoid of phenocrystal quartz and non-xenolithic.
29954 *strr* K-Positive	Porphyritic Trachyandesite. Epidote-stained/albite-pseudomorphed plagioclase phenocrysts, disseminated quartz-epidote amygdales in finely perlitic felsitic alkali groundmass with albite microlites.	Phenocrysts to 2 mm, variably clustered. Amygdales mean 500 μ. Weakly sheared.	Rare chloritised amphibole phenocrysts. Primary magnetite, leucoxenised ?ilmenite, trace apatite.	Some similarities with 29938, but abundant, relatively coarse, evenly disseminated plagioclase phenocrysts suggest minor intrusive origin. Patchy Fe-staining.

Sample No. / K-Stain	Classification - Composition	Fabric	Accessories	Comments
29955 Strr K-Positive	Porphyritic Trachyandesite. Epidotised/albitised plagioclase phenocrysts, clusters; disseminated quartz amygdales in coarsely perlitic felsitic alkali groundmass stained with chlorite (and biotite).	Phenocrysts to 1.5 mm, clusters to 3.5 mm. Amygdales mean 250 μ. Weakly sheared.	Disseminated magnetite, leucoxenised ilmenite, rare apatite. Sparse, partly oxidised pyrite (to 100μ).	Very similar to 29954. Frequent phenocrystal clusters may be cognate xenocrystal in part. Relatively marked biotitic alteration of groundmass.
29962 Strr K-Positive	Porphyritic Trachyandesite. Epidotised/albitised plagioclase phenocrysts, sparse xenoliths in chlorite- and sericite-stained microcrystalline felsic groundmass. Frequent quartz-epidote amygdales.	Phenocrysts mean 350μ, amygdales to 2 mm. Strongly sheared.	Disseminated oxidised magnetite and leucoxene semi-opaques, rare apatite.	Xenoliths sheared into lenses, but of ccognate character (sim. 29955, 54). Fragmental appearance reflects shearing. No tangible pyroclastic features.
29968 Srirr K-Negative.	Dacitic Tuff. Angular to subround, weakly sericitised, silt- to fine sand-sized plagioclase, rare lava clasts in chlorite-sericite matrix. Occasional disrupted labile pelitic interbeds.	Vague relict ?abraded shard textures in sand fraction. Slumped, moderately sheared.	Rare clastic quartz and leucoxenised opaques. Minor relict biotite (chloritised).	Fabric suggests a weakly turbiditic, subaqueous facies (tuffwacke/reworked tuff), but fine detail obliterated by alteration and slaty cleavage.
29969 Srirr K-Positive	Rhyolitic Xenotuff. Fine sand- to grit-sized angular quartz, pelitic rock fragments, subordinate alkali (K) feldspar and lava (rhyolite) clasts. Sheared quartz-sericite matrix.	Poorly sorted, incipiently bedded, strongly sheared. Relict embayed margins in quartz.	Clastic magnetite and rare clastic mica flakes (muscovite, degraded biotite).	Finer detail obliterated by shearing, but clearly proximal lithic-crystal tuff with subordinate non-pyroclastic component. Probably subaqueous.
29652 Shaft Ch. Mt. Marchison K-Negative	Tuffaceous Pelite. Sericitic quartzose silty shale with silty interbeds of angular to subround quartz, minor sericitised ?abraded shards, sparse muscovite in sericite matrix.	Slumped, incipiently sheared. Scattered quartz with relict embayed margins.	Minor clastic biotite (sericitised), leucoxene semi-opaques. Traces carbonaceous matter.	Essentially a weakly carbonaceous, quartzose silty shale with a minor reworked acid tuffaceous component. Weakly Fe-stained, but devoid of sulphides.
29654 Mt. Marchison K-Positive	Hornblende-Biotite-Adamellite. Orthoclase-microperthite and heavily sericitised ?oligoclase in near-equant proportions. Subordinate dark green hornblende, extensively chloritised dark brown biotite, quartz.	Prismatic plagioclase, amphibole, biotite in granitic quartz, orthoclase. Mean grainsize 1.5mm.	Primary magnetite and traces apatite, sphene. Minor secondary epidote and traces oxidised pyrite.	Abundant ferromags. suggest differentiation from diorite-monzonite facies. Sericite is pale green hydromuscovite and orthoclase pink. Incipiently stressed
29658 NPP213 71.30m K-Negative	Rhyolitic Ignimbrite. Sericitised/weakly carbonated feldspar and slightly subordinate quartz crystals/fragments; sericitised/chloritised lithicclasts in sericitised shardy matrix.	Poorly sorted with contorted flow-fabric. Mildly sheared. Late calcite veins.	Disseminated leucoxenised opaques and very rare apatite.	Lithic clasts include lava and pyroclastic types (vitric, vitric-crystal tuff, pumice). Gross fabric typical of flow-brecciated ignimbrite.
29659 NPP213 121.50m K-Negative	Arkosic Sandstone. Framework angular to subround oligoclase-albite and slightly subordinate quartz. Rare sericitised ?rhyolite clasts. Quartz-feldspar-sericite cement.	Poorly to moderately sorted, weakly bedded, incipiently stressed. Irregular aggregates, veins, quartz, calcite, chlorite.	Leucoxenised clastic opaques.	Medium- to coarse--grained. Clastic feldspar mildly sericitised/carbonated. Authigenic overgrowth cement with intergranular sericite. "Granitic" source.

Central Mineralogical Services

Sample No. K-stain	Classification - Composition	Fabric	Accessories	Comments
29660 NPP214 69m K-Positive	Arkosic Sandstone. Framework variably sericitised alkali feldspar, angular to subround quartz, subordinate pelitic rock fragments, mica flakes. Matrix chlorite and sericite.	Weakly bedded silty fine sandstone. Fluorite veins, lenses (to 5 mm wide) throughout.	Clastic leucoxenic semi-opaques. Minor fine sulphide with fluorite. Carbonaceous.	Minor reworked tuffaceous component. Fluorite predates incipient shearing. Sulphides in < 100μ disseminations aroun margins of fluorite and in microfilms.
29661 NPP213 929m K-Negative (T.S. 31038)	Arkosic Psammopelite. Angular to subround (sericitised) feldspar, slightly subordinate quartz with carbonate-stained sericite matrix. Interbeds of carbonaceous silty quartzofeldspathic shale.	Weakly turbiditic, incipiently sheared. Patchy concordant veins fluorite (sim. 660).	Clastic leucoxenic semi-opaques, muscovite flakes, rare magnetite. Minor trace pyrite in fluorite.	Distinct, variably abraded tuffaceous component, particularly "volcanic" quartz, but subordinate to granitic material (feldspar, sim. 29659).

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11th June, 1980

REPORT CMS 80/5/46

YOUR REFERENCE:	Order No. 900164
DATE RECEIVED:	26th May, 1980
SAMPLE NOS.:	31 samples
SUBMITTED BY:	J. Mill
WORK REQUESTED:	Petrology

H.W. Fander, M. Sc.

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REPORT CMS 80/5/46

Notes:

Some discrepancies are evident between the sample numbers listed on the submission sheet and the samples received. This relates particularly to the rock samples (hand specimens). Samples were described in the order shown on the submission sheet.

Three broad groupings are evident:

Group 1 comprises the drill cores and can be categorised as variably veined and mineralised intermediate to acid volcanics with a minor tuffaceous sediment component. There are analogies with the Mount Read Volcanics, but the more significant alteration is of (mesothermal) hydrothermal character, typically as veins.

Relationships are somewhat confused by a late (post-vein) phase of deformation but, generally, veins postdate typical low-grade (greenschist) fabrics. This is consistent with a (?Devonian) "granitic" vein assemblage and this tends to be confirmed by mineralogical similarities with, for example, the Zeehan, Renison and Cleveland situations. Cassiterite is present (similarly stannite), but appears to be of restricted occurrence.

Group 2 comprises the Colebrook Hill specimens (35232, 35238) which are contact-metamorphosed/metasomatised labile, turbiditic sediments. These rocks could be correlated with the tuffaceous greywackes of the Crimson Creek Formation. Alteration can be compared with the pervasive contact-metasomatic (as distinct from vein-) effects at Renison and Cleveland.

Group 3 comprises the hand specimens and, with a few minor exceptions, is representative of a monotonous sequence of porphyritic andesites and trachyandesites. Variations are both minor and rather subtle in this sequence which is of distinctly intermediate character.

These rocks are porphyritic in plagioclase (albitised, with conspicuous epidote, evidently originally quite calcic, probably andesine-labradorite), subordinate ferromagnesian silicates (largely pyroxene, but at least minor amphibole), and may include (trachyandesites) alkali feldspar either as altered phenocrysts or in the microcrystalline groundmass. Primary microtextures are partly obliterated by low-grade regional metamorphic fabrics, but it is clear that many of these rocks had glassy groundmasses. Several show relict perlitic structures and deformational effects may give these a mesoscopic fragmental appearance.

The primary accessory assemblage, particularly rare but ubiquitous smokey apatite, suggests correlation with the Mount Read Volcanics. This suite then reflects a characteristic of M.R.V., that the volcanics from a particular "sub-domain" tend to exhibit a fairly narrow compositional range, although the volcanics as a whole are rather diverse (thus, locally andesitic, elsewhere dacitic, trachytic or (rarely) distinctly rhyolitic). Nonetheless, the very narrow range of composition and fabric reflected here is unusual.

D. Cowan, B. Sc.

T29

REPORT CMS 80/5/46

Petrological Descriptions

T 29797 (T.S. 31960) K-stain positive.
This is an altered and moderately stressed, medium-grained marginal or minor intrusive. Primary composition is obscured by alteration of plagioclase, but the rock is of intermediate character and considered as an orthoclase-microdiorite (i.e. dioritic with accessory K-feldspar, trend monzonitic).

Main components are random, slightly felted, saussurite-stained, albitised plagioclase laths (mean 250x750μ) and a pervasive felsic mesostasis of microcrystalline (weakly micropegmatitic) albite and K-feldspar. Subordinate chloritised-epidotised, granular to microlathic ferromags (probably amphibole, shapes are poorly diagnostic) occur interstitially to the altered plagioclase laths, and weakly leucoxenised, primary accessory Ti-magnetite is disseminated throughout. The rock is weakly amygdaloidal (quartz-Mg-chlorite aggregates to 500μ) and is weakly veined quartz, albite and epidote. Minor traces of pyrite are present. Stress is reflected in deformed feldspar laths, localised zones of incipient granulation and postdates the sporadic veins (to 1 mm).

T 29798 (T.S. 31961) K-stain negative.
This rock is very similar and clearly closely related to 29797. A minor intrusive origin is inferred. The main contrast lies in relatively finer modal sizing and in the style of alteration.

Saussurite-stained, albitised plagioclase laths are texturally near-identical to those in the previous specimen, but relatively unevenly sized, with a mean diameter about 150μ. Subordinate, completely chloritised, indeterminate ferromagnesian laths are interstitial, and leucoxenised Ti-magnetite is disseminated throughout. The mesostasis is pervasively chloritised and was probably glassy originally, in contrast to the microcrystalline felsic mesostasis in 29797 (consistent with the slower cooling, relatively coarser sizing of that phase). Sparse quartz (± chlorite) amygdales are present.

Carbonate (impure calcite) is an accessory alteration phase partly concentrated in crosscutting, semi-continuous veinlets. These include disseminated films of Fe-sulphide (?pyritised pyrrhotite) and predate a mild, late phase of stress.

T 36708 (T.S., P.S. 31962) K-stain negative.
This is a resheared quartz-sericite phyllite representing a greenschist-altered psammopelite. The rock is weakly carbonaceous and "grades" subtly from fine to medium sandy silty shale to argillaceous siltstone/fine to medium silty sandstone.

Splintery to angular and subangular quartz is the main clastic component, with thinly disseminated silicified felsitic "rhyolitic" lava clasts, and clastic muscovite flakes. Sporadic silicified fragmented shards are evident and much clastic quartz is of mildly abraded volcanic character. Overall, the rock has a fairly marked reworked rhyolitic tuffaceous aspect.

The pelitic component comprises sericite and microcrystalline quartz in varying proportions. Subordinate, rather patchy chlorite is present and was partly introduced with quartz in irregular, discontinuous to semi-continuous veins (to 2 mm wide) and films. These features predate a late secondary cleavage, with associated crenulation and disharmonic microfolds, and include frequent disseminations, fine-grained aggregates (to 1 mm) and discontinuous microfilms of pyrrhotite with minor traces of chalcopyrite (blebs to 40 μ, fine films), and rare, weakly granulated grains (to 60 μ) of arsenopyrite. Pyrrhotite is weakly altered to secondary pyrite.

T 36705 (T.S. 31963) K-stain positive.
This is an extensively altered and sheared tuff of felsic intermediate affinities. The relict fabric is characteristic of a lithic-vitric tuff with a minor (feldspar) crystal component, but much finer detail has been obliterated. Lithic clasts are of lapilli to agglomerate dimensions (lapilli tuff or agglomerate tuff).

Lava clasts are typically thoroughly sericitised, chlorite- and carbonate-stained feldspathic types with subvitric groundmasses. A few are strongly quartz-amygdaloidal, but phenocrystal quartz is absent. Similarly, the sparse crystal component is exclusively (sericitised) feldspar. The matrix is relatively strongly altered to a sericite-chlorite phyllite with relics of microcrystalline, quartzofeldspathic material (devitrified ash). Faint relict shard textures persist in places and there is vague evidence of flow-brecciation in sporadic, extensively flattened clasts with vitric-tuffaceous microtextures. Problematically, these features are strongly enhanced by shearing.

The pervasive sericite is a pale green hydromuscovite which, together with chlorite, imparts the dark green colouration (hand specimen). Accessory alteration carbonate (ankeritic) and minor quartz are present, partly in sheared, discontinuous, crosscutting veinlets ($\pm$ chlorite). This rock is weakly impregnated with small (mean 150 μ)

spongy clots of red (moderate Fe-) sphalerite. Minor galena, chalcopyrite, pyrrhotite and pyrite are associated. Sulphides predate the shearing and were introduced (in part at least) with the carbonate-quartz-chlorite veining. Thus, there are similarities with 29798 and 36708.

T 36707 (T.S. 31964) K-stain negative.
This is a thoroughly altered and sheared porphyritic to glomeroporphyritic lava of leucoandesitic to dacitic affinities.

The phenocrysts (mean 350μ, clusters to 1.5 mm) are sericite- and calcite-stained, albitised plagioclase. These are embedded in an altered groundmass with relict (albitised) plagioclase laths (mean 30μ) in a completely chloritised, ?glassy mesostasis. Fine to ultrafine leucoxenised opaques are common throughout. Despite the porphyritic nature of this rock there are textural similarities with T29797 and 29798, and a minor intrusive origin could be considered.

The pervasive fine chlorite is orientated and shearing is most marked in sporadic concordant foliae of semi-massive chlorite. Discontinuous sheared, fine-grained veins of quartz, albite and carbonate occur sporadically (white in hand specimen). These include extremely rare microscopic particles of ?chalcopyrite.

T 36706 (T.S., P.S. 31966) K-stain very weakly positive.
This altered, veined and mineralised rock has been sheared to the extent that primary features are largely obliterated. However, sufficient relics persist to identify it as primarily a porphyritic dacite (or leucoandesite, the distinction is academic), essentially similar to T 36707, but slightly finer-grained. The main features are disseminated discrete to clustered, sericitised-albitised plagioclase phenocrysts (to 600μ, clusters to 2 mm) and a thoroughly chloritised groundmass with patchy albitised or elsewhere sericite-pseudomorphed feldspar microlaths. The relict fabric is closely analogous to that of T 36707. By inference, there are similarities with T 29797 and 29798.

Sporadic irregular to conformable, variably continuous veins of quartz, ankeritic carbonate, fine-grained hydromuscovite and Mg-chlorite predate the tectonic cleavage. These features range from around 200μ to several millimetres in width and include the bulk of sulphides as disseminated grains and semi-massive aggregates.

The sulphide assemblage comprises mainly an- to euhedral arsenopyrite with subordinate, similarly-textured, closely intergrown pyrite. Individual grains range up to a few millimetres diameter and both phases are microfractured and locally weakly granulated.

Relatively minor pyrrhotite is associated and is of intergranular habit. Chalcopyrite occurs sporadically, partly as intergranular patches (to 150μ) and as micro-inclusions in pyrite and arsenopyrite, but more typically in microscopic films (with a little pyrrhotite) healing the microfractures. Rare galena blebs (mean 15μ) are included in pyrite. In one small area (500μ diameter) several blebs of bismuth were observed as inclusions (mean 20μ) in arsenopyrite and pyrite with occasional coarser patches (to 100μ) in adjacent gangue. Bismuth is extensively corroded and replaced by bismuthinite.

There is no detectable cassiterite. Overall, the assemblage is of mesothermal character with analogies to, for instance, the minor veins at Renison and Cleveland.

T 29800 (T.S., P.S. 31967) K-stain negative.
This is a thoroughly chloritised, quartz-veined and mineralised intermediate (?andesitic) volcanic with a lithic fragmental fabric that is rather poorly resolved in thin-section, but is reminiscent of a tuff lava rather than a strictly pyroclastic phase.

Chloritisation is both relatively marked and pervasive, such that much of the area sectioned is a rather featurless, fine-grained chlorite phyllite. The faint lithic clasts are outlined by variations in more or less pervasive leucoxene-staining, with flattened, angular to subangular shapes up to several millimetres diameter. These features, and the chloritised matrix phase, include sparsely disseminated quartz pseudomorphs after feldspar phenocrysts (mean 250-300μ), disseminated leucoxenised accessory Ti-magnetite and flaky ilmenite and occasional silicified-chloritised relics of felsitic-textured (devitrified) groundmass. That is, the matrix phase appears to have been compositionally and texturally similar to the clasts (hence tuff lava).

Ankeritic carbonate is an accessory alteration phase, and chlorite aggregates include rare, fine-grained clots of green tourmaline. Weakly stressed, concordant to irregular quartz veins occur sporadically. These include accessory patches of chlorite, fluorite, carbonate, minor hydromuscovite, rare green schorl, disseminated to semi-massive sulphide aggregates, and range up to 2 cm in width. The paragenesis is similar to the veins in T 36706. These veins predate at least some shearing and their relatively unstressed nature probably reflects the relatively incompetent chloritised host rock.

The sulphide assemblage is closely analogous to that of T36706. Pyrrhotite predominates in coarse-grained aggregates, included single and clustered, sub- to euhedral grains of arsenopyrite (often skeletal, pyrrhotite cores) and occasional pyrite euhedra, locally fine-grained and clustered with intergranular chalcopyrite. Rare blebs of bismuthinite with included corroded bismuth are analogous to those in T 36706 (i.e. partly included in arsenopyrite (or pyrrhotite), elsewhere in gangue proximal to, or in contact with, pyrrhotite).

Rare coarse blebs (to 300μ) of chalcopyrite occur intergranular to pyrrhotite and along pyrrhotite-gangue contacts. The latter type are locally mantled with microscopic films of stannite. A single 15x25μ ovoid bleb of gold was observed in pyrrhotite. There is no detectable cassiterite.

T 20799 (T.S., P.S. 31968) K-stain negative.
This is a moderately stressed, locally granulated, banded quartz-tourmaline-sulphide rock and is representative of the veins/replacements in, for example, T 36706 and 29800. In this case, there is no textural evidence of a metasomatised volcanic, at least in the area sectioned, and this tends to be confirmed by stereobinocular examination of the offcuts.

The specimen includes a zone of semi-massive, fine-grained pyrrhotite with disseminated arsenopyrite. This zone is quartz-gangued with accessory fine muscovite and traces of sideritic carbonate. There is a fairly sharp, but irregular, contact with the adjacent zone consisting essentially of mildly stressed, fine- to medium-grained, an- to subhedral quartz with intergranular, finegrained aggregates of green schorl and sporadic patches of fluorite (to 2 mm+) clouded with tourmaline inclusions. A 1 mm to 3.5 mm wide band of massive, ultrafine, weakly schistose schorl lies adjacent to the contact. Elsewhere, banding is defined partly by the distribution of variably granulated sulphides.

Granulation is locally evident in quartz, with angular particles defined by clouds of included microvacuoles overgrown by clear quartz in optical continuity. Elsewhere, fractures are healed with films of fluorite and sideritic carbonate or, locally, asbestiform schorl.

Cassiterite is sparsely disseminated throughout this rock as 20-100μ diameter (mean 50-60μ) grains, variably included in quartz or fluorite or intergranular to sulphides. This phase is also locally granulated.

The sulphide assemblage comprises mainly pyrrhotite (microfractured in part, elsewhere mosaic-textured, recrystallized) and abundant, variably granulated arsenopyrite. Accessories include pyrite, chalcopyrite and relatively conspicuous stannite. Trace constituents are bismuth and bismuthinite.

Where relatively undeformed, the fabric is closely analogous to that of T 29800 and reflects a medium-grained, semi-massive to disseminated mesothermal vein-type paragenesis.

T 35232 (T.S. 31969) K-stain negative.
This rock is a thoroughly deformed and extensively tourmalinised, turbiditic labile clastic sediment. Relict features are consistent with a variably argillaceous, quartzofeldspathic siltstone laminated on a sub- to millimetric scale with weak, but semi-pervasive, graded bedding and with occasional bands of quartzose fine sandstone. Finer primary details have been obliterated by weak hornfelsing, recrystallization and pervasive tourmalinisation, but general features are consistent with a (intermediate) tuffaceous greywacke/reworked tuff. There are similarities with the labile (tuffaceous) turbidites in the Crimson Creek Formation. This correlation tends to be confirmed by abundant leucoxenised/oxidised clastic opaques.

Deformation is marked, with the more competent (siltstone/fine sandstone) zones disharmonically folded, and more finely laminated, relatively pelitic zones thoroughly crenulated, segmented and microfractured. Much fracturing postdates hornfelsing and alteration, and there is evidence of two phases of deformation (early semi-plastic folding (slumping) followed by hornfelsing/metasomatism and late brittle fracturing).

Tourmaline is fine- to ultrafine-grained green schorl and is pervasive throughout, although distinctly concentrated in the finer (pelitic) bands where it developed by replacement of the primary clay fraction. Minor quartz-schorl veining is evident and these features are displaced by the later microfractures. Rare pyrite cubes are represented by semi-pseudomorphous patches (to 2 mm) of limonite and partly degraded jarosite.

There is no detectable cassiterite. However, minor traces may be masked by the pervasive degraded leucoxenic opaques. Thus, assay for Sn would be warranted.

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Central Mineralogical Services

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West Coast Mines
Electrolytic Zinc Co. of
Australasia Ltd.
P.O. Box 21
ROSEBERY / TAS. 7470

31st March, 1980

REPORT CMS 80/3/21

YOUR REFERENCE: Order No. 900128

DATE RECEIVED: 18th March, 1980

SAMPLE NOS.: T - 29668, 29667, 29976, 29977, 29981, 29801, 29803, 29809, 29810, 29812, 29813, 29814, 35201, 35210, 35216, 35219, 29736, 29737, 29738, 29739, 29740 — not included

SUBMITTED BY: G. Iliff, A. Mollison, I. McDonald

WORK REQUESTED: Petrology

for

H.W. Fander, M. Sc.

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063137

REPORT CMS 80/3/21

Petrological Descriptions

T 29668 (T.S. 31156) K-stain positive.
This is an extensively sericitised and mildly sheared rhyolitic fragmental, considered as a vitric-crystal tuff, although the former presence of shards is more inferred than established over much of the area sectioned.

NE 8 2/4
139 mm

Crystals, crystal fragments and clusters (fragmented glomerophenocrysts) comprise up to 50 % of the rock, are poorly sorted in the 100µ - 5 mm range, show a weakly banded distribution and are largely alkali feldspar (inverted exsolved sanidine-anorthoclase, subordinate albite) with subordinate quartz. These features are accompanied by sparse rhyolitic lithic clasts (to 2.5 mm, microporphyritic lava, rare fragmental types) in a pervasively sericite-stained, microcrystalline, quartzofeldspathic matrix with patchy, very vague, relict microshard textures. There is evidence of a contorted and weakly fragmented flow fabric. These features are enhanced by the weak slaty cleavage, but are reminiscent of an autobrecciated, ignimbritic mode of origin.

Chlorite and cloudy carbonate are minor accessory alteration phases. Rare, very fine-grained clots of pretectonic pyrite are present. Much of the sericite is a pale green illite-hydromuscovite.

T 29667 (T.S. 31157) K-stain positive.
Despite its fragmental appearance in hand specimen, this rock can only be classified as a porphyritic rhyolite. The fragmental aspect reflects an early phase of veining and is enhanced by shearing.

Sterling Valley
Long John Ck.

Relict features comprise frequent coarse, variably resorbed and embayed quartz phenocrysts (to 4 mm) and accessory alkali (K-) feldspar phenocrysts in a devitrified felsic groundmass with minor accessory apatite (typical Mount Read Volcanic-type apatite, clouded with ultrafine inclusions). The groundmass exhibits a sheared perlitic structure and has been silicified. The abundant, relatively coarse and evenly disseminated phenocrysts indicate a probable minor intrusive origin.

Feldspar phenocrysts are extensively sericitised and chloritised. Perlitic cracks are outlined by sheared films of chlorite and sericitic hydromuscovite. Frequent discontinuous sheared veinlets of quartz, Mg-chlorite (or locally pale green phlogopite and sericite) include disseminated epidote and pyrite.

Pyrite occurs as an- to subhedral grains up to 1 mm diameter, often marginally oxidised and locally completely replaced by limonite. Sparse microscopic, bleb-like inclusions of pyrrhotite are present, and pyrite is frequently accompanied by pressure shadow zones of quartz and chlorite.

Sub- to euhedral magnetite (to 600 μ) is disseminated throughout the rock. This tends to be concentrated in the sheared veins (along with fragmented phenocrystal quartz), but is relict primary in origin.

T 29976 (T.S. 31158) K-stain negative.
This is a porphyritic dacite with a weakly clastic fabric (i.e. strictly a tuff lava), enhanced by differential alteration.

Relict primary features are fairly homogeneous, the rock consisting essentially of weakly clustered oligoclase (near albite) phenocrysts (mean 350 μ, max. 1.8 mm) in a weakly sheared/partly recrystallized, microcrystalline, quartzofeldspathic groundmass with sparse accessory opaques and leucoxenic semi-opaques.

Vague angular to irregular clasts (< 1 - 5 mm+) are outlined by subtle variations in groundmass microtexture. These features are closely packed and partly moulded onto one another. The sparse matrix phase is texturally near-identical to the clasts.

Clasts are preferentially weakly sericitised and silicified. In contrast, the matrix is weakly, but pervasively, stained with Fe-Mg chlorite (dark green-grey in hand specimen), with relatively minor associated quartz and sericite. Alteration is pretectonic and its differential nature probably reflects subtle variations in composition.

T 29977 (T.S. 31159) K-stain positive.
This is a devitrified, mildly altered and weakly sheared porphyritic lava of felsic intermediate ("quartz-trachytic") character.

Discrete to weakly clustered feldspar phenocrysts (250 μ - 1.5 mm, clusters to 2.5 mm) are disseminated throughout and consist of variably saussurite-stained/partly albitised oligoclase. These features are accompanied by sparse epidote-chlorite-carbonate-semi-pseudomorphed ferromagnesian phenocrysts (?hornblende, biotite) and quartz-chlorite-epidote amygdales (mean 250 μ). The groundmass consists of pervasively sericite- and weakly chlorite-stained felsitic alkali feldspar with accessory quartz, fine-grained magnetite and minor leucoxenised opaques.

APPENDIX 4.

Diamond Drill Hole Logs for STP 217 and STP 218.

ELECTROLYTIC ZINC CO. OF A'ASIA LTD
ROSEBERY – TASMANIA

DIAMOND DRILL CORE RECORD

HOLE No. STP 217 1 of 5

LOCATION: Sterling Valley
OBJECTIVE: To test a coincident magnetic & I.P. anomaly beneath glacial overburden
RESULT: Tin assays: 92.35m – 93.35m, 4950 ppm; 98.65–105.45 averaged 1400 ppm

Depth(m)	Direction	Dip.
30	–	-63°
66	109°	-60°
84	112°	-58.5°
120	112°	-56°
150	108°	-50°

Depth(m)	Direction	Dip.
200	109°	-40°
249	108°	-26.5°

COLLAR DIP. -60°
DIRECTION 108°
R.L. 176m
COORDINATES
Grid A.M.G. 4280N 4565E S.V.G.
384,190mE 5,374,393mN

TOTAL DEPTH 249.1m
HOLE SIZE NQ 48m BQ 249.1m
COMMENCED 3.4.'80
COMPLETED 2.5.'80
LOGGED BY A.J. Mollison

DEPTH (m) FROM	TO	ROCK DESCRIPTION REFER DDH SUMMARY SHEET A1-526-0012	MINERALISATION
0	17.2	GLACIAL OVERBURDEN	Sulphides negligible. Trace fresh pyrite at 47.4m and 57.1m Remnant sulphide textures in oxidised core
17.2	58.9	TRACHY-ANDESITE dark green fine grained, probably intrusive, unit, which is magnetic throughout.	
17.2	36.4	Heavily weathered section of unit. Orange-brown with remnant feldsphyric texture locally epidotised and epidote veins. Joints strongly limonitic and manganiferous.	
36.4	45	As above – less weathered becoming fresher down hole, with a blochy yellow green colour becoming more uniformly green. Cut locally by remnant quartz veins now filled by limonite. The texture of these veins suggests the limonite may be after sulphides.	
45	58.9	As above – dark green, fine grainded porphyritic in places, with tension fractures filled by epidote with later quartz, carbonate (calcite and rhodocrosite), chlorite and fluorite alteration.	
58.9	74.5	MICRO GABBRO dark green medium grained holo crystalline unit extensively cut by veins of quartz carbonate, chlorite, and possibly fluorite and hematite	Trace pyrite & chalcopyrite associated with epidote
70.4	73.2	Shear zone Micro Gabbro heavily cleaved	
74.5	98.5	ANDESITE green grey fine grained lava	
74.5	79	As above with frequent carbonate, quartz and chlorite veining, and associated shearing.	74.6–74.9 Stringers & disseminations of pyrite up to 5% by volume, assoc. with carbonate & quartz veins. Trace arsenopyrite & Chalcopyrite 74.9–79.0 Pyrite & pyrrhotite in equal proportions associated with quartz, carbonate veins.

NOTE:
c = Chip Sample
sc = Split Core Sample
F = Fusion XRF
A = AAS

SAMPLE NO.	FROM	TO	CORE REC'D	ASSAY DATA per ppm: Sample Length	Pb.	Zn.	Cu	Ag-g/t	As	Fe.	Sn.	CORE REC'D RUN	SHORT
												0-1.5	0.5
												3	1.0
												4	0.2
												4.5	0.4
												5.5	0.4
												11.6	6.0
												14.6	3.8
												16	1.7
												16.6	0.4
33081	0	5	c	5.0	10	30	25	x	8		A9	17.2	0.6
082	5	10	c	5.0	15	30	5	x	10		A1	28.6	9.0
083	10	15	c	5.0	10	25	5	1.0	16		A9	30.1	0.3
084	15	20	c	5.0	50	165	30	x	46		A1	31.6	0.5
085	20	25	c	5.0	15	125	25	x	10		A9	33.1	0.4
086	25	30	c	5.0	10	140	115	x	7		A2	36.1	1.5
087	30	35	c	5.0	10	105	80	x	10		A1	39.1	1.3
088	35	40	c	5.0	5	140	80	0.5	4		A1	40	0.2
089	40	45	c	5.0	15	125	50	1.0	15		A2	40.5	0.1
33090	45	50	c	5.0	10	135	200	x	7		A4	42.5	0.1
091	50	55	c	5.0	15	115	145	x	6		A2	45.5	0.3
092	55	60	c	5.0	10	180	305	x	6		A5	46.1	–
												48.1	–
29797	51.10m		Thin Section – orthoclase microdiorite									51.1	–
												54.1	–
37954	60	61	sc	1.0	5	145	140	x	10		A2	57.1	–
955	61	62	sc	1.0	x	150	60	1.0	10		A2	58.9	–
956	62	63	sc	1.0	x	150	35	1.0	13		F490	63.1	0.6
957	63	64	sc	1.0	x	140	55	x	3		A3	66.1	–
958	64	65	sc	1.0	20	130	105	0.5	4		A4	69.1	–
959	65	66	sc	1.0	10	105	220	x	4		A6	70.3	–
37960	66	67	sc	1.0	10	160	110	x	2		A5	71.1	0.3
961	67	68	sc	1.0	15	215	65	x	4		A8	72.1	0.6
962	68	69	sc	1.0	20	140	160	x	8		A4	73.2	0.5
963	69	70	sc	1.0	20	105	10	x	8		A4	75.1	–
964	70	71	sc	1.0	40	175	1600	2.5	620		F2000	78.1	0.2
965	71	72	sc	1.0	15	160	30	x	20		A10	81.1	0.2
966	72	73	sc	1.0	15	165	70	x	21		A11	84.1	–
967	73	74	sc	1.0	10	215	40	0.5	44		A4	87.1	–
968	74	75	sc	1.0	25	170	80	1.0	4		A6	89.5	–
969	75	76	sc	1.0	50	180	150	1.0	4000		F860		

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063140

ELECTROLYTIC ZINC CO OF A'ASIA LTD
ROSEBERY – TASMANIA

DIAMOND DRILL CORE RECORD

HOLE No. STP 217 2 of 5

DEPTH (m) FROM	DEPTH (m) TO	ROCK DESCRIPTION	MINERALISATION	SAMPLE NO.	FROM	TO	CORE REC'D	ASSAY DATA per ppm: Sample Length	Pb	Zn	Cu	Ag - g/t	As	Fe	Sn	CORE REC'D RUN	CORE REC'D SHORT
79	82.1	As above with minor carbonate veins (less than 5% of rock) with 10 cm wide band of strong silica, chlorite alteration at 79.5m	79.0–82.1 Approximately 0.1%pyrite as cubic infilling up to 5mm diam	37970	76	77	sc	1.0	10	155	50	x	24		F45	90.1	–
				971	77	78	sc	1.0	30	180	90	0.5	24		F270	91.1	0.1
				972	78	79	sc	1.0	20	100	155	1.5	4000		F1000	93.1	0.5
				973	79	80	sc	1.0	80	600	310	2.5	70		Fx	96.1	–
82.1	88.2	As above with minor fine carbonate quartz and epidote veins forming approx 2% of rock.	82.1–88.2 Trace pyrite & pyrrhotite	974	80	81	sc	1.0	35	185	100	1.3	12		F25	99.1	–
				975	81	82	sc	1.0	30	200	40	1.5	14		F270	100.6	–
				976	82	83	sc	1.0	10	110	15	1.0	4		Fx	102.1	–
88.2	89.5	As above more frequent carbonate & quartz veins up to 20% of rock averaging 5% with veins up to 1cm wide	88.2–89.5 Pyrite vein infillings and cubes up to 5mm diam up to 0.5% volume with associated pyrrhotite (0.1% volume).	977	83	84	sc	1.0	20	135	25	1.5	10		F80	105.1	–
				978	84	85	sc	1.0	50	230	45	1.0	8		F310	108.1	–
				979	85	86	sc	1.0	40	200	180	x	22		F630	111.1	–
				37980	86	87	sc	1.0	20	180	100	0.5	12		F330	114.1	–
				981	87	88	sc	1.0	20	135	15	x	5		Ax	117.1	–
				982	88	89	sc	1.0	15	110	20	x	4		Ax	120.1	–
74.5	98.5	ANDESITE green grey fine grained lava														123.1	–
																126.1	–
89.5	92.3	As above – heavily cleaved, chloritised, sericitised and otherwise altered rock. Feldspar grains show alignment parallel to cleavage.	Pyrite & pyrrhotite occur in approximately equal proportions up to 50% volume in veins up to 3cm wide with an average of 5% total pyrite & pyrrhotite.	29798	87.10		Thin	Section – orthoclase microdiorite								129.1	0.1
																132.1	0.1
																135.1	–
				33099	89	90	sc	1.0	25	185	420	x	580		A5	138.1	–
				33100	90	90.65	sc	0.65	20	230	70	1.0	8		A1	138.7	–
				33066	90.65	92.35	sc	0.7	5	130	470	0.5	136		Fx	141.1	–
92.3	98.5	Common (approximately 5% of rock) narrow carbonate, quartz veins (up to 1cm wide) in a weakly but pervasively altered andesite	Pyrrhotite with pyrite and minor chalcopyrite. Pyrrhotite veins average 5% volume of rock & are up to 1cm wide pyrite occasionally associated with pyrrhotite with rare chalcopyrite	067	92.35	93.35	sc	1.0	535	440	1550	3.5	1.8%		F4950	144.1	–
				068	93.35	94.35	sc	1.0	35	165	900	1.0	305		F60	147.1	–
				069	94.35	95.35	sc	1.0	5	200	325	0.5	160		F170	150.1	–
				33070	95.35	96.36	sc	1.0	10	210	400	x	112		F60	153.1	–
				071	96.35	97.35	sc	1.0	15	155	350	x	76		F30	156.1	–
				072	97.35	98.65	sc	0.9	5	155	380	0.5	920		F360	162.1	–
				073	98.65	99.65	sc	1.0	40	115	2360	4.5	6%		F3700	163.1	–
98.5	100.6	Massive arsenopyrite and pyrrhotite with minor pyrite, chalcopyrite and cassiterite in a silica-chlorite-carbonate-fluorite gangue	Up to 100% total sulphides with approximately 40% arsenopyrite 40% pyrrhotite 15% pyrite & 5% chalcopyrite with traces of cassiterite. Arsenopyrite & pyrrhotite occur as broard stringers up to 0.5m wide with pyrite fringing the stringers. Chalcopyrite is associated with pyrrhotite and pyrite as small grains and trains of grains up to 2mm diameter. Cassiterite occur as very fine grains at the interface between the gangue minerals and the major mineralisation.	074	99.65	100.7	sc	1.05	140	125	2250	4.5	15%		F1550	165.1	–
																168.1	–
																171.1	–
																174.1	–
																177.1	–
																180.1	0.1
																183.1	0.3
				33075	100.7	101.65	sc	0.95	25	170	465	1.5	2700		F360	186.2	0.1
				076	101.65	102.55	sc	0.9	20	1050	1200	3.0	3.5%		F1500	189.1	0.2
				077	102.55	103.55	sc	1.0	5	110	285	x	560		F170	192.1	–
				078	103.55	104.55	sc	1.0	15	130	230	x	6000		F1050	195.1	–
				079	104.55	105.45	sc	0.9	45	130	515	1.0	9400		F1500	201.1	0.2
				33080	105.45	106.45	sc	1.0	10	190	40	x	250		F45	204.1	–
																207.1	–
																210.1	–
																213.1	–
																216.1	–
																219.1	–

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ELECTROLYTIC ZINC CO OF A'ASIA LTD
ROSEBERY – TASMANIA

DIAMOND DRILL CORE RECORD

HOLE No. STP 217 3 of 5

DEPTH (m) FROM	DEPTH (m) TO	ROCK DESCRIPTION	MINERALISATION	SAMPLE NO.	FROM	TO	CORE REC'D	ASSAY DATA per ppm: Sample Length	Pb.	Zn	Cu	Ag - g/t	As	Fe	Sn	CORE REC'D RUN	CORE REC'D SHORT
100.6	150.6	DACITIC LITHIC VITRIC TUFF TO LAPILLI TUFF of ACID composition		29799	100.45		Thin Section Sample – quartz-tourmaline-sulphide rock									222.1	–
																225.1	–
																228.1	–
100.6	103.5	As above with strong silica, carbonate and sericite alteration.	Pyrrhotite veins with associated pyrite, arsenopyrite and rare chalcopyrite forming an average of 20% of core volume.													231.1	–
																234.1	–
																237.1	–
				37983	106.45	110	c	3.55	20	185	10	x	6		Ax	240.1	–
				984	110	115	c	5.0	10	150	100	1.0	4		Ax	243.1	–
				985	115	121	c	6.0	20	200	60	x	14		F390	246.1	–
103.5	105.4	Green to pale green grey crystal vitric lithic lapilli tuff of dacitic composition composed of angular pale green fragments after pumice or acid lave elongate parallel to cleavage up to 6cm long in a chloritised vitric matrix.	Minor veins of pyrrhotite and pyrite, averaging 0.1% core volume, up to 5mm wide	29800	104.25		Thin Section Sample – andesitic? tuff-lava									249.1	–
				37910	121	122	sc	1.0	15	175	145	x	27		Fx		
				911	122	123.6	sc	1.6	20	160	900	x	8000		F1200		
				912	123.6	124.6	sc	1.0	25	130	5	x	23		A6		
105.4	119.9	Pale green to green lithic vitric lappilli tuff composed of pale green fine grained angular fragments as for 103.5–105.4 and sub-angular feldspar-quartzphyric acid volcanic fragments in a chloritised vitric matrix. Calcite, epidote and chlorite veins are common (approx 10% core volume) and are up to 2cm wide.	Trace pyrite	37986	124.6	130	c	5.4	10	155	95	1.5	8		F140		
				987	130	135	c	5.0	220	710	75	2.0	8		F340		
				988	135	140.1	c	5.1	70	190	145	0.5	4		A92		
				37913	140.1	141.1	sc	1.0	10	125	30	x	10		A1		
				914	141.1	142.1	sc	1.0	15	105	355	x	230		F200		
				915	142.1	143.1	sc	1.0	5	85	340	x	680		F70		
119.9	121.2	Dark green grey micro gabbro dyke	Trace pyrite	916	143.1	144.1	sc	1.0	10	95	45	x	14		F15		
				917	144.1	145.1	sc	1.0	10	170	180	15	46		F130		
121.2	122	As for 105.4 to 119.9		918	145.1	146.1	sc	1.0	140	370	140	2.5	6		F440		
				919	146.6	147.6	sc	1.0	80	275	670	2.5	960		F920		
122	125	As above – sericitised and cleaved with fragments elongated parallel to cleavage Occasional carbonate and quartz veins (approx 5% core volume) up to 4cm wide cut this unit.	Pyrrhotite occurs as fine irregular veins and blebs representing 0.5% core volume with minor associated pyrite.	37920	147.6	148.6	sc	1.0	150	400	100	1.5	9		F740		
				921	148.6	149.6	sc	1.0	5	170	230	1.0	4		F470		
				922	149.6	150.6	sc	1.0	10	70	410	1.0	7400		F3950		
				923	150.6	151.6	sc	1.0	20	180	360	1.0	500		F2250		
				924	151.6	152.6	sc	1.0	5	120	5	0.5	20		A2		
				925	152.6	153.6	sc	1.0	15	165	275	1.0	18		A6		
125	128.9	Green lithic vitric tuff composed of pale green roughly equant angular lithic fragments in a chloritised vitric matrix.	Except for trace galena and sphalerite at 128.1 there is no visible mineralisation.	926	153.6	154.6	sc	1.0	10	260	1000	3.0	840		A4		
				927	154.6	155.6	sc	1.0	15	150	900	3.0	1.4%		Ax		
				928	155.6	156.6	sc	1.0	20	120	900	2.5	5.6%		Ax		
				929	156.6	157.6	sc	1.0	20	145	525	1.5	1.4%		Ax		
128.9	131.2	As for 119.9 to 121.2	Trace pyrite & pyrrhotite 131.2–134.1	37930	157.6	158.6	sc	1.0	5	130	210	0.5	7400		F490		
				931	158.6	159.6	sc	1.0	5	180	320	0.5	5200		F75		
131.2	141.1	Green lithic vitric tuff composed of pale green roughly equant angular lithic fragments in a chloritised vitric matrix 134.1–141.1 There is a steady increase down hole in the presence of carbonate, quartz veining and silica, chlorite alteration	Veined pyrrhotite & pyrite up to 2cm wide making up approx 5% of 1) core volume with associated traces of chalcopyrite, galena & sphalerite.	932	159.6	160.6	sc	1.0	10	95	700	2.0	4400		F20		
				933	160.6	162.1	sc	1.0	10	110	1300	2.0	7800		F150		
				934	162.1	163.1	sc	1.0	10	220	50	0.5	180		Fx		

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ELECTROLYTIC ZINC CO OF A'ASIA LTD
ROSEBERY – TASMANIA

DIAMOND DRILL CORE RECORD

HOLE No. STP 217 4 of 5

DEPTH (m) FROM	DEPTH (m) TO	ROCK DESCRIPTION	MINERALISATION	SAMPLE NO.	FROM	TO	CORE REC'D	ASSAY DATA per ppm: Sample Length	Pb	Zn	Cu	Ag - g/t	As	Fe	Sn	CORE REC'D RUN	CORE REC'D SHORT
			134.1–141.1 Traces of pyrrhotite & pyrite occur as veins & blebs.														
				36705	147.4		Thin section sample –				felsic intermediate tuff						
141.1	150.6	Heavily silicified & cleaved lithic vitric tuff which is dark green grey	Fine pyrrhotite, pyrite veining (average 5% core volume) with minor arsenopyrite & chalcopyrite associated with larger pyrrhotite	706	155.1		Thin section sample –				porphyritic to glomero-porphyritic						
											Lava of leucoandesitic to dacitic affinities.						
			veins near the bottom of this unit. Mineralisation localised by cleavage.	707	163.1		Thin section sample –				porphyritic dacite						
				708	184.4		Thin section sample –				Quartz sericite phyllite						
150.6	163.1	DARK GREEN CLEAVED DACITIC LITHIC VITRIC TUFF composed of lithic fragments up to 10mm diameter in a vitric matrix.	150.6–158.3 Common fine pyrrhotite veins (approx 10% core volume) with less common pyrite veins (5% core volume) both up to 1cm wide. Minor chalcopyrite is associated with pyrite along tension cracks & cleavage planes. Arsenopyrite occurs in large veins up to 3cm wide in association with larger pyrrhotite veins. There is up to 30% arsenopyrite with an average 2%	37989	163	165	c	2.0	25	150	15	0.5	4		Ax		
				990	165	170	c	5.0	20	180	10	x	2		Ax		
150.6	152	Strong alteration (silica flooding & chloritisation) and cleavage.		991	170	175	c	5.0	20	180	10	0.5	16		Ax		
				992	175	179.3	c	4.3	330	190	15	2.5	10		A22		
				37935	179.3	180.3	sc	1.0	260	560	205	1.0	90		F650		
				936	180.3	181.3	sc	1.0	30	150	420	1.0	760		F450		
				937	181.3	182.3	sc	1.0	30	115	800	1.0	700		F500		
				938	182.3	183.3	sc	1.0	35	135	230	1.0	1120		F920		
				939	183.3	184.3	sc	1.0	30	120	385	1.0	26		F550		
				37940	184.3	185.3	sc	1.0	35	110	405	1.0	350		A6		
				941	185.3	186.3	sc	1.0	25	100	470	2.0	38		Ax		
				942	186.3	187.3	sc	1.0	35	85	280	3.5	10		Ax		
			158.3–163 Pyrite occurs as large aggregates (up to 10% core volume) with associated less abundant pyrrhotite. Pyrrhotite also occurs as separate fine veins up to 3mm diameter.	37993	187.3	190.0	c	2.7	15	100	80	1.5	32		Ax		
				994	190.0	195	c	5.0	20	75	130	1.0	40		Ax		
				995	195	200	c	5.0	15	55	140	1.0	22		A2		
				996	200	205	c	5.0	5	50	30	x	14		Ax		
				997	205	210	c	5.0	50	200	70	1.0	920		Ax		
				998	210	215	c	5.0	10	45	25	1.5	20		Ax		
				999	215	219.1	c	4.1	10	55	45	1.0	30		A6		
163	178.1	Dark green fine grained possibly intrusive non-magnetic andesite, cut by carbonate and quartz veins (with carbonisation, bleaching and minor silicification from 174.0m)	Trace pyrite blebs & veins.	37943	219.1	220.1	sc	1.0	15	75	100	2.0	3400		A8		
				944	220.1	221.1	sc	1.0	15	70	10	1.0	38		A16		
				945	221.1	222.1	sc	1.0	25	80	205	2.5	24		Ax		
				946	222.1	223.1	sc	1.0	10	60	10	2.0	25		Ax		
				947	223.1	224.1	sc	1.0	10	55	15	1.0	60		Ax		
178.1	179.3	ALTERED TUFF pale grey bleached, sheared and bedded	Trace pyrite blebs & veins.	948	224.1	225.1	sc	1.0	10	85	225	x	114		Ax		
				949	225.1	226.1	sc	1.0	15	90	280	2.0	1160		Ax		
				36701	226.1	231.1	c	5.0	20	85	40	x	46		A3		
179.3	249.1	"FARRELL SLATES"		37953	231.1	232.1	sc	1.0	20	90	10	1.0	24		A4		
179.3	186.2	Heavily cleaved siltstone, greywacke & shale grey to dark grey in colour. Rare carbonate & quartz veins occur.	Fine stringers & veins of pyrrhotite up to 30% core volume with an average of 5% with minor pyrite & trace chalcopyrite. Larger pyrrhotite veins (over 2cm wide) are associated with clear to blue	952	232.1	233.1	sc	1.0	25	140	135	2.0	36		A4		
				951	233.1	234.1	sc	1.0	20	95	80	0.5	18		Ax		
				950	234.1	235.1	sc	1.0	25	135	90	0.5	40		Ax		
				36702	235.1	240.1	c	5.0	60	310	50	x	128		A3		
				703	240.	245	c	5.0	45	100	25	x	28		A2		
				704	245	249.1	c	4.1	70	85	70	x	34		A3		

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ELECTROLYTIC ZINC CO OF A'ASIA LTD
ROSEBERY – TASMANIA

DIAMOND DRILL CORE RECORD

HOLE No. STP 217 5 of 5

DEPTH (m) FROM	DEPTH (m) TO	ROCK DESCRIPTION	MINERALISATION	SAMPLE NO.	FROM	TO	CORE REC'D	ASSAY DATA per ppm: Sample Length	Pb.	Zn	Cu.	Ag g/t	As	Fe	Sn	CORE REC'D: RUN	SHORT
			grey silica flooding														
186.2	249.1	Well laminated & cleaved siltstones with approx 10% shale lamallae. Carbonate & quartz veins are infrequent (approx 2% of rock) with an average width of 2mm. The siltstone is subtley bedded with fine grading & slumping at contact with shale layers. Facings 198.1 coarse siltstone slumped & scoured into shale – uphole facing 211.4 coarse siltstone scouring overlying shale bed & coarsening uphole, downhole facing. 223.2 flame structures give downhole facing 245.1 greywacke–siltstone graded – uphole facing 235.4 truncated bedding and grading – up hole facing. 247.9 graded bedding in greywacke coarsening down hole – uphole facing. Core angles: bedding planes to long core axis 195.2 63° 235.4 60° 198.1 65° 241.1 57° 211.4 60° 245.1 65° 223.0 58° 247.9 61° 227.5 62°	Trace pyrrhotite & pyrite in veins upto 3mm wide except 219.5–226.1 increased quartz, carbonate veining (upto 30% core volume, average 10%) Pyrrhotite, pyrite & associated trace chalcopyrite. Upto 40% total sulphides average 5%. Mineralisation associated with silica flooding. 231.1–234.4 strong carbonate, quartz veining upto 50% of core volume averaging 20% with associated pyrrhotite & pyrite in vaguely equal proportions. Upto 20% total sulphides averaging 2% 236.8–237.2 as for 231.1–234.4														

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ELECTROLYTIC ZINC CO. OF A'ASIA LTD
ROSEBERY – TASMANIA

DIAMOND DRILL CORE RECORD

HOLE No. STP 218 1 of 4

LOCATION: Sterling Valley, Western Volcanics

OBJECTIVE: To test ground magnetics, I.P. and geochemical anomalies.

RESULT: Two zones of minor sulphide mineralisation were intersected.

Depth	Direction	Dip.
44	092°	-56.5°
74	097.75°	-53.75°
104	100°	-52.5°
134	105°	-50.5°
164	105°	-49°

Direction: Dip.:

COLLAR DIP. -60°
DIRECTION 087° A.M.G.
R.L.
COORDINATES Grid 4486N 4190E

TOTAL DEPTH 165m
HOLE SIZE NQ (0-17.4m) BQ- 165m
COMMENCED 19.5.80
COMPLETED 9.6.80
LOGGED BY A. Mollison

DEPTH (m) FROM	TO	ROCK DESCRIPTION	MINERALISATION
0	17.4	Porphyritic Trachyte - fresh Pale grey to green fine grained trachyte, locally porphyritic, consisting of zoned plagioclase crystals and hornblende in a pale green ground-mass. Minor quartz and epidote veins are cut by late carbonate (calcite) veins There is a small fine grained basic dyke and veining between 15.3m and 16.3m	Trace disseminated pyrite occurs up to 1% concentration.
17.4	22.4	Dacitic Pyroclastic Pale green to grey fine grained crystal vitric tuff consisting of white feldspar crystals up to 5mm diameter in a pale green sericitised ground-mass. Local lithic fragments indicate a tuffaceous origin. There is a small basic dyke from 18.7-18.9m. Minor calcite/carbonate/quartz veining occurs through the unit.	Trace disseminated pyrite up to 1% and fine grained blackish sulphide about 0.5mm occurs up to 1%.
22.4	23.9	Rhyodacitic crystal lithic pyroclastic Rounded lumps of pinkish porphyritic lava (up to 10cm diameter) occur in a fine grained chloritised and sericitised porphyritic ground-mass. The lower contact is irregular.	Pyrite occurs in trace amounts on shears.
23.9	37.1	Pale green andesitic intrusives Fine grained uniform textured intrusive with slightly baked lower contact and stoped fragments of pyroclastic on the upper contact. Faulted from 28.4-29.2m. There is minor calcite (quartz), epidote fluorite, chlorite veining with incipient epidotisation as halos near veining.	23.9-45.3m Minor pyrite and chalcopyrite with traces of pyrrhotite and arsenopyrite occur in calcite/quartz/epidote/fluorite veins up to 2cm wide, averaging 0.8cm which are between 0.3 and 1.0m apart.

SAMPLE NO.	FROM	TO	CORE REC'D	ASSAY DATA (Sample Length)	Pb ppm	Zn ppm	Cu ppm	Ag g/t	Au g/t	As ppm	Sn ppm	CORE REC'D RUN	CORE REC'D SHORT
38901	0	5	1.0	5.0	40	125	90	x		18	30	0	-
902	5	10	1.7	5.0	30	150	80	x		28	140	9	7.3
903	10	15	5.0	5.0	60	160	55	x		112	160	10	-
904	15	20	5.0	5.0	25	150	50	x		16	65	14.5	-
905	20	25	4.5	5.0	20	160	100	x		6	110	17.4	-
												18.0	-
												21.0	-
29517	13.5		Thin Section Sample - Porphyritic trachyte									22.5	-
												24	0.5
38906	25	30	5.0	5.0	10	130	150	x		12	30	27	-
907	30	35	5.0	5.0	10	110	45	x		68	200	30	-
908	35	40	5.0	5.0	15	120	45	x		45	330	33	-
909	40	45	5.0	5.0	35	155	285	x		450	390	36	-
38910	45	50	5.0	5.0	15	95	55	x		x	25	40	-
911	50	55	5.0	5.0	25	100	60	x		20	110	42	-
912	55	60	5.0	5.0	10	55	15	x		8	110	45	-
913	60	65	5.0	5.0	x	65	25	x		11	65	48	-
914	65	70	5.0	5.0	15	75	15	x		2	15	51	-
915	70	75	5.0	5.0	10	70	45	x		8	40	52.2	0.2
916	75	80	5.0	5.0	20	85	75	x		4	15	54.7	0.2
917	80	85	5.0	5.0	15	110	235	x		960	630	57	-
918	85	90	5.0	5.0	x	85	150	x		1040	30	59	-
919	90	95	5.0	5.0	10	135	195	x		680	240	63	-
920	95	100	5.0	5.0	x	95	225	x		240	160	66	-
38921	100	105	5.0	5.0	x	115	245	x		500	340	67.5	-
922	105	110	5.0	5.0	15	95	150	x		21	70	69	-
923	110	115	5.0	5.0	250	555	240	x		60	160	72	-
924	115	120	5.0	5.0	15	125	125	x		12	320	75	-
925	120	125	5.0	5.0	35	95	150	x		8	20	81	-
926	125	130	5.0	5.0	15	100	100	x		x	120	84	-
927	130	135	5.0	5.0	5	105	110	x		x	25	87	-
928	135	140	5.0	5.0	10	85	115	x		4	x	90	-
929	140	145	5.0	5.0	5	80	130	x		x	15	93	-
38930	145	150	5.0	5.0	30	85	145	x		10	x	96	-
931	150	155	5.0	5.0	10	115	155	x		8	x	98.7	-
932	155	160	5.0	5.0	15	90	60	x		14	15		
933	160	165	5.0	5.0	10	75	135	x		40	50		

ELECTROLYTIC ZINC CO OF A'ASIA LTD
ROSEBERY – TASMANIA

DIAMOND DRILL CORE RECORD

HOLE No. STP 218 2 of 4

DEPTH (m) FROM	DEPTH (m) TO	ROCK DESCRIPTION	MINERALISATION	SAMPLE NO.	FROM	TO	CORE REC'D	ASSAY DATA per ppm: Sample Length	Pb	Zn	Cu	Ag - g/t	Au - g/t	As	Sn	CORE REC'D: RUN	SHORT
37.1	40	Grey medium grained trachy-andesitic crystal vitric tuff Consisting of approximately 30% feldspar phenocrysts up to 5mm in diameter, rounded to irregular in shape with vague grain boundaries. The fine grained chloritised sericitised mesostasis is cut by epidote veins up to 1 cm wide with carbonate, quartz, fluorite and sulphides also present in veins. Upper contact is sharp, brecciated, silicified and epidotised.														102 105 108 111 114 117 119 120 123 126	– – – – – – – – – –
40	44.1	Pale green grey fine grained andesitic lava ?) Consisting of: occasional feldspar phenocrysts up to 3mm in diameter and a chloritised-sericitised matrix after volcanic glass. Veining is the same as for 37.1 to 40m. Unit has green epidotisation throughout.														129 130 132 135 138 141 144 147	– – – – – – – –
44.1	57 X	Pale gre lithic crystal vitric dacitic tuff consisting of: sub-rounded to angular feldspar crystals and lithic fragments in a sericitised chloritised vitric matrix There are rare fine carbonate veins. Unit grades from a crystal vitric tuff down hole to a lithic crystal vitric tuff.	Trace pyrite in veins from 45.3 to 57.0													150 153 156 159 162 165 EOH	– – – – – –
57	59	Pale grey to grey green bedded vitric tuff (or tuffaceous sediments) Bedding is contorted and slumped with a coarsening of grains down hole. 58.0 to 58.2m sheared with carbonate & fluorite veins.	Trace pyrite associated carbonate and fluorite veins														
59	98.7	Pale grey to pale green grey vitric crystal lithic lapilli tuff consisting of: lithic fragments (pink grey-grey porphyritic lava, fine grained pale green grey, dark grey medium grained andesite) in a framework of white and fresh pink feldspar grains (angular to sub-rounded with vague grain boundaries) The mesostasis is sericitised and chloritised vitric material. The unit is graded with grainsize increasing down hole from less than 4mm at 59.0m to coarse fragments up to 5cm at 75.	Trace pyrite & pyrrhotite in rare carbonate, fluorite veins Rare exotic pyritic fragments 78–106.9m approximately 1 cm wide cross-cutting carbonate, fluorite epidote veins containing minor pyrite, chalcopyrite, arsenopyrite and rare pyrrhotite. Veins are between 0.3 & 1m apart														

145

063146

ELECTROLYTIC ZINC CO OF A'ASIA LTD
ROSEBERY – TASMANIA

DIAMOND DRILL CORE RECORD

HOLE No STP 218 3 of 4

DEPTH (m) FROM	TO	ROCK DESCRIPTION	MINERALISATION	SAMPLE NO.	FROM	TO	CORE REC'D	ASSAY DATA per ppm Sample Length	Pb%	Zn%	Cu%	Ag g/t	Au g/t	As	Sn	CORE REC'D RUN	SHORT
		There are rare fine carbonate veins The ground mass of the unit is locally strongly epidotised. The fine grained sedimentary fragments have distinct grain boundaries while volcanic fragments have altered grain boundaries. At the bottom of this unit there are 2 large fragments up to 20cm long composed of trachytic crystal vitric tuff fragments up to 6mm diameter.	78–106.9 see previous sheet														
98.7	109	Porphyritic trachy-andesite consisting of white to cream feldspars of irregular shape up to 6mm long in a chloritised sericitised and locally epidotised vitric matrix. Unit is quite altered near its upper contact with veins containing, epidote calcite, quartz, fluorite and sulphides associated.	106.9–109 trace pyrite, chalcopyrite and arsenopyrite in veins of calcite and fluorite which are rare.														
109	111	Pale grey fine grained bedded vitric tuff consisting of fine feldspar up to 1mm diameter in a vitric matrix. Grains show a distinct bedding or foliation. There are rare fine carbonate veins and the particle size grades down hole. A gradational contact exists at the base of the unit.	Trace pyrite in calcite/fluorite veins.														
111	119	Pale grey lithic crystal vitric tuff grading down hole to crystal lithic vitric tuff. Feldspars are up to 3mm and the lithic fragments up to 5cm long have distinct grain boundaries.	Trace pyrite														
119	123	Bedded fine grained vitric to crystal vitric tuff Pale grey green to grey grading down hole to a crystal lithic vitric tuff with volcanic fragments up to 2cm diameter. The bedding to long core axis angle at 119m if 55° There are rare carbonate and epidote veins up to 1 cm wide.	Trace pyrite														
123	126.1	Pale grey fine grained vitric tuff to crystal lithic vitric tuff with similar texture and grading to 119.0 to 123.0m.	Trace pyrite														

146

063147

ELECTROLYTIC ZINC CO OF A'ASIA LTD
ROSEBERY – TASMANIA

DIAMOND DRILL CORE RECORD

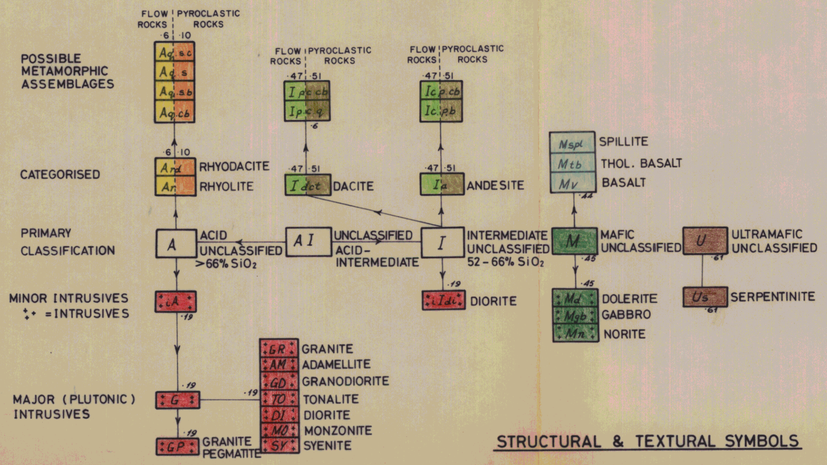
HOLE No. STP 218 4 of 4

DEPTH (m) FROM	DEPTH (m) TO	ROCK DESCRIPTION	MINERALISATION	SAMPLE NO.	FROM	TO	CORE REC'D	ASSAY DATA per ppm: Sample Length	Pb	Zn	Cu	Ag - g/t	Au - g/t	As	Sn	CORE REC'D: RUN	SHORT
126.1	130.1	Pale grey foliated lithic crystal vitric tuff consisting of a vitric matrix with elongate feldspar phenocrysts up to 5mm long and rare pale grey fine grained lithic fragments aligned parallel to bedding in the finer units. Occasional carbonate & epidote veins up to 10% core volume.	Trace pyrite in carbonate/epidote veins.														
130.1	165	Bedded pale green grey fine grained vitric tuff with rare interbeds of coarser lithic crystal vitric material at 135.7m, 138.9m 143m and at 144.9m Between 146 and 152.6m grains are coarser (up to 3mm) with some rare lithic fragments. Carbonate veins are generally uncommon, however, between 159.5 & 160.1m carbonate veins are associated with brecciation & chlorite alteration. Similar veining and alteration occur at 162.1. From 164.5 to 165m the rock is cleaved & altered to chlorite & sericite with elongated fragments Core angles – bedding to long core axis 134.6m 50° 143.6m 50° 145.2m 53° 156.3m 50° Facings – 138.8 graded bedding coarsening down hole to a sharp contact between coarse & fine tuff.	Trace pyrite occasionally in epidote veins														

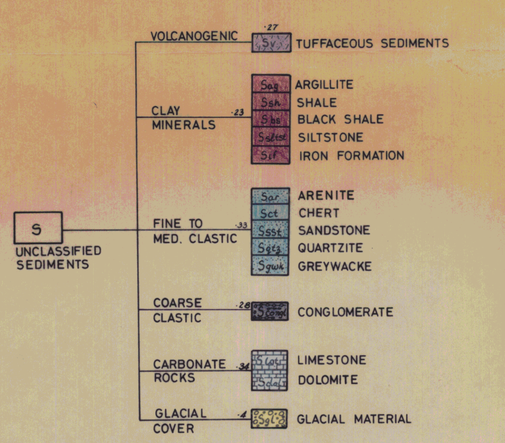
147

063148

IGNEOUS ROCKS



SEDIMENTARY ROCKS



STRUCTURAL SYMBOLS

- FAULT
- DEFINITE CONTACT OR OUTCROP LIMIT
- APPROXIMATE CONTACT OR RUBBLE BOUNDARY
- INTERPRETED CONTACT OR FLOAT BOUNDARY
- SCHISTOSE ZONE
- UNCONFORMITY
- BEDDING
- OVERTURNED BEDDING
- CLEAVAGE
- PRIMARY FOLIATION
- JOINTING
- PLUNGE
- FOLD AXIS PLUNGE
- FACING

STRUCTURAL & TEXTURAL SYMBOLS

- UNDIFERENTIATED TUFF
- LITHIC TUFF
- CRYSTAL TUFF
- VITRIC TUFF
- LAPILLI TUFF 4-32mm.
- BRECCIA >32mm.
- AGGLOMERATE >32mm.
- BOMBS
- FIAMME (LENGTH IN cms.)
- PUMICE
- ASH FLOW
- QUARTZ EYES/AUGEN TEXTURE
- PILLOWS
- FLOW BANDING
- FLOW BRECCIA
- LAVA
- AMYGDALOIDAL
- SPHERULITIC
- PORPHYRITIC
- CLOTS
- ACICULAR
- OPHITIC
- CHILLED MARGIN
- PEGMATIC
- VEINS
- MASSIVE
- CLEAVED
- SCHIST
- OXIDISED
- LATERITE
- BEDDED
- CROSS BEDDED
- THICK BEDDED
- THIN BEDDED
- LAMINATED
- GRADED OR DIRECTION OF DECREASING GRAIN SIZE
- LODE CAST
- SCOUR & FILL
- VESICULAR
- JOINTED
- STAINING
- ASH FALL

IGNEOUS GRAIN SIZE

- VERY COURSE GRAINED >5 cm
- COARSE GRAINED 5cm-5mm
- MEDIUM GRAINED 5mm-1mm
- FINE GRAINED <1mm

SILICATE MINERALOGY

- QUARTZ
- K-FELSPAR
- ALBITE
- PLAGIOCLASE
- AMPHIBOLE
- PYROXENE
- BIOTITE
- CHLORITE
- CARBONATE
- SERICITE
- EPIDOTE
- TALC
- BARITE (STAEDTLER 104-10)
- FELSPAR
- HORNBLENDE
- SIDERITE

- ALBITISED
- CARBONATED
- CHLORITISED
- SERICITISED
- SILICIFIED

SULPHIDE & OXIDE MINERALOGY

- BOXWORK
- SULPHIDES
- GOSSAN
- PENTLANDITE
- HEMATITE
- CHALCOCITE
- COVELLITE
- BORNITE
- CHALCOPYRITE
- SPHALERITE
- GALENA
- PYRRHOTITE
- PYRITE
- ILLMENITE
- LEUCOXENE
- MAGNETITE

MINERALISATION

- DISS 10% DISSEMINATED (STAEDTLER 104-2)
- DISS 10-20% "
- DISS ~25% "
- STR STRINGER
- MAS MASSIVE

COLOURS

- pale PALE
- dk DARK
- pk PINK
- rd RED
- org ORANGE
- yel YELLOW
- ol OLIVE
- grn GREEN
- bl BLUE
- gry GREY
- blk BLACK
- brn BROWN
- wht WHITE
- crm CREAM
- purp PURPLE

TOPOGRAPHICAL SYMBOLS

- WATER RACE
- FENCE
- FORMED ROAD
- TRACK
- RAILWAY
- RAILWAY (ABANDONDED)
- RIVER
- STREAM
- LAKE
- SWAMP
- BUILDING
- POWERLINE
- TRIG. STATION
- BALD HILL
- SHAFTS
- ADIT
- TRENCH
- MINE OR QUARRY
- DRILL HOLE - BARREN
- DRILL HOLE - COLOUR FOR MINERALISATION
- (i) DRILL HOLE - SIGNIFICANT OR POSSIBLE ORE GRADE AND WIDTH (STAEDTLER 104-2)
- (ii) DRILL HOLE - MINOR OR POSSIBLE SUB-ORE GRADE MINERALISATION (STAEDTLER 104-10)
- DRILL HOLE - FAILED TO REACH TARGET

OPERATION OF LEGEND

DESCRIBING ROCK UNITS

1. CAPITAL LETTER - INDICATES PRIMARY CLASSIFICATION eg A - ACID IGNEOUS ROCKS; S - SEDIMENTARY ROCKS
2. LOWER CASE LETTERS - INDICATES THE FOLLOWING:

2i AS PREFIXES IN PROGRESSIVE ORDER

(a) COLOURS eg (i) grn M = GREEN MAFIC IGNEOUS ROCK

(ii) pk/grn A = PINK FRAGMENTS OR PHENOCRYSTS IN AN ACID IGNEOUS ROCK WITH A GREEN MATRIX

(b) STRUCTURAL OR TEXTURAL FEATURES

eg (i) x.t.A. = CRYSTAL TUFF OF ACID COMPOSITION

(ii) x.b.d.S. = CROSS BEDDED SEDIMENTARY ROCK

2ii AS SUFFIXES IN PROGRESSIVE ORDER

(a) CATEGORISED: e.g. (i) Ar = RHYOLITE; (ii) Sah = SHALE;

(b) MINERALOGY: e.g. (i) pAr.f. = RHYOLITE WITH FELSPAR PHENOCRYSTS.

(ii) Ag.s. = QUARTZ SERICITE ROCK OF ACID IGNEOUS ORIGIN

(iii) Ar.a'b. = ALBITISED RHYOLITE

EXAMPLE - pk/grn. c1vd. x.v.t. A.rd. ab. c'd

pk/grn (COLOURS) - PINK CRYSTALS IN A GREEN MATRIX; c1vd (STRUCTURAL FEATURE) - CLEAVED; x.v.t. (TEXTURE) - CRYSTAL VITRIC TUFF; A (PRIMARY SUBDIVISION) - ACID IGNEOUS ROCK; rd. (CATEGORISED) - RHYODACITE; a.b. (PRIMARY MINERALOGY) - ALBITE PHENOCRYSTS; c'd. (ALTERATION MINERALOGY) - CHLORITISED.

10 COLOUR OF CUMBERLAND "DERWENT" N° 19 PENCIL

ELECTROLYTIC ZINC CO. OF A'ASIA. LTD.

PROJECT: MT. BLACK | TAS.

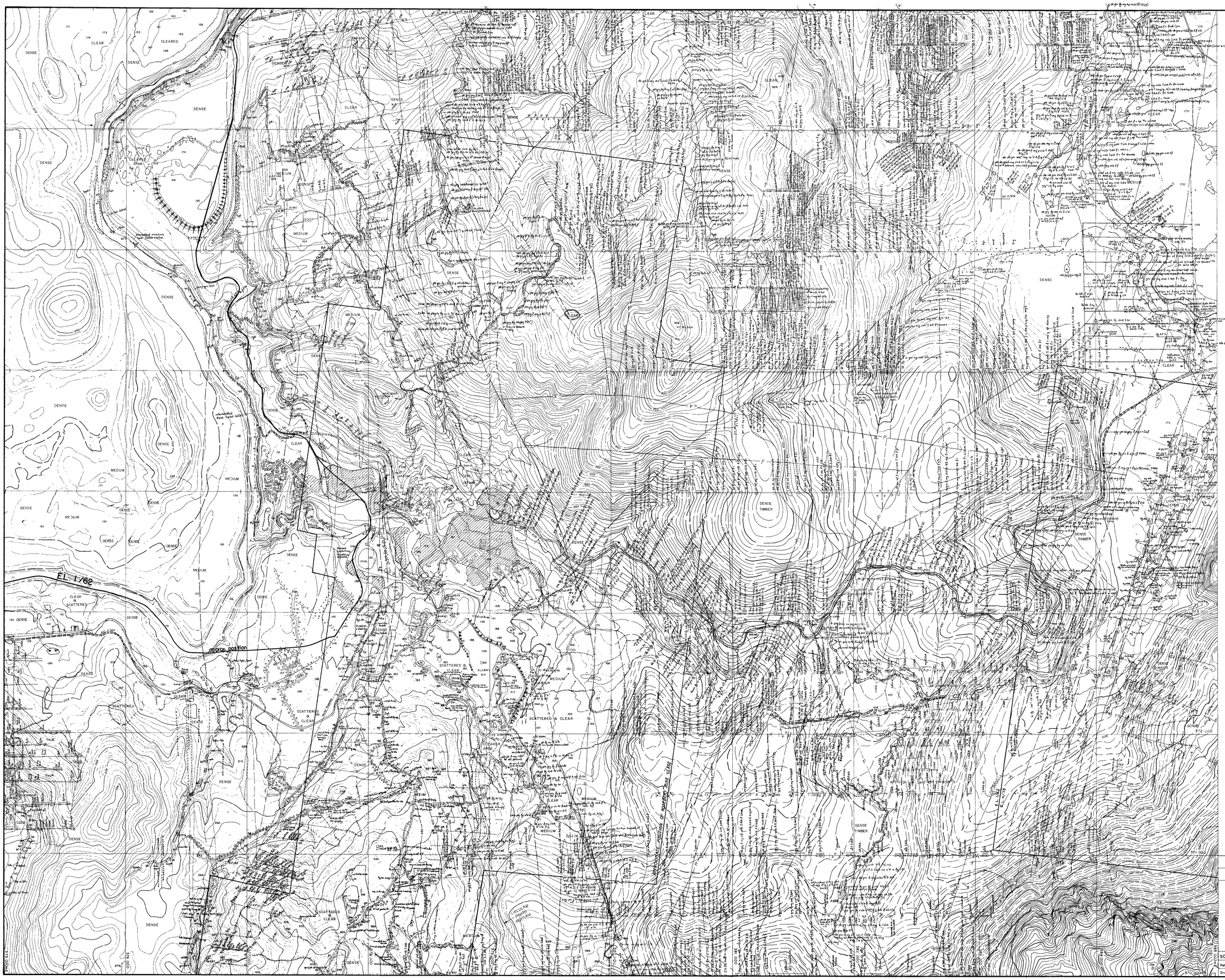
GEOLOGICAL LEGEND 063149

FOR EXPLORATION MAPPING

DATE: 10/75 | REVISED: 12/75 | REF. NO. PLATE 1

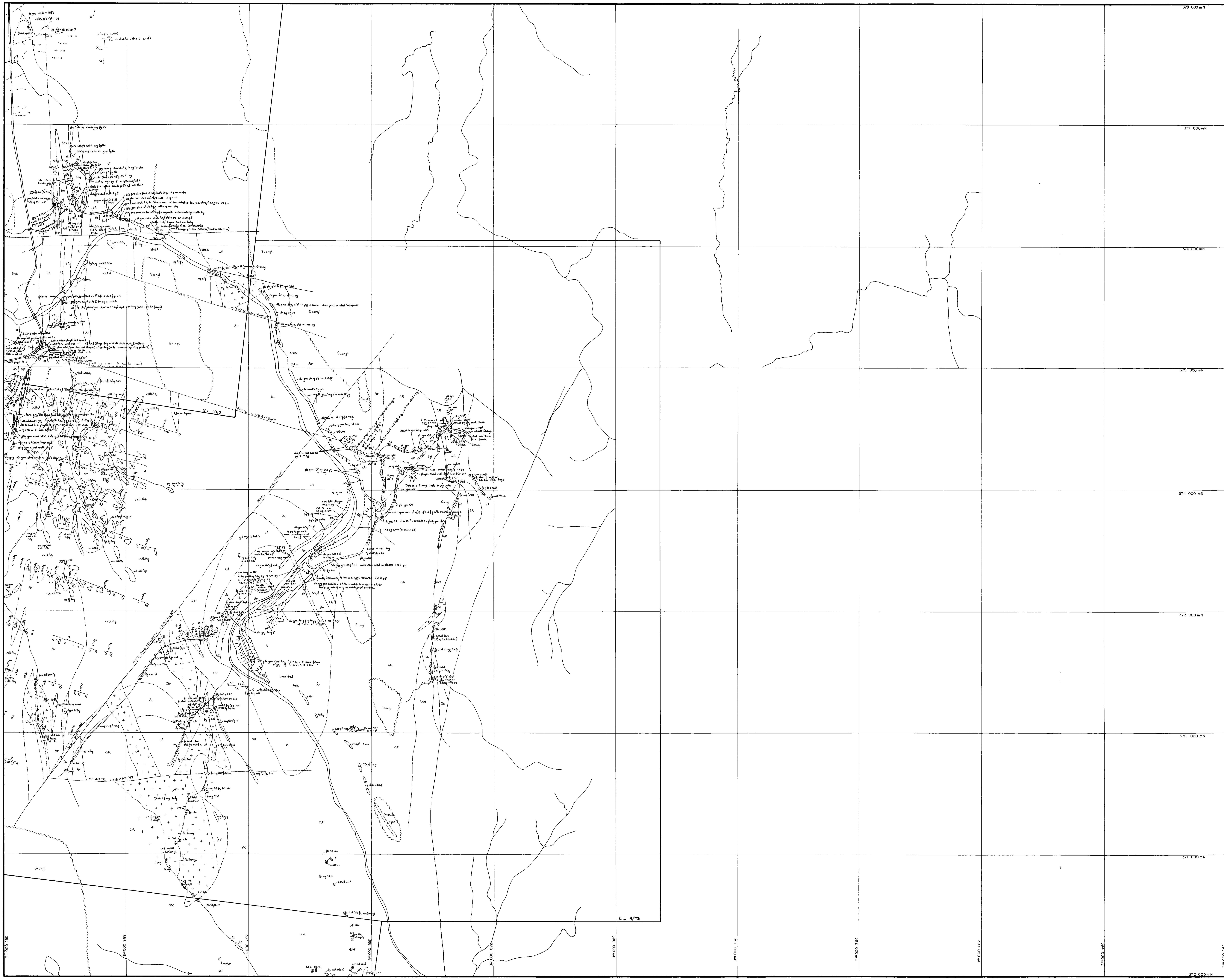
80-1462

2850


CLEAR
CLEARED
DENSE
MEDIUM
SCATTERED & CLEAR
DENSE TIMBER
SCRUB
EL. 1162
approx. position
ELECTROLYTIC ZINC CO. OF A'SIA LTD.
PROJECT: MT. BLACK
TAS.
GEOLOGY
063150
SCALE: 1-10,000
Survey P.K., J.M., W.S.F., C.S.
Revised 1.8.80
Reference
Date 1978/9
REF. Nº
Drawn R.P.T.
Checked
AO-525-0006

80-1662

2551



ELECTROLYTIC ZINC CO OF A ASIA LTD

PROJECT MT BLACK | TAS

063151

GEOLOGY

SCALE 1 10 000	Survey W F	Revised 1 8 70
Reference	Date 4/9/79	REF NO
Drawn R P T	Checked ?	AO - 525 - 0055

80-1462

2852

E Z PLAN CABINET TRIM LINE

AO TRIM LINE

2852

Cutty Sark Grid

Scintrex 1974

Mt. Sale Grid

Scintrex 1974

Mt. Black Grid

Note: Position of dipole - dipole anomalies approximate. Grid not reliably located.

OPEN CUT

ROSEBERY MINE SITE

Mt. Sale Grid

Tullah Grid

Sterling Valley Grid

E.L. 1/62

(approx. position)

Magazine Site

NOTE: Due to high conductivities I.P. readings were not possible over most of this grid

COLEBROOK HILL GRID

GRADIENT ARRAY I.P. (Scintrex, May 1980)

Attempted grid coverage

Semi-effective grid coverage

Note: Positions of dipole - dipole anomalies approximate. Grid not reliably located.

NATONE GRID

Scintrex 1974

Hercules Grid

STITT EXTENSION GRID

Gradient Array I.P. a=200m

E.L. 4/73

Mt. Murchison Grid

APPROXIMATE POSITION OF ROSEBERY MINE LEASE

Position not reliable

Mt. Murchison Grid

NOTES:

1. Chargeability contours (millivolts / volt) compiled from following Gradient Array surveys.

   a) Mt. Black Grids – Scintrex 1974, see report TAS. 023, October 1974.

   b) Cutty Sark Grid – Scintrex 1978, see report

   c) Mt. Sale Grid – Scintrex 1979, see reports TAS.065, March 1979 (1) July 1979 (2)

   d) Hercules Grid – Scintrex 1974, see report TAS. 023, October 1974.

2. All dipole – dipole anomalies defined on basis of chargeability or frequency effect values.

3. Dipole – dipole spreads compiled from the following surveys:

   a) Mt. Murchison Grid – McPhar 1960 (Freq. domain)

   b) Sterling Valley Grid (i) McPhar, 1961 (Freq. domain)
      (ii) Cominco, 1976 (Freq. domain)
      (iii) Scintrex, 1979 (Time domain)

   c) Mt. Black Grid – McPhar, 1961/62 (Freq. domain)

   d) Natone Grid – McPhar, 1962 (Freq. domain)

   e) Cutty Sark Grid – Geoex, 1978 (Freq. domain)

   f) Mt. Sale Grid – Scintrex, 1979 (Time domain) see report TAS.065, June 1979 (2)

   g) Colebrook Hill Grid – Geoterrex, April 1980 (Time domain) Scintrex, May 1980 (also gradient array)

LEGEND

- Dipole – dipole spread showing Electrode interval.
- Location of Definite Anomalies. (Primary and or secondary anomalies) *
- Location of possible Anomalies. (Tertiary anomalies) *
- Contours of chargeability in MV/V.
- Interpolated chargeability contours from dipole – dipole data (average of n=2,3,4) Scintrex time domain 1979

* Scintrex 1979 Time Domain information drawn below the grid line.

1	2
3	4
5	6
28	8
30	9 10
32	11

5 cm

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: MT. BLACK | TAS

063152

INDUCED POLARIZATION

SCALE: 1:10,000	Survey:	Revised: 3.6.80
Reference:	Date: JUNE '79	REF. NO.
Drawn: MB	Checked:	AO 525 0024

2853

E Z PLAN CABINET TRIM LINE

NOTES:

1. Add 62,000 to all values to obtain reading in gammas.
2. Murchison River Grid and Sterling Valley Grid were surveyed in January/February 1980.

Anomaly >62,500 from Abminco Report (Data 1976, 1978)

1	2	
3	4	
5	6	
28	7	8
30	9	10
32	11	

5 cm

ELECTROLYTIC ZINC CO. OF A'ASIA. LTD.

PROJECT: MT. BLACK | TAS

063153

GROUND MAGNETICS

SCALE: 1:10,000	Survey: I. McD.	Revised: 7.6.80
Reference:	Date: 13.2.80	REF. NO.
Drawn: R.P.T.	Checked:	AO-525-0072

80-1462

2854

EZ PLAN CABINET TRIM LINE

AO TRIM LINE

2854

GRID ORIGIN
374300 mE, 5378000 mN

GRID ORIGIN
380500 mE, 5378000 mN

GRID ORIGIN
383900 mE,
5378000 mN

GRID ORIGIN
379700 mE,
5377000 mN

GRID ORIGIN
382500 mE,
5377000 mN

ROSEBERY
MINE GRID

GRID ORIGIN
381400 mE,
5374000 mN

GRID ORIGIN
384500 mE,
5376000 mN

GRID ORIGIN
382000 mE, 5375000 mN

(MURCHISON)
GRID ORIGIN
383900 mE,
5375000 mN

E.L. 1/62

approx position

COLEBROOK HILL GRID

HERCULES
GRID

ROSEBERY LODES
GRID

APPROXIMATE POSITION OF ROSEBERY MINE LEASE

STITT FOLLOW UP GRID

STERLING
VALLEY
GRID

E.L. 1/43

E.L. 1/44

000 mN

Note 1: The position of the Murchison Grid has been corrected to fit topographical and cultural features.

2: Information shown on this plan has been photoreduced from 1:5,000 scale geochem plans which show individual sample data.

Heavy line denotes grid line not sampled.

3: Refer to plan AO-525-0023 for surveyed locations of some Murchison River Grid and Sterling Valley Grid lines

STERLING VALLEY GRID:

Old grid lines

Recut grid lines E.Z. 1979/80

Grid line not sampled E.Z. 1979/80

LEGEND

Pb

45 50 p.p.m.

50 100 p.p.m.

200 200 p.p.m.

200 500 p.p.m.

Note: Samples taken since commencement of E.Z.-GETTY joint venture have been sieved to -80# and analysed by AAS after Perchloric/Nitric acid digestion.

1	2		
3	4		
5	6		
28	7	8	
30	9	10	
32	11		

5 cm

ELECTROLYTIC ZINC CO OF A'ASIA LTD

PROJECT: MT BLACK | TAS

063154

SOIL GEOCHEMISTRY : Pb

SCALE 1:10,000	Survey	Revised 31.7.80
Reference	Date JUNE '79	REF NO
Drawn MB	Checked	AO 525 0026

80 1462

2855

2855 E.Z. PLAN CABINET TRIM LINE

GRID ORIGIN
374900mE, 5378000mN

GRID ORIGIN
380600mE, 5379000mN

GRID ORIGIN
393600mE,
5378000mN

378 000mN

GRID ORIGIN
379700mE, 5377000mN

GRID ORIGIN
395500mE,
5377000mN

ROSEBERY
MINE GRID

GRID ORIGIN
381600mE,
5376000mN

GRID ORIGIN
382500mE,
5376000mN

GRID ORIGIN
382000mE
5375000mN

(MURCHISON)
GRID ORIGIN
393700mE,
5376000mN

F.L. 1/62

approx position

COLEBROOK HILL GRID

HERCULES
GRID

APPROXIMATE POSITION OF ROSEBERY MINE GRID

ROSEBERY LODES
GRID

STITT FOLLOW UP GRID

STERLING
VALLEY
GRID

F.L. 6/62
F.L. 4/73

Note 1: The position of the Murchison Grid has been corrected to fit topographical and cultural features.

2: Information shown on this plan has been photoreduced from 1:5,000 scale geochem plans which show individual sample data.

—— Heavy line denotes grid line not sampled.

3: Refer to plan A0-525-0023 for surveyed locations of some Murchison River Grid and Sterling Valley Grid lines.

STERLING VALLEY GRID:

——— Old grid lines

——— Recut grid lines E.Z. 1979/80

——— Grid line not sampled E.Z. 1979/80

LEGEND

Zn	
25	50 p.p.m.
65	100 p.p.m.
120	200 p.p.m.
	500 p.p.m.
	1000 p.p.m.

Note: Samples taken since commencement of EZ – GETTY joint venture have been sieved to -80# and analysed by A.A.S. after Perchloric/Nitric acid digestion.

	1	2	
	3	4	
	5	6	
28		8	
30	9	10	
32	11		

5 cm

ELECTROLYTIC ZINC CO OF A'ASIA LTD

PROJECT: MT BLACK | TAS

063155

SOIL GEOCHEMISTRY: Zn

SCALE 1:10,000	Survey	Revised 25.2.80
Reference	Date JUNE '79	REF NO
Drawn MB	Checked	A0 525 0027

80-1462

2856

E.Z. PLAN CABINET TRAY UNIT

2856

GRID ORIGIN
379300mE 5378000mN

GRID ORIGIN
380500mE 5378000mN

GRID ORIGIN
382900mE
5379000mN

378 000mN

GRID ORIGIN
379700mE 5377000mN

ROSEBERY MINE GRID

GRID ORIGIN
381500mE 5377000mN

377 000 mN

GRID ORIGIN
381600mE
5376000mN

GRID ORIGIN
382500 mE
5376000mN

376 000 mN

GRID ORIGIN
382000mE 5375000mN

(MURCHISON)
GRID ORIGIN
382000mE
5375000mN

375 000 (mN)

EL 1/62

approx position

COLEBROOK HILL GRID

HERCULES
GRID

APPROXIMATE POSITION OF ROSEBERY MINE LEASE

ROSEBERY LODES GRID

STITT FOLLOW UP GRID

STERLING
VALLEY
GRID

EL 1/62
EL 4/73

374 000 mN

373 000 mN

000 mN

Note 1 The position of the Murchison Grid has been corrected to fit topographical and cultural features

2 Information shown on this plan has been photoreduced from 1 5 000 scale geochem plans which show individual sample data

—— Heavy line denotes grid line not sampled

3 Refer to plan AO 525 0023 for surveyed locations of some Murchison River Grid and Sterling Valley Grid lines

Cu LEGEND

100	1000 ppm
35	500 ppm
13	200 ppm
2	100 ppm
	50 ppm

NOTE Samples taken since commencement of E Z Getty joint venture have been sieved to 80 # and analysed by A A S after perchloric/nitric acid digestion

STERLING VALLEY GRID

—— —— Old grid lines

—— —— Recut grid lines E Z 1979/80

—— —— Grid line not sampled E Z 1979/80

1	2
3	4
5	6
28	8
30	9 10
32	11

5 cm

ELECTROLYTIC ZINC CO OF A ASIA LTD

PROJECT MT BLACK | TAS

063156

SOIL GEOCHEMISTRY Cu

SCALE 1 10,000	Survey	Revised 31 7 80
Reference	Date JUNE '79	REF NO
Drawn MB	Checked	AO 525 0025

80-1162 Vol 2i

E Z PLAN CABINET TRIM LINE

2957

2857

COLEBROOK HILL GRID

APPROXIMATE POSITION OF ROSEBERY MINE LEASE

STERLING VALLEY GRID

EL 4/73

EL 1/62

378 000 mN

377 000 mN

376 000 mN

375 000 mN

374 000 mN

373 000 mN

372 000 mN

371 000 mN

370 000 mN

375 000 mE

376 000 mE

377 000 mE

378 000 mE

379 000 mE

380 000 mE

381 000 mE

382 000 mE

383 000 mE

384 000 mE

385 000 mE

NOTE: Insufficient number of data points to construct geochemical contours

STERLING VALLEY GRID

Old grid lines

Recut grid lines E Z 1979/80

Grid line not sampled E Z 1979/80

Sn LEGEND

> 200 ppm

100 - 200 ppm

50 - 100 ppm

	1	2
	3	4
	5	6
28	7	8
30	9	10
32	11	

5 cm

ELECTROLYTIC ZINC CO OF A'ASIA LTD

PROJECT MT BLACK | TAS

063157

SOIL GEOCHEMISTRY Sn

80-1462

SCALE 1:10,000	Survey J M	Revised 12 5 80
Reference	Date 13 2 80	REF NO
Drawn R P T	Checked	A0 - 525 - 0071

2858

2858 EZ PLAN CABINET TRIM LINE

E.L. 1/62

E.L. 4/73

378 000 mN
377 000 mN
376 000 mN
375 000 mN
374 000 mN
373 000 mN
372 000 mN
371 000 mN
370 000 mN

386 000 mE
387 000 mE
388 000 mE
389 000 mE
390 000 mE
391 000 mE
392 000 mE
393 000 mE
394 000 mE
395 000 mE

LEGEND

Pb, Zn
Cu, Co
Mn, Fe
Sn

Samples were dried and sieved to -80 mesh. Base metals were analysed by A.A.S. after digestion in nitric/perchloric acid. Sn was analysed by A.A.S. after fusion with ammonium iodide.

> 300 ppm Pb is highly anomalous
200 - 300 ppm Pb is weakly anomalous

> 300 ppm Zn is highly anomalous
200 - 300 ppm Zn is weakly anomalous

1	2		
3	4		
5	6		
28	7	8	
30	9	10	
32	11		

5 cm

ELECTROLYTIC ZINC CO OF A'ASIA LTD.

PROJECT: MT. BLACK | TAS

063158

GEOCHEMISTRY

Stream Sediment Samples -80#

Pb

80-1462

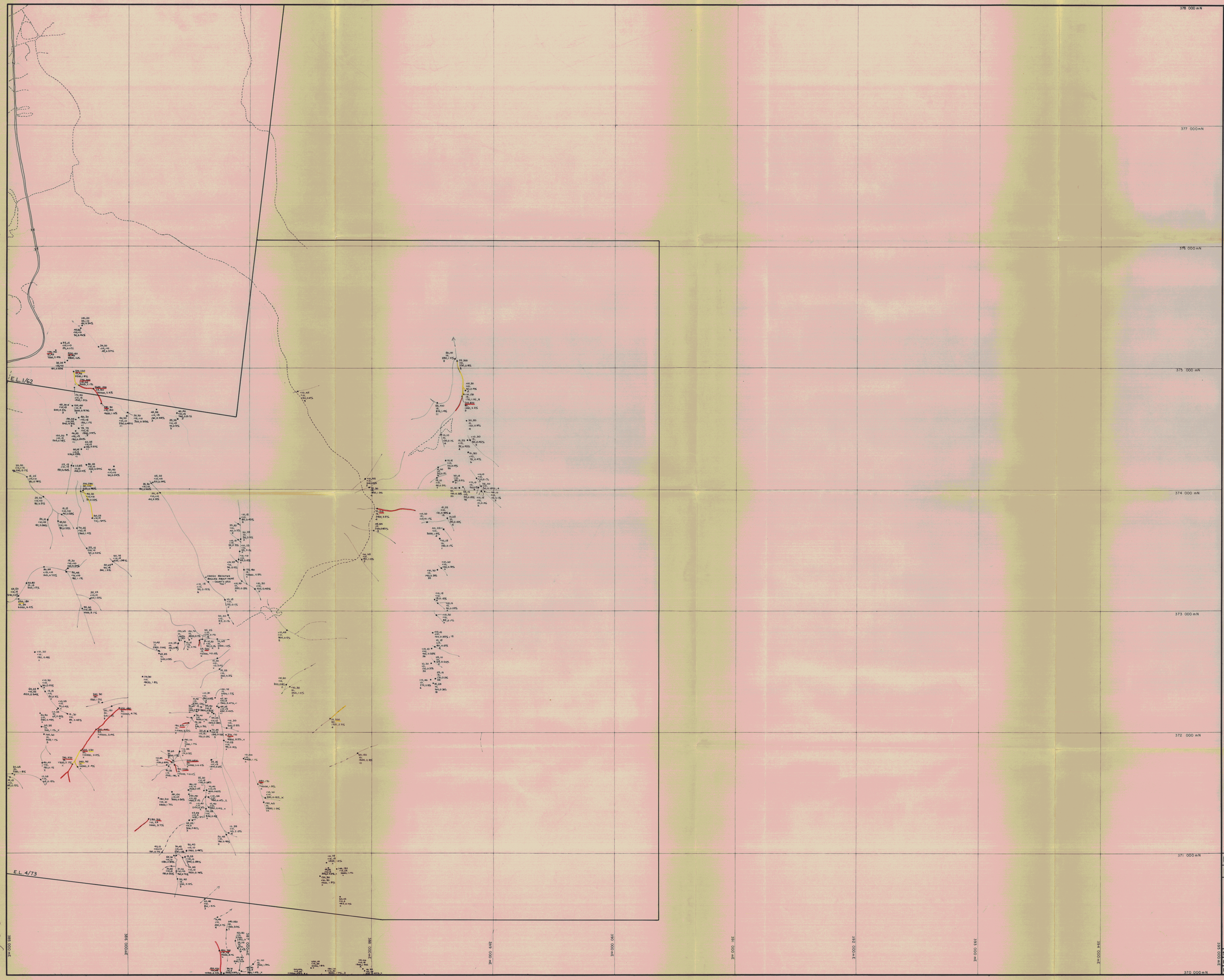
SCALE: 1:10 000	Survey: I.McD.	Revised: I. 8. 80
Reference:	Date: 18.3.80	REF. NO.
Drawn: R.P.T.	Checked:	AO-525-0091

2859

E Z PLAN CABINET TRIM LINE

AO TRIM LINE

2859



LEGEND

Pb, Zn
Cu, Co
Mn, Fe
Sn

Samples were dried and sieved to -80 mesh. Base metals were analysed by A.A.S. after digestion in nitric/perchloric acid. Sn was analysed by A.A.S. after fusion with ammonium iodide.

> 300 ppm Pb is highly anomalous
200 - 300 ppm Pb is weakly anomalous

> 300 ppm Zn is highly anomalous
200 - 300 ppm Zn is weakly anomalous

1	2	
3	4	
5	6	
28	7	8
30	9	10
32	11	

5 cm

ELECTROLYTIC ZINC CO. OF A'ASIA. LTD.

PROJECT: MT. BLACK | TAS

063159

GEOCHEMISTRY

Stream Sediment Samples -80#

Zn

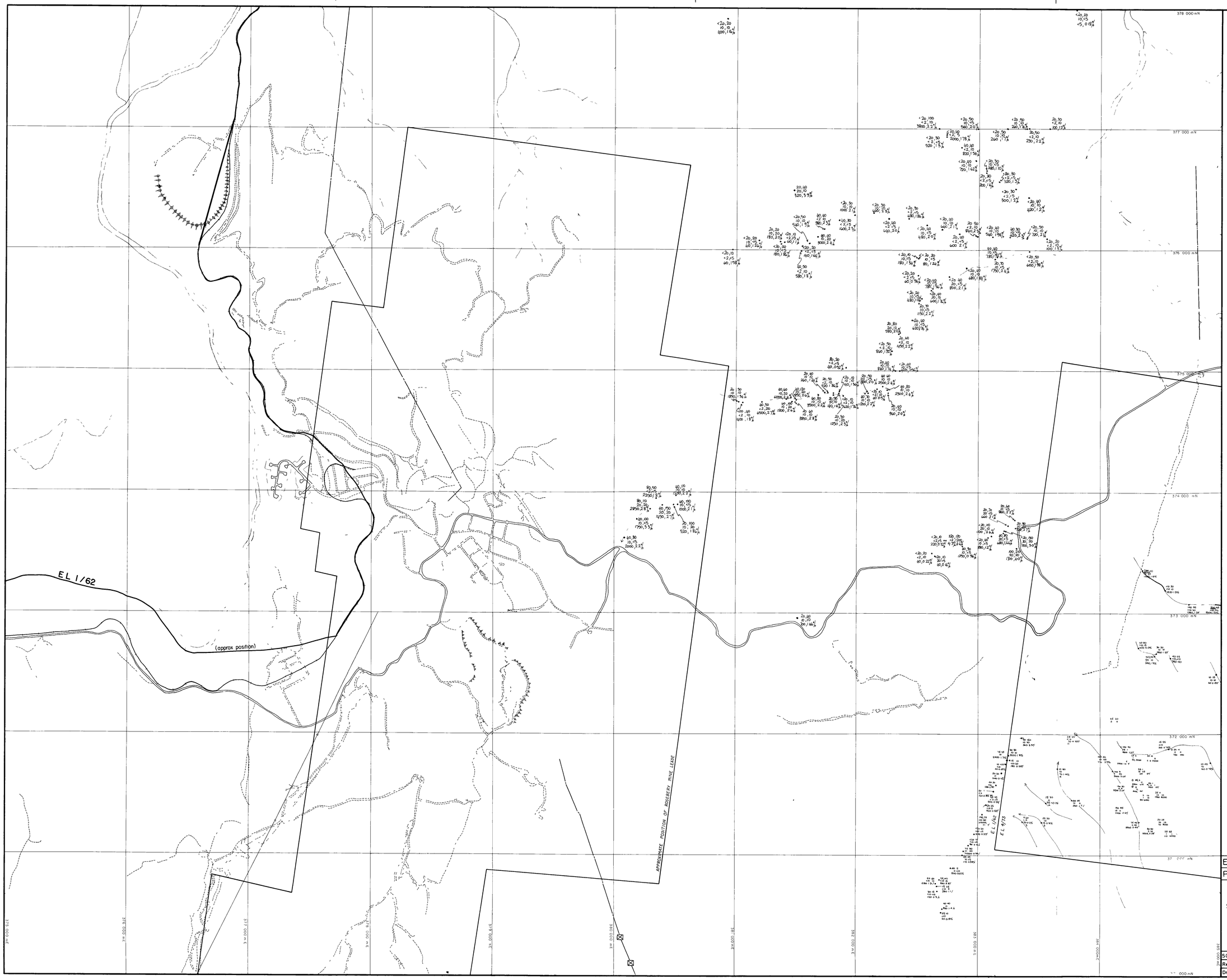
80-1462

SCALE: 1:10 000	Survey: I.McD.	Revised: 1.9.80
Reference:	Date: 18.3.80	REF NO.
Drawn: R.P.T.	Checked:	AO-525-0091

2860

2860

E Z PLAN CABINET TRIM LINE



LEGEND

Pb Zn Cu Ba Mn, Fe

NOTE For analytical method refer to GEOCHEMICAL EXPLORATION FOR BASE METALS WEST COAST TASMANIA N J MARSHALL, APRIL 1979

1	2
3	4
5	6
28	7
30	9
32	11

8 | 10

5 cm

ELECTROLYTIC ZINC CO OF A'ASIA LTD

PROJECT MT BLACK | TAS

063160

STREAM SEDIMENT GEOCHEMISTRY

-80#

Pb

80-1162

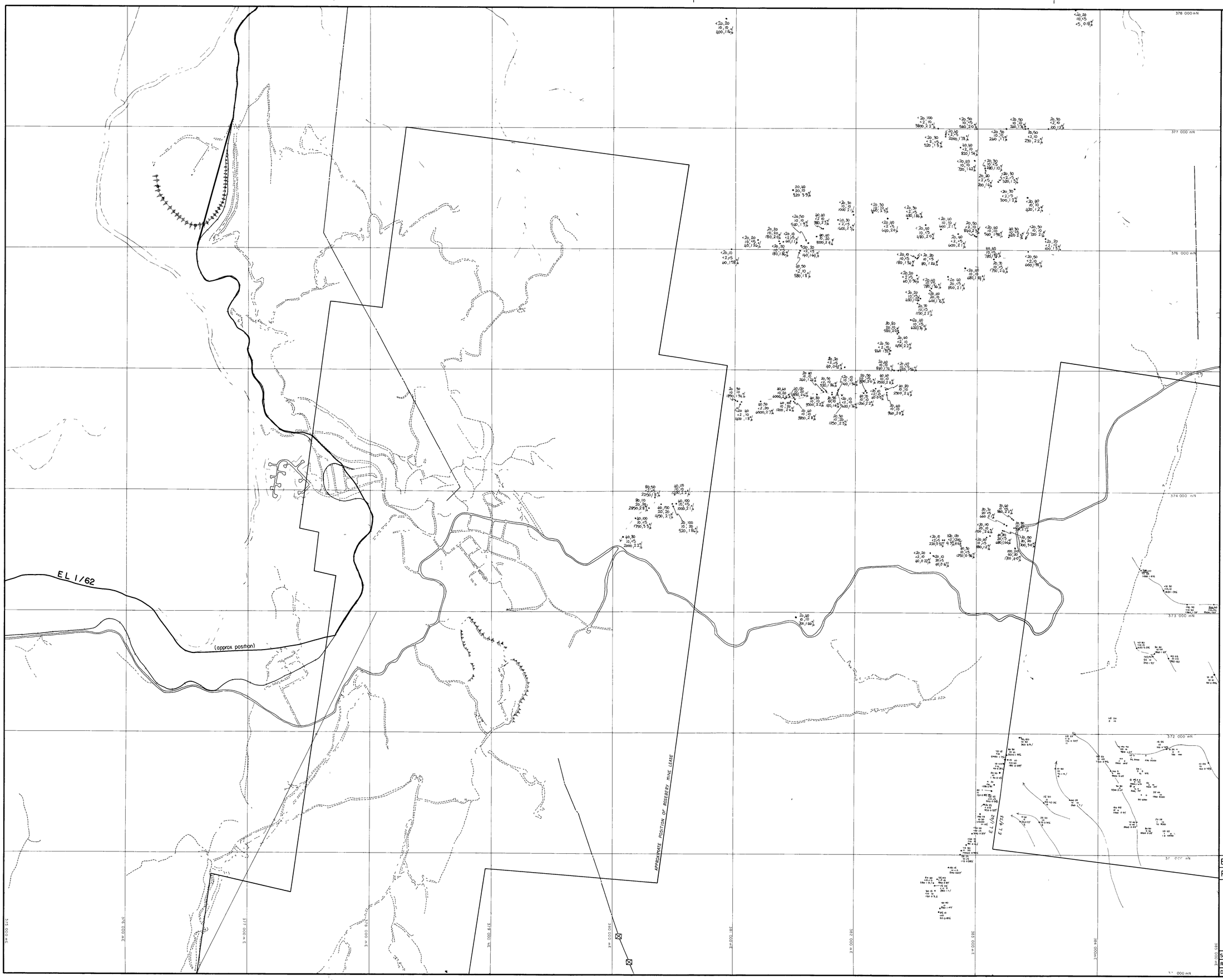
SCALE 1:10,000	Survey	Revised 28 4 80
Reference	Date AUGUST '79	REF NO
Drawn MB	Checked	A0 - 525 - 0049

2861

2861

E Z PLAN CABINET TRIM LINE

A0 TRIM LINE



LEGEND

Pb Zn
Cu Co
Mn Fe

NOTE For analytical method refer to GEOCHEMICAL EXPLORATION FOR BASE METALS WEST COAST TASMANIA
N J MARSHALL APRIL 1979

1	2	
3	4	
5	6	
28	7	8
30	9	10
32	11	

5 cm

ELECTROLYTIC ZINC CO OF A'ASIA LTD

PROJECT MT BLACK — TAS

063161

STREAM SEDIMENT GEOCHEMISTRY

-80#

Zn

80 1462

SCALE 1:10,000	Survey	Revised 28 4 80
Reference	Date AUGUST '79	REF NO
Drawn MB	Checked	A0 - 525 - 0049

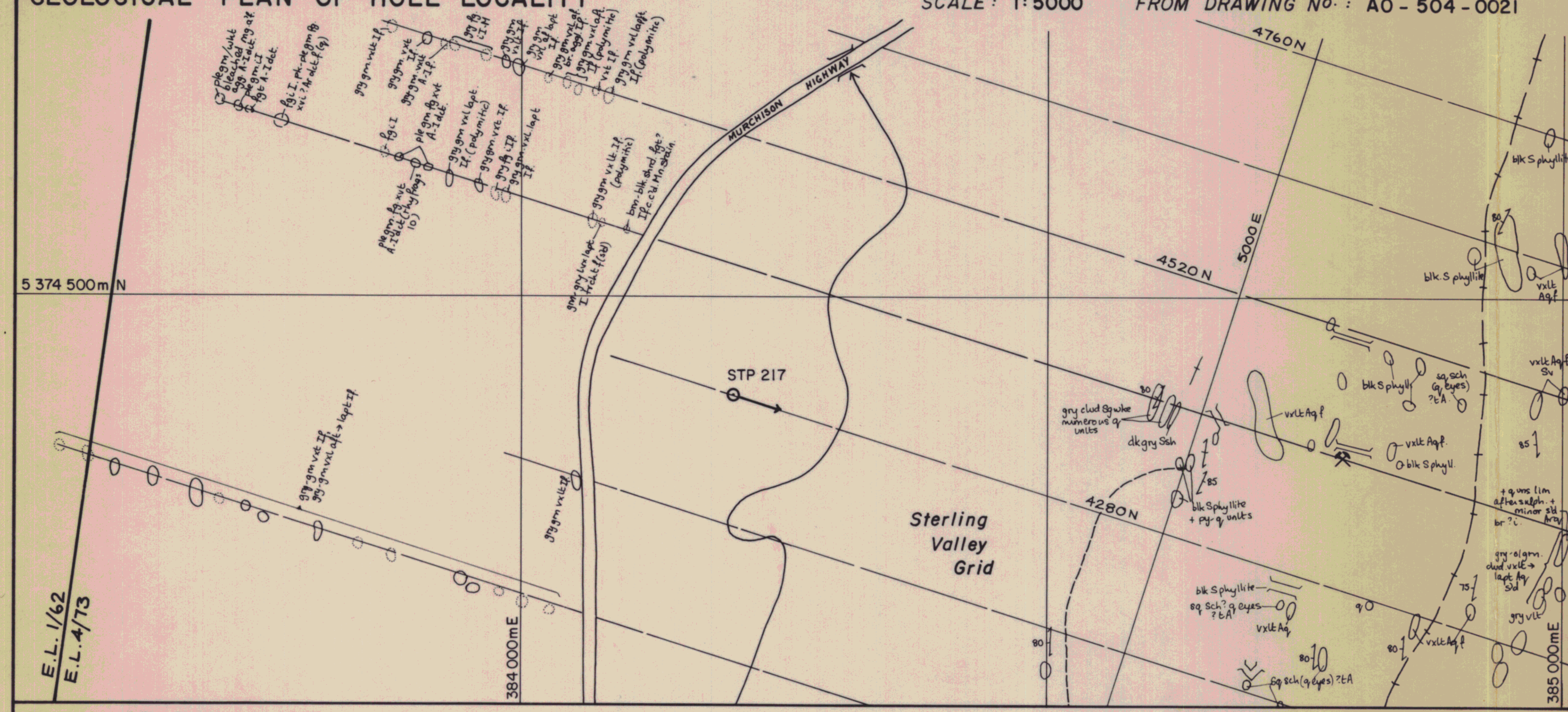
2862

2862

EZ PLAN CABINET TRIM LINE

GEOLOGICAL PLAN OF HOLE LOCALITY

SCALE: 1:5000 FROM DRAWING No.: AO-504-0021

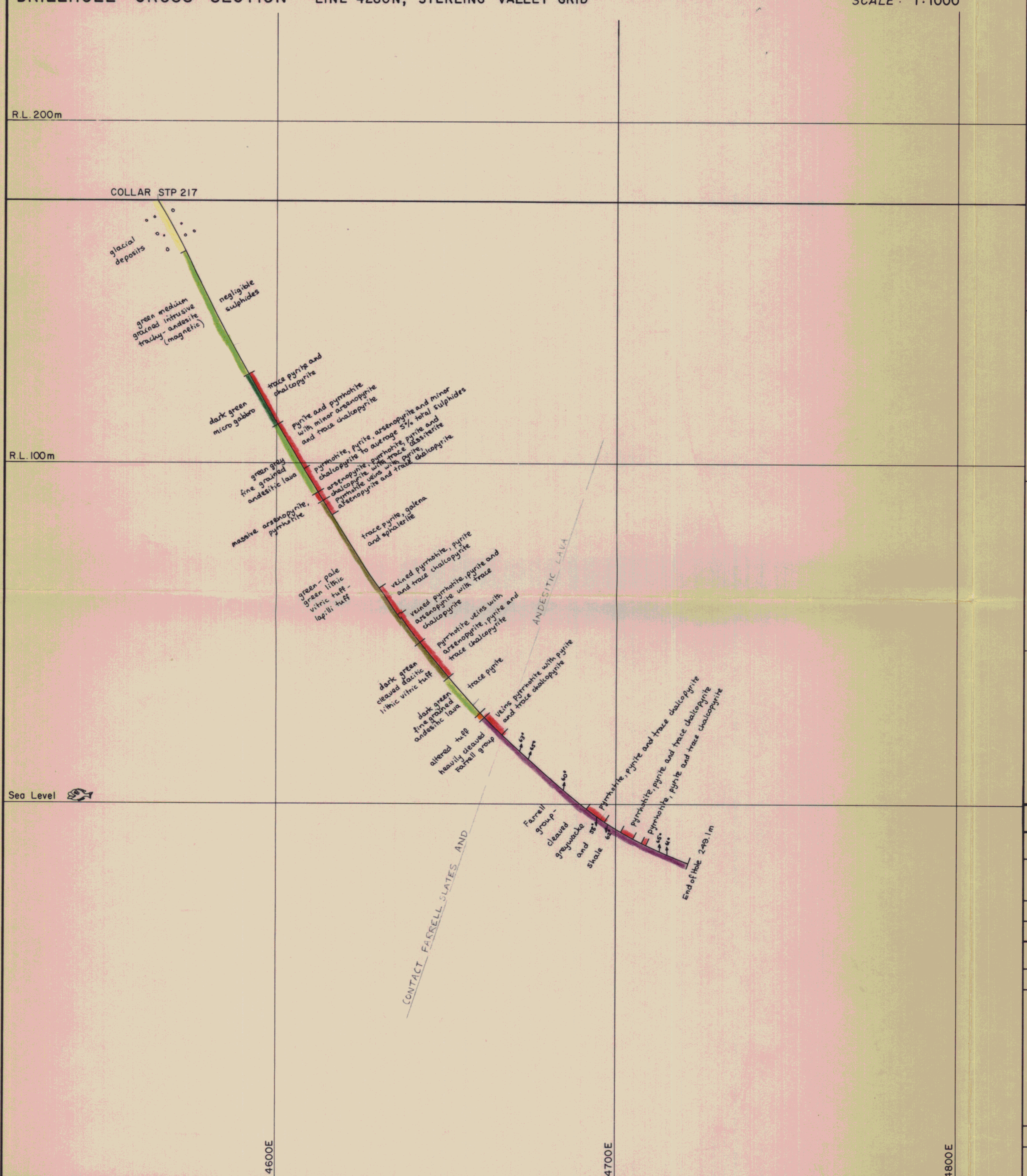


PLAN OF DRILLHOLE

SCALE: 1:1000

DRILLHOLE CROSS SECTION LINE 4280N, STERLING VALLEY GRID

SCALE: 1:1000

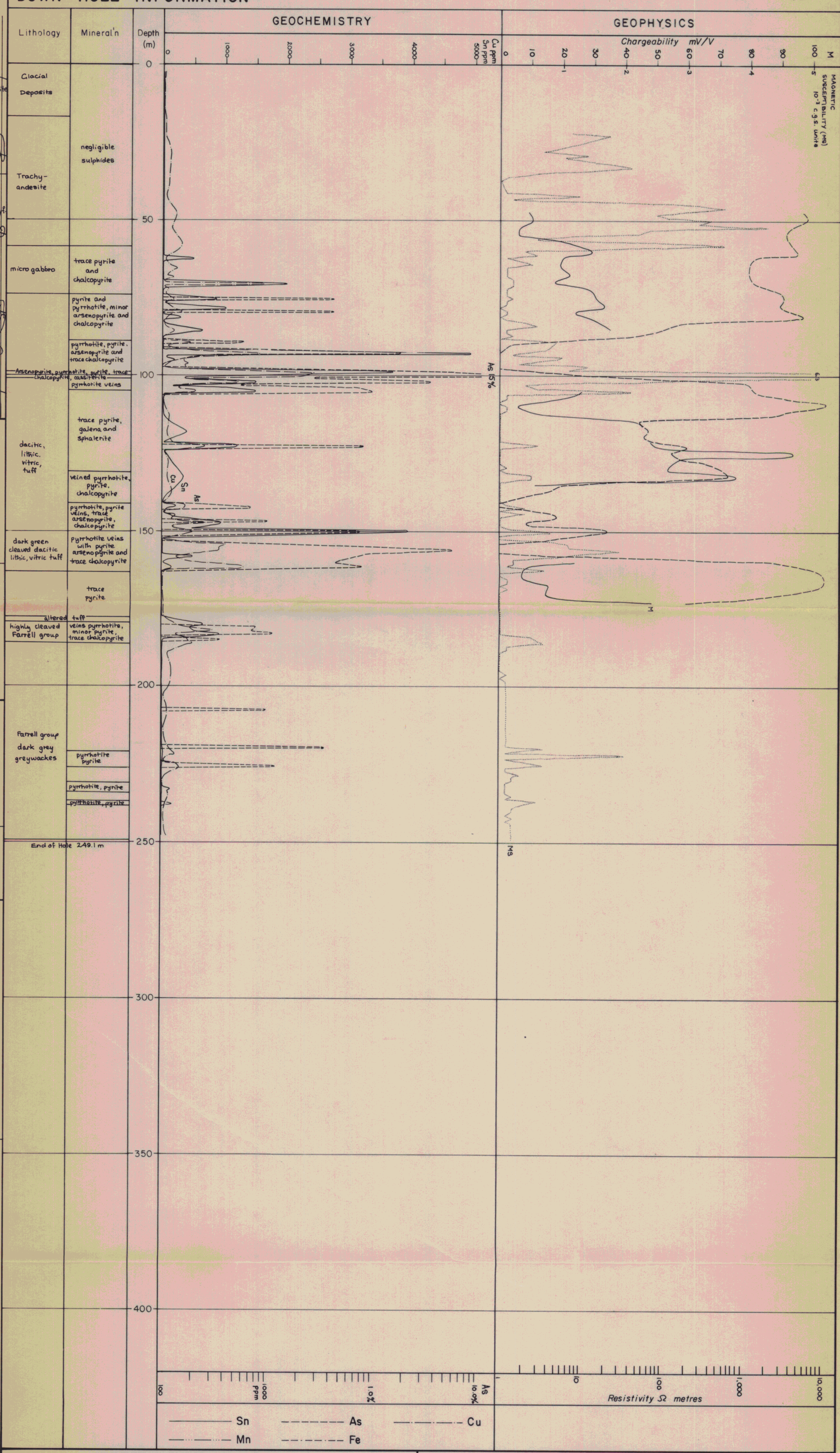


SURFACE GEOPHYSICS

SURFACE GEOCHEMISTRY

NO GEOCHEMICAL DATA DUE TO GLACIAL COVER

DOWN HOLE INFORMATION



SUMMARY OF COMPLETED HOLE

CO-ORDINATES	NORTHING	EASTING	R.L.
LOCAL GRID	4280 N	4565 E	176 m
A.M.G.	5 374 393 mN	384 190 mE	176 m

AZIMUTH: 109.5° A.M.G. DIP: -60° TOTAL DEPTH: 249.1 m

COMMENCEMENT DATE: 8.4.1980 COMPLETION DATE: 2.5.1980

INTERNAL SURVEY INFORMATION

DEPTH	AZIMUTH	DIP	DEPTH	AZIMUTH	DIP
30 m	—	-63°			
66 m	109°	-60°			
84 m	112°	-58.5°			
120 m	112°	-56°			
150 m	108°	-50°			
200 m	109°	-40°			
249 m	108°	-26°			

HOLE SIZE	FROM	TO	HOLE SIZE	FROM	TO
NQ	0	48.0 m			
BQ	48.0	249.1 m			

DRILLED GEOLOGY (SUMMARISED)

DEPTH	LITHOLOGY	MINERALISATION AND SIGNIFICANT ASSAYS
0 - 17.2 m	Glacial deposits	Negligible sulphides
17.2 - 58.9	Grey green medium grained intrusive andesite	Negligible sulphides
58.9 - 74.5	Dark green grey micro gabbro	Trace pyrite and chalcopyrite
74.5 - 98.5	Green grey fine grained andesitic lava	74.5 - 89.5 : pyrite and pyrrhotite with minor arsenopyrite and chalcopyrite average 1% total. 89.5 - 98.5 : pyrrhotite, pyrite, arsenopyrite and minor chalcopyrite.
98.5 - 100.6	Massive stringers of pyrrhotite and arsenopyrite in silica alteration.	98.5 - 100.6 : arsenopyrite, pyrrhotite with trace chalcopyrite and cassiterite.
100.6 - 150.6	Dacitic lithic vitric tuff to lapilli tuff	100.6 - 105.4 : pyrrhotite veins with pyrite, arsenopyrite and trace chalcopyrite 105.4 - 131.1 : trace pyrite, sphalerite and galena 131.1 - 141.1 : veined pyrrhotite, pyrite and trace chalcopyrite 141.1 - 150.6 : veined pyrrhotite, pyrite, arsenopyrite and trace chalcopyrite
150.6 - 163.1	Dark green cleaved dacitic lithic vitric tuff	150.6 - 163.1 : pyrrhotite veins with pyrite and trace chalcopyrite.
163.1 - 178.2	Dark green fine grained andesitic lava	163.1 - 178.2 : trace pyrite
178.2 - 179.3	Altered tuff	178.2 - 179.3 : no visible mineralisation
179.3 - 249.1	Farrell group - cleaved greywackes and shales	219.5 - 226.1, 231.1 - 234.4, 236.8 - 237.2 } pyrrhotite and pyrite veins associated with quartz

LOGGED BY: A.M., J.M. DATE: 20.5.80

SAMPLE DATA

SAMPLED INTERVAL	SAMPLE NUMBERS	SAMPLE TYPE	ELEMENTS DETERMINED	LAB. METHOD
0 - 60m	33081 - 33092	CHIP	Pb, Zn, Cu, Ag, As, Sn	A.A.S.
60 - 106.45	37954 - 37982 33099, -100 33066 - 33080	SPLIT	Pb, Zn, Cu, Ag, As, Sn Sn (70-71, 75-89, 91.65-106.45)	A.A.S. X.R.F.
106.45 - 121.0	37983 - 37985	CHIP	Pb, Zn, Cu, Ag, As, Sn	A.A.S.
121.0 - 124.6	37910 - 37912	SPLIT	Pb, Zn, Cu, Ag, As, Sn (Sn 121.0-123.6)	A.A.S. (X.R.F.)
124.6 - 140.1	37986 - 37988	CHIP	Pb, Zn, Cu, Ag, As, Sn (Sn 124.6-135.0)	A.A.S. (X.R.F.)
140.1 - 163.1	37914 - 37934	SPLIT	Pb, Zn, Cu, Ag, As, Sn (Sn 141.1-150.6, 157.6-162.1)	A.A.S. (X.R.F.)
163.1 - 179.3	37989 - 37992	CHIP	Pb, Zn, Cu, Ag, As, Sn	A.A.S.
179.3 - 187.3	37935 - 37942	SPLIT	Pb, Zn, Cu, Ag, As, Sn (Sn 179.3-184.3)	A.A.S. (X.R.F.)
187.3 - 219.1	37993 - 37999	CHIP	Pb, Zn, Cu, Ag, As, Sn	A.A.S.
219.1 - 226.1	37943 - 37949	SPLIT	Pb, Zn, Cu, Ag, As, Sn	A.A.S.
226.1 - 231.1	36701	CHIP	Pb, Zn, Cu, Ag, As, Sn	A.A.S.
231.1 - 235.1	37950 - 37953	SPLIT	Pb, Zn, Cu, Ag, As, Sn	A.A.S.
235.1 - 249.1	36702 - 36704	CHIP	Pb, Zn, Cu, Ag, As, Sn	A.A.S.
51.1m	29797	THIN SECTION		
87.1	29798	" "		
100.45	29799	" "		
104.25	29800	" "		
147.4	36705	" "		
155.1	36706	" "		
163.1	36707	" "		
184.4	36708	" "		

NOTES:

SPECIFICATIONS OF PROPOSED HOLE

CO-ORDINATES	NORTHING	EASTING	R.L.
LOCAL GRID	4280 N	4565 E	176 m
A.M.G.	5 374 405 mN	384 200 mE	176 m

AZIMUTH: 108° A.M.G. DIP: -60° DESIGNED DEPTH: 250 m

ESTIMATED COMMENCEMENT: 1.4.80

ANTICIPATED GEOLOGY

DEPTH	LITHOLOGY	NATURE OF TARGET AND ANTICIPATED DEPTH
0 - 25 m	Unconsolidated fluvio-glacial deposits	
25 - 130 m	Intermediate volcanics similar to those intersected in MRP 212.	Massive sulphides or graphite with pyrrhotite or magnetite at 100-150m
130 - 250 m	Sediments of the 'Farrell Slates'	

DESIGNED BY: M.J.M. DATE: February 1980

AIM OF HOLE:

To test coincident I.P. and Ground Magnetic anomalies.

NOTES:

063162

5 cm

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: STERLING VALLEY TAS.

SPECIFICATIONS AND SUMMARY OF RESULTS

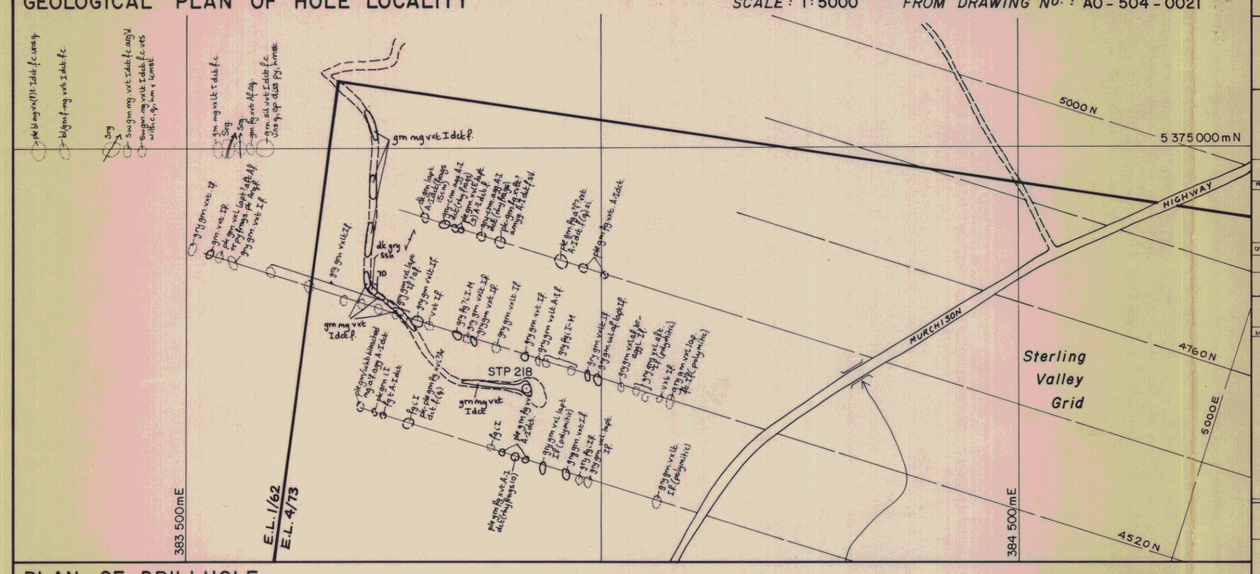
EXPLORATION DIAMOND DRILL HOLE No. STP 217

80-1462

SCALE: As shown	Survey: M.J.M.	Revised: 13.6.80
Reference:	Date: 25.3.80	REF. No. AI-526-0012
Drawn: R.P.T.	Checked:	

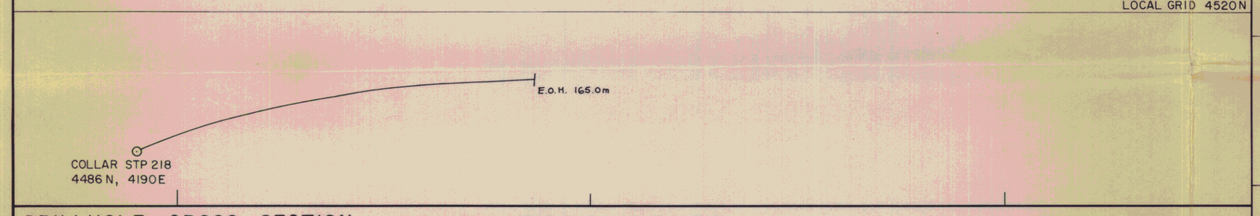
GEOLOGICAL PLAN OF HOLE LOCALITY

SCALE: 1:5000 FROM DRAWING No.: A0-504-0021



PLAN OF DRILLHOLE

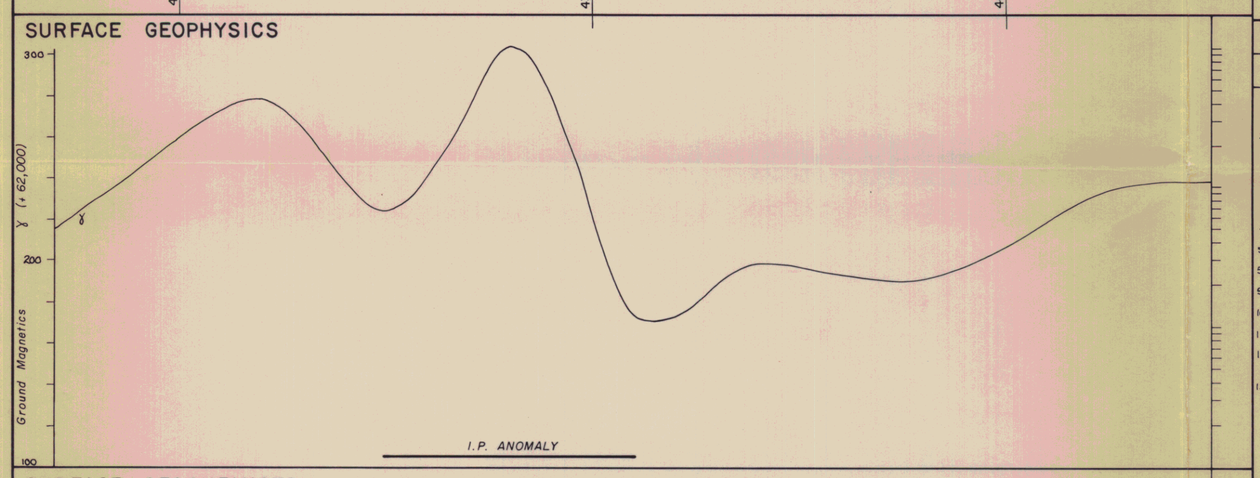
SCALE: 1:1000



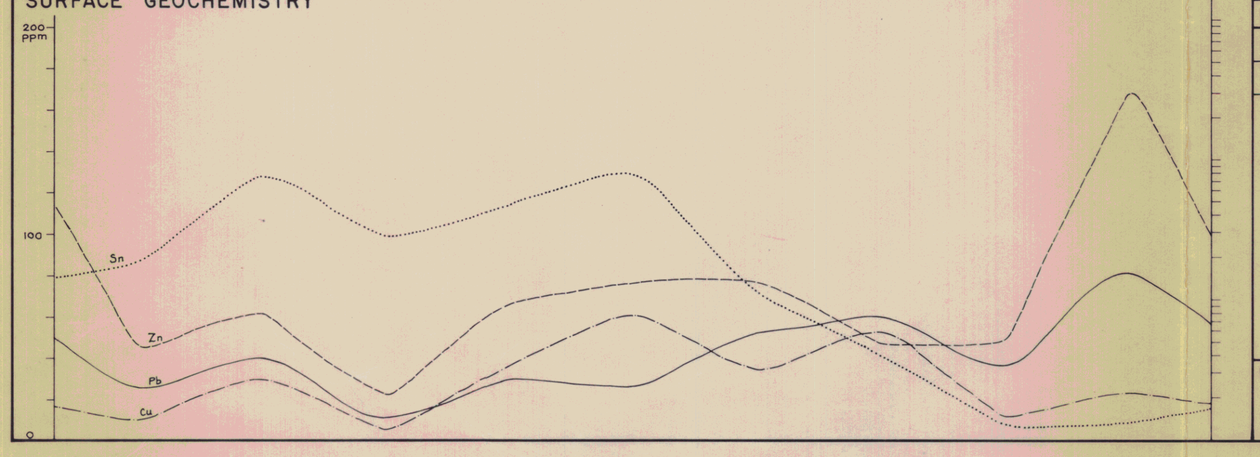
DRILLHOLE CROSS SECTION LINE 4520N, STERLING VALLEY GRID

SCALE: 1:1000

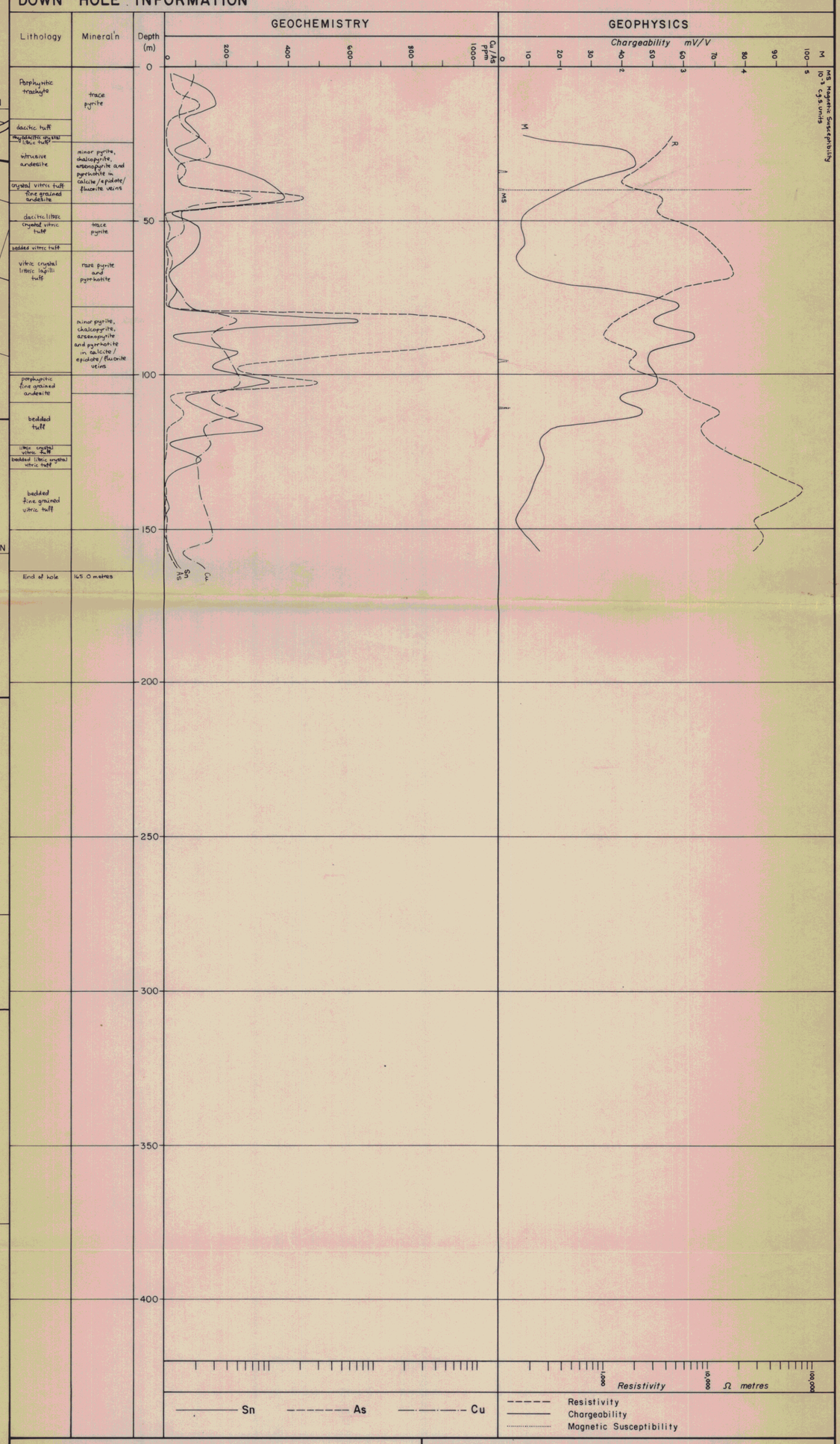
SURFACE GEOPHYSICS



SURFACE GEOCHEMISTRY



DOWN HOLE INFORMATION



SUMMARY OF COMPLETED HOLE

CO-ORDINATES	NORTHING	EASTING	R.L.
LOCAL GRID (Sterling Valley)	4486 N	4190 E	243 m
A.M.G.	5 374 717 mN	383 904 mE	256 m

AZIMUTH: 102° A.M.G. DIP: -62° TOTAL DEPTH: 165.0m

COMMENCEMENT DATE: 19.5.80 COMPLETION DATE: 9.6.80

INTERNAL SURVEY INFORMATION

DEPTH	AZIMUTH	DIP	DEPTH	AZIMUTH	DIP
44m	092°	-56.5°			
74m	097.75°	-53.75°			
104m	100°	-52.5°			
134m	105°	-50.5°			
164m	105° A.M.G.	-49°			

HOLE SIZE	FROM	TO	HOLE SIZE	FROM	TO
NQ	0	17.4m			
BQ	17.4m	165.0m			

DRILLED GEOLOGY (SUMMARISED)

DEPTH	LITHOLOGY	MINERALISATION AND SIGNIFICANT ASSAYS
0-17.4	Porphyritic trachyte	Trace disseminated pyrite up to 1%
17.4-22.4	Dacitic pyroclastic	Ditto.
22.4-23.3	Rhyodacitic crystal lithic tuff	Trace pyrite on shears
23.3-37.1	Pale green intrusive andesite	Minor pyrite, chalcopyrite, arsenopyrite and pyrrhotite in calcite/epidote/fluorite veins.
37.1-40.0	Grey medium grained crystal vitric tuff	
40.0-44.1	Pale green grey fine grained andesite	
44.1-57.0	Pale grey dacitic lithic crystal vitric tuff.	Trace pyrite
57.0-59.0	Pale grey bedded vitric tuff	Trace pyrite associated with veins.
59.0-99.7	Pale green grey vitric crystal lithic lapilli tuff.	78.0-106.9 : trace pyrite, chalcopyrite, pyrrhotite, and arsenopyrite in epidote/calcite/fluorite veins 0.3-1m apart.
99.7-109.0	Porphyritic fine grained trachy andesite.	
109.0-123.0	Pale green grey graded dacitic tuff.	106.9-165.0 : trace pyrite and chalcopyrite in veins.
123.0-126.0	Pale green dacitic lithic crystal vitric tuff.	
126.0-130.1	Pale green grey bedded dacitic lithic crystal vitric tuff.	
130.1-165.0	Pale green grey bedded fine grained dacitic vitric tuff.	

LOGGED BY: A.M. DATE: JUNE 1980

SAMPLE DATA

SAMPLED INTERVAL	SAMPLE NUMBERS	SAMPLE TYPE	ELEMENTS DETERMINED	LAB. METHOD
13.5 m	29517	THIN SECTION		
20.0 m	29518	" "		
34.4 m	29519	" "		
84.6 m	29520	" "		
92.1 m	29523	" "		
119.1 m	29521	" "		
138.8 m	29522	" "		
0-165 m	38901-38933	CHIP	Pb, Zn, Cu, Ag, As Sn	A.A.S. X.R.F. (PRESSED POWDER)

NOTES: 1. 25-45 m average Sn 310 ppm. 80-85 m average Sn 610 ppm.
80-120 m average Sn 250 ppm.

2. Plan and section of hole plotted according to following collar data. Azimuth 087° A.M.G. Dip: -60° R.L. 243m. Survey data shown above for collar of hole in dispute.

SPECIFICATIONS OF PROPOSED HOLE

CO-ORDINATES	NORTHING	EASTING	R.L.
LOCAL GRID	4520 N	4190E	240 m
A.M.G.	5 374 740 mN	383 915 mE	240 m

AZIMUTH: 108° A.M.G. DIP: -60° DESIGNED DEPTH: 200 m

ESTIMATED COMMENCEMENT: APRIL-MAY 1980

ANTICIPATED GEOLOGY

DEPTH	LITHOLOGY	NATURE OF TARGET AND ANTICIPATED DEPTH
0-200m	Intermediate pyroclastics similar to those intersected by MRP 212	Disseminated sulphides (possibly including pyrrhotite) at 100-150m hole depth.

DESIGNED BY: M.J.M. DATE: 25.2.80

AIM OF HOLE:

To test coincident I.P., Ground Magnetic and Sn geochemical anomalies.

NOTES:

5 cm

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: STERLING VALLEY TAS.

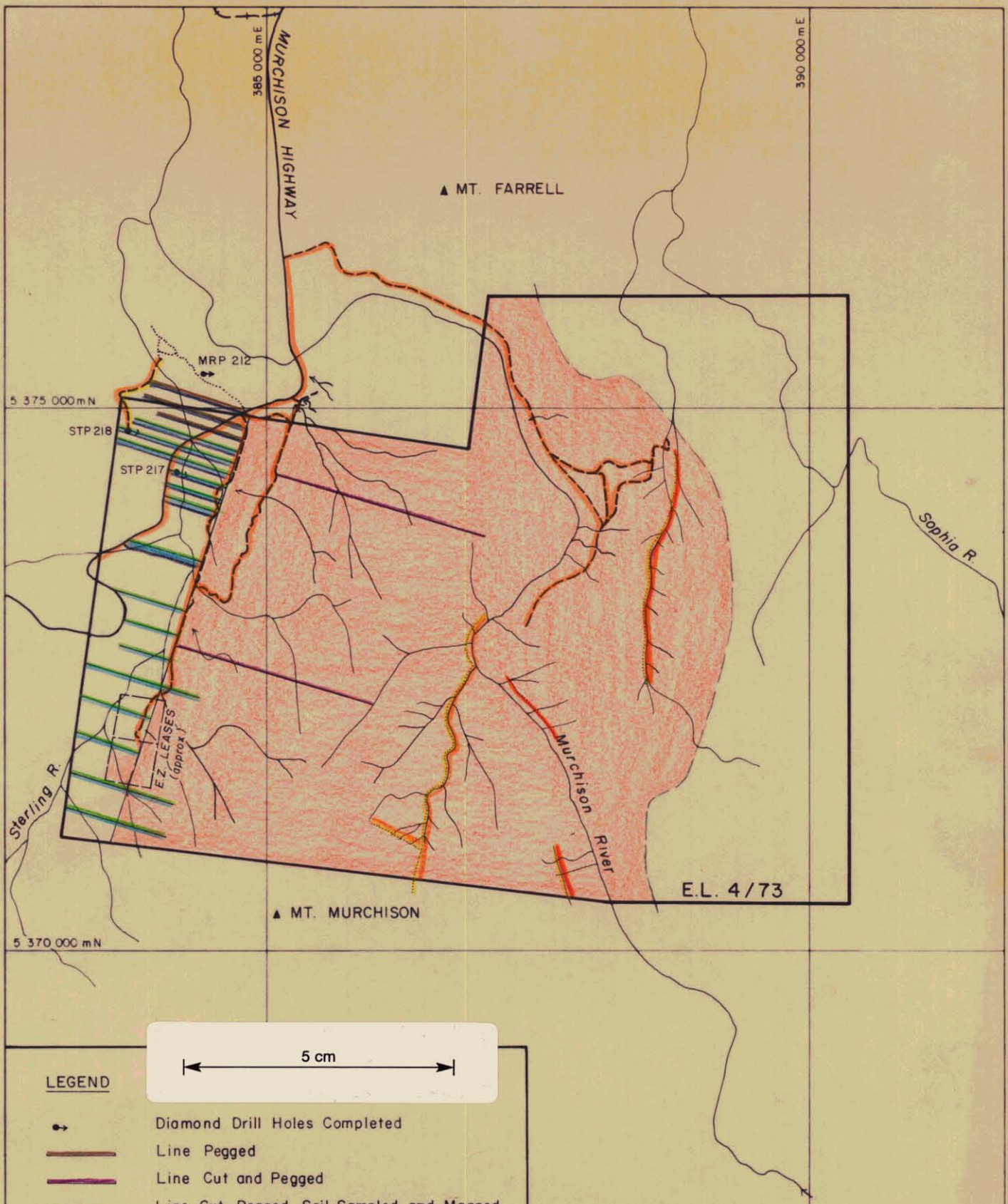
SPECIFICATIONS AND SUMMARY OF RESULTS

EXPLORATION DIAMOND DRILL HOLE No. STP 218

80-1462 063163

SCALE: As shown	Survey: M.J.M.	Revised: 30.6.80
Reference:	Date: 25.3.80	REF. No.
Drawn: R.P.T.	Checked:	AI-526-0013

2864



5 cm

LEGEND

- Diamond Drill Holes Completed
- Line Pegged
- Line Cut and Pegged
- Line Cut, Pegged, Soil Sampled and Mapped
- Stream Sediment Sampling and Mapping Completed
- Line I.P. Dipole - dipole
- Line Ground Magnetics
- Access Mapping Completed
- Road
- Vehicle Track Bulldozed
- Walking Track Cut
- Railway
- Abandoned Tramway
- Transmission Line
- Grid Line.

063164

ELECTROLYTIC ZINC CO. OF A'ASIA. LTD.

PROJECT STERLING VALLEY | TAS.

80-1462 8014

WORK COMPLETED DURING

30.6.79 - 30.6.80

SCALE 1:50,000	Survey A.J.M.	Revised
Reference	Date 4.8.80	REF NO
Drawn R.P.T.	Checked	A4-526-0017

2865