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ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED
West Coast Mines

MT. BLACK EXPLORATION LICENCE 1/62

Report on Work Undertaken to 30th June, 1979

MICROFILMED

Geological Department
Report No. 131

J.H.A. Mill
January, 1980.

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II A photogeological study of Mt. Read Volcanics, North and South of Rosebery, Western Tasmania. 1978.
P. Boshier, Loxton Hunting and Associates Pty. Ltd.
Copies supplied to Getty Oil Development Company Limited.

III Geochemical Exploration for Base Metals, West Coast Tasmania.

N.J. Marshall
April, 1979

Orientation Studies carried out for Electrolytic Zinc Exploration.

N.J. Marshall

April, 1979

Copy appended to: Bulgobac Exploration Licence 12/72
Report No. 130 October, 1979
Forwarded to Mines Department

Copy forwarded to: Getty Oil Development Company Limited.

IV Scintrex Report Tas-065

Comments of Gradient Array Electrical Polarization and Total Magnetic Field Surveys carried out over the Mt. Black Grid near Rosebery, Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited.

March, 1979

Copy supplied to: Getty Oil Development Company Limited.

V Scintrex Report Tas-065

Comments on Gradient Array Detail and Dipole-Dipole Detail at Mt. Black and Contiguous Areas near Rosebery, West Coast Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited, comments pseudo-sections and profiles.

July, 1979

Copy supplied to: Getty Oil Development Company Limited

VI Scintrex Report Tas-065

A report on a Gradient Array Reconnaissance E.I.P. Survey over the Murchison Grid near Tullah, Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited.

July, 1979

Copy supplied to: Getty Oil Development Company Limited.

VII Scintrex Report Tas-065

Comments on dipole-dipole E.I.P. surveys over various grids in the Rosebery Area, Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited.

August, 1979

Copy appended to: Bulgobac Exploration Licence
Report No. 130 October, 1979
Forwarded to Mines Department.

Copy supplied to: Getty Oil Development Company Limited.

VIII Scintrex Report Tas-065

A report on Gradient Array E.I.P. reconnaissance and Dipole-Dipole detail surveys over the White Spur Grid near Rosebery, West Coast Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited.

July, 1979

Copy supplied to: Getty Oil Development Company Limited.

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Geoex
June, 1978

X Pseudo-Section of Cutty Sark I.P. lines 12,300N, 12,700N, 13,500N, 13,900N and 14,100N.

Geoex,
June, 1978

XI Origins and Inflection Points of grid lines cut since the inception of the Mt. Black Joint Venture at Farm Creek, Mt. Sale, Pieman and White Spur.

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LIST OF PLANS

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Reference No.	Scale	Title
VOLUME 4		
Plate 1		Geological Legend for Exploration Mapping.
A2-504-0090	1:50,000	E.L. 1/62 and Excluded Areas
A2-504-0002	1:50,000	Locality Names
A2-504-0095	1:50,000	Aeromagnetics
A2-504-0098	1:50,000	Bedrock Geological Plan
A2-504-0089	1:50,000	Work completed since inception of E.Z./Getty Joint Venture to 30th June, 1979.
JD-525-0062	1:50,000	Sheet Layout Plan
JD-525-0003	1:50,000	Provisional Photogeological Worksheet of of the Rosebery Area, Tasmania.
AO-525-0004	1:10,000	Geology Sheet 5
AO-525-0005	1:10,000	Geology Sheet 6
AO-525-0006	1:10,000	Geology Sheet 7
AO-525-0055	1:10,000	Geology Sheet 8
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AO-525-0054	1:10,000	Induced Polarization Sheet 6
AO-525-0024	1:10,000	Induced Polarization Sheet 7
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AO-525-0058	1:10,000	Induced Polarization Sheet 9
VOLS		
AO-525-0052	1:10,000	Stream Sediment Geochemistry -80 mesh Sheet 5
AO-525-0053	1:10,000	Stream Sediment Geochemistry Mn Coated Pebbles +80 mesh Sheet 5
AO-525-0049	1:10,000	Stream Sediment Geochemistry -80 mesh Sheet 7
AO-525-0051	1:10,000	Stream Sediment Geochemistry Mn Coated Pebbles +80 mesh Sheet 7
AO-525-0030	1:10,000	Soil Geochemistry Cu Sheet 5
AO-525-0031	1:10,000	Soil Geochemistry Zn Sheet 5
AO-525-0032	1:10,000	Soil Geochemistry Pb Sheet 5
AO-525-0025	1:10,000	Soil Geochemistry Cu Sheet 7
AO-525-0027	1:10,000	Soil Geochemistry Zn Sheet 7
AO-525-0026	1:10,000	Soil Geochemistry Pb Sheet 7

Reference No.	Scale	Title
VOL 5 (cont)		
A0-504-0025	1:5,000	Soil Geochemistry Pb/Zn Sheet 5B
A0-504-0026	1:5,000	Soil Geochemistry Cu/Fe Sheet 5B
A0-504-0027	1:5,000	Soil Geochemistry Pb/Zn Sheet 5C
A0-504-0028	1:5,000	Soil Geochemistry Cu/Fe Sheet 5C
VOL 6 A0-504-0029	1:5,000	Soil Geochemistry Pb/Zn Sheet 5D
A0-504-0030	1:5,000	Soil Geochemistry Cu/Fe Sheet 5D
A0-504-0031	1:5,000	Soil Geochemistry Pb/Zn Sheet 6A
A0-504-0032	1:5,000	Soil Geochemistry Cu/Fe Sheet 6A
A0-504-0033	1:5,000	Soil Geochemistry Pb/Zn Sheet 6D
A0-504-0034	1:5,000	Soil Geochemistry Cu/Fe Sheet 6D
A0-504-0048	1:5,000	Soil Geochemistry Pb/Zn Sheet 7A
A0-504-0049	1:5,000	Soil Geochemistry Cu/Fe Sheet 7A
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A0-504-0035	1:5,000	Soil Geochemistry Pb/Zn Sheet 7C
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A1-508-0006	1:2,500	Magnetics - Cutty Sark
A2-504-0118	1:50,000	Bedrock Geological Plan

1. INTRODUCTION

After negotiations with Getty Oil Development Co. Ltd., a Joint Venture was initiated, beginning in April, 1978. The Joint Venture agreement was subsequently signed on 17th November, 1978.

The areas covered by the E.Z./Getty Joint Venture includes E.L. 1/62 and amalgamated licences S.P.L. 132 and S.P.L. 3, but excludes all E.Z. owned mining leases. It also excludes an area of 2km^2 adjoining the mining leases in the Bobadil area. Mining leases owned by E.Z. over the Farrell Mine area were also excluded for all minerals except tin.

It was agreed that E.Z. would be Managers of the Joint Venture.

A description of E.L. 1/62 may be found in Appendix 1. Refer to Plan No. A2-504-0090 (1:50,000 scale) showing E.L. 1/62, S.P.L. 132 and S.P.L. 3 and also E.Z. owned mining leases and other areas excluded from the Joint Venture.

2. ABBREVIATIONS

Standard symbols and terminology used on Geological Plans can be found on Plate 1 Geological Legend for Exploration Mapping.

3. HISTORY OF E.L. 1/62

The area covered by the Mt. Black Joint Venture is held as Exploration Licence 1/62 (Mt. Black).

Initially the area covered by the Mt. Black Joint Venture was held as three licences. viz El 1/62 (Mt. Black), SPL 3 (Tullah) and SPL 132 (Dundas), but these licences were amalgamated as EL 1/62 (Mt. Black) prior to the signing of the Joint Venture agreement.

The prior histories of these three licences are as follows:

3.1. E.L. 1/62 (Mt. Black)

The originial licence of EL 1/62 (Mt. Black) was granted on 22nd January, 1962. The only possible change in the shape of the licence

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prior to amalgamation with SPL's 3 and 132 would be due to the change in the method used to describe the EL involving adoption of AMG co-ordinates in 1977.

3.2. SPL 3 (Tullah)

The original licence of 10 square miles was granted on 6th January, 1965. In July, 1974, it was reduced to 8 square miles by relinquishing the area on the northern side of the Mackintosh River. This area was aquired by Cominco Exploration Pty. Ltd. as part of EL 11/74. Subsequently EL 11/74 was surrendered and then applied for by E.Z. and amalgamated into SPL 3 (Tullah) to make a total area of 30 square kilometers.

3.3. SPL 132 (Dundas)

This licence was originally granted on 29th May, 1974 as an area of 46 sq. km. to cover part of the present EL 1/62 and the Dundas area. The Dundas area was surrendered in November, 1974, reducing the licence to an area of 11 sq. km. as shown on plan A2-504-0090.

On the 22nd April, 1978, the three licences were amalgamated as EL 1/62. Cost accounting and reporting have been simplified by the amalgamation of the licences.

4. AREA SUBDIVISION

The Mt. Black Joint Venture was divided into ten sub-areas on the following parameters:

(i) Geological characteristics
(ii) Stage of exploration
(iii) Topography and access

The subdivisions defined at the commencement of the Joint Venture have been ammended as presented on Sheet A2-504-0002. These alterations are the result of the operating practices accepted up to the end of June, 1979. The area subdivisions have been extensively utilised for programming, budgeting and reporting.

5. EXPLORATION PHILOSOPHY

The primary objective of the Joint Venture has been to explore for massive base metal sulphide orebodies within the Cambrian Mt. Read Volcanics. Tin mineralisation within the sediments of the Natone area is of significant secondary importance and the possibility of tin mineralisation within the Farrell Slates (Tullah sub-area) cannot be discarded.

The programme proposed for the Joint Venture up to the end of June, 1979, consisted of the following:

5.1. Assessment of Previously Explored Areas

5.1.1. Cutty Sark Area:

Programmes commenced prior to the Joint Venture were to be completed. Work involved additional geophysics (I.P. and magnetics) soil geochemistry and geological mapping. As no suitable targets were located the diamond drilling programme has not been carried out.

5.1.2. White Spur Area:

Previous soil sampling and geological mapping has defined a geochemically anomalous sedimentary horizon considered to be equivalent to the Rosebery Host Rock horizon. The programme allowed for completion of geological mapping in the Jones Creek area and coverage with gradient array I.P. diamond drilling of targets to be undertaken as soon as possible.

5.2. Reconnaissance Grid Assessment of Previously Unexplored Areas

5.2.1. Farm Creek

Coverage of 1km north-south speced grid lines with geophysics (magnetics and I.P.), soil geochemistry and geological mapping.

5.2.2. Pieman

Coverage with reconnaissance grid lines with geophysics (magnetics and I.P.), soil geochemistry, and geological mapping. Anomaly follow-up and diamond drilling of targets to be undertaken, if necessary.

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5.2.3. Mt. Sale

Coverage of east-west grid lines at 1km north-south spacings with geophysics (magnetics and I.P.), soil geochemistry and geological mapping. Anomaly follow-up to target selection for diamond drilling to be completed. Diamond drilling to be undertaken if warranted.

5.2.4. Stitt

Reconnaissance geological mapping of existing track access to be completed. The 1km spaced east-west grid system established in the Mt. Sale area to be extended southwards into the Stitt area. Lines to be geologically mapped, soil sampled and surveyed with dipole-dipole I.P..

5.3. General

Aeromagnetics and topographic mapping coverage at 1:10,000 scale to be completed (see sections 6.1 and 6.2). A photogeological interpretation to be undertaken by consultants (see section 6.3).

The completion of assessment of the Cutty Sark and White Spur (Jones Creek) area was intended to provide early diamond drilling targets to attain the scheduled rate of expenditure.

The assessment of areas previously little explored with modern techniques was commenced using available methods on 1km spaced grid lines. This grid line spacing, a compromise between rate of ground coverage and cost, was intended to detect the geochemical, geophysical or geological expression of any obvious mineralised or altered zones and to locate any stratigraphy considered to have potential warranting more detailed examination.

Techniques to be used on the 1km spaced grid lines included:

i) Ground magnetics
ii) I.P.
iii) Soil geochemistry (nominal 'C' horizon)
iv) Geological mapping

Ground magnetics was not considered as an ore locating tool, only as an aid to geological interpretation.

Induced polarisation was selected as the best possible method of locating sulphide mineralisation at depth with the additional benefit of penetrating areas of glacial cover. A mixture of I.P. techniques was utilised including frequency domain dipole-dipole, time domain dipole-dipole and time domain gradient array. The selection of the method to be used is very much dependent on the purpose of the survey; thickness and resistivity of any overburden and the grid layout and logistics required.

Soil geochemistry (nominal 'C' horizon) was considered as the second technique to locate mineralisation and to aid in selection of priorities for follow-up of I.P. anomalies. Any lack of soil geochemical response should be treated with caution due to the variation in soil types and the extensive areas of glacial cover. Soil samples have been individually plotted at 1:5,000 and contoured data photo reduced to 1:10,000 scale (Refer to Sheets A0-525-0025 - A0-525-0027 and A0-525-0030 - A0-525-0032)

Geological mapping should:

i) Elucidate the stratigraphy and structure to ensure that grids are laid out in the most effective orientation, and

ii) locate any alteration or mineralisation warranting further examination even though geophysical and geochemical techniques may not have produced encouraging results, and

iii) Locate any stratigraphy or stratigraphic horizon considered as a favourable geological environment.

6. CONTRACT SERVICES AND REPORTS RECEIVED

6.1. Topographic Mapping (Refer to Plan No. JD-525-0062)

Prior to 1973, the majority of exploration information was presented on grid plans at various scale between 40':1" and 400':1". The grids used varied from extensions of Rosebery Mine and Hercules Mine grids to localised grids established with tape and compass surveys. Only limited use was made of the Lands Dept. 1":20 chains (1:15,840) scale topographic plans.

In 1973, the 1":20 chain topographic plans were photo-enlarged to 1:10,000 scale and a set of base sheets drawn for the Mt. Black E.L.

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The coverage relevent to the Mt. Black and Bulgobac Joint Venture areas is shown on Sheet Layout Plan JD-525-0062. The Lands Dept. topographic plans, produced in the 1950's, predated the construction of many access tracks and thus many of those shown on the original set of 1:10,000 scale plans were plotted from enlarged aerial photographs. Local idealised grid plans at 1:2,500 scale were used in conjunction with the 1:10,000 scale plans as presented in the Annual Progress Reports for 1973/74 and 1974/75. (Williams 1974, 1975).

In 1974/75 funds were approved to undertake topographic mapping of the western half of EL 1/62. Contractors, Associated Surveys Pty. Ltd., photogrammetrically produced 1:5,000 scale topographic plans with 10m contour intervals as indicated on Sheet JD-525-0062. Where possible cut line grids and drill hole collars etc. were photo-targeted and subsequently steroplotted on the topographic plans.

In conjunction with E.Z., Comstaff Pty. Ltd. also contracted Associated Surveys Pty. Ltd. to produce topographic plans at 1:10,000 scale of the area. E.Z. and Comstaff subsequently exchanged these topographic plans and these 1:10,000 scale topographic plans have been used as the topographic base on the Bulgobac Joint Venture.

At the commencement of the Mt. Black Joint Venture it was decided to continue the Associated Surveys 1:10,000 scale topographic plans southwards to cover EL 1/62. Sufficient survey control existed for this work to be completed at the basic price for setting up the photogrammetry and the subsequent steroplotting. The areas previously topographically mapped at 1:5,000 scale were not re-steroplotted but the 1:5,000 scale plans photo-reduced to 1:10,000 scale and re-drafted.

The current set of 1:10,000 scale plans include topographic information derived from the following additional sources:

i) Sheet 32 & 11

Topography which is contoured in metres was derived from a set of 1:5,000 scale plans produced by Australian Aerial Mapping Pty. Ltd. for Geophoto Resources.

Sheet 30

Topography east of 369,500E, west of 373,000E and south of 5,364,000N was also derived from Australian Aerial Mapping Pty. Ltd..

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ii) Sheets 11 & 32

Topography which is contoured in feet was derived from the photo-enlarged Lands Dept. 1:20 chain plans.

Cultural detail which post dates the photography (January, 1975) used for the topographic mapping by Associated Surveys has been added to sepias of the original base sheets. This data has been plotted from the following sources:

i) 1:2,000 scale topographic plans obtained from the Hydro Electric Commission e.g. Pieman Access Road.

ii) E.Z. Survey Dept. tachometric surveys e.g. Stitt Access track.

iii) E.Z. Geology Dept. tape and compass surveys e.g. Sterling River access track.

iv) Recent aerial photography enlarged to plan scale e.g. logging tracks in White Spur area (Jones Creek).

6.2. Aeromagnetics

Pre-existing aeromagnetic coverage of EL 1/62 is indicated below:

i) Rio Tinto Australia (in Joint Venture with E.Z.) produced the first aeromagnetics coverage of EL 1/62. This information has not been used for Joint Venture plans.

ii) Scintrex Turair E.M. surveys (1972). The aeromagnetics produced during the Turair surveys were plotted at 1"=20 chain photomosaic scale. Subsequently these plans were photoenlarged to 1:10,000 scale and plotted on the original (1973) 1:10,000 scale plans. The data was then replotted on the new 1:10,000 scale plans. There are obvious problems with the acurate matching of the 1978 aeromagnetics with the Turair aeromagnetics which are due to the method of replotting the Turair aeromagnetics at 1:10,000 scale.

iii) Scintrex Aeromagnetics (1973). This data was originally plotted at 1:10,000 scale on the photo-enlarged 1" = 20chain topographic base and is reasonally compatable with the newer topographic base.

iv) Geoterrex Input (1975). The aeromagnetics data collected during the Input Survey flown for Comstaff Pty. Ltd. has not been used on the Joint Venture areas as the data is less detailed than the Geoex or Scintrex data and has a distorted photomosaic base.

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v) Geoex Pty. Ltd. completed the aeromagnetics coverage of EL 1/62 in April, 1978. Geoex recovered the flight lines on 1:10,000 scale enlarged aerial photographs and presented the data on the current set of 1:10,000 scale plans.

Part of the area flown by Geoex was a joint project between E.Z. and Mt. Lyell and part was flown entirely for Mt. Lyell.

The available aeromagnetics data has been photo-reduced and plotted at 1:50,000 scale as an overlay to the photogeological interpretation plan produced by Loxton Hunting.

This magnetics compilation at 1:50,000 scale is included as Sheet A2-504-0095 of this report.

6.3. Photogeological Interpretation (Refer to Appendix II and 1:50,000 Geological Interpretation Plan JD-525-0003)

No detailed compilation or photogeological interpretation of EL 1/62 existed at the commencement of the Mt. Black Joint Venture.

R.F. Loxton, Hunting and Associates were contracted to produce a photogeological interpretation plan at 1:50,000 scale of the area between the Que and Henty Rivers. The final plan, included as Sheet JD-525-0003 of this report, was issued with a 19 page report (Boshier, 1978). The photogeologist, Mr. P. Boshier, had access to all geological maps available to E.Z. and consequently the photogeological interpretation is strongly based on previous factual mapping. Thus, in areas of existing access, the photogeological interpretation is substantially in agreement with previous mapping. In areas of no previous detailed geology, the interpretation is based solely on photo interpretation. Experience to date suggests that the photogeological interpretation has successfully identified the different rock type boundaries but in some areas a presumed broad scale joint set has been wrongly interpreted as dip slopes. e.g. Western section of the Mt. Sale area.

There can be no doubt that the photogeological interpretation provided a rapid compilation of pre-existing geological mapping and an interpretation of the inaccessable areas. The completion of this interpretation by a consultant without previous experience in the area provided new ideas although his interpretation may have been influenced

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by the knowledge and consequent interpretation of the E.Z. Geologists involved.

6.4. Geochemistry

Geochemical techniques utilised during the early stage of the Joint Venture have been continuations of those employed previously on the Mt. Black EL. The major emphasis has been soil sampling using a hand auger to obtain samples from a maximum depth. The samples collected have been termed 'C' horizon' but it has long been recognised that the soil profiles vary rapidly and thus this method of sampling is producing samples from horizons varying from A_1 to C.

The -80 mesh fraction has been analysed for Cu, Pb, Zn, Ag and Fe following total extraction in acid solutions (Perchloric/Nitric currently). Sample interval has been 20m. Following a study by N.J. Marshall & Associates during 1979 it was decided to analyse for Mn instead of Ag. (Refer to Appendix III)

Pre Joint Venture stream sediment sampling mainly dates from 1970/71 using analyses of the -80 mesh fraction following total extraction. At least some of this sampling is invalid and thus all the stream sediment samples collected during this period must be treated with scepticism.

A consultant geochemist, Dr. N.J. Marshall of N.J. Marshall & Associates was retained by both Mt. Lyell-Getty and E.Z.-Getty to report to the application of geochemistry to the exploration programmes being conducted by both Joint Ventures. His report entitled "Geochemical Exploration for Base Metals, West Coast Tasmania" consisted of two sections, viz

i) "Part I - General Text"

ii) "Part II - Orientation studies carried out for Electrolytic Zinc Exploration".

(Refer to Appendix III)

The report covers all facets of geochemical exploration possibly applicable to the Joint Venture. The following recommendations by Marshall are currently under investigation:

i) Stream sediment sampling: In addition to the previously used -80 mesh conventional sampling, the collection of Fe and Mn

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oxide coated stream pebbles with analysis by hydroxylamine leach was completed over the Mt. Sale area. Results were not available at the end of June, but the following comments are warrented:

a) Only a limited number of actual pebble samples were collected due to the absence of visible coatings on most stream pebbles, and thus

b) The majority of samples collected were bulk stream sediments from which the +80 mesh fraction was selected for analysis for the oxide coatings.

ii) Soil Sampling:

Marshall suggests that auger sampling should continue on detailed soil grids with 'B horizon' soils being sampled. However, for regional soil sampling and for areas where 'B horizon' is not developed, Marshall recommends sampling of surface litter, A_o or A_1 horizons depending on which is the more prevalent. Litter samples have been collected over many of the follow-up grids on the Mt. Sale area but no results were available at the end of June, 1979.

Further assessment of suggestions by Marshall will continue during 1979/80.

6.5. Geophysics

Aerial E.M. Techniques

Scintrex in 1972 flew a Turair survey over the mine leases. Part of this survey overflew the eastern boundary of the leases onto EL 1/62. The data has been compiled onto 1:10,000 plans.

Geoterrex in 1975 flew an Input E.M. Survey for Comstaff which was extended over E.Z.'s mine leases and part of EL 1/62. The data has also been compiled onto 1:10,000 plans.

Ground Geophysics

Many I.P. surveys have been conducted over various grids on the Rosebery Mine Leases, in the Tullah area, at White Spur and the Hercules area. Mc Phar and Scintrex were the main contractors.

All reports are on file at E.Z.'s Rosebery Office and the data has now been compiled onto 1:10,000 sheets AO-525-0037, 0054, 0024, 0057 and 0058.

6.6. Petrology

Central Mineralogical Services have been used for petrological work. Reports are all on file at Rosebery.

7.0 WORK COMPLETED & RECOMMENDATIONS FOR 1979/80

The following section summarises all work completed on EL 1/62 since the inception of the E.Z./Getty Joint Venture on an area by area basis. Note that some map sheets contain more information than has been referred to in the text. This information has been accumulated since 30th June, 1979 and will be summarised in the Annual Report of 1980.

7.1. Bobadil

This area, located adjacent to the Bobadil tailings dam, covers mainly Rosebery Group Sediments. No activity has been carried out since the commencement of the Joint Venture and none is recommended for 1979/80.

7.2. Cutty Sark

7.2.1. Introduction

The Cutty Sark area is named after the Cutty Sark workings located 0.5km SE of the original E.B.R. bridge over the Pieman River. The Mt. Sale area forms the eastern boundary and the Bobadil area the western boundary. Cutty Sark was separated from the Mt. Sale area as exploration of this area was further advanced with coverage of cut line grids,

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soil geochemistry, gradient array I.P. and geological mapping partially completed. Assessment of the area ceased in 1977 due to budget cut backs and thus the area was at a stage where limited additional exploration was required to locate diamond drill targets.

The pre-existing series of plans developed during 1973/74, 74/75 and 76/77 were continued for the Cutty Sark area. These plans are at 1:2,500 scale in contrast to the remainder of the basic data for Mt. Black which is plotted at 1:5,000 scale. Data has subsequently been transferred to the standard 1:5,000 format.

7.2.2. Access

Pre-Joint Venture access to the Cutty Sark workings and surrounding grid was via Innes foot track (overgrown) or by grid lines from the H.E.C. transmission line road 1km to the west. In 1977 a track suitable for tracked vehicles was constructed from this transmission line but was not completed due to budget restrictions. At the commencement of the Joint Venture upgrading of the track was attempted but abandoned after less than 10 hours bulldozing. Subsequently a track was bulldozed down the ridge running north to the Cutty Sark area to approximately 13,500N (Rosebery Mine Grid). This track has consequently been extended to the Langdon Mine Area.

Only intermittant vehicle access has been gained north of 11,000N (Rosebery Mine Grid) due to ground conditions. Since completion of the Cutty Sark exploration, the H.E.C. have redecked the original E.B.R. bridge over the Pieman River and

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thus access could be constructed from the Cutty Sark workings area westwards to the original E.B.R. bridge. This should prove a more trafficable route than that currently available (e.g. if drilling is contemplated near the Langdon Mine).

7.2.3. Gridding

The cut line grid pre-dating the Joint Venture was laid out on Rosebery Mine Grid with line spacings being in multiples of 100 feet and line co-ordinates being every one hundred feet. Several lines were extended and Innes foot track east of the bulldozed access was cut out to improve access into the area.

7.2.4. Geology (Refer to 1:10,000 Geological Plans 5 & 7 Reference Nos. AO-525-0004 & AO-525-0006 and also 1:50,000 scale Bedrock Geological Plan A2-504-000 covering all of EL 1/62)

Five units have been defined by mapping of the Cutty Sark Grid. From west to east these are:

Unit 1 - Vitric Crystal Lithic Tuff

This is a fine grained ash-flow of rhyolitic composition which contains minor lenses of black, pyritic shale along the old base line.

Unit 2 - Crystal Vitric & Vitric Crystal Tuff

Poorly outcropping feldspathic tuff containing minor quartz.

Unit 3 - Fine Grained Crystal & Crystal Vitric Tuff

This unit consists of a distinctive blue chloritized tuff, containing minor disseminated pyrite and chalcopyrite which has been mined at Cutty Sark.

Unit 4 - Crystal Vitric Tuff

Similar to Unit 3 but with increasing grain size and vitric content.

Unit 5 - Fine Grained Crystal Tuff and Ash-Flow Tuff

This unit is defined by the presence of fiamme and other ash-flow textures.

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The rocks of the Cutty Sark area strike north-south and are seen to dip east at moderate angles. Two directions of cleavage have been noted from plots of cleavage poles. No folding has been observed in the area.

The mineralisation at Cutty Sark is associated with rocks of Unit 3 and consists of massive pyrite veins associated with disseminated pyrite and minor chalcopyrite. The main gangue mineral is chlorite.

7.2.5. Geochemistry (Refer to 1:5,000 Soil Geochemistry Sheets 5D & 7A Pb/Zn, Cu/Fe Nos. AO-504-0029, 0030, 0048 & 0049)

Soil samples were taken at 100' intervals along all grid lines. The samples were assayed for Pb, Zn, Cu, Fe and Ag and results were plotted onto 1:2,500 sheets of the area. These sheets have since been superceeded by the standard 1:5,000 sheet series and all data, with the exception of Fe, has been transferred onto the revised sheets. Contours of the data have since been reduced onto 1:10,000 geochemical contour plans for Pb, Zn and Cu.

Apart from above background Cu and Zn values, to maxima of 365ppm Pb, 65ppm Zn and 1000ppm Cu, in the vicinity of the old Cutty Sark workings no anomalous results were obtained.

7.2.6. Geophysics (Refer to 1:10,000 Induced Polarisation Plans 5 & 7, Reference Nos. AO-525-0037 and 0024 & Appendix X)

1. I.P.

Geoex completed a dipole-dipole frequency domain I.P. survey over lines 12,300N, 12,700N, 13,100N, 13,900N and 14,100N of the Cutty Sark Grid during June, 1978 and the electrode interval was 100'. Subsequently Scintrex completed a Time Domain Gradient Array I.P. survey on all lines north of 11,500N.

Significant responses occurred on line 14,100N for both methods. Chargeability anomalies of up to 40 Mv/v (background 14 Mv/v) with an associated resistivity low

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of 400Ω/m was recorded by the gradient array survey. Similar anomalies were recorded by the frequency domain survey. These anomalies were coincident with the Cutty Sark mineralisation contained in Units 3 & 4 described in Section 7.2.4.

A further broad gradient I.P. anomaly was detailed on lines 12,700N and 13,100N over glacial covered pyroclastics of Unit 2.

2. Ground Magnetics (See Sheet A1-508-0006)

A ground magnetic survey was conducted over the grid and the results plotted at 1:2,500 scale. Magnetic highs of up to 350 gammas above background were obtained from Units 3, 4 and 5. While the high magnetic responses are not generally coincident with I.P. anomalies it should be noted that they are semi-coincident on line 14,100N, near the Cutty Sark mineralisation.

7.2.7. Summary & Conclusions

No new mineralisation was outlined by work at Cutty Sark during the recent programme. Geochemical and I.P. anomalies were adequately explained by the known mineralisation, which does not appear to be of the Rosebery type. Except for Unit 1, which is west of the main mineralisation, no sedimentary units were observed within the volcanic sequence.

7.3. Farm Creek

7.3.1. Introduction

This area is named after Farm Creek which traverses the Murchison Highway in the northern section of the area. The irregular shape of the area relates to the shape of an EL (11/74) aquired by Cominco Exploration Pty. Ltd. in 1974 and surrendered in January, 1976. The ground was subsequently repegged as an extension of SPL 3 (Tullah) and later amalgamated into EL 1/62.

Previous activity on this area by E.Z. was limited to geological mapping of the Murchison Highway and the end of some

of the Boco Grid lines (Bulgobac Joint Venture) which penetrated the northern boundary of the area.

Activity by Cominco Exploration is covered by the following reports:

1. Progress Report EL 11/74, Farm Creek, Tasmania for 6 months ending July, 1975.

2. Final Report EL 11/74, Farm Creek, Tullah, Tasmania 30th April, 1977.

Copies of these reports are held in Rosebery.

Cominco completed geological mapping of roads, tracks and accessable streams and collected stream sediment samples. No significant stream sediment anomalies were located. Geological mapping was supported by petrological examination of numerous specimens. Petrological examination of the same specimens by two different petrologists has in many cases produced totally different rock names indicating the petrological problems existing in the Mt. Read Volcanics. Cominco engaged contractors to fly the "HEM 400" EM system over the Farm Creek area but apparently, as no anomalies were located, the data was never plotted. A single short line of dipole-dipole I.P. was completed NW of where the Murchison Highway crosses Tramway Creek. No pseudo-section of this line has been obtained. Cominco then surrended the licence.

7.3.2. Access

Access into the area is reasonable with the Murchison Highway and the H.E.C. access tracks to the Mackintosh Dam site passing through the area. It is noted that a Scenic Reserve exists along the Murchison Highway within the Farm Creek area.

7.3.3. Gridding (Refer Appendix XI)

Three E-W grid lines totalling 9.72km at 1km N-S spacing, were cut on the following AMG grid northings:- 5,381,500mN,

5,382,500mN and 5,383,500mN. Origins for these grid lines were fixed using 1:10,000 scale topographic plans and enlarged aerial photographs. Line 5,383,500mN crosses through the Scenic Reserve and permission was sought and received from the relevant authorities prior to cutting this line.

7.3.4. Geology (Refer to 1:10,000 Geological Plan Sheets 5 & 6 Reference Nos. AO-525-0004 and 0005)

Mapping at Farm Creek defined two main Cambrian Units.

1. Mt. Read Volcanics

These consist of andesitic - dacitic pyroclastics (ash-flow and ash-fall varieties), breccias and subordinate lavas. Occasional tuffs and lavas of rhyolitic/keratophyric composition occur throughout the sequence. A bed of fine grained, subaqueous ash mapped on line 13,720N of the Boco Grid was not observed on line 5,383,500N and probably pinches out to the north of line 5,383,500N. A thin band of tuffaceous sediment mapped on line 5,382,500N at 386,500E is covered to the south by Tertiary glacials. Graded bedding within a pyroclastic unit in Tramway Creek indicates that the volcanics dip 20-50° west and are not overturned (Cominco Report dated 21.7.'75).

Sporadic pyrite mineralisation occurs throughout the sequence in concentrations up to 7% (just west of the Murchison Highway along Tramway Creek). Traces of galena have also been reported in isolated occurrences near the Mackintosh River and Farm Creek.

Alteration consists of chloritisation of primary mafic minerals within the volcanics, local albitisation silicification and rare epidotization.

In places (especially line 5,383,500N west of the Murchison Highway) the Mt. Read Volcanics have been covered by a thin layer of Tertiary glacial debris consisting of boulders up to 2m in diameter.

2. Farrell Group

This group occurs on the extreme eastern side of the area mapped and consists of shale, greywackes, sandstones and reworked tuffs. The relationship between the Mt. Read Volcanics and the Farrell Group was not observed in the field.

7.3.5. Geochemistry (Refer to 1:5,000 Soil Geochemical Plans Pb/Zn & Cu/Fe Reference Nos. AO-504-0025 - 0028 and AO-504-0031 -0034)

All three lines were soil sampled at 20m intervals. No anomalous results were obtained.

7.3.6. Geophysics (Refer to Appendix VII and Induced Polarisation Sheets Reference Nos. AO-525-0054 & 0037)

An I.P. survey was conducted over all three lines using the Scintrex time-domain system. An initial electrode spacing of 100m was chosen for the reconnaissance stage. Two second order anomalies were located and will be detailed next field season.

The anomalies occur on line 5,383,500N at 335,500E - 385,600E and on line 5,383,500N at 382,800E - 382,900E. No other significant responses were obtained from the survey.

7.3.7. Recommendation for 1979/80

The two I.P. anomalies located by the reconnaissance survey will be detailed with 40m dipole-dipole I.P., soil sampled and geologically mapped during the 1979/80 field season. Further work, to be carried out at a later date, will include a small programme of pitting to test soil profiles over the I.P. responses and a detailed stream sediment survey.

7.4. Mt. Sale

7.4.1. Introduction

The Mt. Sale area (named after Mt. Sale in the NE section of the area) is borded by the Pieman River to the north, the Murchison River to the east, the Murchison Highway to the south, and the Rosebery Mining Leases and the Cutty Sark area to the west. Previous exploration has been limited to

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geological mapping of existing access, Turair E.M. coverage of the western margin, and dubious stream sediment sampling by E.Z. dating from 1970/71(?). Previously reported mineralisation is limited to the Langdons Mine and the Home Rule prospect on the southern side of the Pieman River. No other mineralisation is recorded but prospecting should have been reasonably intensive as logging for King William Pine was wide spread over the slopes of Mt. Black. This activity ceased by 1940 and presumably the logging failed to expose any significant mineralisation.

7.4.2. Access

Prior to the Joint Venture, vehicle access was limited to the Murchison Highway and logging tracks east of the Sterling River. Diamond drill access tracks within the Mining Leases provided some access to the western side of the Mt. Sale area.

Various access routes were considered to facilitate exploration of the Mt. Sale area and an hours helicopter flight (April, 1978) was primarily made to determine the access to be constructe

The following access was constructed:

1. Walking Tracks

   a) Innes Track:

   This track, constructed during 1895-1900 from Rosebery to Tullah, passes along the northern flanks of Mt. Black and Mt. Sale on the south side of the Pieman River. The track, which had been benched where necessary, was cut out from Cutty Sark eastwards to approximately 382,000mE. It could not be followed any further eastwards and grid line 5,379,000mN was used as access to the Murchison River.

   b) East Mt. Black Track:

   A 7km long track was cut along the eastern side of Mt. Black from the Murchison Highway to a logging track running down the northern slopes of Mt. Black.

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c) Murchison Highway Track

A 1.7km long track running NNE from the Murchison Highway was cut to enable access to line 5,375,000mN at 382,860mE.

d) East From 65R Site

This track was cut up the western side of the ridge forming the northern slopes of Mt. Black and joined the logging track running down the ridge. This track was abandoned when bulldozer access was subsequently gained along the same route.

e) Mt. Black Logging Track

This track was cut over a north-south distance of 2.4km and subsequently bulldozed out for 2.0kms.

f) 5,374,000N Access Track

0.7km of track was cut up a small creek to the western end of line 5,374,000N.

2. Bulldozed Access Tracks

a) D.D.H. 65R Site

The pre-existing vehicle access track to this drill site at 5,376,050mN 379,710mE was reopened. In addition to clearing regrowth, this involved blasting a new cutting on a short section where a rock slip and erosion had narrowed the track.

b) East From 65R Site

Bulldozing was successful in establishing a vehicle track from 65R Site to the logging track running down the northern slopes of Mt. Black.

c) Mt. Black Logging Track

This track was bulldozed northwards to 5,377,650mN and south to 375,680mN

d) Innes Track

This walking track was bulldozed from the Cutty Sark area to within 300m of the Langdons Mine.

e) Sterling River Track

A logging track constructed adjacent to the Sterling River between the Murchison Highway and Murchison River was continued northwards along the western side of the Murchison River to the area which has been clear fallen of timber SW of the junction of the Pieman and Murchison Rivers. Vehicle access is only possible to approximately 5,376,770mN due to heavy clay soils developed over the intermediate volcanics rocks.

Although access into some of the Mt. Sale area is time consuming, all field activity has been completed without establishing field camps.

7.4.3. Gridding (Refer to Appendix XI)

Two phases of line cutting have been completed. An initial reconnaissance phase totalling 32.8km consisted of E-W grid lines at 1km spacing. These lines were cut on AMG except for the eastern end of line 5,379,000mN which was turned southwards to follow the southern side of the Pieman River. A follow-up phase of line cutting totalling 30.2km of E-W lines and 6.1km of N-S lines was completed on 10 individual areas. These grids have been referred to by their origins on the 1km spaced reconnaissance grid lines.

7.4.4. Geology (Refer to 1:10,000 Geological Sheet Nos. 5 & 7 Reference Nos. A0-525-0004 & 0006)

Geological mapping has been completed on all vehicle access tracks, rivers, some streams, reconnaissance grid lines and has been largely completed on the follow-up grid lines. Some photo controlled mapping in cleared areas, north of Mt. Black, has also been completed. Follow-up grids at origins 5,376,000N, 382,500E and 5,378,000N, 377,300E remain to be mapped.

Rocks of the Mt. Sale consist almost entirely of Mt. Read Volcanics. A small band of Farrell Group Sediments and tuffs was mapped in the Murchison River and along the Murchison Highway on the eastern edge of the area.

1. Mt. Read Volcanics

In the Mt. Sale area the Mt. Read Volcanics can be sub-divided into two broad groups:

a) Acid Pyroclastics and Porphyritic Rhyolitic

This unit, which appears to overlie the Primrose Pyroclastics consists largely of quartz-poor porphyritic rhyolitic which intertongues with numerous pyroclastic bands.

The group strikes approximately north-south across the western side of Mt. Black. The eastern contact occurs 0.5km east of the peak of Mt. Black where the group appears to interfinger with tuffs and pyroclastics of intermediate composition. The acid pyroclastics consist of fiamme-rich ash-flow tuffs, finely bedded ash-fall tuffs and minor agglomerate units.

A thin band of dark grey shale and sandy tuffaceous sediment occurs in the Langdon Area north of Mt. Sale. The band is less than 40km wide and dips west at 80°. Facing evidence indicates that the unit is not overturned.

Alteration of the lavas and pyroclastics is generally weak and consists of minor chloritisation, sericitisation and albitization of feldspars. Silicification is rare.

Two known mineral occurances occur within the unit. These are the Langdon Mine on Innes Track which is considered to be a vein type Pb/Zn deposit in chlorite/carbonate gangue.

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The deposit cross cuts the regional strike and ore texture, together with contact relationships indicate that the deposit has been remobilised. The Home Rule Mine occurs in shale and tuffaceous sediment mentioned above. Mineralisation consists of minor (<10%) pyrite and trace sphalerite and galena. A moderately strong I.P. anomaly was found to be associated with the shales.

Other mineralisation in the acid pyroclastic and rhyolites is confined to minor occurances of disseminated pyrite. Generally, however, the sequence is barren of mineralisation.

b) Intermediate Pyroclastics, Lavas and Intrusives

This group consists primarily of dacitic pyroclastics with subordinate andesitic-dacitic lavas and is locally intruded by fine-grained basic dykes. To the west it appears to interfinger with the acid pyroclastic and rhyolite sequence mentioned above, although in one place (line 5,376,000N at 381,350E) the contact is the site of intense chloritization, shearing and disseminated pyrite/hematite mineralisation. To the east the unit appears to be faulted against the Farrell Group although contact relationships have been completely obscured by fluvioglacial overburden and thus the exact relationship remains unknown.

Alteration consists of pervasive chloritization and sporadic albitization. A localised zone of strong silicification has been mapped close to the Farrell Group contact in the Murchison River.

No known prospects occur within this group. Mineral occurances consist of this pyrite/chalcopyrite veins and local sparce disseminated pyrite. No occurances observed to date appear to have any economic significance.

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2. Farrell Group

The Farrell Group is almost completely covered by glacials in the Mt. Sale area, however, good outcrop can be observed in the Murchison River and along the Murchison Highway. The group consists of quartz greywacke, sandstone, graphitic pyritic slate and tuffaceous sediments which grade down into quartz-rich, rhyolitic pyroclastics and lavas.

Where mapped the rocks dip steeply west. Facings obtained in the Murchison Highway (fragments of shale in an overlying pyroclastic) indicate that the unit has not been overturned.

Alteration observed consists of light silicification and carbonatisation. Near the contact with the intermediate pyroclastics and lavas the Farrell Group is strongly sheared.

Mineralisation observed consists of disseminated pyrite within the sediments and local pyritic quartz veins containing trace base metal values.

The Green and King workings mentioned by C. Brooks (1962 BSC Thesis, University of Tasmania) is the only recorded mineralisation in the area. The lode which was "trenched for siderite, quartz and a little galena" could not be located in the field.

7.4.5. Geochemistry (Refer to 1:5,000 Geochemistry Sheets Ref. Nos. AO-504-0027-30, AO-504-0035, AO-504-0038-40 and AO-504-0048-51)

1. Soil and Litter Sampling

All grids (both the 1km spaced reconnaissance grid and the detail grids) have been soil sampled at 20m intervals. Litter samples have been collected over some of the detail grids in order to test the validity of this sampling method as an exploration tool.

2. Stream Sediment Sampling (Refer to 1:10,000 Stream Geochemistry Plans Ref. Nos. AO-525-0049,0051-53)

Stream sediment samples have also been collected from some creeks in the area. Separate samples of bulk stream sediments and manganese coated pebbles were collected.

The sampling programme did not outline any zones of primary geochemical interest and areas selected for detailed work were selected primarily on geophysical parameters.

7.4.6. Geophysics (Refer to Appendices IV, V & VI and 1:10,000 Induced Polarisation Sheets Ref. Nos. AO-525-0037 & AO-525-0024)

A reconnaissance Gradient Array EIP survey was conducted over the 1km spaced E-W Grid. The potential dipole interval was 20m. S.P. readings were taken as well as the usual chargeability and resistivity. A proton magnetometer survey was also conducted over the grid at the conclusion of the gradient array survey. All data is presented in Appendix IV.

Based on the reconnaissance survey ten areas were selected for detailed follow-up. A summary of the geology, geochemistry and geophysics of each of these areas is outlined below. Details of the geophysics can be found in Appendices V & VI.

1. Area 1 (Grid origin 5,378,000N, 377,300E AMG)

The initial I.P. response was traced north and south to lines 5,378,100N and 5,377,900N. The rocks consist of acid pyroclastics (ash-flows) which are partly covered by a swamp. The geochemical response is low, however, a value of >200ppm Pb was recorded on line 5,378,000N at 377,100E. Mapping of the grid has not been completed.

2. Area 2 (Grid origin 5,377,000, 379,700E AMG)

The anomaly was traced 100m south to line 5,376,900N as a response 8-10 Mv/v above background. The area is soil covered and marshy, however, outcrop in Robbie's Creek on the northern side of the grid indicates that bedrock consists of ash-flows, and crystal-vitric-lithic tuff. There was no significant soil geochemistry response.

3. Area 3 (Grid origin 5,378,000N, 380,500E AMG)

One of the initial responses of 6-8 Mv/v above background was re-produced by the detail I.P. survey while other responses were not located and are considered to be noise on the original survey.

The response is thought to be consistant with a change in rock type. The geology consists of vesicular, flow banded porphyritic rhyolite and minor tuff. Outcrop is sparce and there was no significant soil geochemical response.

4. Area 4 (Grid origin 5,378,000N, 383,800E AMG)

A broad west (?) dipping initial response of 8 Mv/v was traced north and south by the detail gradient I.P. survey however, it can be observed only as a vague anomaly using dipole-dipole on line 5,378,000N. The bedrock consists of fine-medium grained vitric-crystal-lithic tuffs which are locally covered by a thin veneer of glacial/fluvioglacial overburden. There was no significant soil geochemical response.

5. Area 5 (Grid origin 5,376,000N, 381,600E AMG)

Upon detailing, the initial response was seen to be discontinuous, disappearing and reappearing on adjacent lines as responses up to 14 Mv/v above background. The grid covers a contact zone between fine grained rhyolite to the west and dacitic pyroclastics to the east. The contact zone appears to have been partly intruded by a sheared pyritic basaltic dyke. There was no significant geochemical response.

6. Area 6 (Grid origin 5,377,000N, 382,500E AMG)

The initial sharp response of 13 Mv/v above background was observed on lines 5,377,000N, 5,376,900N, 5,377,300N and 5,377,500N however, no response was obtained from 5,376,700N or 5,377,100N. Bedrock consists of fine-medium grained, dacitic, vitric-crystal, ash-flow tuffs. The geochemical response was flat.

7. Area 7 (Grid origin 5,376,000N, 383,500E AMG)

The follow-up gradient survey produced no significant responses. Soil geochemistry over the grid produced no anomalous values. The grid has not yet been mapped.

8. Area 8 (Grid origin 5,375,000N, 382,000E AMG)

The original gradient anomaly was traced 100m north but has a diminished magnitude. Bedrock consists of poorly outcropping dacitic tuff and pyritic (?) chloritic schist. There was no significant anomalous geochemical response.

9. Area 9 - Langdon Area (Grid origin 5,379,000N 380,500E AMG)

Two north south trending anomalous I.P. zones were outlined by the follow-up I.P. survey.

Zone A with responses of up to 10 Mv/v above background lies 100m west of the Langdon Mine.

Zone B Which has responses of up to 20 Mv/v above background. This zone is associated with a thin band of tuffaceous black shale some 300m east of the Langdon Mine.

The Langdon Grid has been remapped since the follow-up I.P. survey. Mapping revealed a complex group of acid ash-fall tuffs, rhyolites and ash-flow tuffs with thin bands of tuffaceous, pyritic shales. These rocks have been intruded by intermediate-basic intrusives which may be the source for the mineralisation at the Langdon Mine.

Soil geochemistry gave surprisingly low values over the entire grid. Values seem more representative of glacial overburden than volcanic rocks. Maxima of +65ppm for Pb, +45ppm for Zn occur away from the Langdon Mine area. It was noted that geochemical dispersion from the Langdon Mine is effectively confined by the topography to a small gully running past the mine. A stream sediment sampling programme is planned to effectively outline the mineralisation.

10. Murchison River Grid (Grid origin 5,376,000N, 384,000E AMG)
(Refer to Appendix VI)

The Murchison River Grid covers approximately 1.0km^2 of mainly glacial covered ground near the Murchison River. The initial I.P. response was later proved to be a surficial response by a Schlumberger array. However, the detailed I.P. survey did distinguish the contact between the Mt. Black Volcanics and the Farrell Slates. The survey also located a discrete I.P. anomaly immediately to the west of the Farrell Slate/ dacitic volcanic contact The anomaly is completely covered by Pleistocene fluvioglacials but occurs along strike from strongly silicified, pyritic, dacitic tuffs. All lines which crossed outcrop on the grid were soil sampled but no anomalies of significance were located.

In conclusion it is thought that the initial gradient anomalies detailed by grids 1, 2, 3, 4, 5, 6, 7, 8 and zone A of the Langdon area are probably minor barren sulphide responses. They may also represent contact zones between rocks of different electrical properties. Whatever causes the I.P. responses located on the above grids, base metal sulphides are probably not the source.

Reasons for this assumption are outlined below:

1. None of these areas have any significant geochemical response.

2. Apart from zone B on the Langdon Grid, no sediments were mapped on Mt. Sale within the Mt. Read Volcanics.

3. When compared with a test survey over the Que River Pb/Zn/Cu deposit (refer to Scintrex Report No. Tas-034-A, November 1976, on file West Coast Mines) none of the gradient I.P. responses resembles that of a massive sulphide deposit. It seems that they more closely resemble responses obtained by a gradient array I.P. survey in the Boco Area of the Bulgobac EL 12/72. (refer to E.Z. Report No. 128 N.H. Hanson, October, 1977) Three of these anomalies

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were drilled by DDH's BP 207, 208 and 209. The holes intersected only minor disseminated sulphides.

4. Minor disseminated pyrite has been observed on grid 5 and close to zone A on the Langdon Grid.

Anomaly B on the Langdon Grid is explained by a presence of pyritic, tuffaceous black shales which contain minor base metal values.

7.4.7. Recommendations for 1979/80

1. Bulldozing of the Innes Track to be extended into the Langdon Mine area to provide drilling sites and access for two diamond drill holes should they be considered necessary.

2. Diamond drilling of the I.P. anomaly covered by glacials on line 5,375,300N on the Murchison River Grid.

3. Geological mapping of the two grids which have not already been mapped.

4. A programme of pitting over anomalies on grid Nos. 1, 2, 3, 4, 5, 6, 7 and 8 to test the soil profile for glacial overburden and to test for barren sulphide responses as outlined in Appendix III.

7.5. Murchison

7.5.1. Introduction

The Murchison area covers the south eastern prong of the licence east of Mt. Murchison. No previous exploration by E.Z. has been recorded for this area. Information is limited to some creek traverses by R.T.A.E. geologists and a creek traverse near the southern boundary by Mt. Lyell geologists. Exploration of this area has not been undertaken since the commencement of the Joint Venture.

7.5.2. Access

No vehicle or walking tracks are known to exist within the area. Vehicle access, after some track maintenance, should be possible to Anthony Creek (5,365,550mN 397,030mE) approximately 2km south of the southern boundary of the EL. The access track to Anthony Creek was constructed by Mt. Lyell during exploration of EL 9/66.

7.5.3. Recommendations for 1979/80

Budget approval has been granted for a programme involving access track cutting, stream sediment sampling and geological mapping of streams and other access. This programme should be intergrated into the exploration of the "Eastern Volcanics" within the adjacent Sterling Valley Joint Venture (EL 4/73) for which a similar programme has been scheduled.

7.5. Natone

7.6.1. Introduction

The Natone area, forms the western margin of the licence area to the south of the Pieman River. The eastern boundary is formed by the Mining Leases and to the south of Williamsford by the contact between the Primrose Pyroclastics and the sedimentary rocks of the Rosebery Group.

Prospecting activity has been intensive over most of the area and numerous occurences of mineralisation have been recorded. Base metal ores were produced from small workings in the 1880's and 1920's.

Data compilation of all work completed in the Natone area has commenced and will continue throughout 1979/80.

7.6.2. Access

Numerous 4 wheel drive vehicle tracks enable relatively easy access to the area. The Murchison Highway and the E.B.R. traverse the northern end of the Natone area.

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7.6.3. Recommendations for 1979/80

1. All known data on the Natone area will be compiled onto E.Z. standard plans.

2. A report will be prepared by Getty personnel summarising all present knowledge on the area and setting out a programme for future exploration.

3. Exploration scheduled for 1979/80 is ground follow-up of an E.M. conductor near the Colebrook Mine (5,371,600mN 375,000mE). The zone to be detailed has coincident Turair E.M. (Conductor 18) and Input E.M. (CS 10) responses. Work scheduled includes gridding with induced polarisation, geophysics, soil geochemistry and geological mapping.

7.7. Pieman

7.7.1. Introduction

This area is the north western section of EL 1/62 limited by the Pieman and Mackintosh Rivers on the southern and eastern sides, and adjoining the Farm Creek area on the north-eastern side. The topography is generally subdued with particularly good access due to the Murchison Highway, Farrell Tramway and numerous access roads and tracks constructed by the H.E.C..

Previous work by E.Z., excluding aeromagnetics, was limited to geological mapping of access predating the H.E.C.'s recent activities and stream sediment sampling of dubious value undertaken in 1970/71 (?). Cominco Exploration Pty. Ltd. previously held part of the area as EL11/74 and the results of their geological mapping are detailed on reports by G. Raybone (1975) E.H. Skey (1977) (see Section 7.3.1.).

7.7.2. Gridding (Refer to Appendix XI)

The three reconnaissance grid lines over the Pieman area were not laid out on AMG as use was made of H.E.C. lines cleared for Transmission Line construction.

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7.7.3. Geology (Refer to 1:10,000 Geology Sheets 5 & 6 Ref. Nos. AO-525-0004 & 0005)

The rocks of the Pieman area are a strike extension of those of the Mt. Sale area and are essentially similar, consisting of acid pyroclastics and subordinate lavas which contain local thin bands of tuffaceous sediment in the west and intermediate pyroclastic and lavas in the east of the area. The rocks are extensively glacial covered.

Mineralisation, as at Mt. Sale, appears to be insignificant. No significant mineralisation was located on the grid lines. Minor disseminated sphalerite and galena was located on the H.E.C. Bastyan access road at 5,379,350mN, 387,050mE, west of the EL boundary. This exposure, less than ½ metre square is a fracture bounded block of chloritic pyroclastic. The enclosing pyroclastic rocks are not mineralised. Disseminated pyrite occurs regularly in amounts less than 1%. No significant alteration was observed.

7.7.4. Geochemistry (Refer to 1:5,000 Sheet Nos. AO-504-0027-0030 and AO-504-0033-0034)

Soil sampling at 20m intervals along the three lines did not produce any significant anomalies. Glacial cover was a problem, especially on lines P2 and P3.

7.7.5. Geophysics (Refer to Appendix IX)

A reconnaissance dipole-dipole frequency domain, induced polarisation was done on the three Pieman lines by Geoex in June, 1978. No significant anomalies were present.

7.7.6. Recommendions for 1979/80

Geological mapping of the area should be improved in the northern section by utilizing recent aerial photography to position H.E.C. access tracks which have created many new exposures. The mineralised black shale/tuffaceous sediment unit located on the south side of the Pieman River in the Mt. Sale area (AMG 5,379,200mN 380,600mE) should be traced north into the Pieman area.

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7.8. Stitt

7.8.1. Introduction

The Stitt area is that block defined by the Murchison Highway to the north, Mt. Murchison to the east, Mt. Read to the south and the Mining Leases to the west. The area covers most of the drainage basin of the Stitt River.

7.8.2. Access

Prior to the Joint Venture vehicular access was limited to the Murchison Highway and the Telecom access road to Mt. Read. During 1978 a track suitable for 4 wheel drive vehicles was bulldozed from the powerline access track at 5,372,210mN 382,520mE southwards to 5,370,330mN 381,760mE. This track has become known as the "Stitt access track".

The Rosebery to Queenstown H.E.C. transmission line traverses the area from NW to SE and provides a good walking track through the area. Vehicle access to the transmission line east of Mt. Read is possible on tracks constructed by Mt. Lyell to the Red Hills area.

7.8.3. Geology, Geochemistry & Geophysics (Refer to Geology Sheets 7 & 9 Ref. Nos. AO-525-0006 & AO-525-0013)

Pre-existing information in the Stitt area is limited and no reports of mineralisation are known.

Previous geological mapping has been limited to reconnaissance mapping of the available access by E.Z., R.T.A.E. and Anderson (University of Tas. BSc Thesis, 1972).

Part of the Stitt drainage was stream sampled by E.Z. in 1970/71 (?) but the results should be treated with caution as some sampling during the same programme has been established as unreliable (see Williams, E.Z. Dept. Report No. 117, July, 1974).

Other than aeromagnetics, geophysics has been limited to Turair E.M. coverage of the extreme western margin of the area and a

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single dipole-dipole I.P. line across the northern part of the area in 1960.

Activity since the commencement of the Joint Venture has been limited to geological mapping of available access including the Sterling Valley and Queenstown transmission lines, the Stitt access track and access tracks on the western side. This mapping suggests the major lithologies to be intermediate and acid pyroclastic volcanic rock. These lithologies are interpreted as the southern strike extension of the lithologies mapped in the Mt. Sale area.

7.8.4. Recommendations for 1979/80

1. A grid consisting of 0.5km spaced east-west grid lines will be established south of the Murchison Highway. The grid will be an extension of the grid already established on Mt. Sale.

2. The grid will be geologically mapped, soil sampled at 20m intervals and surveyed using 100m dipole-dipole time domain I.P..

3. A geological mapping and stream sediment sampling programme will be completed on all streams in the area.

4. Anomolous zones will be detail gridded in order to find drilling targets for the winter of 1980.

7.9. Tullah

7.9.1. Introduction

The Tullah area is located on the eastern side of the licence area with the western boundary being the Mackintosh and Murchison Rivers except that south of the Murchison River the western boundary is defined by the western contact of the Farrell Slates.

The mining leases surrounding the New North Farrell Mine are excluded from the Joint Venture except for the possibility of economic tin mineralisation.

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This exlusion is discussed under Article 27 of the Joint Venture Agreement.

The area has been subjected to considerable prospecting and there should be little doubt that any outcropping mineralisation has been subjected to adequate examination by trenching pitting etc.. Several of the more interesting old workings have been diamond drill tested by E.Z. in the late 1940's early 1950's (e.g. Murchison Mine, Duttons etc).

The H.E.C. construction Village, workshops and the Mackintosh Dam and Power Station all occur within the area.

7.9.2. Access

Access is excellent with the Murchison Highway passing through the area. There are also numerous all weather H.E.C. access roads and a few 4 wheel drive logging tracks.

7.9.3. Geology

Rocks in the Tullah area have been comprehensively mapped by numerous workers in the past. References on file at E.Z. Rosebery include:

1. The Geology of the Tullah Area. C. Brooks 1962, University of Tasmania.

2. The Geology and Geochemistry of the Tullah Area, W.M. Rivers 1975, University of Tasmania.

3. Extensive mapping on the Tullah leases of E.Z. by various workers.

Four main geological units have been observed.

1. Mt. Read Volcanics

These consist of intermediate pyroclastics and subordinate lavas and are a strike extension of rocks mapped in the Mt. Sale and Farm Creek areas.

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2. Murchison Volcanics

The Murchison Volcanics outcrop east of the Farrell Group and consist of acid, quartz-rich rhyolitic flows and pyroclastics. Minor magnetite/pyrite/chalcopyrite mineralisation has been observed in the Murchison River.

3. Farrell Group

The Farrell Group consists of acid pyroclastics, black shales, greywackes and sandstones which dip and face west. The sequence is tightly folded in places and overturning is not uncommon.

The Farrell Group contains all known economic mineralisation in the Tullah area including the Pb/Ag mines at Tullah and Sterling Valley.

The rocks have locally been extensively sheared near to their contact with the Mt. Read Volcanics.

4. Owen Conglomerate

The massive Ordovician conglomerates and sandstones of the Owen Conglomerate are seen to be downfaulted against the Farrell Group in the Mackintosh Dam site area. The unit contains no known mineralisation and is not considered prospective in the current exploration programme.

7.9.4. Geochemistry

There has been no geochemical work undertaken in the Tullah Area since the inception of the Joint Venture.

7.9.5. Geophysics

There has been no geophysical work undertaken in the Tullah Area since the inception of the Joint Venture.

Previous surveys include a dipole-dipole survey over the Tullah Grid (the northern extension of the Sterling Valley Grid) by McPhar in 1961. Other geophysical surveys around the Mine Leases of E.Z. have not yet been compiled onto the new standard format sheets.

7.9.6. Recommendations for 1979/80

Regional mapping of recent H.E.C. access roads is planned for the 1979/80 field season.

7.10. White Spur

7.10.1 Introduction

The White Spur area is bounded on the north by the Hercules Mine Leases and the Stitt area. To the east and south it is bounded by the boundary between EL 1/62 and Mt. Lyell's EL 9/66 and to the west by the Natone area. The area is along strike from the Hercules Mine and as such represents one of the most prospective areas in EL 1/62. E.Z. has prospected White Spur extensively with soil geochemistry, geological mapping and I.P.. Turair input E.M. and aero-magnetics have been flown over the area. All of the past data has been compiled onto the E.Z. standard 1:10,000 and 1:5,000 sheet format.

7.10.2 Access

Access to the area can be made from Mt. Read along numerous 4 wheel drive exploration tracks which run north-south along most ridges. From the south access can be gained along Howards Track which runs off the Zeehan Highway. Numerous logging tracks run north off Howards Track, into the White Spur area.

7.10.3 Gridding

During the years prior to the Joint Venture a complex system of grids were cut at different orientations in the White Spur area. The two principle grids were the Jones Creek Grid (an extension of the Dalwitz Grid) cut at 077½° magnetic and the Dobson's Creek Grid cut at 090° magnetic.

The Jones Creek Grid has been recut and repegged for the purpose of conducting a gradient array I.P. survey over the area.

7.10.4 Geology (Refer to 1:10,000 Geology Sheet AO-525-0013)

All previous mapping done at White Spur is being compiled onto E.Z. 1:5,000 and 1:10,000 standard sheets. Mapping by Dr. K. Corbett of the Mines Dept. of Tasmania will also be compiled when available. A limited amount of mapping by E.Z. geologists on logging tracks has been completed. This mapping is continuing.

The rocks consist of massive acid, ash-fall and ash-flow pyroclastics which are interbedded with thin lenses of shale and tuffaceous sediments which are locally geochemically anomalous for Pb and Zn. They are intruded by basic intrusives of doleritic composition.

In general the rocks are more altered than those of Stitt and Mt. Sale being sheared, chloritised and sericitised.

7.10.5 Geochemistry

No systematic geochemistry has been done since the inception of the Joint Venture. All grids (covering 90% of the White Spur area) have previously been sampled by E.Z. personnel during the period 1972-75. The results of these programmes have been reported in previous years.

7.10.6 Geophysics (Refer to Appendix No. VIII & Induced Polarisation Plan AO-525-0058)

A Gradient Array E.I.P. survey was completed over the Jones Creek Grid at White Spur. The survey outlined two anomalies considered worthy of drilling. These are located on line 5,600S at 900E and 6,400S at 1,590E.

7.10.7 Recommendations for 1979/80

1. Two diamond drill holes are to be drilled on I.P. anomalies at White Spur.

2. The Dobson Creek Grid is to be surveyed with gradient array I.P. and anomalous results are to be followed-up with drilling if warranted.

3. Mapping of access in the area is to continue.

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APPENDIX I

Description of E.L. 1/62 - Mt. Black

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APPENDIX I

Description of E.L. 1/62 - Mt. Black

In accordance with Section 15C (7) of the Mining Act, 1929, this licence shall now apply to an additional area of 41 km^2 (formerly held under Special Prospector's Licences 3 and 132). The total area of the licence shall now be 169 km^2 (more or less) as described hereunder:

Commencing at a north-west angle of the area whose grid co-ordinates are 382,530 metres E. 5,384,190 metres N. thence easterly to 384,950 metres E. 5,384,215 metres N. southerly to 385,010 metres E. 5,382,935 metres N. again easterly to 387,940 metres E 5,382,515 metres N. again southerly to 386,890 metres E. 5,374,595 metres N. westerly to 383,685 metres E. 5,375,080 metres N. again southerly to 383,140 metres E. 5,371,050 metres N. again easterly to 388,080 metres E. 5,370,450 metres N. again southerly to 387,660 metres E. 5,367,270 metres N. again westerly to 379,340 metres E. 5,368,305 metres N. again southerly to 378,750 metres E. 5,363,115 metres N. again westerly to 376,186 metres E. 5,363,407 metres N. again southerly to 375,670 metres E. 5,359,330 metres N. grid west to 373,395 metres E. grid north to 5,363,741 metres N. northerly to 374,455 metres E. 5,372,565 metres N again easterly to 374,620 metres E. 5,372,545 metres N. again northerly to 374,700 metres E. 5,373,250 metres N. and being a point on the southern bank of the Pieman River by that southern bank in a general easterly direction to 376,630 metres E. 5,372,645 metres N. south easterly to a point adjacent to the 71 mile peg on Emu Bay Railway by that Railway in a general northerly direction to its intersection with a south-east corner of E.L. 5/63 area 4 again easterly by a southern boundary of E.L. 5/63 aforsaid to 384,485 metres E. 5,380,920 metres N. again northerly to 384,735 metres E. 5,382,980 metres N. again westerly to 383,455 metres E. 5,383,285 metres N. continuing westerly to 382,540 metres E. 5,383,275 metres N. thence again northerly to the point of commencement.

The area embraced by this licence shall be exclusive of:

a) All municipal and public reserves and roadways.

b) All forms of mining tenements and water licences including leases, water licences, easement licences, special and exploration licences prospectors licences, miners rights, permit to enter, owners consent and owners rights which were in lawful possession or marked out prior to the date of marking out of this licence.

Appendix I (cont.)

c) Land exempt from the provisions of the Mining Act, 1929.

d) Land under the National Parks and Wildlife Act, 1970, not subject to the Mining Act, 1929.

e) All Crown Reservations or other land set apart or dedicated for any public purposes.

APPENOIX II

A photogeological study of Mt. Read Volcanics, North and South of Rosebery, Western Tasmania. 1978

P. Boshier, Loxton Hunting and Associates Pty. Ltd.

Copies supplied to Getty Oil Development Company Limited.

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ABSTRACT

Prior to this study, geological mapping within this portion of the Mt. Read Volcanics had been mainly confined to detailed investigations of small areas. Although a few previous workers had attempted to provide an overall regional picture of the Mt. Read Volcanics, this study is the first real attempt to combine previously undertaken fact-mapping with detailed airphoto interpretation.

The previously held idea that the Volcanics occupied a palaeo-rift valley was confirmed. Thirteen (13) units were recognized on the aerial photographs. These are made up of two (2) intrusive units (Intrusive Porphyries, Murchison Granite); four (4) flow units (Mt. Black Volcanics, Burns Peak Rhyolite, Murchison Volcanics and Mackintosh Volcanics (?)); four (4) pyroclastic units (Primrose and Queenstown Pyroclastics and Selina and Anthony Creek Volcanics); and three (3) essentially sedimentary units (Bulgobac, Rosebery and Junee Groups, and the Farrell/Que River Slates). Of these, five (5) new units, which although previously recognized, are now confirmed and their extent defined on the aerial photographs.

Faulting was seen to be mainly block faulting with little or no strike movement, and folding was simple and open in style and apparently related to the block faulting rather than to any regional compressive forces.

A close genetic relationship of known mineralisation to the intrusive and flow units is suspected by the author. Although most mineralisation found to date, with the major exception of Que River, has been found associated with sedimentary units, future exploration should be directed towards the intrusive and flow units, and especially to the search for volcanic centres or vents that they may contain. Based on experience in Canada, coarse agglomerates, and vent breccias are found very close to mineralisation found in the same type of geological environment as that seen within the Mt. Read Volcanics.

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IV. CONCLUSIONS AND RECOMMENDATIONS

SELECTED REFERENCES

APPENDIX 1: Aerial Photography used.

1. INTRODUCTION

Following the submission of a proposal by R. F. Loxton, Hunting and Associates on 1st May, 1978 and the receipt of acceptance by the Electrolytic Zinc Company of Australasia Limited, on 5th May, 1978, work commenced on a detailed photogeological study of an area extending north and south from Rosebery. The study area extends from approximately $41^{o}31.6'S$ to $41^{o}56.8'S$ and from $145^{o}27.9'E$ to $145^{o}45'E$, and covers approximately 930 square kilometres. (see Fig.1)

Specific photogeological attention to the following was required:

(a) Elucidation of structure within the Mt. Read Volcanics.

(b) Attempted recognition of lithological units within the Mt. Read Volcanics; specifically sedimentary beds which could correspond with those acting as hosts to mineralisation at Rosebery and Hercules.

(c) Attempted detailed photogeological elucidation of the litho-structure which constitutes the Colebrook Hill area, and adjacent ground.

(d) Recognition of areas of glacial deposits and their extent thickness, distribution and provenance.

The project involved the study of two sets of panchromatic 23 x 23cm aerial photographs with a nominal scale of 1:40 000. Total number of photographs studied was 167, of which 123 covered the study area.

A hand-coloured photogeological map was to be produced at a scale of 1:50 000 showing all geology and relevant natural and cultural features such as roads and tracks, rivers and creeks, towns, railway lines and power lines and mines.

The project was completed within a period of 46 days. A total of twelve days was spent in the field, checking photogeological data, acquiring details of fact-mapping carried out by Electrolytic Zinc personnel, and liasing with relevant E.Z. geologists.

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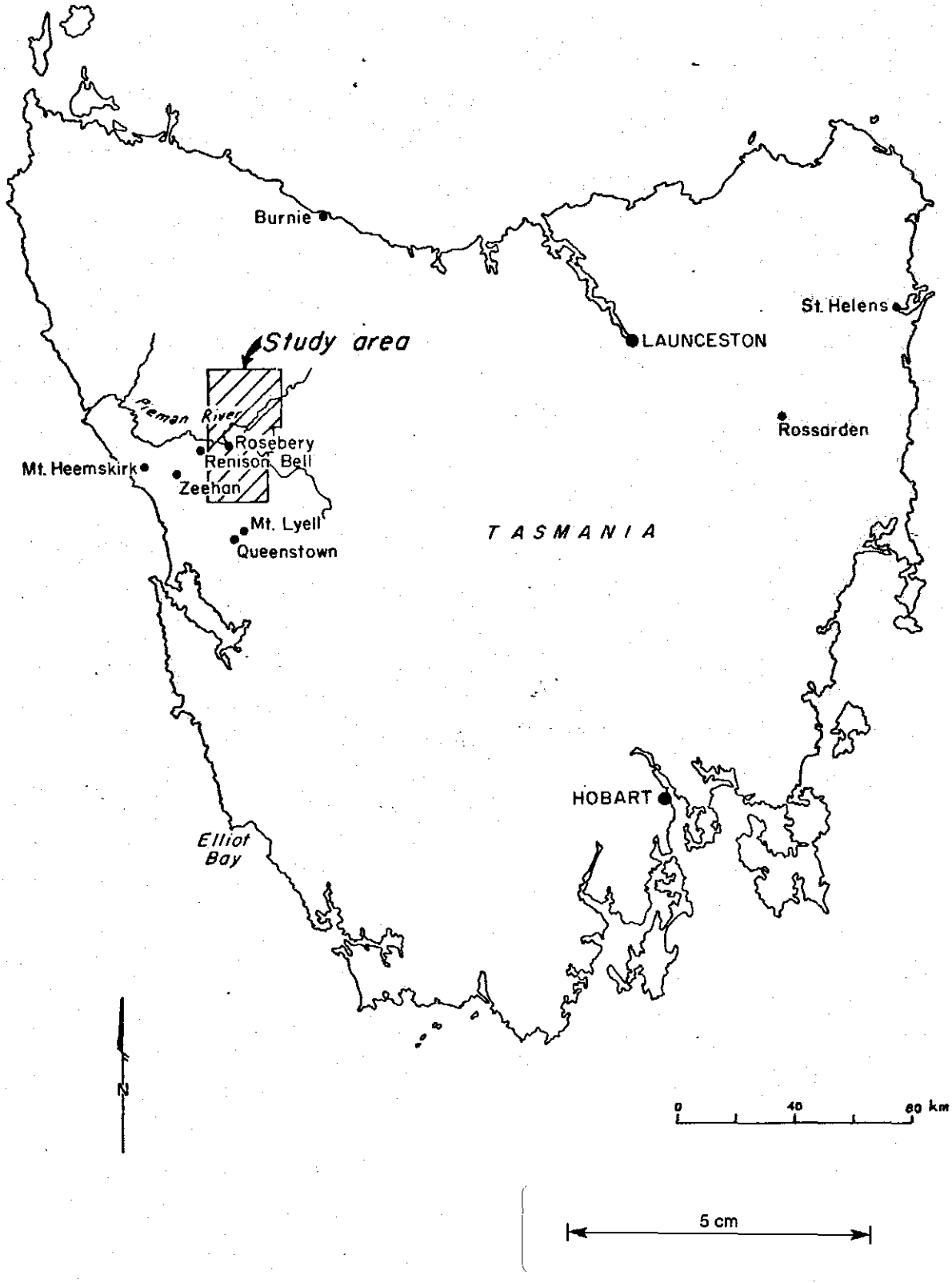

Fig 1. LOCALITY DIAGRAM

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Although the area has been extensively investigated by various workers, most mapping to date has resulted from the detailed investigations of small areas. Only Campana and King (1957, 1960, 1963), Blissett (1962) and Williams and Jennings (1966), have attempted to provide an overall regional picture of the Mt. Read Volcanics.

This project has revealed a considerable amount of new information as to the configuration, internal relationships and structure within the Mt. Read Volcanics. The surrounding rocks were mapped only in sufficient detail to provide geological control.

The work was undertaken by P. Boshier.

II. PROCEDURE

Before annotation commenced a drainage base on the approximate scale of 1:40 000 was prepared on clear acetate film from enlarged transparencies of the Sophia (NMI Sheet No. 8014) and Pieman (NMI Sheet No. 7914) 1:63 360 scale topographic sheets. Geological and cultural information was annotated in ink directly onto the drainage bases which were superimposed on the panchromatic aerial photographs (see Figures 2 and 3). All annotation was carried out using a Zeiss N2 mirror stereoscope fitted with a binocular head having a x6 magnification.

Initially it was intended to use only the "north-south-flown" ROSEBERY AREA photographs (Fig.2), however because of scale problems, they were found to be useful only in certain areas. It was found that the CONICAL ROCKS photographs (flight-lines east-west, see Fig.3) had a more consistent scale. They were also found to give a better photogeological response and were subsequently used for the re-annotation phase that followed an early field-trip. Initial annotation was carried out using the ROSEBERY AREA photographs only.

In marking the photo-centres on the transparent overlay, the photo-numbers were used for the Rosebery Area photographs, and the negative numbers for the Conical Rocks photographs. This was to avoid confusion when referring to photo-centres. (When mentioning particular photographs in the text of this report, the prefixes AR and CR have been used to indicate to which set of photographs the author is referring.)

As noted previously, a total of 123 panchromatic prints was used in annotating the map. Annotation, research, liaison and report writing occupied 34 days, whilst 12 days were spent in the field, examining selected localities, and also collating information from fact mapping compiled by the Geology Department of West Coast Mines.

The photogeological map produced was reduced photographically to a nominal scale of 1:50 000.

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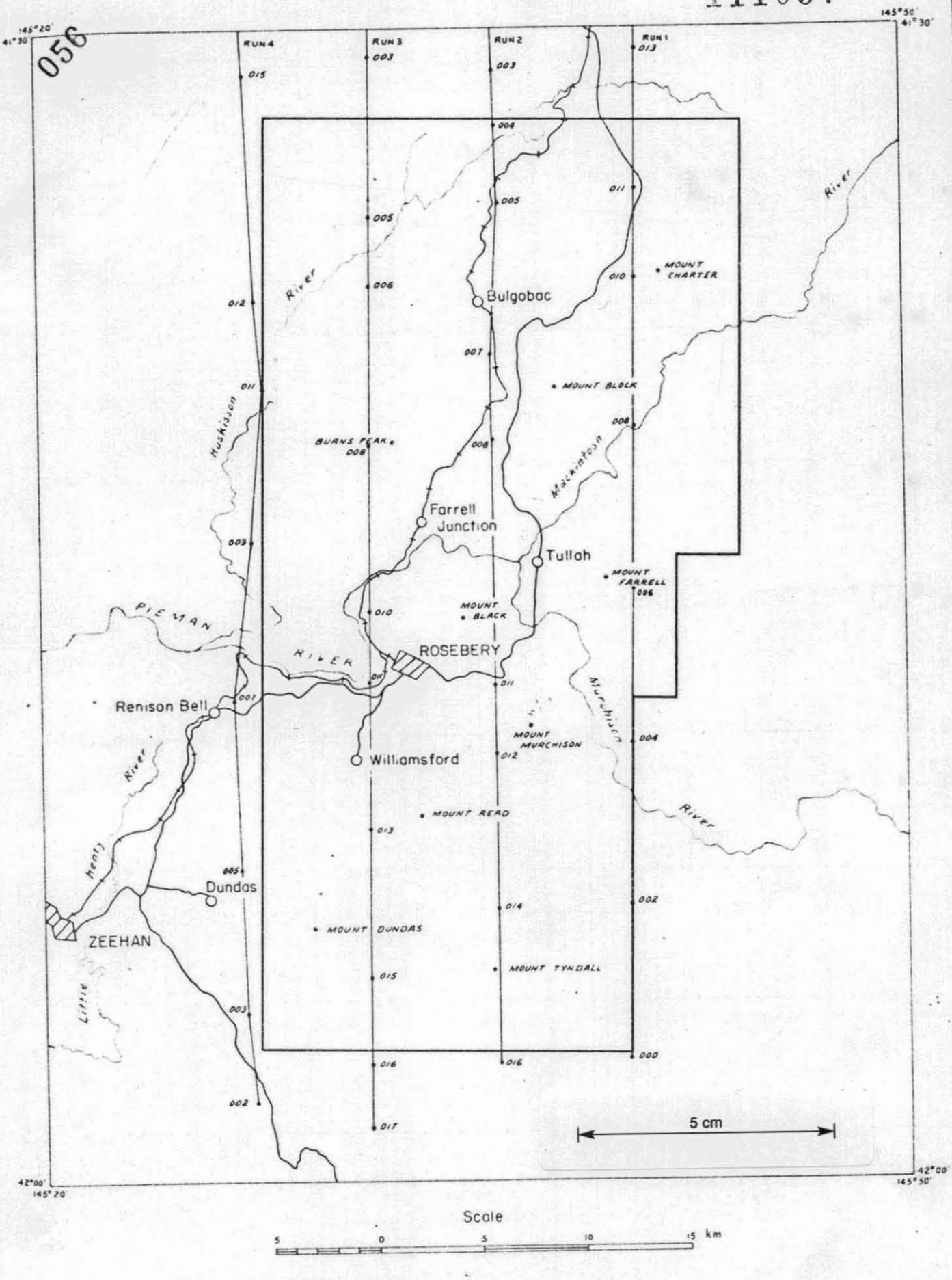

ROSEBERY AREA Aerial Photographs, 1.40 000 scale

Fig 2. Approximate position of flight lines in Rosebery Area, Tasmania

R F Loxton, Hunting and Associates, Canberra

GA 25/78, June 1978

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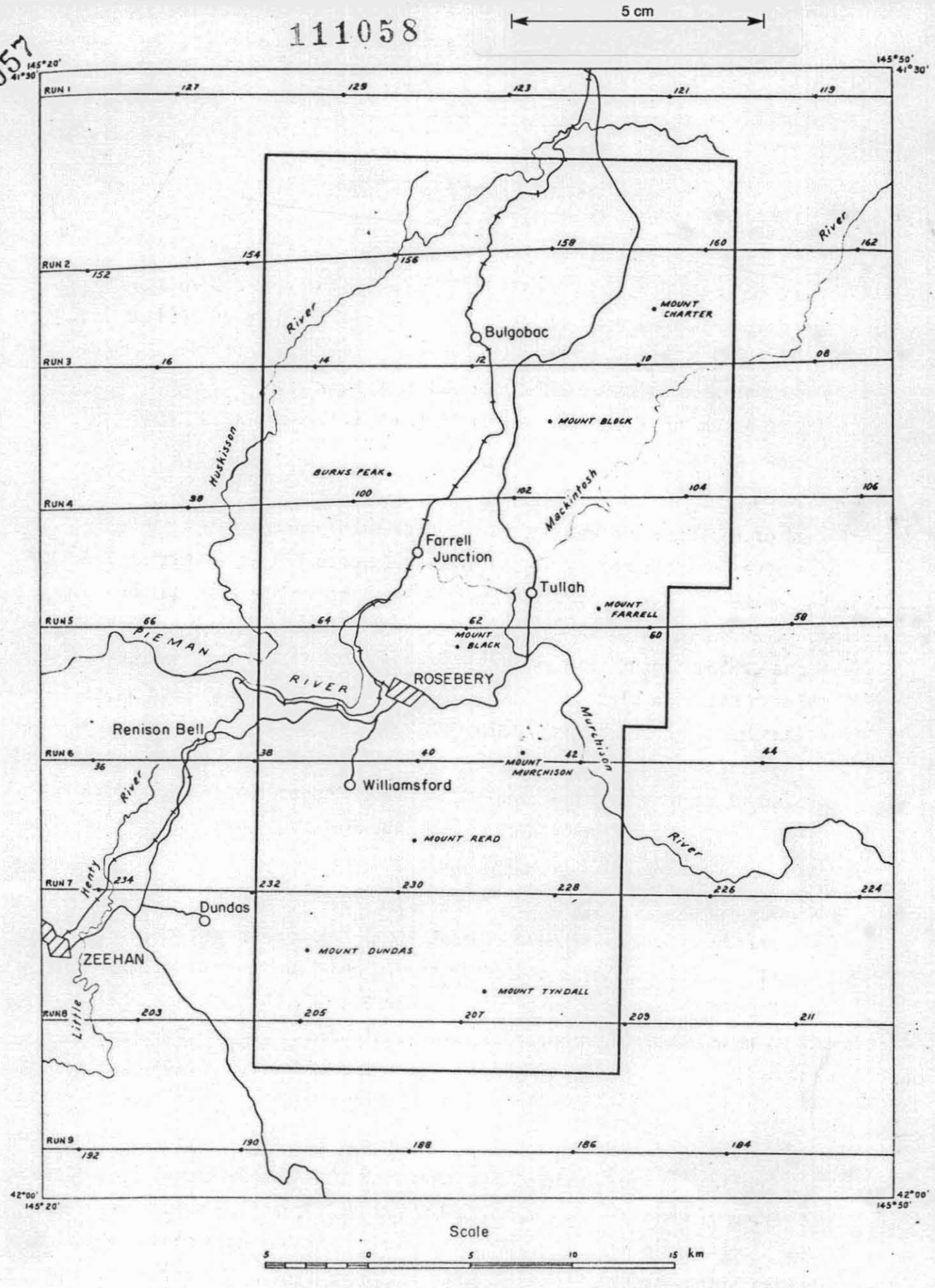

CONICAL ROCKS Aerial Photographs, 1:40 000 scale

Fig 3. Approximate position of Conical Rocks flight lines in Rosebery Area, Tasmania

III. GEOLOGY

A. Introduction

The Mt. Read Volcanics occupy a palaeo-rift valley or trough extending from Eliott Bay in the south, northwards through Queenstown and Rosebery, to link up with the Dial and Fossey Mountain troughs (Campana and King, 1957: Williams et al, 1975). The portion of the Volcanics examined during this project extends from near the Henty River, 20 kilometres to the south of Rosebery, to the Tertiary basalt cover, 23 kilometres north of Rosebery.

The Mt. Read Volcanics are Cambrian in age and are reported to be up to 3000 metres thick (Solomon, 1965). Based on photogeological evidence they are made up of a series of intercalated volcanic piles and sedimentary horizons. The trough is bounded in the east by the Precambrian rocks of the Tyennan Metaquartzite and in the west partially by Proterozoic rocks, and partially by contemporaneous Cambrian sediments. The Volcanics are mainly potassic brecciated rhyolites, dacites and minor andesites, agglomerates and tuffs, overlain by sodic volcanic breccias, tuffs, keratophyres and quartz keratophyres. There appears from photogeological evidence to be an hiatus between the lower potassic and upper sodic volcanic units.

The base of the Mt. Read Volcanics is probably represented by the Anthony Creek Volcanics (Success Creek Phase), seen in the east, whilst the top is marked by the base of the Crimson Creek Formation argillite. The Rosebery Group and Farrell - Que River slates are regarded by this author to be part of the Mt. Read Volcanics. This is based on evidence seen on the aerial photographs, details of which are mentioned below.

Campana and King (1963) suggested that the Mt. Read Volcanics are overlain unconformably by the Dundas Group and Crimson Creek Formation, however this author suggests that the volcanics lie disconformably under the Crimson Creek Formation and are partially overlain by, and partially interdigitate with the Dundas Group. An example of a disconformable contact is the contact between the Crimson Creek Formation and the Bulgobac Group north-west of the Burns Peak. (CR 3/13)

Mineralisation is found within the older volcanic rocks at Que River and within sedimentary sequences of the younger pyroclastic unit (Rosebery, Hercules, Chester).

Southeast of Tullah and west of Bulgobac the Volcanics are intruded by sodic and potassic granite and adamellites (porphyries (?)), similar in composition to the enclosing rhyolites and porphyries. The granites are crudely concordant and probably represent the intruded core of the volcanic pile.

It is intended here to discuss only the geology of the Mt. Read Volcanics and the immediate surrounding rocks. The stratigraphy and structure of other units is adequately described by other authors.

B. Mt. Read Volcanics

1. General

For convenience the Mt. Read Volcanics will be described under two separate headings, namely those north and those south of the Henty Fault. This is an artificial division, as rocks to the north can be correlated with those south of the fault. It is unfortunate that the rocks south of the fault are extensively concealed by the Ordovician Owen Conglomerate which forms the Mt. Murchison - Tyndall Range and also by pervasive Pleistocene glacial deposits, these relationships making direct correlation difficult. The Volcanics north of the fault are bounded in the north by Tertiary plateau basalts, and elsewhere are covered by varying thicknesses of glacial deposits. These glacial deposits were seen to be very extensive on the aerial photographs, and for this reason only thick deposits that have totally obscured the photogeologic expression of the underlying rocks have been annotated.

2. North of Henty Fault

(a) Que River Volcanics (Cqr)

Collins (1975) considered the volcanic rocks which are traceable from the confluence of the Mackintosh and Pieman Rivers to the headwaters of the Que River, to be one unit (the central lava belt); however at least three separate units could be recognized on the aerial photographs. The lowest of

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these three units, this author has termed the *"Que River Volcanics". The best exposure is along the access road to, and around, Abminco's Que River Mine. They appear to be the oldest volcanic rocks in the area, and on the photographs all the other volcanic and sedimentary units were seen to overlie them. They have steep to vertical dips and are characterised by a tall, thick vegetation cover (Myrtle). They outcrop as an approximately north-south-striking belt extending from just west of Mt. Murchison in the Stirling Valley, through Mt. Black, to the Tertiary basalts north of the Que River Mine. They are overlain by the Farrell Slates in the east, and by the Que River Slates, Mt. Black and Mackintosh Volcanics in the west. The name Que River Slates was proposed by Gee et al (1970). He regarded them to be the equivalents of the Farrell Group Slates. This is confirmed by photogeological evidence (see below).

The Que River Volcanics are acid to intermediate in composition, with rhyolite and dacite flows being the most common. Andesites occur within both the foot- and hanging-walls successions at the Que River Mine. The mine sequence is characterised by pyritisation which appears to give a recognizable vegetation anomaly (smaller trees) in the vicinity of the mine (CR 2/160). The individual flows are recognizable on the aerial photographs as discontinuous ridges, with possible volcano-clastic beds occupying the depressions between them (see CR 2/159).

The acid to intermediate composition suggests that this sequence may represent the one of the earliest phases of volcanism, as all other volcanic units are essentially acid in composition. Dacitic volcanic rocks are recorded from east of Chester in the Primrose Pyroclastics (see below).

The Que River Volcanics are of interest, in that the mineralisation is contained within the volcanic rocks themselves, rather than in sedimentary horizons as at Hercules, Rosebery, Chester and Farrell.

The marked angular unconformity between the Que River Volcanics and the overlying rocks suggests a depositioned hiatus, during which tectonism and erosion occurred.

* new name proposed by this author.

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(b) Primrose Pyroclastics (€pp)

Sedimentary layers within these pyroclastic rocks and their southern equivalents, the Queenstown Pyroclastics, are hosts to pyritic-copper lodes at Mt. Lyell, and pyritic-lead-zinc lodes at Hercules, Rosebery and the Chester-Pinnacles area.

The Primrose Pyroclastics consist of vitric, crystal and lithic tuffs, pyroclastic breccias, siltstone and black shale lenses, and quartz-sericite-chlorite schist derived from the pyroclastic rocks (Braithwaite, 1974). A more detailed description of the Pyroclastics is given by Green and Williams (1975).

Based on the geology of the Rosebery area (Braithwaite 1974, E.Z. personal communication), the pyroclastic formations have been divided into foot-wall and hanging-wall sequences, the latter being distinguished in hand specimen from the former by the inclusion of lithic fragments from the mine host sequence (Green and Williams, 1975; Williams, personal communication).

South of the Henty Fault the Primrose Pyroclastics are regarded by previous workers as being continuous with the Queenstown Pyroclastics, which extend south from the fault (see below).

North of the Henty Fault the Primrose Pyroclastics are unconformably overlain by the Mt. Black Volcanics in the east and may be partially conformably with the Dundas Group and Rosebery Group in the west. Photogeological evidence suggests that the contact between the Pyroclastics and the Mt. Black Volcanics may be partially faulted in the vicinity of Rosebery.

To the north the Primrose Pyroclastics are overlain (?) unconformably by the Rosebery Group and probably disconformably by the Bulgobac Group. The relationship of the pyroclastic rocks with the latter is not clear as the contact is partially obscured by other units, and younger glacial deposits.

A rhyolitic to dacitic lava sequence is interbedded within the pyroclastic formation in the Chester area. Farther north in the Burns Peak-Pinnacles area there is a massive rhyolite unit (Burns Peak Rhyolite) (see below). The relationship of this rhyolite mass to the pyroclastic rocks is unclear as it only interfingers with them south of Burns Peak. North of this locality the rhyolite is under- and overlain by sediments of the Bulgobac Group.

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During the photogeological annotation of the photographs it became apparent that the mine sequence at Rosebery is not always to be correlated at the same level within the Primrose Pyroclastics, thus no attempt was made to differentiate between the hanging- and foot-wall sequences. This would be an impossible task anyway as each sequence can only readily be differentiated in the hand specimen.

West Coast Mine's personnel (personal communication) felt that the mine sequence could be traced south through the Rosebery lodes, Dallwitz to Hercules. However careful annotation of the aerial photographs showed that the Rosebery lodes - Dallwitz horizon may be stratigraphically lower than that at Rosebery. No connection between Dallwitz and Hercules could be confirmed, although it does appear, due to their close spacial relationship, that there may be one, which is not, however, readily apparent due to folding between Mt. Read and Hercules. South of White Spur a large number of previously known shale lenses were confirmed on the aerial photographs, and their configuration was clarified. Also in this area field evidence suggests that the pyroclastic component decreases southwards and the purely sedimentary sequences increase.

A north-trending and north-plunging anticline proposed by Braithwaite (1974), and suspected by West Coast Mines' personnel to pass through Rosebery, was thought to be recognized on the aerial photographs. However field evidence indicated that the interpretation could not be confirmed north of the mine. A photo-interpretated fold closure with associated prominent westerly dipping beds that was tentatively identified under the stereoscope immediately northwest of the open-cut, was found to not exist when a field examination was made. It would seem that those structures that appear as westerly inclined dip-slopes are caused by numerous north-east trending fractures. Re-examination of the aerial photographs confirmed this.

The relationship of the mine horizon with the shales near, and south of the new railway bridge over the Pieman River north of Rosebery, is unclear. Photogeological evidence suggests it is a separate horizon.

The southern portion of the Primrose Pyroclastics immediately north of the Henty Fault appears to be covered by a thin veneer of what is possibly Crimson Creek argillite.

(c) Burns Peak Rhyolite (€bp) *

This outcrops as a probable palaeo-dome at Burns Peak. A possible vent was seen on the ground in a new track running east from the track following the ridge north from Burns Peak (SE of AR 3/011). Immediately below the rhyolite an exposure of intrusive porphyry and vent (?) breccia was observed. The dome is made up of massive west-dipping cleaved rhyolite flows, and has been partially folded and faulted. The southern part of the rhyolite mass interfingers with the Primrose Pyroclastics, whilst the northern part is underlain and overlain by shales and other sediments of the Bulgobac Group.

Two analogous rhyolites have been recognized by previous workers near photo-centres CR 3/12 and CR 3/11. The former is interfingered with the Intrusive Porphyries. The latter rhyolite appears to be present at the top of the Mt. Black Volcanic unit, however the relationship is unclear, and the rhyolite may possibly be regarded as a separate body. Both of these rhyolites have a steep to moderate westerly dip.

(d) Farrell Slates (€f), Que River Slates (€qrs)

This apparently connected sequence was deposited around the central topographic high formed by the mass of the Que River Volcanics. Collins (1975) suggested the Farrell Slates underlie the volcanic rocks of the central lava belt, however photogeological evidence indicates they at least overlie the Que River Volcanics, as do the Que River Slates. Both sequences are essentially black slates with intercalations of tuffaceous material. The Farrell Slates extend from the head of the Stirling Valley through Tullah and along the eastern edge of the central lava belt, where they are seen on the aerial photographs to wrap around the northern end of the Que River Volcanics and become the Que River Slates. The Farrell Slates in the vicinity of Tullah and the Stirling Valley have a steep westerly dip. Brooks (1962) suggested that they were overturned. This is confirmed on the aerial photographs, as the slates can be seen to overlie the Que River Volcanics further north, where they exhibit a true dip to the east. The Que River Slates overlie the Que River Volcanics in the north and have, a gentle west dip. Gee et al (1970) gave the age of the Que River Slates as late-Middle Cambrian suggesting that the Que River Volcanics are of early-Middle Cambrian age (Corbett et al, 1974).

* name proposed by Electrolytic Zinc

Collins (1975) suggested that the Que River Volcanics formed an anticlinal axis and this is confirmed on the aerial photographs. It would appear that at the time of deposition of the Farrell Slate the Que River Volcanics may have formed a NNE-trending tectonic ridge.

The Farrell Slates are bound to the east by the northern extension of the Henty Fault. However the fault is largely obscured north of the Murchison River by Owen Conglomerate and Pleistocene glacial deposits. It is suggested that some of the fault movement may have been taken up along cleavage planes within the slates. Movement on the Henty Fault post-dates the Farrell Slates and movement was "west-block-up". This may also be a contributing factor which helps to explain the steep easterly dips and local overturning of the slates, suggesting they were dragged down into the fault.

(e) Mackintosh Volcanics (€mv) *

As mentioned above this is another sub-unit of Collins' (1975) undifferentiated central lava belt. They occur in the north of the study area and unconformably overlie the Que River Volcanics and interfinger with the lower Que River Slates. They appear to be disconformably overlain by the Mt. Black Volcanics. They are reported to be made up of tuffs, lavas and agglomerates (Abminco, pers. comm.). Little is known about the sequence because of poor access.

The Mackintosh Volcanics are seen on the aerial photographs to cropout as moderate to gently west-dipping ridges. The volcanic rocks exhibit a smooth surface texture indicating a low, dense vegetation cover, and they appear to be fairly resistant to erosion as they form a high NNE-trending ridge between the Murchison Highway, north of Tullah, and a point just southwest of Mt. Charter. There is some inconclusive photogeological evidence to suggest that this dominantly volcanic sequence may contain subordinate sedimentary horizons. Sedimentary horizons seen elsewhere in the Mt. Read Volcanics show up as long linear depressions on the aerial photographs.

* name proposed by Electrolytic Zinc

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(f) Mt. Black Volcanics (€mb)

These occur as an essentially west-dipping elongate belt extending from the Red Hills area in the south, to east of Bulgobac in the north. Relationships with other volcanic units recognized on the aerial photographs suggest they are the youngest volcanic group within the Mt. Read Volcanics north of the Henty Fault, and that they may be time-equivalent with respect to the Burns Peak Rhyolite. The Mt. Black Volcanics are seen to overlie the Que River and Mackintosh Volcanics and also the Primrose Pyroclastics. The sequence is made up of massive quartz- and quartz-felspar keratophyres.

Between Mt. Black and Mt. Read the strike gradually swings from north-south to east-west, with a southerly dip. This is probably due to drag folding as the Volcanics approach the Henty Fault (west-block-up). However the possibility of them being on the southern flank of a volcanic centre should not be overlooked, the centre being at or near Mt. Black itself.

(g) Bulgobac Group (€bv) *

This unit crops out as a westerly dipping, north-east-trending belt of sediments, and reworked volcanics, with minor interbedded dacitic tuffs and flows. The belt extends from north of Burns Peak to the north-eastern corner of the study area. This group appears to overlie all other formations within the Mt. Read Volcanics, and is itself disconformably overlain by the Crimson Creek Formation north-west of Burns Peak. The base of the Group, as seen along the Murchison Highway west of the Que River Mine, may be conformable with the underlying Que River Slates.

Limited mapping by previous workers has shown that the Bulgobac Group is made up of greywackes, siltstones, reworked tuffs and black shale, the material being derived from the weathering and erosion of other volcanic units. There are minor intercalations of rhyodacite, and quartz- and quartz-felspar-porphyritic lavas and related pyroclastic rocks. The proportion of purely volcanic intercalations appears to decrease to the southwest.

* name proposed by this author

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Collins (1975) included the Intrusive Porphyries (Cpi) within the Bulgobac Group, and photogeological evidence would tend to confirm this, as the two units can be seen to interfinger north-east of Burns Peak. Interbedded shale units within the Intrusive Porphyries have been mapped by previous workers along the Que River (north-west of CR 2/159), however, these could not be recognized on the aerial photographs.

(h) Intrusive Porphyries (Ꞓpi)

This sequence occurs west of the Bulgobac Group and was reported as a predominantly west-dipping sequence of shales, greywackes and reworked tuffs extensively intruded by massive elongate sill-like bodies of quartz-felspar porphyry (Collins, 1975). This author has differentiated the sediments from the intrusive rocks and has called them the "Bulgobac Group" (see above). To the south the sequence interfingers with the Primrose Pyroclastics and to the north is bounded and overlain by Tertiary basalts.

(i) Rosebery Group (Ꞓr)

This is essentially a sedimentary sequence, which like the Farrell Slates and Que River Slates, is not regarded as being part of the Mt. Read Volcanics by other authors. However because of stratigraphic relationships between the Rosebery Group and the Volcanics and other Cambrian sedimentary sequences, this author feels that the sedimentary Rosebery Group should be included with (in) the Mt. Read Volcanics, even although it represents a transitional sequence between the Volcanics and Sediments. The Group appears to be partially conformable with the Primrose Pyroclastics and it extends as a belt along the western contact of the pyroclastic unit. The outcrop commences south-west of Williamsford and extends to north-west of Bulgobac.

The sedimentary sequence is made up of shale, greywacke, dolomitic siltstone and quartz-wacke (Stitt Quartzite). Its relationship with the shale sequence north of Burns Peak is not clear. The aerial photographs indicate an unconformable contact with the overlying Bulgobac Group. North-west of Burns Peak the Group is partially overlain by a thin veneer of Crimson Creek Formation.

Photogeological evidence suggests the existence of a possible prophyry intrusion near the centre of the fold axis north of Burns Peak (CR 3/13). "Porphyry" is recorded from the Silver Falls Mine, the latter being located at or near the western contact of the porphyry (exact location not known - could not be seen on the aerial photographs).

The Rosebery Group appears to be partially conformable with the Dundas Group and Crimson Creek Formation in the area south of Rosebery, but unconformable, or at least disconformable, relative to the same formations, north of the Pieman River.

3. South of Henty Fault

In this area relationships between various sequences are not clear because of extensive cover by Ordovician Owen Conglomerate and Pleistocene glacial deposits; however, a number of distinct units can be recognized.

(a) Anthony Creek Volcanics * (Success Creek Phase?) (Ꞓps)

These are exposed as a strongly cleaved narrow belt along the western faulted contact of the pre-Cambrian Tyennan Metaquartzite.

They are regarded as being late pre-Cambrian to early Cambrian in age and probably represent the first sedimentary deposition and volcanic activity in the newly formed rift valley, becoming the lowest unit in the Mt. Read Volcanics. They are composed of quartzites with argillaceous and pyroclastic intercalations. The sequence is called Sticht Quartzite by some workers.

(b) Murchison Volcanics * (Ꞓp) and Murchison Granite (Ꞓgm)

The Murchison Volcanics outcrop as a north-south striking, steeply east-dipping sequences of rhyolite and porphyry flows, and sill-like intrusive bodies that are underlain in part by elongate concordant bodies of granite-adamellite. The latter is termed granite though it has the superficial appearance of intrusive porphyry in hand specimen.

* name proposed by this author

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Where it can be seen, as in the Murchison Gorge near Tullah, the granite appears to have an indistinct contact with the rhyolites and porphyries. This suggests it is the intrusive phase of the volcanic rocks, a view held by previous authors.

On the aerial photographs the Murchison Volcanics extend from north of Tullah to Anthony Creek in the south, where they are probably continuous with the Selina Volcanics. The latter contains more pyroclastic material.

Little is known of the Murchison Volcanics due to poor access, except for the exposure along the Murchison River. Photogeological evidence suggests they may contain some pyroclastic material. (Negative topography between "porphyry" and rhyolite flows.)

The granite appears on the aerial photographs as distinct linear depressions with a lower vegetation canopy than exists on the enclosing volcanics. It is probable that additional smaller bodies of granite may outcrop within the volcanics but because of similar bulk chemistry and transitional boundaries they are not easily discernible on the photographs.

A distinctive massive potassic rhyolite known as "Darwin" rhyolite, after the type location south of Queenstown, outcrops as a prominent pink-toned ridge east of Henty Fault in the lower Stirling Valley (NE of AR 2/011). Similar rhyolites have been mapped in the east Red Hills area (CR 7/11, AR 2/013), and also are proposed from photogeological evidence to occur as a prominent ridge along the Murchison River (north from CR 6/42).

(c) Selina Volcanics (Ꞓsv)

These are made up of rhyolite pyroclastics and occur as a north-trending belt east of the Owen Conglomerate of the Mt. Murchison-Tyndall Range. They appear on the aerial photographs to be continuous with the Murchison Volcanics north of Anthony Creek.

(d) Queenstown Pryoclastics (Ꞓqp)

As mentioned above under section B.2(b), these are the southern equivalents of the Primrose Pyroclastics. They crop out in the study-area

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as a wedge-shaped block bounded to the west by the Henty River and to the east by the overlying Owen Conglomerate and Tyennan-Junee Group of the Tyndall Range. The outcrop pattern is not clear owing to masking by glacial deposits, but their compositon is reported to be similar to that of the Primrose Pyroclastics (Corbett, 1975).

(e) Mt. Black Volcanics (Cmb)

These occurs as a thin belt of pink to white quartz-porphyry lavas in the Red Hills Area bounded by the Henty Fault in the west and the Murchison Volcanics and overlying Tyennan Group and Owen Conglomerate in the east. Petrologically the flows are identical to those immediately north of the Henty Fault. (Williams, personal communication) (7)

(f) Junee Group - Tyennan Group (Ct)
(Jukes Breccia (Ctj); Comstock Tuff (Ct))

These are regarded by most authors as being the last phase of the Mt. Read Volcanics, and are the transition zone between the Volcanics and the Ordivician Owen Conglomerates. The material for the group was derived from the rapid erosion of the Volcanics following the Jukesian Orogeny at the end of the Cambrian, the Jukes Breccia representing the first material to be deposited in the re-activated graben (rift valley).

The sequence occurs as a thin veneer beneath the Owen Conglomerate, extending from both sides of the Tyndall Range near Red Hills, to as far north as Tullah. Corbett (1975) regards its age as Middle Cambrian however this probably only applies to the Comstock Tuff, the Jukes Breccia being probably late Cambrian in age.

C. STRUCTURE

The project has revealed a considerable amount of new information on the structure, configuration, and relationships within the Mt. Read Volcanics. The major structural feature is that of a palaeo-rift valley trending approximately north-south. This structural feature was first

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recognized by Campana and King (1957), and, based on photogeological evidence, this author agrees with their interpretation. The eastern margin of the rift is defined by the faulted western margin of the pre-Cambrian Tyennan Meta-quartzite (Tyennan Fault - see Fig.4). The western margin, although partially obscured by overlying sediments, especially north of Burns Peak, is represented by the Marionoak Fault. This fault is visible from Marionoak Creek south through Moore's Pimple to the south-west corner of the study area (CR 7/12). North of Burns Peak the Marionoak Fault is obscured by younger cover rocks. Its approximate position is marked by the contact between the Crimson Creek Formation with the Bulgobac Group and Intrusive Porphyries (see Fig.4), and also by the Que River before it swings to the east (between CR 2/157 and CR 2/158).

The boundaries of sub-rift valleys are defined by the Henty and Great Lyell Faults. Only the northern limit of the latter is present in the southern part of the area, and is visible along the western side of the Tyndall Range. (CR 8/207).

The Henty Fault extends from south of Mt. Dundas, through Tullah and then NNE along the Mackintosh River Valley. Two other large northerly-trending faults are those passing through Lake Dora and Mt. Murchison, and through Mt. Black. Numerous other northerly-trending faults were recognized on the aerial photographs, many being splinter faults related to the larger fractures.

The north-trending faults are offset by many, generally WNW trending cross faults. Movement on all faults appears to be mainly vertical with little or no horizontal movement. The Henty and Mt. Black Faults have components of "west-block-up"; vertical throw on the latter being approximately 150 metres.

It is felt by this author that some northerly-trending faults are not readily apparent, either on the aerial photographs or in the field, as movement is taken up along cleavage planes of interbedded shale lenses. It is suggested that the "schist" on the hanging wall contact at Rosebery may represent an example of this. A pervasive northerly-trending cleavage is recognized throughout the study-area.

Folding is open in style with only local overturning, the limbs having moderate dips. The folding appears to be linked with post-depositional

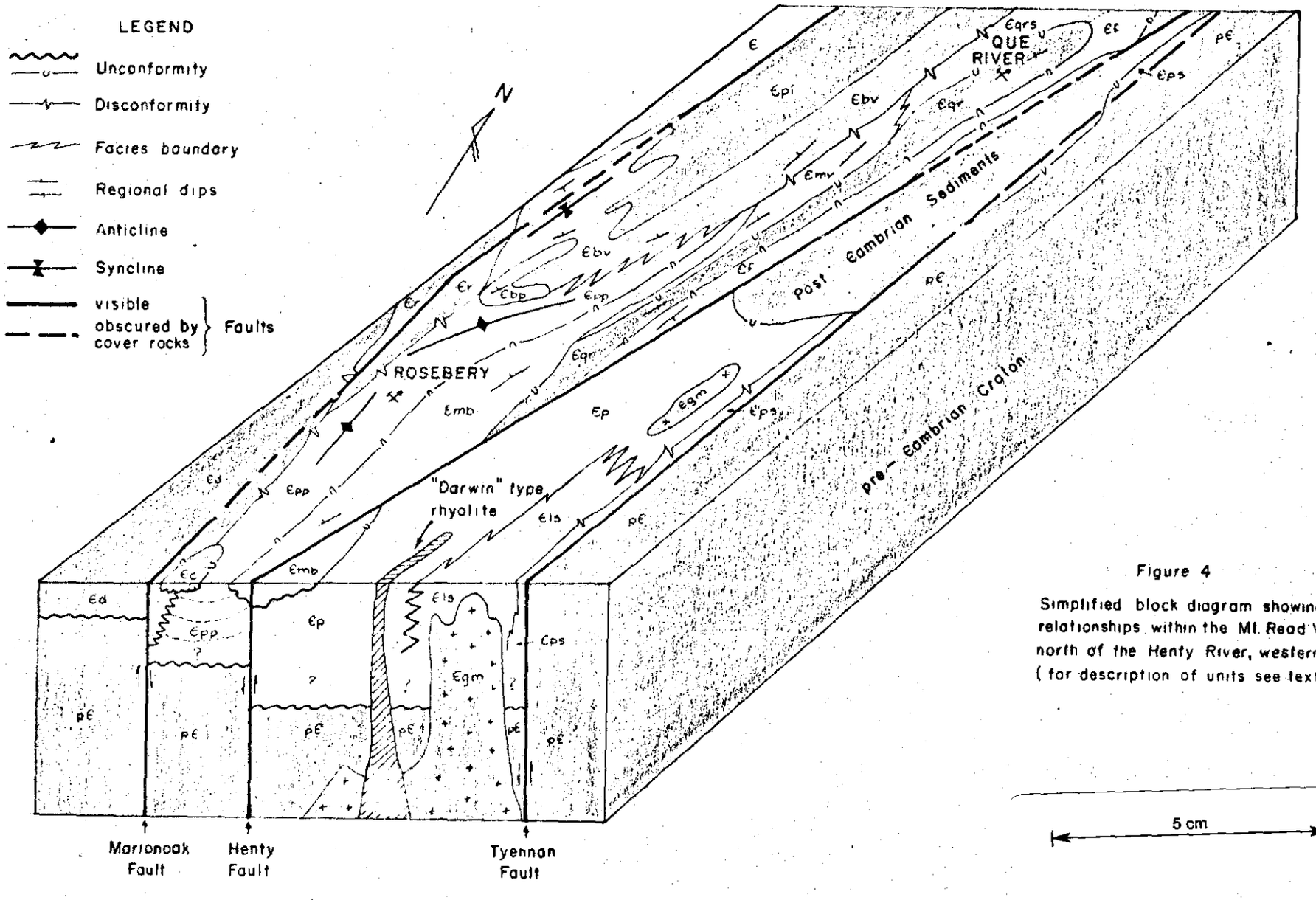

Figure 4

Simplified block diagram showing inferred relationships within the Mt. Read Volcanics north of the Henty River, western Tasmania (for description of units see text)

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movements along strike faults rather than due to any large regional compressional forces. Fold axis have a NNE strike, with gentle northerly plunges being predominant. Large scale open folding was recognized in the Mt. Read Volcanics north of Rosebery. Two large anticlinal ridges were recognized on the photographs trending north from Chester, and also in the Que River Volcanics north of Tullah. A broad syncline was noted north of Burns Peak, and a synform along Farm Creek (AR 2/008).

Many small scale folds were recognized on the aerial photographs. (see map)

IV. CONCLUSIONS AND RECOMMENDATIONS

As mentioned above this project has revealed a considerable amount of new information on the structure, configuration, and relationships within the Mt. Read Volcanics. The main conclusions reached by this author are:-

(a) The Mt. Read Volcanics are confined to a generally north-south trending palaeo-rift valley, that was formed in the late pre-Cambrian, and remained active until late Cambrian to early Ordovician times.

(b) The Volcanics can be divided into an early acid-intermediate to intermediate phase, that was separated from a later acid to acid-intermediate phase, by a depositional hiatus, during which tectonism and erosion occured.

(c) Two main phases and directions of faulting occur in the area, namely north-south trending block faulting that was active from late pre-Cambrian to Ordovician times, and a younger, generally north-west to north-north-west cross faulting that in places offsets the earlier faults. The faults appear to be vertical with little or no strike component.

(d) The folding is open in style, and appears to be related to the faulting, rather than to any major compressional forces.

(e) The spatial relationships of the units within the Mt. Read Volcanics has been clarified, and two other sedimentary units, namely the Rosebery Group and the Farrell-Que River Slates have been included within the Volcanics.

Prior to the discovery of the Que River Mine, all discoveries of major base-metal deposits had been confined to sedimentary units within the Primrose Pyroclastics and to a lesser extent in the Farrell Slates and Bulgobac Group. Mineralisation at Que River is related to a pyritic horizon within an intermediate volcanic suite, termed the Que River Volcanics. Minor mineralisation related to younger acid volcanic rocks is found at Red Hills (CR 7/10) and in the Burns Peak-Pinnacles area (east of AR 3/007).

This author suggests that the Que River Volcanics may be the source rocks for much of the mineralisation in this part of the Mt. Read Volcanics. Although the evidence is by no means conclusive, most of the known mineral occurrences are very close (less than 8 kilometres) to outcrops or potential sub-outcrops of Que River Volcanics. It is possible that these volcanics may also be found at depth beneath the Primrose Pyroclastics in the west. The dacitic volcanics found east of Chester may be related to the Que River Volcanics, suggesting a separate unit, or a possible positive relationship between the Que River Volcanics and the Primrose Pyroclastics.

Based on evidence from similar environments in Canada (Sangster 1972), exploration philosophy in this area should be directed towards looking for massive agglomerate units that may be indicative of a volcanic vent. In Canada it is well known that these rocks are found within a very short distance of known mineralisation. They have been termed "mill rocks" because they are generally found within sight of the mine mill, and they could be useful as "path-finder" rocks when exploring for mineralisation within this type of volcanic environment. In the Rosebery area coarse agglomeratic rocks were seen in the field 4 kilometres west of Mt. Black (AR 2/010), on the H.E.C. road 1 kilometre east of Farrell Junction (east of AR 3/009) and also north-east of Burns Peak. At the latter location a possible sub-volcanic intrusive rock and vent-breccia were seen. Because of their relatively small outcrop area, they could not be positively recognized on the aerial photographs.

Other locations worthy of further investigation are the Intrusive Porphyries and surrounding rocks in the north of the study area; and the Murchison Volcanics and Murchison Granite south-east of Tullah, and the Mt. Black Volcanics.

Whilst this author acknowledges the importance of continued investigation for similar environments to that found at Rosebery and Hercules; a more detailed search for possible source areas (volcanic centres) should be regarded as being equally important. Once these are located, then detailed exploration for Rosebery type mineralisation in the immediate area can follow.

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AERIAL PHOTOGRAPHY USED

ROSEBERY AREA

Tasmanian Lands Department
Scale 1:40 000 RC9(?)
F469 Film No. T673 : 60% overlap
Matt finish, double-weight, high contrast
Runs flown north-south

Run No.	Negative No.	Photo Nos.	No. of Photos	Date	Quality
1	225 - 238	000 - 013	14	18.2.75	Good
2	211 - 224	003 - 016	14	18.2.75	Good
3	173 - 187	003 - 017	15	18.2.75	Good
4	190 - 204	002 - 016	15	18.2.75	Good
			58		

CONICAL ROCKS

Tasmanian Lands Department
Scale 1:40 000 RC9 (?)
F423 Film No. T679 : 60% overlap
Glossy finish, double-weight, moderate contrast
Runs flown east-west

Run No.	Negative No.	Photo Nos.	No. of Prints	Date	Quality
1	119 - 127	006 - 014	9	17.4.75	Good
2	154 - 161	013 - 020	8	17.4.75	Good
3	9 - 16	008 - 015	8	17.4.75	Good
4	98 - 105	011 - 018	8	17.4.75	Good
5	59 - 65	007 - 013	7	17.4.75	Good
6	38 - 43	010 - 015	6	17.4.75	Good
7	227 - 233	008 - 014	7	17.4.75	Good
8	204 - 209	007 - 012	6	17.4.75	Good
9	185 - 190	008 - 013	6	17.4.75	Good
			65		

Note: To avoid confusion on the map, the photo number is used for the Rosebery Area photographs, while the negative number is used for the Conical Rocks photographs

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APPENDIX III

Geochemical Exploration for Base Metals, West Coast Tasmania.

N.J. Marshall
April, 1979

Orientation Studies carried out for Electrolytic Zinc Exploration.

N.J. Marshall
April, 1979

Copy appended to: Bulgobac Exploration Licence 12/72
Report No. 130 October, 1979
Forwarded to Mines Department. 79-1401 C

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APPENDIX IV

Scintrex Report Tas-065

Comments of Gradient Array Electrical Induced Polarisation and Total Magnetic Field Surveys carried out over the Mt. Black Grid near Rosebery, Tasmania, on behalf of Electrolytic Zinc Company of Australasia Limited.

March, 1979

Copy supplied to Getty Oil Development Company Limited.

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COMMENTS ON GRADIENT ARRAY ELECTRICAL INDUCED POLARIZATION AND TOTAL MAGNETIC FIELD SURVEYS CARRIED OUT OVER THE MT. BLACK GRID NEAR ROSEBERY, TASMANIA ON BEHALF OF ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

BY

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SYDNEY, N.S.W.

MARCH, 1979
TAS-065

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GEOPHYSICAL CONSULTANTS AND CONTRACTORS

SUMMARY

A gradient array reconnaissance survey over the 34 kilometres of the Mt. Black grid has defined a number of 'single line' anomalies on the 1 kilometre spaced traverses which are worthy of further investigation by additional short lines placed either side of the areas of primary interest.

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COMMENTS ON
GRADIENT ARRAY ELECTRICAL INDUCED POLARIZATION
AND TOTAL MAGNETIC FIELD SURVEYS
CARRIED OUT OVER THE MT. BLACK GRID
NEAR ROSEBERY, TASMANIA
ON BEHALF OF
ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

INTRODUCTION

At the request of Mr. G. Dunbar, Chief Geologist for West Coast Mines division of Electrolytic Zinc Company of Australasia Limited, Scintrex Pty. Ltd. performed a gradient array electrical induced polarization reconnaissance survey over some 34 line kilometres of grid in the Mt. Black area, near Rosebery Tasmania.

The EIP work was carried out on 4 single and 5 double operator days between 30th November and 18th December, 1978, and 9 single and 3 double operator days between 11th and 26th January, 1979. The earlier part of the survey was marred by a fire in the motor generator/alternator section while enroute to the first set-up. The damage caused by this fire was far more difficult to rectify than first appeared likely. The latter part of the survey was affected by severe magnetic storm acitivity, which also delayed the magnetic field survey. The latter was carried out by three operators on line and a base station, and took some six production days between 28th January and 2nd February, 1979.

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The party leader was Mr. B. Ekstron who was variously assisted by Mr. O. Saeck, Mr. P. List, Mr. T. Von Strokirch,B.Sc., Mr. K. Aprhorpe B.Sc., Mr. K. Hannan,B.Sc. and Mr. D. Webb,B.Sc.

On site geological direction was undertaken by Senior Geologist, Mr. R. Williams.

EQUIPMENT

The equipment consisted of a Scintrex 10/15 kilowatt time domain induced polarization transmitter powered by a trailer mounted Volkswagen industrial generator. The resultant primary (resistivity) and secondary (induced polarization) electrical fields were observed using a Scintrex IPR-8 analog time domain induced polarization receiver, and later in the programme a more sensitive but compatible digitial IPR-10.

The energisation was a two second on, two second off, reverse and repeat, while the data was acquired with a two second, three slice programme on the receiver.

METHOD

The method chosen as the most cost effective was gradient array which has excellent depth penetration due to the *large* current dipoles employed, and excellent resolution due to the *small* potential dipole employed. In the present case they were 6500 metres and 20 metres respectively.

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In order to appreciate the volume from which the observed data originates, some brief comments are made on the method. The characteristic of the gradient array is that the current poles 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, in exaggerated form, shows the influence of terrain on the current paths. From this diagram it can be seen that the *apparent resistivity* is a summation of the volume of material normal to local slope beneath the surface and at right angles to it.

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

Each in-line (i.e. along strike) gradient block will show a similar anomaly form, however, end-on gradient blocks (i.e. adjacent) *may* show material differences as the overlapping potential dipole will not necessarily be sampling the same volume of material. This is increasingly true as the current pole is approached. Figure 2a illustrates this situation diagrammatically.

Distortion can also occur at the extremeties of the array as shown in Figure 2b. This is due to the angle of the primary energising current to the reading potential. If there is a *conductive* unit at, near, or at right angles, to the line, the current will run at

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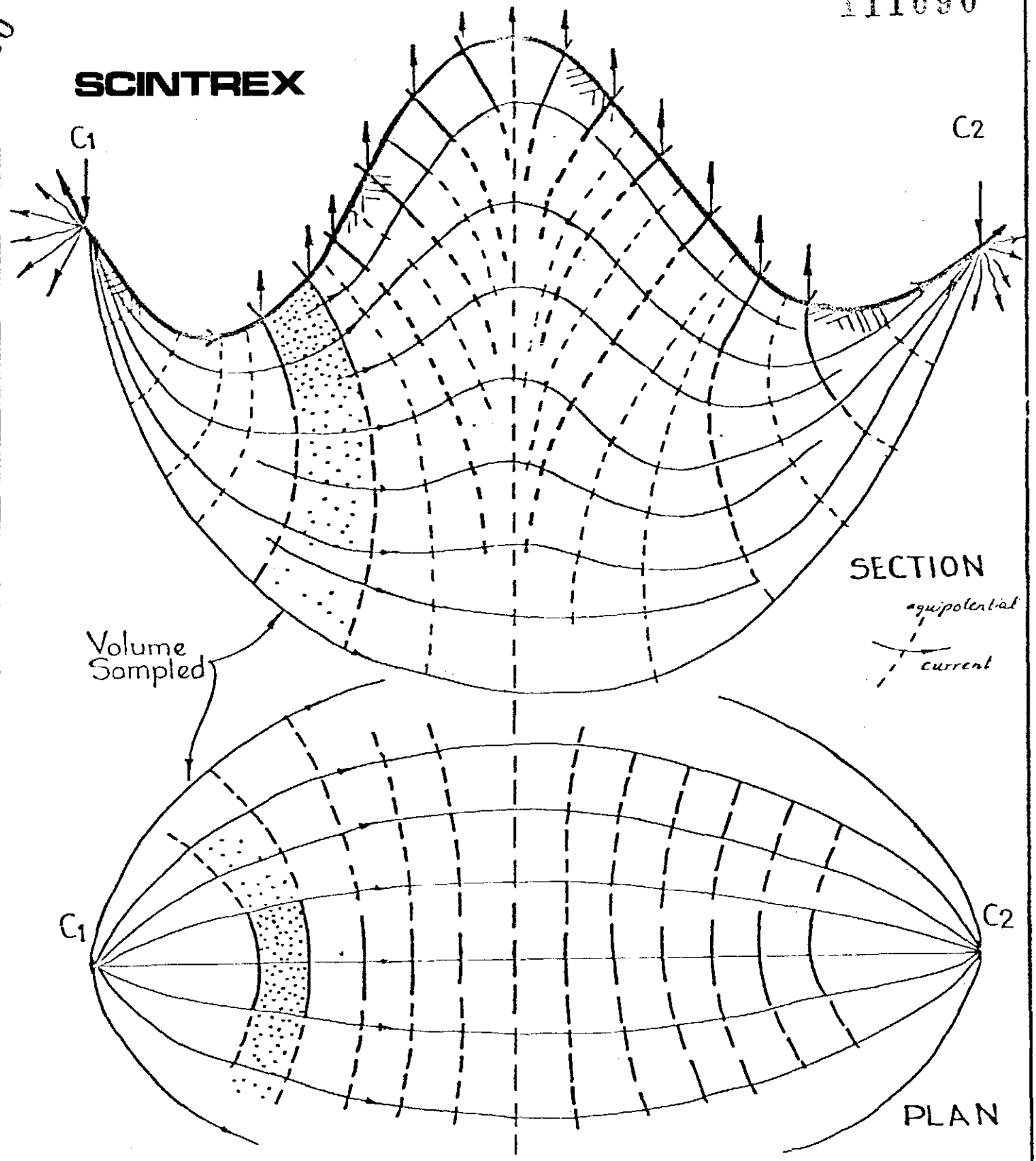

Diagrammatic Representation of Primary Current and Potential Field in Steep Topography.

FIGURE 1.

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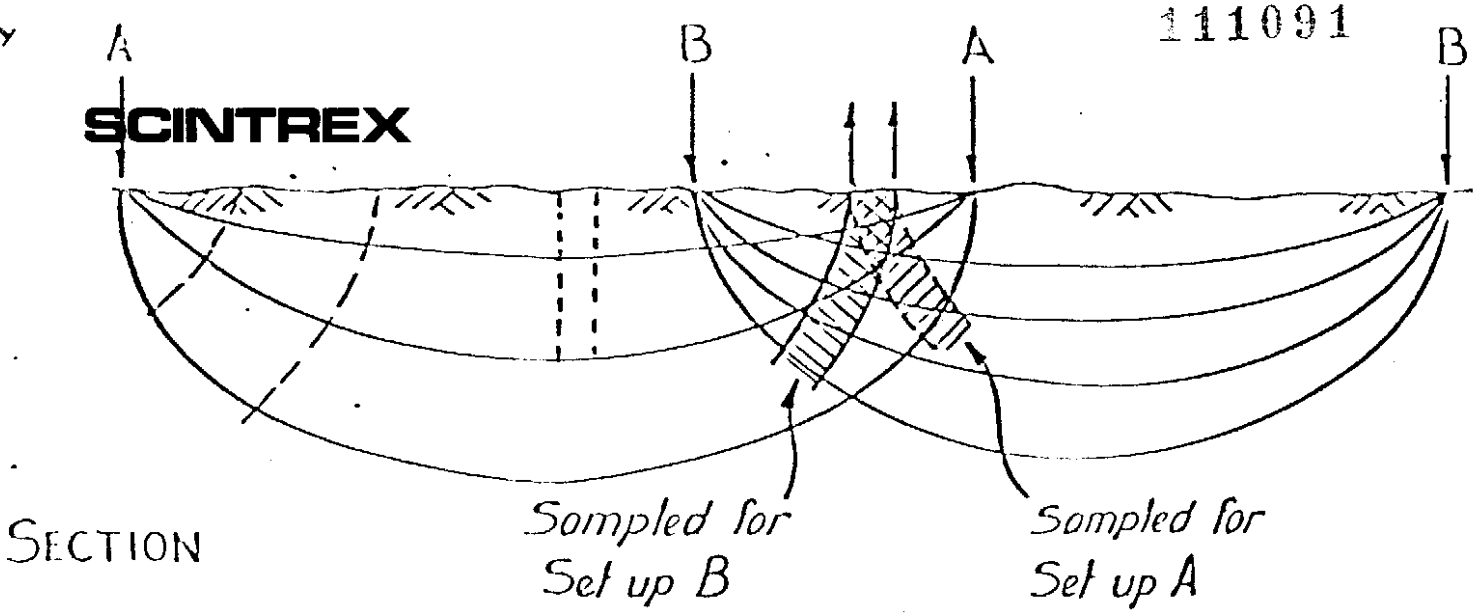
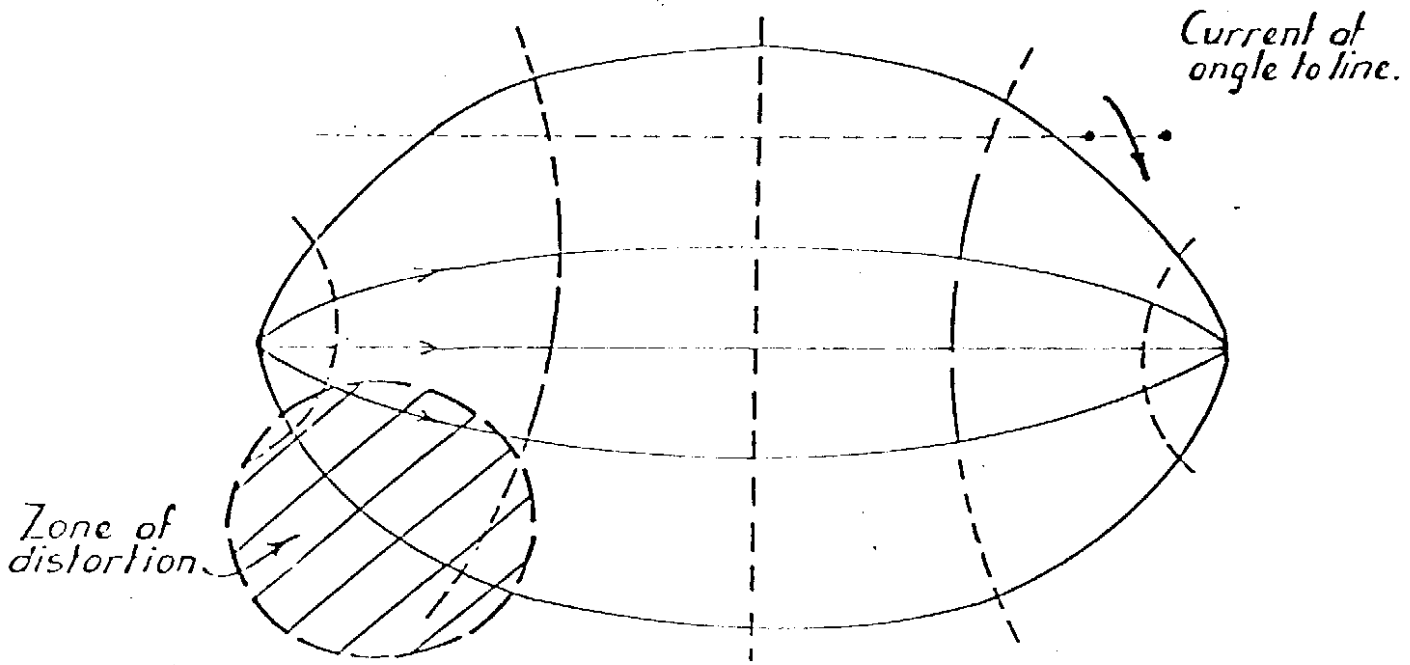


2(a) Explanation of difference in ρ_a measurements for "end-on" arrays.



2(b) Explanation of exaggeration at edges of array.

5 cm

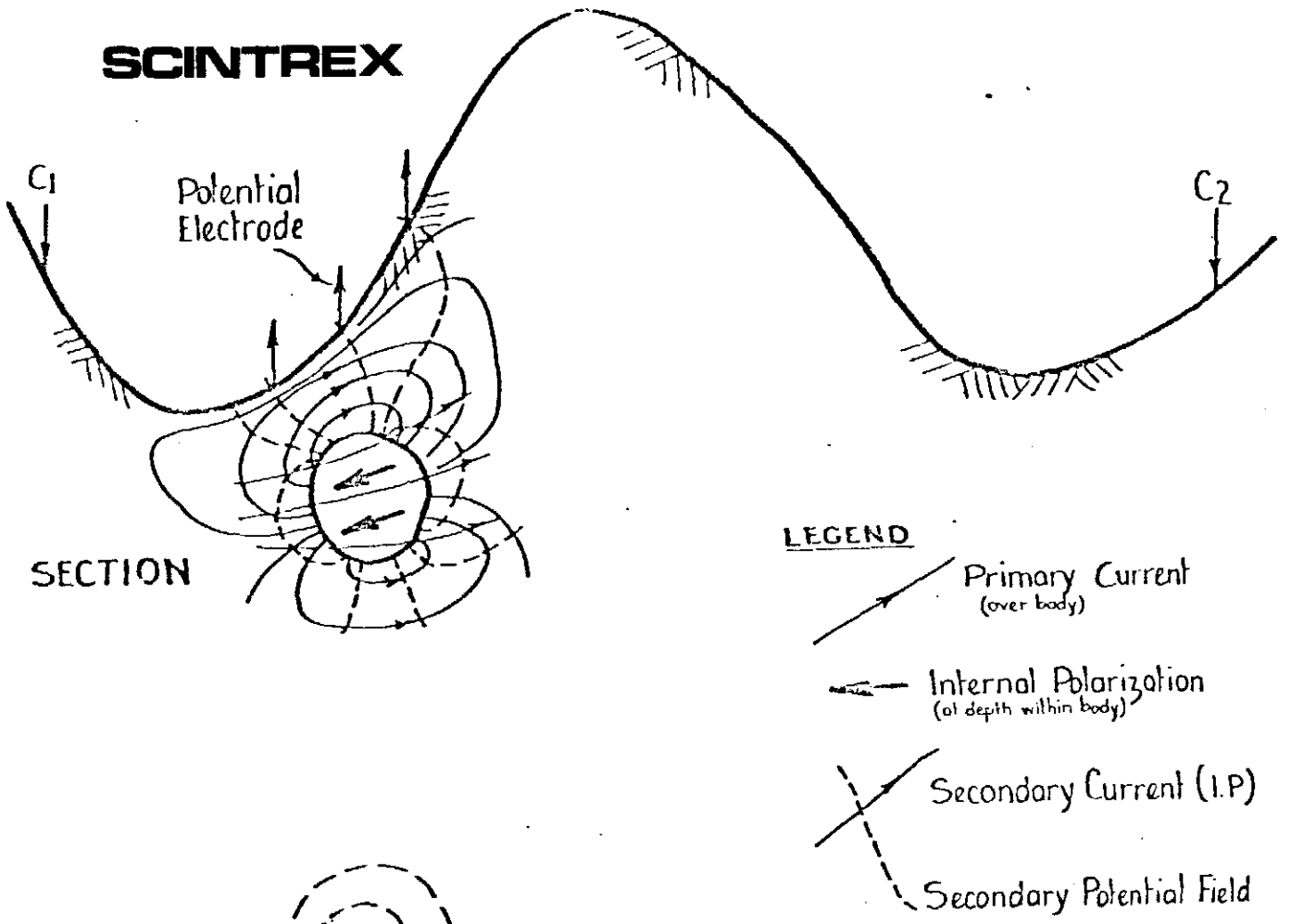
right angles to the line, and thus the equipotentials will be parallel to the reading dipole. Therefore readings in the "zone of distortion" should be regarded with caution.

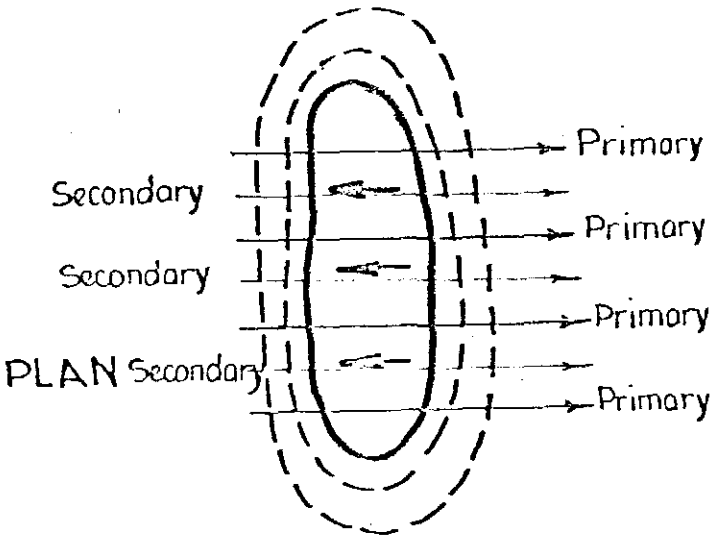
Note particularly that the *source volume* is *normal to local slope* and not vertically beneath the potential dipoles.

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 3 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.

From the *form* of the profile over any resistive or chargeable unit, a maximum depth to source estimate can be made. The depth can, however, be less than the maximum depth estimated, as this calculation assumes a 'narrow' source. Also, the depth to source cannot be estimated better than the potential dipole employed (20 metres)





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

FIGURE 3.

5 cm

within a depth equal to that dipole. In this case therefore, bodies shallower than 20 metres will appear to have maximum depths of 20 metres.

Both the apparent chargeability and apparent resistivity are plotted midway between the potential electrodes.

Decay Form: The decay form was observed in three slices, M_1, M_2 and M_3, which are combinations of slices $M_1 + M_2$, $M_3 + M_4$ and $M_5 + M_6$ shown in Figure 4.

With the IPR-8/10 some six slices under the decay curve can be analysed. Some additional explanation is necessary in respect of this data. Each of the six slices is *normalised* to take account of the 'normal' decay form. This is done within the IPR-8/10 itself. Thus, if the decay form *is* normal, all six slices will be equal, i.e. $M_1 = M_2 = M_3 = M_4 = M_5 = M_6$. For abnormally slow decay forms, $M_1 < M_2 < M_3 < M_4 < M_5 < M_6$, and for abnormally fast decay forms, $M_1 > M_2 > M_3 > M_4 > M_5 > M_6$. This is diagrammatically shown in Figure 4. It follows that ΔM will be *POSITIVE* for slow decay rates and *NEGATIVE* for fast decay rates.

The geological meaning of decay rates is as follows: The decay rate is determined predominantly by the grain size of the causative mineralisation. Slow decay rates are caused by 'large' effective grain size, while fast decays are due to fine grain size mineral assemblages and/or inefficient sources. While the grain size is

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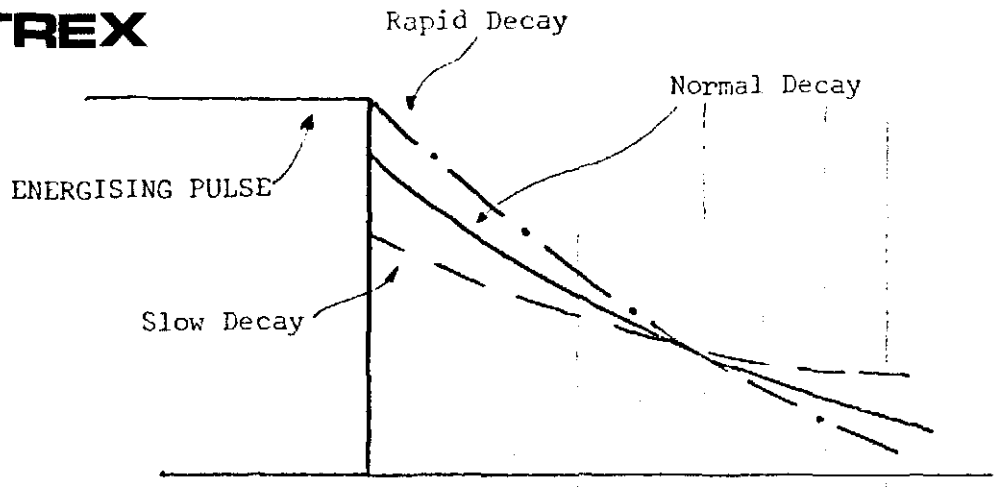
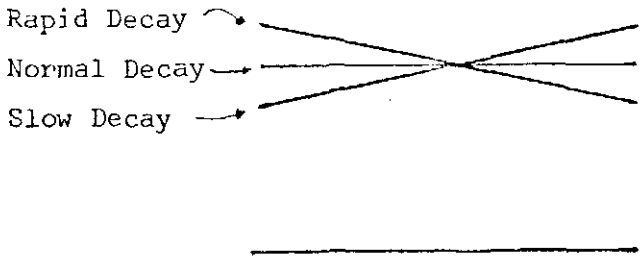


I(a) Actual Decay

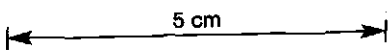


I(b) Decay as read in IPR-8
after normalisation

Decay Slice M_1 M_2 M_3 M_4 M_5 M_6

FIGURE 4

Actual (a) and normalised (b) decay form as read and processed by Scintrex IPR-8



not the sole determinant, in our experience it is the dominant one.

At Mt. Black where M_1, M_3 and M_5 were recorded, only M_3 has been plotted. In areas of low signal and/or high noise, only a single slice (summing M_1 to M_6) was recorded to increase the signal to noise ratio. The former are plotted with a (•), while the latter are shown thus (Δ)

DATA PRESENTATION

The data profiles have been plotted at a scale of 1:2500. The vertical scales for resistivity and chargeability are 10 centimetres = 1 logarithmic cycle and 1 centimetre = 2 millivolts/volt respectively. The gradient of the self potential was recorded and plotted at a scale of 1 centimetre = 10 millivolts while the total magnetic field is presented at 1 centimetre = 50 gamma.

Plate 1 is a contour interpretation of the chargeability, Plate 2 is a contour interpretation of the resistivity data and Plate 3 is a contour interpretation of the total magnetic field data. The scale of all three plates is 1:5000.

DISCUSSION OF RESULTS

Each of the lines is separately discussed, and anomalies on each individual lines are not correlated with adjacent lines, as the distance between lines of 1 kilometre is too far for this to be meaningful.

The chargeability anomalies located are graded in terms of primary, secondary and tertiary interest based on their amplitude, and on form. Those that are associated with lower than background resistivities being considered of greater interest than those of high resistivity.

A diagrammatic location plan is shown in Figure 5 at the scale of 1:50,000.

LINE 379000N

379050E - 38000E

The background chargeability over this section is about 22 millivolts/volt while the apparent resistivity ranged between 1000 ohm-metres and 10,000 ohm-metres but background can be considered to be about 2000 to 5000 ohm-metres.

Significant above background induced polarization responses were located between 379150E and the end of the line at 379050E. At this latter station the chargeability is about twice background, with a lesser maximum of 10 millivolts/volt above background at 379112E. The resistivity background remains a high 2500 ohm-metres indicating a disseminated source. The form of the response does not allow an accurate depth estimate, however a guesstimate is about 25 to 35 metres for both maxima. The priority of this zone is *SECONDARY*.

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Two relatively minor responses of 8 and 6 millivolts/volt were defined at 379212E and 379260E. Disseminated sources are present at 50 metres and 40 metres within resistive material. Both are of *TERTIARY* interest.

A sharp 8 millivolts/volt above background response was recorded at 379440E. The high resistivity of 4000 ohm-metres indicates a resistive, disseminated host, the maximum depth of which is 30 metres. The response is of *TERTIARY* interest only.

380000E - 384050E

Over this section the background chargeability decreases gradually and slowly from about 18 millivolts/volt to 10 millivolts/volt (adjusted), while the apparent resistivity increases over that observed to the west, to a level varying around 10,000 ohm-metres (adjusted). Superimposed on this background are two significant maxima and a number of lesser maxima which are worthy of comment.

At 380035E (±35 metres) a broad high of 6 millivolts/volt above the 20 millivolts/volt local background is accompanied by slightly reduced apparent reissitivities of 4000 ohm-metres. This low amplitude, broad response probably represents a compositional change and thus is of *MINOR* interest only.

Assuming the background to be at about 16 millivolts/volt, a series of increased induced polarization readings were recorded between about 380150E to 380325E with individual maxima at 380190E, 380237E

and 380270E, all of 31 millivolts/volt. A lesser shoulder at 380310E may infer a separate source. The high resistivity of 5000 ohm-metres to 6000 ohm-metres clearly infers a disseminated or electrically discontinuous source, while the maximum depth inferred is about 75 metres. However, the latter is no doubt excessive, as the source is *broad* and probably not sharply enclosed in the background host rocks. This response is of *PRIMARY* interest.

A second response of *PRIMARY* interest was recorded at 380670E±25 metres from either a broad (say 40 metres wide) source *or* two individual sources within this zone. The chargeability rises some 10 millivolts/volt above the local 20 millivolts/volt background, while the apparent resistivity at 900 ohm-metres is depressed below background. The depression is at a minimum over the eastern section of the chargeability maximum, and as this coincides with a negative SP value of 30 millivolts below background, some interconnection, albeit small, is inferred to be present. Much smaller chargeability maxima of 4 millivolts/volt at 380580E and 8 millivolts/volt at 380730E may be related.

A sharp SP minimum of 50 millivolts below background at 380790E which coincides with a 6 millivolts/volt increase in chargeability and an *increase* in resistivity by 2.5 fold to 20,000 ohm-metres, is interpreted as being due to a minor conductive anomaly over a minor electrically continuous zone of minor extent within a resistive host, probably associated with disseminated sulphides (or graphite).

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The remainder of the induced polarization responses recorded are considered minor, and due to compositional differences within the underlying rocks.

LINE 378000N

The line appears to have a general correlation in background to line 379000N in that the background chargeabilities west of about 380800E are at about the 22 to 24 millivolts/volt level, while to the east of that they fall to about 16 millivolts/volt. However, unlike line 379000N, they again rise very gradually to about 22 millivolts/volt at 383600E (±) after which they again fall to 16 millivolts/volt towards 384200E. These changes undoubtedly represent gross compositional changes in the underlying rocks. The apparent resistivities remained between 1000 ohm-metres and 10,000 ohm-metres, with the most resistive rocks being between about 379850E and 381175E and between 382125E and 382650E.

The anomalies worthy of comment are individually discussed below.

At 379730E a sharp single station maximum of 8 millivolts/volt above background was recorded from rocks whose resistivities were recorded as 3000 ohm-metres. The source is interpreted as disseminated sulphides at a maximum depth of about 25 metres.

At 380690E a 28 millivolts/volt maximum was recorded coincident with a fall of 50% or so in the background resistivity to 5000 ohm-metres. The maximum depth to the source, which is less resistive

than the enclosing rocks, is estimated at 50 metres, and the inferred dip is to the east. This response is of *SECONDARY* geophysical interest.

A series of sharp 8 to 10 millivolts/volt maxima above the lower than usual 14 to 16 millivolts/volt background were recorded at 380990E, 381050E and 381110E, all associated with *increases* in apparent resistivity to 10,000 ohm-metres to 7000 ohm-metres above the 4000± ohm-metres background. The maximum depths to source of these three maxima are 50 metres, 25 metres and 35 metres respectively. These sources are disseminated and lie within a resistive host, and are thus of *SECONDARY* to *TERTIARY* interest only.

Two related maxima of *SECONDARY/TERTIARY* and *TERTIARY* interest were defined at 381950E and 381990E from disseminated sources estimated to lie at maximum depths of 50 and 30 metres respectively. These sources are in resistivities considerably less than those further west, and are therefore not similar to them.

A response of *SECONDARY* interest at 382050E again from a disseminated source, this time at a maximum depth of 30 metres, is considered of secondary interest. It is narrow and sharply enclosed into the host rocks.

A series of maxima of 6 to 8 millivolts/volt were recorded between 383250E and 383500E, all within locally lower resistivities of 700 to 1000 ohm-metres. These maxima of 26, 29, 29 and 31 millivolts/volt over the 20 to 22 millivolts/volt background show no individual

resistivity minima and were defined at 383275E, 383370E, 383430E and 383490E, so probably represent segregations of sulphides or graphite within a broader chargeable unit. The maximum depths to source are 50 to 60 metres.

The only anomaly of *PRIMARY* interest was located at 383770E ±25 metres where an 8 to 10 millivolts/volt above background response was recorded over changes in resistivity from 600 ohm-metres at 383730E to 4000 ohm-metres east of 383850E. The source lies then on a transition between two different rocks types, and can be interpreted as not influencing the resistivity of that change. The maximum depth to source is estimated at about 50 to 60 metres, while the asymmetry infers a west dip. The source itself is either 'broad' (30 to 40 metres) or is composed of two or more individual sources within these limits. This zone is recommended for careful follow-up.

LINE 37700N

This line shows a number of distinct level changes. The description of the significant anomalies is by each distinct background section in this case.

378200E - 378900E

The background chargeability over this section is a high 24 to 28 millivolts/volt, while the resistivity varies between about 600 and 2500 ohm-metres.

Within this zone the most significant response was a series of 30 to

36 millivolts/volt maxima between 378500E and 378950E. The resistivity reaches a low of 600 ohm-metres at 378600E, and between 378730E to 378870E within this zone. This broad horizon is of formational origin and may represent graphite and/or sulphides within a less resistive background. Within this zone maximum depths to the sources are 75 metres at 378550E, 30 metres at 378730E. The main individual segregations of chargeable material were noted at 378550E, 378675E, 378730E, 378850E and 378900E.

378980E - 379800E

This section sees a gradual increase in background resistivity from 1000 ohm-metres± in the west to 5000 ohm-metres in the east, while the background chargeability remains at about 24 millivolts/volt (±) over the entire section.

An 8 millivolts/volt above background chargeability response centred at 379025E is accompanied by slightly increased resistivity of 2500 ohm-metres. The maximum depth to the disseminated chargeable and resistive host is about 40 metres. The response is of *SECONDARY* interest at best.

At 379150E a 12 millivolts/volt above background response was recorded, but unfortunately the next two readings to the east were unobtainable. The resistivity over this section was about 650 ohm-metres and showed no change over the anomaly. The source then must be disseminated sulphides or graphite, which does not influence the resistivity of the host.

A sharp 10 millivolts/volt above background response at 379350E is considered to be due to disseminated chargeable material at a maximum depth of 30 metres. This response is of *TERTIARY* interest only.

Two related responses of 10 millivolts/volt and 12 millivolts/volt centred at 379490E and 379550E (± 25 metres) were recorded. The latter is a broad zone which may either be a broader source (say 30 metres) *or* multiple sources *between* these limits. This response is of *SECONDARY* to *PRIMARY* interest.

379800E - 380500E

Between these limits the background resistivity remains at about 5000 ohm-metres while the background chargeability remains at 24 to 22 millivolts/volt.

Within this zone relatively minor 6 to 8 millivolts/volt rises in chargeability above the background at 380000E, 380275E and 380450E are considered of *TERTIARY* interest. The latter two are accompanied by slight depressions in the otherwise resistive backgrounds. The sources in all three cases are disseminated in nature.

380500E - 382000E

This sector is characterised by background resistivity increasing from 2000 to 3000 ohm-metres in the west to 5000 (±) ohm-metres in the east, while the background chargeability falls progressively from

20 millivolts/volt in the west to 12 millivolts/volt in the east. A gradual decrease in chargeable material and an increase in resistivity *infers* increasingly acidic rocks (whether sedimentary or volcanogenic) from west to east. Also, this section is characterised by no induced polarization responses of any note.

382000E - 383900E

Only two induced polarization maxima are worthy of note over the whole section.

The first is a 6 to 7 millivolts/volt above background response at 382100E which unlike any other responses discussed to this point, is accompanied by a very material decrease in resistivity from 10,000 ohm-metres to the immediate east and west, to 1300 ohm-metres. The source therefore, while still resistive as such, is very much less so than the enclosing rocks, which may indicate some inter-connection between the sulphide and/or graphite source.

The second response of note is a most extraordinary one of 32 millivolts/volt at 382550E. The response is on the boundary between 20 millivolts/volt background to the west and 17 millivolts/volt background to the east. The resistivity data however shows no such dramatic change, inferring that the change in background is due wholly to chargeable content. The maximum depth to this interesting zone which is of *SECONDARY* to *PERHAPS PRIMARY* interest, is estimated at 50 metres.

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LINE 376000N

This line, surveyed from 379730E to 384600E, defined some three areas of primary geophysical interest. In addition, there are some material changes in background resistivity which must reflect rock type changes. Of significance is generally similar changes in background chargeability were noted to that observed 1 kilometres to the north. The large interline spacing however, precludes a *precise* correlation, which is best observed on the *coloured* contour presentation. Each of the significant anomalies, and major electrical property changes, is briefly discussed below.

379730E - 380950E

Over this section the background resistivity decreases from 5000 (±) ohm-metres in the west, to about 1000 ohm-metres (±) in the east, while the background chargeability decreases from 22 millivolts/volt to 15 millivolts/volt in sympathy. Over this sector there are few significant induced polarization responses. These are as follows:-

At 380675E a 6 millivolts/volt above background response was recorded from a host which is seen to be 1500 ohm-metres as against 5000 ohm-metres to the west, and 3000 ohm-metres to the east. The maximum depth to source which is less resistive than the enclosing rocks, is about 40 metres. The anomaly is of *TERTIARY* interest on grounds of amplitude, but *SECONDARY* based on form. An east dip to the source appears likely.

Between 380850E and 380890E a 6 millivolts/volt above background response was recorded associated with a resistivity change from 1500 ohm-metres to 2500 ohm-metres across the source. The source is considered to be disseminated, and at a maximum depth of 40 metres and *may* dip to the east. The geophysical interest is considered as *TERTIARY*.

380950E - 381900E

Over this section the resistivity rises to 4000 ohm-metres at 381400E (±) and then remains at about this level to 381900E (±). The chargeability remains at about 14 millivolts/volt over the entire section. Two significant series of induced polarization responses of *PRIMARY* interest occur within this section.

A series of related, sharp, narrow increases in chargeability background of about 12 millivolts/volt, of 27, 30 21 and 23 millivolts/volt at 381090E, 381150E, 381170E and 381230E were recorded. While the resistivities over these responses are lower than most observed on this line at 1500 ohm-metres, the source is nevertheless considered to be disseminated in origin. The maximum depth to individual sources is about 40 metres, while the geophysical interest of the four maxima as a whole is considered *PRIMARY*.

A second zone of *PRIMARY* geophysical interest was located between 381350E to 381500E with above background induced polarization anomalies of 10, 14 and 18 millivolts/volt at 381370E, 381412E and 381470E. The high 3000 ohm-metres (±) resistivities which accompany these

maxima clearly infer the sources to be disseminated in nature.

381900E - 383000E

Between 381950E to 382150E, and between 382400E to 382650E, the background rises from 2000 ohm-metres to 10,000(±) ohm-metres. In the section between, resistivities of 2500 ohm-metres are accompanied by higher chargeabilities. The background on this section is about 12 millivolts/volt. The significant responses above this background are discussed below.

At 382480E an 8 millivolts/volt above background response was recorded from rocks which show 6000 ohm-metres background resistivities. The disseminated source has a maximum depth of 40 metres and the asymmetry of the response suggests a west dip.

Within resistivities of 3000 to 4000 ohm-metres between 382600E and 382900E, which are lower than the 5000 ohm-metres resistivities recorded to the east and west, a series of induced polarization maxima which jointly are of *SECONDARY* interest, was recorded. These maxima, at 382650E, 382710E, 382825E and 382875E indicate disseminated sources at depths of 60, 20, 30 metres and an unquantifiable depth respectively.

383000E - 383600E

This section of the line is characterised by low background chargeability of 16 millivolts/volt (±) with resistivity varying about the

3000 ohm-metres mark. Also characteristic of this section is the lack of significant changes in the induced polarization background.

383600E - 384600E

Over this long section the background resistivity remains at about the 1000 ohm-metres level (similar to the unit seen on the line to the north), while the chargeability varies little from the 20 millivolts/volt level. There are only two significant chargeability events which are as follows:-

The first was recorded at between 384090E and 384200E where chargeability responses to 30 millivolts/volt from the 20 millivolts/volt background was observed. The form of the anomaly suggests an east dip. The accompanying resistivities of 500 ohm-metres (+) between 384070E and 384110E indicate a host significantly less resistive than the enclosing rocks. The maximum depth to source is about 75 metres. Should the dip be as inferred, the footwall would be considerably more resistive than the hanging wall, but is inferred to be chargeable also.

The most easterly response recorded was at 384530E where an 8 millivolts/volt anomaly (above background) was recorded from a source estimated to be 35 metres below surface. The source is seen to be more resistive than the rocks which enclose it and is judged to be of *SECONDARY* interest at best.

LINE 375000N

Each of the significant induced polarization responses, and each of the major changes in background are discussed in detail below.

380130E - 381250E

The resistivity background decreases gradually from about 5000 ohm-metres (±) in the west to about 1000 ohm-metres in the east. The chargeability background also decreases in sympathy from 26 millivolts/volt (±) in the west to 18 millivolts/volt(±) in the east. Only minor variations to 6 millivolts/volt were noted from this background.

381250E - 381600E

Higher resistivity of 4000 to 5000 ohm-metres was noted between these limits. The background resistivity over this section is about 16 millivolts/volt. Only small variations of 4 millivolts/volt at 381440E and 6 millivolts/volt at 381590E were recorded. Both of these are of *MINOR* importance.

381600E - 381900E

The resistivity background is about 2000 ohm-metres, while the background chargeability falls from 16 millivolts/volt in the west to 12 millivolts/volt in the east. Again there are no significant maxima within this zone.

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381900E - 383750E

The resistivity background over this section remains at about 2000 ohm-metres while the chargeability background remains at about 12 millivolts/volt. Several anomalies of *SECONDARY* interest were recorded as follows:-

At 381990E a significant 10 millivolts/volt above background induced polarization response was recorded. The associated resistivity of 3500 ohm-metres is less than that to the immediate east and west, which infers that the source, while disseminated, is nevertheless slightly less resistive than the enclosing rocks. The form of the profile suggests an east dip to the source, and a maximum depth to source of 40 metres.

A 9 millivolts/volt response at 382675E associated with a very slight fall in the otherwise high 2000 ohm-metres resistivities was recorded. The disseminated source lies at a maximum depth of about 35 metres, and is of *TERTIARY* interest only.

Other minor responses at 382870E and 383050E are also of minor interest.

383750E - 384230E

The resistivity background progressively decreases eastward from 1000 ohm-metres in the west to 100 ohm-metres in the east, while the chargeability increases from a background of 20 millivolts/volt to a higher 36 millivolts/volt. This phenomenon is considered to be due

a gradual change in rock properties towards the east. As the energising electrode lies on this line, this increase in chargeability and decrease in resistivity cannot be due to any geometric effect. No such phenomenon was observed on line 376000N, however, east of 383700E on line 374000N a dramatic increase in chargeability was recorded, which obviously correlates with this zone. East of 383900E the resistivity falls to 400 ohm-metres (±), and this also indicates that this feature is representative of the underlying rocks.

It is recommended that the *whole zone* be looked at as being of *PRIMARY* interest as the higher chargeability together with the lower resistivity are the characteristics which from a geophysical point of veiw are of greatest interest. The actual source is nowhere actually conductive as such, so the chargeable material, graphite or sulphides, is either *weakly* interconnected, lies within a less resistive host, or varying combinations of both. The significant maxima were recorded at 384025E, 384070E, 384112E and 384170E where chargeabilities of 38 millivolts/volt plus were recorded together with locally high values of 700 and 600 ohm-metres resistivities for the two most westerly and relatively low 150 and 100 ohm-metres for the two most easterly responses. The maximum depth to source is difficult to assess but is considered to be about 50, 25, 25 and 25 metres respectively from west to east.

LINE 374000N

380500E - 382325E

The resistivity background over this long sector shows very little

variation from the 2000 to 4000 ohm-metres range, while the chargeability background shows a gradual decline from about 20 millivolts/volt in the west to 10 millivolts/volt in the east. The variations in chargeability against this background were, for the most part, minor.

The most significant are as follows:-

Between 380520E and 380670E a broad zone of higher chargeability was noted. The 4 to 6 millivolts/volt above background responses were recorded from 2000 to 4000 ohm-metres resistivities. The assessed sources have a maximum depth of the order of 40 metres in the eastern and western margins.

Small maxima of 4 millivolts/volt at 380990E and a larger 8 millivolts/volt at 381070E arise from sources at maximum depths of 50 metres and 30 metres respectively. 50% to 60% falls in apparent resistivity to about 2000 ohm-metres were recorded.

An anomaly of 20 millivolts/volt against background of about 12 millivolts/volt was recorded at 381625E. The 2500 ohm-metres resistivities infer a disseminated source, while the form of the profile suggests a source width of greater than 20 metres, and a maximum depth of the order of 40 metres.

A 17 millivolts/volt response as against a very low 4 millivolts/volt background at 381850E accompanied by a 70% fall in apparent resistivity

to 1400 ohm-metres was recorded. The source which is less resistive than the enclosing rocks, is estimated to lie at a maximum depth of about 45 metres. This response is of *SECONDARY* interest at best.

382325E - 383700E

The western margin of this sector is marked by a major rock type change at about 382300E, with resistivities to 1000 ohm-metres to the immediate west and 10,000 ohm-metres to the immediate east. To the east of 383700E the resistivity falls unevenly and gradually to 1000 ohm-metres, while the chargeability climbs unevenly but gradually from a low 10 millivolts/volt to about 20 millivolts/volt. There are four major deviations from this background, these are:-

Sharp, 6 millivolts/volt responses were noted at 382650E, 383010E and 383070E, all from within higher 4000 ohm-metres (+) resistivities. The maximum depth to these sources which are considered of *SECONDARY* interest are about 25 to 30 metres.

A significant broad response of 8 millivolts/volt above background recorded centred at 383412E, is associated with a more substantial sharp 50% fall in apparent resistivity to 1700 ohm-metres at 383400E. This displacement, together with the form of the chargeability anomaly suggests the source has an east dip, and a maximum depth of about 60 metres. The response is of *SECONDARY* interest.

383700E - 384075E

Over this section the background resistivity falls from 1000 ohm-metres

in the west to 400 ohm-metres in the east, while the chargeability background shows a rise from the 24 millivolts/volt level to a 32 millivolts/volt level in the east. This sector correlates well with a similar section on the eastern end of line 375000N. Within this dramatically rising chargeability background, a number of distinct maxima were located as described below. The source is considered to be chargeable material, still essentially disseminated, within less resistive rocks. Graphite or pyritic shales would yield such a picture. Overall the priority is considered to be *PRIMARY*.

The major response in this zone was 37 millivolts/volt against background of 24 millivolts/volt accompanied by a broad increase in resistivity to 1700 ohm-metres at 383870E. The maximum depth to source is estimated at 60 metres. The priority is considered *PRIMARY/SECONDARY*.

A second substantial response at 383950E of 34 millivolts/volt as against the 24 millivolts/volt background is accompanied by 600 ohm-metres resistivities. The maximum depth to source is about 40 metres. The priority is *PRIMARY/SECONDARY*.

A very sharp 41 millivolts/volt response at 384010E is accompanied by a minor local depression in resistivity to 350 ohm-metres. Of significance is a sharp depression in the SP profile of 40 to 50 millivolts at 384030E. This suggests a narrow electrically conductive zone of limited extent associated with the chargeable source. The latter has an estimated depth of 30 metres.

CONCLUSIONS

1 - The broad strike directions indicated via all three physical properties of total magnetic field, resistivity and chargeability, are similar, as seen by the major changes in all three properties. However, as was expected from the inception of the programme, *precise* correlation between lines was not seen.

2 - No truly conductive sources were located on the reconnaissance survey. All chargeability responses had associated resistivities which would infer either a disseminated source, or if 'massive' electrically discontinuous.

As the line spacing is large, it is recommended that not only should the *larger* responses having *lower* than background chargeabilities be investigated, but also those which show a series of highs, e.g. 381170E ± and 381412E on line 376000N, as these may well represent 'fishtail' sulphide ending of a lode system.

3 - All significant induced polarization responses are summarised below. The geophysical priority is assessed partly on amplitude and partly on form.

LINE 379000N

379050E	42/22	2000 ohm-metres	secondary	30 metres (±5)
379112E	33/22	2500 ohm-metres	secondary	30 metres (±5)

379212E	30/22	2200 ohm-metres	tertiary	50 metres
379260E	28/24	2700 ohm-metres	tertiary	40 metres
379440E	32/24	4000 ohm-metres	tertiary	30 metres
380035E	26/20	4000 ohm-metres	tertiary	?
380190E	31/16	5000 ohm-metres		
[		]		
380237E	31/16	5000 ohm-metres	primary	70 metres (?)
[		]		
380310E	31/16	5000 ohm-metres		
380670E (±25 metres)	29/20	9000 ohm-metres	primary	50 metres

LINE 378000N

379730E	33/24	3000 ohm-metres	secondary	25 metres
380690E	28/22	5000 ohm-metres	secondary	50 metres
380990E	22/14	11,000 ohm-metres	secondary/ tertiary	50 metres
381050E	22/14	10,000 ohm-metres	secondary/ tertiary	25 metres
381110E	24/14	7000 ohm-metres	secondary/ tertiary	35 metres
381950E	24/16	2500 ohm-metres	secondary/ tertiary	50 metres
381990E	21/16	1000 ohm-metres	tertiary	30 metres
382050E	26/16	1000 ohm-metres	secondary	30 metres
383275E	26/20	1050 ohm-metres	tertiary	50 metres
383370E	29/22	800 ohm-metres	secondary	60 metres
383430E	29/22	700 ohm-metres	secondary	?
383490E	31/22	1000 ohm-metres	secondary	50 metres
383770E (±25 metres)	30/22-18	600(?) ohm-metres	primary	50/60 metres

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LINE 377000N

378500E to 378950E	to 37/28	to 600 ohm-metres	tertiary	30 to 75 metres
379025E	34/26	2500 ohm-metres	secondary	40 metres
379150E	36/24	600 ohm-metres	secondary	?
379350E	32/24	2000 ohm-metres	tertiary	30 metres
379490E	32/24	4000 ohm-metres	tertiary	30 metres
379550E (±25 metres	36/24	4500 ohm-metres	secondary/ primary	50 metres
380000E	28/22	5000 ohm-metres	tertiary	60 metres
380275E	30/22	5000 ohm-metres	tertiary	60 metres
380450E	30/22	3500 ohm-metres	tertiary	70 metres
382100E	19/12	1300 ohm-metres	secondary	35 metres
382550E	32/20-12	4000 ohm-metres	secondary/ primary	50 metres

LINE 376000N

380675E	22/16	1500 ohm-metres	tertiary	40 metres
380870E	21/25	2000± ohm-metres	tertiary	40 metres
381090E	27/16	1500 ohm-metres		
[		]		
381150E	30/12	1500 ohm-metres		
[		]		
381170E	21/12	1500 ohm-metres	primary	40 metres
[		]		
381230E	23/12	3000 ohm-metres		
381370E	24/14	3000 ohm-metres		40 metres
[		]		
381412E	28/14	3000 ohm-metres	primary	50 metres (?)
[		]		
381470E	32/14	3000 ohm-metres		60 metres
382480E	20/12	6000 ohm-metres	tertiary/ secondary	40 metres
382650E	25/18	4000 ohm-metres	secondary	60 metres
[				

382710E	32/14	3000 ohm-metres	secondary/ primary	20 metres
[				
382825E	24/16	2500 ohm-metres	secondary	30 metres
[				
382875E	24/16	2000 ohm-metres	secondary	?
384130E(±)	30/20	500 ohm-metres	primary	75 metres
384530E	31/22	1200 ohm-metres	secondary	35 metres

LINE 375000N

381990E	22/12	3500 ohm-metres	secondary/ primary	40 metres
382675E	20/12	2100 ohm-metres	tertiary	35 metres
383750E - 384230E in detail		500-1000 ohm-metres	primary	
384025E	38/28	700 ohm-metres (high)	primary	50 metres
384070E	38/28	600 ohm-metres (high)	primary	25 metres
384112E	42/28	150 ohm-metres (low)	primary	25 metres
384170E	38/28	100 ohm-metres (low)	primary	25 metres (?)

LINE 374000N

380520E- 380670E	26/20	2000 to 4000 ohm-metres	tertiary	40 metres
380990E	24/20	2000 ohm-metres	tertiary	50 metres
381070E	23/16	2500 ohm-metres	tertiary/ secondary	30 metres
381625E	20/12	2500 ohm-metres	tertiary/ secondary	40 metres
381850E	17/4(?)	1400 ohm-metres	secondary	45 metres

382650E	18/11	4500 ohm-metres	secondary	30 metres
383010E	23/16	4000 ohm-metres	secondary	30 metres
383070E	23/16	4000 ohm-metres	secondary	30 metres
383412E	26/18	1700 ohm-metres	secondary	60 metres
383800E to 384050E in detail			primary	
383870E	37/24	1700 ohm-metres (high)	primary/ secondary	60 metres
383950E	34/24	600 ohm-metres	primary/ secondary	40 metres
384012E	41/24	350 ohm-metres (low)	primary/ secondary	30 metres

4 - From a *geophysical standpoint* those responses which should receive follow-up attention are as listed below.

Line 379000N 380237E (±)

Line 378000N 383770E (±)

Line 376000N 381170E (±)

Line 376000N 381412E (±)

Line 376000N 382800E (±)

Line 375000N 383750E-384230E

Line 374000N 383800E-384050E

Of course geological and geochemical input may drastically alter the priority.

5 - It is recommended that the follow-up should consist of a series of short lines, of say 300 to 400 metres, parallel to the

reconnaissance line, and distanced 100, 200 and 500 metres from it, and on either side of it. It is recommended that the gradient array EIP technique be continued on these lines using the same electrode positions as for the reconnaissance survey. (It is understood that the main sections of the current lines, particularl those in inaccessible areas, are in place, in anticipation of this)

The reasons why this approach is favoured is (i) a shorter line length is required than for dipole-dipole, thus for a given budget a greater number of cross lines can be surveyed, an approach the Author favours, (ii) coverage should be rapid, (iii) contouring of the closer spaced lines should allow a better idea of the detailed distribution and limits of chargeable material, and perhaps of structure also.

6 - It is also suggested that a short spaced (say 20 or 40 metres) dipole-dipole survey be run over the best response in each group to ascertain among other things, the *minimum depth* to the top of the source. (The gradient array gives excellent *maximum depth* information.)

7 - Comments have not been made on the magnetic field data as generally there is little correlation between individual chargeability events and the magnetics (with some notable exceptions such as the zone of primary interest on line 376000N at 381400E $\pm$). Magnetite is nowwhere considered to be the sole or major cause of the induced polarization noted.

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8 - The decay forms observed generally did not vary materially from normal. Those over anomalies were normal to very slightly slower than normal, while those in low background areas were generally slightly faster than normal.

Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

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

GEOPHYSICIST

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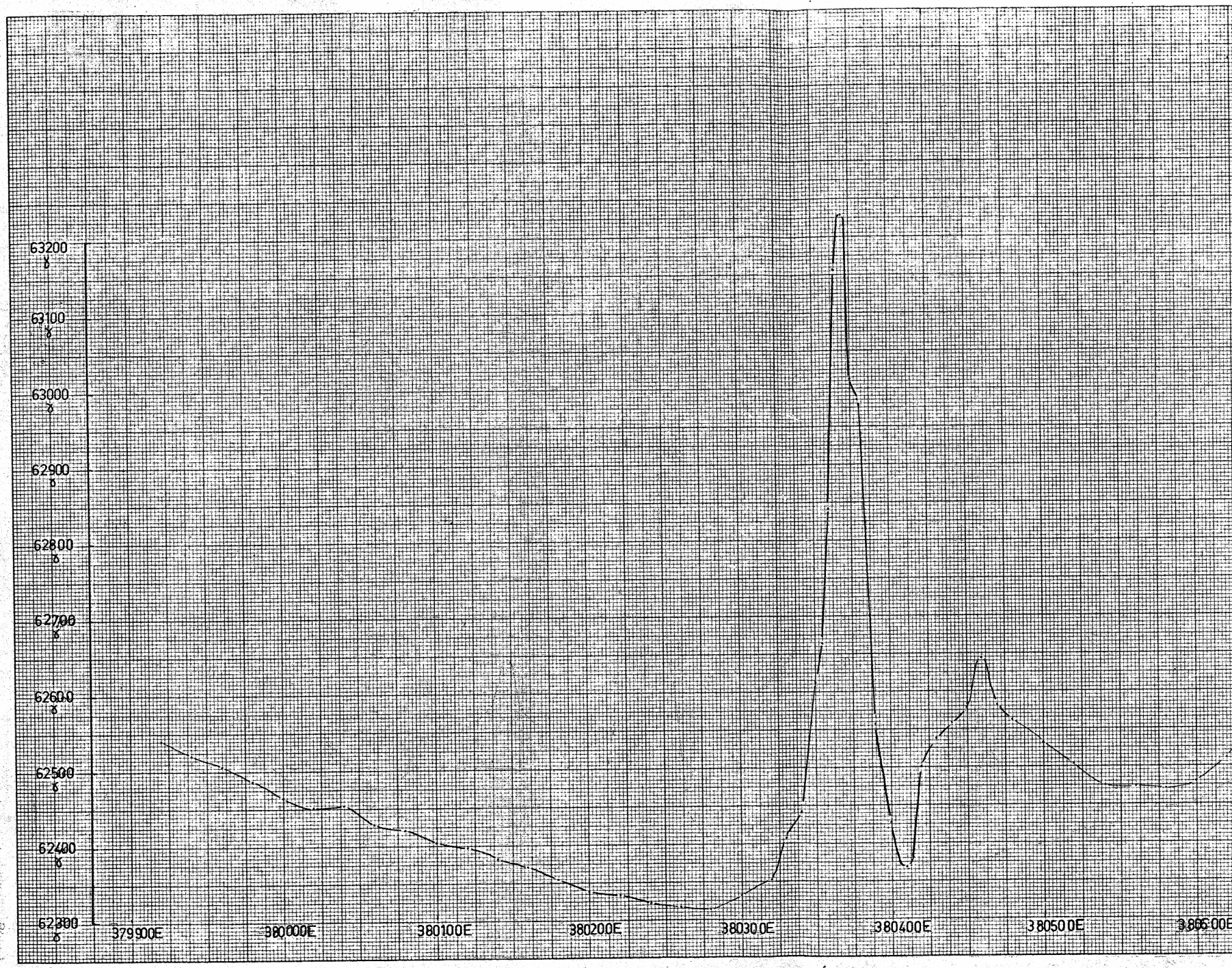

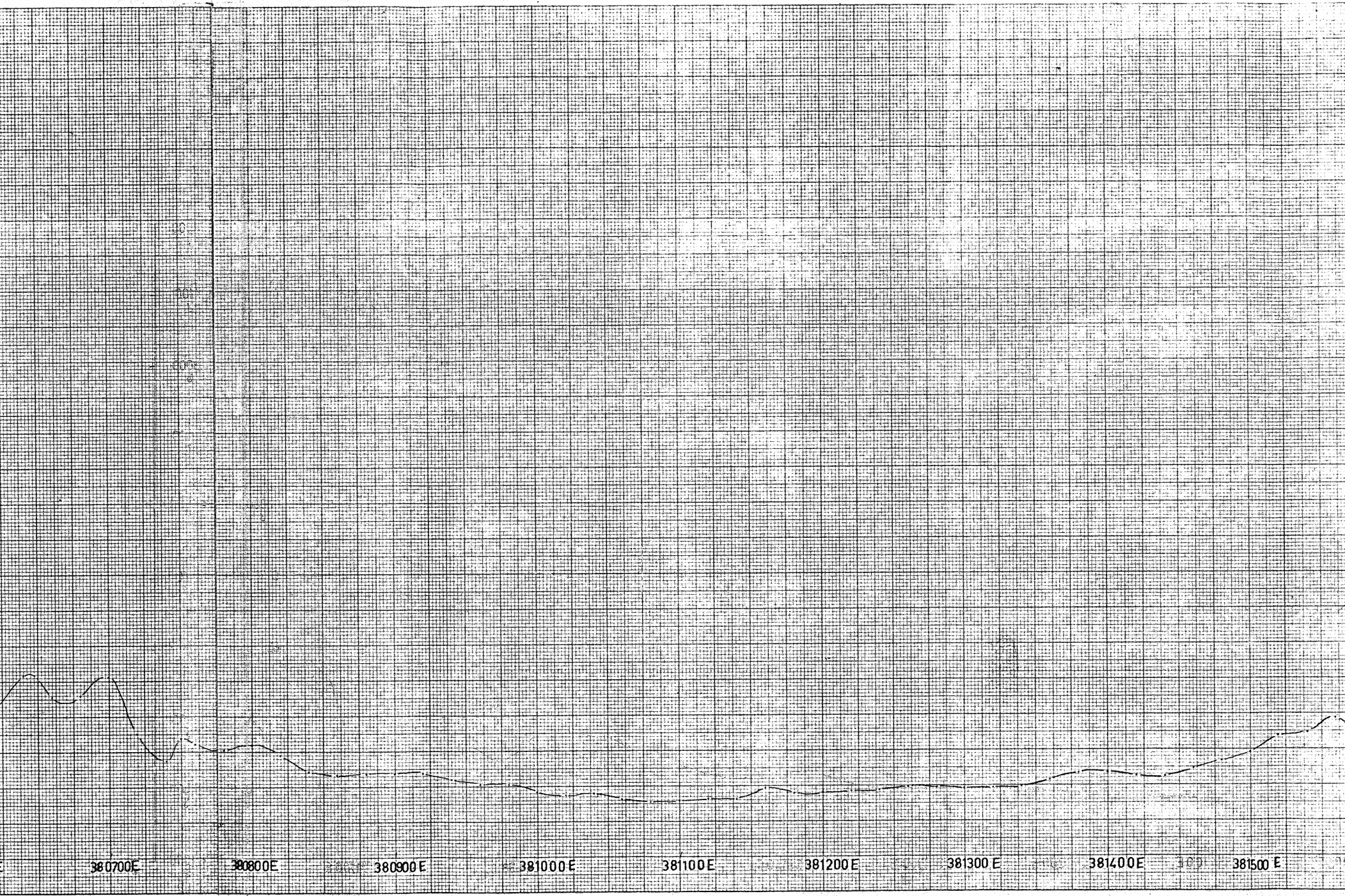

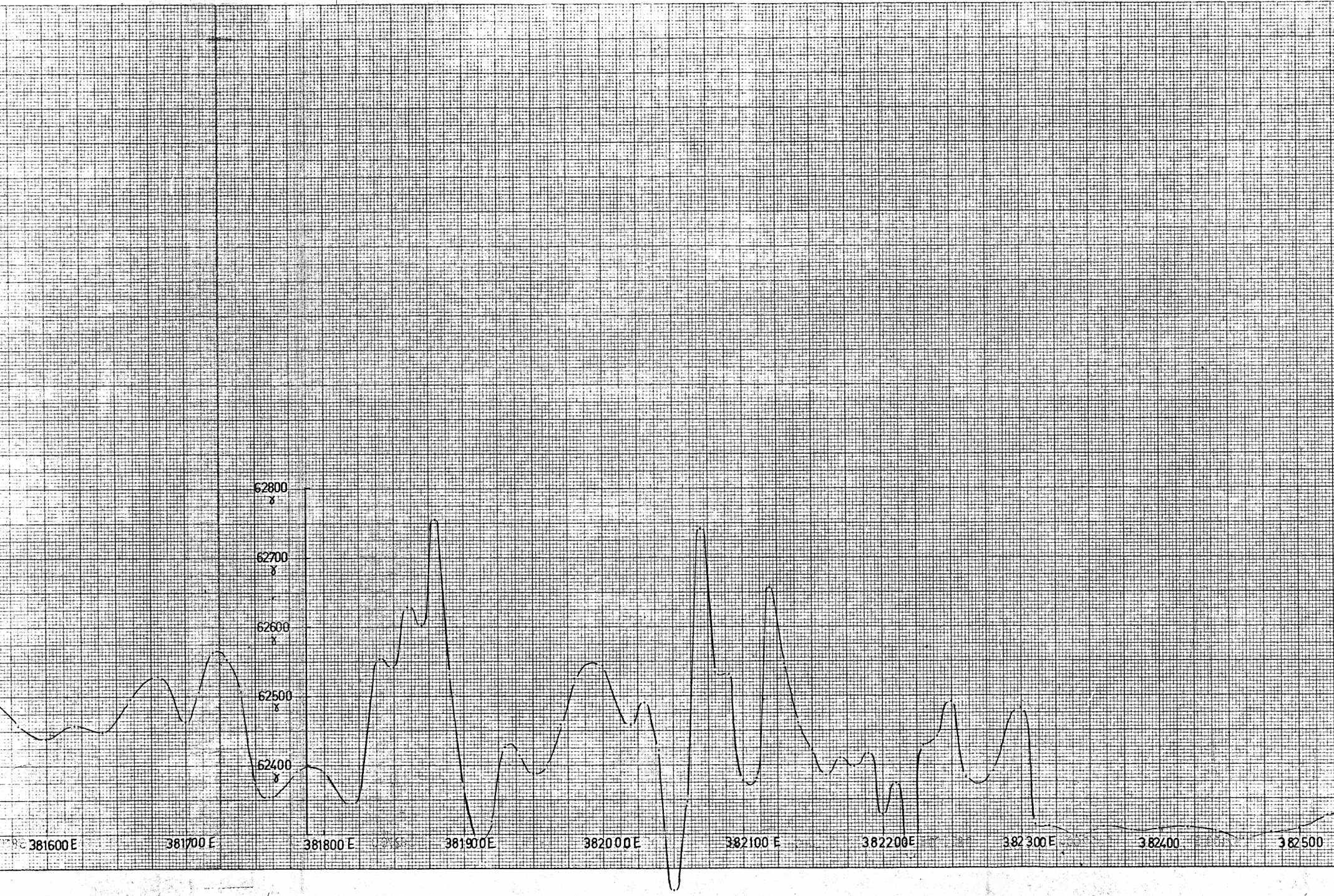

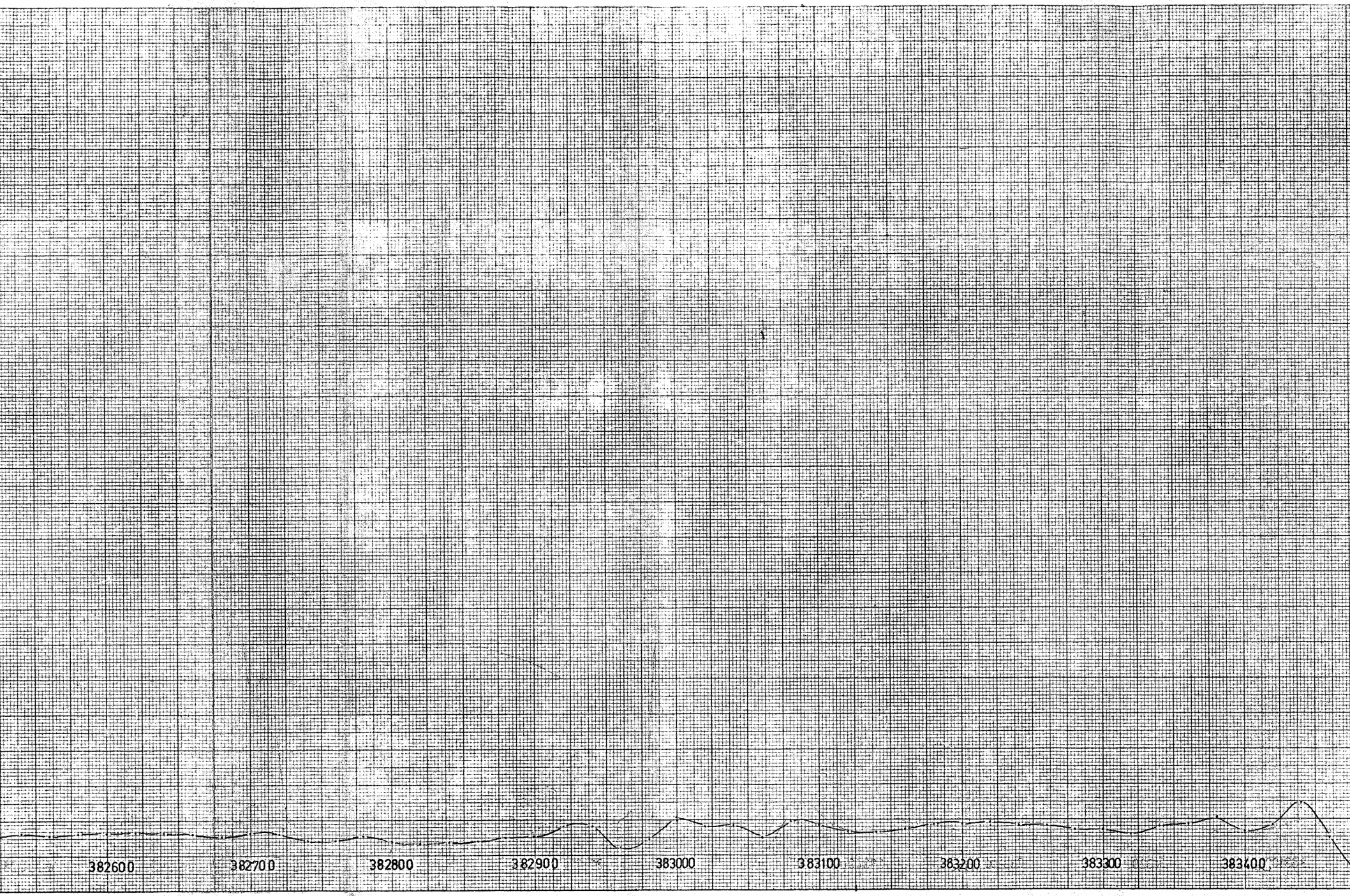

80-1411 (Vol 2/6)

LINE 373000N

Mt Block

MAGNETICS

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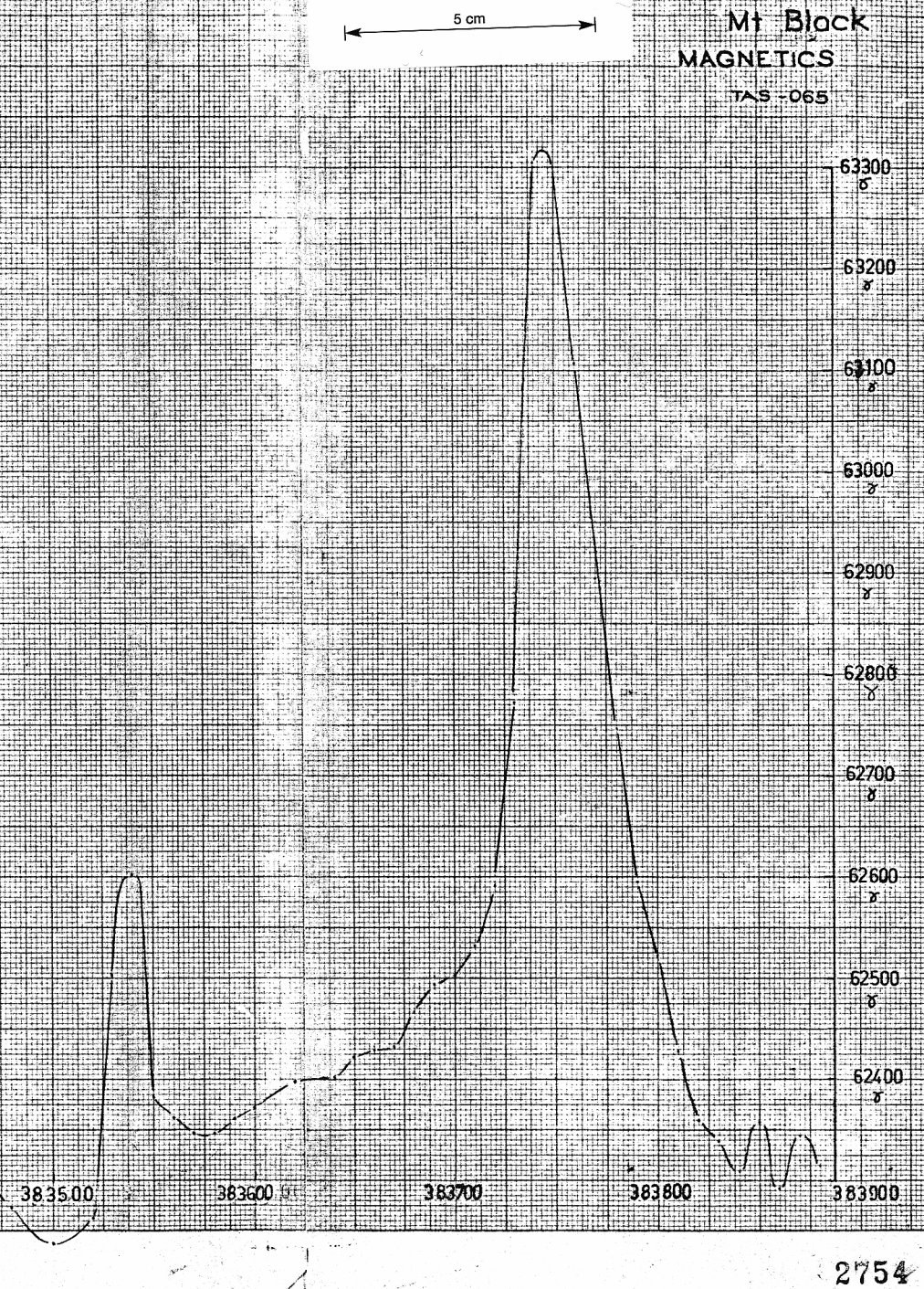

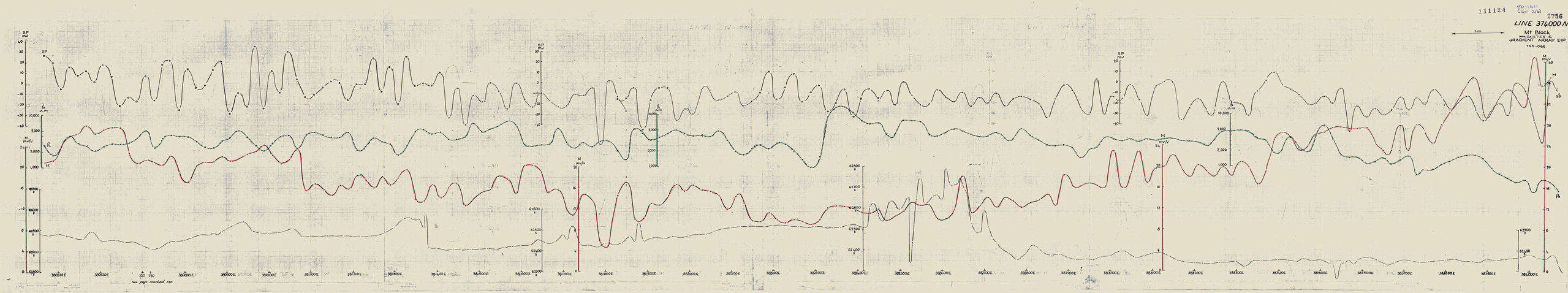
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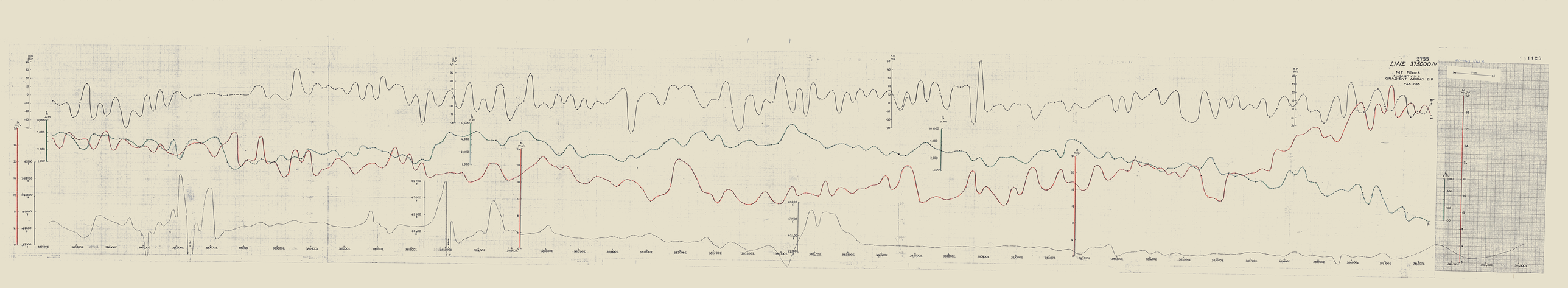
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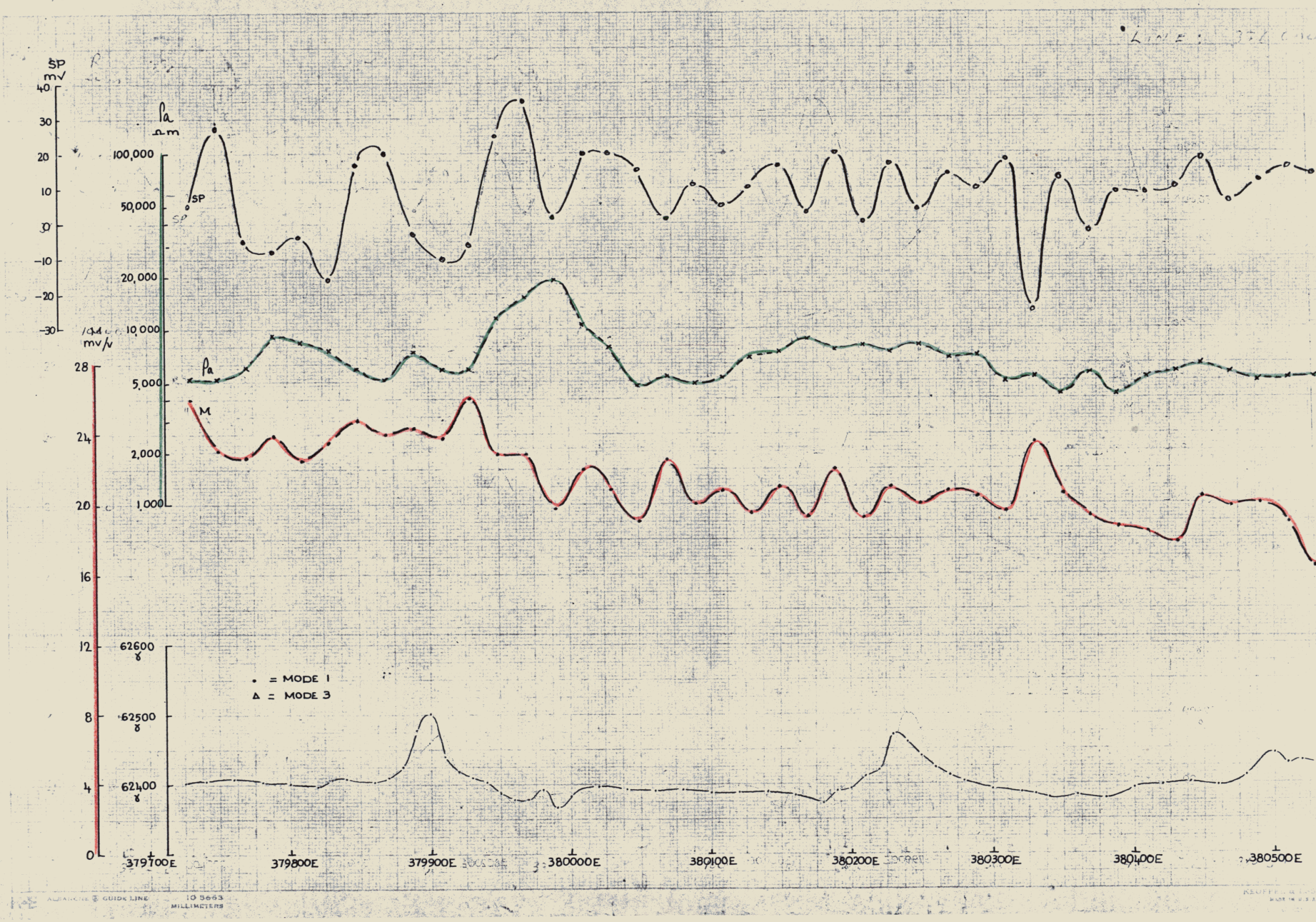

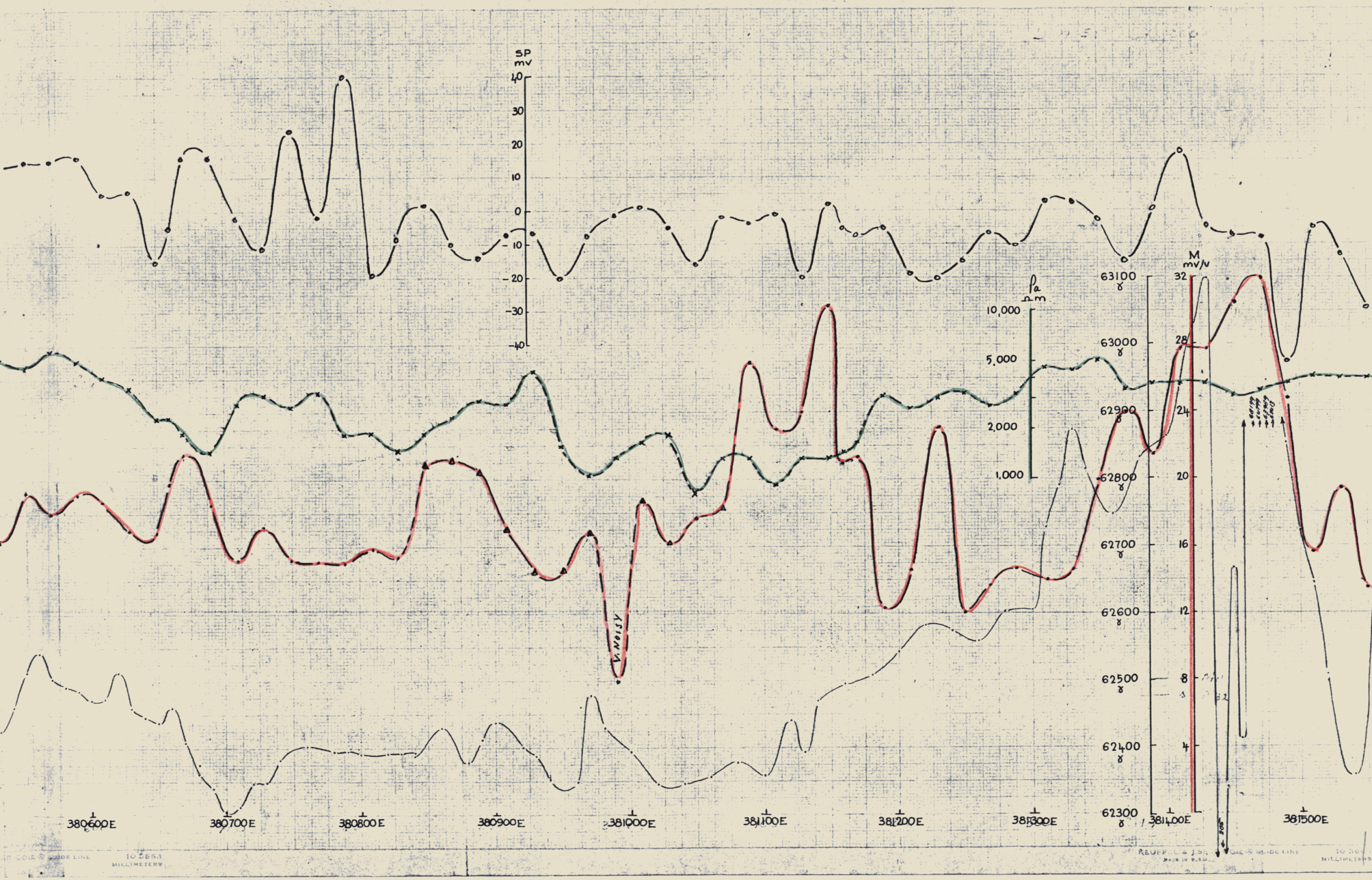

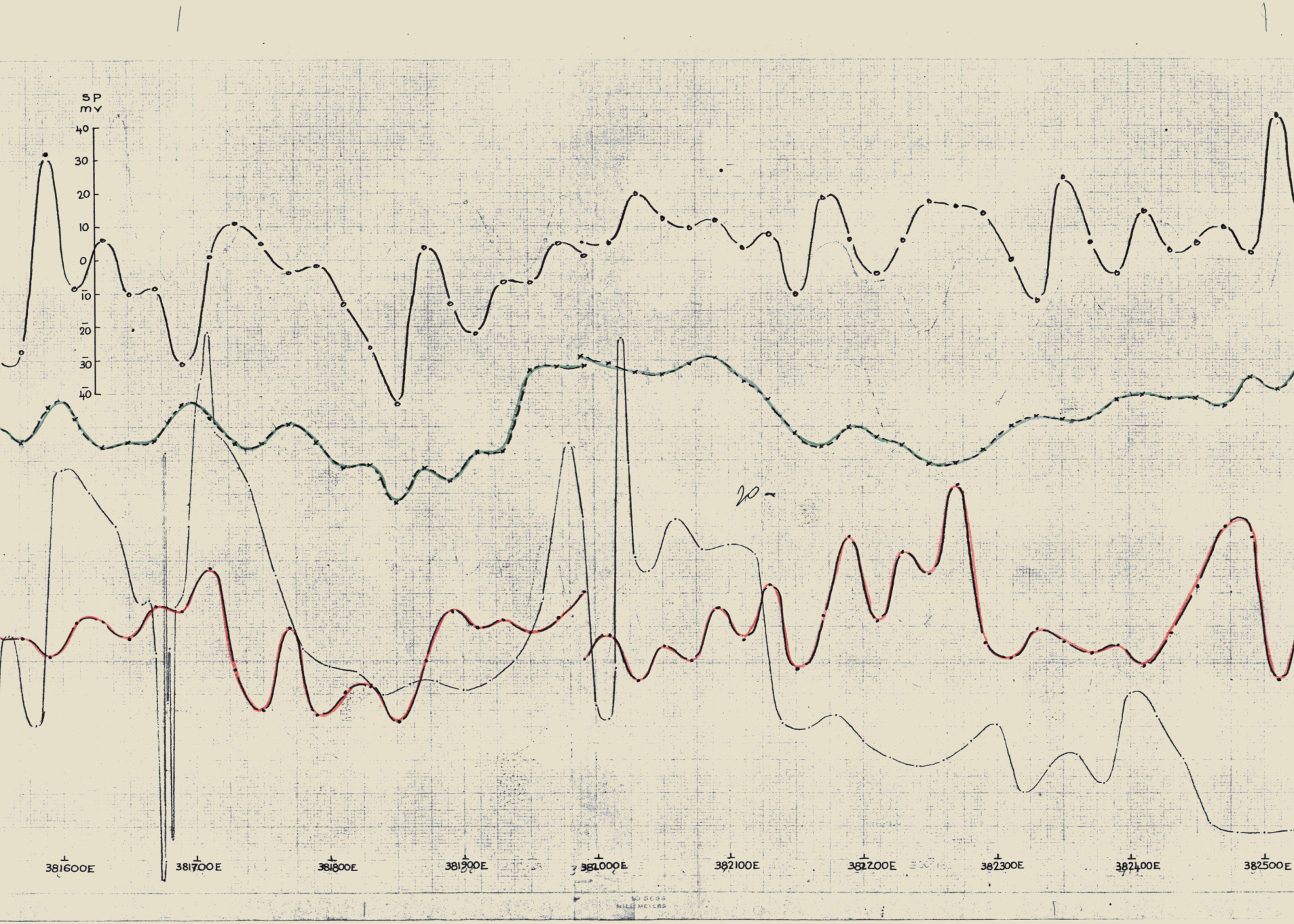

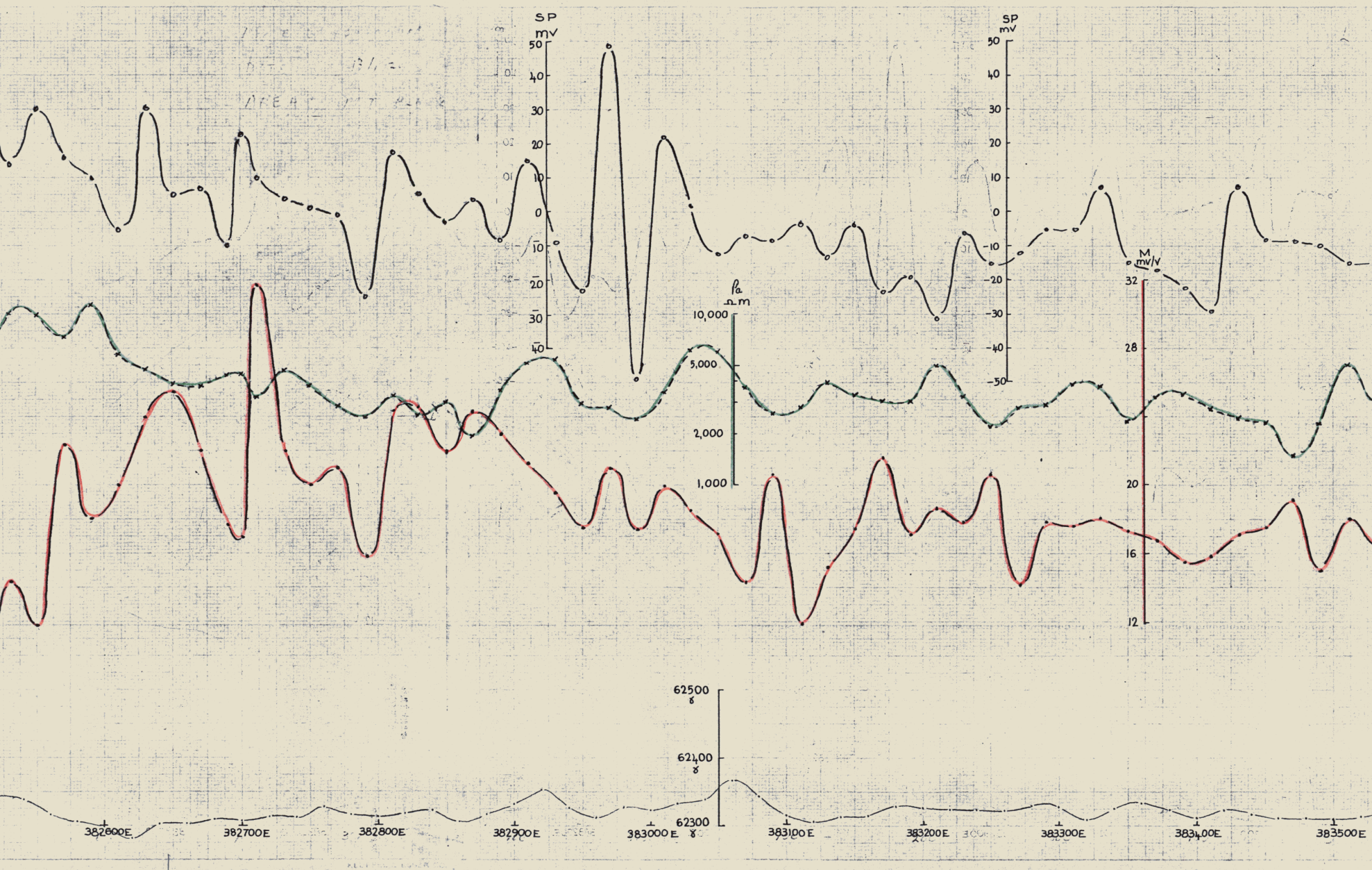

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LINE 376000 N

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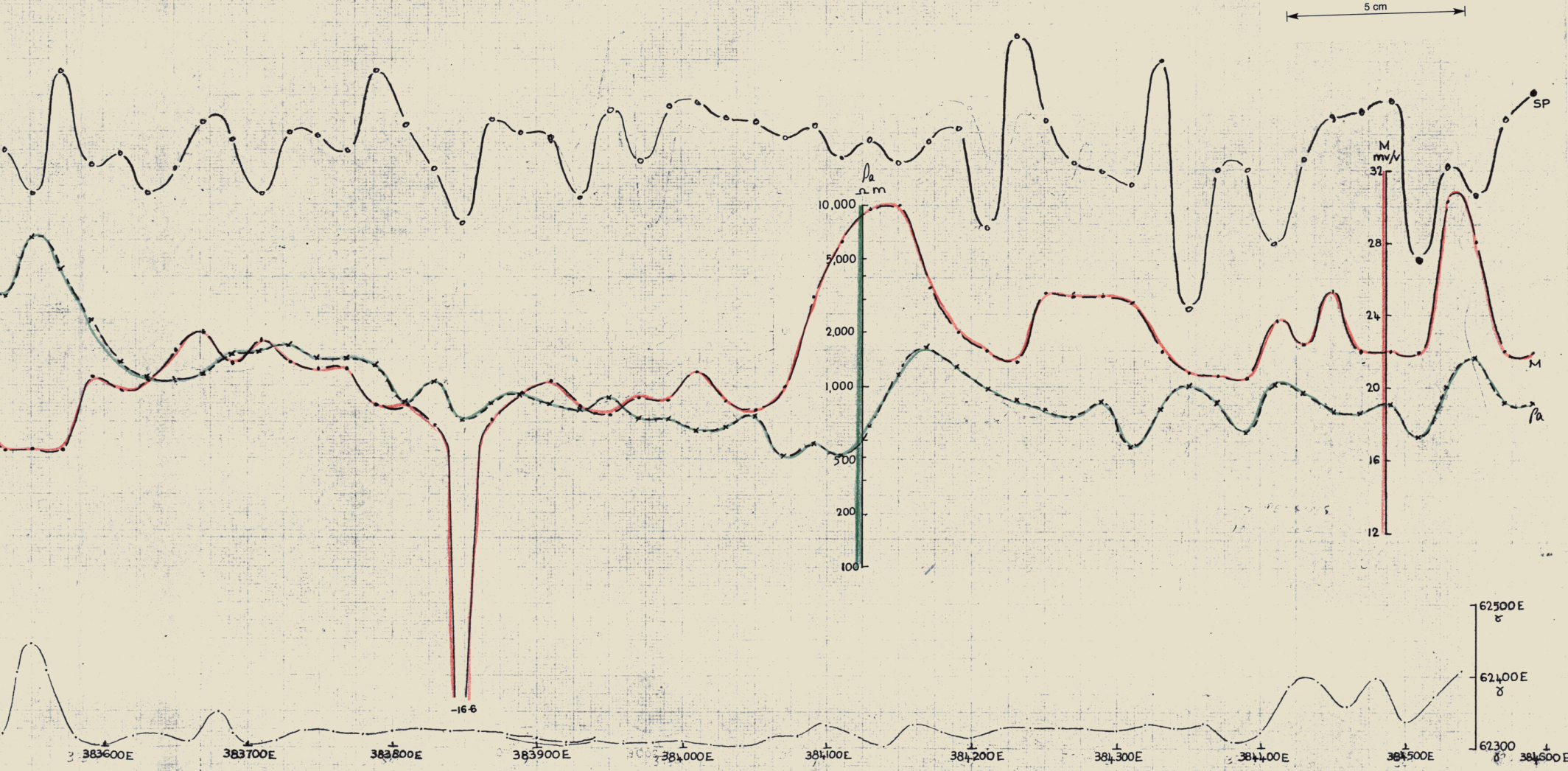

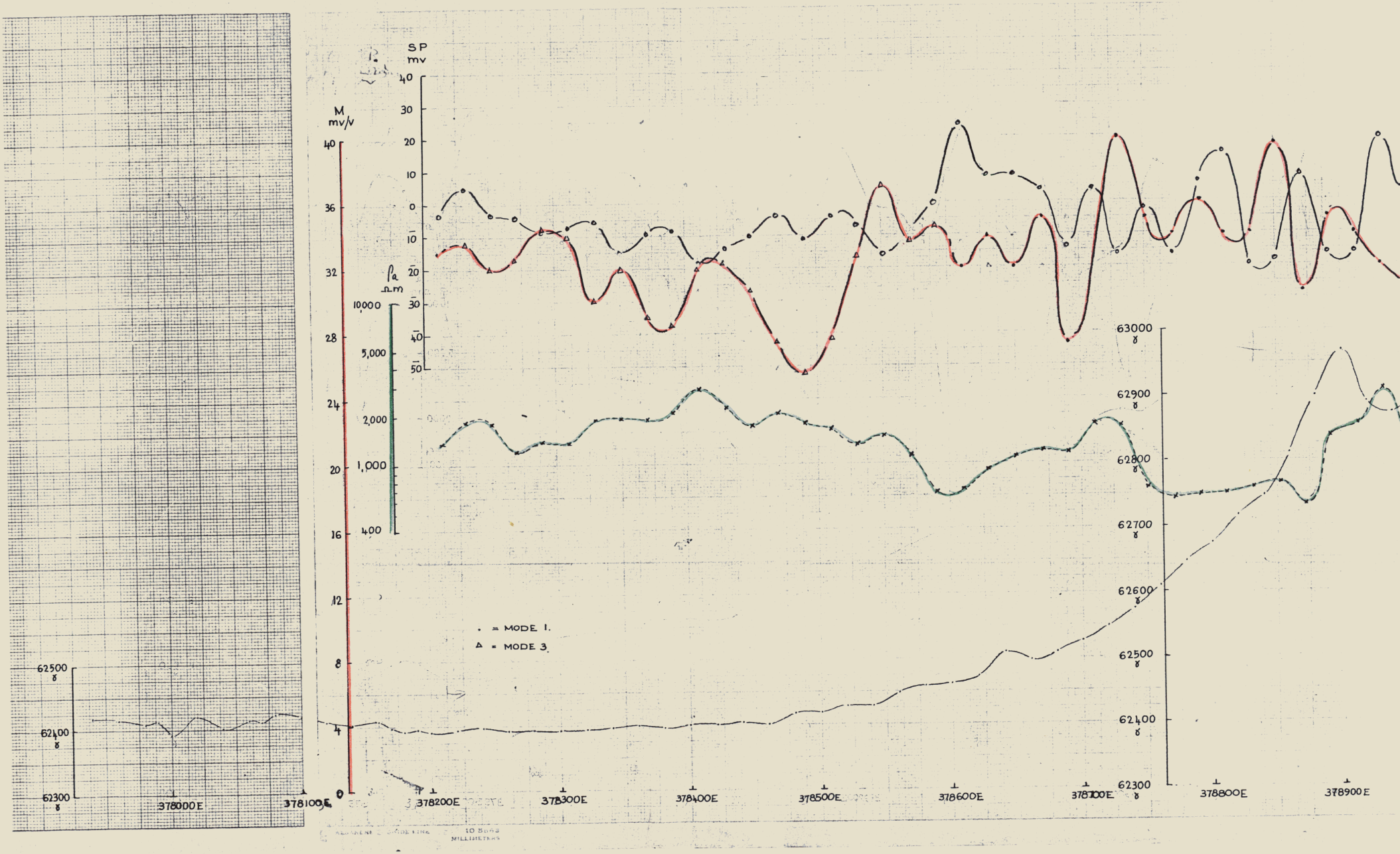

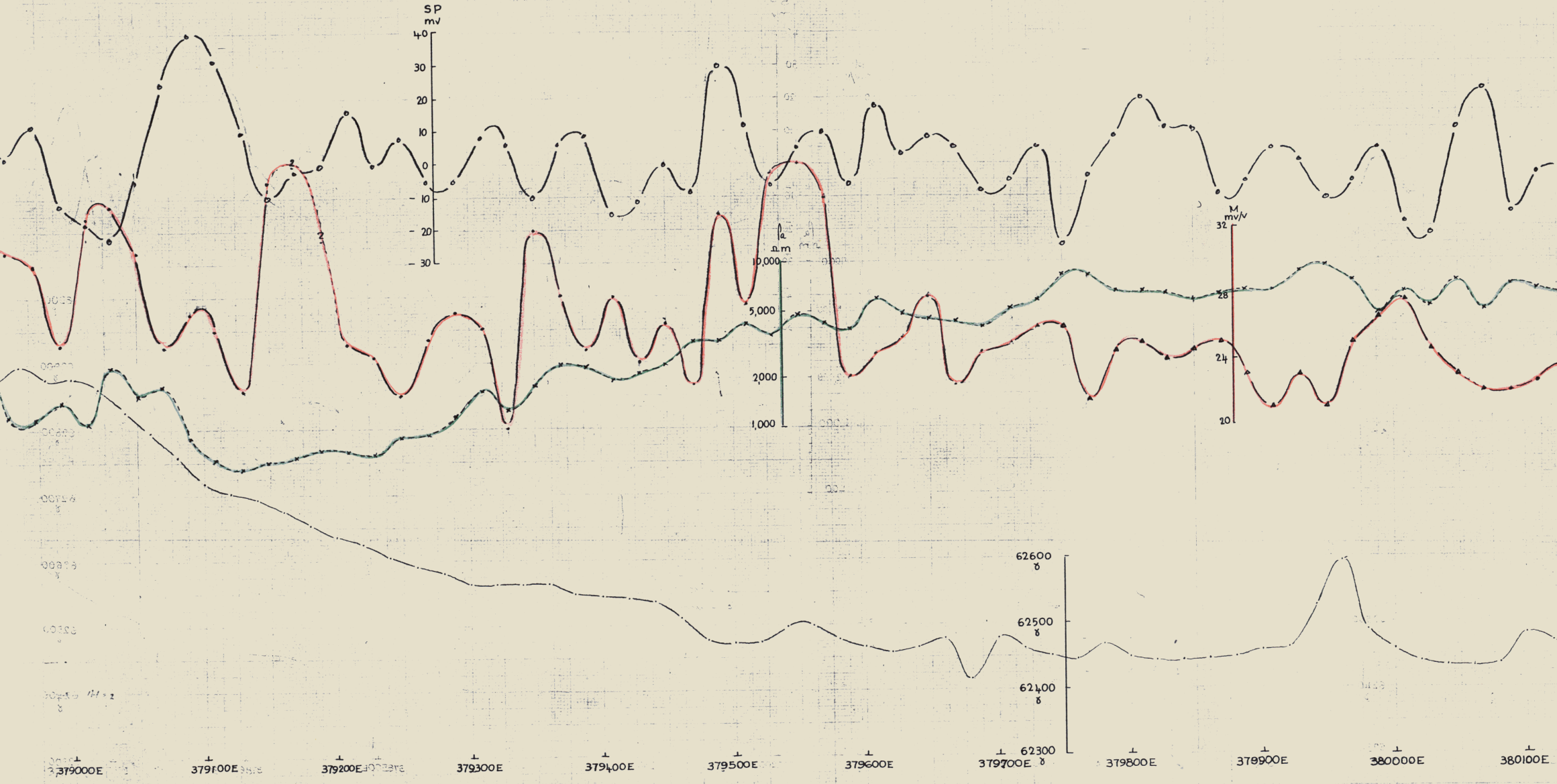

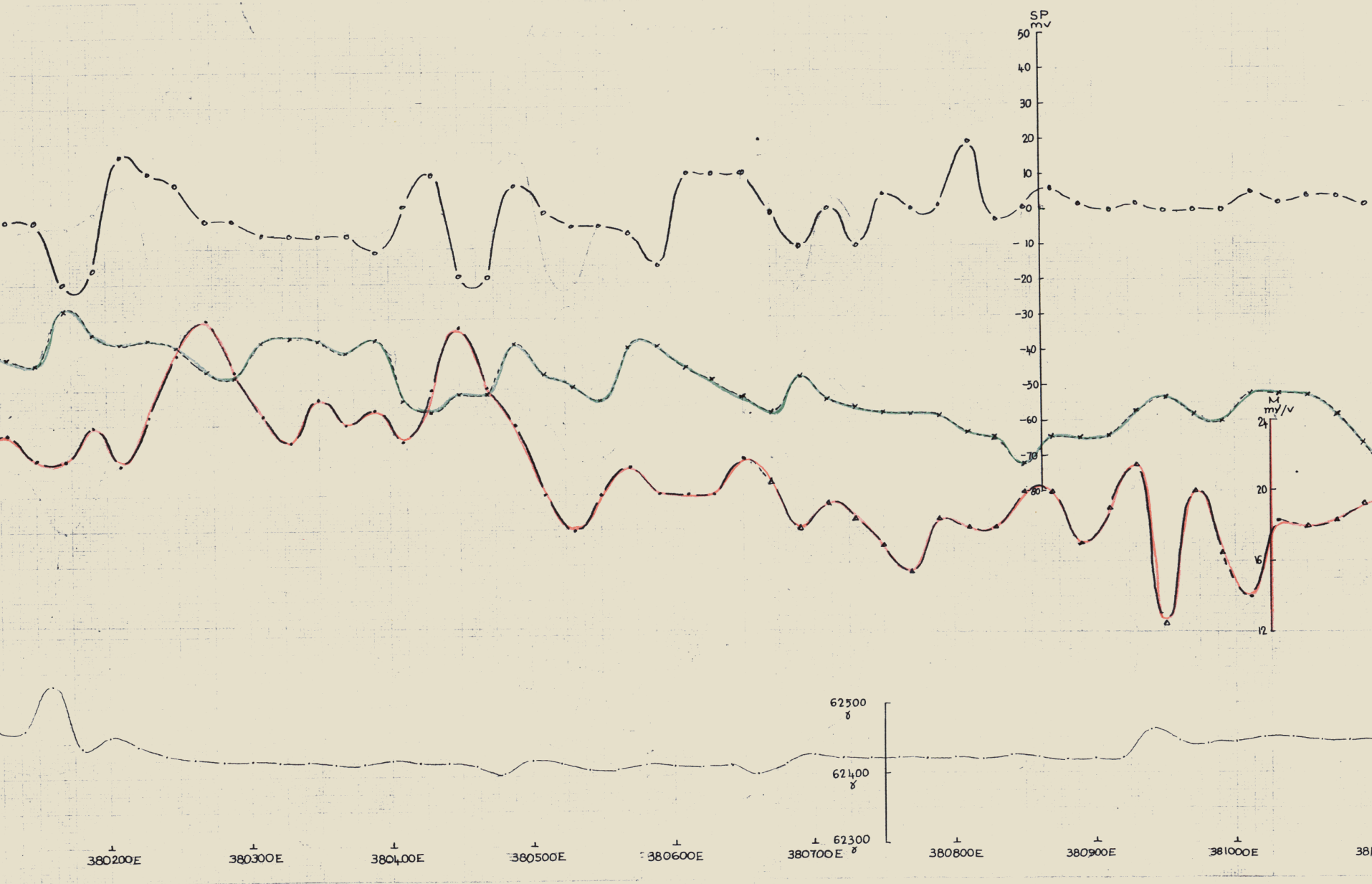

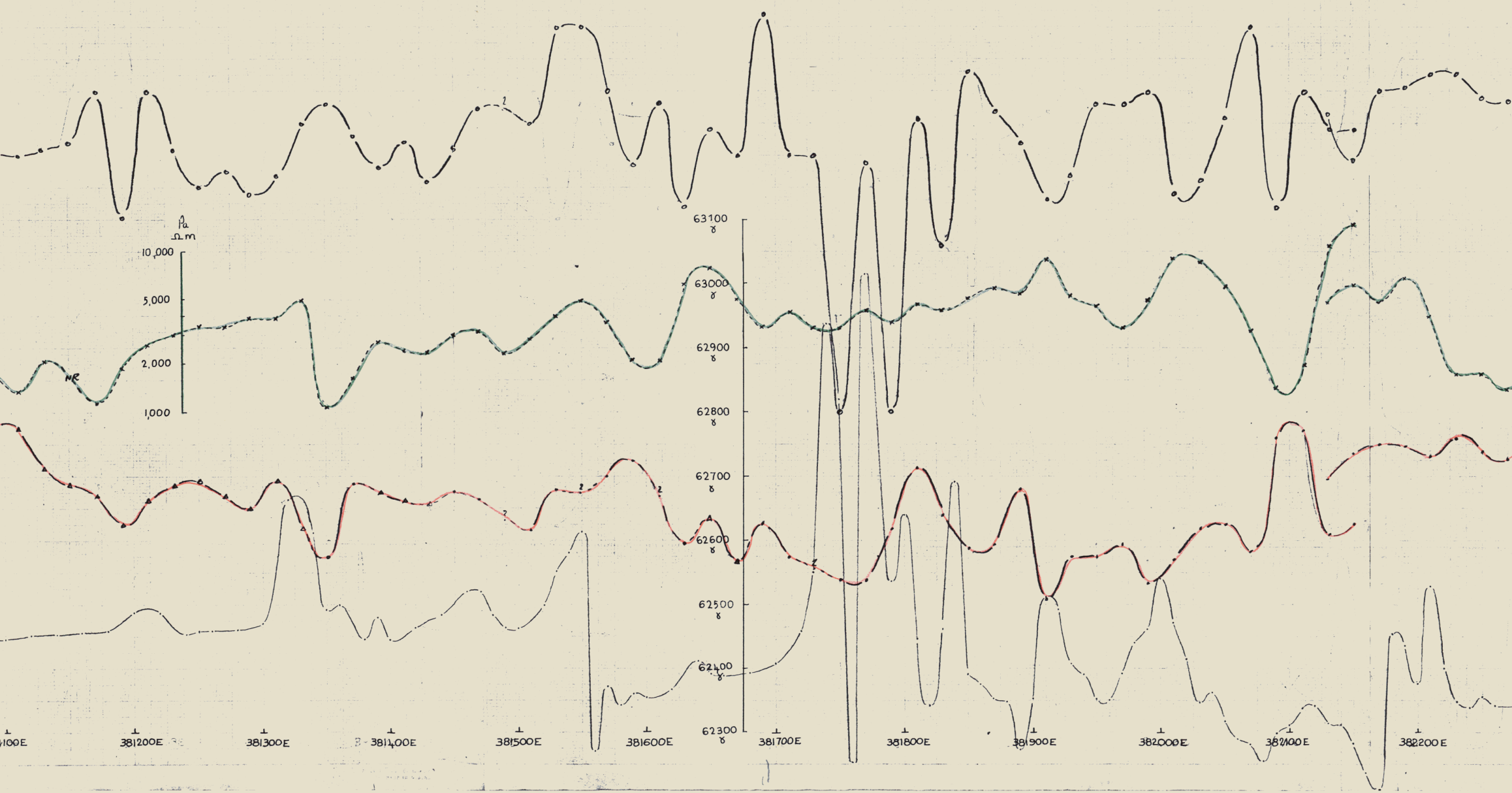

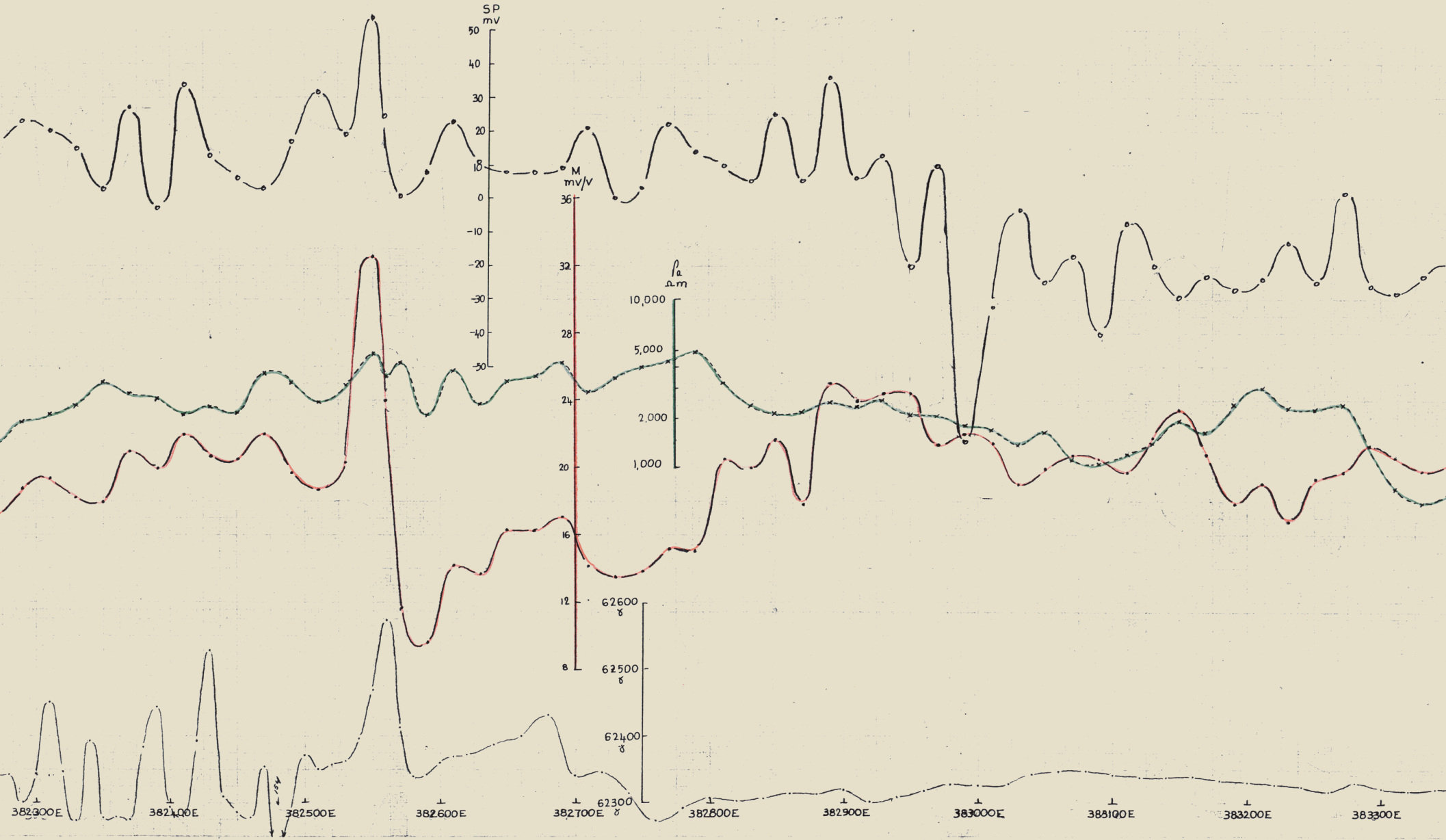

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LINE 377000N

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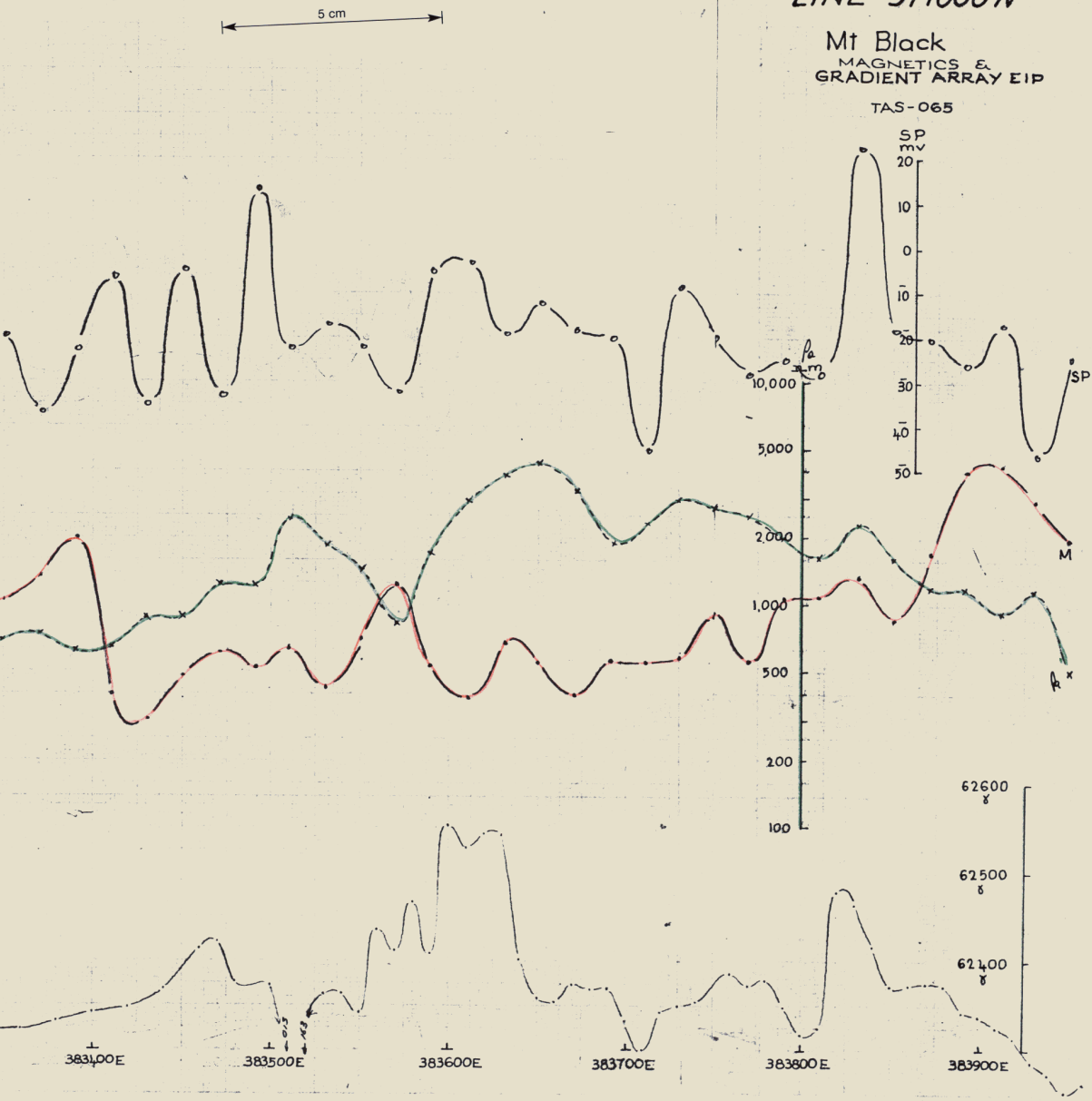

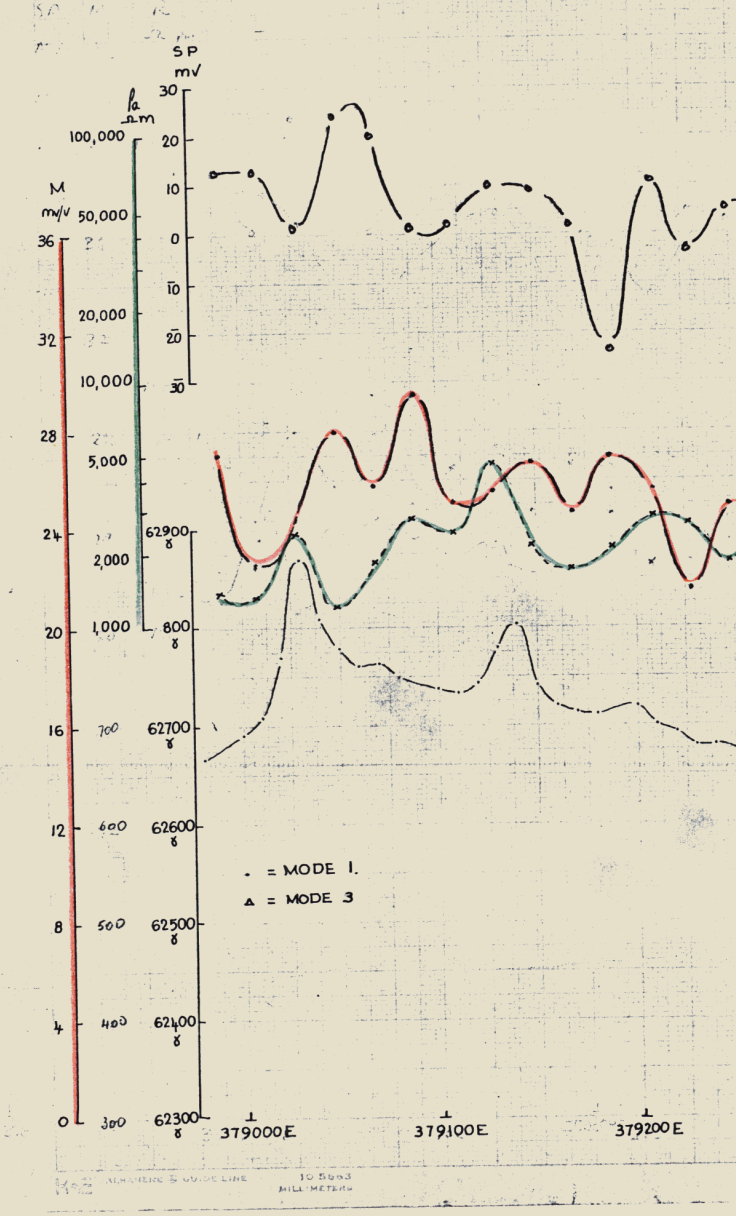



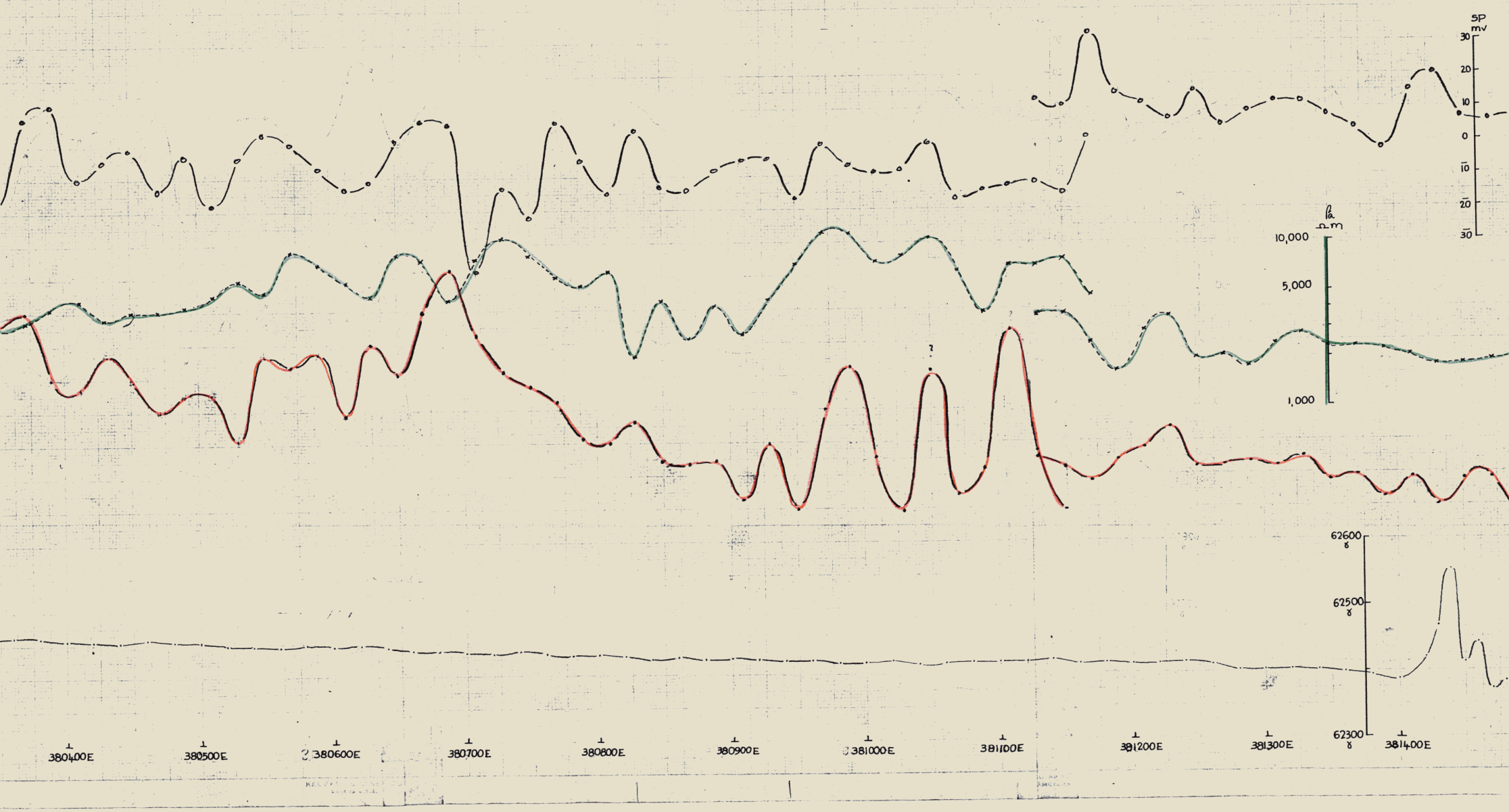

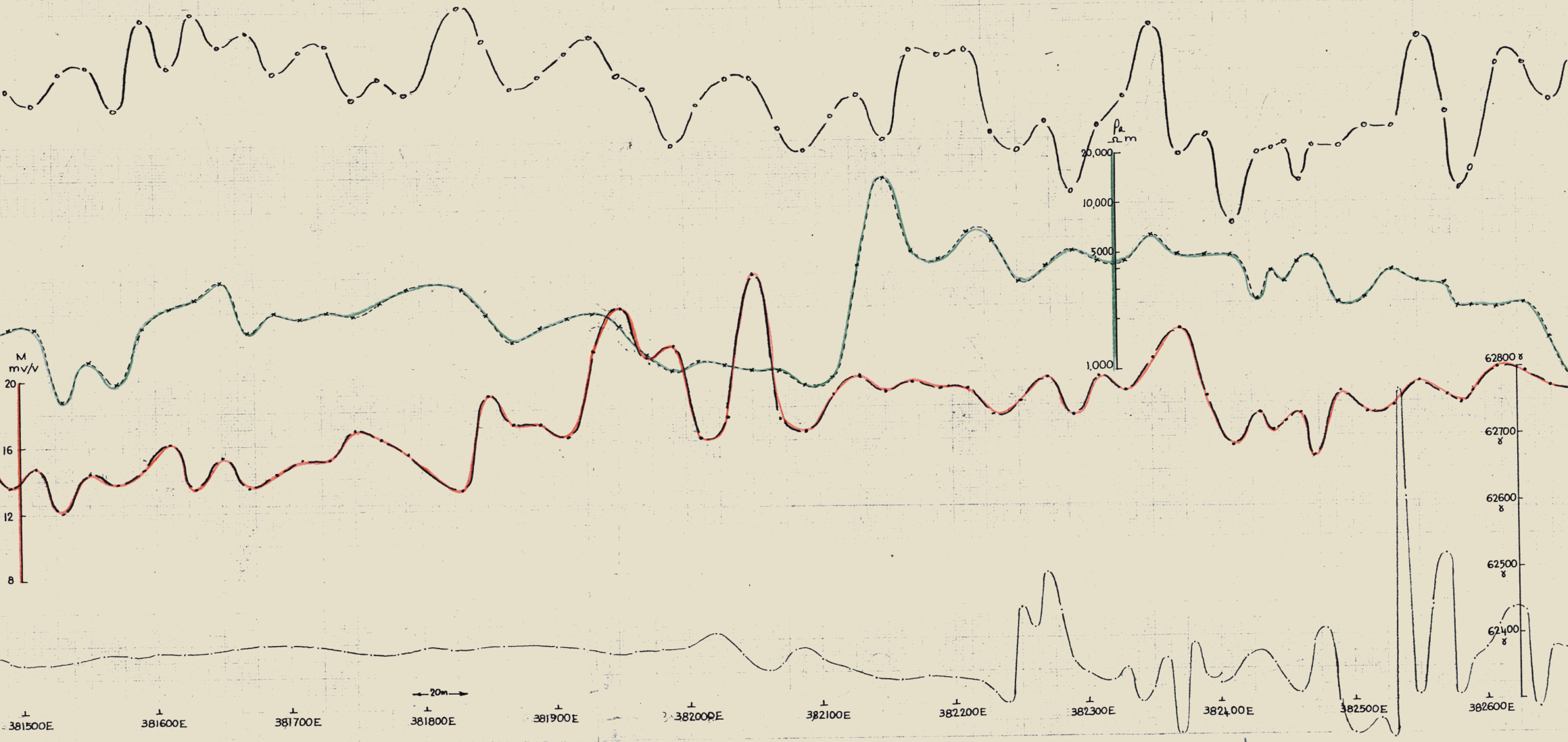

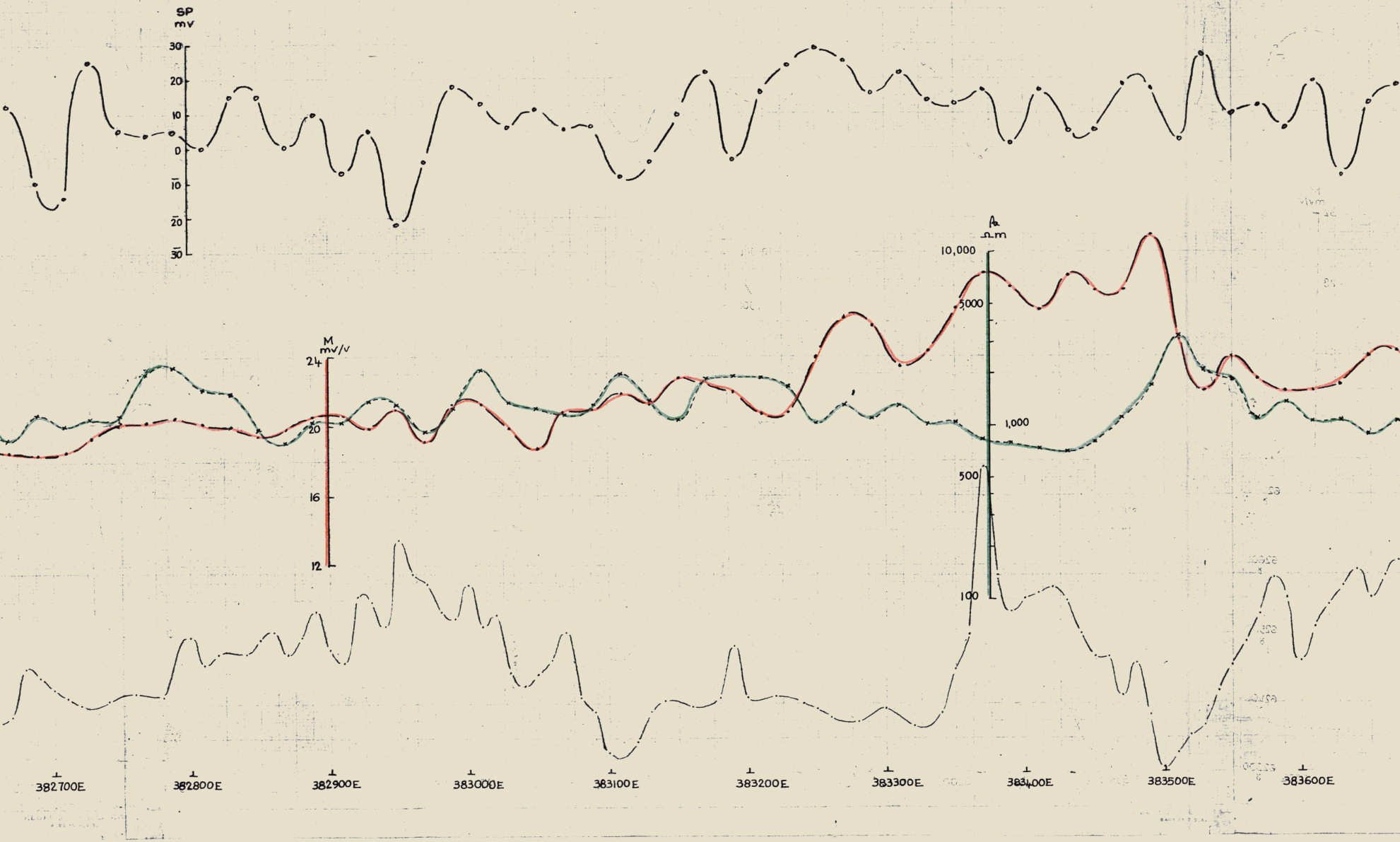

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80-1411 (Vol 2(b)

LINE 378000N

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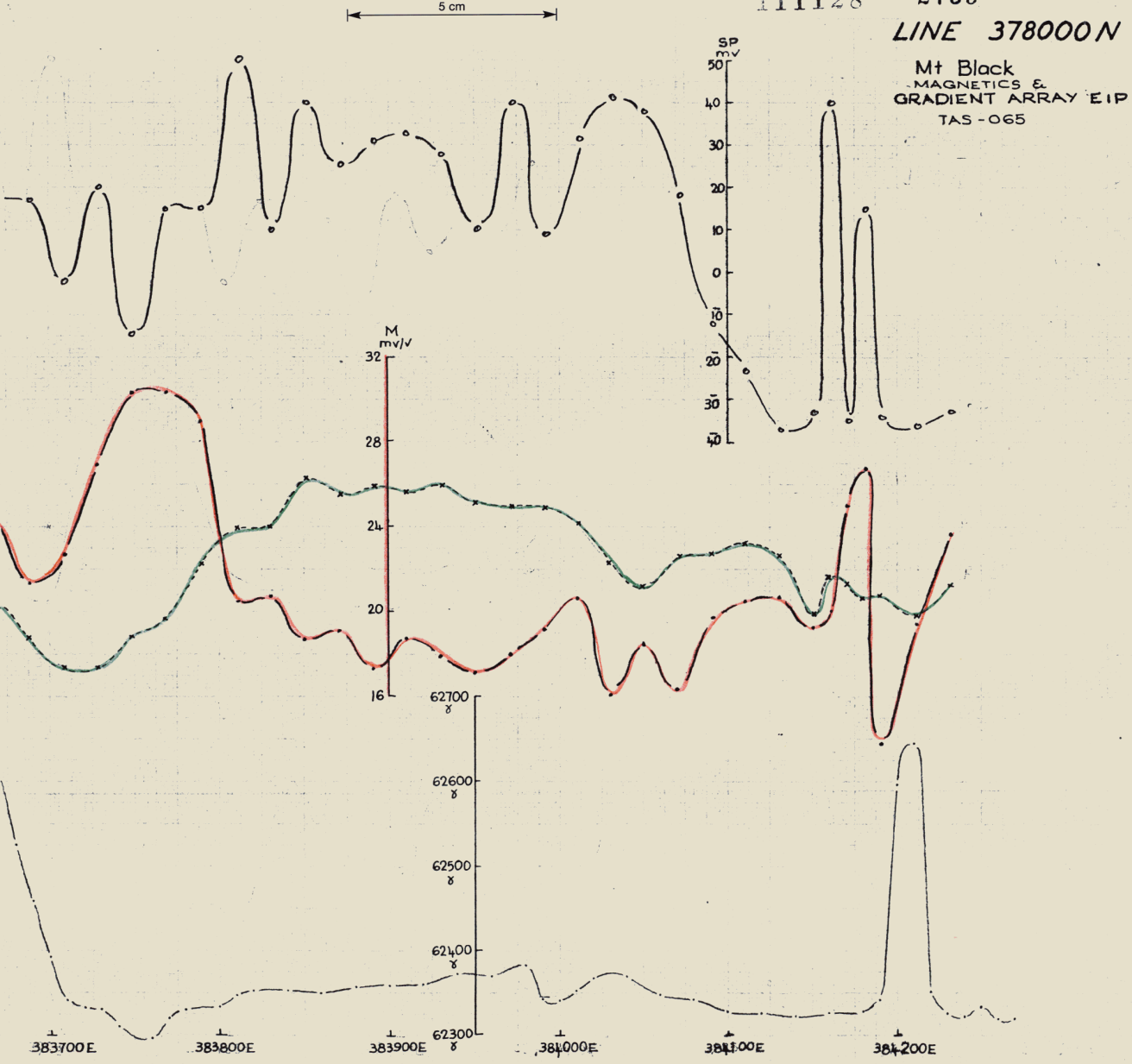

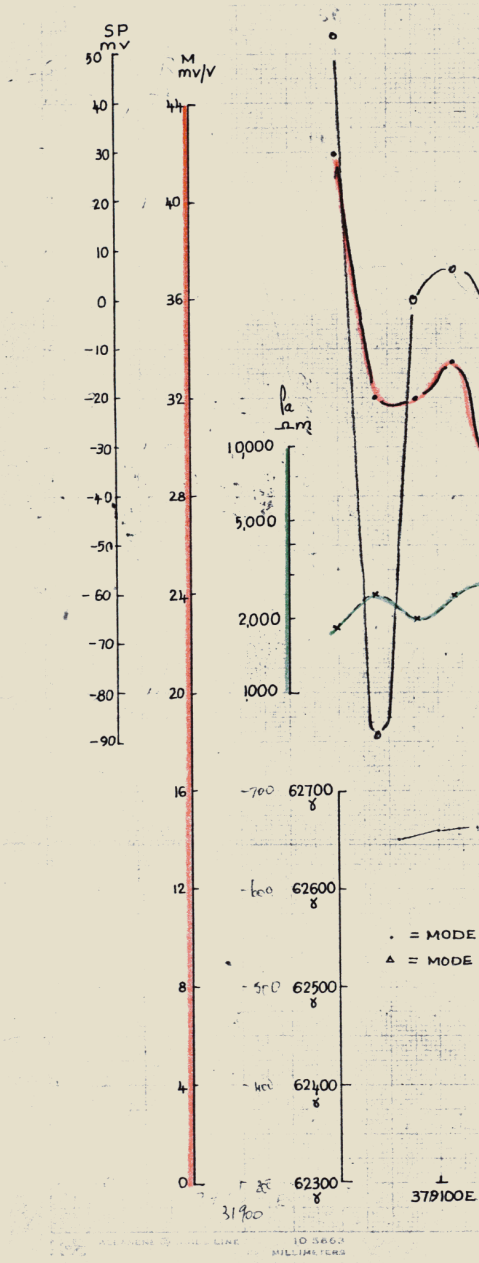

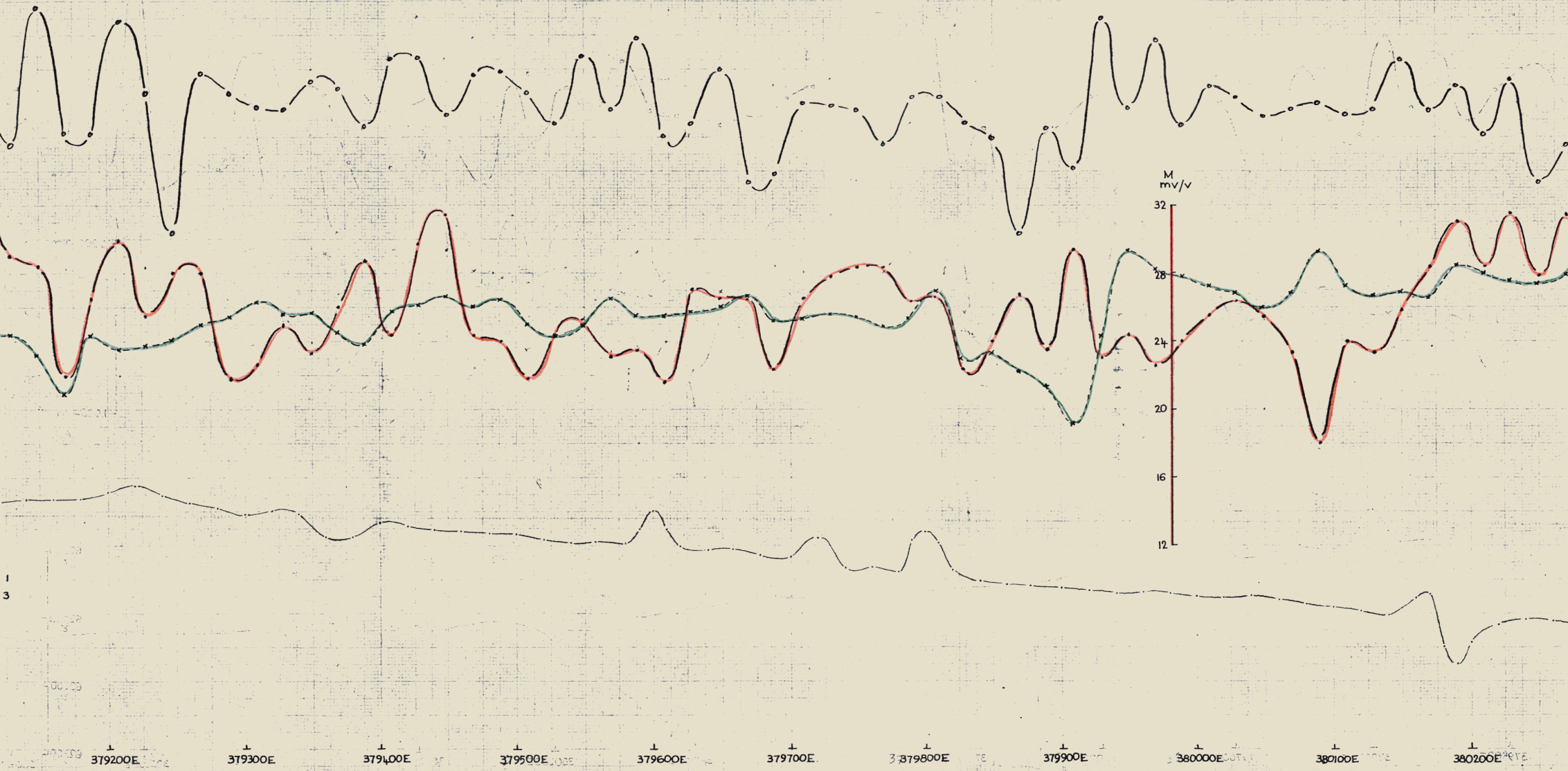

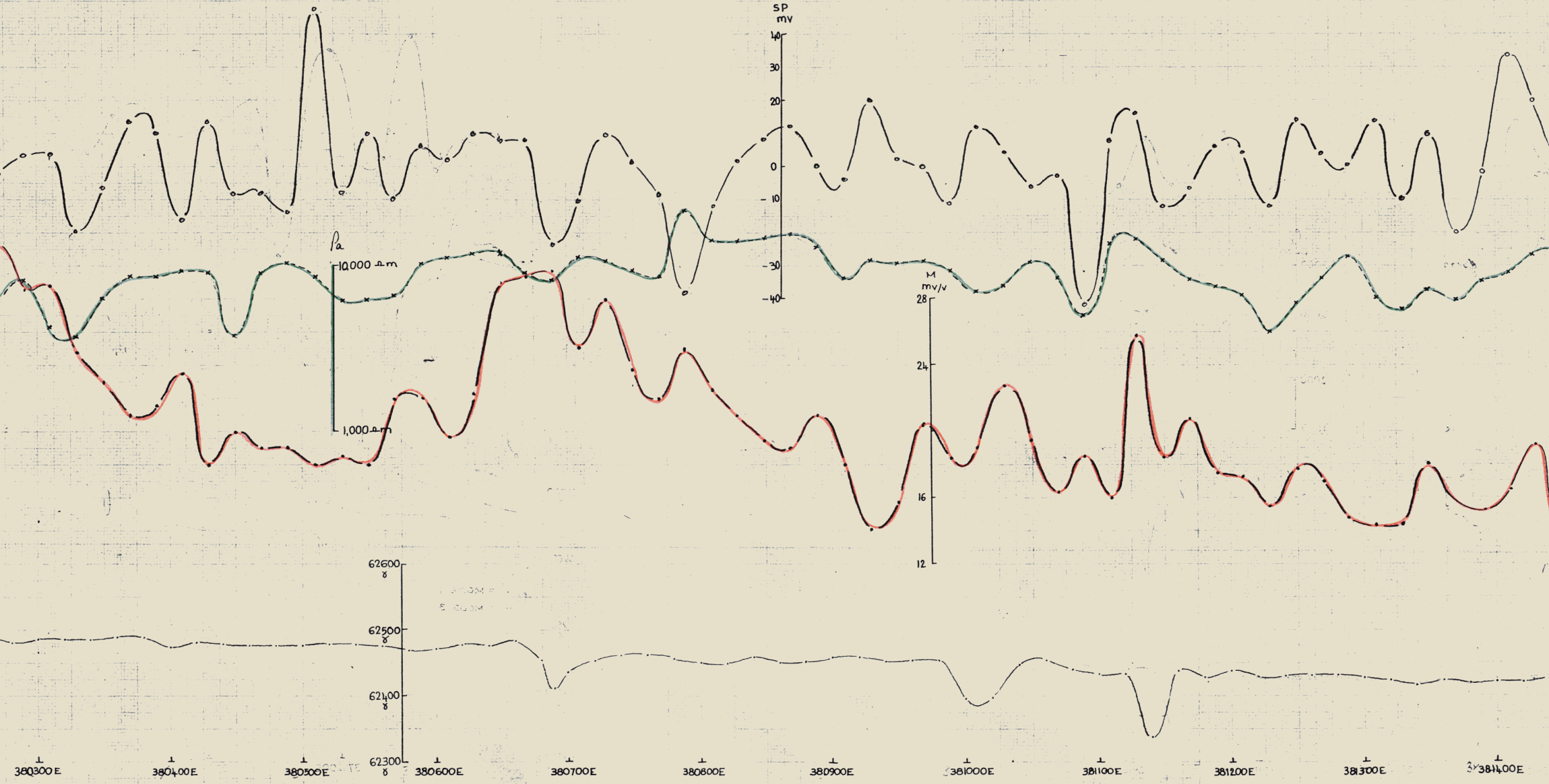

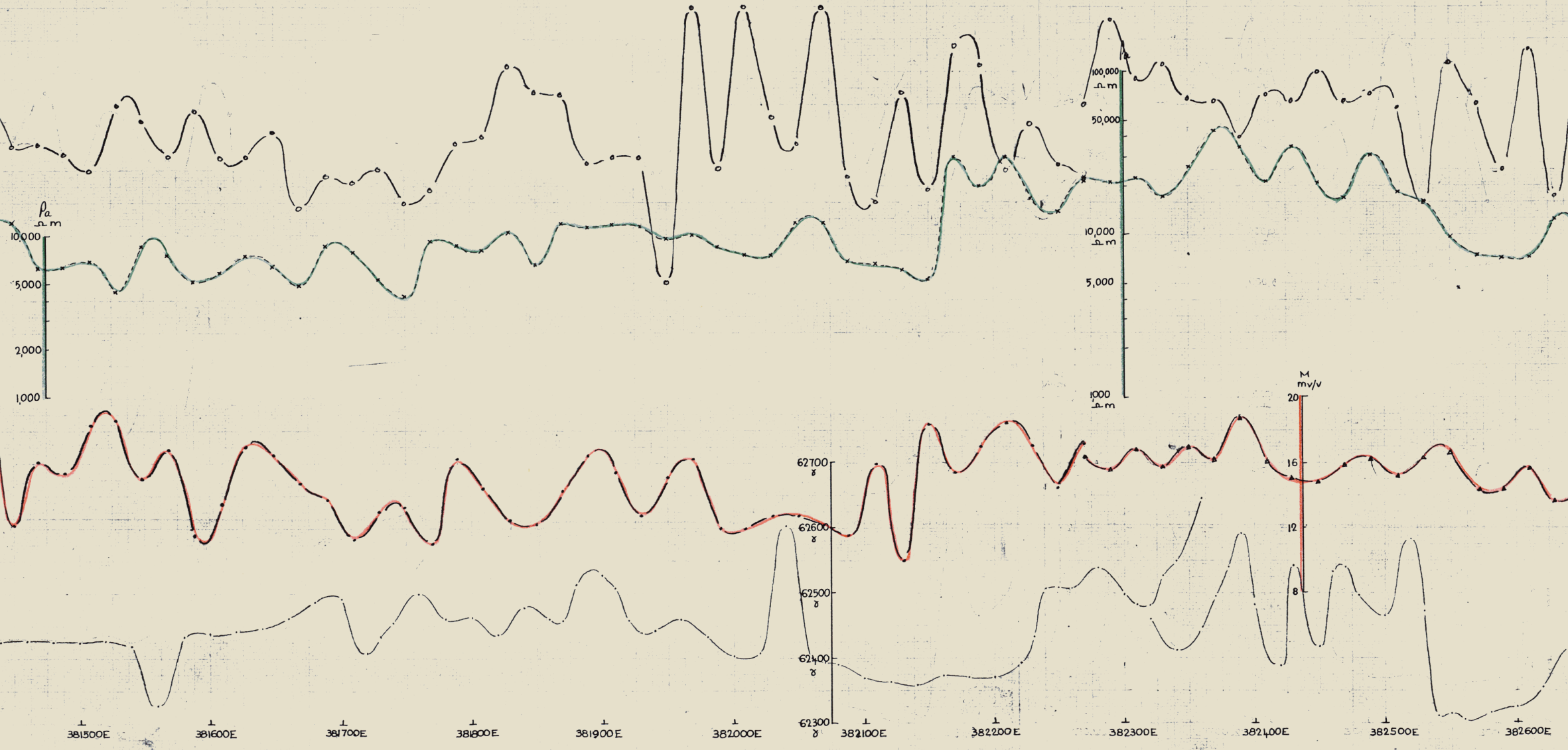

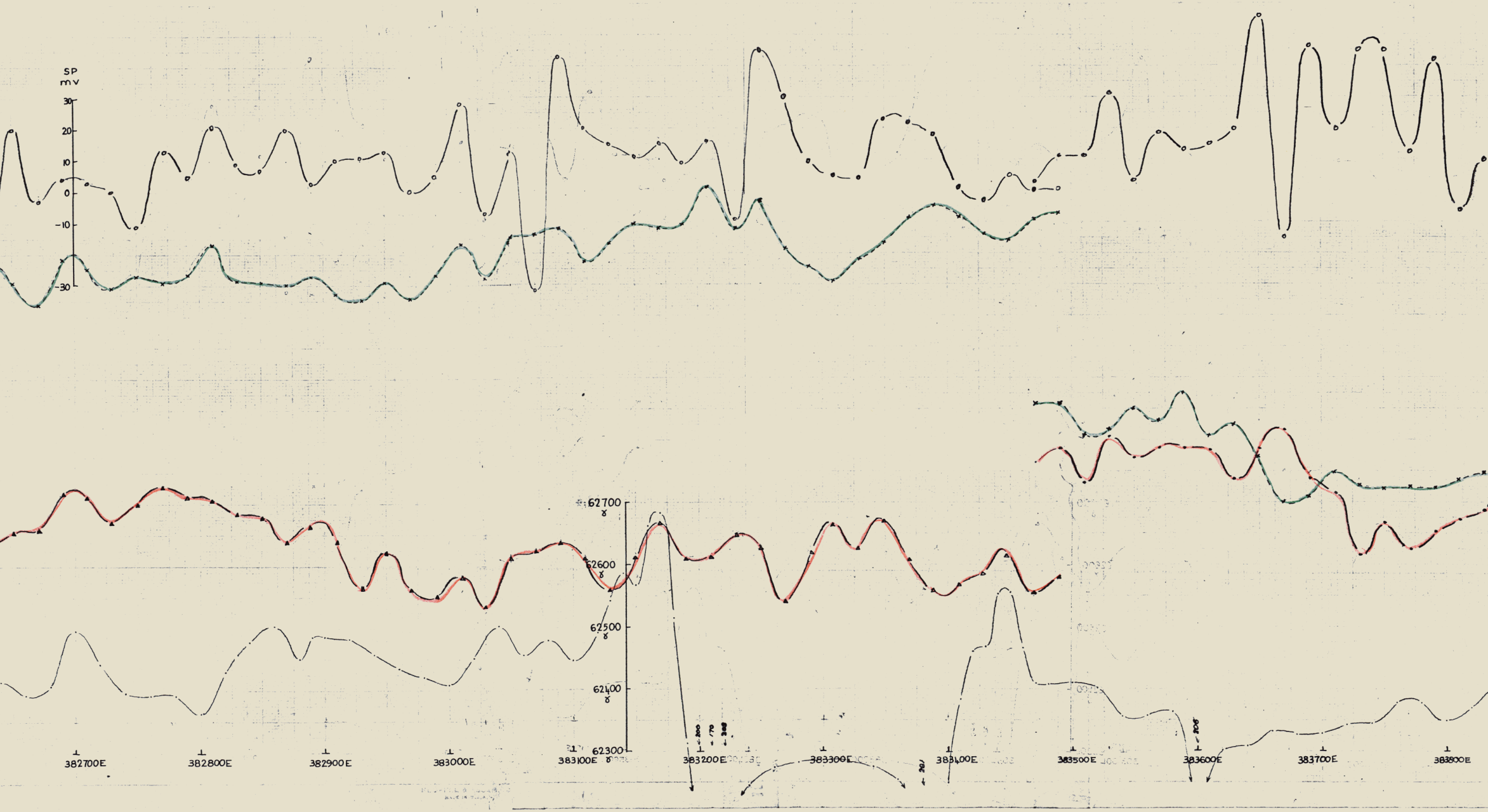

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80-1411 (Vol 2/6)

LINE 379,000 N

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MAGNETICS & GRADIENT ARRAY EIP

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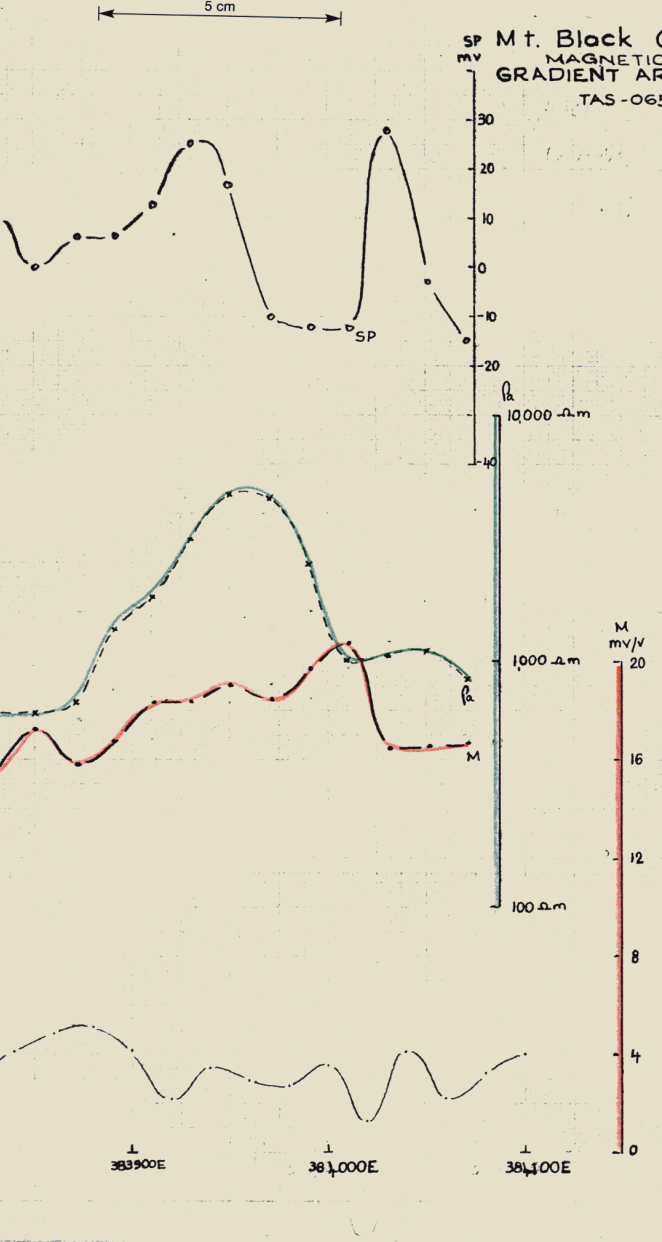

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APPENDIX V

Scintrex Report Tas-065

Comments on Gradient Array Detail and Dipole-Dipole Detail at Mt. Black and Contiguous Areas near Rosebery, West Coast Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited, comments pseudo-sections and profiles.

July, 1979

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COMMENTS ON
GRADIENT ARRAY DETAIL AND DIPOLE-DIPOLE DETAIL
AT MT. BLACK AND CONTIGUOUS AREAS
NEAR ROSEBERY, WEST COAST TASMANIA
ON BEHALF OF
ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

BY

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JULY, 1979

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SUMMARY

The gradient and dipole-dipole array detailed work over anomalies located in the earlier Mt. Black reconnaissance survey confirmed the location of most of the responses located in that survey. For the most part the chargeability responses have been shown to be of limited strike length and of variable nature along strike. Their form suggests them to be either disseminated or, if massive, electrically discontinuous in nature, and this, together with their limited strike length, infers the best to be of secondary interest as far as geophysical signature is concerned. As always, however, the ancillary geological and geochemical data is of greater importance than either form or amplitude in assessing the economic importance of the anomalies located in this survey.

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COMMENTS ON

GRADIENT ARRAY DETAIL AND DIPOLE-DIPOLE DETAIL AT MT. BLACK AND CONTIGUOUS AREAS NEAR ROSEBERY, WEST COAST TASMANIA ON BEHALF OF ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

INTRODUCTION

A series of dipole-dipole and gradient array detail surveys were carried out within the Mt. Black gradient array reconnaissance survey area, (described in report TAS-065 dated March, 1979 by the author), and in areas contiguous to the Mt. Black grid known as Langdons and Mt. Sale.

This work, together with areas at Murchison, Bulgobac and White Spur, were surveyed by a Scintrex crew over various dates between 11th April and 14th June 1979. The party was led by Mr. B. Ekstrom to 11th May, 1979 and thereafter by Mr. D. Webb,B.Sc. Second operators over this period included Mr. P. List, Mr. T. Von Strokirch,B.Sc., and Mr. R. Sims.

On site geological superivison and direction was carried out by Senior Exploration Geologist Mr. R. Williams, and Project Geologist Mr. J. Mills.

EQUIPMENT

The equipment used on these surveys consisted of a 2½/3 kilowatt Australian built time domain induced polarization transmitter powered variously by a 4HP and 8HP Briggs and Stratton motor generator. The resultant primary and secondary potential fields so generated were investigated using analog Scintrex

IPR-8 and compatible digital Scintrex IPR-10 induced polarization receivers. While three slices under the decay curve were recorded, only M_3 has been plotted, comments being made on the decay form where significant.

DATA PRESENTATION

The chargeability and resistivity data for the smaller detailed gradient array surveys have been contoured at the scale used for the reconnaissance data, namely, 1:5000. The data profiles are displayed at the horizontal scale of 1:2500, while vertical scales were 1 centimetre = 2 millivolts/volt for chargeability, 1 centimetre = 10 millivolts for self potential, while resistivity was displayed on a 5 centimetre log cycle and expressed in ohm-metres.

The dipole-dipole data is displayed on a standard pseudo-section format. (See appendix for explanation).

METHOD

The gradient array method is briefly discussed in report TAS-065 referred to above, while the dipole-dipole procedures used were quite standard. Additional comments are made in the appendix.

DISCUSSION OF RESULTS

The areas discussed in this report are shown in Figure 1 at the scale of 1:25000. Each area is separately discussed below.

AREA 1

The three lines surveyed were on the western end of the reconnaissance line

378,000N centred at about 379,500E. The original reconnaissance anomaly was discussed on page 10 of report TAS-065. The repeat was surveyed using a 2800 metre current dipole placed on the line line 378000N with a potential dipole of 20 metres moved at 20 metre intervals.

Line 378000N ..... The background chargeability on the detailed array is about 8 millivolts/volt below the original reconnaissance data, reflecting in part the bias of the distant current electrodes and/or the dilution in the latter of the oxidation/overburden. The apparent resistivity on the second detailed array is *greater*, reflecting the changed bias as for chargeability. However, the *form* of the data profiles is very similar, with the apparent resistivity being almost identical. The most material response remains a 9 millivolts/volt above background response at 379725E on line 378000N. The source is considered to have a maximum depth not exceeding 20 to 30 metres and be due to disseminated sulphides (or graphite). A second minor zone at 379550E(+) of 3 to 4 millivolts/volt above the 16 millivolts/volt background of itself is not significant, however, on both the adjacent lines, 100 metres to the north and south, it becomes more substantial.

Line 378100N ..... The response recorded at 379725E on the reconnaissance line clearly relates to a maximum of 6 to 8 millivolts/volt above background at 379750E on this line. The form of the response *suggests* a west dip to the source and a maximum depth of about 40 to 50 metres. A depression in the resistivity to 2500 ohm-metres from 6000 ohm-metres(+) still infers a disseminated source, however, it is either weakly interconnected or lies within a less resistive rock unit.

The minor response on the reconnaissance line 378000N at 379550E has a more

significant correlative on this line of 6 to 8 millivolts/volt above the 14 millivolts/volt background at 379550E. The source is interpreted to be similar to that at 379750E, while the maximum depth is interpreted to be of the same order, namely 40 to 50 metres.

Line 377900N ..... The main response at 379725E on the reconnaissance line is reflected here as a minor broad 4 millivolts/volt above background chargeability in a broadly lower resistivity feature. This response has no material significance. However, the minor feature at 379550E on the reconnaissance line is seen here as a much more significant 8 millivolts/volt response associated with a fall in resistivity to under 3000 ohm-metres from 9000 ohm-metres and 12000 ohm-metres to east and west. The west dipping source is estimated to have a maximum depth of 40 to 50 metres.

AREA 2

Two lines were surveyed to the north and one to the south at 377300N, 377100N and 376900N using a 3000 metres current dipole on line 377000N with electrodes placed at 377700E and 380700E. A 40 metre dipole-dipole survey was also carried out on line 377000N.

Line 377000N ..... A comparison of the reconnaissance line data and the 3000 metres detail, certainly shows the former to have been subject to noise, both positive and negative with respect to background. The anomaly located at 379550E is, however, repeated here with a 10 millivolts/volt plus, chargeability response above background centred at 379550E superimposed on a 12 millivolts/volt background, almost half that of the original data. As would be expected, no

significant change in the resistivity profile form was observed, which is as per the original reconnaissance data. The source therefore is interpreted to be wholly disseminated in nature (or if 'massive' electrically discontinuous) and at a depth of 60 metres below surface. The form of the anomaly suggests a west dip. A suggestion of two closely related sources rather than a single source is inferred from the profile form.

The dipole-dipole array was surveyed between 379420E and 379660E on an a = 40 metres, n = 1 to 4 spacing. The data shows a source centred at 379540E whose depth is less than the spacing used, namely 40 metres, and which increases in importance with depth. The contact of the source with the enclosing rocks is twofold, while the absolute level of chargeability between the gradient detail and the dipole-dipole are comparable. The very much lower dipole-dipole resistivities clearly demonstrate a less resistive surface layer. Lower values of less than 1000 ohm-metres either side of 379540E are considered encouraging as they *may?* infer differential oxidation or salts with soils over a sulphide as opposed to a graphite source.

Line 376900N ..... The anomaly recorded on line 377000N is clearly correlated to a similar 10 to 11 millivolts/volt above background response at 379560E. The form of the profile suggests a moderate west dip to the source and a maximum depth to that source of 60 metres. The source is probably disseminated as only a minor depression in the otherwise extremely high resistivity was noted.

Line 377100N ..... Just 100 metres north of the reconnaissance line the amplitude of the anomaly is very mcuh reduced to about 6 to 7 millivolts/volt above background while the source is much broader and is associated with higher than

background resistivities. A wholly disseminated source is thus interpreted below 379570E.

Line 377300N ..... On this line, absolutely no manifestation of the anomaly is seen, and therefore it must close on or just north of 377100N.

AREA 3

Three lines were surveyed to detail anomalies located on the reconnaissance line 378000N at 380690E and at 380980E-381200E. To this end a 2800 metres gradient array was used with electrodes placed at 378900E and 381700E on line 378000N.

Line 378000N ..... The general form of the chargeability data between about 380500E and 380900E is almost identical except for a depression in the chargeability background of about 8 millivolts/volt. The three chargeability responses at 380990E, 381050E and 381110E, however, were not repeated. This is considered to be due to array end effect, magnetic field noise and low Vp. The resistivity data over the whole line, however, while identical in form, is of lower base level, presumed to be due to the current electrode positions in this case. It is considered that the chargeability high on this line is a 'local' high, in close proximity to a major chargeability level change from 12 millivolts/volt in the west to 6 millivolts/volt in the east, which marks a rock type boundary.

Line 377900N ..... This line shows an almost identical profile form to the reconnaissance line repeat, showing the geologic units to be continuous across both.

Line 378100N ..... To the north, higher chargeability readings west of 380800E of 14 millivolts/volt as against 8 to 7 millivolts/volt east of that point, show a much sharper contrast between the two supposedly different rock units.

AREA 4 (Known as Mt. Sale)

A significant above background induced polarization response located on line 378000N centred at about 383760E(± 35 metres) was detailed by a 1200 metres current dipole with electrodes placed at 383200E and 384400E on line 378000N, and lines at 100 metres and 300 metres north and south of, as well as on the original reconnaissance line between about 383600E and 383900E. In addition, dipole-dipole detail was run on the reconnaissance line, and line 377500N.

Line 378000N ..... The chargeability response on the detailed array of some 4 to 5 millivolts/volt above background is much reduced from the 10 millivolts/volt recorded on the original reconnaissance survey. Also the background itself is reduced from about 20 millivolts/volt to 8 millivolts/volt - a very substantial fall. Also, while the resistivity data has an almost identical form, the resistivity is some five fold higher on the repeat data. The dipole-dipole run from 383640E ro 383880E shows lower near surface resistivities to less than 1000 ohm-metres increasing to depth to 2000 ohm-metres(+). However, no significant induced polarization anomalies were recorded on the n =1 to 4, a = 40 metres data.

The interpretation of this data is as follows. The larger current dipole spacing must have emphasised the deeper sections of the source which could be as deep as

60 metres plus to the top of the body. The smaller dipole of the detailed data shows two maxima at 383775E and 383830E each of which has an inferred depth to source of 40 metres or so. Absolutely no significant anomalism was recorded on the dipole-dipole data which may infer masking or a lack of resolution within the dipole-dipole array which beacuse of the width of the source is difficult to account for other than in terms of masking, although the contrast in resistivity for this phenomenon does not appear to be present.

Line 377900N ..... The *general form* of both the chargeability and resistivity data on this line is similar to line 378000N, showing a continuity south. The chargeability data shows two minor maxima of 3 millivolts/volt and 2 millivolts/volt at 383770E and 383815E which are not significant anomalies as such, but bearing in mind the reconnaissance line, may well be at depth.

Line 377700N ..... A significant 8 to 9 millivolts/volt above background response was recorded at 383780E which is coincident with a sharp decline in apparent resistivity to 2000 ohm-metres from over 10,000 ohm-metres to the west. The maximum depth to this feature is about 50 to 60 metres, while the asymmetry infers a west dip to the source. A second minor feature of about 3 millivolts/volt above the 10 millivolts/volt background is also accompanied by a depression in the resistivity. This feature is of relatively minor interest although the 8 to 9 millivolts/volt response may have secondary interest.

Line 377500N ..... A dipole-dipole survey was run between 383680E and 383920E using a 40 metre a spacing and n = 1 to 4. The resultant data shows only low chargeabilities of background amplitude over this section. Therefore, should the chargeable zone be present here, it is probably too narrow to define, or

perhaps too deep.

Line 378100N ..... On this line, 100 metres north of the reconnaissance line, two distinct maxima are seen which show a clear correlation with the response on line 378000N. A minor response at 383740E of 4 millivolts/volt is relatively unimportant, however, at 383820E a 10 millivolts/volt anomaly allied with high 5000 ohm-metres resistivity infers a disseminated sulphide (and/or graphite) source at about 40 metres. Again a west dip to the source is inferred. This is one of the rare cases where a minor but definite self potential anomaly of 85 millivolts is present also. The almost identical apparent resistivity profile between lines 378100N and 378000N infers a continuity of geological units over both lines.

Line 378300N ..... The correlative to the response described above on this line consists of maxima of 7 millivolts/volt and 6 millivolts/volt above the 8 millivolts/volt background at 383790E and 383830E accompanied by a depression in the otherwise rising resistivity. The maximum depths to source are considered to be about 50 to 60 metres in each case, while the sources *may* be near vertical.

AREA 5

This area was investigated by a 2000 metres gradient array with electrodes placed at 380200E and 382200E on line 376000N and seven lines between 375500N and 376500N, centred at about 381150E. Also a dipole-dipole array was centred at 381440E on the centre line 376000N.

Line 376000N ..... The reconnaissance line was re-surveyed between 380870E and

381600E. The main response centred between 381300E and 381550E was confirmed by an above background response of 18 millivolts/volt centred at 381460E. The background at about 7 millivolts/volt is however, half that observed on the reconnaissance survey. While the *form* (as would be expected) is different in detail, the overall anomaly is similar. The interpretation is of a series of chargeable zones decreasing in volume percent east and west of 381460E. The resistivity shows an almost identical form, and confirms the source of the chargeability response to be of a disseminated nature, or if massive, electrically discontinuous. It is difficult to judge the *minimum* depth, however, the maximum depth is of the order of 40 to 60 metres. The dipole-dipole was surveyed using an a = 40 metres n = 1 to 4 spacing between 381320E and 381560E. This shows a broad source centred at 381480E $\pm$20 metres of 20 millivolts/volt, while resistivities are higher at 3500 to 4000 ohm-metres over the chargeable source than to the east and west of it. The depth to source is less than the a spacing used, namely 40 metres.

Line 376100N ..... The gradient array was surveyed from 380680E to 381600E and shows a much reduced response between 381300E and 381600E of 8 to 14 millivolts/volt which shows that the chargeable zone fingers out to the north. A number of minor responses including one of 14 millivolts/volt (about 4 millivolts/volt above background) at 381390E are not considered of material significance, but do infer a depth to source of about 40 metres at this site. The high resistivities of 6000 ohm-metres clearly infer a disseminated source to the anomalism.

Line 376300N ..... This short line was run between 381390E and 381590E and shows a number of minor maxima which may be significant. The first, at or west of 381390E is about 6 millivolts/volt above background, while a second at 381445E

is about 4 millivolts/volt above background with a third response between 381510E and 381570E. All are accompanied by high resistivity which shows that the source is disseminated, and probably represents formational differences.

Line 376500N ..... This line was run between 381290E and 381590E. On the 8 millivolts/volt background an anomaly of 5 millivolts/volt was defined at 381490E ±15 metres, with a sharp 8 millivolts/volt response at 381550E. The maximum depth to these sources is estimated to be 50 to 60 metres and 25 to 30 metres respectively, while both sources have disseminated sources, although the latter shows some reduction in resistivity.

Line 375900N ..... The correlative of the reconnaissance line anomaly is centred at 381450E, but is a reduced 6 to 8 millivolts/volt above the 8 millivolts/volt background. Related, separate sources were defined at 381350E and 381530E. The two most easterly chargeability anomalies are associated with lower than background resistivity, while the western maximum shows no contrast. However, *all* are from disseminated sources and estimated maximum depths are 40 metres, 60 metres and 40 metres, west to east, respectively.

Line 375700N ..... On this line, run from 380870E to 381600E, the most westerly anomaly described above is not present. However, the central anomaly on line 375900N correlates with a 6 to 7 millivolts/volt response at 381460E whose maximum depth is about 40 to 60 metres. At 381550E an 8 millivolts/volt above background anomaly correlates with the less significant response at 381545E. This anomaly is accompanied by a decrease in resistivity to a still high value of just over 2000 ohm-metres at 381530E. The maximum depth to source is about 60 metres. A shoulder at 381590E suggests a separate source.

One isolated high of minor significance was defined between 381020E and 381090E. This anomaly is accompanied by a reduction in background resistivity from 6000 ohm-metres to under 2000 ohm-metres and the source is less resistive than the enclosing material. This feature has a maximum depth to source of about 40 to 50 metres and the form of the anomaly suggests an east dip to that source. This response is not identifiable on either the lines to the north or south.

Line 375500N ..... On this, the most southerly line run, two related 5 to 6 millivolts/volt above the 8 millivolts/volt background maxima were recorded at 381430E and 381470E and are accompanied by a depression to 6500 ohm-metres from the 15,000 ohm-metres plus background. The correlatives on line 375700N are 381550E and the shoulder at 381590E. The maximum depth to source is 40 to 50 metres.

AREA 6

This area was investigated on five short gradient lines surveyed from 382400E to 382700E at 376700N, 376900N, 377000N, 377100N and 377300N. To this end, a 3000 metres current dipole was placed at 380750E and 383750E on line 377000N. Also, three dipole-dipole set-ups were placed on lines 377000N, 377500N and 377700N .

Line 377000N ..... On this, the reconnaissance line, a sharp 12 millivolts/volt response was recorded at 382550E on the original survey. This was flanked to the west by 20 millivolts/volt backgrounds and to the east by background about 4 millivolts/volt less. The anomaly therefore was situated on, or in close proximity to a rock type change, which was not, however, reflected by any material

change in background resistivity. The 3000 metres repeat gave an almost identical result, except that the overall background was about 4 millivolts/volt lower. The dipole-dipole data run at a = 40 metres and n = 1 to 4 gave very similar results, with the source being indicated at a depth shallower than the a spacing used, namely 40 metres, centred at 382520E. The western limit of the double peak anomaly, however, may be influenced by a secondary maximum situated (from the gradient array data) at 382470E. As with the gradient data, the resistivity remains high throughout, however, the chargeability background is much reduced to 6 millivolts/volt to the west as well as the east, which may indicate soil cover in the area.

Line 377100N ..... On this line, only some 100 metres north, no significant anomaly was recorded over the correlative section, although a sharp change in induced polarization background from east to west of 8 millivolts/volt to 15 millivolts/volt conforms well with the levels revealed on line 377000N.

Line 377300N ..... It is highly significant that on this line at 382590E a chargeability response very similar to that seen on the reconnaissance line was recorded *in spite of it not being present on the intermediate line*! Here, a 16 to 18 millivolts/volt above background anomaly was recorded on a falling background of about 14 millivolts/volt in the west to 6 millivolts/volt in the east. The only slight fall in the high 6000 ohm-metres resistivity infers either a disseminated or if 'massive, electrically discontinuous source, the maximum depth of which is estimated to be 35 to 40 metres.

Line 377500N ..... On this line a dipole-dipole survey was carried out between 382320E and 382680E on an a = 40 metres dipole from n = 1 to 4. This data shows

a source at 382360E ±20 metres of 24 millivolts/volt as against a background of 5 to 6 millivolts/volt. The depth to that source is less than the spacing used, namely 40 metres, and there is only minimal reduction in resistivity from the 1500 ohm-metres background in the immediate vicinity of the source. This response *is not* related to the source located at 382590E on line 377300N as the strike projection position on line 377500N is about 382600E (unless there is a sinistral displacement between lines 377300N and 377500N). It could be that this maximum is related to a secondary maximum of 16 millivolts/volt (6 millivolts/volt above local background) at 382430E.

Line 377700N ..... A dipole-dipole survey on this line traversed between 382440E and 382680E using an a = 40 metres spacing and n = 1 to 4. No significant anomalism was recorded although very slightly higher readings were located on the extreme west of the set-up.

Line 378000N ..... On this reconnaissance line surveyed early in the season, no response was recorded over the section of the line which could correlate with the responses recorded on line 377500N at about 382360E

Line 376900N ..... This line, 100 metres south of the reconnaissance line, shows excellent correlation with that line. The gradient chargeability maximum of 18 millivolts/volt centred at 382570E is accompanied by 6000 ohm-metres resistivities and thus is interpreted as a disseminated, or if massive, electrically discontinuous source at a maximum depth of about 30 metres. As with line 377000N, the base level of the chargeability to the east is lower (9 millivolts/volt) than that to the west (14 millivolts/volt). A second smaller maximum of about 3 millivolts/volt above background at 382490E correlates with a similar response

at 382470E on line 377000N.

Line 376700N ..... An almost identical resistivity profile allows excellent correlation between lines 376900N (and 377000N) and this line. This shows that a very small increase in background of about 2 to 3 millivolts/volt is the only manifestation of the larger high recorded on line 376900N at 382570E.

AREA 7

A series of induced polarization maxima located between 382500E and 382800E on line 376000N were investigated using a 1600 metre gradient array with electrodes placed at 381900E and 383500E on the reconnaissance line, and lines at 375700N 375900N, 376000N, 376100N and 376300N.

Line 376000N ..... The reconnaissance line was repeated between coordinates 382300E and 382900E. The chargeability profile form is similar west of 382800E but east of that station a reduced response was observed on the repeat data. The level of the detail is about 4 millivolts/volt less than the original reconnaissance data. The form of the resistivity data is to all intents and purposes identical.

The detailed data shows a series of individual maxima at 382480E, 382570E, 382630E, 382670E and 382720E. The eastern maximum is 8 millivolts/volt above background while the remainder are 10 to 12 millivolts/volt above background. All are accompanied by no material change in the high apparent resistivity and thus are due to either disseminated, or if massive, electrically discontinuous sulphides or graphite. The sharp anomaly form suggests maximum depths to source no greater

than about 30 metres below surface.

Line 375900N ..... The gradient data shows only minor responses of 4 millivolts/volt(+) above a rising west to east background. While these can be related to the more substantial anomalies on line 377000N, they suggest a 'fishtailing-out' of the zone to the south.

Line 375700N ..... This line shows only minor variations in background which rises from west to east. None of the induced polarization responses can be considered significant.

Line 376100N ..... The main group of induced polarization anomalies on line 377000N between 382550E and 382700E can be correlated to higher values between 382550E and 382775E on this line. Individual maxima at 382570E, 382610E, 382700E and 382750E, while not showing a direct correlation with line 377000N, are of similar form. The maximum depth to source is estimated at 40 metres, while the source itself is disseminated in nature.

Line 376300N ..... To the north the chargeability data is interpreted to represent only changes in background, with individual maxima not being able to be correlated between lines.

AREA 8

A significant 8 to 10 millivolts/volt induced polarization anomaly centred at 382000E ±25 metres on line 375000N was detailed using a 3000 metres gradient array with electrodes placed at 380750E and 383750E on line 376000N. Three lines were

surveyed, the centre line being a repeat of the reconnaissance line.

Line 375000N ..... The detailed data shows the anomaly in very similar form and amplitude to the reconnaissance survey, save for a 3 millivolts/volt decrease in chargeability background. The resistivity profile form is almost identical. As before the source is indicated to be both single and broad or perhaps two individual segregations of chargeable material centred at 381990E and 382025E. The maximum depth to source appears to be of the order of 60 to 70 metres in both cases, while the asymmetry suggests an east dip. A slight depression in the otherwise high resistivity infers very minor conduction *between* the two possible chargeability sources.

Line 374900N ..... 100 metres to the south on line 374900N there appears to be an overall increase in background to 14 millivolts/volt (from 8 millivolts/volt) west of 382000E. There is, however, no chargeability anomaly as such on this line.

Line 375100N ..... On this line a single minor maximum of 5 millivolts/volt above background was defined at 382010E which is the most northerly manifestation of the western peak of 381990E on line 375000N and lies on a sharp change in resistivity

AREA 9 - LANGDONS GRID

A gradient array having a current dipole of 1600 metres and electrodes placed at 379700E and 381300E on line 379000N was used to energise a block which included sections of lines spaced at 100 metres intervals from 378700N to 379200N between 380000E and 381000E.

Line 379000N ..... A comparison of the original reconnaissance data and the detailed gradient data shows not only a much reduced background to 10 millivolts/volt from 20 millivolts/volt for chargeability, but also a reduced amplitude for individual events on that profile. An almost identical resistivity profile was recorded, but also (unlike other areas at Mt. Black) on a lower resistivity background. This would appears to indicate that there is a cover of lower chargeabioity and lower resistivity which the larger array penetrates somewhat more efficiently.

In this case the chargeability data is best viewed for an overall picture in contour form. This shows two approximate grid north south trending induced polarization anomalies referred to as Zone A and Zone B situated respectively in the western central and eastern central portions of the Langdons grid.

Zone 'A' ..... This zone reaches its maximum development on line *378800N* at 380275E where the chargeability reaches 10 to 12 millivolts/volt above the 10 millivolts/volt background. As there is no significant variation from the 6000 ohm-metres resistivity the source is either disseminated or if 'massive' electrically discontinuous. The maximum depth to source is of the order of 60 metres. At 380340E on the same line, a secondary maximum related to the main Zone 'A' was seen as a 7 millivolts/volt above background response, again with no material displacement in the resistivity profile, indicating a disseminated source. 100 metres to the south on line *378700N* three maxima each of about 6 to 8 millivolts/volt at 380260E, 380310E and 380360E were recorded. The maximum depths to source look to be about 40 to 60 metres and the source must be disseminated or electrically discontinuous as there is no material change in apparent resistivity.

On line *378900N* a significant 14 millivolts/volt response above background was recorded centred at 380290E with a 'shoulder' suggesting a secondary source at 380262E. The high resistivities again infer a disseminated or electrically discontinuous massive source, the maximum depth of which is estimated to be 60 metres to 70 metres. A west dip *could* be inferred from the asymmetry of the profile. A dipole-dipole at an a spacing of 40 metres and n = 1 to 4 was surveyed across this anomaly. This shows the centre of the anomalism to be at about 380280E $\pm$20 metres and a maximum depth of the order of the spacing (40 metres). However, it may be significant that the n = 3 value gave the *largest* reading and that the dipole-dipole amplitudes for chargeability are less than for the gradient array data, inferring a dilution by near surface material. On the n = 1 spacing, lower resistivities were noted over the most chargeable section, perhaps inferring the presence of salts in the soils, or of some oxidation. However, at depth the dipole-dipole data shows similar resistivities to the gradient array.

A further 100 metres to the north on line *379000N* a maximum chargeability of 10 millivolts/volt above the 10 millivolts/volt background was recorded at 380255E. This equates to the maximum at 380290E on line 378900N, while a distinct, separate, but related peak of 8 millivolts/volt above background at 380190E is considered the correlative of the 'shoulder' referred to above on line 378900N at 380250E.

A further minor maximum of 4 millivolts/volt at 380350E equates to a similar minor peak at 380390E on line 378900N.

100 metres north on line *379100N*, two relatively moderate responses each of

about 6 millivolts/volt above background at 380220E and 380300E are the considered northerly extensions of the maximum on line 379000N at 380190E and 380255E. As to the south, the source is disseminated or electrically discontinuous in nature, where the estimated depth is no greater than 30 metres.

On line 379200N two rather sharp maxima of 6 to 7 millivolts/volt above background at 380210E and 380310E were recorded. The high accompanying resistivities again infer a disseminated/electrically discontinuous source. The maximum depths are estimated at 30 to 40 metres, and both correlate directly with similar maxima to the immediate south. A further like response at 380400E cannot be seen to the south.

Zone 'B' ..... This response unfortunately, makes its most dramatic appearance on line *379100N* at 380670E where it is open to the north. The 18 to 20 millivolts/volt above background response is the most significant recorded on Langdons grid, has an estimated maximum depth of 25 to 30 metres, a west dip to the source, while the source is disseminated of if massive, electrically discontinuous.

On line *379000N* the response is a much reduced 6 to 8 millivolts/volt above background accompanied by a slight depression in resistivity to 4000 ohm-metres. The maximum depth is estimated at about 40 metres. On line *378900N* an almost identical chargeability response at 380690E again has an estimated maximum depth of 30 metres. The response on line *378800N*, the most southerly line on which the anomaly can be identified, is 7 to 8 millivolts/volt and has a slightly deeper maximum depth at 40 to 45 metres.

CONCLUSIONS

1 - Noise has been noted on the reconnaissance gradient array surveys as opposed to little or no noise on the detailed re-runs. This has been put down to magnetic storm activity which occurred over those periods when this phase took place, together with the lower Vp readings in the original data. This was particularly noticeable in Area 3, line 377000N between 380950E and 381200E.

2 - Generally the detailed work did not show significant strike continuity for the anomalies located. This may infer (but not prove!) that the chargeable sources in the area as a whole are of low sulphide/graphite concentration and limited strike extent.

3 - The 'mini-contour' interpretations of the gradient set-ups at the 1:5000 scale of the reconnaissance survey show the interline correlation between chargeable zones well.

The detailed conclusions on each of the areas is as follows:

4 - In *AREA 1* (378000N/±100 metres at 379600E ±300 metres)..... Moderate responses were recorded from disseminated sources at maximum depths to source of 40 to 50 metres. Unless additional corroborating data is available these anomalies of themselves would be of secondary interest at best.

5 - In *AREA 2* (37700N±100 metres & +300 metres at 379500E ±200 metres) ..... The significant 10 millivolts/volt response observed at 379550E is confirmed and is seen to close to the immediate north, but crosses lines 376900N at 379560E as a similar response. The source is disseminated or if massive, electrically

discontinuous and lies at a maximum depth of 60 metres, and dips to the west. This response is of secondary to primary geophysical interest.

6 - In *AREA 3* (378000N ±100 metres at 380850E ±350 metres) ..... The response located at 380700E on the reconnaissance survey is put down to a 'local' variation or a rock type change, while substantial local anomalies at 380950E-381150E were due to 'noise' only generated by array end effect exaggeration, magnetic field noise, coupled with low Vp.

7 - In *AREA 4* (378000N ±300 metres, ± 100 metres at 383800E ±150 metres) ..... The 10 millivolts/volt response recorded on the reconnaissance array is confirmed as a much reduced response on a much lower background. The original reconnaissance data inferred either a 'wide' source or two distinct, close bodies. The detailed data showed all lines to be crossed by two parallel chargeable sources showing only a decrease in resistivity of significance on line 377700N at 383780E. At this site the 8 to 9 millivolts/volt response is considered of secondary interest, as is a similar 8 to 10 millivolts/volt response on line 378100N at 383820E. The latter is wholly disseminated, while the former may have some weak interconnection between sulphide (or graphite) grains to account for the recorded depression in resistivity to 2000 ohm-metres. The maximum depth to source in each case is 50 metres(±).

8 - *AREA 5* was investigated by detailed gradient array from about 380750E to 381600E on lines 375500N, 375700N, 375900N, 376100N, 376300N and 376500N and between 381300E and 381600E with dipole-dipole on line 376000N. The major response between 381300E to 381550E and centred at 381460E is confirmed and is intrepeted as being due to a series of chargeable units. To the north and

south this response is much reduced in magnitude and is variable in form. As the strike length of this feature is limited, and its source disseminated, it is considered to be of secondary importance as a geophysical target.

9 - *AREA 6* ... This area was investigated by a series of gradient lines on 376700N, 376900N, 377000N, 377100N and 377300N with dipole-dipole detail on 377000N, 377500N and 377700N all centred at about 382550E.

The original sharp anomaly at 382550E on line 377000N is confirmed and can be traced south across 376900N at 382570E to terminate between 376900N and 376700N. This anomaly terminates to the immediate north of reconnaissance line 377000N as no trace of it is seen on line 377100N, although the form of the resistivity data suggests geological continuity. However, the zone re-appears as a major response on line 377300N at 382590E before being lensed out to the north before line 377500N is reached, or sinistrally displaced some 230 metres to cross line 377500N at 382360E. In all the above cases, the source is disseminated or if massive, electrically discontinuous and is less than 30 to 40 metres below surface. The anomaly is of secondary geophysical interest.

10 - *AREA 7* ... This was investigated using a 2600 metres gradient array on lines 375700N, 375900N, 376000N, 376100N and 376300N centred at 382600E $\pm$300 metres. The detailed work shows that the source on the reconnaissance line fishtails out to the immediate south of the reconnaissance line, crosses line 376100N to the north of the reconnaissance line and disappears into a changed background on line 376300N. The sources are considered to be disseminated chargeable material graphite and/or pyrite in narrow zones at maximum depths

to source of 30 to 40 metres. As such they are not, on geophysical grounds at least, considered of potential economic interest. Positive geological and geochemical data would be required to modify this conclusion.

11 - *AREA 8* ... The significant response recorded on the reconnaissance line 375000N from 381960E to 382250E lenses out to the north and south. This disseminated or electrically discontinuous source lies at a depth of 60 metres(±), and is of limited strike length, and therefore is of limited potential economic interest.

12 - *AREA 9 - LANGDONS GRID* ... This section was surveyed between 380000E and 381000E and 378700N and 379200N. Two approximate grid north south trending zones were defined on the six gradient lines surveyed. *Zone 'A'* reaches its maximum development on lines 378800N and 378900N at 380275E and 380290E but can be seen on a lesser scale on the whole grid. The source is disseminated or electrically discontinuous and lies at a maximum depth of 60 metres. *Zone 'B'* reaches its maximum development on the most northerly line surveyed over the anomaly at 380670E, and as such is open to the north. The disseminated and/or electrically discontinuous source has a maximum depth of the order of 30 metres. The anomaly can be traced south to line 378800N at 380650E always as a lesser response. Zone 'A' on lines 378800N and 378900N and Zone 'B' on line 379100N are of secondary interest from a geophysical standpoint.

SCINTREX

Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

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

GEOPHYSICIST

378000E

379000E

380000E

381000E

382000E

383000E

384000E

385000E

379000E

378000E

377000E

376000E

375000E

374000E

9 Langdons

1

2

3

4

5

6

7

8

MURCHISON

Legend

Dipole-Dipole

Detail work

Reconnaissance

(2) Area identification number

5 cm

GRID PLAN

TAS-065 / TAS-065.B

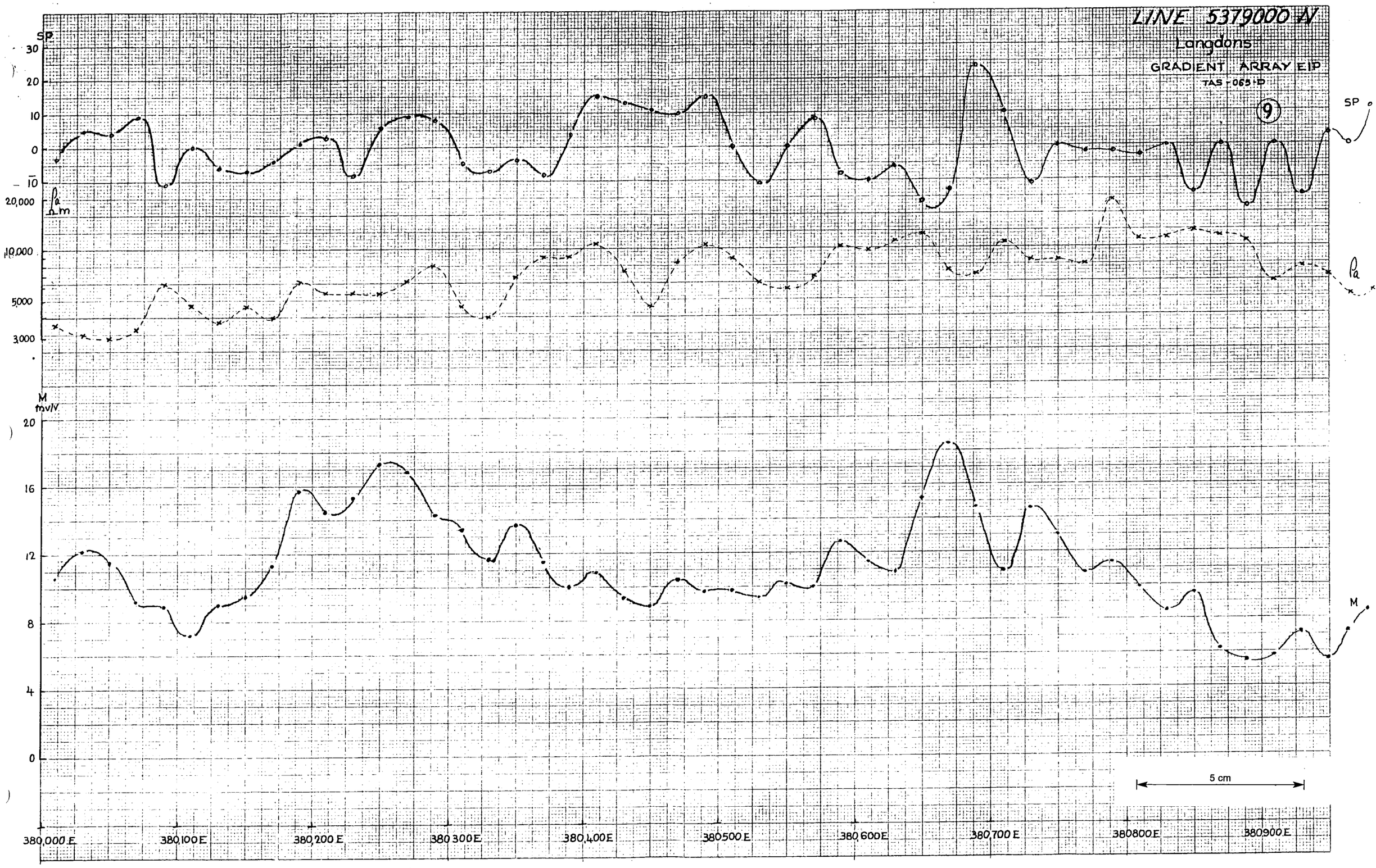
KOLLER & FREW CO. (AUSTRALIA)
10 X 10 TO THE CENTIMETRE • 25 X 25 CM

47 1217



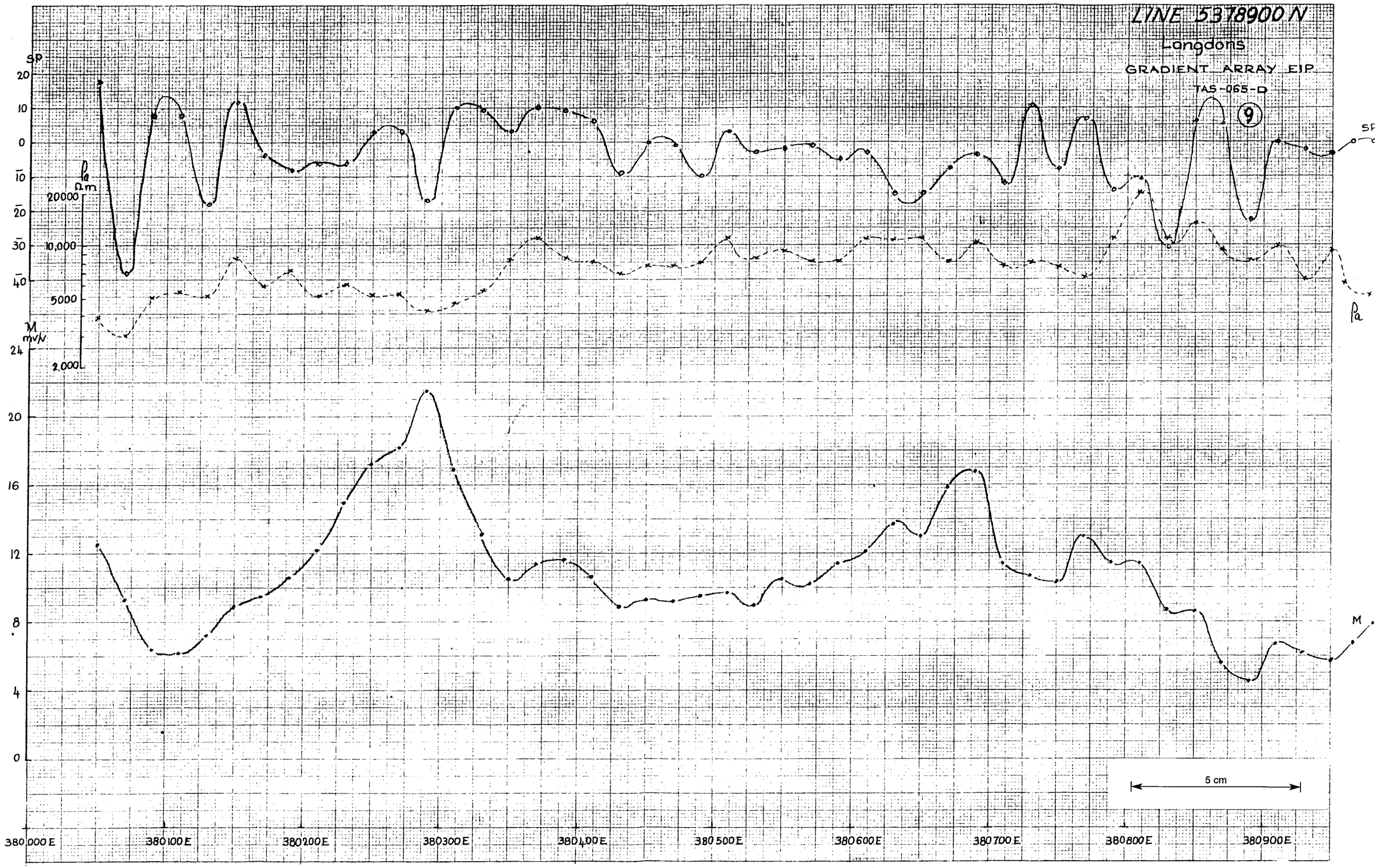
K+E KEUFFEL & ESSER CO. MADE IN U.S.A. 10 X 10 TO THE CENTIMETER • 25 X 35 CM.

A1516


LINE 5379000 N
Langdons
GRADIENT ARRAY EIP
TAS-065-D
9
SP
30
20
10
0
-10
ρa
Ωm
20,000
10,000
5000
3000
M
mv/V
20
16
12
8
4
0
5 cm
380,000 E
380,100 E
380,200 E
380,300 E
380,400 E
380,500 E
380,600 E
380,700 E
380,800 E
380,900 E



LINE 5379100N
Langdons
GRADIENT ARRAY EIP
TAS-065-D
9
SP
40
30
20
0
10
20
30
SP
Ia
20,000
10,000
5000
2,000
Ia
M
mv/V
20
16
12
8
4
0
M
5 cm
380,000 E
380,100 E
380,200 E
380,300 E
380,400 E
380,500 E
380,600 E
380,700 E
380,800 E
380,900 E


LINE 5378900 N
Langdons
GRADIENT ARRAY EIP
TAS-065-D
9
SP
20
10
0
10
20
30
40
ρa
Ωm
20000
10,000
5000
2,000
M
mv/v
24
20
16
12
8
4
0
380000E
380100E
380200E
380300E
380400E
380500E
380600E
380700E
380800E
380900E
5 cm

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

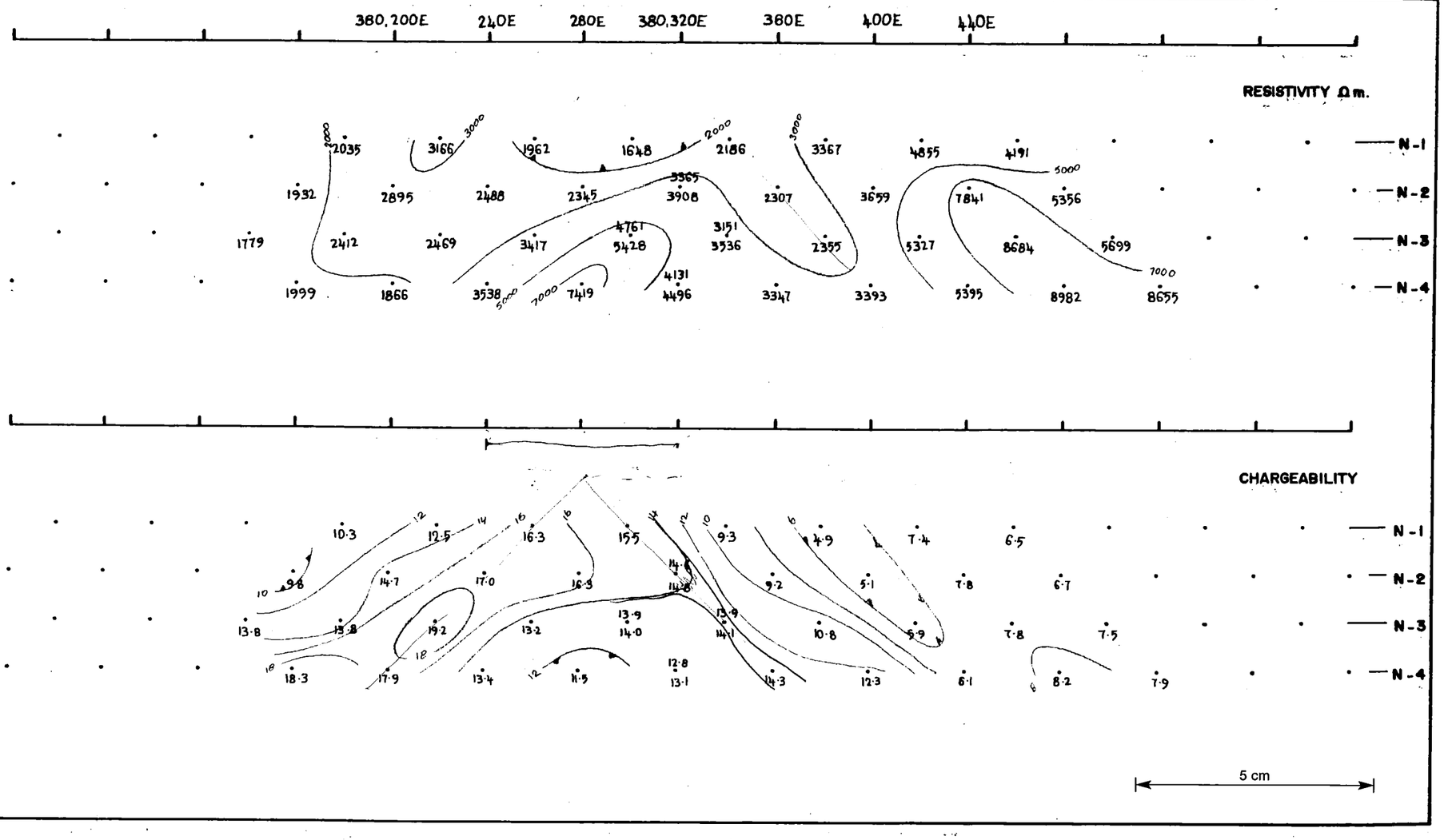
DIPOLE - DIPOLE ARRAY

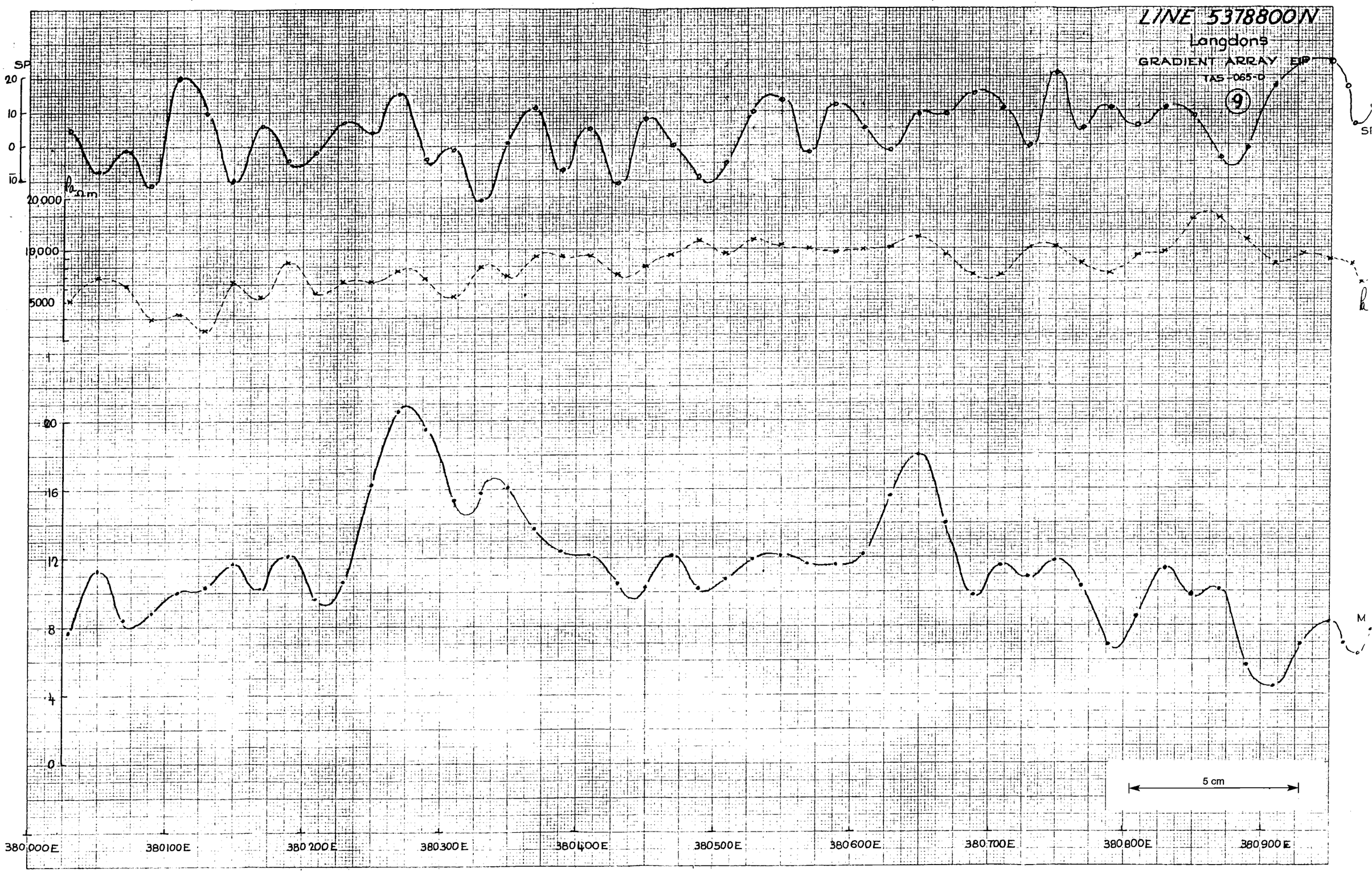
DATE	6·6·79
PLOTTED BY	D.J.T.W
PULSE	2 sec / Rx.
DIPOLE SPACING	40 m

LINE No. 5,378900 N

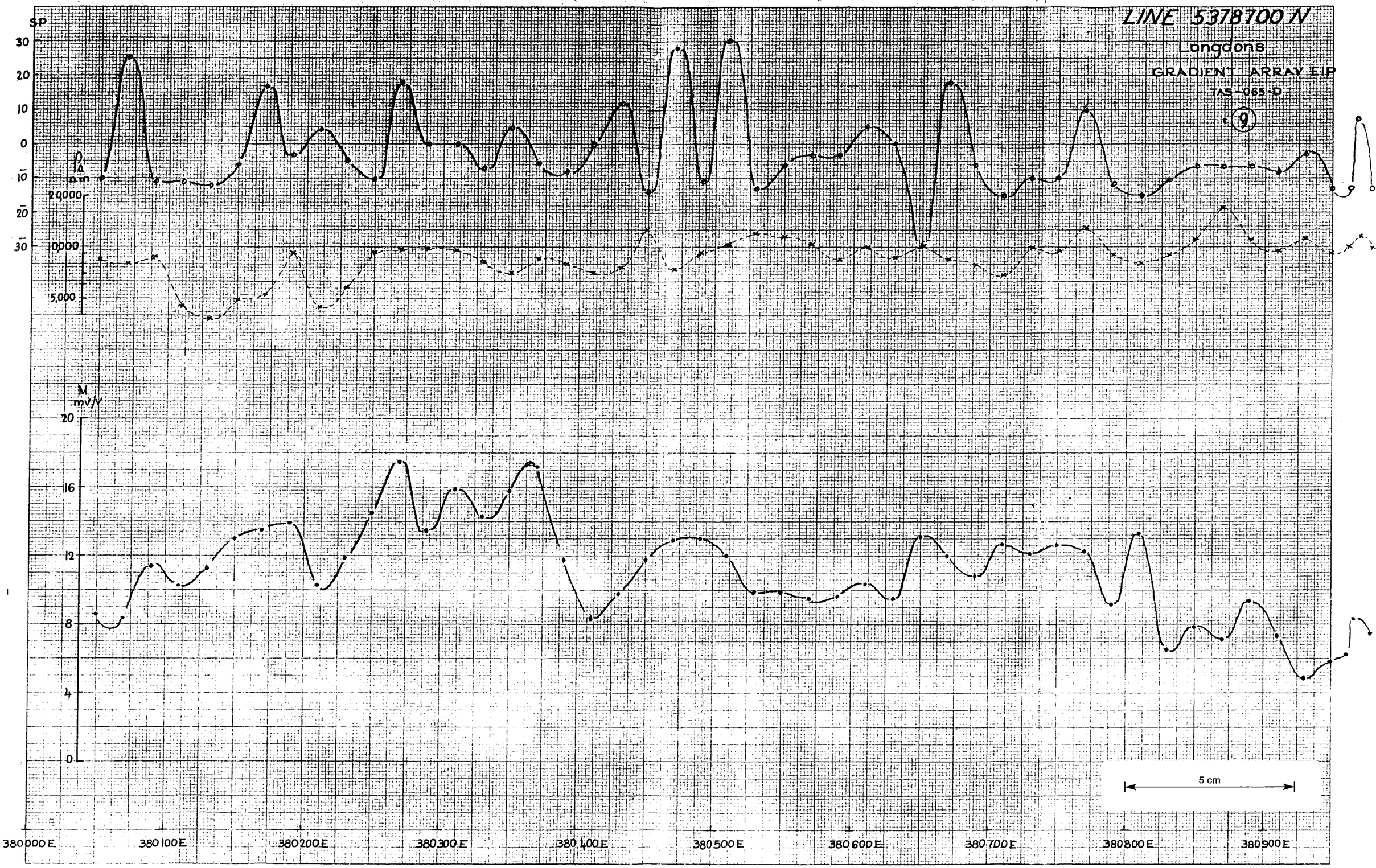
PROSPECT LANGDONS (9)

JOB No. TAS-065-D





K+E 10 X 10 TO THE CENTIMETER 46 1512 KEUFFEL & ESSER CO. MADE IN U.S.A.



K+E KEUFFEL & ESSER CO. MADE IN U.S.A. 10 X 10 TO THE CENTIMETER • 52 X 36 CM
47 1516

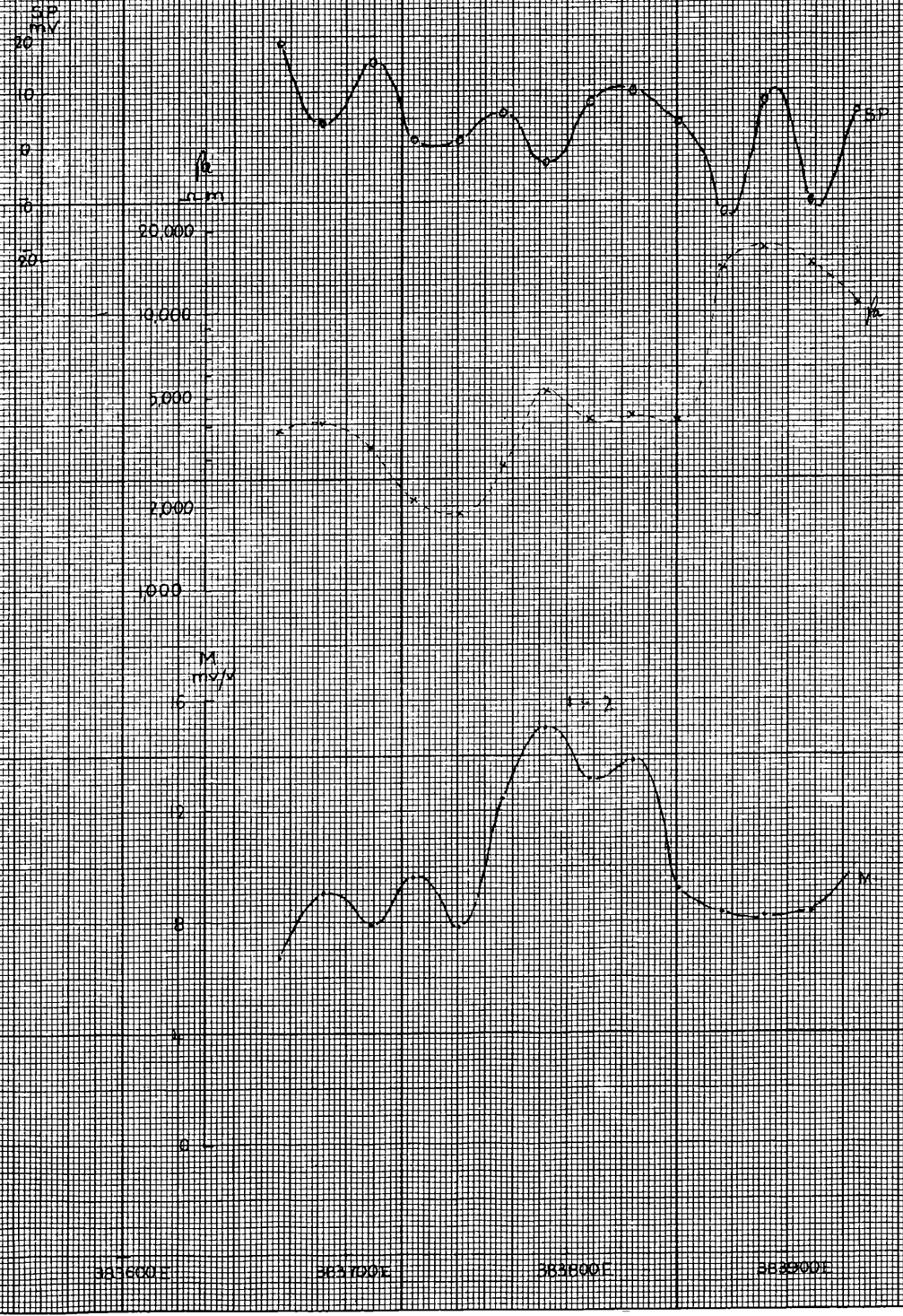
LINE 378300 N

MT Block Area

GRADIENT ARRAY IP

TAS-065D

(4)



LINE 378100N

Mt. Block Area

GRADIENT ARRAY

EIP

TAS-065-D

1

SP mv

30 20 10 0 10 20

ρ_a Ω.m

6,000 5,000

M mv/V

24 2,000

20 1,000

16

12

8

4

0

SP

ρ_a

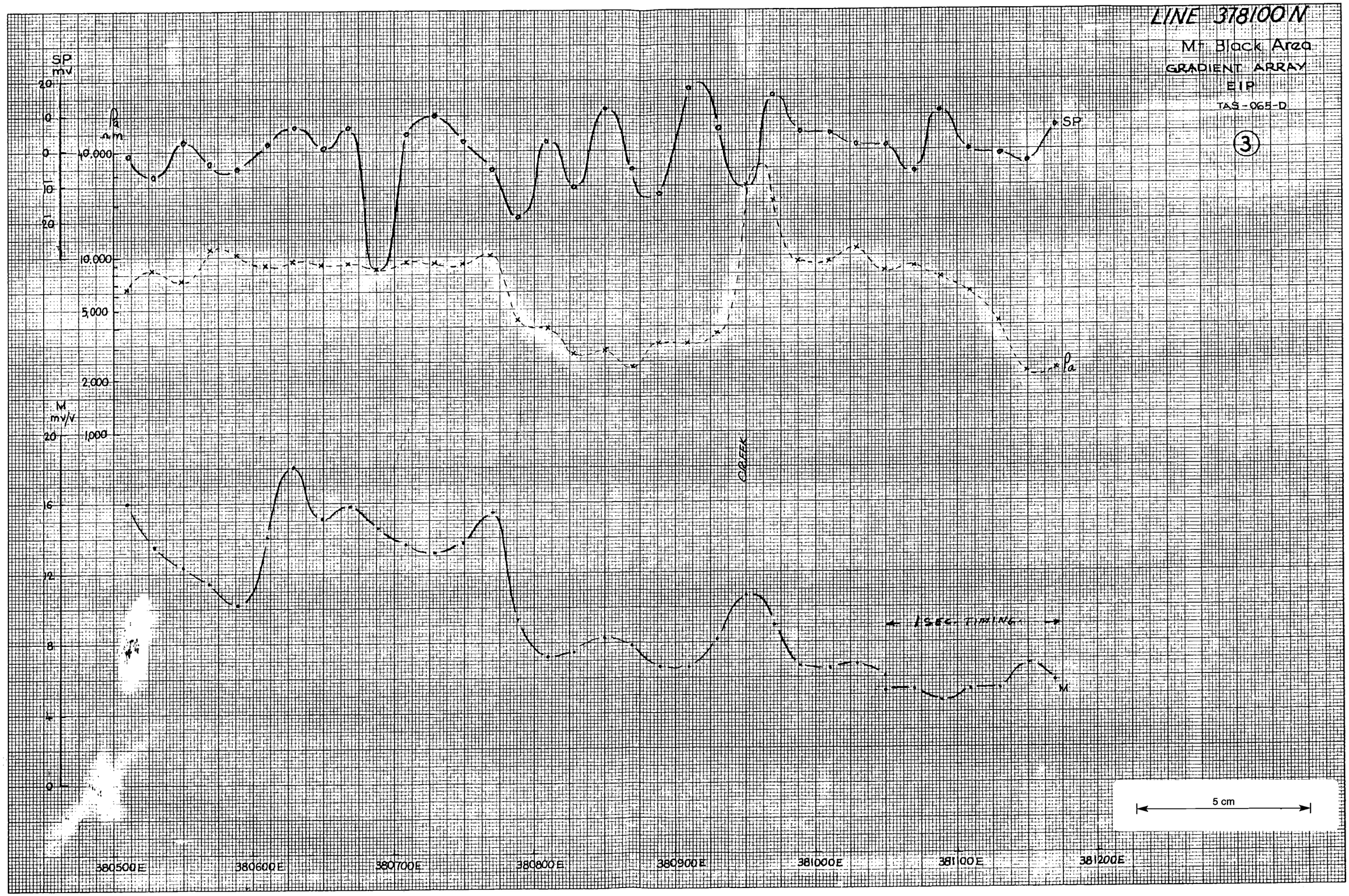
M

379300E 379400E 379500E 379600E 379700E 379800E 379900E

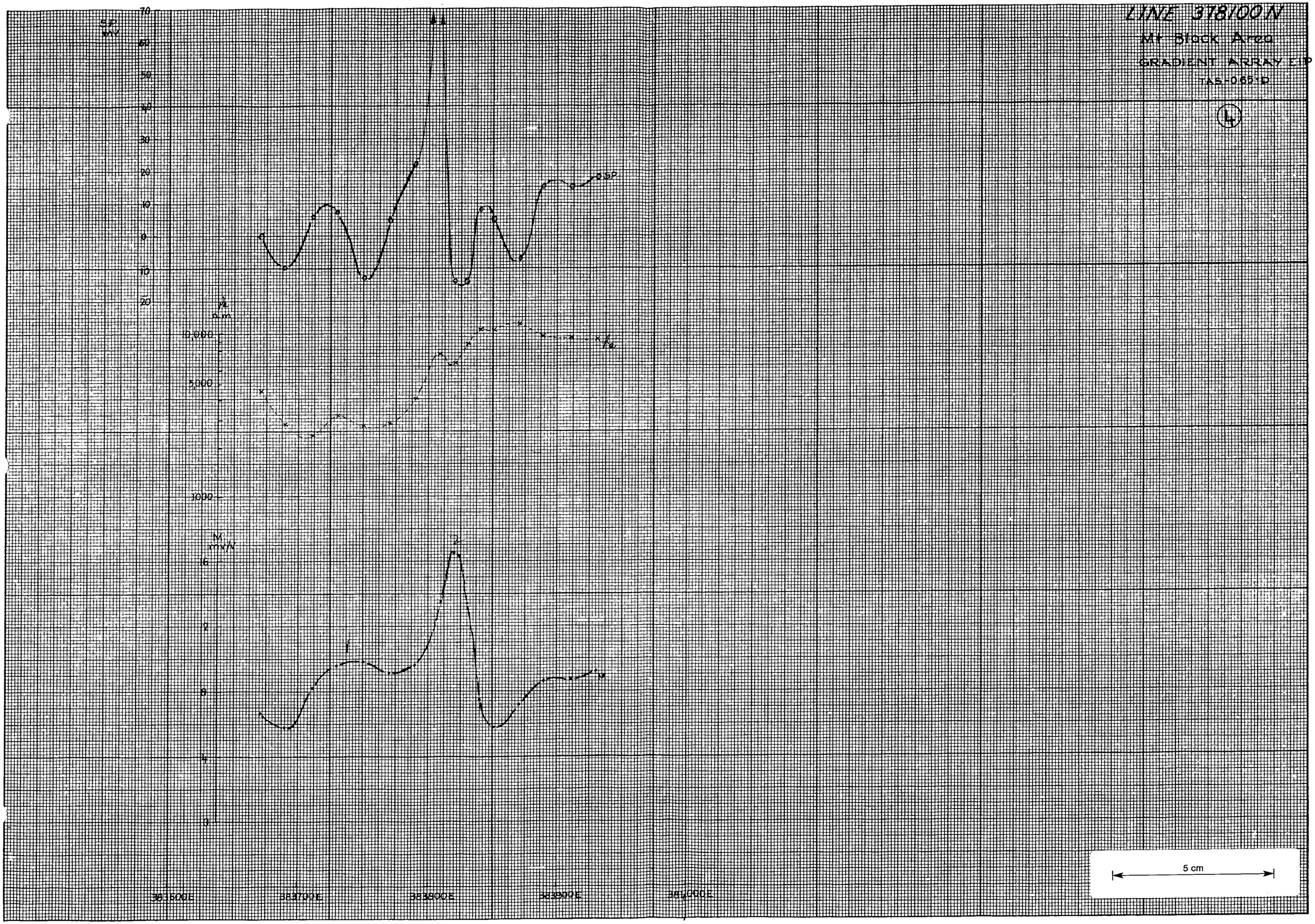
5 cm

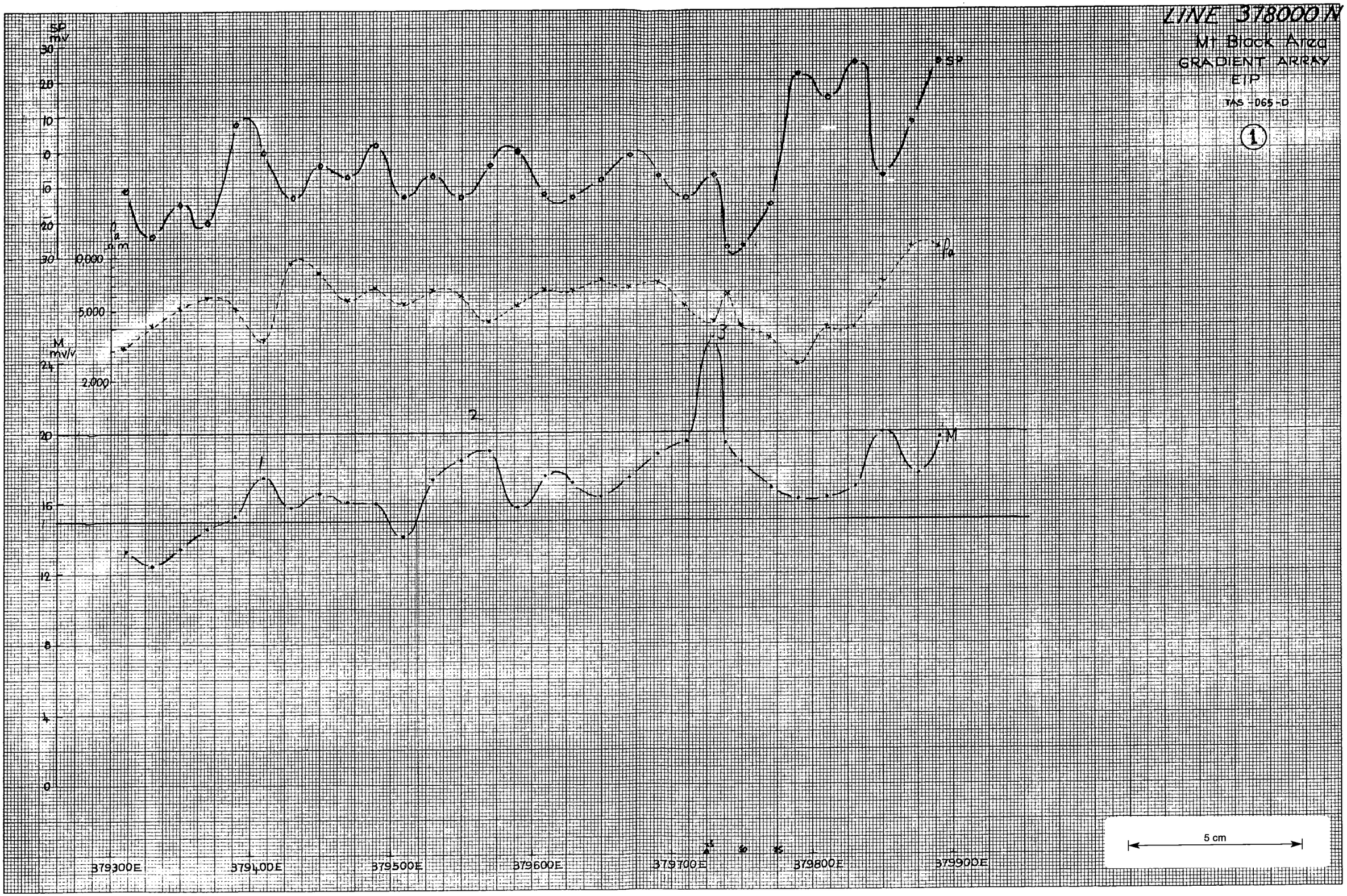
47 1516

K&E 10 X 10 TO THE CENTIMETER • 25 X 38 CM. KEUFFEL & ESSER CO. MADE IN U.S.A.



K+E 10 X 10 TO THE CENTIMETER • 25 X 38 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.
47 1516


LINE 378100N
Mt Block Area
GRADIENT ARRAY EIP
TAS-065-D
4
SP mV
70
60
50
40
30
20
10
0
10
20
SP
ρa Ωm
10,000
5,000
1000
M mV/V
16
12
8
4
0
1
2
383600E
383700E
383800E
383900E
384000E
5 cm



K+E 10 X 10 TO THE CENTIMETER • 25 X 38 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.
47 1516

LINE 378000 N

Mt Block Area

GRADIENT ARRAY

EIP

TAS-065-D

3

SP mV

40 30 20 10 0 10 20

ρ_a Ω-m

20,000 10,000 5,000 1000

M mV/V

20 16 12 8 4 0

SP

ρ_a

M

5 cm

380500E 380600E 380700E 380800E 380900E 381000E 381100E 381200E

47 1516

K&E 10 X 10 TO THE CENTIMETER • 25 X 38 CM. KEUFFEL & ESSER CO. MADE IN U.S.A.

LINE 378000 N

Mt Block Area

GRADIENT ARRAY E.I.P.

TAS-065 P



SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 3·8·79	LINE No. 5,378,000 N
PLOTTED BY DJTW	PROSPECT MT. SALE (4)
PULSE 2 sec / Rx.	JOB No. TAS-065-D
DIPOLE SPACING 40m	

640E 680E 720E 383,760E 800E 840E 880E

RESISTIVITY Ω m.

N-1: 2401 1970 1088 799 668 2073 2110 1607

N-2: 1180 3462 1326 1345 1098 1319 1159 2684 3860 3036

N-3: 1917 1467 2003 2029 2110 2412 1841 1608 1432 1994 3451 3675

N-4: 1602 1755 814 3201 3268 2935 2429 1966 1150 2088 3783 3969

CHARGEABILITY

N-1: 6·6 5·4 4·6 6·1 6·7 7·3 4·8 5·7

N-2: 7·7 7·7 4·3 6·1 5·7 6·6 6·7 5·7 4·7 4·4

N-3: 6·8 9·3 7·6 6·2 4·4 6·5 5·4 5·2 4·7 6·9 4·5 4·4

N-4: 5·5 8·3 7·6 6·9 4·3 4·4 4·6 4·4 5·2 6·5 4·5 3·8

5 cm

LINE 377900 N
Mt Black Area
GRADIENT ARRAY
ETP
MS-065-D
1

SP
mV
20
10
0
-10
-20

ρ_a
Ω-m
20,000
10,000
5,000
3,000

M
mV/V
20
16
12
8
4
0

379310E
379400E
379500E
379600E
379700E
379800E
379900E

5 cm

47 1516

K&E 10 X 10 TO THE CENTIMETER • 25 X 38 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

LINE 377900 N

Mt. Black Area

GRADIENT ARRAY EIP

TAS-065-D

(3)

SP mv

30 20 10 0 10 20

ρ_a Ω.m

20,000 10,000 5,000 2,000

M mv/V

20 16 12 8 4 0

SP

ρ_a

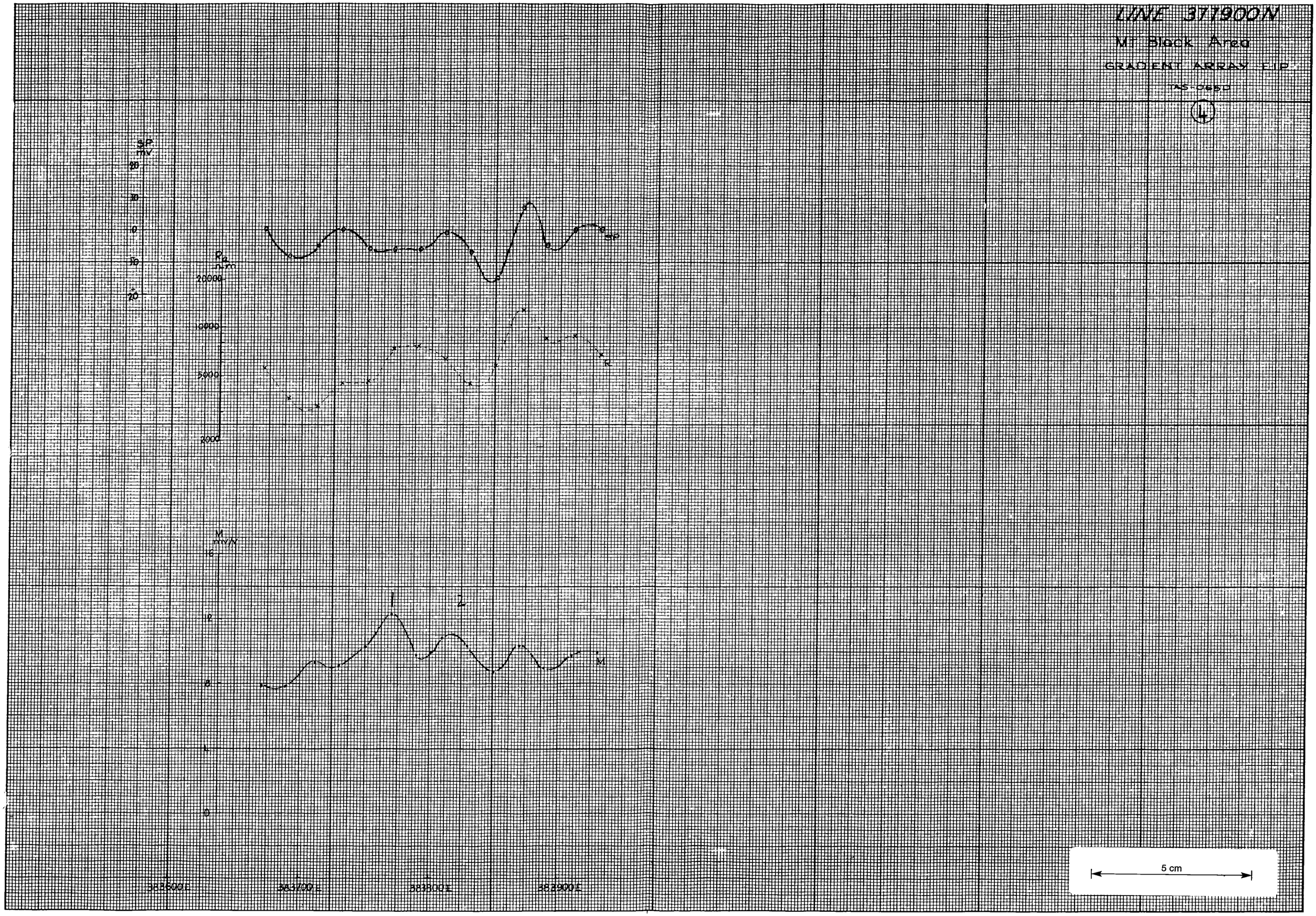
M

5 cm

380500E 380600E 380700E 380800E 380900E 381000E 381100E 381200E 381300E

47 1516

K+E 10 X 10 TO THE CENTIMETER • 25 X 38 CM. KEUFFEL & ESSER CO. MADE IN U.S.A.


LINE 371900N
Mt Black Area
GRADIENT ARRAY E.I.P.
TAS-0650
4
SP
mV
20
10
0
-10
-20
Ra
Ωm
20000
10000
5000
2000
M
mV/V
16
12
8
4
0
1
2
SP
R
M
383600E
383700E
383800E
383900E
5 cm

SCINTREX PTY. LTD.

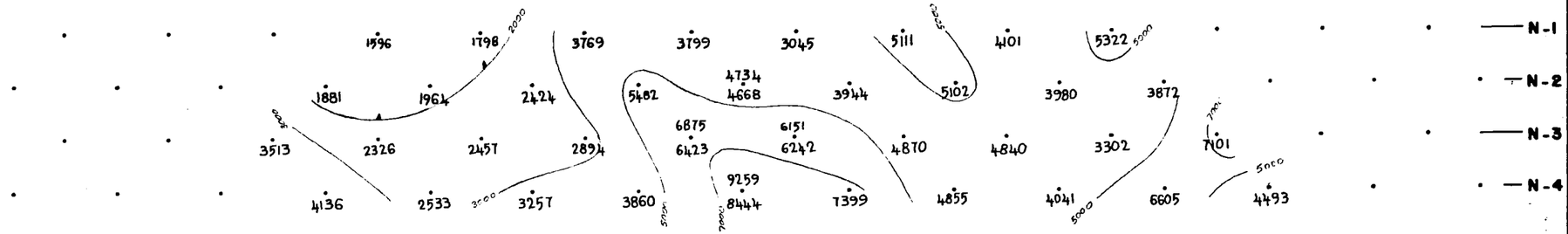
INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

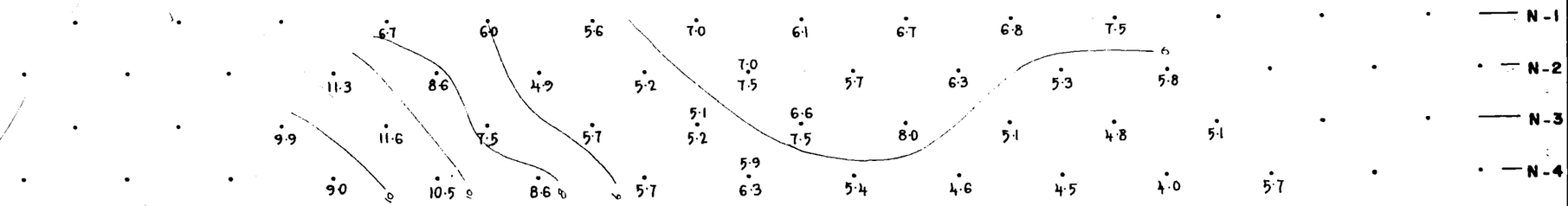
DATE 29·5·79	LINE No. 5,377,700 N
PLOTTED BY D J T W	PROSPECT MT. SALE (6)
PULSE 2 sec / Rx.	JOB No. TAS-065-D
DIPOLE SPACING 40 m	

382360E -400E 382440E -480E -520E 382560E -600E -640E 382680E -720E

RESISTIVITY Ω m.



CHARGEABILITY



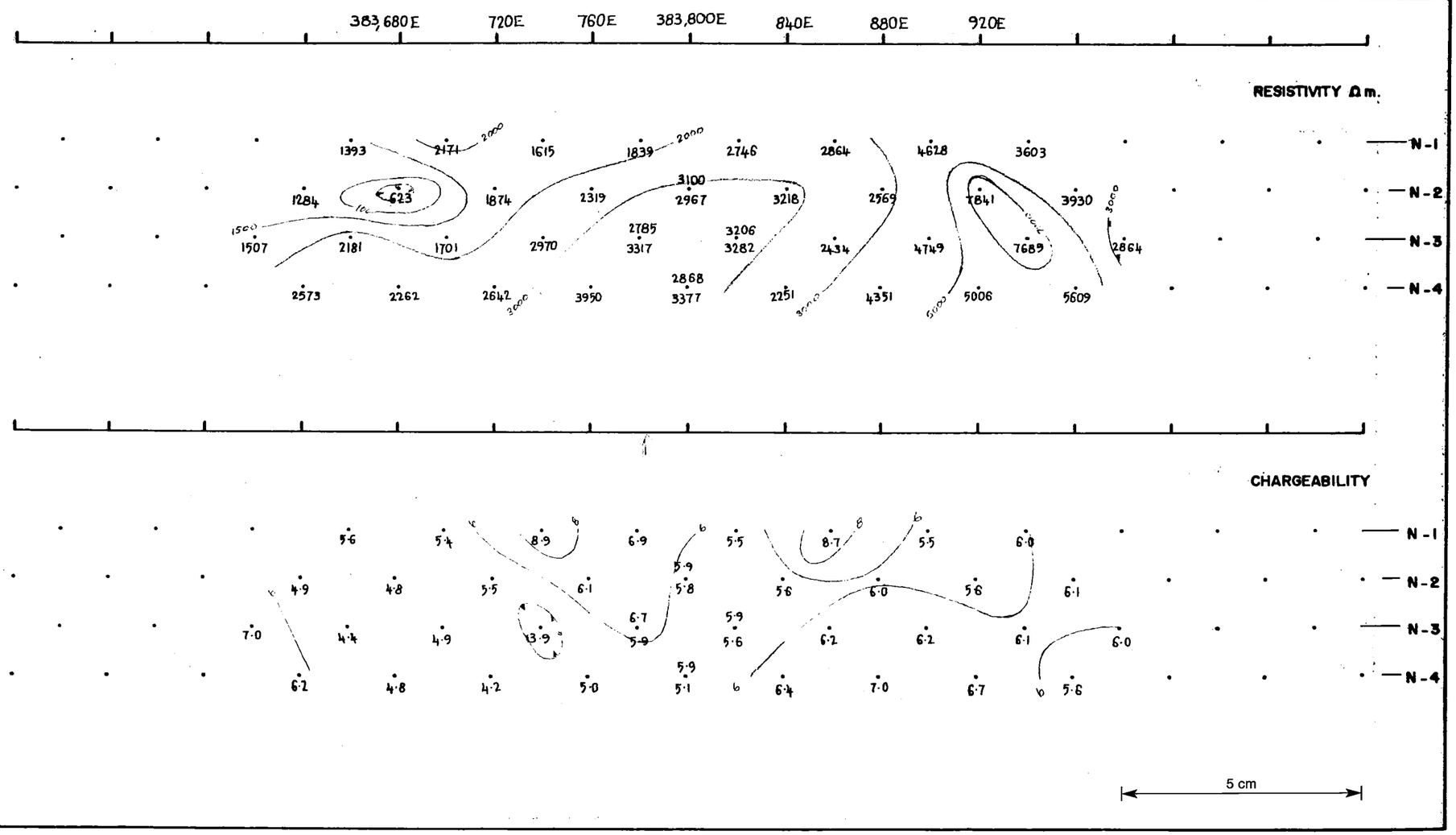
5 cm

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 2-6-79	LINE No. 5,377,500 N
PLOTTED BY D.J.T.W.	PROSPECT MT. SALE (4)
PULSE 2 Sec. / Rx.	JOB No. TAS-065-D
DIPOLE SPACING 40 m	



SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 28-5-79 / 31-5-79	LINE No. 5377,500 N
PLOTTED BY DJTW	PROSPECT MT. SALE (6)
PULSE 2 sec / Rx.	JOB No. TAS-065-D
DIPOLE SPACING 40m	

382240E -280E -320E 382360E -400E -440E 382480E -520E 560E 382600E -640E -680E 382720E

RESISTIVITY Ω m.

N-1 4975 4040 1735 1847 1447 1522 1932 1251 1570 3513 1852 4382 3231

N-2 4342 3596 2050 1266 1387 1168 1448 1485 663 6681 6861 4705 1990 5161 3466

N-3 5409 4089 2306 1886 1922 1820 1747 1346 2925 2635 7181 6559 4697 2538 5152 4659

N-4 3483 4901 2394 2163 3443 2390 1312 3699 2934 2696 6616 5942 2149 5768 5623

CHARGEABILITY

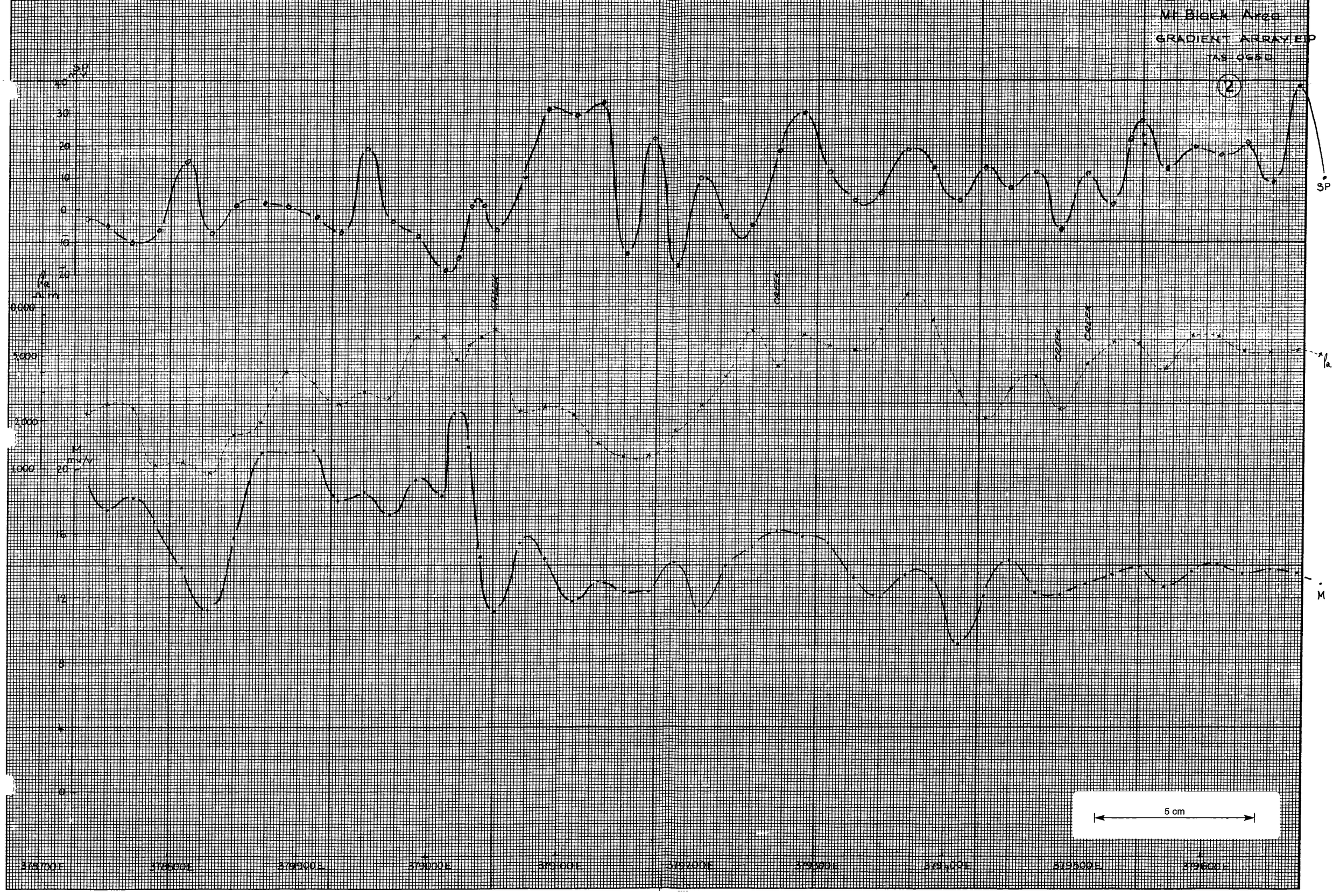
N-1 5.5 24.5 24.0 13.6 14.6 4.2 6.7 5.3 6.2 6.6 7.5 7.1 6.3 5.9

N-2 5.1 19.0 17.2 17.5 17.7 12.9 14.4 7.2 4.3 6.6 6.8 7.5 4.7 5.5

N-3 5.3 15.1 12.4 13.9 13.9 13.5 15.2 5.0 5.6 5.5 6.0 6.2 7.5 6.0 5.0 5.3

N-4 6.5 14.5 9.8 9.7 10.2 13.4 15.6 7.8 5.5 5.8 6.4 5.8 6.3 5.4 6.2

5 cm



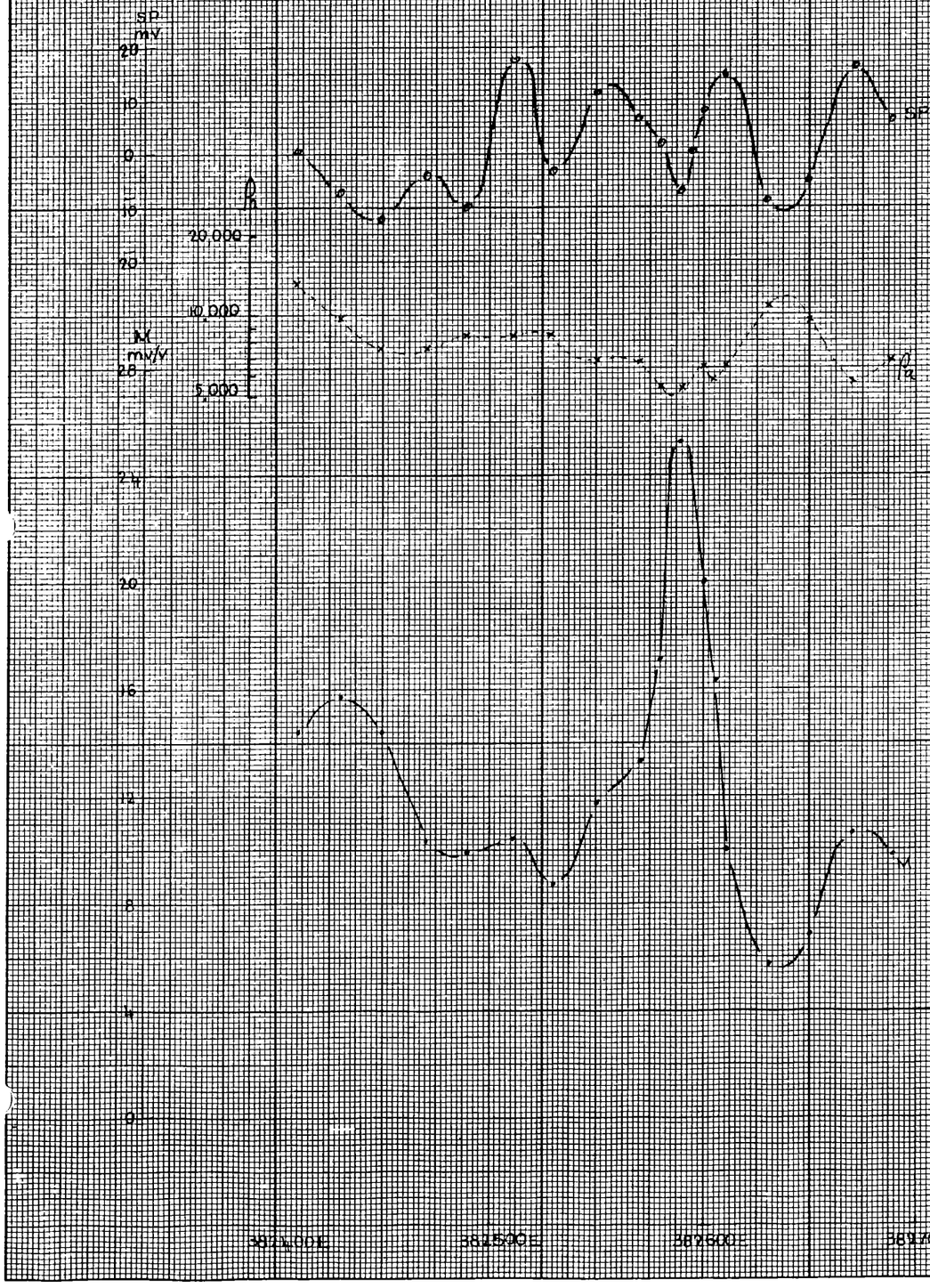
Mt Black Area
GRADIENT ARRAY EIP
TAS-065D
2
SP
mV
40
30
20
10
0
10
20
ρa
Ω m
10,000
5,000
2,000
1,000
M
mV/V
20
16
12
8
4
0
CREEK
CREEK
CREEK
CREEK
SP
ρa
M
5 cm
378700E
378800E
378900E
379000E
379100E
379200E
379300E
379400E
379500E
379600E

Mt Black Area

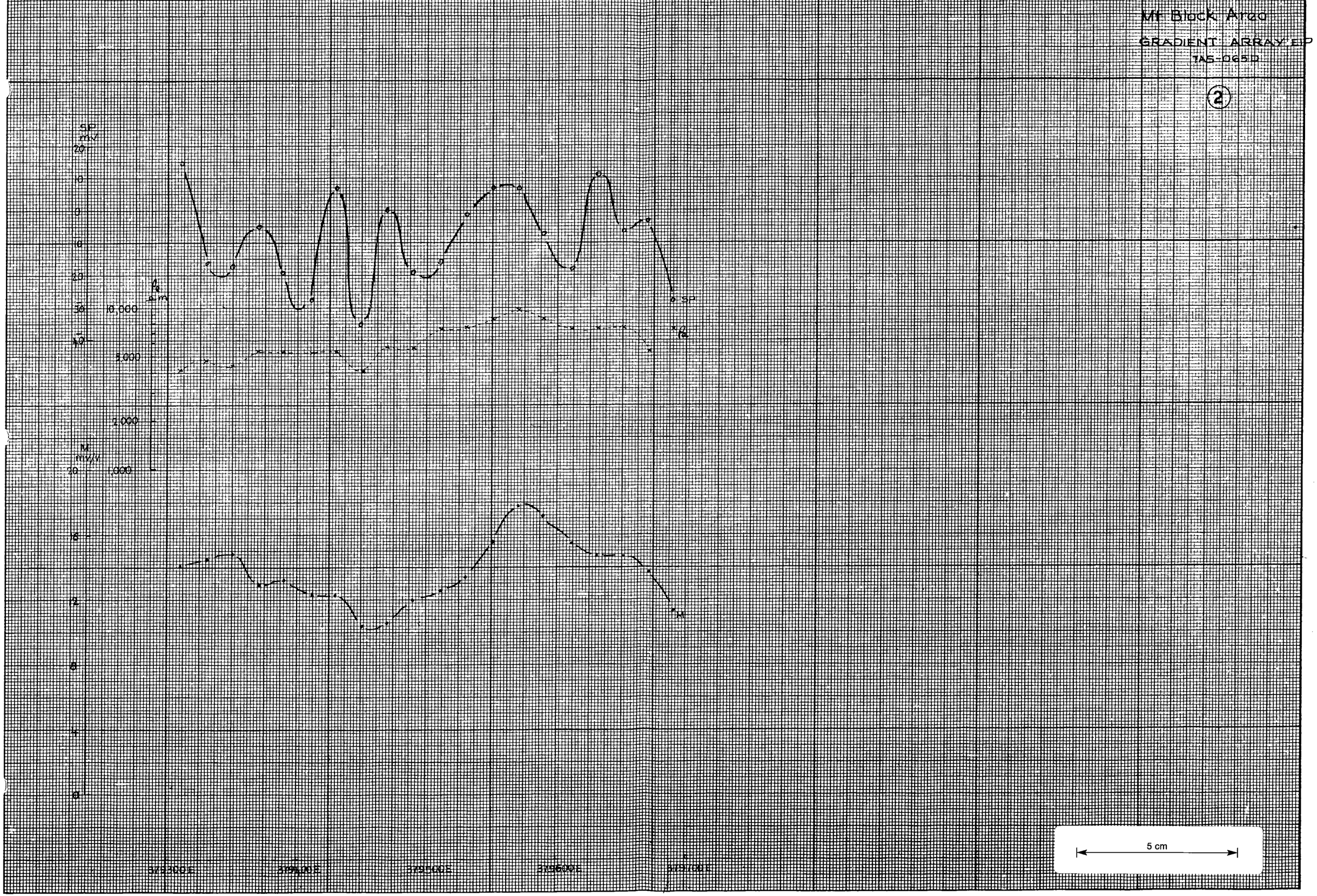
GRADIENT ARRAY E/P

TAS 065-D

6



5 cm



Mt Block Area
GRADIENT ARRAY EIP
7AS-065D
2
SP
mV
20
10
0
10
20
30
40
ρa
Ωm
10,000
5,000
2,000
1,000
M
mV/V
20
16
12
8
4
0
SP
ρa
M
379300E
379400E
379500E
379600E
379700E
5 cm

Mt Black Area
GRADIENT ARRAY EIP
TAS-065 D

6



Mt Block Area

GRADIENT ARRAY E.I.P.

TAS-065-D

(2)



SCINTREX PTY. LTD.

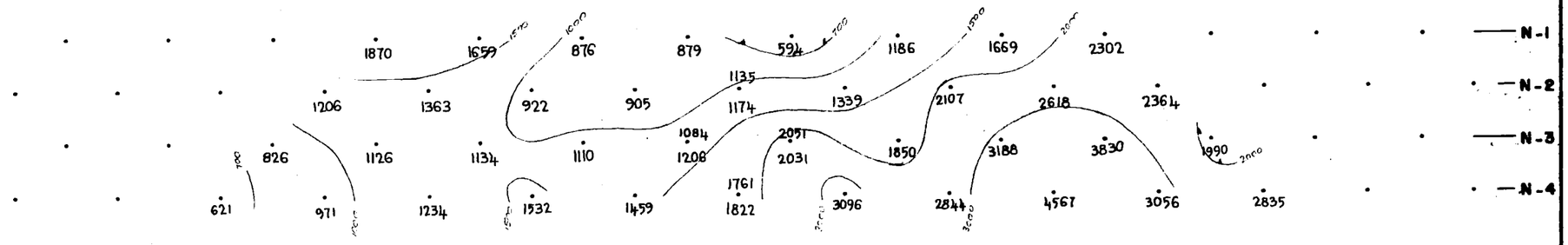
INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

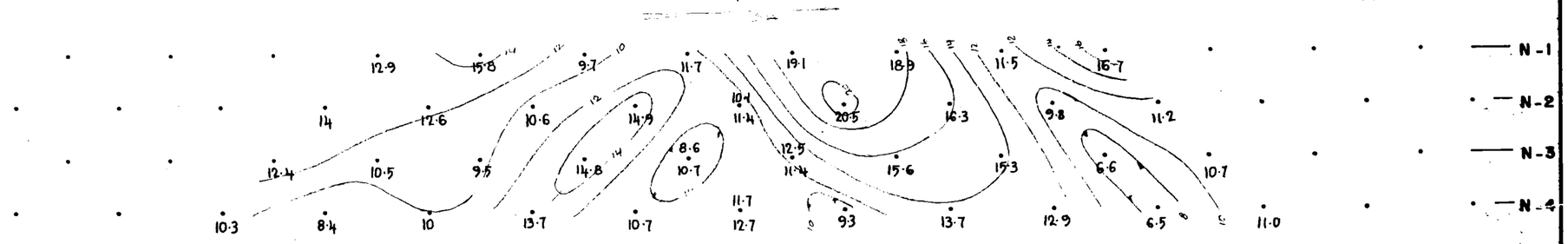
DATE 23·5·79	**LINE No.** 5,377,000 N
PLOTTED BY DJTW	**PROSPECT** MT BLACK (2)
PULSE 2 sec / **Rx.**	**JOB No.** TAS-065-D
DIPOLE SPACING 40 m	

379420E 379460E 379500E 379540E 379580E 379620E 379660E

RESISTIVITY Ω m.



CHARGEABILITY



5 cm

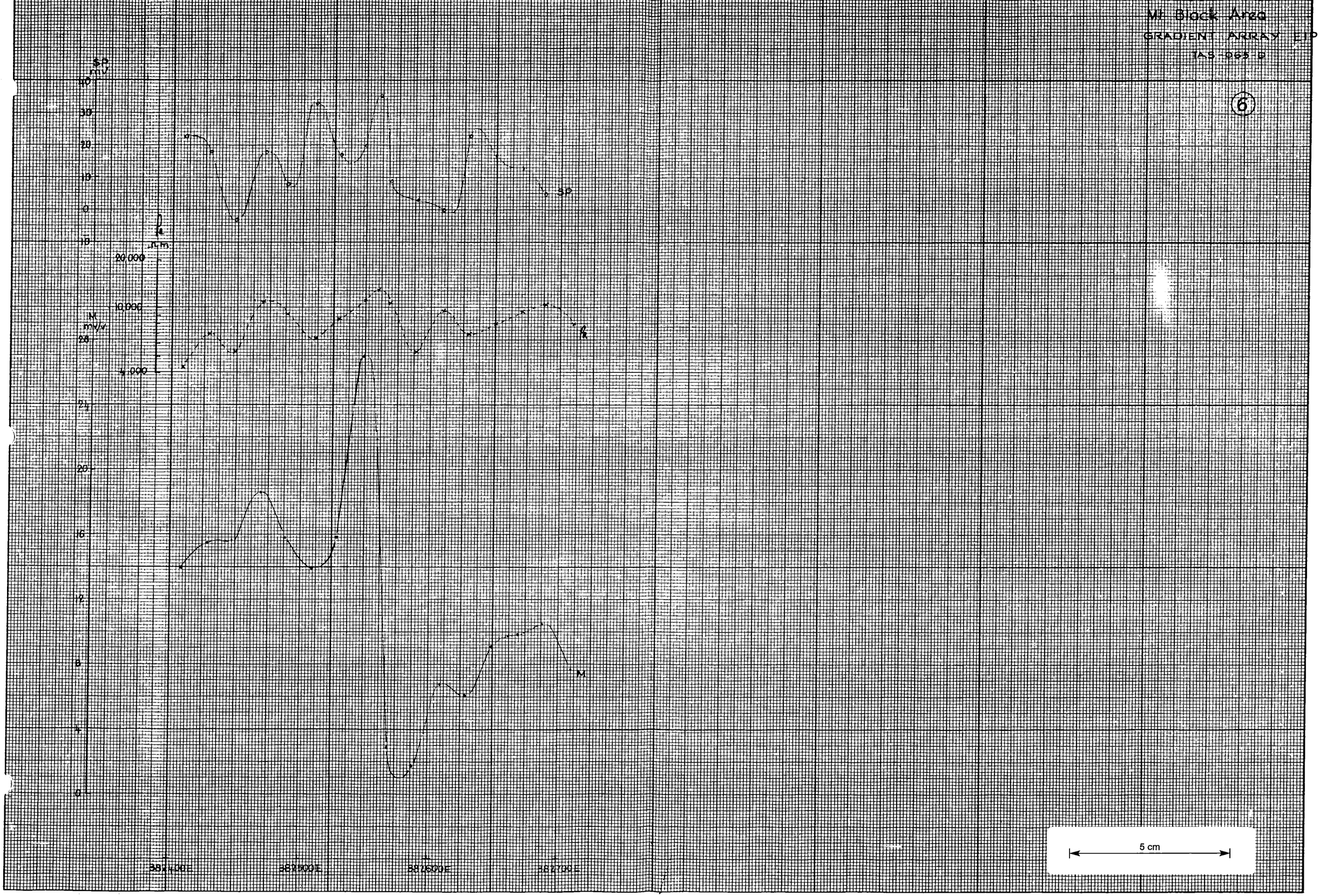
Vt Block Area

GRADIENT ARRAY E.I.P.

TAS-068-D

4





Mt Black Area
GRADIENT ARRAY EIP
TAS-065-D
6
SP
mV
40
30
20
10
0
10
ρ_a
Ωm
20,000
10,000
4,000
M
mV/V
28
24
20
16
12
8
4
0
SP
ρ_a
M
382400E
382500E
382600E
382700E
5 cm

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 25-5-1979	LINE No. 5,377,000 N
PLOTTED BY D.J.T.W	PROSPECT MT. SALE (6)
PULSE 2 Sec / Rx.	JOB No. TAS-065-D
DIPOLE SPACING 40 m	

382360E -400E 382440E -480E -520E 382560E -600E -640E 382680E -720E -760E

RESISTIVITY Ω m.

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

CHARGEABILITY

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

5 cm

Mt Black Area

GRADIENT ARRAY EIP

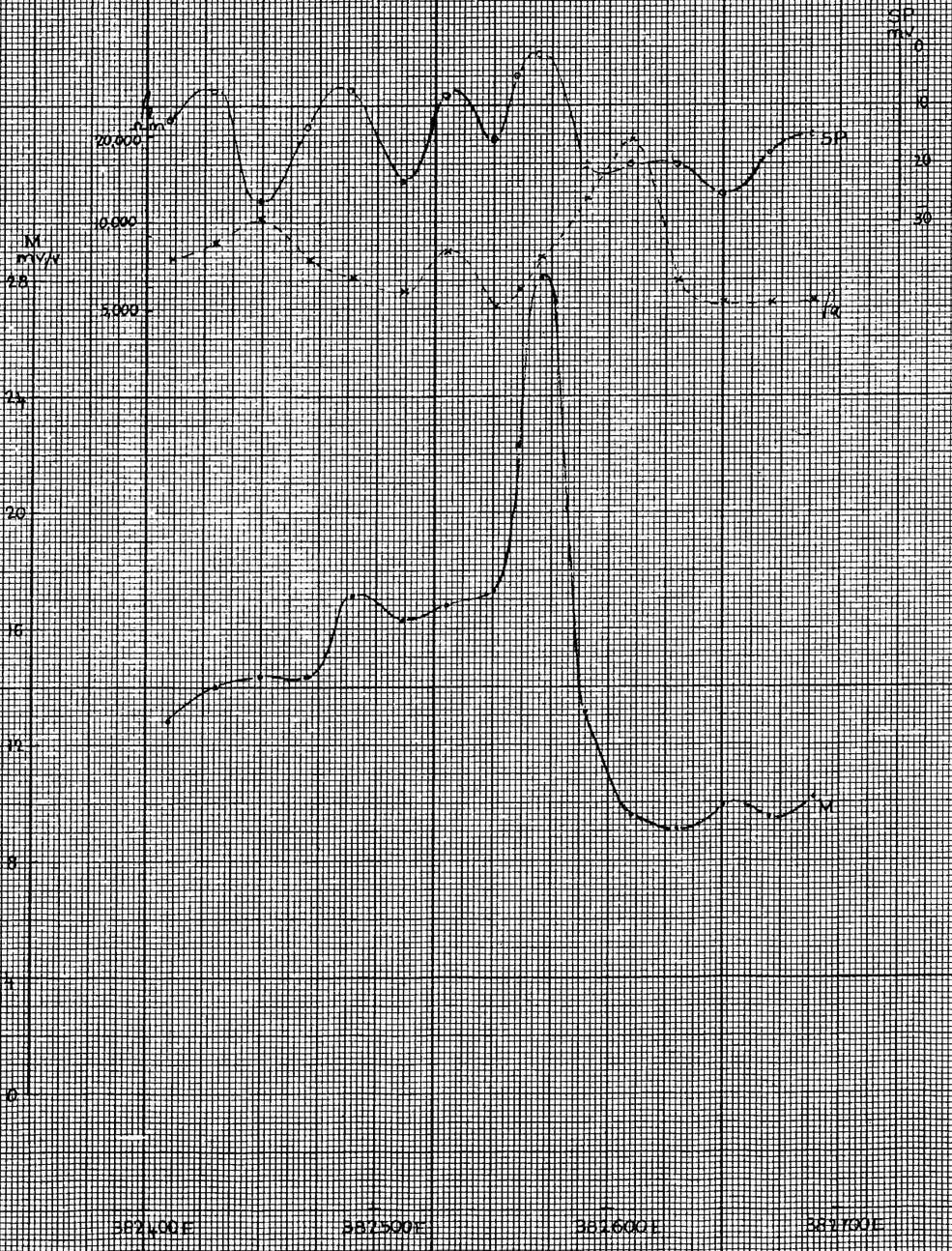
TAS-065-D

2



Mt Block Area
GRADIENT ARRAY
E1P
TAS-065-D

(6)



5 cm

Mt Bleck Area
GRADIENT ARRAY EIP
TAS-065-D
6

SP
mV
30
20
10
0
10
20
30

ρ_a
Ω.m
20,000
10,000
5,000
2,000
1,000

SP

ρ_a

M
mV/V
16
12
8
4
0

M

5 cm

382400E
382500E
382600E
382700E



Mt Block Area
GRADIENT ARRAY
EIP
TAB-062-□
5
SP
mV
50
40
30
20
10
0
10
20
30
40
ρa
Ωm
10,000
5,000
2,000
CREEK
M
mV/V
16
12
8
4
0
381200E
381300E
381400E
381500E
381600E
5 cm

Mt Block Area
GRADIENT ARRAY
EIP
TAS-085-D

(5)



LINE 376900N

Mt Black Area

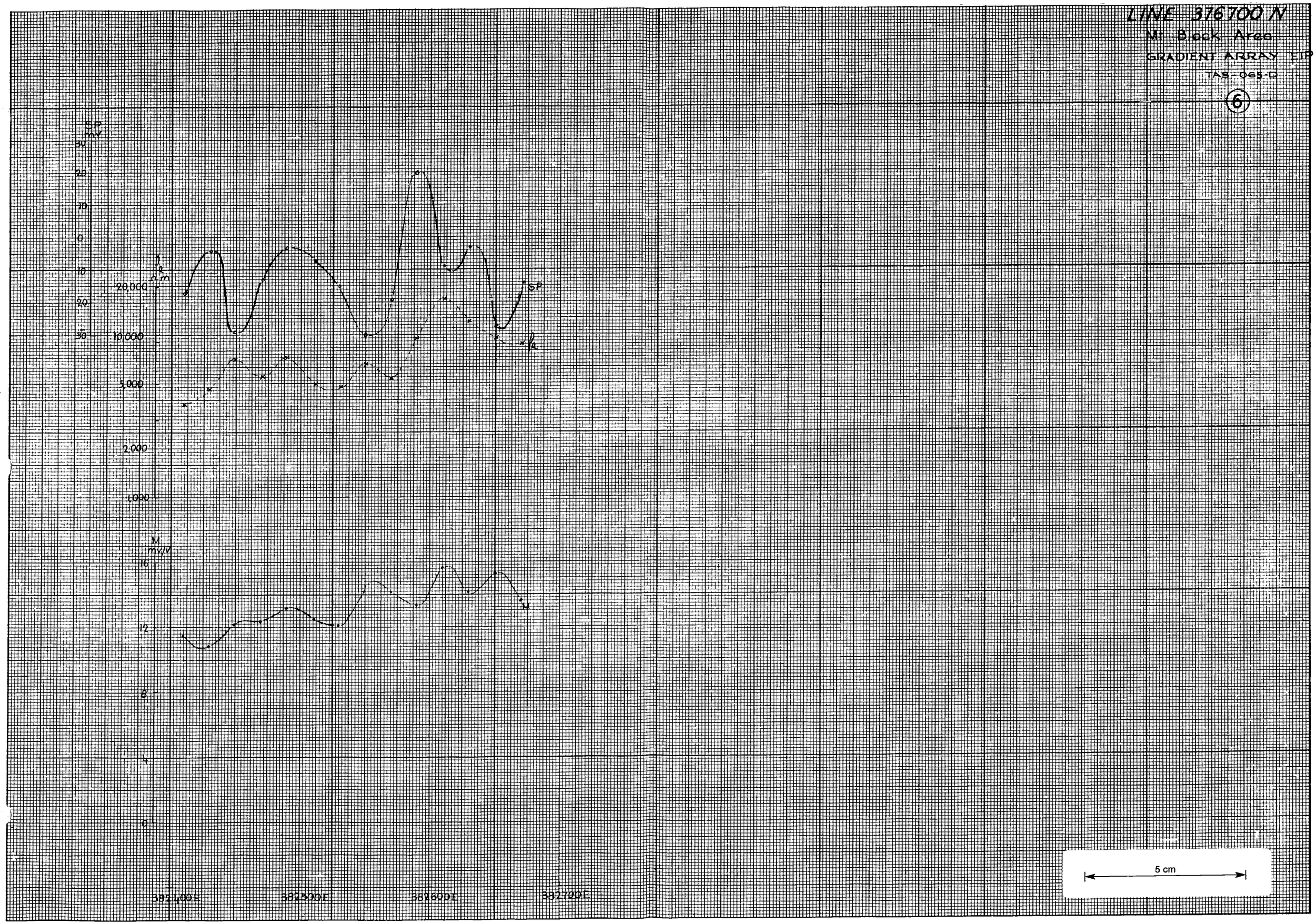
GRADIENT ARRAY

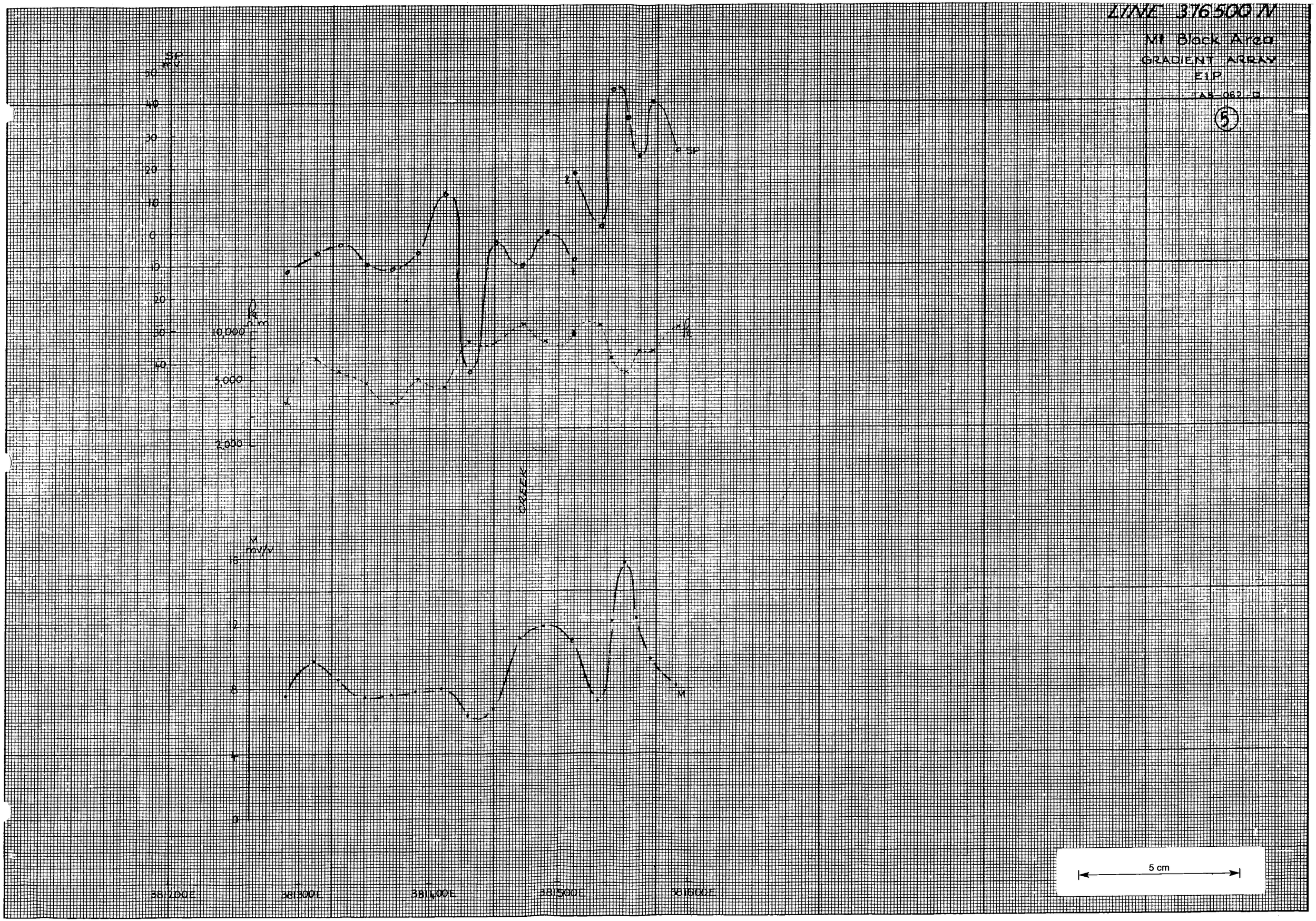
E.I.P.

TAS-065-D

(6)




LINE 376700 N
Mt Block Area
GRADIENT ARRAY EIP
TAS-065-D
6
SP
mv
30
20
10
0
10
20
30
20,000
10,000
5,000
2,000
1,000
SP
M
mv/V
16
12
8
4
0
382400E
382500E
382600E
382700E
5 cm


LINE 376500 N
Mt Block Area
GRADIENT ARRAY
EIP
TAS-062-□
5
SP
mV
50
40
30
20
10
0
10
20
30
40
ρ_a
10,000
5,000
2,000
CREEK
M
mV/V
16
12
8
4
0
381200E
381300E
381400E
381500E
381600E
5 cm

LINE 376300 N

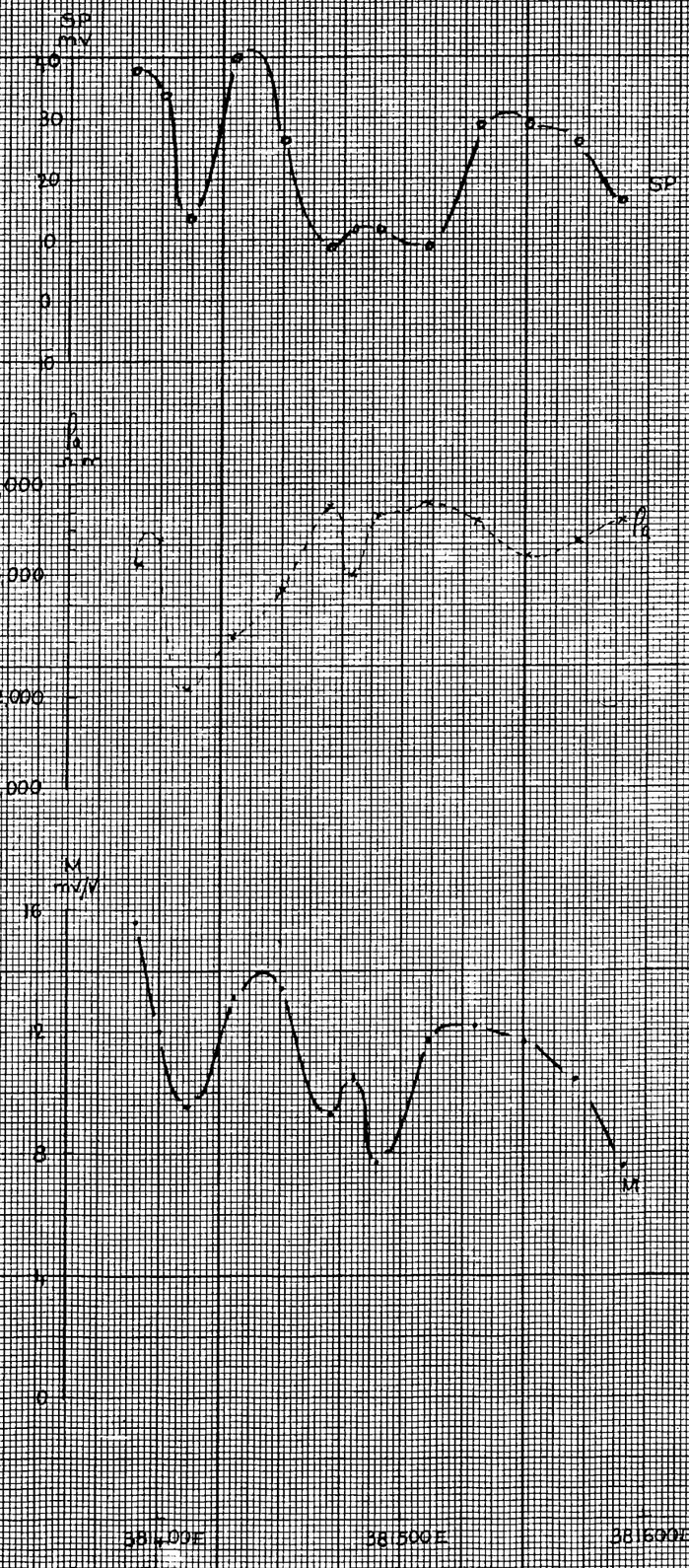
Mt Block Area

GRADIENT ARRAY

EIP

TAS-065-D

5



5 cm

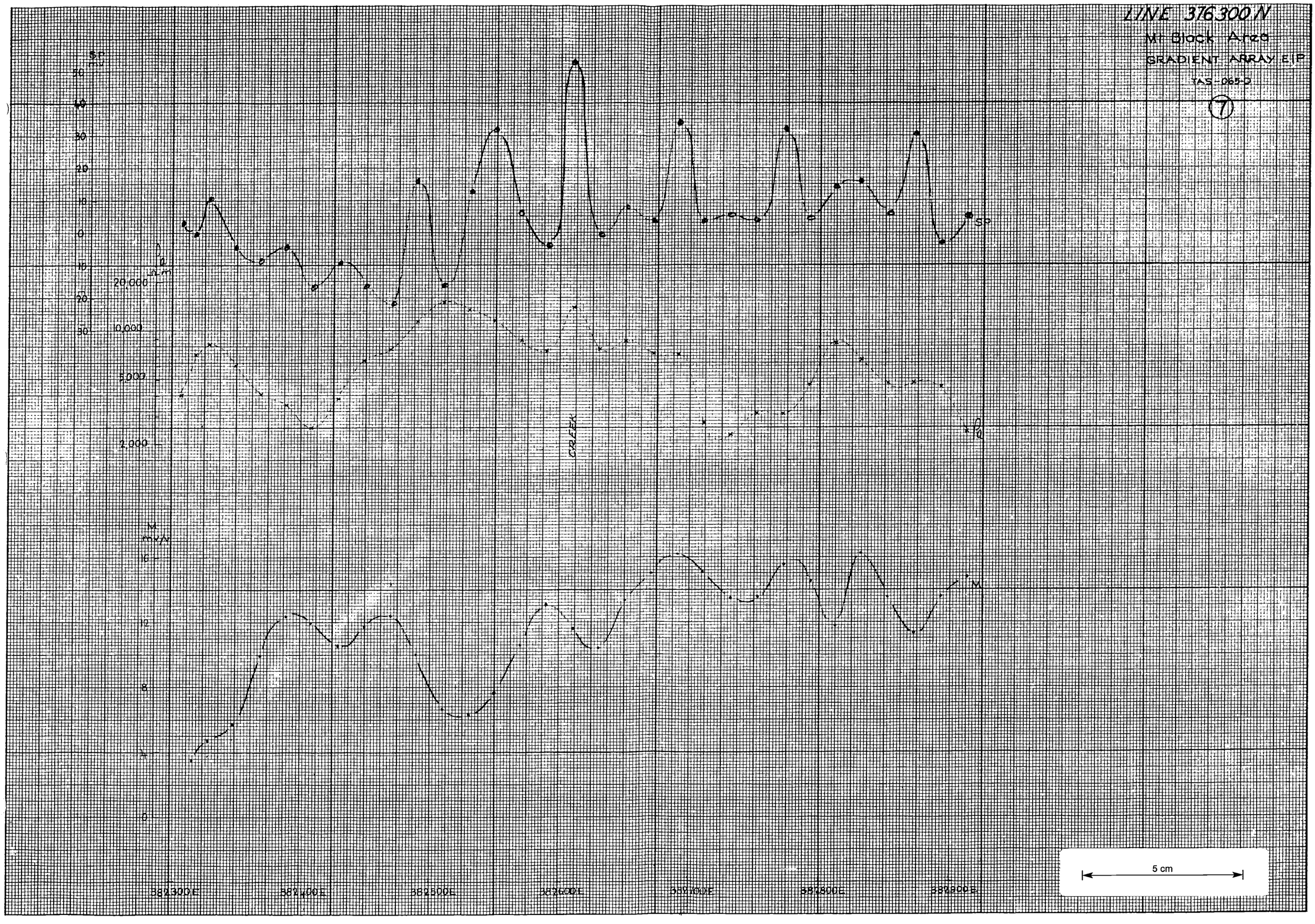
LINE 376300 N

Mt Black Area

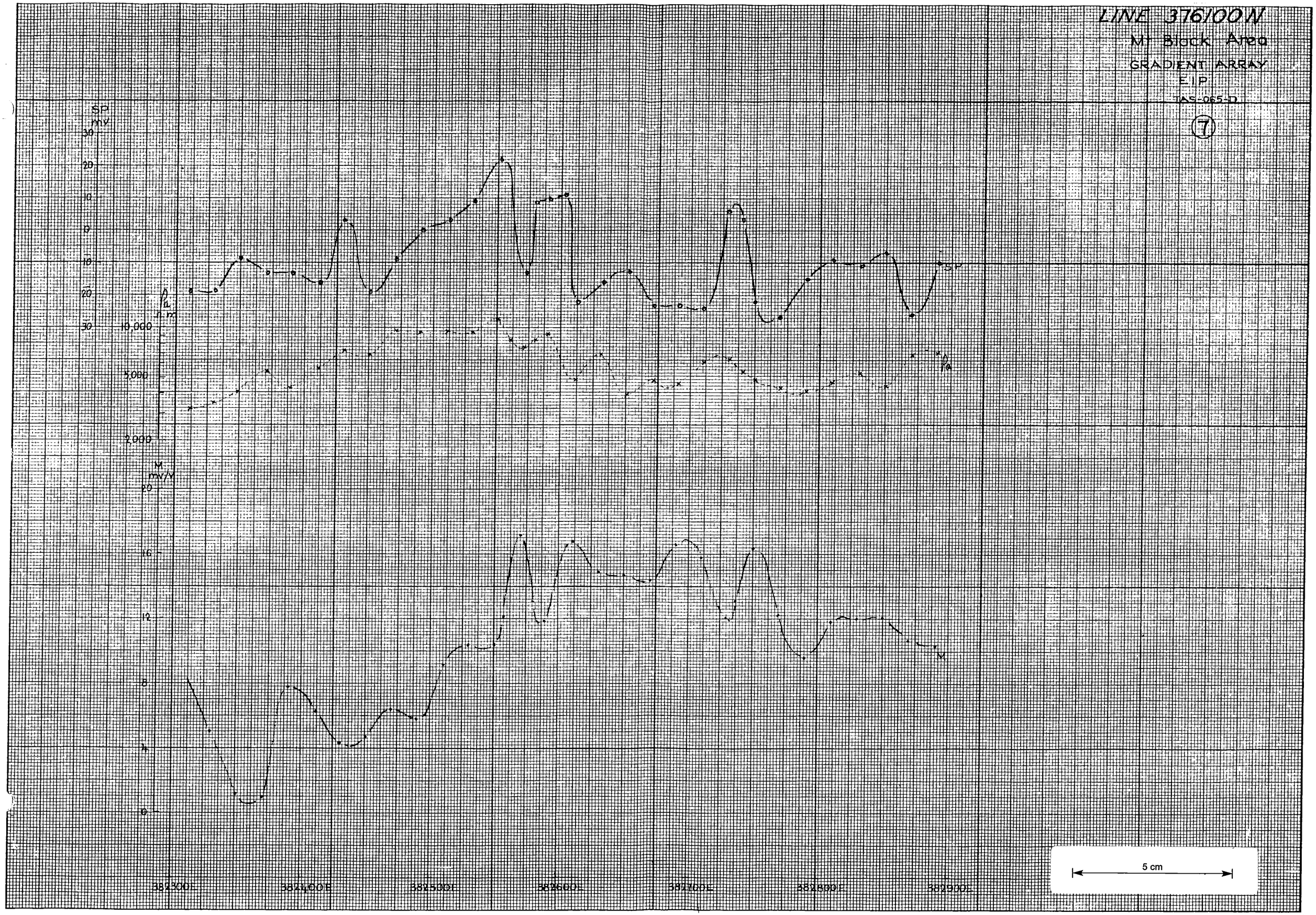
GRADIENT ARRAY E(P

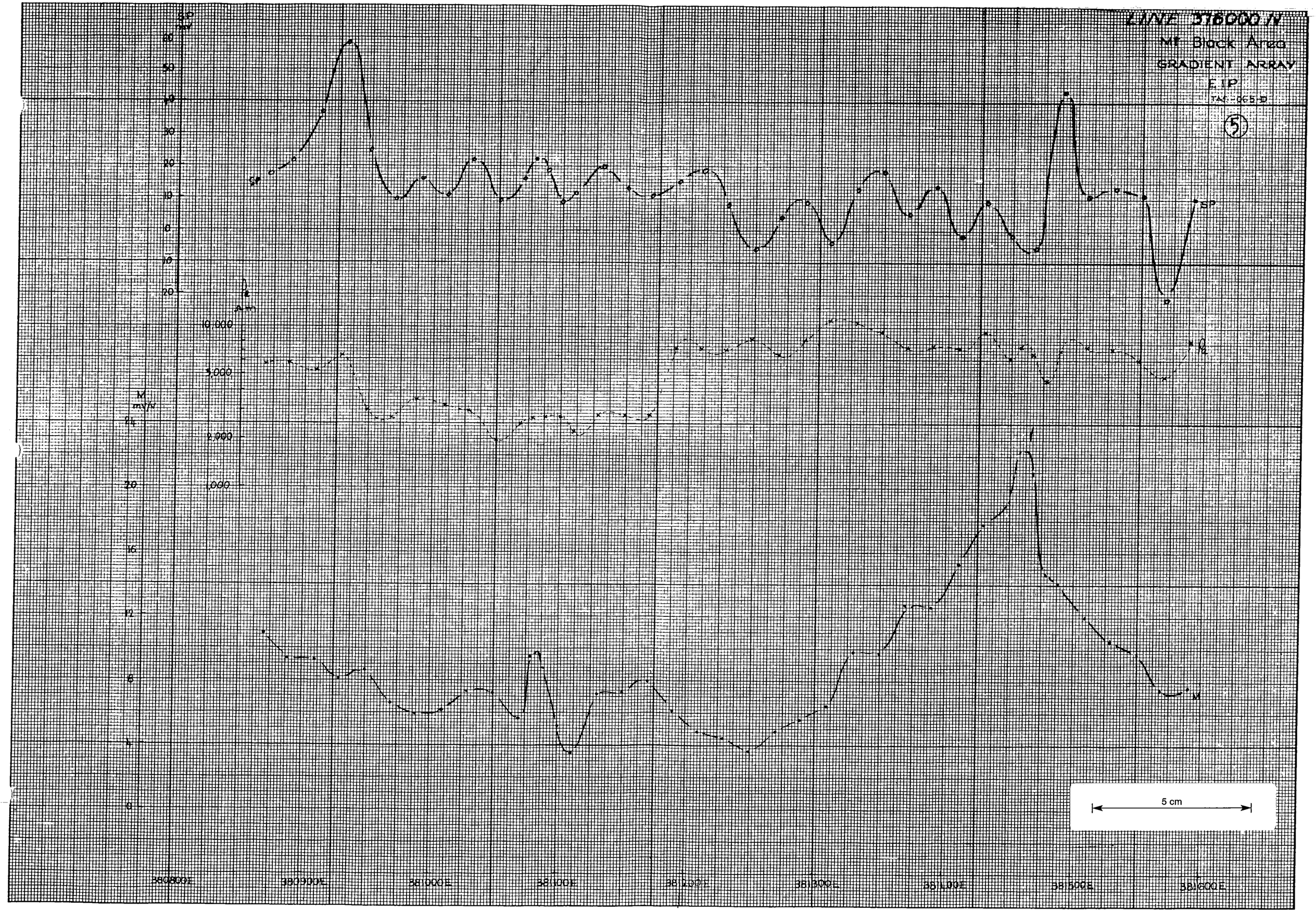
TAS-065-D

(7)




LINE 376100N
Mt Block Area
GRADIENT ARRAY
EIP
TAS-065-D
5
SP
mv
30
20
10
0
10
20
30
40
ρ_a
Ωm
10,000
5,000
2,000
1000
M
mv/V
16
12
8
4
0
SP
ρ_a
M
5 cm
380800E
380900E
381000E
381100E
381200E
381300E
381400E
381500E
381600E


LINE 376100N
Mt Block Area
GRADIENT ARRAY
EIP
TAS-065-D
7
SP
mv
30
20
10
0
10
20
30
ρa
Ωm
10,000
5,000
2,000
M
mv/V
20
16
12
8
4
0
SP
ρa
M
382300E
382400E
382500E
382600E
382700E
382800E
382900E
5 cm

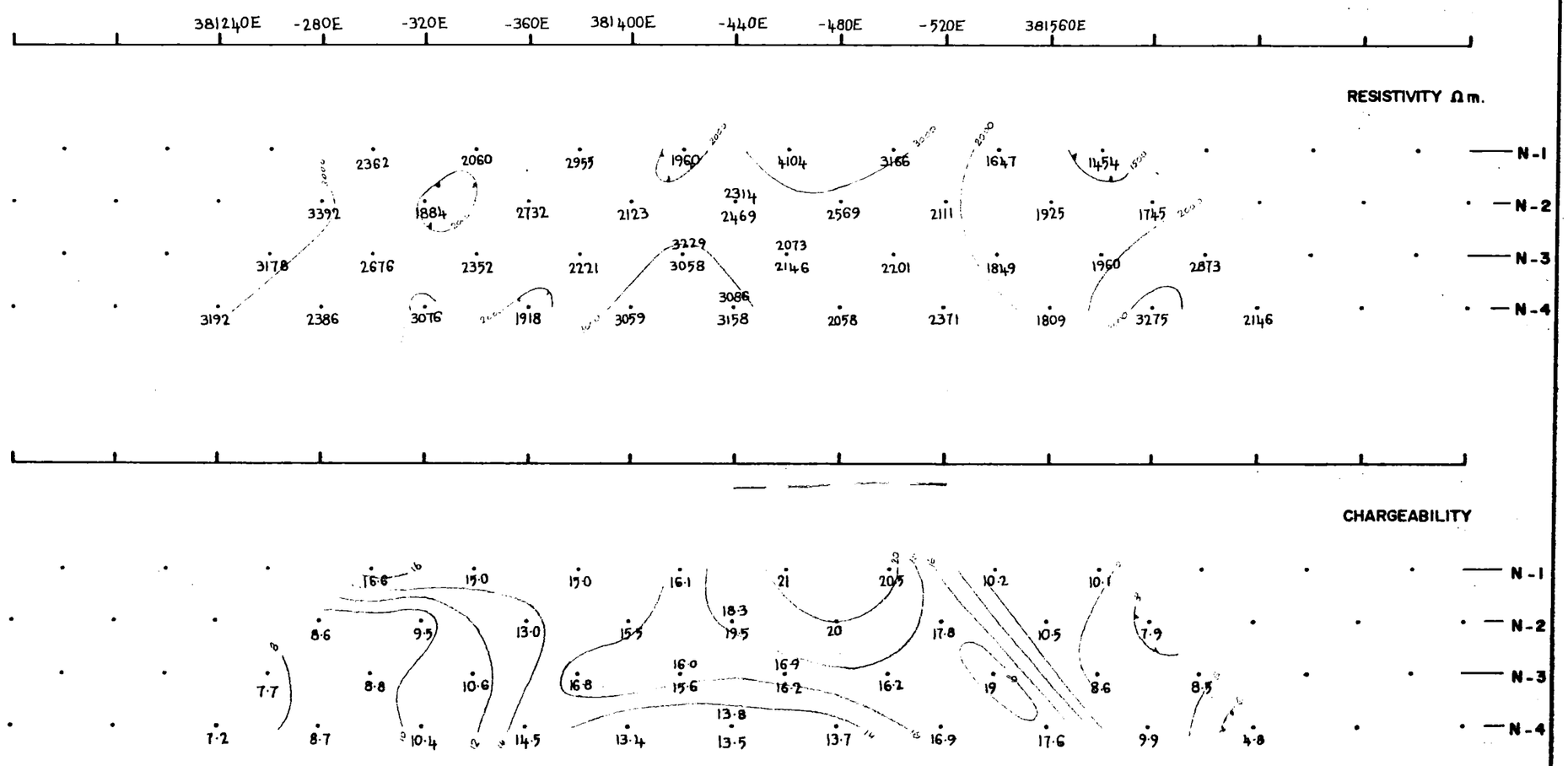

LINE 376000 N
Mt Black Area
GRADIENT ARRAY
E.I.P.
TAS-065-D
5
SP mV
60
50
40
30
20
10
0
10
20
SP
ρa Ωm
10,000
5,000
2,000
1,000
M mV/V
ρa
20
16
12
8
4
0
M
380800E
380900E
381000E
381100E
381200E
381300E
381400E
381500E
381600E
5 cm

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 21-5-79	LINE No. 5376000 N
PLOTTED BY DJTW	PROSPECT MT. BLACK (5)
PULSE 2 Sec | Rx.	JOB No. TAS-065-D
DIPOLE SPACING 40 m	



LINE 376000 N

MF Block Area

GRADIENT ARRAY

E I P

TAS-065-D

(7)

SP
mv
20
10
0
10
20
30
40

ρa
ohm
20,000
10,000
5,000
2,000
1,000

M
mv/v
20
16
12
8
4
0

SP

ρa

M

5 cm

3821300E
3821400E
3821500E
3821600E
3821700E
3821800E
3821900E

Mt Block Area
GRADIENT ARRAY
E I P
TAS-065-D
5

SP
mv
20
10
0
10
20
30
40

ρa
Ω-m
20,000
10,000
5,000
2,000
1,000

M
mv/v
20
16
12
8
4
0

SP

5 cm

380900E
381000E
381100E
381200E
381300E
381400E
381500E
381600E

Mt Black Area
GRADIENT ARRAY
E I P
TAS-065-D
(7)

40
30
20
10
0
10
20
30

ρ_R Ωm
20,000
10,000
5,000
2,000

SP

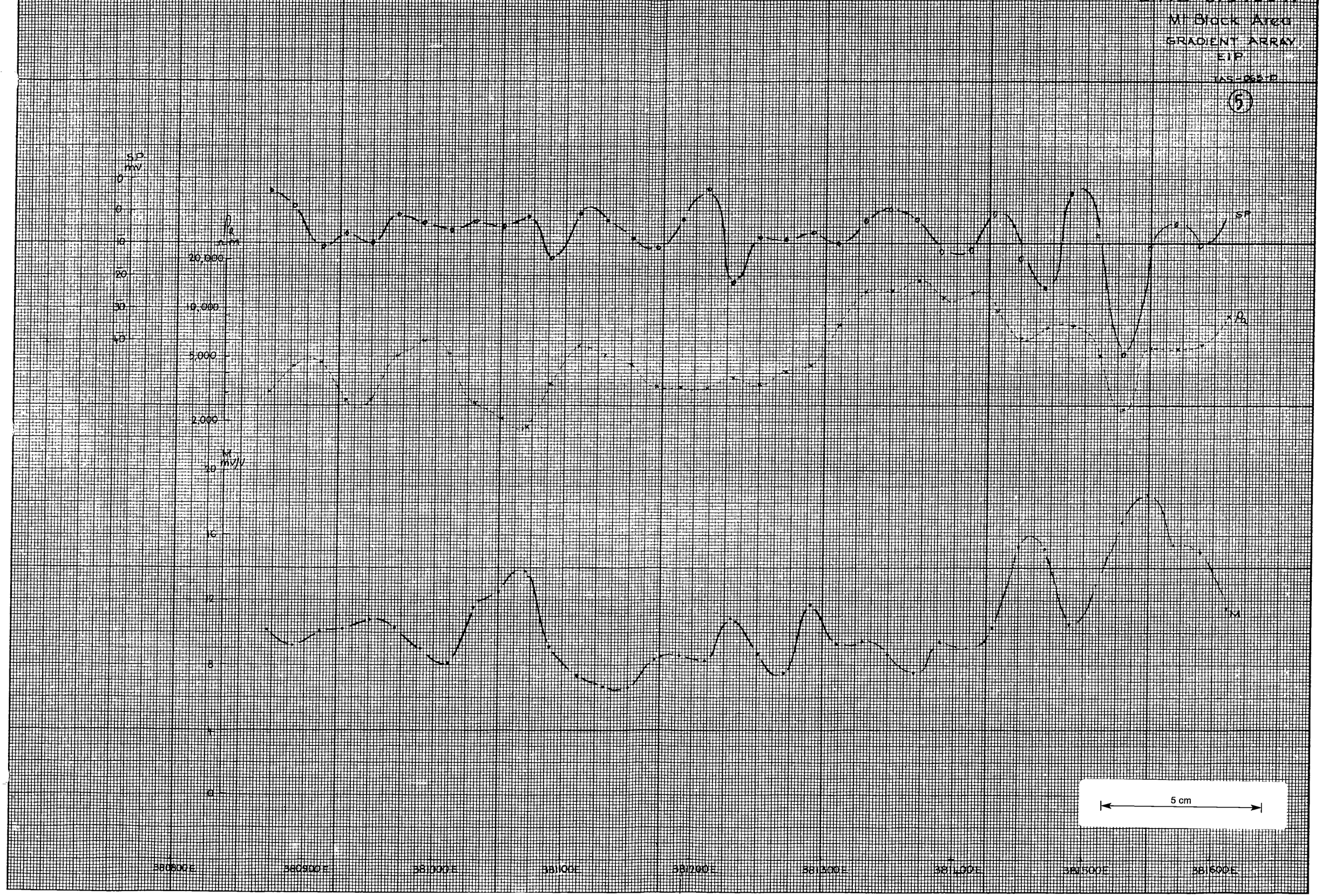
M
mv/v
16
12
8
4
0

ρ_a

M

382300E
382400E
382500E
382600E
382700E
382800E
382900E

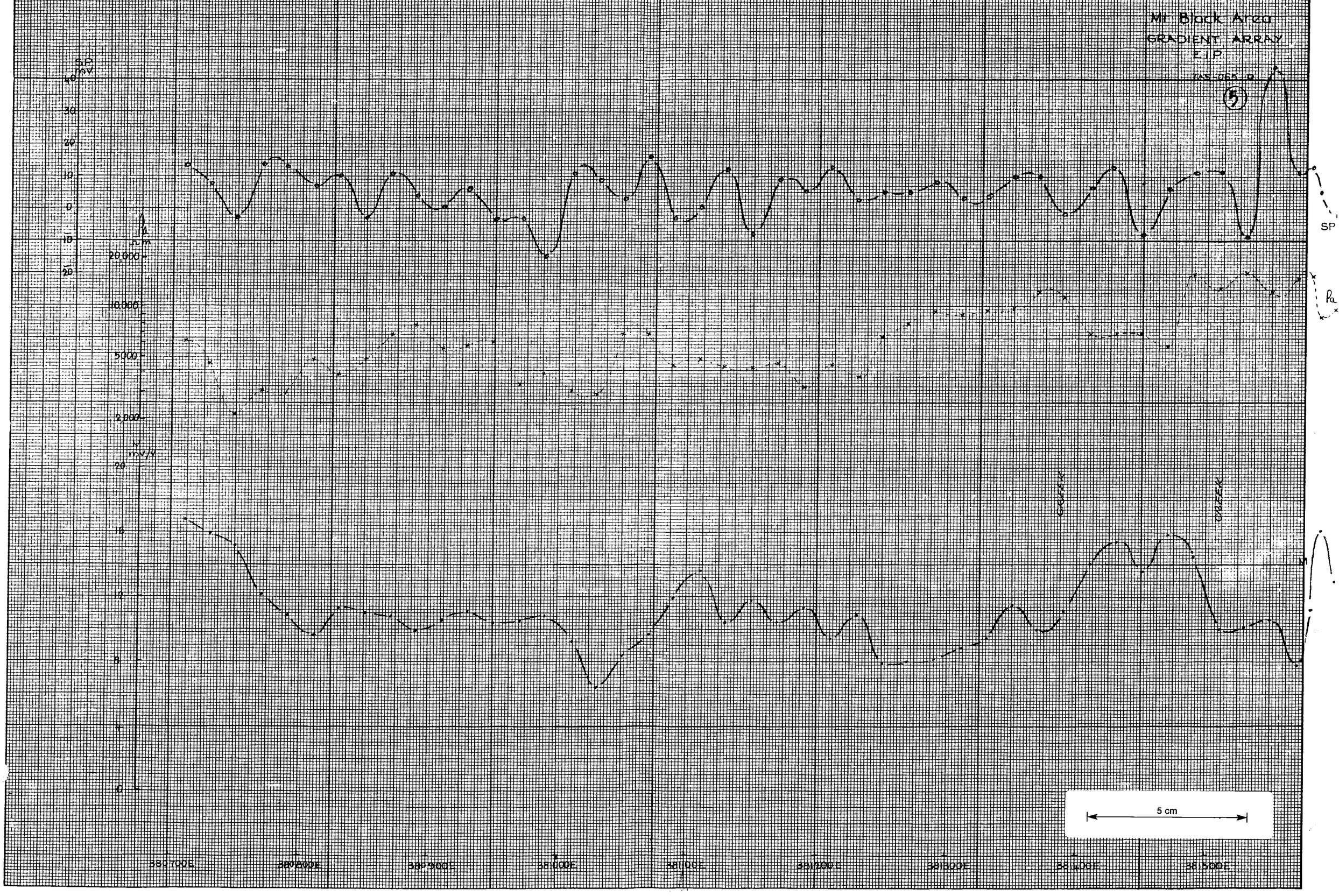
5 cm



Mt Black Area
GRADIENT ARRAY
EIP
IAS-065-D
5
S.P. mV
0
10
20
30
40
ρ_a Ωm
20,000
10,000
5,000
2,000
M mV/V
20
16
12
8
4
0
SP
ρ_a
M
380800E
380900E
381000E
381100E
381200E
381300E
381400E
381500E
381600E
5 cm



Mt Block Area
GRADIENT ARRAY
E.I.P
TAS-065-D
7
SP
mV
30
20
10
0
10
20
30
ρa
Ω m
20,000
10,000
5000
2,000
M
mV/V
16
12
8
4
0
CREEK
SP
ρa
M
382300E
382400E
382500E
382600E
382700E
382800E
382900E
5 cm



Mt Black Area
GRADIENT ARRAY
E.I.P.
TAS-065-D
5
SP mV
40
30
20
10
0
10
20
Ω m
20,000
10,000
5000
2,000
V mV/V
20
16
12
8
4
0
CREEK
CREEK
SP
Pa
M
5 cm
380700E
380800E
380900E
381000E
381100E
381200E
381300E
381400E
381500E

Mt Black Area
GRADIENT ARRAY EIP
TAS-065-D

8



Mt Block Area
GRADIENT ARRAY E/P
TAS-065-D

8



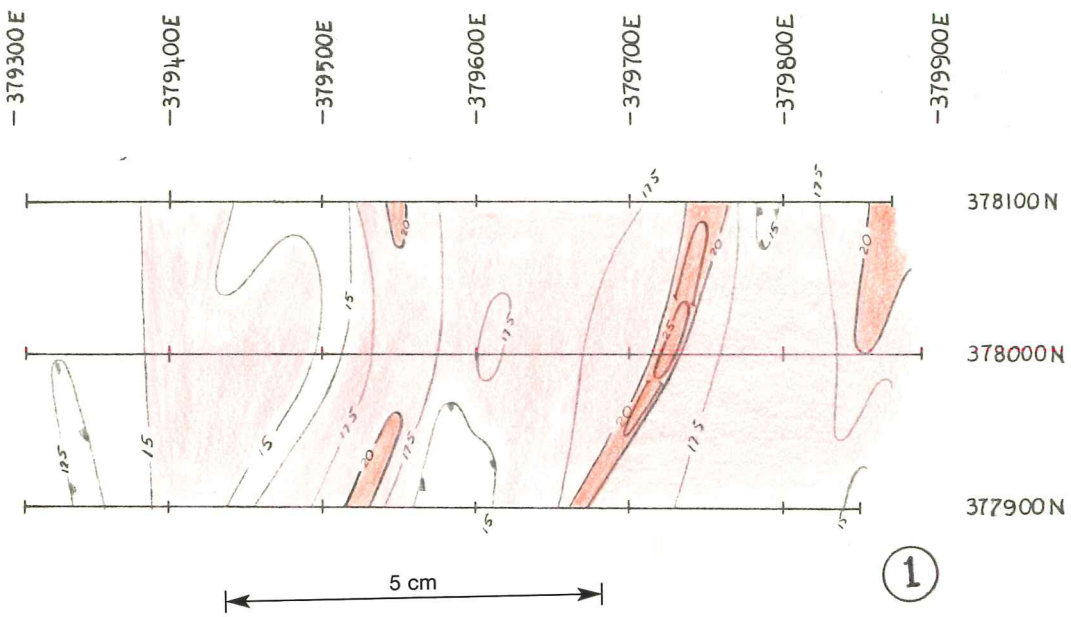
Mt Black Area

GRADIENT ARRAY EIP

TAS-065-D

8





1

ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

EIP DETAIL

CHARGEABILITY CONTOUR PLAN

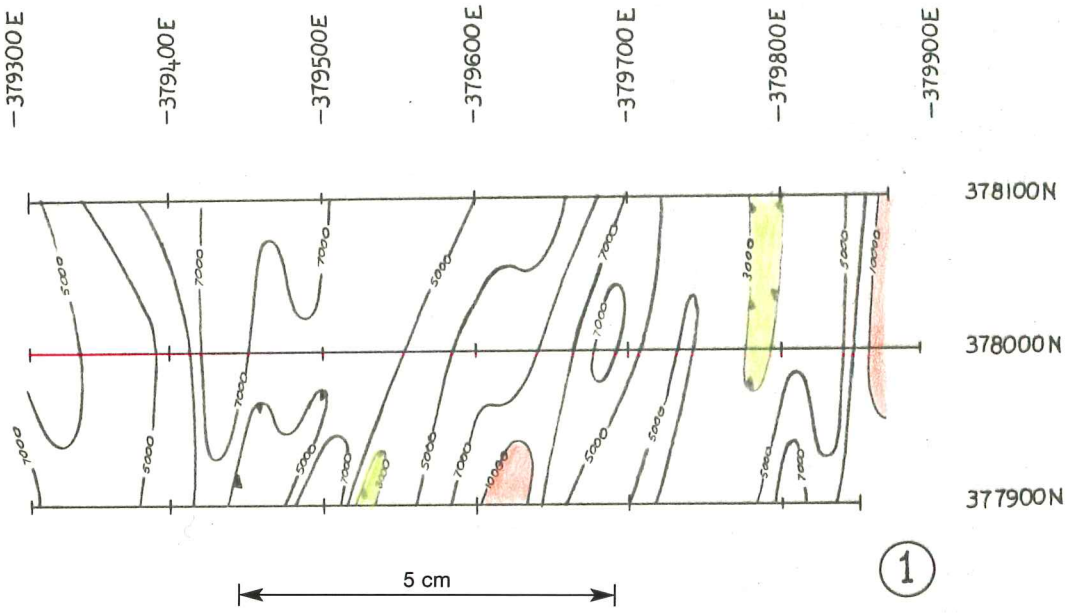
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job N° TAS-065-D



ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

E.I.P. DETAIL

RESISTIVITY CONTOUR PLAN

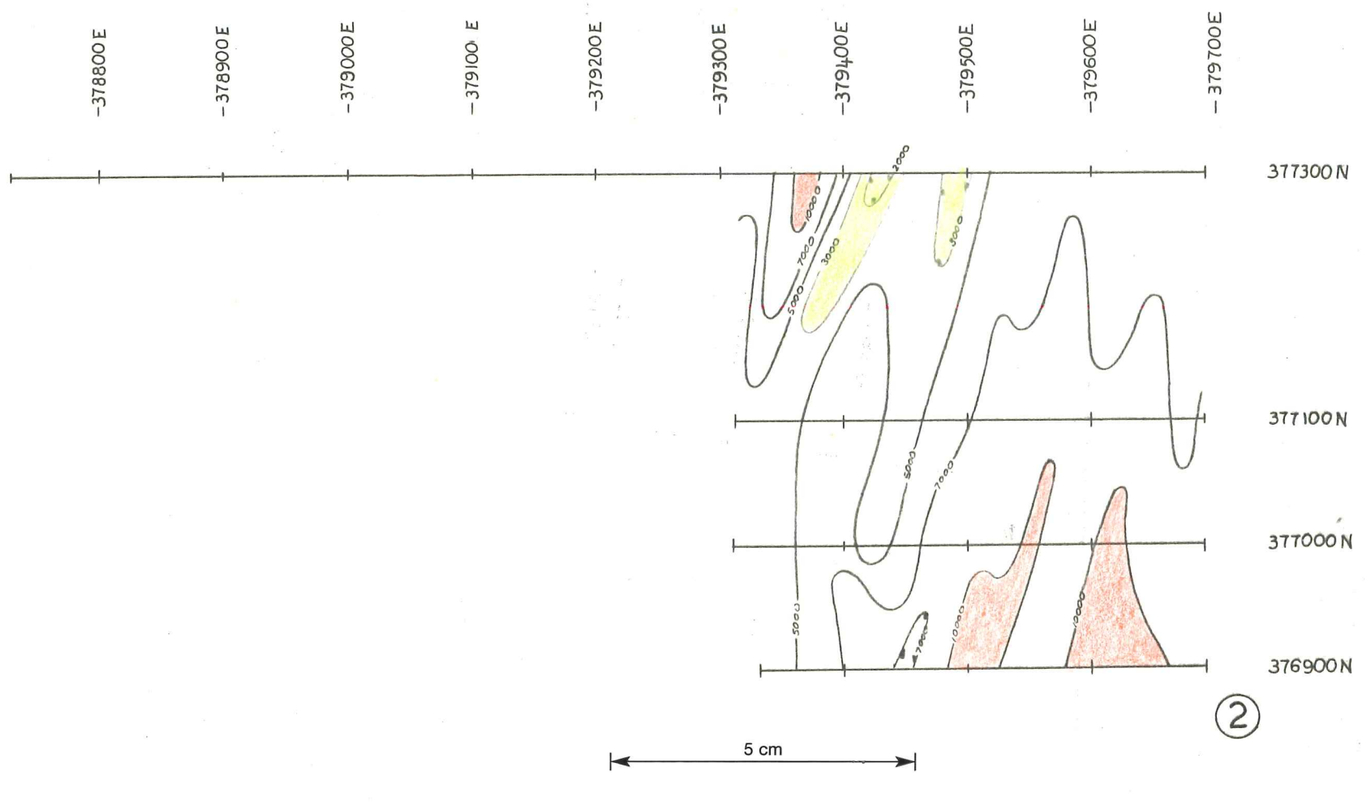
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job Nº TAS-065-D



ELECTROLYTIC ZINC CO. OF ASIA LTD

MT. BLACK

E.I.P. DETAIL

RESISTIVITY CONTOUR PLAN

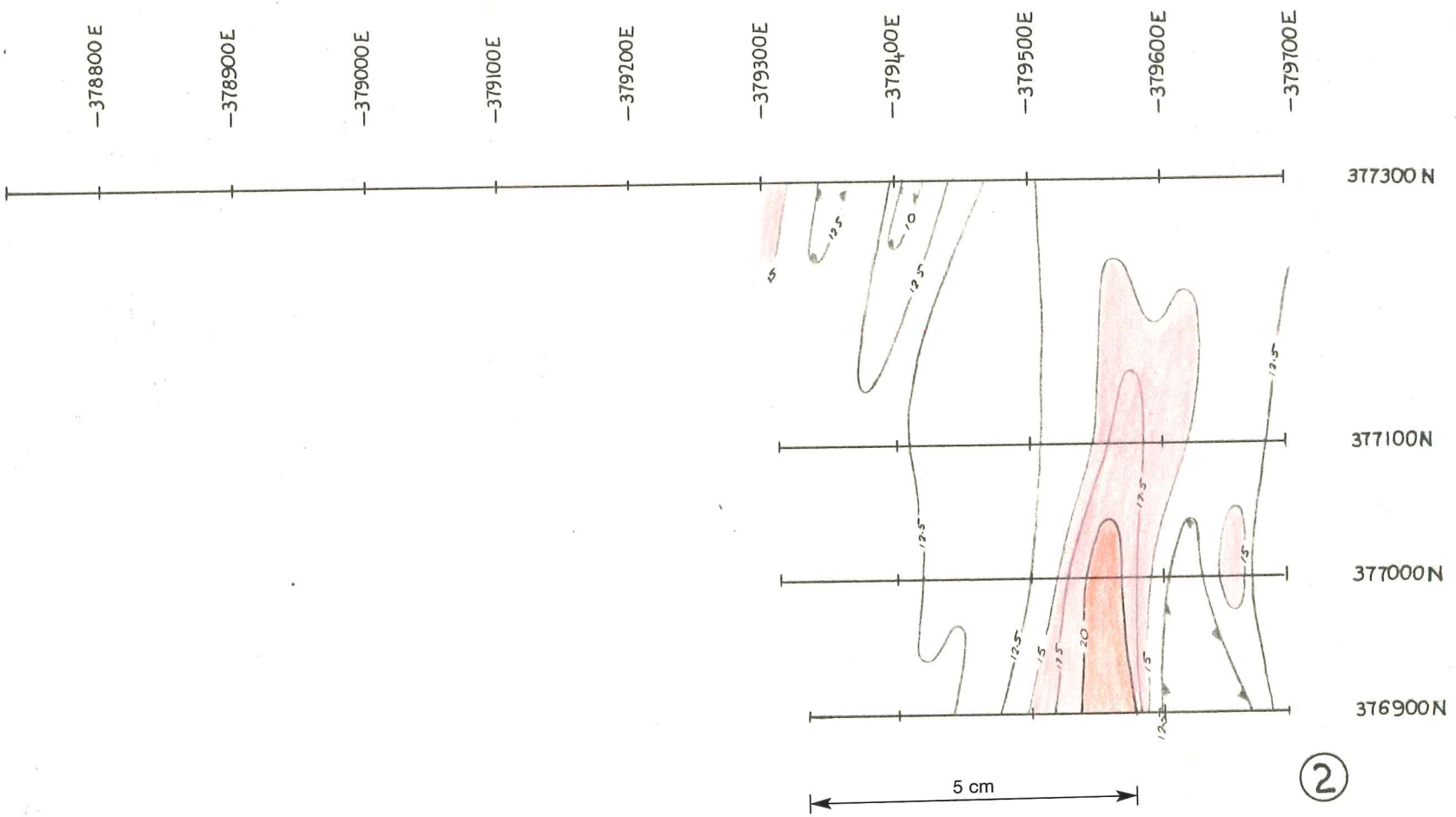
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job Nº TAS-065-D



ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

EIP DETAIL

CHARGEABILITY CONTOUR PLAN

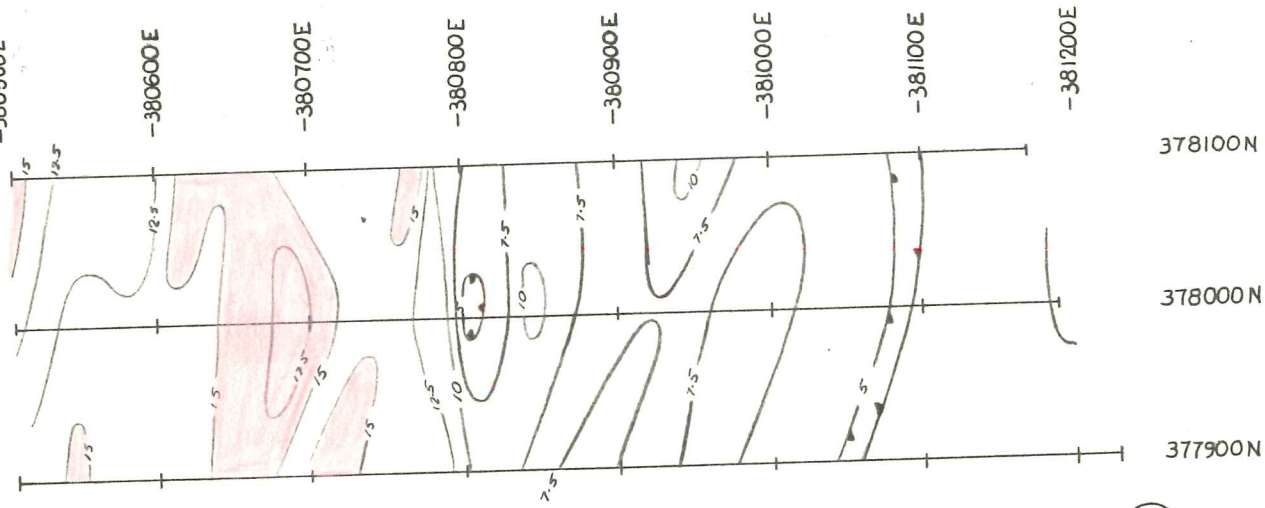
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job N° TAS-065-D



3

ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

EIP DETAIL

CHARGEABILITY CONTOUR PLAN

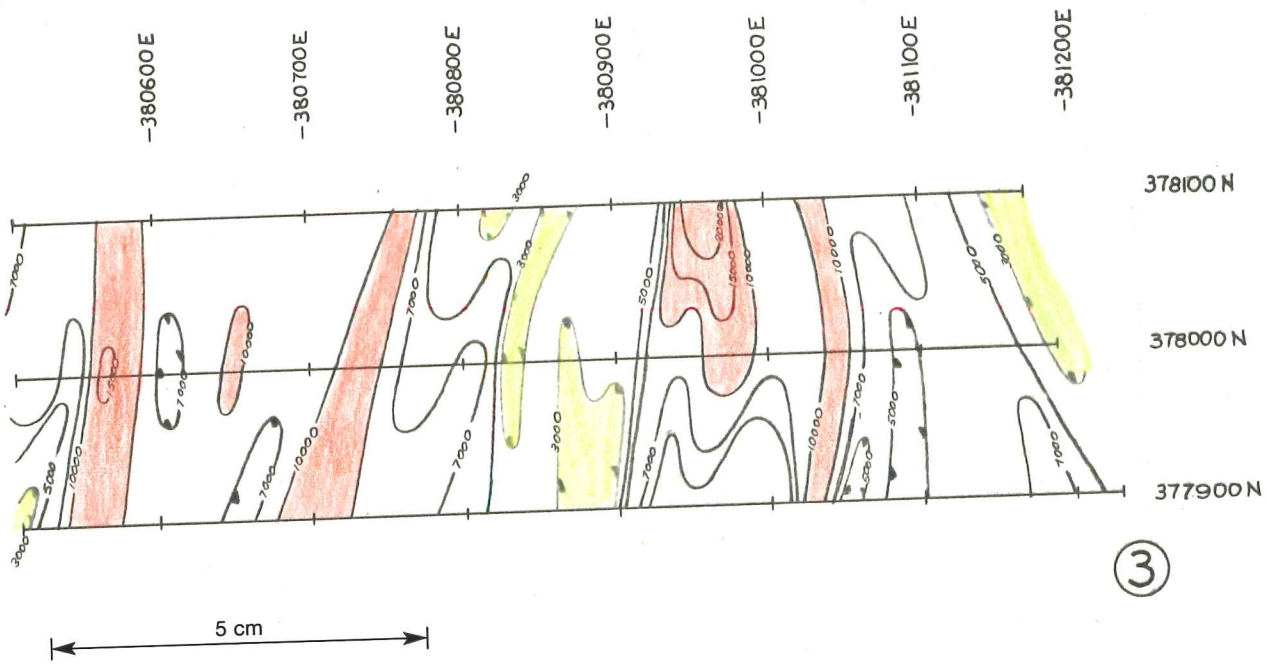
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job Nº TAS-065-D



ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

E.I.P. DETAIL

RESISTIVITY CONTOUR PLAN

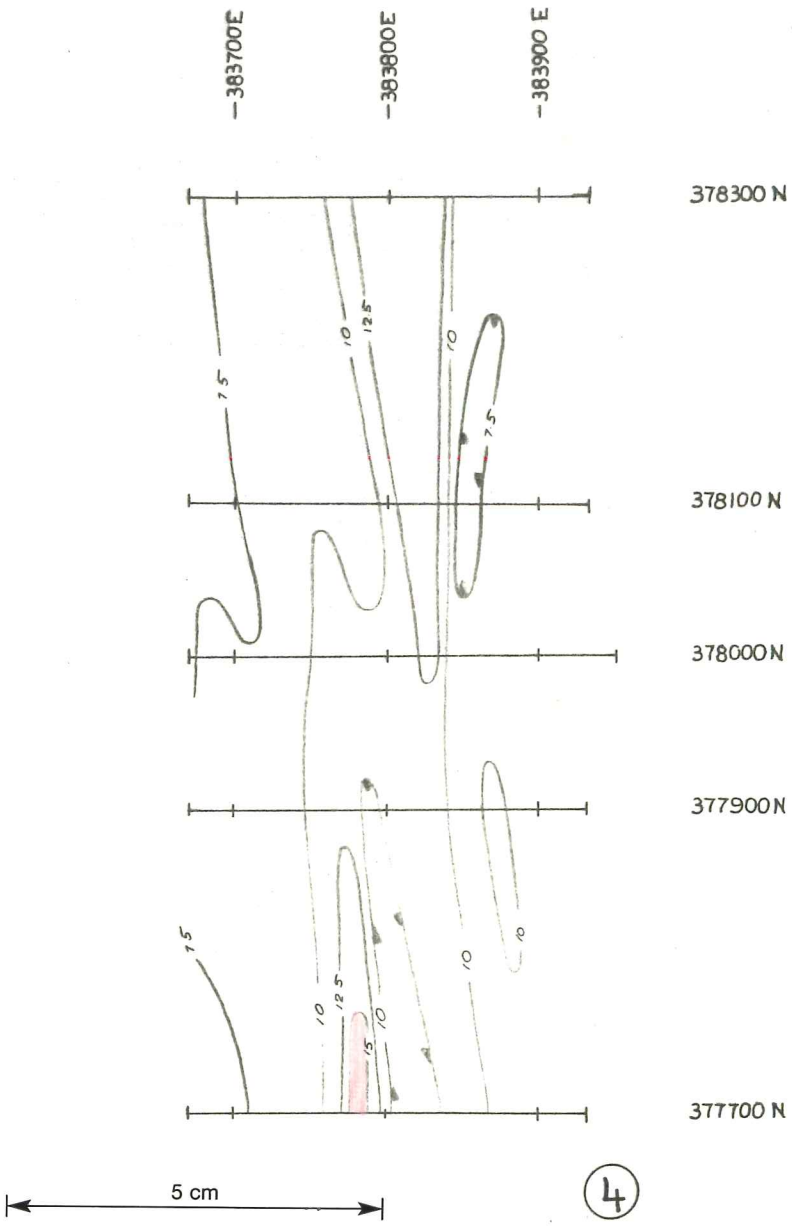
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job No. TAS-065-D



ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

EIP DETAIL

CHARGEABILITY CONTOUR PLAN

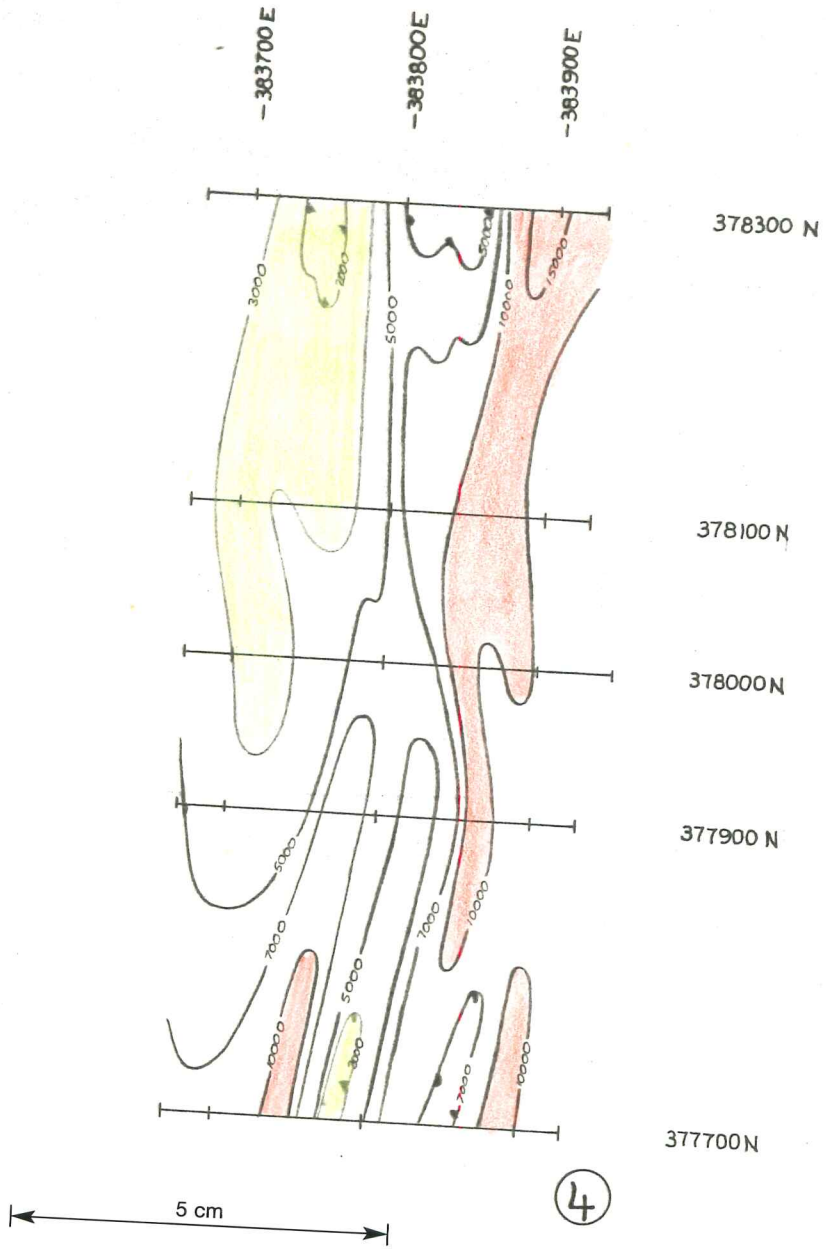
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job N° TA5-005-D



ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT BLACK

EIP DETAIL

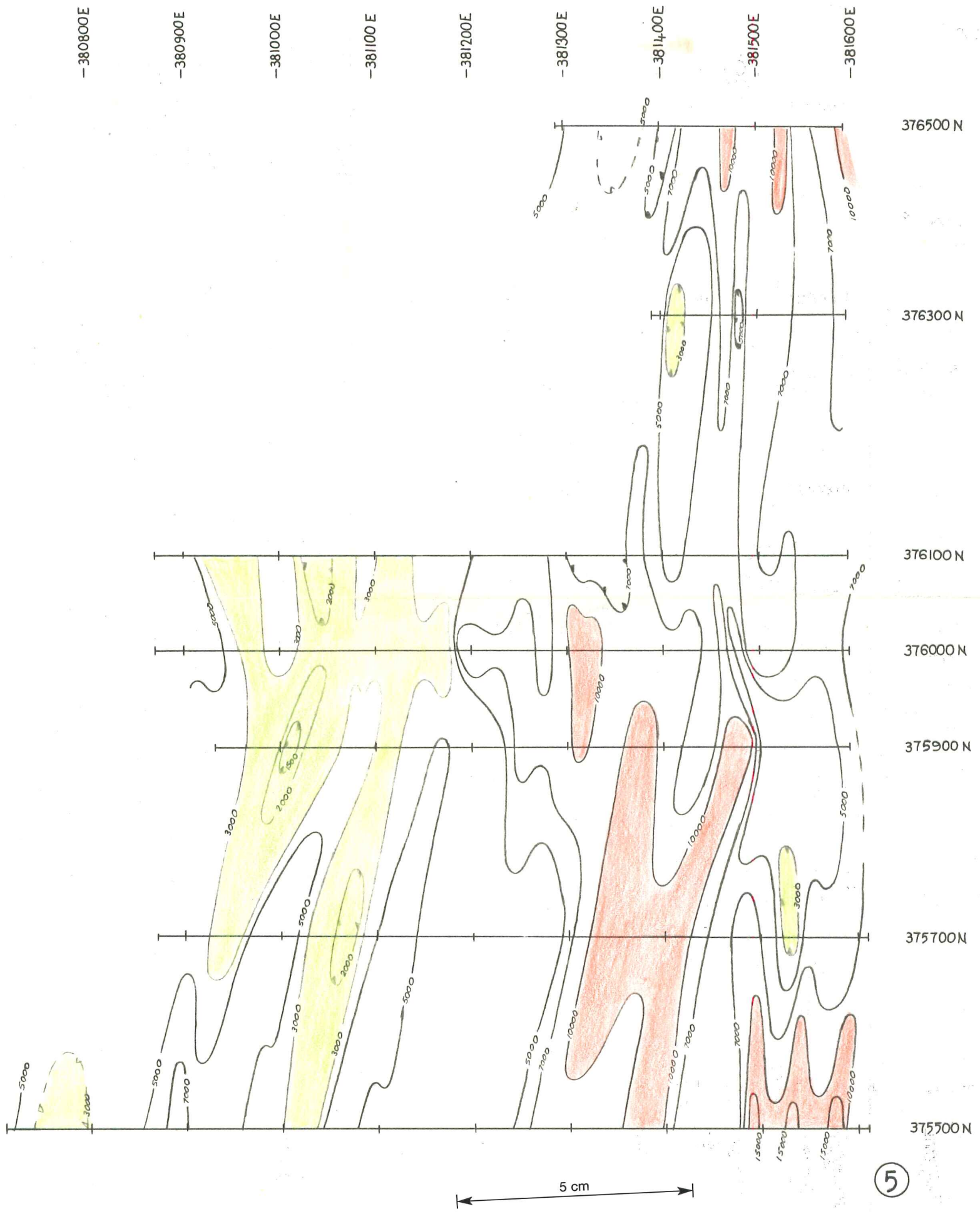
RESISTIVITY CONTOUR PLAN

SURVEYED & COMPILED
by SCINTREX

APRIL-MAY '79

SCALE 1:5000 m

Job Nº TAS-065-D



5

ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

E.I.P. DETAIL

RESISTIVITY CONTOUR PLAN

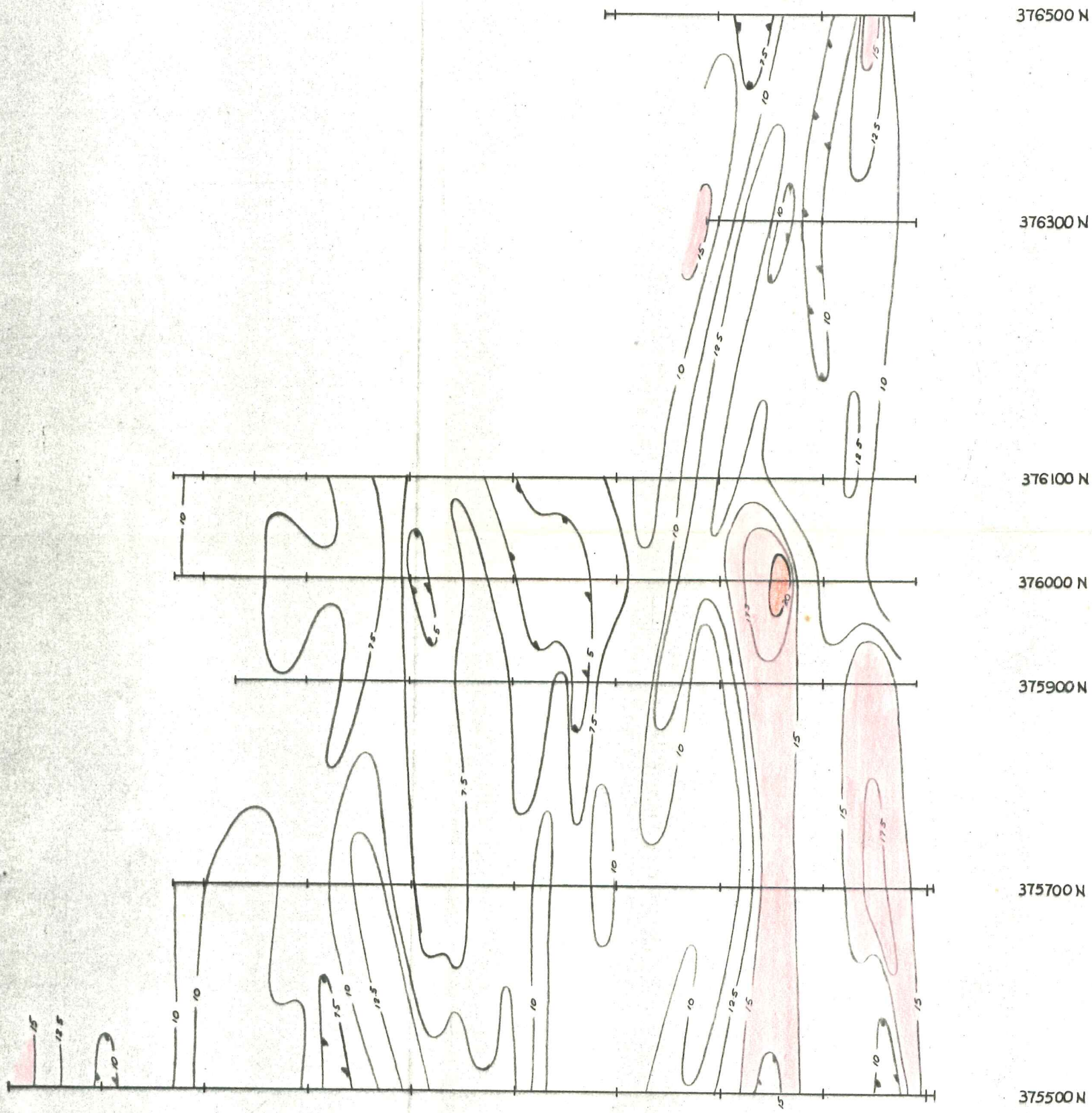
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job Nº TAS-065-D



5 cm

ELECTROLYTIC ZINC CO. OF A.SIA LTD.

MT BLACK

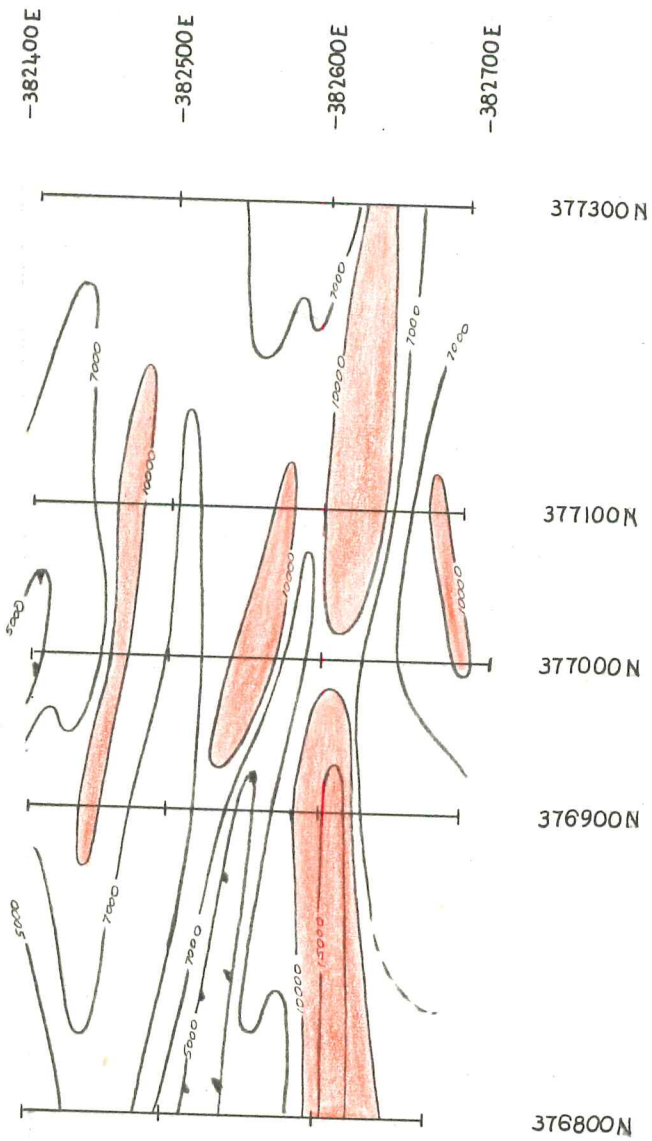
EIP DETAIL
CHARGEABILITY CONTOUR PLAN

SURVEYED & COMPILED BY
SCINTREX

APRIL- MAY 1979

SCALE 1:5000 m

Job Nº TAS-065-D



6

5 cm

ELECTROLYTIC ZINC CO OF ASIA LTD

MT. BLACK

E.I.P. DETAIL

RESISTIVITY CONTOUR PLAN

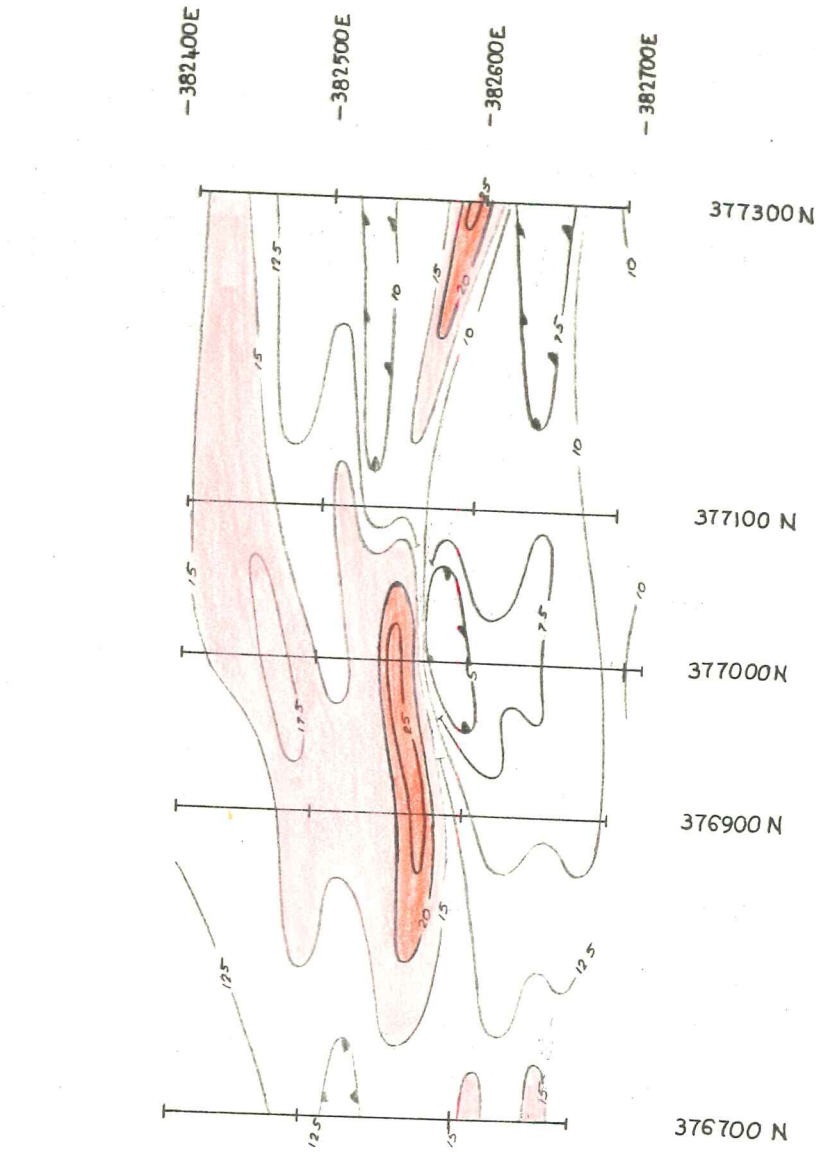
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1 5000 m

Job Nº TAS-065-D



5 cm

6

ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

EIP DETAIL

CHARGEABILITY CONTOUR PLAN

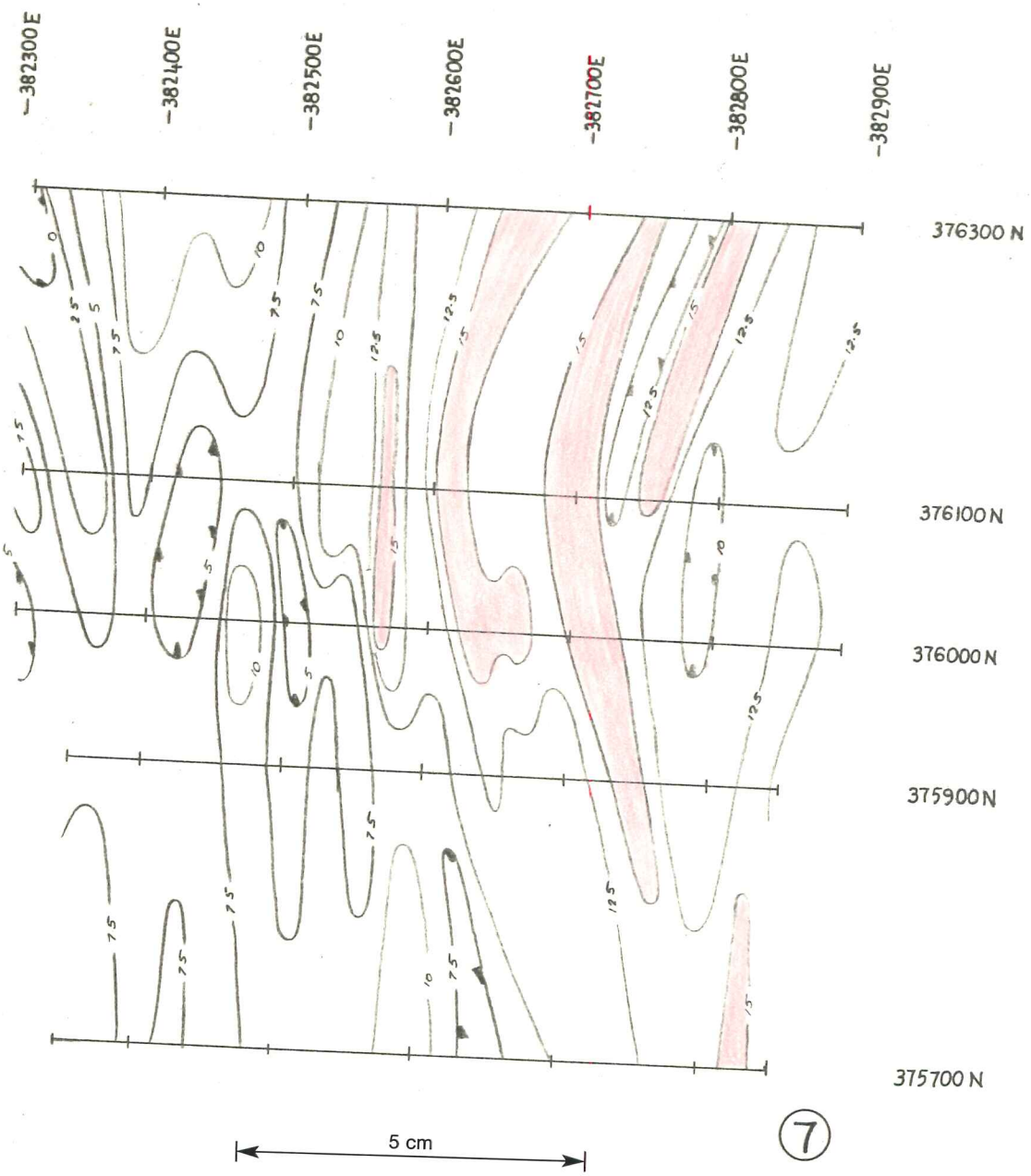
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job Nº TAS-065-D



ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

EIP DETAIL

CHARGEABILITY CONTOUR PLAN

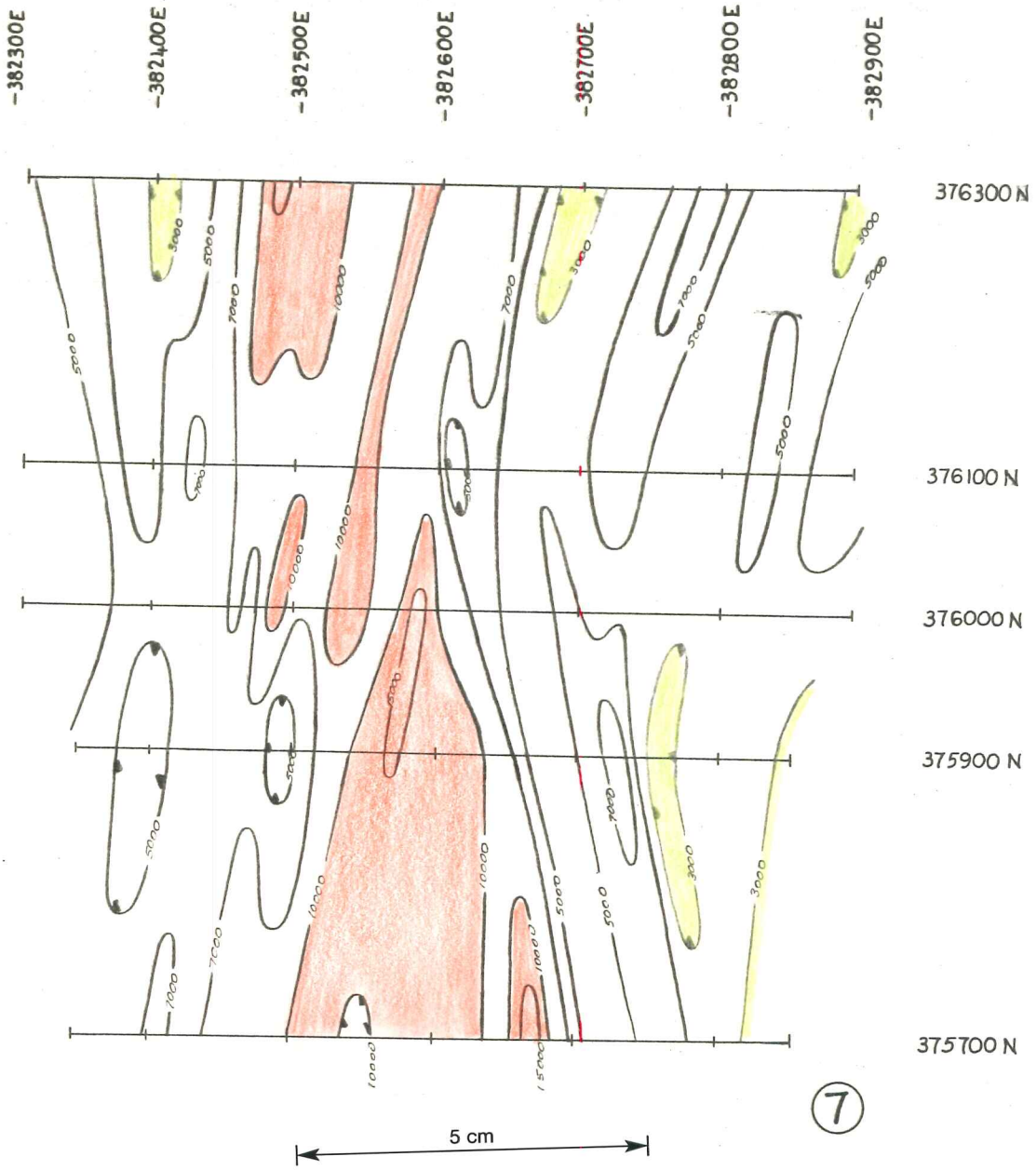
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job N° TAS-065-D



ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

E.I.P. DETAIL

RESISTIVITY CONTOUR PLAN

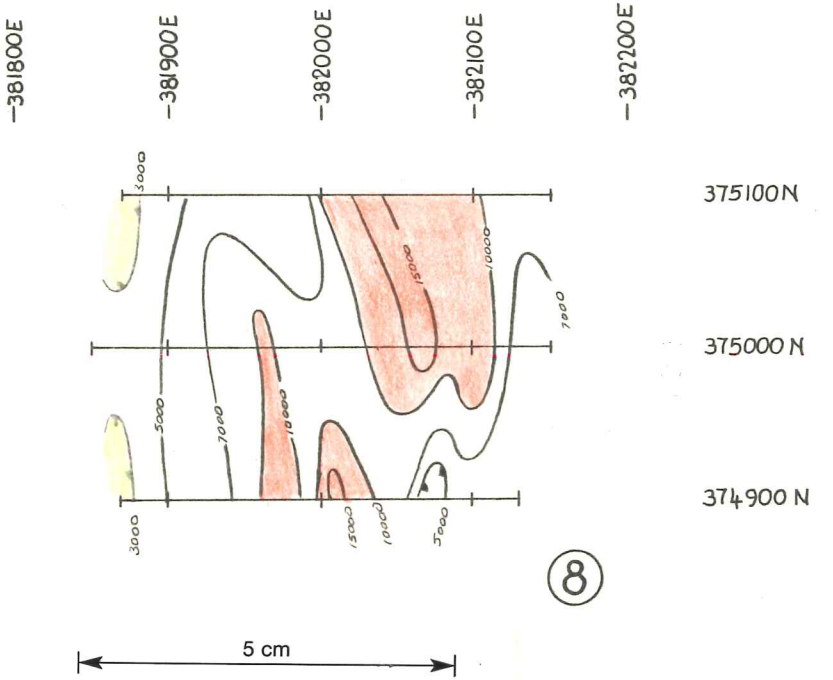
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job Nº TAS-065-D



ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

E.I.P. DETAIL

RESISTIVITY CONTOUR PLAN

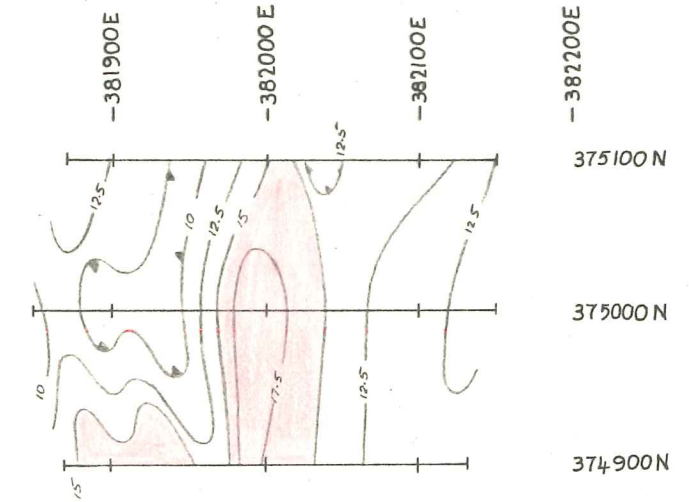
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job Nº TAS-065-D



8

5 cm

ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT BLACK

E.I.P. DETAIL

CHARGEABILITY CONTOUR PLAN

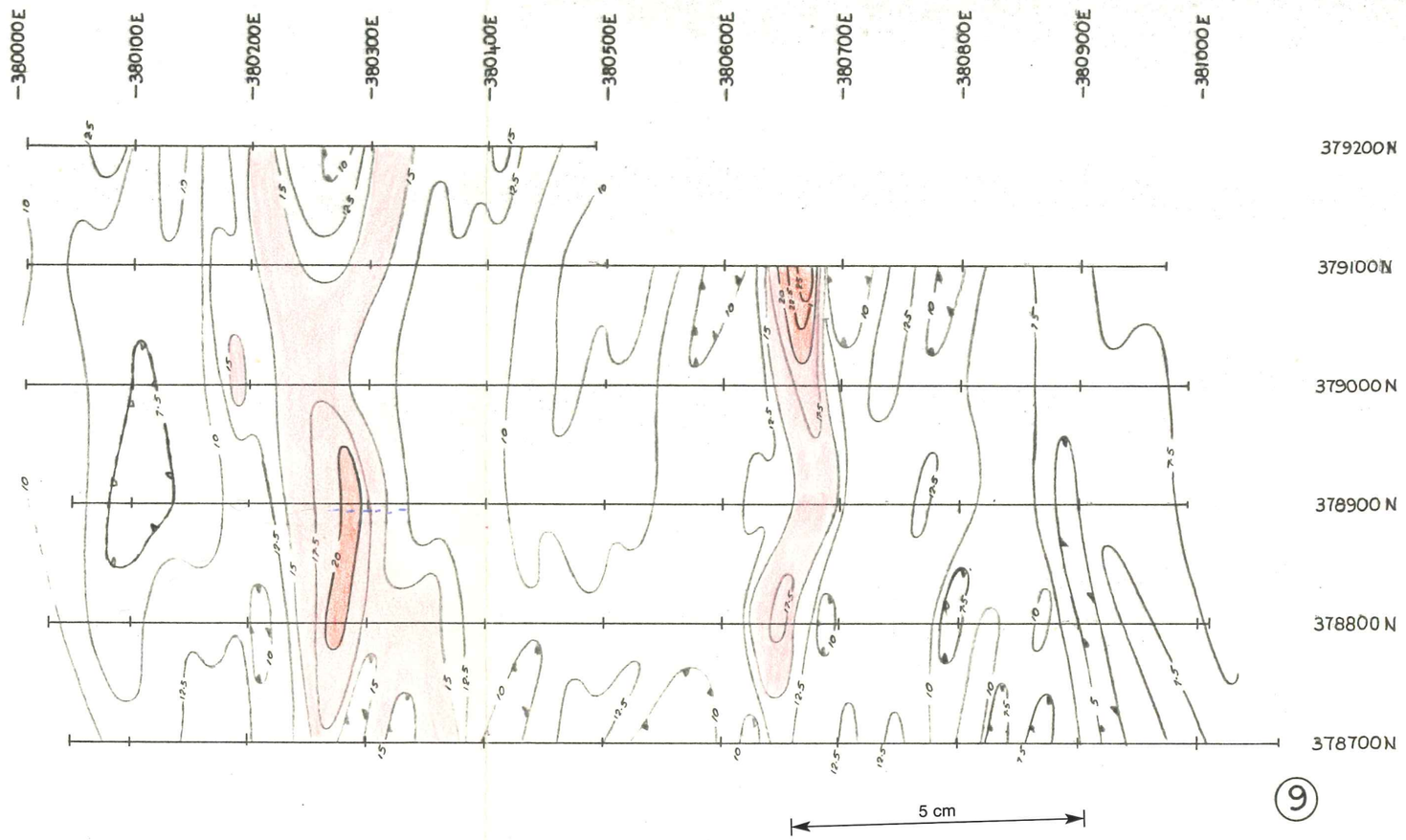
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1" = 500' or

Job No. TAS-065



9

ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

EIP DETAIL

CHARGEABILITY CONTOUR PLAN

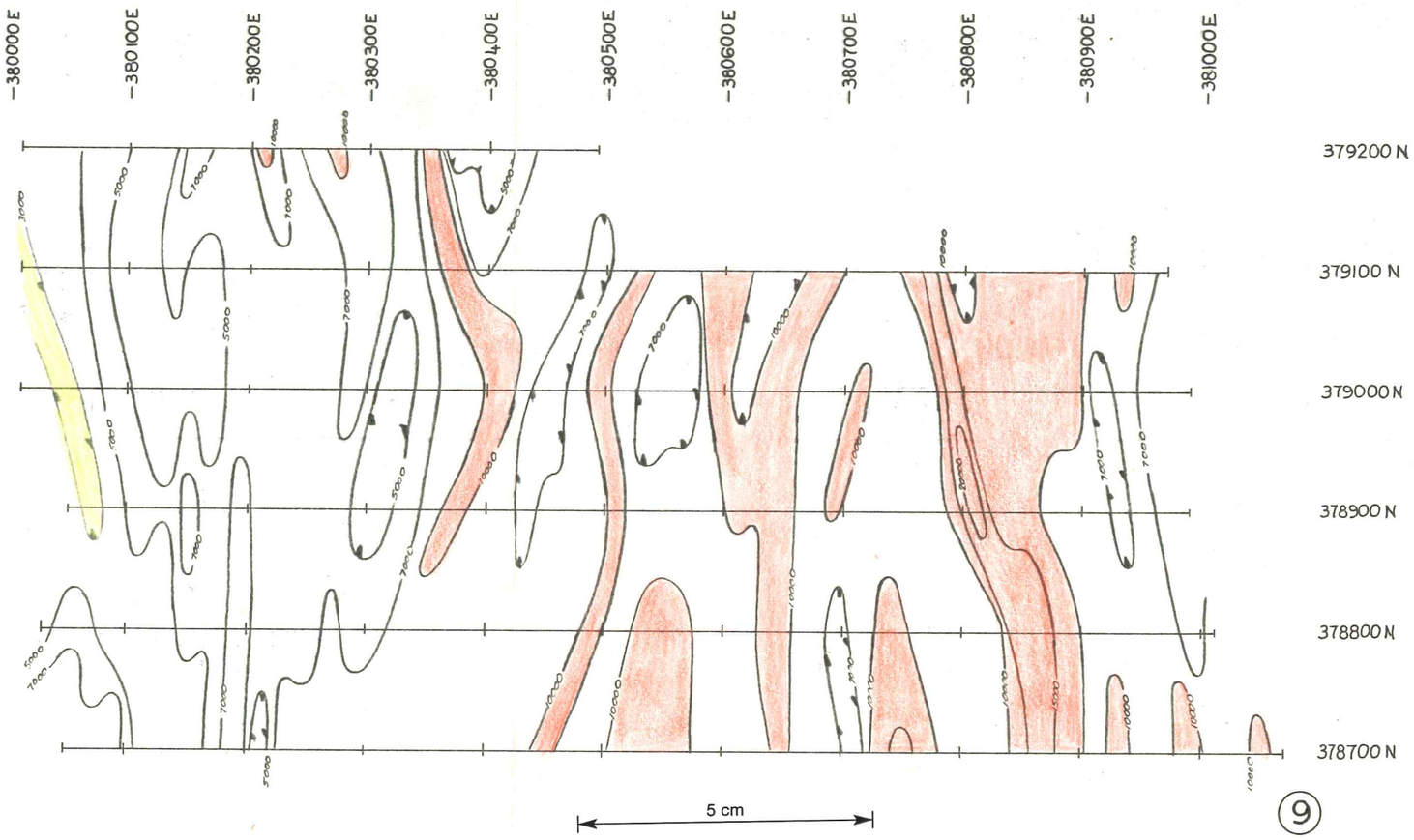
SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job Nº TAS-065-D



9

ELECTROLYTIC ZINC CO. OF ASIA LTD.

MT. BLACK

E.I.P. DETAIL

RESISTIVITY CONTOUR PLAN

SURVEYED & COMPILED

by SCINTREX

APRIL-MAY 1979

SCALE 1: 5000 m

Job Nº TAS-065-D

APPENDIX VI

Scintrex Report Tas-065

A report on a Gradient Array Reconnaissance E.I.P. Survey over the Murchison Grid near Tullah, Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited.

July, 1979

Copy supplied to Getty Oil Development Company Limited.

078

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A REPORT ON

A GRADIENT ARRAY RECONNAISSANCE EIP SURVEY

OVER THE MURCHISON GRID

NEAR TULLAH, TASMANIA

ON BEHALF OF

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

079

111209

SCINTREX

PRIVATE AND CONFIDENTIAL

A REPORT ON
A GRADIENT ARRAY RECONNAISSANCE EIP SURVEY
OVER THE MURCHISON GRID
NEAR TULLAH, TASMANIA
ON BEHALF OF
ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

BY

A.W. HOWLAND-ROSE
MSC,DIC,AMAUSIMM,FGS.
GEOPHYSICIST

SYDNEY, N.S.W.

JULY, 1979
TAS - 065

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Conclusions Page 12

Appendix

Data Profiles

Plate 1 - Chargeability Contour Plan

Plate 2 - Resistivity Contour Plan

Plate 3 - Interpretation Plan

NOT SUPPLIED WITH THIS REPORT

081

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SCINTREX PTY. LTD.

GEOPHYSICAL CONSULTANTS AND CONTRACTORS

SUMMARY

A gradient array electrical induced polarization survey over the 11 line kilometres of the Murchison grid has shown a series of distinct rock units striking either side of grid north south. The area is characterised by a strong chargeability and low resistivity unit along the eastern flank, which is considered to be of formational origin. A series of anomalies within the transitional zone to the immediate west of the above unit and on the contact between the 'formational' and 'transitional' zone, are considered of potential economic interest.

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082

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SCINTREX

A REPORT ON

A GRADIENT ARRAY RECONNAISSANCE EIP SURVEY

OVER THE MURCHISON GRID

NEAR TULLAH, TASMANIA

ON BEHALF OF

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

INTRODUCTION

As part of a series of surveys undertaken for the West Coast mines division of the Electrolytic Zinc Company of Australasia Limited during the 1978-79 field season, some 12 100 metre spaced lines were surveyed over the Murchison grid whose co-ordinates are 5375100N to 5376200N and 384000E to 384900E.

This survey was carried out by Scintrex operator Mr. D. Webb,B.Sc.(Hons) under the supervision of Mr. R. Williams Senior Exploration Geologist for West Coast Mines.

The work was carried out over six production days between 29th-31st March and 13th-16th May, 1979. The grid set-up is shown in relationship to the Mt. Black grid on the location diagram.

EQUIPMENT

The equipment used consisted of a 2½/3 kilowatt Australian built time domain induced polarization transmitter powered by an 8HP Briggs and Stratton motor generator. The resultant primary and secondary potential fields so generated were investigated using Scintrex IPR-8 receivers. While three slices under the decay curve were recorded, only M_3 has been plotted, comments being made on the

decay form where significant.

METHOD

The gradient array method is briefly discussed in report TAS-065, while the dipole-dipole procedures used were quite standard. Additional comments are made in the appendix.

DATA PRESENTATION

The chargeability and resistivity data are displayed in contour form at the standard EZ scale of 1:5000, while the data profiles have been displayed at a horizontal scale of 1:2500. Vertical scales are 1 centimetre = 2 millivolts/volt for chargeability, 1 centimetre = 10 millivots for self potential while the resistivity was shown on a 10 centimetre log cycle and expressed in ohm-metres. The three dipole-dipole set-ups are displayed in the usual pseudo section format. (See appendix for explanation of the meaning of such a format).

DISCUSSION OF DATA

The 12 100 metre spaced lines were surveyed from two 1500 metre current dipoles whose electrodes were positioned at 383700E and 385200E on each of lines 5357400N and 5376000N. The potential dipole was 20 metres moved at 20 metre intervals.

The chargeability contour plan shows a background level of 10 millivolts/volt to 15 millivolts/volt to the west of an approximate grid N30°E, with values of 60 millivolts/volt rising from a 25 millivolts/volt level to the east of that. Within this higher background the strike of individual events is just east of

grid north south. The low background area is characterised by background resistivities of 3000 ohm-metres ±1000 ohm-metres for the most part, while resistivities of less than 1000 ohm-metres are common. The fall-off in resistivity as the increase in chargeability (from west to east) is approached, generally (but not always) occurs some 100 metres west of the sharp increase in chargeability.

A detailed line by line description follows.

Line 5375100N ..... The resistivity data shows three distinct units:-

(A) between 384000E to about 384400E the resistivity remains above about 2000 ohm-metres.

(B) Between about 384420E and 384600E the resistivity gradually falls from 2000 ohm-metres(±) to 250 ohm-metres(±) and,

(C) Between 384600E and the end of the line at 384900E, the resistivity remains below 250 ohm-metres.

The chargeability also shows three divisions but they do not coincide with those for resistivity. They are:-

(X) 384000E to 384275E low chargeability, 12 millivolts/volt (±)

(Y) between 384275E and 384600E, higher chargeability to 20 millivolts/volt (±2 millivolts/volt) and,

(Z) East of 384000E a very steep rise in chargeability to levels exceeding 40 millivolts/volt.

Each of the zones A to C and X to Z represent marked changes in electrical characteristics and therefore changes in rock types.

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Within Y a single point anomaly was defined at 384490E of about 8 millivolts/volt against the local background within Y of 20 millivolts/volt. This response has a maximum depth to source of less than 20 metres, and lies on a rapidly changing resistivity background which at about 1500 ohm-metres still infers the source to be disseminated.

The largest response occurs within Z. A number of maxima were defined at 384850E of 67 millivolts/volt, and 384750E of 53 millivolts/volt with the rocks between remaining highly chargeable. The volume percent sulphide (or graphite) would be expected to be greater than 5% over this section.

Line 5375200N ..... The general form of the data profiles is as per 5375100N. Resistivity zone A being from 384000E to 384500E, and zone B (transition) from 384500E to about 384700E and zone C (the 'low' zone) from 384700E to the end of the line at 384900E. The latter has resistivities of the order of 100 ohm-metres only between 384700E and 384875E. This together with the high chargeability over this section very clearly infers interconnection between the graphite and sulphide grains.

The chargeability data shows a slow build-up from 8 millivolts/volt at 384000E to in excess of 20 millivolts/volt east of 384375E (zone X), with readings of 22 millivolts/volt $\pm$ 2 millivolts/volt between 384375E and 384675E (Zone Y), after which they rise to 46 millivolts/volt (+) east of this point in zone Z. There are no truly significant anomalies in Zone X, while in zone Y only a relatively minor 4 millivolts/volt response is seen at 384400E which is allied to a fall in the higher resistivity to 1500 ohm-metres, and may be of interest. The major maxima occur within zone Z, and represent only minor variations within

highly chargeable material. The maximum depth to source of the chargeable material which occurs between 384675E where it makes a sharp contact with the material to the west, and 384890E is about 40 to 50 metres. While the low 100 ohm-metres resistivities clearly indicate weak interconnection within the graphite (and/or sulphide) source, the lack of significant self potential shows that either the whole sequence lies totally beneath the water table, and/or there are no zones of enhanced interconnection within the chargeable source.

Line 5375300N ..... The general form of the data is very similar to the previous line, however, there are a number of noticeable variations. The western resistive section, zone A, extends from 384000E to 384600E, and the base level is about 500 ohm-metres lower than on the previous line. Because zone A extends further east, the transition zone B between the high and low resistivity sections is narrower, extending from 384600E to 384700E. The low resistivity zone C averages about 70 ohm-metres and extends to the end of the line at 384900E.

The chargeability data shows a number of material variations from that seen to the south. Firstly the chargeability shows a more gradual and variable increase from 8 millivolts/volt at 384000E to about 12 millivolts/volt at 384500E. (zone X) Secondly, over the intermediate chargeability unit, zone Y, two sharp anomalies relative to the higher background were observed at 384570E and 384610E of 34 and 32 millivolts/volt respectively. These anomalies, unlike those to the east, are associated with *high* resistivities of the order of 1800 ohm-metres(+) and therefore originate in sources which are disseminated. The maximum depth to source from west to east are respectively 60 metres, 40 to 50 metres.

In this case, the sharp increase in chargeability (zone Z) is accompanied by a

sympathetic and sharp decrease in resistivity to the order of 70 ohm-metres. The contact is at about 384710E, and the three chargeability maxima of 41, 60 and 54 millivolts/volt at 384750E, 384825E and east of 384875E represent segregations of chargeable material within an overall sulphide or graphite unit, rather than individual sources. The low accompanying resistivities show some interconnection between chargeable zones, although the lack of a self potential response may well indicate this to be weak only. The maximum depth to the chargeable source is estimated to be of the order of 60 metres.

Line 5375400N ..... The general correlation between this line and line 5375300N is very close, the low resistivity and chargeability between 384000E and 384100E being a distinct rock unit (D) seen also on line 5375300N. Between 384100E and 384610E resistivities remain relatively high (zone A), while a sharp fall is noted between 384610E and 384700E from 2000 ohm-metres (+) to 50 ohm-metres (zone B). Very low resistivities of 50 ohm-metres were noted east of this contact.

The chargeability data shows *low* chargeability over the low resistivity unit D, moderate chargeability of 12 millivolts/volt over most of resistivity unit A, which equates to chargeability unit W. However, a substantial rise in chargeability from the 12 millivolts/volt background to 31 millivolts/volt occurs to the east of 384500E to show a maximum at 384600E which is equated to the peak at 384575E on line 5375300N, and a shoulder at about 384650E which is equated to the peak at 384610E on line 5375300N. The former has a resistive source, however, the latter is associated with a fall in resistivity to less than 1000 ohm-metres. Both sources are considered to be essentially disseminated. The maximum depth to these sources is 60 to 80 metres at 384600E and 60 metres at

384650E.

Chargeability unit Z is seen as three maxima of 42 millivolts/volt at 384770E, 47 millivolts/volt at 384810E, and greater than 44 millivolts/volt east of 384850E. These maxima are considered to represent local segregations of chargeable material rather than individual sources. The low resistivity infers interconnection between the chargeable material.

Line 5375500N ..... A very similar general form for both chargeability and resistivity data to the line to the south was recorded on this line. Highlighting only the more interesting features, the chargeability anomaly within the eastern-most part of the central resistive unit A is similar in form but reduced in amplitude. Within the western flank of the chargeability unit Z, very high chargeabilities of 54 millivolts/volt centred at 384745E are accompanied by very low resistivities of as low as 18 ohm-metres. This is accompanied by low amplitude -30 to +50 millivolts gradient self potential anomaly. This then clearly shows that the chargeable material crosses the water table. The maximum depth appears to be about 20 to 25 metres. This feature lies on or in very close proximity to the contact between the western 'resistive' and eastern 'chargeable' sections, and may be of interest as 'massive' sulphides (and/or graphite) is clearly the source. The chargeability remains a relatively high 42 millivolts/volt(+) east of 384725E, while the resistivity remains a low 40 ohm-metres, clearly inferring some conduction within the chargeable source.

Line 5375600N ..... The most significant section on this line occurs east of the Murchison River. The fall in resistivity from 1000 ohm-metres in zone A, through transition zone B, to the low resistivity of 80 ohm-metres in zone C,

takes place between 384700E to 384825E. An extremely high 58 millivolts/volt chargeability response centred at 384800E is associated with this change but unlike that in a similar position on line 5375500N at 384750E is not associated with a *specific* resistivity low, although the resistivity is a low 150 ohm-metres (+) in the vicinity of the anomaly. The maximum depth to source at this point is 50 metres. A second maximum of about 50 millivolts/volt at 384850E is associated with lower 80 ohm-metres resistivity also. The source of the high chargeability east of 384750E is disseminated to interconnected chargeable material, graphite or sulphides, at a maximum depth of 60 metres.

Line 5375700N ..... While the general form of both the resistivity and chargeability data profiles are similar between this line and that to the immediate south, there are a number of interesting differences. Both the resistivity and chargeability data profiles suggest a grid north south (+) strike in the west. In the east the chargeability infers a dextral displacement of as much as 70 metres, while the resistivity infers an almost grid north-south strike, but the level at 200 ohm-metres is much higher. This infers either a flexure or fault between lines 5375600N and 5375700N. The chargeability itself infers a sharp contact at about 384810E with an increasing chargeability contact between this point and the end of the line at 384890E. The maximum depth is difficult to assess due to the build-up of chargeable material, but is not considered greater than 50 metres on the western flank.

Lines 5375800N to 5376000N ..... All lines show the same general form, with a fall in resistivity from the higher levels in the west of 3000 to 5000 ohm-metres starting some 200 metres west of the steep increase in chargeability to values of 40 millivolts/volt. This latter feature is accompanied by still lower resistivities

between 220 ohm-metres and 150 ohm-metres. The inferred strike is grid north-north-east south-south-west.

Line 5376100N ..... While the fall-off from the high resistivity of 4000 ohm-metres (+) to the west commences at 384600E, and falls to 400 ohm-metres at the end of the line at 384890E, the high chargeability zone was not reached and thus must lie to the immediate east as it reappears on line 5376200N.

Line 5376200N ..... On this, the most northerly line, the profile form of the resistivity data shows a development of the previous line, which infers a grid north-south strike. At the eastern end the chargeability rises sharply, which infers the presence to the immediate east of chargeability zone Z.

PHYSICAL PROPERTY INTERPRETATION

This area shows a number of distinct resistivity and chargeability units which have been summarised in Plate 3.

On the western ends of lines 5375400N to 5375800N, and perhaps beyond, 'moderate' resistivity of 1000 ohm-metres(+) and 'low' chargeability of 5 millivolts/volt(+) mark a distinct rock unit. These generally strike just west of grid north south, and *may (?)* be displaced by faults or folding in a dextral sense. (This has been designated chargeability unit W and resistivity unit D).

The 'central' area is dominated by features which strike about grid north south, have very uniform chargeability of about 12 millivolts/volt (+) and 'high' resistivities of 1500 to 3000 ohm-metres for the most part, with individual

zones to 7000 ohm-metres(+). Only in the south-eastern section of this distinct unit does the chargeability rise *within* the high resistivity zone. (This unit has been described in the line description as chargeability unit X and resistivity unit A).

The eastern 'transitional' zone varies from 100 metres to 300 metres in width and is characterised by a transition in resistivity from over 2000 ohm-metres(+) to the west to less than 10% of this level to the east. In the south, this zone is accompanied by distinctly higher chargeabilities of up to twice those seen to the immediate west, while to the north they tend to be only slightly higher. Significant induced polarization anomalies occur within this zone on lines 5357300N and 5375400N (moderate) and on lines 5375500N and 5375600N (strong) in close proximity to the contact with the eastern chargeable/conductive unit. Distinct dextral displacements occur which might represent faults, folding, or even facies changes. (This unit has been desiganted chargeability unit Y and resistivity unit B in the description).

The most easterly unit is characterised by low resistivity of 40 ohm-metres to 220 ohm-metres, with high chargeability always above 20 millivolts/volt and mostly above 30 millivolts/volt. The strike of the units is east of grid north south, with dextral displacement being very noticeable. The origin is thought to be formational, perhaps graphite, with individual maxima representing local segregations of chargeable material.

DIPOLE-DIPOLE DETAIL

Dipole-dipole detail was surveyed over three lines. These are discussed in

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detail below.

Line 5376100N ..... This line was surveyed between 384060E and 384220E at a = 20 metres between n = 1 to 4. The broad low amplitude induced polarization high of 12 millivolts/volt defined at 384150E is seen on the dipole-dipole data as a broad high of 15 to 18 millivolts/volt centred at 384130E. The maximum depth to source looks to be about 20 metres and a multiple source of gradually decreasing chargeable content overall east and west of 384150E is suggested.

The very much lower resistivities (by almost one order of magnitude) on the dipole-dipole, indicates a relatively less resistive overburden/oxidation to be present in the area.

Line 53756200N ..... This line was surveyed between 384180E and 384260E on an a = 20 metres spacing from n = 1 to 4 across a 12 millivolts/volt gradient response centred at 384225E. This is some 4 millivolts/volt above the 8 millivolts/volt background and is associated with high 5000 ohm-metres resistivities. The dipole-dipole data shows the beginning of a double peak anomaly centred at 384240E from a source whose depth is less than 40 metres deep, and which is wider than the dipole used (i.e. wider than 40 metres). The resistivities are a great deal less (20%) on the dipole-dipole data which infers that conductive cover and/or oxidation is present.

Line 5375300N ..... An a = 40 metres, n = 1 to 4 dipole-dipole survey was positioned between 384480E and 384720E, centred over the two significant gradient maxima at 384575E and 384610E.

The dipole-dipole data does not resolve these anomalies, and shows an overall increase in chargeability centred at 384720E midway between the two responses mentioned above, and the high western formational anomalies. As this occurs on the n = 3 and 4 spacings, it gives a false single, deep source effect, when in fact two separate sources are present. A major chargeability break at about 384540E is however, confirmed by the dipole-dipole. Also the response increases in importance with depth, as would be expected from a less conductive and chargeable cover.

CONCLUSIONS

1 - The chargeability and resistivity data have defined a number of distinct geological units which are summarised on Plate 3, where an attempt to interpret this data is made in geological terms.

2 - The eastern section is dominated by high chargeabilities and low resistivities and is obviously a formational unit. The high chargeability to 50 millivolts/volt infers a sulphide or graphite content of 2½% to 8% bulk, with local increases above this, while the low accompanying resistivity of 220 ohm-metres to 40 ohm-metres infers interconnection between the sulphide and/or graphite source which, with one notable exception (on line 5375500N at 384750E) cannot be considered conductive as such. The maximum depths to the source of the chargeability within this zone do not exceed 60 metres, and are often considerably less (40 metres).

3 - The anomalies which *may* be significant are those associated with the transition zone, either within it or in close proximity to it. These are

as follows:

Line 5375500N at 384750E This anomaly is associated with a very sharp change in resistivity from 1500 ohm-metres(+) to the west, to 40 ohm-metres to the east. The response is over 54 millivolts/volt and is accompanied by low resistivity of 18 ohm-metres. The maximum depth to this conductive source may be as little as 20 to 25 metres. A self potential anomaly of -30/+50 millivolts confirms that the water table crossed the source, and that electronic conduction is present. This response could be of primary interest, providing geological and/or geochemical information supports the interest generated by the EIP data.

A sharp response on line 5375600N of 58 millivolts/volt at 384800E from 120 ohm-metres material is considered to be a northerly extension of this anomaly. The source is not as conductive as that on line 5375500N, but it is material and is of high interest.

Line 5375300N at 384575E and 384610E Two significant maxima of 34 and 32 millivolts/volt rise above the 14 ± 2 millivolts/volt background to the west and lie within high 1800 ohm-metres and 1200 ohm-metres resistivity. They have disseminated, or if massive, electrically discontinuous sources which lie at an assessed maximum depth of 60 metres. These two responses can be traced north to cross line 5375400N at 384600E and 384650E where similar sources and depths are inferred.

Eastern Chargeable Zone This is considered to be formational as as such, the relative merit of individual maxima cannot be assessed by geophysical

means alone. Should any individual anomaly have a high geochemical response, this would obviously enhance its interest.

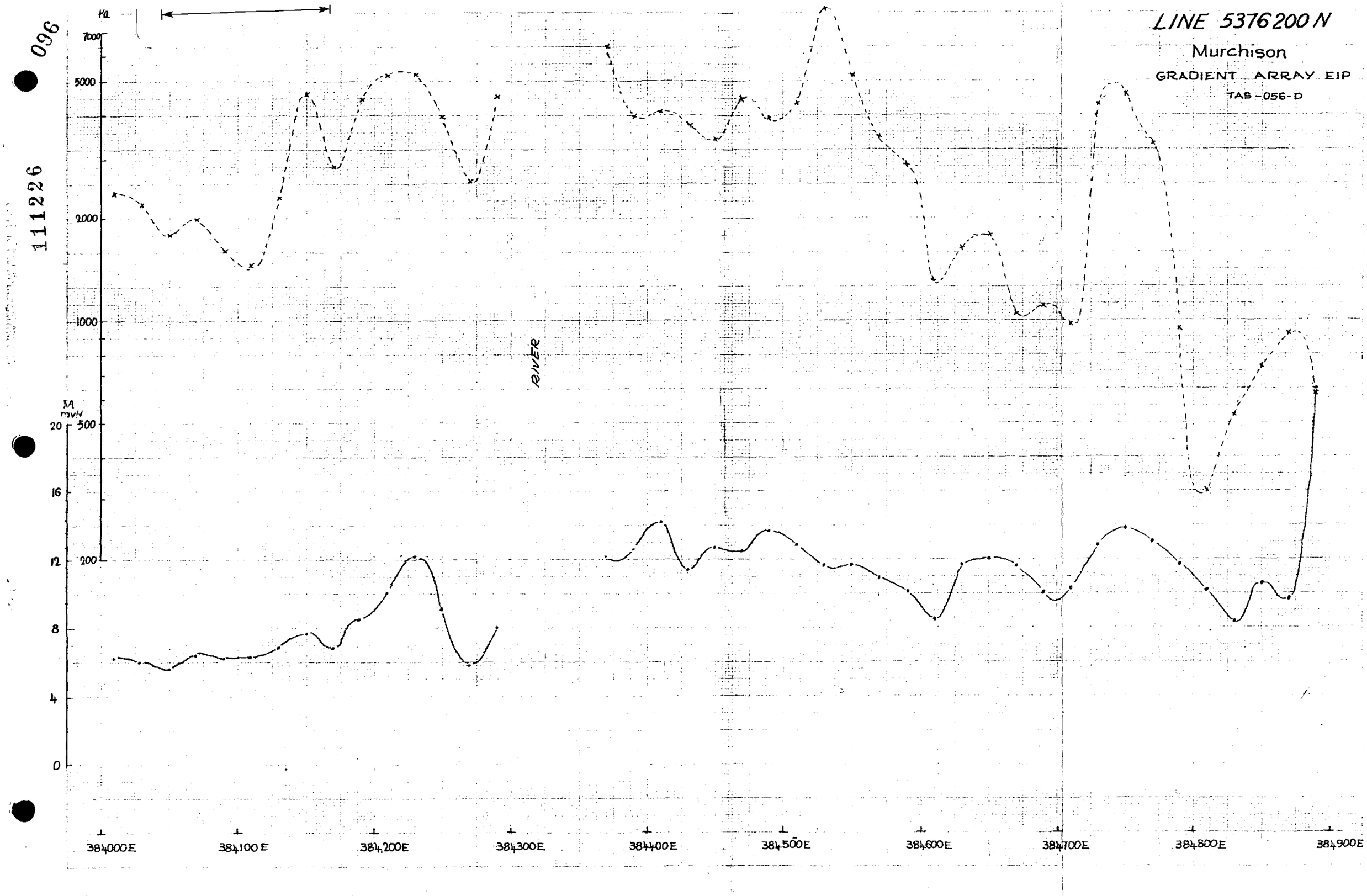
4 - The dipole-dipole detail tended to confirm the gradient data, and showed that a less resistive, less chargeable cover is present in the area covered by the survey.

Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

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

GEOPHYSICIST



LINE 5376200 N
Murchison
GRADIENT ARRAY EIP
TAS-056-D
Ha
7000
5000
2000
1000
500
200
M
mv/v
20
16
12
8
4
0
RIVER
384000E
384100E
384200E
384300E
384400E
384500E
384600E
384700E
384800E
384900E

111226

097

111227

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 1-4-79		LINE No. 5376200N
PLOTTED BY DJTW		PROSPECT MURCHISON
PULSE 2 sec	Rx.	JOB No. TAS-065-C
DIPOLE SPACING 20 m		

384080E 384100E 384120E 384140E 384160E 384180E 384200E 384220E 384240E 384260E 384280E 384300E

RESISTIVITY Ω m.

N-1: 646 682 578 683 977 612 2036

N-2: 271 452 667 1007 783 745 809

N-3: 208 233 477 1314 946 792 363 418 743

N-4: 256 317 305 814 1156 392 844

CHARGEABILITY

N-1: 4·1 6·4 5·8 6·3 8·6 8·2 10·7

N-2: 2·9 3·9 4·3 6·9 6·0 6·0 3·6 8·3

N-3: 1·7 1·8 3·0 6·1 5·7 5·8 2·4 2·6 4·6

N-4: 0·9 1·8 2·6 5·4 5·2 1·4 4·3

5 cm

098
111228

LINE 5376100N

Murchison

GRADIENT ARRAY EIP

TAS-065-D

5 cm

ρ_a ohm-m

7000
5000
2000
1,000
500
400

M mv/v

16
12
8
4
0

RIVER

384,000E
384100E
384,200E
384,300E
384,400E
384,500E
384,600E
384,700E
384,800E
384,900E

099

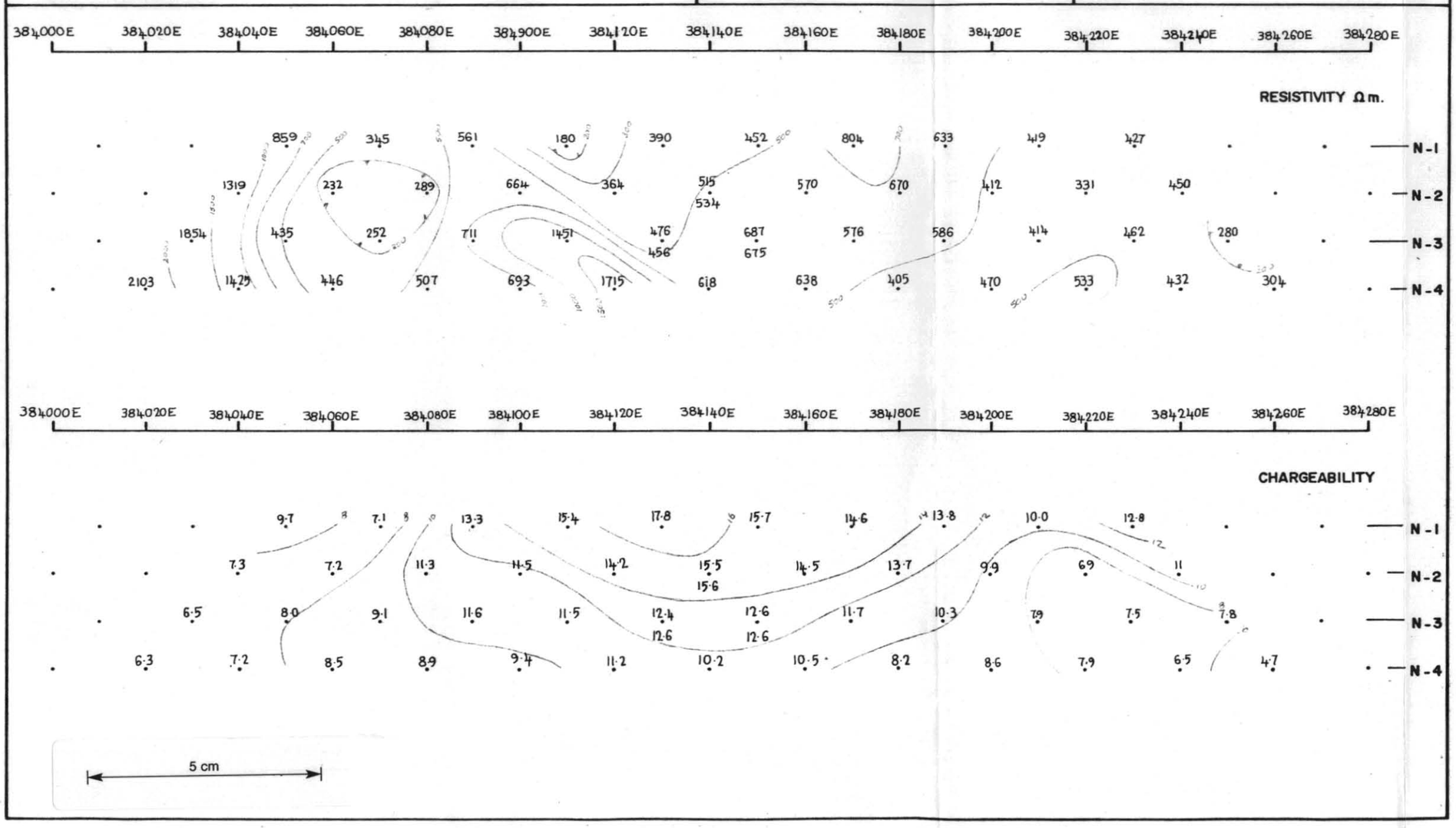
111229

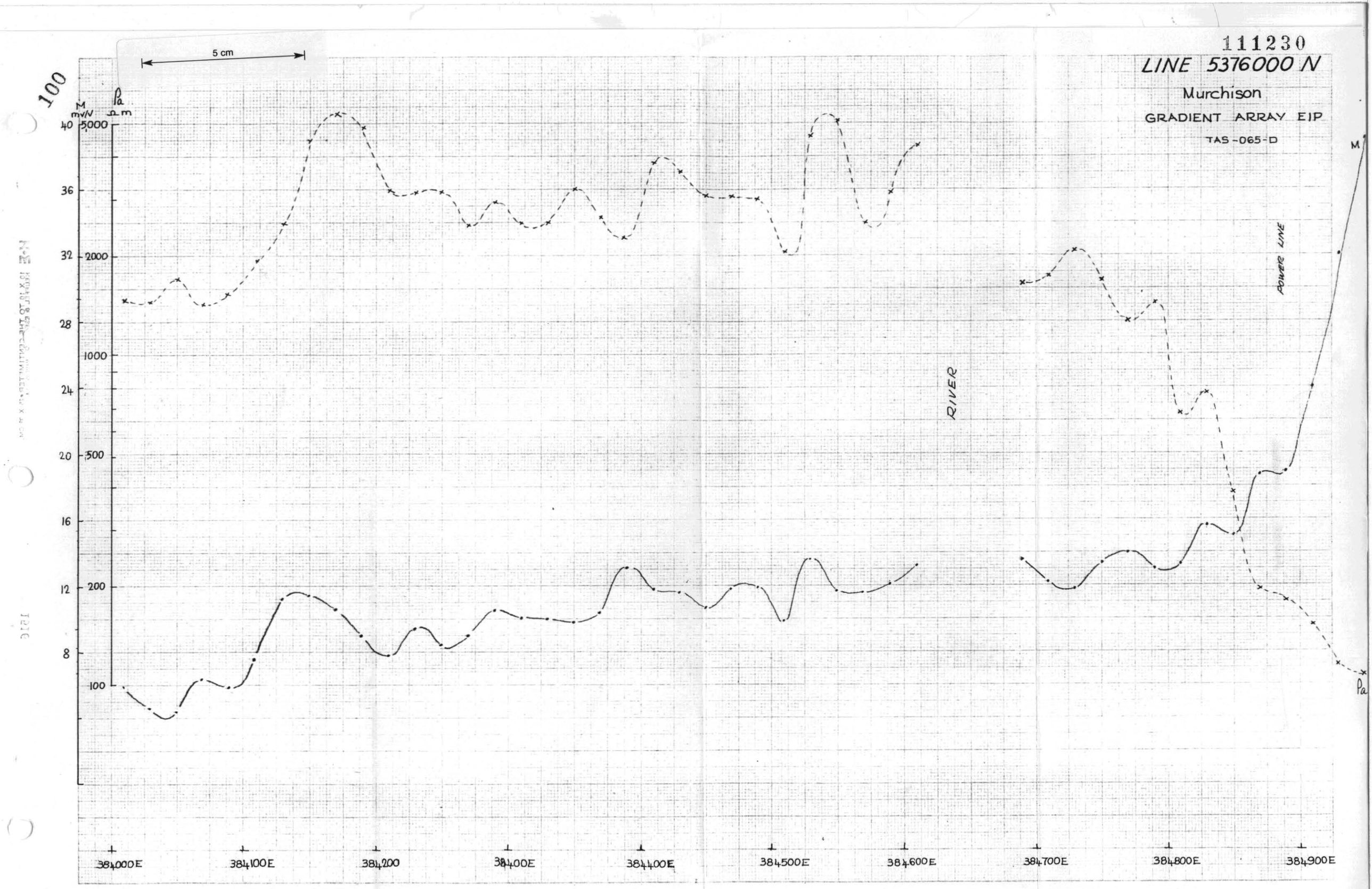
SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 14-1-79	LINE No. 5376100N
PLOTTED BY P.L.	PROSPECT MURCHISON
PULSE 2 sec / Rx.	JOB No. TAS-065-C
DIPOLE SPACING 20 m	





111230
LINE 5376000 N
Murchison
GRADIENT ARRAY EIP
TAS-065-D
5 cm
100
M mV/V
Pa Ωm
40
36
32
28
24
20
16
12
8
5000
2000
1000
500
200
100
RIVER
POWER LINE
M
Pa
384000E
384100E
384200
384400E
384400E
384500E
384600E
384700E
384800E
384900E

111231

101

LINE 5375900N

Murchison

GRADIENT ARRAY EIP

TAS-065-D

5 cm

ρ_a Ωm

7,000

5,000

M mv/V

32

2,000

28

1,000

24

500

20

200

16

12

8

4

0

M

ρ_a

RIVER

384000E

384100E

384200E

384300E

384400E

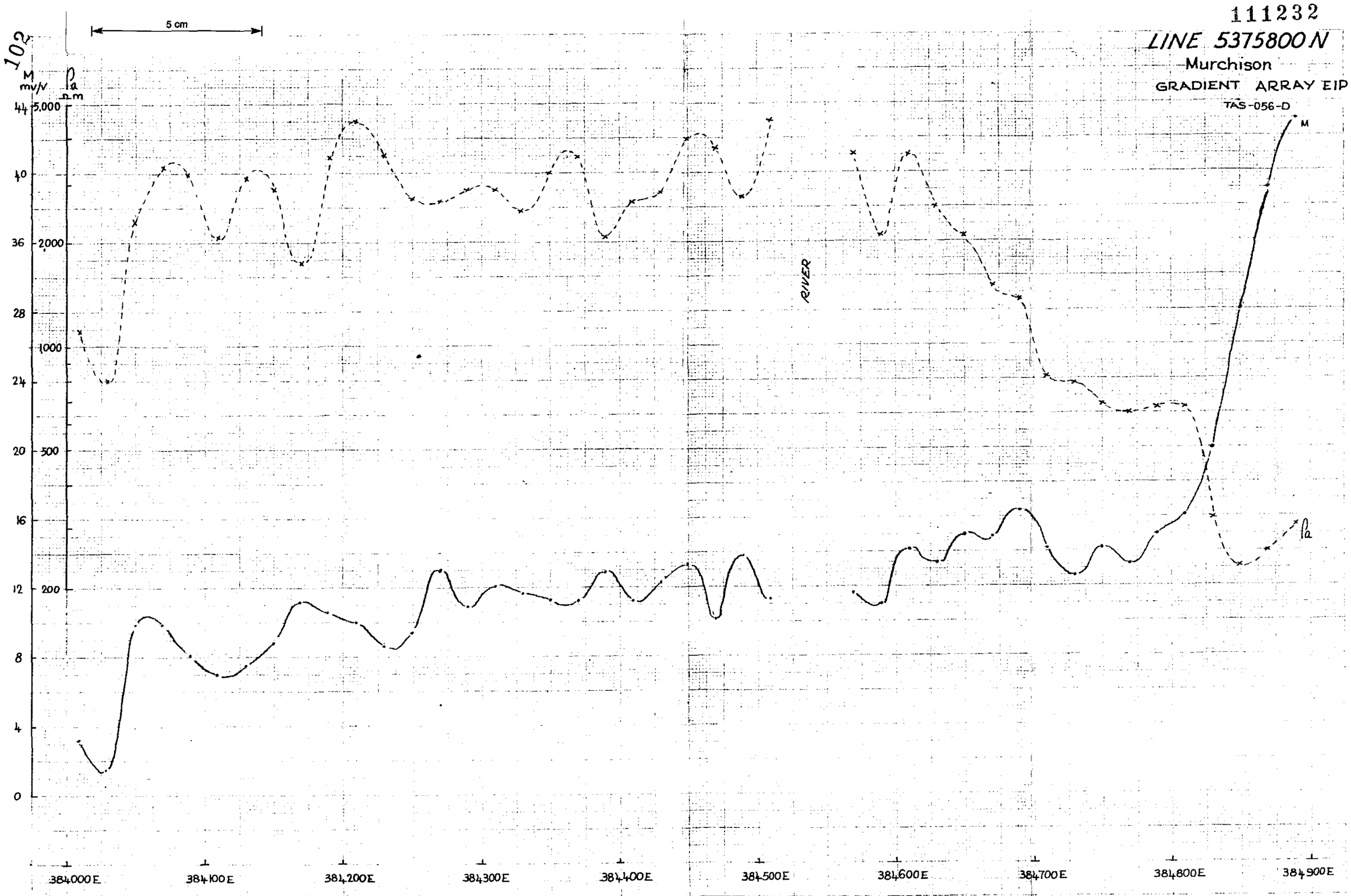
384500E

384600E

384700E

384800E

384900E



111232
LINE 5375800 N
Murchison
GRADIENT ARRAY EIP
TAS-056-D
5 cm
102
M mv/v
ρa Ωm
44
40
36
28
24
20
16
12
8
4
0
5,000
2000
1000
500
200
RIVER
M
ρa
384000E
384100E
384200E
384300E
384400E
384500E
384600E
384700E
384800E
384900E

111233

103

LINE 5375700 N

Murchison

GRADIENT ARRAY EIP

TAS-065-D

5 cm

M mv/v

48 44 40 36 32 28 24 20 16 12 8 4 0

ρa Ωm

4000 3000 2000 1000 500 200

RIVER

SP

40 30 20 10 0 $\bar{10}$ $\bar{20}$ $\bar{30}$

M

SP

ρa

384000E 384100E 384200E 384300E 384400E 384500E 384600E 384700E 384800E 384900E

104

111234

M mv/V

48 44 40 36 32 28 24 20 16 12 8 4 0

5 cm

Pa ρm

3000 2000 1000 500 200 100 50

Chargeability in milliVolts per volt

Resistivity in ohm-metres

57·8 58·5

M

LINE 5375600N

Murchison

GRADIENT ARRAY EIP

TAS-065-D

PLAN

SP

40 30 20 10 0 $\bar{10}$ $\bar{20}$ $\bar{30}$

SP

Pa

384000E 384100E 384200E 384300E 384400E 384500E 384600E 384700E 384800E 384900E

105

411235

LINE 5375500N

Murchison

GRADIENT ARRAY EIP

TAS-065-D

5 cm

M mv/v

48 44 40 36 32 28 24 20 16 12 8 4 0

ρ_a ohm-m

5000 2000 1000 500 200 100 50

SP mv

50 40 30 20 10 0 10 20 30

534 543

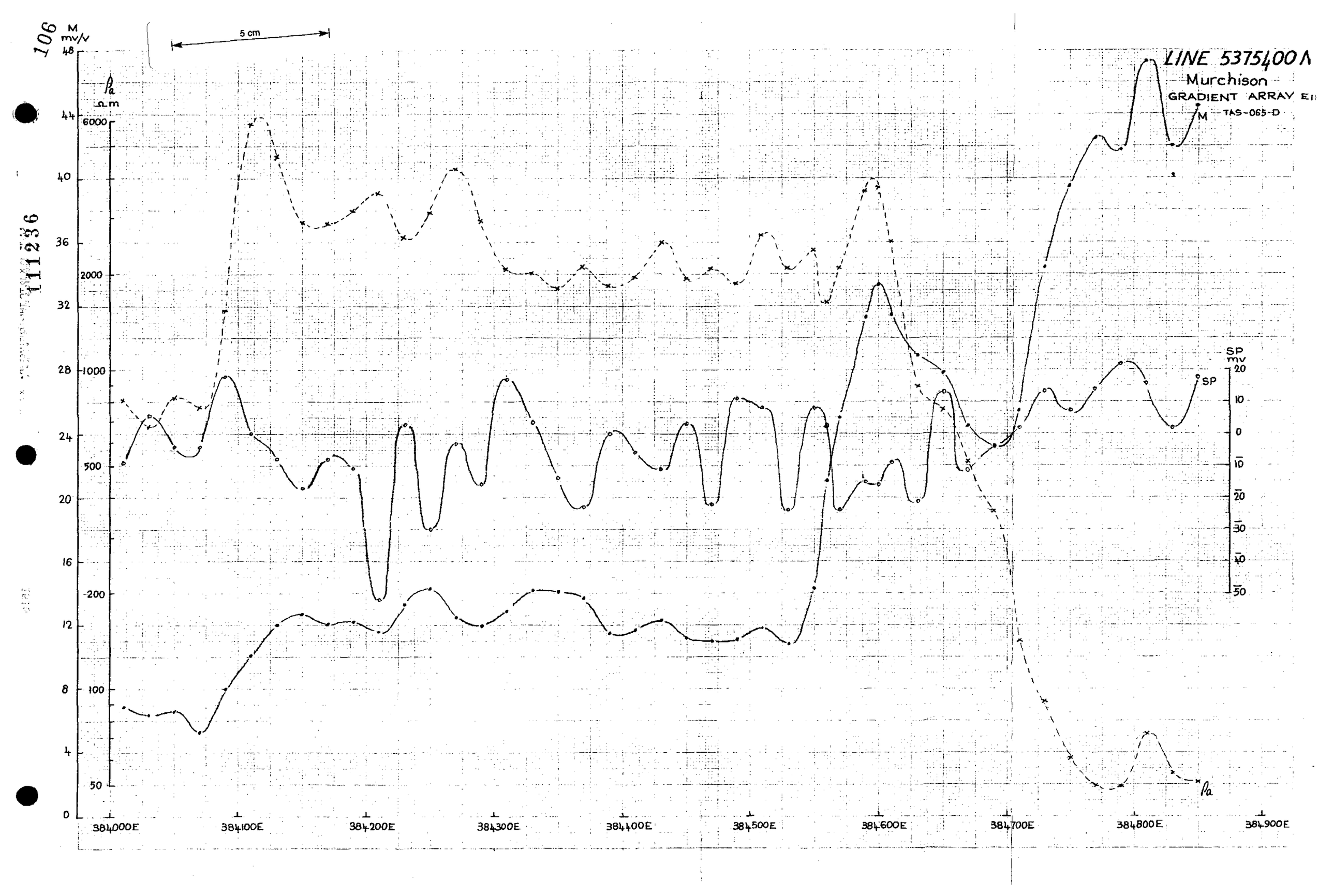
M

SP

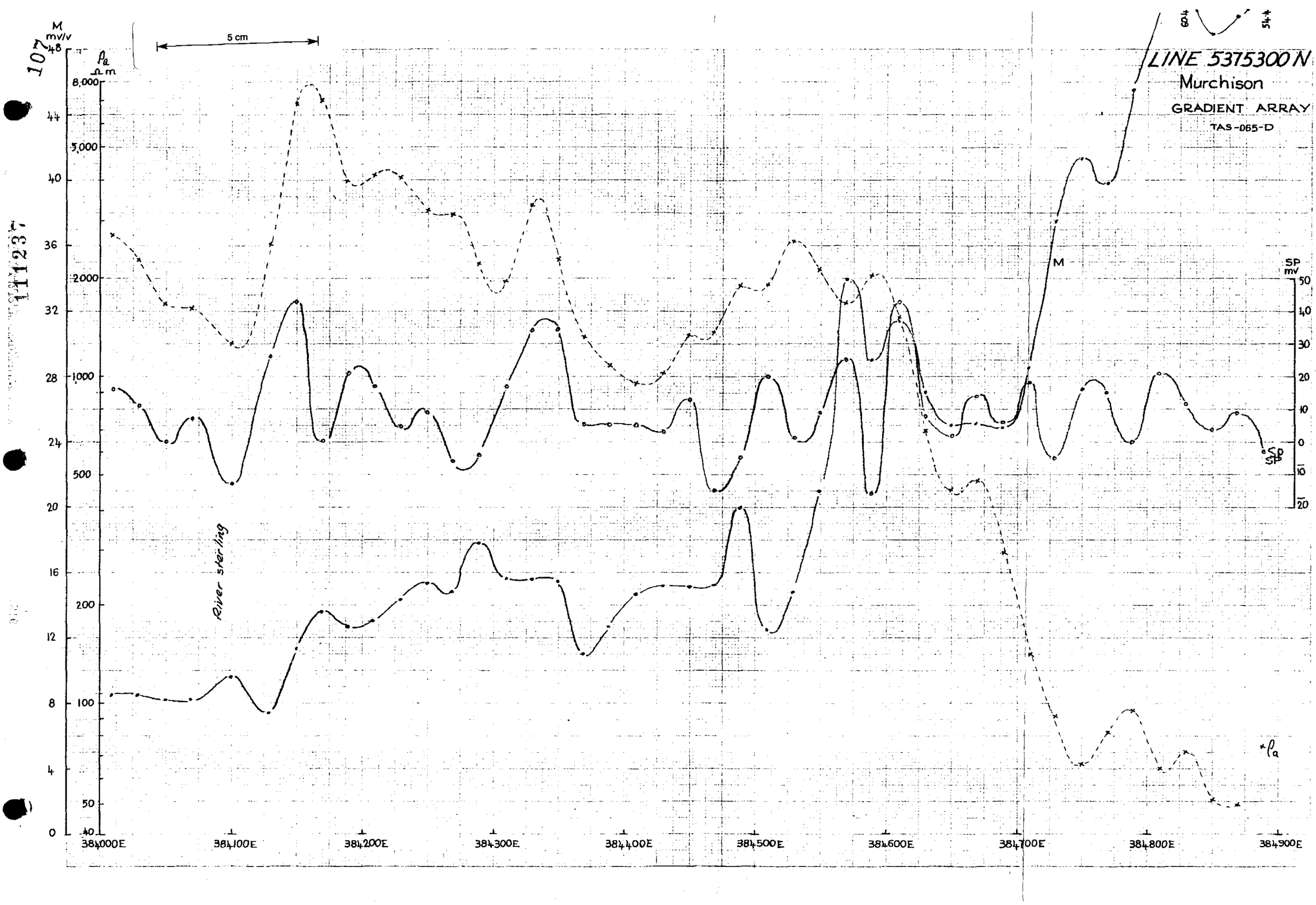
RIVER

ρ_a

384000E 384100E 384200E 384300E 384400E 384500E 384600E 384700E 384800E 384900E



106
111236
M
mv/v
5 cm
LINE 5375400 N
Murchison
GRADIENT ARRAY E
TAS-065-D
M
ρa
Ωm
SP
mv
SP
ρa
384000E
384100E
384200E
384300E
384400E
384500E
384600E
384700E
384800E
384900E



LINE 5375300 N
Murchison
GRADIENT ARRAY
TAS-065-D
5 cm
M
mv/v
ρ_a
Ω m
SP
mv
River sterling
M
SP
ρ_a
384000E
384100E
384200E
384300E
384400E
384500E
384600E
384700E
384800E
384900E

108

1111238

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 1·6·79	LINE No. 5,375,300N
PLOTTED BY D.J.T.W	PROSPECT R. MURCHISON
PULSE 2 sec / Rx.	JOB No. TAS-065-D
DIPOLE SPACING 40m	

480E 520E 560E 384,600E 640E 680E 720E

RESISTIVITY Ω m.

N-1: 864 1040 1168 1538 1319 622 811 995

N-2: 921 888 975 825 730 922 337 352 512

N-3: 1440 986 904 735 520 609 486 258 204 377

N-4: 1276 1972 1032 706 480 377 213 385 171 142 732

CHARGEABILITY

N-1: 11·2 11·1 22·6 16·9 12·3 10·7 17·7 22·0

N-2: 13·1 9·1 23·8 25·0 20·2 13·3 32·0 35·0

N-3: 10·8 11·1 21·5 25·0 22·5 24·3 32 41·0 44·5 29·5

N-4: 8·9 11·4 25·0 22 21·0 23·5 36·5 47·0 55·0 40 37·0

5 cm

109

111239

LINE 5375200N

Murchison

GRADIENT. ARRAY E1P

TAS-065-D

ρ_a Ωm

10,000
5,000
2000
1,000
500
200
100
60

M mv/v

32
28
24
20
16
12
8
4
0

SP mv

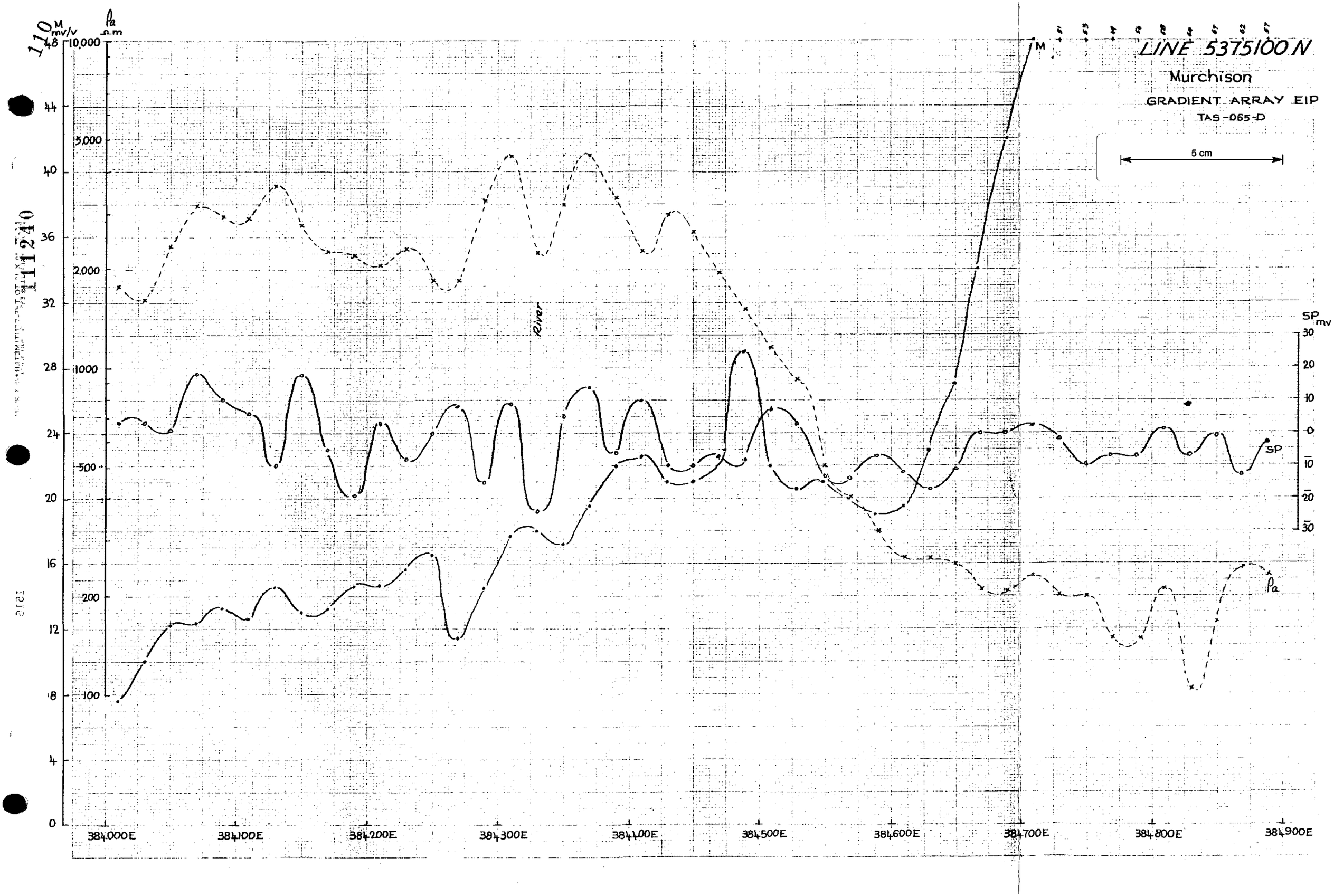
40
30
20
10
0
-10
-20

SP

ρ_a

384000E
384100E
384200E
384300E
384400E
384500E
384600E
384700E
384800E
384900E

5 cm



LINE 5375100 N
Murchison
GRADIENT ARRAY EIP
TAS-065-D
5 cm
M
mv/v
ρa
Ωm
SP
mv
River
ρa
384000E
384100E
384200E
384300E
384400E
384500E
384600E
384700E
384800E
384900E

111

APPENDIX VII

Scintrex Report Tas-065

Comments on dipole-dipole E.I.P. surveys over various grids in the Rosebery Area, Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited.

August, 1979

Copy appended to: Bulgobac Exploration Licence 12/72
Report 130 October, 1979
Forwarded to Mines Department

Refer to Report 79_141CA

Copy supplied to Getty Oil Development Company Limited.

APPENDIX VIII

Scintrex Report Tas-065

A report on Gradient Array E.I.P. reconnaissance and Dipole-Dipole detail surveys over the White Spur Grid near Rosebery, West Coast Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited.

July, 1979

Copy supplied to Getty Oil Development Company Limited.

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A REPORT ON

GRADIENT ARRAY EIP RECONNAISSANCE AND

DIPOLE-DIPOLE DETAIL SURVEYS

OVER THE WHITE SPUR GRID

NEAR ROSEBERY, WEST COAST TASMANIA

ON BEHALF OF

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

111244

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SCINTREX PRIVATE AND CONFIDENTIAL

A REPORT ON
GRADIENT ARRAY EIP RECONNIASSANCE AND
DIPOLE-DIPOLE DETAIL SURVEYS
OVER THE WHITE SPUR GRID
NEAR ROSEBERY, WEST COAST TASMANIA
ON BEHALF OF
ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

BY

A.W. HOWLAND-ROSE
MSC,DIC,AMAUSIMM,FGS.
GEOPHYSICIST

SYDNEY, N.S.W.

JULY, 1979

TAS - 065

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Data Profiles

SCINTREX PTY. LTD.

GEOPHYSICAL CONSULTANTS AND CONTRACTORS

SUMMARY

On a gradient array electrical induced polarization reconnaissance survey with limited dipole-dipole array in-fill, a series of grid north south trending en-echelon chargeable zones of limited, 600 to 800 feet strike length, were located. The en-echelon trend is about grid north-north-west south-south-east. The importance of the three zones, A, B and C decreases from west to east, with only the western anomaly 'A' being of prime interest as a drilling target.

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111247

SCINTREX

A REPORT ON
GRADIENT ARRAY EIP RECONNAISSANCE AND
DIPOLE-DIPOLE DETAIL SURVEYS
OVER THE WHITE SPUR GRID
NEAR ROSEBERY, WEST COAST TASMANIA
ON BEHALF OF
ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

INTRODUCTION

As part of a series of electrical induced polarization surveys undertaken by Scintrex Pty. Ltd. on behalf of the Electrolytic Zinc Company of Australasia Limited, a reconnaissance gradient array survey was undertaken over some 9 lines of the White Spur grid, which lies to the north of the north-eastern flank of the Mt. Lyell grid of the same name.

The reconnaissance work was carried out by Mr. B. Ekstrom in mid-March 1979, while the dipole-dipole detail was carried out in June by D. Webb,B.Sc.

Mr. R. Williams Senior Exploration Geologist for West Coast Mines undertook all local direction and supervision, while the author gave such additional advice as was required.

METHOD

The reconnaissance survey was carried out using the gradient array. Two current dipoles of 9850 feet and 8660 feet placed at 3075W-

SCINTREX

6775E on 6000S and 2180W-6480E on 8800S respectively, were used. These were energised via a Scintrex 10/15 kilowatt time domain IP transmitter, and the resultant primary (resistivity) and secondary (chargeability) potential fields were investigated using a 100 feet potential dipole moved at 100 feet intervals. In areas where steep changes in chargeability and/or resistivity were recorded, additional 50 feet spaced 100 feet dipole readings were taken.

The dipole-dipole detail employed a smaller 2.5 kilowatt transmitter and an 'a' spacing of 100 feet read from n = 1 to n = 4. While three slices under the decay curve were observed, M_3, the central slice, has been plotted. In all cases a 2 second on, 2 second off reverse and repeat square wave energisation was employed.

The area has extremely steep slopes and is dominated by a steep sided valley which runs from 1930E on line 10400S to 1850E on line 6480S. While both the dipole-dipole and gradient array will be subject to distortion, the latter is far less subject to that distortion, and the location of the source is simply located, namely it lies always *normal* rather than *vertically below* the point of measurement. In the case of dipole-dipole, the relationship is more complex.

DATA PRESENTATION

The horizontal scale of the gradient array data is 1 inch = 200 feet (1:2400) while the resistivity is shown on a five inch log cycle

and expressed in ohm-metres, and the chargeability is on an arithmetic scale of 1 inch = 5 millivolts/volt. The chargeability and resistivity are also shown in contour form at the scale of 1:5000. The dipole-dipole data is presented on standard contoured pseudo-section format.

Note that while self-potential was recorded, this data has not been plotted as for the most part it is not significant. It has, however, been commented on where significant results have been obtained.

DISCUSSION OF THE DATA

RECONNAISSANCE GRADIENT EIP SURVEY

The average chargeability background within the area is about 15 millivolts/volt with a variation about this level of ±2.5 millivolts/volt. The average resistivity background is about 7000 ohm-metres with variations to lower than 5000 ohm-metres and higher than 15000 ohm-metres being common.

Within the area surveyed, three zones of interest were defined which are described below in descending order of geophysical interest.

ZONE 'A'

This response is seen best on line 5600S at 875E where a 43 millivolts/volt response was recorded from a source which, from the depression in resistivity to 2000 ohm-metres, is less resistive than the enclosing rocks (4000 ohm-metres to the west and 10,000 ohm-metres to the east). The anomaly lies on, or in close proximity

to a contact between rocks which have a sharp contrast in electrical properties. The maximum depth to source is not greater than about 100 to 140 feet at this point. A small 55 millivolts self potential anomaly (not plotted) was recorded over the anomaly also, which indicates that the source traverses the local water table. This chargeability shows a normalised decay form ΔMn of about 11%, which indicates a coarser than normal grain size to the source.

To the south, a comparison of the profile forms for apparent resistivity, very clearly infers that the chargeability response on line 5600S at 875E corresponds to the position 1080E on line 6400S However, there is no significant chargeability response at this point. Thus, while a 250 feet sinistral flexure or fault is inferred between these lines, the significant chargeability response at 1580E (Zone B) is considered to be a quite separate body.

To the north of the major response on line 5600S, the correlative based on resistivity, is at 790E. A rise in background chargeability at 750E by about 5 millivolts/volt to 24 millivolts/volt having normal decay form and minor self-potential anomalism only, is considered the correlative. The depression in resistivity to 2700 ohm-metres from 4000 ohm-metres(+) to both east and west shows the source to be less resistive than the enclosing rocks, but not *conductive* as such. The maximum depth to source is about 100 to 120 feet.

To the north and south on lines 4000S and 7200S, no significant responses were recorded.

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ZONE 'B'

This zone reaches its maximum development on line 6400S where a maximum of 14 millivolts/volt above the 12 millivolts/volt background was recorded centred at 1590E. A distinct resistivity low was recorded at 1700E which may be related assuming a dip to the source. The *form* of the profile suggests an east dip with respect to the local slope, however, this assumes a source sharply bounded by the enclosing rocks. The maximum depth to source is inferred to be about 200 feet.

To the north on line 5600S, the resistivity data profiles suggests that the chargeability should be present at about 1400E, and in fact there is a minor (3 to 4 millivolts/volt) increase in chargeability at this point. However, the associated (?) resistivity low at 1600E(±) could not be precisely recorded due to the presence of a steep cliff. No sign of this anomaly was recorded on line 4800S.

To the south the chargeability increased from a local background of about 15 millivolts/volt to 20 millivolts/volt at 1600E on line 7200S. This anomaly probably represents the most southerly extension of this zone. The associated resistivity is a high 10,000 ohm-metres plus, which indicates the source of the chargeable material to be disseminated and lies within a resistive source. The maximum depth to source is assessed to be about 150 feet. As the resistivity profile is different in form between lines 6400S and 7200S, it is suggested that a facies change occurs between these lines.

ZONE 'C'

A relatively minor response of just over 20 millivolts/volt was recorded on lines 7200S and 8000S at about 2975E and 3025E respectively. Both are associated with marked depression in resistivity to 4000 ohm-metres from 6000 ohm-metres plus on line 7200S and to 2000 ohm-metres from 9000 ohm-metres plus on line 8000S. The maximum depths to source are about 120 feet in each case, and while the chargeability anomalies of 5 millivolts/volt or so above background are not great, their *form* is that expected from lead/zinc Kuroko type deposits, and as such, merit some further investigations.

DETAILED DIPOLE-DIPOLE SURVEYS

ZONE 'A'

The major response on line 5600S was investigated using a dipole-dipole a=100 feet, n = 1 to 4 set up between 600E and 1200E. This data shows the anomaly lies at 900E±50 feet, and comes within 100 feet of surface, where the resistivity is a low 500 ohm-metres. A significant feature of the anomaly is that while the n = 1 chargeabilities are 32 and 34.5 millivolts/volt, the n = 3 response on the western section of the double peak was 46 millivolts/volt. This *may* indicate a more substantial source with depth.

An intermediate line was surveyed to the north on 5200S and an a = 100 feet, n = 1 to 4 dipole-dipole set-up placed between 500E and 1000E. This data shows the anomaly to be centred at about 800E±50 feet, and comes within 100 feet of surface. Lower coincidental

resistivities of 700 to 860 ohm-metres as against backgrounds of 6000 ohm-metres to the east and 2000 ohm-metres to the west were recorded. The response on this line, while being less than that seen on line 5600S, confirms its interest across this line also.

To the south, an intermediate line was placed at 6000S where a dipole-dipole n = 1 to 4, a = 100 feet set-up between 700E and 1500E clearly demonstrated that the chargeability terminates between lines 5800S and 6400S, although the resistivity low with which it is associated was recorded at about 1050E. This then would indicate that the sinistral displacement between lines 5600S and 6400S on the gradient array can be further refined by this data to be between 5600S and 6000S.

ZONE 'B'

A dipole-dipole set-up on line 6400S was run at an 'a' spacing of 100 feet from n = 1 to n = 4 between 1200E and 1800E to investigate Zone 'B'. This showed a 'double peak' response which indicates a source at about 1600E ±50 feet with a depth to source of less than 100 feet. The amplitude of the response is 20 millivolts/volt as against a background of 10 millivolts/volt on the second separation as against 26 millivolts/volt on the gradient array. The dipole-dipole data also shows a resistivity low of just under 2000 ohm-metres at 1650E(±) east of the inferred source to the chargeability response.

An intermediate dipole-dipole survey was run at 400 feet south of

the maximum response of Zone 'B'. This line, 6800S, showed a relatively low amplitude response of 14 millivolts/volt as against a background of 5 millivolts/volt, which infers a source at, or about 1650E. The source lies within high 5000 ohm-metres resistivity and is thus disseminated in nature. The maximum depth is assessed to be of the order of 100 feet.

CONCLUSIONS

1 - The reconnaissance survey carried out over the White Spur grid has shown three en-echelon responses, each having a strike length of 800 feet plus. Each is summarised below.

2 - The most significant response recorded in the area was Zone 'A' which reaches its best development on line 5600S at 875E where the depth to its source is about 100 to 140 feet. The anomaly is less significant on line 4800S at 800E±50 feet. The strike length therefore is of the order of 500 feet minimum, and 800 feet maximum. The source, while being significantly less resistive than the enclosing rocks, cannot be considered to be conductive as such. It is perhaps significant that the resistivity low in which the chargeability was recorded, extends over a greater strike length (12,000 feet plus allowing for faulting and/or flexuring) than the chargeability anomaly itself.

Should geochemical data confirm the interest of this zone, drilling would be recommended on line 5600S to intersect the

source at a depth of 150 feet plus *normal to the local slope and not vertically below* 875E.

3 - Zone 'B' - A twice background, 26 millivolts/volt anomaly on line 6400S at 1590E from within resistive 5000 to 7000 ohm-metres rocks is interpreted to be due to a disseminated source at a maximum depth of 200 feet with some evidence of the sulphide (or graphite) source lying within 100 feet of surface. The probable(?) dip of the source is to the east. Only on this line is Zone 'B' significant. Unlike Zone 'A' which has the characteristics of higher chargeability within rocks of lesser resistivity, this zone is inferred to be wholly disseminated. As such it is considered of secondary to tertiary interest only, unless significant additional information from say geochemical anomalism enhances its interest.

4 - Zone 'C' is seen as two relatively low 5 millivolts/volt anomalies superimposed on 15 millivolts/volt backgrounds and associated with dramatic decreases in resistivity. The sources are interpreted to be disseminated or weakly interconnected sulphides and/or graphite within a host less resistive than the enclosing rocks. As with zone 'A', the resistivity low in which it occurs extends over a greater distance, 1600 feet plus, than does the chargeability itself. While the response is of the *form* expected of lead/zinc Kuroko type deposits, the low amplitude must obviously dectract from its possible economic interest.

SCINTREX

Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

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

GEOPHYSICIST

127

111257

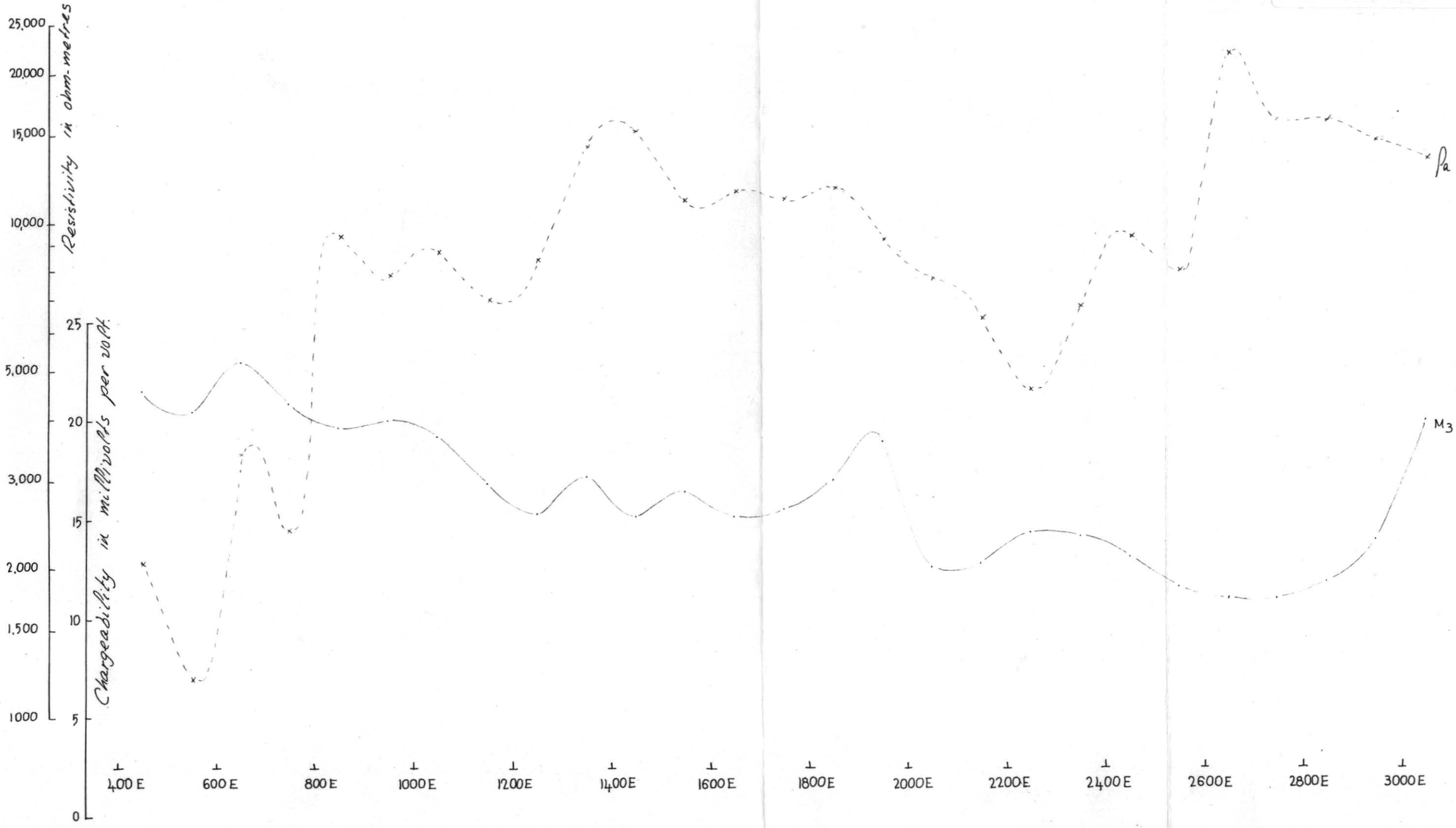
LINE 4000 S

White Spur Grid

GRADIENT ARRAY EIP

TAS-065-D

5 cm

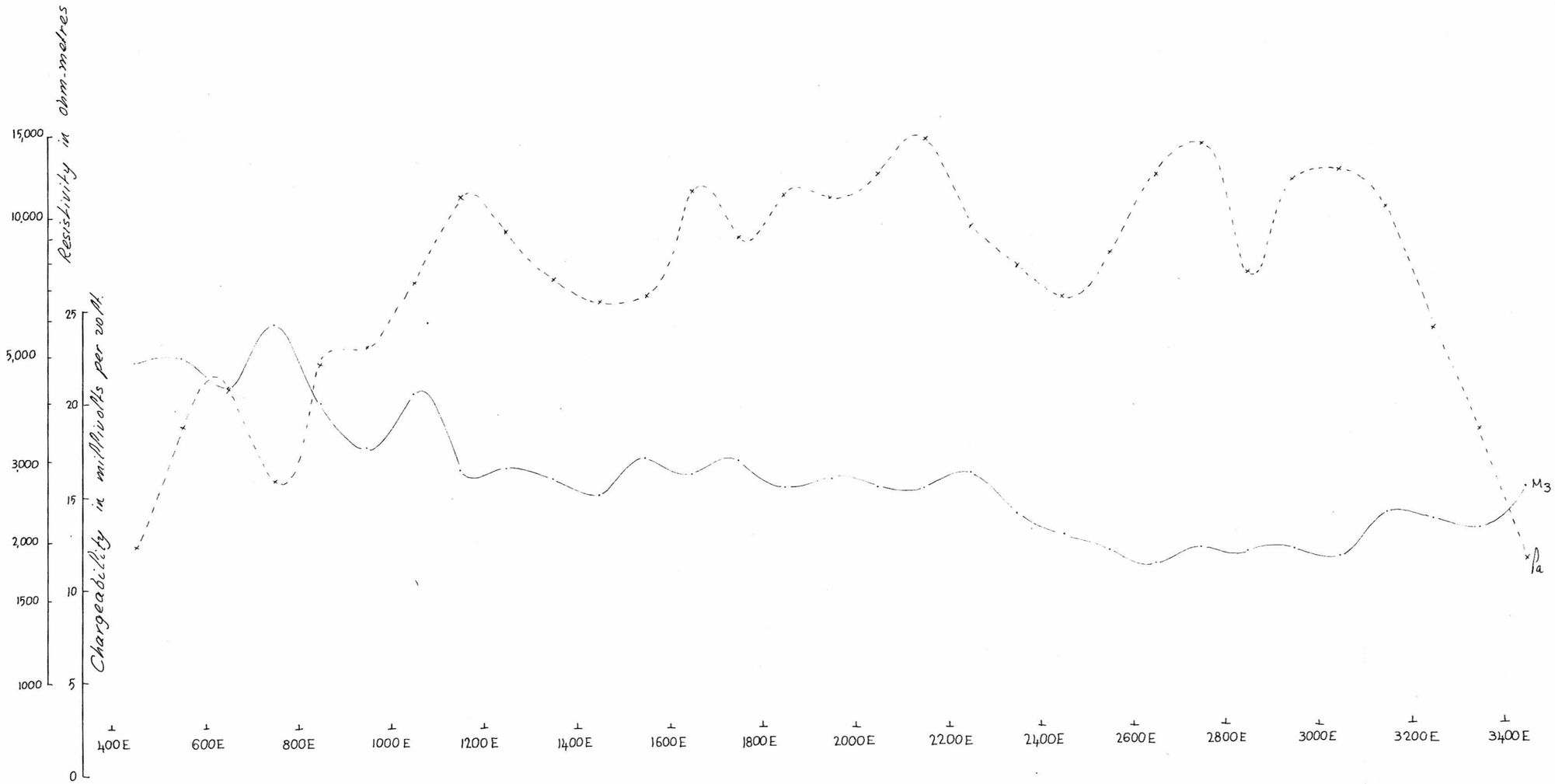


128

11125S

LINE 4800S
White Spur Grid
GRADIENT ARRAY EIP
TAS-065-D

5 cm



129

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SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 8·6·79		LINE No. 5200 S
PLOTTED BY D.J.T.W.		PROSPECT WHITE SPUR
PULSE 2 Sec	Rx.	JOB No. TAS-065-D
DIPOLE SPACING 100 FT.		

300E 400E 500E 600E 700E 800E 900E 1000E 1100E 1200E

RESISTIVITY Ω m.

N-1: 2077 2111 862 6640 4154 13588

N-2: 2308 1529 1084 1338 948 1038 1038 4657 6808 16040

N-3: 1589 1673 1684 1225 2134 2173 1242 1880 765 7581 9116 13,761

N-4: 4462 1159 1599 2277 1915 2674 3600 1047 1114 8749 7885

CHARGEABILITY

N-1: 14·5 9·6 9 2·2 6·2 5·3 5·4

N-2: 9·9 11·1 10·2 2·3 25·5 26·0 25·5 5·8 5·8 4·4

N-3: 10·1 10·7 11·1 20·5 21·8 21·3 24·3 25·3 24·3 6·7 4·9 4·3

N-4: 10·4 12·2 14·6 22·3 19·1 20 20 23·5 25·5 5·7 5·5

5 cm

130

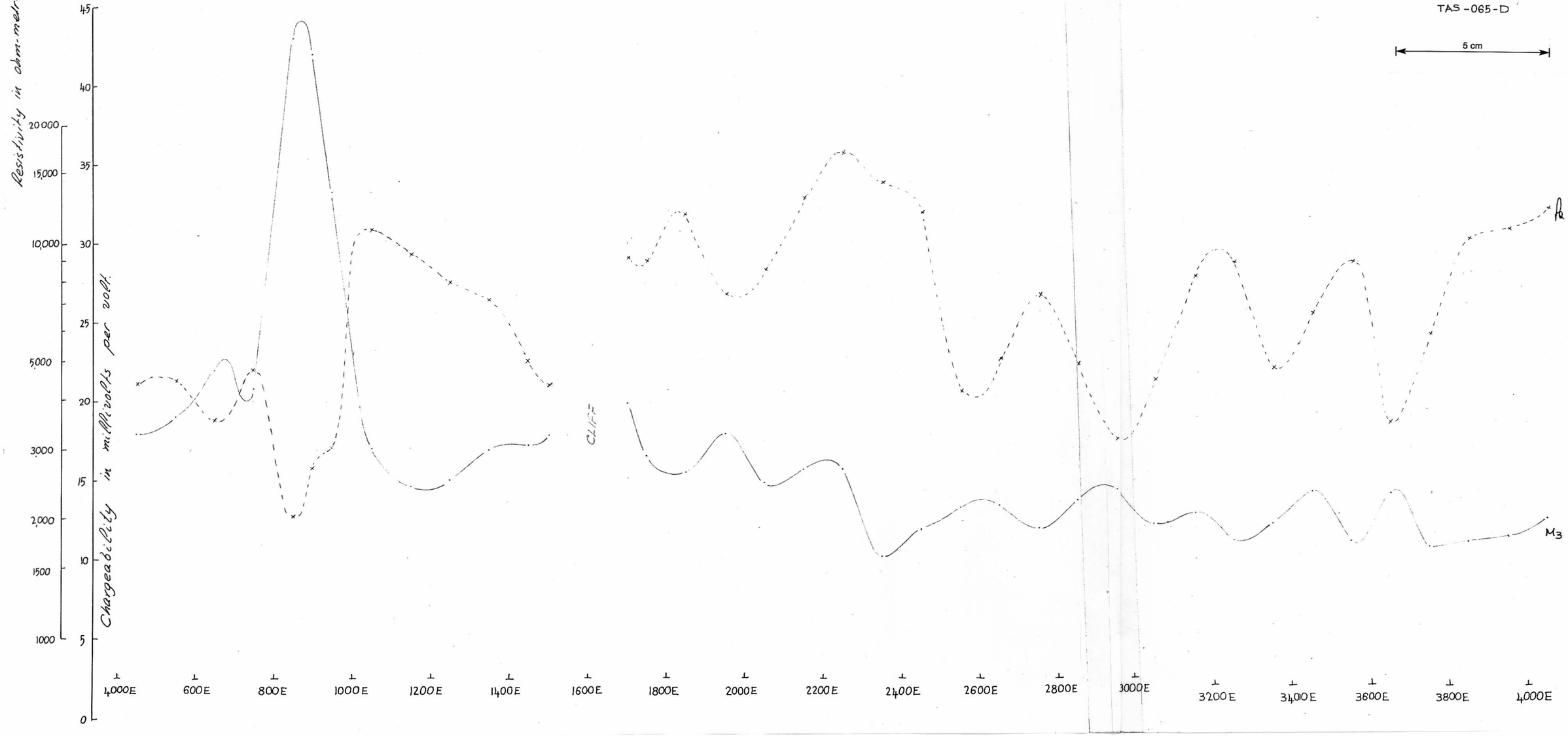
111260 LINE 5600 S

White Spur Grid

GRADIENT ARRAY EIP

TAS-065-D

5 cm



131

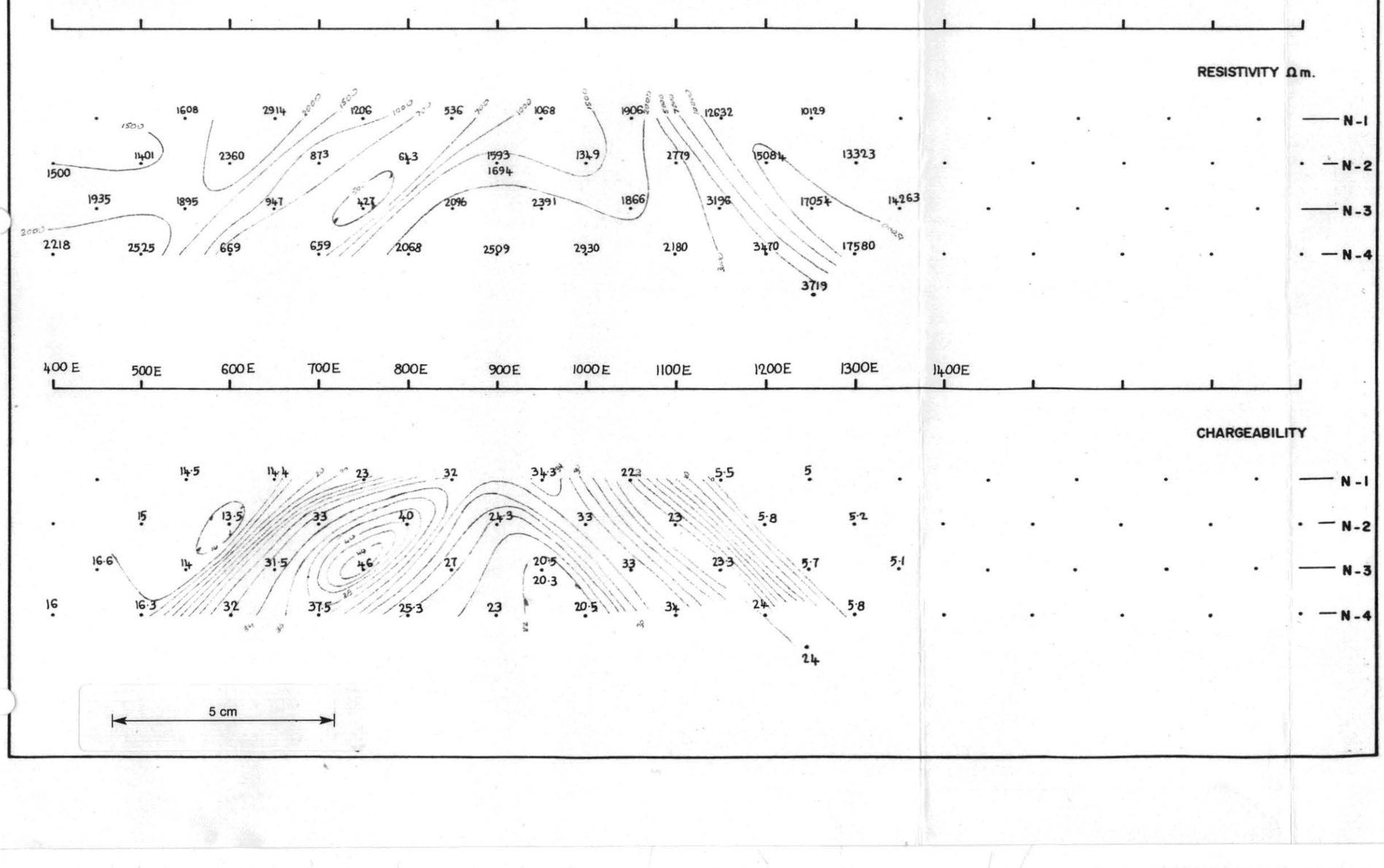
111261

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 9-5-79	LINE No. 5600 S
PLOTTED BY B. E	PROSPECT WHITE SPUR
PULSE 2 sec / Rx.	JOB No. TAS-065-D
DIPOLE SPACING 100'	



132

111262

SCINTREX PTY. LTD.

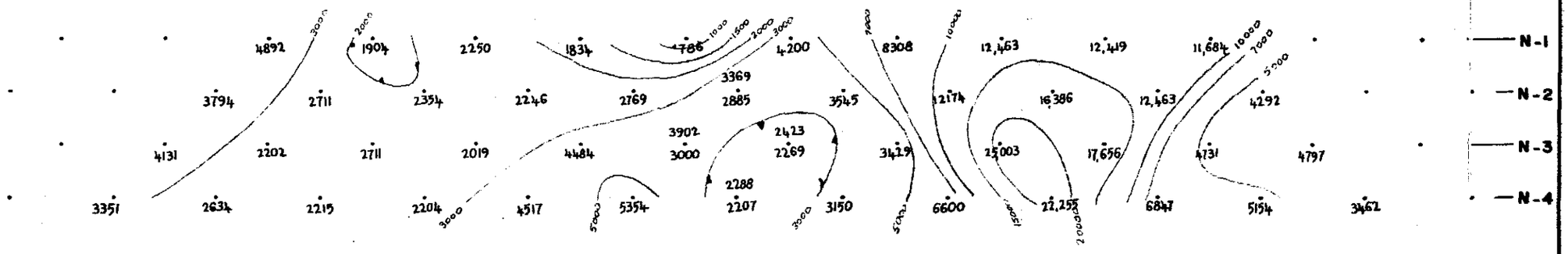
INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

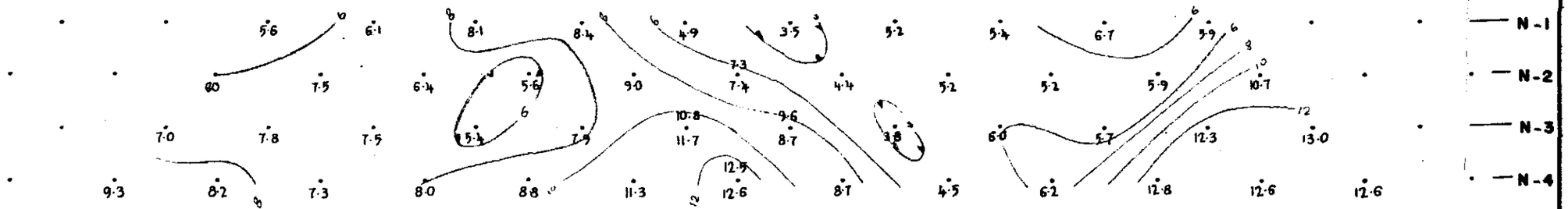
DATE 9-6-79 / 10-6-79		LINE No. 6000 S
PLOTTED BY D J T W		PROSPECT WHITE SPUR
PULSE 2 Sec.	Rx.	JOB No. TAS-065-D
DIPOLE SPACING 100 FT.		

500E 600E 700E 800E 900E 1000E 1100E 1200E 1300E 1400E 1500E 1600E 1700E

RESISTIVITY Ω m.



CHARGEABILITY



5 cm

111263

133

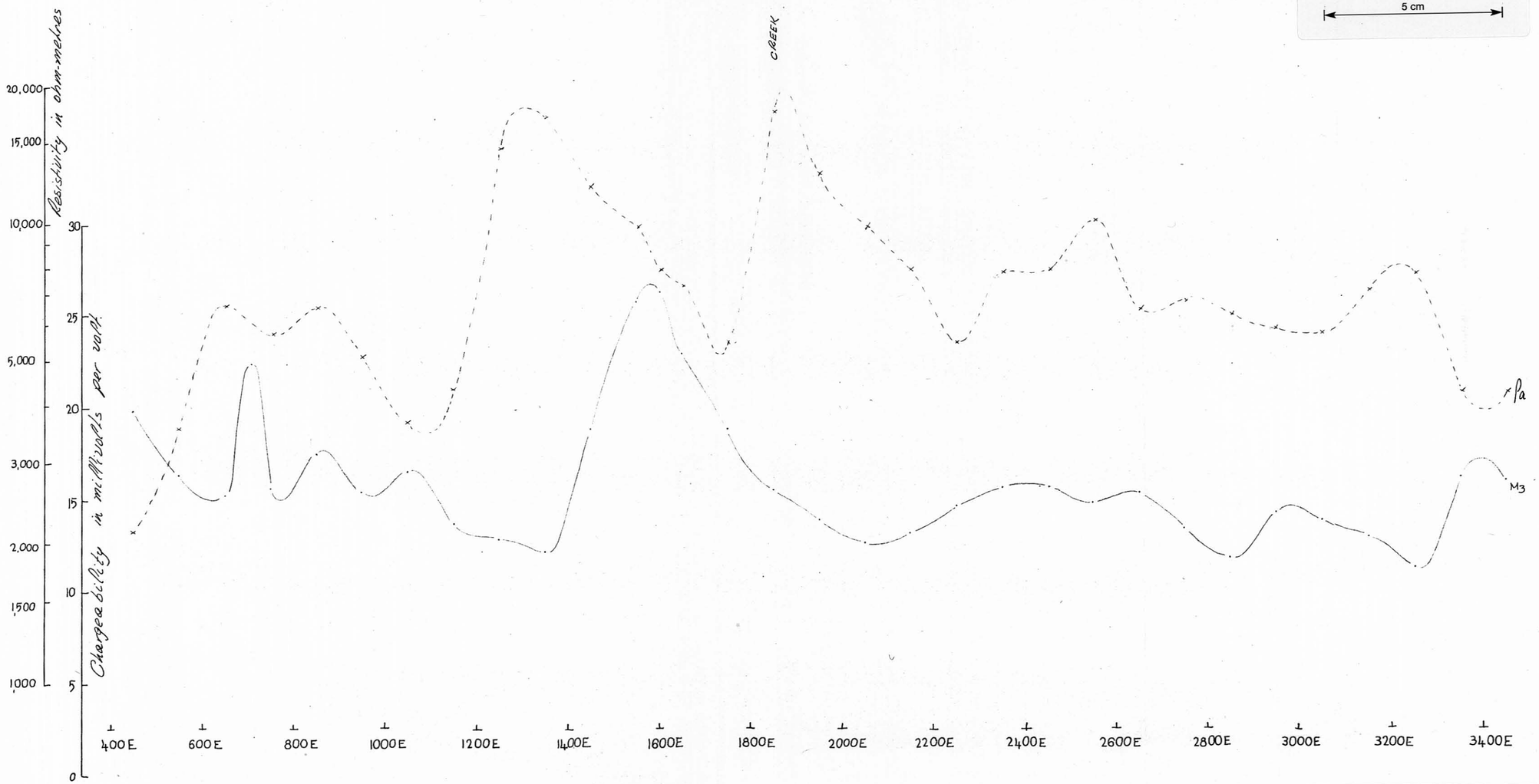
LINE 6400S

White Spur Grid

GRADIENT ARRAY EIP

TAS-065-D

5 cm



134

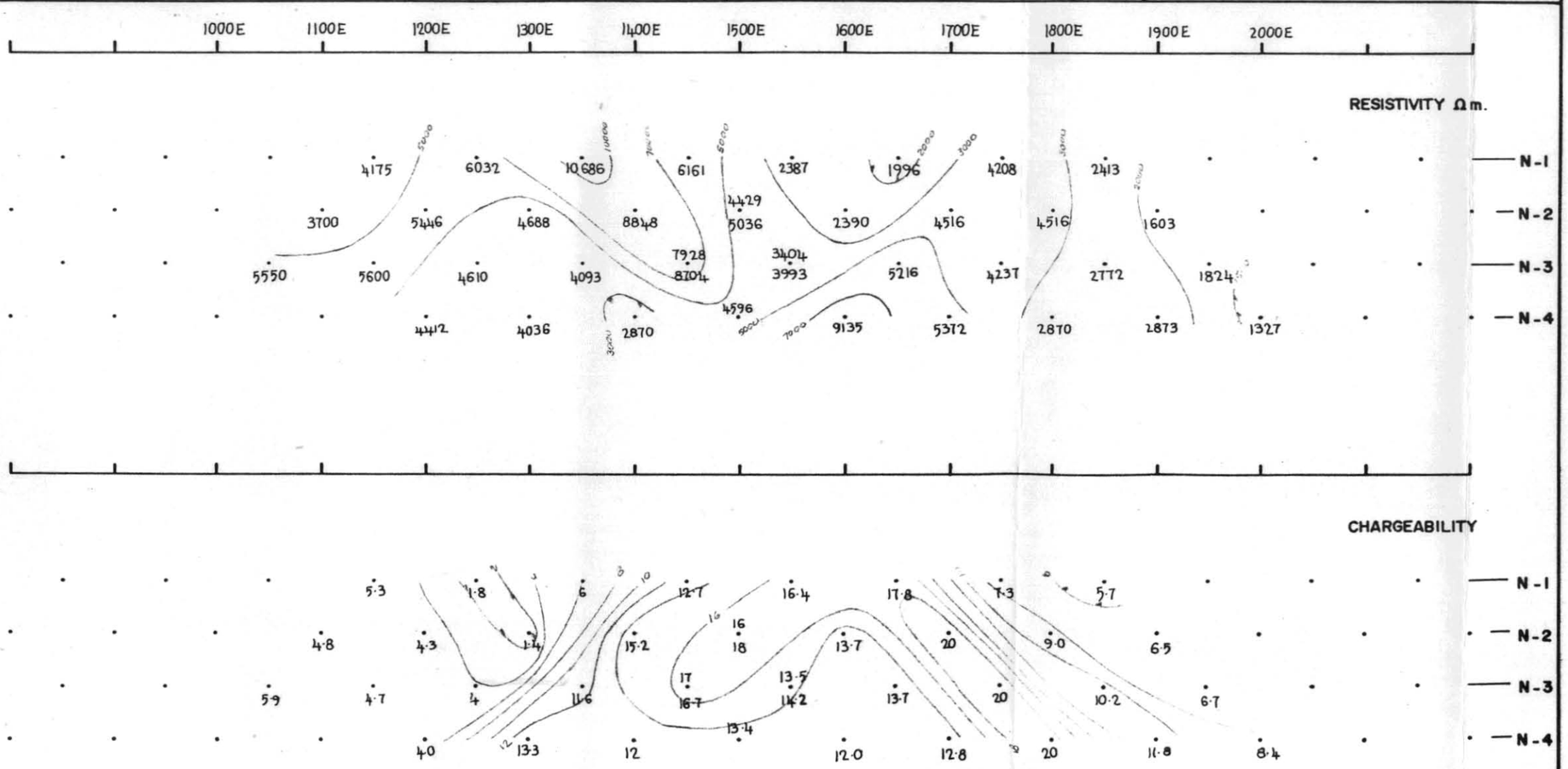
111264

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 15-5-79		LINE No. 6400 S
PLOTTED BY D J T W		PROSPECT WHITE SPUR
PULSE 2 sec	Rx.	JOB No. TAS-065-D
DIPOLE SPACING 100'		



135

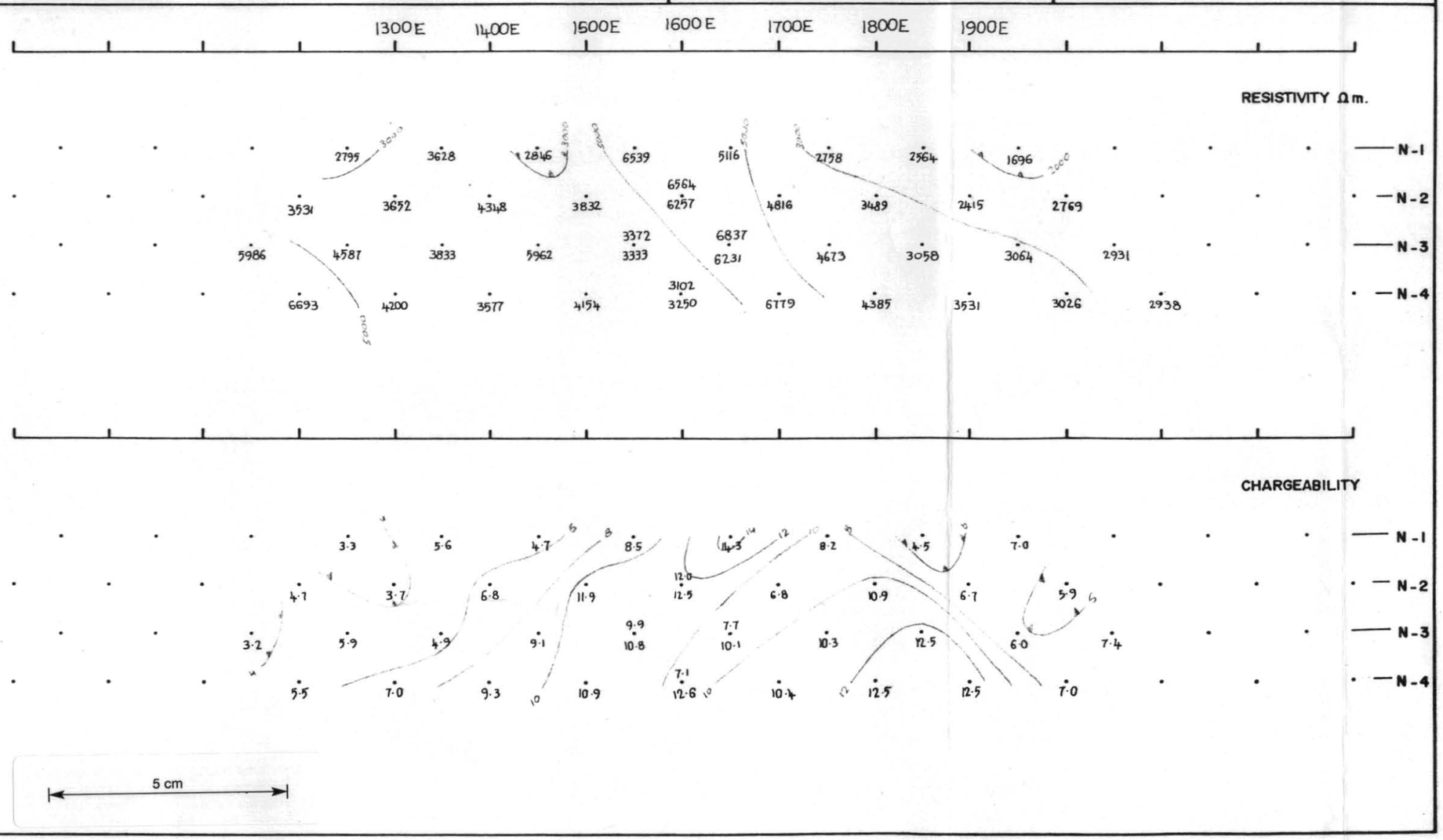
111265

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 13-6-79	LINE No. 6800 S
PLOTTED BY D.J.T.W.	PROSPECT WHITE SPUR
PULSE 2 sec / Rx.	JOB No. TAS-065-D
DIPOLE SPACING 100 ft.	



136

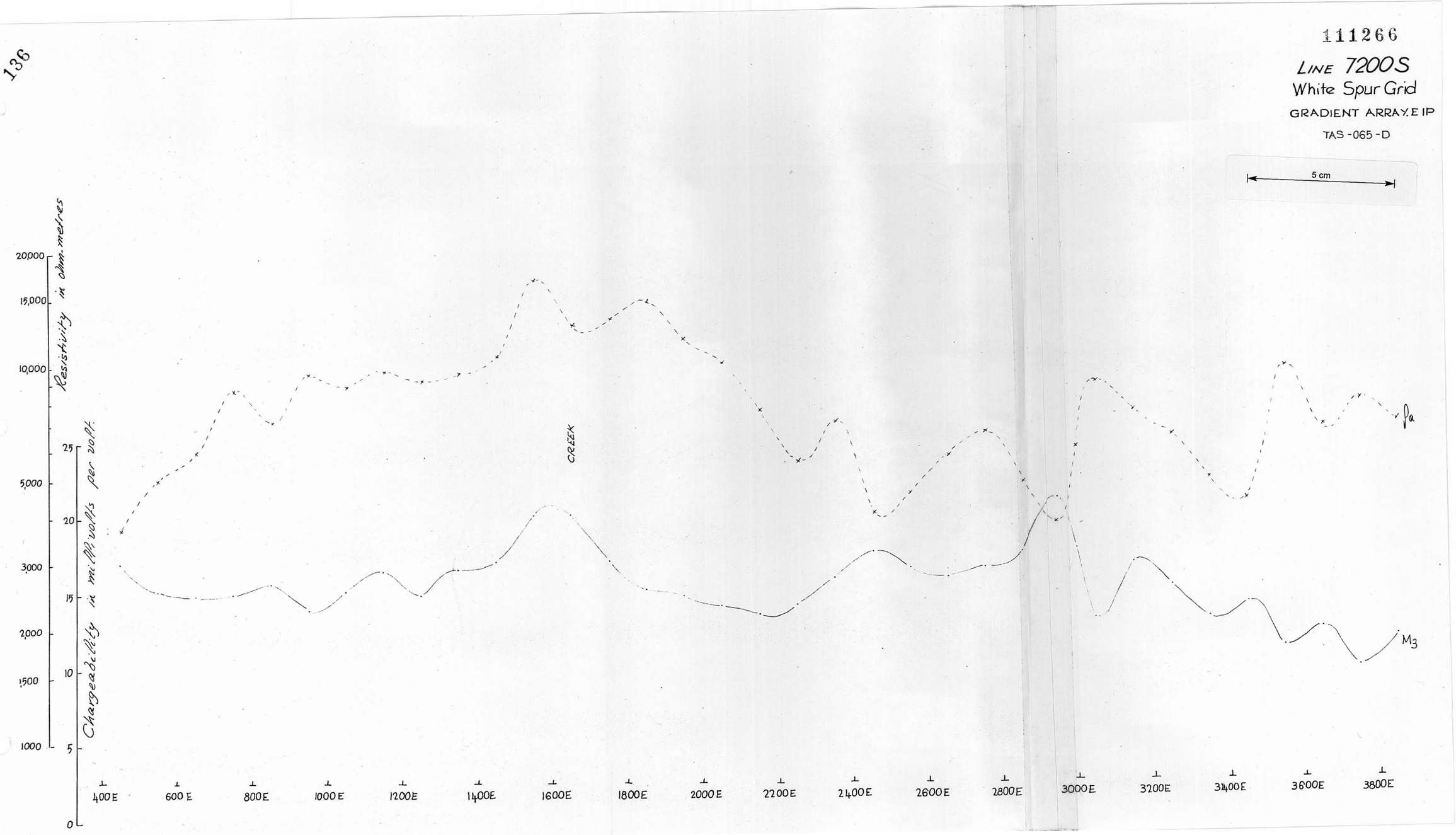
111266

LINE 7200S

White Spur Grid

GRADIENT ARRAY E IP

TAS-065-D



137

111267

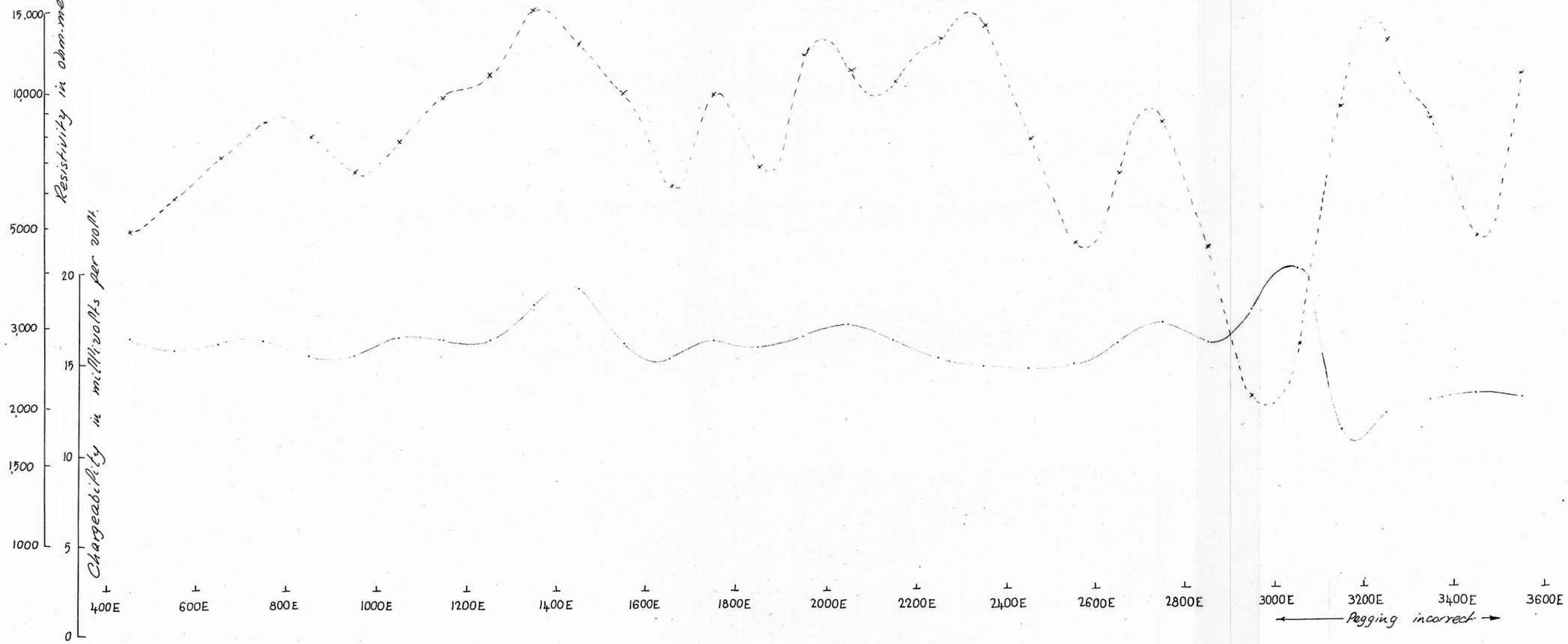
LINE 8000 S

White Spur Grid

GRADIENT ARRAY EIP

TAS-065-D

5 cm



138

111268

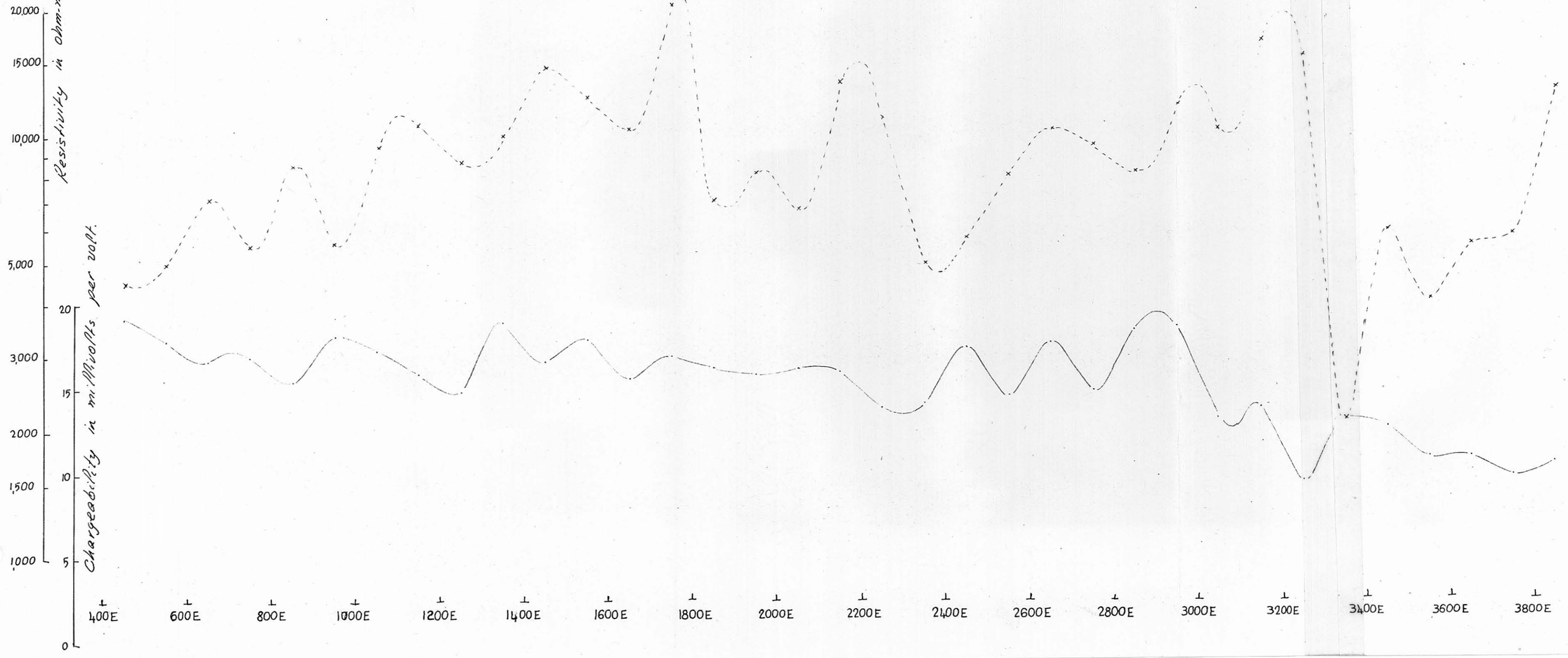
LINE 8800S

White Spur Grid

GRADIENT ARRAY EIP

TAS-065-D

5 cm



111269

139

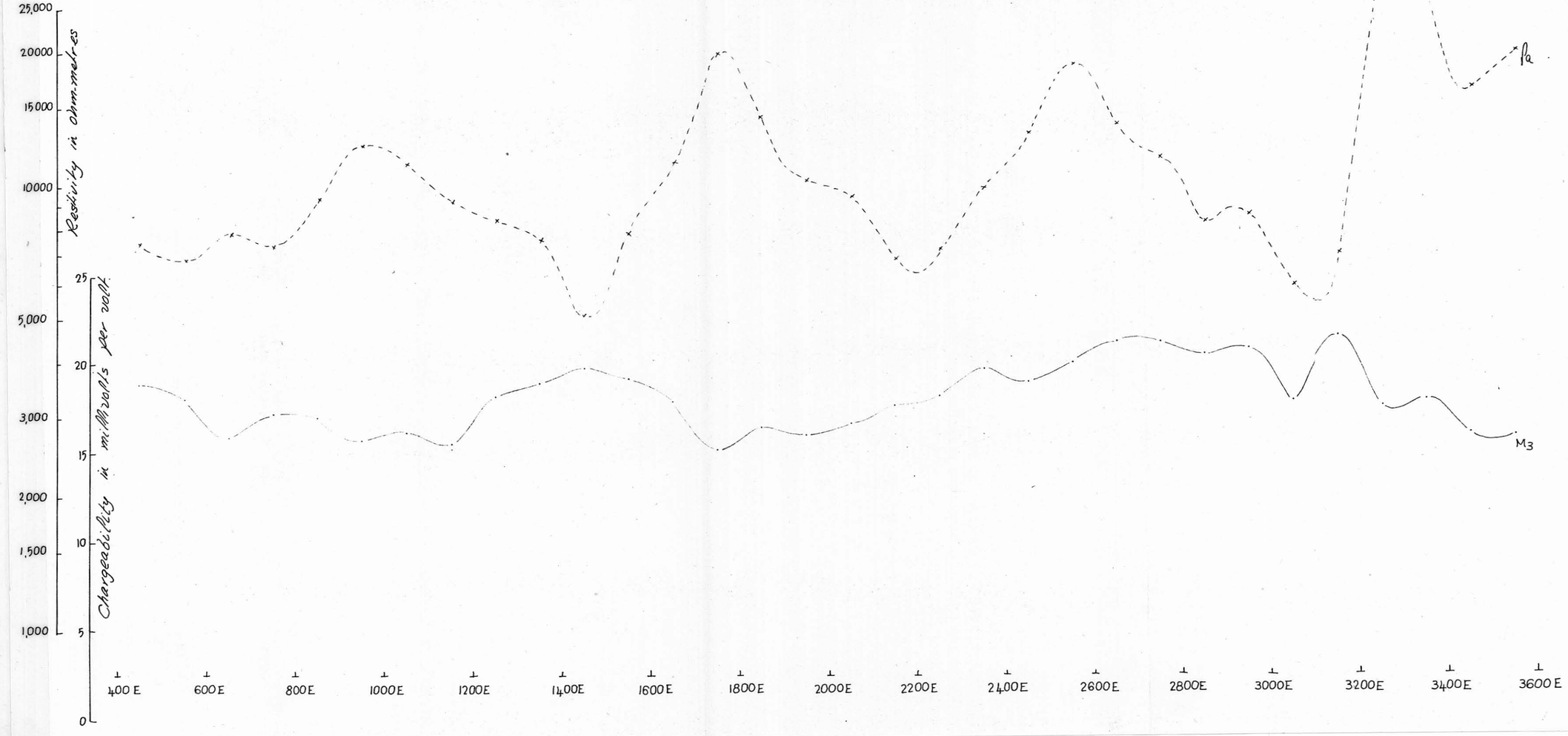
5 cm

LINE 9600 S

White Spur Grid

GRADIENT ARRAY EIP

TAS -065-D



140

111270

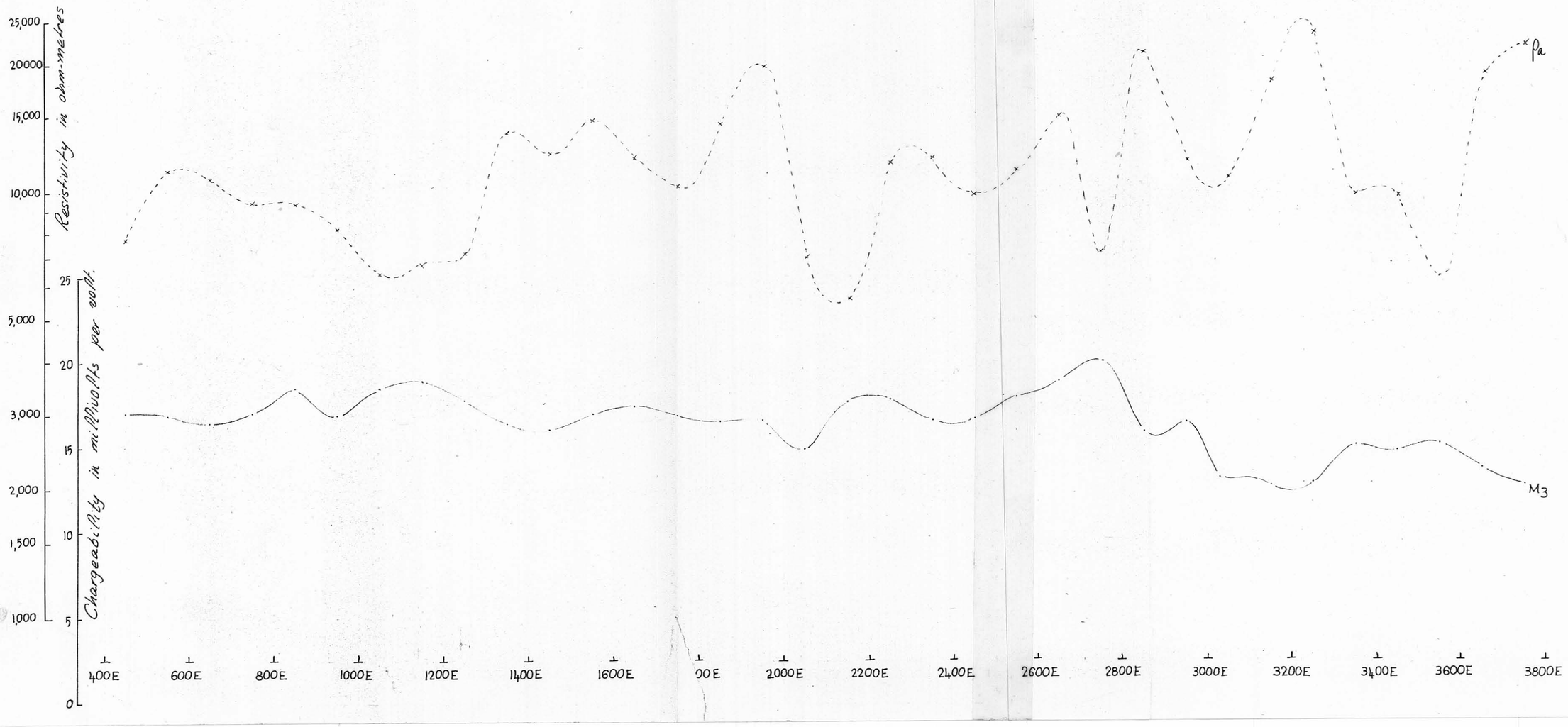
5 cm

LINE 10400S

White Spur Grid

GRADIENT ARRAY EIP

TAS-065-D



141

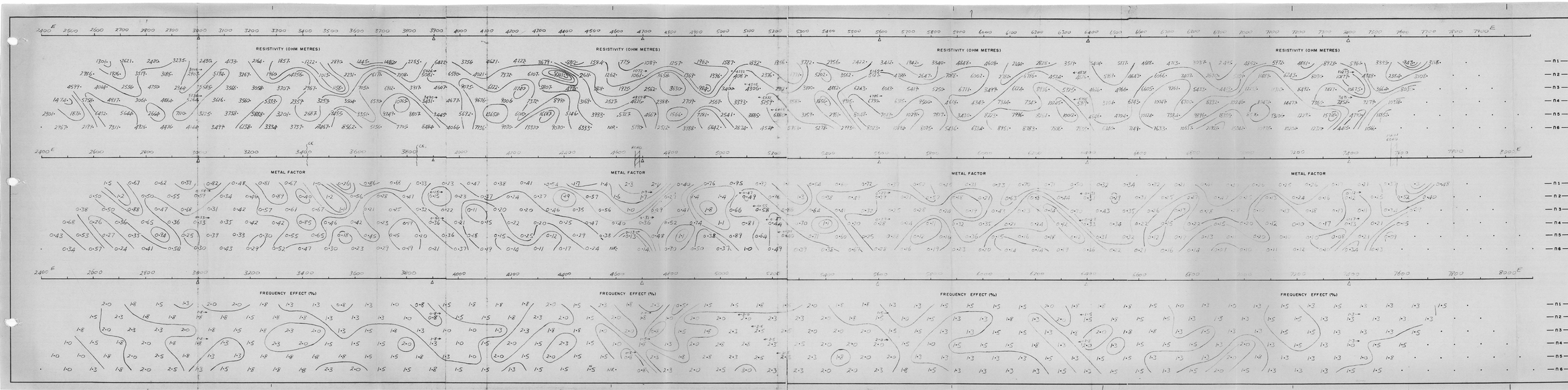
111271

APPENDIX IX

Pseudo-Sections of Pieman Lines p1, p2 and p3.

Geoex

June, 1978



GEOEX 80-1411 (Vol 3/6)

PTY. LTD.

111272

2761

INDUCED POLARISATION AND RESISTIVITY SURVEY

CLIENT Electrolytic Zinc

AREA Pieman

5 cm

LINE No P1

SURVEY SPECIFICATIONS

ELECTRODE INTERVAL	100m
FREQUENCIES	0.3/2.5 Hz
ELECTRODES	Single Aerial
TRANSMITTER SERIAL NUMBER	Tx. 124/125
RECEIVER SERIAL NUMBER	Rx. 225/226
DATE OF SURVEY	May, 1978
PLOTTED BY	J.M.
INTERPRETATION	
FINAL CHECK	
DISTRIBUTED	

GEOEX PTY LTD. ADELAIDE, SOUTH AUSTRALIA

APPROVED: | PROJECT: | DWG. No

111273

GEOEX 80-1411 (Vol 3/6)

PTY LTD

2762

INDUCED POLARISATION AND RESISTIVITY SURVEY

CLIENT ELECTROLYTIC ZINC

AREA PIEMAN

LINE Nº P 2

5 cm

SURVEY SPECIFICATIONS

ELECTRODE INTERVAL 100 m

FREQUENCIES 0·3 / 2·5 Hz

ELECTRODES SINGLE ALFOIL

TRANSMITTER SERIAL NUMBER Tx 124

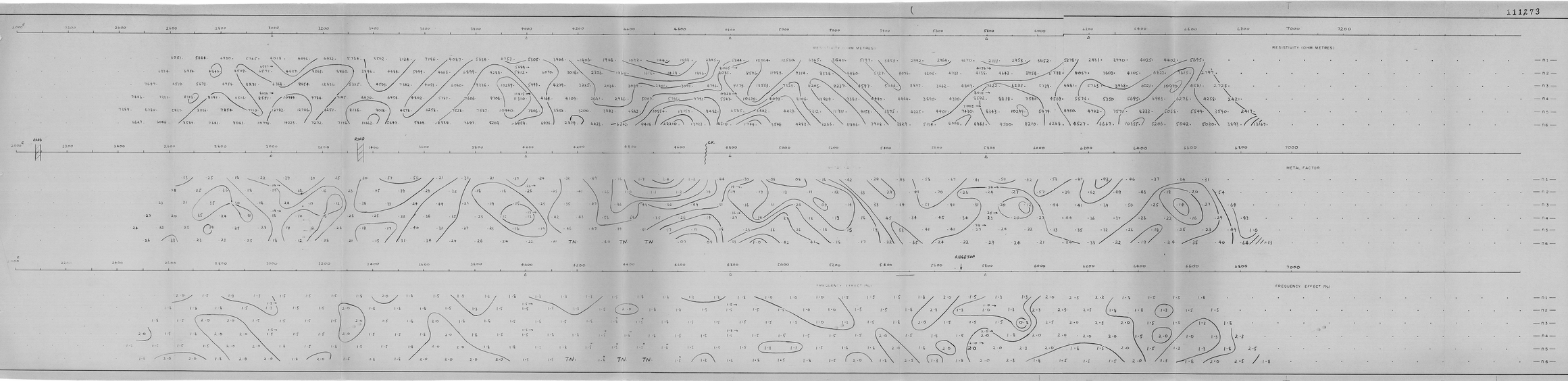
RECEIVER SERIAL NUMBER Rx 225

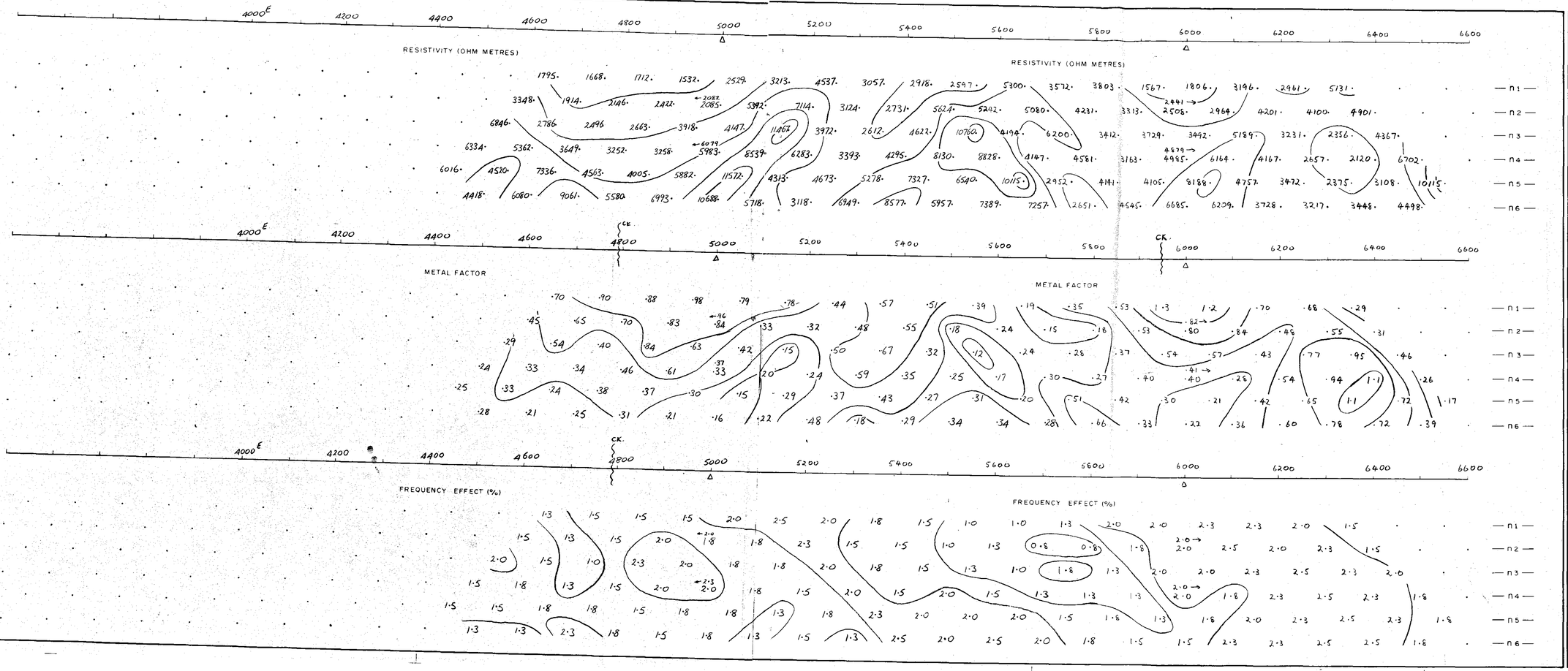
DATE OF SURVEY JUNE 1978

CREW LEADER GM

GEOEX PTY LTD ADELAIDE, SOUTH AUSTRALIA

APPROVED	PROJECT	DWG Nº





GEOEX PTY LTD 111274

2763

INDUCED POLARISATION AND RESISTIVITY SURVEY

CLIENT ELECTROLYTIC ZINC

AREA PIEMAN

LINE Nº P 3

5 cm

SURVEY SPECIFICATIONS

ELECTRODE INTERVAL 100 m

FREQUENCIES 0·3 / 2·5 Hz

ELECTRODES SINGLE ALFOIL

TRANSMITTER SERIAL NUMBER Tx 124

RECEIVER SERIAL NUMBER Rx 221

DATE OF SURVEY JUNE 1978

CREW LEADER GM

80-1411

GEOEX PTY LTD ADELAIDE, SOUTH AUSTRALIA

(Vol 3/6)

APPROVED	PROJECT	DWG Nº

111275

APPENDIX X

Pseudo-Section of Cutty Sark I.P. Lines 12,300N, 12,700N, 13,100N, 13,500N, 13,900N and 14,100N.

Geoex

June, 1978

111276

GEOEX 80-1411 (Vol 3/6)

PTY LTD

2766

INDUCED POLARISATION AND RESISTIVITY SURVEY

CLIENT ELECTROLYTIC ZINC

AREA CUTTY SARK

LINE Nº 12300 N

5 cm

SURVEY SPECIFICATIONS

ELECTRODE INTERVAL 100 ft

FREQUENCIES 0.3/2.5 Hz

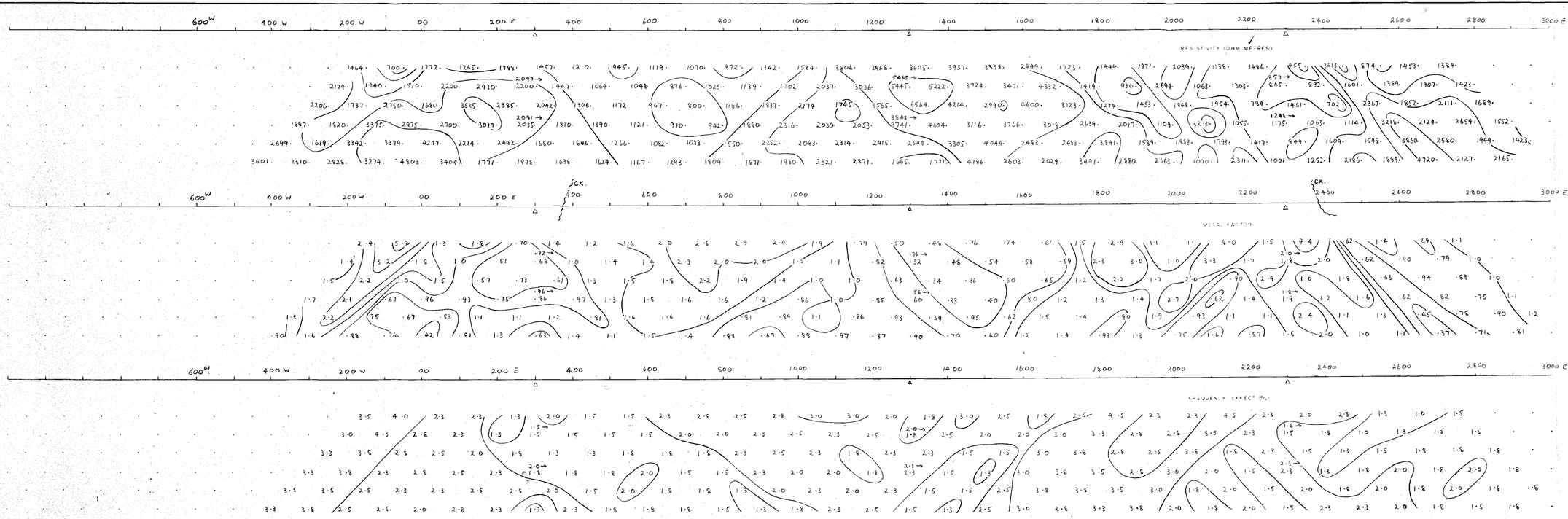
ELECTRODES SINGLE ALFOIL

TRANSMITTER SERIAL NUMBER Tx 125

RECEIVER SERIAL NUMBER Rx 221

DATE OF SURVEY JUNE 1978

CREW LEADER J.M.



GEOEX PTY LTD ADELAIDE, SOUTH AUSTRALIA

APPROVED	PROJECT	DWG. Nº

111277

GEOEX 80-141 (Vol 3/6)

PTY. LTD.

2765

INDUCED POLARISATION AND RESISTIVITY SURVEY

CLIENT Electrolytic Zinc

AREA Cutty Sark

LINE Nº 12700 N

5cm

SURVEY SPECIFICATIONS

ELECTRODE INTERVAL 100 ft

FREQUENCIES 0.3/2.5 Hz

ELECTRODES Single Alfoil

TRANSMITTER SERIAL NUMBER Tx 125

RECEIVER SERIAL NUMBER Rx 221

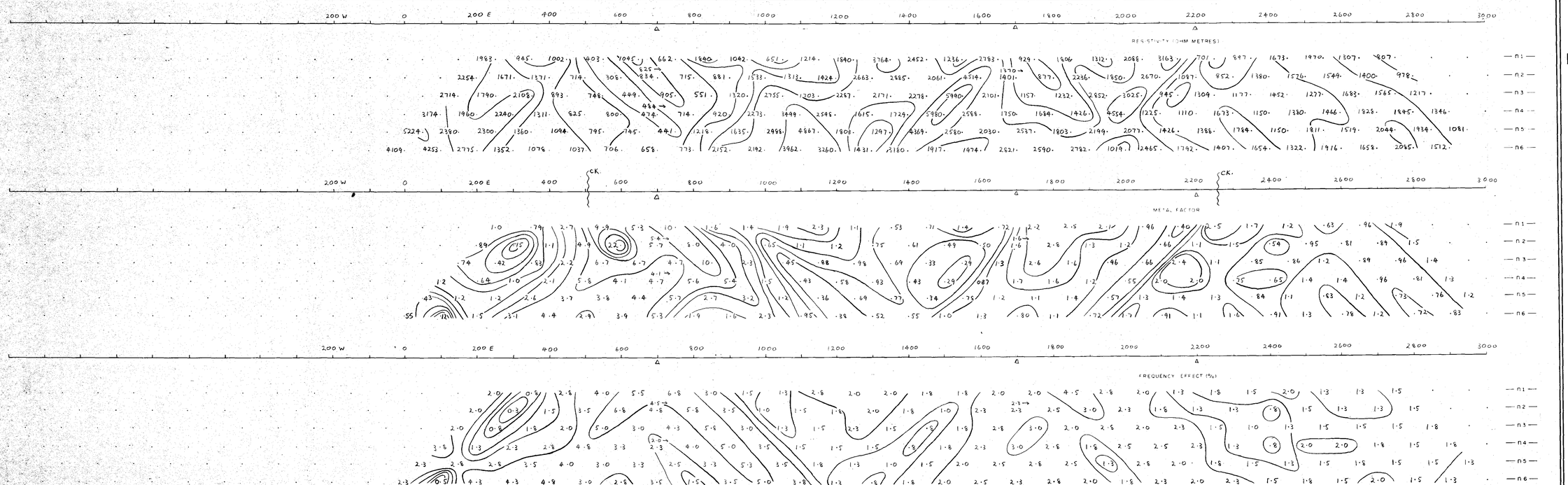
DATE OF SURVEY 11th-13th June, 1978

CREW LEADER S. M.

ρ_a IN OHM-METRES.

GEOEX PTY LTD ADELAIDE, SOUTH AUSTRALIA

APPROVED	PROJECT	DWG. Nº



111278

GEOEX 80-141 (No) 316

GEOEX PTY LTD.

2764

INDUCED POLARISATION AND RESISTIVITY SURVEY

CLIENT ELECTROLYTIC ZINC

AREA CUTTY SARK

LINE Nº 13100 N

5 cm

SURVEY SPECIFICATIONS

ELECTRODE INTERVAL 100 FT

FREQUENCIES 0·3 / 2·5 Hz

ELECTRODES SINGLE ALFOIL

TRANSMITTER SERIAL NUMBER Tx 125

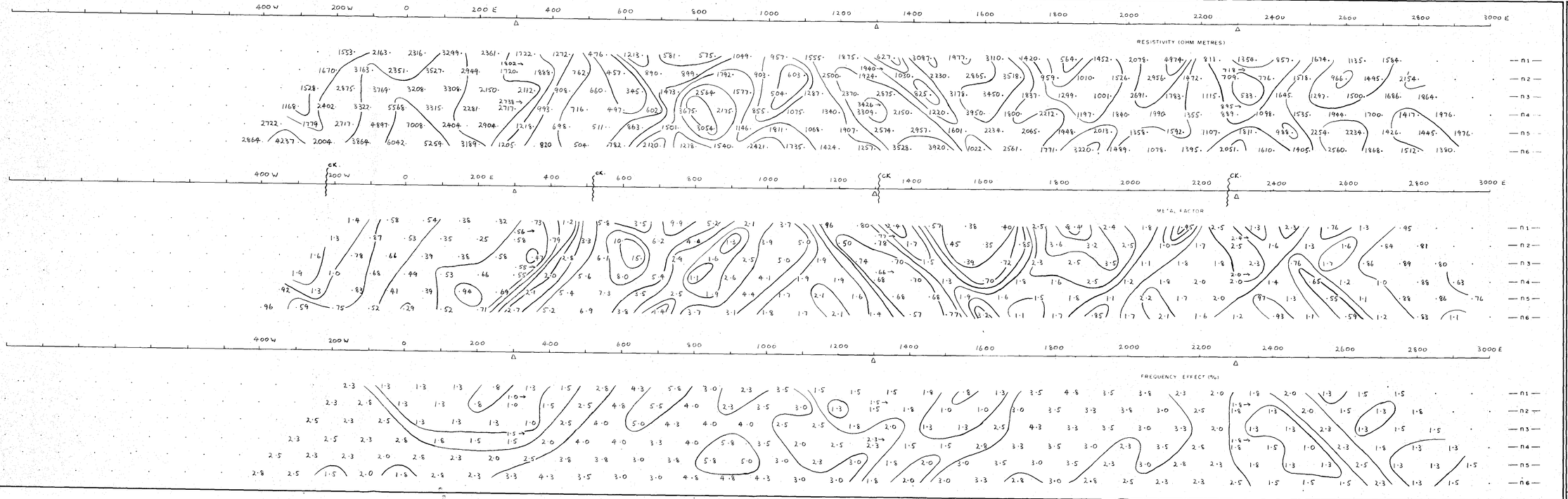
RECEIVER SERIAL NUMBER Rx 221

DATE OF SURVEY JUNE 1975

CREW LEADER S.M.

GEOEX PTY LTD. ADELAIDE, SOUTH AUSTRALIA

APPROVED	PROJECT	DWG Nº



111279

GEOEX 80-1411 CV01316

PTY LTD

2768

INDUCED POLARISATION AND RESISTIVITY SURVEY

CLIENT ELECTROLYTIC ZINC

AREA CUTTY SARK

LINE Nº 13500 N

5 cm

SURVEY SPECIFICATIONS

ELECTRODE INTERVAL 100 ft

FREQUENCIES 0.3 / 2.5 Hz

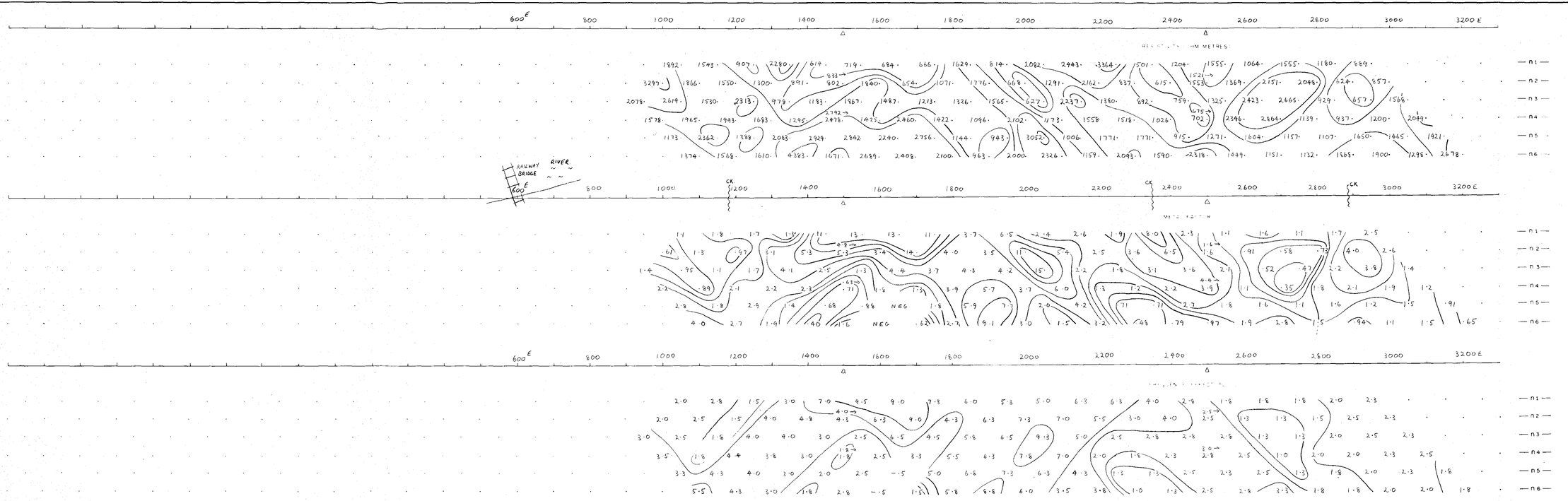
ELECTRODES SINGLE ALFOIL

TRANSMITTER SERIAL NUMBER Tx 125

RECEIVER SERIAL NUMBER Rx 221

DATE OF SURVEY JUNE 1978

CREW LEADER SM



GEOEX PTY LTD ADELAIDE, SOUTH AUSTRALIA

APPROVED	PROJECT	DWG Nº

111280

GEOEX 80-1411 (VOL 3/6)

PTY LTD

2789

INDUCED POLARISATION AND RESISTIVITY SURVEY

CLIENT ELECTROLYTIC ZINC

AREA CUTTY SARK

LINE Nº 13900 N

5 cm

SURVEY SPECIFICATIONS

ELECTRODE INTERVAL 100 ft

FREQUENCIES 0.3 / 2.5 Hz

ELECTRODES SINGLE ALFOIL

TRANSMITTER SERIAL NUMBER Tx 125

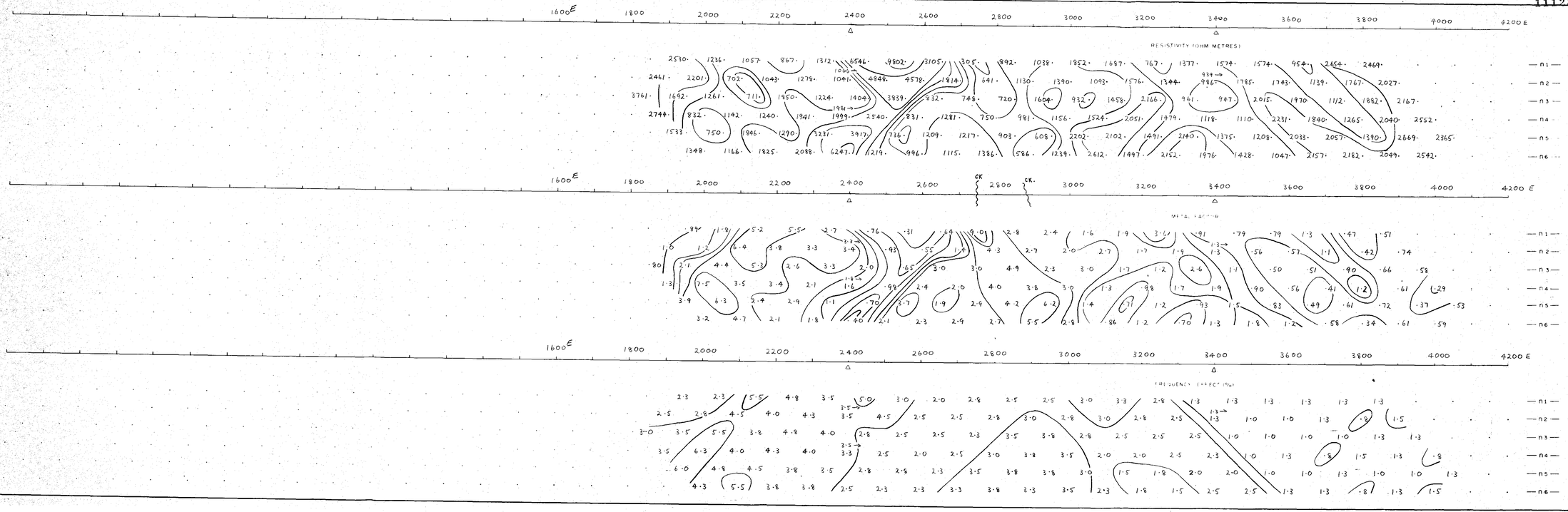
RECEIVER SERIAL NUMBER Rx 221

DATE OF SURVEY JUNE 1978

CREW LEADER J.M

GEOEX PTY LTD ADELAIDE, SOUTH AUSTRALIA

APPROVED	PROJECT	DWG Nº



GEOEX 111281
PTY. LTD.

2767

INDUCED POLARISATION AND RESISTIVITY SURVEY

CLIENT ELECTROLYTIC ZINC

AREA CUTTY SARK

LINE Nº 14100 N

5 cm

SURVEY SPECIFICATIONS

ELECTRODE INTERVAL 100 ft

FREQUENCIES 0.3 / 2.5 Hz

ELECTRODES SINGLE ALFOIL

TRANSMITTER SERIAL NUMBER Tx 125

RECEIVER SERIAL NUMBER Rx 221

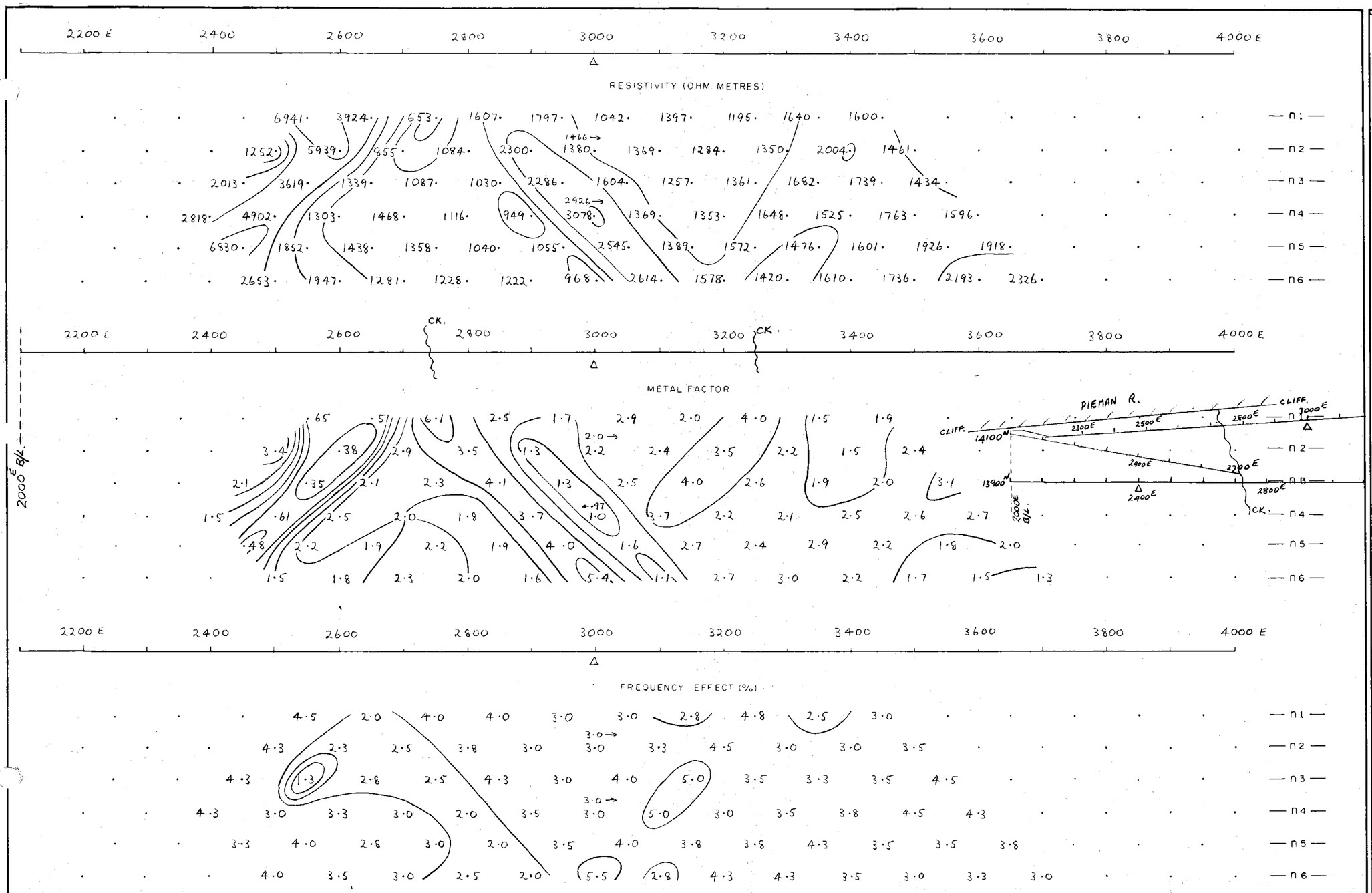
DATE OF SURVEY JUNE 1978

CREW LEADER S. M.

80-1411 (Vol 3/6)

GEOEX PTY LTD ADELAIDE, SOUTH AUSTRALIA

APPROVED	PROJECT	DWG. Nº



APPENDIX XI

Origins and Inflection Points of grid lines cut since the inception of the Mt. Black Joint Venture at Farm Creek, Mt. Sale, Pieman and White Spur.

APPENDIX XI.

Origins and Inflection Points of grid lines cut since the inception of the Mt. Black Joint Venture at Farm Creek, Mt. Sale, Pieman and White Spur.

All co-ordinates in A.M.G. unless otherwise stated.

FARM CREEK AREA

Line	From	To	Distance
5,383,500N	382,060E	385,480E	3.42km
5,382,500N	383,580E	387,040E	3.46km
5,381,500N	384,060E	387,160E	3.10km

PIEMAN AREA

Line	Western End	Inflections	Eastern End	Distance
P 1	5,381,190N 379,850E		5,380,400N 385,800E	6.04km
P 2	5,380,280N 380,000E	5,380,260N 381,810E	5,379,820N 385,040E	5.10km
P 3	5,380,100N 381,540E	5,379,700N 382,390E		
		5,379,450N 382,820E		
		5,379,090N 383,610E	5,379,050N 384,340E	3.08km

MT. SALE AREA

Line	Western End	Inflections	Eastern End	Distance
5,379,200N	379,960E		380,500E	0.54km
5,379,100N	379,980E		380,880E	0.90km
5,379,000N	378,980E	5,379,000N 381,800E	5,378,520N 384,080E	4.11km
5,378,900N	380,040E		381,060E	1.02km
5,378,800N	380,020E		381,020E	1.00km
5,378,700N	380,040E		381,080E	1.04km
5,378,300N	383,660E		383,960E	0.30km
5,378,100N	379,300E		379,880E	0.58km
5,378,100N	380,500E		381,180E	0.68km
5,378,100N	383,660E		383,960E	0.30km
5,378,000N	378,980E		384,200E	5.22km
5,377,900N	379,300E		379,880E	0.58km
5,377,900N	380,500E		381,260E	0.76km
5,377,900N	383,660E		383,960E	0.30km

APPENDIX XI Cont.

Line	Western End	Inflections	Eastern End	Distance
5,377,700N	382,280E		382,900E	0.62km
5,377,700N	383,440E		383,940E	0.50km
5,377,500N	382,100E		382,880E	0.78km
5,377,500N	383,520E		384,080E	0.56km
5,377,300N	378,720E		379,700E	0.98km
5,377,300N	382,400E		382,700E	0.30km
5,377,100N	379,300E		379,700E	0.40km
5,377,100N	382,420E		382,700E	0.28km
5,377,000N	378,630E		384,040E	5.41km
5,376,900N	379,280E		379,700E	0.42km
5,376,900N	382,400E		382,700E	0.30km
5,376,700N	382,400E		382,680E	0.28km
5,376,500N	381,270E		381,600E	0.33km
5,376,300N	381,380E		381,600E	0.22km
5,376,300N	382,300E		382,900E	0.60km
5,376,200N	384,000E		384,880E	0.88km
5,376,100N	380,920E		381,600E	0.68km
5,376,100N	382,320E		382,900E	0.58km
5,376,100N	384,000E		384,900E	0.90km
5,376,000N	379,720E		384,920E	5.20km
5,375,900N	380,920E		381,600E	0.68km
5,375,900N	382,340E		382,860E	0.52km
5,375,900N	384,000E		384,900E	0.90km
5,375,800N	384,000E		384,900E	0.90km
5,375,700N	380,840E		381,600E	0.76km
5,375,700N	382,340E		382,860E	0.52km
5,375,700N	384,000E		384,880E	0.88km
5,375,600N	384,900E		384,880E	0.88km
5,375,500N	380,700E		381,600E	0.90km
5,375,500N	384,000E		384,820E	0.82km
5,375,400N	384,000E		384,860E	0.86km
5,375,300N	384,000E		384,900E	0.90km
5,375,200N	384,000E		384,920E	0.92km
5,375,100N	381,860E		382,140E	0.28km
5,375,100N	384,000E		384,900E	0.90km
5,375,000N	380,120E		384,500E	4.38km
5,374,900N	381,860E		382,140E	0.28km
5,374,000N	380,520E		384,060E	3.54km
5,373,000N	380,180E		383,900E	3.72km

APPENDIX XI Cont.

BASE LINES

Line	Northern End	Southern End	Distance
380,500E	5,379,200N	5,378,700N	0.50km
379,300E	5,378,100N	5,377,900N	0.20km
380,500E	5,378,100N	5,377,900N	0.20km
383,800E	5,378,300N	5,377,500N	0.80km
379,000E	5,377,300N	5,376,900N	0.40km
382,500E	5,377,700N	5,376,700N	1.00km
381,600E	5,376,500N	5,375,500N	1.00km
382,500E	5,376,300N	5,375,700N	0.60km
384,000E	5,376,200N	5,375,000N	1.20km
382,000E	5,375,100N	5,374,900N	0.20km

WHITE SPUR AREA

Line	Western End	Eastern End	Distance
5,200N(Dalwitz Co-ords.)	400E	2,500E	0.64km
6,000 "	400E	2,500E	0.64km

LIST OF PLANS

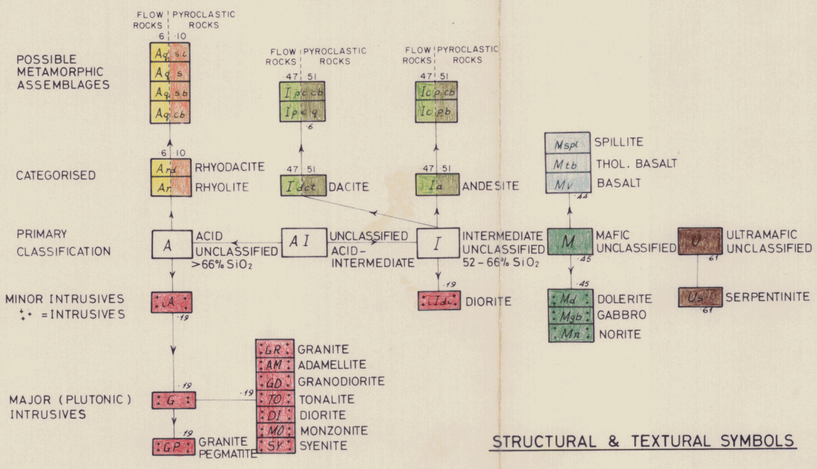
111286

Reference No.	Scale	Title
VOLUME 4		
Plate 1		Geological Legend for Exploration Mapping.
A2-504-0090	1:50,000	E.L. 1/62 and Excluded Areas
A2-504-0002	1:50,000	Locality Names
A2-504-0095	1:50,000	Aeromagnetics
A2-504-0098	1:50,000	Bedrock Geological Plan
A2-504-0089	1:50,000	Work completed since inception of E.Z./Getty Joint Venture to 30th June, 1979.
JD-525-0062	1:50,000	Sheet Layout Plan
JD-525-0003	1:50,000	Provisional Photogeological Worksheet of of the Rosebery Area, Tasmania.
A0-525-0004	1:10,000	Geology Sheet 5
A0-525-0005	1:10,000	Geology Sheet 6
A0-525-0006	1:10,000	Geology Sheet 7
A0-525-0055	1:10,000	Geology Sheet 8
A0-525-0013	1:10,000	Geology Sheet 9
A0-525-0037	1:10,000	Induced Polarization Sheet 5
A0-525-0054	1:10,000	Induced Polarization Sheet 6
A0-525-0024	1:10,000	Induced Polarization Sheet 7
A0-525-0057	1:10,000	Induced Polarization Sheet 8
A0-525-0058	1:10,000	Induced Polarization Sheet 9
VOLS		
A0-525-0052	1:10,000	Stream Sediment Geochemistry -80 mesh Sheet 5
A0-525-0053	1:10,000	Stream Sediment Geochemistry Mn Coated Pebbles +80 mesh Sheet 5
A0-525-0049	1:10,000	Stream Sediment Geochemistry -80 mesh Sheet 7
A0-525-0051	1:10,000	Stream Sediment Geochemistry Mn Coated Pebbles +80 mesh Sheet 7
A0-525-0030	1:10,000	Soil Geochemistry Cu Sheet 5
A0-525-0031	1:10,000	Soil Geochemistry Zn Sheet 5
A0-525-0032	1:10,000	Soil Geochemistry Pb Sheet 5
A0-525-0025	1:10,000	Soil Geochemistry Cu Sheet 7
A0-525-0027	1:10,000	Soil Geochemistry Zn Sheet 7
A0-525-0026	1:10,000	Soil Geochemistry Pb Sheet 7

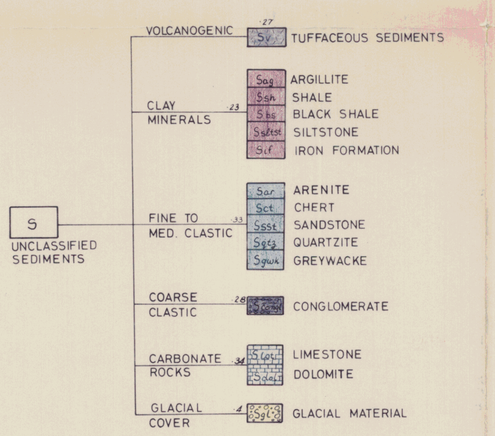
111287

Reference No.	Scale	Title
VOL 5 (cont)		
AO-504-0025	1:5,000	Soil Geochemistry Pb/Zn Sheet 5B
AO-504-0026	1:5,000	Soil Geochemistry Cu/Fe Sheet 5B
AO-504-0027	1:5,000	Soil Geochemistry Pb/Zn Sheet 5C
AO-504-0028	1:5,000	Soil Geochemistry Cu/Fe Sheet 5C
VOL 6 AO-504-0029	1:5,000	Soil Geochemistry Pb/Zn Sheet 5D
AO-504-0030	1:5,000	Soil Geochemistry Cu/Fe Sheet 5D
AO-504-0031	1:5,000	Soil Geochemistry Pb/Zn Sheet 6A
AO-504-0032	1:5,000	Soil Geochemistry Cu/Fe Sheet 6A
AO-504-0033	1:5,000	Soil Geochemistry Pb/Zn Sheet 6D
AO-504-0034	1:5,000	Soil Geochemistry Cu/Fe Sheet 6D
AO-504-0048	1:5,000	Soil Geochemistry Pb/Zn Sheet 7A
AO-504-0049	1:5,000	Soil Geochemistry Cu/Fe Sheet 7A
AO-504-0038	1:5,000	Soil Geochemistry Pb/Zn Sheet 7B
AO-504-0039	1:5,000	Soil Geochemistry Cu/Fe Sheet 7B
AO-504-0035	1:5,000	Soil Geochemistry Pb/Zn Sheet 7C
AO-504-0040	1:5,000	Soil Geochemistry Cu/Fe Sheet 7C
AO-504-0050	1:5,000	Soil Geochemistry Pb/Zn Sheet 7D
AO-504-0051	1:5,000	Soil Geochemistry Cu/Fe Sheet 7D
A1-508-0006	1:2,500	Magnetics - Cutty Sark
A2-504-0118	1:50,000	Bedrock Geological Plan

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

- t UNDIFERENTIATED TUFF
- lt LITHIC TUFF
- xt CRYSTAL TUFF
- vt VITRIC TUFF
- lpt LAPILLI TUFF 4-32mm
- b BRECCIA >32mm
- ag AGGLOMERATE >32mm
- bm BOMBS
- fm(3) FIAMME (LENGTH IN cms.)
- pm PUMICE
- ab ASH FLOW
- qe QUARTZ EYES/AUGEN TEXTURE
- pil PILLOWS
- fb FLOW BANDING
- fa FLOW BRECCIA
- LAVA
- a AMYGDALOIDAL
- s SPHERULITIC
- p PORPHYRITIC
- cl CLOTS
- Σ ACICULAR
- oph OPHITIC
- CHILLED MARGIN
- pg PEGMATIC
- vns VEINS
- m MASSIVE
- clvd CLEAVED
- sch SCHIST
- ox OXIDISED
- LATERITE
- bd BEDDED
- x bd CROSS BEDDED
- THbd THICK BEDDED
- thbd THIN BEDDED
- lam LAMINATED
- gd GRADED OR DIRECTION OF DECREASING GRAIN SIZE
- LODE CAST
- sf SCOUR & FILL
- ves VESICULAR
- jtd JOINTED
- stain STAINING
- afl ASH FALL

IGNEOUS GRAIN SIZE

- vcg VERY COURSE GRAINED >5 cm
- cg COARSE GRAINED 5cm-5mm
- mg MEDIUM GRAINED 5mm-1mm
- fg FINE GRAINED <1mm

SILICATE MINERALOGY

- q QUARTZ
- k K-FELSPAR
- ab ALBITE
- p PLAGIOCLASE
- a AMPHIBOLE
- px PYROXENE
- b BIOTITE
- c CHLORITE
- cb CARBONATE
- s SERICITE
- e EPIDOTE
- t TALC
- ba BARITE (STAEDTLER 104-10)
- f FELSPAR
- hb HORNBLENDE
- sd SIDERITE

- a'b ALBITISED
- cb'd CARBONATED
- c'd CHLORITISED
- s'd SERICITISED
- si. SILICIFIED

SULPHIDE & OXIDE MINERALOGY

- bx BOXWORK
- Sul SULPHIDES
- gos GOSSAN (RED / JAR)
- pn PENTLANDITE
- hm HEMATITE
- cc CHALCOCITE
- cv COVELLITE
- bn BORNITE
- cp CHALCOPYRITE
- sp SPHALERITE
- gn GALENA
- po PYRRHOTITE
- py PYRITE
- il ILLMENITE
- lx LEUCOXENE
- mag MAGNETITE

MINERALISATION

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

COLOURS

- ple. PALE
- drk 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 (LAKE)
- SWAMP
- BUILDING
- POWERLINE
- TRIG STATION
- HILL (BALD HILL)
- SHAFTS
- ADIT
- TRENCH
- MINE OR QUARRY
- DRILL HOLE - BARREN
- DRILL HOLE - COLOUR FOR MINERALISATION
- (c) DRILL HOLE - SIGNIFICANT OR POSSIBLE ORE GRADE AND WIDTH (STAEDTLER 104-2)
- (cc) DRILL HOLE - MINOR OR POSSIBLE SUB-ORE GRADE MINERALISATION (STAEDTLER 104-10)
- DRILL HOLE - FAILED TO REACH TARGET

OPERATION OF LEGEND

DESCRIBING ROCK UNITS

S Sedimentary Rocks
A - Acid Igneous Rocks

1. CAPITAL LETTER - Indicates Primary Classification eg
2. LOWER CASE LETTERS - Indicates The Following:

2.i 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 vxt A. = Crystal Tuff of Acid Composition

(ii) x bd S = Cross Bedded Sedimentary Rock

2.ii AS SUFFIXES In Progressive Order

(a) CATEGORISED eg (i) Ar = Rhyolite, (ii) Ssh = Shale;

(b) MINERALOGY eg (i) pAr'i = Rhyolite with Felspar Phenocrysts

(ii) Ags = Quartz Serikite Rock of Acid Igneous Origin

(iii) Ar a'b = Albitised Rhyolite

EXAMPLE - pk/grn clvd x vt A rd ab c'd

pk/grn (Colours) - Pink Crystals in a Green Matrix; clvd (Structural Feature) - cleaved; x vt (Texture) - crystal vitric tuff; A (Primary Subdivision) - acid igneous rock; rd (Categorised) - rhyodacite; ab (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 FOR EXPLORATION MAPPING	
111288	
80-141 (Vol 4/6)	REF. NO. PLATE I
DATE: 10/75 REVISED: 12/75	

2770 80-141

370000 mE

380000 mE

390000 mE

5380000 mN

5370000 mN

5360000 mN

BURNS PEAK

RAILWAY

River

BAY

Mackintosh

FARRELL MINE
TULLAH

S.P.L. 3

MT. FARRELL

River

EMU

AREA TO
BE APPLIED FOR

MT. BLACK

Murchison

Pieman

MURCHISON

ROSEBERY

HIGHWAY

River

MT. MURCHISON

Stitt

AERIAL ROPEWAY

WILLIAMSFORD

HAULAGE

River

E.L. 1/62

MT. READ

S.P.L. 132

MT. DUNDAS

LEGEND

MINE LEASES EXCLUDED FROM JOINT VENTURE

AREA TO BE PEGGED AS MINING LEASE EXCLUDED FROM JOINT VENTURE

FARRELL MINING LEASES EXCLUDED FROM THE JOINT VENTURE FOR ALL MINERALS EXCEPT TIN

E.L. 1/62, S.P.L. 132, & S.P.L. 3

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: MT. BLACK | TAS.

111289

E.L. 1/62 & EXCLUDED AREAS

5 cm

80-1411 (Vol 4/6)

SCALE 1 : 50,000

REFERENCE :

DATE : 1/5/78 | TRACED : R.P.T.

REFERENCE NO.

A2 504-0090

80-1411

2771

370000mE

380000mE

390000mE

BURNS PEAK

RAILWAY

River

FARM CREEK

Mackintosh

5380000mN

BAY

PIEMAN

FARRELL MINE

TULLAH

CUTTY SARK

River

EMU

BOBADIL

TULLAH

MT. FARRELL

MT. SALE

MT. BLACK

Murchison

Pieman

MURCHISON

ROSEBERY

HIGHWAY

River

MT. MURCHISON

5370000mN

STITT

Stitt

NATONE

AERIAL ROPEWAY

MURCHISON

WILLIAMSFORD

HAULAGE

E.L. 1/62

River

MT. READ

WHITE SPUR

MT. DUNDAS

5360000mN

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: MT. BLACK | TAS.

111290

LOCALITY NAMES

5 cm

80-1411 (Vol 4/6)

SCALE 1 : 50,000

REFERENCE :

DATE : 1/5/78 | TRACED : R.P.T.

REFERENCE NO.

A2 504-0002

80-411

2772

370000mE

380000mE

390000mE

5380000mN

5370000mN

5360000mN

BURNS PEAK

RAILWAY

River

Mackintosh

BAY

X FARRELL MINE

TULLAH

River

EMU

MT. FARRELL

MT. BLACK

Murchison

Pieman

MURCHISON

ROSEBERY

HIGHWAY

River

MT. MURCHISON

Stitt

AERIAL ROPEWAY

WILLIAMSFORD

HAULAGE

River

E.L. 1/62

MT. READ

MT. DUNDAS

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: MT. BLACK | TAS.

111291

AEROMAGNETICS

5 cm

80-1411 (Vol 4/6)

SCALE 1 : 50,000

REFERENCE : JD - 525 - 0038

DATE : 19/11/79 | TRACED : R.P.T.

REFERENCE NO.

A2 - 504 - 0095

2773 80-1411

370000 mE

380000 mE

390000 mE

5380000 mN

5370000 mN

5360000 mN

BURNS PEAK

RAILWAY

BAY

River

EMU

Pieman

MURCHISON

ROSEBERY

HIGHWAY

MT. BLACK

MT. FARRELL

FARRELL MINE

TULLAH

Mackintosh

MT. MURCHISON

Stitt

Murchison

AERIAL ROPEWAY

WILLIAMSFORD

HAULAGE

MT. READ

MT. DUNDAS

E.L. 1/62

GEOLOGICAL LEGEND

PLEISTOCENE	Tgl	Glacials and fluvioglacials
		UNCONFORMITY
ORDOVICIAN	Ogl	Owen Conglomerate (conglomerate and sandstone)
CAMBRIAN	€J	Jukes Breccia
		UNCONFORMITY
	€F	Farrell Group (pyroclastics, tuffaceous sediments, black slates)
	€Ar	Acid lavas
	€tAr	Acid pyroclastics
	€Idct-a	Intermediate lavas
	€tIdct-a	Intermediate pyroclastics
	€s	Tuffaceous sediments and shales
	€sx	Undifferentiated sediments

INTRUSIVES

JURASSIC	Jmd	Dolerite
CAMBRIAN	€tAr	Murchison Granite

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: MT. BLACK | TAS.

111292

BEDROCK GEOLOGICAL PLAN

5 cm

80-1411 (Vol 4-16)

SCALE 1 : 50,000

REFERENCE :

DRAWN : R.P.T. | DATE : 10/8/79

REFERENCE NO. A2 504-0098

2774 80-1411

370000mE

380000mE

390000mE

5380000mN

5370000mN

5360000mN

BURNS PEAK

RAILWAY

BAY

Mackintosh River

FARRELL MINE
TULLAH

MT FARRELL

EMU River

(1) (2) (3) (4) (5) (6) (7) (8) (9)

Langdons Area

Line F3

Abandoned

MT BLACK

Murchison River Area

Murchison River

Pieman

MURCHISON

ROSEBERY

HIGHWAY

MT MURCHISON

Stitt River

Abandoned

AERIAL ROPEWAY

WILLIAMSFORD

HAULAGE

MT READ

Jones Creek Grid

E.L. 1/62

111293

5 cm

MT DUNDAS

MURCHISON HIGHWAY

LEGEND

- Line Cut, Pegged, Mapped, Soil Sampled and Surveyed with I.P.
- Line Surveyed with I.P.
- Access Bulldozed and Mapped
- Access Mapped
- Walking Track Cut
- Road
- Vehicle Track
- Walking Track
- Railway
- Abandoned Tramway
- Transmission Line
- Grid Line

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: MT. BLACK | TAS.

WORK COMPLETED SINCE INCEPTION OF

E.Z./GETTY JOINT VENTURE

TO 30/06/1979

80-1411 (VOL 4(b))

SCALE 1:50,000	REFERENCE NO. A2 504-0089
REFERENCE:	
DATE: 1/5/78 TRACED: R.P.T	

80-1411 L 2775

2776

BULGOBAC EL 12/72

BULGOBAC SPECIAL SHEET (NORTH)

BULGOBAC SPECIAL SHEET (SOUTH)

MT BLACK E.L. 1/62

STERLING VALLEY E.L. 4/73

QUE RIVER

FARRELL

ROSEBER

HERCULES

Mt. Block

Mt. Farrell

Mt. Romulus

Mt. Reed

Mt. Tyndall

Mt. Dundas

Mt. Murchison

Mt. Charter

Burns Peak

Colebrook Hill

LEGEND - EXTENT OF TOPOGRAPHIC COVERAGE

- TOPOGRAPHIC MAPPING BY ASSOCIATED SURVEYS
- TOPOGRAPHIC MAPPING FROM LANDS DEPT. 1" TO 20CH PHOTOENLARGED TO 1:10,000 SCALE
- TOPOGRAPHIC MAPPING BY AUSTRALIAN AERIAL MAPPING PTY. LTD., DUNDAS AREA
- TOPOGRAPHIC MAPPING FROM H.E.C. PIEMAN ROAD SHEETS A22528, A22806, A22921

SHEET LAYOUT LEGEND

- BULGOBAC SPECIAL SHEETS 1:10,000 SCALE
- 2 — 1:10,000 SCALE SHEET LAYOUT
- 2A — 1:5,000 SCALE SHEET LAYOUT
- 2 — 1:5,000 SCALE SHEET LAYOUT ASSOCIATED SURVEYS PTY. LTD.

KEY TO MINERAL OCCURRENCES

1	SOCK CREEK	Pb-Zn
2	MT. CHARTER	Ba.
3	SILVER FALLS	Pb-Zn.
4	PINNACLES	Pb-Zn.
5	CHESTER	Py.
6	HOME RULE	Pb-Zn.
7	LANGDON	Pb-Zn.
8	CUTTY SARK	Cu.
9	MURCHISON	Pb-Zn.
10	SALMONS	Cu-Pb-Zn.
11	STERLING VALLEY	Pb-Zn-Ag.
12	COLEBROOK	Cu.
13	X PROPRIETARY	Sn.
14	OLYMPIC	Sn.
15	KOONYA	Pb-Zn.
16	GRAND CENTRE	Cu.
17	ATHENIC	Sn.
18	JUPITER	Pb-Zn-Cu.
19	RING P.A.	Cu-Pb-Zn.
20	BONNIE DUNDEE	Cu-Ag-Pb.
21	FAHL ORE	Cu-Ag-Pb.
22	FRAZER	Cu-As.
23	CURTAIN DAVIS	Cu-Ag-Pb.
24	RED HILLS	Cu.
25	HECLA	Cu-Bi.
26	EVENDEN	Zn-Pb.
27	BURNS PEAK	Pb-Zn.

11120

ELECTROLYTIC ZINC CO. OF A'ASIA. LTD.

PROJECT: MT. BLACK | TAS.

80-1411

SHEET LAYOUT PLAN

5 cm

80-1411 (Vol 4/6)

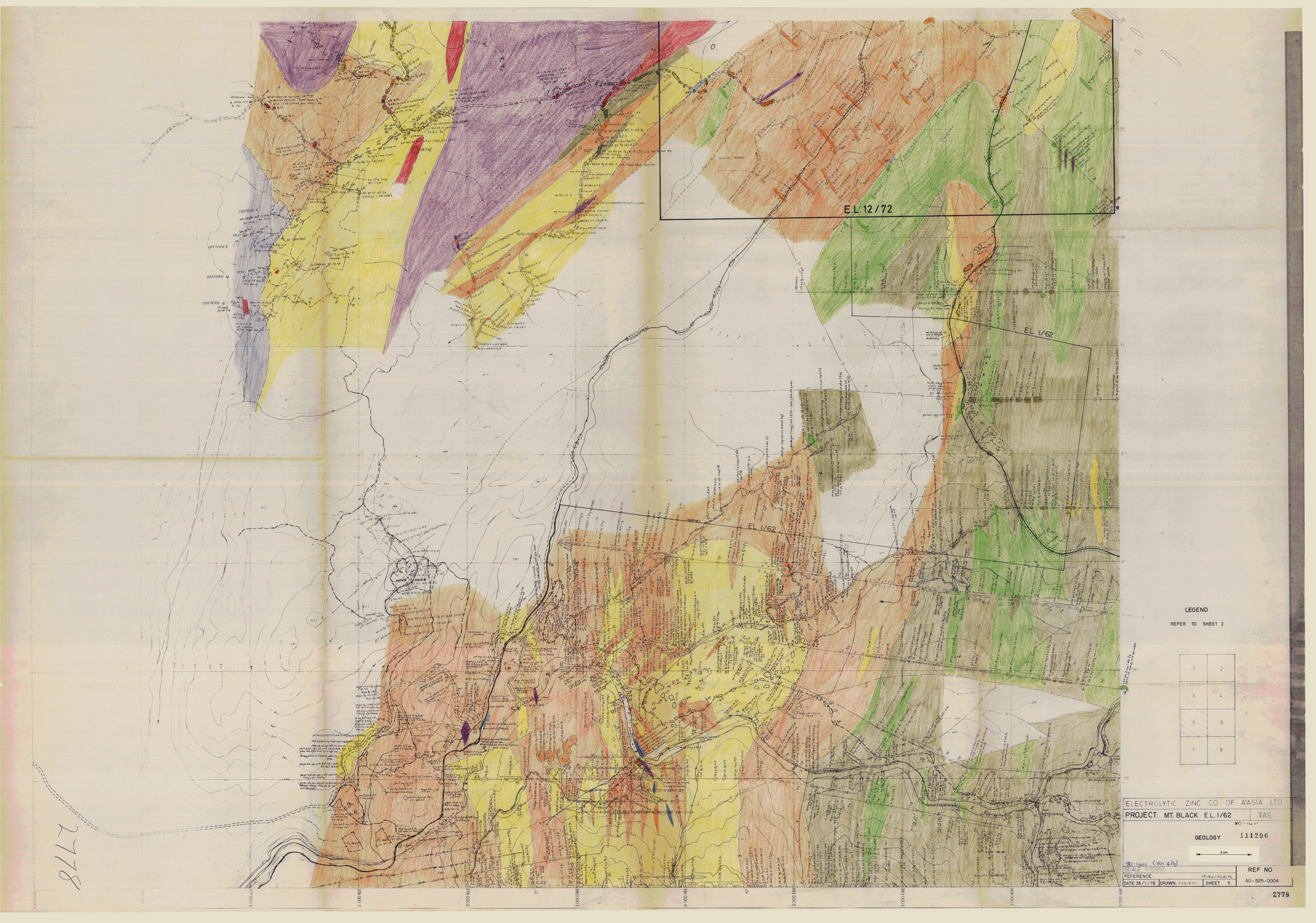
SCALE: 1:50 000	Survey:	Revised:
Reference:	Date: 22/11/79	REF. NO.
Drawn: R.P.T.	Checked:	JD - 525 - 0062

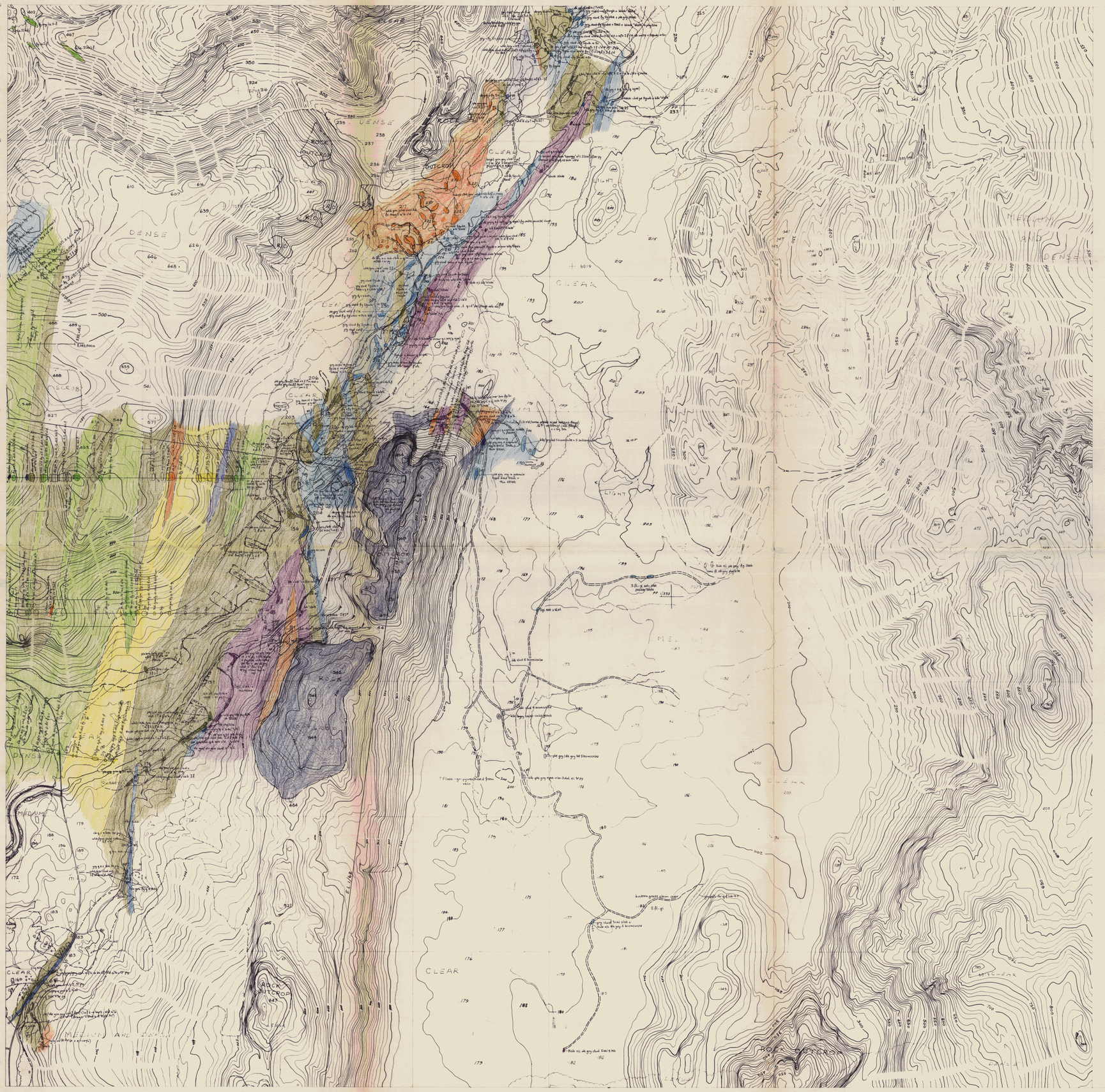
2776

2777 JD 525-0003
80-1411
111295 80-1411 (Vol 4/6)

PROVISIONAL PHOTOGEOLOGICAL WORKSHEET OF THE ROSEBERY AREA, TASMANIA.


Bulgobac
Mt. Charter
Mt Block
Mt Block
Burns Peak
Merton Hill
Chester
Rosebery
Mt Farrell
Tullah
Mt Romulus
Bald Hill
Victoria Peak
Colebrook Hill
Williamsford
Mt Murchison
Mt Read
Red Hills
White Cliff Hills
Moores Pimple
Mt Dundas
Newton Peak
Mt Tyndall
THE PINNACLES
Farrell Dam
Tailrace Dam
Lake Mackintosh
Lake Rosebery
Lake Murchison
Lake Huntley
Lake Selina
Lake Plimsoll
Lake Meredith
Lake Jukes
Lake Newton
Lake Rolleston
Que River
Mt Block Creek
Murchison
Henty
Tyndall
Farrell
Dundas
Darwin
Linda
Heazlewood
Denison
Pieman
Queenstown
Zeehan
Hercules
Mackintosh
Rosebery
Surface re-entry diatremes (pipes)
Fault obscured by cover sequence
Fault obscured by younger deposits
Fault obscured by cover sequence
Fault obscured by younger deposits
Fault obscured by younger deposits
Fault obscured by younger deposits


E.L. 12/72
EL 1/62
EL 1/62
COSTEAN 3
COSTEAN 4
COSTEAN 6
UNIT 10
LEGEND
REFER TO SHEET 2
1
2
3
4
5
6
7
8
ELECTROLYTIC ZINC CO OF A'ASIA LTD
PROJECT: MT. BLACK E.L. 1/62
TAS
GEOLOGY
111296
5 cm
80-1411 (Vol 4/6)
SCALE 1:10000
REFERENCE
DATE 28/1/76
DRAWN
SHEET 5
REF. NO
A0-525-0004
2778
2778



1	2
3	4
5	6
7	8

ELECTROLYTIC ZINC CO. OF A'ASIA. LTD.

ROSEBERY AREA | TAS

80-1411

GEOLOGY 111297

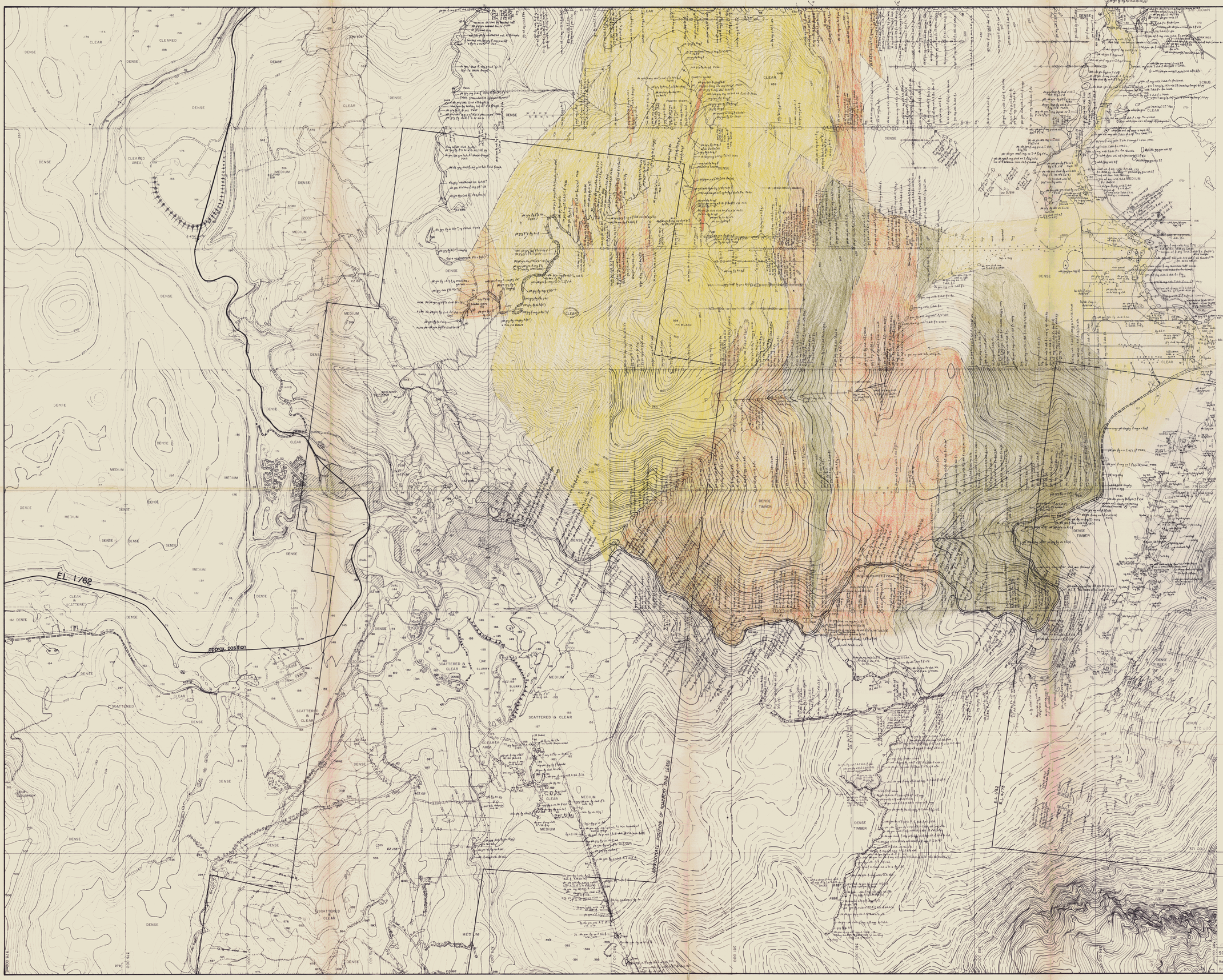
5 cm

80-1411 (Vol 4 fol)

SCALE 1:10,000 | DATE November 1978 | REF. No. A0-525-0005

VERTICAL INTERVAL 10m | P.K.

2779



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

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: MT. BLACK TAS.

80-1411

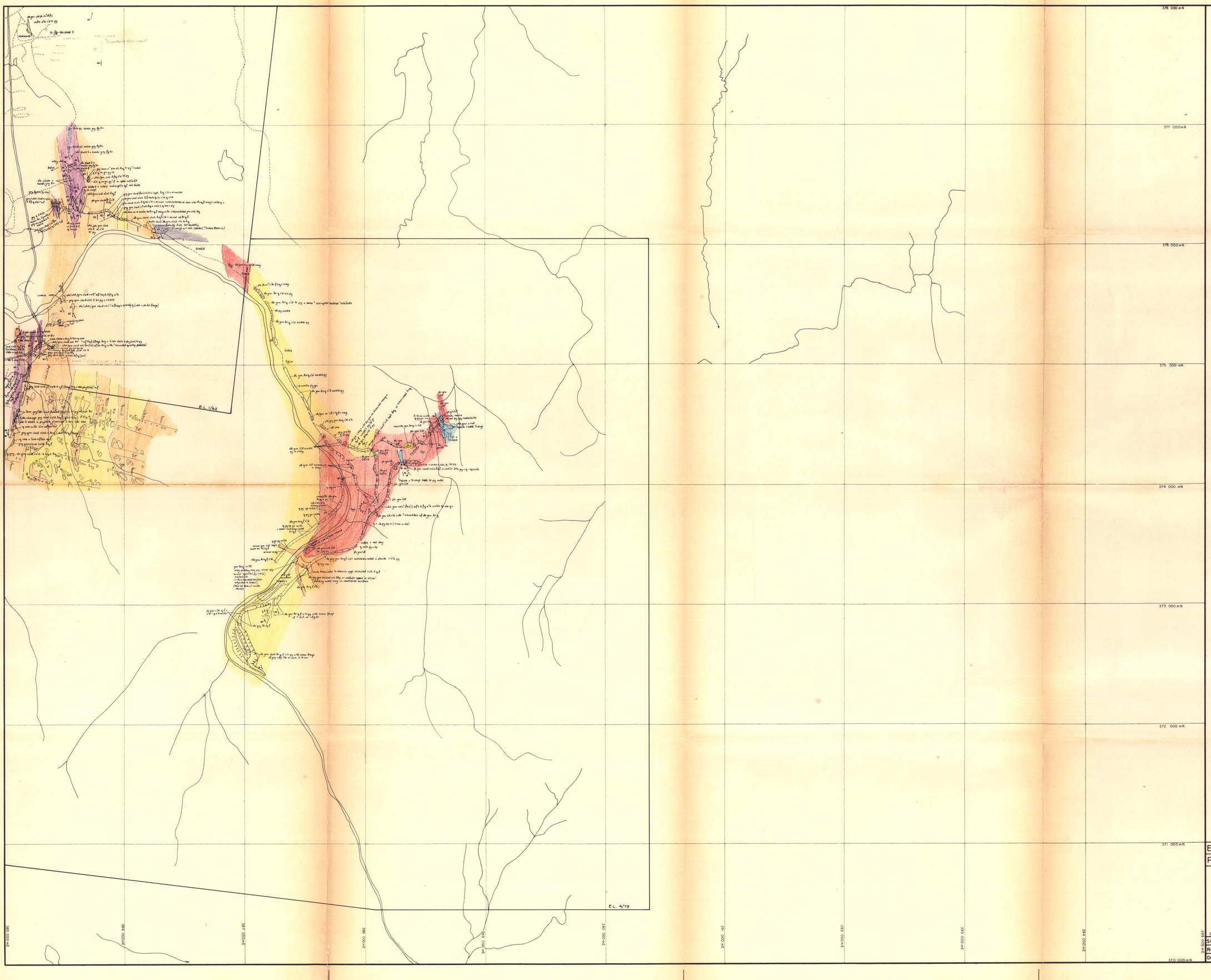
GEOLOGY 111298

5 cm

SCALE: 1:10,000	Survey: P.K., J.M., W.S.F.	Revised:
Reference:	Date: 1978/9 Aden & Long Island	REF. Nº
Drawn: R.P.T.	Checked:	AO-525-0006

2780

2780


EL 1/62
EL. 4/73
SIXEE
SIXEE
SIXEE

E.L. 1/62

E.L. 1/62

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT : MT. BLACK | TAS.

GEOLOGY

111300

80-1611 (Vol 4/6)

SCALE : 1:10,000	Survey J.M.	Revised
Reference	Date May 1979	REF. N°
Drawn R.P.T.	Checked	AO - 525 - 0013

2782

2782

Boco Grid

E.L. 12/72

E.L. 1/62

Farm Creek Grid

(approx. position)
E.L. 1/62

Pieman Grid

Mt. Sale Grid

Cutty Sark Grid

LINE P1

LINE P2

LINE P3

5 385 000 mN

5 384 000 mN

5 383 000 mN

5 382 000 mN

5 381 000 mN

5 380 000 mN

5 379 000 mN

378 000 mE

377 000 mE

376 000 mE

375 000 mE

NOTES:

1. Chargeability contours (millivolts / volt) compiled from following Gradient Array surveys:
   a) Boco Grid – Scintrex 1976, see report TAS.033, Oct-Nov. 1976. Extended Scintrex 1978, see report TAS.051, May 1978.
   b) Mt. Sale Grid – Scintrex 1979, see reports TAS.065, March 1979 (1), July 1979 (2).
   c) Cutty Sark Grid – Scintrex 1978.

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

3. Dipole – dipole spreads compiled from following surveys:
   a) Boco Grid – Scintrex 1978, 1979 (Time domain) see reports TAS.051, May 1978, and TAS.065, August 1979.
   b) Farm Creek Grid – Scintrex 1979 (Time domain) see reports TAS.065, Aug. 1979 and TAS.
   c) Pieman Grid – Geoex 1978 (Frequency domain)
   d) Cutty Sark Grid – Geoex 1978 (Freq. domain)
   e) Mt. Sale Grid – Scintrex 1979 (Time domain) see report TAS.065, July 1979 (2).

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 mv/v.

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

ELECTROLYTIC ZINC CO OF A'ASIA LTD

PROJECT: MT BLACK | TAS

80-1411

INDUCED POLARIZATION

111301

5 cm

80-1411 Vol 4(c)

SCALE 1 10 000	Survey	Revised
Reference	Date JUNE '79	REF NO
Drawn MB	Checked	AO 525 0037

27817

2783 E Z PLAN CABINET TRIM LINE

A0 TRIM LINE