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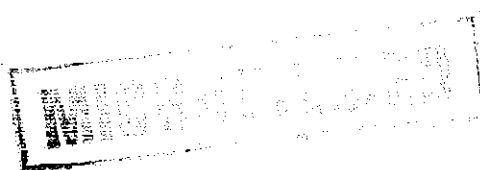
EXPLORATION LICENCE 39/85
BULGOBAC RIVER
TASMANIA

PARTIAL RELINQUISHMENT REPORT
ON EXPLORATION TO JANUARY, 1992

VOLUME I

TEXT & APPENDICES

LOCATED MAGNETIC DATA ON TAPE



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BR8	1:10,000	UTEM Coverage
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SK55.3-3303	1:10,000	Residual Magnetic Contours
SK55.3-3304	1:10,000	Flight Path Recovery
SK55.3-3305	1:5,000	Frazer Filtered VLF Profiles
SK55.3-3306	1:5,000	IP Chargeability
MAC114		Surface Geological Mapping Legend

1.0 INTRODUCTION

The target within EL 39/85 is a volcanogenic massive sulphide deposit. The geology of the Bulgobac River area indicated that a significant volume of Que-Hellyer Volcanics, host to the nearby Que River and Hellyer orebodies, would occur at depth beneath flat lying younger Cambrian volcanoclastics and sediments.

The generally large depth to the prospective host horizon has resulted in exploration on this licence having a significant geophysical and diamond drilling component. Most of this work has focussed on the area of the licence to be retained.

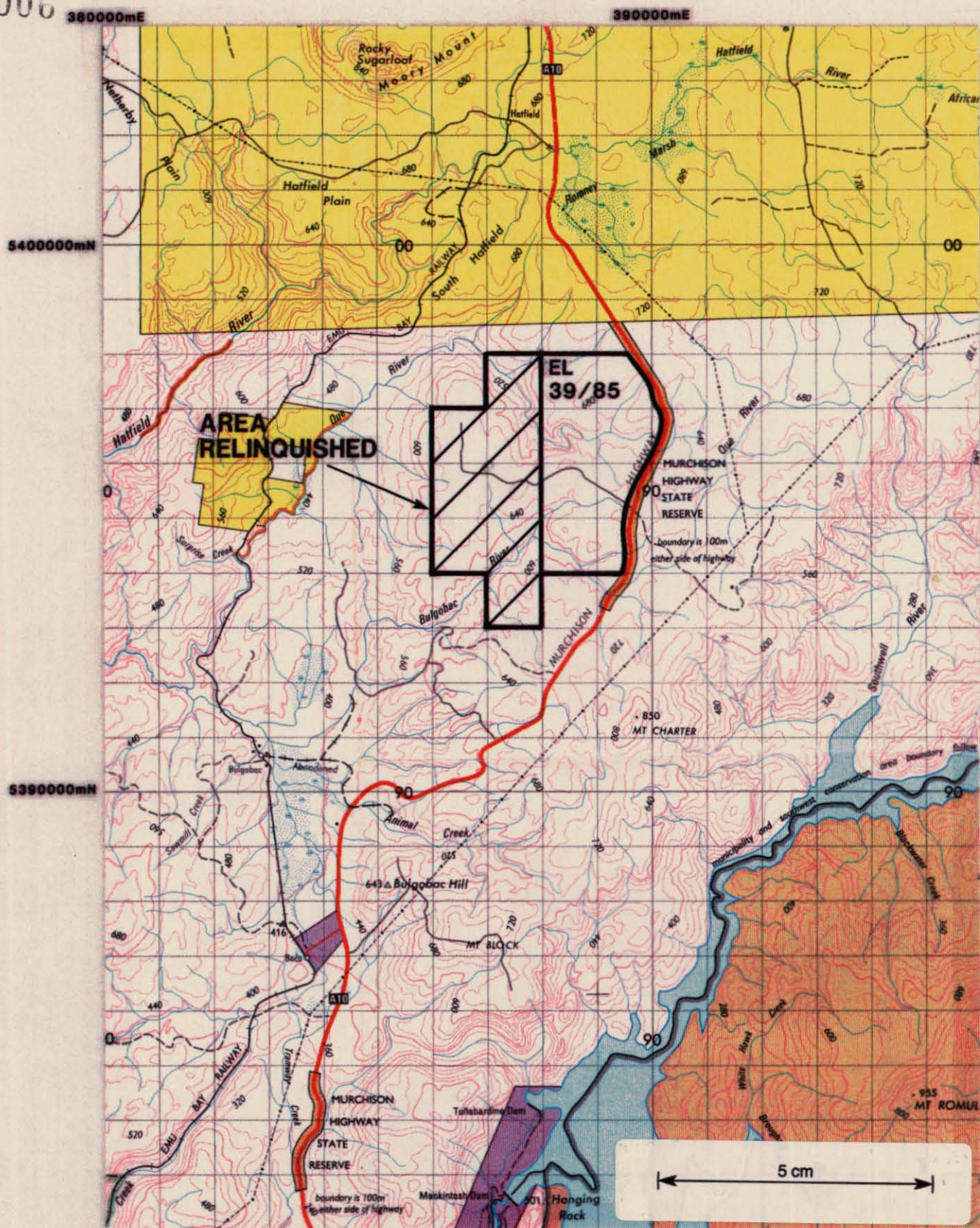
2. TENURE

Exploration Licence 39/85 "Bulgobac River" was granted to CSR Ltd. on 14 February, 1986. In mid 1988 CSR's Mineral Group was purchased by Placer Exploration Ltd. At about the same time the Department of Mines increased the original area of 11 km² to 16 km² to adjust the EL boundaries to AMG kilometre graticules.

In February 1991 Aberfoyle Resources Ltd. entered a joint venture agreement with Placer to fund and manage exploration on EL 39/85. Statutory regulations required that 50% of the licence area be relinquished at this time but this was deferred for twelve months by the Department of Resources and Energy to allow Aberfoyle to explore the full area of the licence.

The 50% relinquishment is now due on 14 February, 1992. Plate BR5 shows the area to be relinquished.

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Aberfoyle Resources Limited EXPLORATION DIVISION

NORTH WEST TASMANIA BULGOBAC RIVER E.L. 39/85 LOCALITY MAP

Compiled : Lands Dept.

Drawn :

Traced : MAR

Checked :

Plate No. : BR 5

REVISIONS			
Init.	Date	Init.	Date

Location Code :

Scale : 1:100 000

Date : January 1992

3.0 PREVIOUS EXPLORATION

3.1 Introduction

No old mines, mineral occurrences or evidence of early prospecting activity are known within EL 39/85. In the 1950's limited geological mapping of the area was undertaken by Rio Tinto as part of a joint venture with the Electrolytic Zinc Company.

Prior to 1985 the Bulgobac River area was part of Comstaff Pty. Ltd.'s EL 5/63 and became available for tender when that licence was reduced, under new regulations, to the maximum allowable area of 125 km².

3.2 Stream Sediment Geochemistry

During 1969-71 Comstaff undertook detailed -80 mesh stream sediment and limited heavy mineral concentrate stream sediment sampling programmes in the Bulgobac River area. Two anomalous areas were detected.

An anomalous gold assay reported from a heavy mineral concentrate stream sediment sample in Debussey Creek. This was followed up with additional stream sediment sampling and A horizon soil sampling; with negative results.

Anomalous -80 mesh stream sediment samples in the Sock Creek area were followed up and the Sock Creek vein type Ag-Pb-Zn mineralisation was discovered. This prospect is located 1 km south west of the south west corner of EL 39/85. Additional work on this prospect extended into EL 39/85 and included geological mapping, soil geochemistry and ground EM surveys.

3.3 Airborne Geophysics

As part of a larger survey on EL 5/63 an INPUT EM and magnetics survey was flown over the area of EL 39/85. Conductive zones located by this survey were interpreted to be due to surficial or stratigraphic conductors and were not followed up (Butt et. al., 1975).

4.0 SUMMARY OF WORK COMPLETED

The area to be relinquished is regarded as less prospective than that retained as it lies largely to the west of the inferred limit of Que-Hellyer Volcanics. Exploration, in particular diamond drilling, has therefore tended to be focussed in the eastern half of the original licence.

The prospectivity of the Sock Creek Volcanics, which lie within the relinquished area, has been downgraded, as no significant conductors were detected within this sequence by a recent UTEM survey.

4.1 Geology

4.1.1 Mapping

Geological mapping of the area to be relinquished has been undertaken by CSR, Placer and Aberfoyle. Interpretative geology is shown on Plates BR 6A, 6B, 6C and summarised on Plate BR7.

Tertiary basalt outcrops over the bulk of the area. north and east of the Mount Charter Fault this is inferred to be underlain by felsic volcanoclastics and minor shale of the Southwell Sub Group. South and west of the Mount Charter Fault felsic lavas with minor intercalated epiclastics (Sock Creek Volcanics) are inferred to be correlates of the Que-Hellyer Volcanics. Both sequences dip shallowly to the west or north west and are intruded by Cambrian quartz-feldspar porphyry, which is part of a large body extending south to the Boco area.

4.1.2 Petrology

Twenty samples from the relinquished area were submitted for petrological description. Sample locations are shown on the enclosed 1:2500 geological plans. Descriptions are attached as Appendix 1.

4.2 Geophysics

4.2.1 Aeromagnetics

A low level aeromagnetic survey was completed early in 1986. The Geo-Metrics gradiometer system was flown at a nominal terrain clearance of 70m and a flight line spacing of 100m. Results for the relinquished area are presented on DRG No. SK55.3-3303 as contours of the tail boom magnetometer data. Pitch and roll measurement/corrections are inadequate for the full gradiometer data in relation to the detail obtained by 100m line spacing. Contouring of the gradiometer data results in distortions due to altitude and levelling difficulties. DRG No. SK55.3-3304 indicates the flight path recovery of the survey.

The aeromagnetic responses can be divided into the following:

- i) an intense pattern of highs and lows over Tertiary basalt.
- and
- ii) a flat magnetic field with a regional gradient increasing to the south west over Cambrian rocks.

4.2.2 VLF-EM

Several grid lines were surveyed with VLF-EM using the North West Cape signal. This was done in an attempt to map out conductive shale units. The survey results are presented in Fraser filtered form as DRG No. SK55.3-3305.

Survey limitations resulted in little significance being attached to the results.

4.2.3 Induced Polarisation

In 1987 a gradient array IP survey was conducted on EL 39/85. Part of this survey falls within the area to be relinquished. The data is presented as chargeability contours on Plan SK 55-3-3306. Current electrode separation of 3.5 km, a 7.5 kva generator, and 25m dipole separation were used.

Results indicate that the area to be relinquished is characterised by low chargeabilities related to Southwell Sub Group volcanics.

4.2.4 CSAMT

The interpretation of shallowly dipping stratigraphy including conductive Que River Shale indicated the applicability of CSAMT to EL 39/85. After a successful trial on line 7600N an extended survey was completed in March 1987. Part of the area surveyed lies within the area to be relinquished. Interpretation of the data is presented in Appendix II.

Little faith is attached to the CSAMT results. Near and transitional field effects make most of the data below 256 hz uninterpretable. Except for odd stations most data was only from shallow depth.

4.2.5 UTEM

During 1987 a one loop 15 line km. UTEM survey was conducted over the northern part of EL 39/85. Part of the surveyed area falls within the area to be relinquished. The area surveyed and loop location is shown on Figure 1. Results are attached as Appendix III.

No anomalous responses were detected within the area to be relinquished.

During February-March 1991 a three loop 17 line km. UTEM survey was centred over prospective Sock Creek Volcanics, south of the 1987 CSR survey. Loop locations and survey lines are shown on Plate BR8. Results are attached as Appendix IV.

No anomalous responses were detected within the area to be relinquished.

4.2.6 Gravity

Between 1986 and 1988 a gravity survey was undertaken over a large area of EL 39/85. This survey was carried out by Solo Geophysics with data processing by Leaman Geophysics. Survey and processing specifications are described in Appendix V. Results for the relinquished area are presented on Plate XBR4.

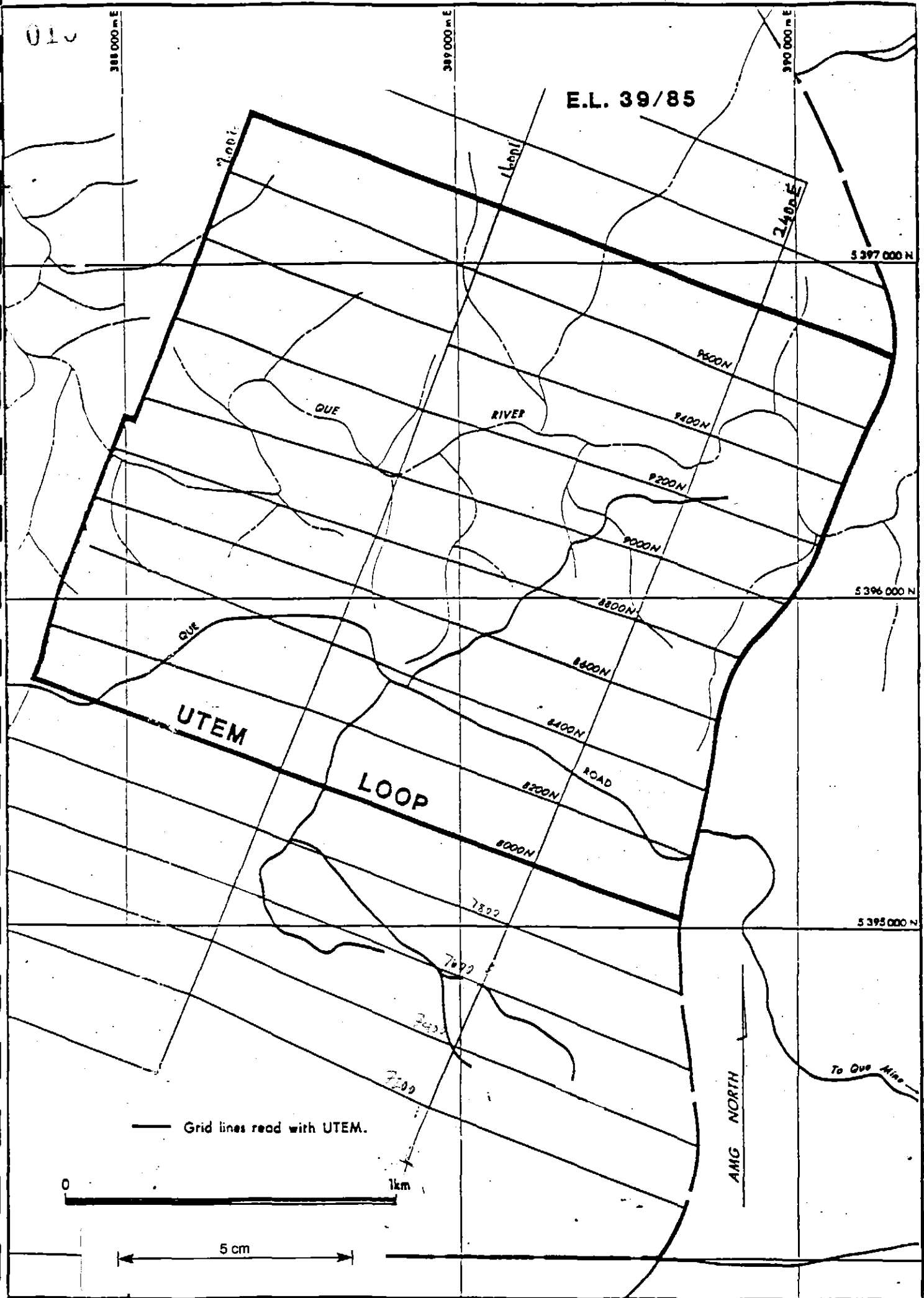


Figure 1 UTEM COVERAGE

RIJN GORAC RIVER TAS

The area to be relinquished is dominated by negative Bouguer anomalies which correlate directly with Tertiary basalt.

5.0 CONCLUSION

The work completed on that part of EL 39/85 to be relinquished has indicated its lower prospectivity compared to the area retained.

6.0 BIBLIOGRAPHY

- Butt, G., Hansen, J. and Finney, W. (1975). Interpretation Report. Airborne EM (INPUT) survey of the Comstaff South Leases, Tasmania, Australia for Australian Anglo-American Ltd. by Geoterrex Pty. Ltd. (unpub. report).
- Collins, P. L. F., Gulline, A. B., and Williams, E. (1981). Explanatory Report. Mackintosh Geological Atlas 1 Mile Series. Tasmanian Dept. of Mines.
- Comstaff Pty. Ltd. (1985). Final Reports on Areas Surrendered to the Department of Mines, Tasmania (June, 1985). Exploration Licence 5/63. Unpub. report Australian Anglo-American Ltd.
- Corbett, K. D. and Lees, T. C. (1987). Stratigraphic and structural relationships and evidence for Cambrian deformation at the western margin of the Mount Read Volcanics, Tasmania. Aust. Jour. Earth Sc. 34. pp 45-68.
- Ellis, P. D., 1988. Renewal Report. 1989. Exploration Licence EL 39/85 Bulgobac River, Tasmania. Unpub. report, Placer Exploration Report No: Tas 1/89.
- Ellis, P. D., 1990. Renewal Report. 1990. Exploration Licence EL 39/85 Bulgobac River, Tasmania. Unpub. report, Placer Exploration Report No: Tas 1/90.
- Hudspeth, J. W. and Richardson, R. G. (1985). A preliminary gravity survey at the Hellyer prospect. Unpub. report, Tas. Dept. Mines 1985/25.
- Leaman, D. E. (1987). Mount Read Volcanics Project: mineralisation signature study: geophysics gravity and magnetics. Unpub. report, Tas. Dept. Mines.

Williams, R. E. (1987a). EL 39/85. Bulgobac River, Tasmania:
Progress Report for the Period Ending 31 March,
1987. Unpub. report, MEDG. CSR Limited, Report No:
EMR 75/85.

Williams, R. E. (1987b). EL 39/85. Bulgobac River, Tasmania:
Second Progress Report for the Period Ending 1
December, 1987. Unpub. report, MEDG. CSR Limited,
Report No: EMR 145/87.

011

APPENDIX I

010

Sample No.

A 161951

Rock Type.

Partly altered and oxidised vitric tuff, with sparse lithic and crystal debris from an acidic volcanic source.

Hand Specimen

A massive pale brown grey, very fine grained sample with outlines of somewhat rounded patchy mottled (?alteration) domains. No K-feldspar was detected by staining.

Thin Section.

In contrast to the previous sample the present rock contains conspicuous well preserved outlines of cusped glass shards forming the voluminous matrix fraction. The latter encloses sparse partly altered but recognisable lithic and crystal debris. The lithic clasts are extremely fine grained types with angular to irregular shapes and vague outlines of relict vesicular textures. Several contain albitised plagioclase microphenocrysts that are set in dense pale brown wispy montmorillonite. The sparse broken angular crystal debris rarely exceeds 0.2 mm across, and includes approximately equal major proportions of albite and quartz.

Alteration in the fine grained matrix includes selective alteration of the glass shards to microgranular secondary albite, and these are set in a cherty to felsic microgranular mosaic variously stained by red-brown limonitic oxides. Narrow crosscutting veinlets contain almost monomineralic granular quartz.

This sample may be described as a partly altered and oxidised vitric tuff, with sparse lithic and crystal debris from an acidic volcanic source.

013

Sample No.

A162201

Rock Type.

Partly altered and albitised, poorly sorted crystal tuff, containing broken angular crystal and fewer lithic fragments from a porphyritic acidic igneous sources.

Hand Specimen

A compact dark grey fine grained sample containing abundant irregularly distributed conspicuous coarse to medium grained white to pale pink crystals and aggregates. K-feldspar staining proved negative.

Thin Section.

This is an unsorted tuffaceous rock containing almost equally abundant broken angular to shattered quartz crystals, and cleavage fragments of clouded and albitised plagioclase phenocryst debris. Vague outlines of unsorted irregular shaped lithic fragments, that are mostly less than 3 mm across, include fine grained but polygonised altered and albitised and partly oxidised acidic igneous types, several of which are sparsely quartz-porphyritic, as well as rare clasts that once may have been flow banded and rhyolitic. The exceptionally fine grained rock matrix comprises mainly low birefringent argillic and cherty secondary products enclosing very small but recognisable angular crystal chips.

Very strong alteration has affected the rock with selective patches of very fine wispy "sericite" developed in albitised plagioclase crystal sites. Wispy, pale yellow brown montmorillonite is concentrated along narrow branching fractures and veinlets, and also present are irregular patches and veinlets of secondary albite crystals ± quartz intergrown with the argillic material and clusters of limonitic oxides. At least some of the latter appear to pseudomorph previous sulphides. Elsewhere are patches of strained and deformed vein quartz partly intergrown with patchy chlorite and sericite. Traces of fine grained carbonate are accessory.

The rock is a partly altered and albitised, poorly sorted crystal tuff containing angular crystal and fewer lithic fragments from a porphyritic acidic igneous source.

Sample No.

A 162202

Rock Type.

Substantially altered and veined, unsorted
crystal tuff of acidic affinity.

Hand Specimen

A mottled fine grained mid-grey compact sample with scattered pale grey medium grained crystal sites and irregular pale grey veins, several of which react strongly with cold dilute HCl. K-feldspar staining gave weak positive results for sparse crystal sites.

Thin Section.

Unsorted fragmental texture is clearly preserved in this crystal-tuffaceous rock which is clearly related to the previous sample A 162201. Once again broken angular quartz chips and albitised feldspar cleavage fragments are present in approximately equal major proportions, and crystal debris accounts for roughly a quarter of the total thin section area. Several coarse quartz grains exhibit magmatically well rounded and embayed shapes, while others appear to have been shattered in situ. Sparse altered lithic fragments include altered but once-glassy quartz and feldspar porphyritic volcanic types, and types that are themselves fragmental, including broken chips of quartz and feldspar. The voluminous but exceptionally fine grained low birefringent rock matrix appears to be mostly cherty (or feldspathic) with patchy chlorite, carbonate and clay.

Alteration includes development of dense sericite in clouded and albitised feldspar crystal sites, while vein-like patches comprise fine grained secondary albite clear of inclusions; chlorite $\pm$ quartz $\pm$ carbonate; microgranular quartz; and almost monomineralic carbonate (calcite - see reaction above). Partial deformation of this rock has produced branching zones of polygonisation in certain coarse quartz grains.

The sample may be described as a substantially altered and veined unsorted crystal tuff of acidic affinity.

Sample No. A 162203

Rock Type. Quartz-albite-sericite-carbonate altered and significantly veined, strongly porphyritic acid igneous (or partly fragmental) rock.

Hand Specimen A fine grained compact mid grey sample containing scattered, very coarse grained pale grey crystals that is cut by a branching network of narrow dark grey to pale grey veinlets. K-feldspar staining gave weak positive results for patches in the matrix fraction of the rock.

Thin Section. This sample retains a strongly porphyritic texture defined by coarse quartz and albitised feldspar crystals and aggregates, most of which are apparently unbroken. These crystals comprise about a quarter of the thin section area, and quartz and feldspar are almost equally well represented. The quartz grains have deeply embayed and magmatically corroded shapes, while prismatic to subrounded shapes are characteristic of the albitised and sericitised feldspar crystals. Several of the latter have simple twins and once may have comprised K-feldspar. Rare sites of previous mafic (?amphibole) microphenocrysts now contain abundant sphene and carbonate. The abundant matrix of this sample comprises a microgranular mosaic of intergrown quartz and altered feldspar crystal sites, at least some of which are most likely K-feldspar - see staining. Slight differences in grain size are characteristic in the matrix fraction, suggesting the possible presence of lithic ?fragments.

The rock has undergone patchy intense silicification, and a network of narrow branching veins contain intergrown granular to subhedral quartz and carbonate $\pm$ minor chlorite. Elsewhere microfractures contain chlorite and discontinuous trails of sphene granules.

The rock may be only tentatively identified as a strongly porphyritic acid igneous or partly fragmental type, that is partly silicified, albitised and carbonated.

032

Sample No. A 162204

Rock Type. Partly altered unsorted lithic tuff containing coarsely porphyritic volcanic debris of acidic primary composition.

Hand Specimen Poorly sorted, distinctly lithic fragmental rock containing large and small dark grey porphyritic fragments and pale grey crystal sites, set in a mid-green-grey, fine grained matrix. K-feldspar staining proved negative.

Thin Section. Unsorted lithic fragmental texture in this rock is defined by a variety of angular volcanic lithic fragments up to 1.5 cm across. These account for almost half of the present thin section area. Very strongly porphyritic types predominate, containing coarse magmatically well rounded and embayed quartz phenocrysts, and albitised, lightly sericitised plagioclase laths and aggregates. Rare mafic crystal sites are pseudomorphed by chlorite and clusters of sphene granules. Relict textures in the groundmass fractions of most fragments suggest that they were once glassy, but have been replaced by fine to medium grained secondary albite, intergrown with chlorite and/or a montmorillonite type clay. As well as the lithic debris there is present abundant angular and broken phenocrystic debris, again including mainly quartz and albitised plagioclase cleavage fragments, and accessory zircon, sphene and degraded oxide crystal sites. The rock matrix in this sample comprises a finely polygonised mosaic of cherty quartz $\pm$ albite, chlorite and clay (mostly a birefringent montmorillonite type).

Vein-like branching to irregular shaped patches contain dense granular secondary quartz intergrown with water-clear secondary albite, indicating significant introduction or at least redistribution of this material.

The rock may be described as a partly altered unsorted lithic tuff containing coarsely porphyritic volcanic debris of acidic primary composition.

Sample No.

A 162212

Rock Type.

Altered vitric tuff enclosing sparse lithic and crystal debris from an acidic volcanic source.

Hand Specimen

A mid-grey fine grained compact sample containing abundant conspicuous angular dark grey to pale grey lithic clasts, as well as numerous white and pale yellow-brown oxidised crystal sites. K-feldspar staining gave weak positive results for the matrix fraction and for sparse fragments.

Thin Section.

As in the previous sample A 162210 outlines of very abundant cusped and branching glass shards are characteristic in the matrix of this sample. Also present are sparse recognisable unsorted lithic fragments including completely altered, finely banded once glassy types, flattened aggregates of shards that most likely represent clasts of welded vitric tuff (or ignimbrite), and plagioclase-microporphyritic ?trachytic types with abundant poorly defined minute feldspar microlites, set in a chlorite-altered matrix. The scattered medium to coarse grained broken crystal debris includes subhedral to angular and broken crystals of quartz, equally abundant broken crystals of albitised plagioclase

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with accessory deformed and partly altered flakes of biotite, as well as sphene-albite-altered mafic crystal sites. Fine grained ?sedimentary lithic fragments are accessory.

The glass shards now are selectively altered to granular albite with narrow rims of pale green fine grained chlorite in turn set in a microgranular felsic mosaic - most likely intergrown K-feldspar (see staining) albite and quartz.

The rock may be identified as an altered vitric tuff enclosing sparse lithic and crystal debris from an acidic volcanic source.

<u>Sample No.</u>	A 162213	ANG Co-ords 387060mE 5 39 3020mN
<u>Rock Type.</u>	Partly altered microporphyritic trachytic volcanic rock with distinct perlitic cracks.	
<u>Hand Specimen</u>	A mottled pale greenish grey to yellow-brown oxidised fine grained sample that is cut by a network of very narrow curving to branching fractures filled with dark green-grey material. K-feldspar staining gives weak patchy positive results.	
<u>Thin Section.</u>	Well preserved relict textural features in this once-glassy volcanic rock include sparse euhedral prismatic microphenocrysts and glomeroporphyritic aggregates of untwinned clouded K-feldspar and albitised plagioclase, as well as abundant wispy feldspar microlites aligned subparallel to the previous direction of magmatic flow. Quartz phenocrysts are conspicuously absent. The voluminous micro-litic rock matrix is cut by abundant curving and branching perlitic cracks, clearly resulting from rapid chilling of a once glassy lithology, that are now filled with dense concentrations of fine grained chlorite, minute sphene clusters, and in some are developed microgranular aggregates of secondary albite ± quartz. The abundant wispy albitised feldspar microlites in this groundmass, are in turn "suspended" in a devitrified mosaic of clouded ?K-feldspar, albite, chlorite, sphene and patchy low birefringent clay.	

Clear microporphyritic, and trachytic textures outlined by feldspar microlites, as well as the development of conspicuous perlitic cracking indicates that this rock had a partly glassy volcanic parent of microporphyritic trachytic primary affinity.

<u>Sample No.</u>	A 162214	ANG	386810 mE 5 392690 mN
<u>Rock Type.</u>	Partly altered, sparsely microporphyritic albite-rich trachyte enclosing sparse flattened amygdales filled with quartz.		
<u>Hand Specimen</u>	A fine grained pale grey sample with scattered mid-green-grey patches. Sparse narrow elongate subparallel dark grey lenses are present. K-feldspar staining proved negative.		
<u>Thin Section.</u>	This fine grained volcanic rock retains a distinct trachytic texture defined by ubiquitous minute "felted" to "feathery" feldspar microlites aligned subparallel to the direction of magmatic flow. This felted mat largely consists of albitised microlites intergrown with numerous, more or less evenly distributed clusters of oxidised sphene granules and irregular shaped patches of chlorite. The voluminous groundmass fraction encloses sparse albitised lath shaped plagioclase microphenocrysts, once again set subparallel to the direction of magmatic flow. Rare small glomeroporphyritic clusters of feldspar, once again comprise albitised plagioclase. The narrow elongate subparallel lenses of the hand specimen prove to be flattened vesicle sites that are now filled with monomineralic polygonised secondary quartz. The latter encloses trails of minute dusty inclusions suggesting original colloform banded deposition of the silica. Later narrow veinlets are also filled with microgranular quartz and albite, while even later microfractures that are subparallel to the trachytic flow direction are filled with minute flakes of a very fine grained pale green birefringent clay.		

This sample may be described rather simply as a partly altered, sparsely microporphyritic albite-rich trachyte, enclosing sparse flattened amygdales filled with quartz.

Sample No. A-162238

Rock Type. Fine grained silty carbonaceous slate with a weak foliation parallel to a narrow poorly defined primary layering.

Hand Specimen A dark grey fine grained weakly fissile slaty rock with narrow joints containing fine grained sulphides. K-feldspar staining proved negative.

Thin Section. This is a very fine grained, weakly banded and foliated carbonaceous sediment. It contains scattered silt sized angular quartz and some ?albite chips, as well as sparse small well rounded sites of previous microfossils (?radiolaria), also now filled with microgranular cherty quartz. These small grains are "suspended" in a voluminous matrix fraction of dense carbonaceous dust and wispy ?sericite flakes, well oriented parallel to the foliation. The latter appears to be subparallel to a weak primary banding defined by somewhat variable proportions of carbonaceous dust. The rock is cut by several narrow veinlets filled with granular quartz, low birefringent clay and clusters of minute cubic sulphide crystals.

The rock may be simply described as a fine grained silty carbonaceous slate with a weak foliation parallel to a narrow poorly defined primary layering.

Sample No. A-162239

Rock Type. Partly brecciated or autobrecciated, sparsely porphyritic microlitic and once-glassy volcanic rock of intermediate, possibly trachytic, affinity.

Hand Specimen A pale yellow-brown stained fine grained mottled sample with distinct outlines of abundant angular to irregular shaped lithic fragments. K-feldspar staining proved negative. The rock is cut by several joints coated with limonitic oxides. No K-feldspar was detected by staining.

Thin Section. Partial fragmental texture in this sample most likely represents autobrecciation of a single flow rather than a pyroclastic feature. All the angular fragments comprise a single lithology, and interfragment material comprises a branching vein-like network of fine grained cherty quartz. The volcanic lithology contains sparse stout prismatic crystals and glomeroporphyritic aggregates of albitised plagioclase, as well as sparse plagioclase microphenocrysts, these are set throughout a substantially altered groundmass with wispy unoriented plagioclase microlites set in a devitrified mat of equigranular quartz patches intergrown with patches rich in partly oxidised and clouded chlorite. The rock matrix comprises a cherty mosaic of intergrown quartz and albite with previous voids lined with chlorite, peripherally and granular quartz centrally.

Trails and patches of red-brown limonitic oxides are mostly located within the branching cherty interfragment domains, and certain of these once may have comprised sulphides.

The exact primary composition of this sample is masked by its intense alteration and devitrification. However,

it may be tentatively described as a partly brecciated or autobrecciated, sparsely porphyritic microlitic and once-glassy volcanic rock of intermediate, possibly trachytic, affinity.

Sample No.

A-162240

Rock Type.

Substantially altered, poorly sorted lithic/crystal tuff containing debris from a fine grained but coarsely plagioclase-quartz-porphyritic acidic volcanic source.

Hand Specimen.

A poorly sorted medium to coarse grained distinctly fragmental rock with abundant angular to irregular shaped "buff" coloured fragments, as well as sparse dark green-grey deformed fragments set in a poorly defined fine grained pale grey matrix. K-feldspar staining gave strong positive results for sparse coarse crystal clasts and parts of the fine grained matrix.

Thin Section.

Poorly sorted fragmental texture is characteristic of this sample and all the recognisable debris is of volcanic origin. The rock contains almost equal major proportions of crystal and fine grained volcanic lithic fragments, most of which are less than 5 mm across. The crystal fragments include dominant cleavage fragments of albitised and lightly sericitised plagioclase with slightly subordinate angular and broken quartz chips. The volcanic lithic fragments are all very fine grained to once-glassy altered types and recognisable relict textures in these include sparse albite microphenocrysts and small quartz-filled vesicle sites, vague outlines of possible glass shards and several finely polygonised quartz and chlorite $\pm$ montmorillonite-rich fragments that once may have been magmatically flow banded. Accessory crystal debris includes strongly clouded perthitic ?K-feldspar and sparse degraded ?oxide sites now containing dense sphene and chlorite. The rather meagre rock matrix contains abundant chlorite intergrown with a cherty quartz-rich mosaic. Parts of this material could include K-feldspar - see staining of offcut.

Alteration has obscured the finer textural features of this rock, but it may be described generally as a poorly sorted lithic/crystal tuff containing debris from a fine grained but coarsely plagioclase-quartz-porphyritic acidic volcanic source.

Sample No. A-162241

Rock Type. Partly altered, fine grained once-vesicular trachyte.

Hand Specimen A fine grained rather massive pale grey sample with buff coloured elongate mottled patches and elongate flattened mid-grey ?vesicle sites defining a possible magmatic flow direction. K-feldspar staining gave positive results for the majority of this fine grained sample.

Thin Section. Microlitic trachytic texture is well defined in this fine grained volcanic rock, and sparse narrow elongate vesicle sites are also drawn out parallel to the direction of magmatic flow. The ubiquitous wispy feldspar microlites are albitised, and these are set throughout a matrix comprising microcrystalline felsic domains (possibly intergrown quartz and K-feldspar), and chlorite-rich domains. The elongate almond-shaped vesicle sites contrast with the fine grained host since they are filled with relatively coarse granular quartz with partial rims of oxidised chlorite and sphene. Sparse microphenocrysts of albite are accessory. The rock is cut by narrow branching quartz filled veins, but these are unmineralised.

Unlike most of the fragmental samples in this suite the present rock comprises a trachytic and sparsely vesicular volcanic flow rock, most likely of trachytic primary composition. Alteration of the rock has included albitisation of feldspars and development of patchy quartz and chlorite.

Sample No.

A-162242

Rock Type.

Partly altered and devitrified autobrecciated volcanic flow rock containing fragments of a once glassy microlitic trachytic type with conspicuous perlitic cracks.

Hand Specimen

A massive fine grained pale grey ?siliceous sample with vague outlines of possible mid-grey coloured fragments. Numerous small pale yellow-brown patches could represent crystal sites. K-feldspar staining proved negative.

Thin Section.

This sample most likely represents an auto-brecciated once-glassy volcanic flow rock rather than a fragmental pyroclastic type since it contains ubiquitous angular to irregular shaped lithic fragments of a single distinctive lithology. The fragments exhibit conspicuous perlitic cracks now marked by concentrations of minute green chlorite flakes, and these cracks enclose domains of mottled microgranular albite ± quartz. Albitised plagioclase microlites define a clear direction of magmatic flow, and adjacent elongate "fragments" commonly exhibit similar orientations of microlites. Sparse subhedral prismatic microphenocrysts and glomeroporphyritic aggregates are of albitised plagioclase. Rare crystals of this phase that are located in the matrix fraction appear to be angular and broken suggesting at least some brecciation. Clusters of sphene granules are a common accessory phase.

The rock matrix is a "cherty" mottled mosaic of intergrown quartz, albite and relatively minor chlorite.

This sample almost certainly represents an auto-brecciated flow of a sparsely microporphyritic once-glassy microlitic trachytic type with ubiquitous chlorite-filled perlitic cracks.

Sample No. A-162243

Rock Type. Partly altered (particularly albitised) vitric tuff with numerous lithic and crystal fragments from an acidic volcanic source.

Hand Specimen A pale grey fine grained sample containing numerous almost white (?feldspathic) and fewer dark grey fragments. K-feldspar staining gave strong positive results for sparse crystal and lithic debris.

Thin Section. Once again this sample exhibits unsorted fragmental (pyroclastic) textures defined by abundant broken crystal and lithic debris set in a matrix containing numerous outlines of previous glass shards. The broken phenocrystic debris includes almost equal major proportions of quartz and albitised plagioclase, as well as minor strongly clouded perthitic K-feldspar. The poorly defined fine grained volcanic lithic debris includes once-glassy types now converted to monomineralic wispy pale green birefringent ?montmorillonite, barely recognisable types with fine wavy ?flow banding, devitrified felsic material with fine perlitic cracks marked by wispy chlorite (these fragments could accept a positive K-feldspar stain), still other finely devitrified fragments once were strongly vesicular. Much of the exceptionally fine grained "cherty" felsic rock matrix lacks recognisable relict textures but in certain domains clear outlines of previous cusped glass shards are preserved. The shards are pseudomorphed by granular albite which is clear of inclusions, while the enclosing "cherty" matrix is strongly clouded.

The rock may be described as a partly altered (albitised) vitric tuff with numerous lithic and crystal fragments from an acidic volcanic source.

Sample No. A-162244

Rock Type. Partly altered and poorly sorted volcanic (or tuffaceous) conglomerate containing predominant fine grained volcanic lithic and crystal clasts from an acidic (rhyolitic) to trachytic source.

Hand Specimen

A poorly sorted conglomeratic sample containing abundant pale grey and fewer dark grey subrounded to irregular shaped lithic clasts, set in a much finer grained pale grey ?arenaceous matrix. K-feldspar staining gave positive results for scattered fine grained debris.

Thin Section.

Poorly sorted clastic texture is evident in this tuffaceous but partly conglomeratic sample. Lithic clasts commonly exhibit subrounded to well rounded outlines and include the following types; once partly glassy fine grained microlitic trachyte with well defined perlitic cracks; dense once-glassy material that is converted to pale green ?montmorillonite; devitrified albite and cherty quartz-rich finely ?flow banded ?rhyolite; strongly microporphyritic trachyte; albite-altered once-vesicular types; sparse deformed clasts of weakly foliated carbonaceous siltstone; fine grained quartz-rich arenite and weakly foliated fine grained quartzite. The abundant crystal debris in this rock includes approximately equal proportions of angular albitised plagioclase cleavage fragments and quartz chips with rare grains of clouded ?K-feldspar. The poorly defined rock matrix of this sample comprises fine grained lithic and crystal debris similar to that described above.

The rock may be described as a partly altered, poorly sorted volcanic (or tuffaceous) conglomerate, containing predominant fine grained volcanic lithic and crystal clasts from an acidic (rhyolitic) to trachytic source.

Sample No.

A-162245

Rock Type.

Considerably altered, poorly sorted lithic tuff containing abundant clinopyroxene and plagioclase porphyritic fragments from an intermediate (?trachy-andesitic) volcanic source.

Hand Specimen

A mid- to dark-green grey fine grained sample with scattered pale grey patches or fragments. K-feldspar staining gave positive results for parts of certain large (?phenocrystic) feldspars.

030

Thin Section.

This sample, both texturally and compositionally, is unlike the previous fragmental rocks of acidic affinity. It is fragmental, however, and almost certainly is pyroclastic. The most striking difference is the presence of scattered coarse euhedral grains of zoned pale green to pale yellow clinopyroxene. Certain of these have central zones of clear colourless clinopyroxene. They are remarkably unaltered. Several clinopyroxene-rich glomeroporphyritic clusters are intergrown with coarse grains of albitised plagioclase with exsolved patches of K-feldspar. Albitised plagioclase microphenocrysts are subordinate and in part of the rock these are converted to patchy clouded ?prehenite $\pm$ minor pumpellyite. Several large lithic fragments clearly were once glassy and very strongly vesicular but now these are converted to assemblages amongst the phases albite, quartz, chlorite, epidote and sphene. On the other hand other fragments are partly carbonated, while sparse volcanic fragments retain albitised microlitic trachytic textures. Numerous small fragments, some of which carry fresh phenocrystic clinopyroxene and albitised plagioclase now are converted to very dense fine grained pumpellyite.

The primary composition of volcanic lithic fragments in this rock is partly masked by its intense alteration. Nevertheless it may be tentatively described as a poorly sorted lithic tuff, containing abundant clinopyroxene and plagioclase porphyritic and vesicular fragments from an intermediate (?trachy-andesitic) volcanic source.

Sample No.

A 162246

Rock Type.

Partly altered and veined, unsorted lithic tuff containing a variety of mostly once-glassy debris from an acidic source.

Hand Specimen

An unsorted fragmental sample with fine grained pale brown, white, mid-grey and dark grey lithic fragments up to 1 cm across, set in a fine grained matrix with a weak wavy lamination. K-feldspar staining gave strong positive results for individual coarse phenocryst debris, wispy narrow bands in flow-banded lithic fragments and also for a narrow branching veinlet.

Thin Section.

Unsorted fragmental texture is clearly developed in this pyroclastic rock. Recognisable lithic clasts have angular shapes and include flow banded and once-glassy vesicular volcanic types, as well as types containing sparse quartz phenocrysts including doubly terminated (high temperature) quartz and albitised plagioclase, while elsewhere are phenocrysts of clouded K-feldspar. The abundant rock matrix contains outlines of cusped glass shards, broken vesicular lithic fragments and types with perlitic cracks as well as scattered broken angular crystal debris including quartz chips, plagioclase chips, degraded mafic phases, and oxide microphenocryst sites.

Alteration is patchy and includes montmorillonite, wispy "sericite" (or pyrophyllite), patches of minute chlorite flakes, minor carbonate, aggregates of albite, cherty quartz, and sparse narrow branching veinlets of albite and K-feldspar (most likely adularia), with patches of limonitic oxides, possibly partly replacing previous sulphides but also pseudomorphing iron-bearing carbonate.

The sample may be described as a partly altered and veined, unsorted lithic tuff containing a variety of mostly once-glassy debris from an acidic volcanic source.

030

Sample No. 162247

Rock Type. Partly altered vesicular and microporphyritic
acidic volcanic rock with ubiquitous minute
feldspar microlites.

Hand Specimen A massive fine grained mid-grey sample containing
sparse scattered elongate subparallel dark green-grey patches. K-feldspar
staining gives weak positive results for most of the sample and particularly
for narrow rims around vesicle sites.

Thin Section. This is a devitrified once-glassy volcanic
flow rock containing very abundant minute feldspar microlites that are
partly decussate and partly trachytic (oriented parallel to the direction
of magmatic flow). They are set in a matrix that now comprises an equi-
granular mosaic of intergrown anhedral domains of quartz and albite $\pm$
K-feldspar $\pm$ wispy chlorite and "sericite", as well as small clusters
and trails of sphene dust. Sparse microphenocrysts include euhedral
prismatic crystals of plagioclase and titaniferous opaque oxides that
are now converted to clouded leucoxene $\pm$ sphene. Crystals of apatite
and zircon are accessory. Numerous small vesicle sites which are drawn
out parallel to the direction of magmatic flow are now filled with granular
quartz, and subordinate patches of sphene, chlorite, K-feldspar and traces
of microgranular epidote. Sparse subhedral mafic crystal sites now are
filled with chlorite, quartz, sphene, and small patches of "sericite".

The exact composition of this sample is partly
masked by its fine grain size and patchy alteration. It may be tentatively
identified as a partly altered vesicular and microporphyritic acidic
volcanic rock with ubiquitous minute feldspar microlites.

Sample No. A 162248

Rock Type. Partly altered, very fine grained microlitic
and once partly glassy vesicular trachytic
volcanic rock.

Hand Specimen

A compact massive fine grained mid-brown sample with sparse patches of grey oxides. Staining gave very strong positive results for K-feldspar outlining numerous minute patches (or ?vesicle sites) that lack K-feldspar.

Thin Section.

Fine grained trachytic texture is well defined in this igneous rock which is also strongly vesicular. Sparse microphenocrysts of albitised plagioclase exhibit zoning structures, with chlorite centrally and wispy sericite inclusions throughout, while rare euhedral mafic crystal sites (?amphibole) now contain aggregates of chlorite, sphene and epidote. The dense mat of groundmass feldspar microlites are set in a meagre granular devitrified mosaic of intergrown K-feldspar ± quartz ± patches of chlorite and sphene dust.

The abundant small irregular shaped vesicle sites now are filled mainly with granular secondary quartz with wispy sericite marking original outlines. Accessory secondary phases in the vesicle sites include aggregates of epidote, chlorite and sphene. Several large anhedral patches and veins are filled with dense chlorite, pale yellow "sericite" and almost opaque to red-brown translucent limonitic oxides centrally, that most likely comprise oxidised carbonate rather than sulphides.

This sample is strongly potassic, lacks phenocrystic quartz but contains microphenocrysts of plagioclase and rarely altered mafic sites. It may be tentatively identified as a partly altered, very fine grained microlitic and once partly glassy vesicular trachytic volcanic rock.

Sample No.

A 162249

Rock Type.

Perlitic vesicular sodic trachyte, with patchy selective alteration and quartz veining.

Hand Specimen

A massive fine grained mid grey sample cut by an irregular system of veinlets and sparse narrow fractures that are coated with red-brown oxides. K-feldspar staining proved negative.

Thin Section.

Felted trachytic texture is very well developed in this extremely fine grained volcanic rock. Minute wispy elongate feldspar microlites are well aligned parallel to a direction of previous flow. In addition the sample contains sparse euhedral to subhedral microphenocrysts of albite that are lightly dusted with wispy sericite. Accessory microphenocryst sites include leucoxene-sphene altered euhedral opaque oxide crystal sites, and rare mafic crystal sites that are now converted to dense chlorite and sphene. Ubiquitous small clusters of sphene granules are evenly distributed throughout. Also present are numerous small, irregular shaped vesicle sites that now are filled with almost monomineralic microgranular quartz $\pm$ chlorite, while a dense pattern of narrow curving perlitic cracks are filled with trails of chlorite. The conspicuous branching veins of the offcut are filled with microgranular and prismatic quartz crystals.

The perlitic cracks in this sample attest to its origin as a partly glassy quickly cooled volcanic flow rock, and its trachytic texture with ubiquitous sodic feldspars suggests a sodic trachyte composition.

Sample No. A 161952

Rock Type. Partly altered mixed tuffaceous sediment, containing abundant lithic, crystal and glass shard material of acidic composition, set in a meagre ?carbonaceous cherty matrix.

Hand Specimen An unsorted fragmental sample with mottled pale grey, dark grey and pale brown angular and irregular lithic and crystal debris set in a mid-grey fine grained matrix. K-feldspar staining gave positive results for small angular crystal clasts and weak results for irregular shaped lithic debris.

Thin Section. This sample is somewhat similar to the previous sample A 161951. It is an unsorted fragmental rock in which lithic clasts and broken crystal debris are more or less equally abundant. The lithic clasts rarely exceed 5 mm across, and these include the following types; quartz porphyritic once-glassy rhyolite. Strongly vesicular once-glassy types now converted to wispy pale yellow montmorillonite $\pm$ albite, albite-porphyritic once-glassy types, and sparse clasts of silty carbonaceous mudstone. The broken phenocrystic debris includes angular chips and shattered cleavage fragments of weakly sericitised albite and fewer of clouded K-feldspar. All the fragments are "suspended" in a voluminous rock matrix that retains well preserved relict textures of cusped glass shards (now converted to microgranular albite), that are in turn enclosed

within dusty (?carbonaceous) cherty material with patches of chlorite and carbonate. This most likely requires incorporation of the tuffaceous debris into fine grained carbonaceous sedimentary material.

The sample may be identified as a partly altered mixed tuffaceous sediment, containing abundant lithic, crystal and glass shard material of acidic composition, set in a meagre ?carbonaceous cherty matrix.

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APPENDIX II



DATE: 21 February 1990
TO: Peter Ellis
FROM: Keiran Logan
SUBJECT: RE-INTERPRETATION OF 1986 CSAMT SURVEY

The initial interpretation of CSAMT incorrectly inferred that the survey had detected the Mixed Layer Sequence Volcanics and that the low resistivities between 128 - 256 Hz corresponded with the depth limits of the Que River Shale. The drill-hole BRD01 quickly dissolved this interpretation prompting the need for a re-interpretation of the data in the light of new geological information.

Figure 1 shows an annotated plan of the stacked CSAMT traverses. On this plan the inferred boundaries of the Far, Transitional and Near field effects are also plotted. These boundaries were inferred from selected station plots on a resistivity v's frequency plot (Figure 2). The relevance of these boundaries is as follows:

1. Near field

Data within this field is useless because of the complex nature of the electromagnetic field which makes the resistivity independent of frequency and hence not representing the apparent resistivities.

2. Transitional field

Transitional field zone between the Near and Far fields which is displayed as a low resistivity "notch" on Figure 2 at frequencies 128 - 256 Hz.

3. Far field

This is responsible for the data above 256 Hz. It displays the useful resistivity information at shallow depths.

The result of these boundary definitions is that most of the data below 256 Hz is un-interpretable. However, exceptions to this were discovered, for example station 2400E/7600N (Figure 3) which coincides with BRD01. Figure 3 shows the modelling results for this station which correspond with the geology in BRD01. Note that

...2/

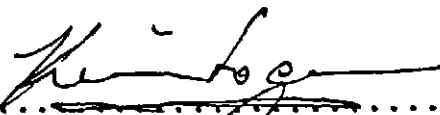
Memo to P. Ellis 21.2.90

RE-INTERPRETATION OF 1986 CSAMT SURVEY

.2

the bottom of the Que River Shale could not be seen in the data but the model suggests that it could be seen at lower frequencies (ie in the range of a Magnetotelluric survey). The model also suggests that the top of the Que River shale is very conductive (15ohm.m).

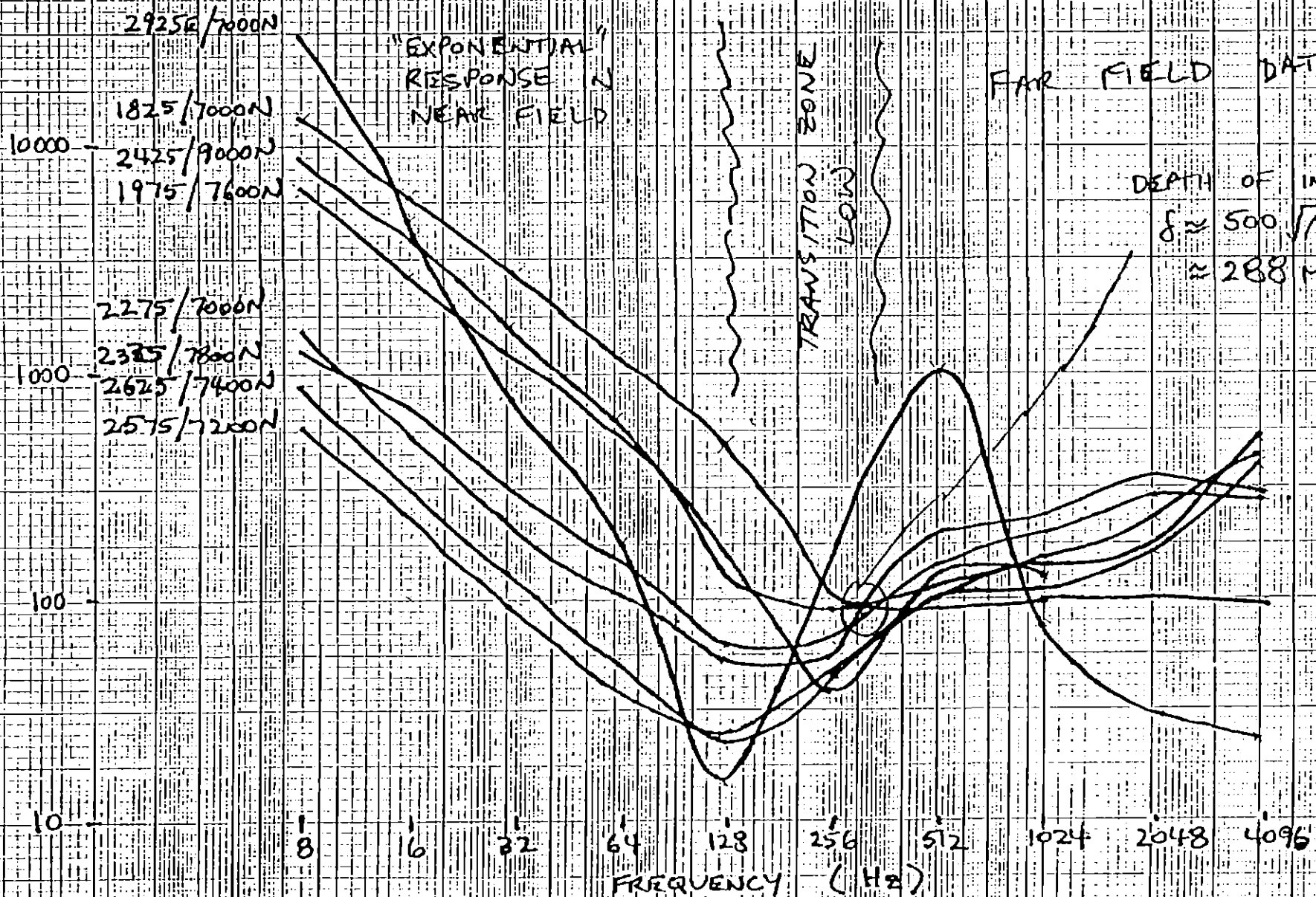
The transmitter location for the survey was 12km to the SE and this was considered (at the time) adequate to remove most of the Near field from the survey's lower frequencies. This did not work and suggests that the transmitter was in highly resistive geology permitting a "good" propagation of the field. The modelling of station 2400E/7600N infers that at places the Transitional zone overlaps with the conductive top of the Que River Shale, but it also infers that this conductive layer inhibits the depth penetration of CSAMT regardless of the absence of a Near field effect. Magnetotellurics in the frequency range of 0.025 - 16 Hz would have to be used to penetrate to depths of 1.6 - 2km but this would also have a decrease in resolvability of geologically units.


.....
Keiran Logan
Geophysicist

encl. Figures 1 to 3

KL122

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CAGNIARD APPARENT RESISTIVITIES ($\Omega \cdot m$)

FREQUENCY - RESISTIVITY CURVES FOR SELECTED

CSAMT STATIONS THROUGH SECTIONS 7000N TO 9000N.

ILLUSTRATING THE EARLY INFLUENCE OF THE NEAR FIELD

014 BULGOBAC RIVER.

PLACER EXPL. LTD.

CSAMT MODELLING.

116045

STATION 2400E./7600N
(BRD1).

KJL 10/1/90.

Depth.	MODEL.
0-75	400 $\Omega \cdot m$
75-145	15 $\Omega \cdot m$
145-535	150 $\Omega \cdot m$
535- ∞	4300 Ω

PYROCLASTICS

QUE RIVER
SHALES.

HELLYER
BASALT.

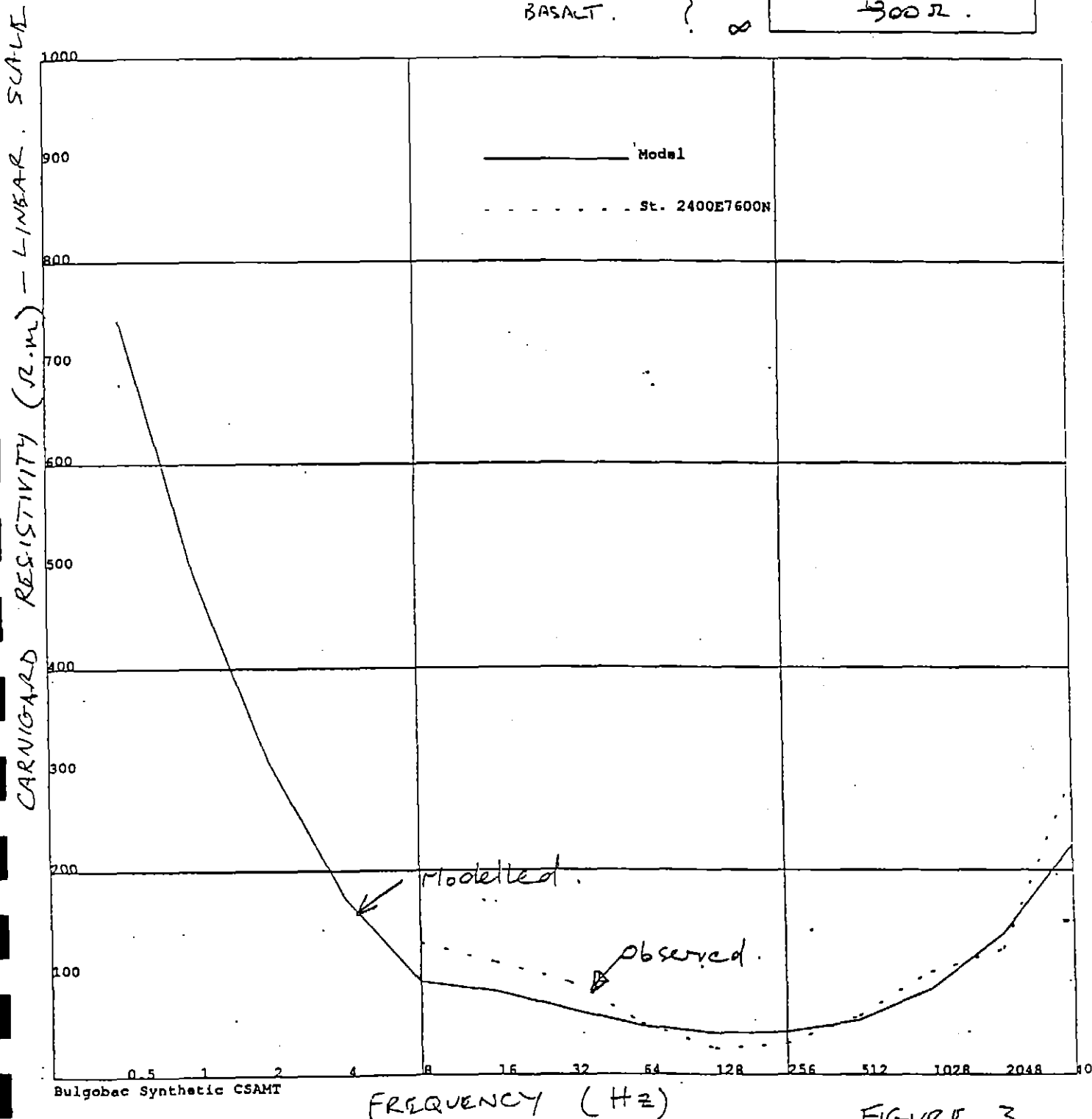


FIGURE 3

010

FAR
TRANS
NEAR

LN 9000N

FAR
TRANS
NEAR

LN 8600N

FAR
TRANS
NEAR

LN 8200N

FAR
TRANS
NEAR

LN 7800N

FAR
TRANS
NEAR

LN 7600N

KEY

↓ STATIONS PLOTTED FROM VSP CURVE (Figure 1).
FAR TRANSITION NEAR
BOUNDARIES BETWEEN DATA AFFECTED BY FAR, TRANSITION AND NEAR FIELDS.

NB, USEFUL CSAMT DATA IS CONTAINED IN THE TOP FAR FIELD DATA. TRANSITIONAL AND NEAR FIELD DATA IS NOT USEFUL.

FAR
TRANS
NEAR

LN 7400N

FAR
TRANS
NEAR

LN 7200N

FAR
TRANS
NEAR

LN 7000N

Figure 1

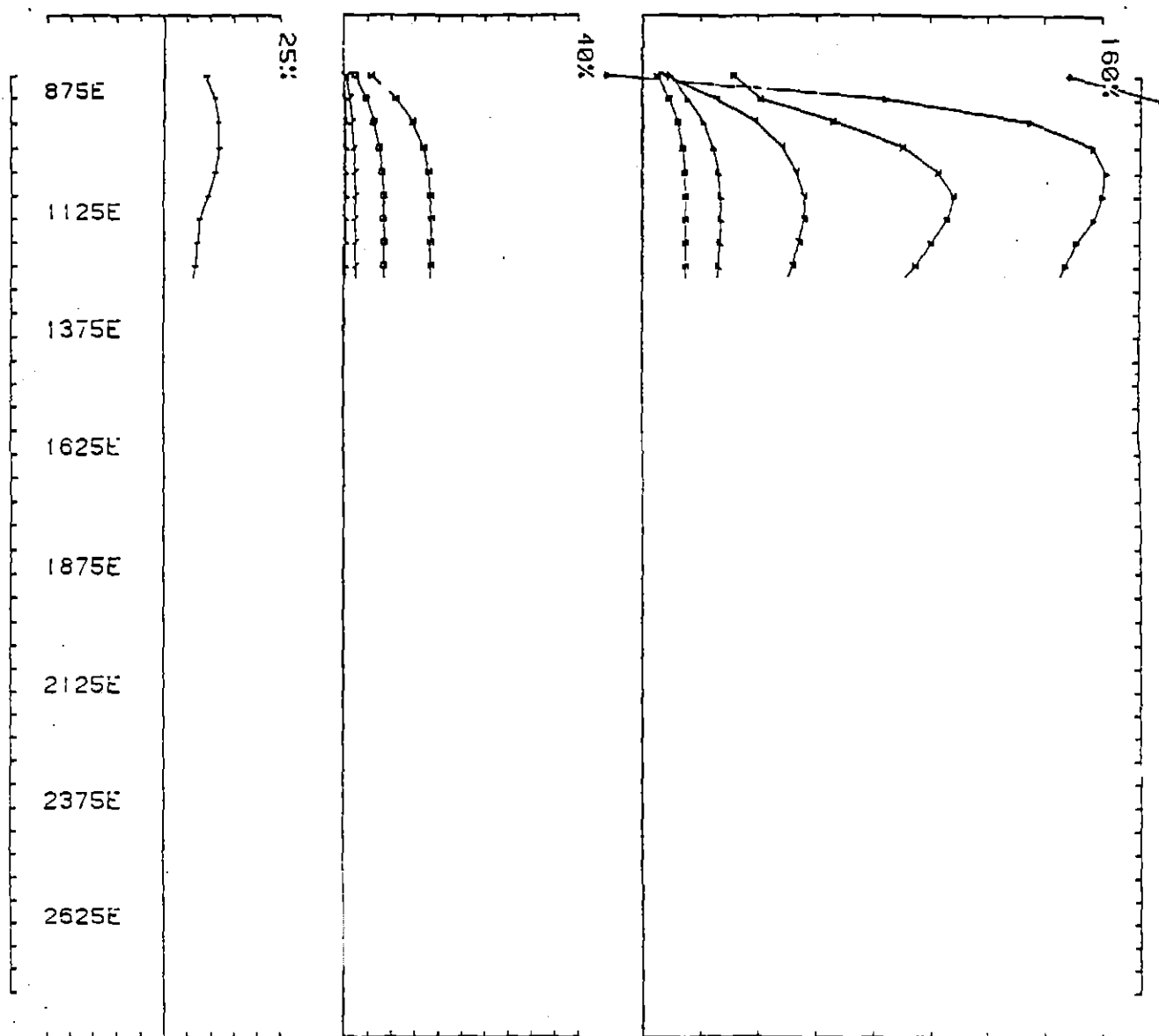
CSR Limited - NEGG
BULGOBAC CREEK
CSAMT RESISTIVITIES (ANNOTATED)

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116047

APPENDIX III



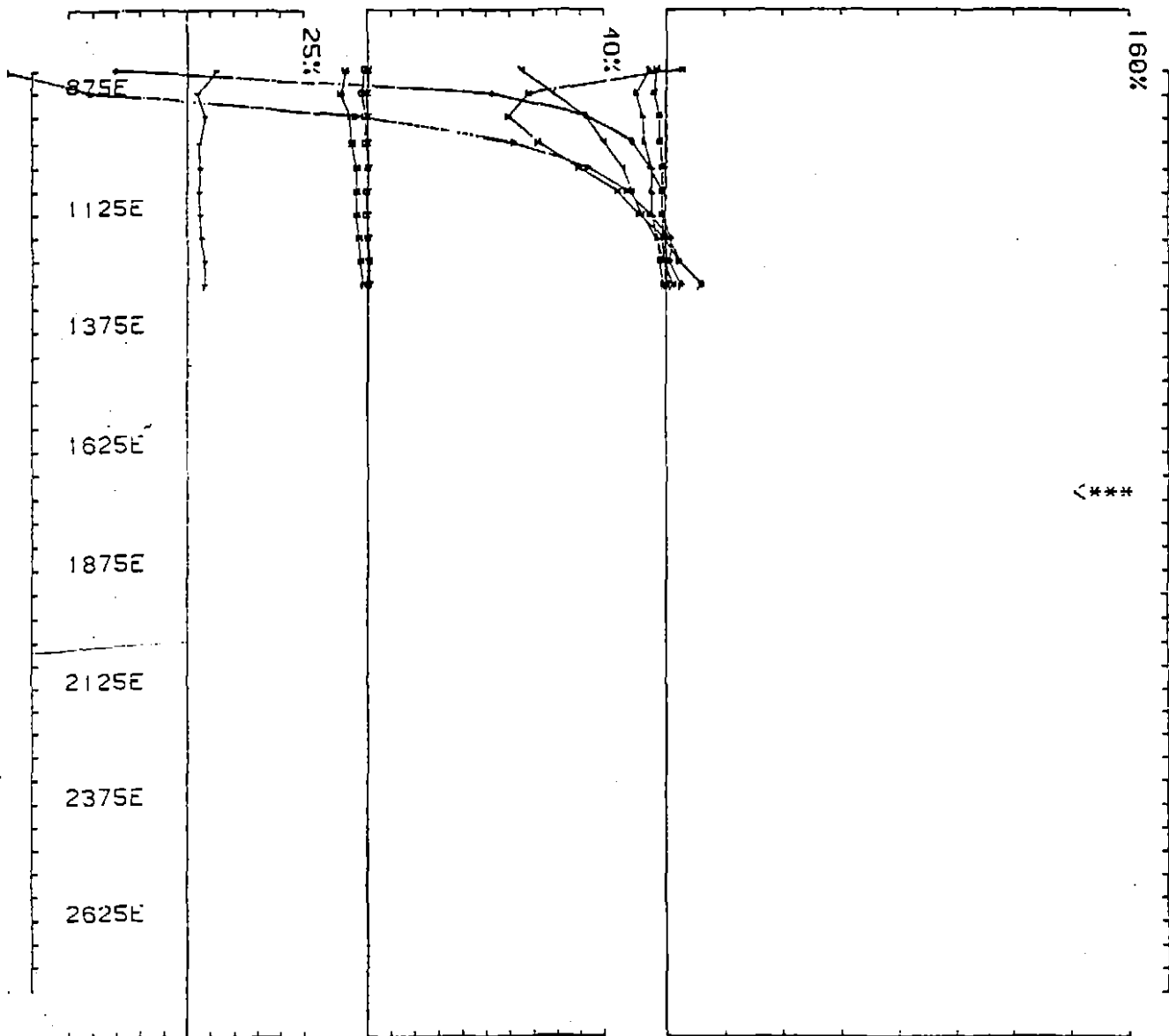
UTEM SURVEY at QUE ROAD for C.S.R.

conducted by PMM PAO Job 8726 base freq (hz) 26.230 10/12/87

Loop 0001 line 8200N component HZ secondary field Ch 1 contin. norm.

116049

010



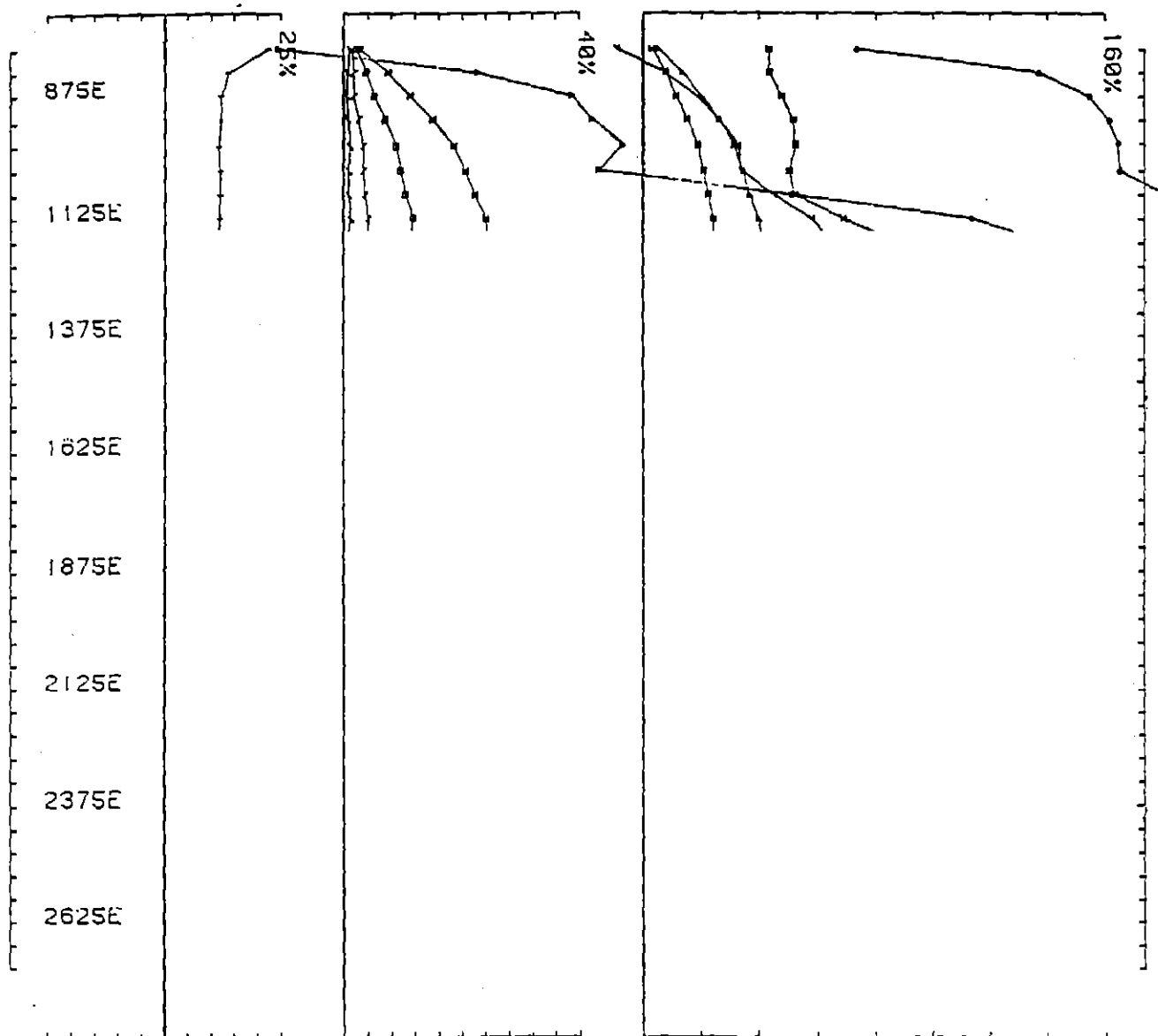
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043

116050



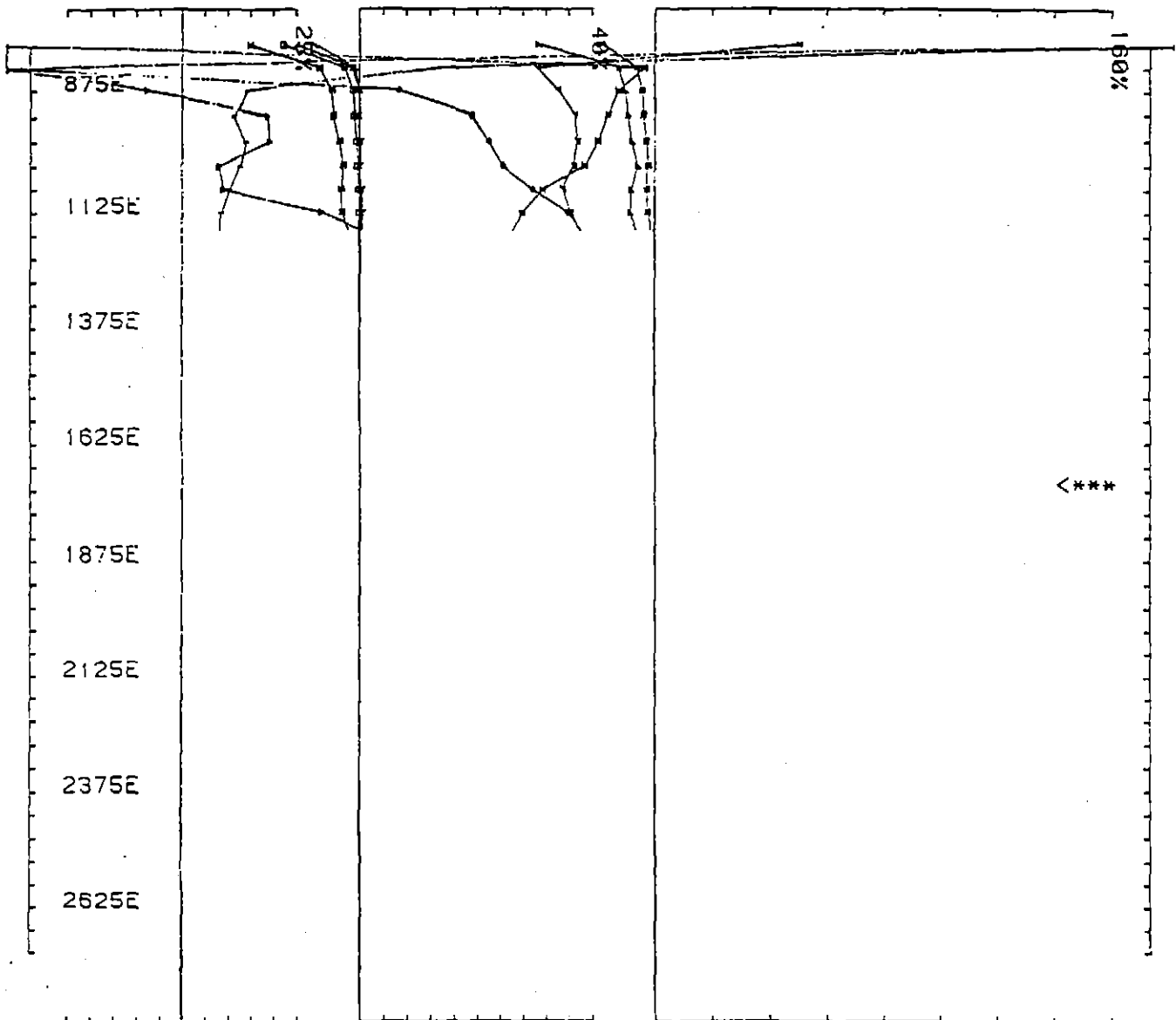
UTEM SURVEY at QUE ROAD for C.S.R.

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000

116051

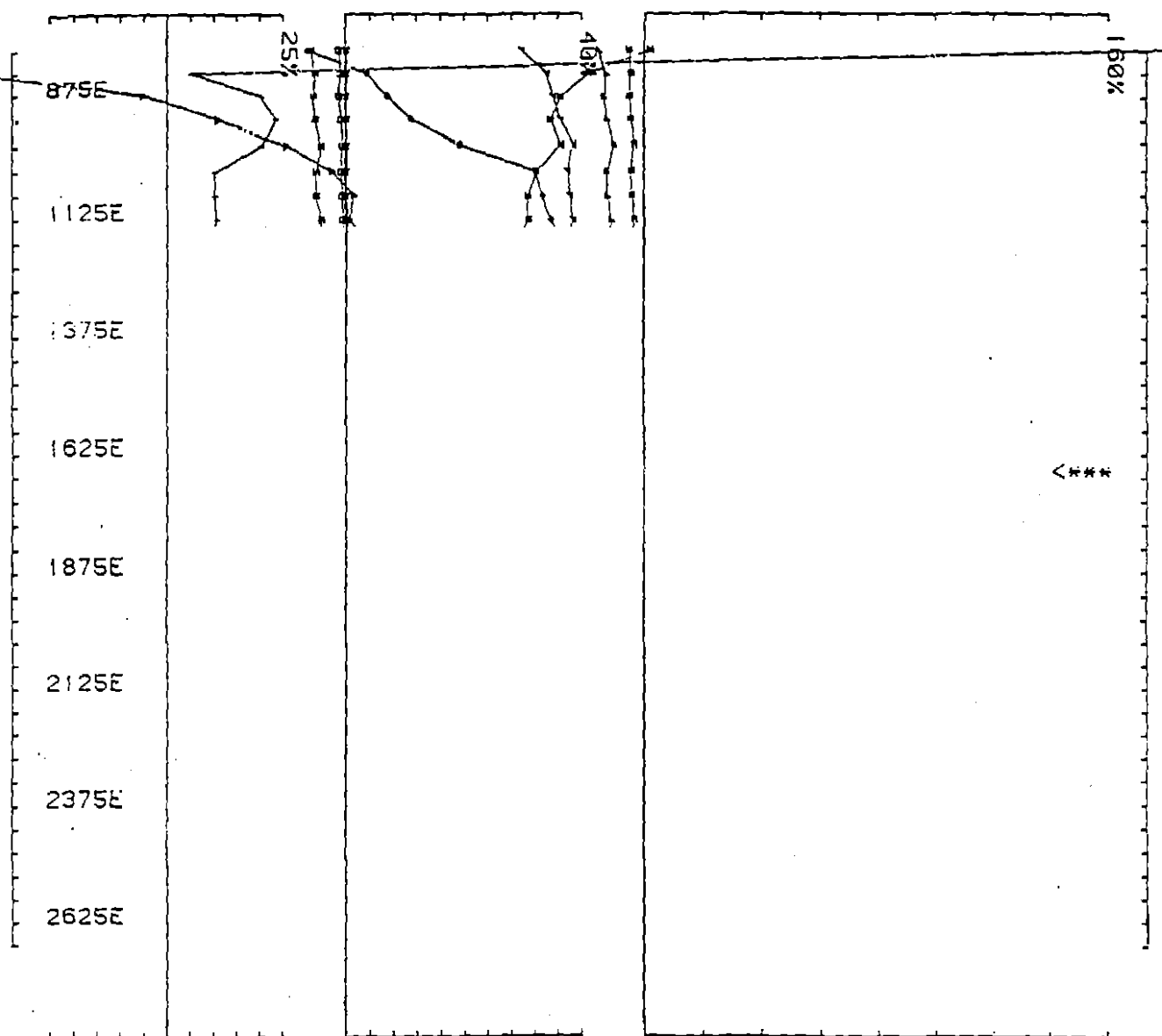


UTEM SURVEY at QUE ROAD for C.S.R.

conducted by PMM PAO job 8726 base freq (hz) 26.230 9/12/87

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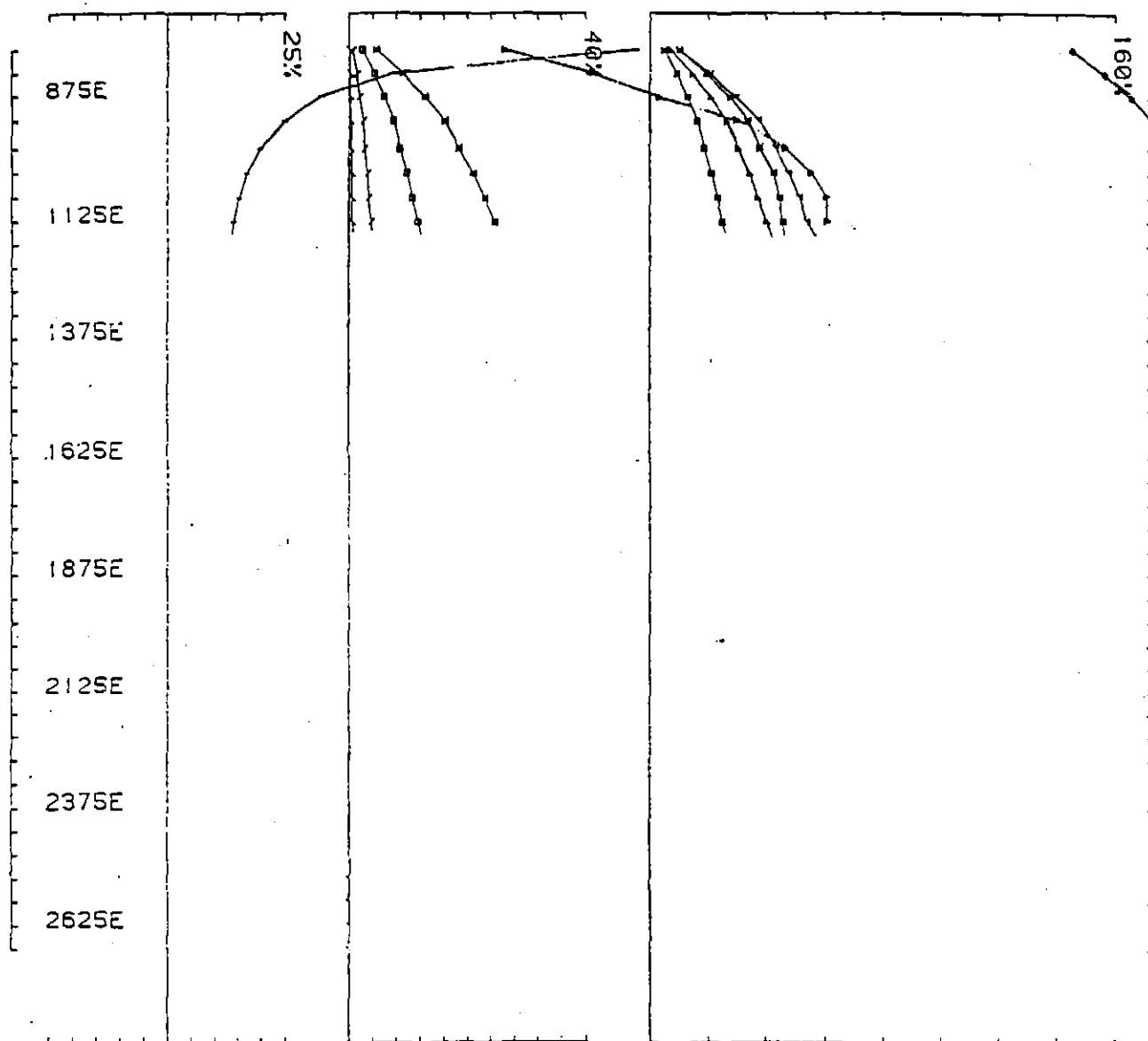
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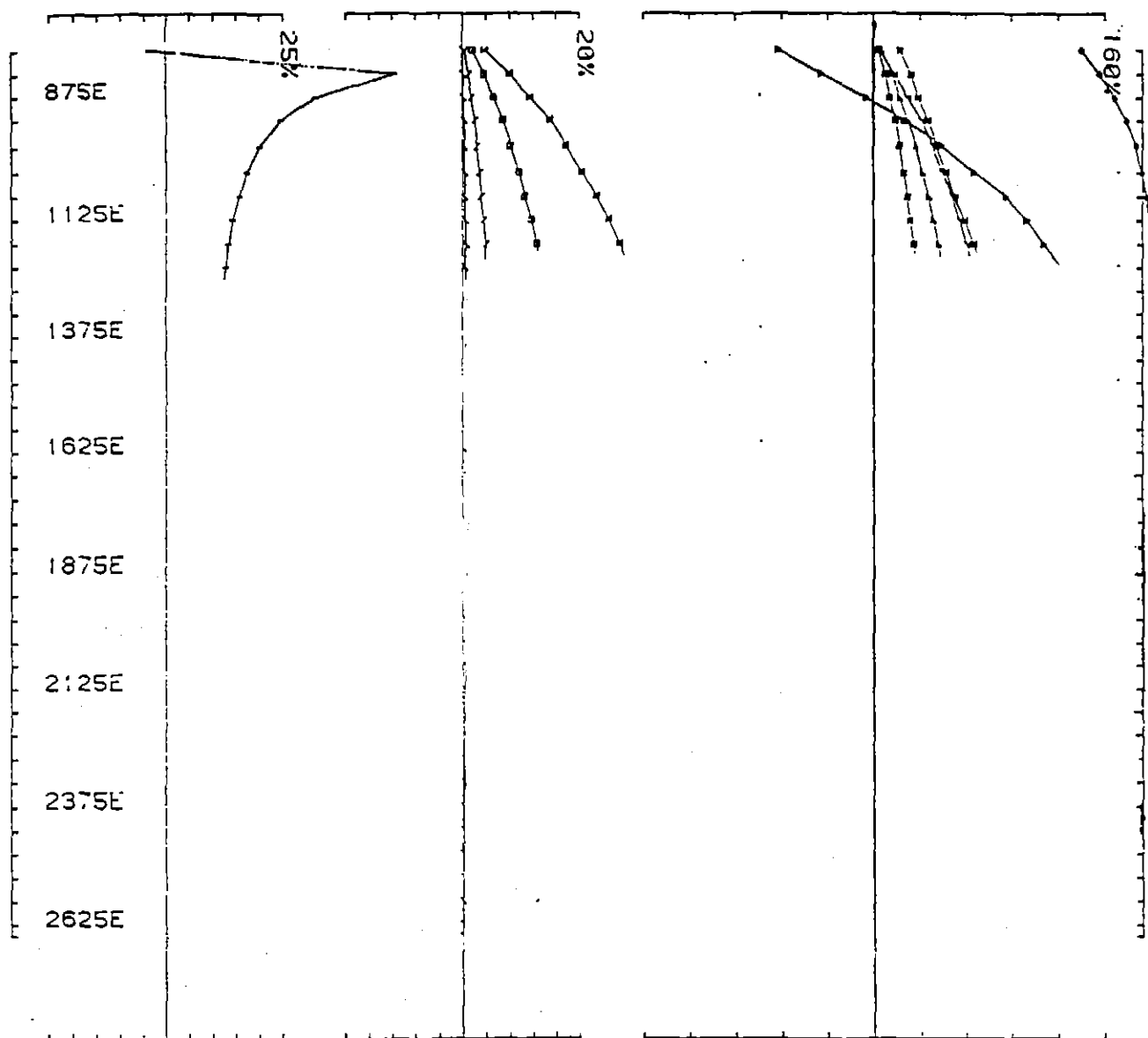


UTEM SURVEY at QUE ROAD for C.S.R.

conducted by PMM PAO job 8726 base freq (hz) 26.230 10/12/87

Loop 0001 line 8600N component Hz secondary field Ch 1 contin. norm.

050



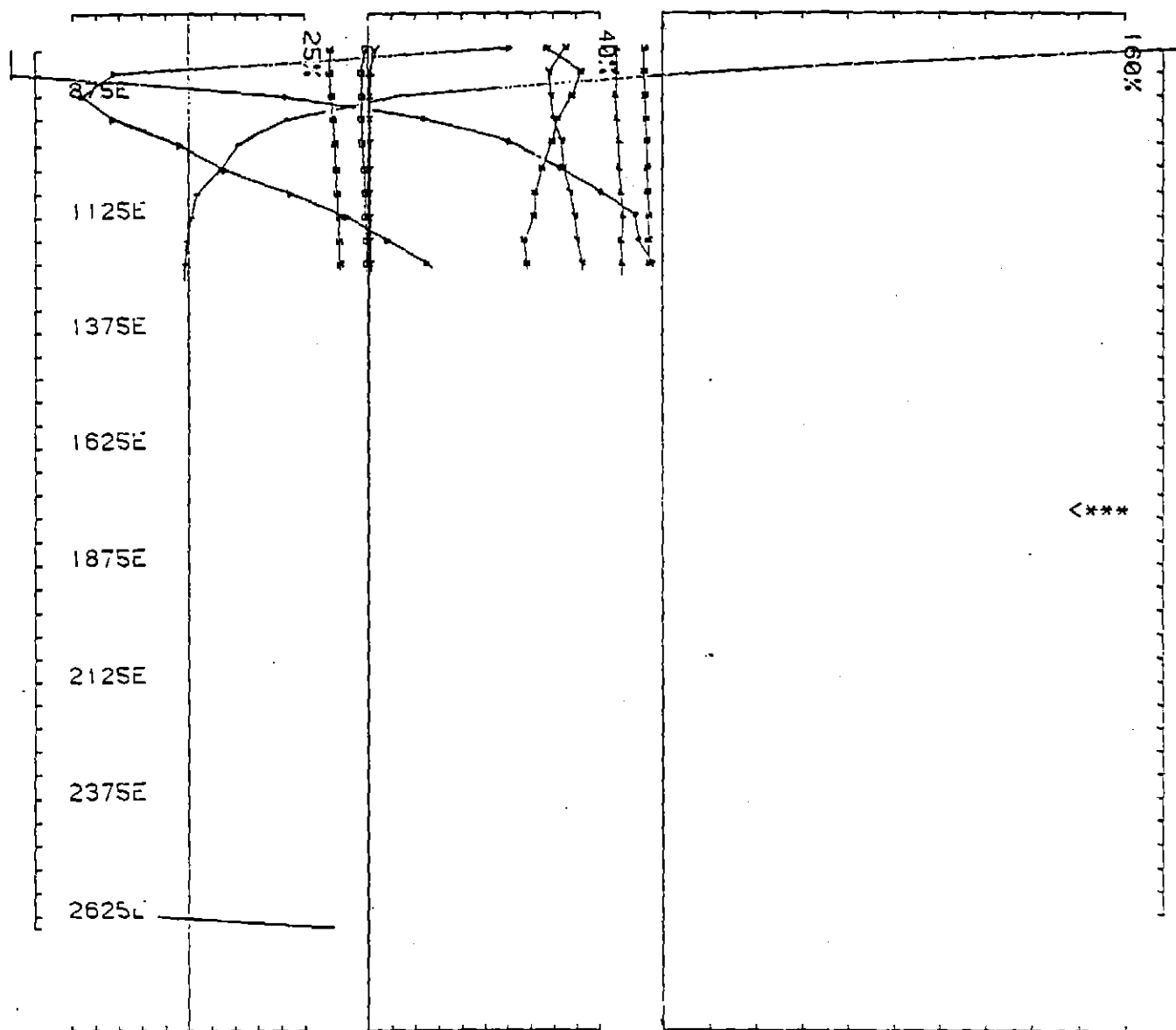
UTEM SURVEY at QUE ROAD for C.S.R.

conducted by PMM PAO job 8726 base freq (hz) 26.230 10/12/87

Loop 0001 line 8800N component Hz secondary field Ch 1 contin. norm.

054

116055



UTEM SURVEY at QUE ROAD for C.S.R.

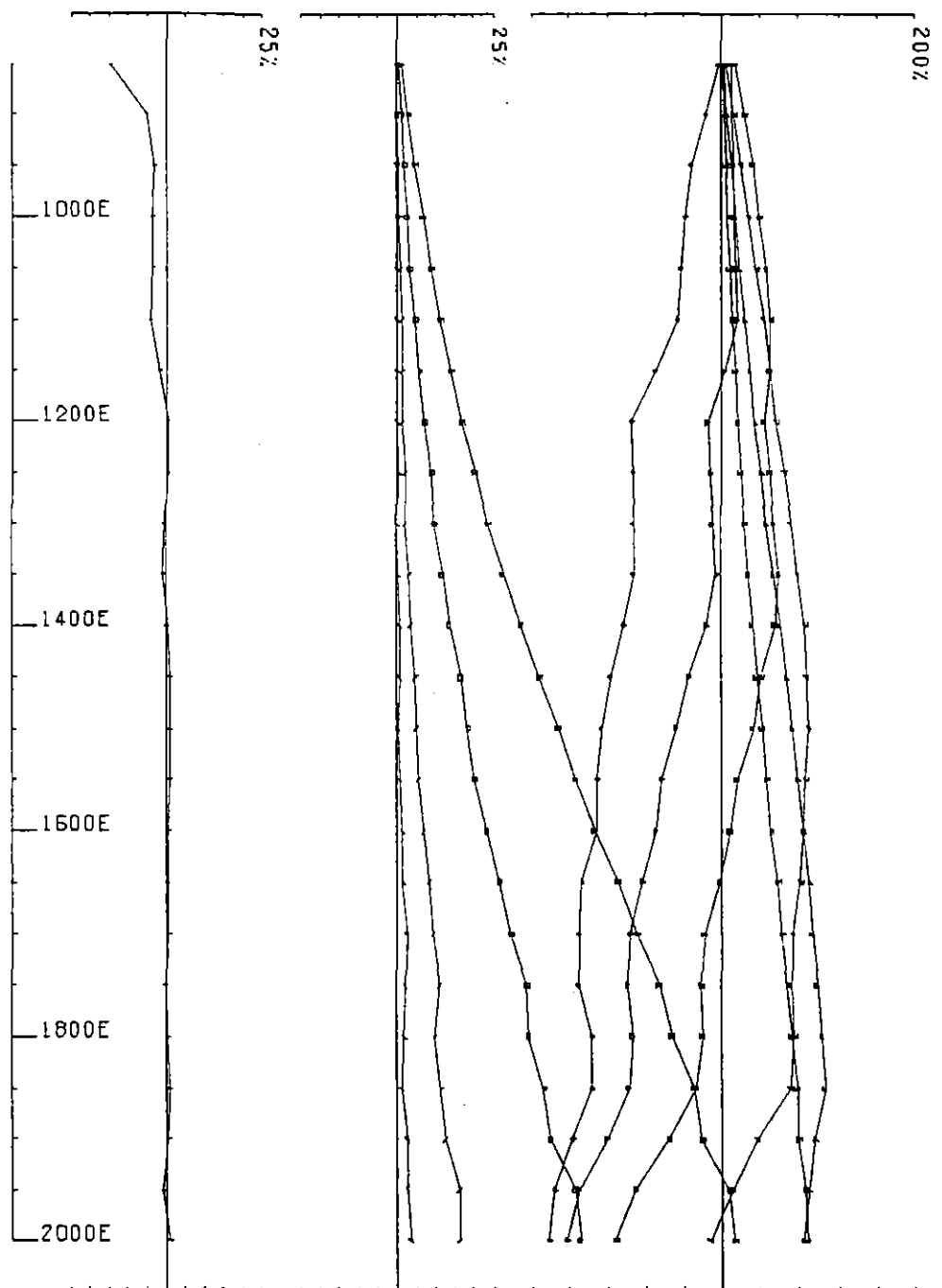
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Loop 0001 line 8800N component Hx secondary field Ch 1 point norm.

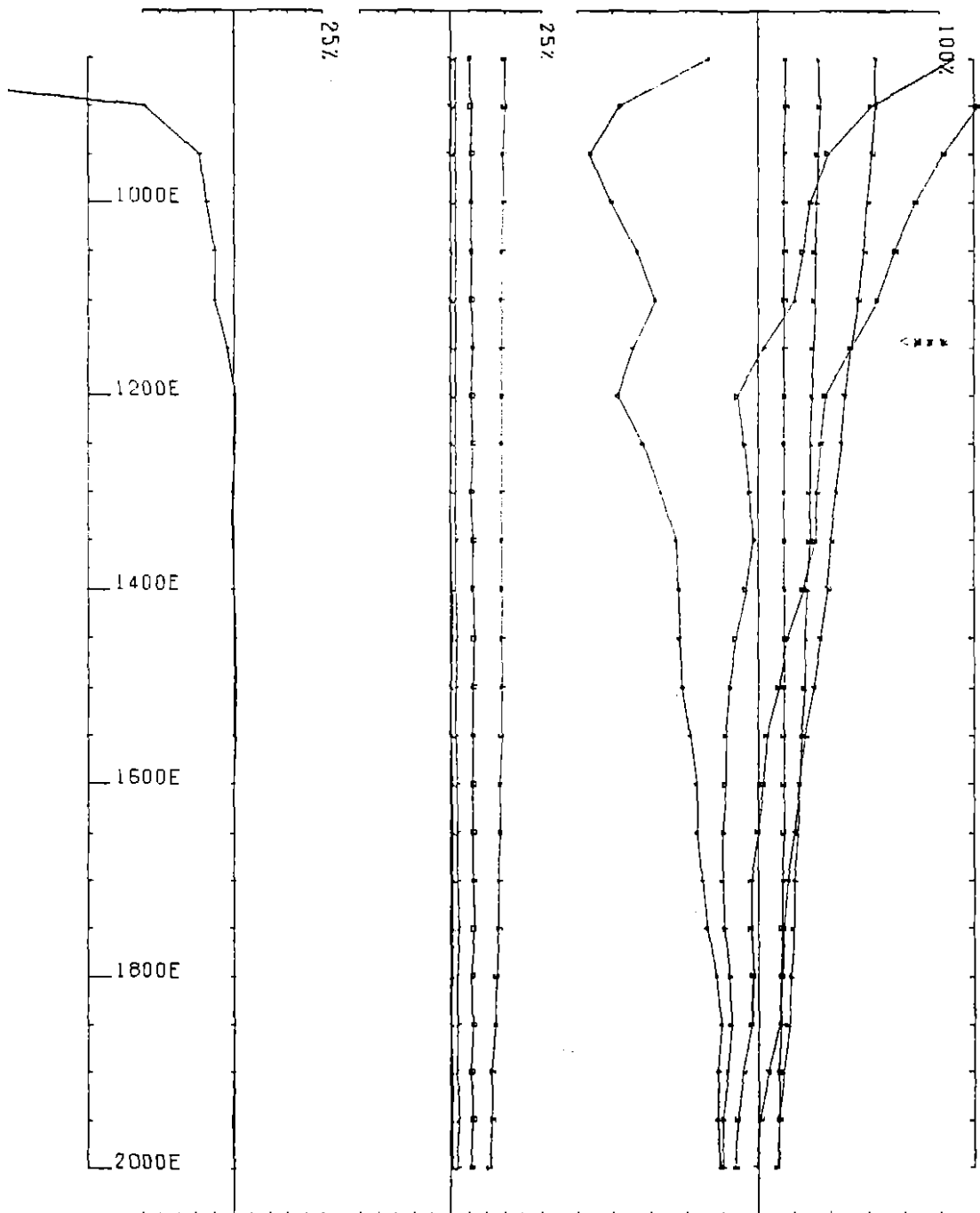
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116056

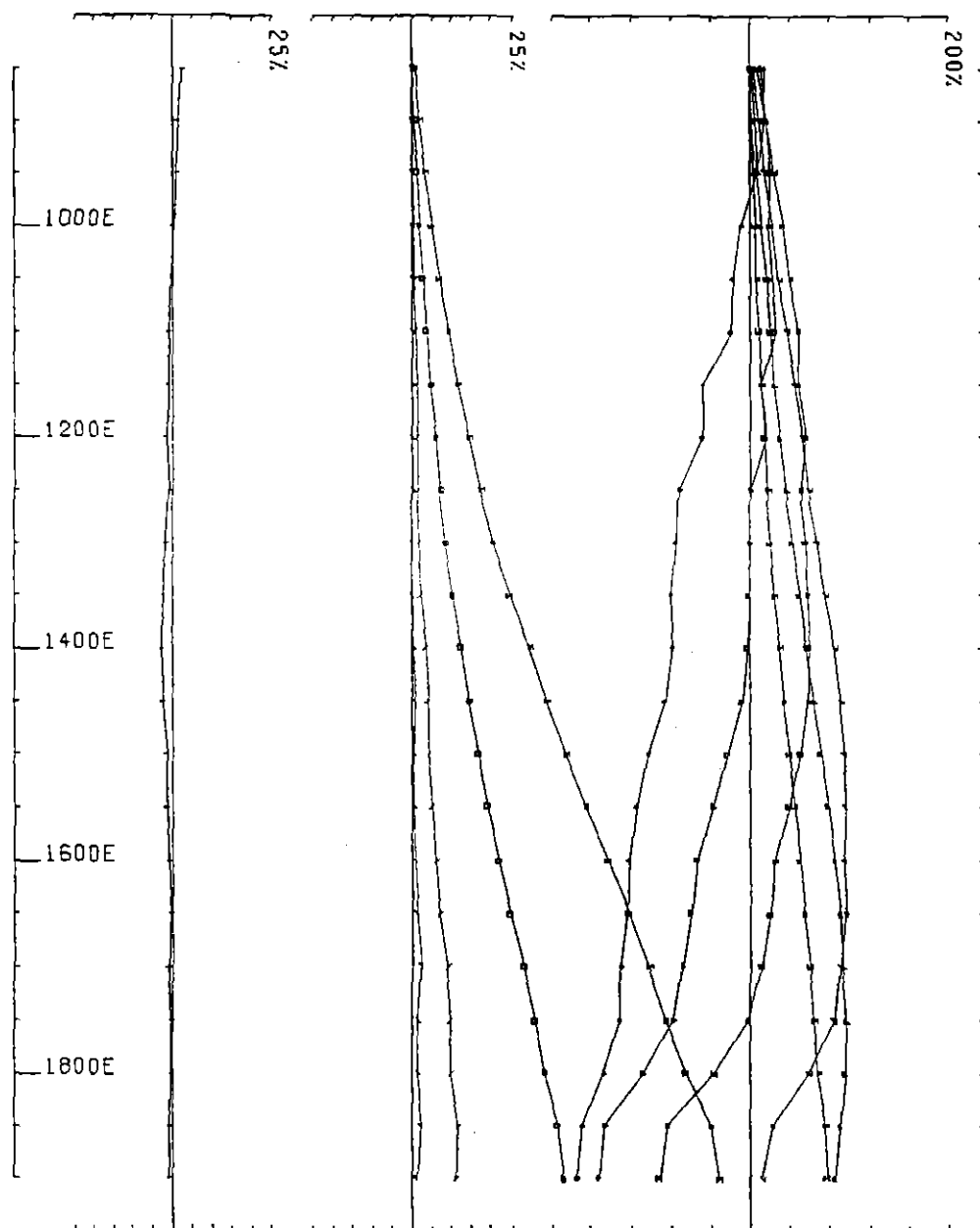
APPENDIX IV



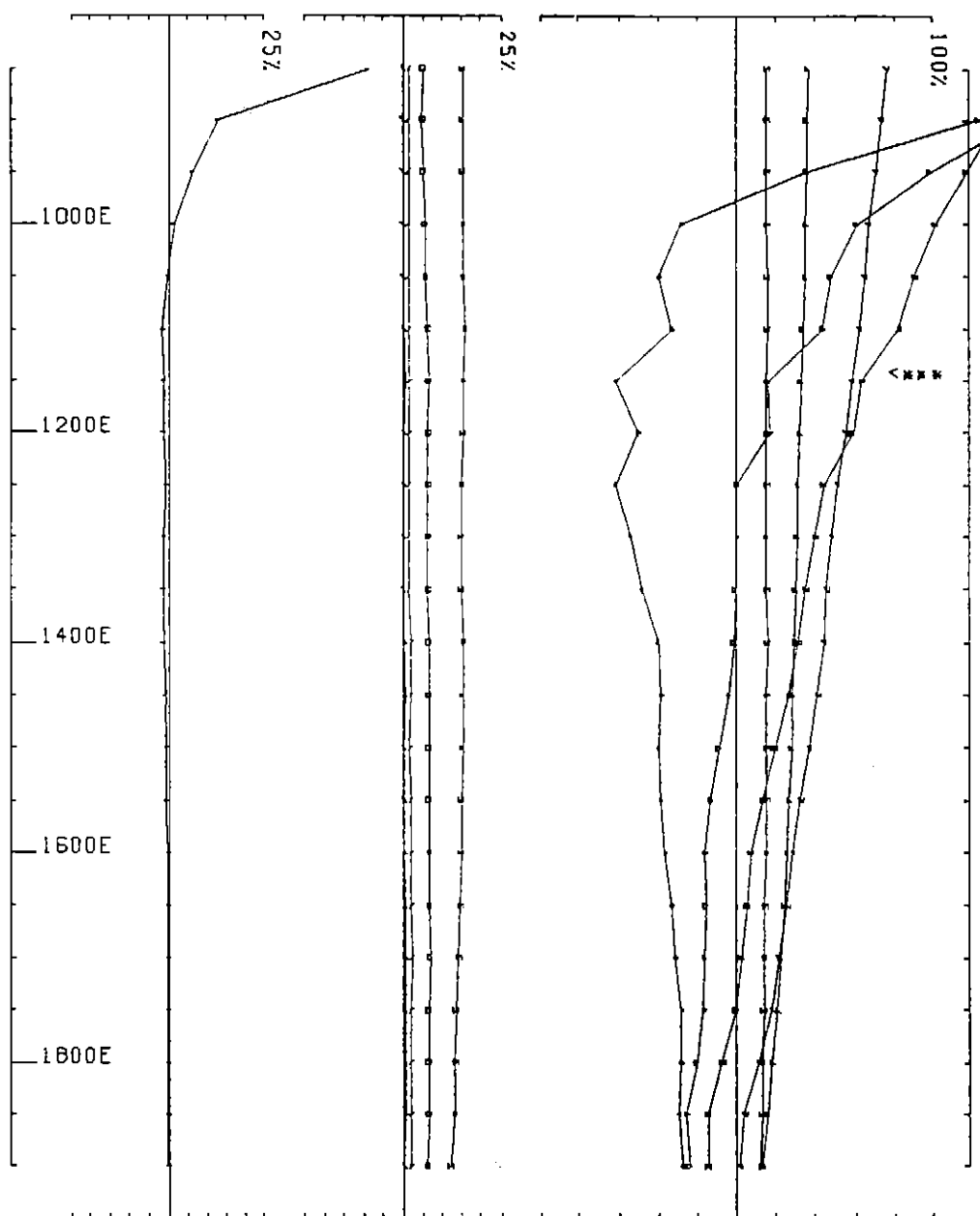
UTEM SURVEY AT BULOGBAC RIVER FOR ABERFOYLE RESOURCES LTD FEBRUARY 1993
CONDUCTED BY LANONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.23
LOOP NO 3 LINE 5600 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.



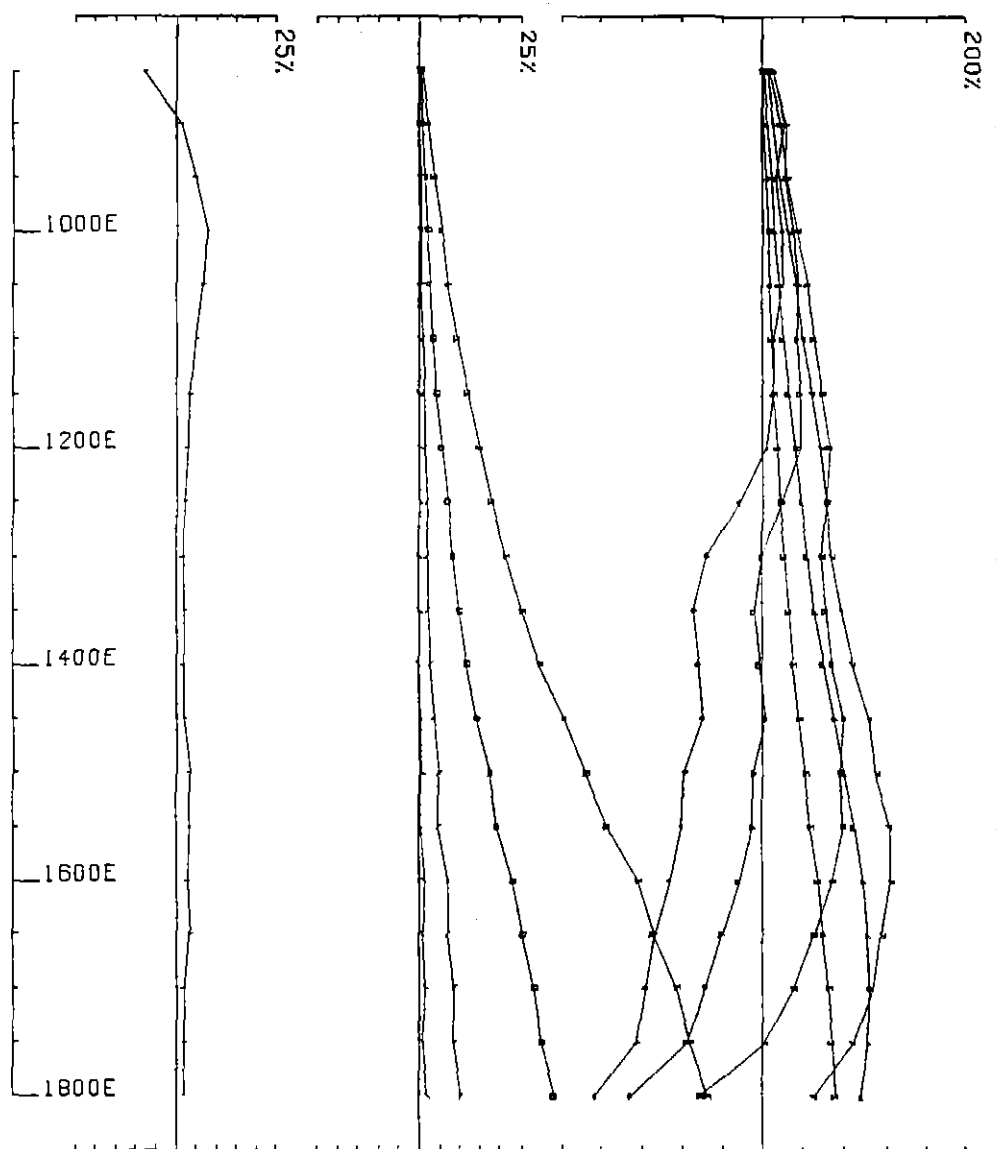
UTEM SURVEY AT BULOGBAC RIVER FOR ABERFOLYLE RESOURCES LTD FEBRUARY 1993
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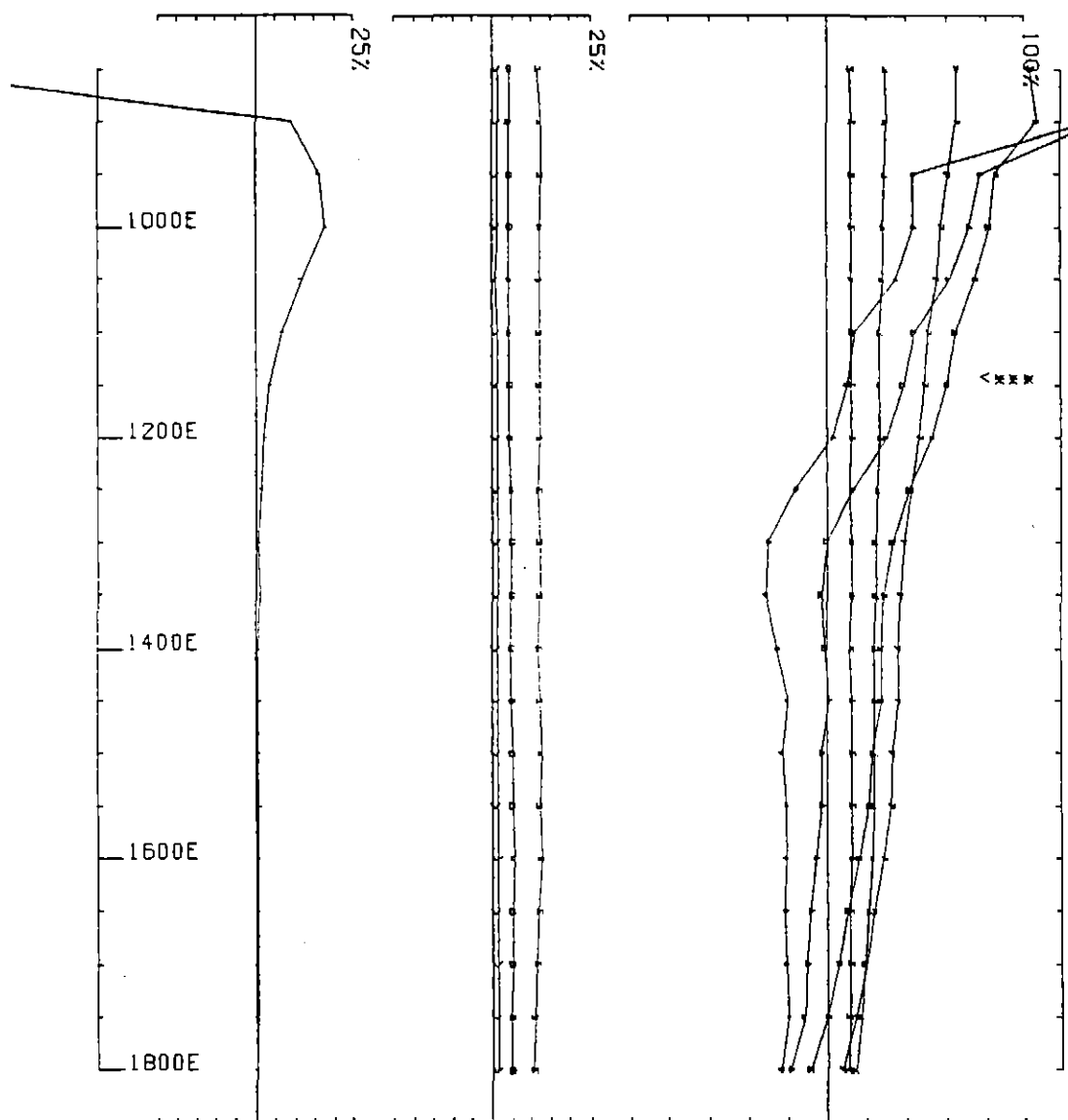
UTEM SURVEY AT BULGOZAC RIVER FOR ABERFOYLE RESOURCES LTD FEBRUARY 1991
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LOOP NO 3 LINE 5800 N COMPONENT 1 HZ SECONDARY FIELD CH1 CONTIN. NORM.



UTM SURVEY AT BULGOZAC RIVER FOR ABERFOYLE RESOURCES LTD FEBRUARY 1991
CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.23
LOOP NO 3 LINE 5800 N COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.

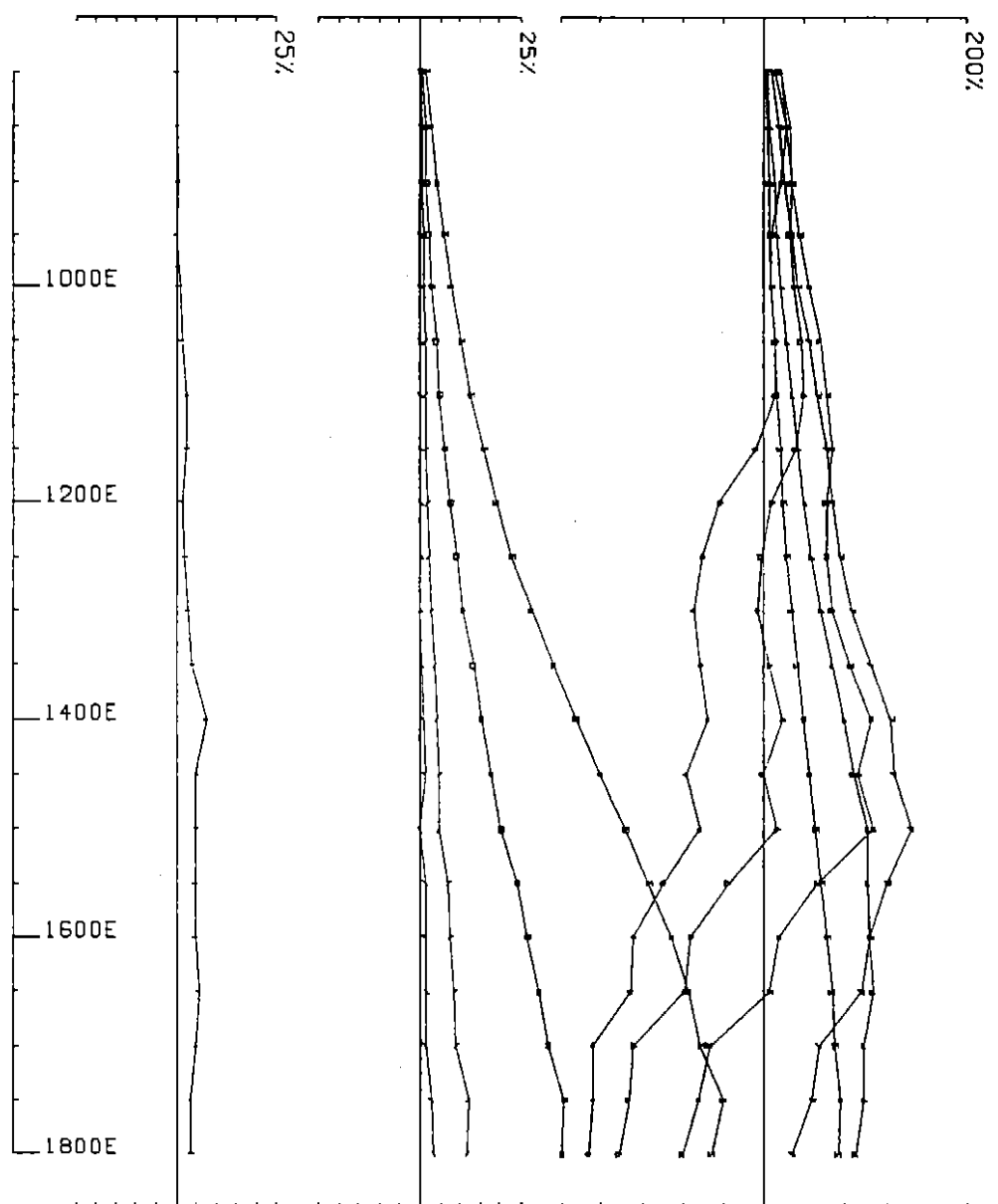


UTEM SURVEY AT BULGOBAC RIVER FOR ABERFOYLE RESOURCES LTD FEBRUARY 1991
CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ 1HZ 26.23
LOOP NO 3 LINE 6000 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NDRM.



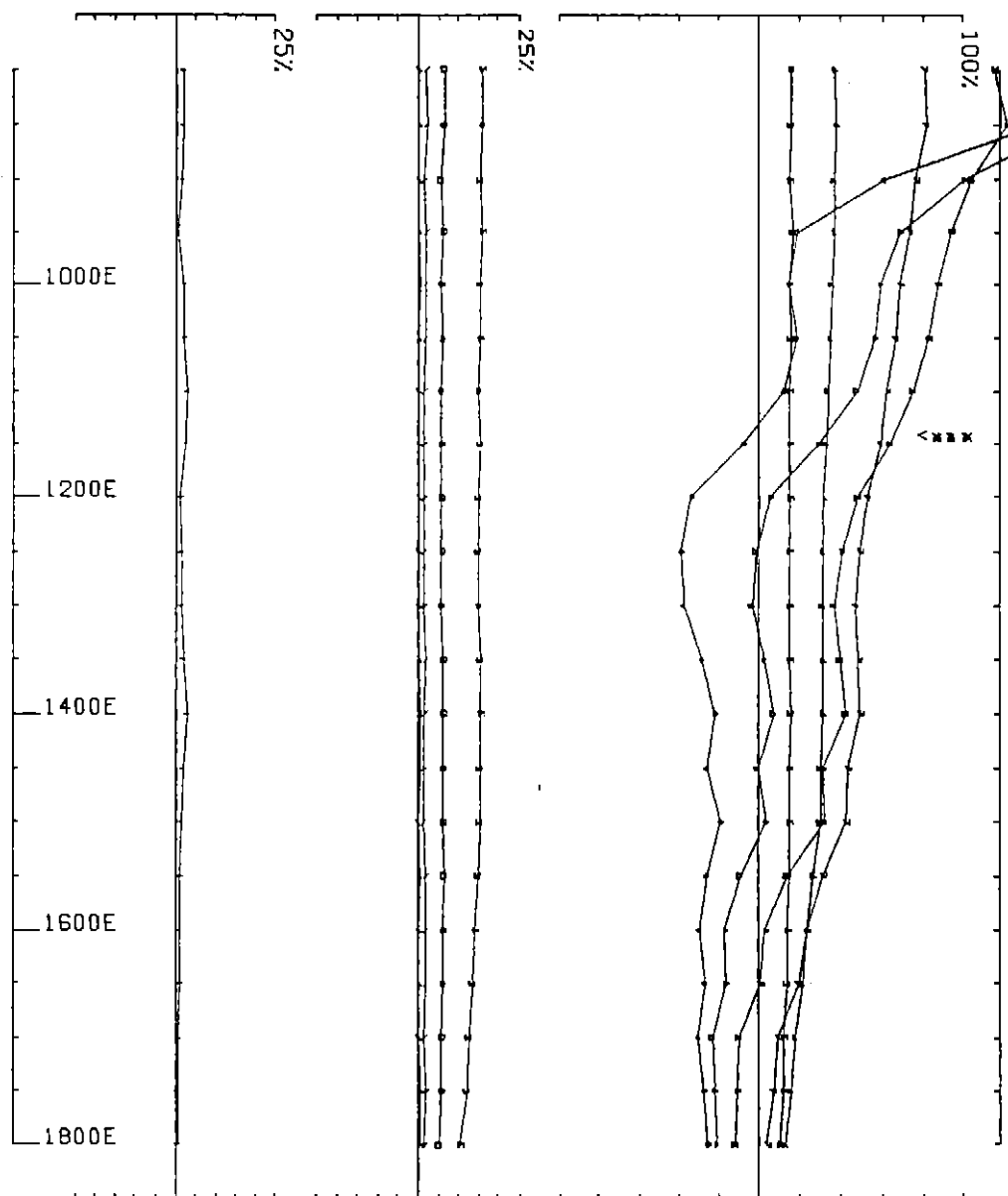
ITEM SURVEY AT BULGOBAC RIVER FOR ABERFOYLE RESOURCES LTD FEBRUARY 1991
CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.29
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064

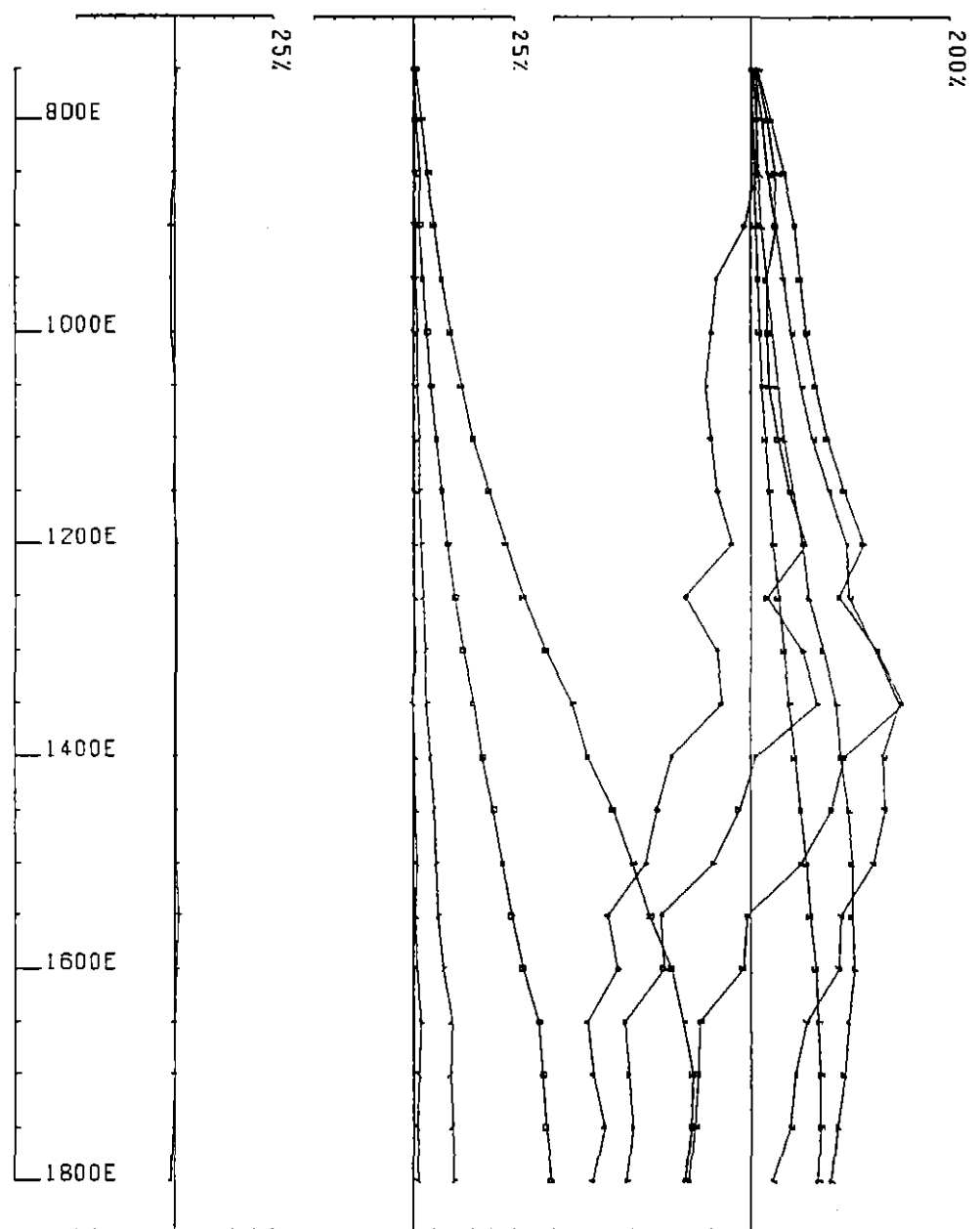


UTEM SURVEY AT BULGOZAC RIVER FOR ABERFOYLE RESOURCES LTD FEBRUARY 1993
CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ 1HZ 26.23
LOOP NO 3 LINE 6200 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.

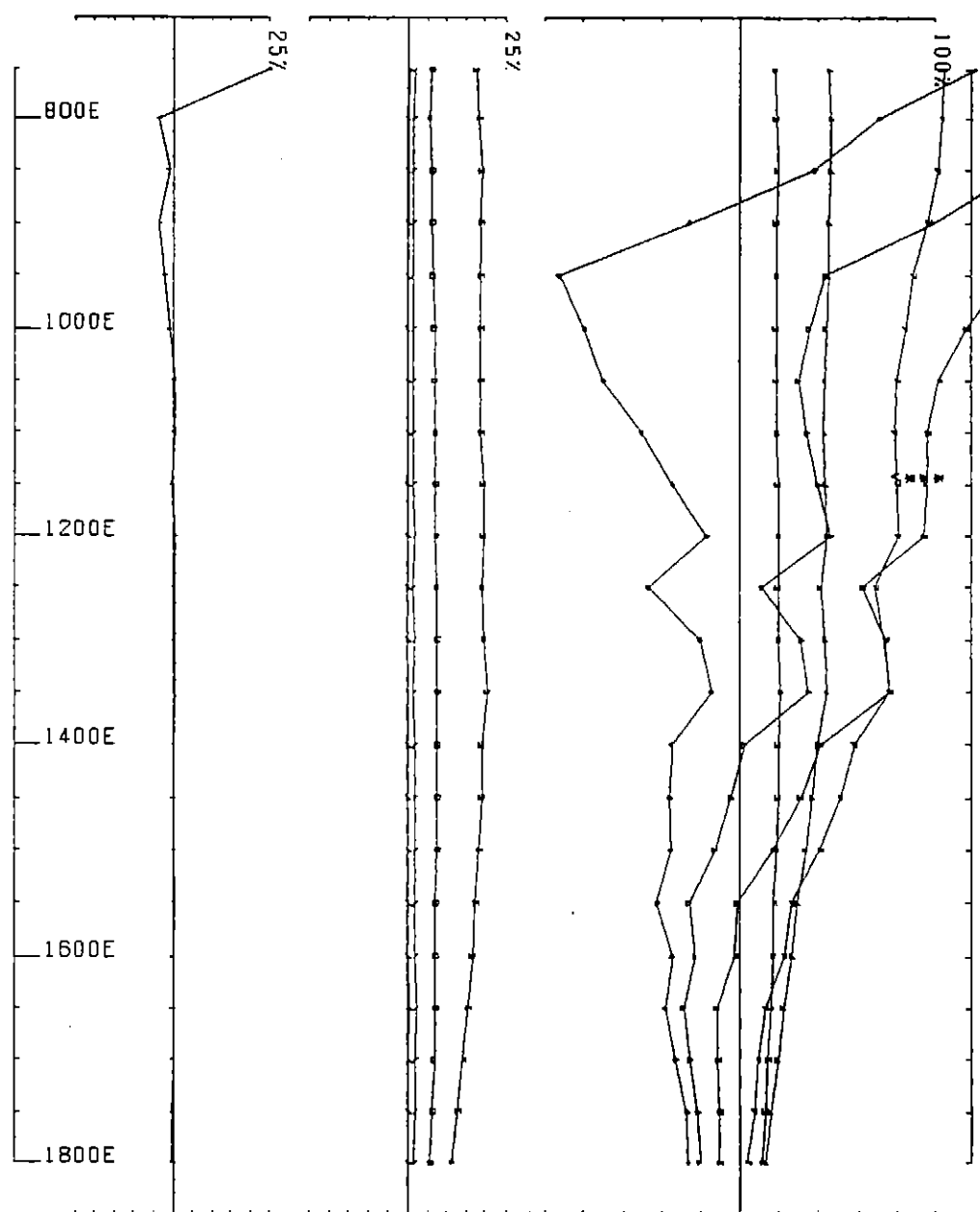
083



UTEM SURVEY AT BULGOAC RIVER FOR ABERFOYLE RESOURCES LTD FEBRUARY 1991
 CONDUCTED BY LANDMAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.23
 LOOP NO 3 LINE 6200 N COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.

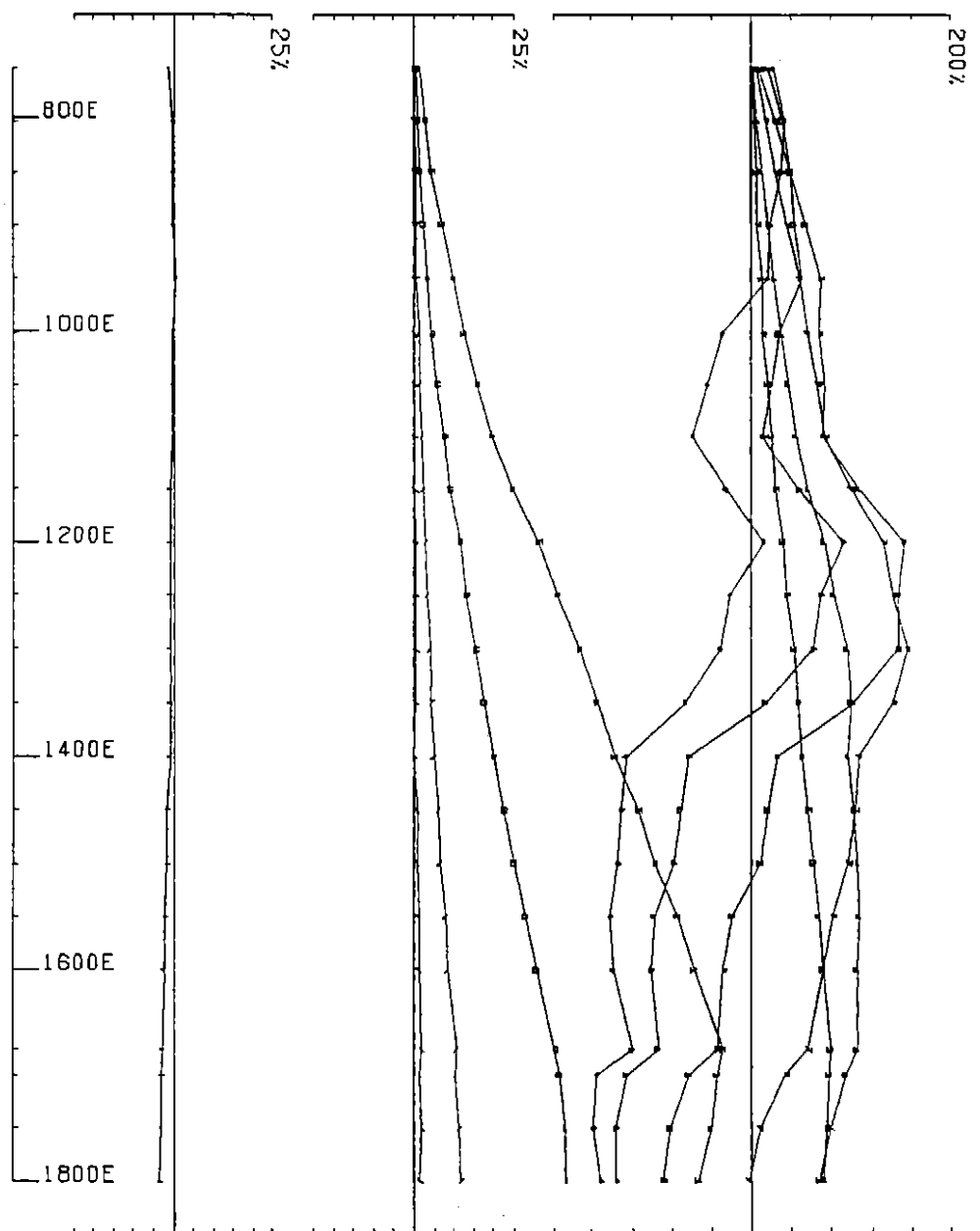


UTEM SURVEY AT BULOBBAC RIVER FOR ABERFOYLE RESOURCES LTD FEBRUARY 1991
CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.23
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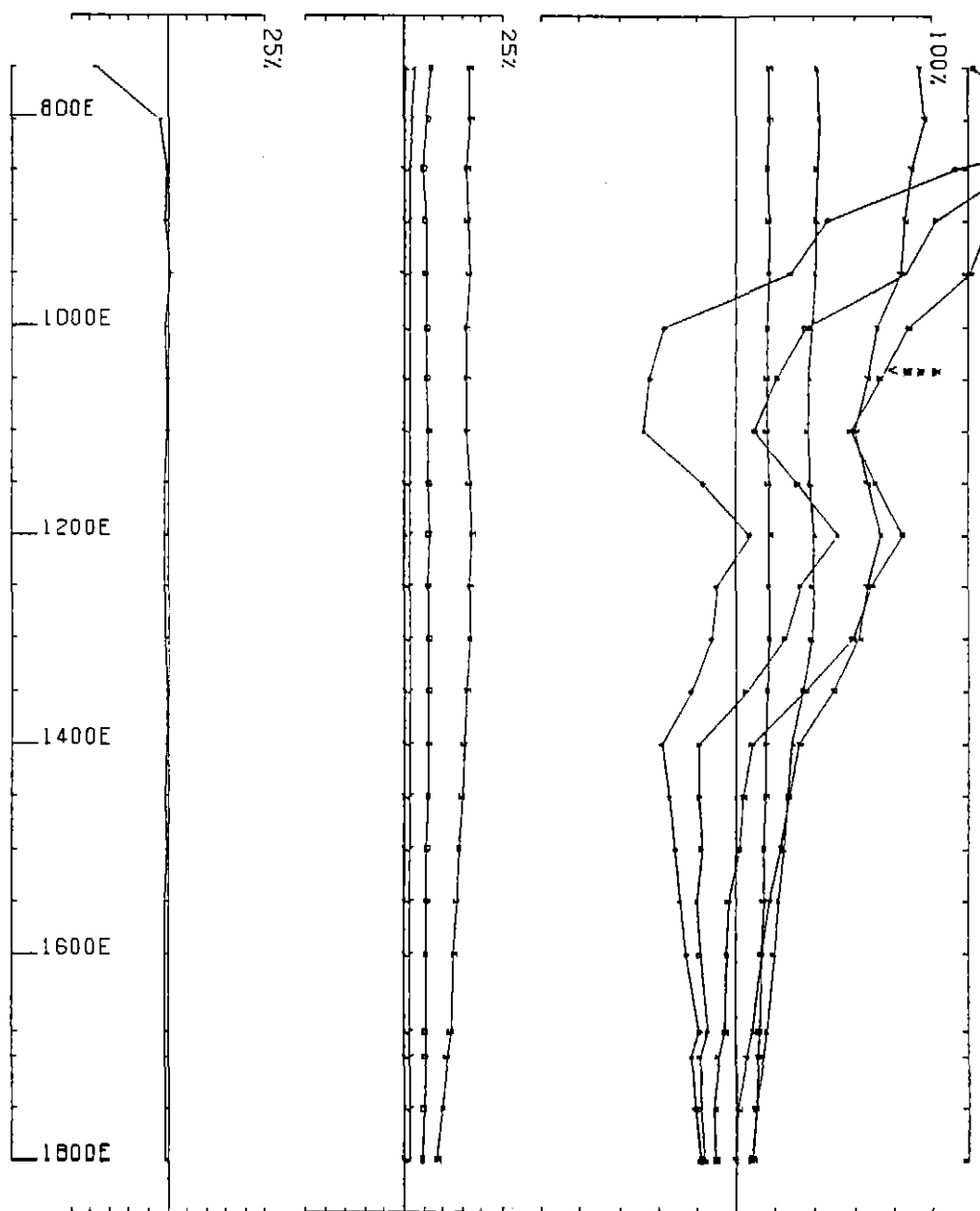


UTEM SURVEY AT BULGOOBAC RIVER FOR ABERFOYLE RESOURCES LTD FEBRUARY 1991
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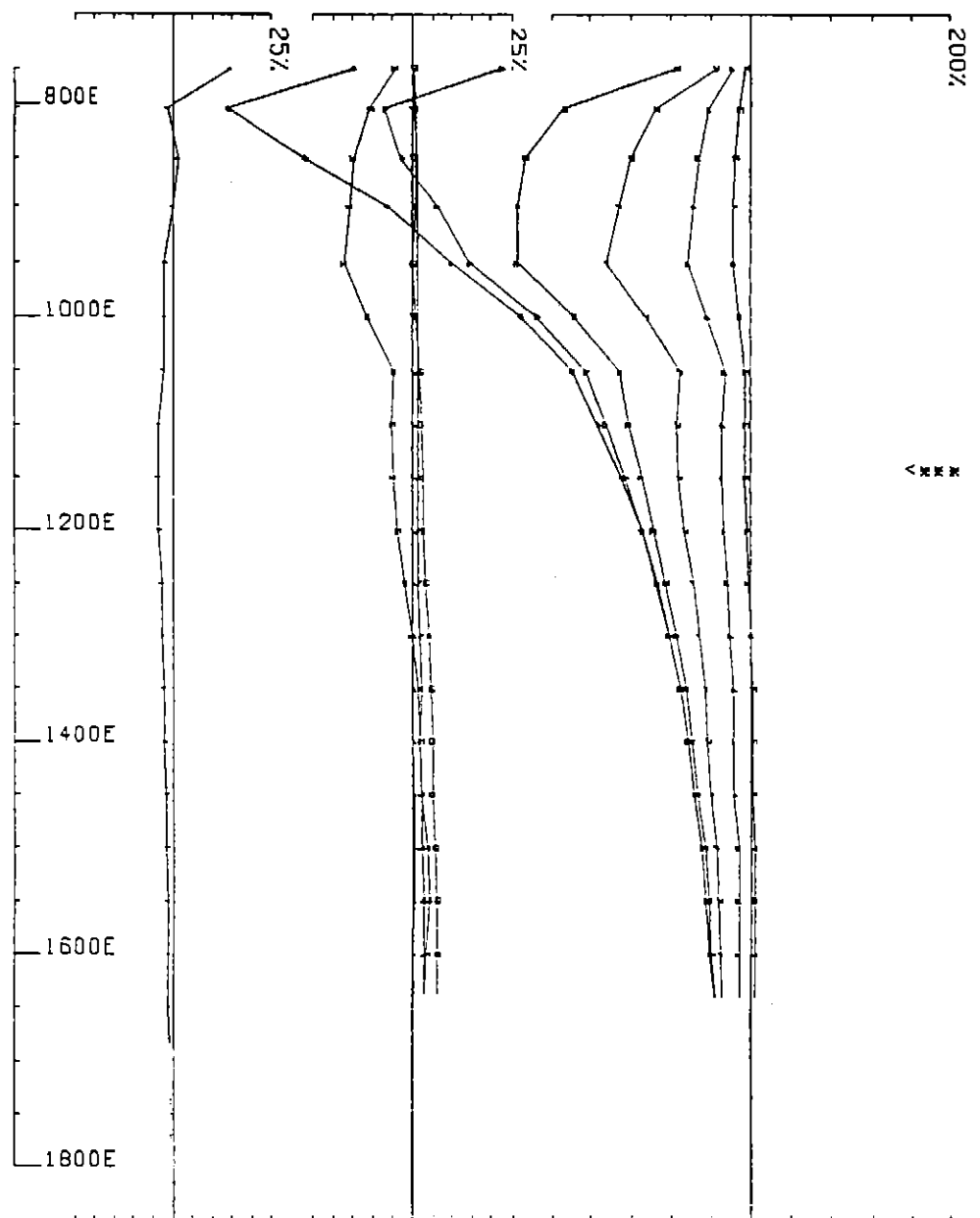
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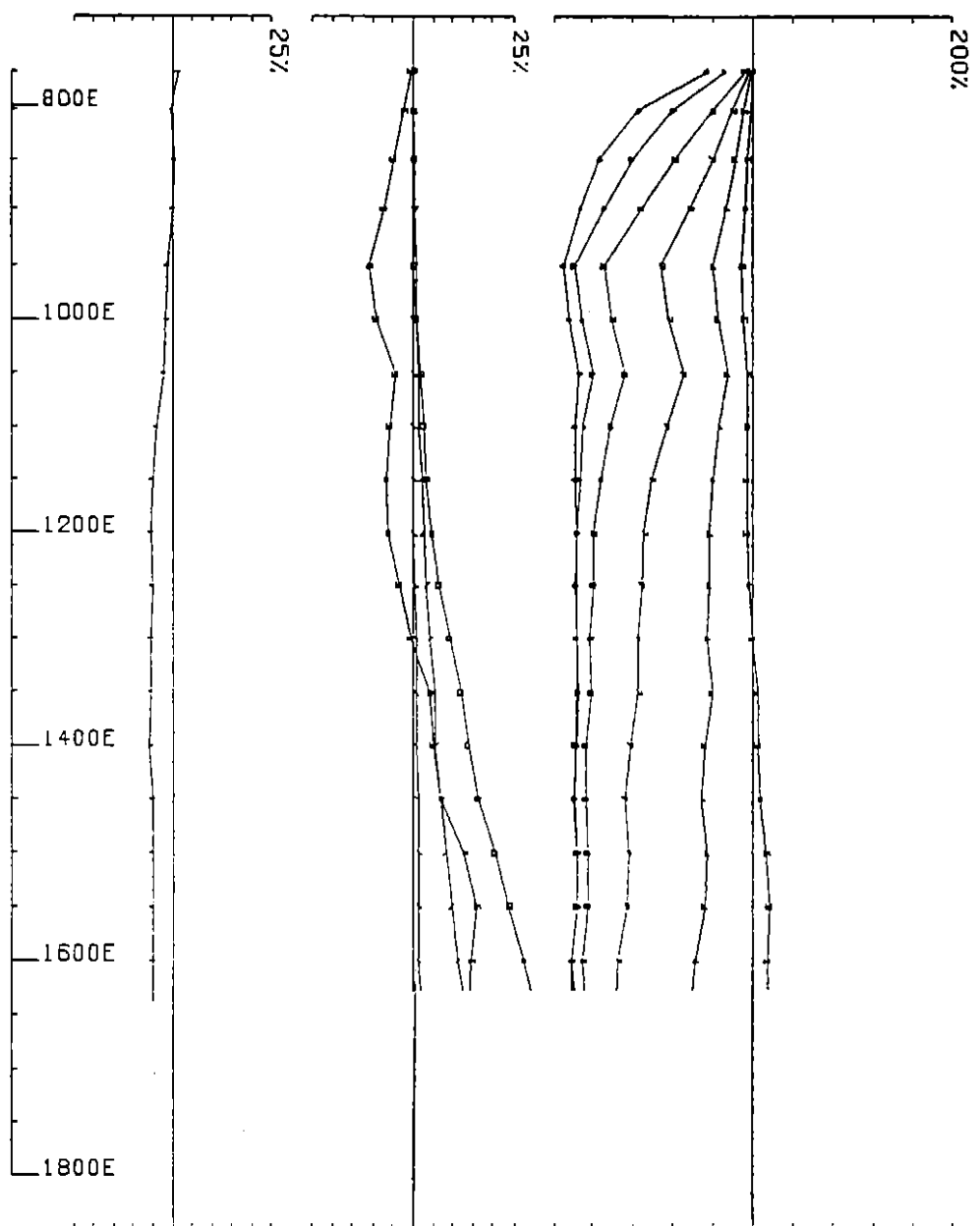
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 CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.25
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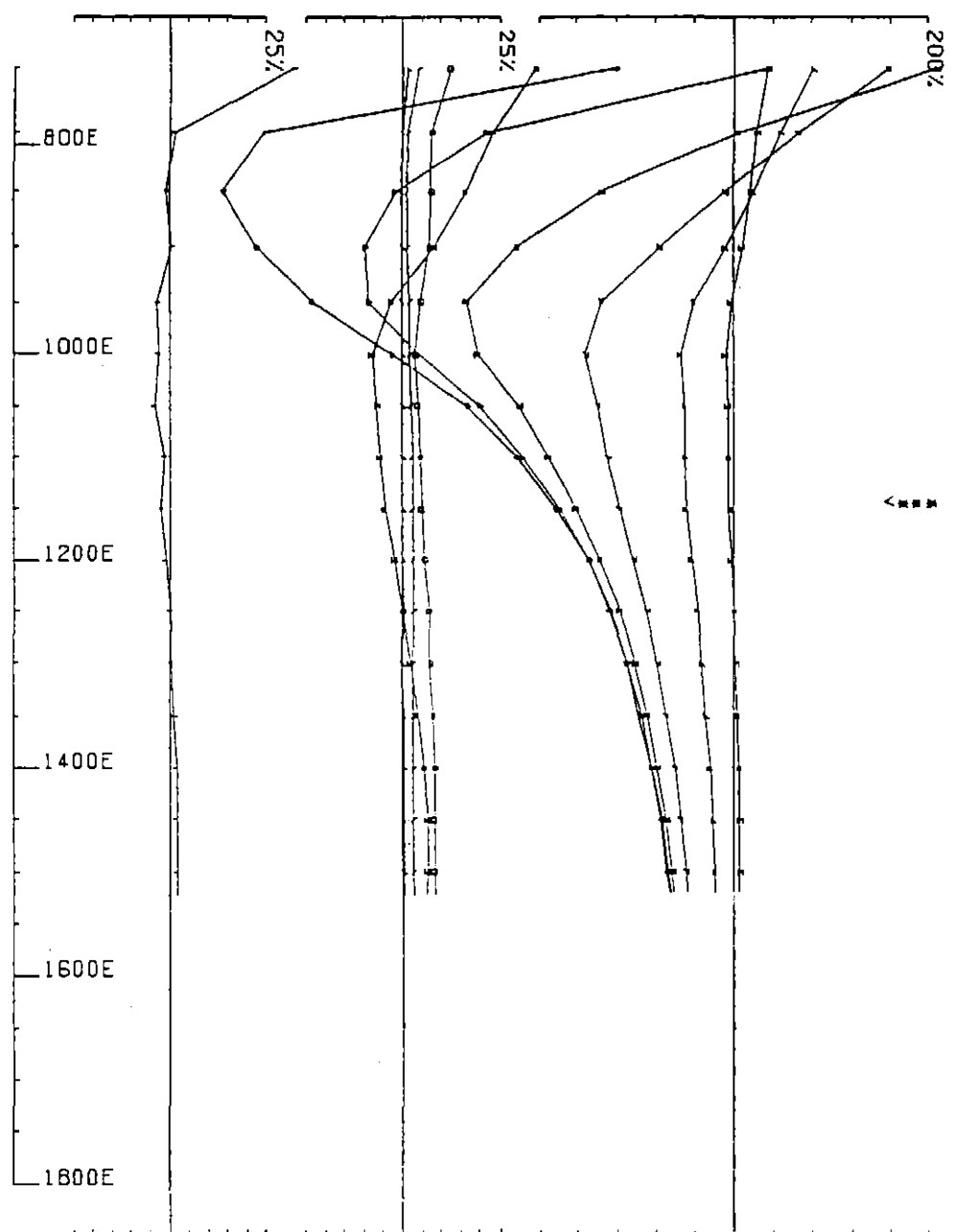
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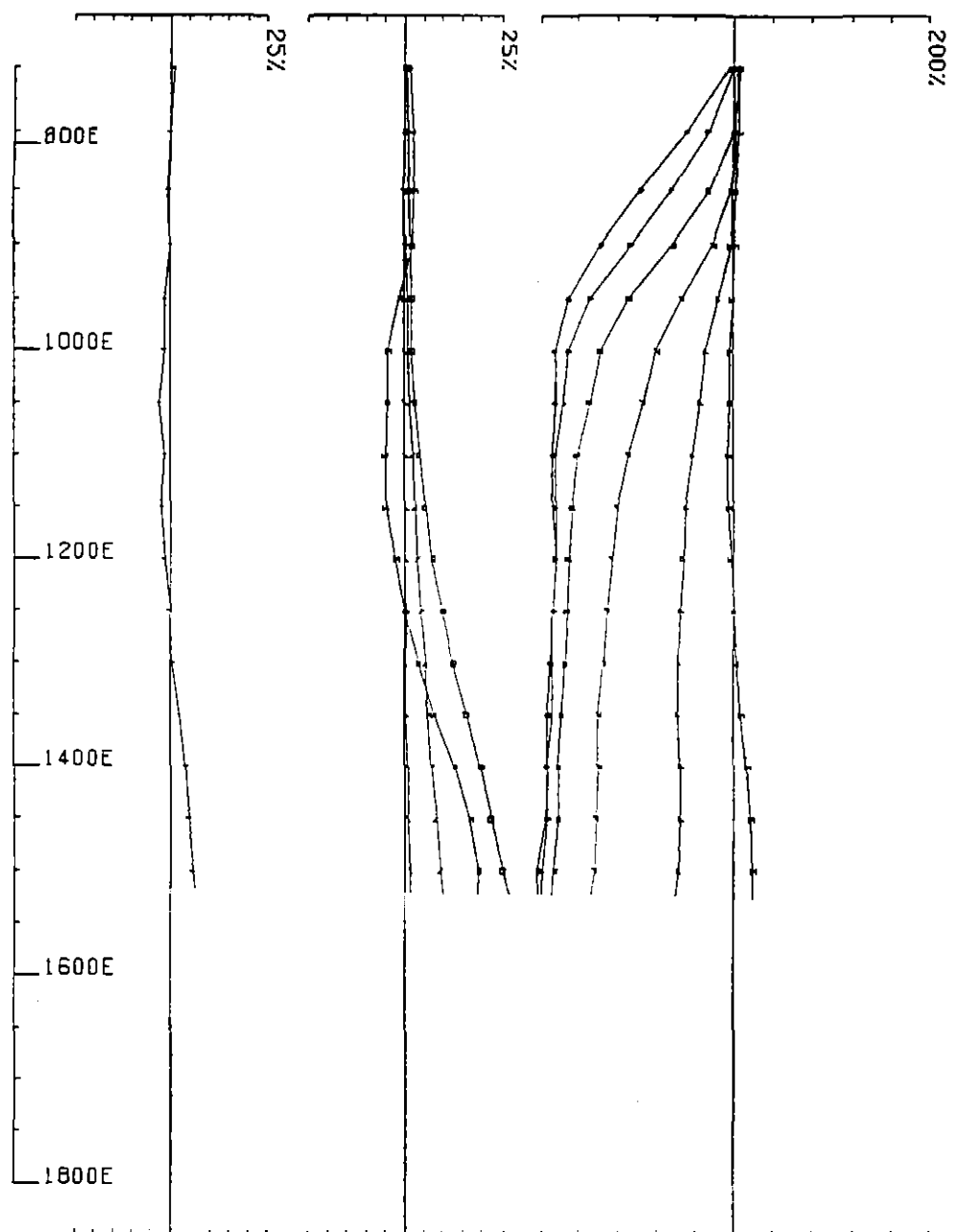
UTEM SURVEY AT BULGOBAC FOR ABERFOYLE RESOURCES FEBRUARY 1991
CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 25-23
LOOP NO 2 LINE 5800 N COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.



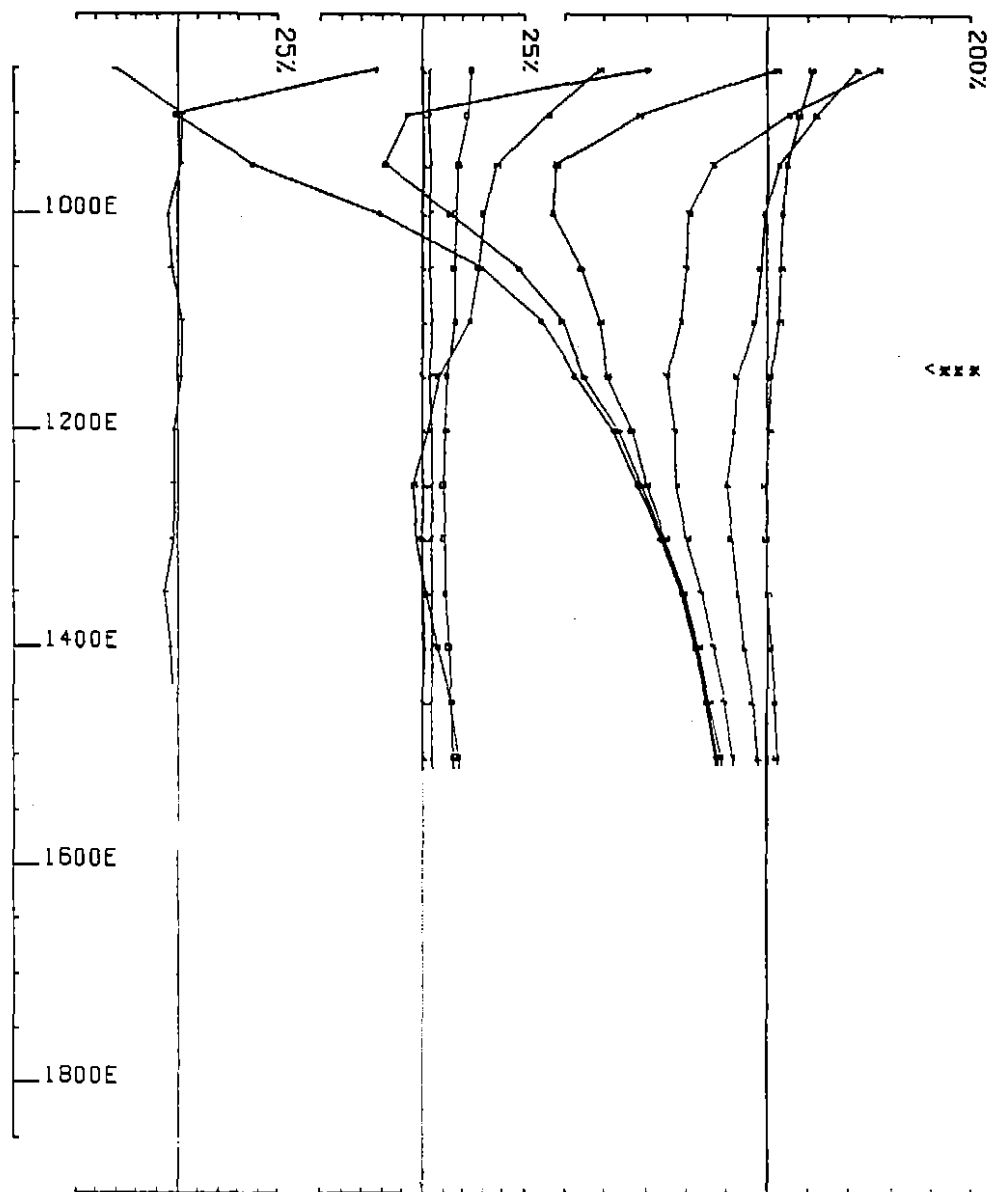
UTEM SURVEY AT BULGOZAC FOR ABERFOYLE RESOURCES FEBRUARY 1991
CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.23
LOOP NO 2 LINE 8800 W COMPONENT HZ SECONDARY FIELD (CH) CONTIN. NORM.



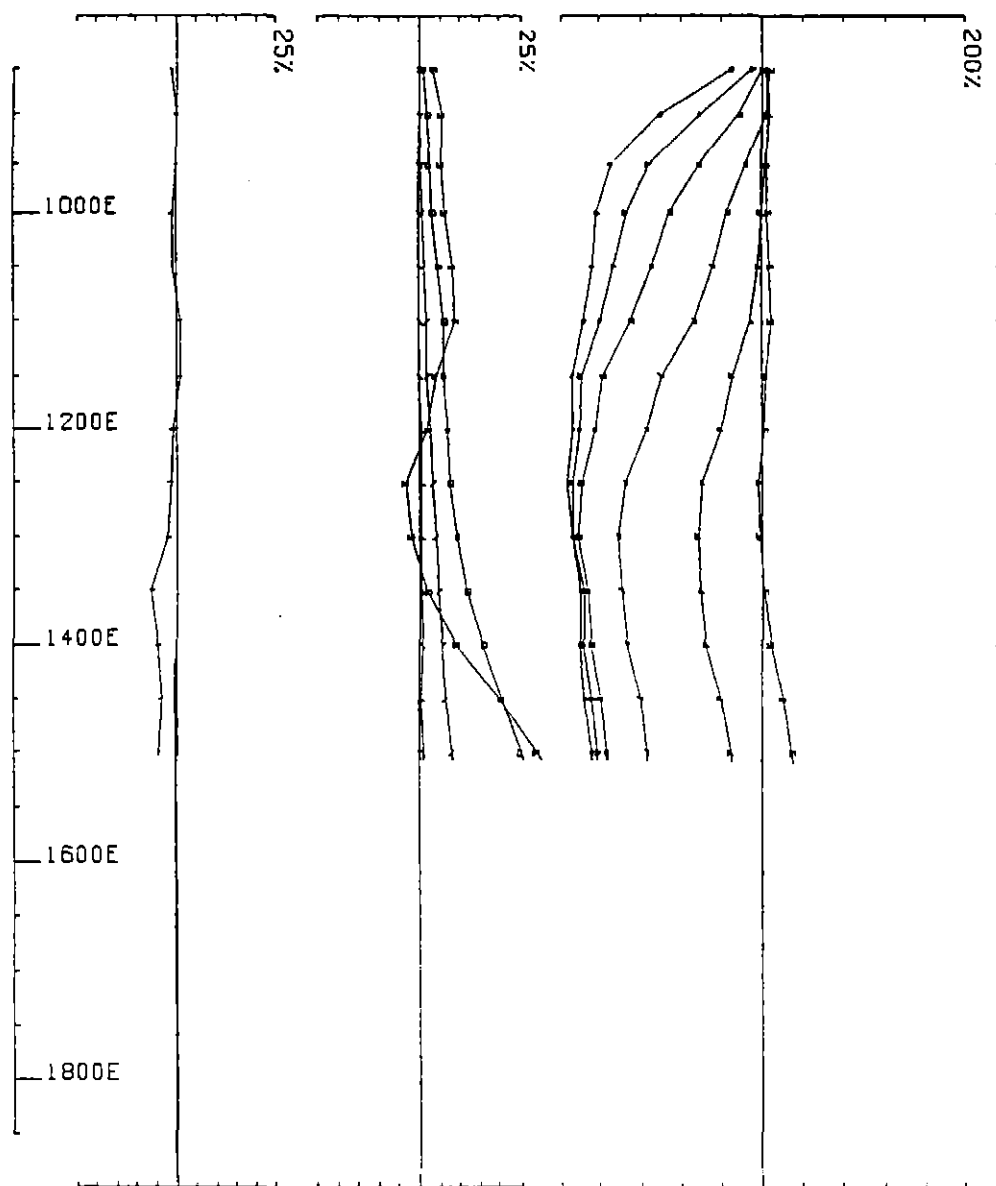
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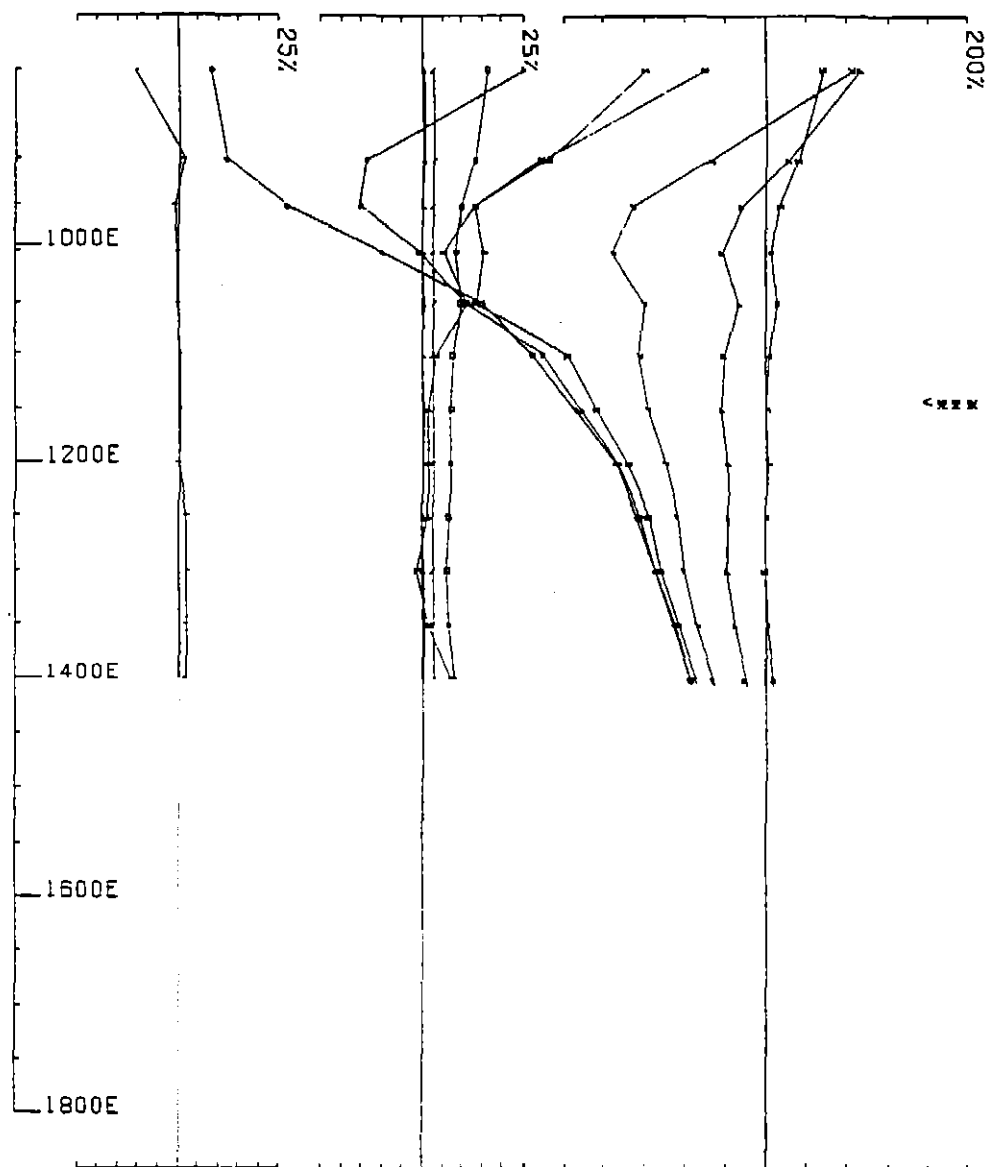
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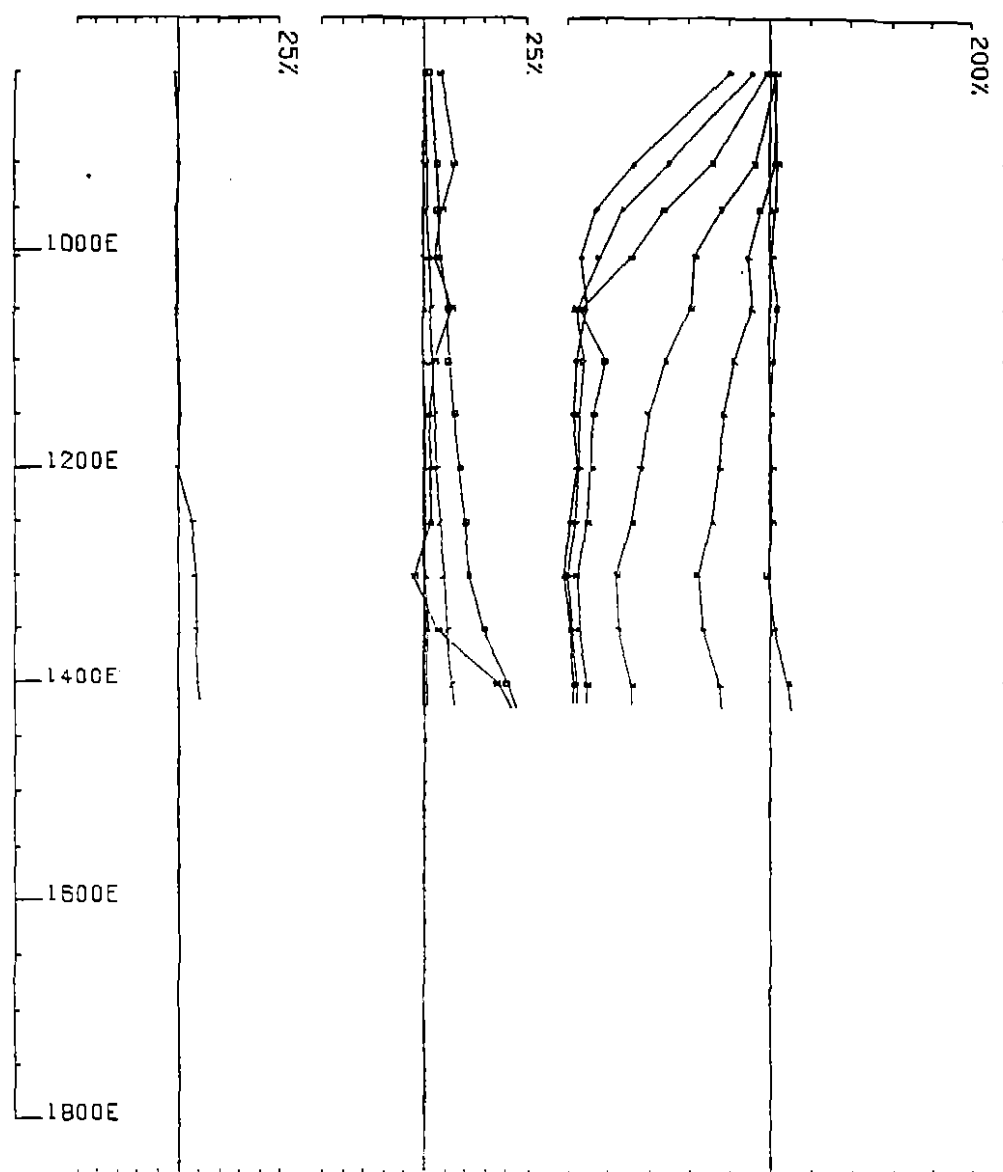
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LOOP NO 2 LINE 7200 N COMPONENT HZ SECONDARY FIELD CHI POINT NORM.



UTEM SURVEY AT BULGOZAC FOR ABERFOYLE RESOURCES FEBRUARY 1991
CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.25
LOOP NO 2 LINE 7200 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.

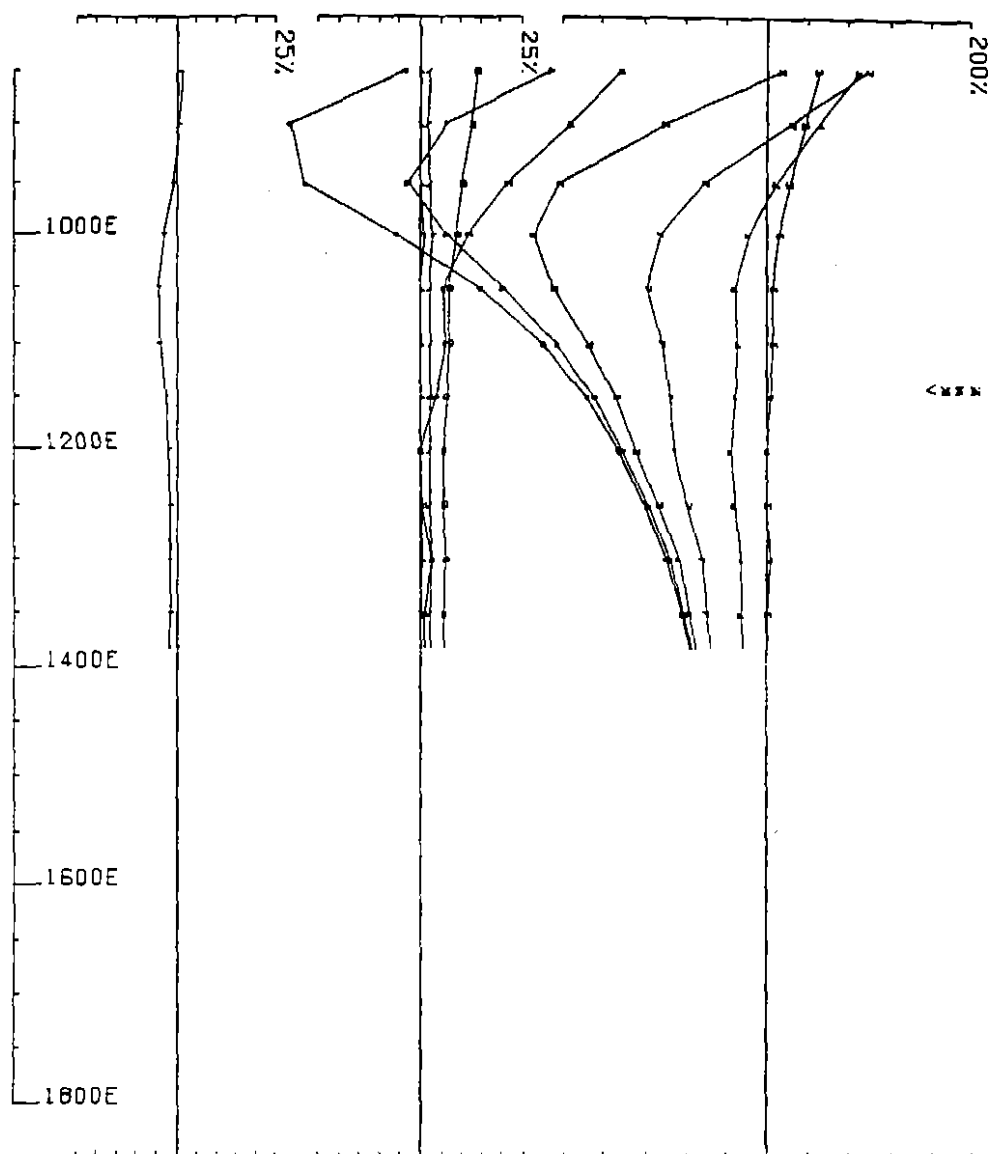


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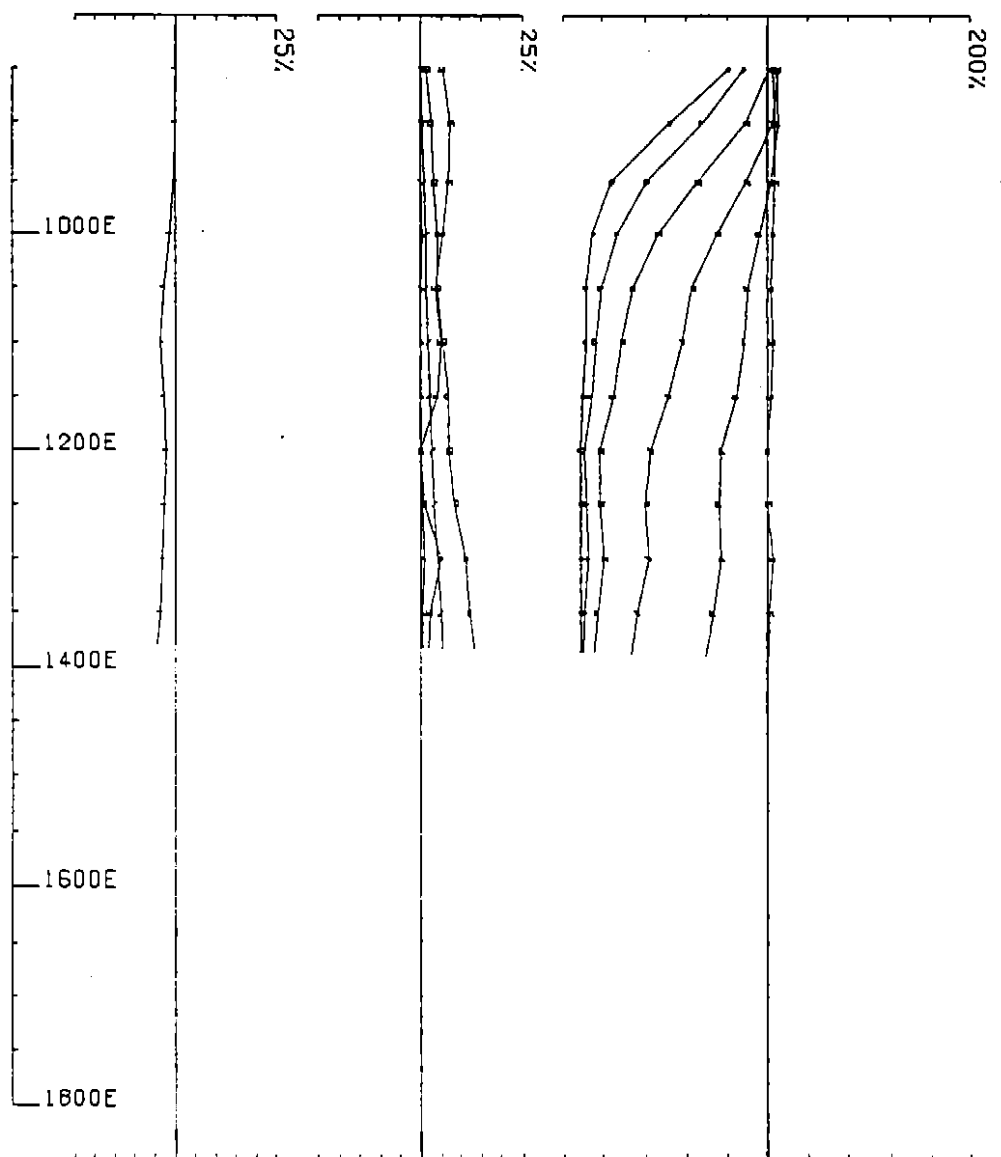


UTEM SURVEY AT BULCOBAC FOR ABERFOYLE RESOURCES FEBRUARY 1991
 CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.23
 LOOP NO 2 LINE 7400 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.

076

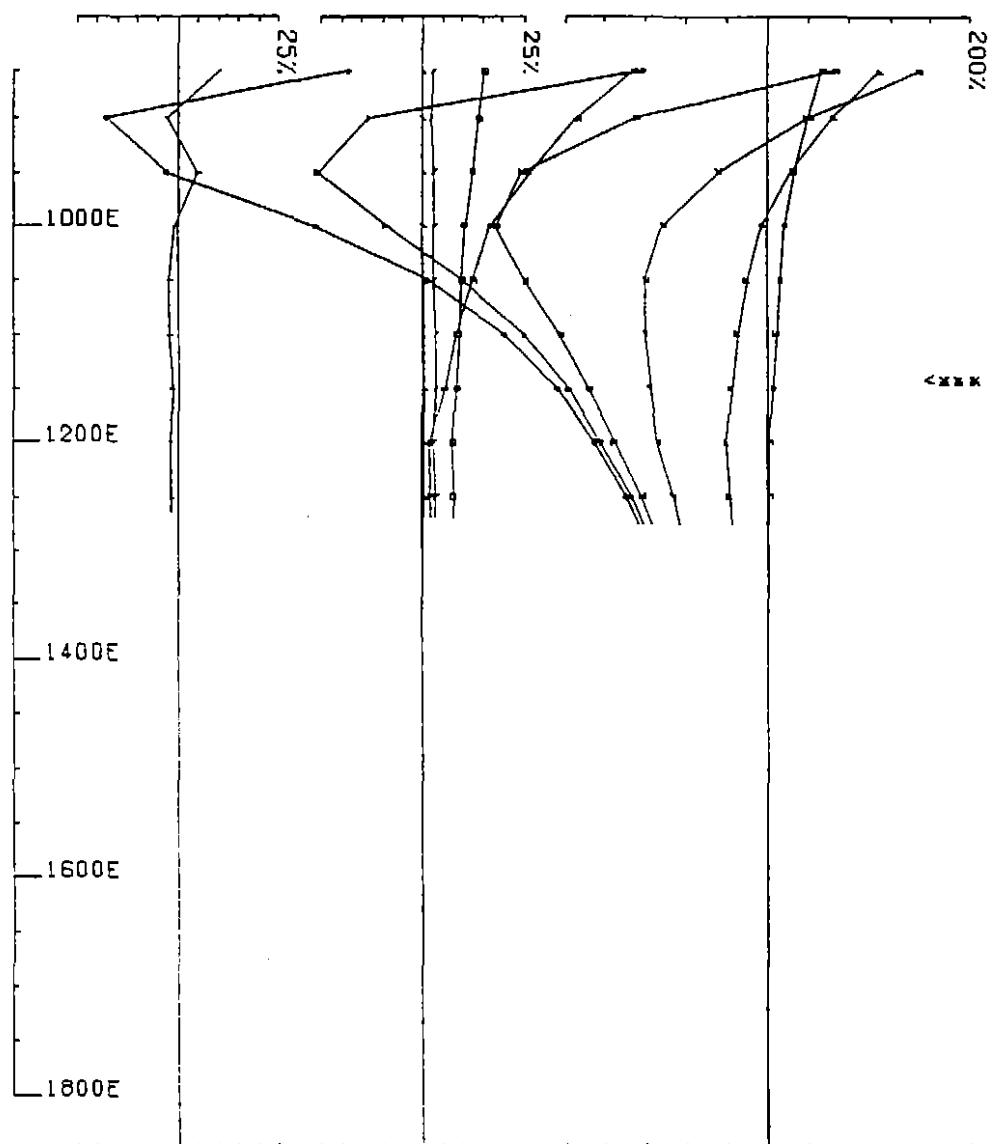


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CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ 1HZ 26.23
LOOP NO 2 LINE 7600 N COMPONENT HZ SECONDARY FIELD CH1 POINT NORTH.

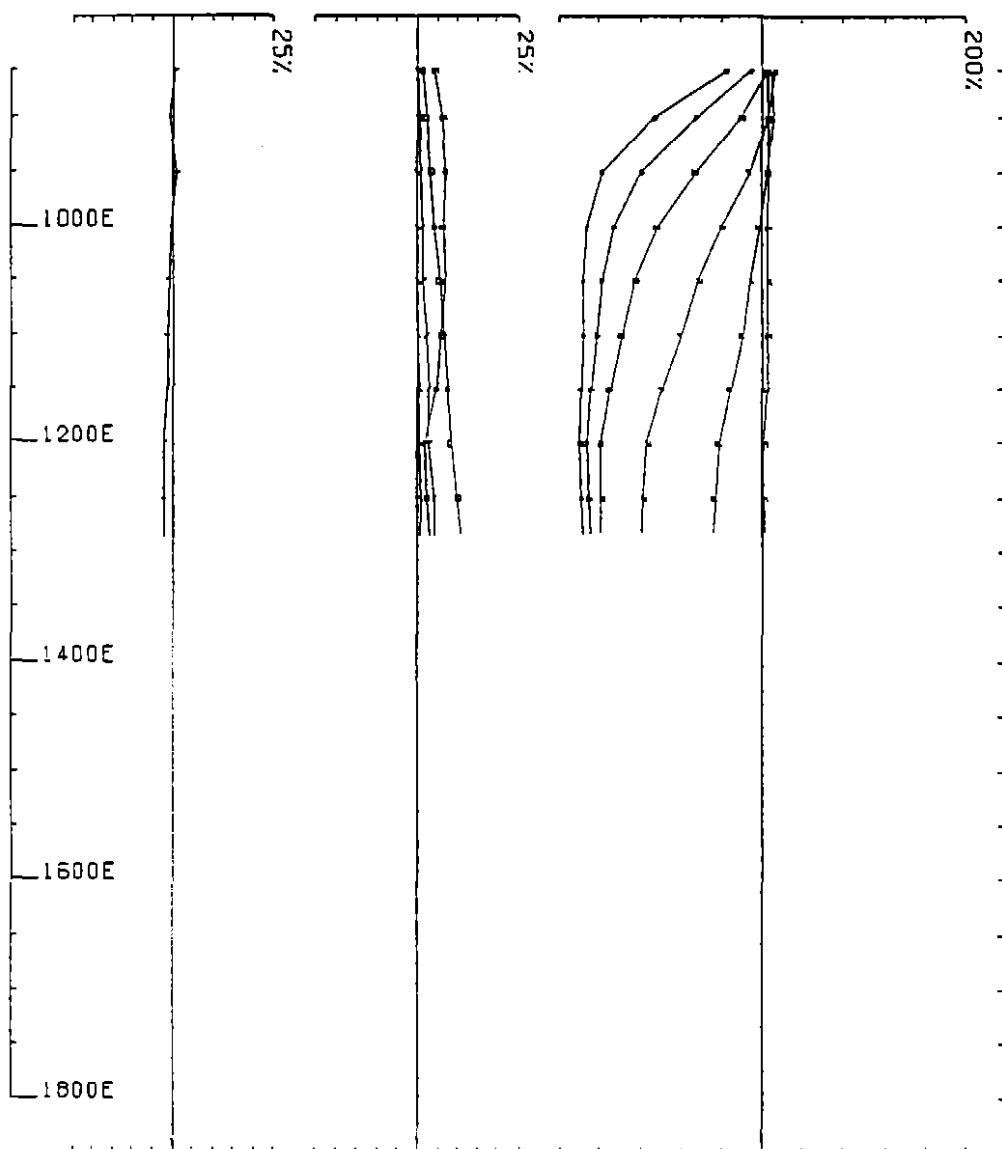


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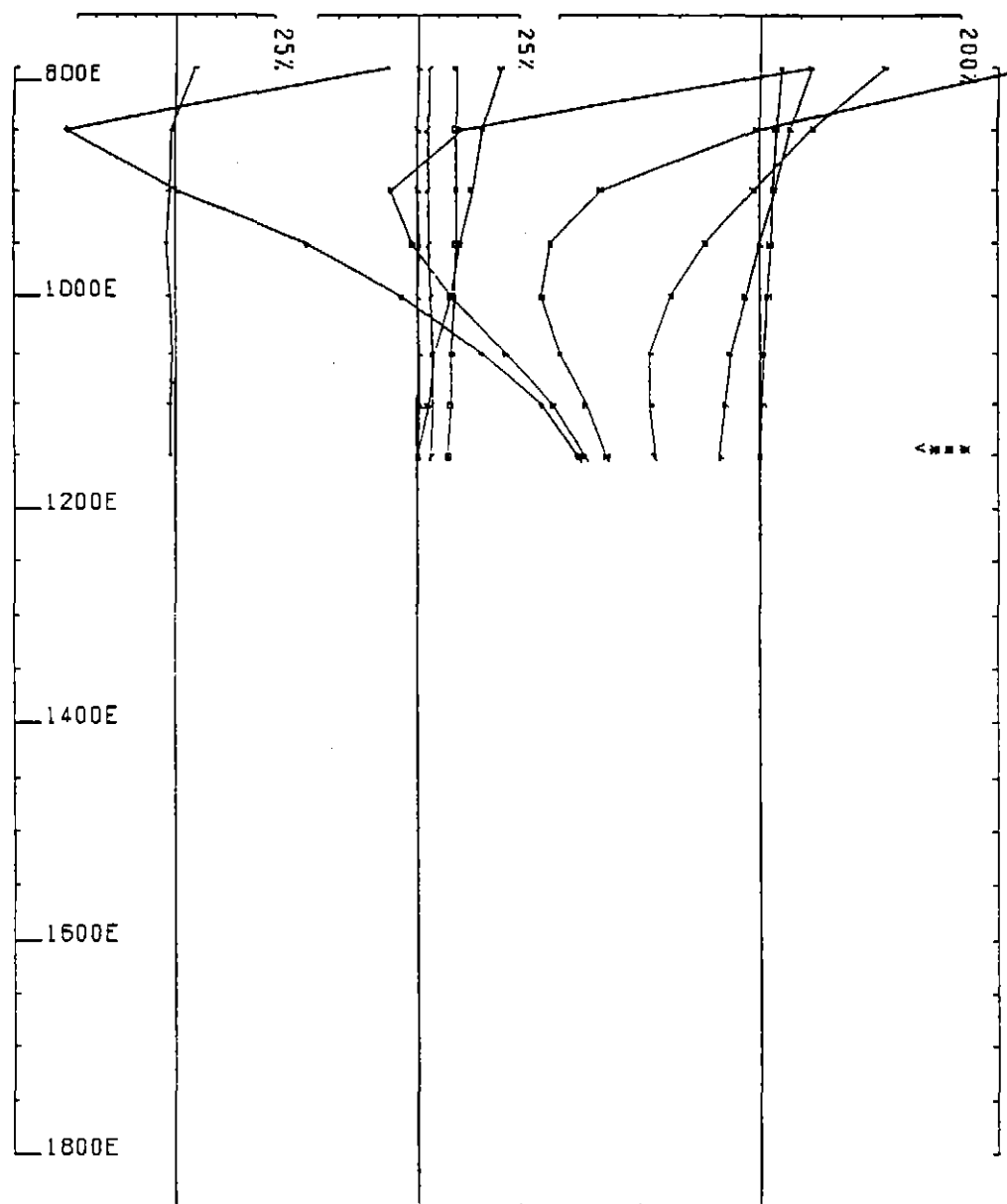
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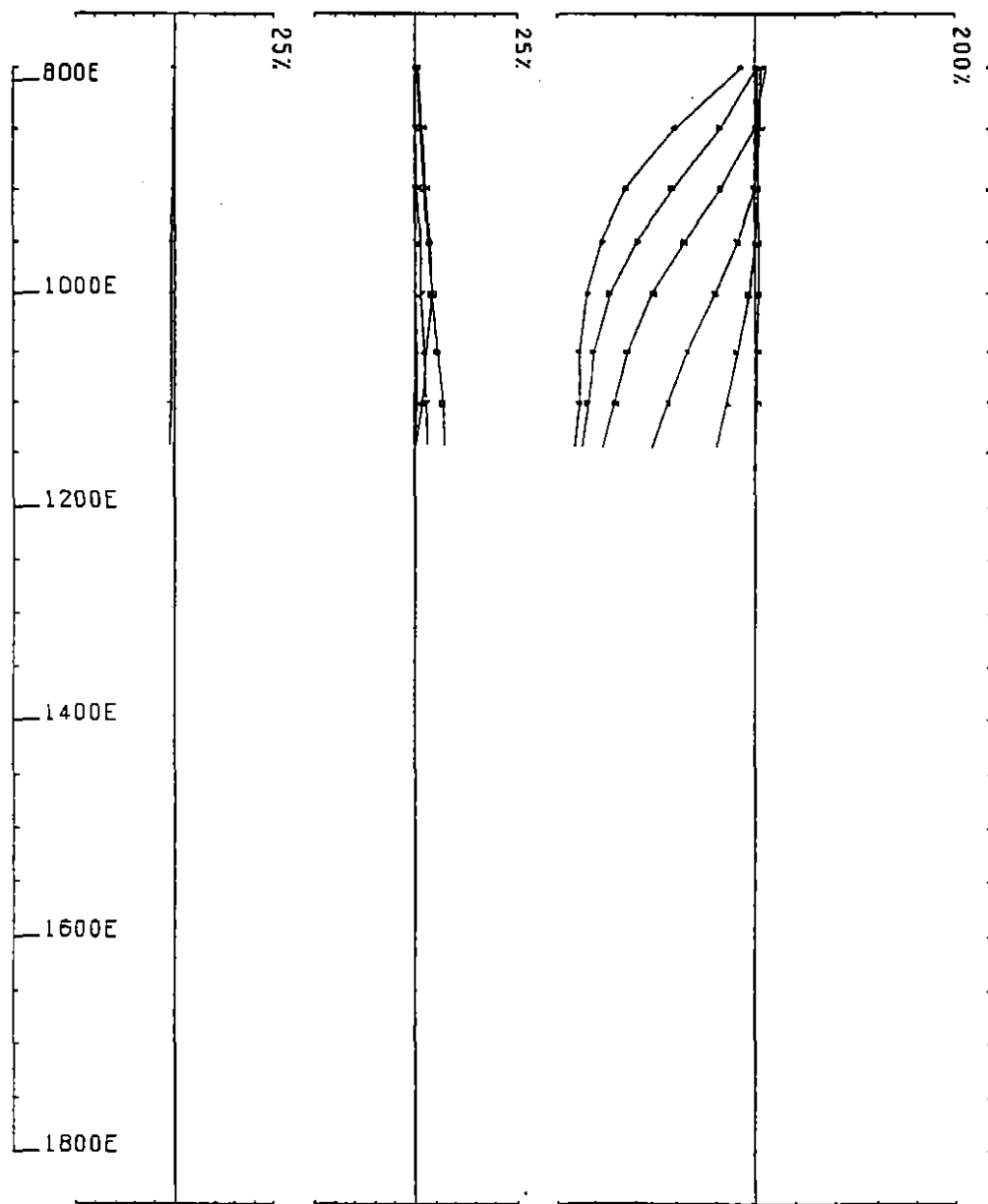
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CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (KHZ) 25.25
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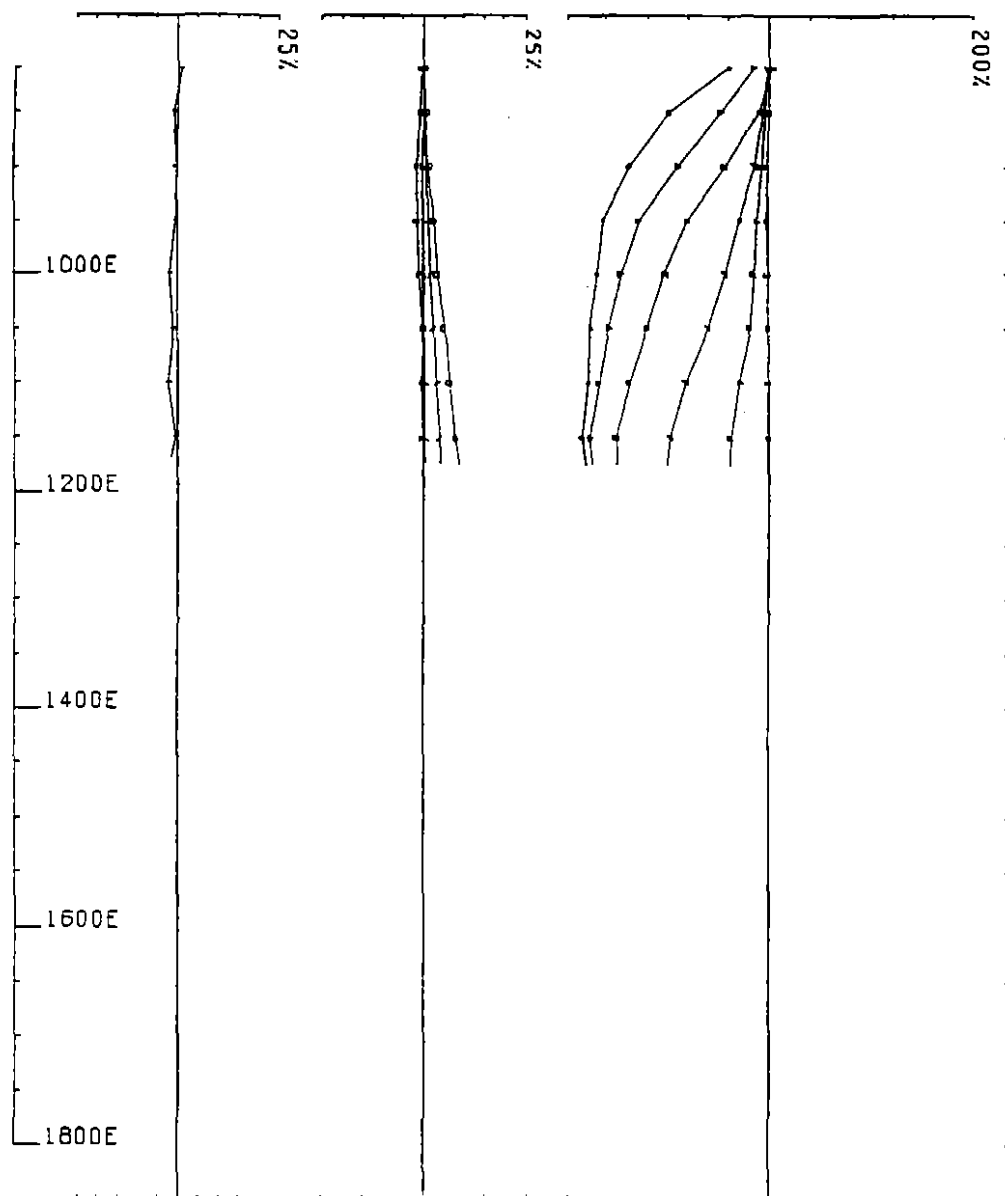
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CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.29
LOOP NO 2 LINE 7800 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.



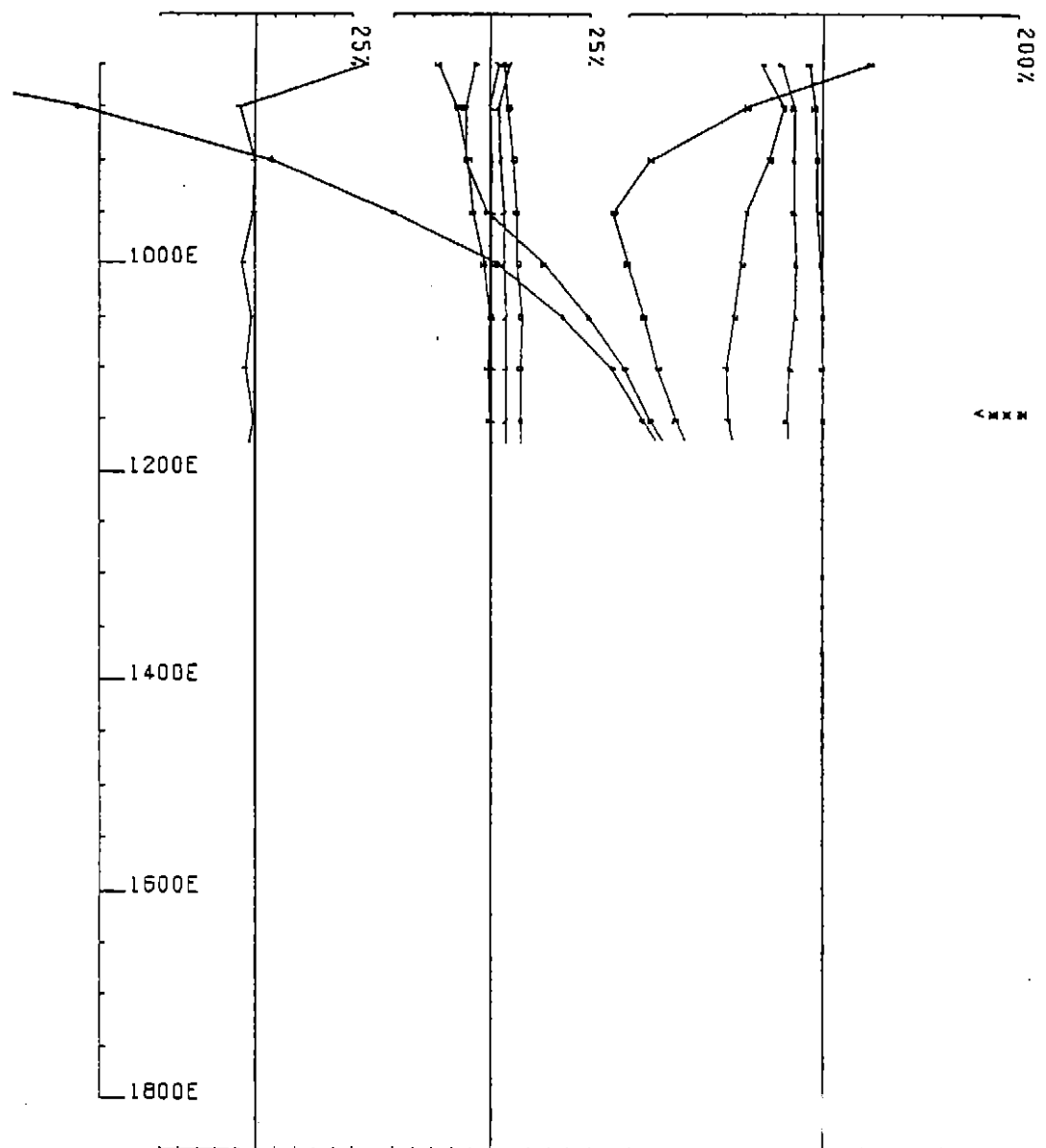
UTEM SURVEY AT BULOBBAC FOR ABERFOTLE RESOURCES FEBRUARY 1991
 CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 0102 BASE FREQ (HZ) 26.23
 LOOP NO 2 LINE 8000 N COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.



UTEM SURVEY AT BULOGBAC FOR ABERFOYLE RESOURCES FEBRUARY 1991
CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB 9102 BASE FREQ (HZ) 26.23
LOOP NO 2 LINE 8000 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.



UTEM SURVEY AT BULOGBAC FOR ABERFOYLE RESOURCES FEBRUARY 1991
CONDUCTED BY LANONTAGNE GEOPHYSICS LTD JOB 0102 BASE FREQ (HZ) 26.23
LOOP NO 2 LINE 8200 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.



UTEM SURVEY AT BULOBBAC FOR ABERFOYLE RESOURCES FEBRUARY 1991
CONDUCTED BY LAMONTAGNE GEOPHYSICS LTD JOB B102 BASE FREQ (HZ) 26.23
LOOP NO 2 LINE 8200 M COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.

084

116085

APPENDIX V

THE GRAVITY SURVEY:

The initial observations were made by G.L. Rau of Solo Geophysics between January 30 and February 6, 1987. La Coste and Romberg meter number 561 with a scale constant of 1.00928 was used.

The survey was tied to Mines Department Que River alternate base; station 8551.9976, 980177.5 mGal.

The grid used was surveyed and levelled and the coverage was based on a station spacing of 50 m on lines 200 m apart. The base line was 2400 E. The grid was oriented to match the larger Aberfoyle grids in the region. The highway was used as a subsidiary base line.

Five tie points were used, each linked by drift controlled multiple observations.

1. Que River base
2. 2400E,8300N -3.1 divisions with respect to base
3. 2400E,7600N -0.19 divisions
4. 2400E,8800N -0.38 divisions
5. highway,9300N 7.7 divisions

The survey increments were also undertaken by G.L. Rau of Solo Geophysics between December 14, 1987 and February 11, 1988 using La Coste and Romberg meter 556 with a scale constant of 1.01387. The new work was ultimately tied to Que River base and tie points in the original survey. Some additional tie points were established.

1. station 312 -3.03 divisions with respect to base
2. station 456 25.27 divisions
3. station 688 -3.42 divisions
4. station 726 -8.85 divisions

Two variants from normal practice were noted.

1. Due to unstable surface conditions many stations were observed at tripod levels some 700 to 900 mm above ground level.
2. Some loops were not completed in balanced formats; i.e., they were terminated on a tie point different from the start point. Although all loops were referred to tie points and all differences were properly established this is not ideal practice and complicates corrections for loops affected. Some residual uncertainty is inevitable but is unavoidable in difficult terrain where opportunities for simple closes and short loop times are limited.

The reduction was completed using a density of 2.67 t/cu m and the old ellipsoid (for compatibility with the TASGRAV data base). Terrain corrections were applied up to Hammer zone M. Near station compensation was based on special notes of the conditions up to 50 m from the observation point for the initial survey and 30 m for the new survey.

Compensation for the raised meter levels at some stations was included within the terrain correction since the Free-Air effect can be directly applied to the height of the meter but the Bouguer correction is inadequate by an amount equal to the elevation of the meter above ground. This means that should the reduction density be changed any adjustment can be simply applied to the correction column as a scalar correction.

Note that the Bouguer anomaly value attaches to the position of the meter and this may have been up to 1 m above ground level.

The gravity observations were found to be reproducible within 0.02 mGal after loop and drift corrections in most cases; exceptions were always restricted to loops not closed to the starting point. Only two misclosures greater than 0.04 mGal were found. Errors due to position or height errors are not believed to exceed 0.01 mGal. The terrain and, where necessary, Bouguer slab adjustment corrections range between 0.2 and 1.1 mGal for this relatively low relief area. Possible errors are considered to lie in the range 0.02 to 0.07 mGal. The RMS error is thus of the order of 0.05 mGal or less and the values can be safely contoured with intervals of about 0.15 mGal.

Some problems may attach to precise location of certain line segments west of 1200E. These have not been fully resolved and were generated by confusing identification of stations, and their own reference points, by surveyors. A "best judgment" alignment is shown in Map 1 but some tens of metres may be involved along the central part of 800E. While of concern this error source is not significant in terms of this presentation or use of the reduced data since the elevations are reliable and the potential position error amounts to no more than 0.02 mGal.

Map 1 (folder) presents the distribution of stations, assigned station numbering and Bouguer values. The body of the number system is derived from surveyor loops rather than line references. This was done to avoid, or at least minimise, risk of confusion from any attempt to renumber or recode the coordinate or level information when combining it with the observed gravity and gravity correction information. It is recommended that future surveys be coded on a line basis and that surveyors note the peg numbers as a cross check on location. Confusion also arose during the survey extension when surveyors referred to their own, not the gravity, number system.

Contours in map 1 have been drawn with variable density but a contour interval of 0.125 mGal has been used for much of the survey area. Note that all values labelled and contoured include a scalar addition of 15 mGal and this value should be removed if the plot is to be compared with state datum maps.

116088

OPEN FILE

Aberfoyle Resources Limited
EXPLORATION DIVISION

MICROFILMED
FICHE No. 012426-29

92-3323

MINES	
File Ref.	
22 JAN 1992	
Doc. Ref.	
Action Officer	Initials
Rafws	h
21/1/92	CA 39/85
Folio 58	
Resubmit to	
Date	

EXPLORATION LICENCE 39/85

BULGOBAC RIVER

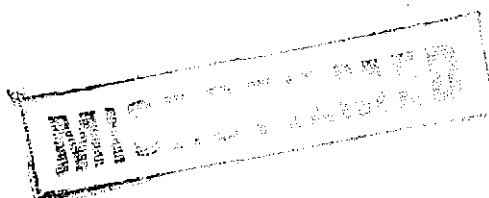
TASMANIA

PARTIAL RELINQUISHMENT REPORT
ON EXPLORATION TO JANUARY, 1992

VOLUME II

PLATES

92-3323.1



Compiled by:

S Richardson

S M Richardson

Distribution:

Aberfoyle - Burnie (1/4)
Aberfoyle - Hawthorn (2/4)
Placer (3/4)
Division of Mines & Mineral Resources (4/4)

Issued by:

David Wallace
D B Wallace
Regional Manager

V 2/2



92-3323

5 cm

0 200m

NOTE: This plan is part of MAC 148/A9

REVISIONS

Init.	Date	Init.	Date

Location Code :

Aberfoyle Resources Limited

EXPLORATION DIVISION

NORTH WEST TASMANIA

MACKINTOSH AREA

E.L. 39/85 BULGOBAC RIVER

INTERPRETIVE GEOLOGY

Scale : 1:2500

Compiled :

Drawn :

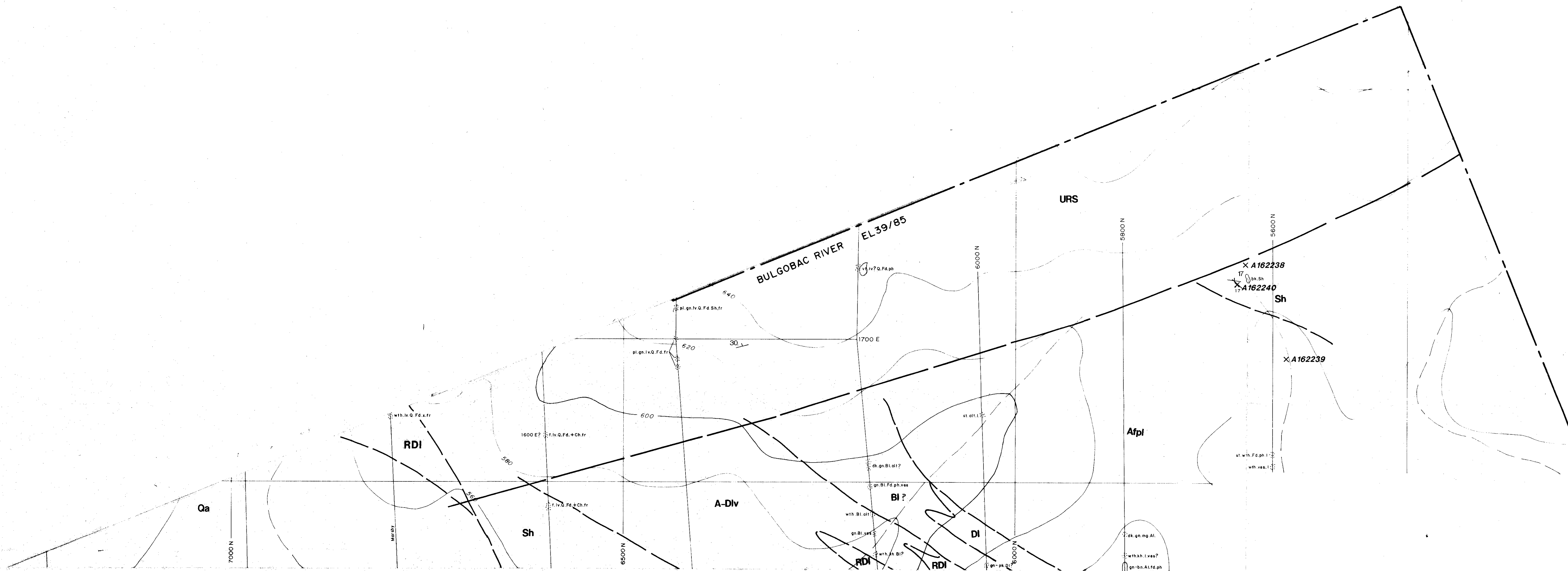
Traced : MAR

Checked :

Plate No : BR 6A

116089

Date : January 1992



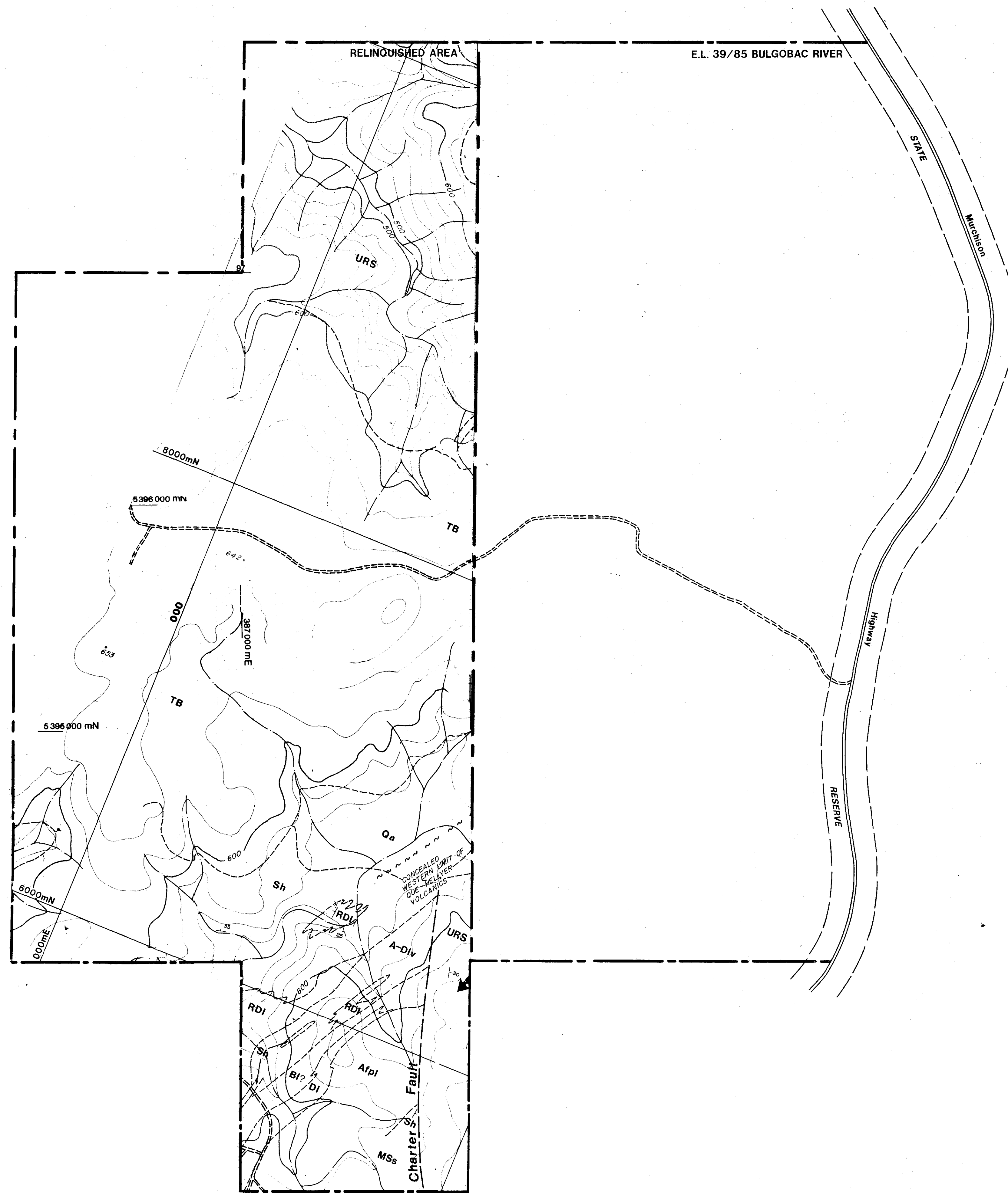
5 cm

0 200m

NOTE: This plan is part of MAC 148/QQ

Aberfoyle Resources Limited				116091	
EXPLORATION DIVISION					
NORTH WEST TASMANIA					
MACKINTOSH AREA					
E.L. 39/85 BULGOBAC RIVER					
INTERPRETIVE GEOLOGY					
Location Code :		Scale : 1:2500		Date : January 1992	
Compiled :		Drawn :		Traced : MAR	
Checked :		Plate No : BR 6C			

92-3323



92-3323

Aberfoyle Resources Limited				110092			
EXPLORATION DIVISION							
NORTH WEST TASMANIA							
MACKINTOSH AREA							
E.L. 39/85 BULGOZAC RIVER							
INTERPRETIVE GEOLOGY							
Location Code :				Scale : 1:10 000		Date : January 1992	
REVISIONS				Compiled : AMH,AMCN			
Init. Date Init. Date				Drawn : AMH,AMCN			
				Traced : MAR			
				Checked :			
				Plate No : BR 7			



92-3323.

Aberfoyle Resources Limited				116093			
EXPLORATION DIVISION							
NORTH WEST TASMANIA							
MACKINTOSH AREA							
BULGOBAC RIVER E.L. 39/85							
UTEM COVERAGE							
Location Code :				Scale : 1:10 000		Date : January 1992	
REVISIONS				Compiled : MAG			
Init. Date Init. Date				Drawn :			
				Traced : MAR			
				Checked :			
				Plate No : BR 8			



CSR LTD
 EL 39/85 BULGOBAC RIVER
 QUE ROAD GRAVITY SURVEYS
 1987 - 88
 BOUGUER ANOMALY
 2.67 t/gm
 CORRECTION, COMPILATION and REDUCTION by LEAMAN GEOPHYSICS, HOBART
 (April, 1988)
 OBSERVATION SOLO GEOPHYSICS, ADELAIDE
 Plate No. XBR 4

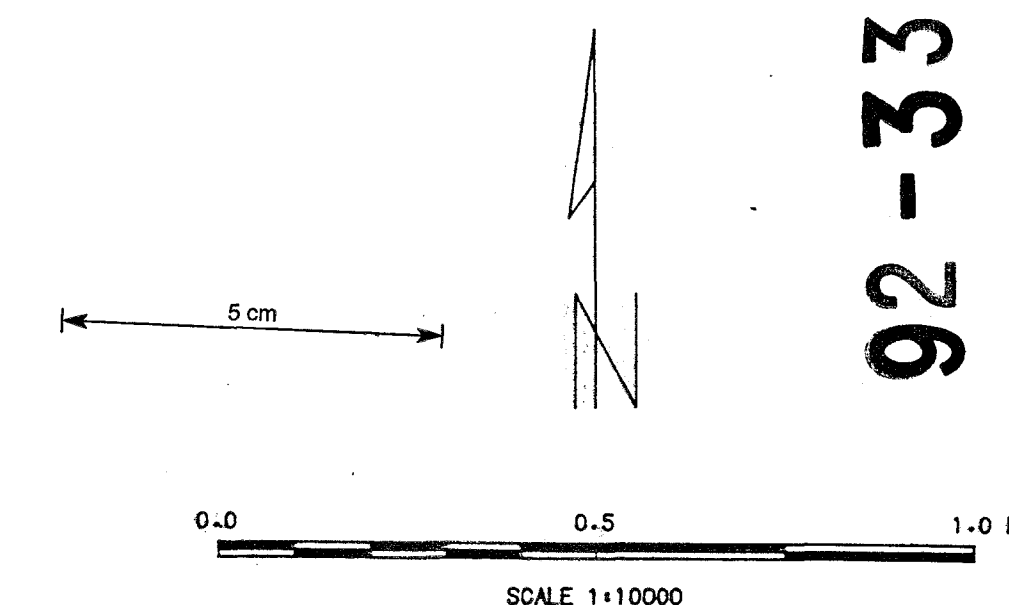
```

MAGNETOMETER :      0-0.13 gauss, processed on magnetometer
                  :      1 mV, trigger and wrap 4.0s
                  :      sensitivity is 0.02 mT
RECORDING INTERVAL :      75m sampling

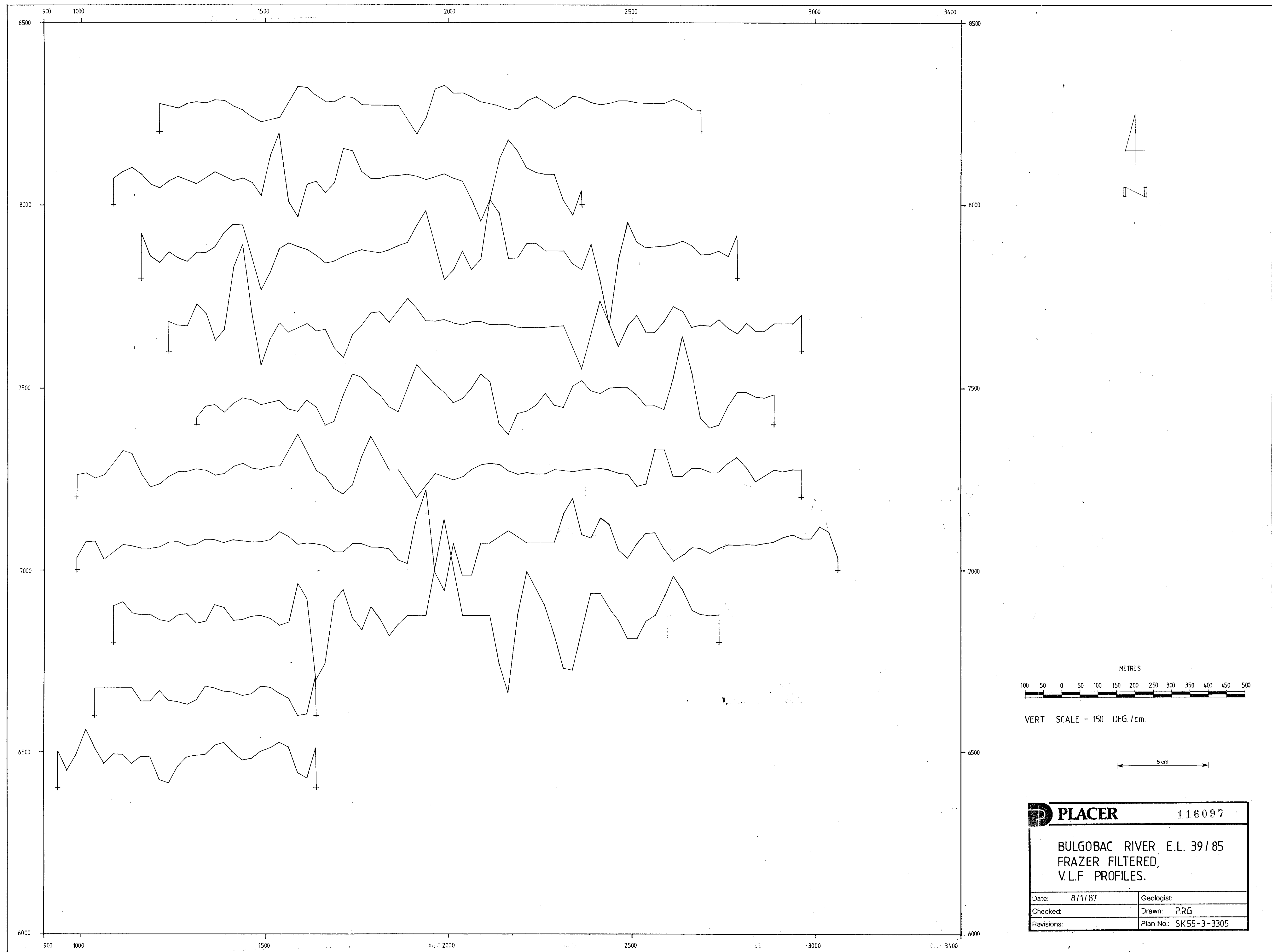
SPECTROMETER :      1A = 500 gamma ray spectrometer
                  :      1 line = 10.0 MeV, 10 lines
TOTAL COUNT WINDOW :      1.8 = 0.003 MeV
PEAK POSITION WINDOW :      1.26 = 1.886 MeV
URANIUM WINDOW :      65 = 1.465 MeV
THORIUM WINDOW :      1402 = 2.463 MeV
RECORDING INTERVAL :      75m sampling

DATA RECORDING :      1.0 second per 75m acquisition system
                  :      2.5 to 10 magnet cycles
MINIMAL TERRAIN CLEARANCE :      0 = potential in a height of 75m
MINIMAL LINE SPACING :      100 = distance between 100 metres
                  :      1 line = 100 metres
FLIGHT PATH RECORD :      1 = 100 metres per cycle
FLIGHT LINE RECORD :      1 = 100.000 m on a grid point

```

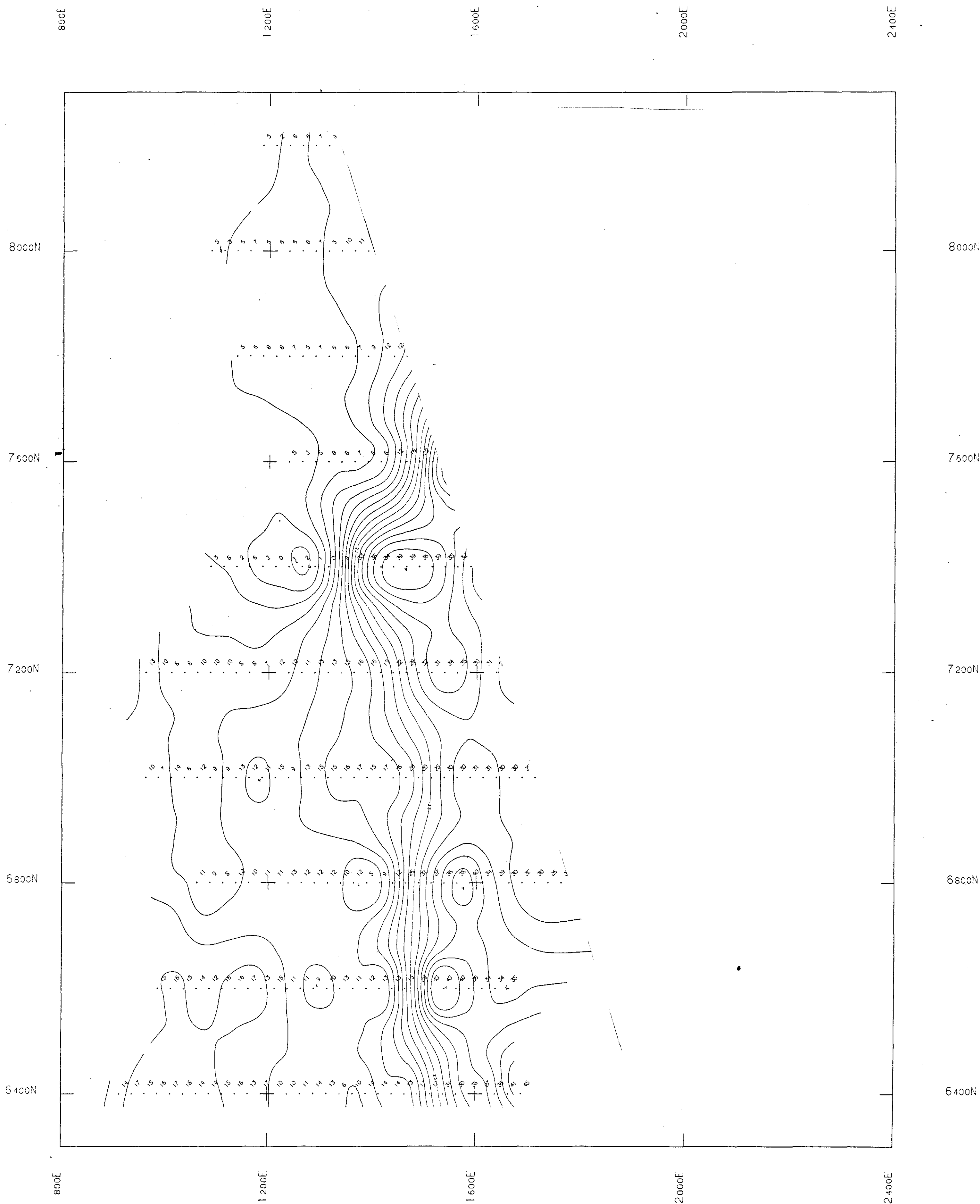


92-3323.



92-3323.

125500



Con. Int. = 5m.radians



PLACER

116098

BULGOZAC RIVER E.L. 39/85
I:P - CHARGEABILITY.

Date: 4/3/87.	Geologist:
Checked: PRG	Drawn: PRG
Revisions:	Plan No.: SK55-3-3306

Scale -1:5000

10502

FACT GEOLOGICAL MAPPING LEGEND MAC 79,110 PLAN SERIES
(NOTE: COMPLETE LIST OF ABBREVIATIONS IS STORED ON HP-1000 FILE ABBRV:HL:14)

LITHOLOGY COMPOSITION		LITHOLOGY TEXTURE / FORM	
R	Rhyolite	l	lava
D	Dacite	lb	lava breccia
A	Andesite	pl	pillow lava
B	Basalt	av	ash volcanoclastic
Y	Polymict	flv	fine lapilli volcanoclastic
Ss	Sandstone	mlv	medium " "
Sh	Shale	clv	coarse " "
Slt	Siltstone	bv	breccia " "
Ba	Barite	xv	crystal " "
Py	Pyrite	ves	vesicular
BMS	Base Metal Sulphide	por	porphyritic
Ch	Chert	eux	eutaxitic
TB	Tertiary Basalt	fbn	flowbanded
JDo	Jurassic Dolerite	gnlr	granular
OCg	Ordovician Conglomerate	ibd	interbedded
		md	matrix dominant

ALTERATION COMPOSITION		ALTERATION TEXTURE / FORM		ALTERATION INTENSITY WEATHERING INTENSITY	
Co	Carbonate	per	pervasive	1	trace
Cl	Chlorite	dis	disseminated	2	weak
Kf	K-feldspar	pat	patchy	3	moderate
Fu	Fuchsite	spt	spotty	4	strong
Py	Pyrite	sfr	selected fragments	5	extreme
Se	Sericite	stw	stockwork		
Si	Silica	stc	structure controlled		
		vn	vein		
		mtx	matrix		

COLOUR		FAULT TERMS		GENERAL TERMS	
br	brown	cav	cavernous	tr	trace
bk	black	lch	leached	lgt	light
gy	grey	slk	slickenside	dk	dark
gn	green	rhd	rehealed	brt	bright
or	orange	rbb	rubble	ox	oxidised
pk	pink	shd	sheared	fg	fine grained
wh	white			mg	medium grained
yw	yellow			cg	coarse grained
bl	blue				

ABBREVIATED DESCRIPTION FORMAT

LITHOLOGY:

LITHOLOGY WEATHERING ALTERATION
colour, composition, form, texture / intensity / composition, intensity, form, texture
example gy - gn, YA, flv / Ox 3 / Fu.3, dis
Interpretive comment can be added in brackets ()

FAULT:

WIDTH (cms) / MINERALOGY, TEXTURE
example F 20 / Cl, cav.

VEIN:

WIDTH (cms) / MINERALOGY, TEXTURE
example V 5 / Q, Py, cav

INTERPRETIVE GEOLOGICAL MAPPING LEGEND MAC89,111 PLAN SERIES

VOLCANICS		SEDIMENTS	
R.I R.Ib	26 Rhyolite lava, lava breccia	Ss Gw	71 Sandstone, micaceous Greywacke
R.av R.lv R.bv R.xv	25 Rhyolite volcanoclastic	Sh	68 Shale, black (carbonaceous, pyritic)
YR.av YR.lv YR.bv	65 Rhyolitic Polymict volcanoclastic	Slt	69 Siltstone, tuffaceous Siltstone
D.I D.Ib	63 Dacite lava, lava breccia	SULPHIDES, SULPHATES	
D.av D.lv D.bv D.xv	54 Dacite volcanoclastic	BMS	21 Base Metal Sulphide rock
YD.av YD.lv YD.bv	56 Dacitic Polymict volcanoclastic	MPy	29 Massive pyrite rock
A.fp.l A.fp.lb	48 Andesite feldsparphyric lava, lava breccia	GSP	23 Glassy silica, colloform pyrite rock
A.l A.Ib	41 Andesite lava, lava breccia	Ba	22 Barite
A.av A.lv A.bv A.xv	44 Andesite volcanoclastic	POST CAMBRIAN ROCKS	
YA.av YA.lv YA.bv	40 Andesitic Polymict volcanoclastic	TB	8 Tertiary Basalt
B.I B.Iv	45 Basalt lava, lava breccia	JD	32 Jurassic Dolerite
B.pl	50 Basalt pillow lava	OCg	20 Ordovician Siliciclastics
B.av B.lv B.bv B.xv	49 Basalt volcanoclastic	ALTERATION ROCK TYPES	
YB.av YB.lv YB.bv	42 Basaltic Polymict volcanoclastic	HA	6 Highly altered rock
Y.av Y.lv Y.bv	58 Polymict rock	Qll	18 Quelltite
av	52 Ash volcanoclastics (composition not determined)	Q-lv Q-bv	17 Quelltite fragmental

PARTIAL STRATIGRAPHIC COLUMN

TB	8	TERTIARY BASALT
JD	32	JURASSIC DOLERITE
OCG	20	ORDOVICIAN SILICICLASTICS
URS	65	UPPER RHYOLITIC SEQUENCE
QRS	68	QUE RIVER SHALE
MGW	71	MT. CHARTER MICACEOUS GREYWACKE
HBS	45	HELLYER BASALT SEQUENCE
HVS SWB	56	HANGINGWALL VOLCANICLASTIC SEQUENCE SWITCHBACK VOLCANICLASTIC SEQUENCE
HMS	21	HELLYER MINERALISED SEQUENCE
FPS	48	ANDESITE FELDSPAR PHYRIC SEQUENCE

ALTERATION SYMBOLS Overprint on "HA" symbol
(Combinations can be used)

	Carbonate		Illite
	Chlorite		Feldspar
	Fuchsite		Pyrite
	Sericite		Silica

SYMBOLS MAC79,110 AND MAC89,111 SERIES

(SYMBOLS AS SHOWN IN ABEX "STANDARDS FOR GEOLOGICAL DRAWINGS", JAN. 1983)

LINE TH'NESS / LEROY LETTER SIZE (LENGTH AS SHOWN)		
.35		Outcrop boundary
.35		Fault
.35		Contact known
.35		Contact interpreted
.35		Contact inferred
.35		Facies change
.35		Unconformity
.25		Anticline, syncline with plunge and trend
.25		Minor fold with plunge and trend
.25/50		Bedding, strike, dip
.25/50		Foliation, strike, dip
.25/50		Joint, strike, dip
.5/50,100		Fault, definite, strike, dip, mineralogy
.5/100		Fault, inferred
.35		Shear zone
.35/60		DDH collar and trace, top 20m geology shown
.25		Grid line, stadia surveyed
.25		Grid line, tape and compass survey
.25		Grid line, nominal position
/60		Petrology sample location
.35		Track, unsurveyed
.35		Road (unsealed) or track, surveyed
.7		Major road
.35		Costean
.25		Creek
.35		Mining Lease boundary
.5		Exploration Licence boundary
/60		Peg with number, tape and compass surveyed
/60		Peg with number, stadia surveyed
.25		Alteration boundary

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A Aberfoyle Exploration Pty Ltd

REVISIONS				NORTH WEST TASMANIA		Compiled:	AMH
Init.	Date	Init.	Date	MACKINTOSH E.L.2/70, HATFIELD E.L.15/73		Drawn:	AMH
GLC	12-85			SURFACE GEOLOGICAL MAPPING LEGEND		Traced:	GLC
GLC	1-86					Checked:	AMH
						Plate No:	MAC 114
Location Code: K55/6/44				Scale:		Date:	November, 1985