

# Aberfoyle Resources Limited

EXPLORATION DIVISION  
A.C.N. 004 664 108

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TASMANIA

EXPLORATION LICENCE 106/87, LAKE MACKINTOSH

93- 3410

PARTIAL RELINQUISHMENT REPORT

FOR

SECOND STATUTORY RELINQUISHMENT

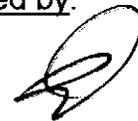
FEBRUARY 1993

VOLUME 1 of 4

TEXT &amp; APPENDICES 1-8

MINES		
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		COVERING LETTER
		SEE EK 106/87
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Prepared by:



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Endorsed by:



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Regional Manager

DECEMBER, 1992

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## 1.0 SUMMARY

- Exploration data in areas to be relinquished from EL 106/87 Mackintosh is grouped into four blocks, being North Hatfield, Animal Creek, Henty Fault and Mount Cripps.
- The North Hatfield Block is underlain by Animal Creek Greywacke correlates and has been explored by regional mapping and one diamond drill hole. It is concluded that if prospective volcanics of either the Central Volcanic Complex or Que Hellyer Volcanics exist, they would be greater than 500 m below surface and do not rank as a priority target at Mackintosh.
- The Animal Creek Block comprises Central Volcanic Complex stratigraphy which was considered prospective for Rosebery style deposits. Exploration in the form of detailed mapping, soil geochemistry, EM surveys and one diamond drill hole, have effectively sterilised the block to 200 m. There is no data to encourage exploration below these depths.
- The Henty Fault Block has been explored for Henty and Lakeside style Au deposits by mapping, rock chip sampling and stream sediment geochemical surveys. No targets worthy of drilling were identified.
- The Mount Cripps Block comprises Tyndall Group Volcanics overlain in part by Ordovician siliciclastics and Tertiary basalt. Regional mapping and stream sediment geochemical surveys did not locate targets for follow up.
- The four blocks described above are the lowest ranking on the Mackintosh property and are recommended for inclusion in the second statutory partial relinquishment of EL 106/87.

## 2.0 INTRODUCTION

Exploration Licence 106/87 Lake Mackintosh was granted to Aberfoyle Resources Ltd on 5 February, 1988 under provisions of the Hellyer Mine Agreement Ratification Act 1987. The licence was issued for ten years with partial relinquishments required on the second and fifth anniversaries.

The first partial relinquishment was effected in February, 1990 when the licence was reduced from 135 to 95 sq. km. (McNeill, 1990).

The second partial relinquishment from 95 to 54 sq. km. is due on 5 February, 1993. This report describes exploration undertaken on those areas selected for the second relinquishment.

Prior to the granting of EL 106/87, exploration was conducted under EL's 2/70 Mackintosh and 15/73 Hatfield. Exploration data collected during the currency of these licences is now available from reports held on open file at the Tasmanian Department of Mines.

### 3.0 EXPLORATION PROGRAMMES

Exploration data generated by programmes within the relinquished areas is reported under four headings. They are: North Hatfield Block (Area's 2 F, G, & H), Animal Creek Block (Area 2 I), Henty Fault Block (Area 2A) and Mount Cripps Block (Area's 2B, C, D & E). These areas are located on Plate MAC 354.

#### 3.1 NORTH HATFIELD BLOCK

Reconnaissance mapping by Aberfoyle (McNeill, 1989) and the Tasmanian Department of Mines (Corbett and Komysan, 1989) indicated an unexplored window of Cambrian sediments which extended from the Cradle Mount Link Road to south of the Hatfield River, (Plate MAC 161B). Exploration of this area by Aberfoyle has been directed toward locating and testing permissive volcanics within the Cambrian sediments.

##### 3.1.1 Geology

A programme of geological mapping at both 1:10,000 scale (Plate MAC 193 A & B) and 1:2500 scale (Plates MAC 89/ZZ, 3 and 4), rock chip sampling (Appendix 2) and costeaning (Plate MAC 89/3) was undertaken to explore the area. 1:2500 map sheet locations are shown on Figure 1 and a geological legend is shown as Plate MAC 114.

Exposures on the Cradle Mountain Link Road are dominated by grey-green mica sandstone and black shale with rare interbedded crystal rich volcanoclastics similar in appearance to the Animal Creek Greywacke. These rocks are folded into open shallowly NE and SW plunging structures and are cut by dominantly SE trending steeply east or west dipping faults, often associated with silicification and quartz veining of adjacent sandstones. These sandstones become "dirtier" to the east and grade into sandstones similar to those from the Southwell Sub-Group.

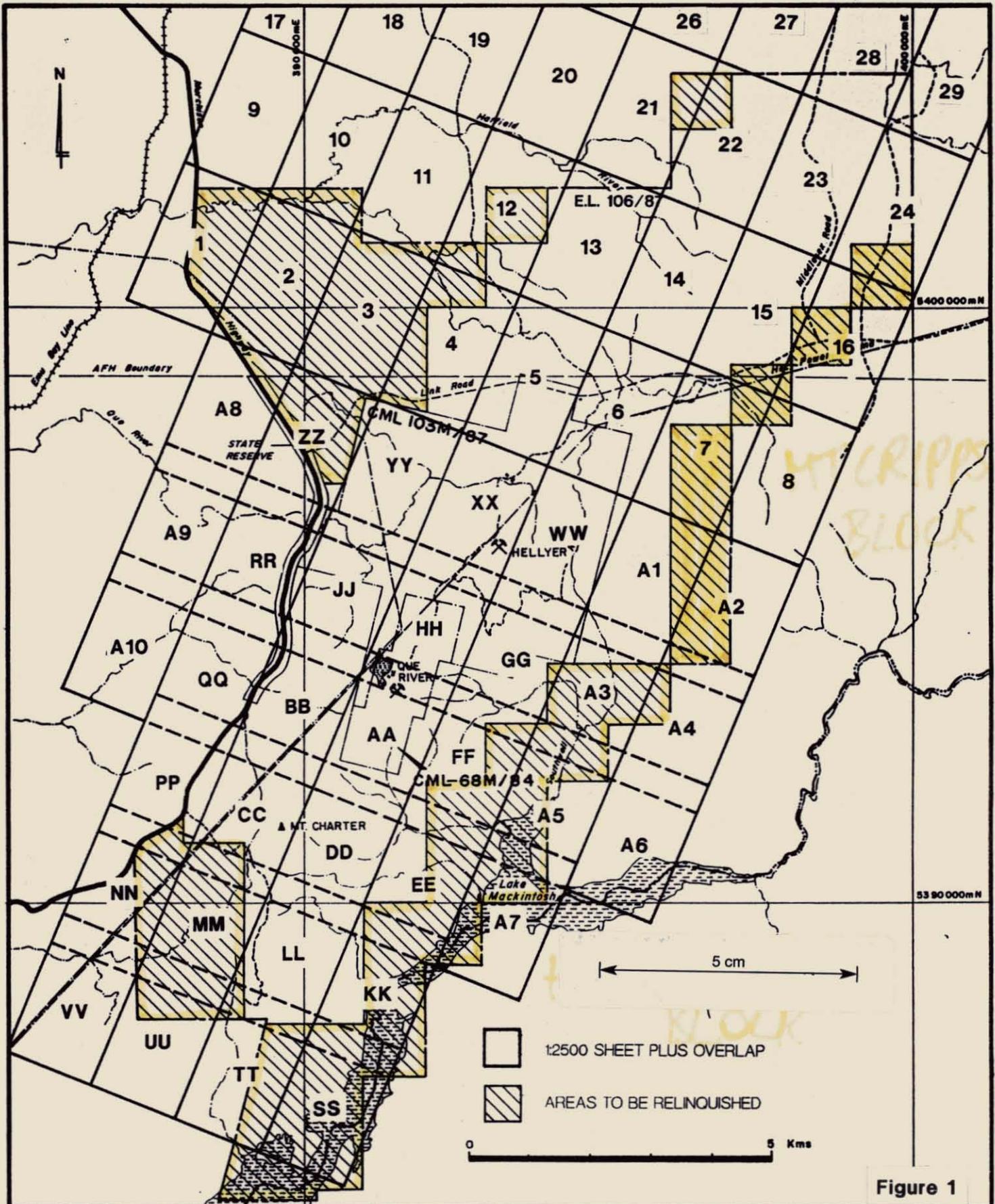


Figure 1

**Aberfoyle Resources Limited**  
EXPLORATION DIVISION

NORTH WEST TASMANIA

MACKINTOSH E.L.106/87

**1:2500 MAP SHEET INDEX**

REVISIONS			
Init.	Date	Init.	Date
RJE	May90		

Location Code : K55/6/44

Scale : As shown

Date : December 1992

Compiled : AMcN

Drawn :

Traced : JMS

Checked :

Plate No. : MAC 355

North of the Cradle Mountain link road the volcanoclastic component increases (e.g. 427809) in generally fine grained sandstones interbedded with mica sandstone. Around 12700N, 1700E is conspicuous float of yellow/brown massive to vesicular dacitic lava (e.g. 427814), sericite-pyrite altered in part. Costeans at 12745N, 1615E and at 12700N, 1645E, (Black Harry's Road) have exposed outcrop of this lava.

Costean 1615E has exposed the contact of dacite lava and mica sandstone which has a variable strike and dip but is not obviously faulted. In one exposure, clasts of pyritic dacite are included in the base of a mica sandstone unit. This relationship is suggestive of some mixing at the lava-sediment interface. Mineralisation is restricted to disseminated pyrite at the sandstone-dacite contact.

Mapping, at 1:2500 scale of the Black Harry Road access track to DDH MAC-24 (3.1.3) is shown on Plate MAC 89/3. Outcrop on the access track is dominated by massive dacitic lava, with minor disseminated pyrite, and is overlain to the south by moderately south east dipping interbedded mica sandstone and volcanoclastic sandstone. These rocks are in turn unconformably overlain by Tertiary basalt at approximately 12400N.

### 3.1.2 Geochemistry

#### 3.1.2.1 Rock Chip

Samples from this area (Appendix 3, see Plate MAC 193 B for locations and Plate 193 B/R for results) generally yielded low base metal values, the exception being sample 427814 (525 ppm Pb, 1300 ppm Zn, 1.0 g/t Ag) of a weakly pyrite altered dacitic lava.

Both Black Harry Road costeans were channel sampled, at 2 m intervals, and samples assayed for Cu, Pb, Zn, Ag, Au, As and Ba. Results are presented in Appendix 3 and samples located on Plate MAC 89/3. Samples from massive lava in the 1645E costean yielded low base and precious metal values while those from the 1615E costean also produced low values, with a maximum of 565 ppm Cu and 0.8 ppm Ag from the dacitic lava.

Grab samples from the dacite/mica sandstone contact in the 1615E costean also have low base and precious metal values, the exception being sample 515663 with 280 ppm Cu, 2 ppm Ag, 26 ppb Au and 140 ppm As.

#### 3.1.2.2 Pb Isotope

Sample 427814, a pyritic dacite (525 ppm Pb, 1300 ppm Zn, 1.0 ppm Ag), was submitted to Sirotep for Pb isotope analysis. Results and interpretation are included as Appendix 4. This sample falls within the target field for Cambrian massive sulphide mineralisation, supporting the concept that the disseminated mineralisation is syn-volcanic and related to emplacement of the dacite.

### 3.1.3 **Diamond Drilling**

#### 3.1.3.1 Geology

This hole (see Plate MAC 89/3 for collar location) was drilled by the Department of mines as part of the Mount Read Volcanic project, to confirm the presence of interpreted Central Volcanic Complex volcanics beneath mica sandstone near Black Harry's Road (BLHY-1 in DOM terminology). Logistical support was provided by Aberfoyle Resources and as a result, access was granted to the core for logging and sampling.

A detailed log and petrographic descriptions are included as Appendix 5 while a section of the hole is presented as Plate MAC 273 (see Plate MAC 115 for legend).

A summary log is as follows:

0 - 9.8m	Tertiary basalt and sediments.
9.8 - 120.7m	Feldspar-phyric dacitic lava/intrusive with minor volcanoclastic interbeds.
120.7 - 150.95m	Interbedded shale, siltstone and sandstone with volcanic derived fragments and minor volcanoclastic interbeds.
150.95 - 163.45m	Dacite lava.
163.45 - 230.9m	Interbedded sandstone, shale and ash to fine lapilli volcanoclastic. Fault contact to:
220.9 - 279.2m	Dacite lava. Gradational contact to:
279.2 - 302.2m	Dominantly ash volcanoclastic.
302.2 - 313.95m	Dacite lava.
313.95 - 488.8m	Dominantly ash volcanoclastic with minor lapilli volcanoclastic, shale and dacite lava.

The sequence intersected in this hole may be broadly correlated with the basal part of the Animal Creek Greywacke, defined near Animal Creek by Corbett and Komyshan (1989) and at the southwest corner of EL 106/87 by McNeill and Corbett (1989). In this area micaceous sandstone overlies a sequence of dominantly ash volcanoclastic with minor sandstone (referred to as tuffaceous lithicwacke by Corbett and Komyshan [1989]). The major difference between the MAC 24 section and areas to the south is the presence of shallow dacitic intrusives/lavas and prominent ovoid devitrification structures, not noted near Animal Creek. An implication of this correlation is that the Central Volcanic Complex, if present, occurs at considerable depth in this area (>500m).

Alteration is of a generally low-grade regional type, dominated by sericite-carbonate assemblages, with minor haematite in the upper most dacite unit. Mineralisation is restricted to trace minor disseminated and vein pyrite  $\pm$  sphalerite apparently concentrated in breccia zones within the dacitic lava.

### 3.1.3.2 Geochemistry

The complete length of MAC 24 was core-ground and samples analysed for Cu, Pb, Zn, Ba, As, Ag, Au, Cr, Ti and Zr. Results are presented in Appendix 5 and on Plate MAC 273 a.

Base metal values are low throughout the section (maximum 300 ppm Zn and 100 ppm Pb) as are precious metals, which are generally below detection limit with scattered values to 13 ppb Au. As (max. 47 ppm) and Ba (360 ppm) are also low. Cr values in sandstone units are generally much lower than in the Animal Creek Greywacke, probably due to the increased volcanoclastic component. Low Ti/Zr ratios and Cr values confirm that the lavas/intrusives are dacitic.

### 3.1.3.3 Geophysics

DDH MAC 24 was cased with PVC and read with DHEM (EM-37). Results are included in Appendix 6. No conductors attributable to massive sulphide mineralisation were detected.

## 3.1.4 **Summary and Conclusions**

Intercalated Cambrian sediments and volcanics have been located in a Tertiary Basalt window north west of the Cradle Mountain Link Road. Mapping by the Tasmanian Department of Mines indicates that these rocks are part of the Animal Creek Greywacke sequence and thus older than Que Hellyer Volcanics.

Mineralisation is restricted to pyritisation of dacitic lavas with slightly elevated base metal values. A diamond drill hole (MAC 24) was drilled by the Department of Mines to test for Central Volcanic Complex rocks beneath the Animal Creek Greywacke correlates. This hole was completed at 489 m and was still in the sediment-felsic volcanic sequence at that depth. Potential Central Volcanic Complex rocks would be beyond that depth and do not constitute an attractive target at this time.

## 3.2 ANIMAL CREEK BLOCK

This area of activity is located south of the Mount Charter fault and is dominantly underlain by felsic volcanics of the Central Volcanic Complex. Exploration in this area has been directed toward locating Rosebery style mineralisation.

### 3.2.1 Geology

Initial mapping at 1:2500 scale, on 400 m spaced lines was closed up in the Boundary prospect area (see below) and then on 200 m spaced lines with some re-mapping of earlier traverses. Outcrop geology is shown on Plates MAC 89 PP, CC, LL, TT, MM, NN and UU (see Plate MAC 114 for legend, Figure 1 for map sheet locations and Appendix 1 for geological abbreviations) while petrographic reports are included as Appendix 7. A geological interpretation of the area is shown on Plate 161C at 1:10,000 scale.

The general distribution of rock type indicates an anticlinal closure as suggested by McNeill and Corbett (1989). However, structural data is sparse, especially in the core where lithologies are dominated by massive to weakly flow-banded felsic feldspar-quartz phyrlic, dacite-rhyolite, with some possibly andesitic lavas and intrusives and silicified eutaxitic lapilli-breccia volcanoclastics. Quartz + sericite+chlorite alteration of variable intensity is widespread and probably related to low-grade regional metamorphism. This complex is overlain by a sequence of interbedded feldspar-phyric ash to fine lapilli volcanoclastic which grade into the overlying mica sandstone and shale of the Animal Creek Greywacke (of Collins et al 1981).

In a quarry at 2825E, 2990N, a zone of strong silicification associated with quartz-sphalerite and abundant pyrite-baryte veins and vug fillings is exposed. This mineralisation occurs in a sericite-K-feldspar and manganese altered lava and is bounded by two shear zones. This alteration is quite restricted in area and costeaning (see Plate MAC 89 MM for location) and mapping have failed to locate any further alteration of this type. This alteration zone has been named the Boundary prospect.

### 3.2.2 Geochemistry

#### 3.2.2.1 Soil Sampling

"C" horizon soil sampling, by hand auger, was initially completed at 25 m intervals on 400 m spaced lines from 1400N to 3800N (590 samples) and followed-up by infill sampling on 50 m spaced lines over the Boundary prospect (123 samples). Samples were analysed for Cu, Pb, Zn, Ba, As, Cr, Ni, Ti and Zr; results and sample locations are included in Appendix 8. Colour images of the processed data are included as Plates MAC 358 a-i.

Copper and Pb values are generally low throughout this area, however a weak Ba-Zn-As anomaly was defined around 1800N, 4300E. An infill sampling programme was designed to further detail this anomaly and in combination with rock-chip sampling (3.2.3.2) indicate its source. A total of 92, 25 m spaced samples on lines 1600N and 2000N (3700-4700E) and 2400N (4200-4500E) were collected by hand auger, sieved to -80# and analysed for Cu, Pb, Zn, Ba, As, Ag, Au, Cr, Ti and Zr. Sample locations and results are included as Appendix 8.

Weakly anomalous As (<20 ppm) and Zn (<165 ppm) occur between 1600N and 2400N around 4300E. The anomaly appears to be related to the contact between rhyodacitic lava and ash volcanoclastics. A single point Au (36 ppb) anomaly occurs at 1600N, 4175E, with no obvious source.

No anomalous values occur over the Boundary prospect which appears to occur on the edge of a barium anomaly and adjacent to a barium low.

Chromium defines the mica sandstone to the east with values generally >200 ppm. Titanium and zirconium do not appear to define any major lithological changes.

### 3.2.2.2. Rock Chip Sampling

This area has been extensively rock-chip sampled; results and sample locations are included as Appendix 9. Locations are also shown on the 1:2500 scale outcrop maps (Plates MAC 89 PP, CC, LL, TT, MM, NN and UU) while results are shown on Plates MAC 88 R, PP, CC, LL, TT, MM, NN and UU.

Samples from the Boundary prospect generally yield low base and precious metal values, the exception being those from the most intense alteration which contains weakly anomalous Zn (550 ppm), Pb (225 ppm) and Ag (to 1.5 ppm). Gold values were all below detection limit (8 ppb).

Base metal values outside the Boundary prospect are low, with Cu and Pb often below detection limit, and a maximum of 215 ppm Zn from a dacitic volcanoclastic. Silver values are low while two weak Au values, 25 ppb and 17 ppb (427320 and 427316 respectively), occur in apparently unaltered rhyolitic lava.

Titanium and zirconium values confirm that lithologies are generally dacitic-rhyolitic.

### 3.2.2.3 Stream Sediment Sampling

#### **i Bulk Cyanide Leach**

A total of 10 samples were collected from sites either below major creek junctions or where creeks intersected roads for ease of access. From 4.6 to 16 kg of sieved (-6 mm) wet, active stream sediment was collected and partially dried prior to submission for analysis by ALS using method PM216. All samples contained some organic material.

Sample locations are shown on Plate MAC 203C while analytical results are presented on Plate MAC 204C and in Appendix 10. Results were generally low with the majority being below detection limit (i.e. 50 ppt).

## ii -80# Stream Sediment

A total of 45 samples (430786-430830) of active stream sediment were collected and sieved to -72# in the laboratory. Samples were analysed for Cu, Pb, Zn, Ba, As, Ag, Au and splits of 430792, 430803 and 430826 (430831-833 respectively) were assayed as a check on analytical precision. Sample locations are shown on Plate MAC 203C and results on MAC 204C and in Appendix 10.

Due to the relatively small sample set, statistical analysis using probability paper was not feasible so thresholds were selected using the mean + 2 standard deviations. Results are tabulated below:

<u>Element</u>	<u>Mean (ppm)</u>	<u>Threshold (ppm)</u>
Cu	28	52
Pb	33	137
Zn	86	293
Ba	360	591
As	16	79

A threshold of 15 ppb was set for Au by visual examination of the data while no Ag results were considered to be anomalous as all were at or below detection limit. Two anomalies were defined:

- i) Sample 430786 (2790N, 2185E) is anomalous in Cu, As and Ag with high Ba (550 ppm). A probable source is the hangingwall style alteration at the Boundary prospect, tested by DDH MAC 16 (section 3.2.4).
- ii) Sample 430829 (2780N, 3940E) a single point 15 ppb Au anomaly.

#### 3.2.3.4 Pb Isotope

One sample (271234) from the Boundary prospect was submitted for Pb isotope characterisation. A report is included as Appendix 11. Results are consistent with a Cambrian age but some uncertainty exists due to low Pb content.

### 3.2.3 **Geophysics**

#### 3.2.3.1 Ground Magnetics

A total of 21.9 line km, of 10 m spaced ground magnetic data was collected on 200 m lines using an Omni 4 EDA proton precession magnetometer. This data was dumped to a portapak computer and combined with data from a second Omni magnetometer in base station mode, to produce the stacked profiles on Plate MAC 235. This data is also available in digital format.

#### 3.2.3.2 UTEM

A total of 30 line km. of UTEM data was collected from 5 loops. Results are included in Appendix 12. No responses attributable to a VMS accumulation were detected.

### 3.2.4 **Diamond Drilling DDH MAC 16**

#### 3.2.4.1 Geology

Diamond drill hole MAC 16 was sited 3 km. southwest of mount Charter (Plate 89 NN) to test alteration in rhyolitic Central Complex Volcanics, the target being Hellyer or Rosebery type VMS.

Intense K-feldspar-sericite-quartz alteration, associated with baryte veining, is restricted to one exposure in a quarry. Further costeaming in this area has not located any additional alteration. UTEM was ineffective due to the proximity of power lines, so the alteration system had not been geophysically tested. As the orientation of the alteration was unknown, a vertical hole collared on the most intense alteration, was designed to test this target.

A detailed log and petrographic report are included in Appendix 13 while a section of the hole is included as Plate MAC 200. A summary log is as follows:

0 - 44.2 m	Rhyodacitic lava. Baryte-pyrite-quartz veins to 9.8m.
44.2 - 55.4 m	Banded volcanoclastic with lava clasts.
55.4 - 116.7m	Rhyodacitic lava.
116.7 - 123.1m	Felsic lapilli volcanoclastic.
123.1 - 173.1m	Rhyodacitic-dacitic lava. Variably chloritized + silicified. 146-148.5m trace native Cu in microfissures.
173.1 - 223.6m	Eutaxitic volcanoclastic with rhyodacitic lava clasts.
223.6 - 235.6m	Silica-K-feldspar-chlorite altered volcanic. Increasing intensity of quartz veins down-hole.
235.6 - 267m	Quartz vein, massive to vuggy.
267 - 281m	Altered, intensely quartz veined lava. Fault contact to:
281 - 340.4m	Rhyodacitic-dacitic lava.
340.4 - 367.4m	Felsic lapilli volcanoclastic with pink lava clasts.

The quartz-pyrite-sericite-K- feldspar alteration seen at surface extends to approximately 12 m depth, but may be equivalent to the alteration associated with quartz veining deeper in the hole. Mineralisation, i.e. native Cu, malachite and chalcocite (often rimming chalcopyrite) has supergene characteristics although both sphalerite and chalcopyrite occur in the quartz vein, as do zones of sericite, K-feldspar and manganese oxide. Outside this alteration, pyrite is often associated with chloritic veinlets or alteration patches in the regionally silica-sericite altered lavas and probable ignimbritic volcanoclastics. Bedding and flow-banding in the volcanics appears to be at a high angle to the core axis indicating relatively shallow dips.

#### 3.2.4.2 Geochemistry

The majority of MAC 16 was core-ground, on nominal 10 m intervals or lithological boundaries, and analysed for Cu, Pb, Zn, Ba, As, Cr, Ti, Zr, Ag and Au while the interval 140.3-152.1 m was split and analysed for the elements listed above and epithermal indicator elements. Results are presented on Plate MAC 200A and in Appendix 13.

High Ba and As at the top of the hole correlate with the hangingwall style alteration, however elevated Zn values reach a peak below the obviously altered interval. The reason for this is not obvious.

The quartz vein is associated with high Cu (to 2000 ppm) which also occurs in the interval 146-148 m while Ba shows a marked depletion (and Zn is weakly enriched) around this vein system.

The depletion of Ba is not characteristic of hangingwall alteration and suggests the two altered intervals are unrelated. Precious metal values are low throughout the hole.

### 3.2.4.3 Geophysics

MAC 16 was read with Sirotem, results and interpretations of which are presented in Appendix 14. No anomalies were detected.

### 3.2.5 **Summary and Conclusions**

The Animal Creek Block is dominantly underlain by Central Volcanic Complex rocks which were thought to have potential for Rosebery style deposits. Exploration undertaken by Aberfoyle comprised mapping, soil geochemistry and UTEM, designed to identify targets for drill testing. Results of these surveys indicated that only the Boundary prospect (where EM was ineffective) was worthy of drilling. Drill results were negative.

This area has now been sterilised to a depth of 200 m by deep search EM. There is no data available to encourage exploration beyond these depths.

## 3.3 **HENTY FAULT BLOCK**

This part of the relinquished area contains sections of the Henty Fault Zone. Exploration by Aberfoyle under EL 106/87 has been directed toward locating either Henty (McNeill and Corbett, 1992) or Lakeside (Taheri and Green, 1990) style Au deposits associated with or near the Henty Fault zone.

### 3.3.1 **Geology**

Geologic mapping at 1:2500 scale is shown on Plates MAC 89, TT, SS, LL, KK, EE, FF, GG and A3 while a 1:10,000 scale geological interpretation is included on Plate MAC 161B. Petrological reports are attached as Appendix 15.

The Henty Fault Zone is well defined south of 5200N and contains a mixed sequence of variably sheared, generally west dipping, mica sandstone, shale and volcanoclastic. As the fault is crossed there is a dramatic decrease in the intensity of deformation and a sequence of massive, west dipping, mica sandstone ( an equivalent of the Animal Creek Greywacke) and overlying prehnite-pumpellyite altered basalt (the lower basalt of the QHV) is encountered. To the east the HFZ is bounded by the Owen Conglomerate, dominantly correlates of the Middle Owen, dipping moderately to the east, which unconformably overly variably silicified and haematite altered, sheared to massive rhyolite lava. The affinities of this lava (i.e. Southwell Sub-Group or Central Volcanics) is currently unclear.

Southwest of the Sharks-Fin, Owen Conglomerate overlies rhyolitic lava and volcanoclastic which are interbedded with mica sandstone north of 5500N, 6000E, suggesting they stratigraphically underly the Animal Creek Greywacke, and that very little movement has occurred on the HFZ. Line 5200N is the northernmost line on which intense deformation, as seen to the south, is exposed, but here the cleavage appears to be at a high angle to the normal NW-SE trend associated with the HFZ suggesting possible cross faulting that may offset the HFZ.

### 3.3.2 Geochemistry

#### 3.3.2.1 Rock Chip

A total of 24 samples from the HFZ and associated sequences were assayed. Results and locations are included in Appendix 16 (also refer Plates MAC 89 TT, SS, LL, KK, EE, FF, GG and A7 for location and Plates MAC 88 R, TT, SS, LL, KK, EE, FF and A7 for results). No anomalous gold values were returned. The most significant base metal results being from sample 427426, a weakly altered sandstone hosting galena veins, with anomalous Pb (645 ppm), Zn (190 ppm) and As (250 ppm) and 427459, an altered volcanic, with Pb (250 ppm), Ag (2.5 ppm) and As (280 ppm).

Both of these samples occur within the HFZ. Cr values from mica sandstone samples in the HFZ are generally lower, (max. 220 ppm) than those from the Animal Creek Greywacke.

### 3.3.2.2 Soil Sampling

"C" horizon soil sampling of the Que Hellyer Volcanics often extended easterly beyond the Henty Fault Zone. Approximately 450 samples lie within the Henty Fault Block and are reported here. Sample locations and results are attached as Appendix 17 and are also plotted at 1:2500 scale on Plates MAC 356 EE, FF, GG, KK. }

Samples were collected by hand auger at 10 or 25 m spacings on lines spaced 200 m apart from 3000N to 8600N, then sieved to -80# and analysed for Cu, Pb, Zn, Ba, As, Ag, Cr, Ti and Zr.

### 3.3.2.3 Stream Sediment

#### **i Bulk Cyanide Leach**

A total of 12 samples, varying from 7.2 to 13.5 kg wet, of active stream sediment were collected for Au analysis by cyanide extraction. No sieving was carried out in the field to avoid losing fines, however samples still comprised dominantly < 7 mm material.

Sample locations are shown on Plate MAC 203C and D and results on Plate MAC 204C and D, and in Appendix 18.

Results were generally below the detection limit of 50 ppt and none were above 100 ppt Au.

## ii -80#

A total of 33 samples of 2 to 3 kgs of active stream sediment were collected at a sample density of 5 samples per sq. km. Samples were sieved to -72 # in the laboratory and assayed for Cu, Pb, Zn, Ba, As, Ag and Au.

Sample locations are shown on Plates MAC 203C and D and results on Plates MAC 204C and D, and in Appendix 18.

Due to the relatively small number of samples, statistical analysis using probability paper was not feasible so thresholds were selected using the Mean + 2 standard deviations. Results are tabulated below:

<u>Element</u>	<u>Mean (ppm)</u>	<u>Threshold (ppm)</u>
Cu	37.9	114
Pb	27.8	170
Zn	97.7	374
Ba	212.1	469
As	5.3	24

As a large number of Au and Ag analyses were below detection limit, thresholds of .01 ppm and 2.0 ppm respectively, were selected by visual examination of the data.

The anomaly and follow-up work completed are detailed below:

Sample 427718 (Cu) and 427719 (Cu, Pb, Zn, Ag, Au anomalous) occur in adjacent creeks around 2800N, 6700E. Mapping of these creeks failed to find an obvious source for these anomalies.

Follow-up sampling, spaced at 100 m, suggests that the source of this anomaly is confined to the area between 6600E and 6800E and within approximately 100 m of the lakes shore. It should be noted that the follow-up results were treated as a statistically separate data set, to allow for analytical variance, and that a repeat of 427719 (Sample 427765) was anomalous in Cu and Zn only, while a repeat of 427718 (427773) was not statistically anomalous in Cu, although the value obtained was in the upper 15% of the population.

### 3.3.3 Summary and Conclusions

The Henty Fault Block has been explored for Henty or Lakeside style Au deposits in or near the Henty Fault Zone. Exploration comprised mapping, rock chip sampling and stream sediment geochemistry. Extensions of the Que-Hellyer Volcanic soil sampling programme also fall within this block.

Follow up of a weak Au anomaly detected in the stream sediment sampling programme was unable to locate a source and no further exploration was undertaken.

The area is considered to have little potential for base metal sulphide deposits and no Au targets have been identified.

### 3.4 MOUNT CRIPPS BLOCK

The area comprising the Mount Cripps Block has not been rated as highly prospective and exploration has comprised regional geological and geochemical surveys only.

#### 3.4.1 Geology

A distinctive sequence of purple-weathering volcanoclastic conglomerate, sandstone, siltstone and minor crystal tuff occurs on the western slopes of Mount Cripps and is correlated with the Tyndall Group of the Queenstown area (Corbett, et. al., 1974, Corbett, 1979). The sequence is in the order of 500-600 m thick, and appears to conformably overlie the pumice-rich tuff unit of the Southwell Sub-Group. The beds dip moderately to steeply east, and face east, although occasional westerly dips indicate some minor folding.

Siliciclastic conglomerate and sandstone correlated with the Owen Conglomerate (Denison Group) occurs in the Mount Cripps area and dips moderately to steeply east. The contact with the underlying Tyndall Group is apparently conformable. The sequence in this area consists mostly of pink pebble to pebble-cobble conglomerate with some interbedded sandstone and minor units with boulder grade clasts.

Areas to the north east of Mount Cripps are covered by Tertiary flood basalt.

Outcrop mapping is shown on Plates MAC 89 A1, A2, 7 and 15. Petrology sample locations are also shown on the outcrop maps and are included in the petrology descriptions in Appendix 19.

### 3.4.2 Geochemistry

#### 3.4.2.1 Rock Chip

One rock chip sample (427398) has been analysed from this area. It is located at 10250N, 9540E and is also located on Plate MAC 89 A2.

The analytical results are in ppm; 15 Cu, 25 Pb, 90 Zn, <0.5 Ag, <0.008 Au, 330 Ba, <1 As, <5 Cr, 25 Ni, 260 Zr, 1800 Ti and 35 Zr and are shown on Plate MAC 88 R A2.

#### 3.4.2.2 Stream Sediment

Ten stream sediment samples were collected in the area using the procedures described in section 3.3.2.3., ii and analysed for Cu, Pb, Zn, Ag, Au, Ba and As. No anomalous values were recorded.

Sample locations are plotted on Plate MAC 203 B & F and results on Plate MAC 204 B & F and in Appendix 20.

### 3.4.3 Summary and Conclusions

The Mount Cripps Block comprises Cambrian volcanics of the Tyndall Group overlain in part by Owen Conglomerate and Tertiary Basalt. Regional mapping and geochemical surveys have failed to identify targets for follow up.

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APPENDIX I

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## GEOLOGICAL ABBREVIATIONS

Abundant abn  
 Adularia Adl  
 Agglomerate agg  
 Albite Ab  
 Alkali feldspar Afd  
 Altered alt  
 Amphibolitic amb  
 Amphibole Amb  
 Amygdaloidal amg  
 Andalusite An  
 Andesite A  
 Angular ang  
 Ankerite An  
 Aplite Ap  
 Approximate apx  
 Arcuate ar  
 Arenaceous arn  
 Argillaceous arg  
 Argillite Arg  
 Arkose Ak  
 Arkosic ak  
 Arsenopyrite Ap  
 Ash volcanoclastic av  
 Autobrecciated aub  
 Average ave  
 Azurite az  
 Banded bnd  
 Barite Ba  
 Basalt B  
 Bedded bd  
 Biotite Bio  
 Black bk  
 Black shale Bsh  
 Blue bl  
 Boulder bld  
 Breccia b  
 Breccia volcanoclastic bv  
 Bright brt  
 Brown br  
 Calcareous cc  
 Calcite Cc  
 Carbonaceous carb  
 Carbonate Co  
 Cassiterite Cass  
 Cavernous cav  
 Cemented cem  
 Chalcopyrite Cp  
 Chert Ch  
 Chlorite Cl  
 Chromite Cr  
 Chromiferous cr  
 Clay cy  
 Coarse c  
 Coarse grained cg  
 Colloform coll  
 Colour col  
 Common com  
 Conglomerate Cg  
 Conglomeratic cg  
 Crimson cm  
 Crystal x  
 Crystal volcanoclastic xv  
 Dacite D  
 Dark dk  
 Dense dns  
 Devitrification dv  
 Diorite Di  
 Disseminated dis  
 Dolerite Dol  
 Dolomite Dm  
 Dyke dy  
 Elongated el  
 Emphasised emp  
 Epiclastic (noun) E  
 Epidote Ep  
 Euhedral euh  
 Eutaxitic eux  
 Fabric fab  
 Fault F  
 Fault zone FZ  
 Feldspar Fd  
 Feldspathoid Fdd  
 Feldspar phyrlic fp  
 Feldspathic fel  
 Ferruginous fer  
 Fibrous fb  
 Fine f  
 Fine grained fg  
 Fissile fis

===== abvgeol Mon 07-Dec-92

Flowbanded fbn  
 Fluorite Fl  
 Foliated fo  
 Fragments fr  
 Fuchsite Fu  
 Gabbro Gb  
 Galena Gn  
 Glass Gl  
 Glassy gl  
 Gossan Gos  
 Granite Gr  
 Granodiorite Gd  
 Granular glr  
 Graphite Gt  
 Graphitic gt  
 Green gn  
 Grey gy  
 Greywacke Gw  
 Groundmass gm  
 Haematite Hmt  
 Hanging wall vlc1  
 Hornblende Hb  
 Igneimbrite Ig  
 Illite Ill  
 Interbedded ibd  
 Intercalated icl  
 Intrusive int  
 Joint J  
 Jurassic Ju  
 K-Feldspar Kfd  
 Khaki kh  
 Laminated lm  
 Lapilli volcanoclastic lv  
 Lava l  
 Lava breccia lb  
 Leached lch  
 Leucite Lct  
 Leucitite Ltt  
 Limonitic Lim  
 Light lgt  
 Limestone Lst  
 Lithic lh  
 Magnetite Mt  
 Malachite Ma  
 Manganese Mn  
 Mari Ml  
 Massive mas  
 Matrix mtx  
 Matrix dominated md  
 Medium med  
 Medium grained mg  
 Metamorphosed meta  
 Mica mic  
 Micaceous mic  
 Mineralised min  
 Minor mnr  
 Mixed mxd  
 Mottled mcl  
 Mudstone Mst  
 Nodule nd  
 Off white ow  
 Olivine Ol  
 Oolitic oo  
 Orange or  
 Ordovician O  
 Oxidised ox  
 Pale pl  
 Patchy pat  
 Peperitic pep  
 Perlitic prl  
 Pervasive per  
 Phenocrysts phn  
 Phyllite phyl  
 Phyrlic p  
 Picrite Pic  
 Pillow lava pl  
 Pink pk  
 Polymict Y  
 Porphyritic por  
 Predominantly pred  
 Pumice Pu  
 Pumiceous pu  
 Purple pp  
 Pyrite Py  
 Pyritic py  
 Pyroalusite Pr  
 Pyroxene Px  
 Pyrrhotite Po  
 Quartz Q  
 Quartzite Qtz  
 Quellite Qll  
 Questionable ?

===== abvgeol Mon 07-Dec-92

Recrystallised rx  
 Red rd  
 Rehealed rhd  
 Reworked rw  
 Rhodacite RD  
 Rhyolite R  
 Ripple marks rmk  
 Round rnd  
 Rubble rbb  
 Sandstone Ss  
 Schist Sch  
 Schistose sch  
 Sediment sed  
 Selected fragments sfr  
 Sericite Se  
 Serpentine Srp  
 Shale Sh  
 Sheared shd  
 Sheeted sht  
 Siderite Sid  
 Silica Si  
 Siliceous sil  
 Siltstone Slt  
 Slickenside slk  
 Sphalerite Sp  
 Spotted spt  
 Spotty spt  
 Stockwork stw  
 Stratabound stb  
 Strong str  
 Structure controlled stc  
 Syngenetic syn  
 Talc Tc  
 Tertiary T  
 Tourmaline Tm  
 Trace tr  
 Trachyte Tr  
 Tuff Tf  
 Tuffaceous tf  
 Variable var  
 Variolitic vr  
 Vein vn  
 Vein concordant to bedd cv  
 Vein discordant to bedd dv  
 Very v  
 Vesicular ves  
 Vitric vtr  
 Volcanic vlc  
 Volcanoclastic vlc1  
 Weak wk  
 Weathered wth  
 White wh  
 Yellow yw

APPENDIX II

east	north	sample	REPORT No.
2950	10270	379427	CM87/5/35
2790	10850	383623	CM87/5/17
2680	11340	383624	CM87/5/17
2250	12710	427809	CM88/7/36
1570	13080	427811	CM88/7/36
1880	12680	427814	CM88/7/36
1880	12490	427815	CM88/7/36
2510	12230	427819	CM88/7/36
2800	11760	427821	CM88/7/36

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22nd May, 1987

### REPORT CMS 87/5/17

YOUR REFERENCE:	Letter dated 14.5.1987
DATE RECEIVED:	15th May, 1987
SAMPLE NOS.:	383621 - 383625
SUBMITTED BY:	A.M. Hesse
WORK REQUESTED:	Petrology

Copy to:  
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*H.W. Fander*  
H.W. Fander, M. Sc.

REPORT CMS 87/5/17

Five rock chip samples of Que River shale and micaceous sandstone were received for petrological examination, with emphasis on hydrothermal bleaching and alteration effects. Representative thin-sections were prepared and examined with the respective offcuts. Microscopic data is summarised in the attached tabulated descriptions.

Summary

The two samples of shale are similar, both rocks representing incipiently cleaved silty shales, with the clastic components dominated by white mica flakes. Both examples exhibit partial illitic degradation of the clastic mica flakes and more or less pervasive kaolinisation of the primarily sericitic/white micaceous matrix. Sample 383621 exhibits partial leaching of thin silty partings, with resultant microscopic cavities partly infilled with ultrafine kaolin (visible as whitish clots and films in stereobinocular examination of sawn surfaces). On this basis, the kaolinitic bleaching is considered as a weathering effect.

In contrast, the similarly kaolinitic-illitic 383622 exhibits distinctive bleaching effects in narrow zones adjacent to quartz veinlets. This phenomenon is due to destruction of carbonaceous matter. There are no microscopically detectable changes in mineralogy, apart from removal of carbonaceous matter, in the simple mica-kaolin-quartz assemblage.

The three sandstones are essentially quite similar and may be categorised as micaceous protoquartzites. These rocks include low-grade regional metapelite-derived carbonaceous lithic clasts and may be less prone to bleaching of carbonaceous matter than the incipiently metamorphosed carbonaceous pelites. Sample 383623 exhibits weathering-induced partial degradation of matrix mica. Sample 383624 is essentially fresh, but does exhibit partial removal of argillaceous (strictly micaceous) matrix components, and is consequently rather porous. In contrast, 383625 exhibits rather subtle sericitic and silicification alteration effects associated with sericitic quartz and crosscutting quartz veinlets respectively. There is no apparent associated bleaching of carbonaceous matter from the clast of metapelite.

D. Cowan, B. Sc.

383623	Micaceous Protoquartzite. Framework of sub-angular quartz grains, subordinate variably carbonaceous pelite and low-grade metapelite clasts, muscovite flakes. Weakly Fe-stained, fine to semi-sericitic white mica/minor quartz	Poorly/trend bimodally sorted in silt to medium sand range. Weakly bedded. Incipiently stressed.	Minor clasts of meta-quartzite, metachert. Sparse detrital tourmaline, leucoxene, zircon, chromite.	Lithoclastic protoquartzite with dominantly low-grade regional meta-sediment-derived lithic clasts. Reflects selective partial weathering/Fe-staining of fine matrix mica.
383624	Micaceous Protoquartzite. Framework of <sup>cement.</sup> subangular quartz grains, quartz-muscovite phyllite and subordinate carbonaceous pelite/low-grade metapelite clasts, muscovite flakes. Fine-grained quartz-muscovite matrix/cement.	Similar to 383623; slightly finer-grained. Very incipiently stressed.	Minor detrital leucoxene, rare zircon, very rare chromite. Sparse clasts of chert chloritised biotite.	Close affinities with 383623, relatively lithoclastic in comparison, devoid of weathering/partial ferruginisation effects, but with a partly leached matrix.

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17th July, 1987

### REPORT CMS 87/5/35

YOUR REFERENCE:	Letter dated 27.5.1987
DATE RECEIVED:	29th May, 1987
SAMPLE NOS.:	379425 - 379428
SUBMITTED BY:	A.M. Hespe
WORK REQUESTED:	Petrology

H.W. Fander, M. Sc.

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REPORT CMS 87/5/35

Four rock chip samples of doleritic rock from separate intrusives in the Que-Hellyer area were received for petrological examination. Representative thin-sections were prepared, examined in transmitted light and together with respective offcuts in oblique incident light. Attached tabulated descriptions summarise the microscopic data and include comparative comments.

Summary

All four rocks may be classified as microgabbros and are compositionally similar, although in detail each rock is different and characterised by a specific pyroxene type or assemblage. These variations would support interpretation as four separate intrusives, although conceivably from a single magma.

Pyroxenes include pigeonite-diallagic augite, diopsidic augite-orthopyroxene, pigeonitic augite and diopsidic augite-pigeonitic augite assemblages. Despite these variations all four rocks carry accessory ilmenite and are of calc-alkaline character. Three rocks are amygdaloidal. Sample 379425 represents the single non-amygdaloidal phase, and this rock is relatively fresh in possible explanation of the noted contrasting outcrop pattern. Sample 379428 represents a distinctly relatively (saussurite-uralite) altered phase and, on this basis, could be interpreted as a temporally early intrusive.

D. Cowan, B. Sc.

379427	Amygdaloidal Microgabbro. Labradorite laths and pigeonitic clinopyroxene with a sparse hematitic, glassy to subvitic mesostasis, semi-pervasive interstitial amygdales of sideritic carbonate.	Amygdaloidal, medium-grained, ophitic.	<del>custatite-bronzite.</del> Relatively conspicuous ilmenite. Fe-stainings (partly degraded carbonate). Rare olivine.	Compositional contrasts with both 379425 and 379426. Unaltered apart from carbonate amygdale overprint and mild weathering effects.
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037041



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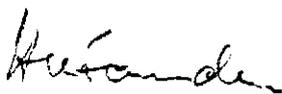
Mr. A.W. McNeill  
Geologist  
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13th September, 1988

### REPORT CMS 88/7/36

YOUR REFERENCE: Letter dated 25.7.1988  
DATE RECEIVED: 26th July, 1988  
SAMPLE NOS.: 7 Samples  
SUBMITTED BY: A.W. McNeill  
WORK REQUESTED: Petrology

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H.W. Fander, M. Sc.

REPORT CMS 88/7/36

A suite of seven rock chip samples from the Hatfield River area N.W. of Hellyer was received for routine petrological examination. Representative thin sections were prepared, examined in transmitted light and, together with respective offcuts, in oblique incident light. Attached descriptions summarise the microscopic data and include interpretative comments.

Summary

This suite is a composite of quartzose sandstones (samples 427811, 427818 and 427821), sericite(-quartz)-altered impure pelitic and psammopelitic ashes (or "xenotuffs", reworked in part, samples 427809, 427815, 427819), and a similarly altered and pyritised felsitic "dacite" (sample 427814).

Sandstones are weakly carbonaceous and chromiferous micaceous types with lithoclastic debris dominated by basement-derived low-grade regional meta-sedimentary types. Sample 427818 is a relatively fine-grained, well-sorted and mature orthoquartzite, possibly reworked from the 427811/821-type facies.

Tuffaceous sediments are of sub- to distal character and, as noted, at least locally reworked. These rocks may be interpreted as subaerially transported/subaqueously deposited, and are weakly microfossiliferous.

The single devitrified and altered felsic volcanic (427814) is poorly diagnostic in terms of possible correlatives with the inferred primary dacitic composition perhaps more typical of the Que/Hellyer sequence than the generally rhyolitic Central Volcanics complex.

D. Cowan, B. Sc.

SAMPLE NO.: 427809 (T.S. 60395)

CLASSIFICATION: Tuffaceous Siltstone

COMPOSITION: Sericite pseudomorphs after splintery to angular/subangular silt-sized clastic debris, with relatively minor silt- to fine sand-sized, splintery to subangular quartz grains, carbonaceous pelite clasts, minor muscovite flakes. Poorly determinate sericite/cryptocrystalline quartz matrix/cement. Weak/semi-pervasive Fe-stainings.

FABRIC: Weakly bedded, slightly sandy silty clastic/vaguely relict vitroclastic.

ACCESSORIES: Rare siliceous microfossils (spicules, ?foram fragments). Minor clastic leucoxenic semi-opaques, traces of degraded clastic biotite. Minor clots, rhombs of degraded/ferruginised carbonate. Rare clasts of impure chert, quartzose silty pelite.

INTERPRETATION/  
COMMENTS: Finer detail obscured by sericitic alteration of labile clastic material interpreted as shards/shard fragments on the basis of ghosted shapes. Rock is thus interpreted as a tuffaceous (vitroclastic) siltstone/trend pelitic ash. Microfossils, although rare, may warrant palaeontological examination. Advanced sericitic alteration may mask marginal contact effects.

SAMPLE NO.: 427811 (T.S. 60396)

CLASSIFICATION: Micaceous Protoquartzite

COMPOSITION: Framework of angular to subangular quartz grains/minor composites, subordinate lithic clasts (quartz-muscovite phyllite, mica phyllite, chert-metaquartzite, carbonaceous shale, carbonaceous slate, minor felsitic intermediate-acid lava clasts), relatively minor muscovite flakes. Intergranular fine quartz/minor sericite cement, supplemented by a little overgrowth quartz and intergranular cavity-filling clots of chlorite.

FABRIC: Weakly bedded, moderately to well sorted, fine to medium sandy clastic. Mildly stressed.

ACCESSORIES: Traces of partly chloritised detrital biotite. Traces detrital leucoxene, feldspar grains, minor traces detrital chromite, rare detrital graphite, tourmaline.

INTERPRETATION/  
COMMENTS: A quartzose lithoclastic micaceous sandstone with lithoclastic debris dominated by low-grade regional metasedimentary types ("basement"-derived). Reflects mild stress and chloritic alteration effects. No detectable sulphide.

SAMPLE NO.: 427814 (T.S. 60397) 2.

CLASSIFICATION: Pyritic, Altered Felsite

COMPOSITION: Disseminated sericite (+ pyrite) pseudomorphed feldspar phenocrysts and phenocrystal clusters in a matrix of variably sericite-stained anhedral quartz with included sericite-pseudomorphed feldspar microlites and interspersed sericitised anhedral feldspar. Disseminated clots and minor discontinuous films of fine-grained pyrite. Minor pyritic quartz veinlets.

FABRIC: Porphyritic/trend glomeroporphyritic, incipiently flow-structured felsitic ("snowflake-textured"). Weakly cognate-xenolithic.

ACCESSORIES: Leucoxenised opaques, rare cloudy microscopic zircons. Minor traces of sphalerite and galena in pyritic quartz veinlets.

INTERPRETATION/COMMENTS: A thoroughly sericitised/mildly silicified and pyrite-mineralised, devitrified, feldspar-porphyritic pitchstone with dacitic relict compositional characteristics. Conceivably a semi-chilled minor intrusive, dependent on field relationships. Accessory base metal sulphide in traces only, apparently restricted to thin pyritic quartz veinlets.

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SAMPLE NO.: 427815 (T.S. 60398)

CLASSIFICATION: Altered Impure Pelitic Ash

COMPOSITION: Aggregates of semi- to sericitic white mica with a little intergrown chlorite and cryptocrystalline quartz. Evenly disseminated splintery to subangular, silt- to fine sand-sized quartz grains, minor muscovite flakes, carbonaceous pelite clasts, sericitised and sericite-quartz-pseudomorphed feldspar grains and similarly altered indeterminate lithic (?lava) clasts. Sporadic microfractures with Fe-pigmented selvages.

FABRIC: Similar to 427809, relatively massive (unbanded) in comparison.

ACCESSORIES: Minor clastic leucoxenitic semi-opaques, traces degraded biotite, sparse siliceous microfossils, minor clots of degraded/ferruginised carbonate.

INTERPRETATION/COMMENTS: Close affinities with 427809 and similarly altered; slightly relatively distinctive pelitic vitric ashy characteristics, although impure and strictly a tuffaceous siltstone.

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SAMPLE NO.: 427819 (I.S. 60400)

CLASSIFICATION: Altered Impure Psammopelitic Ash

COMPOSITION: Aggregates of sericite and crypto- to finely microcrystalline quartz with disseminated silt- to fine sand-sized, angular to subangular and splintery quartz grains, minor muscovite flakes, carbonaceous pelite clasts and sericitised lava clasts. Semi-pervasive network of quartz veinlets.

FABRIC: Similar to 427809 and 427815; coarser-grained. Weakly bedded and slumped, with irregular pelitic dykes. Unsheared.

ACCESSORIES: Relatively conspicuous detrital leucoxene. Minor microscale kaolinitic quartz veinlets. Rare detrital zircon. Minor traces degraded/ferruginised carbonate.

INTERPRETATION/  
COMMENTS: Close affinities with 427809 and 427815; similarly altered, but relatively siliceous (i.e. silicified). Selectively sericitised vitroclastic debris is dominated by weakly fragmental shards, consistent with mild reworking. Initially pelitic ash-parted, slumped and sedimentary-dyked.

SAMPLE NO.: 427821 (T.S. 60401)

CLASSIFICATION: Micaceous Protoquartzite

COMPOSITION: Framework of fine to medium/minor coarse sand-sized, angular to subangular quartz grains, subordinate variably carbonaceous pelite and regional metapelite, orthoquartzite and meta-quartzite, impure chert and metachert clasts, minor muscovite flakes. Limonitic, sericitic-chloritic/intergranular quartz cement.

FABRIC: Poorly (trend bimodally) sorted, slumped, sandy clastic. Very incipiently stressed.

ACCESSORIES: Detrital leucoxene, traces of chloritic/Fe-stained detrital biotite, rare zircons and rare chromite.

INTERPRETATION/  
COMMENTS: Close affinities with 427811, relatively lithoclastic and poorly sorted in comparison. Finer detail obscured by partial ferruginisation, but apparently similarly altered, with late intergranular vugs of chlorite.

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SAMPLE NO.:

CLASSIFICATION:

COMPOSITION:

FABRIC:

ACCESSORIES:

INTERPRETATION/  
COMMENTS:

APPENDIX III

east	north	sample	lab	sample	Job	No	Cu[ppm]	Pb[ppm]	Zn[ppm]	Ag[ppm]	Au[ppm]	Hg[ppm]	As[ppm]	Ba[ppm]	Cr[ppm]	Ti[ppm]	Zr[ppm]	Y[ppm]
1643	12695	563501	ANA	CSOIL	6690	6690	10	50	85	<.5	<.008	na	<2	250	na	na	na	na
1642	12697	563502	ANA	CSOIL	6690	6690	10	45	60	.5	<.008	na	<2	240	na	na	na	na
1641	12699	563503	ANA	CSOIL	6690	6690	10	15	35	<.5	<.008	na	<2	220	na	na	na	na
1640	12700	563504	ANA	CSOIL	6690	6690	10	20	35	<.5	<.008	na	<2	210	na	na	na	na
1639	12701	563505	ANA	CSOIL	6690	6690	5	10	30	<.5	<.008	na	<2	220	na	na	na	na
1638	12703	563506	ANA	CSOIL	6690	6690	5	10	35	<.5	<.008	na	<2	220	na	na	na	na
1619	12738	563507	ANA	CSOIL	6690	6690	20	30	40	<.5	<.008	na	<2	220	na	na	na	na
1618	12739	563508	ANA	CSOIL	6690	6690	30	25	40	<.5	<.008	na	<2	220	na	na	na	na
1617	12741	563509	ANA	CSOIL	6690	6690	60	25	55	<.5	<.008	na	6	210	na	na	na	na
1616	12743	563510	ANA	CSOIL	6690	6690	565	30	45	.8	<.008	na	2	230	na	na	na	na
1614	12744	563511	ANA	CSOIL	6690	6690	65	20	35	<.5	<.008	na	3	260	na	na	na	na
1613	12746	563512	ANA	CSOIL	6690	6690	40	20	30	<.5	<.008	na	9	190	na	na	na	na
1612	12749	563513	ANA	CSOIL	6690	6690	110	100	60	<.5	<.008	na	10	120	na	na	na	na
1611	12750	563514	ANA	CSOIL	6690	6690	20	15	25	<.5	.009	na	<2	340	na	na	na	na
1609	12752	563515	ANA	CSOIL	6690	6690	15	20	30	<.5	<.008	na	2	260	na	na	na	na
1608	12754	563516	ANA	CSOIL	6690	6690	10	15	30	<.5	<.008	na	<2	310	na	na	na	na
1570	12732	515060	ANA	RC	6079	6079	50	90	25	<.5	<.008	na	8	170	8	1600	210	na
1570	12732	515061	ANA	RC	6079	6079	35	200	15	<.5	<.008	na	10	170	6	1500	210	na
1571	12733	515062	ANA	RC	6079	6079	35	145	10	<.5	<.008	na	11	180	<5	1650	210	na
1571	12733	515063	ANA	RC	6079	6079	280	45	15	2.0	.026	na	140	170	20	1550	190	na
1745	12430	515064	ANA	RC	6079	6079	<5	310	10	<.5	<.008	na	2	200	25	1400	240	na
1770	12435	515065	ANA	RC	6079	6079	55	95	5	<.5	<.008	na	1	180	65	1600	210	na
2250	12710	427809	ANA	RC	5609	5609	15	105	450	<.5	<.008	na	8	500	30	1450	250	35
1570	13080	427811	ANA	RC	5609	5609	5	40	140	<.5	<.008	na	<1	250	630	1950	120	6
1880	12680	427814	ANA	RC	5609	5609	90	525	1300	1.0	.025	na	20	160	45	1650	210	35
1880	12490	427815	ANA	RC	5609	5609	5	35	30	.5	<.008	na	1	180	35	1600	270	40
2510	12230	427819	ANA	RC	5609	5609	<5	15	15	<.5	<.008	na	<1	140	90	850	130	15
2800	11760	427821	ANA	RC	5609	5609	na	na										
1670	12690	427812	ANA	RC	5609	5609	<5	20	55	<.5	<.008	na	3	270	40	1900	220	30
1700	12600	427813	ANA	RC	5609	5609	<5	10	25	<.5	<.008	na	10	280	20	2000	220	30
1870	12490	427816	ANA	RC	5609	5609	5	85	20	.5	<.008	na	8	190	15	1750	200	20
2940	10780	379401	ANA	RC	4503	4503	100	35	20	<.5	na	.180	18	800	130	na	na	na
2850	10790	379402	ANA	RC	4503	4503	30	30	15	<.5	na	.125	9	820	140	na	na	na
2820	10770	379403	ANA	RC	4503	4503	20	40	10	<.5	na	.110	2	810	120	na	na	na
2820	10750	379404	ANA	RC	4503	4503	10	125	10	<.5	na	.135	1	850	110	na	na	na
2830	10730	379405	ANA	RC	4503	4503	10	155	15	<.5	na	.160	4	950	120	na	na	na
2830	10710	379406	ANA	RC	4503	4503	10	330	15	<.5	na	.260	2	910	110	na	na	na
2840	10690	379407	ANA	RC	4503	4503	20	130	20	<.5	na	.135	2	950	110	na	na	na
2850	10670	379408	ANA	RC	4503	4503	25	125	20	<.5	na	.110	6	950	110	na	na	na
2860	10640	379409	ANA	RC	4503	4503	60	175	30	<.5	na	.235	14	960	140	na	na	na
2860	10620	379410	ANA	RC	4503	4503	60	265	65	<.5	na	.130	15	1100	140	na	na	na
2870	10590	379411	ANA	RC	4503	4503	60	225	50	<.5	na	.135	12	1050	140	na	na	na
2810	10810	379412	ANA	RC	4503	4503	15	155	10	<.5	na	.345	1	690	120	na	na	na
2810	10830	379413	ANA	RC	4503	4503	25	60	5	<.5	na	.250	3	610	130	na	na	na
2800	10850	379414	ANA	RC	4503	4503	30	15	10	<.5	na	.080	22	490	410	na	na	na
2780	10870	379415	ANA	RC	4503	4503	45	15	10	<.5	na	.040	12	510	470	na	na	na
2910	11120	379421	ANA	RC	4503	4503	<5	<5	15	<.5	na	.090	1	270	360	na	na	na
2680	11330	379422	ANA	RC	4503	4503	10	20	40	<.5	na	.090	5	280	490	na	na	na
2690	11330	379423	ANA	RC	4503	4503	75	45	110	<.5	na	.110	10	410	340	na	na	na
2700	11310	379424	ANA	RC	4503	4503	10	20	20	<.5	na	.110	4	270	470	na	na	na

APPENDIX IV

ATTACHMENT

Sample No:	Location	Type	Description	Pb Content	Comment
427426	155S 6080E	Rock Chip			Galena vein from Henty Fault Zone. Any similarities to farrell style mineralisation?
427814	12680N 1880E	Rock Chip (pulp)	Pyritic dacite	525 ppm	Thought to be a correlate of Central Complex i.e. younger than Que-Hellyer

**Sirotope****CSIRO**  
AUSTRALIA

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Chief: Dr. B.J.J. Embleton

**REPORT TO ABERFOYLE RESOURCES LIMITED****ON THE Pb ISOTOPIC COMPOSITIONS****AND METALLOGENIC ASSOCIATION OF EXPLORATION SAMPLES****FROM TEN MILE GRID AND THE MACKINTOSH LICENCE, N.W TASMANIA****REPORT SR 092****GRAHAM R. CARR**  
**JUDITH A. DEAN****29/8/89****R e s e a r c h   A d v a n c i n g   A u s t r a l i a****Floreat Park**

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## 1. AIMS OF STUDY

The aim of this study has been to determine the likely metallogenic association of exploration samples from the Ten Mile Creek grid, Mount Romulus situated about 10km ENE of Hellyer, and from two locations in the Mackintosh licence (106/87).

## 2. SAMPLES

MACKINTOSH LICENCE A galena from the Henty Fault Zone (427426) and a sample of pyritic dacite (427814), thought to be a correlate of the Central Complex, were submitted by A. McNeill.

## 3. TARGET SIGNATURES

All major Cambrian ore deposits of western Tasmania have similar Pb isotopic compositions confirming that they formed as part of a major metallogenic event (see Gulson and Porritt, 1987). A relatively homogeneous isotopic composition over such a region suggests the hydrothermal systems were very large, leaching Pb and other elements from a significant volume of crust and thus tending to average out local variations in the Pb isotopic composition of the source rocks. The Cambrian massive sulfide ("target") signature is represented in this study by the overlapping fields for Hellyer, Que River and Rosebery(+Hercules) (Fig. 1). The fields are 95% confidence ellipses which depict the mean  $\pm$  2 x standard deviations of data for each deposit. Despite the averaging effect of the hydrothermal systems, minor differences can be expected between deposits, as is exemplified by Rosebery/Hercules and Que River/Hellyer fields.

Minor mineralization in western Tasmania commonly consists of discontinuous pods or veins. The isotopic composition of such mineralization varies between occurrences indicating that the hydrothermal systems were probably much smaller. Most examples of this mineralization have isotopic compositions that are more radiogenic than the Cambrian target (i.e. higher  $^{206}\text{Pb}/^{204}\text{Pb}$  ratios, Fig 1.) and some can be associated with Devonian plutonism (e.g. Queen Hill, Mt Farrell).

However, other examples have isotopic compositions that are less radiogenic than the Cambrian target, e.g. WOW/CAB, an old Comstaff prospect in the Oonah Formation and the Marionoak mineralization on the Pieman Dam road (Fig. 1). While the origin of such mineralization remains enigmatic, the low  $^{206}\text{Pb}/^{204}\text{Pb}$  ratios may result from leaching of Pb from nearby Precambrian source rocks. At both WOW/CAB and Marionoak both more radiogenic and less radiogenic populations are present indicating a complex

Although it is likely that Devonian thermal events were responsible for the generation of these relatively localized hydrothermal systems, it is possible they developed at other times, even during the Cambrian. Irrespective of the age, it is unlikely that such mineralization would have significant economic potential.

#### 4. METHODS

Whole rock powders provided by Aberfoyle were leached in a mixture of 7N  $\text{HNO}_3$  and 7N  $\text{HCl}$  acids. Lead was purified from the leachate by anion exchange in  $\text{HBr}$  solutions and by micro-electrodeposition techniques. The galena sample was dissolved in concentrated nitric acid and Pb was purified by electroplating

onto Pt electrodes as above.

Analyses were performed on an ISOMASS 54E thermal ionization mass spectrometer run in fully automated mode. Precision estimates for the ratios are depicted as error bars in the upper left hand corner of the ratio plots and are based on the analyses of over 1000 standards.

## 5. RESULTS

MACKINTOSH LICENCE Whereas sample 427814 plots within the Hellyer signature, sample 427426 is slightly more radiogenic and plots outside the Target signatures for Cambrian massive sulfide mineralization (points 1-3 on Fig. 2 represent repeat analyses of 42746). It has a similar isotopic composition to the Murchison Lode (Gulson and Porritt, 1987, Table 8) but is dissimilar to the Mt Farrell mineralization.

## 6. DISCUSSION AND CONCLUSIONS

Sample 427814 from the Mackintosh Licence also has a high probability of being part of this major Cambrian event. However, sample 427426 is more enigmatic because it plots between the Cambrian and Devonian signatures, but close to the Cambrian signature. The dilemma is: could this represent as yet unrecognised local variation in the Cambrian signature of a scale similar to the differences between Rosebery/Hercules and Que River/Hellyer or is it part of the broad Devonian signature?

TABLE 1. LEAD ISOTOPE RATIOS FOR TEN MILE GRID AND MACKINTOSH LICENCE.

Sample	$\frac{208 \text{ Pb}}{206 \text{ Pb}}$	$\frac{207 \text{ Pb}}{206 \text{ Pb}}$	$\frac{206 \text{ Pb}}{204 \text{ Pb}}$	$\frac{207 \text{ Pb}}{204 \text{ Pb}}$	$\frac{208 \text{ Pb}}{204 \text{ Pb}}$	Pb(ppm)
1 427426gl	2.0751	0.8475	18.389	15.585	38.159	870,000
2 427426glR/1	2.0770	0.8479	18.419	15.617	38.256	
3 427426glR/2	2.0751	0.8474	18.407	15.597	38.197	
4 427814	2.0795	0.8501	18.343	15.594	38.144	525

Sample No prefixes are used to plot points in Figures 2 and 3  
gl denotes galena

R/1, R/2 denote repeat dissolution and analysis.

# REFERENCE DATA - TASMANIA

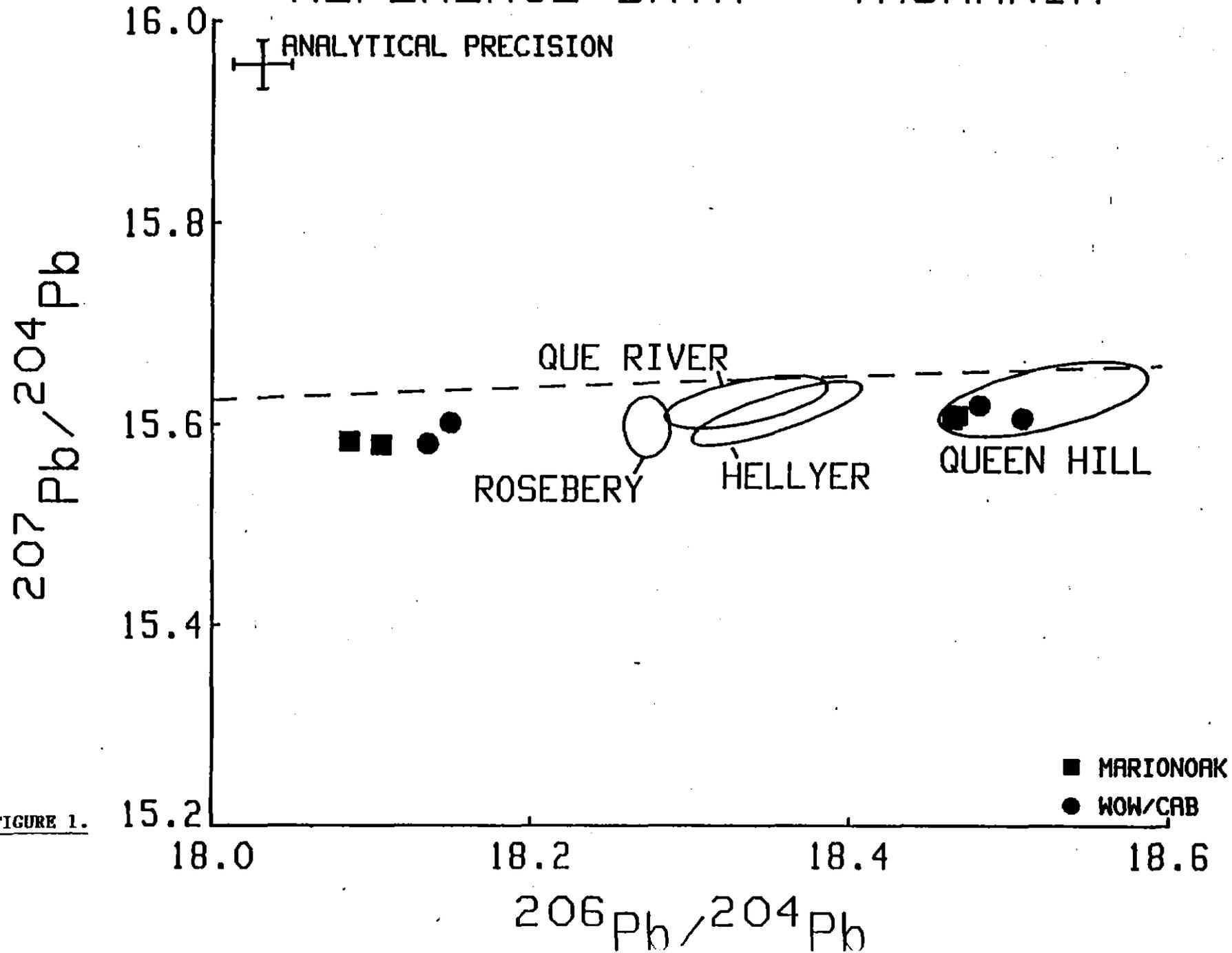


FIGURE 1.

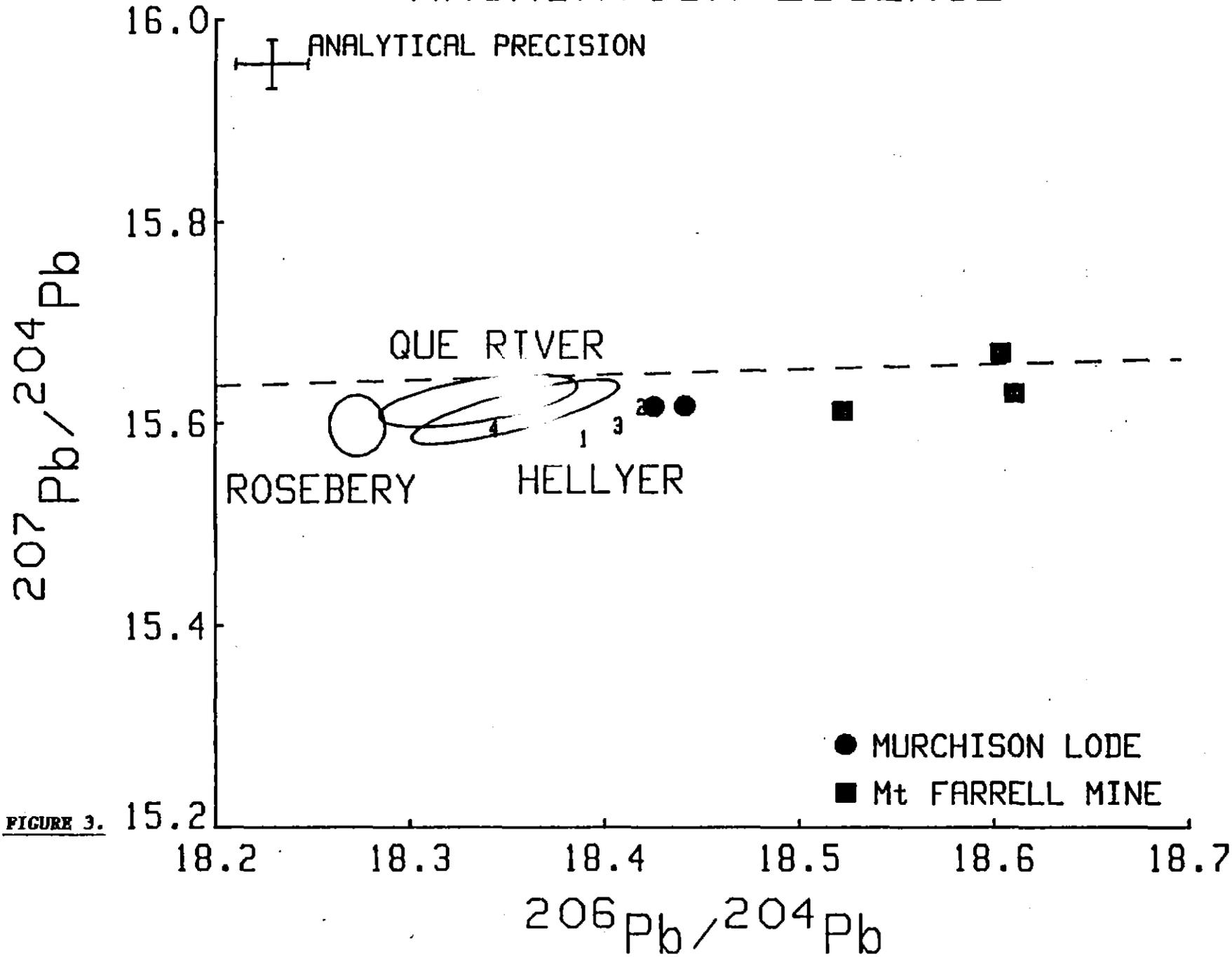


FIGURE 3.

037059

APPENDIX V

\*\* Header data set report for : DDMA0024

AMG E 390326.46  
AMG N 5399479.95

-----  
HOLE NAME: DDMA0024

Collar Coords:	East	North	RL
Collar Depth:	1822.30s	12395.30s	685.80s
Hole Depth:	.00		
	488.80		
Geologist	A.McNeill		
Start DateTime	08/05/1989		
End DateTime	01/08/1989		
Work Proposal	DDM DDH VLHY-1		
Tenement	E.L.106/87		
Prospect	Black Harrys rd		
Hole Objective	Test cent comp		

\*\* Survey data set report for : DDMA0024

Depth	Dip	Azi	Instrument
.00	-70.00	338.50	theodolite
25.00	-70.00	336.00	eastman
50.00	-70.00	334.00	eastman
75.00	-70.00	332.00	eastman
100.00	-70.00	329.00	eastman
125.00	-70.00	327.00	eastman
150.00	-70.00	325.00	eastman
175.00	-69.20	325.00	eastman
200.00	-68.40	325.00	eastman
225.00	-67.60	325.00	eastman
250.00	-66.80	325.00	eastman
275.00	-66.00	325.00	eastman
300.00	-65.20	325.00	eastman
325.00	-64.40	324.00	eastman
350.00	-63.60	324.00	eastman
375.00	-62.80	324.00	eastman
400.00	-62.00	324.00	eastman
425.00	-61.40	324.00	eastman
450.00	-60.60	324.00	eastman
475.00	-59.80	324.00	eastman
488.80	-59.40	324.00	eastman

\*\* Drill log data set report for : 00MA0024

Item #	From	To	Contractor	Drill Rig	Drill Method	ID	Sample Type
1.00	.00	43.70	D.O.Mines		Diamond	96	cgri
2.00	43.70	488.80	D.O.Mines		Diamond	75	cgri

\*\* Casing log data set report for : 00MA0024

Item #	From	To	Casing Type	ID	L	Comments
1.00	.00	488.80	PVC	36	y	PVC broken in 2 places approx 200m, 32mm class 12

## \*\* Geochemical data set report for : DDMA0024

From	To	Sample Type	Cu	Pb	Zn	Ag	Au	Ba	As	Cr	Zr	Ti
			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
.00	9.90	515686 CGRI	50	30	205	<.50	<.008	200	22	350	210	12250
9.90	20.00	515687 CGRI	30	55	110	<.50	<.008	150	8	20	230	1650
20.00	30.00	515688 CGRI	75	30	130	<.50	.012	230	28	25	230	1650
30.00	40.00	515689 CGRI	90	10	170	<.50	<.008	140	19	30	220	1500
40.00	50.00	515690 CGRI	15	5	135	<.50	<.008	130	14	15	230	1600
50.00	60.00	515691 CGRI	20	10	120	<.50	<.008	150	15	10	250	1700
60.00	70.00	515692 CGRI	10	10	60	<.50	<.008	160	17	20	230	1600
70.00	80.00	515693 CGRI	10	<5	75	<.50	<.008	160	8	<5	220	1550
80.00	90.00	515694 CGRI	15	<5	120	<.50	<.008	160	13	5	210	1550
90.00	100.00	515696 CGRI	10	<5	80	<.50	<.008	190	20	15	220	1600
100.00	110.00	515697 CGRI	10	<5	55	<.50	<.008	200	15	7	220	1600
110.00	120.60	515698 CGRI	10	10	55	<.50	<.008	180	30	<5	220	1550
120.60	132.50	515699 CGRI	15	30	90	<.50	<.008	260	26	130	260	2100
132.50	142.50	515700 CGRI	40	20	100	<.50	<.008	280	28	60	270	1900
142.50	147.50	515701 CGRI	45	60	105	<.50	.009	320	47	90	240	2450
147.50	149.70	515702 CGRI	10	10	60	<.50	<.008	300	18	<5	230	2150
149.70	150.90	515703 CGRI	45	45	330	<.50	<.008	240	35	110	190	2400
150.90	161.20	515704 CGRI	10	25	170	<.50	<.008	230	22	9	170	1850
161.20	171.90	515705 CGRI	110	55	190	<.50	<.008	290	28	65	240	2350
171.90	181.90	515706 CGRI	65	25	70	<.50	<.008	320	35	95	250	2450
181.90	187.70	515707 CGRI	40	20	70	<.50	<.008	310	19	85	280	2200
187.70	197.10	515708 CGRI	40	50	105	<.50	<.008	250	18	45	250	1700
197.10	201.50	515709 CGRI	35	20	85	<.50	<.008	230	16	80	210	1800
201.50	211.50	515710 CGRI	20	20	100	<.50	<.008	230	14	45	200	1750
211.50	220.90	515711 CGRI	10	15	30	<.50	<.008	230	24	35	190	2050
220.90	231.00	515712 CGRI	25	15	55	<.50	<.008	330	14	10	150	2000
231.00	241.00	515713 CGRI	15	10	30	<.50	<.008	360	4	10	160	1900
241.00	251.00	515714 CGRI	15	15	30	<.50	<.008	270	5	30	160	1800
251.00	261.00	515715 CGRI	15	20	45	<.50	<.008	320	3	10	160	1850
261.00	271.00	515716 CGRI	40	20	40	<.50	<.008	190	8	35	190	2150
271.00	279.70	515717 CGRI	25	15	35	<.50	<.008	200	6	30	210	2350
279.70	285.00	515718 CGRI	15	15	40	<.50	<.008	190	11	55	250	2900
285.00	290.55	515719 CGRI	30	15	50	<.50	<.008	190	9	60	300	3050
290.55	296.80	515721 CGRI	20	20	60	<.50	<.008	210	10	80	280	3100
296.80	302.15	515722 CGRI	15	15	35	<.50	<.008	200	11	40	220	2050
302.15	313.90	515723 CGRI	15	30	110	<.50	<.008	270	14	35	180	1950
313.90	323.90	515724 CGRI	15	15	65	<.50	<.008	260	10	70	240	2250
323.90	333.85	515725 CGRI	20	15	55	<.50	<.008	230	7	85	300	2750
333.85	343.45	515726 CGRI	85	75	145	<.50	<.008	270	39	85	160	2950
343.45	350.10	515727 CGRI	90	50	115	<.50	<.008	240	31	130	130	2950
350.10	355.80	515728 CGRI	25	10	80	<.50	<.008	320	3	15	160	1900
355.80	365.30	515729 CGRI	50	45	205	<.50	<.008	310	22	65	180	2950
365.30	373.45	515730 CGRI	35	100	200	<.50	.013	320	14	25	270	2950
373.45	379.00	515731 CGRI	35	40	120	<.50	<.008	350	6	20	290	3000
379.00	387.00	515732 CGRI	70	50	205	<.50	<.008	360	13	20	240	2950
387.00	397.00	515733 CGRI	40	50	240	1.00	<.008	270	11	10	310	2900
397.00	407.00	515735 CGRI	30	35	140	1.00	<.008	280	10	30	310	2800
407.00	417.00	515736 CGRI	35	20	85	1.00	<.008	240	10	20	300	2650
417.00	427.00	515737 CGRI	15	5	75	<.50	.011	220	5	6	320	2350
427.00	437.00	515738 CGRI	10	20	60	<.50	<.008	240	4	<5	300	2350
437.00	447.00	515739 CGRI	20	15	65	<.50	<.008	220	4	5	310	2300
447.00	459.50	515740 CGRI	20	15	70	<.50	<.008	210	6	75	290	2400
459.50	465.90	515741 CGRI	30	45	180	<.50	.012	230	12	<5	230	3050
465.90	470.60	515742 CGRI	40	55	210	<.50	<.008	220	17	25	210	1850
470.60	488.80	515743 CGRI	30	10	100	.50	<.008	180	6	8	230	1400

Aberfoyle Resources Limited  
EXPLORATION DIVISION

DIAMOND DRILL LOG

PROJECT : Machintash

PROSPECT : North Halffield

HOLE NO : MA-16 (VLM-1)  
PAGE : 1 of 12  
LOGGED : ARH  
DATE : 6-6-89

DEPTH	DRILL RUND CORE LOGS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
		ROCK NAME	DESCRIPTION								
0-2	87%	Tertiary Basalt	red-brown vesicular Basalt lava. One massive. Brown-green, possibly feldspar-phric intercal. is. 4.4-7.3m.					Ch 1-4			
2-6	50%										
6-8	33	Tertiary Sediments	fine grained grey-green to red siltstone.								
8-10	68%	Dacite lava/interflow	Strongly weathered to 40cm. green feldspar-phric (sericite altered) massive to brecciated lava or intrusive. Breccia zones have sericite & chlorite rich matrix. breccia not angular fragments (not veins) have the coatings.	Pat Hst (12)			10.6 fault pug	CH2 12.3			
10-16	46%		grey-green massive cryptic dacite lava	15.6			12.6 fault - Mg-ph led.				
16-22	21%		light green feldspar-phric (sericite altered) breccia lava. Major zones of brecciation ca 19.7-	Pat 10.6 Red Hst (1)	Col + some other fracture rh coated.		18.8 fault - breccia zone looked to core zone. 20.0 fault - 20" to ca. broken core 23.1 fault.				
22-24							20.7 fault - 15" to ca.				
24-26							22.7 fault - 10" - pug 2 This from faulting. to 50" to ca.				
26-28							24.6 fault.				
28-30							26.4 fault.				
30-32							28.8 fault - broken core & pug.				
32-34											
34-36											
36-38											
38-40											
40-42											

037064

Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

PROJECT : Almaden  
PROSPECT : NW Half

HOLE NO : Mac 10 (V244-2)  
PAGE : 2 of 2  
LOGGED : RAJ  
DATE : 6-6-89

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY:		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
			ROCK NAME	DESCRIPTION								
4			Dacite brecciated			Cl (1) Co (1)	NO MIN.					
6												
8												
10												
12												
14												
16												
18												
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100												

037065



Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

PROJECT : Blackwater

PROSPECT : North Matfield

HOLE NO: 170224 (170224-1)  
PAGE: 4 of 11  
LOGGED: RAM  
DATE: 06-09

DEPTH	DRILL RUNS CORE LOBB	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
		ROCK NAME	DESCRIPTION								
0-10			interbedded shale and sandstone. Some sandstone bed contains shale fragments.								
10-15			105-120 green-grey ash volcanoclastic interbed.		Py(1), Co+Py(1-2)						
15-17			-Altopt Contact		-107-108 Co+Py(1-2)						
17-21		105-115 Some dark volcanoclastic ?Dacite	fine grained grey matrix basaltic breccia yellowish-brown calcareous fragments and (iron colored carbonate?) nodules. minor shale interbeds. from 109-112: have green-pink matrix.								
21-27		117-119 interbedded shale sandstone and shale	shale to fine to laminated shale and light grey, silty shale interbedded with fine grained sandstone (micaceous). Shales in part with shaly or disrupted bedding.		Co(1-2), Py(1-2)						
27-30			109-112 green-grey ash volcanoclastic								
30-35		117-119 Basaltic lava	109-112 interbedded volcanoclastic with yellowish brown matrix. grey.		109-112 Co(1) Py(1-2) Py(1) Co+Py(1-2) 109-112 100-100% of Py(1) Via on Galena: Co+Py(1-2)					109-112 ash. 109-112 fine ash to coarse 109-112 fine ash to coarse Contacts: 67' bed. faulted	
35-40		119-121 Sandstone and shale	grey-brown massive lava with matrix altered higher up. Minor white clay alteration. Minor brownish soil. Contact: none.	Si(1) Ss(1-2)	Co(1-2), C(1-1)					Altopt unconformable Contact 109-112 fault 55' to 60' S.W. dip	
40-45		119-121 Basaltic lava	dominantly grey-brown shale, minor sandstone and ash volcanoclastic interbeds.		Co(1-2), Py(2)					110-112-100-112 fault zone	
45-50			greenish brown matrix to weakly laminated lava. coarse. Sericitized feldspar phenocrysts.	Si(1-2) (C(1))	Co(1-1)						
50-55			100-105 light green-grey dehydrated zone								
55-60			100-105 Sandstone and shale		100-105 Co(1) 100-105 Co(1-2)						
60-65			interbedded fine grained light grey sandstone and black-grey shale. Laminated. Zones of shaly bedding. To 106-107-108 green-grey coarse volcanoclastic. 2 shale beds.		Co(1-2) Co(1-2), Py(1-1), Co+Py(1-2)						
65-70			106-107-108 yellowish-brown coarse volcanoclastic 2 shale beds.								
70-75			108-105 yellowish-brown sandstone with 2 shale chert 50' thick.								

159.7 Petrology 515071

161.45 Core Orientation  
Radial angle = 25°  
CR. inclination = 67°  
S. = 40° to 051°

037067

Aberfoyle Resources Limited  
EXPLORATION DIVISION

# DIAMOND DRILL LOG

PROJECT : Maclean

PROSPECT : North Half

HOLE NO: MAC 24 (VLM-1)

PAGE: 5 of 11

LOGGED: AMW

DATE: 6-6-79

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH	
			ROCK NAME	DESCRIPTION									
110			Interbedded sandstone and slate	as above		Co(1-2) - py(1-2) Co(1-1) - py(1) fault associated							
110-111				110-111-112 central volcanics, felsic, phyll							1710 Petrology SIS672		
111				111-112 1cm of scoria, chromite clasts in sandstone		111-112 Co + iron vein		111-112 bedding = 75° to ca.					
112				112-113 light pink-grey and volcanics with pyroclastic material				112-113 fault = 10° to ca.					
113				113-114 coarse matrix breccia - associated with faulting				113-114 bedding = 10° to ca.					
114				114-115 decomposed and volcanics made up fine black extruded volcanics		114-115 Co + Fe + 10-15% py		114-115 fault = 50° to ca.					
115				115-116 breccia of black shale fragments in a fine light volcanics with dark brown matrix - also a 115-116		Co(1-2) py(1-2)		115-116 bedding = 65° to ca.					
116				116-117 grey bedded with volcanics - fine grained matrix, sandstone		py(1)		116-117 fault = 55° to ca.					
117				117-118 grey fine grained matrix, felsic phyll with scattered black shale fragments. Breccia (pyroclastic) matrix common below 117-118 - common with cream carbonate in fragment - ca line?				117-118 bedding = 75° to ca.					
118				Volcanic				118-119 bedding = 60° to ca.					
119				119-120 interbedded slate and sandstone		119-120 Co(1-2) py(1-2)		119-120 bedding = 70° to ca.					
120				120-121 1cm of volcanics				120-121 bedding = 65° to ca.					
121				121-122 1cm of volcanics				121-122 bedding = 55° to ca.					
122				122-123 1cm of volcanics				122-123 bedding = 75° to ca.					
123				123-124 1cm of volcanics				123-124 bedding = 60° to ca.					
124				124-125 1cm of volcanics				124-125 bedding = 70° to ca.					
125				125-126 1cm of volcanics				125-126 bedding = 25° to ca.					
126				126-127 1cm of volcanics				126-127 bedding = 25° to ca.					
127				127-128 1cm of volcanics				127-128 bedding = 20° to ca.					
128				128-129 1cm of volcanics				128-129 bedding = 65° to ca.					
129				129-130 1cm of volcanics				129-130 bedding = 70° to ca.					
130				130-131 1cm of volcanics				130-131 bedding = 25° to ca.					
131				131-132 1cm of volcanics				131-132 bedding = 25° to ca.					
132				132-133 1cm of volcanics				132-133 bedding = 20° to ca.					
133				133-134 1cm of volcanics				133-134 bedding = 10° to ca.					
134				134-135 1cm of volcanics				134-135 bedding = 10° to ca.					
135				135-136 1cm of volcanics				135-136 bedding = 50° to ca.					
136				136-137 1cm of volcanics				136-137 bedding = 65° to ca.					
137				137-138 1cm of volcanics				137-138 bedding = 65° to ca.					
138				138-139 1cm of volcanics				138-139 bedding = 65° to ca.					
139				139-140 1cm of volcanics				139-140 bedding = 65° to ca.					
140				140-141 1cm of volcanics				140-141 bedding = 65° to ca.					

037068

Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

PROJECT : Mackintosh  
PROSPECT : North Hatfield

HOLE NO : Mac 24 (V.L.H.V.-D)  
PAGE : 6 of 12  
LOGGED : AMCN  
DATE : 11.1.89

DEPTH	DIAM. RUNS	SCORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
			ROCK NAME	DESCRIPTION								
0			volcaniclastic	green-grey matrix developed with volcaniclastic		Co(C1)						
0.2						Co(C1)						
0.4						Co(C1)						
0.6												
0.8												
1.0												
1.2												
1.4												
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037069



Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

PROJECT : Mackintoh  
PROSPECT : Black Henry - North Hillfield

HOLE NO: MAC-19 (V49-1)  
PAGE: 8 of 12  
LOGGED: ARM  
DATE: -6-89

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
			ROCK NAME	DESCRIPTION								
296			alt volcanolithic	grey-green alt volcanolithic & minor shaly fragments		Co(c1)						
298				28% grey patchily dehydrated alt volcanolithic. Some large rounded dehydrated textures.								
300				302.3 1.5m dia round pyrite clast?								
302			302-2 Dacitic lava	green-brown porous dacitic lava & irregular chlorite stained & carbonate lined vesicles.	302.6 Se(1-2)	Co(c1-c2) Co(py-c1) -2m Qtz(c1-c2)	Py(c1) disc. Py(c1-c2) disc.				Abrupt, slightly irregular Contact at 297 to 298.  Contact = faults at 297 and 307 to 308.	
304				- see More vesicular.		308 1 fine black pyrite, va. (c1) 309.5 dr py in coarse m.						
310			307-75 alt volcanolithic	strongly dehydrated adjacent to Contact. grey alt volcanolithic with shaly partings and scattered shaly clasts. large to 15m dia grey dehydrated spherules. from 314.5-316.5 a medium-grained volcanolithic & shaly and dacitic lava clasts.	Se(1-2)	Qtz(c1-2)	Py disc (c1-2) Py pat (c1)				Abrupt Contact - surface. 314.5 bedding = 60° to CA.	
312				- see weathered sensitive yellowish-brown extensive fragments. rather appear to be carbon slightly.								
314												
316												
318												
320												
322												
324												
326												
328												
330												
332												
334			332-9 Shale	332.95 332.95 low of breccia with coarse matrix. laminated black-grey shale & pyritic beds (4cm thick) and very minor fine-grained volcanolithic interbeds.		Co(c1-2)	332.9 75m (1-2) Py pat (c1-2)				332.95 = 70° to CA. 332.95 = 65° to CA conformable Contact = 55° to CA.	

037071

Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

PROJECT : Mackintosh  
PROSPECT : North Hatfield

HOLE NO : APC 14 (V100-1)  
PAGE : 9 of 12  
LOGGED : AMW  
DATE : 6-89

DEPTH	BREL RUNS CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
		ROCK NAME	DESCRIPTION								
54		Shale	laminated grey-black shale, with minor ash volcanic interbeds.		Co (1-1); Py (1)	Py pat (1-2).					
100											
140											
160											
170		170-1 Dacitic lava	green to orange, identified dacite lava, feldspar, oligo- felspar altered to Sericite or celadon	170-1 Se (1) on contact	Co (2) Py (1) Co (1)	Py pat (2)	170-1 bedding = 85° to CA.				
200											
250		250-9 Shale	dark argillite contact laminated black-grey shale	250-9 Se (1) on contact	Co (1) : Py (1)	Py pat (2-3) Py pat (1)	250-9 bedding = 87° to CA.				
300											
340											
360											
380											
400											
420											
440											
460											
480		480-1 volcaniclastic	grey-green, weakly laminated ash volcan. tuff, 2 mm interbedded shale (eg 480-2, 480-3). Scattered and disruption between laminae often shaly and unbedded 2 millie sand conk.	480-1 Se (1) on contact			480-1 bedding = 87° to CA.				
520											
540											
560											
580											
600											
620											
640											
660											
680											
700											
720											
740											
760											
780											
800											
820											
840											
860											
880											
900											
920											
940											
960											
980											
1000											

037072

Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

PROJECT : Mackintosh

PROSPECT : North Halfed

HOLE NO : MHL 14 (2484-1)  
PAGE : 10 of 11  
LOGGED : AND  
DATE : 7/97

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH	
			ROCK NAME	DESCRIPTION									
			Old volcanic clastic										
310			Polynat coarse lapilli volcanoclastic	Medium to coarse grained clasts (> 25mm dia) of laminated tuff, ash volcanoclastic, dark blue, grey. Contains rich siliceous and "fisher-phosphate" type in a fine lapilli matrix. Clasts generally angular.		Q*HCL(L)	310-1 dia py (L-L)						
321.9			ash volcanoclastic	grey-green weathery laminated ash volcanoclastic									
360.9			Polynat volcanoclastic ash volcanoclastic	green fine lapilli volcanoclastic ash to coarse ash volcanoclastic (370.1-382.9m) dominantly grey-green weathery laminated ash volcanoclastic with minor shale fragments from the interior of fine lapilli volcanoclastic (by 371.5m). Fine ash fragments interbedded but not as much as seen with Q*H.		Q*CO (L) Q*(L) : Co (L) : Co (H) (L)		382 bedding = 60° to ca.					
397.9						Q*(Co (L))		397.5 fault = 50° to ca. 398.0 fault = 60° to ca. 398.5 bedding = 90° to ca.					
402.7						Q*(Co (L)) 1/2 Q*(Co (H) (L))		398.5 bedding = 65° to ca. 398.9 fault = 45° to ca.					
402.7								402.7 fault and/or flow structure => facing up hole 402.7 fault = 75° to ca.  Considerable micro faulting					
404.6						Q*(Co (L))		404.6 bedding = 37-50° to ca. 410.7 fault = 50° to ca.					
410													
414													
416													
418													
420													

397.9 Petrology SIS 676 &  
Re-numbered  
SIS 135

037073

Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

PROJECT : Macintyre

PROSPECT : North Halffield

HOLE NO : TRC-44 (VLM-1)  
PAGE : 11 of 12  
LOGGED : AMW  
DATE : 7/14

DEPTH	DRILL RINGS	CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
			ROCK NAME	DESCRIPTION								
426			wt. volcanic ash	as above.		Qtz veins						
430												
434												
438												
442												
446												
450												
454												
458												
462												
466												
470												
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-426 S petrology S15677 #  
Renumbered: S15116

-430.9 fault  
-431.2 fault

Pg pet (S)

Pg pet (S): dm pyrites  
1? massive pyrite clast?

-479.4 fault - broken core  
-479.7 bedding - 10% to CA.

Renumbered - S15157P  
-4102 S petrology S15677 #

037074

Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

PROJECT : Mackintosh  
PROSPECT : North Halfpenny

HOLE NO : MCH-11 (2014-1)  
PAGE : 11 of 12  
LOGGED : ARM  
DATE : 7-89

DEPTH	DRILL PIVOTS CORE LOGS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
		ROCK NAME	DESCRIPTION								
464		fine grained volcanics	Polymict medium to fine grained volcanics. Interbedded with grey chert of basic lava, dark volcanics, dark and green micritic fissures.								
466		4659 Shale	Dark grey shale		Q460 (1-2)	Py nod, with Zn long (1-2)	Contact - 87° to 6° CA				
468		4664 volcanics	grey and volcanics		Co (2)	466.9 py nod (1)	466.4 bedd. = 70° to CA				
470			Blue green and volcanics mostly laminated. Minor desiccation cracks and brittle spots.		Co (2)		471.7 fa. = 45° to CA 472.1 fault = 60°				
472					472.1 466.9 py nod in fault						
474											
476			grey-green weakly laminated and volcanics. Some zone of mineral to weakly polymerized (eg 466.5)		Q460 (1-2) mainly associated with zone of brecciation		475.6 bedding = 80° to CA 476.1 fault = 60° to CA 476.5 fault = 60° to CA				
478											
480		4838	EOH							474.8 Core orientation radial angle = 006 Core axis inclination = 52 ∴ So =	
482										480.5 Core Orientation radial angle = 385 Core axis inclination = 62 ∴ So =	

037075

**Aberfoyle Resources Limited**

Incorporated in Victoria

EXPLORATION DIVISION

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27 June, 1989

Mr. D. Cowans  
David Cowans & Associates Pty. Ltd.  
5 Mountford Avenue  
BRIDGEWATER S.A. 5155

Dear David,

Please find enclosed ten (10) samples for routine petrographic description. Sample numbers, depths and descriptions are attached.

This suite of samples is from DDH MAC 24 drilled by the Mines Department NW of Hellyer. Current geological interpretation suggests that this hole should intersect Central volcanic complex lithologies; however this has not happened to date. Could you please comment on the affinities of this suite, are they similar to upper rhyolitic sequence type lithologies (e.g. CMS 88/6/28 and 88/12/9) or do they correlate with units transitional from the QHV to underlying Central volcanic complex (e.g. CMS reports 87/2/14 and some samples from CMS 86/11/12).

In addition could you please prepare two thin sections of each sample and return these with off-cuts to our Burnie office as soon as possible.

Yours sincerely,

A. W. McNeill  
GEOLOGIST.

Attachment MAC 24

<u>Sample No:</u>	<u>Depth</u>	<u>Description</u>
515670	70.45m	Dacitic lava/intrusive
515671	158.7m	Dacitic lava/intrusive
515672	171.0m	Laminated siltstone and shale
515673	186.0m	Fine lapilli volcanoclastic
515674	200.25m	Coarse polymict lapilli volcanoclastic
515675	123.45m	Fine micaceous sandstone
515676	205.8m	Ash volcanoclastic
515677	217.45m	Ash volcanoclastic
515678	263.45m	Dacitic lava/intrusive
515679	286.95m	Fine grained volcanoclastic?

037078

**Aberfoyle Resources Limited**

Incorporated in Victoria

**EXPLORATION DIVISION**

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Telex: AA38646

4 August, 1989

Mr. D. Cowans  
David Cowans & Associates Pty. Ltd.  
5 Mountford Avenue  
BRIDGEWATER SOUTH AUST 5155

Dear David,

Please find enclosed three (3) samples for routine petrographic description. Sample numbers, depths and descriptions are attached.

These samples are a further group from DDH MAC 24. Could you please include descriptions of these in the report covering the previous batch of samples, despatched last month. As with this previous batch could you prepare two thin sections of each sample and return with off-cuts to our Burnie office as soon as possible.

Yours sincerely,



A. W. McNeill,  
GEOLOGIST.

DESCRIPTIONS IN  
OTHER REPORT

Attachment: DDH MAC 24

Sample No:	Depth	Description
S15135 <del>515676</del>	397.9	Shale
S15136 <del>515677</del>	426.5	Ash volcanoclastic
S15137 <del>515678</del>	462.5	Fine lapilli volcanoclastic

# David Cowan & Associates Pty. Ltd.

037080 MAC 24



## PETROLOGICAL & GEOLOGICAL SERVICES

5 MOUNTFORD AVENUE,  
BRIDGEWATER, S.A. 5155  
Telephone (08) 339 5560

Mr. A. W. McNeill,  
Geologist,  
Aberfoyle Resources Limited,  
Exploration Division,  
P.O. Box 952,  
BURNIE/ TAS. 7320

24th August, 1989.

### REPORT DCA 89/7/4.

YOUR REFERENCE: Letters dated 27/6/89 and  
4/8/89.

DATES RECEIVED: 28/7/89 and 9/8/89.

SAMPLE NO'S: 515670-515679 incl. and  
515676A-515678A incl.

SUBMITTED BY: A. W. McNeill.

WORK REQUESTED: Petrology.

A handwritten signature in black ink, appearing to read 'D Cowan'.

DAVID COWAN. M.Aus.I.M.M.

COPY TO:  
Mr. H. Skey,  
Exploration Manager,  
Aberfoyle Resources Ltd.,  
Exploration Division,  
123 Camberwell Road,  
HAWTHORN EAST/ VIC. 3123

REPORT DCA 89/7/4.

A total of thirteen samples of drill core from DDH/MAC-24 was received in two submissions (of ten, and subsequently three samples) for routine, petrological examination. All thirteen samples are incorporated into this report at the request of A.W. McNeill.

As the second group of three samples duplicated previously received sample numbers these samples were arbitrarily assigned the suffix-A to avoid confusion. As requested two representative thin sections were prepared from each sample. Sections are not strictly identical being prepared from separate offcuts, and the attached tabulated descriptions, summarising microscopic data, are, in a few cases, composites of the two sections examined.

SUMMARY.

As drilled and sampled the MAC-14 sequence comprises an altered felsic intermediate acid igneous "unit" (samples 515670, 515671) overlying a sequence of similarly altered sediments.

The "upper" unit exhibits leuco-andesitic/trend dacitic relict compositional characteristics and semi-chilled textural features. This unit is "amygdaloidal". Altered cavity fillings in sample 515670 were primarily quartzofeldspathic with textural features consistent with late magmatic/deuteric infilling of miarolytic vugs. On this basis, and generally homogeneous textures this unit is interpreted as a minor intrusive.

The underlying sediments comprise a sequence of mainly altered tuffaceous, or distal-ashy, pelitic to psammopelitic rocks with intercalated coarser grained clastic sediments. Compositional detail is partly obscured by alteration and mild shearing effects but pelitic rocks typically exhibit relict "vitroclastic" microtextures. Coarser grained units are generally polymict but variably acid volcanic-derived (similarly the pelites) and include a distinctly conglomeratic unit (sample 515674) in addition to mass flow or turbiditic-textured units.

Sediments in general exhibit "intrabasinally" reworked carbonaceous-pelitic material and coarser grained units may include basement-derived clasts of low grade regional metasediment. The latter clastic assemblage is then similar to that of polymict units representing "breaks" in the dominantly volcanic QHV. However, these rocks appear devoid of basic-intermediate volcanic debris and, more specifically, clastic (or detrital) chromite.

On these bases this sequence is considered as relatively "basal" and probably trending towards or flanked by a "rhyolitic" volcanic sequence.

The sequence, as a whole, is rather uniformly altered with a sericite/Fe-carbonate assemblage locally accompanied by chlorite and/or quartz and disseminations of pyrite.

Fe-carbonate is replacive in part, presumably after a Ca-carbonate (?dolomite) as clasts and diagenetic concentrations within the sediments.

A few rocks exhibit late, partly fracture-controlled, development of kaolin as a partial replacement of sericite.

DAVID COWAN. M.AUS.I.M.M.

SAMPLE NO.: 515670. (Section No. DCA 0093).

CLASSIFICATION: Amygdaloidal Felsite.

COMPOSITION: Frequent variably Fe-carbonate-stained sericite pseudomorphs (mean 500mu) after phenocrystal feldspar, minor similarly altered but leucoxenised opaque-stained phenocrystal ferromags. Disseminated amygdales (to 2mm) of quartz, sericite and cloudy microcrystalline sideritic carbonate. Altered groundmass of sericite and variably sericite-stained anhedral quartz (mean 100mu) with included sericitised feldspar microlites.

FABRIC: Strongly porphyritic, amygdaloidal, with evenly disseminated phenocrysts and amygdales in a felsitic ("snowflake-textured") groundmass.

ACCESSORIES: Conspicuous very fine, minor coarser leuco-xenised opaques, traces of extremely fine acicular apatite. Rare spherulitic-textured carbonate-stained sericite aggregates. Rare very fine pyrite.

COMMENTS: Amygdales are strictly altered quartzofeldspathic and on this basis reasonably interpreted as strictly miarolytic vugs and this rock as a semi-chilled minor intrusive. Apparent primary composition was leuco-andesitic/dacitic with detail obscured by pervasive sericite-quartz-carbonate alteration. This rock is essentially unstressed.

SAMPLE NO.: 515671. (Section No. DCA 0094).

CLASSIFICATION: Amygdaloidal "Leuco-Andesite".

COMPOSITION: Disseminated sericite (-carbonate) pseudomorphed feldspar phenocrysts (mean 350mu, to 1mm). Subordinate leucoxene-stained quartz-carbonate-sericite pseudomorphs (mean 250 to 500mu) after lathic phenocrystal ?amphibole. Sporadic/minor quartz-carbonate micro-amygdales (mean 250mu). Altered groundmass of sericite and sericite-stained microcrystalline quartz (30mu) with pervasive clots of cloudy carbonate and minor sericite-quartz pseudomorphed feldspar micro-laths (20mu).

FABRIC: Similar to 515670. Relatively porphyritic, weakly amygdaloidal and finer grained with a felsitic/incipiently snowflake-textured groundmass.

ACCESSORIES: Semi-conspicuous more or less evenly disseminated leucoxenised opaques, rare very fine apatite. Thinly disseminated fine to ultra-fine pyrite partly concentrated in the altered ferromag. phenocrysts. Minor late discontinuous kaolin veinlets.

COMMENTS: Close compositional affinities with 515670 and similarly altered but relatively pyritic. In comparison this rock is finer grained and relatively lava-like but may represent a relatively chilled minor intrusive. Exhibits relatively abundant altered phenocrystal amphibole consistent with leuco-andesitic rather than strictly dacitic primary composition.

SAMPLE NO.: 515672. (Section No. DCA 0095).

CLASSIFICATION: Carbonaceous "Dolomitic" Pelite.

COMPOSITION: Semi-sericitic and abundant fine silt sized relict detrital muscovite with subordinate to minor silt-sized splintery to subangular detrital quartz. Semi-pervasive carbonaceous matter. More or less pervasive fine grained and coarser semi-lustre-mottled patches of Fe-carbonate, concentrated in sporadic (quartzose, micaceous) silty, semi-massive interbands (mesoscopically pale grey).

FABRIC: Intricately banded on a micro- to submillimetric scale with laminated micaceous silty shale units, sporadic relatively carbonaceous shaly and silty "dolomitic" partings/interbeds. Some relatively quartzose silty shale units are weakly graded, as are similarly the silty "dolomite" units. Very incipient concordant slaty cleavage with minor microscale high angle discordant carbonaceous microfractures.

ACCESSORIES: Rare recrystallised simple radiolaria and ?sponge spicules. Semi-conspicuous very fine clastic leucoxenic semi-opaques, rare zircons and apatite. Minor traces of ultrafine "syngenetic" pyrite.

COMMENTS: A finely banded micaceous, quartzose silty shale with silty "dolomitic" interbeds. Strongly carbonaceous, very weakly pyritic and incipiently microfossiliferous. The carbonate is a ferroan ("sideritic") variety and is interpreted as replacive, presumably after dolomite. No tangible volcanically-derived or tuffaceous features.

SAMPLE NO.: 515673. (Section No. DCA 0096).

CLASSIFICATION: Polymict Breccia.

COMPOSITION: Clastic framework (50%) of sericitised/variably sideritic carbonate-impregnated, poorly determinate lithic clasts, splintery angular to sub-angular/minor rounded quartz grains and minor composites; frequent clastic muscovite flakes and aggregates of sideritic carbonate/altered dolomite(?) rock. Matrix of silt to fine sand sized muscovite flakes, sericitised shard fragments, minor quartz and carbonate grains. Microcrystalline sericite-stained kaolinitic cement.

FABRIC: Randomly sorted, weakly bedded gritty fine to coarse sandy clastic; silt-supported and clay-cemented.

ACCESSORIES: Carbonaceous pelite and low grade regional metapelitic clasts, minor metaquartzite clasts. Clastic leucoxene, minor zircons. Minor quartz-carbonate veinlets. Thinly disseminated pyrite.

COMMENTS: Exhibit slump- or "mass flow debris" sedimentary breccia characteristics. Strongly polymict with a variety of intrabasinal sedimentary and basement-derived metasedimentary components and a partly reworked tuffaceous (fragmented-shardy in part) clastic matrix. Finer detail obscured by marked clay-carbonate alteration but no definite primary pyroclastic components.

SAMPLE NO.: 515674. (Section No. DCA 0097).

CLASSIFICATION: Polymict Breccia.

COMPOSITION: Framework (75-80%) of quartz-sericite altered and variably carbonate-impregnated felsitic-devitrified acid (dacitic-rhyolitic) lava clasts, subordinate clasts of chert/impure (sericitic, sideritised-dolomitic(?) chert; minor quartz grains and carbonaceous pelite clasts. Cement of semi-sericitic white mica with a little sericite stained quartz and sporadic clots of sideritic carbonate.

FABRIC: Essentially lithoclastic grit/coarse sand-matrixed/sericite-cemented conglomeratic. Subangular to subround poorly sorted pebbly framework dominated by acid lava clasts.

ACCESSORIES: Altered lithoclast-hosted leucoxenised opaques. Thinly/semi-pervasively disseminated fine to ultrafine pyrite. Minor chlorite-selvedged quartz-carbonate veinlets. Rare coarse detrital muscovite.

COMMENTS: A dominantly acid volcanomict but strictly polymict sedimentary breccia, distinctly conglomeratic in comparison with 515673, relatively sericite-quartz altered, carbonate-deficient and relatively pyritic. Additionally apart from very minor coarse detrital muscovite flakes this rock is devoid of metasedimentary components.

SAMPLE NO.: 515675. (Section No. DCA 0098).

CLASSIFICATION: Altered Dolomitic Tuffaceous(?) Siltstone.

COMPOSITION: Aggregates of semi- to sericitic white mica with subordinate/variable proportions of silt sized splintery to subangular quartz and disseminated to conspicuous silt sized relict detrital muscovite flakes. Semi-pervasive spongy clots (mean 100mu) of cloudy sideritic carbonate, concentrated in relatively quartzose-micaceous silty bands (to 5mm wide). Semi-pervasive carbonaceous matter, partly as clastic silt-sized aggregates.

FABRIC: Planar- to lenticularly banded on a sub- to millimetric scale with minor incipient grading, scour and fill, and flaser microtextures. Essentially unsheared. Vaguely pseudomorphous sericite aggregates apparently replacive after splintery to subangular felsic (?feldspathic) debris. Rare late calcite veinlets.

ACCESSORIES: Semi-conspicuous fine silt sized clastic leuc-oxenic semi-opaques, rare zircons. Minor traces of pyrite.

COMMENTS: Primarily a semi-labile siltstone with clastic quartz and muscovite subordinate to feldspathic and/or ashy debris now obscured by sericitic alteration. Sideritic carbonate interpreted as secondary after dolomite. This rock is tentatively considered as primarily a composite of distal ashy, detrital, and reworked "intra-basinal" carbonaceous pelitic components.

SAMPLE NO.:            515676.            (Section No. DCA 0099).

CLASSIFICATION:    Altered Tuffaceous(?) Siltstone.

COMPOSITION:        Aggregates of semi- to sericitic white mica with thinly/pervasively disseminated silt-sized relict detrital muscovite flakes, carbonaceous pelite clasts and splintery to subangular quartz grains. More or less pervasively disseminated spongy clots (mean 200mu) of cloudy Fe-carbonate. Irregular networks of variably continuous carbonate veinlets. Semi-pervasive late displacive carbonaceous microfractures.

FABRIC:                Essentially similar to 515675; similarly but relatively flaser-microtextured and relatively massive/poorly banded. Mildly displacive carbonate veinlets, variably crenulated to mildly segmented by late carbonaceous microfractures.

ACCESSORIES:        Conspicuous fine silt sized clastic leucoxenic semi-opaques, minor zircons, rare apatite. Rare spongy clots of pyrite in Fe-carbonate veinlets. Rare recrystallised radiolaria(?).

COMMENTS:            Close affinities with 515675 and similarly interpreted as sericite-carbonate altered tuffaceous on microtextural grounds. Vague relict distal vitroclastic ashy type microstructures largely obscured by sericitisation and mild heterogeneous shearing/deformational effects.

SAMPLE NO.: 515677. (Section No. DCA 0100).

CLASSIFICATION: Altered Tuffaceous Pelite.

COMPOSITION: Aggregates of semi- to sericitic white mica weakly stained with ultrafine leucoxenic material partly concentrated into lensoid clots (mean 200mu diameter). Thinly disseminated silt sized clastic muscovite flakes, relatively minor quartz grains and carbonaceous pelite clasts. Sporadic spongy impregnations of sideritic carbonate (to 750mu diameter).

FABRIC: Massive to weakly banded and incipiently medium angle discordantly sheared. Exhibits essentially pervasive vague but diagnostic sericitic "ghosts" of fine silt sized vitroclastic debris.

ACCESSORIES: Fine silt sized clastic leucoxenic semi-opaques, rare zircons. Rare discontinuous microscale carbonate veinlets with minor traces of ultrafine grained galena(?).

COMMENTS: Affinities with 515675 and 515676. In comparison this rock is finer grained and exhibits relatively marked distal vitroclastic ashy characteristics. Essentially an impure pelitic ash with clastic/non-tuffaceous mica flakes and carbonaceous pelitic intraclasts. Pervasive sericitic alteration, with relatively minor associated Fe-carbonate, enhanced by incipient shearing effects.

SAMPLE NO.: 515678. (Section No. DCA 0101).

CLASSIFICATION: Altered Tuffaceous Pelite.

COMPOSITION: Aggregates of semi- to sericitic white mica with pervasively disseminated silt sized splintery to subangular quartz grains, subordinate carbonaceous pelite clasts and muscovite flakes. Semi-pervasive spongy clots/impregnations of sideritic carbonate with sporadic associated irregular discontinuous veinlets and minor intergrown chlorite.

FABRIC: Essentially massive (unbanded) silty clastic with sporadic carbonate (-chlorite-sericite) altered/poorly determinate sand sized lithoclasts. The sericitic matrix exhibits vague relict vitroclastic microtextures. Very incipiently sheared.

ACCESSORIES: Clastic leucoxenitic semi-opaques, rare zircons and sericitised biotite flakes. Late displacive veinlets of ankeritic carbonate with disseminated blebs of chalcopyrite. Rare disseminated very fine pyrite.

COMMENTS: A sericite-carbonate (-chlorite) altered, vitroclastic ashy, slightly sandy-lithoclastic siltstone with close affinities to 515675, 515676 and 515677. "Sideritised" lithoclasts were probably initially limey (?dolomitic) in part at least, with minor selectively sericitised "volcanic" types. Carbonaceous matter virtually entirely clastic in silt-sized aggregates as in the associated (altered) ashy pelites.

SAMPLE NO.:            515679.            (Section No. DCA 0102).

CLASSIFICATION:    Altered Dolomitic Tuffaceous Psammopelite.

COMPOSITION:       Framework (50%) of splintery to subangular silt to fine/minor medium sand-sized quartz grains and ankeritic carbonate lithoclasts with subordinate fine muscovite flakes and thinly disseminated clasts of carbonaceous shale. Microcrystalline sericite-stained kaolinitic matrix/cement with minor crypto- to microcrystalline quartz.

FABRIC:               Poorly sorted weakly bedded silty to medium sandy clastic with a very vaguely relict vitroclastic-microtextured argillised matrix. Very incipiently sheared.

ACCESSORIES:        Conspicuous fine clastic leucoxenic semi-opaques, minor zircons, traces of apatite. Minor discontinuous ankeritic carbonate veinlets. Minor late relatively continuous veinlets of microcrystalline kaolin and quartz.

COMMENTS:            This rock exhibits certain turbiditic characteristics partly obscured by argillic alteration with kaolin apparently developing as a late partial replacement of sericite. Similarities with 515675 etc. but distinctly quartzose, micaceous and (altered) dolomitic-lithoclastic in comparison. In contrast to the broadly compositionally similar 515673 there are no definite basement (i.e. metasediment) -derived components. The vaguely tuffaceous matrix is supplemented by minor sericitised volcanic lithoclasts and embayed/fragmented volcanic quartz grains.

S15135

SAMPLE NO.: 515676A. (Section No. DCA 0120).

CLASSIFICATION: "Cherty Argillite".

COMPOSITION: Aggregates of semi- to sericitic white mica and crypto- to microcrystalline sericite-stained quartz with conspicuous fine silt sized clastic white mica flakes. Pervasive microscopic films and lensoid clots of carbonaceous matter. Thinly disseminated rhombs (mean 25 $\mu$ ) of Fe- and minor relics of dolomitic carbonate.

FABRIC: Silty clastic and flaser-textured on a microscale with an incipient concordant slaty cleavage and sporadic late high angle discordant carbonaceous microfractures.

ACCESSORIES: Thinly disseminated silt to fine sand sized clastic quartz grains. Conspicuous fine silt sized clastic leucoxenic semi-opaques. Minor traces of ultrafine pyrite.

COMMENTS: Similarities with 515676 etc. and possibly similarly strictly a distal ashy silty pelite. Finer detail obscured by relatively fine grain-sizing and the poorly optically determinate sericitic quartz which may be primary, or alternatively, replacive.

515136

SAMPLE NO.:515677A.

(Section No. DCA 0121).

CLASSIFICATION:Altered Ashy Pelite.COMPOSITION:

Aggregates of semi- to sericitic white mica with thinly/pervasively disseminated silt-sized clastic quartz grains and muscovite flakes. More or less pervasively disseminated clots (mean 250mu) of sideritic carbonate, locally concentrated into lensoid semi-massive aggregates with minor associated discontinuous (Fe-) carbonate veinlets. Subordinate/variable proportions of cryptocrystalline quartz intergrown with sericite.

FABRIC:

Weakly planar to lenticularly laminated with interspersed lenses of relatively massive carbonate. Incipiently concordantly sheared. More or less pervasively silty clastic/vaguely relict vitroclastic.

ACCESSORIES:

Disseminated silt-sized clasts of carbonaceous matter/carbonaceous pelite. Fine silt sized clastic leucoxenic semi-opaques, extremely rare zircons. Rare very fine to ultrafine pyrite

COMMENTS:

Close affinities with the overlying distal ashy dolomitic, carbonaceous, pelitic sediments and similarly altered with a replacive Fe-carbonate/sericite assemblage. Relatively distinctly altered ashy-vitroclastic in comparison with 515676A although much finer detail is obscured by alteration and mild but penetrative shearing effects.

515137

SAMPLE NO.:515678A.

(Section No. DCA 0122).

CLASSIFICATION:Altered Reworked Rhyolitic "Xenotuff".COMPOSITION:

Aggregates of sericite and crypto- to micro-crystalline quartz with semi-pervasive clots and rhombs of sideritic carbonate. Minor clots of chlorite. Pervasively disseminated splintery to subangular/minor subround silt to fine-medium sand sized quartz grains. Minor sericite-stained clastic feldspar (oligoclase-albite) grains. Disseminated carbonaceous shale clasts.

FABRIC:

Poorly sorted silty fine to medium sandy clastic with "furbiditic" bedding structures. Strongly lithoclastic with sericite-carbonate altered/poorly determinate felsic lava and eutaxite-like clasts. Incipiently sheared.

ACCESSORIES:

Minor clasts of chert/impure chert and low grade regional metapelite. Clastic muscovite flakes, conspicuous clastic leucoxenic semi-opaques, rare zircons, extremely rare apatite.

COMMENTS:

A thoroughly altered turbidite-like sandy clastic facies dominated by altered rhyolitic debris which may be a composite of primary tuffaceous and reworked components. Xenolithic in carbonaceous pelitic, low grade regional metapelitic, chert clasts, and mica flakes. Affinities with for example 515679 but relatively tuffaceous; similarly altered.

# ANALABS

A Division of MacDonell Hamilton & Co. Pty. Ltd.  
 52 Murray Road, Welshpool, W.A. 6106  
 FAX: 041 38 8890

Phone (09) 458 7999

Telex AA92560

**ANALYTICAL REPORT No. 23.3.08.06307**

**THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA**

Aberfoyle Resources Exp. Division  
 P.O. Box 952  
 Burnie  
 Tasmania 7320

ORDER No	PROJECT
7880	
DATE RECEIVED	RESULTS REQUIRED
26/06/89	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
2	11/07/89	1	10

SAMPLE NUMBERS	PRE-TREATMENT							ANALYSIS		
	DRY	CRUSH	SPLIT	PUL-VERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	METHOD
515670/679	80	Prep: 006,010,011,012,013,016						Cu,Pb,Zn,Ag/101,As/114		
515670/679	80							Ba,Cr,Ir,Ti/401,Au/309		

RESULTS TO RESULTS TO

Aberfoyle Resources Exp. Division  
 P.O. Box 952  
 Burnie  
 Tasmania 7320

REMARKS  
 MAC-24  
 PET.  
 (10)

STATE OF SAMPLES	ANALYSIS — PREPARATION				ANALYSIS — METHOD		
WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS	
SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF	
CU	nitric acid	A3	other mixed acids	Ma	spectrophotometry	SPEC	
Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL	
SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR	
PU	HF mixture	A6	ignition	IG	titration	TTN	
WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemicals means	CHEM	
TI	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC	
SS					fluorescence	FLUOR	
HM					inductively coupled plasma	ICP	

AUTHORISED OFFICER





# ANALABS

A Division of Macdonald Fraser & Co. Pty Ltd.

## ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER NO.

PAGE

23.3.08.06307

11/07/89

7880

2 OF 2

SBE No.	SAMPLE No.	T1							
1	515670	1950							
2	515671	2150							
3	515672	3000							
4	515673	2450							
5	515674	2050							
6	515675	1850							
7	515676	2100							
8	515677	2000							
9	515678	2150							
10	515679	3050							
11									
12									
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# ANALABS

23.3.08706401

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 P.O. Box 952  
 Burnie  
 Tasmania 7320

B214

RESULTS REQUIRED

07/08/89

ASAP

No. OF PAGES OF RESULTS

DATE REPORTED

No. OF COPIES

TOTAL No. OF SAMPLES

2

16/08/89

1

3

PRE-TREATMENT

ANALYSIS

SAMPLE NUMBERS	PRE-TREATMENT							REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE			
515676/678	BC	Prep: 006,010,011,012,013,015						Cu,Pb,Zn,Ag/101,As/114		
515676/678	BC							Ba,Cr,Zr,Ti/401		
515676/678	BC							Au,AuChk/309		

REMARKS

RESULTS TO

Aberfoyle Resources Exp. Division  
 P.O. Box 952  
 Burnie  
 Tasmania 7320

RESULTS TO

STATE OF SAMPLES

ANALYSIS - PREPARATION

ANALYSIS - METHOD

core	WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS
ore	SC	hydrochloric acid	A2	specific sulphide	CS	x-ray fluorescence	XRF
ting	CU	nitric acid	A3	other mixed acids	MA	electrophoresis	SPEC
ck	ES	acid wash	A4	alkaline break	AA	colorimetry	COL
	SO	10% peroxide	A5	volatilization	VO	gas chromatography	CHR
	Y	hydrogen peroxide	A6	ion exchange	IC	ion chromatography	ITN
sue	W		A7	ion exchange	IE	ion chromatography	ICH
eam	W		A8	ion exchange	IG	ion chromatography	IMC
eam	W		A9	ion exchange	IG	ion chromatography	ELON
mining	W		A10	ion exchange	IG	ion chromatography	ICR

AUTHORISED OFFICER





APPENDIX VI

ABERFOYLE RESOURCES  
Exploration Division

INTERPRETATION REPORT

DHEM SURVEY

DDH MAC22, MAC23, MAC24, AND MAC25

MACKINTOSH EL 106/87

Prepared by:

J SILIC

Distribution

Hawthorn (1)  
Burnie (1)

Issued By:

  
J SILIC  
Chief Geophysicist

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Discussion of Results

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Fig 2	:	DHEM	Mac 23	Loop 1
2a	:	DHEM	Mac 23	Loop 2
Fig 3	:	DHEM	Mac 24	Loop 1
3a	:	DHEM	Mac 24	Loop 2
Fig 4	:	DHEM	Mac 25	Loop 1
4a	:	DHEM	Mac 25	Loop 1
4b	:	DHEM	Mac 25	Loop 1
4c	:	DHEM	Mac 25	Loop 2
4d	:	DHEM	Mac 25	Loop 2
4e	:	DHEM	Mac 25	Loop 2

## Introduction

Electromagnetic techniques have played an important role in the discoveries of the Que River and Hellyer deposits (Webster and Skey, 1979; Silic et al, 1985; Eadie et al, 1985). Since the Hellyer discovery, downhole EM techniques (DHEM, Silic and Eadie, 1989, Appendix I) have been an important part of the exploration strategy in the volcanic sequence hosting the above deposits because of the failure of blanket Em surveys to locate further targets worthy of follow up and because no other method can accurately target drill holes at depths beyond the surface Em detection limits.

The purpose of this report is to discuss and present the results from DHEM surveys in DDH MAC 22, 23, 24, and 25 on the Mackintosh EL 106/87.

## Survey Specifications

All loops were designed so that their primary magnetic field would couple with targets at specified target horizons. Possible variations in dips of the targets from the predicted dips (based on the geological knowledge) was also taken into account, as was the detection limitations of the DHEM surveys, the parameters of which are known from in-house research studies (Silic and Eadie 1989).

## Discussion of Results

Only responses from host volcanics are evident in the data (Appendix II). The data quality however is good enough for a target of approximately 2 mt to have detected if it was within 150 metres from the holes.

## Conclusion

No targets worthy of follow up have been detected by the DHEM surveys in DDH MAC 22, 23, 24, and 25.

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Eadie, E T., Silic, J. and Jack, D J (1985), 'The application of geophysics to the discovery of the Hellyer ore deposit, Tasmania', *Explor. Geophys.* 16, 207-209.

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Silic J., Eadie E T., (1989), DHEM: The Que Hellyer Volcanics Experience, *Explor. Geophys.* 720.

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Appendix I

DHEM: THE QUE-HELLYER VOLCANICS EXPERIENCE

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123 Camberwell Road  
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Keywords

downhole electromagnetics, Que River, Hellyer, volcanics

Short title

Que Hellyer DHEM

Contact either author at (03) 882 2226 or fax (03) 813 1086

Abstract

The intermediate volcanic sequence hosting the Que River and Hellyer mines provides an excellent environment for electromagnetics in that the only two strong conductors ever found in them have been developed into mines. Now that the ground has been thoroughly explored by surface EM and the search is by necessity becoming deeper, downhole EM has become an extremely important aspect of the exploration programme. However, even in this ideal environment for EM, there are factors that cause interpretation headaches, although all can be overcome with care and experience. These problems include the overlying moderately conductive black shales, instrumentation responses from the Sirotem unit, responses from culture, and the effect of strong conductors such as the known ore bodies close to the target.

## Introduction

Electromagnetic techniques have played an important role in the discoveries of the Que River and Hellyer deposits (Webster and Skey, 1979; Silic et al, 1985; Eadie et al, 1985). Since the Hellyer discovery, downhole EM techniques (DHEM) have become an important part of the exploration strategy in the volcanic sequence hosting the above ore bodies (referred to in this paper as the Que-Hellyer volcanics) because of the failure of blanket surface EM surveys to locate further targets worthy of follow up and because no other method can accurately target drillholes at depths beyond the surface EM detection limits. Some forty exploration drillholes have been logged with EM since the Hellyer discovery. Recently drillhole patterns have been designed and are being drilled to be used as geophysical platforms for potential targets at depths beyond the detection capabilities of the surface systems.

This paper discusses our experience with DHEM techniques in the Que-Hellyer volcanics by illustrating the power of the method and also some of the problems encountered.

## The EM environment of the Que Hellyer volcanics

The Que-Hellyer volcanics are known to be relatively resistive with a bulk value of about 500 ohm-metres (Webster and Skey, 1979). The overlying Que River Shales are slightly more conductive, although variable, with resistivities as low as 100 ohm-metres. Conductive weathering is not a problem in this environment, and there are not many other spurious conductors. In fact the only two first-priority surface EM conductors followed up in the Que-Hellyer volcanics are the two ore bodies, Que River and Hellyer. However, given the relatively short time constants associated with parts of these deposits (Silic et al, 1985; Eadie et al, 1985; Staltari, 1986) there have been two candidates identified as having the potential to overshadow an EM response from an ore body: the shales that overlie the Que-Hellyer volcanics and the Sirotem instrumentation response.

DHEM through the overlying shale horizon

The UTEM anomaly shown in Figure 1 is one of the few surface responses in the area that is comparable in strength to the Hellyer UTEM discovery anomaly and the Que River response, with the anomaly lasting beyond 1 ms. An experienced interpreter, using for example the second derivative technique of Silic (1989), would recognise that the sudden changes in slope of the profile mark the edge of a conductive unit, in this case the Que River shale horizon beneath a dolerite sill. This was understood prior to drilling, and a hole was designed not to test the conductor, but rather a prospective horizon some hundreds of metres below the surface. Unlike the surface data which superficially resembles the Hellyer results, the DHEM data (Figure 1) do not at all replicate the DHEM results at Hellyer where a time constant of 3-4 ms is evident (Eadie, 1987). Instead the response can be interpreted to be from a large body with a moderately low resistivity (the shales), and would not be confused with a good inductive ore body response.

Sirotem instrumentation response

A number of responses occur with elevated signal levels which are impossible to reconcile with the resistivities of the Que-Hellyer volcanics. The shape of the response and the signal levels vary significantly with the transmitter loop position. Similar effects have been observed by other companies working in relatively resistive terrains (Irvine, 1986). An example of this effect is shown in Figure 2, where the Sirotem response at 2.05 ms is shown for three loops. Although only the data at 2.05 ms is shown here, the responses at other times have identical shapes with amplitudes decreasing monotonically with time. In this case the signal levels are much higher than the expected signal from the volcanics, which should produce 0.1-0.2 uV/A at this delay time for this set up. The shape of the profile and signal levels vary considerably from loop to loop, with the secondary field being practically zero for Loop 1. The response correlates very closely with the axial component of the primary magnetic field

produced by each transmitter loop (Figure 2), as was confirmed by inverting the data using simple current filament models (eg Fullagar, 1987). This response is presently referred to as the "probe self response", although without further investigations we cannot be absolutely certain whether this is the case.

Nevertheless, we have made the observation that in resistive terrains when the loop is close to the drillhole and the primary field is therefore expected to be large, these "probe self responses" have invariably been noted. To ensure that no target responses are overshadowed, it is good practice to keep the loop as far away from the drill hole as is possible.

#### Locating targets in electromagnetically active areas

One of the important exploration problems in the Que-Hellyer volcanics is to locate targets in the immediate vicinity of the existing deposits. In these cases the responses from the existing deposits and the associated culture invariably contribute to the DHEM data. Thus, the problem posed in these situations is to understand the effects from the known ore bodies and culture so that these responses may be separated from those of the other targets. Two examples, one a discovery near the Hellyer deposit and the other an attractive target about to be drilled near the Que River mine will be used to show some of the problems and solutions.

Figure 3 shows the SiroteM response at 3.4 ms in two drill holes on a section about 100 m north of the northern limits of the Hellyer ore body. The problem is to determine if the total response can be explained by the nearby orebody or if there is an unknown conductor influencing the results. Data from both drillholes show similar amplitude variations from loop to loop which are for the most part explainable by the Hellyer orebody, but in drillhole HL045, there is a consistent migration of crossovers from Loop 1 to 4, with a corresponding reduction in the width of the anomalies. It was this observation that suggested that a target conductor may lie close to this hole and therefore northeast of the known orebody. In particular, loops 3 and 4, which couple relatively well with a hypothesised flat-

lying conductor north east of Hellyer and poorly with Hellyer itself, generate current flow within about 50-70 m of HL045. The intersection of 1.9 m of conductive base metal sulphides in HL069A gives geological support to the hypothetical conductor.

Another example of this type occurred during a drilling programme at Que River. Two deep holes were drilled 400 m apart beneath the mine. This pattern was based on the size and conductivity parameters of the target and the detectability limitations of DHEM. Both holes were surveyed using Sirotem with a late time broad negative trough detected in one of the holes, QR1060A (Figure 4), centred at 975 m down the hole. This trough is at least 700 m wide at 4.8 ms with a half-width greater than 500 m (half-width is defined as the width of the anomaly at half of its peak amplitude). Two questions arose regarding this response. The first question was whether or not the response was due to the Que River massive sulphides or culture associated with the mine, 500 metres above the hole. This possibility was ruled out because no late time anomaly was observed in the other hole, QR1001, which was the same distance from the deposit. The second question involved the change in anomaly sign at approximately 2 ms. To better understand the response, both holes were resurveyed with EM-37, and data was obtained from additional surface loops. Selected time channels from two of the loops are shown in Figure 5.

The early time capability and close channel sampling of the EM-37 system enable a thorough interpretation. In the loop 2 data, a strong broad cultural response can be seen clearly at early times shallow in the hole. In fact this cultural effect which decreases slowly down the hole imprints a large long wavelength background response on the data to late delay times even at depth. It is this background response that gives the apparently large half-width in both the EM-37 and Sirotem loop 2 data. Therefore loop 7 data, which has no cultural contamination is used for the interpretation. The signs of the responses are inverted for the loop 7 data because the loop position is on the opposite side of the conductor.

The major effect to be explained is the transition from a broad

negative, centred at 975 m depth to a broad positive late in time. A similar effect has been noted by Asten et al, (1987) and ascribed to drive delay. However in rocks as resistive as these, this effect can be calculated (Silic, 1987) to die out by 0.1 ms. Another possibility is a change in the magnetic field from being current channelling dominated to vortex flow dominated as documented and reported as a possible effect at Thalanga (Irvine, 1987). This appears to explain the response very well in that from our experience in these volcanics, strong current channelling effects generally last to about 2 ms. In addition, at the changeover time, which in this case is between 1.77 ms and 2.21 ms, the response shows some characteristics of both channelling and vortex flow, instead of just passing straight through zero. Since the channelling and vortex flow responses are of opposite polarity, the conductor is interpreted to lie above the drill hole as shown in Figure 6.

### Discussion

Even in the most ideal terrains for electromagnetics, care and experience are necessary to not only ensure that drastic errors are not made in DHEM interpretation, but also to derive the maximum possible information from the data. In fact in these areas, DHEM should be more than just another step in the exploration programme. Rather it should actually lead the effort with every drill hole planned to make full use of its potential. One could also extrapolate the power of DHEM to areas of conductive cover. Having the receiver down the hole overcomes many of the problems of weathering and makes DHEM a powerful exploration tool even in areas where surface EM has been only a limited success.

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### Figure Captions

Figure 1: Surface and downhole response to the overlying shale unit. (a) The surface UTEM anomaly lasts to comparable times to that of the Que River and Hellyer ore bodies. (b) The DHEM response is interpreted to be from a large body with a moderately low resistivity.

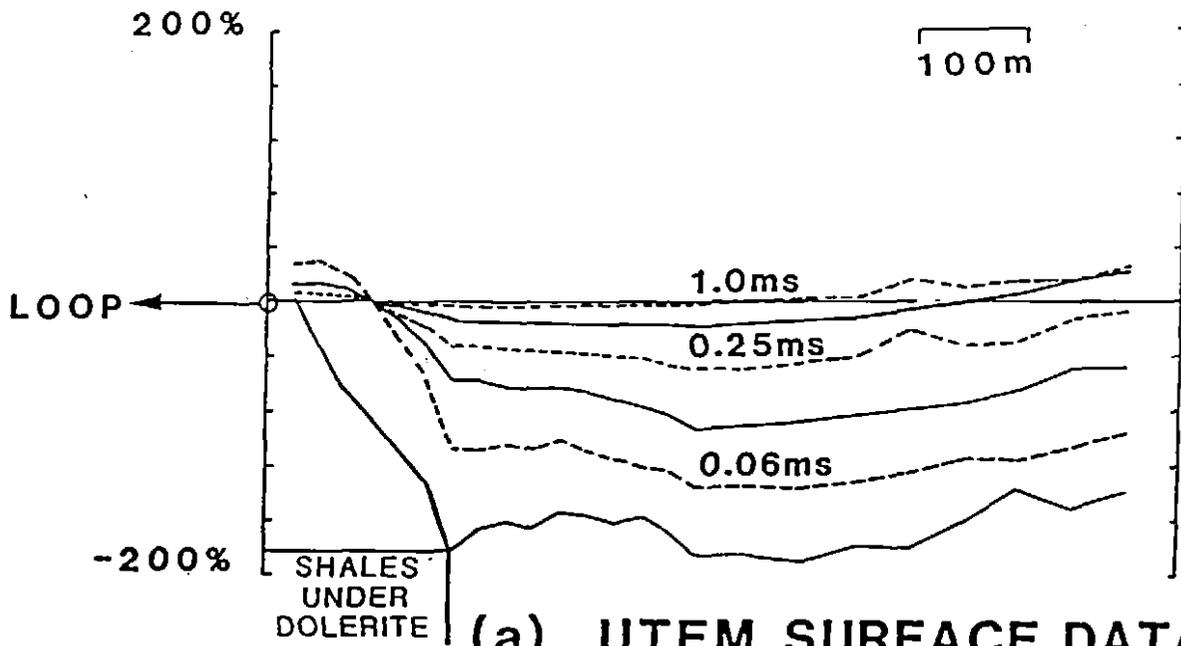
Figure 2: The SiroteM data in MAC 8 from loops 1, 2 and 3 (top) correlates with the axial component of the primary magnetic field of the transmitter loops (bottom). This instrumental response is referred to as "probe self-response".

Figure 3: Immediately north of Hellyer, the large responses in HL045 and HL062 can not be interpreted to arise solely from the known ore body. A second conductor must be invoked and this is supported by drill information.

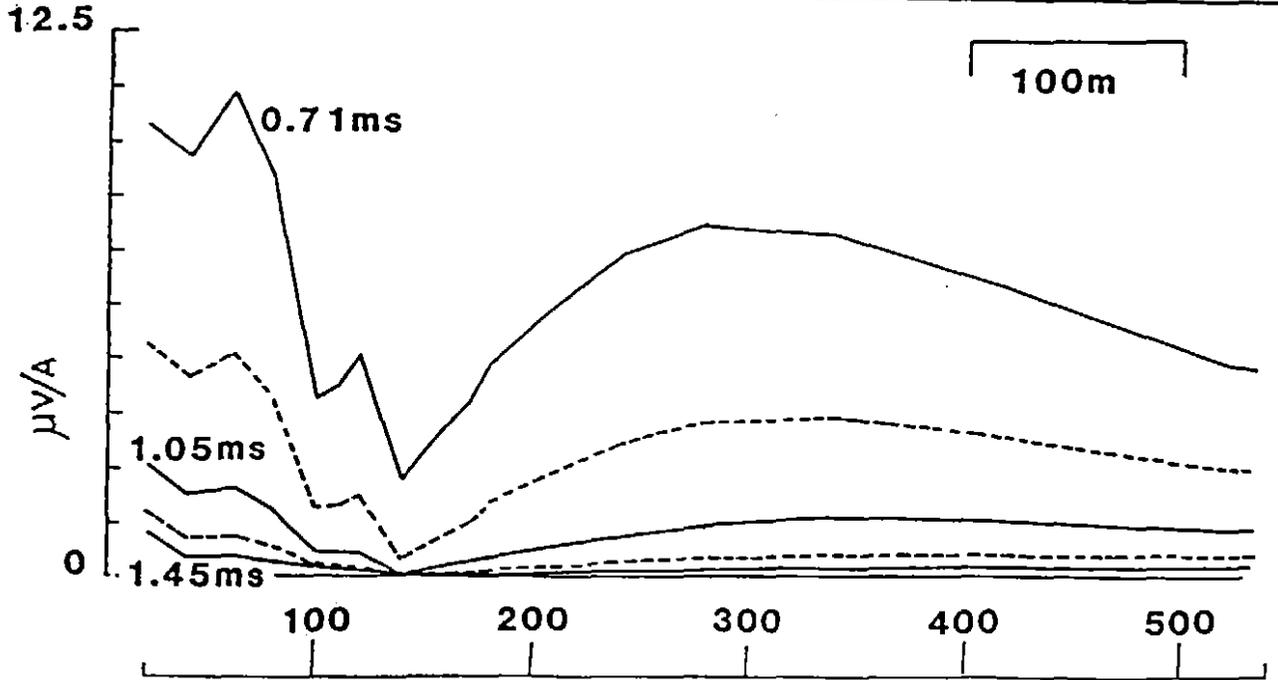
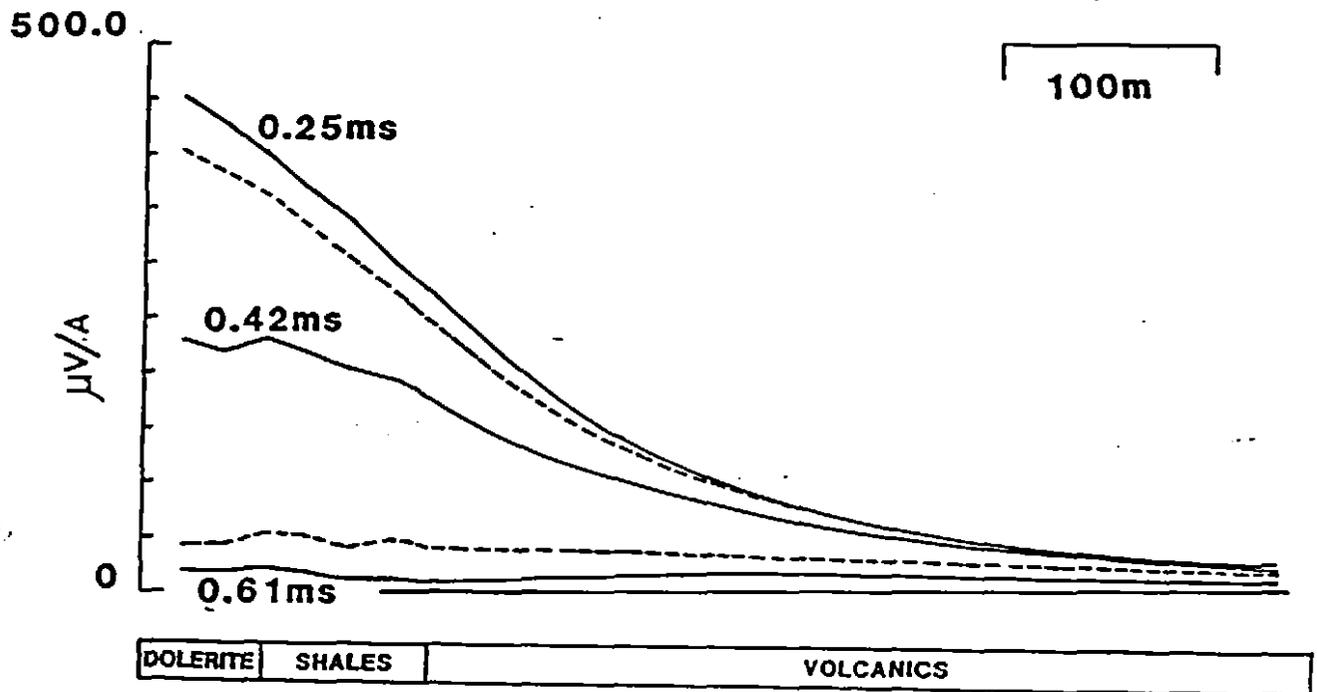
Figure 4: Downhole SiroteM response for QR1060A, loop 2. A very broad anomaly centred at 975 m changes from a positive to a negative with increasing delay time.

Figure 5: Downhole EM-37 responses for QR1060A, loops 2 and 7. The loop 2 response can be seen to have a very large long wavelength response strongest at shallow depths from culture near the Que River Mine, which superimposes a large background on the response to depth. The loop 7 response is initially dominated by a negative response (current channelling) at about 1000 m. It undergoes a sign change, and is finally dominated by a broad positive peak (vortex flow).

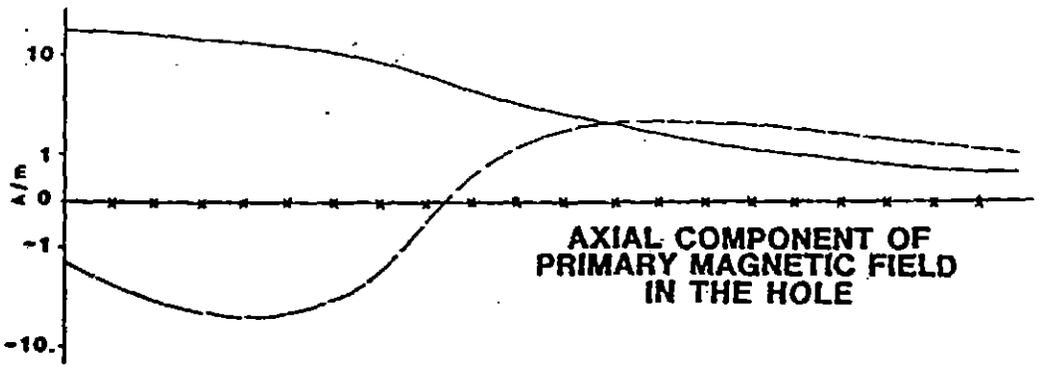
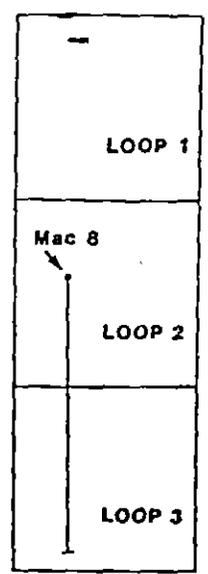
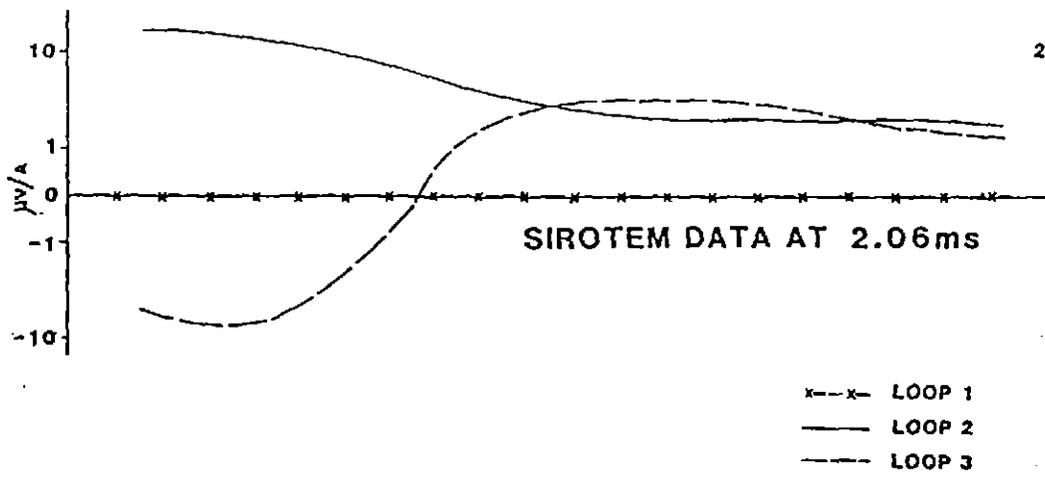
Figure 6: Location of drillhole QR1060A, transmitter loops, Que River Mine and interpreted conductor.

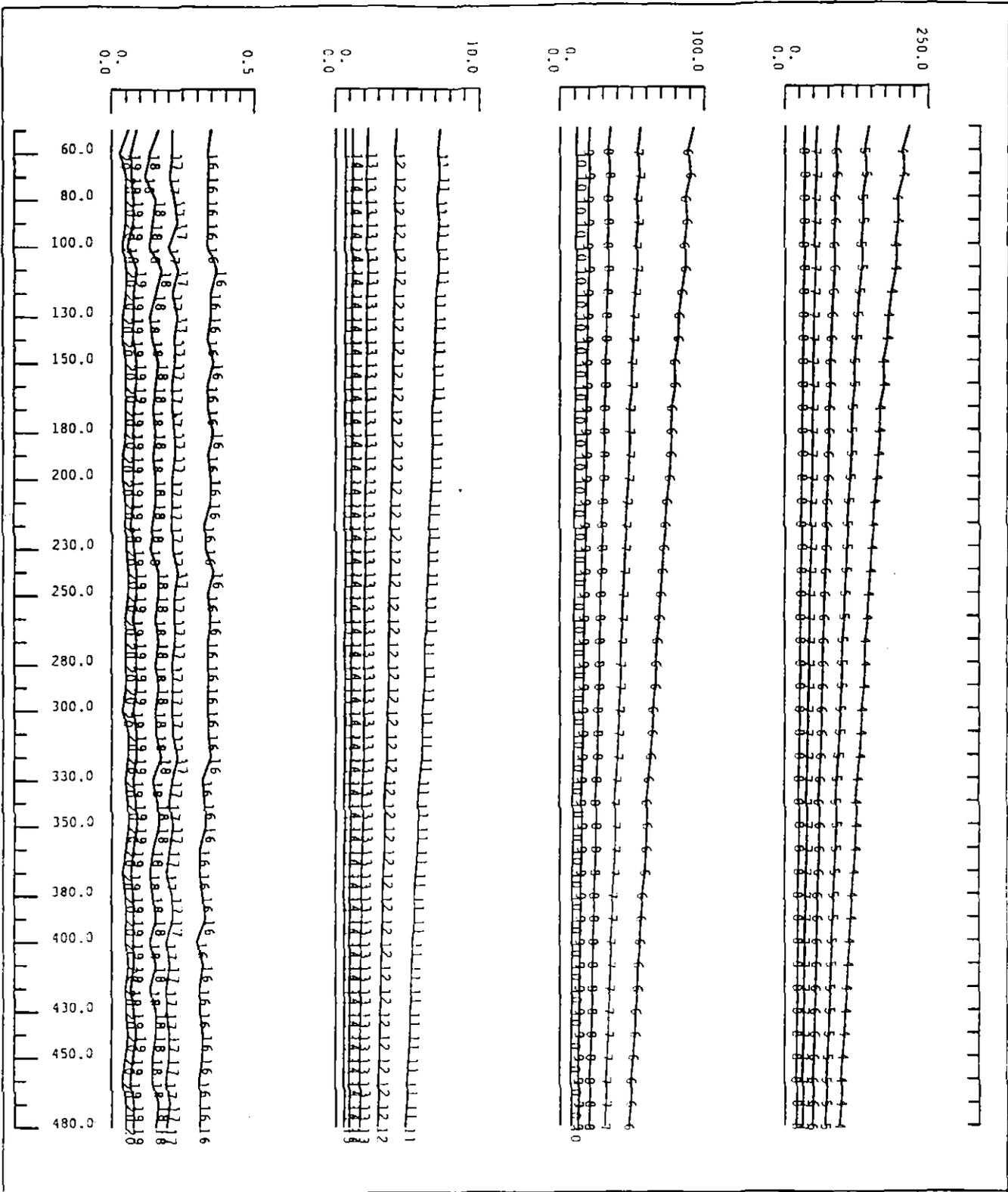


(a) UTEM SURFACE DATA  
(CONTINUOUS NORMALISATION)



(b) DOWN-HOLE SIROTEM DATA





MAC24 LOOP2

300M\*300M LOOP

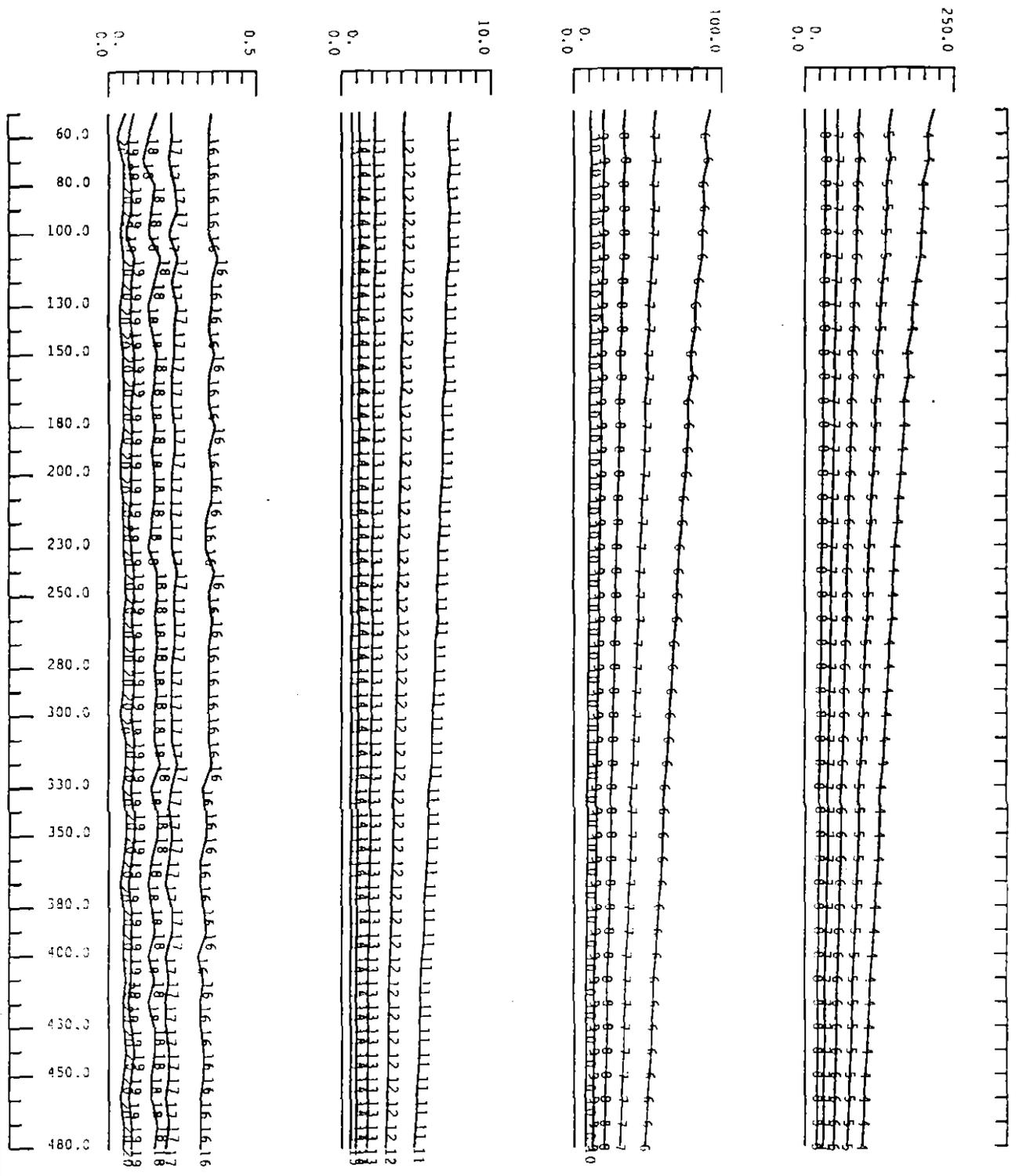
000N\_300N

300E\_600E

GEOTERREX EM37 DATA

Aberfoyle Resources Limited

Fig 2



MAC24 LOOP2

300M\*300M LOOP

000N\_300N

300E\_600E

GEOTERREX EM37 DATA

Aberfoyle Resources Limited

037121

APPENDIX VII

east	north	sample	REPORT No.
2400	3400	156088	PONT1913
2550	3400	156089	PONT1913
3575	3400	156095	PONT1913
3650	3400	166566	PONT1913
3965	3400	166567	PONT1913
3960	3490	271205	CM86/5/4
2710	3000	271206	CM86/5/4
2884	2992	271232	CM86/6/6
2885	2993	271235	CM86/6/6
2886	2994	271236	CM86/6/6
2790	2919	271237	CM86/6/6
2775	2915	271238	CM86/6/6
2712	2897	271239	CM86/6/6
2725	2900	271240	CM86/6/6
2615	2634	271243	CM86/6/6
2552	2615	271244	CM86/6/6
2730	2740	271250	CM86/6/6
2270	3000	271402	CM86/11/12
2280	3235	271403	CM86/11/12
2670	3940	271411	CM86/11/12
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2300	3530	271415	CM86/11/12
3100	3000	271417	CM86/11/12
3425	3000	271418	CM86/11/12
3900	3000	271419	CM86/11/12
2815	2976	271903	CM86/5/4
3000	3355	271904	CM86/5/4
3080	3545	271905	CM86/5/4
4300	1910	379707	CM87/2/14
4300	1580	379708	CM87/2/14
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3325	2400	427328	CM88/1/18
3480	2400	427330	CM88/1/18
3680	2600	427334	CM88/1/18
3760	2600	427335	CM88/1/18
3465	2800	427338	CM88/1/18
2580	3200	427343	CM88/1/18
3495	3200	427344	CM88/1/18
3515	3200	427345	CM88/1/18

*Jan R. Pontifex & Associates*TEL. 332 6744  
A.H. 31 381626 KENSINGTON ROAD, ROSE PARK  
SOUTH AUSTRALIAP.O. BOX 91, NORWOOD  
SOUTH AUSTRALIA 5067MINERALOGICAL REPORT NO. 1913

12th February 1976

TO: Mr. E.H. Skey,  
Cominco Exploration Pty. Ltd.,  
c/- Post Office Luina,  
TASMANIA 7321

COPY TO: Mr. K.R. Yates,  
Cominco Exploration Pty. Ltd.,  
1 Greenhill Road,  
WAYVILLE, S.A. 5034

YOUR REFERENCE: Order No. 5345  
Charge Hatfield 1400

MATERIAL: Rock samples

IDENTIFICATION: 156088, 89, 95  
166566, 67, 68  
166599

WORK REQUESTED: Thin section and description

SAMPLES & SECTIONS: Returned to your Luina address


IAN R. PONTIFEX & ASSOCIATES

3400N 2400E

156088: very fine, acid (notably potassic)  
vitric crystal tuff

This is a homogeneous, very fine grained (0.15 mm) rock. It consists largely of a loosely packed aggregate of fine quartz grains (20%) which are generally angular (broken), but some are subrounded; shard-like individuals (20-25%) of diffuse, microcrystalline devitrified glass, and fine angular (broken) crystals of plagioclase (?10%) and potash feldspar (?15%).

These components have a generalised common alignment and are evenly distributed through a turbid, diffuse matrix of ?clays, and/or cryptocrystalline material which gives a strongly positive reaction to sodium cobaltinitrite stain, indicating a highly potassic composition.

Fine turbid granules of secondary titania minerals (?pseudobrookite) (5-7%) and accessory small grains of pyrite and/or marcasite are disseminated.

The rock is interpreted as an acid tuff, qualified by "crystal" by virtue of abundant quartz and plagioclase grains which seem most likely to be of direct volcanic derivation, although some may be "normal" clastic detritus of alternate origin. Also it is qualified by "vitric" by virtue of the shards and apparent potassic glass alteration products forming the matrix. It is conceivably related to the crystal tuffs referred to in the covering notes.

3400N 2550E

156089: diffuse, clouded cryptocrystalline mass of silica and potassic (?felspar);  
no diagnostic textures but conceivably  
an original acid glass

This is an extremely fine grained, quite massive rock, with a very vague, diffuse, streaky fine layering. Staining of the offcut indicates a very fine and somewhat mottled distribution of potassic material forming an estimated 15-20% of the rock (seen under binocular microscope).

In thin section it is seen to consist of a clouded mass of essentially cryptocrystalline silica, which according to staining, is intimately mixed with potassic (?glass or felspar). There are no diagnostic micro-textures. The fine size, and diffuse turbid nature of the bulk of the rock prevents a positive identification.

Fine (0.1 mm) grains of quartz (7-10%), fine granules of limonite (3-5%) and limonitised secondary titania material (3-5%) are randomly disposed.

The petrographic evidence is insufficient to positively identify this rock type. Comparisons with 156088 indicate that it is more-or-less equivalent to the matrix in that rock and thus may be interpreted to represent acid glass alteration products. Quite conceivably it may be an original, homogeneous, glassy lava which would agree then with the field interpretation given in the covering notes.

*Harold R*  
3400N 3575E

156095: silicified rhyolite lava

Phenocrysts in this rock (0.2 to 2 mm) consist of euhedral plagioclase crystals (10-15%), subrounded and embayed single quartz crystals (7-10%). Irregular patches of microcrystalline epithermal-type quartz mosaic (25-30%) up to 3 mm are also present.

These components are randomly dispersed through a diffuse microcrystalline groundmass of essential quartz (?tridynite-cristobalite) and potash feldspar in which turbid material including minor clay-sericite outlines irregular spherulitic and variolitic textures characteristic of volcanic glass.

There is little doubt that this is a rhyolite lava, modified by late-stage volcanic exhalative silicification, which confirms the field interpretation. There is no petrographic evidence for its reported dyke-like mode of occurrence.

There is no evidence of a breccia.

3650E 3400N

166566: very extensively silicified, vesicular  
and weakly porphyritic, rhyodacitic lava

Most of this rock consists of a diffuse mottled, microcrystalline aggregate of quartz, with a cristobalite texture crowded with ultra fine sericite. Replicas of small euhedral plagioclase phenocrysts, and clumps of these (10-15%), preserved in clay-sericite, and smaller (0.3 mm) primary quartz phenocrysts (3-5%) are scattered.

Irregular cavities, apparently primary vesicles, are also scattered throughout this quartzose matrix, and almost invariably they are filled by fibrous chalcedonic silica, varying to microcrystalline mosaic.

The quartz filled vesicles and plagioclase replicas have a vaguely layered distribution, probably reflecting a primary flow structure.

The rock is a very extensively silicified, weakly porphyritic felsic lava. Although the number of primary quartz phenocrysts is very small there are sufficient (together with more abundant plagioclase phenocrysts) to indicate a probable acid rhyodacitic, or possible intermediate lava, rather than a basaltic lava (which is a possible alternative suggested in the covering notes). Also there is no evidence of a basaltic texture, or of relict mafic components.

3965E 3400N

166567: (graphitic) muscovite quartz,  
argillaceous, and silty,  
very fine sandstone

This is a homogeneous, sedimentary rock in which bedding is indicated by fairly regular but very slight variations in the size of detrital quartz grains, around 0.15 mm, also by the common orientation and variable concentration of detrital muscovite.

Subangular to subrounded quartz grains form about 35% of the rock, detrital muscovite about 15% and detrital "argillite grains" (7%) conceivably after feldspar, and these form a fairly loosely packed aggregate within a largely indeterminate argillaceous matrix of clay-sericite.

The matrix also contains very fine (0.15 mm) flakes and/or minute lenses of almost certain graphitic, and some limonitic, argillaceous material (7-10%); no doubt of the same black shale facies noted in the covering letter. Accessory fine tourmaline and trace minute pyrite is also present.

The detrital muscovite probably derived from a metamorphic provenance, however such a provenance is by no means proven to be the only source for this sediment.

037129  
14 MAY REC'D

## Central Mineralogical Services

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P.O. Box 952  
BURNIE / TAS. 7320

12th May, 1986

### REPORT CMS 86/5/4

YOUR REFERENCE: Letter dated 1.5.1986  
DATE RECEIVED: 2nd May, 1986  
SAMPLE NOS.: 7 Samples  
SUBMITTED BY: D.J. Jack  
WORK REQUESTED: Petrology

H.W. Fander, M. Sc.

Copy to:  
The Chief Geologist  
Aberfoyle Resources Ltd.  
Exploration Division  
123, Camberwell Road  
HAWTHORN EAST / VIC. 3123

REPORT CMS 86/5/4

A suite of seven rock chip samples was received for routine petrological examination. Representative thin-sections were prepared and examined together with respective offcuts, with feldspar and carbonate stain tests performed as warranted.

Summary

Four rocks (271902 - 271905 inclusive) represent devitrified and altered rhyolitic volcanics. These are rather typical of the Central sequence of Mount Read Volcanics and may be contrasted with the dominantly basic to intermediate facies comprising the bulk of the "M.R.V." sequences.

Sample 271205 represents a rebrecciated and extensively silicified dacitic (trend rhyodacitic) breccia. Sample 271906 is a thoroughly quartz-chlorite-albite-altered chromiferous basalt. The sediment (271206) may be categorised as a carbonaceous pyritic micaceous siltstone.

D. Cowan, B. Sc.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
271903	Rhyolitic Tuff. Felsitic quartz and partly degraded (kaolinitic) K-feldspar with disseminated albite phenocrysts/phenocrystal clusters, minor corroded quartz phenocrysts. Frequent quartz veinlets, minor sericite.	Irregularly quartz-veined, felsitic. Lava-like, but vitric-crystal fragmental in detail.	Leucogenised opaques. Semi-pervasive secondary Fe-pigmentation. Minor fine-scale vugs of barite.	Devitrified, extensively silicified rhyolitic fragmental. Fabric is heterogeneous, non-eutaxitic, but w microscale features consistent with a welded ignimbrite.
271904	Brecciated Rhyolite. Felsitic and disseminated phenocrystal K-feldspar with minor phenocrystal quartz, semi-pervasive chlorite, minor sericite. Irregular veins and replacements of quartz and chlorite.	Flow-banded to brecciated perlitic-felsitic. Irregular chloritic quartz aggregates.	Leucogenised opaques. Sporadic clots of limonite.	Textural detail obscured by irregular zones of brecciation/chloritic silicification. Relict features consistent with a glassy clastic lava (tuff lava).
271905	Rhyolitic Tuff. Felsitic quartz and K-feldspar with disseminated sanidine, albite, minor quartz crystal fragments. Irregular poikilitic clots of calcite and chlorite. Minor sericite.	Contorted to brecciated, eutaxitic, with a felsitic devitrification overprint. Weakly stressed.	Leucogenised opaques, rare zircons. Traces of adularia in secondary quartz aggregates.	Devitrified, quartz-calcite-chlorite (-adularia)-altered rhyolitic vitric crystal tuff. Flow-brecciated/welded ignimbritic characteristics.

02 JUL RECD

## Central Mineralogical Services

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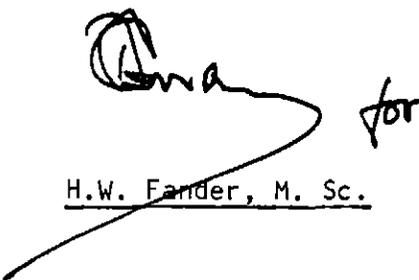
Mr. D.J. Jack  
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30th June, 1986

### REPORT CMS 86/6/6

YOUR REFERENCE:	Letter dated 19.6.1986
DATE RECEIVED:	20th June, 1986
SAMPLE NOS.:	14 Samples
SUBMITTED BY:	D.J. Jack
WORK REQUESTED:	Petrology

Copy to:  
The Chief Geologist  
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Exploration Division  
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HAWTHORN EAST / VIC. 3123

 for  
H.W. Fander, M. Sc.

REPORT CMS 86/6/6

Fourteen rock chip samples of variably weathered rocks were received for routine petrological examination. Representative thin-sections were prepared and examined together with respective offcuts, with stain tests performed as warranted. Attached tabulated descriptions summarise the microscopic data and include interpretative comments.

Summary

This suite comprises entirely extensively altered intermediate to acid volcanics. Finer details of some rocks are obscured by alteration, mild shearing and weathering effects. On the basis of relict features, however, this suite is dominated by dacitic lavas and tuffs with subordinate andesitic types.

These rocks exhibit essentially pervasive sericite-quartz alteration assemblages, variably complexed by albite, chlorite, extensively degraded and ferruginised carbonate, and traces of partly oxidised sulphide. Dacitic rocks tend to be relatively quartz-veined and silicified, and include devitrification-induced and "tectonic" quartz-healed breccia facies.

D. Cowan, B. Sc.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
271232 (T.S. 56153)	<u>Amygdaloidal Dacite.</u> Sparse silicified feldspar, corroded quartz, ferruginised clay-pseudomorphed ferromagnesian phenocrysts, sporadic quartz amygdaloids in a matrix of ferruginised clay-stained quartz. Irregular sericitic-pyritic quartz vein.	Amygdaloidal, weakly porphyritic, flow-structured, felsitic. Mildly stressed.	Frequent microscale quartz veinlets. Leucoxenised opaques. Minor oxidised and supergene-altered chalcopyrite.	Thoroughly silicified(-sericitised) felsitic-devitrified amygdaloidal dacitic characteristics. Marked secondary ferruginisation of sericite. Pyrite-chalcopyrite-bearing vein is stressed.
271235	<u>Brecciated Dacite.</u> Clasts of silicified/variably kaolinitic, variably pyritic lava (sim. to 271232) in a matrix of fine to microcrystalline and chalcedonic quartz, with interspersed clots of pyrite. Minor late quartz veinlets.	Random angular sub-millimetric to centimetric clasts; mildly stressed, semi-crustiform matrix.	Minor relics of sericite, traces sphalerite, supergene altered chalcopyrite. Leucoxenised opaques,	Close affinities with 271232, similarly altered and weathered; relatively fractured/quartz-veined and mineralised in comparison. Late chromite.
271236	<u>Dacitic Breccia.</u> Clasts of strongly silicified/weakly sericitic felsic lava in a matrix of fine to microcrystalline and chalcedonic quartz with minor semi-sericitic white mica, interspersed clots of kaolin.	Similar to 271235; relatively strongly quartz-amygdaloidal, subround clasts.	Leucoxenised opaques.	Interpreted as a devitrification-induced breccia. Matrix is cavity-filling rather than fracture-infill. Relatively siliceous, weakly sericitic, non-pyritic alteration.
271237	<u>Amygdaloidal Dacite.</u> Felsitic and sericite-stained secondary quartz with thinly disseminated albitised plagioclase and corroded quartz phenocrysts, sporadic kaolin-quartz amygdaloids, frequent sericite-quartz veinlets.	Porphyritic, amygdaloidal, weakly flow-structured felsitic; incipiently stressed.	Leucoxenised opaques, secondary Fe-stainings	Affinities with 271235, 271236 and particularly 271232. Similarly altered, but unmineralised.
271238	<u>Amygdaloidal Dacite.</u> Variably sericite-stained quartz with thinly disseminated sericitic albitised plagioclase and corroded quartz phenocrysts; sporadic quartz amygdaloids, minor sericitic quartz veinlets.	Amygdaloidal, weakly flow-structured, porphyritic felsitic. Weakly stressed.	Leucoxenised opaques. Minor traces chlorite. Minor secondary Fe-stainings. Trace oxidised pyrite.	Close affinities with 271232 and 271237. Extensively silicified and sericite-quartz-veined; incipiently pyrite-mineralised.
271239	<u>Amygdaloidal Dacite.</u> Variably kaolin-stained microcrystalline-felsitic quartz with disseminated quartz amygdaloids, albitised/weakly sericite-stained plagioclase phenocrysts, minor corroded quartz microphenocrysts.	Flow-structured, porphyritic, amygdaloidal, microfelsitic. Locally brecciated/quartz-healed.	Leucoxenised opaques. Sporadic veinlets of quartz, ferruginised clay, degraded carbonate. Trace oxidised pyrite.	Relatively flow-structured felsitic devitrified dacite with conspicuous flow-orientated quartz amygdaloids. Incipiently pyrite-mineralised.
271240	<u>Dacitic Tuff.</u> Clasts of extensively sericitised/montmorillonite-stained felsic lava, disseminated albitised plagioclase, minor corroded quartz grains in a sericitic/montmorillonite-stained microfelsitic matrix.	Flow-structured lithic-crystal fragmental; vaguely eutaxitic/flow-brecciated matrix.	Leucoxenised opaques, secondary Fe-stainings (partly after montmorillonite).	Interpreted as a welded ignimbritic lithic-vitric-crystal tuff on relict textural grounds. Greenish colouration reflects montmorillonite clay.
271243	<u>Pelitic Ash.</u> Microcrystalline albite with minor intergrown quartz, minor sericite. Sporadic irregular clots of partly degraded/Fe-stained montmorillonite. Sporadic quartz veinlets.	Weakly banded, vaguely relict silty vitroclastic. Locally brecciated/cherty quartz-matrixed.	Fine silt-sized clastic leucoxenitic semi-opaques. Minor fine sand-sized quartz feldspar grains.	Devitrified/albitised pelitic vitric ash with very well-sorted distal characteristics and felsic-intermediate acid ("dacitic") affinities.

## CENTRAL MINERALOGICAL SERVICES

Sample No.	Classification - Composition	Fabric	Accessories	Comments
271244	Dacitic Tuff. Variably sericitic/chlorite- and limonitic degraded carbonate-stained lava clasts, albitised plagioclase and minor corroded quartz grains in a similarly altered microcrystalline quartzofeldspathic matrix.	Analogous to 271240. Weakly stressed.	Leucoxenised opaques. Minor quartz(-albite) amygdales. Minor relics carbonate (Fe-calcite).	Close affinities with 271240; flow-structured/brecciated dacitic welded ignimbritic lithic-vitric-crystal tuffaceous characteristics.
271250	Felsite. Sparse quartz-pseudomorphed feldspar and minor corroded quartz phenocrysts in a groundmass of felsitic and sericite-stained feldspar-pseudomorphous quartz. Minor quartz veinlets.	Weakly porphyritic, crudely banded, felsitic. Weakly stressed.	Leucoxenised opaques. Traces oxidised carbonate. Minor clots, stringers of oxidised pyrite.	Devitrified/quartz-sericite-altered obsidian. Rhyolitic in comparison with 271232-244 dacites.

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HAT. 037136

Central Mineralogical Services



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22nd December, 1986

REPORT CMS 86/11/12

YOUR REFERENCE:	Letter dated 10.11.1986
DATE RECEIVED:	14th November, 1986
SAMPLE NOS.:	20 Samples
SUBMITTED BY:	D.J. Jack
WORK REQUESTED:	Petrology

Copy to:  
The Chief Geologist  
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123, Camberwell Road  
HAWTHORN EAST / VIC. 3123

*H. W. Fander*  
H.W. Fander, M. Sc.

BOUNDARY  
PROSPECT  
ROCK CHIPS.

REPORT CMS 86/11/12

Twenty rock chip samples from the Boundary Prospect of the Que-Hellyer area were received for routine petrological examination. Representative thin-sections were prepared and examined in transmitted and oblique incident light. Microscopic examinations were supplemented by stain tests, where warranted. Petrological data is summarised in the attached tabulated descriptions which include interpretative comments.

This suite is dominated by sedimentary rocks, particularly sub- to distal tuffaceous (typically vitric-ashy) types. These include non-volcanic components and grade into non-tuffaceous types which are relatively quartzose and micaceous.

Subordinate igneous rocks include andesitic and dacitic volcanics and a variety of felsitic-devetrified intermediate-acid phases considered as intrusive in part.

D. Cowan, B. Sc.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
271402	<u>Pelitic Ash.</u> Fine silt-sized detrital white mica flakes, minor albite and quartz grains in a matrix of sericitic/chlorite-stained crypto- to microcrystalline albite. Pervasive clots of dolomite; minor late chloritic microfractures.	Analogous to 271401; relatively massive (poorly bedded) and incipiently sheared in comparison.	Conspicuous clastic leucoxic semi-opaques, traces carbonaceous matter, rare ultrafine pyrite. Minor clots of calcite.	Close affinities with 271401, distinct argillaceous-pelitic in comparison and partly sericitised/incipiently calcitised. Only incipiently carbonaceous and pyritic.
271403	<u>Pelitic Ash.</u> Silt-sized detrital white mica flakes, minor splintery quartz and albite grains in a matrix of partly argillised crypto- to microcrystalline albite. Minor degraded/ferruginised ?dolomite.	Very similar to 271401 relatively banded/incipiently shale-parted in comparison. Essentially unsheared.	Conspicuous leucoxic semi-opaques, traces of carbonaceous matter, minor traces of chlorite.	Similar to 271401 and particularly 271402. Vitroclastic material largely obscured by argillic alteration. Traces only of degraded carbonate.



Sample No.	Classification - Composition	Fabric	Accessories	Comments
271418	Felsite. Albitised/variably saussurite-stained plagioclase, minor corroded quartz, epidotised ferromagnesian phenocrysts, sporadic xenoliths in a groundmass of albitised felsite with clots and films of sericite and chlorite. minor cloudy epidote.	Porphyritic/trend glomeroporphyritic, with corroded lava and tuff xenoliths. Felsitic (devitrified)	Conspicuous leucoxenised opaques, traces of apatite. groundmass.	Similarities with 271407, 271417, but relatively slightly basic and distinctly xenolithic in comparison (intrusive ?breccia). Phenocrystal quartz is possibly xenocrystal.
271419	Dacitic Tuff. Sericite and crypto- to micro-crystalline quartz with disseminated albitised sericite-stained to sericite-pseudomorphed feldspar crystals, minor quartz crystal fragments. Sporadic quartz veinlets.	Lithic-crystal fragmental with a locally vaguely shandy matrix. Mildly sheared.	Leucoxenised opaques; minor clots of chlorite.	Interpreted as a lithic-vitric-cryst tuff on relict textural grounds. Dacitic characteristics; finer detail obscured by sericite-quartz alteration mild shearing effects.

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13th March, 1987

## REPORT CMS 87/2/14

YOUR REFERENCE:	Letter dated 19.2.1987
DATE RECEIVED:	20th February, 1987
SAMPLE NOS.:	379705 - 379717 (10)
SUBMITTED BY:	D.J. Jack
WORK REQUESTED:	Petrology

Copy to:  
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Aberfoyle Resources Ltd.  
Exploration Division  
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HAWTHORN EAST / VIC. 3123

  
H.W. Fander, M. Sc.

REPORT CMS 87/2/14

Ten rock chip samples from the South Hatfield area were received for routine petrological description. Representative thin-sections were prepared and examined together with the offcuts, with stain tests performed as warranted. Attached tabulated descriptions summarise the microscopic data and include interpretative comments.

Summary

With the exception of sample 379712, which represents an intermediate (broadly andesitic, but unusually feldspathic) lava, this suite consists entirely of sedimentary rocks.

Sediments include typical quartz-mica sandstone and relatively micaceous siltstones. The majority, however, are (primary or mildly reworked) tuffaceous types, including tuffaceous sandstones, pelitic ashes and ashy or vitroclastic pelites.

These reflect sodic to sodi-potassic acid volcanism, apparently sub- to distal to the sediments, but clearly contemporaneous in part. Minor acid-volcanic-derived components appear within the quartz-mica psammopelite facies which, as elsewhere in the Que/Hellyer sequence, represent breaks in volcanism.

Pelitic ashes have been partly misidentified as cherts, no doubt due to cherty "field" characteristics. Observation of fracture pattern (brittle, as against conchoidal) may be useful in distinguishing these rocks from true cherts.

D. Cowan, B. Sc.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
379707	"Tuffaceous" Sandstone. Framework of sub-angular K-feldspar, subordinate quartz and albite grains, minor muscovite flakes, sericitic degraded shard fragments. Weakly chloritic, cryptocrystalline quartz/illitised sericite matrix.	Loose, poorly sorted silty fine sandy framework. Featureless matrix. Incipiently banded.	Minor clastic leucoxene, carbonaceous pelite, impure chert clasts. Traces degraded carbonate, pyrite.	Weakly micaceous arkosic silty sandstone with reworked tuffaceous characteristics. Includes sporadic secondary clots of chloritic quartz.
379708	"Tuffaceous" Sandstone. Loose framework of subangular feldspar, subordinate quartz grains, devitrified/partly degraded shard fragments, minor muscovite flakes. Weakly chloritic-sericitic microcrystalline feldspathic cement.	Very similar to 379707; slightly coarser-grained.	Carbonaceous pelite, impure chert clasts, clastic leucoxene. Traces oxidised carbonate, with the mica-quartz sandstone partly oxidised pyrite.	Close affinities with 379707; similar interpreted. Distinctly arkosic reworked tuffaceous in comparison with the mica-quartz sandstone facies.
379710	Cherty Argillite. Sericite and sericitic microcrystalline quartz with thinly disseminated silt-sized clastic quartz grains, subordinate muscovite flakes. Sporadic cherty quartz veinlets.	Homogeneous, massive (unbanded), microcrystalline, with irregular discontinuous veinlets.	Semi-pervasive secondary Fe-stainings. Leucoxenic pigmentations. Minor traces carbonaceous matter.	Highly impure (argillaceous) chert/cherty argillite; chemical sedimentary characteristics. Exhibits vague sub-hornfelsic induration features.



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 Aberfoyle Resources Ltd.  
 Exploration Division  
 P.O. Box 952  
BURNIE / TAS. 7320

24th February, 1988

### REPORT CMS 88/1/18

YOUR REFERENCE:	Letter dated 22.1.1988
DATE RECEIVED:	27th January, 1988
SAMPLE NOS.:	16 Samples
SUBMITTED BY:	A.W. McNeill
WORK REQUESTED:	Petrology

Copy to:  
 Mr. H. Skey  
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 Aberfoyle Resources Ltd.  
 Exploration Division  
 123, Camberwell Road  
 HAWTHORN EAST / VIC. 3123

*H. W. Fander*  
H.W. Fander, M. Sc.

REPORT CMS 88/1/18

A suite of sixteen rock chip samples was received for routine petrological description. Representative thin sections were prepared, examined in transmitted light and, together with respective cobaltinitrite-stained offcuts, in oblique incident light. Attached descriptions summarise the microscopic data and include interpretative comments.

Summary

Twelve samples (427317 - 427345 non-inclusive) from the Boundary prospect area represent a sequence of altered felsic intermediate to acid volcanics. These range from andesitic or, strictly, quartz-trachyandesitic, through dacitic to rhyodacitic and rhyolitic in terms of composition, and include lavas, and possibly minor intrusives, in addition to lava breccias and (minor) pyroclastics.

Sample 427343 represents a strongly volcanomict/mildly reworked tuffaceous lithic sandstone with intraclasts of carbonaceous pelite. This rock provides a link with the previous suite of sediment-dominated Central Complex volcanics.

This group, as a whole, exhibits quartz-sericite  $\pm$  chlorite and carbonate alteration assemblages, locally complexed by a little epidote, and exhibits strictly limited sulphide mineralisation.

Of the remaining four rocks, two represent devitrified and altered acid glassy volcanics (samples 427352, 427354). Sample 427355 represents an altered basic volcanic with a pronounced kaolinitic weathering overprint on the initial phyllosilicate-carbonate alteration assemblage. Sample 427356 represents a lithoclastic fine sandy siltstone with similarities to QRS facies, but with finer detail obscured by partial weathering effects.

D. Cowan, B. Sc.

SAMPLE NO.: 427317 (T.S. 59586) 1.

CLASSIFICATION/  
COMPOSITION: Amygdaloidal Quartz-Trachyandesite. Albitised/weakly argillised plagioclase phenocrysts and phenocrystal clusters, subordinate chlorite-montmorillonite-epidote-pseudomorphed ferromagnesian phenocrysts, sporadic quartz-chlorite-epidote amygdales in a groundmass of alkali (K-)feldspar microlaths with a felsic to chloritic/locally siliceous mesostasis.

FABRIC: Amygdaloidal/semi-glomeroporphyritic with incipiently flow-orientated phenocrysts. Mesostasis is weakly felsitic ("snowflake-textured") where siliceous.

ACCESSORIES: Disseminated magnetite and leucoxenised opaques. Sparse corroded/partially recrystallised phenocrystal quartz grains.

INTERPRETATION/  
COMMENTS: Weakly flow-structured amygdaloidal lava with differentiated intermediate rather than strictly acid characteristics (hence quartz-trachyandesite). Reflects selective alteration of phenocrysts, particularly the ferromagnesian (amphibole and pyroxene).

SAMPLE NO.: 427324 (T.S. 59587)

CLASSIFICATION/  
COMPOSITION: Altered "Porphyry". Frequent sericitised/albitised prismatic feldspar laths, subordinate chloritised ferromagnesian phenocrysts, sporadic quartz amygdales in a groundmass of quartz-mesostasised sericitic alkali feldspar microlaths with subordinate chloritised ?amphibole.

FABRIC: Strongly porphyritic, mildly amygdaloidal. Groundmass similar to that in 427317; relatively siliceous and slightly coarser-grained.

ACCESSORIES: Magnetite and leucoxenised opaques, traces of apatite and corroded phenocrystal quartz.

INTERPRETATION/  
COMMENTS: Compositional affinities with 427324, but with finer detail obscured by advanced sericitic alteration. Fabric consistent with a minor intrusive or flow core zone.

SAMPLE NO.: 427326 (T.S. 59588) 2.

CLASSIFICATION/COMPOSITION: Amygdaloidal Trachyandesite. Albitised plagioclase-, relatively minor chloritised ferromagnesian phenocrysts; sporadic quartz-muscovite-chlorite amygdales in a groundmass of albite microlaths with a K-feldspathic mesostasis. Sporadic quartz and crosscutting chloritic quartz-muscovite veinlets.

FABRIC: Porphyritic/trend glomeroporphyritic and relatively coarsely amygdaloidal. Strongly cognate-xenolithic/weakly flow-structured/subtrachytic.

ACCESSORIES: Leucoxenised opaques.

INTERPRETATION/COMMENTS: Amygdaloidal trachyandesitic clastic lava (tuff lava); quartz-sericite-chlorite-veined and -amygdaloidal. Lava clasts (mean 1 mm) are evenly sized, semi-orientated, texturally similar to the host lava.

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SAMPLE NO.: 427327 (T.S. 59589)

CLASSIFICATION/COMPOSITION: "Dacitic Tuff Lava". Semi- to sericitic, partly degraded (illitised to kaolinised/Fe-stained) white mica and very fine to microcrystalline quartz in varying proportions. Very thinly disseminated sericite-pseudomorphed phenocrystal feldspar.

FABRIC: Weakly flow-structured lithoclastic, with featureless to flow-structured and porphyritic clasts; similarly textured matrix.

ACCESSORIES: Sparse quartz phenocrysts, conspicuous leucoxenised opaques. Traces extensively oxidised pyrite. Minor discontinuous microcrystalline quartz veinlets.

INTERPRETATION/COMMENTS: The semi-orientated, sub- to fine millimetric-scale clasts include minor pumiceous and vaguely vitric tuffaceous types. Much detail obscured by devitrification, sericite-quartz alteration, and weathering effects. Relict features consistent with a lava breccia (tuff lava) rather than a strictly pyroclastic facies.

SAMPLE NO.: 427328 (T.S. 59590) 3.

CLASSIFICATION/COMPOSITION: **"Rhyolitic Breccia.** Weakly sericitic albite phenocrysts, clusters and crystal fragments, subordinate sericite-quartz-pseudomorphed ?sanidine, minor quartz crystals in a matrix of sericite and relatively minor fine granular to spherulitic and microcrystalline quartz, minor clots of chlorite.

FABRIC: Flow-structured lithic-crystal fragmental. Semi-pervasive perlitic devitrification structures in the sericite-quartz-altered groundmass/matrix. Locally vaguely relict microshard-textured.

ACCESSORIES: Leucoxenised opaques, minor clots of chlorite, rare vugs of sideritic carbonate, traces of ultrafine hematite, traces of carbonaceous matter; rare apatite.

INTERPRETATION/COMMENTS: Finer detail obscured by perlitic (to locally microspherulitic) devitrification and marked sericitic alteration. General features consistent with a welded and flow-brecciated sodi-potassic ignimbritic lithic-vitric-crystal tuff. Possibly strictly rhyodacitic.k

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SAMPLE NO.: 427330 (T.S. 59591)

CLASSIFICATION/COMPOSITION: **"Trachyandesitic" Breccia.** Albitic/epidote-stained plagioclase crystals/clusters, minor silicified ferromags. in a matrix of fine to microcrystalline quartz and sericite, with relics of microcrystalline alkali (K-)feldspar.

FABRIC: Flow-structured, semi-moulded, lithoclastic. Weakly porphyritic, semi-selectively silicified felsitic matrix.

ACCESSORIES: Conspicuous oxidised/leucoxenised opaques. Minor traces of phenocrystal quartz. Minor clots of chlorite, traces of magnetite.

INTERPRETATION/COMMENTS: This rock lacks strictly pyroclastic features and is best interpreted as a quartz-trachyandesitic lava breccia. Relatively siliceous alteration in comparison with 427328.

SAMPLE NO.: 427334 (T.S. 59592) 4.

CLASSIFICATION/COMPOSITION: Quartz-Trachyandesite. Phenocrysts of albitised/variably sericitic plagioclase, subordinate sericitised-chloritised ferromags. (amphibole) and minor microphenocrystal quartz grains in a matrix (altered groundmass) of sericitised plagioclase microlaths with a K-feldspathic mesostasis and minor quartz.

FABRIC: Semi-glomeroporphyritic, flow-banded, semi-pervasively perlitic on a fine scale; pervasively mildly stressed, microfractured.

ACCESSORIES: Leucoxenised opaques, secondary limonitic Fe- and Mn-oxide stainings. Minor traces of Cu-sulphide(?).

INTERPRETATION/COMMENTS: Primarily a subvitric felsic intermediate lava, quartz-trachyandesitic rather than strictly acid, with affinities to 427317, 427324 and 427326. Moderately sericite-chlorite-altered, stressed, and microfractured.

SAMPLE NO.: 427335 (T.S. 59593)

CLASSIFICATION/COMPOSITION: "Rhyodacitic Breccia". Clasts of variably sericite/microcrystalline quartz-altered albite- and weakly quartz-porphyritic K-feldspathic groundmassed lava, minor clasts of relatively sericitised microgabbro. Matrix of selectively cherty-silicified felsic glass with sporadic feldspar crystal fragments.

FABRIC: Loose to semi-compact framework of lapilli-grade angular lithoclasts. Featureless to vaguely relic microshardy-textured matrix with a semi-pervasive contorted microscale flow-banding.

ACCESSORIES: Leucoxenised opaques, minor clots, films of chlorite in clasts and matrix. Sporadic quartz veinlets. Semi-pervasive irregular network of quartz-muscovite veinlets. Limonitic Fe-stainings.

INTERPRETATION/COMMENTS: Pelitic vitric ash-matrixed breccia, apparently a distal vitric ash flow with lapilli-grade intraclasts of rhyodacitic lava and relatively altered microgabbroic xenoliths. Reflects semi-differential sericitic alteration of clasts, silicification of matrix. The late quartz-muscovite veinlets are of marginal granitic character.

SAMPLE NO.: 427338 (T.S. 59594) 5.

CLASSIFICATION/COMPOSITION: Amygdaloidal Dacite. Weakly sericite-calcite-stained albite-, minor corroded quartz and chlorite-quartz-pseudomorphed amphibole phenocrysts, sporadic variably chalcedonic quartz amygdales in a pervasively sericitic/variably silicified felsic groundmass.

FABRIC: Flow-structured, weakly banded, mildly amygdaloidal, semi-glomeroporphyritic, perlitic-devitrified.

ACCESSORIES: Minor chlorite. Leucoxenised opaques, rare magnetite.

INTERPRETATION/COMMENTS: Devitrified, sericite-quartz(-chlorite-calcite)-altered/quartz-amygdaloidal dacitic lava. Exhibits very incipient shearing, stress, and microfracturing effects.

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SAMPLE NO.: 427343 (T.S. 59595)

CLASSIFICATION/COMPOSITION: Volcanomict Lithic Sandstone. Framework of fine to medium sand-sized, subangular quartz-chlorite-altered felsic intermediate lava clasts, subordinate sericite-chlorite-stained/albitised plagioclase grains, minor quartz and sparse K-feldspar grains. Chloritic microcrystalline quartz matrix/cement with pervasive microscopic cloudy clots of zoisitic epidote.

FABRIC: Poorly sorted (silty fine to medium) sandy clastic, essentially massive (unbanded), and only incipiently bedded.

ACCESSORIES: Clasts of chloritic vitric and vitric-crystal tuff, carbonaceous shale; detrital muscovite flakes, leucoxene, rare monazite, tourmaline and zircon. Minor traces of pyrite, rare microscopic blebs of (dark red) sphalerite.

INTERPRETATION/COMMENTS: Clastic debris almost entirely felsic intermediate-acid volcanic-derived and is mildly reworked or slumped tuffaceous in part. No apparent basement-derived components (e.g. metapelite clasts), but finer detail is obscured by chloritic alteration effects.

SAMPLE NO.: 427344 (T.S. 59596) 6.

CLASSIFICATION/COMPOSITION: **Altered Felsite.** Aggregates of sericite and variably sericite-stained anhedral quartz with disseminated variably sericitic quartz pseudomorphs after feldspar phenocrysts, thinly disseminated corroded quartz phenocrysts. Sporadic films of sericite, semi-pervasive network of microcrystalline quartz veinlets.

FABRIC: Porphyritic/weakly flow-structured, felsitic (devitrified felsic glass).

ACCESSORIES: Sparse leucoxene- and Fe-oxide stained quartz pseudomorphs after phenocrystal amphibole. Leucoxenised opaques.

INTERPRETATION/COMMENTS: Devitrified/pervasively sericite-quartz altered dacitic(?) pitchstone. Primarily a lava, or conceivably a semi-chilled minor intrusive, dependent on field relationships.

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SAMPLE NO.: 427345 (T.S. 59597)

CLASSIFICATION/COMPOSITION: **Dacitic Breccia.** Variably sericitic albite-, minor quartz-chlorite-pseudomorphed ferromagnesian-, sparse corroded quartz phenocrysts and sporadic quartz amygdales in a variously extensively sericitised felsitic to cherty-silicified microcrystalline groundmass. Interspersed zones of cherty quartz matrix. Sporadic quartz veinlets.

FABRIC: Random angular, millimetric to centimetric clasts; corrosive/replacive crypto- to microcrystalline quartz matrix (cement).

ACCESSORIES: Leucoxenised opaques. Disseminated to conspicuous ferruginised carbonate (?siderite) rhombs, clusters, concentrated in sericitic zones. Minor cavities after carbonate in quartz veinlets.

INTERPRETATION/COMMENTS: Poorly diagnostic in terms of mode of origin, although general features are consistent with a subproximal subaerial lithic tuff ("lapilli tuff"). Alternately, a flow-marginal breccia. No tangible ignimbritic features.

APPENDIX VIII

east	north	sample	sample	Cu[ppm]	Pb[ppm]	Zn[ppm]	Ag[ppm]	Au[ppm]	As[ppm]	Ba[ppm]	Cr[ppm]	Ni[ppm]	Ti[ppm]	Zr[ppm]
3000	1400	379167	CSOIL	<5	<5	25	<1.0	na	3	360	<5	10	2850	360
3025	1400	379168	CSOIL	<5	<5	5	<1.0	na	1	70	20	10	2670	340
3050	1400	379169	CSOIL	<5	<5	15	<1.0	na	1	230	<5	10	3200	380
3075	1400	379170	CSOIL	<5	<5	20	<1.0	na	1	210	35	10	4300	270
3100	1400	379171	CSOIL	<5	<5	10	<1.0	na	4	270	20	20	5300	230
3125	1400	379172	CSOIL	<5	<5	5	<1.0	na	3	320	60	20	7500	260
3150	1400	379173	CSOIL	<5	<5	10	<1.0	na	5	320	25	20	5400	250
3175	1400	379174	CSOIL	<5	<5	10	<1.0	na	4	330	35	20	5450	220
3200	1400	379175	CSOIL	<5	<5	5	<1.0	na	8	460	15	15	4350	180
3225	1400	379176	CSOIL	<5	<5	50	<1.0	na	3	520	10	15	4250	180
3250	1400	379177	CSOIL	<5	<5	15	<1.0	na	3	420	10	10	5000	200
3275	1400	379178	CSOIL	<5	<5	5	<1.0	na	5	390	30	15	5350	220
3300	1400	379179	CSOIL	<5	<5	10	<1.0	na	5	500	15	10	4900	200
3325	1400	379180	CSOIL	<5	<5	10	<1.0	na	3	410	6	15	4050	240
3350	1400	379181	CSOIL	<5	<5	10	<1.0	na	3	520	20	15	3650	280
3375	1400	379182	CSOIL	<5	<5	5	<1.0	na	3	390	<5	10	3250	290
3400	1400	379183	CSOIL	<5	<5	5	<1.0	na	2	590	<5	10	2250	280
3425	1400	379184	CSOIL	<5	<5	10	<1.0	na	4	510	10	10	2850	290
3450	1400	379185	CSOIL	<5	<5	10	<1.0	na	1	570	15	10	2700	300
3475	1400	379186	CSOIL	<5	<5	20	<1.0	na	8	770	15	25	7550	250
3500	1400	379187	CSOIL	<5	<5	5	<1.0	na	5	560	25	15	2700	200
3525	1400	379188	CSOIL	<5	<5	5	<1.0	na	3	820	10	10	3150	260
3550	1400	379189	CSOIL	<5	<5	5	<1.0	na	2	640	25	15	3100	220
3575	1400	379190	CSOIL	<5	<5	35	<1.0	na	3	820	7	10	3000	230
3600	1400	379191	CSOIL	<5	<5	20	<1.0	na	1	700	<5	10	3600	250
3625	1400	379192	CSOIL	<5	<5	20	<1.0	na	1	720	30	15	3300	240
3650	1400	379193	CSOIL	<5	<5	15	<1.0	na	1	850	<5	5	3000	290
3675	1400	379194	CSOIL	<5	<5	15	<1.0	na	2	750	7	10	3200	270
3700	1400	379195	CSOIL	<5	<5	15	<1.0	na	<1	250	<5	10	3200	320
3725	1400	379196	CSOIL	<5	<5	20	<1.0	na	3	680	10	10	2700	300
3750	1400	379197	CSOIL	<5	<5	20	<1.0	na	3	570	<5	10	2400	270
3775	1400	379198	CSOIL	<5	<5	5	<1.0	na	3	700	6	10	2150	260
3800	1400	379199	CSOIL	<5	<5	5	<1.0	na	2	810	<5	10	2250	250
3825	1400	379200	CSOIL	<5	<5	5	<1.0	na	6	770	25	10	2400	230
3850	1400	379201	CSOIL	<5	<5	25	<1.0	na	5	600	15	10	2600	230
3875	1400	379202	CSOIL	<5	<5	5	<1.0	na	13	560	15	15	2800	210
3900	1400	379203	CSOIL	<5	<5	20	<1.0	na	15	640	25	10	2400	210
3925	1400	379204	CSOIL	<5	<5	10	<1.0	na	1	620	<5	10	2350	250
3950	1400	379205	CSOIL	<5	<5	15	<1.0	na	2	750	15	10	2550	250
3975	1400	379206	CSOIL	<5	<5	5	<1.0	na	<1	630	<5	5	2350	250
4000	1400	379207	CSOIL	<5	<5	5	<1.0	na	3	640	30	5	2800	220
4025	1400	379208	CSOIL	<5	<5	25	<1.0	na	4	560	8	10	3700	240
4050	1400	379209	CSOIL	<5	<5	5	<1.0	na	6	440	15	10	4350	280
4075	1400	379210	CSOIL	<5	<5	10	<1.0	na	2	390	15	5	3000	300
4100	1400	379211	CSOIL	<5	<5	20	<1.0	na	5	640	<5	5	2250	260
4125	1400	379212	CSOIL	<5	<5	15	<1.0	na	3	270	120	15	2000	180
4150	1400	379213	CSOIL	<5	<5	20	<1.0	na	2	450	10	10	2400	260
4175	1400	379214	CSOIL	<5	<5	5	<1.0	na	1	460	30	15	3200	310
4200	1400	379215	CSOIL	<5	<5	15	<1.0	na	1	480	25	10	2450	270
4225	1400	379216	CSOIL	<5	<5	15	<1.0	na	<1	370	15	10	2850	270
4250	1400	379217	CSOIL	<5	<5	10	<1.0	na	<1	390	<5	5	3500	310
4275	1400	379218	CSOIL	<5	<5	15	<1.0	na	<1	330	15	10	2700	240
4300	1400	379219	CSOIL	<5	<5	15	<1.0	na	<1	180	110	15	4500	260
4325	1400	379220	CSOIL	<5	<5	15	<1.0	na	4	320	50	10	4300	320
4350	1400	379221	CSOIL	<5	<5	5	<1.0	na	<1	150	15	5	4550	310
4375	1400	379222	CSOIL	<5	<5	10	<1.0	na	1	240	70	10	4150	280
4400	1400	379223	CSOIL	<5	<5	10	<1.0	na	2	190	10	5	5100	360
4425	1400	379224	CSOIL	<5	<5	20	<1.0	na	2	260	25	10	6000	400
4450	1400	379225	CSOIL	<5	<5	15	<1.0	na	3	280	40	15	5050	320
4475	1400	379226	CSOIL	<5	<5	5	<1.0	na	1	210	40	10	5950	530
4500	1400	379227	CSOIL	<5	<5	10	<1.0	na	<1	260	35	10	6850	550
4525	1400	379228	CSOIL	<5	<5	10	<1.0	na	<1	370	120	15	3750	420
4550	1400	379229	CSOIL	<5	<5	10	<1.0	na	<1	410	45	10	4900	280
4575	1400	379230	CSOIL	<5	<5	5	<1.0	na	<1	230	55	10	5500	270
4600	1400	379231	CSOIL	<5	<5	10	<1.0	na	2	360	20	10	3650	180
4625	1400	379232	CSOIL	<5	<5	5	<1.0	na	1	400	85	20	3400	240
4650	1400	379233	CSOIL	<5	<5	20	<1.0	na	1	430	85	15	3600	280
4675	1400	379234	CSOIL	15	5	20	<1.0	na	3	310	190	25	3450	250
4700	1400	379235	CSOIL	<5	<5	20	<1.0	na	7	180	250	35	4150	190
4725	1400	379236	CSOIL	<5	<5	15	<1.0	na	7	160	250	30	4850	220
4750	1400	379237	CSOIL	10	<5	30	<1.0	na	9	270	280	55	4550	200
4775	1400	379238	CSOIL	10	<5	25	<1.0	na	8	170	340	50	4450	180
4800	1400	379239	CSOIL	<5	<5	20	<1.0	na	3	160	230	20	4600	210
4825	1400	379240	CSOIL	<5	<5	10	<1.0	na	<1	220	45	10	2400	270
3700	1600	430851	CSOIL	<5	<5	45	<.5	<.008	2	490	30	na	2850	250
3725	1600	430853	CSOIL	<5	<5	30	<.5	<.008	2	390	<5	na	2250	290
3750	1600	430855	CSOIL	<5	<5	25	<.5	<.008	2	580	15	na	2550	280
3775	1600	430857	CSOIL	<5	<5	25	<.5	<.008	1	530	<5	na	1950	270
3800	1600	430859	CSOIL	<5	<5	20	<.5	<.008	1	560	<5	na	2950	260
3825	1600	430861	CSOIL	<5	<5	20	<.5	<.008	2	500	10	na	2700	280
3850	1600	430863	CSOIL	<5	<5	25	<.5	<.008	2	480	<5	na	2700	280
3875	1600	430865	CSOIL	<5	<5	20	<.5	.010	2	290	15	na	2500	290
3900	1600	430867	CSOIL	<5	<5	20	<.5	<.008	1	240	<5	na	2700	290
3925	1600	430869	CSOIL	10	<5	25	<.5	<.008	5	270	20	na	2800	300
3950	1600	430871	CSOIL	<5	<5	25	<.5	<.008	2	260	<5	na	2800	280
3975	1600	430873	CSOIL	<5	<5	25	<.5	<.008	2	310	30	na	2500	260
4000	1600	430875	CSOIL	<5	<5	25	<.5	<.008	1	620	<5	na	1400	190
4025	1600	430877	CSOIL	<5	<5	15	<.5	<.008	1	180	25	na	2500	250
4050	1600	430879	CSOIL	<5	<5	20	<.5	<.008	1	340	<5	na	3000	320
4075	1600	430881	CSOIL	<5	<5	25	<.5	<.008	1	430	30	na	3300	250
4100	1600	430883	CSOIL	20	<5	95	<.5	<.008	10	290	210	na	4950	200

4125	1600	430885	CSOIL	5	<5	30	<.5	.010	2	260	30	na	2500	280
4150	1600	430887	CSOIL	<5	<5	35	<.5	<.008	3	260	25	na	3400	320
4175	1600	430889	CSOIL	<5	<5	30	<.5	.032	2	250	10	na	2850	320
4200	1600	430891	CSOIL	<5	<5	15	<.5	<.008	1	380	<5	na	2800	320
4225	1600	430893	CSOIL	5	<5	40	<.5	<.008	4	400	20	na	2200	260
4250	1600	430895	CSOIL	5	<5	45	<.5	<.008	6	350	15	na	2650	270
4275	1600	430897	CSOIL	<5	5	60	<.5	<.008	7	390	25	na	2600	230
4300	1600	430899	CSOIL	20	10	110	<.5	<.008	14	320	60	na	3200	260
4325	1600	430901	CSOIL	5	<5	45	<.5	<.008	9	240	45	na	3800	310
4350	1600	430903	CSOIL	10	10	45	<.5	<.008	9	250	50	na	3850	310
4375	1600	430905	CSOIL	20	20	130	<.5	.013	16	360	75	na	4150	320
4400	1600	430907	CSOIL	20	25	150	<.5	<.008	16	390	75	na	4150	320
4425	1600	430909	CSOIL	10	20	45	<.5	<.008	7	170	45	na	3450	340
4450	1600	430911	CSOIL	10	15	40	<.5	<.008	9	380	55	na	4850	330
4475	1600	430913	CSOIL	10	10	40	<.5	<.008	4	120	30	na	4150	280
4500	1600	430915	CSOIL	10	10	35	<.5	<.008	6	210	35	na	4250	260
4525	1600	430917	CSOIL	10	15	50	<.5	<.008	8	320	35	na	3950	270
4550	1600	430919	CSOIL	10	10	75	<.5	<.008	4	570	35	na	2900	250
4575	1600	430921	CSOIL	<5	<5	25	<.5	<.008	5	270	25	na	2200	270
4600	1600	430923	CSOIL	<5	<5	15	<.5	<.008	2	260	50	na	3250	310
4625	1600	430925	CSOIL	<5	<5	15	<.5	<.008	1	90	490	na	3150	260
4650	1600	430927	CSOIL	15	<5	45	<.5	<.008	3	360	60	na	5400	220
4675	1600	430929	CSOIL	15	<5	40	<.5	<.008	3	330	65	na	5450	210
4700	1600	430931	CSOIL	20	<5	50	<.5	<.008	2	680	75	na	5400	200
4325	1800	314778	CSOIL	5	20	80	na	na	20	1600	na	na	na	na
4350	1800	314779	CSOIL	10	20	70	na	na	20	1100	na	na	na	na
4375	1800	314780	CSOIL	5	5	20	na	na	<10	700	na	na	na	na
4400	1800	314781	CSOIL	10	10	60	na	na	15	900	na	na	na	na
4425	1800	314782	CSOIL	5	15	50	na	na	15	950	na	na	na	na
4450	1800	314783	CSOIL	5	15	50	na	na	15	900	na	na	na	na
4475	1800	314784	CSOIL	<5	5	5	na	na	<10	550	na	na	na	na
4500	1800	314785	CSOIL	<5	10	30	na	na	15	800	na	na	na	na
4525	1800	314786	CSOIL	10	20	25	na	na	15	600	na	na	na	na
4550	1800	314787	CSOIL	<5	20	15	na	na	<10	400	na	na	na	na
4575	1800	314788	CSOIL	5	15	30	na	na	20	900	na	na	na	na
4600	1800	314789	CSOIL	<5	15	5	na	na	15	400	na	na	na	na
4625	1800	314790	CSOIL	50	30	90	na	na	70	500	na	na	na	na
4650	1800	314791	CSOIL	<5	<5	<5	na	na	<10	180	na	na	na	na
4675	1800	314792	CSOIL	<5	<5	<5	na	na	<10	340	na	na	na	na
2800	1800	379106	CSOIL	<5	5	15	<1.0	na	2	500	6	5	6000	320
2825	1800	379107	CSOIL	<5	15	35	<1.0	na	3	480	20	20	4150	240
2850	1800	379108	CSOIL	20	10	25	1.0	na	3	510	<5	10	3200	290
2875	1800	379109	CSOIL	5	15	30	<1.0	na	5	510	6	10	4800	190
2900	1800	379110	CSOIL	<5	15	25	<1.0	na	2	400	30	10	6000	210
2925	1800	379111	CSOIL	<5	10	25	<1.0	na	1	400	<5	10	5750	200
2950	1800	379112	CSOIL	5	10	30	<1.0	na	2	350	40	20	5250	200
2975	1800	379113	CSOIL	<5	10	20	<1.0	na	1	590	<5	5	6050	240
3000	1800	379114	CSOIL	<5	10	25	<1.0	na	2	380	9	10	5450	230
3025	1800	379115	CSOIL	10	15	50	<1.0	na	2	410	20	15	5150	190
3050	1800	379116	CSOIL	<5	10	35	<1.0	na	2	880	<5	10	4000	200
3075	1800	379117	CSOIL	<5	<5	20	<1.0	na	2	350	<5	10	2850	290
3100	1800	379118	CSOIL	<5	<5	10	1.0	na	2	220	55	10	3000	310
3125	1800	379119	CSOIL	<5	<5	15	<1.0	na	3	480	5	5	3200	380
3150	1800	379120	CSOIL	<5	<5	10	<1.0	na	2	260	<5	5	3150	330
3175	1800	379121	CSOIL	<5	<5	35	<1.0	na	3	350	15	10	3500	320
3200	1800	379122	CSOIL	25	<5	75	<1.0	na	7	450	120	5	3800	280
3225	1800	379123	CSOIL	15	<5	50	<1.0	na	4	460	65	20	3000	260
3250	1800	379124	CSOIL	5	<5	45	<1.0	na	4	370	40	15	3500	290
3275	1800	379125	CSOIL	<5	<5	20	<1.0	na	2	470	25	10	2850	340
3300	1800	379126	CSOIL	<5	<5	20	<1.0	na	3	670	25	5	2900	270
3325	1800	379127	CSOIL	<5	<5	25	<1.0	na	5	600	30	15	2850	200
3350	1800	379128	CSOIL	<5	5	20	<1.0	na	4	540	15	15	3200	170
3400	1800	379130	CSOIL	10	<5	45	<1.0	na	5	480	40	20	4500	200
3425	1800	379131	CSOIL	10	<5	25	<1.0	na	4	310	30	15	3050	180
3450	1800	379132	CSOIL	5	<5	50	<1.0	na	6	500	40	20	4300	190
3475	1800	379133	CSOIL	<5	<5	20	<1.0	na	4	560	5	15	2750	240
3500	1800	379134	CSOIL	<5	<5	10	<1.0	na	2	460	9	10	2900	240
3525	1800	379135	CSOIL	<5	<5	10	<1.0	na	1	490	<5	10	3450	220
3550	1800	379136	CSOIL	<5	<5	15	<1.0	na	1	370	15	15	2850	230
3575	1800	379137	CSOIL	<5	<5	10	<1.0	na	2	550	10	10	2800	260
3600	1800	379138	CSOIL	<5	<5	20	<1.0	na	7	630	<5	10	2300	230
3625	1800	379139	CSOIL	<5	<5	10	<1.0	na	2	470	15	10	2650	230
3650	1800	379140	CSOIL	<5	<5	10	<1.0	na	2	340	<5	10	2750	280
3675	1800	379141	CSOIL	<5	<5	25	<1.0	na	3	440	20	10	2550	250
3700	1800	379142	CSOIL	5	<5	45	<1.0	na	50	270	10	15	1900	190
3725	1800	379143	CSOIL	<5	<5	20	1.0	na	7	380	9	10	2750	300
3750	1800	379144	CSOIL	5	<5	30	<1.0	na	15	290	<5	10	2600	260
3775	1800	379145	CSOIL	<5	<5	20	<1.0	na	15	360	15	10	2750	270
3800	1800	379146	CSOIL	<5	<5	25	<1.0	na	14	390	<5	15	4800	260
3825	1800	379147	CSOIL	<5	5	10	<1.0	na	9	310	<5	5	2950	300
3850	1800	379148	CSOIL	<5	<5	15	<1.0	na	3	270	50	10	2800	280
3875	1800	379149	CSOIL	<5	<5	15	<1.0	na	5	960	5	10	2600	240
3900	1800	379150	CSOIL	<5	<5	15	<1.0	na	1	270	35	10	3200	320
3925	1800	379151	CSOIL	<5	<5	20	<1.0	na	5	350	<5	10	3000	330
3950	1800	379152	CSOIL	<5	<5	15	<1.0	na	1	260	<5	10	3450	330
3975	1800	379153	CSOIL	<5	<5	20	<1.0	na	1	350	25	10	3050	370
4000	1800	379154	CSOIL	<5	<5	10	<1.0	na	2	280	<5	10	4450	370
4025	1800	379155	CSOIL	<5	<5	15	<1.0	na	7	160	40	10	3600	320
4050	1800	379156	CSOIL	<5	<5	15	<1.0	na	4	250	15	10	3400	300
4075	1800	379157	CSOIL	<5	<5	10	<1.0	na	4	360	40	15	3500	290
4100	1800	379158	CSOIL	<5	<5	10	<1.0	na	2	400	20	10	3500	280
4125	1800	379159	CSOIL	<5	<5	15	<1.0	na	5	300	30	10	2750	240

4150	1800	379160	CSOIL	<5	<5	10	<1.0	na	4	460	5	10	2500	230
4175	1800	379161	CSOIL	<5	<5	20	<1.0	na	5	520	10	10	2150	200
4200	1800	379162	CSOIL	<5	<5	25	<1.0	na	7	300	5	10	4400	300
4225	1800	379163	CSOIL	<5	<5	20	<1.0	na	6	220	30	10	3450	250
4250	1800	379164	CSOIL	<5	5	20	<1.0	na	22	380	6	15	5750	190
4275	1800	379165	CSOIL	<5	10	50	<1.0	na	34	340	20	10	5050	290
4300	1800	379166	CSOIL	5	20	120	<1.0	na	51	640	110	30	5850	350
3700	2000	430932	CSOIL	10	<5	30	<.5	<.008	4	380	35	na	3500	290
3750	2000	430936	CSOIL	<5	<5	15	<.5	<.008	1	170	380	na	2750	250
3775	2000	430938	CSOIL	<5	<5	15	<.5	<.008	1	160	360	na	3550	280
3800	2000	430940	CSOIL	<5	<5	20	<.5	<.008	1	370	390	na	3100	290
3825	2000	430942	CSOIL	<5	<5	15	<.5	<.008	2	110	15	na	4650	270
3850	2000	430944	CSOIL	<5	<5	15	<.5	<.008	1	200	540	na	3500	290
3875	2000	430946	CSOIL	<5	<5	25	<.5	<.008	<1	560	210	na	2100	250
3900	2000	430948	CSOIL	<5	<5	20	<.5	<.008	<1	270	5	na	2550	300
3925	2000	430950	CSOIL	<5	<5	20	.5	<.008	1	430	240	na	2400	270
3950	2000	430952	CSOIL	<5	<5	25	<.5	<.008	2	360	150	na	2900	290
3975	2000	430954	CSOIL	<5	<5	25	<.5	<.008	1	270	280	na	2400	270
4000	2000	430956	CSOIL	<5	<5	30	<.5	<.008	3	420	300	na	1950	260
4025	2000	430958	CSOIL	<5	<5	20	<.5	<.008	1	580	260	na	3900	340
4050	2000	430960	CSOIL	<5	<5	20	<.5	<.008	1	620	880	na	3300	360
4075	2000	430962	CSOIL	<5	<5	20	<.5	<.008	2	690	1150	na	3300	340
4100	2000	430964	CSOIL	<5	5	35	<.5	<.008	3	720	1250	na	3250	340
4125	2000	430966	CSOIL	<5	<5	25	<.5	<.008	2	660	1150	na	3800	370
4150	2000	430968	CSOIL	<5	<5	30	<.5	<.008	3	570	1200	na	4000	350
4175	2000	430970	CSOIL	5	<5	40	<.5	<.008	8	520	1300	na	4700	360
4200	2000	430972	CSOIL	5	10	30	<.5	<.008	7	340	230	na	3900	250
4225	2000	430974	CSOIL	<5	125	30	<.5	<.008	8	260	550	na	4200	220
4250	2000	430976	CSOIL	10	5	35	<.5	<.008	9	460	850	na	5650	410
4275	2000	430978	CSOIL	<5	<5	30	<.5	<.008	7	680	540	na	5200	380
4300	2000	430980	CSOIL	<5	<5	20	<.5	<.008	6	430	45	na	4200	260
4325	2000	430982	CSOIL	<5	<5	15	<.5	<.008	1	310	20	na	4350	270
4350	2000	430984	CSOIL	<5	<5	15	<.5	<.008	2	190	30	na	3600	200
4375	2000	430986	CSOIL	<5	<5	20	<.5	<.008	11	360	25	na	2650	170
4400	2000	430988	CSOIL	15	<5	20	<.5	<.008	6	230	35	na	3400	200
4425	2000	430990	CSOIL	20	10	65	<.5	<.008	9	590	50	na	3400	220
4475	2000	430994	CSOIL	5	<5	30	<.5	<.008	10	310	40	na	3050	180
4500	2000	430996	CSOIL	25	10	165	<.5	<.008	15	430	95	na	4350	260
4525	2000	430998	CSOIL	5	<5	20	<.5	<.008	4	280	130	na	4200	270
4550	2000	431000	CSOIL	<5	<5	20	<.5	<.008	8	330	210	na	3500	220
4575	2000	515002	CSOIL	<5	<5	35	<.5	<.008	6	340	200	na	3500	230
2600	2200	378997	CSOIL	<5	10	30	<1.0	na	5	690	10	10	3350	260
2625	2200	378998	CSOIL	<5	10	45	<1.0	na	4	590	<5	10	2800	300
2650	2200	378999	CSOIL	<5	5	10	<1.0	na	3	160	15	5	3000	310
2675	2200	379000	CSOIL	<5	5	20	<1.0	na	4	410	<5	5	2350	290
2700	2200	379001	CSOIL	<5	5	10	<1.0	na	4	390	10	5	3350	310
2725	2200	379002	CSOIL	<5	<5	30	<1.0	na	5	590	<5	10	3100	330
2750	2200	379003	CSOIL	<5	5	20	<1.0	na	5	440	30	10	3150	260
2775	2200	379004	CSOIL	<5	5	10	<1.0	na	3	260	20	5	4850	340
2800	2200	379005	CSOIL	<5	10	20	<1.0	na	4	490	<5	<5	3350	310
2825	2200	379006	CSOIL	<5	10	35	<1.0	na	7	270	15	10	5700	270
2850	2200	379007	CSOIL	15	10	75	<1.0	na	7	210	<5	15	8700	210
2875	2200	379008	CSOIL	<5	10	35	<1.0	na	6	390	<5	10	4350	330
2900	2200	379009	CSOIL	<5	10	65	<1.0	na	15	630	6	10	4500	170
2925	2200	379010	CSOIL	<5	10	50	<1.0	na	4	690	25	15	4800	200
2950	2200	379011	CSOIL	<5	10	25	<1.0	na	4	590	7	10	5300	220
2975	2200	379012	CSOIL	<5	10	40	<1.0	na	6	330	10	15	4450	210
3000	2200	379013	CSOIL	<5	5	35	1.0	na	5	400	25	10	4700	200
3025	2200	379014	CSOIL	<5	10	30	<1.0	na	5	320	5	10	3400	250
3050	2200	379015	CSOIL	<5	5	30	<1.0	na	4	690	15	5	2800	320
3075	2200	379016	CSOIL	<5	10	20	<1.0	na	4	390	<5	10	2550	300
3100	2200	379017	CSOIL	<5	5	25	<1.0	na	5	350	10	5	2900	300
3125	2200	379018	CSOIL	15	15	45	<1.0	na	5	850	230	20	3450	190
3150	2200	379019	CSOIL	<5	10	30	<1.0	na	7	660	25	10	2700	180
3175	2200	379020	CSOIL	5	<5	35	<1.0	na	1	750	<5	<5	2700	220
3200	2200	379021	CSOIL	<5	10	25	<1.0	na	4	930	15	10	2750	240
3225	2200	379022	CSOIL	<5	10	20	<1.0	na	5	700	9	5	3150	250
3250	2200	379023	CSOIL	<5	5	15	<1.0	na	5	620	15	5	3800	270
3275	2200	379024	CSOIL	<5	5	20	<1.0	na	4	580	15	10	2850	230
3300	2200	379025	CSOIL	<5	5	10	<1.0	na	4	80	<5	<5	3700	310
3325	2200	379026	CSOIL	<5	10	10	<1.0	na	4	550	<5	<5	2950	320
3350	2200	379027	CSOIL	<5	10	15	<1.0	na	4	440	55	5	2400	320
3375	2200	379028	CSOIL	<5	5	35	<1.0	na	6	960	<5	5	2950	310
3400	2200	379029	CSOIL	<5	5	50	<1.0	na	9	700	20	10	3250	290
3425	2200	379030	CSOIL	<5	10	40	<1.0	na	6	530	7	5	3650	280
3450	2200	379031	CSOIL	15	10	50	<1.0	na	12	520	20	15	3700	220
3475	2200	379032	CSOIL	5	15	25	<1.0	na	9	360	10	15	3100	250
3500	2200	379033	CSOIL	<5	5	10	<1.0	na	6	730	35	5	3550	250
3525	2200	379034	CSOIL	<5	10	15	<1.0	na	7	610	6	5	3300	240
3550	2200	379035	CSOIL	<5	5	15	<1.0	na	5	460	30	<5	3350	340
3575	2200	379036	CSOIL	<5	15	10	<1.0	na	5	700	<5	5	2100	220
3600	2200	379037	CSOIL	10	20	35	<1.0	na	7	570	7	15	1600	190
3625	2200	379038	CSOIL	<5	10	20	<1.0	na	1	540	20	10	2350	240
3650	2200	379039	CSOIL	<5	15	20	<1.0	na	3	580	6	10	2300	240
3675	2200	379040	CSOIL	<5	10	20	<1.0	na	2	480	15	10	2250	250
3700	2200	379041	CSOIL	<5	5	10	<1.0	na	2	400	<5	5	2900	280
3725	2200	379042	CSOIL	<5	10	15	<1.0	na	2	770	<5	10	2900	240
3750	2200	379043	CSOIL	<5	10	10	<1.0	na	2	820	25	10	2750	220
3775	2200	379044	CSOIL	<5	5	15	<1.0	na	3	800	<5	10	2450	250
3800	2200	379045	CSOIL	<5	5	10	<1.0	na	1	580	<5	10	2800	240
3825	2200	379046	CSOIL	<5	<5	20	<1.0	na	1	370	25	10	3000	270
3850	2200	379047	CSOIL	<5	5	15	<1.0	na	2	320	<5	10	3550	270

3875	2200	379048	CSOIL	<5	5	20	<1.0	na	1	410	<5	10	3350	290
3900	2200	379049	CSOIL	<5	5	20	<1.0	na	1	420	25	10	3600	290
3925	2200	379050	CSOIL	<5	<5	10	<1.0	na	1	390	<5	10	4550	300
3950	2200	379051	CSOIL	<5	5	15	<1.0	na	1	340	<5	10	3500	280
3975	2200	379052	CSOIL	<5	10	30	<1.0	na	1	580	30	15	2400	280
4000	2200	379053	CSOIL	<5	<5	35	<1.0	na	1	410	<5	10	3050	300
4025	2200	379054	CSOIL	<5	<5	30	<1.0	na	1	350	<5	5	1950	240
4050	2200	379055	CSOIL	<5	5	15	<1.0	na	1	560	10	5	3400	290
4075	2200	379056	CSOIL	<5	<5	15	<1.0	na	1	710	<5	5	3550	310
4100	2200	379057	CSOIL	<5	5	15	<1.0	na	1	510	<5	5	3450	320
4125	2200	379058	CSOIL	5	<5	65	<1.0	na	3	440	25	20	5350	200
4150	2200	379059	CSOIL	<5	<5	20	<1.0	na	1	440	<5	10	3200	290
4175	2200	379060	CSOIL	<5	5	15	1.0	na	1	290	6	5	3200	240
4200	2200	379061	CSOIL	<5	5	15	<1.0	na	2	230	25	10	4400	240
4225	2200	379062	CSOIL	<5	30	20	<1.0	na	9	370	8	5	3850	210
4250	2200	379063	CSOIL	<5	10	25	<1.0	na	23	240	10	10	4650	210
4275	2200	379064	CSOIL	10	20	75	<1.0	na	11	650	100	25	5750	400
4300	2200	379065	CSOIL	<5	20	20	<1.0	na	8	300	20	5	3950	190
4325	2200	379066	CSOIL	15	60	155	<1.0	na	27	350	35	30	3700	300
4350	2200	379067	CSOIL	15	45	60	<1.0	na	20	460	60	20	3750	290
4375	2200	379068	CSOIL	10	15	30	1.0	na	11	660	75	30	3400	240
4400	2200	379069	CSOIL	5	10	20	1.0	na	4	500	85	20	3350	290
4425	2200	379070	CSOIL	<5	15	20	1.0	na	12	380	210	30	3250	210
4450	2200	379071	CSOIL	<5	10	20	1.0	na	9	370	210	30	3500	220
4475	2200	379072	CSOIL	10	10	25	1.0	na	7	340	180	25	3350	240
4500	2200	379073	CSOIL	10	15	35	1.0	na	7	420	190	40	3500	200
4200	2400	515013	CSOIL	5	35	105	<.5	<.008	5	710	40	na	3600	250
4225	2400	515015	CSOIL	<5	85	35	<.5	<.008	5	540	15	na	5150	260
4275	2400	515019	CSOIL	<5	<5	25	<.5	<.008	3	400	100	na	3200	250
4300	2400	515021	CSOIL	<5	<5	25	<.5	<.008	4	390	150	na	3050	230
4325	2400	515023	CSOIL	<5	<5	25	<.5	<.008	5	340	130	na	3100	240
4350	2400	515025	CSOIL	<5	<5	30	<.5	<.008	4	340	140	na	2850	220
4375	2400	515027	CSOIL	<5	<5	20	<.5	<.008	4	400	130	na	3600	300
4400	2400	515029	CSOIL	<5	<5	20	<.5	<.008	3	290	190	na	3600	230
4425	2400	515031	CSOIL	5	<5	30	<.5	<.008	6	480	130	na	2850	240
2450	2600	378882	CSOIL	10	<5	15	<1.0	na	6	610	15	15	2700	350
2475	2600	378883	CSOIL	5	<5	15	<1.0	na	6	480	50	15	2750	350
2500	2600	378884	CSOIL	5	<5	15	<1.0	na	7	380	20	15	3550	400
2525	2600	378885	CSOIL	5	10	15	<1.0	na	5	350	25	20	3550	390
2550	2600	378886	CSOIL	10	<5	20	<1.0	na	5	190	55	20	4550	490
2575	2600	378887	CSOIL	10	5	40	<1.0	na	5	880	<5	10	2700	370
2600	2600	378888	CSOIL	15	20	75	1.0	na	13	450	10	15	2400	350
2625	2600	378889	CSOIL	10	15	130	1.0	na	9	470	15	15	3000	350
2650	2600	378890	CSOIL	10	15	50	<1.0	na	9	430	10	10	3600	430
2675	2600	378891	CSOIL	10	<5	35	1.0	na	11	490	25	15	3100	420
2825	2600	378897	CSOIL	10	5	20	<1.0	na	5	340	10	15	2850	360
2850	2600	378898	CSOIL	10	10	55	1.0	na	7	460	<5	10	2450	360
2875	2600	378899	CSOIL	10	<5	65	1.0	na	8	390	55	15	2150	280
2900	2600	378900	CSOIL	10	15	30	1.0	na	7	690	20	20	1750	270
2925	2600	378901	CSOIL	10	<5	25	1.0	na	8	550	10	10	3750	340
2950	2600	378902	CSOIL	25	5	45	1.0	na	8	960	25	15	2500	250
2975	2600	378903	CSOIL	10	25	20	<1.0	na	6	290	15	10	4850	270
3000	2600	378904	CSOIL	10	<5	45	1.0	na	5	580	<5	10	2300	240
3025	2600	378905	CSOIL	10	10	40	<1.0	na	5	680	<5	10	2900	240
3050	2600	378906	CSOIL	10	<5	10	<1.0	na	6	310	35	15	2450	260
3075	2600	378907	CSOIL	5	<5	10	1.0	na	5	220	15	10	2350	220
3100	2600	378908	CSOIL	5	<5	20	<1.0	na	4	380	35	15	2250	250
3125	2600	378909	CSOIL	10	5	20	1.0	na	8	620	15	15	2700	250
3150	2600	378910	CSOIL	10	<5	45	<1.0	na	9	590	15	15	2300	270
3175	2600	378911	CSOIL	10	30	15	<1.0	na	9	800	40	15	2100	240
3200	2600	378912	CSOIL	5	<5	15	<1.0	na	6	640	<5	10	2500	260
3225	2600	378913	CSOIL	5	<5	15	<1.0	na	7	440	15	15	3100	260
3250	2600	378914	CSOIL	5	15	15	<1.0	na	7	420	55	20	2750	240
3275	2600	378915	CSOIL	5	<5	15	<1.0	na	4	390	20	15	3000	270
3300	2600	378916	CSOIL	5	10	10	1.0	na	3	300	10	15	2200	280
3350	2600	378918	CSOIL	5	<5	15	<1.0	na	6	430	15	15	2300	280
3375	2600	378919	CSOIL	5	20	20	<1.0	na	13	410	8	15	2850	340
3400	2600	378920	CSOIL	5	<5	30	<1.0	na	5	480	25	15	2450	340
3425	2600	378921	CSOIL	5	<5	40	<1.0	na	7	480	5	15	3500	340
3450	2600	378922	CSOIL	5	10	25	<1.0	na	7	280	8	15	2550	330
3475	2600	378923	CSOIL	5	5	25	1.0	na	7	380	15	15	2650	350
3500	2600	378924	CSOIL	5	<5	20	1.0	na	7	450	10	10	2750	350
3525	2600	378925	CSOIL	10	<5	15	<1.0	na	2	340	20	45	2500	330
3550	2600	378926	CSOIL	5	<5	30	<1.0	na	5	570	20	15	2050	300
3575	2600	378927	CSOIL	5	<5	25	<1.0	na	2	610	15	10	2150	260
3600	2600	378928	CSOIL	5	<5	40	1.0	na	6	910	10	15	1800	220
3625	2600	378929	CSOIL	5	10	35	<1.0	na	8	720	25	15	2100	260
3650	2600	378930	CSOIL	5	15	30	<1.0	na	6	580	8	25	2050	290
3675	2600	378931	CSOIL	5	10	25	<1.0	na	7	600	20	25	2300	310
3700	2600	378932	CSOIL	5	<5	25	1.0	na	6	450	<5	15	2500	300
3725	2600	378933	CSOIL	5	<5	10	<1.0	na	3	410	10	10	3350	390
3750	2600	378934	CSOIL	10	5	20	<1.0	na	8	430	100	20	2900	330
3775	2600	378935	CSOIL	5	10	15	<1.0	na	2	380	20	30	3100	340
3800	2600	378936	CSOIL	10	5	25	1.0	na	2	460	55	30	2750	330
3825	2600	378937	CSOIL	10	20	40	<1.0	na	5	300	230	35	2600	240
3875	2600	378939	CSOIL	5	<5	10	<1.0	na	2	150	35	15	3100	350
3900	2600	378940	CSOIL	5	<5	10	<1.0	na	2	250	35	15	3400	330
3925	2600	378941	CSOIL	5	<5	15	<1.0	na	2	250	45	20	2700	270
3950	2600	378942	CSOIL	5	5	20	<1.0	na	1	350	50	25	3000	290
3975	2600	378943	CSOIL	5	<5	15	<1.0	na	2	460	25	15	2900	300
4000	2600	378944	CSOIL	5	<5	25	<1.0	na	3	400	30	15	3200	370
4025	2600	378945	CSOIL	5	<5	20	<1.0	na	2	450	45	15	2550	310

4050	2600	378946	CSOIL	5	<5	40	<1.0	na	9	670	5	15	2250	260
4075	2600	378947	CSOIL	10	15	30	<1.0	na	2	610	75	25	2300	260
4100	2600	378948	CSOIL	5	<5	20	<1.0	na	1	540	6	15	2300	290
4125	2600	378949	CSOIL	5	<5	25	<1.0	na	2	670	7	15	2350	310
4150	2600	378950	CSOIL	5	<5	25	<1.0	na	<1	340	20	10	2200	250
4175	2600	378951	CSOIL	5	<5	20	<1.0	na	2	460	<5	20	2000	252
4200	2600	378952	CSOIL	10	<5	50	1.0	na	10	340	10	20	4250	300
4225	2600	378953	CSOIL	10	<5	40	<1.0	na	18	610	50	25	5050	400
4250	2600	378954	CSOIL	10	10	35	<1.0	na	7	830	30	25	2950	290
4275	2600	378955	CSOIL	10	<5	15	1.0	na	6	250	85	25	2850	280
4300	2600	378956	CSOIL	10	<5	20	<1.0	na	6	280	55	30	2400	290
4325	2600	378957	CSOIL	10	<5	15	<1.0	na	10	310	140	25	2750	280
4350	2600	378958	CSOIL	10	<5	20	1.0	na	11	310	170	35	2750	260
3900	2800	314516	CSOIL	<5	<5	10	na	na	<10	800	28	10	3400	200
3925	2800	314517	CSOIL	<5	<5	<5	na	na	<10	850	na	na	na	na
3950	2800	314518	CSOIL	<5	<5	10	na	na	<10	800	na	na	na	na
3975	2800	314519	CSOIL	<5	<5	15	na	na	<10	380	na	na	na	na
4000	2800	314520	CSOIL	<5	80	180	na	na	15	280	na	na	na	na
4025	2800	314521	CSOIL	<5	20	60	na	na	10	120	na	na	na	na
4050	2800	314522	CSOIL	10	15	70	na	na	<10	550	na	na	na	na
4075	2800	314523	CSOIL	<5	<5	30	na	na	<10	360	na	na	na	na
4100	2800	314524	CSOIL	<5	40	80	na	na	10	440	na	na	na	na
4125	2800	314525	CSOIL	<5	15	10	na	na	<10	360	na	na	na	na
4150	2800	314526	CSOIL	<5	35	45	na	na	10	460	na	na	na	na
4175	2800	314527	CSOIL	<5	<5	35	na	na	<10	260	na	na	na	na
4200	2800	314528	CSOIL	<5	<5	45	na	na	<10	650	na	na	na	na
4225	2800	314529	CSOIL	<5	20	60	na	na	30	550	na	na	na	na
4250	2800	314530	CSOIL	<5	30	na	na	na	<10	650	na	na	na	na
2600	2900	379620	CSOIL	<5	<5	30	<1.0	.000	<1	830	<5	10	3150	220
2625	2900	379621	CSOIL	5	<5	35	<1.0	.000	1	810	35	15	3000	220
2650	2900	379622	CSOIL	15	<5	50	<1.0	.000	1	500	25	10	2600	270
2675	2900	379623	CSOIL	15	<5	40	<1.0	.000	<1	410	<5	10	2500	310
2700	2900	379624	CSOIL	<5	<5	25	<1.0	.000	<1	420	15	5	3400	350
2750	2900	379628	CSOIL	10	<5	20	<1.0	.000	<1	200	40	10	2800	300
2763	2900	379629	CSOIL	<5	<5	40	<1.0	.000	2	420	20	10	2700	290
2838	2900	379635	CSOIL	5	<5	60	<1.0	.000	<1	570	5	10	1800	300
2850	2900	379636	CSOIL	5	<5	20	<1.0	.000	1	210	<5	5	3000	310
2863	2900	379637	CSOIL	<5	<5	25	<1.0	.000	<1	620	5	5	2750	300
2875	2900	379638	CSOIL	5	<5	60	<1.0	.000	3	870	5	10	3450	220
2888	2900	379639	CSOIL	5	<5	60	<1.0	.000	1	560	10	10	2300	280
2900	2900	379640	CSOIL	5	<5	25	1.0	.000	1	620	10	10	2650	310
2913	2900	379641	CSOIL	5	<5	30	<1.0	.000	2	470	5	15	3200	310
2925	2900	379642	CSOIL	5	<5	25	<1.0	.000	3	460	20	10	3300	300
2938	2900	379643	CSOIL	10	<5	20	1.0	.000	6	610	15	10	3400	290
2950	2900	379644	CSOIL	5	<5	25	<1.0	.000	4	430	10	10	3850	310
2963	2900	379645	CSOIL	10	<5	50	<1.0	.000	5	390	20	15	3750	200
2975	2900	379646	CSOIL	5	<5	45	<1.0	.000	11	660	15	15	3500	260
2988	2900	379647	CSOIL	20	<5	25	<1.0	.000	2	690	15	15	3650	290
3025	2900	379649	CSOIL	5	<5	30	<1.0	.000	2	980	15	5	2200	250
3050	2900	379650	CSOIL	<5	<5	25	1.0	.000	1	630	<5	10	2400	270
3075	2900	379651	CSOIL	<5	<5	40	1.0	.000	<1	570	15	5	2700	290
3100	2900	379652	CSOIL	<5	<5	20	<1.0	.000	<1	630	35	10	2900	290
2600	2950	379587	CSOIL	5	20	75	<1.0	.000	4	790	55	20	2850	220
2625	2950	379588	CSOIL	<5	20	50	<1.0	.000	1	910	20	15	2700	220
2650	2950	379589	CSOIL	5	5	40	<1.0	.000	2	880	30	15	3050	230
2675	2950	379590	CSOIL	<5	10	50	<1.0	.000	3	530	15	10	2800	290
2700	2950	379591	CSOIL	<5	5	30	<1.0	.000	2	280	30	10	3000	300
2713	2950	379592	CSOIL	<5	<5	25	<1.0	.000	1	440	10	15	3100	320
2725	2950	379593	CSOIL	<5	10	20	<1.0	.000	<1	470	<5	5	3100	310
2738	2950	379594	CSOIL	<5	<5	35	<1.0	.000	2	260	15	10	2650	330
2750	2950	379595	CSOIL	<5	5	10	<1.0	.000	2	90	110	15	1800	190
2763	2950	379596	CSOIL	<5	<5	35	<1.0	.000	2	300	7	10	2900	350
2775	2950	379597	CSOIL	<5	5	30	<1.0	.000	3	200	30	5	2950	350
2788	2950	379598	CSOIL	<5	<5	55	<1.0	.000	2	330	15	10	2350	330
2800	2950	379599	CSOIL	<5	5	25	<1.0	.000	2	580	35	10	2700	310
2813	2950	379600	CSOIL	<5	5	55	<1.0	.000	5	600	15	5	2650	340
2850	2950	379603	CSOIL	5	5	140	<1.0	.000	4	300	9	10	2450	350
2863	2950	379604	CSOIL	5	5	105	<1.0	.000	5	370	15	10	2750	300
2875	2950	379605	CSOIL	5	<5	35	<1.0	.000	1	310	20	10	3150	360
2888	2950	379606	CSOIL	5	<5	25	<1.0	.000	1	790	10	10	2900	320
2900	2950	379607	CSOIL	5	<5	25	<1.0	.000	1	580	10	10	2650	320
2913	2950	379608	CSOIL	10	<5	30	<1.0	.000	1	370	20	10	2700	310
2925	2950	379609	CSOIL	10	<5	35	<1.0	.000	1	540	10	15	3100	350
2938	2950	379610	CSOIL	10	<5	30	<1.0	.000	1	600	10	15	2950	330
2950	2950	379611	CSOIL	5	5	25	<1.0	.000	1	510	<5	10	3750	340
2963	2950	379612	CSOIL	10	<5	60	<1.0	.000	12	630	9	15	3800	210
2975	2950	379613	CSOIL	10	<5	40	<1.0	.000	3	570	10	15	3850	220
2988	2950	379614	CSOIL	5	<5	20	<1.0	.000	<1	380	<5	10	3900	370
3000	2950	379615	CSOIL	5	<5	10	<1.0	.000	<1	530	55	10	3800	340
3025	2950	379616	CSOIL	5	<5	25	<1.0	.000	<1	760	<5	10	1750	230
3050	2950	379617	CSOIL	10	<5	25	<1.0	.000	<1	640	35	10	2650	260
3075	2950	379618	CSOIL	10	<5	35	<1.0	.000	<1	750	9	10	2700	310
3100	2950	379619	CSOIL	5	<5	35	<1.0	.000	<1	670	20	10	2450	270
2275	3000	378774	CSOIL	5	<5	15	<1.0	na	3	460	30	10	4100	220
2300	3000	378775	CSOIL	5	15	35	<1.0	na	3	440	25	10	3950	250
2325	3000	378776	CSOIL	10	5	40	<1.0	na	5	610	20	15	3100	240
2350	3000	378777	CSOIL	5	<5	25	<1.0	na	6	750	30	15	3500	280
2375	3000	378778	CSOIL	5	5	30	<1.0	na	3	750	15	10	3500	260
2400	3000	378779	CSOIL	5	<5	20	<1.0	na	2	770	35	10	3400	260
2425	3000	378780	CSOIL	5	<5	20	<1.0	na	1	570	8	10	3800	270
2450	3000	378781	CSOIL	5	<5	40	<1.0	na	2	380	25	20	2900	270
2475	3000	378782	CSOIL	5	<5	25	<1.0	na	6	650	15	10	3750	290

2500	3000	378783	CSOIL	5	10	25	<1.0	na	1	920	15	10	3300	280
2525	3000	378784	CSOIL	5	<5	20	<1.0	na	3	1000	25	10	3100	280
2550	3000	378785	CSOIL	5	5	30	<1.0	na	2	860	15	15	3400	290
2575	3000	378786	CSOIL	5	<5	40	<1.0	na	3	800	5	10	3600	350
2600	3000	378787	CSOIL	5	10	15	<1.0	na	3	690	30	10	3250	300
2625	3000	378788	CSOIL	5	<5	95	<1.0	na	8	840	10	15	3150	270
2650	3000	378789	CSOIL	5	<5	90	1.0	na	6	910	25	15	2850	240
2675	3000	378790	CSOIL	5	<5	35	<1.0	na	2	630	6	10	3650	310
2700	3000	378791	CSOIL	10	<5	50	1.0	na	2	670	7	10	3500	270
2713	3000	379567	CSOIL	<5	15	40	<1.0	.000	3	600	35	10	4200	240
2725	3000	378792	CSOIL	15	5	55	1.0	na	2	460	30	15	3300	250
2738	3000	379568	CSOIL	<5	10	65	<1.0	.000	2	550	<5	10	3250	260
2750	3000	378793	CSOIL	10	<5	65	<1.0	na	2	790	10	15	3000	260
2763	3000	379569	CSOIL	<5	15	35	<1.0	.000	2	920	25	10	3350	250
2775	3000	378794	CSOIL	10	5	65	<1.0	na	1	540	30	15	3050	270
2788	3000	379570	CSOIL	5	<5	60	<1.0	.000	8	410	5	10	3050	280
2800	3000	378795	CSOIL	10	<5	55	<1.0	na	7	270	<5	10	2850	390
2813	3000	379571	CSOIL	<5	20	30	<1.0	.000	4	740	290	5	2500	280
2825	3000	378796	CSOIL	10	<5	85	<1.0	na	12	450	20	20	2850	340
2838	3000	379572	CSOIL	10	15	110	<1.0	.000	16	490	90	10	2900	290
2900	3000	378799	CSOIL	5	<5	40	<1.0	na	2	460	20	15	2500	370
2913	3000	379575	CSOIL	<5	5	40	<1.0	.000	3	350	20	10	3100	360
2925	3000	378800	CSOIL	5	<5	35	<1.0	na	<1	780	<5	10	2400	390
2938	3000	379576	CSOIL	<5	<5	15	<1.0	.000	<1	530	30	10	2800	350
2950	3000	378801	CSOIL	5	<5	30	1.0	na	<1	630	<5	15	2900	390
2963	3000	379577	CSOIL	<5	<5	15	<1.0	.000	<1	380	25	10	3450	380
2975	3000	378802	CSOIL	5	<5	30	1.0	na	<1	350	35	20	3100	410
2988	3000	379578	CSOIL	<5	5	25	<1.0	.000	5	390	15	10	2650	330
3000	3000	378803	CSOIL	5	<5	25	1.0	na	1	670	10	15	2850	370
3025	3000	378804	CSOIL	5	<5	40	<1.0	na	1	570	9	15	2200	310
3050	3000	378805	CSOIL	5	<5	40	<1.0	na	1	830	25	15	2450	290
3075	3000	378806	CSOIL	5	<5	25	<1.0	na	3	670	7	15	2350	280
3100	3000	378807	CSOIL	5	<5	30	<1.0	na	4	650	25	15	3000	320
3125	3000	378808	CSOIL	5	<5	40	<1.0	na	5	660	10	15	2700	290
3150	3000	378809	CSOIL	5	<5	40	<1.0	na	3	750	45	15	2600	270
3175	3000	378810	CSOIL	5	<5	20	<1.0	na	1	720	<5	15	3100	330
3200	3000	378811	CSOIL	5	<5	20	<1.0	na	2	450	<5	10	3000	390
3225	3000	378812	CSOIL	5	10	35	1.0	na	1	440	30	15	2550	370
3250	3000	378813	CSOIL	5	<5	60	<1.0	na	6	380	<5	10	2350	380
3275	3000	378814	CSOIL	10	<5	30	<1.0	na	3	420	6	15	2800	390
3300	3000	378815	CSOIL	5	10	30	<1.0	na	5	460	25	15	3000	410
3325	3000	378816	CSOIL	10	<5	45	<1.0	na	4	510	5	15	3100	390
3350	3000	378817	CSOIL	10	15	35	1.0	na	<1	1500	6	15	2500	380
3375	3000	378818	CSOIL	10	20	30	1.0	na	1	410	30	15	3000	390
3400	3000	378819	CSOIL	5	20	25	1.0	na	3	600	<5	15	3400	440
3425	3000	378820	CSOIL	5	25	25	1.0	na	1	330	7	15	2850	390
3450	3000	378821	CSOIL	5	20	25	1.0	na	2	300	25	15	2750	360
3475	3000	378822	CSOIL	5	15	30	1.0	na	3	450	<5	10	2600	370
3500	3000	378823	CSOIL	5	15	25	<1.0	na	<1	680	5	10	2200	270
3525	3000	378824	CSOIL	5	15	35	<1.0	na	4	500	30	15	3050	370
3550	3000	378825	CSOIL	<5	20	30	<1.0	na	3	440	5	15	2950	380
3575	3000	378826	CSOIL	<5	20	25	1.0	na	3	480	8	10	2400	330
3600	3000	378827	CSOIL	<5	15	20	1.0	na	<1	450	25	15	2400	320
3625	3000	378828	CSOIL	<5	<5	20	1.0	na	1	510	5	10	2550	300
3650	3000	378829	CSOIL	<5	15	25	1.0	na	7	320	5	10	2450	360
3675	3000	378830	CSOIL	<5	30	30	1.0	na	5	290	40	20	2950	390
3700	3000	378831	CSOIL	<5	15	30	<1.0	na	<1	290	<5	15	2900	390
3725	3000	378832	CSOIL	<5	<5	35	<1.0	na	3	280	30	20	2800	360
3750	3000	378833	CSOIL	<5	20	20	1.0	na	<1	220	<5	15	2750	370
3775	3000	378834	CSOIL	<5	10	20	1.0	na	3	460	5	10	2900	340
3800	3000	378835	CSOIL	<5	15	15	<1.0	na	<1	370	25	15	2850	340
3825	3000	378836	CSOIL	5	25	20	<1.0	na	2	490	<5	15	2550	330
3850	3000	378837	CSOIL	5	20	20	1.0	na	1	370	9	15	2600	330
3875	3000	378838	CSOIL	10	<5	40	<1.0	na	<1	340	20	20	2400	230
3900	3000	378839	CSOIL	5	5	20	1.0	na	<1	400	7	20	2450	280
3925	3000	378840	CSOIL	5	25	30	1.0	na	4	440	9	15	2950	300
3950	3000	378841	CSOIL	10	55	85	1.0	na	8	340	260	45	4200	260
3975	3000	378842	CSOIL	10	20	50	1.0	na	<1	420	70	35	4050	350
4000	3000	378843	CSOIL	10	25	45	1.0	na	8	780	35	35	4700	370
4025	3000	378844	CSOIL	10	30	35	<1.0	na	2	300	75	45	3750	240
4050	3000	378845	CSOIL	5	15	25	1.0	na	7	290	100	35	3100	310
4075	3000	378846	CSOIL	5	<5	25	<1.0	na	6	240	240	45	3600	250
4100	3000	378847	CSOIL	5	5	20	<1.0	na	4	310	260	35	3750	240
4125	3000	378848	CSOIL	<5	15	20	<1.0	na	2	250	180	25	3700	250
4150	3000	378849	CSOIL	<5	20	20	<1.0	na	1	230	160	25	3750	340
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2713	3050	379539	CSOIL	<5	5	35	<1.0	.000	2	980	7	10	3400	240
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2900	3050	379554	CSOIL	<5	5	25	<1.0	.000	4	710	<5	10	2650	340
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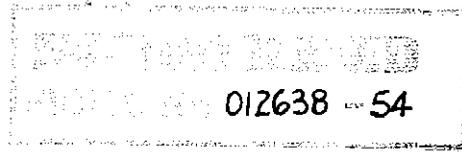


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2880	3400	178297	CSOIL	3	<20	16	na	na	na	na	na	na	na	na
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2940	3400	178303	CSOIL	5	<20	16	na	na	na	na	na	na	na	na
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2980	3400	178307	CSOIL	5	<20	18	na	na	na	na	na	na	na	na
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Aberfoyle Resources Limited  
EXPLORATION DIVISION  
A.C.N. 004 664 108



TASMANIA

EXPLORATION LICENCE 106/87, LAKE MACKINTOSH

PARTIAL RELINQUISHMENT REPORT

FOR

SECOND STATUTORY RELINQUISHMENT

FEBRUARY 1993

VOLUME 2 of 4

TS 9 - 20

93 - 3410.

MINES		
FILE NO.	EL106/87	
	7 FEB 1993	
REQ. BY		
DATE	FOR	INFO.
	Covering letter	
	See EL106/87	
	folio 54A	
	21/12/92	
REVIEW	DATE	

APPENDIX IX

east	north	sample	lab	sample	Job No	Cu[ppm]	Pb[ppm]	Zn[ppm]	Ag[ppm]	Au[ppm]	As[ppm]	Ba[ppm]	Cr[ppm]	Ni[ppm]	Ti[ppm]	Zr[ppm]	Y[ppm]
2811	2929	379870	ANA	CH	3846	<5	<5	70	.5	<.008	4	480	5	15	1800	340	na
2815	2938	379871	ANA	CH	3846	<5	<5	65	<.5	<.008	2	680	<5	35	1800	360	na
2817	2947	379872	ANA	CH	3846	<5	<5	65	.5	<.008	3	870	<5	45	1800	350	na
2821	2957	379873	ANA	CH	3846	5	<5	70	.5	<.008	5	1000	<5	20	1700	350	na
2824	2966	379874	ANA	CH	3846	15	210	175	.5	<.008	10	960	<5	40	1500	310	na
2877	3068	379875	ANA	CH	3846	10	<5	45	<.5	<.008	3	530	<5	10	1650	330	na
2885	3085	379876	ANA	CH	3846	10	<5	60	.5	<.008	2	700	10	40	1750	380	na
2895	3105	379877	ANA	CH	3846	5	<5	45	<.5	<.008	1	750	<5	15	1700	350	na
2902	3123	379878	ANA	CH	3846	5	<5	40	<.5	<.008	1	650	10	20	1600	330	na
2911	3141	379879	ANA	CH	3846	10	<5	45	<.5	<.008	3	250	15	50	1800	340	na
2916	3158	379880	ANA	CH	3846	10	<5	45	1.0	.040	4	240	8	10	1850	340	na
2920	3198	379881	ANA	CH	3846	5	<5	60	<.5	<.008	5	630	20	25	1700	340	na
2918	3214	379882	ANA	CH	3846	5	<5	75	<.5	<.008	3	960	<5	40	1800	360	na
2857	2919	379883	ANA	CH	3847	10	<5	50	<.5	<.008	1	570	<5	10	2050	380	na
2847	2919	379884	ANA	CH	3847	10	<5	45	<.5	<.008	<1	690	9	15	1750	340	na
2837	2918	379885	ANA	CH	3847	10	<5	40	<.5	<.008	1	650	<5	5	2050	380	na
2827	2918	379886	ANA	CH	3847	5	<5	50	<.5	<.008	1	450	5	10	2000	360	na
2817	2918	379887	ANA	CH	3847	5	<5	60	<.5	<.008	1	540	<5	10	1950	370	na
2791	2916	379889	ANA	CH	3847	10	<5	90	<.5	<.008	4	680	15	10	1600	310	na
2781	2917	379890	ANA	CH	3847	10	<5	80	<.5	<.008	9	810	<5	10	1350	280	na
2771	2915	379891	ANA	CH	3847	10	<5	55	<.5	<.008	5	610	25	15	1250	250	na
2762	2912	379892	ANA	CH	3847	10	<5	50	<.5	<.008	8	950	7	10	1250	260	na
2752	2910	379893	ANA	CH	3847	10	<5	30	<.5	<.008	1	770	8	10	1550	300	na
2743	2906	379894	ANA	CH	3847	5	<5	25	<.5	<.008	2	420	20	15	1950	310	na
2733	2903	379895	ANA	CH	3847	5	<5	45	<.5	<.008	1	700	<5	10	1950	370	na
2724	2901	379896	ANA	CH	3847	5	<5	40	<.5	<.008	1	490	10	15	1700	310	na
2714	2896	379897	ANA	CH	3847	5	<5	80	<.5	<.008	1	740	20	10	1750	350	na
2707	2894	379898	ANA	CH	3847	5	<5	50	<.5	<.008	1	290	5	15	1900	350	na
4615	1800	427859	ANA	RC	6002	40	30	50	<.5	<.008	19	840	160	<999	3400	200	30
4565	1800	427861	ANA	RC	6002	20	40	15	<.5	<.008	15	570	25	<999	1950	170	30
4295	1800	427862	ANA	RC	6002	10	35	95	<.5	<.008	64	240	160	<999	5200	420	30
4265	1800	427863	ANA	RC	6002	<5	15	60	<.5	<.008	8	1750	<5	<999	4000	380	50
4295	2200	427865	ANA	RC	6002	35	20	265	<.5	<.008	34	260	25	<999	2700	280	40
4475	2200	427866	ANA	RC	6002	<5	10	30	<.5	<.008	5	230	240	<999	2300	140	10
4475	2000	427869	ANA	RC	6002	<5	5	35	<.5	<.008	8	190	30	<999	1250	200	30
4300	1850	427872	ANA	RC	6002	<5	5	60	<.5	<.008	4	680	55	<999	3000	260	15
4440	1600	427873	ANA	RC	6002	10	20	85	<.5	<.008	11	930	50	<999	3000	250	15
4520	1600	427874	ANA	RC	6002	10	25	35	<.5	<.008	7	680	15	<999	1600	150	20
4400	2000	427871	ANA	RC	6002	15	45	25	<.5	<.008	22	810	20	<999	2100	160	30
2820	2990	271232	ANA	RC	3759	35	120	140	1.5	<.008	na	1550	na	<999	na	na	na
2820	2990	271234	ANA	RC	3759	30	245	420	1.0	<.008	na	2050	na	<999	na	na	na
3900	3000	271419	ANA	RC	3980	5	<5	10	.5	<.008	3	na	na	25	na	na	na
3950	3000	271420	ANA	RC	3980	5	10	55	<.5	<.008	18	860	15	15	1700	280	na
4300	1580	379709	ANA	RC	4248	5	5	105	.5	<.008	25	820	20	15	1900	250	na
3430	1000	427316	ANA	RC	5097	30	<5	100	<.5	.017	2	1150	15	10	3000	170	na
3445	1000	427317	ANA	RC	5097	35	<5	30	<.5	<.008	1	740	<5	<5	1600	270	na
3190	1200	427318	ANA	RC	5097	<5	<5	30	<.5	<.008	<1	660	5	<5	1950	300	na
3300	1200	427319	ANA	RC	5097	5	10	70	<.5	<.008	1	1750	<5	10	1700	250	na
3975	1400	427320	ANA	RC	5097	<5	<5	20	<.5	.025	1	1100	15	10	1350	210	na
4660	1400	427321	ANA	RC	5097	20	20	45	<.5	.008	10	720	90	35	2350	240	na
3125	1800	427322	ANA	RC	5097	<5	<5	30	<.5	<.008	6	1850	15	10	1950	260	na
3350	1800	427323	ANA	RC	5097	<5	5	55	<.5	<.008	4	880	6	5	3250	170	na
3375	1800	427324	ANA	RC	5097	<5	5	35	<.5	<.008	9	1050	25	10	2900	150	na
2930	2000	427325	ANA	RC	5097	<5	<5	70	<.5	<.008	1	1100	6	10	3400	170	na
3510	2000	427326	ANA	RC	5097	<5	<5	75	<.5	<.008	<1	780	10	15	2050	210	na
3430	2200	427327	ANA	RC	5097	5	<5	20	<.5	<.008	1	810	<5	<5	1950	300	na
3325	2400	427328	ANA	RC	5097	5	<5	55	<.5	<.008	1	1900	<5	10	2400	440	na
3450	2400	427329	ANA	RC	5097	<5	<5	30	<.5	<.008	6	1100	<5	<5	2050	320	na
3480	2400	427330	ANA	RC	5097	<5	<5	35	<.5	<.008	4	1250	<5	<5	1750	290	na
3500	2400	427331	ANA	RC	5097	<5	<5	60	<.5	<.008	5	490	15	10	1800	290	na
3525	2400	427332	ANA	RC	5097	<5	5	15	<.5	.008	8	1150	<5	<5	1400	240	na
2800	2600	427333	ANA	RC	5097	15	<5	120	<.5	<.008	3	1150	15	10	3450	210	na
3680	2600	427334	ANA	RC	5097	<5	<5	30	<.5	<.008	1	1000	<5	<5	1600	260	na
3760	2600	427335	ANA	RC	5097	<5	<5	40	<.5	<.008	2	1450	<5	5	1400	230	na
3780	2600	427336	ANA	RC	5097	<5	<5	25	<.5	<.008	1	910	30	10	1550	260	na
3340	2800	427337	ANA	RC	5097	<5	<5	30	<.5	<.008	1	930	<5	5	1450	250	na
3465	2800	427338	ANA	RC	5097	<5	5	50	<.5	<.008	1	1500	<5	<5	2150	340	na
3375	2800	427339	ANA	RC	5097	10	10	35	<.5	<.008	1	250	20	10	1450	230	na
2530	3000	427340	ANA	RC	5097	5	20	65	<.5	<.008	2	1250	<5	5	2100	220	na
3175	3000	427341	ANA	RC	5097	<5	<5	45	<.5	<.008	<1	1500	10	15	1800	210	na
3800	3000	427342	ANA	RC	5097	<5	<5	20	<.5	<.008	<1	1300	<5	<5	1500	240	na
2580	3200	427343	ANA	RC	5097	45	75	215	<.5	<.008	9	1300	85	40	3600	270	na
3495	3200	427344	ANA	RC	5097	<5	<5	20	<.5	<.008	1	260	<5	5	1400	210	na
3515	3200	427345	ANA	RC	5097	<5	<5	15	<.5	<.008	1	350	35	10	1800	290	na
2900	3400	427346	ANA	RC	5097	<5	<5	25	<.5	<.008	2	970	<5	5	1550	240	na

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APPENDIX X

east	north	sample	lab	sample	Job No	Cu[ppm	Pb[ppm	Zn[ppm	Ag[ppm	Au[ppm]	As[ppm	Ba[ppm
2200	3360	430839	ALS	BCL	P427	na	na	na	na	.00005	na	na
3475	2370	430840	ALS	BCL	P427	na	na	na	na	.00005	na	na
3250	1800	430842	ALS	BCL	P427	na	na	na	na	.00002	na	na
3435	1270	430844	ALS	BCL	P427	na	na	na	na	.00002	na	na
3940	2820	430845	ALS	BCL	P427	na	na	na	na	.00010	na	na
4670	1400	430846	ALS	BCL	P427	na	na	na	na	.00025	na	na
2895	1535	430791	ANA	SS	5958	30	35	90	<.5	.01000	16	310
3110	1680	430792	ANA	SS	5958	35	60	180	<.5	.01000	16	310
2205	3350	430795	ANA	SS	5958	40	60	180	<.5	.00900	15	460
2505	3715	430798	ANA	SS	5958	35	15	75	<.5	<.00800	9	490
3985	3085	430799	ANA	SS	5958	45	10	65	<.5	<.00800	9	140
3950	3100	430800	ANA	SS	5958	15	25	80	<.5	<.00800	13	210
3690	3475	430802	ANA	SS	5958	35	30	65	<.5	<.00800	25	330
3730	3510	430803	ANA	SS	5958	5	5	30	<.5	<.00800	9	110
3860	3245	430804	ANA	SS	5958	30	10	45	<.5	<.00800	11	170
3840	3200	430805	ANA	SS	5958	25	10	45	<.5	<.00800	10	270
2975	3240	430806	ANA	SS	5958	20	5	40	<.5	<.00800	13	360
3035	2400	430807	ANA	SS	5958	20	10	50	<.5	.00900	11	530
3225	1735	430809	ANA	SS	5958	40	20	65	.5	<.00800	9	440
3260	1785	430810	ANA	SS	5958	15	25	60	<.5	<.00800	14	280
3540	2160	430811	ANA	SS	5958	40	15	55	<.5	<.00800	11	520
3570	2125	430812	ANA	SS	5958	40	15	50	<.5	<.00800	7	480
3475	2160	430813	ANA	SS	5958	30	50	80	<.5	<.00800	24	280
3460	2420	430814	ANA	SS	5958	30	25	50	<.5	<.00800	19	360
3490	2425	430815	ANA	SS	5958	20	45	85	<.5	.00800	20	240
3545	2550	430816	ANA	SS	5958	30	25	60	<.5	<.00800	10	450
3600	2575	430817	ANA	SS	5958	20	45	100	<.5	<.00800	28	280
2995	1305	430818	ANA	SS	5958	20	35	70	<.5	<.00800	7	450
3300	1260	430819	ANA	SS	5958	40	5	50	<.5	<.00800	2	210
3425	1260	430820	ANA	SS	5958	45	35	100	<.5	<.00800	5	470
3440	1000	430821	ANA	SS	5958	30	10	50	<.5	<.00800	3	450
3775	1260	430822	ANA	SS	5958	20	5	40	<.5	<.00800	4	420
4580	1800	430825	ANA	SS	5958	30	20	60	<.5	<.00800	21	370
4640	1500	430827	ANA	SS	5958	15	20	40	<.5	<.00800	11	330
4620	1485	430828	ANA	SS	5958	20	15	45	<.5	<.00800	7	460
3940	2780	430829	ANA	SS	5958	20	50	115	<.5	.01500	29	250
3990	2710	430830	ANA	SS	5958	10	15	50	<.5	<.00800	9	540

APPENDIX XI

**SIROTOPE**

CSIRO

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REPORT TO  
ABERFOYLE RESOURCES LTD  
ON  
A Pb ISOTOPIC STUDY  
OF  
PYRITIC ROCKS, HELLYER AREA

SR 039

GRAHAM R. CARR  
JUDITH A. DEAN  
28/7/8

## 1. AIMS OF STUDY

The aim of this work has been to determine whether Pb in pyritic rocks from Cambrian rhyolitic volcanics in the Hellyer area is Cambrian or Devonian in origin.

## 2. SAMPLES

Two pyritic samples, containing 145 and 225ppm Pb, were analysed.

## 3 TARGET SIGNATURES

The target signatures used are that of the Hellyer mine, Devonian veins from throughout the west coast of Tasmania and pyritic rocks from the Lake Selina deposit. The target signature is defined by ellipses which represent the distribution of the target data (mean + 2xSD, or 95% confidence domains).

## 4. METHODS

Sample 271234 was received in a coarsely crushed form which was used for the initial analysis. Subsequently the sample was pulverised and analyses 2 and 3 are duplicates of this material. All samples were digested in a 7N nitric + 7N hydrochloric solution prior to ion exchange and electroplating onto Pt electrodes. The samples were analysed on an ISOMASS 54E solid source thermal ionization mass spectrometer in fully automated mode. Precision estimates representing 2 standard deviations about the mean of over 700 analyses of standards are shown in the top left hand corner of the figures presented below.

## 5. RESULTS

Sample 271234 was analysed in triplicate (points 1, 2 and 3 in Figures 1 and 2) and 271221 in duplicate (points 4 and 5, Figures 1 and 2) (Table 1). Pb in the pyrite pod sample 271234

plots within and adjacent to the Hellyer 95% confidence ellipse on the  $^{208}\text{Pb}/^{204}\text{Pb}$  vs  $^{206}\text{Pb}/^{204}\text{Pb}$  diagram (Figure 1) and adjacent to the ellipse on the  $^{207}\text{Pb}/^{204}\text{Pb}$  vs  $^{206}\text{Pb}/^{204}\text{Pb}$  diagram (Figure 2). On Figure 1 the variation between point 1 and points 2 and 3 is outside the analytical precision indicating possible sample inhomogeneity in the  $^{208}\text{Pb}/^{204}\text{Pb}$  ratio. Pb in sample 271221 plots outside the target ellipse and has higher  $^{206}\text{Pb}/^{204}\text{Pb}$  ratios.

## 6. DISCUSSION AND CONCLUSION

The isotopic compositions of both samples are consistent with a Cambrian origin but, because of the relatively low Pb contents, some uncertainty exists. The variation from the target signature, especially in sample 271221, can be accounted for if the samples contain about 2 to 3ppm U. The addition of radiogenic  $^{206}\text{Pb}$  from the decay of  $^{238}\text{U}$  over the past 500 Ma could have changed the isotopic composition from the target signature to their present values.

A comparison of the results with pyrite material from Lake Selina indicates some subtle differences exist between the two groups. On both Figures 3 and 4 most of the Lake Selina data plot on a linear array (also probably produced by the post Cambrian in situ decay of U and Th) which lies closer to the average global Pb evolution (growth) curve than does the data from this study. Such differences probably result from slight variations in the isotopic composition of the source rocks of Pb in the two sets of samples.

The results are also compared with a suite of Devonian veins from throughout the west coast of Tasmania. It is apparent that these veins have Pb isotopic compositions that plot in two clusters on both Figure 5 and 6. One cluster has lower

$^{206}\text{Pb}/^{204}\text{Pb}$  ratios than the Cambrian target and the other (including the majority of samples from the Queen Hill area) has higher ratios. Except for two low-Pb samples that fall within the Cambrian target, these Devonian data do not overlap the isotopic composition of the pyritic rocks of this study. However, because of the relative heterogeneity of the Devonian data, these two groups cannot be differentiated with any confidence on statistical grounds.

TABLE 1. Pb ISOTOPE COMPOSITIONS OF PYRITIC SAMPLES.

Sample	$\frac{208 \text{ Pb}}{206 \text{ Pb}}$	$\frac{207 \text{ Pb}}{206 \text{ Pb}}$	$\frac{206 \text{ Pb}}{204 \text{ Pb}}$	$\frac{207 \text{ Pb}}{204 \text{ Pb}}$	$\frac{208 \text{ Pb}}{204 \text{ Pb}}$	Pb(ppm)
271234	2.0721	0.8451	18.450	15.593	38.231	225
271234	2.0719	0.8451	18.436	15.581	38.197	225

Figure 1

# DUNDAS TROUGH-SWITCHBACK

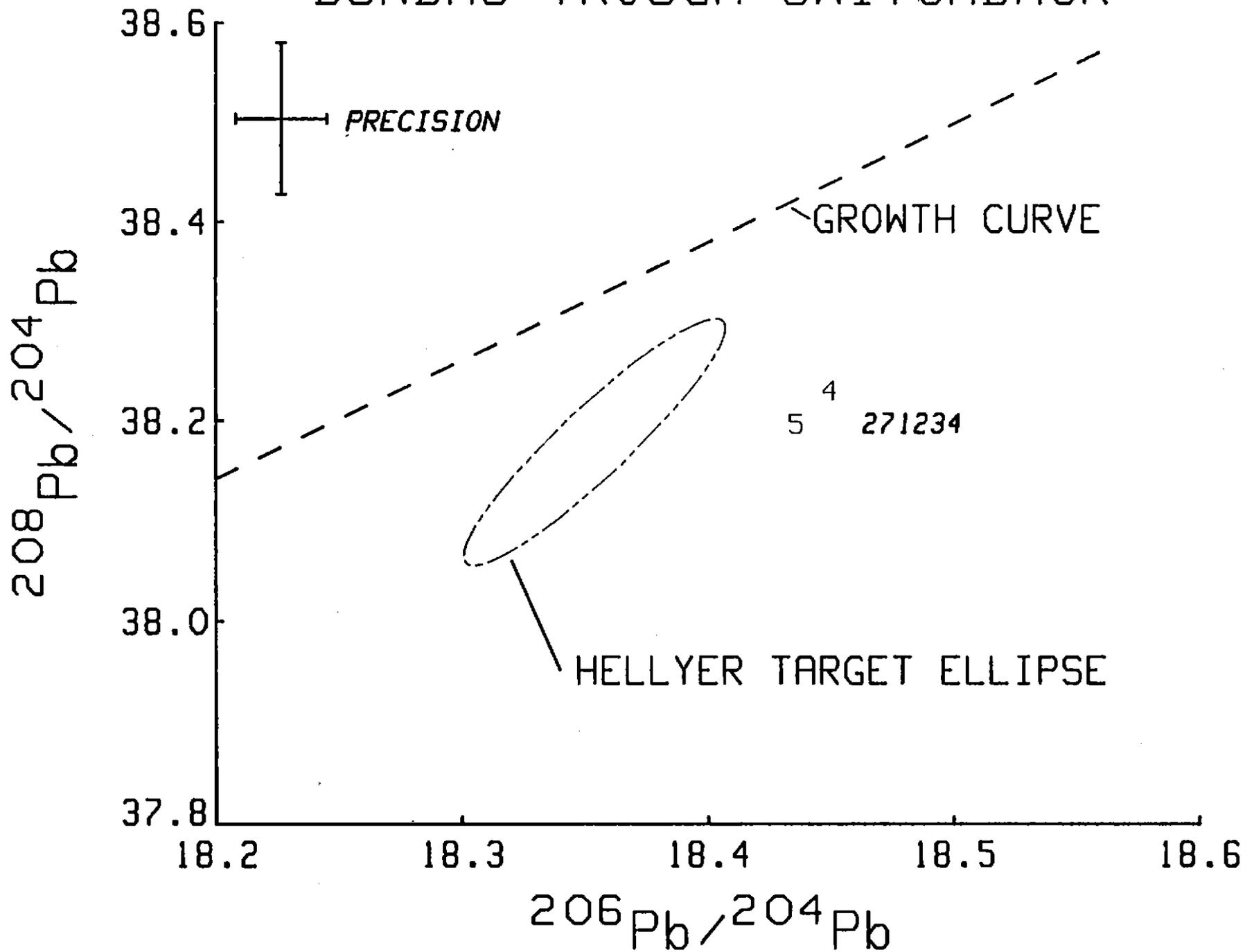
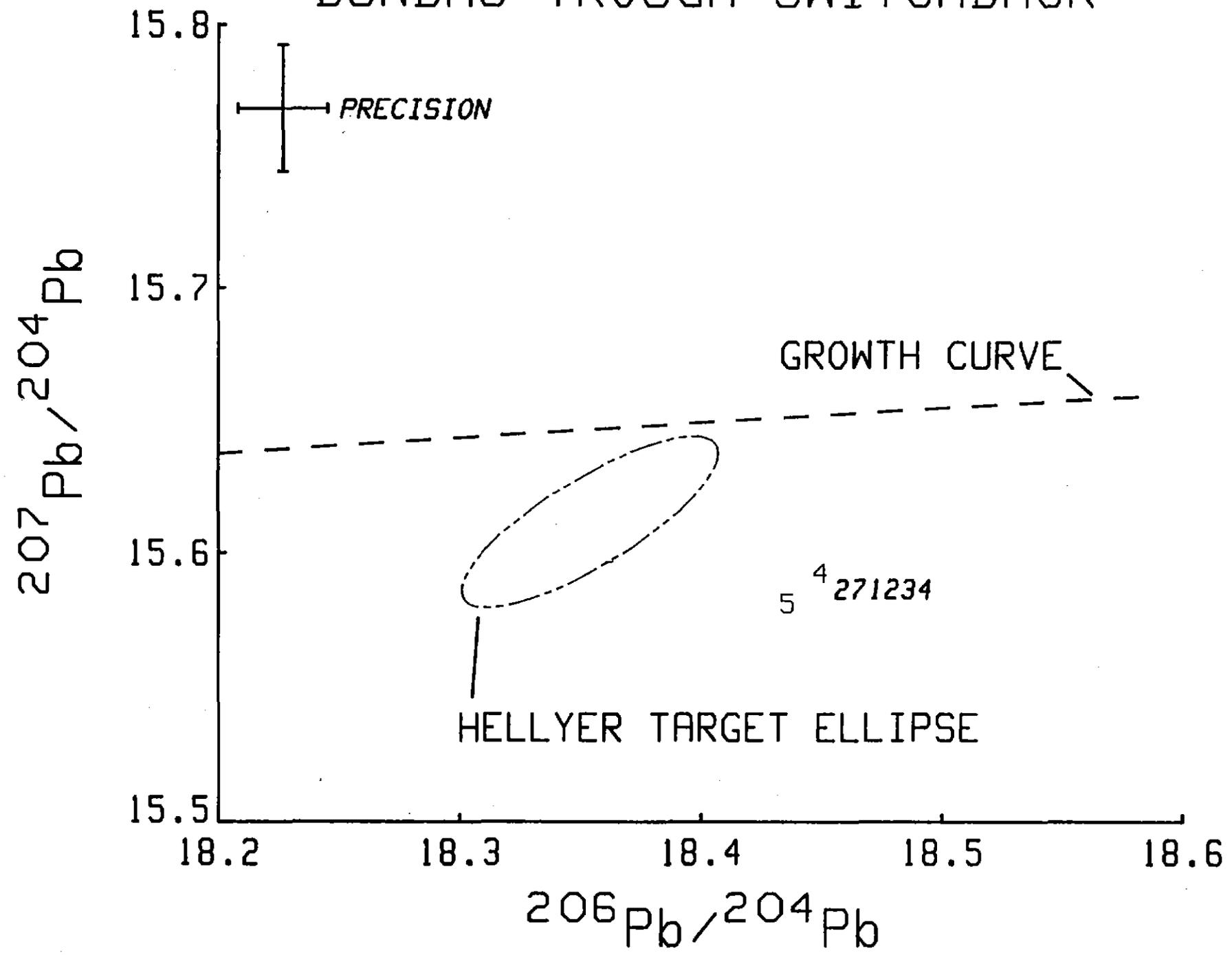


Figure 2

# DUNDAS TROUGH-SWITCHBACK



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Figure 3

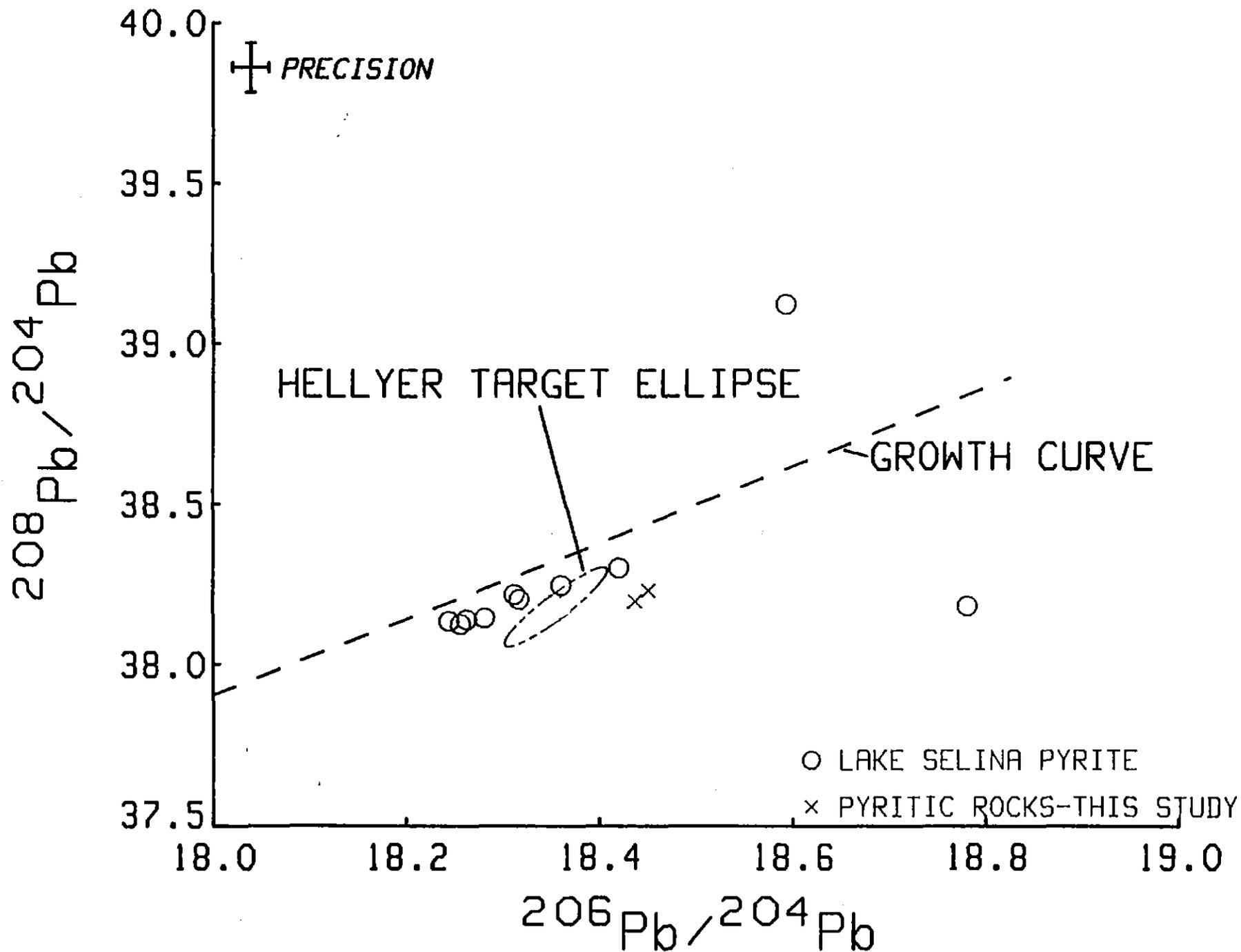


Figure 4

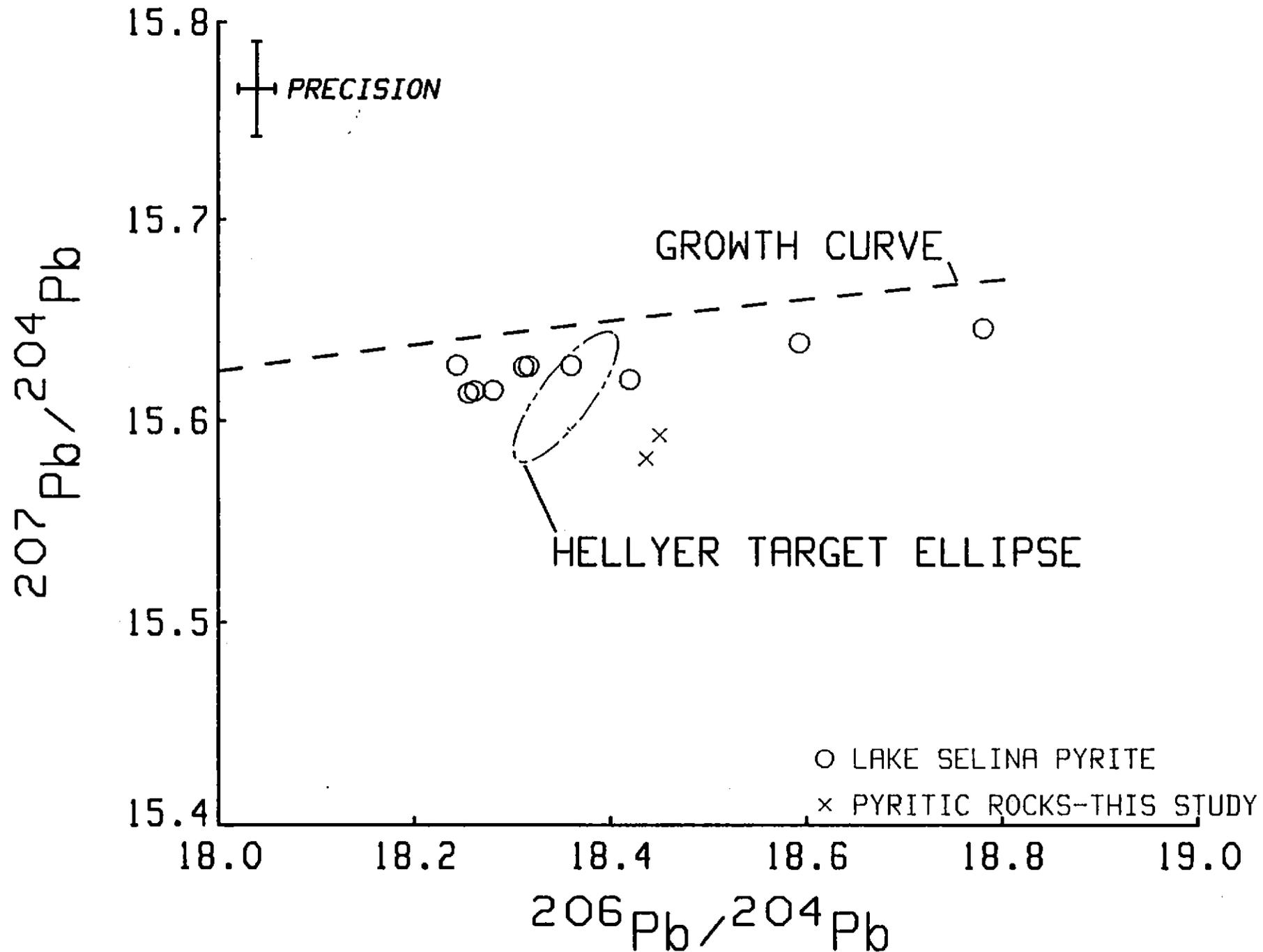
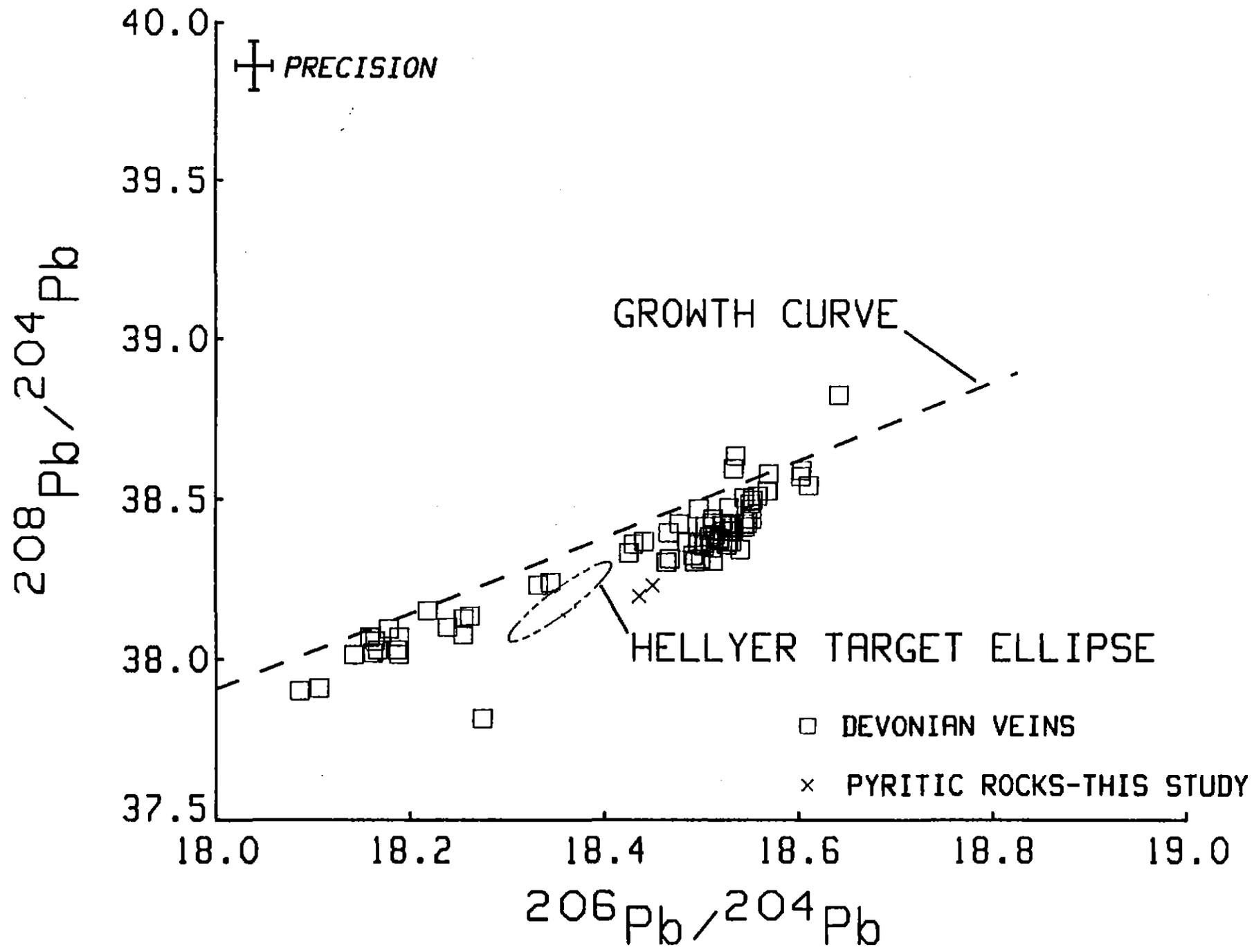
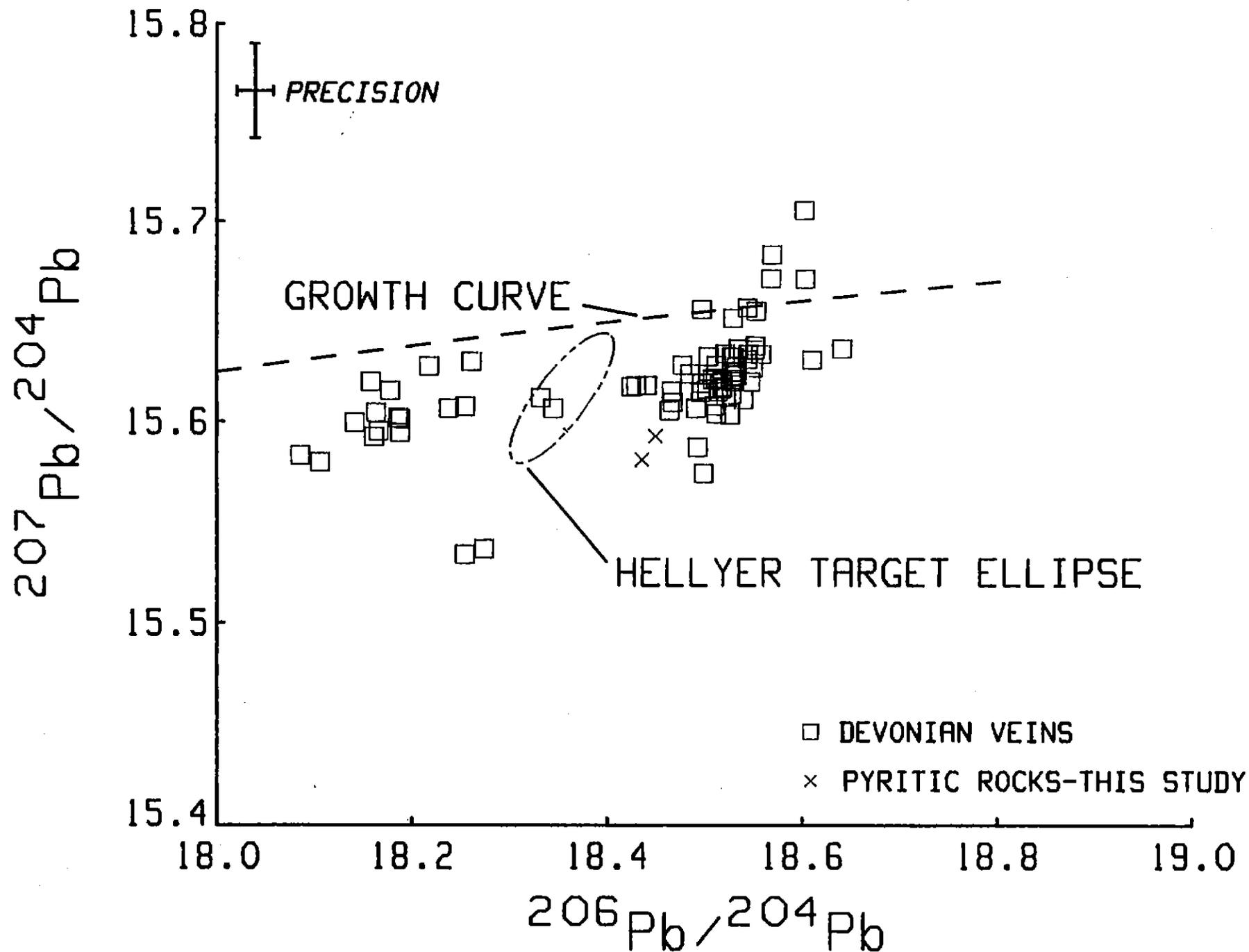


Figure 5



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APPENDIX XII

## INTERPRETATION REPORT

UTEM SURVEY

SOUTH HATFIELD GRID

HATFIELD EL 15/73

Prepared By:

J. Silic

Issued By:

J. Silic

Distribution

Hawthorn (1)

Burnie (1)

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UTEM DATA SECTIONS

## INTRODUCTION

Electromagnetic techniques have played important roles in the discoveries of the Que River and Hellyer deposits (Webster and Skey, 1979; Silic et al, 1985; Eadie et al, 1985). Since the Hellyer discovery Aberfoyle Resources has further refined the use of these techniques in the search for Hellyer and Que River type targets (Silic, 1989).

The purpose of this report is to discuss the results of a UTEM (West et al, 1984) survey over the South Hatfield grid on the Hatfield licence. (Plate 1)

## SURVEY SPECIFICATIONS

A five loop, UTEM survey covering lines (2800N to 3800N) from 2200E to 4000E, lines 1800N to 2800N from 2400E to 5000E and lines 1200N to 1600N from 3500E to 4800E was conducted over the South Hatfield grid.

Vertical component ( $H_z$ ) data was collected at 25-50 metre station spacing.

## DISCUSSION OF THE RESULTS

The major problem in this survey has been the power line noise. However, careful stacking of the data has resulted in the data being good enough for the Que River and Hellyer type responses to be recognised in the data. No such responses were detected.

## CONCLUSION

No targets worthy of follow-up have been detected by the UTEM survey.

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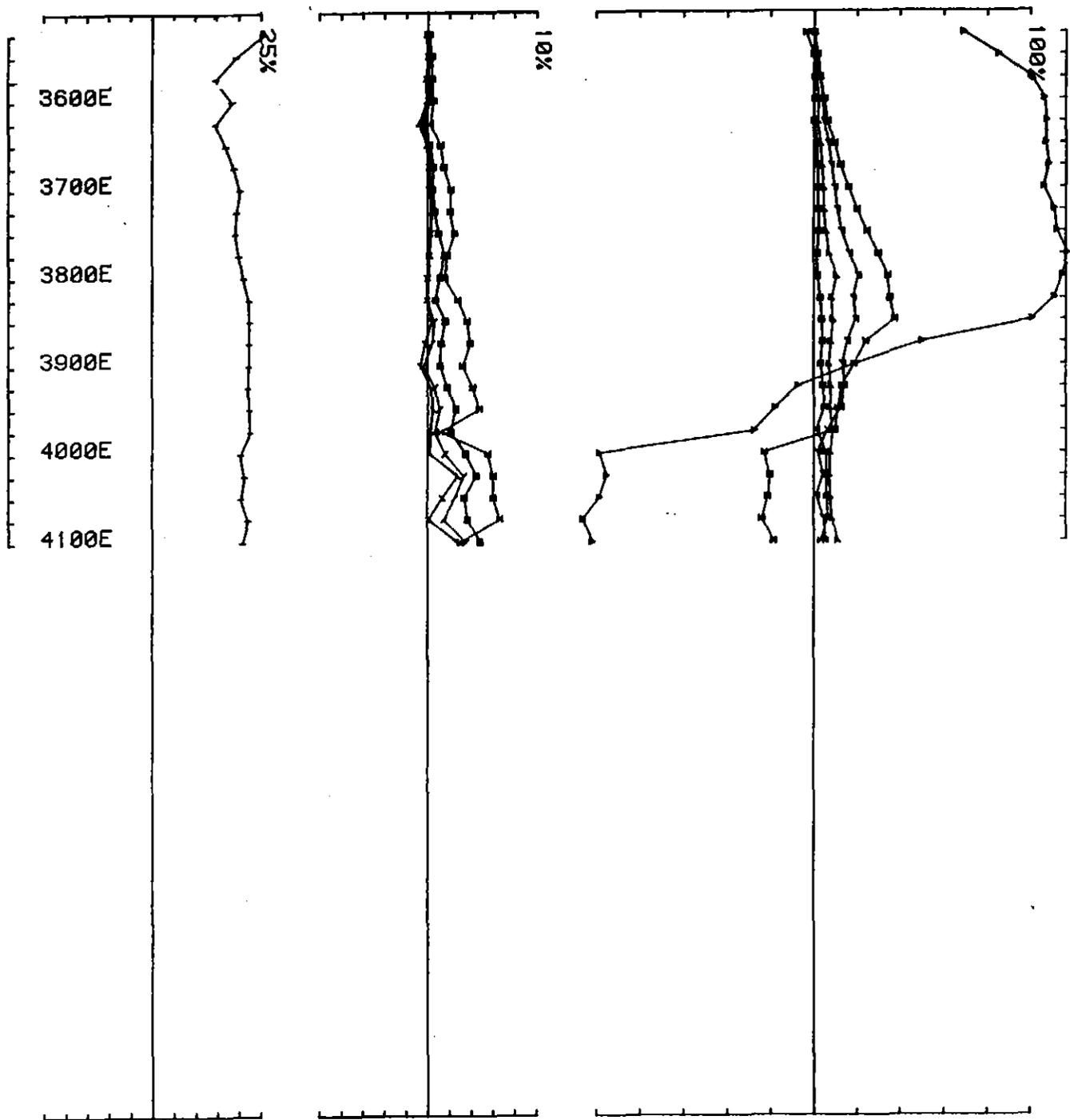
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Silic J., Eadie, E. T., and Jack, D. J. (1985), 'Application of time domain electromagnetic methods in the discovery of the Hellyer ore deposit, Tasmania, Australia', in volume of Extended Abstracts of the 55th SEG meeting, Washington, DC.

Webster, S. S. and Skey, E. H. (1979), 'Geophysical and geochemical case history of the Que River deposit, Tasmania', in Geophysics and Geochemistry in the Search for Metallic Ores; Peter J. Hood, editor, Geological Survey of Canada, Economic Geology Report 31, 697-720.

West, G. F., MacNae J. C. and Lamontagne Y. (1984), 'A time domain EM system measuring the step response of the ground', Geophys., 49, 1010-1026.

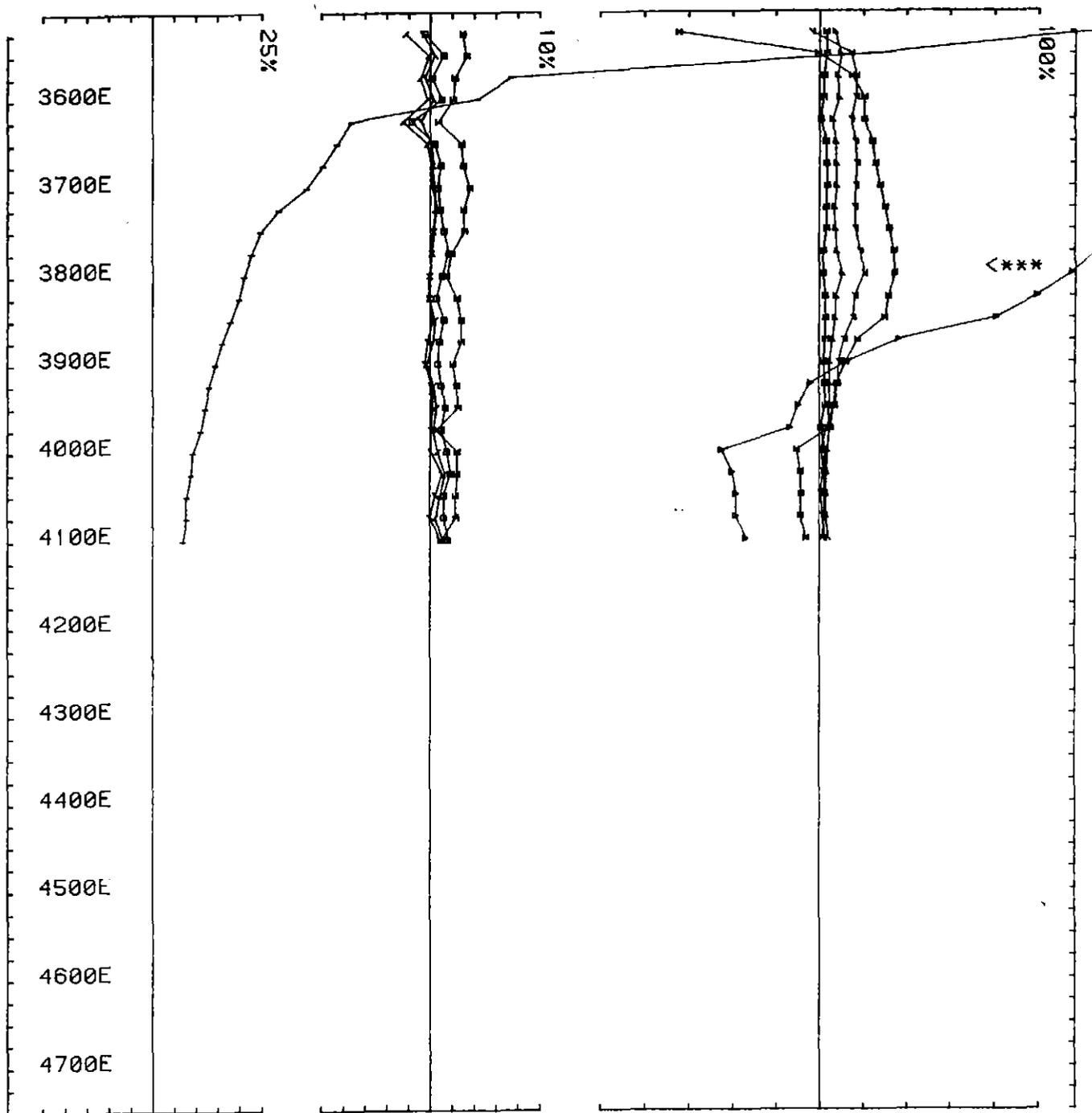
APPENDIX 1



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 1/9/87

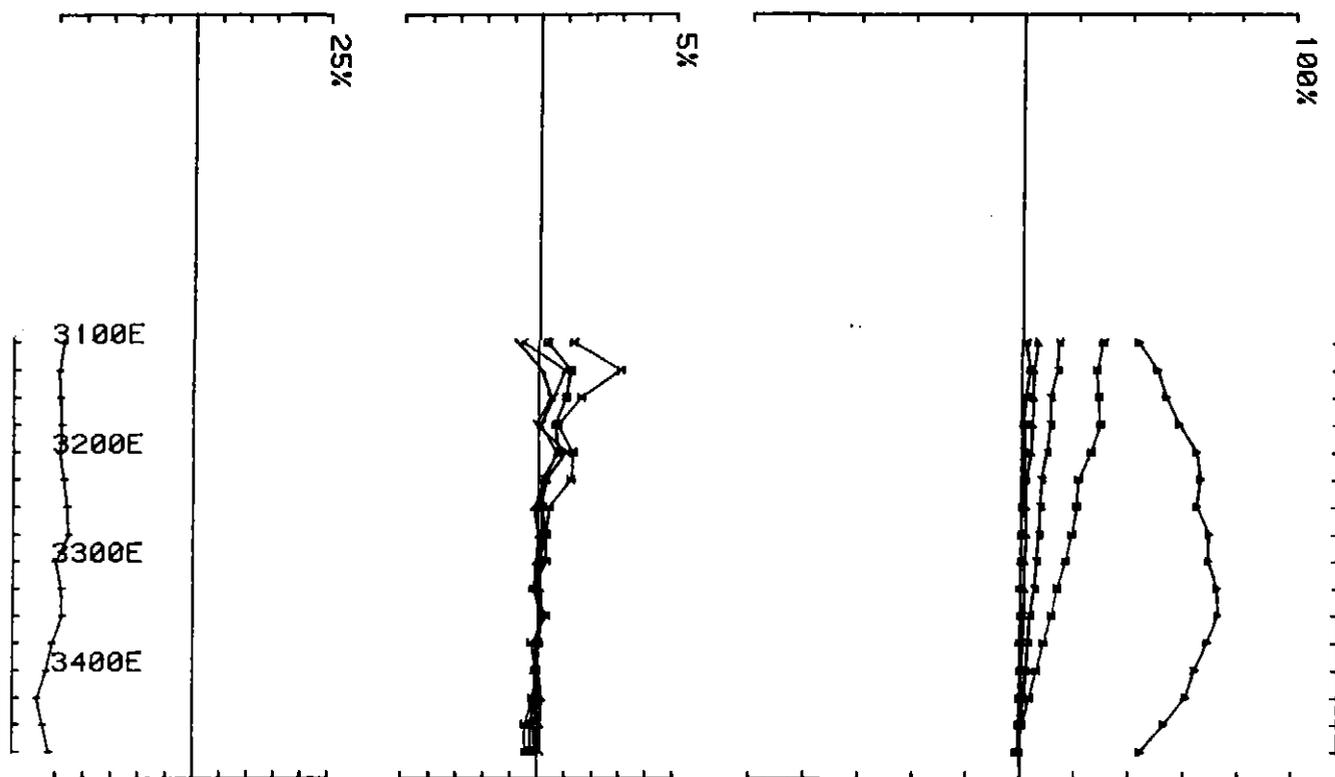
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 8721 base freq (hz) 26.230 6/9/87

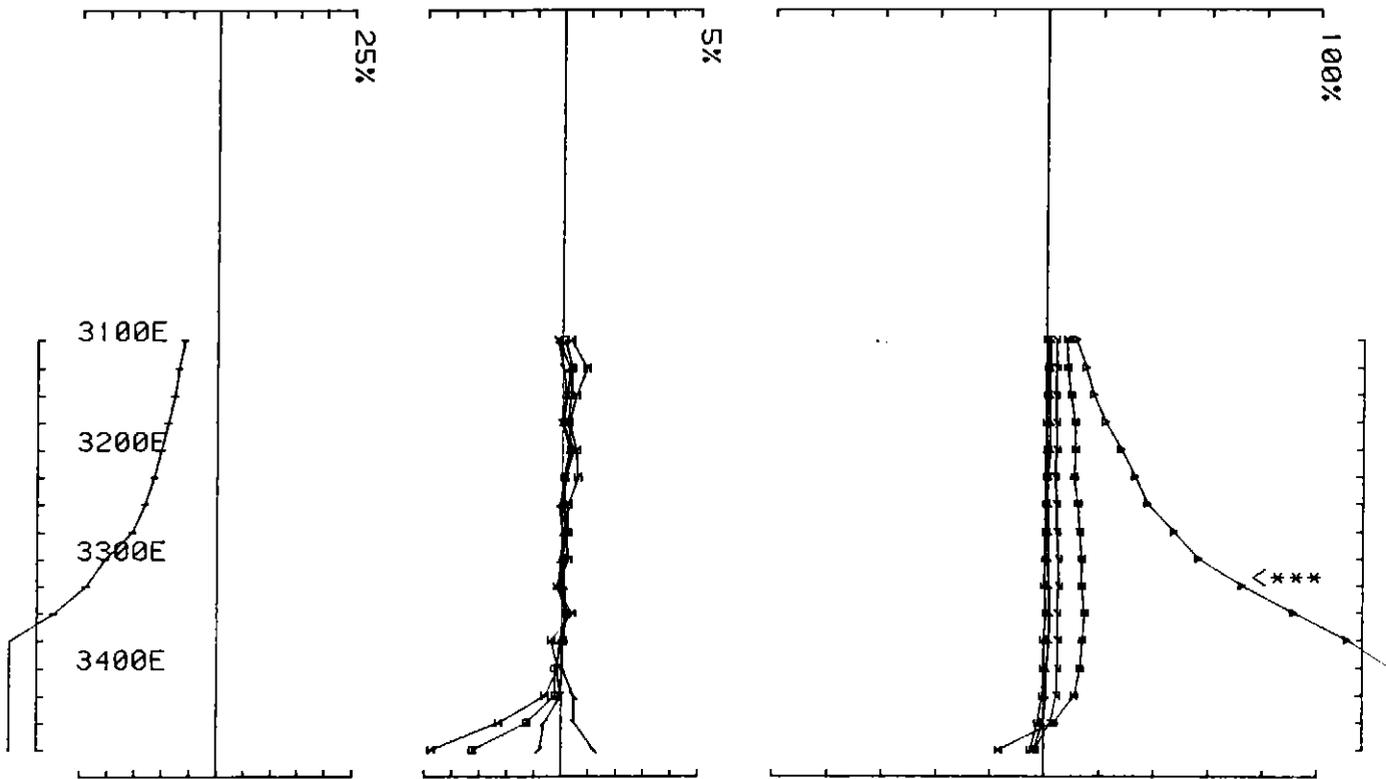
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 4/9/87

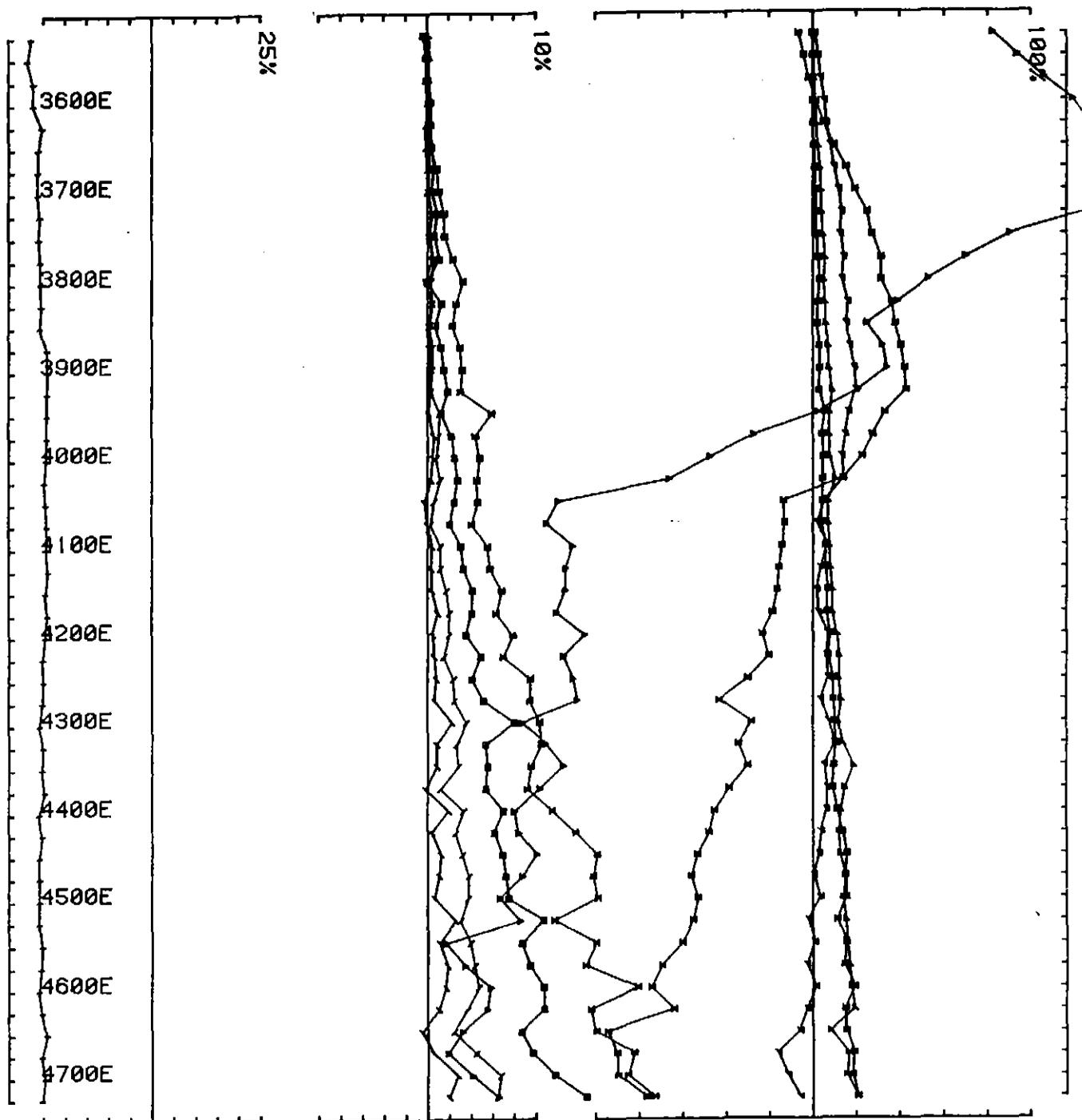
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 8721 base freq (hz) 26 230 6/9/87

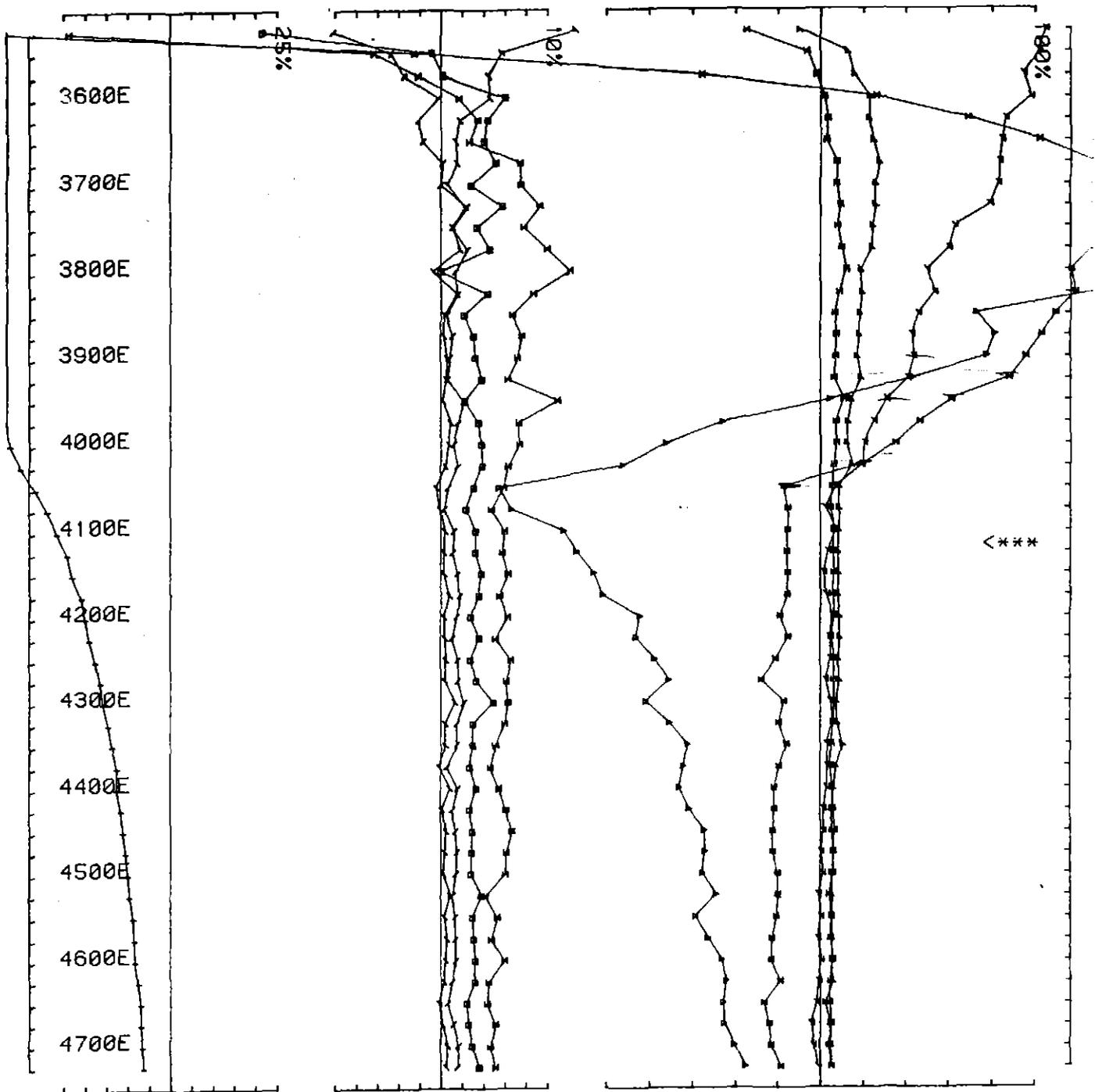
Loop 0006 line 1200N component Hz secondary field Ch 1 point norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 2/9/87

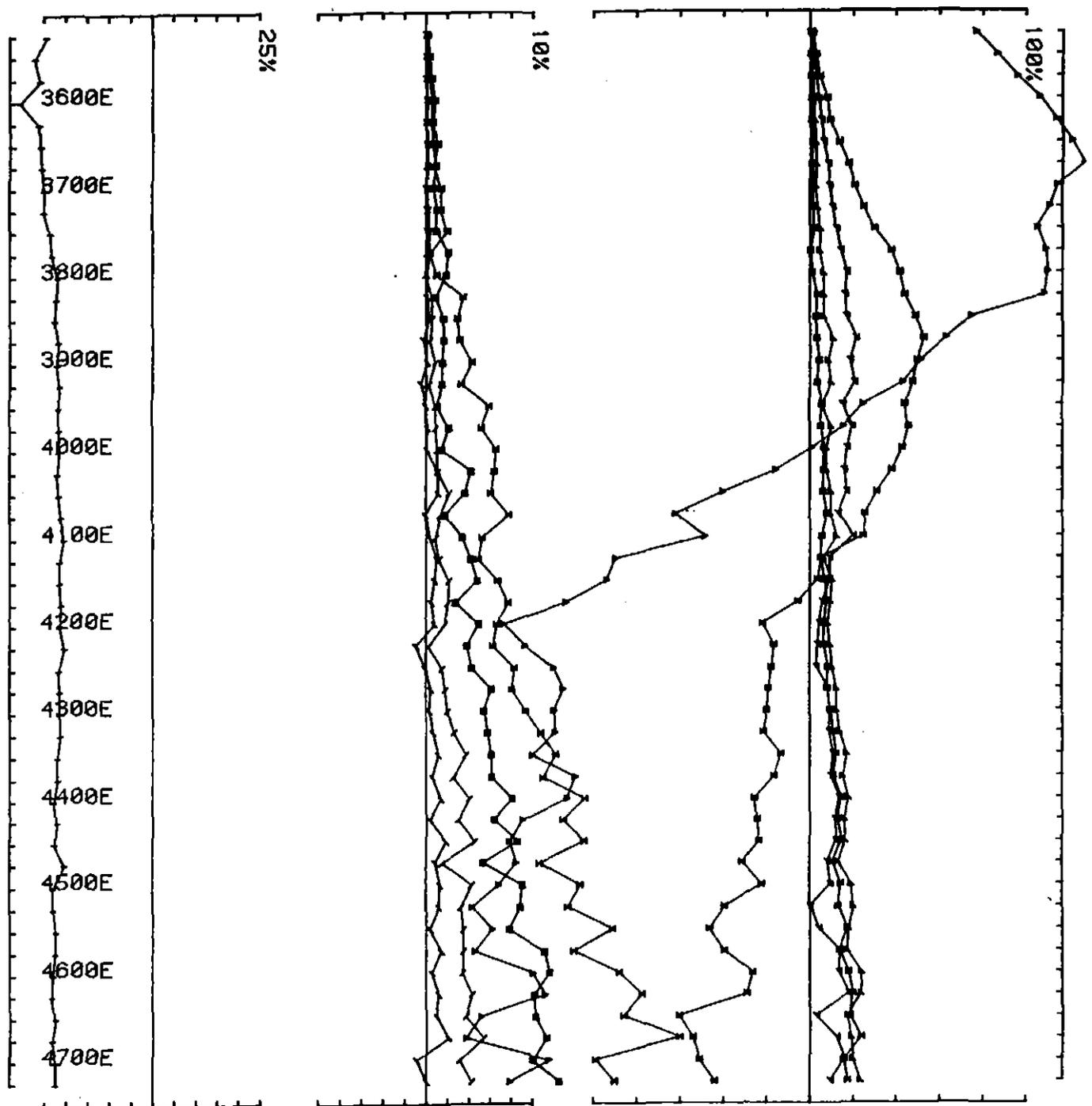
Loop 0005 line 1200N component Hz secondary field Ch 1 cont'n. norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 872! base freq (hz) 26.230 6/9/87

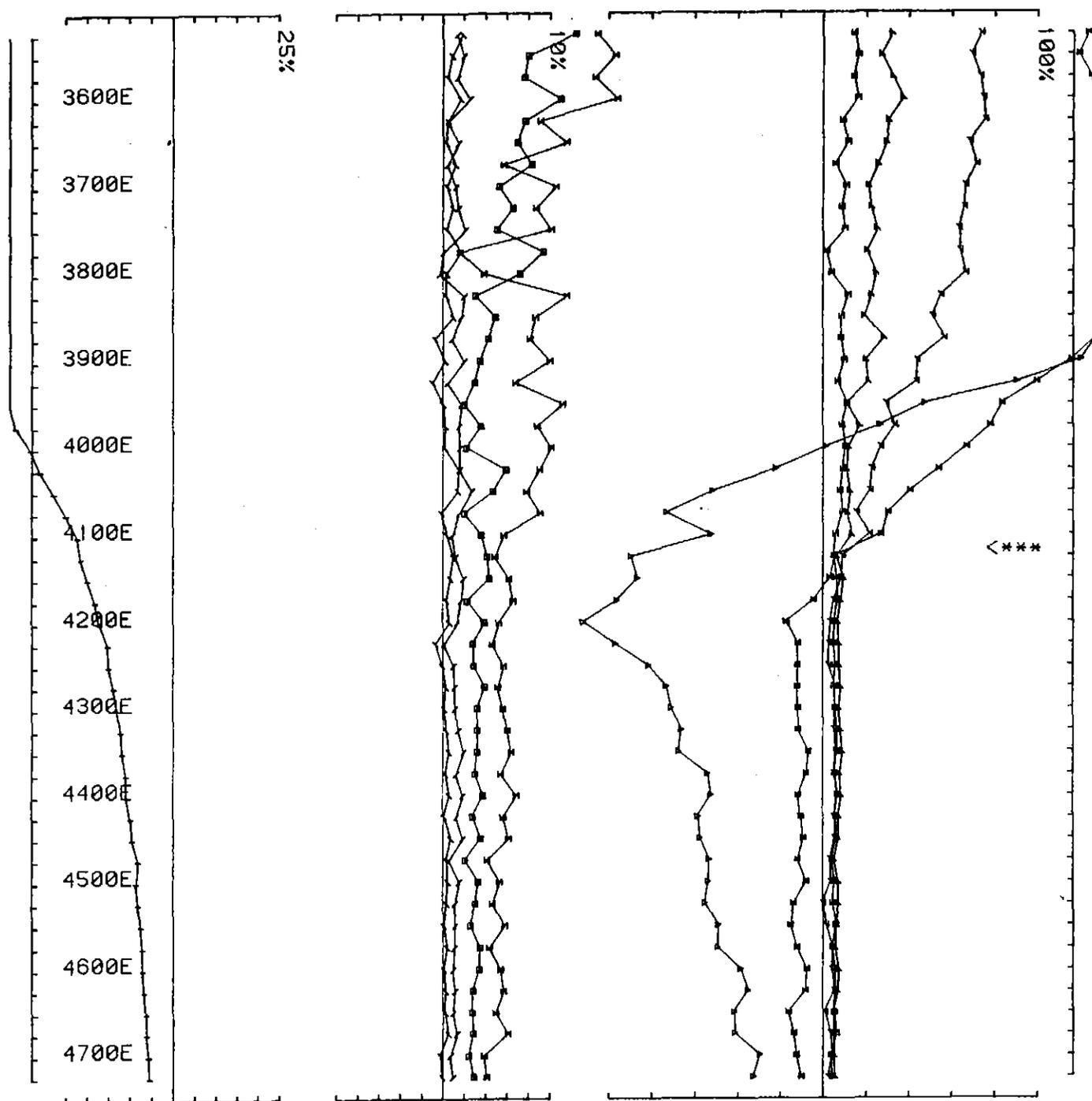
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 2/9/87

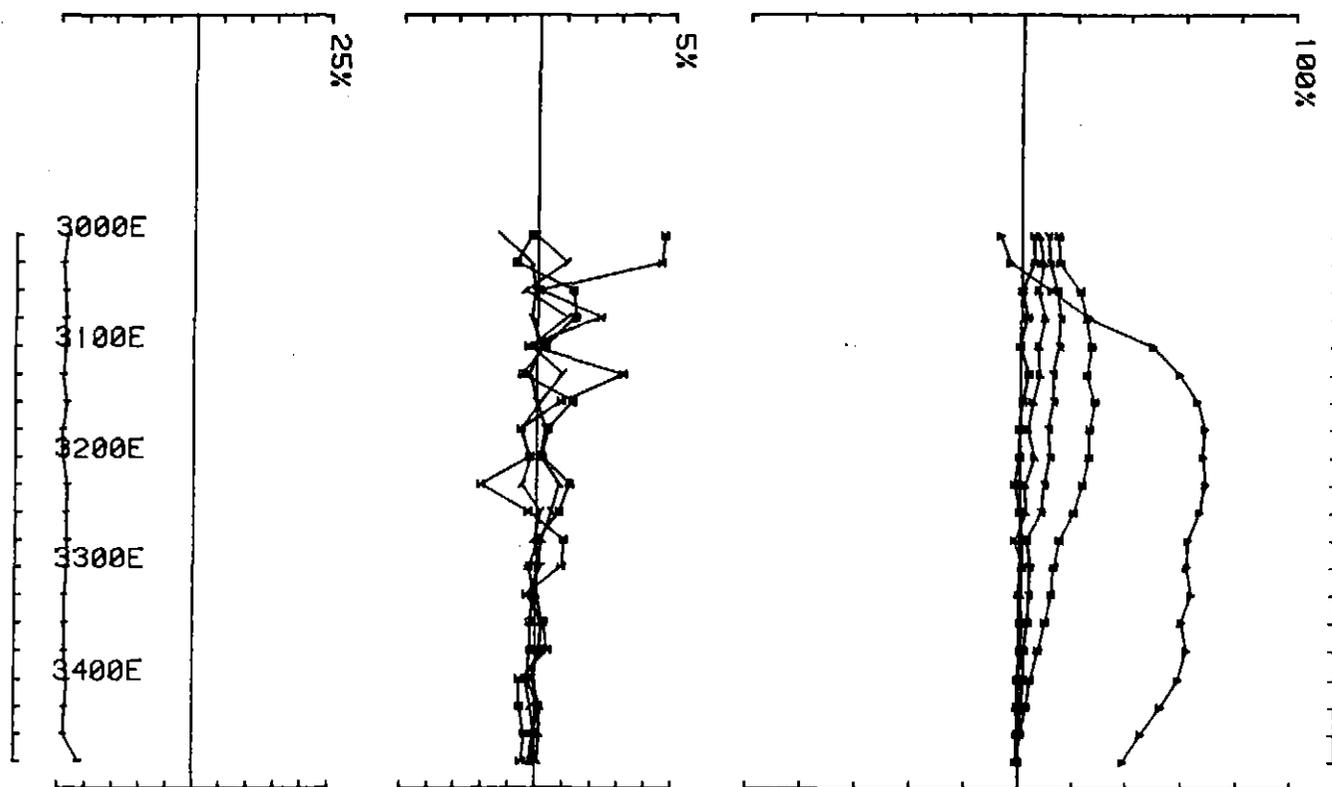
Loop 0005 line 1400N component Hz secondary field Ch 1 contin. norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 8721 base freq (hz) 26.230 6/9/87

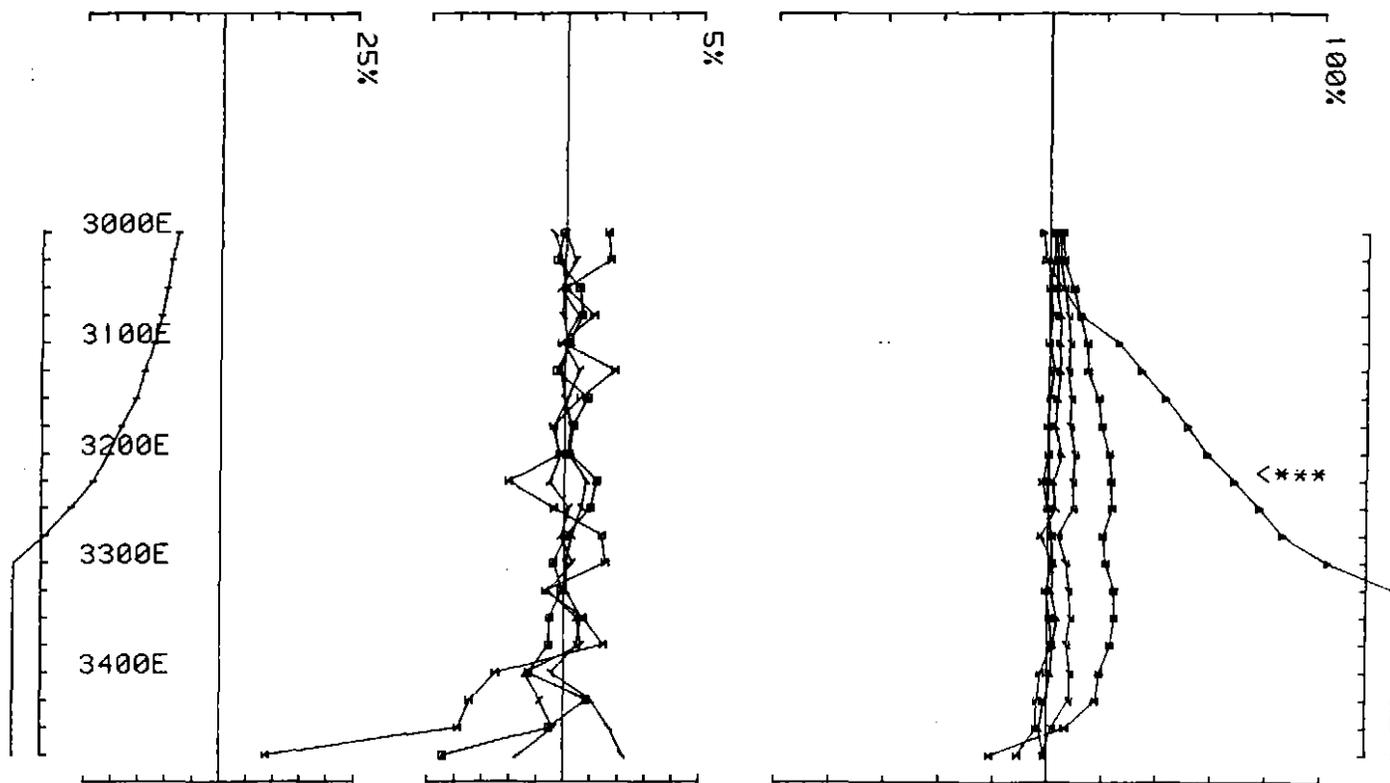
Loop 0005 line 1400N component Hz secondary field Ch 1 point norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 4/9/87

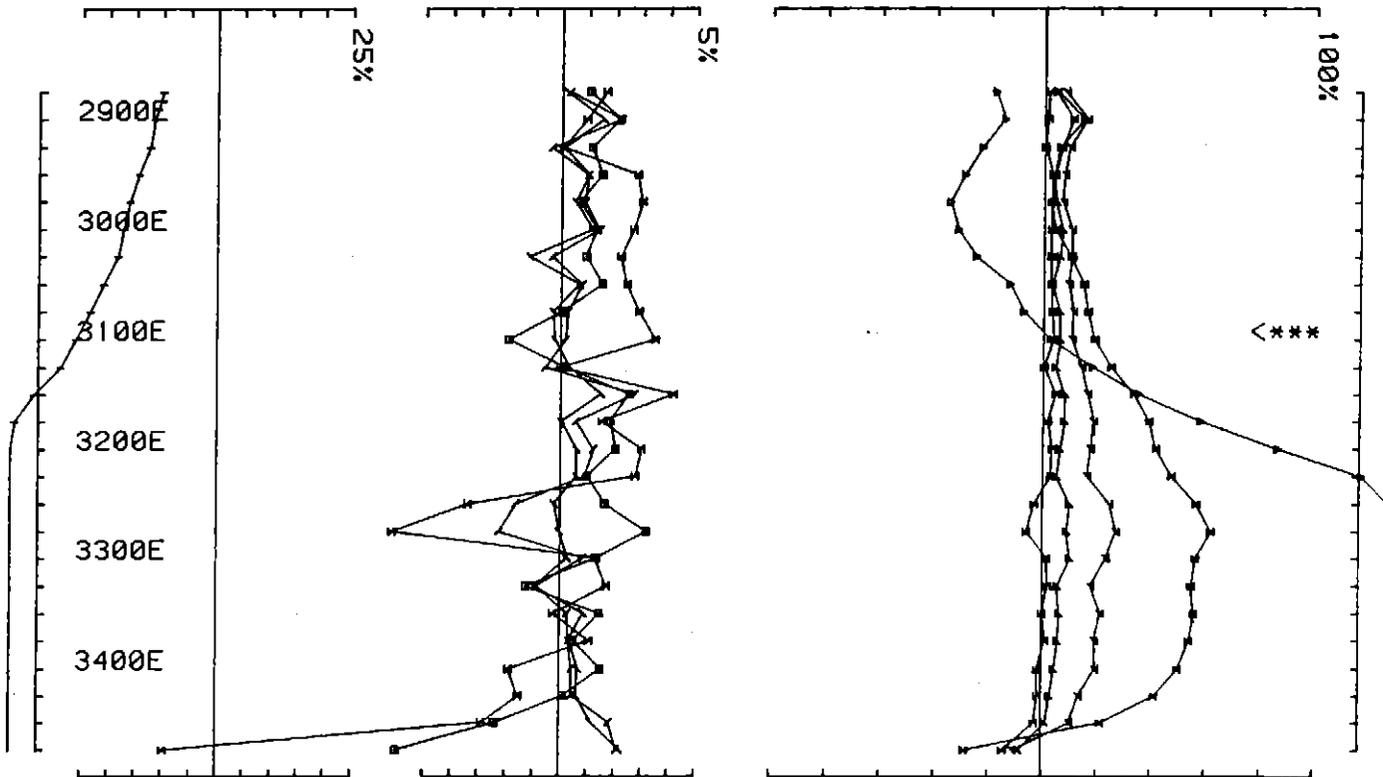
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 8721 base freq (hz) 26.230 6/9/87

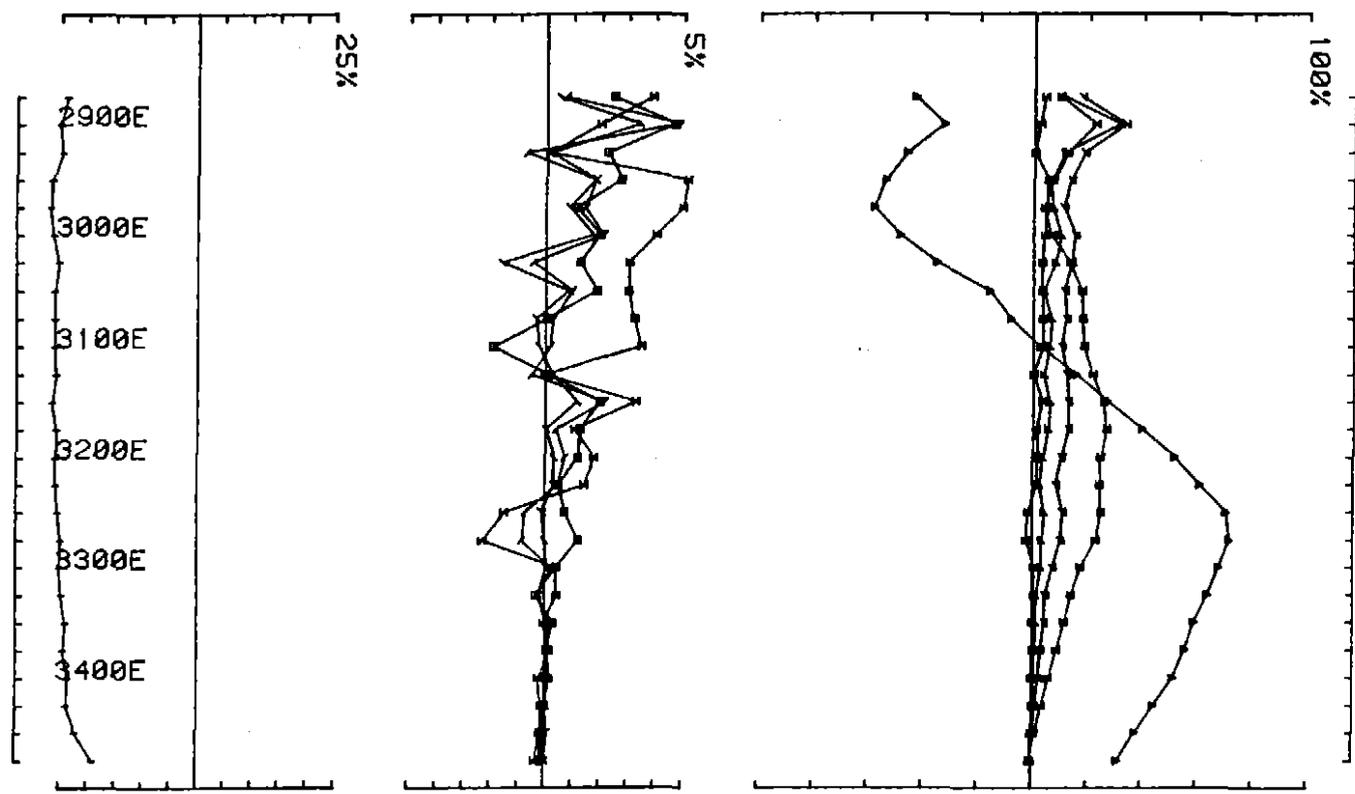
Loop 0006 line 1400N component Hz secondary field Ch 1 point norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 8721 base freq (hz) 26.230 6/9/87

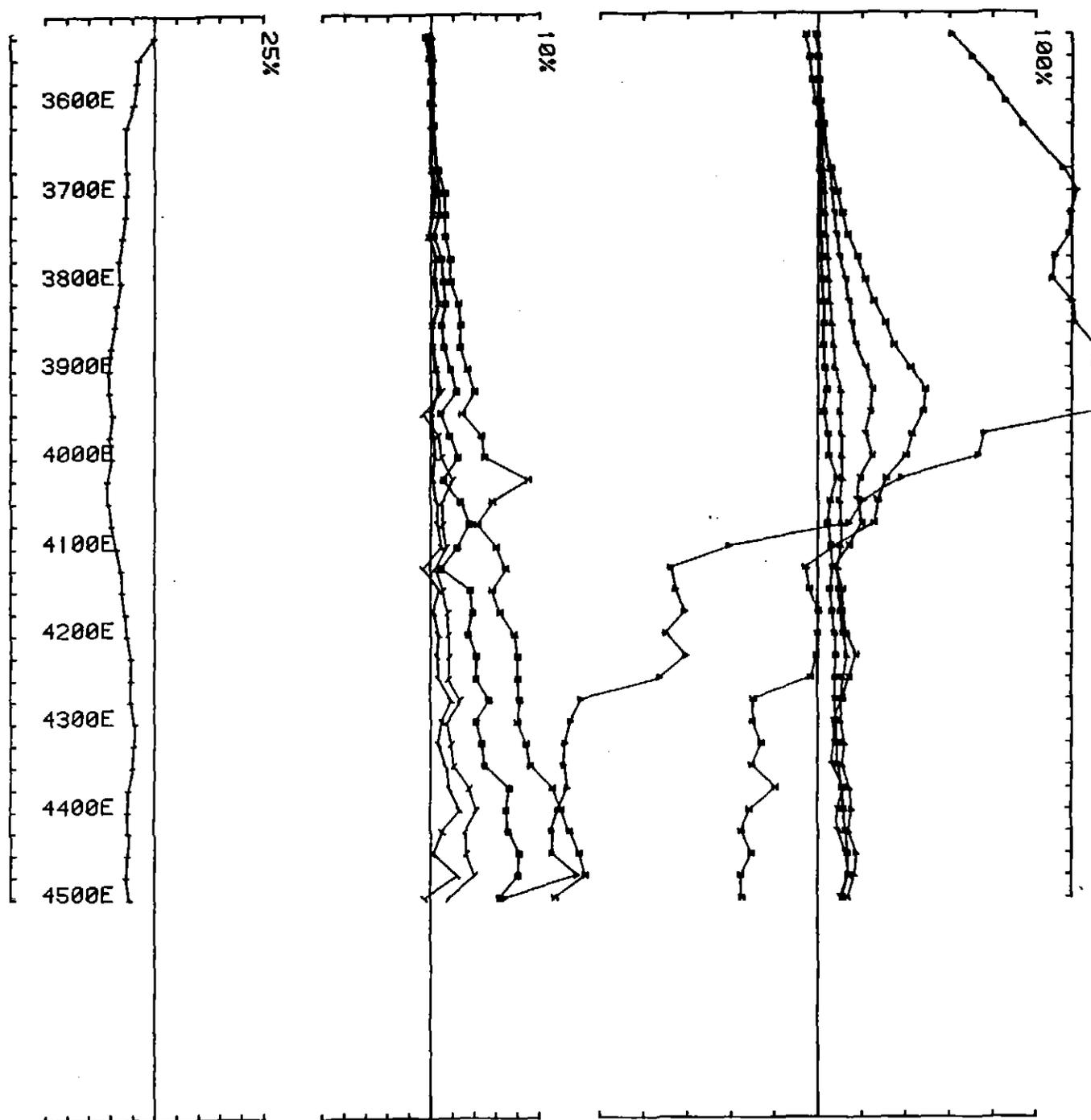
Loop 0006 line 1600N component Hz secondary field Ch 1 point norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 4/9/87

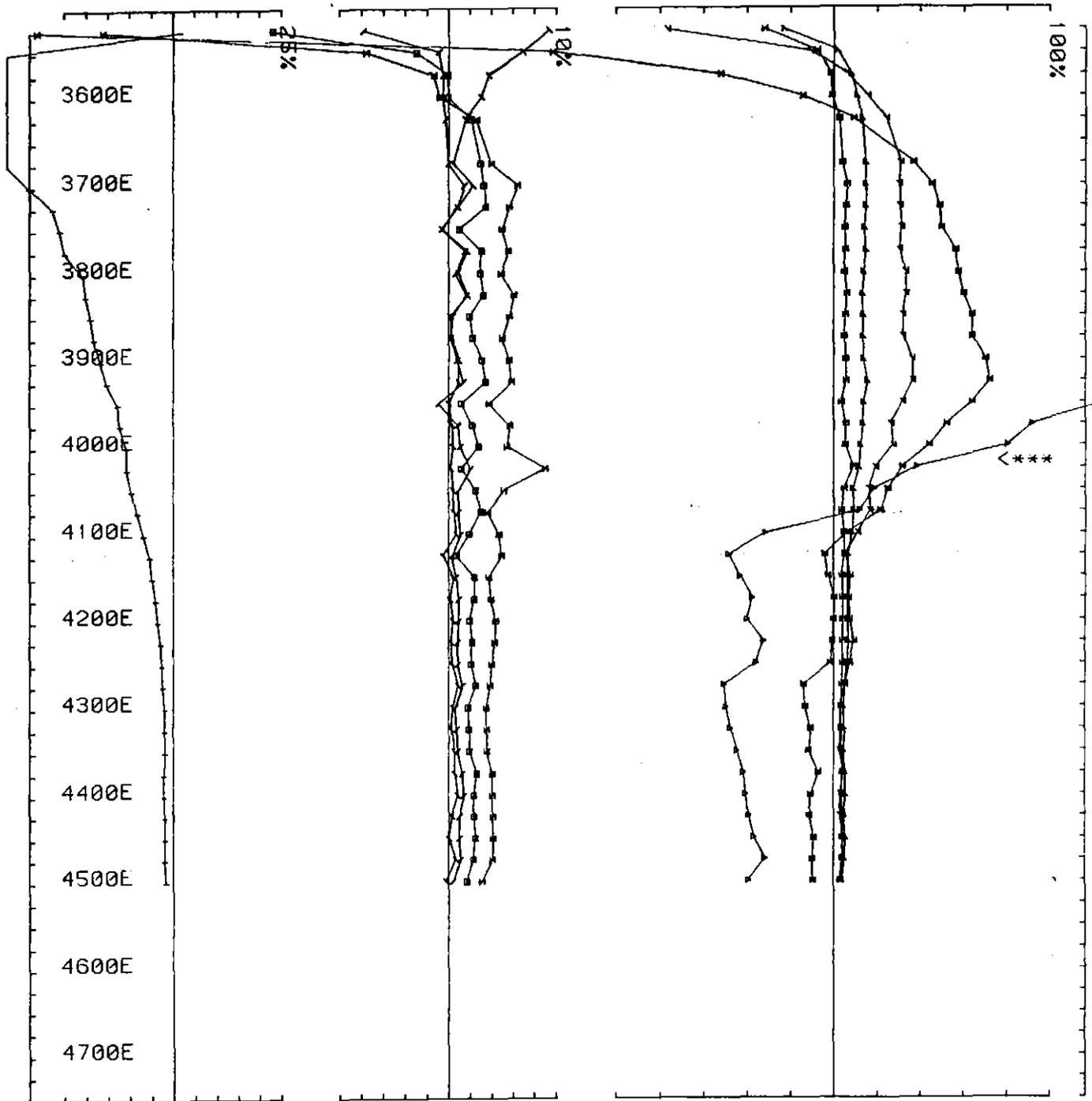
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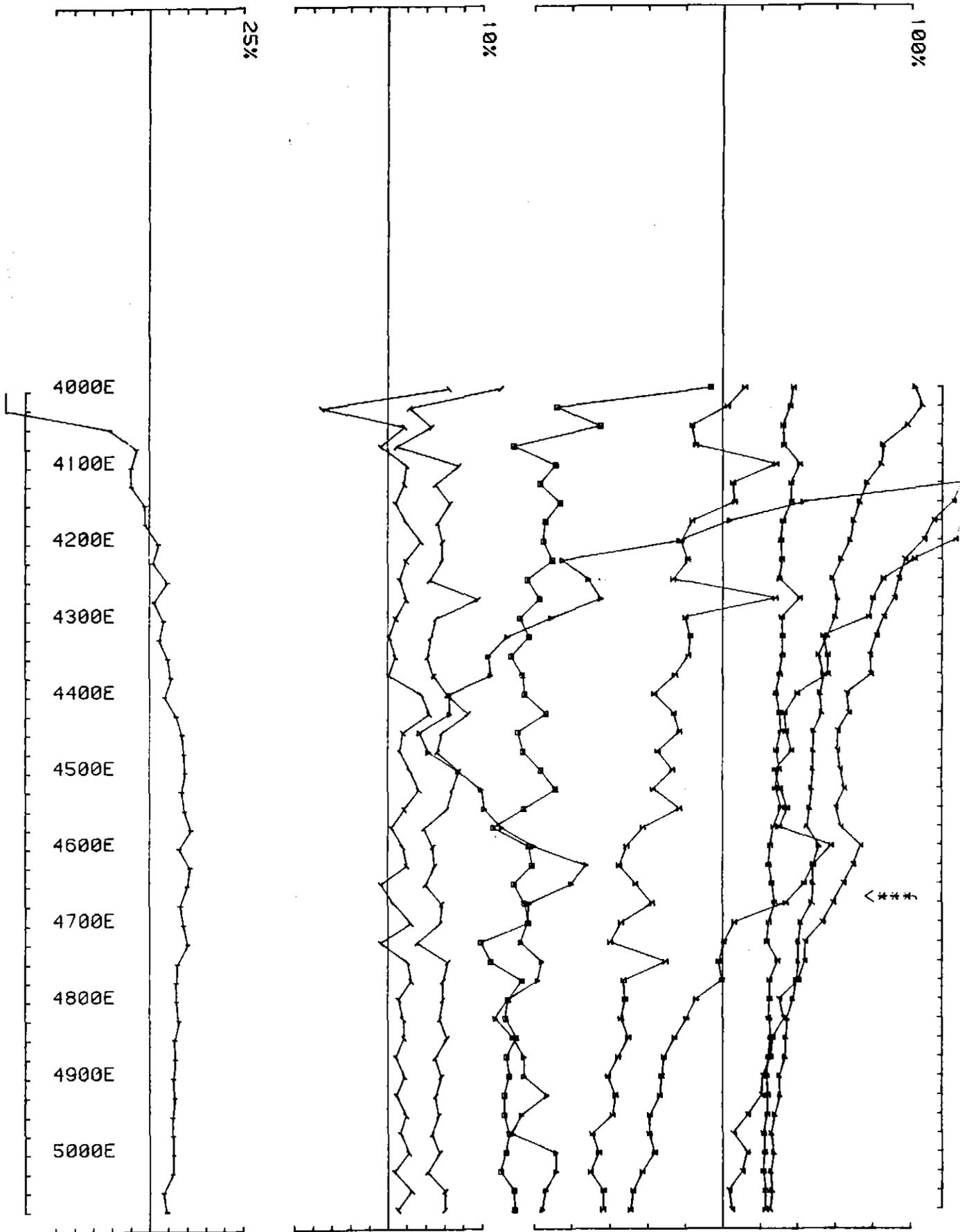
UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 1/9/87

Loop 0005 line 1600N component Hz secondary field Ch 1 contin. norm.



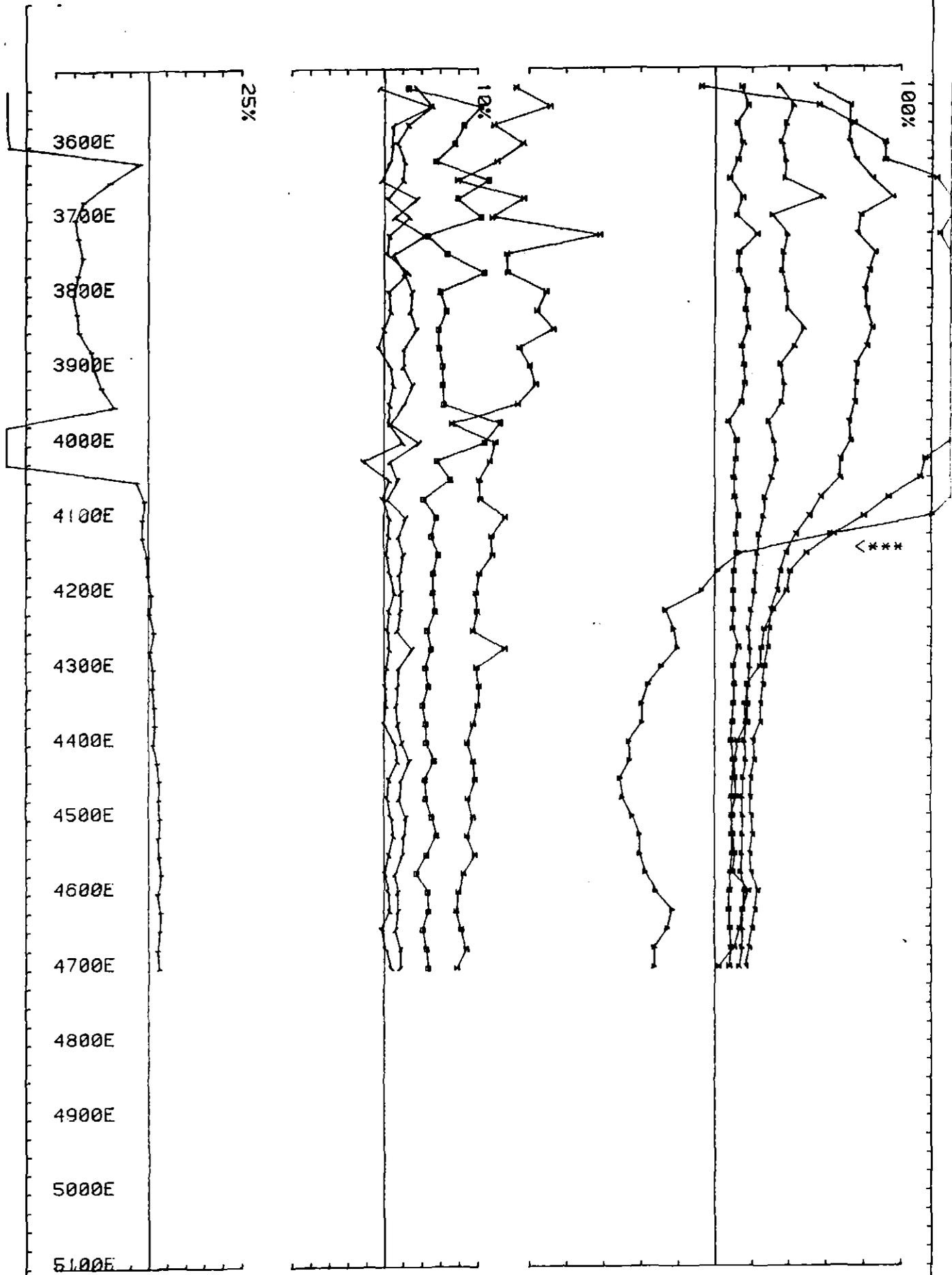
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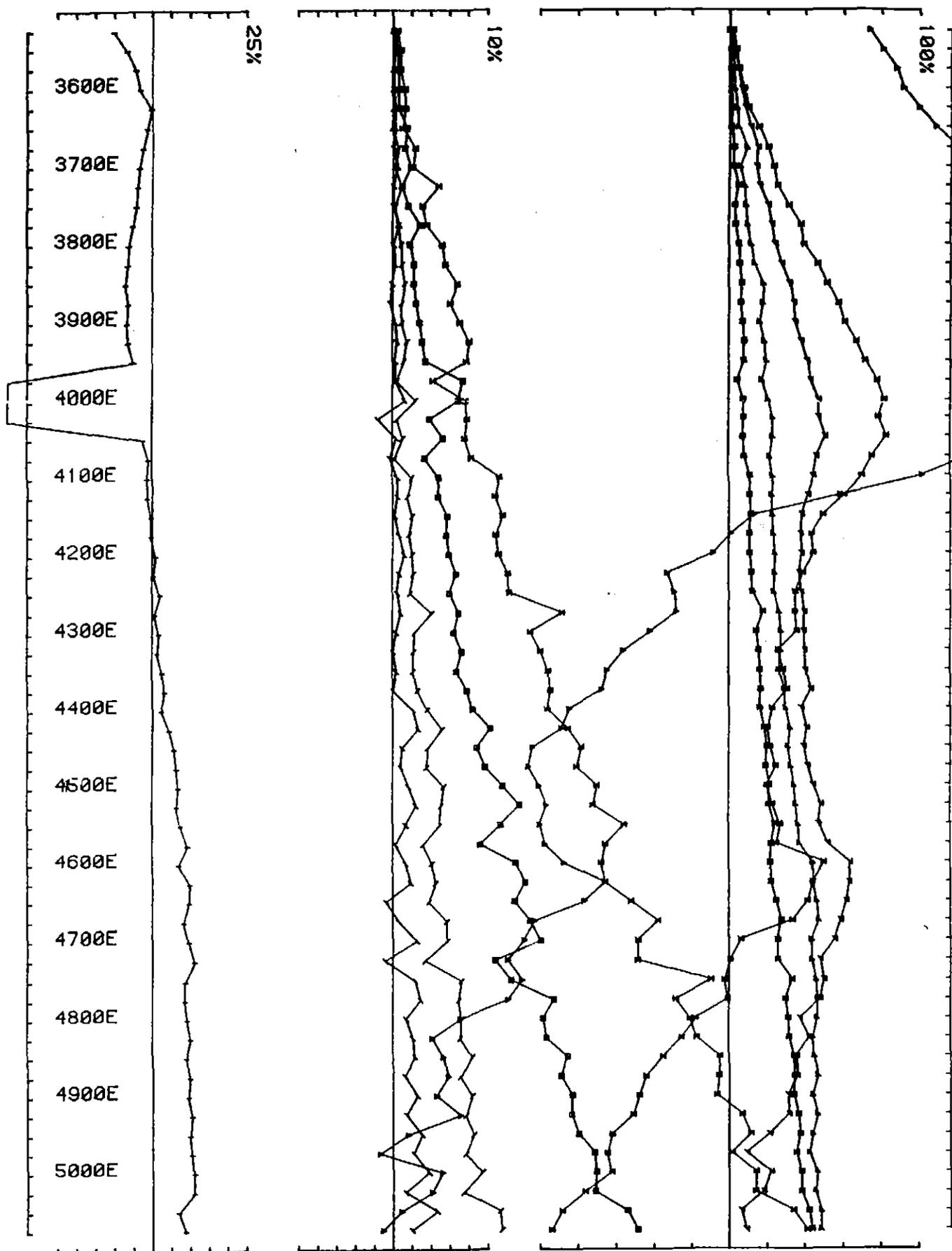
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conducted by PMM PAO Job 8721 base freq (hz) 26.230 6/9/87

Loop 0004 line 1800N component Hz secondary field Ch 1 point norm.



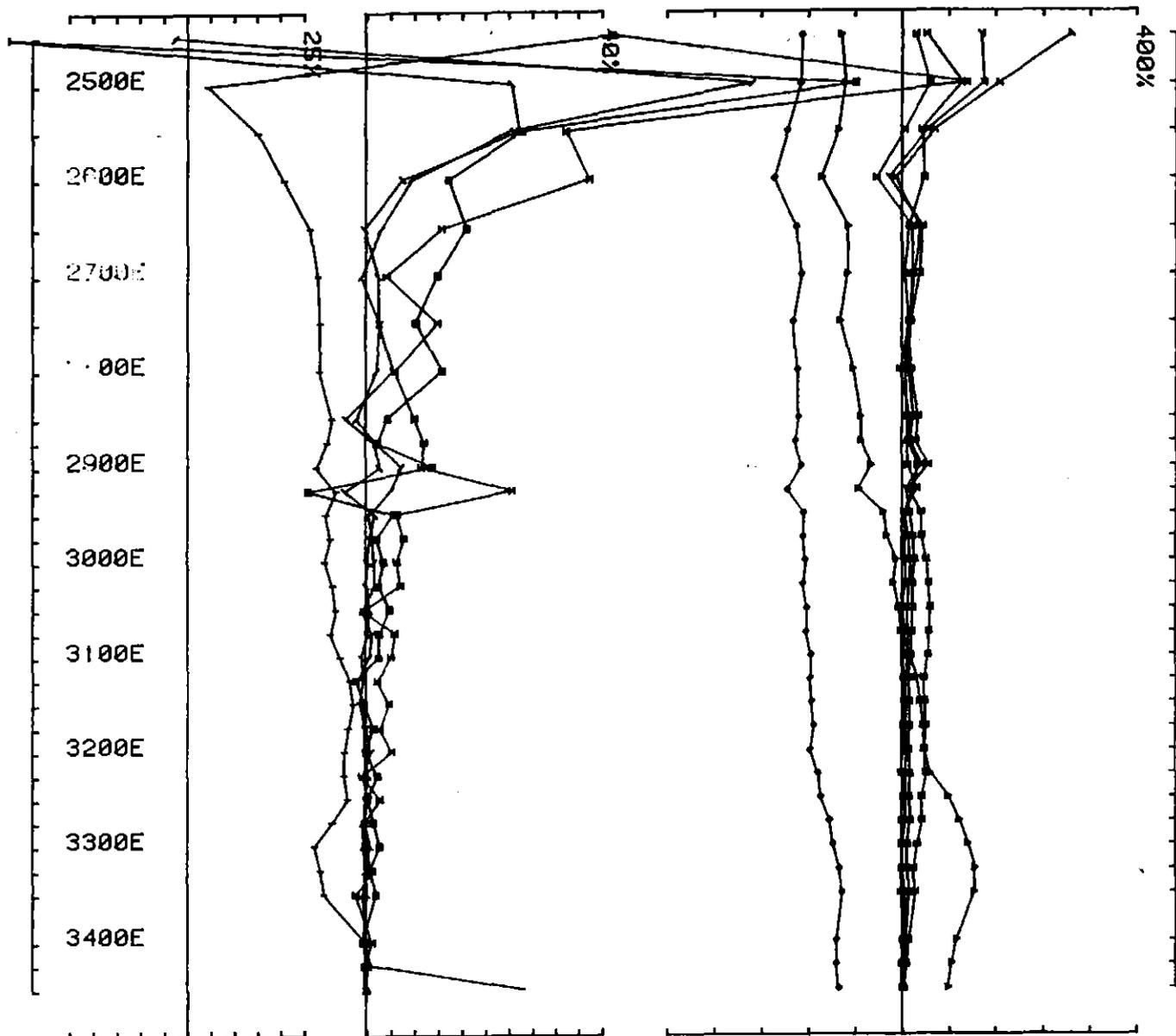
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 18



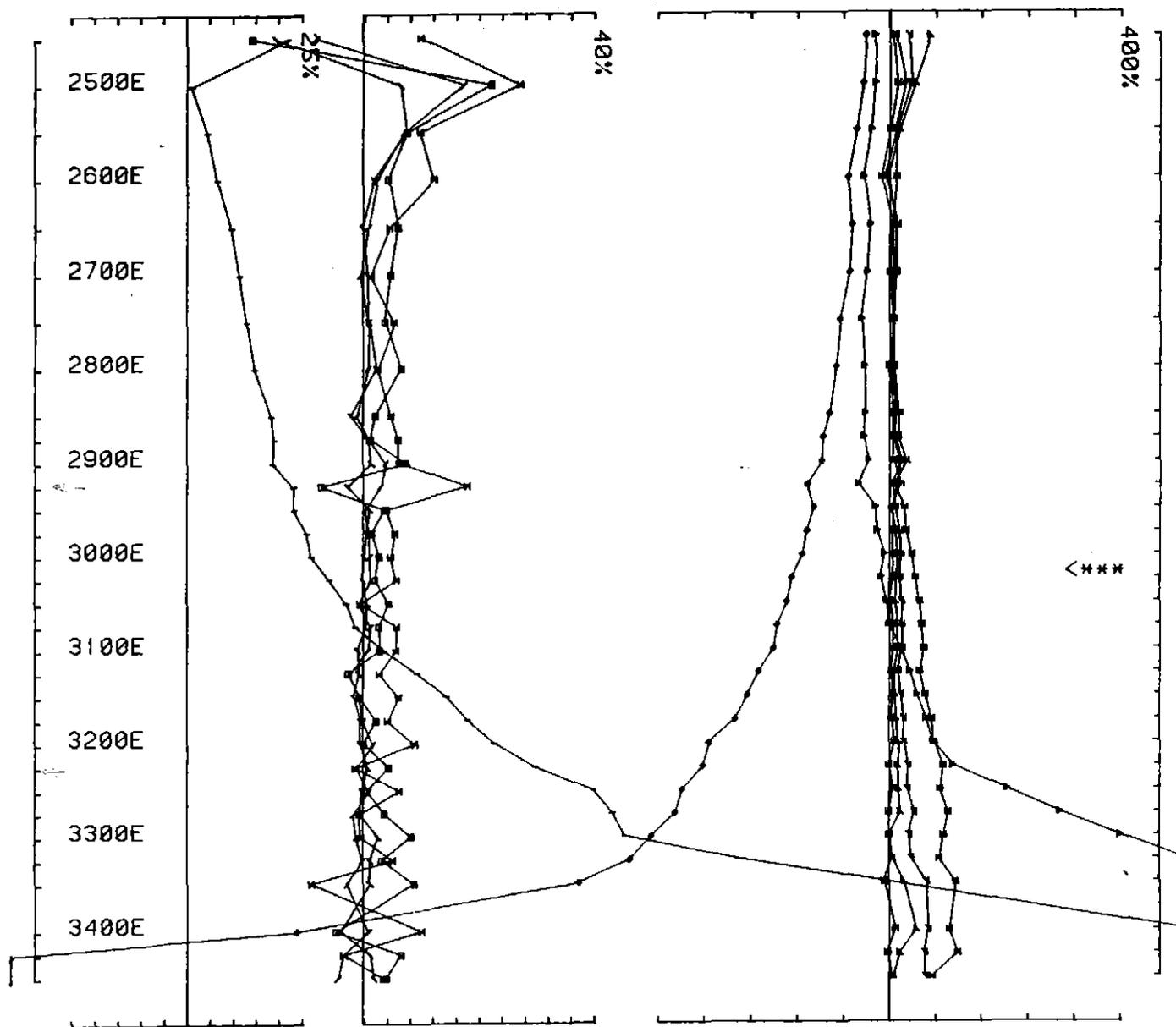
UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 2/9/87

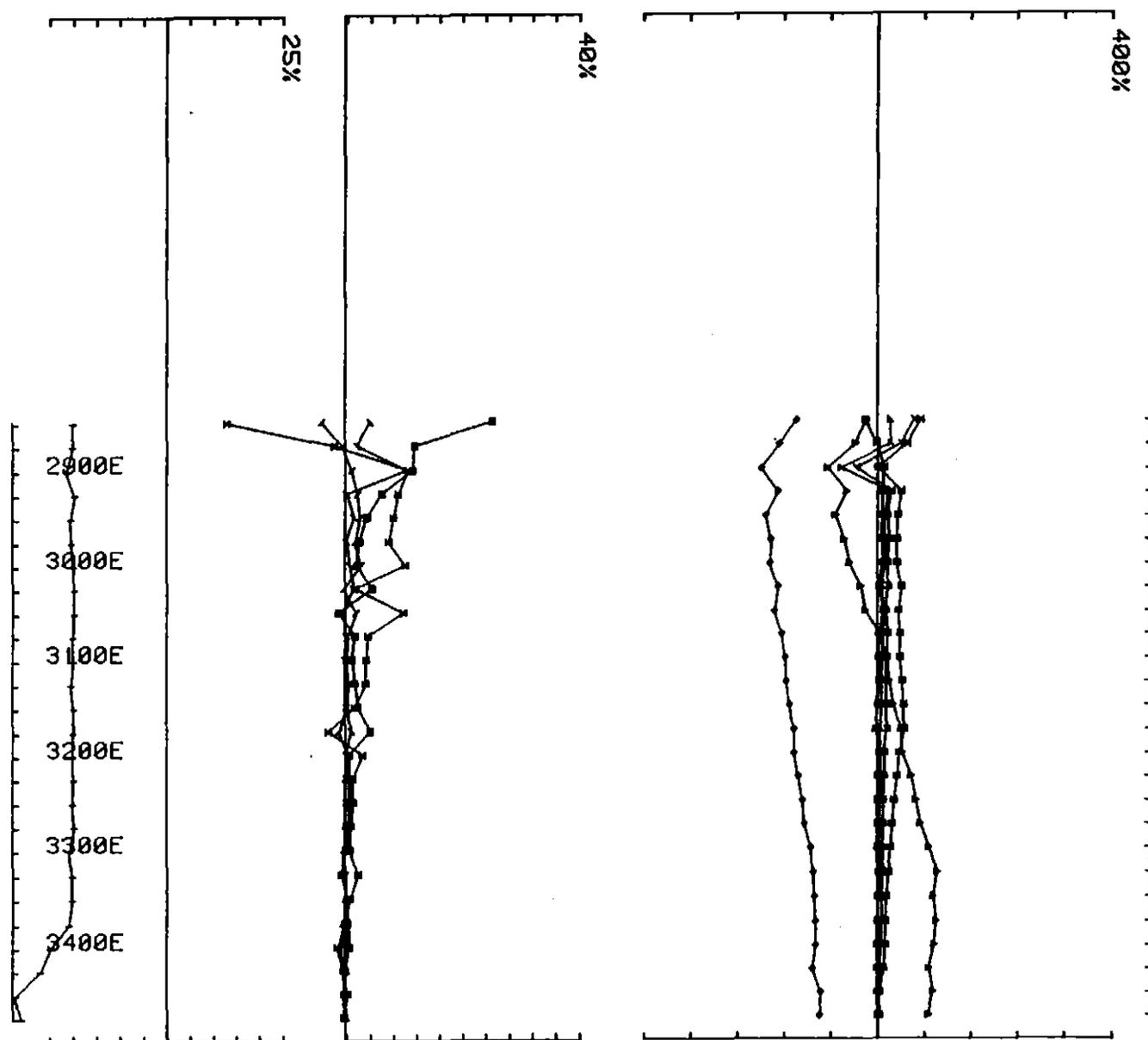
Loop 0004 line 1800N component Hz secondary field Ch 1 contin. norm.



UTEM SURVEY at MOUNT CHARTER for ABERFOYLE RESOURCES  
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 Loop 0002 line 1800N component Hz secondary field Ch 1 contin. norm.



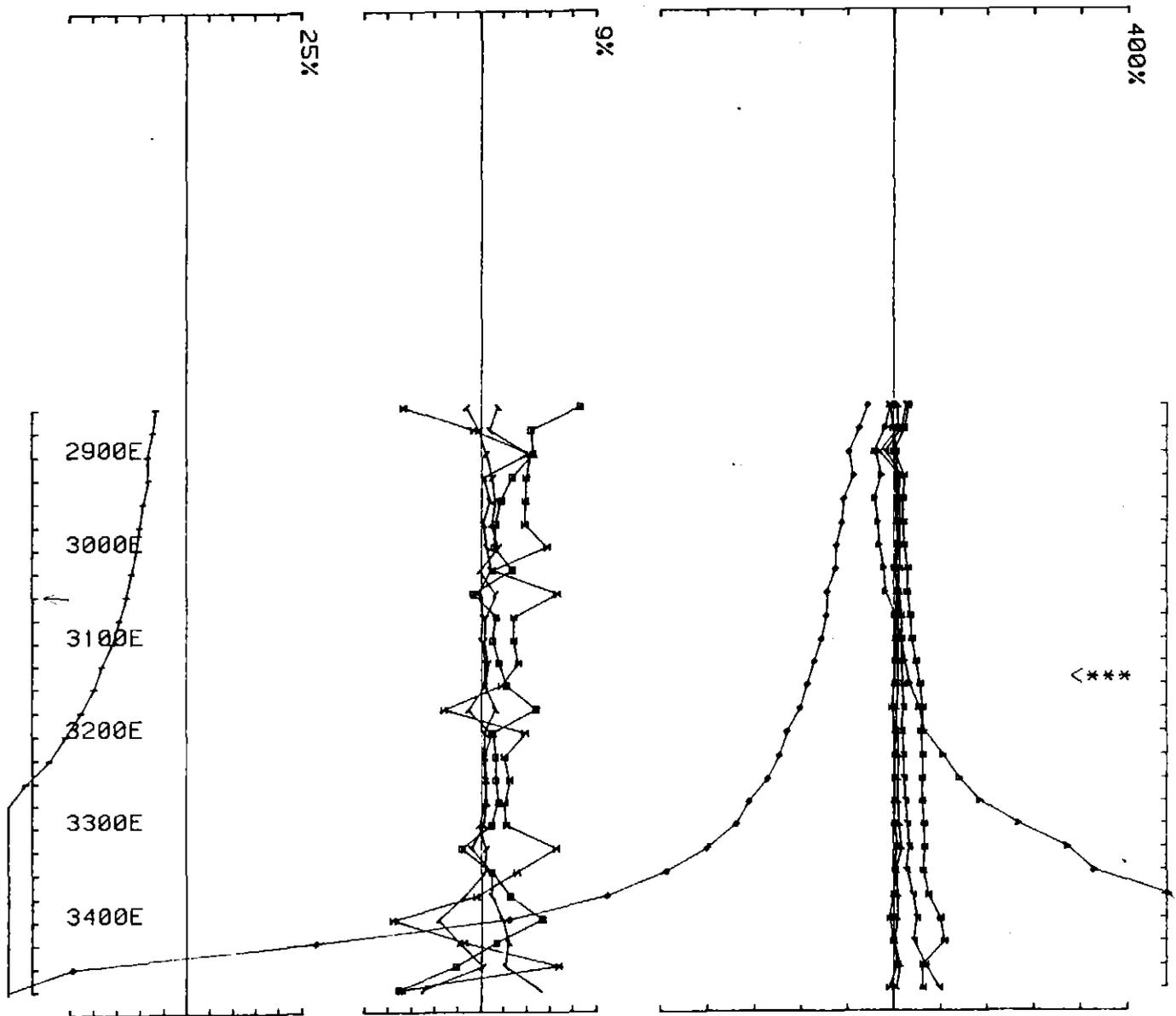
UTEM SURVEY at MOUNT CHARTER for ABERFOYLE RESOURCES  
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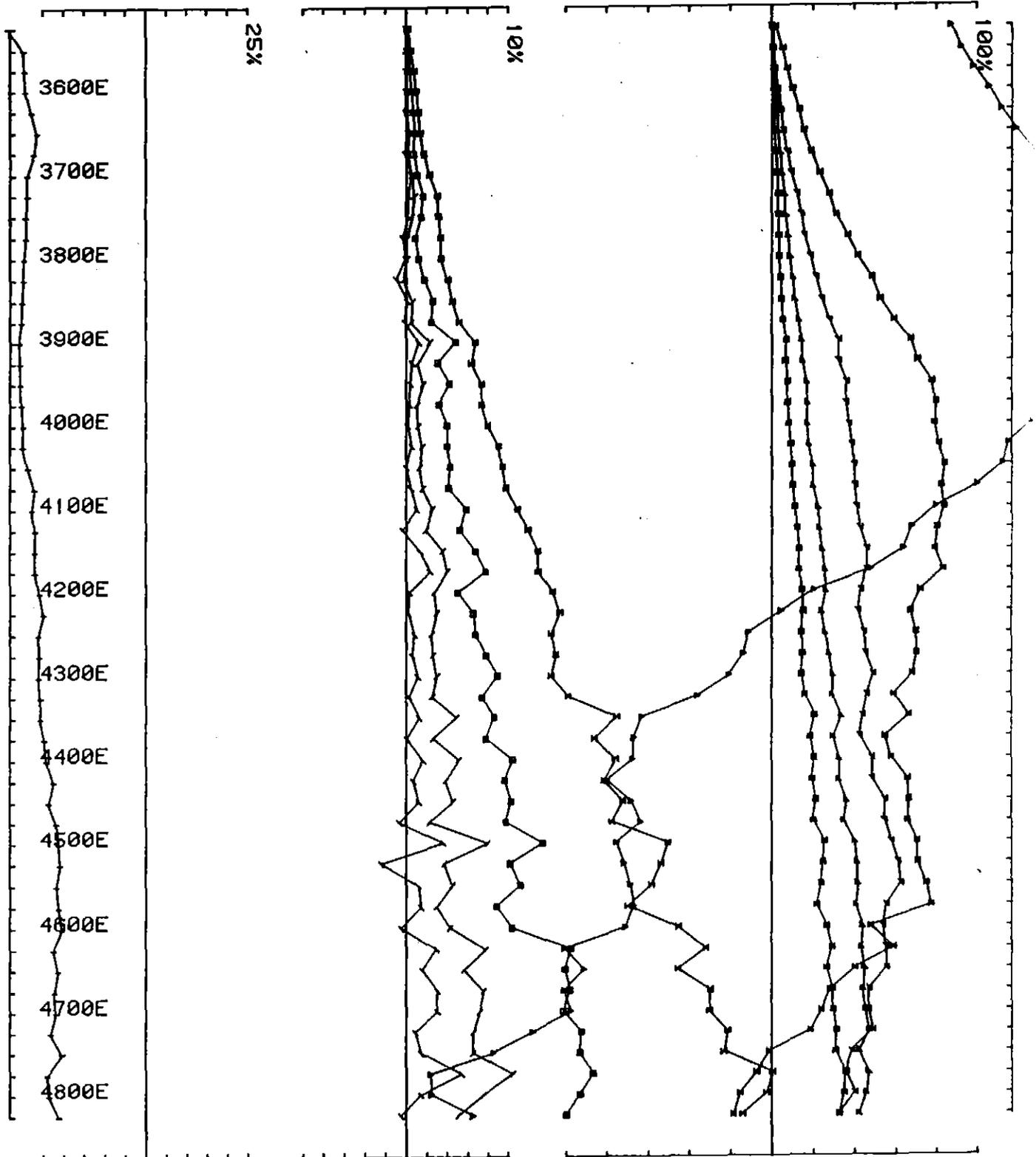
UTEM SURVEY at MOUNT CHARTER for ABERFOYLE RESOURCES

conducted by PAO PMM Job 8721 base freq (hz) 26.230 30/8/87

Loop 0002 line 2000N component Hz secondary field Ch 1 contin. norm.



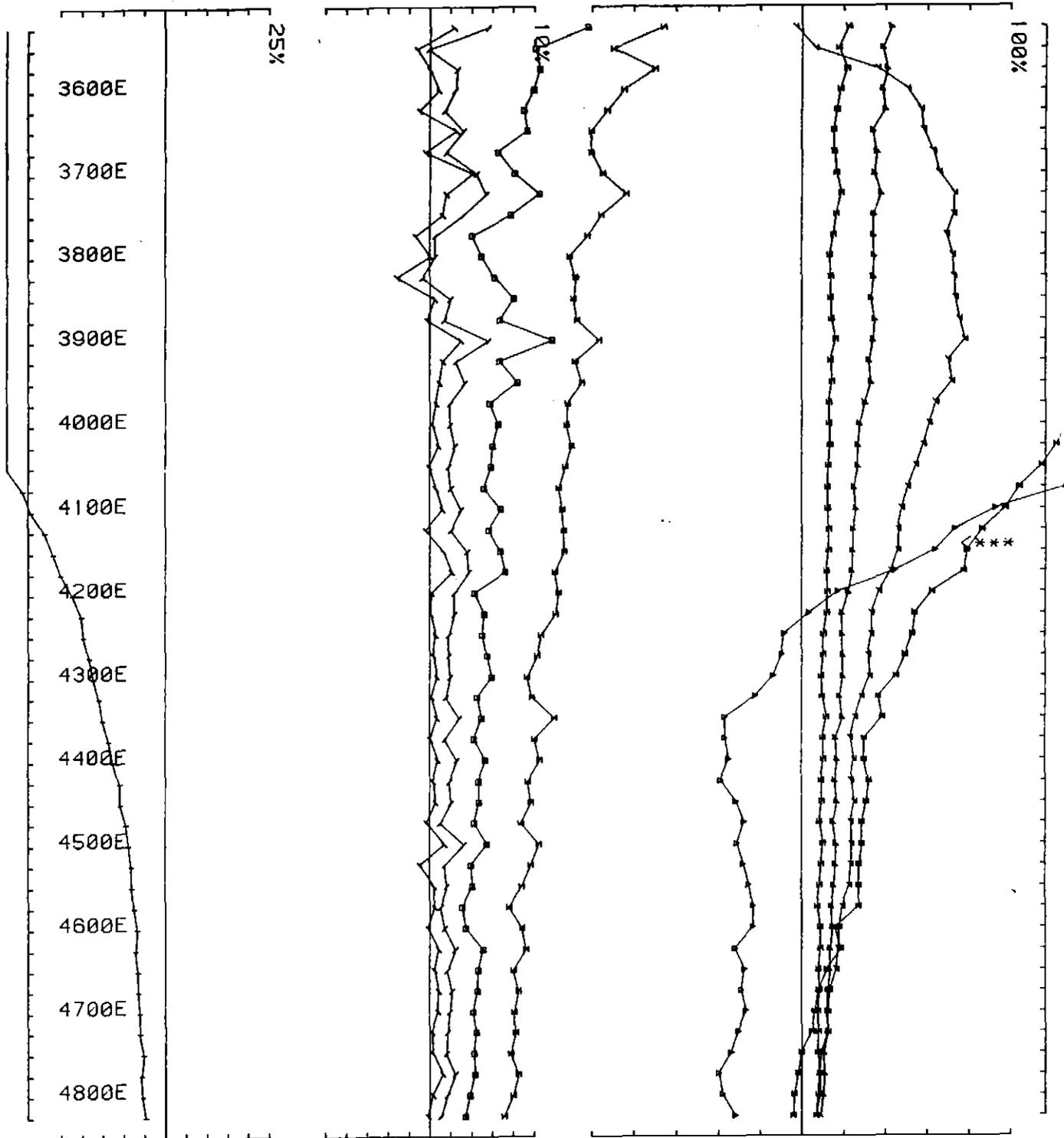
UTEM SURVEY at MOUNT CHARTER for ABERFOYLE RESOURCES  
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 31/8/87

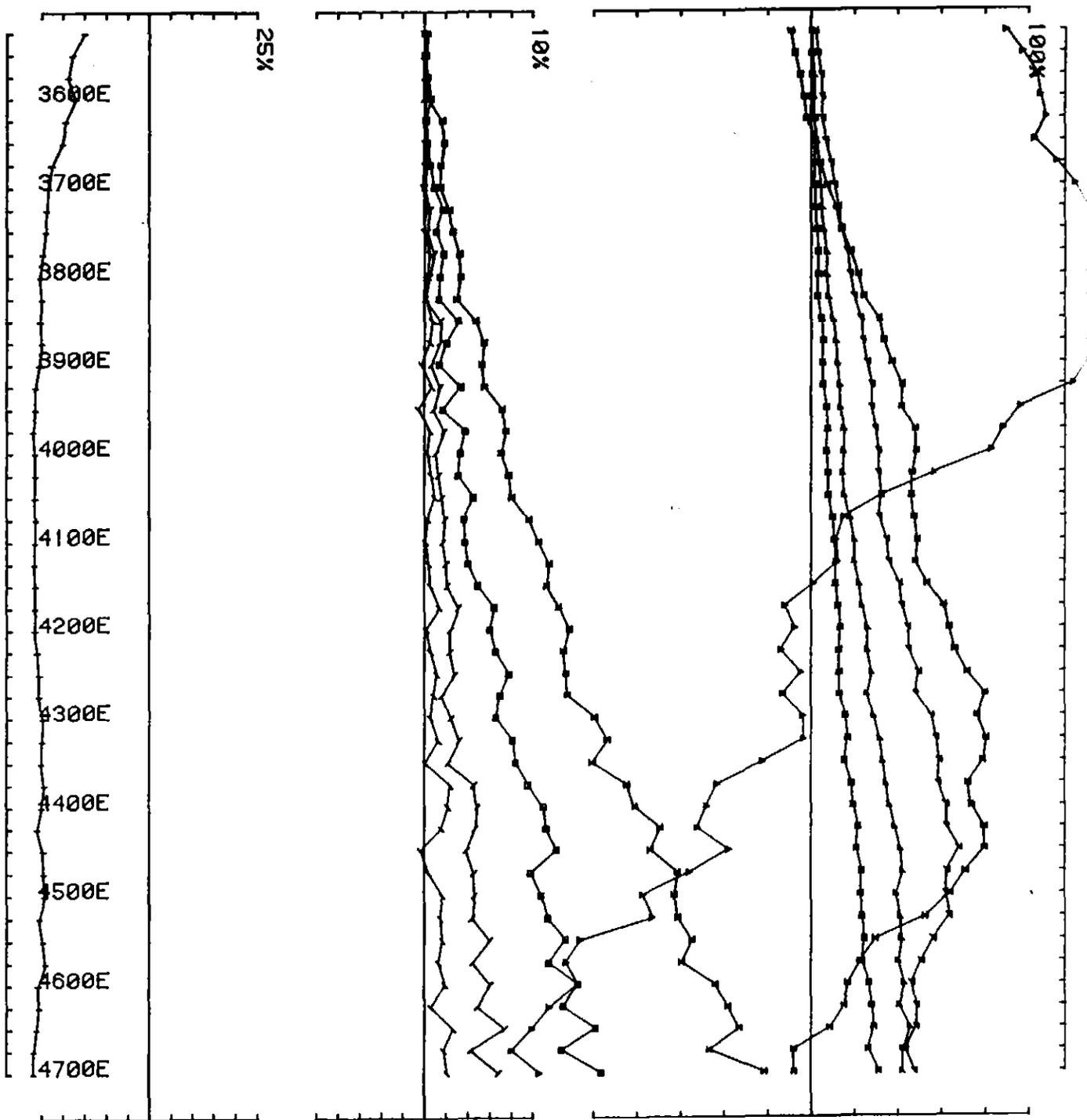
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 6/9/87

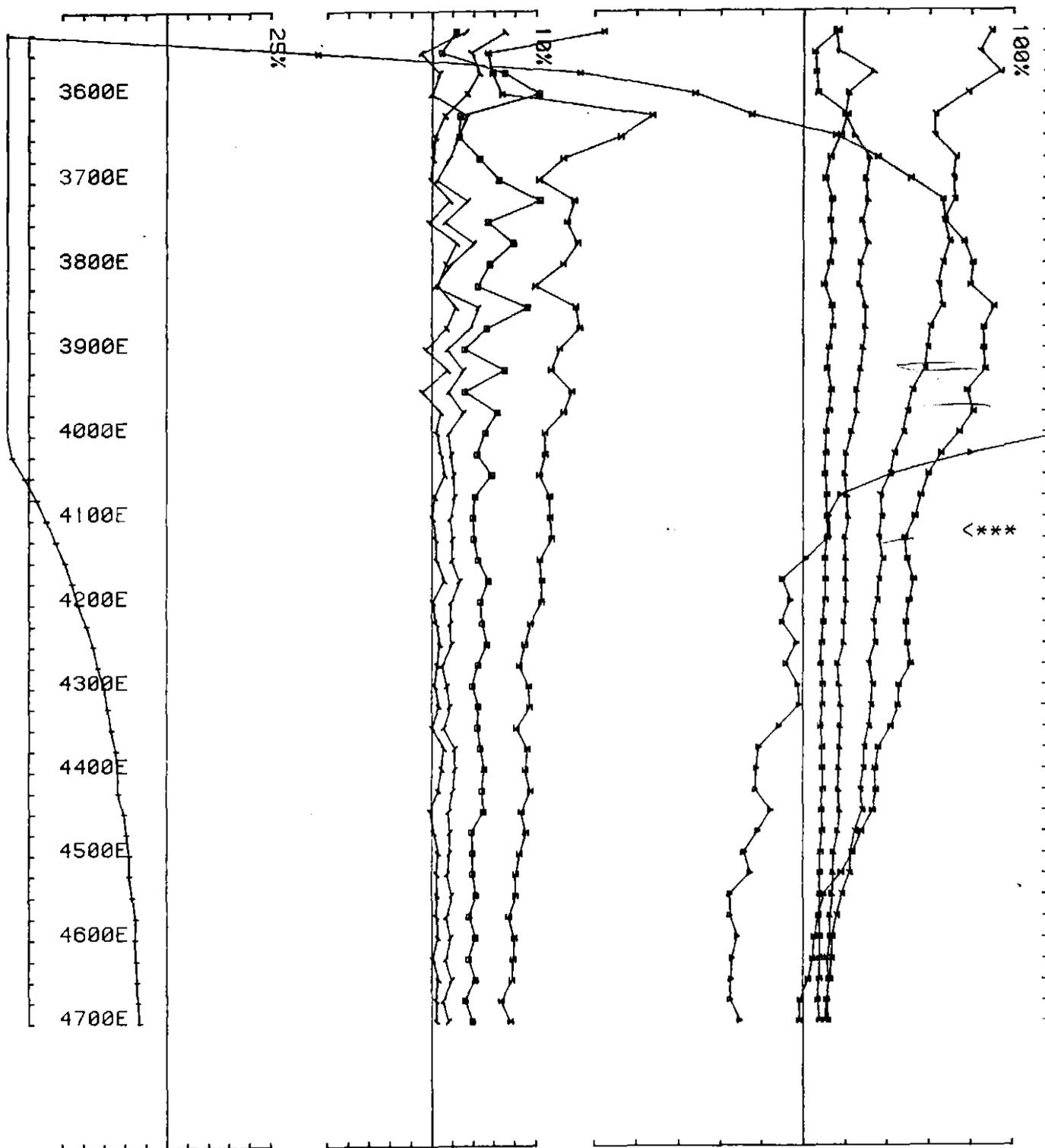
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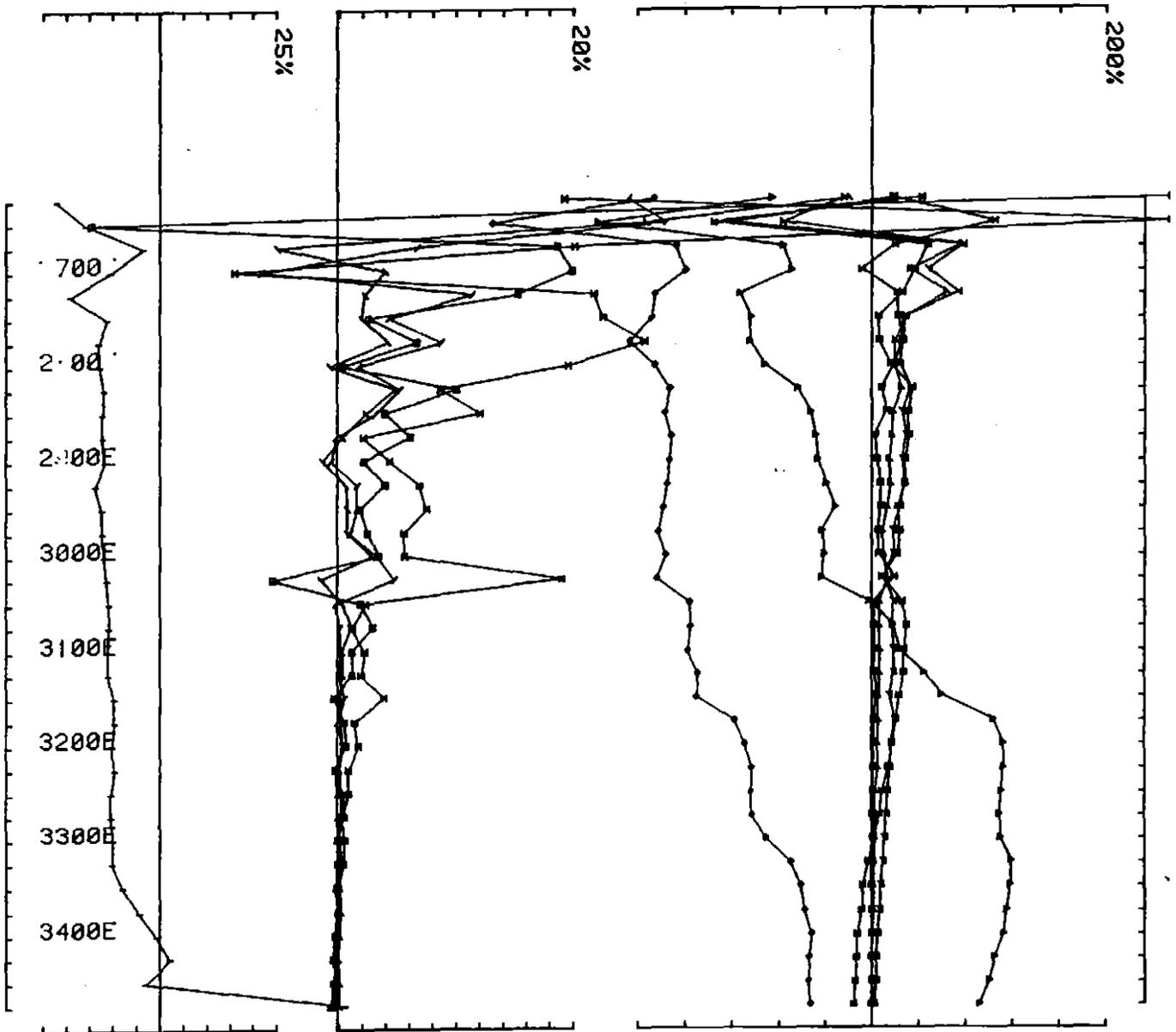
UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 31/8/87

Loop 0004 line 2200N component Hz secondary field Ch 1 contin. norm.



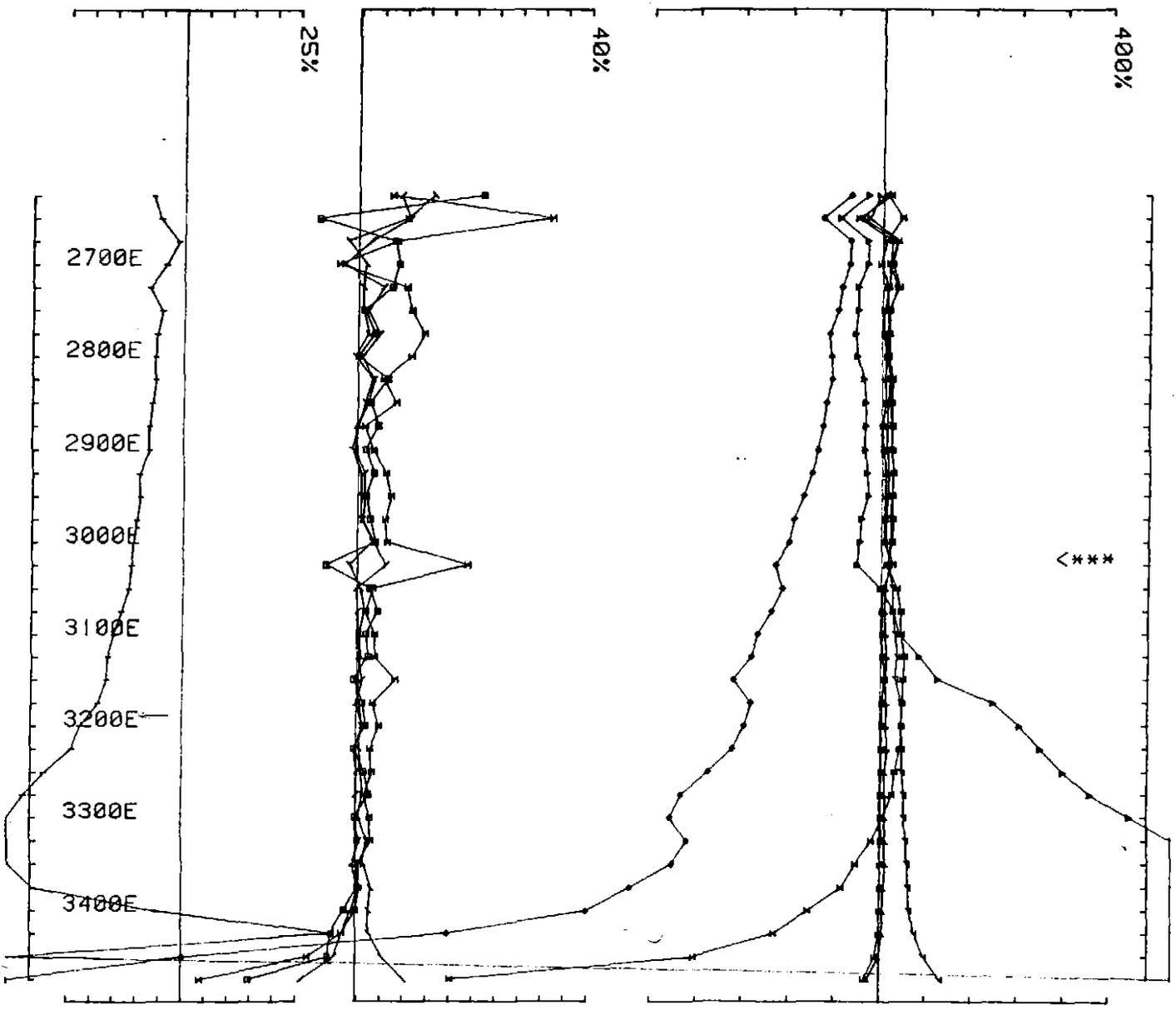
UTEM SURVEY at Mt. CHARTER for ABERFOYLE  
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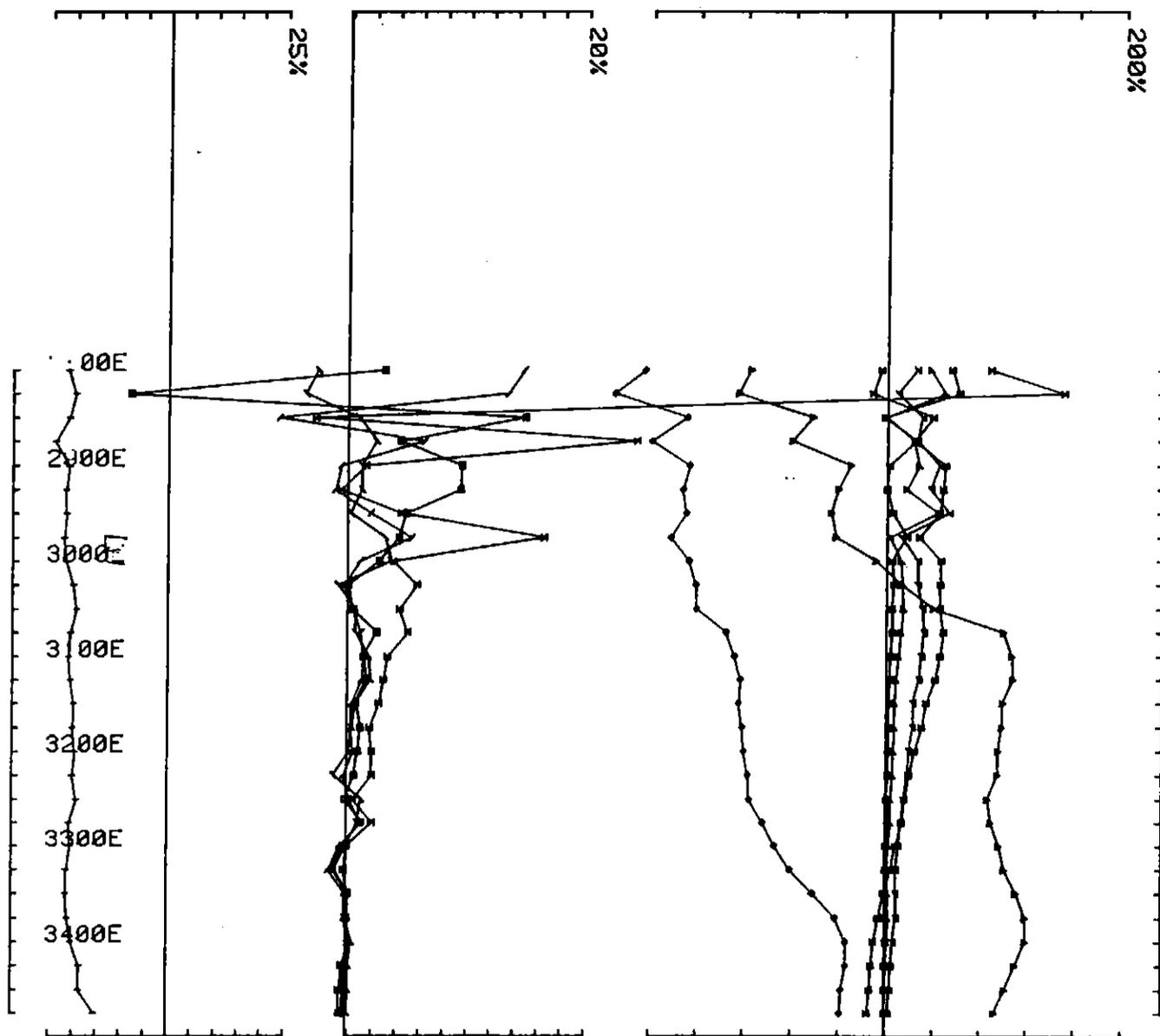
UTEM SURVEY at MOUNT CHARTER for ABERFOYLE RESOURCES

conducted by PAO PMM job 8721 base freq (hz) 26.230 28/8/87

Loop 0002 line 2200N component Hz secondary field Ch 1 contin. norm.



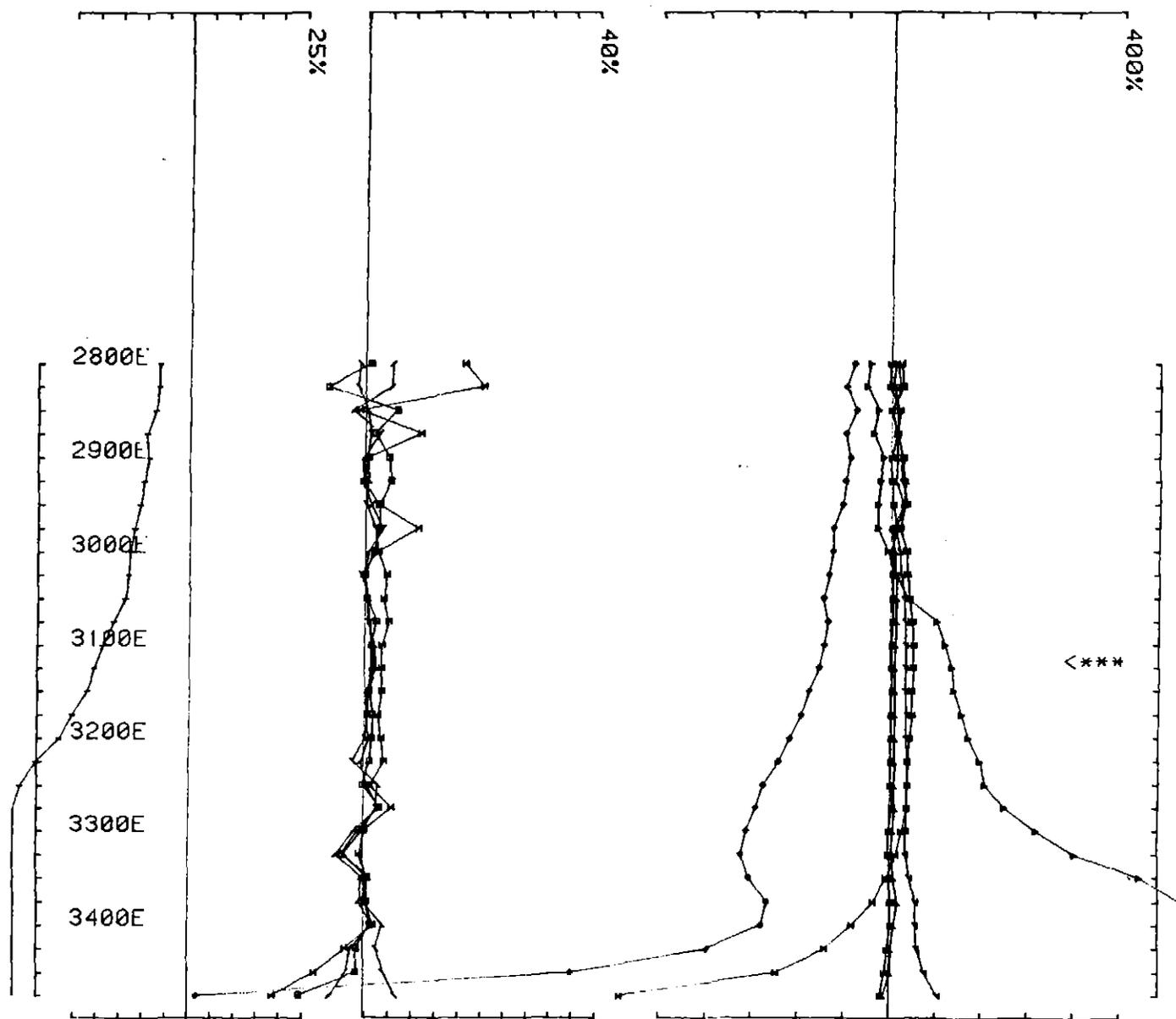
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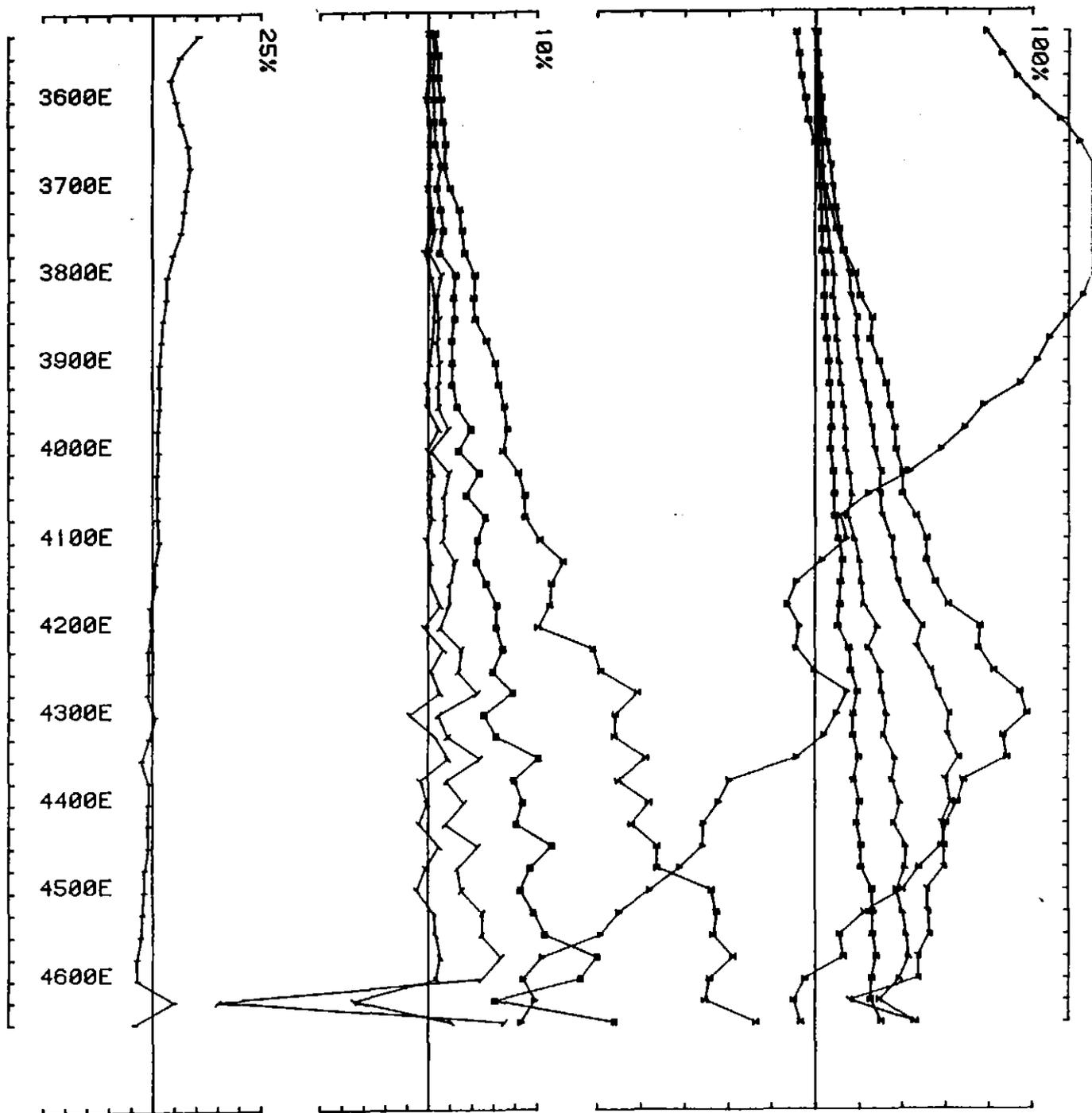
UTEM SURVEY at MOUNT CHARTER for ABERFOYLE RESOURCES

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Loop 0002 line 2400N component Hz secondary field Ch 1 contin. norm.



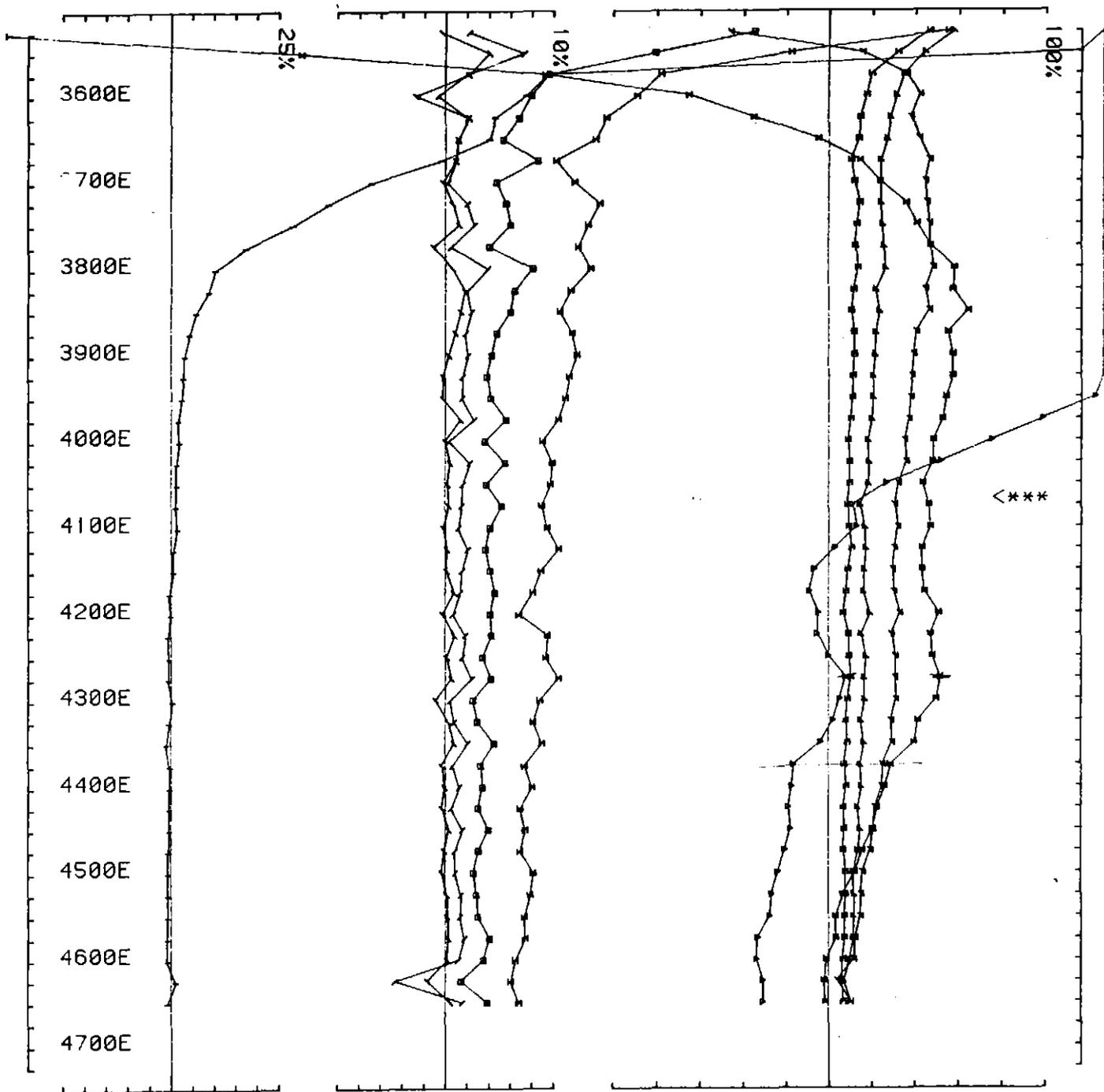
UTEM SURVEY at MOUNT CHARTER for ABERFOYLE RESOURCES  
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 31/8/87

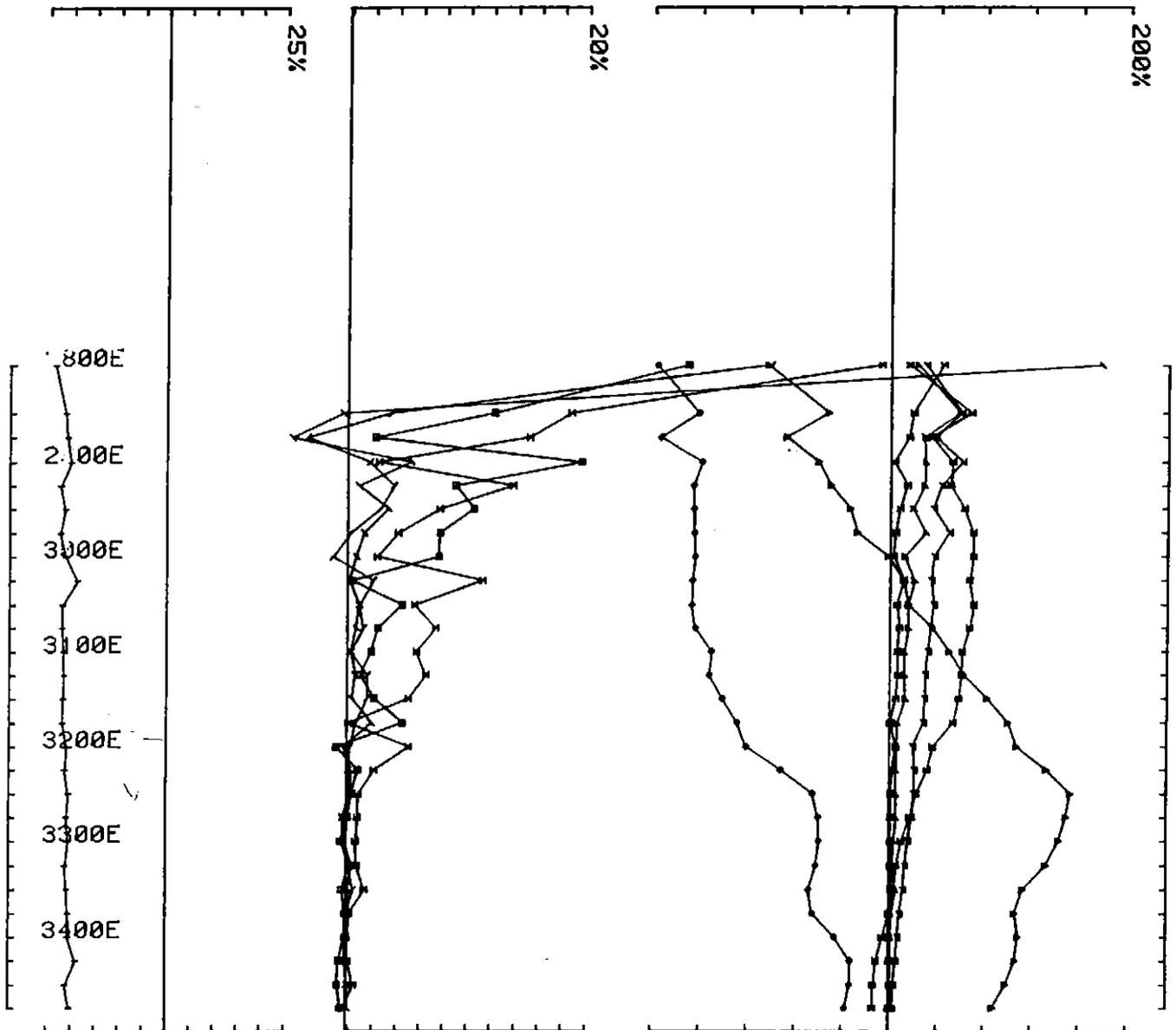
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 8721 base freq (hz) 26.230 6/9/87

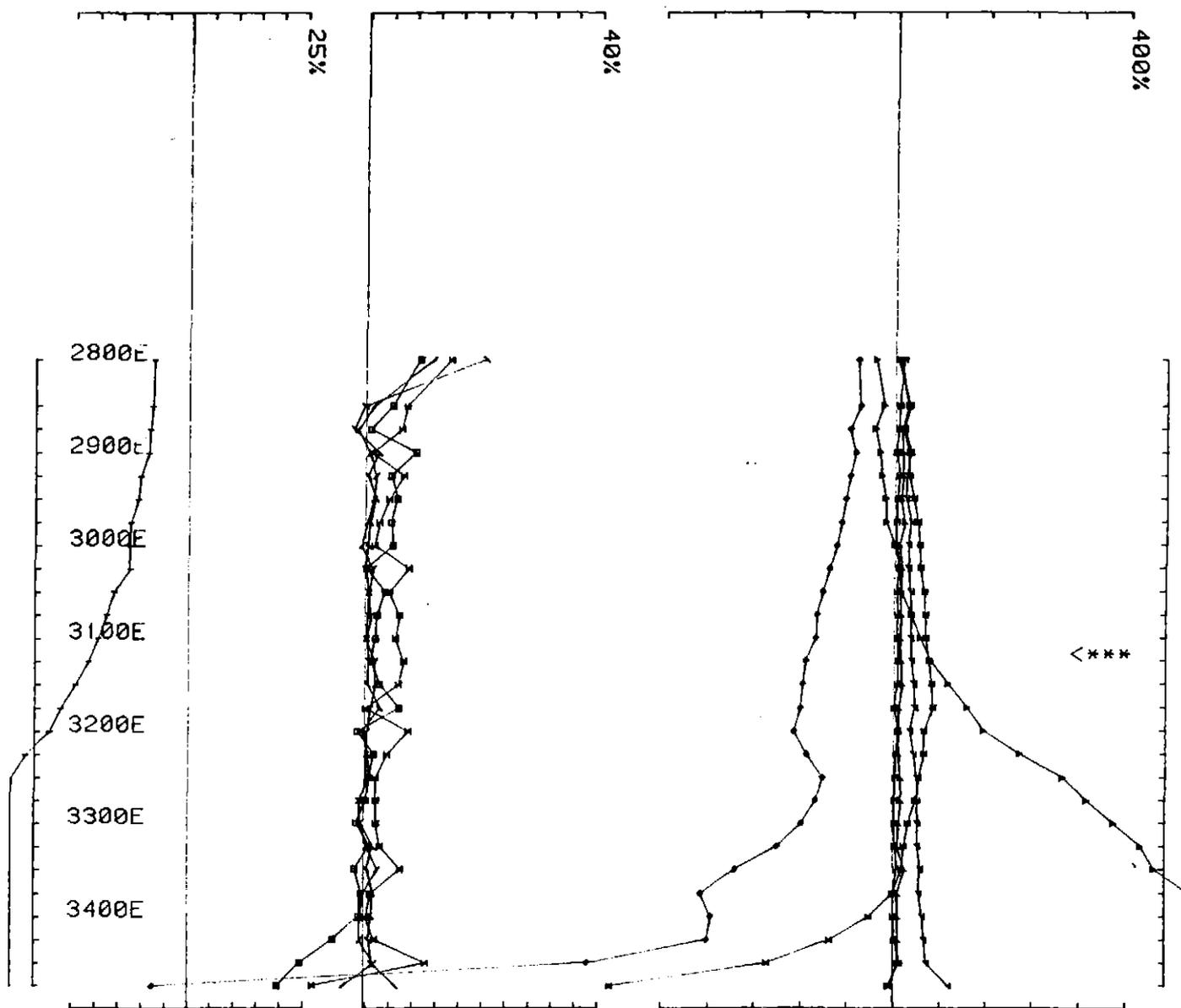
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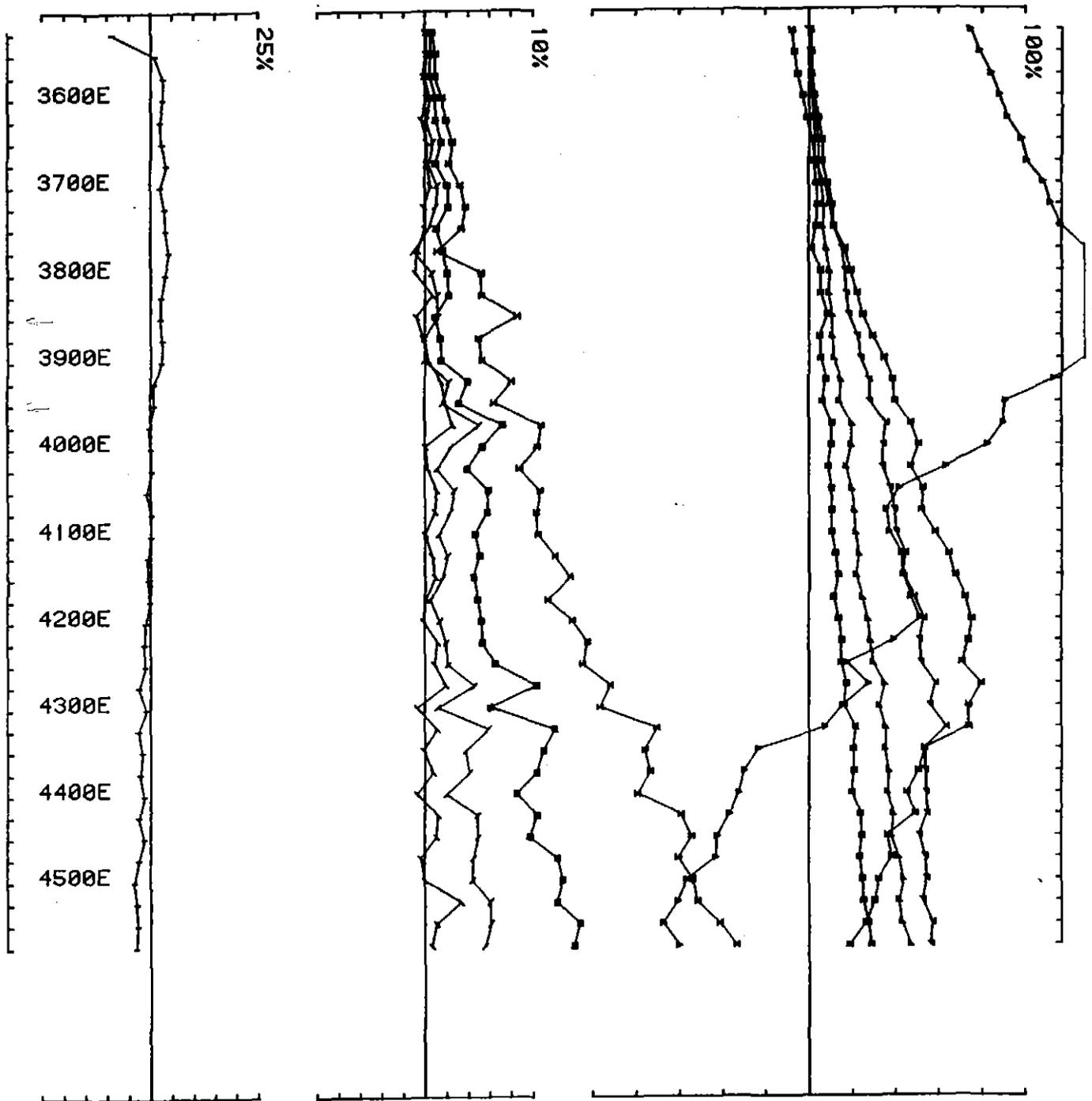
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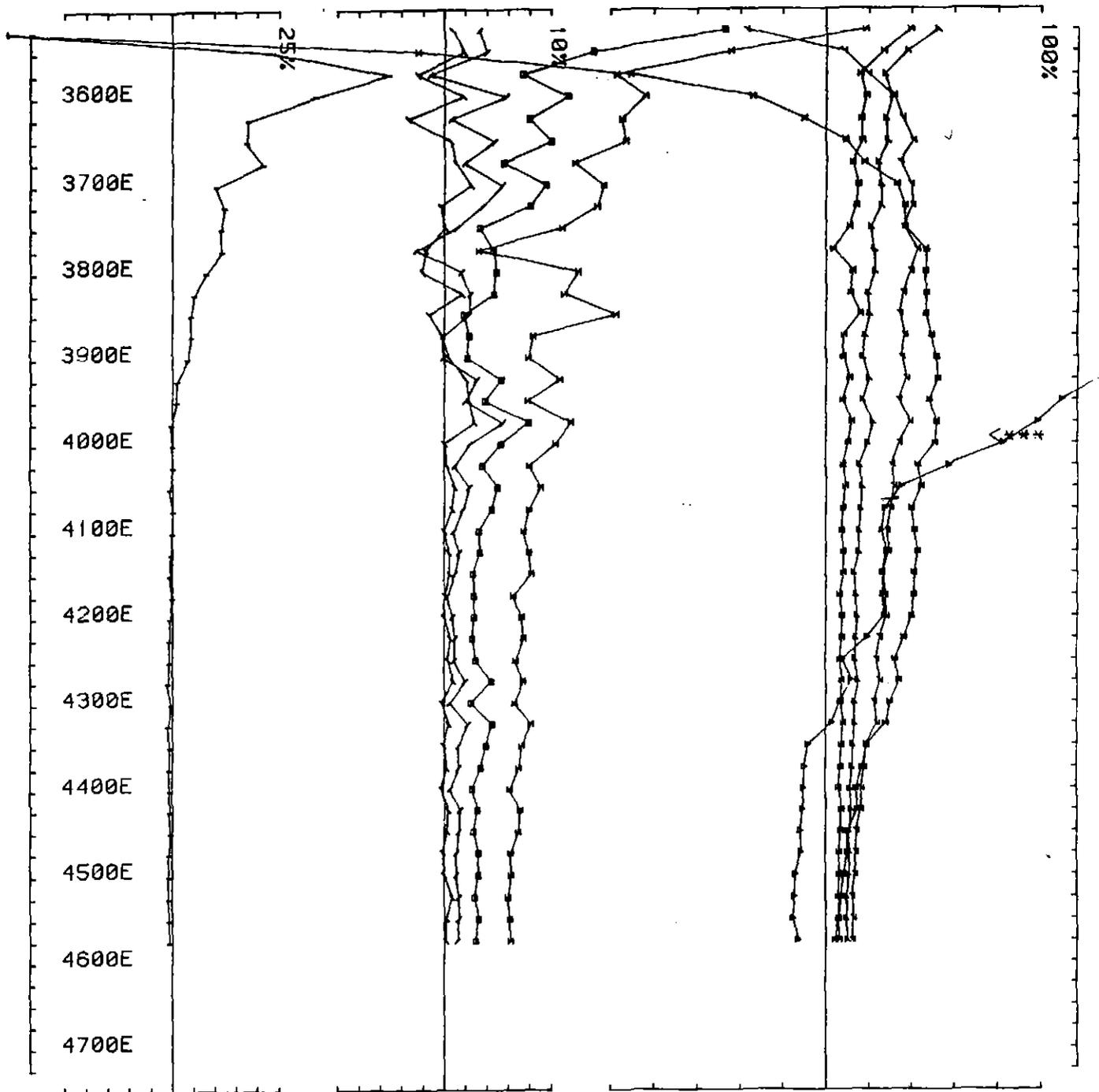
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 31/8/87

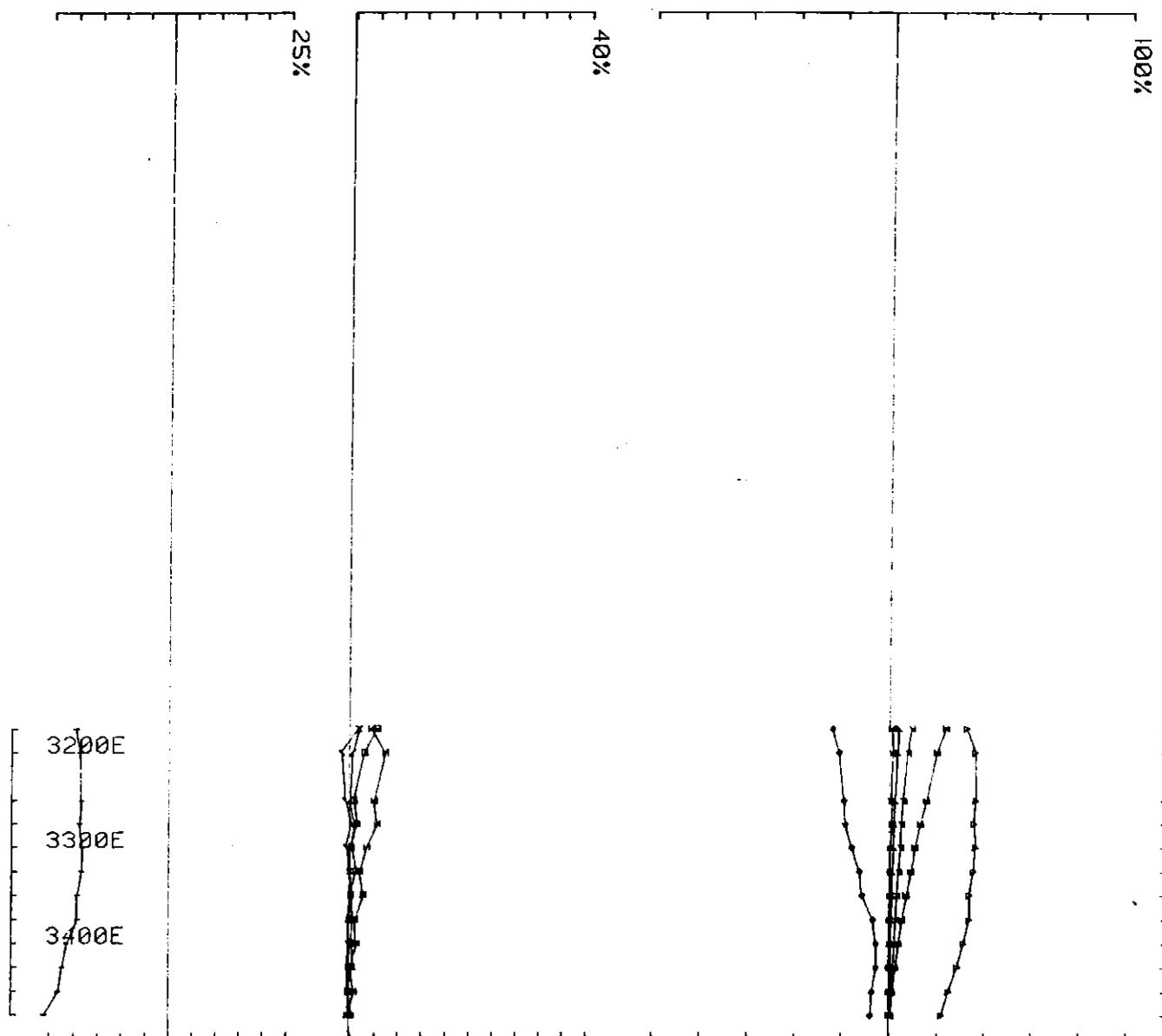
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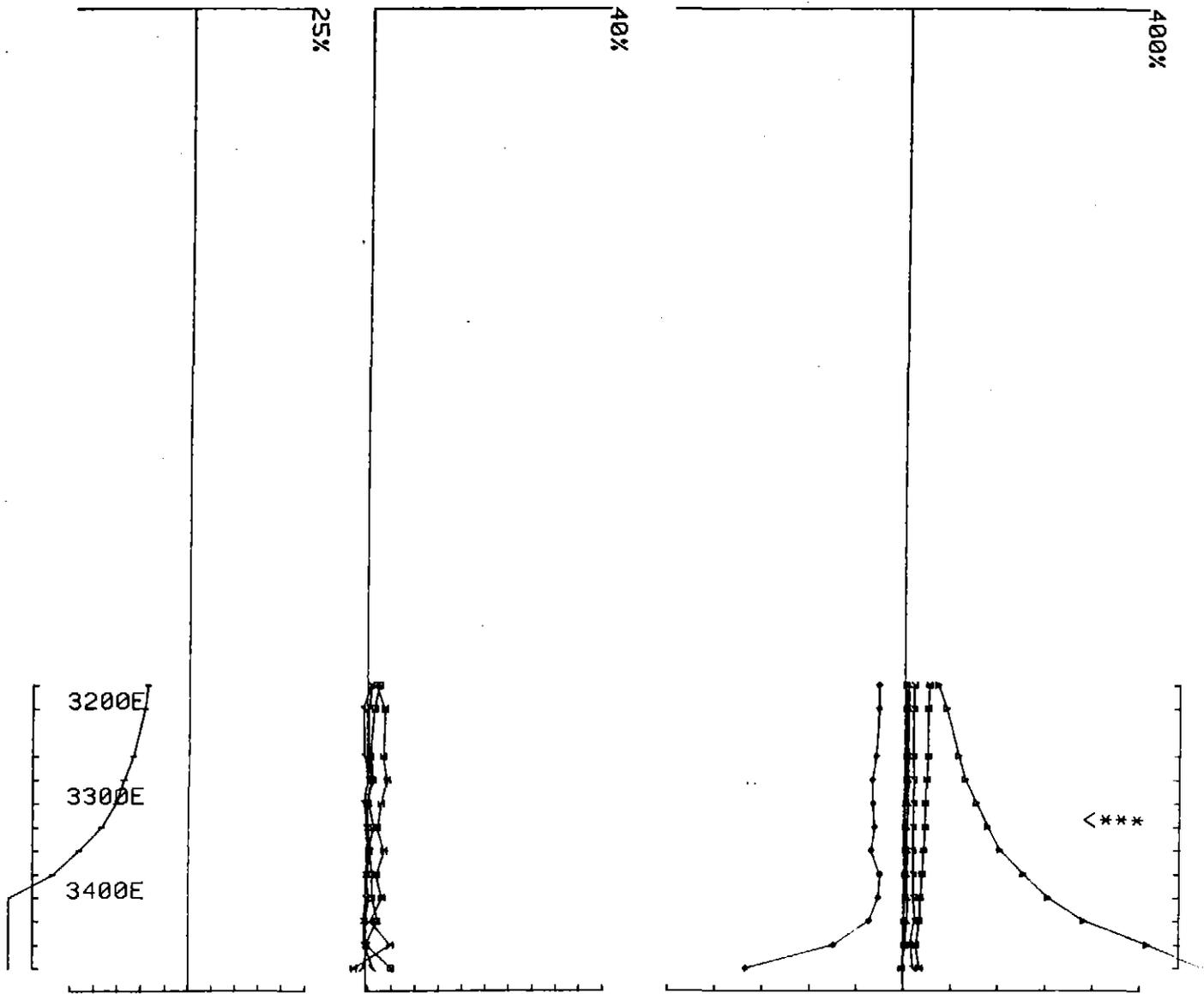
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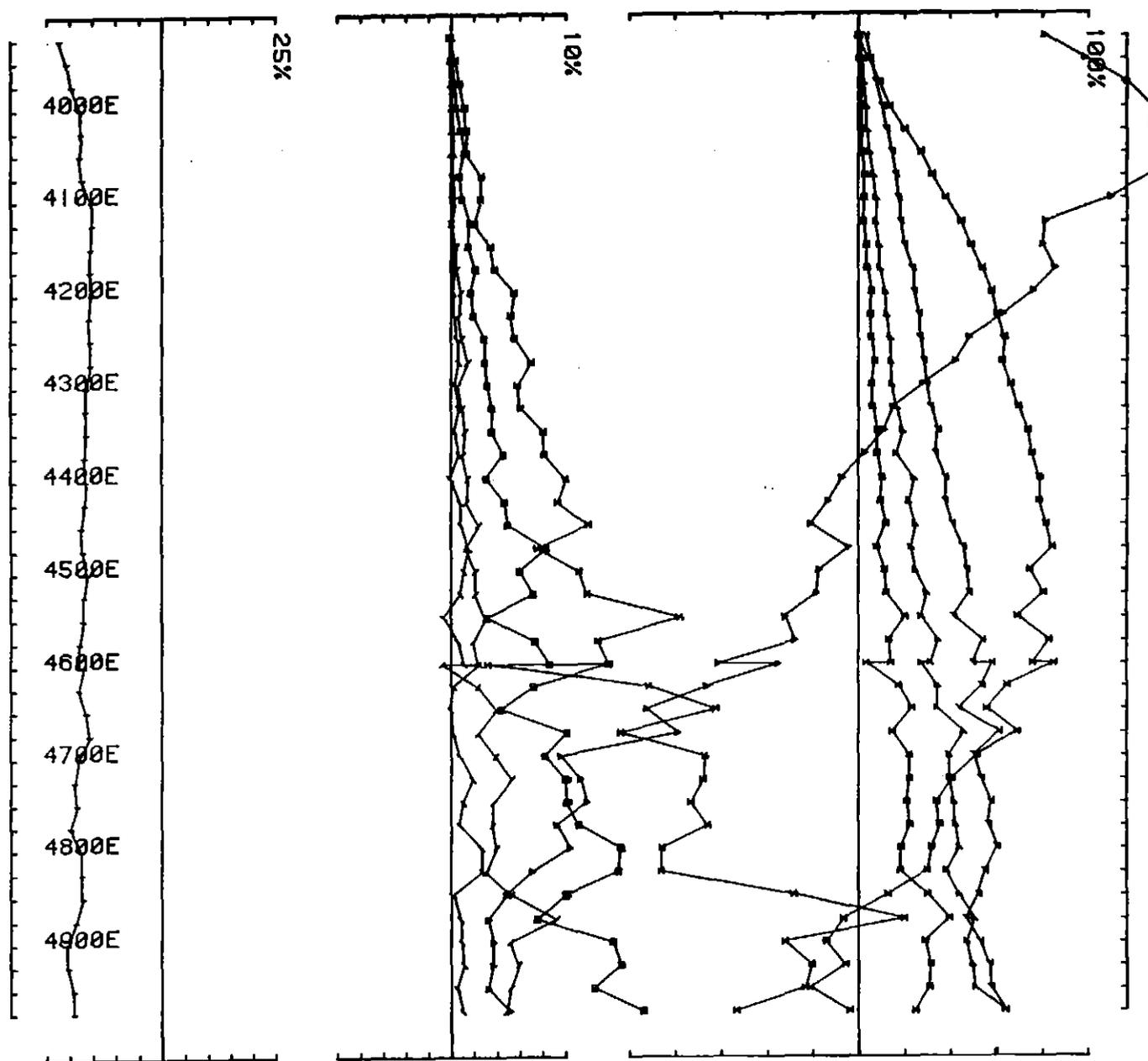
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UTEM SURVEY at MOUNT CHARTER for AB RFOYLE RESOURCES  
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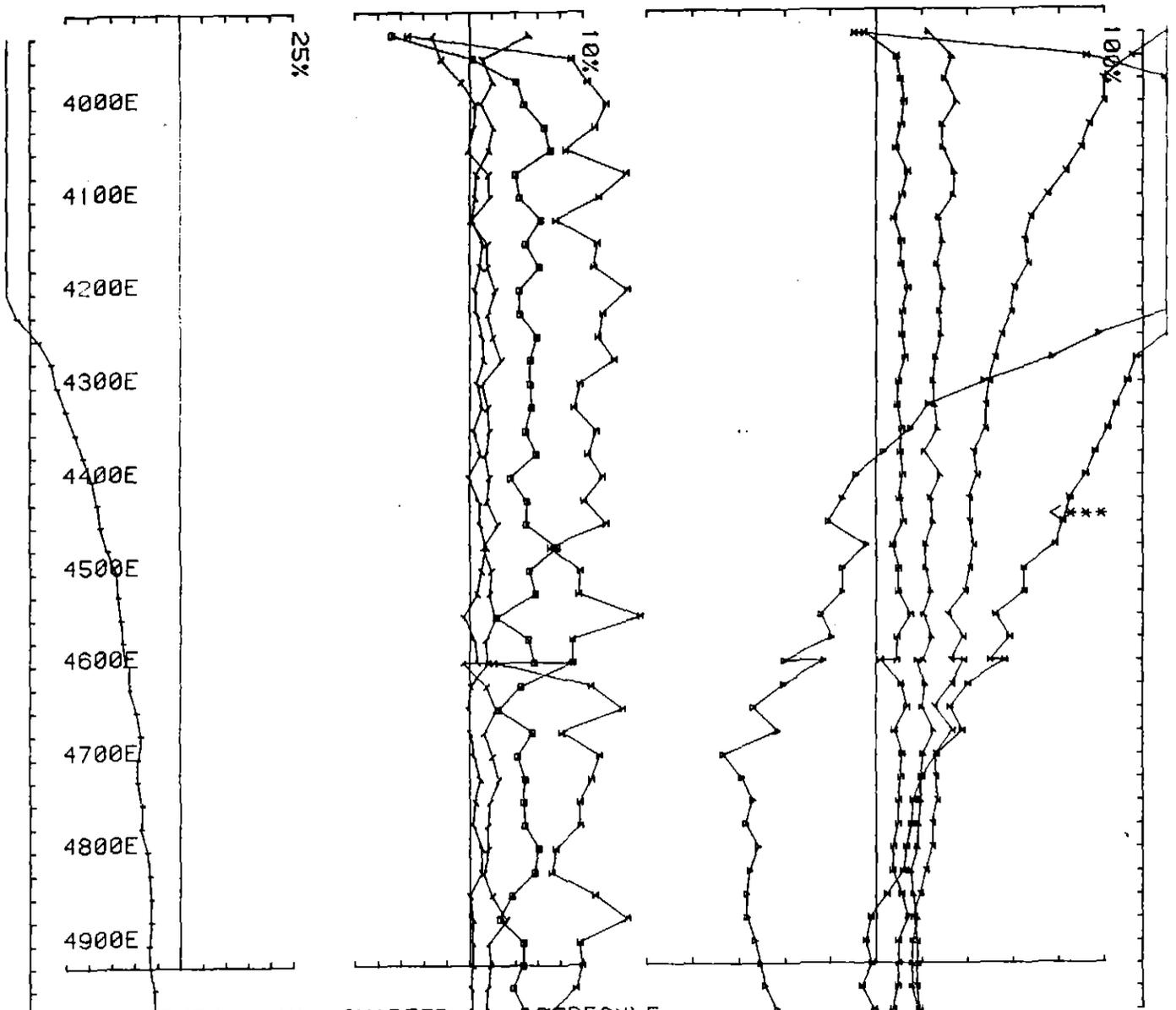
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 8721 base freq (hz) 26.230 30/8/87

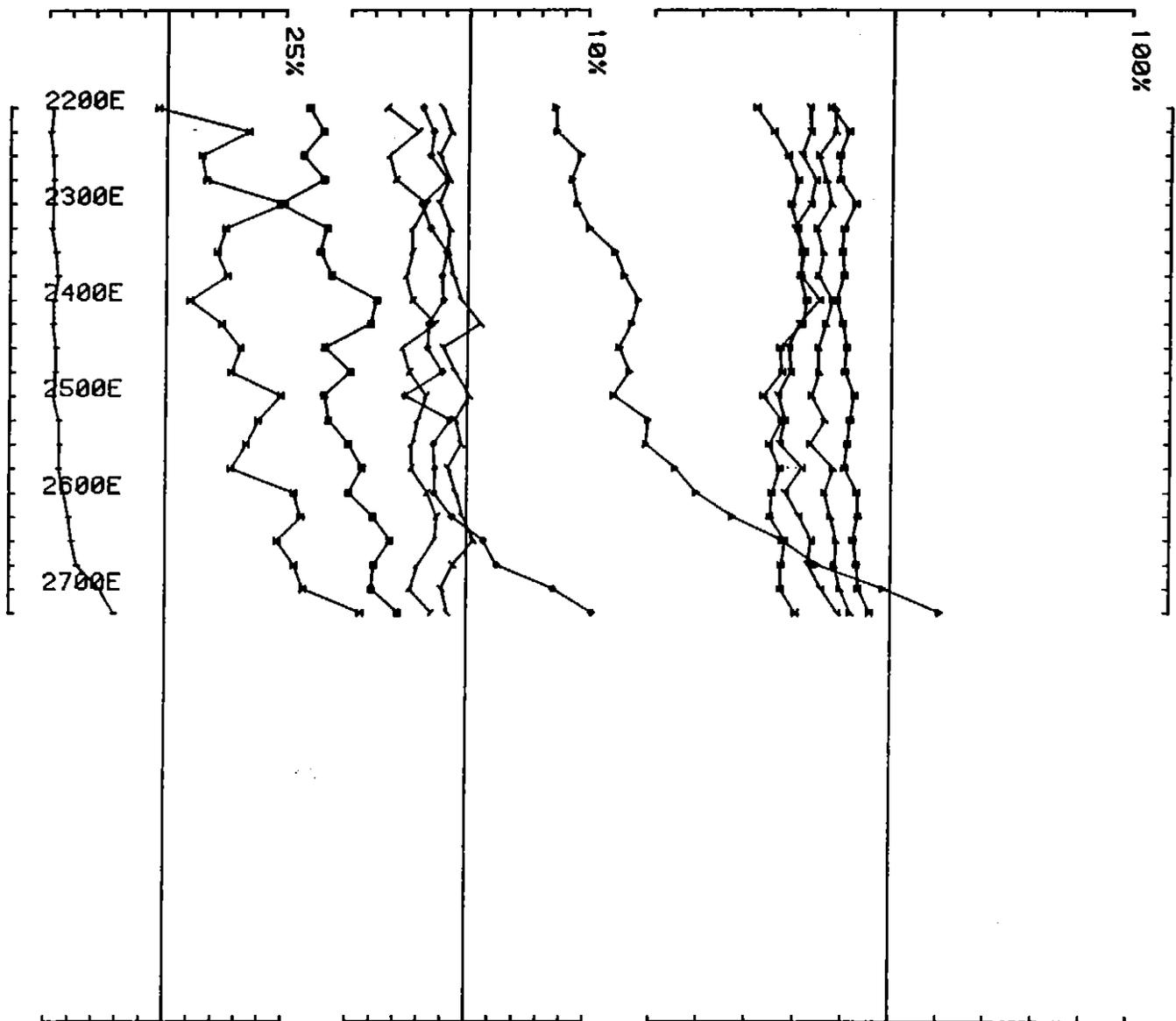
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UTEM SURVEY at Mt. CHARTER For ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 6/9/87

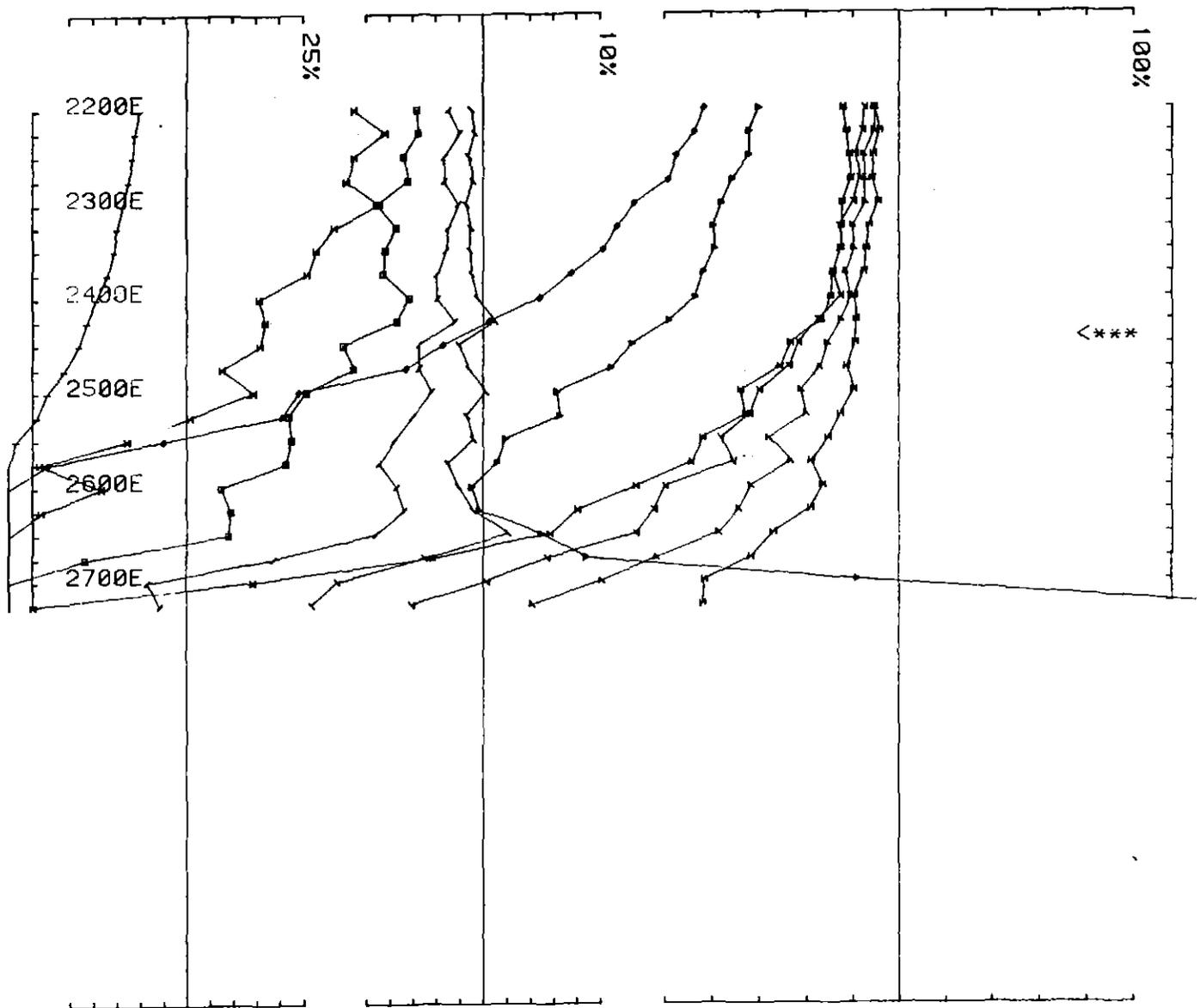
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 30/8/87

Loop 0003 line 2800N component Hz secondary field Ch 1 contin. norm.

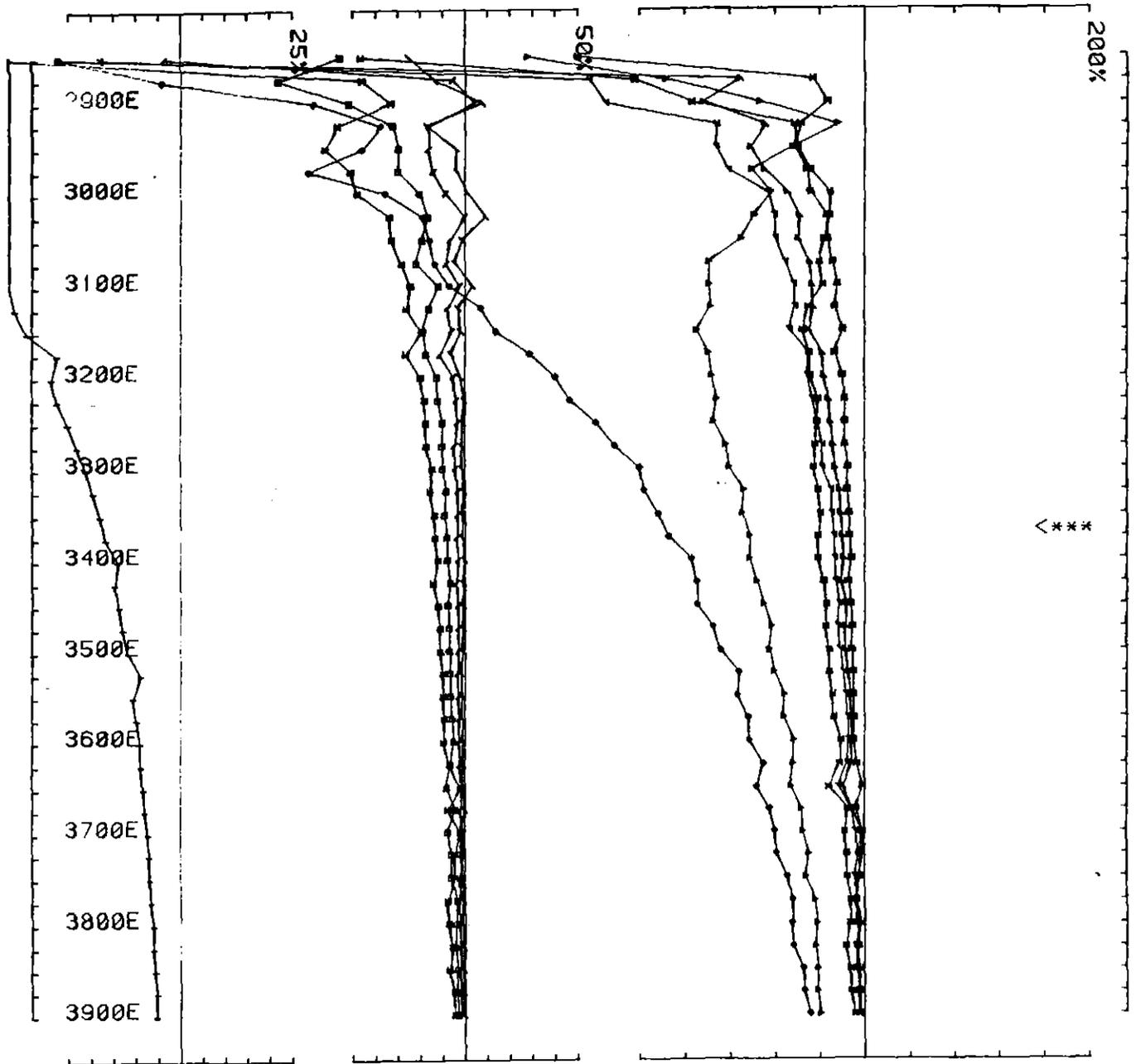


UTEM SURVEY at Mt. CHARTER for ABERFOYLE

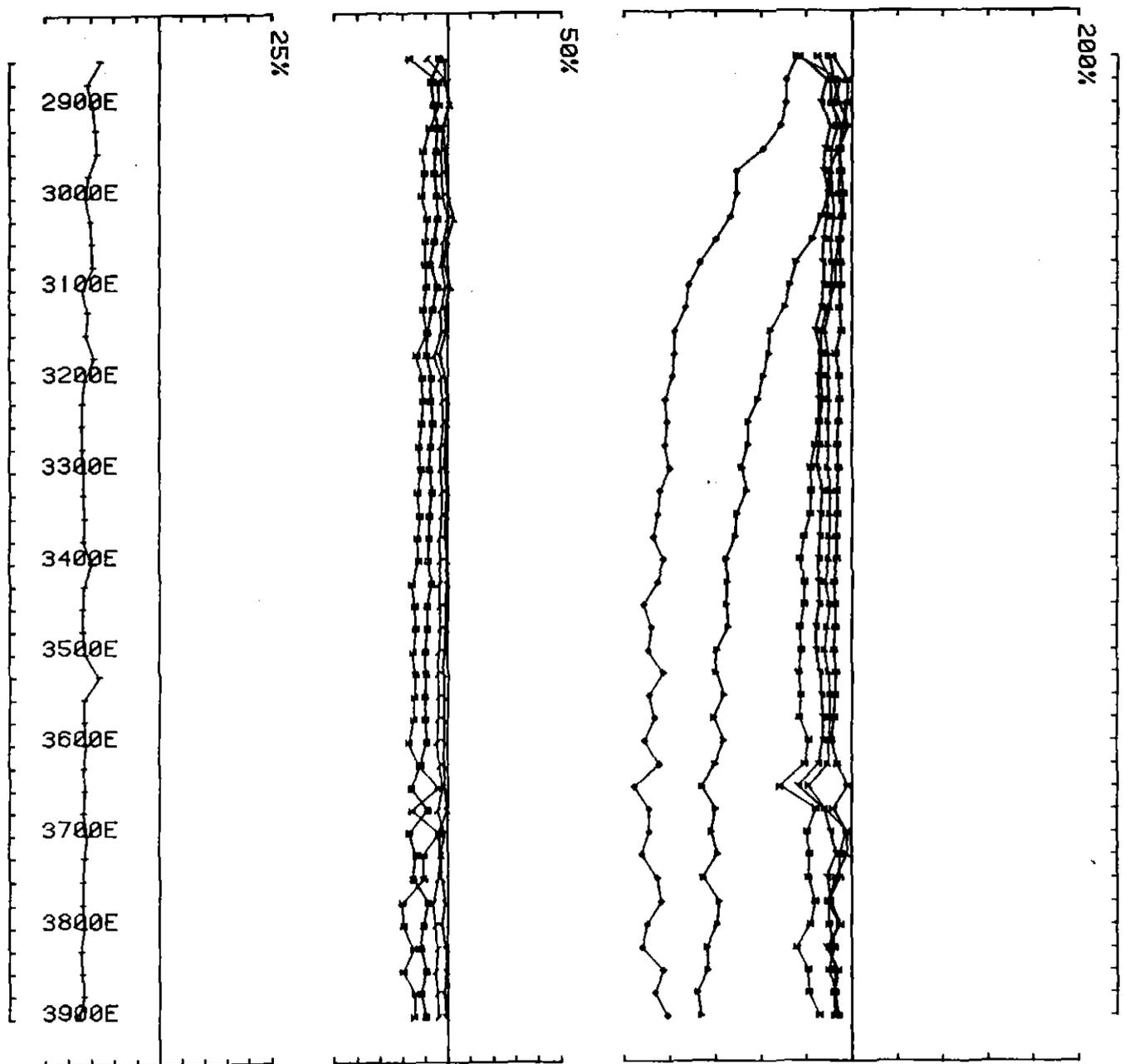
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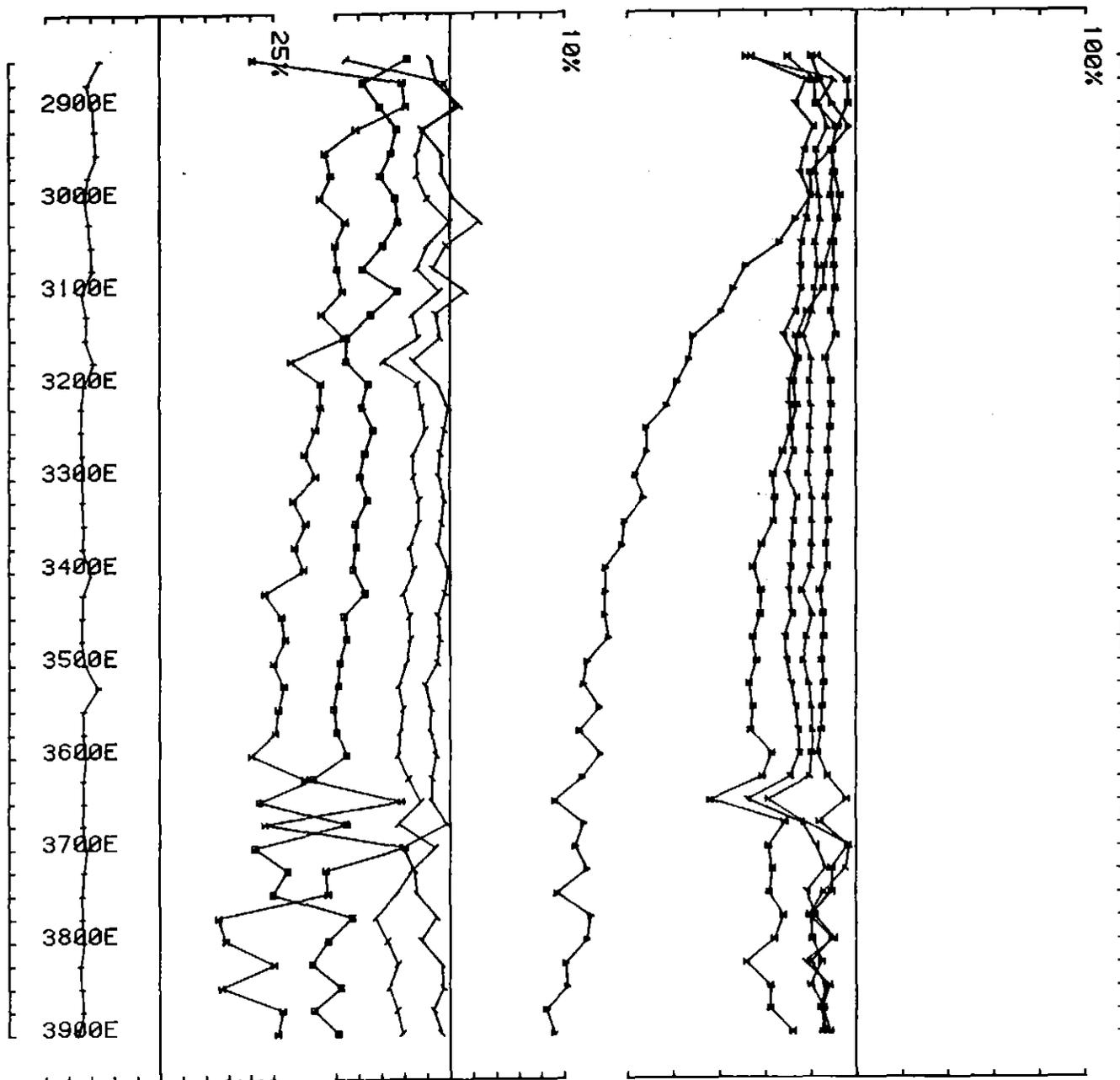
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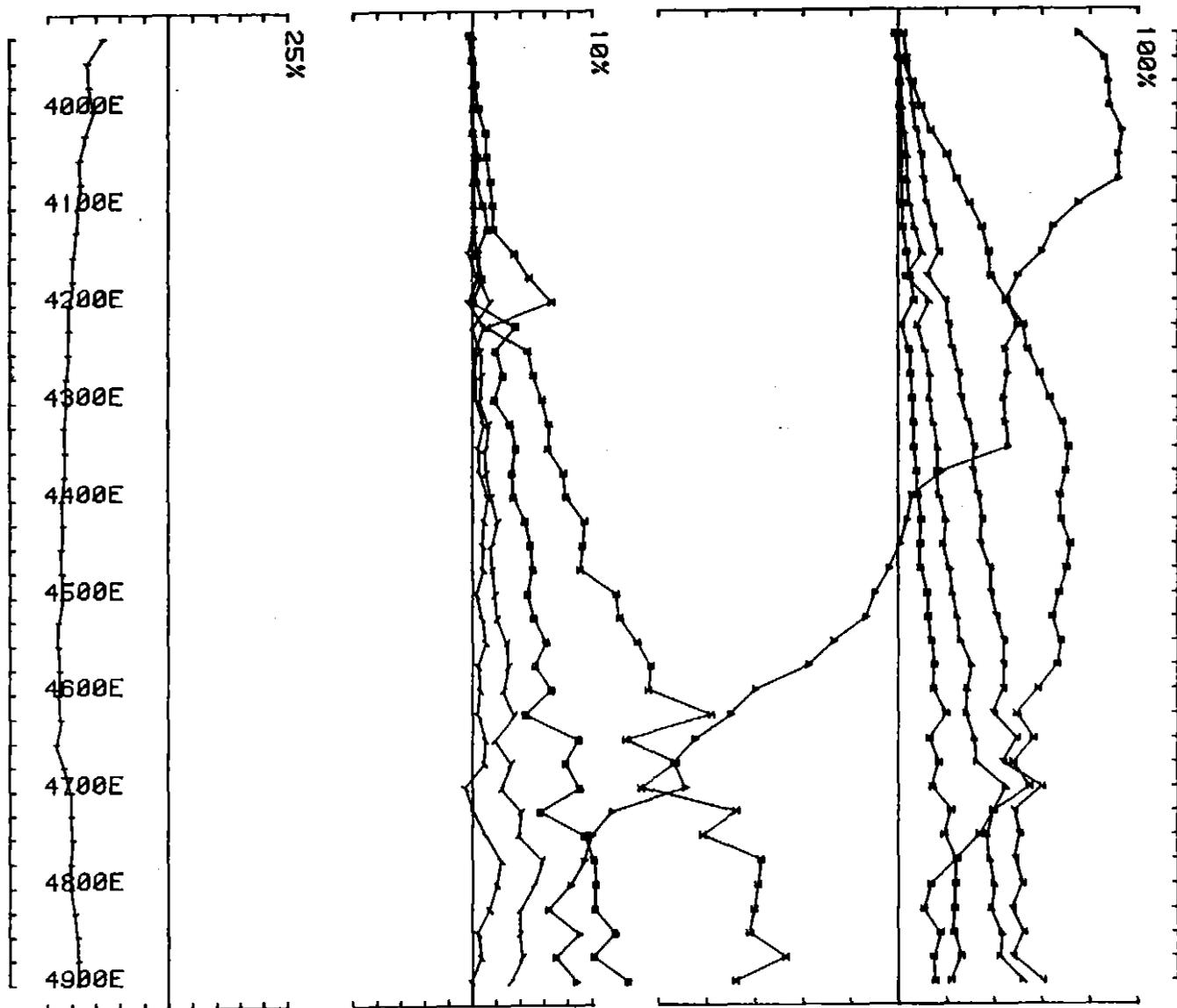
UTEM SURVEY at MT. CHARTER for ABERFOYLE RESOURCES  
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Loop 0001 line 2800N component Hz secondary field Ch 1 point norm.



UTEM SURVEY at MOUNT CHARTER for ABERFOYLE P/L  
 conducted by PAO PMM Job 8721 base freq (hz) 26.230 11/7/87  
 Loop 0001 line 2800N component Hz secondary field Ch 1 contin. norm.



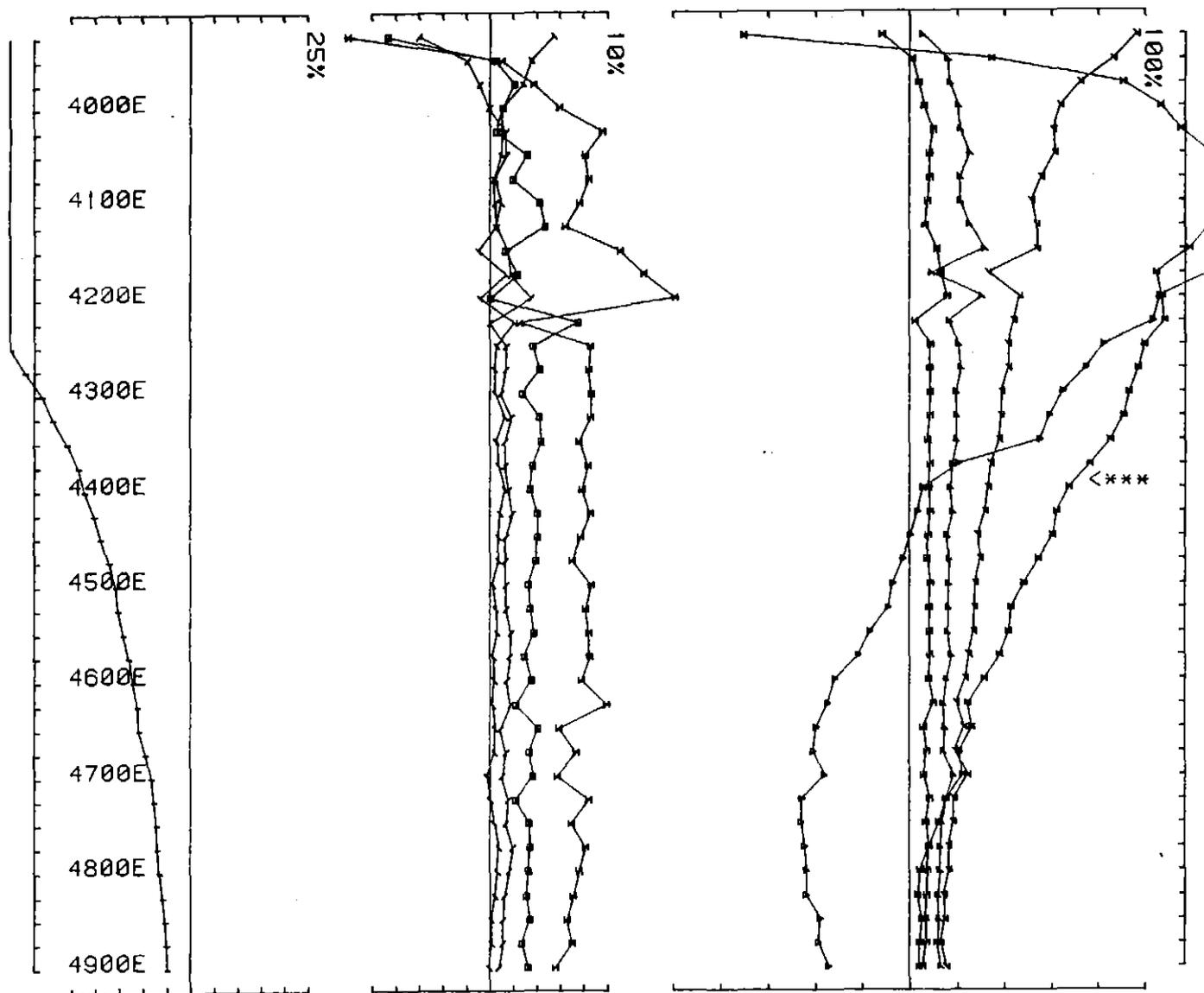
UTEM SURVEY at MOUNT CHARTER for ABERFOYLE P/L  
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 30/8/87

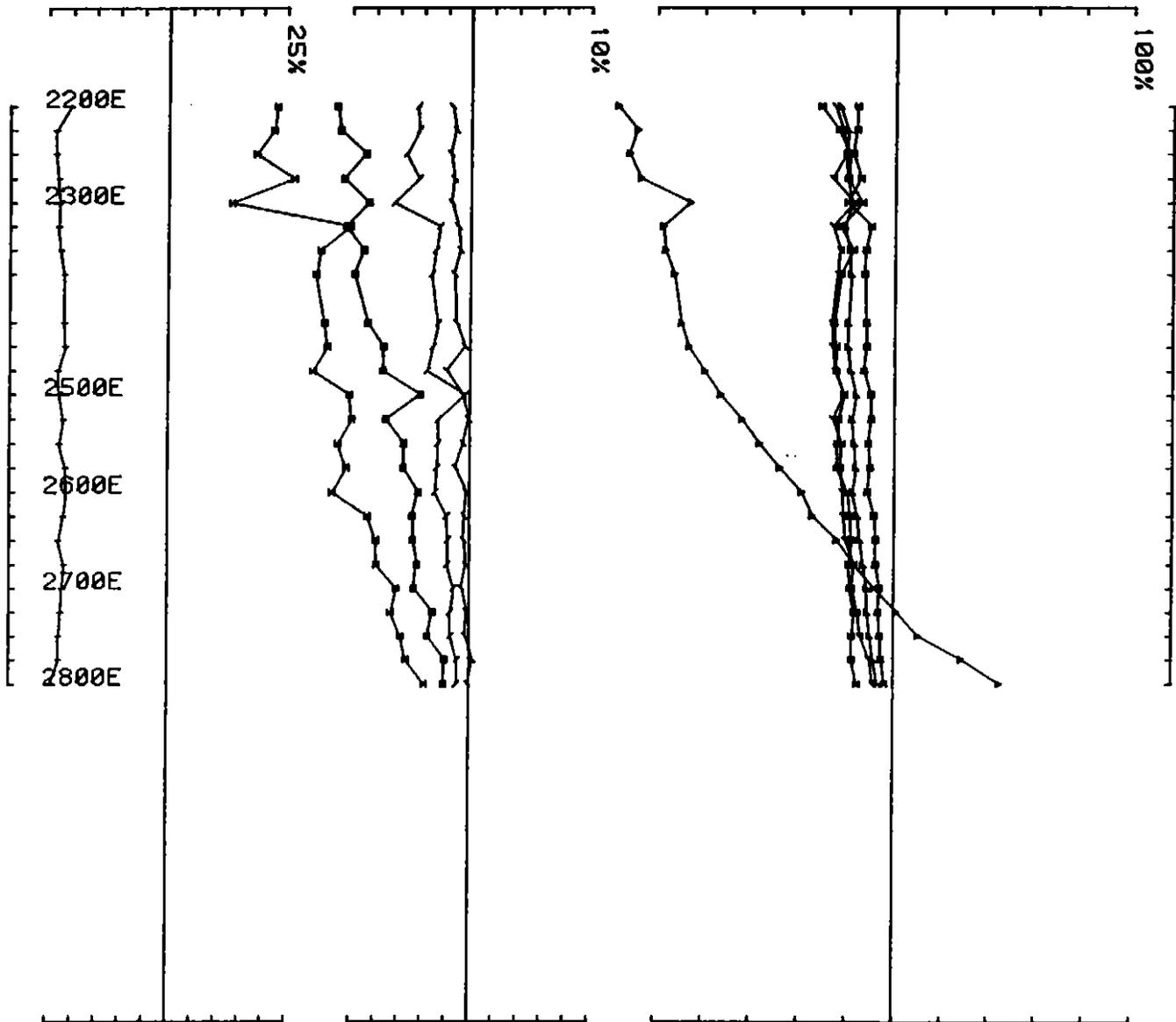
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 8721 base freq (hz) 26.230 6/9/87

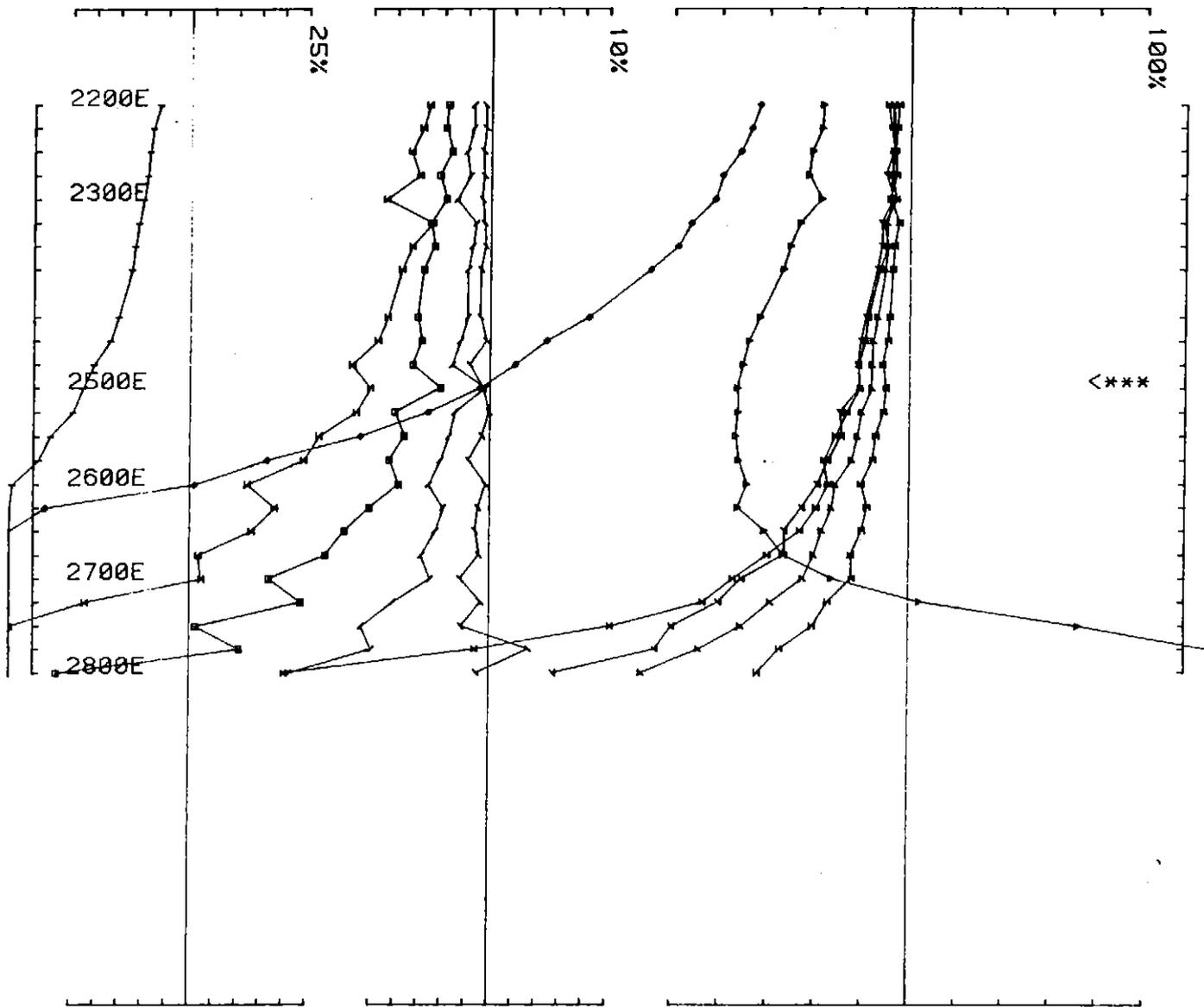
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

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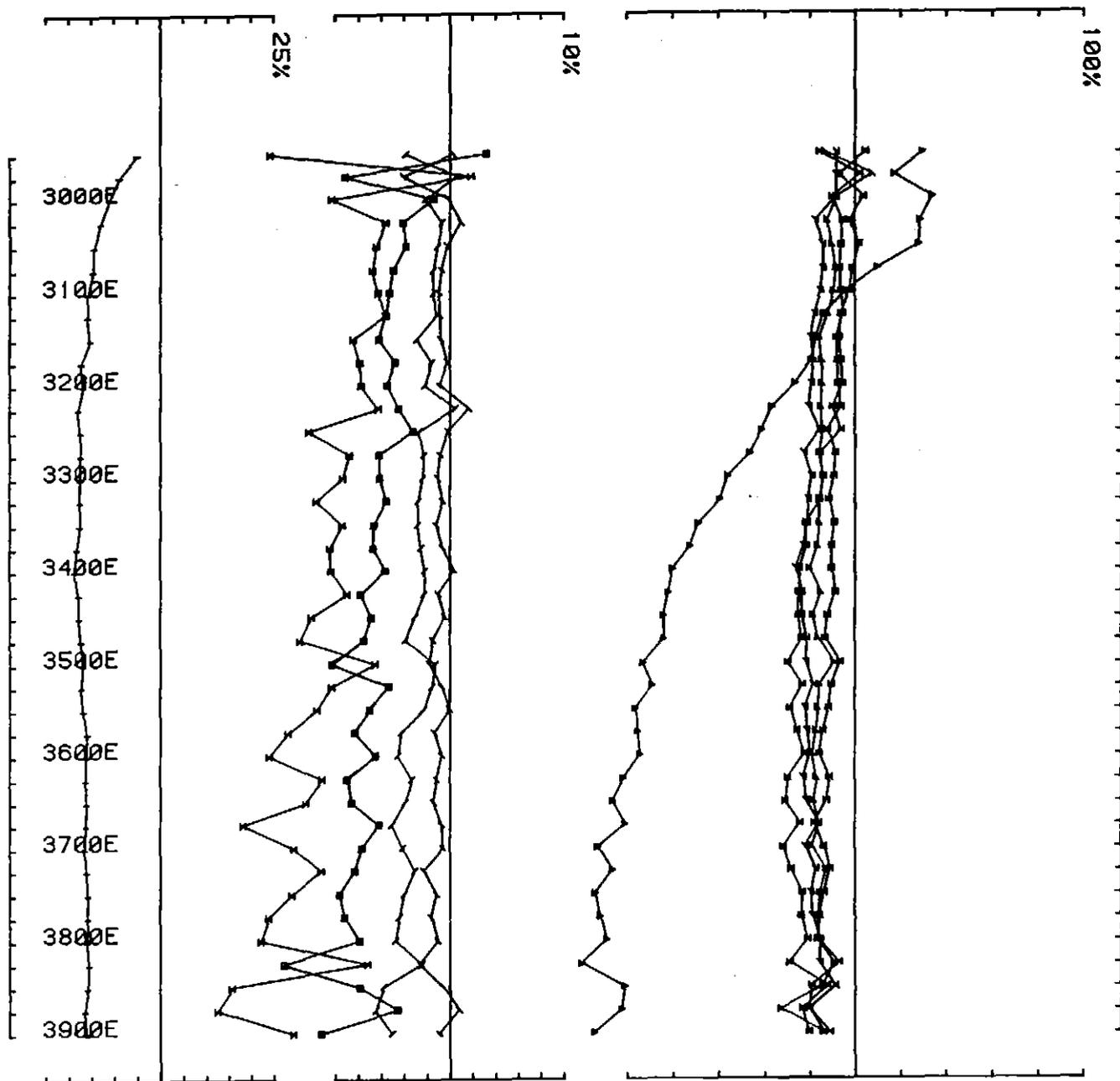
Loop 0003 line 3000N component Hz secondary field Ch 1 cont'n. norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 6/9/87

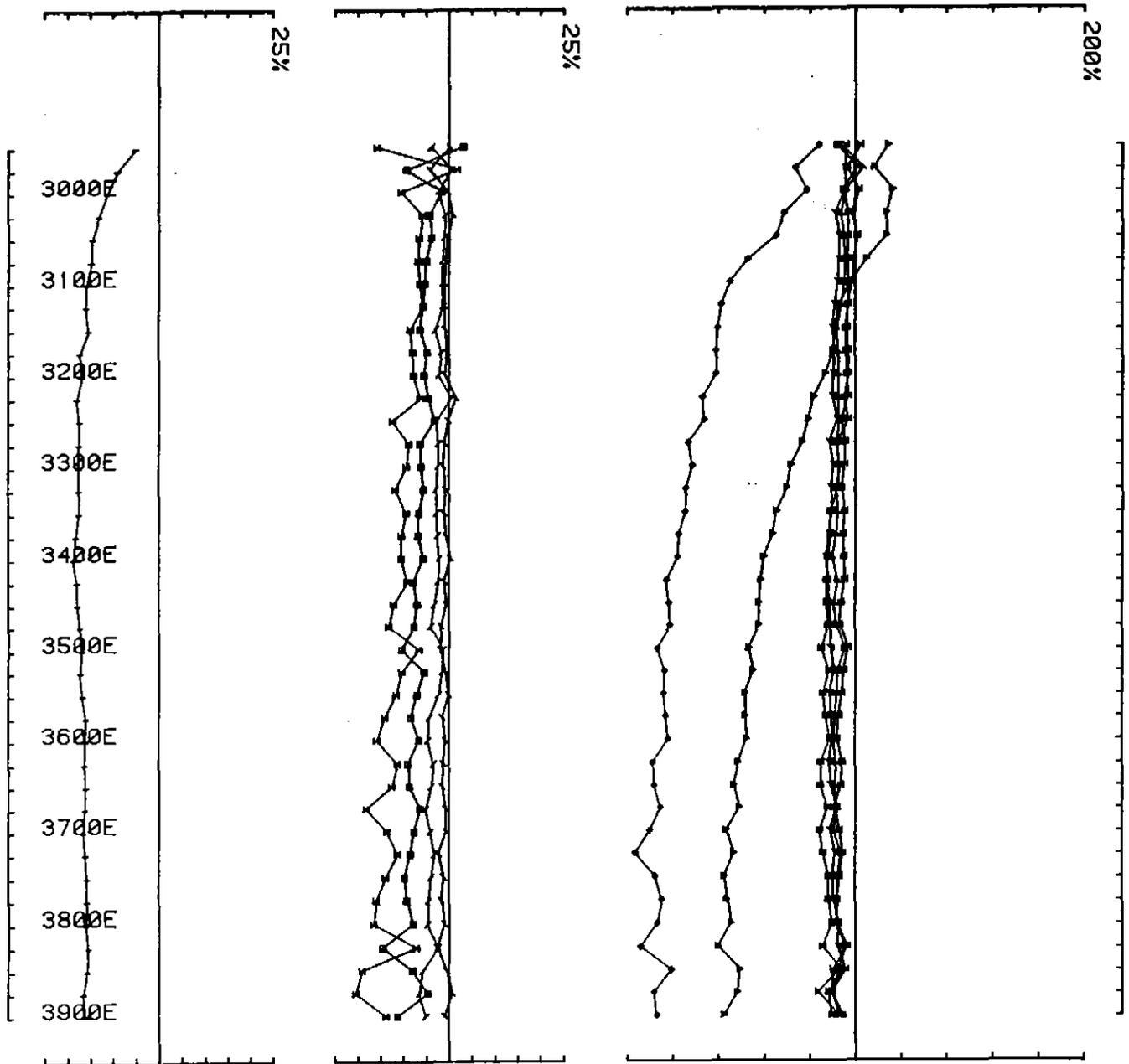
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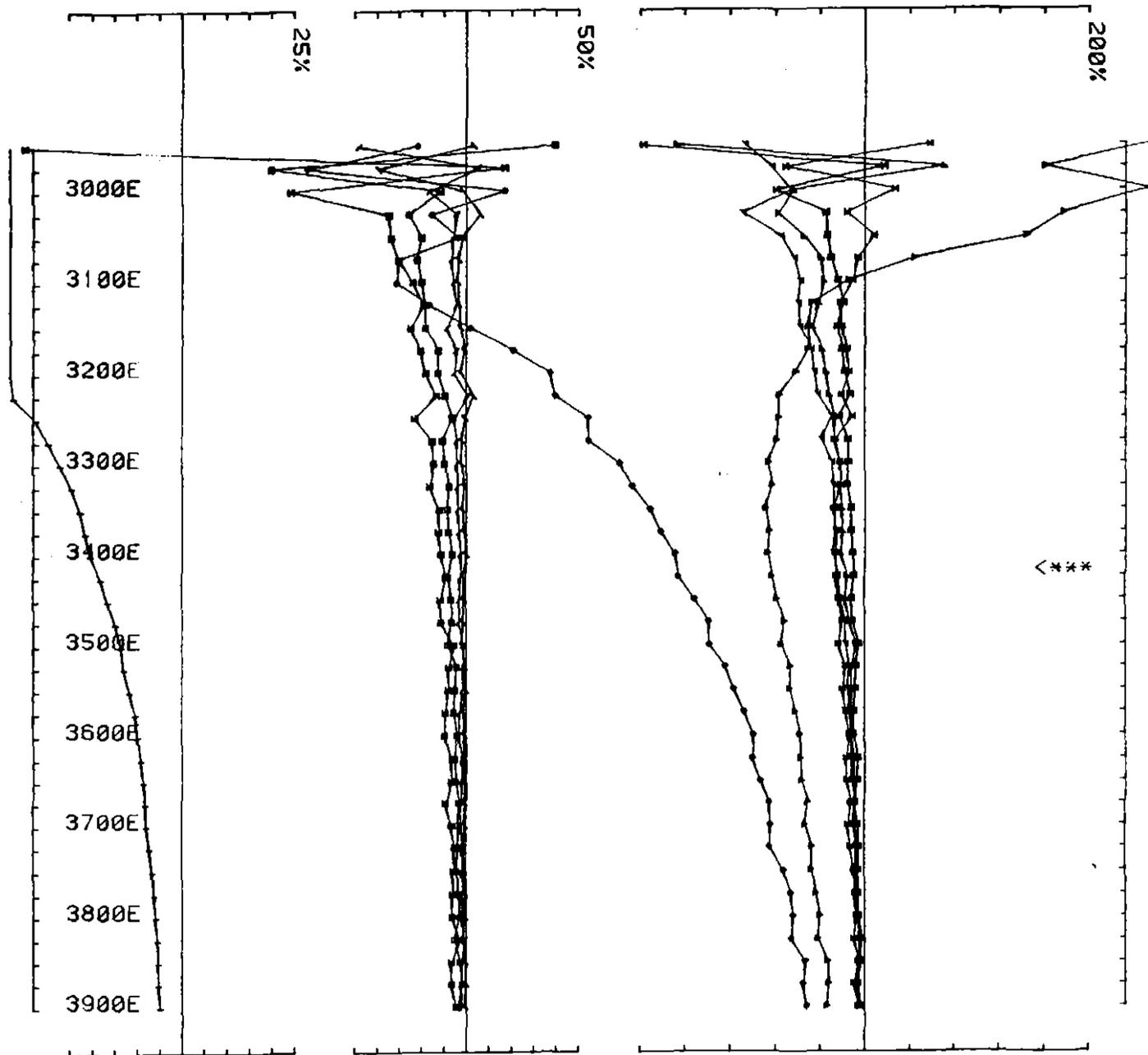
UTEM SURVEY at MOUNT CHARTER for ABERFOYLE P/L

conducted by PAO PMM Job 8721 base freq (hz) 26.230 22/8/87

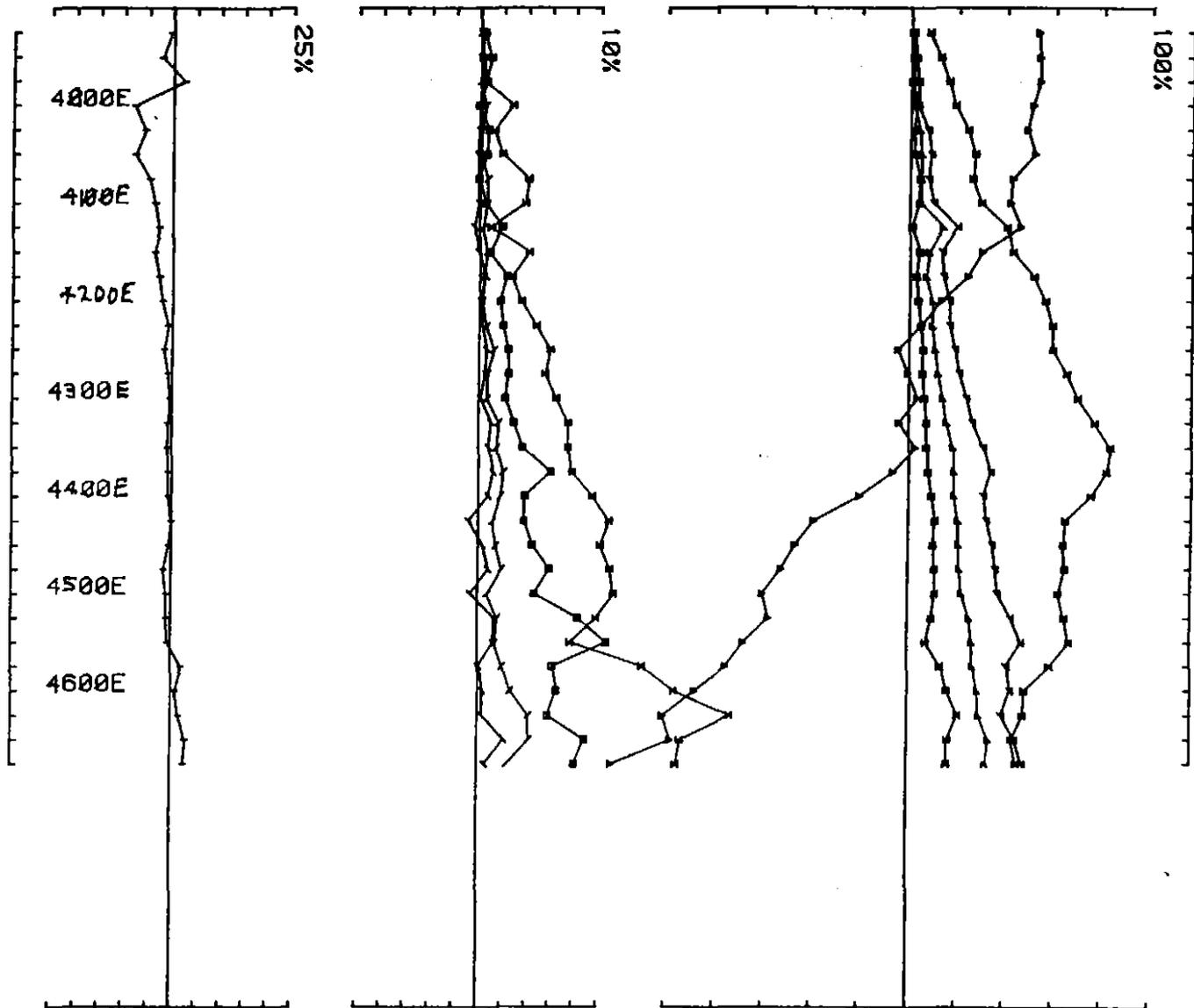
Loop 0001 line 3000N component Hz secondary field Ch 1 contin. norm.



UTEM SURVEY at MOUNT CHARTER for ABERFOYLE P/L  
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 Loop 0001 line 3000N component Hz secondary field Ch 1 contin. norm.



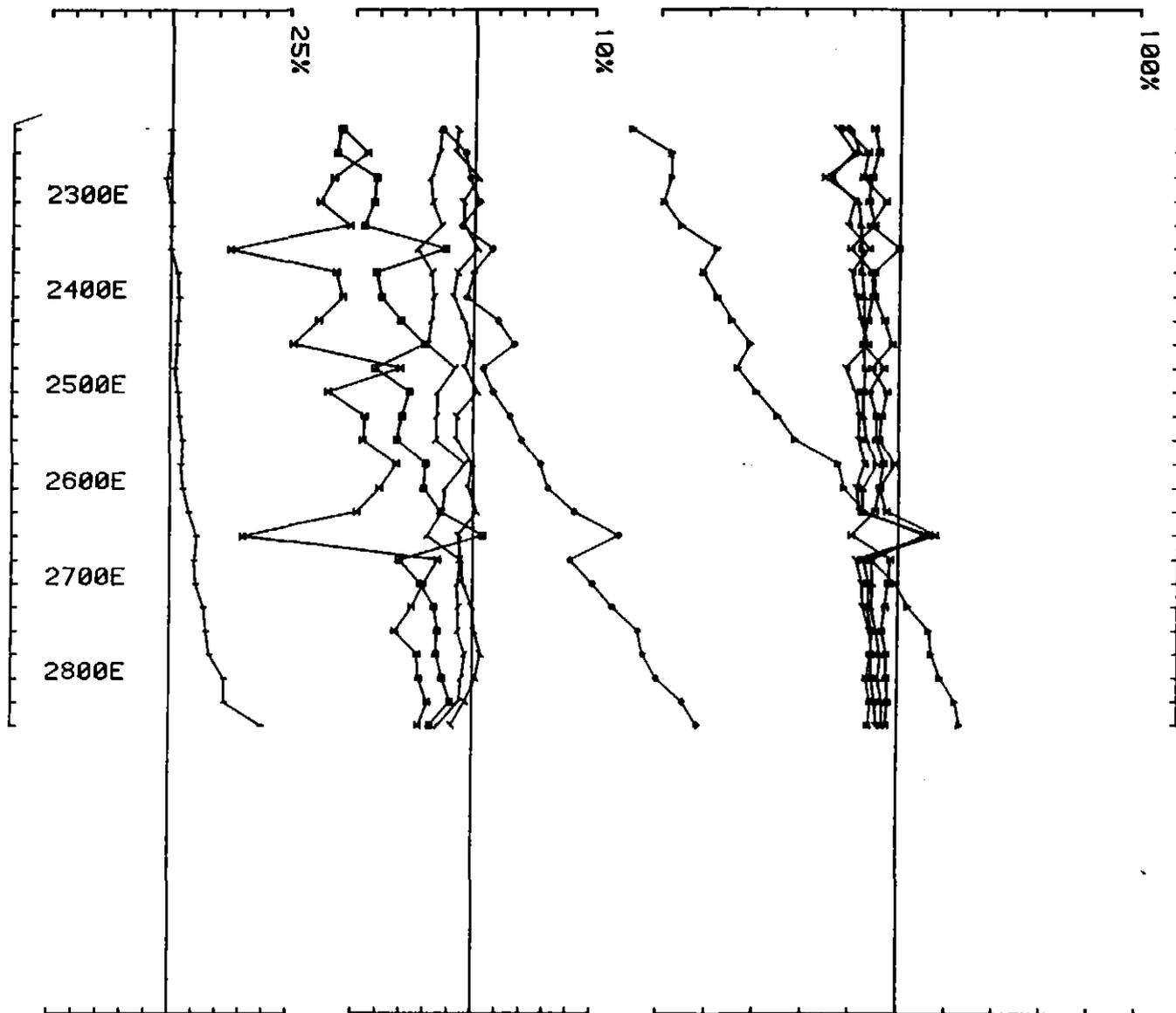
UTEM SURVEY at MT. CHARTER for ABERFOYLE RESOURCES  
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 Loop 0001 line 3000N component Hz secondary field Ch 1 point norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 8721 base freq (hz) 26.230 30/8/87

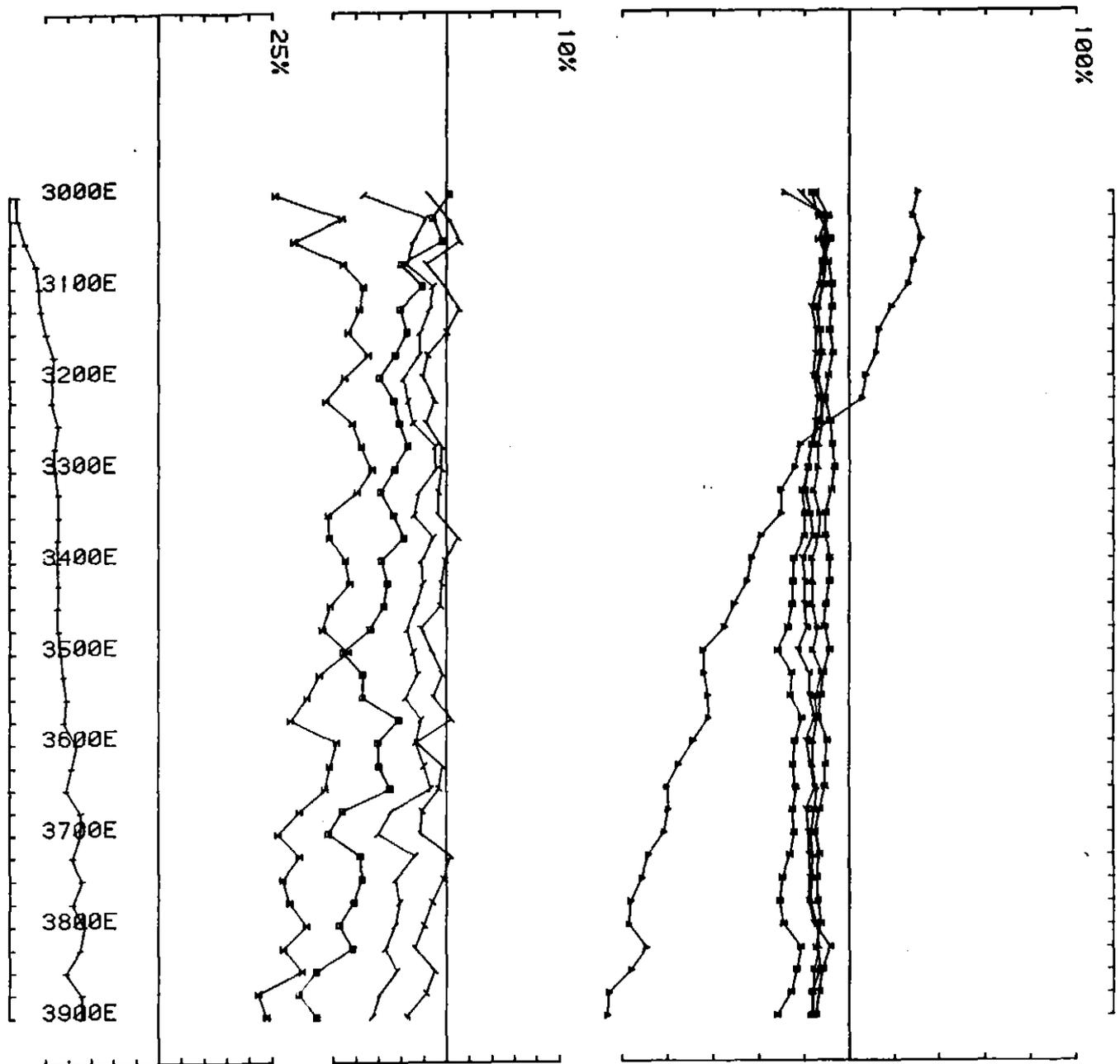
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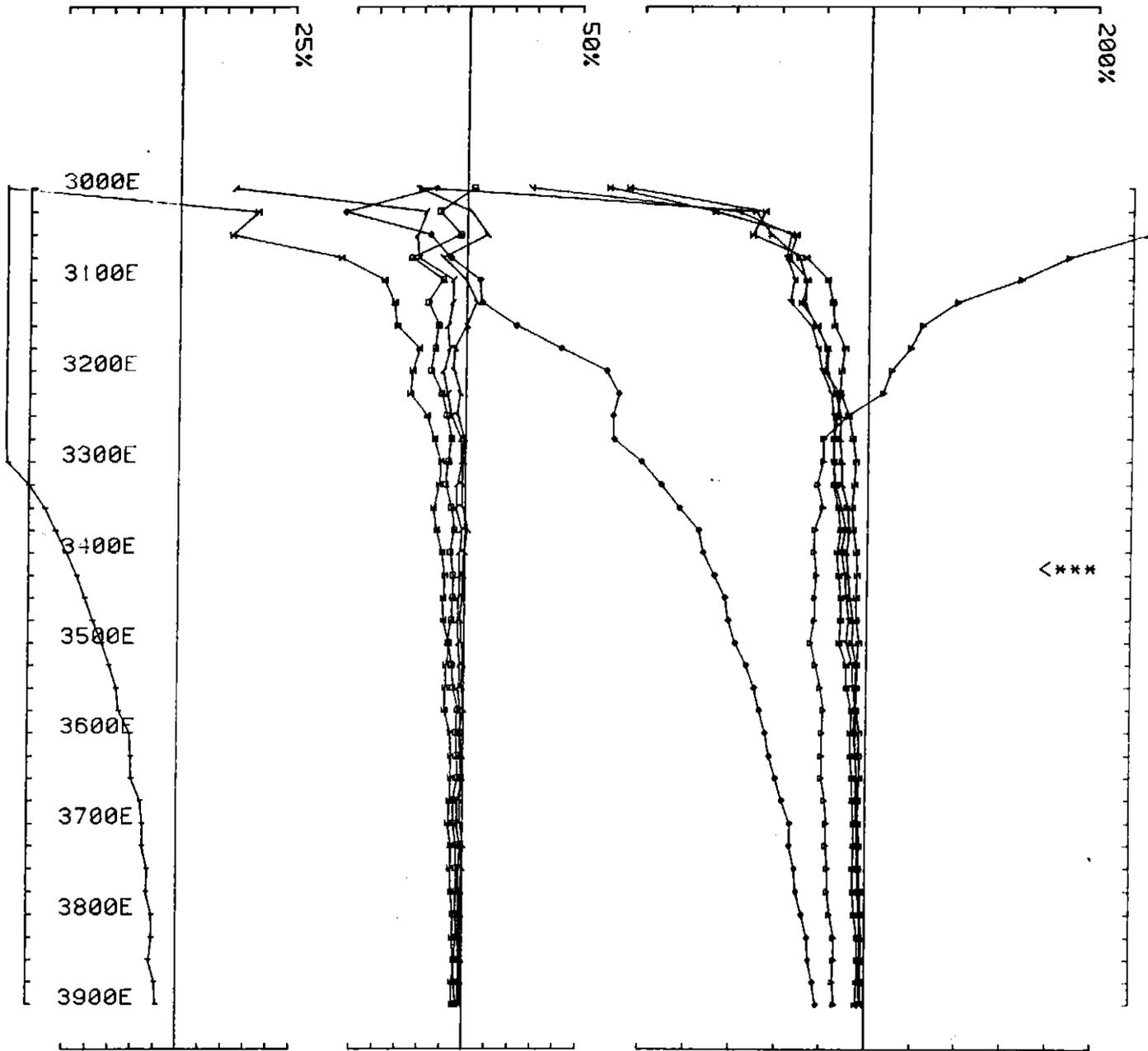
UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 30/8/87

Loop 0003 line 3200N component Hz secondary field Ch 1 contin. norm.



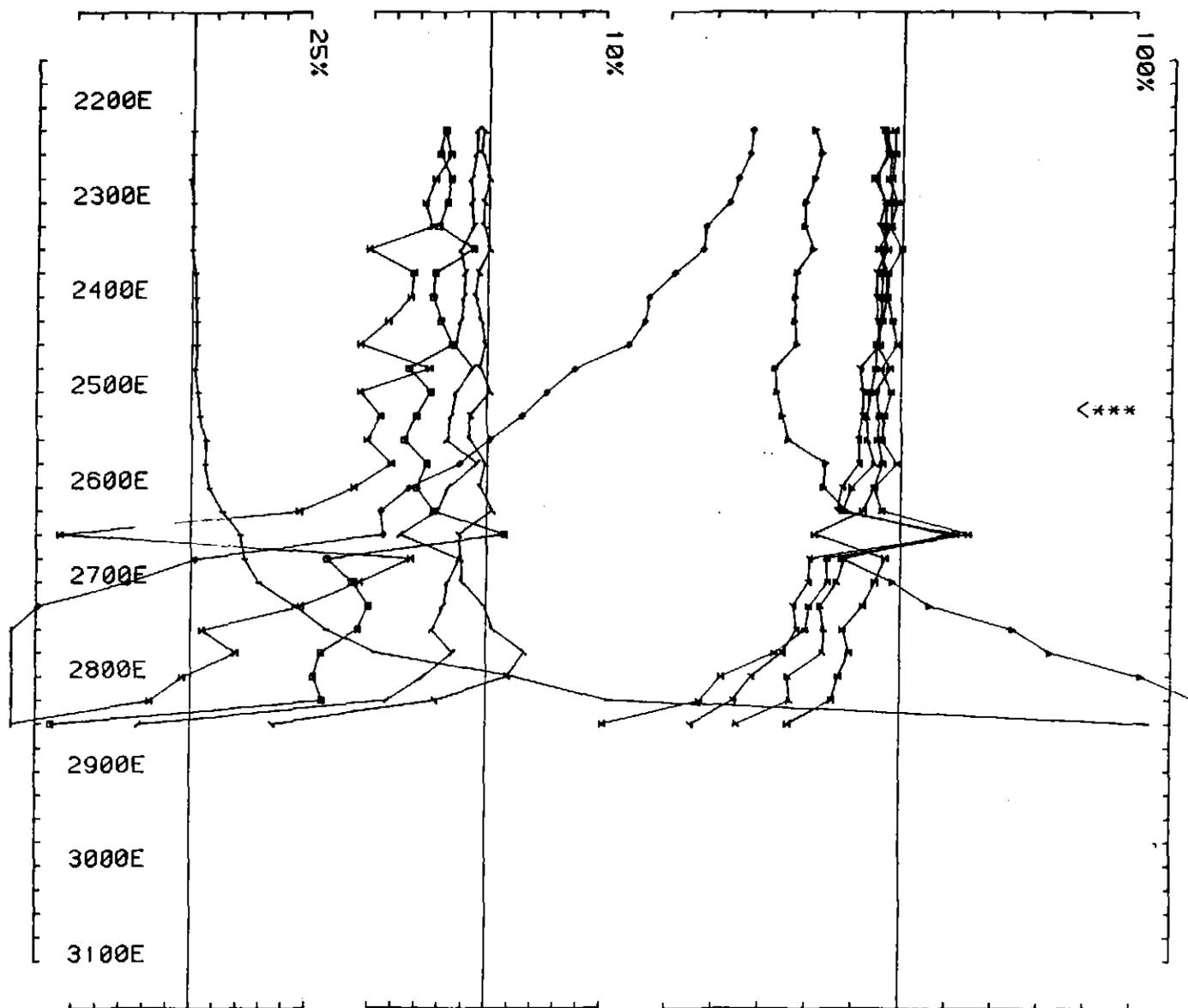
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 Loop 0001 line 3200N component Hz secondary field Ch 1 contin. norm.



UTEM SURVEY at MT. CHARTER for ABERFOYLE RESOURCES

conducted by PAO PMM job 8721 base freq (hz) 26 230 6/9/87

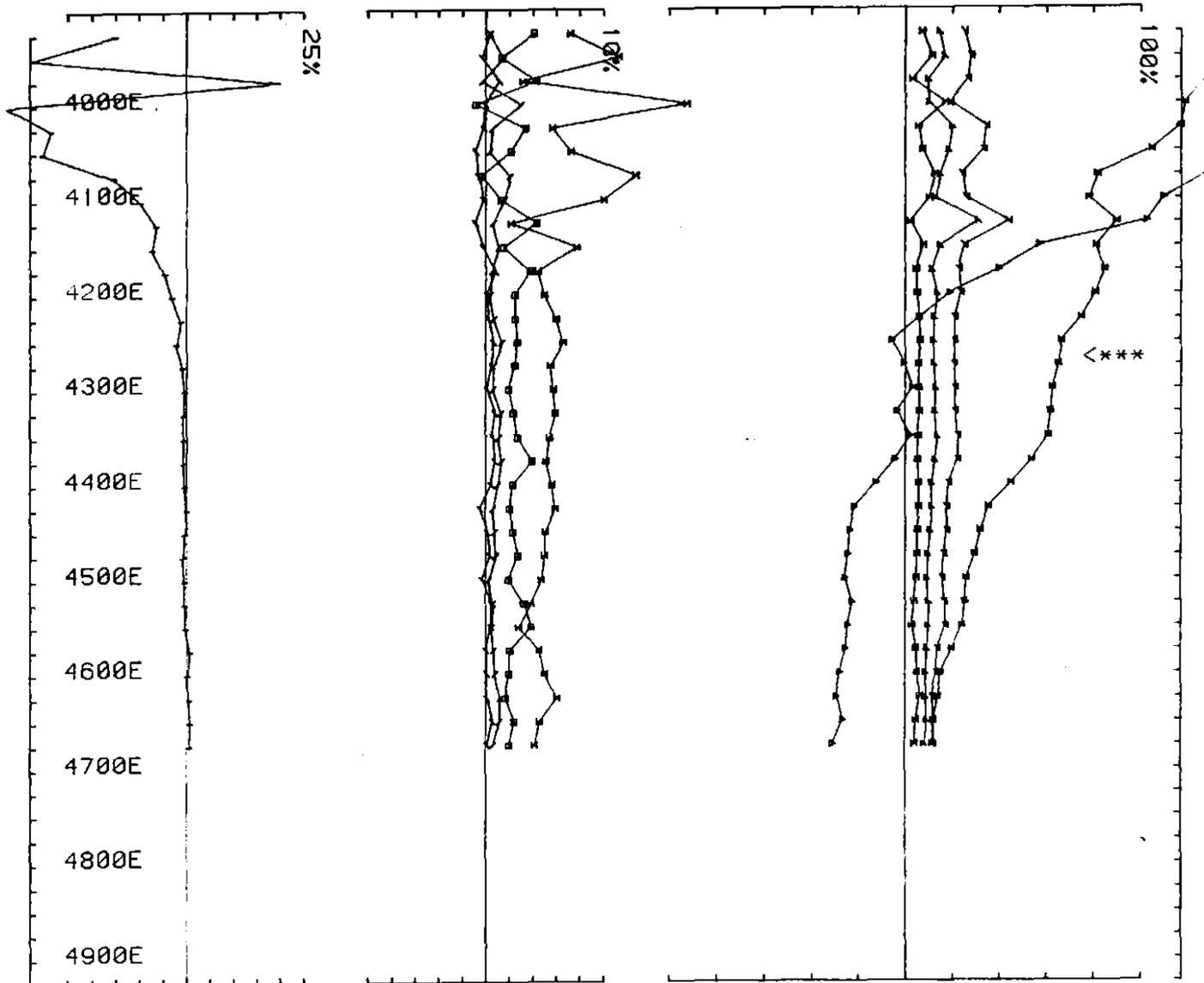
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UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 6/9/87

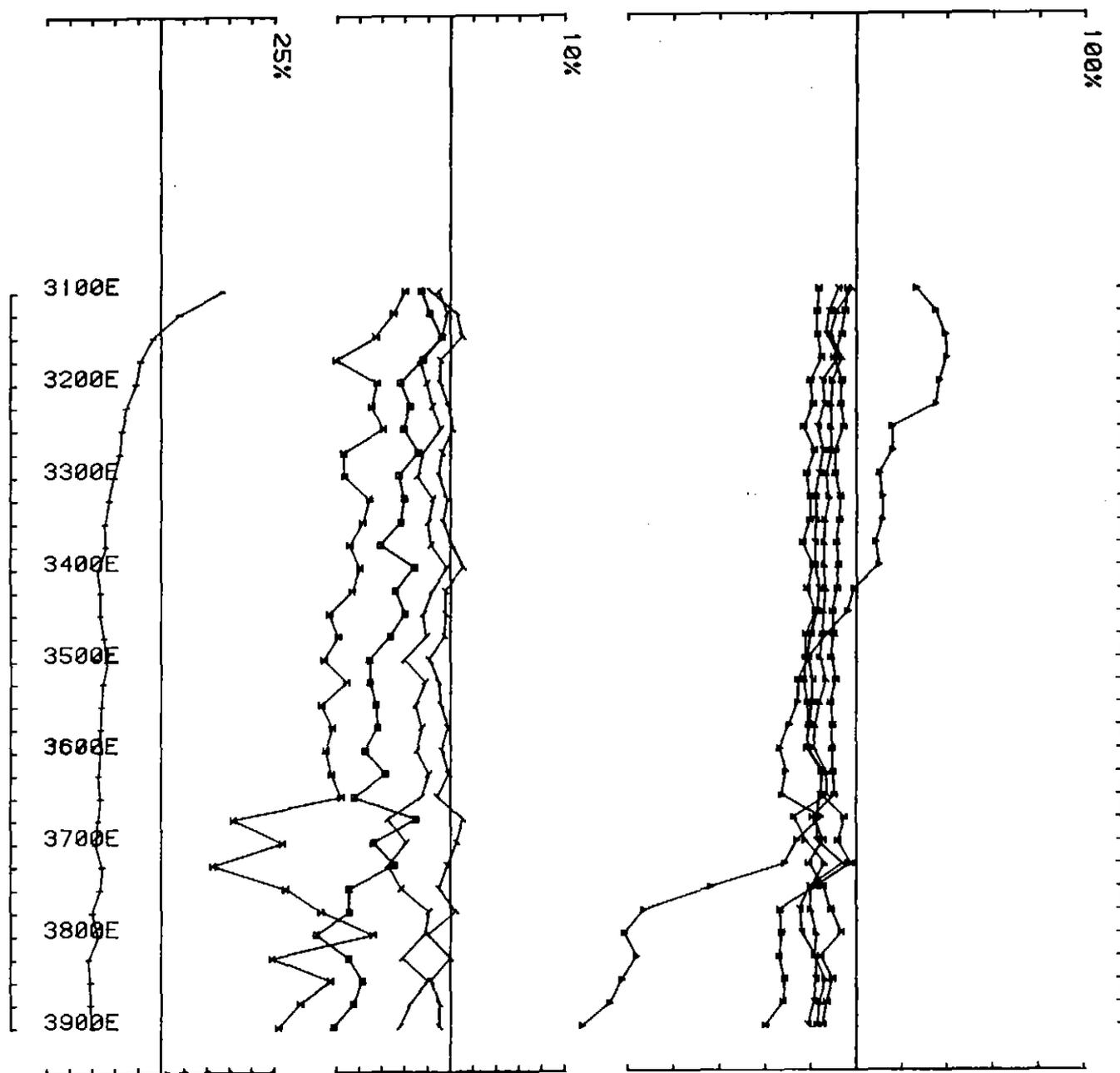
Loop 0003 line 3200N component Hz secondary field Ch 1 point norm.



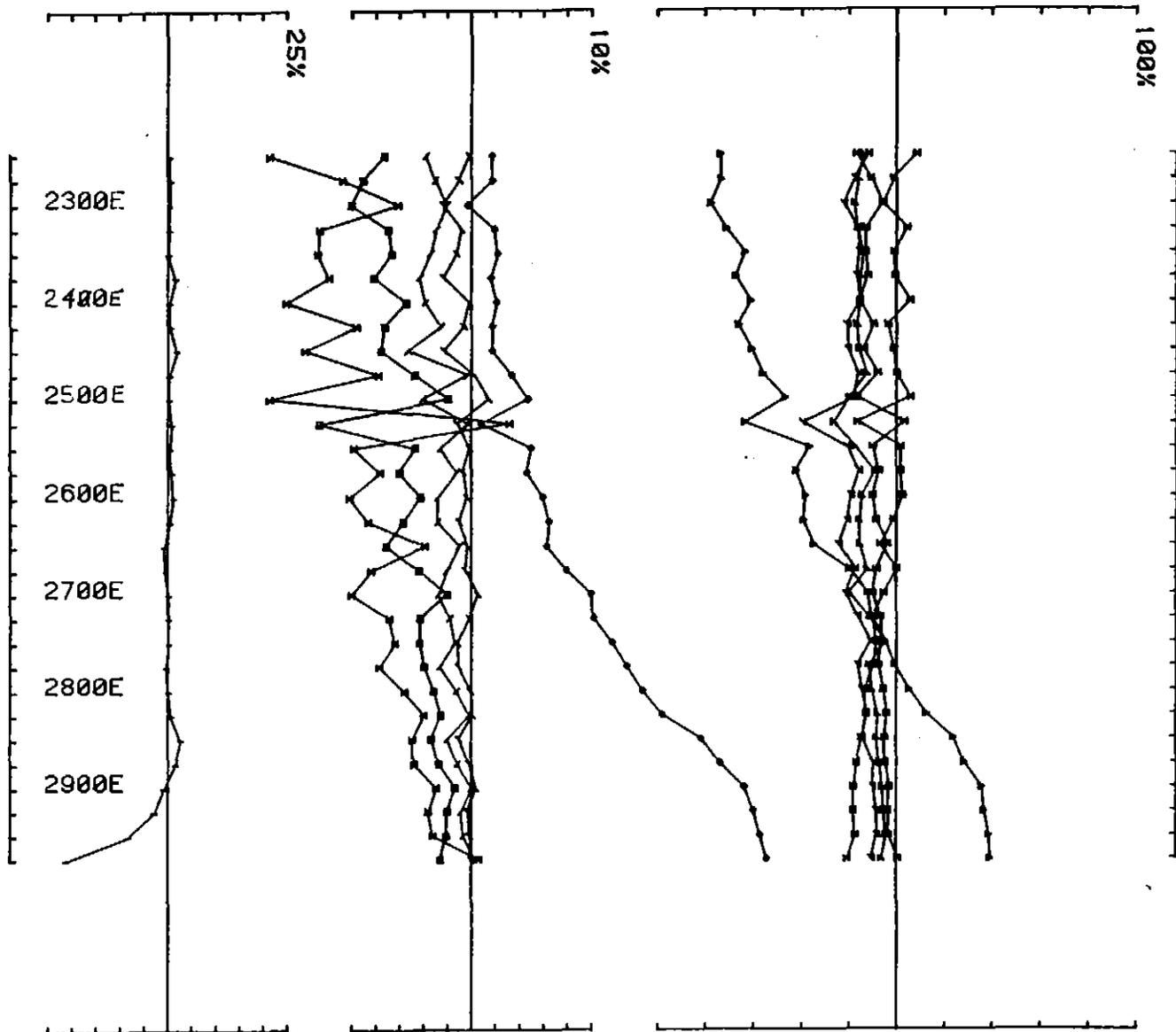
UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO job 8721 base freq (hz) 26.230 6/9/87

Loop 0003 line 3200N component Hz secondary field Ch 1 point norm.



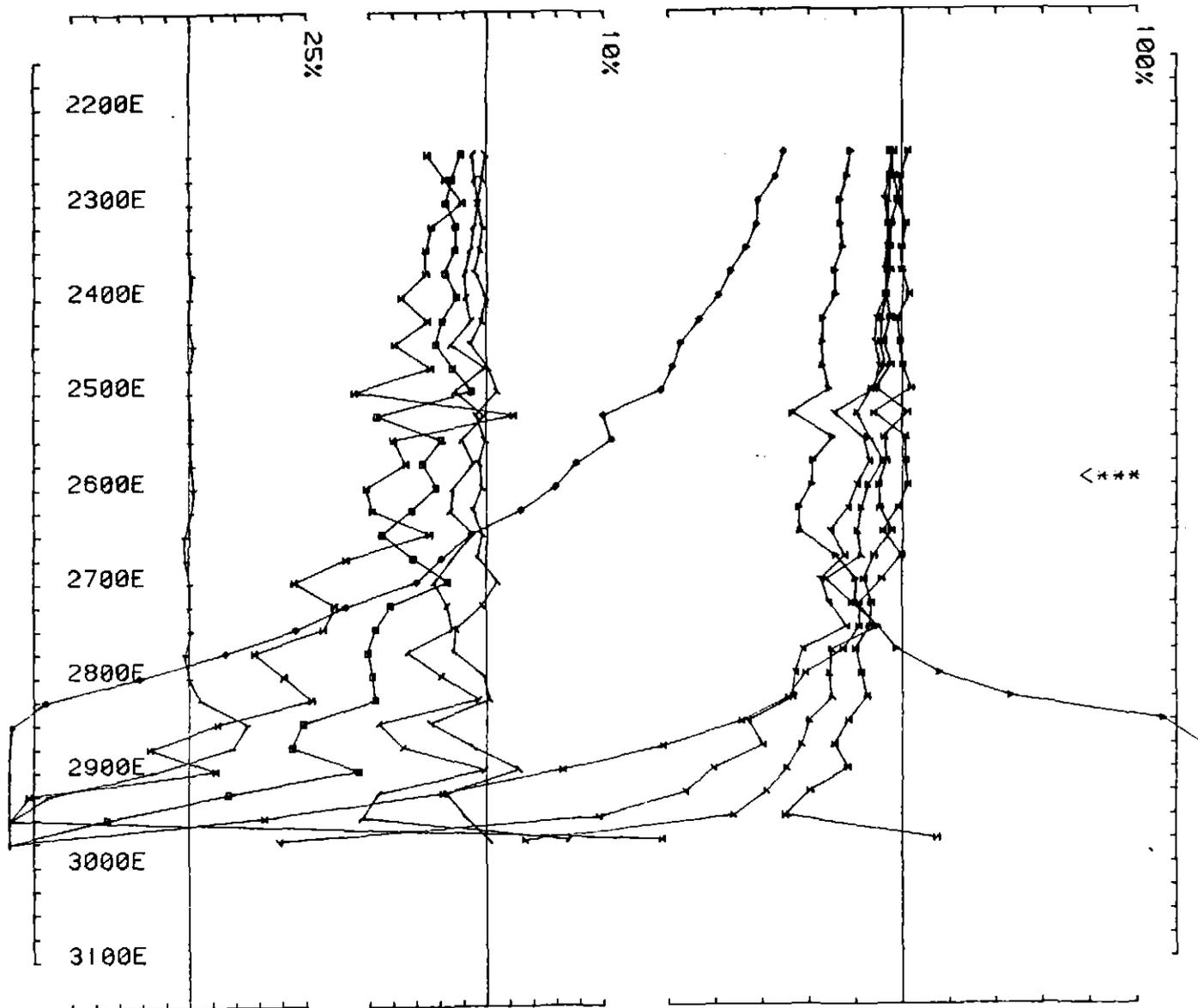
UTEM SURVEY at MOUNT CHARTER for ABERFOYLE P/L  
 conducted by PAO PMM Job 8721 base freq (hz) 26.230 22/8/87  
 Loop 0001 line 3400N component Hz secondary field Ch 1 contin. norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 30/8/87

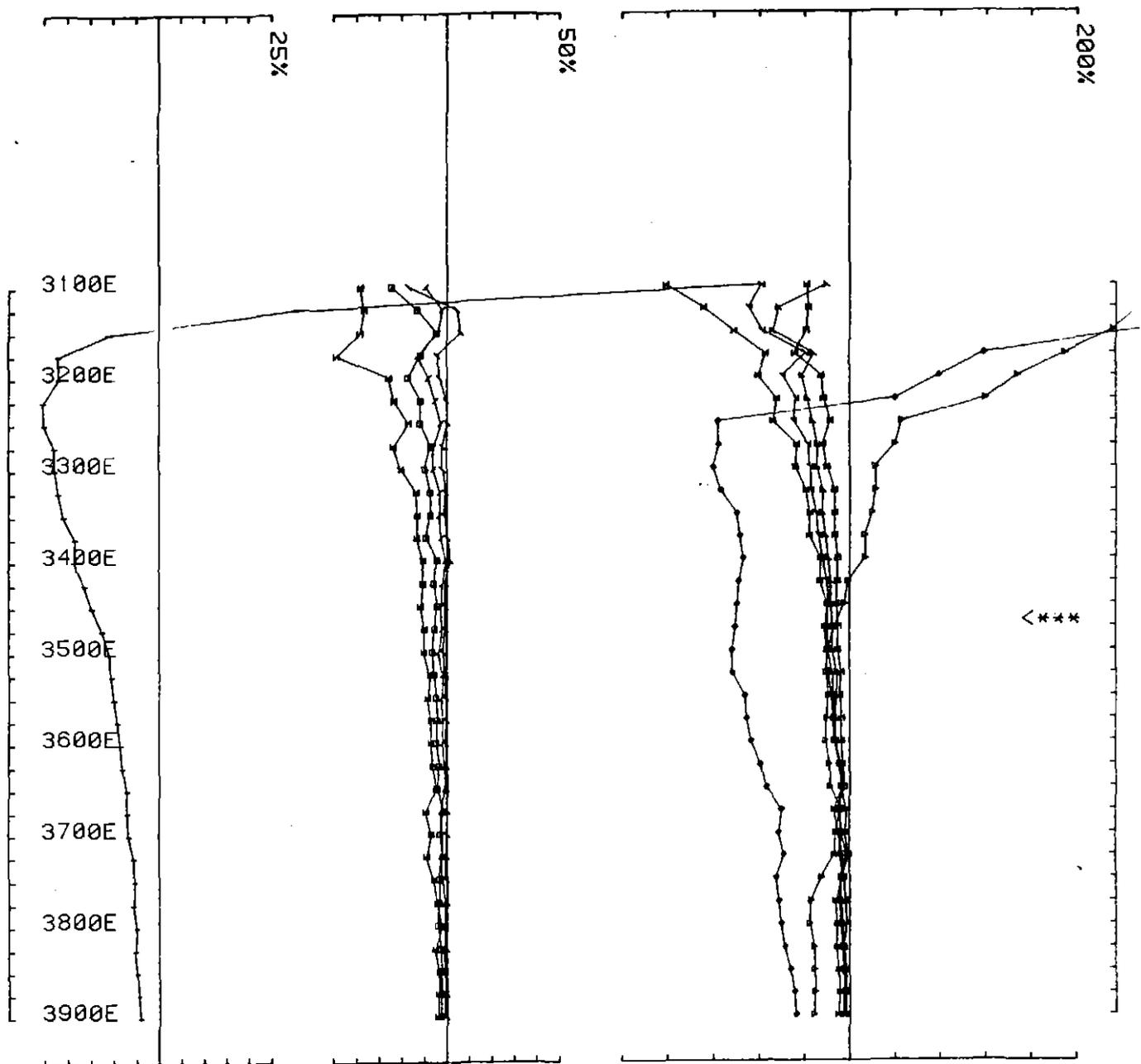
Loop 0003 line 3400N component Hz secondary field Ch 1 contin. norm.



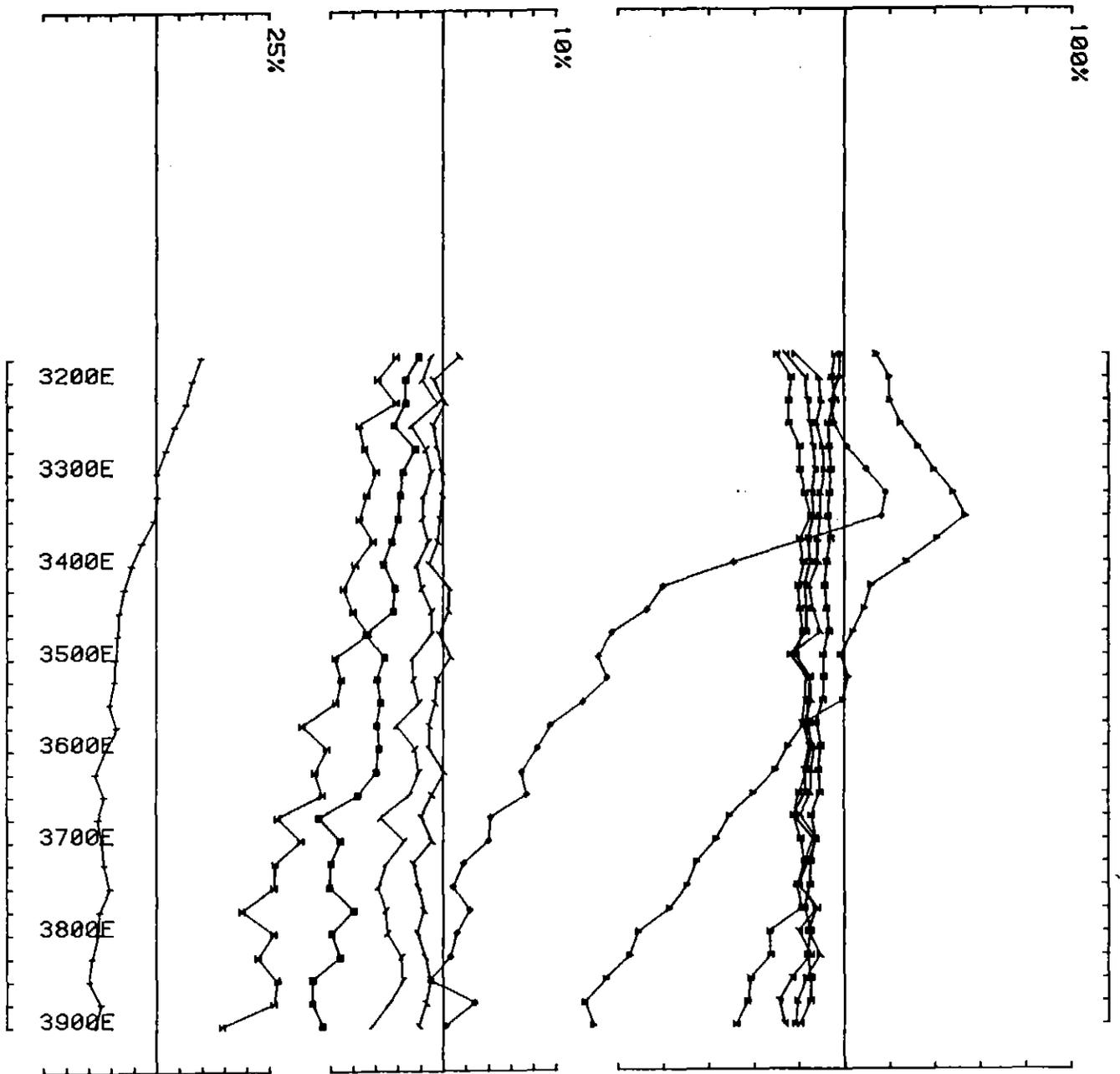
UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 6/9/87

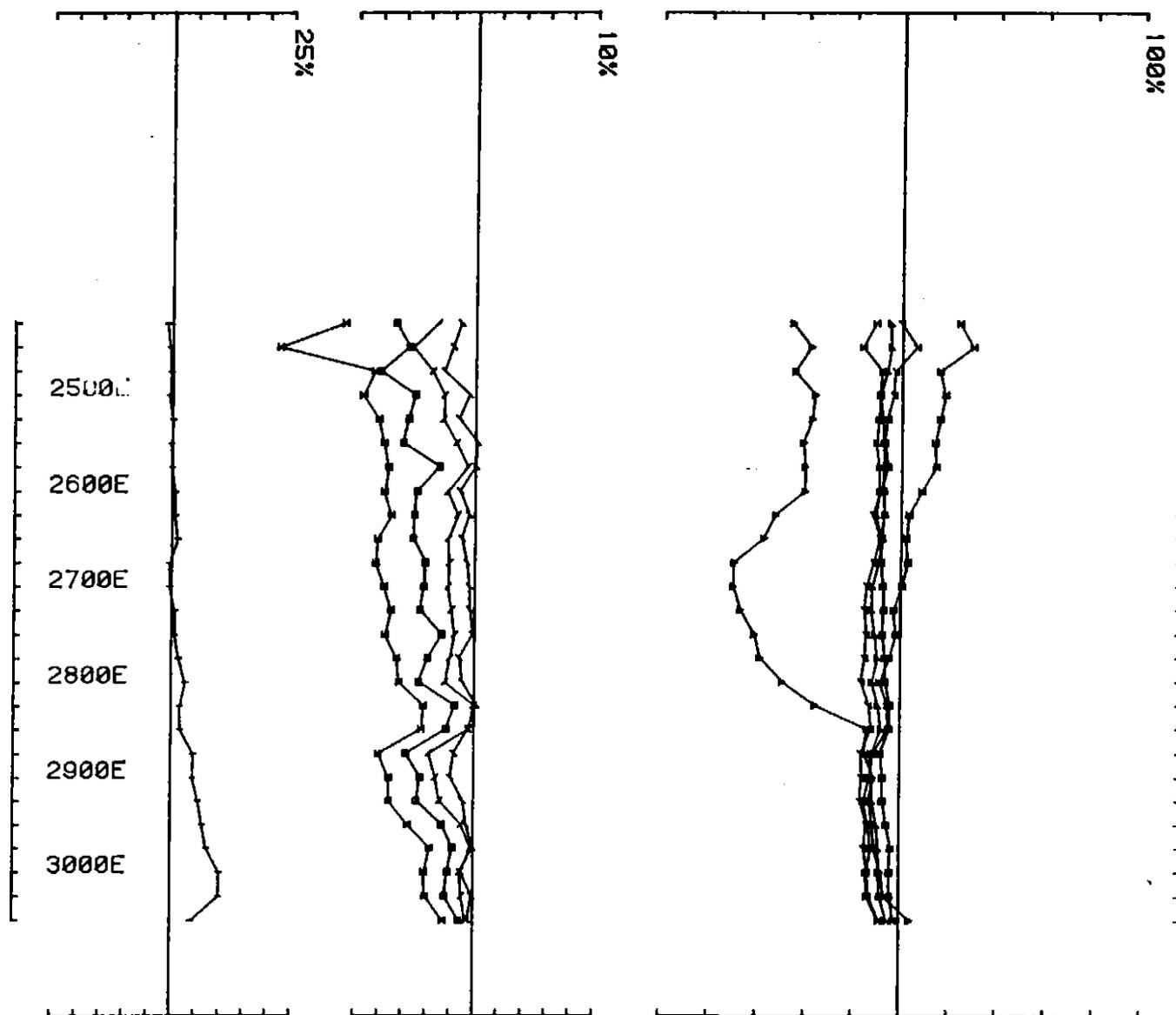
Loop 0003 line 3400N component Hz secondary field Ch 1 point norm.



UTEM SURVEY at MT. CHARTER for ABERFOYLE RESOURCES  
 conducted by PAO PMM job 8721 base freq (hz) 26 230 6/9/87  
 Loop 0001 line 3400N component Hz secondary field Ch 1 point norm.



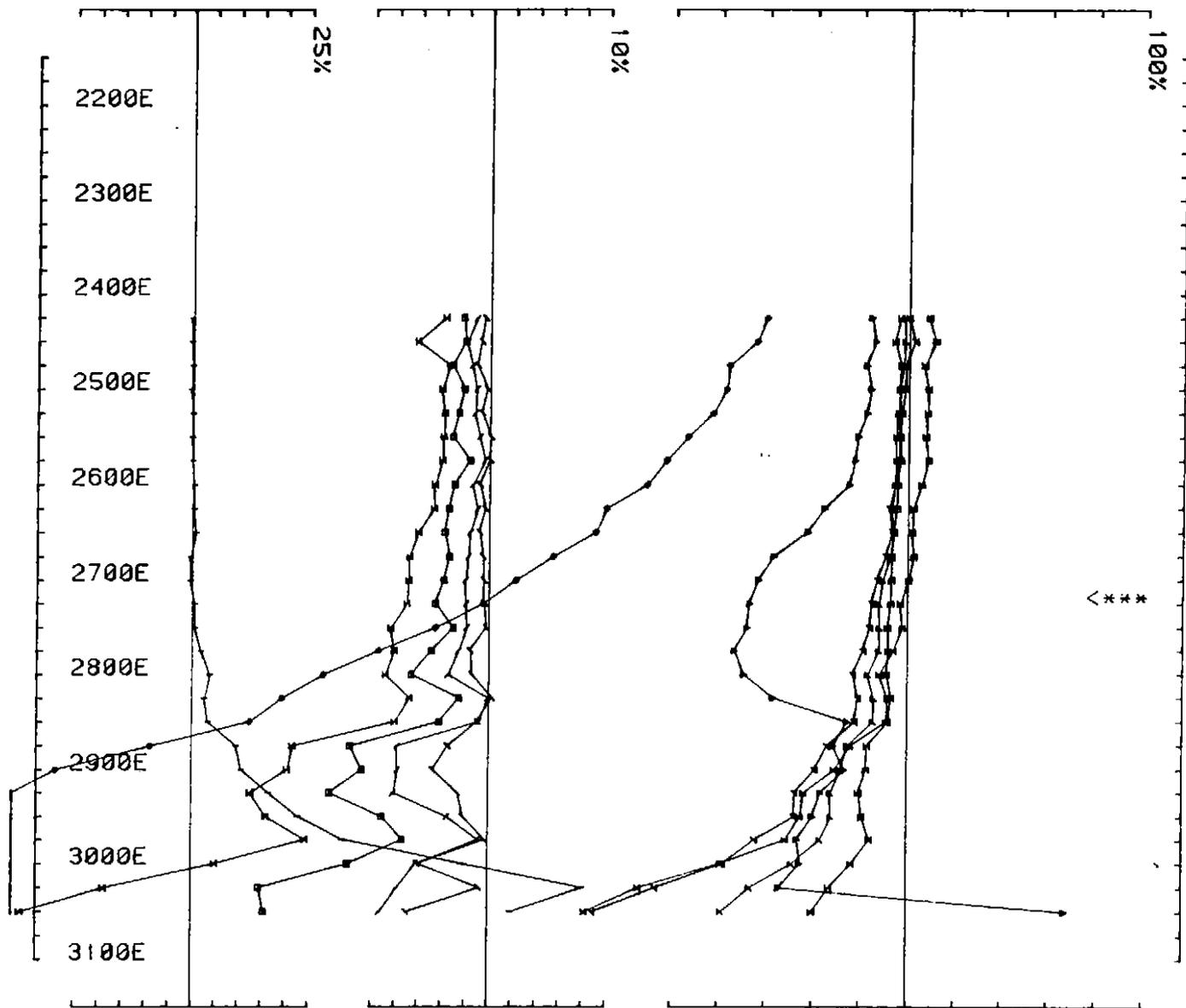
UTEM SURVEY at MOUNT CHARTER for ABERFOYLE P/L  
 conducted by PAO PMM Job 8721 base freq (hz) 26.230 22/8/87  
 Loop 0001 line 3600N component Hz secondary field Ch 1 contin. norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 30/8/87

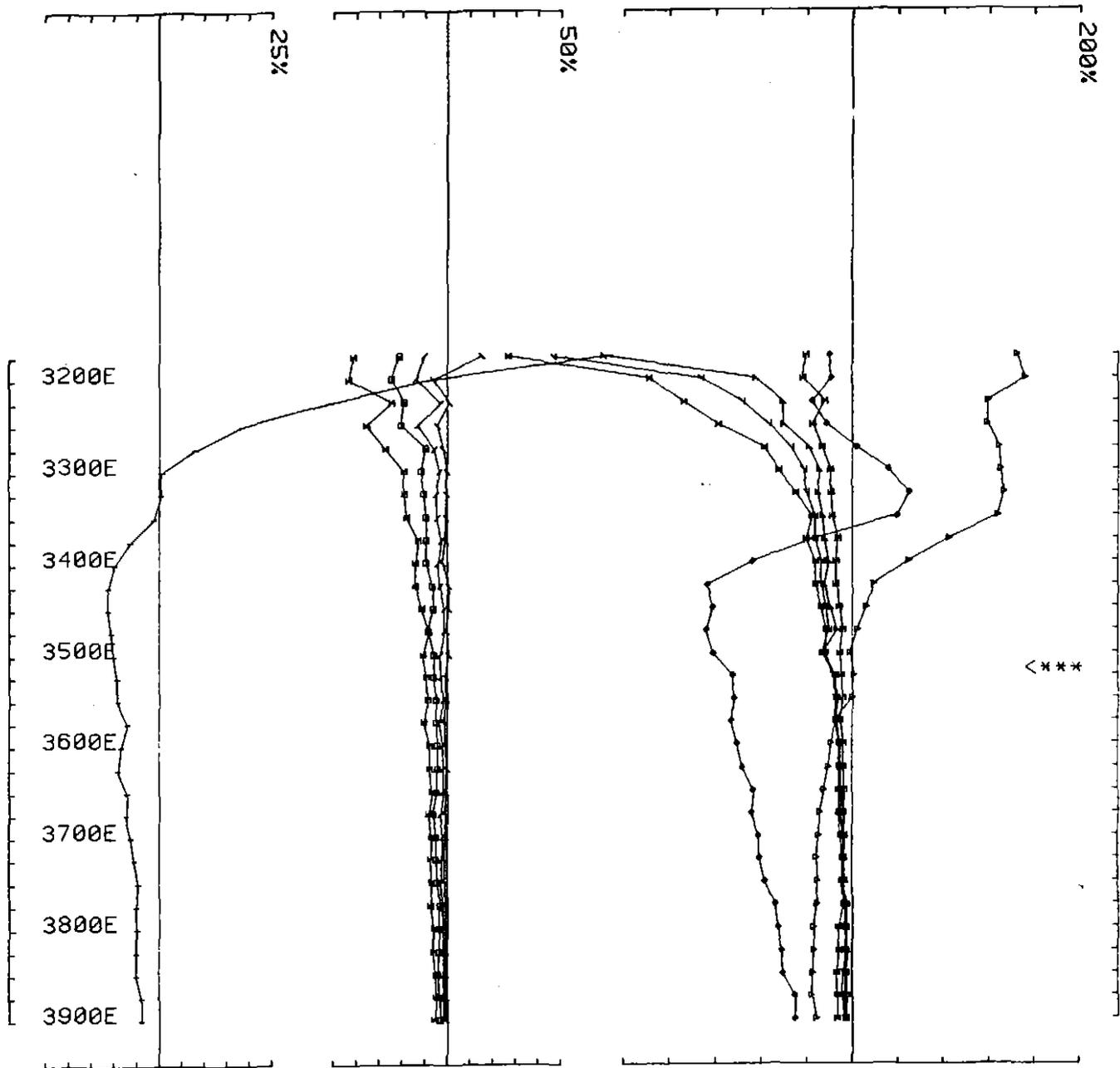
Loop 0003 line 3600N component Hz secondary field Ch 1 contin. norm.



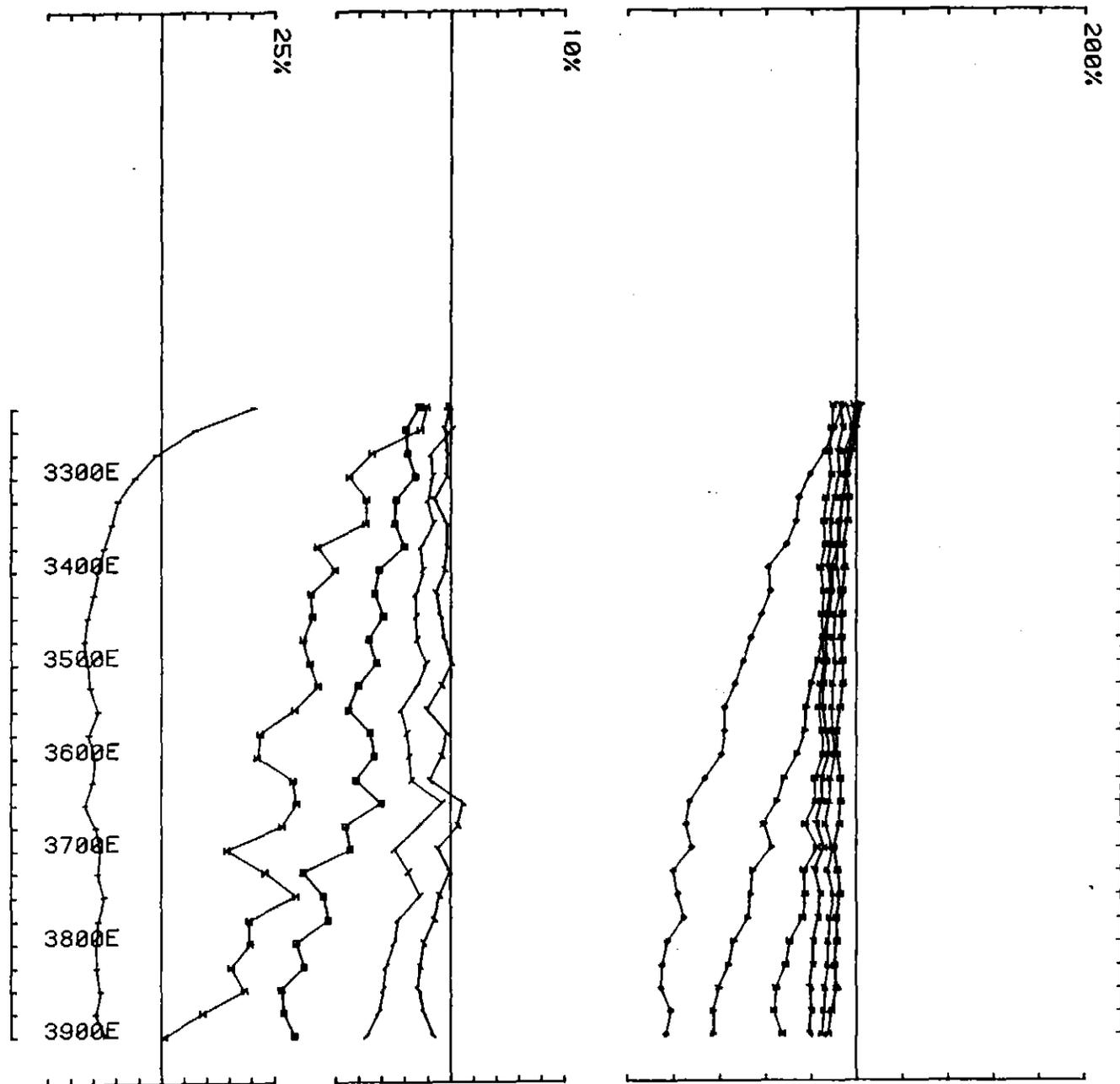
UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 6/9/87

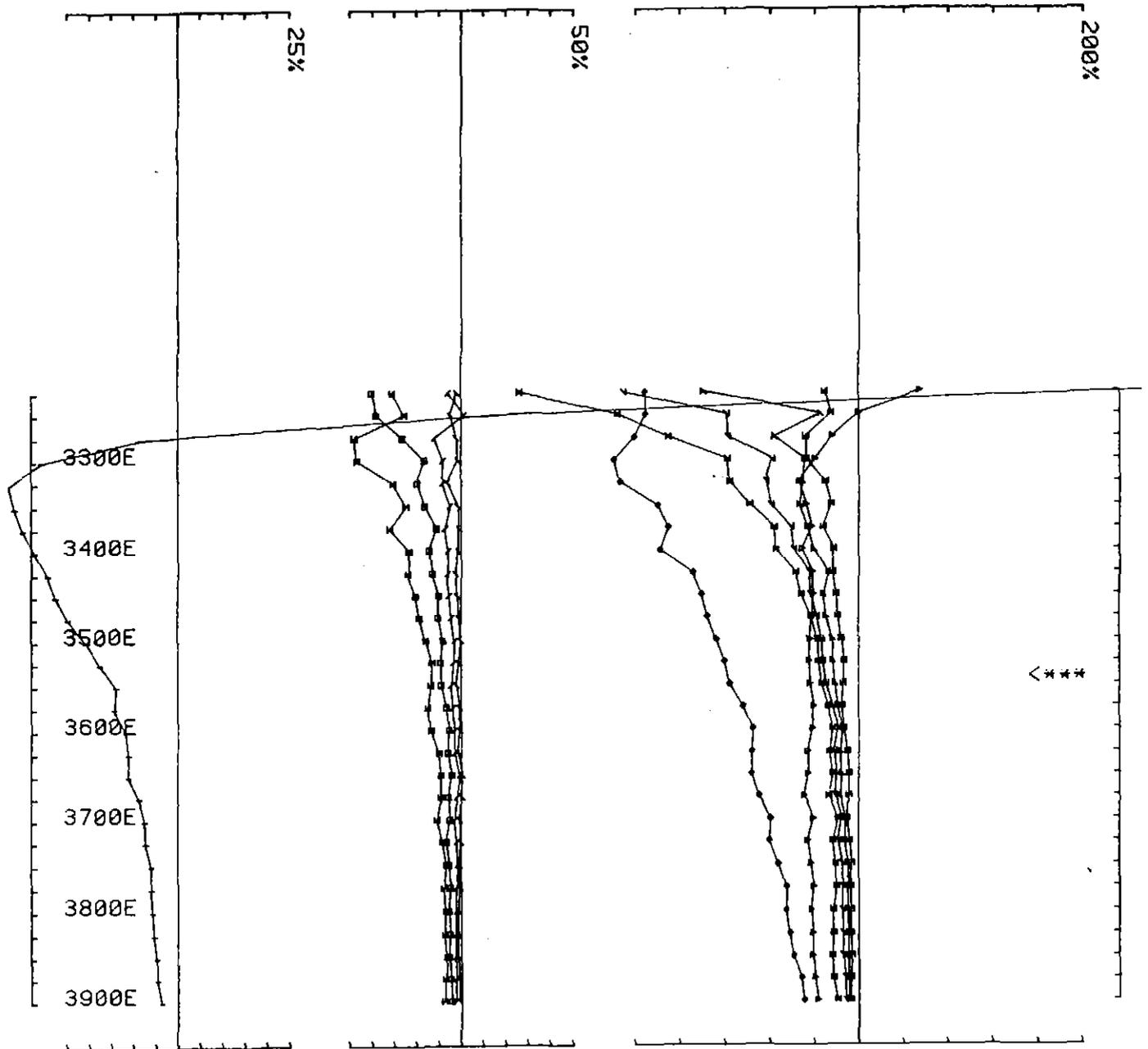
Loop 0003 line 3600N component Hz secondary field Ch 1 point norm.



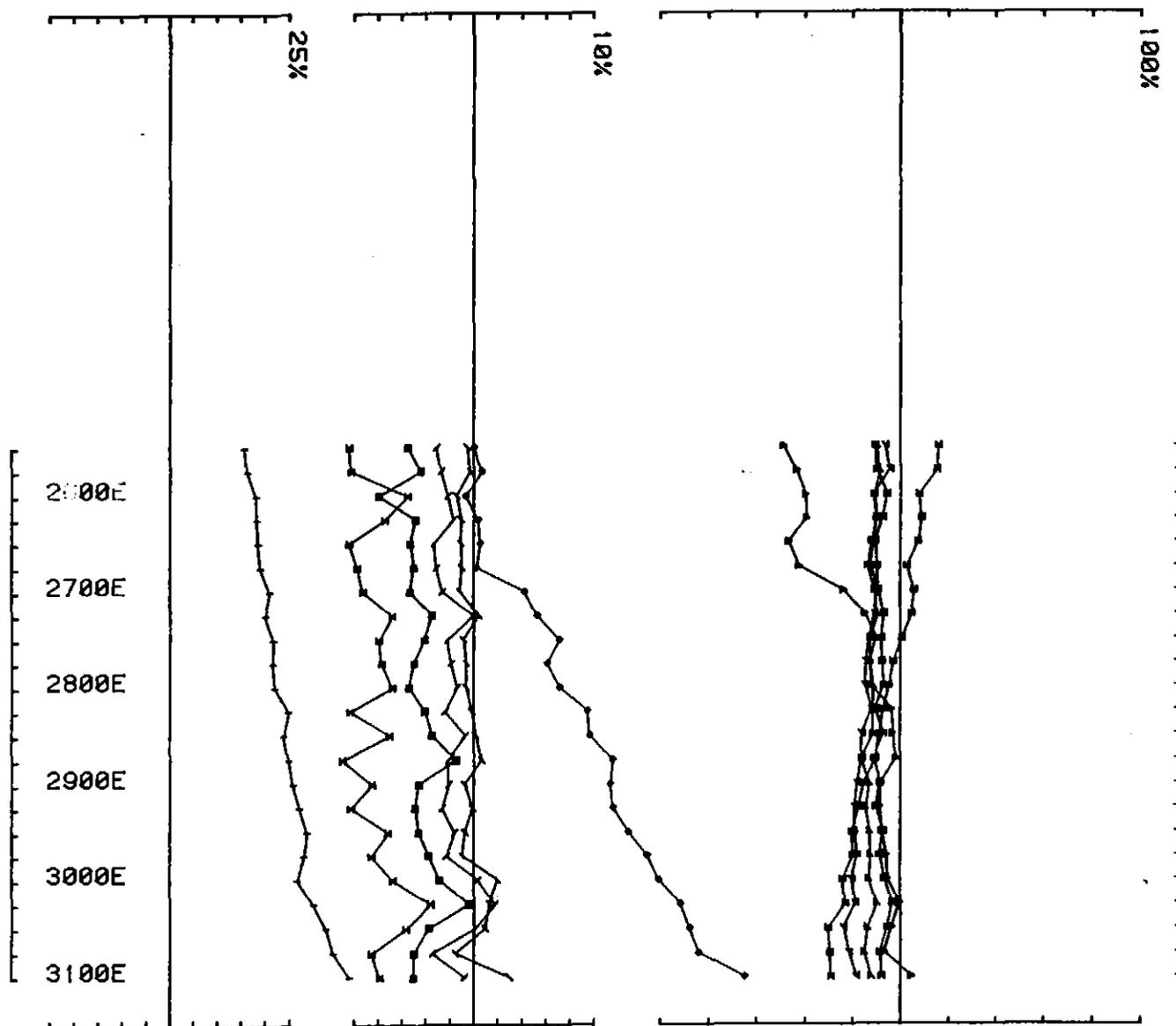
UTEM SURVEY at MT. CHARTER for ABERFOYLE RESOURCES  
 conducted by PAO PMM job 8721 base freq (hz) 26.230 6/9/87  
 Loop 0001 line 3600N component Hz secondary field Ch 1 point norm.



UTEM SURVEY at MOUNT CHARTER for ABERFOYLE P/L  
 conducted by PAO PMM Job 8721 base freq (hz) 26.230 23/8/87  
 Loop 0001 line 3800N component Hz secondary field Ch 1 contin. norm.



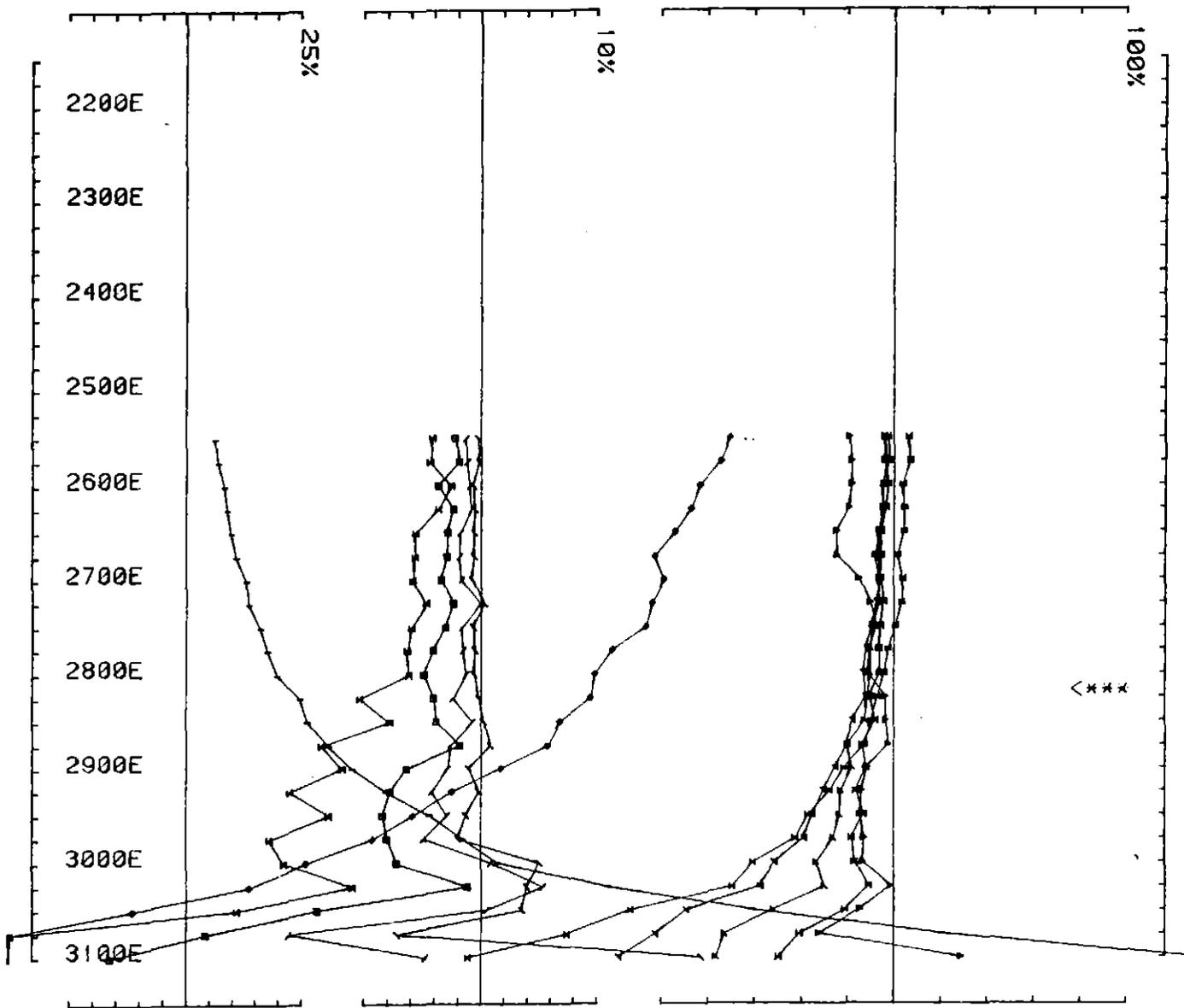
UTEM SURVEY at MT. CHARTER for ABERFOYLE RESOURCES  
 conducted by PAO PMM Job 8721 base freq (hz) 26 230 6/9/87  
 Loop 0001 line 3800N component Hz secondary field Ch 1 point norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 30/8/87

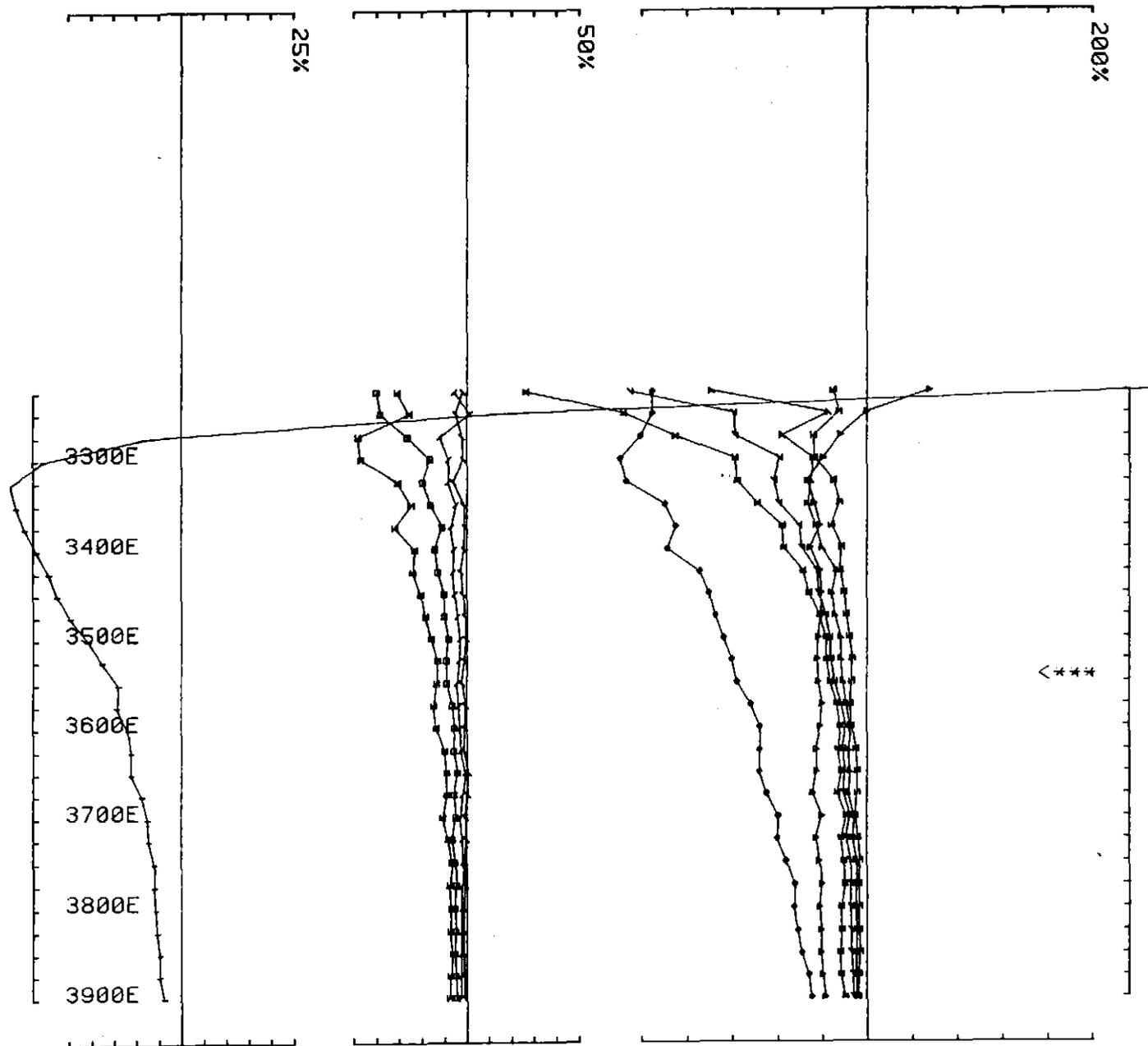
Loop 0003 line 3800N component Hz secondary field Ch 1 contin. norm.



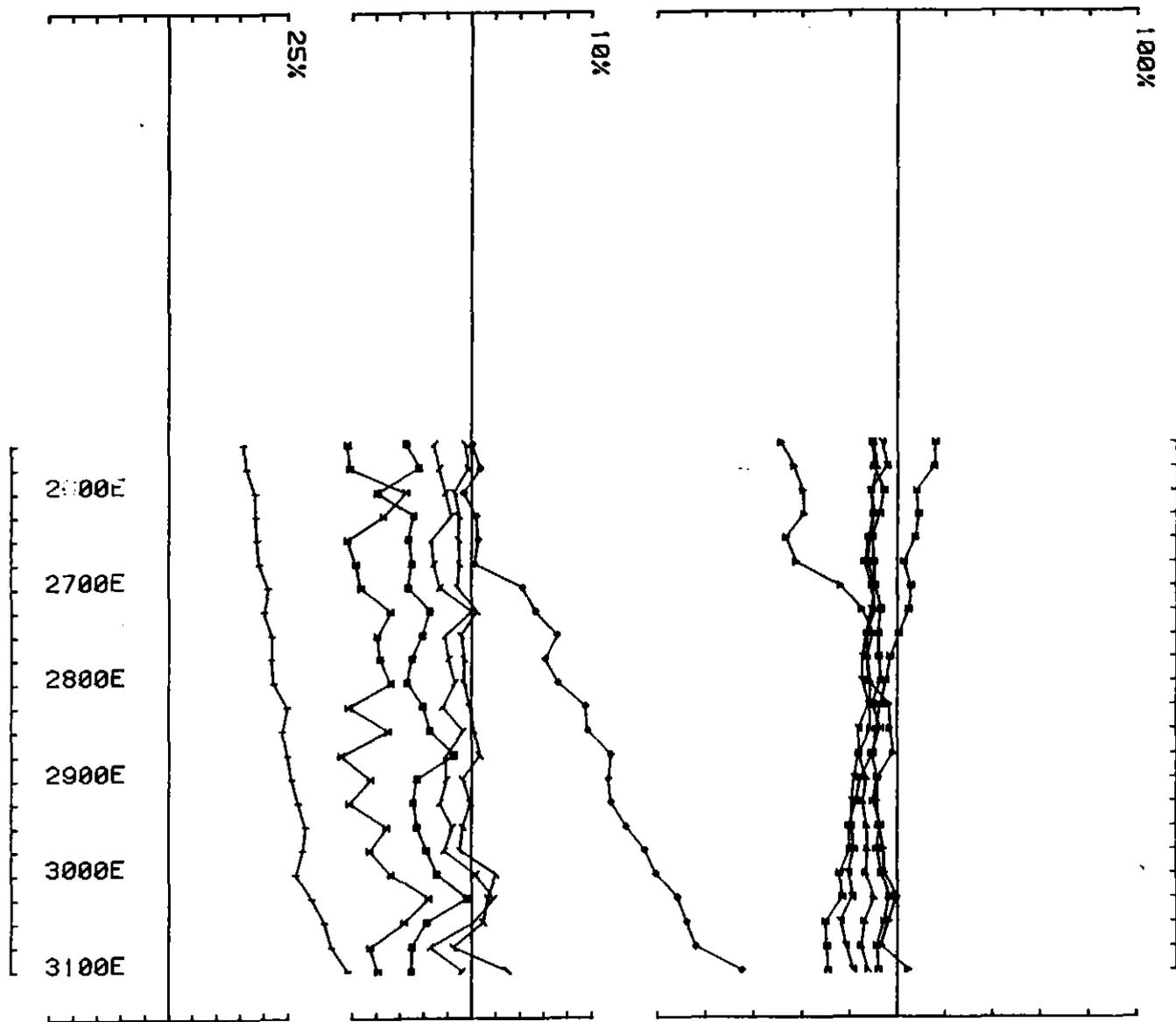
UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26 230 6/9/87

Loop 0003 line 3800N component Hz secondary field Ch 1 point norm.



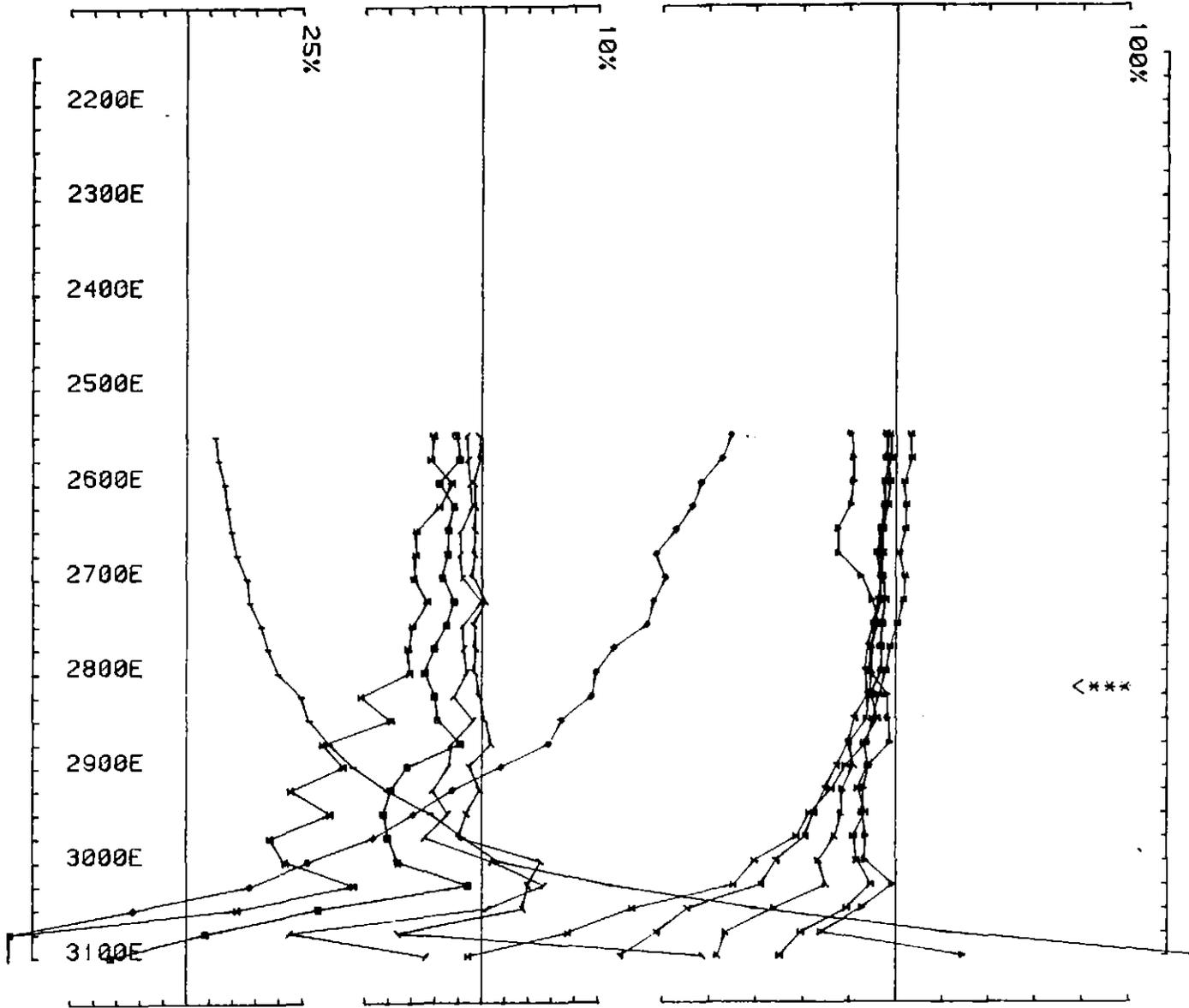
UTEM SURVEY at MT. CHARTER for ABERFOYLE RESOURCES  
 conducted by PAO PMM job 8721 base freq (hz) 26.230 6/9/87  
 Loop 0001 line 3800N component Hz secondary field Ch 1 point norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 30/8/87

Loop 0003 line 3800N component Hz secondary field Ch 1 contin. norm.



UTEM SURVEY at Mt. CHARTER for ABERFOYLE

conducted by PMM PAO Job 8721 base freq (hz) 26.230 6/9/87

Loop 0003 line 3800N component Hz secondary field Ch 1 point norm.

APPENDIX XIII

\*\* Header data set report for : DDMA0016

**AMG E 387707.2**  
**AMG N 5390402.7**

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HOLE NAME: DDMA0016

	East	North	RL
Collar Coords:	2814.76s	2995.89s	678.00s
Collar Depth:	.00		
Hole Depth:	367.40		
Geologist	A.McNeill		
Start DateTime	26/04/1988		
End DateTime	24/05/1988		
Work Proposal			
Tenement	E.L.106/87		
Prospect	Boundary Pspect		
Hole Objective	Alt.in CS VoIcs		

\*\* Survey data set report for : DDMA0016

Depth	Dip	Azi	Instrument
.00	-90.00	200.00	theodolite
25.00	-90.00	200.00	eastman
50.00	-90.00	200.00	eastman
75.00	-90.00	200.00	eastman
100.00	-90.00	200.00	eastman
125.00	-90.00	200.00	eastman
150.00	-90.00	200.00	eastman
175.00	-90.00	200.00	eastman
200.00	-90.00	200.00	eastman
225.00	-90.00	200.00	eastman
250.00	-90.00	200.00	eastman
275.00	-89.70	200.00	eastman
300.00	-89.20	200.00	eastman
325.00	-89.00	203.00	eastman
350.00	-89.00	207.00	eastman
367.40	-89.00	210.00	eastman

\*\* Casing log data set report for : 00MA0016

Item #	From	To	Casing Type	ID	L	Comments
1.00	.00	1.00	HW	101.6	y	
2.00	.00	367.40	PVC	36	y	32mm class 12

\*\* Drill log data set report for : DDMA0016

Item #	From	To	Contractor	Drill Rig	Drill Method	ID	Sample Type
1.00	.00	1.00	F.Ortner	F49J	Tricone	118	cgri
2.00	1.00	52.70	F.Ortner	F49J	Diamond	96	cgri
3.00	52.70	367.40	F.Ortner	F49J	Diamond	75	cgri/scor

From	To	Sample	Type	Cu	Pb	Zn	Ag	Au	Ba	As	Cr	Zr	Ti	Y	Sb	Ni	Hg
				ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
.00	13.90	428217	CGRI	20	75	310	.50	<.008	2500	27	6	230	1550	35	1.6	na	na
13.90	22.40	428218	CGRI	15	35	535	<.50	<.008	1300	6	25	290	2050	65	.6	na	na
22.40	32.20	428219	CGRI	15	50	670	<.50	.015	1400	5	5	290	1950	50	1.0	na	na
32.20	37.30	428220	CGRI	10	55	765	<.50	<.008	1100	4	15	340	2250	35	1.0	na	na
37.30	48.10	428221	CGRI	15	75	600	<.50	<.008	1900	4	5	280	1850	40	.6	na	na
48.10	55.40	428222	CGRI	30	25	95	<.50	<.008	1150	1	25	290	1950	40	.6	na	na
55.40	65.40	428223	CGRI	10	55	80	<.50	<.008	1150	2	15	200	1900	45	.4	na	na
65.40	75.40	428224	CGRI	15	60	80	<.50	<.008	1250	1	30	210	2050	35	.2	na	na
75.40	85.40	428225	CGRI	15	80	80	<.50	<.008	1200	2	10	200	2200	40	<.2	na	na
85.40	95.40	428226	CGRI	15	65	90	<.50	<.008	1350	2	30	210	2100	40	<.2	na	na
95.40	105.40	428227	CGRI	10	50	80	<.50	<.008	1300	1	10	210	2100	45	.2	na	na
105.40	116.70	428229	CGRI	20	55	90	.50	<.008	1250	<1	10	200	2000	35	.6	na	na
116.70	126.70	428230	CGRI	15	25	60	<.50	<.008	1200	<1	6	260	1950	40	.2	na	na
126.70	133.40	428231	CGRI	20	30	55	<.50	<.008	1150	<1	35	280	1850	40	<.2	na	na
133.40	140.30	428232	CGRI	20	35	55	<.50	<.008	1250	2	<5	280	1900	35	.2	na	na
140.30	140.70	428201	SCOR	60	20	230	<.50	<.008	2200	10	20	330	1850	30	<.2	15	.030
140.70	141.70	428202	SCOR	45	15	45	<.50	<.008	1450	15	25	220	1200	25	<.2	15	.010
141.70	142.70	428203	SCOR	25	5	30	<.50	<.008	1350	8	<5	240	1250	25	<.2	15	.020
142.70	143.60	428204	SCOR	15	<5	30	<.50	<.008	1550	5	30	260	1350	25	<.2	15	.010
143.60	144.50	428205	SCOR	185	10	55	<.50	<.008	1300	7	15	220	1150	25	<.2	15	.020
144.50	145.50	428206	SCOR	585	15	50	1.00	<.008	1300	3	20	220	1200	25	<.2	15	.020
145.50	145.70	428207	SCOR	140	<5	55	<.50	<.008	1400	8	45	220	1150	25	<.2	10	<.005
145.70	146.20	428208	SCOR	210	5	35	<.50	<.008	1350	8	5	240	1300	25	<.2	10	<.005
146.20	146.70	428209	SCOR	300	10	40	<.50	<.008	1350	15	35	220	1150	25	<.2	15	<.005
146.70	147.30	428210	SCOR	305	30	45	<.50	<.008	1350	6	<5	210	1150	25	<.2	10	.020
147.30	147.90	428211	SCOR	155	<5	50	<.50	<.008	1450	2	35	260	1300	30	<.2	20	.010
147.90	148.50	428212	SCOR	150	<5	35	<.50	<.008	1250	<2	<5	220	1150	25	<.2	10	.010
148.50	149.50	428213	SCOR	165	15	90	<.50	<.008	1250	4	30	240	1250	30	<.2	15	.020
149.50	150.50	428214	SCOR	20	<5	65	<.50	<.008	1400	2	15	240	1250	30	<.2	10	.030
150.50	151.60	428215	SCOR	15	<5	40	<.50	<.008	1400	<2	20	230	1200	30	<.2	15	<.005
151.60	152.10	428216	SCOR	10	<5	30	<.50	<.008	1350	<2	15	220	1150	30	<.2	10	<.005
152.10	155.30	428233	CGRI	60	30	115	1.00	.009	1350	7	35	210	1800	45	1.0	na	na
155.30	163.40	428234	CGRI	20	50	70	<.50	<.008	1400	6	7	200	2000	45	.2	na	na
163.40	168.00	428235	CGRI	280	50	70	<.50	<.008	1350	3	25	250	1600	35	.2	na	na
168.00	178.40	428236	CGRI	30	40	60	.50	<.008	1300	1	<5	270	1750	40	.4	na	na
178.40	188.40	428237	CGRI	15	80	70	<.50	<.008	1250	2	<5	300	1950	45	.2	na	na
188.40	198.40	428238	CGRI	15	35	65	<.50	<.008	950	1	25	300	1900	40	<.2	na	na
198.40	208.40	428239	CGRI	15	45	85	<.50	<.008	720	1	5	290	1750	40	.4	na	na
208.40	218.40	428240	CGRI	15	35	75	<.50	<.008	540	1	20	280	1750	35	<.2	na	na
218.40	223.40	428241	CGRI	20	55	95	<.50	<.008	510	1	6	280	1650	30	.2	na	na
223.40	235.60	428242	CGRI	35	40	150	<.50	<.008	420	1	25	300	1800	40	.2	na	na
235.60	245.40	428243	CGRI	2000	45	200	<.50	<.008	230	6	10	80	460	25	9.4	na	na
245.40	252.80	428244	CGRI	1100	20	240	<.50	<.008	250	5	100	10	70	20	5.4	na	na
252.80	263.20	428245	CGRI	500	50	110	<.50	<.008	240	1	6	160	950	10	<.2	na	na
263.20	270.00	428246	CGRI	685	60	90	<.50	<.008	340	1	50	200	1250	20	<.2	na	na
270.00	280.40	428247	CGRI	90	60	40	<.50	<.008	760	1	<5	240	1400	25	<.2	na	na
280.40	290.40	428248	CGRI	90	40	60	<.50	<.008	1000	1	25	240	1500	25	<.2	na	na
290.40	300.40	428249	CGRI	50	60	55	<.50	<.008	1000	1	<5	240	1350	35	<.2	na	na
300.40	310.40	428250	CGRI	50	35	60	<.50	<.008	1350	1	25	240	1450	35	<.2	na	na
310.40	320.40	428251	CGRI	75	50	85	<.50	<.008	1350	<1	<5	270	1600	35	<.2	na	na
320.40	330.40	428252	CGRI	65	60	75	<.50	<.008	1050	<1	25	260	1500	35	<.2	na	na
330.40	340.40	428253	CGRI	20	45	60	<.50	<.008	540	<1	<5	270	1500	35	<.2	na	na
340.40	349.00	428254	CGRI	60	35	85	<.50	<.008	310	1	25	270	1650	40	<.2	na	na
349.00	355.40	428255	CGRI	25	40	60	<.50	<.008	460	<1	5	300	1750	40	<.2	na	na

Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

PROJECT : Nackawash

PROSPECT : Boundary

HOLE NO: Plac 16

PAGE: 1 of 9

LOGGED: A.M.N.

DATE: 1-5-88

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH	
			ROCK NAME	DESCRIPTION									
0													
0-10			Rhyolactic lava	White-cream-orange, generally massive feldspar minor quartz-phylic lava.		basic quartz-phylic ve. Q = (1-2)		52 feet breccia.	Lab. 64 D(1)				
10-14				109 brecciated with Fe oxide stained filling	70% 75% 80% } grey alteration & sericitized feldspar - alteration surrounding quartz veins.								
14-18				109 brecciated with Fe oxide stained filling									
18-22				110: black, aphanitic to micritic lava - feldspar phyc fractured to root, brecciated with iron oxide stained material		Py ve (1-2)			110(3)				
22-26				110: fine brown, feldspar-phylic, Rhyolactic lava - minor chlorite veils & brecciation.		Q + Fe stained ve. (1-2)							
26-30				110: mottled pink-green micritic lava with fine feldspar phenocrysts.		211 Q + Fe ve (2-3)		517 from fault zone					
30-34				110: pink-brown Rhyolactic lava with fine feldspar phenocrysts and chlorite patches.		Q + surrounding to feldspar alteration (1-2)		6 feet face = 20'					
34-38				110: egg-white feldspar-phylic Rhyolactic lava				224 feet face = 50'					
38-42				110: mottled green-brown aphanitic lava - minor brecciation				60-3 New locality, site 16 CA.					

03/203

# DIAMOND DRILL LOG

PROJECT : MacIsaac

PROSPECT : Boundary

HOLE NO: AKC 16

PAGE: 2 of 9

LOGGED: A. R. W.

DATE: 3-5-88

DEPTH	DRILL RUNS	CORE LOBS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
			ROCK NAME	DESCRIPTION								
1				Dark grey matrix, feldspar phyc. & angular "red fragments"		Q <sub>2</sub> kfd (1-3)						
1.5			Volcaniclastic	Red-pink siliceous banded feldspar phyc. volcanoclastic with siliceous clasts, siliceous, weakly developed "desulfurization" textures. Common grey-pink low pyroxene.	Si 3-4.			200' banding at 20' loca. 200' banding at 70' loca.			40' <u>Pathology 42822</u> "Altered dacitic breccia" - flow brecciated ignimbrite. High-silica-cemented to 50.	
4.4			Rhyolitic lava	Light pink-dark pink massive lava with feldspar and minor quartz phenocrysts. Characteristic sericite and chlorite coat fracture surfaces.		Q <sub>2</sub> kfd (1-2)					52.9 <u>Pathology 42825</u> "Altered dacitic tuff-bone" - "welded" flow brecciated tuff	

037264

# DIAMOND DRILL LOG

PROJECT : Macintosh

PROSPECT : boundary

HOLE NO: 11K 16

PAGE: 3 of 9

LOGGED: A.M.N.

DATE: 3-5-77

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH	
			ROCK NAME	DESCRIPTION									
0													
16			Rhyolactic lava	Pink-red lava with chlorite spots									
16.7			volcaniclastic?	gn and matrix & fragments of pink rhyolitic lava with some desilification textures. <small>Caedonoid Ca-feld</small>									
16.8				massive brown-green feldspar phytic volcanic, some brecciation, desilification textures (Chalk type) common.									
16.9													
17.0													
17.1													
17.2													
17.3													
17.4													
17.5													
17.6													
17.7													
17.8													
17.9													
18.0													
18.1													
18.2													
18.3													
18.4													
18.5													
18.6													
18.7													
18.8													
18.9													
19.0													
19.1													
19.2													
19.3													
19.4													
19.5													
19.6													
19.7													
19.8													
19.9													
20.0													

11K  
"Amphibole Andesite"  
- ? intrusive.

037265

# Aberfoyle Resources Limited

EXPLORATION DIVISION

## DIAMOND DRILL LOG

PROJECT : Apitihua

PROSPECT : Boundary

HOLE NO : MK 16

PAGE : 4 of 9

LOGGED : ARW

DATE : 3-5-88

DEPTH	DRILL RUND CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
		ROCK NAME	DESCRIPTION								
152.4		Basaltic lava	green feldspar-epid. volcanic green feldspar-epid. basaltic lava		Q1001 (1-2)						
152.1		Rhyolitic lava	brown-green groundmass feldspar-epid. lava with minor pot. alteration		Q1011 (1-2)						
152.0			brecciated pink-green lava								
151.8			grey to pink feldspar-epid. lava	Sil 2-5	Q1011 (1-2)						
151.7		Basaltic lava	dark green feldspar-epid. lava with rounded pink-brown desulfidation features by 152.2m green-brown colour	CU1, SIL 2 CU1 (2) SIL 2-5		grey silification + py (2-5)					
151.4			green-pink lava, brecciated in parts, with rounded desulfidation structures.	Sil 2-5, CU 1							
151.2			brecciated green-grey lava with feldspar-epid. chlorite patches in groundmass.	Sil 2-5							

151.8 } trace detrital native Cu  
in microfractures

156.5 lava with fault at 25' to Ca.

150.75 fault line - Area 25'

145.5 fault line? at 60' from

157.5 fault pyg

160.1 2cm of fault pyg. fault at 55' to Ca.

163.5 fault breccia. fault at 55' to Ca.

145' faulting at 70' to Ca.

156.0 Amphibole 470287  
"Amphibole-like amphibole"  
- look for structure!

037266

# DIAMOND DRILL LOG

PROJECT : Muckinloch

PROSPECT : Boundary

HOLE NO : MAC 16

PAGE : 5 of 9

LOGGED : A.M.N.

DATE : 1-6-88

DEPTH	DRELL RUNS	CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
			ROCK NAME	DESCRIPTION								
1.0			Rhyolite lava.		Si (1)							
1.5				Green-brown feldspar phytic lava with irregular chlorite patches (feldspar phytic) weakly brecciated + deformed.								
2.0			volcaniclastic.	interstratified contact.								
2.5				Mottled pink-green volcanic with calcareous feldspar phytic, chloritized matrix. fragments of pink-green silicified lava and some fine grained interbeds.								
3.0												
3.5												
4.0												
4.5												
5.0												
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M14m. Alteration - 42260  
"Altered dacitic Breccia"  
- probably a flow-brecciated well  
to H.

037267

# DIAMOND DRILL LOG

PROJECT : Machinist

PROSPECT : Boundary

HOLE NO: M4c16

PAGE: 6 of 9

LOGGED: A.M.J.

DATE: 1-6-88

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
			ROCK NAME	DESCRIPTION								
15			volcaniclastic		Sil (1-3).	Q + Kfd (2).						
16			345 fine grained chlorite altered. 1144			1149 1154 Py (1-2). Q + Kfd (1-2)		1144 Contact = 60 to CA				
17												
18			1156 Altered volcanic	Flame red-green volcanic	Si (1-4), Kfd (1), Cl (1-1)			1156 Fault = 20 to CA.				
19								1177 Shd (M2) S <sub>1</sub> = 22 to CA.				
20			1194 Brown-green volcanic		Si (3-4), Kfd (2) and Cl (1-1). Cl (1-2).							
21												
22												
23			1156 Quartz Vein	White-grey Quartz vein with manganese fil on fractures. Brecciated in part with manganese and iron oxide cement. Patches of light green waste.	Si (2-3), Kfd (2), Si (1-2), Cl (1) MAR Manganese	1154 Increase concentration of Aluminosilicate Qm. 1156 pin into fracture of vein.		1156 Contact: Qm = 75 to CA.				
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037268

Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

HOLE NO: MAC 4  
PAGE: 7 of 9  
LOGGED: A.M.P.  
DATE: 1-6-88

PROJECT: Macbeth  
PROSPECT: Bambury

DEPTH	DRILL RUNS	CORE LOBE	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
			ROCK NAME	DESCRIPTION								
13.5			Quartz vein.	As above.			As above.					
14.5		88										
15.5			1722	No core - Fossil.								
16.5		88										
17.5			142	Quartz vein.			+ Cps. Sp. Pgs. chalcocite.					
18.5				White-grey Quartz vein with patches of kerite, parallel to highly altered volcanic. In places with manganese fillings.								
19.5			267	Altered volcanic.	Pink-grey, feldspar phyl. volcanic.	Si (2-4), Si (2).	Q (1-4)	+ Cps. Pgs. chalcocite in veins.				
20.5				Green feldspar phyl. volcanic.	Si (2-4), E. Mt. Si (3-4)	Q + Mt (1-4)						
21.5						27-47 Q + sp. + chalcocite.						
22.5			1745	Quartz vein.			Cpy (1-3), rimmed by chalcocite. Native copper in microfractures.					
23.5				White-grey Quartz vein with green & pinkish. Minor manganese.								
24.5			177	Altered lava?	green massive feldspar-phyl. volcanic.	Si (2-3), Si (3).	Q (2-3) ± tr. sp. + native Cu. + Cpy (1-2).					
25.5												
26.5			187	Rhyolitic lava.	green-pink feldspar + minor quartz phyl. lava.	Si (1-2).	Thin anastomosing Q + hfd (1-2) and thicker Q + Cpy (1) ± tr. hfd. (1-2).					
27.5							Q + hfd. ± tr. sp. (2-3).					
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037269

# Aberfoyle Resources Limited

EXPLORATION DIVISION

## DIAMOND DRILL LOG

HOLE NO: MA-16

PAGE: 2 of 9

LOGGED: A.M.N.

DATE: 1-6-88

PROJECT : Madison

PROSPECT : Boundary

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH	
			ROCK NAME	DESCRIPTION									
0				Hydrothermal base									
1				As Above									
2				Green-Pink. feldspar + quartz phen. matrix. Usually dehydrated base. minor chlorite patches.		Q + Cl (A) + Crpg (A) + P (A) (1-2)		to disseminated by associated with chlorite patches.					
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Aberfoyle Resources Limited  
EXPLORATION DIVISION  
**DIAMOND DRILL LOG**

PROJECT : Mackintosh  
PROSPECT : Boundary

HOLE NO: MAC 16  
PAGE: 9 of 9  
LOGGED: AMW  
DATE: 1-6-88

DEPTH	DRILL RUNS CORE LOSS	LITHOLOGY		ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
		ROCK NAME	DESCRIPTION								
0		Rhyolitic lava	Green, feldspar physis, matrix, lava.	S(C2)							
1404		Volcaniclastic	Dark Green feldspar physis lava, desulfidated, brecciated in part with pink lava fragments	S(1-2)	Q + Kfs + tr py on cut by later Kfs - tr Qz Q + Kfs + tr py (1-2)						
1410			Mottled Pink-Green with feldspar physis clasts. Clots + patches of grey silicification and pink lava fragments	S(1-2)	Q + tr (1-2), Q (1-2)	tr sp.					
1415			Mottled Pink-green volcaniclastic with no obvious lava fragment.	S(1-2)	Q + Kfs + tr py (1-2) Q + tr py (1-2)						
1420			As above - altered lava?	S(1)	Q + tr py (1-2)	Py (1-2) associated with chlorite					
1427	END										

037271

## APPENDIX - MAC 16

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Sample No.	Depth	Description
428256	52.9	Dacitic volcaniclastic
428257	46.2	Dacitic volcaniclastic - eutaxitic?
428258	102.6	Rhyodacitic lava
428259	156.0	Devitrified dacitic lava - patch of alteration
428260	193.4	Volcaniclastic - eutaxitic?

---

## Central Mineralogical Services

39 Beulah Road, Norwood, South Australia 5067  
Telephone (08) 42 5659 Fax (08) 363 1820  
International: Telephone + 618 42 5659 Fax + 618 363 1820



Mr. A.W. McNeill  
Geologist  
Aberfoyle Resources Ltd.  
Exploration Division  
P.O. Box 952  
BURNIE / TAS. 7320

12th September, 1988

### REPORT CMS 88/6/37

YOUR REFERENCE: Letter dated 22.6.1988  
DATE RECEIVED: 28th June, 1988  
SAMPLE NOS.: 428256 - 428260  
SUBMITTED BY: A.W. McNeill  
WORK REQUESTED: Petrology

Copy to:  
Mr. H. Skey  
Exploration Manager  
Aberfoyle Resources Ltd.  
Exploration Division  
123, Camberwell Road  
HAWTHORN EAST / VIC. 3123

  
H.W. Fander, M. Sc.

REPORT CMS 88/6/37

Five slabbed drill core samples from DDH MAC-16 at the Boundary prospect were received for routine petrological examination. Representative thin sections were prepared and examined together with respective offcuts, with stain tests performed as warranted. Attached descriptions summarise the microscopic data and include interpretative comments.

Summary

As sampled, this suite represents altered dacitic volcanics flanking an andesitic to trachyandesitic unit represented by samples 428258 and 428259 (MAC-16/102.6 m and 156.0 m, respectively).

Dacites are typically flow-brecciated types, with some evidence of a flow-brecciated ignimbritic mode of origin, although much of the finer detail is obscured by alteration effects.

The andesitic unit is possibly intrusive in part, specifically the relatively coarse-grained and texturally homogeneous 428258 sample. Pyritic mineralisation is associated with discontinuous, weakly chloritic quartz veinlets and sericitic microfractures in the 428259 (trachy)andesite. Alteration assemblages are noted in the individual descriptions.

D. Cowan, B. Sc.

SAMPLE NO.: 428256

(T.S. 60250)

037275

1.

CLASSIFICATION: Altered Dacitic Tuff Lava

COMPOSITION: Frequent albitised/weakly sericitised plagioclase-, minor variably corroded quartz phenocrysts in a matrix of partly degraded/kaolinised sericite, with varying proportions of anhedral fine to microcrystalline quartz. Minor spongy clots of chlorite and partly degraded "montmorillonitic" clay. Conspicuous leucoxenitic semi-opaques.

FABRIC: Flow-structured and brecciated porphyritic, semi-felsitic with flow-orientated sub- to fine millimetric-scale lava clasts in a texturally similar matrix (hence tuff lava). Locally vaguely relict eutaxite-like on a microscale. Incipiently sheared.

ACCESSORIES: Minor traces of apatite, rare montmorillonite-chlorite-pseudomorphed ferromagnesian (?amphibole) microphenocrysts. Extremely rare feldspar-replacive clots of fibrous zoisitic epidote.

INTERPRETATION/COMMENTS: An argillised/partly silicified felsic intermediate-acid flow breccia with dacitic compositional characteristics. This rock is clastic lava-like, but may represent a thoroughly welded and flow-brecciated tuff (vitric-crystal) on vague relict micro-textural grounds.

SAMPLE NO.: 428257

(T.S. 60251)

CLASSIFICATION: Altered Dacitic "Breccia"

COMPOSITION: Disseminated to frequent variably sericitised and extensively degraded/kaolinised feldspar phenocrysts and crystals fragments, relatively quite minor corroded quartz phenocrysts in a matrix of semi- to sericitic partly degraded (illitic, to kaolinitic, variably Fe-stained) white mica with varying proportions of felsitic-anhedral quartz.

FABRIC: Random to semi-flow-structured, moulded, psammite to lapilli grade lithoclastic. Featureless to distinctly microshardy/contorted eutaxitic matrix in individual clasts, partly obscured by felsitic devitrification. Incipiently sheared.

ACCESSORIES: Conspicuous leucoxenised opaques. Secondary limonitic stainings and minor films of Mn-oxide. Rare oxidised pyrite. Rare zircon and monazite.

INTERPRETATION/COMMENTS: An altered dacitic flow breccia with affinities to 428256; coarser lithoclastic structures and relatively diagnostic flow-brecciated welded-tuffaceous features. Reasonably interpreted as a flow-brecciated ignimbritic lithic-vitric-crystal tuff.

SAMPLE NO.: 428258

(T.S. 60252)

037276

2.

CLASSIFICATION: Amygdaloidal Andesite

COMPOSITION: Albitised/sericite-montmorillonite-stained plagioclase phenocrysts and phenocrystal clusters, subordinate chloritic montmorillonite semi-pseudomorphed ferromagnesian (amphibole, pyroxene) phenocrysts and microphenocrysts, disseminated quartz amygdales and micro-amygdales. Groundmass of Fe-pigmented, weakly argillised (kaolinitic) albite microlaths with subordinate chloritised amphibole laths and a semi-pervasive quartz mesostasis.

FABRIC: Porphyritic/trend glomeroporphyritic, weakly amygdaloidal with a fine/trend medium-grained random semi-felted lathic groundmass.

ACCESSORIES: Leucoxenised opaques, traces of apatite.

INTERPRETATION/  
COMMENTS: A texturally homogeneous andesitic/trend quartz-andesitic phase with textural features suggestive of a minor intrusive mode of origin; alternately, may represent the core zone of a relatively thick flow. Moderately chlorite-clay-altered, enhanced by mild weathering effects.

---

SAMPLE NO.: 428259

(T.S. 60253)

CLASSIFICATION: Amygdaloidal Trachyandesite

COMPOSITION: Albitised/weakly sericitic plagioclase phenocrysts, relatively quite minor chlorite-montmorillonite pseudomorphs after ferromagnesian phenocrysts and microphenocrysts, sporadic quartz amygdales in a groundmass of albite microlaths and microlites with a K-feldspathic mesostasis. Sporadic discontinuous weakly chloritic quartz veinlets and sericitic microfractures. Disseminated extensively oxidised pyrite (mean 750 um).

FABRIC: Porphyritic, amygdaloidal, weakly flow-structured/subtrachytic. Very incipient post-veining stress effects.

ACCESSORIES: Irregular Fe-stainings partly controlled by late limonitic microfractures. Leucoxenised opaques, minor traces of apatite.

INTERPRETATION/  
COMMENTS: Similarities with 428258, but distinctly finer-grained, lava-like and trachyandesitic in comparison. Finer detail obscured by irregular zones of secondary Fe-staining. Pyrite partly controlled by quartz veinlets and semi-contemporaneous sericitic microfractures. The host rock is only mildly chlorite-clay-altered.

SAMPLE NO.: 428260

(T.S. 60254)

3.

CLASSIFICATION: **Altered Dacite Breccia**

COMPOSITION: Phenocrysts and phenocrystal clusters of oligoclase-albite, relatively minor quartz microphenocrysts in a matrix of very fine to microcrystalline albite with subordinate/variable proportions of microcrystalline quartz and semi-pervasive microscopic intergranular clots of chlorite.

FABRIC: Psammite to lapilli grade, moulded lithoclastic, with porphyritic lava-like to vaguely relict eutaxitic clasts.

ACCESSORIES: Rare leucoxic anatase-stained chlorite pseudomorphs after microphenocrystal ferromags. Traces of K-feldspar. Disseminated leucoxic semi-opaques.

INTERPRETATION/  
COMMENTS: This rock is broadly similar to 428256 and particularly 428257. In contrast, it exhibits a chloritic alteration assemblage with subsequent irregular replacive zones of weakly Fe-pigmented microcrystalline albite. Tuff lava-like, but probably a flow-brecciated welded tuff.

---

SAMPLE NO.:

CLASSIFICATION:

COMPOSITION:

FABRIC:

ACCESSORIES:

INTERPRETATION/  
COMMENTS:

# ANALABS

23.3.08.05544

Aberfolye Resources Exp. Division  
 P.O. Box 952  
 Burnie  
 Tasmania 7320

ORDER NO. **3828** PROJECT

DATE RECEIVED **23/06/88** RESULTS REQUIRED **ASAP**

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
2	12/07/88	1	5

SAMPLE NUMBERS	PRE-TREATMENT							ANALYSIS		
	DRY	CRUSH	SPLIT	INVERSE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	METHOD
28256/60	SC	Prep: 008,010,011,012,013,016						Cu,Pb,Zn,Ag/101,As/114		
28256/60	SC							Ba,Cr,Zr,Ti/401,Au/309		

RESULTS TO

Aberfolye Resources Exp. Division  
 P.O. Box 952  
 Burnie  
 Tasmania 7320

RESULTS TO

REMARKS

*MAC-16 Petrology*

STATE OF SAMPLES	ANALYSIS	PREPARATION	ANALYSIS	METHOD			
core	WC	perchloric acid	A1	radio	CA	atomic absorption	AA
core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XF
ring	CU	nitric acid	AS	other mixed acids	MA	spectrophotometry	SPE
sk	NO	hydrolysis	AV	aluminum salt	VA	colorimetry	CO
	SO	hydrochloric acid	AS	aluminum salt	VA	gravimetry	GR
	MA	perchloric acid	AS	aluminum salt	VA	gravimetry	GR
	NO	hydrochloric acid	AS	aluminum salt	VA	gravimetry	GR
due	MA	perchloric acid	AS	aluminum salt	VA	gravimetry	GR
team and	IS	hydrochloric acid	AS	aluminum salt	VA	gravimetry	GR
method	IS	hydrochloric acid	AS	aluminum salt	VA	gravimetry	GR

AUTHORISED OFFICER

# ANALABS

A Division of International Minerals & Chemicals Pty. Ltd.

## ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

23.3.08.05544

12/07/88

3282

1 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	Ba	As	Cr	Zr
1	428256	<5	<5	45	<0.5	<0.008	1200	2	45	290
2	428257	5	5	140	<0.5	<0.008	1800	2	30	330
3	428258	<5	5	55	<0.5	<0.008	1300	1	5	210
4	428259	5	10	45	<0.5	0.011	1650	10	25	210
5	428260	<5	<5	20	<0.5	<0.008	520	2	<5	250
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17										
18	DETECTION	5	5	5	0.5	0.008	10	1	5	5
19	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
20										
21										
22										
23										
24										
25	METHOD	101	101	101	101	309	401	114	401	401

Results in ppm unless otherwise specified  
 T = element present; but concentration too low to measure  
 X = element concentration is below detection limit  
 - = element not determined

AUTHORISED OFFICER



# ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

## ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

23.3.08.05544

12/07/88

3282

2 OF 2

TUBE No.	SAMPLE No.	Ti							
1	428256	2100							
2	428257	2200							
3	428258	2150							
4	428259	1850							
5	428260	1600							
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23	DETECTION	50							
24	UNITS	PPM							
25	METHOD	401							

Results in ppm unless otherwise specified  
 T = element present, but concentration too low to measure  
 X = element concentration is below detection limit  
 - = element not determined

AUTHORISED OFFICER



APPENDIX XIV

ABERFOYLE RESOURCES  
EXPLORATION DIVISION

Technical Report

MACKINTOSH EL

DHEM SURVEYS

MAC 16 & MAC 20

Prepared by:

J Silic  
Chief Geophysicist

Distribution

1. Aberfoyle Resources, Hawthorn (1)
2. Aberfoyle Resources, Burnie (1)

Issued by:

  
J Silic  
Chief Geophysicist

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MAC 16 RESULTS

CONCLUSIONS

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Fig 2: MAC 20 - EM37 Borehole Survey Loop 1

Fig 3: MAC 20 - EM37 Borehole Survey Loop 2

Fig 4: MAC 16 - SIROTEM Survey Loop 2

Fig 5: MAC 16 - SIROTEM Survey Loop 2

Fig 6: MAC 16 - SIROTEM Survey Loop 1

Fig 7: MAC 16 - SIROTEM Survey Loop 1

## INTRODUCTION

In keeping with Aberfoyle's exploration strategy, that every drillhole be logged with Down Hole Electromagnetic (DHEM) techniques, MAC 16 and MAC 20 were logged.

For both holes loops were laid out so that the loop's primary magnetic field would couple with any vertical and horizontally dipping targets that may exist within 150 meters from the hole.

Loop locations for MAC 16 are shown on Fig 1, while the loop coordinates for the MAC 20 hole are given on the legend accompanying the profile plots.

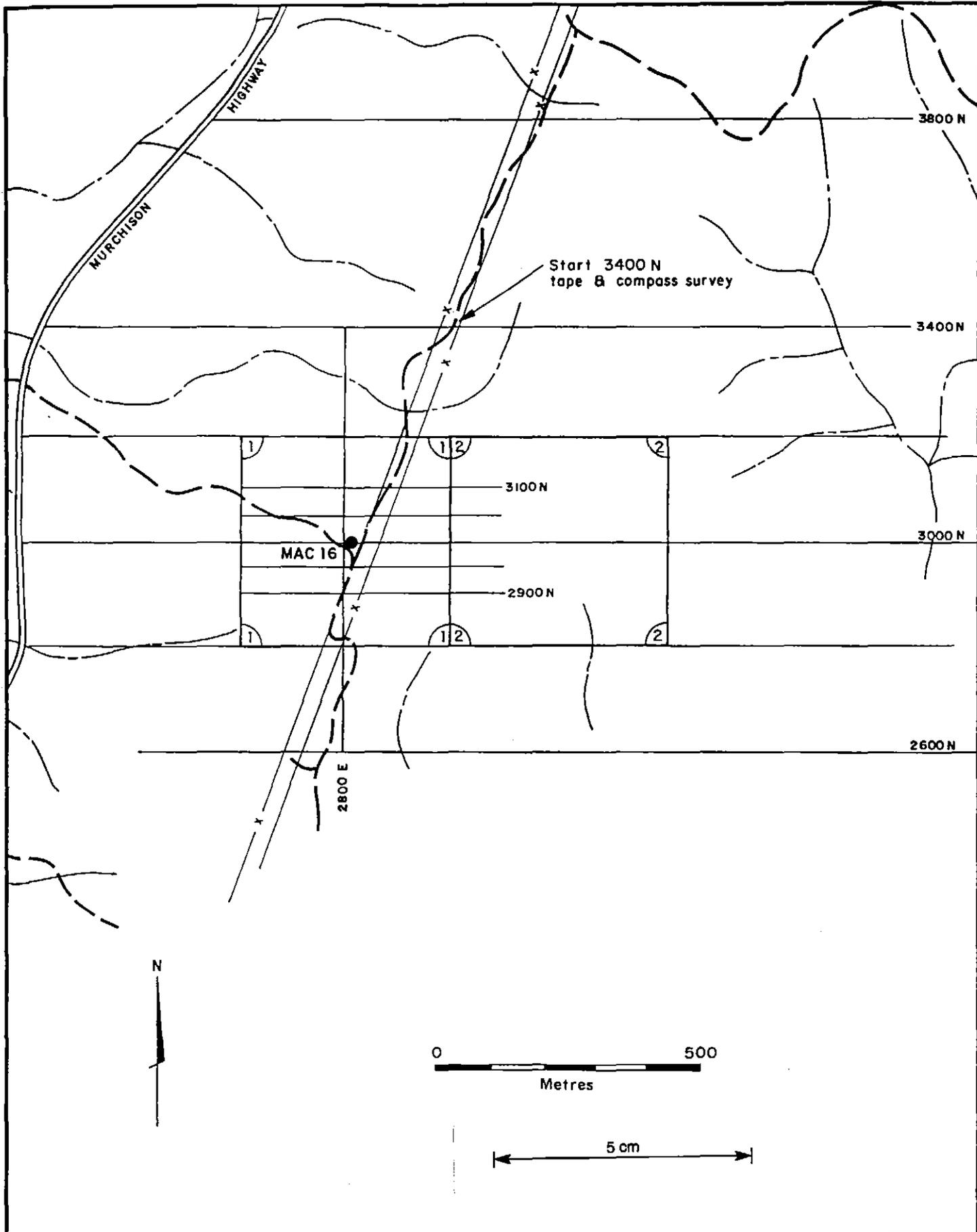
Mac 16 was logged by McSkimmins Geophysics using the SIROTEM downhole unit, while the MAC 20 hole was logged by a Geoterrex crew using an EM-37 unit.

## MAC 20 RESULTS (Figures 2 & 3)

## MAC 16 RESULTS (Figures 4 - 7)

The MAC 16 data is obviously polluted by powerline noise, particularly evident in the uphole negatives in the loop 2 data.

Nevertheless, no obvious effects from an off-hole conductor are present in the data.



**Aberfoyle Resources Limited**  
EXPLORATION DIVISION

FIG. 1

NORTH WEST TASMANIA  
**MAC 16**  
**DHEM LOOP LOCATIONS**

REVISIONS			
Init.	Date	Init.	Date

Compiled :
Drawn :
Traced : Geo Drafting
Checked :
Plate No : MAC 229

Location Code :

Scale : 1 : 10000

Date : February 1989

1511

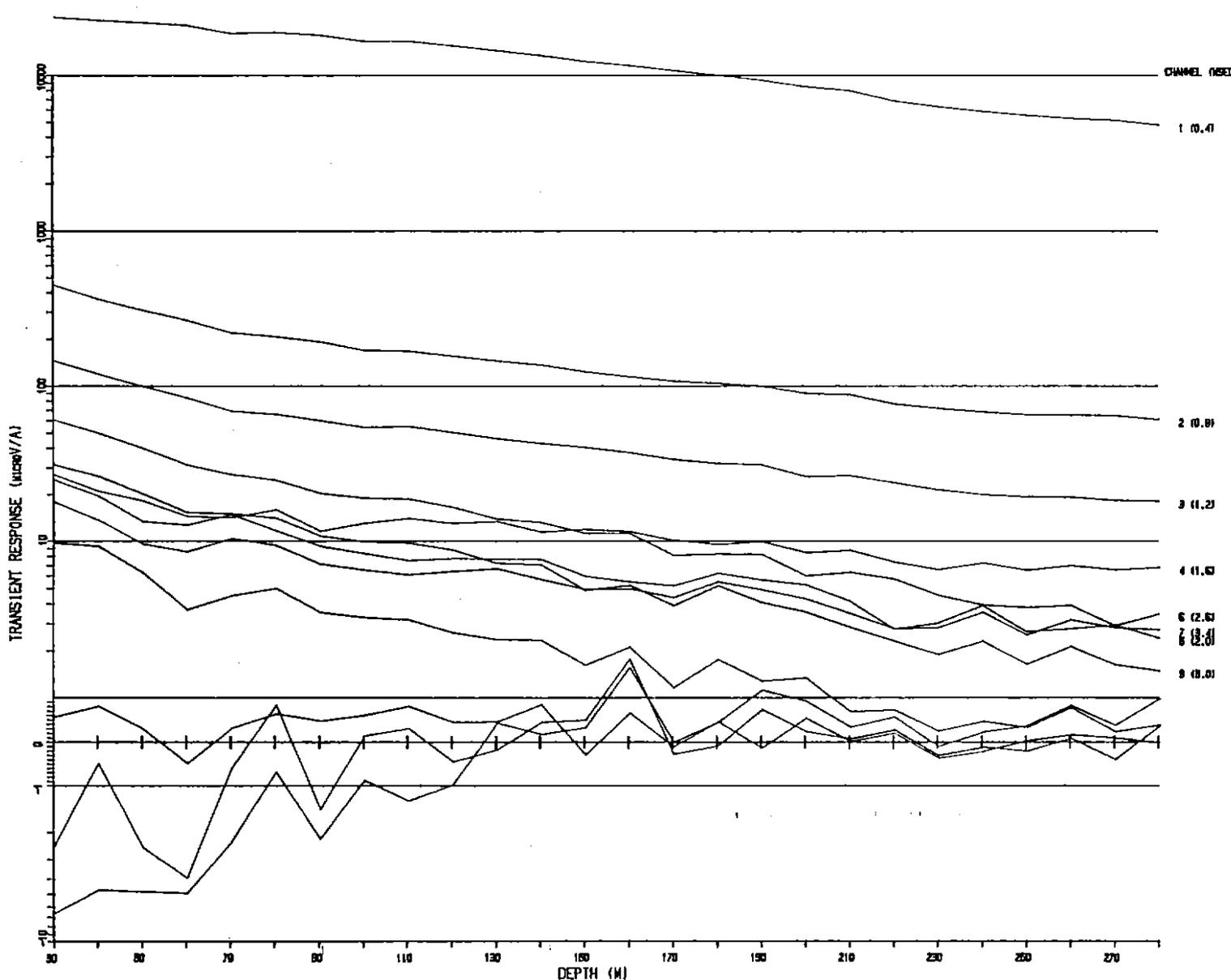
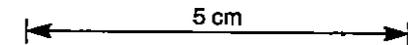
SURVEY SPECIFICATIONS

DATA ACQUISITION : MCKIMMING GEOPHYSICS P/L

SURVEY DATE : AUGUST 1988  
 CONFIGURATION : 400M SQUARE TRANSMITTER LOOP,  
 DRILL HOLE SURVEY  
 READING INT. : 10 METRES  
 NO. OF STACKS : 2048  
 TRANSMITTER : 1 MEDION POWER  
 RECEIVER : 1 SIROTEM 11 S/N 1236  
 CURRENT : 1 8.0 AMPS  
 OPERATOR : P MCKIMMING

PLOT SPECIFICATIONS

HORIZONTAL SCALE - 1:1000  
 VERTICAL SCALE - LOGARITHMIC  
 4CM. PER DECADE  
 LINEAR BETWEEN -1 AND +1

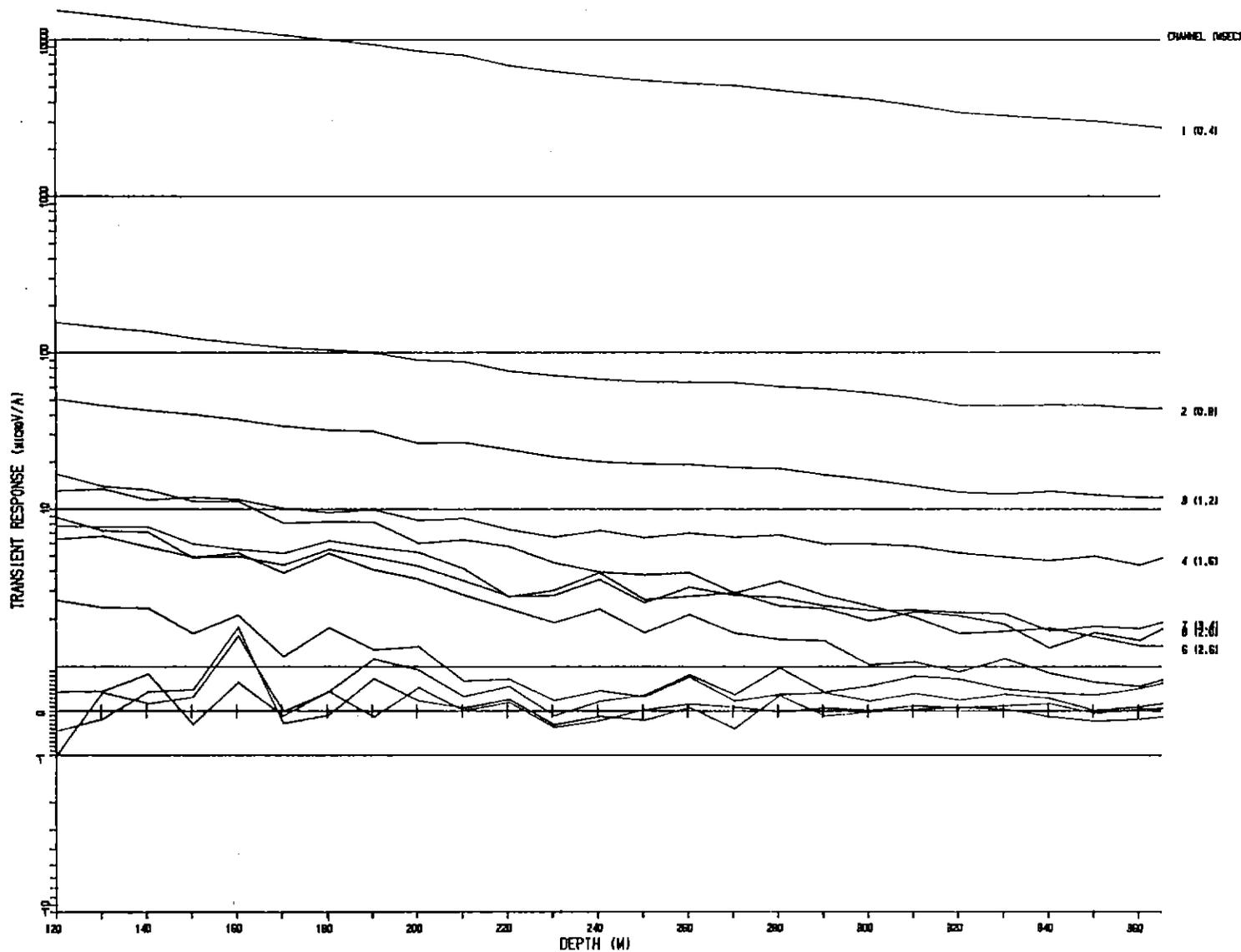


ABERFOYLE EXPLORATION

TASMANIA  
 MACINTOSH  
 SIROTEM PROFILE  
 LINE MAC 16 LOOP 1

SCALE - 1:1000

037286



### SURVEY SPECIFICATIONS

DATA ACQUISITION: MCKENNING GEOPHYSICS P/L

SURVEY DATE : 1 AUGUST 1988  
 CONFIGURATION : 400M GEOMETRIC TRANSMITTER LOOP,  
 DRILL HOLE SURVEY  
 READING INT. : 10 METRES  
 NO. OF STACKS : 2048  
 TRANSMITTER : 1 MEDION POWER  
 RECEIVER : SIROTEM II 6/M 1200  
 CURRENT : 0.0 AMPS  
 OPERATOR : P MCKENNING

### PLOT SPECIFICATIONS

HORIZONTAL SCALE - 1:1000  
 VERTICAL SCALE - LOGARITHMIC  
 1CM PER DECADE  
 (LINEAR BETWEEN -1 AND 1)

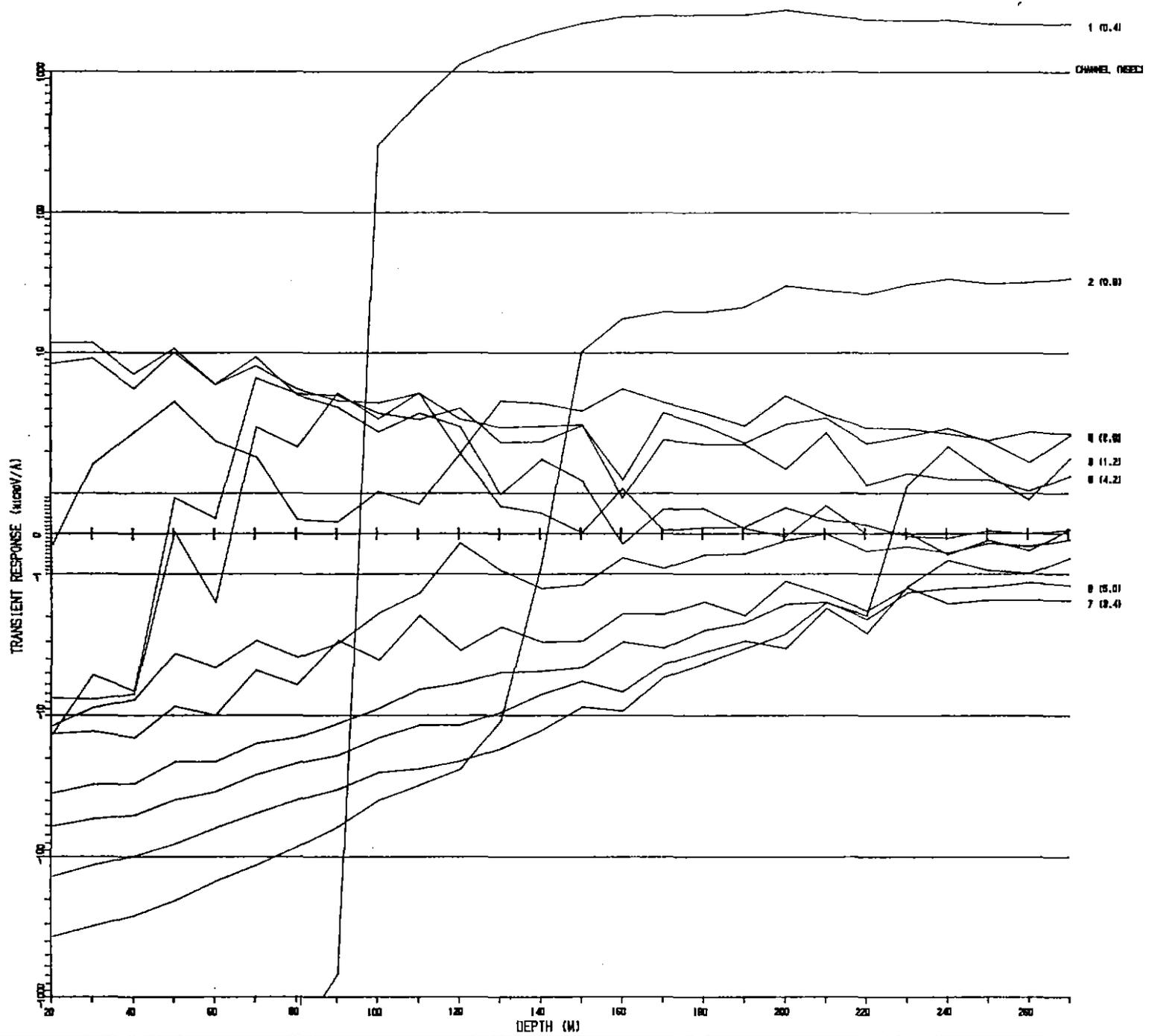
5 cm

ABERFOYLE EXPLORATION

TASMANIA  
 MACINTOSH  
 SIROTEM PROFILE  
 LINE MAC 16 LOOP 1

SCALE - 1:1000

037287



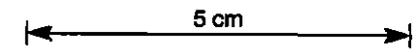
**SURVEY SPECIFICATIONS**

DATA ACQUISITION : MACKENZIE GEOPHYSICS P/L

SURVEY DATE : 1 AUGUST 1988  
 CONFIGURATION : 400N 800MIE TRANSMITTER LOOP,  
 DRILL HOLE SURVEY  
 READING INT. : 10 METRES  
 NO. OF STACKS : 2048  
 TRANSMITTER : MEDION POWER  
 RECEIVER : SIROTEM II 12/M 1226  
 CURRENT : 0.0 AMPS  
 OPERATOR : P. MACKENZIE

**PLOT SPECIFICATIONS**

HORIZONTAL SCALE - 1:1000  
 VERTICAL SCALE - LOGARITHMIC  
 4CM. PER DECADE  
 LINEAR BETWEEN -1 AND 11

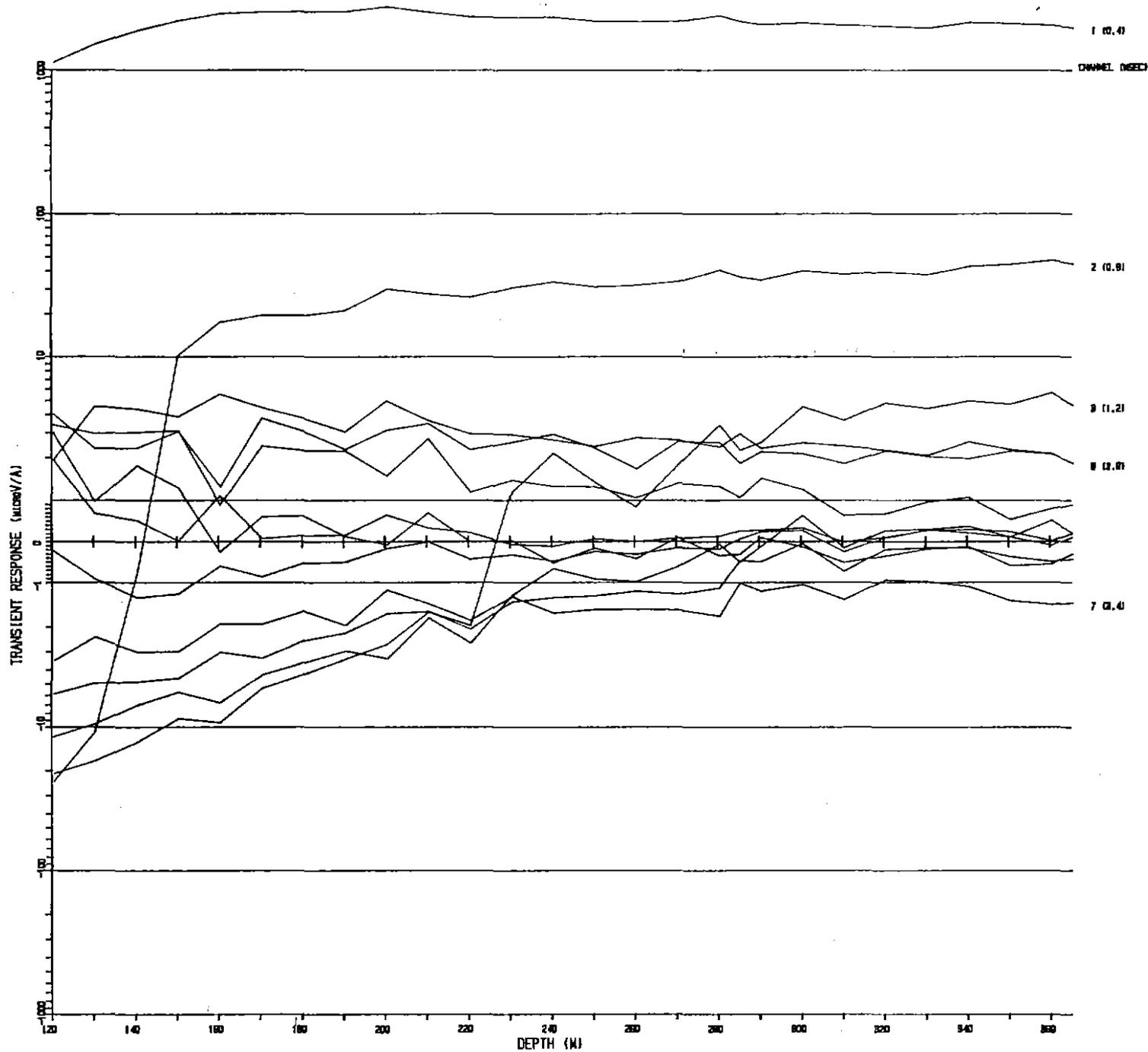


ABERFOYLE EXPLORATION

TASMANIA  
 MACINTOSH  
 SIROTEM PROFILE  
 LINE MAC 16 LOOP 2

SCALE - 1:1000

0372888



### SURVEY SPECIFICATIONS

DATA ACQUISITION : MURKIMING GEOPHYSICS P/L

SURVEY DATE : AUGUST 1980  
 CONFIGURATION : 400M SQUARE TRANSMITTER LOOP,  
 DRILL HOLE SURVEY  
 READING INT. : 10 METRES  
 NO. OF STAGES : 2048  
 TRANSMITTER : MEDIUM POWER  
 RECEIVER : SIROTEM II S/M 1226  
 CURRENT : 0.0 AMPS  
 OPERATOR : P. MURKIMING

### PLOT SPECIFICATIONS

HORIZONTAL SCALE - 1:1000  
 VERTICAL SCALE - LOGARITHMIC  
 4CM. PER DECADE  
 LINEAR BETWEEN -1 AND 11

5 cm

ABERFOYLE EXPLORATION

TASMANIA  
 MACINTOSH  
 SIROTEM PROFILE  
 LINE MAC 16 LOOP 2

SCALE - 1:1000

037289

APPENDIX XV

east	north	sample	REPORT No.
7430	6400	206348	CM77/4/18
6878	5000	271424	CM86/11/14
6780	4803	271425	CM86/11/14
6780	4814	271426	CM86/11/14
6770	4800	271427	CM86/11/14
6150	3600	271444	CM86/11/14
6075	3800	271445	CM86/11/14
6475	4000	271447	CM86/11/14
5400	1400	379717	CM87/2/14
6700	310	379727	CM87/6/22
6700	310	379732	CM87/6/22
7525	4100	379734	CM87/6/22
7525	4100	379735	CM87/6/22
6850	2830	379737	CM87/6/22
6850	2830	379739	CM87/6/22
6850	2830	379740	CM87/6/22
6660	2400	379743	CM87/6/22
6660	2400	379745	CM87/6/22
7200	<10	379746	CM87/6/22
7200	<10	379747	CM87/6/22
6580	2570	379749	CM87/6/22
6400	6055	427465	CM88/6/31
6395	5800	427472	CM88/6/31
6880	2830	427478	CM88/6/31
5670	1260	562660	TC46
5485	1210	562662	TC46

## CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 3rd May 1977

## SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

Job No. CMS 77/4/18 Date Received: 28.4.77Reference Order No. 7129Sample No. 206348Nature of Sample: Hand Specimen

DESCRIPTION SECTION No. 21059

## a. Hand Specimen:

Grey white argillaceous quartzite, non-magnetic.

## b. Microscopic:

This specimen was examined briefly in thin section and subsequently in polished section and by determination of Vickers Microhardness of the opaque phase appearing as minute black specks in hand specimen.

The rock is a poorly sorted weakly argillaceous orthoquartzite consisting of quartz-cemented fine to coarse sand sized single and composite quartz grains with sporadic (quartzite, chert, and argillite) lithic fragments. Traces of kaolin are included in the quartz cement and the rock is quite markedly stressed.

The opaque phase is an accessory detrital constituent as fairly evenly sized angular to rounded grains (mean about 100 $\mu$ ) comprising 0.2 - 0.5% of the rock. Optical features (opaque to incipiently translucent in dark red brown at thin edges, isotropic, unzoned, grey, low reflectivity) indicate that this is a spinel and one of the more chemically complex varieties most likely a picotite. This could be confirmed by spectography but a larger specimen would be required for initial heavy liquid separation/concentration.

Minor traces of detrital zircon and partly leucoxenised brown rutile are also present.

D. Cowan, B.Sc.

IDENTIFICATION
206348
DETRITAL ? PICOTITE
MACKINTOSH
6400N 7430E

MACK.

037293

## Central Mineralogical Services

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Mr. D.J. Jack  
Geologist  
Aberfoyle Resources Ltd.  
Exploration Division  
P.O. Box 952  
BURNIE / TAS. 7320

23rd December, 1986

### REPORT CMS 86/11/14

YOUR REFERENCE:	Letter dated 10.11.1986
DATE RECEIVED:	14th November, 1986
SAMPLE NOS.:	32 Samples
SUBMITTED BY:	D.J. Jack
WORK REQUESTED:	Petrology

*Burnie CK.  
Rock 6 tips*

*H.W. Fander*

H.W. Fander, M. Sc.

Copy to:  
The Chief Geologist  
Aberfoyle Resources Ltd.  
Exploration Division  
123, Camberwell Road  
HAWTHORN EAST / VIC. 3123

REPORT CMS 86/11/14

Thirty-two rock samples from the Barite Creek Grid were received for routine petrological examination. Representative thin-sections were prepared and examined in transmitted and oblique incident light, supplemented by stain tests on offcuts, where warranted. Attached tabulated descriptions summarise the microscopic data and include interpretative comments.

Summary

This suite is a composite of altered volcanics and quartzose-micaceous sedimentary rocks. Volcanics range from basic to acid and are analogous to those developed in the Que-Hellyer area. In comparison, however, rhyolitic facies appear relatively conspicuous, although this may reflect sampling.

Sediments are typified by micaceous quartzites grading into protoquartzite and relatively micaceous pelitic facies. These rocks are non-tuffaceous, but may include minor reworked volcanic components. In this sense, these rocks may be contrasted with similar quartzose-micaceous psammopelitic facies developed at the Boundary Prospect (CMS 86/11/12), which are typically distinctly tuffaceous in comparison.

D. Cowan, B. Sc.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
271424	<u>Mica Siltstone.</u> Fine silt-sized, partly de-graded white mica flakes, subordinate to minor silt- to locally fine sand-sized quartz grains with a semi-sericitic white mica matrix, minor shale partings.	Silty shale-parted fine-grained siltstone with minor fine sandy quartzose partings.	Minor clastic leucoxenitic semi-opaques, traces of carbonaceous matter.	Fine-grained micaceous pelite with a minor quartz sand component concentrated in thin bands. Exhibit lacustrine bedding/sorting characteristics.
271425	<u>Basaltic Breccia.</u> Clasts of silicified ?orthopyroxene/weakly augite-porphyrific, albitised feldspar-microlathic, chloritic glass-mesostasised lava with varying proportions sericitised phenocrystal feldspar. Chloritic <del>impure chert matrix/cement.</del>	Weakly flow-structured, psammite to lapilli grade, lithoclastic. Locally crustiform matrix.	Traces magnetite, apatite. Sporadic albite-epidote-quartz amygdales. Traces of pyrite, pale sphalerite.	Impure chert-cemented subaqueous basaltic flow-breccia characteristic. Sulphides concentrated in amygdales and altered pyroxene phenocrysts.
271426	<u>Sericitic Orthoquartzite.</u> Framework of sub-angular to subround quartz grains, minor angular quartzite clasts. Fine to micro-crystalline quartz cement with disseminations, minor clots of sericite.	Poorly sorted, gritty, fine to medium sandstone. Unbedded (?slumped). Stressed.	Minor detrital sericitised feldspar, leucoxenitic semi-opaques, zircons.	Slightly impure (weakly sericitised feldspathic) orthoquartzite or "quartz pebble sandstone". Marked and pervasive stress effects.
271427	<u>Amygdaloidal Basalt.</u> Saussuritic feldspar and fresh to chloritic pigeonitic augite phenocrysts, sporadic chlorite-quartz amygdales. Albitised plagioclase-microlathic/epidote-stained chloritic mesostasised groundmass.	Flow-textured, porphyritic trend glomeroporphyritic amygdaloidal, basaltic. Locally brecciated/ mass. chert-cemented.	Minor leucoxenitic, opaques, rare ultrafine pyrite. Minor chloritised phenocrystal ?orthopyroxene.	Massive to flow-brecciated/chert-cemented, amygdaloidal pyroxenic basalt. Close compositional affinities with 271423, 271425.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
271444	<p style="text-align: center;">Late vugs of chalcedony.</p> <p>Andesitic Tuff. Montmorillonitic clay aggregates with interspersed clots of micro-crystalline quartz, partly degraded/argillised feldspar-replacive albite, clots/lenses of chlorite.</p>	Sheared/crudely phyllitic, vaguely relict sandy clastic lithic-crystal fragmental.	Leucoxenised/oxidised opaques. Semi-pervasive limonitic stainings.	Interpreted as an andesitic lithic-crystal tuff on relict composition and textural features. Detail obscured by weathering effects.
271445	<p>Basaltic Breccia. Clasts of augite/albitised-saussuritised feldspar-porphyrific, chlorite-quartz-amygdaloidal, subvitric feldspar-microlitic lava. Microcrystalline albite-quartz matrix with frequent fine vugs of chlorite and</p>	Similar to 271441, but semi-moulded in comparison. Corrosive/replacive matrix. quartz.	Leucoxenised opaques, traces of chromite. Minor clots of pale microcrystalline pumpellyite.	Flow-breccia characteristics, but alternately a weakly moulded lithic ("lapilli") tuff. Typical basaltic relict compositional and alteration features.
271447	<p>Protoquartzite. Framework of subangular to subround quartz grains, subordinate chert/impure chert/cherty argillite clasts, disseminated chromite grains with associated clots/discontinuous films of fuchsite. Overgrowth quartz</p>	Moderately to well-sorted, fine to medium sandy clastic. Weakly bedded; incipiently quartz cement. stressed.	Detrital zircons, leucoxene, tourmaline, cloudy leucoxenic-argillic degraded albitic lava clasts.	"Fuchsite quartzite" with affinity to 271426, but carrying accessory, volcanically-derived lithic clasts, partly altered chromite grains.

## Central Mineralogical Services

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BURNIE / TAS. 7320

13th March, 1987

### REPORT CMS 87/2/14

YOUR REFERENCE: Letter dated 19.2.1987  
DATE RECEIVED: 20th February, 1987  
SAMPLE NOS.: 379705 - 379717 (10)  
SUBMITTED BY: D.J. Jack  
WORK REQUESTED: Petrology

Copy to:  
Mr. H. Skey  
Exploration Manager  
Aberfoyle Resources Ltd.  
Exploration Division  
123, Camberwell Road  
HAWTHORN EAST / VIC. 3123

  
H.W. Fander, M. Sc.

REPORT CMS 87/2/14

Ten rock chip samples from the South Hatfield area were received for routine petrological description. Representative thin-sections were prepared and examined together with the offcuts, with stain tests performed as warranted. Attached tabulated descriptions summarise the microscopic data and include interpretative comments.

Summary

Sediments include typical quartz-mica sandstone and relatively micaceous siltstones. The majority, however, are (primary or mildly reworked) tuffaceous types, including tuffaceous sandstones, pelitic ashes and ashy or vitroclastic pelites.

These reflect sodic to sodi-potassic acid volcanism, apparently sub- to distal to the sediments, but clearly contemporaneous in part. Minor acid-volcanic-derived components appear within the quartz-mica psammopelite facies which, as elsewhere in the Que/Hellyer sequence, represent breaks in volcanism.

Pelitic ashes have been partly misidentified as cherts, no doubt due to cherty "field" characteristics. Observation of fracture pattern (brittle, as against conchoidal) may be useful in distinguishing these rocks from true cherts.

D. Cowan, B. Sc.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
379717 (T.S. 57498)	Mica-Quartz Sandstone. Silt-sized muscovite flakes, subordinate subangular quartz, minor sericitic feldspar grains, with a partly degraded (illitic/kaolinitic) sericite matrix.	Well-sorted, silty clastic, massive to finely ganded; incipiently sheared.	Clastic leucoxene, carbonaceous matter, carbonaceous pelite clasts. Discontinuous spongy stringer of pyrite and chlorite.	Essentially a silty, relatively micaceous variant of 379716; only incipiently volcanomict in comparison. Pyritic stringer is a mildly sheared pyrite-chlorite veinlet.

# Central Mineralogical Services

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P.O. Box 952  
BURNIE / TAS. 7320

22nd July, 1987

REPORT CMS 87/6/22

YOUR REFERENCE:	Letter dated 18.6.1987
DATE RECEIVED:	19th June, 1987
SAMPLE NOS.:	22 Samples
SUBMITTED BY:	D.J. Jack
WORK REQUESTED:	Petrology

H.W. Fander, M.Sc.

Copy to:  
Mr. H. Skey  
Exploration Manager  
Aberfoyle Resources Ltd.  
Exploration Division  
123, Camberwell Road  
HAWTHORN EAST / VIC. 3123

REPORT CMS 87/6/22

Twenty-two rock chip samples from the Lake Mackintosh (17 samples) and Romny Moor (5 samples) were received for routine petrological examination. Representative thin-sections were prepared, examined in transmitted light and, together with respective offcuts, in oblique incident light, with feldspar and carbonate stain tests performed as warranted.

Attached tabulated descriptions summarise the microscopic data and include interpretative comments.

Summary

The Lake Mackintosh suite is dominated by incipiently regionally metamorphosed pelitic and psammopelitic sedimentary rocks. These reflect sub- to low-greenschist facies metamorphic effects with weakly directed sericitic white mica, quartz and chloritic assemblages. Sandstones are volcanomict in part, but in general these rocks are devoid of tuffaceous components. This group, however, includes a psammopelitic ash (sample 379702) and an altered andesitic volcanic (379701), which could be considered as distal equivalents of the Que/Hellyer volcanic sequence and may warrant trace element analysis in confirmation.

A group of devitrified and sericite-altered, dacitic to rhyolitic acid volcanics is represented by samples 379737, 739, 740, 743 and 750. These rocks appear to represent minor intrusives in part, although this group includes one rhyolitic tuff (379743).

Partly recrystallized/weakly directed sedimentary quartzites comprise a distinctive minor group of rocks, represented by samples 379735, 746 and 747. These rocks are incipiently volcanomict and carry minor detrital chromite with related development of secondary fuchsite mica in these variously quartz-veined and restressed rocks. Individual examples carry traces of pyrite, concentrated in pelitic lithic clasts, and/or secondary films of pyrite-derived jarosite.

The Romny Moor suite is similarly dominated by psammopelitic rocks. These include two tuffaceous siltstones or distal impure pelitic ashes and a quartz-mica sandstone with affinities to those in the Que River Shale, and representing breaks in the Que/Hellyer volcanic sequence.

D. Cowan, B. Sc.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
379727	<u>Sericitic Slate</u> . Semi- to sericitic white mica with minor fine silt-sized relict detrital quartz and muscovite flakes, minor carbonaceous matter. Sporadic quartzose-silty interbeds.	Banded on a sub- to fine millimetric scale concordantly mildly sheared.	Minor degraded sericitic clastic feldspar and degraded/ferruginised carbonate in silty units.	Weakly carbonaceous quartzose-micaceous silty shale with variably (degraded) dolomitic argillaceous siltstone partings. Rare oxidised, weakly pressure-shadowed pyrite.
379732	<u>Lithic Sandstone</u> . Relict framework of sericitic pelite, carbonaceous shale and sericitic to (degraded) dolomitic impure chert/cherty argillite clasts, minor quartz grains. Semi sericitic white mica matrix.	Well-sorted, medium to coarse sandy clastic, with a phyllitic overprint.	Degraded/ferruginised biotite flakes, minor feldspar grains, sericitic lava clasts, leucoxene, chromite grains.	Primarily a coarse-grained lithic sandstone, pelite/chert-derived, with minor felsic intermediate-acid volcanic-, and granite-derived components. Non-tuffaceous; mildly metamorphosed.
379734	<u>Quartz-Mica Phyllite</u> . Subpolygonal/directed quartz and subordinate fine-grained muscovite with thinly disseminated magnetite and silt- to fine sand-sized, well-rounded relict detrital zircons.	Strictly a fine-grained banded schist. Disharmonically resheared and crenulated.	Semi-pervasive sericitic to locally hematitic microfractures.	Primarily an impure (sericitic) orthoquartzite. Reflects relatively advanced greenschist facies regional metamorphism and reshearing effects.
379735	<u>"Metaquartzite"</u> . Relict framework of sub-angular to rounded overgrown quartz grains with disseminated relict detrital magnetite, films of chlorite and fuchsite mica. Irregular quartz veins.	Well-sorted, weakly bedded fine sandy clastic; partly recrystallized. Mildly stressed veins.	Detrital zircon, schorl, chromite, leucoxene. Traces of carbonaceous matter.	Similarities with 379734, but representing a relatively pure orthoquartzite. Mildly regionally metamorphosed; irregularly quartz-veined; mildly restressed.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
379737	<u>Altered Felsite</u> . Aggregates of sericite and variably sericitic fine-grained quartz with thinly disseminated sericitised feldspar phenocrysts. Minor clots, films of chlorite. Irregular hematitic fractures.	Weakly banded, felsitic irregularly fractured to semi-brecciated. Incipiently sheared.	Leucogenised opaques. Rare sericitised biotite phenocrysts.	Devitrified, sericitised/mildly silicified-chloritised felsic pitchstone; broadly dacitic. Hematitic fracture pattern similar to that in 379734, relatively marked.
379739	<u>Altered Felsite</u> . Aggregates of sericite and weakly sericitised fine anhedral quartz; thinly disseminated sericitised feldspar phenocrysts. Semi-pervasive limonitic Fe-stainings.	Similar to 379737; slightly relatively banded, similarly incipiently sheared.	Relatively abundant leucogenised opaques, rare sericitised biotite. Minor fine oxidised pyrite.	Close affinities with 379737; slightly relatively siliceous. Pyrite in micro scale siliceous-sericitic stringers; partly recrystallized/pressure-shadowed.
379740	<u>Altered Felsite</u> . Sericite and variably sericite-stained quartz, with minor sericitised feldspar phenocrysts, thinly disseminated corroded quartz microphenocrysts.	Weakly quartz-amygdaloidal, felsitic semi-perlitic. Weakly sericite-veined. Incipiently sheared.	Leucogenised opaques, minor clots of chlorite. Minor limonitic microfractures.	Affinities with 379737 and 379739, with similar devitrified/sericitised dacitic characteristics. Limonitic microfractures, apparently degraded hematitic.
379743	<u>Rhyolitic Tuff</u> . Quartz and subordinate sericitic albite crystals/crystal fragments, minor sericitised/poorly determinate lithic clasts in a matrix of Fe-stained sericite and microcrystalline quartz.	Poorly sorted, psammite-grade fragmental with a vaguely relict shaly micro-textured matrix.	Conspicuous leucogenised opaques. Minor but pervasive fine degraded carbonate. Traces oxidised pyrite.	Extensively sericitised rhyolitic vitric-crystal tuff with accessory lithic clasts. Finer detail obscured by alteration and partial weathering. Incipiently sheared.
379745	<u>Sericitic Slate</u> . Semi-sericitic white mica with varying proportions of fine silt-sized relict detrital quartz (partly recrystallized) subordinate clastic muscovite; semi-pervasive carbonaceous matter.	Banded/fine siltstone-parted on sub- to fine millimetric scale; microcrenulated concordant slaty cleavage.	Degraded/ferruginised carbonate in silty partings. Minor traces oxidised pyrite.	Similarities with 379727, with relatively fine-grained, well-sorted dolomitic siltstone partings; Fe-staining largely reflects degradation of carbonate.
379746	<u>"Metaquartzite"</u> . Relict framework of overgrown subangular quartz grains, minor sericitic pelite and impure chert clasts, minor sericitic shaly partings. Sporadic quartz veinlets.	Analogous to 379735; slightly coarser-grained. Similarly stressed irregular veinlets.	Detrital magnetite, leucoxene, tourmaline, zircon, muscovite. Traces of pyrite, secondary films of jarosite.	Close affinities with 379735, similarly partly recrystallized/weakly directed, veined and mildly restressed. Pyrite concentrated in lithic clasts.
379747	<u>"Metaquartzite"</u> . Relict framework of overgrown subangular quartz grains, relatively minor sericitic pelite, impure chert clasts. Minor clots, films of fuchsitic sericite fringing discontinuous quartz veinlets.	Analogous to 379735 and particularly 379746. Relatively unstressed.	Detrital leucoxene, albite, magnetite, chromite, schorl, zircon, apatite. Minor films of degraded jarosite.	Close affinities with 379735 and particularly 379746. Main contrast is the presence of accessory detrital feldspar grains.
379749	<u>Sericitic Slate</u> . Orientated semi- to sericitic white mica with pervasively disseminated relict detrital silt- to fine sand-sized quartz, minor albite grains, muscovite flakes, carbonaceous pelite clasts.	Massive to faintly banded silty fine sandy pelite; concordantly cleaved.	Detrital leucoxene, minor low-grade metapelite, metaquartzite clasts. Minor quartz veinlets.	Primarily an essentially massive silty fine sandy shale. Weakly volcanomict, but non-tuffaceous. Locally weakly dolomitic (degraded, ferruginised).

## Central Mineralogical Services

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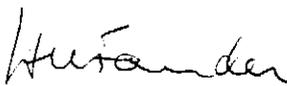
Mr. A.W. McNeill  
Geologist  
Aberfoyle Resources Ltd.  
Exploration Division  
P.O. Box 952  
BURNIE / TAS. 7320

7th September, 1988

### REPORT CMS 88/6/31

YOUR REFERENCE:	Letter dated 22.6.1988
DATE RECEIVED:	24th June, 1988
SAMPLE NOS.:	12 Samples
SUBMITTED BY:	A.W. McNeill
WORK REQUESTED:	Petrology

Copy to:  
Mr. H. Skey  
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HAWTHORN EAST / VIC. 3123

  
H.W. Fander, M. Sc.

REPORT CMS 88/6/31

A suite of twelve rock chip samples from the Henty Fault Zone was received for routine petrological examination. Representative thin sections were prepared and examined together with respective offcuts, with stain tests performed as warranted. Attached tabulated descriptions summarise the microscopic data and include interpretative comments.

Summary

Following A.W. McNeill's grouping (letter of 22nd June), the Que-Hellyer Volcanics are represented by two basics (lava and quartz microgabbro; samples 427463, 427467 respectively), and an altered felsitic (devitrified) pitchstone interpreted as dacitic (sample 427451)

The second group, of acid volcanics, comprises rhyolitic tuff lavas and a variety of variably tuffaceous sediments. This group includes carbonaceous tuffaceous facies broadly similar to those previously noted in the CMS 87/11/16 suite described from A.M. Hesper. Associated are impure- and pelitic-ashy cherty sediments which enhance the similarities.

This latter group includes a "dacitic" altered felsitic pitchstone similar to 427451, although this may be simply co-incidental. Alteration assemblages and stereobinocular-determined sulphide assemblages are noted in the individual descriptions.

D. Cowan, B. Sc.

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SAMPLE NO.: 427465 (T.S. 60218)

CLASSIFICATION: Rhyolitic Tuff

COMPOSITION: Abundant weakly sericite-stained/variably degraded, partly ferruginised feldspar (albite-oligoclase), subordinate quartz crystals/crystal fragments, sporadic cryptocrystalline quartz-sericite-altered lithic clasts in a matrix of sericite and cryptocrystalline quartz.

FABRIC: Similar to 427464, coarser-grained and relatively lithoclastic. Some evidence of flow-brecciation with "cognate" xenoclasts to 2.5 mm. Vaguely relict eutaxite-structured matrix.

ACCESSORIES: Carbonaceous stainings, minor poorly determinate carbonaceous pelitic and impure cherty xenoclasts. Leucoxenised opaques. Secondary limonitic stainings.

INTERPRETATION/  
COMMENTS: Close affinities with 427464 and similarly altered/mildly sheared. In comparison, this rock is coarser-grained and relatively lithoclastic, with evidence of flow-brecciation which would support an ignimbritic interpretation (similarly 427464?).

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SAMPLE NO.: 427472 (T.S. 60220)

CLASSIFICATION: Altered, Veined Felsite

COMPOSITION: Sericite and variably sericite-stained fine anhedral quartz with minor irregular sericite veinlets and relatively massive feldspar phenocryst semi-pseudomorphous sericite aggregates; sparse corroded microphenocrystal quartz (to 300 um). Sporadic quartz veins and veinlets with interspersed clots and films of semi-sericitic white mica and small vugs partly infilled with secondary aggregates of kaolin and quartzose silt.

FABRIC: Weakly porphyritic, even-grained, massive to incipiently banded felsitic (devitrified). Stressed quartz veinlets and crudely comb-structured semi-stockwork-style quartz veins, incipiently displaced by sericite veinlets.

ACCESSORIES: Rare zircons, traces ultrafine leucoxenic semi-opaques, rare ver fine oxidised pyrite. Sporadic secondary exotic (introduced) limonitic stainings.

INTERPRETATION/  
COMMENTS: A devitrified felsic pitchstone (weakly porphyritic glassy lava), reasonably interpreted as dacitic. Reflects partial silicification with semi-contemporaneous to subsequent sericitisation and "grades" into a quartz-sericite-matrixed breccia. Close affinities with 427462; porphyritic and slightly relatively siliceous in comparison.

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SAMPLE NO.: 427478 (T.S. 60222)

CLASSIFICATION: Tuffaceous Impure Chert

COMPOSITION: Crypto- to microcrystalline quartz with subordinate to minor semi- to sericitic white mica; thinly disseminated silt- to fine sand-sized clastic quartz grains and minor silt-sized muscovite flakes. Sporadic discontinuous quartz veinlets, sericitic microfractures and late chlorite-quartz veinlets.

FABRIC: Crudely lenticularly banded with lensoid chert clasts, sericitic matrix. Cherty zones are vaguely relict microshardy in part. Mildly sheared.

ACCESSORIES: Disseminated leucoxenic semi-opaques and microscopic clots of carbonaceous matter. Extremely rare microscopic "authigenic" green tourmaline.

INTERPRETATION/  
COMMENTS: Affinities with 427474; relatively cherty in comparison and with enhanced silty to fine sandy clastic components (quartz grains, mica flakes, leucoxenic semi-opaques), supplemented by poorly defined silicified vitroclastic debris. This rock could grade into a pelitic ash.

**SAMPLE: 562660**

**SUMMARY: This sample is a holocrystalline plagioclase+augite-phyric andesitic dyke rock with a low greenschist facies alteration assemblage.**

**HAND SPECIMEN:**

This is a weathered pinkish speckled felsic lava or shallow intrusive with abundant clay-altered feldspar phenocrysts and black chloritic spots, some several mm long.

**THIN SECTION DESCRIPTION:**

In thin section, it is clear that this sample is a holocrystalline andesitic rock, probably a dyke rock, with abundant phenocrysts of augite and albitized plagioclase, and common groundmass quartz. The plagioclase phenocrysts make up around 10 modal% of this rock, and are totally albitized; many are longer than 2mm, although multi-crystal clots of intimately intergrown plagioclase crystals are present. These are speckled with sericite and little crystals of epidote, but are not clay-altered, as suggested in the hand specimen description. Rather, it is the augite phenocrysts that are partly altered to dirty brownish-red clayey material. Augite crystals make up around 5-8 modal% of this rock and are often altered to chlorite and the clay material noted above; significantly, they show actinolite fringes on many crystals, indicating lowermost greenschist facies conditions of recrystallization. They range from several mm long to tiny crystals in the matrix, and are rather ragged and often intergrown with plagioclase at their margins. Several small gabbroic inclusions are composed of intergrown augite and plagioclase crystals identical to the phenocrysts, and are clearly cognate.

The groundmass of this rock is holocrystalline, being composed of intergrown albite laths, stubby chloritized augite, and common interstitial quartz, with subordinate tiny leucoxenitized FeTi oxide grains. Angular patches of green chlorite up to several mm across frequently have quartz crystals projecting into the chlorite. Secondary minerals other than albite and chlorite include not uncommon granular epidote, that also forms veinlets, and interstitial palest green acicular actinolite.

This sample was definitely an intrusive andesite or basaltic andesite. The greenschist metamorphic assemblage is unusual for the Hellyer area, and may be of some significance.

**SAMPLE: 562662**

**SUMMARY: This sample is a volcanoclastic sandstone containing detritus from both felsic volcanics (mainly tuffs) and also from pelitic metamorphics.**

**HAND SPECIMEN:**

This is a dark green volcanoclastic with detrital altered plagioclase crystals to several mm long, lithic fragments of dacite or andesite, and black areas of intensely chloritized groundmass.

**THIN SECTION DESCRIPTION:**

By far the most abundant component of this volcanoclastic sandstone are large partially to totally sericitized detrital phenocrysts of albitized plagioclase, most of which are 1-2mm long. These have blocky shapes typical of the more evolved Mount Read Volcanics (ie. felsic lavas and tuffs), and their well-preserved crystal shapes suggest that they have been liberated from ashes or non-welded tuffs rather than lavas. Detrital quartz grains are less common than feldspar, and smaller, rarely being larger than 1mm long. They show features indicative of both volcanic (even extinction, relic crystal faces) and pelitic metamorphic (multi-crystalline, uneven extinction) quartz, indicating unambiguously that the quartz was supplied from two different sources. Detrital muscovite crystals are not uncommon, and lithic clasts composed of quartz-muscovite schist, and quartzite, are also present (~5 modal%). A few lithic clasts were clearly once-glassy sparsely plagioclase-phyric lavas; one large clast was a plagioclase-phyric andesite with perlitic cracks in the glassy groundmass. Common former FeTi oxide crystals have totally altered to dirty brown leucoxenitic material.

This sandstone was crystal-rich, but not quite framework supported. The matrix of this rock was largely a mixed volcanogenic silt with a large vitric component, although tiny detrital muscovite and metamorphic quartz are also common. Areas of the groundmass have been replaced by pale green streaky chlorite, and dirty brownish carbonate is not uncommon overprinting both groundmass and phenocrysts. This sandstone was clearly derived from two sources, one composed of felsic volcanic tuffs and lavas, and the other Precambrian pelitic metamorphics.

APPENDIX XVI

east	north	sample	lab	sample	Job No	Cu[ppm]	Pb[ppm]	Zn[ppm]	Ag[ppm]	Au[ppm]	As[ppm]	Ba[ppm]	Cr[ppm]	Ni[ppm]	Ti[ppm]	Zr[ppm]	Y[ppm]
6782	4806	271425	ANA	RC	3981	190	35	510	.5	<.008	9	1250	130	40	2950	150	na
6759	4800	271427	ANA	RC	3981	30	30	80	<.5	<.008	4	750	95	35	4000	150	na
6075	3800	271445	ANA	RC	3981	15	30	120	<.5	<.008	7	830	60	30	4000	150	na
6595	2815	427450	ANA	RC	5413	10	10	45	<.5	<.008	6	60	na	<999	na	na	na
6330	5800	427470	ANA	RC	5413	5	5	5	<.5	<.008	<1	330	na	<999	na	na	na
6375	5800	427472	ANA	RC	5413	5	<5	10	<.5	<.008	1	1100	na	<999	na	na	na
6080	<155	427426	ANA	RC	5295	60	645	190	<.5	<.008	250	850	260	135	3200	190	20
5950	<55	427427	ANA	RC	5295	55	<5	35	<.5	<.008	6	1050	25	20	1800	220	25
6200	140	427428	ANA	RC	5295	25	<5	35	<.5	<.008	3	360	<5	35	1700	170	20
6145	210	427429	ANA	RC	5295	25	5	125	<.5	<.008	1	770	490	130	3150	110	15
6435	440	427430	ANA	RC	5295	75	5	40	<.5	<.008	2	130	75	60	1550	60	15
6270	1720	427431	ANA	RC	5295	30	15	20	<.5	<.008	<1	1050	45	10	2150	180	15
6595	1685	427432	ANA	RC	5295	20	10	20	<.5	<.008	4	420	35	15	1500	150	20
6780	1830	427433	ANA	RC	5295	5	5	50	<.5	<.008	1	820	<5	10	1850	170	25
6700	310	379728	ANA	RC	4567	na	na	na	na	.017	na	na	na	<999	na	na	na
6700	310	379729	ANA	RC	4567	na	na	na	na	<.008	na	na	na	<999	na	na	na
6700	310	379730	ANA	RC	4567	na	na	na	na	<.008	na	na	na	<999	na	na	na
6700	310	379731	ANA	RC	4567	na	na	na	na	<.008	na	na	na	<999	na	na	na
7525	4100	379733	ANA	RC	4567	5	<5	10	<.5	<.008	na	na	na	<999	na	na	na
6850	2830	379736	ANA	RC	4567	15	20	50	<.5	na	6	1700	<5	15	2450	200	na
6850	2830	379738	ANA	RC	4567	10	20	40	<.5	na	6	1800	25	20	2400	200	na
6850	2830	379741	ANA	RC	4567	na	na	na	na	<.008	na	na	na	<999	na	na	na
6660	2400	379742	ANA	RC	4567	10	50	95	<.5	na	7	210	7	75	990	210	na
6660	2400	379744	ANA	RC	4567	na	na	na	na	<.008	na	na	na	<999	na	na	na
7200	<10	379748	ANA	RC	4567	na	na	na	na	<.008	na	na	na	<999	na	na	na
5400	1400	379718	ANA	RC	4248	25	<5	50	.5	<.008	15	750	220	125	3150	210	na
5670	1260	562660	ANA	RC	7720	20	40	100	2.0	na	<2	764	165	na	3343	94	na
5515	1225	562661	ANA	RC	7720	5	30	20	3.0	na	<2	115	18	na	1201	219	na
5485	1210	562662	ANA	RC	7720	10	30	100	1.0	na	<2	834	90	na	3263	186	na
5450	830	562664	ANA	RC	7720	5	30	50	<.5	na	<2	1069	63	na	3638	170	na

APPENDIX XVII

east	north	sample	sample	Cu[ppm]	Pb[ppm]	Zn[ppm]	Ag[ppm]	Au[ppm]	As[ppm]	Ba[ppm]	Cr[ppm]	Ni[ppm]	Ti[ppm]	Zr[ppm]
6350	3000	314919	CSOIL	20	50	40	na	na	20	400	140	36	3500	165
6375	3000	314920	CSOIL	<5	10	<10	na	na	<10	140	18	4	3800	314
6400	3000	314921	CSOIL	<5	10	<10	na	na	<10	120	16	<4	3600	389
6275	3200	314510	CSOIL	35	90	90	na	na	20	360	500	70	6400	140
6300	3200	314511	CSOIL	30	25	50	na	na	<10	180	210	24	5800	150
6325	3200	314512	CSOIL	15	30	90	na	na	10	140	400	25	5900	260
6350	3200	314513	CSOIL	20	40	35	na	na	10	160	450	18	6600	200
6375	3200	314514	CSOIL	30	15	60	na	na	10	180	430	24	7500	200
6400	3200	314515	CSOIL	35	15	60	na	na	10	140	390	49	5500	195
6200	3400	314974	CSOIL	<5	15	10	na	na	<10	180	65	12	4600	250
6210	3400	178768	CSOIL	14	<20	21	na							
6220	3400	178769	CSOIL	na										
6225	3400	314975	CSOIL	15	40	60	na	na	<10	480	60	8	6400	195
6230	3400	178770	CSOIL	22	<20	30	na							
6240	3400	178771	CSOIL	na										
6250	3400	314976	CSOIL	10	30	45	na	na	15	240	36	4	7400	190
6260	3400	178800	CSOIL	23	<20	40	na							
6270	3400	178799	CSOIL	na										
6275	3400	314977	CSOIL	25	30	50	na	na	15	240	38	6	7300	164
6280	3400	178798	CSOIL	32	25	84	na							
6290	3400	178797	CSOIL	na										
6300	3400	314978	CSOIL	45	30	80	na	na	10	240	70	12	8600	220
6325	3400	314979	CSOIL	40	50	90	na	na	20	280	210	20	7000	220
6350	3400	314980	CSOIL	25	40	100	na	na	15	260	160	10	8700	185
6375	3400	314981	CSOIL	15	15	20	na	na	<10	300	240	12	5000	220
6420	3400	178784	CSOIL	16	30	22	na							
6440	3400	178782	CSOIL	10	<20	41	na							
6460	3400	178780	CSOIL	7	20	20	na							
6470	3400	178779	CSOIL	na										
6480	3400	178778	CSOIL	10	<20	80	na							
6490	3400	178777	CSOIL	na										
6520	3400	197995	CSOIL	2	20	18	na							
6540	3400	197994	CSOIL	<2	<20	7	na							
6560	3400	197993	CSOIL	<2	<20	19	na							
6580	3400	197992	CSOIL	3	25	23	na							
6620	3400	197990	CSOIL	<2	<20	3	na							
6640	3400	197989	CSOIL	<2	<20	5	na							
6660	3400	197988	CSOIL	<2	<20	12	na							
6680	3400	197987	CSOIL	<2	<20	7	na							
6700	3400	197986	CSOIL	<2	<20	7	na							
6720	3400	197985	CSOIL	<2	<20	10	na							
6740	3400	197984	CSOIL	<2	<20	8	na							
6760	3400	197983	CSOIL	<2	<20	8	na							
6780	3400	197982	CSOIL	9	20	41	na							
6800	3400	197981	CSOIL	<2	<20	10	na							
6820	3400	197980	CSOIL	<2	<20	7	na							
6840	3400	197979	CSOIL	<2	<20	12	na							
6860	3400	197978	CSOIL	21	25	250	na							
6880	3400	197977	CSOIL	2	<20	15	na							
6900	3400	197976	CSOIL	<2	<20	12	na							
6920	3400	197975	CSOIL	<2	<20	19	na							
6940	3400	197974	CSOIL	3	<20	18	na							
6960	3400	197973	CSOIL	<2	<20	6	na							
6980	3400	197972	CSOIL	<2	10	9	na							
7000	3400	197971	CSOIL	28	25	33	na							
6400	3400	378006	CSOIL	30	5	50	<1.0	na	9	150	460	70	4900	150
6425	3400	378008	CSOIL	15	<5	25	<1.0	na	7	190	130	20	4550	200
6450	3400	378010	CSOIL	15	<5	25	<1.0	na	5	160	340	40	4600	140
6475	3400	378012	CSOIL	15	5	20	<1.0	na	5	160	290	25	4850	150
6500	3400	378014	CSOIL	5	<5	15	<1.0	na	1	75	260	10	3550	170
6525	3400	378016	CSOIL	10	<5	25	<1.0	na	4	160	400	35	4100	140
6550	3400	378018	CSOIL	35	15	70	<1.0	na	11	210	640	100	3750	140
6575	3400	378020	CSOIL	10	<5	10	<1.0	na	2	75	230	15	5550	200
6600	3400	378022	CSOIL	10	<5	5	<1.0	na	2	25	160	10	1750	170
6125	3600	377276	CSOIL	40	10	80	<1.0	na	8	260	85	20	6850	180
6150	3600	377278	CSOIL	25	5	70	<1.0	na	5	190	55	20	7950	170
6175	3600	377280	CSOIL	30	5	5	<1.0	na	7	260	55	20	7200	170
6200	3600	377282	CSOIL	30	10	70	<1.0	na	7	240	90	20	7650	180
6225	3600	377284	CSOIL	25	10	50	<1.0	na	7	230	75	20	7650	160
6250	3600	377286	CSOIL	55	10	70	<1.0	na	10	150	460	45	7650	150
6275	3600	377288	CSOIL	40	10	60	1.0	na	12	130	410	35	8500	180
6300	3600	377290	CSOIL	30	10	55	<1.0	na	9	120	570	35	8750	190
6325	3600	377292	CSOIL	40	10	60	<1.0	na	11	170	540	50	8200	200
6350	3600	377294	CSOIL	35	5	50	<1.0	na	7	130	560	70	6450	150
6375	3600	377296	CSOIL	35	10	35	<1.0	na	9	160	590	60	5500	130
6400	3600	377298	CSOIL	25	<5	30	<1.0	na	4	80	530	55	5300	140
6425	3600	377300	CSOIL	30	15	40	<1.0	na	5	30	550	50	3150	110
6450	3600	377302	CSOIL	10	<5	20	<1.0	na	2	70	360	30	4200	130
6475	3600	377304	CSOIL	10	<5	10	<1.0	na	1	30	170	10	3350	190
6500	3600	377306	CSOIL	5	<5	10	<1.0	na	<1	<10	80	10	2150	150
6550	3600	377310	CSOIL	5	<5	5	<1.0	na	1	20	150	10	2100	230
6575	3600	377312	CSOIL	5	<5	10	<1.0	na	<1	15	100	15	1950	240
6050	3800	377190	CSOIL	40	30	85	<1.0	na	8	90	120	20	10500	250
6075	3800	377192	CSOIL	45	20	80	<1.0	na	5	110	100	5	9700	240
6100	3800	377194	CSOIL	30	10	55	<1.0	na	4	110	70	25	8200	210
6125	3800	377196	CSOIL	30	30	75	<1.0	na	11	50	85	25	7700	190
6150	3800	377198	CSOIL	35	30	60	<1.0	na	7	110	80	25	6400	140
6175	3800	377200	CSOIL	20	10	45	<1.0	na	4	150	75	20	6400	160
6200	3800	377202	CSOIL	10	10	25	<1.0	na	2	65	90	20	6300	160
6225	3800	377204	CSOIL	20	5	40	<1.0	na	2	130	80	20	6350	170
6275	3800	377208	CSOIL	30	5	55	<1.0	na	3	140	270	35	6450	170



6870	5200	179118	CSOIL	9	40	31	na	na	na	na	na	na	na	na
6880	5200	179119	CSOIL	6	30	20	na	na	na	na	na	na	na	na
6890	5200	179120	CSOIL	3	20	12	na	na	na	na	na	na	na	na
6910	5200	179122	CSOIL	17	60	51	na	na	na	na	na	na	na	na
6920	5200	179123	CSOIL	10	45	34	na	na	na	na	na	na	na	na
6930	5200	179124	CSOIL	2	20	14	na	na	na	na	na	na	na	na
6940	5200	179125	CSOIL	6	35	27	na	na	na	na	na	na	na	na
6950	5200	179126	CSOIL	25	50	89	na	na	na	na	na	na	na	na
6960	5200	179127	CSOIL	9	35	30	na	na	na	na	na	na	na	na
6970	5200	179128	CSOIL	6	30	24	na	na	na	na	na	na	na	na
6980	5200	179129	CSOIL	13	35	36	na	na	na	na	na	na	na	na
6990	5200	179130	CSOIL	13	40	39	na	na	na	na	na	na	na	na
6575	5200	376658	CSOIL	20	35	40	1.0	na	6	380	70	25	3150	330
6600	5200	376660	CSOIL	15	20	30	<1.0	na	4	290	60	<5	3300	430
6625	5200	376662	CSOIL	25	35	65	<1.0	na	16	420	75	10	3100	310
6650	5200	376664	CSOIL	15	45	45	1.0	na	5	470	60	10	3250	340
6675	5200	376666	CSOIL	25	40	50	1.0	na	9	470	140	5	3300	320
6700	5200	376668	CSOIL	15	15	40	1.0	na	3	340	95	<5	3300	370
6725	5200	376670	CSOIL	25	55	70	<1.0	na	10	510	120	10	3500	300
6750	5200	376672	CSOIL	20	40	55	<1.0	na	9	510	75	<5	3400	350
6775	5200	376674	CSOIL	10	20	30	<1.0	na	5	290	40	10	3400	440
6800	5200	376676	CSOIL	20	45	50	1.0	na	9	440	55	20	3350	320
6825	5200	376678	CSOIL	15	25	40	1.0	na	5	280	50	10	3000	380
6850	5200	376680	CSOIL	10	10	40	1.0	na	5	190	55	10	3100	340
6875	5200	376682	CSOIL	10	35	45	<1.0	na	5	290	50	15	3500	330
6900	5200	376684	CSOIL	5	40	45	1.0	na	2	260	45	10	3400	400
6490	5400	179252	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6510	5400	179250	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6520	5400	179249	CSOIL	15	40	28	na	na	na	na	na	na	na	na
6530	5400	179248	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6540	5400	179247	CSOIL	10	35	25	na	na	na	na	na	na	na	na
6560	5400	179245	CSOIL	2	<20	12	na	na	na	na	na	na	na	na
6570	5400	179244	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6580	5400	179243	CSOIL	6	<20	20	na	na	na	na	na	na	na	na
6590	5400	179242	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6610	5400	179240	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6620	5400	179239	CSOIL	6	<20	20	na	na	na	na	na	na	na	na
6630	5400	179238	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6640	5400	179237	CSOIL	23	45	78	na	na	na	na	na	na	na	na
6660	5400	179235	CSOIL	5	<20	18	na	na	na	na	na	na	na	na
6670	5400	179234	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6680	5400	179233	CSOIL	8	40	26	na	na	na	na	na	na	na	na
6690	5400	179232	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6710	5400	179230	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6720	5400	179229	CSOIL	5	35	20	na	na	na	na	na	na	na	na
6730	5400	179228	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6740	5400	179227	CSOIL	3	25	16	na	na	na	na	na	na	na	na
6760	5400	179225	CSOIL	27	30	58	na	na	na	na	na	na	na	na
6770	5400	179224	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6780	5400	179223	CSOIL	4	20	18	na	na	na	na	na	na	na	na
6790	5400	179222	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6810	5400	179220	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6820	5400	179219	CSOIL	5	30	20	na	na	na	na	na	na	na	na
6830	5400	179218	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6840	5400	179217	CSOIL	2	<20	10	na	na	na	na	na	na	na	na
6860	5400	179215	CSOIL	3	20	10	na	na	na	na	na	na	na	na
6870	5400	179214	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6880	5400	179213	CSOIL	3	25	11	na	na	na	na	na	na	na	na
6890	5400	179212	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6910	5400	179210	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6920	5400	179209	CSOIL	3	25	13	na	na	na	na	na	na	na	na
6930	5400	179208	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6940	5400	179207	CSOIL	7	40	18	na	na	na	na	na	na	na	na
6950	5400	179206	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6960	5400	179205	CSOIL	4	20	13	na	na	na	na	na	na	na	na
6970	5400	179204	CSOIL	na	na	na	na	na	na	na	na	na	na	na
6980	5400	179203	CSOIL	3	30	16	na	na	na	na	na	na	na	na
6990	5400	179202	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5400	179201	CSOIL	3	25	14	na	na	na	na	na	na	na	na
6500	5400	376570	CSOIL	10	<5	30	<1.0	na	13	280	5	15	1300	110
6525	5400	376572	CSOIL	10	5	25	<1.0	na	7	260	20	15	1900	180
6550	5400	376574	CSOIL	10	5	20	<1.0	na	4	290	<5	15	1650	160
6575	5400	376576	CSOIL	10	5	30	<1.0	na	3	250	15	15	2200	180
6600	5400	376578	CSOIL	10	10	80	<1.0	na	6	280	120	30	2550	160
6625	5400	376580	CSOIL	35	55	105	1.0	na	20	390	290	55	3500	130
6650	5400	376582	CSOIL	30	45	75	<1.0	na	25	240	330	35	4400	120
6675	5400	376584	CSOIL	70	100	205	<1.0	na	29	380	460	100	4100	150
6700	5400	376586	CSOIL	30	60	75	<1.0	na	19	600	190	30	3500	110
6750	5400	376590	CSOIL	15	40	40	<1.0	na	5	380	60	15	3050	300
6775	5400	376592	CSOIL	15	40	40	<1.0	na	4	370	50	15	3250	290
6800	5400	376594	CSOIL	45	45	85	<1.0	na	12	390	260	50	3800	200
6825	5400	376596	CSOIL	25	30	55	1.0	na	10	370	200	35	3650	250
6850	5400	376598	CSOIL	35	50	60	<1.0	na	45	470	120	30	3450	260
6875	5400	376600	CSOIL	20	45	40	<1.0	na	6	420	60	20	3150	280
6900	5400	376602	CSOIL	15	40	25	<1.0	na	4	400	50	15	3200	330
6925	5400	376604	CSOIL	10	20	25	<1.0	na	5	330	55	10	3300	370
6425	5600	376482	CSOIL	5	<5	5	<1.0	na	<1	80	15	5	1850	90
6450	5600	376484	CSOIL	<5	<5	15	<1.0	na	1	140	20	5	1050	130
6475	5600	376486	CSOIL	<5	<5	10	<1.0	na	<1	350	15	10	1150	140
6500	5600	376488	CSOIL	<5	<5	10	<1.0	na	1	130	20	5	1950	130
6525	5600	376490	CSOIL	<5	<5	15	<1.0	na	1	85	70	15	2350	140
6550	5600	376492	CSOIL	<5	<5	20	<1.0	na	5	310	20	10	1450	120



7000	4880	179139	CSOIL	<2	<20	8	na	na	na	na	na	na	na	na
7000	4890	179140	CSOIL	1	na	na	na	na	na	na	na	na	na	na
7000	4900	179141	CSOIL	<2	<20	8	na	na	na	na	na	na	na	na
7000	4910	179142	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	4920	179143	CSOIL	<2	<20	3	na	na	na	na	na	na	na	na
7000	4930	179144	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	4940	179145	CSOIL	<2	<20	3	na	na	na	na	na	na	na	na
7000	4950	179146	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	4960	179147	CSOIL	<2	<20	4	na	na	na	na	na	na	na	na
7000	4970	179148	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	4980	179149	CSOIL	<2	<20	9	na	na	na	na	na	na	na	na
7000	4990	179150	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5010	179152	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5020	179153	CSOIL	<2	<20	10	na	na	na	na	na	na	na	na
7000	5030	179154	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5040	179155	CSOIL	2	70	11	na	na	na	na	na	na	na	na
7000	5050	179156	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5060	179157	CSOIL	15	48	27	na	na	na	na	na	na	na	na
7000	5070	179158	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5080	179159	CSOIL	10	25	33	na	na	na	na	na	na	na	na
7000	5090	179160	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5100	179161	CSOIL	10	30	26	na	na	na	na	na	na	na	na
7000	5110	179162	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5120	179163	CSOIL	20	30	55	na	na	na	na	na	na	na	na
7000	5130	179164	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5140	179165	CSOIL	10	20	28	na	na	na	na	na	na	na	na
7000	5150	179166	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5160	179167	CSOIL	2	<20	9	na	na	na	na	na	na	na	na
7000	5170	179168	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5180	179169	CSOIL	10	25	30	na	na	na	na	na	na	na	na
7000	5190	179170	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5200	179171	CSOIL	17	35	51	na	na	na	na	na	na	na	na
7000	5210	179172	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5220	179173	CSOIL	19	40	48	na	na	na	na	na	na	na	na
7000	5230	179174	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5240	179175	CSOIL	4	40	17	na	na	na	na	na	na	na	na
7000	5250	179176	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5260	179177	CSOIL	2	<20	5	na	na	na	na	na	na	na	na
7000	5270	179178	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5280	179179	CSOIL	<2	<20	5	na	na	na	na	na	na	na	na
7000	5290	179180	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5300	179181	CSOIL	4	<20	7	na	na	na	na	na	na	na	na
7000	5310	179182	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5320	179183	CSOIL	4	20	17	na	na	na	na	na	na	na	na
7000	5330	179184	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5340	179185	CSOIL	3	25	11	na	na	na	na	na	na	na	na
7000	5350	179186	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5360	179187	CSOIL	2	<20	7	na	na	na	na	na	na	na	na
7000	5370	179188	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5380	179189	CSOIL	2	20	10	na	na	na	na	na	na	na	na
7000	5390	179190	CSOIL	na	na	na	na	na	na	na	na	na	na	na
7000	5400	179191	CSOIL	<2	20	8	na	na	na	na	na	na	na	na
6925	7000	375890	CSOIL	4	<4	4	<1.0	na	3	10	70	4	3300	300
6950	7000	375892	CSOIL	7	<4	10	<1.0	na	5	15	250	<4	2000	240
6975	7000	375894	CSOIL	5	<4	8	<1.0	na	7	15	20	<4	2500	320
7000	7000	375896	CSOIL	4	<4	7	<1.0	na	4	<10	100	<4	1500	210
6850	7200	375764	CSOIL	4	<4	9	<1.0	na	5	<10	150	4	2300	450
6875	7200	375766	CSOIL	3	<4	8	<1.0	na	3	<10	75	<4	2900	390
6900	7200	375768	CSOIL	4	<4	10	<1.0	na	7	10	75	<4	3200	400
6925	7200	375770	CSOIL	4	6	20	<1.0	na	4	10	130	<4	1400	180
6950	7200	375772	CSOIL	5	<4	16	<1.0	na	6	10	165	<4	2600	350
6825	7400	375640	CSOIL	4	<4	7	<1.0	na	6	20	32	<4	2900	290
6850	7400	375642	CSOIL	3	<4	8	<1.0	na	5	10	120	<4	1800	210
6875	7400	375644	CSOIL	4	<4	4	<1.0	na	4	20	115	<4	2600	290
6900	7400	375646	CSOIL	4	<4	7	<1.0	na	7	20	115	<4	2400	240
6925	7400	375648	CSOIL	4	<4	6	<1.0	na	4	15	135	<4	1300	140
6950	7400	375650	CSOIL	4	<4	10	<1.0	na	4	10	180	4	1900	175
6975	7400	375652	CSOIL	4	<4	6	<1.0	na	4	15	55	4	3200	300
7000	7400	375654	CSOIL	3	<4	5	<1.0	na	4	<10	75	<4	3300	440
7332	7598	378626	CSOIL	24	46	85	<1.0	na	26	230	130	24	3900	155
7357	7598	378628	CSOIL	5	30	26	<1.0	na	16	300	85	16	4300	195
7408	7598	378632	CSOIL	22	42	46	<1.0	na	28	200	155	24	4000	115
7433	7598	378634	CSOIL	<2	24	12	<1.0	na	8	280	44	<4	5900	310
7458	7599	378636	CSOIL	<2	22	12	<1.0	na	10	240	38	<4	5700	330
7483	7599	378638	CSOIL	7	40	30	<1.0	na	28	410	50	4	4300	200
7508	7599	378640	CSOIL	6	36	30	<1.0	na	30	490	55	<4	4400	200
7444	8399	378474	CSOIL	24	75	50	1.0	na	14	430	130	24	4500	150
7469	8399	378476	CSOIL	42	80	110	<1.0	na	16	410	150	42	4200	135
7494	8399	378478	CSOIL	28	80	70	<1.0	na	14	480	125	28	4400	150
7519	8399	378480	CSOIL	18	65	34	<1.0	na	12	450	110	22	4400	180
7370	8600	378428	CSOIL	10	50	20	<1.0	na	9	400	165	32	4800	175
7395	8600	378430	CSOIL	10	26	12	<1.0	na	14	200	85	16	4100	145
7420	8600	378432	CSOIL	12	34	20	<1.0	na	12	155	80	10	5000	180
7445	8600	378434	CSOIL	6	40	14	<1.0	na	14	115	65	6	5200	220
7470	8600	378436	CSOIL	3	16	8	<1.0	na	8	85	40	8	4500	240
7495	8600	378438	CSOIL	9	44	14	<1.0	na	16	180	100	22	5900	195
7520	8600	378440	CSOIL	4	24	10	<1.0	na	9	220	85	8	5100	180
7575	8800	395102	CSOIL	30	85	80	.5	na	7	720	85	na	3500	230

APPENDIX XVIII

east	north	sample	lab	sample	Job No	Cu[ppm]	Pb[ppm]	Zn[ppm]	Ag[ppm]	Au[ppm]	As[ppm]	Ba[ppm]
6145	255	427886	ALS	BCL	0010	na	na	na	na	.00002	na	na
6255	180	427887	ALS	BCL	0010	na	na	na	na	.00002	na	na
6475	280	427888	ALS	BCL	0010	na	na	na	na	.00002	na	na
6805	1090	427889	ALS	BCL	0010	na	na	na	na	.00005	na	na
6855	1740	427890	ALS	BCL	0010	na	na	na	na	.00002	na	na
6855	1875	427891	ALS	BCL	0010	na	na	na	na	.00002	na	na
6645	2775	427894	ALS	BCL	0010	na	na	na	na	.00002	na	na
6835	2815	427895	ALS	BCL	0010	na	na	na	na	.00002	na	na
7770	4735	427896	ALS	BCL	0010	na	na	na	na	.00010	na	na
6645	2335	427897	ALS	BCL	0010	na	na	na	na	.00002	na	na
7640	5975	427898	ALS	BCL	0010	na	na	na	na	.00005	na	na
8020	6610	427899	ALS	BCL	0010	na	na	na	na	.00005	na	na
6305	3910	427762	ANA	SS	5525	10	<5	20	1.0	<.00800	2	90
6320	3810	427763	ANA	SS	5525	10	<5	10	.5	<.00800	1	50
6320	3510	427764	ANA	SS	5525	10	<5	10	<.5	<.00800	1	80
6815	2815	427765	ANA	SS	5525	115	65	250	1.0	<.00800	16	300
6825	2805	427766	ANA	SS	5525	30	10	55	.5	<.00800	6	310
6795	2915	427767	ANA	SS	5525	45	20	55	1.5	<.00800	8	340
6770	3035	427768	ANA	SS	5525	70	20	55	1.0	<.00800	8	360
6760	3105	427769	ANA	SS	5525	25	5	20	1.0	<.00800	6	240
6785	3115	427770	ANA	SS	5525	20	<5	15	.5	<.00800	2	130
6765	3220	427771	ANA	SS	5525	40	<5	25	1.5	<.00800	3	95
6745	3330	427772	ANA	SS	5525	10	5	15	.5	<.00800	2	70
6645	2775	427773	ANA	SS	5525	80	20	90	.5	<.00800	10	210
6890	2835	427774	ANA	SS	5525	20	<5	20	1.0	<.00800	2	190
6590	2820	427775	ANA	SS	5525	40	20	50	1.5	<.00800	7	160
6145	<255	427709	ANA	SS	5417	15	<5	30	<.5	<.00800	2	60
6255	<180	427710	ANA	SS	5417	20	<5	35	<.5	<.00800	2	130
6150	210	427711	ANA	SS	5417	55	<5	70	<.5	<.00800	6	120
6475	280	427712	ANA	SS	5417	45	<5	90	<.5	<.00800	9	230
6805	1090	427713	ANA	SS	5417	40	25	110	<.5	<.00800	2	230
6855	1740	427714	ANA	SS	5417	30	50	95	<.5	<.00800	1	260
6855	1875	427715	ANA	SS	5417	35	55	135	<.5	<.00800	8	290
6645	2775	427718	ANA	SS	5417	130	15	120	.5	<.00800	5	160
6815	2815	427719	ANA	SS	5417	230	345	885	2.5	<.00800	50	300
7770	4735	427720	ANA	SS	5417	55	5	110	<.5	<.00800	4	270
6645	2335	427721	ANA	SS	5417	70	<5	75	<.5	<.00800	1	160
8020	6610	427726	ANA	SS	5417	115	110	990	<.5	<.00800	10	420
7640	5975	427727	ANA	SS	5417	10	<5	30	<.5	<.00800	1	70
7815	6875	427728	ANA	SS	5417	10	<5	30	<.5	<.00800	1	<10
6765	4830	427737	ANA	SS	5417	40	45	85	<.5	<.00800	10	380
6565	5295	427742	ANA	SS	5417	15	10	40	<.5	<.00800	1	240
6530	5290	427743	ANA	SS	5417	150	260	2150	<.5	<.00800	25	570
6685	5525	427744	ANA	SS	5417	10	<5	25	<.5	<.00800	2	250
6545	5935	427750	ANA	SS	5417	30	<5	35	<.5	<.00800	6	290

037321

APPENDIX XIX

east north sample REPORT No.  
9400 10080 427440 IN HOUSE  
9330 9960 427442 IN HOUSE

Southwell River Area - Additional Petrology

A. McNeill      May 1988

427440. A light grey, massive fine grained lithology that, in thin section, is composed dominantly of sericite rich felsite with scattered quartz crystal fragments and opaque grains, these clasts have haloes of relatively coarsely crystallised sericite and quartz. Unidentified opaque acicular minerals are also common. This lithology is considered to be a highly recrystallised ash volcanoclastic.
427442. A light green-grey fine grained sandstone. Equigranular, subangular quartz grains with weakly serrate grain boundaries and undulose extinction form a grain to weakly matrix supported mass and constitute 90% of the sample. Other clast types are micaceous quartzite and detrital muscovite while the major accessories, subhedral tourmaline and anhedral zircon define bedding. Rare subhedral pyrite was noted. The matrix is fine grained sericite with a weak crystallographic preferred orientation defining a cleavage.

This lithology appears to be dominantly derived from a low-grade regionally metamorphosed source and is a probable Eldon group correlate.

APPENDIX XX

east	north	sample	lab	sample	Job No	Cu[ppm]	Pb[ppm]	Zn[ppm]	Ag[ppm]	Au[ppm]	As[ppm]	Ba[ppm]
7905	12940	427660	ANA	SS	5250	5	10	30	<.5	<.008	1	220
8018	13123	427661	ANA	SS	5250	5	<5	20	2.5	<.008	1	240
9700	10297	427666	ANA	SS	5250	15	10	55	<.5	<.008	1	550
9877	10268	427667	ANA	SS	5250	5	10	50	<.5	<.008	1	470
9982	10219	427668	ANA	SS	5250	10	10	10	<.5	<.008	1	15
9837	10346	427669	ANA	SS	5250	25	10	65	<.5	<.008	3	430
9750	10656	427670	ANA	SS	5250	15	15	60	<.5	<.008	2	510
8827	11264	427694	ANA	SS	5250	50	5	50	<.5	<.008	2	310
9090	11113	427695	ANA	SS	5250	60	15	110	<.5	<.008	5	1150
8235	11850	427696	ANA	SS	5250	10	<5	50	<.5	<.008	2	480
8736	10830	427708	ANA	SS	5250	10	10	110	<.5	<.008	3	830
8683	13956	427653	ANA	SS	5250	10	15	40	<.5	<.008	1	35
8654	13983	427654	ANA	SS	5250	15	10	15	<.5	<.008	1	15
8528	14012	427655	ANA	SS	5250	5	<5	10	<.5	<.008	1	10
8513	13998	427656	ANA	SS	5250	25	20	25	1.0	<.008	1	<10

**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**

R	Rhyolite
D	Dacite
A	Andesite
B	Basalt
Y	Polymict
Se	Sandstone
Sh	Shale
Slt	Siltstone
Ba	Barite
Py	Pyrite
BMS	Base Metal Sulphide
Ch	Chert
TB	Tertiary Basalt
JDo	Jurassic Dolerite
OCg	Ordovician Conglomerate

**LITHOLOGY TEXTURE / FORM**

l	lava
lb	lava breccia
pl	pillow lava
av	ash volcanoclastic
flv	fine lapilli volcanoclastic
miv	medium " "
clv	coarse " "
bv	breccia "
xv	crystal "
ves	vesicular
por	porphyritic
eux	eutaxitic
fbn	flowbanded
gnr	granular
lbd	interbedded
md	matrix dominant

**VOLCANICLASTIC SIZE RANGE**

> 2mm	ash
2-8	fine lapilli
8-32	medium lapilli
32-64	coarse lapilli
> 64	breccia

**ALTERATION COMPOSITION**

Co	Carbonate
Cl	Chlorite
Kf	K-feldspar
Fu	Fuchsite
Py	Pyrite
Se	Sericite
Sl	Silica

**ALTERATION TEXTURE / FORM**

per	pervasive
dis	disseminated
pat	patchy
spt	spotty
sfr	selected fragments
stw	stockwork
etc	structure controlled
vn	vein
mtx	matrix

**ALTERATION INTENSITY WEATHERING INTENSITY**

1	trace
2	weak
3	moderate
4	strong
5	extreme

**COLOUR**

br	brown
bk	black
gy	grey
gn	green
or	orange
pk	pink
wh	white
yw	yellow
bl	blue

**FAULT TERMS**

cav	cavernous
lch	leached
slk	slickenside
rhd	rehealed
rbb	rubble
shd	sheared

**GENERAL TERMS**

tr	trace
lgt	light
dk	dark
brt	bright
ox	oxidised
fg	fine grained
mg	medium grained
cg	coarse grained

**ABBREVIATED DESCRIPTION FORMAT**

**LITHOLOGY:**

LITHOLOGY      WEATHERING      ALTERATION  
 colour, composition, form, texture / intensity / composition, intensity, form, texture  
 example    gy - gn, YA, flv / Ox3 / Fu3, 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 / O, Py, cav

**INTERPRETIVE GEOLOGICAL MAPPING LEGEND MAC89,111 PLAN SERIES**

**VOLCANICS**

R.I R.Ib	28	Rhyolite lava, lava breccia
R.av R.lv R.bv R.xv	28	Rhyolite volcanoclastic
YR.av YR.lv YR.bv	68	Rhyolitic Polymict volcanoclastic
D.I D.Ib	63	Dacite lava, lava breccia
D.av D.lv D.bv D.xv	64	Dacite volcanoclastic
YD.av YD.lv YD.bv	66	Dacitic Polymict volcanoclastic
A.fp.I A.fp.Ib	48	Andesite feldsparphyric lava, lava breccia
A.I A.Ib	41	Andesite lava, lava breccia
A.av A.lv A.bv A.xv	44	Andesite volcanoclastic
YA.av YA.lv YA.bv	40	Andesitic Polymict volcanoclastic
B.I B.Ib	45	Basalt lava, lava breccia
B.pl	50	Basalt pillow lava
B.av B.lv B.bv B.xv	49	Basalt volcanoclastic
YB.av YB.lv YB.bv	42	Basaltic Polymict volcanoclastic
Y.av Y.lv Y.bv	58	Polymict rock
av	52	Ash volcanoclastics (composition not determined)

**SEDIMENTS**

Se Sw	71	Sandstone, micaceous Greywacke
Sh	68	Shale, black (carbonaceous, pyritic)
Slt	69	Siltstone, tuffaceous Siltstone

**SULPHIDES, SULPHATES**

BMS	21	Base Metal Sulphide rock
MPy	29	Massive pyrite rock
GSP	23	Glassy silica, colloform pyrite rock
Ba	22	Barite

**POST CAMBRIAN ROCKS**

TB	8	Tertiary Basalt
JD	32	Jurassic Dolerite
OCg	20	Ordovician Siliciclastics

**ALTERATION ROCK TYPES**

HA	6	Highly altered rock
QII	18	Quellite
Q-IV Q-bv	17	Quellite 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)

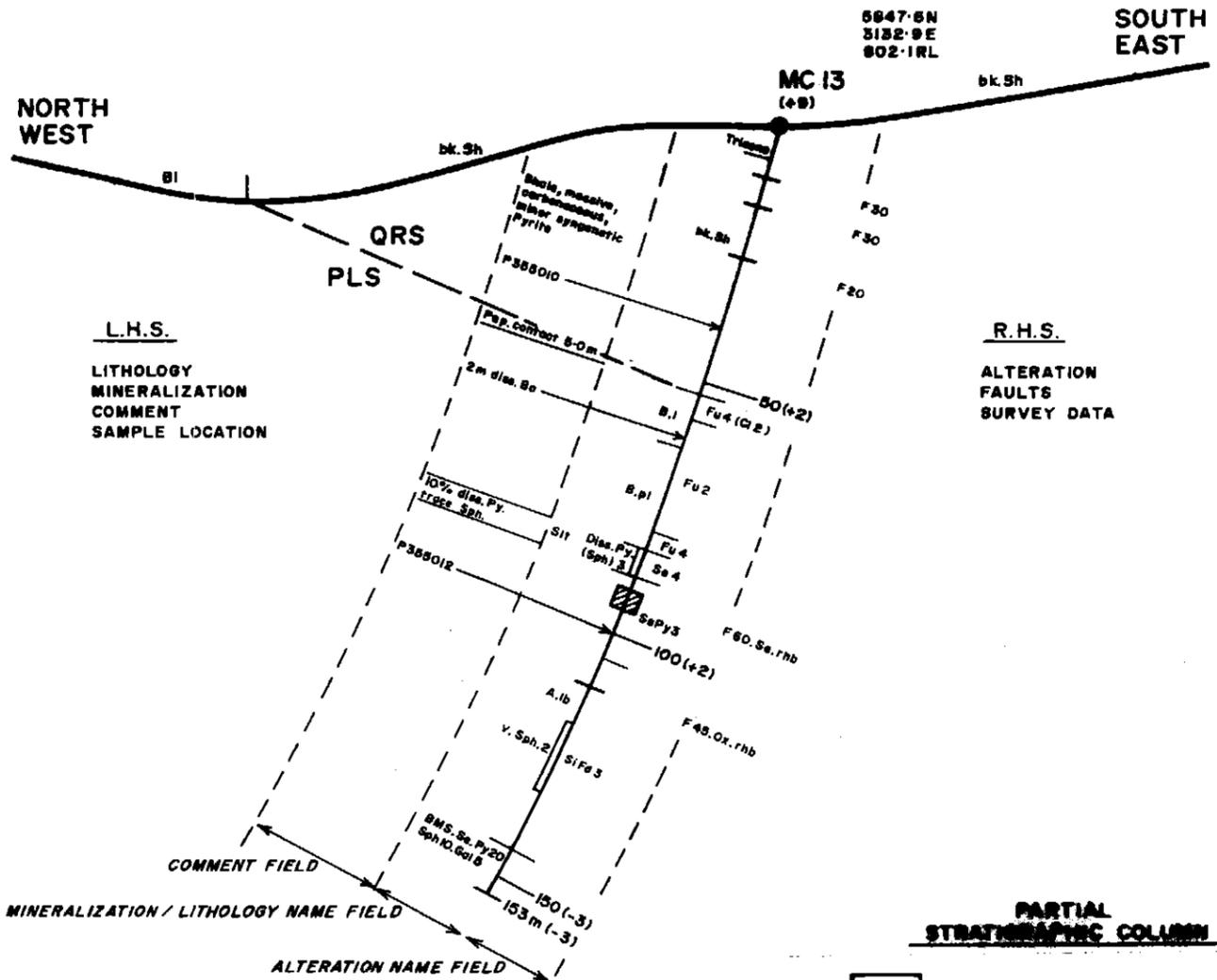
LINE TH'NESS / LEROY LETTER SIZE	(LENGTH AS SHOWN)	
-35		Outcrop boundary
-35		Fault
-35		Contact known
-35		Contact interpreted
-35		Contact inferred
-35		Facies change
-35		Unconformity
-25		Anticline, syncline with plunge and trend
-25		Minor fold with plunge and trend
-25/50		Bedding, strike, dip
-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		Castean
-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

037326

93-3410.

**Aberfoyle Exploration Pty Ltd**

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



**L.H.S.**  
LITHOLOGY  
MINERALIZATION  
COMMENT  
SAMPLE LOCATION

**R.H.S.**  
ALTERATION  
FAULTS  
SURVEY DATA

**PARTIAL STRATIGRAPHIC COLUMN**

- TB** 0 TERTIARY BASALT
- JD** 32 JURASSIC DOLERITE
- OCG** 20 ORDOVICIAN SILICICLASTICS
- URS** 68 UPPER RHYOLITIC SEQUENCE
- QRS** 60 QUE RIVER SHALE
- MGW** 71 MT. CHARTER MICACEOUS GREYWACKE
- HBS** 45 HELLYER BASALT SEQUENCE
- HVS** 54 HANGINGWALL VOLCANICLASTIC SEQUENCE
- SWB** 54 SWITCHBACK VOLCANICLASTIC SEQUENCE
- HMS** 21 HELLYER MINERALISED SEQUENCE
- FPS** 48 ANDESITE FELDSPAR PHYRIC SEQUENCE

- VOLCANICS**
- R.i** 68 Rhyolite lava, lava breccia
  - R.iv** 68 Rhyolite volcaniclastic
  - YR.av** 68 Rhyolitic Polymict volcaniclastic
  - D.i** 63 Dacite lava, lava breccia
  - D.iv** 64 Dacite volcaniclastic
  - YD.av** 64 Dacitic Polymict volcaniclastic
  - A.fp.i** 48 Andesite feldsparphyric lava, lava breccia
  - A.i** 41 Andesite lava, lava breccia
  - A.iv** 44 Andesite volcaniclastic
  - YA.av** 40 Andesitic Polymict volcaniclastic
  - B.i** 45 Basalt lava, lava breccia
  - B.pl** 50 Basalt pillow lava
  - B.iv** 48 Basalt volcaniclastic
  - YB.av** 42 Basaltic Polymict volcaniclastic
  - Y.v** 68 Polymict rock
  - av** 62 Ash volcaniclastic (composition not determined)

- SEDIMENTS**
- Sa** 71 Sandstone, micaceous greywacke
  - Sh** 66 Shale, black (carbonaceous, pyritic)
  - Slt** 69 Siltstone, tuffaceous siltstone

- SULPHIDES, SULPHATES**
- BMS** 21 Base Metal Sulphide rock
  - MPy** 29 Massive pyrite rock
  - SSP** 23 Siliceous, oolitic pyrite rock
  - So** 22 Sulfite

- POST CAMBRIAN ROCKS**
- TB** 0 Tertiary Basalt
  - JD** 32 Jurassic Dolerite
  - OCG** 20 Ordovician Siliciclastics

- ALTERATION ROCK TYPES**
- HA** 6 Highly altered rock
  - QII** 16 Quartzite
  - QW** 17 Quartzite fragments

**ALTERATION**

- Si** 2 Silica
- SIFd** 13 Silica Feldspar
- SIFdCl** 14 Silica Feldspar Chlorite
- Cl** 47 Chlorite
- CiCo** 41 Chlorite Carbonate
- SeCl** 30 Sericite Chlorite
- SePy** 38 Sericite Pyrite
- Se** 38 Sericite
- Fu** 46 Fuchsite
- Il** 18 Illite

**INTENSITY SCALE**

- 1 Trace
- 2 Weak
- 3 Moderate
- 4 Strong
- 5 Extreme

037327

90-3410

- MC 13 (+9)** DDH number, DDH collar distance behind (+), in front (-) of section (1/35/100, 80)
- 5847-6 N 3132-9 E 802-1 RL** Survey pick-up of collar (1/50)
- 50(+2)** Downhole fiducial, 50m interval for 1:1000 section (1/25/80)
- Lithology, alteration boundary - DDH and surface (1/18/)**
- DDH to surface correlation (1/33/)**
- B.pl** Lithology abbreviation classification, colour on adjoining table (1/50)
- QRS** Stratigraphic classification (1/100)
- Fu4 (C12)** Alteration composition, intensity. Subordinate alteration type in brackets (1/50)
- F60Se.rhb** Fault zone, angle to core axis, gouge composition (1/35/80)
- F45.Ox.rhb** Fault, angle to core axis, gouge composition (1/38/80)
- Dis.Py. (Sph) 2** Low grade mineralization disseminated, composition, intensity. Minor sulphides in brackets (1/18/50)
- v.Sph. (Py) 2** Low grade mineralization vein, composition, intensity. Minor sulphides in brackets (1/18/50)
- P385010** Petrology sample location, specify other sample type eg. Pb isotope (1/50)
- BMS.Se.Py20 Sph.10.Gal.5** High grade mineralization, composition, visual estimate (1/50)

ALL LINWORK AND LETTERING SHOWN AT ACTUAL SIZE (LINE THICKNESS / LEROY LETTER SIZE)  
NOTE: GEOPHYSICAL AND GEOCHEMICAL DATA ARE SHOWN ON OVERLAYS

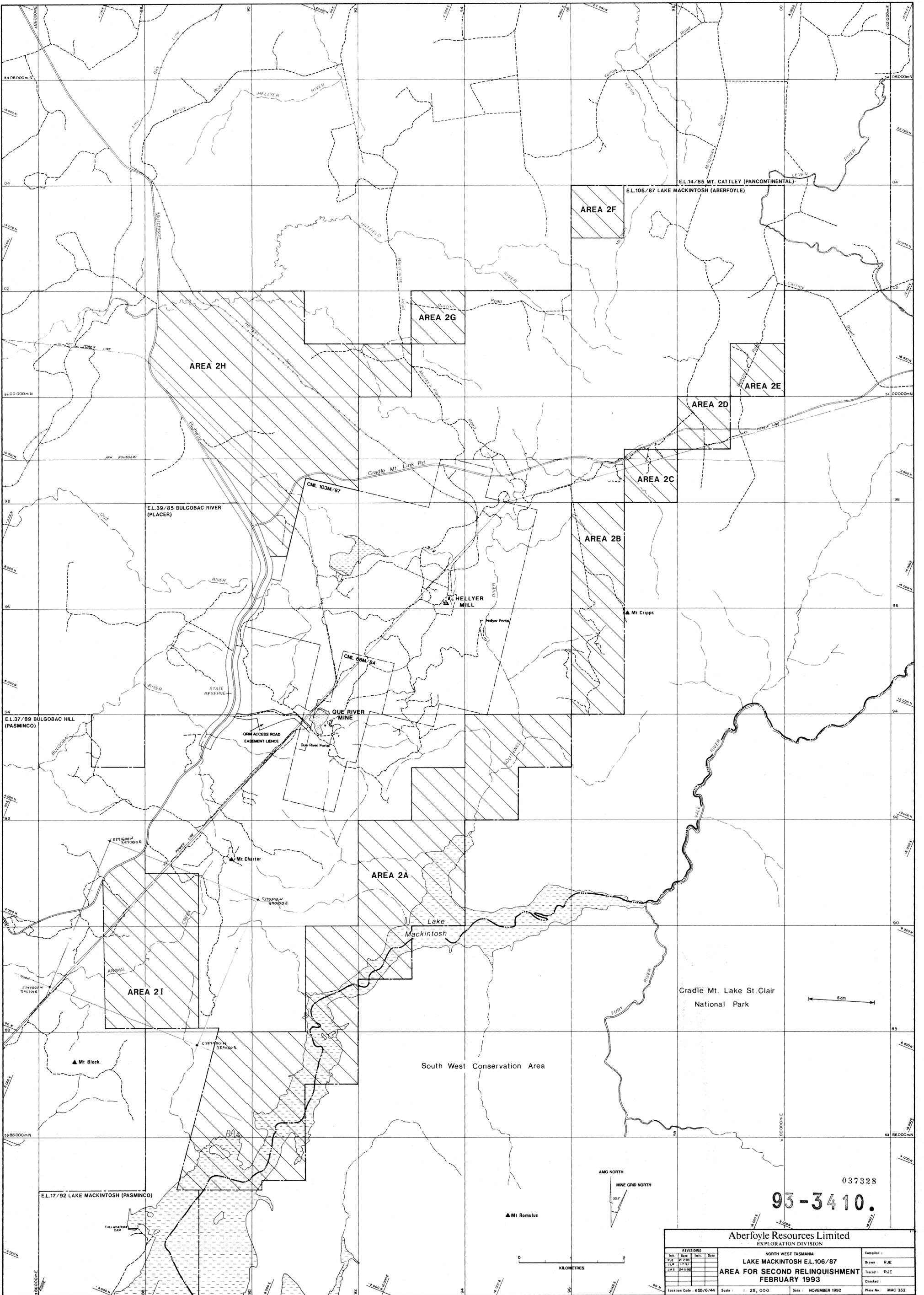
**Aberfoyle Exploration Pty Ltd**

NORTH WEST TASMANIA  
MACKINTOSH E.L.2/70, HATFIELD E.L.15/73

**GEOLOGICAL LEGEND**  
1:1000 SCALE DDH SECTIONS

REVISIONS			
Int.	Date	Int.	Date
GLC	12-85		

Location Code: K55/6/44	Scale: _____	Date: November, 1985	Compiled: AMH
			Drawn: AMH
			Traced: GLC
			Checked: AMH
			Plate No: MAC 115



E.L.14/85 MT. CATTLEY (PANCONTINENTAL)  
 E.L.106/87 LAKE MACKINTOSH (ABERFOYLE)

AREA 2F

AREA 2G

AREA 2H

AREA 2E

AREA 2D

AREA 2C

AREA 2B

AREA 2A

AREA 2I

E.L.17/92 LAKE MACKINTOSH (PASMINGO)

E.L.39/85 BULGOBAC RIVER (PLACER)

E.L.37/89 BULGOBAC HILL (PASMINGO)

AMG NORTH  
 MINE GRID NORTH

▲ Mt Romulus

▲ Mt Charter

▲ Mt Cripps

▲ Mt Black

South West Conservation Area

Cradle Mt. Lake St. Clair National Park

5 cm

037328  
**93-3410.**

**Aberfoyle Resources Limited**  
 EXPLORATION DIVISION

NORTH WEST TASMANIA  
**LAKE MACKINTOSH E.L.106/87**  
**AREA FOR SECOND RELINQUISHMENT**  
**FEBRUARY 1993**

REVISIONS		
NO.	DATE	DESCRIPTION
1	22/91	INITIAL
2	24/92	REVISED
3	24/92	REVISED

Location Code: K55/6/44    Scale: 1:25,000    Date: NOVEMBER 1992    Plate No: MAC 353

Compiled: \_\_\_\_\_  
 Drawn: RJE  
 Traced: RJE  
 Checked: \_\_\_\_\_

PROJECT: mac  
SECTION DEFINITION:  
N: 0 718.0  
PL: -518.0  
Forward extent: 10.0  
Backward extent: 10.0  
Section Start: 90.0  
Section Length: 718.0  
PDF file: mh000a24.pdf  
PDF file: mh000a24.pdf  
PLOTfile: ood.plt

DRILL HOLE LEGEND - PRR  
= VERTICALLY  
gch Cu (ppm)  
Scale in mm: 0.00  
Units per mm: 2.000  
Max dist in mm: 50

gch Pb (ppm)  
Scale in mm: 0.00  
Units per mm: 2.000  
Max dist in mm: 50

gch Zn (ppm)  
Scale in mm: 0.00  
Units per mm: 0.000  
Max dist in mm: 50

gch Ag (ppm)  
Scale in mm: 0.00  
Units per mm: 200  
Max dist in mm: 20

gch Au (ppm)  
Scale in mm: 0.00  
Units per mm: 0.000  
Max dist in mm: 20

gch Bi (ppm)  
Scale in mm: 0.00  
Units per mm: 10.000  
Max dist in mm: 50

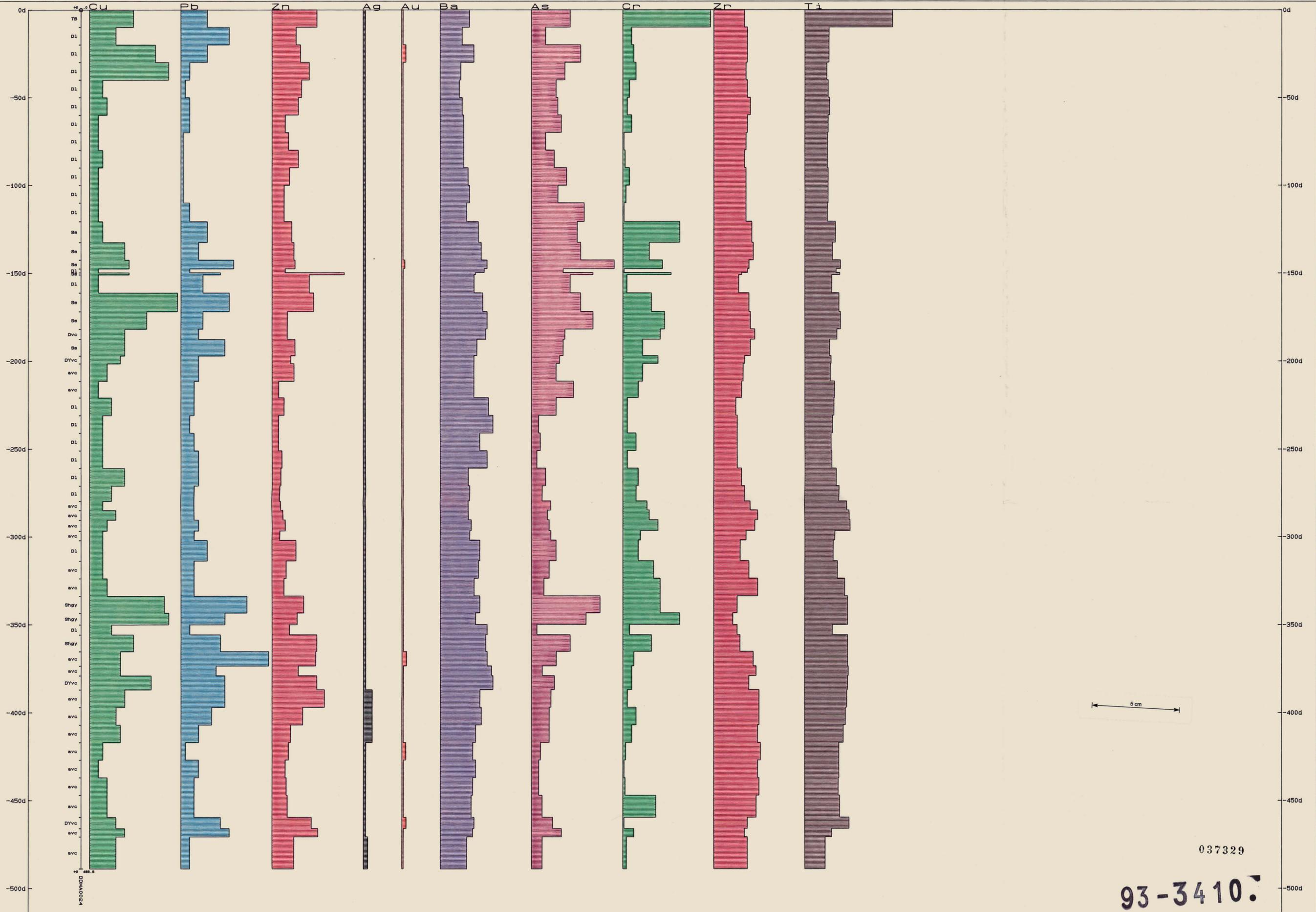
gch Ar (ppm)  
Scale in mm: 0.00  
Units per mm: 1.000  
Max dist in mm: 50

gch Cr (ppm)  
Scale in mm: 0.00  
Units per mm: 4.000  
Max dist in mm: 50

gch Sr (ppm)  
Scale in mm: 0.00  
Units per mm: 10.000  
Max dist in mm: 50

gch Ti (ppm)  
Scale in mm: 0.00  
Units per mm: 100.000  
Max dist in mm: 50

DRILL HOLE LEGEND - LHM  
= ANNOTATION #  
gch Rock

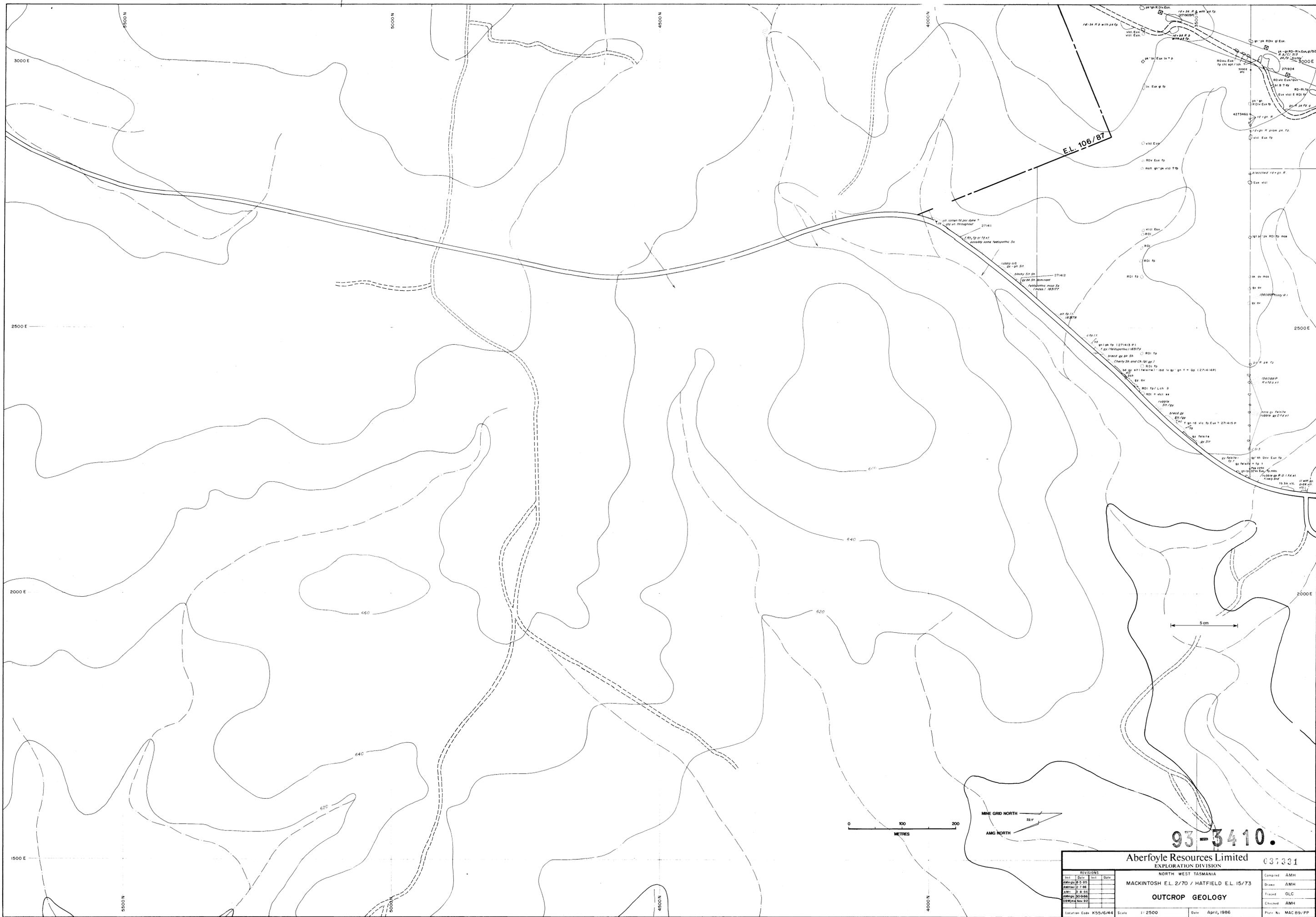


037329

93-3410

Aberfoyle Resources Limited EXPLORATION DIVISION			
REVISIONS		Tasmania	
Intl. Date	Intl. Date	Mackintosh E.L. 106/87	
		Geochemical Profiles	
		DDH MAC-24	
Location Code:	Scale: 1: 1000	Date: 04/12/92	Plate No.: MAC273A





93-3410.

**Aberfoyle Resources Limited**  
 EXPLORATION DIVISION

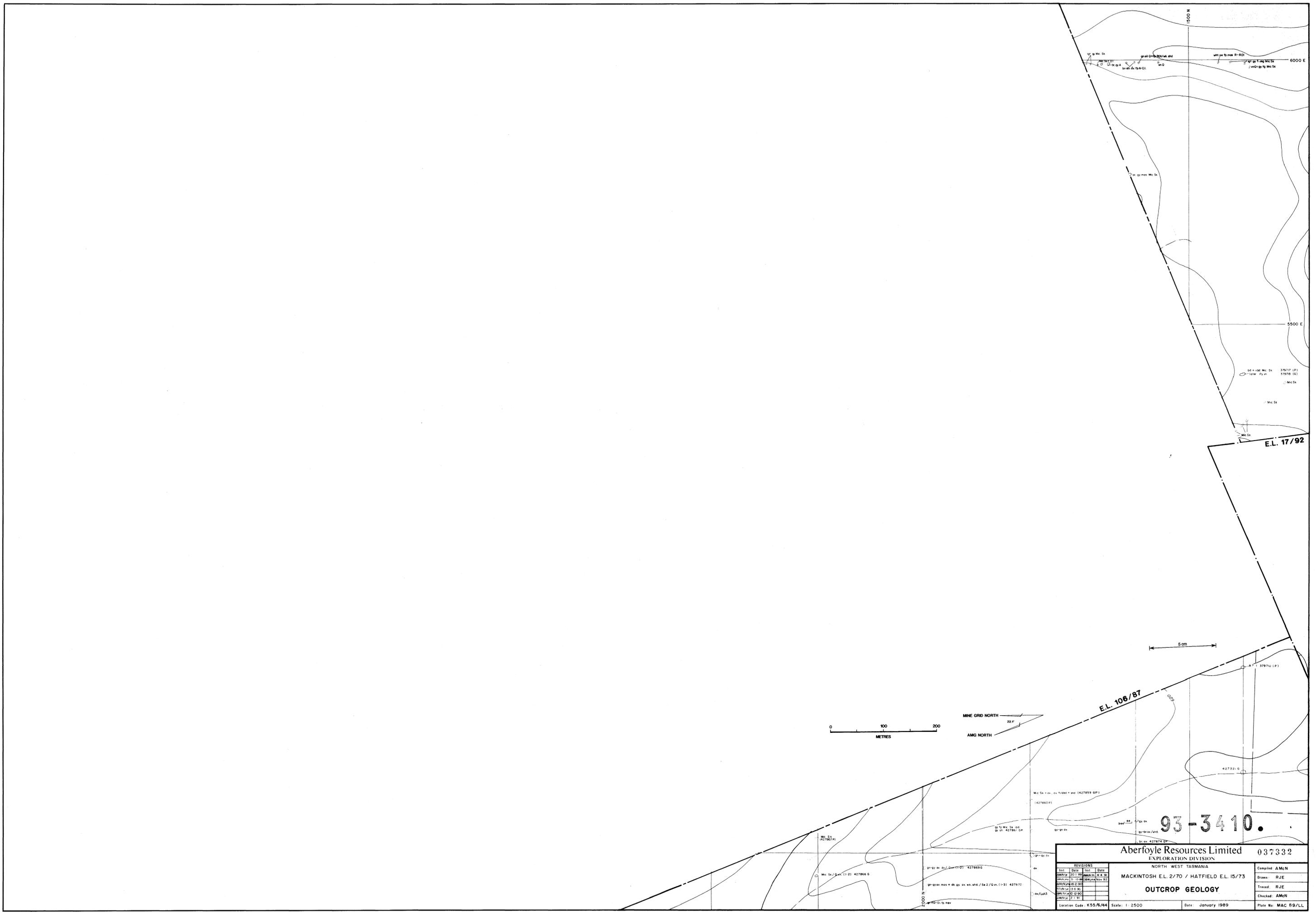
NORTH WEST TASMANIA  
 MACKINTOSH E.L. 2/70 / HATFIELD E.L. 15/73

**OUTCROP GEOLOGY**

REVISIONS			
Rev	Date	Text	Date
AMH/SL	2-8-85		
AMH/SL	2-7-86		
AMH	2-8-86		
AMH/SL	20-9-86		
DSW/ML	Nov 92		

Location Code: K55/G/44    Scale: 1:2500    Date: April, 1986    Plant No: MAC/BSY/PP

Compiled: AMH  
 Drawn: AMH  
 Traced: GLC  
 Checked: AMH

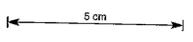
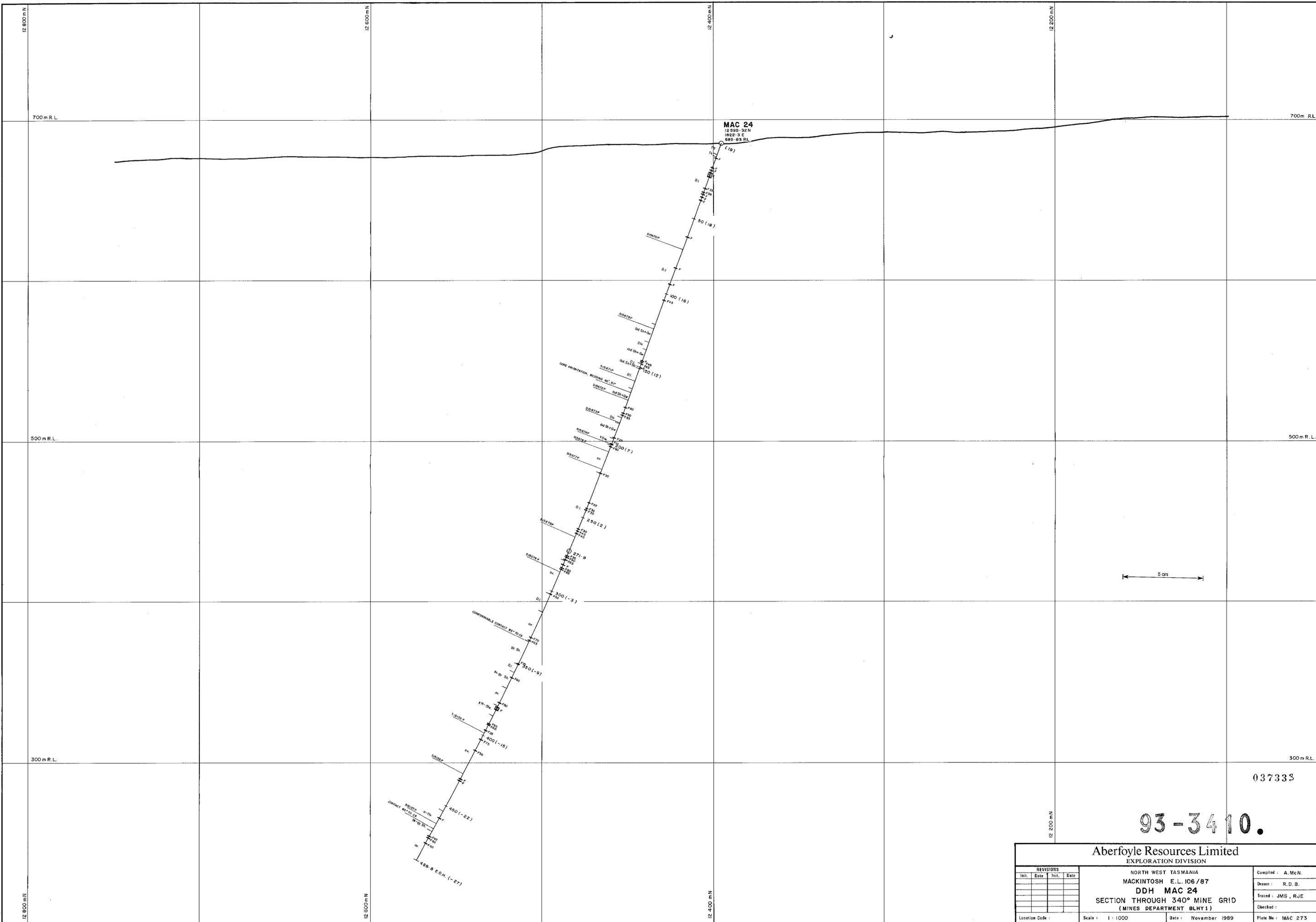


93-3410.

**Aberfoyle Resources Limited** 037332  
 EXPLORATION DIVISION  
 NORTH WEST TASMANIA  
 MACKINTOSH E.L. 2/70 / HATFIELD E.L. 15/73  
**OUTCROP GEOLOGY**

REVISIONS		Compiled: AMcN	
Int.	Date	Int.	Date
1	20/1/89	AMcN	4/4/92
2	1/1/90	RJE	2/2/92
3	1/1/90	RJE	2/2/92
4	1/1/90	RJE	2/2/92
5	1/1/90	RJE	2/2/92
6	1/1/90	RJE	2/2/92

Location Code: K55/6/44 Scale: 1:2500 Date: January 1989 Plate No: MAC 69/L



037333

93-3410.

<b>Aberfoyle Resources Limited</b> EXPLORATION DIVISION				Compiled: A. McN.																					
NORTH WEST TASMANIA MACKINTOSH E.L. 106/87 <b>DDH MAC 24</b> SECTION THROUGH 340° MINE GRID (MINES DEPARTMENT BLHY 1)				Drawn: R.D.B. Traced: JMS, RJE Checked:																					
REVISIONS <table border="1"> <thead> <tr> <th>Init.</th> <th>Date</th> <th>Init.</th> <th>Date</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>		Init.	Date	Init.	Date																	Location Code:		Scale: 1:1000	
Init.	Date	Init.	Date																						
Date: November 1989				Plate No: MAC 273																					

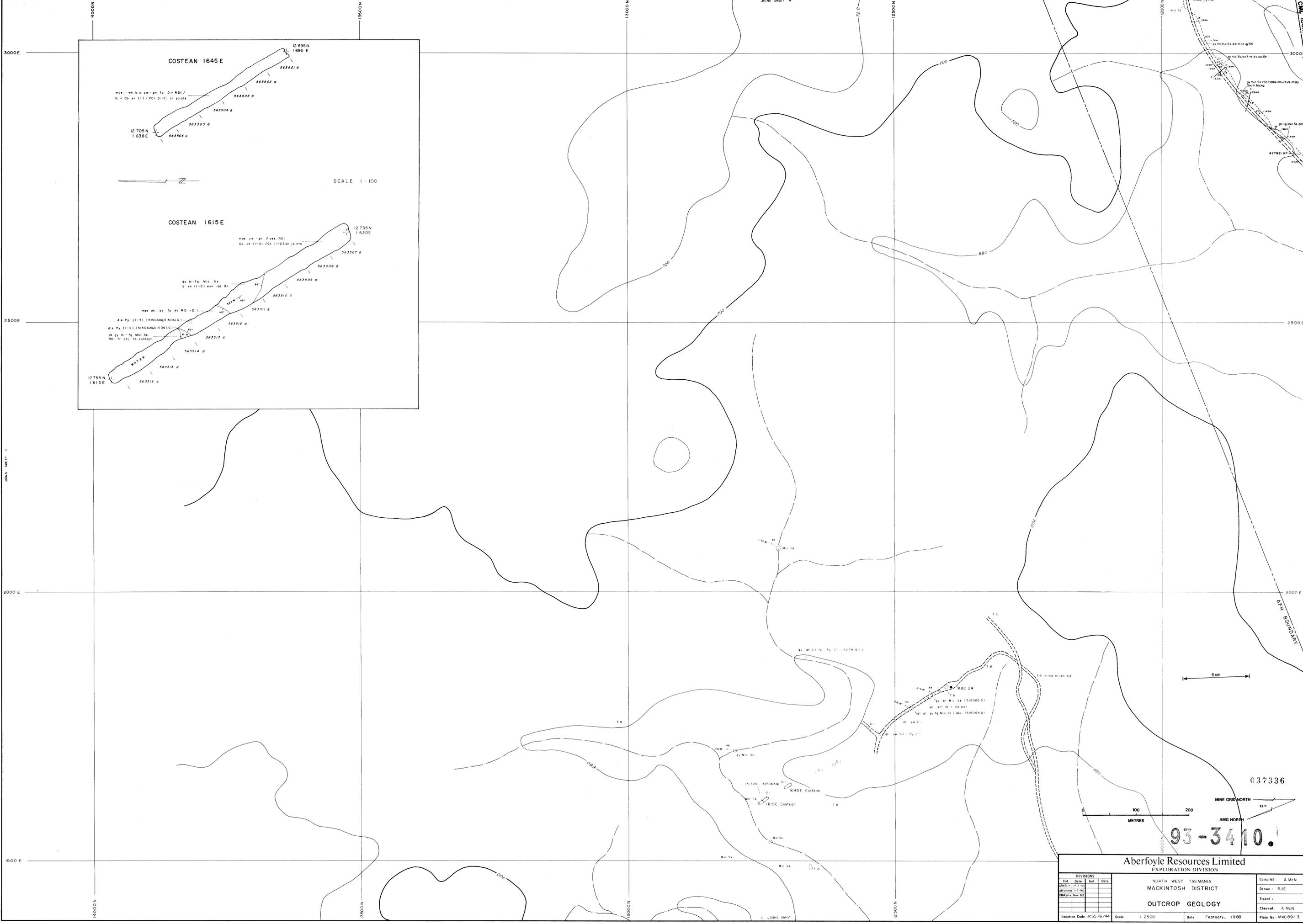
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037334 93-3410.

REVISIONS		Tasmania		Explor. Res.	
DATE	BY	DATE	BY	DATE	BY
		Mackintosh E.L. 106/87		Explor.	
		Area For Second Relinquishment		Explor.	
		Rockchip/Costean Assay Results		Explor.	
LOCALITY CODE		SCALE 1:10000		DATE 10/12/93	
				STATE NO. MAC12098	





**COSTEAN 1645 E**

12 095 N  
1 695 E

mos - wk b a ym - gn fa D - RD1 /  
G + Co va (1) / CI (1-2) on joints

12 705 N  
1 638 E

SCALE 1 : 100

**COSTEAN 1615 E**

12 735 N  
1 620 E

mos ym - gn P vks RD1 /  
Co va (1-2) / CI (1-2) on joints

gy m - fg Mic Sh  
G va (1-2) mar - bd Sh

mos wk b a ym - gn fa D - RD1 /  
G + Co va (1) / CI (1-2) on joints

dia Py (1-3) (5150406,15061 G)  
dia Py (1-2) (5150420,15063 G)

gy m - fg Mic Sh  
RD1 va - ud) fa contact

WATER

037336

5 cm

MINE GRID NORTH  
22°

AMG NORTH

**93-3410**

**Aberfoyle Resources Limited**  
EXPLORATION DIVISION

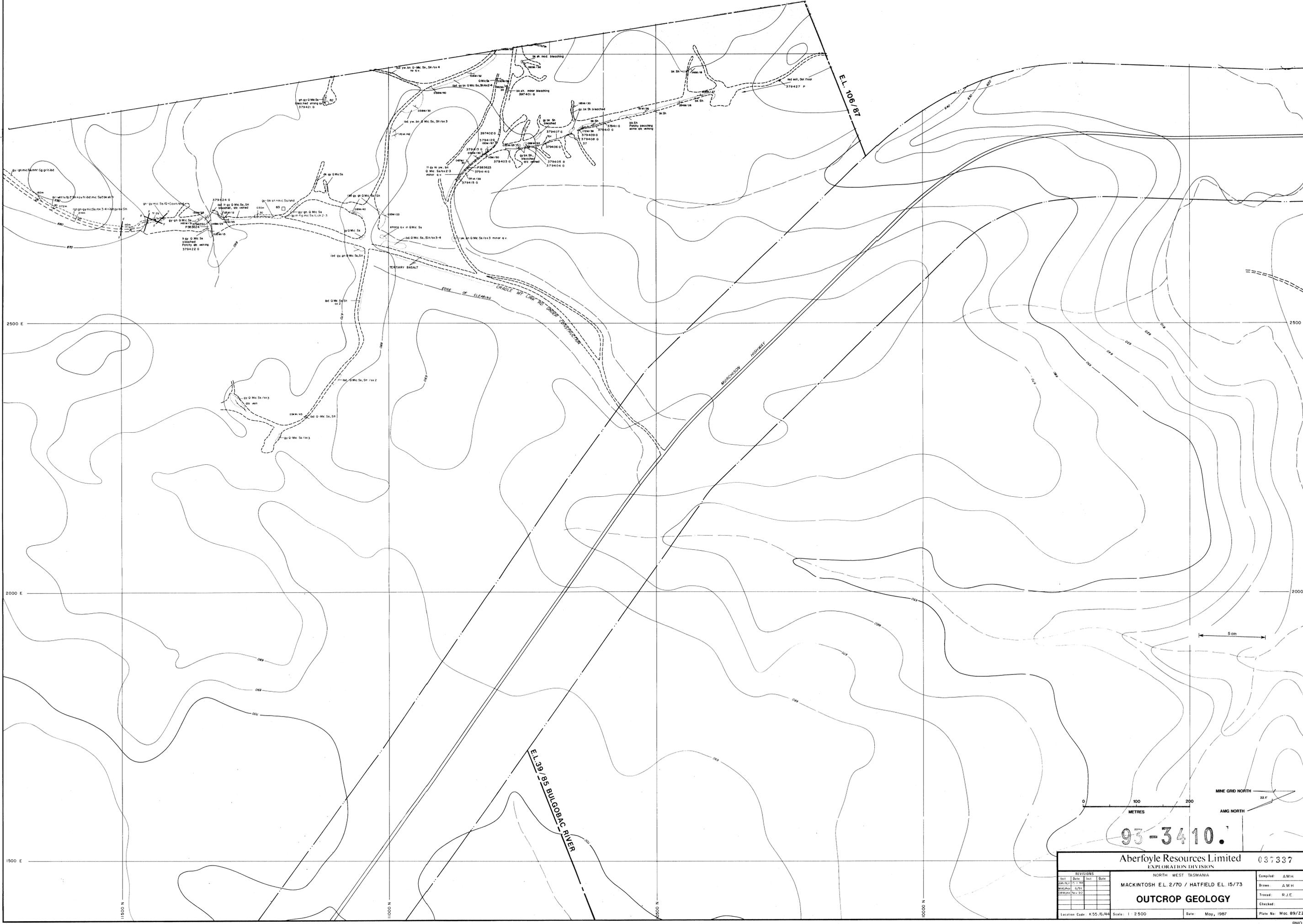
NORTH WEST TASMANIA  
MACKINTOSH DISTRICT

**OUTCROP GEOLOGY**

REVISIONS			
Inst	Date	Inst	Date
DRW	15/92		
OBW	15/92		
OBW	Nov 92		

Compiled : A McN  
Drawn : RJE  
Traced :  
Checked : A McN

Location Code : K55/6/44 Scale : 1 : 2500 Date : February, 1988 Plate No : MAC89/ 3



E.L. 106/87

E.L. 139/85 BULGOBAC RIVER

5 cm

MNE GRID NORTH  
22.1'  
AMG NORTH

93-3410.

Aberfoyle Resources Limited 037337  
EXPLORATION DIVISION

NORTH WEST TASMANIA  
MACKINTOSH EL. 2/70 / HATFIELD EL. 15/73  
OUTCROP GEOLOGY

REVISIONS			
Int	Date	Int	Date
MAC/SP	5/91		
CH/SP	Nov 92		

Location Code: K 55/76/84 Scale: 1 : 2 500 Date: May, 1987 Plate No: Mac 89/ZZ



5 cm

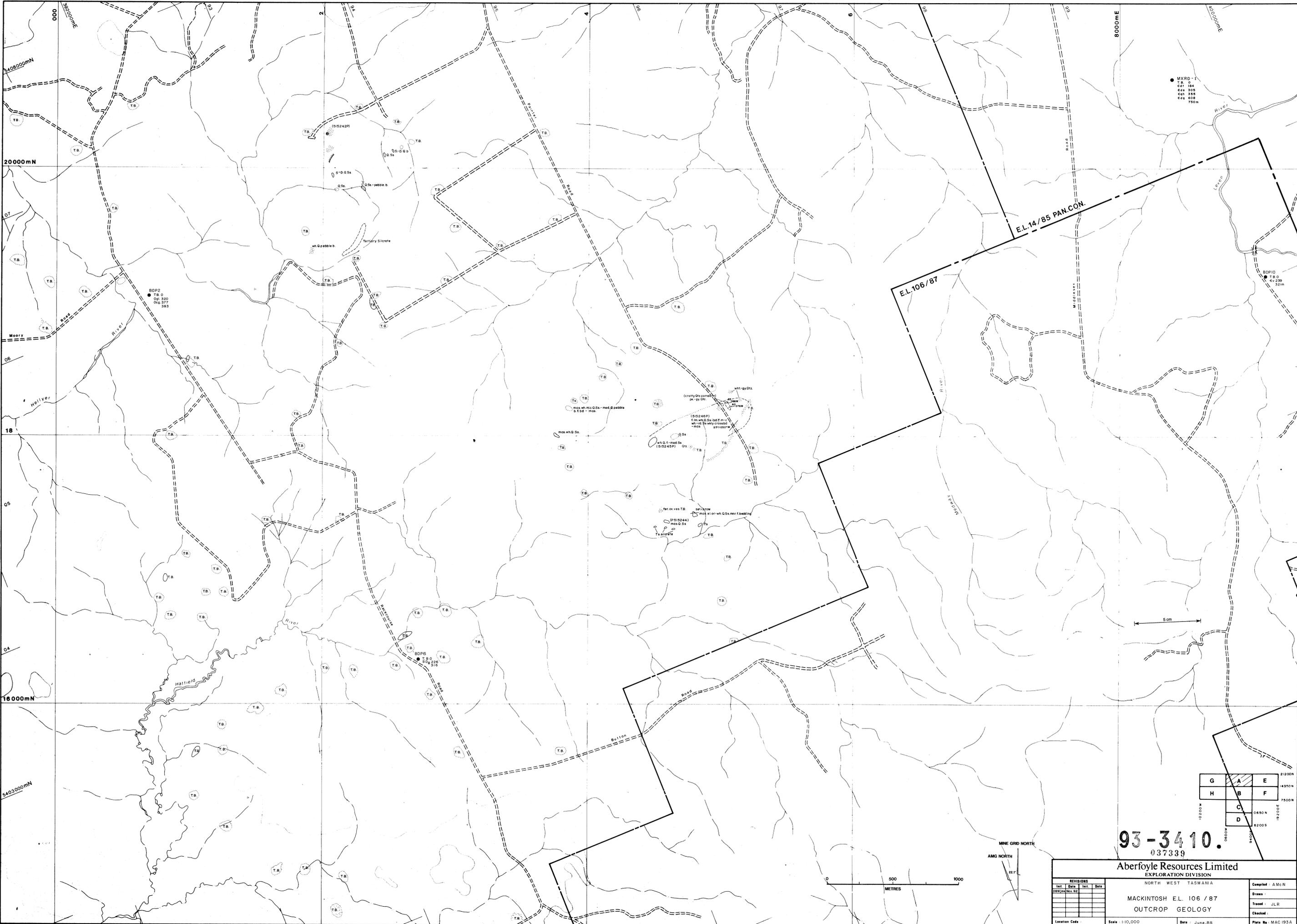
MINE GRID NORTH  
AMG NORTH  
22.1

A	81800 N
B	74300 N
C	7500 N
D	6880 N
	6200 S

0 500 1000  
METRES

93-3410

<b>Aberfoyle Resources Limited</b>		037338																												
EXPLORATION DIVISION																														
NORTH WEST TASMANIA																														
MACKINTOSH AREA																														
OUTCROP GEOLOGY																														
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Init	Date	Init	Date																											
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Drawn:																														
Treed: J.L.R.																														
Checked:																														
Plate No: 193 b																														
Location Code:	Scale: 1:10,000	Date: July, 1988																												



MXRD  
 T.B. 0  
 47 184  
 C44 305  
 C48 388  
 C44 808  
 C44 750m

BOP2  
 T.B. 0  
 50 320  
 C44 377  
 C48 388

BOP6  
 T.B. 0  
 59 226  
 C44 316

(P515244)  
 mos. Qs  
 Tertiary Silcrete

(P515244)  
 mos. Qs  
 Tertiary Silcrete

G	A	E	2100N
H	B	F	1450N
	C		750N
	D		0650N
			1920E
			8200E
			9400E

**93-3410.**  
 037339

**Aberfoyle Resources Limited**  
 EXPLORATION DIVISION

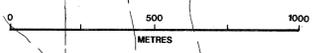
NORTH WEST TASMANIA

**MACKINTOSH E.L. 106 / 87**  
 OUTCROP GEOLOGY

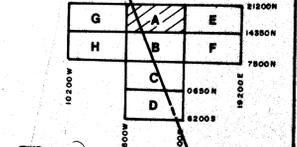
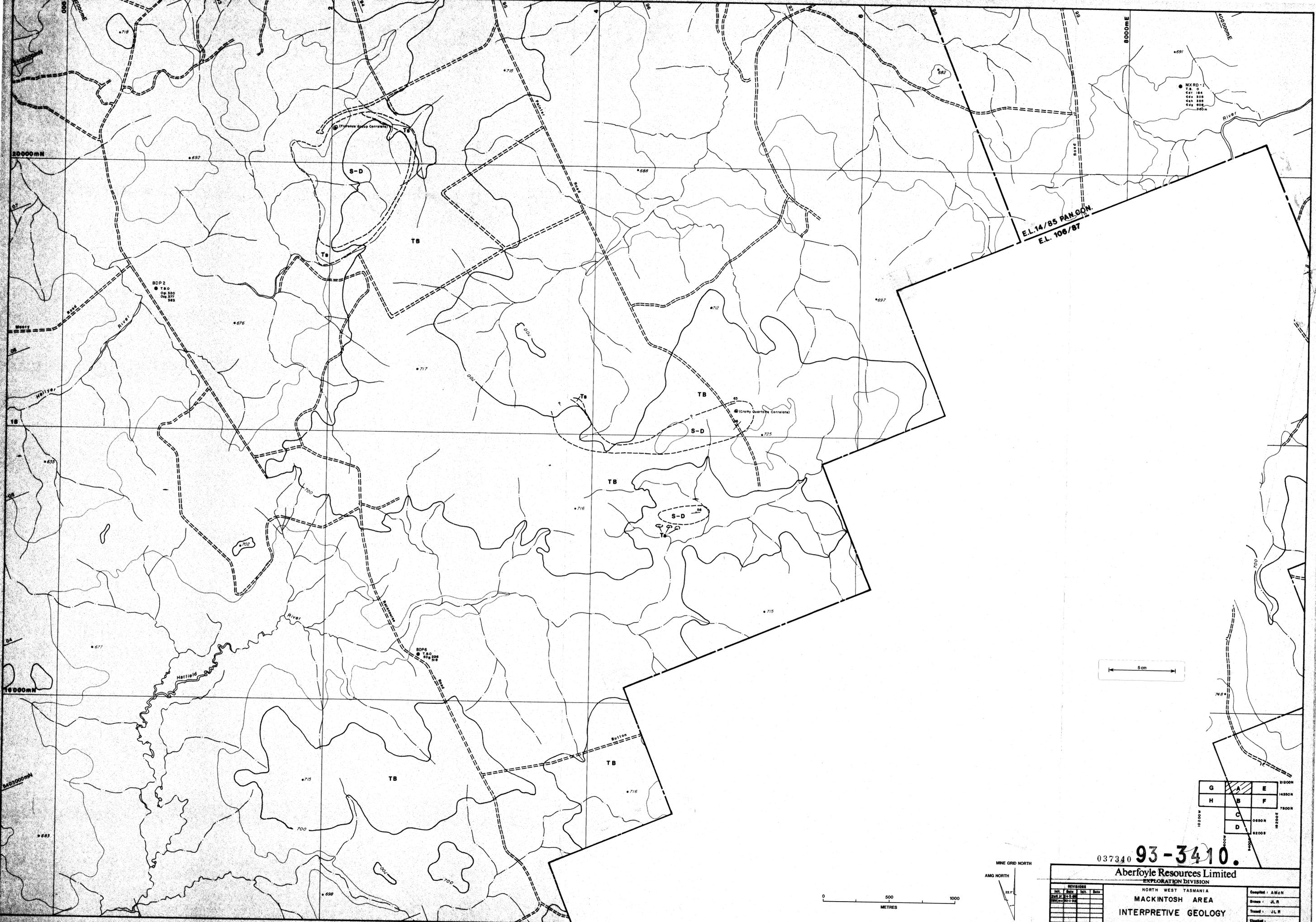
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REVISIONS			
Int.	Date	Int.	Date
001	10/01/88		

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Drawn: J.L.R.
Checked: J.L.R.
Plate No: MAC193A



MINE GRID NORTH  
 AMG NORTH



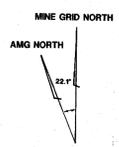
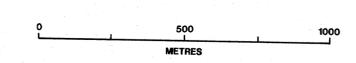
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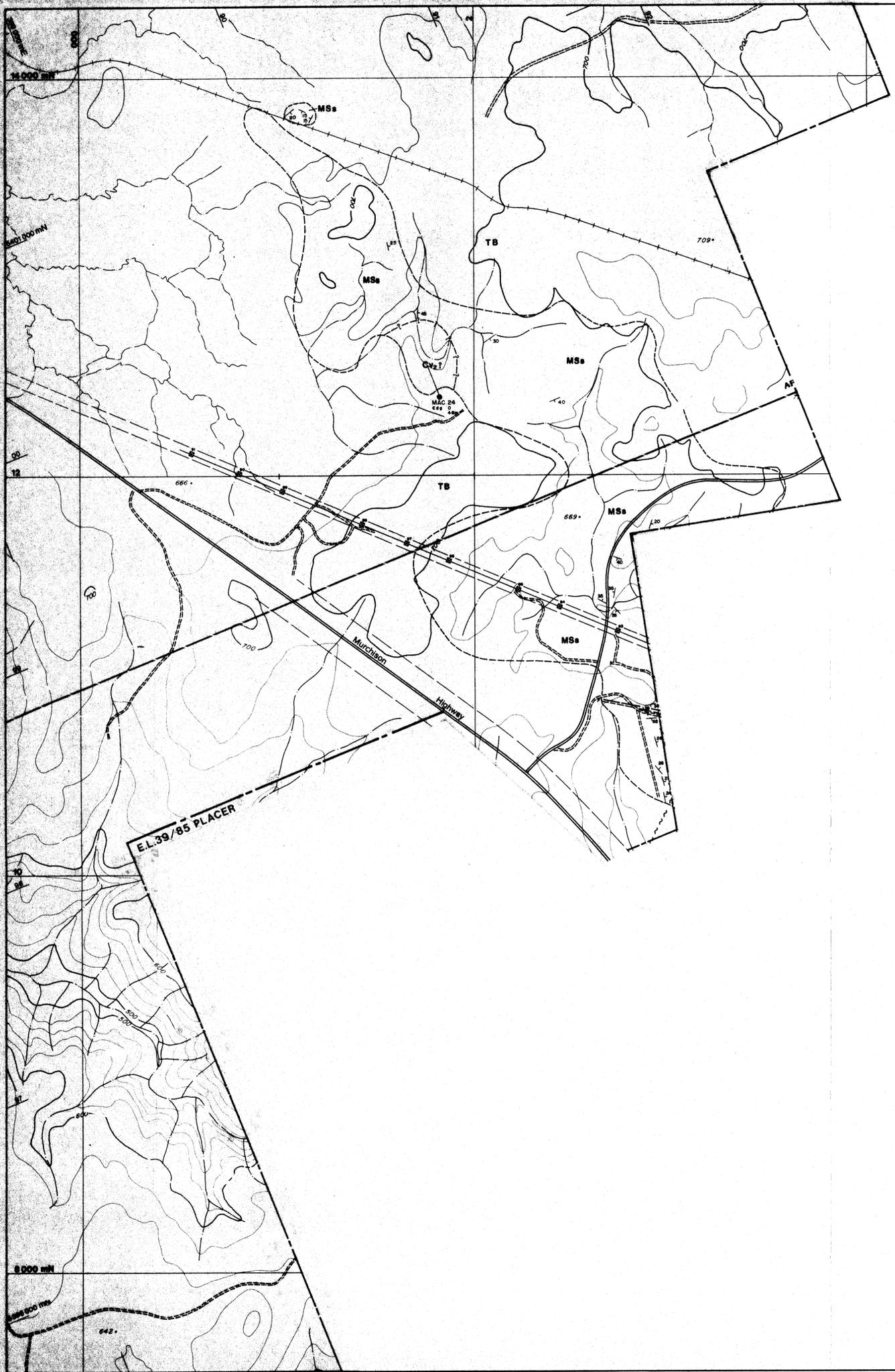
**Aberfoyle Resources Limited**  
 EXPLORATION DIVISION  
 NORTH WEST TASMANIA  
**MACKINTOSH AREA**  
 INTERPRETIVE GEOLOGY

REVISIONS	DATE	BY	REASON

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 Checked:   
 Plate No: MAC (81) A

Location Code:      Date: September, 1988      Scale: 1:10,000





MINE GRID NORTH  
AMG NORTH

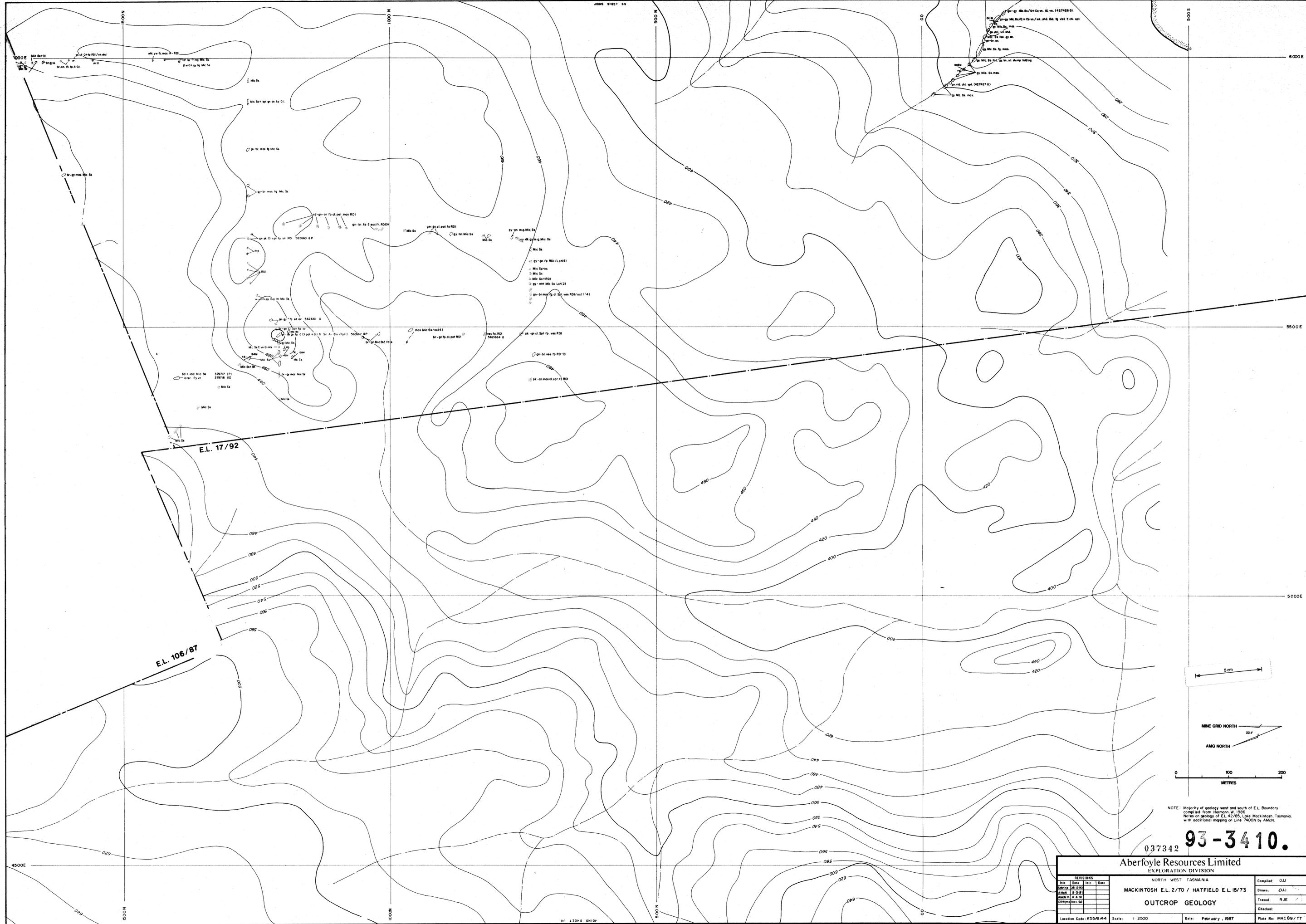
**93-3710**

**Aberfoyle Resources Limited** 037341  
EXPLORATION DIVISION

NORTH WEST TASMANIA  
**MACKINTOSH AREA**  
INTERPRETIVE GEOLOGY

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Date	Drawn	By	Notes	AMH
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1987/05/08				Traced: RJE
1987/05/08				Checked: AMH

Location Code: V35/8/04 Scale: 1:10,000 Date: September, 1987 Plate No: MAC 181 B



JONES SHEET 53

NOTE: Majority of geology west and south of E.L. Boundary compiled from Hermon, W. 1986. Notes on geology of E.L. 42/85, Lake Mackintosh, Tasmania, with additional mapping on Line 7400N by AMcN.

037342 **93-3410.**

**Aberfoyle Resources Limited**  
EXPLORATION DIVISION

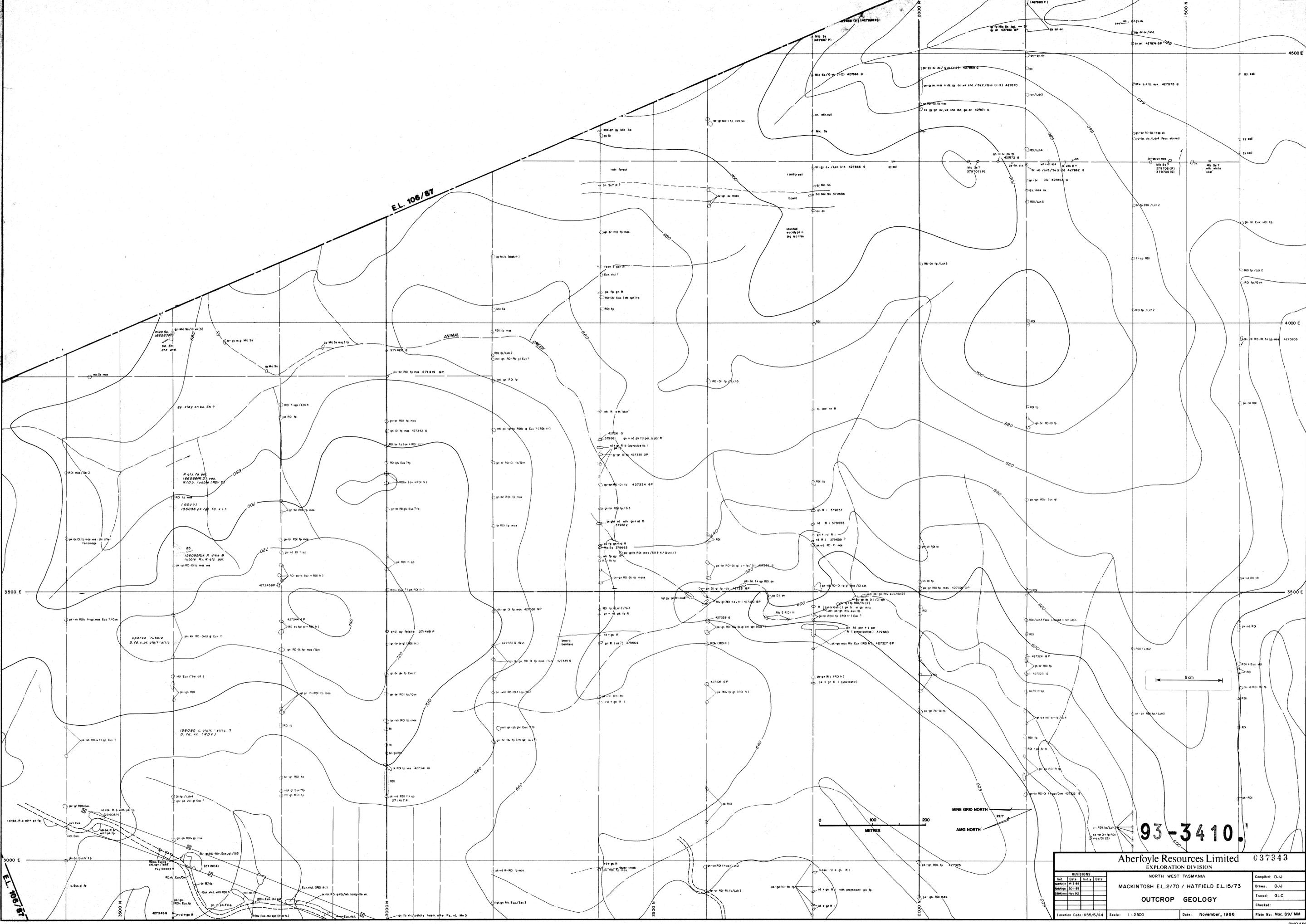
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MACKINTOSH E.L. 2/70 / HATFIELD E.L. 15/73

**OUTCROP GEOLOGY**

REVISIONS			
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AMcN	2-13-87		
AMcN	4-4-87		
AMcN	Nov. 87		

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Drawn: DJJ  
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Plate No: MAC89/TT

Location Code: K55/6/44 Scale: 1:2500 Date: February, 1987 Plate No: MAC89/TT



**93-3410**

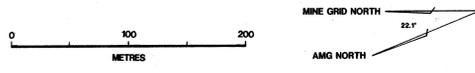
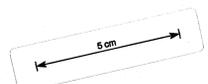
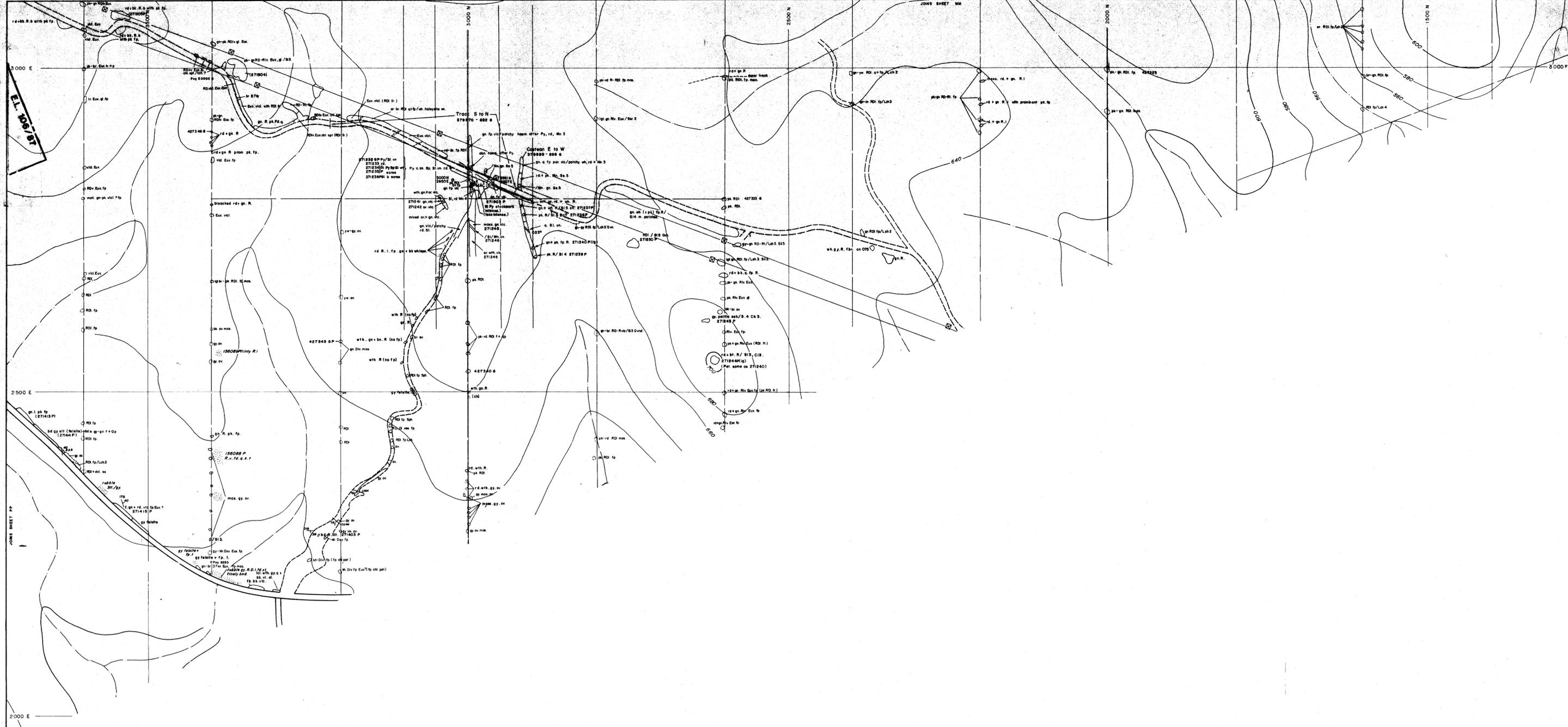
Aberfoyle Resources Limited 037343  
EXPLORATION DIVISION

NORTH WEST TASMANIA  
MACKINTOSH E.L.2/70 / HATFIELD E.L.15/73

**OUTCROP GEOLOGY**

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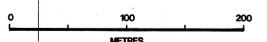
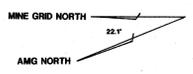
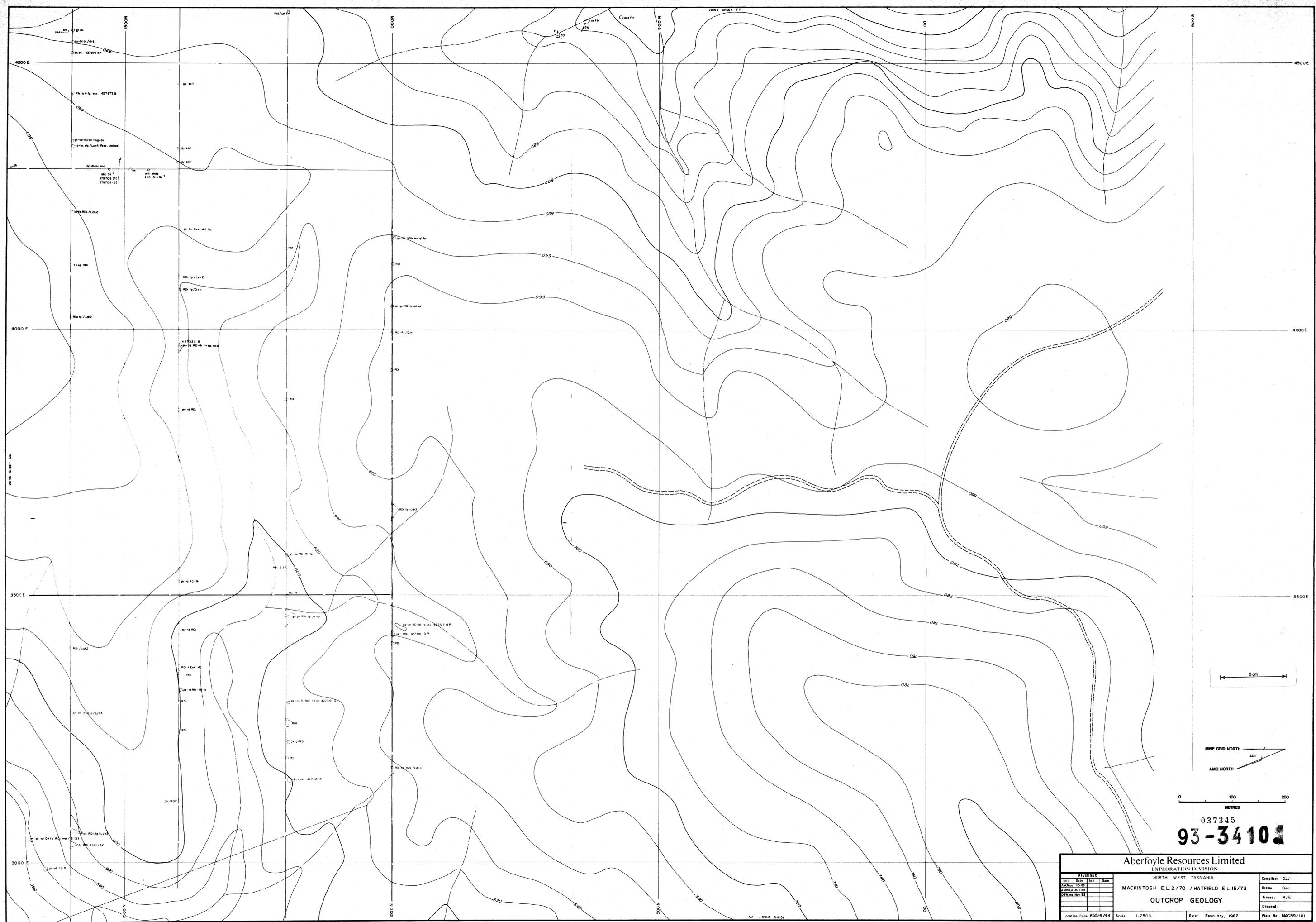
E.L. 106/87



93-3410.

Aberfoyle Resources Limited 037344  
EXPLORATION DIVISION

REVISIONS				NORTH WEST TASMANIA		Completed DJJ	
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037345  
**93-3410**

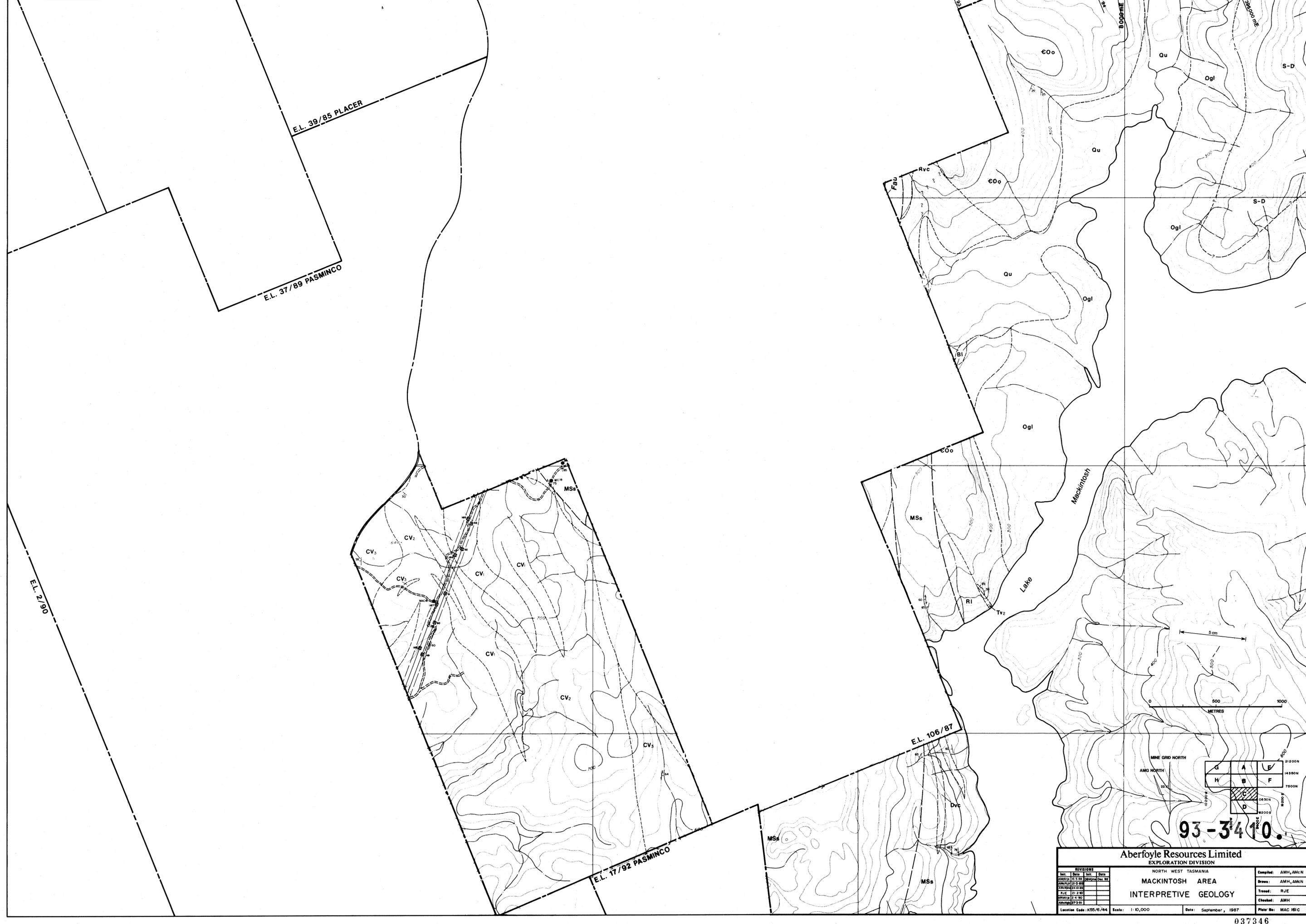
**Aberfoyle Resources Limited**  
 EXPLORATION DIVISION  
 NORTH WEST TASMANIA

MACKINTOSH E.L. 2/70 / HATFIELD E.L. 15/73  
**OUTCROP GEOLOGY**

REVISIONS			
Rev.	Date	Init	Date
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2	01/87	AMM	01/87
3	02/87	AMM	02/87

Location Code: K55/6/44 Scale: 1:2500 Date: February, 1987

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 Checked:  
 Plate No: MACB9/UU



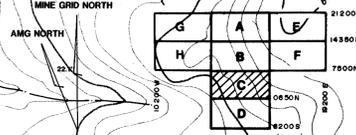
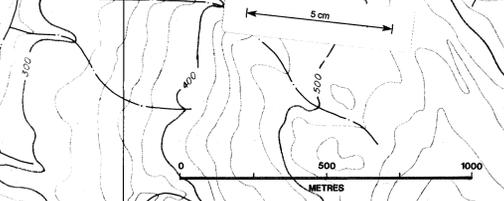
E.L. 39/85 PLACER

E.L. 37/89 PASMINGO

E.L. 2/80

E.L. 106/87

E.L. 17/92 PASMINGO



93-3410

<b>Aberfoyle Resources Limited</b>																																					
EXPLORATION DIVISION																																					
NORTH WEST TASMANIA																																					
MACKINTOSH AREA																																					
INTERPRETIVE GEOLOGY																																					
<table border="1"> <thead> <tr> <th>REVISED</th> <th>DATE</th> <th>BY</th> <th>REASON</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>15/10/87</td> <td>AMH</td> <td>Initial</td> </tr> <tr> <td>2</td> <td>21/09/88</td> <td>RJE</td> <td>Revised</td> </tr> <tr> <td>3</td> <td>21/09/88</td> <td>RJE</td> <td>Revised</td> </tr> <tr> <td>4</td> <td>21/09/88</td> <td>RJE</td> <td>Revised</td> </tr> <tr> <td>5</td> <td>21/09/88</td> <td>RJE</td> <td>Revised</td> </tr> </tbody> </table>		REVISED	DATE	BY	REASON	1	15/10/87	AMH	Initial	2	21/09/88	RJE	Revised	3	21/09/88	RJE	Revised	4	21/09/88	RJE	Revised	5	21/09/88	RJE	Revised	<table border="1"> <tr> <td>Compiled:</td> <td>AMH, AMN</td> </tr> <tr> <td>Drewn:</td> <td>AMH, AMN</td> </tr> <tr> <td>Traced:</td> <td>RJE</td> </tr> <tr> <td>Checked:</td> <td>AMH</td> </tr> <tr> <td>Plotter:</td> <td>MAC/IBC</td> </tr> </table>		Compiled:	AMH, AMN	Drewn:	AMH, AMN	Traced:	RJE	Checked:	AMH	Plotter:	MAC/IBC
REVISED	DATE	BY	REASON																																		
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2	21/09/88	RJE	Revised																																		
3	21/09/88	RJE	Revised																																		
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Location Code: K55/6/44		Scale: 1:10,000																																			
		Date: September, 1987																																			
		Plate No: MAC/IBC																																			

Aberfoyle Resources Limited  
EXPLORATION DIVISION

MACKINTOSH, TASMANIA

Zirconium Soil Geochemistry  
C Horizon  
Scale: 1-10000, RGP, 071292

Plate No.: MAC-358i

5 cm

4000

3000

2000

3000

4000

5000

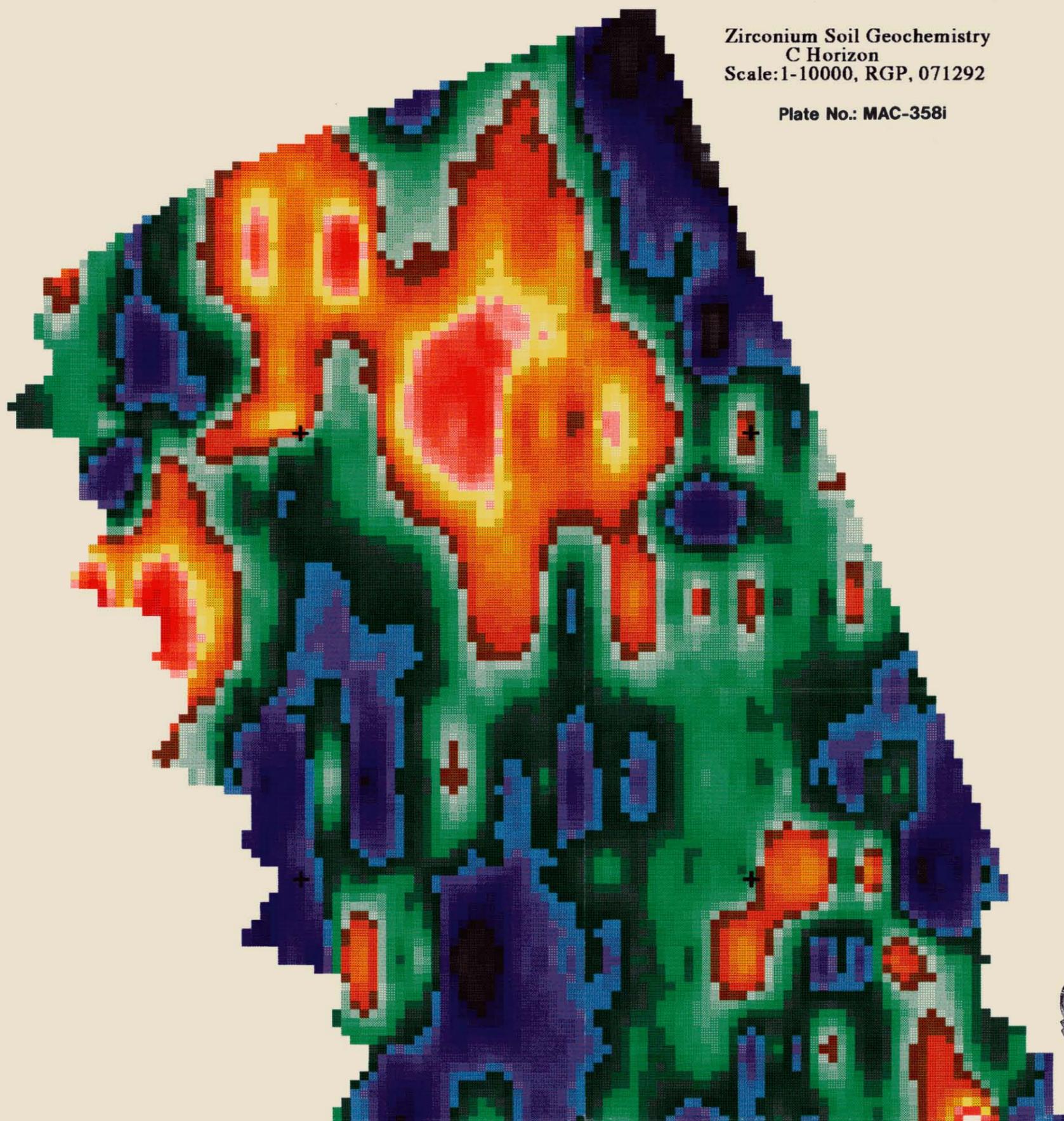
430 ppm

170 ppm



93-3410.

037347



# Aberfoyle Resources Limited

EXPLORATION DIVISION

MACKINTOSH, TASMANIA

Titanium Soil Geochemistry  
C Horizon  
Scale: 1-10000, RGP, 071292

Plate No.: MAC-358h

4000

3000

2000

3000

4000

5000

4500 ppm



+

1970<sup>+</sup> ppm

93-3410.

037348

Aberfoyle Resources Limited  
EXPLORATION DIVISION

MACKINTOSH, TASMANIA

Nickel Soil Geochemistry  
C Horizon  
Scale: 1-10000, RGP, 071292

Plate No.: MAC-358g

4000

3000

2000

3000

4000

30 ppm

2 ppm



93-3410.

037349

5000

Aberfoyle Resources Limited  
EXPLORATION DIVISION

MACKINTOSH, TASMANIA

Chromium Soil Geochemistry  
C Horizon  
Scale: 1-10000, RGP, 071292

Plate No.: MAC-358f

4000

3000

2000

3000

4000

5000

160 ppm

+

2 ppm



93-3410.

037350

Aberfoyle Resources Limited  
EXPLORATION DIVISION

MACKINTOSH, TASMANIA

Arsenic Soil Geochemistry  
C Horizon  
Scale: 1-10000, RGP, 071292

Plate No.: MAC-358e

4000

3000

2000

3000

4000

5000

15ppm

+

1.0ppm



93-3410.

037351

# Aberfoyle Resources Limited

EXPLORATION DIVISION

MACKINTOSH, TASMANIA

Barium Soil Geochemistry  
C Horizon

Scale: 1-10000, RGP, 071292

Plate No.: MAC-358d

4000

3000

2000

3000

4000

5000

878 ppm



+

115 ppm

93-3410.

037352

# Aberfoyle Resources Limited

EXPLORATION DIVISION

MACKINTOSH, TASMANIA

Zinc Soil Geochemistry

C Horizon

Scale: 1-10000, RGP, 071292

Plate No.: MAC-358c

4000

3000

2000

3000

4000

5000

55ppm



5.0ppm

93-3410.

037353

Aberfoyle Resources Limited  
EXPLORATION DIVISION

MACKINTOSH, TASMANIA

Lead Soil Geochemistry  
C Horizon  
Scale: 1-10000, RGP, 071292

Plate No.: MAC-358b

4 000

3 000

2 000

3 000

4 000

18ppm

+

1.0ppm  
+



93-3410.

037354

5 000

Aberfoyle Resources Limited  
EXPLORATION DIVISION

MACKINTOSH, TASMANIA

Copper Soil Geochemistry  
C Horizon  
Scale: 1-10000, RGP, 071292

Plate No.: MAC-358a



4000

3000

2000

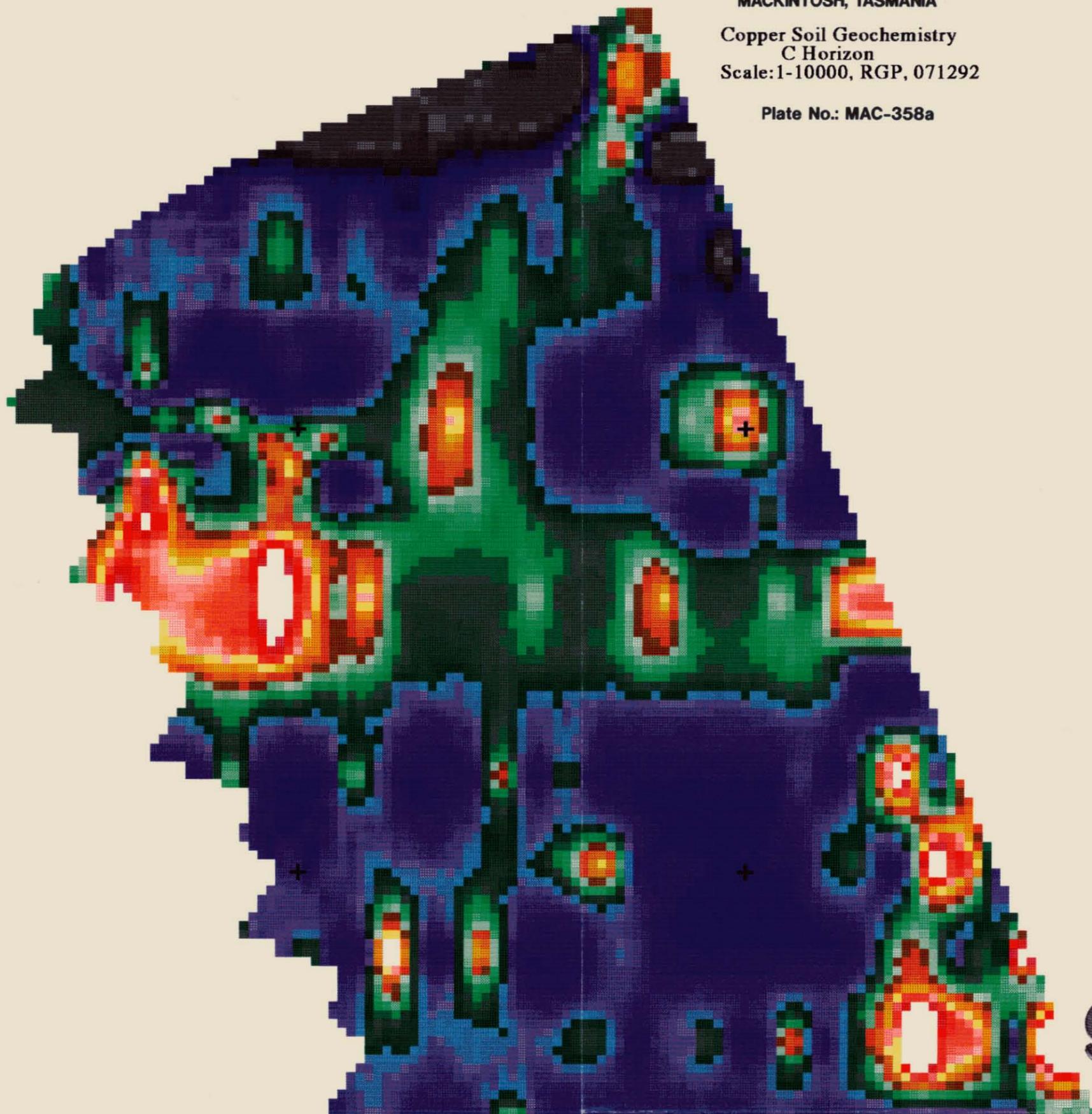
12ppm



+

+

1.2ppm



3000

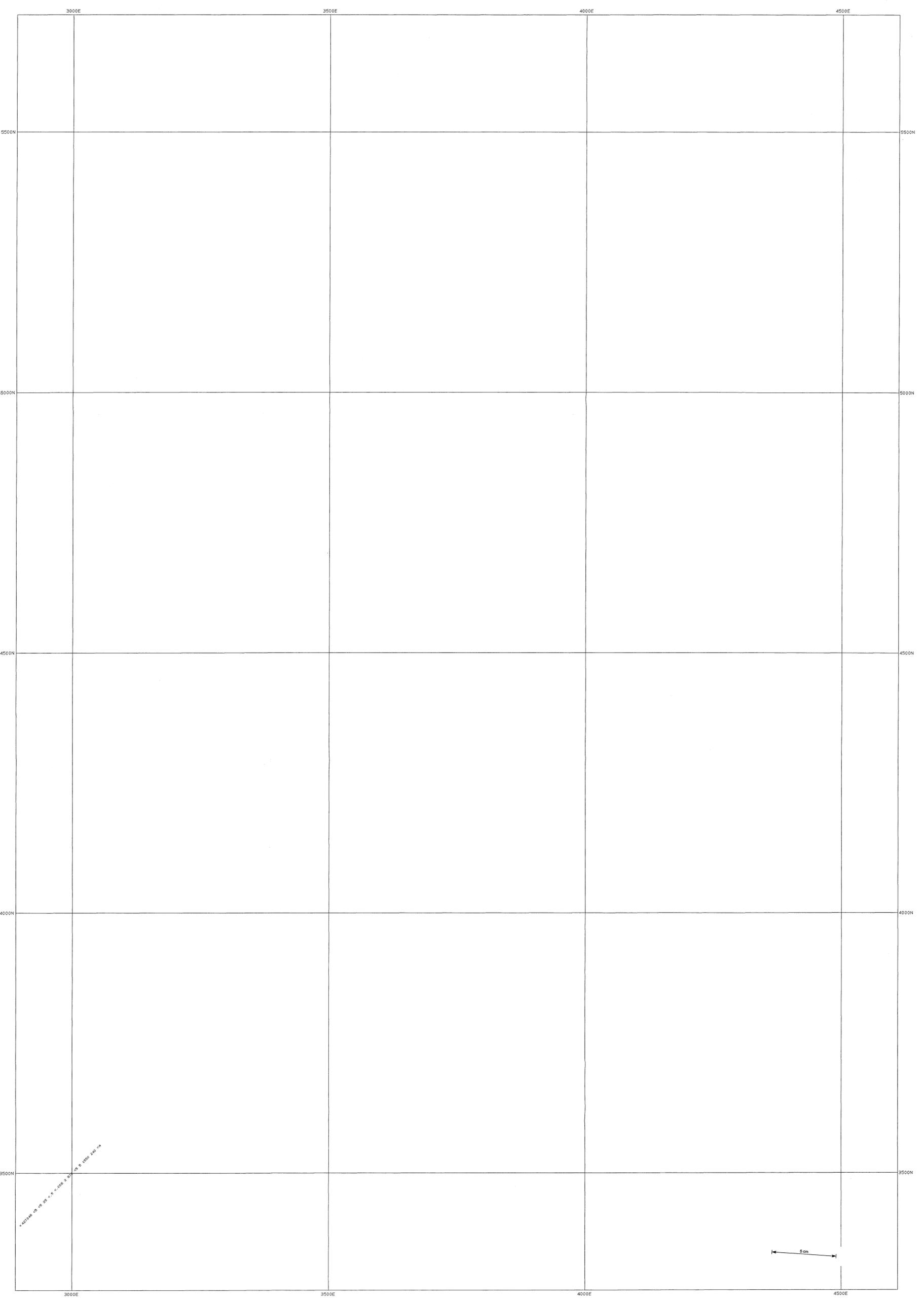
4000

5000

93-3410.

037355

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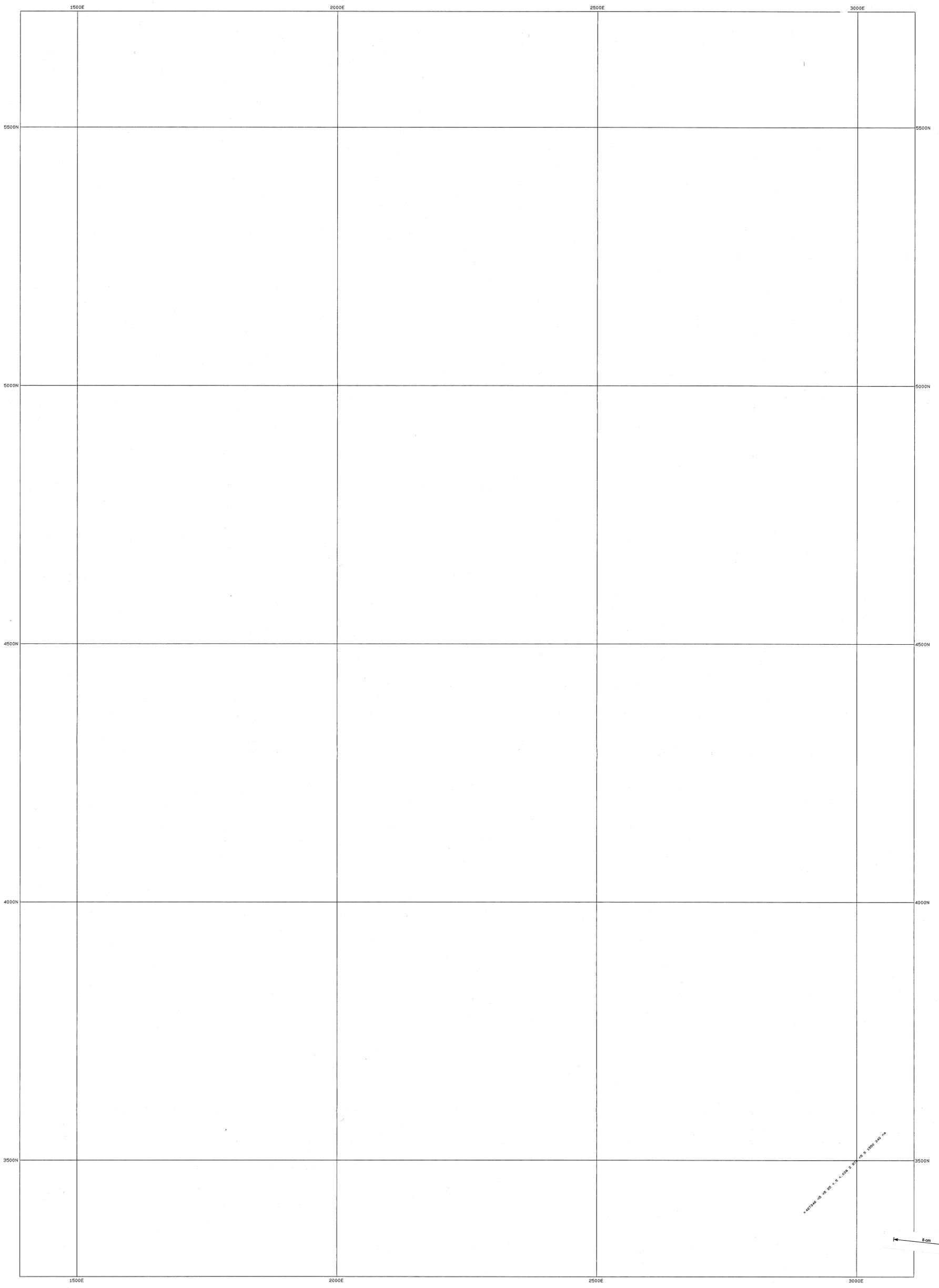


037356

REVISIONS DATE   BY   DESCRIPTION _____   _____   _____ _____   _____   _____ _____   _____   _____			Aberfoyle Resources Limited EXPLORATION DIVISION Tasmania Mackintosh E.L. 106/97 Area For Second Relinquishment Rockchip/Costean Assay Results Scale: 1:2500 Date: 10/12/92		Formulas: RMR Drawn: Checked: DBM Plate No: MACKBREC
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93-3410.1

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 DRAWN BY: MACKERRON

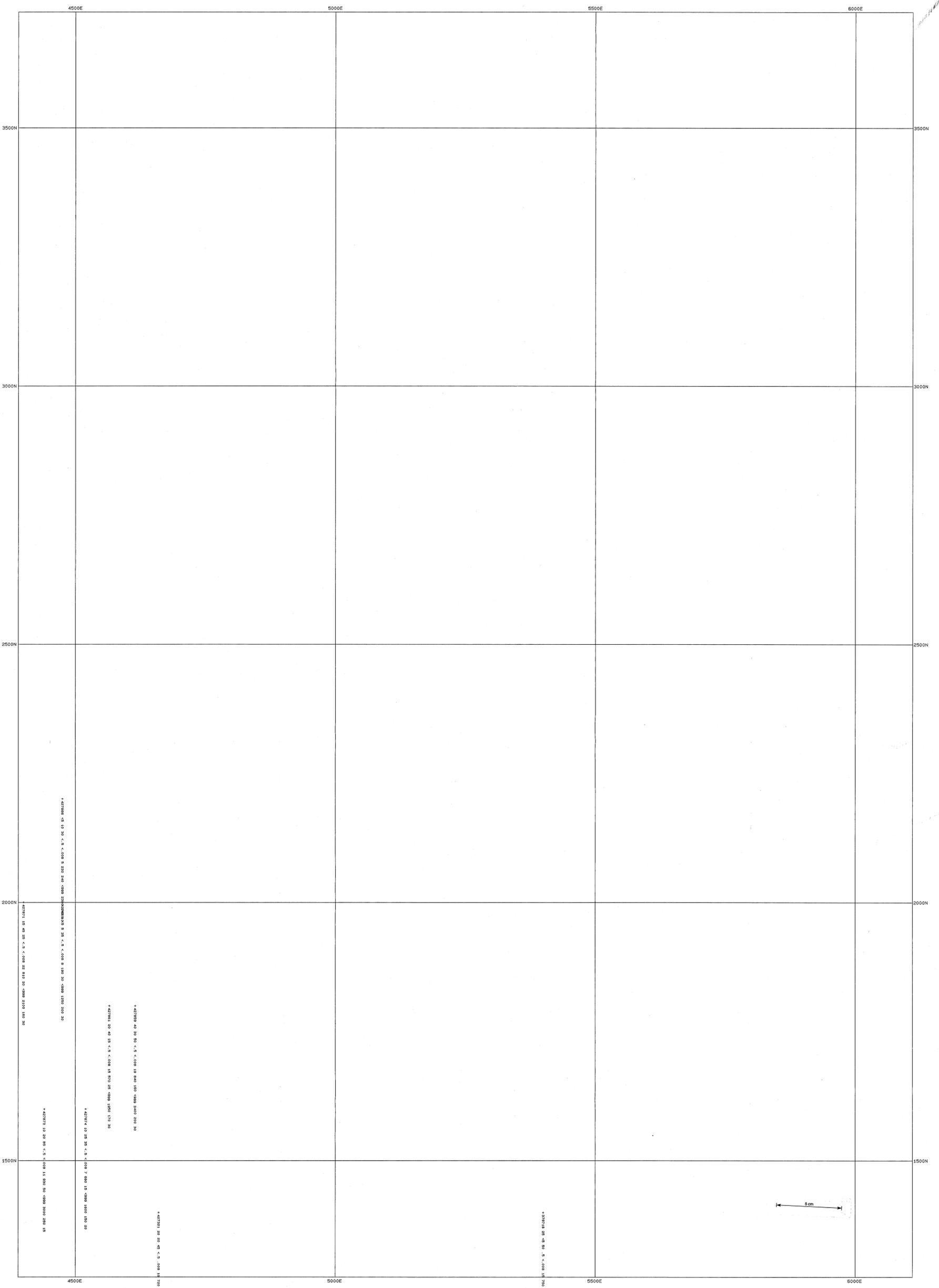


037357

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Tasmania Mackintosh E.L. 106/87		Drawn: MACKERRON
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Rockchip/Costean Assay Results		Date: 10/12/92
Scale: 1:2500	Sheet: 01 OF 02	Plan No: MACKERRON

93-3410.1

PROJECT: 037358  
 PLAN: 037358-01  
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 APPROVED: DM  
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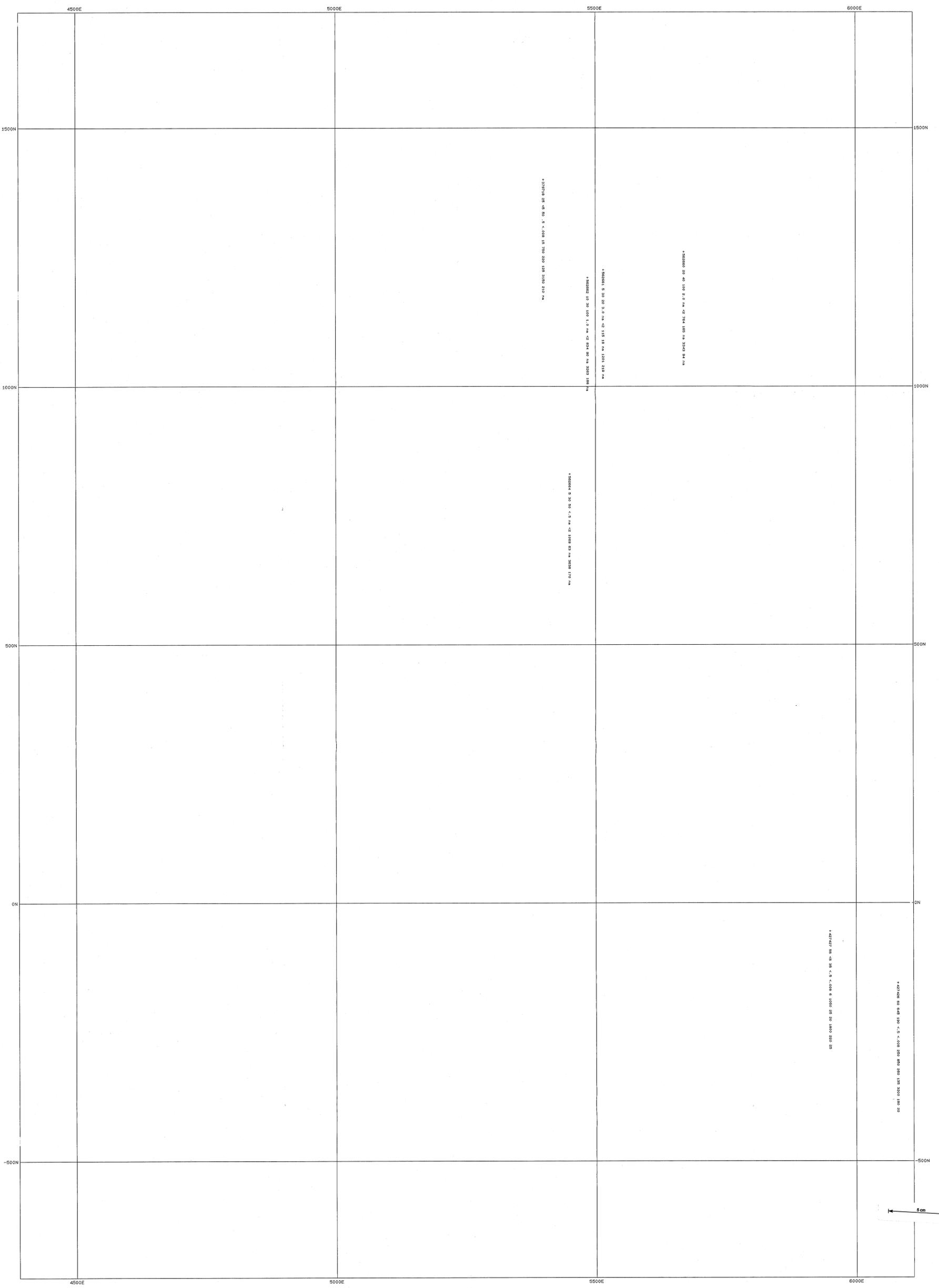


037358

Aberfoyle Resources Limited EXPLORATION DIVISION		Tasmania		Drawn: DM
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93-3410.1

PROJECT: 037359  
 PLAN: RELINQUISHMENT  
 NO. 0001  
 DATE: 10/15/92  
 DRAWN: MCGIBERTT  
 CHECKED: DEN  
 APPROVED: DEN  
 LOCATION: TASMANIA  
 PROJECT: 037359  
 PLAN: RELINQUISHMENT  
 NO. 0001  
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 DRAWN: MCGIBERTT  
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 PROJECT: 037359  
 PLAN: RELINQUISHMENT  
 NO. 0001  
 DATE: 10/15/92  
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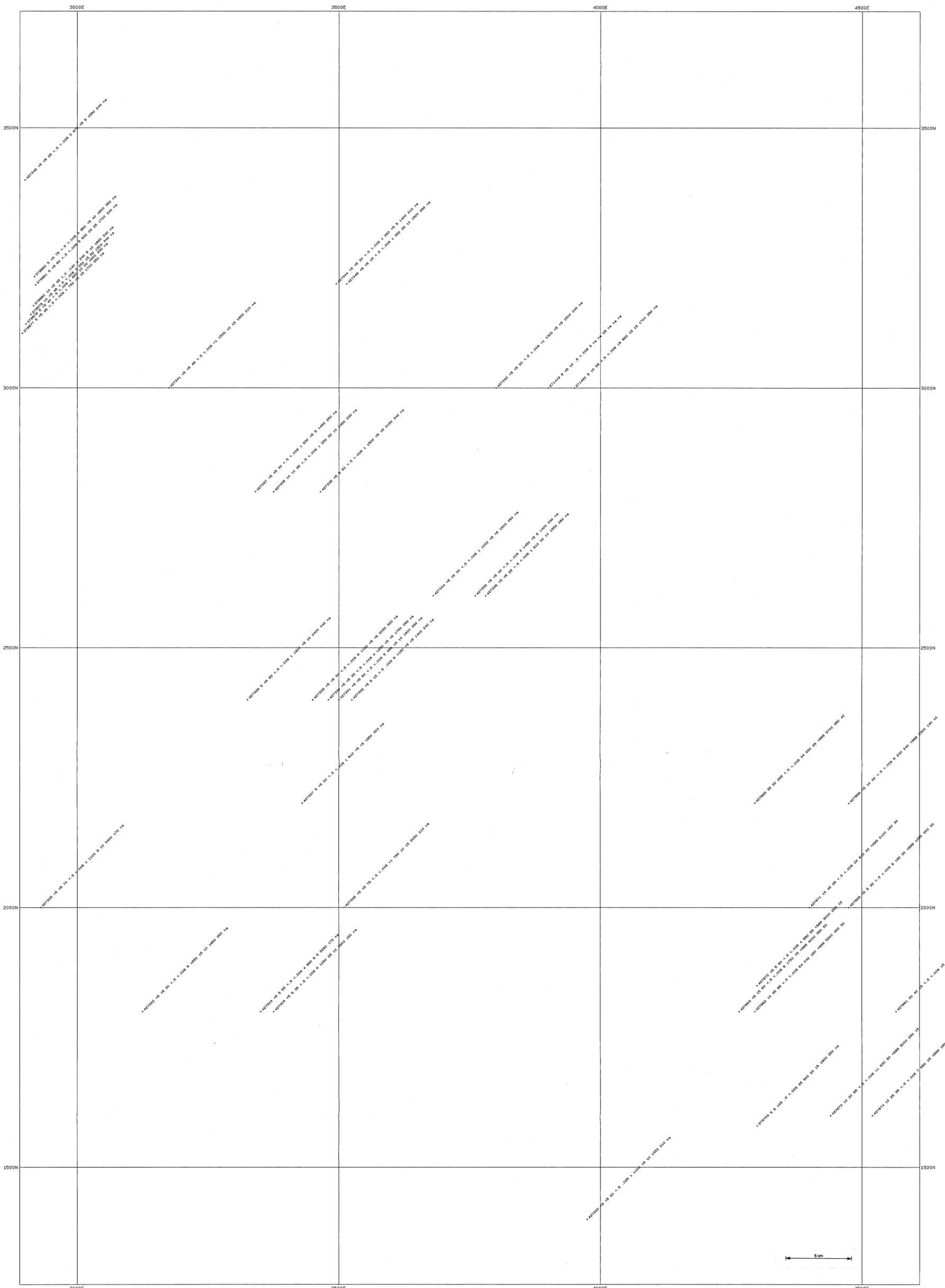


037359

Aberfoyle Resources Limited EXPLORATION DIVISION		Tasmania		Revision: 0001
Mackintosh E.L. 106/87		Area For Second Relinquishment		Drawn: MCGIBERTT
Rockchip/Coston Assay Results		10/15/92		Checked: DEN
Location Code: 0001		Scale: 1:2500		Approved: DEN
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93-3410.

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 PLAN: ...  
 SHEET: ...  
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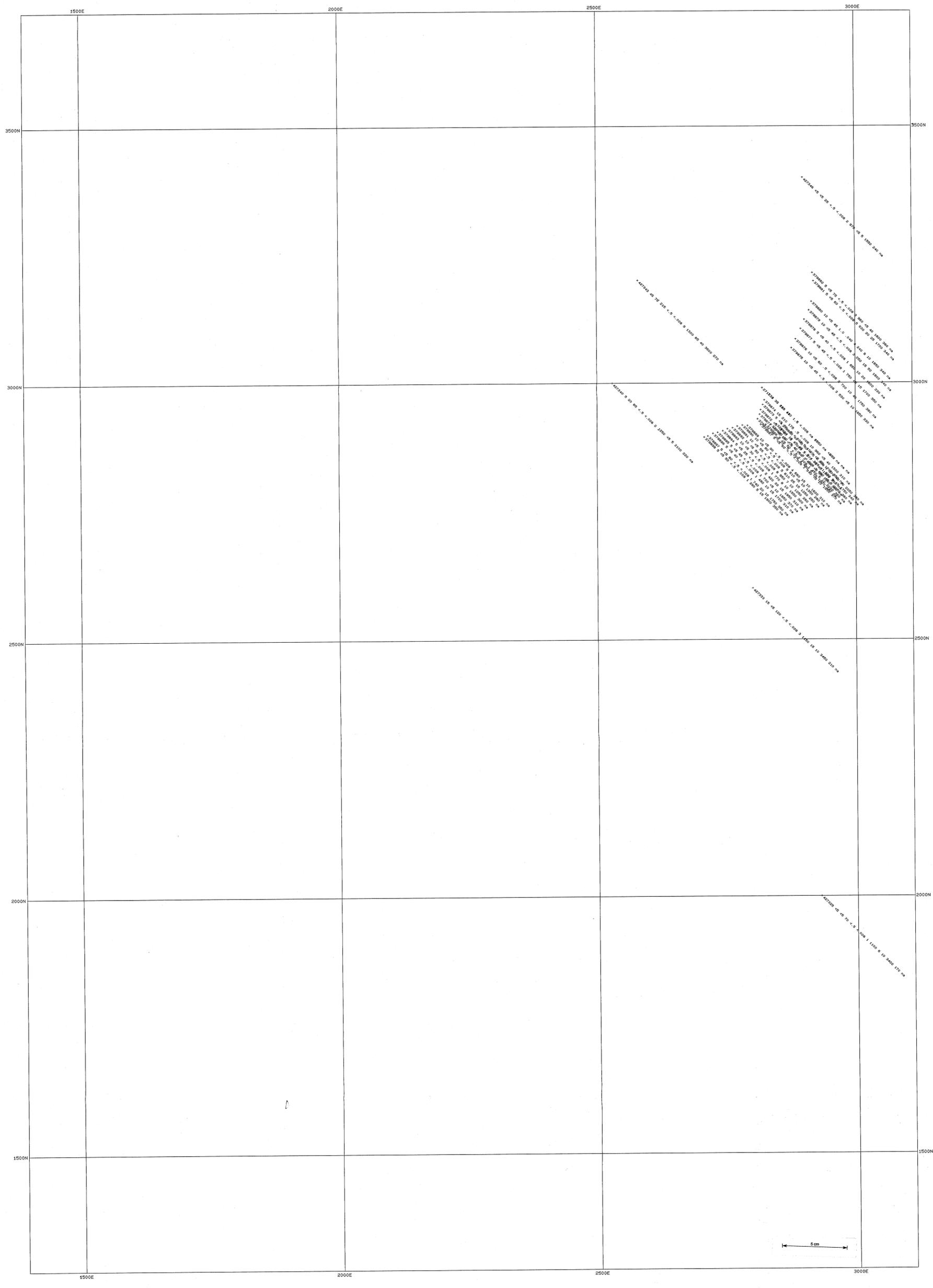
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93-3410



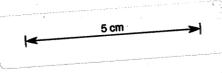
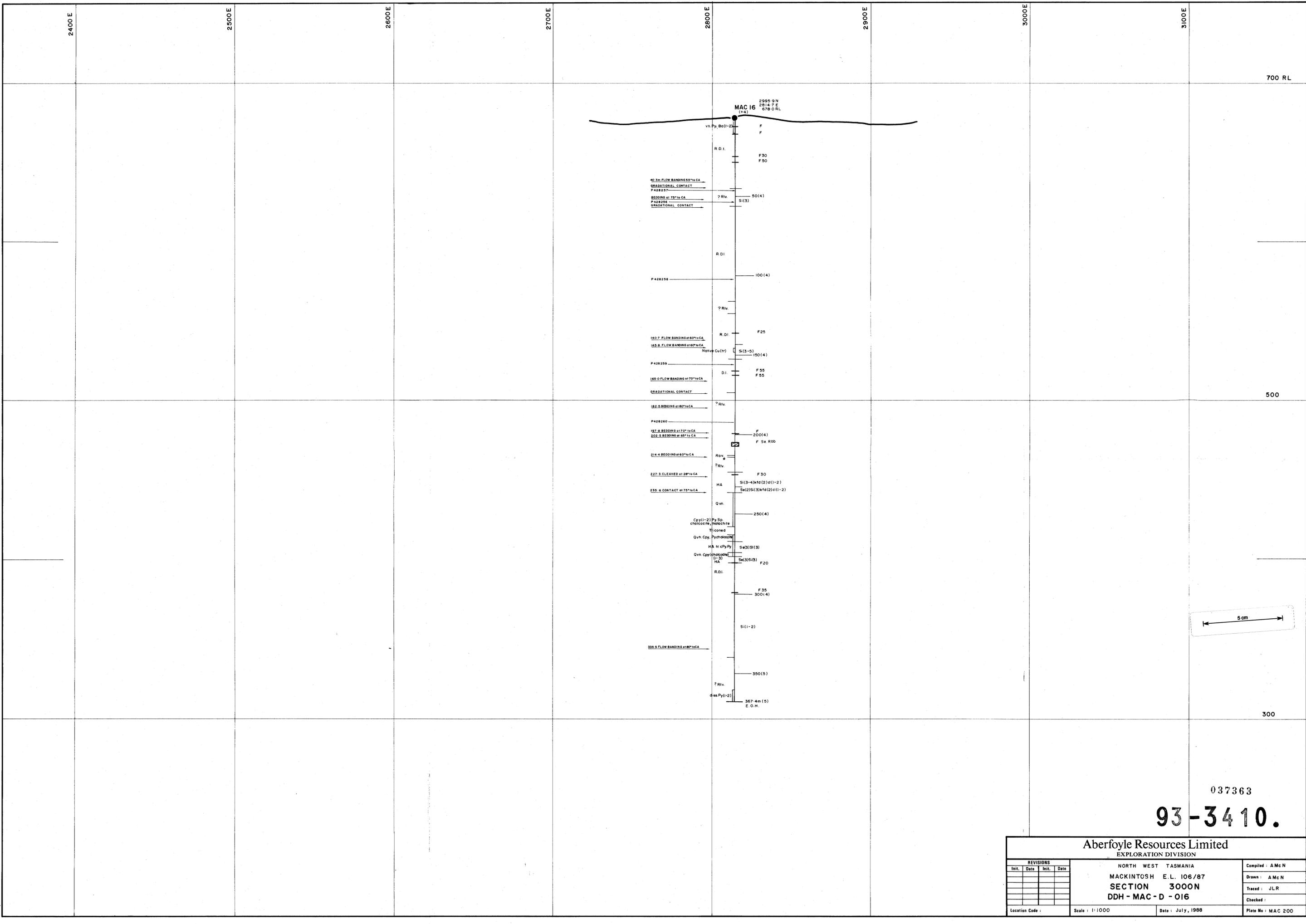
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 TITLE: AREA FOR SECOND RELINQUISHMENT  
 ROCKCHIP/COSTEEN ASSAY RESULTS



037362

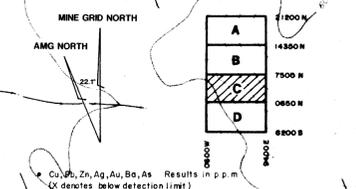
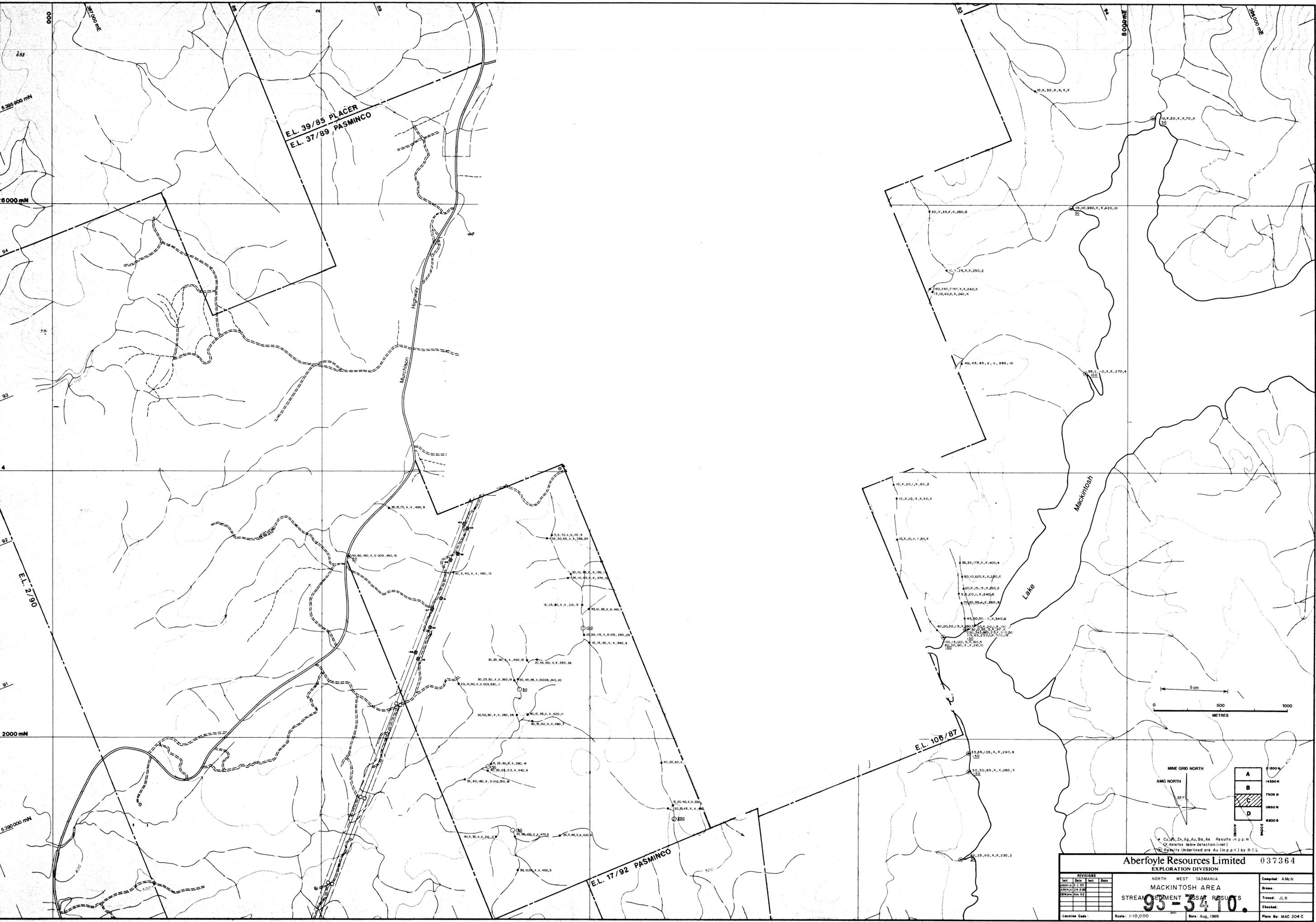
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Rockchip/Costeen Assay Results		Scale: 1:2500		Checked: J. HARRIS	
Date: 10/12/92		Sheet: 1 OF 1		Plate No: 037362	

93-3410.



037363  
**93-3410.**

<b>Aberfoyle Resources Limited</b> EXPLORATION DIVISION				Compiled : A Mc N																					
NORTH WEST TASMANIA MACKINTOSH E.L. 106/87 SECTION 3000 DDH - MAC - D - 016				Drawn : A Mc N Traced : JLR Checked :																					
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Init.	Date	Init.	Date																						



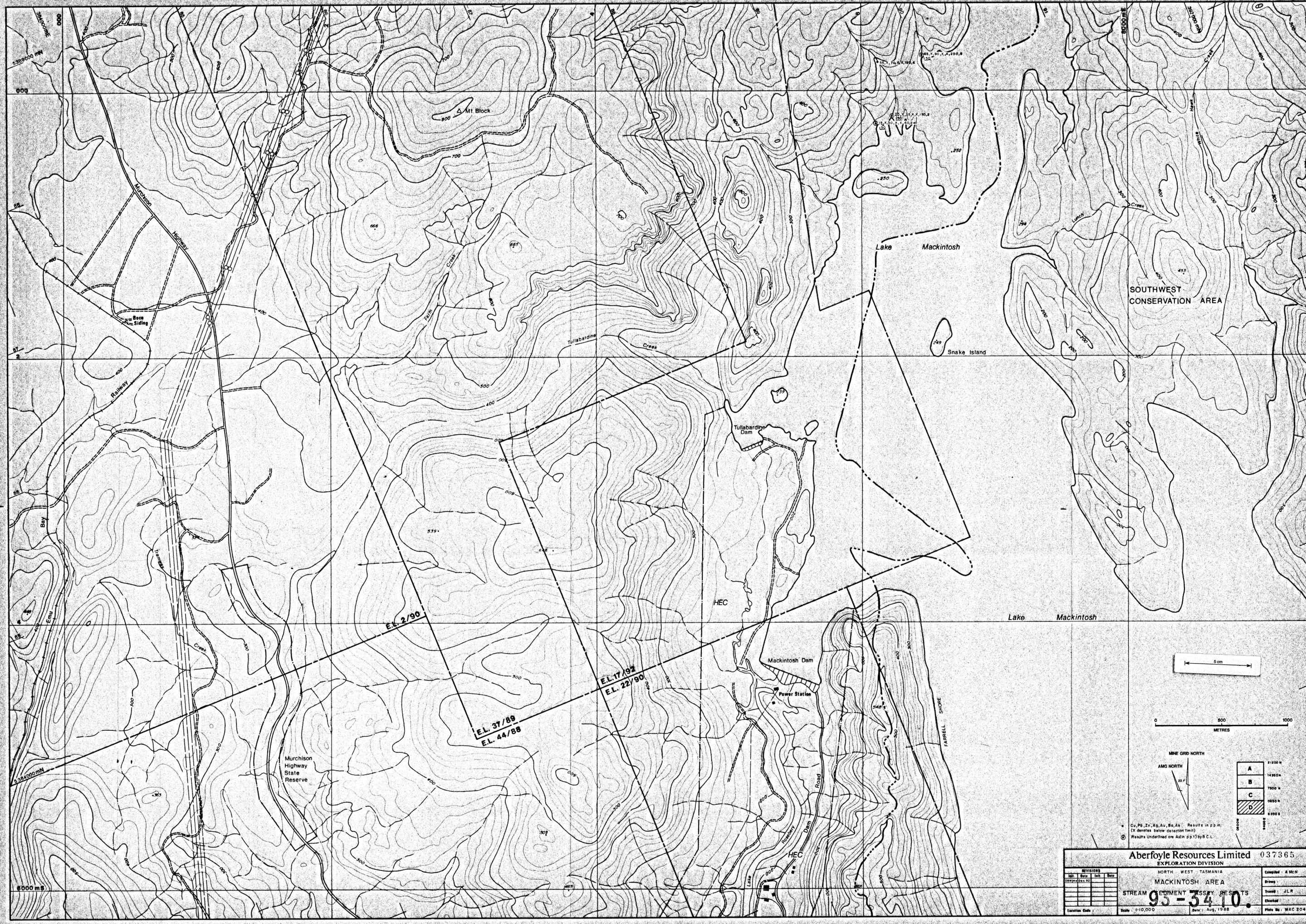
Aberfoyle Resources Limited 037364  
EXPLORATION DIVISION

REVISIONS			
Int.	Date	Int.	Date

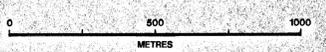
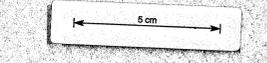
NORTH WEST TASMANIA  
**MACKINTOSH AREA**  
 STREAM SEDIMENT ASSAY RESULTS  
**93-3410.**  
 Scale: 1:10,000 Date: Aug, 1988 Plate No: MAC 204 C

Compiled: A.McN
Drewn:
Traced: J.L.R
Checked:

• Cu, Pb, Zn, Ag, Au, Ba, As Results in p.p.m.  
 (X denotes below detection limit)  
 ◯ Results Underlined are Au (in p.p.t.) by B.C.L.



SOUTHWEST CONSERVATION AREA



A	14200 N
B	7500 N
C	2800 N
D	4200 E

• Cu, Pb, Zn, Ag, Au, Bi, As Results in ppm  
 (X denotes below detection limit)  
 © Results Underlined are Adu (p.1) by S.C.L.

**Aberfoyle Resources Limited** 037365  
 EXPLORATION DIVISION  
 NORTH - WEST TASMANIA  
**MACKINTOSH AREA**  
 STREAM SEDIMENT ASSAY RESULTS  
**95-3410**  
 Scale: 1:10,000 Date: Aug, 1988 Plate No: MAC 204D

REVISIONS			
No.	Date	Init.	Date

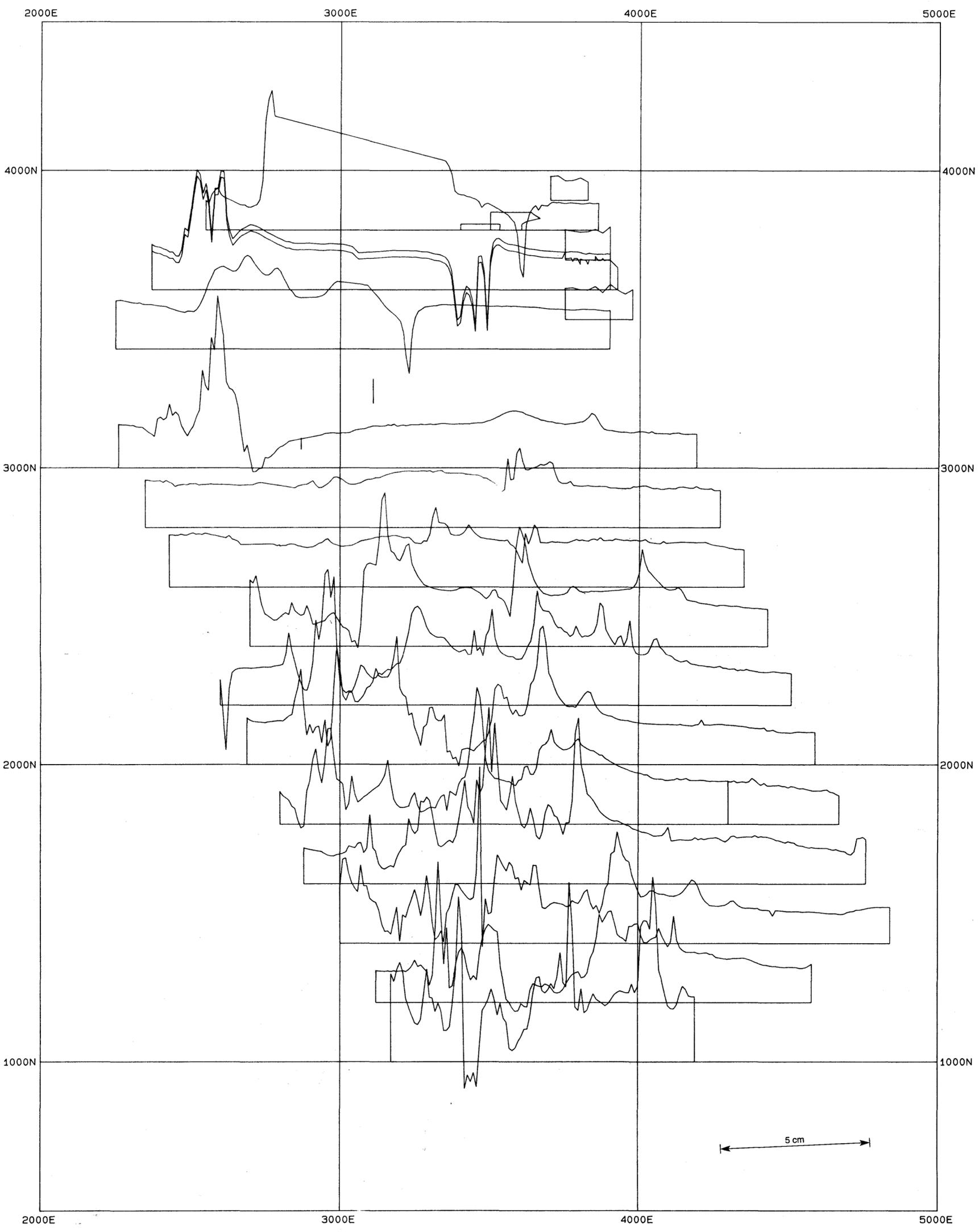
Author: A.M.N.  
 Drawn: J.L.R.  
 Checked: J.L.R.  
 Plate No: MAC 204D

PROSPECT: mac  
 PLAN definition:  
 E: 2000.0 5000.0  
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 PLOTfile: mac235.plt

USER NOTES  
 VERTICAL SCALE 70nT/cm  
 BASE LEVEL 50nT

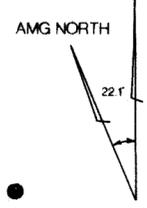
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 Polygon is being used  
 Minimum Sample: -999  
 Maximum Sample: 9999999

Plot option number 7  
 \* PROFILE \*  
 T.Fid (ppm)  
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 Max dist in mm: 100

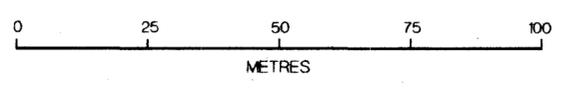


037366

MINE GRID NORTH



**93-3410.**



Aberfoyle Resources Limited EXPLORATION DIVISION													
Tasmania Mackintosh E.L.106/87 Animal Creek Area Ground Magnetic Profiles													
Location Code:		Scale: 1 : 10000	Date: 18/12/92										
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REVISIONS													
INIT.	DATE												
		Traced:	Checked: DBW										
			Plate No.: MAC235										

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 SECTION: definition  
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 N: -815.0  
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 Backward extent: 10.0  
 Section Start: 0.0  
 Section Length: 715.0  
 PDF file: mh1000m16.pdf  
 PLOT file: mh1000m16.pdf  
 PLOT file: 006.plt

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 Base in mm: 0.000  
 Units per mm: 4.000  
 Max dist in mm: 50

gch Zn (ppm)  
 Base in mm: 0.000  
 Units per mm: 20.000  
 Max dist in mm: 50

gch Ag (ppm)  
 Base in mm: 0.000  
 Units per mm: 20.000  
 Max dist in mm: 20

gch Au (ppm)  
 Base in mm: 0.000  
 Units per mm: 0.000  
 Max dist in mm: 20

gch Ba (ppm)  
 Base in mm: 0.000  
 Units per mm: 50.000  
 Max dist in mm: 50

gch As (ppm)  
 Base in mm: 0.000  
 Units per mm: 1.000  
 Max dist in mm: 50

gch Cr (ppm)  
 Base in mm: 0.000  
 Units per mm: 2.000  
 Max dist in mm: 50

gch Ni (ppm)  
 Base in mm: 0.000  
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 Units per mm: 10.000  
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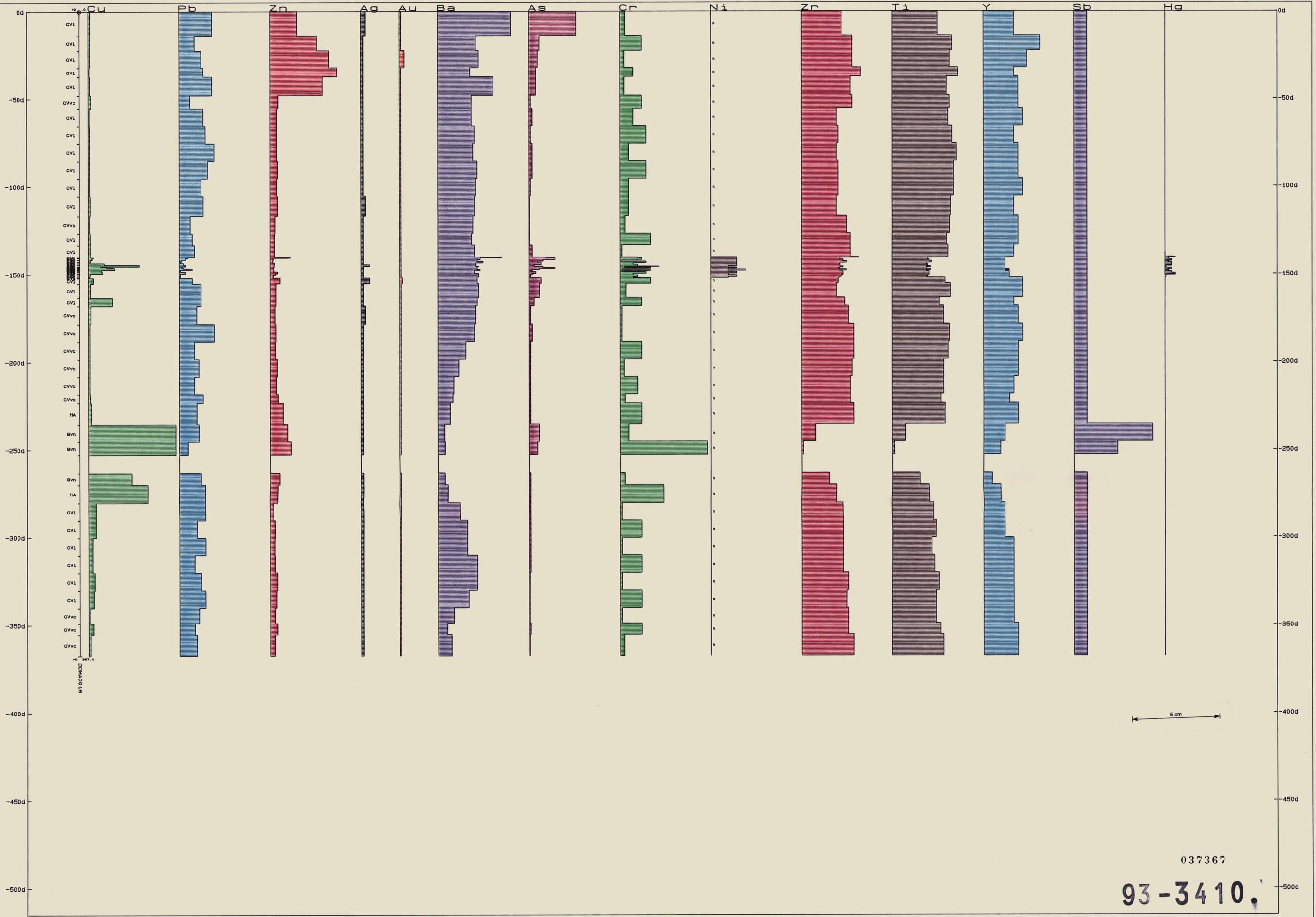
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 Units per mm: 20.000  
 Max dist in mm: 50

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 gch Peak



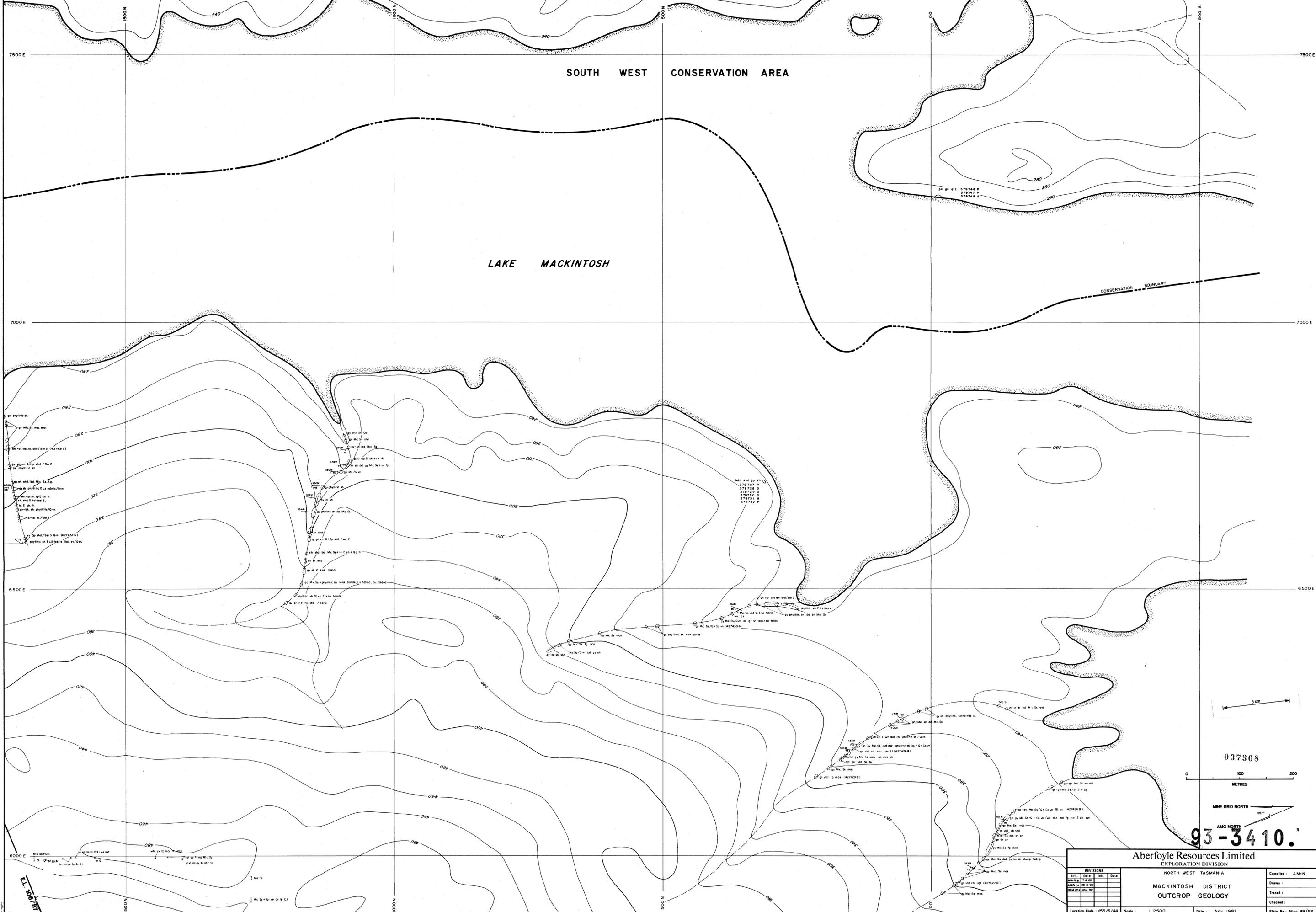
037367  
 93-3410

Aberfoyle Resources Limited				Compiled: RdeB	
EXPLORATION DIVISION				Drawn:	
Tasmania				Traced:	
Mackintosh E.L. 106/87				Checked: DBW	
Geochemical Profiles				Date: 04/12/92	
DDH MAC-16				Plate No.: MAC200A	
Location Code:		Scale: 1: 1000		Date: 04/12/92	
REVISIONS		Date:		Date:	
Init. Date	Init. Date				

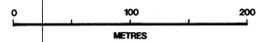
SOUTH WEST CONSERVATION AREA

LAKE MACKINTOSH

CONSERVATION BOUNDARY



037368



MINE GRID NORTH  
22°

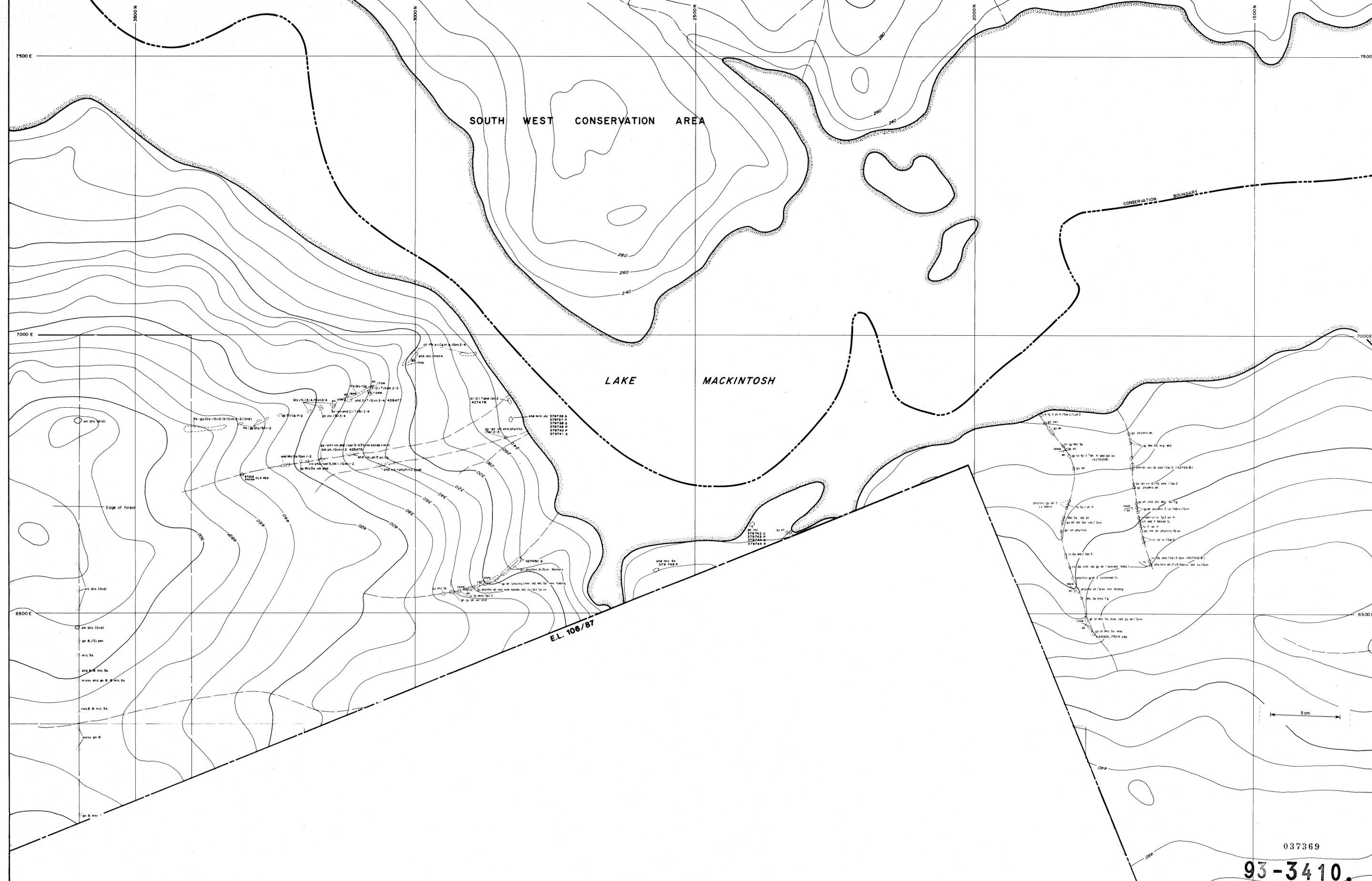
AMG NORTH  
**93-3410.**

Aberfoyle Resources Limited  
EXPLORATION DIVISION

REVISIONS			
Int.	Date	Int.	Date
1	17.4.88		
2	28.2.90		
3	10.11.92		

Location Code: K55/6/44    Scale: 1:2500    Date: Nov 1987    Compil: A/MCN  
 Drawn: \_\_\_\_\_  
 Traced: \_\_\_\_\_  
 Checked: \_\_\_\_\_  
 Plate No: Moc B9/55

NORTH WEST TASMANIA  
MACKINTOSH DISTRICT  
OUTCROP GEOLOGY



7500 E 7500 E 7500 E 7500 E

7000 E 7000 E 7000 E 7000 E

6500 E 6500 E 6500 E 6500 E

3500 N 3000 N 2500 N 2000 N 1500 N

SOUTH WEST CONSERVATION AREA

LAKE MACKINTOSH

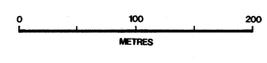
CONSERVATION BOUNDARY

EL. 106/87

5cm

037369

93-3410.



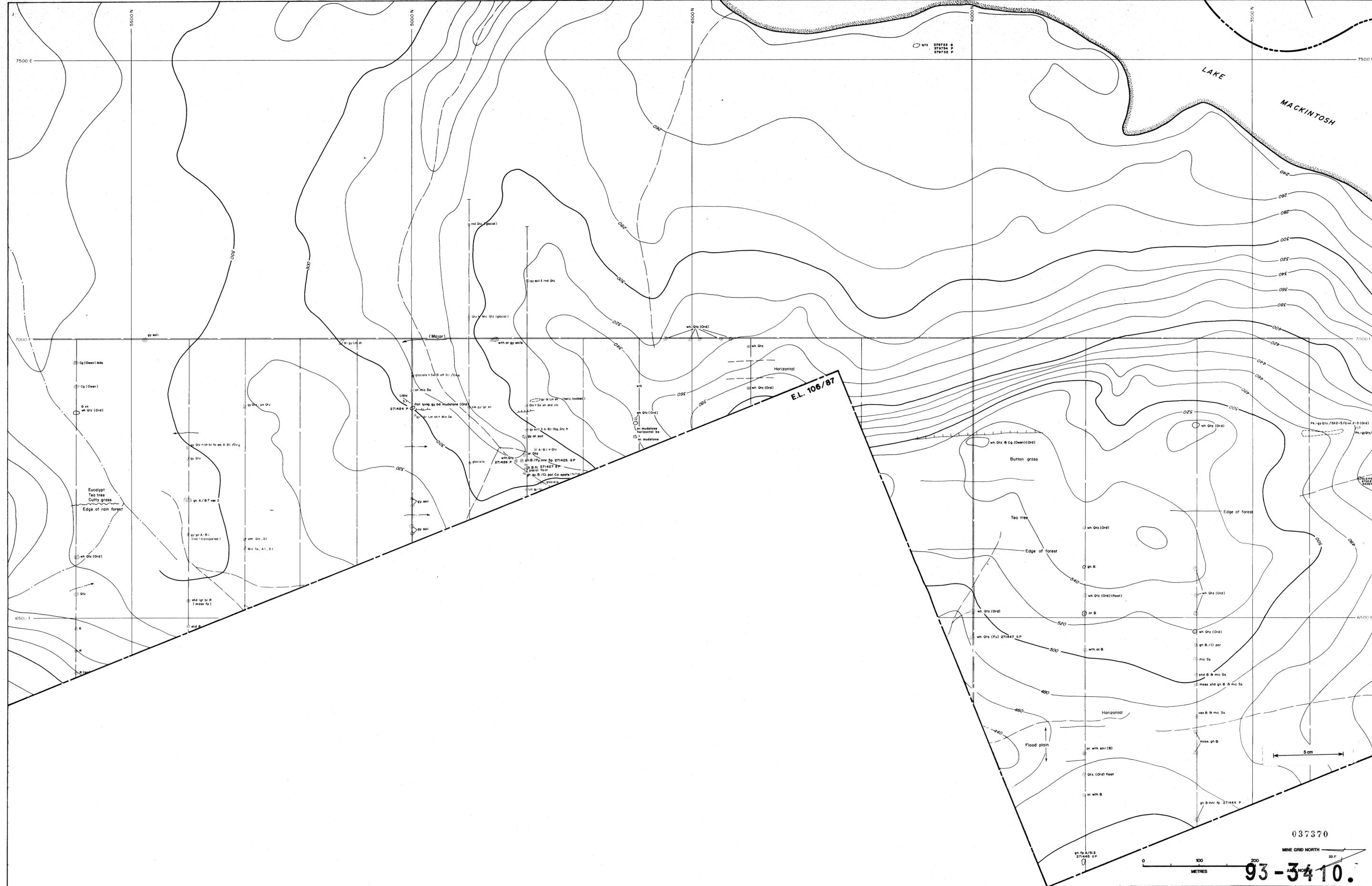
MINE GRID NORTH  
22.1'  
AMG NORTH

**Aberfoyle Resources Limited**  
EXPLORATION DIVISION

NORTH WEST TASMANIA  
**MACKINTOSH DISTRICT**  
**OUTCROP GEOLOGY**

REVISIONS				Compiled : A.McN
Init.	Date	Init.	Date	
				Drawn : Traced : Checked :

Location Code: K55/6/44    Scale: 1:2500    Date: Nov 1987    Plate No: MAC 89/KK



037370

MINE GRID NORTH

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METRES

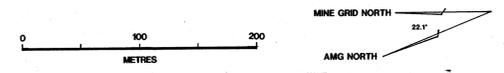
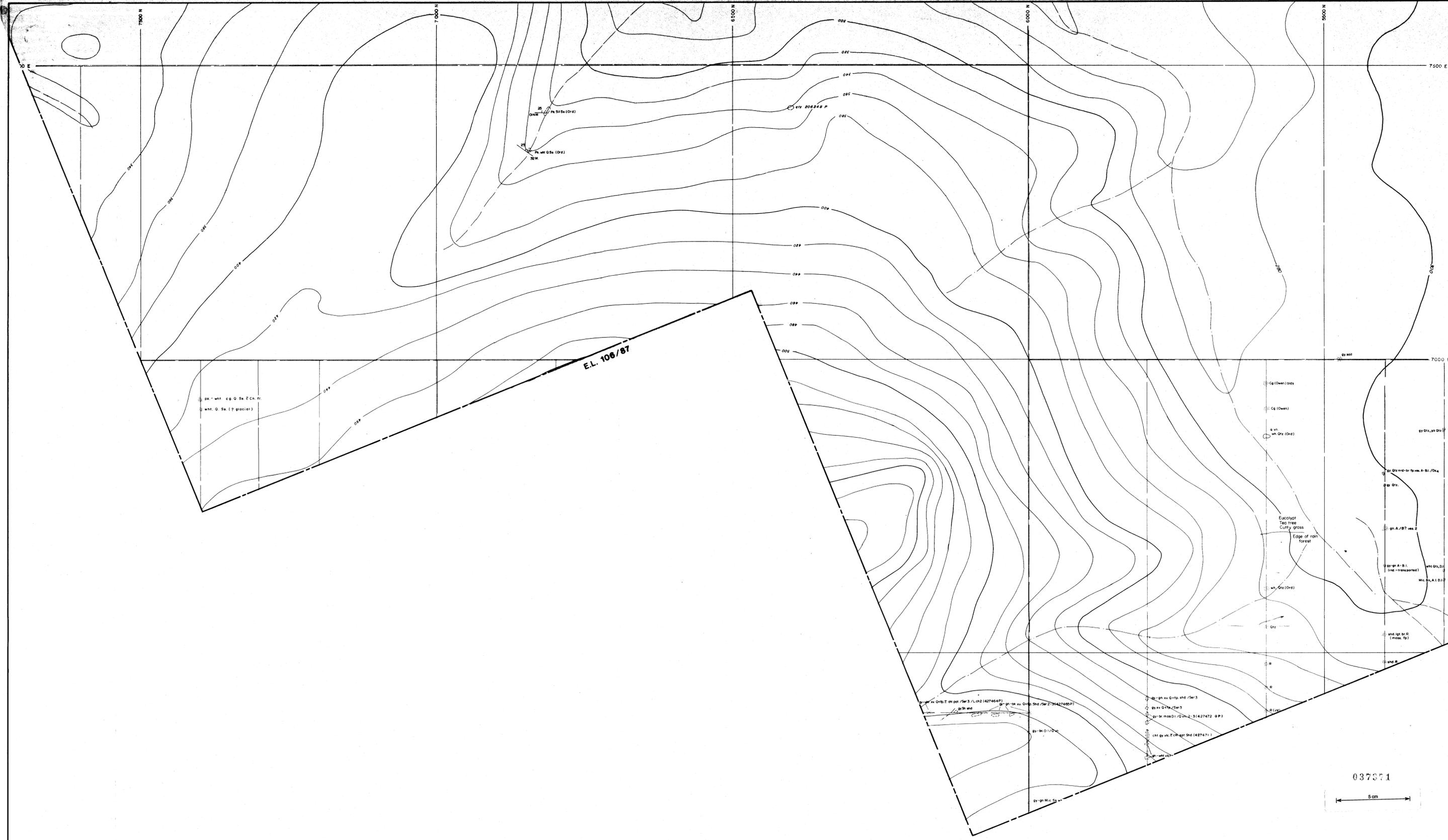
**93-3410.**

**Aberfoyle Resources Limited**  
EXPLORATION DIVISION

NORTH WEST TASMANIA  
MACKINTOSH E.L. 2/70 / HATFIELD E.L. 15/73  
**OUTCROP GEOLOGY**

REVISIONS			
Rev.	Date	By	Check
1	15/08/88	DJJ	DJJ
2	18/08/88	DJJ	DJJ
3	18/08/88	DJJ	DJJ
4	18/08/88	DJJ	DJJ
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6	18/08/88	DJJ	DJJ
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Exploration Code: K55/6/44    Scale: 1:2500    Date: October, 1986    Plate No: MAC 89/EE



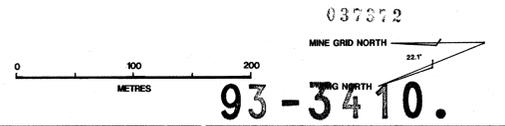
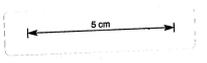
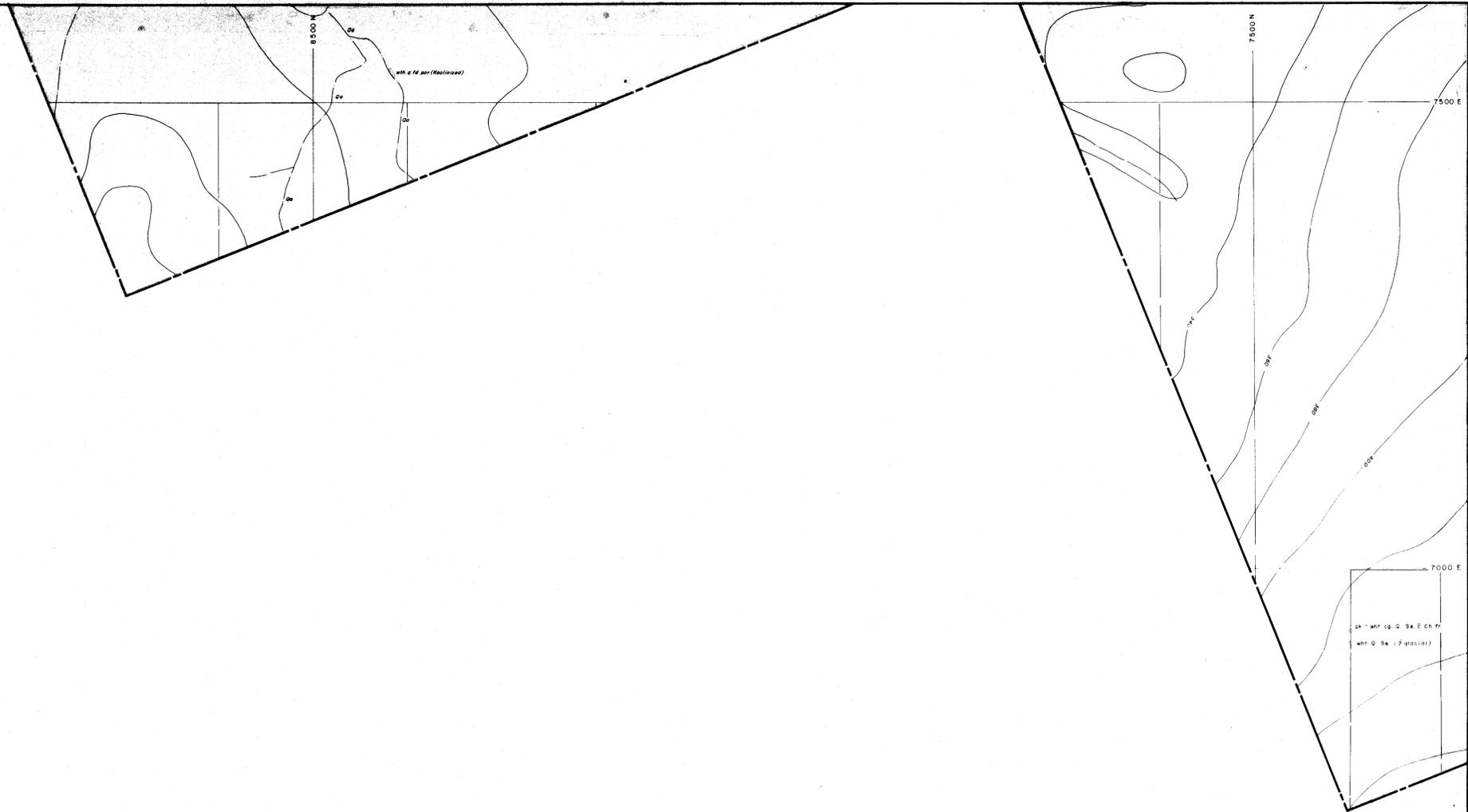
037371

5 cm

**93-3410.**

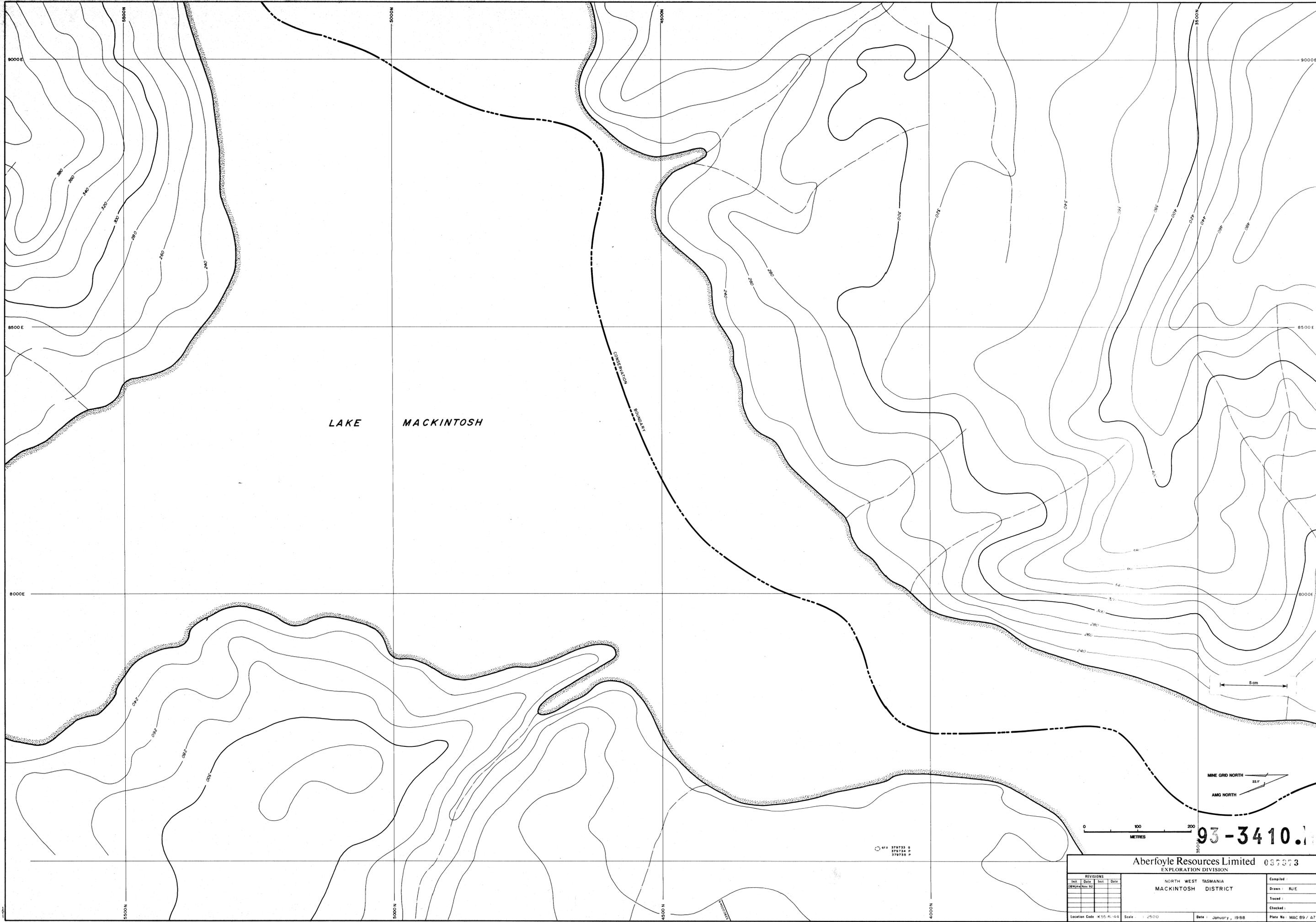
**Aberfoyle Resources Limited**  
EXPLORATION DIVISION

NORTH WEST TASMANIA				Compiled: AMH
MACKINTOSH E.L. 2/7C / HATFIELD E.L. 15/73				Drawn: AMH
<b>OUTCROP GEOLOGY</b>				Traced: GLC
Location Code: K55/6/44				Checked:
Date: February, 1988				Plate No: M05 B9/FF



Aberfoyle Resources Limited  
EXPLORATION DIVISION

REVISIONS: Date: 2/8/85 Drawn: J.S. Mac Checked: D.J.J. AMH Date: 2/8/85 Drawn: J.S. Mac Checked: D.J.J. AMH Date: 2/8/85 Drawn: J.S. Mac Checked: D.J.J. AMH Date: 2/8/85 Drawn: J.S. Mac Checked: D.J.J. AMH	NORTH WEST TASMANIA MACKINTOSH EL. 2/70 / HATFIELD EL. 1573 OUTCROP GEOLOGY	Date: February, 1985 Plate No: Mac 89/86
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LAKE MACKINTOSH

CONSERVATION BOUNDARY

5 cm

MINE GRID NORTH  
22'  
AMG NORTH

0 100 200  
METRES

93-3410.1

Aberfoyle Resources Limited  
EXPLORATION DIVISION

NORTH WEST TASMANIA  
MACKINTOSH DISTRICT

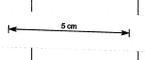
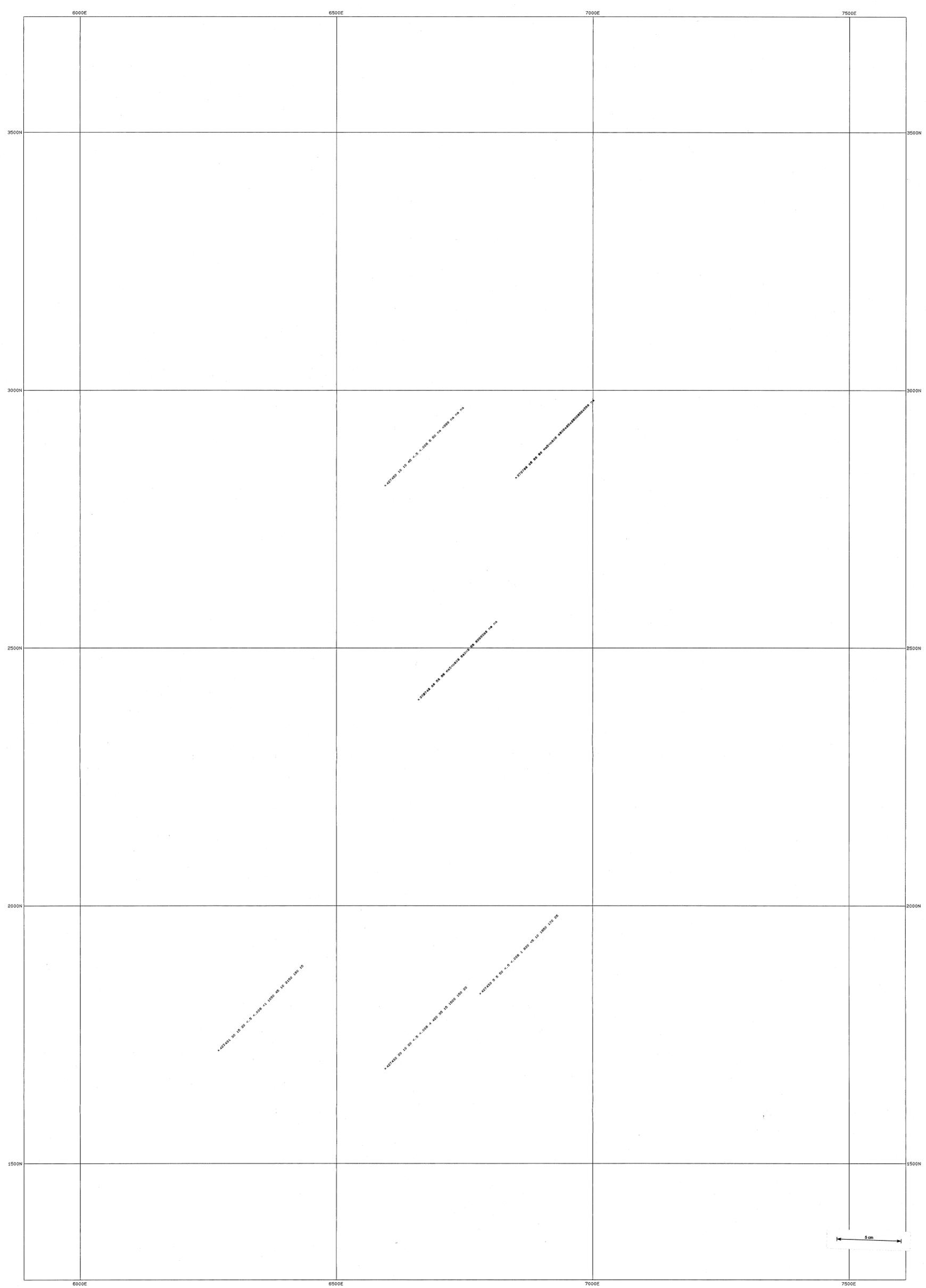
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Init.	Date	Iss.	Date
SEW	Nov 92		

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Drawn:	RJE
Traced:	
Checked:	

Location Code: K55A/44 Scale: 1:2500 Date: January, 1988 Plate No: MAC 89 / A7



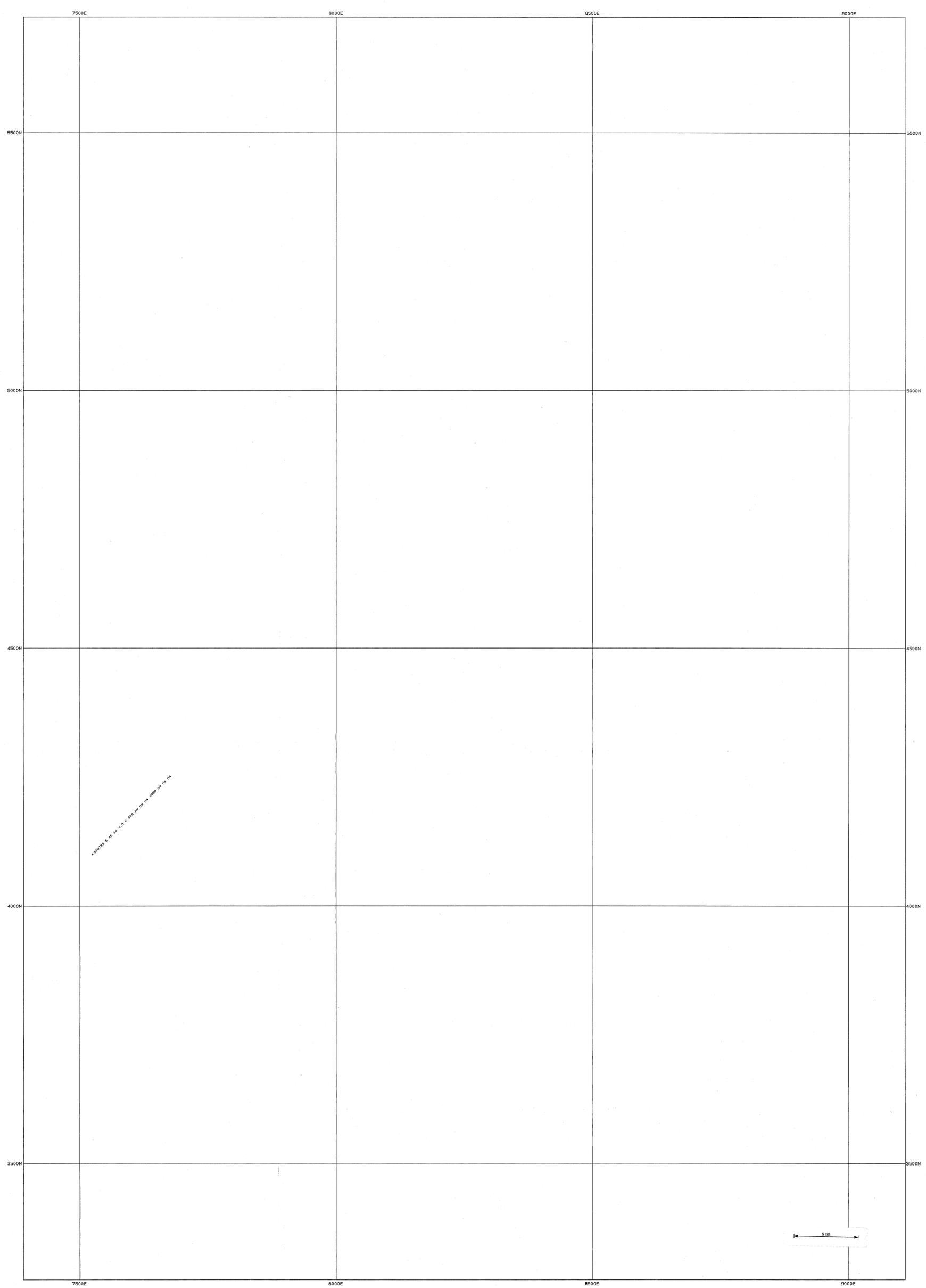
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 SHEET: 01 OF 01  
 DATE: 10/18/92  
 DRAWN BY: [Name]  
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 APPROVED BY: [Name]



93-3410.

Aberfoyle Resources Limited		EXPLORATION DIVISION		037375
Tasmania		Meckintosh E.L. 106/87		Revision: 001
Area For Second Relinquishment		Rockchip/Costean Assay Results		Drawn: [Name]
Location: [Name]		Scale: 1:4000		Date: 10/18/92
Sheet: 01 of 01		Project: 93-3410		Drawn: [Name]

PROJECT NO.  
 PLAN SHEET NO.  
 DATE  
 DRAWN BY  
 CHECKED BY  
 TITLE



4000N  
 4500N  
 5000N  
 5500N

5m

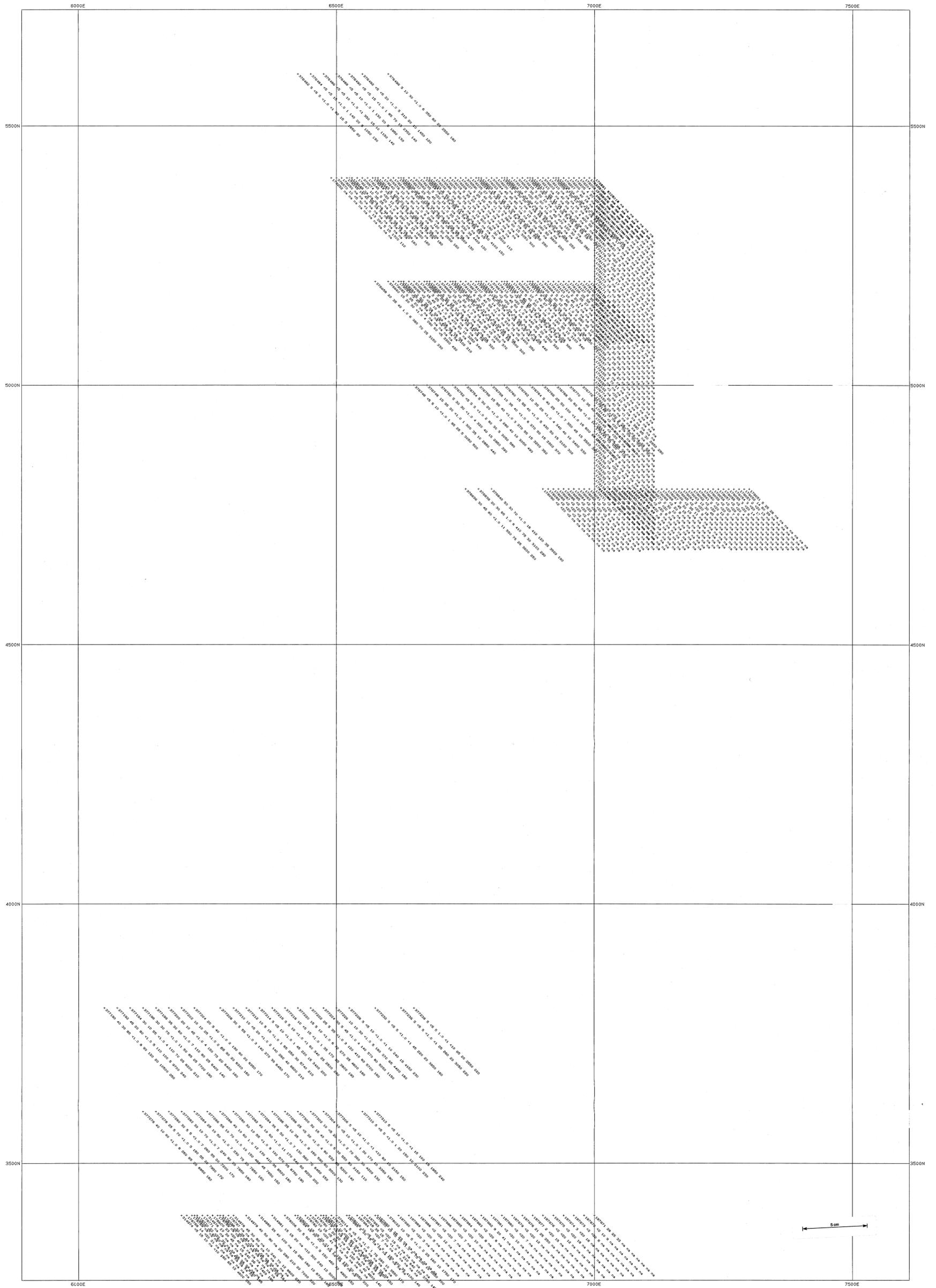
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Aberfoyle Resources Limited		EXPLORATION DIVISION		037376
Tasmania		Meckintosh E.L. 106/87		Area For Second Relinquishment
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REVISIONS	DATE	BY	DESCRIPTION	
Location Code	Scale: 1:2500	Date: 10/12/92	Sheet No.: 4038847	





PROJECT: 93-3410  
 SHEET: 1 OF 1  
 DATE: 10/12/92  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 TITLE: [Title]



037379

Aberfoyle Resources Limited EXPLORATION DIVISION		Revision: 0000
Tasmania		Drawn:
Hekintosh E.L. 106/87		Checked: DM
Area For Second Relinquishment		Scale: 1:2500
Soil Sample Assay Results		Date: 10/12/92
Location Code:		Sheet No: MAC9506E

93-3410.



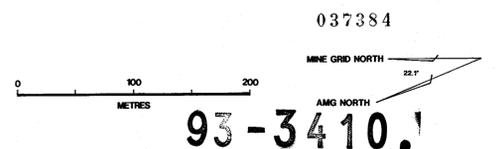








E.L. 106/87

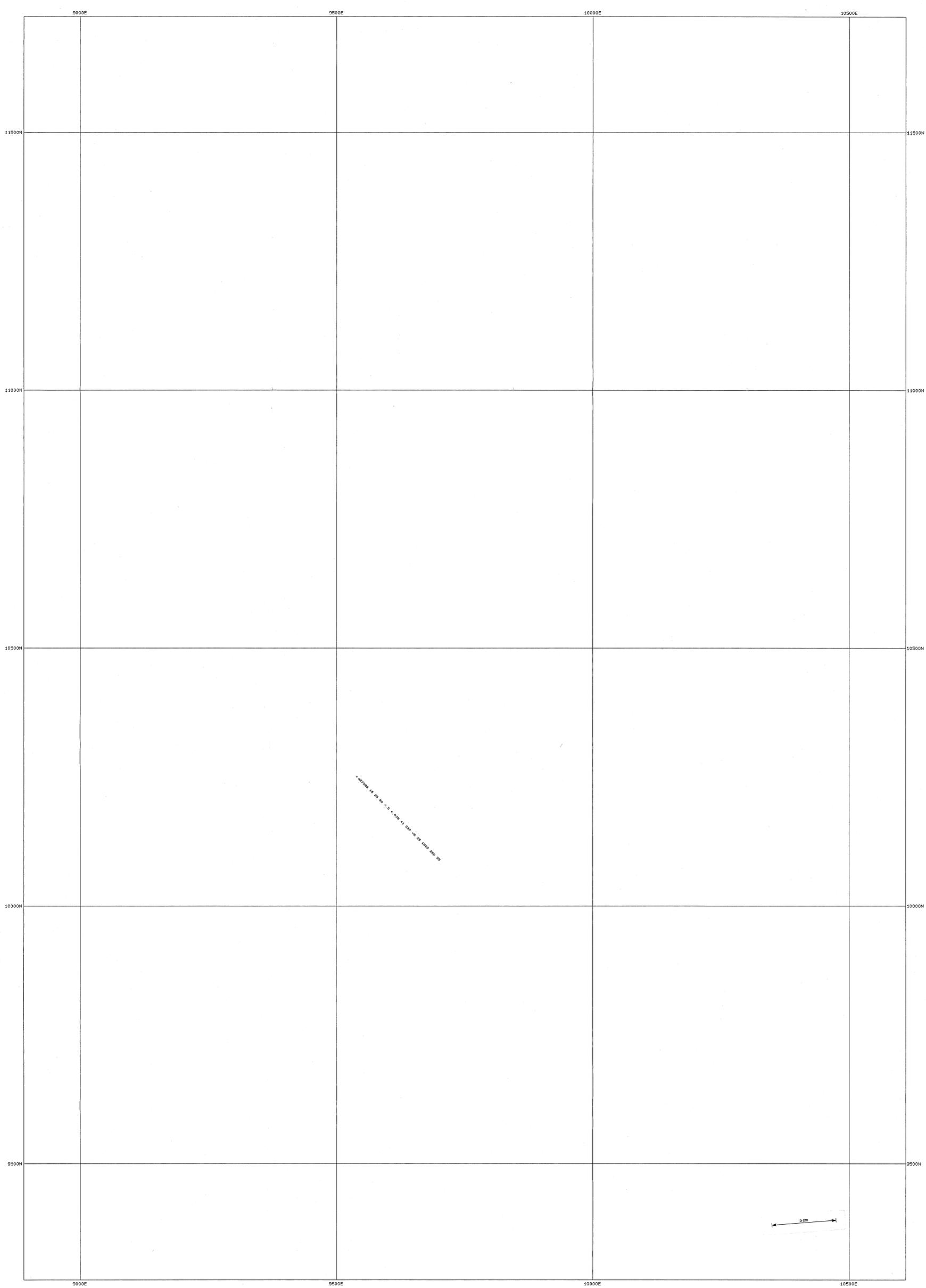


037384

**93-3410!**

<b>Aberfoyle Resources Limited</b> EXPLORATION DIVISION				NORTH WEST TASMANIA MACKINTOSH DISTRICT OUTCROP GEOLOGY		Compiled : Drawn : RJE Traced : Checked :																			
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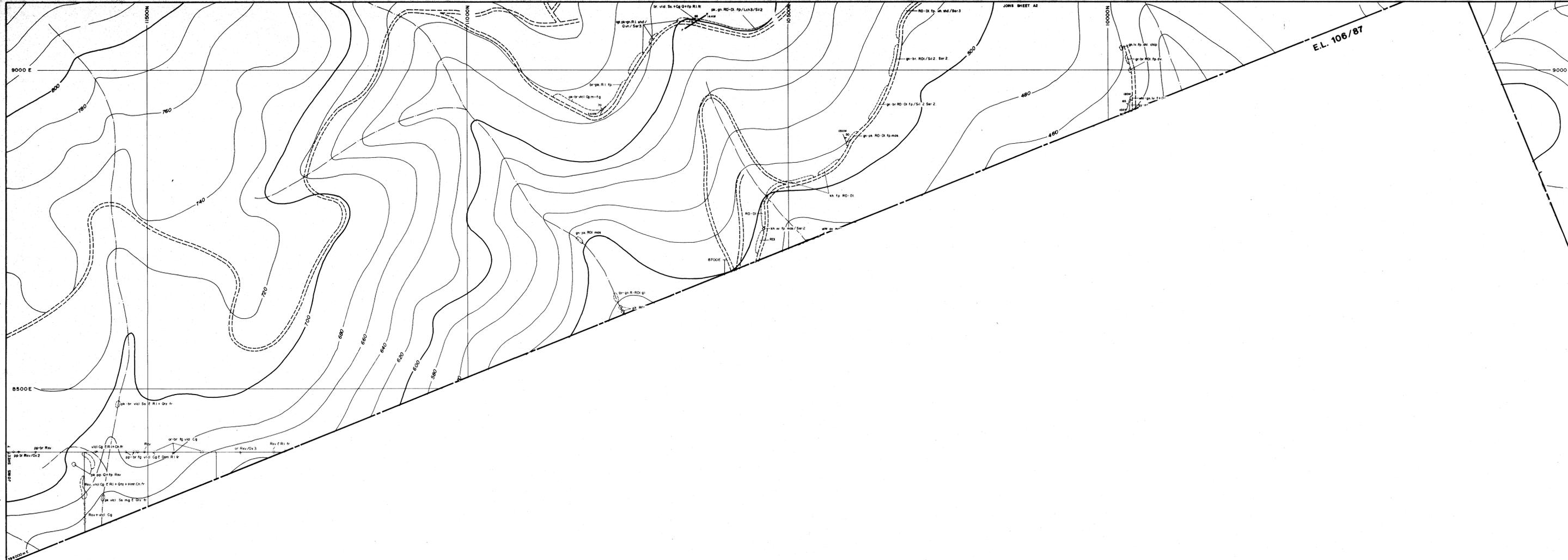
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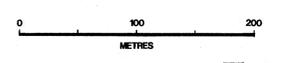
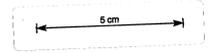
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**93-3410!**

Aberfoyle Resources Limited EXPLORATION DIVISION		Tasmania		Revision: 002
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Rockchip/Costean Assay Results				Checked: DM
Location Code:	Scale: 1:2500	Date:	10/18/92	Sheet No: 037385



E.L. 106/87



037386

MINE GRID NORTH  
22.1'  
AMG NORTH

**93-3410.**

**Aberfoyle Resources Limited**  
EXPLORATION DIVISION

REVISIONS				Compiled: J.MCN	
Unit	Date	Init.	Date	Drawn:	RJE
Initial	11.4.88			Traced:	
Revised	15.3.90			Checked:	
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NORTH WEST TASMANIA  
MACKINTOSH DISTRICT  
OUTCROP GEOLOGY

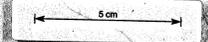
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E.L. 39/85 PLACER  
E.L. 37/89 PASMINCO

Murchison Highway

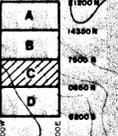
Lake

Mackintosh



037387

MINE GRID NORTH



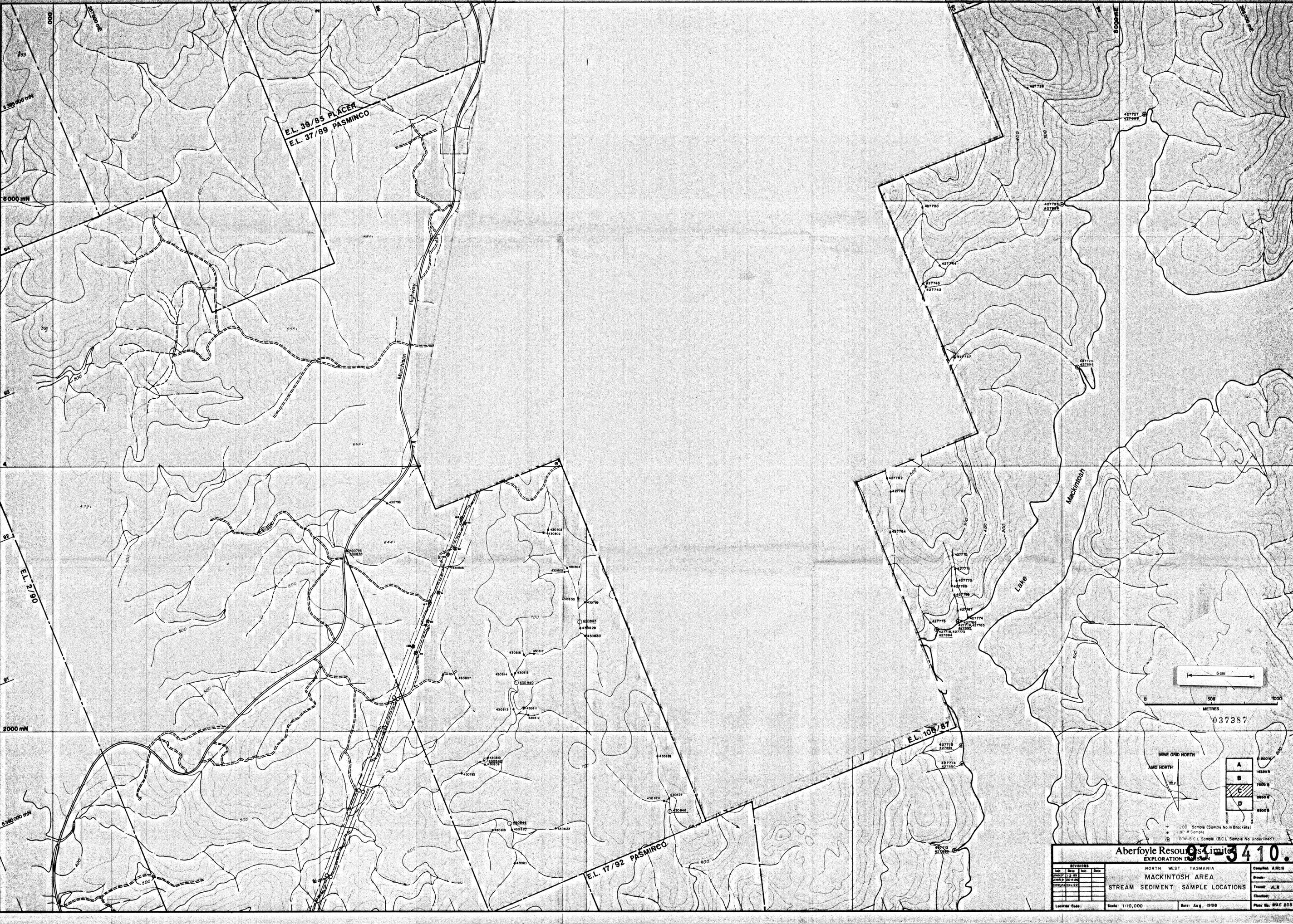
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- 100 Sample
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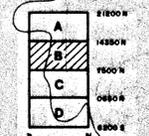
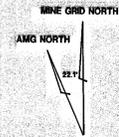
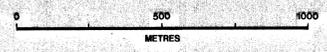
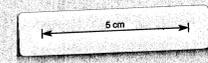
**Aberfoyle Resources Limited**  
EXPLORATION DIVISION **3410.**

REVISIONS				Compiled: A.M.H.
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3	12-89			
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7	12-89			
8	12-89			
9	12-89			
10	12-89			

NORTH WEST TASMANIA  
**MACKINTOSH AREA**  
STREAM SEDIMENT SAMPLE LOCATIONS

Location Code: Scale: 1:110,000 Date: Aug, 1988 Plate No: MAC 808C





93-3410.1  
Cu, Pb, Zn, Ag, Au, Bi, Sn  
 (X denotes below detection limit)

<b>Aberfoyle Resources Limited</b> 037388 EXPLORATION DIVISION		Compiled: A McN Drawn: JLR Traced: JLR Checked:												
<b>NORTH WEST TASMANIA</b> <b>MACKINTOSH AREA</b> <b>STREAM SEDIMENT ASSAY RESULTS</b>	Location Code:	Scale: 1:10 000 Date: Aug, 1988 Plan No: MAC 204 B												
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REVISED	DATE	BY												



SOUTHWEST  
CONSERVATION AREA

Lake Mackintosh

HEC

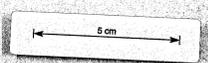
Mackintosh Dam

Power Station

HEC

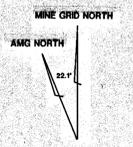
HEC

Murchison  
Highway  
State  
Reserve



0 500 1000  
METRES

037389



A	11200 N
B	11300 N
C	7800 E
D	6800 E

• -80# Sample  
⊙ -80# +BCL Sample (BCL Sample No Underlined)

Aberfoyle Resources Limited  
EXPLORATION DIVISION

NORTH WEST TASMANIA  
MACKINTOSH AREA

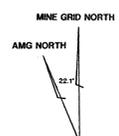
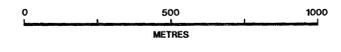
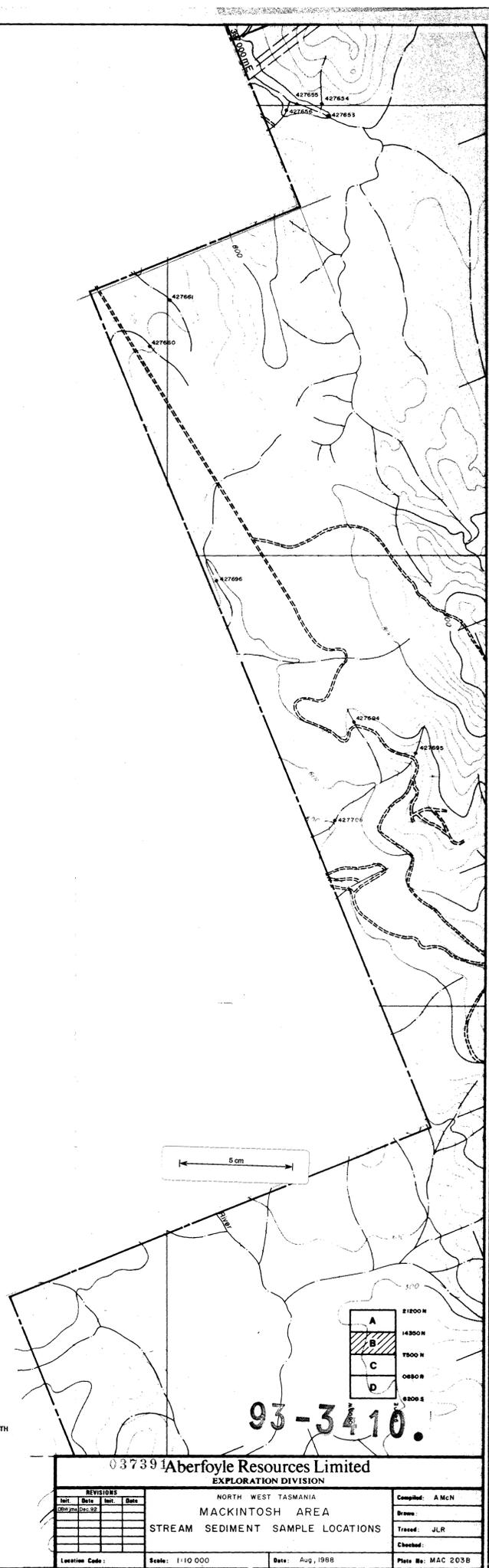
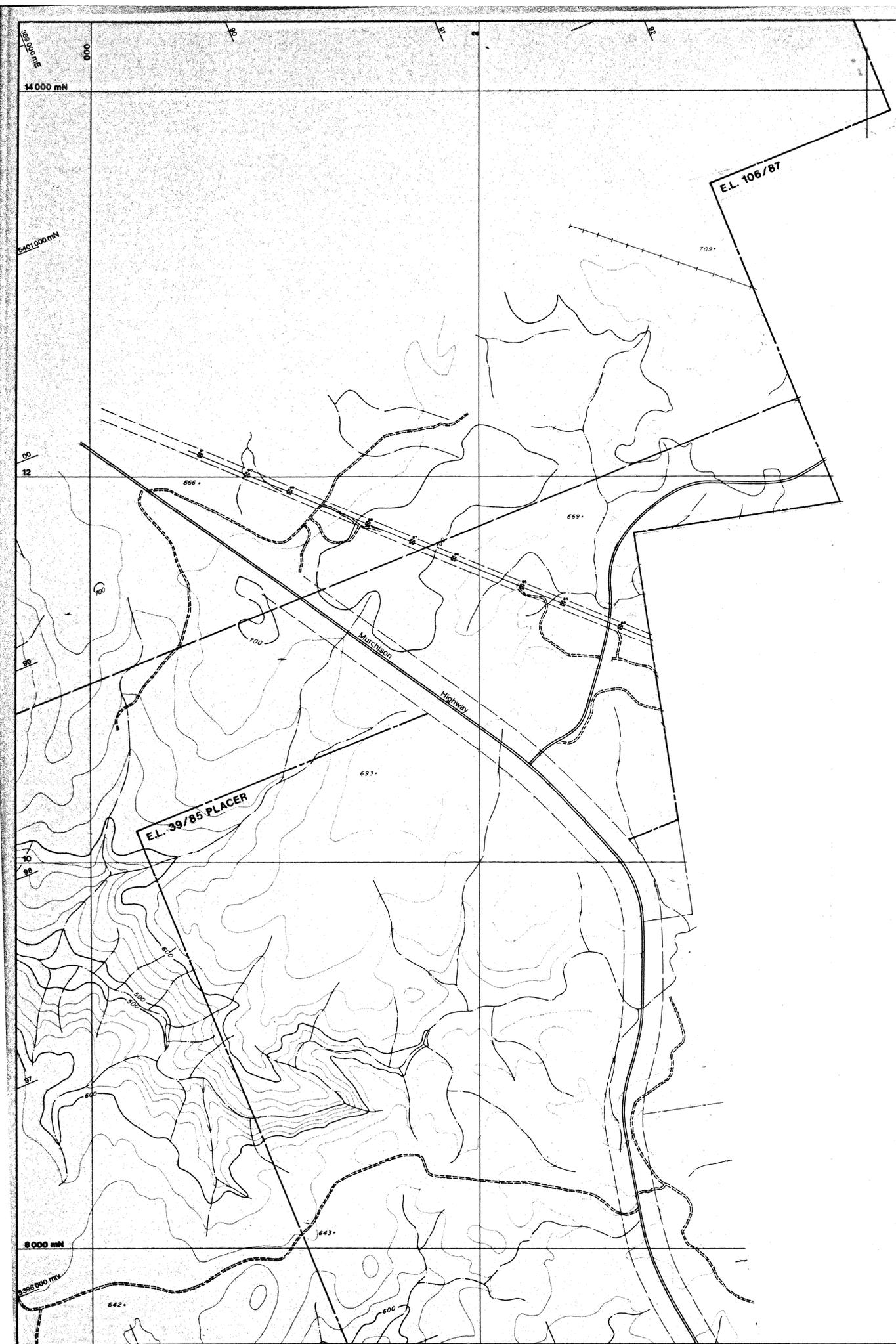
STREAM SEDIMENT SAMPLE LOCATIONS  
**93-3410**

Scale: 1:10,000 Date: AUG 1988

REVISIONS				
NO.	DATE	BY	REASON	INITIALS

Compiled: A/McN  
Drawn: JLR  
Checked: JLR  
Plate No: MAC 208D



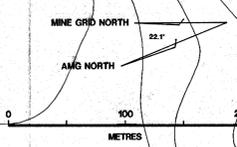
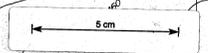
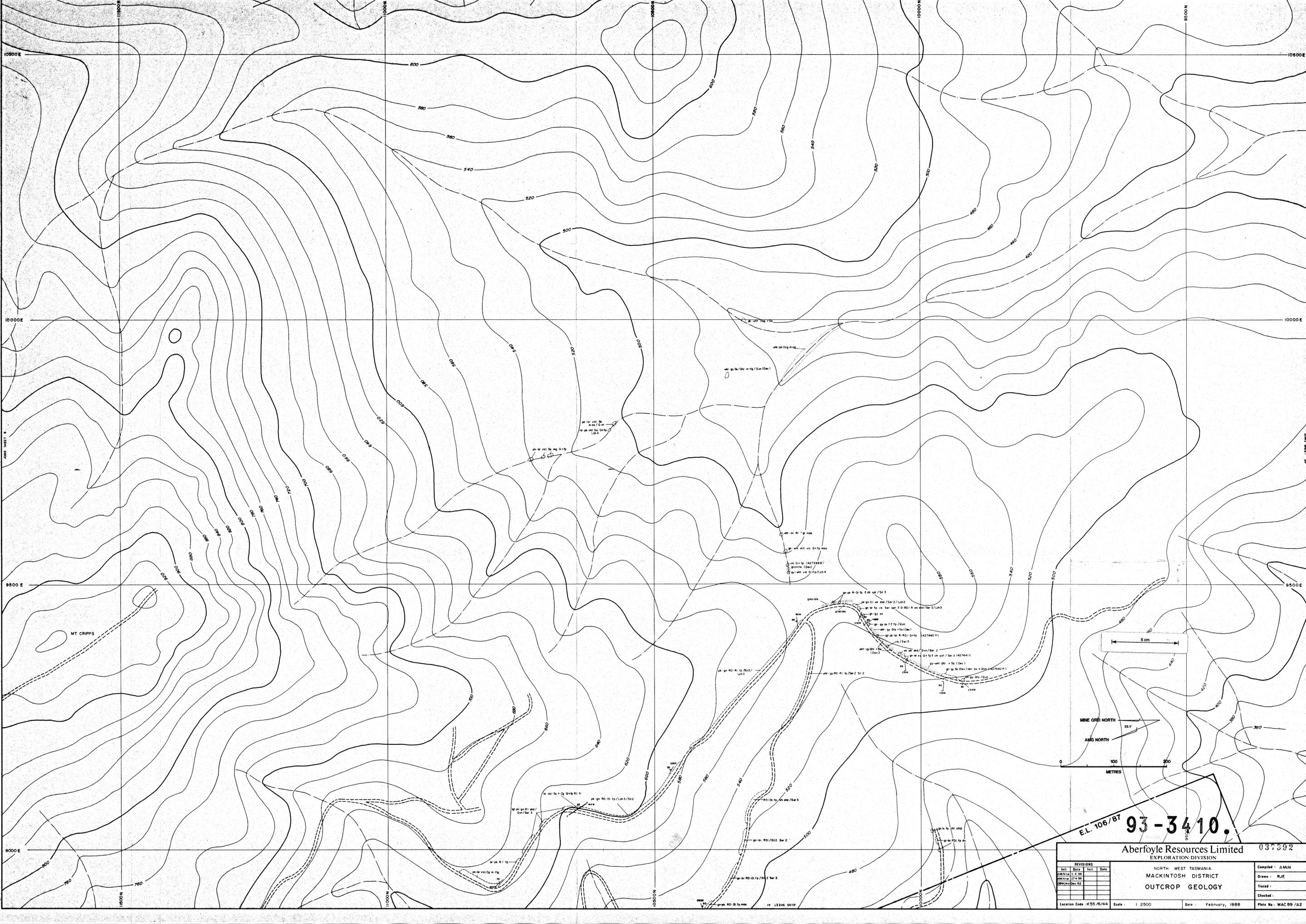


037391 Aberfoyle Resources Limited  
EXPLORATION DIVISION  
NORTH WEST TASMANIA  
MACKINTOSH AREA  
STREAM SEDIMENT SAMPLE LOCATIONS

REVISIONS			
No.	Date	By	Date

Location Code: \_\_\_\_\_ Scale: 1:10,000 Date: Aug, 1988 Plate No: MAC 203B

Compiled: A.McH  
Drawn: \_\_\_\_\_  
Traced: J.L.R.  
Checked: \_\_\_\_\_



E.L. 106/87 **93-3410.**

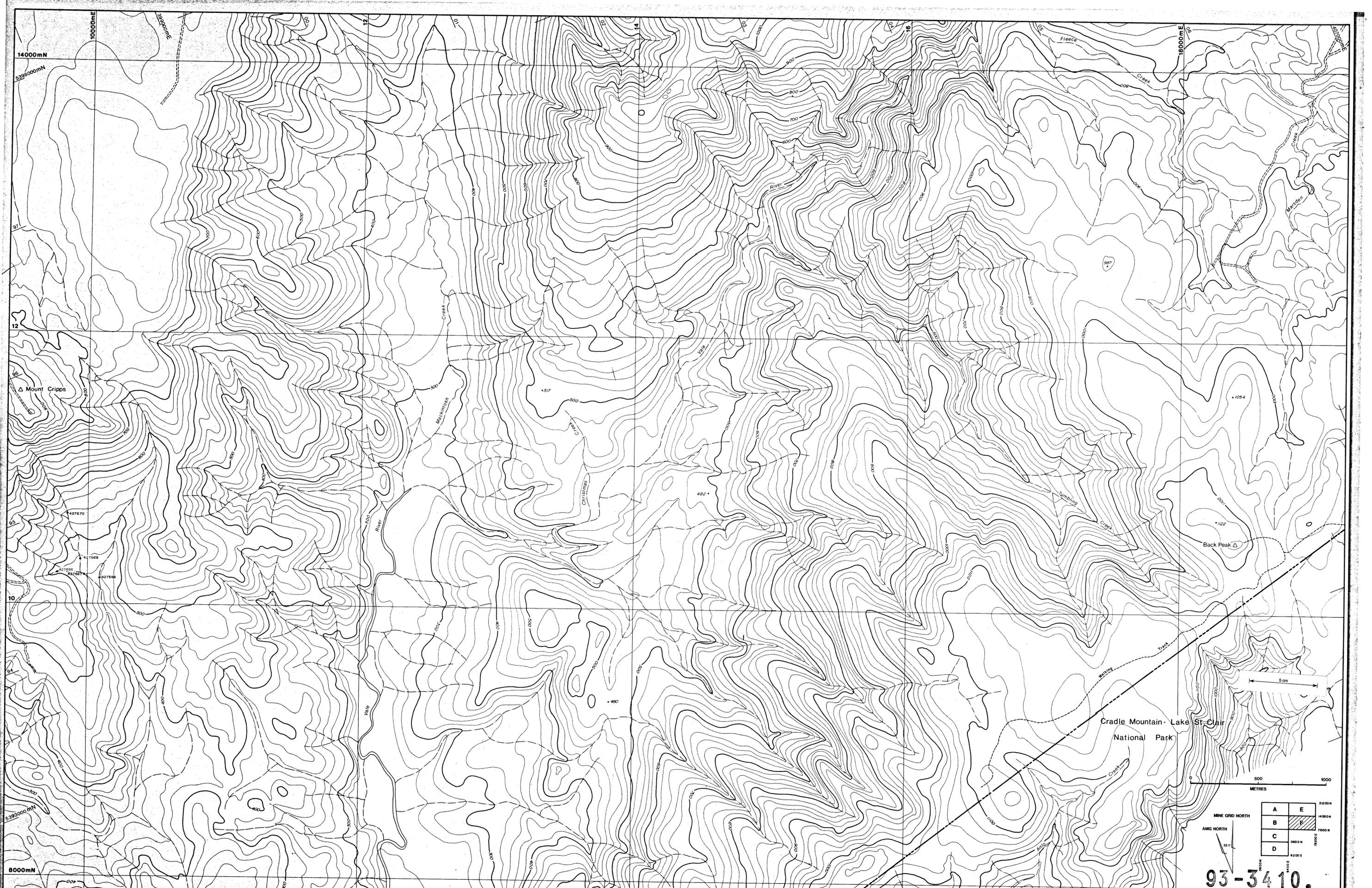
Aberfoyle Resources Limited 037392  
EXPLORATION DIVISION

REVISIONS			
Int.	Date	Int.	Date

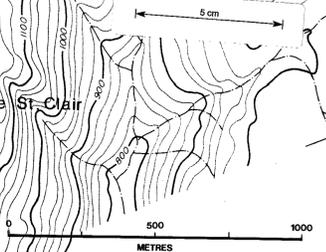
NORTH WEST TASMANIA  
MACKINTOSH DISTRICT  
OUTCROP GEOLOGY

Compiled: AMcN  
Drawn: RJE  
Traced:  
Checked:

Location Code: K55/6/44 Scale: 1:2500 Date: February, 1988 Plate No: MAC89/A2



Cradle Mountain-Lake St-Clair  
National Park



MINE GRID NORTH		2400N
A	E	2350N
B	F	2300N
AMG NORTH		2250N
C		2200N
D		2150N
		2100N

**93-3410**

**Aberfoyle Resources Limited**  
EXPLORATION DIVISION

NORTH WEST TASMANIA MACKINTOSH AREA STREAM SEDIMENT SAMPLE LOCATIONS		Compiled: A.McN Drawn: J.L.R. Checked: Plate No: MAC 203 F																
REVISIONS <table border="1"> <tr> <th>Int.</th> <th>Date</th> <th>Int.</th> <th>Date</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Int.	Date	Int.	Date													Location Code: Scale: 1:10,000 Date: Aug, 1988	
Int.	Date	Int.	Date															