433001

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Aberfoyle Resources Limited
EXPLORATION DIVISION

90-3190 c/F

MINES

EL 5/85

LAKE MARGARET EL 5/85

TASMANIA

LETTER
19. 10. 90
REFERS

Technical Progress Report

for the year

ended 20 October, 1990

VOLUME 1

APPENDICES 1- 8

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VOL 1/2

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1.0 SUMMARY

Exploration activity during the year ending 20 October, 1990 concentrated on the Red Hills, Beatrice and North Selina prospects.

The Red Hills prospect in the northwest corner of the licence was the subject of further geophysical surveys and subsequently drilling. The DHEM survey undertaken on DDH - RH-18 detected an off hole response attributed to a conductor lying below and to the west of DDH RH-18. A second DDH, RH-19 (237m) intersected, a shallowly dipping black shale unit was intersected at the interpreted conductor position. The shale horizon was considered to be the source of the interpreted downhole and surface EM anomaly and no further work was undertaken.

Exploration on the Beatrice prospect in the southeast of the exploration licence was initiated during the summer field season. A two loop (28 line km) UTEM survey reading inside and outside the loop was undertaken but no responses attributable to an accumulation of massive sulphides were detected. Geological mapping was undertaken over the Beatrice lava dome and over the area immediately to the east of the dome. Extensive areas of volcaniclastics and rhyolitic lava were identified but a potential shale host horizon similar to that exposed in the Itat creek area to the west of the dome was not located. Soil geochemistry over the northeast corner of the Beatrice grid failed to highlight any significantly anomalous zones.

The North Selina prospect is located in the area between Mount Selina and the licences northern boundary. It appears from the early phase of reconnaissance mapping and stream sediment geochemistry to potentially be the most prospective area of the licence. Rock chip sampling identified two areas with anomalous geochemistry, an outcrop within Red Hills Creek (Cu 250 ppm, Pb 555 ppm and Zn 7900 ppm) and an outcrop in a minor creek draining east into the Anthony River Gorge (Cu 65 ppm, Pb 1900 ppm and Zn 6900 ppm). The results of the F, Sn, Rb and K geochemistry studies were equivical and failed to resolve the question of the mineralisation source. The Pb isotope studies suggest that two Cambrian hydrothermal systems may have been active in the area.

Reconnaissance mapping in the Mount Lyell and Julia Creek areas to date has failed to highlight any prospective Cambrian volcanics or potential host lithologies.

2.0 INTRODUCTION

The Lake Margaret exploration licence, 5/85, covers an area of 145 sq. km. to the north and east of Queenstown from the south of Mount Lyell to the north of the Red Hills (Figure 1).

The EL has been held by CRA Exploration Pty Ltd since 20 September, 1985 and is subject to the terms of the Mount Read Volcanics Joint Venture.

This report outlines exploration on EL 5/85 and concentrates on the work undertaken on the Red Hills, Beatrice and North Selina prospects over the last year.

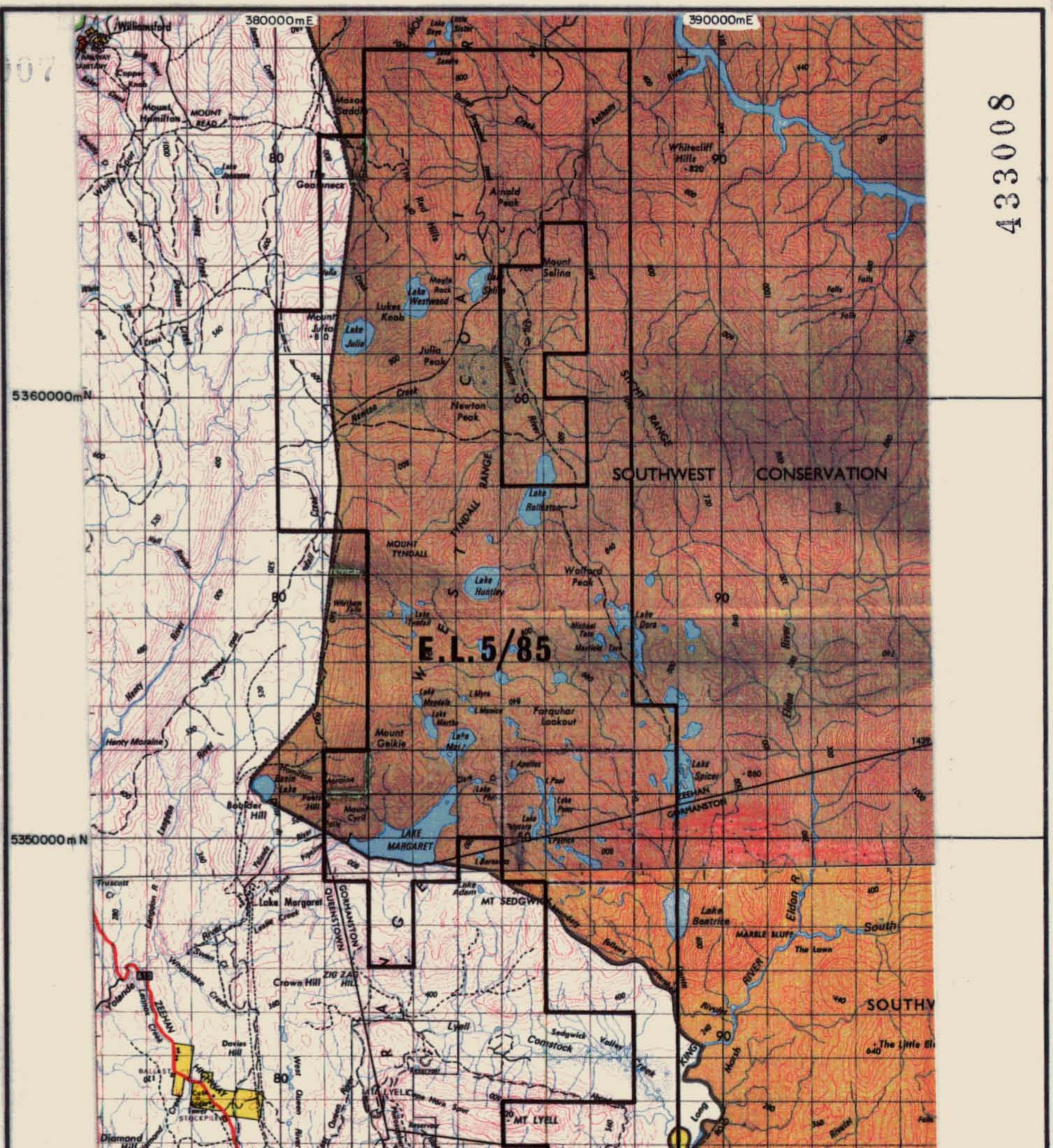

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Figure 1

EXPLORATION DIVISION

REVISIONS			
Init.	Date	Init.	Date

NORTH WEST TASMANIA

LAKE MARGARET E.L. 5/85 C.R.A. JV.

LOCALITY MAP

Compiled : RJE

Drawn : Dept. Lands

Traced :

Checked :

Location Code :

Scale : As shown

Date : September, 1989

Plate No. : L.Marg. 13

5 cm

3.0 PREVIOUS EXPLORATION

The area bound by the present day Lake Margaret EL 5/85 has had a long history of exploration.

3.1 Early Prospecting Activity

The Cu, Pb, Zn, Ag and Au potential of a number of areas within the EL was examined by early prospectors. Extensive evidence of numerous small workings are indicated on McNeill (1987), Corbett and Jackson (1987) and Corbett et al. (1989) and summarised in detail by Green and Bamford (1986 a, b). A number of adits and pits have been identified in the Red Hills, Mount Selina, Dora-Spicer and Howards Anomaly areas.

3.2 Modern Systematic Exploration

Exploration during 1989-90 concentrated on a number of prospects. The prospects were identified during previous exploration programmes. The previous exploration in these areas is summarised below.

i) Rio Tinto Zinc/Electrolytic Zinc Co. 1957-1961

Between 1957 and 1961, Rio Tinto Zinc (RTZ) explored the Red Hills, Howards Anomaly and Lake Dora areas. Various surface geological, geophysical and geochemical investigations were conducted in addition an airborne magnetic survey was flown. RTZ in conjunction with the Electrolytic Zinc Co. (EZ), conducted an extensive exploration programme in the Red Hills area. The work undertaken was summarised by McNeill (1989).

ii) Mount Lyell Mining and Railway Co. Ltd 1966-1984

In 1966 the Mount Lyell Mining and Railway Co. later as Goldfields Exploration Pty. Ltd. were granted EL 9/66 which covered an area of 637 sq. km. and included all the area covered by EL 5/85. Between 1966-1984 systematic exploration for VMS style base metal mineralisation and gold mineralisation was undertaken. Exploration was focussed on a number of prospect areas.

a) The work undertaken on the Red Hills prospect was summarised by McNeill (1989).

b) Mount Lyell commenced exploration in the Lake Selina area in 1969-70. The bulk of the exploration centred about Mount Selina, in the area retained by Mount Lyell following the reduction of EL 9/66 in 1984. This area was subsequently relinquished and is currently held by Billiton as part of EL 103/87. Previous work in the Lake Selina area is summarised in detail by Purvis et al., (1983) and Fitzgerald (1987). Work undertaken at Lake Selina in the area now covered by EL 5/85 Lake Margaret included geological mapping, soil and rock chip geochemistry and IP surveys. The IP surveys generated several anomalies centred about two intensely altered linear belts referred to as the western and eastern pyrite zones. These IP anomalies were drill tested through a 13 hole diamond drill programme. Only three holes LS8, LS11 and LS12 lie within the North Selina area.

c) Previous work in the Beatrice area south southeast of Mount Sedgwick has concentrated on the Itat Creek area to the west of the Beatrice lava dome in what is now EL 102/87. Exploration by the Mount Lyell Mining and Railway Co. commenced in 1974 and no prior exploration is known. The work undertaken in the area now covered by EL 5/85 Lake Margaret included geological mapping, IP and ground magnetics soil and rock chip geochemistry and minor pitting (Meares et al. 1980, Purvis et al. 1983 and Fitzgerald, 1987). The area to the east of the Beatrice dome had previously received limited attention. Soil and IP anomalies generated by Goldfields Exploration Pty. Ltd. were not considered worthy of follow up exploration.

iii) <u>CRA Exploration Pty. Ltd. 1985-1988</u>

a) Previous exploration by CRA Exploration Pty. Ltd. at Red Hills is summarised by McNeill (1989).

b) CRA Exploration reviewed the available data on the Lake Selina area but completed no further work on the prospect (Von Strokirch, 1987).

c) A limited stream sediment sampling programme was undertaken to assess the gold potential of the Beatrice lava dome and the area to the east of the dome (Von Strokirch, 1987).

d) An effort was made by CRA Exploration to assess the subsurface potential beneath the Cambro-Ordovician Owen Conglomerate cover. Aeromagnetic anomalies at Rolleston Road, Julia Creek and to northeast of Mount Sedgwick (Sedgwick east) were targeted for follow up ground magnetic surveys. The Rolleston Road anomaly was considered less prospective because of its limited size and estimated depth of 300m (Von Strokirch, 1987).

IP surveys were conducted to further assess the potential of the Julia Creek and Sedgwick east anomalies with the aim of detecting any pyrite, chalcopyrite mineralisation associated with interpreted magnetite, haematite veining (Von Strokirch, 1987).

A 9 sq. km. area centred over the Sedgwick east anomaly was formerly excluded from the CRA-Aberfoyle joint venture agreement. On 28 August, 1990 the exclusions lapsed and the area was included as part of EL 5/85 falling under the terms of the MRV joint venture. The Sedgwick east anomaly was drilled by CRA Exploration in 1988, DDH 88MS1 was stopped at 600m. The hole failed to intersect Cambrian volcanics or any significant gold or base metal mineralisation. The aeromagnetic anomaly was interpreted to be explained by a zone of magnetite intersected between 454 and 600m. No further work was undertaken, though DHEM was recommended. (Funnell, 1988).

4.0 EXPLORATION ACTIVITY LAKE MARGARET EL 5/85 1989-1990

4.1 Red Hills Prospect

4.1.1 Geology

The geology of the Red Hills prospect, summarised on plate LMARG 11, has been described in detail by Corbett (1975), McNeill (1987) and summarised by McNeill (1989).

4.1.2 Diamond Drilling

4.1.2.1 DDH RH-18

Geology

DDH RH-18 was completed in July 1989 and initial results and summary log have been reported in McNeill (1989) while a section of this hole is included as plate LMARG 14.

Description of petrographic samples (Appendix IX) submitted from this hole indicate that:

i) The quartz-phyric lavas from 14.1-61.5m and 112.1-139.2m are very similar and are probable Tyndall Group correlates.

ii) The volcaniclastics from 65.2-112.1m contain conspicuous quartz crystal, rhyolitic lava and epiclastic sandstone fragments and are possible Tyndall Group correlates, while those from 299.5-356.8m are feldspar-phyric, contain little or no quartz and are sourced from a dacitic terrain, more typical of Central Complex volcaniclastics.

iii) Lavas from 197.9-286.9m, logged as andesitic to dacitic are petrographically dacite, a conclusion supported by geochemistry (see below) which indicates dacitic-rhyolitic affinities.

Geochemistry

The complete length of RH-18 was split or core-ground, with intervals based on alteration/geological boundaries or on 10m lengths in areas of uniform lithology. All samples were analysed for Cu, Pb, Zn, Ba, As, Ag, Au, Cr, Ti and Zr (sample 517915 was also analysed for Y). Results are included in appendix II.

Two intervals contain elevated base metal values:

231-236m, 5m @ 4160 ppm Pb, 5125 ppm Zn, 1.6 ppm Ag, a zone of disseminated and minor vein sphalerite-pyrite ± galena in dacitic lava.

287.6-299.5m, 12.9m @ 2800 ppm Pb, 5750 ppm Zn, 2 ppm Ag over the basal part of the lower black shale unit, and including two approximately 1cm bands of syngenetic mineralisation. The interval 296-297m also has elevated Au, 0.2 ppm and As, 180 ppm, the result of the syngenetic mineralisation.

Lithological indicator elements suggest all lithologies, with the exception of the basalt dyke 140.7-140.9m, have dacitic to rhyolitic affinities, i.e. low Cr and Ti/Zr ratio. The basalt however, has a high Ti/Zr of 58 with high absolute Ti (1.45%) and Zr (250 ppm) abundances. These coupled with a Y content of 40 ppm suggest tholeiitic affinities.

Geophysics

Both Sirotem (one loop) and EM-37 (three loops) surveys, with associated surface work using two loops to collect EM-37 data on line 84S, have been completed on this hole. Results and detailed interpretations are included in appendix X. These surveys have defined two anomalies; an eastern shale related anomaly tested by DDH RH-18, and a flat lying western conductor that has been recommended for testing by further drilling.

4.1.2.2 DDH RH-19

Geology

DDH RH-19, collared at 5363401 mN, 382396 mE, was designed to test the flat lying conductor (conductor 1, Appendix X) detected by DHEM to lie below and to the west of DDH RH18.

The hole was drilled west from DDH RH-18 drill pad to minimise the environmental impact, reduce the access costs and to allow for the possibility that the target horizon may have been shallower, and located further to the east than had been interpreted.

A detailed log for DDH RH-19 is included as Appendix XI , while a section of the hole is presented on plate LMARG 14. A summary log is as follows:

0 - 5.3m	Tricone.
5.3 - 5.5m	Pleistocene glacials.
5.5 - 100.95m	Quartz-feldspar-phyric lava or intrusive (Tyndall Group?).
100.95 - 102.0m	White quartz sealed and in places sericitised fault interval? with some associated dissolution.
102.0 - 139.4m	Quartz-feldspar-phyric lava or intrusive (Tyndall Group?).
139.4 - 140.9m	A variably carbonate veined ash volcaniclastic.
140.9 - 158.8m	Rhyolitic lapilli volcaniclastic in places with ash volcaniclastic beds or lithic fragments of rhyolitic lava and ash volcaniclastic, carbonate veins and spotting throughout.

158.8	- 159.75m	A moderately carbonate veined ash volcaniclastic with minor disseminated pyrite and minor pyrite and galena band at 159.1m.
159.75	- 169.0m	Sheared chloritised rhyolite lapilli volcaniclastic with associated carbonate veins and spotting throughout.
169.0	- 169.5m	Fractured, puggy and highly broken possible fault zone.
169.5	- 172.9m	Rhyolitic lava or porphyry with minor disseminated pyrite and chalcopyrite at 172.5m.
172.9	- 180.8m	Rhyolitic lapilli volcaniclastic with associated carbonate veins and pervasive chloritisation.
180.8	- 188.25m	A polymict breccia volcaniclastic tending to lapilli volcaniclastic downhole with felsic lava and siltstone clasts.
188.25	- 192.45m	An interval of interbedded siltstone sandstone and lapilli volcaniclastic.
192.45	- 194.05m	Dominantly black shale with minor interbedded siltstone and sandstone and minor syngenetic pyrite.
194.05	- 199.8m	Massive quartz phyric rhyolitic lava.
199.8	- 206.25m	Dominantly black shale with minor interbedded siltstone with veinlets and disseminated grains of syngenetic pyrite throughout and a very minor bleb of sphalerite on the lower contact.
206.25	- 207.8m	White quartz sealed fault zone? of quartz phyric rhyolitic lava.
207.8	- 237.3m	Massive quartz phyric rhyolitic lava.

The quartz phyric lava or porphyry from 5.5 -139.4m correlates well with the quartz phyric lava described by McNeill (1989) from DDH RH-18. Petrographic descriptions of samples from DDH RH-18 (Appendix IX) concluded that the lavas were probable Tyndall Group correlates.

The quartz phyric rhyolitic lapilli volcaniclastic with associated ash volcaniclastic lithic fragments, bands or horizons 139.4 - 188.25m correlate well with the volcaniclastics observed by McNeill (1989) from DDH RH-18. Petrography from DDH RH-18 (Appendix IX) concluded that the volcaniclastics were Tyndall Group correlates.

The interval dominated by black shale with lesser siltstone, sandstone, lapilli volcaniclastic and quartz phyric rhyolitic lava from 188.25 - 206.25 was considered to adequately explain the source of the DHEM response detected in DDH RH-18 survey.

Mineralisation

Minor syngenetic pyrite mineralisation was observed associated with the black shale intervals from 192.45 - 194.05m and 199.8 - 206.25m. An isolated bleb of sphalerite was observed at 206.25m.

Geochemistry

Core grinding of RH-19 is not yet complete. Results will be presented in the next annual report.

Geophysics

It is proposed in the future to undertake a DHEM survey on RH 19 as a DHEM modelling research exercise.

4.2 Beatrice Prospect

4.2.1 Introductions

The Beatrice prospect, is situated south southeast of Mount Sedgwick in the southeastern part of EL 5/85. The similarity of the geological setting of the Beatrice prospect to that of Red Hills (a rhyolitic lava dome flanked by volcaniclastics and shale with minor associated occurrences of sphalerite and galena, Meares et al., 1980), coupled with the absence of any previous UTEM coverage made the Beatrice area a highly prospective VMS target.

A grid (20.2 line km) was established over the Beatrice area during the 1989/90 summer. Geological mapping (1:2500 scale), rock chip and soil geochemical sampling, magnetic and UTEM surveys were subsequently undertaken over the grid. (Sample locations are displayed on plates 29A, B and petrographic descriptions are included as part of Appendix IX and list of geological abbreviations used, is included as Appendix I).

4.2.2 Geology

4.2.2.1 Cambrian

The distinction between CVC and Tyndall Group volcanics within the Beatrice area has been based largely upon the petrographic evidence and where it is available the outcrop relationships.

The CVC lavas and volcaniclastics have been mapped as aphyric and rarely quartz, feldspar phyric units. The Tyndall Group volcanics are recognised as distinctly quartz, feldspar phyric units. The presence of accessory minerals such as biotite, zircon and apatite has aided the definition of distinctly mappable units of rhyolitic-dacitic lava. This has proved to be extremely useful over the east of the grid where the substantial cover of pleistocene glacials has obscured many of the contact relationships.

i) Central Volcanic Complex

The CVC within the mapped area is a lava dominated volcano-sedimentary sequence (Plates 29 A, B and 32 A, B).

The sequence is dominated by pink orange-green massive with lesser autobrecciated dominantly aphyric, formerly vitric, rarely quartz, feldspar phyric rhyolite lava (Ccrl) (P564322, P564351, P564391, P564435, P564455, P564472, P564522). The bulk of the rhyolitic lava outcrops to form the local topographic high known as the Beatrice lava dome. Minor outcrops of rhyolite are exposed in the creeks towards the southeast margin of the dome. A polymict lava breccia or breccia volcaniclastic (Ccrb) composed of dacitic to rhyolitic lava fragments (P564338, P564517) flanks the southeast margin of the rhyolite dome.

Lapilli volcaniclastics (Cclv) flank the northwest margin and outcrop extensively to the east of the main lava mass. The lapilli volcaniclastics (P564454, P564481, P564513, P564515) are composed of a mix of devitrified glassy fragments, minor feldspar phenocrysts (mainly plagioclase in places albitised or replaced by polly-crystalline quartz) and the occasional lithic fragment (dacitic or rhyolitic lava) in a matrix of fine quartz, chlorite and sericite.

In places breccia volcaniclastic (Ccbv) (P564374, P564433) occurs as lenses within the main mass of lapilli volcaniclasic. The breccia volcaniclastic lenses are composed of a diversity of lithic fragments the bulk of which were formerly glassy felsic lava. Isolated lenses of greygreen-black shale (Ccsh) occur within the lapilli volcaniclastic. In places shale masses flank the lenses of breccia volcaniclastic or occur as lithic fragments or boudons within the breccia volcaniclastic.

ii) <u>Tyndall Group</u>

The Tyndall Group is a variable volcano-sedimentary sequence that conformably/unconformably overlies the CVC to the east of the grid (Plates 29 A, B; 32 A, B).

A number of outcrops of green to green grey brown feldspar, quartz phyric rhyolitic-dacitic lava (Ctdl) (P564330, 564340, 564451, 564467, 564481, 564491, 564495) outcrop over the eastern portion of the grid. The lavas are characterised by a distinct assemblage of phenocrysts including quartz, feldspar (commonly albitised plagioclase), apatite and lesser zircon and biotite in a devitrified groundmass of fine quartz, albite and sericite.

Dacitic lapilli volcaniclastic (Ctlv) (rarely breccia volcaniclastic) (P564341) outcrops in the southeast of the grid or as masses flanking the rhyolitic-dacitic lava.

The volcaniclastic is composed of rhyolitic-dacitic lava fragments along with minor fragments of holocrystalline dacite (possibly derived from porphyritic intrusive masses). Very minor chlorite, sericite and iron oxide occurs along clast margins. In places quartz and feldspar phenocrysts occur dispersed interstitially between lithic fragments. Minor lenses of green grey ash volcaniclastic (Ctav) or shale (P564500) are hosted within masses of dacitic lapilli volcaniclastic. Composed dominantly of fine detrital grains of volcanic quartz, with a moderate sericite overprint which defines a weak foliation.

A holocrystalline quartz phyric rhyolitic lava or porphyry (Ctp) outcrops within the southeast of the mapped area. Composed of prominent quartz phenocrysts within devitrified and somewhat sheared goundmass of quartz and sericite.

Unconformably overlying the CVC and Tyndall Group lavas and associated volcaniclastics is a volcaniclastic conglomerate (Ctc) (correlated with the Jukes Conglomerate Corbett, 1979, Meares et al., 1980). Composed of lithic fragments including, rhyolitic-dacitic lava, granite and large rounded quartzite pebbles (derived from the Pre-Cambrian basement) along with minor shale fragments. The lithic fragments are hosted within a matrix of volcanic quartz, feldspar, sericite, chlorite and iron oxide.

4.2.2.2 Quaternary

Unconsolidated Pleistocene glacial till (Qg) unconformably overlies much of the mapped area limiting basement exposure over much of the southern and eastern portions of the grid. The pleistocene sediments are predominantly derived from scouring of the Owen Conglomerate with some minor locally derived rhyolitic lava and volcaniclastic conglomerate floaters were also observed within the till.

4.2.2.3 Alteration

The CVC rhyolitic lava was subjected to an early phase of pervasive haematite ± K-Spar alteration (564391). In some samples (564455) haematite alteration apparently post dates chlorite-sericite-pyrite alteration.

A mild pervasive chlorite with lesser associated silica, sericite, pyrite alteration persists throughout the CVC rhyolitic lavas and volcaniclastics. Rarely in places the alteration becomes intense. Commonly chlorite, silica ± pyrite form crosscutting vein sets within the rhyolitic lava. In places extensive recrystallisation and pervasive chlorite, silica alteration of the aphyric rhyolitic lava has resulted in the generation of subrounded masses of secondary quartz that in hand specimen resembles phenocrysts. Rarely samples are sericite, silica ± pyrite altered with little or no associated chlorite alteration evident.

The breccia volcaniclastics in places contain clasts that have been subjected to intense sericite, silica, pyrite alteration (564472) prior to deposition.

The Tyndall Group dacitic lavas and volcaniclastics have similarly suffered pervasive chlorite, silica $\pm$ pyrite alteration. In addition samples 564451 and 564491 have suffered a later phase of mild patchy calcite replacement and vein development.

Sample 564491 displays evidence of additional strong pervasive sericite alteration and is less intensely chlorite altered with only chloritic patches evident.

Sample 564510 is somewhat unique displaying evidence of microshear development with associated sericite, goethite and very minor tourmaline alteration. This suggests the interaction of granite sourced fluids during shear development.

A number of samples from the Beatrice grid were analysed for CaO, MgO, Na_2O and K_2O to enable calculation of alteration indices to assist in the characterisation of the alteration style present at the Beatrice prospect.

The alteration index [A.I. = 100 X (k_2O + MgO)/(CaO + k_2O + MgO + Na_2O)] varies from 71 (sample 564505) to a maximum of 98 (sample 564455), with the majority of samples varying between 90 and 97. This implies the majority of samples have been depleted in Na and Ca relative to K and Mg which suggests a possible footwall style alteration. The value of such data is somewhat limited because of the potential depletion in Na and Ca via preferential leaching during weathering processes.

4.2.2.4 Mineralisation

Only very limited mineralisation was located during the mapping programme. The galena and sphalerite mineralisation previously reported by Goldfields Exploration Pty. Ltd. (Meares et al., 1980) could not be relocated despite extensive searching within the vicinity of reported locations. The elevated Zn (6000 ppm) in sample 564468 may represent the reported sphalerite mineralisation and the elevated Pb (3200 ppm) sample 564472 may represent the reported galena mineralisation.

Mild disseminated pyrite mineralisation was observed in association with pervasive chlorite alteration of CVC rhyolitic-dacitic lavas and Tyndall Group dacitic lavas. Minor chalcopyrite was observed in association with the disseminated pyrite in samples 564481, 564517. The breccia volcaniclastic sample 564464 contained sulphide clasts composed predominantly of fine grained pyrite. In places pyrite veins were observed associated with haematite, chlorite and silica veins within the CVC rhyolitic lava.

Extensive haematite, magnetite (± pyrite) vein stockwork is developed throughout the CVC rhyolite lava, but is generally more prevalent towards the top of the lava dome.

4.2.2.5 Structure

Geological mapping coupled with an interpretation of the magnetic survey data led to interpretation of a minor EW fault structure truncating the CVC lapilli volcaniclastic unit against the CVC rhyolitic lava within the NE of the grid.

The recognition of minor outcrops of bedded shale units within the CVC volcaniclastics has provided additional evidence to support the interpretation of NS strike for the lavas and volcaniclastic units within the east of the grid.

The EW strike of a minor Tyndall Group volcaniclastic unit within the SE of the grind suggests that a major discontinuity may exist between the CVC sequence to the north and the Tyndall Group volcaniclastics in the south. No evidence was located during field mapping or from the interpretation of magnetic data to suggest that any major fault structure was present. This suggests some overiding sedimentary control on the deposition of the ash volcaniclastic and the possibility that the Tyndall Group volcaniclastics in the south of the grid may rest unconformably upon a basement of CVC lavas and volcaniclastics.

4.2.3 Geochemistry

4.2.3.1 Soil Geochemistry

A limited soil geochemical survey (160 samples) was conducted on four lines over the northeast of the Beatrice grid. Samples were taken at 25m intervals. Samples were collected with a power auger from the 'C' horizon at depths of generally just less than 1m. Sample locations and results are included as appendix IV . Samples were analysed for Cu, Pb, Zn and Ba.

The survey aimed firstly, to confirm the existence of the previously identified Pb, Zn anomaly located on line 2000N between 1976E and 2050E by Goldfields Exploration Pty Ltd in Meares et al. (1980). Secondly, to identify the northern limit of the anomaly. Finally, identify the limits and magnitude of the anomaly, particularly in light of moderately elevated rock chip assay values and the reporting of minor sphalerite and galena mineralisation from the area by Goldfields Exploration Pty. Ltd. (Meares et al., 1980).

Sampling confirmed the presence of a coincident Pb (595 ppm), Zn (255 ppm) and Cu (125 ppm) anomaly extending over two lines and centred at 7850E 6900N. The programme failed to identify any significantly anomalous values or to substantially expand the limits of the previously identified anomaly on line 1800N (Meares et al., 1980).

4.2.3.2 Rock Chip Geochemistry

A limited rock chip sampling programme (37 samples) was conducted both as a support to the geological mapping programme and with the primary aim of identifying potential anomalous zones. Sample results are included as appendix IX and sample locations are displayed on Plates LMARG 29 A, B.

Samples were analysed for Cu, Pb, Zn, Ag, Au, As, Ba and most samples were analysed for the lithophile elements Cr, Zr, Ti, Y and several samples were analysed for K_2O, Na_2O, CaO, MgO to facilitate the calculation of an alteration index figure.

The lithophile element proved to be an extremely useful as a support to the geological interpretation. Samples 564330, 564451, 564491 and 564495 all displayed geochemically similar signatures (a moderate elevation in Cr (67 - 191 ppm) and a similar Ti/Zr ratio 11.3 - 15.7). This provided additional information to support the geological interpretation that these were all samples of Tyndall Group dacitic lava. All the samples mapped as rhyolitic-dacitic lavas displayed a similar geochemical signature with low Cr values (<22 ppm) and a similar Ti/Zr ratio (6.5 - 14.8 but generally <7.0).

Near background base metal values were recorded for samples CVC rhyolitic lava from the west of the grid. Mild elevations in base metal values were recorded from the far east of the grid. A single unit of CVC rhyodacite lava extending between 6520N and 7100N at 7780-7850E was found to be anomalous in Pb (350-1850 ppm) and Zn (605-6000 ppm). A unit of CVC rhyolitic lava centred about the southern end of the middle base line displayed mild elevations in Cu (20-515 ppm) and Zn (125-340 ppm).

Two outcrops of CVC breccia volcaniclastic (564464 and 564472) were mildly anomalous in base metals, Cu (110 ppm), Pb (3200 ppm) and Zn (1800 ppm) and Cu (260 ppm), Pb (240 ppm) and Zn (225 ppm) respectively.

A single sample (564451) from a unit of Tyndall Group dacitic lava flanking the eastern margin of the grid exhibited mild elevations in Pb (430 ppm) and Zn (680 ppm).

Precious metal values were generally below the level of detection. No significantly anomalous results were recorded.

4.2.4 Geophysics

4.2.4.1 UTEM

A two loop UTEM survey was conducted over the previously unsurveyed area covered by the Beatrice grid in January 1990. The two loop, 8 line survey acquired 28 line km. of Hz component data spaced at 50m. Both in loop and out-of-loop readings were taken to account for a variety of potential conductor positions and geometries. Stacked profiles and loop locations and geophysical assessment of the area is included as Appendix VII.

The survey defined a number of weak formational conductors, no conductors indicative of significant accumulations of base metal mineralisation were detected.

4.2.4.2 Magnetics

A 16 line km. ground magnetics survey was conducted over the Beatrice grid during late January 1990. The magnetic profiles are included as Appendix VIII.

The high level of noise produced by the extensive magnetite, haematite vein stockworking of the rhyolitic lava substantially reduced the overall effectiveness of the survey.

The survey clearly delineated an EW fault, dislocating the CVC lapilli volcaniclastic and rhyolitic lava within the NW corner of the grid. The survey clearly defined the western limit of the Tyndall Group volcaniclastic conglomerate along the eastern margin of the grid. The quartz feldspar phyric porphyry body in the SE corner of the grid was outlined as a distinct magnetic low.

4.2.5 Pb Isotopes

Three rock chip samples (564351, 564459 and 564464) were submitted for Pb isotope analysis. The aim of the study was to ascertain whether the Pb mineralisation detected in the samples was a product of a Cambrian hydrothermal system. The results of the Pb isotope studies by Carr and Dean (1990) are attached as Appendix VI.

The result of the Pb isotope study of Beatrice grid samples was not absolute and sample 564351 rhyolitic-dacitic lava plots within the limits of the Rosebery 95% confidence ellipse. While sample 564459 (a sulphide clast within a breccia volcaniclastic) plot within the limits of the Que-Hellyer confidence ellipse.

The possibility exists that the separation of the data may reflect the influence of two hydrothermal solutions. The more likely scenario is that 564459 and 564464 have had the initial Pb isotopic ratios altered by radiogenic addition of ^{206}Pb, ^{207} Pb and ^{208}Pb since the Cambrian period. Thus all samples probably had the same initial isotopic ratio which was very similar to the Rosebery signature.

4.3 North Selina Prospect

4.3.1 Introduction

The North Selina prospect is situated in the northeastern corner of the EL between Mount Selina and Mount Murchison. The area was targeted for 1:5000 scale reconnaissance mapping, rock chip sampling (15 petrographic samples) and a stream sediment sampling programme (22 samples).

4.3.2 Geology

4.3.2.1 Pre-Cambrian (Pp)

A Pre-Cambrian sequence dominated by brown-black pelitic quartz mica phyllite with lesser quartzite was mapped along the eastern margin of the area. In places moderate to intense white quartz vein development was evident. Minor syngenetic pyrite was evident in outcrops within the Anthony River.

4.3.2.2 Cambrian

i) Sticht Range Beds (Csrb)

Unconformable upon the Pre-Cambrian basement is a sequence of siliciclastic grey conglomerate and sandstone with interbedded micaceous siltstone in places with minor interbedded lapilli volcaniclastic lenses.

ii) Tyndall Group

The Tyndall Group is a variable volcano-sedimentary sequence that conformably overlies the Sticht Range Beds which flank the eastern margin of the mapped area (Plates 20 B_1/B_2 and 33 B_1/B_2).

A commonly feldspar or quartz phyric rhyolitic-dacitic lava rarely lava breccia (Ctdl), in places with rare apatite phenocrysts and sericitised plagioclase phenocrysts. (Samples 482726, 482749, 482791, 564815, 564818, 564961; Plate LMARG 16). The lava outcrops as two north south striking linear belts in the south of the area and as a large northeast-southwest trending mass between Red Hills Creek and the northern margin of the licence.

A major mass of lapilli volcaniclastic or epiclastics (Ctlv) in places interfinger with the lenses and masses of rhyolitic-dacitic lava in the south and the north of the area. The commonly sheared outcrops of epiclastic or lapilli volcaniclastic (samples 482708, 482710, 482727, 482745, 482795, 482957, 482804) are composed of quartz and feldspar phenocrysts, minor devitrified former glassy fragments of quartz/albite and minor felsic lithic fragments all derived from a rhyolitic volcanic source.

Disconformably overlying the volcanic sequence to the west of the mapped area is a volcaniclastic conglomerate (Ctc). Composed of lithic fragments, including quartzite, granite, shale and rhyolitic lava clasts, hosted within a moderately intensely sheared matrix of volcanic quartz, feldspar and pervasive intersticial haematite and sericite.

4.3.2.3 Cambrian Intrusives

The major mass of rhyolitic-dacitic lava or porphyry (Ctp) outcrops in the northwest of the mapped area (sample 482722). Lesser outcrops occur at the mouth of Red Hills Creek and within a road cutting to the north of Mount Selina. Petrographically described as a holocrystalline quartz phyric rhyolitic lava or porphyry composed of prominent quartz phenocrysts in places contains xenoliths of rhyolitic-dacitic lava and minor biotite or hornblende phenocrysts within a devitrified and extensively recrystallised groundmass.

A massive green pink brown quartz phyric granite (Cgr) (Murchison Granite) with chlorite spots after mafics outcrops as a large mass along the northern margin of the mapped area. The granite is interpreted to underlie much of the North Selina area.

The moderate to intense magnetite, haematite, quartz, k-spar ± tourmaline alteration is attributed to the influence of the granitic intrusion.

4.3.2.4 Cambro-Ordovician

An undifferentiated sequence of siliciclastic conglomerate and minor sandstone (Ocg) (Owen Conglomerate) unconformably overly the Tyndall Group sequence to the west and north of the mapped area.

4.3.2.5 Quaternary

Unconsolidated Pleistocene glacial till (Qg) unconformably overlies much of the northern portion of the mapped area and forms the basement to an extensive area of button grass plain in the centre of the mapped area. The Pleistocene till is predominantly derived from scouring of the Owen Conglomerate with some minor locally derived clasts of granite.

4.3.2.6 Alteration

A moderate to intense, pervasive to vein associated k-spar± magnetite with lesser quartz and minor epidote, tourmaline and calcite alteration is more prevalent towards the north and northwest of the mapped area (samples 482708, 482710, 482722, 482726, 482741, 482749 and 482791). In places some quartz, sericite ± k-spar ± magnetite alteration is also developed.

This earlier alteration phase is commonly cut by later chlorite and pyrite, chlorite and magnetite, quartz and chlorite, and quartz and sericite veining.

Towards the south of the area pervasive chlorite and sericite occurs throughout and in places quartz and chlorite and intense sericite quartz and pyrite alteration is developed as a north-south trending linear zone HA (Plate LMARG 33 B_1/B_2).

4.3.2.7 Mineralisation

Extensive pervasive and vein related magnetite mineralisation is developed throughout the North Selina volcanic sequence. Generally more intense pervasive magnetite mineralisation is confined to the northwest of the area. Magnetite mineralisation to the south of the area is vein related or occurs as disseminated grains of magnetite mineralisation. In places magnetite is commonly martitized to haematite.

Pyrite mineralisation appears to generally overprint the magnetite mineralisation but in places appears to be virtually contemporaneous (482710). Pyrite occurs as disseminated grains or as veins, the latter commonly associated with remobilised magnetite. Minor pyrrhotite, chalcopyrite and galena (482749) are observed in places associated with pyrite vein development. In places minor chalcopyrite and covellite occurs with pyrite lining veins or fractures (482710).

Two zones with mineralised rock chip samples were identified. A lapilli volcaniclastic or epiclastic outcropping in a small creek draining eastwards into the Anthony River host a clasts of magnetite and sulphide (samples 564795 and 564957). Despite the encouraging assay values (discussed in section 4.3.3.2), no base metal mineralisation was observed in hand specimen.

An outcrop of rhyolitic lava within the Red Hills Creek (samples 482749 and 482986) also returned encouranging base metal assay results (discussed in section 4.3.3.2). Minor sphalerite mineralisation was observed in hand specimen within sample 482749.

4.3.2.8 Structure

Two minor fault structures were located during the mapping programme. A minor EW fault dislocates the Cambrian-Ordovician volcano-sedimentary sequence along Red Hills Creek in the northwest of the area. A small northwest-southeast structure dislocates the Tyndall Group volcanics to the southeast of the horseshoe bend in the HEC Henty-Anthony Road.

Limited bedding or flowbanding observed along with observable geological contacts suggests a steep west southwesterly dipping north-south striking volcanic sequence. A moderate to strong northwest-southeast cleavage development is particularly evident within volcaniclastics and to a lesser extent rhyolitic-dacitic lava.

4.3.3 Geochemistry

4.3.3.1 Stream Sediment Geochemistry

A conventional -80 mesh stream sediment survey (22 samples) was conducted over the North Selina area as part of the initial assessment of the area. Results and locations of the sampling programme are included in Appendix V and displayed on plates LMARG 16, 18.

Base metal determinations in the North Selina area were generally less than encouraging. Values in the area ranged from Cu (5-30 ppm), Pb (5-135 ppm) and Zn (40-360 ppm). The most encouranging result (sample 482754) Cu (20 ppm), Pb (135 ppm) and Zn (360 ppm) was obtained from the mouth of a small creek draining eastward into the Anthony River. Subsequent follow up mapping of the creek lead to the identification of anomalous magnetite, sulphide clasts within a lapilli volcaniclastic (samples 564795, 564957) and an extensive outcrop of highly altered (intense sericite, silica, pyrite alteration) dacitic lava.

4.3.3.2 Rock Chip Geochemistry

A limited rock chip sampling programme (41 samples) was conducted jointly with the stream sediment and reconnaissance mapping programme undertaken over the North Selina area. Sample results are tabulated in Appendix V and sample locations are displayed on plates LMARG 16, 18.

Samples were analysed for Cu, Pb, Zn, Ag, Au, As, Ba and the majority of samples were analysed for the lithophile elements: Cr, Zr, Ti, Y and several were analysed for K_2O, Na_2O, CaO and MgO to facilitate the calculation of an alteration index figure. Several samples were selected for F, Sn and Rb analysis to aid in the characterisation of possible granite related mineralising processes active within the North Selina area.

i) Base Metal Analyses

The rock chip sampling programme identified two outcrops distinctly anomalous in base metals. An outcrop (samples 482749, 482986) of rhyolitic lava within the Red Hills Creek returned mildly anomalous base metal assays of Cu (100-250 ppm), Pb (185-555 ppm) and Zn (3050-7900 ppm). A second outcrop (sample 482957, 564795) of lapilli volcaniclastic or epiclastic with identifiable magnetite with associated sulphide clasts returned Cu (40-65 ppm), Pb (1900-2298 ppm) and Zn (2689-6900 ppm).

Several samples of outcrops throughout the area displayed mild base metal elevations. A sample (482792) of intensely sericite, silica $\pm$ pyrite altered dacitic lava exhibited a mild elevation in Cu (425 ppm).

A sample (482790) of rhyolitic breccia volcaniclastic outcropping in Red Hills Creek displayed mild elevations in Cu (405 ppm) and Pb (335 ppm). A sample (482727) of moderate to intensely sericitised and chloritised epiclastic or volcaniclastic outcropping in the Anthony River returned mild elevations in Pb (340 ppm) and Zn (280 ppm).

ii) Precious Metals Analyses

Precious metal values were generally below the level of detection. No significantly anomalous results were recorded. A sample (482714) of a magnetite, pyrite vein from within a lapilli volcaniclastic outcropping in a tributary of the Red Hills Creek in the northwest of the area displayed a mild elevation in Au (0.430 ppm).

iii) Lithophile Element Analyses

The lithophile element analyses were of limited value providing little additional information to aid the interpretation. The Ti/Zr ratio suggested a degree of internal variability existed within the unit of highly altered dacitic lava. This suggested that several dacitic to rhyolitic lava flows may be present. The volcaniclastic units exhibited highly variable Ti/Zr ratios (rhyolitic-andesitic compositions) implying that the volcanic detritus maybe sourced from a range of volcanic proveniences.

iv) Alteration Index Analyses

A number of samples from the North Selina area were analysed for K_2O, MgO, CaO and Na_2O to enable calculation of alteration indices to assist in the characterisation of the alteration style present at North Selina.

The alteration index (A.I. = 100 X (K_2O + MgO)/CaO + Na_2O + K_2O + MgO) varies from 58 (sample 482750) to a maximum of 98 (sample 482743), with the majority of samples depleted in Na and Ca relative to K and Mg which suggests a possible footwall style alteration. The intensely sericite, silica, pyrite altered zone (HA) has a distinct footwall style alteration index of 90-98.

v) Granitic Fluid Study

The F_2K_2O, Rb and Sn survey primarily aimed to resolve the question as to whether two Cambrian hydrothermal processes were active in the North Selina area. Firstly the likely extent of the hydrothermal processes associated with the intrusion of the Murchison granite and secondly whether any hydrothermal alteration indicative of a fossil VMS system was also present.

The elevations in Rb and F were not necessarily associated with the samples displaying the most intense magnetite, k-spar alteration. The elevation in Rb (>200 ppm) and F (>600 ppm) suggests a degree of interaction between granitic fluids and the outcropping Tyndall Group volcanics.

The possibility still exists that the alteration associated with the intrusion of the Murchison granite may overprint an earlier fossil VMS system.

4.3.4 Pb Isotopes

Seven rock chip samples (482710, 482729, 482749, 482790, 482957, 482972, 482986) were submitted for Pb isotope analysis. The aim of the study was to ascertain whether Pb mineralisation present in the samples from North Selina was the product of Cambrian hydrothermal processes. Then if possible establish whether any variation was present in the isotopic signature that may enable a distinction to be drawn between possible granitic and/or volcanogenic mineralising processes. The results of the Pb isotope studies by Carr and Dean (1990) are attached as Appendix VI.

The results of the Pb isotope study were not absolute and two groupings of the data were evident. The first group includes the samples (482729, 482749, 482957, 482986) that plot within the limits of the Rosebery 95% confidence ellipse on the $^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram. The second grouping includes all the samples (482710, 482790, 482792) with higher $^{206}Pb/^{204}Pb$ ratios which plot within or close to the Hellyer and Que River 95% confidence ellipse. The second group have a lower Pb content than Group 1 samples. The apparent variation in the $^{206}Pb/^{204}Pb$ ratio is probably a result of insitu addition of radiogenic Pb since the Cambrian, thus the samples may all have had similar initial Pb isotope ratios.

There is a slight possibility that the variation indicates the activity of more than one Cambrian hydrothermal event. The available evidence did not allow any firm conclusion to be drawn as to the likely nature of either of the potential hydrothermal events.

4.4 Regional Programme

4.4.1 Mount Lyell Area

4.4.1.1 Introduction

The previously identified outcrops of Tyndall Group volcaniclastics (Corbett et al., 1989) were targeted for limited reconnaissance mapping in an effort to identifying any prospective volcanics in the area to the east of Mount Lyell. Mapping concentrated on weathered outcrops exposed in cuttings on the Linda Valley - Comstock Mine railway.

4.4.1.2 Geology

Reconnaissance mapping at 1:10000 scale (Plate LMARG 28 D) identified a Cambro-Ordovician sequence exposed to the east of Mount Lyell. The lithologies mapped from exposures in railway cuttings along the Linda Valley railway compare favourably with units described by (Corbett, 1979 and Corbett et al., 1989).

The sequence of volcaniclastics were assigned to the Tyndall Group (Corbett et al., 1989).

Reconnaissance mapping identified minor sheared outcrops of white green quartz phyric ash-lapilli volcaniclastic within a creek in the southeast of the mapped area. A green grey orange brown lithic fragment bearing quartz feldspar phyric lapilli volcaniclastic (Comstock Tuff correlate, Corbett, 1979) conformably overlies the ash-lapilli volcaniclastic and outcrops over a substantial proportion of the area.

A unit of quartz feldspar phyric volcaniclastic conglomerate (Jukes Conglomerate correlate, Corbett, 1979) was identified overlying the Comstock Tuff correlate.

Conformably overlying the Tyndall Group volcano-sedimentary sequence to the north and northwest is a Cambro-Ordovician siliciclastic conglomerate sequence (Owen Conglomerate).

Unconformably overlying the Cambro-Ordovician basement are minor pockets of Pleistocene glacial till.

4.4.2 Julia Creek Area

4.4.2.1 Introduction

A traverse was made of the Julia Creek in an effort to locate the outcrops of Tyndall Group volcanics reported by CRA Exploration Pty. Ltd..

4.4.2.2 Geology

Reconnaissance mapping Plate LMARG 28 A identified minor float of lapilli volcaniclastic possibly emplaced by glacial processes. Minor outcrops of siliciclastic conglomerate were identified towards the southern end of Julia Creek. The reported outcrops of MRV could not be relocated.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Exploration to date within the EL has concentrated on the assessment of the base metal potential of three main prospects, limited reconnaissance work was undertaken as part of an ongoing regional programme.

i) Red Hills, where an extensive UTEM programme was conducted to the south and east of Red Hills (McNeill, 1989). This led to a two hole diamond drilling programme and subsequent DHEM programme in the Red Hills south area.

ii) Beatrice, where a grid was established and UTEM, geological mapping and limited rock chip and soil sampling programmes were undertaken to assess the VMS potential of Beatrice lava dome and flanking volcano-sedimentary sequence.

iii) North Selina, an area to the north of Mount Selina where a reconnaissance geological mapping, rock chip and stream sediment sampling programme has highlighted anomalous base metal values within a Tyndall Group volcaniclastic and rhyolitic lava.

iv) Regional programme, limited reconnaissance mapping was undertaken in the Julia Creek and Mount Lyell areas with the aim of identifying prospective outcrops of MRV in these areas.

Red Hills Prospect

DDH RH-19 was drilled to test the interpreted position of "conductor 1". A conductive body interpreted to lie below and to the west of DDH RH-18. DDH RH-19 intersected a flat lying shale horizon at the interpreted conductor position and no further work was recommended.

A review of all the data available on the Red Hills prospect is planned with the aim of generating a geologically based target for drill testing during 1991.

Beatrice Prospect

The absence of any significant UTEM anomaly attributable to an accumulation of VMS has downgraded the potential of the Beatrice prospect. The geological mapping, rock chip and soil sampling programmes highlighted a number of isolated lenses of black shale, along with minor outcrops with anomalous base metal geochemistry. The programme failed to locate a potential host horizon or an extensive zone of highly anomalous soil or rock chip geochemistry.

No further work is recommended for the Beatrice prospect.

North Selina Prospect

The results of the reconnaissance mapping and associated rock chip and stream sediment sampling programmes have been encouraging, highlighting two areas with anomalous base metal geochemistry. The Pb isotope studies have confirmed a Cambrian isotopic signature for the North Selina mineralisation. Geochemical and isotopic studies have failed to characterise the origin of the mineralisation as VMS type or due solely to the influence of the intrusion of Cambrian Murchison granite into the volcanic sequence.

Further work is recommended in the North Selina area:

i) A grid should be established and a UTEM survey should be undertaken over the previously unsurveyed area to the north of Mount Selina, where recent reconnaissance mapping has identified anomalous rock chip geochemistry.

ii) A 1:2500 scale grid mapping programme should precede the UTEM programme to establish the stratigraphic sequence and aid survey design. An emphasis should be placed on establishing the extent of the highly altered zones, and to identify any further sulphide mineralisation.

iii) A ground magnetics survey should be undertaken over the area to assist the geological interpretation and to outline the extent of magnetite/haematite altered rocks.

Regional Programme

The regional programme to date has involved limited reconnaissance mapping in the Julia Creek and Mount Lyell areas designed to identify prospective base metal host horizons within the MRV. Limited work to date has failed to highlight a prospective volcanic sequence.

Regional work by CRA Exploration Pty. Ltd. concentrated on the potential for massive fossil hydrothermal system beneath the Cambro-Ordovician sedimentary cover. Previous work identified three prospective airborne magnetic targets, Mount Sedgewick East, Julia Creek and Rolleston Road. The potential of these areas should not be overlooked.

Further regional exploration is recommended:

i) Further reconnaissance mapping and rock chip sampling of creeks should be undertaken towards the eastern margin of the Mount Lyell area with the aim of identifying a prospective suite of MRV.

ii) The collar of CRA Exploration Pty. Ltd. DDH 88MS-1 drilled into the large airborne magnetic anomaly to the east of Mount Sedgewick should be relocated and the current state of the hole should be determined. If clear a DHEM survey should be completed.

iii) Should positive results arise out of the DHEM survey consideration should be given to re-entering and extending DDH 88 MS-1.

iv) Following the work programme on DDH 88MS-1 consideration should be given to reviewing the available data and assessing the potential of the Julia Creek and Rolleston Road magnetic anomalies.

v) A review of available exploration data on Howards Anomaly, Lake Dora and Lake Spicer prospects should be completed.

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APPENDIX I

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 volcaniclastic	av
Autobrecciated	aub
Average	ave
Banded	bnd
Barite	Ba
Basalt	B
Bedded	bd
Biotite	Bio
Black	bk
Black shale	Bsh
Blue	bl
Boulder	bld
Breccia	b
Breccia volcaniclastic	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
Chromitiferous	cr
Clay	cy
Coarse	c
Coarse grained	cg
Colloform	coll
Colour	col
Common	com
Conglomerate	Cg
Conglomeratic	cg
Crimson	cm
Crystal	x
Crystal volcaniclastic	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 phyric	fp
Felspathic	fel
Ferruginous	fer
Fibrous	fb
Fine	f
Fine grained	fg
Fissile	fis
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
Hornblende	Hb
Ignimbrite	Ig
Illite	Ill
Interbedded	ibd
Intercalated	icl
Intrusive	int
Jurassic	Ju
K-Feldspar	Kfd
Khaki	kh
Laminated	lm
Lapilli volcaniclastic	lv
Lava	l
Lava breccia	lb
Leached	lch
Leucite	Lct
Leucitite	Ltt
Limonitic	Lim
Light	lgt
Limestone	Lst
Lithic	lh
Magnetite	Mt
Manganese	Mn
Marl	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	mtl
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
Phyric	p
Picrite	Pic
Pillow lava	pl
Pink	pk
Polymict	Y
Porphyritic	por
Predominantly	pred
Pumice	Pu
Pumiceous	pu
Purple	pp
Pyrite	Py
Pyritic	py
Pyroxene	Px
Pyrrhotite	Po
Quartz	Q
Quartzite	Qtz
Quellite	Qll
Questionable	?
Recrystallised	rx
Red	rd
Rehealed	rhd
Reworked	rw
Rhyodacite	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
Volcaniclastic	vlcl
Weak	wk
Weathered	wth
White	wh
Yellow	yw

APPENDIX II

433037

CORE GRIND SAMPLING - ~~MACKINTOSH~~ / ~~HATFIELD~~

Lake Margaret

HOLE No. RH-18

DATE 3-10-89

No.	SAMPLE NUMBER	INTERVAL	ELEMENTS REQUIRED	ST	SAMPLE NUMBER	INTERVAL	ELEMENTS REQUIRED	ST
1	517901	14.1-24.1	All + Au.	–	517932	233-234	SCOR	
2	902	24.1-34.1	↓		933	234-235	SCOR	
3	903	34.1-44.1			934	235-236	SCOR	
4	904	44.1-54.1			935	236-237	SCOR	
5	905	54.1-63			936	237-238	SCOR	
6	906	63-73			937	238-239	SCOR	
7	907	73-83			938	239-249		
8	908	83-97.5			939	249-259		
9	909	97.5-107.5			940	259-269		
10	910	107.5-112.1			941	269-279		
11	911	Standard			942	Standard		
12	912	112.1-122.1			943	279-287.6		
13	913	122.1-134.2			944	287.6-288.6	SCOR	
14	914	134.2-140.7			945	288.6-289.6	SCOR	
15	915	140.7-140.9	All + Au + Y		946	289.6-290.6	SCOR	
16	916	140.9-148.8	All + Au		947	290.6-291.2	SCOR	
17	917	148.8-152.8	↓		948	291.2-296		
18	918	152.8-157.5			949	296-297	SCOR	
19	919	157.5-167.5			950	297-298	SCOR	
20	920	167.5-176.2			951	298-299.5	SCOR	
21	921	176.2-186.2			952	299.5-300.5	SCOR	
22	922	186.2-197.9			953	300.5-301.5	SCOR	
23	923	197.9-207.9			954	301.5-302.5	SCOR	
24	924	207.9-217.9			955	302.5-312.5		
25	925	217.9-225			956	312.5-322.5		
26	926	225-229			957	322.5-332.5		
27	927	Standard			958	332.5-342.5		
28	928	229-230	SCOR		959	342.5-352.5		
29	929	230-231	SCOR		517960	352.5-356.8		
30	930	231-232	SCOR					
31	517931	232-233	SCOR					
32								

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

52 Murray Road, Welshpool, W.A. 6106 — Telex AA92560

ANALYTICAL REPORT No. 23.3.08.06665

ORDER No. 7388

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie, Tasmania, 7320

DATE RECEIVED 16/11/89 — RESULT REQUIRED ASAP

			TOTAL No. OF SAMPLES
6	12/12/89	1	60

PRE-TREATMENT / ANALYSIS

Sample Nos.		Pre-treatment	Analysis
517901/960	SC	Prep: 006,010,011,012,013,016	Cu,Pb,Zn,Ag/101
517901/960	SC		Au,AuChk/309
517901/960	SC		Ba,As,Cr,Zr,Ti/401
517915	SC		Y/401
517901/960	SC		Ti/403,Ba/404

RESULTS TO:

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie, Tasmania, 7320

REMARKS

RH-18

RESULTS TO:

STATE OF SAMPLE — ANALYSIS PREPARATION — ANALYSIS METHOD

AUTHORISED OFFICER

433038

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06665	12/12/89	7388	1 OF 6

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	Ba	As
1	517901	10	20	75	<0.5	0.036	<0.008	850	-	<2
	517902	10	10	70	<0.5	<0.008	-	830	-	<2
3	517903	10	35	85	<0.5	<0.008	-	860	-	<2
	517904	10	15	75	<0.5	<0.008	-	760	-	<2
	517905	10	10	80	<0.5	<0.008	-	760	-	<2
6	517906	25	15	145	<0.5	<0.008	-	870	-	5
	517907	25	<5	140	<0.5	<0.008	-	590	-	<2
	517908	15	5	220	<0.5	<0.008	-	640	-	<2
	517909	30	20	105	<0.5	<0.008	-	1750	-	<2
	517910	90	10	120	<0.5	<0.008	-	970	-	<2
	517911	140	200	2350	0.5	<0.008	-	1150	-	15
	517912	15	110	255	<0.5	<0.008	-	660	-	<2
13	517913	10	65	145	<0.5	<0.008	-	800	-	<2
	517914	60	135	335	0.5	<0.008	-	820	-	25
	517915	55	5	150	<0.5	<0.008	-	120	-	80
16	517916	110	550	730	1.0	<0.008	-	1000	-	35
	517917	45	500	2000	1.5	<0.008	-	1250	-	10
18	517918	35	220	390	0.5	<0.008	-	1250	-	8
	517919	65	400	1600	1.5	0.009	-	860	-	30
	517920	65	1650	2300	2.0	0.009	-	1250	-	3
21	517921	60	1300	1700	2.0	<0.008	-	940	-	10
	517922	90	720	1550	1.5	0.008	-	880	-	20
23	517923	30	135	320	0.5	<0.008	-	1050	-	4
	517924	30	155	375	1.0	<0.008	-	750	-	<2
25	517925	25	300	490	1.0	<0.008	-	900	-	<2

NOTE: Results in ppm unless otherwise specified
"-" element present but concentration too low to measure
"X" element concentration is below detection limit
"n" element not determined

AUTHORISED OFFICER

493039

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A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06665	12/12/89	7388	2 OF 6

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	Ba	As
1	517926	55	450	1200	0.5	<0.008	–	1050	–	<2
2	517927 *	125	195	2350	1.0	<0.008	–	1200	–	15
3	517928	40	350	1550	0.5	0.014	–	1950	–	<2
	517929	30	65	135	0.5	<0.008	–	2500	–	<2
	517930	75	1250	2050	1.0	0.010	0.013	>2500	0.31	<2
6	517931	130	4100	5550	1.5	0.018	–	>2500	0.36	<2
	517932	95	4350	4950	2.0	0.018	–	>2500	0.37	<2
8	517933	55	4450	6650	1.5	0.014	–	>2500	0.31	<2
	517934	20	3750	3350	1.5	0.021	–	>2500	0.32	<2
	517935	30	555	340	3.0	<0.008	–	>2500	0.30	<2
11	517936	25	1500	1650	1.0	0.010	–	1750	–	<2
	517937	25	700	1150	0.5	<0.008	–	1350	–	<2
13	517938	50	410	1150	0.5	<0.008	–	1650	–	<2
	517939	45	460	995	0.5	<0.008	–	1900	–	<2
	517940	30	160	150	0.5	<0.008	–	1200	–	<2
16	517941	38	10	85	<0.5	<0.008	–	1200	–	<2
	517942 A	134	230	2300	0.5	<0.008	–	1100	–	15
18	517943	40	750	215	0.5	0.018	–	1250	–	<2
	517944	30	3000	1900	1.5	<0.008	–	340	–	<2
20	517945	30	3050	3500	1.0	<0.008	–	760	–	<2
21	517946	55	5900	4950	3.0	<0.008	–	510	–	3
	517947	100	2050	6350	1.5	0.010	–	870	–	4
23	517948	90	3600	7650	2.5	0.022	–	580	–	40
	517949	130	3150	9100	3.0	0.152	0.223	420	–	180
25	517950	105	570	7700	2.0	0.035	0.038	720	–	15

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

433040

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06665	12/12/89	7388	3 OF 6

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	Ba	As
1	517951	125	1350	4650	2.0	0.021	–	810	–	<2
2	517952	800	235	350	1.0	0.014	–	900	–	7
3	517953	110	195	275	<0.5	0.017	–	870	–	9
4	517954	430	630	4800	3.5	0.027	–	1050	–	7
5	517955	15	95	180	0.5	<0.008	–	1300	–	<2
6	517956	15	125	210	<0.5	<0.008	–	970	–	<2
7	517957	15	65	600	<0.5	<0.008	–	860	–	<2
8	517958	20	315	275	<0.5	<0.008	–	2050	–	<2
9	517959	50	40	90	<0.5	<0.008	–	>2500	0.36	<2
10	517960	120	250	95	<0.5	<0.008	–	>2500	0.43	<2
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	0.008	0.008	10	0.01	2
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
25	METHOD	101	101	101	101	309	309	401	404	401

N.L.: Results in ppm unless otherwise specified
J = element present but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

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433041

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06665	12/12/89	7388	4 OF 6

TUBE No.	SAMPLE No.	Cr	Zr	Ti	Ti	Y				
1	517901	<5	240	1000	–	–				
2	517902	8	230	1050	–	–				
3	517903	<5	210	990	–	–				
4	517904	5	230	1100	–	–				
5	517905	<5	220	1150	–	–				
6	517906	30	170	3000	–	–				
7	517907	20	160	4100	–	–				
8	517908	35	170	4400	–	–				
9	517909	<5	190	1500	–	–				
10	517910	<5	120	610	–	–				
11	517911	980	85	2400	–	–				
12	517912	10	180	1550	–	–				
13	517913	15	220	1750	–	–				
14	517914	140	160	2400	–	–				
15	517915	140	250	>10000	1.45	40				
16	517916	140	140	2600	–	–				
17	517917	70	140	2400	–	–				
18	517918	50	190	2800	–	–				
19	517919	100	150	2400	–	–				
20	517920	95	120	2250	–	–				
21	517921	85	130	2100	–	–				
22	517922	100	140	2250	–	–				
23	517923	6	250	2250	–	–				
24	517924	10	240	2250	–	–				
25	517925	7	240	2200	–	–				

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

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433042

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A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06665	12/12/89	7388	5 OF 6

TUBE No.	SAMPLE No.	Cr	Zr	Ti	Ti	Y				
1	517926	10	210	2050	–	–				
2	517927	980	80	2450	–	–				
3	517928	15	250	2250	–	–				
4	517929	8	300	2550	–	–				
5	517930	15	210	1800	–	–				
6	517931	<5	210	1600	–	–				
7	517932	15	210	1600	–	–				
8	517933	6	200	1550	–	–				
9	517934	6	200	1600	–	–				
10	517935	15	190	1700	–	–				
11	517936	7	190	1600	–	–				
12	517937	10	240	2100	–	–				
13	517938	<5	220	1950	–	–				
14	517939	30	230	2050	–	–				
15	517940	5	220	2050	–	–				
16	517941	5	220	2000	–	–				
[illegible]	517942	980	80	2450	–	–				
18	517943	7	220	2000	–	–				
19	517944	30	100	1050	–	–				
20	517945	30	230	2050	–	–				
21	517946	30	140	1400	–	–				
22	517947	30	260	2250	–	–				
23	517948	65	140	1800	–	–				
24	517949	90	120	1700	–	–				
25	517950	75	190	2250	–	–				

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

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A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06665	12/12/89	7388	6 OF 6

TUBE No.	SAMPLE No.	Cr	Zr	Ti	Ts	Y				
1	517951	50	170	1750	–	–				
2	517952	<5	270	1700	–	–				
3	517953	8	240	1800	–	–				
4	517954	<5	270	1750	–	–				
5	517955	<5	310	1850	–	–				
6	517956	<5	310	1900	–	–				
7	517957	<5	280	1700	–	–				
8	517958	<5	320	1850	–	–				
9	517959	<5	270	1700	–	–				
10	517960	<5	260	1500	–	–				
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	50	0.01	5				
24	UNITS	ppm	ppm	ppm	%	ppm				
25	METHOD	401	401	401	403	401				

LEGEND: 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

433044

ANALABS

ANALYTICAL REPORT No.

7389

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

16/11/89

ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	06/12/89	1	10

PRETREATMENT

SAMPLE NUMBERS				ANALYSIS
561975/984	SC	Prep: 006,010,011,012,013,016		Cu,Pb,Zn,Ag/101
561975/984	SC			Ba,As,Cr,Zr,Ti/401

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS

REMARKS

RH-18

PET.

STATE OF SAMPLES

ANALYSIS PREPARATION

ANALYTICAL METHOD

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06666	06/12/89	7389	1 OF 1

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Ba	As	Cr	Zr	Ti
1	561975	5	20	60	0.5	810	3	<5	220	1050
2	561976	20	10	90	0.5	740	<2	25	160	2700
3	561977	20	15	80	1.0	1200	<2	<5	200	1200
4	561978	10	<5	130	<0.5	760	<2	10	220	1800
5	561979	15	50	430	0.5	680	3	<5	180	1500
6	561980	30	5	65	<0.5	1850	2	15	230	1950
7	561981	60	20	115	<0.5	1550	<2	5	230	1950
8	561982	15	70	245	0.5	1050	<2	<5	310	1550
9	561983	20	100	990	0.5	480	<2	<5	230	1350
10	561984	25	20	115	0.5	2250	<2	<5	260	1400
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	10	2	5	5	50
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
25	METHOD	101	101	101	101	401	401	401	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

433046

APPENDIX III

047

433048

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.
Phone (09) 458 7999 52 Murray Road, Welshpool, W.A. 6106 Telex AA92560
FAX: 004 31 8890

ANALYTICAL REPORT No. 23.3.08.07124

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

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No.	PROJECT
9878	Lake M'garet

DATE RECEIVED	RESULTS REQUIRED
28/05/90	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
2	02/07/90	1	32

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS: REFER TO ANALYSIS SECTION	PREPARATION	MET
	Various	RC	Prep: 016						Cu,Pb,Zn,Ag/101		
	Various	RC							Au,AuChk/309		
	Various	RC							Ba,As,Cr,Zr,Ti,Y/401		
	Various	RC							K2O,MgO,CaO,Na2O/104		
	Various	RC							Ti:Zr/199		

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

BEATRICE +
2 N. SELINA
Rock CHIPS

STATE OF SAMPLES	
whole core	WC
split core	SC
cutting	CU
rock	Ro
soil	SO
pulp	PU
water	WA
tissue	TI
stream sediment	SS
heavy mineral	HM

ANALYSIS — PREPARATION			
perchloric acid	A1	cold acid	CA
hydrochloric acid	A2	specific sulphide	SS
nitric acid	A3	other mixed acids	Ma
aqua regia	A4	alkaline attack	AA
nitric-perchloric	A5	volatilization	VO
HF mixture	A6	ignition	IG
HF under pressure	A7	pressed powder (XRF)	PP
fusion	A8	glass fusion (XRF)	GF

ANALYSIS — METHOD	
atomic absorbtion	AAS
x-ray fluorescence	XRF
spectrophotometry	SPEC
colorimetry	COL
chromatography	CHR
titration	TTN
other chemicals means	CHEM
miscellaneous	MISC
fluorescence	FLUOR
inductively coupled plasma	ICP

AUTHORISED OFFICER Jenkins

048

433049

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07124	02/07/90	9878	1 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	As	Cr
1	564322	515	10	125	0.5	0.048	-	786	8	[illegible]
2	564330	20	40	310	<0.5	<0.008	-	951	<2	[illegible]
3	564338	25	30	95	<0.5	<0.008	-	819	<2	[illegible]
4	564340	5	10	85	<0.5	<0.008	-	2218	<2	[illegible]
5	564341	25	20	100	<0.5	<0.008	-	910	<2	[illegible]
6	564374	45	10	140	0.5	<0.008	-	1520	<2	[illegible]
7	564380	10	25	295	0.5	<0.008	-	1042	<2	[illegible]
8	564391	55	5	220	<0.5	<0.008	-	1871	<2	[illegible]
9	564433	105	40	190	<0.5	<0.008	-	999	<2	[illegible]
10	564435	170	40	180	0.5	0.020	-	719	15	
11	564451	20	430	680	<0.5	<0.008	-	1490	3	[illegible]
12	564454	5	45	165	0.5	0.070	-	768	<2	
13	564467	25	415	760	1.0	0.012	-	1769	13	
14	564468	130	330	6000	1.0	0.016	-	1737	8	
15	564470	15	115	130	0.5	<0.008	-	1746	6	
16	564472	110	3200	1800	2.0	0.027	-	1570	10	
17	564473	30	245	455	<0.5	0.028	<0.008	1229	<2	
18	564481	85	105	765	1.0	0.012	-	171	65	
19	564482	40	1850	2150	2.5	<0.008	-	155	<2	
20	564491	35	65	260	0.5	<0.008	-	1560	4	
21	564493	25	10	75	0.5	<0.008	-	485	<2	[illegible]
22	564495	15	45	200	<0.5	<0.008	-	1092	<2	
23	564500	5	30	105	<0.5	<0.008	-	1019	<2	
24	564505	5	10	60	<0.5	<0.008	-	753	<2	
25	564508	20	40	340	<0.5	<0.008	-	586	<2	

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

AUTHORISED OFFICER

043

433050

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07124	02/07/90	9878	2 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	As	Cr
1	564510	135	65	150	<0.5	<0.008	–	1419	<2	[illegible]
2	564513	15	40	230	0.5	<0.008	–	1015	<2	[illegible]
3	564515	5	5	180	<0.5	<0.008	–	1089	3	
4	564517	95	30	135	<0.5	<0.008	–	1633	6	[illegible]
5	564522	45	70	180	<0.5	<0.008	–	1395	3	[illegible]
6	564804	15	10	215	<0.5	<0.008	–	756	15	[illegible]
7	564818	5	25	420	<0.5	<0.008	<0.008	1381	4	[illegible]
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	0.008	0.008	10	2	
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	p[illegible]
25	METHOD	101	101	101	101	309	309	401	401	4[illegible]

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 Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07124	02/07/90	9878	1 OF 2

TUBE No.	SAMPLE No.	Zr	Ti	Ti:Zr	Y	K2O	MgO	CaO	Na2O
1	564322	200	1309	6.5	25	—	—	—	—
2	564330	250	3920	15.7	40	—	—	—	—
3	564338	200	2204	11.0	25	5.28	1.24	0.10	0.88
4	564340	300	2625	8.7	30	—	—	—	—
5	564341	200	2614	13.1	30	—	—	—	—
6	564374	230	2763	12.0	40	—	—	—	—
7	564380	230	2133	9.3	40	—	—	—	—
8	564391	210	1328	6.3	25	—	—	—	—
9	564433	260	2711	10.4	40	—	—	—	—
10	564435	260	1810	7.0	40	3.00	1.26	0.07	0.04
11	564451	260	3851	14.8	30	—	—	—	—
12	564454	340	1997	5.9	40	4.38	1.27	0.12	0.95
13	564467	240	1997	8.3	25	7.45	0.41	0.17	0.08
14	564468	220	1872	8.5	25	5.88	0.45	0.12	0.08
15	564470	300	2097	7.0	30	6.10	0.75	0.12	0.07
16	564472	260	2231	8.6	45	—	—	—	—
17	564475	200	2358	11.8	40	6.04	1.71	0.25	0.79
18	564481	220	2216	10.1	25	1.24	1.04	0.10	0.05
19	564482	210	2017	9.6	30	1.17	1.04	0.12	0.05
20	564491	270	3466	12.8	35	—	—	—	—
21	564493	200	2555	12.8	35	—	—	—	—
22	564495	240	2712	11.3	40	—	—	—	—
23	564500	220	1755	8.0	40	—	—	—	—
24	564505	250	2537	10.1	35	4.37	1.01	0.53	1.66
25	564508	200	2960	14.8	45	—	—	—	—

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

051 433052

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07124	02/07/90	9878	2 OF 2

TUBE No.	SAMPLE No.	Zr	Ti	Ti:Zr	Y	K2O	MgO	CaO	Na2O
1	564510	280	1681	6.0	30	—	—	—	—
2	564513	250	1487	5.9	45	—	—	—	—
3	564515	250	1664	6.6	50	—	—	—	—
4	564517	270	2989	11.1	45	—	—	—	—
5	564522	240	1658	6.9	30	—	—	—	—
6	564804	180	2760	15.3	20	3.53	1.96	0.21	0.01
7	564818	190	3329	17.5	30	4.95	3.32	0.26	0.05
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23	DETECTION	5	50	0.1	5	0.01	0.01	0.01	0.01
24	UNITS	ppm	ppm	%	ppm	%	%	%	%
25	METHOD	401	401	199	401	104	104	104	104

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

433053

ANALABS

ANALYTICAL REPORT No. 2323.08.06913

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

	ORDER No.	PROJECT
Aberfoyle Resources Limited Exploration Division P.O. Box 952 Burnie Tasmania 7320	8663	Lake M'garet
	DATE RECEIVED	**RESULTS REQUIRED**
	06/03/90	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	19/03/90	1	5

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	X5644,55,58,59,62,64	RC	Prep: 016						Cu,Pb,Zn,Ag/101		
	X5644,55,58,59,62,64	RC							Au,AuChk/309		
	X5644,55,58,59,62,64	RC							Ba/401		
	X5644,55,58,59	RC							As/401		
	X5644,55,58	RC							Cr,Zr,Ti/401		

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

Fox Lore
A/c

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	X-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	MA		SPEC
rock	RO	aqua regia	A4	alkaline attack			COL
soil	SO	nitric perchloric	A5	volatilization	VO		CHR
pulp	PU	HF mixture	A6	ignition	IG		TTN
water	WA	HF under pressure	A7	pressed powder (XRF)			CHEM
tissue	TI	fusion	A8	glass fusion (XRF)	GF		MISC
stream sediment	SS						FLUO
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER

433054

ANALABS

Division of Inchcape Inspection and Testing Services, Australia, Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06913	19/03/90	8663	1 OF 1

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	As	Cr
1	564455	40	120	170	0.5	<0.008	–	440	30	[illegible]
2	564458	70	35	200	<0.5	<0.008	–	810	65	[illegible]
3	564459	180	170	335	<0.5	<0.008	–	190	50	
4	564462	125	150	185	1.5	0.016	–	2150	–	
5	564464	260	240	225	0.5	0.010	–	1350	–	
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	3	3	0.5	0.008	0.008	10	2	[illegible]
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	pp[illegible]
25	METHOD	101	101	101	101	309	309	401	401	40[illegible]

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 Jenkins

433055

ANALABS

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06913	19/03/90	8663	1 OF 1

TUBE No.	SAMPLE No.	Zr	Ti	K2O	MgO	CaO	Na2O			
1	564455	270	1950	3.57	0.46	<0.01	0.09			
2	564458	270	1750	--	--	--	--			
3	564459	--	--	--	--	--	--			
4	564462	--	--	6.99	0.75	<0.01	0.15			
5	564464	--	--	--	--	--	--			
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	50	0.01	0.01	0.01	0.01			
24	UNITS	ppm	ppm	%	%	%	%			
25	METHOD	401	401	104	104	104	104			

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 Jenkin

ANALABS

ANALYTICAL REPORT No. 23.3.08.06876

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

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No.	PROJECT
8649	Lake M'garet

DATE RECEIVED	RESULTS REQUIRED
90/02/22	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
2	07/03/90	1	2

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS REFER TO ANALYSIS SECTION	PREPARATION	METHOD
										—	

REMARKS

RESULTS TO

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

STATE OF SAMPLES		ANALYSIS – PREPARATION				ANALYSIS – METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	X-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	MA	spectrophotometry	SPEC
rock	R	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric perchloric	A5			chromatography	CHR
pulp	PU		A6				TTN
water	W		A7	pressed powder (XRF)			CHEM
tissue	T		A8	glass fusion (XRF)	G		MISC
stream sediment	SS						FLUO
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER

056

433057

ANALABS

Division of Inchcape Inspection and Testing Services Australia Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06876	07/03/90	8649	1 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	As	Zr
1	S64350	75	60	230	<0.5	<0.008	-	570	2	25[illegible]
2	S64351	105	370	605	<0.5	0.014	0.011	380	20	24[illegible]
3										
4										
5										
6										
7										
8										
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11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	0.008	0.008	10	2	5
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
25	METHOD	101	101	101	101	309	309	401	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 [signature]

433058

U 037

ANALABS

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06876	07/03/90	8649	2 OF 2

TUBE No.	SAMPLE No.	Ti								
1	364350	2600								
2	364351	2100								
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
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 IV

6600N

433060

LICENCE:
PROJECT: 059

SAMPLED BY: [illegible] GWW

COORD	NUMBER	DEPTH	COLOUR		COORD	NUMBER	DEPTH	COLOUR	
7000E	564600	20	LBR LGY		7725E	564629	50	BR.	
7025	601	30	BR		7750	630	40	LGR	
7050	602	30	BR WH		7775	631	50	BR	
7075	603	20	BR		7800	632	70	LBR	cree
7100	604	20	D BR		7825	633	80	LGY L BR	
7125	605	40	LBR WH		7850	634	50	LGY	
7150	606	50	BR		7875	635	80	GY BR.	
7175	607	50	L BR		7900	636	100	LBR LGY	cree
7200	608	60	LBR OR		7925	637	50	LBR	
7225	609	50	LBR YW		7950	638	40	LBR LGY	
7250	610	80	LBR		7975	639	80	BR	
7275	611	80	LBR OR		8000E	564640	35	LBR LGY.	
7300	612	50	D/BR						
7325	613	60	L BR						
7350	614	40	LBR OR						
7375	615	50	LBR						
7400	616	50	L OR BR						
7425	617	40	LBR						
7450	618	40	LGY						
7475	619	40	LGY						
7500	620	20	WH						
7525	621	40.	LGY						
7550	622	20	LBR WH						
7575	623	40	LGY						
7600	624	45	BR	creek					
7625	625	50	L OR BR						
7650	626	50	LBR OR						
7675	627	20	LGY WH						
7700	628	30	BR	Creek					

G800N.

433061

LICENCE:
PROJECT: 600

SAMPLED BY: G Cooper
G.W.W.

COORD	NUMBER	DEPTH	COLOUR
7000E	564641	40	L BR YW
7025	642	40	BR
7050	643	50	L BR LGY
7075	644	100	L GY GR
7100	645	80	BR
7125	646	70	GR BR
7150	647	50	BR YW
7175	648	80	L BR OR
7200	649	50	D BR
7225	650	50	L GR
7250	651	40	BR GY
7275	652	30	BR GY
7300	653	30	BR WH
7325	654	40	L BR GY
7350	655	40	L BR GY
7375	656	30	L BR GY
7400	657	40	L BR
7425	658	40	L BR GY
7450	659	40	L BR
7475	660	40	L BR OR
7500	661	50	BR
7525	662	50	L BR OR
7550	663	30	BR
7575	664	60	L BR OR
7600	665	90	L BR
7625	666	60	BR YW
7650	667	40	BR
7675	668	NS	ROCK
7700	669	40	BR

N.B.

COORD	NUMBER	DEPTH	COLOUR
7725E	564670	40	BR YW
7750	671	90	YW GY
7775	672	60	GR BR
7800	673	70	L BR
7825	674	50	OR
7850	675	40	BR
7875	677	50	OR
7900	678	70	L BR OR
7925	679	60	OR
7950	680	50	L BR YW
7975	681	60	L BR YW
8000E	564682	20	WH BR

1000N

LICENCE: 061
PROJECT:

433062
SAMPLED BY: G-W.W.

COORD	NUMBER	DEPTH	COLOUR	
7000E	564683	70	L GY WH	
7025	684	40	D BR	Creek
7050	685	30	D BR	
7075	686	30	OR WH	
7100	687	20	BR	Land slide
7125	688	20	BR	
7150	689	40	OR	
7175	690	40	L BR YW	
7200	691	30	L BR	
7225	692	40	L BR YW	
7250	693	40	L BR	
7275	694	40	YW OR	
7300	695	50	L BR	
7325	696	70	L BR	
7350	697	80	L BR GR	
7375	698	50	L BR YW	
7400	699	60	OR L BR	
7425	700	80	L BR OR	
7450	701	80	OR	
7475	702	50	L BR	
7500	703	50	OR BR	
7525	704	50	BR	
7550	705	90	L BR L GY	
7575	706	30	L BR	
7600	707	50	L GY BR	
7625	708	50	BR WH	
7650	709	60	BR.	
7675	710	100	L BR GR	
7700	711	80	L BR OR	

COORD	NUMBER	DEPTH	COLOUR	
7725E	564712	80	OR	
7750	713	80	YW OR	
7775	714	40	L BR OR	
7800	715	20	BR	cree.
7825	716	60	L BR YW	
7850	717	50	BR GY	
7875	718	40	BR	
7900	719	40	L BR OR	
7925	720	60	L BR YW	
7950	721	40	L BR YW	
7975	722	50	L GY BR	
8000E	564723	40	L GY	

LICENCE: 052 72CON. 433063

PROJECT: SAMPLED BY: G Cooper G.W.W.

COORD	NUMBER	DEPTH	COLOUR
7000E	564724	30	LBR
7025	725	40	LBR LGY
7050	726	30	LBR
7075	727	40	LBR
7100	728	50	LBR
7125	729	50	LBR
7150	730	50	LOR BR
7175	731	80	LBR
7200	732	90	LBR LGY
7225	733	90	LBR GR
250	734	90	LBR LGY
7275	735	80	GYBL
7300	736	80	LBR GY
7325	737	80	LBR GY
7350	738	90	GY
7375	739	80	BR GY
7400	740	80	LBR YW
7425	741	70	BR OR
7450	742	20	BR GY
STD # 7475	743	NS	—
7500	744	80	LBR OR
7525	745	70	LBR YW
7550	746	80	LBR YW
7575	747	90	LBR OR
7600	748	80	LBR OR
7625	749	30	GY
7650	750	30	GY BR
7675	751	20	DBR
7700	752	40	LGY BR

COORD	NUMBER	DEPTH	COLOUR
7725E	564753	30	BR
7750	754	40	BR
7775	755	20	BR
# 7800	756	NS	— STD
7825	757	NS	— X
7850	758	40	LGY BR
7875	759	40	LGY BR
7900	760	40	LGY BR
7925	761	20	LGY BR
7950	762	40	LBR GY
7975	763	50	LGY
8000E	564764	30	LBR BR

063

433064

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

Phone (09) 458 7999 52 Murray Road, Welshpool, W.A. 6106 Telex AA92560

FAX: 004 31 8890

ANALYTICAL REPORT No. 23.3.08.07122

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

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No.	PROJECT
9876	

DATE RECEIVED	RESULTS REQUIRED
28/05/90	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
7	08/06/90	1	164

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PUL-VERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS REFER TO ANALYSIS SECTION	PREPARATION	MET
	X564,599/675,677/756,758/764	SO	Prep: 018						Cu,Pb,Zn,Ag/101		
	X564,599/675,677/756,758/764	SO							Ba,As/401		

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

LAKE MARGARET

BEATRICE INFILL SOILS

STATE OF SAMPLES	
whole core	WC
split core	SC
cutting	CU
rock	Ro
soil	SO
pulp	PU
water	WA
tissue	TI
stream sediment	SS
heavy mineral	HM

ANALYSIS — PREPARATION			
perchloric acid	A1	cold acid	CA
hydrochloric acid	A2	specific sulphide	SS
nitric acid	A3	other mixed acids	Ma
aqua regia	A4	alkaline attack	AA
nitric-perchloric	A5	volatilization	VO
HF mixture	A6	ignition	IG
HF under pressure	A7	pressed powder (XRF)	PP
fusion	A8	glass fusion (XRF)	GF

ANALYSIS — METHOD	
atomic absorbtion	AAS
x-ray fluorescence	XRF
spectrophotometry	SPEC
colorimetry	COL
chromatography	CHR
titration	TTN
other chemicals means	CHEM
miscellaneous	MISC
fluorescence	FLUOR
inductively coupled plasma	ICP

AUTHORISED OFFICER G Jenkins

433065

064

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07122	08/06/90	9876	1 OF 7

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Ba	As
1	564599 * STD	25	195	190	<0.5	600	70
2	564600	10	35	45	<0.5	200	3
3	564601	15	45	40	<0.5	120	4
4	564602	10	30	45	<0.5	330	4
5	564603	10	10	30	<0.5	95	<2
6	564604	10	15	30	<0.5	130	3
7	564605	5	10	30	<0.5	140	4
8	564606	15	35	60	<0.5	300	10
9	564607	10	160	275	<0.5	500	2
10	564608	15	50	75	<0.5	400	6
11	564609	10	35	40	<0.5	270	4
12	564610	15	75	115	<0.5	440	3
13	564611	15	60	105	<0.5	470	7
14	564612	30	80	65	<0.5	530	15
15	564613	10	50	85	<0.5	520	5
16	564614	10	35	60	<0.5	340	6
17	564615	10	45	70	<0.5	480	4
18	564616	10	25	60	<0.5	420	4
19	564617	10	30	45	<0.5	330	4
20	564618	10	35	35	<0.5	160	<2
21	564619	5	25	25	<0.5	130	<2
22	564620	10	40	25	<0.5	60	2
23	564621	5	25	30	<0.5	190	2
24	564622	5	35	45	<0.5	370	2
25	564623	5	25	30	<0.5	75	2

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

AUTHORISED OFFICER [signature]

065

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07122	08/06/90	9876	2 OF 7

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Ba	As			
1	564624	20	70	85	<0.5	570	5			
2	564625	20	70	55	<0.5	290	<2			
3	564626	20	60	55	<0.5	370	4			
4	564627	10	50	25	<0.5	110	<2			
5	564628	20	95	100	<0.5	480	4			
6	564629	10	50	25	<0.5	110	<2			
7	564630	5	35	30	<0.5	210	2			
8	564631	5	110	130	<0.5	640	2			
9	564632	25	240	170	<0.5	460	5			
10	564633	5	75	75	<0.5	370	<2			
11	564634	5	65	60	<0.5	470	3			
12	564635	15	90	160	<0.5	590	3			
13	564636	20	105	95	<0.5	420	6			
14	564637	10	50	100	<0.5	490	<2			
15	564638	5	35	70	<0.5	550	3			
16	564639	5	30	45	<0.5	770	3			
17	564640	15	60	70	<0.5	410	10			
18	564641	20	40	110	<0.5	620	3			
19	564642	20	25	115	<0.5	860	4			
20	564643	15	40	135	<0.5	660	3			
21	564644	15	25	100	<0.5	920	<2			
22	564645	15	35	150	<0.5	850	3			
23	564646	15	30	75	<0.5	660	2			
24	564647	15	30	60	<0.5	430	4			
25	564648	15	80	135	<0.5	630	2			

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

AUTHORISED OFFICER Jenkin

060

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07122	08/06/90	9876	3 OF 7

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Ba	As		
1	564649	10	20	30	<0.5	140	<2		
2	564650	25	55	40	<0.5	140	7		
3	564651	10	30	50	<0.5	190	4		
4	564652	15	45	35	<0.5	110	3		
5	564653	15	30	35	<0.5	190	<2		
6	564654	15	25	40	<0.5	180	4		
7	564655	10	50	60	<0.5	190	6		
8	564656	20	30	40	0.5	190	5		
9	564657	15	30	40	0.5	200	6		
10	564658	15	50	35	<0.5	200	7		
11	564659	15	40	50	<0.5	290	5		
12	564660	30	85	70	<0.5	520	6		
13	564661	120	195	105	<0.5	630	9		
14	564662	20	40	85	<0.5	740	<2		
15	564663	20	95	260	<0.5	700	4		
16	564664	20	85	95	<0.5	680	4		
17	564665	20	105	215	<0.5	940	2		
18	564666	20	40	95	<0.5	600	6		
19	564667	25	120	135	0.5	690	10		
20	564668 * STD	25	185	170	<0.5	600	65		
21	564669	40	110	70	<0.5	550	15		
22	564670	45	125	85	<0.5	670	20		
23	564671	20	80	125	<0.5	680	5		
24	564672	20	65	140	<0.5	670	10		
25	564673	15	105	75	<0.5	500	10		

Results in ppm unless otherwise specified
T : element present but concentration too low to measure
< : element concentration is below detection limit
— : element not determined

AUTHORISED OFFICER Jenkin

067

433068

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07122	08/06/90	9876	4 OF 7

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Ba	As		
1	564674	20	310	160	<0.5	570	8		
2	564675	90	585	215	<0.5	580	20		
3	564677	25	325	255	0.5	580	<2		
4	564678	20	260	215	<0.5	660	2		
5	564679	125	550	205	0.5	300	10		
6	564680	60	415	165	1.0	160	15		
7	564681	25	180	130	1.0	510	7		
8	564682	20	125	60	<0.5	320	4		
9	564683	10	30	35	<0.5	880	<2		
10	564684	130	315	120	<0.5	710	40		
11	564685	70	160	60	<0.5	830	20		
12	564686	15	40	45	<0.5	720	7		
13	564687	35	70	125	<0.5	890	5		
14	564688	50	120	80	<0.5	780	7		
15	564689	15	45	65	<0.5	720	5		
16	564690	20	35	115	<0.5	790	2		
17	564691	40	95	90	<0.5	690	10		
18	564692	15	40	90	<0.5	730	4		
19	564693	10	20	50	<0.5	540	7		
20	564694	15	60	55	<0.5	720	5		
21	564695	15	50	90	0.5	780	<2		
22	564696	20	65	115	<0.5	780	4		
23	564697	20	60	125	<0.5	750	5		
24	564698	15	25	55	<0.5	500	2		
25	564699	20	20	55	<0.5	600	8		

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

AUTHORISED OFFICER Jenkin

050

433069

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07122	08/06/90	9876	5 OF 7

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Ba	As			
1	564700	20	65	115	<0.5	620	<2			
2	564701	20	365	50	<0.5	480	3			
3	564702	15	45	45	<0.5	290	2			
4	564703	5	15	50	<0.5	240	5			
5	564704	10	35	45	<0.5	280	7			
6	564705	10	25	45	<0.5	230	<2			
7	564706	5	15	30	<0.5	150	2			
8	564707	5	15	35	<0.5	140	4			
9	564708	15	30	20	0.5	75	<2			
10	564709	5	15	40	<0.5	430	4			
11	564710	5	35	105	<0.5	1100	2			
12	564711	10	35	70	<0.5	530	<2			
13	564712	54	30	70	<0.5	530	<2			
14	564713	15	50	75	<0.5	490	2			
15	564714	15	40	55	<0.5	420	5			
16	564715	70	200	110	<0.5	480	15			
17	564716	20	195	150	0.5	480	10			
18	564717	75	540	170	1.0	440	20			
19	564718	70	595	165	1.5	430	20			
20	564719	35	185	140	1.0	400	9			
21	564720	15	135	95	1.5	350	<2			
22	564721	50	585	220	2.0	450	10			
23	564722	10	55	40	1.5	290	<2			
24	564723	5	20	30	1.0	75	<2			
25	564724	20	50	65	<0.5	530	7			

Results in ppm unless otherwise specified
[illegible] - element present but concentration too low to measure
[illegible] - element concentration is below detection limit
— - element not determined

AUTHORISED OFFICER Jenkin

069

433070

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07122	08/06/90	9876	6 OF 7

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Ba	As
1	564725	10	30	50	<0.5	570	4
2	564726	15	35	85	<0.5	720	9
3	564727	15	50	85	<0.5	910	6
4	564728	30	60	90	<0.5	830	9
5	564729	10	30	70	<0.5	760	7
6	564730	15	45	100	<0.5	840	<2
7	564731	15	35	110	<0.5	740	<2
8	564732	15	45	105	<0.5	770	<2
9	564733	15	45	115	<0.5	800	2
10	564734	5	45	90	<0.5	750	<2
11	564735	5	15	65	<0.5	720	<2
12	564736	5	20	70	<0.5	630	<2
13	564737	5	10	85	<0.5	840	<2
14	564738	5	15	70	<0.5	630	<2
15	564739	5	65	75	<0.5	580	<2
16	564740	5	20	80	<0.5	660	<2
17	564741	10	35	75	<0.5	610	20
18	564742	20	60	55	<0.5	410	6
19	564743 * STD	20	180	160	<0.5	600	60
20	564744	10	25	90	<0.5	670	<2
21	564745	15	35	95	<0.5	750	<2
22	564746	15	30	90	<0.5	680	<2
23	564747	15	30	95	<0.5	630	6
24	564748	5	15	70	<0.5	530	<2
25	564749	5	15	25	<0.5	40	<2

Results in ppm unless otherwise specified
T = element present but concentration too low to measure
[illegible]
— element not determined

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433071

070

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07122	08/06/90	9876	7 OF 7

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Ba	As			
1	564750	10	20	15	<0.5	20	<2			
2	564751	15	55	30	<0.5	15	2			
3	564752	10	20	20	<0.5	50	<2			
4	564753	15	20	20	<0.5	10	<2			
5	564754	10	10	20	<0.5	10	<2			
6	564755	20	45	35	0.5	15	<2			
7	564756 > * STD	25	185	180	<0.5	580	65			
8	564758	10	15	15	<0.5	10	<2			
9	564759	20	40	35	<0.5	180	<2			
10	564760	5	10	15	<0.5	10	<2			
11	564761	15	25	15	<0.5	10	<2			
12	564762	10	10	30	0.5	160	<2			
13	564763	5	5	10	<0.5	10	<2			
14	564764	5	10	25	<0.5	20	<2			
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	10	2			
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm			
25	METHOD	101	101	101	101	401	401			

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

AUTHORISED OFFICER Jenkin

APPENDIX V

433073

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

Phone (09) 458 7999 52 Murray Road, Welshpool, W.A. 6106 Telex AA92560
FAX: 004 31 8890

ANALYTICAL REPORT No. 23.3.08.07243

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

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No.	PROJECT
10033	Lake M'gret

DATE RECEIVED	RESULTS REQUIRED
17/07/90	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	30/07/90	1	12

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PUL-VERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	MET-
	Various	PU	Prep: 016						K20/104		
	Various	PU	Prep: 016						K20/104		
	Various	PU							Sn,Rb/401,F/129		
	Various	PU							Sn,Rb/401,F/129		

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

RESULTS
ENTERED BY HAND
1/8/90

RE ANALYSIS OF PULPS
FOR N. SELINA ROCKCHIPS
WHERE ORIGINAL ASSAY HAD
K20 THIS REMAINED
UNCHANGED.

STATE OF SAMPLES	
whole core	WC
split core	SC
cutting	CU
rock	Ro
soil	SO
pulp	PU
water	WA
tissue	TI
stream sediment	SS
heavy mineral	HM

ANALYSIS — PREPARATION			
perchloric acid	A1	cold acid	
hydrochloric acid	A2	specific sulphide	SS
nitric acid	A3	other mixed acids	Ma
aqua regia	A4	alkaline attack	AA
nitric-perchloric	A5	volatilization	VO
HF mixture	A6	ignition	IG
HF under pressure	A7	pressed powder (XRF)	PP
fusion	A8	glass fusion (XRF)	GF

ANALYSIS — METHOD	
atomic absorbtion	AAS
x-ray fluorescence	XRF
spectrophotometry	SPEC
colorimetry	COL
chromatography	CHR
titration	TTN
other chemicals means	CHEM
miscellaneous	MISC
fluorescence	FLUOR
inductively coupled plasma	ICP

AUTHORISED OFFICER

073

433074

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07243	30/07/90	10033	1 OF 1

TUBE No.	SAMPLE No.	K2O	Sn	Rb	F				
1	482700	8.61	<3	257	300				
2	482722	5.62	<3	157	150				
3	482741	6.99	<3	257	660				
4	482795	4.85	3	229	760				
5	482967	4.06	13	131	740				
6	482986	4.42	5	214	860				
7	482995	5.34	4	227	550				
8	564779	5.14	6	329	2200				
9	564795	2.35	3	135	820				
10	564804	3.70	<3	177	660				
11	564808	5.86	754	280	640				
12	564818	5.37	<3	242	1000				
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23	DETECTION	0.01	3	5	100				
24	UNITS	%	ppm	ppm	ppm				
25	METHOD	104	401	401	129				

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 Jenkin

433075

074

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

Phone (09) 458 7999 52 Murray Road, Welshpool, W.A. 6106 Telex AA92560
FAX: 004 31 8890

ANALYTICAL REPORT No. 23.3.08.07009

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

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No.	PROJECT
9812	

DATE RECEIVED	RESULTS REQUIRED
10/04/90	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	20/04/90	1	18

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PUL-VERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS REFER TO ANALYSIS SECTION	PREPARATION	METH
	Various	RC Prep: 01							Cu,Pb,Zn,Ag,/101		
	Various	RC							Au,AuChk/309		
	Various	RC							Ba,As,Cr,Zr,Ti,Y/401		
	Various	RC							K2O,MgO,CaO,Na2O/104		
	Various	RC Prep: 01							Cu,Pb,Zn,Ag,/101		

REMARKS

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

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

AUTHORISED OFFICER

075

433076

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07009	20/04/90	9812	1 OF 1

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Au
1	482957	—	65	—	1900	—	6900	—	11	0.11
2	482961	55	—	10	—	35	—	0.5	—	0.01
3	482965	35	—	5	—	110	—	0.5	—	
4	482967	10	—	5	—	10	—	1.0	—	<0.00
5	482969	95	—	15	—	60	—	0.5	—	
6	482972	425	—	170	—	65	—	1.5	—	0.0
7	482973	10	—	15	—	170	—	0.5	—	
8	482974	10	—	10	—	100	—	0.5	—	0.02
9	482980	15	—	25	—	80	—	0.5	—	<0.0
10	482986	250	—	355	—	7900	—	3.0	—	0.0
11	482995	85	—	195	—	210	—	1.0	—	<0.00
12	482997	40	—	145	—	130	—	0.5	—	<0.00
13	482998	40	—	195	—	105	—	1.0	—	
14	564802	15	—	5	—	130	—	0.5	—	0.0
15	564805	275	—	20	—	70	—	1.5	—	0.0
16	564808	20	—	30	—	230	—	0.5	—	<0.0
17	564815	90	—	170	—	75	—	2.5	—	0.0
18	564819	90	—	70	—	170	—	0.5	—	0.0
19										
20										
21										
22										
23	DETECTION	5	25	5	25	5	25	0.5	2	0.0
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	p
25	METHOD	101	104	101	104	101	104	101	104	[illegible]

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

076

433077

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07009	20/04/90	9812	1 OF 1

TUBE No.	SAMPLE No	AuChk	Ba	Ba	As	Cr	Zr	Ti	Y	K20
1	482957	0.104	700	–	120	15	110	2700	25	1.9
2	482961	–	770	–	35	40	290	1900	40	3.9
3	482963	–	620	–	35	30	100	3450	35	3.2
4	482967	–	510	–	15	7	270	1450	20	3.
5	482969	–	930	–	10	20	220	3200	35	4.5
6	482972	–	780	–	45	9	280	1700	40	3.
7	482973	–	1850	–	20	30	210	3800	25	4.
8	482974	–	1400	–	20	25	240	3750	25	5.
9	482980	–	1100	–	3	7	270	1950	40	5.
10	482986	0.019	620	–	45	45	170	1550	35	4.
11	482995	–	1800	–	7	25	200	2550	30	6.0
12	482997	–	1550	–	4	25	220	2400	20	5.
13	482998	–	1700	–	4	30	220	220	30	
14	564802	–	900	–	3	25	150	2050	35	3.
15	564805	–	1050	–	50	25	100	2650	15	4.4
16	564808	–	1450	–	15	25	200	3050	20	5.
17	564813	–	>2500	0.28	35	20	230	2100	30	
18	564819	0.010	160	–	65	55	65	830	5	
19										
20										
21										
22										
23	DETECTION	0.008	10	0.01	2	5	5	30	5	0.
24	UNITS	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	
25	METHOD	309	401	403	401	401	401	401	401	10

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

077 433078

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A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07009	20/04/90	9812	1 OF 1

TUBE No.	SAMPLE No.	MgO	CaO	Na2O
1	482957	1.74	0.53	0.07
2	482961	0.21	0.18	0.13
3	482965	1.09	0.08	0.13
4	482967	0.18	0.03	0.16
5	482969	0.89	0.15	0.17
6	482972	0.63	0.05	0.12
7	482973	1.72	0.04	0.09
8	482974	1.44	0.05	0.11
9	482980	0.94	1.23	1.16
10	482986	1.16	0.10	0.11
11	482995	2.02	0.49	0.17
12	482997	1.44	0.11	0.12
13	482998	—	—	—
14	564802	1.81	0.66	0.35
15	564805	0.36	0.04	0.13
16	564808	2.40	0.74	0.16
17	564815	—	—	—
18	564819	—	—	—
19				
20				
21				
22				
23	DETECTION	0.01	0.01	0.01
24	UNITS	%	%	%
25	METHOD	104	104	104

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

433079

A division of MacDonald Hamilton & Co. Pty. Ltd.

Phone (09) 458 7999 | 52 Murray Road, Welshpool, W.A. 6106 | Telex AA92560

FAX: 004 31 8890

U/O

ANALYTICAL REPORT No. 23.3.08.07179

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

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No.	PROJECT
10013	Lake M'gret

DATE RECEIVED	RESULTS REQUIRED
19/06/90	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	04/07/90	1	2

STATE OF SAMPLES		PRE-TREATMENT							ANALYSIS		
REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PUL-VERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	ME
	<5647,79,95	RC	Prep: 016						Cu,Pb,Zn,Ag/101		
	<5647,79,95	RC							Au,AuChk/309		
	<5647,79,95	RC							Ba,As/401		
	<5647,79	RC							Cr,Zr,Ti/401		
	<5647,79	RC							Ti:Zr/9825		

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

N. SALINA
Rock CHIPS

STATE OF SAMPLES	
whole core	WC
split core	SC
cutting	CU
rock	Ro
soil	SO
pulp	PU
water	WA
tissue	TI
stream sediment	SS
heavy mineral	HM

ANALYSIS — PREPARATION			
perchloric acid	A1	cold acid	CA
hydrochloric acid	A2	specific sulphide	SS
nitric acid	A3	other mixed acids	Ma
aqua regia	A4	alkaline attack	AA
nitric-perchloric	A5	volatilization	VO
HF mixture	A6	ignition	IG
HF under pressure	A7	pressed powder (XRF)	PP
fusion	A8	glass fusion (XRF)	GF

ANALYSIS — METHOD	
atomic absorbtion	AAS
x-ray fluorescence	XRF
spectrophotometry	SPEC
colorimetry	COL
chromatography	CHR
titration	TTN
other chemicals means	CHEM
miscellaneous	MISC
fluorescence	FLUO
inductively coupled plasma	ICP

AUTHORISED OFFICER [signature]

'079

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

433080

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07179	04/07/90	10013	1 OF 1

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	As	Cr
1	564779	9	96	143	<0.5	<0.008	<0.008	749	~~103~~ 4	4
2	564795	40	2298	2689	7.0	0.075	—	747	7	
3										
4										
5										
6										
7										
8										
9										
10										
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17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	0.008	0.008	10	2	
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	p
25	METHOD	101	101	101	101	309	309	401	401	40

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

009 433081

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.07179	04/07/90	10013	1 OF 1

TUBE No.	SAMPLE No.	Zr	Ti	Ti:Zr					
1	564779	177	3270	18.5					
2	564795	—	—	—					
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23	DETECTION	5	50	0.1					
24	UNITS	ppm	ppm	%					
25	METHOD	401	401	9825					

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

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ANALABS

52 Murray Road, Welshpool W.A. 6106 — Telex AA92560

ANALYTICAL REPORT No. 2323.08.06774

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

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No.	PROJECT
9342	

DATE RECEIVED	RESULTS REQUIRED
08/01/89	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	15/01/90	1	13

STATE OF SAMPLES (REFER BELOW)	SAMPLE NUMBERS	PRE-TREATMENT: DRY / CRUSH / SPLIT / PULVERISE / SIEVE / OTHER SEE REMARKS / NONE	ANALYSIS: REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	Various	RC Prep: 008,010,011,012,013,016	Cu,Pb,Zn,Ag,/101		
	Various	RC	Au,AuChk/309		
	Various	RC	Ba,As,Cr,Zr,Ti/401		
	Various	RC	K2O,MgO,CaO,Na2O/104		

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

LAKE MARGARET

N. SELINA
Rock CHIPS

STATE OF SAMPLES		ANALYSIS PREPARATION				ANALYSIS METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	MA	spectrophotometry	SPEC
rock	RO	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric perchloric	A5				CHR
pulp	PU		A6				ETN
water	WA		A7	pressed powder (XRF)			CHEM
tissue	TI		A8	glass fusion (XRF)			MISC
stream sediment							FLUC
heavy mineral	HM						ICP

AUTHORISED OFFICER

034 433083

ANALABS

A Division of Inchcape Inspection and Testing Services Australia

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06774	15/01/90	9342	1 OF 1

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	As	Cr
1	482708	35	5	115	<0.5	<0.008	<0.008	170	5	[illegible]
2	482726	50	30	265	1.0	0.023	-	640	40	[illegible]
3	482727	90	60	225	1.0	<0.008	-	1200	9	[illegible]
4	482728	20	40	310	<0.5	0.009	-	2700	<2	[illegible]
5	482729	20	340	280	<0.5	0.013	-	1500	<2	[illegible]
6	482741	20	15	225	<0.5	<0.008	<0.008	1050	2	[illegible]
7	482743	15	5	145	<0.5	<0.008	-	970	<2	[illegible]
8	482745	10	10	125	<0.5	<0.008	-	770	<2	[illegible]
9	482749	100	185	3050	1.0	<0.008	-	570	6	[illegible]
10	482750	15	5	160	<0.5	0.012	-	420	<2	[illegible]
11	482790	405	335	160	0.5	0.010	-	1000	<2	[illegible]
12	482791	25	65	90	0.5	<0.008	-	1400	<2	[illegible]
13	482795	10	5	90	<0.5	<0.008	-	910	<2	[illegible]
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	0.008	0.008	10	2	
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	pp[illegible]
25	METHOD	101	101	101	101	309	309	401	401	40[illegible]

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

033 433084

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A Division of Inchcape Inspection and Testing Services Australia Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06774	15/01/90	9342	1 OF 1

TUBE No.	SAMPLE No.	Zr	Ti	K2O	MgO	CaO	Na2O			
1	482708	70	1400	1.21	1.35	0.44	0.82			
2	482726	260	1950	2.84	2.21	1.11	0.04			
3	482727	120	2750	4.04	2.74	0.35	0.07			
4	482728	310	1950	6.33	1.07	0.12	0.09			
5	482729	260	1850	5.94	0.71	0.09	0.79			
6	482741	330	2800	5.92	1.69	0.13	0.31			
7	482743	260	2050	6.09	1.42	0.05	0.09			
8	482745	640	4650	6.04	1.16	0.25	0.08			
9	482749	170	760	4.00	0.92	0.04	0.03			
10	482750	300	2650	3.43	1.69	1.25	2.43			
11	482790	210	2200	5.49	1.66	0.08	0.06			
12	482791	220	2100	11.69	1.27	1.20	1.43			
13	482795	260	2550	4.87	1.24	0.53	2.14			
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	50	0.01	0.01	0.01	0.01			
24	UNITS	ppm	ppm	%	%	%	%			
25	METHOD	401	401	104	104	104	104			

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

433085

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.
Phone (09) 458 7999 — 52 Murray Road, Welshpool W.A. 6106 — Telex AA92560

ANALYTICAL REPORT No. 23.3.08.06674

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

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No.	PROJECT
7403	

DATE RECEIVED	RESULTS REQUIRED
20/11/89	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	05/12/89	1	6

SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS: REFER TO ANALYSIS SECTION	PREPARATION	METHOD
K482,700,710,714,717,722,724	RC	Prep: 008,010,011,012,013,018						Cu,Pb,Zn,Ag/101		
K482,700,710,714,717,722,724	RC							Au.AuChk/309		
K482,700,710,714,717,722,724	RC							Ba,As,Cr,Zr,Ti,Y/401		
K482,710,717,722	RC							K2O,MgO,CaO,Na2O/104		

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

LAKE MARGARET.
NORTH SEUNA
ROCK CHIPS

STATE OF SAMPLES	ANALYSIS — PREPARATION		ANALYSIS — METHOD
...e core WC	perchloric acid A1	cold acid CA	atomic absorption AAS
...core SC	hydrochloric acid A2	specific sulphide SS	X-ray fluorescence XRF
...ting CU	nitric acid A3	other mixed acid MA	spectrophotometry SPEC
[illegible]	aqua regia [illegible]	alkali [illegible] AA	colorimetry COL
[illegible]	[illegible]	[illegible]	chromatography CHR
[illegible]	[illegible]	[illegible]	[illegible]
...am sediment	[illegible]	[illegible]	[illegible] FLUOR
...y mineral [illegible]	[illegible]	[illegible]	inductively coupled plasma ICP

AUTHORISED OFFICER

085

433086

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06674	05/12/89	7403	1 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	As	Cr
1	482700	15	<5	40	0.5	0.008	-	1650	<2	<5
2	482710	160	140	220	1.0	0.010	-	290	30	25
3	482714	140	<5	130	1.5	0.430	0.396	240	10	30
4	482717	360	45	120	3.5	<0.008	-	3250	65	5
5	482722	20	<5	105	<0.5	0.012	-	3150	5	30
6	482724	25	270	100	0.5	0.020	-	3250	4	<5
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	0.008	0.008	10	2	5
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
25	METHOD	101	101	101	101	309	309	401	401	401

Results in ppm unless otherwise specified
Tr: element present but concentration too low to measure
< X: element concentration is below detection limit
- : element not determined

AUTHORISED OFFICER

056 433087

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A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06674	05/12/89	7403	2 OF 2

TUBE No.	SAMPLE No.	Zr	Ti	Y
1	482700	120	890	20
2	482710	190	2150	8
3	482714	100	2250	15
4	482717	160	2050	10
5	482722	160	1400	9
6	482724	180	1100	10
23	DETECTION	5	50	5
24	UNITS	ppm	ppm	ppm
25	METHOD	401	401	401

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

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433088

037

ANALABS

Division of Inchcape Inspection and Testing Services Australia Pty Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06674	05/12/89	7403	1 OF 1

TUBE No.	SAMPLE No.	K2O	MgO	CaO	Na2O					
1	482700	–	–	–	–					
2	482710	2.95	2.22	0.69	0.78					
3	482714	–	–	–	–					
4	482717	9.10	0.76	0.25	0.78					
5	482722	6.86	0.50	0.10	0.19					
6	482724	–	–	–	–					
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.01	0.01	0.01	0.01					
24	UNITS	%	%	%	%					
25	METHOD	104	104	104	104					

Results in ppm unless otherwise specified

I.S. element present but concentration too low to measure

X = element concentration is below detection limit

* = element not determined

AUTHORISED OFFICER

433089

ANALABS

ANALYTICAL REPORT No. 23.3.08.06793

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

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No.	PROJECT
9376	Lke Margaret

DATE RECEIVED	RESULTS REQUIRED
15/01/90	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	23/01/90	1	3

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	PRE-TREATMENT: DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS: REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	482770/772	SS Prep: 006,007,016							Cu,Pb,Zn,Ag/101,Wt/9807		
	482770/772	SS							Au,AuChk/309		
	482770/772	SS							Ba,As/401		

REMARKS

S/SEDS.

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

STATE OF SAMPLES		ANALYSIS – PREPARATION				ANALYSIS – METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	X-ray fluorescence	XRF
cutting	CU						SPEC
rock	Ro	aqua regia		alkaline			COL
soil	SO	nitric-perchloric					CHR
pulp	PU						TIN
water	WA	HF under pressure	A7	pressed powder (XRF)			CHEM
tissue	TI	fusion	A8	glass fusion (XRF)			MISC
stream sediment	SS						
heavy mineral	HM						

AUTHORISED OFFICER

009

433090

ANALABS

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06793	23/01/90	9376	1 OF 1

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	Ba	As	Wt
1	482770	15	40	140	<0.5	0.015	890	4	31.4
2	482771	20	30	115	<0.5	<0.008	740	60	58.5
3	482772	25	40	70	<0.5	<0.008	360	4	27.0
4									
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7									
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9									
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11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23	DETECTION	5	5	5	0.5	0.008	10	2	0.1
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	g
25	METHOD	101	101	101	101	307	401	401	9807

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

Phone (09) [illegible] 52 Murray Road Welshpool [illegible] 6106 [illegible]

ANALYTICAL REPORT No. 23.3.08.06741

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

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No.	PROJECT
9304	

DATE RECEIVED	RESULTS REQUIRED
19/12/89	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	05/01/89	1	10

STATE OF SAMPLES REFER BELOW	PRE-TREATMENT: SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS	REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	<4827,60/69	SS	Prep: 005,016						Cu,Pb,Zn,Ag/101,Wt/9807			
	<4827,60/69	SS							Au,AuChk/309			
	<4827,60/69	SS							Ba,As/401			

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	Ma	spectrophotometry	SPEC
rock	Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric perchloric	A5	volatilisation	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	[illegible]	TIN
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	[illegible]	CHEM
tissue	TI	fusion	A8	glass fusion (XRF)	GF	[illegible]	MISC
stream sediment	SS					fluorescence	FLUC
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER

433092

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06741	05/01/89	9304	1 OF 1

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuChk	Ba	As	Wt
1	482760	10	60	105	<0.5	0.017	–	1200	10	54.
2	482761	10	85	105	<0.5	<0.008	–	870	6	34.
3	482762	15	45	110	<0.5	<0.008	–	1000	4	34.
4	482763	5	15	60	<0.5	<0.008	–	270	3	42.
5	482764	20	100	130	<0.5	<0.008	–	1000	3	34.
6	482765	5	5	80	<0.5	<0.008	<0.008	240	2	64.
7	482766	<5	20	75	<0.5	0.018	–	430	4	52.
8	482767	20	30	90	<0.5	IS	IS	510	3	17.
9	482768	15	35	75	<0.5	<0.008	–	670	2	37.
10	482769	5	25	70	<0.5	<0.008	–	330	4	32.
11										
12										
13										
14										
15										
16										
17										
18										
19										
20	Wt of samples for Au analysis were as follows:-									
21	Sample 482761 - 10gms, 482762 - 10gms, 482763 - 15gms, 482764 - 10gms.									
22	482768 - 12gms, 482769 - 8gms.									
23	DETECTION	5	5	5	0.5	0.008	0.008	10	2	0.
24	UNITS	PPM	PPM	PPM	PPM	ppm	ppm	ppm	ppm	GS
25	METHOD	101	101	101	101	309	309	401	401	980

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

433093

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

Phone (09) 458 7999 52 Murray Road, Welshpool, W.A. 6106 Telex AA92560

ANALYTICAL REPORT No. 23.3.08.06687

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

	ORDER No.	PROJECT
Aberfoyle Resources Limited Exploration Division P.O. Box 952 Burnie Tasmania 7320	7418	

DATE RECEIVED	RESULTS REQUIRED
27/11/89	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	12/12/89	1	6

SAMPLE NUMBERS	PRE-TREATMENT	ANALYSIS (REFER TO ANALYSIS SECTION)	PREPARATION	METHOD
482,754/759	SS Prep: 005,016	Cu,Pb,Zn,Ag/101		
482,754/759	SS	Au,AuChk/309		
482,754/759	SS	Ba,As/401		
482,754/759	SS Prep: 005,016	Wt/9807		

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

NORTH SELINA
S/SEDS

STATE OF SAMPLES	ANALYSIS — PREPARATION		ANALYSIS — METHOD
core WC	perchloric acid A1	cold acid CA	atomic absorbtion AAS
core SC	hydrochloric acid A2	specific sulphide SS	X-ray fluorescence XRF
cuttings CU	nitric acid A3	other mixed acids MA	spectrophotometry SPEC
[illegible]	aqua regia A4	alkaline attack AA	colorimetry COL
[illegible]	nitric-perchloric A5	volatilization VO	chromatography CHR

AUTHORISED OFFICER

093 433094

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.09.06687	12/12/89	7418	1 OF 1

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	AuWt	Ba	As	Wt
1	482754	20	135	360	1.0	0.091	10.23	400	5	16.80
2	482755	10	55	125	<0.5	<0.008	15.18	590	<2	23.96
3	482756	10	35	100	<0.5	<0.008	11.82	620	2	18.45
4	482757	10	45	115	<0.5	<0.008	20.75	850	<2	28.61
5	482758	10	5	40	<0.5	<0.008	17.36	450	<2	24.04
6	482759	15	50	95	<0.5	0.009	25.08	770	<2	44.72
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	0.008	0.01	10	2	0.01
24	UNITS	ppm	ppm	ppm	ppm	ppm	gms	ppm	ppm	gms
25	METHOD	101	101	101	101	309	9807	401	401	9807

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

AUTHORISED OFFICER

433095

ANALABS

Phone (09) 458 7999

ANALYTICAL REPORT No. 23.3.08.06673

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

	ORDER No.	PROJECT
Aberfoyle Resources Limited Exploration Division P.O. Box 952 Burnie Tasmania 7320	7402	
	DATE RECEIVED	RESULTS REQUIRED
	20/11/89	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	05/12/89	1	3

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	PRE-TREATMENT: DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS: REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	K482,751/753	SS	Prep: 005,016						Cu,Pb,Zn,Ag/101,Wt/9807		
	K482,751/753	SS							Au,AuChk/309		
	K482,751/753	SS							Ba,As/401		

RESULTS TO

R. de Bomford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

LAKE MARGARET
NORTH SELINA
S/SEDS.

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	X-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	MA	spectrophotometry	SPEC
rock	Ro	aqua regia	A4	alkaline attack		colorimetry	COL
soil	SO	nitric/perchloric	A5	volatilization	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	titration	TTN
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	wet chemical methods	CHEM
tissue	TI	fusion	A8	glass fusion (XRF)	GF		MISC
stream sediment	SS						FLUOR
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER

ANALABS

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	23.3.08.06673	05/12/89	7402	1 OF 1

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	WtAu	Ba	As	Wt
1	482751	20	10	90	<0.5	<0.008	19.34	270	<2	29.47
2	482752	10	15	85	<0.5	<0.008	17.51	140	4	58.90
3	482753	30	5	85	<0.5	0.009	26.06	460	3	23.08
4										
5										
6										
7										
8										
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16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	0.008	0.01	10	2	0.01
24	UNITS	ppm	ppm	ppm	ppm	ppm	gms	ppm	ppm	gms
25	METHOD	101	101	101	101	309	9807	401	401	9807

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

Co-Ordinates	Sample No:	Cu	Pb	Zn	Ag	Au	As	Ba	Cr	Zr	Ti
NORTH SELINA											
385530 5366662	482710	160	140	220	1.0	0.010	30	280	25	190	2150
386463 5364861	482729	20	340	280	X	0.013	X	1500	X	260	1850
386656 5365825	482749	100	185	3050	1.0	X	6	570	20	170	760
386717 5365804	482790	405	335	160	0.5	0.010	X	1000	40	210	2200
386210 5364930	482957	65	1900	6900	11	0.110	120	700	15	110	2700
385849 5364942	482972	425	170	65	1.5	0.032	45	780	9	280	1700
386656 5365825	482986	250	555	7900	3.0	0.019	45	620	45	170	1550
BEATRICE											
7832 7000	564351	105	370	605	X	0.011	20	380	-	240	2100
6653 6708	564459	180	170	335	X	X	50	190	-	-	-
6649 6720.4	564464	260	240	225	0.5	0.010	-	1350	-	-	-

APPENDIX VI

030

433099

Sirotope

CSIRO
AUSTRALIA

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Chief: Dr. B.J.J. Embleton

REPORT TO ABERFOYLE RESOURCES LTD

ON THE PROBABLE METALLOGENIC ASSOCIATIONS

OF EXPLORATION SAMPLES FROM THE

LAKE MARGARET E.L., WESTERN TASMANIA

REPORT SR 118

GRAHAM R. CARR
JUDITH A. DEAN

22/6/90

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SUMMARY

Exploration samples from the Lake Margaret E.L containing between 150 and 1600 ppm Pb have a narrow range of Pb isotopic compositions consistent with derivation from Cambrian hydrothermal fluids.

The variation that is apparent, especially in the $^{206}Pb/^{204}Pb$ ratio of the lowest Pb samples is probably a result of in situ addition of radiogenic Pb since the Cambrian and thus all samples probably had similar initial Pb isotope ratios.

There is a slight possibility that the variation indicates the activity of more than one Cambrian hydrothermal event. However, insufficient evidence is available to indicate whether one of these events may have been associated with the intrusion of the Murchison Granite, rather than being volcanogenic in origin.

1. AIM

A total of 10 exploration samples from the Lake Margaret E.L. to the north and east of Queenstown have been analysed for their Pb isotopic composition with the aim of determining their likely metallogenic association. In addition to discriminating between Cambrian and Devonian mineralizing events, it is pertinent to consider the possible effects of Cambrian granitoid emplacement especially in the group of samples from around Mount Selina.

2. SAMPLES

Seven samples were obtained by Danny Noonan during a creek mapping program in the area to the north of Mount Selina and an additional 3 samples were taken during a grid mapping program to the east of the Beatrice lava dome. Brief sample descriptions provided by Danny Noonan are presented in Table 1. All samples were provided as pulps.

3. METHODS

About 0.15g of each pulp was digested in a 1:1 mixture of 7N HNO_3 and 7N HCl acids in Teflon beakers. Lead was separated by anion exchange techniques in dilute HBr solutions and purified by electroplating onto Pt electrodes. Lead isotope ratios were determined on a VG ISOMASS 54E solid source thermal ionization mass spectrometer run in fully automated mode. Precision estimates, representing 2 standard deviations about the mean of over 1000 analyses of international standards and natural samples, are shown in the upper left hand corner of the following diagrams.

Although geochemical data were provided, it was decided to check Pb concentrations since some of the samples contained relatively low amounts (140 ppm). These were measured by isotope dilution by adding a known amount of ^{202}Pb spike at the initial dissolution stage.

4. TARGET SIGNATURES

The signatures of major Cambrian VMS mineralization at Rosebery, Que River and Hellyer are presented in Figures 1 and 2. The heavy dashed line is the average crustal Pb evolution curve, or growth curve, of Cumming and Richards (1975). The Rosebery signature is very homogeneous and includes other deposits in the region such as Hercules and Koonya. In contrast, the Que River and Hellyer signatures have slightly higher and more variable $^{206}Pb/^{204}Pb$ ratios. A simple explanation of these two apparently different signatures is that they represent regional variations in isotopic ratios related to the one major VMS metallogenic event. The variation may be due to differences in the relative U, Th and Pb contents of source rocks between localities of an essentially contemporaneous event (e.g the differences between the Central Volcanic Complex (Rosebery) and the Western Sequence/basal Dundas Group (Que River, Hellyer)). Slight time differences may be involved if, for example, the centre of hydrothermal activity was migrating across the volcanic belt(s) over the period of volcanic activity.

In some localities, for example Mt Lyell, Pinnacles, and Lake Selina, both signatures are present indicating that sulfides were deposited from two hydrothermal systems containing Pb with different isotopic compositions. These systems may have been operating essentially contemporaneously (e.g. Carr and Gulson, 1984) or sequentially. In such cases, and where Cambrian granitoids are also present, it is possible that one of the systems was associated with granite intrusion.

To discriminate which, if any, of these signatures is associated with plutonic rather than volcanogenic processes an assessment is required of:

1) Structural, textural and petrological differences between deposits, or samples within the same deposit, which show the different signatures;

2) The Pb isotope systematics of the Murchison granite compared with unaltered Mt Read Volcanics.

At this stage, insufficient evidence is available to draw conclusions concerning the significance of the two apparent Pb isotope signatures in areas such as the Lake Margaret E.L. where hydrothermal solutions may have derived from granite emplacement as well as from volcanic processes.

5. RESULTS

The Pb contents of the samples as determined by isotope dilution are given in Table 2 and compare closely with the AAS results provided by Aberfoyle.

The Pb isotope results fall into two groups (Table 2, Figs 1 and 2):

Group 1 Those samples which plot within the Rosebery 95% confidence ellipse on the $^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram (482729, 749, 957, 986 and 564351).

Group 2 Those samples with higher $^{206}Pb/^{204}Pb$ ratios which plot within or close to the Hellyer and Que River 95% confidence ellipses. These samples tend to have lower Pb contents than Group 1 samples (Fig. 3).

On the $^{208}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram (Fig. 1), the samples in Group 1 have higher $^{208}Pb/^{204}Pb$ ratios than Rosebery.

6. DISCUSSION

The results confirm that the Pb in all samples probably derived from Cambrian hydrothermal activity. There is no evidence of Devonian mineralization. However, as was discussed in section 4, drawing distinctions between VMS-related and granite-related mineralization is not straightforward.

The distinction between the two groups of data may be related to different hydrothermal events, or it may be due to radiogenic addition of ^{206}Pb, ^{207}Pb and ^{208}Pb since the Cambrian, which is only apparent in the low Pb samples of Group 2.

In other datasets from the region there is a threshold Pb content, above which the majority of samples have a homogeneous Pb isotopic composition which represents the initial ratios, that is the ratios at the time of formation in the Cambrian. The thresholds for Que River and Hellyer are in the range 80-150 ppm Pb, but those for mineralization at Lake Selina, Red Hill and Henty Fault Zone tend to be less well defined and higher (approx. 500 - 1000 ppm). This almost certainly results from variable, but generally higher, U contents of this mineralization.

Thus with the present data it is likely, though not definite, that Group 2 samples had the same initial ratio as Group 1 but their Pb isotopic composition has changed due to in situ addition of radiogenic Pb.

The slightly elevated ^{208}Pb/^{204}Pb ratios of the Group 1 samples compared to Rosebery is of no great significance. Such regional variations are not uncommon between even large VMS deposits of the same metallogenic province.

There is an outside possibility that the two groups result from different Cambrian hydrothermal solutions, but at this stage, isotopic evidence is not able to discriminate between possible plutonic and volcanic processes. However, an assessment of the geological relationships, if any, between the two groups may help to resolve this complex problem.

7. CONCLUSIONS

Exploration samples from the Lake Margaret E.L. have a narrow range of Pb isotopic compositions and appear to plot in two groups both of which fall within the range for known volcanogenic mineralization. The differences between the groups probably results from in situ addition of radiogenic Pb in low-Pb samples. Thus all samples probably had the same initial isotope ratios which were very similar to the Rosebery signature.

There is a slight possibility that the two groups represent different Cambrian hydrothermal solutions, but no conclusions can be made as to whether plutonic processes were involved.

8 REFERENCES

Carr, G.R. and Gulson, B.L., 1984. Multiple lead sources in the stratiform Lady Loretta Zn-Pb-Ag deposit, Northwest Queensland. Geol. Soc. Aust., Abstracts, 12, Seventh Aust. Geol. Convention, pp. 90-92.

Cumming, G.L. and Richards, J.R., 1975. Ore lead isotope ratios in a continuously changing Earth. Earth and Planet. Sci. Letts, 28, pp. 155-171.

TABLE 1. Brief sample descriptions as privided by Danny Noonan.

Sample 482710 is a ash volcaniclastic with pervasive sericite veins and lesser magnetite pyrite veinlets taken from an outcrop at the junction of Red Hills and Quinn Creeks. The mineralisation is possibly associated with the intrusion of the Murchison Granite.

Sample 482729 is a sample of pervasively sericite altered ash volcaniclastic from an outcrop within the Anthony River.

Samples 482986/482749 were taken from an outcrop of sericite, pyrite altered rhyolitic lava within Red Hills Creek.

Sample 482790 is a sample of breccia volcaniclastic with pervasive chlorite alteration and disseminated pyrite from within Red Hills Creek, the sample was taken from an outcrop approximately 100m downstream from sample 482986.

Sample 482972 is an intensely sericite, silica, pyrite altered sample taken from within the main Selina alteration zone.

Sample 482957 is a sample of a sulphide clast hosted within a volcaniclastic to the east of the main Selina alteration zone.

Sample 564351 is a sample of dacitic lava which has under gone pervasive chlorite alteration and has minor disseminated pyrite throughout.

Sample 564459 is a sulphide clast, somewhat oxidised to haematite formerly hosted within a breccia volcaniclastic. Sample 564464 is a sample of breccia volcaniclastic.

TABLE 2. LEAD CONCENTRATIONS AND Pb ISOTOPE RATIOS OF SAMPLES.

Sample	$\frac{208\ Pb}{206\ Pb}$	$\frac{207\ Pb}{206\ Pb}$	$\frac{206\ Pb}{204\ Pb}$	$\frac{207\ Pb}{204\ Pb}$	$\frac{208\ Pb}{204\ Pb}$	Pb(ppm)	
1 482710	2.0825	0.8509	18.351	15.615	38.215	153	North Selina
2 482729	2.0843	0.8530	18.267	15.581	38.073	278	
3 482749	2.0870	0.8542	18.273	15.609	38.136	181	
4 482790	2.0841	0.8523	18.303	15.600	38.145	330	
5 482957	2.0876	0.8549	18.261	15.612	38.121	1,600	
6 482957RLD	2.0882	0.8549	18.262	15.612	38.135	1,600	
7 482972	2.0810	0.8509	18.334	15.600	38.153	175	
8 482972R	2.0811	0.8509	18.332	15.599	38.151	178	
9 482986	2.0887	0.8547	18.274	15.618	38.169	510	
10 564351	2.0887	0.8549	18.260	15.610	38.139	400	Beatrice
11 564459	2.0724	0.8483	18.385	15.596	38.101	172	
12 564464	2.0820	0.8504	18.364	15.618	38.234	250	

RLD = Reload of same dissolution.
R = repeat analysis

WR. Pulps.

North Selina 386700 E ±2000 m.
5366000 N

Beatrice ?

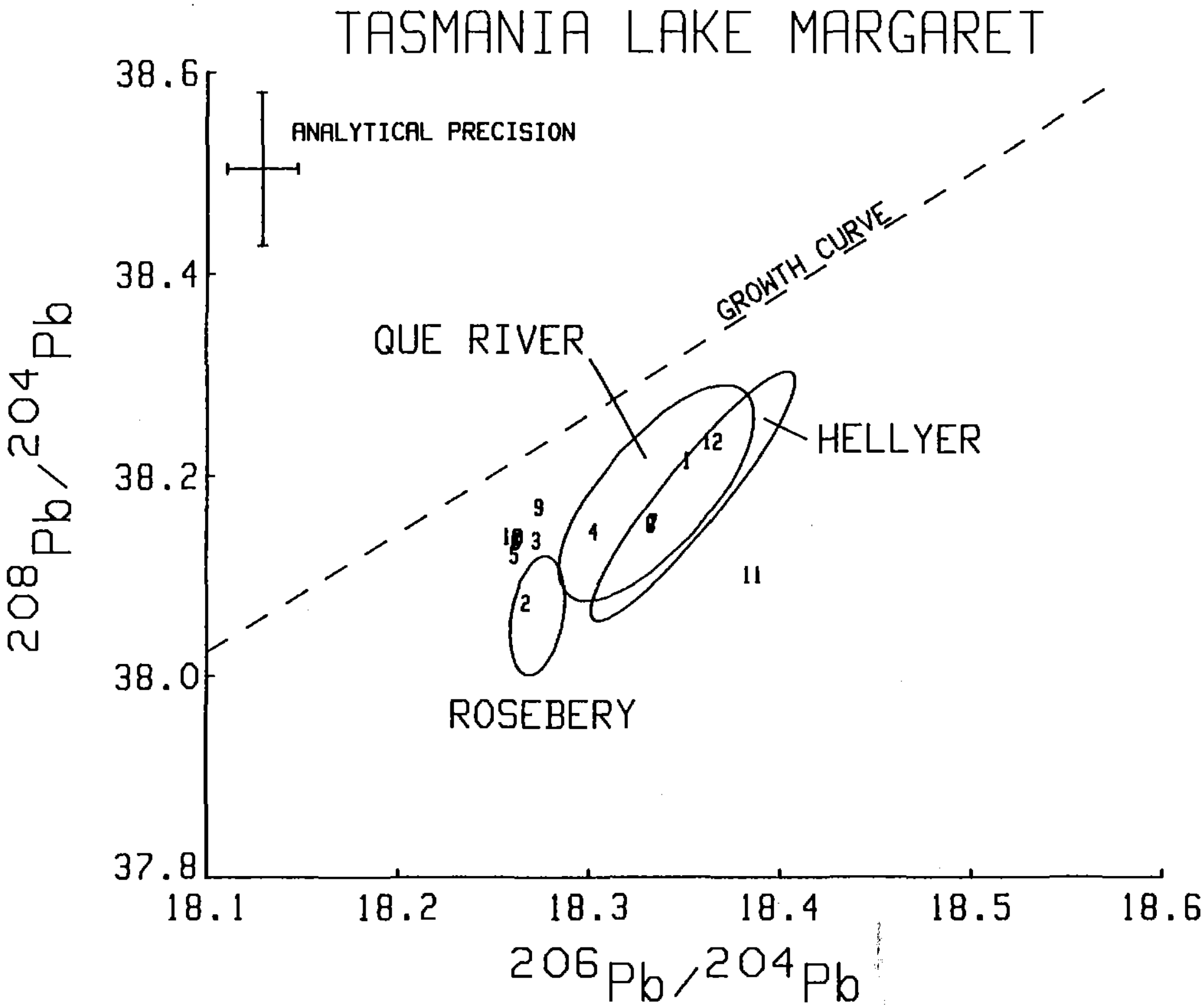

FIGURE 1 A $^{208}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram showing the Pb isotope ratios of Lake Margaret samples in relation to the 95% confidence ellipses for Que River, Hellyer and Rosebery. Also shown is the growth curve of Cumming and Richards, 1975.

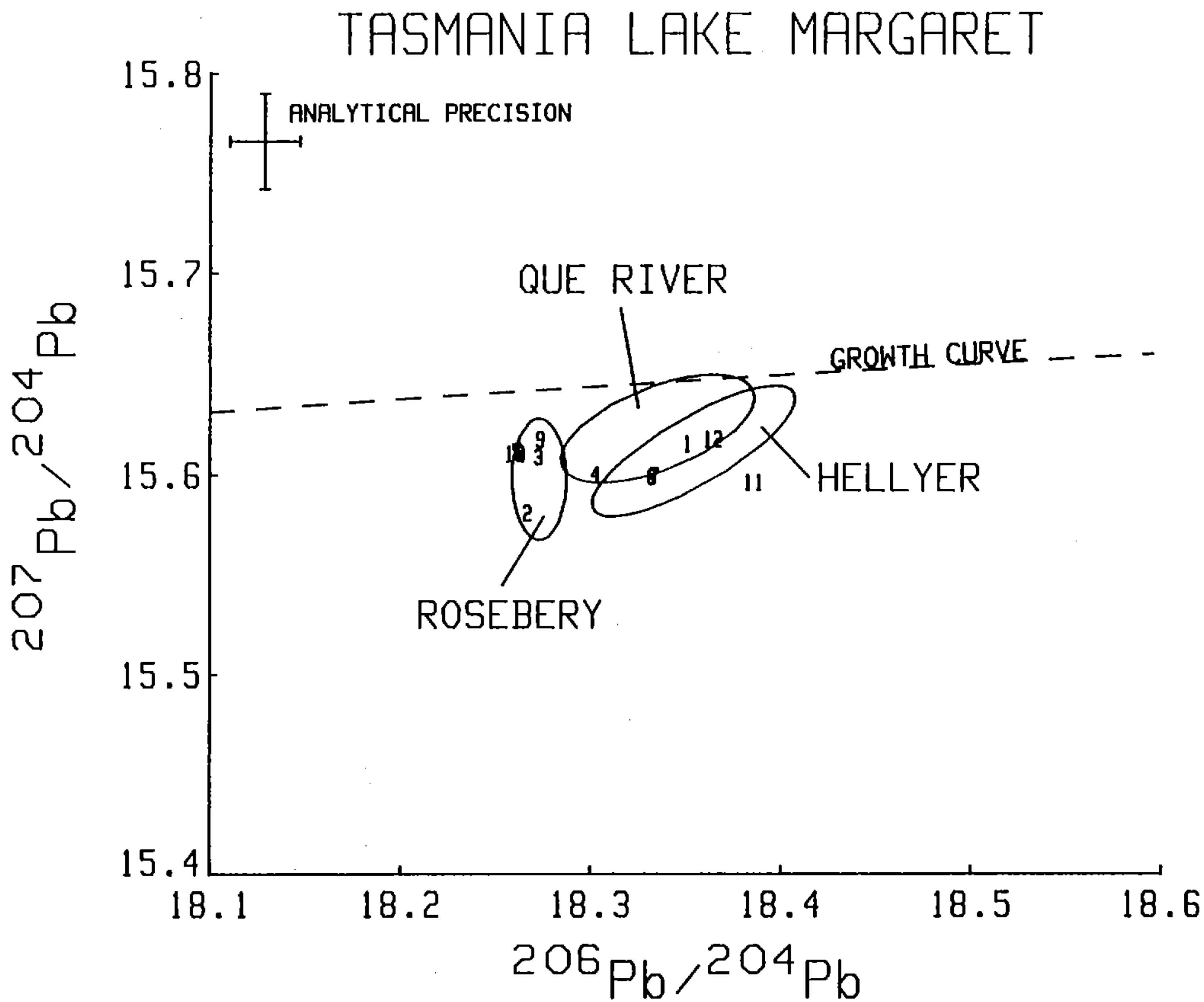

FIGURE 2 A $^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram showing the Pb isotope ratios of Lake Margaret samples in relation to the 95% confidence ellipses for Que River, Hellyer and Rosebery. Also shown is the growth curve of Cumming and Richards, 1975.

433109

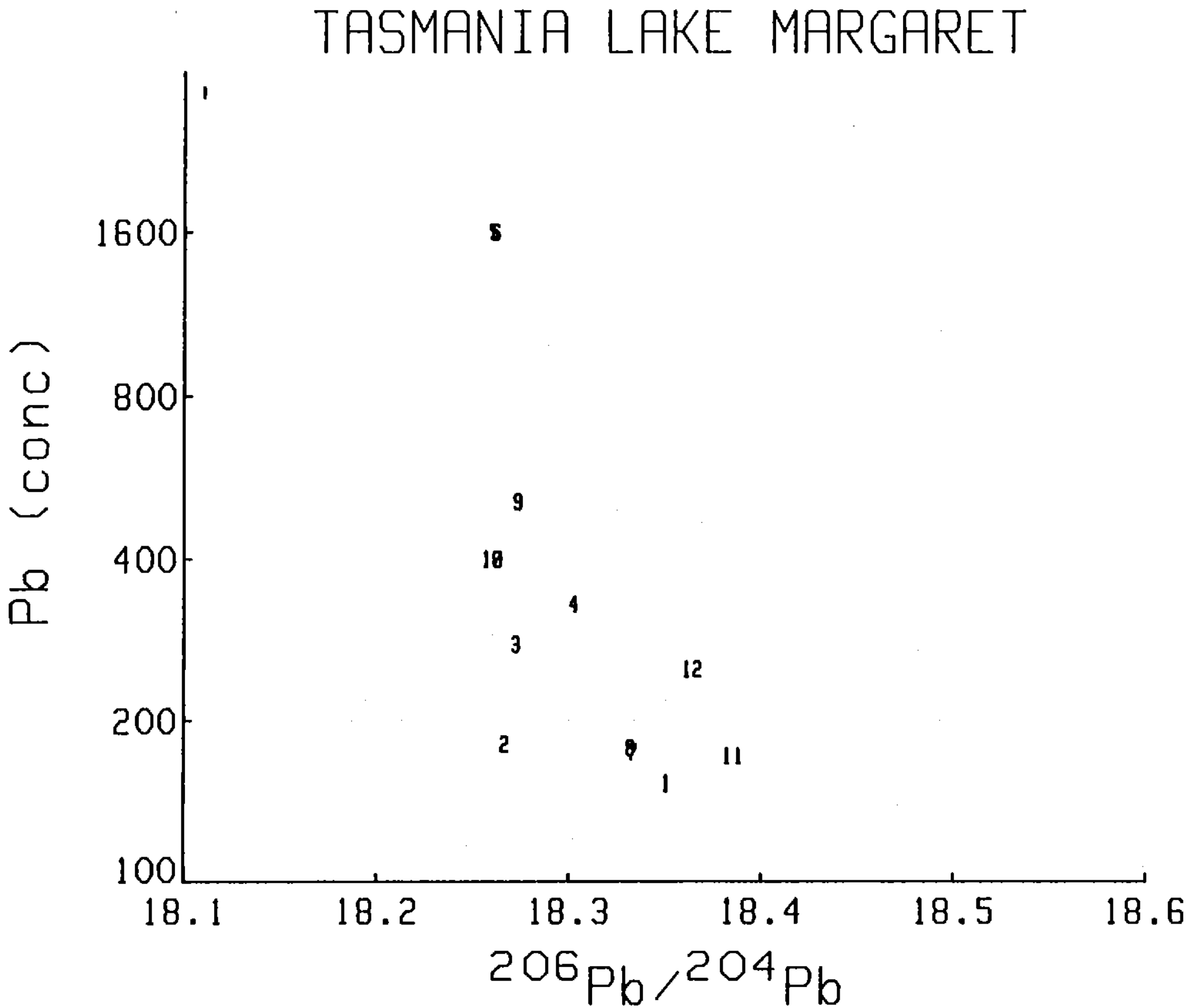

FIGURE 3 An XY plot showing the variation in $^{206}Pb/^{204}Pb$ ratio relative to the Pb content of the sample. Note that 4 out of the 5 samples with Pb less than ≈ 300 ppm have high $^{206}Pb/^{204}Pb$ ratios. These samples make up Group 2 as discussed in the text.

APPENDIX VII

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433112

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Telex: AA38646

DRAFT

EXPLORATION LICENCE 5/85

LAKE MARGARET

TASMANIA

UTEM SURVEY

LAKE BEATRICE

TECHNICAL REPORT

DISTRIBUTION

Hawthorn (1)
Burnie (1)

Submitted by: [signature]

G B Walker
Geophysicist

Endorsed by: [signature]

J Silic
Chief Geophysicist

SUMMARY

A two-loop, 28 line-km UTEM survey was completed over the Lake Beatrice prospect on the Lake Margaret licence in January 1990. Although the survey defined a number of weak formational conductors, no conductors indicative of significant accumulations of ore were detected.

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433114

LIST OF CONTENTS

FIGURES

PLATE

APPENDICES

1. INTRODUCTION

The Lake Margaret exploration licence, 5/85, covers an area of 140 km^2 north and east of Queenstown extending from south of Mt Sedgwick to north of the ~~Red Hills~~ Mt Lyell (Figure 1).

The Lake Beatrice prospect is situated south and southeast of Mt Sedgwick in the southeastern parts of the EL. The geological setting of the prospect consists of a haematite - magnetite stockworked rhyolite dome flanked by volcaniclastics and shale (McNeill, 1989). Sphalerite-rich fragments and disseminated sphalerite and galena occur in the volcaniclastics. The area had not previously been surveyed with UTEM.

Although the Lake Beatrice prospect is located only 6km from Queenstown, land access is difficult and the exploration program required helicopter support. The exploration grid was established in December 1989/January 1990.

This report presents the results of a two-loop UTEM survey conducted on the Lake Beatrice prospect in January 1990.

2. UTEM SURVEY

The UTEM survey was carried out by Lamontagne Geophysics (Australia) Pty Ltd using UTEM-III instrumentation in the period 18/1/90 - 31/1/90. The two-loop, 8 line survey acquired 28 line-km of HZ component data spaced at 50m. Because of the considerable cover of Owen Conglomerate in the prospect, both in-loop and out-of-loop readings were taken to account for a variety of conductor positions and geometries.

The survey layout and coverage are shown on Plate 1.

3. RESULTS

The interpretation of the UTEM survey is indicated on Plate 1. The survey failed to detect a response directly attributable to sulphide mineralisation. A number of formationals or conductive masses contained within stratigraphic units, were defined. These features may be used to extend known geological boundaries.

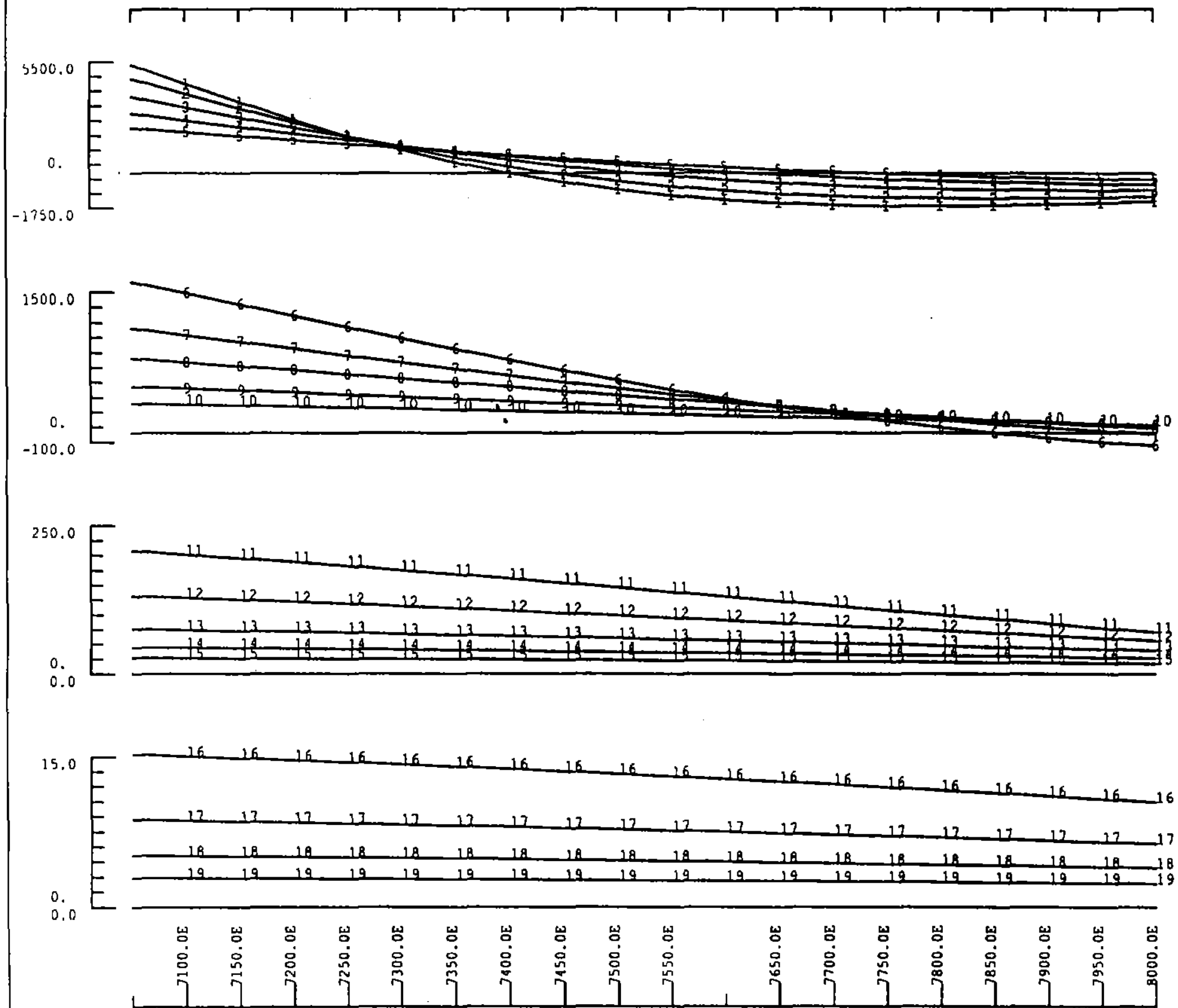
Field checks indicated that much of the survey was conducted over host rocks with resistivities estimated to be in excess of 1000 Ohm-m. This environment would have increased the penetration depth of the UTEM system, enabling detection of a Hellyer-sized target to depths of approximately 600m.

4. CONCLUSIONS AND RCOMMENDATIONS

The UTEM survey defined several formational conductors but did not identify a target warranting further investigation. No further geophysical work is recommended on the basis of the UTEM program.

5. REFERENCES

McNeill, A. W., 1989. Lake Margaret EL 5/85. Technical Progress Report for the Period August 1988 to September 1989. Aberfoyle Resources Report Number Lake Margaret 2.



LAKE BEATRICE

SCHEIBE MODEL

PRIMARY FIELD

Z-COMPONENT

Aberfoyle Resources Ltd

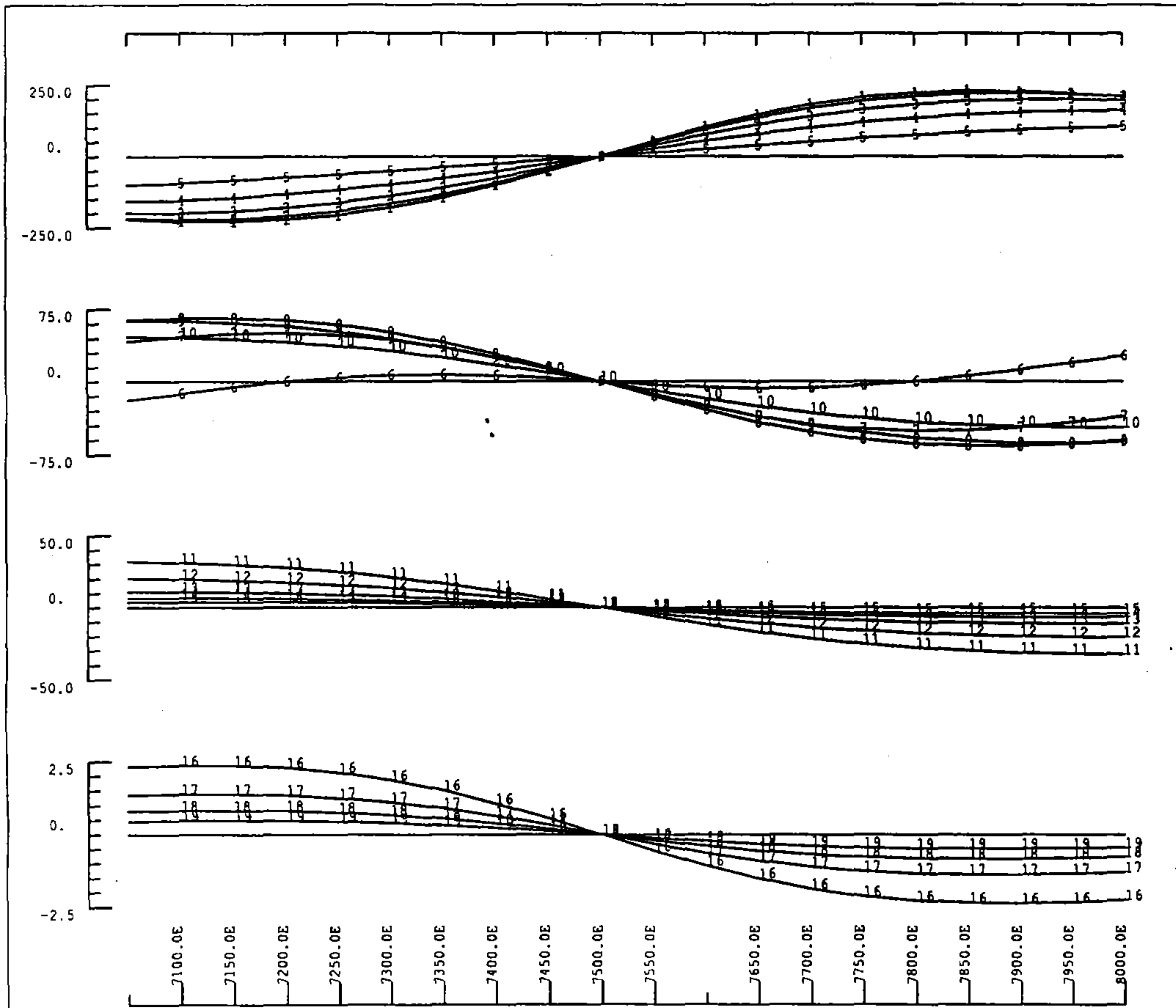
MAY 1990

<gbw>

Plot Date : 10/05/90 Horiz

FIGURE 2

433117



LAKE BEATRICE

SCHEIBE MODEL

SECONDARY FIELD

Z-COMPONENT

Aberfoyle Resources Ltd

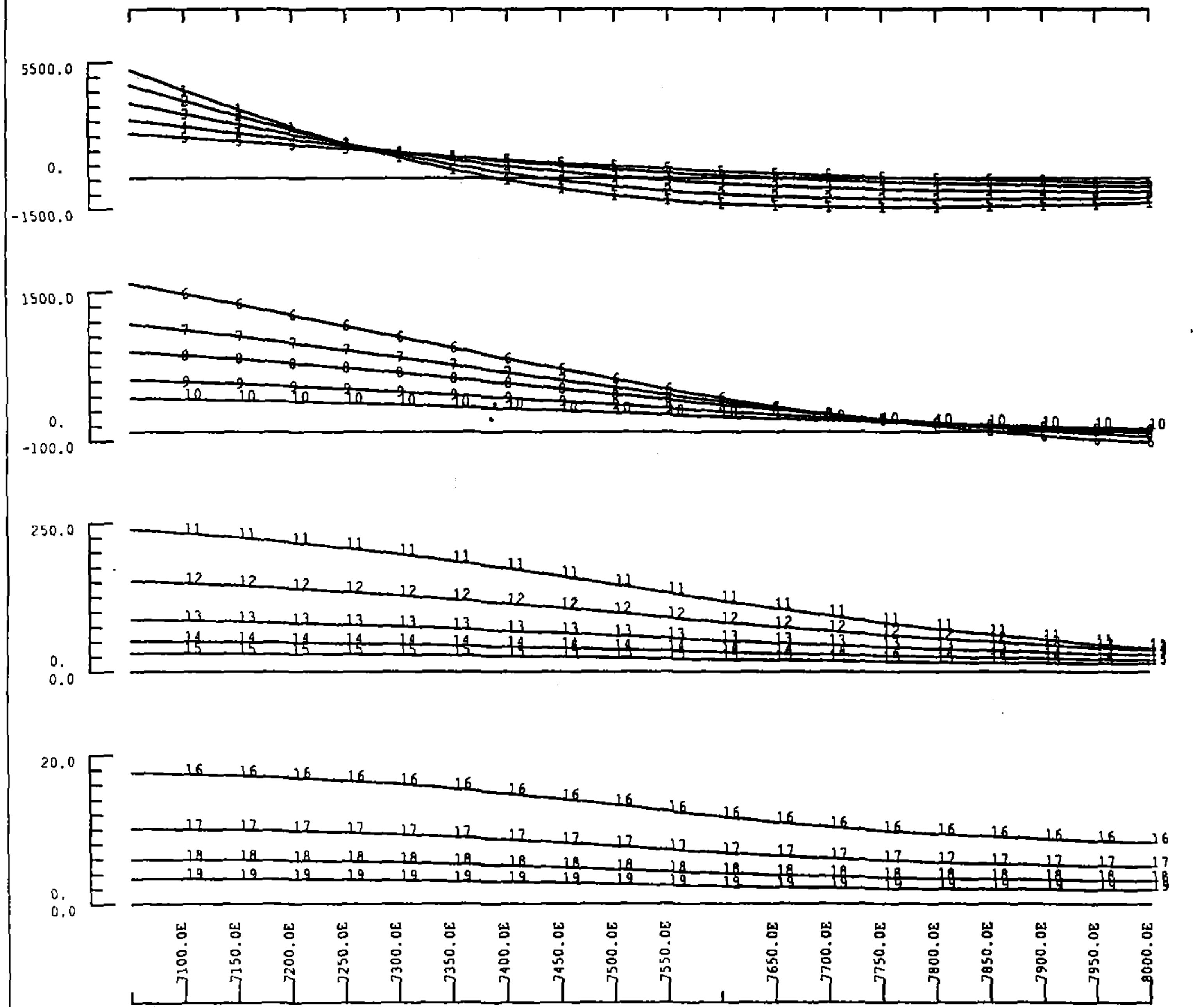
MAY 1990

<gbw>

Plot Date : 10/05/90   Horiz

FIGURE 3

43118



LAKE BEATRICE
SCHEIBE MODEL
TOTAL FIELD
Z-COMPONENT

Aberfoyle Resources Ltd
MAY 1990
<gbw>

Plot Date : 10/05/90 Horiz

FIGURE 4

433119

APPENDIX I

UTEM DATA PLOTTING SPECIFICATIONS

UTEM DATA PLOTTING SPECIFICATIONS

NOMINAL TIME WINDOWS
(for a base frequency of 26.23 Hz)

Channel No.	Start (ms)	Centre (ms)	End (ms)
10	0.019	0.028	0.037
9	0.037	0.056	0.074
8	0.074	0.112	0.149
7	0.149	0.223	0.298
6	0.298	0.447	0.596
5	0.596	0.894	1.191
4	1.191	1.79	2.383
3	2.383	3.57	4.766
2	4.766	7.15	9.531
1	9.531	14.30	19.06

All channels plotted as:

$$\frac{\text{channel - reference}}{\text{base}} \quad \times\ 100\%$$

For continuously normalised plots:

reference = channel 1
base = primary field (total) at reading station

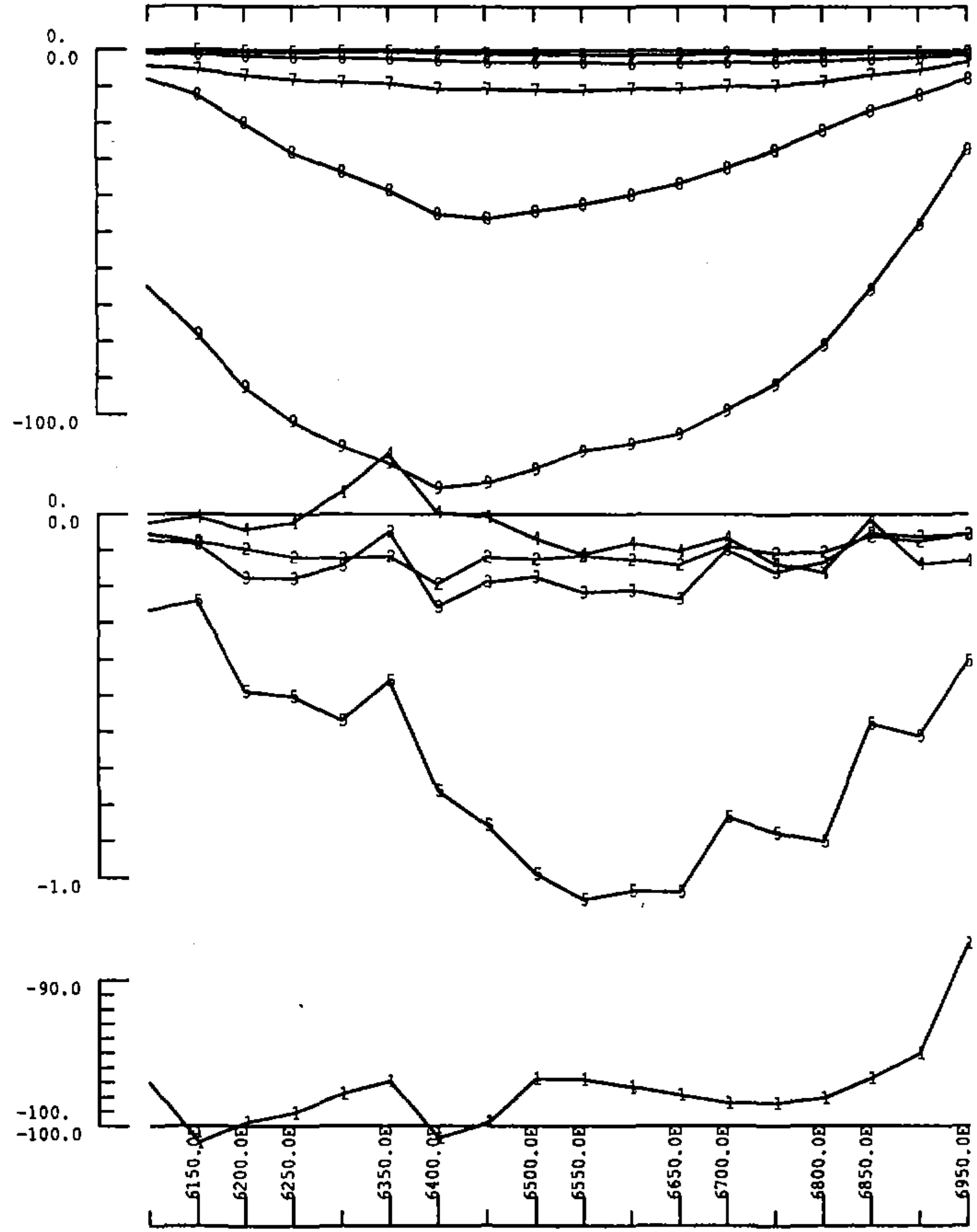
For point normalised plots:

reference = channel 1
base = primary field (total) at reference station

APPENDIX 2

UTEM DATA SECTIONS

433123



Line 6200, Loop#1

In-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

Aberfoyle Resources Ltd

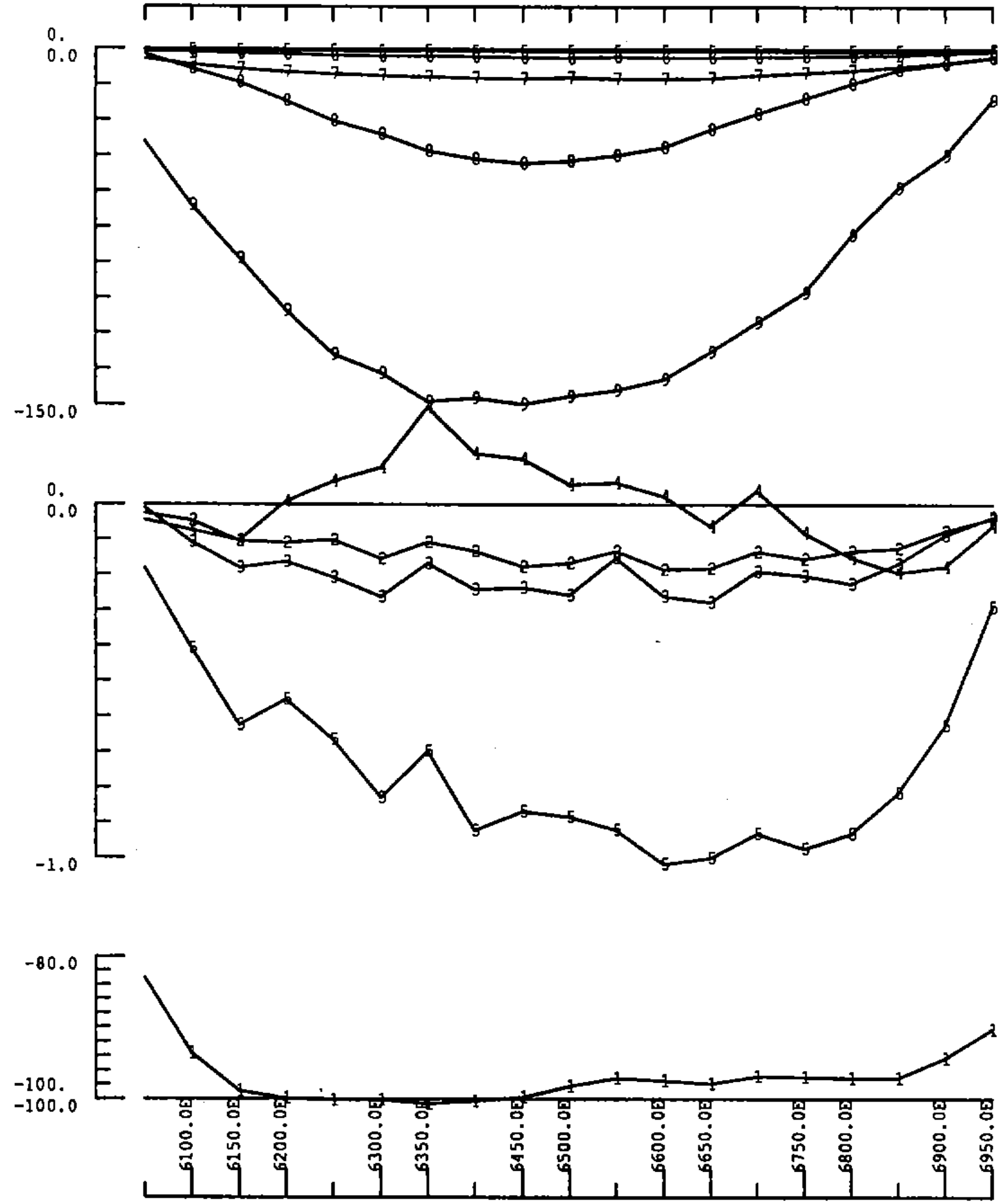
January 1990 <gbw>

| Loop1 |

|********| 6200N

Plot Date : 23/01/90 Horiz

433124



Line 6400, Loop#1

In-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

Aberfoyle Resources Ltd

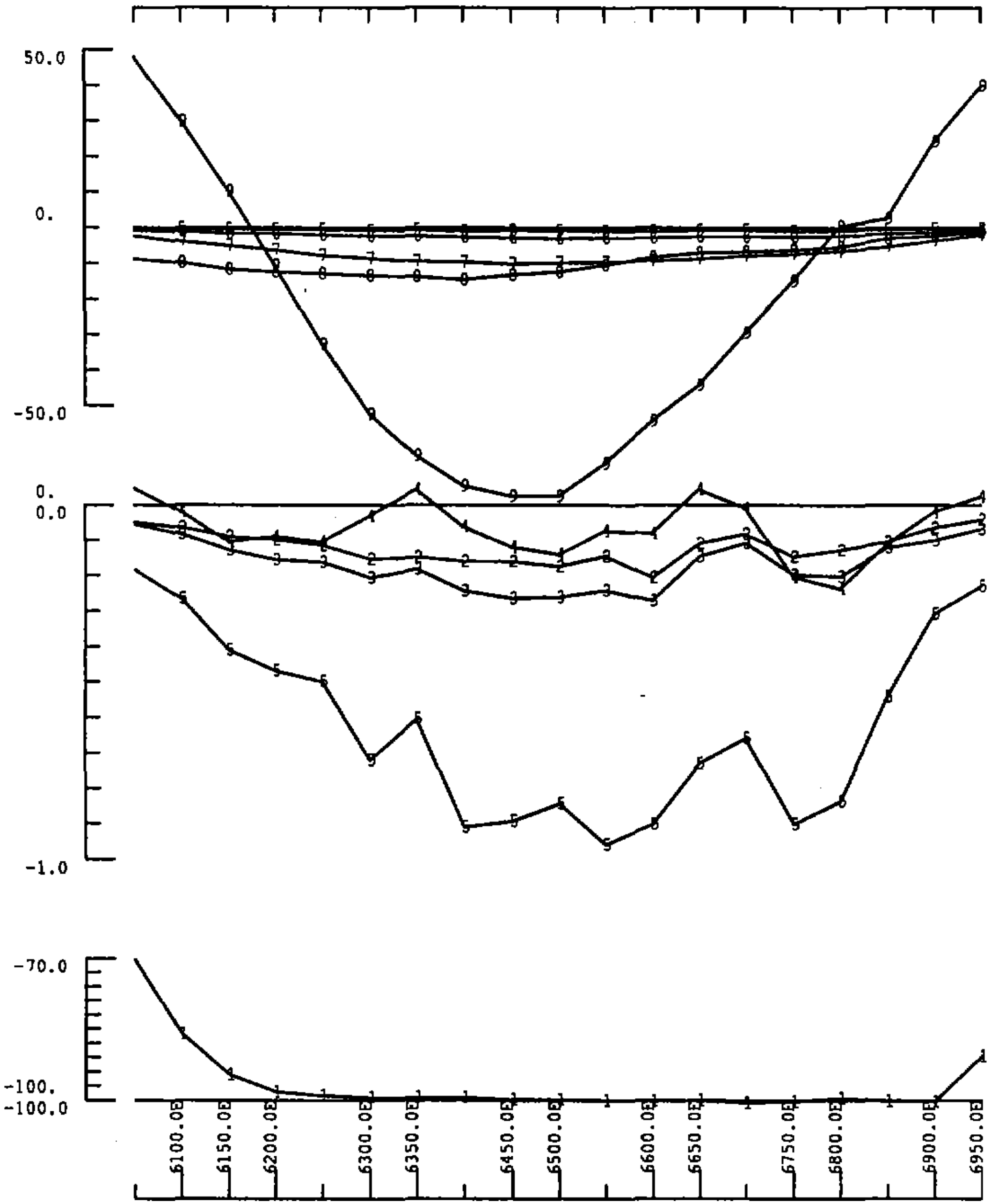
January 1990 <gbw>

| Loop1 |

|******** | 6400N

Plot Date : 23/01/90 Horiz

433125



Line 6600N, Loop#1

In-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

Aberfoyle Resources Ltd

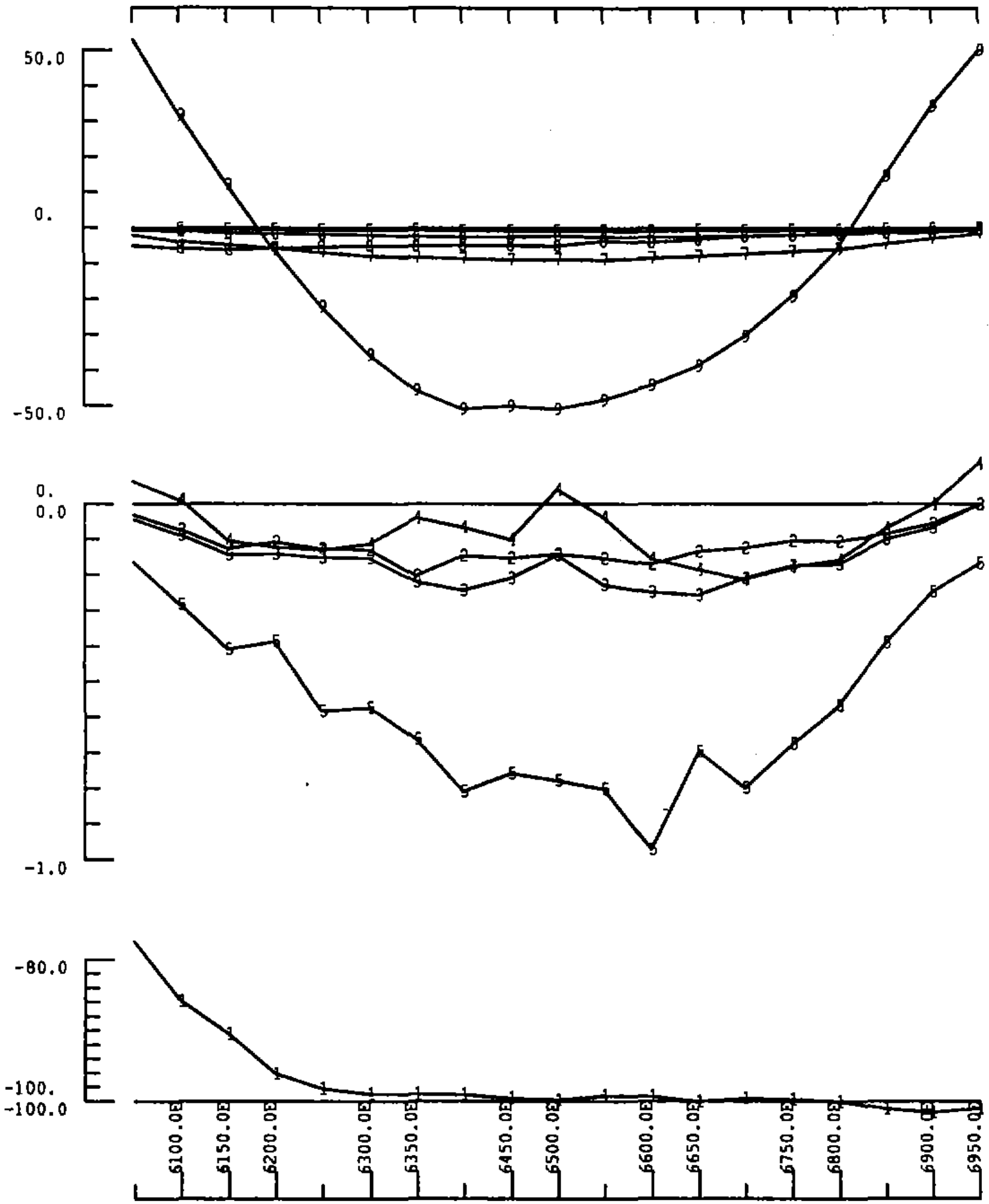
January 1990 <gbw>

| Loop1 |

|********| 6600N

Plot Date : 23/01/90 Horiz

433126



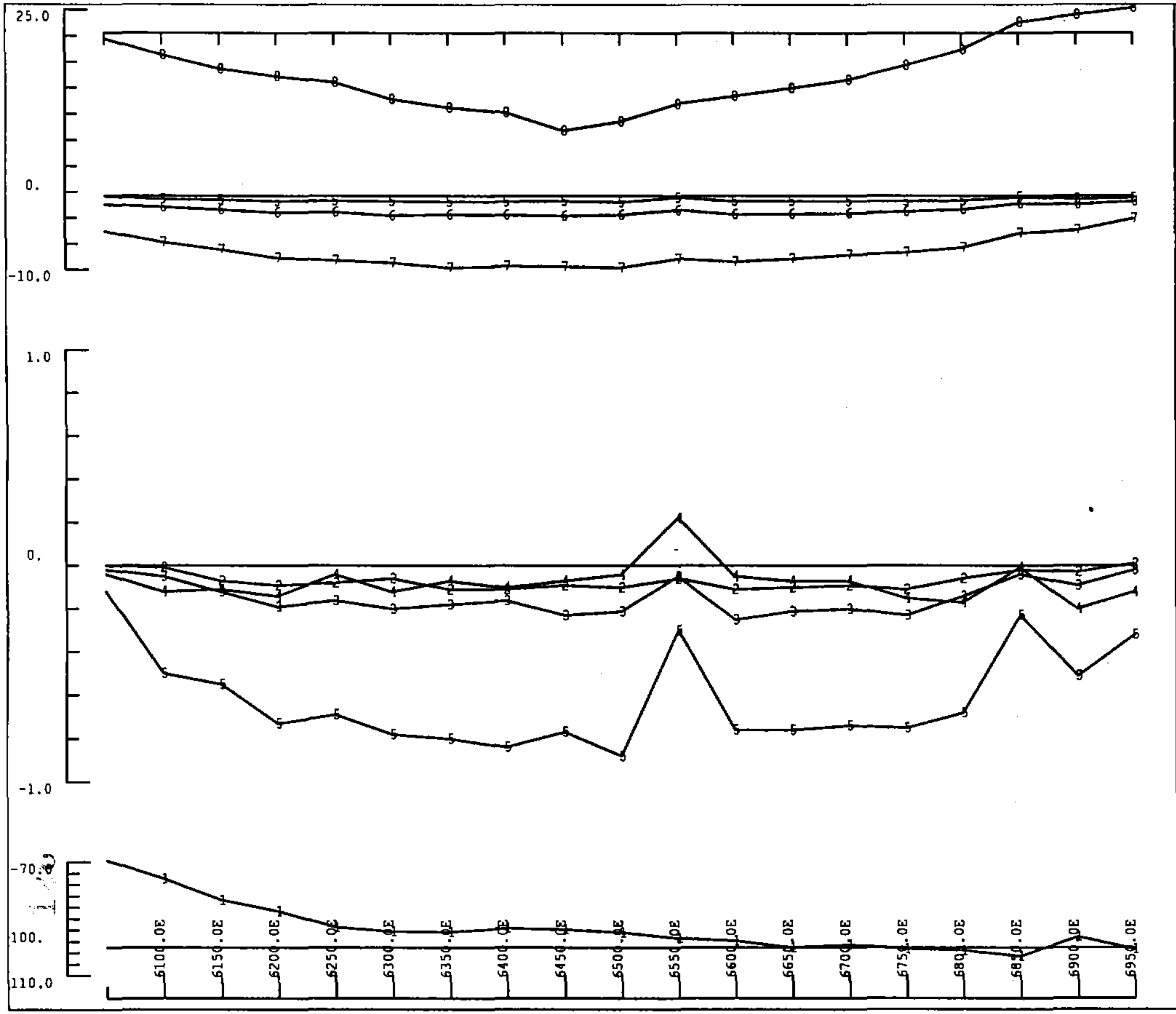
Line 6800N, Loop#1
In-Loop Section
Lake Beatrice Grid
Lake Margaret EL
UTEM Survey Jan90
Hz Component
Freq. 26.23Hz

Aberfoyle Resources Ltd
January 1990 <gbw>

| Loop1 |
|********| 6800N

Plot Date : 23/01/90   Horiz

433127



Line 7000N, Loop#1

Lake Beatrice Grid

CONTINUOUS NORM

UTEM Survey Jan89

Hz Component

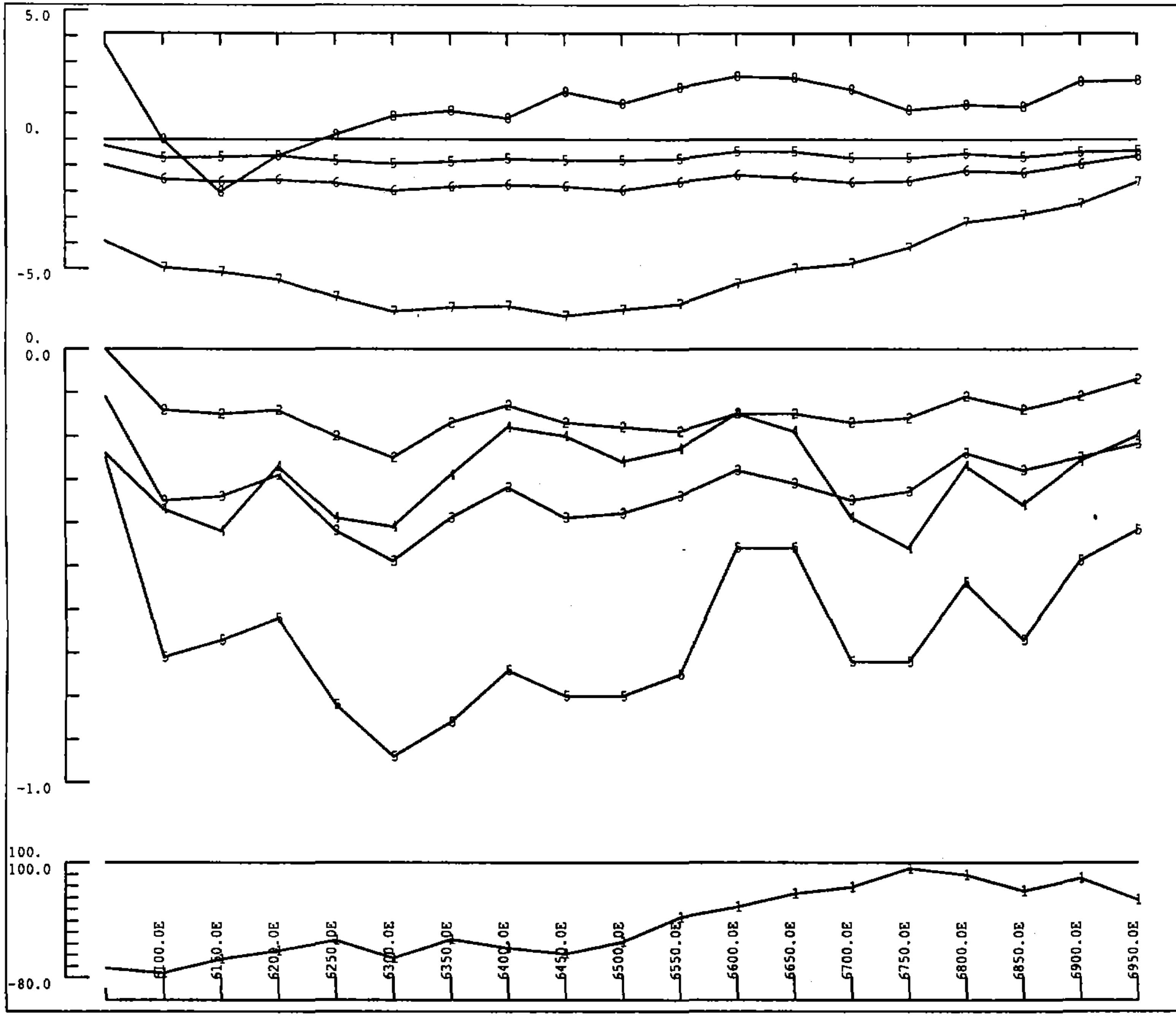
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 21/03/90 Horiz

433128

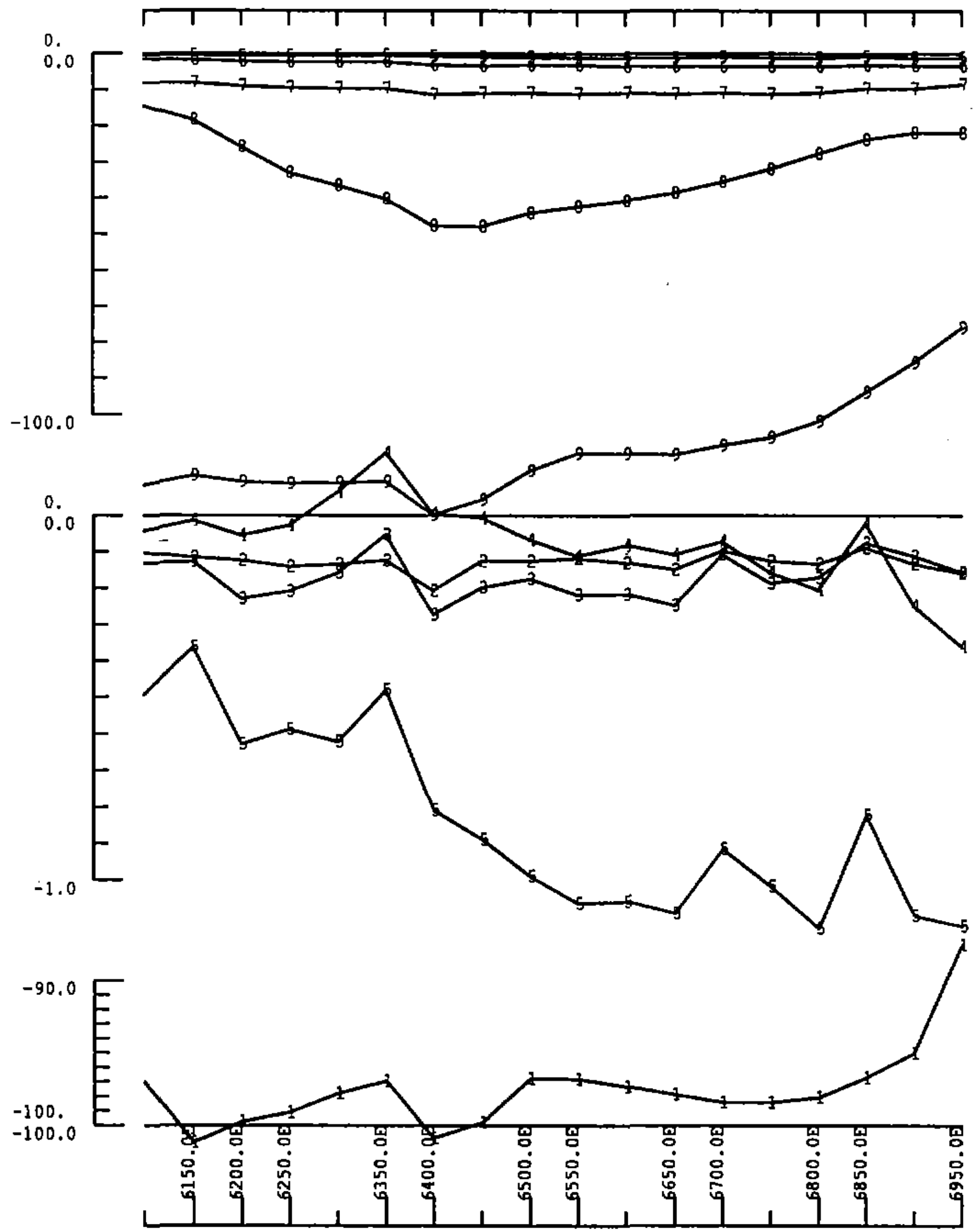


Line 7200N, Loop#1
Lake Beatrice Grid
CONTINUOUS NORM
UTEM Survey Jan89
Hz Component
Freq. 26.23Hz

Aberfoyle Resources Ltd
March 1990 <gbw>

Plot Date : 21/03/90   Horiz

433129



Line 6200N, Loop#1

Point Norm at 6500E

In-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

ABERFOYLE RESOURCES LTD

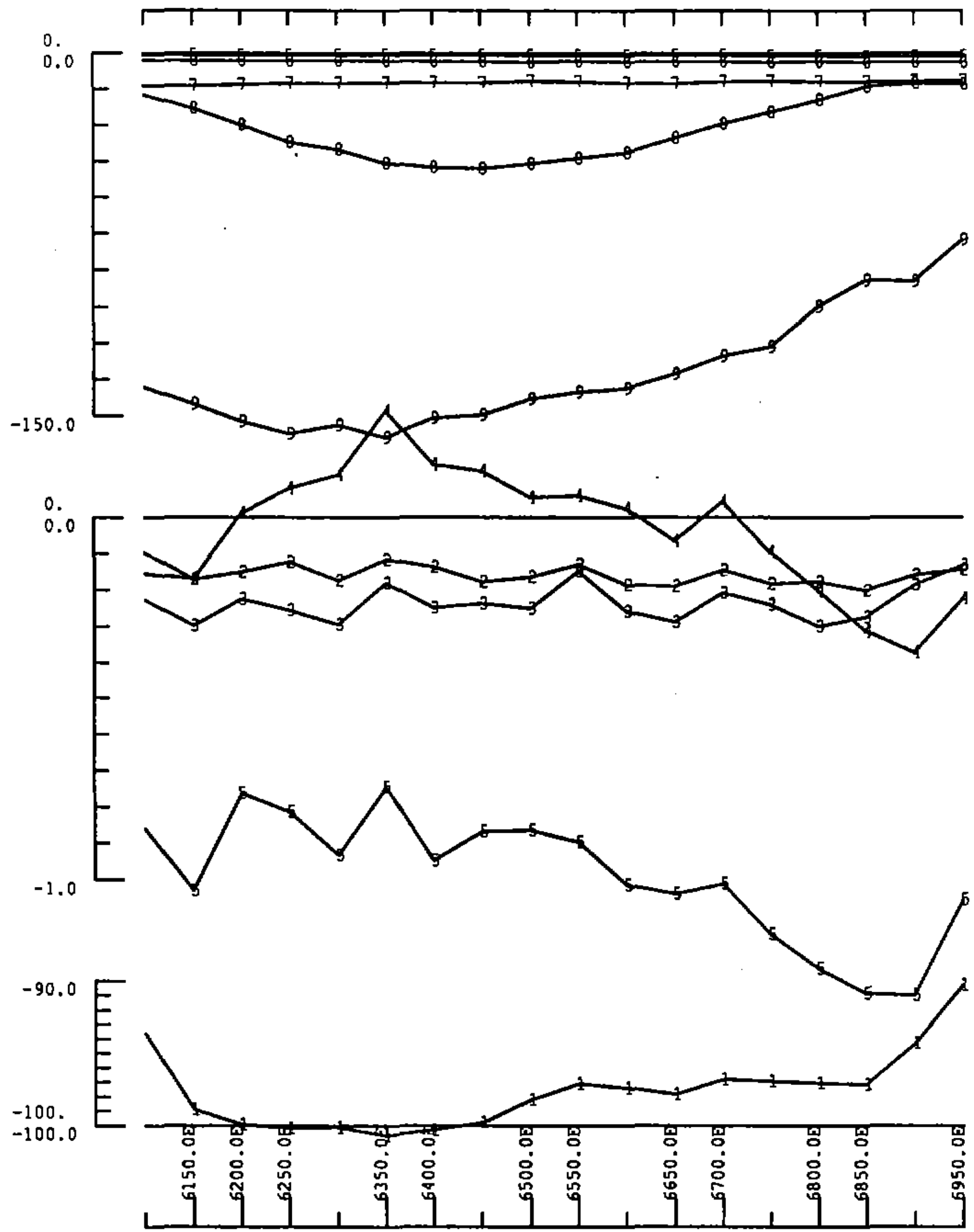
January 1990 <gbw>

Loop1

******** 6200N

Plot Date : 24/01/90 Horiz

433130



Line 6400N, Loop#1

Point Norm at 6450E

In-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

ABERFOYLE RESOURCES LTD

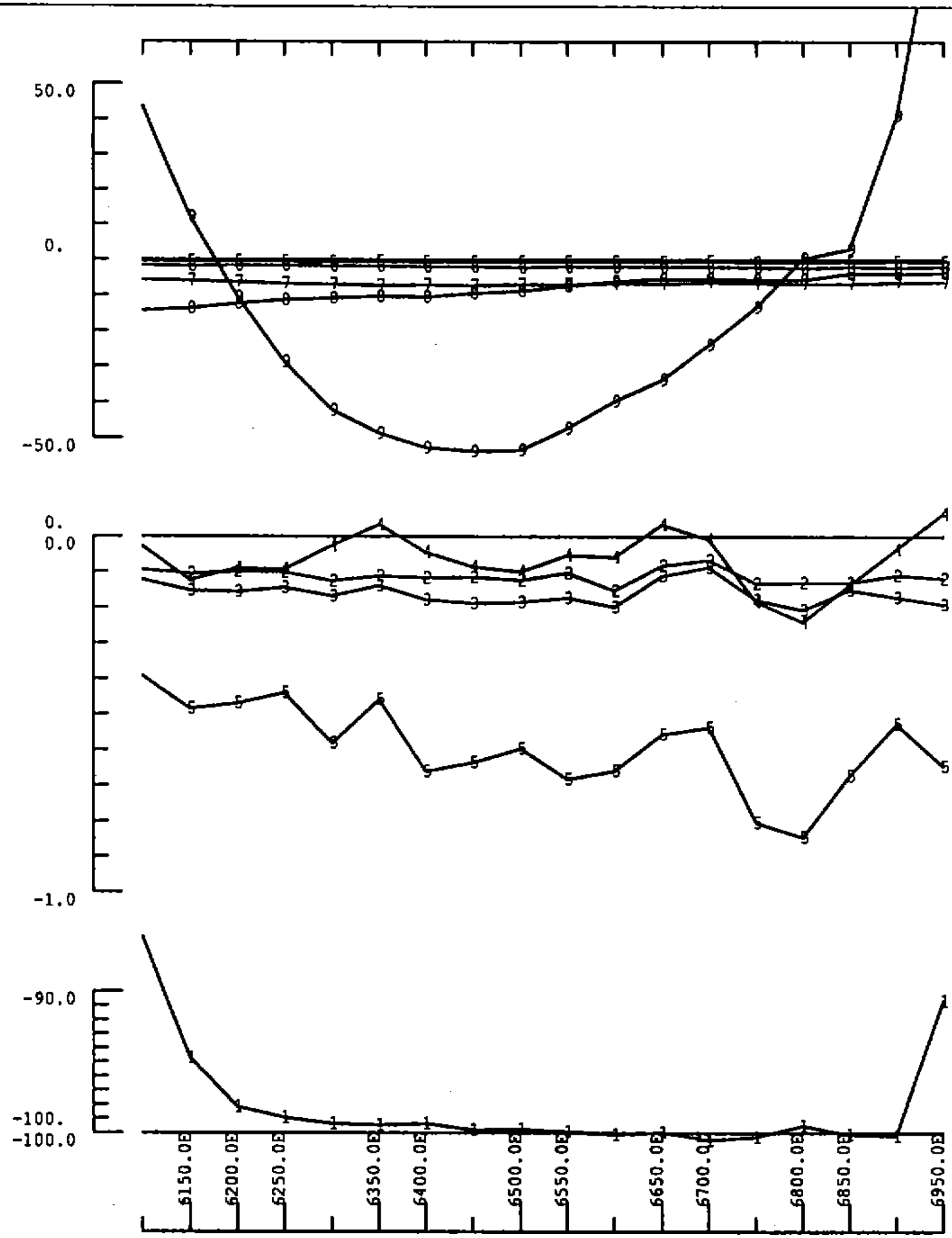
January 1990 <gbw>

| Loop1 |

|********| 6400N

Plot Date : 24/01/90 Horiz

433131



Line 6600N, Loop#1

Point Norm at 6200E

In-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

ABERFOYLE RESOURCES LTD

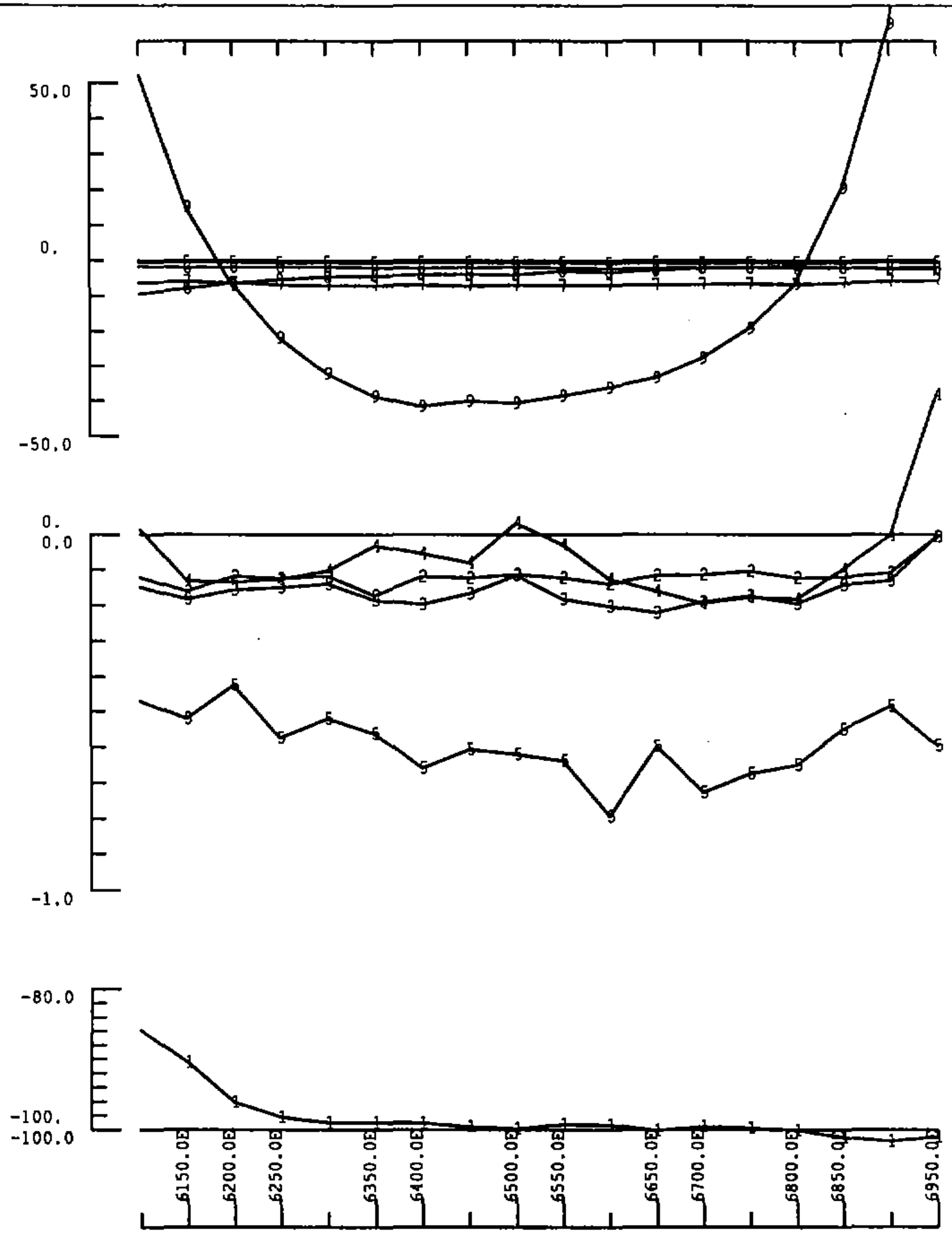
January 1990 <gbw>

| Loop1 |

|********| 6600N

Plot Date : 24/01/90 Horiz

433132



Line 6800N, Loop#1

Point Norm at 6750E

In-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

ABERFOYLE RESOURCES LTD

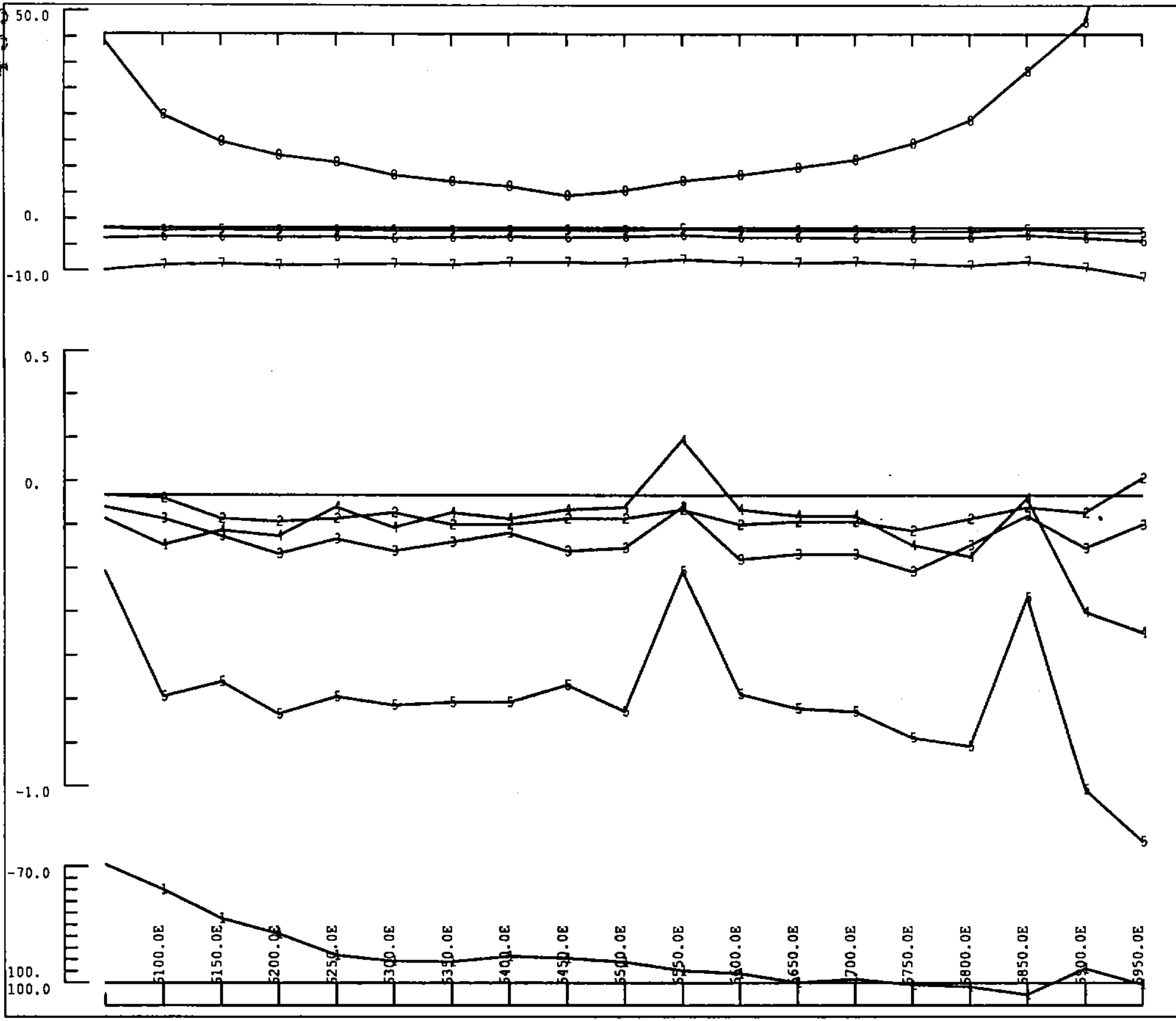
January 1990 <gbw>

| Loop1 |

|********| 6800N

Plot Date : 24/01/90 Horiz

433133



Line 7000N, Loop#1

Lake Beatrice Grid

POINT NORM 6700E

UTEM Survey Jan89

Hz Component

Freq. 26.23Hz

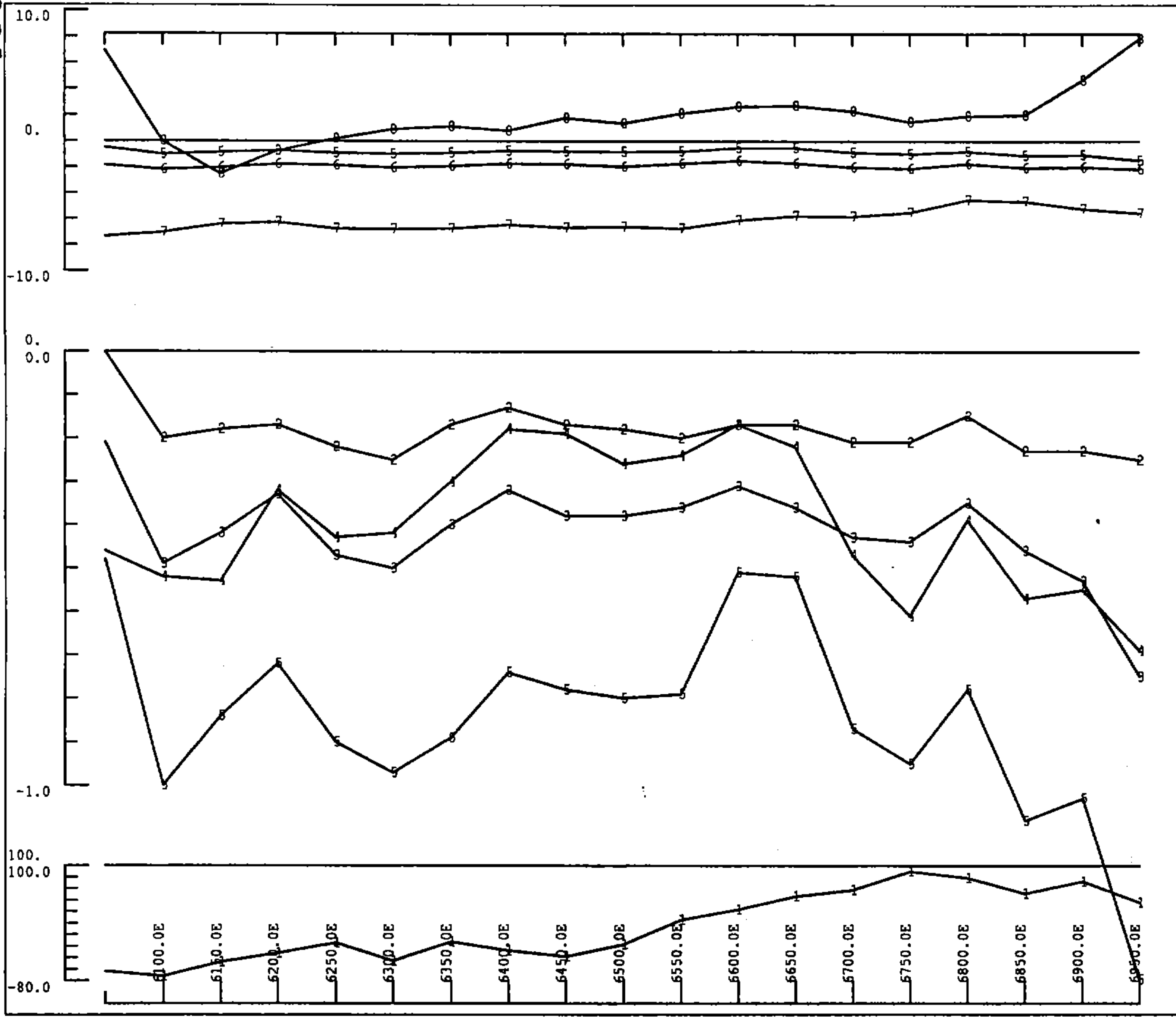
Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 21/03/90 Horiz

136

433134



Line 7200N, Loop#1

Lake Beatrice Grid

POINT NORM 6500E

UTEM Survey Jan89

Hz Component

Freq. 26.23Hz

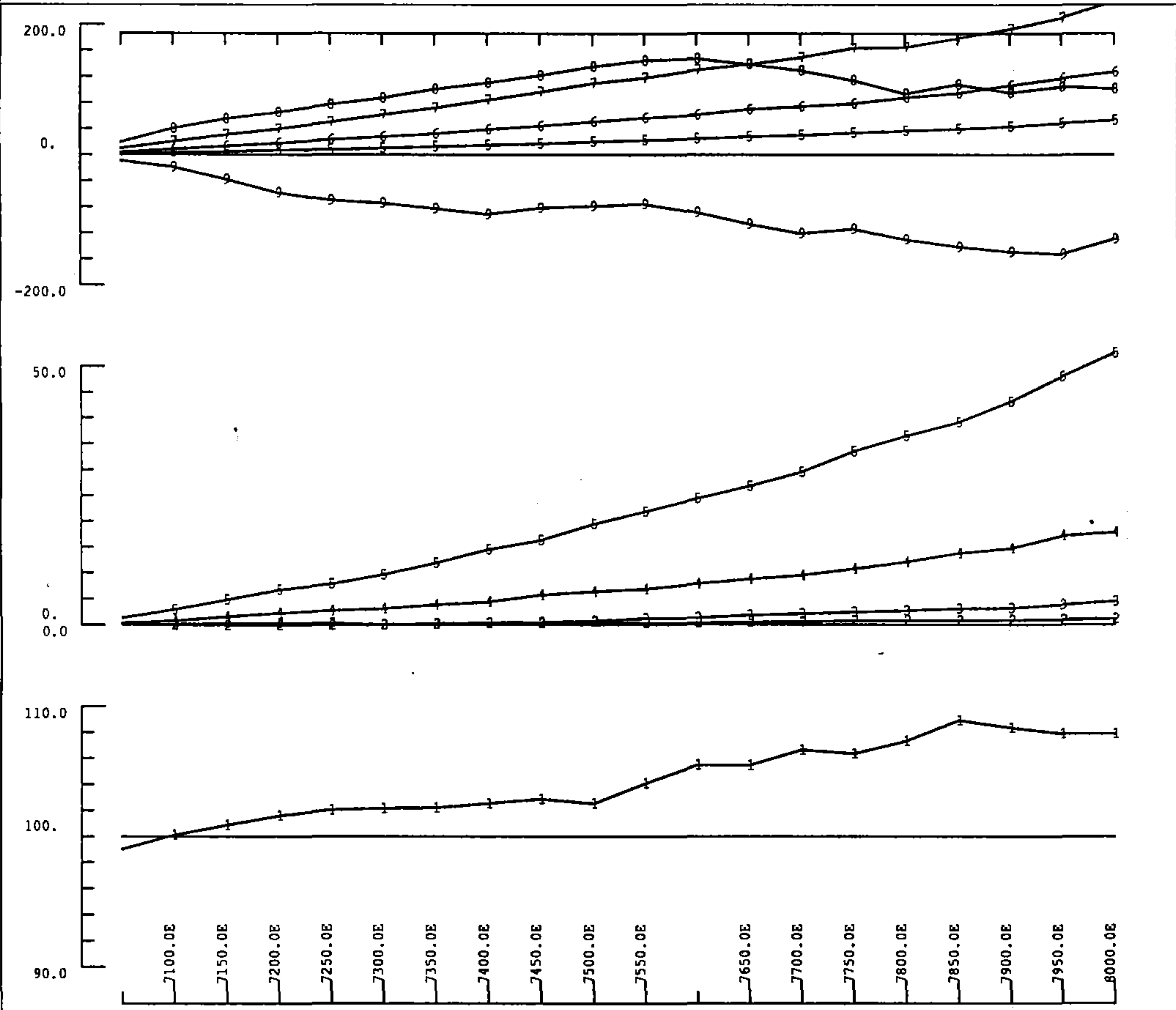
Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 21/03/90 Horiz

133

433135



Line 6000N, Loop#1

Lake Beatrice

Continuous Norm

UTEM Survey Jan90

Hz Component

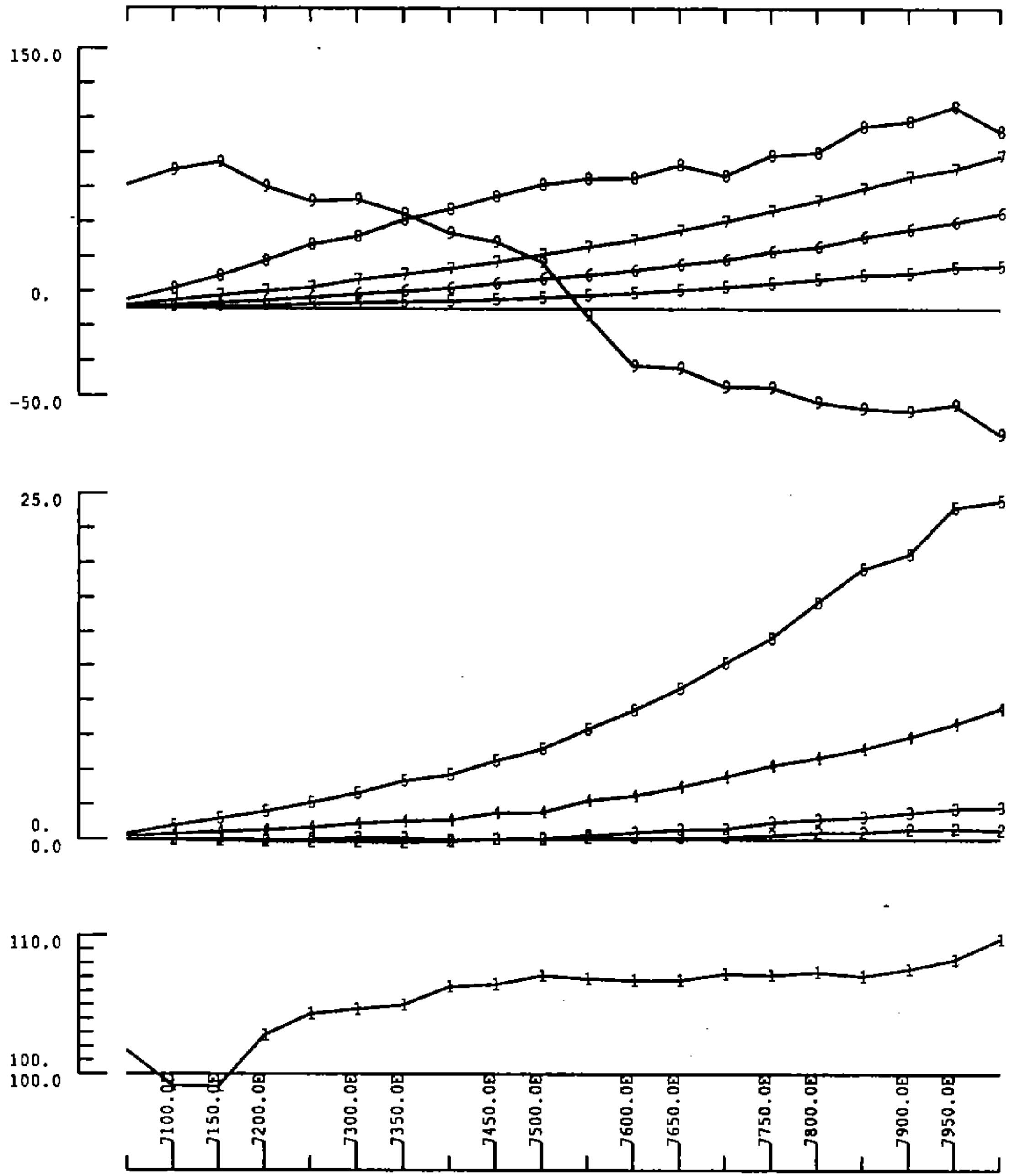
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 03/03/90   Horiz

433136



Line 6600N, Loop#1

Out-of-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

Aberfoyle Resources Ltd

January 1990 <gbw>

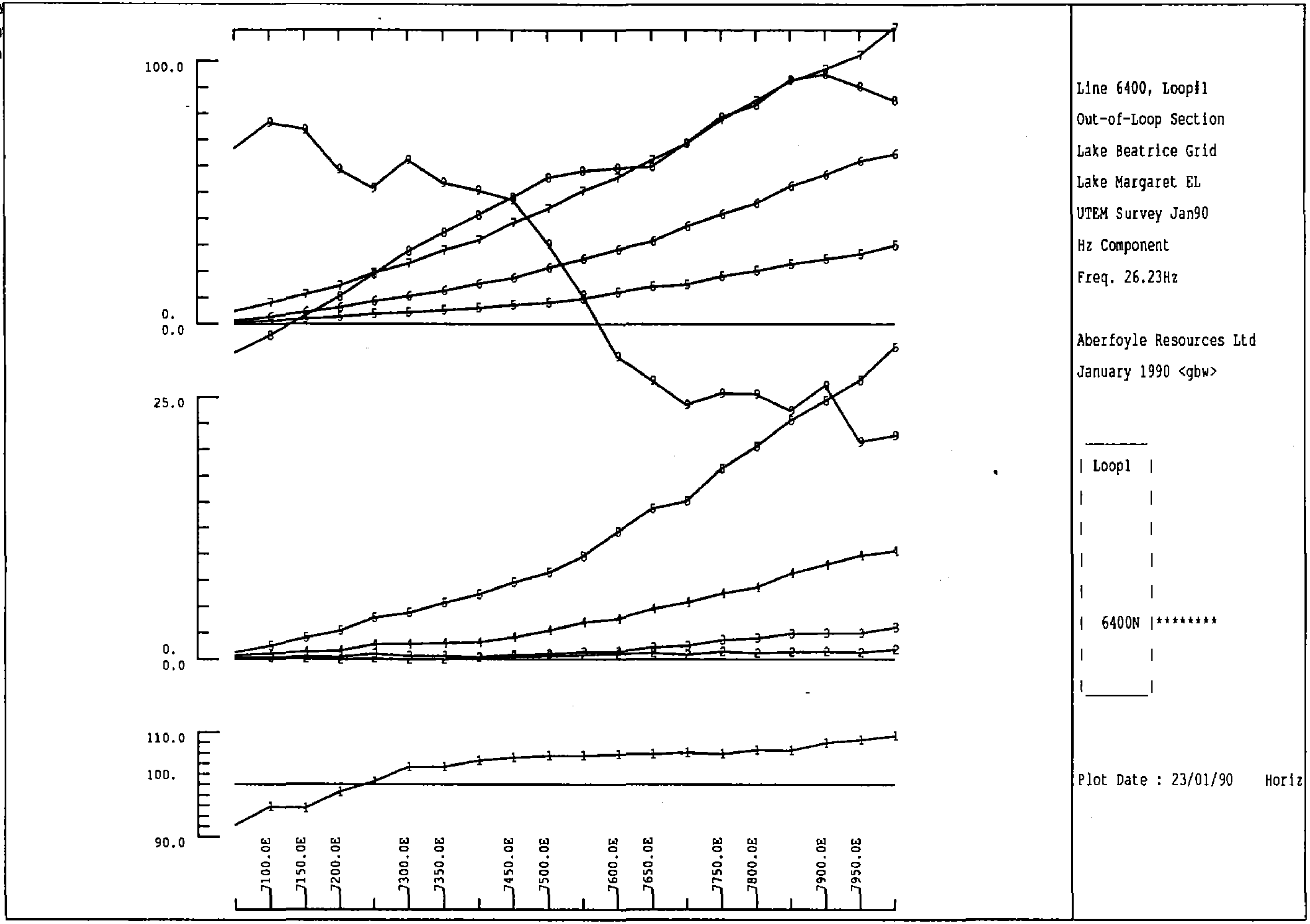
| Loop1 |

| 6600N |********

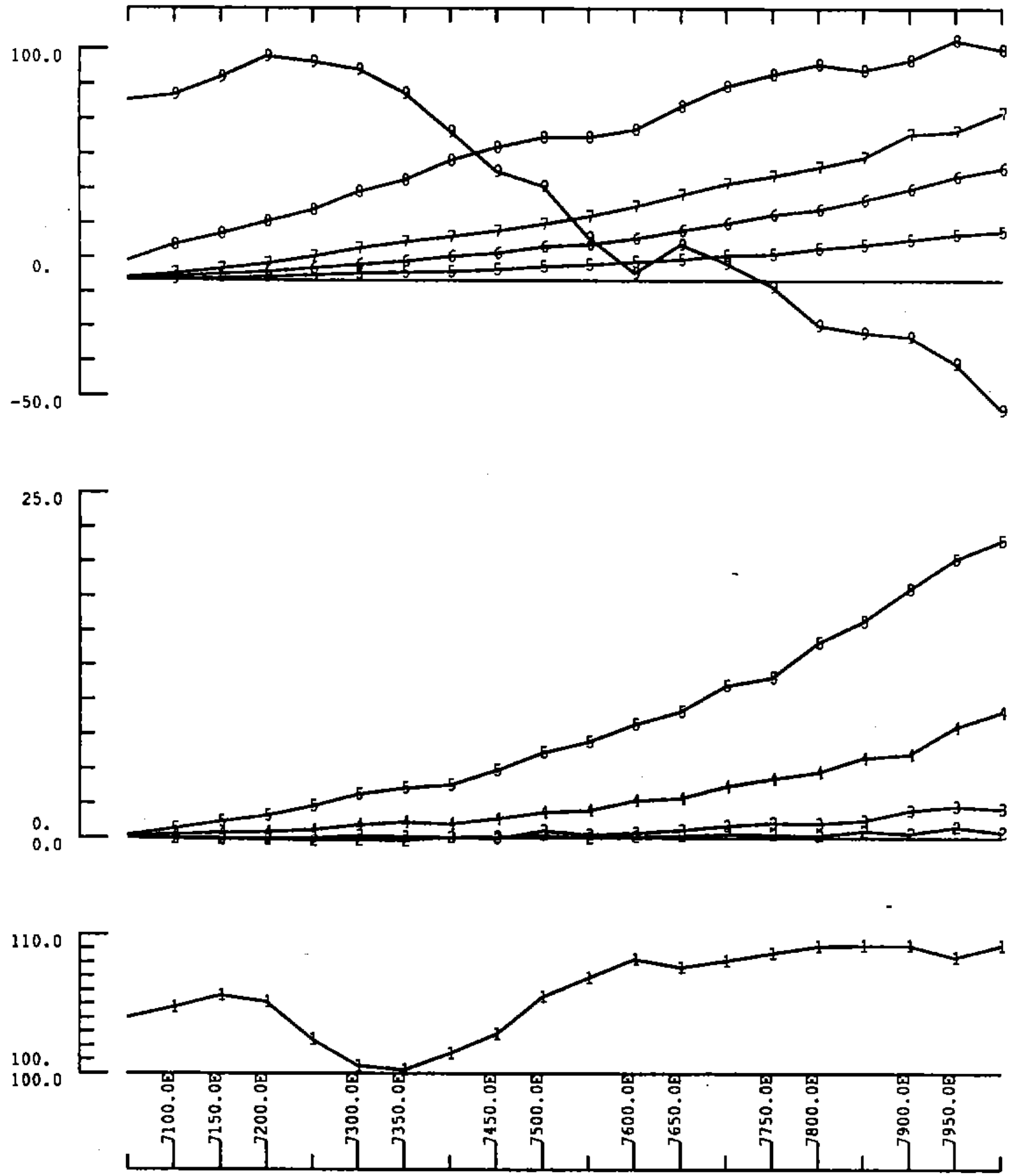
Plot Date : 23/01/90 Horiz

133

433137


100.0
0.
0.0
25.0
0.
0.0
110.0
100.
90.0
7100.0E
7150.0E
7200.0E
7300.0E
7350.0E
7450.0E
7500.0E
7600.0E
7650.0E
7750.0E
7800.0E
7900.0E
7950.0E
Line 6400, Loop#1
Out-of-Loop Section
Lake Beatrice Grid
Lake Margaret EL
UTEM Survey Jan90
Hz Component
Freq. 26.23Hz
Aberfoyle Resources Ltd
January 1990 <gbw>
Loop1
6400N ********
Plot Date : 23/01/90 Horiz

433138



Line 6800N, Loop#1

Out-of-Loop Section

Lake Beatrice Grid

Lake Margaret EL

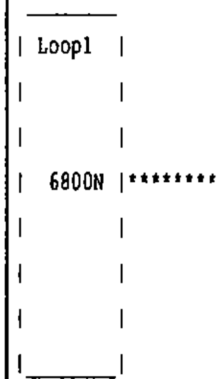
UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

Aberfoyle Resources Ltd

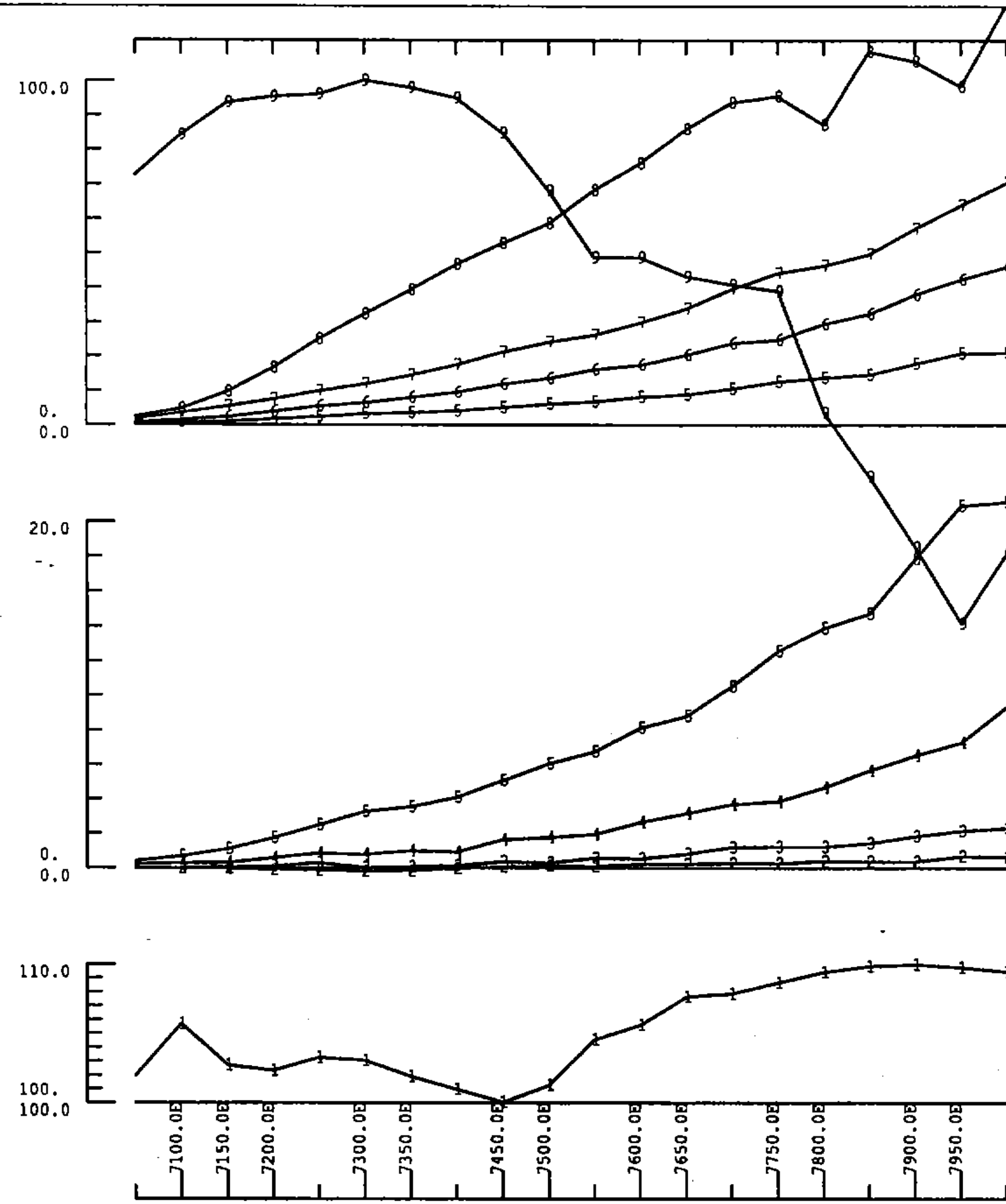
January 1990 <gbw>



Plot Date : 23/01/90 Horiz

137

433139



Line 7000N, Loop#1

Out-of-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

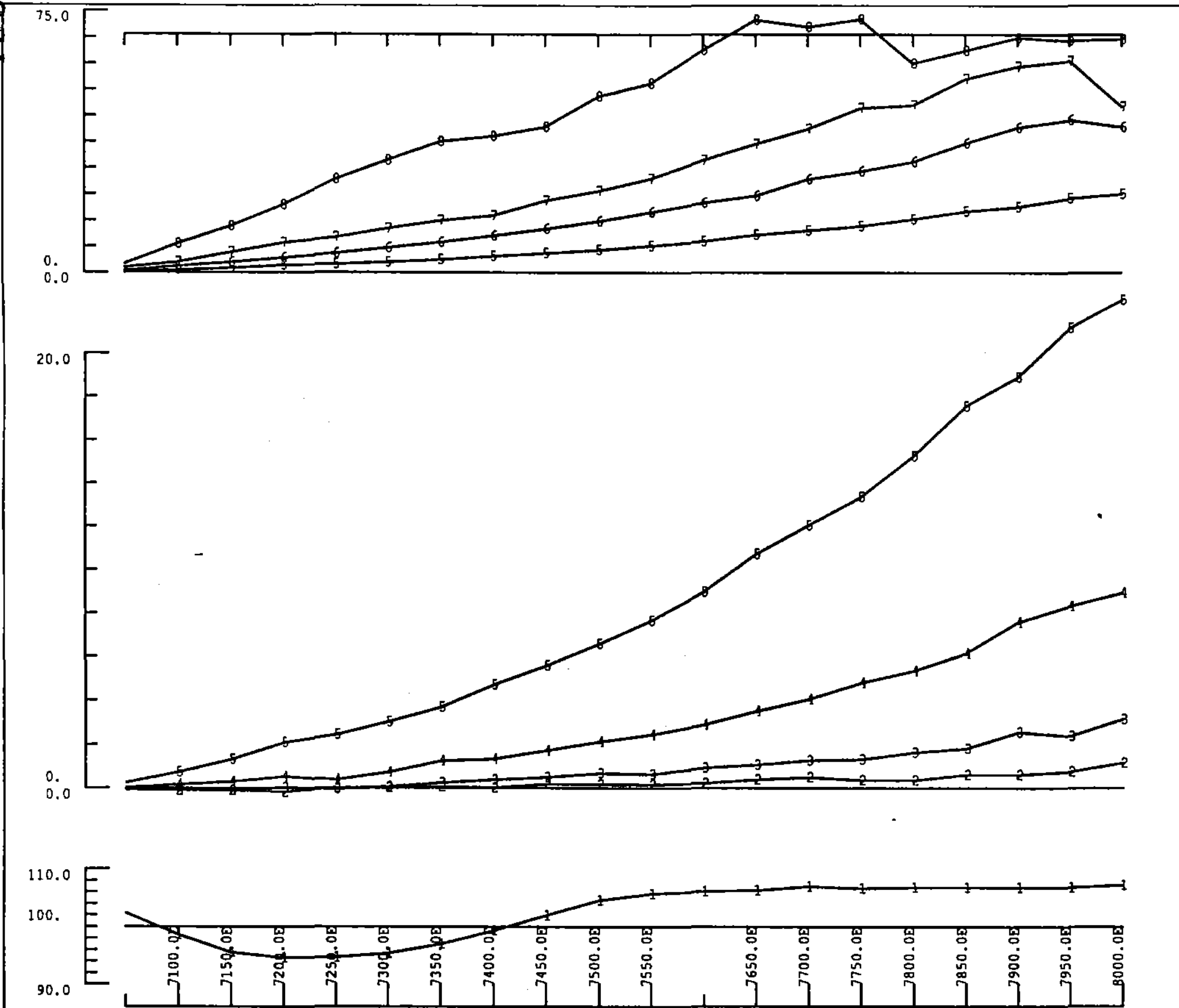
Aberfoyle Resources Ltd

January 1990 <gbw>

| Loop1 |

| 7000N |********

Plot Date : 24/01/90 Horiz



Line 7200N, Loop#1

Lake Beatrice Grid

CONTINUOUS NORM

UTEM Survey Jan89

Hz Component

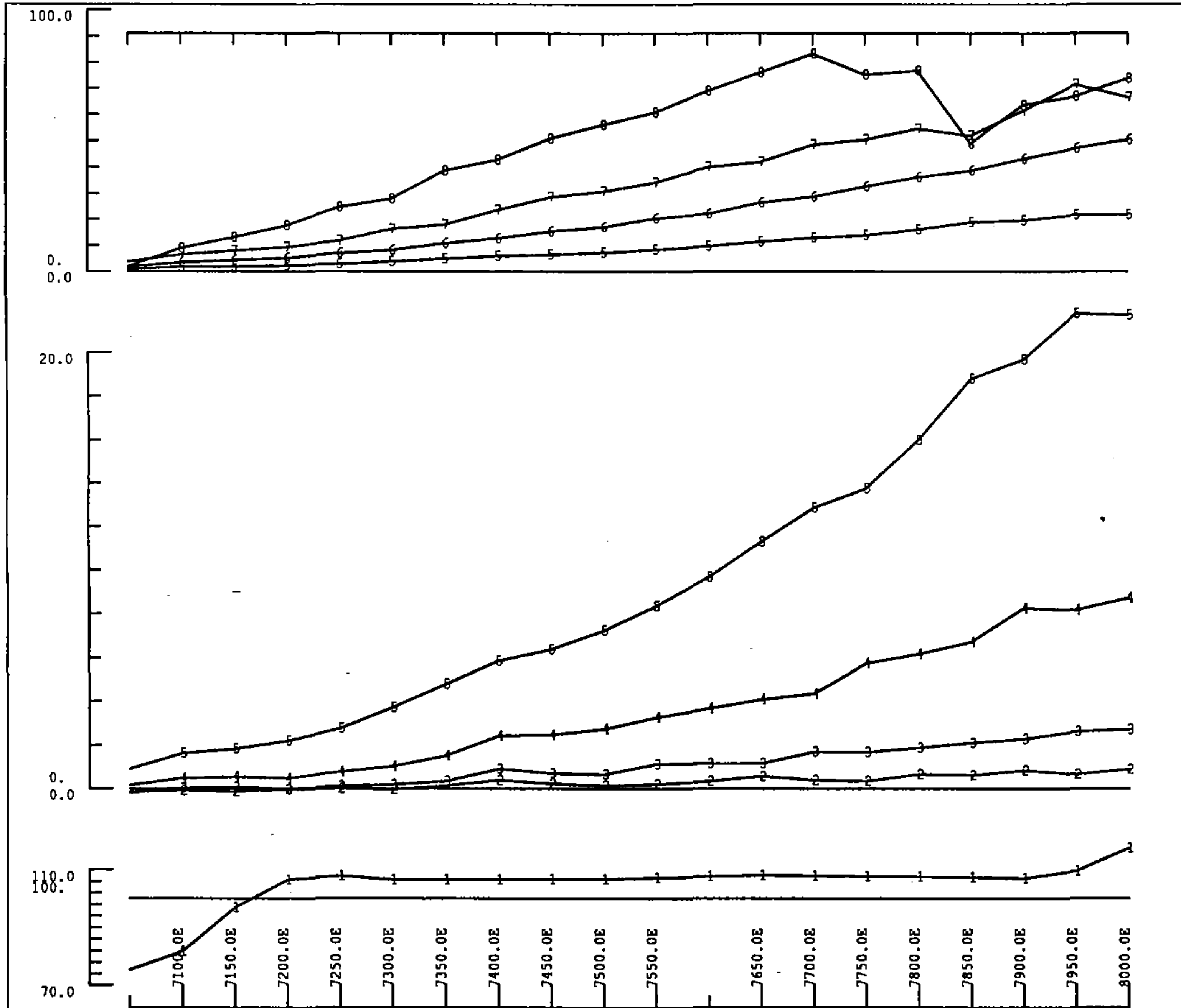
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 21/03/90   Horiz

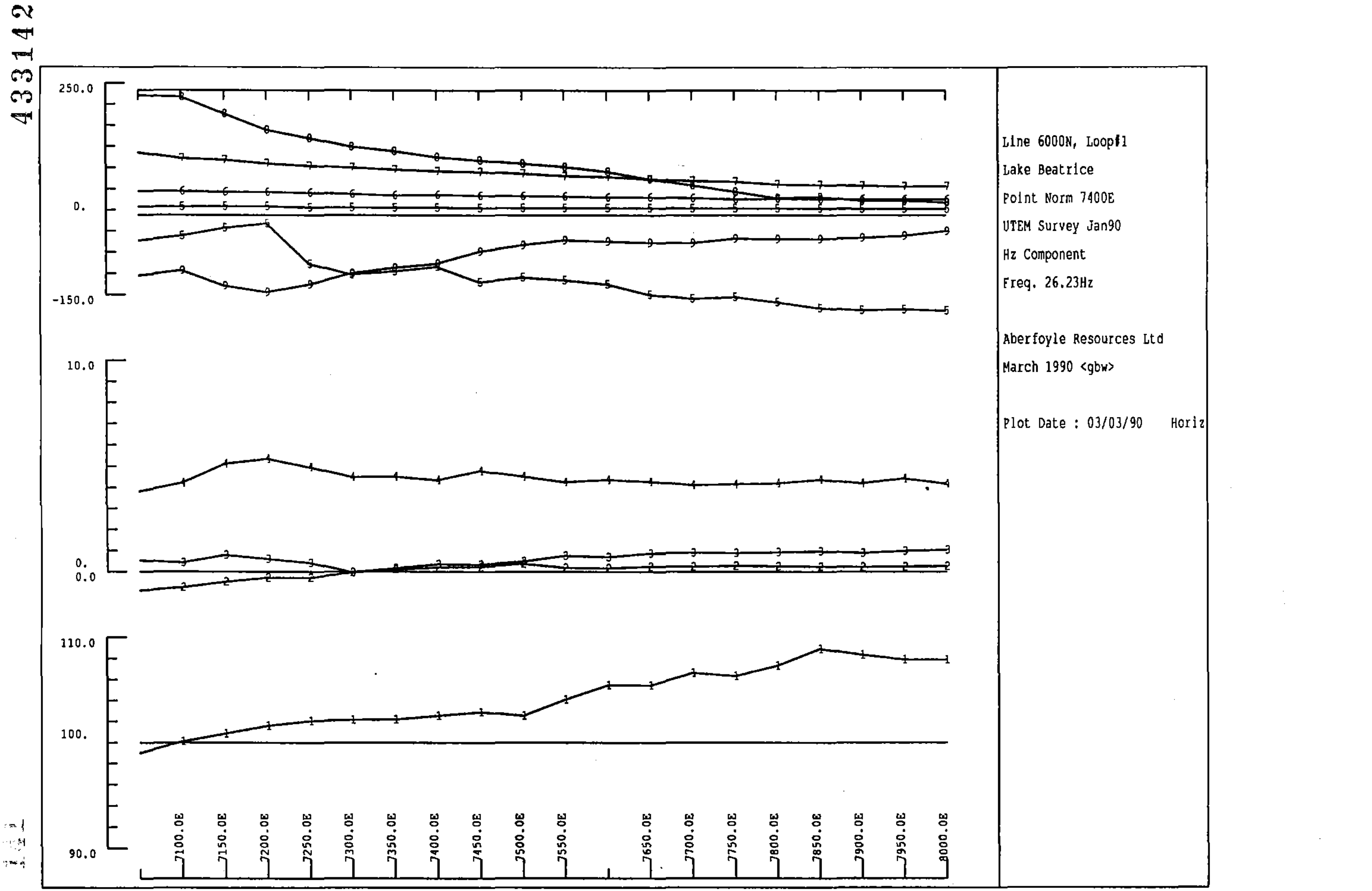
433141



Line 7400N, Loop#1
Lake Beatrice Grid
CONTINUOUS NORM
UTEM Survey Jan89
Hz Component
Freq. 26.23Hz

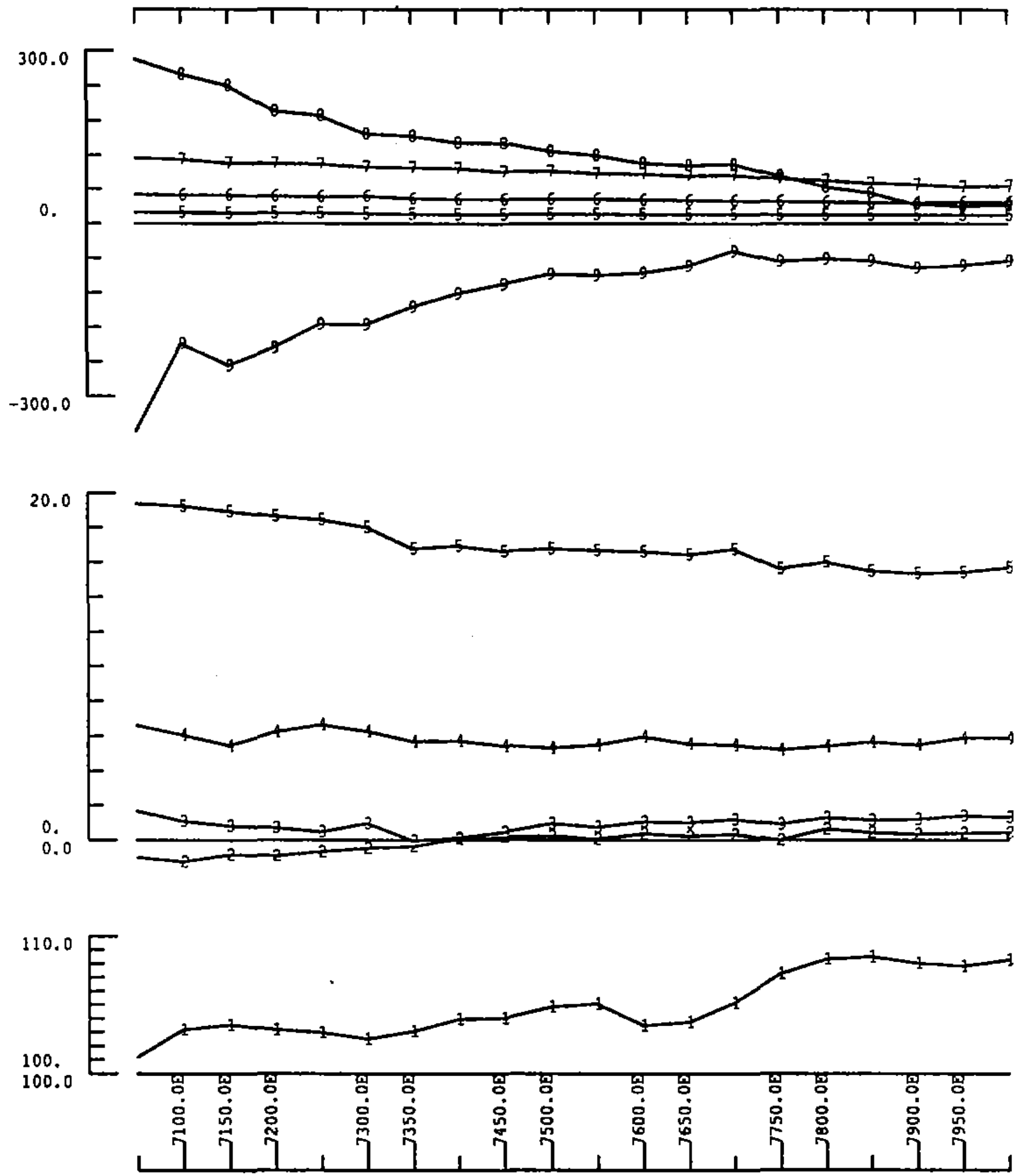
Aberfoyle Resources Ltd
March 1990 <gbw>

Plot Date : 21/03/90 Horiz



433142
250.0
0.
-150.0
10.0
0.
0.0
110.0
100.
90.0
7100.0E
7150.0E
7200.0E
7250.0E
7300.0E
7350.0E
7400.0E
7450.0E
7500.0E
7550.0E
7650.0E
7700.0E
7750.0E
7800.0E
7850.0E
7900.0E
7950.0E
8000.0E
Line 6000N, Loop#1
Lake Beatrice
Point Norm 7400E
UTEM Survey Jan90
Hz Component
Freq. 26.23Hz
Aberfoyle Resources Ltd
March 1990 <gbw>
Plot Date : 03/03/90 Horiz

433143



Line 6200N, Loop#1

Point Norm at 7600E

Out-of-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

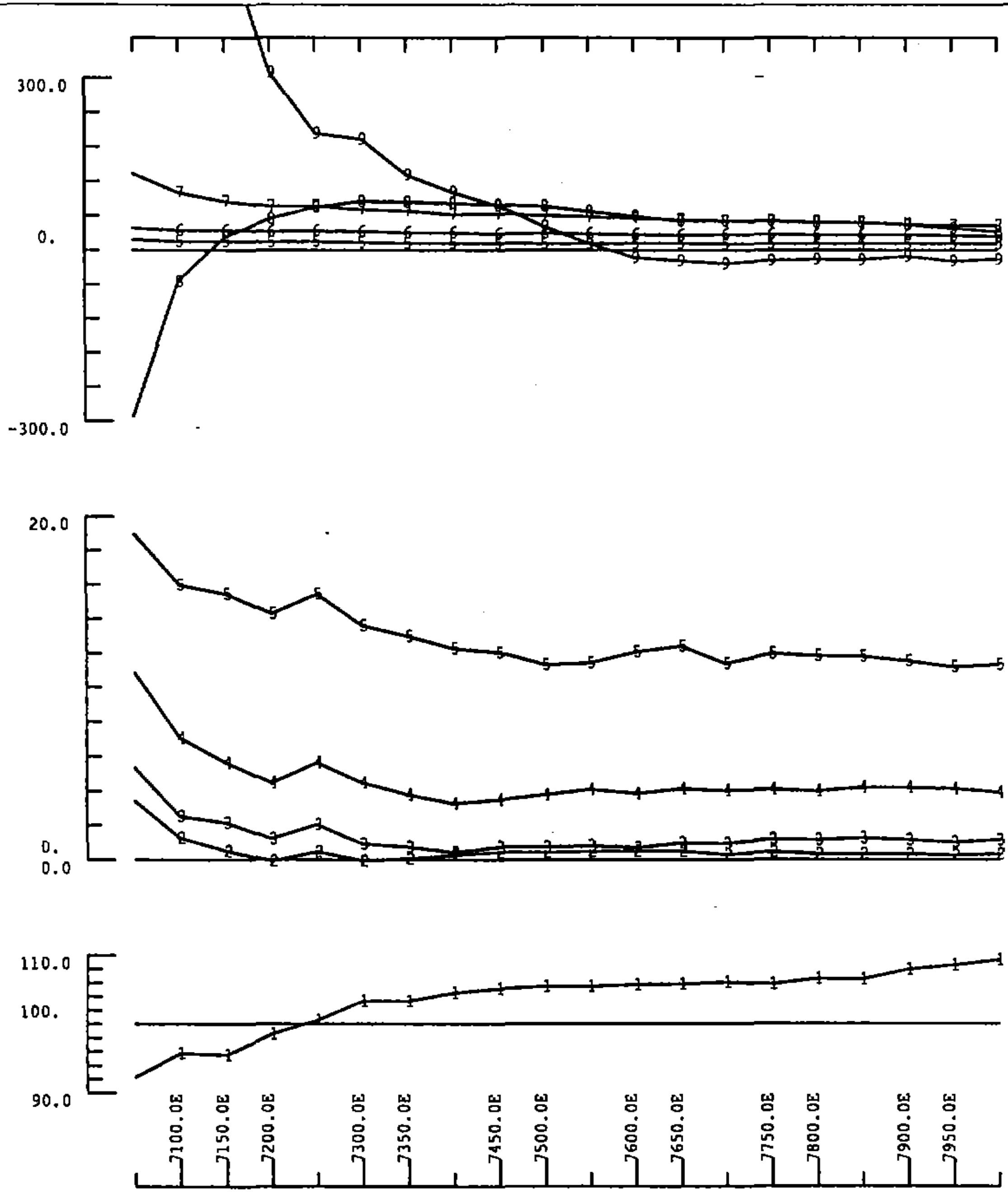
ABERFOYLE RESOURCES LTD

January 1990 <gbw>

| Loop1 |

| 6200N |********

Plot Date : 24/01/90 Horiz



Line 6400N, Loop#1

Point Norm at 7600E

Out-of-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

ABERFOYLE RESOURCES LTD

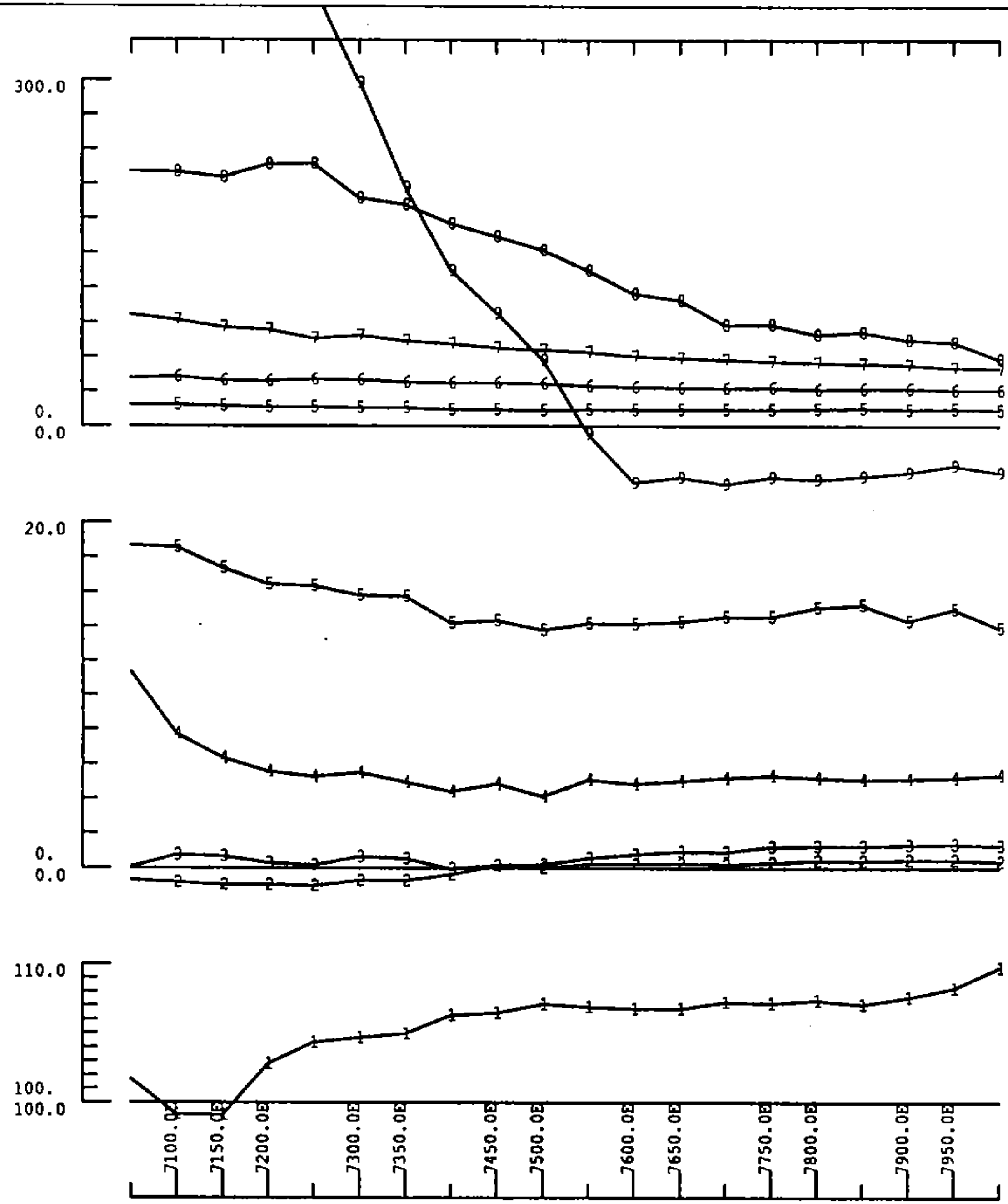
January 1990 <gbw>

| Loop1 |

| 6400N |********

Plot Date : 24/01/90 Horiz

433145



Line 6600N, Loop#1

Point Norm at 7750E

Out-of-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

ABERFOYLE RESOURCES LTD

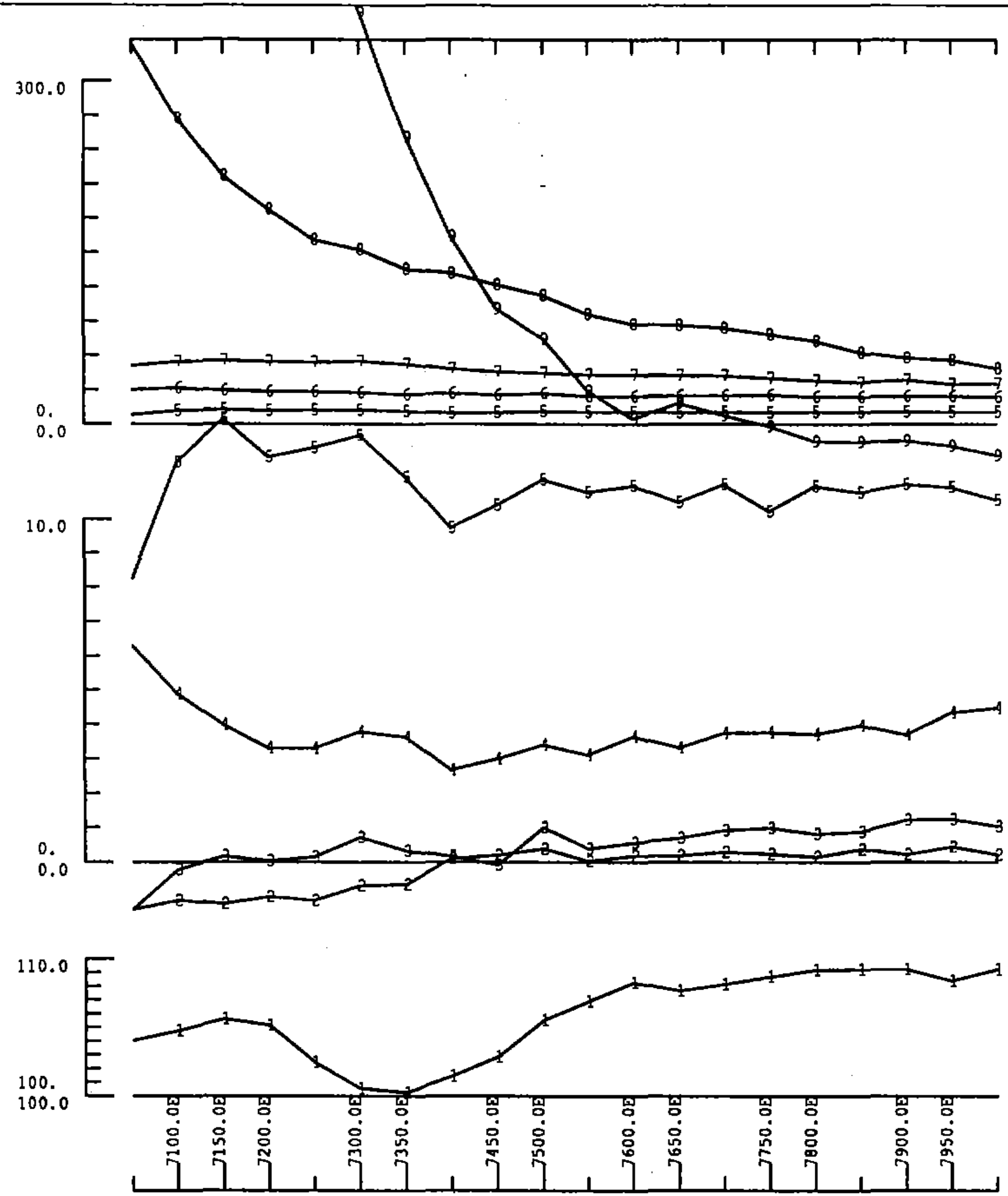
January 1990 <gbw>

| Loop1 |

| 6600N |********

Plot Date : 24/01/90 Horiz

433146



Line 6800N, Loop#1

Point Norm at 7700E

Out-of-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

ABERFOYLE RESOURCES LTD

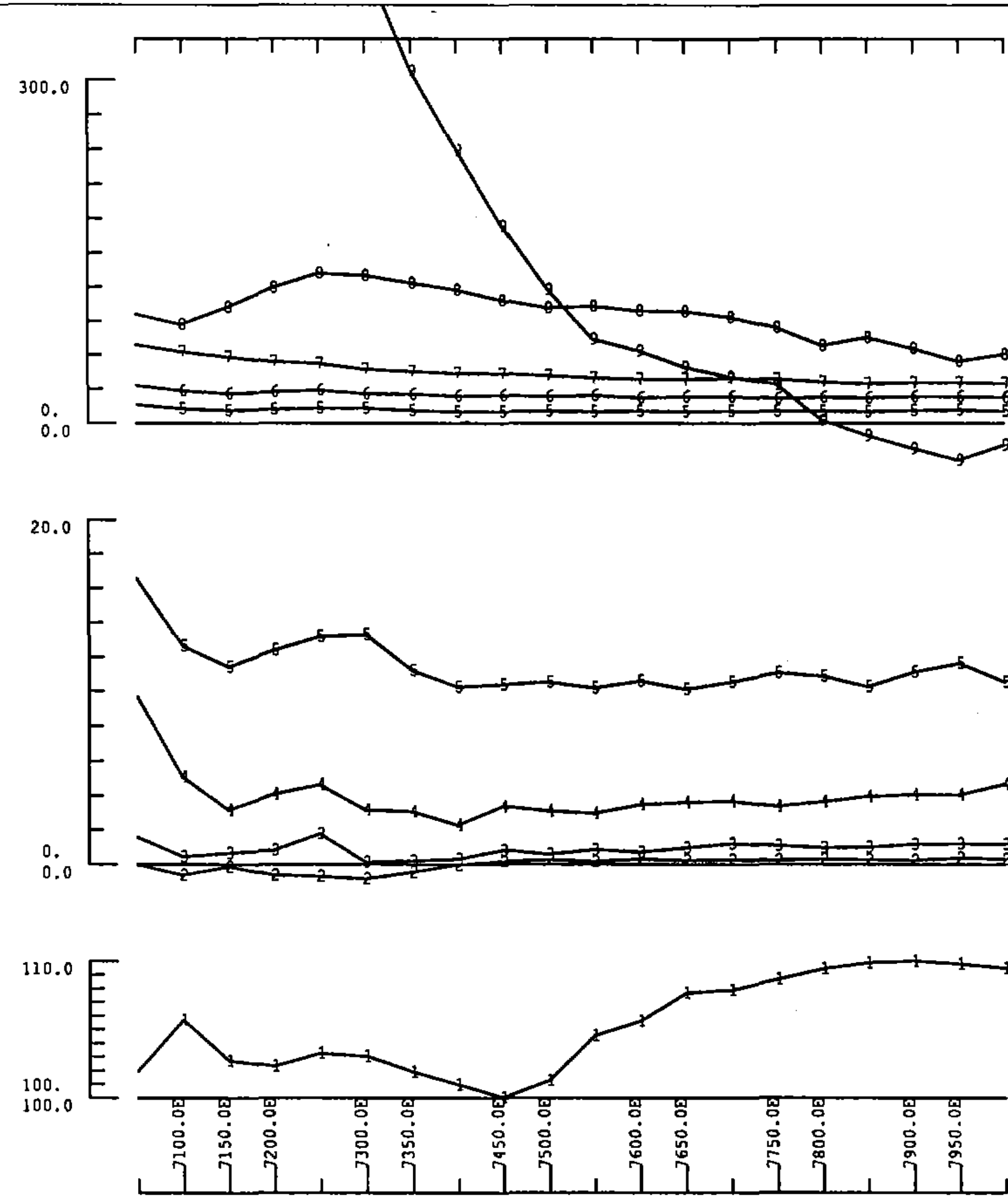
January 1990 <gbw>

| Loop1 |

| 6800N |********

Plot Date : 24/01/90 Horiz

433147



Line 7000N, Loop#1

Point Norm at 7700E

Out-of-Loop Section

Lake Beatrice Grid

Lake Margaret EL

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

ABERFOYLE RESOURCES LTD

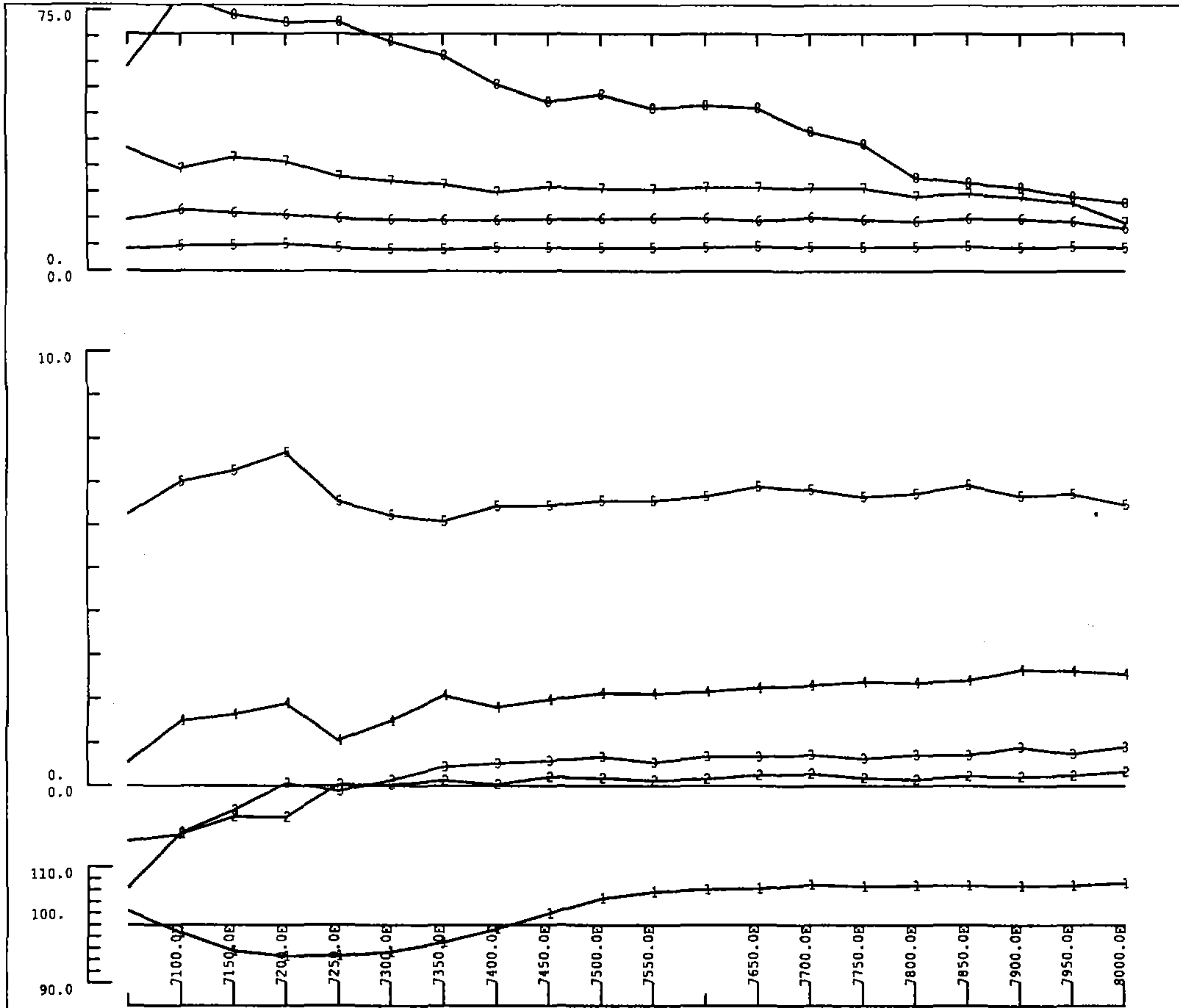
January 1990 <gbw>

| Loop1 |

| 7000N |********

Plot Date : 24/01/90 Horiz

433148



Line 7200N, Loop#1

Lake Beatrice Grid

POINT NORM 7500E

UTEM Survey Jan89

Hz Component

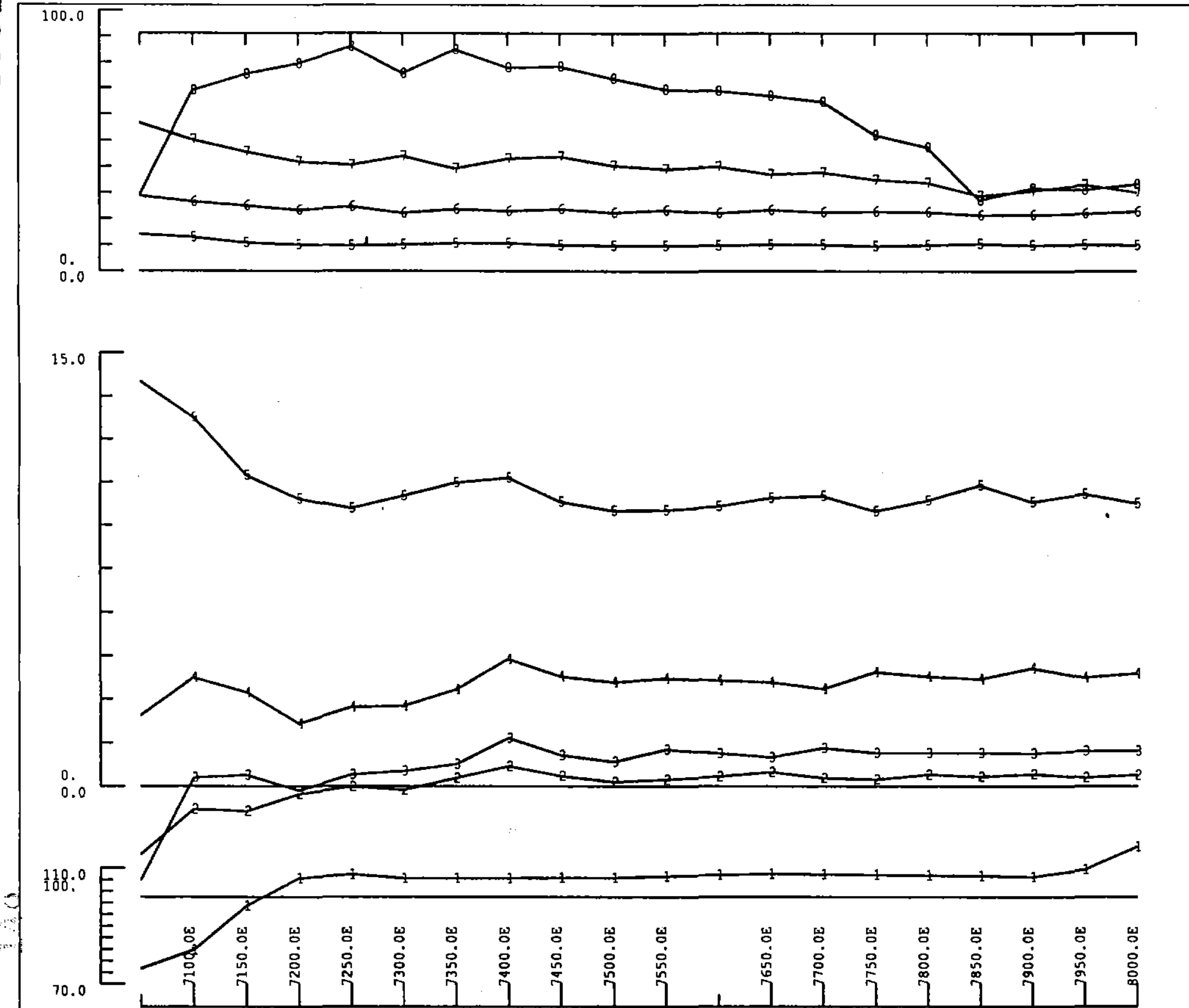
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 21/03/90 Horiz

433149



Line 7400N, Loop#1

Lake Beatrice Grid

POINT NORM 7600E

UTEM Survey Jan89

Hz Component

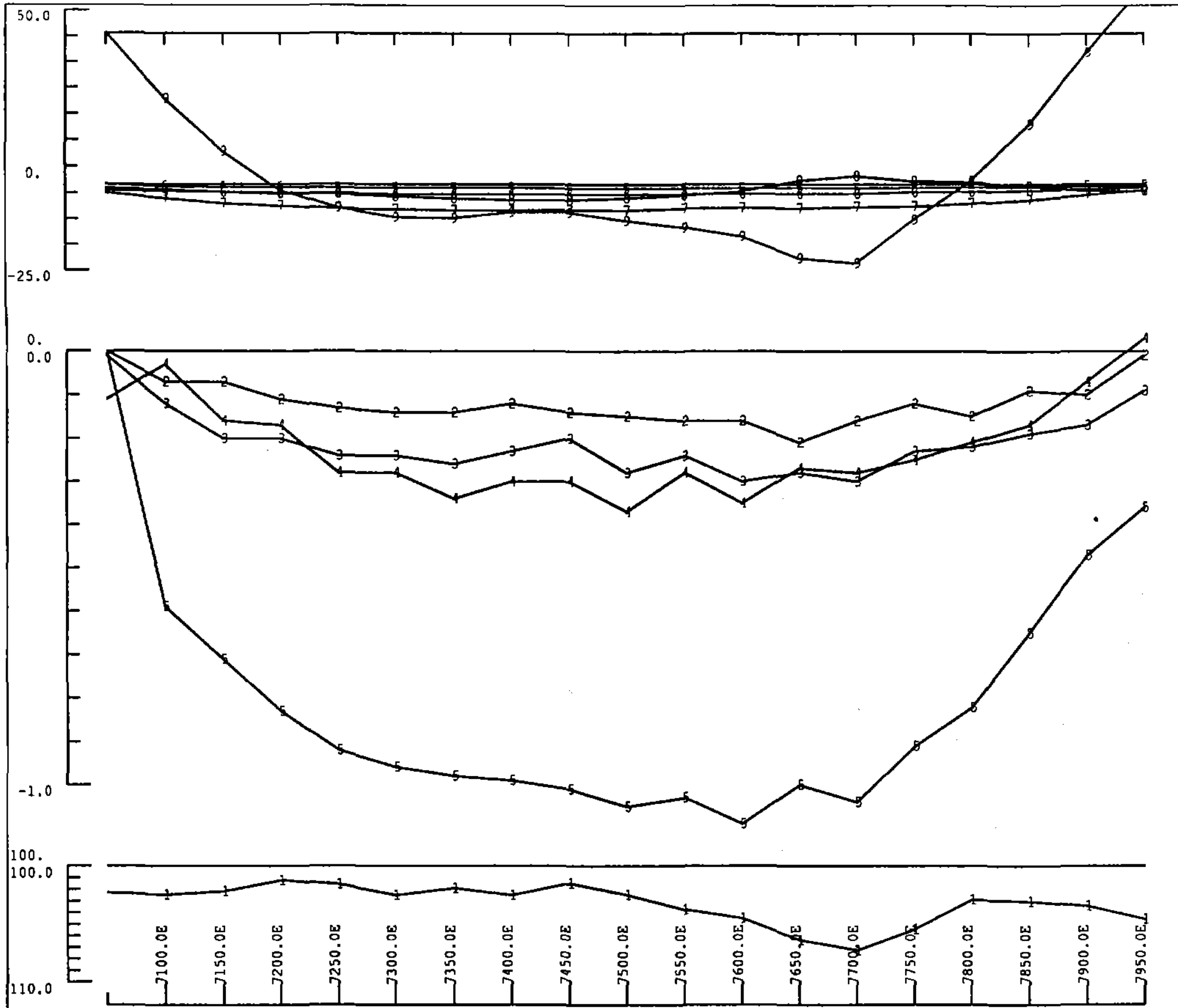
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 21/03/90 Horiz

433150



Line 6200N, Loop#2

In-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

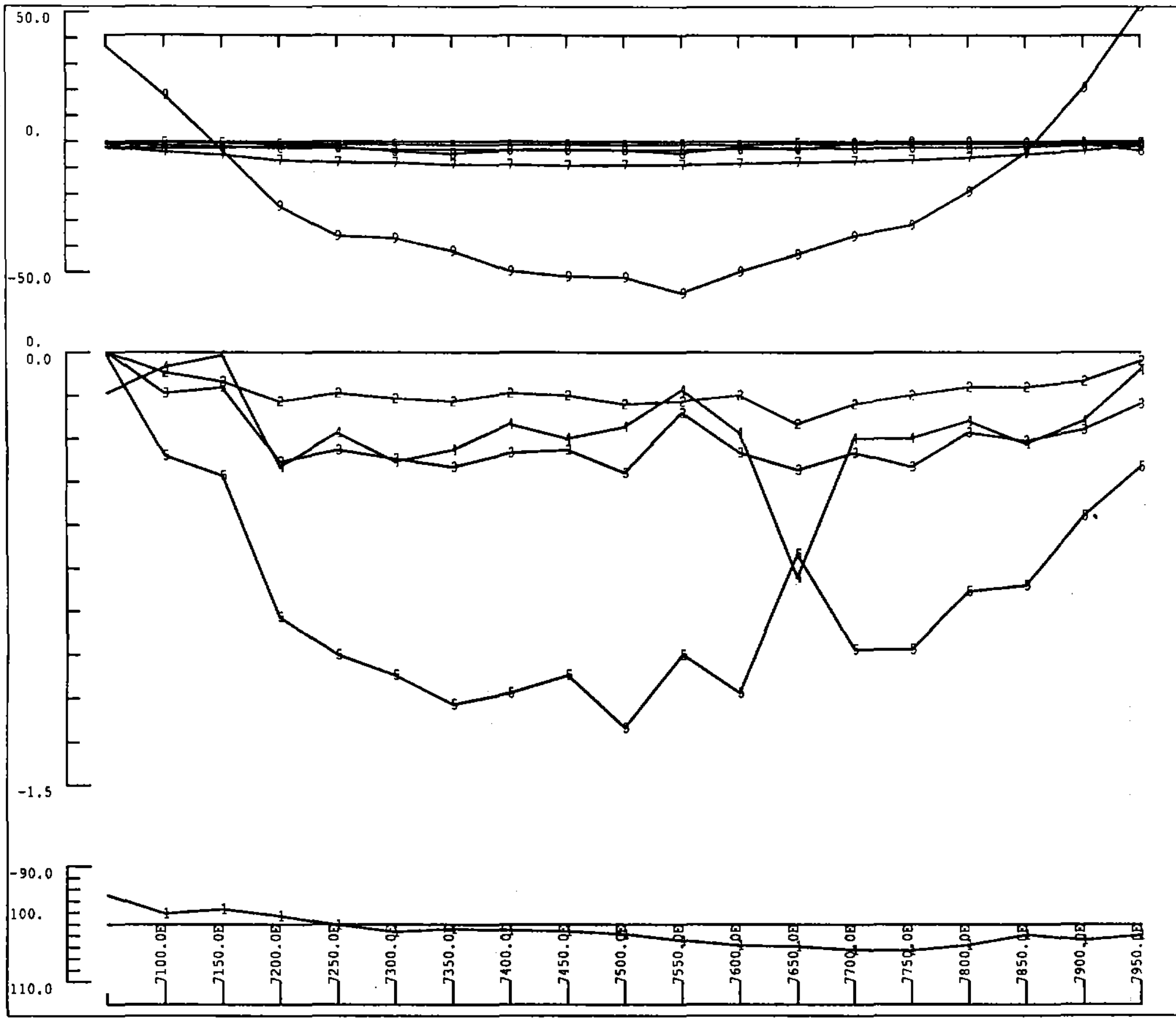
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433151



Line 6400N, Loop#2

In-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

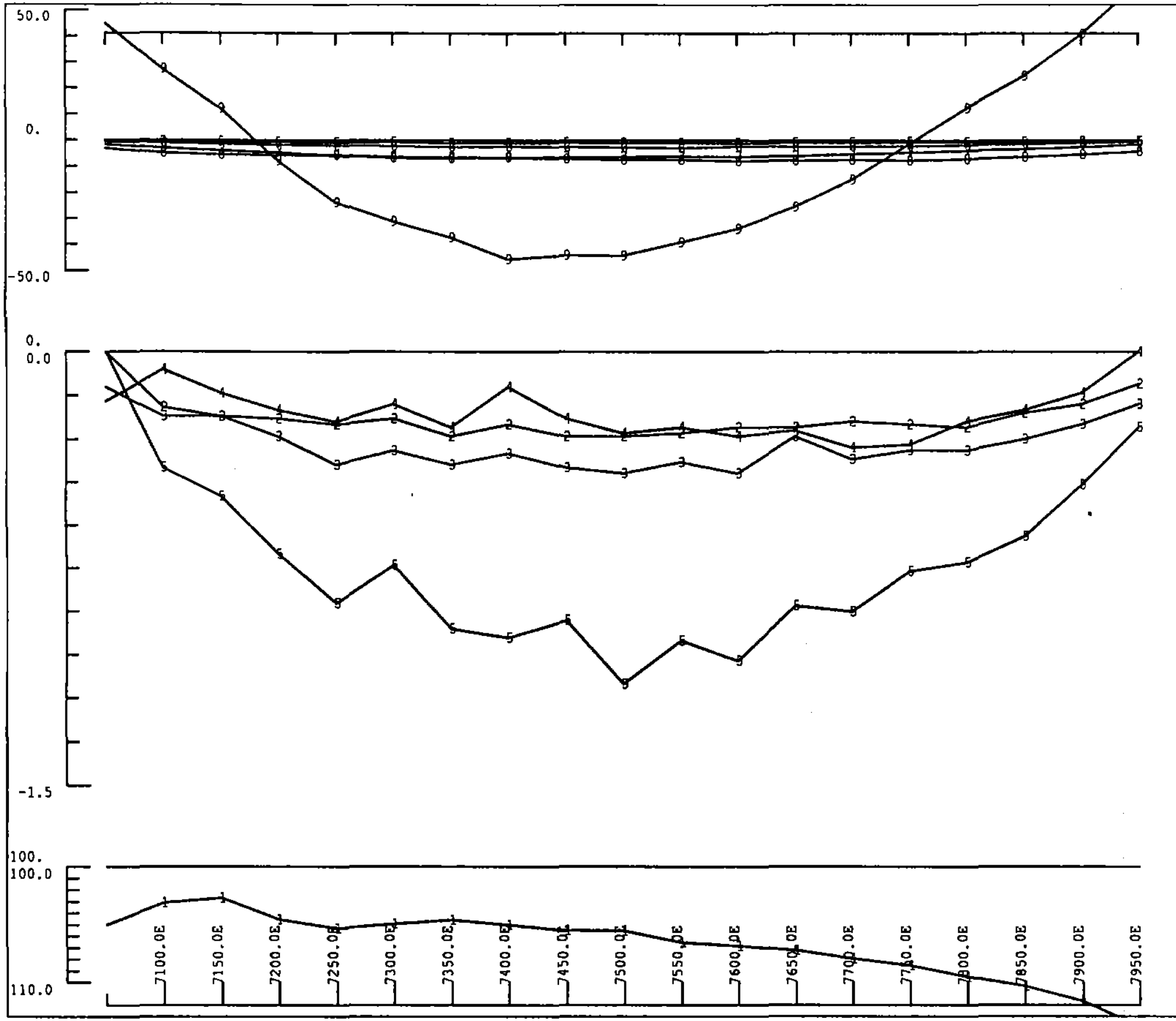
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433152

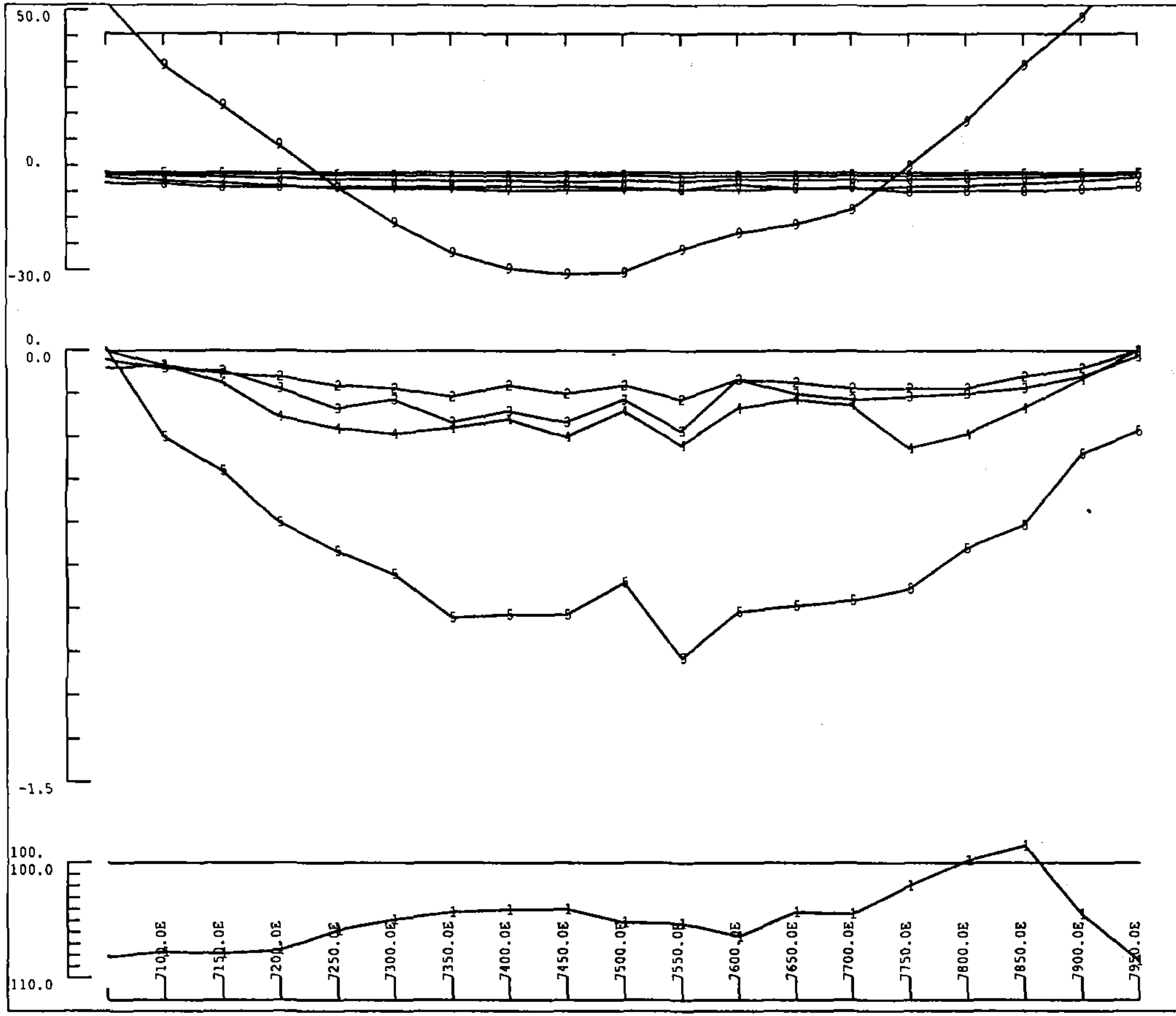


Line 6600N, Loop#2
In-Loop Section
Lake Beatrice
CONTINUOUS NORM
UTEM Survey Jan90
Hz Component
Freq. 26.23Hz

Aberfoyle Resources Ltd
March 1990 <gbw>

Plot Date : 14/03/90   Horiz

433153



Line 6800N, Loop#2

In-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

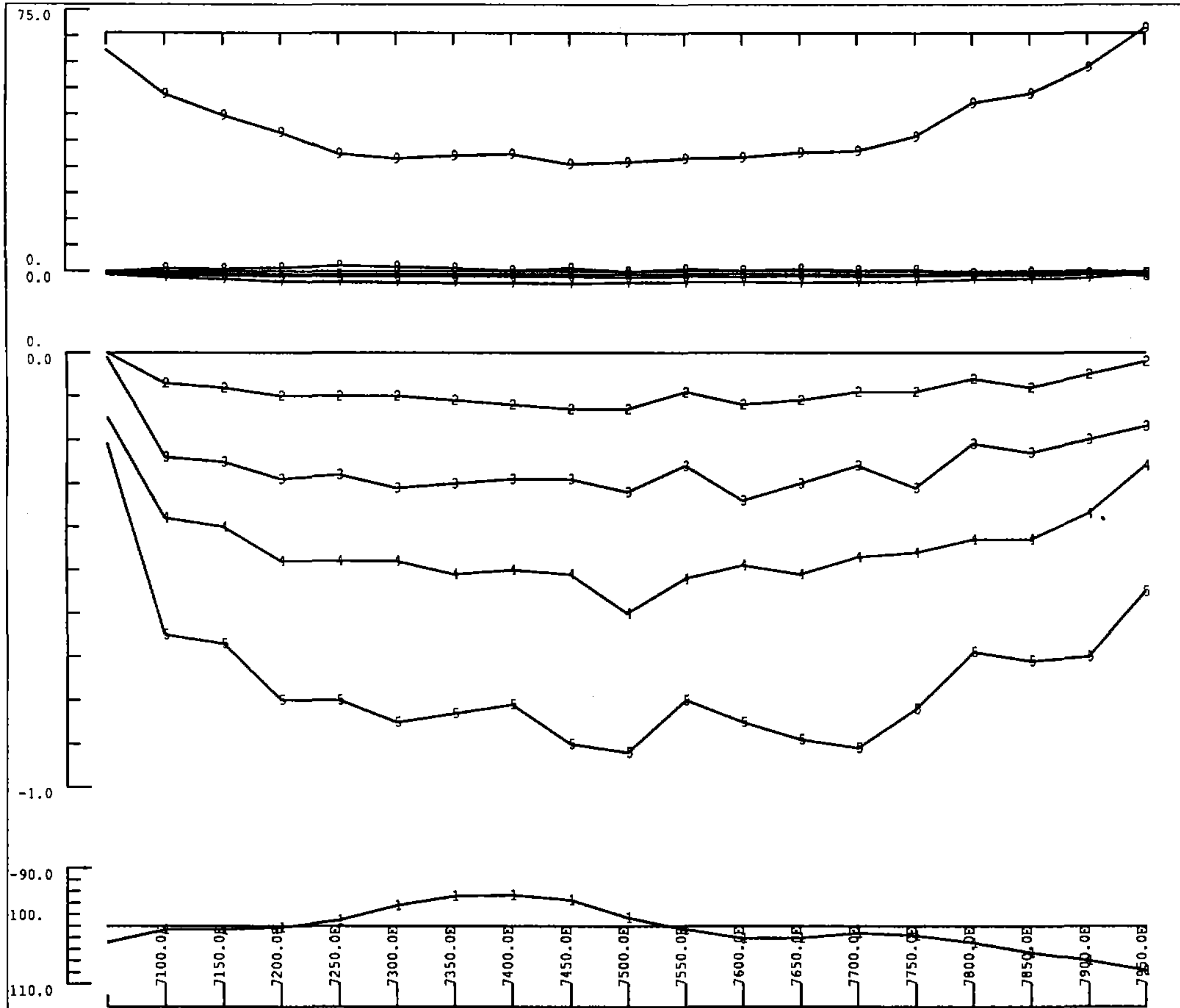
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433154



Line 7200N, Loop#2

In-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

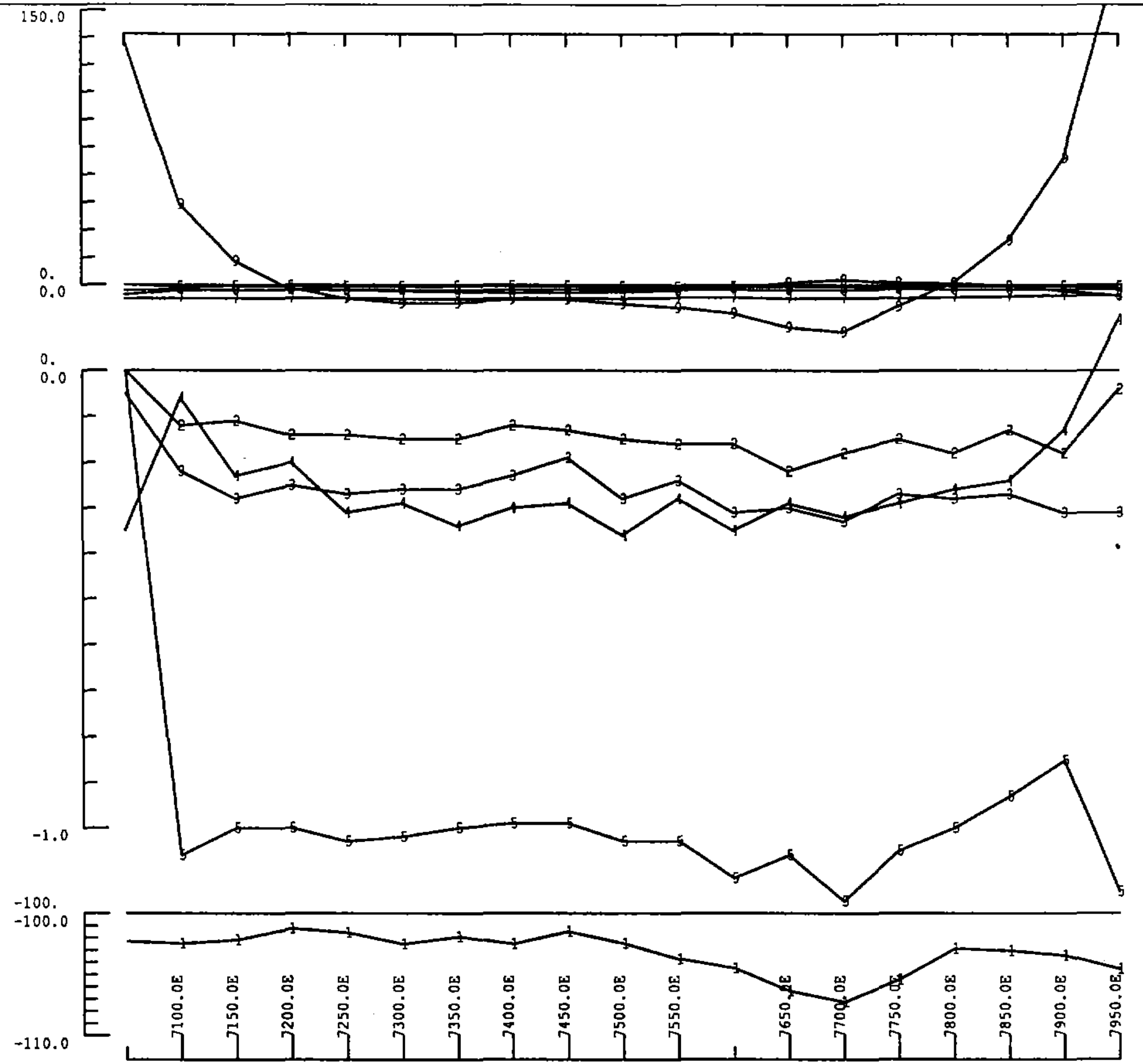
Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

153

433155



Line 6200N, Loop#2

In-Loop Section

Lake Beatrice

POINT NORM 7400E

UTEM Survey Jan90

Hz Component

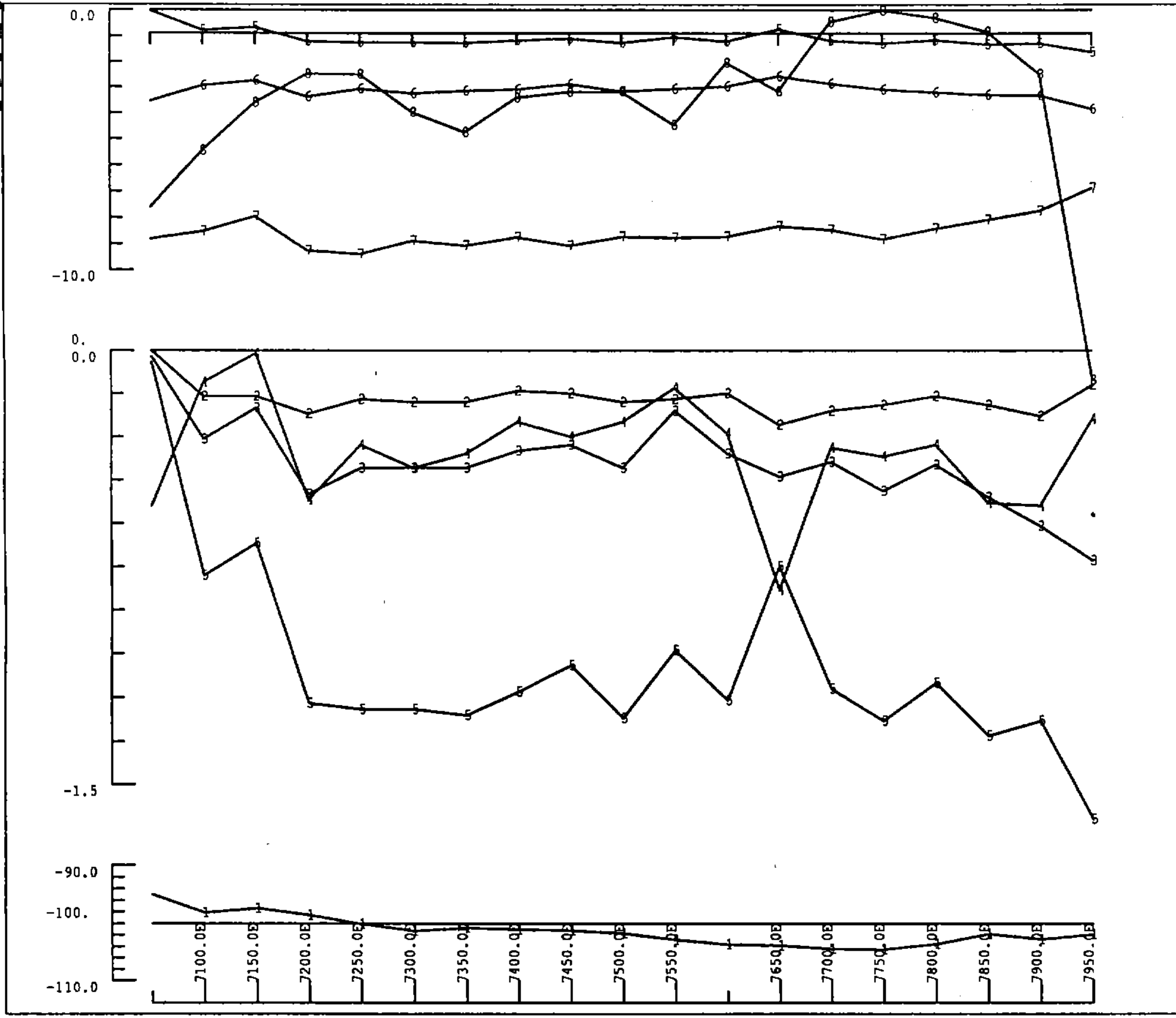
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433156



Line 6400N, Loop#2

In-Loop Section

Lake Beatrice

POINT NORM 7400E

UTEM Survey Jan90

Hz Component

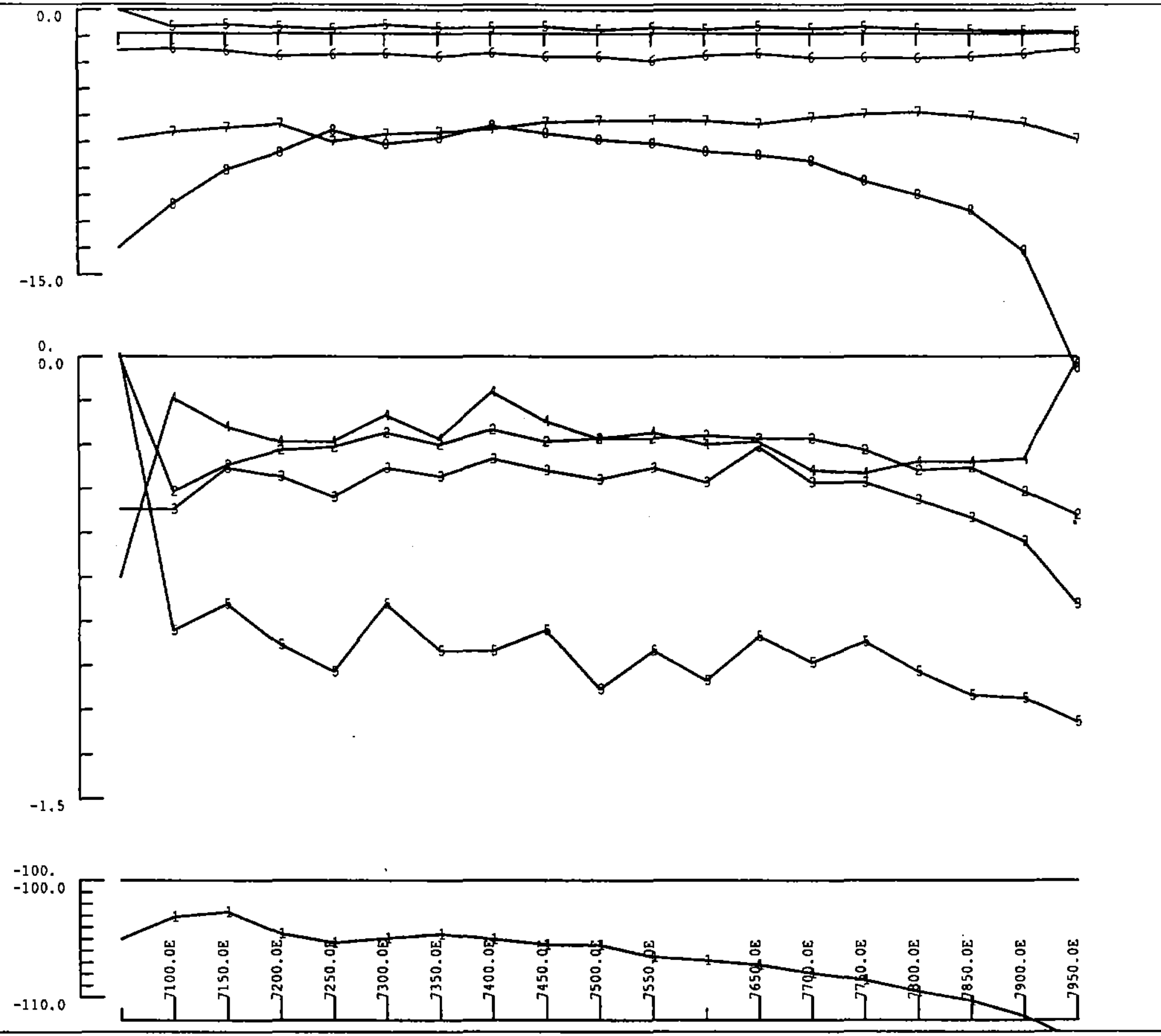
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433157



Line 6600N, Loop#2

In-Loop Section

Lake Beatrice

POINT NORM 7550E

UTEM Survey Jan90

Hz Component

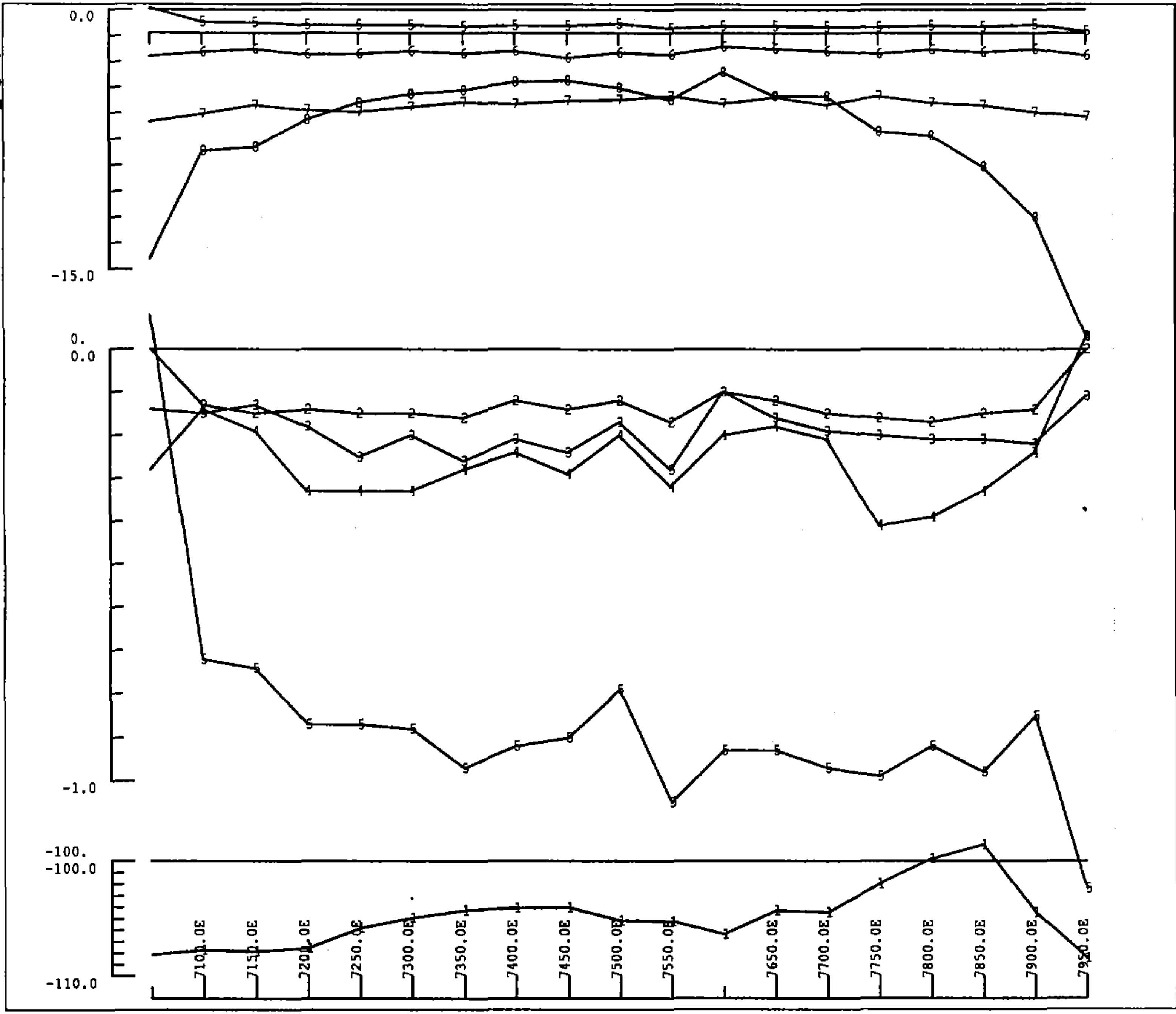
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

43158



Line 6800N, Loop#2

In-Loop Section

Lake Beatrice

POINT NORM 7400E

UTEM Survey Jan90

Hz Component

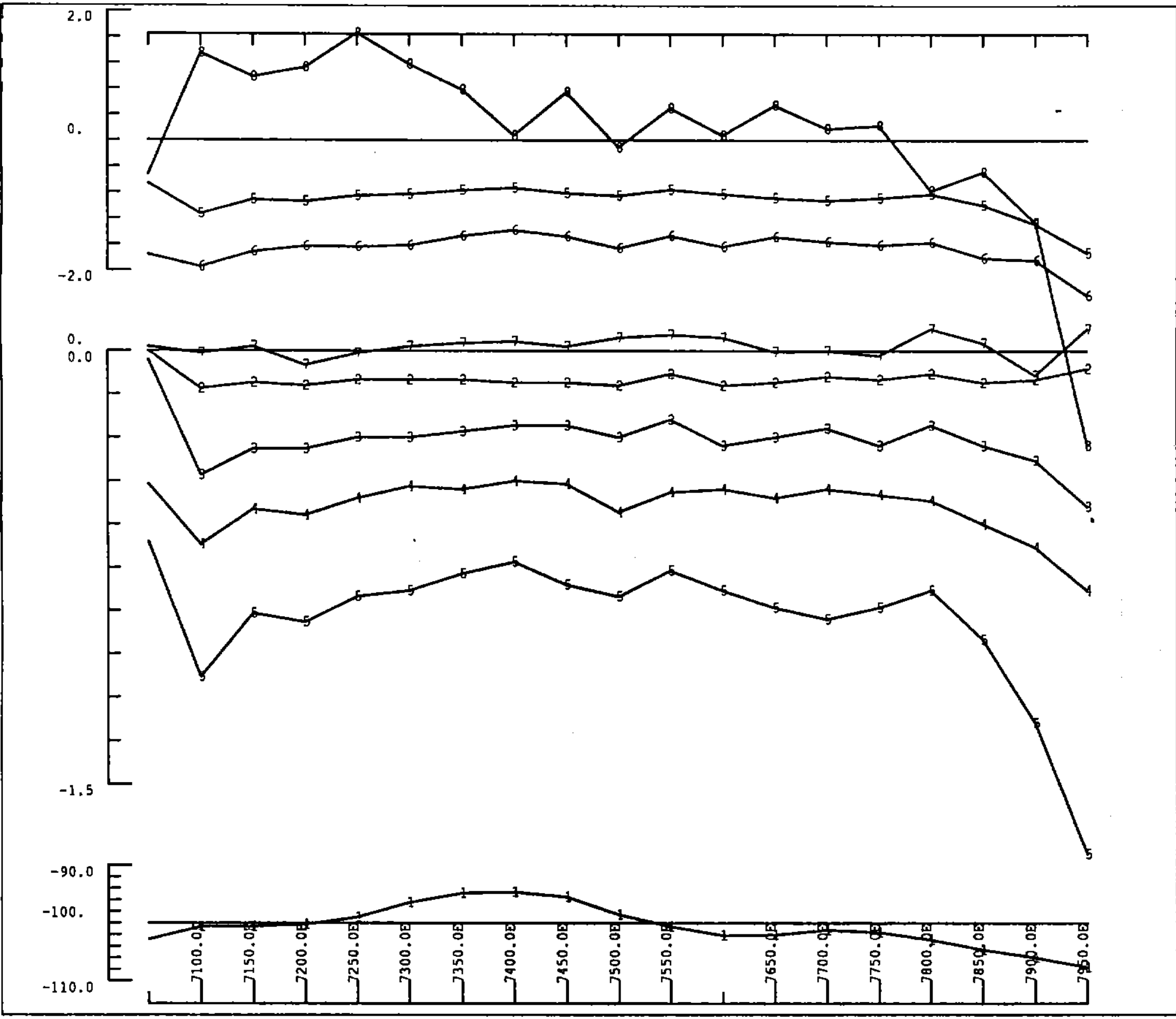
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433159



Line 7200N, Loop#2

In-Loop Section

Lake Beatrice

POINT NORM 7650E

UTEM Survey Jan90

Hz Component

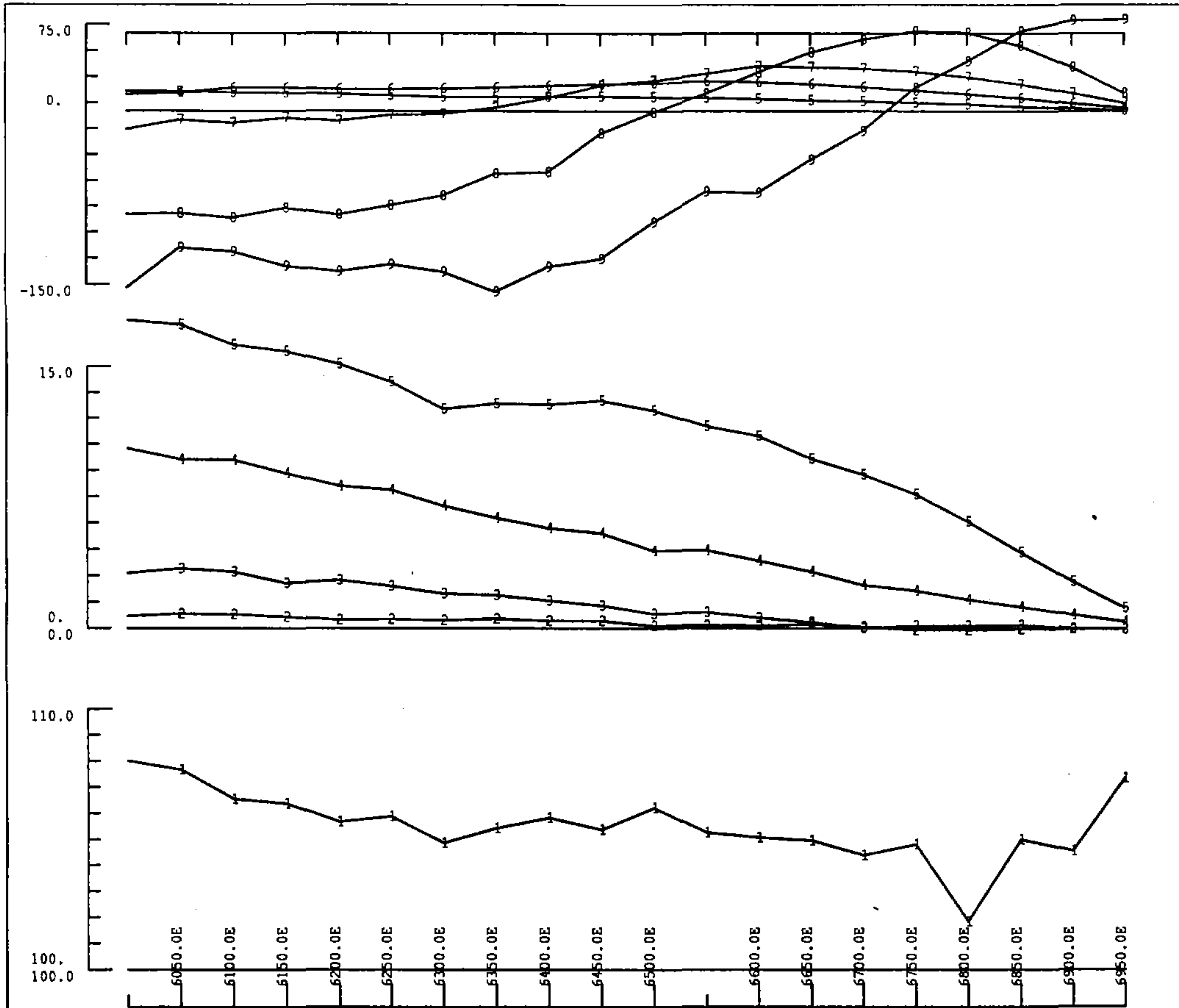
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433160



Line 6000N, Loop#2

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

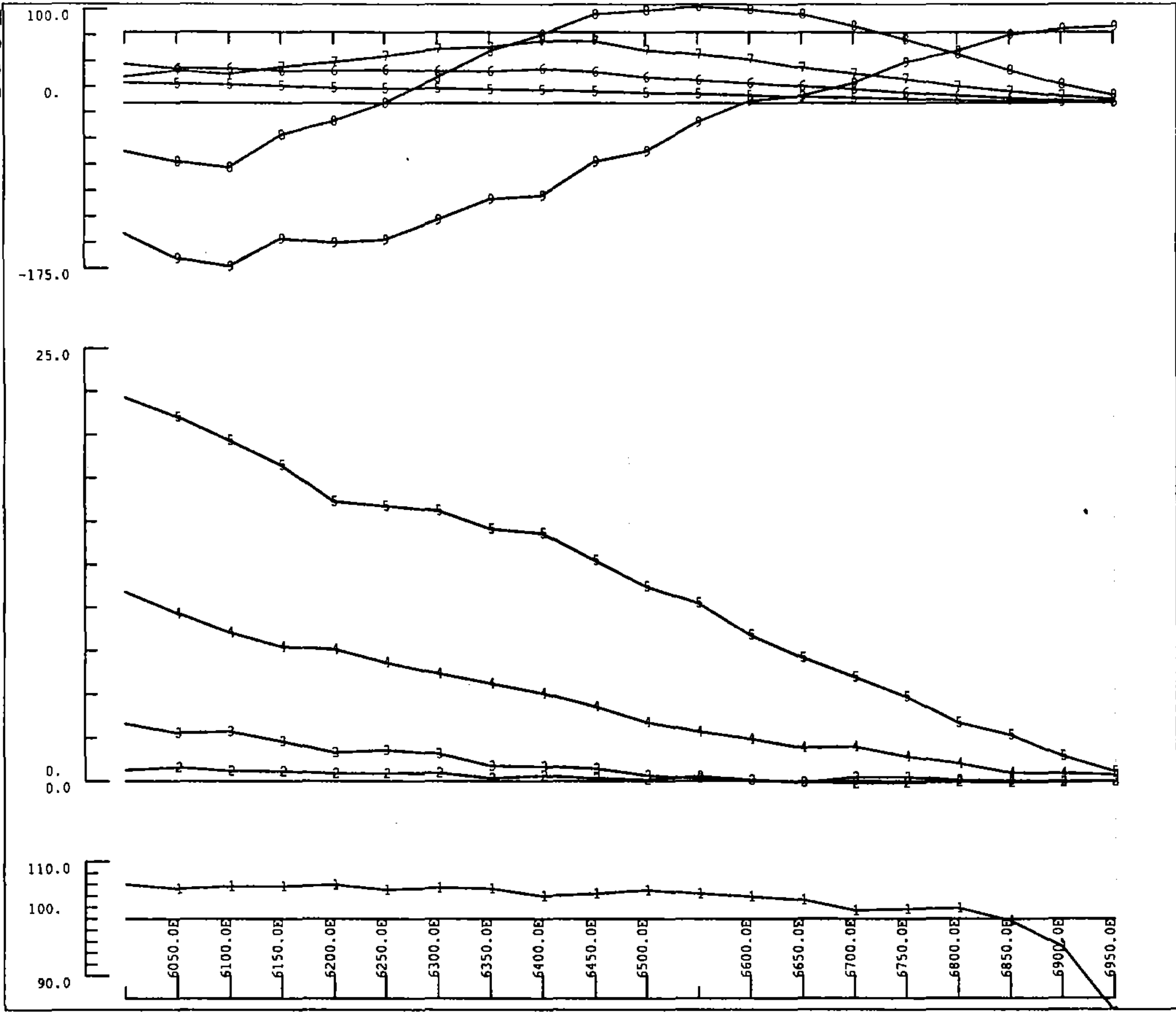
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433161



Line 6200N, Loop#2

Out-of-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

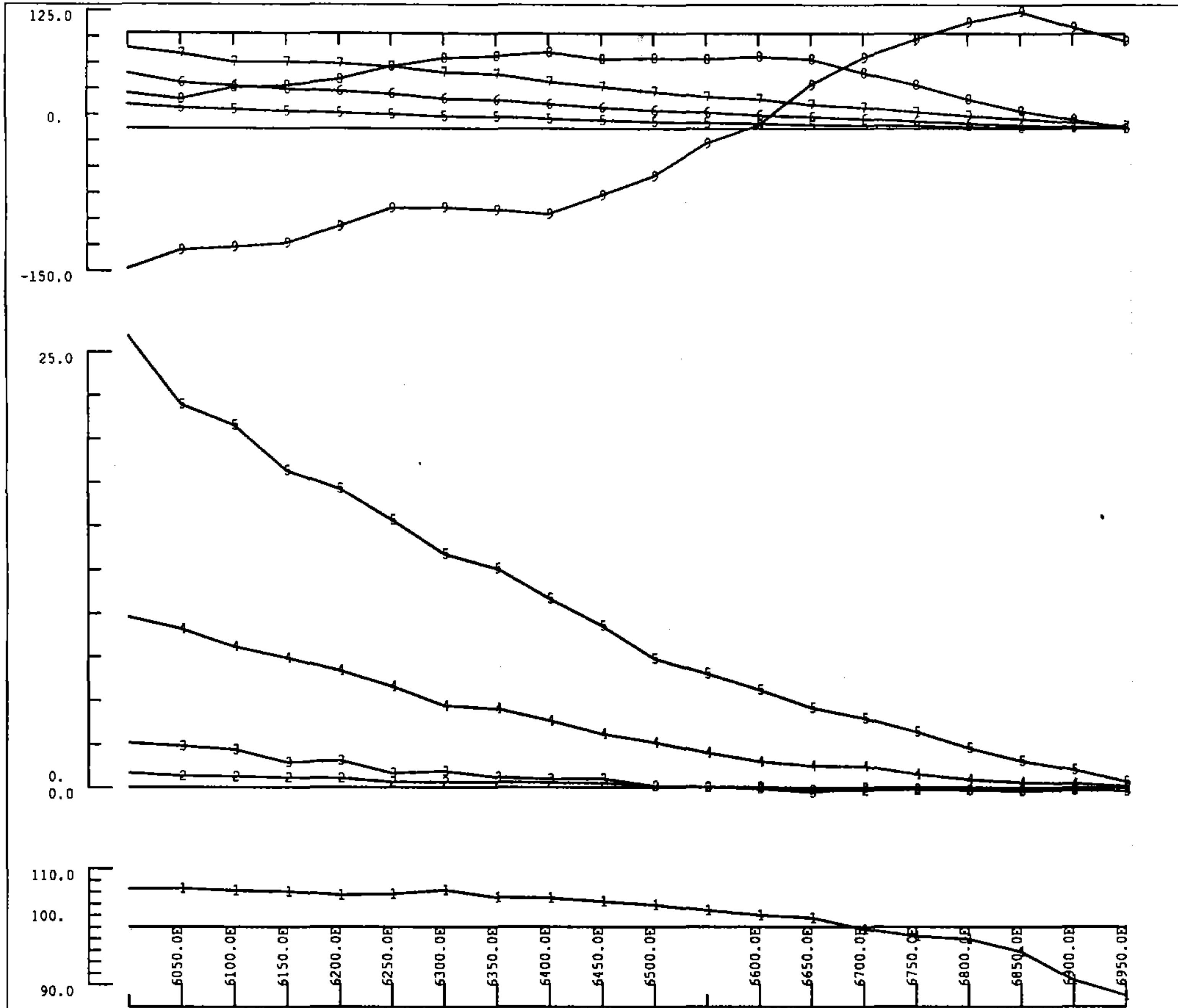
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433162



Line 6400N, Loop#2

Out-of-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

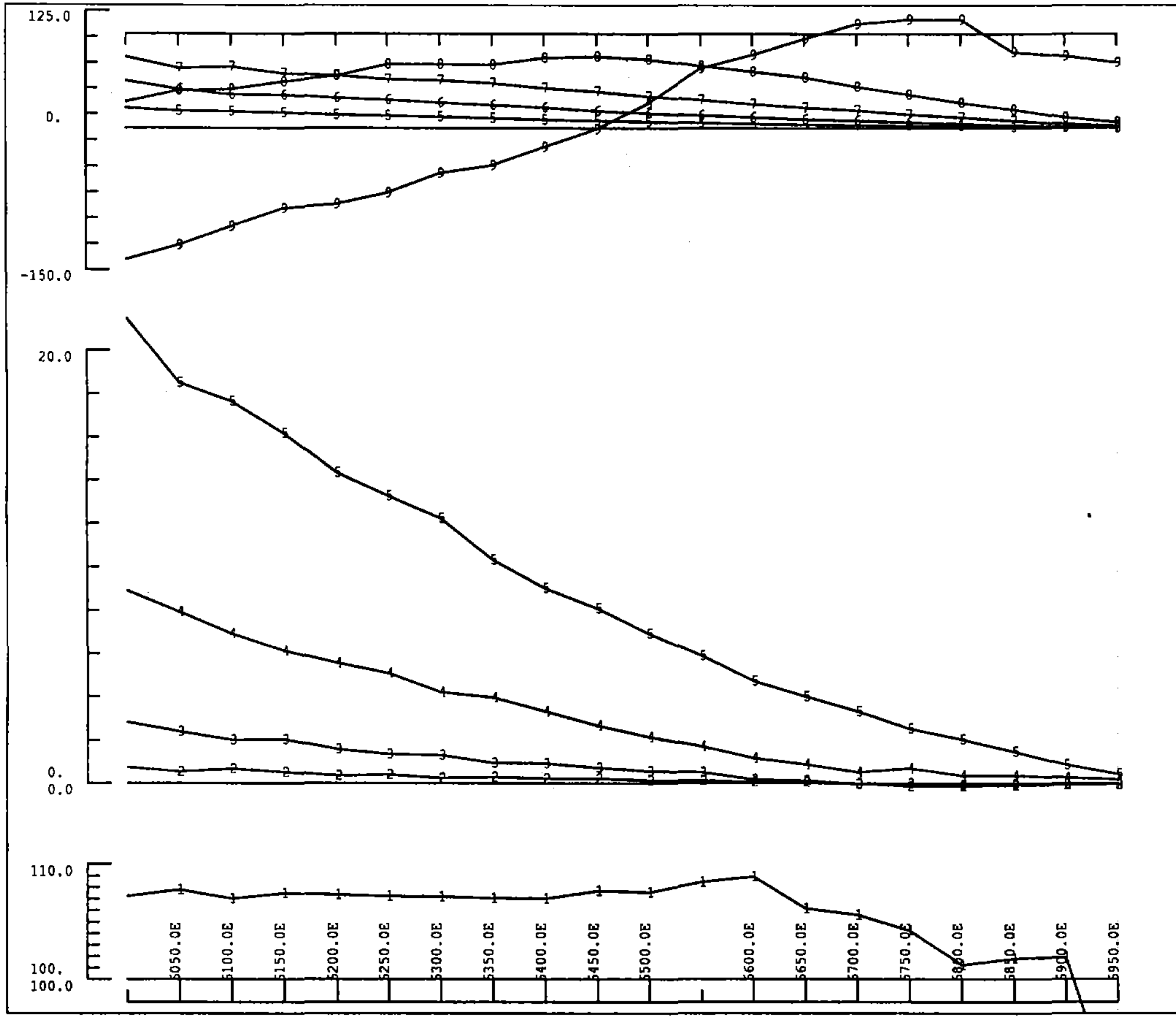
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433163



Line 6600N, Loop#2

Out-of-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

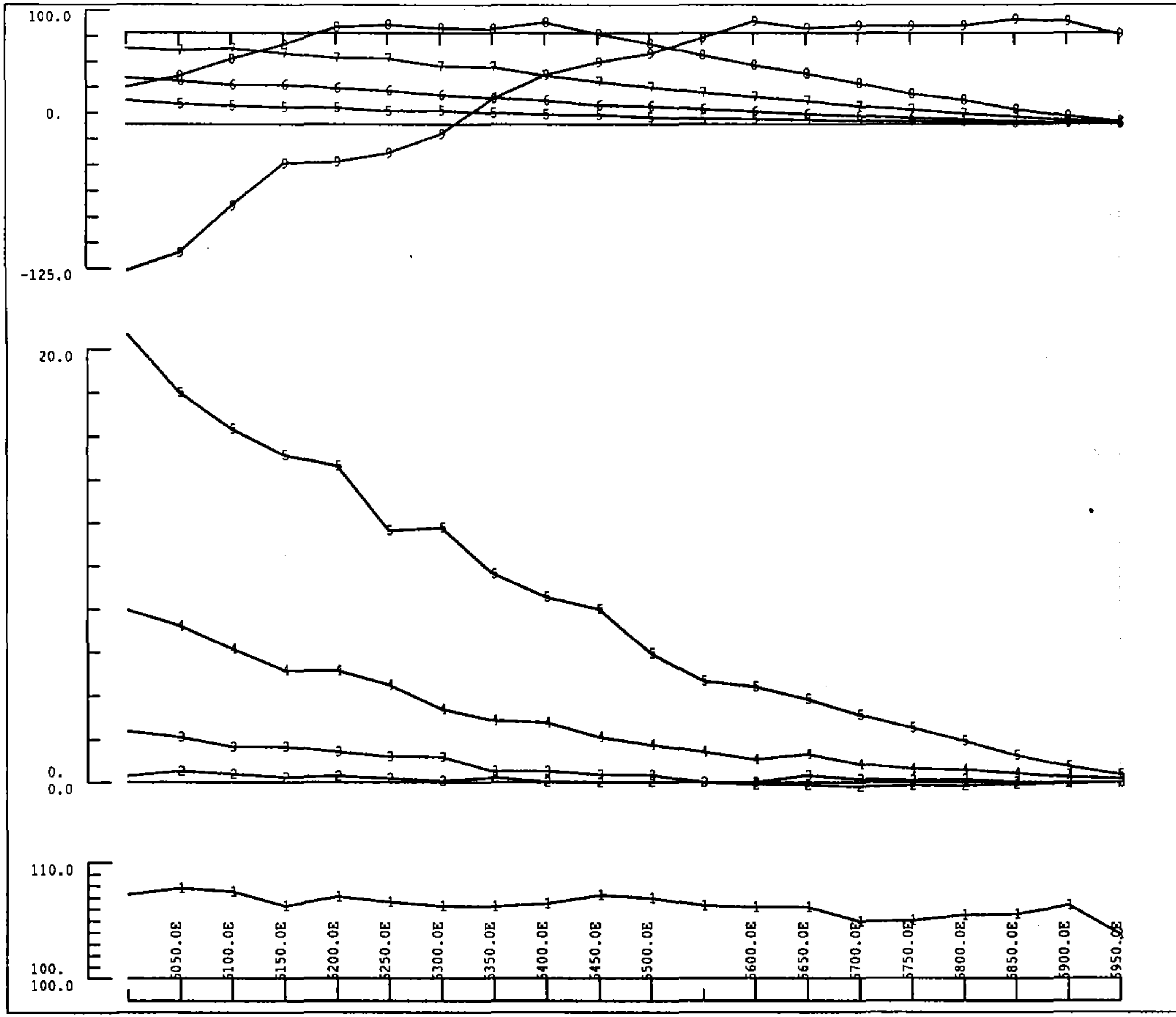
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433164



Line 6800N, Loop#2

Out-of-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

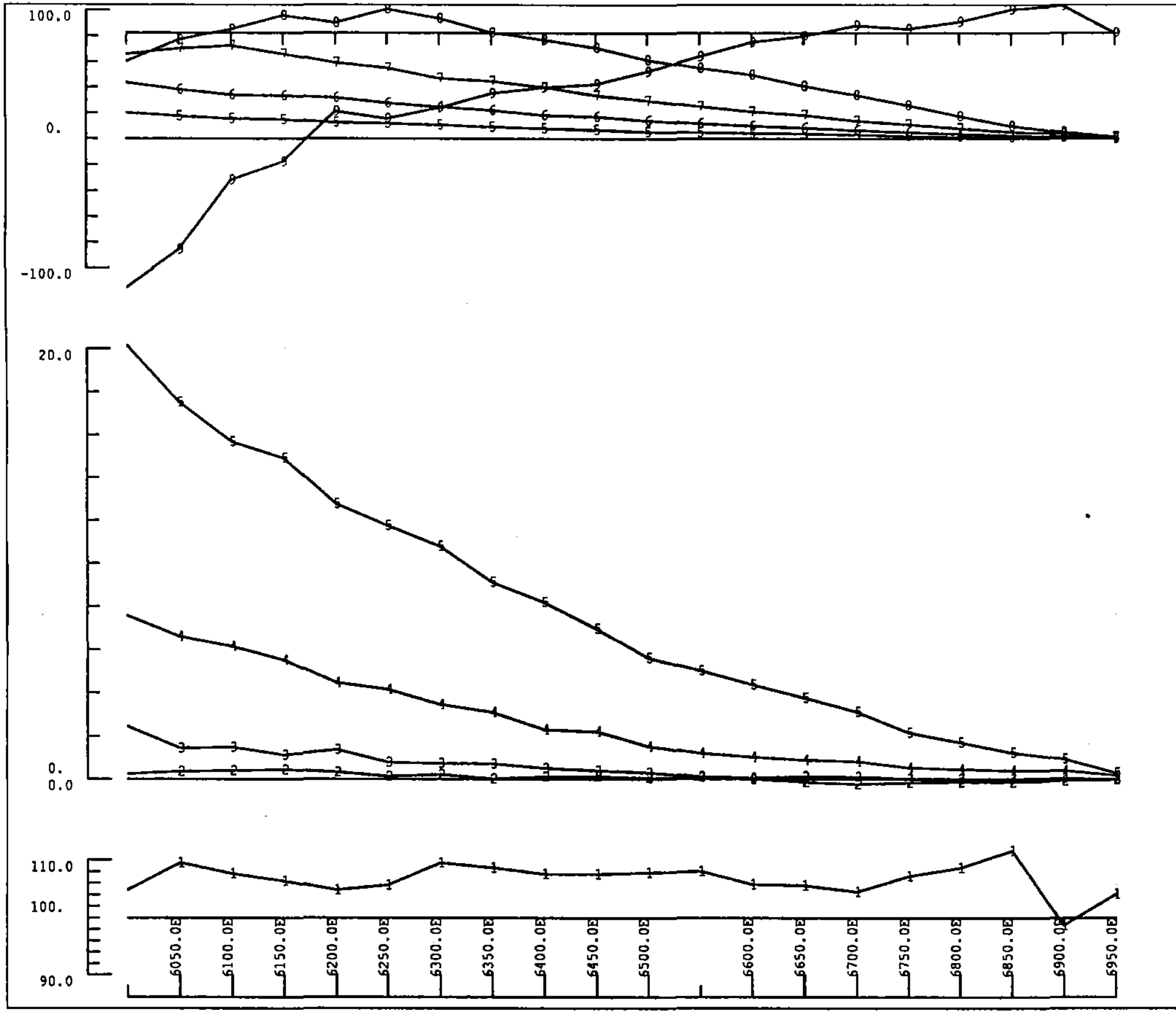
Hz Component

Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz



Line 7000N, Loop#2

Out-of-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

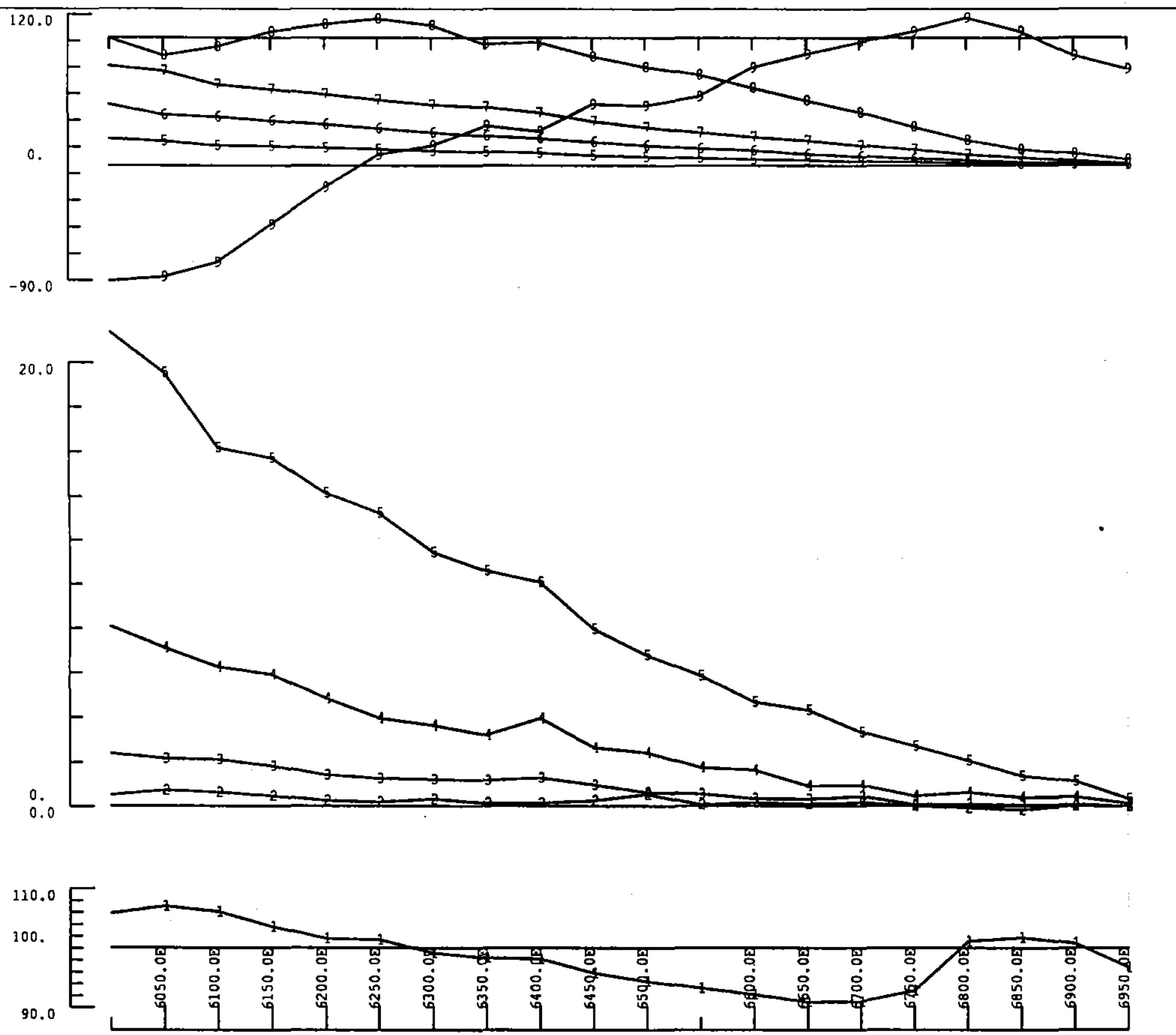
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90   Horiz

433166



Line 7200N, Loop#2

Out-of-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

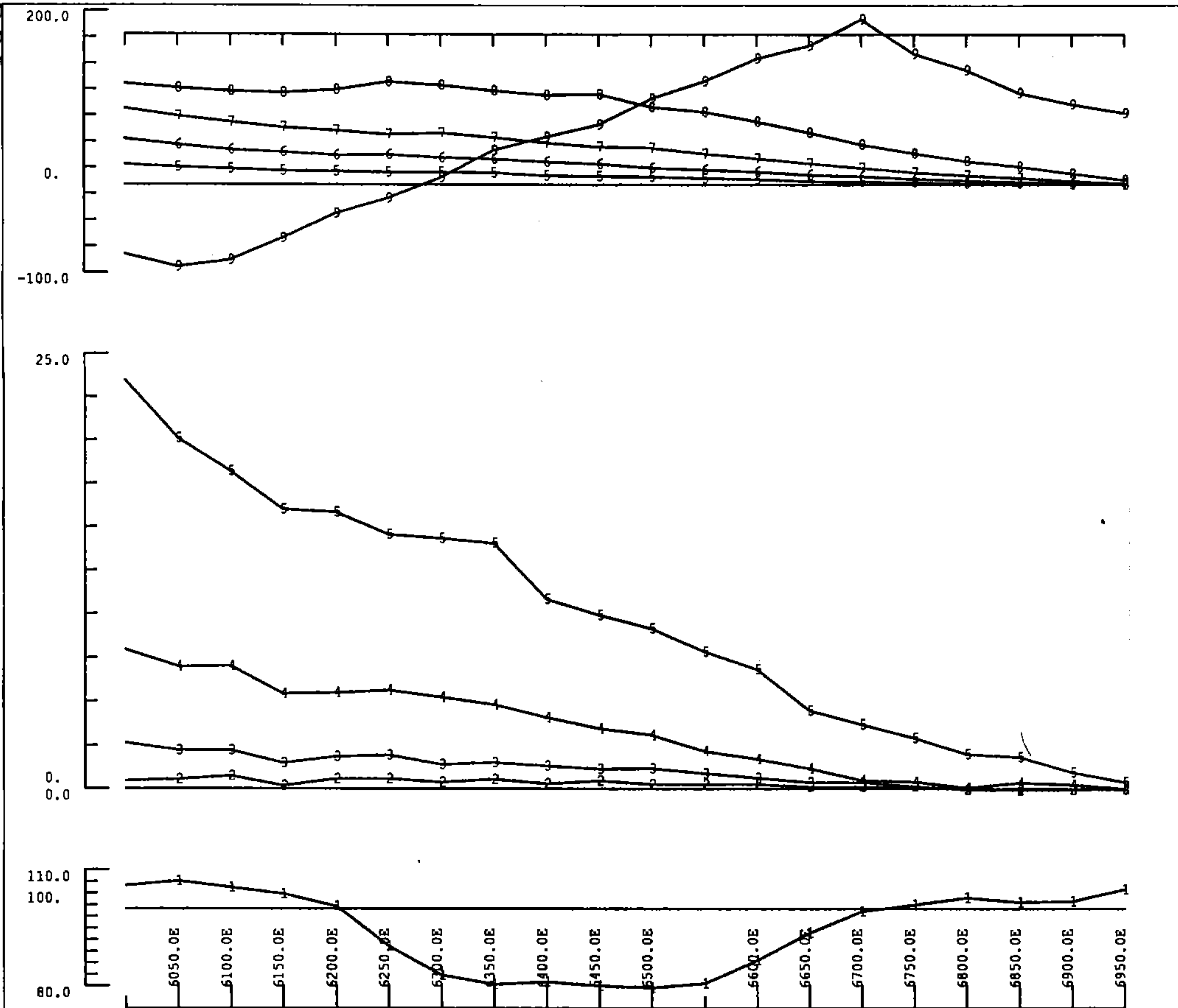
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433167



Line 7400N, Loop#2

Out-of-Loop Section

Lake Beatrice

CONTINUOUS NORM

UTEM Survey Jan90

Hz Component

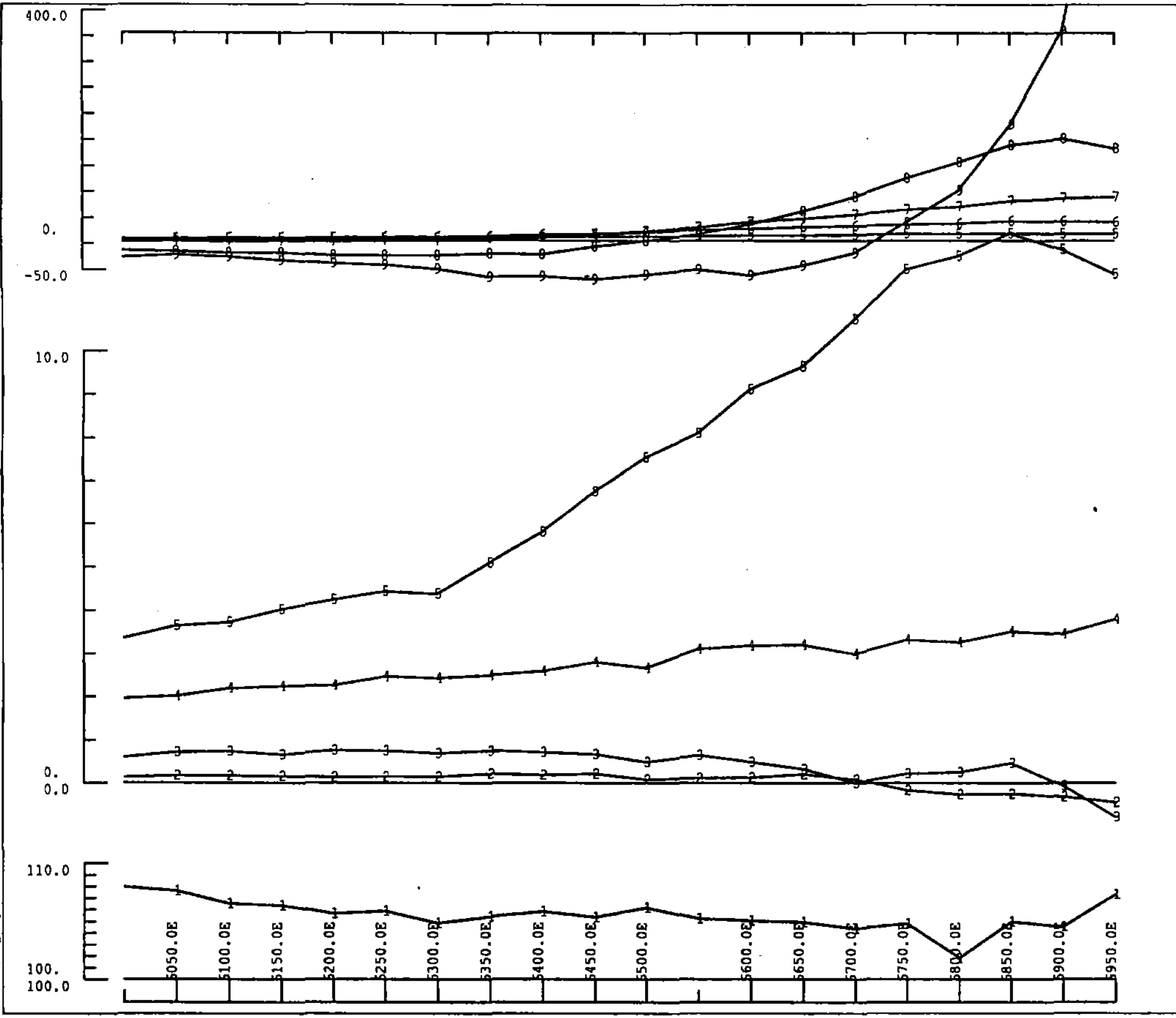
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433168

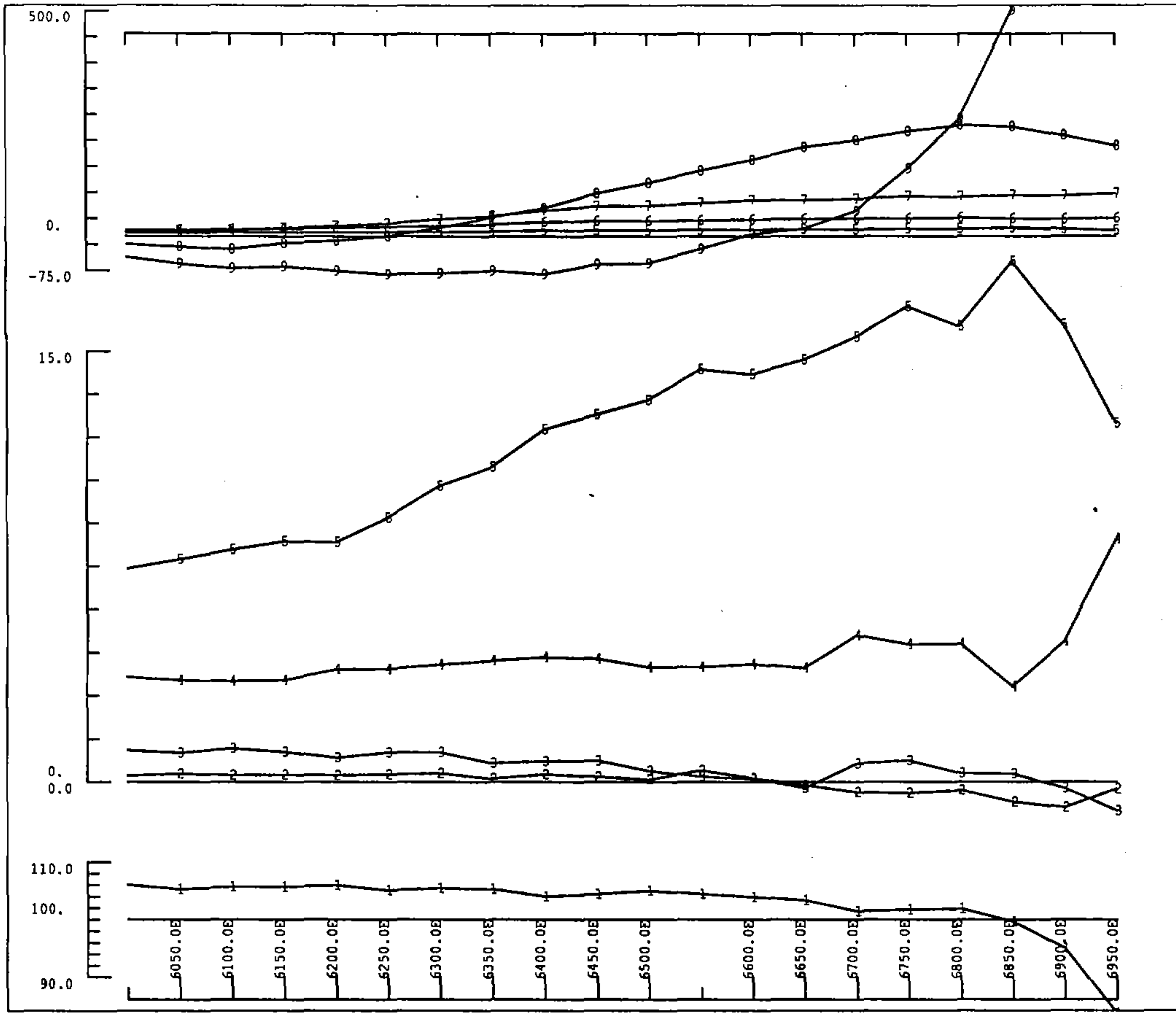


Line 6000N, Loop#2
Out-of-Loop Section
Lake Beatrice
POINT NORM 6650E
UTEM Survey Jan90
Hz Component
Freq. 26.23Hz

Aberfoyle Resources Ltd
March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433169



Line 6200N, Loop#2

Out-of-Loop Section

Lake Beatrice

POINT NORM 6450E

UTEM Survey Jan90

Hz Component

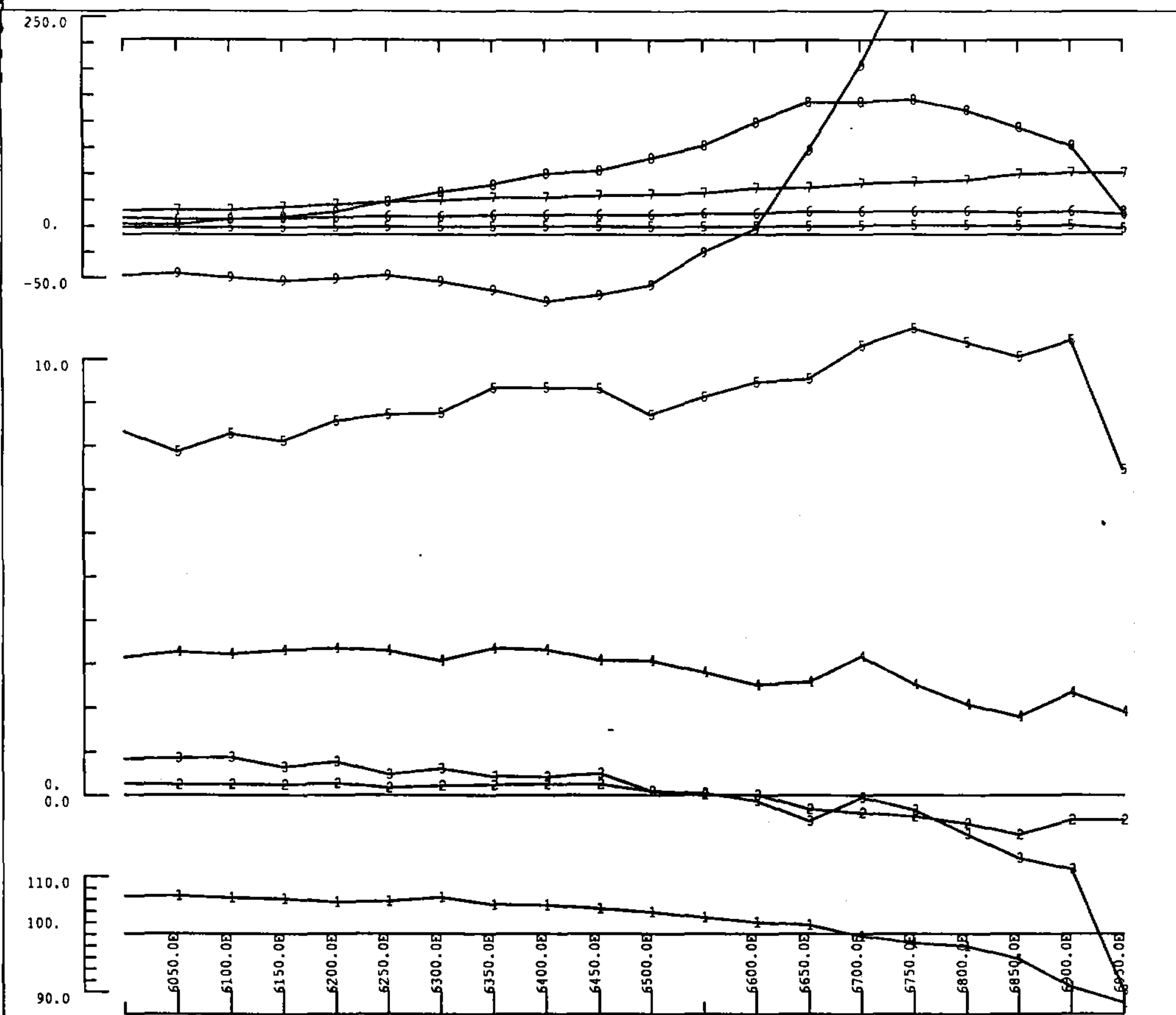
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90   Horiz

433170



Line 6400N, Loop#2

Out-of-Loop Section

Lake Beatrice

POINT NORM 6450E

UTEM Survey Jan90

Hz Component

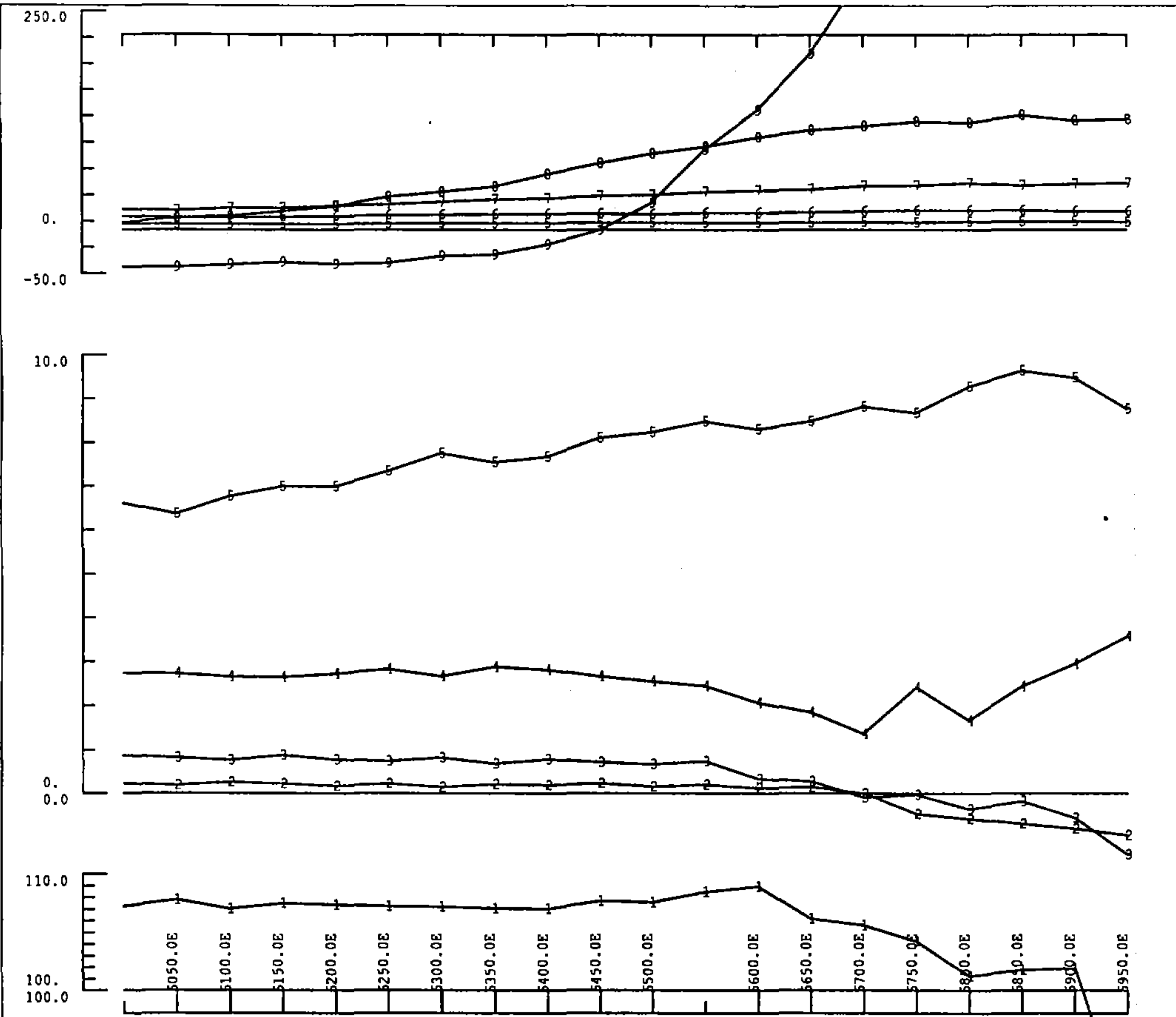
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433171



Line 6600N, Loop#2

Out-of-Loop Section

Lake Beatrice

POINT NORM 6450E

UTEM Survey Jan90

Hz Component

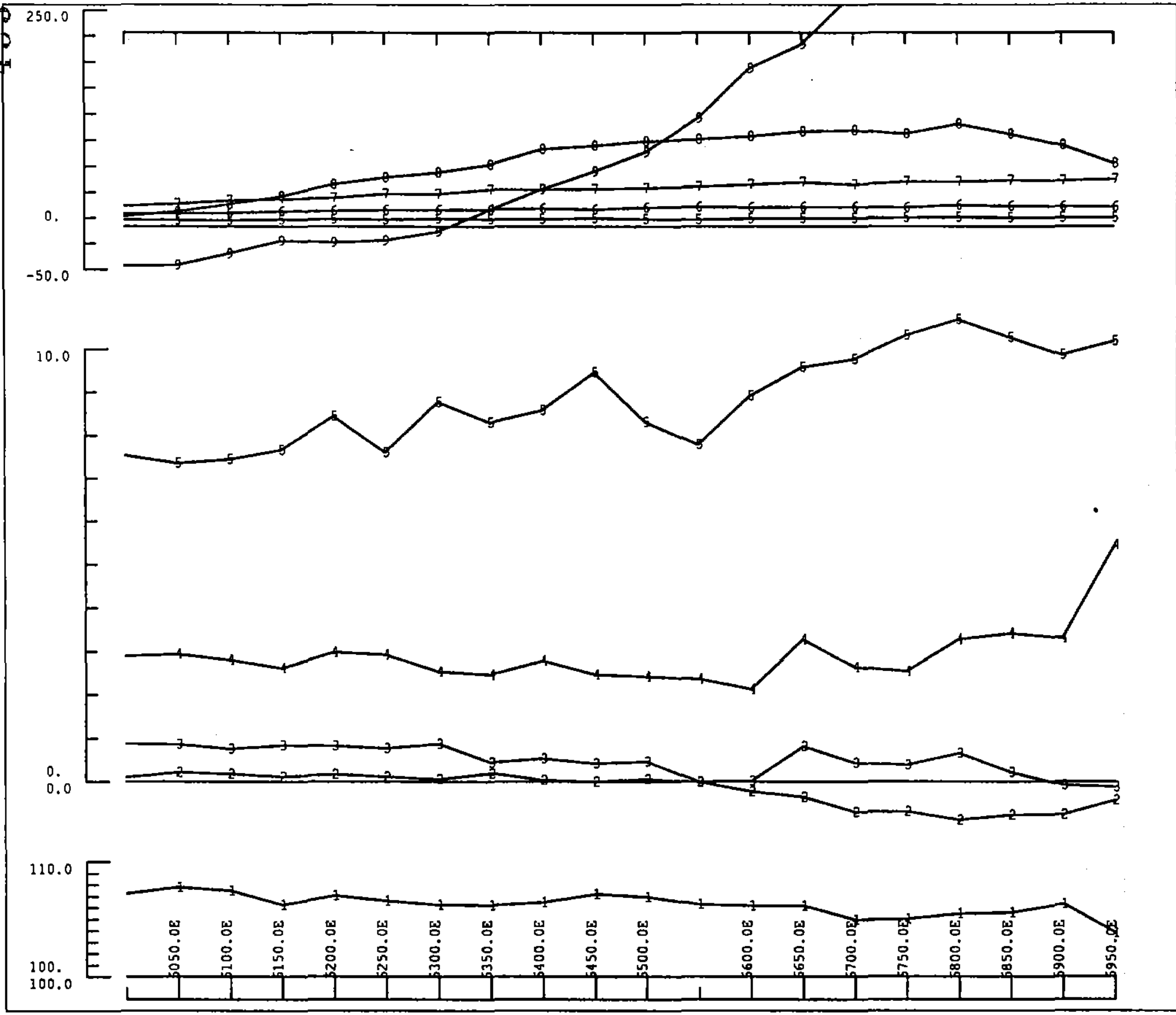
Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

Plot Date : 14/03/90 Horiz

433172



Line 6800N, Loop#2

Out-of-Loop Section

Lake Beatrice

POINT NORM 6400E

UTEM Survey Jan90

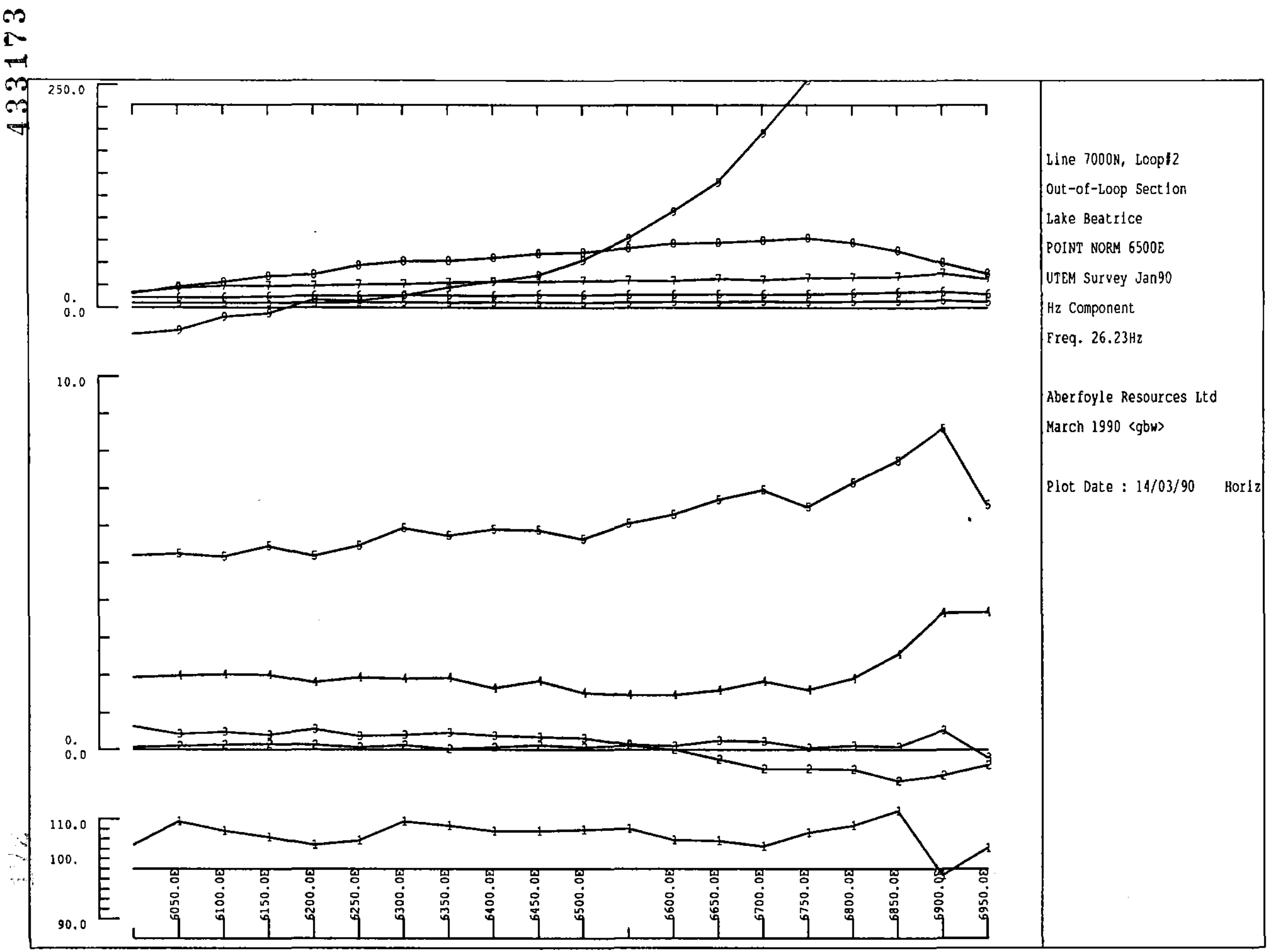
Hz Component

Freq. 26.23Hz

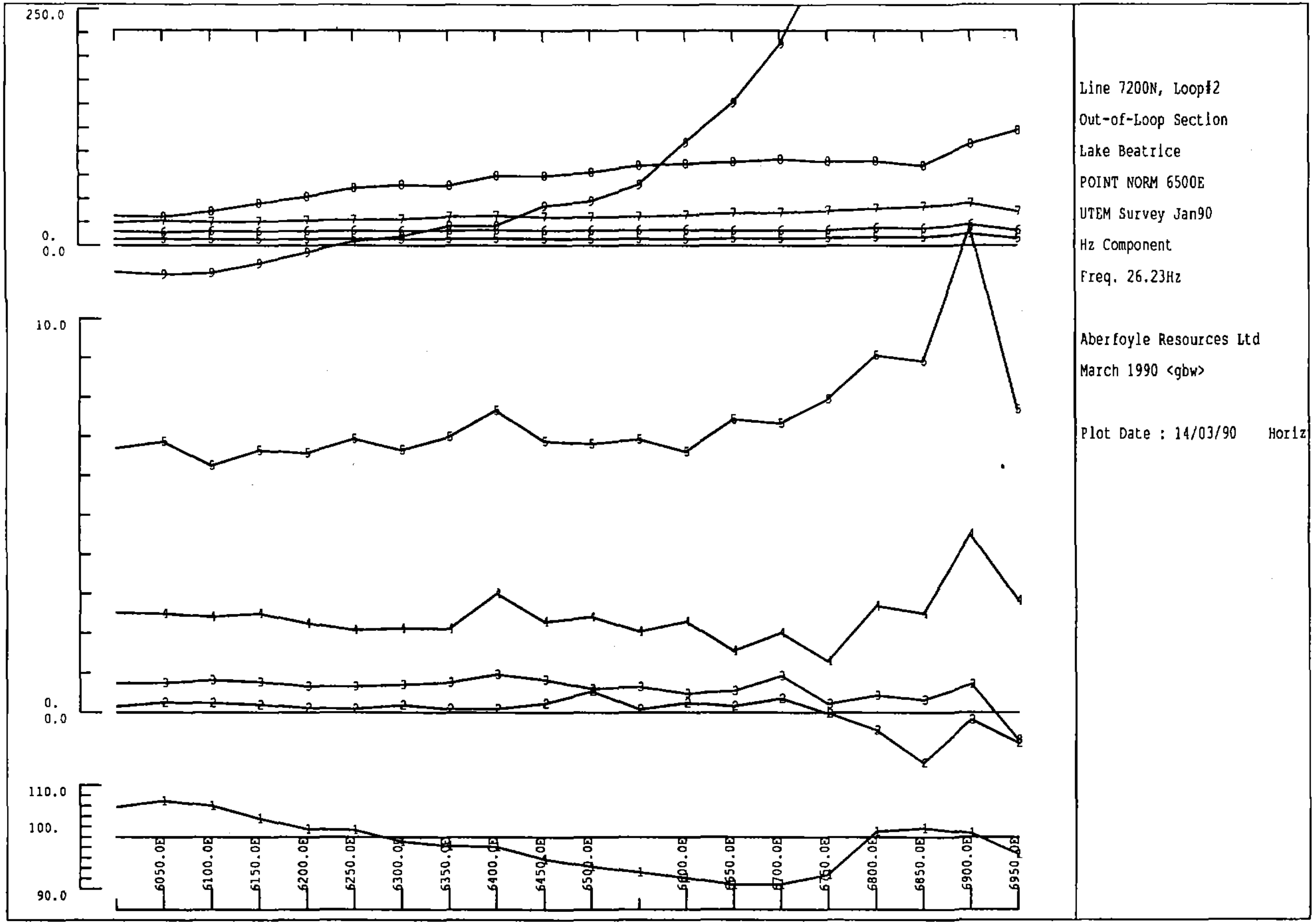
Aberfoyle Resources Ltd

March 1990 <gbw>

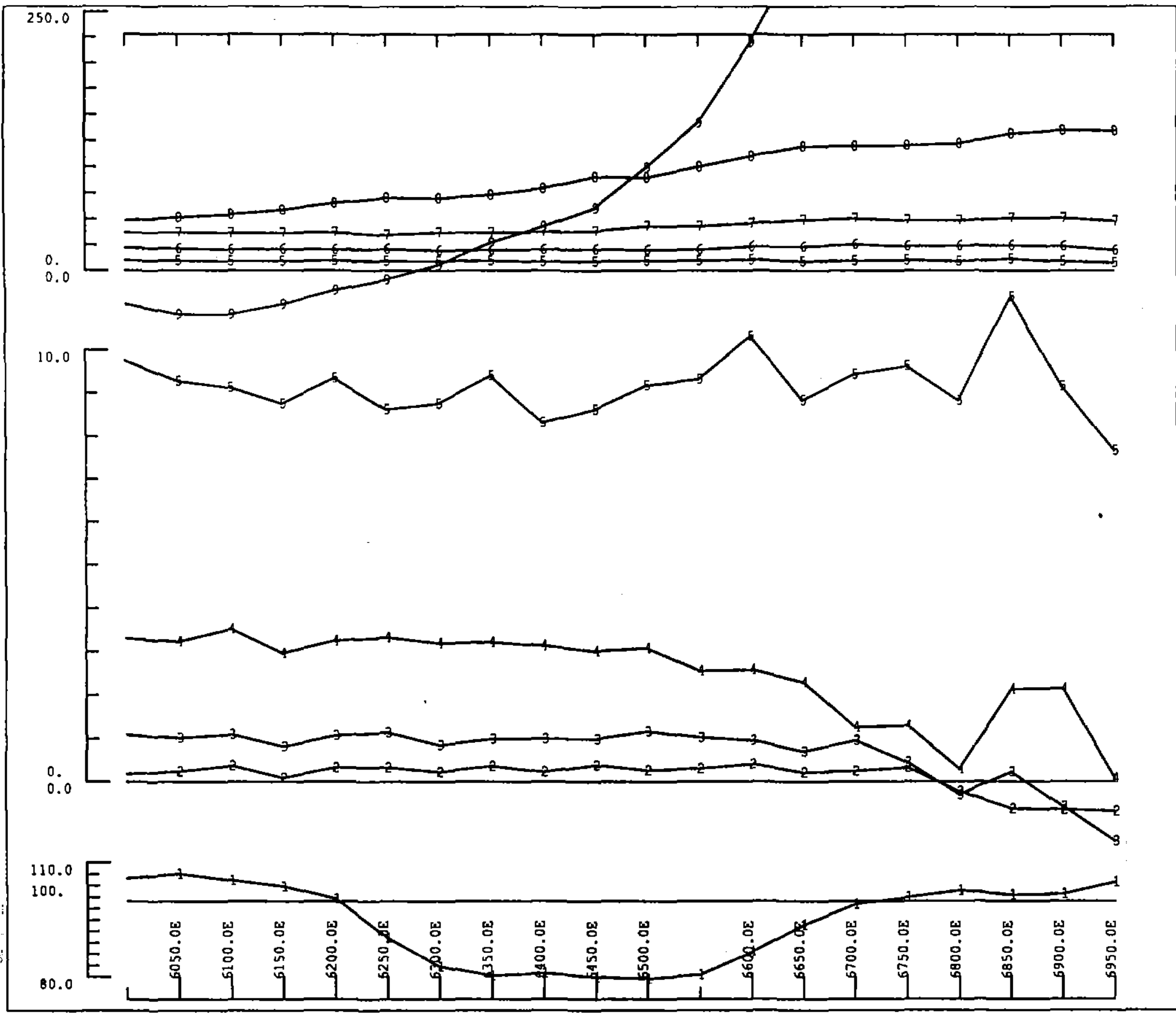
Plot Date : 14/03/90 Horiz


433173
250.0
0.
0.0
10.0
0.
0.0
110.0
100.
90.0
6050.0E
6100.0E
6150.0E
6200.0E
6250.0E
6300.0E
6350.0E
6400.0E
6450.0E
6500.0E
6600.0E
6650.0E
6700.0E
6750.0E
6800.0E
6850.0E
6900.0E
6950.0E
Line 7000N, Loop#2
Out-of-Loop Section
Lake Beatrice
POINT NORM 6500E
UTEM Survey Jan90
Hz Component
Freq. 26.23Hz
Aberfoyle Resources Ltd
March 1990 <gbw>
Plot Date : 14/03/90 Horiz

433174


250.0
0.
0.0
10.0
0.
0.0
110.0
100.
90.0
6050.0E
6100.0E
6150.0E
6200.0E
6250.0E
6300.0E
6350.0E
6400.0E
6450.0E
6500.0E
6600.0E
6650.0E
6700.0E
6750.0E
6800.0E
6850.0E
6900.0E
6950.0E
Line 7200N, Loop#2
Out-of-Loop Section
Lake Beatrice
POINT NORM 6500E
UTEM Survey Jan90
Hz Component
Freq. 26.23Hz
Aberfoyle Resources Ltd
March 1990 <gbw>
Plot Date : 14/03/90 Horiz

433175



Line 7400N, Loop#2

Out-of-Loop Section

Lake Beatrice

POINT NORM 6500E

UTEM Survey Jan90

Hz Component

Freq. 26.23Hz

Aberfoyle Resources Ltd

March 1990 <gbw>

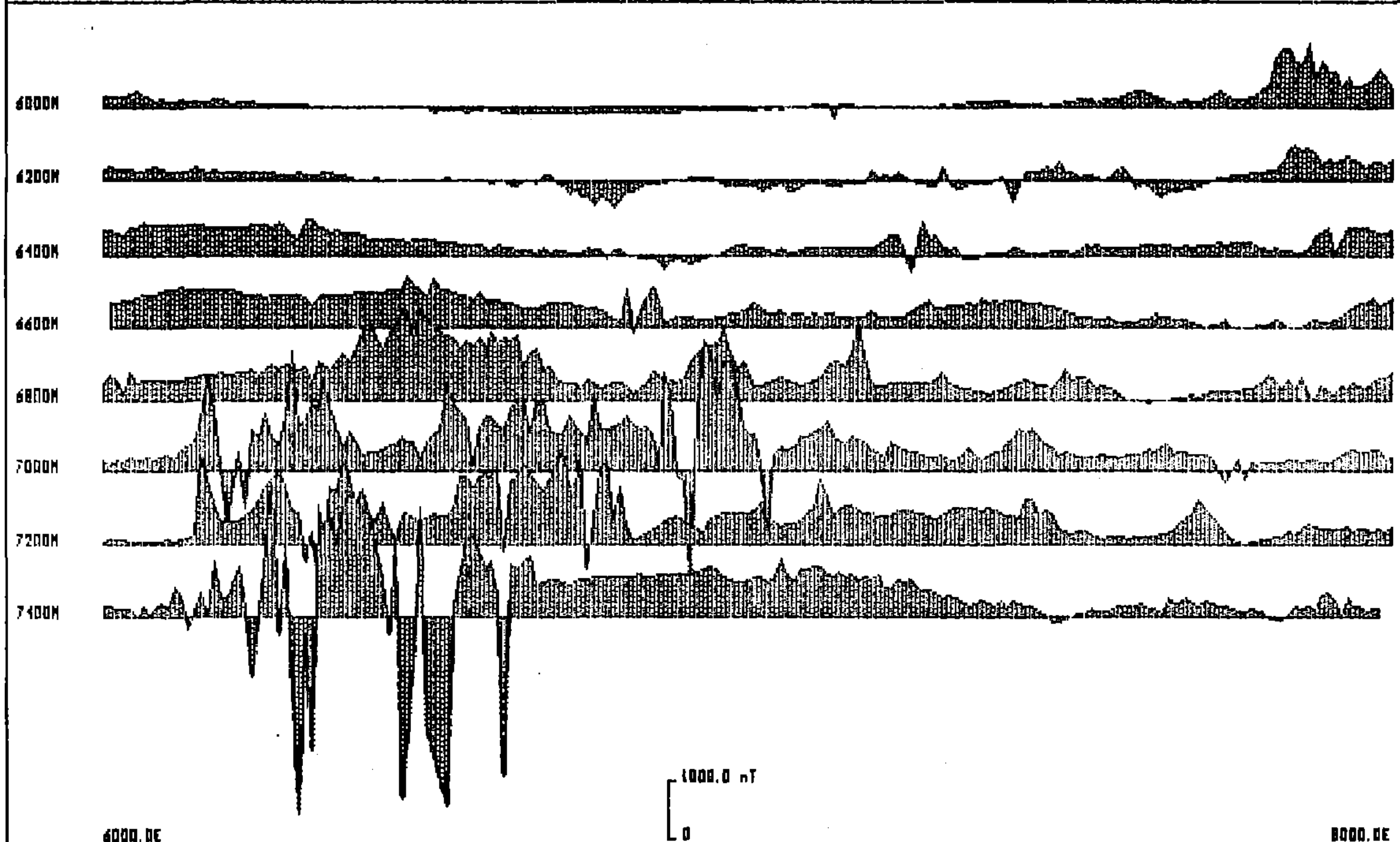
Plot Date : 14/03/90 Horiz

APPENDIX VIII

Client : Aberfoyle
Prospect : Beatrice

Surveyed by : B Stedman
Survey Date : 30/01/90

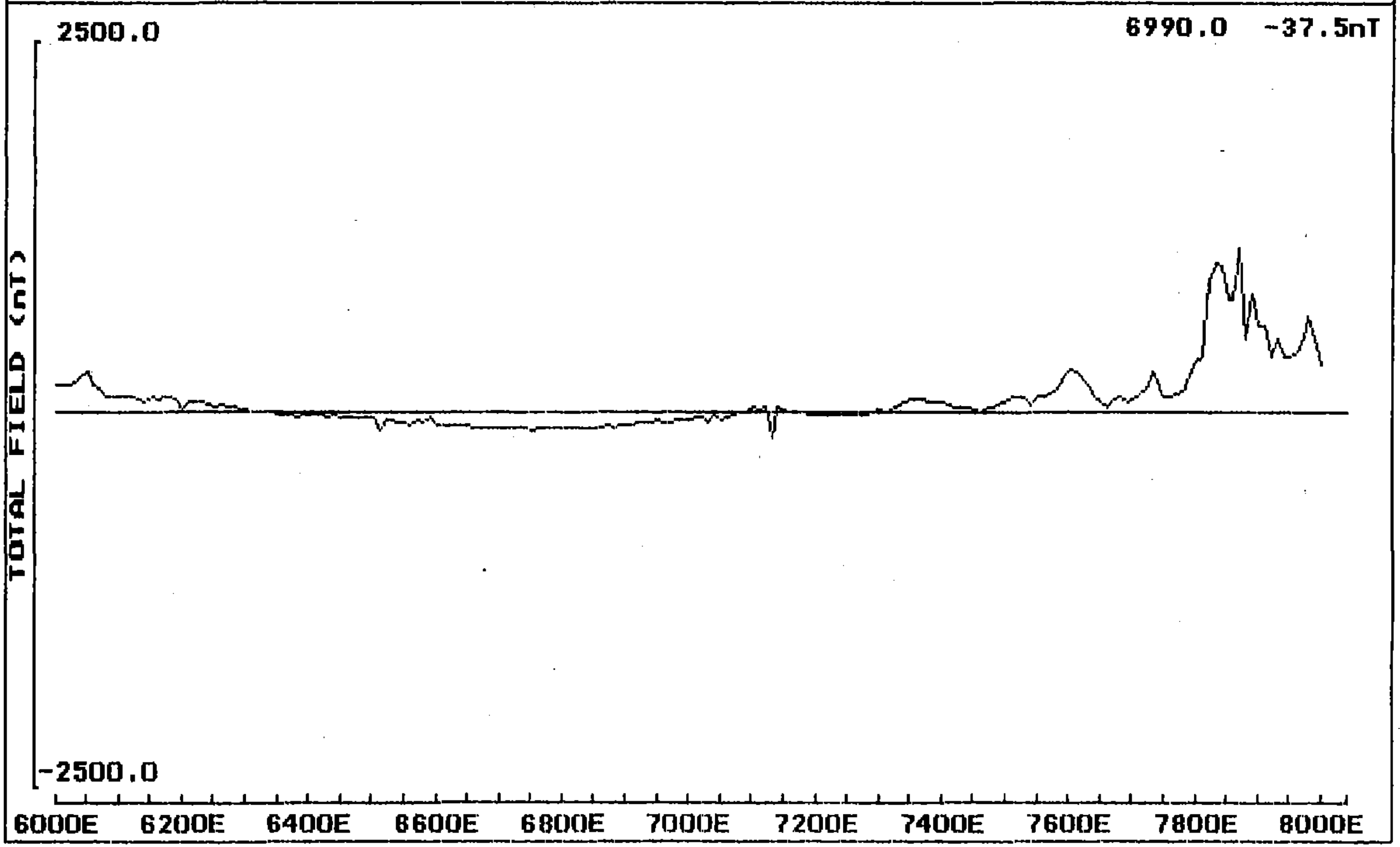
STACKED



5 cm

LAKE / [illegible] / BEATRICE GRID
GEOPHYSICS
43177

Client : Aberfoyle	Surveyed by : B Stedman	6000N
Prospect : Beatrice	Survey Date : 30/01/90	

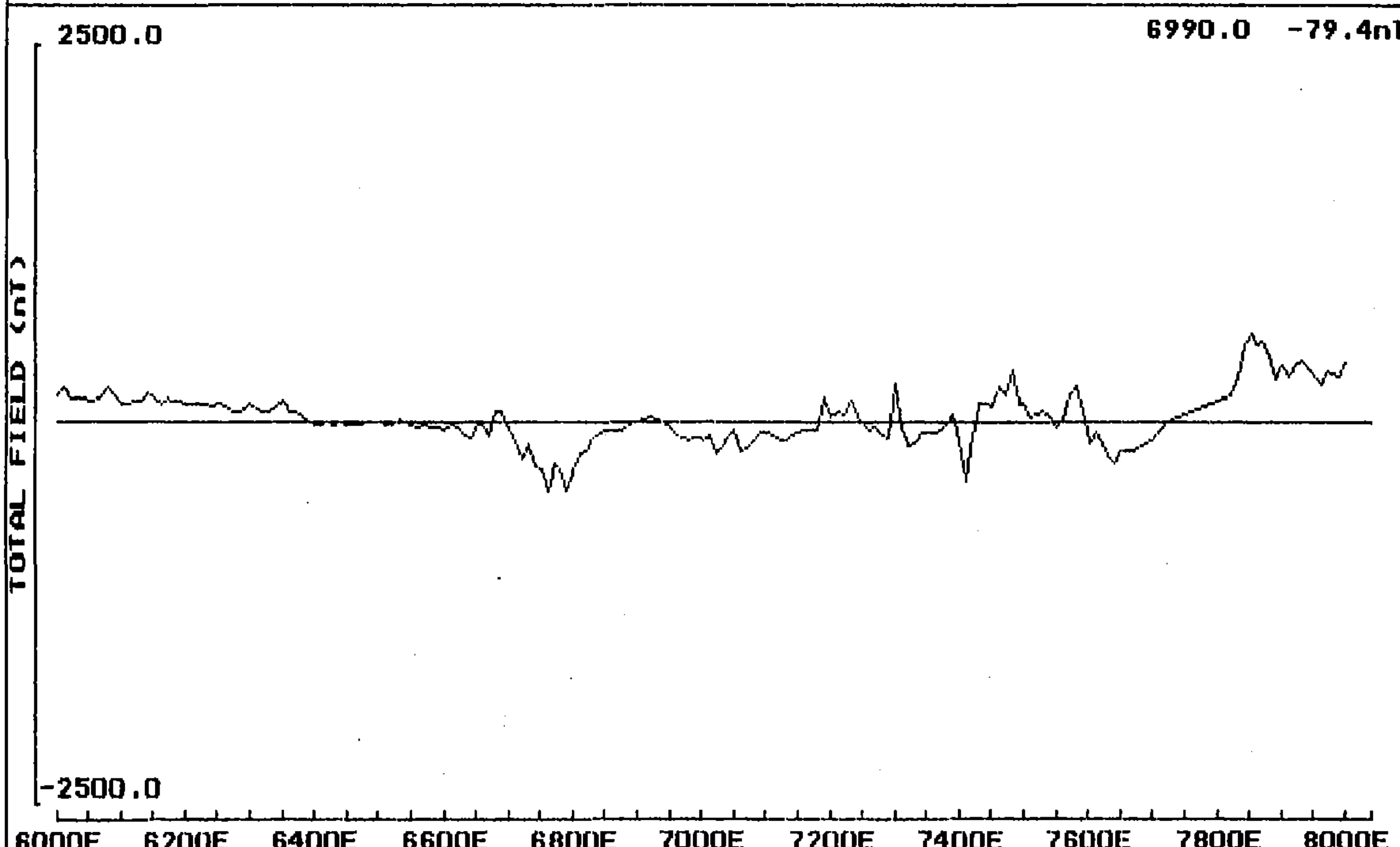


433178

Client : Aberfoyle
Prospect : Beatrice

Surveyed by : B Stedman
Survey Date : 30/01/90

6200N

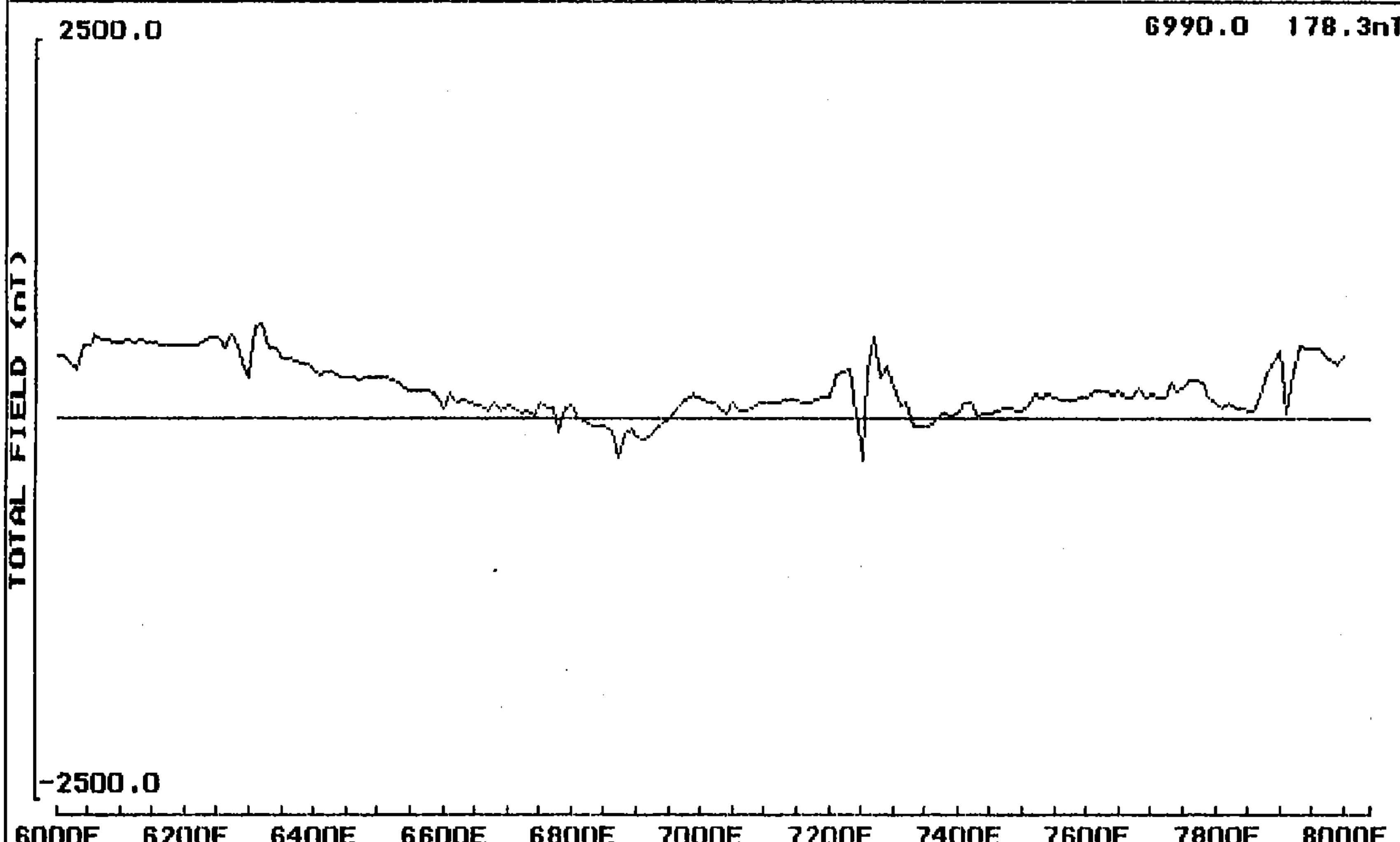


433179

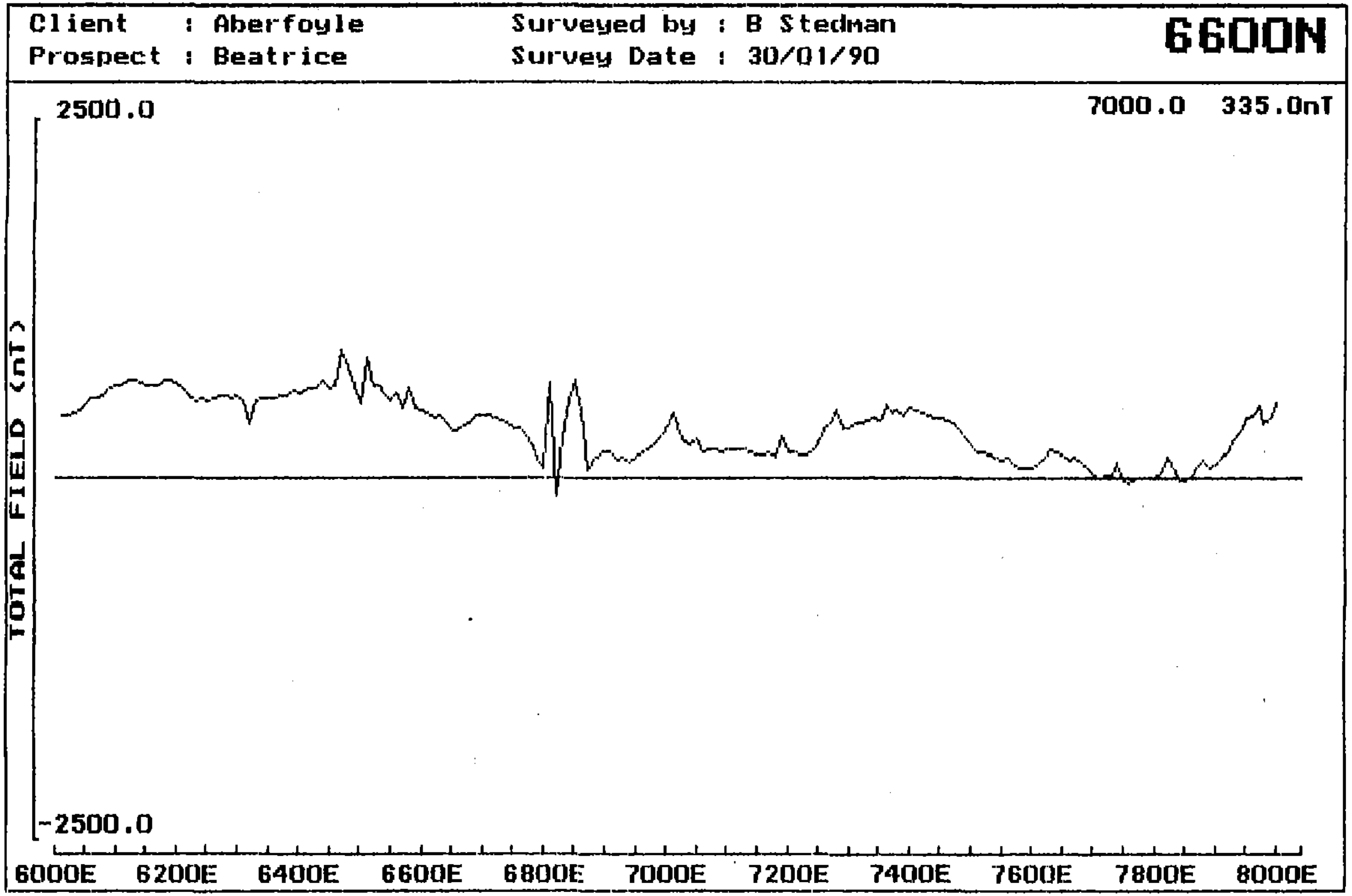
Client : Aberfoyle | Surveyed by : B Stedman

Prospect : Beatrice | Survey Date : 30/01/90

6400N



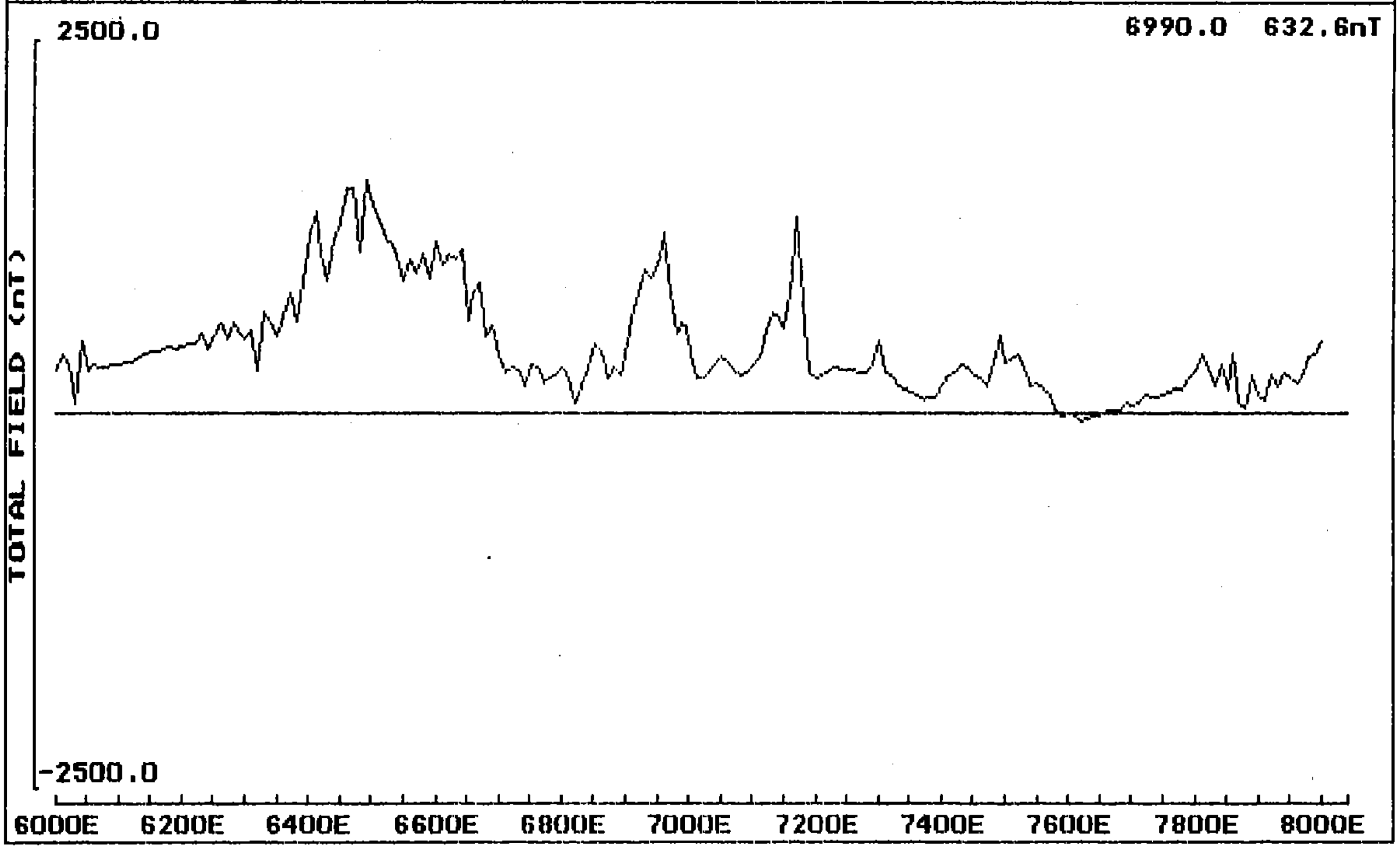
433180


Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90
6600N
2500.0
7000.0 335.0nT
TOTAL FIELD (nT)
-2500.0
6000E
6200E
6400E
6600E
6800E
7000E
7200E
7400E
7600E
7800E
8000E

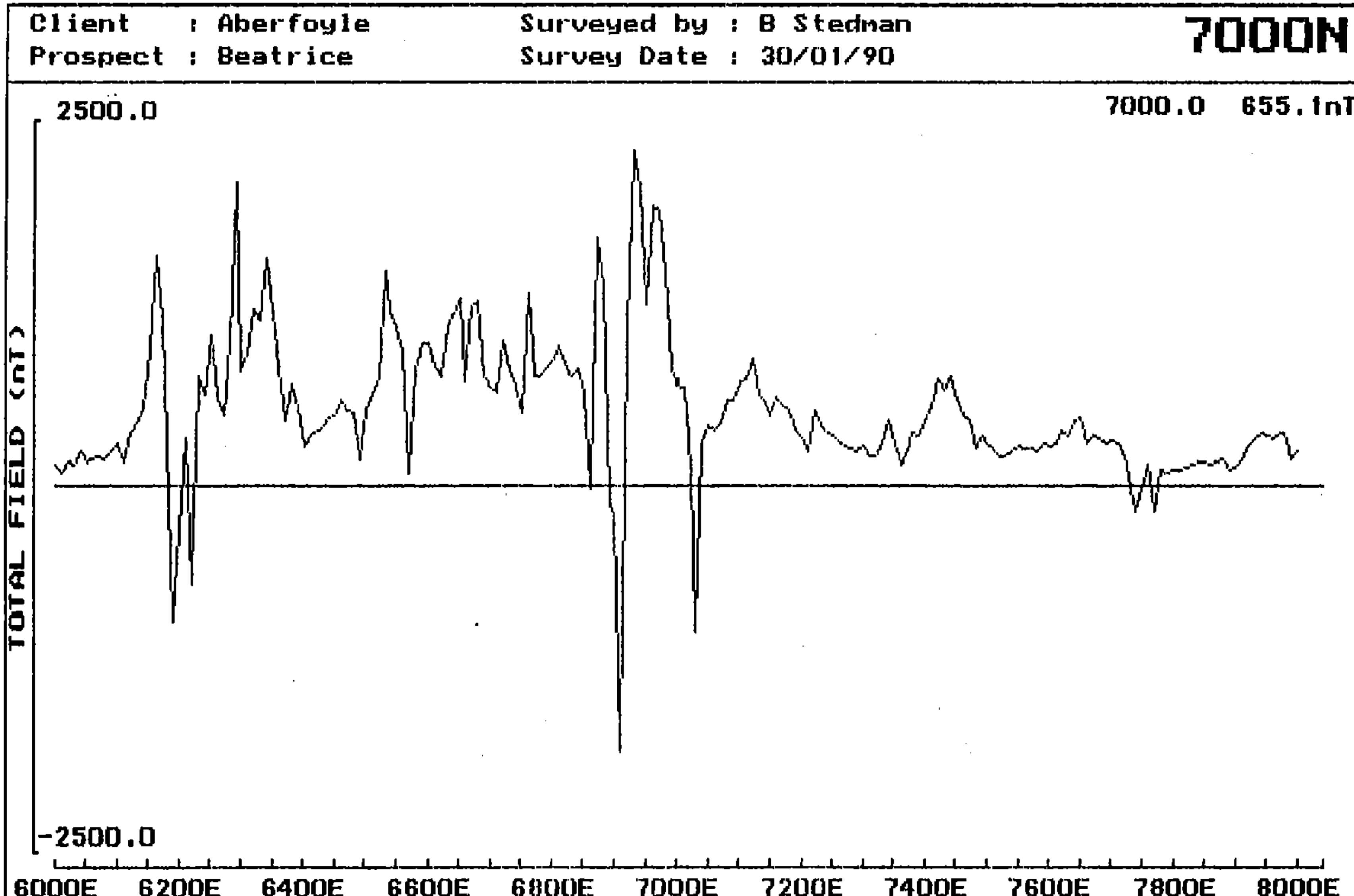
433181

Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90

6800N



433182

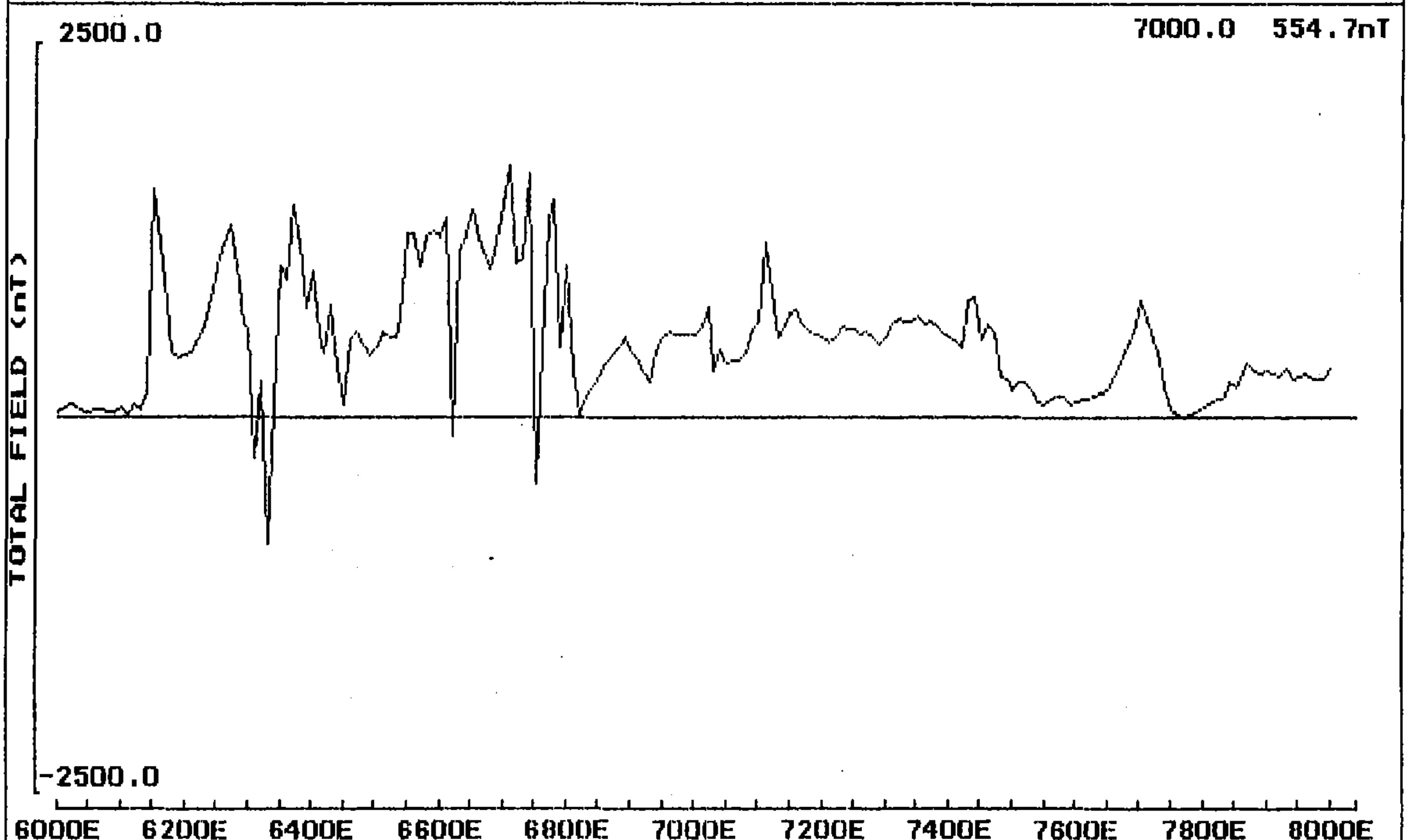

Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90
7000N
2500.0
7000.0 655.1nT
TOTAL FIELD (nT)
-2500.0
6000E
6200E
6400E
6600E
6800E
7000E
7200E
7400E
7600E
7800E
8000E

433183

Client : Aberfoyle
Prospect : Beatrice

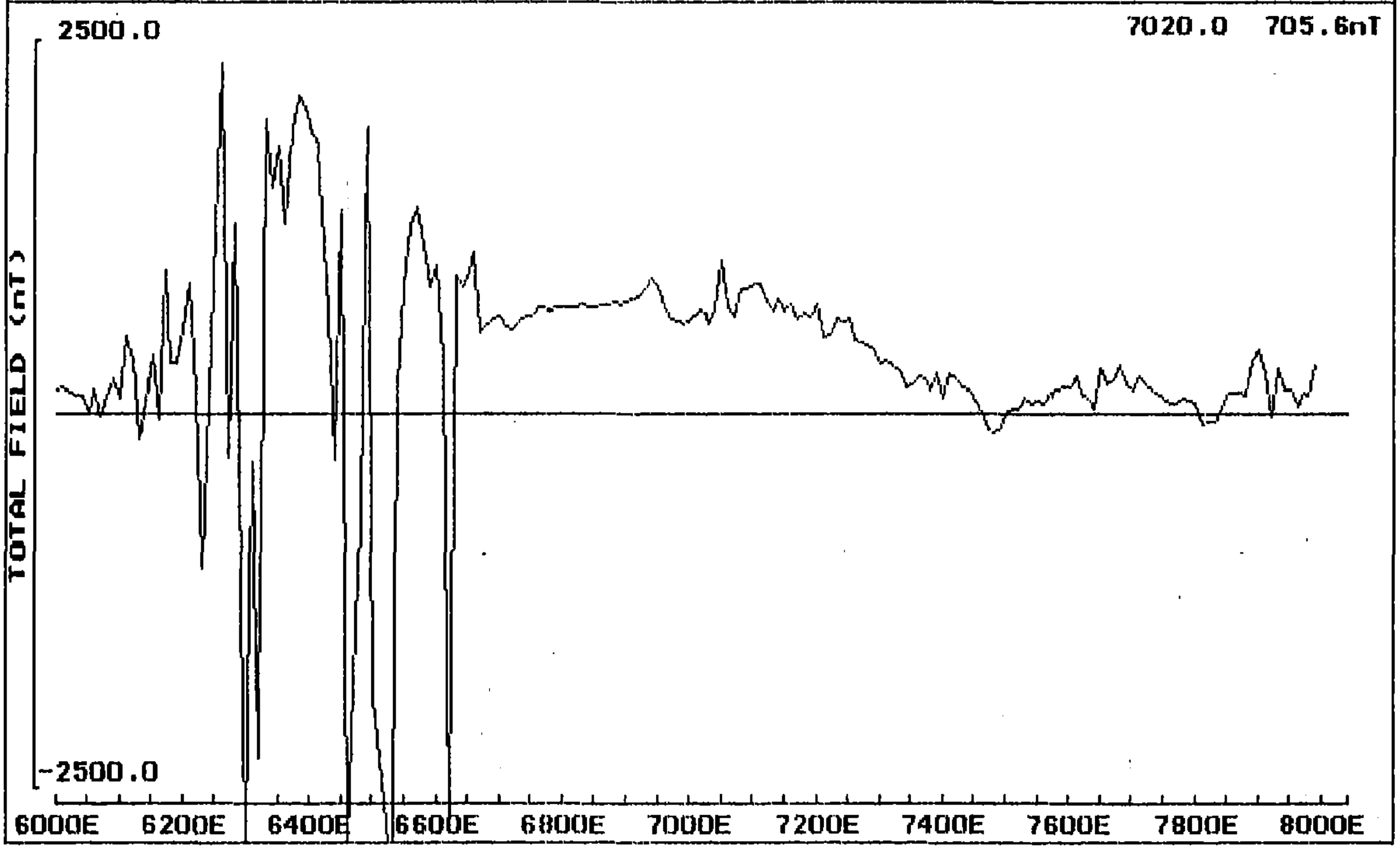
Surveyed by : B Stedman
Survey Date : 30/01/90

7200N

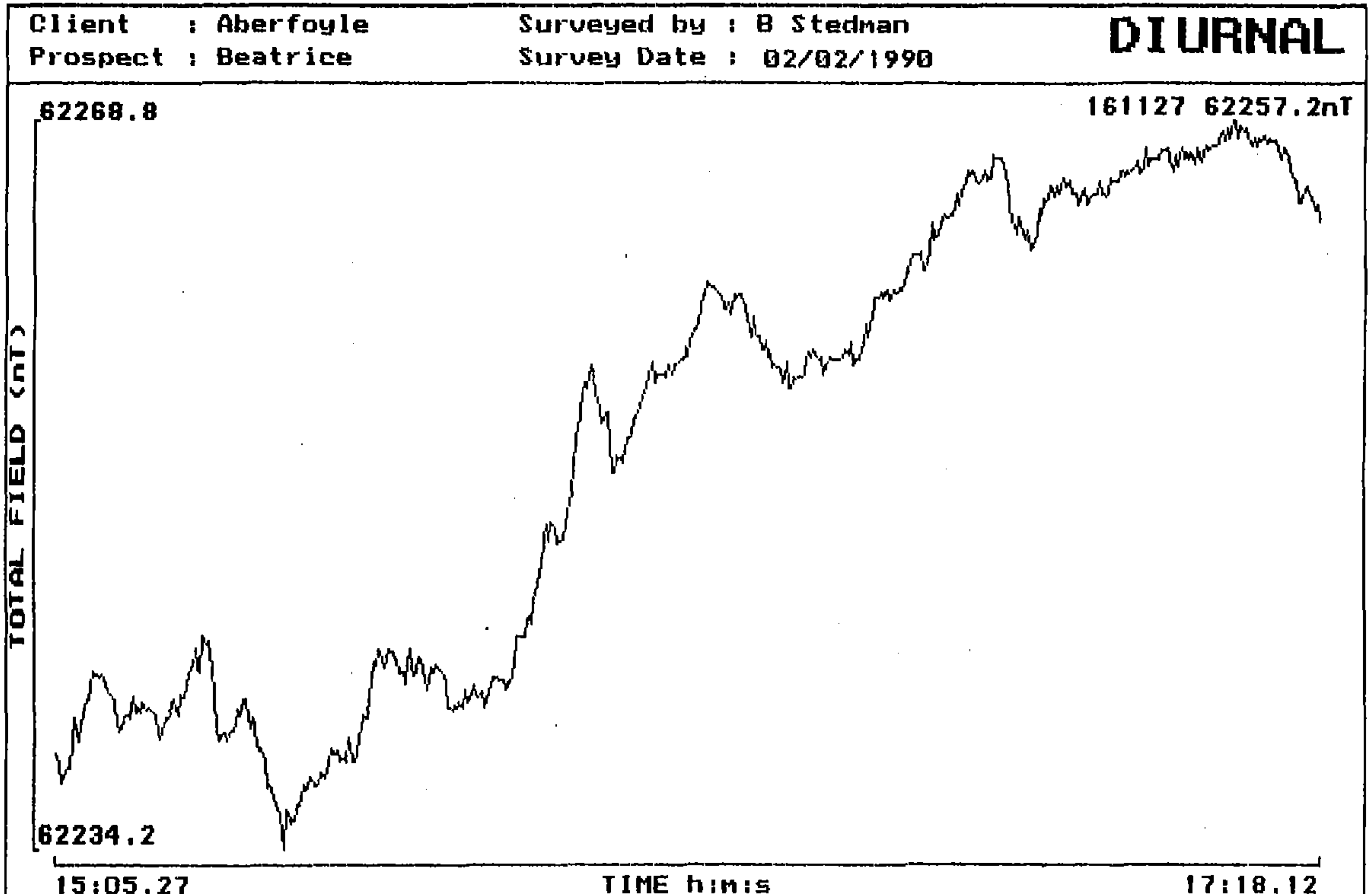


433184

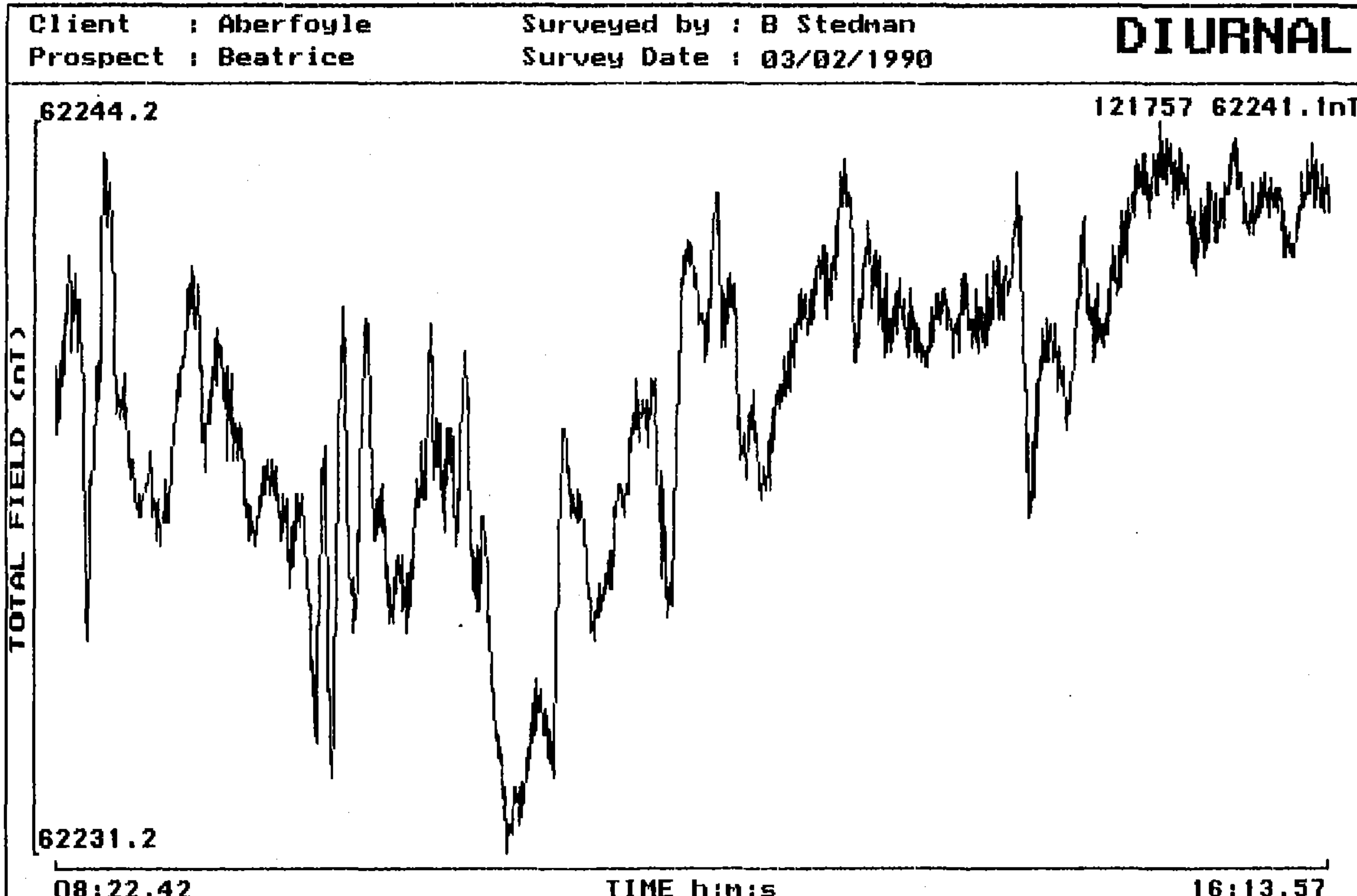
Client : Aberfoyle	Surveyed by : B Stedman		**7400N**
Prospect : Beatrice	Survey Date : 30/01/90		



433185

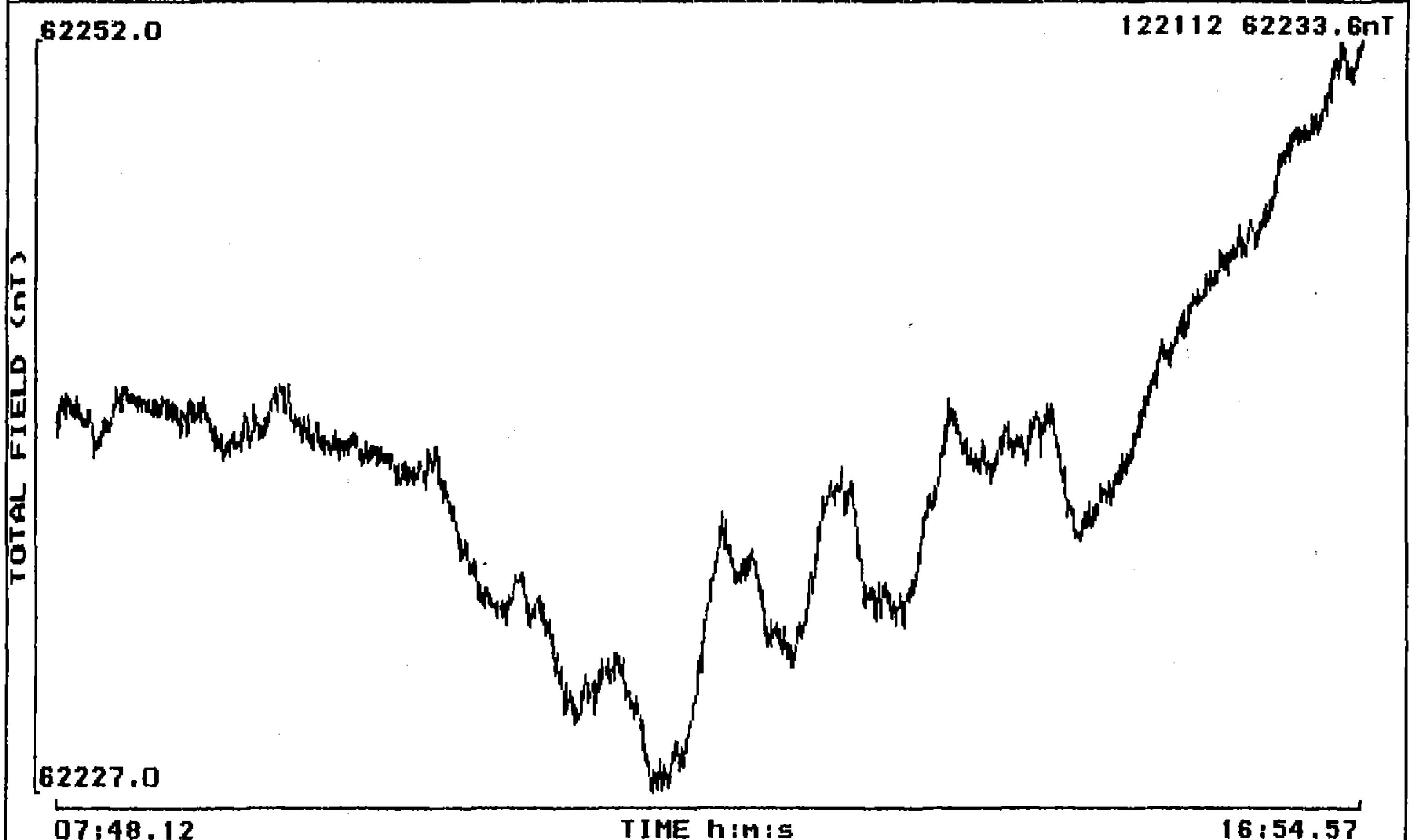

Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 02/02/1990
DIURNAL
62268.8
161127 62257.2nT
TOTAL FIELD (nT)
62234.2
15:05.27
TIME h:m:s
17:18.12

433186


Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 03/02/1990
DIURNAL
62244.2
121757 62241.1nT
TOTAL FIELD (nT)
62231.2
08:22.42
TIME h:m:s
16:13.57

433187

Client : Aberfoyle	Surveyed by : B Stedman	DIURNAL
Prospect : Beatrice	Survey Date : 4/2/1990	

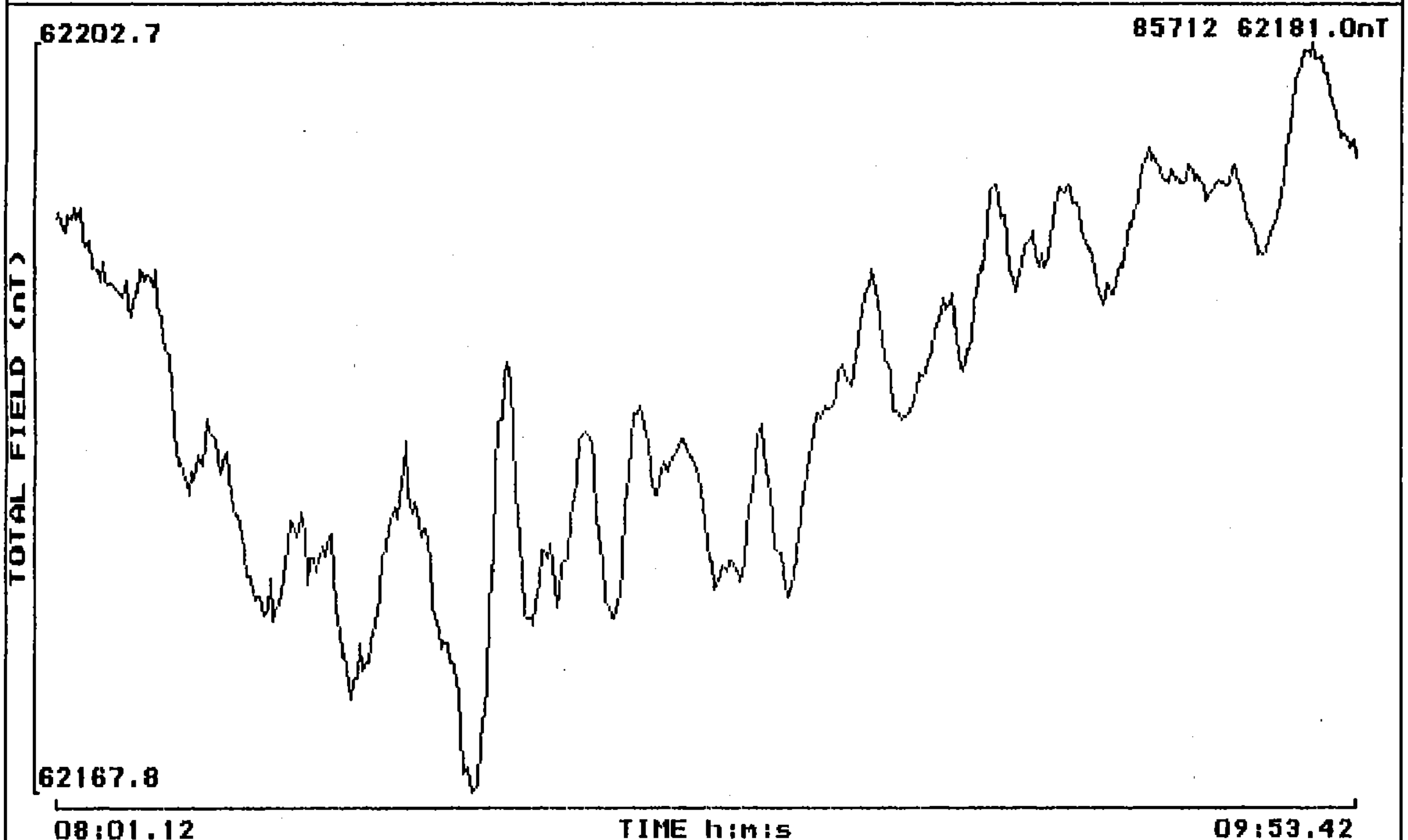


433188

Client : Aberfoyle
Prospect : Beatrice

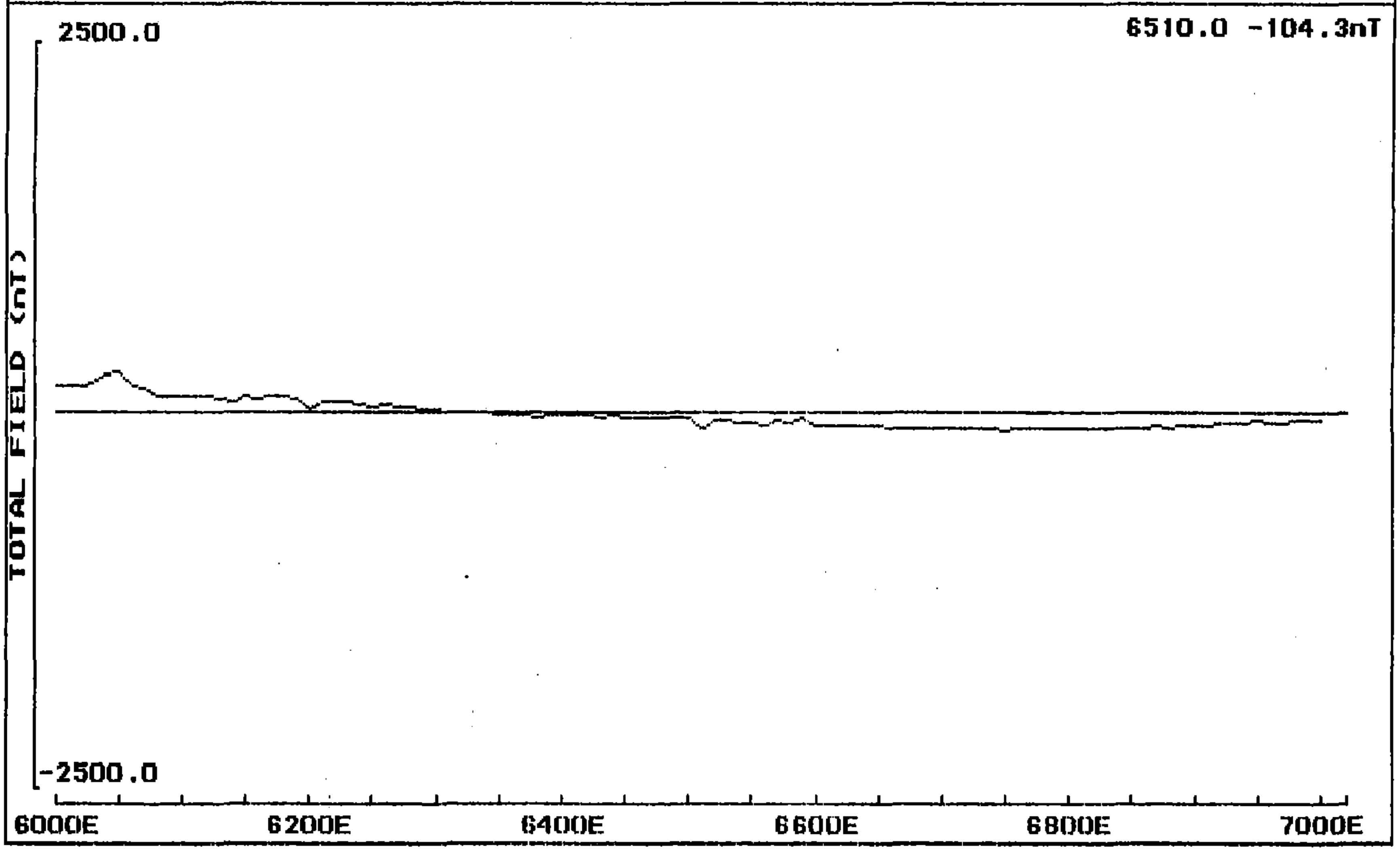
Surveyed by : B Stedman
Survey Date : 5/2/1990

DIURNAL



433189

Client : Aberfoyle | Surveyed by : B Stedman | **6000N**
Prospect : Beatrice | Survey Date : 30/01/90

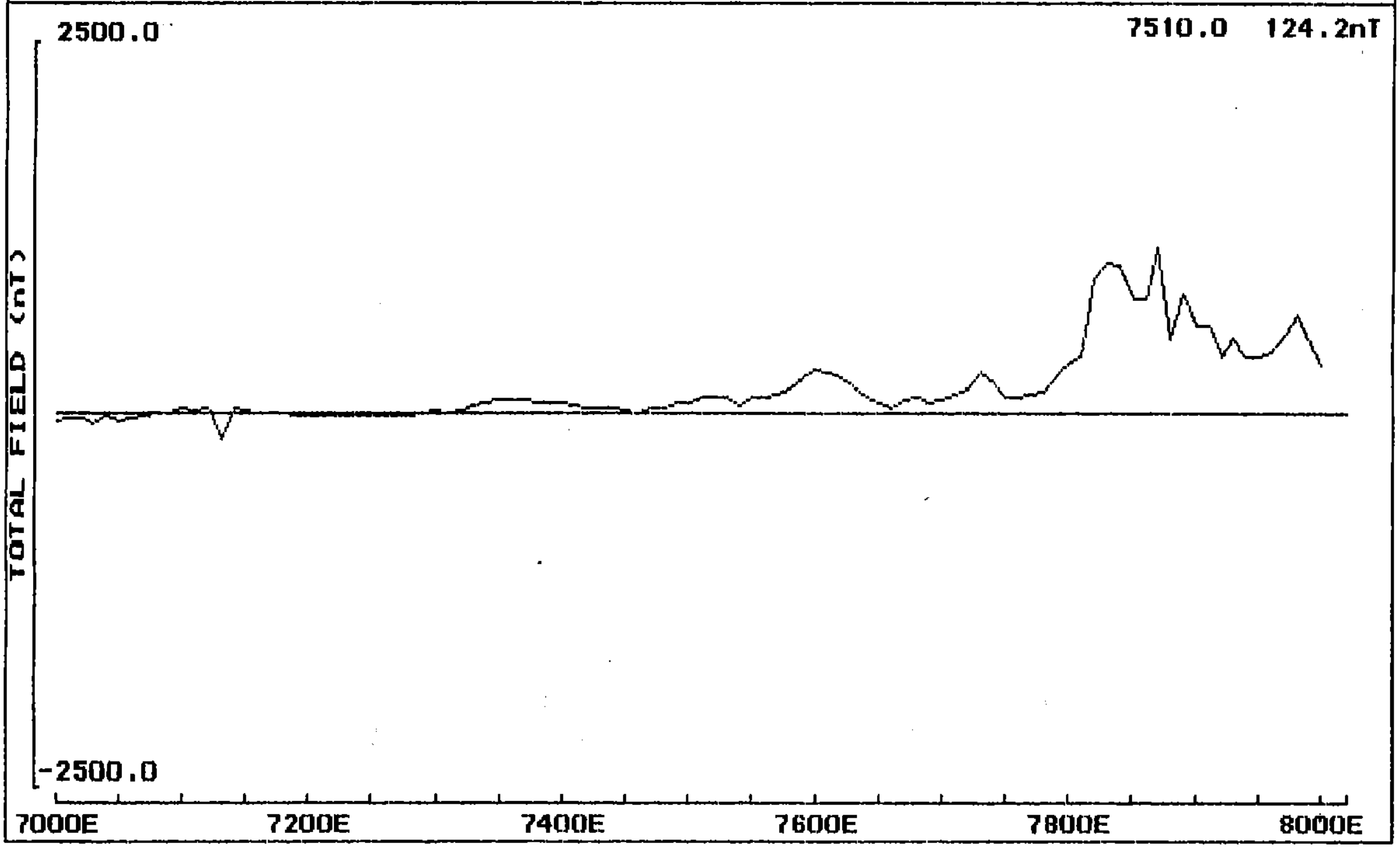


433190

Client : Aberfoyle
Prospect : Beatrice

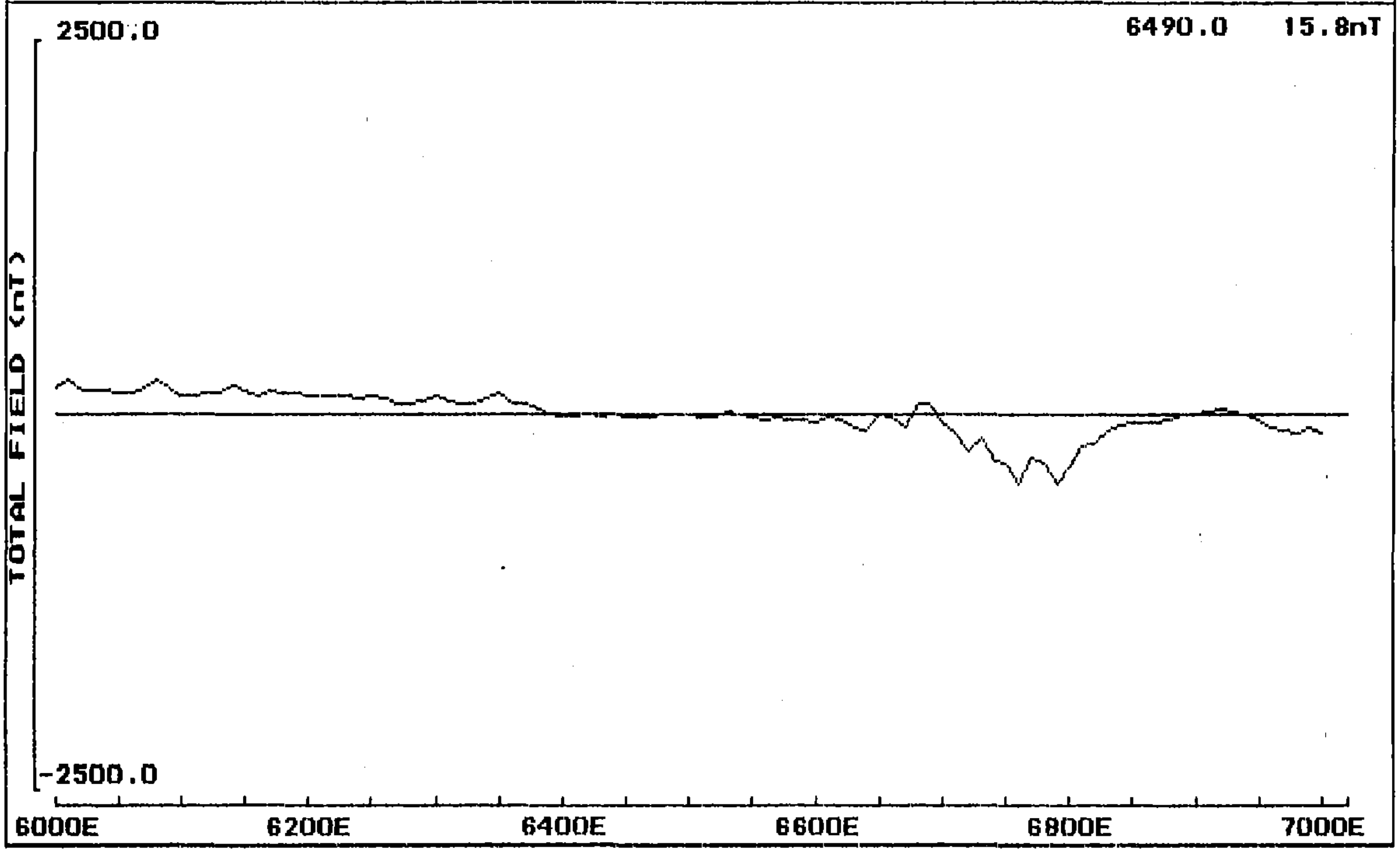
Surveyed by : B Stedman
Survey Date : 30/01/90

6000N



433191

Client : Aberfoyle	Surveyed by : B Stedman		6200N
Prospect : Beatrice	Survey Date : 30/01/90		

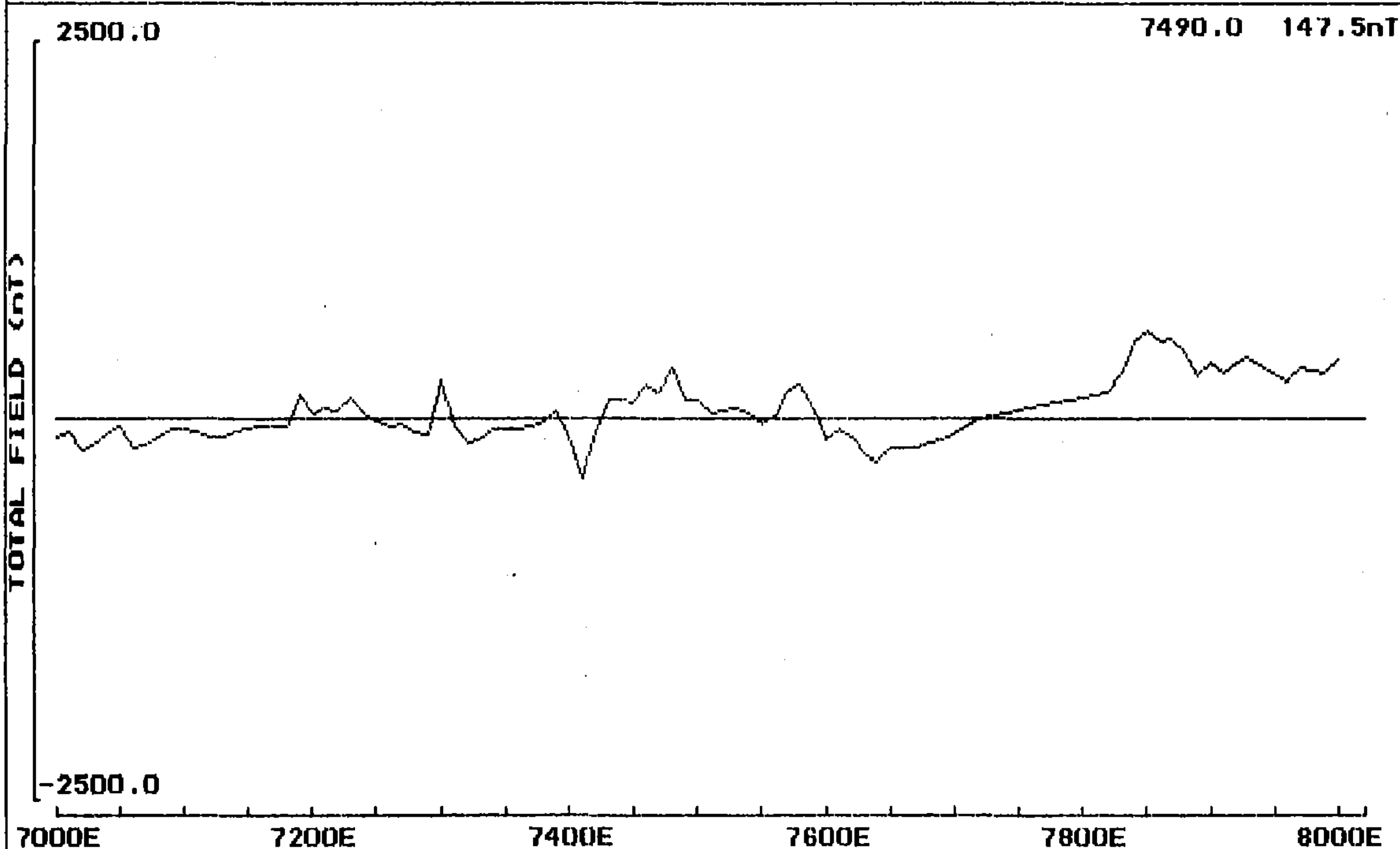


433192

Client : Aberfoyle
Prospect : Beatrice

Surveyed by : B Stedman
Survey Date : 30/01/90

6200N

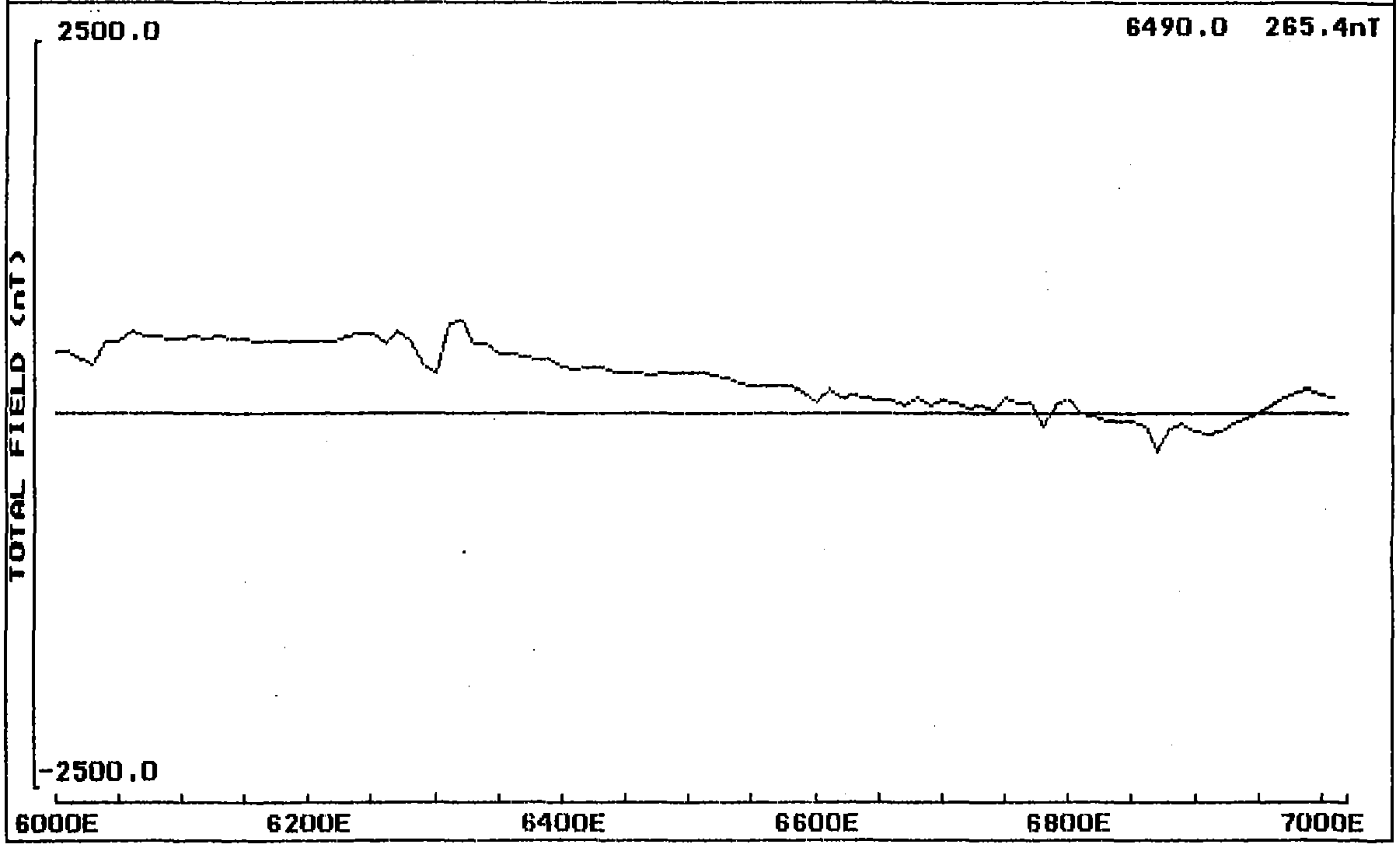


433193

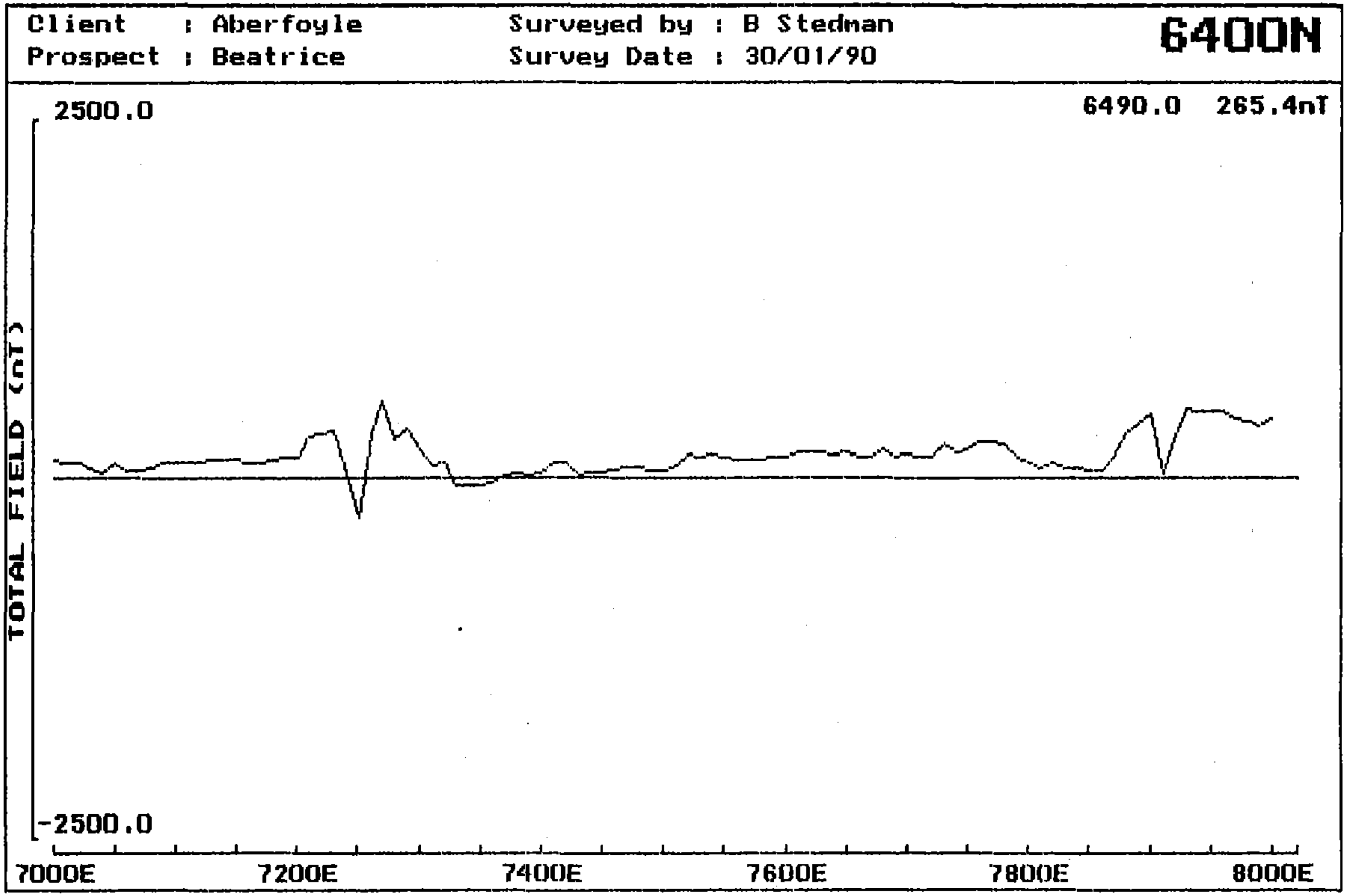
Client : Aberfoyle
Prospect : Beatrice

Surveyed by : B Stedman
Survey Date : 30/01/90

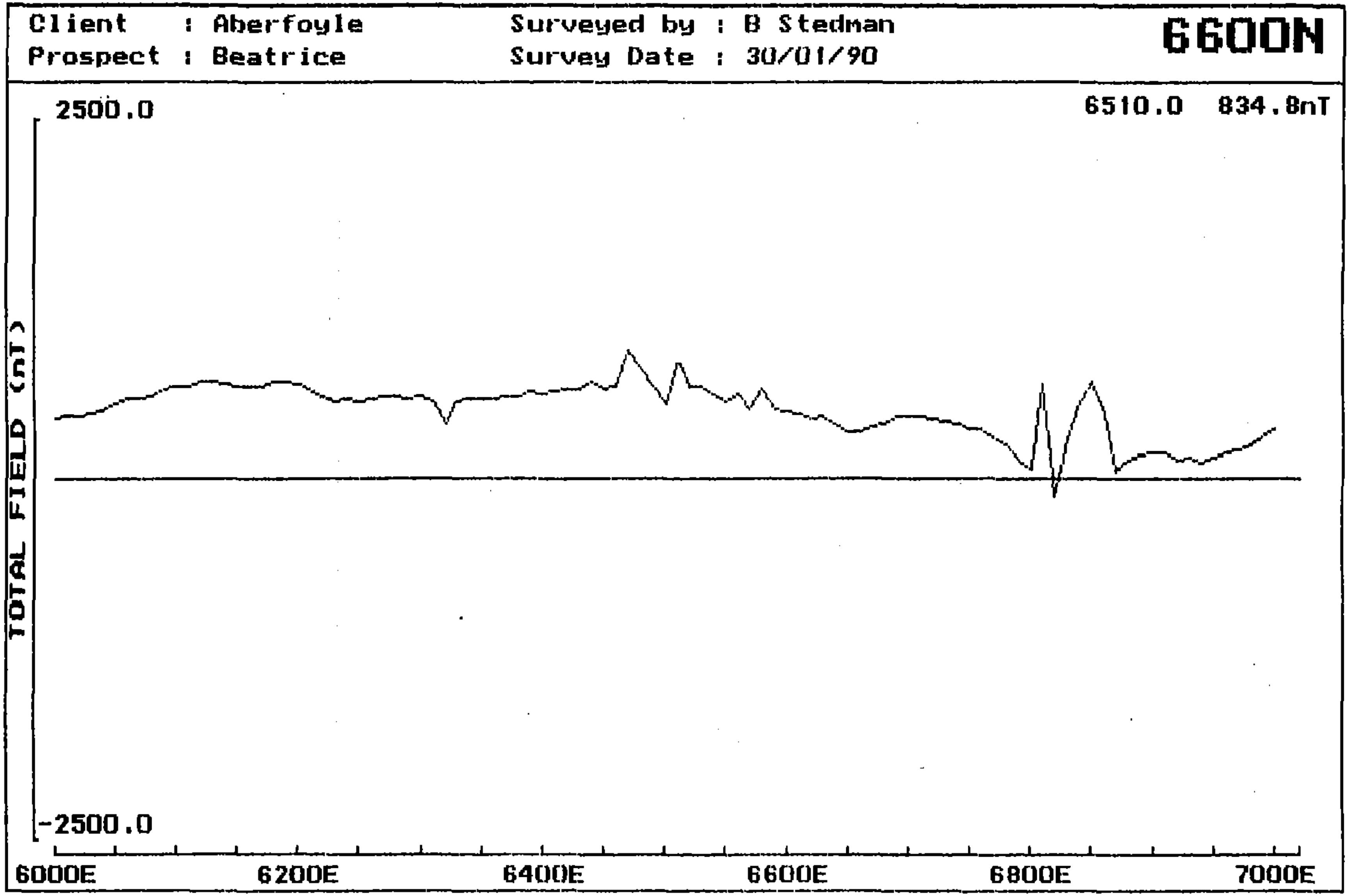
6400N



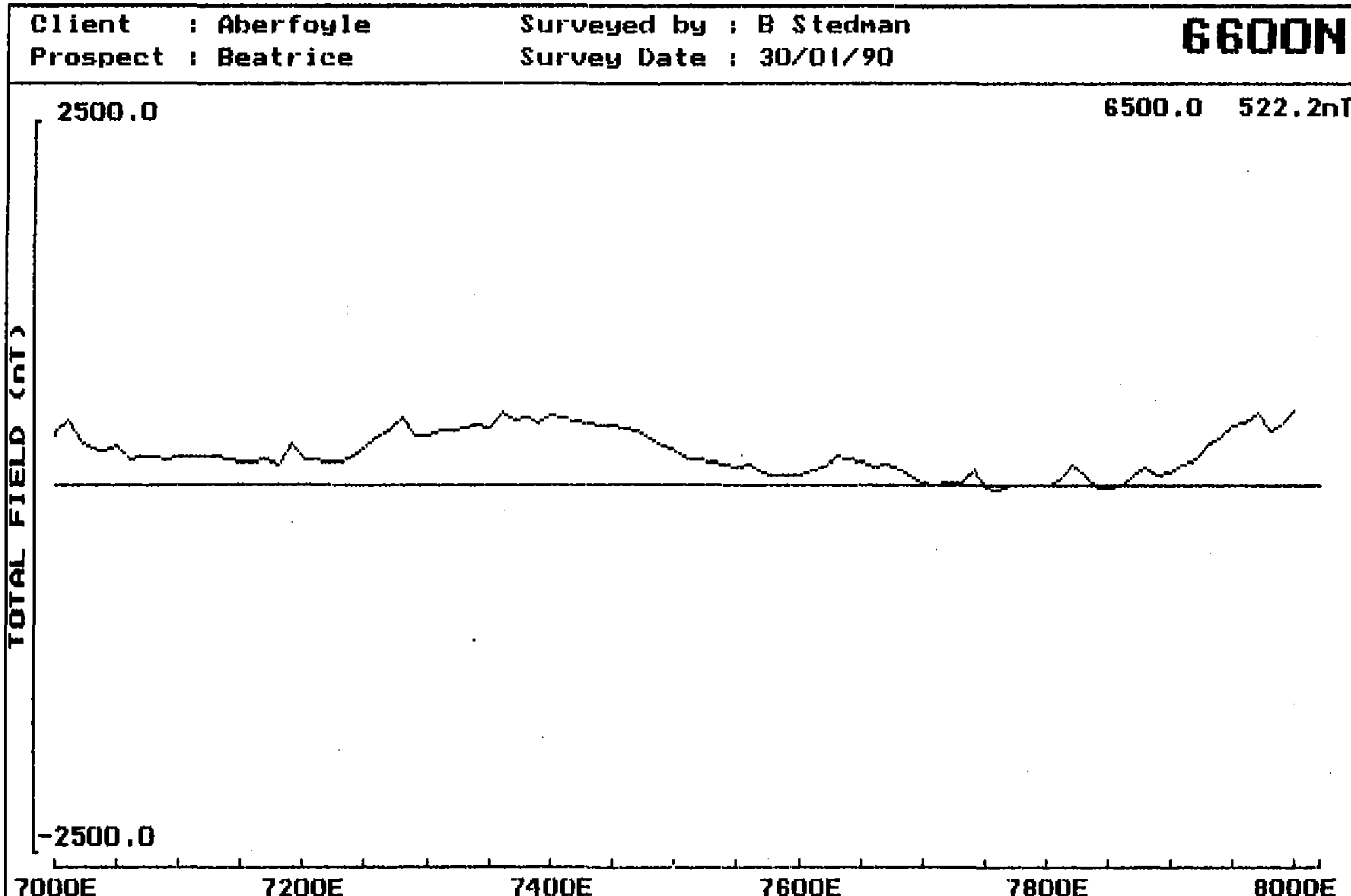
433194


Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90
6400N
6490.0 265.4nT
2500.0
-2500.0
TOTAL FIELD (nT)
7000E
7200E
7400E
7600E
7800E
8000E

433195


Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90
6600N
2500.0
6510.0 834.8nT
TOTAL FIELD (nT)
-2500.0
6000E
6200E
6400E
6600E
6800E
7000E

433196

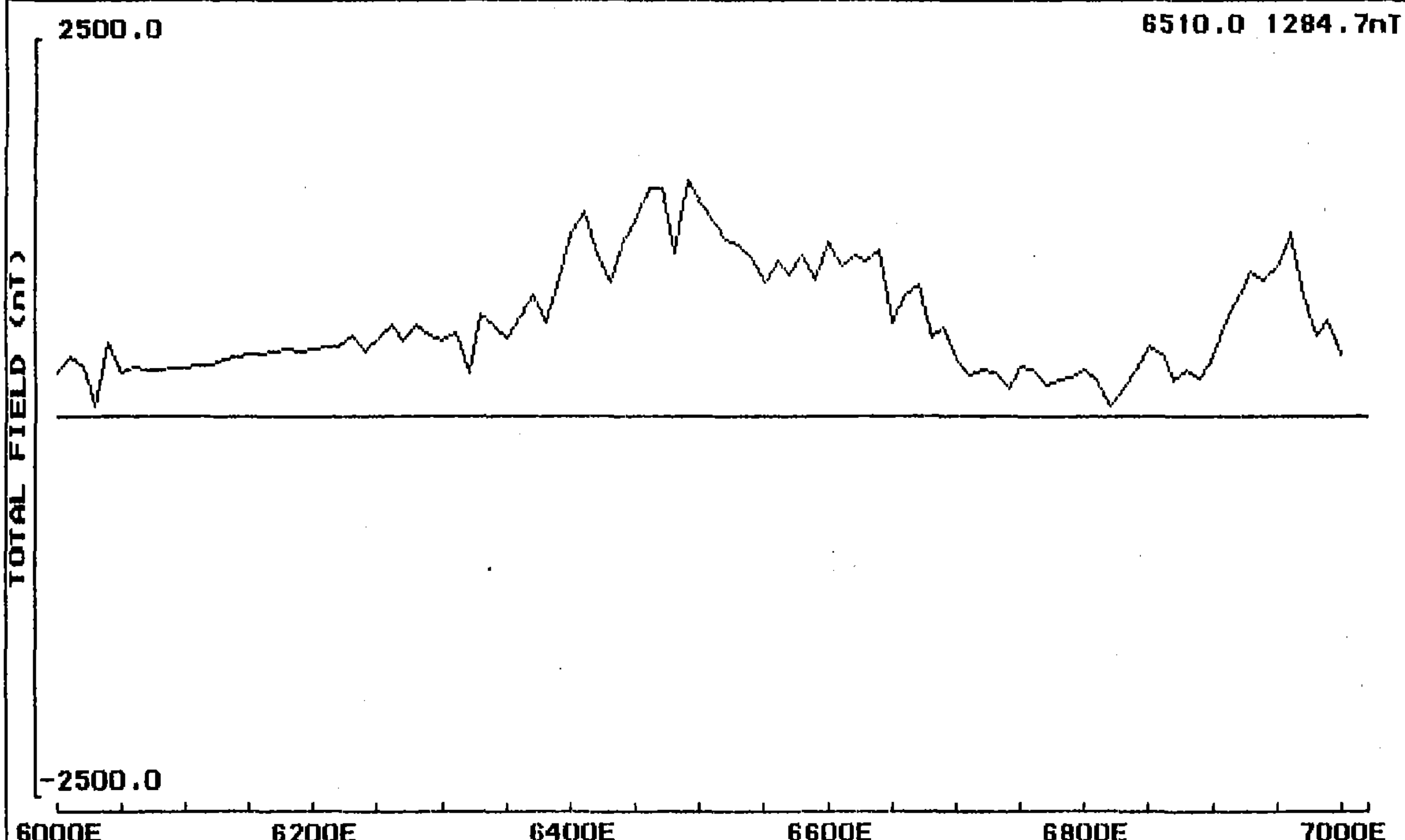

Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90
6600N
2500.0
6500.0 522.2nT
TOTAL FIELD (nT)
-2500.0
7000E
7200E
7400E
7600E
7800E
8000E

433197

Client : Aberfoyle
Prospect : Beatrice

Surveyed by : B Stedman
Survey Date : 30/01/90

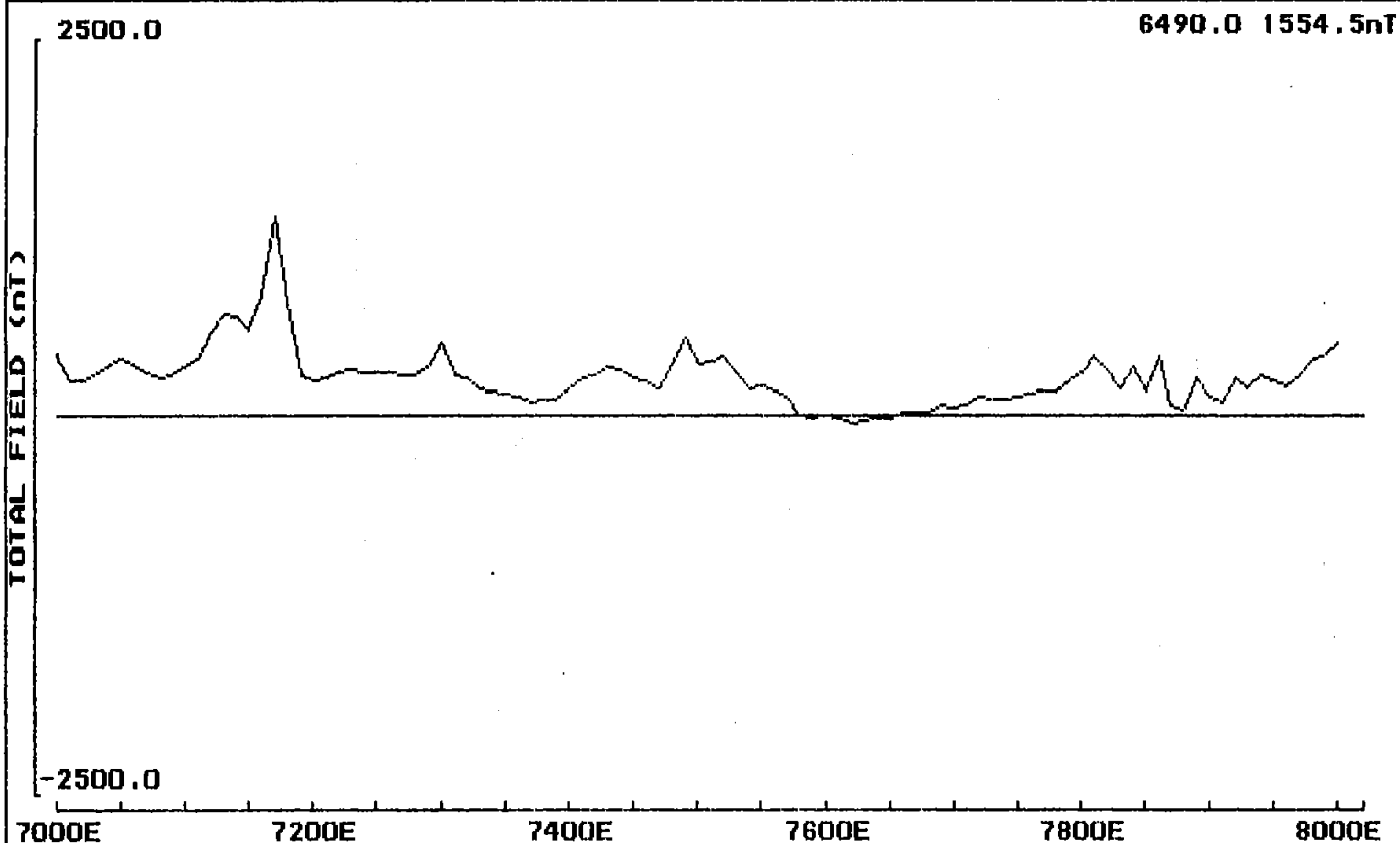
6800N



433198

Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90

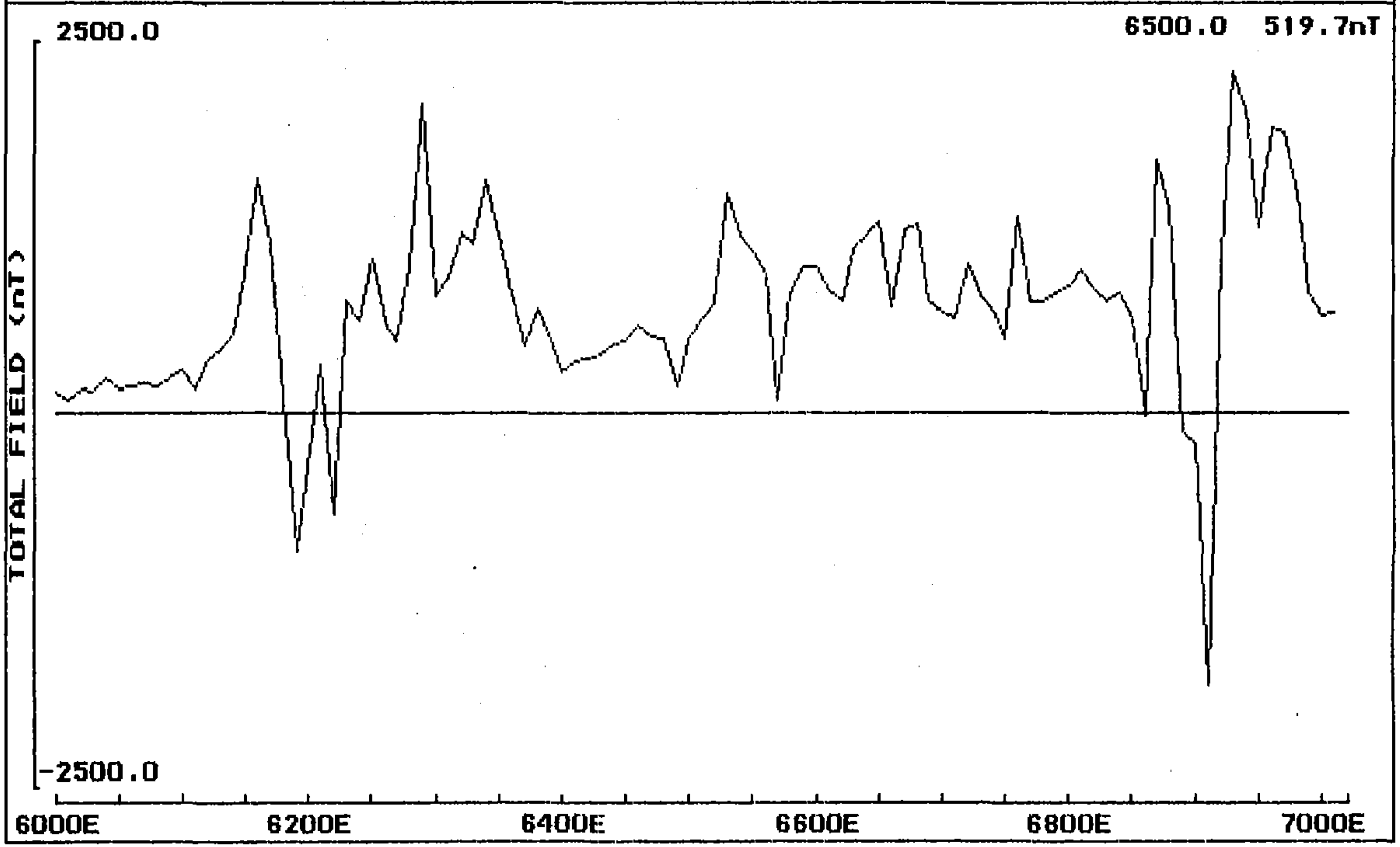
6800N



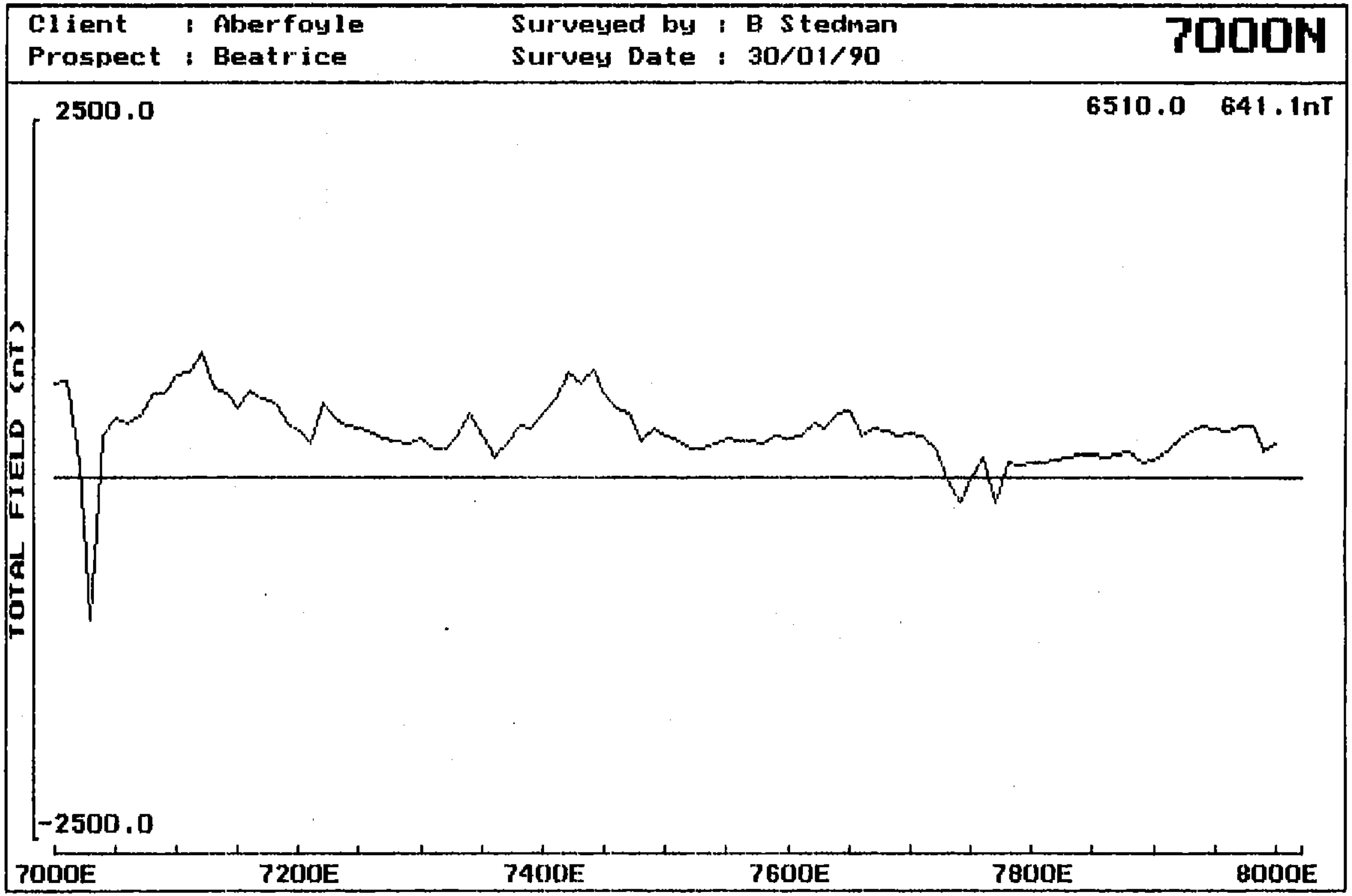
433199

Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90

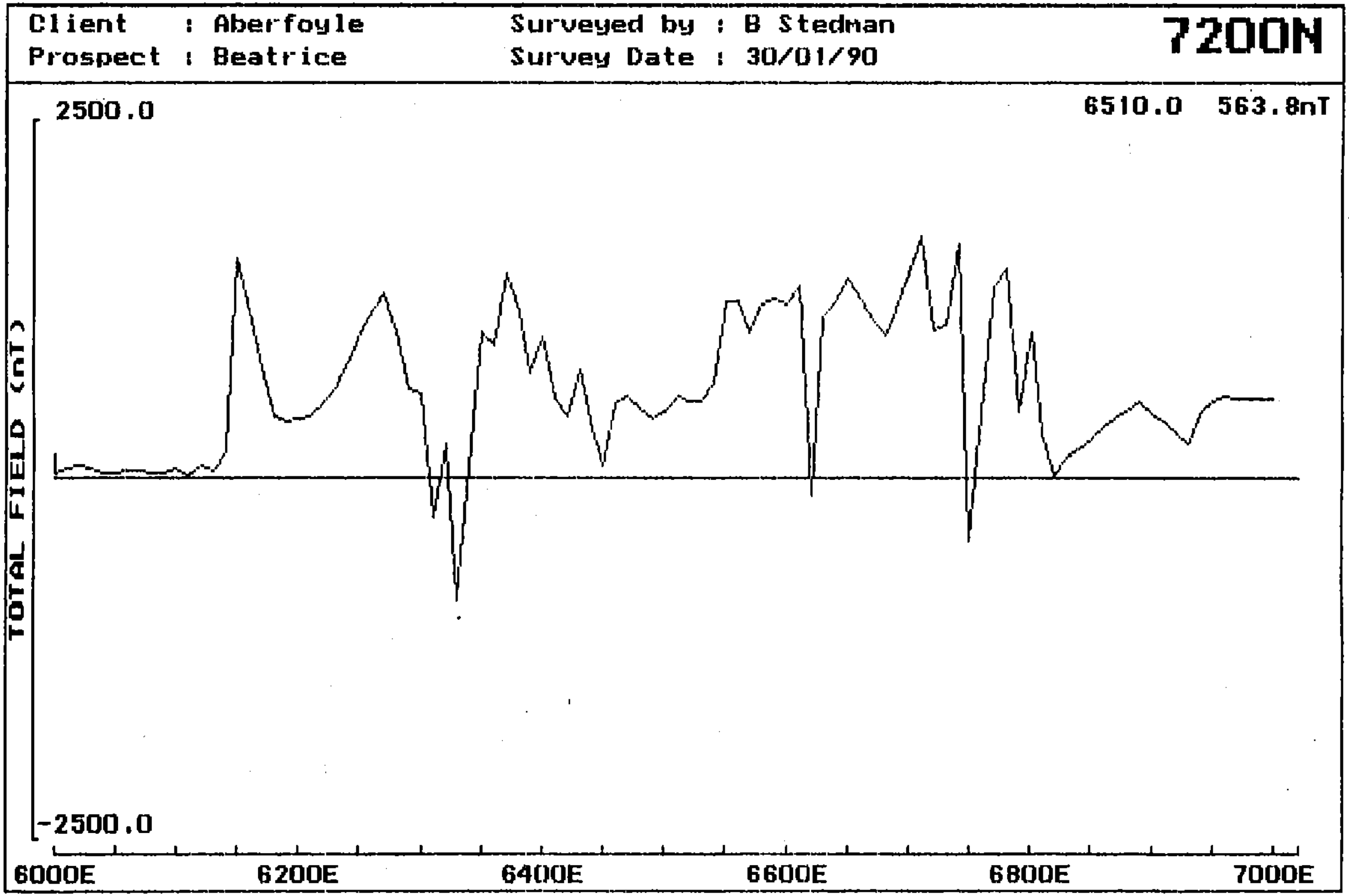
7000N



433200


Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90
7000N
2500.0
6510.0 641.1nT
TOTAL FIELD (nT)
-2500.0
7000E
7200E
7400E
7600E
7800E
8000E

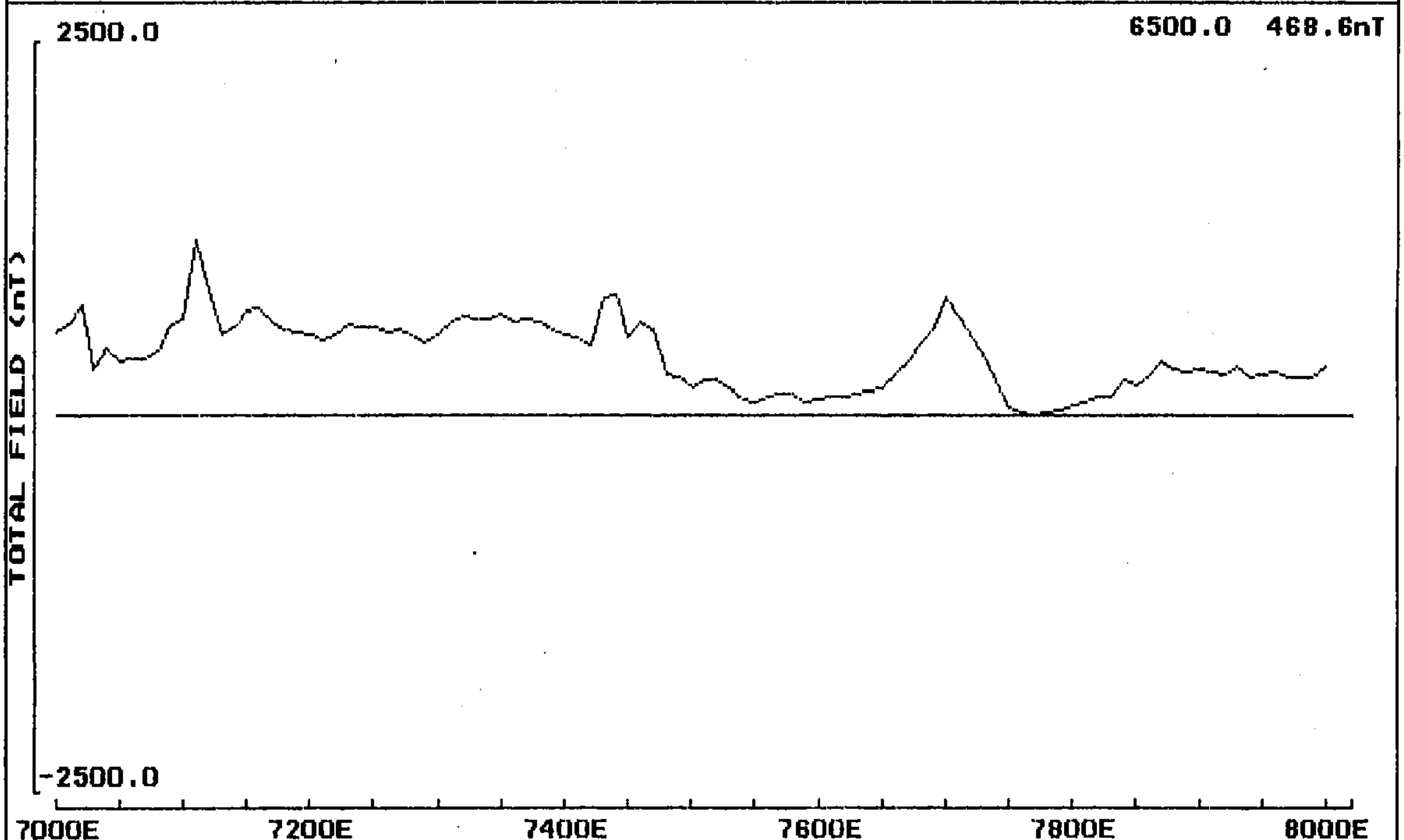
433201



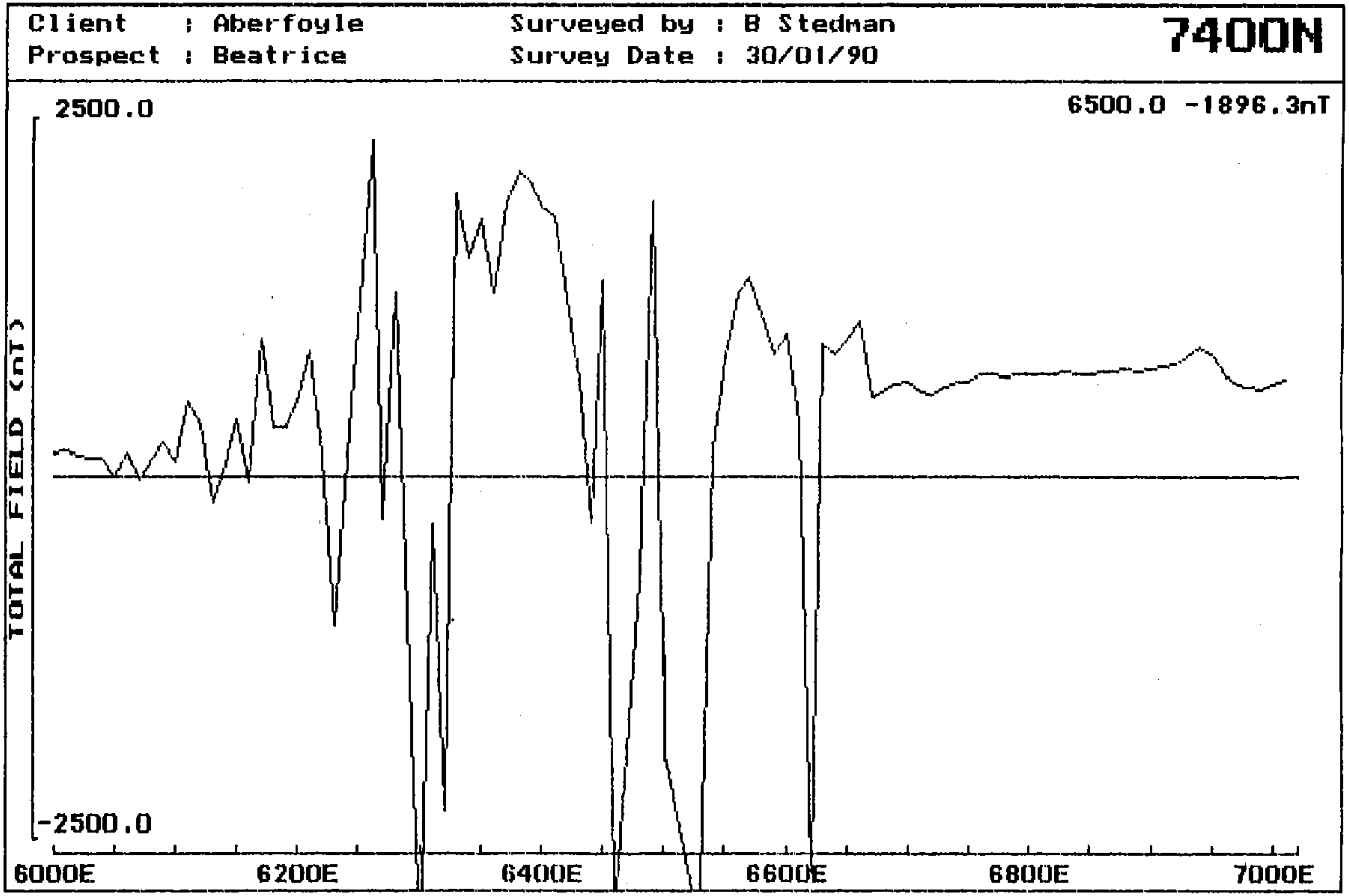
Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90
7200N
2500.0
6510.0 563.8nT
TOTAL FIELD (nT)
-2500.0
6000E
6200E
6400E
6600E
6800E
7000E

433202

Client : Aberfoyle	Surveyed by : B Stedman	7200N
Prospect : Beatrice	Survey Date : 30/01/90	

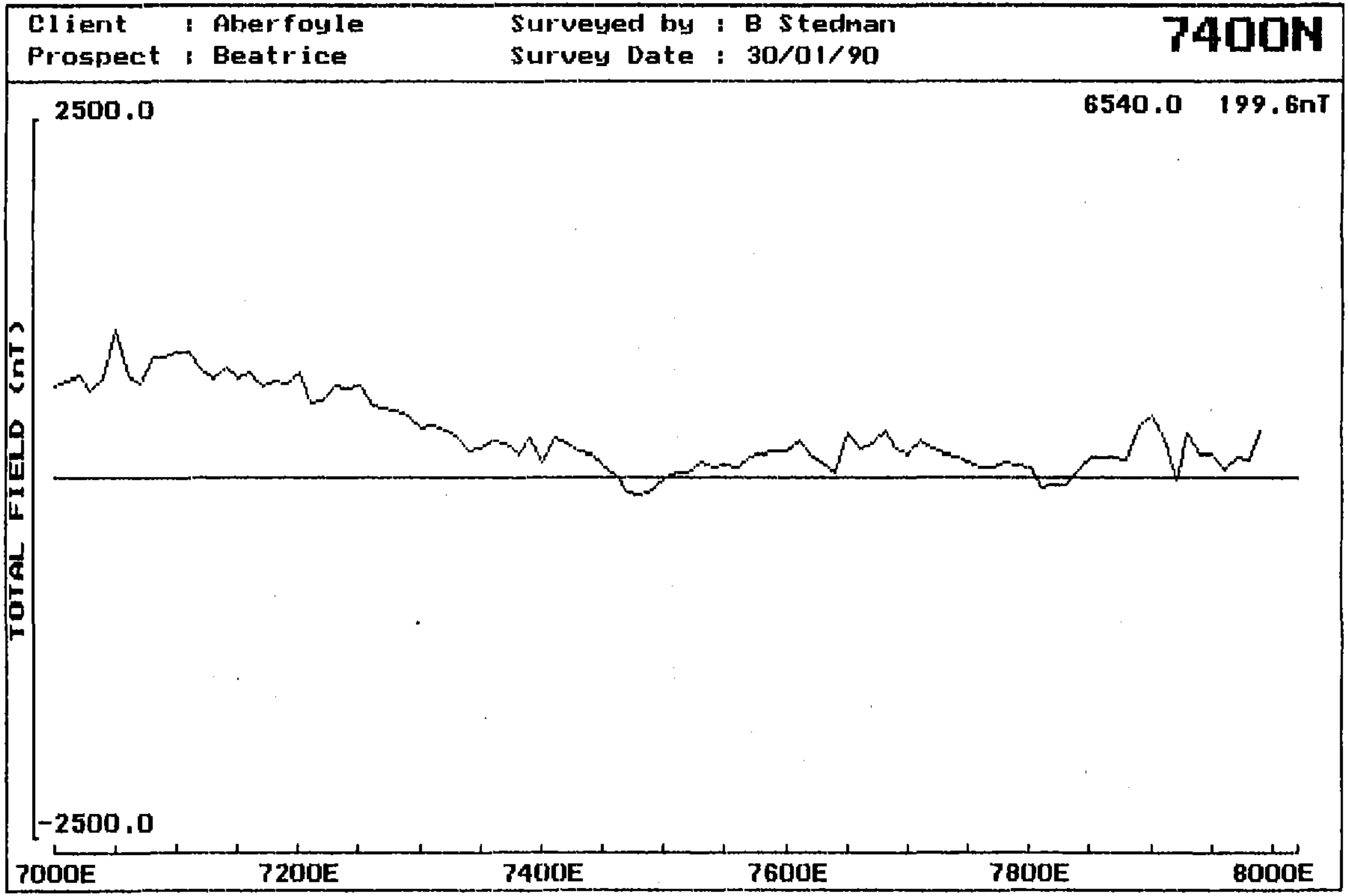


433203



Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90
7400N
2500.0
6500.0 -1896.3nT
TOTAL FIELD (nT)
-2500.0
6000E
6200E
6400E
6600E
6800E
7000E

433204


Client : Aberfoyle
Prospect : Beatrice
Surveyed by : B Stedman
Survey Date : 30/01/90
7400N
2500.0
6540.0 199.6nT
TOTAL FIELD (nT)
-2500.0
7000E
7200E
7400E
7600E
7800E
8000E

433205

2

90-3190

433206

EL 5/85

LETTER
19.10.'90
REFERS

OPEN FILE

LAKE MARGARET EL 5/85

TASMANIA

Technical Progress Report

for the year

ended 20 October, 1990

Volume 2

APPENDICES 9-11 & PLATES

90-3190.
VOL 2/2

MICROFILMED

Distribution

Aberfoyle - Burnie	(1)
Aberfoyle - Hawthorn	(1)
Dept. of Resources & Energy	(1)
CRA Exploration - Canberra	(1)

APPENDIX IX

Attachment:

DDH RH-18

Sample No:	**Depth**	**Logged Description**
561975	57.7m	Quartz-feldspar porphyry-Tyndall Group.
561976	72.7m	Sheared rhyolitic lapilli volcaniclastic-Central Complex.
561977	106.0m	Ash volcaniclastic.
561978	130.2m	Sheared quartz-phyric lava.
561979	199.2m	Andesitic-dacitic lava-pepperitic.
561980	240.3m	Andesitic-dacitic lava-massive.
561981	262.35m	Andesitic-dacitic lava-massive.
561982	310.3m	Ash volcaniclastic.
561983	322.65m	Polymict lapilli volcaniclastic.
561984	352.15m	Polymict lapilli volcaniclastic.

PETROGRAPHIC REPORT

ROCKS FROM RED HILLS PROSPECT DDH RH-18

FOR ABERFOYLE RESOURCES LTD

attn ANDREW McNEILL

by

Anthony J. CRAWFORD
Geology Department
Uni of Tasmania
16/12/89

SAMPLE NUMBER: 561975

SUMMARY:

This is a weakly foliated, strongly sericitic quartz-phyric rhyolitic lava with a notable absence of feldspar phenocrysts, and is almost certainly Tyndall Group.

HAND SPECIMEN:

This is a pale grey, quartz-phyric felsic volcanic or shallow intrusive rock with a weak foliation defined by sericite.

THIN SECTION:

This sample is clearly either a rhyolitic lava or rhyolitic dome-plug/shallow dyke intrusive rock. It consists of about 5-8 modal % of quartz phenocrysts that range up to at least 4mm across. These are generally entire, euhedral to subhedral, and frequently somewhat resorbed and reacted around their margins. Many contain devitrified small melt inclusions that have partially crystallized to quartz and albite (?). The sample is most unusual in that it shows no evidence at all for the former existence of feldspar phenocrysts. A few small almost prismatic sericite-rich areas streaked out into the foliation may have been former albite microphenocrysts, although this is by no means certain. FeTi oxide microphenocrysts and mafic silicate phenocrysts were apparently not present in this sample.

The groundmass of this sample is pervaded by a mesh of sericite that defines the weak foliation present. The original texture of the groundmass is very difficult to discern. I suggest that small domains of less altered and less foliated groundmass have textures suggestive of relatively fine-grained mosaic intergrowths of quartz-albite±sericite, typically derived from crystallization of devitrified rhyolitic glass. Occasional streaks of secondary quartz and intergrown hematite(?) parallel the foliation. Chlorite and calcite are virtually absent in this sample.

The non-broken quartz phenocrysts and the relic groundmass textures mentioned above suggest to me that this sample was unlikely to be a rhyolitic crystal tuff, but rather that it was probably a rhyolitic lava or shallow intrusive. In my experience, shallow intrusives of broadly rhyolitic composition often contain minor biotite, and have small prismatic albite grains intergrown with anhedral quartz in the groundmass. Since neither of these features are present in this sample, I suggest that it was an extremely evolved rhyolitic lava. The mineralogy is certainly more typical of Tyndall Group lavas than Central Volcanic Complex lavas.

SAMPLE NUMBER: 561976

SUMMARY:

This is a foliated quartz-feldspar crystal lithic tuff that has undergone strong sericite-chlorite-calcite alteration. It could be either Tyndall Group or Central Volcanic Complex.

HAND SPECIMEN:

This is a grey strongly sheared and foliated chloritic felsic lava or tuff with distinct pink feldspathic (?) augen up to 2cm long.

THIN SECTION:

In thin section, this sample is clearly a former crystal lithic tuff. It consists of around 5-8 modal% of dispersed angular fragments of quartz crystals of clear volcanic derivation, and much less abundant albite phenocrysts, FeTi oxide microphenocrysts and felsic volcanic fragments. The quartz phenocryst fragments show occasional crystal faces and common rounded, devitrified melt inclusions. Albite crystal fragments probably form 1-2 modal% of the sample and are partially altered to sericite. FeTi oxide microphenocrysts were slightly less abundant than albite, and have all altered to chlorite-leucoxene-magnetite aggregates that subsequently sheared out into black-speckled streaks up to 1mm long.

Former felsic volcanic fragments appear to be the component making up the pink augen notable in hand specimen. Two of the three examples of relatively large (>1mm long) lithic fragments present in this section appear to be aphyric, totally devitrified rhyolitic glass that has crystallized as a very fine-grained quartz-albite-sericite admixture. It is not possible with the textural reconstitution due to foliation development whether these lithic fragments were pumiceous, or massive glassy (obsidian) lava. The augen-shape of the fragments is obviously deformation-related. The third lithic fragment present in this sample is probably an epiclastic siltstone.

The groundmass of this sample is strongly sheared and foliated. The foliation is quite intense, and discrete sericite-rich, and subordinate chlorite-rich layers, as well as stretched fragments, define the foliation. Calcite is common as tiny dpots throughout the sample, and as larger streaks and trains that parallel the foliation.

This is a quartz-feldspar crystal lithic tuff of rhyolitic composition that has suffered strong sericite-chlorite-calcite alteration and shows a pronounced foliation. It could equally as well be Tyndall Group based on the mineralogy, as Central Volcanic Complex.

SAMPLE NUMBER: 561977

SUMMARY:

This is a weakly foliated quartz-feldspar crystal tuff that lacks the chloritic alteration notable in the previous rock (561976).

HAND SPECIMEN:

This is a fine-grained, foliated felsic lava or tuff with well-developed minerogical layering of darker bands and lighter, sericite-rich bands.

THIN SECTION:

This sample is very similar to the preceding sample, but differs in the following respects.

1. This rock does not contain the large pink (formerly pumiceous?) augen that were a notable component of the preceding sample. Lithic fragments are present but are generally smaller than 0.5mm, and not very abundant.
2. This rock contains much more albite, mainly as broken crystal fragments that are only slightly sericitized.
3. Chlorite is a very minor component of this sample

The groundmass of this sample is composed dominantly of recrystallized fine-grained quartz and albite and is slightly foliated, with bands of wispy sericite and trains of multi-crystalline calcite defining the foliation. A second, poorly developed foliation crosscuts the primary foliation at about 30°, and is also defined by weak sericite and minor chlorite kinking out of the dominant cleavage direction.

This is a fine-grained rhyolitic quartz-feldspar crystal tuff that lacks the strong chloritic alteration of the previous sample.

SAMPLE NUMBER: 561978

SUMMARY:

This is a weakly foliated quartz-phyric rhyolitic lava very similar to 561975.

HAND SPECIMEN:

This is a pale grey foliated quartz-phyric felsic lava or tuff with a few narrow, cleaved calcite veins.

THIN SECTION:

This sample is a rhyolitic lava dominated by around 10 modal% of euhedral to slightly rounded and reacted quartz phenocrysts that contain small rounded melt inclusions and internal strain features, and fractures filled with calcite and fine-grained secondary quartz aggregates. Former FeTi oxide phenocrysts or microphenocrysts are more abundant than the relatively uncommon partially sericitized albite phenocrysts, and have altered to chlorite, granular magnetite and possibly leucoxene(sphene?); they have been stretched into the foliation.

The groundmass of this rock is a fine-grained quartz-feldspar mosaic, probably crystallized from devitrified glass, although recrystallization associated with the weak foliation-forming event might be expected. The foliation is defined by variably intense meshworks of sericite that pervade the groundmass, and many quartz phenocrysts have well-developed pressure fringes of sericite. One calcite veinlet 2-3mm thick shows pronounced recrystallization in the foliation direction as curved elongate blades. Chlorite is a very minor phase in this sample.

This is a quartz-phyric rhyolitic lava, that shows only minimal difference from sample 561975, and therefore could equally well be Tyndall Group as CVC.

SAMPLE NUMBER: 561979

SUMMARY:

This is a weakly foliated, formerly glassy plagioclase-phyric dacitic lava that has suffered fairly strong calcite-sericite ± chlorite alteration, and developed a very heterogeneous-textured quartz-albite groundmass.

HAND SPECIMEN:

This is a grey-green mottled (pepperitic?) weakly foliated felsic volcanic with paler grey sericitic patches up to a cm across.

THIN SECTION:

Beyond being fairly sure that this sample was originally a plagioclase-phyric dacitic volcanic (lava or tuff?), this is a difficult sample to diagnose with certainty. It consists of single crystals and crystal clots of euhedral, rather ragged-edged albite up to 2mm long that make up about 2-4 modal% of the rock, set in a very altered and recrystallized groundmass. FeTi oxide microphenocrysts were not uncommon, and have altered to magnetite-chlorite-calcite-sphene intergrowths.

The groundmass of this sample is exceptionally heterogeneous in texture and difficult to interpret. Besides a strong calcite overprint and a weak sericite-defined foliation, the groundmass shows rapid changes in grainsize over short distances and a very patchy texture of fine- and somewhat coarser-grained granular mosaic textures dominated by quartz and albite. Boundaries of coarser-grained domains are mainly diffuse and gradual, and do not appear to be as sharp as would be expected if the coarser areas represented lithic fragments. Calcite is abundant as irregular coarse-grained patches and veinlets, as well as small rhombs scattered through the groundmass and in albite crystals. A few large crystals of pyrite are associated with the calcite. Chlorite is relatively common in this rock, as streaks along the weak foliation, mainly intergrown with sericite.

I think that this rock was a glassy plagioclase-phyric dacitic lava, although I have no idea why the devitrification and foliation-induced (re)crystallization should have produced such a heterogeneous texture. The relationships of this sample with surrounding rocks might be informative.

SAMPLE NUMBER: 561980

SUMMARY:

This rock was a glassy, sparsely plagioclase-phyric dacitic lava that has a heterogeneous groundmass texture formed by blebs of secondary quartz crystallizing from a dusty quartz-sericite-calcite matrix.

HAND SPECIMEN:

This is a massive dark grey, altered plagioclase-phyric dacitic lava with calcite veinlets but no apparent foliation.

THIN SECTION:

This is a relatively sparsely plagioclase-phyric dacitic lava with around 3-5 modal% of plagioclase phenocrysts set in an altered and recrystallized groundmass. The plagioclase phenocrysts are mainly fairly blocky, ragged-edged prisms, less than 1mm long, often gathered in multi-crystal clots, that are partially altered to fine-grained sericite and small pools and spots of calcite. Former FeTi oxide microphenocrysts are not uncommon, and are altered to aggregates of fine-grained magnetite, chlorite, sphene(?) and possibly quartz. Mafic silicate phenocrysts were absent from this sample.

The groundmass of this rock is highly altered and recrystallized, with a rather unusual texture. Although it is difficult to say with certainty, it appears to have been a very glassy-rich groundmass that has devitrified and recrystallized extensively, producing a rather unusual texture that resembles at first glance an epiclastic sediment or crystal tuff. The groundmass is dominated by discrete ragged patches and blebs of clear secondary quartz averaging around 0.2mm across, that look like detrital grains at first. Between these is a dusty matrix composed of fine-grained quartz and albite extensively replaced by sericite and calcite. Pale green chlorite forms a few tiny patches and discontinuous veinlets, but is volumetrically insignificant. A few calcite veinlets transect the sample.

This was certainly a plagioclase-phyric dacitic lava; it probably had a glassy groundmass that has devitrified and recrystallized in a rather patchy, heterogeneous manner relative to the usual uniform quartz-albite mosaics replacing glass in MRV dacites.

SAMPLE NUMBER: 561981

SUMMARY:

This is a formerly glassy almost aphyric dacitic lava that has the same unusual groundmass recrystallization texture as the preceding rock.

HAND SPECIMEN:

This is a dark grey massive aphyric dacitic lava with a faint suggestion of a cleavage.

THIN SECTION:

Although this rock is unlikely tobe from the same flow unit as the previous sample, it is very similar in most respects, especially with regards the unusual-textured groundmass. The major difference from the preceding sample is that this rock is almost aphyric. It contains less than 1 modal% of sericitized plagioclase phenocrysts that are difficult to discern from the altered groundmass. Also, this rock contains at least 10 relatively large zircon euhedra not noted in 561980.

The groundmass of this rock is essentially identical to the previous sample. It was almost certainly glassy and devitrified, bur has crystallized to an unusual texture that resembles a crystal tuff. Abundant small blebs and patches of secondary quartz, many of which are compound grains with diffuse extinction, are scattered through a sericite+calcite-dominated matrix. The sericite forms wispy trains that define a very weak foliation, not shown in 561980. Small patches and streaks of calcite are distributed throughout the rock.

SAMPLE NUMBER: 561982

SUMMARY:

This sample was a relatively fine-grained crystal-poor tuff or epiclastic siltstone that has suffered a strong cleavage-producing event in a high-strain zone relative to the previous few rocks in this set. It is strobgly sericitic and contains a late- or post-cleavage veinlet dominated by calcite and sphalerite.

HAND SPECIMEN:

This is a pale grey banded and foliated fine-grained tuff or epiclastic sediment.

THIN SECTION:

This sample is a crystal tuff or fine-grained epiclastic sediment that has a quite strong fine-grained foliation. Occasional narrow bands (<2mm thick) containing relatively abundant crystal fragments of albitized plagioclase to about 0.5mm across are set in a much finer-grained matrix that contains sparse, generally smaller albite fragments in a strongly cleaved sericitic matrix. Strongly flattened lenses of finely-crystalline quartz-sericite-calcite-chlorite are quite common, and may be boudinaged microlayers. Also paralleling the cleavage are:

1. microlayers of dirty brown leucoxene material, possibly produced by concentration of less soluble FeTi oxides during dissolution associated with cleavage development, and
2. microlayers dominated by abundant tiny cubic magnetite(?) crystals that have undoubtedly crystallized during the cleavage-producing event. In the thickest of these bands (~1mm), magnetite euhedra are intergrown with ribbon quartz.

A 1mm thick band that broadly parallels cleavage but crosscuts its locally, and is clearly late- or post-cleavage, is composed of more equigranular quartz, minor magnetite (or pyrite?), fairly abundant yellowish sphalerite and abundant calcite.

SAMPLE NUMBER: 561983

SUMMARY:

This is a weakly foliated, formerly glassy crystal-lithic tuff of dacitic composition, dominated by albite crystal fragments and dacitic lava and shallow intrusive rock fragments. It contains sphalerite in a calcite vein subparallel with the foliation.

HAND SPECIMEN:

This is a mid-grey foliated volcaniclastic rock (tuff or epiclastic?) containing some lithic fragments up to 3mm long.

THIN SECTION:

This sample is probably a medium-grained crystal lithic tuff. It is dominated by angular crystal fragments of albite, only very slightly sericitized, that average around 0.5mm across. They are often partially replaced by calcite. Altered FeTi oxide microphenocrysts are quite common. Almost as abundant as the crystal fragments, but much less easily discerned in the altered groundmass, are sand-sized lithic fragments that are all of felsic lavas or shallow intrusive rocks. The great majority of felsic lithic fragments appear to have been glassy dacitic lavas that have recrystallized glass as albite-quartz mosaics. A few lithic fragments have textures composed essentially of intergrown stubby laths of albite and anhedral quartz; these are probably subvolcanic dykes or plugs od dacite derived from the same source as the formerly glassy lavas.

The matrix of this sample was either a welded glass or glassy ash that has altered and totally recrystallized to a very fine-grained albite-quartz-sericite mixture that is rather heterogeneous texturally. It is pervaded by a mesh of sericite that forms a weak foliation. Minor amounts of green chlorite are scattered throughout the rock, mainly streaked out parallel to the foliation.

Calcite forms some veins up to almost 1cm thick in this sample, and in at least one of these calcite is intergrown with yellowish sphalerite.

The lack of any sign of rounding on the albite crystal fragments and the decidedly non-detrital appearance of the matrix of this rock argue that it was a crystal-lithic tuff rather than an epiclastic sediment.

SAMPLE NUMBER: 561984

SUMMARY:

This is a relatively coarse-grained lithic tuff or epiclastic sandstone derived from a dacite-dominated volcanic event/terrain.

HAND SPECIMEN:

This is a grey-green relatively coarse-grained polymict tuff or epiclastic sediment that contains a diverse assemblage of lithic fragments up to almost 1cm long, and abundant pinkish feldspar crystals mainly less than 1mm across.

THIN SECTION:

This sample is essentially a slightly coarser-grained version of the preceding sample. It is certainly richer in lithic fragments than 561983, although the broad range of textures (and original lithologies) represented in this fragment population is basically across the same range as for 561983. A few decidedly holocrystalline fragments composed of interlocking elongate albite laths are almost certainly intrusive dacite dykes. Many formerly glassy dacitic lava fragments show unusual groundmass textures similar to 561980 and 561982, with small blebs of secondary quartz growing in a dirty sericitic groundmass.

Sericite meshworks pervade parts of the section more strongly than other parts, and define a very poorly-developed foliation. The matrix of this sample was largely glassy and has extensively altered and crystallized as fine-grained albite, quartz and sericite. It is extremely difficult to decide whether this rock was a lithic tuff or an epiclastic sediment. The implications of either are so similar that it probably doesn't matter. The main point is that it is derived from dacitic volcanism probably more explosive, but otherwise similar to that which yielded the dacitic lavas such as 561980 and 561981.

SAMPLE NUMBER:

SUMMARY:

HAND SPECIMEN:

THIN SECTION:

SAMPLE NUMBER:

SUMMARY:

HAND SPECIMEN:

TC 40

433220

PETROGRAPHIC REPORT

For Aberfoyle Resources Ltd

(attn Danny Noonan)

Rocks from Beatrice lava dome

by

Anthony J. Crawford
Geology Department
Uni of Tasmania
26/6/90

SAMPLE NUMBER: 564322 LOCATION: Beatrice 387002E 5346455N

SUMMARY: This is an unusual textured former highly glassy aphyric felsic lava that has suffered intense silica-chlorite (±pyrite) alteration and subsequent oxidation (weathering?).

HAND SPECIMEN: Tyndall Group: This is a red-pink felsic lava breccia or 'false breccia' with intense silica - chlorite-hematite alteration.

THIN SECTION:

This is a strongly silicified originally phenocryst-poor, highly glassy felsic lava (obsidian) in which the primary texture has been all but obliterated by post-eruption recrystallization and silicification. A few suggestions of the former presence of quartz and perhaps feldspar phenocrysts are present, but these are indistinct, and overprinted by silicification. The dominant feature of the sample is a most unusual texture composed of packed subspherical 'cells' or 'ovoids' of silica averaging around 0.5-1mm across, closely intergrown, and separated only by thin partitions of brown oxidized chlorite. Many of these ovoid bodies have a core of clear quartz, then pass out into a rim of 'dirty' quartz packed with tiny chlorite inclusions. Quartz within each 'cell' looks very like mosaic-textured quartz growing from devitrified felsic glass, and I am sure the primary matrix of this sample was highly glassy. Tiny quartz veinlets crosscut 'cells' and local spots of granulation and subgrain recrystallization are common. Clots of green pleochroic chlorite are common, some as large as 3-4mm across. These sprout off veins into adjacent quartz 'cells' and often occur with abundant intergrown small pyrite cubes, many of which are oxidized to bright red translucent hematite or goethite. Much of the chlorite, particularly where it is less modally 'intense', is oxidized to reddish-brown clayey material that grades into hematite-goethite and gives the rock its colouring.

Although the unusual texture of this sample could possibly be due to it having been derived from a vitric lapilli tuff, the intensity of recrystallization and quartz-chlorite overprinting suggests to me that any primary texture has been obliterated, and that the sample was probably a very glassy felsic lava. This is a strongly silicified and chloritized felsic glassy lava.

SAMPLE NUMBER: 564330 LOCATION: Beatrice 387568E 5346200N

SUMMARY: This is a feldspar+quartz+apatite+zircon+rare biotite-phyric dacitic to rhyolitic lava that has suffered quite strong chlorite overprinting with associated weak disseminated pyrite mineralization. It is related to 564340, 564451 and 564491.

HAND SPECIMEN: (CVC) This is a dark green chloritized felsic lava with abundant holes and reddish spots filling sites of former disseminated pyrite grains.

THIN SECTION:

At first glance, this sample appears to be a monomict lava breccia, but careful examination shows the brecciated texture to be almost certainly a 'false breccia' texture due to alteration. This rock was a feldspar+quartz+apatite+rare biotite+zircon phyric dacitic to rhyolitic lava with a formerly glassy groundmass. The feldspar phenocrysts, that make up probably less than 1 modal% of this rock, are small stubby prisms of albite speckled by sericite. Quartz phenocrysts are not much more abundant, but are much larger and rounded and reacted. Apatite phenocrysts are relatively large, (to almost 1mm long) and quite common (probably 1-2 modal%), and zircon microphenocrysts are also large and quite common. Two crystals of chlorite-altered biotite were noted.

The groundmass of this sample was glassy, but has been replaced by a ragged mosaic intergrowth of quartz and albite with minor sericite that has been strongly overprinted by chlorite. Quite large pyrite euhedra (mainly 0.5-1mm across) are scattered throughout the chloritized groundmass but show no relation to modal abundance of chlorite.

This sample is a chloritized dacitic to rhyolitic lava clearly related to those other apatite-biotite-zircon-phyric lavas described above (564340, 564451 and ~~564291~~). Is this a distinctly mappable unit?

564491

SAMPLE NUMBER: 564338 LOCATION: Beatrice 387023E 5348625N

SUMMARY: This is felsic lava breccia probably formed by mass slumping down the side of a submarine felsic volcanic edifice; it is much less altered than most other samples in this set.

HAND SPECIMEN: (CVC) This is a grey polymict lava breccia with fragments of felsic lava to at least 1cm long.

THIN SECTION:

This sample is clearly a polymict lava breccia, and is composed of angular to weakly rounded fragments of various formerly glassy felsic lavas, mainly from 0.5-4mm across. The fragments are not closely intergrown, but separated by a silty to sandy matrix in which angular quartz crystals and tiny lithic fragments are the only identifiable components. Most fragments are composed of mosaic-textured quartz-albite intergrowths after felsic glass; some are sparsely quartz-phyric and were probably rhyolitic, others have sparse small albite phenocrysts, and may have been more dacitic. The fragments are variably recrystallized and sericitized, but almost always less sericitized than the matrix, which was probably a glass-rich ash or reworked ash. Chlorite is a very minor component of this sample, occurring as small disrupted veinlets and occasional small interstitial patches.

It is difficult to say without outcrop evidence whether this sample is a reworked felsic lava breccia (coarse epiclastic sandstone) or a mass flow slumping directly off a felsic volcanic edifice; the implications are essentially similar anyway. This rock is much less altered than most of the preceding samples.

SAMPLE NUMBER: 564340 LOCATION: Beatrice 387027E 5347002N

SUMMARY: This is a quartz+feldspar-phyric rhyolitic lava that has suffered deformation-related brecciation with associated sericite alteration.

HAND SPECIMEN: This is an altered brown quartz+feldspar-phyric felsic lava breccia with a few distinct fragment around 5mm across.

THIN SECTION:

This is clearly a brecciated lava or monomict lava breccia composed of poorly defined fragments of quartz-porphyritic rhyolitic lava. Most fragments are rather indistinct because of their originally very similar or identical composition and texture, and also because of the effects of devitrification of the largely glassy groundmass of the fragments. 'Fragments' consist on average of around 12-15 modal% of quartz phenocrysts and somewhat less modal abundance of albitized feldspar phenocrysts in a devitrified formerly glassy groundmass. Quartz phenocrysts are often partially resorbed, but up to 3mm across, with crystal faces often preserved. Almost all crystals have been strongly fractured and disrupted internally, and show strained extinction. Albitized plagioclase phenocrysts are blocky euhedra usually 1-2mm long that show variable but mainly strong sericite alteration; sericite is often Fe-stained and yellowish. A few small euhedra composed of green chlorite charged with tiny FeTi oxides probably represent altered former biotite microphenocrysts. A notable feature of this sample is the presence of at least 25-30 relatively large and well-formed zircon grains, indicating that this sample would be useful for ion microprobe dating of zircons in this part of the CVS.

Almost all fragments have rather heterogeneous textures developed from albite-quartz mosaics after devitrified glass, with variable amounts of clear, almost rounded quartz growing from the quartz in the devitrified groundmass. The groundmass is extensively fractured and meshed by yellowish sericite and minor chlorite and quartz. A few small patches of intense chlorite development in angular fractures have associated pyrite(?) grains growing in the chlorite, but this mineralization is volumetrically insignificant.

The texture of this sample, especially the fractured and deformed quartz phenocrysts, suggests that the brecciated nature of the sample in thin section is probably deformation-related rather than a primary feature. The abundantly quartz-phyric nature of this sample is more reminiscent of the Tyndall Group rhyolites rather than typical CVC lavas, but I believe quartz-phyric lavas are being recorded with increasing regularity from areas mapped as CVC. It further emphasizes the poor distinction between the Tyndall Group and the CVC, and the need for revised nomenclature.

SAMPLE NUMBER: 564341 LOCATION: Beatrice 387095E 5347004N

SUMMARY: This is a slightly sericite+chlorite-altered fairly coarse-grained epiclastic sediment dominated by detritus from a quartz+feldspar-phyric rhyolitic lava source.

HAND SPECIMEN: This is pale green chloritized polymict felsic lava breccia or coarse-grained epiclastic sediment with one fragment (clast?) at least 3cm diameter.

THIN SECTION:

In thin section, it is clear that this sample is an epiclastic sediment derived largely from felsic volcanic sources. The large clast noted in hand specimen, however, is a formerly holocrystalline intrusive dacite composed of sparse quite large albite phenocrysts set in a medium-grained crystalline groundmass of interlocking feldspar (albite) and much less abundant chloritized augite, with abundant interstitial (primary?) quartz, and yellowish chlorite.

The remainder of the clasts in this sediment are sand- to granule sized and composed of diverse formerly glassy quartz+feldspar-phyric rhyolitic and rhyodacitic lava fragments, many almost identical to the previous sample (564340). As in the previous sample, the glassy groundmass has devitrified and partially recrystallized to quartz-albite mosaics variably overprinted by sericite webs and networks. The strong variation in the extent of sericite alteration from clast to clast indicates that the sericitization predates the deposition of the sediment. Pressure solution has produced tightly interlocking boundaries between clasts, although patchy chlorite alteration is common along clast margins and commonly is laced with dirty red-brown oxidized fine-grained pyrite(?). Chorite also occurs within clasts as dispersed flakes and small patches, but it is not as abundant as sericite. Detrital discrete grains of quartz are remarkably sparse. This is clearly derived from a felsic volcanic terrain dominated by rhyolitic lavas

SAMPLE NUMBER: 564351 LOCATION: Beatrice 387832E 5347000N

SUMMARY: This is a formerly highly glassy, almost aphyric felsic lava that has suffered extensive sericite-silica (±pyrite) alteration, with total disaggregation of the recrystallized and silicified glassy groundmass to result in rounded quartzose blebs in a sericite matrix.

HAND SPECIMEN: (CVC) This is a grey chloritic former felsic lava or tuff with disseminated pyrite

THIN SECTION:

This is an extensively recrystallized and altered rock, the original nature of which it is very difficult to determine with any certainty. It resembles a detrital quartz-rich sandstone at first glance, but like sample 564467, careful examination shows that it is more likely to have been a formerly highly glassy lava or vitric tuff that has been extensively altered and texturally degraded. It is composed of subrounded blebs of polycrystalline quartz immersed in a matrix of fine-grained foliated sericite and less abundant green chlorite. The texture of the quartzose blebs is essentially identical to the matrix of the previous sample and probably it is partially disaggregated recrystallized glassy groundmass, and partially silicified groundmass. The sericite forms a dense weakly foliated matrix of this sample making up more than 40 modal% of the rock, with intertitial green chlorite. Trains of tiny oxidized pyrite cubes occur in the sericite matrix.

This is almost certainly a formerly highly glassy, almost aphyric felsic lava that has suffered extensive sericite-silica (±pyrite) alteration.

SAMPLE NUMBER: 564374 LOCATION: Beatrice 387254E 5346375N

SUMMARY: This is a coarse epiclastic sandstone to fine conglomerate composed of fragments of felsic glassy lavas in a silty to sandy groundmass derived fromthe same material; it is fairly strongly sericite-altered.

HAND SPECIMEN: (Tyndall Group) This is a dark green weakly foliated coarse epiclastic sediment with imbicated lava fragments up to several cm long.

THIN SECTION:

This sample is very similar to sample 564338 described above. Essentially, it is composed of a diversity of lava fragments of formerly glassy felsic lavas. Most were sparsely quartz or quartz+feldspar-phyric. Feldspar phenocrysts are always altered to sericite, and the groundmass of all lava fragments has devitrified and recrystallized as quartz-albite -sericite intergrowths with very variable textures. A few fragments were clearly silicified before being incorporated into this sediment, and have distinct sugary matrix textures; others appear to have been chloritized before deposition in this sediment, as they contain many times more abundant chlorite than samples that texturally appear to have been derived from very similar lavas, but which are almost chlorite-free.

The matrix of this epiclastic sediment is composed of a silty material containing abundant often partly subgrain recrystallized quartz phenocryst fragments; it has been very strongly sericitized, with dense meshes of sericite defining a fairly well-developed foliation. Small grains of disseminated pyrite are present, but rather sparse, scattered through the matrix.

SAMPLE NUMBER: 564380 LOCATION: Beatrice 386000E 5347143N

SUMMARY: This is an epiclastic sandstone derived from local felsic volcanics with weak sericite alteration.

HAND SPECIMEN: This is a pale green and pink weakly foliated volcanogenic sediment or felsic lithic crystal tuff with quartz and feldspar grains or phenocrysts.

THIN SECTION:

This sample is almost certainly an epiclastic sediment derived from glassy felsic volcanics. Most clasts in the rock are slightly rounded sparsely quartz+feldspar-phyric formerly glassy lavas fragments in which the groundmass has devitrified to very fine-grained quartz-albite specked with chlorite. Albite and quartz phenocrysts are mainly less than 1mm long and the albite is little altered. Many lava fragments show a pronounced similarity of texture, suggesting that they may be derived from a single eruptive event. A few clasts are coarser-grained, with larger blocky feldspar phenocrysts and clearly derived from a different lava unit. Also, discrete detrital crystals of quartz and albite are present but not abundant, and are slightly rounded.

A fairly well-developed mesh of sericite pervades this sample, defining a weak foliation. The matrix between clasts seems to be very granulated in places, and probably reworked and recrystallized ash in other places. Chlorite is unevenly distributed through the sample in small patches overprinting groundmass/matrix.

This sample is probably an epiclastic sediment derived from local felsic volcanic sources.

SAMPLE NUMBER: 564391 LOCATION: Beatrice 386575E 534700N

SUMMARY: This is a formerly glassy aphyric felsic lava that suffered hematite + Kspar(?) alteration during recrystallization of the groundmass, and later quartz-chlorite-pyrite alteration often as quartz-pyrite-chlorite veining.

HAND SPECIMEN: (CVC) This is a brick-red felsic lava pervaded by a fairly dense fracture network filled with hematite(?), quartz and chlorite.

THIN SECTION:

This is a texturally much better preserved felsic lava than many of the preceding samples. It was aphyric and entirely glassy, with the glass devitrifying and recrystallizing to a well-preserved mosaic-textured quartz-albite(?) groundmass. The groundmass is full of totally altered small bladed crystals of hematite that often only have goethite or limonite rims preserved with the cores filled by sericite or chlorite. While these apparently are responsible for the red colouration of this sample, there is abundant dusty feldspar in the recrystallized groundmass that may be K spar (it is too murky and fine-grained to be identified with certainty), and this too imparts a pinkish colour to the rock. Chlorite occurs in two main modes in this rock, firstly as quite large patchy masses overprinting the groundmass, and secondly as angular fillings in quartz veins that pervade this sample. The quartz veins make up about 15 modal% of the rock, and grade outward into areas of groundmass that are clearly silicified relative to the better-preserved bulk of the groundmass. Quartz veins often contain abundant pyrite as disseminated tiny crystals. There is a clear association between the quartz-chlorite and pyrite, and it post-dates the hematite-Kspar(?) alteration.

SAMPLE NUMBER: 564433 LOCATION: Beatrice 387540E 5346792N

SUMMARY: This is a coarse epiclastic sediment dominated by fragments of felsic lava (to at least 8 cm long) in a matrix that has suffered strong chlorite-hematite (goethite) alteration.

HAND SPECIMEN: (CVC) This is a pale grey-brown monomict felsic lava breccia or false breccia with thick dark brown hematite veins cutting the rock.

THIN SECTION:

This is an unusual sample in thin section. It consists of a layer (flow?) less than 8cm thick of well-preserved felsic lava sandwiched between two beds of chlorite-hematite altered epiclastic sandstone. The latter are similar in that they are composed of sand-sized grains of variably silicified and sericitized formerly glassy felsic lavas and less abundant angular quartz phenocryst fragments in a matrix that has been largely replaced by chlorite and then oxidized, so that yellowish-red chlorite and hematitic or goethitic material dominates in the matrix.

The exceptionally thin lava unit in between these sandstone beds is a formerly glassy sparsely plagioclase-phyric dacitic lava. It is composed of much less than 1 modal% of very small (<0.5mm long) albitized plagioclase phenocrysts set in a matrix made up of a quite strongly sericitized fairly fine-grained mosaic intergrowth of quartz and albite. It is cut by many fractures that are filled by red translucent hematite or goethite, and single grains of altered pyrite are present in this rock, although quite rare. I am certain that this was a lava and not a tuff; therefore, this lava probably is simply a large clast in the epiclastic sediment, rather than an exceptionally thin felsic lava flow.

SAMPLE NUMBER: 564435 LOCATION: Beatrice 387542E 5346778N

SUMMARY: This is a formerly glassy aphyric felsic lava, slightly autobrecciated, that has suffered moderate chlorite-quartz -pyrite alteration.

HAND SPECIMEN: (CVC) This is a dark green chloritic felsic lava breccia with disseminated pyrite.

THIN SECTION:

This is a slightly autobrecciated almost aphyric, formerly glassy felsic lava that has devitrified to an even-textured very fine-grained quartzo-feldspathic intergrowth flecked with unorientated greenish yellow chloritic patches and streaks. Weak autobrecciation is evident in places, with jigsaw-fit fragments separated by chloritic stockworks. A few small anhedral clots of polycrystaline quartz may be recrystallized quartz phenocrysts, although this is difficult to be sure about. Several areas of the slide show recrystallization of small lava fragments to more coarse-grained sugary quartz, suggesting local silicification. Quite large (to almost 1mm) pyrite grains are disseminated sparsely throughout the sample, and mainly have bright red oxidized rims. They are more strongly associated with chlorite-secondary quartz domains than with less fractured and recrystallized groundmass.

SAMPLE NUMBER: 564451 LOCATION: Beatrice 387857E 5346803N

SUMMARY: This is distinctive formerly glassy plagioclase+ quartz+biotite+apatite+zircon-phyric dacitic lava with weak silica-chlorite alteration, and strong affinities with samples 564491 and 564340.

HAND SPECIMEN: (CVC) This is a weakly foliated green-brown felsic lava with strong chlorite development.

THIN SECTION:

This is a distinctive and texturally well-preserved dacitic to rhyolitic lava with phenocryts of feldspar (approx. 5-8 modal%), quartz (2-3 modal%), biotite (1-2 modal%) and apatite (<<1 modal%) set in a devitrified glassy groundmass. The plagioclase phenocrysts are almost entirely replaced by calcite and fine-grained dirty sericitic material, and are up to 2mm long. Quartz phenocrysts are smaller and strongly reacted and rounded, and often rather fractured. Biotite phenocrysts, up to at least 2mm long, vary from perfectly fresh (which is most unusual in the Mount Read Volcanics) to being replaced entirely by green chlorite-FeTi oxide aggregates. The apatite phenocrysts are large, euhedral and much more abundant than usual in Mount Read Volcanics lavas; some are almost 1mm long. Another notable feature of this sample is the abundance of relatively large, euhedral zircon microphenocrysts, indicating that this sample would be excellent for potential ion microprobe dating studies of these lavas.

The groundmass of this sample was clearly glassy. It has devitrified to a very fine-grained quartz-albite mosaic in best-preserved areas. However, strong modification of this texture by overprinting quartz-chlorite alteration, and later calcite veining and patchy replacement has produced a texturally variable groundmass. Calcite veinlets cut the rock but are not abundant.

This distinctive sample is clearly related to samples 564~~3~~491 and 564340, in having biotite, and large apatite and zircon phenocrysts.

SAMPLE NUMBER: 564454 LOCATION: Beatrice 387754E 5346600N

SUMMARY: This is probably a former lapilli tuff composed of glassy fragments of aphyric rhyolite that were flattened and devitrified during compaction and deformation; it has suffered mild chloritization.

HAND SPECIMEN: This is dark green chloritized felsic lithic vitric tuff or (formerly) glassy volcanic-fragment rich epiclastic sediment.

THIN SECTION:

This sample is rather difficult to diagnose. It is clearly composed almost exclusively of originally glassy aphyric felsic lava fragments, mainly 2-4mm long. These have been weakly flattened and pervaded by a mesh of sericite. Matrix between fragments is non-existent, and the rock appears to have been composed of glassy lapilli fragments that have suffered pressure solution impaction accompanying devitrification to very fine-grained quartz-albite intergrowths peppered with sericite. Boundary areas between many fragments show elongate and foliated green chlorite concentrations, and often have small totally oxidized pyrite grains enclosed within the chlorite.

This sample presumably reflects glassy lapilli of broadly rhyolitic composition generated in a single eruptive event and deposited in water, to be later compacted and devitrified. It is difficult to judge whether the lapilli were water-sorted (ie. is this an epiclastic sediment or a lapilli tuff?) before burial and compaction. The concentration of chlorite in this sample is certainly greater than normally observed in rhyolitic rocks within the CVC, and implies some local hydrothermal activity producing chlorite alteration.

SAMPLE NUMBER: 564455 LOCATION: Beatrice 387706E 5346600N

SUMMARY: This is a strongly but patchily hematite-altered formerly aphyric glassy felsic lava or vitric tuff.

HAND SPECIMEN: This is very fine-grained aphyric formerly glassy tuff or obsidian lava that has been strongly oxidized with intense hematite alteration over part of the sample.

THIN SECTION:

This sample was definitely composed entirely of felsic glass that has devitirified and been deformed to produce a clear foliation. The glass was apparently aphyric, as no trace of former phenocrysts could be discerned. No distinct fragmental or brecciated texture is evident in this sample, and the degree of foliation development and chlorite-sericite-hematite alteration has effectively obliterated any former clues as to whether this rock was a rhyolitic obsidian or a vitric tuff.

More interesting is the alteration. Following devitrification of glass to mainly fine-grained quartz-albite intergrowths, significant deformation produced foliation and strong sericitization. Fe-staining of the sericite (and chlorite) in this rock makes it difficult to distinguish chlorite from yellow, Fe-stained sericite. Foliation planes are picked out by hematitized sericite and chlorite. Pyrite crystals to about 0.5mm are scattered sparsely through the sample, generally with quartz pressure fringes; they have been totally replaced by red translucent hematite. Patches of fine-grained hematite occur in the paler coloured parts of the rock, often defining stylolite-like diffusion fronts. However, large patches of the rock are saturated by very fine-grained hematite that may be replacing sericite, giving these areas dark red-purple colouration. Hematite veinlets about 0.5-2mm wide transect the sample, but not in abundance subparallel to but clearly cross-cutting the foliation.

The sequence of alteration in this sample is probably sericite-chlorite-pyrite accompanying foliation development, followed by later hematite alteration

SAMPLE NUMBER: 564467 LOCATION: Beatrice 38774E 5346674N

SUMMARY: This is a former plagioclase+minor augite-phyric dacitic lava that has suffered silica-chlorite (±pyrite) alteration with production of a strange groundmass texture resembling a detrital quartzose sandstone.

HAND SPECIMEN: This is greenish brown silicified felsic lava with very thin veinlets of pyrite.

THIN SECTION:

This is a rather remarkable sample in thin section. Texturally, it immediately appears to be an epiclastic sediment composed of non-framework supported rounded quartz grains set in a very fine-grained quartz-albite-sericite-chlorite matrix. However, careful examination shows the presence of about 3-5 modal% of euhedral phenocrysts, including totally sericitized blocky albitized plagioclase to about 2mm long, and uncommon small chloritized mafic (probably augite) phenocrysts. In addition, the apparently rounded quartz grains in this rock are not subhedral volcanic quartz, but polycrystalline grains growing into rounded aggregates. These quartz grains are better interpreted as secondary silica patches growing from a silicified, devitrified formerly glassy groundmass. Also present are thin apatite needles that would be most unlikely to have persisted with this grain shape during sediment transport and deposition. The rock is therefore interpreted to be a silicified dacitic lava, and not adetrital sediment.

The groundmass consists of about 50 modal% of the rounded polycrystalline quartz grains described above set in exceptionally fine-grained quartz -chlorite mixtures. Green chlorite also occurs as common rather rounded spots throughout the groundmass, and as streaks and patches to several mm across sometimes associated with fine-grained oxidized pyrite.

This is a dacitic lava that has been suffered relatively strong silica-chlorite±pyrite alteration, with the production of a strange groundmass texture very reminiscent of a detrital sediment rather than a lava.

OPAQUE MINERALOGY: This sample contains sparsely disseminated, inclusion-free and unaltered pyrite as small subidiomorphic grains (<0.5mm across), sometimes occurring as discontinuous tiny veinlets. A fibre quartz veinlet in a high-strain microshear contains aggregates of tiny well-formed pyrite crystals showing very minor hematite alteration on their rims. No other sulphides were noted in this sample.

SAMPLE NUMBER: 564472

LOCATION: Beatrice 387631E 5346749N

SUMMARY: This is formerly glassy, vesicular monomict rhyolitic lava breccia that has suffered strong silica-sericite ± pyrite alteration.

HAND SPECIMEN: (CVC) This is a clayey, highly weathered grey felsic quartz-rich lava breccia or epiclastic sandstone.

THIN SECTION:

This rock is a *strongly sericitized formerly highly glassy, vesicular* felsic lava breccia. It is composed of indistinct fragments of mainly quite vesicular lava, less than 2mm long, in which the rather elongate vesicles have been filled by polycrystalline quartz. The originally highly glassy groundmass of the lava fragments has altered extensively to rather coarsely crystalline polygonal quartz patches and the remainder is sericite. Disrupted small quartz veinlets are common, and the sample contains quite abundant dispersed opaque mineral concentrations, probably fine-grained pyrite; this is not associated with any particular style of alteration (eg with quartz veinlets or with sericitized glass).

This sample was probably a vesicular monomict rhyolitic lava breccia erupted explosively and subsequently strongly altered hydrothermally, with *silica-sericite alteration being most pronounced* (although the rock is not silicified).

SAMPLE NUMBER: 564481 LOCATION: Beatrice 387754E 5346558N

SUMMARY: This is an intensely chloritized former felsic lava(?) that has suffered total textural and minerlogical reconstitution during strong chlorite-quartz-pyrite alteration.

HAND SPECIMEN: This is a very strongly chlorite-altered fairly fine-grained epiclastic sediment with relatively common disseminated pyrite.

THIN SECTION:

The original texture of this sample has been effectively obliterated by the intense chloritization. It is composed essentially of a complex and variable intergrowth of bright green chlorite and quartz, with common dispersed pyrite as individual grains and multi-crystalline trains. The quartz varies from disaggregated and boudinaged former veinlets and narrow bands, to tiny rounded multicrystalline grains similar in every way to those in the previous sample (564467). There is minimal sericite or albite in this rock. Chlorite occurs basically as the matrix in which the quartz grains are dispersed, and constitutes at least 50 modal% of the sample. Irregular rather elongate, narrow areas of very finely-crystalline quartz with no interstital chlorite may represent local recrystallization of quartz and dissolution of chlorite in some late-stage high-strain zones. The pyrite occurs associated with both quartz and chlorite and occurs as clusters of very small crystals that may reach 0.5-1mm diameter across a cluster.

Keeping in mind the extensive textural modification of the previous sample during relatively weak silica-chlorite alteration, the original nature of this sample, with intense chlorite-quartz alteration, can only be guessed at. I presume it was a felsic lava, but the intense chlorite-quartz alteration has produced total recrystallization and reconstitution of the sample.

OPAQUE MINERALOGY:

This sample contains not uncommon disseminated pyrite as ragged grains to about 0.6mm across mainly restricted to the altered matrix of this rock. The pyrite grains are anhedral and commonly fractured and many have volumetrically insignificant marginal attachments or overgrowths of chalcopyrite that has partially altered to blue covellite. Many pyrite grains show partial or complete alteration to hematite. The sulphides in this sample are definitely associated with the strong chlorite-quartz alteration, but are not going to be a big money-spinner for Aberfoyle.

SAMPLE NUMBER: 564491 LOCATION: Beatrice 387703E 5347280N

SUMMARY: This rock is a strongly sericite-calcite-altered crystal lithic tuff with notable biotite and quite large apatite phenocrysts in addition to quartz and altered feldspar.

HAND SPECIMEN: Tyndall Group: This is a chloritized greenish felsic lava or lava breccia.

THIN SECTION:

This is a strongly calcite-sericite altered felsic lava breccia or lithic crystal tuff. It has a texture that is so overprinted by sericite-dominated alteration that it is difficult to judge with certainty whether it is a felsic lava breccia, a felsic lava with a false breccia texture due to alteration, or a felsic crystal lithic tuff. Poorly defined lava 'fragments' are devitrified rhyolitic lava with quartz, and altered feldspar and biotite phenocrysts in a mosaic-textured quartz-albite matrix. Several fragments have a weakly banded texture and angular, broken phenocrysts of quartz, and strongly resemble crystal lithic tuff. Very sudden changes in groundmass texture, and areas with and without biotite phenocrysts, lead me to conclude that this is probably a rhyolitic crystal lithic tuff. This sample has two unusual features; firstly, biotite phenocrysts altered to distinctive book-shaped aggregates of chlorite and FeTi oxide granules are uncommon but notable, and secondly, four or five large apatite phenocrysts are present, some over 0.5mm long. All feldspar phenocrysts are altered to calcite and sericite.

The texturally heterogeneous groundmass is strongly overprinted by a mesh of sericite and calcite, the former defining a weak foliation, and in places being Fe-stained to a brownish web. Chlorite forms small angular concentrations in the groundmass but is much less abundant than sericite or calcite. The calcite also forms veinlets that clearly cross-cut the sericitic mesh. Opaque oxides or sulphides (pyrite?) are disseminated in very minor abundance through the altered groundmass, but could not be identified without a polished section.

SAMPLE NUMBER: 564493 LOCATION: Beatrice 387815E 5346203N

SUMMARY: This is a formerly glassy quartz-phyric rhyolitic lava that has suffered strong silica-sericite alteration during deformation that produced a weak foliation.

HAND SPECIMEN: (Tyndall Group) This is a pale brown, slightly foliated felsic lava with prominent quartz phenocrysts to 4mm across.

THIN SECTION:

This is a formerly glassy rhyolitic lava with about 5-8 modal% of unusually large (mainly 2-4mm across) quartz phenocrysts in a devitrified and foliated groundmass. The quartz phenocrysts vary from subhedral with slightly reacted and rounded outlines, to being almost rounded. All have suffered strong straining and fracturing, and most are partially or entirely granulated or subgrain recrystallized. Also, most quartz phenocrysts have rolled during the foliation development, and have the sericitic matrix wrapping around them rather closely. A few patches with stretched angular outlines are almost certainly totally sericitized feldspar phenocrysts.

The groundmass of this sample was glassy, and has recrystallized following devitrification to a very sugary quartz-rich matrix transected by an intense sericite-defined foliation., much of which is Fe-stained. Streaky chlorite distributed along the foliation is much less abundant than sericite and altered to yellowish oxychlorite or chlorite-clay mixtures. Very fine-grained opaque oxides or altered pyrite occur in a few dispersed small patches.

SAMPLE NUMBER: 564495 LOCATION: Beatrice 387782E 5346294N

SUMMARY: This is a probably monomict rhyolitic lava breccia that has suffered a strong stretching, with foliation development and extensive sericitization. It has strong petrographic similarities (apatite and biotite phenocrysts) to sample 564491.

HAND SPECIMEN: (Tyndall Group) This is a strongly foliated and sericitized felsic lava breccia or epiclastic sediment.

THIN SECTION:

This is a quite strongly foliated felsic lava breccia, dominated by stretched fragments of quartz and rarely quartz+feldspar-phyric formerly glassy lava. Lava fragments are lens-shaped and flattened, and the formerly glassy groundmasses of these fragments have devitrified and recrystallized to a complex and heterogeneous mixture of fine-grained quartz-albite-sericite. Quartz phenocrysts make up less than a few modal% of this sample, and Strain distribution in this sample was not homogeneous, as some quartz phenocrysts are almost pristine and others are strained and fractured, and many show subgrain recrystallization. The few feldspar phenocrysts are totally sericitized and rather 'smeared out'. A notable phase is relatively abundant (perhaps 20-30 crystals in the section) small phenocrysts of apatite similar to those in sample 564491, and further emphasizing the similarity with that sample, this rock contains a few chloritized biotite phenocrysts.

The groundmass is transected by curving masses of felted sericite that define a fairly well-developed foliation that wraps around phenocrysts and between lava fragments. Chloritic patches are streaked and speckled with tiny opaque oxides.

SAMPLE NUMBER: 564500 LOCATION: Beatrice 387718E 5346235N

SUMMARY: This is weakly sericitized and foliated shale derived from a felsic volcanic terrain.

HAND SPECIMEN: (Tyndall Group) This is very fine-grained, probably silicified shale with a weak parting preserved.

THIN SECTION:

This is clearly a very fine-grained detrital sediment in thin section. The only easily identifiable detrital grains are angular volcanic quartz fragments, much less than 0.1mm across. The remainder of the rock is composed of a very even-textured intergrowth of microcrystalline quartz and possibly albite, all evenly overprinted by a well-developed but not intense mesh of sericite that forms a weak foliation. Tiny spots of chlorite through the sample are not uncommon, and a few veinlets of calcite cut the rock.

This is clearly a shale derived probably from a felsic volcanic terrain, and it probably had an abundant very fine-grained comminuted glassy ash component. Although the sample seems silicified in hand specimen, it has not been silicified; the apparent toughness is due to recrystallization of the former glassy component to dominant quartz and albite. It is quite unlike the Que River Shale, for instance, in the lack of detrital pelitic metamorphic detritus (eg muscovite) in this rock.

SAMPLE NUMBER: 564508 LOCATION: Beatrice 386986E 5346288N

SUMMARY: This is a formerly aphyric obsidian or vitric tuff that has suffered patchy silica-chlorite (±pyrite) alteration.

HAND SPECIMEN: Tyndall Group: This is a dark brown-greenish strongly altered felsic lava with fairly intense chlorite alteration.

THIN SECTION:

This sample was probably originally an aphyric felsic lava or a fine-grained vitric tuff. It is now composed of a fine-grained but rather heterogeneous matrix varying from saccharoidal silica, typical of zones of intense silicification, to more pristine, murky areas in which the original *albite-quartz intergrowth* replacing devitrified glass has been partially altered to sericite. Small angular areas of coarser-grained quartz are clearly disrupted and discontinuous quartz veinlets. Chlorite patches up to 4-5mm across are composed of dense webs and meshworks of pleochroic yellowy-green chlorite that are altered to yellowish-red oxidized clay-chlorite mixtures in many areas of the slide. Small disseminated cubes of pyrite occur as narrow trains and clusters along fractures through both chloritized, and unchloritized areas of the sample; they clearly cut across and post-date sercitized groundmass. Chlorite also occurs more evenly dispersed through the slide, and intergrown with coarse quartz in fan-like aggregates.

This sample was either an aphyric glassy lava (obsidian), or a fine-grained, crystal-free vitric tuff, that has suffered patchy silicification and chlorite alteration that overprinted an earlier weak sericitization. Pyrite appears to be asociated with the quartz-chlorite alteration.

SAMPLE NUMBER: 564510 LOCATION: Beatrice 386965E 5346339N

SUMMARY: This is formerly highly glassy felsic lava or vitric tuff, very similar to 564322, with strong sericite-hematite (+silica?) alteration, and tourmaline in a microshear that may indicate granite-related alteration.

HAND SPECIMEN: (Tyndall Group) This is a red-brown formerly glassy almost aphyric felsic lava.

THIN SECTION:

This sample in thin section is almost identical to sample 564322, in having a distinctive groundmass texture composed of cells of mosaic-textured quartz and minor albite. As in 564322, these cells often have clear quartz in the centre of each cell, but with chlorite-speckled dirty quartz and minor albite in the outer zones of each cell. The contacts between adjacent cells are Fe-stained or oxidized chloritic material often present only as dark films. This rather lapilli-like texture almost certainly results from recrystallization of devitrified glass, possibly accompanied by some silicification. A few large (>1mm) remnants of clear quartz probably represent former phenocrysts.

This rock is transected by anastomosing seams of oxidized yellow-red Fe-stained sericite; this pervades the rock as a fine mesh, but abundant development of this material is more restricted to broad (often more than 1mm wide) shear zones subparallel with the sericite mesh, and often with inclusions of granulated groundmass quartz. Cores of these shear zones are sometimes filled by red translucent goethite, and one single distinctive pleochroic grain of tourmaline was noted in such a shear. Coarse-grained sheaves of sericite also are a minor notable component of this rock. Parts of the groundmass outside the sericitic miroshears are pervaded by small bladed crystals of altered secondary hematite.

This sample was probably an almost aphyric rhyolitic glassy lava (obsidian), less likely a fine-grained vitric tuff. After devitrification -recrystallization the rock suffered strong sericite-hematite alteration, and possibly silicification; the presence of tourmaline strongly suggests that this alteration was granite-related. I realize that the nearest outcrops of Murchison Granite are about 10-15 km further N, but the alteration present is fairly typical of the outer granite-related alteration, and the presence of tourmaline in this rock further supports this story. Granite may extend in the subsurface for many km south of the last outcrop of Murchison Granite.

SAMPLE NUMBER: 564513 LOCATION: Beatrice 386878E 5346470N

SUMMARY: This is weakly foliated formerly highly glassy, sparsely plagioclase-phyric dacitic to rhyolitic lava or tuff that has suffered notable but not strong chlorite alteration, and weak pyrite mineralization associated with late-stage fracturing and recrystallization in high-strain zones.

HAND SPECIMEN: (Tyndall Gp) This is a pale grey-green felsic lava with small dark chlorite patches

THIN SECTION:

This sample is composed of a weakly foliated fine-grained intergrowth of quartz, chlorite, sericite and minor disseminated pyrite. The texture of the sample is homogeneous but not diagnostic with respect to the primary nature of this rock. A few former plagioclase phenocryst sites are replaced by polycrystalline quartz, and the remainder of the sample was probably originally glassy. Although a foliation is not evident in the hand specimen, sericitic webs through the sample form intergrowths parallel with streaks of green chlorite and narrow zones of recrystallization in high-strain areas, defining a clear foliation in thin section. The high-strain zones of recrystallization are sericite- and chlorite-free and composed of finer-grained secondary quartz (almost microcrystalline) but contain common scattered tiny cubes of fresh pyrite. A second set of irregular quartz-filled, narrow tension gashes crosscuts the foliation direction at a high angle.

The textural reworking of this sample renders it difficult to judge its original identity. It may well have been a highly glassy sparsely plagioclase-phyric dacitic to rhyolitic lava, although there is no evidence to rule out it having been a vitric tuff. The absence of quartz phenocrysts contrasts this sample with some of the (apparently) CVC rhyolitic lavas described earlier in this set. More extensive foliation development from a sample such as 564454 could produce a rock very similar to this sample.

The abundance of chlorite in the rock is notably more than would normally be seen in an altered felsic volcanic from the MRV, so the sample should be described as chloritized, but the minor pyrite mineralization is clearly associated with late stage fracturing and recrystallization.

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SAMPLE NUMBER: 564515 LOCATION: Beatrice 386844E 5346555N

SUMMARY: This is formerly highly glassy, sparsely plagioclase-phyric dacitic to rhyolitic vitric lithic tuff that has suffered weak chlorite alteration.

HAND SPECIMEN: (CVC) This is a dark grey-green silicified chlorite-altered felsic volcanic or tuff with abundant spots where disseminated pyrite has weathered out from the rock.

THIN SECTION:

This sample is very similar to the previous rock (despite their being apparently from different stratigraphic units), except it is has less sericite-mesh foliation development, and a few quite large (to 1.5mm long) albitized plagioclase phenocrysts are preserved. The remainder of the rock is very fine-grained but variably textured quartz-albite-chlorite intergrowths after former devitrified glass. At least two areas of the 'groundmass' with rather more coarse-grained albite and chlorite strongly resemble lithic fragments. Former (albite?) phenocryst sites in other parts of the rock are replaced by polycrystalline clear quartz. The distribution of fine-grained chlorite in the groundmass is very heterogeneous, giving the impression that the rock may have had a fragmental texture; this is supported by the occurrence of a single quite large 'fragment' composed almost totally of exceptionally fine-grained sericite. However, the margins of this sericitic fragment merge imperceptibly into the 'normal' part of this difficult rock. I think that probably this was a vitric lithic tuff, composed very largely of almost aphyric glassy fragments of rhyolitic to dacitic composition. As for many of the other samples, this rock was chloritized during or after devitrification of the glass.

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SAMPLE NUMBER: 564517 LOCATION: Beatrice 386844E 5346574N

SUMMARY: This is polymict lava brecia derived from dacitic to rhyolitic lava fragments; it shows strong sericite+ minor chlorite alteration of the matrix.

HAND SPECIMEN: (CVC) This is a pink and green felsic lava breccia with pinkish lava fragments in a dark green chloritized matrix.

THIN SECTION:

This is probably a polymict lava breccia, although the fragments (some at least 2cm long) present seem to come from only two distinct flow units. Most fragments are clearly derived from a near-aphyric dacitic to rhyolitic glassy lava in which the groundmass has devitrified to very fine-grained quartz and albite, with minor chlorite and sericite; spots and small patches of secondary quartz are growing from the fine-grained devitrified groundmass, and the grainsize of the recrystallized groundmass varies irregularly across fragments. The other fragment type contains about 5-10 modal% of smallish (<0.5mm across) albite phenocrysts; these are mainly alteration free and have subhedral outlines, and more frequently than not they occur in multi-crystalline clots.

The matrix between the quite angular lava fragments appears to be composed of comminuted material identical to the lava fragments, perhaps originally an ash. The matrix has suffered extensive sericite (±chlorite) alteration, and sericitization along fractures of some of the lava fragments has produced a microscopic 'false-brecciation' texture within individual fragments. A few grains of pyrite to about 0.4mm across occur.

OPAQUE MINERALOGY

In this sample, pyrite occurs as sparse angular disseminated grains, differing from the pyrite in 564481 in that this (564517) pyrite lacks hematite alteration. Apparently unrelated to the pyrite are small ragged zones of chalcopyrite that show strong marginal alteration to covellite. These chalcopyrite 'concentrations' occur in matrix between lava fragments. A single discontinuous small quartz-albite veinlet contains a small amount of idiomorphic inclusion-free pyrite grains (<0.3mm across) that sometimes show minor rimming of chalcopyrite-covellite. All the sulphides in this sample are of hydrothermal or diagenetic origin, and most appears to be related to the sericite alteration.

SAMPLE NUMBER: 564522 LOCATION: Beatrice 387250E 5346559N

SUMMARY: This rock was probably a glassy dacitic to rhyolitic lava breccia that suffered intense silica-chlorite alteration before being strongly hematite-altered.

HAND SPECIMEN: (CVC) This is a cherty, silicified red felsic lava or lava breccia.

THIN SECTION:

This rock is very strongly altered and texturally reconstituted, making identification of the protolith difficult. Almost certainly, it was a rhyolitic to dacitic very glassy lava or lava breccia, possibly even a vitric tuff. However, intense recrystallization of the devitrified groundmass to secondary silica and chlorite, followed by strong hematite alteration, have obliterated the original texture. Local sudden variations of the groundmass texture suggest that the rock was a lava breccia. Streaks and bands of chlorite, up to a few mm wide and strongly foliated, transect the sample, defining a weak foliation. Sericite forms streaks and patches, and appears to have been largely replaced by fine-grained granular hematite that makes up perhaps 30 modal% of the sample. The hematitized domains often define curved 'fronts', suggesting diffuion waves of Fe-rich solutions passed through the sample after silicification.

The intense chlorite-silica alteration in this sample is similar though perhaps not as pervasive as in sample 564481; the latter sample, however, did not suffer a later hematite alteration event.

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PETROGRAPHIC REPORT

Further Samples from Lake Margaret EL

For Aberfoyle Resources

Attn. Danny Noonan

by

Anthony J. Crawford

Geology Department

University of Tasmania

17/6/90

SAMPLE NUMBER: 482795

LOCATION: N Selina area, Lake Margaret EL

SUMMARY:

This is a strongly foliated quartz+(sparse) feldspar-phyric former crystal tuff, felsic lava breccia or epiclastic sediment; despite proximity to the Murchison granite, this rock shows a texture and mineralogy atypical of Murchison granite aureole felsic rocks, suggesting it is faulted (thus the stronger foliation) into its present position.

HAND SPECIMEN:

This is a quite strongly foliated grey meta-felsic tuff or epiclastic sediment.

THIN SECTION:

At first glance, the foliation and angular crystal fragments in this section give the strong impression that the rock is a crystal tuff. However, having seen the previously described samples in this set, I can't rule out the possibility that the stronger deformation texture (ie well-developed foliation) in this particular sample has destroyed any evidence of it once having been a quartz-phyric polymict lava breccia or epiclastic sediment. However, small (<<1mm) almost rounded fragments of mosaic-textured quartz-albite intergrowths after devitrified felsic glass adjacent to, or immersed in extremely fine-grained quartz-sericite matrix suggest too much textural heterogeneity for this rock to have been a felsic lava. The sample consists of about 5-10 modal% of angular volcanic quartz fragments from 0.1-2mm across, and occasional small partially sericitized albite phenocryst fragments set in a strongly sericite-altered matrix pervaded by a sericite-defined foliation that is enhanced visually be Fe-staining of the sericite along foliation planes. Chlorite is very fine-grained and considerably less abundant in this sample than most of the preceding rocks. I see no obvious evidence for the possible overprint you mention in your notes resulting from proximity to the Murchison granite. Could a fault separate this sample from the granite, and be related to the stronger foliation in this sample? It is texturally and mineralogically (no obvious Kspar) nothing like felsic rocks from the Murchison aureole to my experience.

SAMPLE NUMBER: 563804

LOCATION: N Selina area, Lake Margaret EL

SUMMARY:

This is a strained, very strongly chlorite (±quartz ± pyrite) -altered former fairly coarse-grained epiclastic sediment derived from quartz+feldspar-phyric felsic lavas.

HAND SPECIMEN:

This is a dark green chlorite-quartz altered felsic lava or lava breccia.

THIN SECTION:

This sample is extremely heterogeneous texturally, suggesting it was originally a polymict lava breccia or epiclastic sandy sediment. It is mainly composed of indistinct quartz+albite-phyric formerly glassy lava or tuff fragments that have recrystallized to fine- to quite coarse-grained quartz; these have, in turn, been overprinted by intense chlorite alteration. Several areas dominated by strained volcanic quartz grains aggregated more tightly together by pressure solution give the appearance of sandy bands rather than disrupted quartz veinlets. Former feldspar phenocrysts in some fragments are totally replaced by dusty brownish sericite, and the same material occurs streaked through chlorite throughout the rock, although in much less abundance than chlorite. The chlorite overprinting a large part of this sample occurs as bright green interstitial patches between former clasts or fragments, and in fibrous kinks intergrown with quartz, that transect the sample in abundance. Small altered (?) pyrite grains, and granules of rather bladed hematite, and yellowish epidote, occur concentrated in some chorite patches.

This sample was probably an epiclastic sandstone derived from quart+feldspar-phyric felsic volcanics; it has been strained and suffered strong chlorite-quartz±pyrite alteration.

SAMPLE NUMBER: 564815

LOCATION: N Selina area, Lake Margaret EL

SUMMARY:

This is a quartz-phyric rhyolitic lava breccia that has suffered fairly strong chlorite-sericite (±pyrite) alteration concomitant with weak foliation development and strain fracturing of phenocrysts.

HAND SPECIMEN:

This is a weakly foliated chloritic lava breccia or epiclastic sediment with distinct fine-grained almost black lava fragments to about 1cm long.

THIN SECTION:

Extensive alteration of this sample makes it rather hard to diagnose with certainty. It is most likely to be a monomict felsic lava breccia. Angular fragments of quartz-phyric formerly glassy rhyolitic lava contain up to about 5 modal% of large quartz phenocrysts (to 3mm long), most of which are internally strained, broken up and granulated, and often subgrain recrystallized. The formerly glassy groundmass is extensively recrystallized as fine- to relatively coarse-grained quartz, often with a sugary texture, but sometimes with typical mosaic textures. It is difficult if not impossible to determine whether the rather variable groundmass recrystallization textures are primary (due to variable cooling -devitrification textures within the same brecciated flow) or alteration-induced. The altered groundmass is overprinted by dispersed and patchy very fine-grained chloritic alteration. Sericite is more restricted to anastamosing veins that defined a weak foliation. Many fragments have the fine-grained chloritic groundmass replaced by messy red-brown hematite-goethite. This Fe oxide-hydroxide alteration is after oxidized pyrite grains, still visible as altered euhedra sparsely disseminated through some fragments and not through others.

SAMPLE NUMBER: 564818

LOCATION: N Selina area, Lake Margaret EL

SUMMARY:

This is a chlorite-sericite-pyrite altered glassy plagioclase-phyric dacitic lava.

HAND SPECIMEN:

This is a dark grey foliated fairly fine-grained with clots of black chlorite to several mm in diameter.

THIN SECTION:

This is an altered dacitic lava in which the primary texture is nevertheless quite well preserved. This was a plagioclase-phyric dacitic lava with a glassy groundmass, made up of about 5-8 modal% of totally sericitized plagioclase phenocrysts, mainly less than 1mm across set in a mosaic textured quartz-albite intergrowth replacing devitrified glass. A notable feature of this sample is the relative abundance and large size of apatite phenocrysts, reminiscent of samples from the Winterbrook area that I described for Sven Rand. Patches of groundmass are overprinted by streaky sericite alteration essentially defining a weak foliation, and less abundant but often somewhat larger patches of bright green chlorite are aligned along the same direction. Pyrite grains to 1mm across are scattered throughout the sample (<1 modal%) but definitely more concentrated in chlorite patches. The pyrite grains are often broken down around their edges to hematite(?), and some grains are entirely reduced to tiny granules of hematite(?).

SAMPLE NUMBER: 482957

LOCATION: N Selina area, Lake Margaret EL

SUMMARY:

This is a very strongly chlorite-magnetite-altered volcanic quartz-rich epiclastic sandstone with sparse thin pyrite veinlets post-dating magnetite alteration.

HAND SPECIMEN:

This is a strongly chlorite-altered and weathered felsic epiclastic sediment with lava clasts to about 4mm across. It contains common disseminated fine-grained pyrite.

THIN SECTION:

This sample is exceptionally strongly altered and strained, and the thin section offers less clues to its original identity than the hand specimen. It consists of about 60-70 modal% of quite coarse-grained (to 5mm long) volcanic quartz that has been strongly strained, granulated or fragmented, and sub-grain recrystallized. Matrix areas are dominated by green chlorite with intergrown colourless sericite, that pervades the rock without producing any foliation. Magnetite is distributed throughout the chlorite, sometimes in concentrations of grains up to 5mm across. Diffuse areas of the rock, but particularly in the weathering rind, are strongly oxidized, with chlorite replaced by dull red-brown goethite or limonite, and magnetite oxidized to bright red hematite or limonite cubes.

The sheer amount of volcanic quartz in this sample suggests that it was probably an epiclastic sandstone derived from quartz-phyric rhyolitic volcanics. It has clearly been strongly chlorite-altered, with magnetite and later pyrite (see later) being introduced during the chloritization and granulation of the sample.

OPAQUE MINERALOGY

This sample shows a fairly simple opaque mineralogy, basically magnetite-pyrite-hematite (martite). Magnetite occurs as clots and trains of idiomorphic to angular and corroded grains, mainly less than 0.5mm across, but with clots up to 5mm across being obvious in thin section. The magnetite is being pseudomorphed by hematite (martite) adjacent to fractures and irregularly throughout the slide. Hematite, in turn, and also chlorite, are replaced by messy red limonite or goethite in waves and almost colliform growths throughout the sample. Euhedral pyrite occurs as a few trains of single euhedral crystals, occasionally with cores of magnetite. No sphalerite, galena or chalcopyrite were noted. Magnetite-chlorite (±pyrite) alteration is typical of the outer zone of the Murchison Granite alteration, for example, at the Lake Selina prospect.

SAMPLE NUMBER: 482961

LOCATION: N Selina area, Lake Margaret EL

SUMMARY:

This is an intensely silica+sericite+pyrite-altered formerly glassy felsic lava. Pyrite introduced in the silicification event has recrystallized to coarser grains in veins produced by deformation late, or after the main alteration.

HAND SPECIMEN:

This is a silicified and pyritized felsic lava with several 1-2mm-thick veins of pyrite.

THIN SECTION:

This extensively altered sample was originally a plagioclase (±quartz?)-phyric glassy dacitic to rhyolitic lava. However, almost every trace of the original texture has been obliterated by an intense silicification, so that only occasional ghost outlines of former albitized plagioclase phenocrysts survive. The silica alteration of the formerly devitrified glass (which would likely have been a mosaic quartz-albite intergrowth prior to silicification) has produced a fine-grained, sugary textured intergrowth of tiny quartz grains with convolute grain boundaries. Sericite overprints the silica alteration as a fine web that coalesces to form more massive clots and common diffuse veins that define a weak foliation (alignment) parallel to the pyrite veinlets.

Pyrite occurs as disseminated patches and concentrations of ragged crystals intergrown in sericite and scattered through the sugary matrix. Most grains in these patches are less than 0.2mm across. The wider pyrite veins are composed of more euhedral, coarser-grained pyrite associated with coarser-grained, strained quartz and sericite that often forms pressure fringes on the pyrite. These veins are discontinuous, and almost certainly represent high-strain zones in the original silicified rock in which quartz, sericite and pyrite recrystallized to their more euhedral, coarser-grainshapes. The pyrite therefore, was probably associated with the silica-sericite alteration, but regrew in coarser veins during late- or post-alteration deformation.

T.C. 28

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PETROGRAPHIC REPORT

ROCKS FROM LAKE MARGARET LICENCE

FOR ABERFOYLE RESOURCES LTD

attn Danny Noonan

by

Anthony J. CRAWFORD
Geology Department
Uni of Tasmania
17/2/90

SAMPLE NUMBER: 482708

SUMMARY:

This rock was a felsic crystal lithic tuff with a glassy groundmass that has been extensively magnetite-chlorite altered.

HAND SPECIMEN:

This is a dark grey-green very strongly fractured and chloritized felsic lava or pyroclastic with strong magnetite veining.

THIN SECTION:

This is a very strongly altered and mineralized former felsic tuff. It is composed of abundant strongly strained and often sub-grain recrystallized quartz grains to at least 3mm long, most of which are quite angular in outline, and are clearly broken crystals; however, in a few areas of the slide, the quartz grains appear to be disrupted and deformed quartz veinlets. A few angular crystals of albite are also present, although much smaller than the quartz grains. Several grains clearly distinguishable from the groundmass are fine-grained recrystallized (devitrified) former glassy felsic volcanic fragments, mainly less than 1mm long. These, and the broken nature of the phenocrystal quartz and subordinate feldspar, strongly indicate a felsic crystal lithic tuff origin for this rock.

In the least altered (or least replaced) areas of groundmass, the original rocktype clearly had a very fine-grained devitrified glassy texture, composed dominantly of quartz, minor albite and chlorite, all riddled by very fine webs of sericite.

The rock has suffered intense chlorite-magnetite alteration, with large areas of the thin section being composed entirely of dense trains of magnetite crystals immersed in pale green chlorite. The latter forms well-formed books and sheaves intergrown with epidote and ribbon quartz in places.

OPAQUE MINERALOGY

Almost massive stringer magnetite, composed of intergrown ragged grains (rarely subhedral to euhedral), makes up almost 50 modal% of this sample. The magnetite is martitized to hematite along many cracks and grain boundaries, and this, in turn, is often altered to translucent goethite. Veinlets composed entirely of goethite cut the sample in places. Tiny rounded inclusions of pyrite and rarely, chalcopyrite, are present in the magnetite, but form only a tiny proportion of each magnetite grain. Similar tiny inclusions of pyrite and chalcopyrite occur in the gangue.

SAMPLE NUMBER: 482710

SUMMARY:

This is a tuffaceous shale siltstone with veinlets of pyrite and magnetite, and sparse disseminated magnetite and pyrite. The presence of tourmaline strongly suggests granite-related mineralizing fluids.

HAND SPECIMEN:

This is a very dark green, particularly fine-grained felsic pyroclastic or volcanogenic sediment with common extremely thin seams and veinlets of pyrite.

THIN SECTION:

This sample was a tuffaceous shale-siltstone composed of tiny fragments of volcanic quartz and much less abundant albite set in a very fine-grained groundmass or matrix of quartz, albite, and possible Kspar, all strongly veined by sericite that occurs as a fine web throughout the rock. Two separate domains of the original rocktype are obvious, differing mainly in grainsize (fine versus very fine) and abundance of tiny opaque grains. It is difficult to determine whether these domains are disrupted adjacent beds or layers, or simply differing responses of the formerly vitric-rich matrix to devitrification-recrystallization.

The rock has fractured quite extensively, and varying vein assemblages have grown in fracture zones. The most abundant assemblage is almost pure very fine-grained sericite, whereas quartz-epidote-chlorite- pyrite-magnetite veins, with less abundant sericite, are coarser grained but less common. An important feature of this sample is the presence of dull blue-grey tourmaline, both as rare crystals in the quartz-epidote-chlorite veinlets, and as tiny poorly formed crystals and patches in the matrix.

OPAQUE MINERALOGY

Fine-grained anhedral magnetite, and less abundant but much larger euhedral to subhedral pyrite grains occur scattered through the sample. Pyrite crystals sometimes form discontinuous veinlets. The magnetite crystals are often fractured and slightly altered to hematite, and they occasionally contain tiny rounded pyrite inclusions. The bigger pyrite grains often contain small chalcopyrite inclusions, and these also occur less abundantly in the gangue. Covellite occurs along cracks in chalcopyrite-bearing pyrite, clearly due to alteration of chalcopyrite. Pyrite and magnetite appear to be almost contemporaneous in the paragentic sequence in this sample.

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SAMPLE NUMBER: 482Ø22

SUMMARY:

This sample was probably a glassy, autobrecciated quartz-phyric rhyolitic lava that has suffered strong K feldspar - magnetite alteration, and been cut by a few possibly later pyrite veinlets.

HAND SPECIMEN:

This is a dark grey felsic lava breccia or lithic tuff with pink, strongly altered lava fragmants mainly less than 5mm across, set in a very fine-grained dark, altered and mineralized matrix.

THIN SECTION:

This sample is a very strongly altered and mineralized lava breccia originally of rhyolitic composition. Many lava fragments show jig-saw-fit boundaries. All were originally a quartz-phyric rhyolite, with well-formed quartz phenocrysts to 2mm across, set in what was probably a glassy groundmass that has extensively recrystallized. Most quartz phenocrysts show strong internal deformation features. The texture and mineralogy of these recrystallized lava fragments is unusual and distinctive. They are composed of a holocrystalline relatively 'coarse-grained' intergrowth of granular quartz and untwinned or simply-twinned Kspar. Occasional almost euhedral patches of yellow chlorite are possibly pseudomorphs after primary biotite phenocrysts.

The groundmass of this lava breccia shows an identical coarse-grained quartz-Kspar mineralogy as the lava fragments, but in addition it is riddled with pervasive fine-grained magnetite. Veins of quartz-magnetite-chlorite, quartz-chlorite-epidote-magnetite, and quartz-sericite (minor) are present in the sample, although chlorite is a minor phase and often oxidized to reddish-orange ferri-chlorite.

OPAQUE MINERALOGY

The matrix of this lava breccia is riddled with tiny anhedral, inclusion-free magnetite grains, that often form almost continuous linked intergrowths. Magnetite shows marginal alteration to reddish hematite in places. A few narrow veinlets containing almost totally altered pyrite subhedra are composed now of translucent goethite that forms parallel bands or seams along the length of the veinlets. Although it is very difficult to be certain, I think that the pyrite veinlets post-date the disseminated magnetite in this rock.

SAMPLE NUMBER: 482726

SUMMARY:

This is a formerly glassy, almost aphyric rhyolitic lava that has suffered fairly strong chlorite-pyrite alteration after a K feldspar-quartz-calcite alteration event.

HAND SPECIMEN:

This is a very strongly chloritized and mineralized felsic lava or pyroclastic with abundant disseminated pyrite and sparse carbonate veinlets in a chloritic matrix.

THIN SECTION:

This sample is a strongly chlorite-altered formerly almost aphyric rhyolitic lava. In a few places, fairly convincing relics of perlitic cracking are present. The sample contained only a few small quartz microphenocrysts, and these are strained and reacted at their rims. The sample is transected by several vein assemblages, the most important being a very fine-grained swirling sericite ± minor fine carbonate. Chlorite veins and segregations are also common, and mid-green chlorite is dispersed in abundance through most of the sample. A few coarser-grained carbonate veins cut the sample, and a few monomineralic, discontinuous quartz veins are also present.

The formerly glassy groundmass of this sample has recrystallized entirely to a relatively 'coarse-grained' granular, sugary intergrowth of quartz and Kspar, with interspersed chlorite and fine-grained calcite. It is likely that the chlorite-pyrite alteration post-dated the Kspar-quartz -calcite alteration event.

OPAQUE MINERALOGY

This sample contains around 8 modal% disseminated, fairly fine-grained pyrite, with individual grains rarely larger than 1mm across. The pyrite occurs as angular and irregular to subhedral grains, either randomly distributed through the rock, or occurring in trains of crystals often marginal to chlorite-quartz-calcite veinlets, and much less frequently associated with sericite-calcite veins. The pyrite grains often contain small magnetite inclusions, and much less common, tiny rounded chalcopyrite and pyrrhotite inclusions. Although determining a paragenetic sequence of opaques for this slide is rather difficult, it appears that dominant pyrite might post-date and have overgrown less abundant early magnetite.

SAMPLE NUMBER: 482727

SUMMARY:

This is a volcanogenic sandstone derived from felsic volcanics, that has suffered magnetite mineralization disseminated through the sample, followed by minor pyrite-chlorite veining.

HAND SPECIMEN:

This is a very slightly schistose dark grey siltstone to sandstone.

THIN SECTION:

The detrital nature of the quartz grains in this sample is obvious, as they make up more than 60 modal% of this sample. Almost all have features strongly indicating a rhyolitic volcanic source; these include almost euhedral grains, and common rounded, devitrified melt inclusions. Most of the detrital quartz has, however, suffered moderate to strong granulation, deformation and recrystallization in places. A few former detrital albite grains have been strongly sericitized.

The matrix of this sample is very strongly sericitized, and sericite seams and meshes define the weak foliation. Chlorite is also common in this sample, as irregular patches and meandering veinlets, many of which seem to be associated with the more coarse-grained pyrite mineralization.

OPAQUE MINERALOGY

Pyrite is disseminated as large (0.5-2mm across) inclusion-free subhedral to irregular grains constituting discontinuous veinlets through the rock. The pyrite grains have narrow rims of translucent limonite or goethite. Magnetite occurs as disseminated ragged, fractured grains throughout the sample, mainly << 1mm across, probably constituting around 1 modal% of the sample. The pyrite veinlets appear to crosscut magnetite grains in several places, and thus probably post-date the magnetite mineralization.

SAMPLE NUMBER: 482741

SUMMARY:

This is a strongly foliated, sericitic, felsic lithic tuff with disseminated magnetite, and K spar-sericite dominated alteration.

HAND SPECIMEN:

This is a dark grey, quite strongly foliated sericitic volcaniclastic sandstone or lithic tuff.

THIN SECTION:

This sample is much more strongly foliated than any of the preceding samples. It consists of a variety of volcanic clasts to about 4mm across, including quartz, albite and felsic lava fragments, set in a cleaved sericitic matrix. Many of the sericitized formerly glassy felsic lava fragments are stretched into the foliation, and detrital quartz grains often have pressure fringes of ribbon quartz. All the detrital quartz grains are clearly of rhyolitic volcanic origin, and show marginal recrystallization and reaction with the groundmass. Most lava fragments are snowflake-textured, devitrified glassy rhyolites to dacites; a few have small quartz phenocrysts, and Kspar appears to be common in the recrystallization assemblage. Chlorite is not common in this sample, which is sericite-K feldspar dominated.

OPAQUE MINERALOGY

Magnetite occurs as disseminated grains to a maximum size of about 0.7mm across, forming much less than 1 modal% of this rock. The magnetite grains are subhedral to euhedral, and all are partially to completely martitized to hematite. Relic magnetite cores in some larger martite grains are obvious. A mesh of translucent goethite replacing hematite and magnetite occurs at the edge of the slide, and represents a highly altered former magnetite vein at least 2mm wide. Tiny hematite euhedra occur in abundance throughout the foliated groundmass of this sample; it is difficult to determine whether they are associated with the devitrification-recrystallization of former glass, or whether they are associated with the magnetite-producing mineralization event. I favout the latter.

SAMPLE NUMBER: 482745

SUMMARY:

This is a strongly foliated sericitic felsic crystal tuff with disseminated magnetite altered to hematite.

HAND SPECIMEN:

This is a foliated dark grey, strongly sericitic quartz-phyric rhyolitic lava or crystal tuff.

THIN SECTION:

This sample is a strongly foliated sericitic felsic crystal tuff dominated by entire to granulated phenocrysts and crystal fragments of quartz to at least 2mm across set in a cleaved sericitic matrix. Few quartz phenocrysts show any crystal faces, and many appear to have been broken up into many small crystal fragments that are now dragged out in the cleavage. Some show strong internal deformation and subgrain recrystallization, suggesting that a period of brittle deformation may have preceded the cleavage-forming event. The sample is remarkable for the abundance and size of zircon crystals in it, and it would be a useful sample for U-Pb dating of the zircons.

The groundmass of this sample was probably a vitric ash. It has devitrified, then suffered extensive sericite alteration accompanying cleavage development. Pale green chlorite is not uncommon dispersed through the rock, and former FeTi oxide grains have altered to leucoxenic aggregates.

OPAQUE MINERALOGY

The opaque mineralogy of this sample is essentially identical to the preceding rock, with disseminated former magnetite grains mainly <<1mm across, and forming much less than 1 modal% of the sample. No relic cores of magnetite are preserved, however, in this sample, as all magnetite has been martitized to hematite.

SAMPLE NUMBER: 482749

SUMMARY:

This is a formerly glassy quartz-phyric rhyolite with sparse pyrite veinlets and stringers associated with quartz-chlorite alteration.

HAND SPECIMEN:

This is a foliated and fractured very fine-grained grey-green felsic lava or tuff, probably silicified, with narrow stringers of pyrite.

THIN SECTION:

This rock was originally a very uniform-textured glassy quartz-phyric rhyolite. The original texture is largely retained, although the sample has suffered extensive devitrification-recrystallization of the groundmass, and weak foliation development. Quartz phenocrysts make up around 10-15 modal% of this sample. Most were from 1 - 3m across, and subhedral and rather reacted and rounded. However, most quartz phenocrysts have been fragmented and strained, and many show subgrain recrystallization.

The groundmass of this sample was glassy, but has devitrified and recrystallized to a very uniform, fine-grained quartz-sericite ± Kspar intergrowth in which the sericite defines a weak foliation. Parallel with the foliation are a series of discontinuous fractures and space fillings in which rather coarser-grained secondary quartz, often with ribbon habit, has grown together with green chlorite and pyrite.

OPAQUE MINERALOGY

This sample contains disrupted and discontinuous veinlets of discrete, fairly fine- grained pyrite crystals less than 1mm across, many with ribbon quartz shadows. Small magnetite inclusions are not uncommon in the pyrite, and these often have tiny chalcopyrite and pyrrhotite inclusions attached to them, and possibly rare very small galena inclusions. The pyrite post-dates magnetite, and is clearly associated with the quartz-chlorite vein assemblages.

SAMPLE NUMBER: 482791

SUMMARY:

This is a formerly glassy, plagioclase-phyric rhyolitic or rhyodacitic lava with sparse, disseminated magnetite in a quartz-K feldspar altered recrystallized groundmass.

HAND SPECIMEN:

This is a texturally well-preserved, massive quartz and feldspar-phyric brown rhyolitic lava.

THIN SECTION:

This sample is clearly a rhyolitic or rhyodacitic lava dominated by quite large (1-4mm long) euhedral phenocrysts of albitized plagioclase in which ghost zoning is preserved despite extensive replacement by sericite. Altered plagioclase phenocrysts probably make up at least 12-15 modal% of this sample. Much less abundant, but not uncommon, are rather reacted and fragmented quartz phenocrysts, mainly less than 2mm long. Also present are a few well-formed former biotite microphenocrysts that have been replaced by green chlorite and calcite, and abundant small FeTi oxide microphenocrysts have exsolved ilmenite and altered to leucoxene aggregates. Small, euhedral apatite phenocrysts are also rather common.

The groundmass of this sample was probably largely glassy. However, it has recrystallized to a relatively coarse-grained sugary-textured granular intergrowth of quartz and slightly sericite-speckled Kspar. A few strongly foliated calcite - chlorite veinlets cut the sample, and patchy green chlorite is not uncommon in the groundmass.

OPAQUE MINERALOGY

This sample only contains rare, disseminated, fractured magnetite subhedra that are about half altered on average to hematite.

APPENDIX X

433266

ABERFOYLE RESOURCES LIMITED

EXPLORATION LICENCE 5/85

LAKE MARGARET

TECHNICAL REPORT

DHEM SURVEYS DDH RH-18 1989

Prepared by:

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Distribution

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2. Aberfoyle Resources Limited, Hawthorn

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APPENDICES

1. Summary

A UTEM survey conducted at the Red Hills Prospect in 1988-89, identified a conductor adjacent to the western edge of a black shale horizon from 72S to 104S. DDH RH-18 drilled on line 84S to test this anomaly, failed to intersect economic mineralisation. Sirotem and Em-37 DHEM surveys conducted in DDH RH-18 led to the interpretation of a flat lying conductor occurring below and west of DDH RH-18. DDH RH-19 drilled to test this conductor intersected a shallowly dipping shale horizon at the conductor position. The down-hole and surface EM anomalies have now been satisfactorily explained in terms of the shale horizon and no further exploration can be recommended on geophysical grounds, at the Red Hills Prospect.

2. Introduction

EL 5/85 covers an area of 140 km ^{2}, from north and east of Queenstown to north of Red Hills. This EL is currently the subject of a joint venture agreement between CRA Exploration and Aberfoyle Resources Limited. Aberfoyle Resources manage exploration of the licence. With the inception of the joint venture the Red Hills Prospect, in the NW corner of the EL, became the focus of Aberfoyles initial exploration (see figure 1).

The geology, of the Red Hills Prospect is dominated by an elongate lens of rhyolitic to rhyodactic lava, that forms the Red Hills lava dome. Flanking the dome to the west, is a basinal sequence of felsic volcanoclastics. Within this sequence is a steeply west dipping, thick black shale unit. This black shale thins considerably at depth. Unconformably overlying the lava dome to the east are correlates of the Middle Ordovician Owen Conglomerate. McNeill (1987) suggests the volcanoclastic sequence is repeated on the east side of the lava dome, but is covered by approximately 300m of conglomerate.

A four loop UTEM program was conducted over the western volcaniclastic sequence during December 1988 and January 1989 (Read 1989). This survey identified a current gathering UTEM anomaly occuring over a 2.2 km strike length, from 16S to 104S. This UTEM anomaly was closely associated with the black shale unit within the volcaniclastics. North of line 72S, the observed UTEM anomaly could be adequately explained by the current gathering EM effects of the conductive black shale. From 72S to 104S the UTEM anomaly did not exhibit the EM characteristics expected from a wide block of conductive shale. Consequently it was concluded that there were three possible causative sources for the UTEM anomaly:

(1) Thickening of the shale body at depth
(2) Increase in the shale conductivity at depth, thereby giving the effect of a conductive body at depth.
(3) Conductive body, adjacent to the base the black shale.

433270

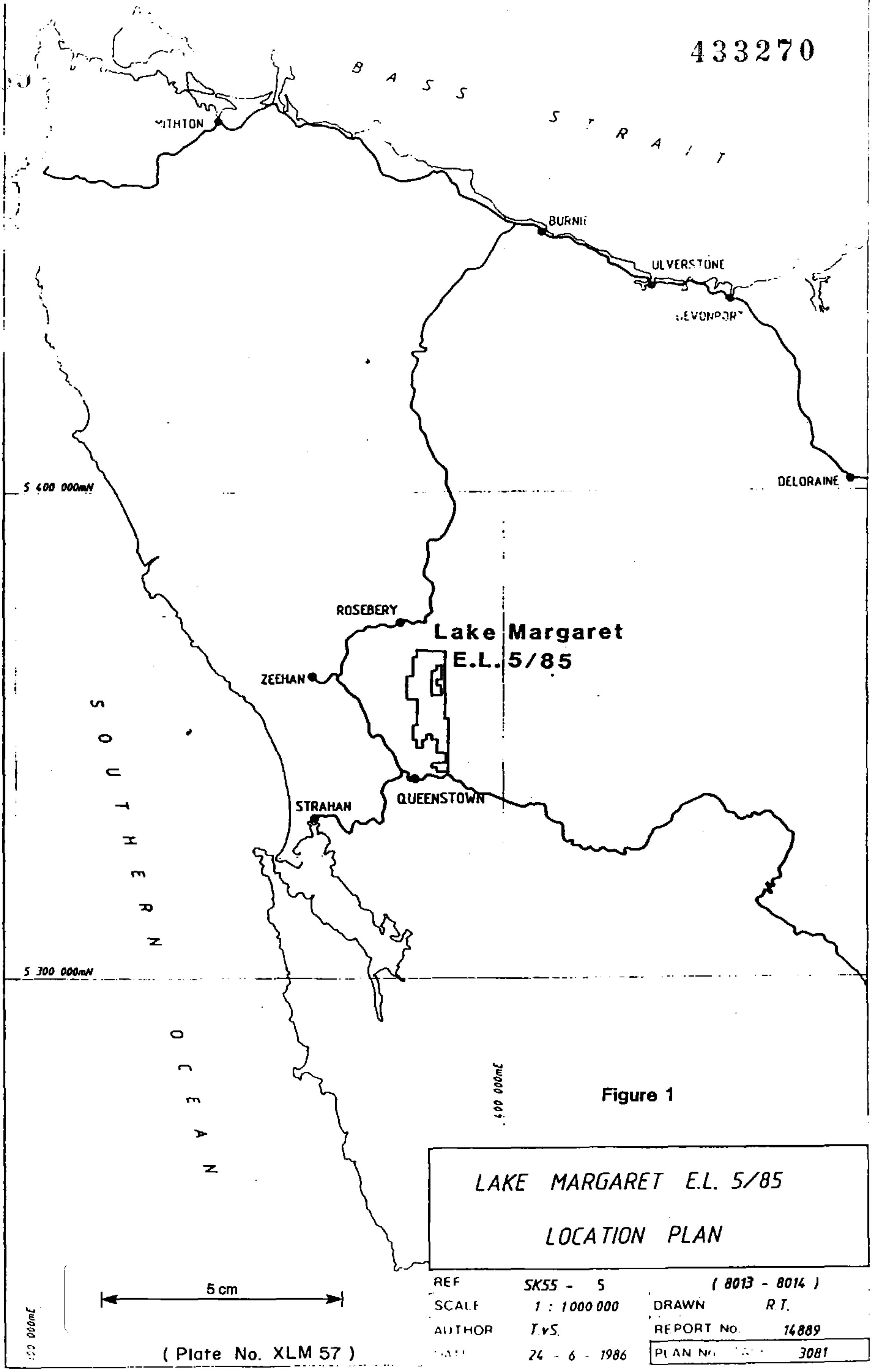


Figure 1

LAKE MARGARET E.L. 5/85

LOCATION PLAN

REF	SK55 - 5	(8013 - 8014)	
SCALE	1 : 1000 000	DRAWN	R.T.
AUTHOR	T.vS.	REPORT No.	14889
DATE	24 - 6 - 1986	PLAN No.	3081

(Plate No. XLM 57)

Possibility (1) was considered geologically unlikely as previous drilling had shown a wedging out of the shale at depth. Drilling was recommended on line 84S, to test for a conductive body occurring west of the shale from 1050-1075E, at a depth of approximately 220M. DDH RH-18 testing this anomaly did not intersect any significant mineralisation. Two black shale horizons were intersected at the following down-hole depths , 134-198m and 291-299m. In order to determine if the interpreted conductor occurred further west, and at a shallower depth than expected, a DHEM survey was conducted. The results of this survey are presented in this report.

It was considered highly probable that the conductor did occur further west than initially interpreted as the geological dip measured in DDH RH-18, was significantly shallower that the 80-90 ^{O}W dip, assumed when modelling the line 84S UTEM anomaly. A lesser dip, would place the conductor at a shallower depth.

3. DHEM Surveys in DDH RH-18

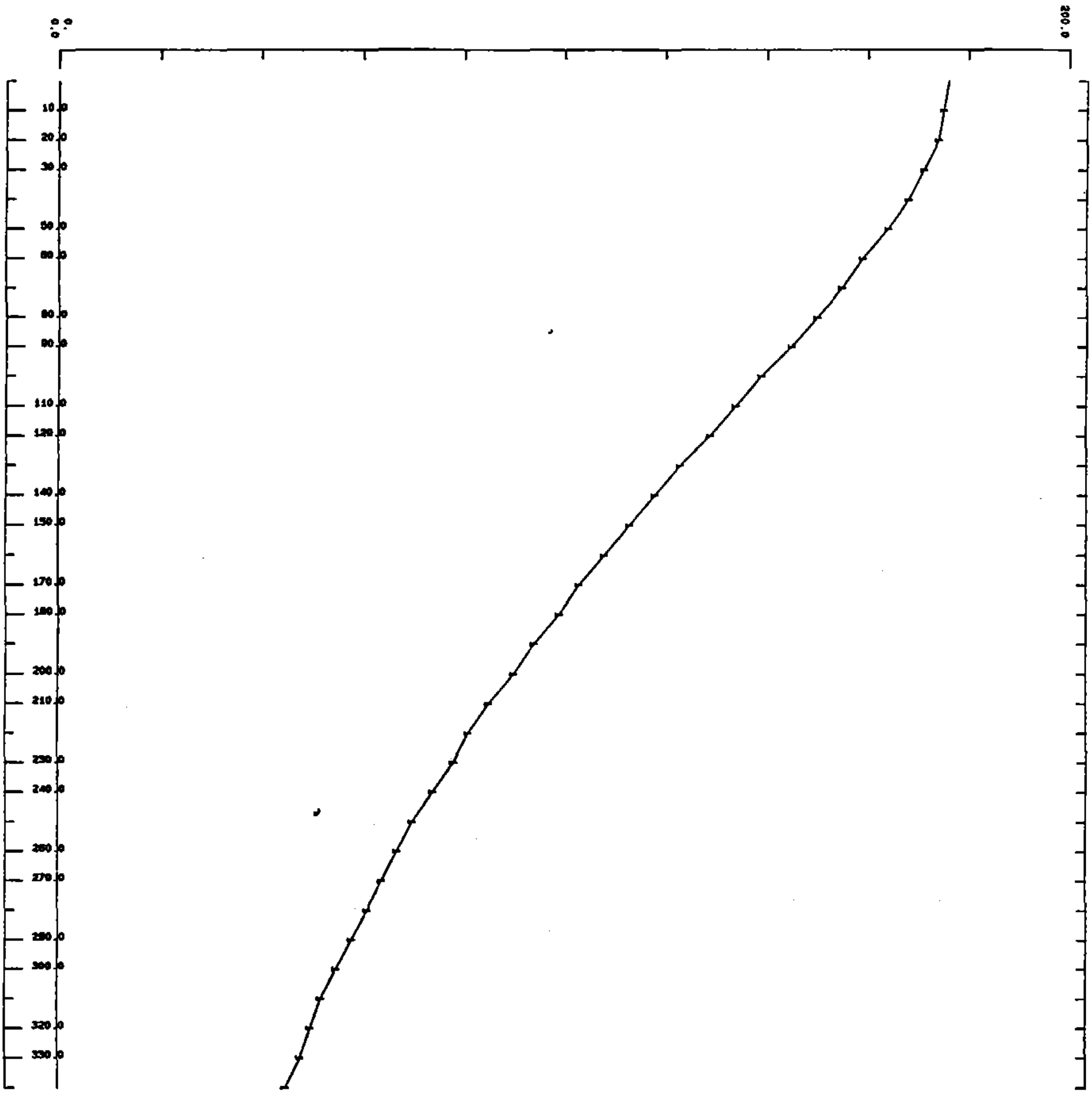
3.1 Sirotem Survey RH-18

Before DHEM surveying of RH-18 commenced, the half-space EM response of the volcaniclastic sequence was calculated using the computer program GRENDL. I.P data previously collected at Red Hills showed that the resistivity of the volcaniclastics varied from 1000 to 3000 ohms. For these resistivities, the late-time half-space response would range from 0.25 to 0.1 micro volts/amp. The self-response of the Sirotem probe down DDH RH-18 was also calculated using GRENDL and is given in figure 2.

The contract for the initial DHEM investigation of DDH RH-18 was awarded to McSkimming Geophysics of 35 The Boulevard, Boulevard Heights, Adelaide. One loop (loop 13, see Figure 3) of Sirotem data was collected on the 7th September 1989, using a medium power Sirotem Mk II transmitter and a Sirotem slimline down-hole probe. Due to the fast decaying, current-gathering nature of the UTEM anomaly, 10 channels of Sirotem early-time data were collected, in addition to 10 channels of standard time data. Hence, data was obtained over a delay time range of 0.049-5.779 ms. The down hole Sirotem data is given in Appendix 1.

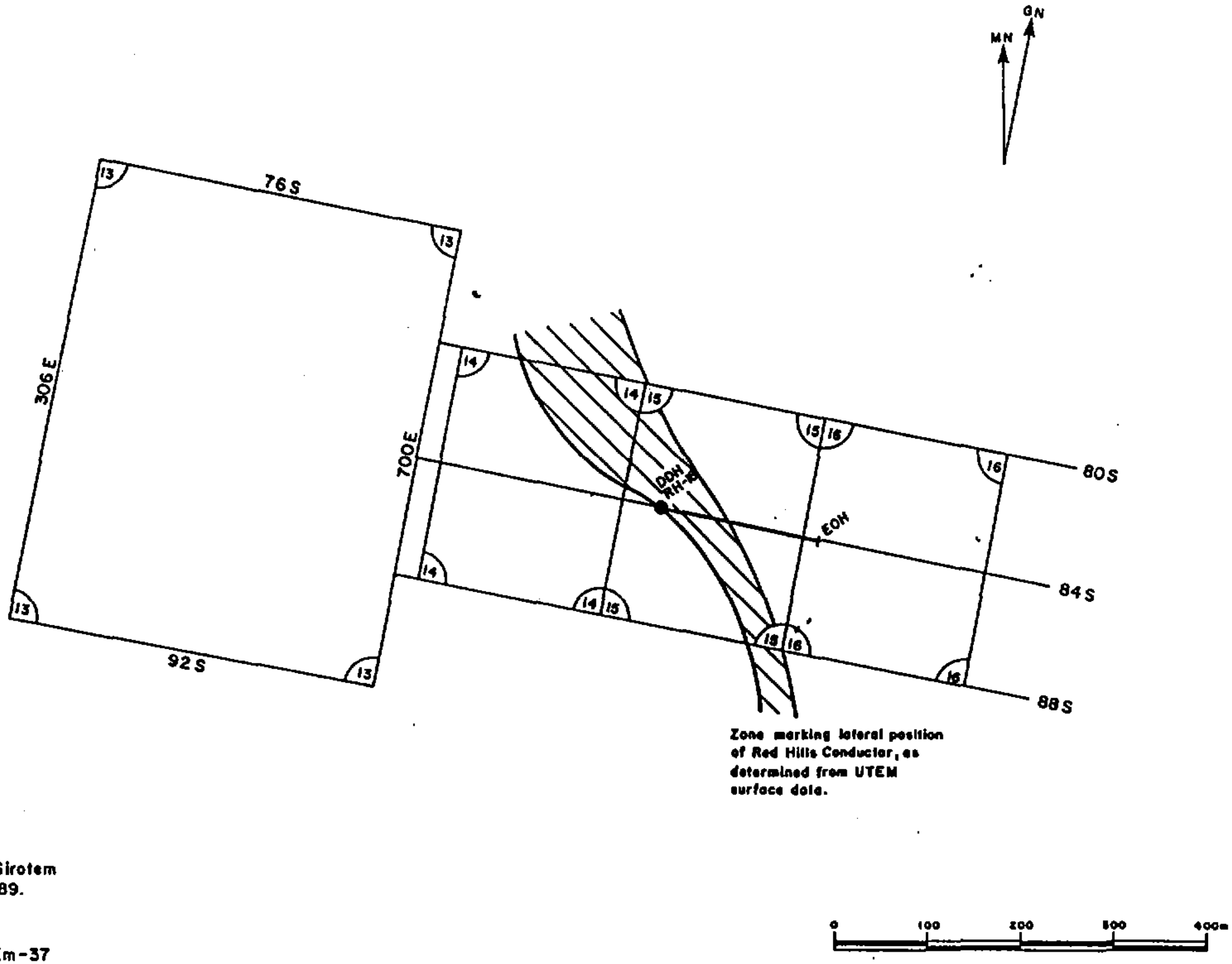
The Sirotem data revealed the presence of an anomaly indicative of an off-hole conductor, reaching a maximum 170m down-hole. The anomalous response changed sign from early to late-time, indicative of current gathering processes dominating at early-time and vortex eddy-currents dominating at late-time. For the configuration of loop 13 and DDH RH-18, the response polarity change indicated an anomaly source below DDH RH-18.

433272



RED HILLS PROSPECT LAKE MARGARET EL.
DHEM SURVEY DDH 18
SELF RESPONSE FROM LOOP 13
Aberfoyle Resources Limited September 1989
Plot Date :04/09/89 Horiz scale 1: 1500.0 Plot number : 51

FIG. 2 - Sirotem Probe Self-Response DDH RH-18.



Loop 13	Used for Down-Hole Sirotem Survey, September 1989.
Loop 14-16	Used for Down-Hole Em-37 Survey, October 1989.
14	Loop corner and loop number.

5 cm

Figure 3

43273

Aberfoyle Resources Limited
EXPLORATION DIVISION

TASMANIA

E.L. 5/85 RED HILLS PROSPECT
DHEM LOOP POSITIONS, 1989 SURVEYS

REVISIONS			
Init.	Date	Init.	Date

Compiled :	JJR
Drawn :	JJR
Traced :	RKW
Checked :	JJR

Location Code

Scale 1 5000

Date FEB 1990

Plan No.

Due to the noisy nature of the Sirotem profiles, and the possibility of significant interaction between the interpreted off-hole conductor and the conductive shale, a further three loops of DHEM data were recommended in order to clarify the interpretation.

3.2 Em-37 Survey DDH RH-18

The contract for the follow-up DHEM survey in DDH RH-18 was awarded to Geoterrex Pty Ltd of 13 Whiting Street, Artarmon N.S.W. Three loops of down hole and surface H_z component EM data, were collected on the 20th and 21st October 1989. This data was collected using the Em-37 TDEM system operating at a frequency of $25H_z$, allowing the collection of data until 7.157ms delay time.

The surface EM data was collected in addition to the DHEM data in order to investigate the interaction between the conductive black shale and the interpreted western conductor. Using two data sets for interpretation, the position of the western conductor could be better constrained.

The general features the two data sets showed were as follows:

(1) The DHEM data indicated a conductor was intersected in DDH RH-18 at 165m.

(2) The in-hole conductor produced an early-time response, but there was a clear transition to a late-time off-hole response of opposite sign.

(3) The late-time DHEM anomaly reached a maximum amplitude when the target zone was situated beneath loop 15.

(4) The late-time DHEM response was negative for loops 14 and 15, but positive for loop 16.

(5) The shape of the DHEM anomaly was distinctly asymmetrical.

(6) The amplitude of the surface Em-37 anomaly was a maximum from loop 15

(7) The surface anomaly was positive from loops 14 and 15, but negative from loop 16.

The change in sign of both the surface and down-hole anomalies, from loop 15 to loop 16, was interpreted as indicating the conductor lay between these loops. As loop 15 produced the largest amplitude response, the conductor must have occurred closer to the middle of this loop than loop 16. The assymetrical form of the surface and down-hole anomalies was interpreted to indicate the conductor has a shallow dip.

4. Modelling the Em-37 Data

Due to the down-hole and surface Em-37 data exhibiting similar loop-to-loop variations, it was initially, and logically, assumed that both EM anomalies were due to the same conductive source. Despite extensive modelling using the computer program OZPLATE, a single conductor could not be obtained whose EM response reproduced the features of the surface and down-hole anomalies listed in section 3.2.

Consequently it was postulated that the down-hole and surface data represented responses from different conductors or different segments of the same conductor. Supporting evidence for this hypothesis was obtained by calculating the Exponential Time Constant and Power Law Decay Constant for the surface and down-hole anomalies. The following constants were obtained from the loop 15 data:

Down-Hole Data:	Exponential Time Constant	- 1.3ms
	Power Law Decay Constant	- 3.8
Surface Data:	Exponential Time Constant	- 0.22ms
	Power Law Decay Constant	- 6.0

The differences in these constants, suggested the surface data responded to a less conductive source, producing faster decaying currents, than did the down-hole data. The interaction between the two responses, decaying at different rates, produced an overall response that was neither current gathering nor true vortex eddy current flow.

Modelling the Red Hills Em-37 data proceeded in the following manner:

(1) A model was produced to match the down-hole data

(2) A model was produced to match the surface data, that included the response obtained from (1)

(3) The result from (2) was compared to the DHEM data and step (1) repeated.

This iterative procedure continued for each loop until the major features of both data sets were reproduced.

In order to produce the gradual increase in the down-hole late-time anomaly seen from loops 14 and 16, and a maximum anomaly response on loop 15, a shallowly east dipping conductor was required. The best-fit model profiles for loops 14, 15, and 16 are given in figures 4a, 5a and 6a, with the corresponding observed profiles in figures 4b, 5b, and 6b.

Changes in the conductivity, dip, down-dip extent and strike length of the best fit DHEM conductor could not generate the observed surface profiles. To reproduce the surface data a moderately west dipping conductor, of significant down-dip extent was required. The best fit model surface data, combining the effects of the two conductors are given in figures 7a, 8a, and 9a with the corresponding observed data given in figures 7b, 8b, and 9b.

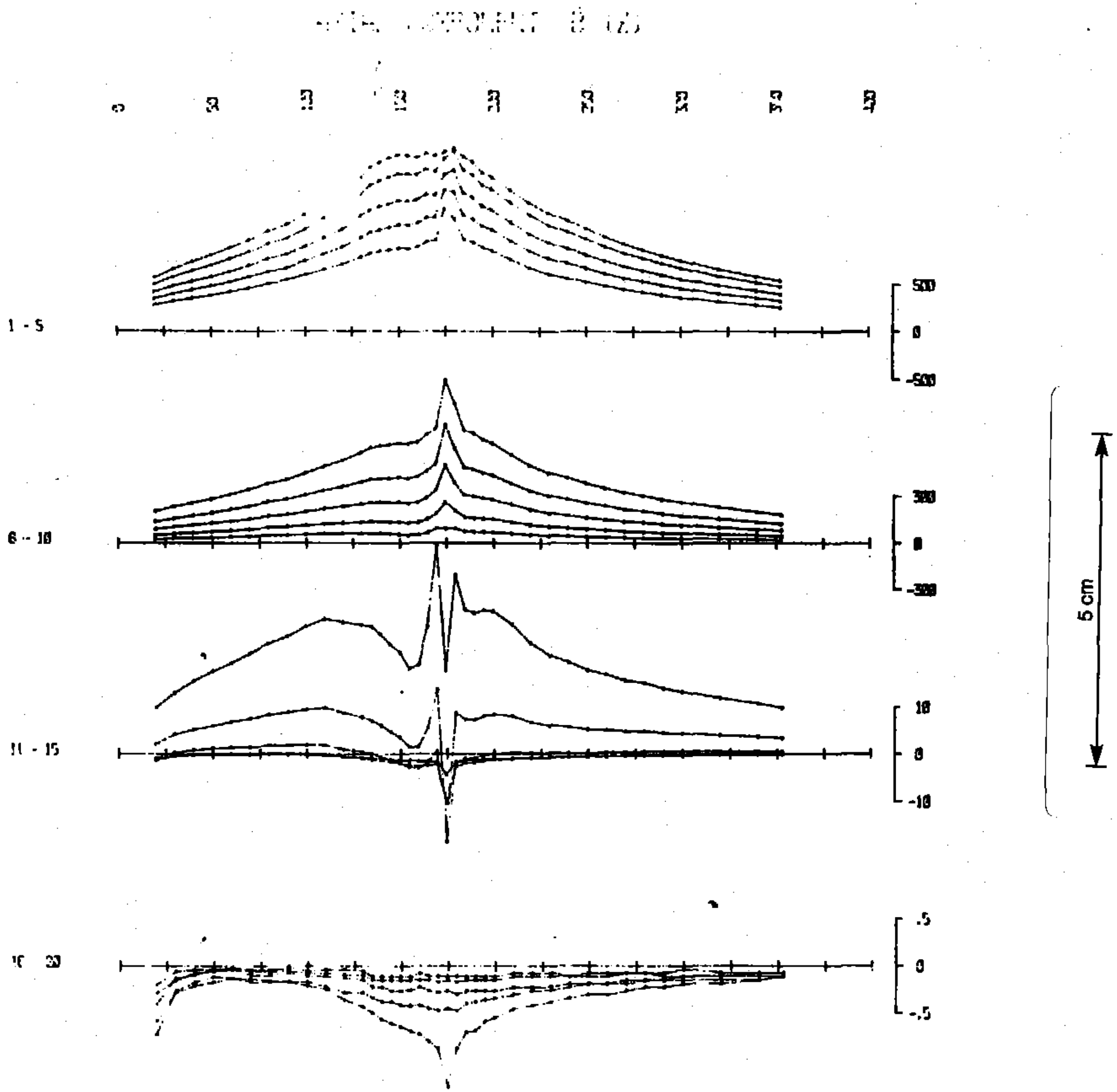
The best fit between the model data and the field data occurs for loop 14. The configuration of conductors shown in figure 10 reproduced the unusually fast decay, shown by the surface data, for this loop. This was due to conductor 1 producing a dominantly negative response from loop 14, while conductor two produced a dominantly positive response. At early times the response of conductor 1 dominated the surface response, but with increasing time the more slowly decaying response of conductor two became dominant. The superposition of these two responses of opposite polarity and different decay rates produced the overall, fast decaying response.

The dominating of the early to mid-time surface response by conductor two, was partly due to the two conductors differing decay rates and partly due to conductor two being closer to the surface receiver than conductor one. With DDH RH-18 situated between the two conductors the DHEM data primarily showed the effects of the different decay rates of the two conductors.

Conductor two was interpreted to occur within the black shale unit, representing a local region of increased conductivity. The shale was known not to be homogeneously conductive, as although DDH RH-18 entered the black shale at 134 m little EM response was measured until a thin conductor was intersected at 165m.

It was concluded that the two interpreted off-hole conductors and the conductor intersected by RH-18, were part of the same geological horizon folded into a synform as represented in figure 10. As the conceptual target at Red Hills was sulfide mineralisation occurring at the base of the shale horizon, it was recommended Conductor 1 be diamond drill tested, as due to its significant conductivity, it was potentially sulfide mineralisation. DDH RH-19 drilled to test this conductor, did not intersect any base metal mineralisation, but intersected a black shale unit between 192-206m. This shale, intersected 30m below the modelled sulfide position, is equated as being the

433277



EM-37

BOREHOLE SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY

TX LOOP SIDES	99S 725E
	39S 925E
TX LOOP SIZE	200 m X 200 m
TX TURN OFF TIME	142
FIRST GATE TIME	99.5
CURRENT	15.7
FREQUENCY	25 Hz.
INTEGRATION TIME	1024
SYNC MODE	
HORIZONTAL SCALE	1:2500
SURVEYED BY	RJL
DATE	

SURVEYED AND COMPILED BY GEOTERREX PTY. LTD.

PROJECT NO 4-143

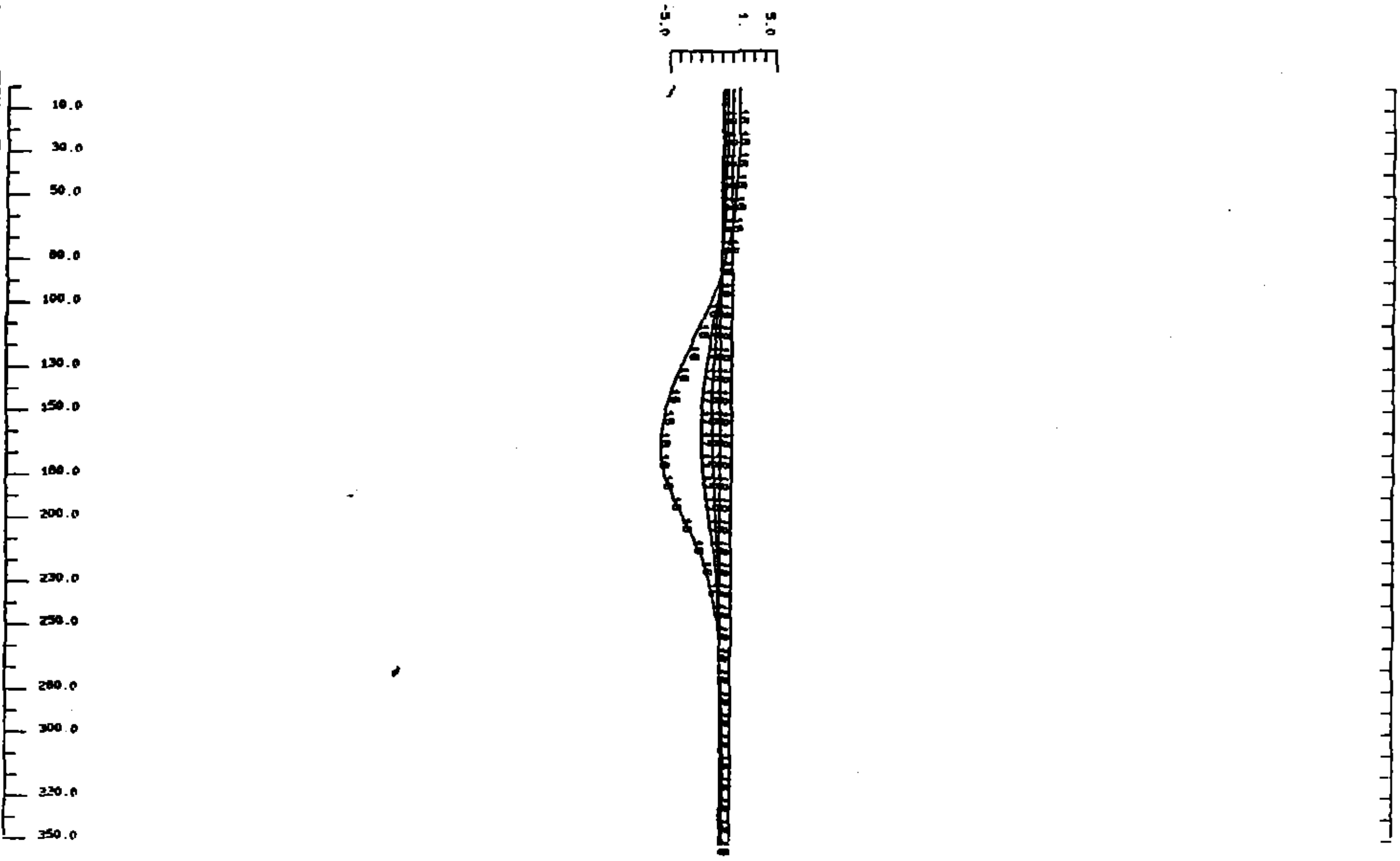
CLIENT	[illegible]
PROJECT	
AREA	RED HILLS
BOREHOLE	[illegible]
TX LOOP	[illegible]

Figure 4A

276

Figure 4B

433278



5 cm

RED HILLS PROSPECT LAKE MARGARET EL
OZPLATE MODEL EM-37 DATA (late time anomaly)
DHEM DATA DDH RH-18 LOOP 14
CONDUCTOR 1 X, Y, Z 850E, 10600S, 160m DIP 1E
STRIKE LENGTH 800m width/strike 0.10 s-t 80
CONDUCTOR 2 X, Y, Z 1100E, 10600S, 80m DIP 70W
STRIKE LENGTH 800m width/strike 0.10 s-t 50
Aberfoyle Resources Limited 1989 JJR
Plot Date 27/11/89 Horiz scale 1: 2500.0 Plot number : 13

433279

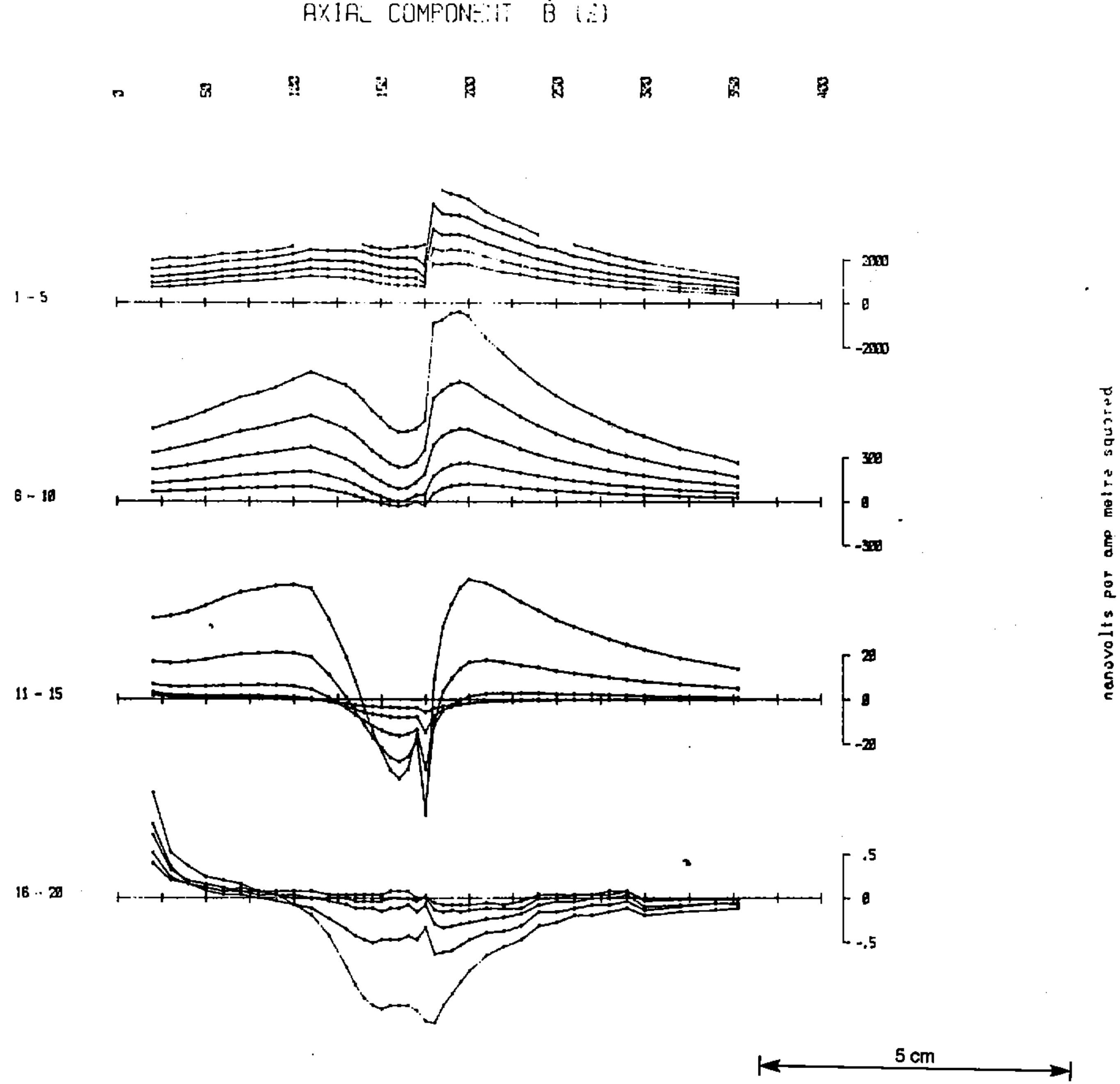


Figure 5A

EM-37

BOREHOLE SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY (B)

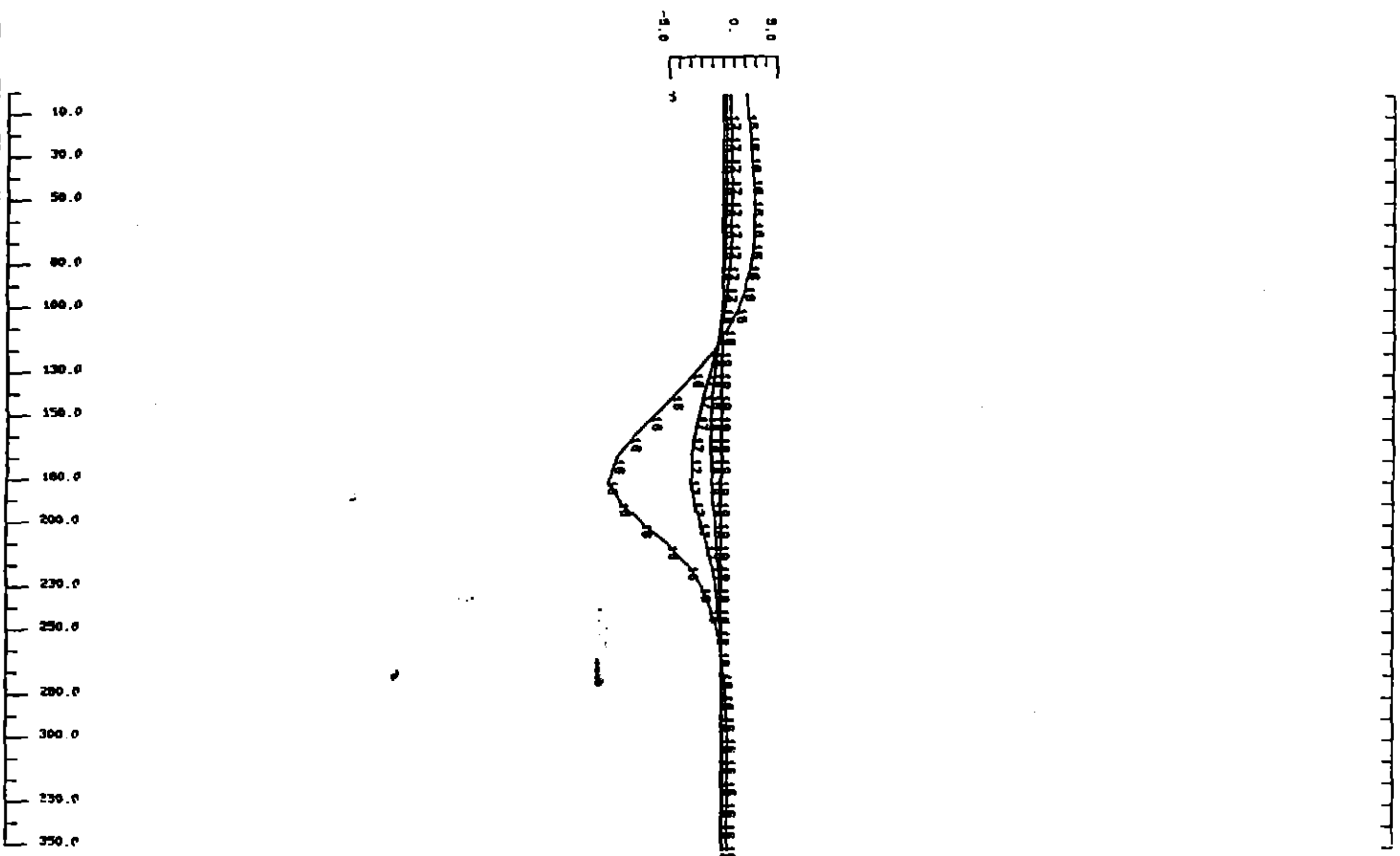
TX LOOP SIDES	: 82S	925E
	: 89S	1125E
TX LOOP SIZE	: 200 m X 200 m	
TX TURN OFF TIME	: 140 microsecs.	
FIRST GATE TIME	: 88.5 microsecs.	
CURRENT	: 15.2 amps	
FREQUENCY	: 25 Hz.	
INTEGRATION TIME	: 1024 cycles	
SYNC MODE	: CRYSTAL	
HORIZONTAL SCALE	: 1:2500	
SURVEYED BY	: RJL	
DATE	: 20/10/1989	

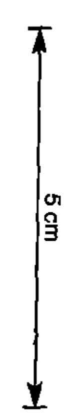
SURVEYED AND COMPILED BY GEOTERREX PTY. LTD. | PROJECT NO. 1-143

CLIENT	: Aberfoyle Resources Lt
PROJECT	: 1
AREA	: RED HILLS
BOREHOLE	: RH19 A
TX LOOP	: 15

Figure 5B

433280





RED HILLS PROSPECT LAKE MARGARET EL
DZPLATE MODEL EM-37 DATA (late time anomaly)
DHEM DATA DDH RH-18 LOOP 15
CONDUCTOR 1 X, Y, Z 850E, 10600S, 160m DIP 1E
STRIKE LENGTH 800m width/strike 0.10 s-t 80
CONDUCTOR 2 X, Y, Z 1100E, 10600S, 80m DIP 70W
STRIKE LENGTH 800m width/strike 0.10 s-t 50
Aberfoyle Resources Limited 1989 JJR
Plot Date .27/11/89 Horiz scale 1: 2500.0Plot number : 14

433281

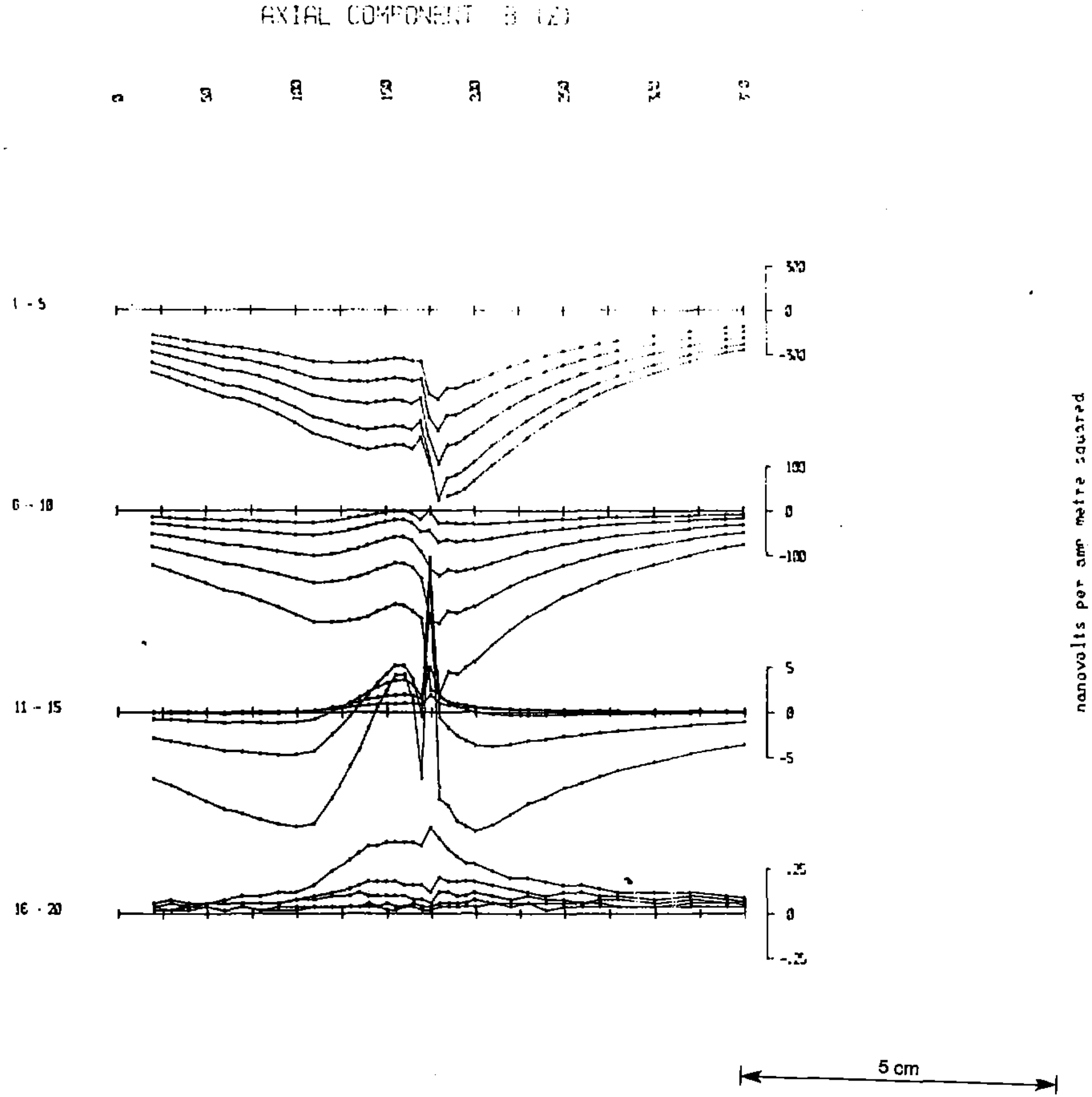


Figure 6A

EM-37

BOREHOLE SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY (B)

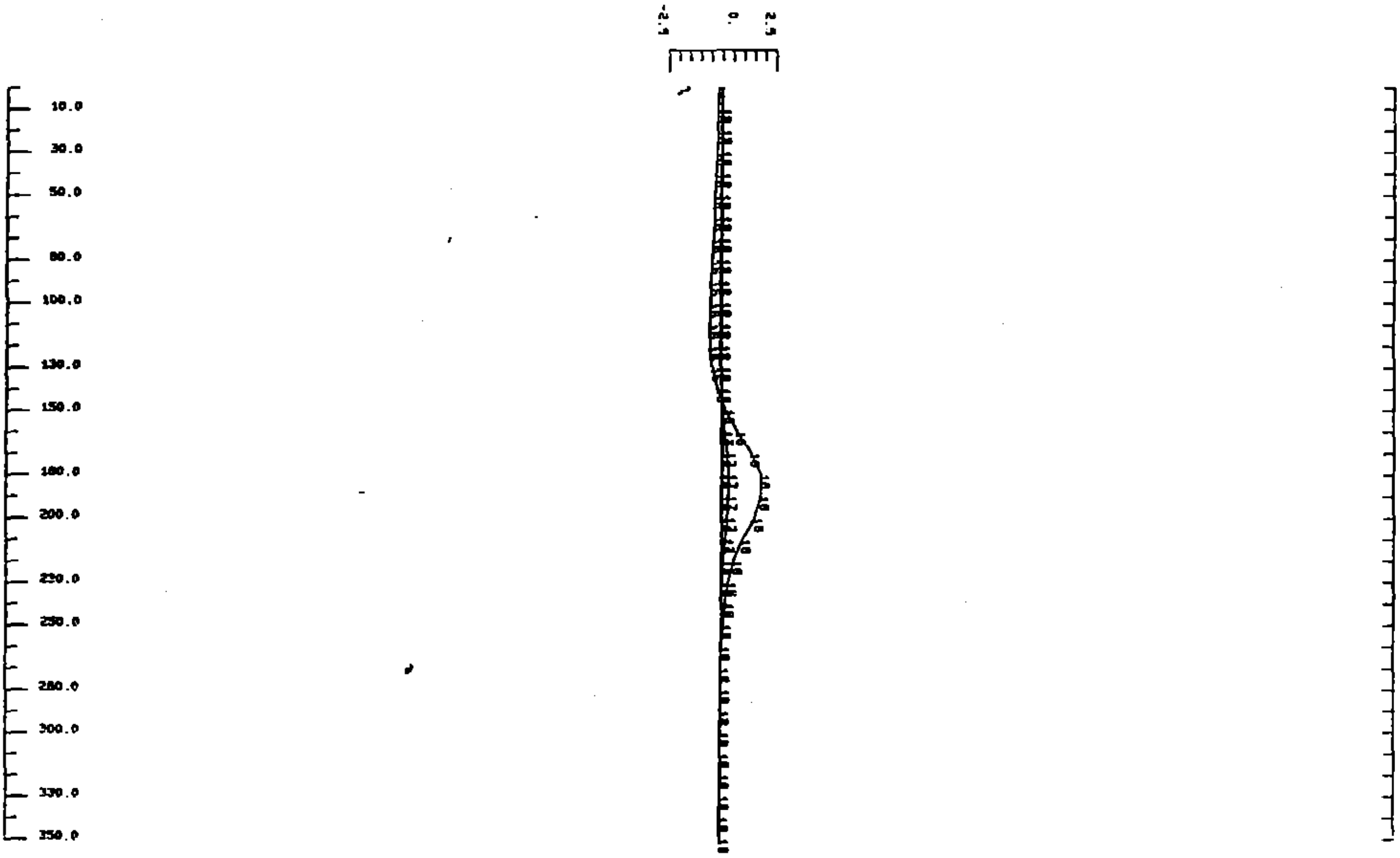
TX LOOP SIDES	: 925 1125E
	: 995 1325E
TX LOOP SIZE	: 200 m X 200 m
TX TURN OFF TIME	: 130 microsecs.
FIRST GATE TIME	: 88.5 microsecs.
CURRENT	: 15.0 amps
FREQUENCY	: 25 Hz.
INTEGRATION TIME	: 1024 cycles
SYNC MODE	:
HORIZONTAL SCALE	: 1:2500
SURVEYED BY	: PF
DATE	: 21/10/1990

SURVEYED AND COMPILED BY GEOTERREX PTY. LTD. — PROJECT NO. 4-143

CLIENT	: Aberfoyle Resources Ltd
PROJECT	: 1
AREA	: RED HILLS
BOREHOLE	: RH18 A
TX LOOP	: 1E

433282

Figure 6B



RED HILLS PROSPECT LAKE MARGARET EL
OZPLATE MODEL EM-37 DATA (late time anomaly)
DHEM DATA DDH RH-18 LOOP 16
CONDUCTOR 1 X, Y, Z 850E, 10600S, 160m DIP 1E
STRIKE LENGTH 800m width/strike 0.10 s-t 80
CONDUCTOR 2 X, Y, Z 1100E, 10600S, 80m DIP 70W
STRIKE LENGTH 800m width/strike 0.10 s-t 50
Aberfoyle Resources Limited 1989 JJR
Plot Date .27/11/89 Horiz scale 1: 2500.0 Plot number : 16

5 cm

433283

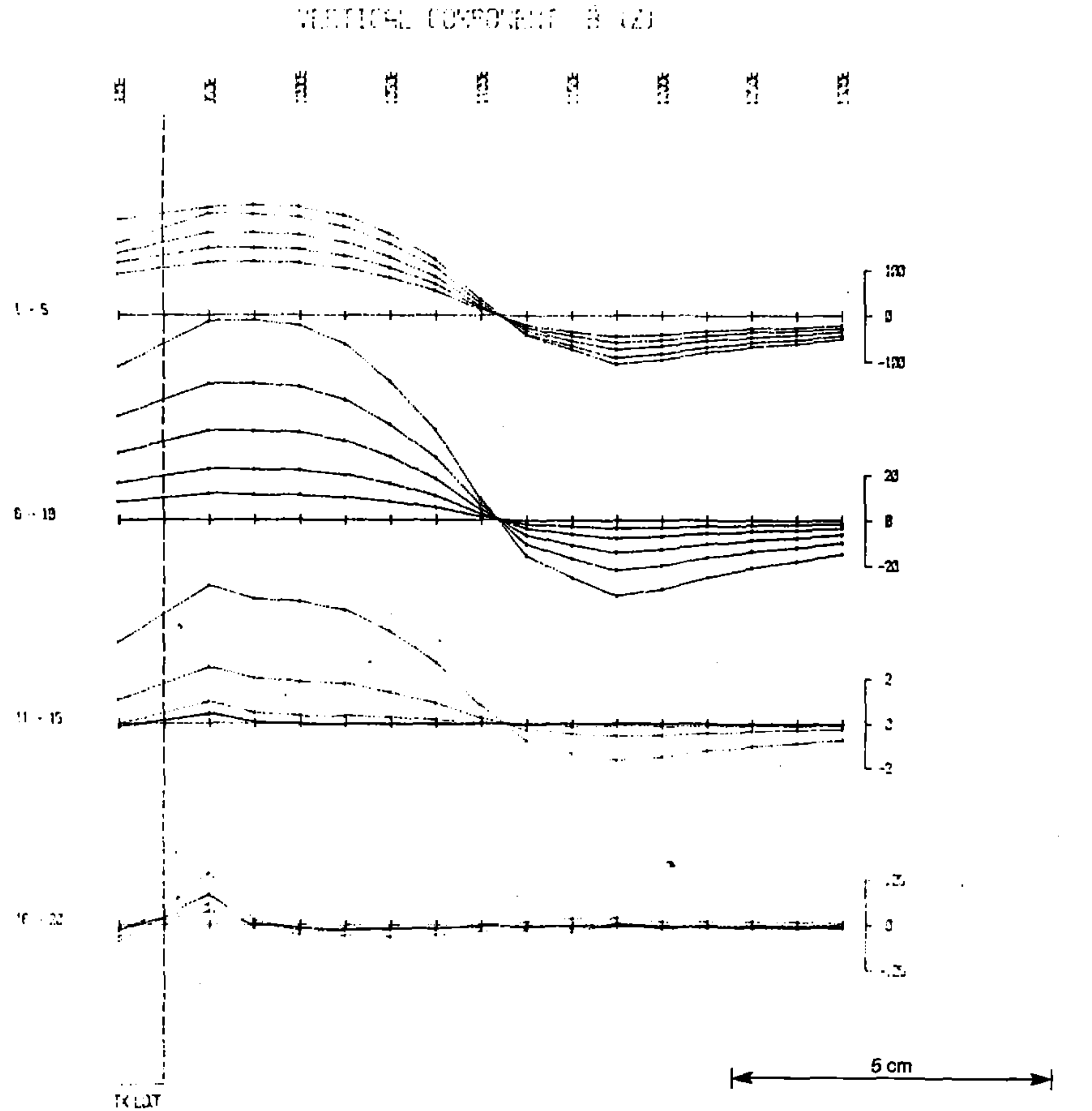


Figure 7A

FIXED
TRANSMITTER
SURVEY

ELECTROMOTIVE FORCE INDUCED BY
SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY

TX LOOP SIDES :

TX LOOP SIZE : 200 m X 200 m

TX TURN OFF TIME : 142

FIRST GATE TIME :

CURRENT :

FREQUENCY : Hz.

INTEGRATION TIME :

SYNC MODE

HORIZONTAL SCALE :

SURVEYED BY :

DATE :

SURVEYED AND COMPILED BY
GEOTERREX PTY. LTD.

PROJECT NO.

CLIENT :

PROJECT :

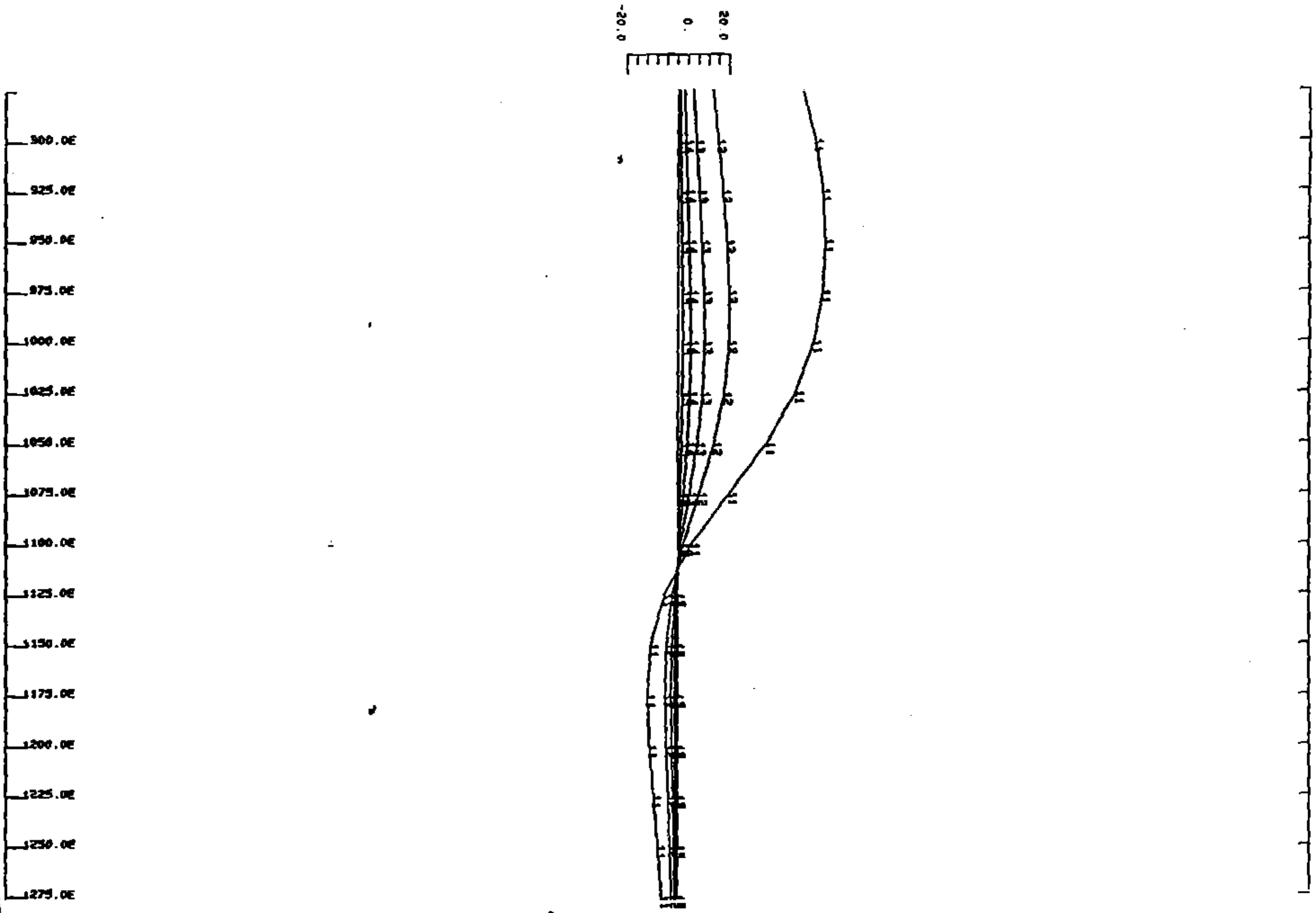
AREA :

LINE

TX LOOP

433284

Figure 7B



5 cm

RED HILLS PROSPECT LAKE MARGARET EL
OZPLATE MODEL EM-37 DATA (late time anomaly)
SURFACE DATA LINE 84S LOOP 14
CONDUCTOR 1 X,Y,Z 850E, 10600S, 160m DIP 1E
STRIKE LENGTH 800m SIGMA-T 30 W/S 0.10
CONDUCTOR 2 X,Y,Z 1100E, 10600S, 80m DIP 70W
STRIKE LENGTH 800m SIGMA-T 50 W/S 0.10
Aberfoyle Resources Limited 1989 JJR
Plot Date 17/11/89 Horiz scale 1: 2500.0 Plot number 10

433285

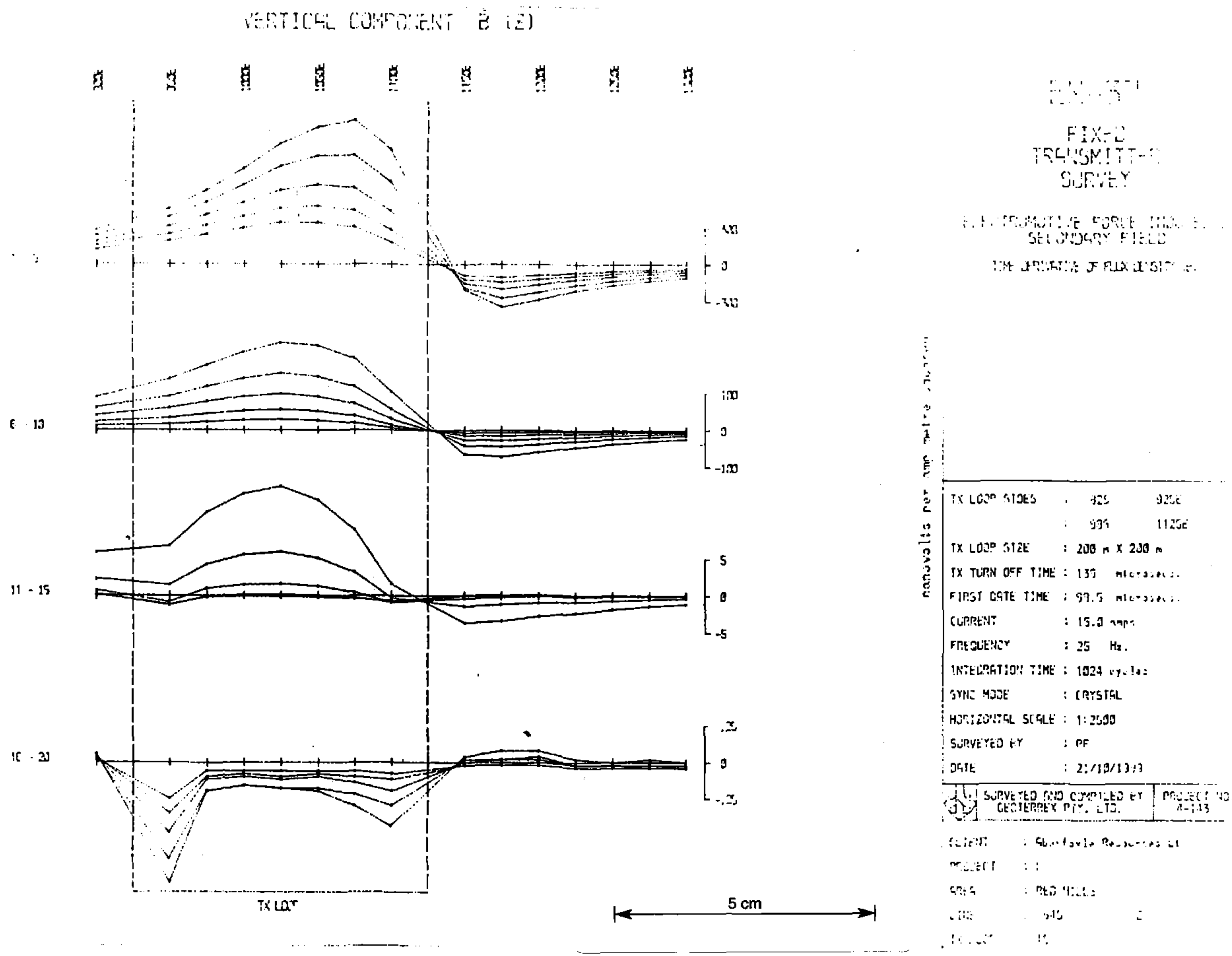
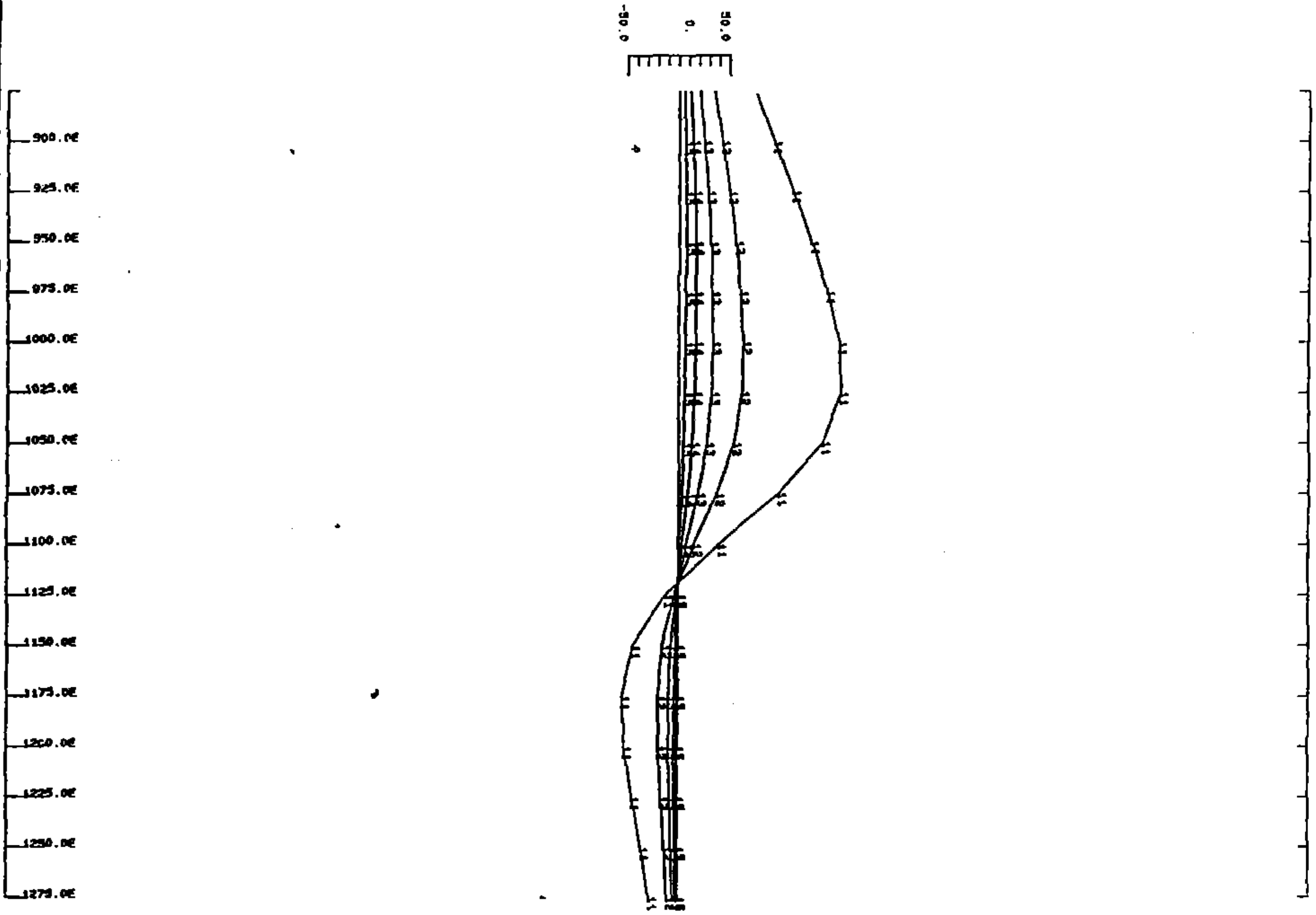


Figure 8A

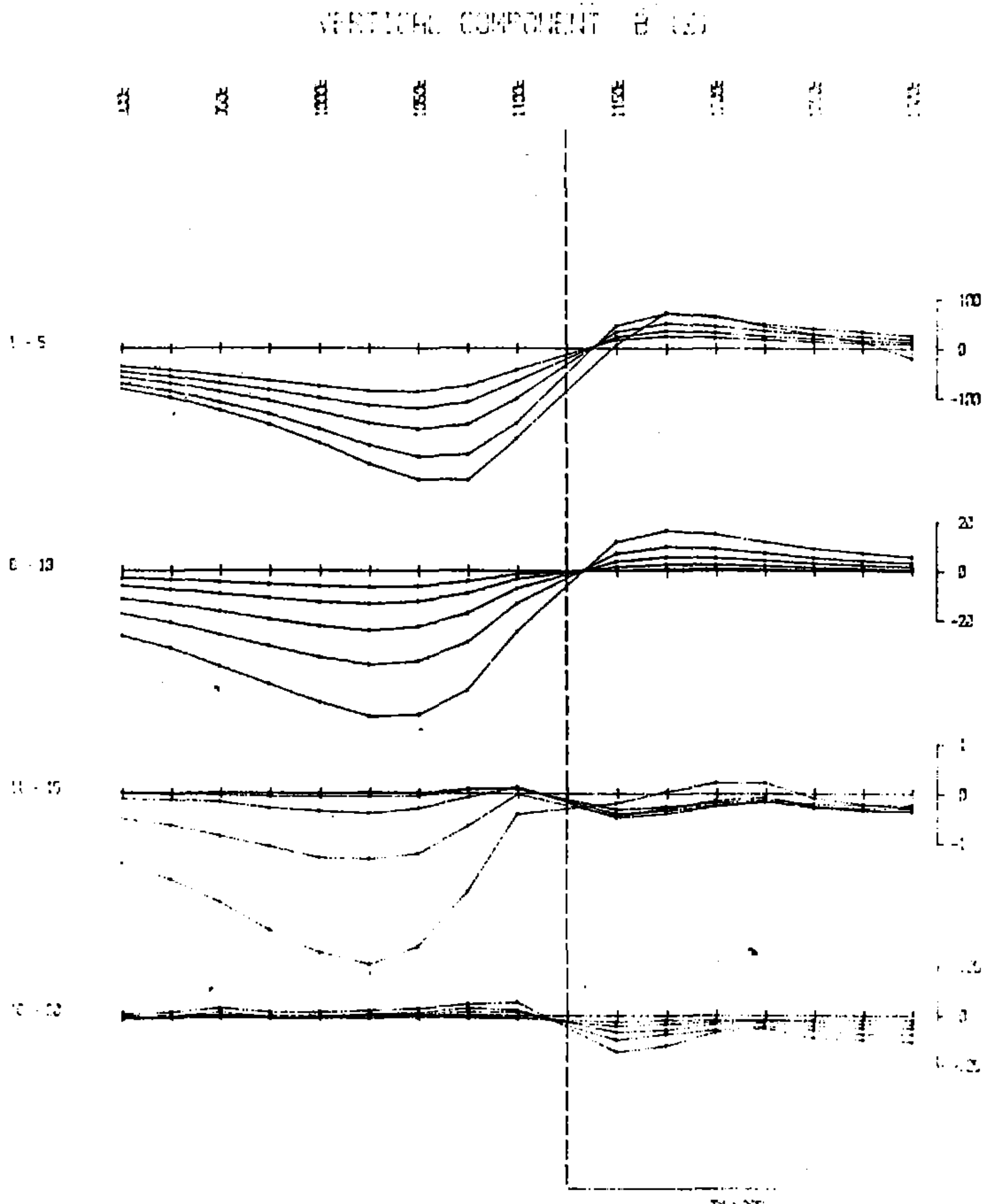
433286

Figure 8B



RED HILLS PROSPECT LAKE MARGARET EL
OZPLATE MODEL EM-37 DATA (late time anomaly)
SURFACE DATA LINE 84S LOOP 15
CONDUCTOR 1 X, Y, Z 850E, 10600S, 160m DIP 1E
STRIKE LENGTH 800m SIGMA-T 30 W/S 0.10
CONDUCTOR 2 X, Y, Z 1100E, 10600S, 80m DIP 70W
STRIKE LENGTH 800m SIGMA-T 50 W/S 0.10
Aberfoyle Resources Limited 1989 JJR
Plot Date :27/11/89 Horiz scale 1: 2500.0 Plot number 20

433287



5 cm

EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY (B)

TX LOOP SIDES	: 300 1125E
	: 385 1325E
TX LOOP SIZE	: 200 m X 200 m
TX TURN OFF TIME	: 130 microsecs.
FIRST GATE TIME	: 89.5 microsecs.
CURRENT	: 15.0 amps
FREQUENCY	: 25 Hz.
INTEGRATION TIME	: 1024 cycles
SYNC MODE	:
HORIZONTAL SCALE	: 1:2500
SURVEYED BY	: PF
DATE	: 21/10/1990

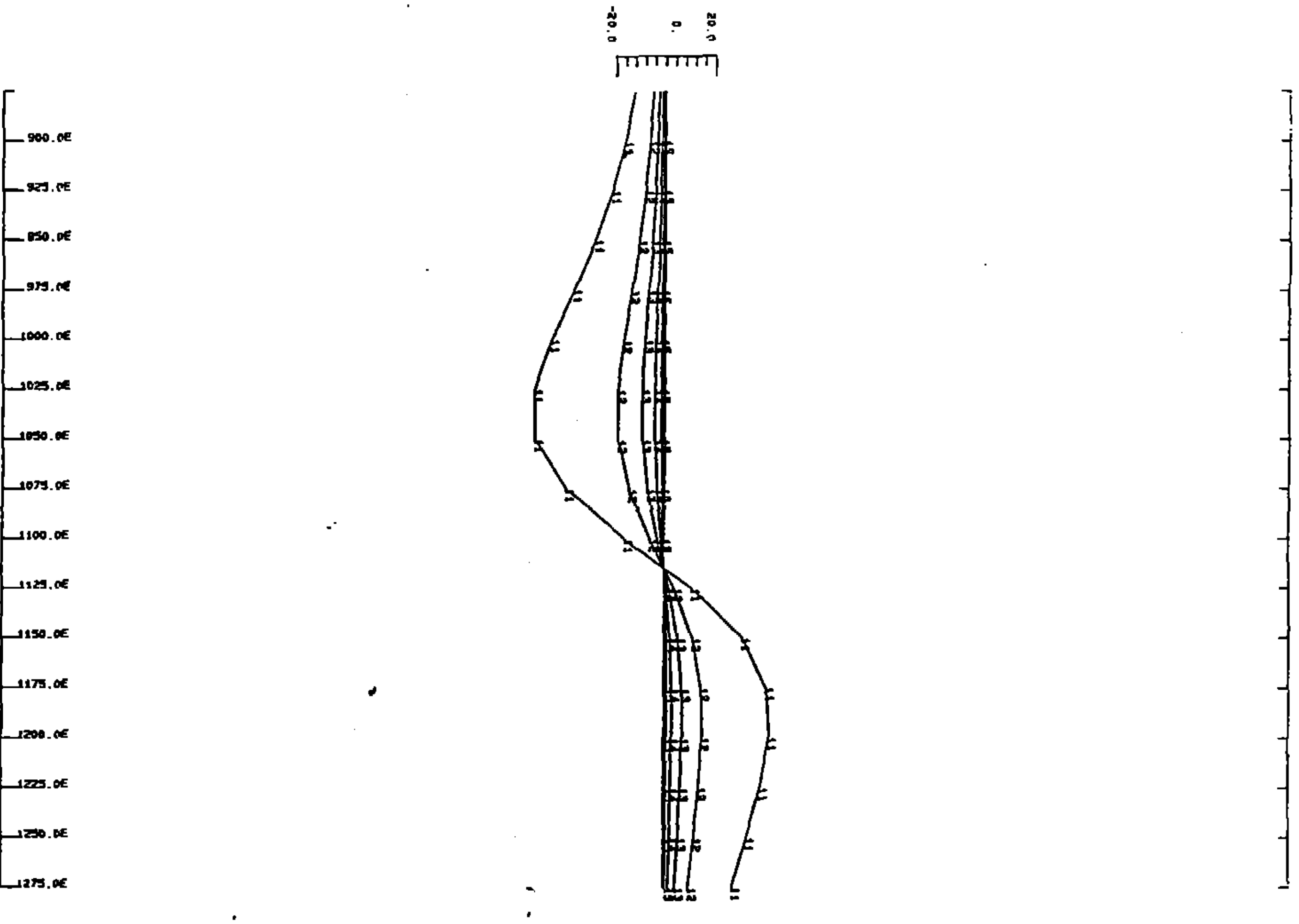
SURVEYED AND COMPILED BY GEOTERREX PTY. LTD. | PROJECT NO. 4-143

CLIENT	: Aberfoyle Resources Ltd
PROJECT	:
AREA	: RED HILLS
LINE	:
TX LOOP	:

Figure 9A

433288

Figure 9B



RED HILLS PROSPECT LAKE MARGARET EL
DZPLATE MODEL EM-37 DATA (late time anomaly)
SURFACE DATA LINE 84S LOOP 16
CONDUCTOR 1 X, Y, Z 850E, 10600S, 160m DIP 1E
STRIKE LENGTH 800m SIGMA-T 30 W/S 0.10
CONDUCTOR 2 X, Y, Z 1100E, 10600S, 80m DIP 70W
STRIKE LENGTH 800m SIGMA-T 50 W/S 0.10
Aberfoyle Resources Limited 1989 JJR
Plot Date .27/11/89   Horiz scale 1: 2500.0 Plot number :   17

433289

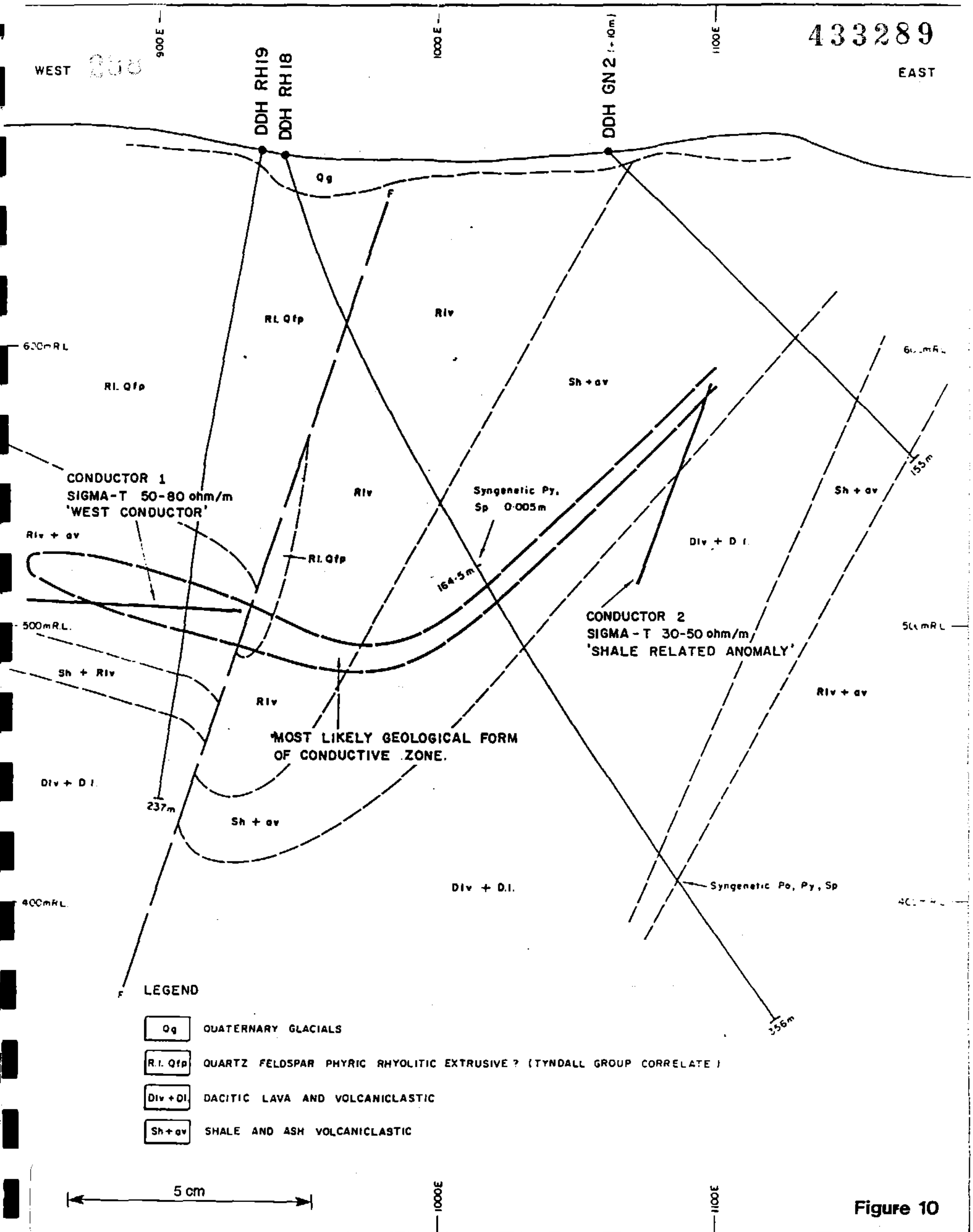


Figure 10

Aberfoyle Resources Limited
EXPLORATION DIVISION

REVISIONS			
Init.	Date	Init.	Date
DJN/jms	30-1-90		

Location Code :

NORTH WEST TASMANIA
LAKE MARGARET E.L. - RED HILLS PROSPECT
SECTION 84 S
INTERPRETATION OF DHEM DATA DDH - RH 18
INTERPRETATION OF SURFACE Em 37 DATA

Scale 1:1250 (A4) = 1:2500 Date December 1989

Compiled JRR, AMcN, DJN
Drawn
Traced JMS
Checked

interpreted western conductor. Hence, this shale must represent an area of increased local conductivity, similar to that intersected in DDH RH-18.

The flat dip of the main western conductor was only interpreted after a distinct asymmetry was noted in the DHEM data for DDH RH-18. The asymmetry the 1988-89 UTEM anomaly exhibited was initially explained by suggesting a half-space response was superimposed on the deep conductors response, causing the cross-over point of the anomaly to separate from the zero level, producing the anomalies asymmetry. If no half-space response is present , the cross-over point and zero level, of an anomaly, are coincident. The effect of the half space response could have been investigated by energising the conductors from a loop on the opposite side of the conductors to the initial loop. If the resulting UTEM anomaly had a larger positive response, than negative response, a strong half space response could be assumed. If the large positive response of the initial anomaly, was matched by a large negative response, then the conductor could have been interpreted as shallowly dipping.

5. Conclusions

DDH RH-18 was drilled to test a conductor, interpreted from the 1988-89 UTEM data, to occur west of the shale horizon. This hole failed to intersect base metal mineralisation. A Sirotem survey conducted in DDH RH-18 suggested a conductor occurred off-hole from DDH RH-18 and consequently a 3 loop follow-up Em-37 survey was conducted. Interpretation of the DHEM survey and surface Em-37 data suggested two off-hole conductors were present. The eastern conductor was interpreted as being non prospective, due to it occurring within the shale, while the western conductor was interpreted as being potentially sulfides due to its significant conductivity. DDH RH-19 drilled to test the western conductor, intersected a shallowly dipping black shale horizon that was correlated with the interpreted conductor. This shale horizon must represent an area of increased conductivity within the shale. The synformal nature of the conductive zone, interpreted from the DHEM was confirmed by the geological interpretation of DDH RH-18 and DDH RH-19.

The UTEM and DHEM anomalies identified at the Red Hills Prospect have been explained by a flat lying block of shale occurring at depth, and to the west of the main shale horizon. Consequently no further exploration of the Red Hills Prospect can be recommended.

6. References

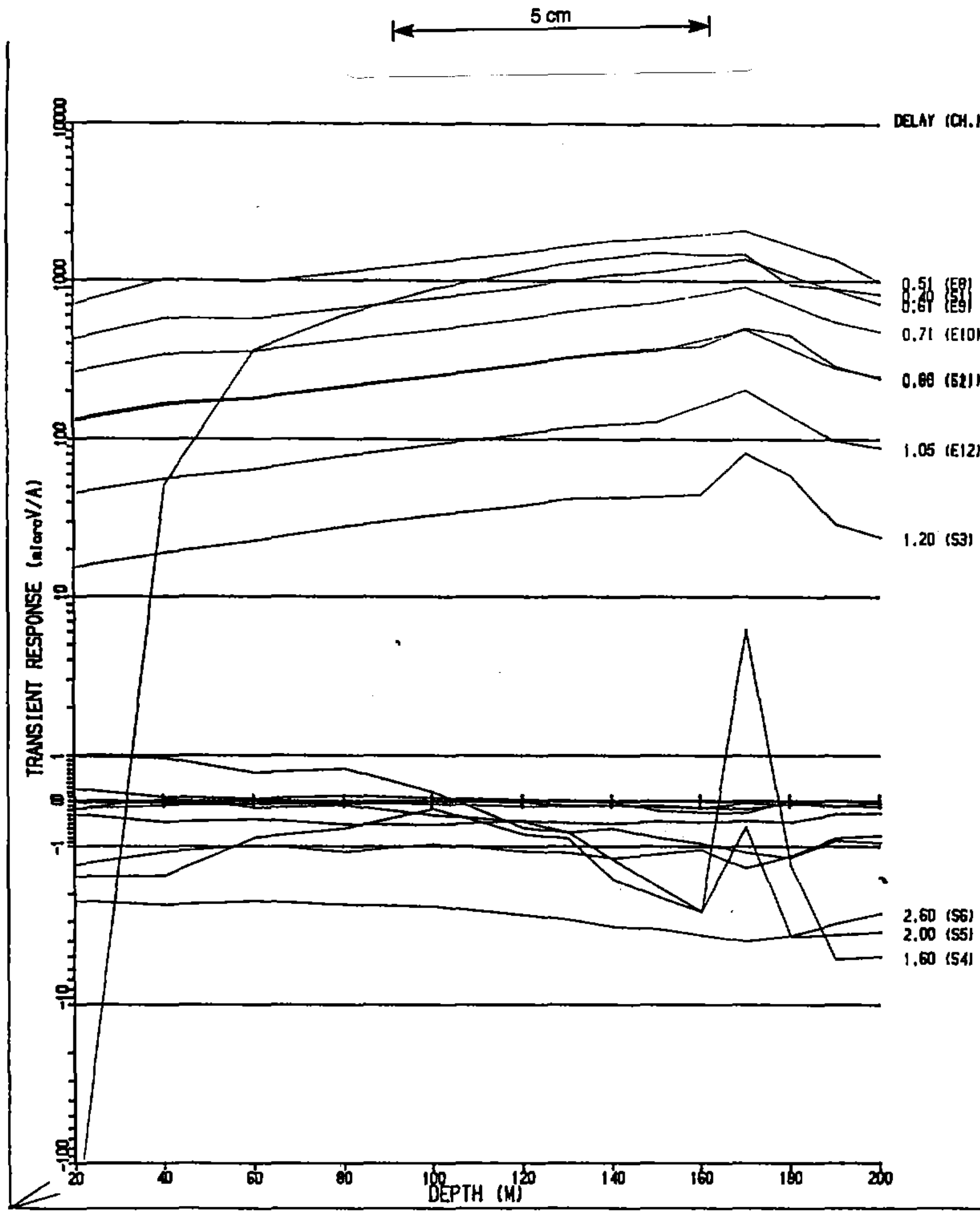
McNeill, A W, (1987), Geology of the Mt Murchison Area, Mt Read Volcanics Project Map 4, Department of Mines Tasmania

Read, J J, (1989), Exploration Licence 5/85, Lake Margaret Technical Report Reconnaissance UTEM Program December 1988, Aberfoyle Resources Limited Internal Report.

McNeill A W, (1989), Lake Margaret El 5/85 Tasmania Technical Progress Report for the Period August 1988 to September 1989. Aberfoyle Resources Limited Internal Report No. Lake Margaret 2.

Appendix 1

DDH RH-18 DHEM SIROTEM DATA



SURVEY SPECIFICATIONS

DATA ACQUIS'N : McSKINNING GEOPHYSICS

SURVEY DATE : 05-09-89
CONFIGURATION : 600M SQUARE TX. LOOP, DRILL HOLE SURVEY
READING INT. : 20 METRES
NO. OF STACKS : 1024
TRANSMITTER : MEDIUM POWER
RECEIVER : SIROTEM II S/N 1237
CURRENT : 7.0 AMPS
OPERATOR : MICHAEL ROSE

PLOT SPECIFICATIONS

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

TIME DELAYS IN MILLISECONDS
E - EARLY TIME WINDOW
S - STANDARD TIME WINDOW

ABERFOYLE EXPLN

TASMANIA
RED HILLS

SIROTEM PROFILE

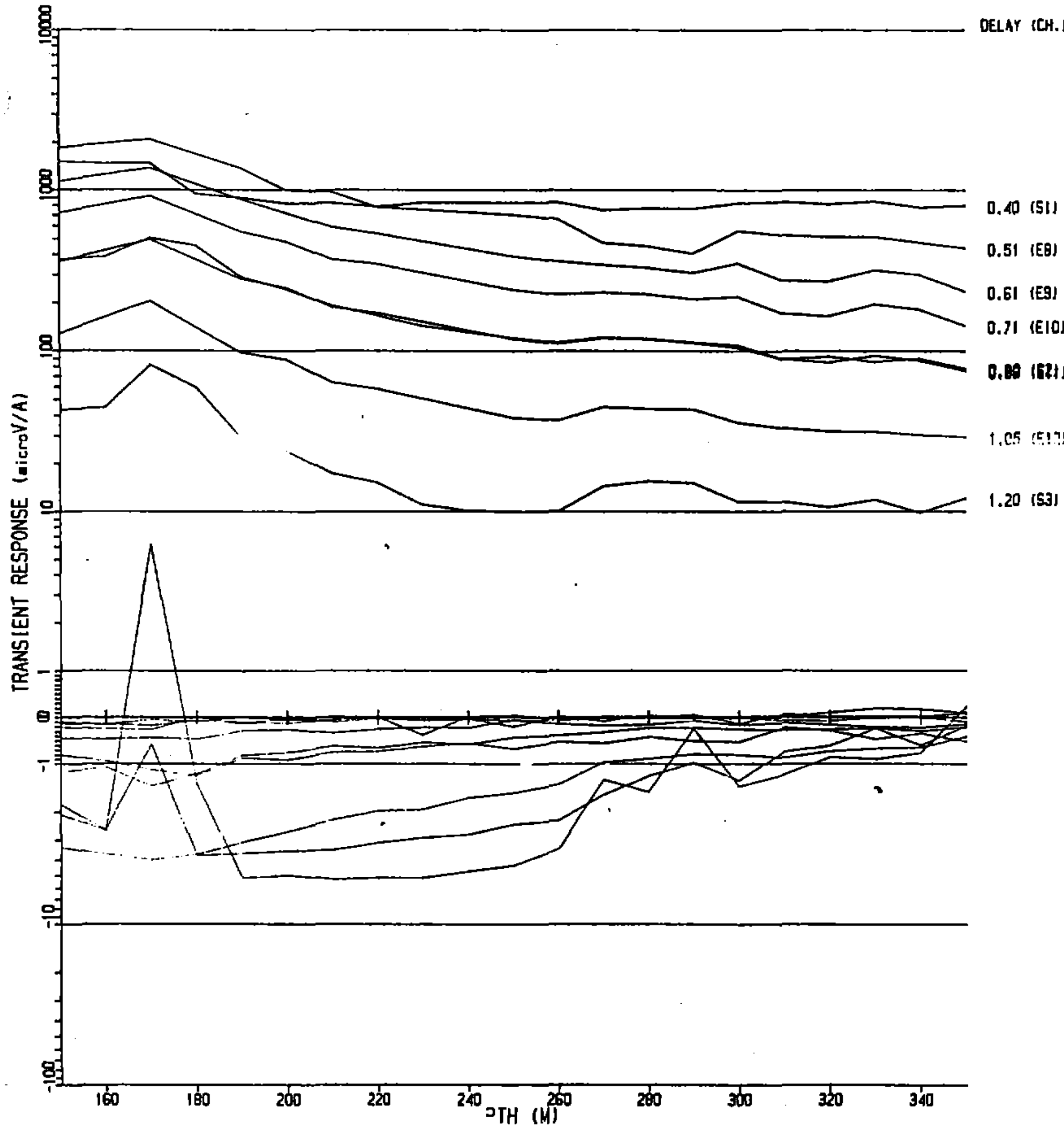
LINE HOLE18 LOOP 13

SCALE - 1:1000

433293

433294

5 cm



SURVEY SPECIFICATIONS

DATA ACQUIS'N : McSKIMMING GEOPHYSICS

SURVEY DATE : 05-09-89
CONFIGURATION : 500M SQUARE TX. LOOP, DRILL HOLE SURVEY
READING INT. : 20 METRES
NO. OF STACKS : 1024
TRANSMITTER : MEDIUM POWER
RECEIVER : SIROTEM II S/N 1237
CURRENT : 7.0 AMPS
OPERATOR : MICHAEL ROSE

PLOT SPECIFICATIONS

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

TIME DELAYS IN MILLISECONDS
E - EARLY TIME WINDOW
S - STANDARD TIME WINDOW

ABERFOYLE EXPLN

TASMANIA
RED HILLS

SIROTEM PROFILE

LINE HOLE18 LOOP 13

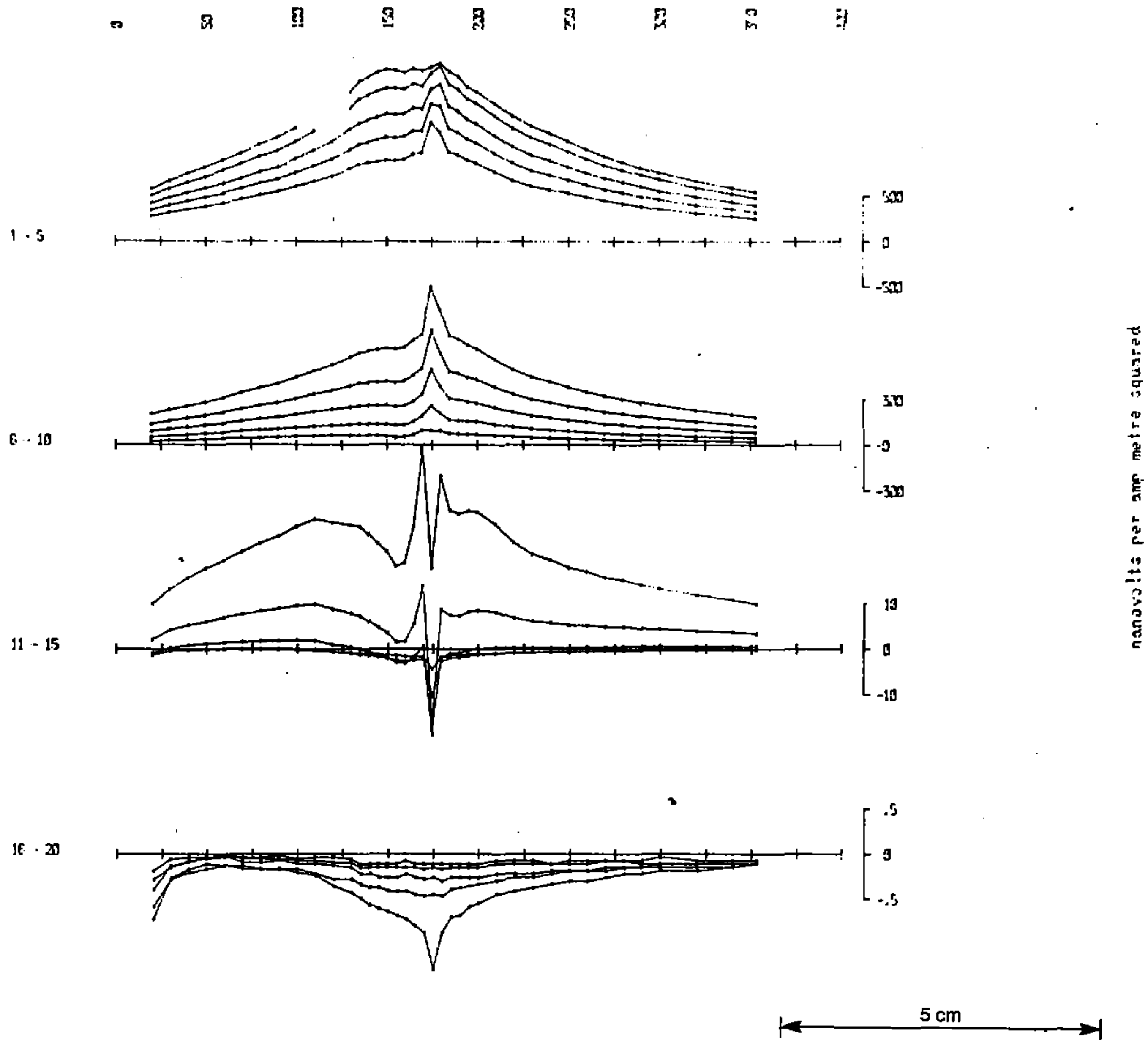
SCALE - 1:1000

Appendix 2

DDH RH-18 DHEM EM-37 DATA

433296

AXIAL COMPONENT B (Z)



EM-57

BOREHOLE SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY (B)

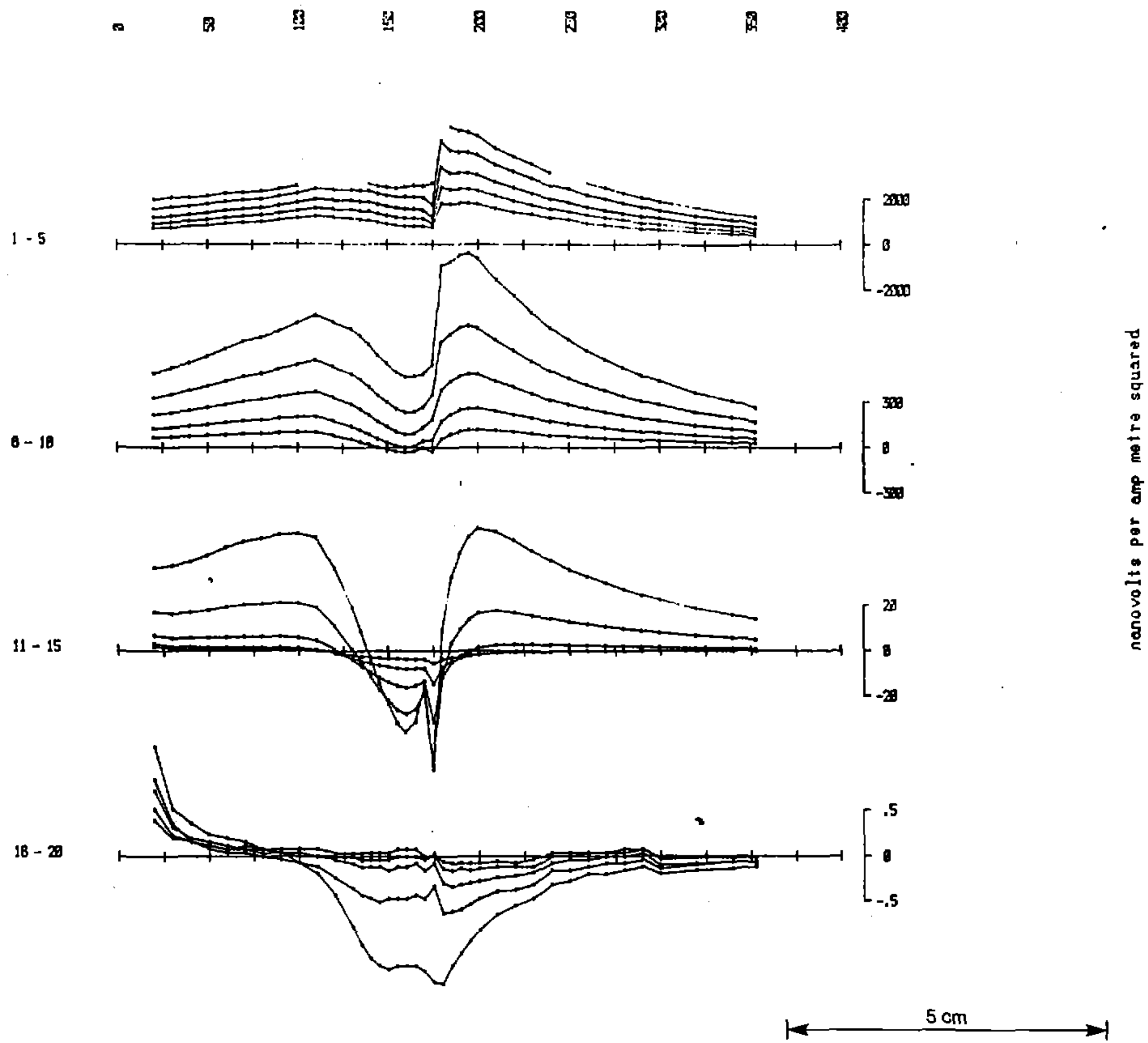
TX LOOP SIDES	: 99S	725E
	: 99S	925E
TX LOOP SIZE	200 m X 200 m	
TX TURN OFF TIME	: 147 microsecs.	
FIRST GATE TIME	: 99.5 microsecs.	
CURRENT	: 15.7 amps	
FREQUENCY	: 25 Hz.	
INTEGRATION TIME	: 1024 cycles	
SYNC MODE	:	
HORIZONTAL SCALE	: 1:2500	
SURVEYED BY	: RJL	
DATE	: 20/10/1989	

SURVEYED AND COMPILED BY GEOTERREX PTY. LTD. | PROJECT NO. 4-143

CLIENT	: Aberfoyle Resources Lt
PROJECT	:
AREA	: RED HILLS
BOREHOLE	: RHIP 6
TX LOOP	14

433297

AXIAL COMPONENT $\dot{B}$ (Z)



EM-37

BOREHOLE SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD

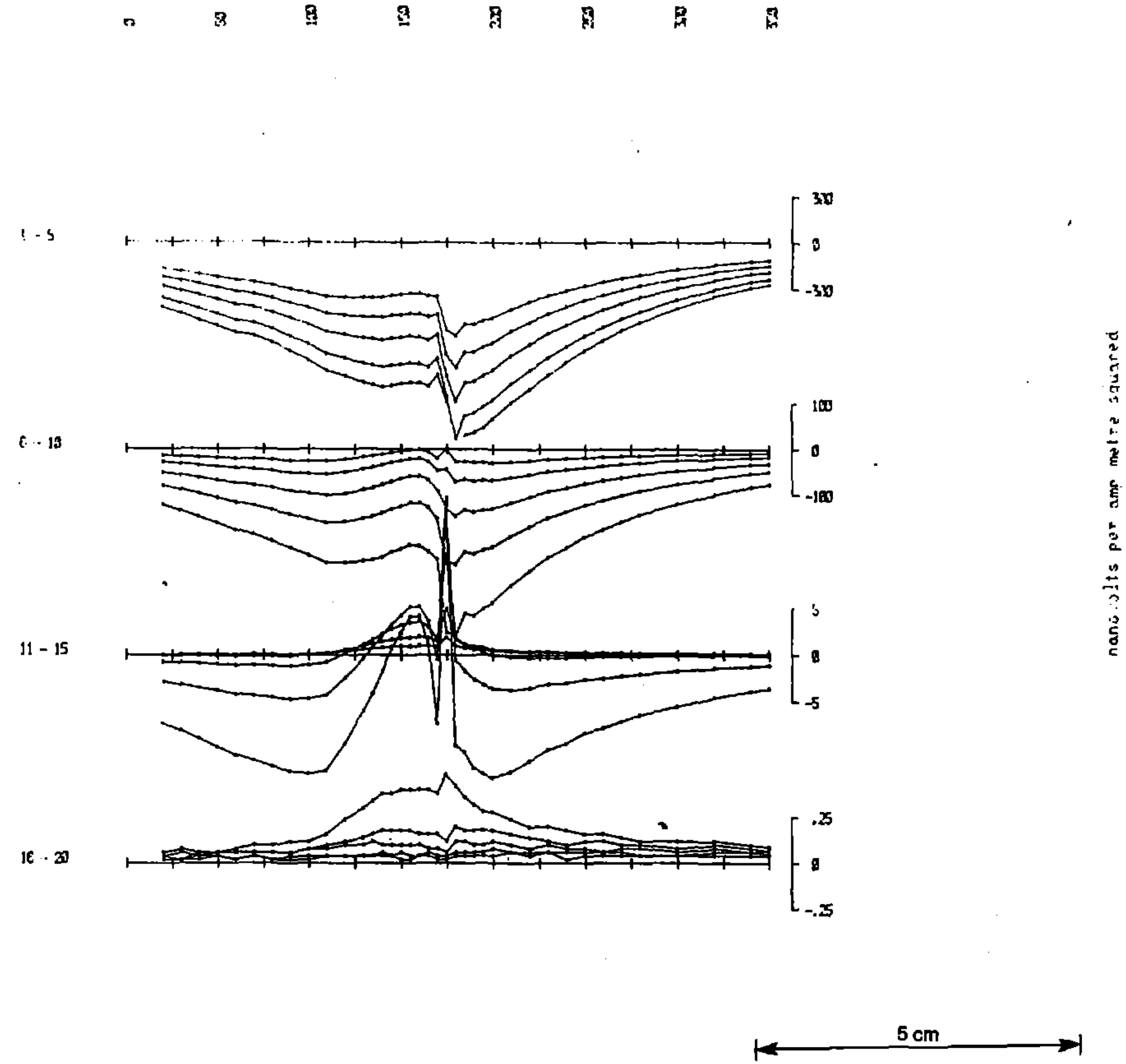
TIME DERIVATIVE OF FLUX DENSITY (B)

TX LOOP SIDES	:	82S	925E
	:	88S	1125E
TX LOOP SIZE	:	200 m X 200 m	
TX TURN OFF TIME	:	140 microsecs.	
FIRST GATE TIME	:	88.5 microsecs.	
CURRENT	:	15.2 amps	
FREQUENCY	:	25 Hz.	
INTEGRATION TIME	:	1024 cycles	
SYNC MODE	:	CRYSTAL	
HORIZONTAL SCALE	:	1:2500	
SURVEYED BY	:	RJL	
DATE	:	20/10/1989	

SURVEYED AND COMPILED BY GEOTERREX PTY. LTD. | PROJECT NO. 4-143

CLIENT	:	Aberfoyle Resources Lt	
PROJECT	:	I	
AREA	:	RED HILLS	
BOREHOLE	:	RH18	A
TX LOOP	:	15	

AXIAL COMPONENT B (Z)



EK-57

BOREHOLE
SURVEY

ELECTROMOTIVE FORCE INDUCED BY
SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY (B)

TX LOOP SIDES	. 925 1125E
	: 935 1325E
TX LOOP SIZE	: 200 m X 200 m
TX TURN OFF TIME	: 135 microsecs.
FIRST GATE TIME	: 99.5 microsecs.
CURRENT	: 15.0 amps
FREQUENCY	: 25 Hz.
INTEGRATION TIME	: 1024 cycles
SYNC MODE	:
HORIZONTAL SCALE	: 1:2500
SURVEYED BY	: PF
DATE	: 21/10/1999

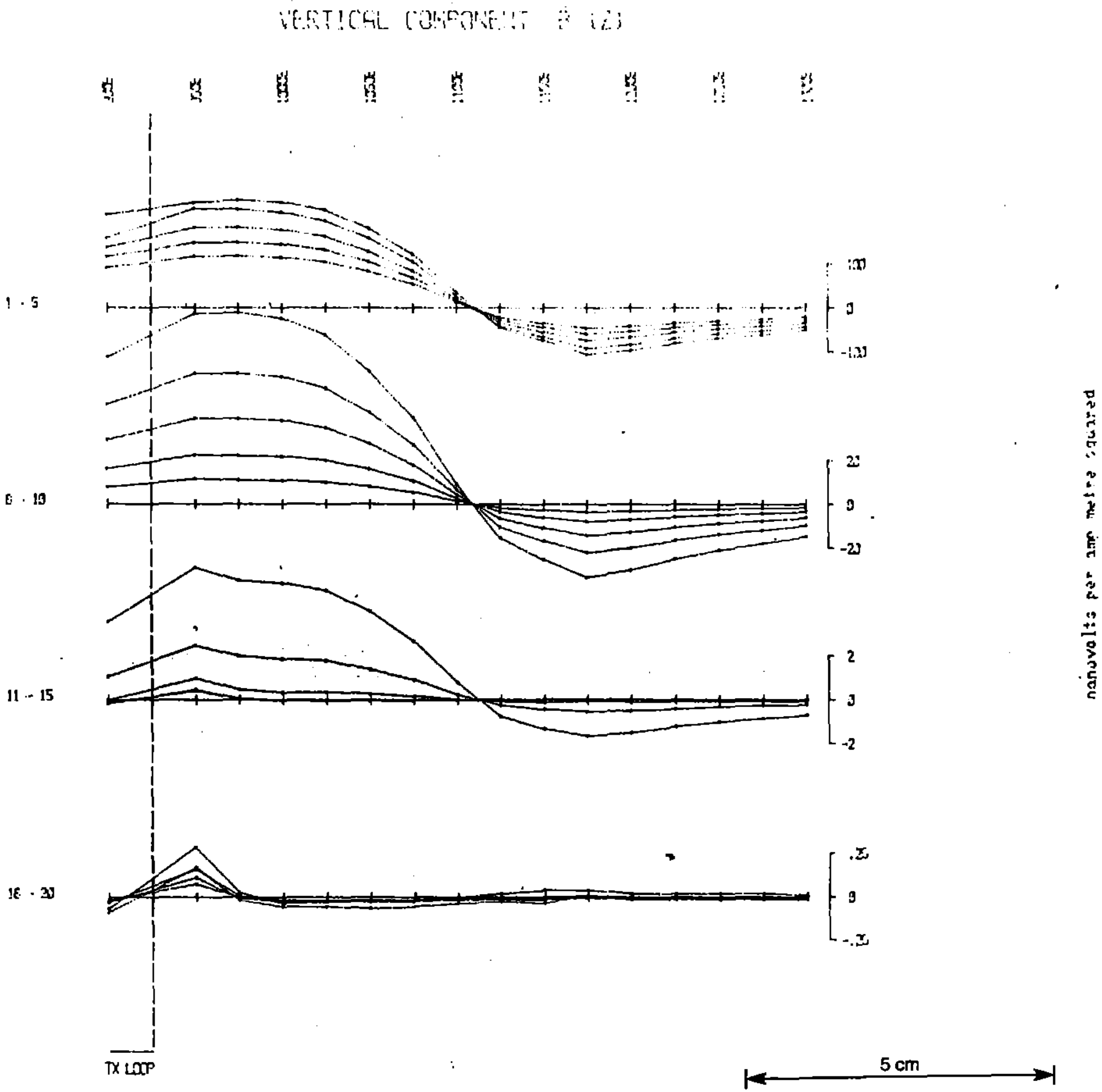
SURVEYED AND COMPILED BY GEOTERREX PTY. LTD.	PROJECT NO. 4-143

CLIENT	: Aberfoyle Resources Lt
PROJECT	: F
AREA	. RED HILLS
BOREHOLE	. RH12 A
TX LOOP	1C

Appendix 3

LINE 84S SURFACE EM-37 DATA

433300



FIXED
TRANSMITTER
SURVEY

ELECTROMOTIVE FORCE INDUCED BY
SECONDARY FIELD

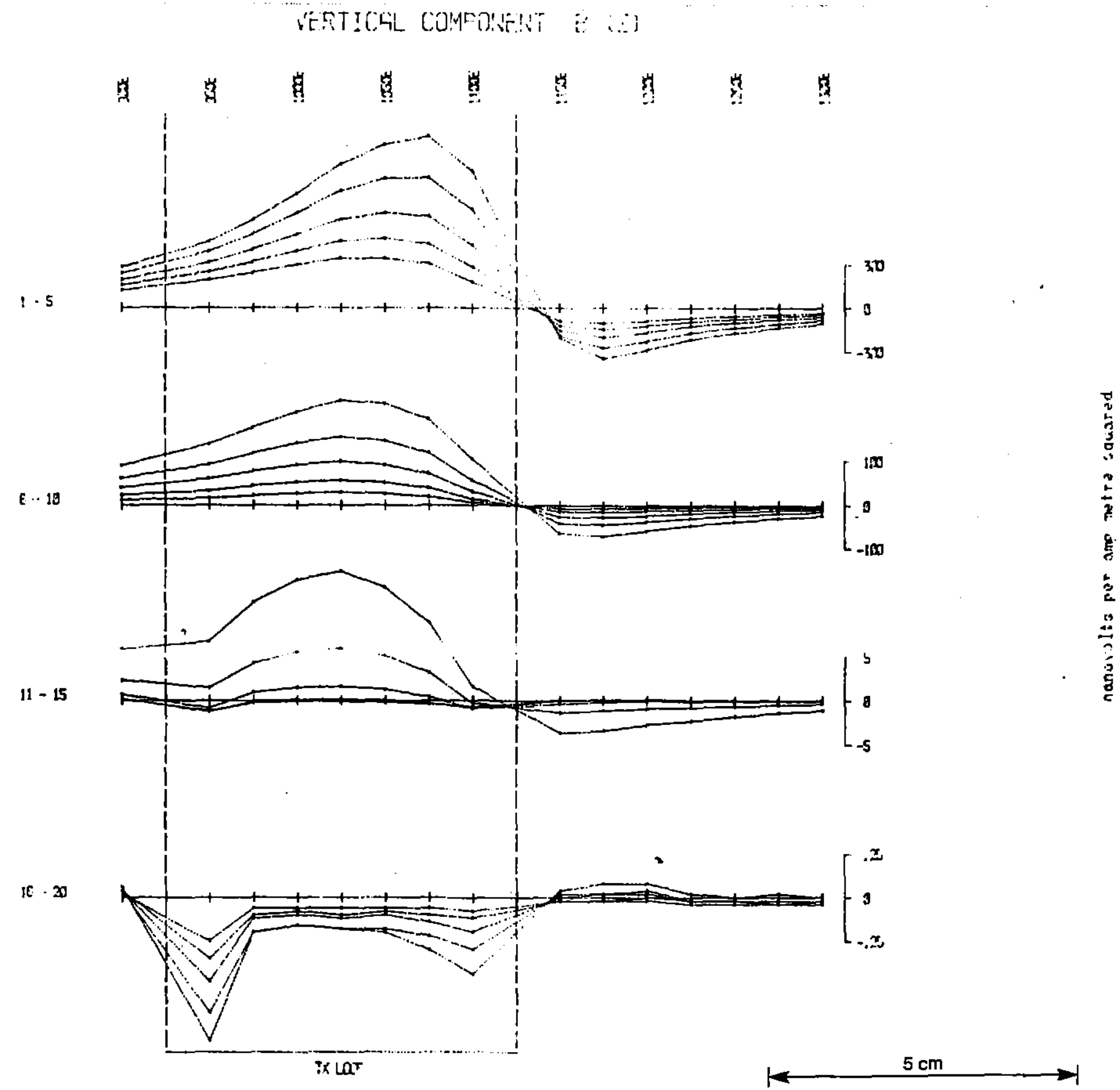
TIME DERIVATIVE OF FLUX DENSITY (B)

TX LOOP SIDES	: 80S 725E
	: 98S 925E
TX LOOP SIZE	: 200 m X 200 m
TX TURN OFF TIME	: 142 microsecs.
FIRST GATE TIME	: 88.5 microsecs.
CURRENT	: 15.7 amps
FREQUENCY	: 25 Hz.
INTEGRATION TIME	: 1024 cycles
SYNC MODE	:
HORIZONTAL SCALE	: 1:2500
SURVEYED BY	: PF
DATE	: 20/10/1989

SURVEYED AND COMPILED BY GEOTERREX PTY. LTD.	PROJECT NO. 4-143

CLIENT	: [illegible] Resources Lt
PROJECT	:
AREA	. RED HILLS
LINE	: 945 Z
TX LOOP	1A

433301



FIXED
TRANSMITTER
SURVEY

SECONDARY FIELD

TX LOOP SIDES	925 0250E
	595 1125E
TX LOOP SIZE	200 m X 200 m
TX TURN OFF TIME	: 139 microsecs.
FIRST GATE TIME	: 99.5 microsecs.
CURRENT	: 15.0 amps
FREQUENCY	: 25 Hz.
INTEGRATION TIME	: 1024 cycles
SYNC MODE	: CRYSTAL
HORIZONTAL SCALE	: 1:2500
SURVEYED BY	: PF
DATE	: 21/10/1999

SURVEYED AND COMPILED BY GEOTERREX PTY. LTD.

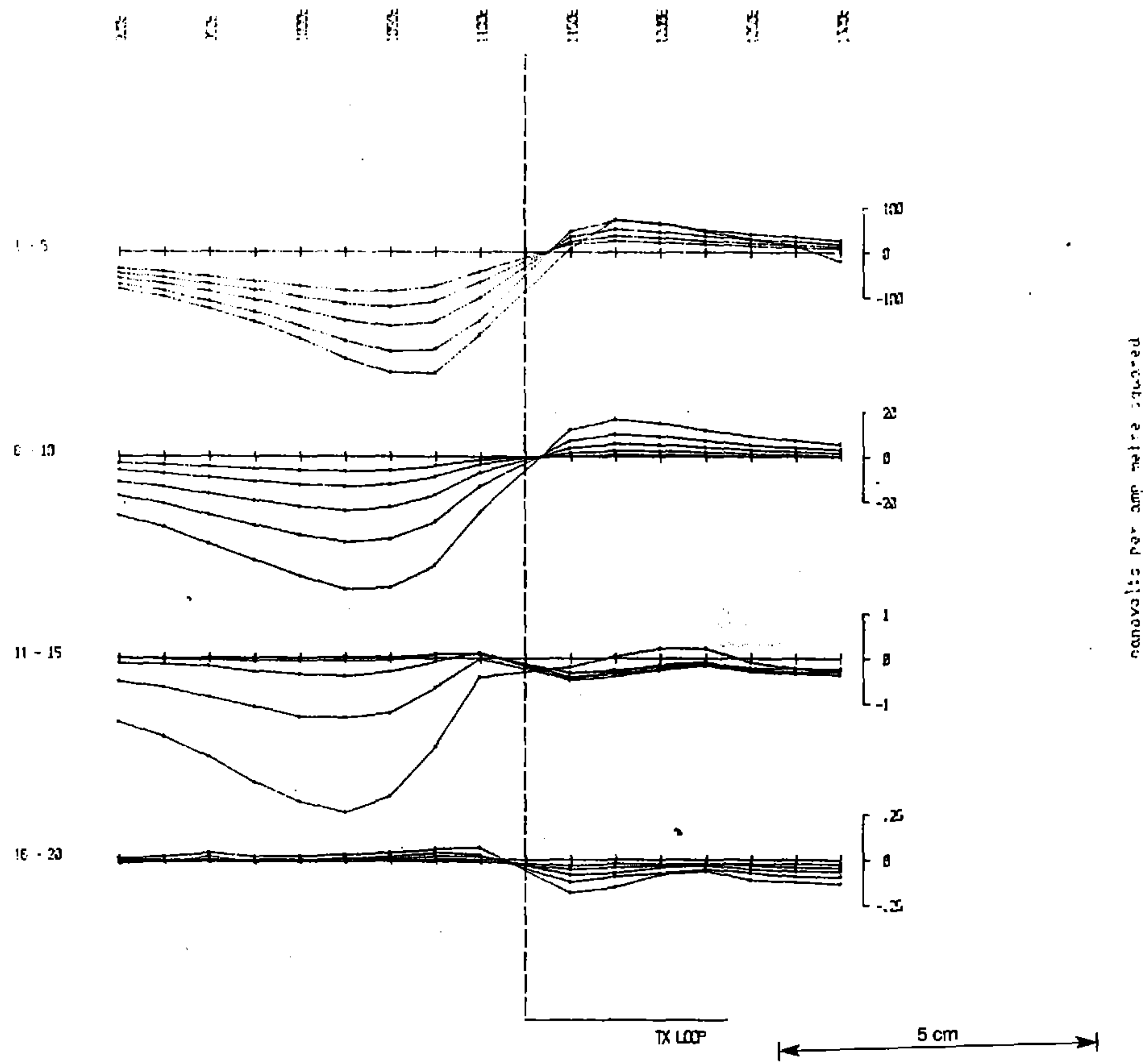
PROJECT NO. [illegible]

CLIENT	: [illegible]
PROJECT	: [illegible]
AREA	: RED HILLS
LINE	545 2
TX LOOP	15

300

433302

VERTICAL COMPONENT



FIXED
TRANSMITTER
SURVEY

ELECTROMOTIVE FORCE INDUCED BY
SECONDARY FIELD

TX LOOP SIDES	: 305 1125E
	: 395 1325E
TX LOOP SIZE	: 200 m X 200 m
TX TURN OFF TIME	: 155 microsecs.
FIRST GATE TIME	: 39.5 microsecs.
CURRENT	: 15.0 amps
FREQUENCY	: 25 Hz.
INTEGRATION TIME	: 1024 cycles
SYNC MODE	:
HORIZONTAL SCALE	: 1:2500
SURVEYED BY	: PF
DATE	: 21/10/1989

SURVEYED AND COMPILED BY GEOTERREX PTY. LTD.	PROJECT NO. 4-143

CLIENT	: Aberfoyle Resources Ltd
PROJECT	:
AREA	: RED HILLS
LINE	:
TX LOOP	:

APPENDIX XI

Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG

433304

PROJECT: LAKE MARGARET

PROSPECT: RED HILLS

HOLE NO: SH 19
PAGE: 1 of
LOGGED: DJN
DATE: 25/5/90

DEPTH	DRILL RUNS	CORE LOSS	ROCK NAME	DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
0.0			Qgt	Tricone precollar in surficial glacial till Cover. Minor recovery of ~~fractured~~ glacial till fragments from 5.3 - 5.5m. Dominately fragments of Owen Conglomerate and sandstone.	–	–	–	–			Hw tricone 0.0 - 5.3m. ~~Euhedral clear xline quartz phenocrysts upto~~ 4mm. HQ coring 5.3m →	
5.5m			gygn QFP Por? wth 2-3	A somewhat weathered/leached interval of gygnwh QFP Por?, in places gy Se flecks after Fd?. Former f.g. glassy or Xlline mtx highly weathered to Se. Possibly intrusive Porphyry or Rhyolitic lava.	Odd mnr fleck of Fe stain after haematite?						Core somewhat fractured, possibly drill induced, but also some fracture plains lined with Se developed at 0-15° to CA and at 55 & 75° to CA. Euhedral clear Xline quartz phenocrysts upto 4mm.	
15.7m			Cr bgy QFP Por?	A haematite stained interval of QFP Por! In places mnr flecks of Se possibly after Fd?							Fe stain after Hmt forms an irregular vein like network throughout.	
16.5m			gywhgn QFP Por?/R.1?	A somewhat weathered/leached interval of massive QFP Por? / R.1. In places flecks of Se after Fd? Minor patches of Fe stain after patches & veinlets of Hmt.		Mnr whQ vn (1-10mm) developed from 14.6-19.7m & @ 22.0 - 22.1m. At 21.1m 5-10mm whQ vn @ 20° to CA		Joints 10.9m @ 30° to CA. 17.2m @ 15° to CA 17.3m @ 35° to CA 17.7m @ 40° to CA 18.8 @ 35° to CA 19.0 @ 35° to CA 20.4 @ 20° to CA 21.0 @ 65° to CA 21.3 @ 60° to CA 21.4 @ 60° to CA 24.8 @ 30° to CA			Fracturing commonly drill induced, with some jointing.	

Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG

433305

PROJECT :

PROSPECT:

HOLE NO: RH 14
PAGE: 2 of
LOGGED: DJN
DATE: 25/5/90

DEPTH	DRILL RUNS	CORE LOSS	ROCK NAME	DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
25·7m 26·7m			gygnyl QFP Br?	A somewhat faulted & brec weathered/leached gygnyl QFP Por?/R.I. In places Se flecks after Fd. Mtx somewhat sericitised. In places much of the mtx is highly leached along frac.				A possible faulted interval.			At 25·7m frac plain @ 10° to CA & @ 26·7m frac plain @ 20° to C.A. Elsewhere core highly brkn & frac ē substantial leaching & disolution	
30			gygn QFP Por? -cbr (26·7–44·4m)	A more massive & competent interval of gygn QFP Por?/R.I.? Q phenocrysts euhedral ≤5mm. Mnr Se patches after Fd? In places Fe stained by flecks patches & irregular Hmt veinlets		At 41·3m mnr wh Q vn (1–4mm) @ 40° to CA.		Some jointing @ 50–70° to CA. & 25, 30, 35 & 40° to CA.			At 29·2m a semblance of banding @ 15° to CA, possibly a response to Hmt & Se rich bands. Mnr frac. developed @ 0–5° to CA from 37.1–38·3m. Also some irregular fracturing is drill induced.	
40												
43												

Aberfoyle Resources Limited

EXPLORATION DIVISION

DIAMOND DRILL LOG

433306

PROJECT :

PROSPECT :

HOLE NO: RH17

PAGE: 3 of

LOGGED: DJN

DATE: 25/5/90

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY: ROCK NAME	LITHOLOGY: DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
49												
49.4 – 51.5			gygryl QFP Por? (49.4-51.5)	A slightly more altered & frac. interval gygryler QFP Por?/ R.1? In places mtx moderately sericitised, with sericite/clay pug lining several fractures.	Se. patchy masses moderately altering mtx. Generally less sericitised towards the base of the interval.			Frac 5° to CA pug lined. Joint set 13-45° to CA & n set @ 50-60° to CA.			Degree of Fe stain after Hmt patches & veinlets. Much of the fracturing drill induced, but several intersecting jt sets evident. Core increasingly broken downhole.	
51.5 – 56.9			gygnbr QFP Por?	A mildly sericitised & Hmt stained gygnbr QFP Por/R1? c euhedral 1-4mm Q phenocrysts	Mild sericitisation of the mtx, in places after Fd also. Minor banding & patches of or br Fe stain after Hmt?						Mnr frac lined by sericite & Fe stained in places @ 7, 10, 15 & 80° to CA.	
56.9 – 62.4			wh or brgy QFP Por? wk 3	A highly leached & weathered interval of QFP Por / R.1? Spotting & irregular veinlets & frac. linings of Fe. Some degree of sericitisation of mtx (Se. 1.2 por) & some se after Fd?	Fe stain becomes more pervasive downhole. Some per sericitisation of mtx.						The interval is moderately jointed & jts @ 10, 25, 40, 60 & 70°	
62.4 – 64.1			gyylor QFP Por?	A gyylor QFP Por / R.1 Seper 3. an interval & highly sericitised mtx, some Fe stn of frac. & as spots. Interval mildly shd.				Mild cleavage @ 10° to CA. Joints @ 25 & 50° to CA.				

Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG

433307

PROJECT :

PROSPECT :

HOLE NO: RH19

PAGE: 4 of

LOGGED: DJN

DATE: 25/5/90

DEPTH	DRILL RUNS	CORE LOSS	ROCK NAME	DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
		05	whgygr QFP Por?	An interval of mildly leached whgygr QFP Por?/R.I? in places mildly shd @ 10-15° to CA.	Some sericitisation & leaching of mtx			Some jointing @ 25, 70 & 80° to CA. Shearing c 10-15° to CA.			From 66·3 - 67·3m an interval of highly frac. & brkn & puggy porphyry. Possibly Fault related. Possibly some core loss assoc. c F1t interval. Possibly sheared or fltd @ 10° to CA.	
57·6 - 79·4			pper whgygr QFP Por.	An interval of mildly leached and Hmt stained pper-whgygr QFP Por /R.I? , Qp generally euhedral. (1-3mm) (Fd generally sericitised) Progressively less Hmt fol'n downhole generally more leached c odd larger 2-5mm subround Qp appearing.	Some sericitisation assoc c leached nature of mtx. Some banding & pper colouration possibly assoc. c Hmt			The Hmt bands define fol'n @ 10-15° to CA			Mnr frac. @ 30° to CA lined c Se	
79·4 - 83·5			whgygr-pper QFP Por?	A generally more leached interval of whgygr-pper QFP Por/R.I? , mnr with Hmt bands. (Fd are sericitised) ~~S~~ Qp 1-3mm euhedral - subrounded. Interval more brkn & leached than preceding interval.	Some sericitisation of mtx assoc. c leached, wth? appearance			Hmt bands → possible fol'n 20-27° to CA.			Core somewhat frac. dominately drill induced & @ 10, 25, 40° to CA. In places drilling has reduced core to a no. of fragments.	
83·5 - 84·05			whgygr QFP Por?	A highly leached interval of whgygr QFP Por/R.I? Core highly brkn, dominately drill induced (Fd sericitised) (phenocrysts 1-3mm)	Core highly leached appearance, mtx altered to sericite.			A semblance of fol'n @ 20° to CA.			Core highly brkn by failure along phyllosilicate planes during drilling, c fracturing @ 10-40° to CA.	

Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG

433308

PROJECT :

PROSPECT :

HOLE NO: RH19
PAGE: 5 of
LOGGED: DJN
DATE: 27/6/90

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY: ROCK NAME	LITHOLOGY: DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
54.05 - 85.55			whgygn-ppcr QFP Por?	A highly sericitised & Hmt stained whgygn-crppo QFP Por? (Fd - sericitised) Qp (1-5mm) euhedral - subrounded	Highly sericitised mtx, c̄ intense patches cr, pp Hmt.			Hmt bands → Fol^n @ 20° to CA				
85.55 - 87.75			whgygn QFP Por?	A massive mildly sericitised whgygn QFP Por/Rl? Qp (1-5mm) euhedral occasionally subrounded	mildly sericitised mtx, Fd phenocrysts sericitised. Odd Hmt pat. Sericitisation increases downhole			Some drill induced frac. @ 40°, 20° + sub ‖ to CA.			86.6m reduce from HQ to NQ. Core more highly brkn. + frac following reduction to NQ.	
87.75 - 91.1m			gn whgy QFP Por?	A mildly leached + wth gnwhgy QFP Por? (Qp (1-5mm) euhedral & subrounded in places. (Fd sericitised)	Some Sericitisation of mtx, mild Se bands developed. Some or br Fe Stn	Some mnr Q veinlets sub ‖ to inferred fol^n @ 25° to CA.		Possible fol^n @ 25° to CA defined by Se bands.			At 90.5m a fracture cavity c̄ some assoc. dissolution.	
91.1 - 92.7m			whgn-br QFP Por?	A mildly leached & sericitised whgn-br QFP Por? (Qp 1-4mm, Fd 1-3mm (plagioclase?)) In places residual felsic patches, possibly represent less altered rock. An anastomosing network (Fishnet) of or-br Fe stained veinlets or cleavage infills wrapping phenocrysts	In places mtx more sericitised			Fe Stn or br veinlets or cleavage seams @ 10 & 25° to CA.				

Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG

PROJECT :

PROSPECT :

HOLE NO: RH19
PAGE: 6 of
LOGGED: DJN
DATE: 27/6/90

DEPTH	ROCK NAME	DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	REMARKS
92.7 - 98.4	gngy QfpPor?	A more massive gngy QFp Por/Rl (Fd - sericitised) (Qp 1-5mm) In places more felsic whpk br zones of massive unaltered Por.	In places mildly sericitised mtx.	V. minor whQ veinlets @ 25° to CA.		Fol'n defined by wispy Fe stn veinlets @ 25° to CA.	Minor Fe stn surfaces + minor wispy veinlets aligned along cleavage. At 97.8m mnr dissolution cavity + assoc. frac. @ high ∠ to CA.
98.4 - 100.95	gngy br Qp Por?	A massive gngy brwh Qp Por?Rl Qp (1-4mm) euhedral - subrounded. Core becomes more pk br downhole.	Mnr Hmt pat. near gnwh Se pat	In places wh Q vns crosscut CA @ 50 & 67° to CA c some assoc blebs. Some felsic patches assoc. c whQvns.			Core Orientation @ 100.7m: Se fol'n @ 70° to CA. At 100.7m R.L.D. = 255 So = 25° ⇒ 68° → 340°
100.95 - 102.04	Fault	A whQ veined interval sealing a Fault. From 100.95 - 101.1m pkbr Qfp Por interv. whQvns. 101.1 - 101.2m whgygn sericitised Qfp. 101.2 - 102m dominately whQ vns mnr pk felsic patches & highly leached areas of residual rock.			V. mnr dis Py assoc. whQ vns on frac & 2 in dissolution cavity @ 101.45m.		
102 - 139.4	gygn wh-ppr Qfp Por	A massive to variably altered or leached interval gngy-wh to ppcm Qfp Por / Rl.? Minor dissolution cavities @ 132.7m. Qp prevalent 1-5mm euhedral - subrounded.	In places ppr c per Hmt to Hmt pat. In other areas pat gngy Se occasionally developing weak fol'n	Mnr whQvn @ 123.7m @ 35°	V. mnr dis blebs of Py 139-139.4m. Mnr blebs Py assoc. c Hmt @ 137.1m.	A possible fol'n ⇒ Hmt/se bands @ 35° to CA.	At 122m a frac. lined c Fe stn @ 15° to CA. From 126 - 131m mnr frac 10 & 25° to CA often Fe stn. 131-139 mn frac 50-55° to CA.

60339

Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG

PROJECT :

PROSPECT :

HOLE NO: RH 9
PAGE: 7 of
LOGGED: DJN
DATE: 27/6/90

DEPTH	DRILL RUNS	CORE LOSS	ROCK NAME	DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
139.4 – 140.2			gywk-gygn av/slt	A variably carbonate veined gywk-gygn av or slt. Possibly some leaching along upper contact c R1/Por from 139.4-139.6m where tends to be gywk slt.	Co. alt or blebs throughout moderately developed	Co + mnr Q uns or veinlets throughout @ 30-40° to CA subll to fol^n also irregular xcutting vn @ 139.7m		Bedding @ 30-35° to CA.			Contact b/w app Por/R1 @ ash vol./slt is conformable mnr interfingering. Contact @ 28° to CA.	
140.2 – 140.9m			gygn-wk av/blu	Dominately gygn av with numerous Co blebs veinlets & possibly wh Co. alt'd slt bands subll fol^n. In places mnr lv bands Qp (0.5-1mm) lv bands rarely exceed 1-5mm.	Co. por.s intense patches developed after av? as bands & blebs subll to CA.	Numerous small Co, Q veinlets subll fol^n.		Fol^n => So @ 25° to CA.				
140.9 – 147.35			grgywk lv ibd gygrav	Dominately grgywk lvQp lh.fr (gyav clasts) mnr ibd bands gy-gygn av/ssdslt. Possibly some Chl fragments after glassy fragments?	Se pat 3, as bands also. Co pat, blebs + veinlets. mod to intense.	Co uns developed subll to fol^n.	Mnr blebs of Py sporadically distributed.	Fol^n or So @ 35° to CA.				
147.35 – 147.95			gygn lv Qp	Ap'gygn lv Qp mnr fd flecks? + mnr av fragments as lh.fr. Possibly mnr av bands.	intense Co blebs + uns.	Co uns xcut CA subll to a low < to the fol^n.	Mnr dis blebs of Py.	Fol^n or So @ 25° to CA.				
147.95 – 151.2			gn-dkgn lv ibd av	An interval dominated by gn-dkgn lv Qp lh.fr (Felsic clasts & grgyav). ibd mnr gn-grgy av/slt bands. Mnr gygn slt clustered glassy fragments?	Co uns & blebs mod-intensely developed	Co, Q uns + veinlets throughout.	Mnr Py blebs & narrow 1-2mm band @ 149.95m. In places assoc c Co, Q uns.	Fol^n or So @ 35° to CA.			Mnr Mt throughout c response to magnet moderate to strong	

Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG

433311

PROJECT :

PROSPECT :

HOLE NO: RH19
PAGE: 8 of
LOGGED: DJN
DATE: 27/6/90

DEPTH	DRILL RUNS	CORE LOSS	ROCK NAME	DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
154.2 - 154.3			grgy lv Qp.	An interval dominated by grgy lv Q fp p_n/lhfr (au. clsts, felsic clsts.) mnr ibd grgy au & slt.	Se per throughout mtx. Co blebs & vns moderate development.	Co vns & blebs throughout.		Fol^n => So @ 27° to CA.			pk br felsic clsts of R.I / Por Qp. Moderate strong Mt response possibly related to the proliferation of felsic clasts.	
154.3 - 154.6			grgy au	An interval dominated by grgy au mnr ibd gn lvQp lhfr (felsic pk br Qp Por, grgy sh) fp (sericitised).		mod Co vn development as blebs & irregular veinlets.		Fol^n => So @ 35° to CA.				
154.6 - 158.8			grgy sh lv	An interval dominated by grgy sh lv Qfp, lh.fr (felsic R.I Qp clsts, Qtz clsts, sh/au clsts).	Some mod Se per of mtx.	Irregular Co vns blebs & pat occur throughout. Also mnr Q assoc c Co vns.	157.8 - 158.8m mnr dis blebs of Py.	Fol^n => So @ 20° to CA.			Abundant Mt throughout to presence strong magnetic response.	
158.8 - 159.75			gygn au/Sh	An interval Dominated by gy-gygn au/slt c mnr ibd lv Qp, fp lhfr (R.I, sh).	Some Sericitisation of mtx of lv.	Mnr veinlets & blebs of Co.	Dis blebs of Py occur throughout lv, mnr Py bands c in gy au/sh along c mnr band of gn @ 159.1m.				Strong Mt response as a result to Mt assoc c lv.	
159.75 - 166.0m			gn-dkgn lv	An interval dominated by gn-dkgn lv Qfp lhfr (felsic RIQp, sh. frag.) felsic lava clsts more prolific downhole. Core frac subll fol^n from 162.4 - 163.7 dominantly drill induced.	Some Sericitisation of mtx, mod. Some Cl assoc c Se.	Numerous Co vns & veinlets & blebs.	mnr wispy veinlets of Py @ 165.25m. Mnr dis Py throughout.	Fol^n => So @ 30° to CA. => 35° to CA downhole.			Strong magnetic response as a result dis Mt. Some frac subll to fol^n, c some Cl/Se pmg lining frac.	

Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG 433312

PROJECT :
PROSPECT:

HOLE NO: RH 19
PAGE: 9 of
LOGGED: DJN
DATE: 27/6/90

DEPTH	DRILL RUNS	CORE LOSS	ROCK NAME	DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
166.0 - 166.4			gngy au	An interval dominated by gngy au/sit mnr Cc vns or bands subll folh + mnr wispy bands w Qp.fp lhfr (feature L1).		Co vns + blebs subll to So. Mnr Hmt assoc c Co vns @ 166.05m.		Folh => So @ 35-40° to CA.				
166.4 - 168.5m			gn lv	gn-gygn lv Qp.fp lhfr pkor R.1Qp, Moderate frac subll to Folh in places more intensely frac drill induced.	Some Cl flecking of mtx along c mnr per sericitiz.	Co vns, veinlets well developed, esp. in assoc. c felsic lhfr.		Folh => So @ 33-43° to CA.			mod-intense magnetic response, mt possibly assoc c or related to occurrence of felsic lhfr.	
168.5 - 169.0m			gnlv	gn-dkgnlv Qp fp only v. mnr sporadically distributed felsic lhfr R.1Qp, occur.	mnr wispy Cl veinlets. Some sericitisation of mtx mild.	Irregular Co blebs + veinlets.	mnr Py assoc c wispy Cl veinlets + patches.					
169.0 - 169.5			gnlv	A possible fault zone with intense chloritisation of gn-dkgnlv Qfp c some assoc. pug development + chl on shd plains. Core highly brkn, with the possibility of drill induced frac. also rods may have been pulled to a bit allowed some over coring of cave material.	Cl per moderate - intense.	Intense Co + mnr assoc Q vns + veinlets.	mnr dis Py blebs assoc. c Cl. Possibly some small Hmt spt (strongly resemble Cuss. in habit)	Upper shear contact @ 17° to CA. Dominate frac. @ 40° + 17° to CA.			0.2m coreloss.	

Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG

433313

PROJECT :

PROSPECT:

HOLE NO: RH19
PAGE: 10 of
LOGGED: DJN
DATE: 28/6/90

DEPTH	ROCK NAME	DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	REMARKS
169.5 - 172.9	gn Rhl?	An almost banded gn-wh Rl fp cl. per with bands or zones of residual bands or zones of pk brwn felsic R.1/Por? Qp. (Hmt stn often intense in felsic bands).	Cl per b/w zones of felsic lava.	Co vns less prevalent mainly assoc c felsic areas. Some whQ, Co + Cl vns.	In places felsic lava has dis to per Py min & mnr blebs of cp assoc c Py. 172.5-172.6m.		Mt dis throughout c mod. strong magnetic response. Some drill induced frac. & over coring from 170.1 - 170.4m. 170.7-170.9 core highly brkn c some over coring
172.9 - 173.1	gn lv?	A highly brkn frac. interval gn-dkgn lv fp in places shd.	Cl. per mod-intense mnr pat Hmt.	Intense whQ. Co vns c some assoc. Cl.		@ 173.1m a shear @ 25° to CA c some assoc crenulation	dis Mt throughout. Frac generally irregular c some regular frac @ 25, 60 & 70° to CA.
173.1 - 177.15	gnlv?	gngy lv fp. Cospt possibly some Qp. essentially massive c some Cl. se pa mtx. v.mnr lkpr. felsic lava	Co. spt mod. Cl. se pa mtx mod. Cl spt sporadic.	Co. vns irregular & subll to foln In places Hmt assoc. c Co vns	174.85m mnr Py band	Possible foln S, @ 40° to CA	Core orientation @ 175.7m. Mt. throughout c strong magnetic response
177.15 - 178.6	gn lv	gngy - brwpk lv c abundant felsic clasts Rl (Qp Hmt pa) similar to 169.5-172.9 may represent Cl altn of Rl/Por? Felsic zones commonly define bands subll foln.	Cl. per mod in places intensely developed upon frac.	Irregular Co vns throughout, in particular assoc c felsic clasts. Some veins/veinlets subll to foln.		Foln S, ? 40-43° to CA. Some frac. subll to foln c 40-45° to CA.	Mt throughout c strong magnetic response.
178.6 - 180.8	gnlv/av	A possible gn lv fp. felsic frags. Cospt like gn av/slt mnr. i.e. mnr av/slt bands 1-20mm int c lv c mnr areas of felsic lava clasts/bands.	Cl. se pa mtx moderate. Co. spt mnr Hmt spt assoc c felsic clasts.	Co veinlets & vns sporadically distributed. Some Q, Co. Cl vns		Foln possibly So @ 25° c some alignment of Se? @ 35° to CA	Mt throughout c strong magnetic response.

Aberfoyle Resources Limited

EXPLORATION DIVISION

DIAMOND DRILL LOG

433314

PROJECT :

PROSPECT:

HOLE NO: RH19

PAGE: 11 of

LOGGED: DJN

DATE: 28/6/90

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY: ROCK NAME	LITHOLOGY: DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
180.8 – 188.25			gn fv+lv	An interval that is dominated by large masses or bands of an pkbr felsic lava uphole that progress to smaller subrounded clasts of felsic lava and finally to gy-wh felsic lava clasts & slt clasts downhole. gngy-wh lv/bv lh fr (felsic lava (R.I), slt, qtz?). Qfp.	Cl flecks spt throughout mod. Cl.Se pv mtx mod.	Irregular Co vns, veinlets & blebs throughout.	Mnr dis blebs & wispy veinlets of Py more prevalent down hole.	Banding @ 20-30° to CA ⇒ S0 or S1. Possibly represents compositional differences ⇒ S0.			Becomes less magnetic downhole.	
188.25 – 192.45			gy slt ibd gy ss : ltgy lv	An interval of interbedded gy-bk slt ē gy-wh ss ē gngy lv Qfp ē mnr wispy slt beds. The ss → Qtz. (lv : ss : slt = 3 : 2 : 2)	Mnr Cl.Se pv mtx of lv. In places Cl spt assoc ē ss & commonly ē lv.	Mnr Co veinlets sporadically distributed dominately assoc ē lv.	Mnr Py bands & blebs assoc. ē ss bands.	well defined bedding @ 25-30° to CA.				
192.45 – 194.05			bk sh/slate	Dominately bk sh/slate ē mnr ibd gy slt/ss. Highly frac., somewhat graphitic upon frac. planes.		Mnr Co vns & veinlets.	Mnr blebs of Py assoc ē Co vns. Some Py lining frac planes.	well defined bedding @ 30-25° to CA.			well developed cleavage sub// to fol'n ē core highly frac along cleavage.	
194.05 – 199.8			gy Qp R.I	gy-pl gy QpR.I, coarse 1-6mm Qp. massive. Somewhat leached paler grey 194.3-199.8m possibly assoc ē Q vn development may be some sericitisation.	v. mnr Cl? infilling wispy veinlets poss? Some Cl assoc ē intense wh Q veining towards the base of the interval.	V. mnr Co veins & veinlets sporadically distributed. In places well developed wh Q mnr Co vns 194.3-194.5m ē some assoc. leaching.						

Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG

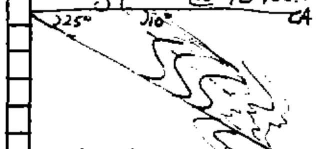
433315

PROJECT :

PROSPECT :

HOLE NO : RH14
PAGE : 12 of
LOGGED : DJN
DATE : 28/6/90

DEPTH	DRILL RUNS	CORE LOSS	LITHOLOGY: ROCK NAME	LITHOLOGY: DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
199.84 - 206.25			gy bkSh.	An interval dominately of gy bk Sh c̄ mnr ibd gy Slt. In places silty so in other areas highly graphitic bk Sh. Some Syngenetic Py. From Core orientation sequence appears to dip towards S.W.		Irregular blebs & veinlets of Co + whQ.	Dis Py & mnr Py veinlets throughout, Py also lines bedding planes & lines frac. Minor veinlets of Mt. 200.2 - 200.3m. Minor bleb Sp on lower contact.	Bedding @ 30° to CA → 15° to CA downhole. ⇒ 30° by base of interval. At 202.3m 2 c.D = 23° So = 21° ⇒ 74° → 043 At 201.4m ALD = 10° So = 22° ⇒ 60° → 186°			Conformable upper contact, faulted lower contact. At 206.15m highly broken pug sheared bk Sh. c̄ frac @ 40, 65° to CA. At 205.65m mnr Shd zone c̄ pug & Co lining frac. @ 40° to CA. Some crenulation & shearing of bk Sh. Core Orientation @ 202.3m.	
206.25 - 207.8			gy QpR.I (FAULT)	A Fault sealed zone of intensely whQ veined interval with some irregular clasts of gy QpR.I in places intensely Cl altered.	Some Cl. por in places, particularly downhole. As result leucocratic frag. intensely altered.	Intense whQ vn development as F/t seal c̄ mnr assoc. Co.		Lower contact @ 45° to CA upper contact more irregular but approx 45° to CA.				
207.8 - 213.7			gy QpR.I	A gy QpR.I massive cut by numerous whQ vns. In places some leaching & possible Se alt. Fringing zones of intense whQ vn development esp 212.4 - 213.7m.	V. mnr pat Se alt. mild.	Intense whQ veining mnr assoc. Co veinlets & blebs in places. Vns 45 - 55° to CA 0.5 - 100mm wide.					Possible Fault Seal zone 211.9 - 212.4 i.e. intense whQ vned zone c̄ mnr residual blocks of gy QpR.I	
213.7 - 214.15			gnav	A highly chloritised interval possibly gnav or former aphyric R.I?	Cl alt intense & pervasive Mnr Se flecks?	In places intense whQ vn development 214.05 - 214.15m					May simply represent Si & vn or F/t seal from 213.6 - 214.15m.	



Aberfoyle Resources Limited
EXPLORATION DIVISION

DIAMOND DRILL LOG

433316

PROJECT :
PROSPECT:

HOLE NO: RA19
PAGE: 13 of
LOGGED: DJN
DATE: 28/6/90

DEPTH	DRILL RUNS	CORE LOSS	ROCK NAME	DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
214.15 - 217.4			gngyQpR.l	A gngy QpR.l interval massive but c a gngy colouration resulting from mild pervasive se alteration. Again coarse Qp (1-5mm).	Mild Se. per.	Moderate whQ ± Co, Cl vn development throughout c vns @ 55, 60, 70° & irregularly subll tox cutting CA.	—					
217.4 - 219.0			gyQpR.l	Similar to previous interval gy QpR.l, c generally finer (0.5-3mm) Qp. gy somewhat sericitised mtx	per Se. mod. mnr Cl. pat.	A no. of broad 5-15cm whQvn zones. vns @ 55, 65, 80° to CA. Mnr Co and Cl assoc c whQ vns.						
219.0 - 232.5m			gyQpR.l	A massive gyQpR.l little whQ.Co veinlet development.	Mnr Se per, but generally massive unaltered.	Only v. mnr short veinlets & narrow irregular whQ vn development. Mnr veinlets & blebs of Co. Mnr broader 1-2cm vns, veinlets of whQ downhole.					219.9m banding 27° to CA.	

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EXPLORATION DIVISION

DIAMOND DRILL LOG

433317

PROJECT :

PROSPECT :

HOLE NO: RH19

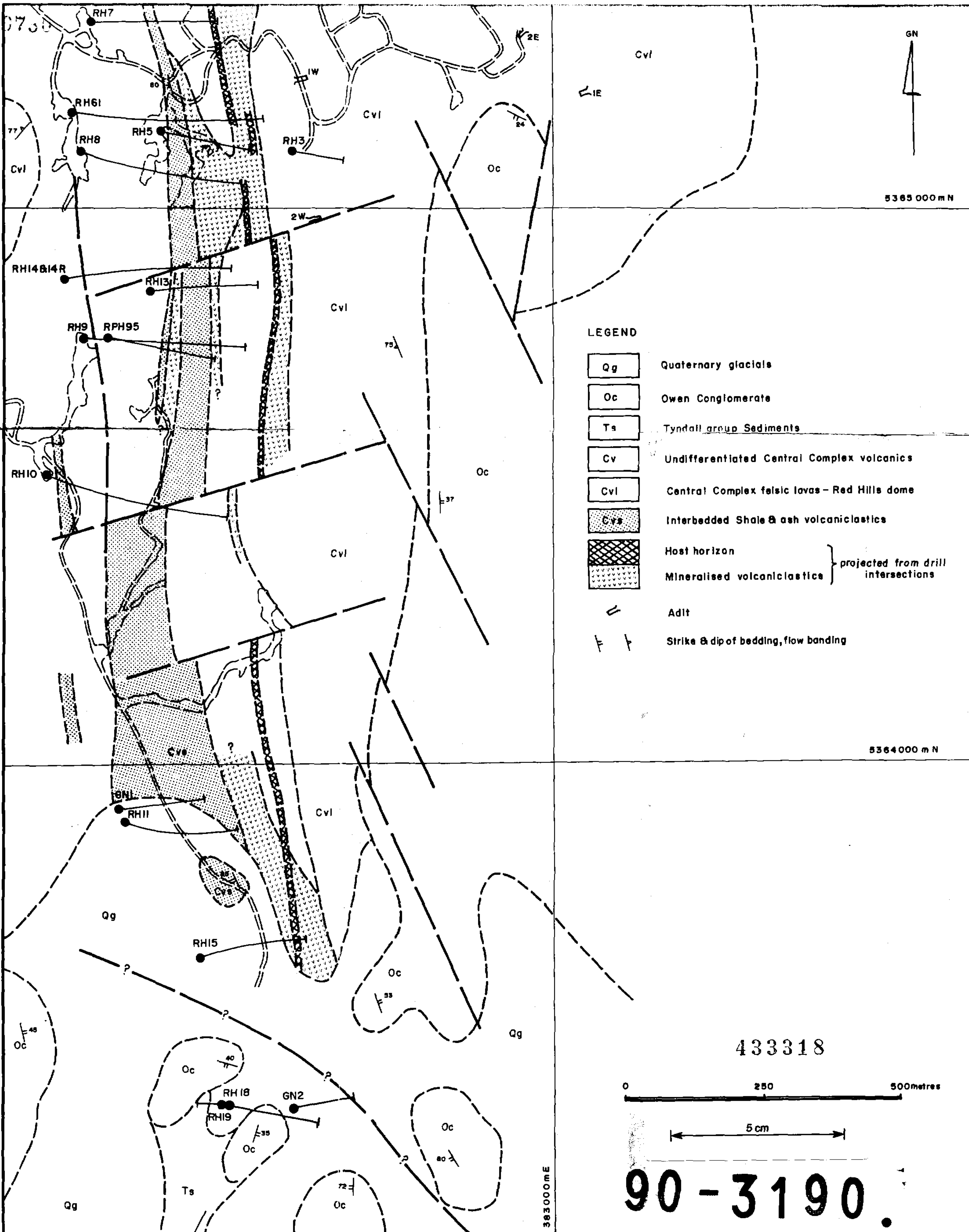
PAGE: 14 of

LOGGED: DJN

DATE: 28/6/90

DEPTH	DRILL RUNS	CORE LOSS	ROCK NAME	DESCRIPTION	ALTERATION	VEINING	MINERALISATION	STRUCTURE	WEATHERING	VISUAL LOG	REMARKS	DEPTH
232.5 - 234.3			gygr Qp R.I	A highly brkn interval of gygr Qp R.I. (Qp 1-5mm).	Mild se alt pervasively through mtx. Also some se lining frac surfaces.	Mnr Co, Q veinlet development sporadically throughout		Highly fractured, fractures irregular in places lined c̄ sericite-py. Frac 10, 20, 35, 45° to CA.			Core highly brkn, to a degree drill induced, also some jamming & result breaking during extraction from core barrel. Possibly some low ∠ shear fol^n as plain of weakness @ a low ∠ to CA.	
234.3 - 237.3			gygr QpRI	Similar to preceding intervals gygr QpRI (Qp 1-5mm) but generally less brkn.	V. mild se per alteration of mtx but generally massive unaltered.	Minor wh Q, Co veinlets sporadically developed.		Some low ∠ frac development @ 15, 20, 35° to CA often at oblique ∠s to each other.			Some se to sericite-py lining frac surfaces.	

EOH 237.3m



LEGEND

Qg	Quaternary glacials
Oc	Owen Conglomerate
Ts	Tyndall group Sediments
Cv	Undifferentiated Central Complex volcanics
Cvl	Central Complex felsic lavas – Red Hills dome
Cvs	Interbedded Shale & ash volcaniclastics
	Host horizon } projected from drill intersections
	Mineralised volcaniclastics } projected from drill intersections
	Adit
	Strike & dip of bedding, flow banding

433318

0 250 500metres

5 cm

90 - 3190.

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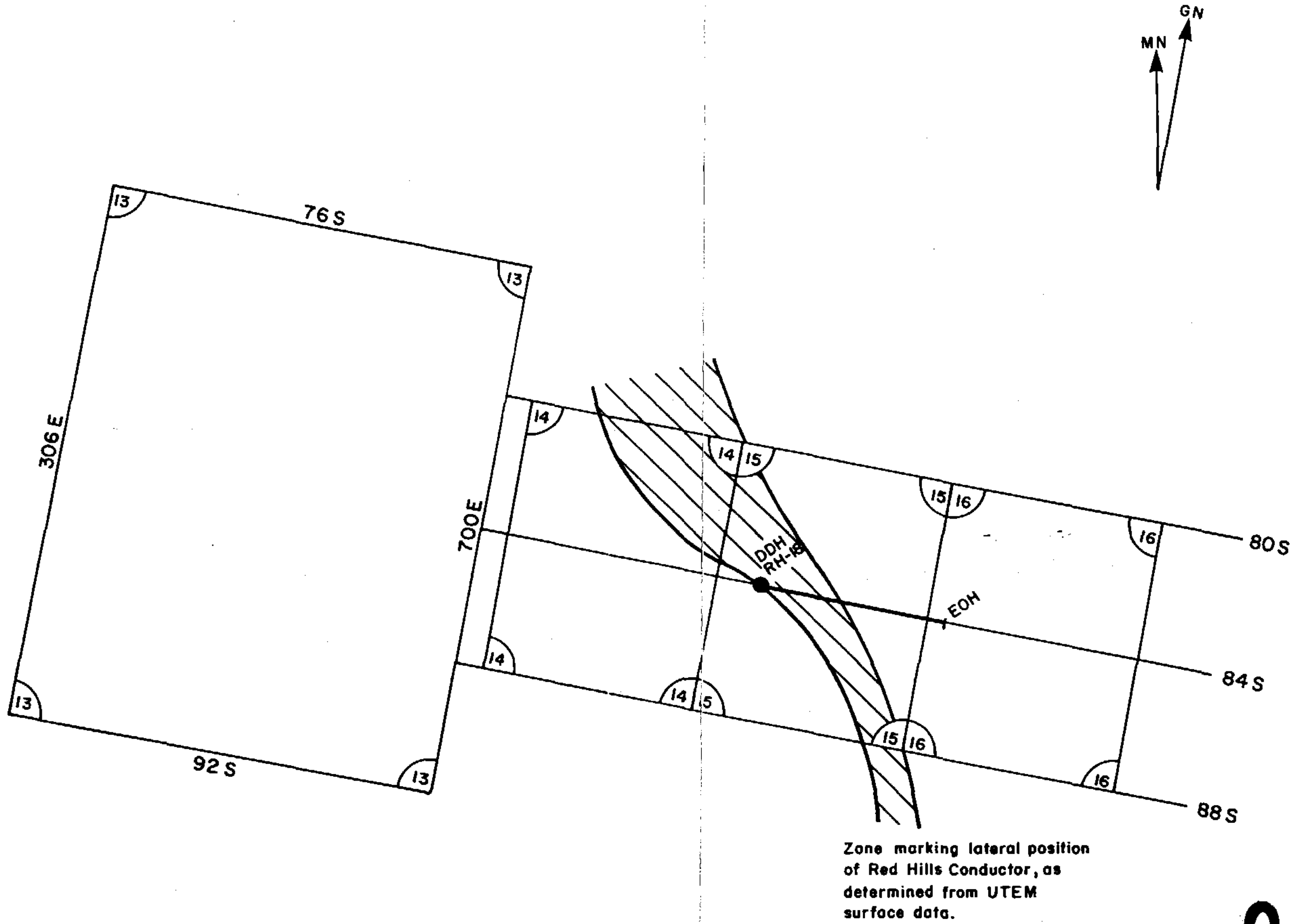
EXPLORATION DIVISION

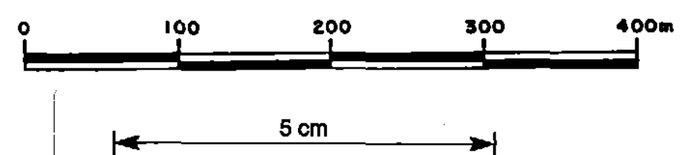
REVISIONS				NORTH WEST TASMANIA LAKE MARGARET E.L. 5 / 85 RED HILLS PROSPECT SUMMARY INTERPRETED GEOLOGY	Compiled : AMcN
Init.	Date	Init.	Date		Drawn :
AMcN/je	21·9·89				Traced : JLR
					Checked :
Location Code :				Scale : As shown / Date : June, 1989	Plate No. : LMARG II

9736



433319

90-3190.



Loop 13 — Used for Down-Hole Sirotem Survey, September 1989.

Loop 14-16 — Used for Down-Hole Em-37 Survey, October 1989.

14 — Loop corner and loop number.

Aberfoyle Resources Limited

EXPLORATION DIVISION

REVISIONS			
Init.	Date	Init.	Date

Location Code :

TASMANIA

E.L. 5/85 RED HILLS PROSPECT
DHEM LOOP POSITIONS, 1989 SURVEYS

Scale : 1:5000 | Date : FEB. 1990

Compiled : JJR
Drawn : JJR
Traced : RKW
Checked : JJR
Plate No. : LMARG 24

QUATERNARY

Qg	Pleistocene glacial deposits, mainly till.

CAMBRIAN

Tyndall Group

€tc	Volcaniclastic conglomerate (possibly Jukes Conglomerate correlate?).
€tav	Green grey ash volcaniclastic or siltstone.
€tlv	Quartz phyric lapilli volcaniclastics, moderately to intensely sericitised.
€tdl	Quartz phyric dacitic lavas in places intensely chloritised.

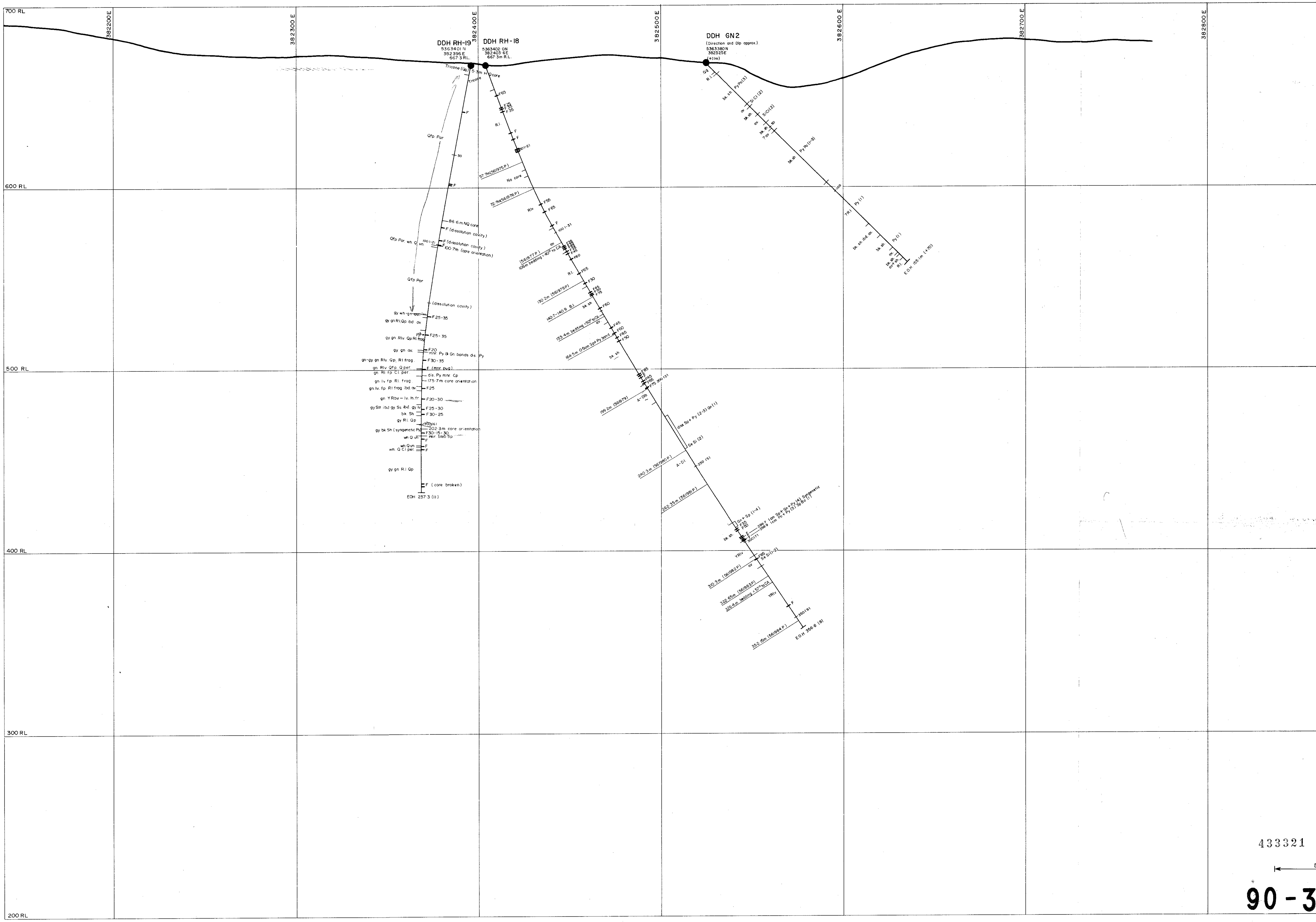
Central Volcanic Complex

€cbv	Breccia volcaniclastic commonly with a range of lithic clasts including; black shale, felsic lava and odd minor pyritic sulphide clast.
€clv	Lapilli volcaniclastics, quartz feldspar phyric and commonly containing felsic lava fragments.
€csh	Black shale lenses, commonly enclosed by volcaniclastics.
€crb	Polymict lava breccia derived from dacite to rhyolitic lava fragments.
€crl	Pink orange green massive rhyolitic lava commonly cut by intense haematite quartz and lesser chlorite vein networks. (Beatrice lava dome).

INTRUSIVES

€tp	Porphyry associated with Tyndall Group Volcanics.

9731



433321

90-3190.

Aberfoyle Resources Limited EXPLORATION DIVISION		
REVISIONS: Init. Date Init. Date — DJN / je 4-7-90	NORTH WEST TASMANIA LAKE MARGARET E.L. 5/85 CRA JV. RED HILLS PROSPECT SECTION ON 090° MAG. - DDH RH18-19	Compiled: AMcN Drawn: AMcN Traced: RJE Checked: AMcN
Location Code:	Scale: 1 : 1000 — Date: September, 1989	Plate No: L.Marg 14


9744
SOUTHWEST CONSERVATION AREA BOUNDARY
E.L. 5/85
SOUTHWEST CONSERVATION AREA
ANTHONY ROAD
QUINN CREEK
HILLS CREEK
ANTHONY RIVER
SOUTHWEST CONSERVATION AREA BOUNDARY
384 000 mE
386 000 mE
388 000 mE
5 368 000 mN
5 366 000 mN
Aberfoyle Resources Limited
EXPLORATION DIVISION
433322
REVISIONS
Init. Date Init. Date
NORTH WEST TASMANIA
LAKE MARGARET E.L.5/85 CRA JV
NORTH SELINA AREA
INTERPRETIVE GEOLOGY
Compiled : DJN
Drawn :
Traced : RJE
Checked :
Location Code :
Scale : 1 : 5 000
Date : October, 1990
Plate No : L.MARG.33/B1
5 cm

QUATERNARY

Qg	Pleistocene glacial deposits.

CAMBRO-ORDOVICIAN

Ocg	Undifferentiated Owen Conglomerate.

CAMBRIAN

Tyndall Group

€tc	Volcaniclastic Conglomerate. (Jukes Conglomerate correlate?) In places haematite alteration developed.
€tlv	Quartz feldspar phyric lapilli volcaniclastics commonly sheared.
€tdl	Quartz feldspar phyric rhyolitic-dacitic lavas commonly chloritised. In places intensely altered to sericite, silica and pyrite (HA) indicated. In other areas intense chlorite, k-spar ± magnetite (minor pyrite) vein stockworking/alteration is present.

Sticht Range Beds

€srb	Siliclastic grey conglomerate and sandstone interbedded with micaceous siltstone, in places minor interbedded lapilli volcaniclastic lenses.

PRECAMBRIAN

Ꝑp	Dominantly pelitic quartz mica phylite.

INTRUSIVES

€tp	Porphyry associated with Tyndall Group Volcanics.
€gr	Granitic rocks (Murchison Granite).


5368000mN
(Top of licence)
382000mE
388000mE
381000mE
380000mE
5366000mN
5362000mN
5361000mN
QUINN
RED HILLS CREEK
CONSERVATION BOUNDARY
ANTHONY
BOUNDARY
Arnold Peak
SOUTHWEST CONSERVATION AREA
SHELL EL 103/87
HEC
HEC POWERLINE
Mt Selina
LAKE SELINA
Moyle Rock
LAKE WESTWOOD
Lukes Knob
JULIA CREEK
LAKE JULIA
Mt Julia
Julia Peak
ANTHONY RIVER
CONSERVATION BOUNDARY
+ -80# SAMPLE LOCATION
+ Cu, Pb, Zn, Ag, Au, Ba, As
IS = INSUFFICIENT SAMPLE
● Cu, Pb, Zn, Ag, Au, Ba, As, Cr, Zr, Ti, Y (ppm)
K2O, MgO, CaO, Na2O (%)
TASMANIA
BURNIE
DEVONPORT
LAUNCESTON
Lake Margaret E.L.5/85
QUEENSTOWN
HOBART
100Km
0 500 1000metres
Index to Sheets
A
B
C
D
432324
5cm
90-3190.
Aberfoyle Resources Limited
EXPLORATION DIVISION
NORTH WEST TASMANIA
LAKE MARGARET E.L.5/85 CRA J.V.
NORTH SELINA PROSPECT
STREAM SEDIMENT SAMPLE RESULTS
Compiled: DJN
Drawn: JLR
Traced: JMS RJE
Checked: DJN
Scale: 1:10 000
Date: December 1989
Plate No: L MARG 18

9745
ARNOLD PEAK
MOUNT SELINA
LAKE SELINA
ANTHONY RIVER
ANTHONY ROAD
SOUTHWEST CONSERVATION AREA BOUNDARY
SOUTHWEST CONSERVATION AREA
E.L. 5/85
SHELL E.L. 103/87
HA
€tlv
€tc
€tdl
€tp
€srb
Qg
₽p
5 364 000mN
5 362 000mN
384 000mE
386 000mE
388 000mE
433325
5 cm
Aberfoyle Resources Limited
EXPLORATION DIVISION
REVISIONS
Init. Date Init. Date
NORTH WEST TASMANIA
LAKE MARGARET E.L.5/85 CRA JV
NORTH SELINA AREA
INTERPRETIVE GEOLOGY
Compiled DJN
Drawn :
Traced : R.J.E.
Checked :
Location Code :
Scale : 1 : 5 000
Date : October, 1990
Plate No : L.MARG.33/B2


9740
386000 m E
387000 m E
5 348000 m N
5 347 400 m N
5 347 200 m N
5 347 000 m N
5 346 800 m N
5 346 600 m N
5 346 400 m N
5 346 200 m N
5346000 m N
800
700
600
500
400
300
5 cm
0
200 metres
Sheet A
Sheet B
Aberfoyle Resources Limited
EXPLORATION DIVISION
433326
REVISIONS
Init. Date Init. Date
NORTH WEST TASMANIA
LAKE MARGARET E.L.5/85
BEATRICE AREA
OUTCROP GEOLOGY
Compiled : DJN
Drawn :
Traced : RJE
Checked :
Location Code :
Scale : 1 : 2500
Date : July , 1990
Plate No : L.Marg 29A

433327

Aberfoyle Resources Limited
EXPLORATION DIVISION

NORTH WEST TASMANIA
LAKE MARGARET E.L. 5/85
BEATRICE AREA
OUTCROP GEOLOGY

REVISIONS			
Init.	Date	Init.	Date

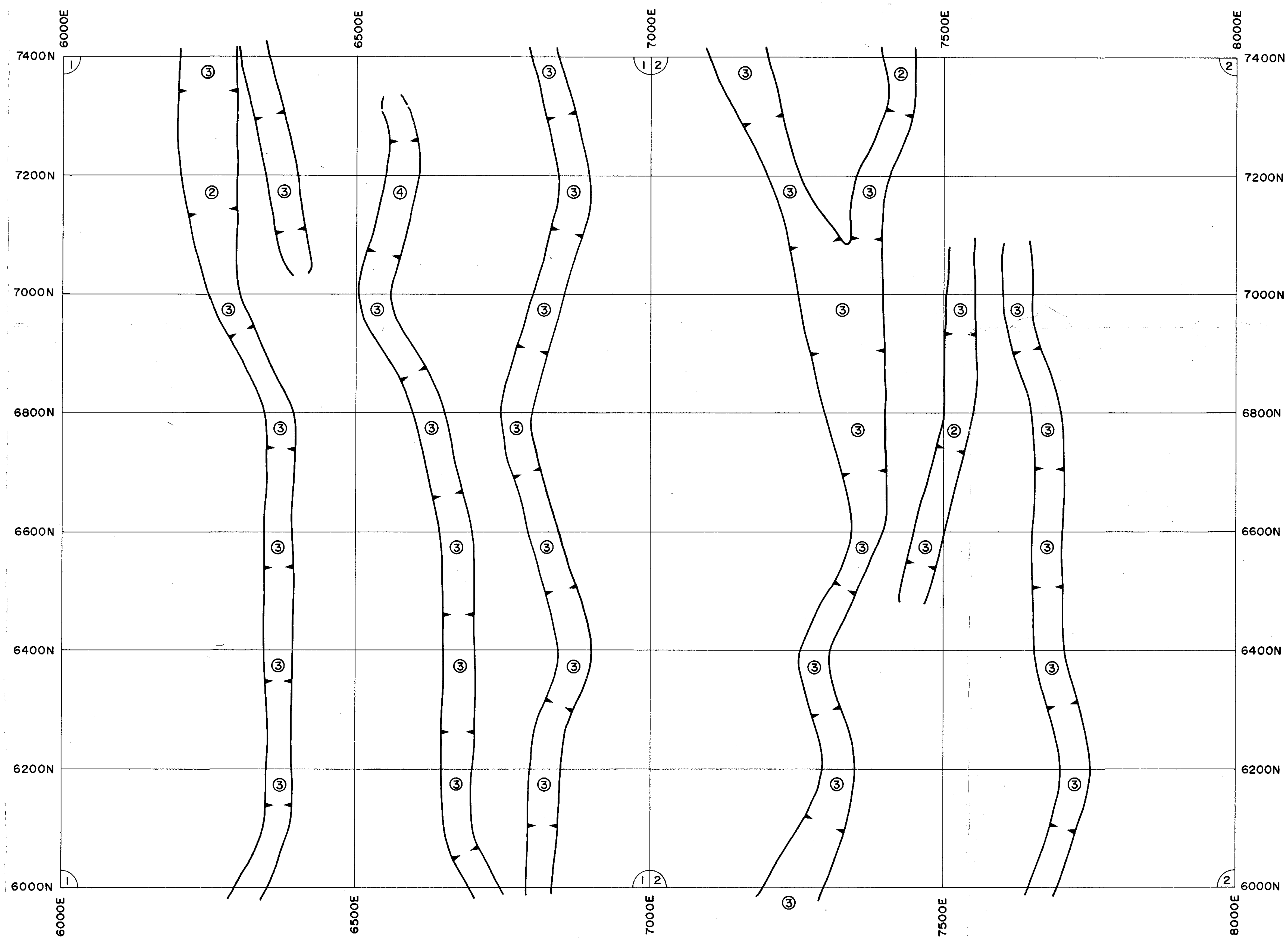
Location Code :

Scale : 1: 2500

Date : July, 1990

Compiled : DJN
Drawn :
Traced : RJE
Checked :
Plate No : L.Marg. 29B

9737



433328

90-3190.

5 cm

UTEM loop with number

Conductive source with latest anomalous channel
(lower number = stronger conductor)

Aberfoyle Resources Limited
EXPLORATION DIVISION

REVISIONS			
Init.	Date	Init.	Date

North West Tasmania

LAKE MARGARET EL. 5/85
Lake Beatrice Grid
UTEM Interpretation

Compiled :	GBW
Drawn :	GBW
Traced :	JAB
Checked :	

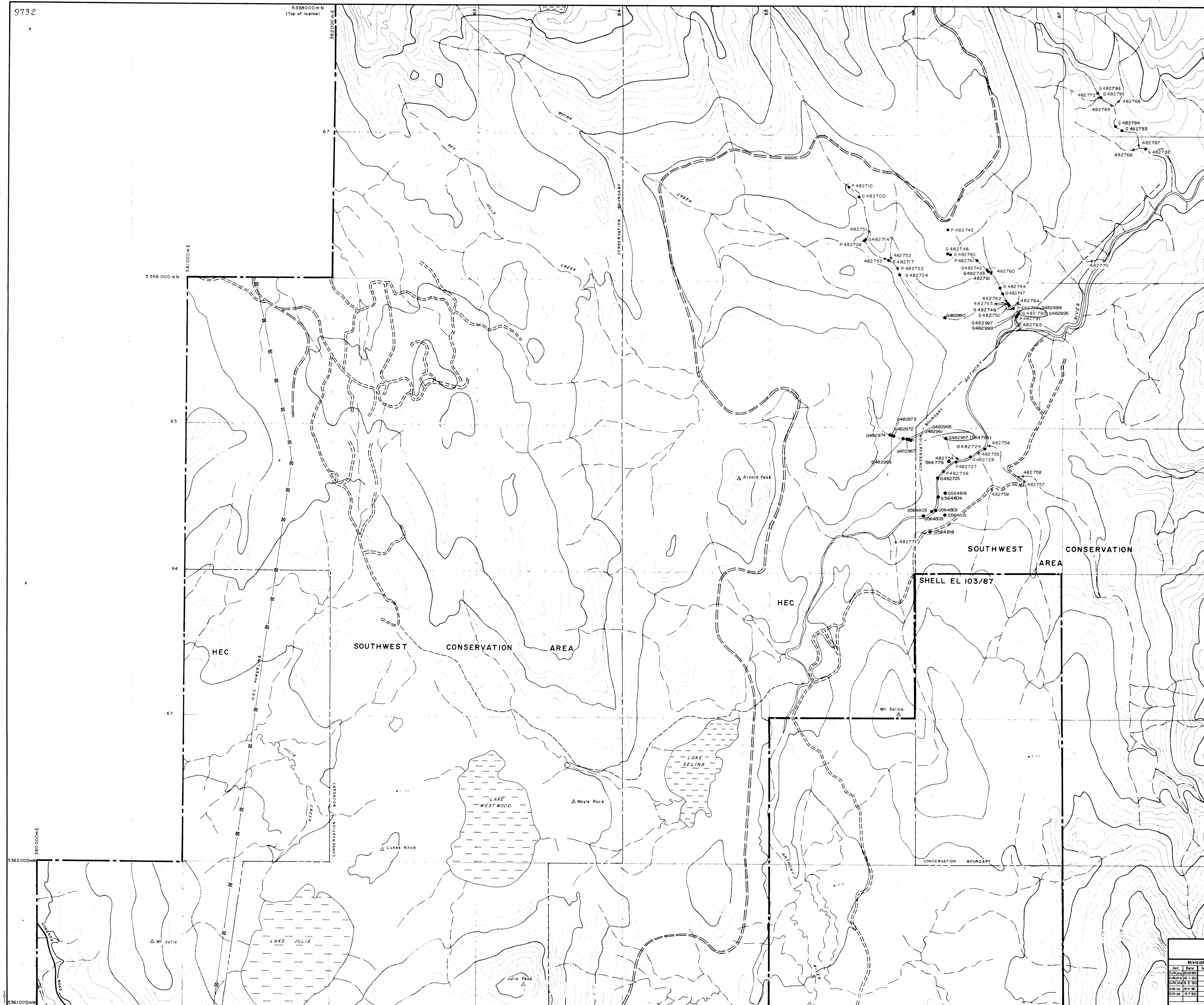
Location Code : | Scale : 1:5000 | Date : APRIL 1990 | Plate No : LMARG 25

Aberfoyle Resources Limited

EXPLORATION DIVISION

REVISIONS					
Init.	Date	Init.	Date	NORTH WEST TASMANIA LAKE MARGARET E.L.5/85 BEATRICE AREA **INTERPRETIVE GEOLOGY**	Compiled : DJN Drawn : Traced : RJE Checked :
Location Code :				Scale : 1 2500 · Date : September, 1990	Plate No : L.Marg 32 A

9732



Aberfoyle Resources Limited
EXPLORATION DIVISION

433330

REVISIONS			
Init.	Date	Init.	Date
DJN jms	20·12·89		
DJN jms	16-1-90		
DJN jms	8·2·90		
DJN rje	18·4·90		
DJN rje	9·7·90		

Location Code :

NORTH WEST TASMANIA
LAKE MARGARET E.L.5/85 CRA J.V.
NORTH SELINA PROSPECT
STREAM SEDIMENT SAMPLE LOCATION PLAN

Scale : 1:10 000
Date : December 1989

Compiled : D.J.N.
Drawn :
Traced : J.M.S.
Checked :
Plate No : L MARG. 16

SOUTHWEST CONSERVATION AREA BOUNDARY
E.L. 5/85
ANTHONY ROAD
QUINN CREEK
RED HILLS CREEK
ANTHONY RIVER
SOUTHWEST CONSERVATION AREA
SOUTHWEST CONSERVATION AREA BOUNDARY
DDH 3217 (HEC)
5 368 000 mN
5 366 000 mN
384 000 mE
386 000 mE
388 000 mE
5 cm
Aberfoyle Resources Limited
EXPLORATION DIVISION
433331
REVISIONS
Init Date Init Date
DJNrje 18·4·90
DJNrje 26·6·90
NORTH WEST TASMANIA
LAKE MARGARET E.L.5/85 CRA JV
NORTH SELINA PROSPECT
OUTCROP GEOLOGY
Compiled : D.J.N.
Drawn : J.M.S.
Traced : J.M.S.
Checked :
Location Code
Scale 1 : 5 000
Date JANUARY 1990
Plate No : L.MARG.20/B1

9733
384 000mE
388 000mE
5 364 000mN
5 362 000mN
ARNOLD PEAK
E.L. 5/85
E.L. 103/87
SOUTHWEST CONSERVATION AREA
ANTHONY RIVER
ANTHONY ROAD
LAKE SELINA
516m
MOUNT SELINA
776
LS12 (RGC)
LS8 (RGC)
WK 663
482725
482726
482727
482728
482729
482730
482731
482732
482733
482734
482735
482736
Aberfoyle Resources Limited
EXPLORATION DIVISION
433332
REVISIONS
Init | Date | Init | Date
DJN rje | 25·6·90
NORTH WEST TASMANIA
LAKE MARGARET E.L.5/85 CRA JV
NORTH SELINA PROSPECT
OUTCROP GEOLOGY
Compiled : D.J.N.
Drawn : J.M.S.
Traced : J.M.S.
Checked :
Location Code
Scale 1 : 5 000
Date JANUARY 1990
Plate No : L.MARG.20/B2

433333

90-3190.

Aberfoyle Resources Limited
EXPLORATION DIVISION

REVISIONS			
Init.	Date	Init.	Date

NORTH WEST TASMANIA

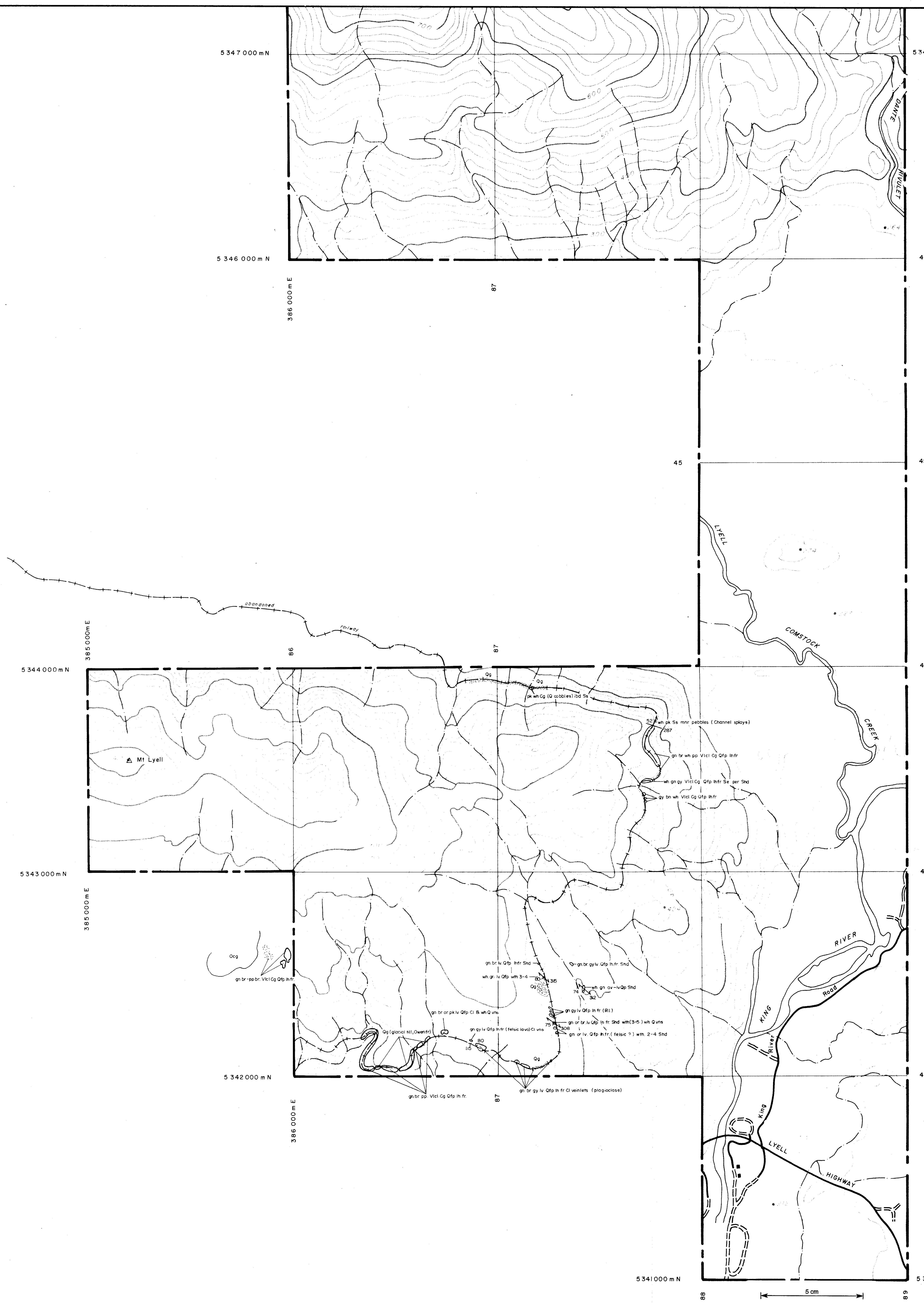
LAKE MARGARET E.L.5/85 CRA J.V.

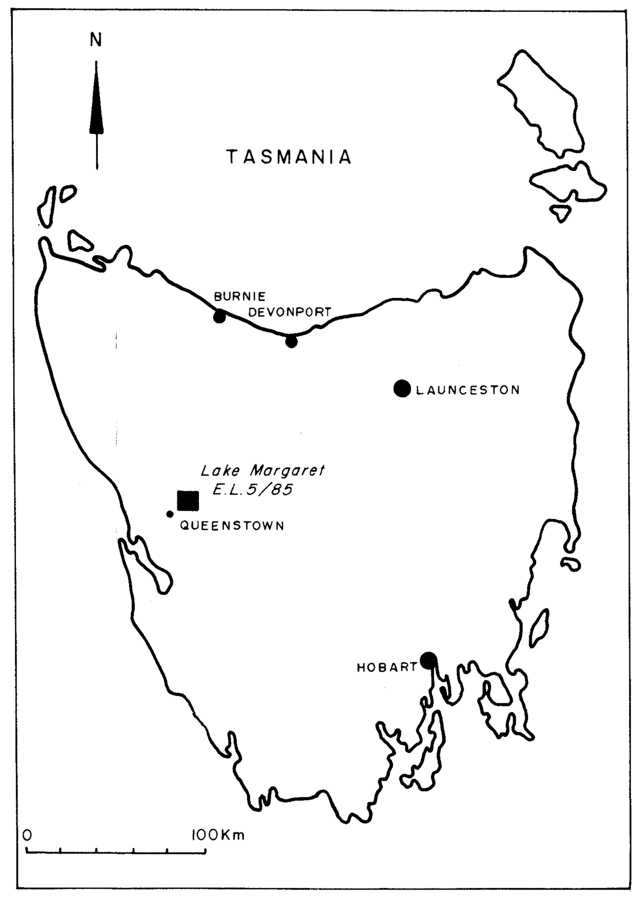
OUTCROP GEOLOGY

Compiled: DJN
Drawn: RJE
Traced:
Checked:

Location Code:
Scale: 1:10 000
Date: July, 1990
Plate No: LMARG 28A

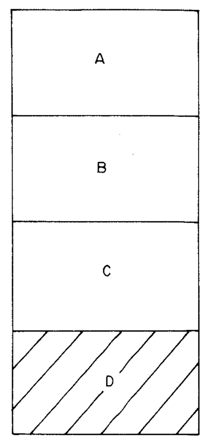
9734





0 500 1000metres

Index to Sheets



90-3190.

433334

Aberfoyle Resources Limited
EXPLORATION DIVISION

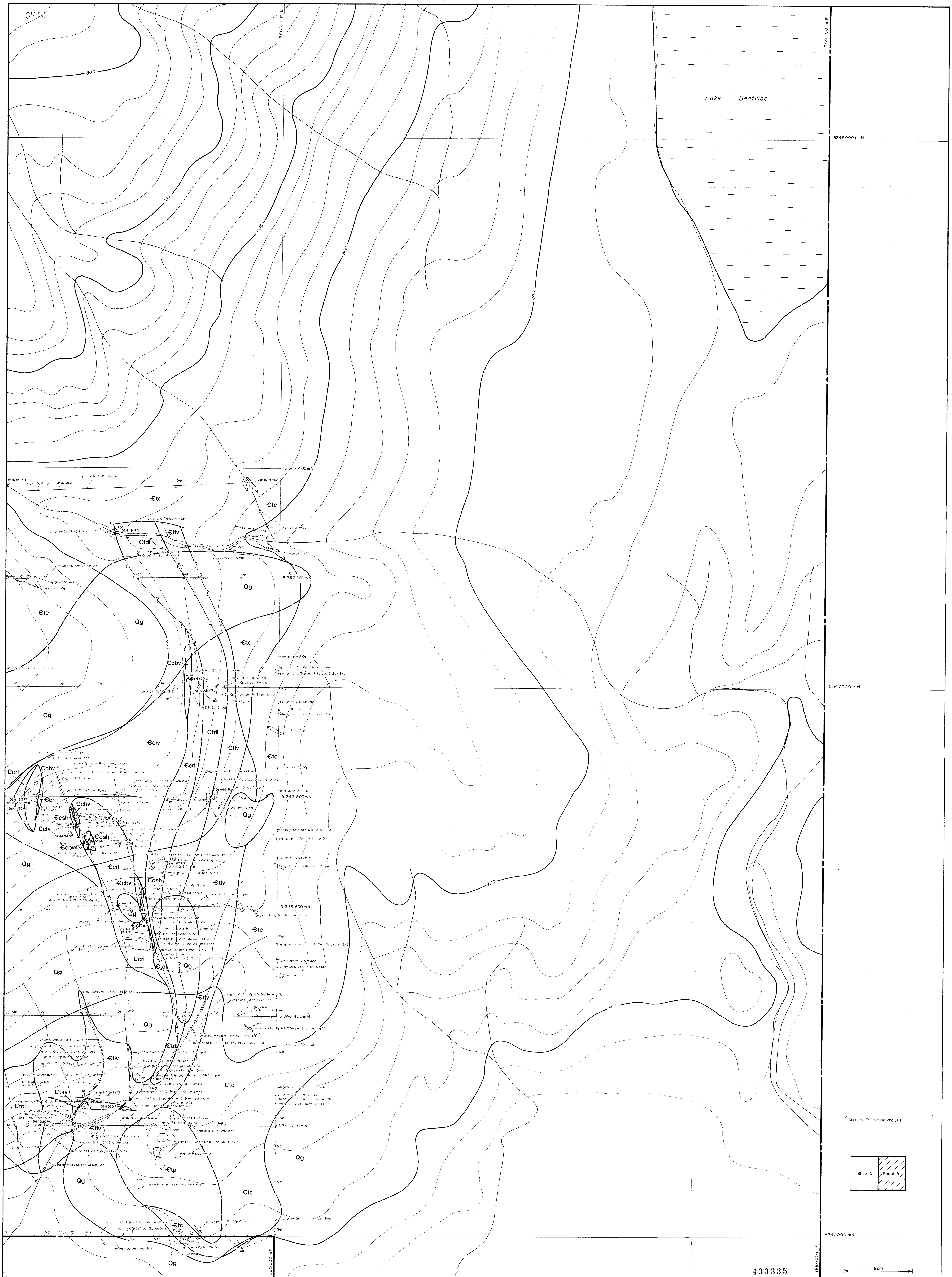
REVISIONS			
Init.	Date	Init.	Date

Location Code :

NORTH WEST TASMANIA
LAKE MARGARET E.L.5/85 CRA J.V.
OUTCROP GEOLOGY

Scale : 1:10000
Date : June, 1990

Compiled : DJN
Drawn : RJE
Traced :
Checked :
Plate No : L MARG 28D



433335

Aberfoyle Resources Limited
EXPLORATION DIVISION

REVISIONS			
Init.	Date	Init.	Date

NORTH WEST TASMANIA
LAKE MARGARET E.L.5/85
BEATRICE AREA
INTERPRETIVE GEOLOGY

Compiled : DJN
Drawn :
Traced : RJE
Checked :

Location Code :
Scale : 1 : 2500
Date : September , 1990
Plate No : L.Marg.32B