CR 6939

# EXPLORATION LICENCE 102/87
# REPORT FOR THE YEAR ENDED 21ST APRIL 1990

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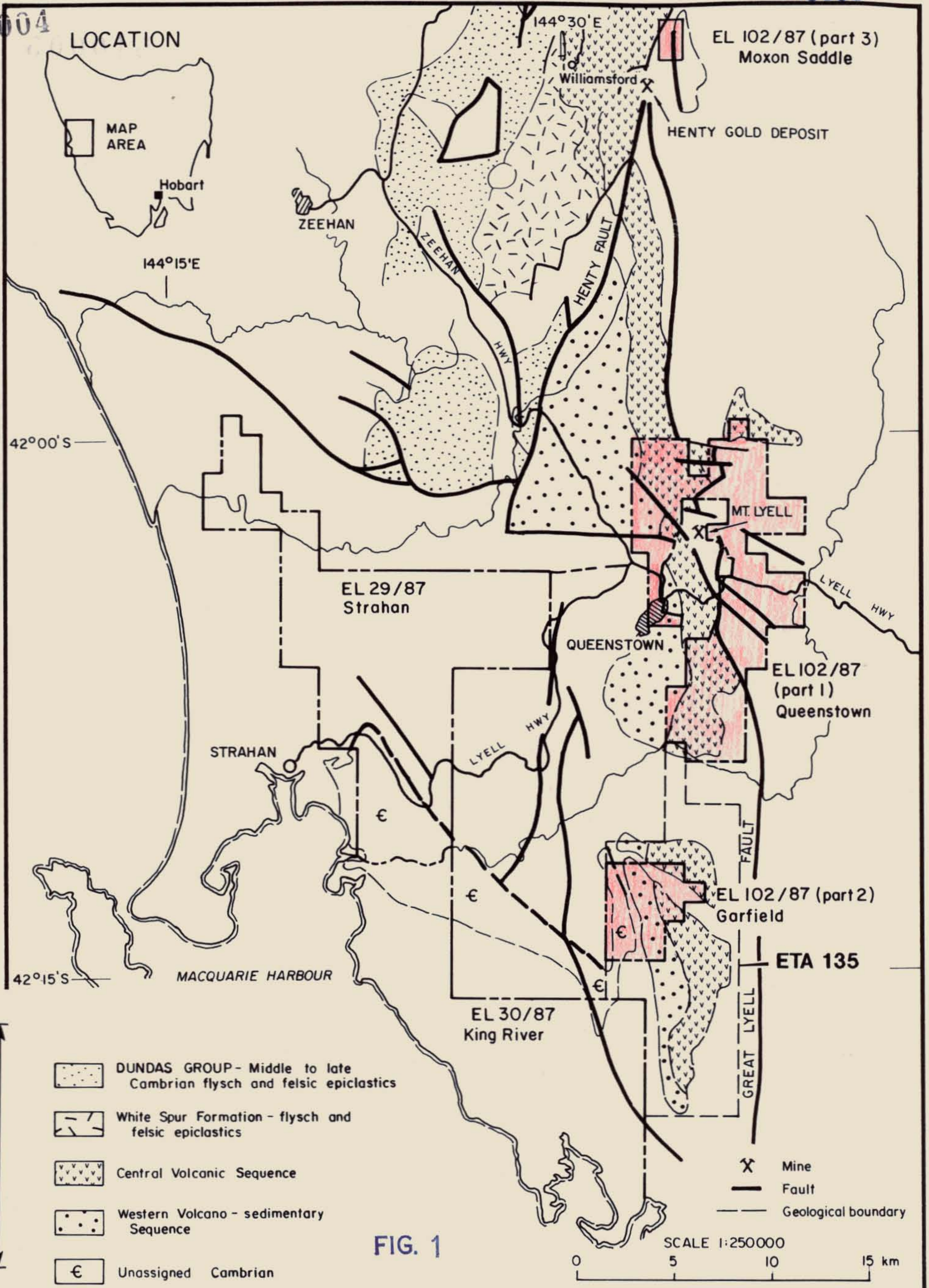


FIG. 1

| Centre | THE BROKEN HILL PROPRIETARY CO. LTD. | Project Nº |
|---|---|---|
| Melbourne | QUEENSTOWN REGION, TAS. | B57 |
| Date | EXPLORATION TENEMENTS & REGIONAL GEOLOGY | Drawing Nº |
| 20·11·89 | | A4 3001 |

## 1. INTRODUCTION

This report describes results of exploration activity during the period from April 1989 to March 1990, carried out by BHP Minerals in EL 102/87 (Fig. 1). The licence currently occupies 99 $km^2$, in three parts; the bulk of which (Area 1) surrounds the Mt Lyell Cu-Au mine at Queenstown. Area 2 (19 $km^2$) covers the vicinity of the Garfield River, while Area 3 (2 $km^2$) occupies Moxon Saddle, southwest of Mt Murchison (Fig. 1).

Lead and zinc are the main commodities being sought, but lesser effort has been directed towards assessing the gold potential of the licence area. Although the Mt Lyell field has traditionally been a producer of Cu, Au and Ag there are Cambrian massive Pb-Zn sulphide bodies exposed in the Comstock and Tasman and Crown Lyell mines, as well as within the Prince Lyell copper orebody, and "The Blow". Substantial but low grade Pb-Zn mineralization is known south of the Mt Sedgwick (Beatrice deposit). Although the main Pb-Zn target type is Cambrian massive sulphide, the possibility of significant base metal mineralization within Ordovician Gordon Limestone is also being investigated. Saturation TEM coverage is the favoured exploration tool for such massive sulphides, and this year has seen the completion of virtual total TEM coverage of prospective lithologies within parts 1 and 3 of the licence area.

In order to assess the gold potential of the licence area, compilation of existing geochemical (particularly stream sediment) data has been completed, and several old gold prospects sampled. New BLEG and IP data have been collected in areas 1 and 3.

## 2. SUMMARY OF EXPLORATION AND RESULTS

Exploration activity took place in all three parts of the EL during this reporting period, and was designed to search for base metal and gold targets. Base metal exploration consisted of TEM (UTEM) on the Moxon Saddle (Area 3) Beatrice, Comstock West and part of the Comstock Valley grids. Moving Loop Sirotem was carried out over the Comstock Valley grid. An additional UTEM survey commenced in Area 2 on 11th March, but results are not yet available.

Two significant conductors were located in the Comstock Valley. One is along strike from the Tasman and Crown Lyell workings (within the Mt Lyell mine lease) and the second 500 m NE of this. The latter confirmed a 1965 Turam conductor, and was tested by diamond drillhole CV1, which penetrated 118 m of Glacial sediments and 198 m of Gordon Limestone. The Limestone contains a 13 m thick zone of pyrite veining, with weak base metal mineralization (best intersection 183-184 m at 0.26% Zn 470 ppm Pb and 1.5 ppm Ag). A combination of this pyritic mineralization and graphite in the host rock explains the surface anomaly. No UTEM response was obtained over the Beatrice deposit, indicating no potential for massive sulphide at $<$ 200 m.

A bulk-leach extraction gold (BLEG) stream sediment sampling program was carried out over the whole of area 1. Significant anomalies were located along the Great Lyell fault west and south of Mt Owen and in the vicinity of the Mt Ellen gold mine, and West Dorite Creek alluvial gold workings. Cemetery Creek, in the Linda Valley, gave the highest gold values. The BLEG survey also highlighted drainage south of the Tramway auriferous pyrite occurrence. IP test lines were conducted over the Mt Ellen and Mountain Maid mineralization.

An IP survey was carried out along the Henty fault zone and its footwall rocks in area 3. Two anomalies were located, one associated with chloritic and pyritic schist with up to 0.44 g/t Au at outcrop.

McDowell's P.A. gold mine was sampled but gold was conspicuously absent. A zone of secondary(?) base metal enrichment, however, occurs beneath the mine (Goldfields drillhole G14 intersected 80 m of >0.1% Zn in friable clays).

Reassaying of Zn-rich intervals from MS1 and MS3, Beatrice Prospect, yielded a best gold intersection of 7 m at 0.25 g/t Au (maximum 0.37).

In summary, base metal exploration culminated in the drilling of CV1 in the Comstock Valley, which downgraded the area as a base metal prospect. A second conductor was not drilled owing to limited strike length within EL 102/87 (<200 m). Gold exploration defined several areas worthy of follow up at Moxon Saddle, North Huxley, Cemetery Creek and Tramway Pyrite. In all these areas (except Cemetery Creek which has not yet been rock chip sampled) values in excess of 0.2 ppm Au occur at outcrop.

## 3. EXPLORATION ACTIVITY 1989-1990

### 3.1 Access

Extensive track cutting was required to facilitate ground EM surveys, this included re-opening of the Mt. Lyell Co. Beatrice grid, Goldfields Comstock AMG and Snake Spur grids and much new work. The break-down of cutting by area is as follows:-

| GRID | TOTAL KM | AREA |
|---|---|---|
| Comstock-Beatrice | 168.5 | 1 |
| Moxon Saddle | 17.4 | 3 |
| South Huxley Extensions | 5.4 | 1 |
| Garfield River | 70.0 | 2 |
| TOTAL | 261.3 | - |

Mines Department track-cutting guidelines were observed throughout track-cutting operations, particularly in areas of King William and Huon pine (Moxon Saddle and Garfield River).

All grids have a nominal line spacing of 200 m, and slope-corrected peg spacing of 25 m. Peg positions were surveyed using compass and tape. Existing grid pegs from the Goldfields Exploration Comstock AMG grid were re-positioned at 25 m slope-corrected intervals and original peg positions marked by smaller pegs for accurate retrieval of Goldfields IP and ground magnetic data.

A four wheel drive track was constructed into part 2 of the licence area, as there was no existing road access. Construction of the 5 km long track commenced on the 2nd October and was completed on the 5th December 1989. Stringent guidelines set out by the Mines Department were met, and great care was taken to minimise the environmental impact of the road, particularly to ensure its ready rehabilitation.

## 3.2 Regional Drainage Geochemistry

### 3.2.1 Assessment of Old Drainage Data

Existing stream sediment data was collated and statistically assessed in order to determine whether additional stream sediment coverage was required and to establish threshold values for anomaly recognition. No single survey has covered the entire licence area, necessitating comparison of many different surveys, most of which employed the -80# fraction, analysed only for Cu, Pb and Zn. Most surveys utilised analytical facilities at Mt. Lyell. A limited amount of sampling for gold was carried out in the Sedgwick and Huxley areas prior to 1987 (Fig. 2) using the -80# fraction and panned concentrates. Creeks draining Mt. Owen and the Linda Valley have not been sampled, despite early prospectors reports of gold.

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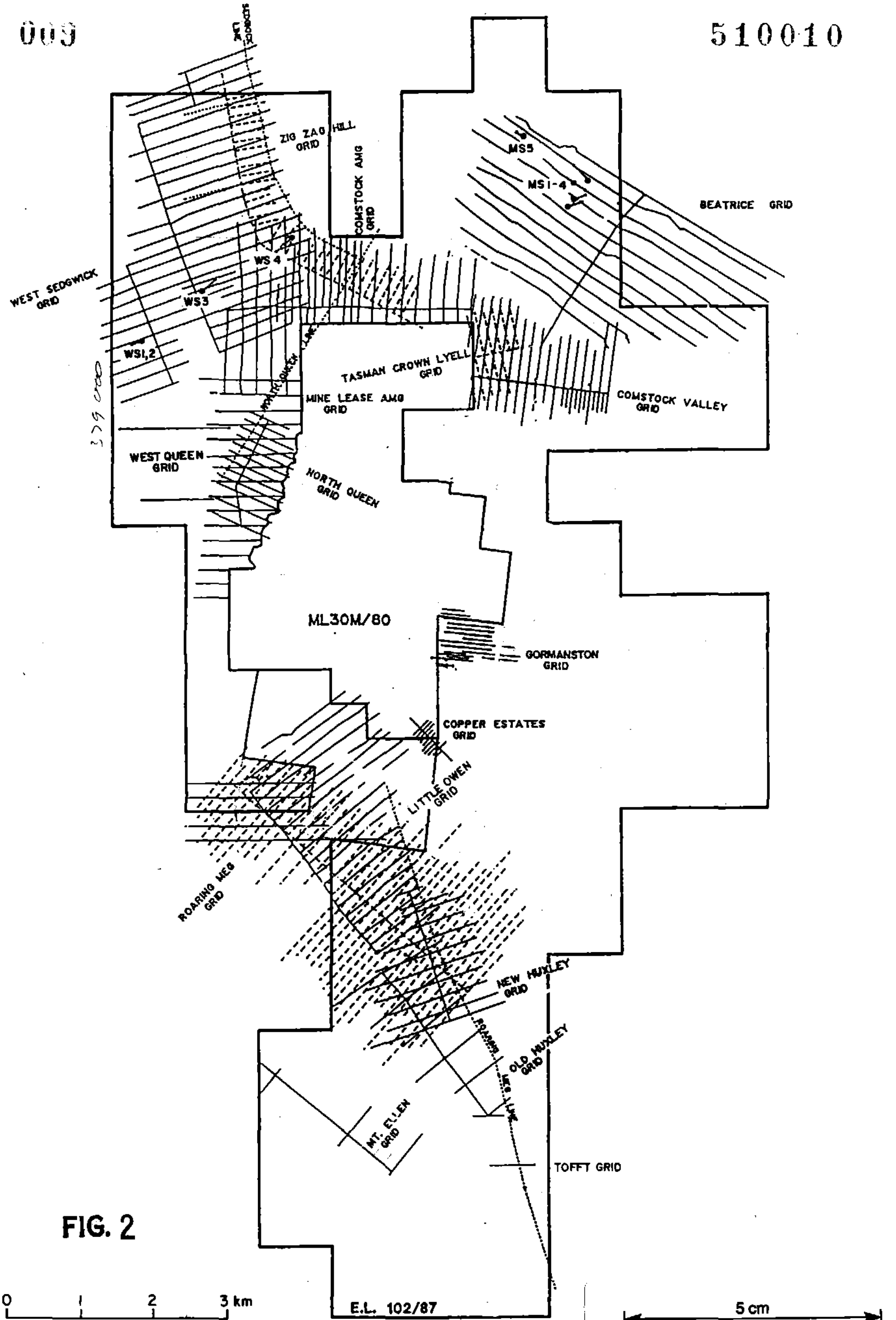



FIG. 2

| | | | |
|---|---|---|---|
| Centre Melbourne | THE BROKEN HILL PROPRIETARY CO.LTD. EL 102/87, QUEENSTOWN, TAS. LOCATION OF OLD EXPLORATION GRIDS | | Project No B57 |
| Date April'89 | | | Drg No A4-2924 |

Threshold values vary between different surveys, reflecting different sampling procedures, analytical methods and conditions, and varying background levels. High background levels of copper, for example, may be due to the accumulation of fall-out from the old Mt. Lyell smelters which closed during the 1920's. Threshold values are listed in Table 1. Values for Pb and Zn show reasonable agreement between different -80# surveys, and an orientation survey carried out in 1989 on creeks draining the Nasty Knob gossan. Copper, however, is significantly higher in the samples analysed at Mt. Lyell compared to the orientation survey by a factor of two or three times. A probable explanation for this is significant contamination in the Mt. Lyell assay laboratories.

Seven areas are highlighted by the old data (Table 2). Of these only the Swan Creek gold anomaly, and South Huxley lead anomaly have had no follow-up work. The South Huxley anomaly has been further investigated by a small soil geochemical survey detailed in Section 3.6.1 The Swan Creek anomaly, close to the site of old alluvial workings falls mainly outside EL 102/87, but is close to the Tramway pyrite occurrence (Section 3.6.4). The most significant gold anomalism is around the Mt. Ellen gold mine (Section 3.6.2). Goldfields Exploration cut a small grid over Mt. Ellen (Fig. 2) which was wacker-sampled. Although no gold in excess of 50 ppb was located, the grid cannot be said to have adequately tested this area. Similarly two lines were cut over the Tofft anomaly, but bedrock sampling revealed very low values.

| ELEMENT | PERCENTILE | OLD SURVEYS | ORIENTATION |
|---|---|---|---|
| Cu | 95 | 35 - 60 ppm | 24 ppm |
| | 90 | 30 - 54 ppm | 22 ppm |
| Pb | 95 | 58 - 360 ppm | 140 ppm |
| | 90 | 54 - 180 ppm | 66 ppm |
| Zn | 95 | 28 - 92 ppm | 52 ppm |
| | 90 | 23 - 83 ppm | 32 ppm |

Table 1: Threshold values for anomaly recognition in the -80# fraction of stream sediment, from a compilation of old surveys and an orientation survey carried out near Nasty Knob.

| AREA | DRAINAGE SIZE | #ANOM. SAMPLES | MAXIMUM ASSAY | TECHNIQUE |
|---|---|---|---|---|
| Mt Ellen | 4 $km^2$ | >10 | 1.27 ppm Au | -80#/Pancon |
| Tofft River | 0.3 $km^2$ | 3 | 29 ppm Au | Pancon |
| Swan Creek | 0.25 $km^2$+ | 2 | 90 ppb Au | Pancon |
| Beatrice | 0.75 $km^2$ | 7 | >400 ppm Pb | -80# |
| Nasty Knob | 0.25 $km^2$ | 1 | 430 ppm Pb | -80# |
| S. Huxley | 0.25 $km^2$ | 3 | 270 ppm Pb | -80# |
| Whip Spur | 2.5 $km^2$ | >10 | 340 ppm Cu | -80# |

Table 2: Summary of drainage anomalies in EL 102/87 Area 1, identified to 1989.

### 3.2.2 BLEG Survey

Given the erratic and by and large incomplete drainage sampling for gold within Area 1, it was decided to survey all major drainages in the EL using the bulk leach extraction gold (BLEG) technique. A nominal sample density of one per 5 km was employed, although this was reduced where this density would result in inadequate cover (e.g. Comstock and Linda Valleys). At each sample site 5 kg of -2 mm material was collected for BLEG determination and a further 5 kg for base metal (and some carbon rod gold) analysis of the -80# fraction. Sample locations are given in figure 3. A total of 52 samples were taken for BLEG analysis, including duplicates and checks on anomalous samples.

The data show a wide range, from below the limit of detection (0.05 ppb) to as much as 70 ppb. Duplicate sampling revealed a good correspondence of BLEG values, with the exception of one sample taken along Cemetery Creek with values of 1.55 and 70.0 ppb. Possible explanations are the "nugget effect" and the influence of heavy rain between the original and the check sample. Poor correspondence between BLEG and fire assay laboratory check assays is not surprising given probable inhomogeneous distribution of gold in the sample (and variable grain-size distribution) and the different sample volumes required for the two analytical techniques. Poor correspondence between BLEG and -80#/carbon rod assays is also likely to be a reflection of the distribution of gold between -80# fraction and the -2 mm to +80# fraction. For example sample BX4780 has a BLEG value of 0.15 ppb, compared to a carbon rod value of 65 ppb, suggesting that the gold in this sample is quite fine-grained. Alternatively this may indicate inhomogeneity of gold distribution at the sample site.

Analysis of the BLEG data suggests that 1 ppb is a useful threshold value for anomaly definition. Thus several areas are highlighted. The Beatrice Pb-Zn prospect is reflected in a 1.1 ppb anomaly (BX4764), it is discussed in Section 3.4.6 and will not be considered further here. A value of 1.5 ppb in the Comstock Valley is almost certainly spurious. Comstock Creek drains the adits and dumps of the Comstock and Tasman and Crown mines, and it is likely that the anomalous sample taken in a boggy flat close to this creek was contaminated by backflow.

Up to 5.55 ppb gold was recorded in creeks draining westwards from Mt Owen, reflecting an area of old workings, probably associated with the Great Lyell Fault. Although one sample location was clearly contaminated by waste from the Copper Estates workings, a tributary of Conglomerate Creek to the south gave a positive anomaly. Cemetery Creek returned two values in excess of 60 ppb, the maximum gold values recorded in this survey. Outcropping sphalerite was noted by Loftus-Hills (1965) from Gordon Limestone within this drainage. Coarse, nuggety, gold was panned from this creek, which may indicate however, that it is detrital gold from the Pioneer Beds.

Samples BX4759 and 4971 returned values of 4.5 and 7.0 ppb respectively in a creek west of the West Queen River (Fig. 3). This drainage is adjacent to the Tramway pyrite zone (discussed in Section 3.6.4) which contains minor gold at outcrop. It is not clear, however, if this body is actually contributing to the anomaly, since it is more likely to be drained by a seperate creek system to the north.

The north Mt Huxley area contains the largest area of anomalous drainages. A tributary of the Tofft sampled by BX4966 was also highlighted by Goldfields Exploration panned concentrate sampling, which returned a maximum of 29 ppm. This area, together with the drainage sampled by BX4965 evidently drain an area underlain by the Great Lyell Fault; an area of known base metal anomalism. Anomalies in Diorite and West Diorite Creeks cannot, however, be related to the Great Lyell Fault. The West Diorite Creek anomaly of 32 ppb is 300 m downstream from the West Diorite Creek alluvial gold workings and the creek also drains the Mt Ellen gold workings. This area was also highlighted by Goldfields panned concentrate work.

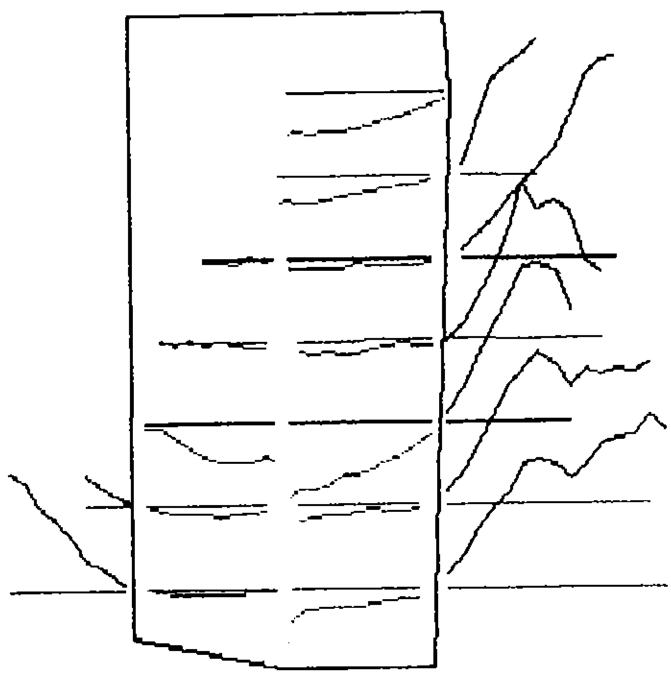
## 3.3 Reinterpretation of 1988 Utem Data

During 1989 the newly-acquired facility to produce computer-plotted stacked profiles of selected TEM channels was used to re-examine old data for subtle anomalies of economic interest. In addition, attempts were made to correlate anomalies due to lithological units or structures in order to aid geological mapping within the Huxley and West Sedgwick grids.

In the West Sedgwick grid, the Great Lyell Fault can be clearly traced but is an early time feature. One feature of interest is a well-defined early time anomaly trending north-west from line 46000N at 80700E to line 46800N at 80225E. This feature occurs within a zone of anomalous Pb/Zn soil geochemistry, tested by Mt Lyell drillhole WS3 (see Section 3.6.4).

Within the Mt Huxley grid a feature in the vicinity of Nasty Knob was highlighted. At early times a sharp crossover is evident with a strike length of approximately 800m or more (Fig. 4). At late times an anomaly is still evident on line 10600N (Fig. 5). The early time feature is interpreted to represent the Great Lyell Fault. The late time feature may be caused by base metal mineralisation associated with, or adjacent to, the fault zone. A definitive interpretation is not possible at this stage since the anomaly occurs at the end of the survey lines and has not been fully detailed. A follow-up UTEM survey is planned over an extended grid to provide sufficient information to enable a comprehensive evaluation of this feature. The follow-up survey will consist of reading four 100m spaced lines at 25m intervals from a 400m x 400m transmitting loop, as illustrated in Fig. 6. This survey will be conducted early in March 1990.

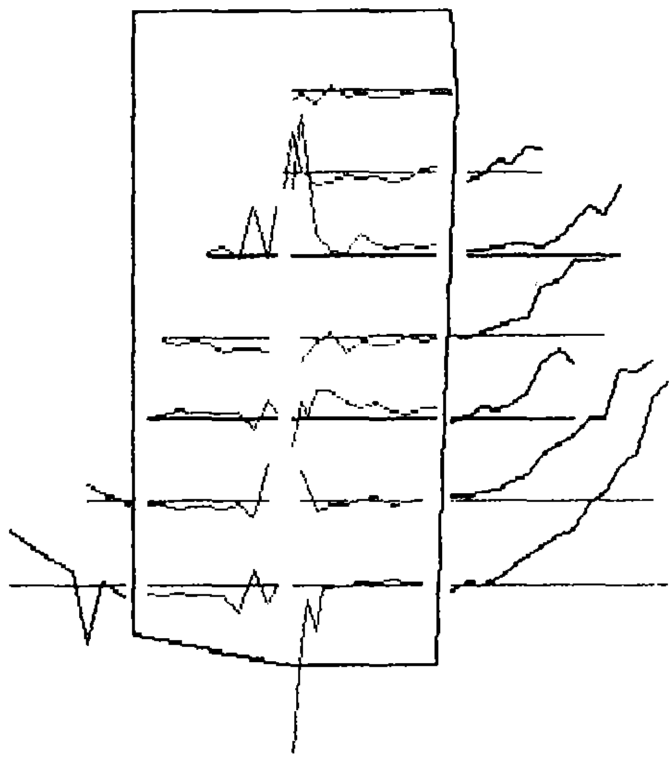
HX1



field data channel : 8
(Cts norm)

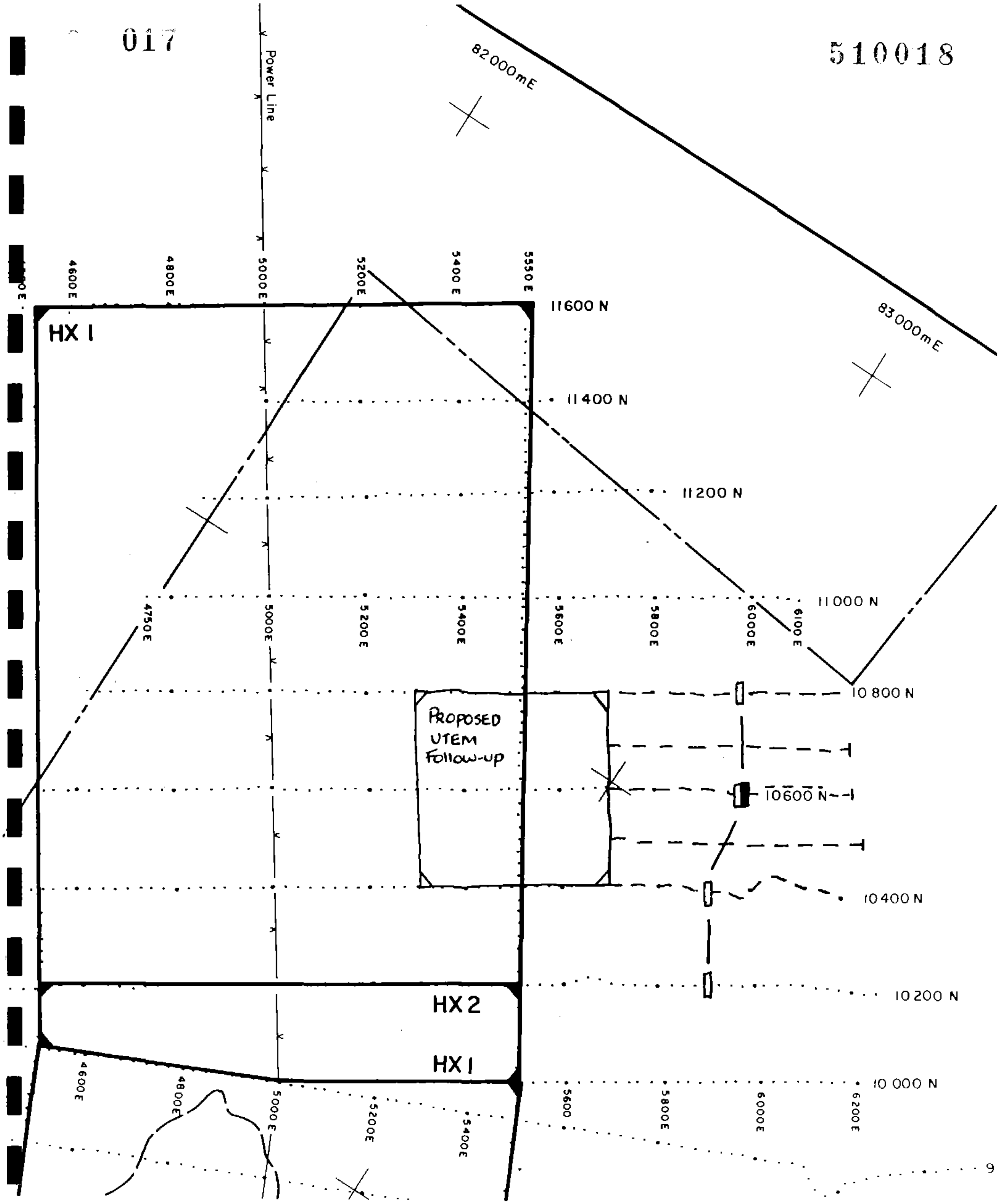
FIGURE 4

HX1



field data channel : 4
(Cts norm)

FIGURE 5




MT HUXLEY GRID

NASTY KNOB PROSPECT

1:10 000
SCALE

5 cm

FIGURE 6

▭ - channel 8 UTEM anomaly

▬ - channel 4 UTEM anomaly

## 3.4 Comstock Valley - Beatrice Area

### 3.4.1 Previous Activity

Early prospecting at the western end of the Comstock Valley lead to the discovery of the (Lyell) Comstock copper mine, and the Tasman and Crown Lyell Extended Pb-Zn-Ag mine, both of which had closed by 1945. RTAE attempted to trace the known mineralization eastwards into the valley during the ninteen fifties. They established the Tasman Lyell grid (of Fig. 2) and surveyed it with Turam, gravity and IP. During the nineteen sixties Mt Lyell surveyed a second grid for the BMR to carry out SP, IP and Turam. Several IP anomalies and a Turam conductor were located, and drillholes C54, C49 and C51 collared to test the IP features. It appears that drillhole C54 was not correctly positioned to test the major Turam conductor, and all three holes penetrated barren Gordon Limestone. Clay at the base of the limestone, however, yielded up to 0.23% Cu. Drillhole C54 was partially logged by gamma-ray, SP and resistivity. There has been little serious exploration activity in the valley for the past 25 years.

During the mid nineteen seventies the Mt Lyell Co carried out a stream sediment survey of the Cambrian volcanic rocks exposed south of Mt Sedgwick. Sample density varied, but in some cases was as little as 200 m. Samples (-80# fraction) were analysed at the Mt Lyell assay laboratories for Cu, Pb and Zn. The survey detected significant concentrations of Pb, Zn and Cu in Itat Creek. This lead to the establishment of the Lake Beatrice grid to control soil geochemical, induced polarization (IP) and magnetic surveys, as well as geological mapping. Various types of IP were employed but the greatest coverage was by gradient array (details can be found in Reid et al., 1979; Howland-Rose 1977 and 1979 and Street, 1980). A high chargeability zone was recorded over the Sedgwick Porphyry body with two smaller peaks on the northern slopes of the Comstock Valley which were attributed to "shale" horizons.

Soil samples were taken at 30 m intervals (15 m over IP anomalies), sieved to -80# and -10 - +80#, and analysed by AAS for Cu, Pb, Zn, Ag and Mn at the Mt Lyell laboratories. This defined an extensive anomalous zone, the Mt Sedgwick Anomaly Zone (MSAZ) 1.2 km long and 350 m wide with up to 11000 ppm Pb, 1900 ppm Zn, 510 Cu and 6 ppm Ag. Manganese reached 16% locally. The geochemical anomaly occurs east of, and is parallel with the IP anomaly over the Sedgwick porphyry. Access tracks and trenches were bulldozed into the soil anomaly, and channel samples taken along the tracks. The latter yielded 80 m at 0.2% Pb, 0.3% Zn, 65 ppm Cu and 4 ppm Ag with 5 m at 0.6% Pb and 0.5% Zn.

Four diamond drillholes tested the soil anomaly (MS1-4) and all penetrated significant thicknesses of low grade mineralization (e.g. MS3 106-150 m 44 m at >0.2% Zn maximum 1.6% Zn). 8% Zn was recorded over 2 m in MS1. MS5 tested the northern part of the Sedgwick Porphyry with negative results. All these holes were geophysically logged (IP and resistivity). No further work was carried out prior to the granting of EL 102/87. Only nine samples had been assayed for gold (yielding values between 0.2 and 0.4 ppm - analytical method unknown).

Since no EM technique had been used over the deposit it was decided to re-open the Beatrice grid and survey it using the University of Toronto transient EM system (UTEM), in an attempt to locate any massive occurrence of mineralization beneath the disseminated Beatrice mineralization. Also areas to the south and west of the Beatrice grid previously unsurveyed by EM (including part of the Goldfields Comstock AMG grid) were thought to be prospective for massive sulphide.

A thorough evaluation of existing geophysical data, which included a statistical analysis by rock type of downhole IP and resistivity data for the Beatrice drillholes and also conductivity measurements on core samples, is presented as Table 3.

TABLE 3: Geophysical Properties of rocks from the Beatrice Prospect determined from Mt Lyell Co downhole IP and resistivity logs and new conductivity measurements of core.

| | RESISTIVITY (Ω /m) | | | | | IP (mV) | | | | | CONDUCTIVITY (S/m) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | MAX | MIN | $\bar{X}$ | SD | N | MAX | MIN | $\bar{X}$ | SD | N | MAX | MIN | $\bar{X}$ |
| ORDOVICIAN | | | | | | | | | | | | | | |
| Gordon Limestone | - | - | - | - | - | - | - | - | - | - | 60 | 4.1 | 0.12 | 0.91 |
| CAMBRIAN META-SEDIMENTS | | | | | | | | | | | | | | |
| Sandstone | 29 | 10,000 | 794 | 5,534 | 3007 | 34 | 60.9 | 2.4 | 19.9 | 15.2 | 7 | 0.49 | 1.80 | 0.88 |
| Massive Slate | 100 | 3,000 | 398 | 981 | 503 | 132 | 98.7 | 19.0 | 59.5 | 16.7 | 32 | 8.21 | 0.42 | 2.13 |
| Laminated Slate | 11 | 1,950 | 850 | 1,404 | 297 | 11 | 68.5 | 38.0 | 51.8 | 11.8 | 4 | 5.68 | 1.03 | 2.37 |
| Siltstone | 25 | 1,800 | 230 | 1,175 | 341 | 30 | 68.6 | 27.0 | 46.6 | 12.6 | 1 | - | - | 0.86 |
| Quartz-Chlorite-Mica Rock | 135 | 90,000 | 40 | 3,824 | 8,296 | 134 | 55.0 | 2.0 | 13.4 | 7.8 | - | - | - | - |
| Crystal Breccia | 7 | 5,450 | 950 | 2,478 | 1,936 | 7 | 10.0 | 4.0 | 6.43 | 2.3 | 1 | - | - | 0.62 |
| Lithic Breccia | 23 | 7,250 | 4,800 | 3,876 | 1,514 | 23 | 26.5 | 1.0 | 9.89 | 7.5 | - | - | - | - |
| Pumiceous Breccia | 124 | 7,200 | 316 | 2,773 | 1,547 | 131 | 54.0 | 1.0 | 14.0 | 12.0 | 12 | 2.50 | 0.33 | 1.14 |
| MISC. ROCKS | | | | | | | | | | | | | | |
| Sedgwick Porphyry | 220 | 50,119 | 850 | 10,021 | 10,689 | 237 | 56.4 | -11.9 | 17.2 | 12.9 | 48 | 2.22 | 0.09 | 0.61 |
| Fault Gouge | 2 | 1,584 | 1,259 | 1,421 | 230 | 6 | 31.1 | 19.3 | 25.2 | 4.4 | - | - | - | - |
| "Chert" (Hydrothermal) | 18 | 6,309 | 1,900 | 3,625 | 1,410 | 14 | 27.2 | 8.0 | 15.2 | 5.9 | - | - | - | - |
| Quartzite (Hydrothermal) | 7 | 6,200 | 2,500 | 4,185 | 1,557 | 7 | 9.0 | 6.0 | 7.0 | 1.0 | - | - | - | - |
| Schist (?Tectonic) | 2 | 1,250 | 1,250 | 1,250 | 0 | 2 | 38.0 | 25.0 | 31.5 | 9.2 | - | - | - | - |

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### 3.4.2 Moving Loop Sirotem Sounding Survey

A moving loop Sirotem sounding survey was conducted by McSkimming Geophysics within the Comstock Valley in two stages. The first stage was designed with the following aims:

1) to determine the relative merit of fixed loop TEM vs moving loop TEM as an exploration tool within the valley.

2) to gain an increased understanding of the geology and structure of the valley, which are poorly resolved due to limited exposure.

Three traverses, were surveyed; one at either end of the valley and one in the centre. Line 4800E was preferred as the western traverse since geological control was available from DDH C54 and a comparison could be made with previous Turam data (Fig.14 ). The central traverse was conducted on line 6200E while the eastern traverse was conducted on line 7600E.

Prior to the survey forward models were calculated to evaluate whether 100m x 100m or 200m x 200m loops would be most effective in optimising resolution and depth penetration. These models indicated that either would be suitable, but the former size was preferred for logistical reasons. Thus each traverse was surveyed using 100m x 100m loops and 100m moves to read 16 channels of early time and standard time data. Only the vertical component was recorded. Readings were taken in the centre of each loop and 50m north and south of each loop. Some 200m x 200m loops were also measured to provide a comparison. Portable battery packs were used to power the SATX transmitter. The survey data are presented in Appendix 4 in the form of log and linear stacked profiles of early time data. An explanation of symbols and delay times represented by each channel is presented in Appendix 2 .

The survey data were severely influenced by Induced Polarisation (IP) effects. The in-loop data on a resistive line such as 6200E showed late time negatives. The out-of-loop data were also suppressed and in some cases were negative at late times, but to a lesser degree. This phenomenon was modelled using CSIRO's RECLED software and the results are presented in figure 10 . This modelling clearly demonstrates that the Comstock Valley field data shows classic IP effects. The out-of-loop data was often not affected to a significant degree but this was not always the case. Hence frequently inversions of sounding data could not be performed to produce geoelectric sections since the "in-loop/out-of-loop" correction technique was not applicable when out-of-loop data was also affected.

Because the in-loop data was degraded by IP effects the interpretation was largely based on the north and south of loop data. Examination of the profiles reveals that the north and south of loop data are very consistent, with the only difference being that features are displaced 100m north or south due to the different coupling positions. Hence in the discussion of the data we will refer only to the north of loop data.

Examination of the stacked profiles for the north of loop data reveals that while the amplitudes of responses on lines 6200E and 7600E are quite low the amplitudes of the responses on line 4800E are generally much greater. Lines 4800E and 7600E both display an assymetric character, of opposite nature, while 6200E appears symmetric. All

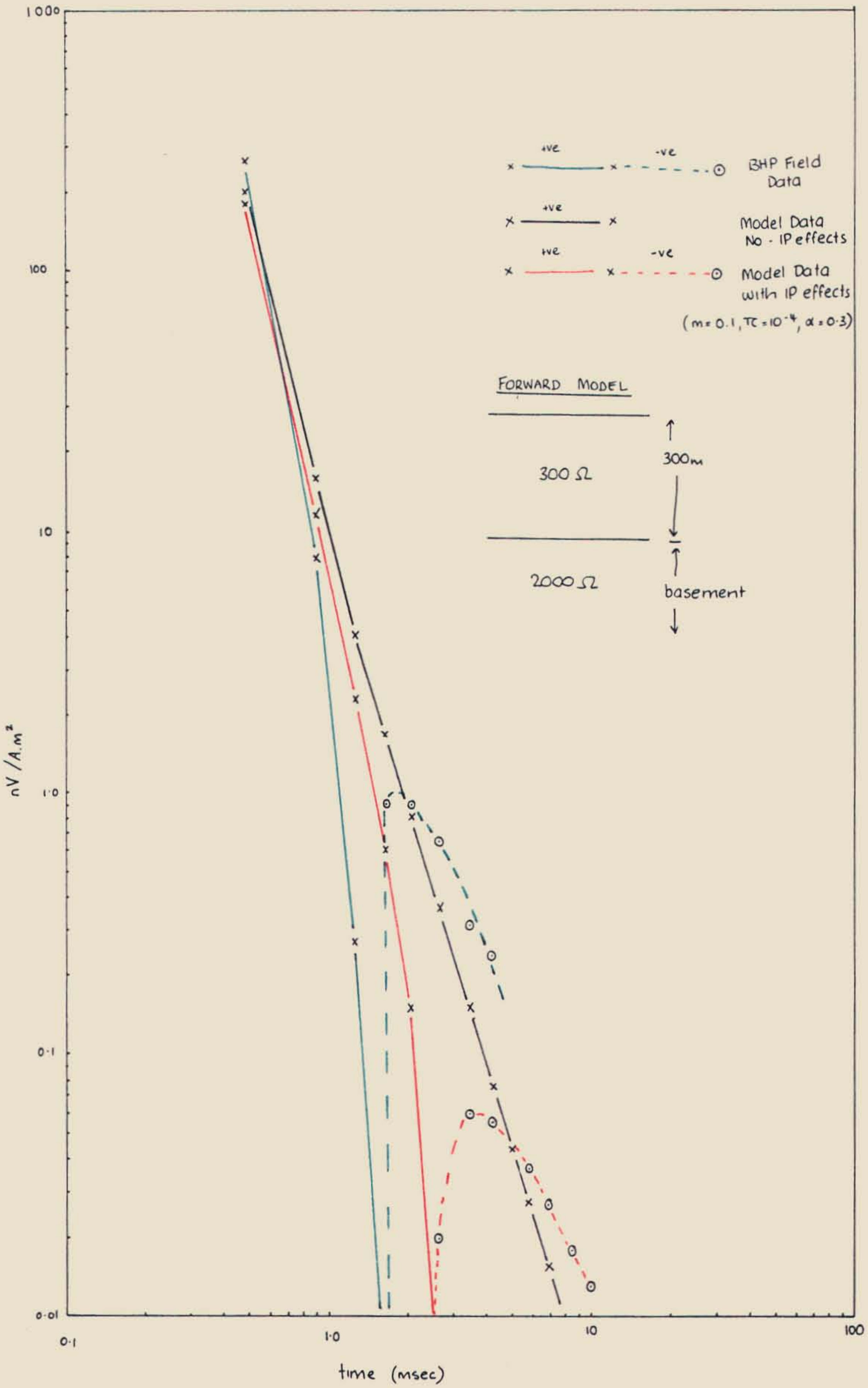


FIGURE 10 COMPARISON OF FORWARD MODELS ILLUSTRATING IP EFFECTS WITH BHP FIELD DATA

(LINE 6200E, 5550N, In-loop)

profiles display "side-lobes" on either side of the central anomaly. Modelling reveals that these side lobes indicate an abrupt termination of a conductor. The depth to this edge cannot be too great because increasing the depth to the termination rapidly causes the side-lobes to diminish and eventually disappear.

On line 4800E there is a strong, assymetric anomaly suggesting a plate-like conductor dipping to the north at approximately 45 degrees with a conductivity thickness of the order of 5 Siemens. Alternatively the anomaly is the result of superposition of a broad low amplitude response (due to the low to moderate conductivity of the limestone) and a localised response due to a thin, more conductive, carbonaceous limestone unit within the sequence. Because the assymetry is due to this superposition the dip of the thin conductive unit is poorly constrained. A third possibility is that the complex response is due to an irregularly-shaped conductive body situated within the southern portion of the limestone.

An inversion of out of loop field data was performed at the peak of the anomaly. The starting model consisted of four layers representing the glacial sediments, the limestone sequence, the conductor within the limestone and the underlying basement. A comparison of the field and model data and the resulting geoelectric section are presented in figure 11 . The inversion forward model and the statistical analysis of the resulting output model are presented in Appendix 5 . The glacial sediments appear as a 140m thick poorly conductive unit whose thickness and resistivity are statistically well resolved. Underlying this is a 20m wide zone of relatively highly conductive material with a conductivity of 7 ohm-m. This zone is moderately well resolved. The remainder of the limestone sequence appears as a poorly conducting unit overlying a

FIG 11 LAYERED EARTH INVERSION

LINE 4800E

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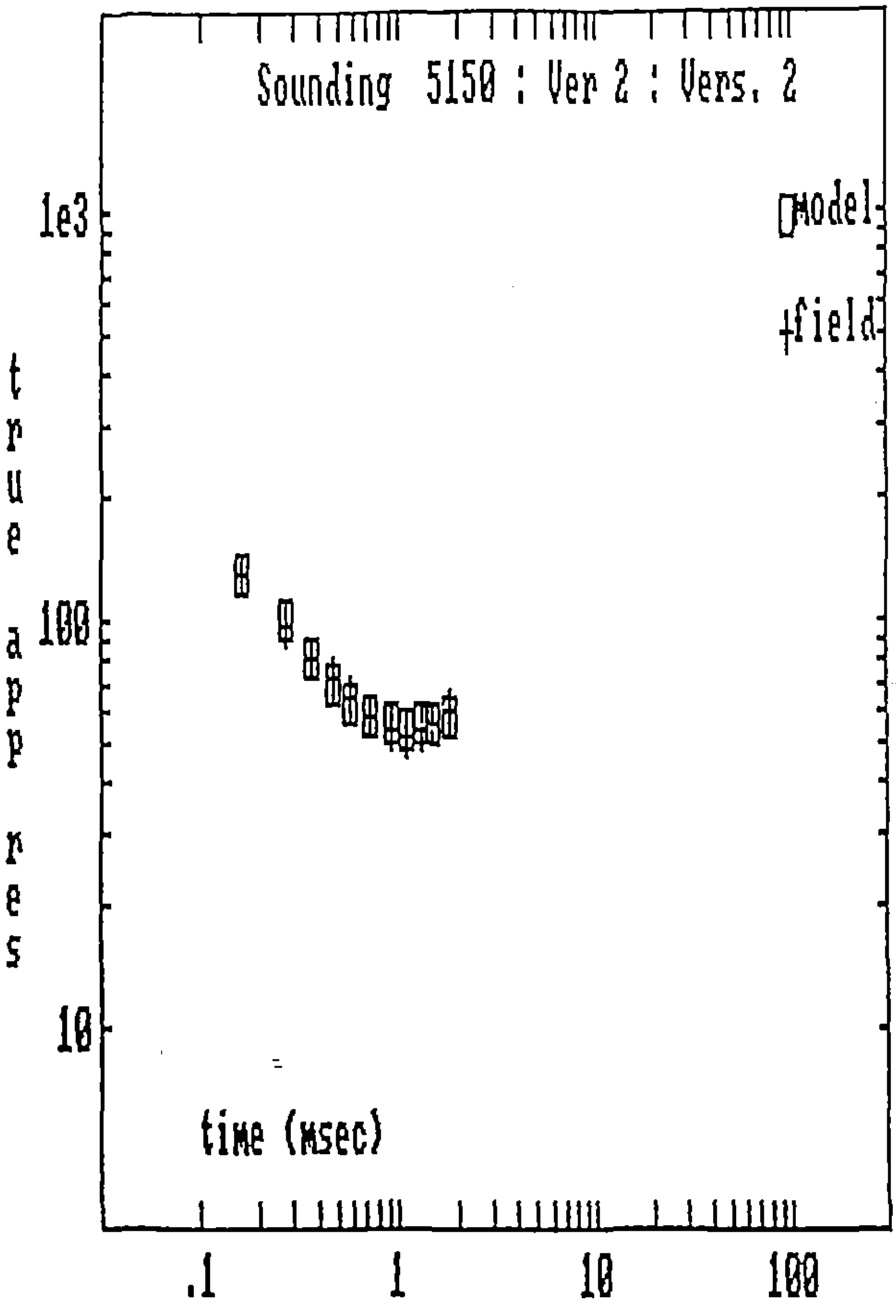



SOUNDING: 5150 : Vers 2
06 : , 4800E , 5150N .
4 LYR NORTH OF LOOP

5150A2

| | | |
|---|---|---|
| * 125 ohm.m | * 138 m. | * 125 |
| 6.6 ohm.m | 20.6 m. | 6.6 |
| 218 ohm.m | 57.6 m. | 218 |
| (2261 ohm.m) | | (2261) |

very resistive basement, the Denison Group. The thickness of the limestone sequence is not very well resolved. It should be noted that inversion theory breaks down if the strata are discontinuous or are not flat or shallowly dipping. Hence these results may not be valid if the more conductive zone is steeply dipping or is not sufficiently continuous.

If we now examine line 6200E we see that this profile is more symmetric. The relatively highly conductive zone on line 4800E has either gradually decreased in size or conductivity (perhaps due to a facies change in the limestone sequence) or has been abruptly terminated by a cross-cutting structure. The Turam data indicate a relatively abrupt decrease in conductivity between lines 4800E and 5000E.

Results from an inversion of data from a position in the centre of line 6200E are presented in figure 12 and Appendix 5. The glacial sediments and the limestone could not be electrically distinguished and appear as a single poorly conductive layer approximately 300m thick, overlying highly resistive basement.

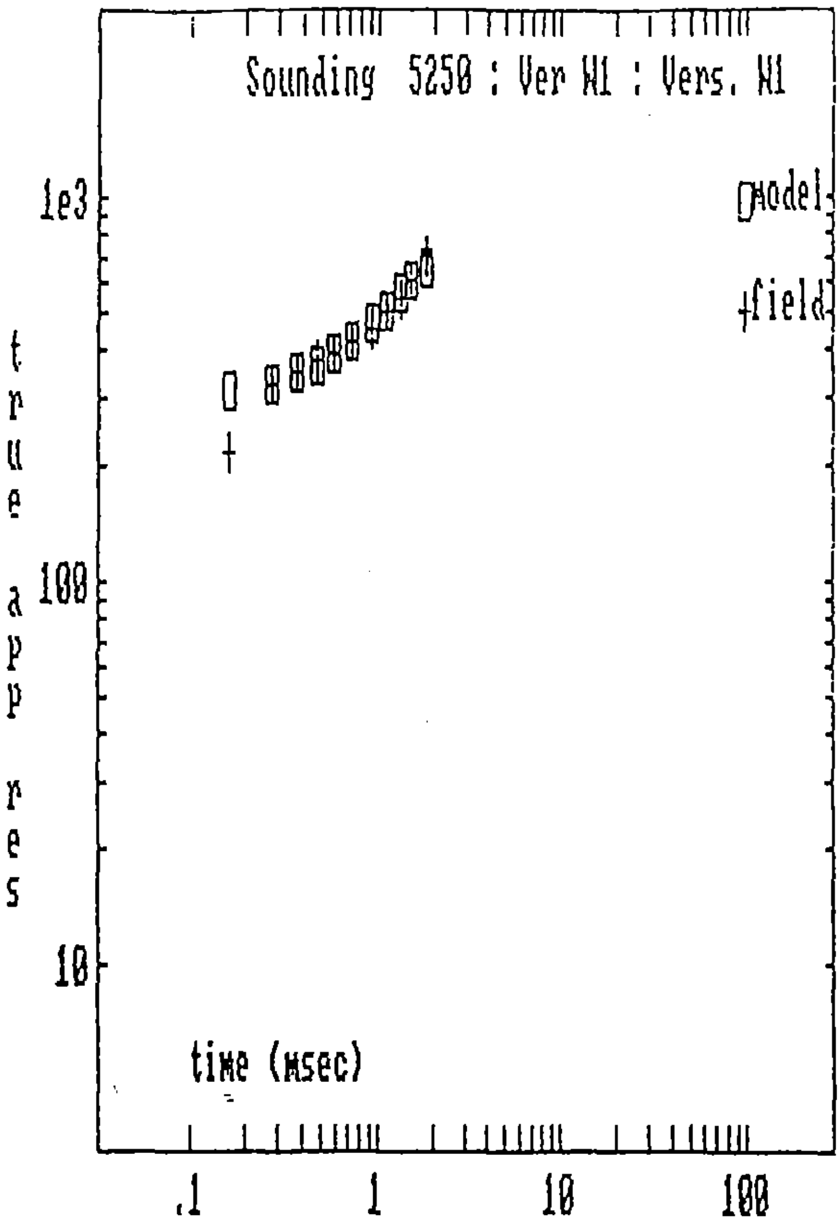
Line 7600E displays a different character again. The profile displays an assymetric central anomaly bordered on either side by "side-lobes", similar to line 4800E. However the assymetry is opposite to that seen on line 4800E and suggests a southerly dip. The initial amplitude of the anomaly on line 7600E is comparable to the amplitude of the anomaly on line 4800E but the amplitude of the anomaly on line 7600E decays far more rapidly, indicating a poorer conductor.

027

FIG 12 LAYERED EARTH INVERSION

LINE 6200E

510028




SOUNDING: 5250 : Vers W1
06 : , 6200E , 5250N .
2 LYR LAST 10 PTS STH LOOP

5250AW

* 329 ohm.m * 308 m.

* 329

* 306 m.

7840 ohm.m

E7840
S- 19

A geoelectric section obtained from inversion of data on line 7600E at 5250N is presented as figure 13. The forward model and inversion statistics are presented in Appendix 5. The first feature to note is that the field and model apparent resistivities do not match well at late times, due to the steep increase in apparent resistivity of the field data caused by IP effects. Hence the resistivity of, and depth to, basement is not well resolved. This section implies a 55m thick glacial layer overlying the conductor within the limestone. The limestone sequence is generally more resistive than the glacials. The conductor within the limestone is a relatively poor conductor and probably represents a carbonaceous limestone unit.

In summary the first stage program provided the following information:

1) The Comstock Valley is underlain by Gordon Limestone which is faulted to the north and south against rocks of the Denison group, which are interpreted to underlay the limestone in the centre of the valley.

2) The width of the limestone sequence varies, narrowing to the east and west.

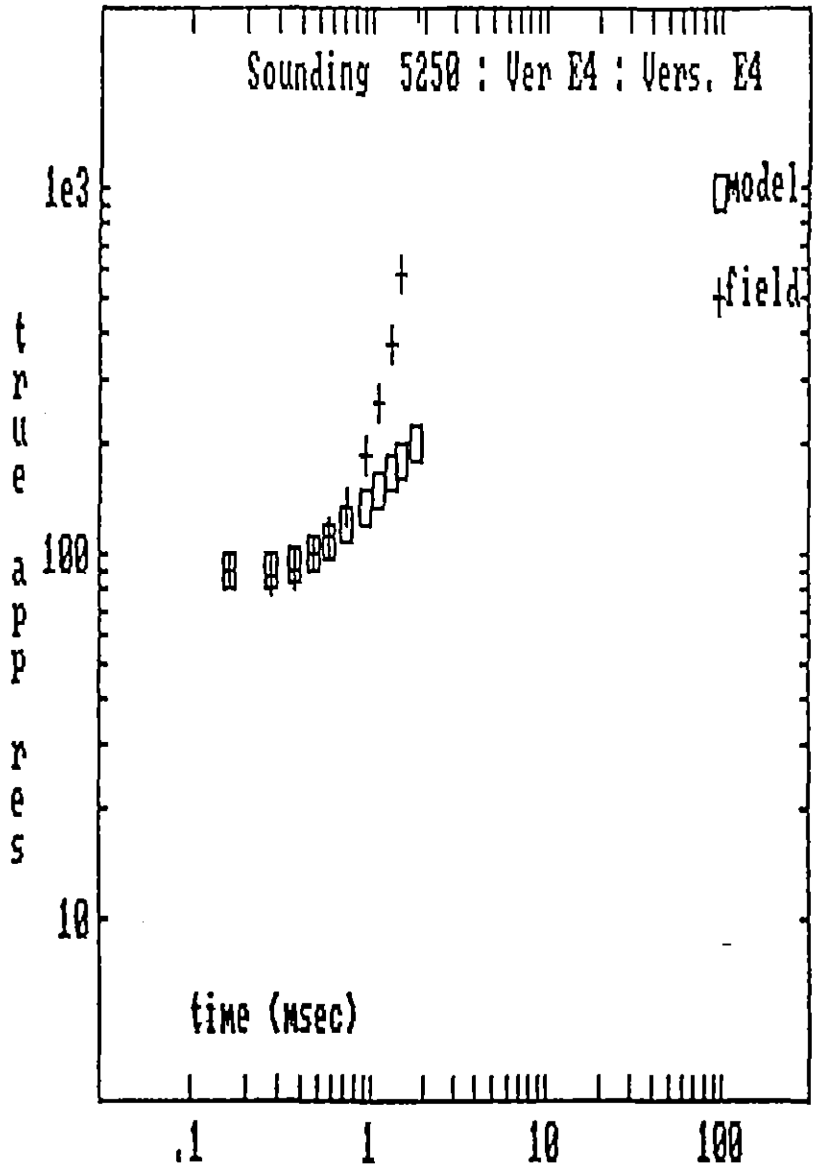
3) Overlying the limestone is a blanket of glacial sediments which attain thicknesses of at least 140m in the valley centre. The glacials have resistivities of the order of 100 to 200 ohms as compared to the limestone sequence which has resistivities of 200 to 300 ohms.

4) Conductive zones occur within the limestone, which probably reflect more carbonaceous limestone units. Indeed this is suggested by in-situ conductivity measurements on C54 drillcore.

FIG 13 LAYERED EARTH INVERSION
LINE 7600E

510030

023




SOUNDING: 5250 : Vers E4
07 : , 7600E , 5250N .
4 LYR INITIAL MODEL MANY POINTS WEIGHTED OUT

5250AE

| | | |
|---|---|---|
| ( 178 ohm.m) | * 55.4 m. | ( 178) |
| 36.0 ohm.m | 37.8 m. | 36.0 |
| ( 278 ohm.m) | (64.5 m.) | ( 278) |
| * 2196 ohm.m | | * 2196 |

STD ERR= 3.8% : S= 2 S

E- 4%
S- 2S

A second stage program was designed to achieve the following:

1) To map the faulted margins of the limestone and any crosscutting faults. These zones would be prospective for Irish-style mineralisation.

2) To identify any in-faulted blocks of prospective Mt Read volcanics within the valley proper or the western neck.

3) To directly explore for Irish-style deposits.

An additional 9 traverses were proposed to complete the TEM coverage of the valley, as illustrated in figure 9. Data were recorded within the loop and at one station 50m in front of each loop. The data from this survey is presented in the form of stacked profiles in Appendix 4. Interpretation is still in progress but at this stage there appear to be no economically significant anomalies. Poor conductors are apparent but are probably carbonaceous limestone. The faulted margins of the limestone are well defined and some internal faults may be present. It is planned to image process the data to assist the final interpretation.

### 3.4.3 Fixed Loop UTEM Survey

A fixed loop UTEM survey was conducted over the West Comstock and Beatrice grids and a portion of the Comstock Valley grid. The survey was conducted in October/November 1989 by Lamontagne Geophysics Ltd. A total of 81 line kilometres was surveyed using 8 loops. Loop sizes ranged from approximately 1km x 1km to 1.2km x 1.4km, with the exception of loop WC4 which was 800m x 900m. Readings were taken at 50m intervals along lines 200m apart. At each station the vertical component was read using a transmitting frequency of 26.23 Hz to record 10 channels of data. Where possible each grid line was surveyed from two different transmitting loops to minimise possible coupling problems. Locations of loops and lines surveyed are presented in Figure 8. Data is presented in Appendix 3 in the form of continuously normalised profiles and point normalised profiles. An explanation of symbols and delay times represented by each channel is presented in Appendix 2. Interpreted anomalies are plotted on Figure 8.

Two anomalies of interest were identified on the Comstock Valley grid. The first anomaly to be discussed was originally identified by a Turam survey (Fig.14) and hence is referred to as the Turam anomaly. This feature is present on lines 4000E to 4800E, trending north-west (*Fig.8). The conductor has a large strike and depth* extent. The conductor appears to be shallowest on line 4800E where the inferred depth to the top of the conductor is approximately 200m. From line 4800E the conductor plunges to the north-west. The anomaly amplitude is strongest on line 4800E where it appears to dip to the north at an angle of approximately 45 degrees. Decay curve analysis indicates an exponential decay of 0.8 to 1.0 ms.

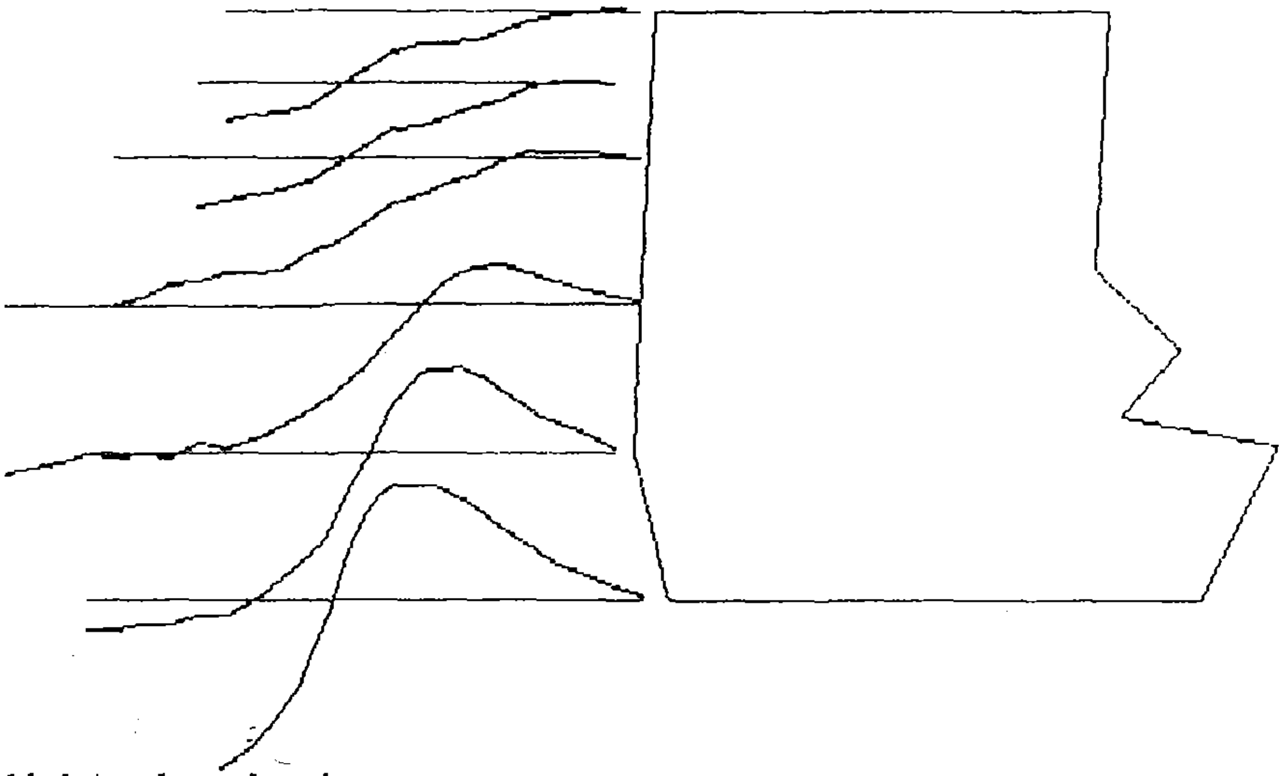
A drillhole was recommended to test this anomaly. The causative body was interpreted to be a plate-like conductor at a depth of approximately 170m below 5000N on line 4800E, dipping at 45 degrees to the north. It was not possible, however, to eliminate the possibility that the conductivity anomaly on line 4800E was due to Irish-style base metal mineralization. The proposed hole was designed to intersect the target at a depth of 200m below 5050N on line 4800E.

The second anomaly is also visible in the Turam data as a subtle anomaly. In the UTEM data the anomaly is swamped at early times by the stronger early time response of the main Turam conductor. At late times a well-formed slowly decaying response is evident on line 4000E at 5025N. If we examine stacked profiles of continuously normalised Channel 4 data and Hilbert transformed Channel 4 data for lines 4000E to 4800E (Figs.15 and 16 respectively) this subtle anomaly is evident on lines 4000E, 4100E and 4200E. The anomaly is strongest on line 4000E where it appears deepest, with the depth to the top of the conductor interpreted to be approximately 115m. Decay curve analysis indicates an exponential decay with a time constant of the order of 2 ms. The fact that the anomaly amplitude decreases to the east while the wavelength also decreases may indicate that lines 4100E and 4200E are off the end of the conductor.

On the West Comstock grid a strong early time response was evident trending north-west across the entire grid. This anomaly has a power law decay of 2.5 indicating a current channelling response. The anomaly is interpreted to be reflecting a major regional fault. The north-western portion of this anomaly corresponds to the Zig Zag Hill Sirotem anomaly previously identified and drilled by Goldfields Exploration. On the southern margin of the grid a less well defined anomaly may also reflect a major structure.

No strong conductors were associated with the base metal mineralised zone on the Beatrice grid. Only poorly conducting features associated with structures or lithologies were recognised and these are plotted on Figure 8.

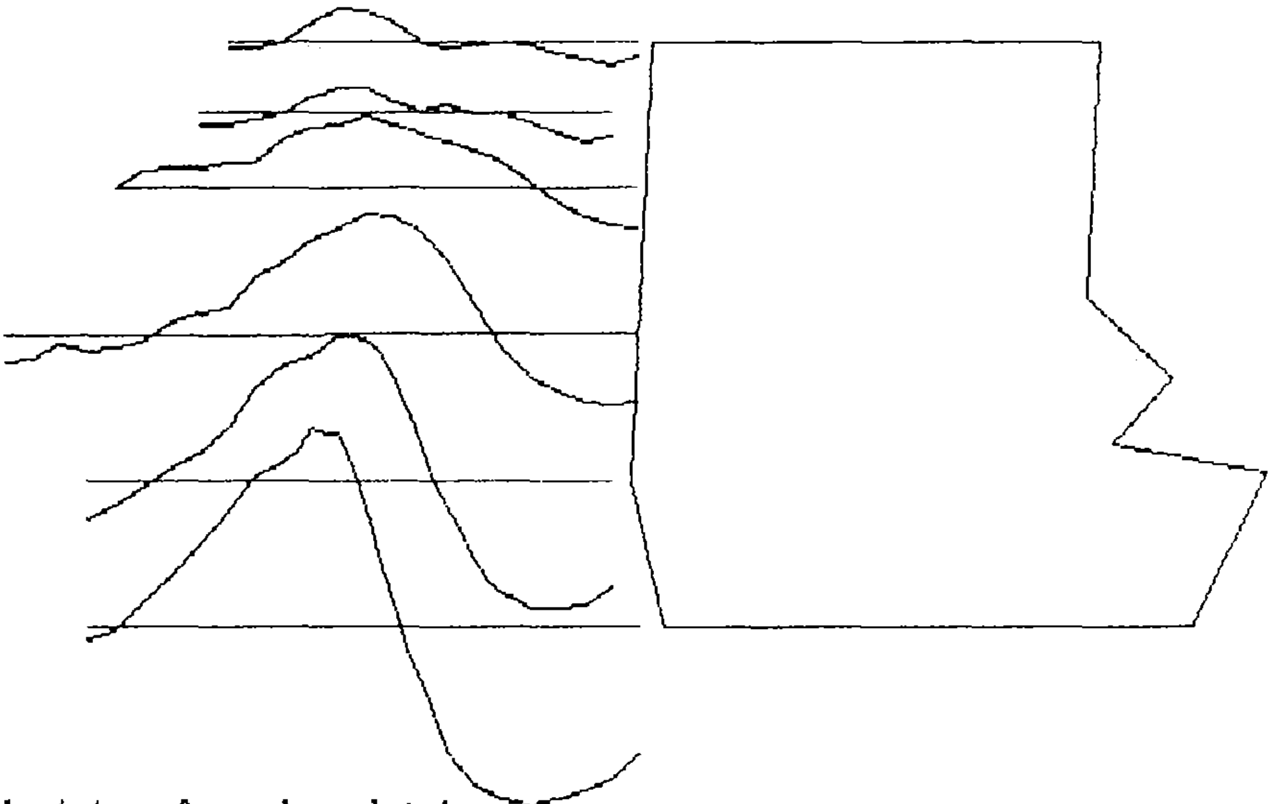
WC4



field data channel : 4
(Cts Norm)

FIGURE 15

WC4



Hilbert transform channel : 4
(Cts Norm)

FIGURE 16.

3.4.4 Drilling

In order to test the combined UTEM/SIROTEM/TURAM conductor on line 4,800E a diamond drillhole, CV1, was collared at 4,850E, 5,175N (local grid co-ordinates), on an old access track. The hole was designed to intersect the conductor at a vertical depth of 200 m. It was positioned off line 4,800E, mainly to take advantage of the existing access, rather than bulldoze a new access track. Also the anomaly is somewhat stronger immediately to the east of line 4,800E.

A Longyear 38 drill rig of Diamond Drilling Tasmania was contracted to complete the hole. Difficulties were encountered in penetrating some 100 m vertical thickness of poorly consolidated glacial sediments. A casing advancer was used to a depth of 80 m, after an abortive attempt at coring, where the glacials become more indurated and NQ wireline was used below this to a depth of 125 m. At 125 m BQ was used in order to seal off the entire glacial zone. The hole was completed at 316 m (Appendix 5), and cased with 30 mm IP PVC piping.

3.4.5 Downhole Electromagnetic Survey

A down-hole Sirotem survey was performed within DDH CV1 by McSkimming Geophysics on behalf of BHP. The hole was surveyed from three different loops, as shown in figure 9. Readings were taken every 5m with 20 channels of standard and early time data being recorded at each station. Data are presented in the form of log and linear profiles in Appendix 7 . An explanation of plotting symbols and delay times represented by each channel is provided in Appendix 2.

Examination of the profile surveyed from loop 1 reveals a broad positive anomaly, with a small crossover superimposed at a down-hole depth of 200m. The positive shoulder of the crossover occurs on the up-hole side of the inflection. Data gathered from loop 2 reveals an anomaly of similar form and sign to that measured from loop 1. The amplitude of the anomaly is greater by a factor of ten. At early times the positive shoulder of the small crossover occurs on the down-dip side of the hole. At later times the form of the crossover reverses to match that measured from loop 1. Data from loop 3 shows an anomaly with very similar form to that seen from loops 1 and 2, but opposite in sign ie entirely negative. The anomaly amplitude is similar to that of loop 1, and a factor of ten less than loop 2.

A study of primary field coupling diagrams suggests that the different responses measured from each loop could be caused by a large plate like conductor dipping to the north. This conductor would be intersected by the drillhole at a down-hole depth of 200m, and this is interpreted to be the cause of the localised crossover seen at this depth. This qualitative interpretation was supported by filament inversion models of channel 12 data from each loop. Quantitative modelling of the DHEM responses was conducted using OZPLATE, the CSIRO modified version of the University of Toronto PLATE program. The model results supported the interpretation of the surface data and the qualitative interpretation of the downhole data. The character of the localised crossovers in the OZPLATE models was also consistent, until the model profile actually passed into the plate. The OZPLATE model results are included in Appendix 8.

Therefore it is felt that DDH CV1 successfully tested the TURAM/SIROTEM/UTEM anomaly, intersecting a conductor at a depth consistent with that expected from the surface data and possessing a geometry also consistent with that inferred from the surface data.  The said conductor is carbonaceous impure limestone with up to 10% volume per metre of massive pyrite veins. There is no evidence for an off-hole conductor.

### 3.4.6 Geology of the Beatrice Prospect

All the Beatrice diamond drillholes, MS1-5, were relogged and surface exposures of the mineralization sampled. Twenty-nine samples of drillcore were re-assayed to check Mt Lyell Cu, Pb and Zn values and to establish gold contents. Drillsections showing holes MS1-4 are presented as figures 17-20, and the surface geology as figure 7. Excellent agreement was obtained between the new assays and the old Mt Lyell results (Appendix 9). Gold in the 29 samples correlates well with high Zn, and there is an intersection of 7 m in MS1 averaging 0.25 g/tonne. The maximum gold value is 0.37 g/tonne.

The Sedgwick Porphyry, a rhyolitic intrusive forms the footwall to the mineralization and has been intersected in drillholes MS1, 2, 4 and 5. It is massive in all drillhole intersections, but flow-layering has been reported by Mt Lyell geologists at outcrop. It varies from pink to green in colour, and contains 30% by volume rounded quartz phenocrysts (to 5 mm) tabular feldspar (to 4 mm) and rare biotite flakes (now replaced by chlorite, sericite and $TiO_2$). In MS5 a thin, crystal-rich marginal facies 2 m wide, occurs at top and bottom of the Porphyry. Crystals comprise as much as 80% of this facies. Contacts between Porphyry and slate as seen in MS1 and MS5 are very irregular and interfingering. Groundmass colour varies from green-grey to pink reflecting volume of pervasive K-feldspar. Rare disseminated pyrite, galena and sphalerite are present. In MS5 0.22% Zn, was found over 62.4-64.1 m at the upper margin of the porphyry, but it is likely that the mineralization is present in muddy material in this interval.

The mineralized sequence is dominated by meta-sediments. Outcrop consists of dark-green chlorite-mica-quartz schist (after a fine-grained sediment) which is gradational in drillcore to pumiceous breccias. The breccias are homogeneous consisting of 20-40% of flattened, angular pumice fragments up to 5 cm long, and minor pink-grey fine-grained "chert" and limestone. Bedding is rare and there is little evidence of grading on a small scale, although the breccia appears to grade upwards into the chlorite-mica-quartz schist on a scale of tens of metres. The base of the breccias are usually quite sharp and presumeably erosive onto a chlorite-mica quartz schist beneath. It is considered that these rocks represent massive debris flows. It has not proved possible to correlate these rocks between drillholes.

Also part of the mineralized sequence are interbedded slate, siltstone and sandstone. Slate typically contains small volumes of pyrite (<5%) as bedding-parallel layers or nodular aggregates. In some of the drillholes there is a downwards gradation from massive to laminated slate to massive siltstone. In MS5 the laminae within the slate are calcareous and light-grey in colour. Rare sandstone contains minor slate clasts (1% vol.) and is green due to pervasive chlorite. There are also pumice clasts in the sandstone, and disseminated pyrite.

Mineralization is of three types: veinlets (minor) replacing pumice (minor) and fine disseminations (major). High grade mineralization is often restricted to finer lithologies and correlates with high vein densities. The bulk of contained metal is fine-grained (there is poor correspondence between logged sphalerite and assay Zn values for example).

Rocks in the Beatrice prospect have a mineralogy of mica, chlorite, quartz, calcite, rutile and K-feldspar. Variations in the volume of pervasive K-feldspar leads to conspicuous changes in colour from green to pink. A distinct zone of K-feldspar alteration adjacent to mineralized quartz-carbonate veins can be seen close to line 1600N. These veins trend nearly north-south and are composed of quartz, carbonate (? siderite) and coarse sphalerite. It is likely that this zone is responsible for the soil anomaly on Line 1600N and has been intersected at the bottom of MS2 where it is associated with minor Zn enrichment ( 0.2% Zn). Similar K-feldspar/quartz zones were seen in MS3 and higher in MS2, correlating with outcrop in the eastern access track.

The Beatrice prospect contains a significant volume of Pb and Zn, but at very low grades. It is partly vein-related and partly replacive, and the abundance of associated K-feldspar alteration and absence of major silicification and pyrite suggests that this mineralization is not of the target type VMS-style. Its origins, however, remain obscure. Lack of a UTEM response other than that due to a fault (intersected in MS1 and MS4) does not provide any justification for further work. Downhole EM is precluded by the fact that MS1 to 4 are all blocked at shallow depth. Consistently low gold grades and good correlation between gold and Zn suggest that this is not a significant gold prospect.

### 3.4.7 Geology of the Comstock Valley Prospect

The Comstock Valley area is floored by a thick blanket of Quaternary glacial sediments. Outcropping to the south of the valley are sandstones and conglomerates of the Owen Conglomerate (Denison Group) which dip northwards at an average of 45°. Outcropping to the north forming a prominent knob at 5345480S, 385200E are similar lithologies dipping at between 35 to 40° south. The gross structure of the valley would therefore appear to be synformal, with Ordovician Gordon limestone subcropping beneath the glacial sediments in the core of the fold.

Four diamond drillholes, CV1, C54, C49 and C51 have penetrated the Gordon Limestone (Figs. 21 and 22). Angles between bedding and core axes indicate that the limestone is dipping at circa 45° north, similar to the dip of the underlying Denison Group exposed to the south. The contact between the two cannot, however, be conformable. Drillholes C49, C51 and C54 intersected a clay zone beneath the limestone, and it would appear that the interface between clay and limestone is sub-vertical. This is consistent with EM sounding data which strongly suggests a steep termination to the conductive limestone block (Section 3.4.2). The most probable explanation of the clay is therefore that it represents glacial fill of a steep-sided valley, formed by a scarp of Gordon Limestone (perhaps reflecting a Devonian fault similar to the North Lyell fault). Owen Conglomerate, limestone and rare gossan fragments within the clay are thereby explained as talus or discrete boulder beds, such as those observed near-surface. Alternatively the clay may represent fault gouge, or even an altered equivalent of the Pioneer Beds or Florentine siltstone which underlie the Gordon Limestone.

X-ray diffraction examination of clays from drillhole C49 shows that the "clay" is actually very fine sandstone, with minor illite, kaolinite K-feldspar, smectite, calcite and geothite. Geochemical analysis of three samples of this clay material (Table 4) reveal that the clay/siltstone is enriched in base metals ($\bar{x}$ Cu 92 ppm, Pb 60 ppm, Zn 896 ppm) compared to six samples of limestone from C54 and C51 ($\bar{x}$ Cu 6 ppm, Pb 8 ppm, Zn 16 ppm). By analogy with a similar clay sample from McDowell's P.A. gold mine (Section 3.6.3) the anomalous base metals are likely to be located in iron oxides, and possibly some zincian chromite.

041

Table 4: Geochemical analyses of samples of Gordon Limestone and possible glacial clay (actually a fine sandstone) from the Comstock Valley. Cu, Pb, Zn, Ag AAS, Au fire assay, BA, As XRD. Additional assays are given in Appendix .*Quality of these analyses is unknown. High Cu may be due to laboratory contamination, indeed there is poor correspondence between the BHP and Mt Lyell analyses. Twenty-three samples of limestone, analysed by Goldfields yielded a mean value of 17 ppb gold (maximum 67 ppb).

| SAMPLE # | LOCATION | ROCK TYPE | Cu | Pb | Zn | Ag | Au | Ba | As | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| BX4564 | C51 200-245 m | Limestone | 12 | 10 | 42 | <1 | <0.01 | - | - | Composite chip sample |
| BX4705 | C49 411.3 | Clay/"Gossan" | 120 | 70 | 1850 | <0.5 | <0.008 | 70 | 30 | |
| BX4559 | C54 245-255 m | Limestone | 7 | 6 | 7 | <1 | <0.01 | - | - | Composite chip sample |
| BX4560 | C54 295-305 m | Limestone | 6 | 8 | 12 | <1 | <0.01 | - | - | Composite chip sample |
| BX4561 | C54 345-355 m | Limestone | 3 | 5 | 11 | <1 | <0.01 | - | - | Composite chip sample |
| BX4562 | C54 375-385 m | Limestone | 4 | 6 | 10 | <1 | 0.01 | - | - | Composite chip sample |
| BX4563 | C54 385-420 m | Limestone | 6 | 10 | 15 | <1 | <0.01 | - | - | Composite chip sample |
| 23403 | C49 390 m | Clay (Sandstone) | 85 | 50 | 370 | <0.5 | <0.008 | - | 25 | |
| 23404 | C49 436 m | Clay (Sandstone) | 70 | 60 | 470 | <0.5 | <0.008 | - | 39 | |
| - | C49 376-383 m | Clay (Sandstone) | 1,350 | <500 | 100 | - | - | - | - | Mt Lyell Co analyses (1967)* |
| - | C49 392-395 m | Clay (Sandstone) | 500 | <500 | 100 | - | - | - | - | Mt Lyell Co analyses (1967)* |
| - | C49 414-414.5 m | Clay (Sandstone) | 2,300 | <500 | 300 | - | - | - | - | Mt Lyell Co analyses (1967)* |

510042

## 3.5 Moxon Saddle

### 3.5.1 Previous Exploration

The Moxon Saddle area (part 3 of EL 102/87) was originally part of EL 9/66 held by the Mt Lyell Company and later by Goldfields Exploration. It has been covered by the Mt Lyell Co. Red Hills and Henty fault zone grids (Fig. 23), which were partially covered by SP, pole-dipole IP, resistivity, ground magnetics and soil geochemistry. A small portion of the licence area was surveyed by UTEM for CRAE. None of these surveys yielded any significant results. A single drillhole, HFZ2, was collared within the tenement, also with disappointing results.

Despite the lack of any encouraging geochemical or geophysical data from the area, it remains highly prospective simply because of its proximity to the Red Hills massive sulphide prospect, and Henty Gold Deposit (Fig. 24). Since no EM technique has been applied to much of the area, it was decided that the entire 2 $km^2$ area be surveyed with UTEM. Furthermore the small portion of the Henty Fault which traverses the north-west part of the licence and its footwall rocks, were covered by dipole-dipole IP, in an attempt to better resolve any areas of disseminated sulphide.

### 3.5.2 UTEM Survey

A fixed loop UTEM survey was conducted over the Moxon Saddle Grid. The survey was conducted in October/November 1989 by Lamontagne Geophysics Ltd. as part of a larger survey covering the West Comstock, Beatrice and Comstock Valley grids near Queenstown. A total of 11 line kilometres was surveyed on the Moxon Saddle Grid using 3 loops. Loop sizes were approximately 1km x 1km. Readings were taken at 50m intervals along lines 200m apart. At each station the vertical component was read using a transmitting frequency of 26.23 Hz to record 10 channels of data. Locations of loops and lines surveyed are presented in figure 25. Data is presented in Appendix 3 in the form of continuously normalised profiles and point normalised profiles. An explanation of symbols and delay times represented by each channel is presented in Appendix 2.

No significant anomalies were identified by this survey. However a corridor up to 300m wide surrounding the power line could not be considered to have been adequately tested , due to the powerline interference. Part of this corridor covers the Henty Fault Zone.

### 3.5.3 Time Domain Induced Polarisation Survey

A time-domain Induced Polarisation survey was conducted during February 1989 over the north-western portion of the Moxon Saddle grid. The survey was conducted by Geoterrex Ltd, on behalf of BHP, using a Huntec 7.5 kva transmitter in conjunction with a Huntec Mk 4 reciever. A helicopter was used to transport the equipment to the survey site. A total of five electrode spreads were read using 50m dipole spacings. Each spread consisted of 10 to 14 tx electrode pits. Data are presented in Appendix 10 in the form of hand plotted and contoured pseudosections.

Two distinct anomalously chargeable zones are evident. The first is visible on lines 7500N, 7700N and 7900N (Fig.25). This feature sits within the Henty Fault zone adjacent to the contact with the Tyndall Group. The assymetric nature of the anomaly is consistent on all three lines, becoming more pronounced to the south. The anomaly is strongest on the northern-most line. The depth to the top of the source is of the order of less than 25m on all three lines. Interpretation is still at a preliminary stage, and

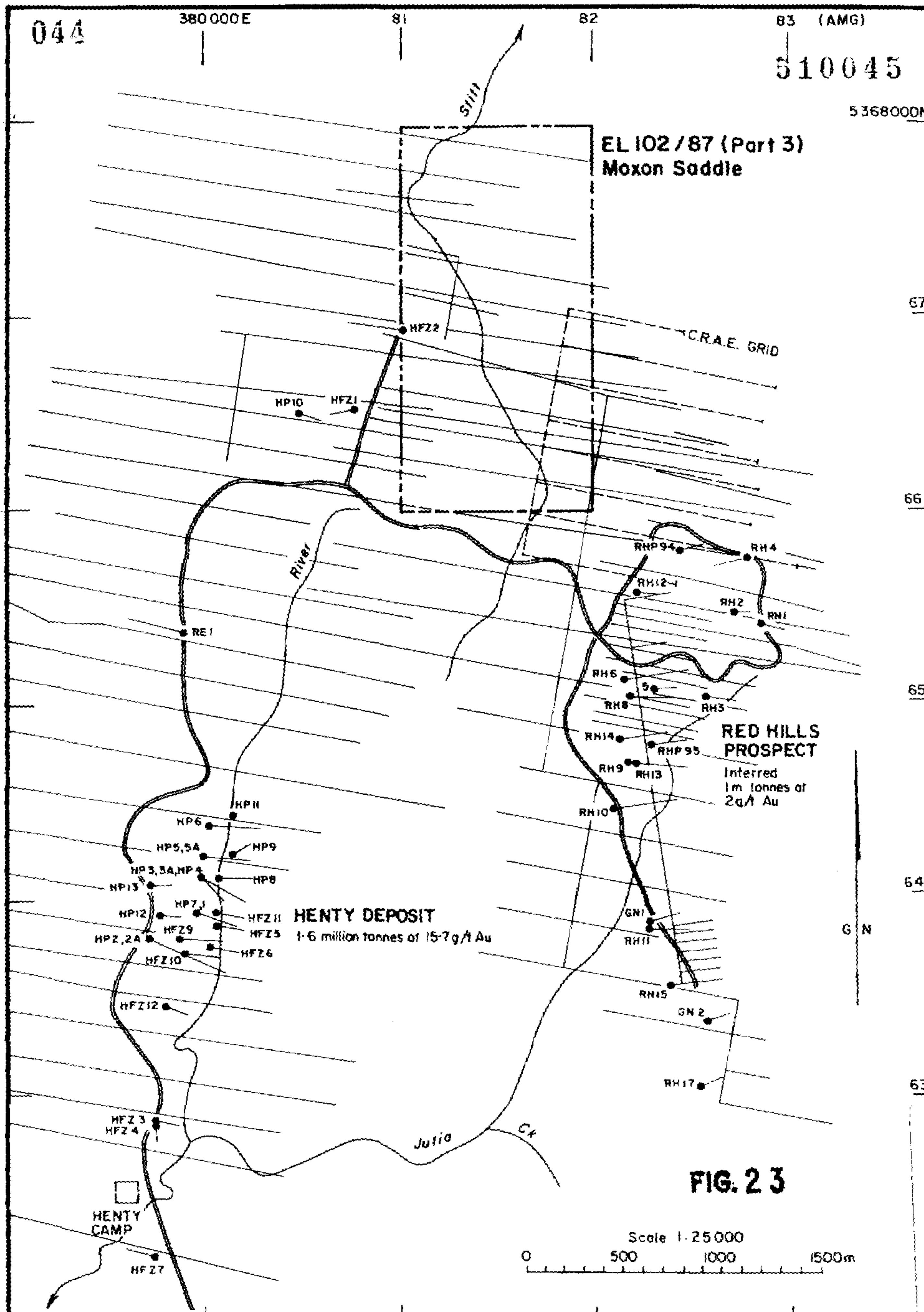



**FIG. 2.3**

| Centre Melbourne | THE BROKEN HILL PROPRIETARY CO. LTD. EL 102/87 (PART 3), QUEENSTOWN, TASMANIA MOXON SADDLE – RED HILLS – HENTY DEPOSIT AREA | Project Nº 8 57 |
|---|---|---|
| Date March 90 | **LOCATION OF OLD GRIDS & DRILL HOLES** | Drawing Nº A4 - 2973 |

forward modelling will be performed to resolve the ambiguity in the geometry of the anomaly source.

The second anomaly occurs only on line 7300N. This feature appears to have very little depth extent and is very near surface. The feature corresponds to a zone of old workings in chloritic pyritic schists, which lie on a mapped fault (Fig. 25).

### 3.5.4 Geology

Much of the outcrop at Moxon Saddle is composed of Cambrian felsic lavas. These rocks are terminated to the west by the Henty fault zone, a 100-200 m wide schist zone which contains minor Cu mineralization to the immediate west of the licence area (Fig. 24). This mineralization, which had been prospected by a shaft and a trench, was the first target along the fault zone to be drilled by the Mt. Lyell Co (in 1973). The trench yielded 12 m of 1.22% Cu in quartz-chlorite schists. The shaft exposed pyrite-magnetite-chalcopyrite mineralization in "chloritic volcanics". Drillhole HFZ1 intersected 76 m at 0.11% Cu (Pb, Zn <300 ppm), while HFZ2 was barren. Surprisingly, there is no record of any gold assay on the drillcore. J.G. Purvis, Goldfields geologist, concluded that the rocks in the vicinity of HFZ1 and 2 are lateral equivalents of those in the hanging wall of the Henty fault at the Henty gold deposit. They are interpreted (by Goldfields) as sheared mafic volcanic rocks (possible flows), crystal tuffs and ignimbrites. Sulphide is disseminated, and locally massive (up to 6 cm thick). It is mostly associated with quartz veinlets and fractures. The sulphides gave a gradient array IP response, and a 700 ppm Cu in soil anomaly, although Purvis suggested that the latter may have been due to contamination from the dumps.

It appears that rocks similar to those tested by HFZ1 and HFZ2 extend into the northwestern corner of the E.L., although outcrop in this rugged and heavily vegetated area is poor. These are bounded to the east by a NE-SW

trending quartz-porphyritic rock, which varies from salmon pink to a purplish maroon in colour (Fig. 24). This has been equated with the Tyndall Group by the Tasmanian Mines Department, but is rather similar to the Red Hills lava. It hosts small areas of disseminated pyrite, as hematised or partially hematised cubes up to 1 cm in diameter, which seldom exceed 5 volume % of the rock. Chloritic alteration is present locally. To the south of line 6100N this rock hosts quartz-hematite-bornite veins on which a substantial two compartment shaft was sunk.
Chlorite-pyrite schist occurs at the eastern margin of the body on 7300N 1400E, at its boundary with a flow-layered, feldspar porphyritic rock (possibly a lava). A 12 m long trench and shaft were excavated on this zone. These were sampled revealing anomalous gold (up to 0.44 g/t) (Table 5). This rock has an associated IP response, although it appears that the sulphide has a limited strike extent (<400 m). Zinc is generally enriched (mean 167 ppm) and Pb and Cu are anomalous in some samples.

## 3.6 OTHER AREAS

### 3.6.1 South Huxley Soil Geochemistry

A small soil geochemical survey was carried out in order to follow up a low order lead in stream sediment anomaly in creeks draining southwards from Mt Huxley (maximum 270 ppm Pb). One hundred and thirty-nine samples (including duplicates) were collected using a hand auger, along lines 5000, 4800 & 4600N. In general penetration depths were less than 80 cm, and the soil material dominated by quartz fragments derived from Owen Conglomerate lithologies. It is unlikely that true weathered bedrock, C-horizon, was sampled in many cases. Samples were submitted to ALS of Brisbane for ICP analysis of Cu, Pb, Zn, Fe, Mn, V, S and for Au by carbon rod/AAS. Results are presented in Appendix 9.

Table 5: Analyses of samples from old workings near Henty fault at Moxon Saddle. Cu, Pb, Zn, Ag AAS, Au - Fire assay, Ba, As - XRF. All as ppm except Au as ppb.

| | Cu | Pb | Zn | Ag | Au | As | Ba |
|---|---|---|---|---|---|---|---|
| BX4739 | 30 | 15 | 165 | 1.0 | 42 | 25 | 1700 |
| 40 | 175 | 45 | 210 | 1.0 | 373 | 75 | 1800 |
| 41 | 35 | <5 | 220 | 0.5 | 116 | 7 | 1300 |
| 42 | 30 | 30 | 155 | 1.0 | 47 | 80 | 1750 |
| 43 | 70 | 5 | 110 | 0.5 | 18 | <2 | 590 |
| 51 | 75 | 400 | 200 | 0.5 | 437 | 25 | 1500 |
| 52 | 50 | 50 | 140 | 1.5 | 20 | 20 | 1150 |
| 53 | 75 | 35 | 260 | 1.5 | 17 | 40 | 2450 |
| 54 | 455 | <5 | 40 | 0.5 | 20 | 15 | 1700 |
| AVERAGE | 110 | 65 | 167 | 0.9 | 121 | 32 | 1550 |

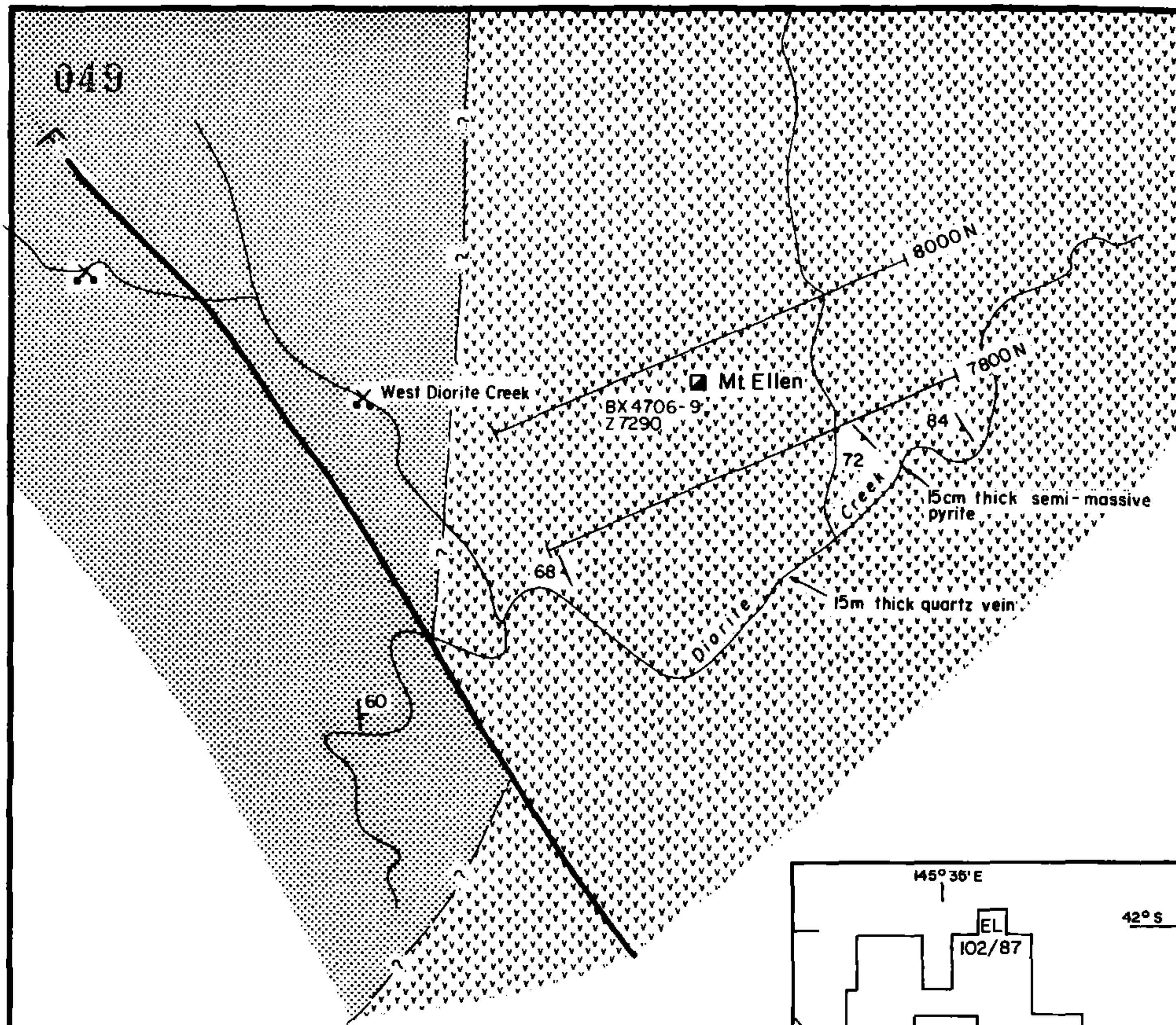
Only two samples registered in excess of 130 ppm Pb or Zn, these being BX4837 and 4943. The best result was 850 ppm Pb and 210 ppm Pb, but this correlates with very high Fe and Mn (total 22.4%), and presence of black, organic-rich swampy conditions. The anomaly is not found on adjacent lines. It is likely that this anomaly is due to scavenging of base metals by organics and is not considered to be of great significance.

### 3.6.2 Mt Ellen Mine/Mountain Maid

Twelvetrees (1900) visited the Mt Ellen mine, 1 km north of Mt Huxley, and described "felsitic rock and cupiferous chlorite schist" forming a belt over a mile wide. At the mine site, an adit had been driven 30 m east into "felsite". Near the mouth of the tunnel the "felsitic rock decomposed to a soft reddish clay, seamed with flat quartz leaders and thin veins of iron ore". The clay evidently persisted for 15 m or so, where it passed into massive felsite. Twelvetrees noted that the felsite "softens wherever the quartz appears". Gold was restricted it seems to the softer, clay rock. It is likely that the clay represents weathered phyllosilicate alteration, associated with quartz vein emplacement. In a nearby trench gold was associated with oxidised cubes of pyrite.

During December 1975 the mine was relocated and sampled by Mt Lyell Co. geologists. Twelve samples were taken which averaged 1.1 g/t Au, 209 ppm Cu, 44 ppm Pb and 43 ppm Zn. One sample yielded 6 g/t Au. Such low grades (for that time) warranted no further work. Goldfields Exploration revisited the site several years later, and sampled the (collapsed) entrance to the adit, obtaining a maximum Au value of only 0.2 g/t. This is also the maximum value obtained by BHP sampling during this reporting period. It is noticeable that both BHP and Goldfields samples failed to reproduce the high Cu values of the Mt Lyell assays, which may be due to laboratory contamination. This has also been inferred earlier in this report from comparisons of stream sediment data.

049




CAMBRIAN MT READ VOLCANICS

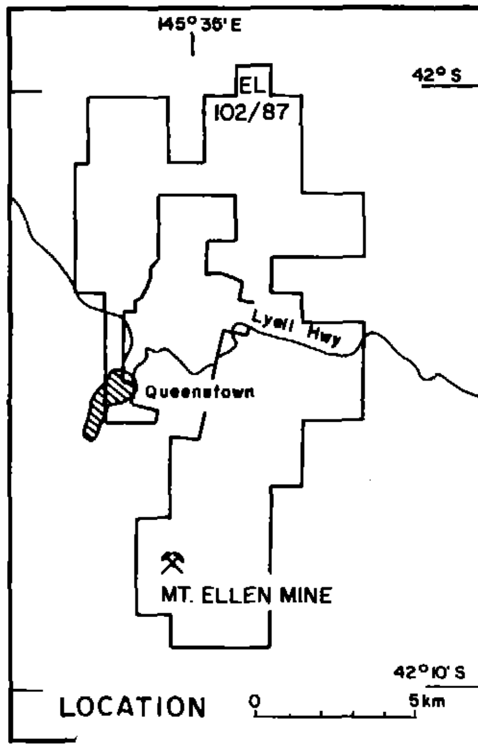
*CENTRAL VOLCANIC COMPLEX*
*Red-purple massive rhyodacite to green-grey foliated variety*

*WESTERN SEQUENCE*
*Fine-grained sediments, often pyritic intrusive quartz-feldspar porphyry and mafic lava*

Strike and dip of main foliation

Abandoned alluvial gold working

8000 N IP line




SCALE 1:10000

0 500 metres

5 cm

Geology modified from Mt Lyell Co. mapping at 1:6000 & Tasmanian Mines Dept. mapping at 1:50 000

FIG. 2 6

510050

| Centre | THE BROKEN HILL PROPRIETARY CO. LTD. | Project Nº |
|---|---|---|
| Melbourne | 102/87, QUEENSTOWN, TAS. MT. ELLEN MINE | B57 |
| Date 5·3·90 | GEOLOGY & SAMPLE LOCATIONS | Drawing Nº A4 3045 |

TABLE 6: Analyses of samples from the Mt Ellen gold mine. ME are Mt Lyell Co samples, BX - BHP, others from Goldfields. The latter samples were also analysed for Sn (<25 ppm) and $WO_3$ (<35 ppm).

| Sample No. | Cu | Pb | Zn | Ag | Au (ppb) |
|---|---|---|---|---|---|
| ME1 | 156 | 21 | 57 | nd | 50 |
| ME2 | 197 | 6 | 10 | nd | 10 |
| ME3 | 323 | 15 | 61 | nd | <10 |
| ME4 | 255 | 22 | 17 | nd | 500 |
| ME5 | 141 | 8 | 15 | nd | 40 |
| ME6 | 133 | 6 | 23 | nd | 70 |
| ME7 | 165 | 3 | 31 | nd | 20 |
| ME8 | 157 | 32 | 138 | nd | 4600 |
| ME9 | 541 | 7 | 21 | nd | 330 |
| ME10 | 231 | 20 | 29 | nd | 30 |
| ME11 | 87 | 11 | 14 | nd | 250 |
| ME12 | 119 | 373 | 36 | nd | 6200 |
| 2659 | 10 | 10 | 20 | 1 | <10 |
| 2660 | <10 | 300 | 40 | 1 | 200 |
| 2661 | <10 | 160 | 30 | 1 | <10 |
| BX4706 | 10 | <5 | 65 | <0.5 | 11 |
| BX4707 | 10 | <5 | 55 | 0.5 | 27 |
| BX4708 | 5 | <5 | 45 | <0.5 | 200 |
| BX4709 | 10 | <5 | 70 | <0.5 | <8 |

Two test IP lines were performed over the Mt Ellen workings and one line was surveyed adjacent to the Mountain Maid prospect. The Geoterrex crew used a Huntec Mk 4 receiver and a Huntec 7.5 kva transmitter to read the three 7-electrode spreads using a 50m dipole spacing. The data is presented in Appendix 10 in the form of hand plotted and contoured pseudosections.

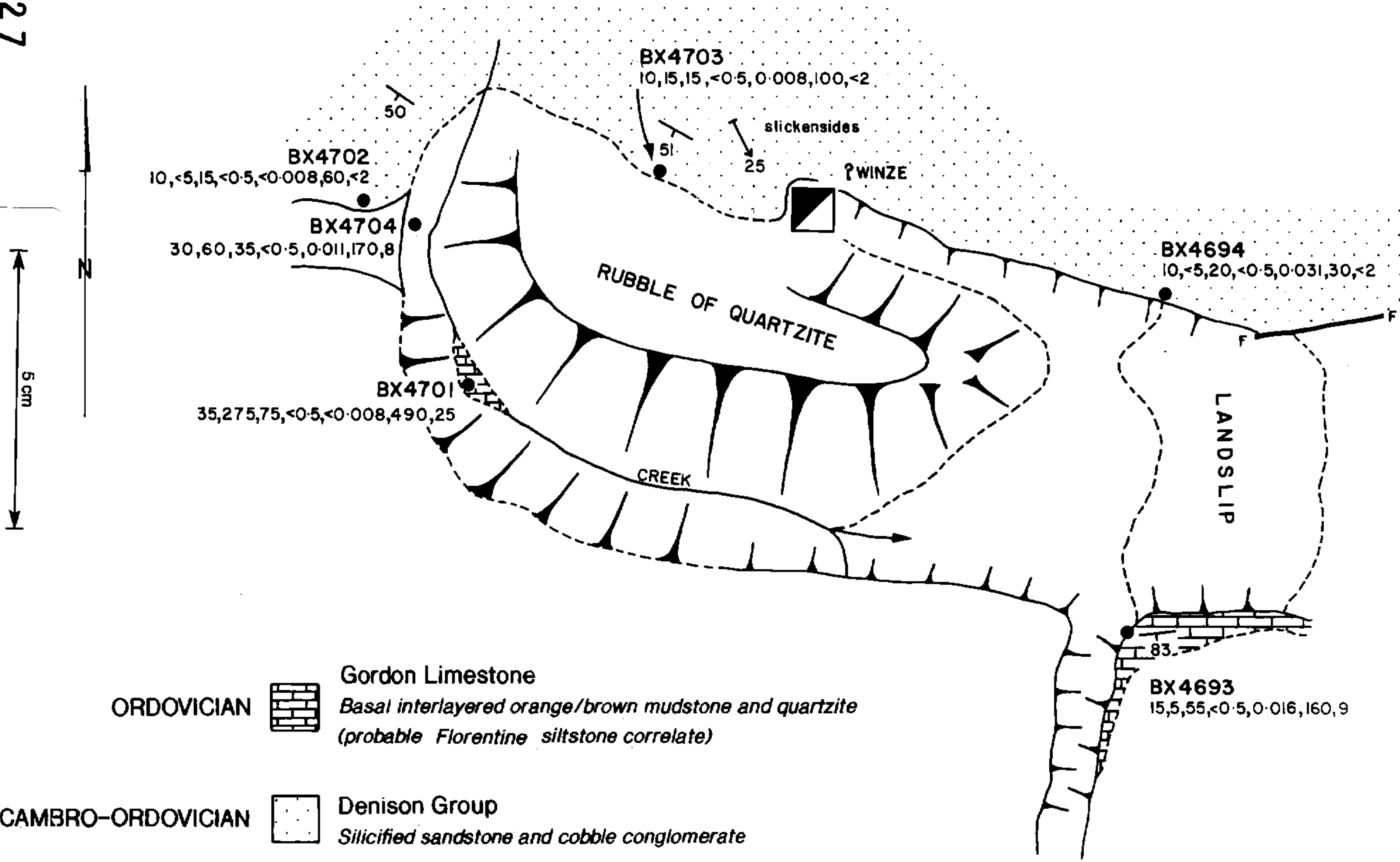
The interpretation of data from these traverses has not yet been completed but even so it is clear that a very strong, well- defined chargeability anomaly is associated with the Mountain Maid mineralisation. An anomaly is also associated with the Mt Ellen workings but the anomaly is broader and less well defined and will be more difficult to interpret.

### 3.6.3 McDowells (McDouals) P.A.

McDowells P.A. gold mine (also known as McDouals) is located some 1 km east of the Lyell Blocks deposit, on the southern slopes of Mt. Lyell. It is reached by a short drill access track. Underground workings consisted of a 12 m long adit (now blocked) accessing several levels serviced by a winze, but were not laterally extensive. Evidently the mine became a small open cut at some time after 1917. According to Bird (1984) mineralization at McDowells consisted of free gold in a breccia pipe at the junction of the North Lyell fault and a northwest striking fault. Ore grades and tonnages are not known, but it is likely that the yield was small given the size of the workings and high-grade, given that gold was recovered by hand (Bird, 1984).

McDowell's open cut was mapped and sampled during August 1989. A map is presented as figure 27. Coarse, quartzitic sandstone and conglomerate of the Denison Group (Owen Conglomerate) are exposed in the northern pit face, dipping at 50° south. The conglomerate of quartzite cobbles forms layers a few centimetres thick. Silicification is intense less than 1 m from the inferred position of the North Lyell

FIG. 2.7




ORDOVICIAN — Gordon Limestone
*Basal interlayered orange/brown mudstone and quartzite (probable Florentine siltstone correlate)*

CAMBRO-ORDOVICIAN — Denison Group
*Silicified sandstone and cobble conglomerate*

● BX4702 — BHP Rockchip Sample Cu, Pb, Zn, Ag, Au, Ba, As (ppm)

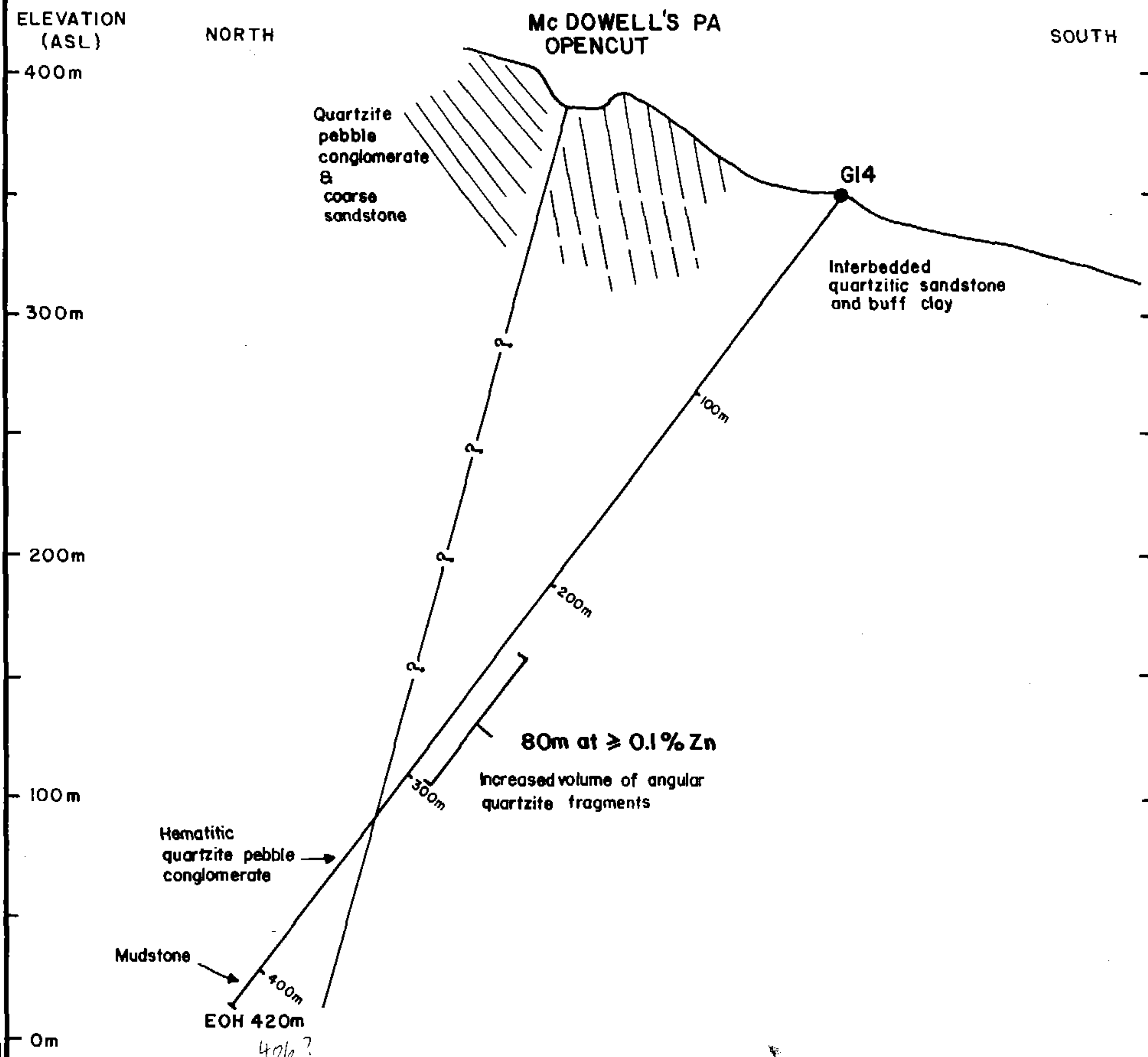
Centre: Melbourne
Date: 5. 3. 90

THE BROKEN HILL PROPRIETARY CO. LTD.
EL 102/87, QUEENSTOWN, TASMANIA
McDOWELL'S PA GOLD MINE - GEOLOGY & SAMPLE LOCATIONS

Project Nº: B57
Drawing Nº: A4 - 3027

052

510053




5 cm

1:2500

0 100m

| DEPTH | Cu | Pb | Zn | As | Ba | Au |
|---|---|---|---|---|---|---|
| 200 | 20 | 65 | 140 | 20 | 420 | 10 |
| 225 | 25 | 520 | 900 | 35 | 140 | 10 |
| 250 | 55 | 1850 | 1300 | 60 | 300 | 14 |
| 275 | 20 | 160 | 1450 | 20 | 320 | 11 |
| 300 | 45 | 560 | 1400 | 50 | 290 | 16 |
| 330 | 40 | 195 | 540 | 50 | 250 | 10 |
| 334 | 10 | 5 | 30 | 2 | 20 | 14 |
| 350 | 5 | <5 | 20 | <2 | 25 | 12 |
| 375 | 5 | <5 | 20 | <2 | 85 | 13 |
| 400 | 15 | <5 | 40 | <2 | 320 | 20 |

FIG. 2 8

Cu, Pb, Zn, Ag - AAS. All Ag <0.5 ppm. As, Ba - XRF
Au - Fire Assay. Results in ppm, except Au - ppb

For location of DDH see A4-3027

| | | |
|---|---|---|
| Prepared: A.Wilde | BHP-Utah Minerals International (Asia Pacific Division) | Proj. No.: B57 |
| Drawn: C.Purnell | EL 102/87, QUEENSTOWN, TASMANIA | Drg No.: A4-3026 |
| Date: March 90 | McDOWELL'S PA GOLD MINE - SECTION & GEOCHEM RESULTS | Fig |
| Centre: Melbourne | | |

fault. South of the fault, interlayered quartzitic sandstone and orange-brown friable mudstone are exposed, dipping steeply south. Minor purple pervasive hematite is visible. Rock chip samples revealed uniformly low base-metal, silver and gold values (Fig. 27).

Diamond drillhole G14 was completed by Goldfields Exploration, presumably to test for the downplunge extension of the McDouals gold orebody. This drillcore was relogged (Fig. 28, Appendix 12). Over 300 m of orange clay and quartzite fragments were intersected before the hole penetrated hematitic sandstone, probably belonging to the Denison Group. Samples of the clay and hematitic sandstone were taken at 25 m intervals and analysed for Cu, Pb, Zn, Ag, As, Ba and Au. This data suggests that the clay/quartzite sequence contains in excess of 0.15% Zn and Pb over 80 m (maximum 1850 ppm Zn, 1300 ppm Pb) confirming earlier Goldfields assays. Gold is below 20 ppb in all samples.

X-ray diffraction of clay shows it to be dominated by fine-grained white-mica (sericite). Zinc was found to be present in hematite pseudomorphs after possible marcasite and in chromite. Chromites contain as much as 17% ZnO (microprobe analysis). Judging by bulk-rock Cr/Zn ratios, the bulk of zinc is associated with the hematite pseudomorphs. Detrital zircon and tourmaline are also present. It seems likely that the chromite is of detrital origin, and thus the host-rock may be a correlative of the Pioneer Beds, which commonly contain detrital chromite. A Pleistocene glacial origin (Bird, 1984), however, cannot be eliminated.

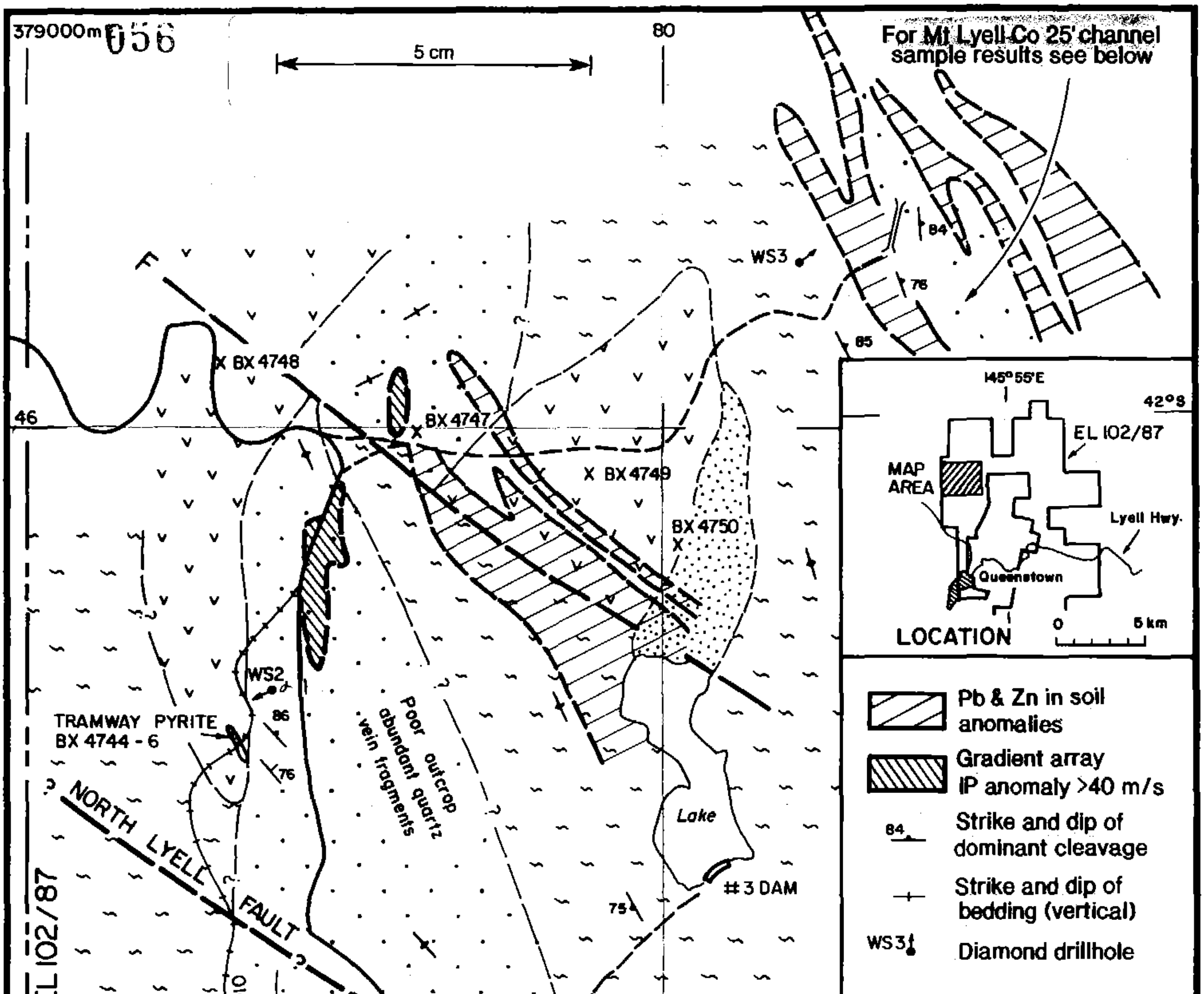
A strong similarity is apparent between base-metal mineralization at McDowells PA and that at the Mt. Lyell Blocks and Lyell Consols ("copper clays"), although the Pb and Zn grades at the latter are unknown. Markham (1968) concluded that mineralization at the Blocks and Consols deposits "formed by oxidation of underlying copper sulphides". Mineragraphic examination of samples from G14 suggest that iron oxides replace marcasite, and also pyrite framboids (up to 20 microns in diameter).

### 3.6.4 #3 Dam Zone

The #3 Dam Zone occurs south of Lake Margaret township, north and west of the Mt Lyell Co #3 Dam. Its position within the lease is given in figure 29. This zone includes a pyritic schist outcrop known as the Tramway Pyrite (Shepherd, 1972), a gold-bearing quartz vein, and areas of anomalous Pb and angular Zn in soil. There is also evidence that some of the almost ubuiquitous cover of quartz-vein fragments has been prospected, probably for gold. The area has been partially covered by IP, ground magnetics and soil geochemistry (Mt Lyell Co: Brophy and Stevens-Hoare, 1976; Sheppard, 1974) and completely by UTEM (BHP: Wilde and Kerr, 1989).

The Tramway Pyrite outcrop, formerly described as a "pyritic tuff" (Sheppard, 1972), actually a pyritic quartz sericite schist, is exposed in an old tramway cutting, is two metres wide and probably has a strike length of no more than 30 m. It outcrops in yellow clay, possibly weathered andesite. Samples reveal up to 0.67 g/t gold (Fig. 29) in good agreement with Sheppard's (1972) figure of 0.7 g/t. Despite this elevated gold, drillhole WS2 which was aimed at intersecting this pyrite at depth evidently was not assayed for gold. WS2 was relogged during this reporting period (Appendix 12, Fig. 30). The hole intersected what is interpreted as two coarsening downward sedimentary cycles. Massive slate at the top becomes laminated with depth and grades into a volcaniclastic sandstone of quartzo-feldspathic debris and conspicuous rip-up clasts of the slate. The transition is by way of an increase in the volume of discrete sandstone beds, suggesting that the cycle is not the product of a single flow event. There is a diffuse (altered) contact with highly altered andesite, probably correlative of the Crown Hill andesite. Locally coarse stumpy euhedral hornblende phenocrysts are preserved in support of this. Both altered andesite and the rocks above it are quite pyritic, with 1-2% disseminated pyrite and chalcopyrite in carbonate veins visible to 100 m downhole depth i.e. over at least 75 m of core. Sporadic assays by the Mt Lyell Co revealed generally low base metal contents (maximum 215 ppm Cu, 100 ppm Pb, 188 ppm Zn).

056




**MT LYELL CO. 25' CHANNEL SAMPLES IN TRENCH**

| Cu | Pb | Zn | Mn |
|---|---|---|---|
| 560 | 400 | 36 | 90 |
| 410 | 560 | 99 | 1130 |
| 365 | 970 | 125 | 4300 |
| 410 | 150 | 90 | 435 |
| 630 | 92 | 128 | 375 |
| 365 | 98 | 41 | 47 |

*RECENT*

*Alluvial fluvial*

*CAMBRIAN*

*'Andesites'*

*Schist with feldspar crystals*

*Mudstone and volcaniclastic sandstone*

0 1:10,000 500 metres

**BHP ROCK CHIP SAMPLES**

| | Cu | Pb | Zn | Ag | Au | Ba | As |
|---|---|---|---|---|---|---|---|
| BX 4744 | 465 | 15 | 40 | 1·0 | 0·675 | 320 | 10 |
| BX 4745 | 5 | <5 | 30 | 1·0 | 0·386 | 610 | 45 |
| BX 4746 | 30 | 70 | 70 | 0·5 | 0·017 | 1600 | <2 |
| BX 4747 | 45 | <5 | 100 | <0·5 | <0·008 | 900 | 3 |
| BX 4748 | 60 | 20 | 105 | <0·5 | <0·008 | 1650 | 6 |
| BX 4749 | 45 | 30 | 85 | 0·5 | 0·032 | 1600 | 2 |
| BX 4750 | 105 | 40 | 265 | 1·0 | 0·04 | 890 | <2 |

Cu, Pb, Zn, Ag - AAS Ba, As - XRF Au - Fire Assay

**FIG. 2 9**

510057

| | | |
|---|---|---|
| Centre: Melbourne | THE BROKEN HILL PROPRIETARY CO. LTD. | Project Nº: B57 |
| Date: 5·3·90 | EL 102/87 QEENSTOWN, TAS. #3 DAM ZONE<br>GEOLOGY & SAMPLE LOCATIONS | Drawing Nº: A4 3044 |

SSW057 510058 NNE

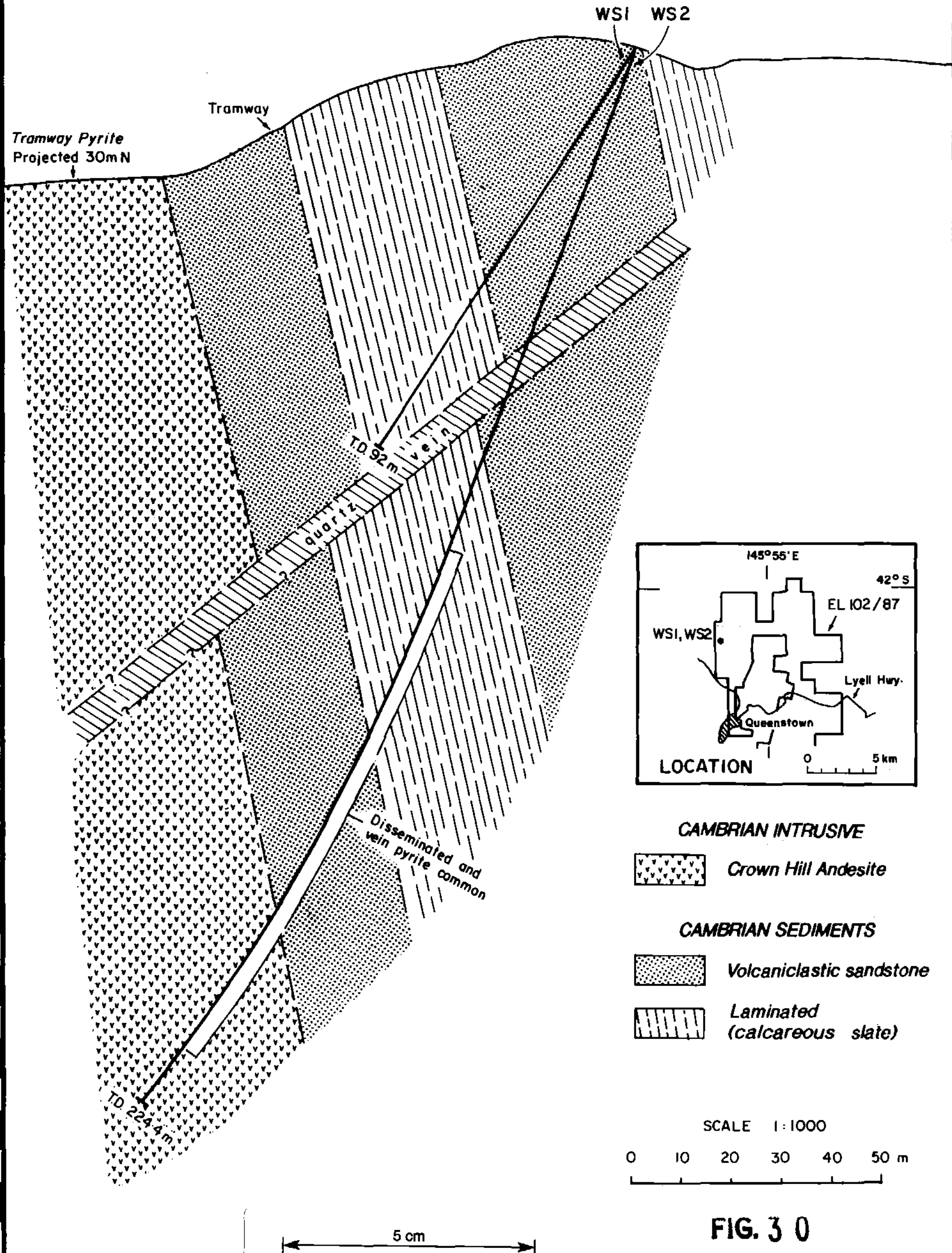



FIG. 30

| Centre: Melbourne | THE BROKEN HILL PROPRIETARY CO. LTD. | Project No: B57 |
|---|---|---|
| Date: 5·3·90 | EL 102/87, QUEENSTOWN TAS.<br>TRAMWAY PYRITE ZONE - SECTION 45,600 N | Drawing No: A4 3046 |

Mineralization and alteration at the margin of the andesite is not uncommon. WS4 (Fig. 2) intersected highly altered and weakly pyritic andesite, close to its outcrop on Zig Zag Hill, where up to 4% pyrite and 0.4% Cu have been recorded (Sheppard, 1972). Semi-massive pyrite lenses have also been described in this area.

Two zones of elevated Pb and Zn in soil occur, north east of the Tramway pyrite, one of which was tested by the Mt Lyell Co with diamond drillhole WS3, and a trench. The northern most of the two soil zones is coincident with an IP chargeability response. WS3 revealed anomalous Pb and Zn with up to 0.11% Zn and 760 ppb Pb, associated with "intermediate tuffs" and "shales", equivalent to the gradational mudstone/sandstone sequence encountered in WS2. Again no assays for gold were carried out (or at any rate reported).

The southern of the two soil anomalies is currently unexplained, outcrop in the area being poor. A maximum of 0.2% Pb and 0.1% Zn was recorded in soils here. The anomaly is elongated along an inferred NW-SE trending fault of probable North Lyell fault age (i.e. Devonian?), and thus may represent structurally controlled mineralization.

In summary, the area is one of substantial hydrothermal alteration and weak pyrite development, with locally strong base metal anomalism. Negative UTEM response is perhaps discouraging, but two powerlines are present in the vicinity of the pyrite zone anomaly, and any massive sulphide here would not have been detected by EM. No previous EM has been attempted. Apart from samples of the Tramway pyrite outcrop, no analyses for gold have been made. It is worthy of note, that due to the rather erratic Mt Lyell sampling pattern neither soil anomaly is closed off to the southeast.

## 4. CONCLUSIONS AND RECOMMENDATIONS

Base metal exploration to date has been unsuccessful, and it remains only to extend TEM coverage into the rest of the prospective sequence in part 2 of the EL and in that part of the Linda Valley (part 1) underlain by Gordon Limestone. Geological mapping will be required in Area 2 to delineate known alteration zones, and to assess the geological significance of any TEM conductors. Should this work, and the re-evaluation of the Nasty Knob Extended UTEM anomaly generate a drill target, this should be drill-tested and the holes logged by TEM and gamma-ray.

Gold exploration has outlined several areas of interest. The Moxon Saddle IP anomaly, given encouragement from rock chip sampling should be drill tested. Several holes, supported by helicopter, would be required.

Several areas of gold anomalism have been defined within area 1, and geochemical follow up is required in order to generate drill targets. The area with the highest priority is the Mt Ellen Mine and environs. Follow up should consist, initially, of infill BLEG and/or panned concentrates, and sampling of adits. Anomalous sub-drainages could then be sampled by a combination of rock chip where outcrop is good and "wacker" bed rock sampling where outcrop is poor. Any targets would be drill tested, and the holes logged with TEM and gamma ray.

Former Mt Lyell Co. drillhole WS2 should be assayed for gold. HFZ2, collared within EL 102/87 but currently held by RGC Exploration, should be acquired and assayed for gold.

Ongoing aeromagnetic and gravity evaluation will be designed to generate conceptual gold and base metal targets. An important part of this work will be the continued acquisition of geophysical rock property data.

REFERENCES

Bird M., 1984: Linda Valley Exploration, June Quarter 1983-84 and Drilling Recommendations. Unpub. Rep. Goldfields Exploration.

Brophy P., Stevens-Hoare N.P., 1976: Annual report EL 41/71 (Henty-Yolande) 1975-76. Unpub. Rep. Mt Lyell Mining and Railway Co.

Howland-Rose A.W., 1977: A report on gradient array reconnaissance EIP and total field magnetometer surveys over the Beatrice grid EL 10/69, near Queenstown, West Coast Tasmania. Unpub. Rep. Scintrex Pty Ltd.

Howland-Rose A.W., 1979: A report on electrical geophysical surveys over the Beatrice grid near Queenstown, Tasmania. Unpub. Rep. Scintrex Pty Ltd.

Loftus-Hills C., 1965: The Linda Valley Zinc Project. Tas. Mines Dept. Rep. TCR65/385

Markham N.L., 1968: Some Genetic Aspects of the Mt Lyell Mineralisation. Min. Deposita, V3, 199-221.

Reid K.O., Meares R.M.D., Walter A.C., Hutton M.J. and Drake G., 1979: Exploration Licence 9/66. Annual Report 1978-79. Unpub. Rep. Mt Lyell Mining and Railway Co.

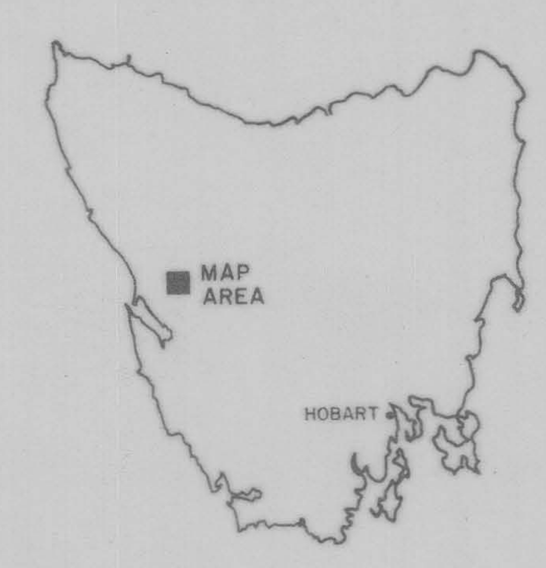
Sheppard N.W., 1972: Annual Report on EL 41/71 Henty-Yolande Area 1971-72. Unpub. Rep. Mt Lyell Mining and Railway Co.

Sheppard N.W., 1974: Annual Report on EL 41/71 (Henty-Yolande Area) 1973-74. Unpub. Rep. Mt Lyell Mining and Railway Co.

Street G.J., 1980: A report on EIP detail and magnetic surveys over the Beatrice grid near Queenstown, Tasmania. Unpub. Rep. Scintrex Pty Ltd.

Twelvetrees W.H., 1900: Report on the Mineral Districts of Mounts Huxley, Jukes and Darwin. Report of the Tasmanian Mines Dept. 109-144.

Wilde A.R. and Kerr T.L., 1989: Exploration Licence 102/87, Annual Report for 1988-1989. Unpub. Rep. to the Tasmanian Mines Dept.


979/0.90 (1.0) — Sample location and number (prefixed BX4) with BLEG Au results in ppb and duplicate analyses by fire assay (brackets)

× — Alluvial workings (abandoned)

⚒ — Hard-rock mine/(abandoned) or prospect

BLEG V CARBON ROD RESULTS

| PPB | BLEG | CARBON ROD |
|---|---|---|
| BX 4762 | <0·05 | 2·00 |
| BX 4763 | 0·15 | 1·00 |
| BX 4764 | 1·10 | 2·00 |
| BX 4765 | 0·50 | 3·00 |
| BX 4766 | 1·50 | 3·00 |
| BX 4767 | 0·05 | 1·00 |
| BX 4768 | 0·10 | 1·00 |
| BX 4769 | 0·05 | 1·00 |
| BX 4770 | 0·25 | 3·00 |
| BX 4771 | 1·55 | <1·00 |
| BX 4772 | <0·05 | 1·00 |
| BX 4780 | 0·15 | 65·00 |
| BX 4787 | 0·20 | 1·00 |
| BX 4788 | 0·25 | 3·00 |

510063

G.S. 33841-96

90-3102 1

Scale 1:25000

0 500 1000 1500 2000 2500 metres

5 cm

FIG. 3

**BHP-Utah Minerals International**
Asia Pacific Division - Exploration Department

**EL 102/87, QUEENSTOWN, TASMANIA**
**REGIONAL DRAINAGE CHEMISTRY, AREA 1**
**SAMPLE LOCATIONS & GOLD RESULTS (ppb)**

| | | |
|---|---|---|
| Prepared: A. Wilde | Date: 13·3·90 | Centre: Melbourne |
| Drawn: M. Rosker | Project No.: B57 | Fig |
| Checked: A. Wilde | Drawing No AI-2403 | |


**FIG. 7**

BHP-Utah Minerals International
Asia Pacific Division - Exploration Department

**EL 102/87, QUEENSTOWN, TAS.**
**BEATRICE–COMSTOCK AREA**
**INTERPRETED GEOLOGY**

| Revisions: | | | |
|---|---|---|---|
| | Prepared: A. Wilde | Date: 19·3·90 | Centre: Melbourne |
| | Drawn: C. Osborne | Project Nº: B57 | Drawing Nº: A1-2401 |
| | Checked: | | |


064
382000 mE
5349000 mN
EL 102/87
Mt. Sedgwick
BEATRICE GRID
WEST COMSTOCK GRID
COMSTOCK VALLEY GRID
WC1
WC2
WC3
WC4
BT1
BT2
BT3
BT4
MS1
MS2
MS3
MS4
MS5
BEATRICE PROSPECT
C50
C54
C51
C49
Tasman & Crown Lyell Extended shaft
Comstock
Cape Horn
Mt. Lyell
90-3102
UTEM ANOMALIES
Weak conductor
Strong conductor
Weak conductor position migrates from UTEM Channel 7 to UTEM Channel 5
510065
Grid pegs (25m spacing)
Drillhole location and number
Four wheel drive track
Walking track
Old tramway
Outline of opencut
Lake
Note The West Comstock and Beatrice grids are old Mt Lyell Co./ Goldfields Exploration grids which were re-opened and re-pegged. Peg locations were surveyed by compass and tape. The West Comstock baseline was surveyed by theodolite by Goldfields Exploration and it's position has been plotted from old Goldfields Exploration plans. There is some discrepancy between the plotted position of the Beatrice Grid and that which appears on old Mt Lyell plans, which may be due to the fact that the old Lyell grid was not slope-corrected
SCALE 1:10 000
0 500 1000 1500 metres
FIG. 8
BHP-Utah Minerals International
EL 102/87, QUEENSTOWN, TAS.
BEATRICE-COMSTOCK AREA
1989 UTEM SURVEY
LOOP LOCATION & ANOMALY PLAN
Prepared N. Rist
Drawn C. Osborne
Checked
Date 13-3-90
Project No 857
Centre Melbourne
Drawing No A1-2391

9310


Grid pegs (25m spacing)

C49 Drillhole location and number

Four wheel drive track

Walking track

Old tramway

Outline of opencut

Lake

Margin of lst as indicated by Sirotem Survey - Stage 1

Margin of lst as intersected at depth in DDH C54, C51, C49

SIROTEM - STAGE 1

moderate conductor

weak conductor

FIG. 9

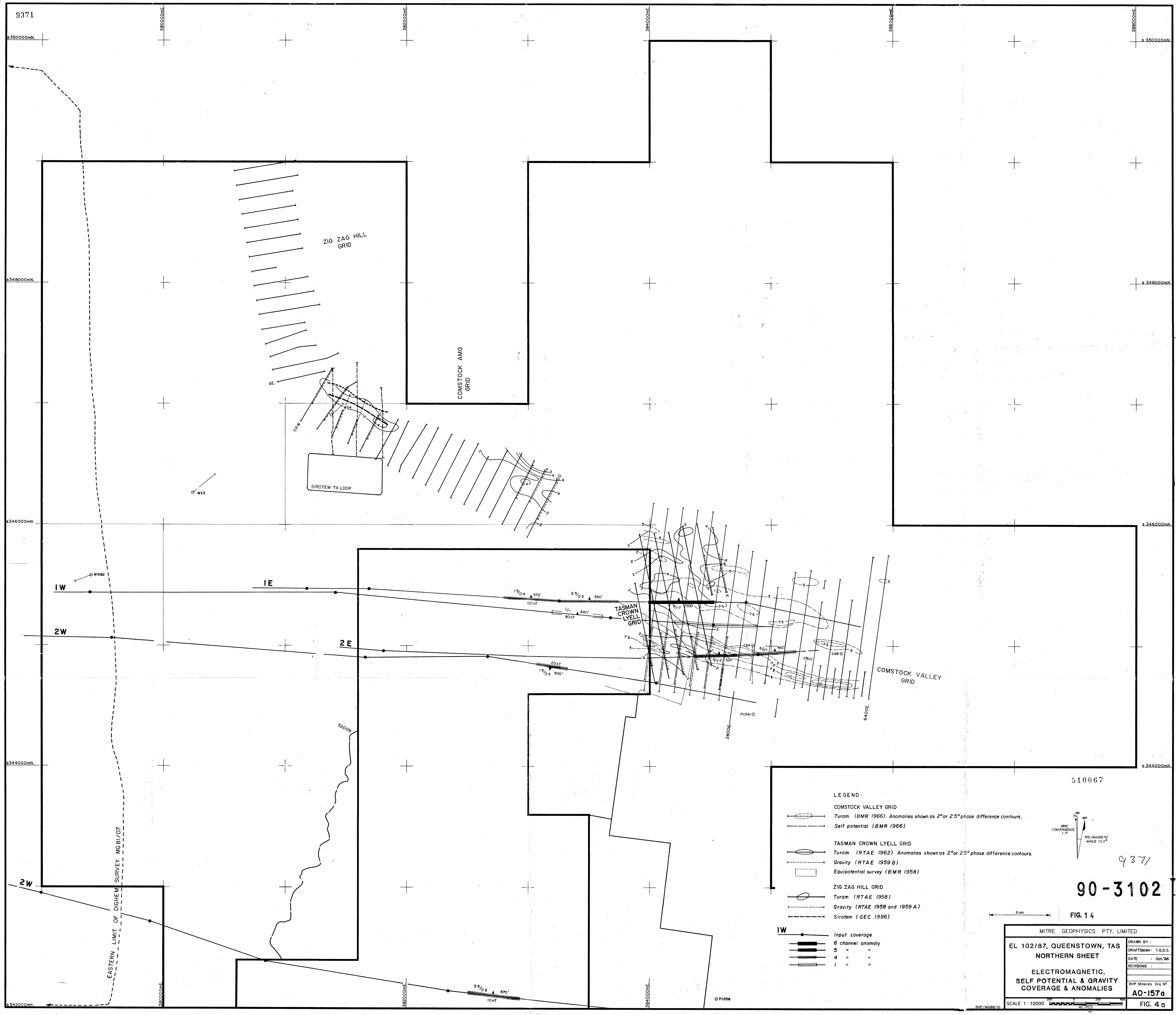
BHP-Utah Minerals International
Asia Pacific Division - Exploration Department

EL 102/87, QUEENSTOWN, TAS.
BEATRICE-COMSTOCK AREA
SIROTEM LOOPS & DOWNHOLE SIROTEM LOOPS
INTERPRETATION-STAGE 1

| | | |
|---|---|---|
| Prepared T. Kerr | Date March 90 | Centre Melbourne |
| Drawn P. Digney | Project No | Drawing No |
| Checked | B57 | A1-2402 |

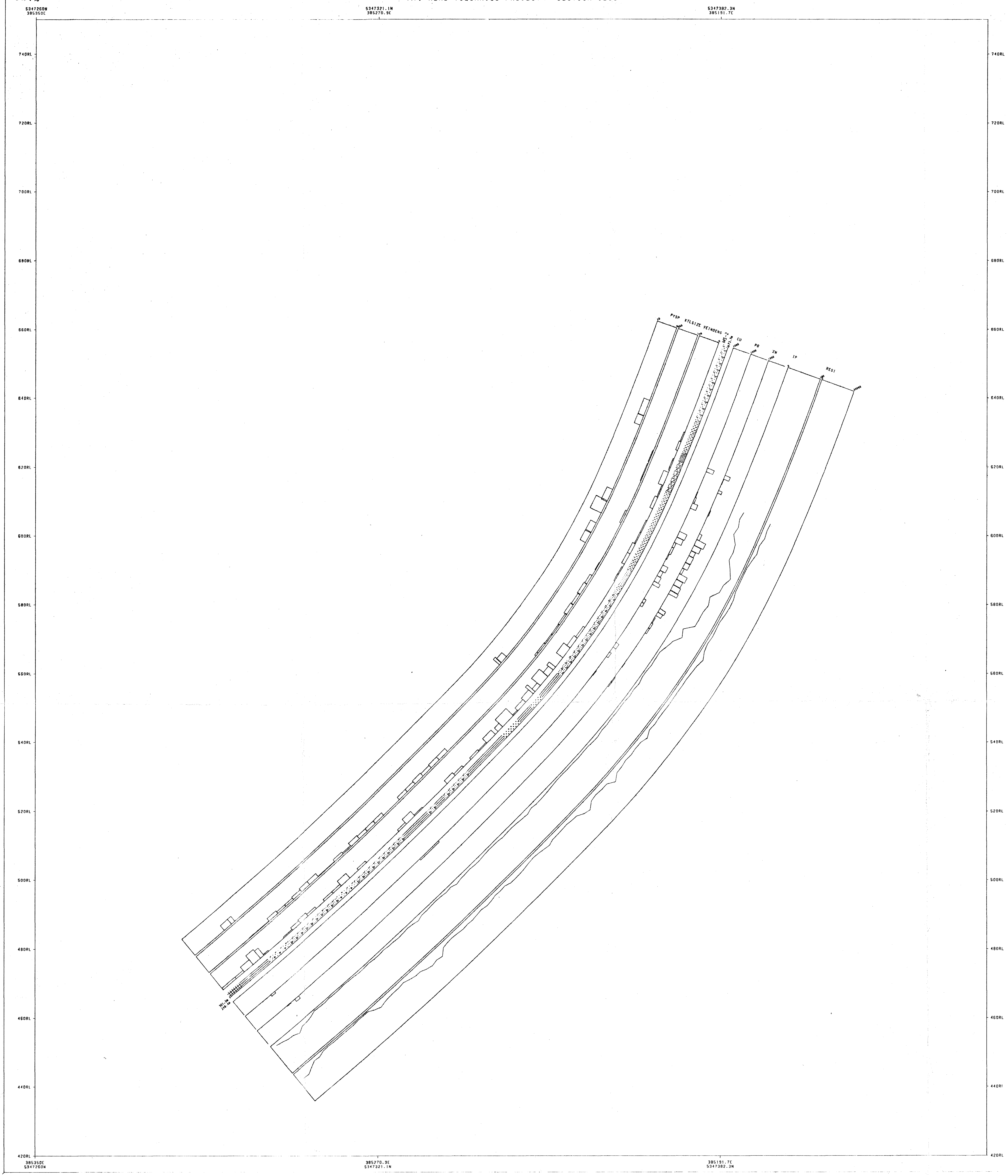
Revisions

9371


6350000mN.
6348000mN.
6346000mN.
6344000mN.
6342000mN.
380000mE.
382000mE.
384000mE.
386000mE.
388000mE.
ZIG ZAG HILL GRID
COMSTOCK AMG GRID
SIROTEM TX LOOP
WS3
WS4
WS1&2
1W
1E
2W
2E
TASMAN CROWN LYELL GRID
COMSTOCK VALLEY GRID
EASTERN LIMIT OF DIGHEM SURVEY MG 81/07
5200N
2800E
6400E
PC541
PC556
510067
LEGEND
COMSTOCK VALLEY GRID
Turam (BMR 1966). Anomalies shown as 2° or 2·5° phase difference contours.
Self potential (BMR 1966)
TASMAN CROWN LYELL GRID
Turam (RTAE 1962) Anomalies shown as 2° or 2·5° phase difference contours.
Gravity (RTAE 1959 B)
Equipotential survey (BMR 1958)
ZIG ZAG HILL GRID
Turam (RTAE 1958)
Gravity (RTAE 1958 and 1959 A)
Sirotem (GEC 1986)
1W Input coverage
6 channel anomaly
5 " "
4 " "
1 " "
GN
TN
MN
GRID CONVERGENCE 1.1°
GRID/MAGNETIC ANGLE 12.0°
9371
90-3102
5 cm
FIG. 14
MITRE GEOPHYSICS PTY. LIMITED
EL 102/87, QUEENSTOWN, TAS
NORTHERN SHEET
ELECTROMAGNETIC, SELF POTENTIAL & GRAVITY COVERAGE & ANOMALIES
DRAWN BY :
DRAFTSMAN : T.G.D.S.
DATE : Oct.'88
REVISIONS :
BHP Minerals Drg No
AO-157a
SCALE 1 : 10000
METRES
FIG. 4a
BHP/MG88/10

9372

# MT. READ VOLCANICS PROJECT - SECTION 1200




SAMPLE BASED RESULTS:

1000 50000+ CU AAS? pct

1000 50000+ PB AAS? pct

1000 50000+ ZN AAS? pct

GEOLOGICAL INTERVAL BASED RESULTS:

0 20+ VEINDENS VISUAL m

1 250+ XTLSIZE VISUAL mm

0 10+ PYSP VISUAL PCT

ROCK1:

- Overburden
- Massive slate
- Clay
- Sedewick porphyry
- Sandstone
- Pumiceous Breccia
- Quartz Mica Rock
- Quartzite
- Crystal Breccia
- Chert

DRILLHOLE SYMBOLS:

- Drillhole collar

510068

5 cm

90-3102

FIG. 17

BHP-UTAH Minerals International

MT. READ VOLCANICS PROJECT

EL102/87 QUEENSTOWN TASMANIA

SECTION 1200N DRILLHOLE MS-2

Rocktype patterns Cu Zn Pb histograms

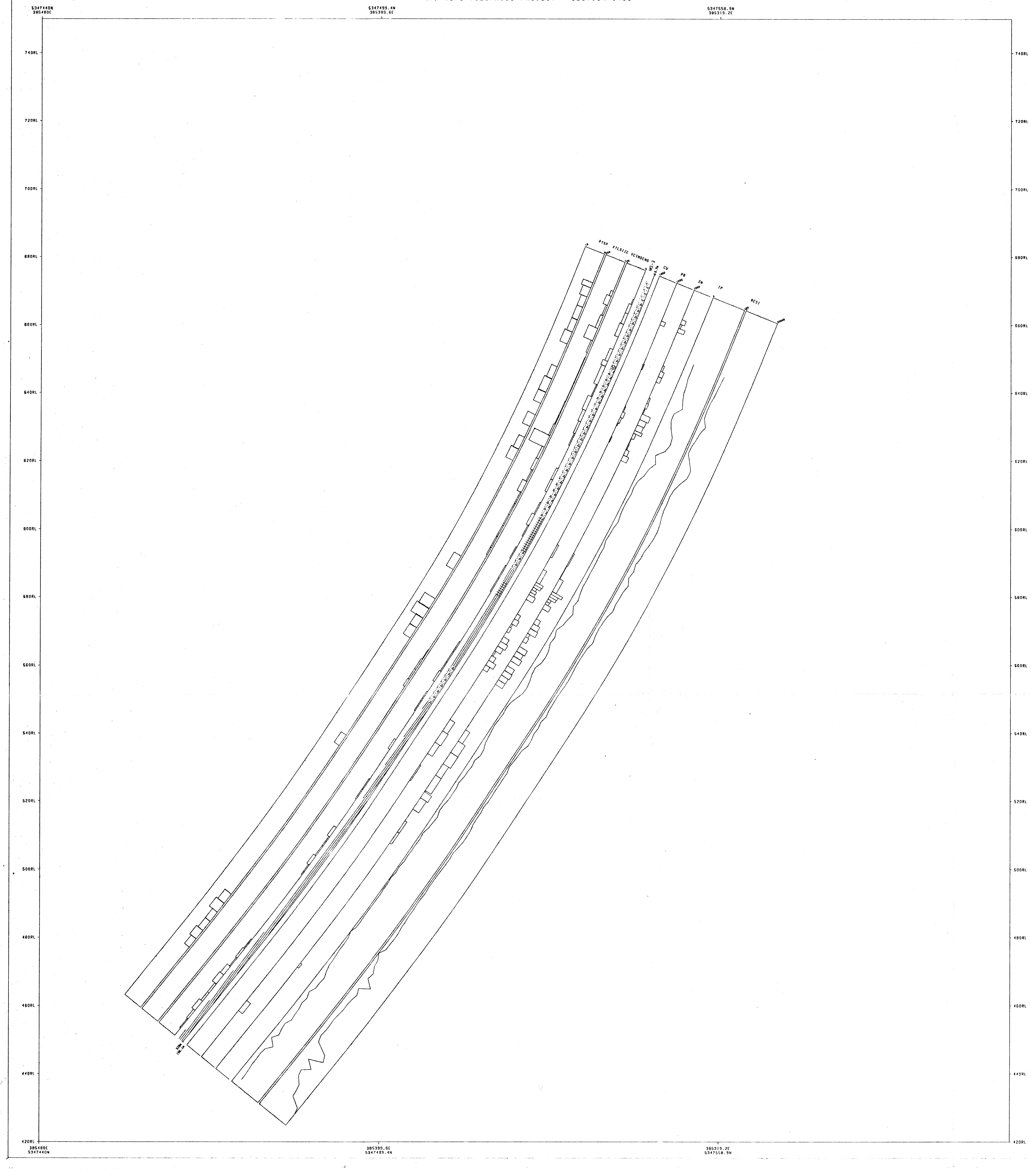
Resistivity IP Conductivity Logs

Pyrite Sphalerite Crystal Size

| | | |
|---|---|---|
| DATE: 2-MAR-90 | Compiled by KLB | BHP-UTAH MINERALS INTERNATIONAL ASIA PACIFIC DIVISION EXPLORATION DEPARTMENT |
| SCALE: 1:500 | | |

9373

MT. READ VOLCANICS PROJECT - SECTION 1400




SAMPLE BASED RESULTS:

1000 50000+ 1000 50000+ 1000 50000+

CU AAS? pct — PB AAS? pct — ZN AAS? pct

GEOLOGICAL INTERVAL BASED RESULTS:

0 20+ 1 250+ 0 10+

VEINDENS VISUAL m — XTLSIZE VISUAL mm — PYSP VISUAL PCT

ROCK1:

- Overburden
- Pumiceous Breccia
- Marble
- Chert
- Quartz Mica Rock

DRILLHOLE SYMBOLS:

- Drillhole collar

90-3102

510069

FIG. 18

BHP-UTAH Minerals International

MT. READ VOLCANICS PROJECT

EL102/87 QUEENSTOWN TASMANIA

SECTION 1400N DRILLHOLE MS-3

Rocktype patterns Cu Zn Pb histograms

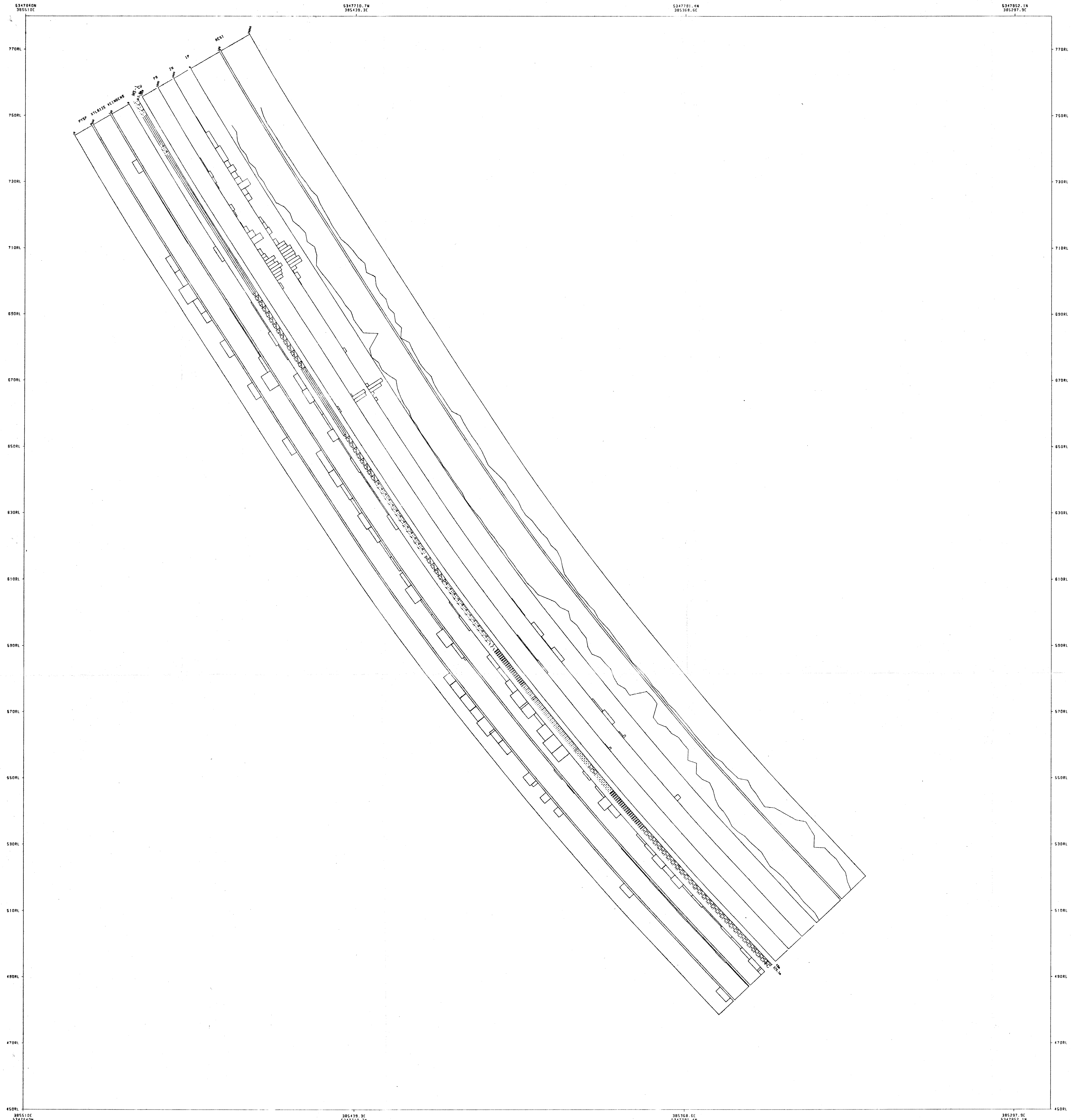
Resistivity IP Conductivity Logs

Pyrite Sphalerite Crystal Size

| | | |
|---|---|---|
| DATE: 2-MAR-90 | Compiled by KLB | BHP-UTAH MINERALS INTERNATIONAL ASIA PACIFIC DIVISION EXPLORATION DEPARTMENT |
| SCALE: 1:500 | | |

9374

MT. READ VOLCANICS PROJECT - SECTION 1600




SAMPLE BASED RESULTS:

| | | |
|---|---|---|
| 1000 — 50000+ | 1000 — 50000+ | 1000 — 50000+ |
| CU AAS? ppm | PB AAS? ppm | ZN AAS? ppm |

GEOLOGICAL INTERVAL BASED RESULTS:

| | | |
|---|---|---|
| 0 — 20+ | 1 — 250+ | 0 — 10+ |
| VEINDENS VISUAL m | XTLSIZE VISUAL mm | PYSP VISUAL PCT |

ROCK1:

- Overburden
- Quartz Mica Rock
- Pumiceous Breccia
- Lithic Breccia
- Schist
- Laminated slate
- Siltstone
- Clay
- Massive slate
- Sedewick porphyry

DRILLHOLE SYMBOLS:

- Drillhole collar

510070

**90-3102**

5 cm

**FIG. 19**

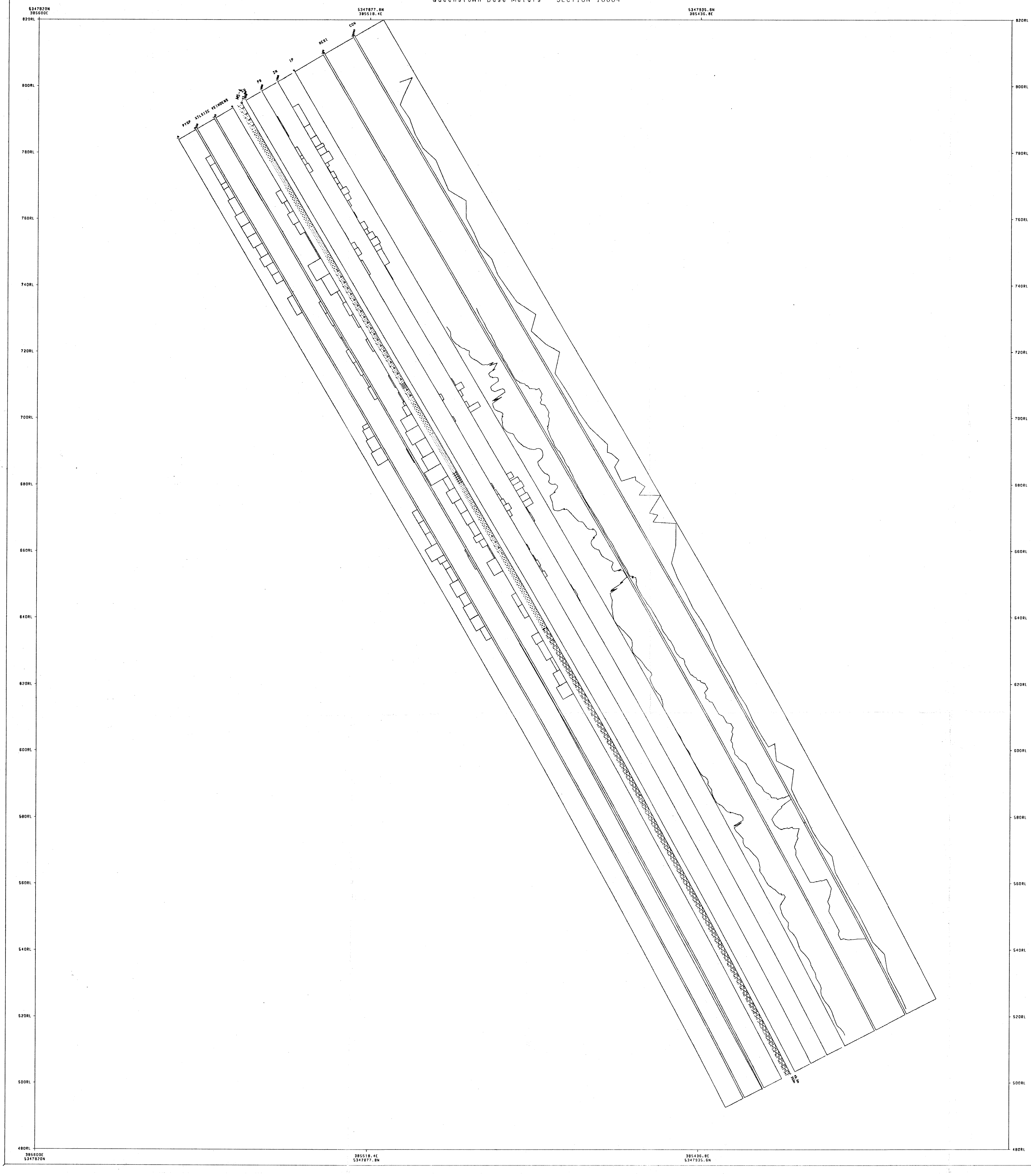
BHP-UTAH Minerals International
MT. READ VOLCANICS PROJECT

EL102/87 QUEENSTOWN TASMANIA
SECTION 1600N DRILLHOLE MS-1
Rocktype patterns Cu Zn Pb histograms
Resistivity IP Conductivity Logs
Pyrite Sphalerite Crystal Size

| | | |
|---|---|---|
| DATE: 2-MAR-90 | Compiled by KLB | BHP-UTAH MINERALS INTERNATIONAL ASIA PACIFIC DIVISION EXPLORATION DEPARTMENT |
| SCALE: 1:500 | | |

9375

Queenstown Base Metals - SECTION 18004




SAMPLE BASED RESULTS:

1000 50000+ 1000 50000+ 1000 50000+

CU AAS? pct | PB AAS? pct | ZN AAS? pct

GEOLOGICAL INTERVAL BASED RESULTS:

0 20+ 1 250+ 0 10+

VEINDENS VISUAL m | XTLSIZE VISUAL mm | PYSP VISUAL PCT

ROCK1:

- Overburden
- Massive slate
- Sandstone
- Pumiceous Breccia
- Fault gouge
- Chert
- Siltstone
- Sedewick porphyry

DRILLHOLE SYMBOLS:

- Drillhole collar

510071

90-3102

5 cm

FIG. 2 0

BHP-UTAH Minerals International

MT READ VOLCANICS PROJECT

EL102/87 QUEENSTOWN TASMANIA

SECTION 1800N DRILLHOLE MS-4

Rocktype patterns Cu Zn Pb histograms

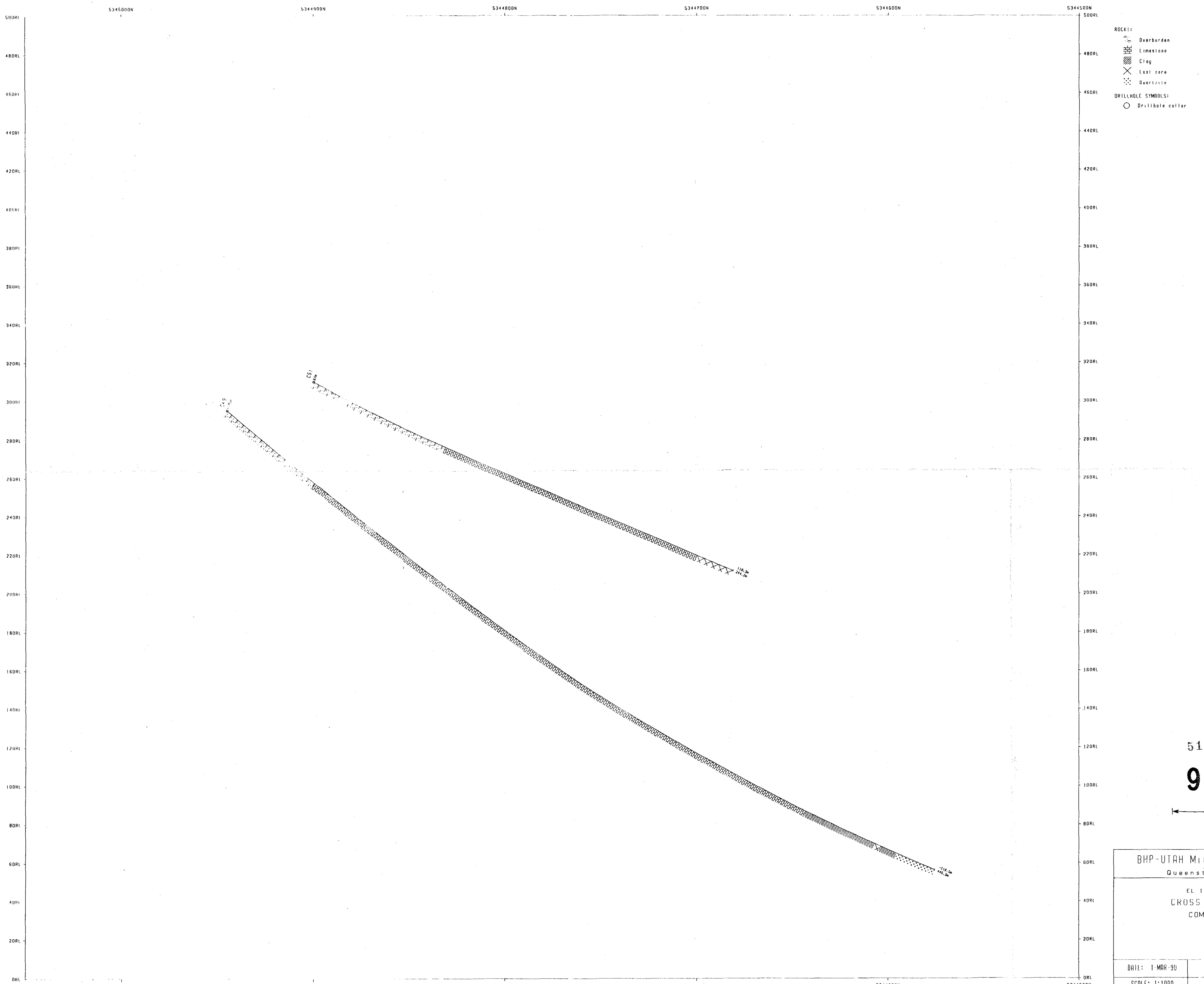
Resistivity IP Conductivity Logs

Pyrite Sphalerite Crystal Size

| | | |
|---|---|---|
| DATE: 6-MAR-90 | Compiled by KLB | BHP-UTAH MINERALS INTERNATIONAL ASIA PACIFIC DIVISION EXPLORATION DEPARTMENT |
| SCALE: 1:500 | | |

9376

Queenstown Base Metals - SECTION 385400 EAST




510072

90-3102

5 cm

FIG. 21

BHP-UTAH Minerals International
Queenstown Base Metals

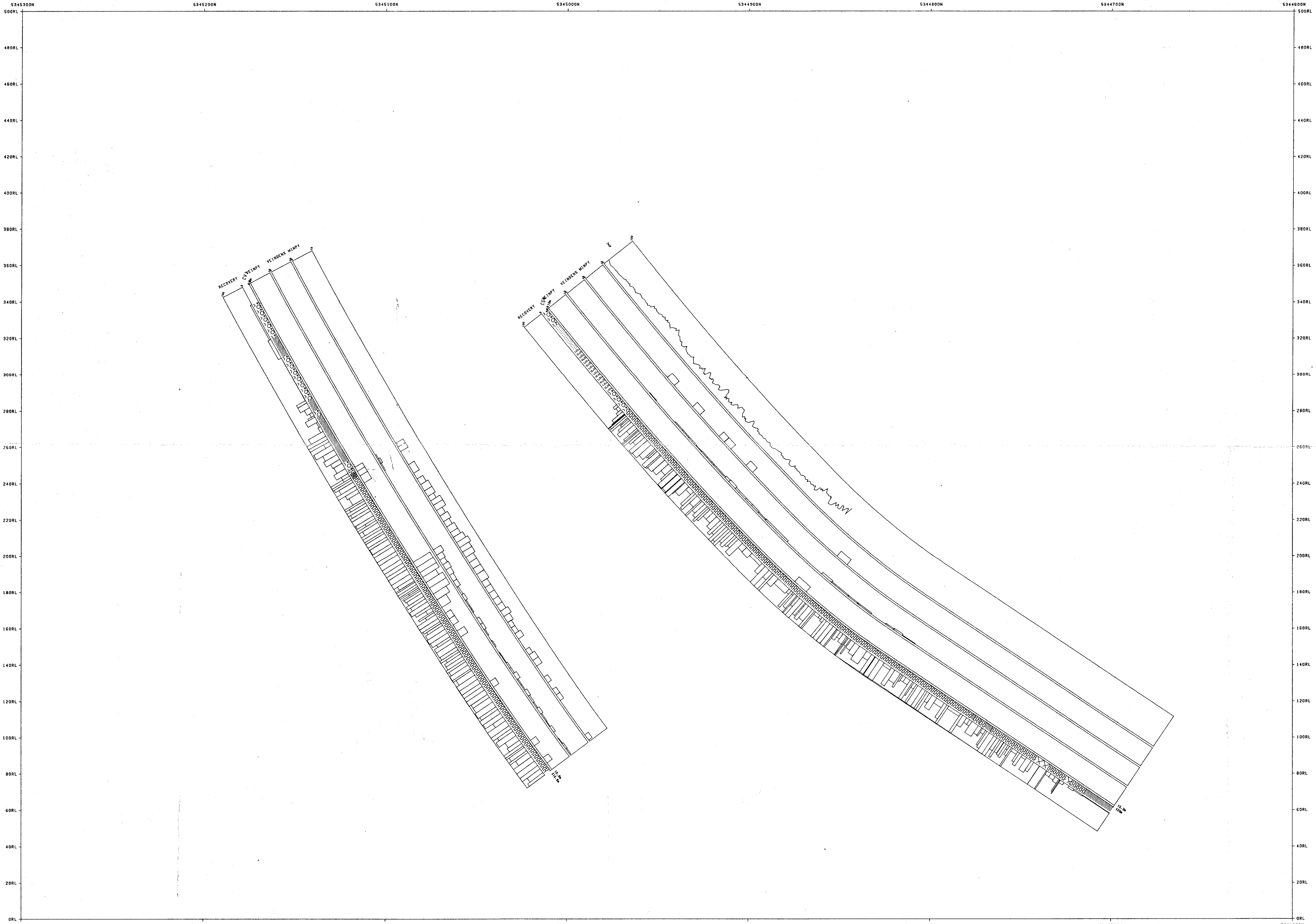
EL 102/87 QUEENSTOWN
CROSS SECTION 5400E
COMSTOCK VALLEY

DATE: 1-MAR-90
SCALE: 1:1000
Compiled by KLB

BHP-UTAH MINERALS INTERNATIONAL
ASIA PACIFIC DIVISION
EXPLORATION DEPARTMENT

9377

MT READ VOLCANICS PROJECT - SECTION 384850 EAST




GEOLOGICAL INTERVAL BASED RESULTS:

| 0 — 40+ | 0 — 10+ | 0 — 10+ | 0 — 100+ |
|---|---|---|---|
| VEINDENS VISUAL m | VEINPY VISUAL | MINPY VISUAL pct | RECOVERY VISUAL PCT |

ROCK1:

- Conglomerate
- Sandstone
- Mudstone
- Limestone
- Clay
- Lost core

DRILLHOLE SYMBOLS:

- Drillhole collar

510073

90-3102

5 cm

FIG. 2 2

BHP-UTAH Minerals International

MT READ VOLCANICS PROJECT

.EL 102/87 QUEENSTOWN

CROSS SECTION 4850E

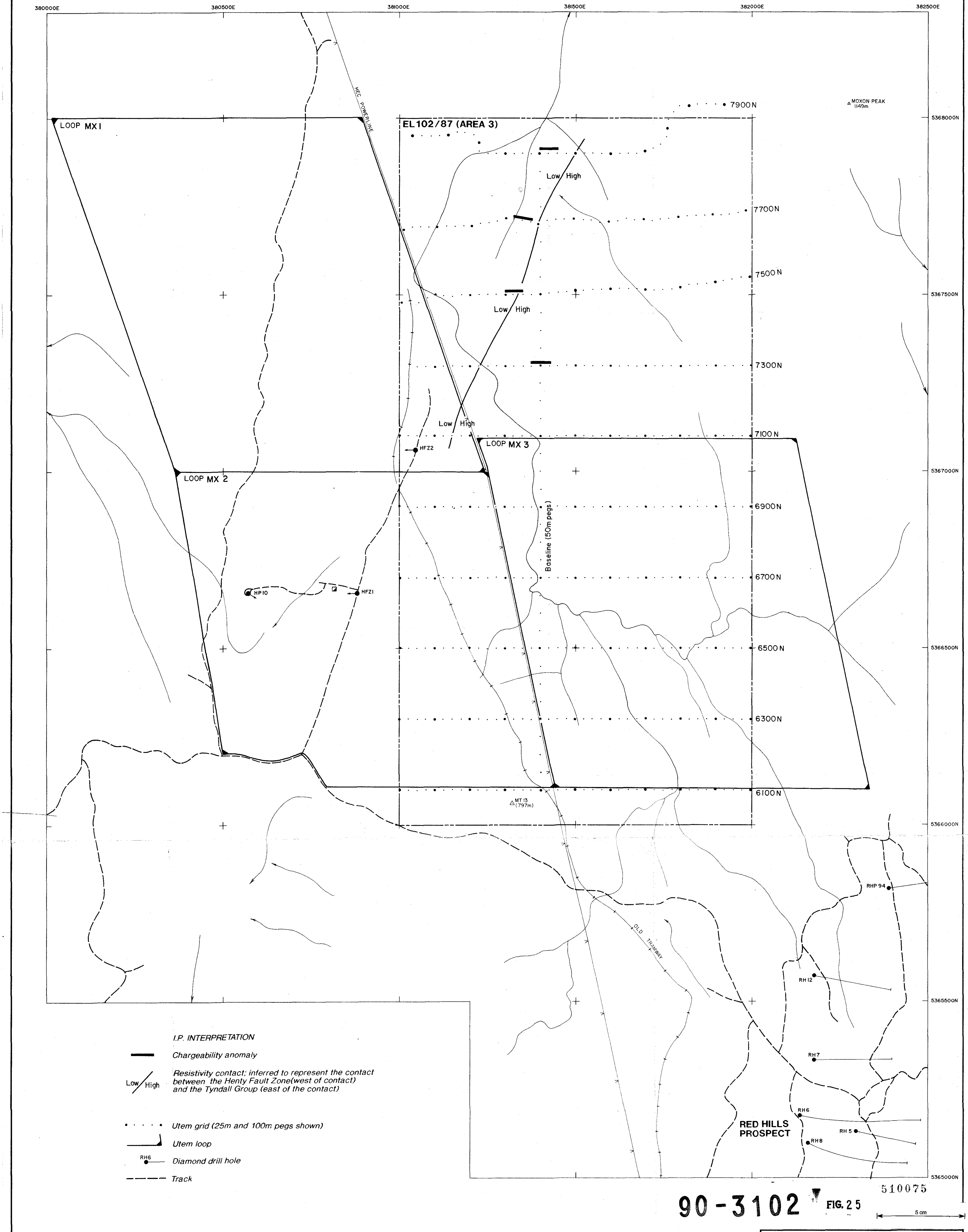
COMSTOCK VALLEY

| DATE: 14-MAR-90 | Compiled by KLB | BHP-UTAH MINERALS INTERNATIONAL ASIA PACIFIC DIVISION EXPLORATION DEPARTMENT |
|---|---|---|
| SCALE: 1:1000 | | |

9378

380000E
380500E
381000E
381500E
382000E
382500E
5368000N
5367500N
5367000N
5366500N
5366000N
5365500N
5365000N
EL102/87 (AREA 3)
HENTY FAULT ZONE
HEC POWERLINE
MOXON PEAK 1149m
MT 13 (797m)
TRACK
OLD TRAMWAY
HFZ2
HFZ1
HP10
15m at 1·2% Cu in trench
76m at 0·11% Cu Incl. 2m at 0·6% Cu
RHP 94
RH12
RH7
RH6
RH5
RH8
RED HILLS PROSPECT
€cv
€d
€p
€rp
€vc
€o
€ss
Qg
QUATERNARY
Qg Glacial deposits, mainly till
CAMBRO-ORDOVICIAN
€o DENISON GROUP; sandstone and conglomerate (Owen Conglomerate)
CAMBRRIAN
€rp PORPHYRITIC LAVA; with feldspar and quartz phenocrysts, flow banded in places and autobrecciated
€vc FELSIC PYROCLASTIC · ROCKS; mineralised horizons at Red Hills shown (projected to surface from drill holes)
€ss SEDIMENTS; slate, sandstone
€cv CENTRAL VOLCANIC SEQUENCE; contains basalt and breccia. Large part unmapped
INTRUSIVES
€p ? CAMBRIAN; spherulitic felsic porphyry
€d ? CAMBRIAN; dolerite
Geological boundary
Fault
Dip and strike of bedding
Dip and strike of foliation
RH7 Diamond drill hole
Scale 1:5000
0 100 200 300 400 500 metres
5 cm
LOCATION
Burnie
EL 102/87 (Area 3)
Queenstown
HOBART
510074
90-3102
BHP-Utah Minerals International
Asia Pacific Division - Exploration Department
EL102/87, QUEENSTOWN, TASMANIA
AREA 3 (MOXON SADDLE)
GEOLOGY
GEOLOGY TAS. MINES DEPT. & GOLDFIELDS EXPL.
Prepared: A. Wilde
Date: March 90
Centre: Melbourne
Drawn: M. Rosker
Project No.: B57
Checked: A. Wilde
Drawing No.: A1-2404


FIG. 2 4




90-3102 FIG. 25

510075

BHP-Utah Minerals International
Asia Pacific Division - Exploration Department

EL102/87, QUEENSTOWN, TASMANIA
AREA 3 (MOXON SADDLE)

**UTEM GRID, LOOP LOCATIONS & I.P. ANOMALIES**

| | | |
|---|---|---|
| Prepared: T. Kerr | Date: March 90 | Centre: Melbourne |
| Drawn: M. Rosker | Project No.: 857 | |
| Checked: T. Kerr | Drawing No.: A1-2405 | |

069

510076

CR 6939

EXPLORATION LICENCE 102/87

REPORT FOR THE YEAR ENDED

21ST APRIL 1990

APPENDICES



1315r

APPENDIX 1

Stream Sediment Geochemical Data

.067

# ANALABS

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

510078

## ANALYTICAL DATA

| SAMPLE PREFIX | REPORT NUMBER | REPORT DATE | CLIENT ORDER No. | PAGE |
|---|---|---|---|---|
| | 14.4.08.06852 | 16/02/90 | 005614 | 1 OF 1 |

| TUBE No. | SAMPLE No. | Cu | Pb | Zn | Fe | Mn | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BX4962 | 20 | 20 | 35 | 8650 | 40 | | | | |
| 2 | BX4963 | 25 | 35 | 55 | 8470 | 210 | | | | |
| 3 | BX4964 | 35 | 15 | 40 | 11400 | 135 | | | | |
| 4 | BX4965 | 20 | 10 | 30 | 5350 | 50 | | | | |
| 5 | BX4966 | 20 | 35 | 60 | 8490 | 130 | | | | |
| 6 | BX4967 | 15 | <5 | 110 | 7150 | 55 | | | | |
| 7 | BX4969 | 80 | 70 | 115 | 13600 | 230 | | | | |
| 8 | BX4970 | 20 | 5 | 360 | 11100 | 20 | | | | |
| 9 | BX4972 | 25 | 20 | 60 | 2750 | 20 | | | | |
| 10 | BX4973 | 15 | 15 | 30 | 6350 | 30 | | | | |
| 11 | BX4974 | 15 | 40 | 70 | 10700 | 105 | | | | |
| 12 | BX4975 | 5 | 10 | 35 | 4000 | 30 | | | | |
| 13 | BX4976 | 15 | 25 | 40 | 7450 | 50 | | | | |
| 14 | | | | | | | | | | |
| 15 | | | | | | | | | | |
| 16 | | | | | | | | | | |
| 17 | | | | | | | | | | |
| 18 | | | | | | | | | | |
| 19 | | | | | | | | | | |
| 20 | | | | | | | | | | |
| 21 | | | | | | | | | | |
| 22 | | | | | | | | | | |
| 23 | DETECTION | 5 | 5 | 5 | 5 | 5 | | | | |
| 24 | UNITS | ppm | ppm | ppm | ppm | ppm | | | | |
| 25 | METHOD | 101 | 101 | 101 | 101 | 101 | | | | |

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 ____________

510079

# ANALABS

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

## ANALYTICAL DATA

| SAMPLE PREFIX | REPORT NUMBER | REPORT DATE | CLIENT ORDER No. | PAGE |
|---|---|---|---|---|
| | 14.4.08.06737 | 28/12/89 | 11199 | 1 OF 1 |

| TUBE No. | SAMPLE No. | Cu | Pb | Zn | Fe | Mn | Au | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BX4772 | 60 | 360 | 190 | 19500 | 7000 | 0.001 | | | |
| 2 | BX4773 | 35 | 40 | 65 | 9750 | 300 | — | | | |
| 3 | BX4774 | 30 | 20 | 85 | 13500 | 225 | — | | | |
| 4 | BX4775 | 15 | 10 | 15 | 5500 | 70 | — | | | |
| 5 | BX4776 | 10 | 10 | 10 | 2950 | 40 | — | | | |
| 6 | BX4777 | 45 | 120 | 155 | 21800 | 2550 | — | | | |
| 7 | BX4779 | 25 | 45 | 30 | 5750 | 80 | — | | | |
| 8 | BX4780 | 50 | 20 | 200 | 13000 | 195 | 0.065 | | | |
| 9 | BX4782 | 25 | 30 | 35 | 8250 | 140 | — | | | |
| 10 | BX4783 | 35 | 30 | 40 | 9950 | 185 | — | | | |
| 11 | BX4784 | 40 | 70 | 85 | 15000 | 560 | — | | | |
| 12 | BX4786 | 65 | 225 | 170 | 16700 | 4900 | — | | | |
| 13 | BX4787 | 35 | 40 | 50 | 2700 | 50 | 0.001 | | | |
| 14 | BX4788 | 320 | 390 | 2100 | 49600 | 390 | 0.003 | | | |
| 15 | BX4789 | 375 | 425 | 1400 | 61000 | 380 | 0.011 | | | |
| | | | | | | | | | | |
| 17 | | | | | | | | | | |
| 18 | | | | | | | | | | |
| 19 | | | | | | | | | | |
| 20 | | | | | | | | | | |
| 21 | | | | | | | | | | |
| 22 | | | | | | | | | | |
| 23 | DETECTION | 5 | 5 | 5 | 5 | 5 | 0.001 | | | |
| 24 | UNITS | PPM | PPM | PPM | PPM | PPM | PPM | | | |
| 25 | METHOD | 101 | 101 | 101 | 101 | 101 | 336 | | | |

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

068

# ANALABS

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

QUEENSTOWN REGION ... 
510080

## ANALYTICAL DATA

| SAMPLE PREFIX | REPORT NUMBER | REPORT DATE | CLIENT ORDER No. | PAGE |
|---|---|---|---|---|
| | 14.4.08.06703 | 13/12/89 | 11198 | 1 OF 1 |

| TUBE No. | SAMPLE No. | Cu | Pb | Zn | Fe | Mn | Au | AuChk | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BX4755 | 25 | 40 | 65 | 7500 | 25 | – | – | | |
| 2 | BX4756 | 60 | 90 | 530 | 9650 | 20 | – | – | | |
| 3 | BX4757 | 20 | 25 | 75 | 22800 | 240 | – | – | | |
| 4 | BX4758 | 60 | 40 | 80 | 25500 | 280 | – | – | | |
| 5 | BX4759 | 40 | 60 | 45 | 15400 | 150 | – | – | | |
| 6 | BX4760 | 40 | 75 | 110 | 30100 | 1450 | – | – | | |
| 7 | BX4761 | 10 | 10 | 20 | 3750 | 40 | – | – | | |
| 8 | BX4762 | 10 | 10 | 20 | 3400 | 30 | 0.002 | – | | |
| 9 | BX4763 | 35 | 230 | 95 | 34800 | 3830 | 0.001 | – | | |
| 10 | BX4764 | 75 | 500 | 550 | 32200 | 8350 | 0.002 | – | | |
| 11 | BX4765 | 135 | 290 | 500 | 38700 | 170 | 0.003 | – | | |
| 12 | BX4766 | 15 | 25 | 120 | 6650 | 70 | 0.003 | – | | |
| 13 | BX4767 | 50 | 30 | 50 | 4850 | 45 | 0.001 | – | | |
| 14 | BX4768 | 25 | 35 | 60 | 15100 | 85 | 0.001 | – | | |
| 15 | BX4769 | 20 | 30 | 75 | 5000 | 45 | 0.001 | – | | |
| 16 | BX4770 | 100 | 70 | 45 | 16600 | 180 | 0.003 | – | | |
| 17 | BX4771 | 70 | 90 | 100 | 13900 | 145 | <0.001 | <0.001 | | |
| 18 | BX4951 | 30 | 35 | 75 | 4200 | 40 | 0.001 | – | | |
| 19 | | | | | | | | | | |
| 20 | | | | | | | | | | |
| 21 | | | | | | | | | | |
| 22 | | | | | | | | | | |
| 23 | DETECTION | 5 | 5 | 5 | 5 | 5 | 0.001 | 0.001 | | |
| 24 | UNITS | ppm | ppm | ppm | ppm | ppm | PPM | PPM | | |
| 25 | METHOD | 101 | 101 | 101 | 101 | 101 | 336 | 336 | | |

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 2

Geophysical Survey Specifications

UTEM DATA PLOTTING SPECIFICATIONS

| SYMBOL | CHANNEL NUMBER | NOMINAL TIME WINDOWS (for a base frequency of 26.23Hz) START (ms) | CENTRE (ms) | END (ms) |
|---|---|---|---|---|
| ◇ | 10 | .018 | .027 | .036 |
| △ | 9 | .036 | .054 | .072 |
| ⧖ | 8 | .072 | .108 | .144 |
| 7 | 7 | .144 | .216 | .288 |
| ∡ | 6 | .288 | .432 | .576 |
| Σ | 5 | .576 | .864 | 1.152 |
| □ | 4 | 1.152 | 1.73 | 2.304 |
| \ | 3 | 2.304 | 3.46 | 4.608 |
| / | 2 | 4.608 | 6.91 | 9.216 |
| \| | 1 | 9.216 | 13.82 | 18.43 |

All channels are plotted as :

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

For continuously normalised plots:

reference = primary (for channel 1)
= channel 1 (for all other channels)

base = primary field (total) at reading station

For point normalised plots:

reference = primary (for channel1)
= channel 1 (for all other channels)

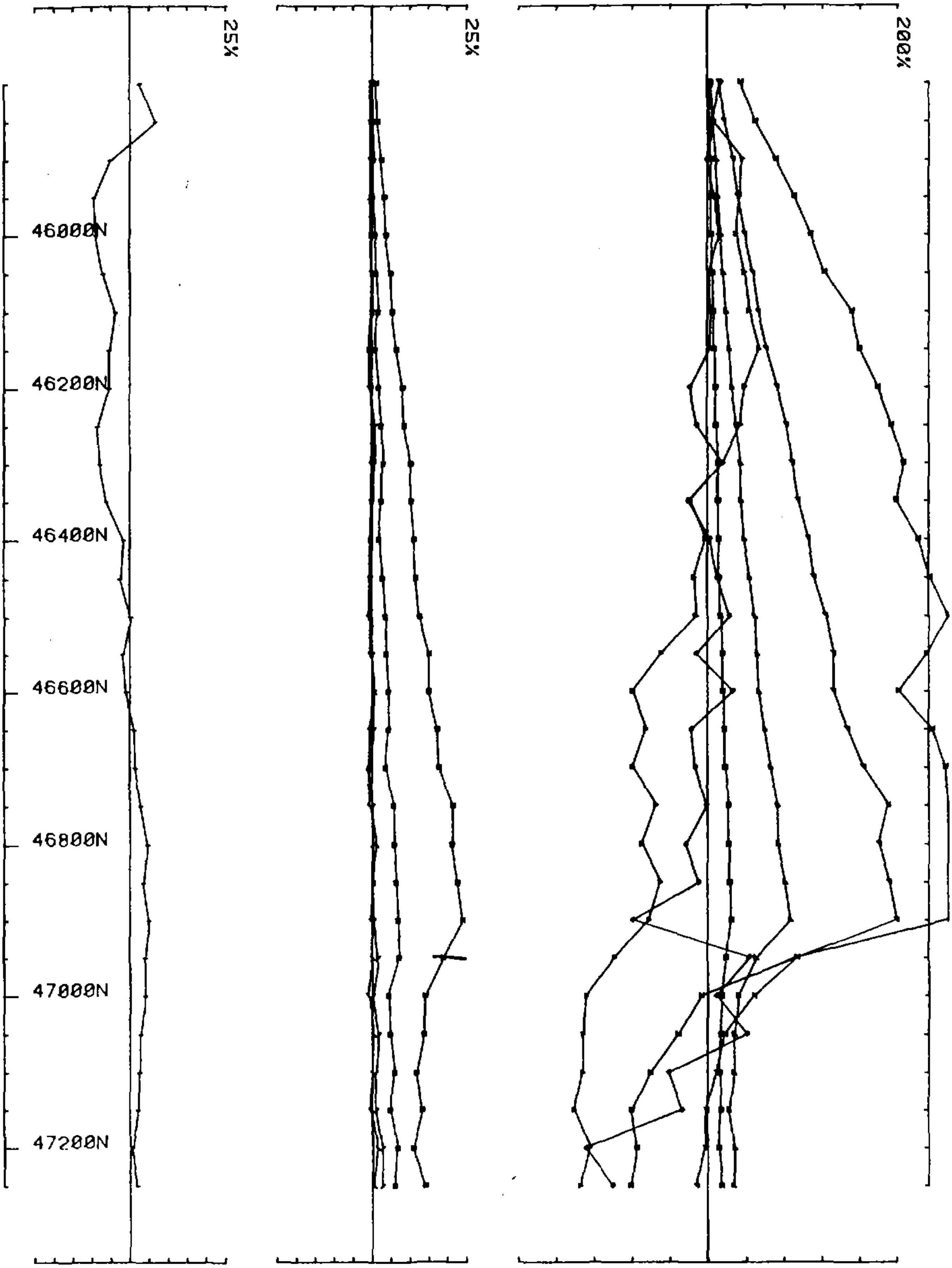
base = primary field (total) at reference station marked with symbol ***)

SIROTEM MK II
NOMINAL DATA WINDOWS
AND PLOTTING SYMBOLS

| TING MBOL | EARLY TIME CHANNEL | START (MS) | MIDDLE (MS) | END (MS) | STANDARD TIME CHANNEL | PLOT SYMBOL | START (MS) | MIDDLE (MS) | END (MS) |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 0.025 | 0.049 | 0.074 | 1 | | 0.315 | 0.487 | 0.659 |
| | 2 | 0.074 | 0.098 | 0.123 | 2 | | 0.707 | 0.879 | 1.051 |
| | 3 | 0.123 | 0.147 | 0.172 | 3 | | 1.099 | 1.271 | 1.443 |
| △ | 4 | 0.172 | 0.196 | 0.221 | 4 | △ | 1.491 | 1.663 | 1.835 |
| | 5 | 0.221 | 0.245 | 0.270 | 5 | | 1.883 | 2.055 | 2.227 |
| | 6 | 0.270 | 0.319 | 0.368 | 6 | | 2.275 | 2.643 | 3.011 |
| | 7 | 0.368 | 0.417 | 0.466 | 7 | | 3.059 | 3.427 | 3.795 |
| ⧖ | 8 | 0.466 | 0.515 | 0.564 | 8 | ⧖ | 3.843 | 4.211 | 4.579 |
| | 9 | 0.564 | 0.613 | 0.662 | 9 | | 4.627 | 4.995 | 5.363 |
| | 10 | 0.662 | 0.711 | 0.760 | 10 | | 5.411 | 5.779 | 6.147 |
| | 11 | 0.760 | 0.858 | 0.956 | 11 | | 6.195 | 6.955 | 7.715 |
| ✡ | 12 | 0.956 | 1.054 | 1.152 | 12 | ☆ | 7.763 | 8.523 | 9.283 |
| | 13 | 1.152 | 1.250 | 1.348 | 13 | | 9.331 | 10.091 | 10.851 |
| | 14 | 1.348 | 1.446 | 1.544 | 14 | | 10.899 | 11.659 | 12.419 |
| | 15 | 1.544 | 1.642 | 1.740 | 15 | | 12.467 | 13.227 | 13.987 |
| □ | 16 | 1.740 | 1.936 | 2.132 | 16 | □ | 14.035 | 15.579 | 17.123 |
| | 17 | 2.132 | 2.328 | 2.524 | 17 | | 17.171 | 18.715 | 20.259 |
| | 18 | 2.524 | 2.720 | 2.916 | 18 | | 20.307 | 21.851 | 23.395 |
| | 19 | 2.916 | 3.112 | 3.308 | 19 | | 23.443 | 24.987 | 26.531 |
| ○ | 20 | 3.308 | 3.504 | 3.700 | 20 | ○ | 26.579 | 28.123 | 29.667 |
| | 21 | 3.700 | 4.092 | 4.484 | 21 | | 29.715 | 32.827 | 35.939 |
| | 22 | 4.484 | 4.876 | 5.268 | 22 | | 35.987 | 39.099 | 42.211 |
| | 23 | 5.268 | 5.660 | 6.052 | 23 | | 42.259 | 45.371 | 48.483 |
| | 24 | 6.052 | 6.444 | 6.836 | 24 | | 48.531 | 51.643 | 54.755 |
| | 25 | 6.836 | 7.228 | 7.620 | 25 | | 54.803 | 57.915 | 61.027 |
| | 26 | 7.620 | 8.404 | 9.188 | 26 | | 61.075 | 67.323 | 73.571 |
| | 27 | 9.188 | 9.972 | 10.756 | 27 | | 73.619 | 79.867 | 86.115 |
| | 28 | 10.756 | 11.540 | 12.324 | 28 | | 86.163 | 92.411 | 98.659 |
| | 29 | 12.324 | 13.108 | 13.892 | 29 | | 98.707 | 104.955 | 111.203 |
| | 30 | 13.892 | 14.676 | 15.460 | 30 | | 111.251 | 117.499 | 123.747 |
| | 31 | 15.460 | 17.028 | 18.596 | 31 | | 123.795 | 136.315 | 148.835 |
| | 32 | 18.596 | 20.164 | 21.732 | 32 | | 148.883 | 161.403 | 173.923 |

APPENDIX 3

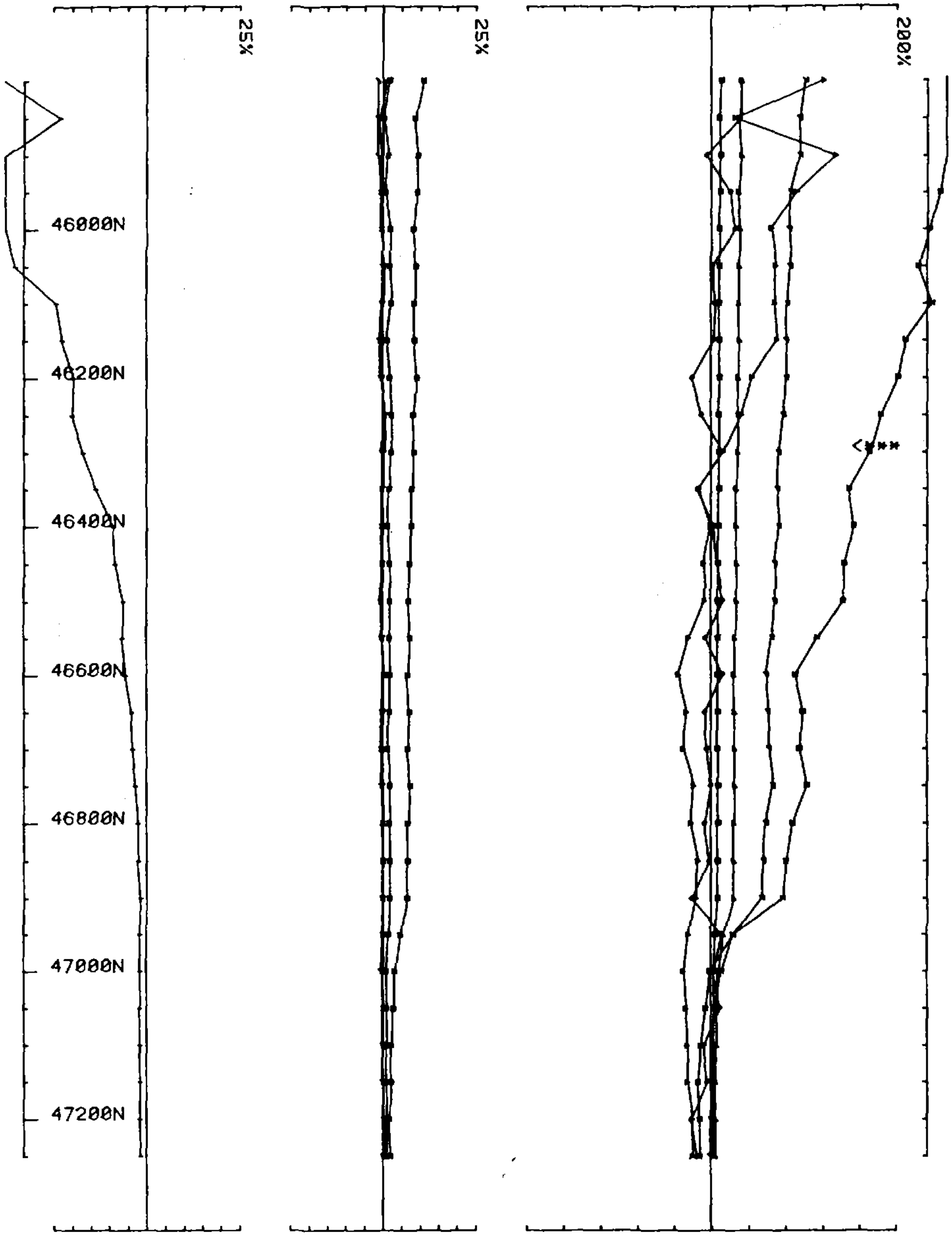
UTEM Data



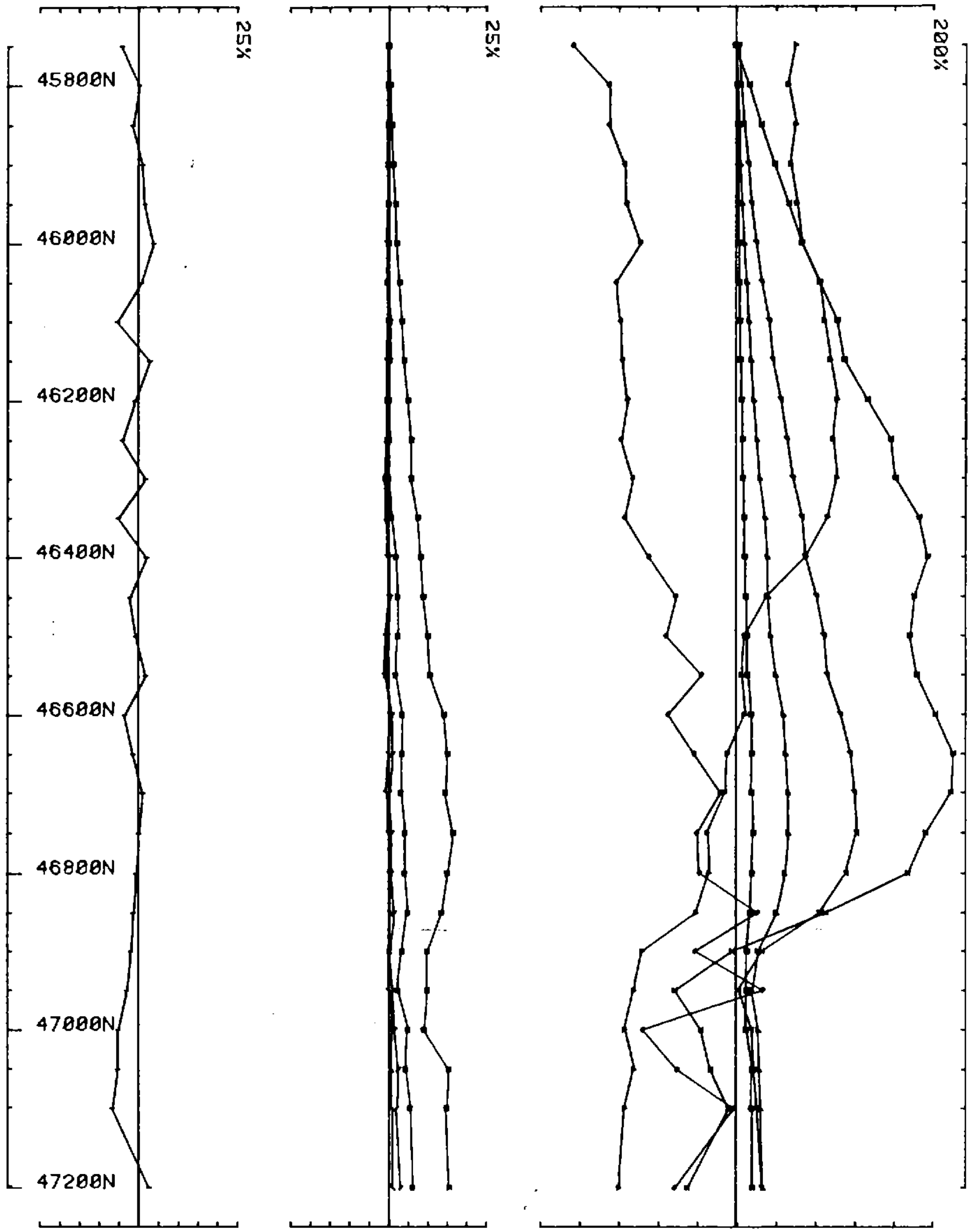

UTEM SURVEY at WEST COMSTOCK for B H P
conducted by LAMONTAGNE GEOPHYSICS LTD Job 8970 base freq (hz) 26.230 1989
loop no WC1 line 81600E component Hz secondary field Ch 1 contin. norm.

075

510086



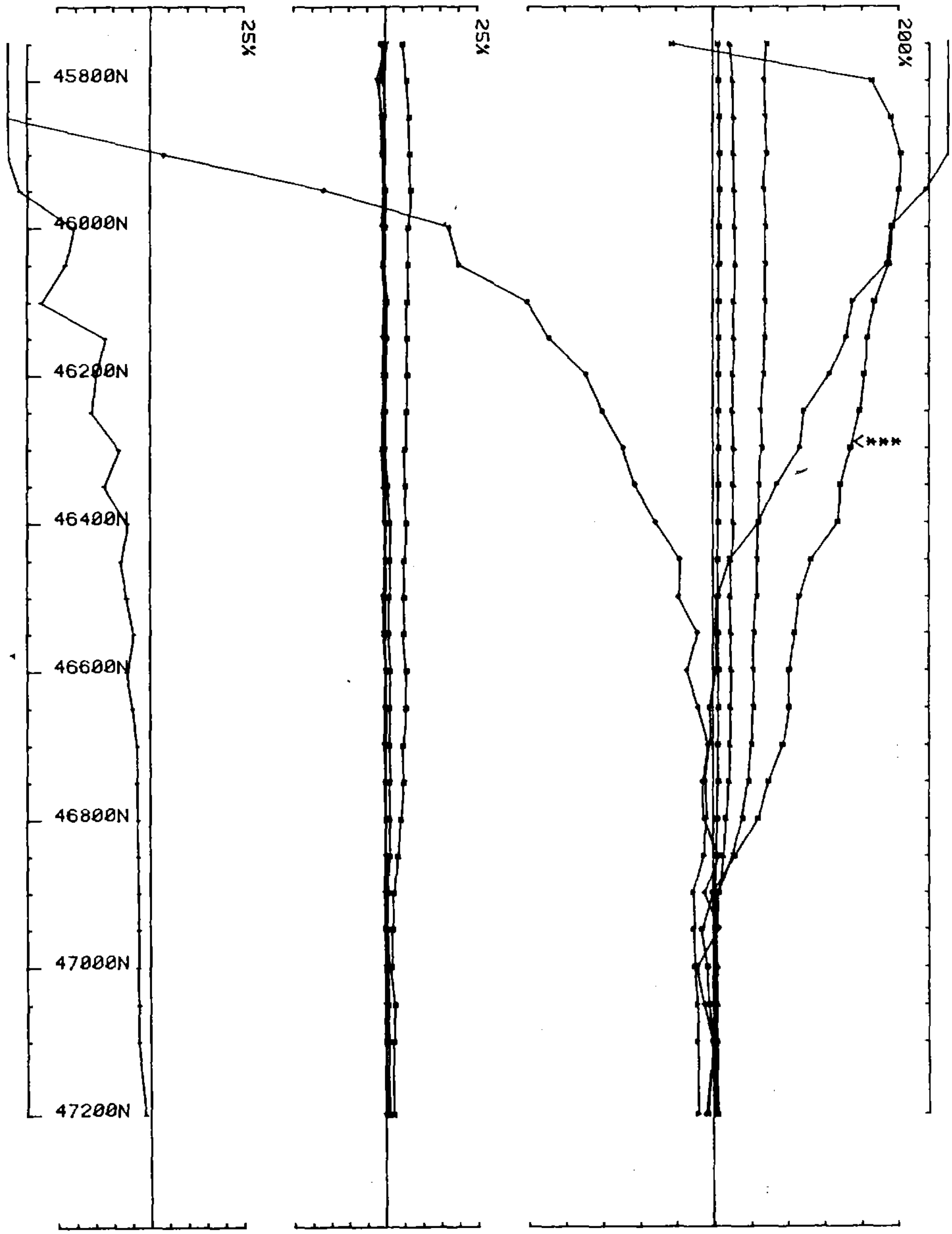

UTEM SURVEY at WEST COMSTOCK for B H P
conducted by LAMONTAGNE GEOPHYSICS LTD job 8970 base freq (hz) 26.230 OCT 89
loop no WC 1 line 81600E component Hz secondary field Ch 1 point norm.



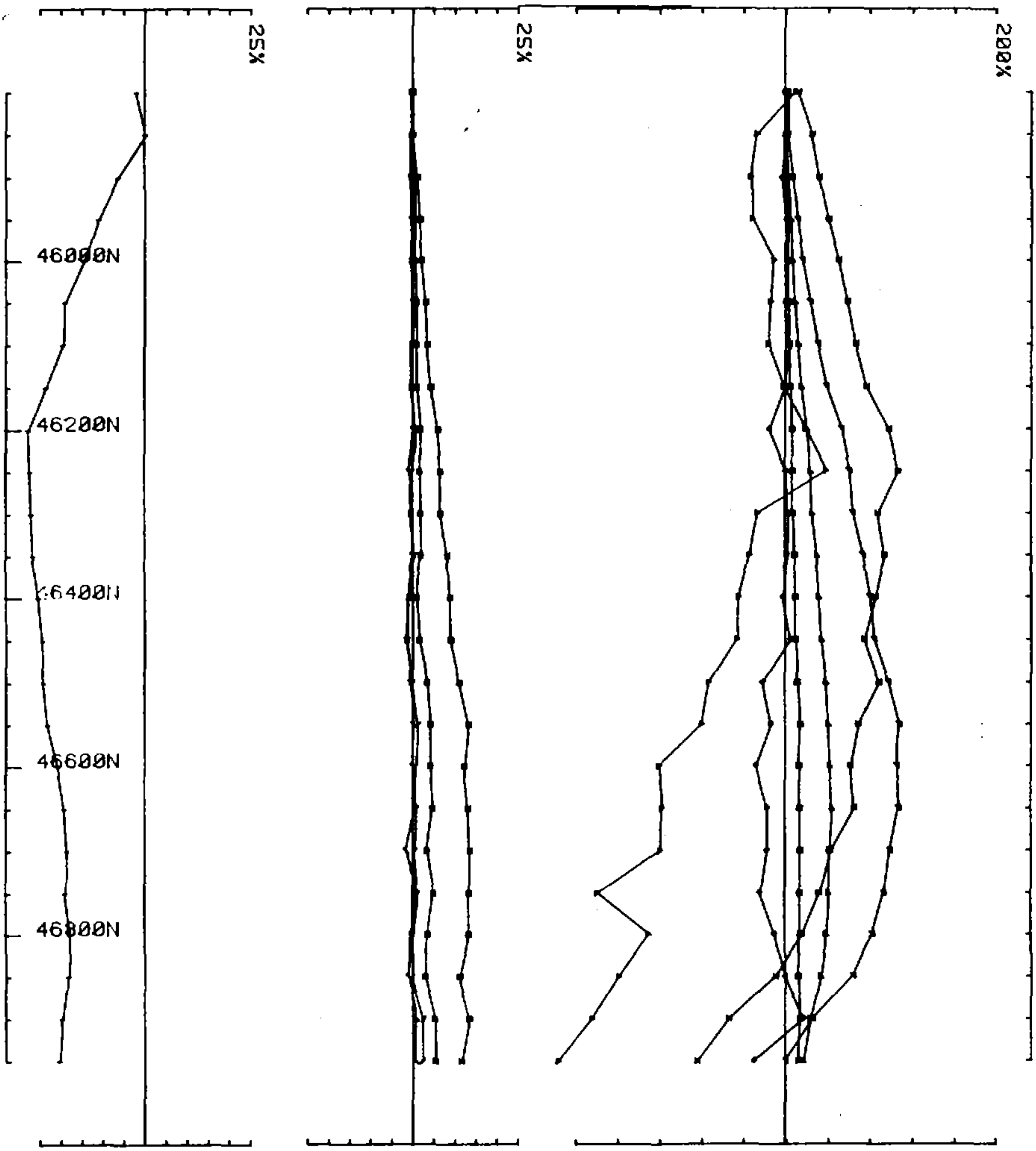

UTEM SURVEY at WEST COMSTOCK for B H P

conducted by LAMONTAGNE GEOPHYSICS LTD job 8970 base freq (hz) 26.230 1989

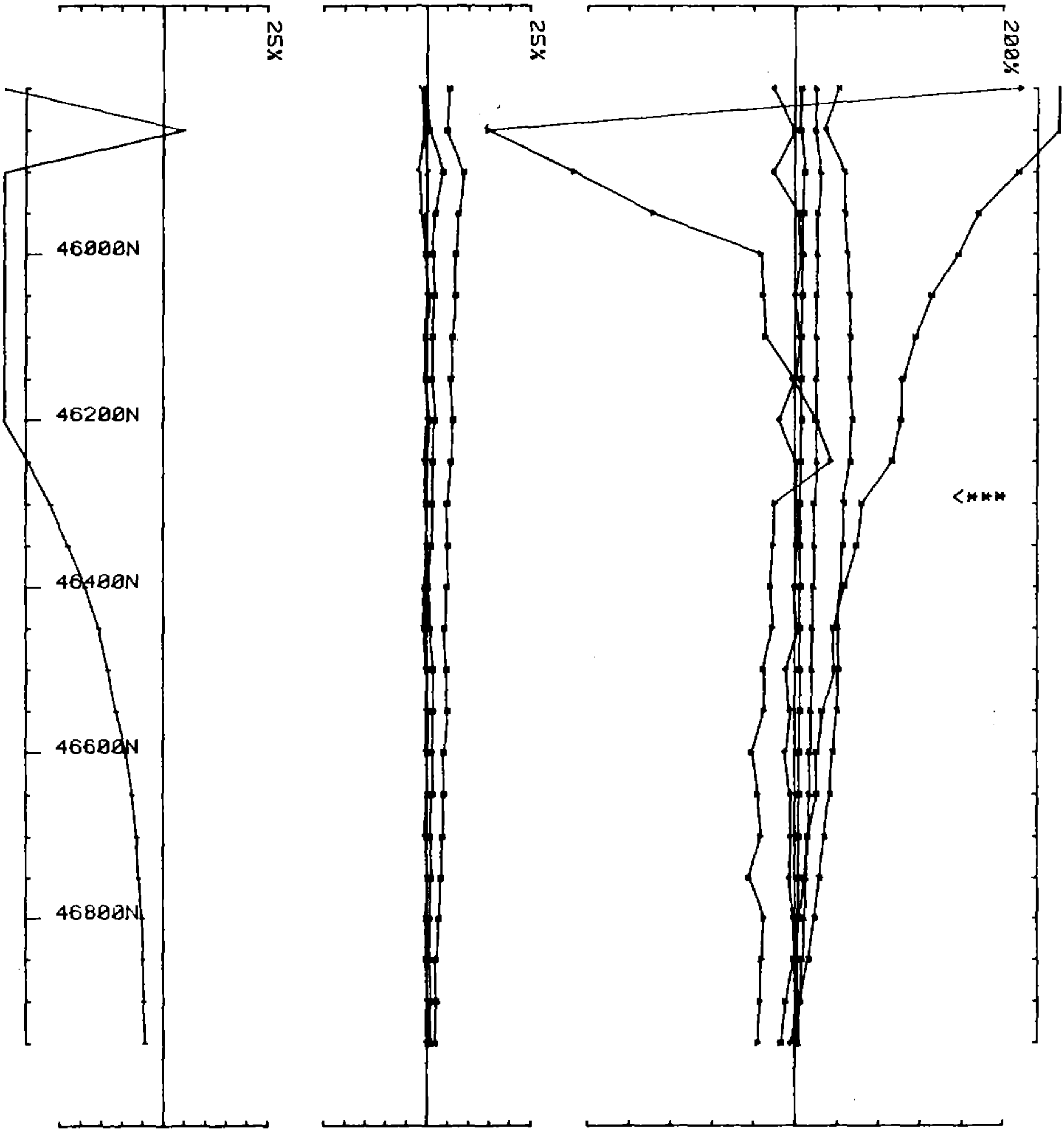
loop no WC1 line 81800E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for B H P
conducted by LAMONTAGNE GEOPHYSICS LTD job 8970 base freq (hz) 26.230 OCT 89
loop no WC 1 line 81800E component Hz secondary field Ch 1 point norm.




UTEM SURVEY at WEST COMSTOCK for B H P
conducted by LAMONTAGNE GEOPHYSICS LTD job 8970 base freq (hz) 26.230 OCT 89
loop no WC 1 line 82000E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for B H P
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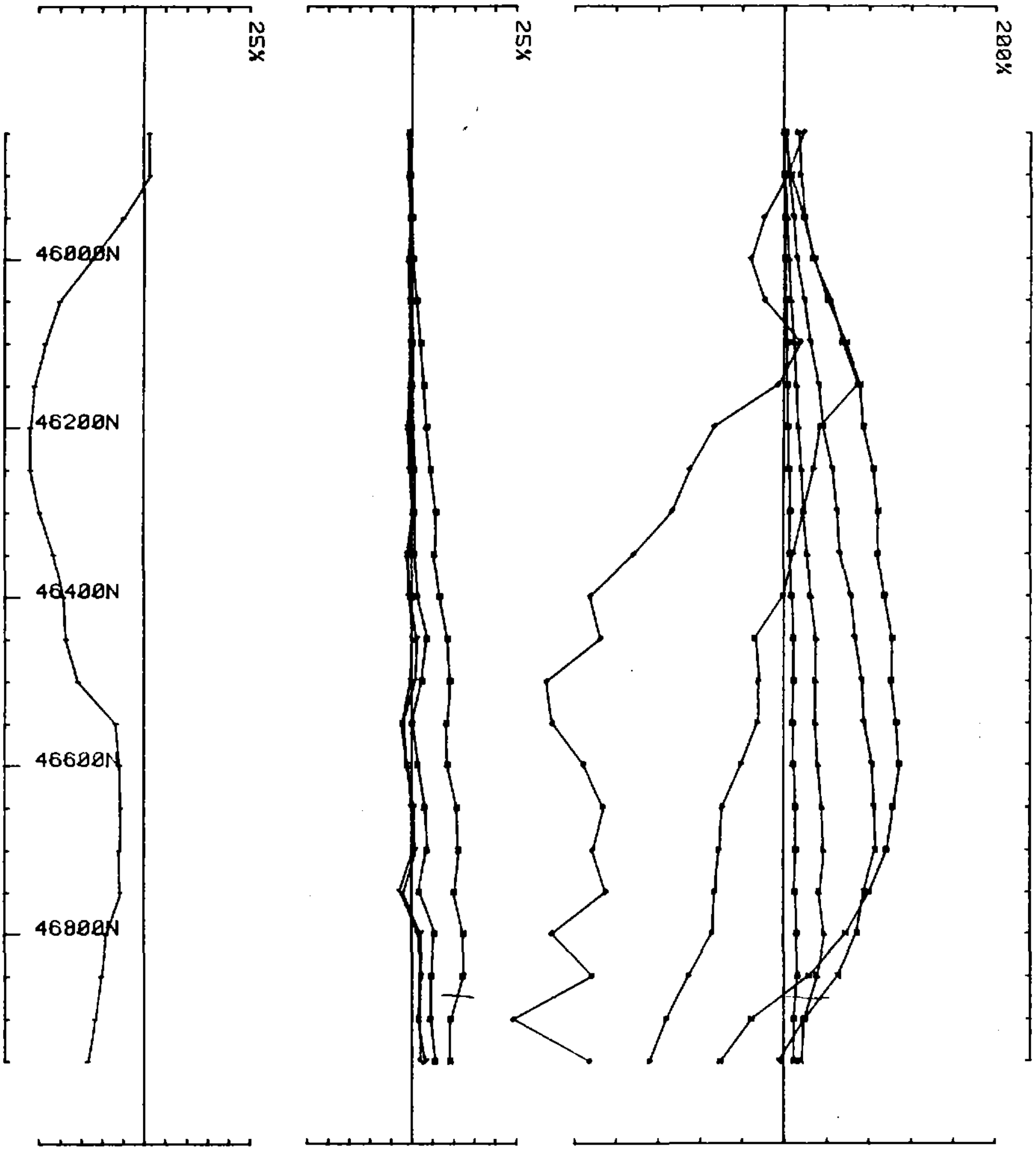
loop no WC 1 line 82000E component Hz secondary field Ch 1 point norm.




UTEM SURVEY at WEST COMSTOCK for B H P
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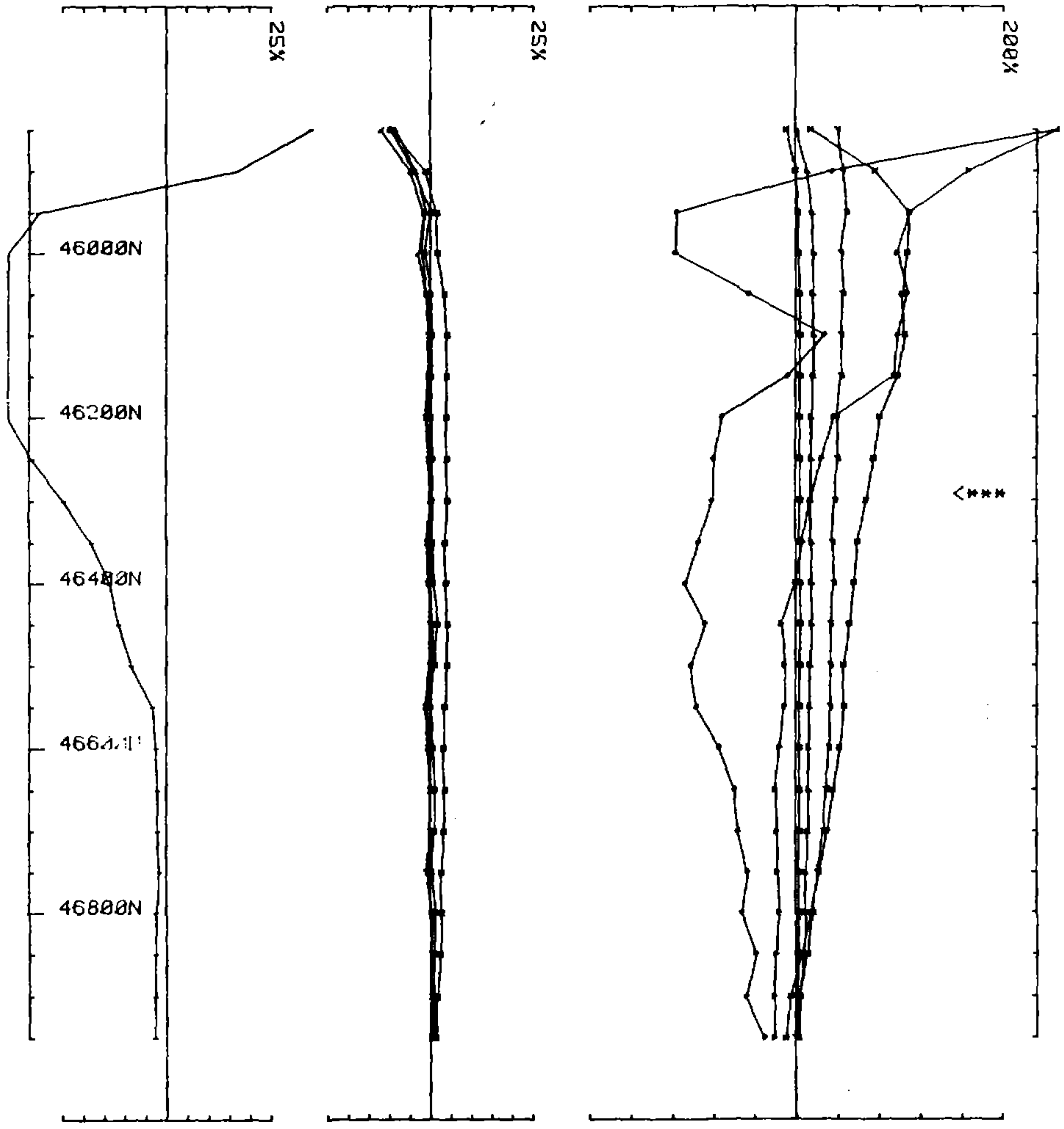
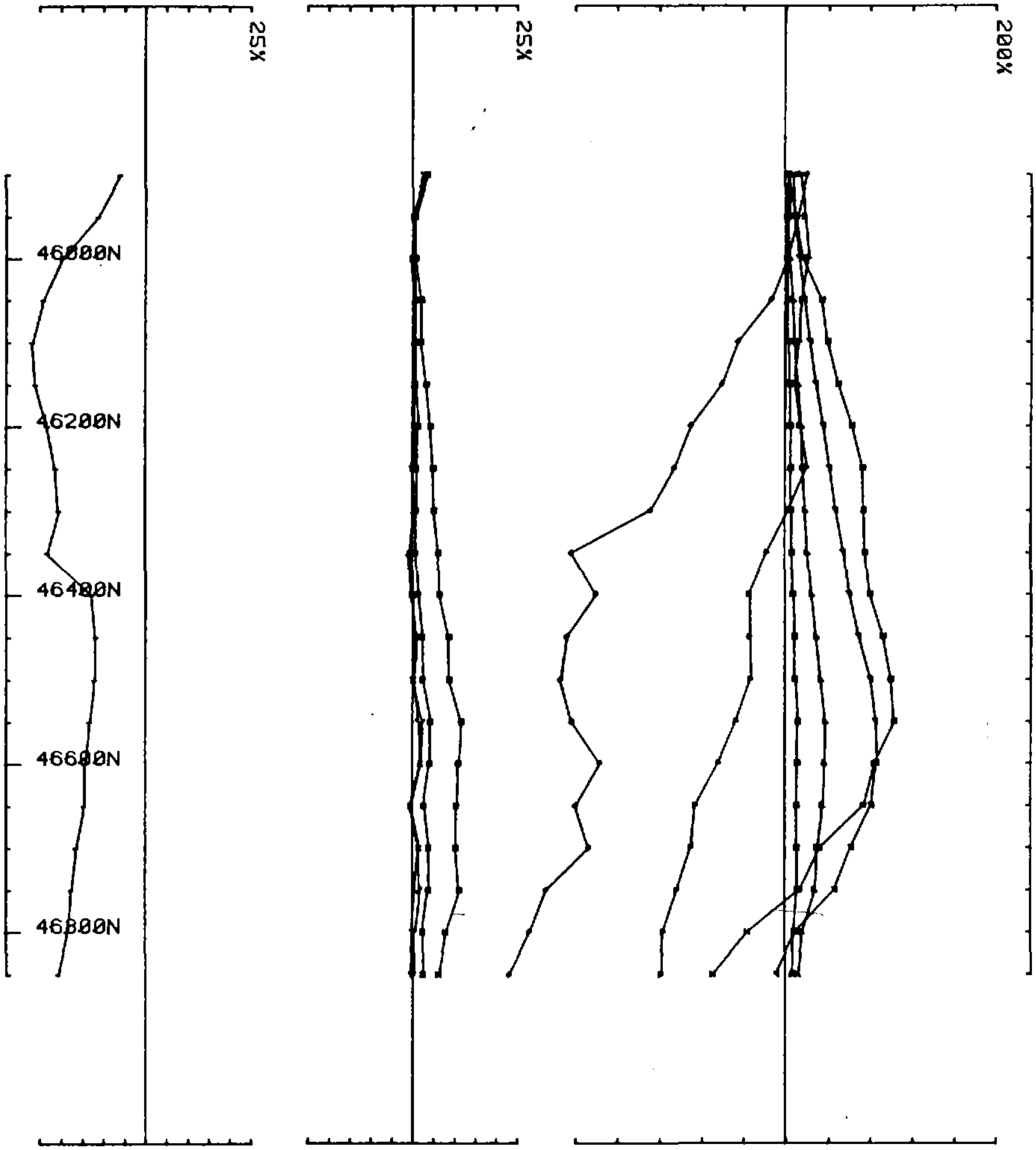
loop no WC 1 line 82200E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for B H P

conducted by LAMONTAGNE GEOPHYSICS LTD job 8070 base freq (hz) 26.230 OCT 89

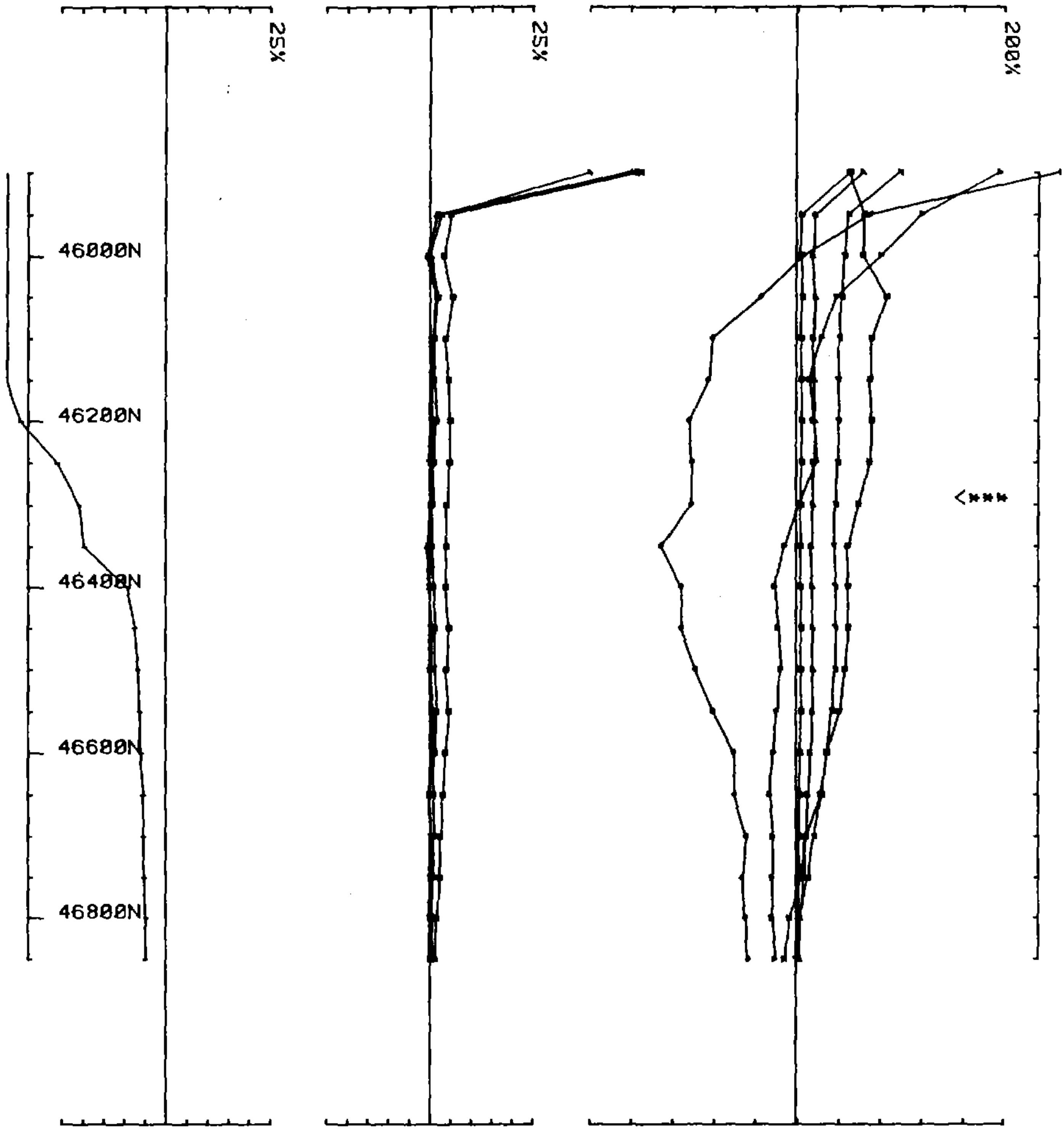
loop no WC 1 line 82200E component Hz secondary field Ch 1 point norm.




UTEM SURVEY at WEST COMSTOCK for B H P

conducted by LAMONTAGNE GEOPHYSICS LTD job 8970 base freq (hz) 26.230 OCT 89

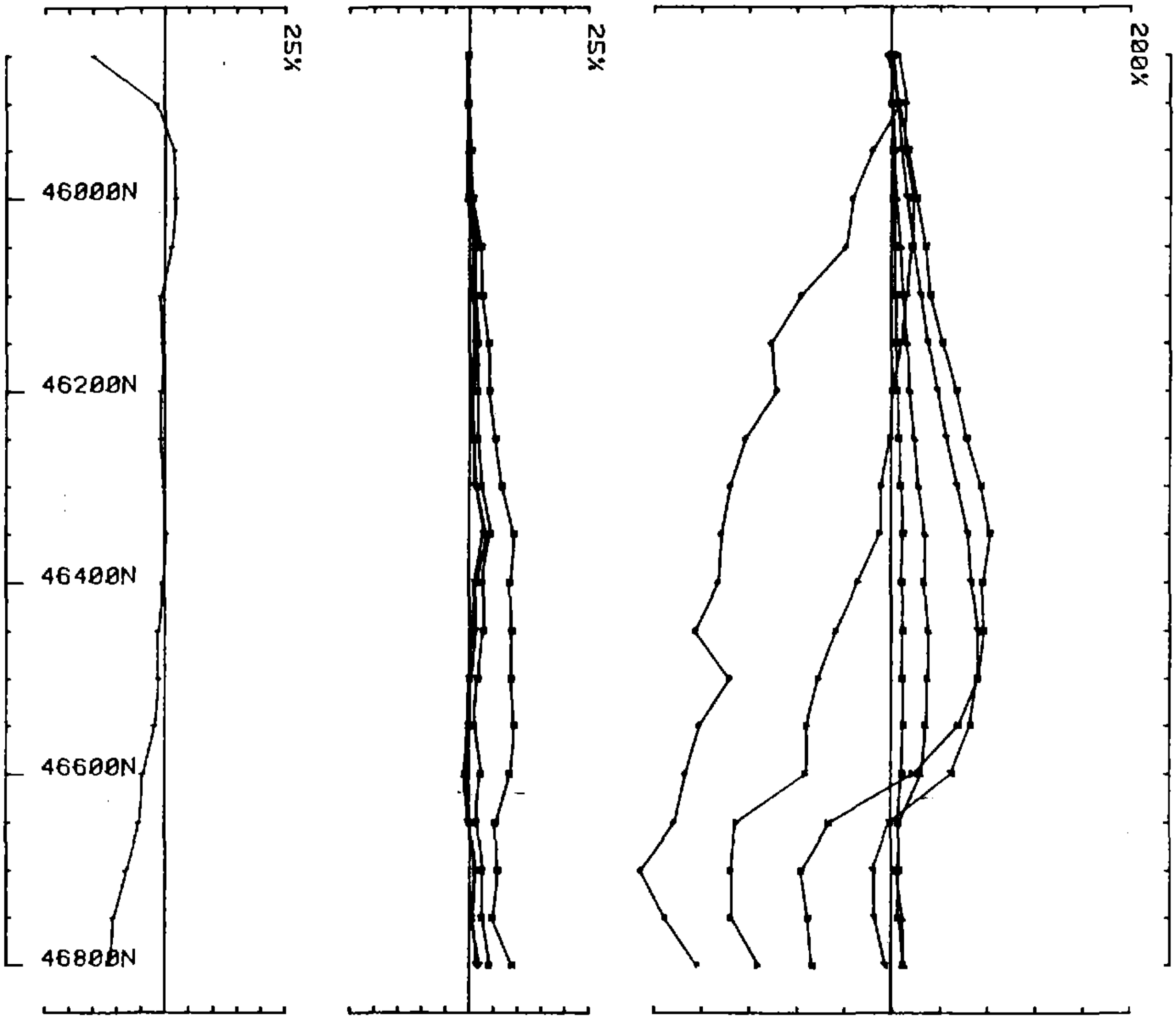
loop no WC 1 line 82400E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for B H P

conducted by LAMONTAGNE GEOPHYSICS LTD job 8970 base freq (hz) 26.230 OCT 89

loop no WC 1 line 82400E component Hz secondary field Ch 1 point norm.



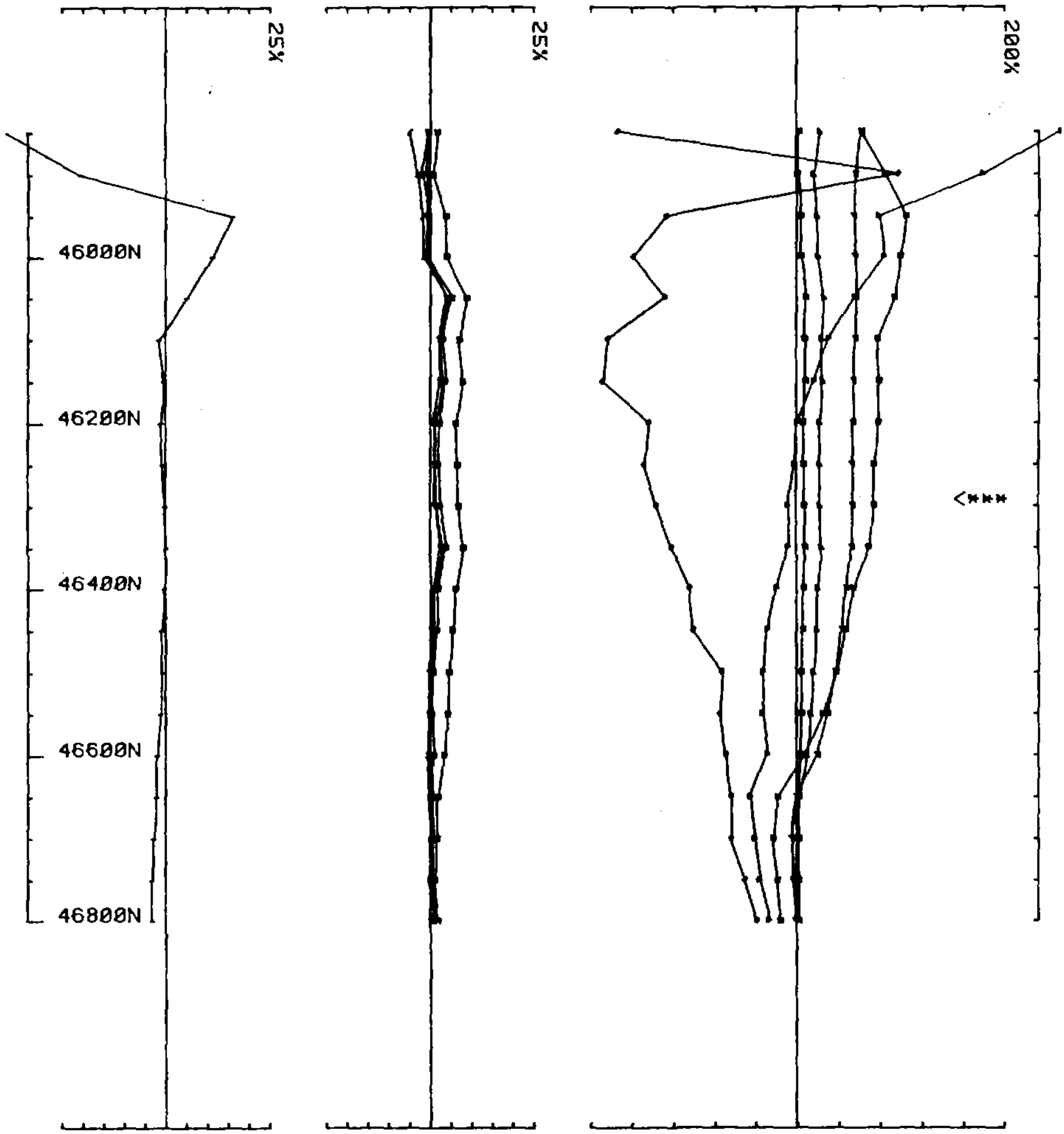

UTEM SURVEY at WEST COMSTOCK for B H P

conducted by LAMONTAGNE GEOPHYSICS LTD job 8970 base freq (hz) 26.230 1989

loop no WC1 line 82600E component Hz secondary field Ch 1 contin. norm.

083

510096




UTEM SURVEY at WEST COMSTOCK for B H P
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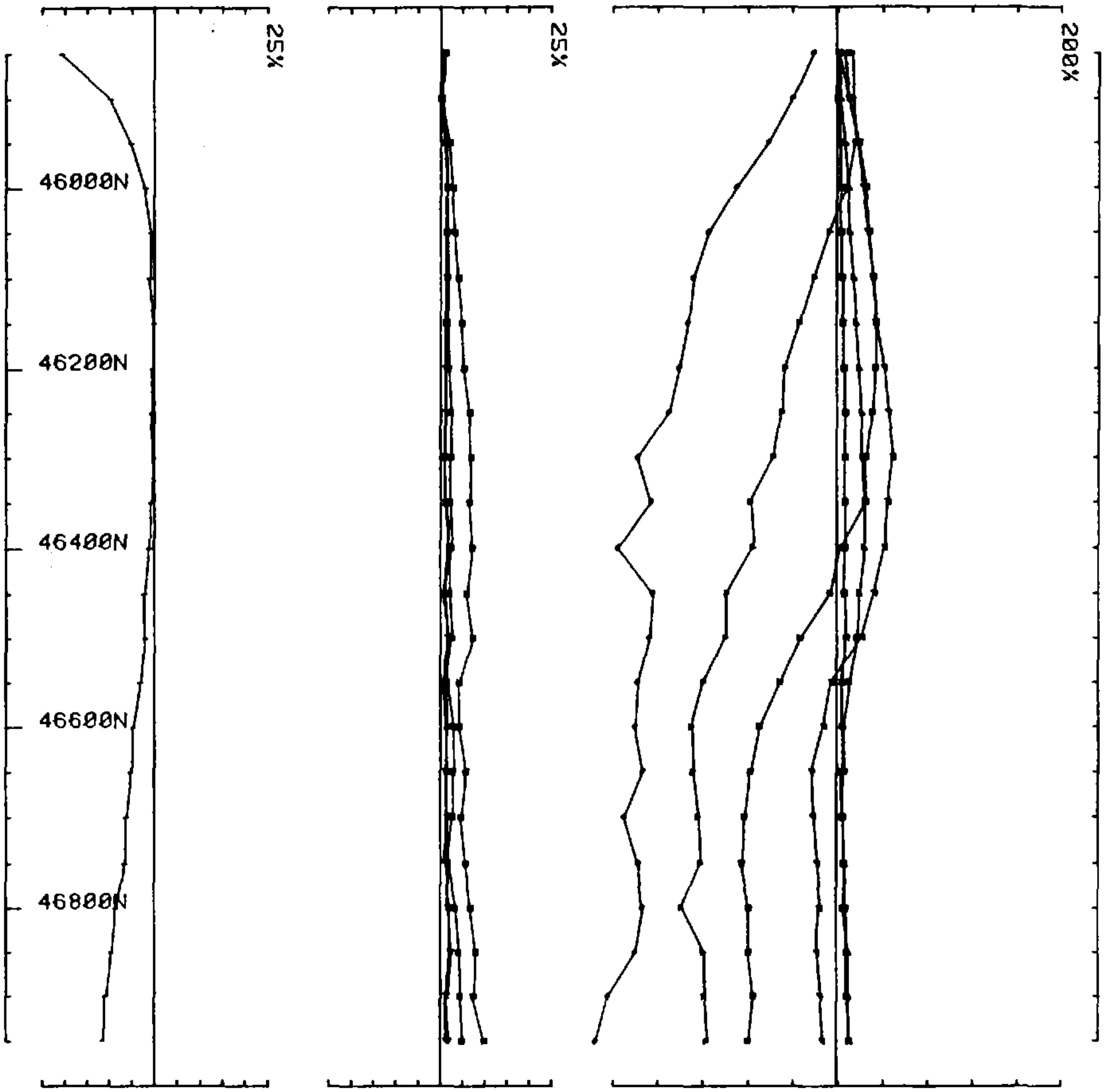
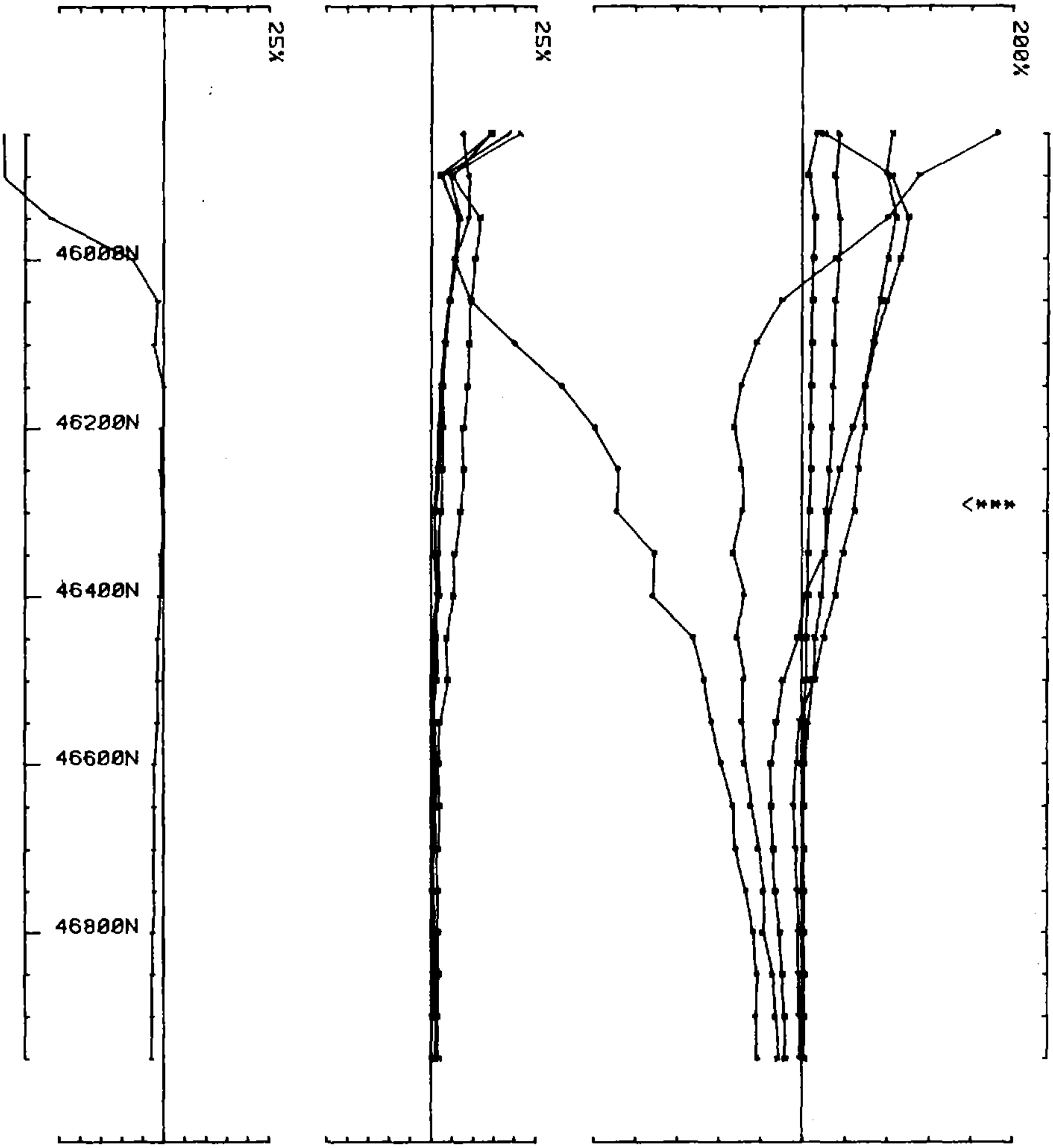
loop no WC 1 line 82600E component Hz secondary field Ch 1 point norm.

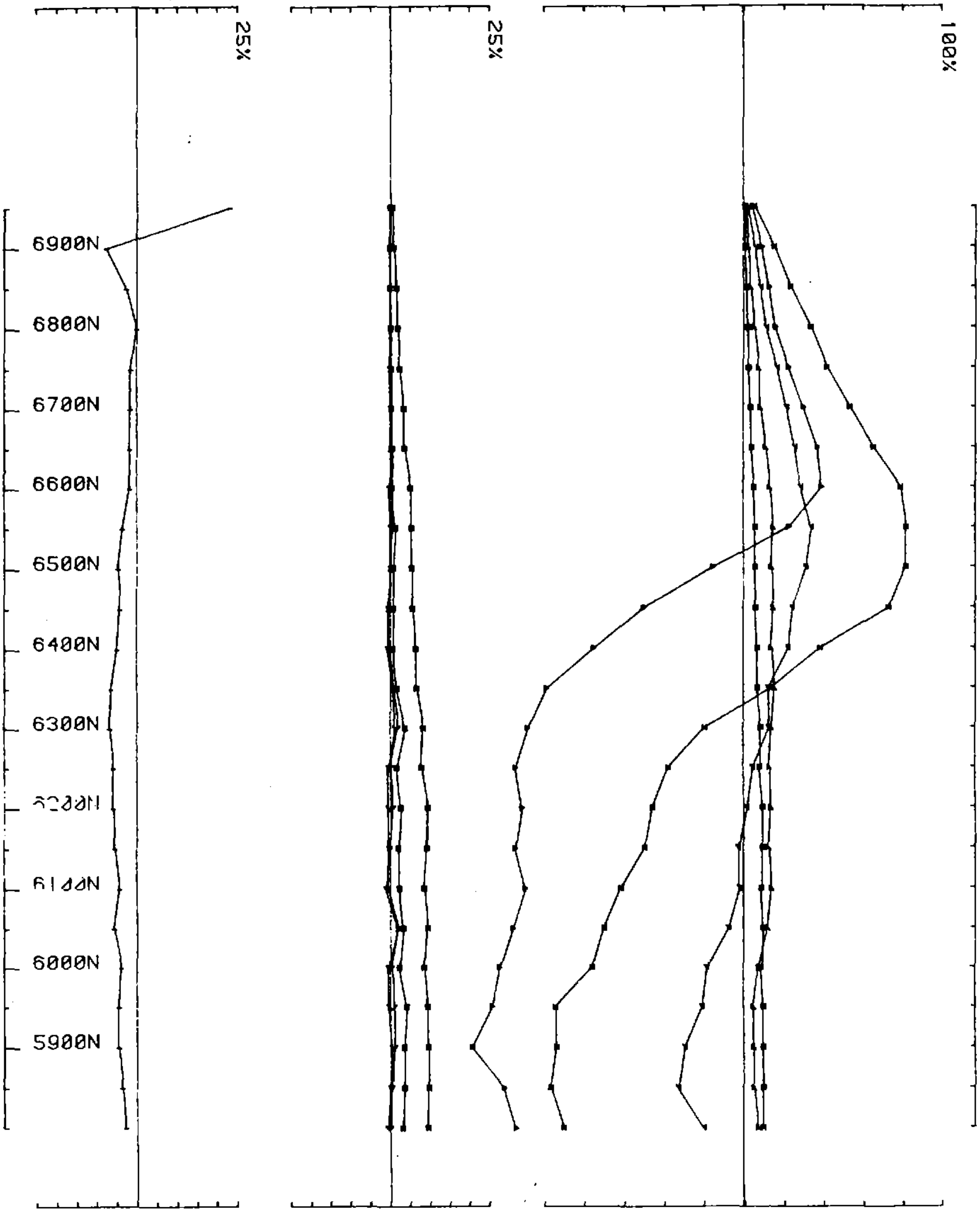



UTEM SURVEY at WEST COMSTOCK for B H P
conducted by LAMONTAGNE GEOPHYSICS LTD , job 8970 base freq (hz) 26.230 1989
loop no WC1 line 82800E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for B H P
conducted by LAMONTAGNE GEOPHYSICS LTD job 8970 base freq (hz) 26.230 OCT 89
loop no WC 1 line 82800E component Hz secondary field Ch 1 point norm.

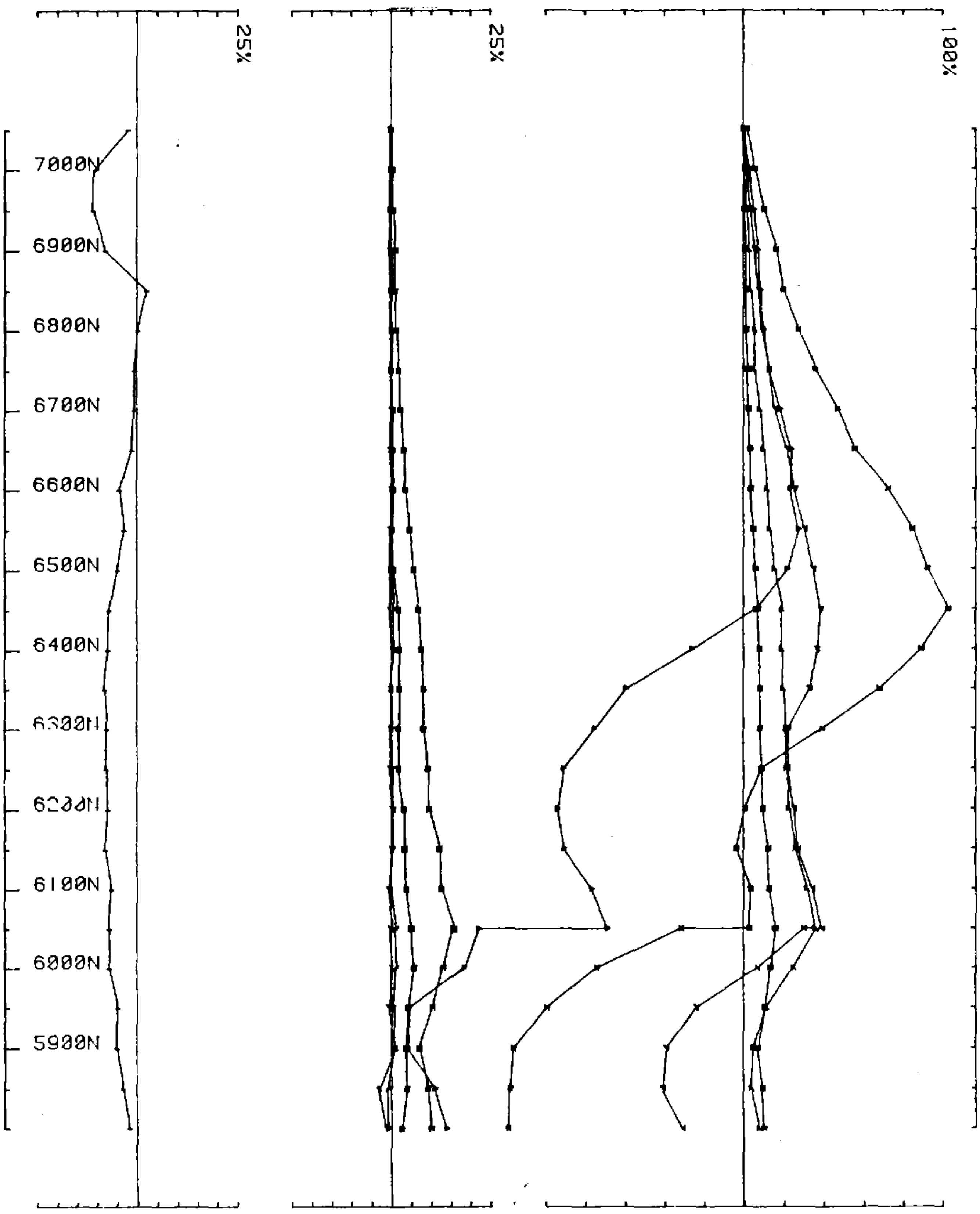
510099




UTEM SURVEY at WEST COMSTOCK for B H P

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

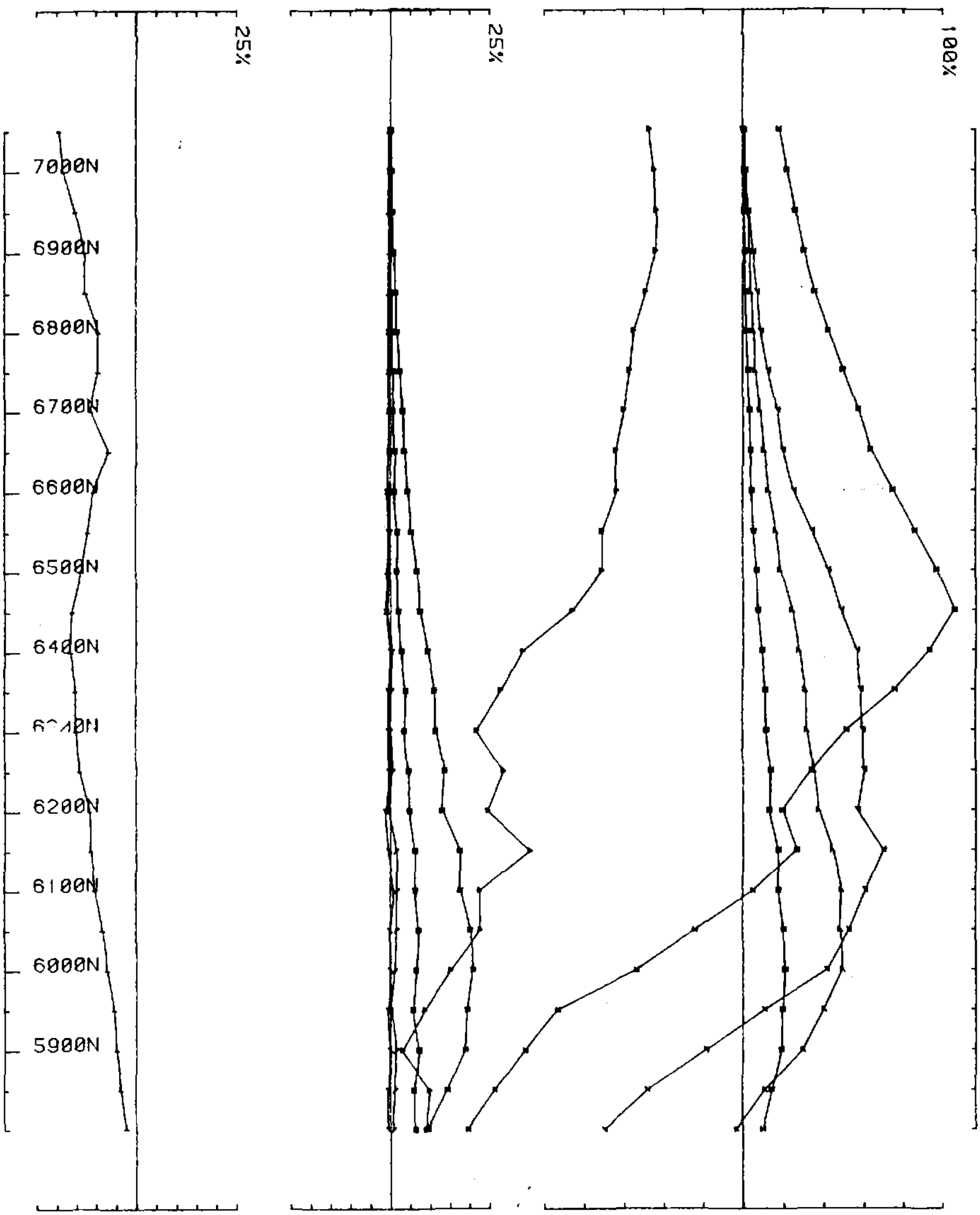
loop no WC 2 line 2800E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for B H P

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

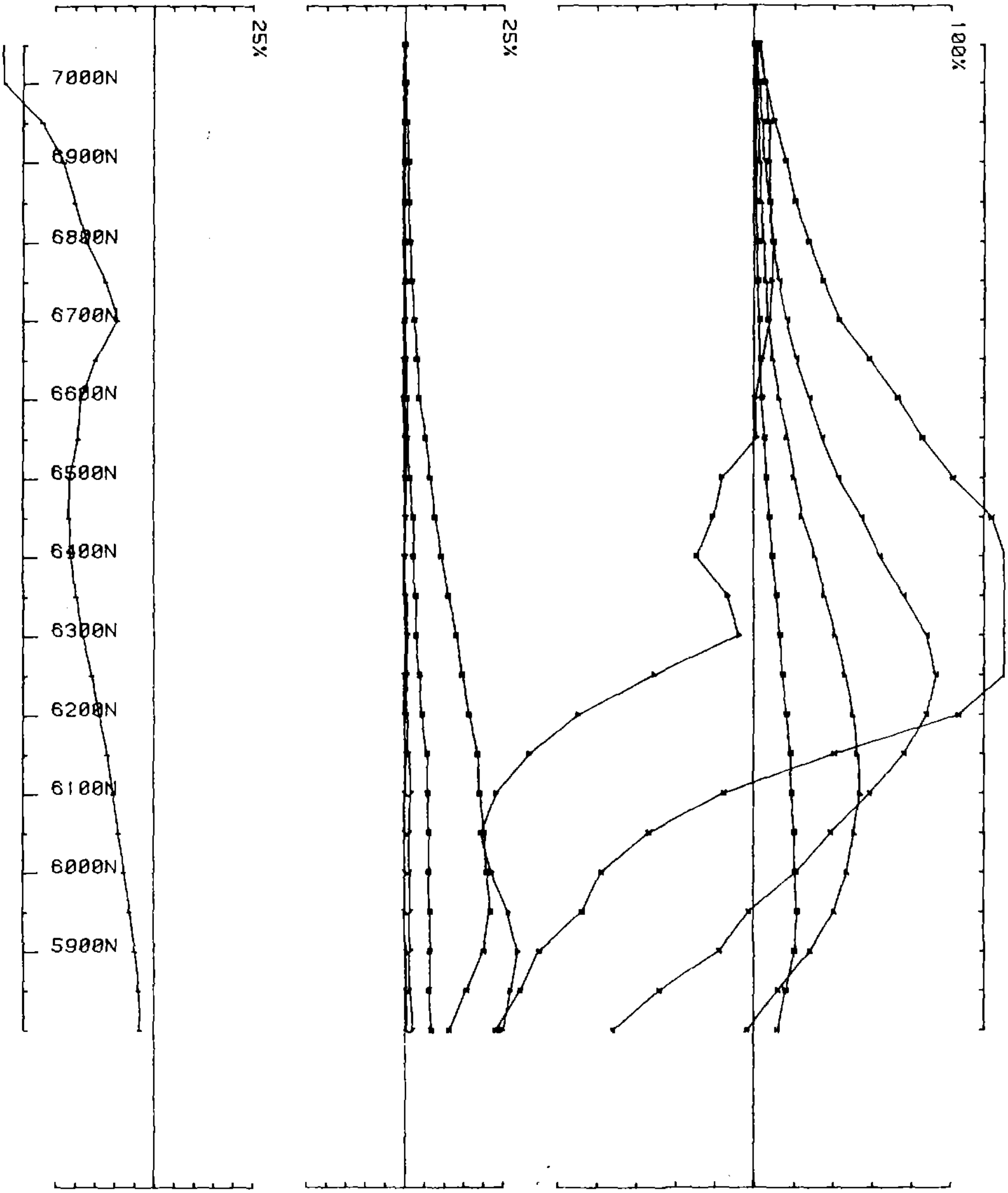
loop no WC 2 line 3000E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for B H P

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

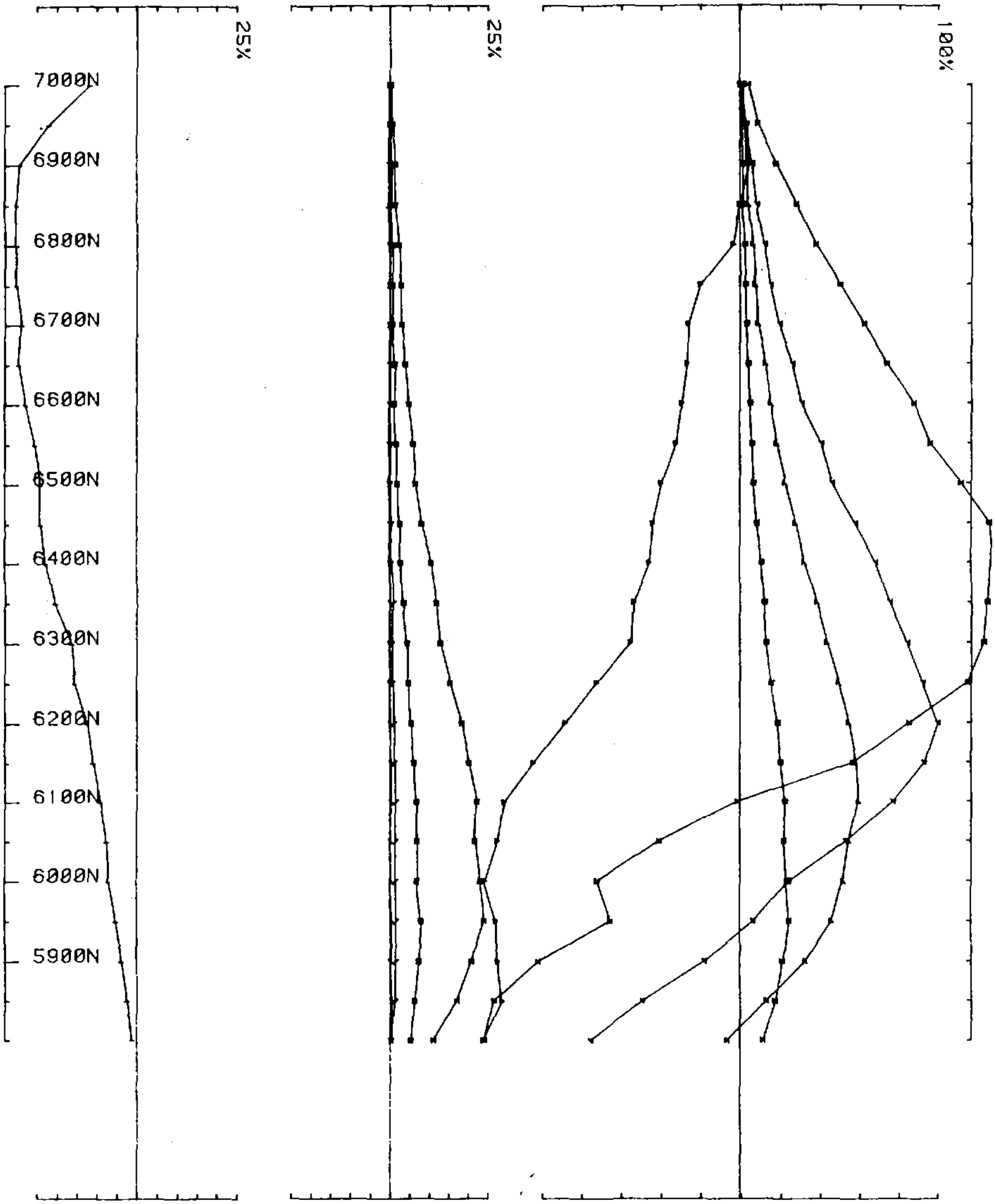
loop no WC 2 line 3200E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for B H P

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

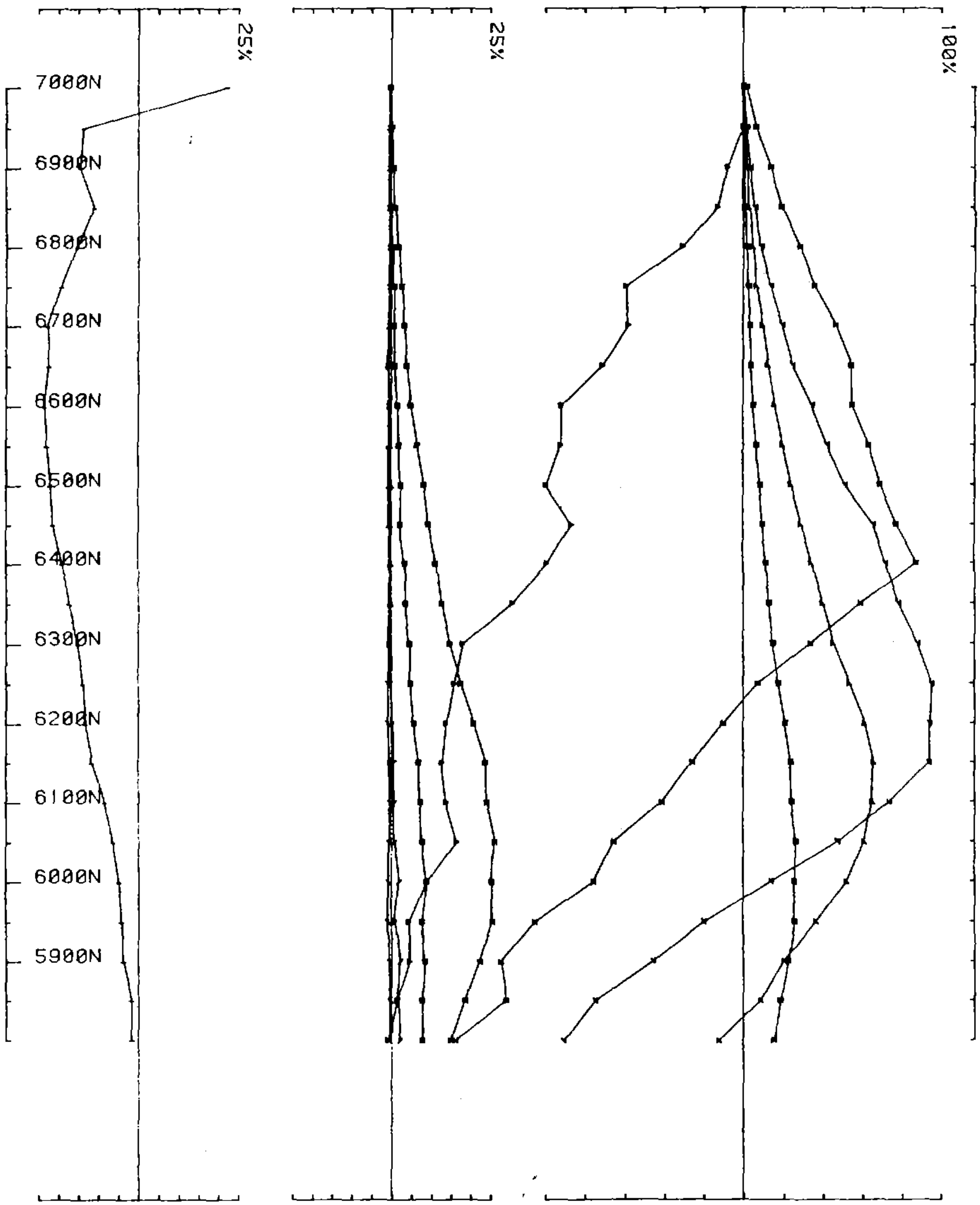
loop no WC2 line 3400E component Hz secondary field Ch I contin. norm.




UTEM SURVEY at WEST COMSTOCK for B H P
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 2 line 3600E component Hz secondary field Ch 1 contin. norm.

091

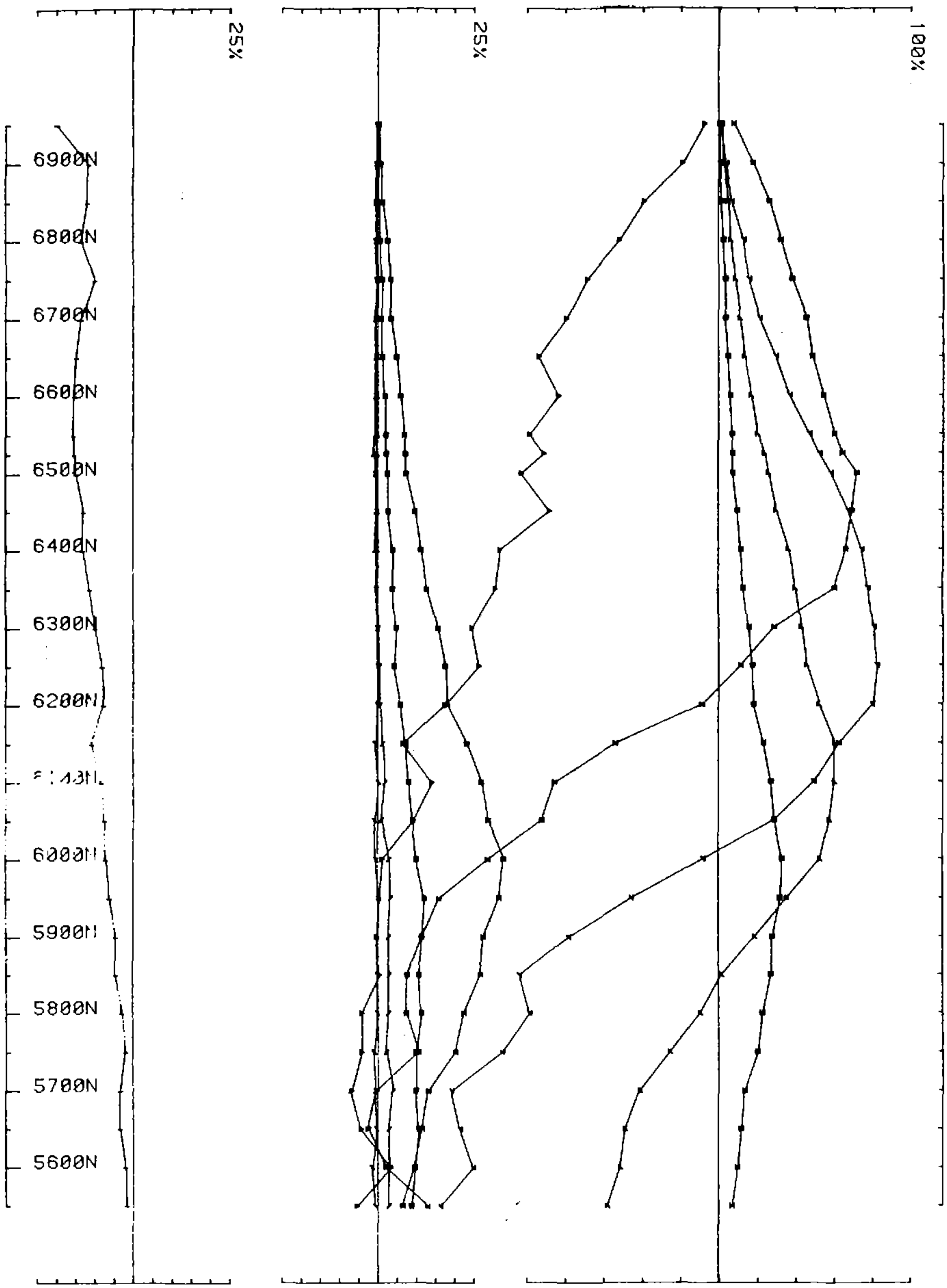
510104




UTEM SURVEY at WEST COMSTOCK for B H P

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

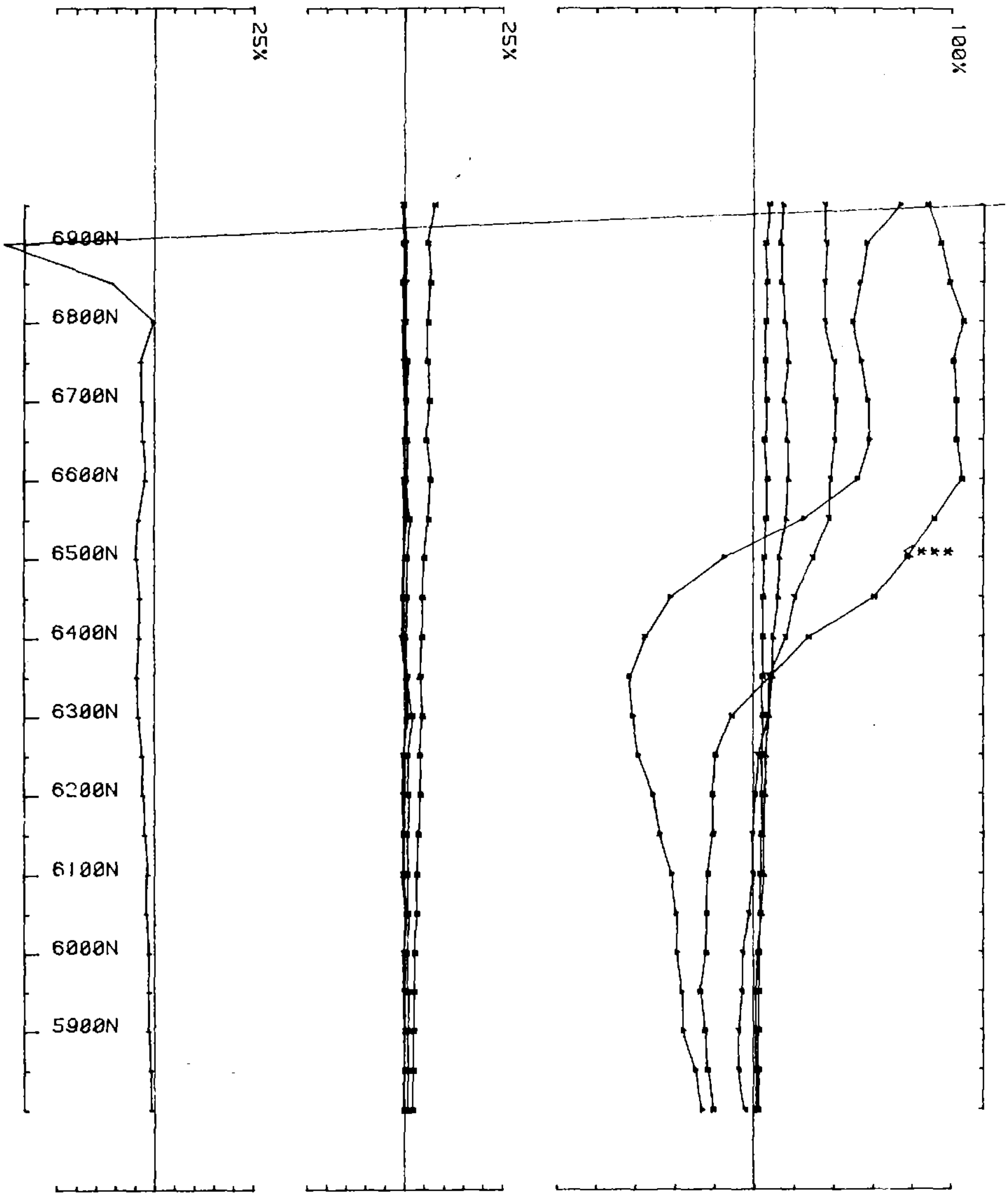
loop no WC 2 line 3800E component Hz secondary field Ch 1 contin. norm.



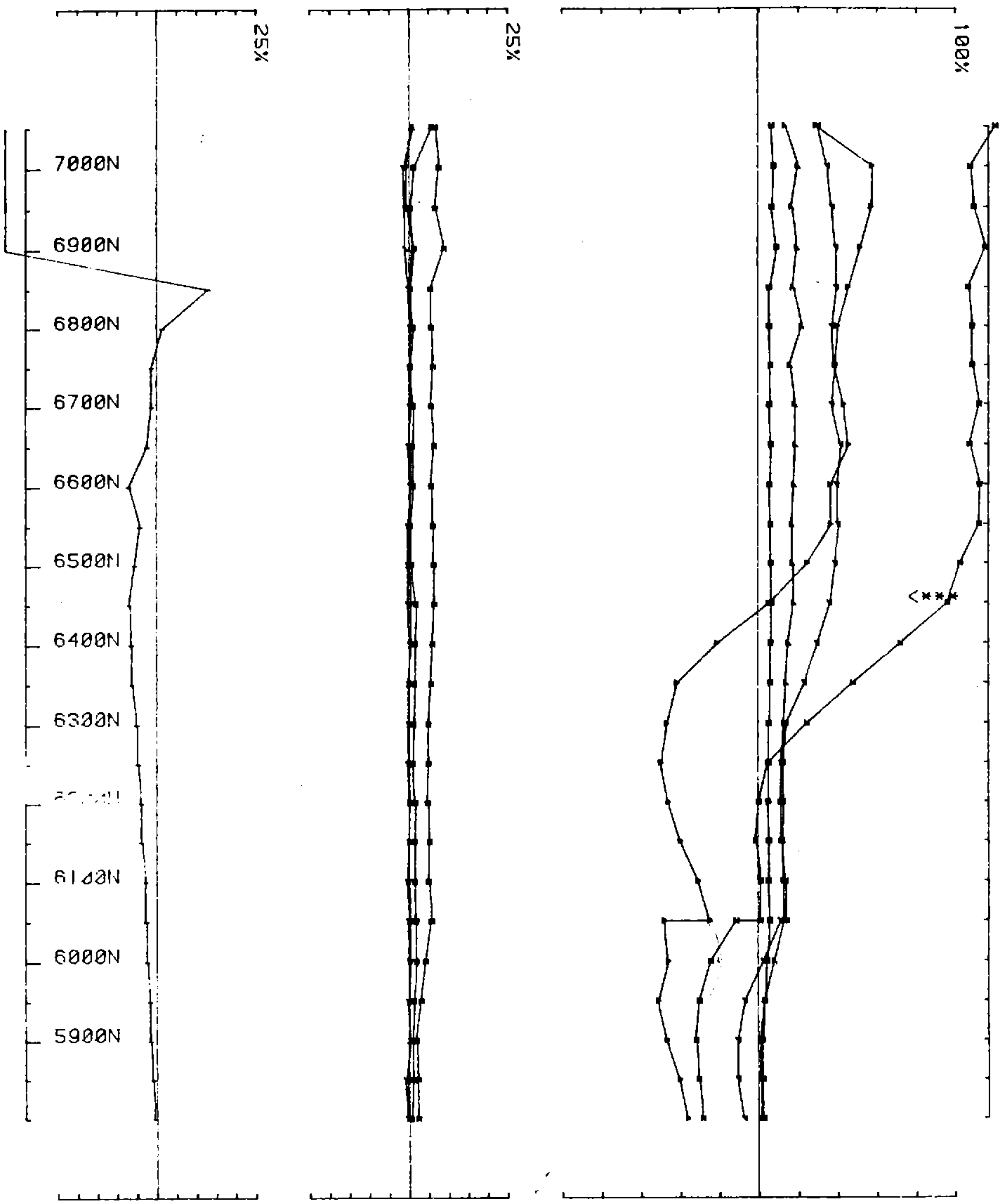

UTEM SURVEY at WEST COMSTOCK for B H P

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

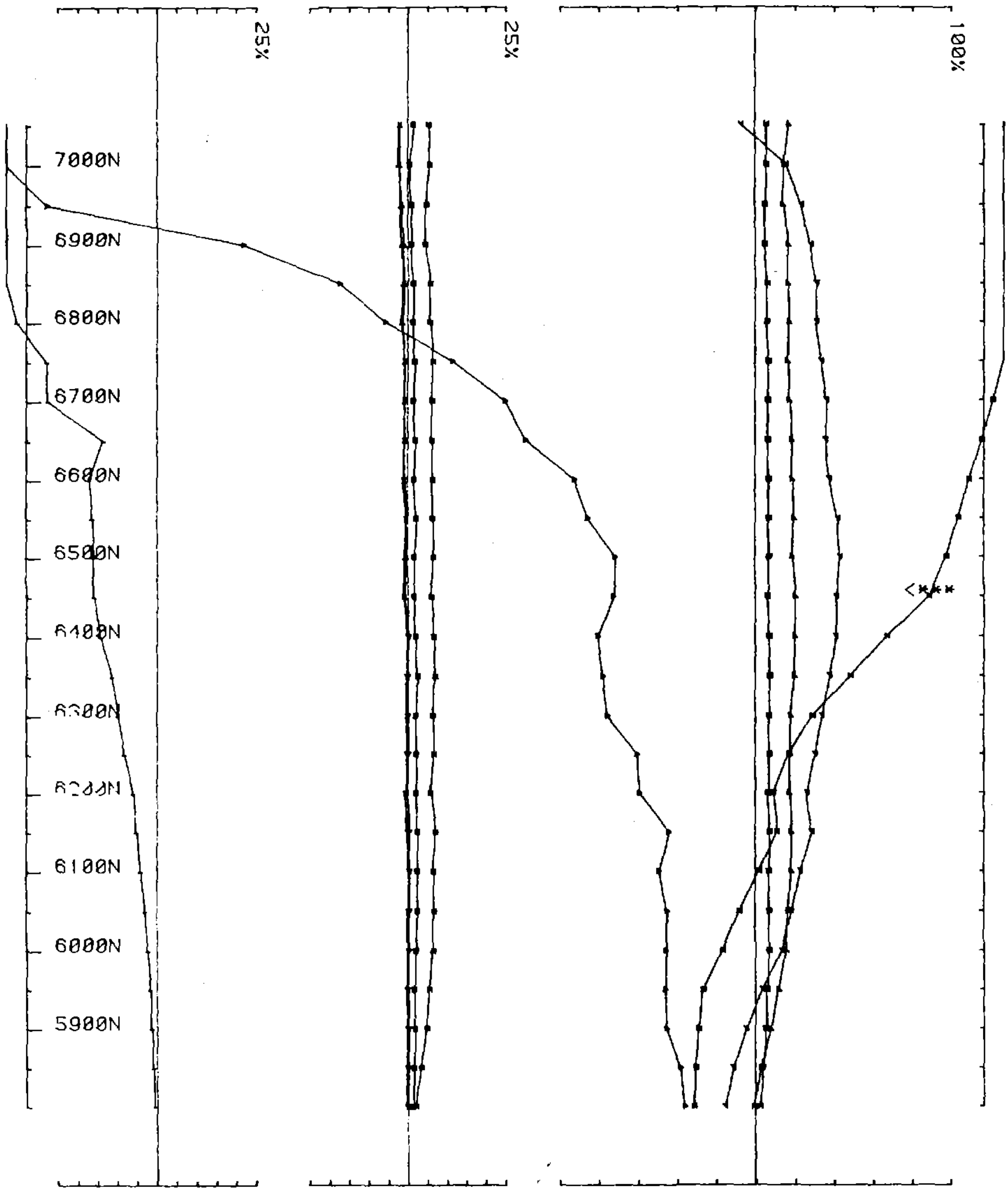
loop no WC 2 line 4000E component Hz secondary field Ch 1 contin. norm.



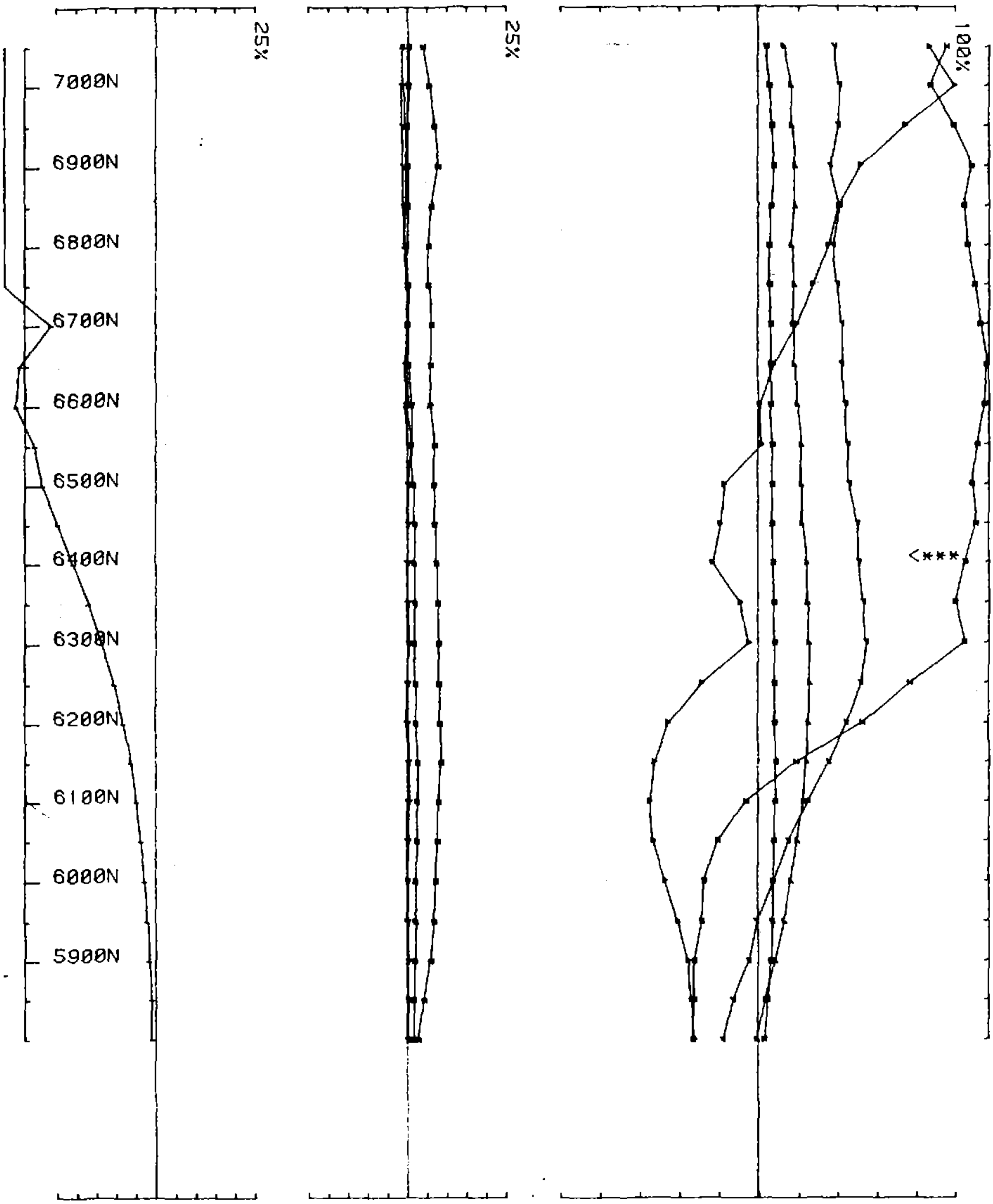

UTEM SURVEY at WEST COMSTOCK for B H P
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 2 line 2800E component Hz secondary field Ch 1 point norm.




UTEM SURVEY at WEST COMSTOCK for B H P
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 2 line 3000E component Hz secondary field Ch 1 point norm.



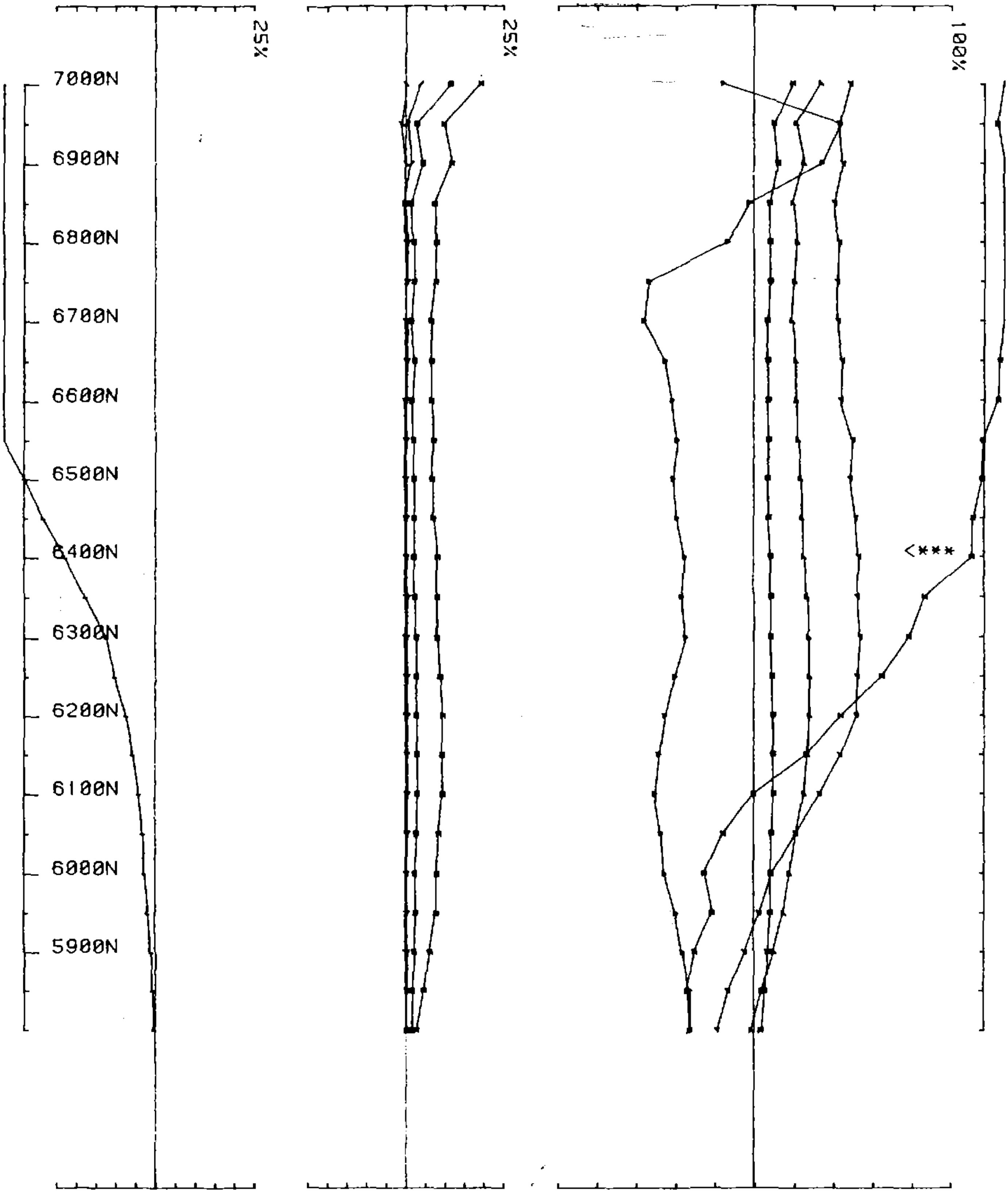

UTEM SURVEY at WEST COMSTOCK for B H P
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 2 line 3200E component Hz secondary field Ch 1 point norm.



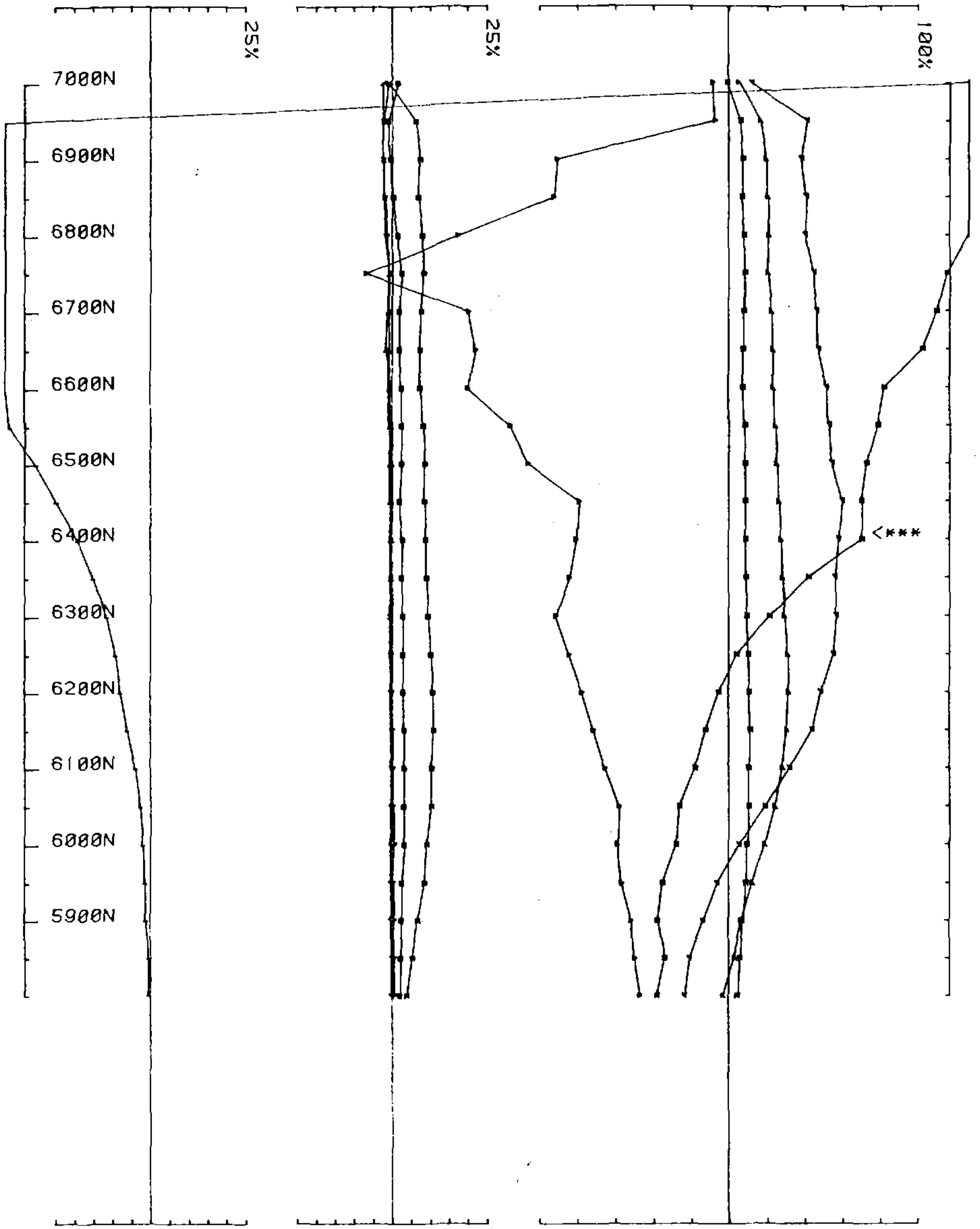

UTEM SURVEY at WEST COMSTOCK for B H P

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

loop no WC 2 line 3400E component Hz secondary field Ch 1 point norm.




UTEM SURVEY at WEST COMSTOCK for B H P
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 2 line 3600E component Hz secondary field Ch 1 point norm.

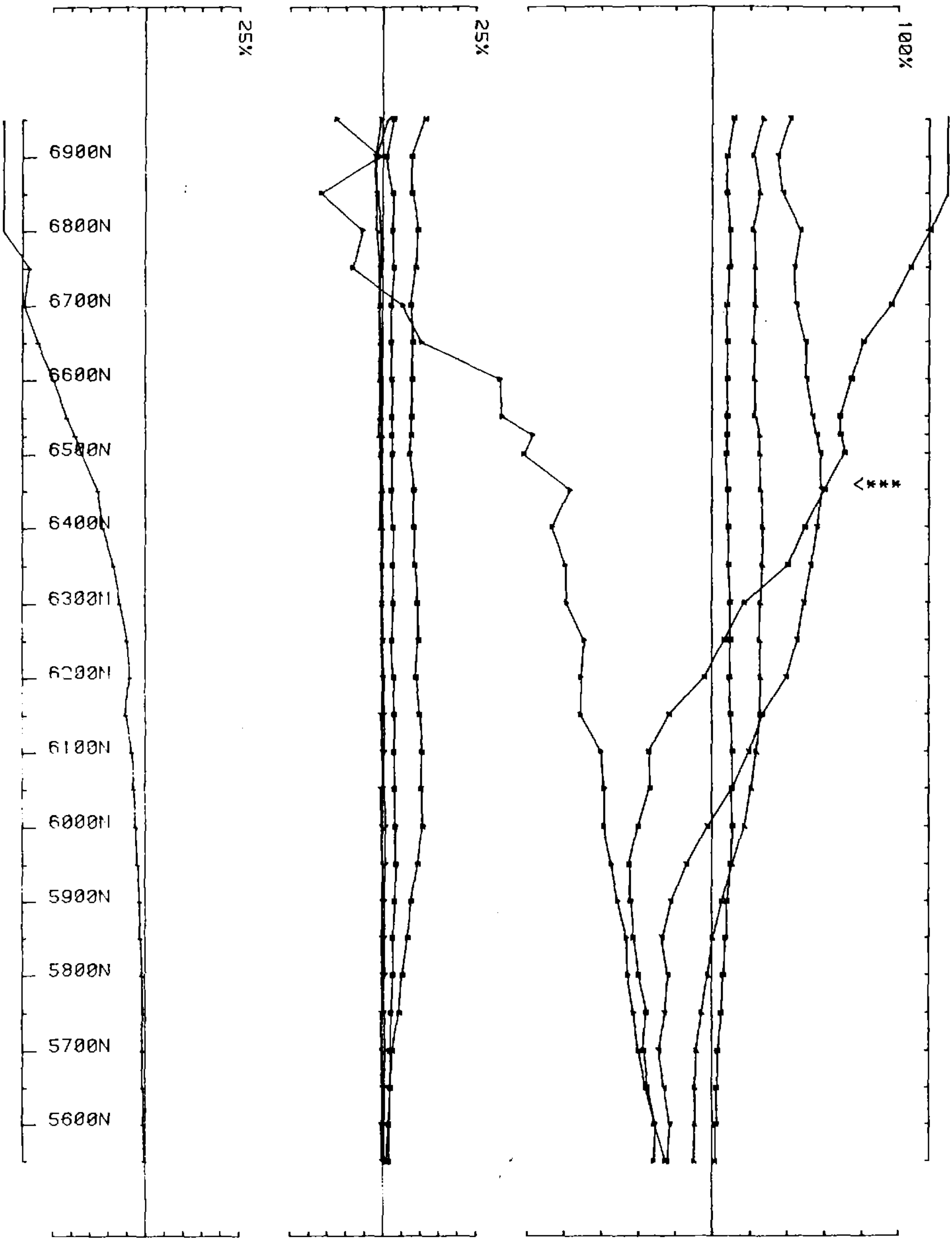



UTEM SURVEY at WEST COMSTOCK for B H P

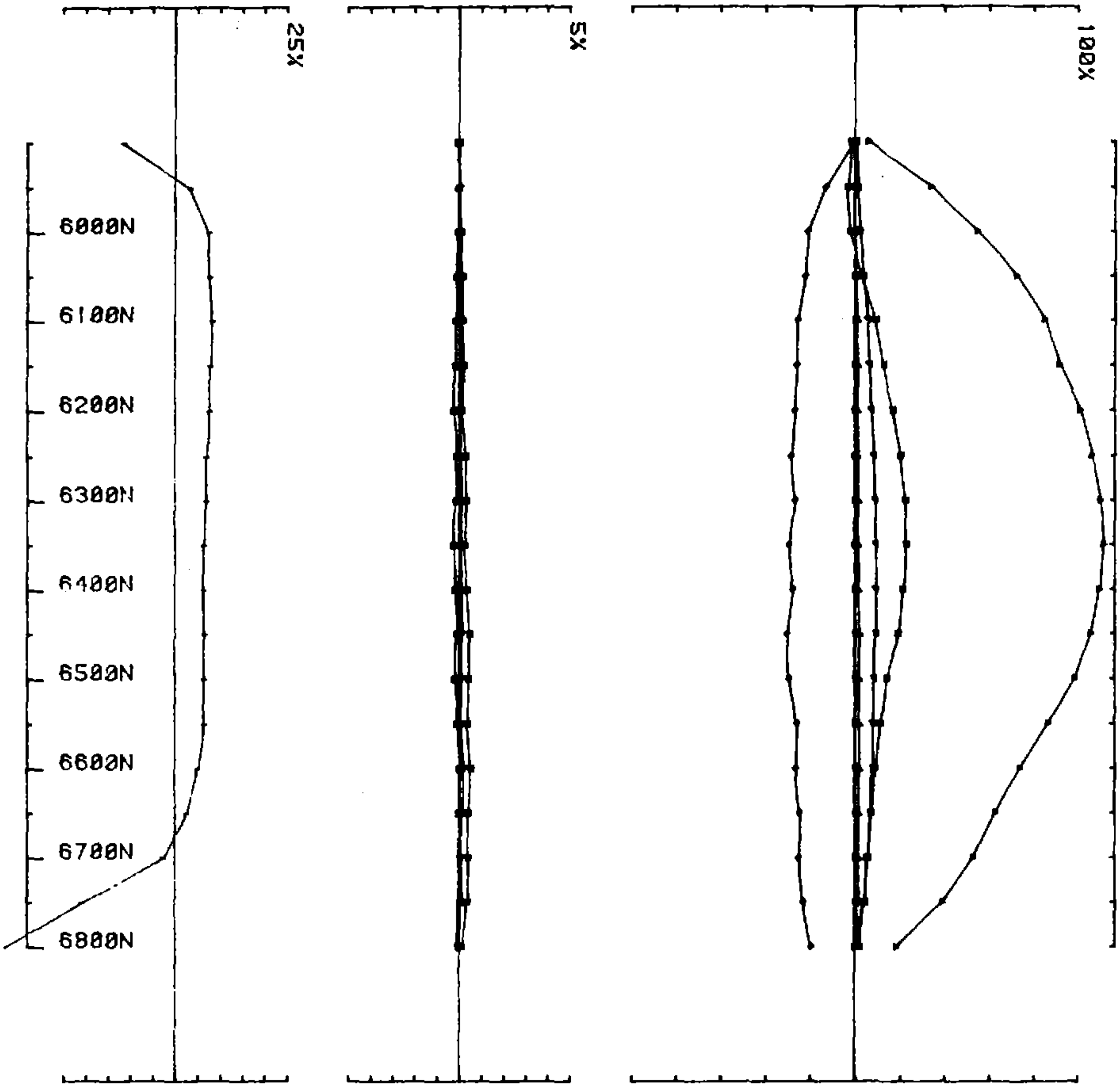
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

loop no WC 2 line 3800E component Hz secondary field Ch 1 point norm.

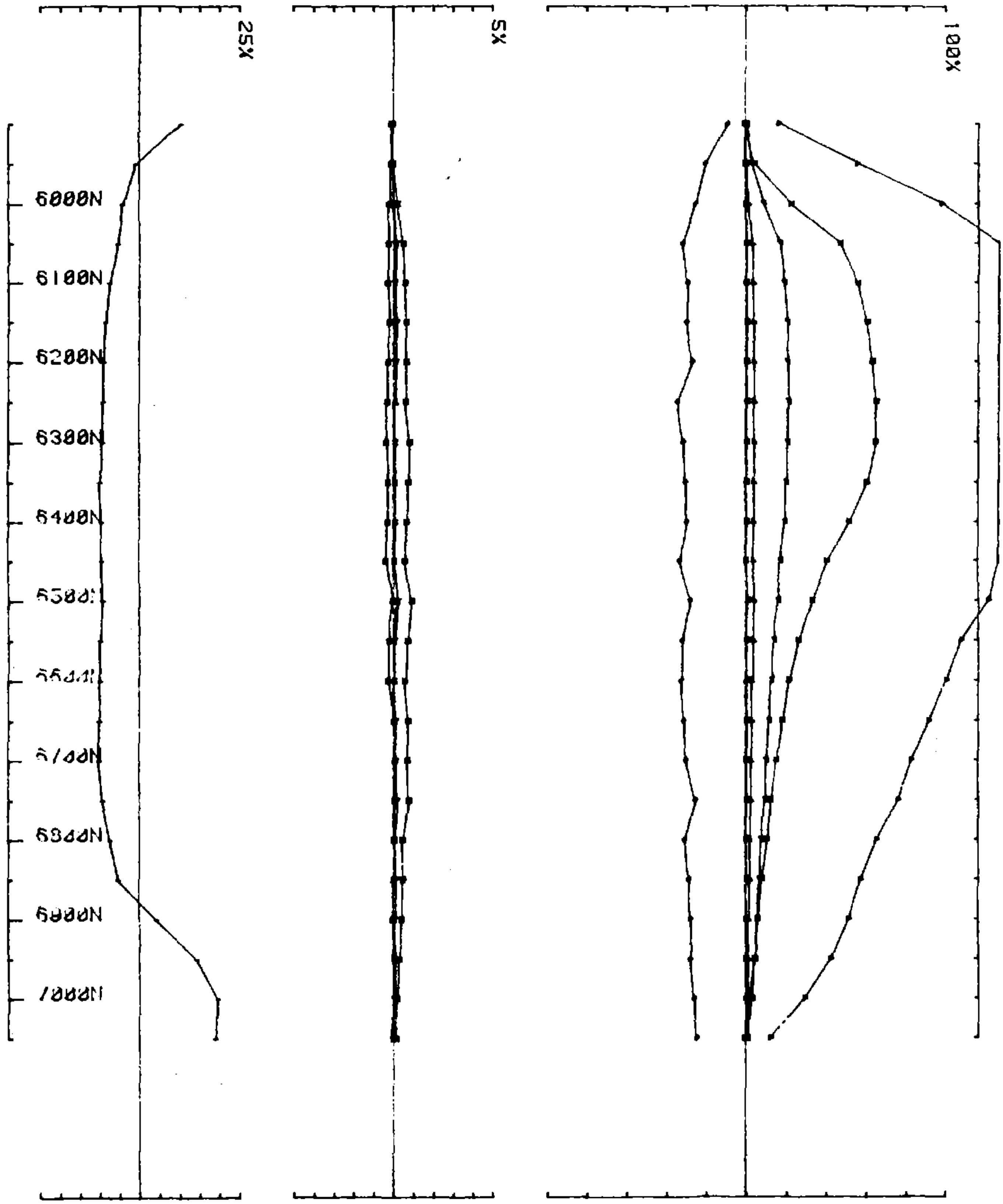
09J




UTEM SURVEY at WEST COMSTOCK for B H P
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 2 line 4000E component Hz secondary field Ch 1 point norm.



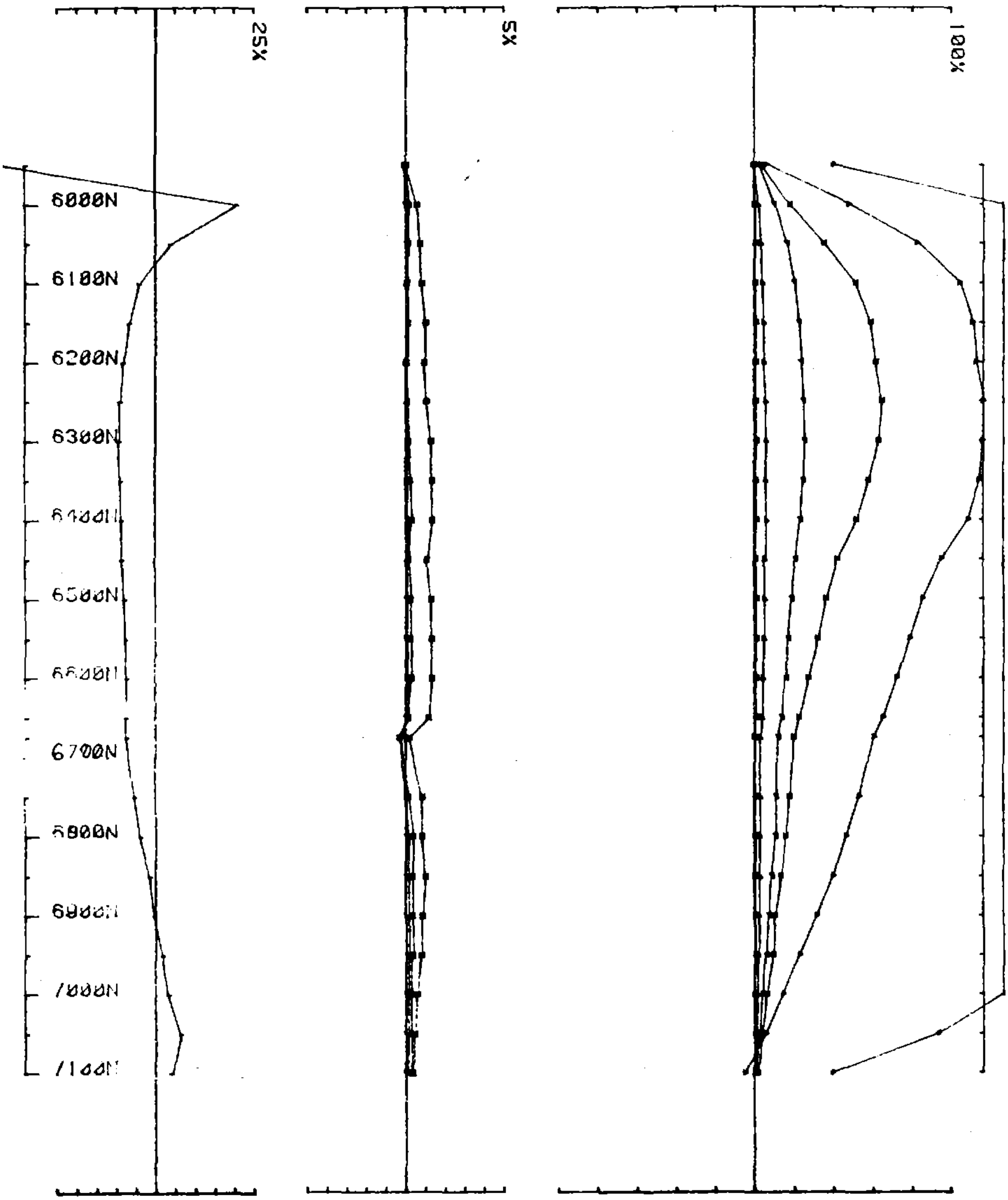

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 3 line 2800E component Hz secondary field Ch I contin. norm.




UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

loop no WC 3 line 3000E component Hz secondary field Ch 1 contin. norm.



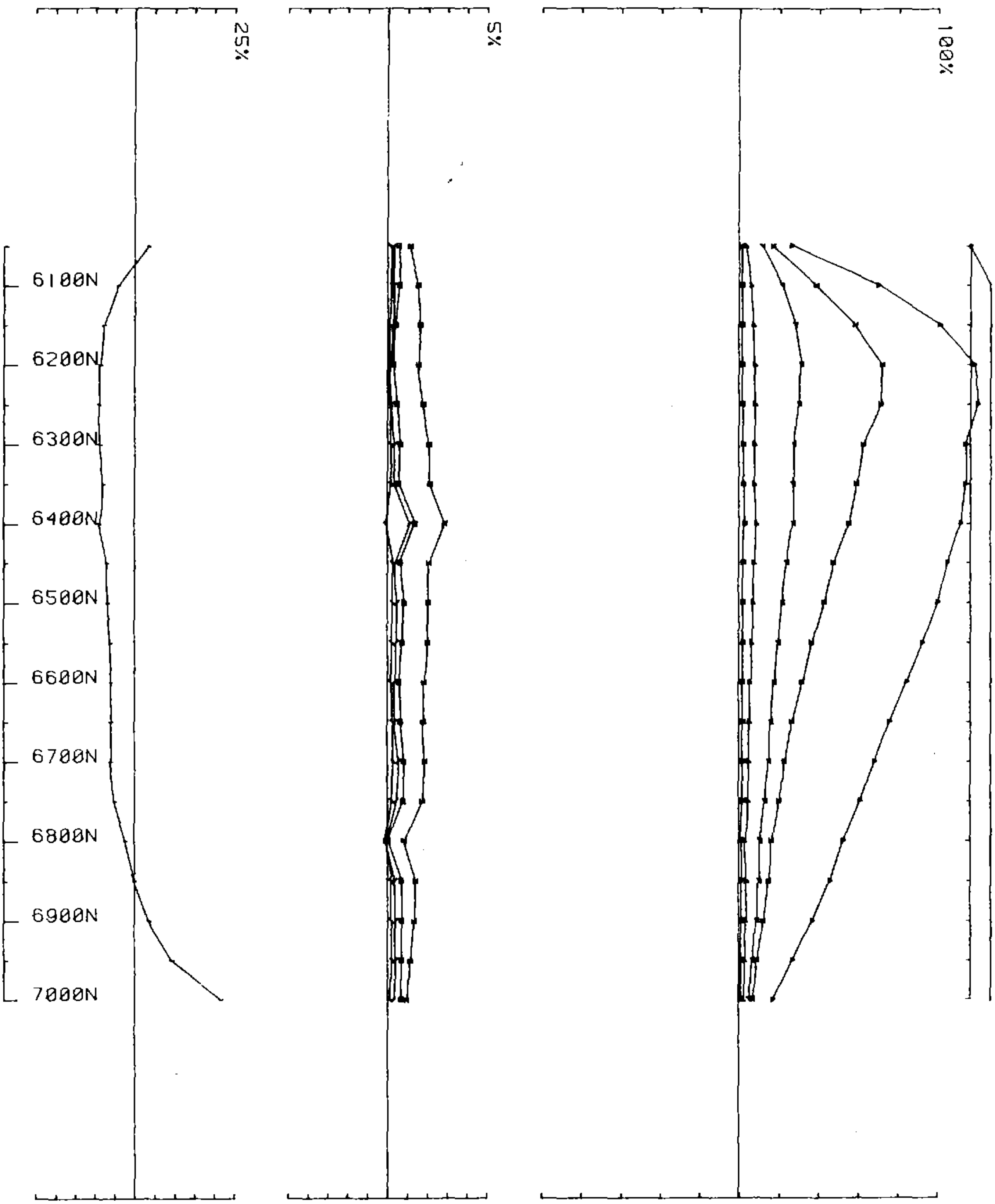

UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

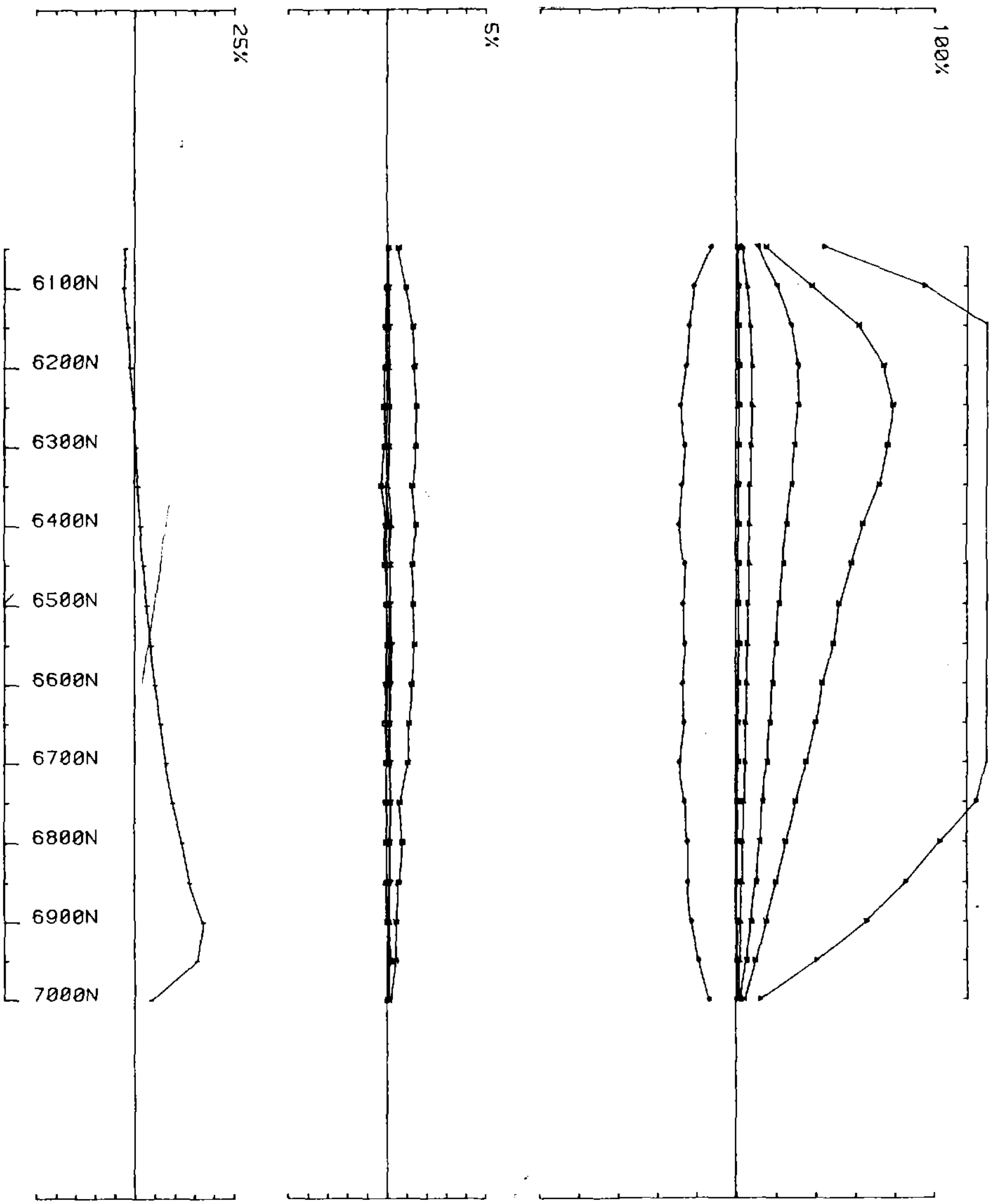
loop no WC 3 line 3200E component Hz secondary field Ch 1 contin. norm.

103

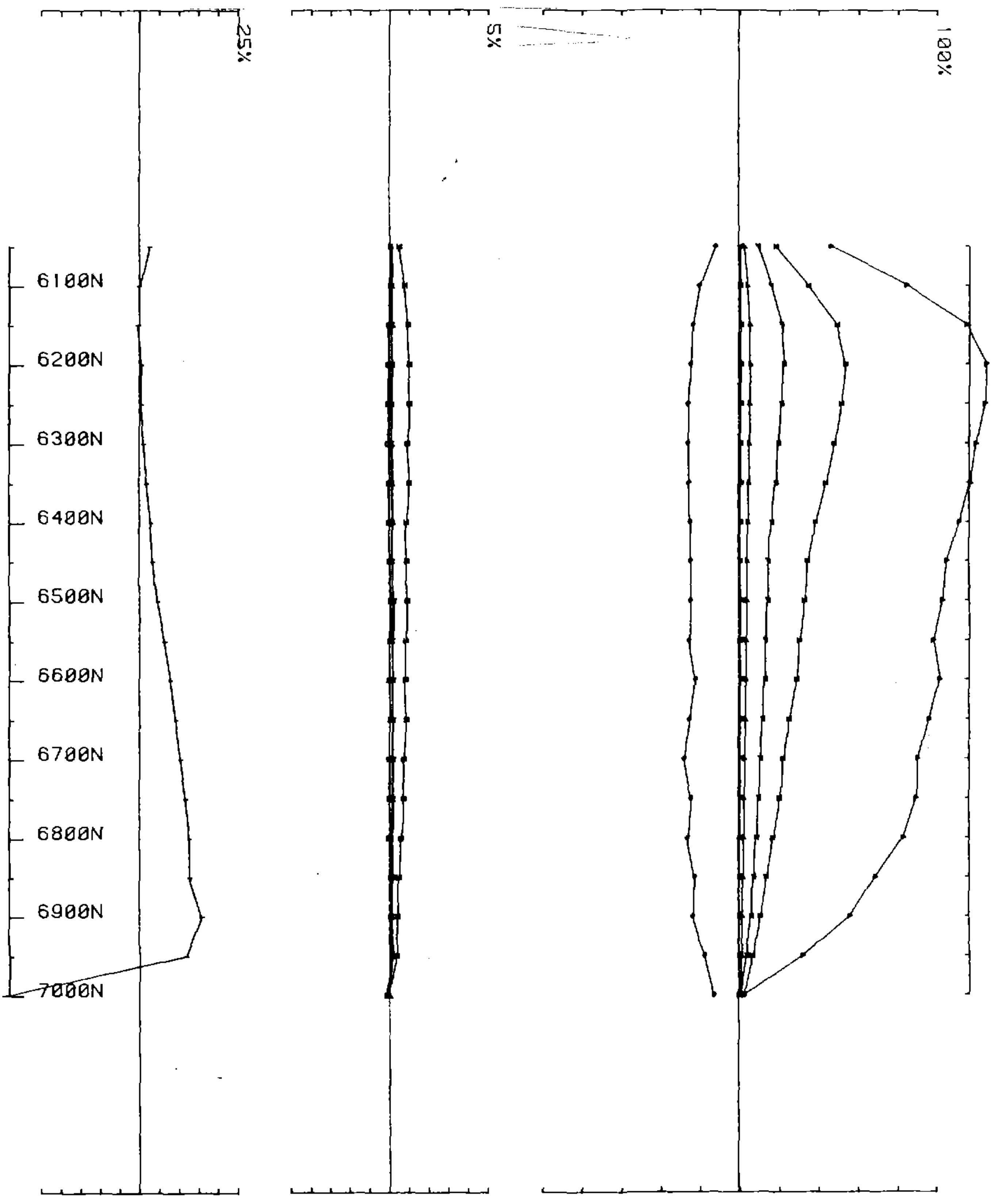
510116



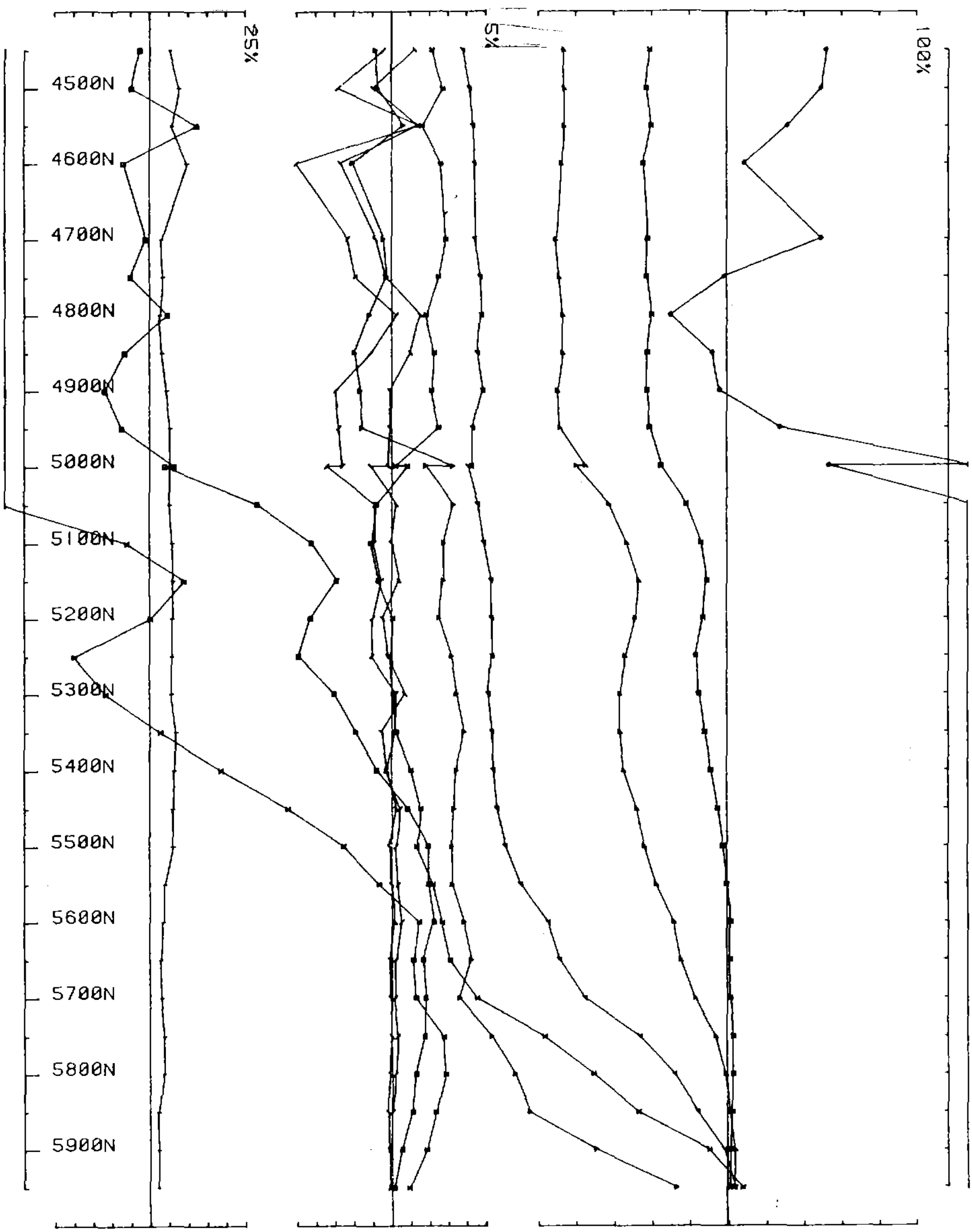

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 3 line 3400E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 3 line 3600E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 3 line 3800E component Hz secondary field Ch 1 contin. norm.



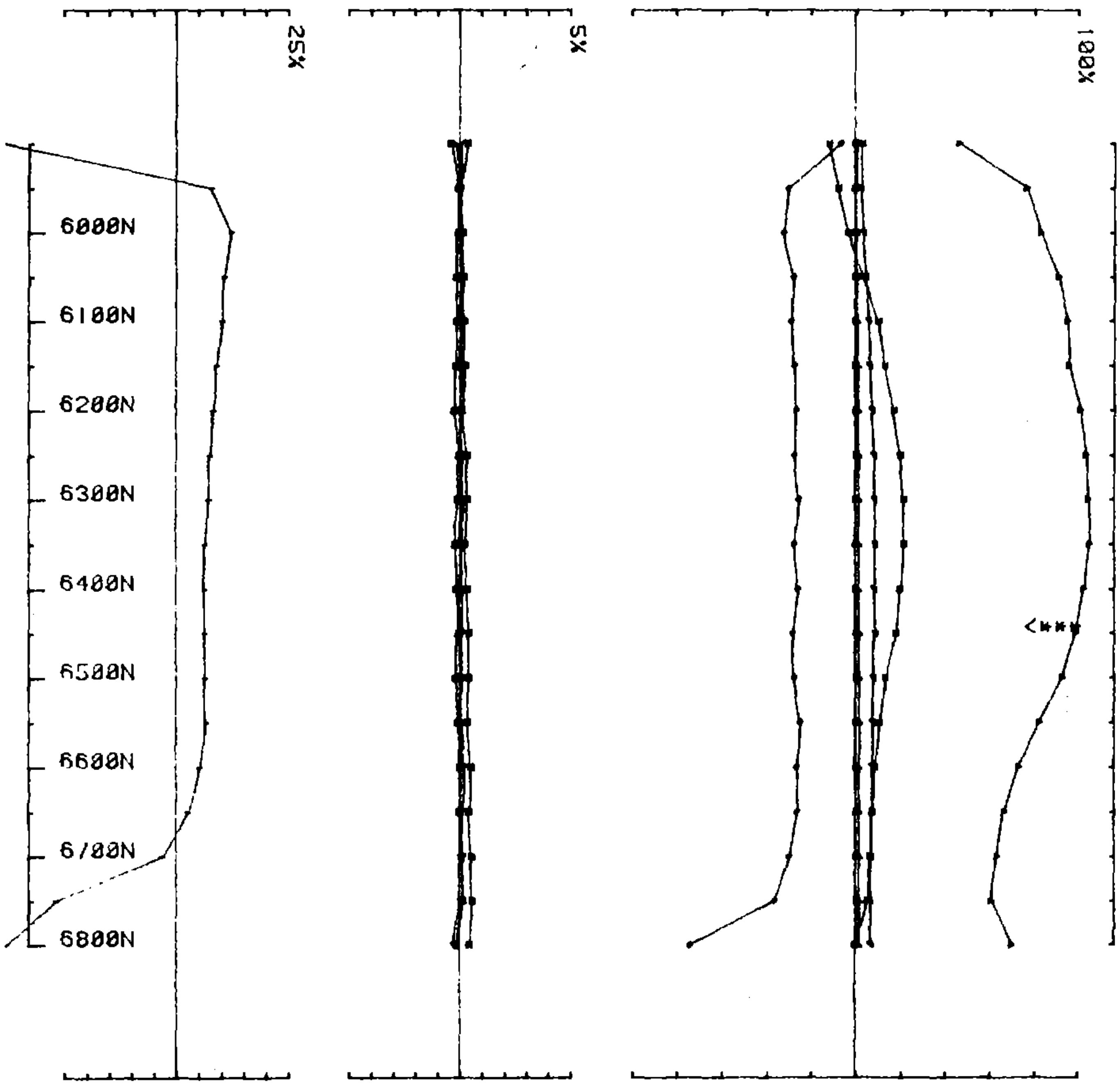

UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230

loop no 7003 line 4000E component Hz secondary field Ch 1 contin. norm.

107

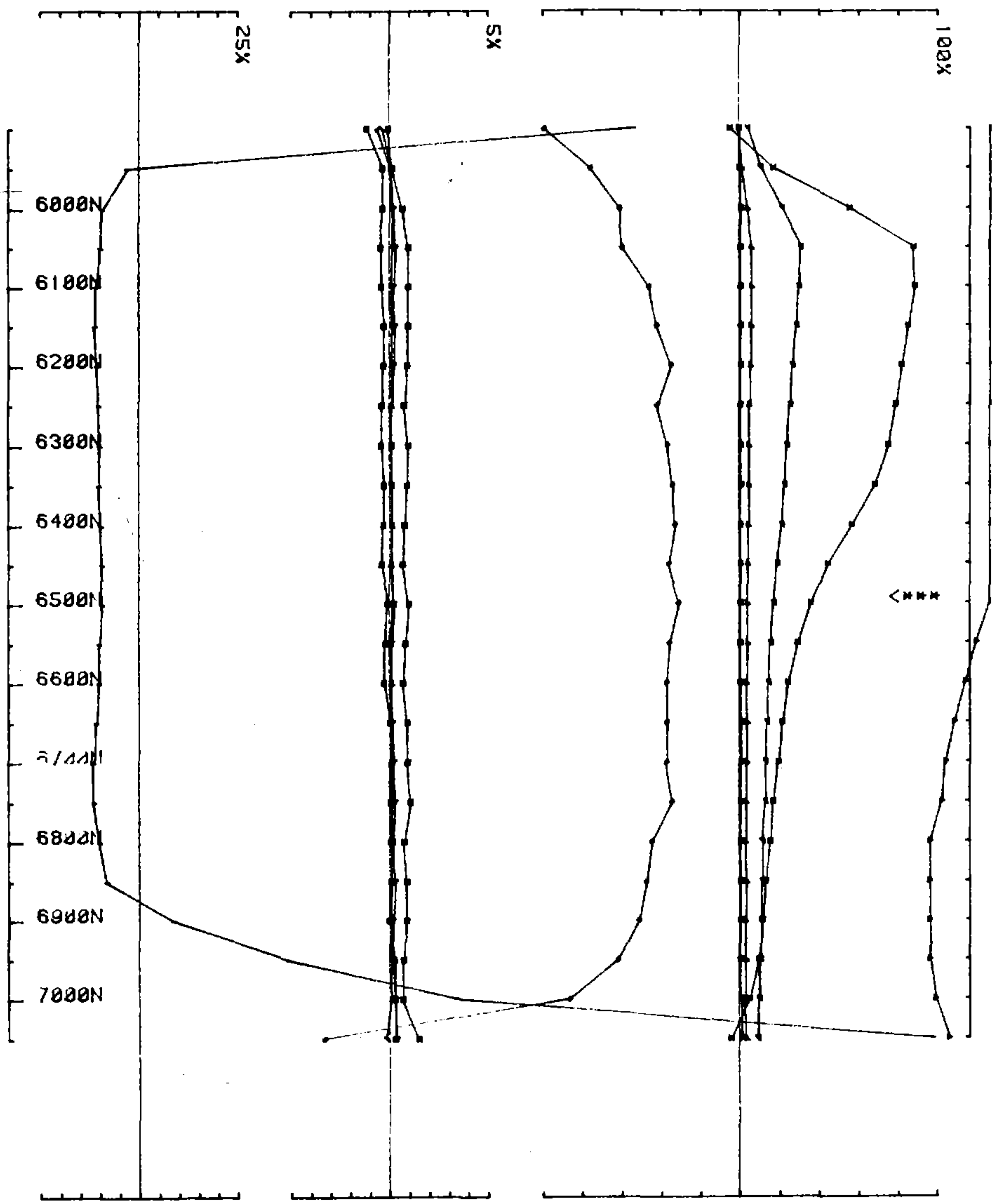
510120



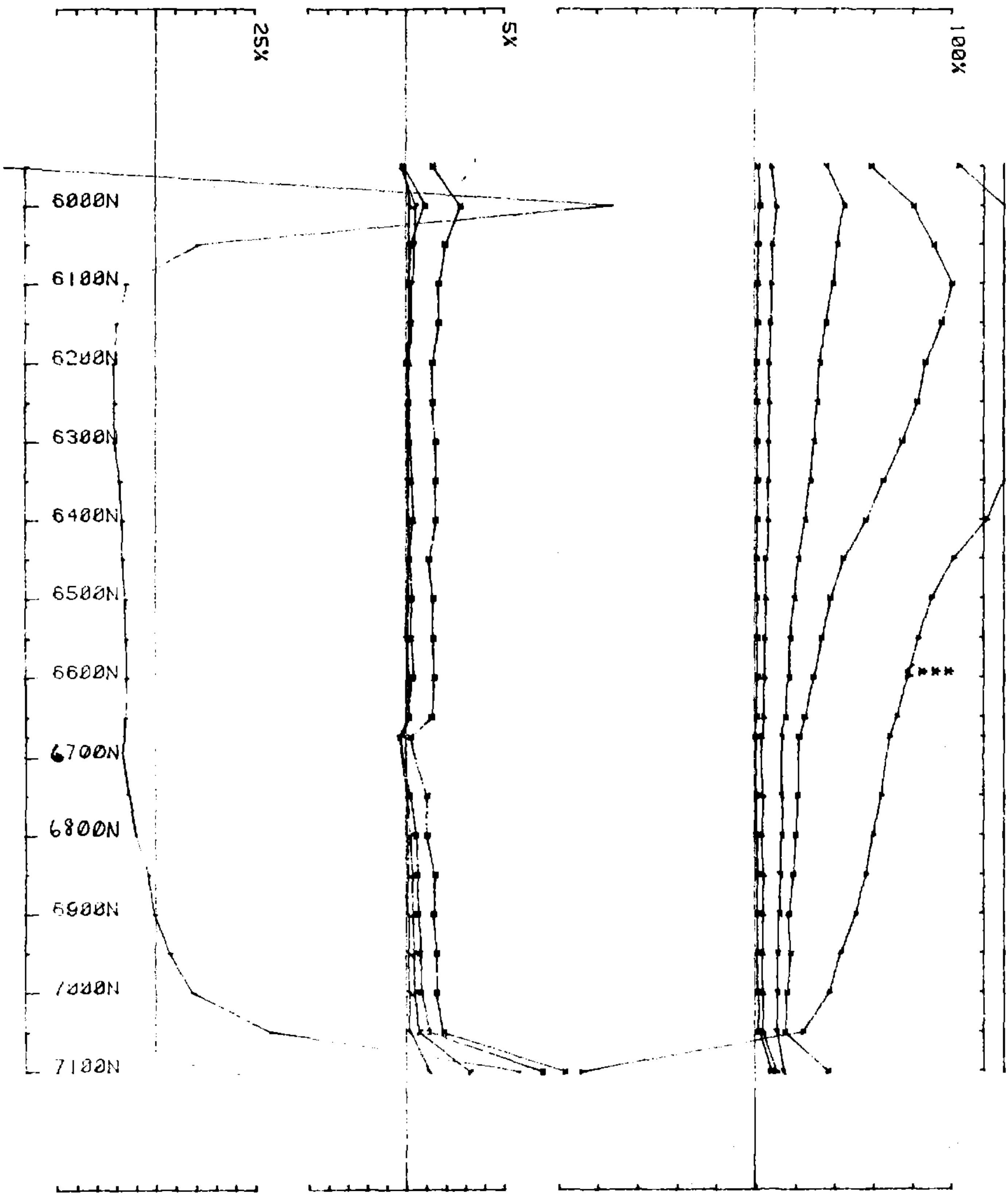

UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

loop no WC 3 line 2800E component Hz secondary field Ch 1 point norm.



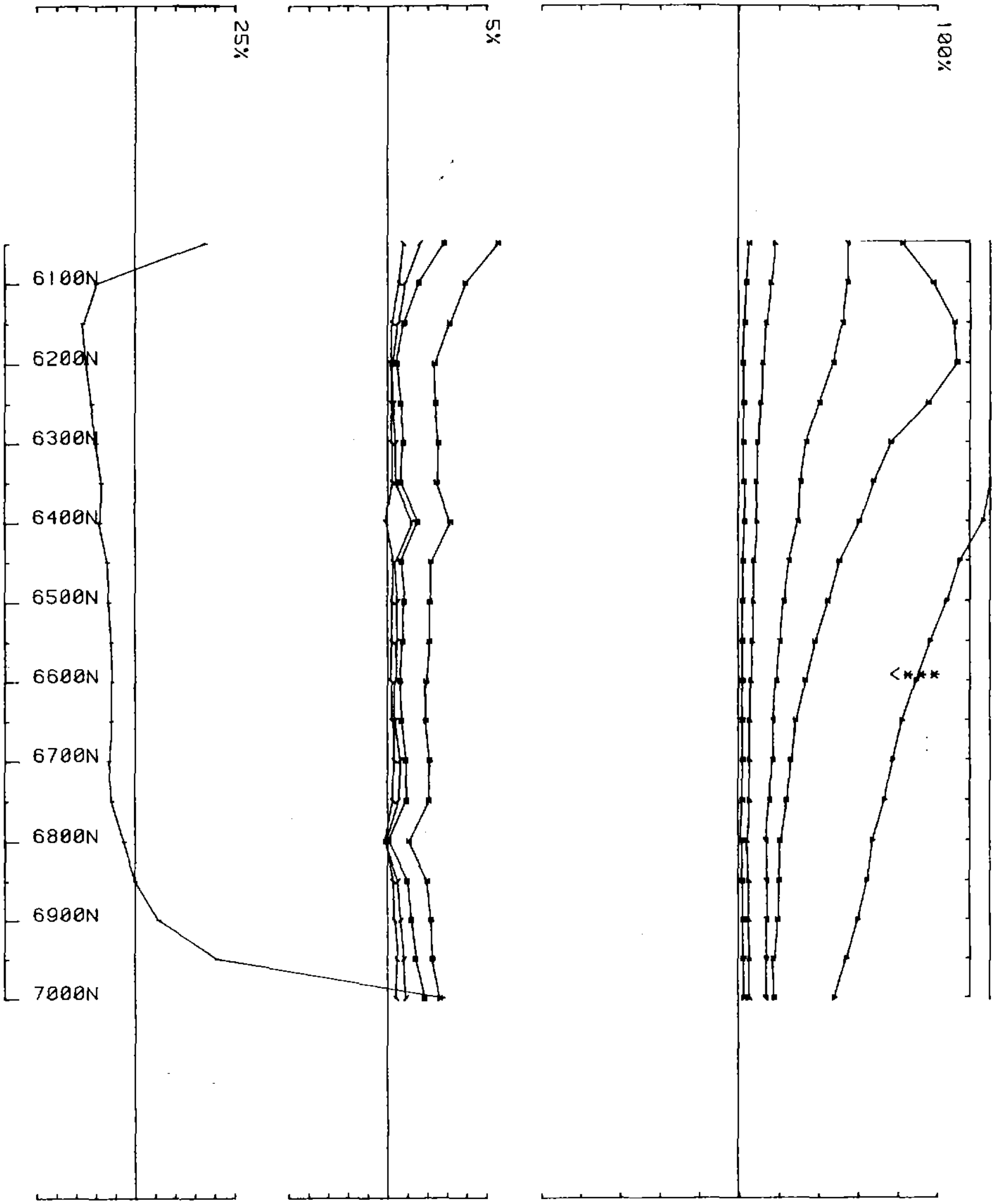

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 3 line 3000E component Hz secondary field Ch 1 point norm.



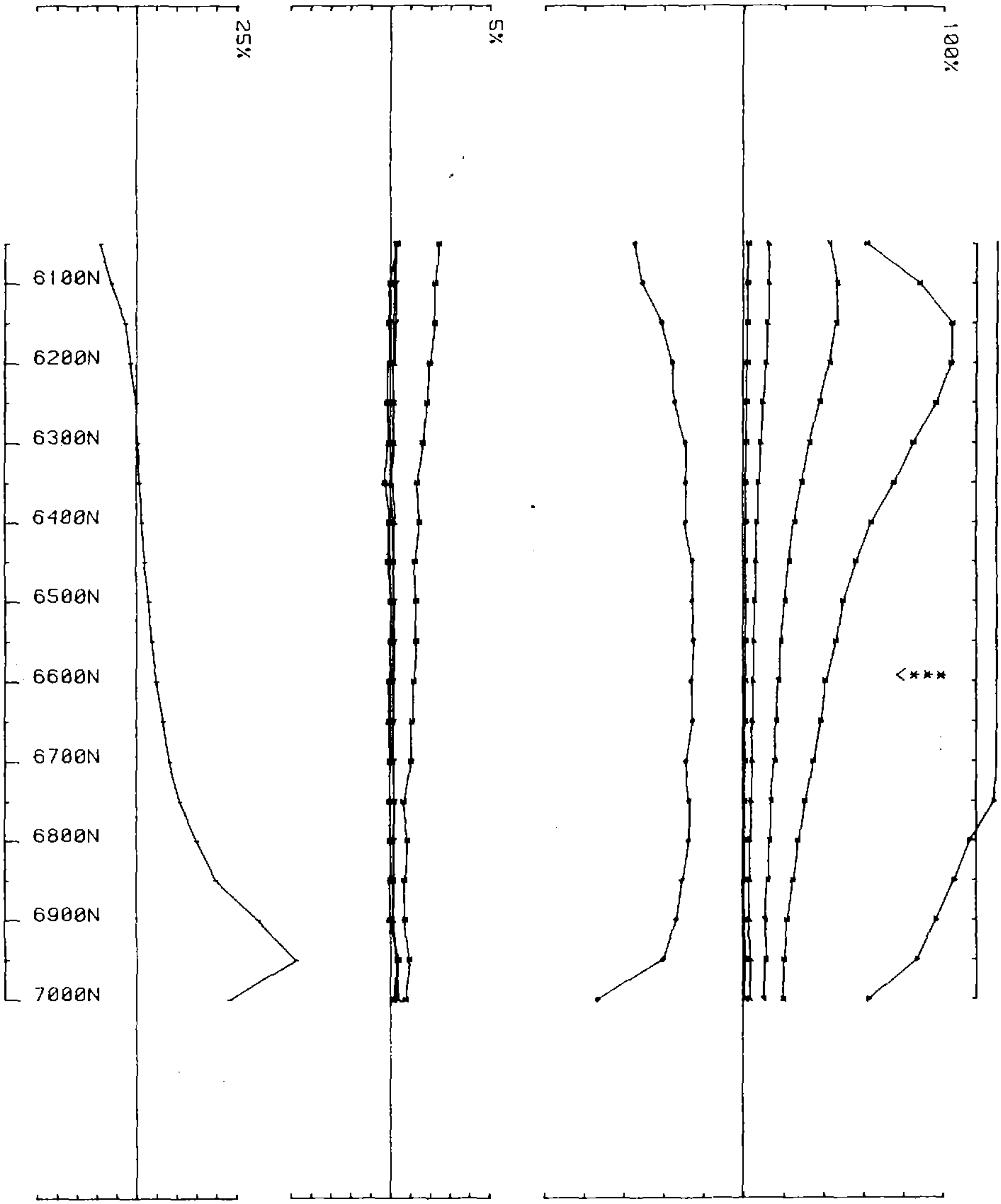

UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

loop no WC 3 line 3200E component Hz secondary field Ch 1 point norm.




UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 3 line 3400E component Hz secondary field Ch 1 point norm.



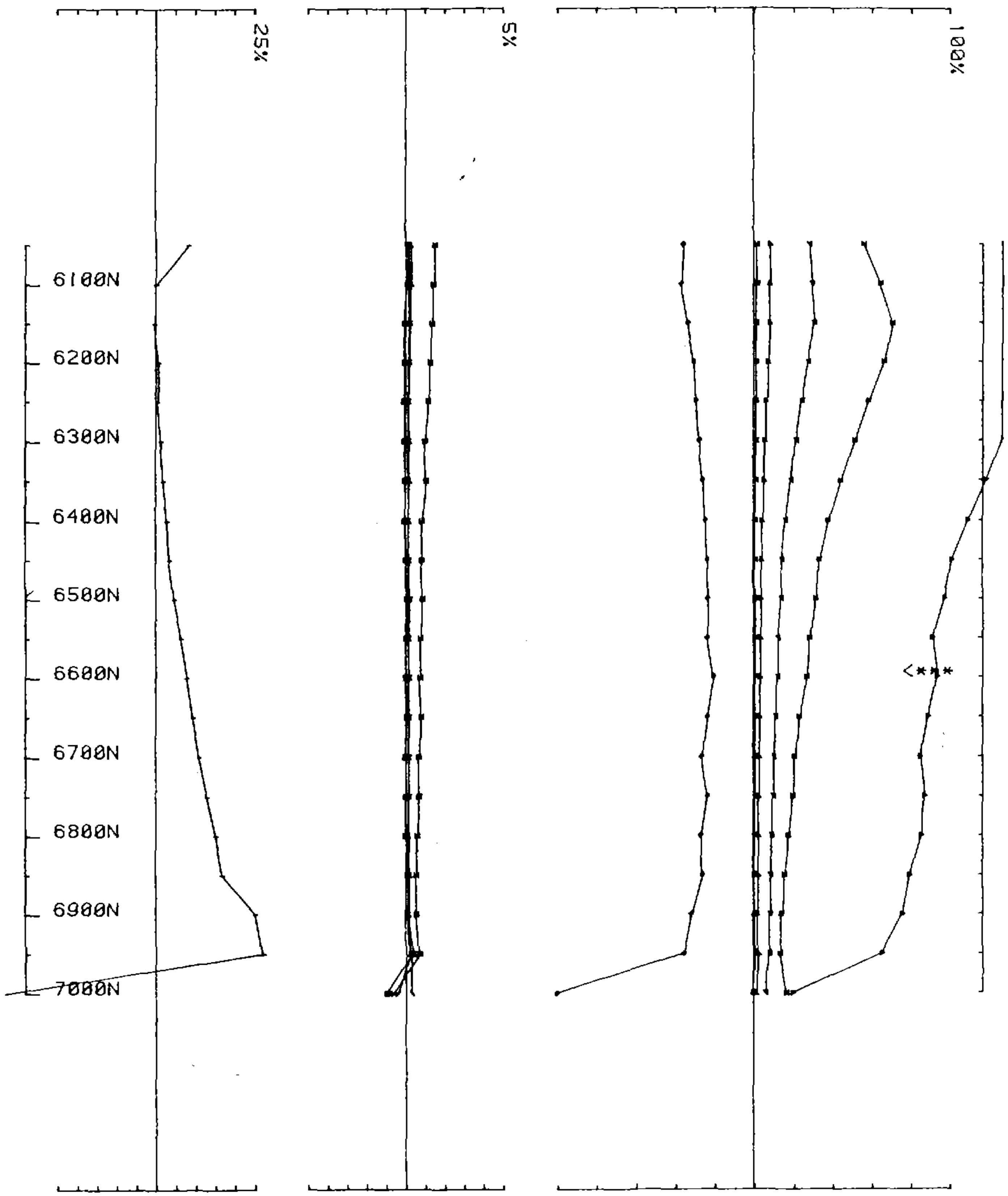

UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

loop no WC 3 line 3600E component Hz secondary field Ch 1 point norm.

112

510125



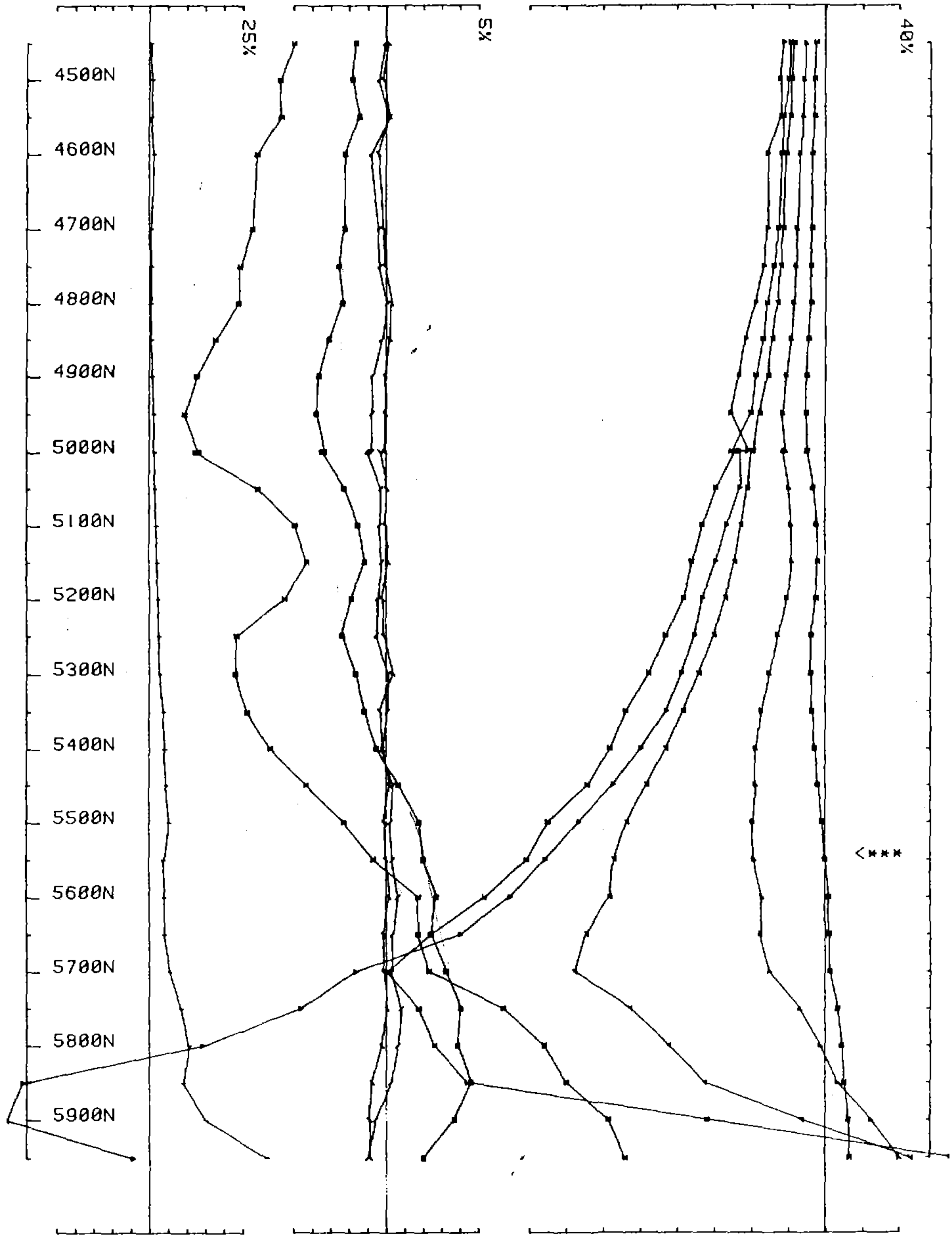

UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

loop no WC 3 line 3800E component Hz secondary field Ch 1 point norm.

113

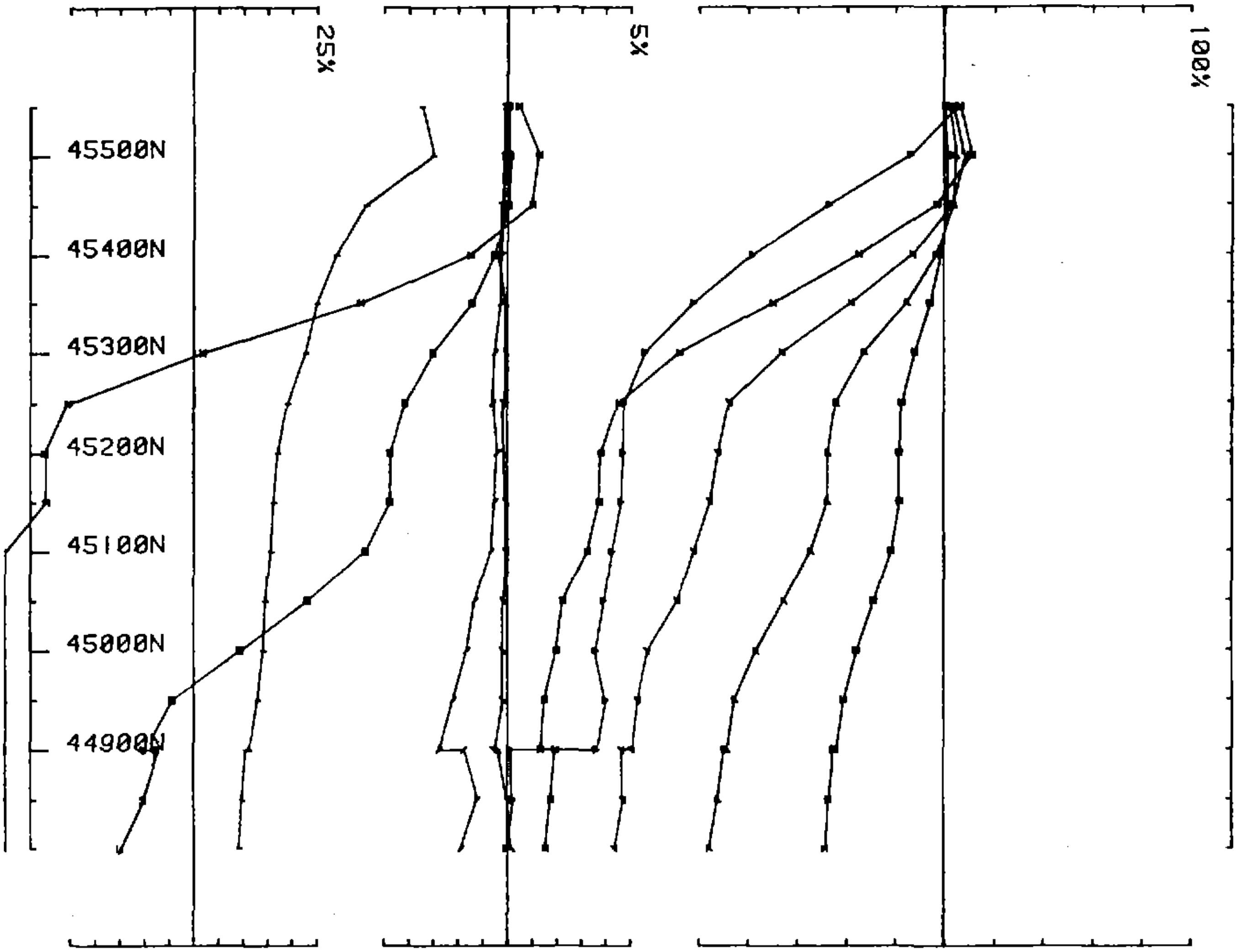
510126



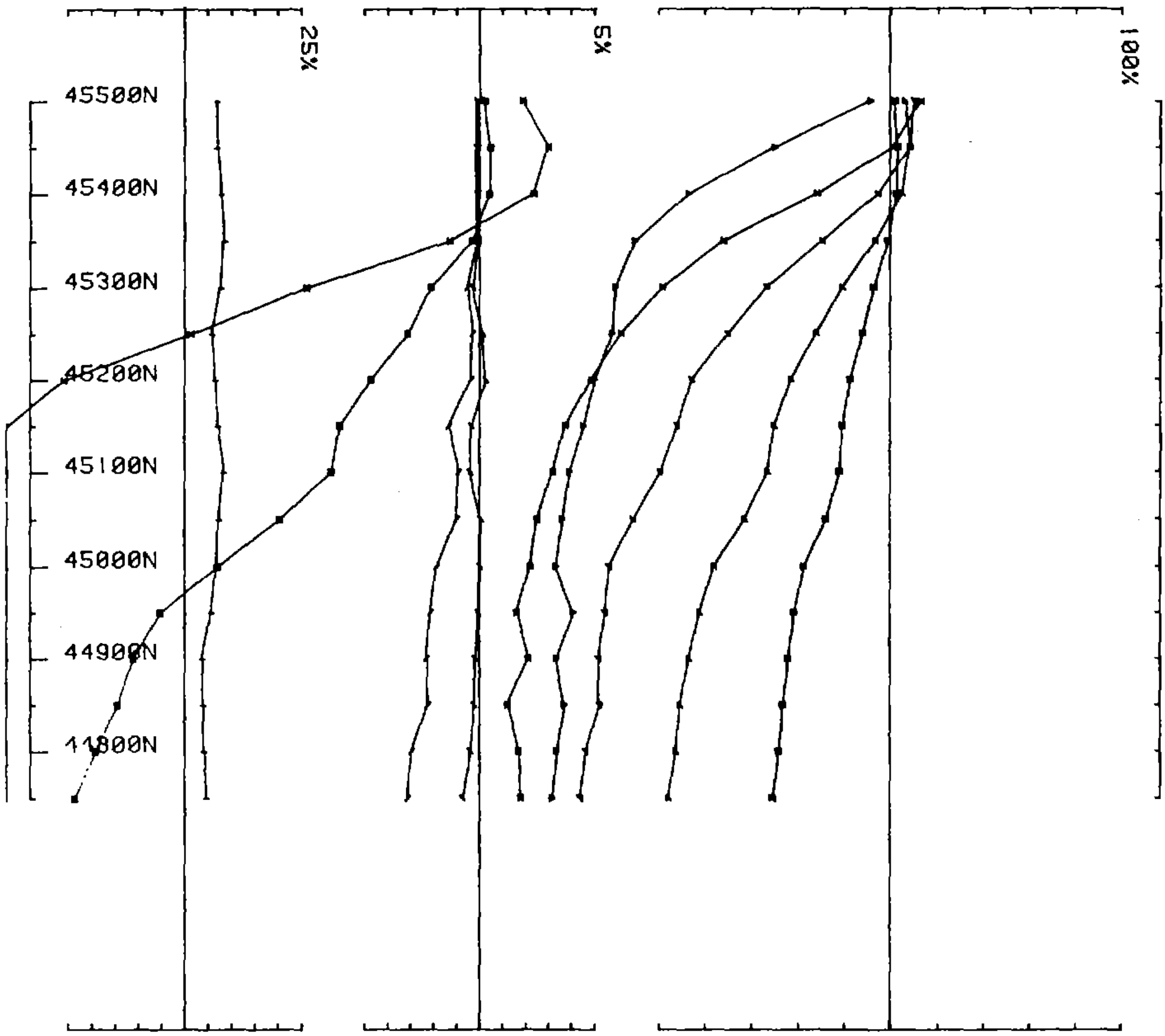

UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

loop no WC 3 line 4000E component Hz secondary field Ch 1 point norm.



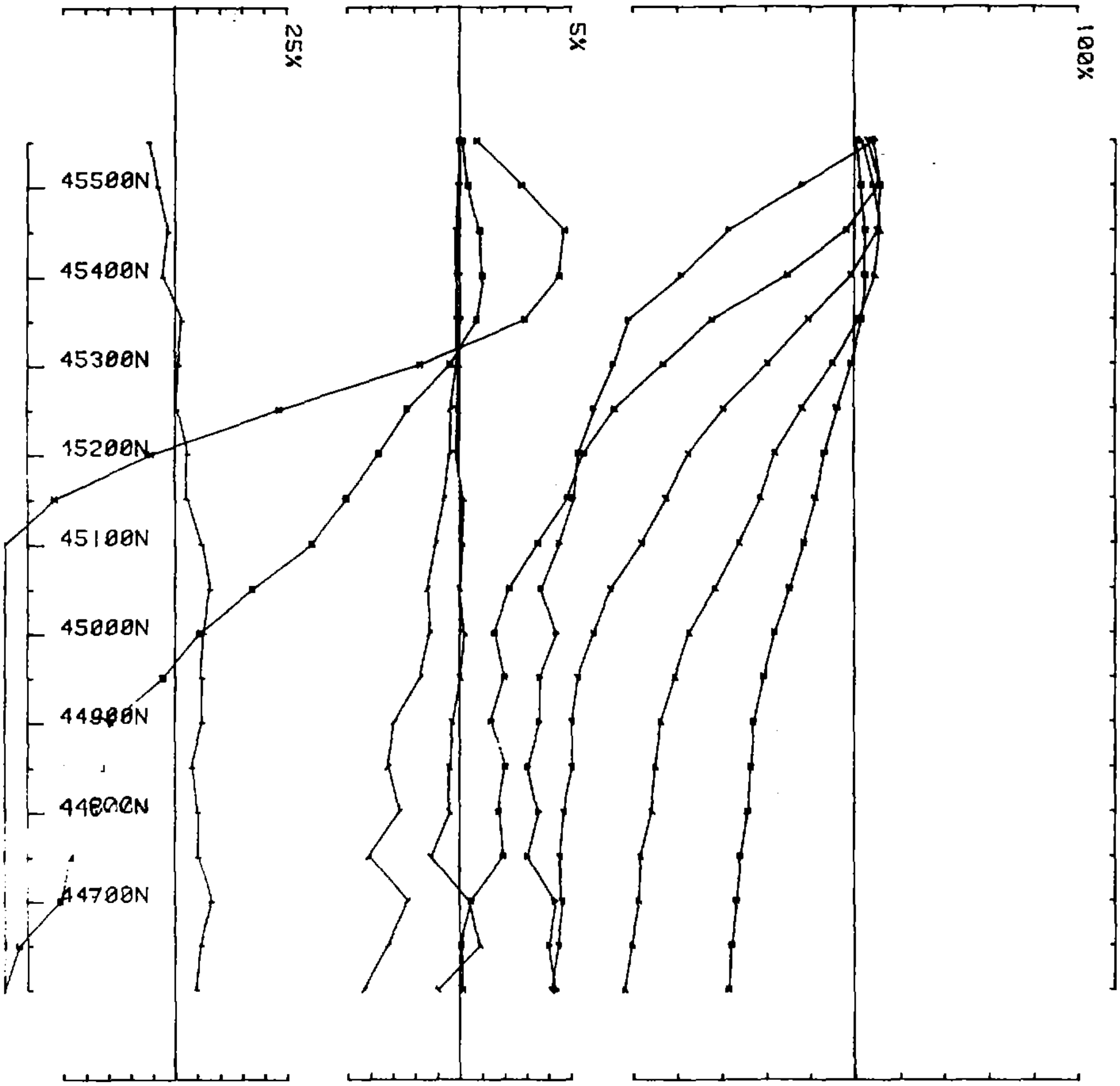

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989
loop no WC4 line 84000E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989

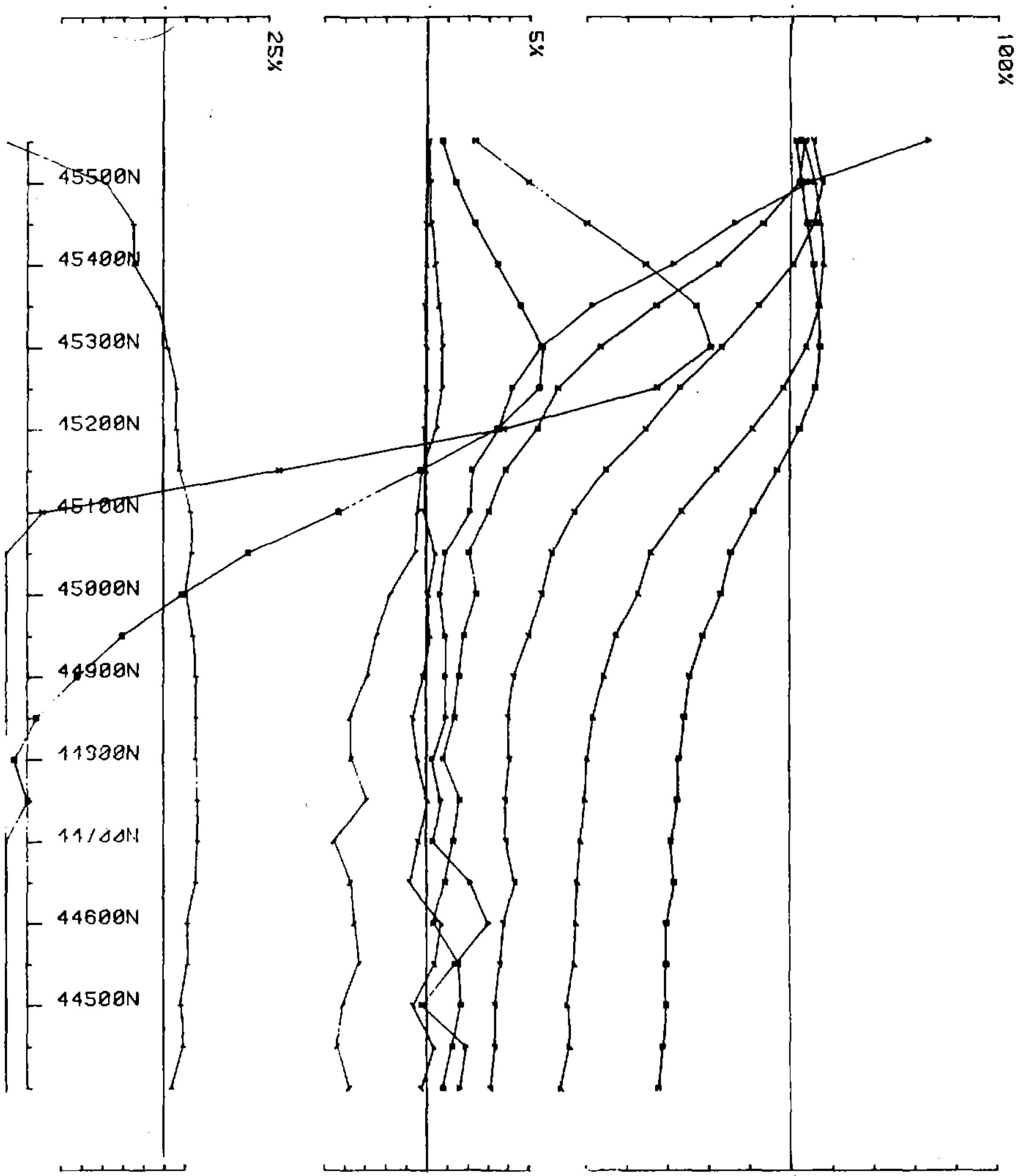
loop no WC4 line 84100E component secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 bas. freq (hz) 26.230 Nov 1989
loop no WC4 line 84200E component Hz secondary field Ch 1 contin. norm.

117



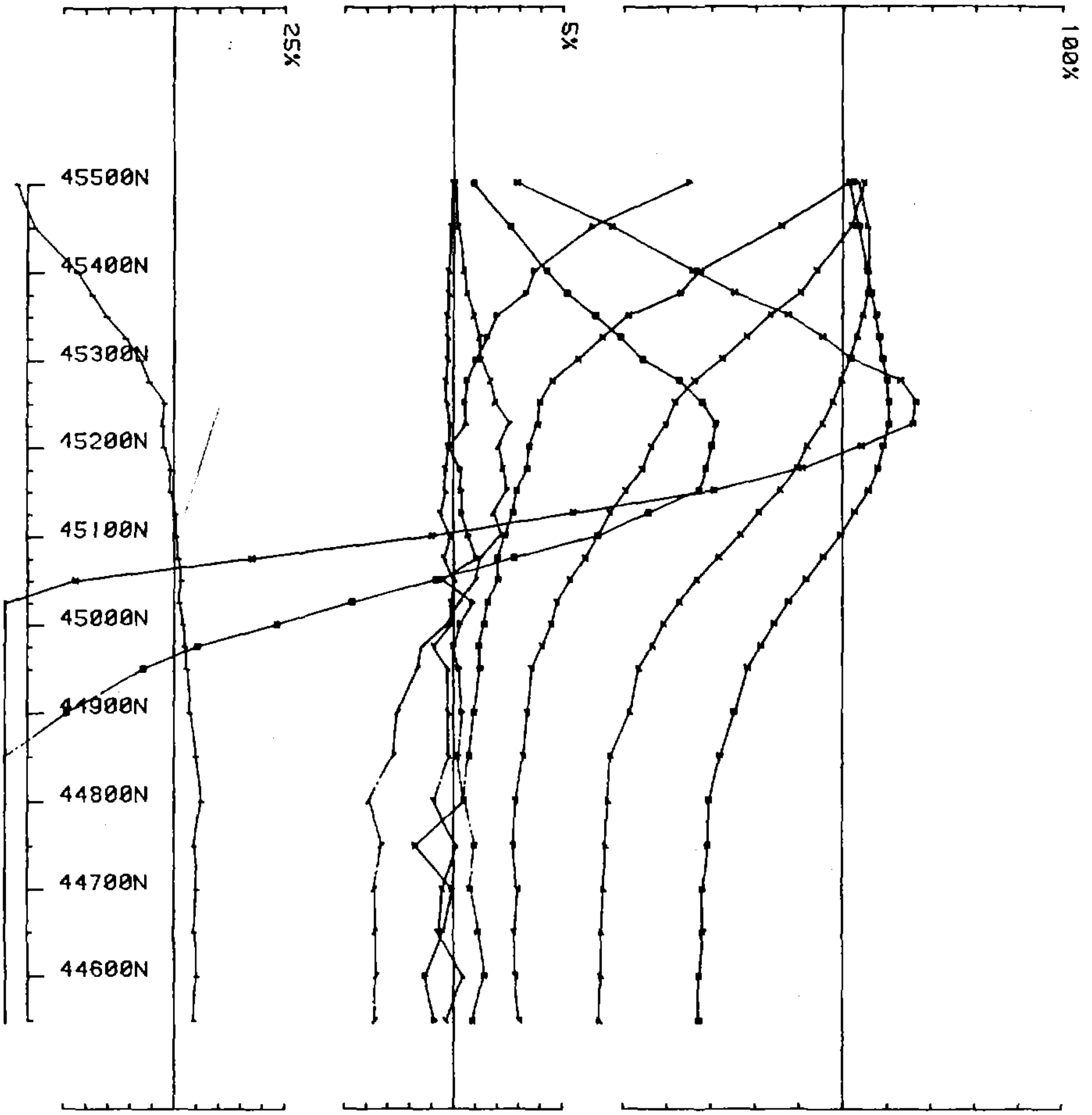



UTEM SURVEY at WEST COMSTOCK for BHP

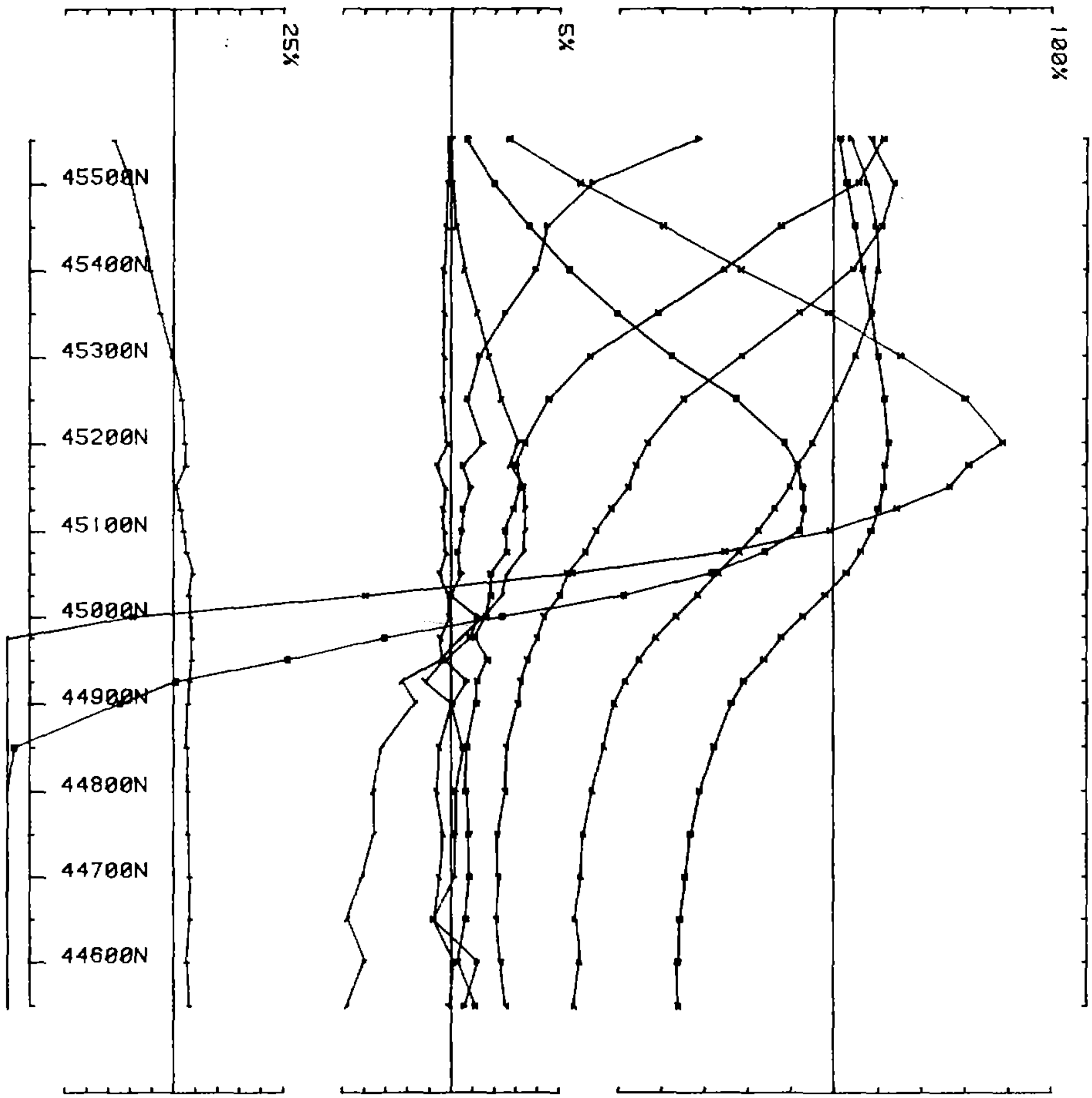
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989

loop no WC4 line 84400E component Hz secondary field Ch 1 contin. norm.

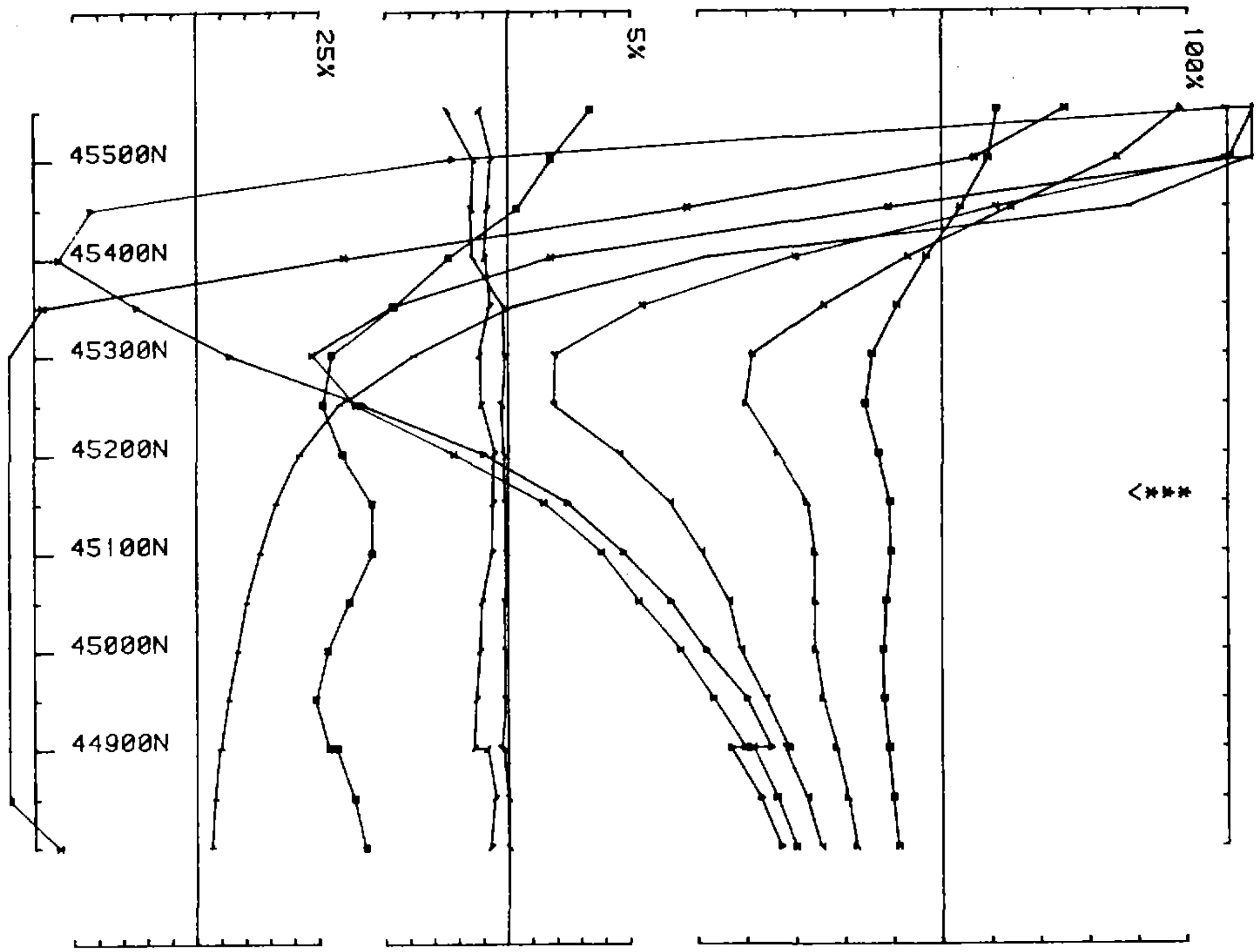
118



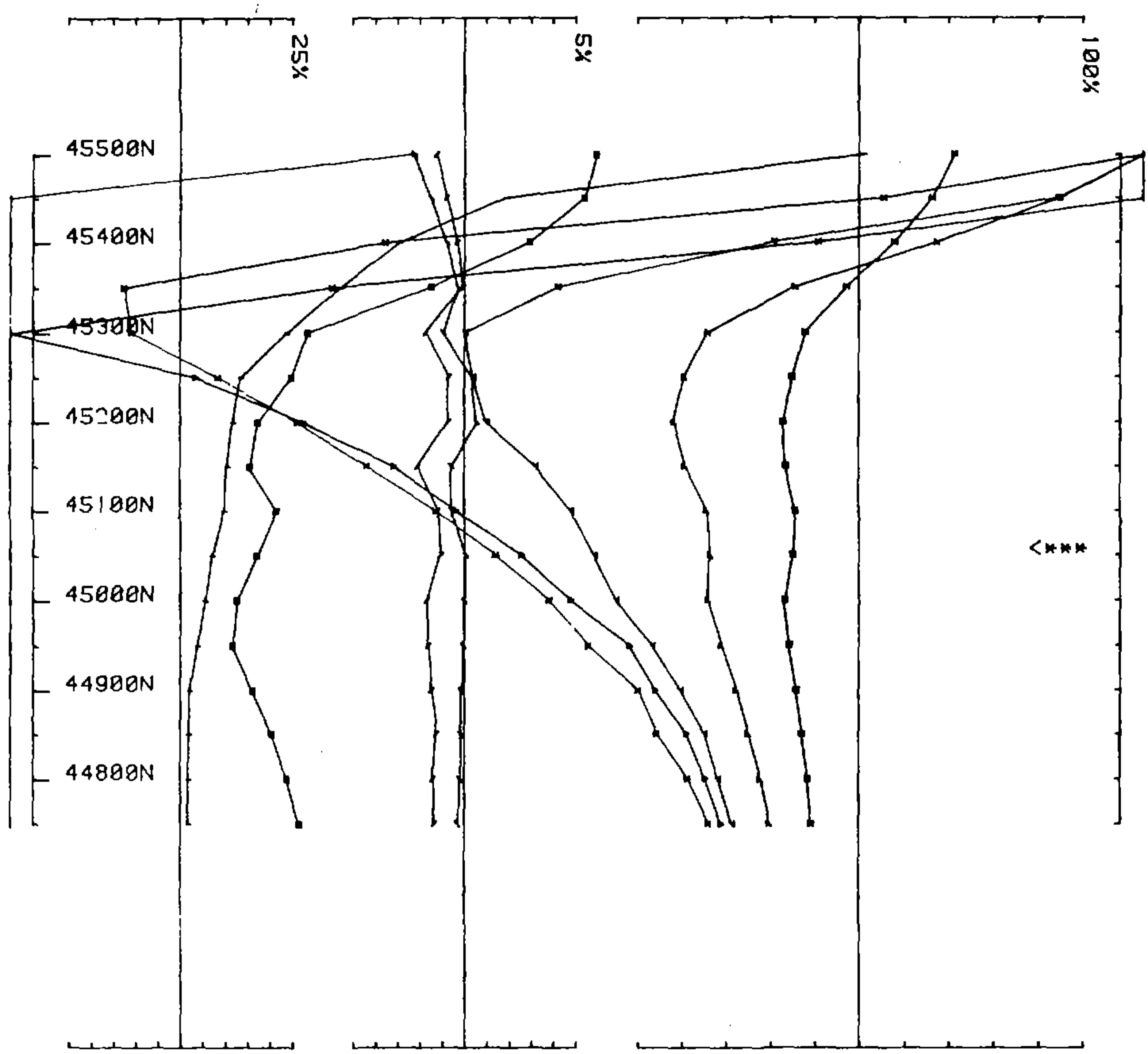

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989
loop no WC4 line 84600E component Hz secondary field Ch 1 contin. norm.



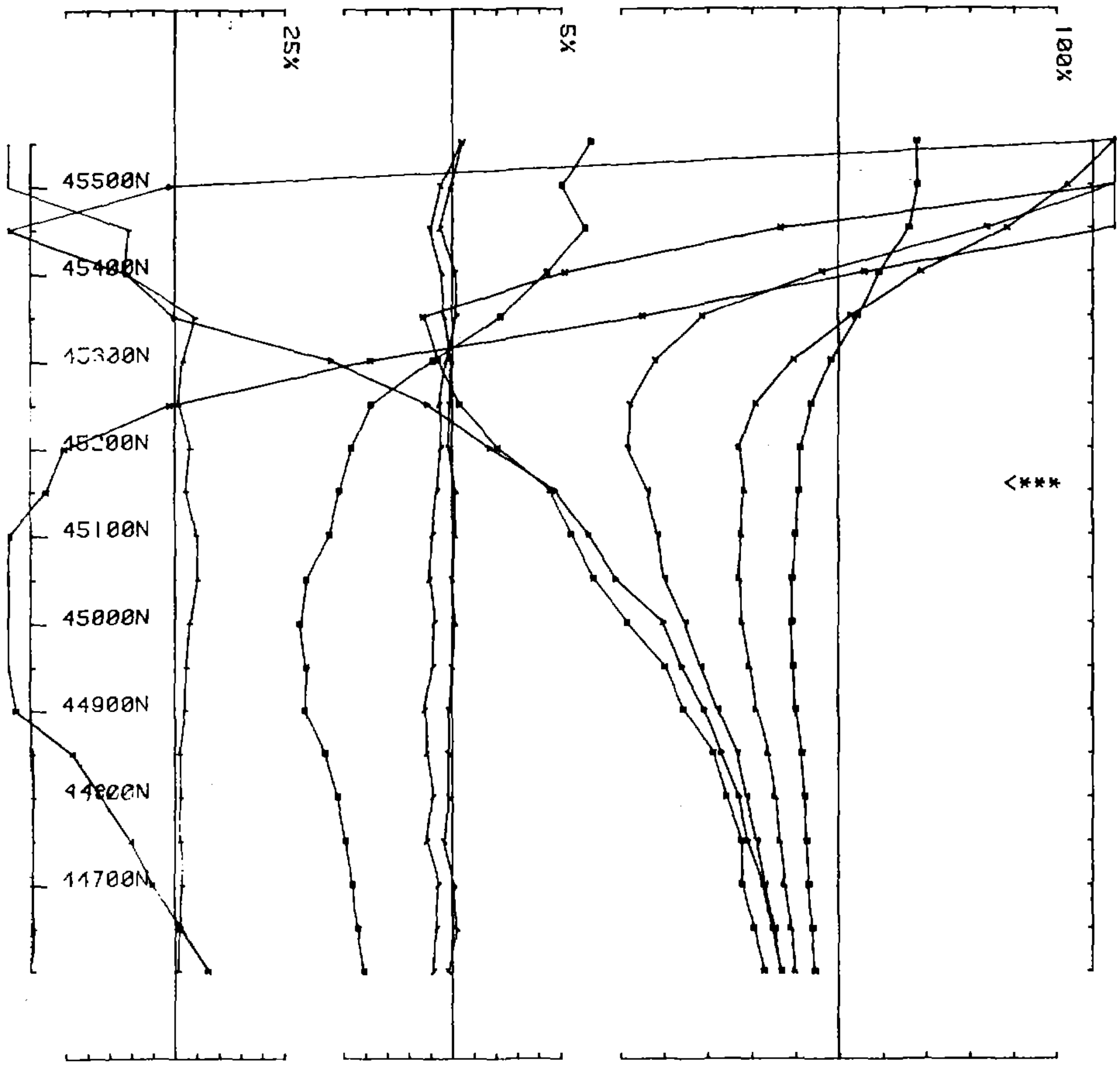

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989
loop no WC4 line 84800E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989
loop no WC3 line 84000E component Hz secondary field Ch I point norm.



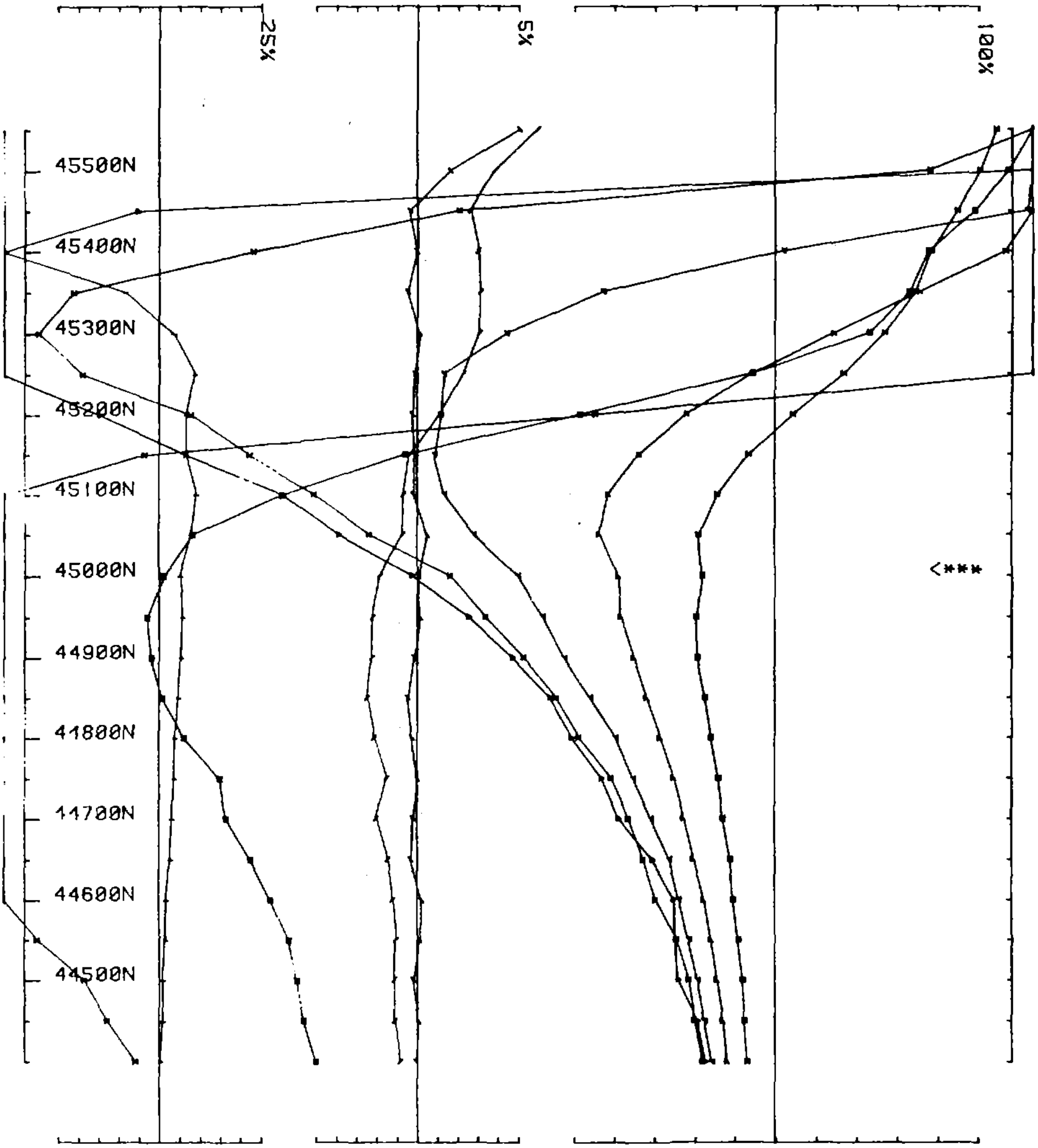

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8973 base freq (hz) 26.230 Nov 1989
loop no WC4 line 84100E component Hz secondary field Ch 1 point norm.



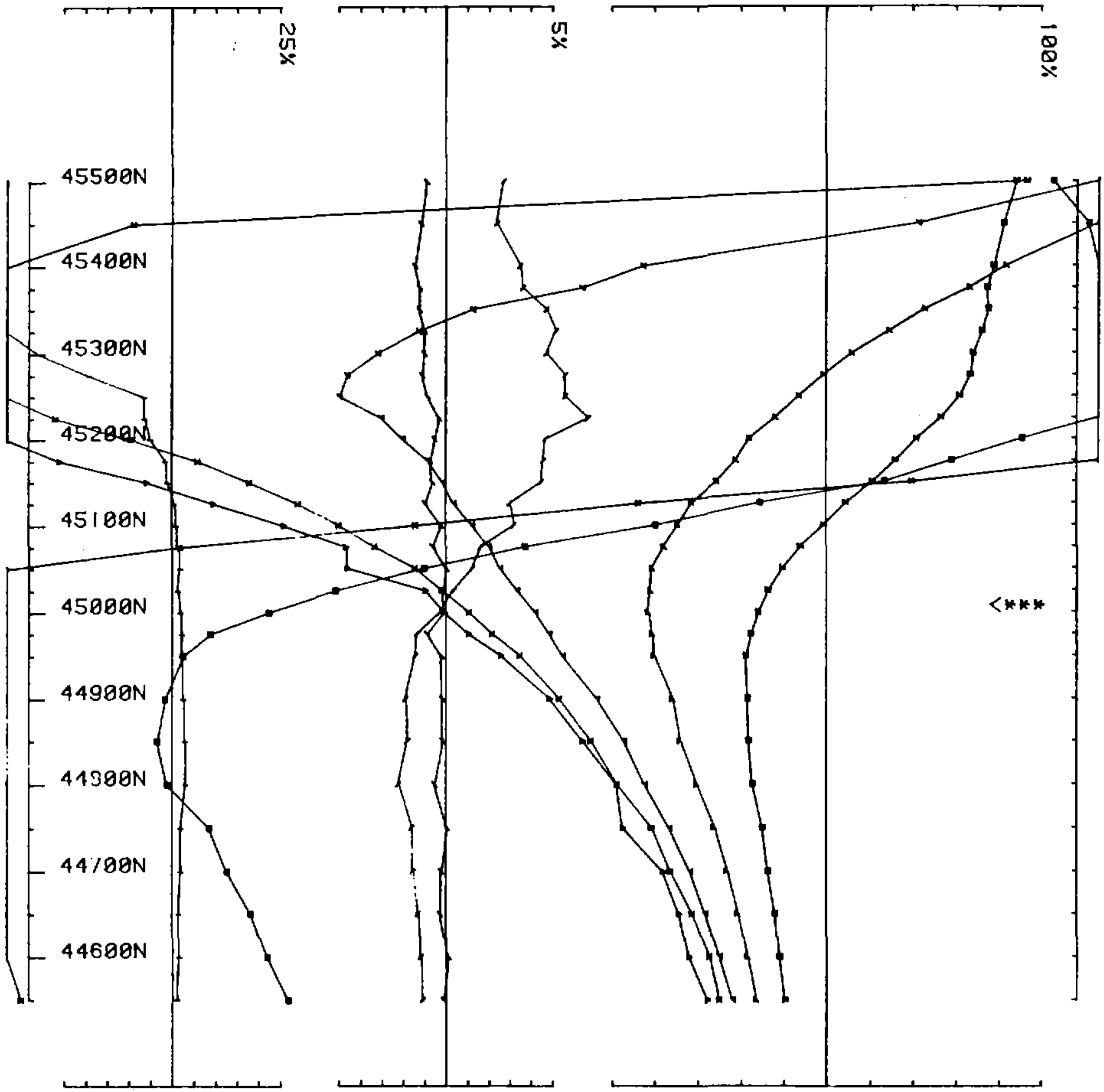

UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989

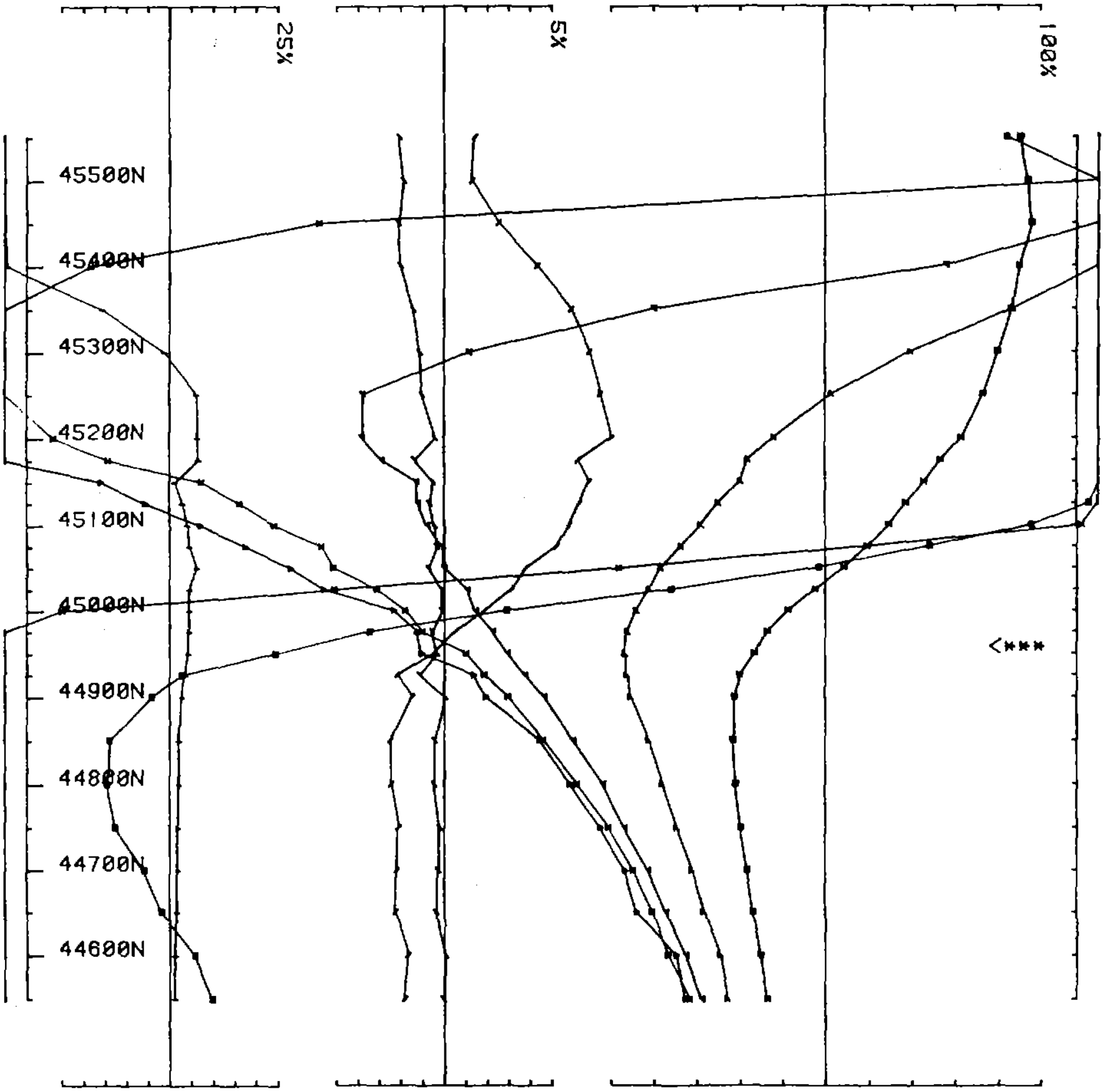
loop no WC4 line 84200E component Hz secondary field Ch I point norm.



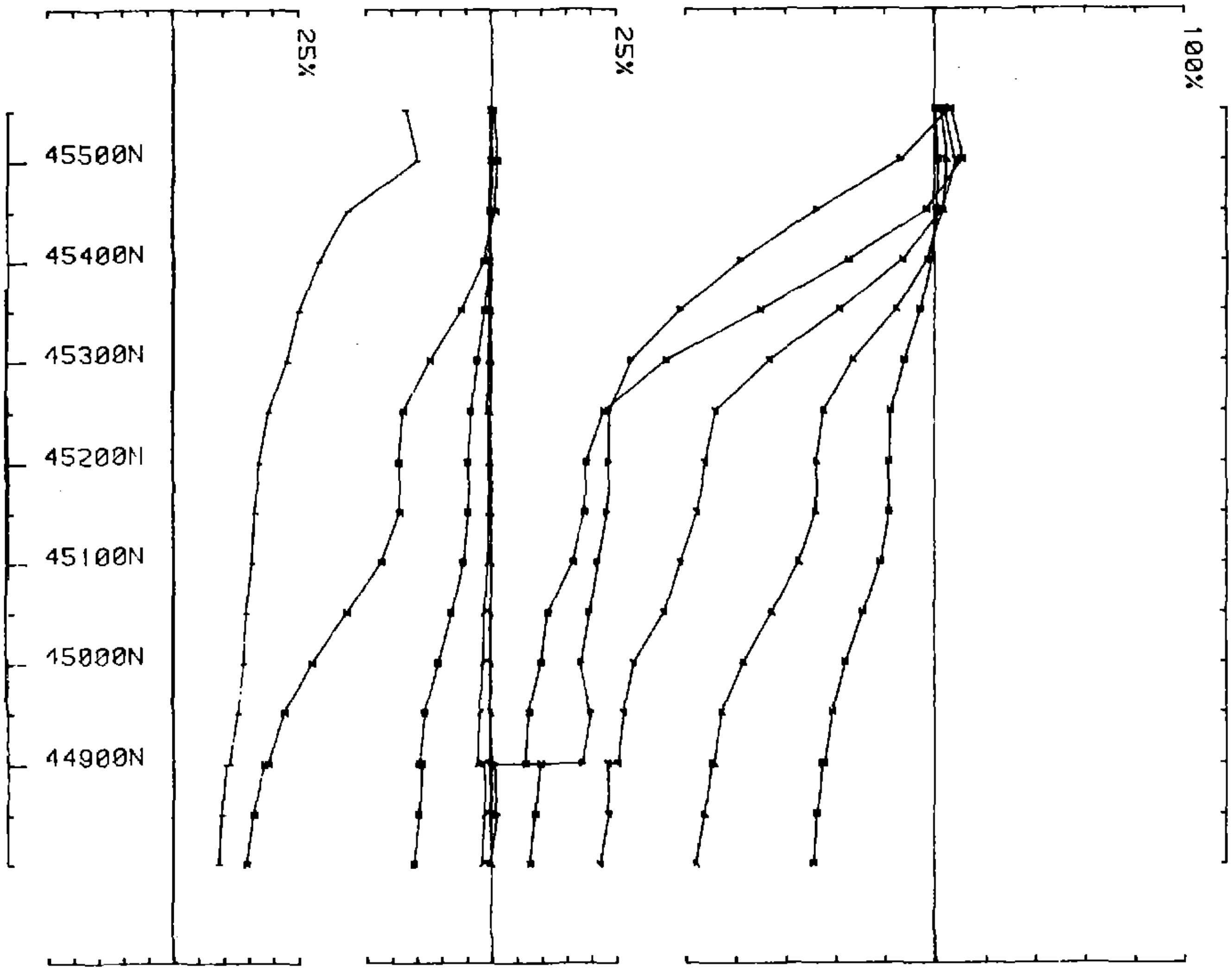

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 bas. freq (hz) 26.230 Nov 1989
loop no WC4 line 84400E component Hz secondary field Ch 1 point norm.



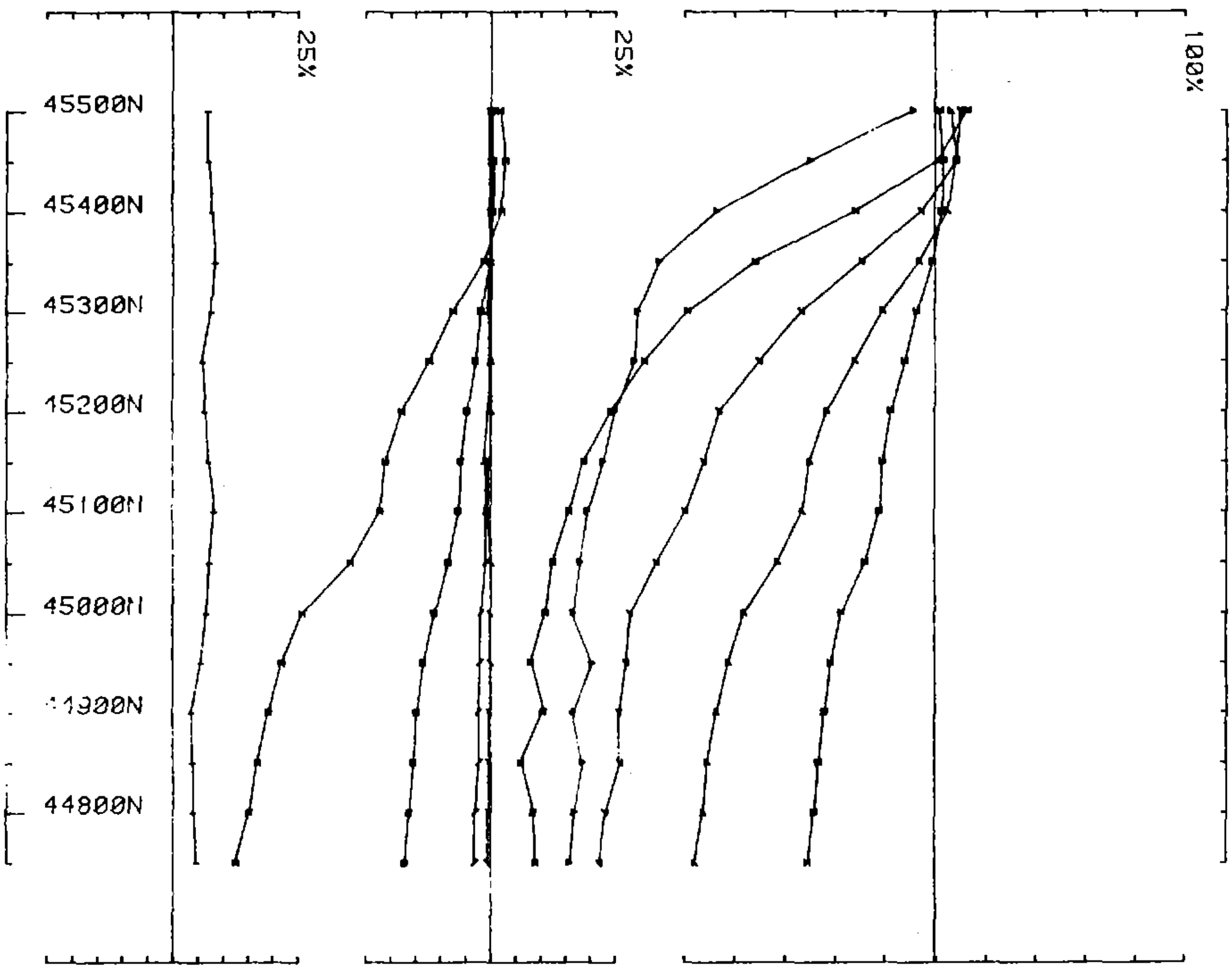

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989
loop no WC4 line 84600E component Hz secondary field Ch 1 point norm.



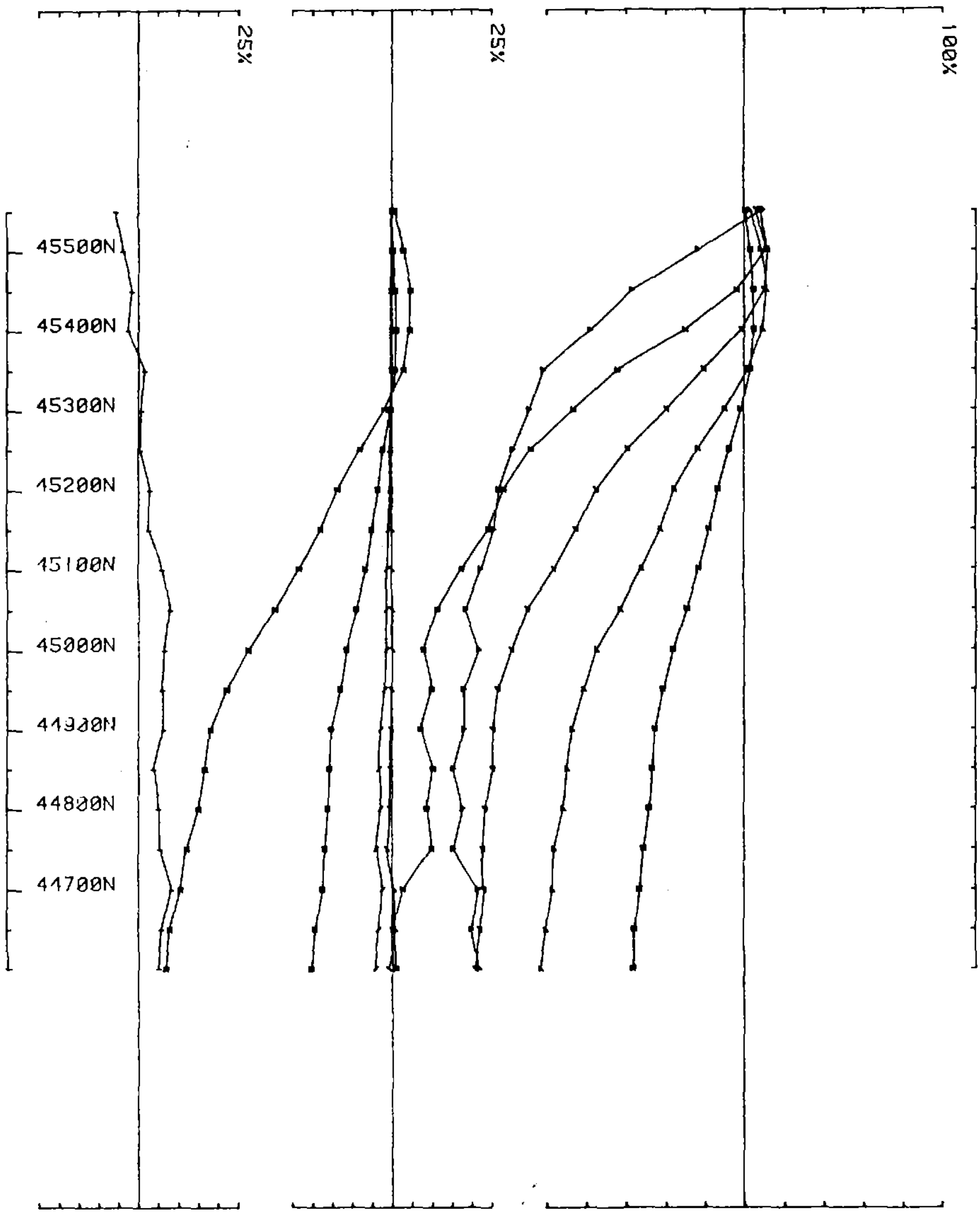

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989
loop no WC4 line 84800E component Hz secondary field Ch 1 point norm.



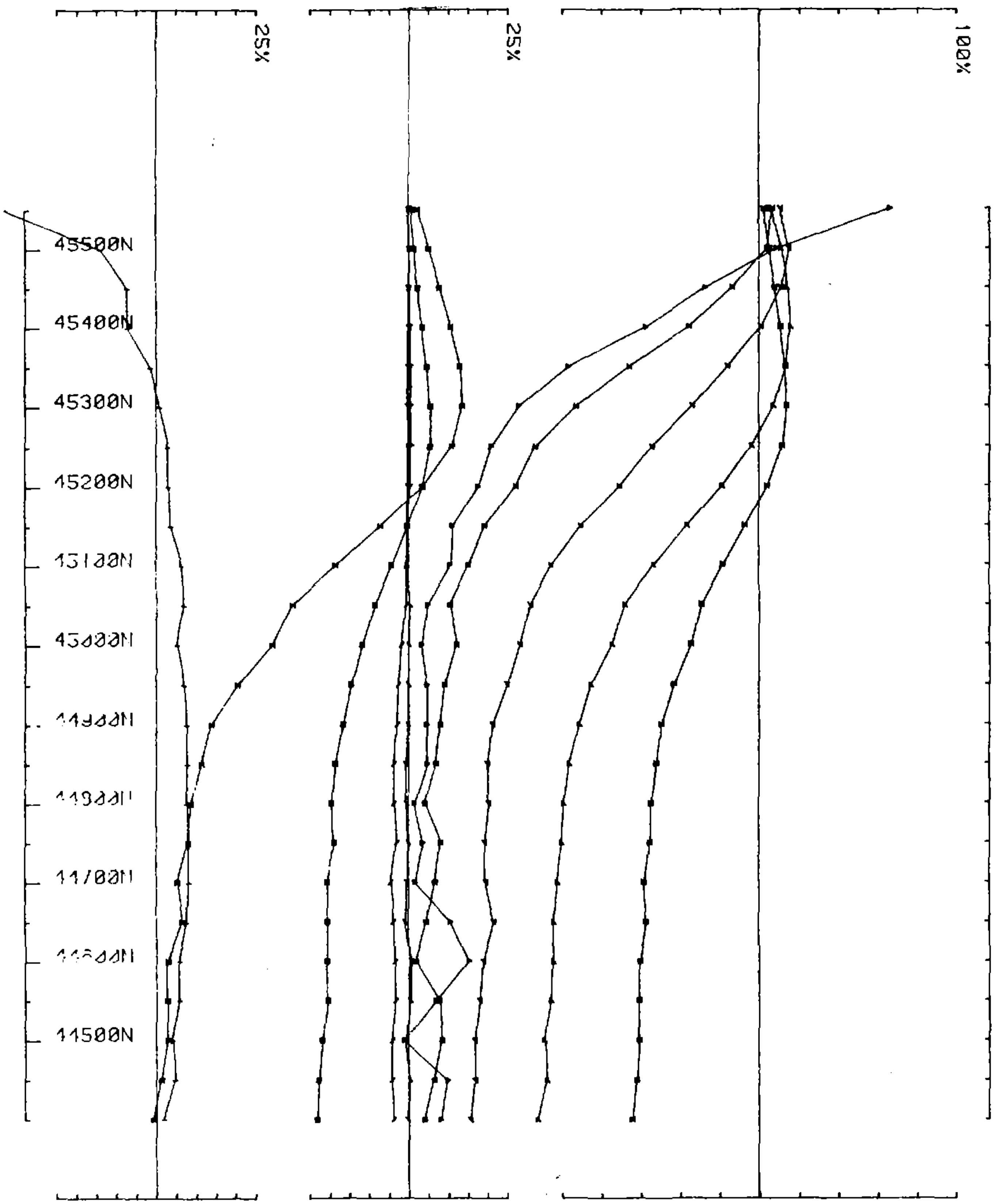

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989
loop no WC4 line 84000E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989
loop no WC4 line 84100E component Hz secondary field Ch 1 contin. norm.



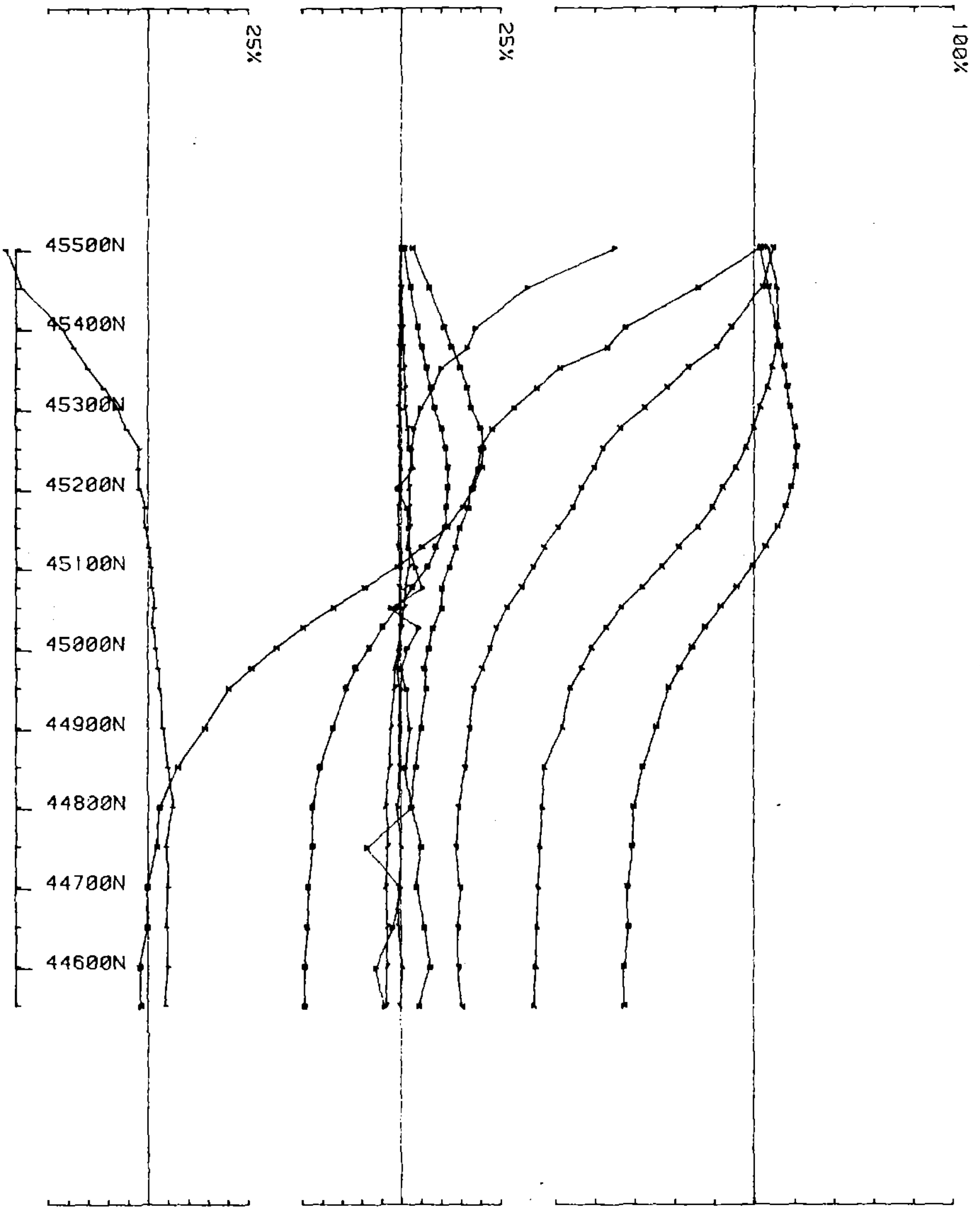

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 4 line 84200E component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89
loop no WC 4 line 84400E component Hz secondary field Ch 1 contin. norm.

510143

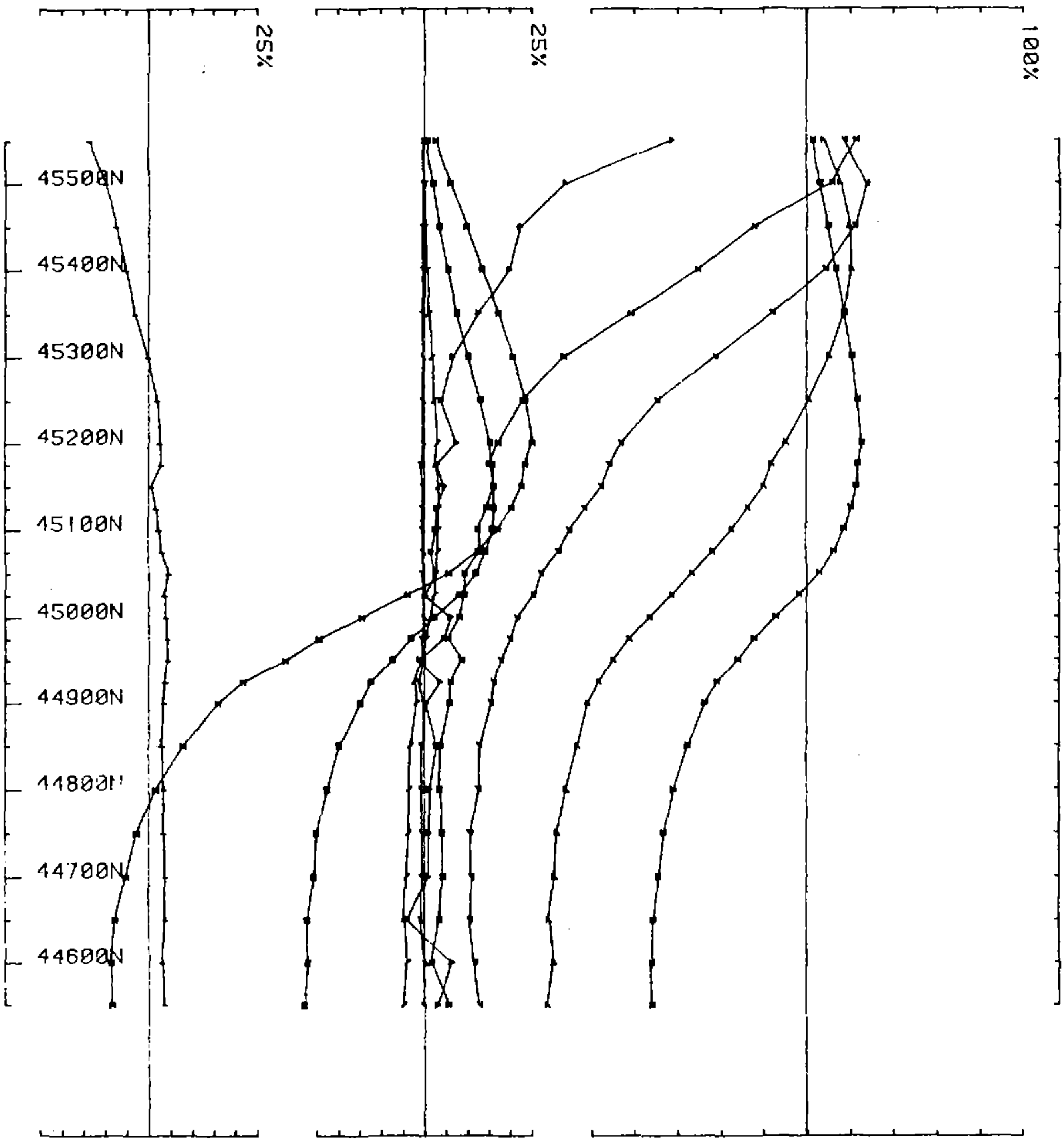
130




UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 NOV 89

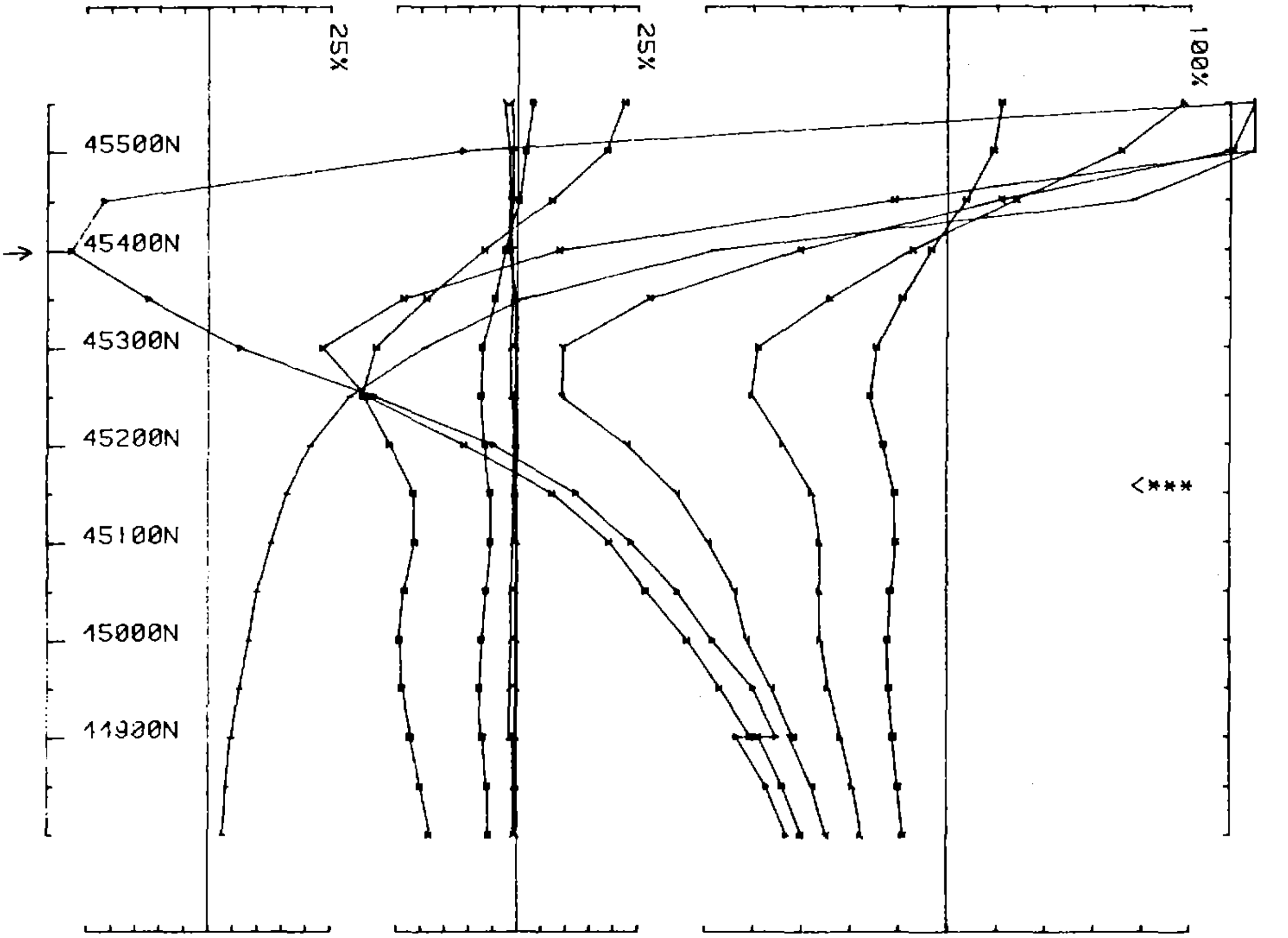
loop no WC 4 line 84600E component Hz secondary field Ch 1 contin. norm.



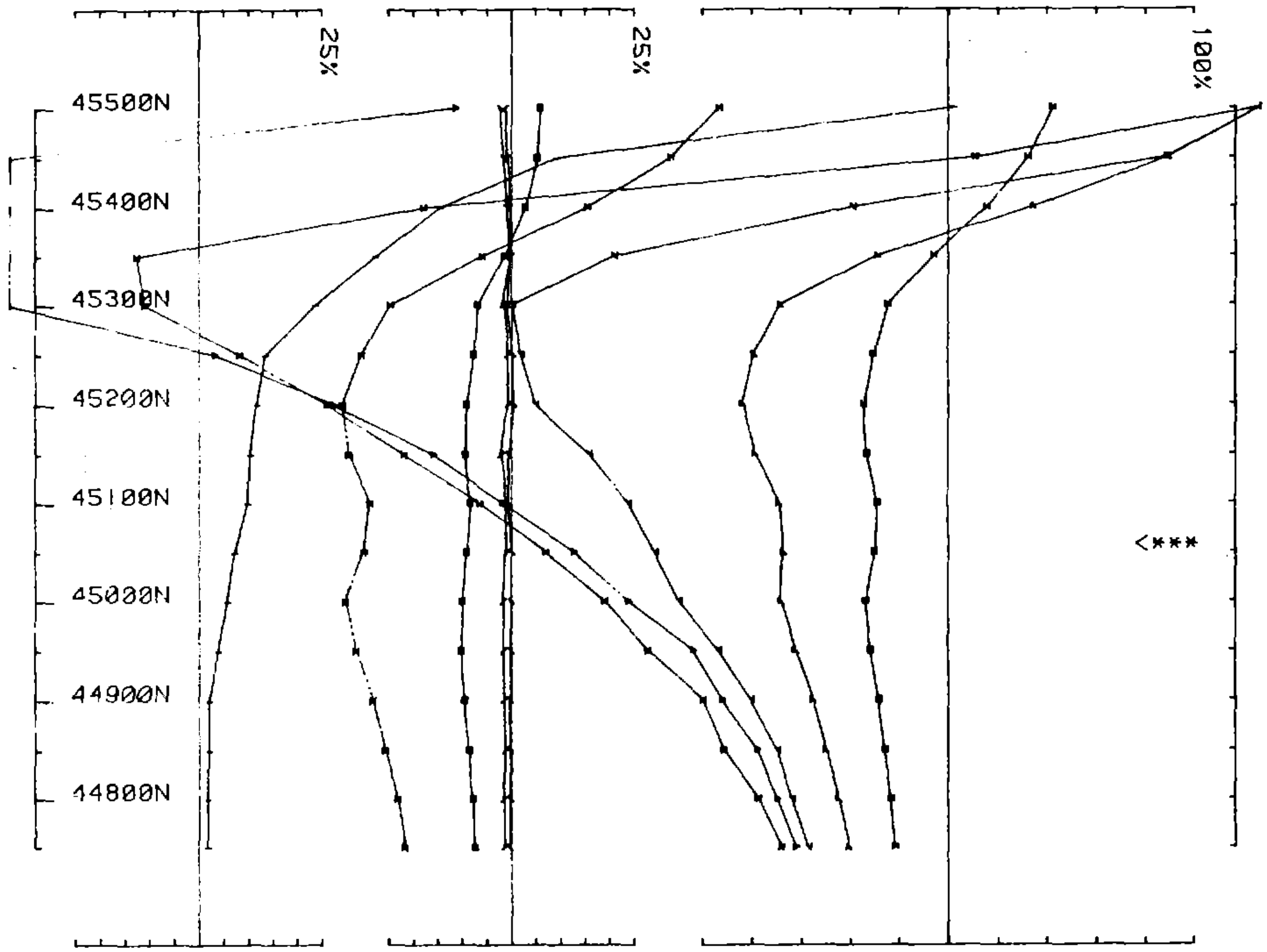

UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989

loop no WC4 line 84800E component Hz secondary field Ch 1 contin. norm.



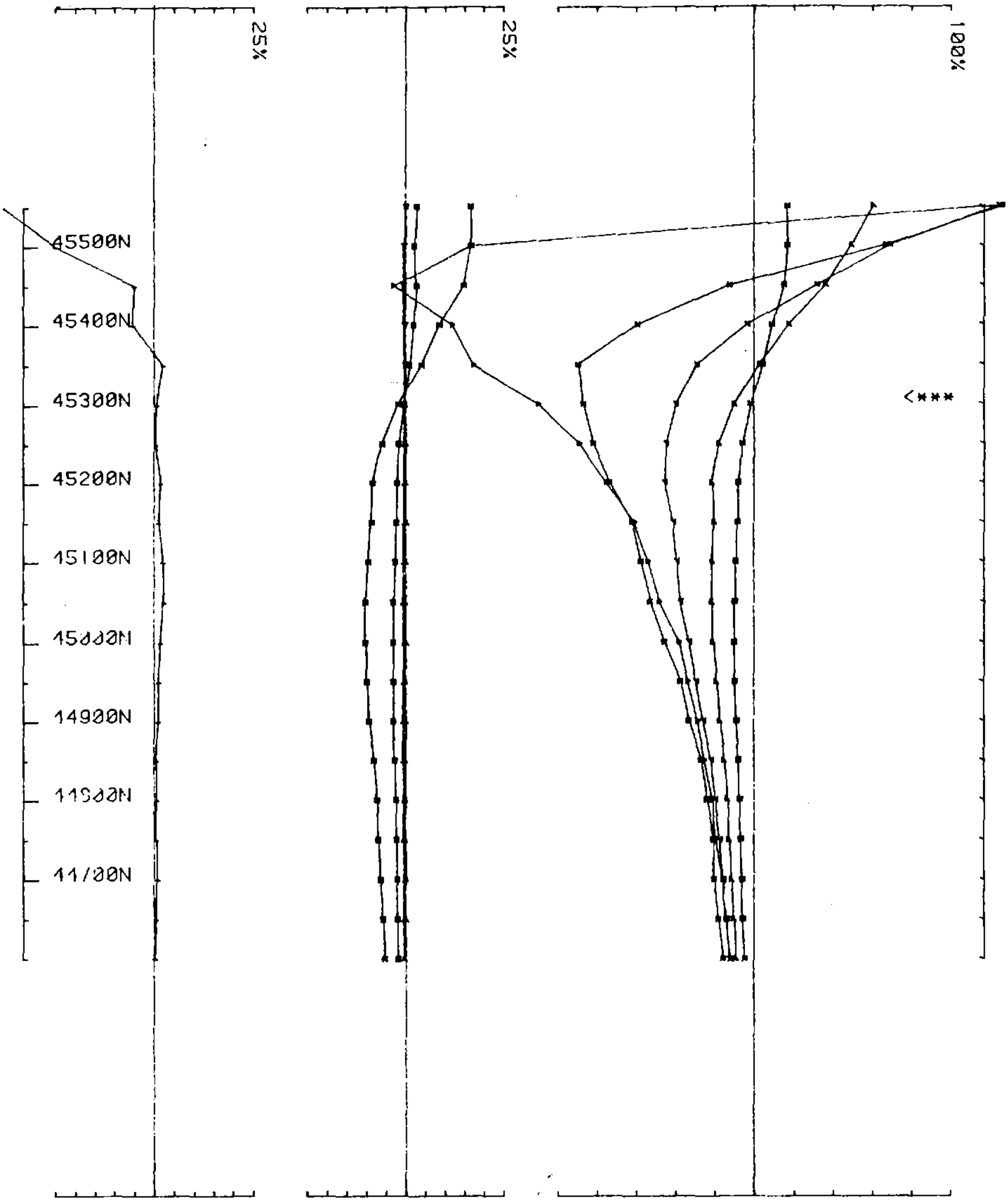

UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989
loop no WC4 line 84000E component Hz secondary field Ch 1 point norm.




UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989

loop no WC4 line 84100E component Hz secondary field Ch 1 point norm.

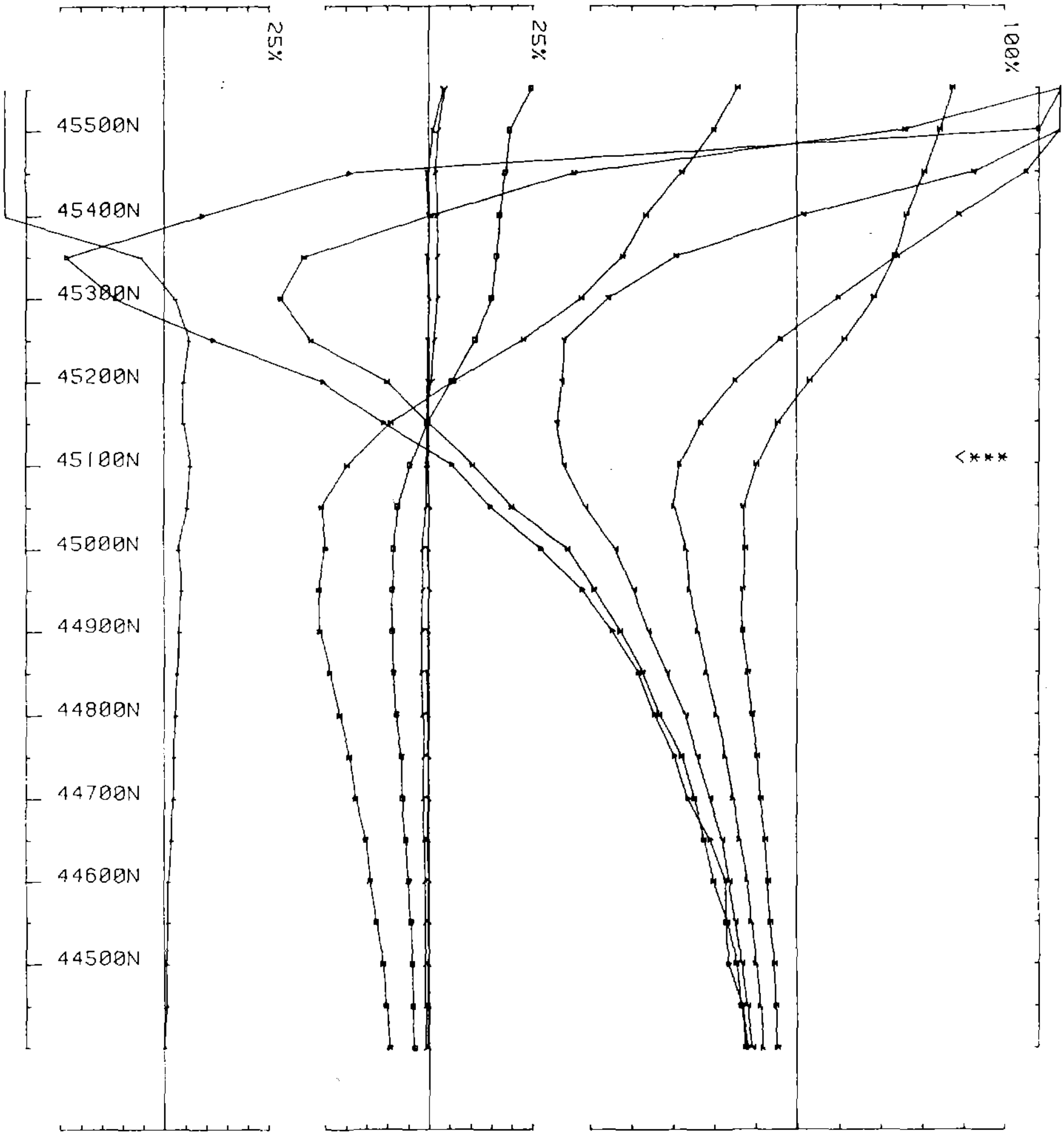



UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 nov 89

loop no wc 4 line 84200E component Hz secondary field Ch 1 point norm.

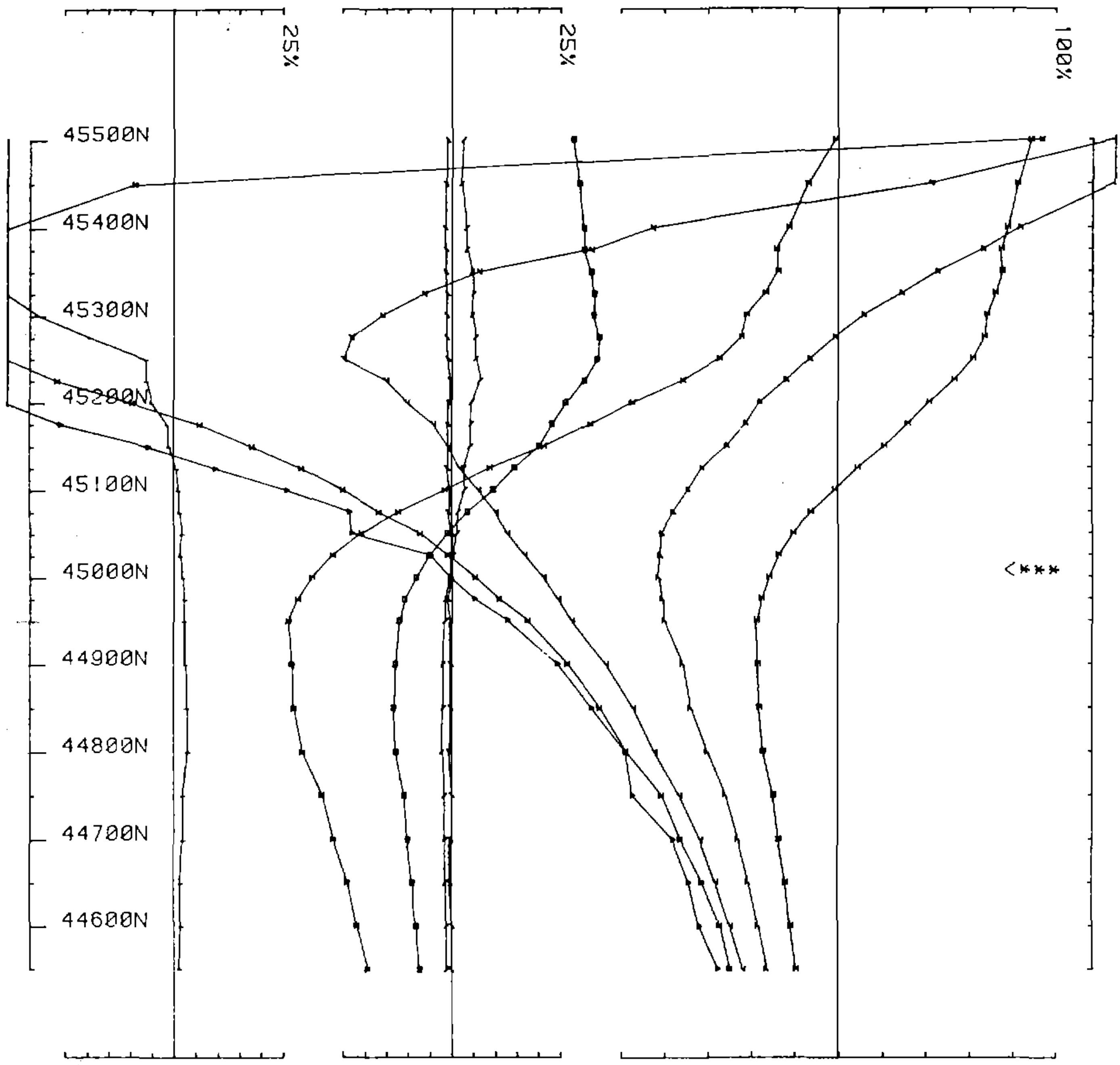
510148




UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989

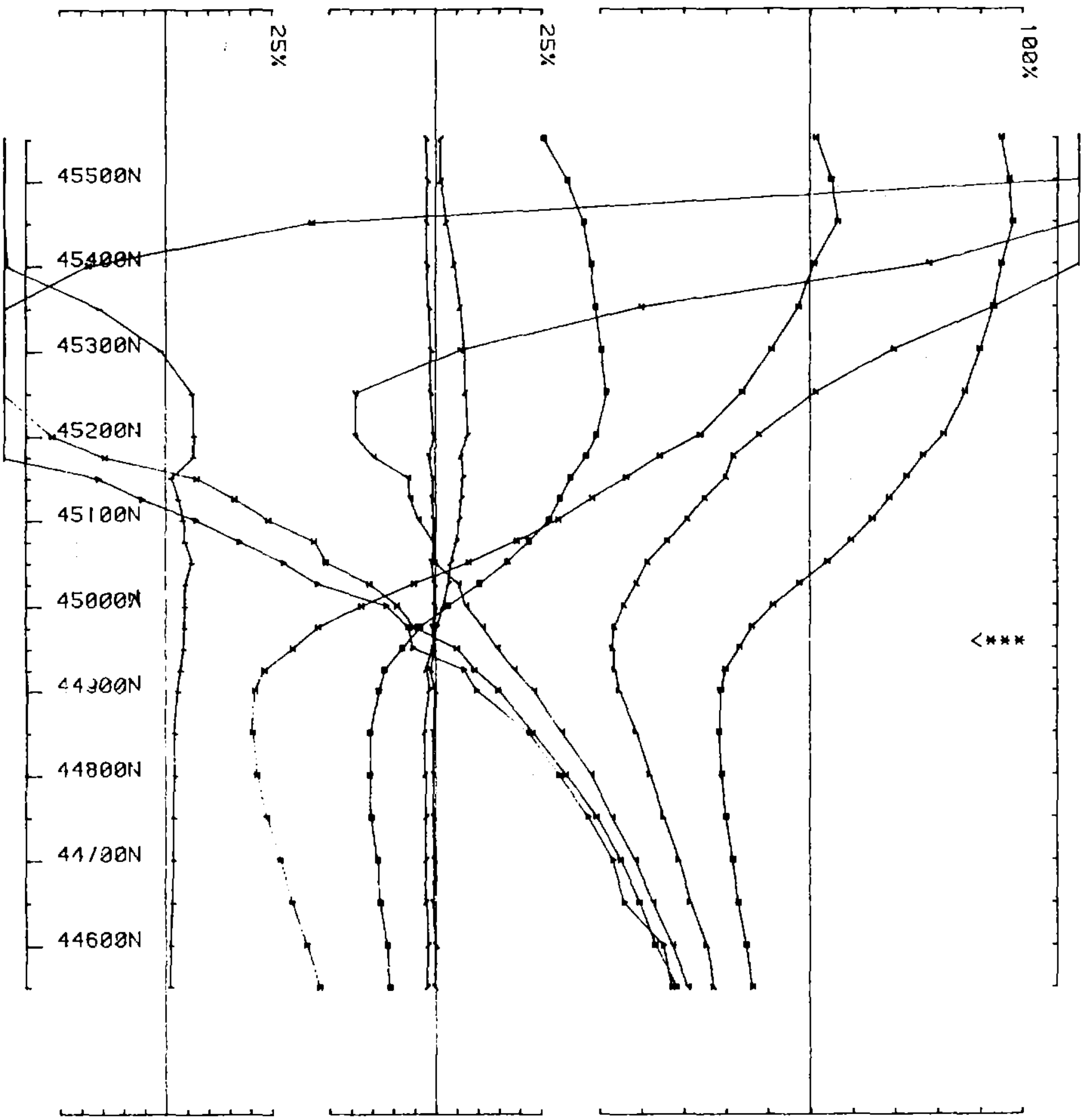
loop no WC4 line 84400E component Hz secondary field Ch 1 point norm.



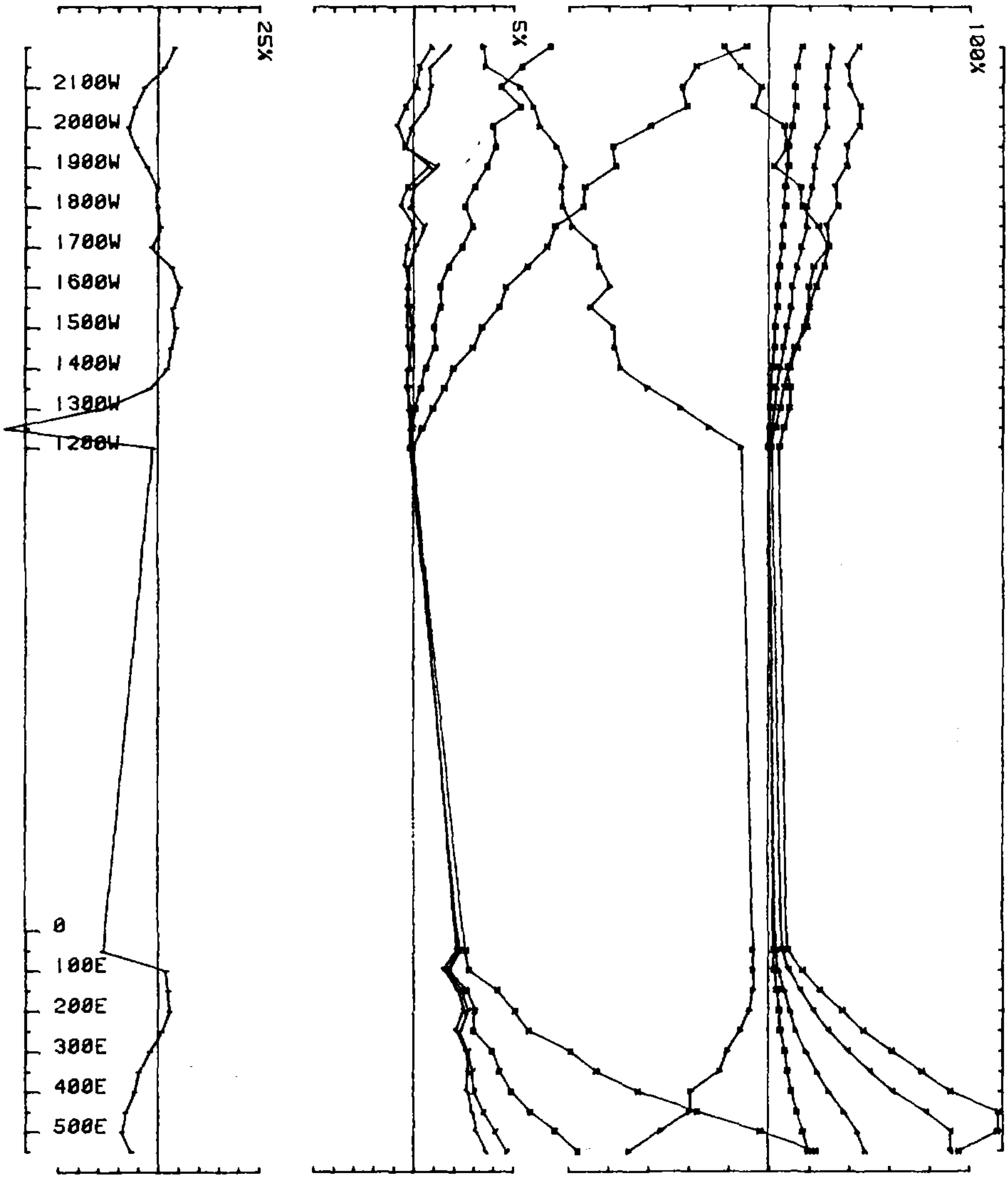

UTEM SURVEY at WEST COMSTOCK for BHP

conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989

loop no WC4 line 84600E component Hz secondary field Ch 1 point norm.




UTEM SURVEY at WEST COMSTOCK for BHP
conducted by TM ST RL job 8970 base freq (hz) 26.230 Nov 1989
loop no WC4 line 84800E component Hz secondary field Ch 1 point norm.

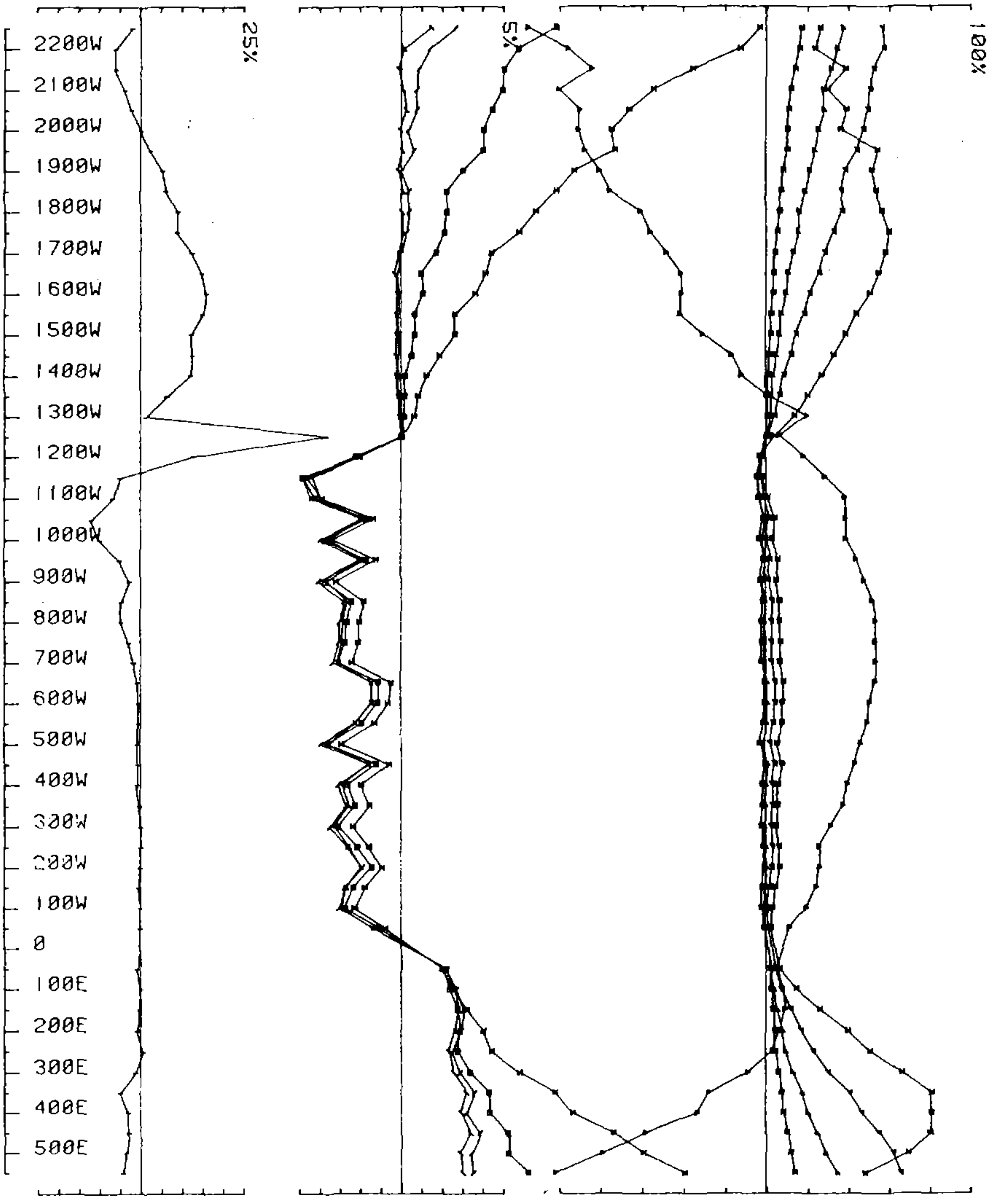



UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 0N component Hz secondary field Ch 1 contin. norm.

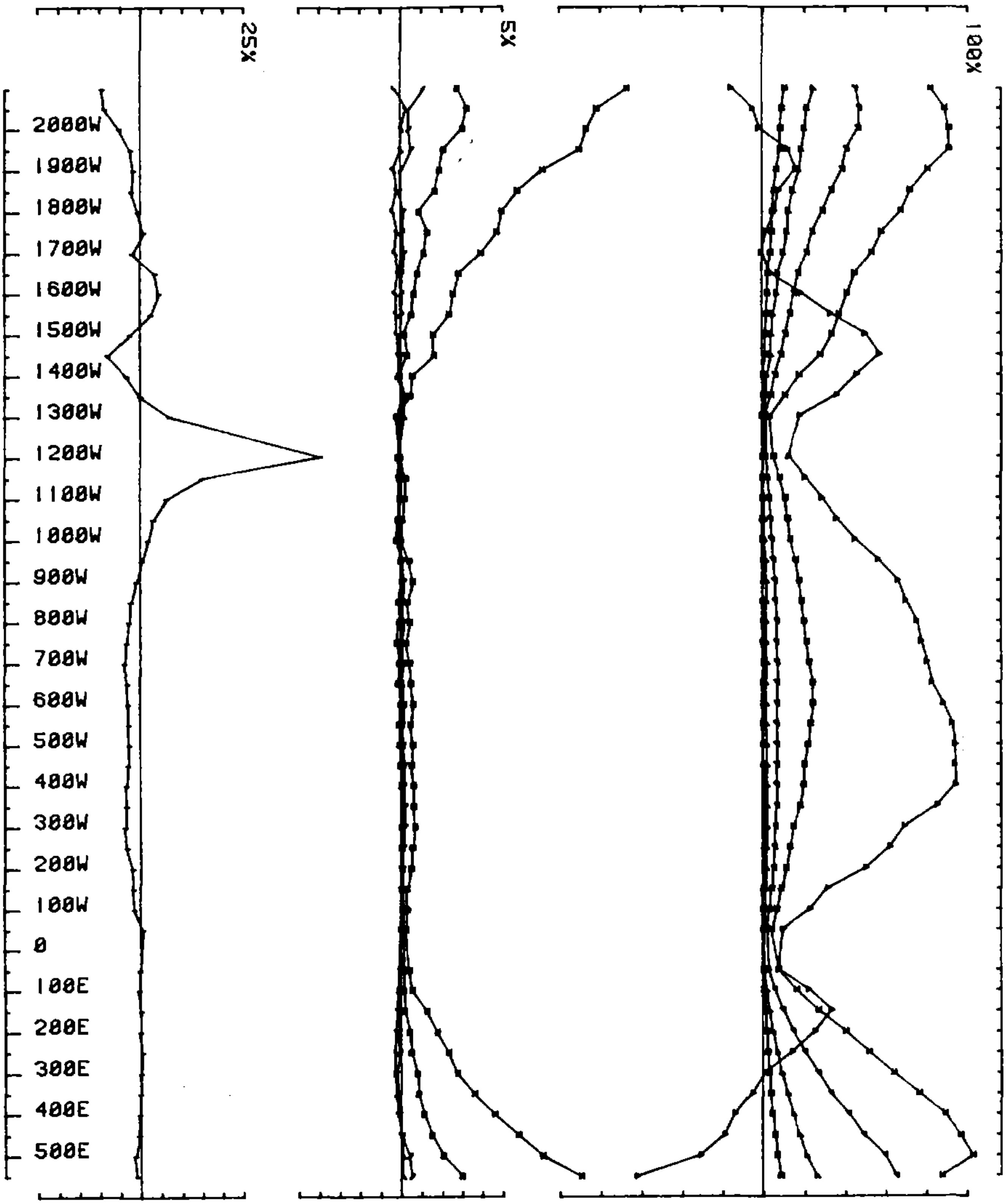
510152




UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

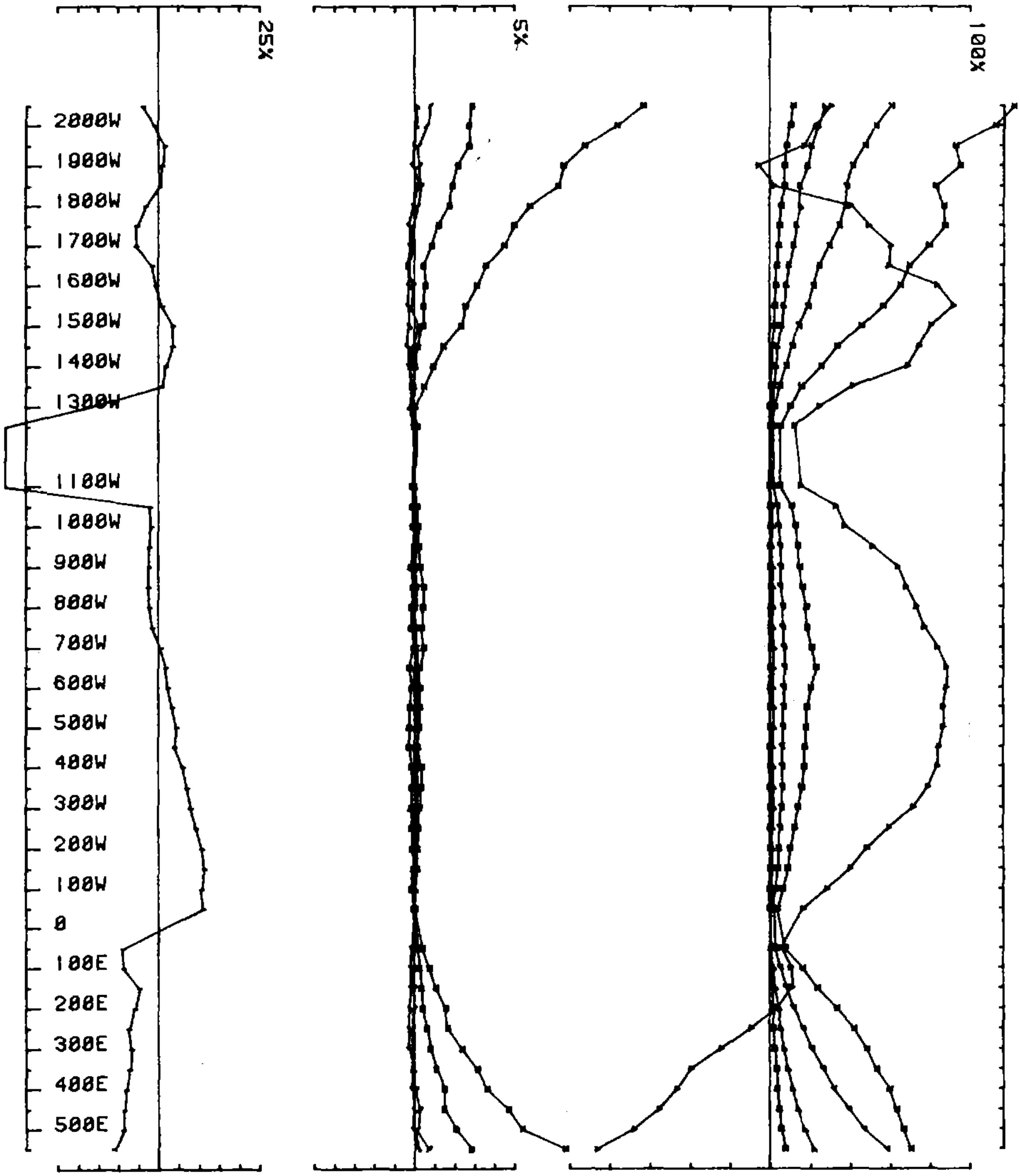
loop no BT 1 line 200N component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 400N component Hz secondary field Ch 1 contin. norm.

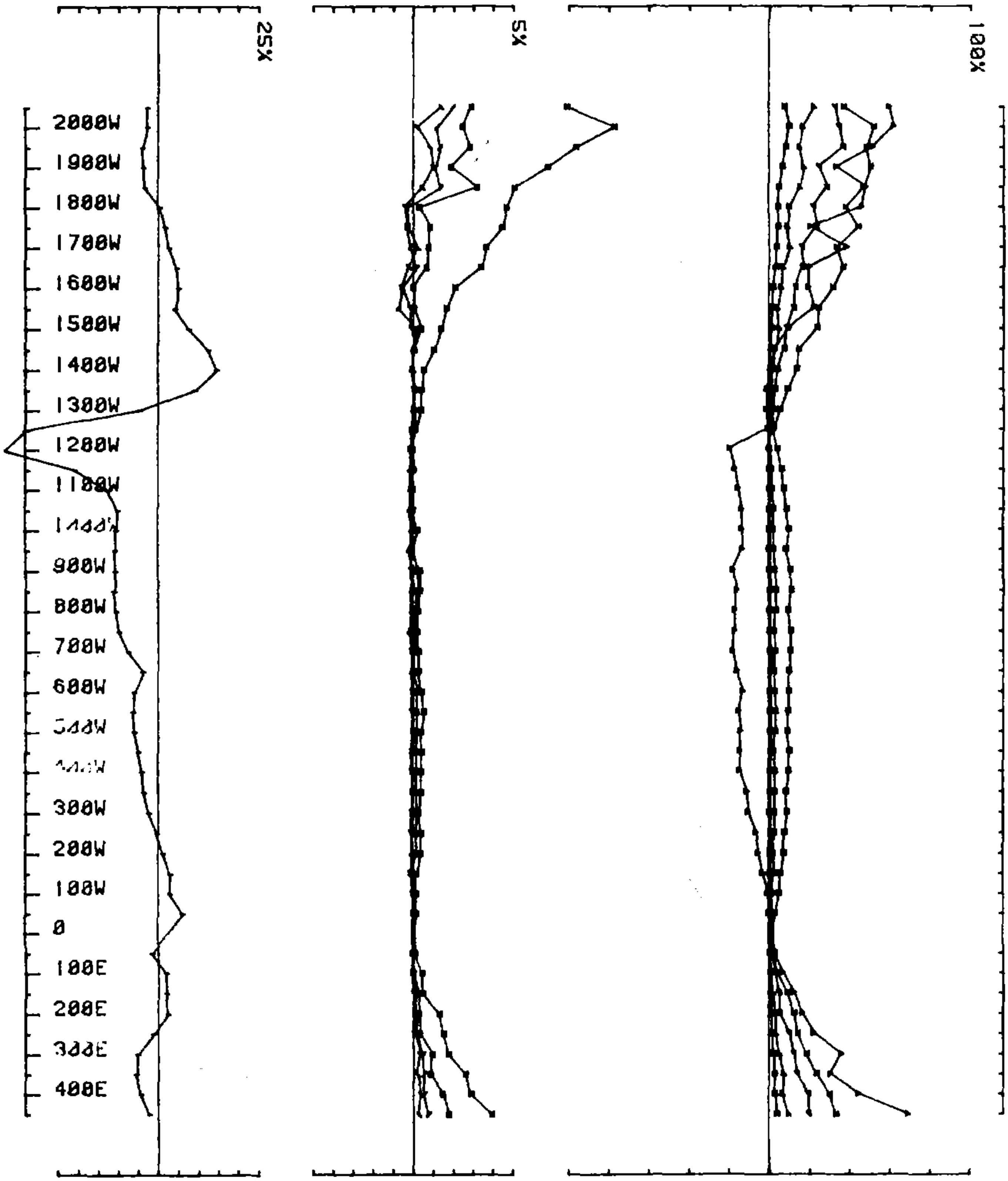



UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 600N component Hz secondary field Ch 1 contin. norm.

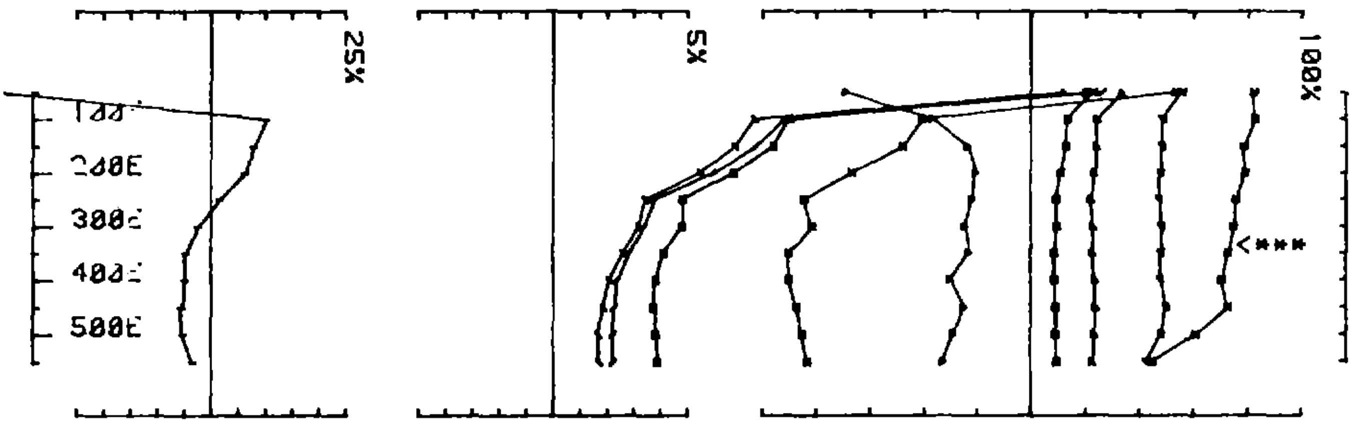
510155




UTEM SURVEY at BEATRICE GRID for B H P

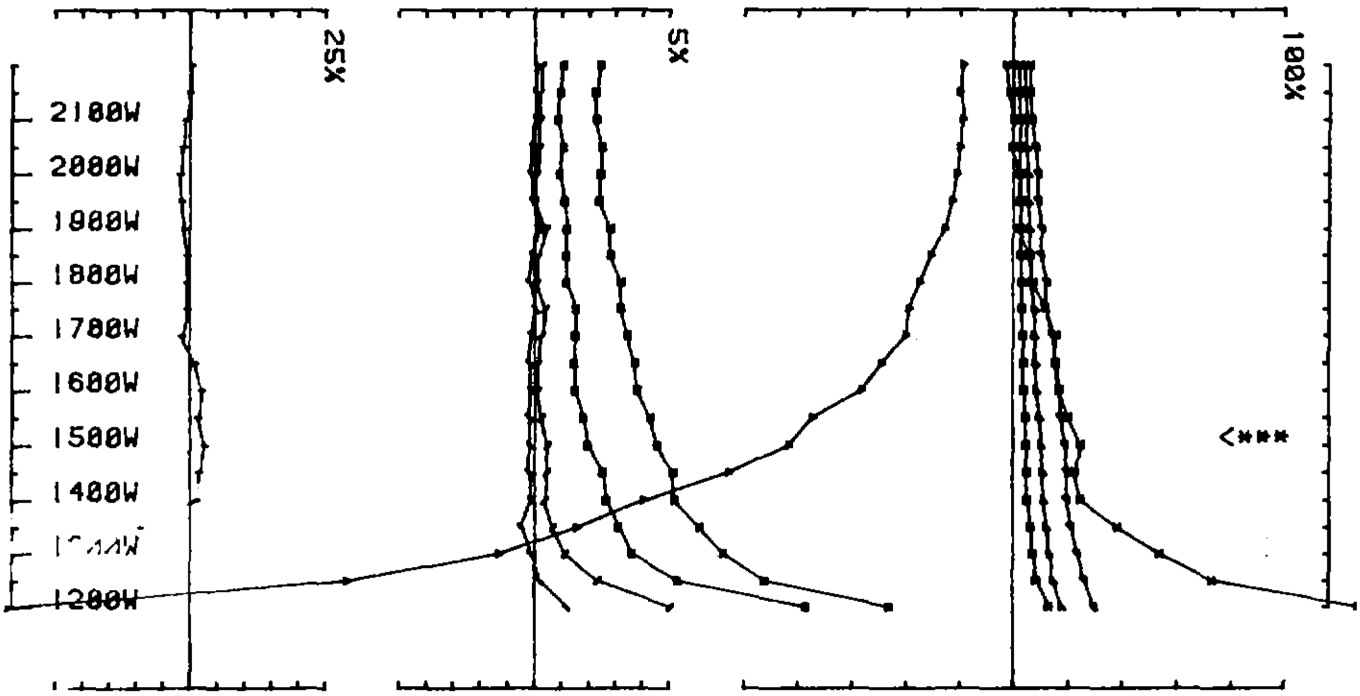
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 800N component Hz secondary field Ch 1 contin. norm.

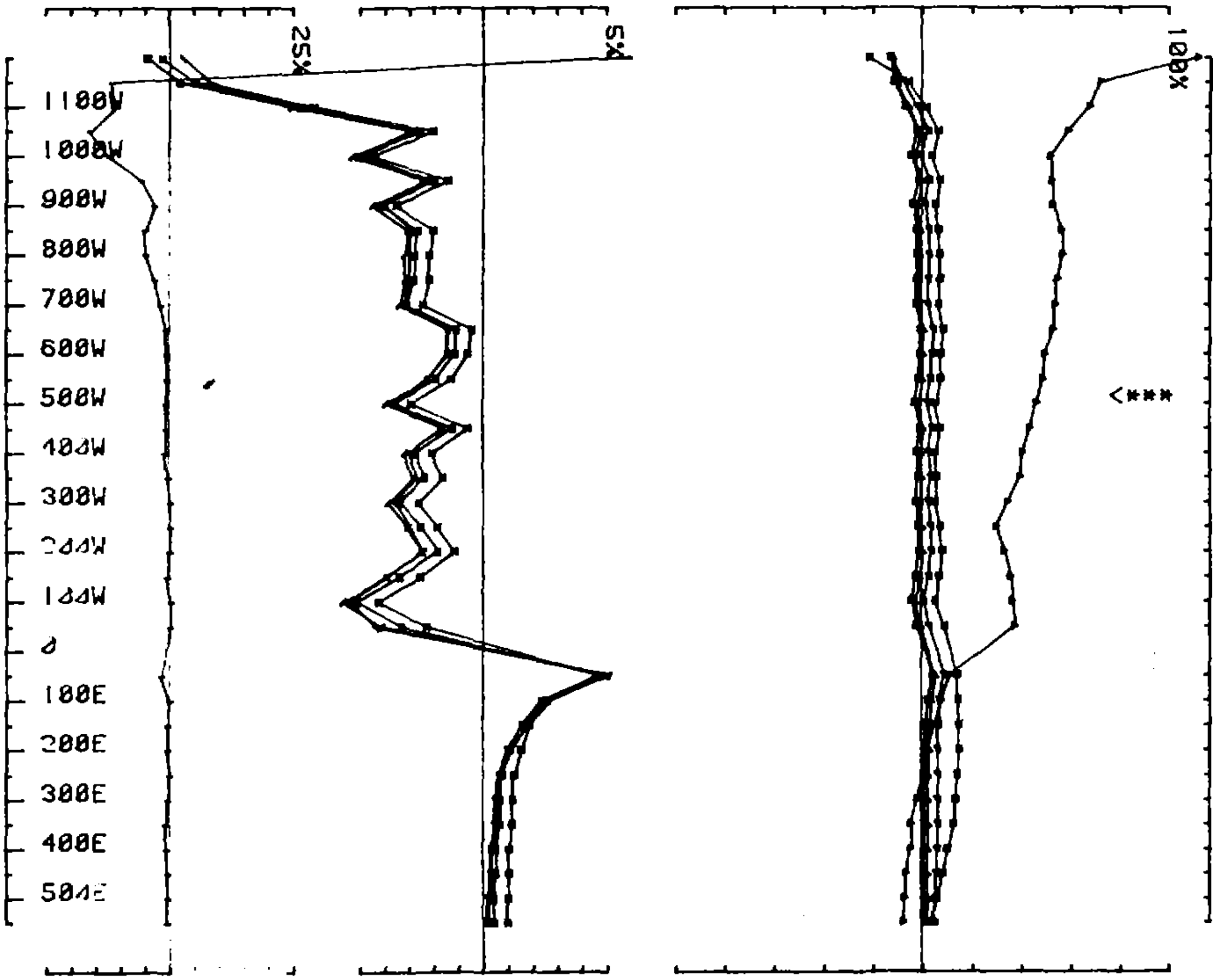



UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 0N component Hz secondary field Ch 1 point norm.

510157



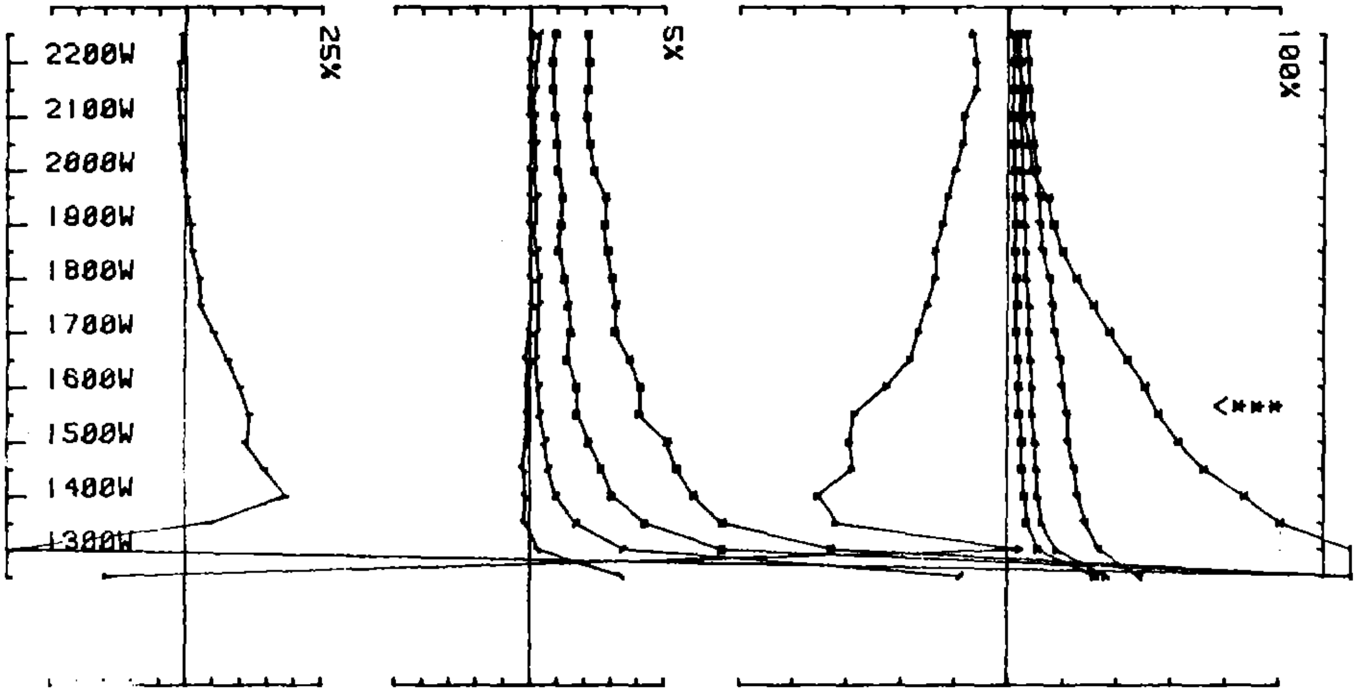

UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 0N component Hz secondary field Ch 1 point norm.



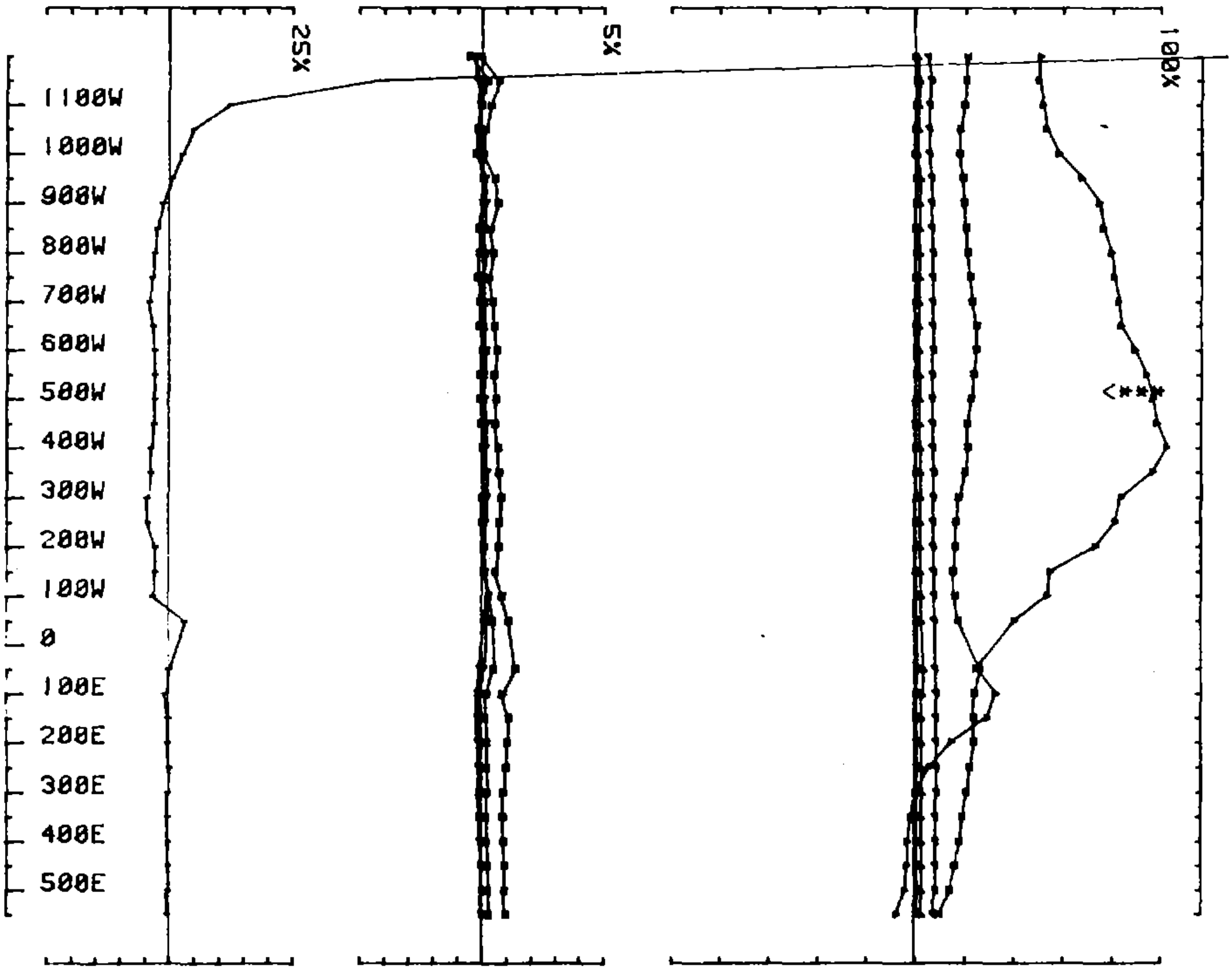

UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 200N component Hz secondary field Ch 1 point norm.

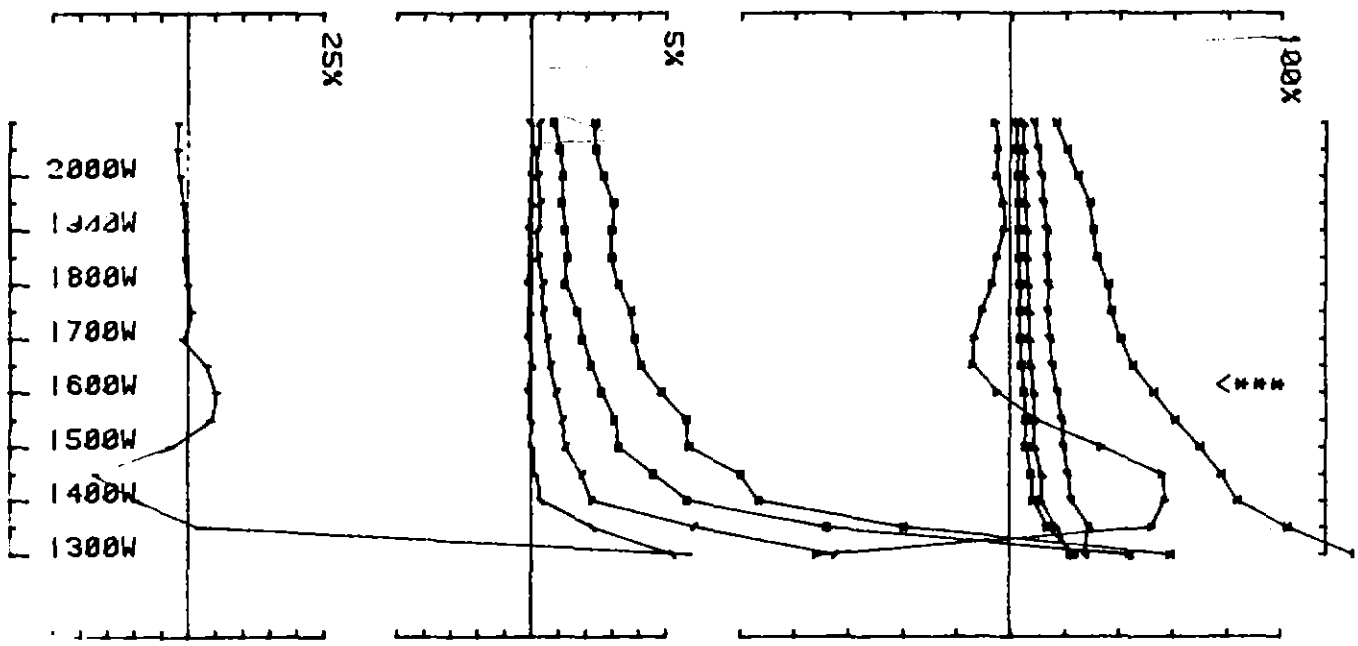



UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 200N component Hz secondary field Ch 1 point norm.

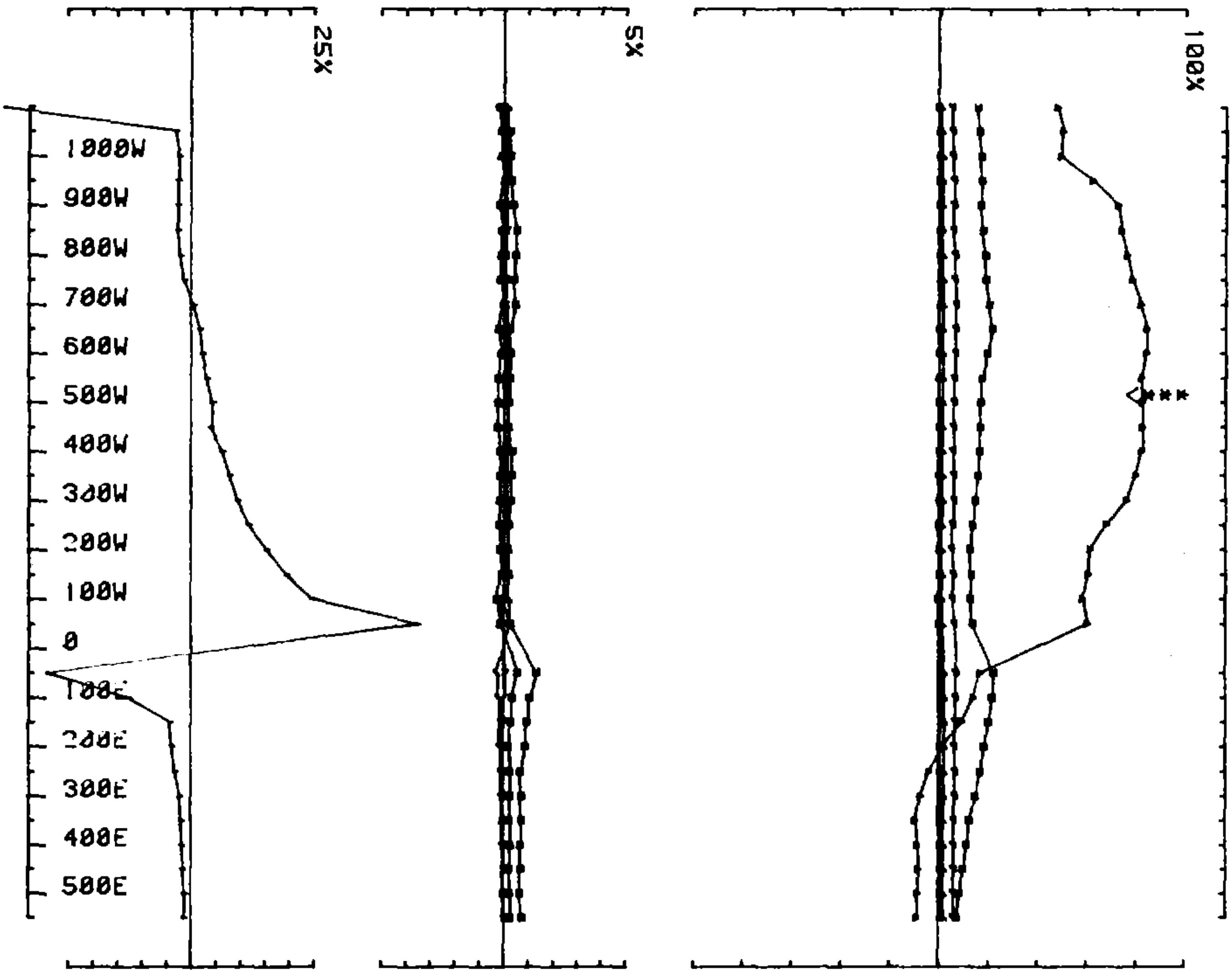



UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 400N component Hz secondary field Ch 1 point norm.

510161

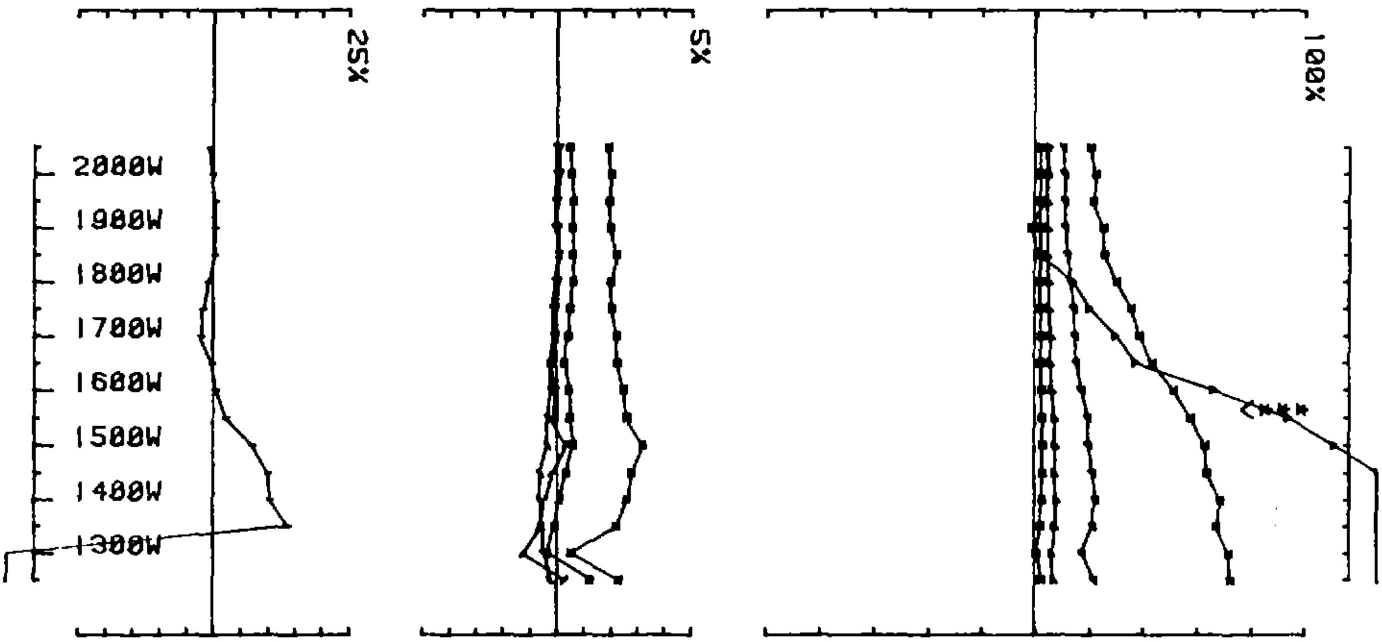



UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 400N component Hz secondary field Ch 1 point norm.

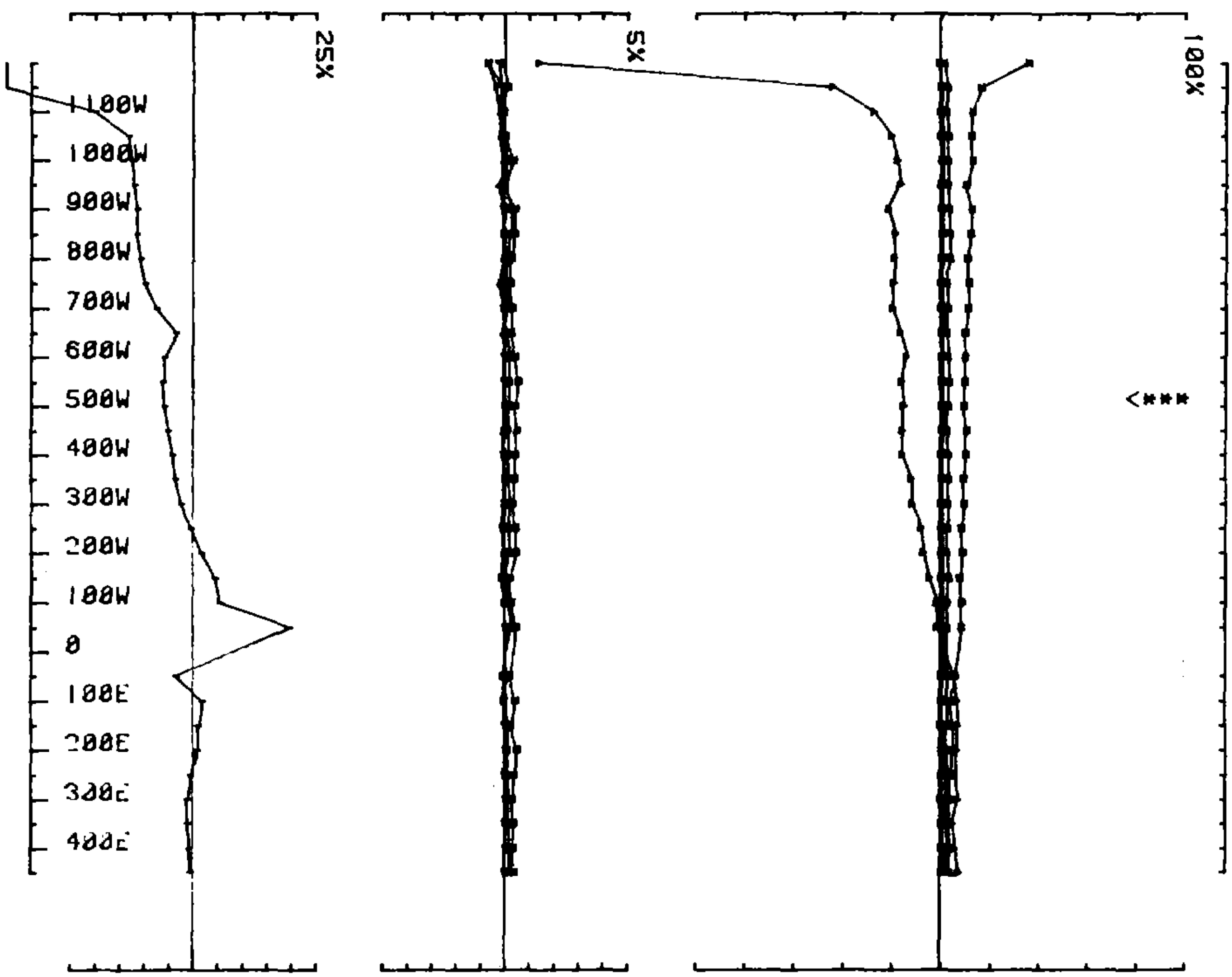



UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 600N component Hz secondary field Ch 1 point norm.

510163




UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no 7101 line 600N component Hz secondary field Ch 1 point norm.

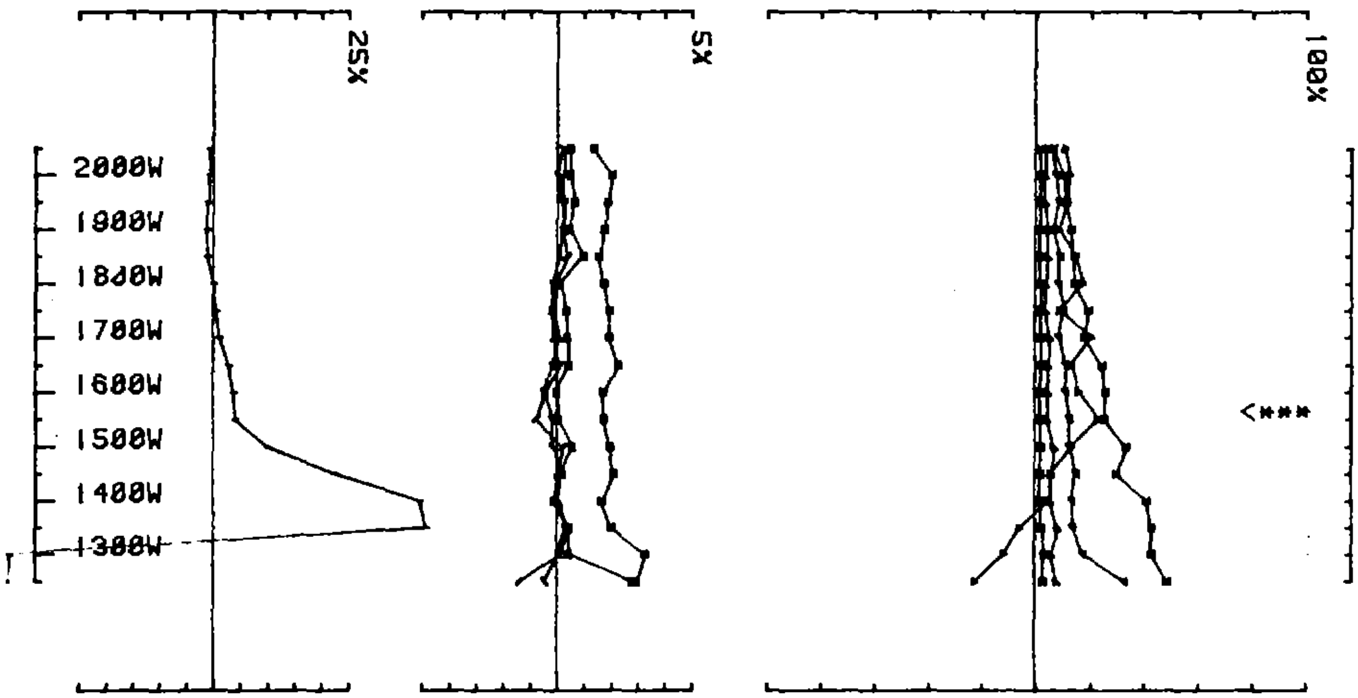



UTEM SURVEY at BEATRICE GRID for B H P

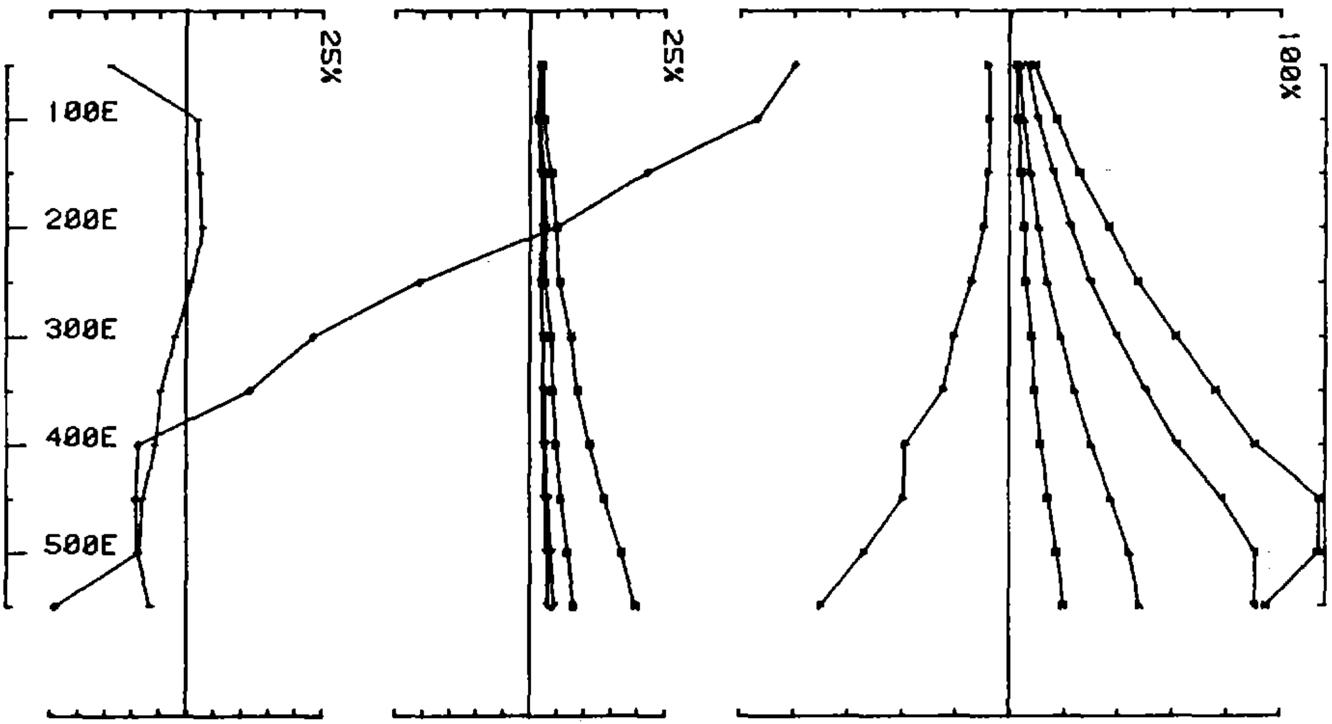
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 800N component Hz secondary field Ch 1 point norm.

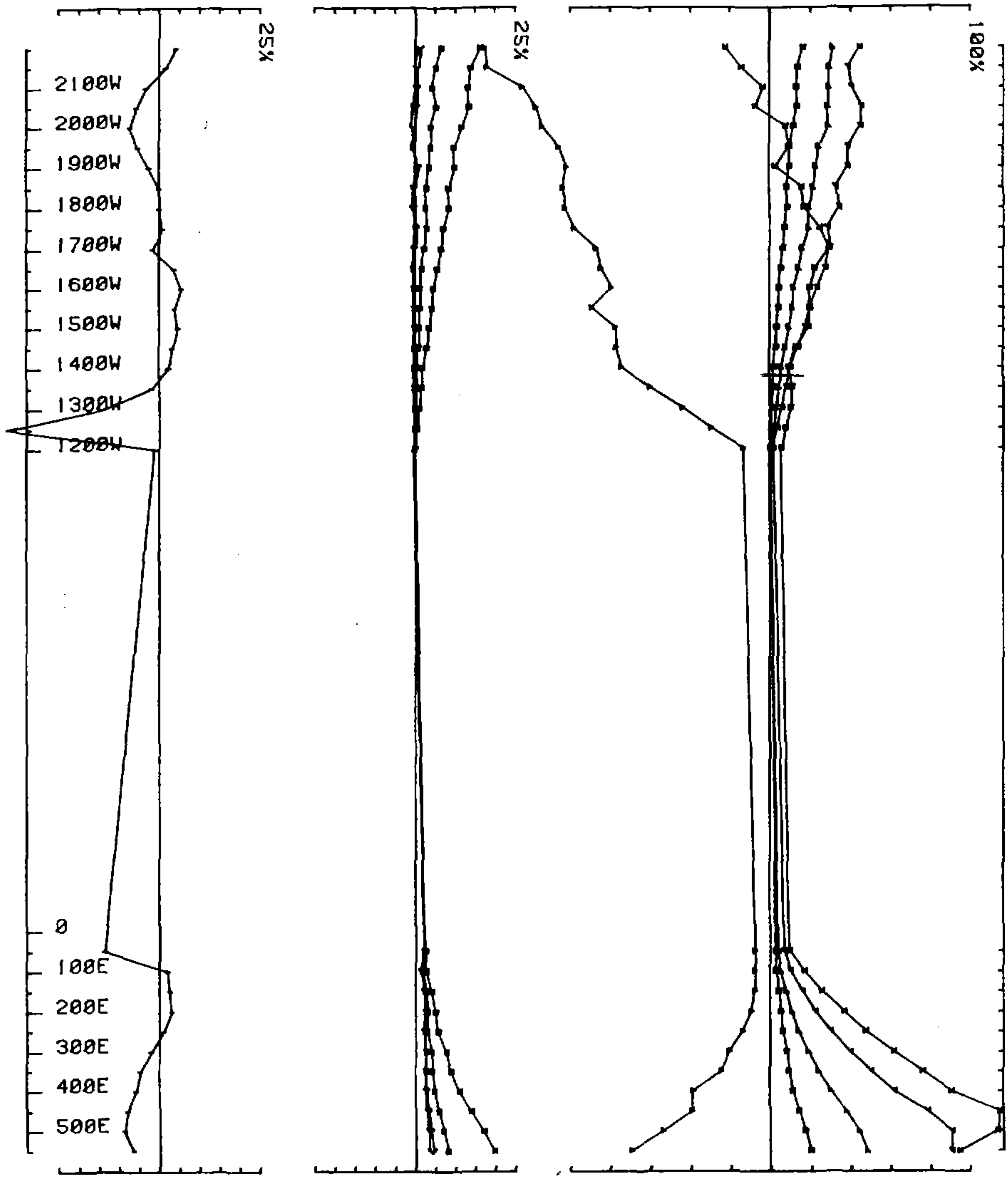
510165




UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 800N component Hz secondary field Ch 1 point norm.



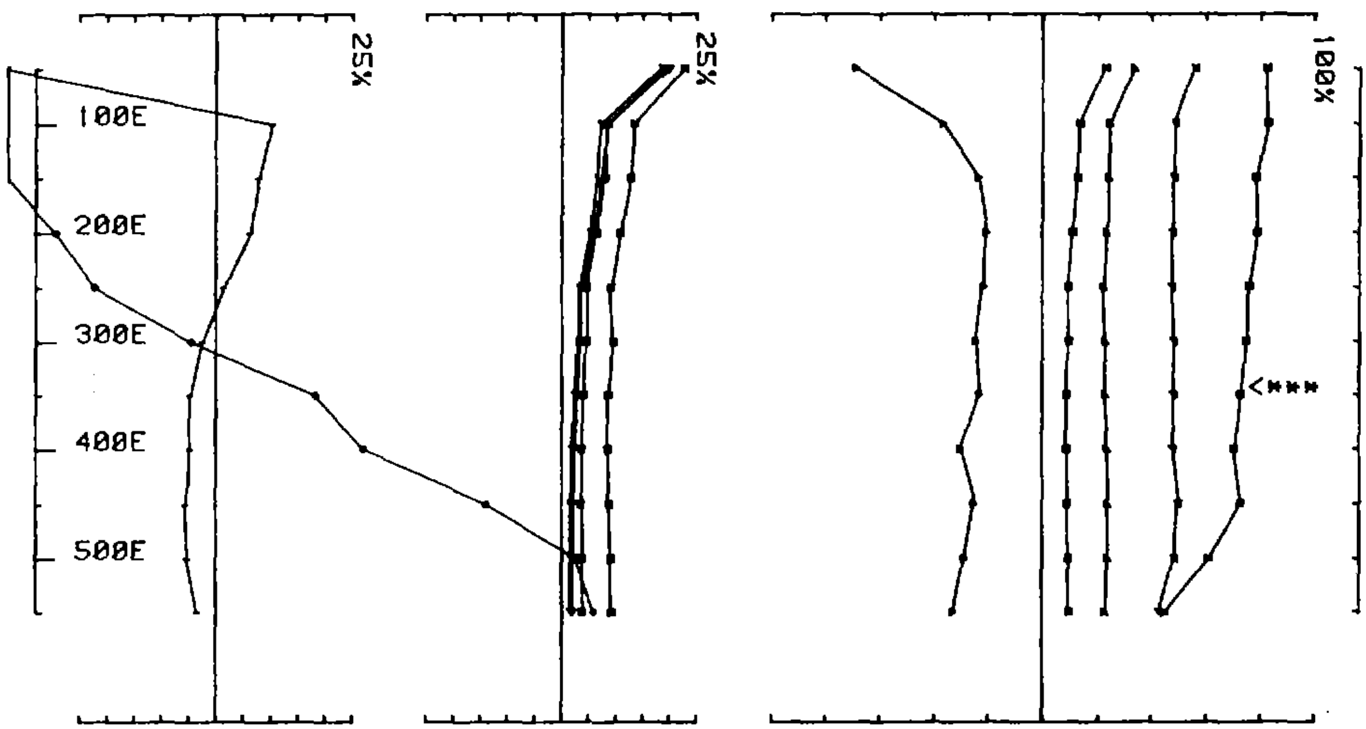

UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R Job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 0N component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R Job 8971 base freq (hz) 26.230 Oct 1989

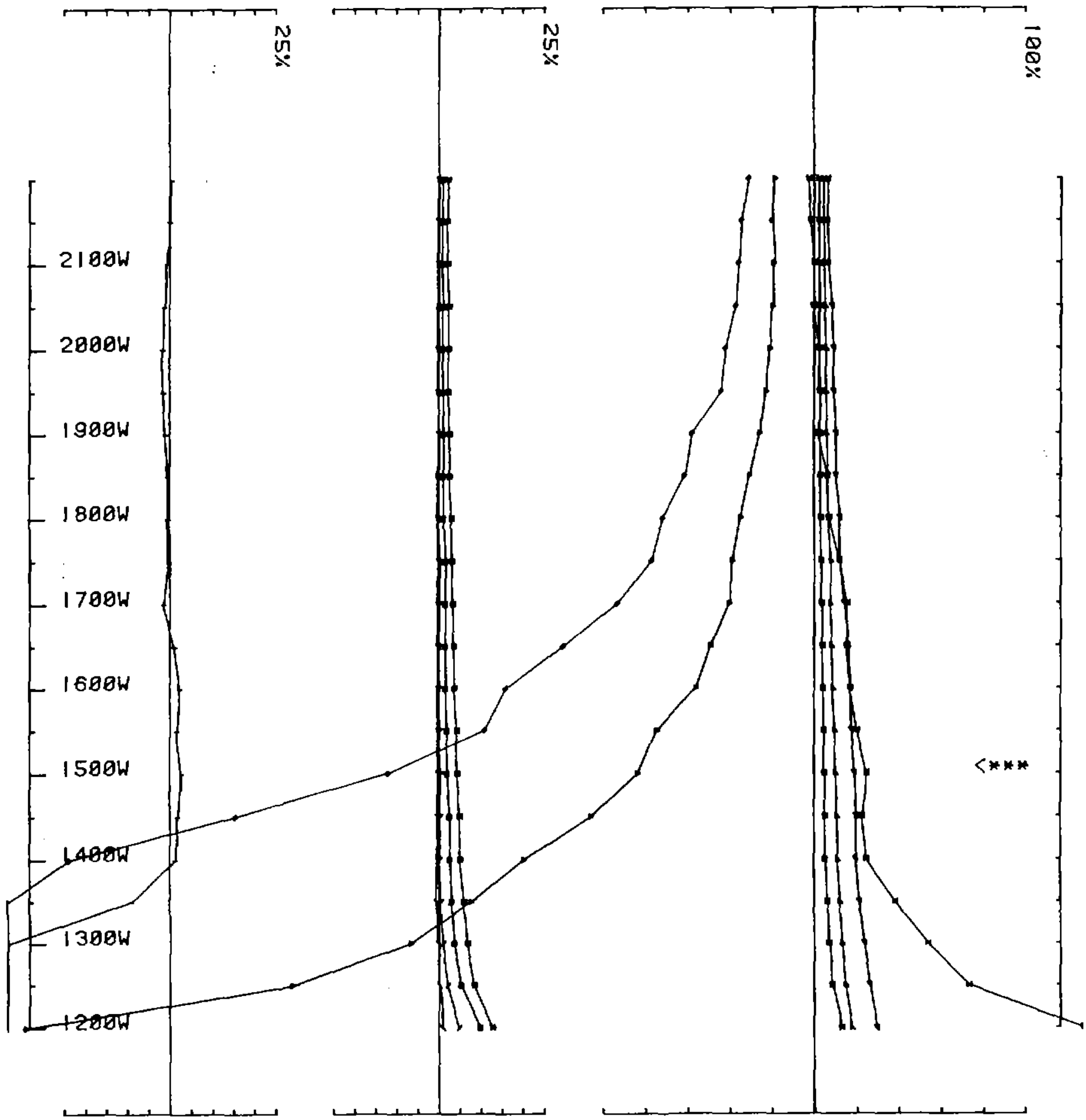
loop no bt1 line 0N component Hz secondary field Ch 1 contin. norm.



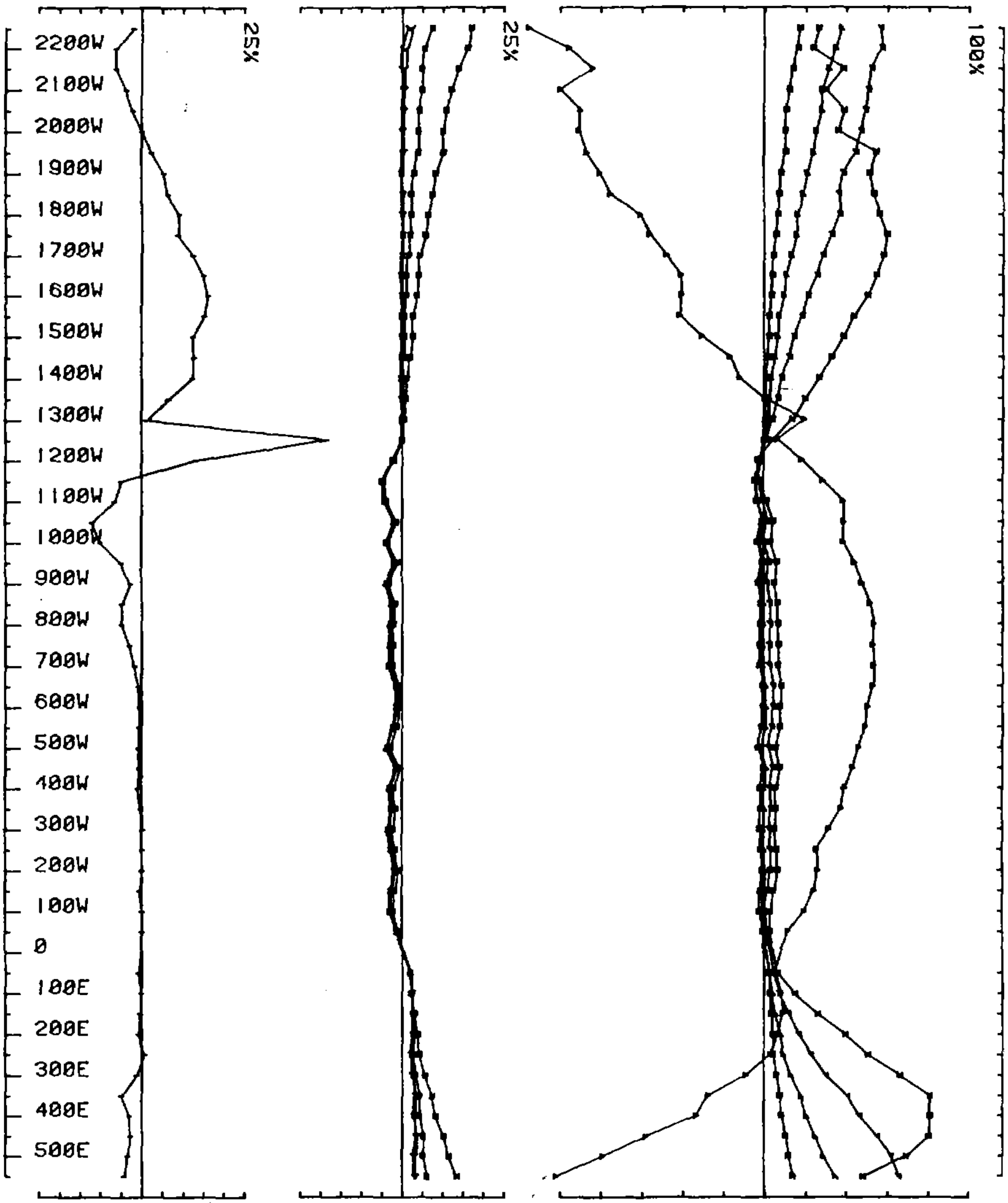

UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 0N component Hz secondary field Ch 1 point norm.




UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 0 N component Hz secondary field Ch 1 point norm.

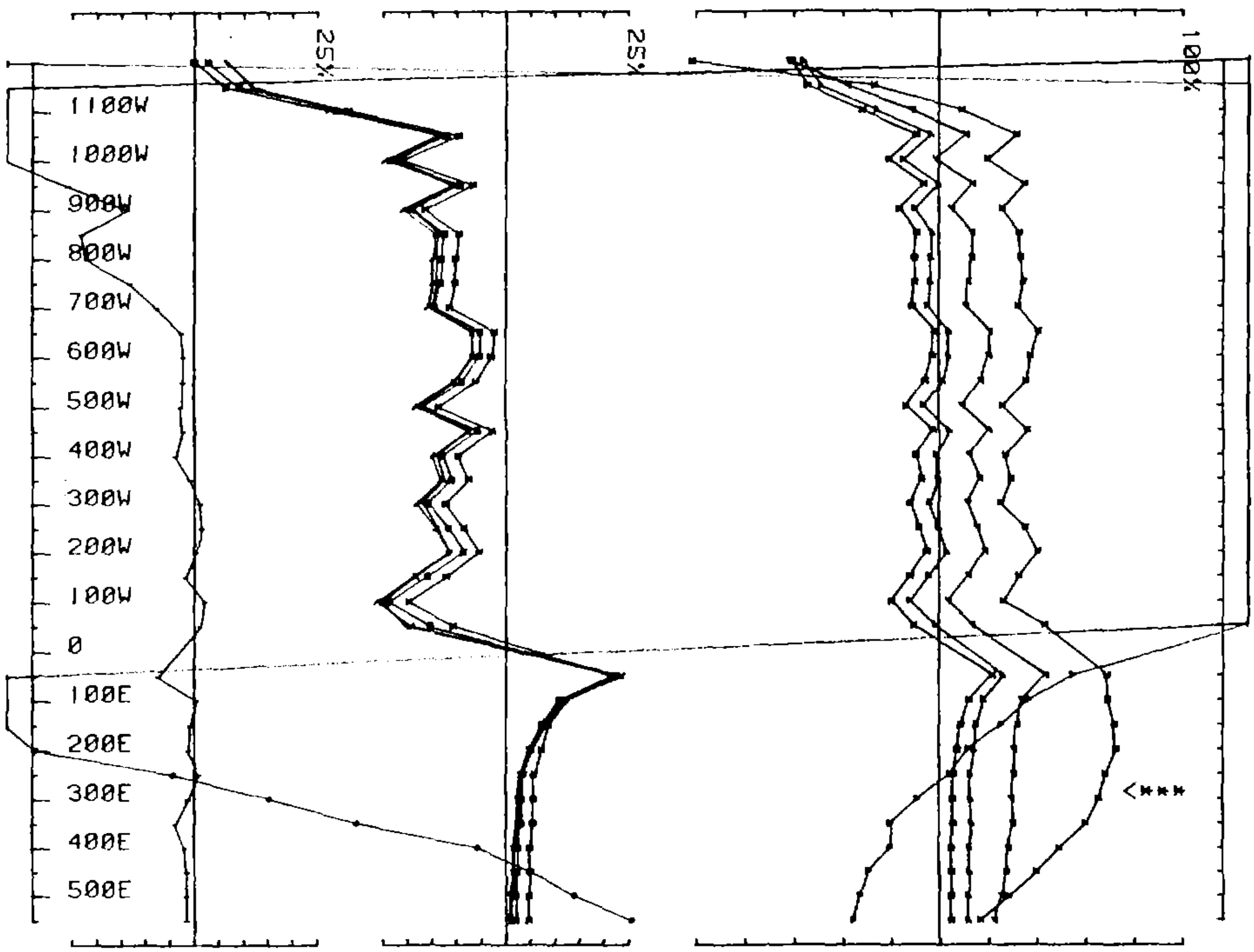



UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 Oct 1989

loop no bl1 line 200N component Hz secondary field Ch 1 contin. norm.

158

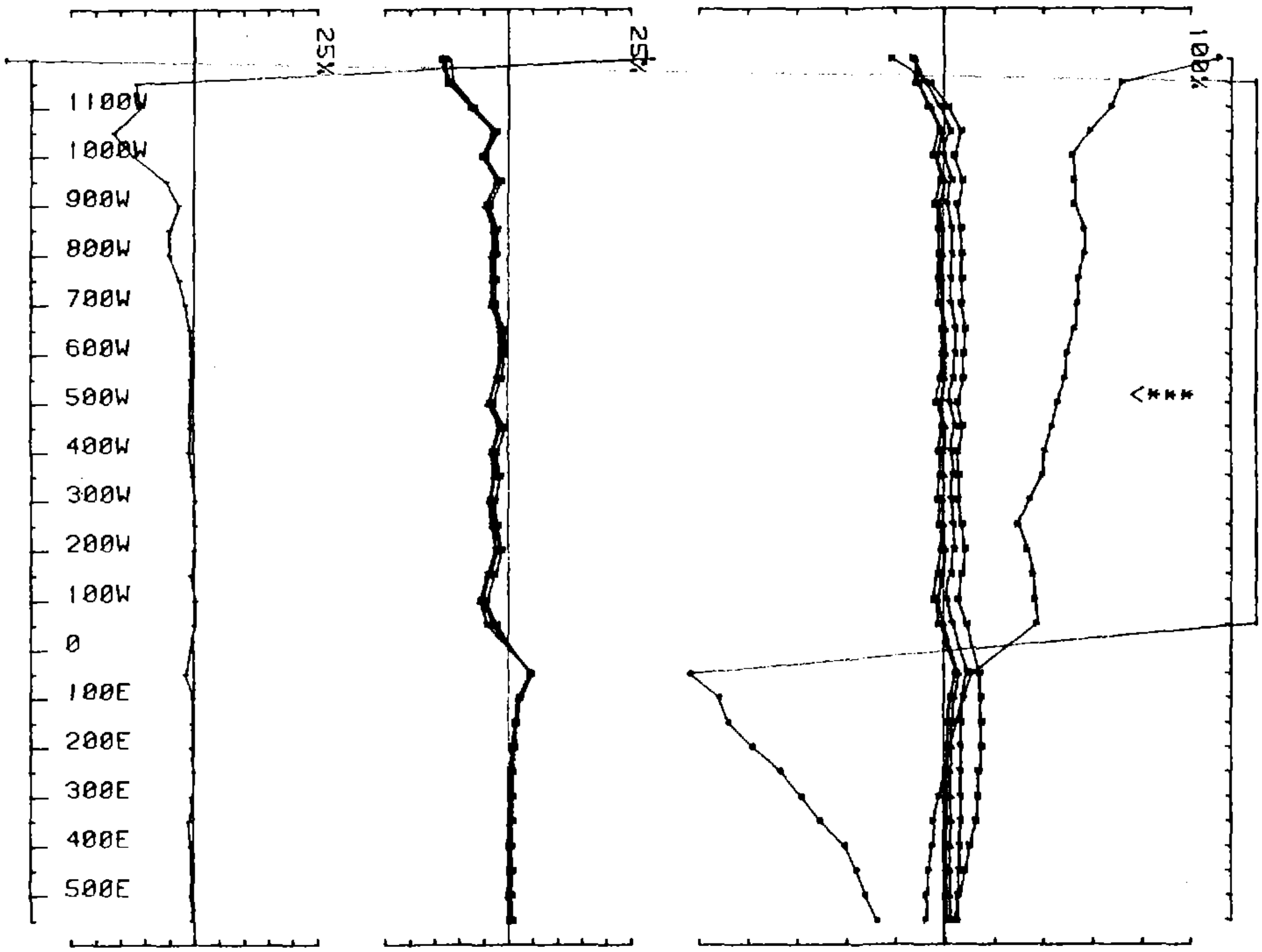



UTEM SURVEY at BEATRICE GRID for B H P

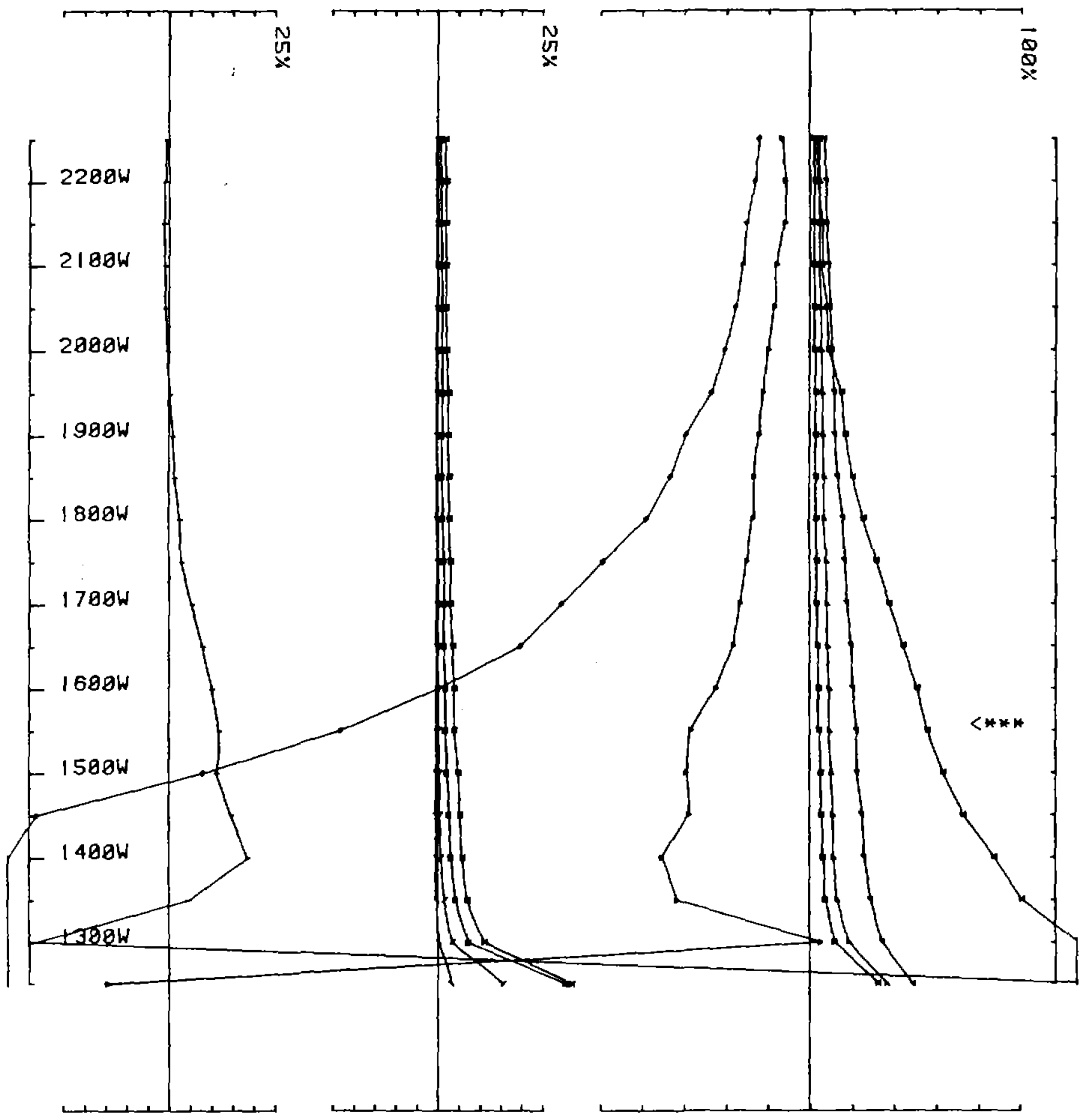
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 200N component Hz secondary field Ch 1 point norm.

153




UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 200N component Hz secondary field Ch 1 point norm.

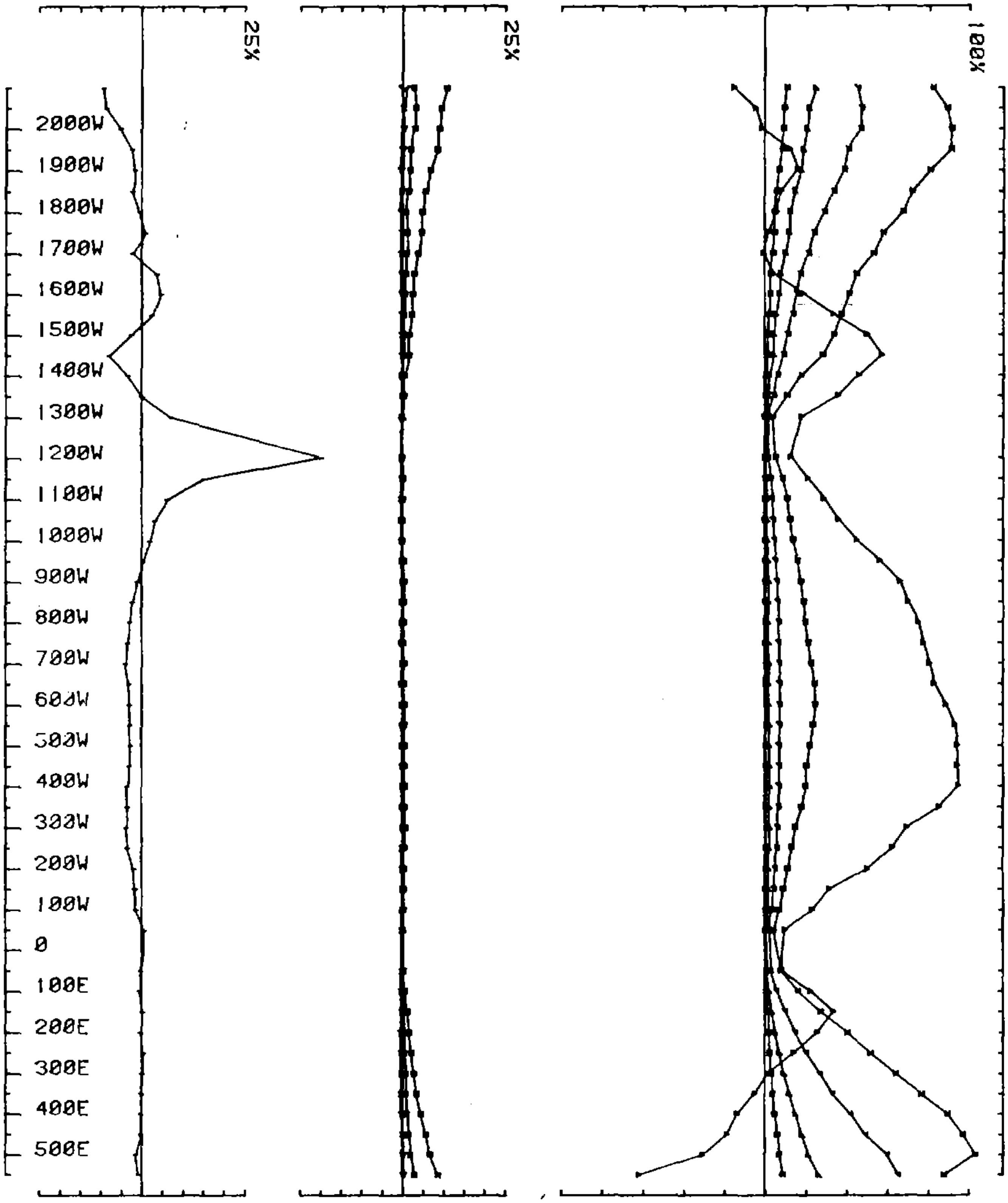



UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 200N component Hz secondary field Ch 1 point norm.

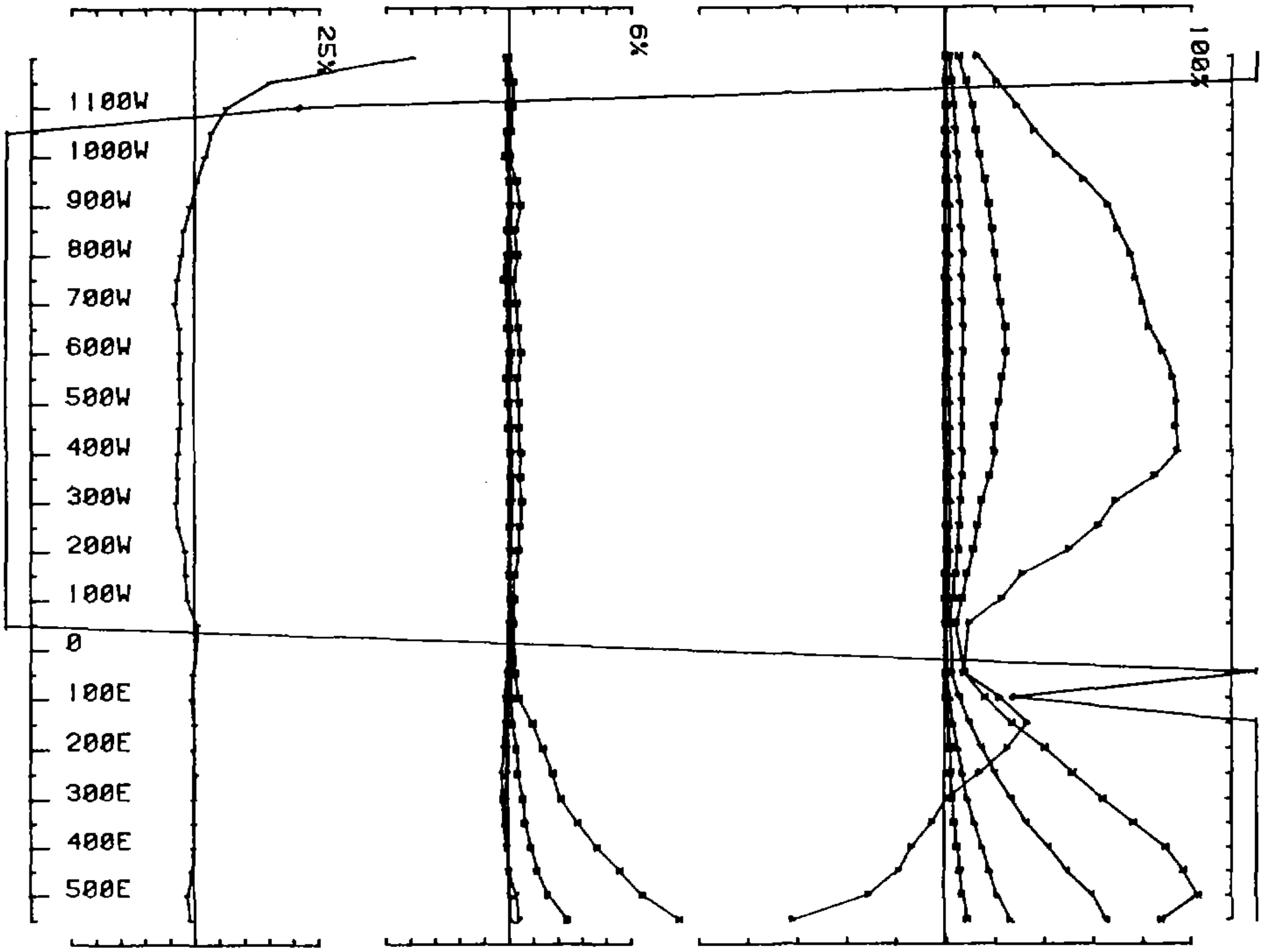
161




UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 Oct 1989

loop no BT1 line 400N component Hz secondary field Ch 1 contin. norm.

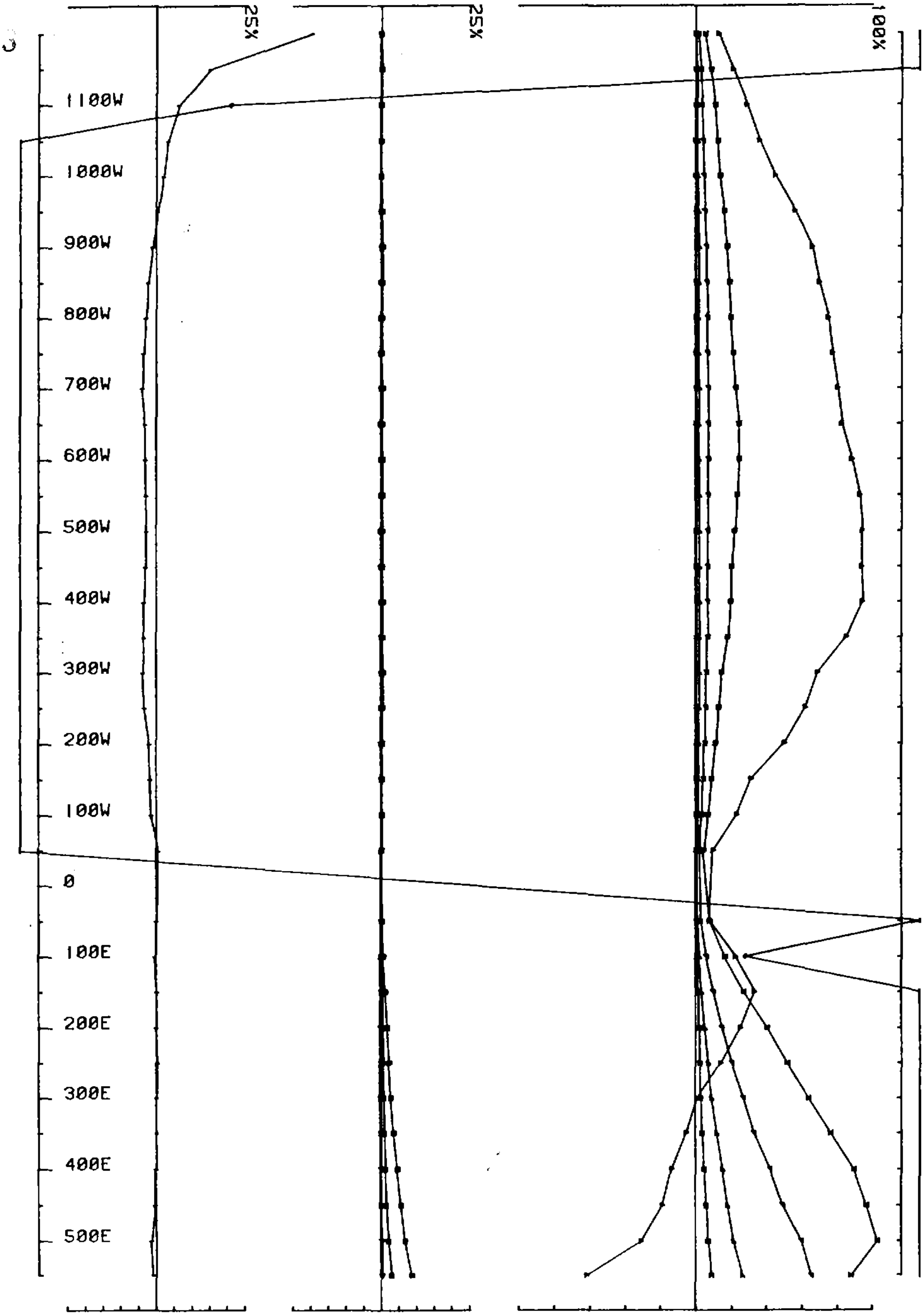



UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 400N component Hz secondary field Ch 1 contin. norm.

163

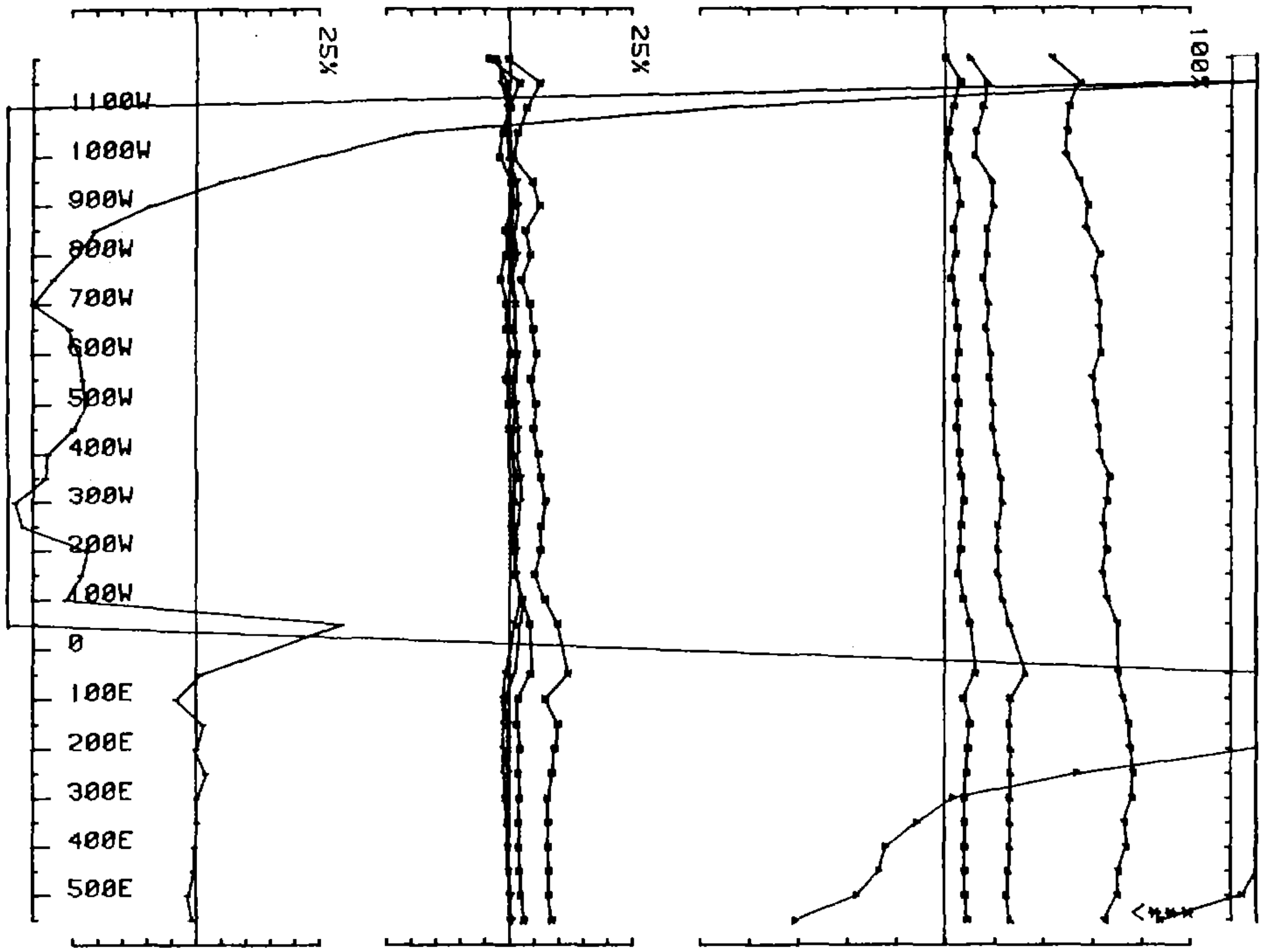



UTEM SURVEY BEATRICE 89 GRID 26.230

510176

LINE 400N GRID BT 1

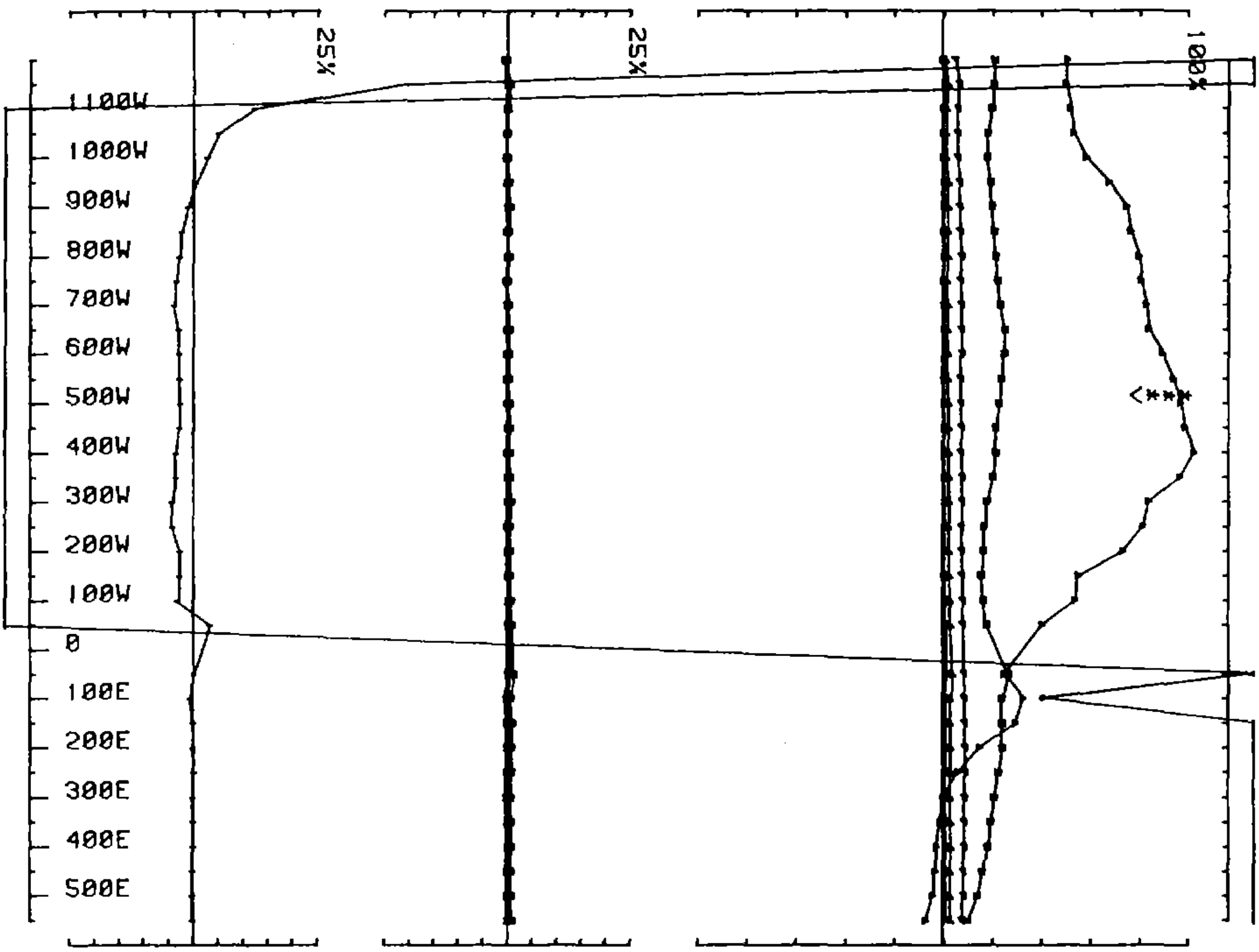
510177




UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 400N component Hz secondary field Ch 1 point norm.

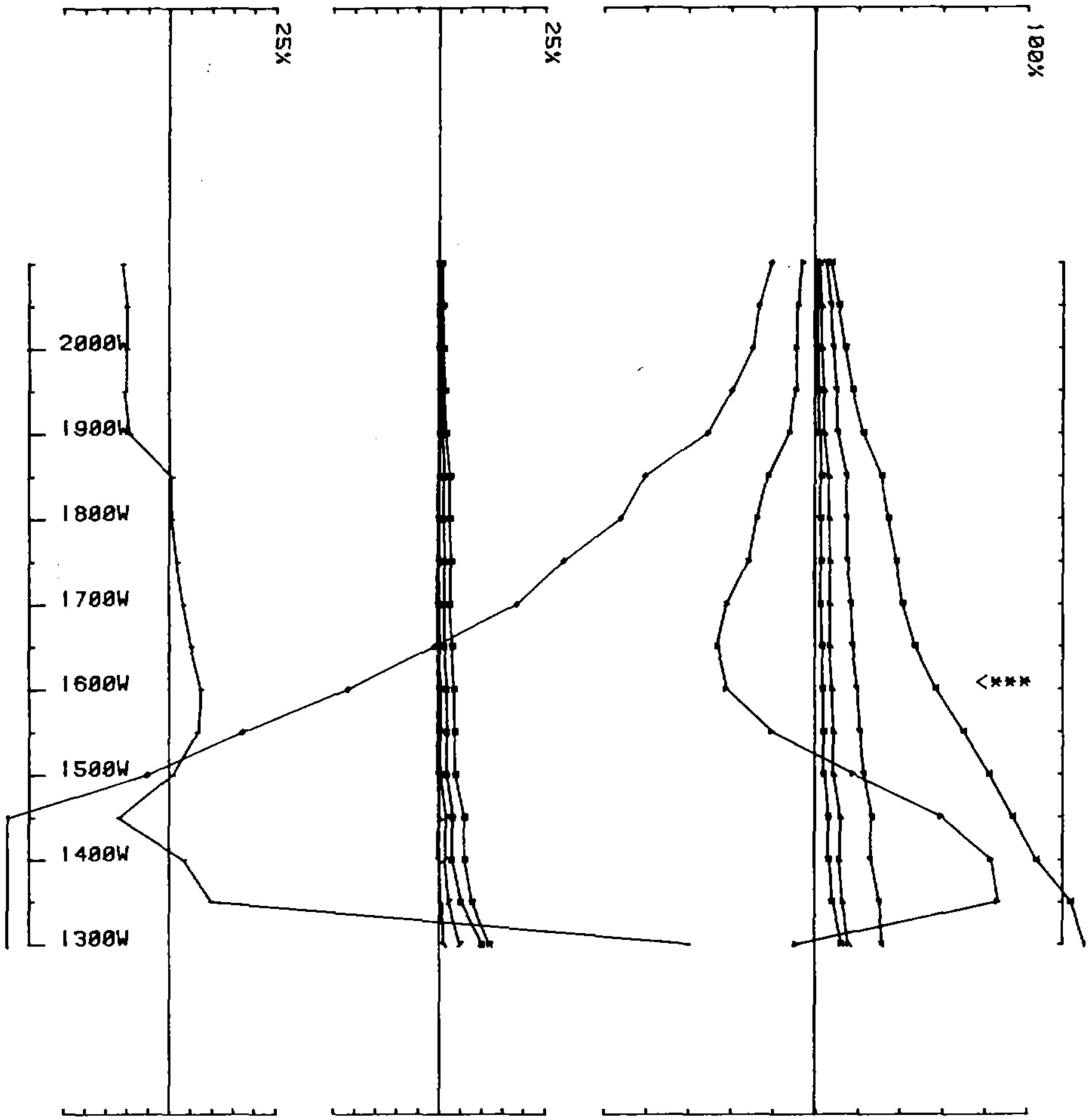



UTEM SURVEY at BEATRICE GRID for B H P

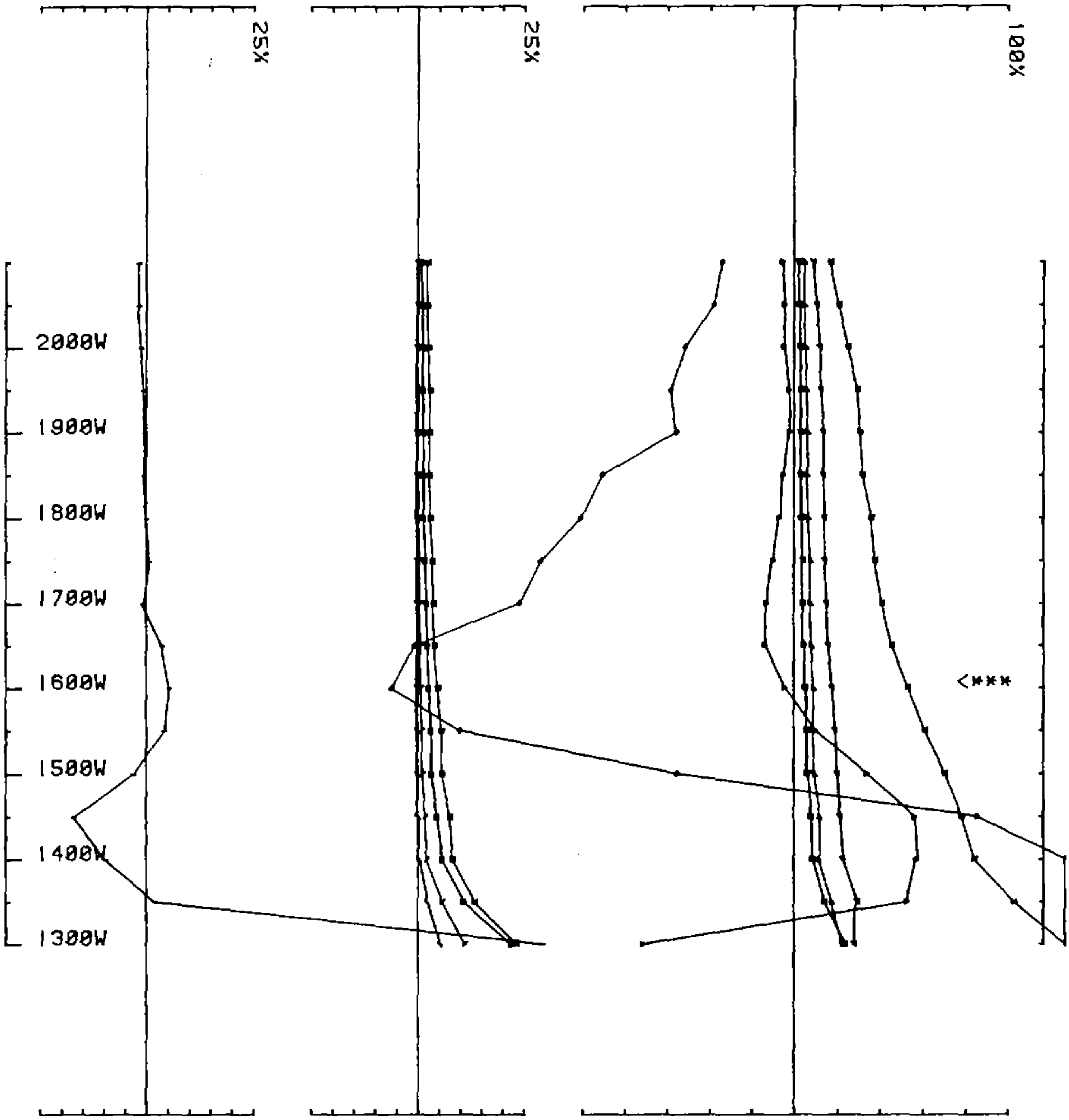
conducted by TM ST R Job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 400N component Hz secondary field Ch 1 point norm.

510179



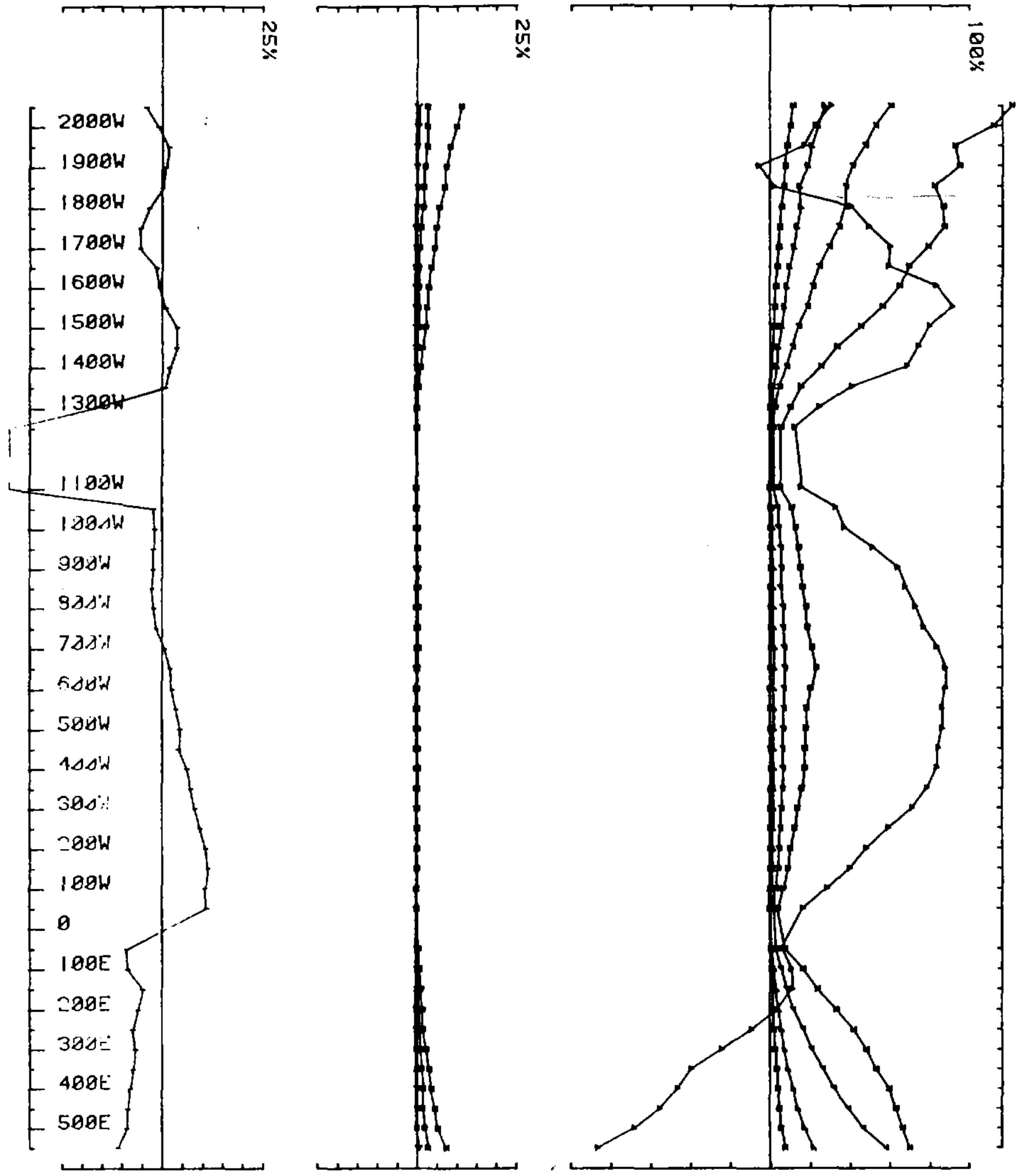

UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 400N component Hz secondary field Ch 1 point norm.




UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

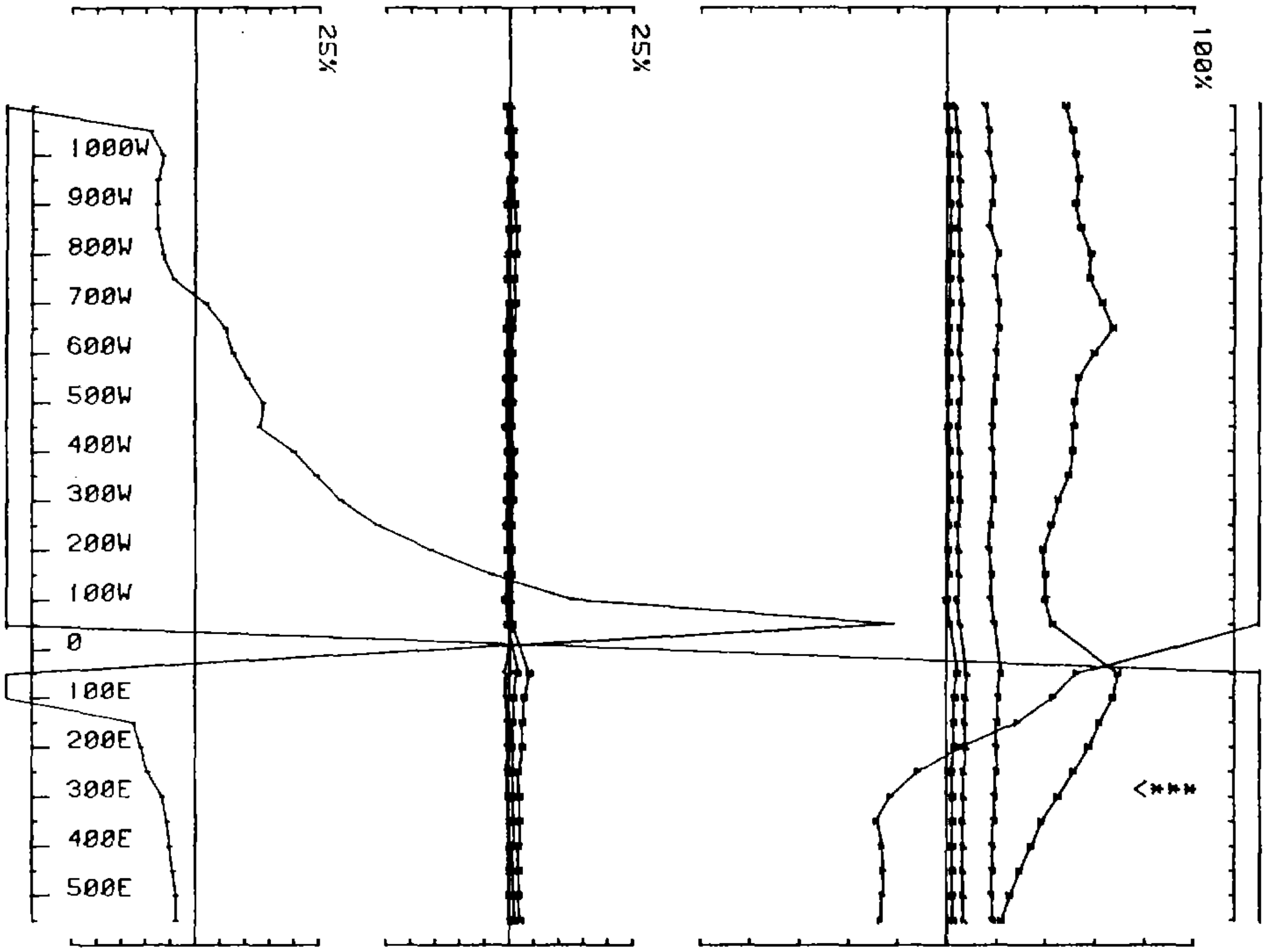
loop no BT 1 line 400N component Hz secondary field Ch 1 point norm.




UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 Oct 1989

loop no BT1 line 600N component Hz secondary field Ch 1 contin. norm.

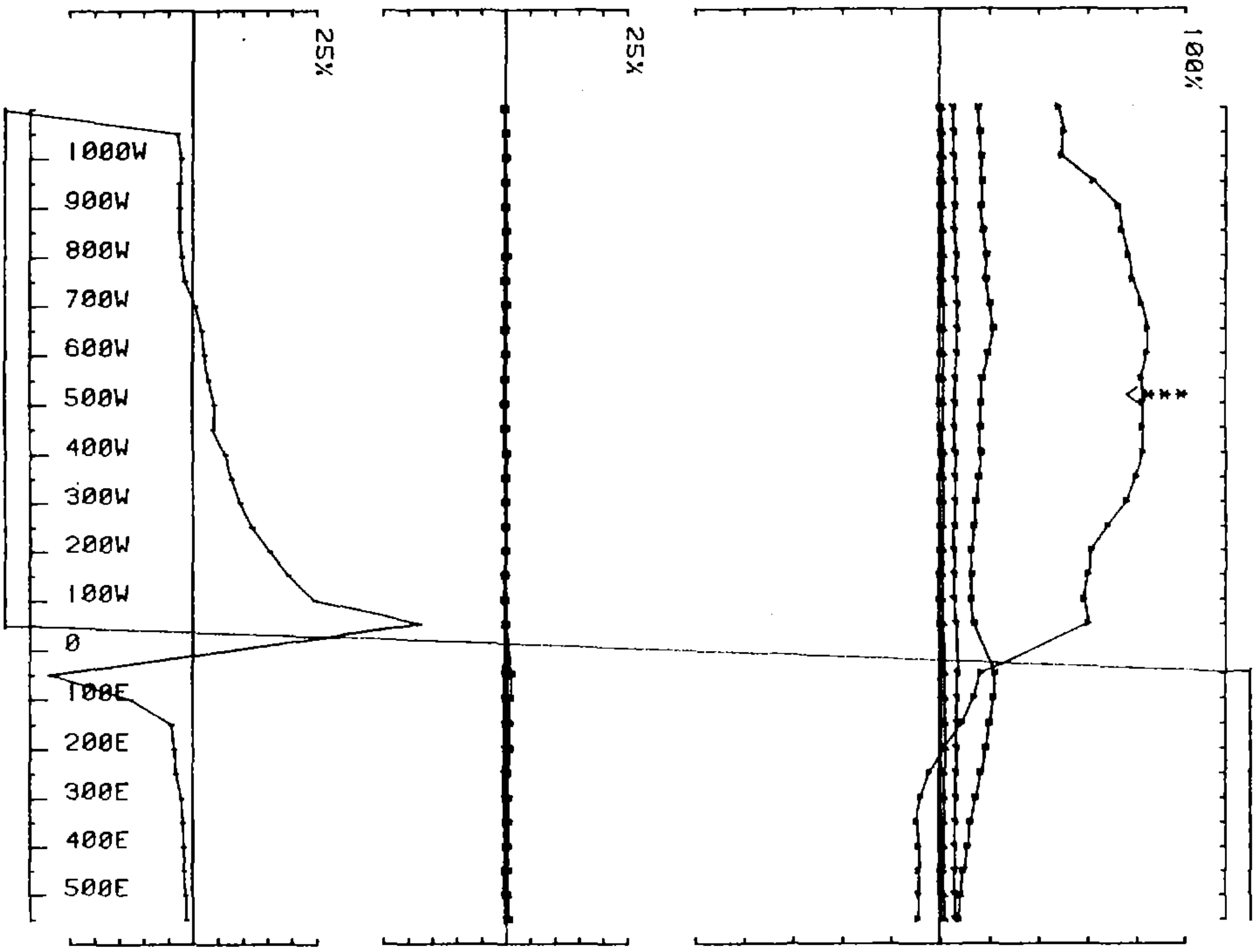



UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 600N component Hz secondary field Ch 1 point norm.

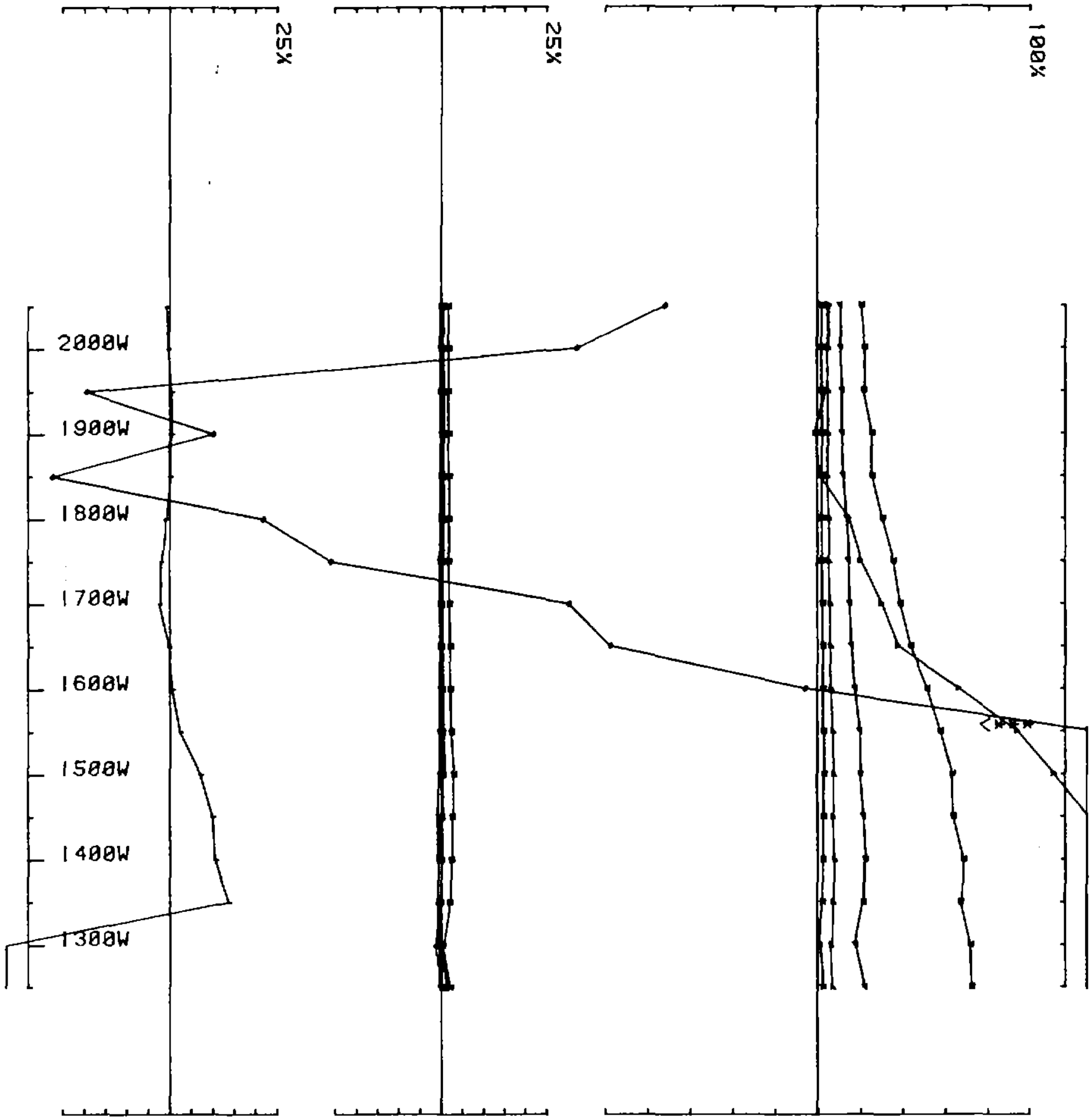
170




UTEM SURVEY at BEATRICE GRID for B H P

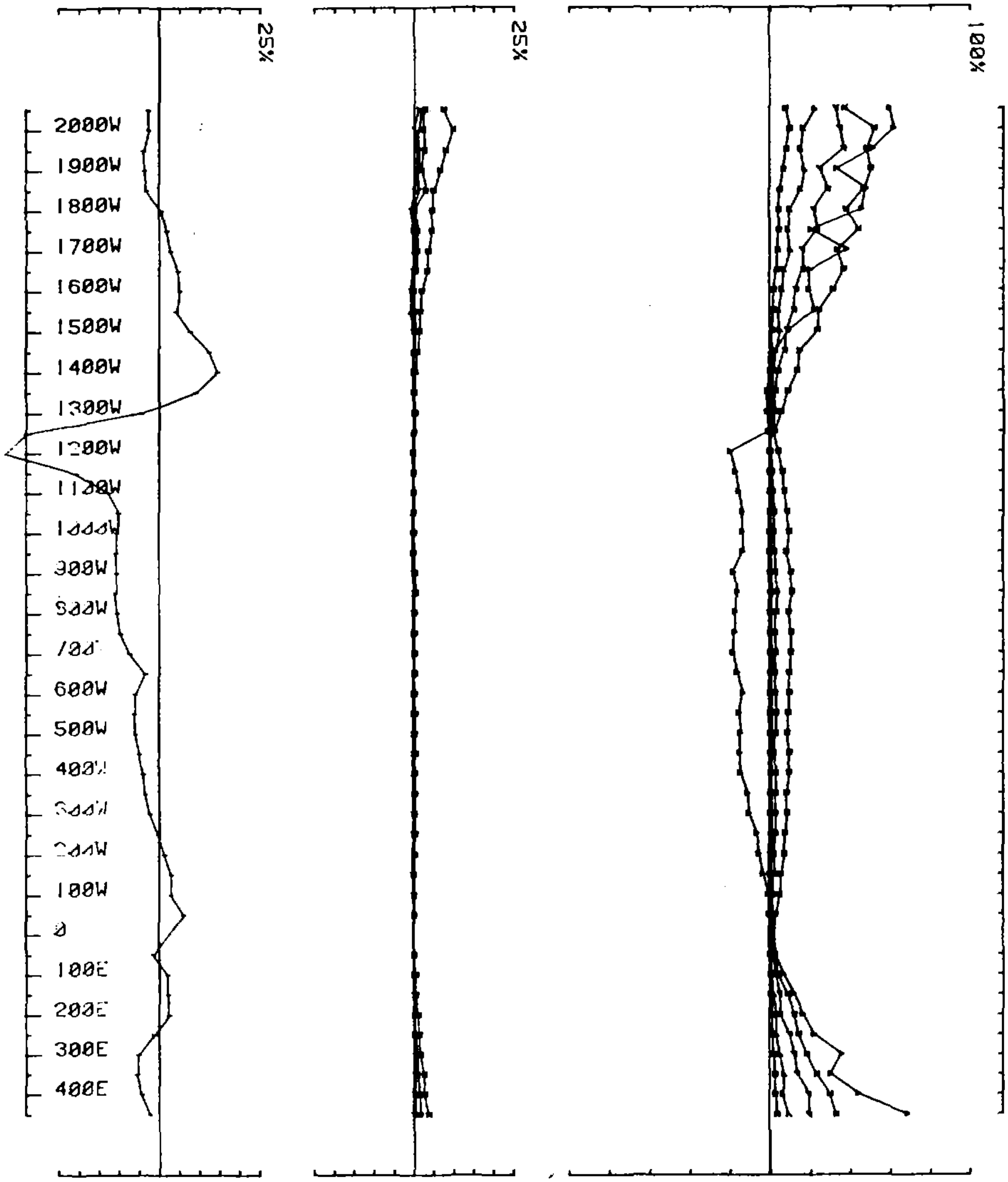
conducted by TM ST R Job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 600N component Hz secondary field Ch 1 point norm.




UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 600N component Hz secondary field Ch 1 point norm.

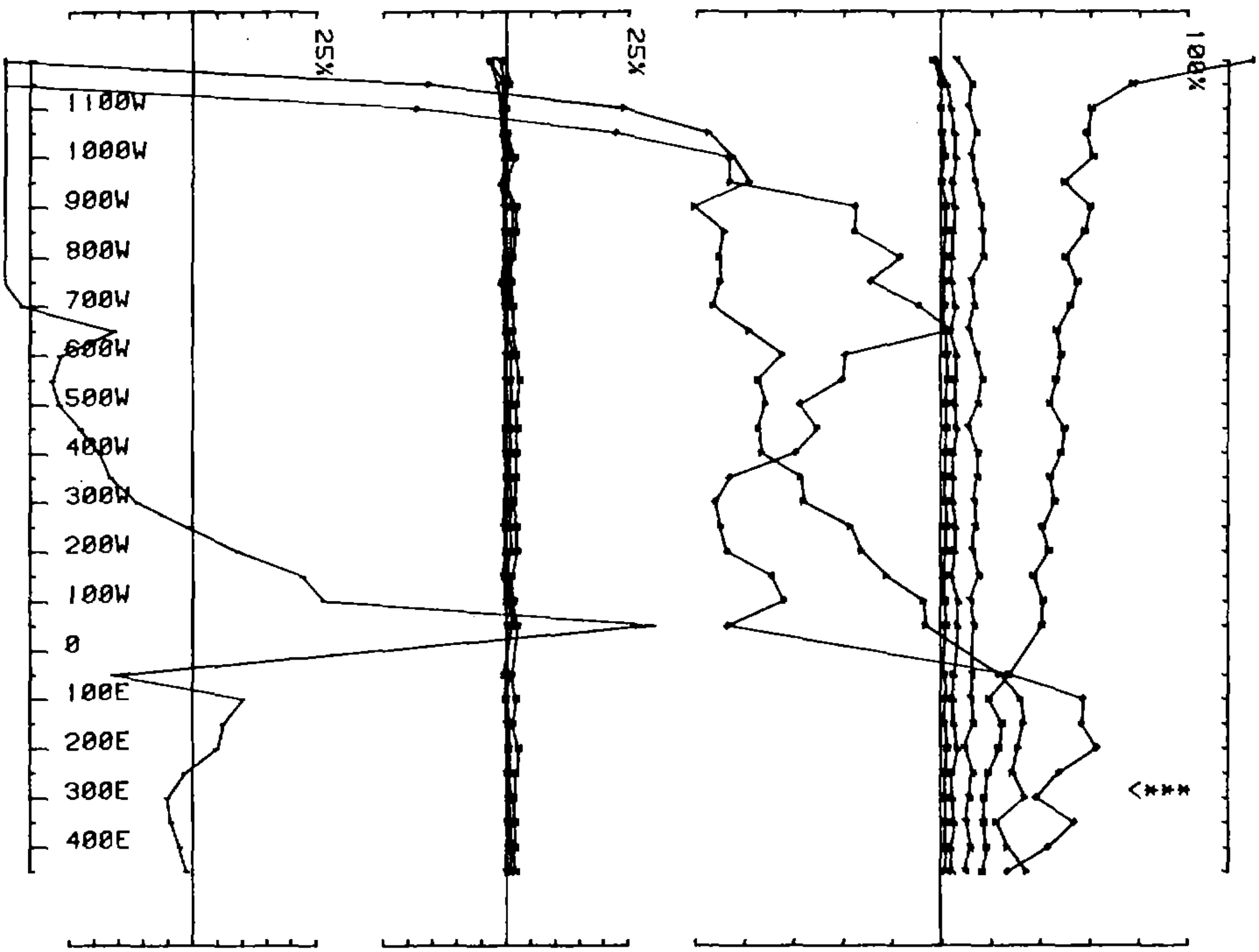
510185



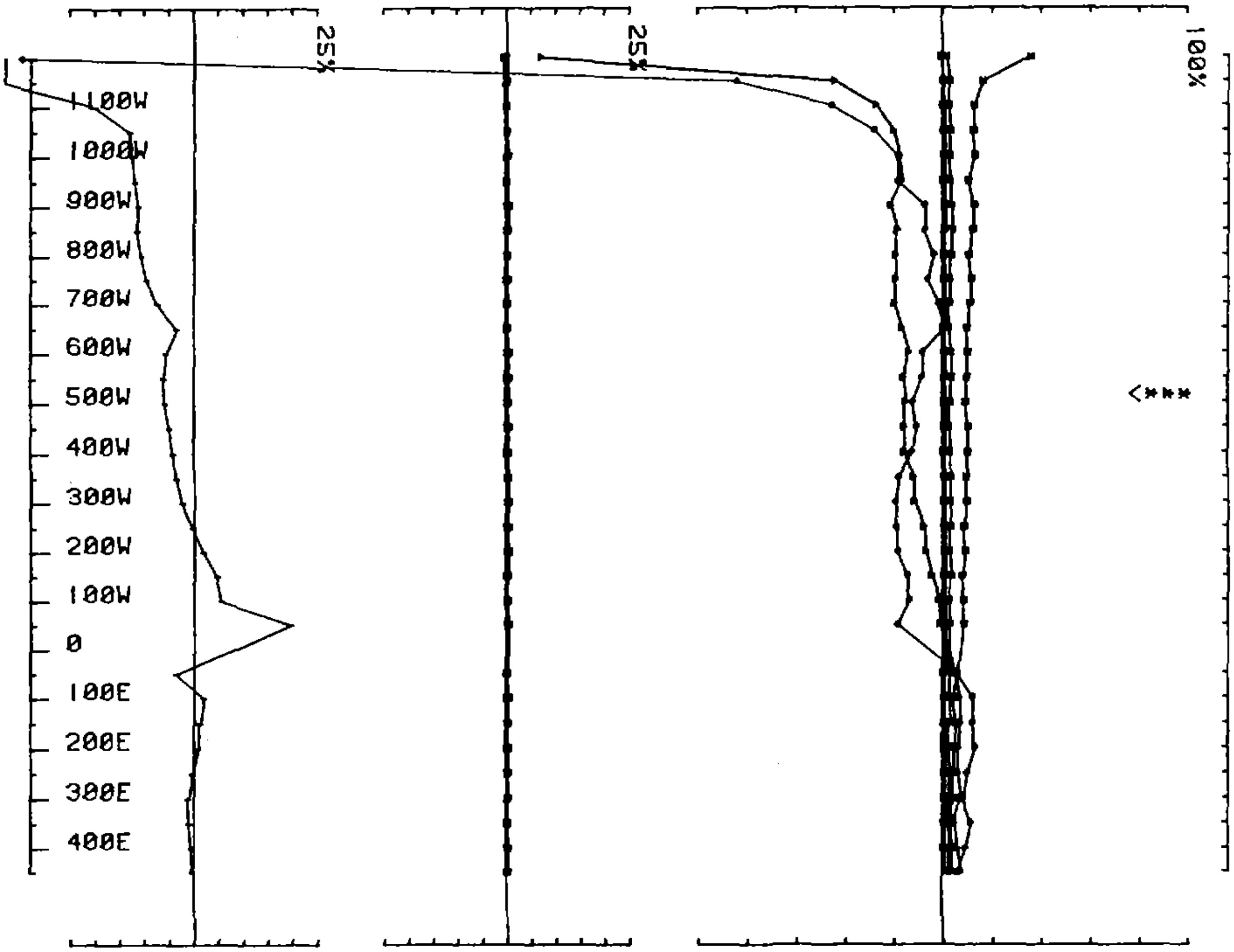

UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 Oct 1989

loop no BT1 line 800N component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at BEATRICE GRID for B H P
conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89
loop no BT 1 line 800N component Hz secondary field Ch 1 point norm.



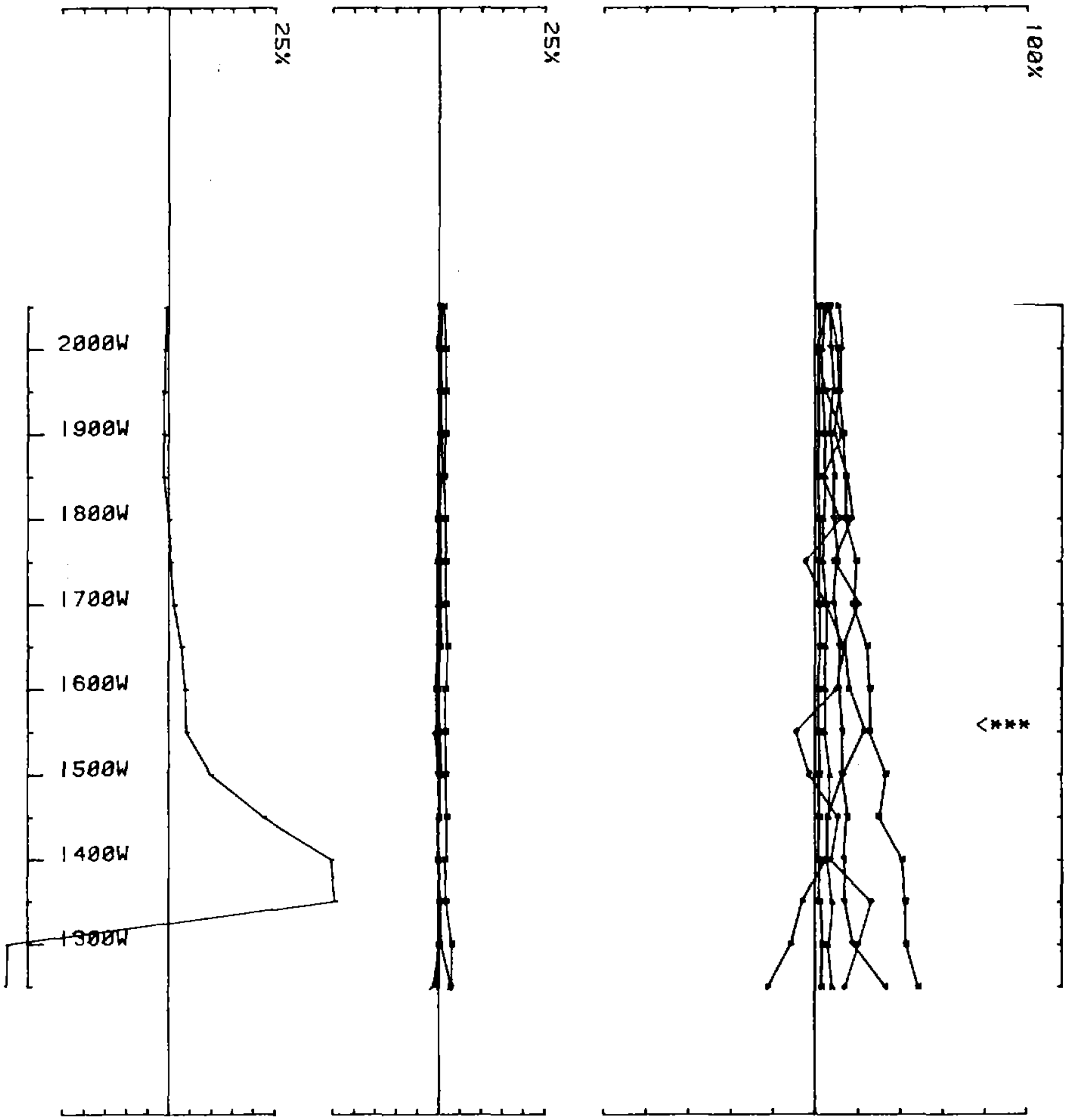

UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 800N component Hz secondary field Ch 1 point norm.

175

510188



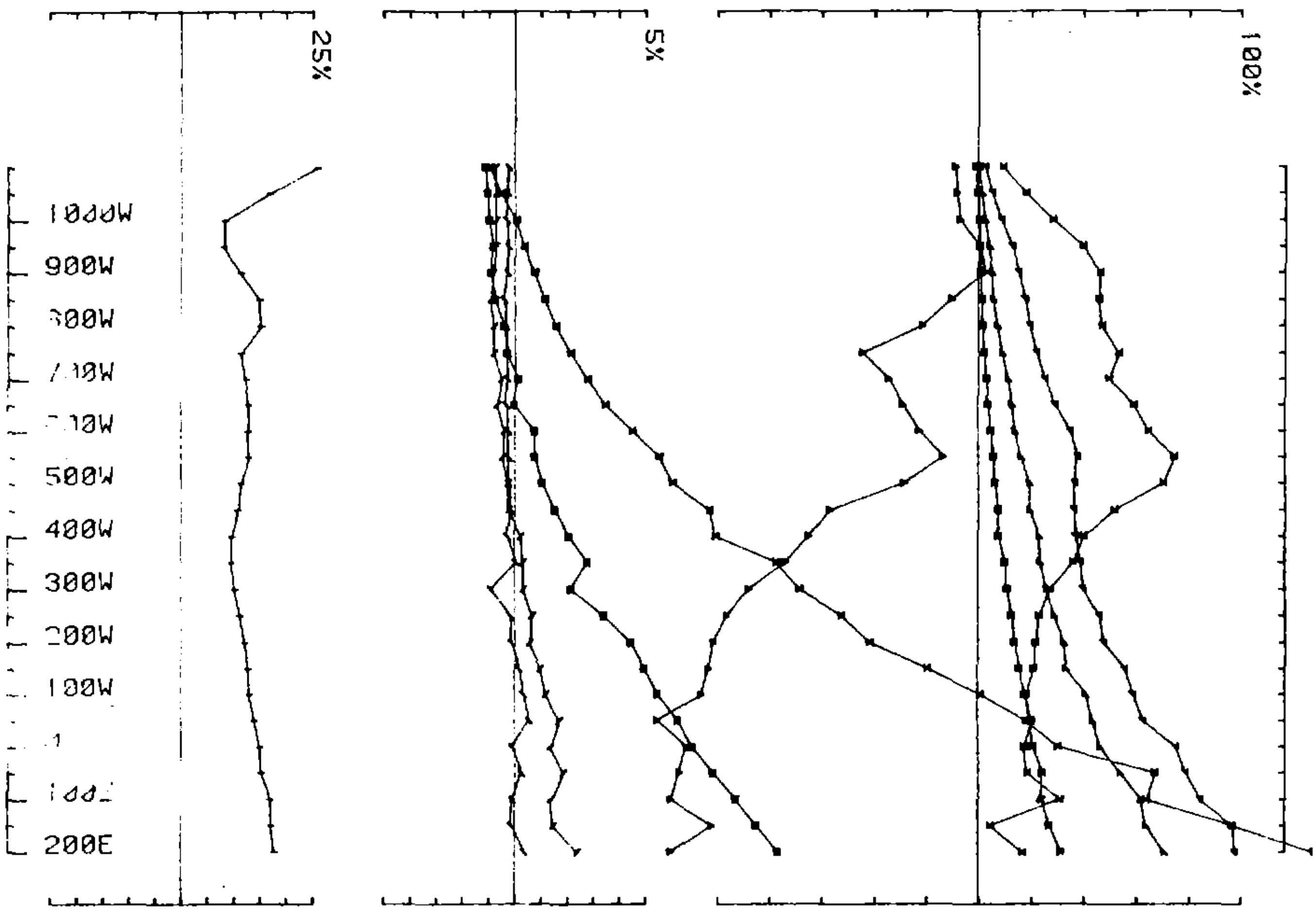

UTEM SURVEY at BEATRICE GRID for B H P

conducted by TM ST R job 8971 base freq (hz) 26.230 OCT 89

loop no BT 1 line 800N component Hz secondary field Ch 1 point norm.

510189

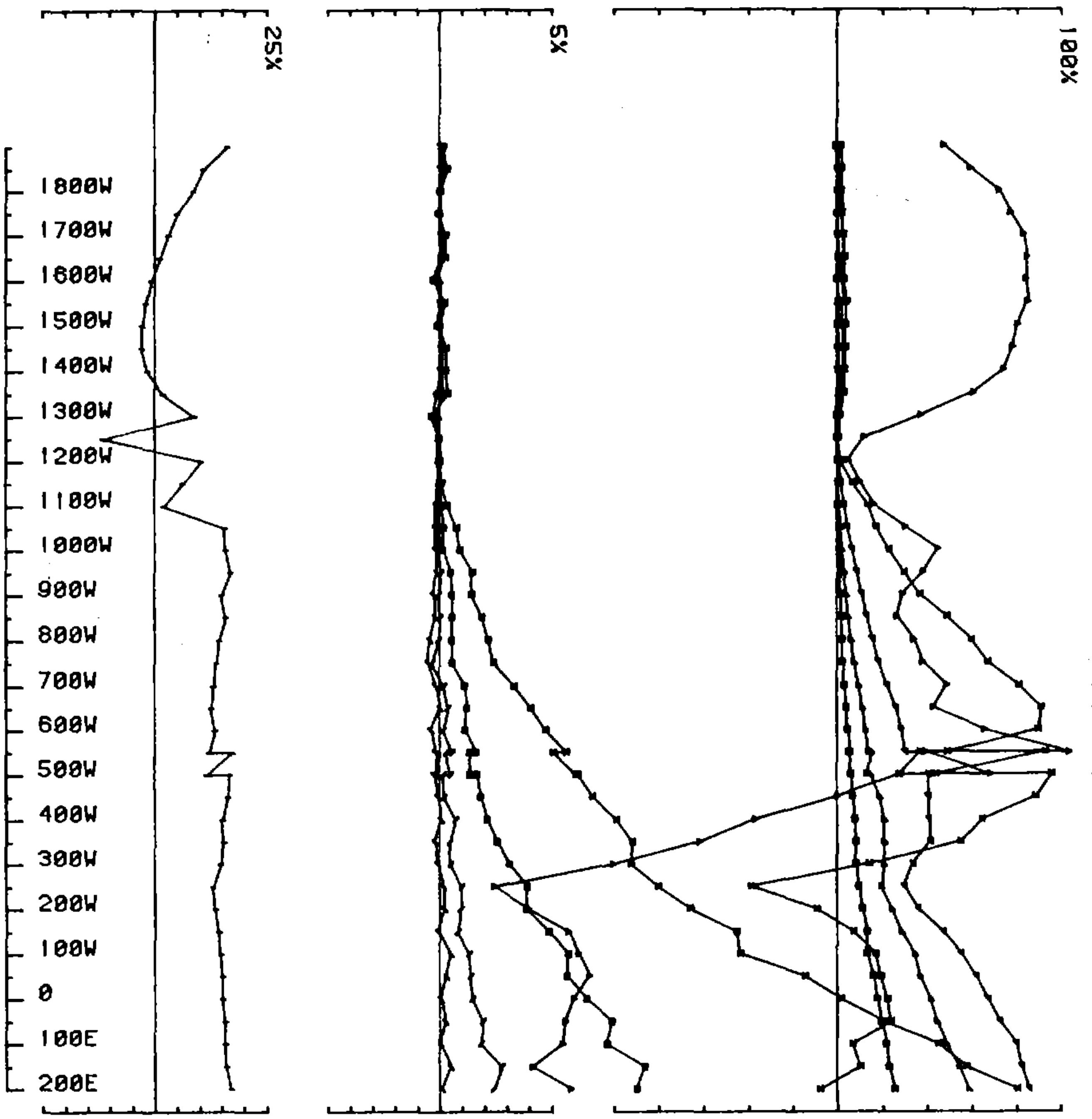
176




UTEM SURVEY at BEATRICE for BHP
conduct-l by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 2 line 0 component Hz secondary field Ch 1 contin. norm.

510190

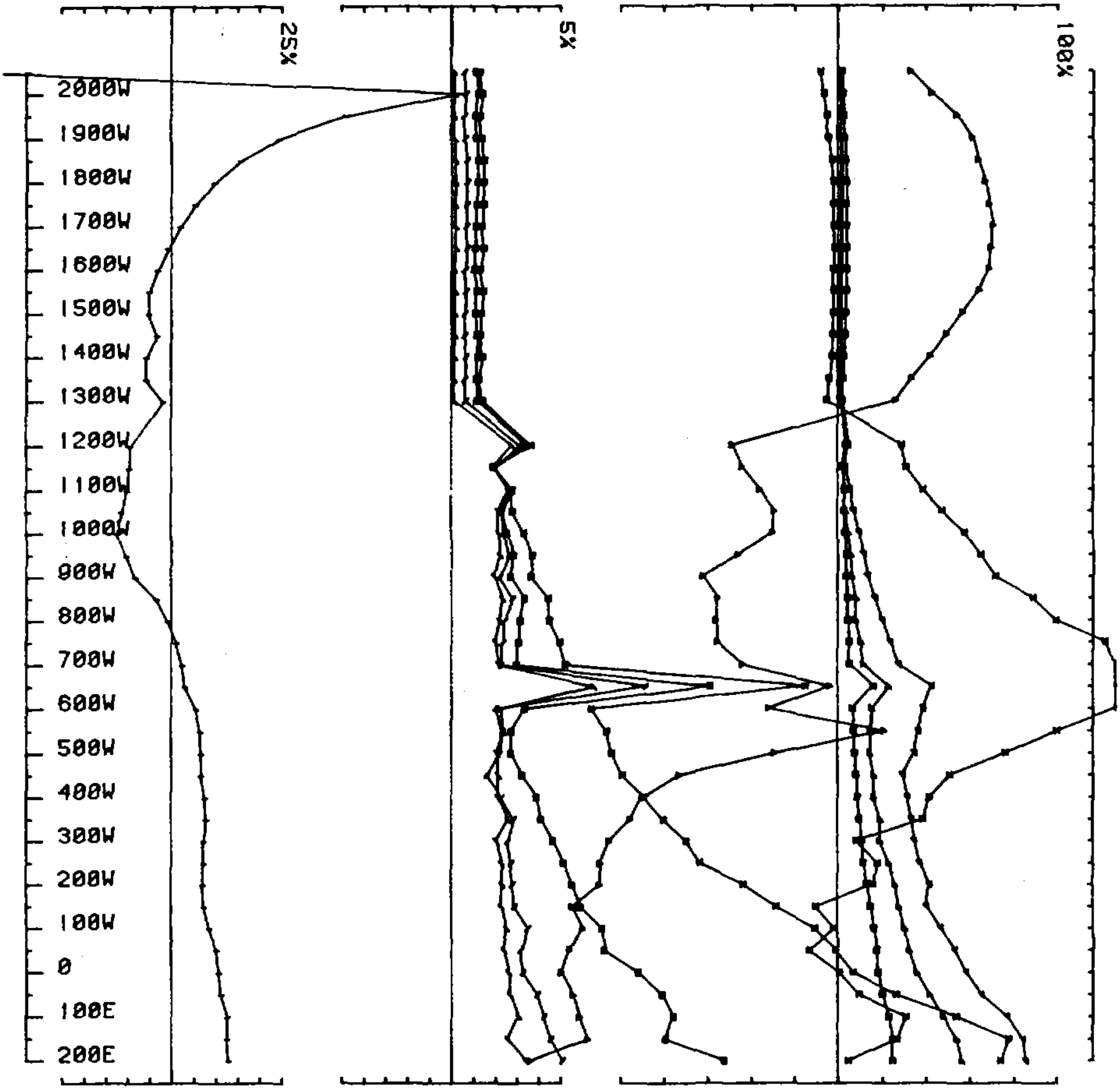
177




UTEM SURVEY at BEATRICE for BHP

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 2 line 200N component Hz secondary field Ch 1 contin. norm.

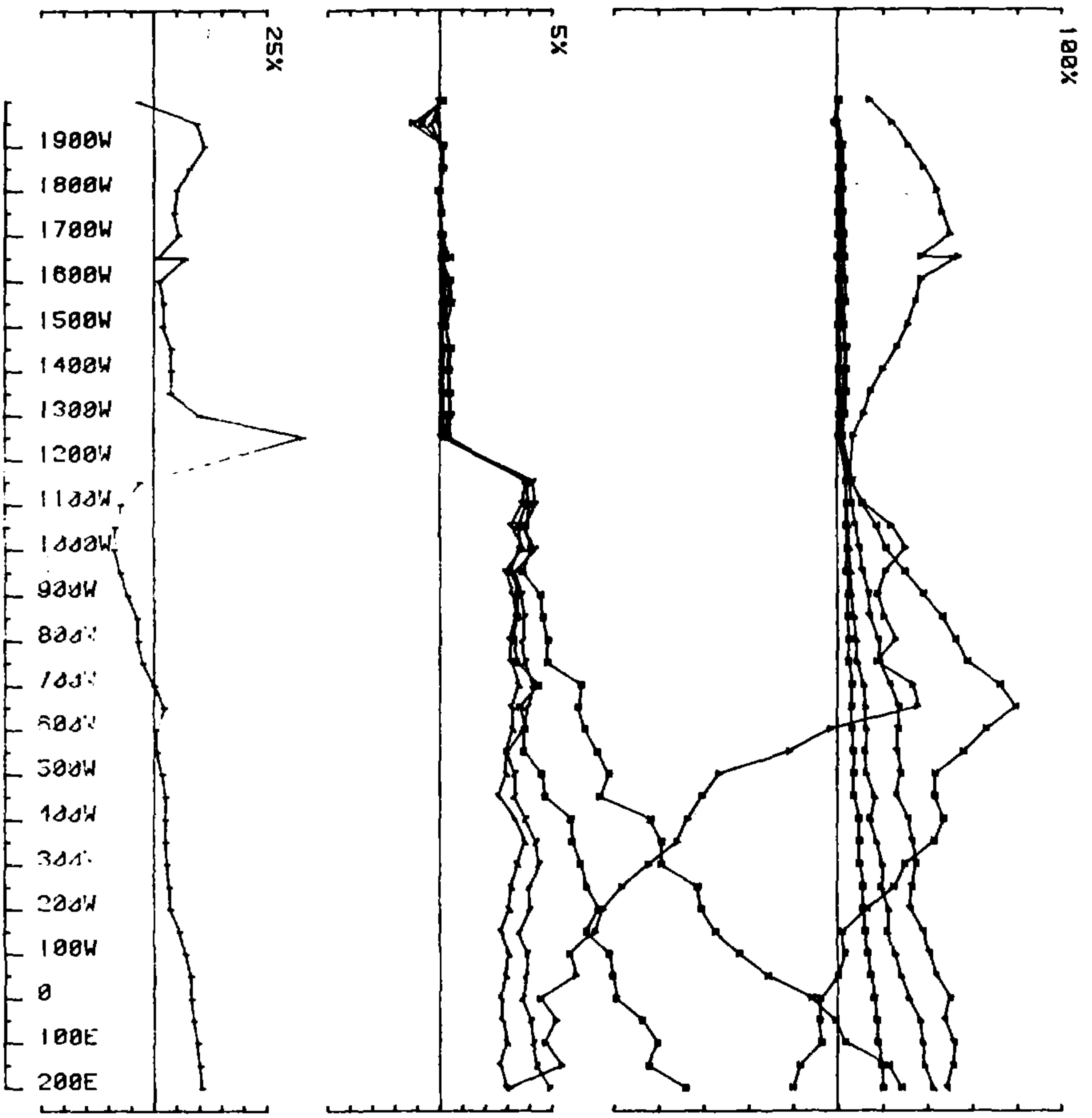



UTEM SURVEY at BEATRICE for BHP

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 2 line 400N component Hz secondary field Ch 1 contin. norm.

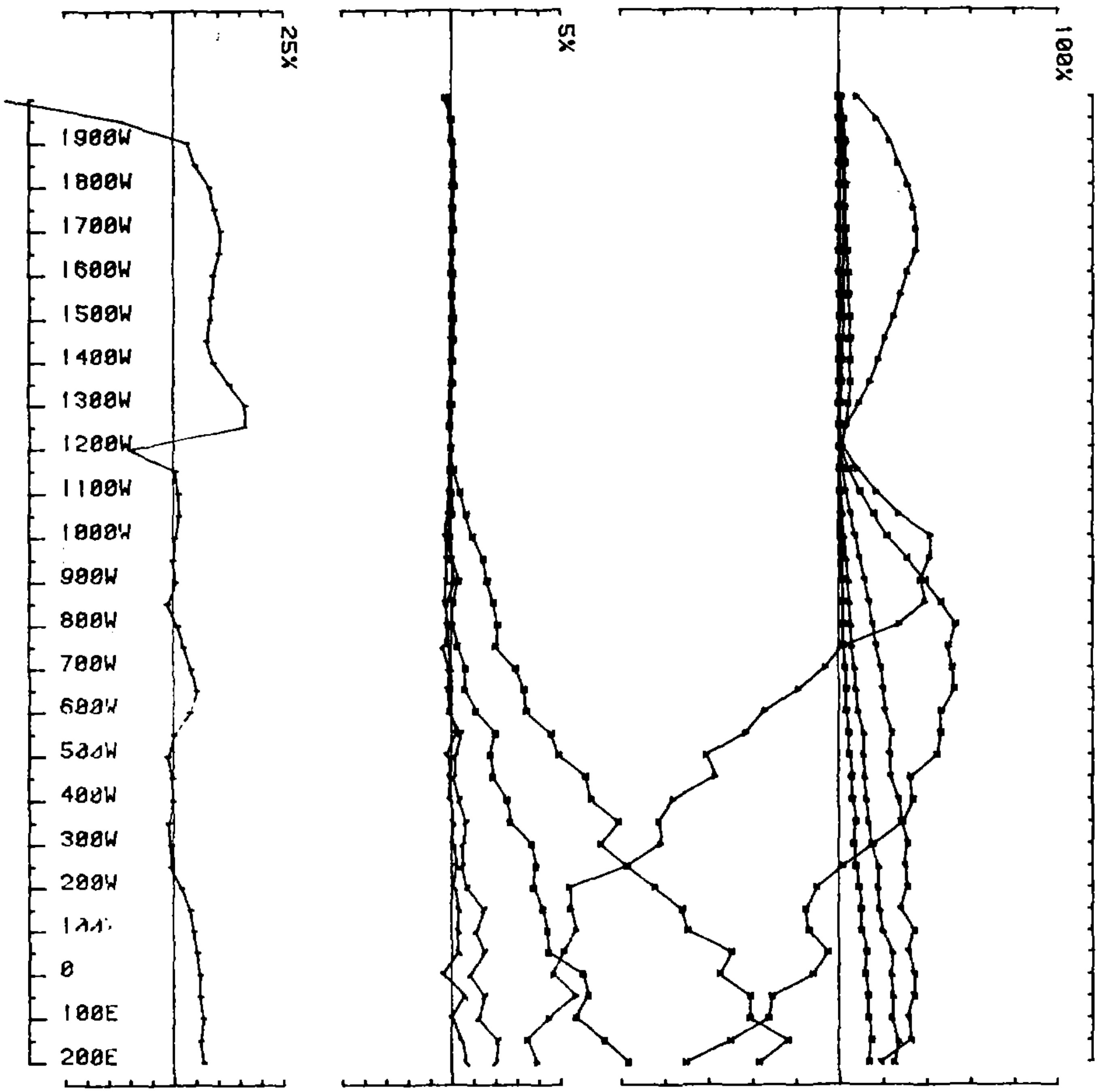
510192




UTEM SURVEY at BEATRICE for BHP

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

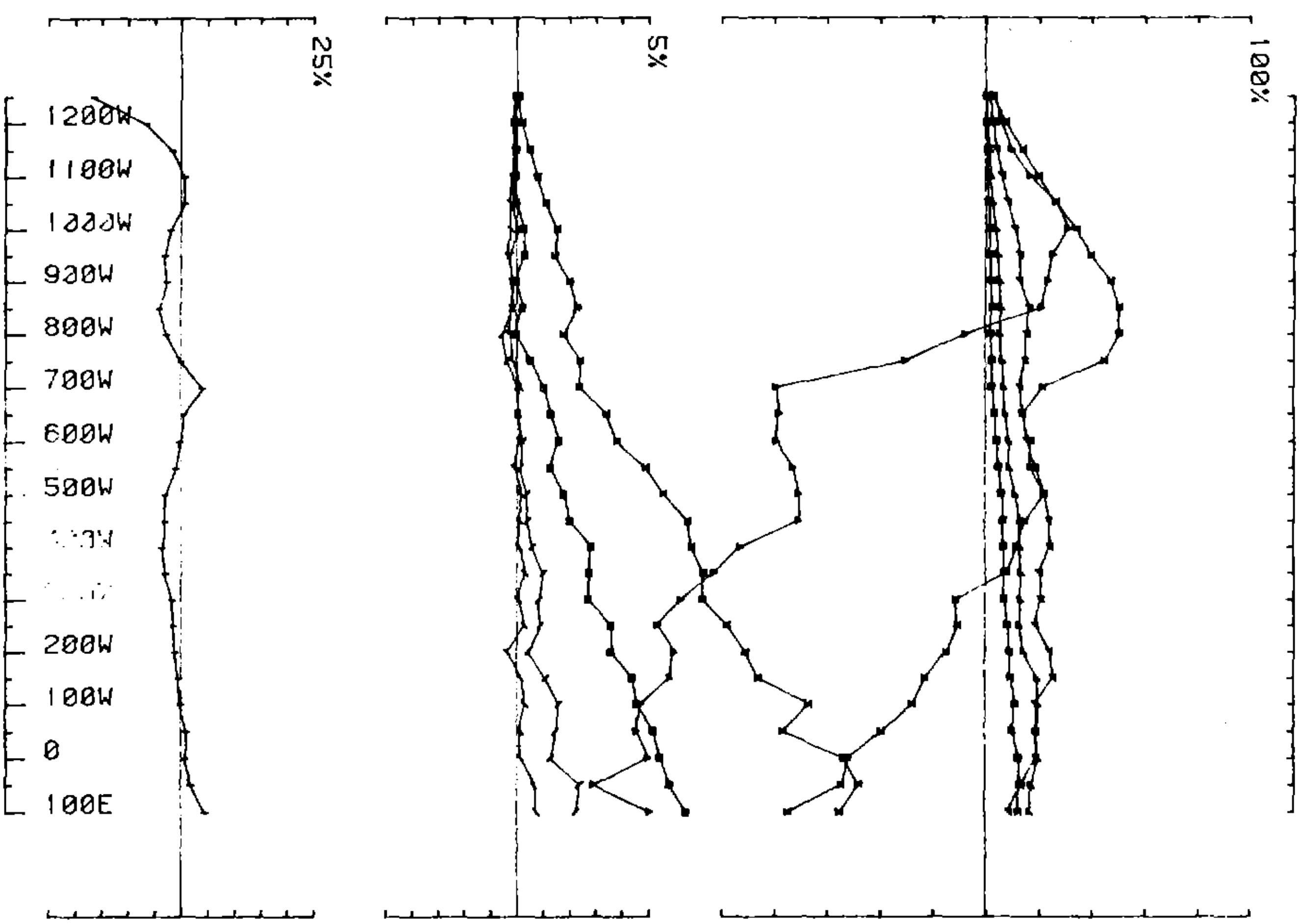
loop no BT 2 line 600N component Hz secondary field Ch 1 contin. norm.



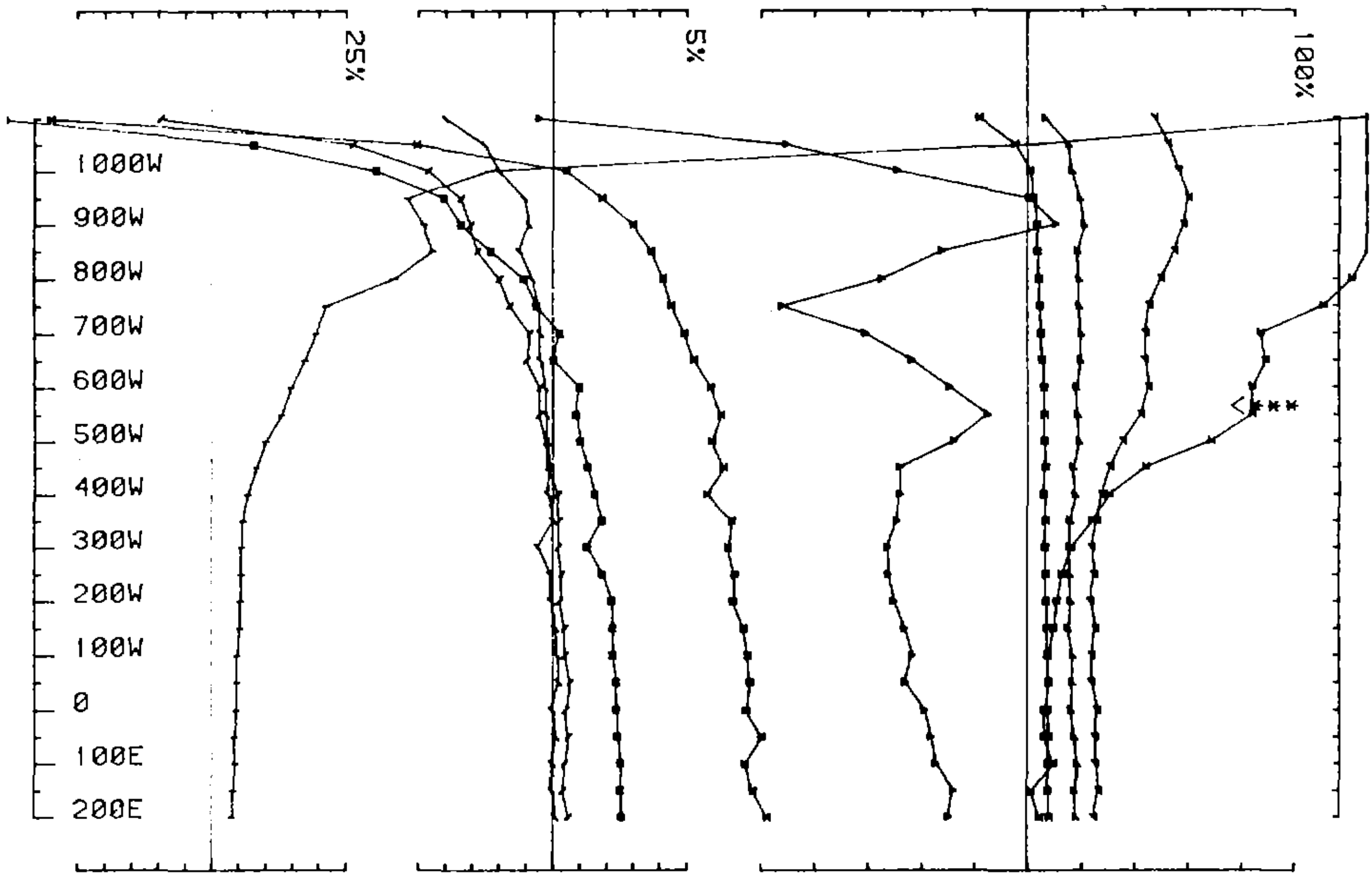

UTEM SURVEY at BEATRICE for BHP

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

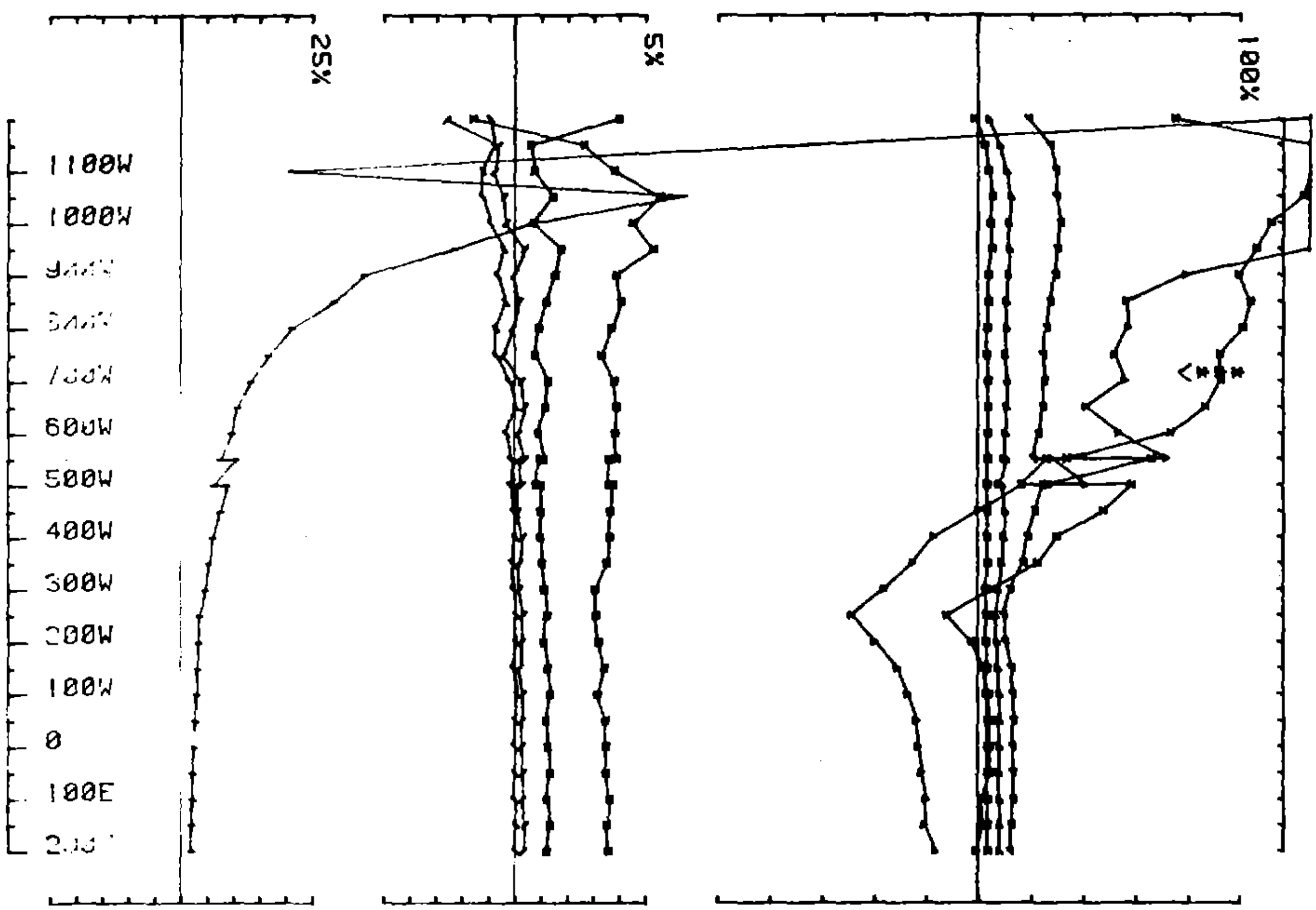
loop no BT 2 line 800N component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at BEATRICE for BHP
conducted by TM ST RL job 5071 base freq (hz) 26.230 OCT 89
loop no BT 2 line 1000N component Hz secondary field Ch 1 contin. norm.



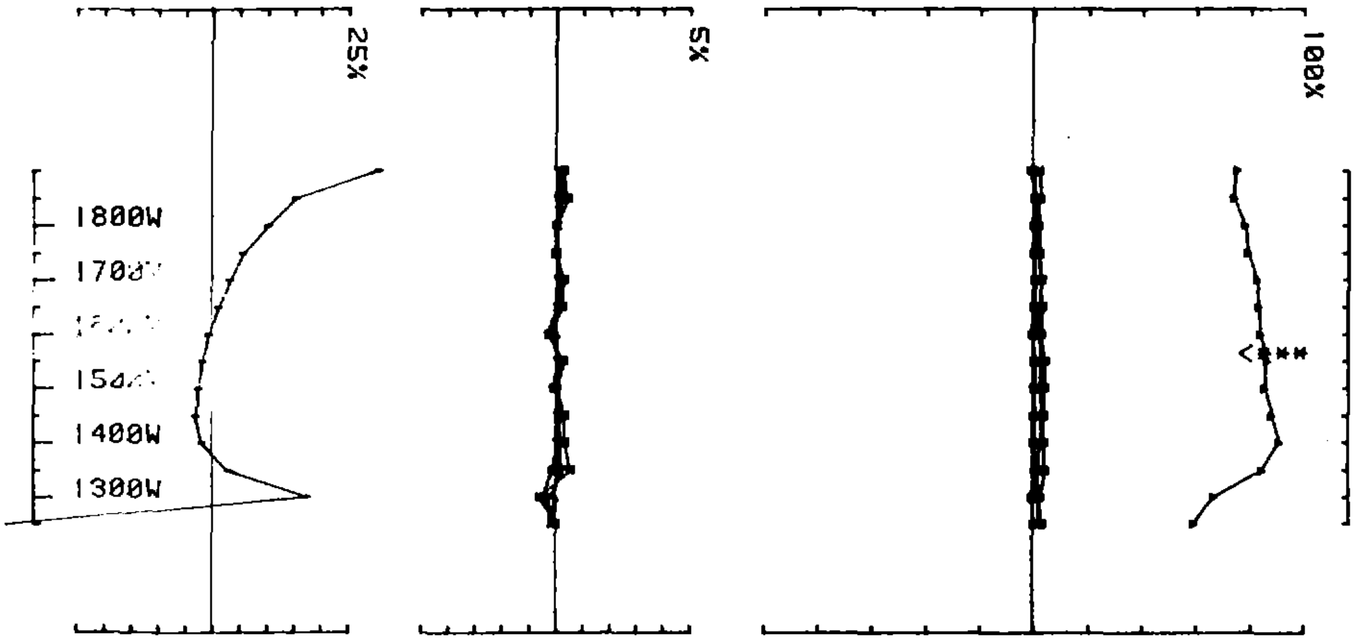

UTEM SURVEY at BEATRICE for BHP
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 2 line ON component Hz secondary field Ch I point norm.




UTEM SURVEY at BEATRICE for BHP

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 2 line 200N component Hz secondary field Ch 1 point norm.



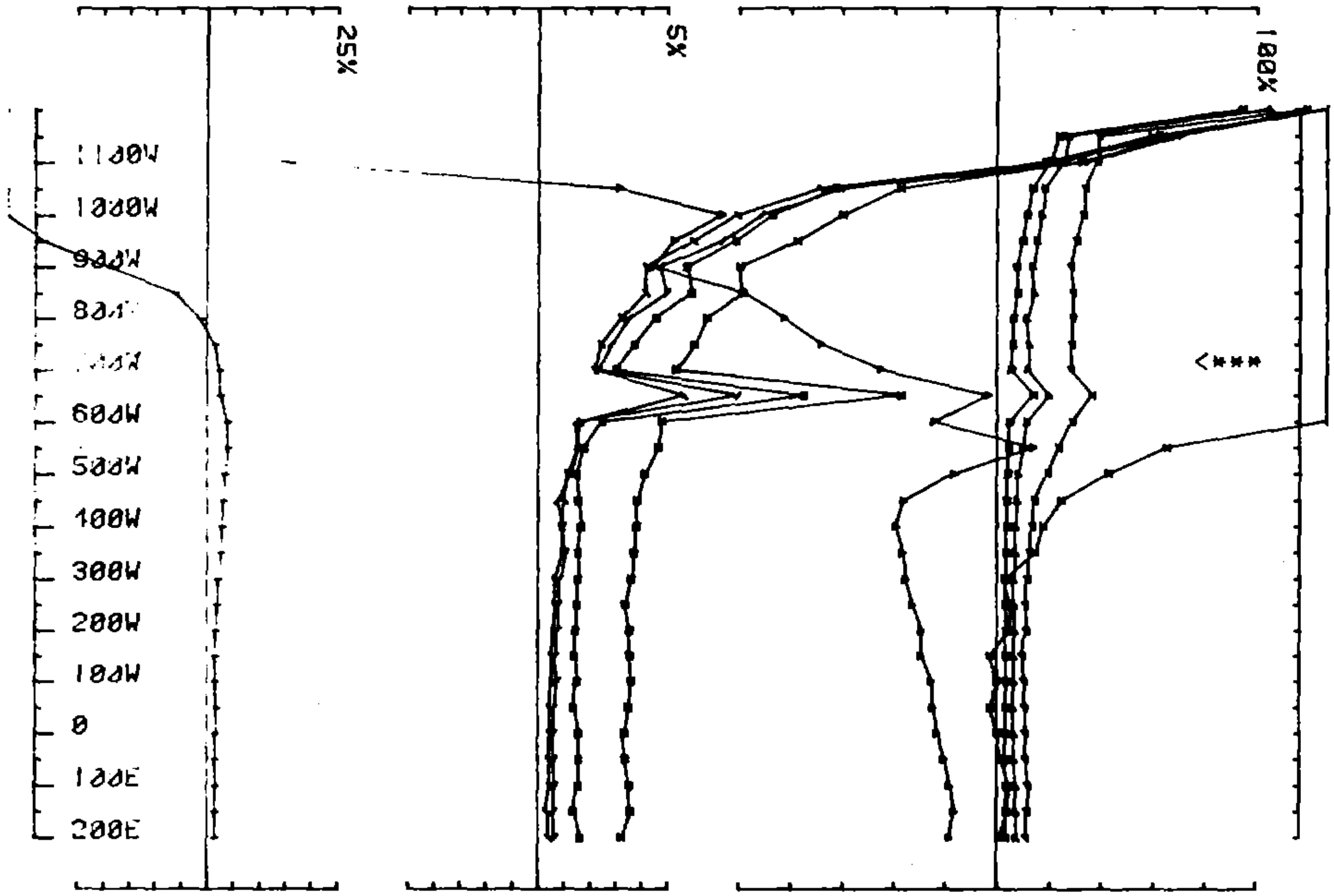

UTEM SURVEY at BEATRICE for BHP

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

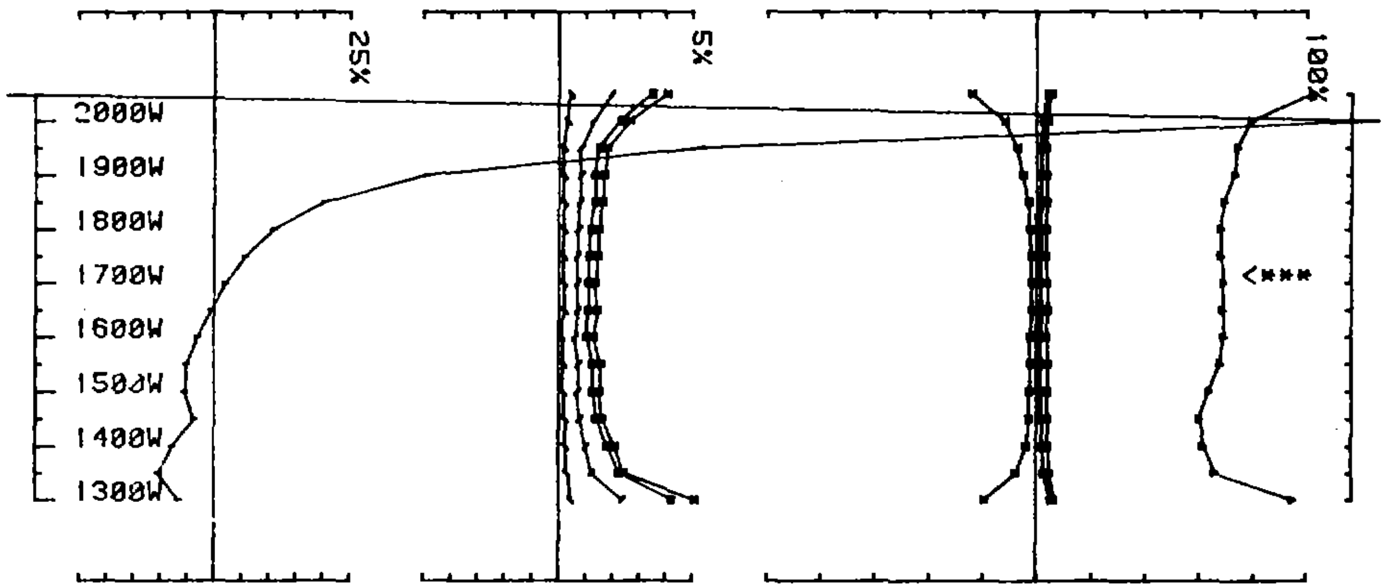
loop no B line 200N component Hz secondary field Ch 1 point norm.

185

510198

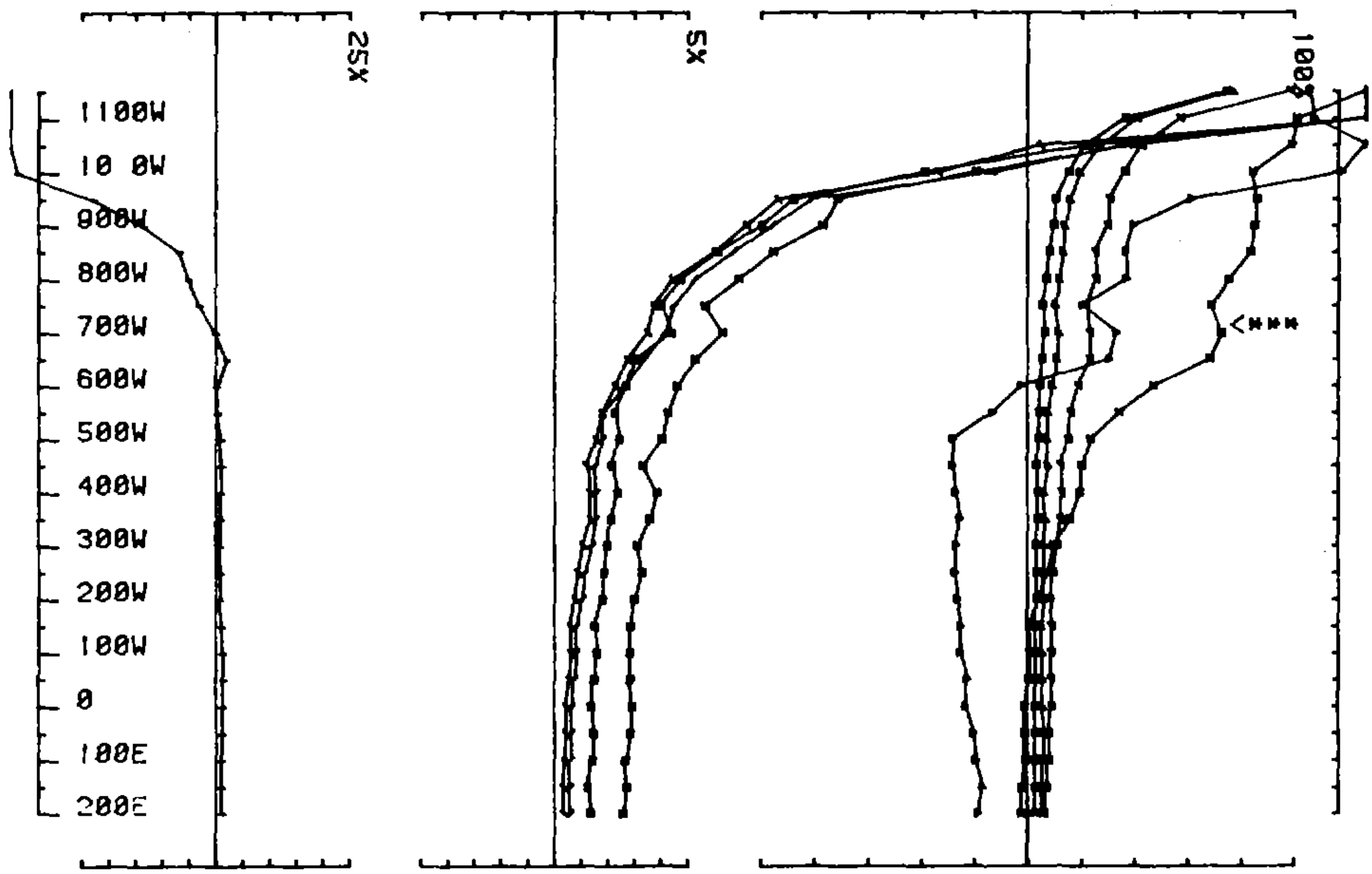



UTEM SURVEY at BEATRICE for BHP
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 2 line 400N component Hz secondary field Ch 1 point norm.




UTEM SURVEY at BEATRICE for BHP
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 2 line 400N component Hz secondary field Ch 1 point norm.

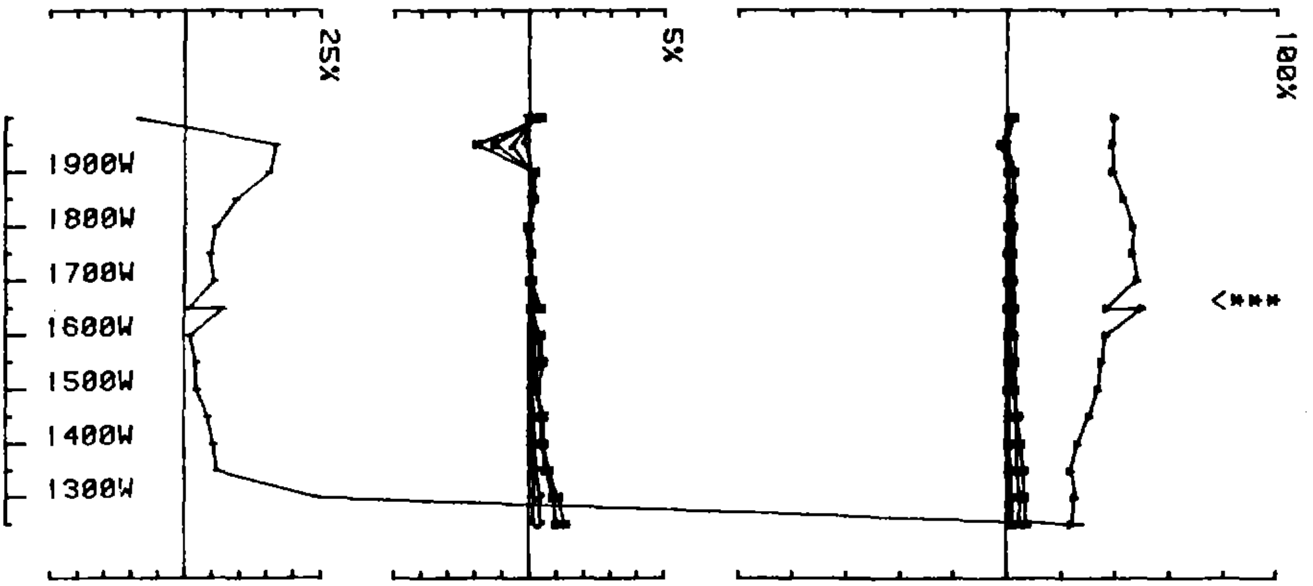
187




UTEM SURVEY at BEATRICE for BHP

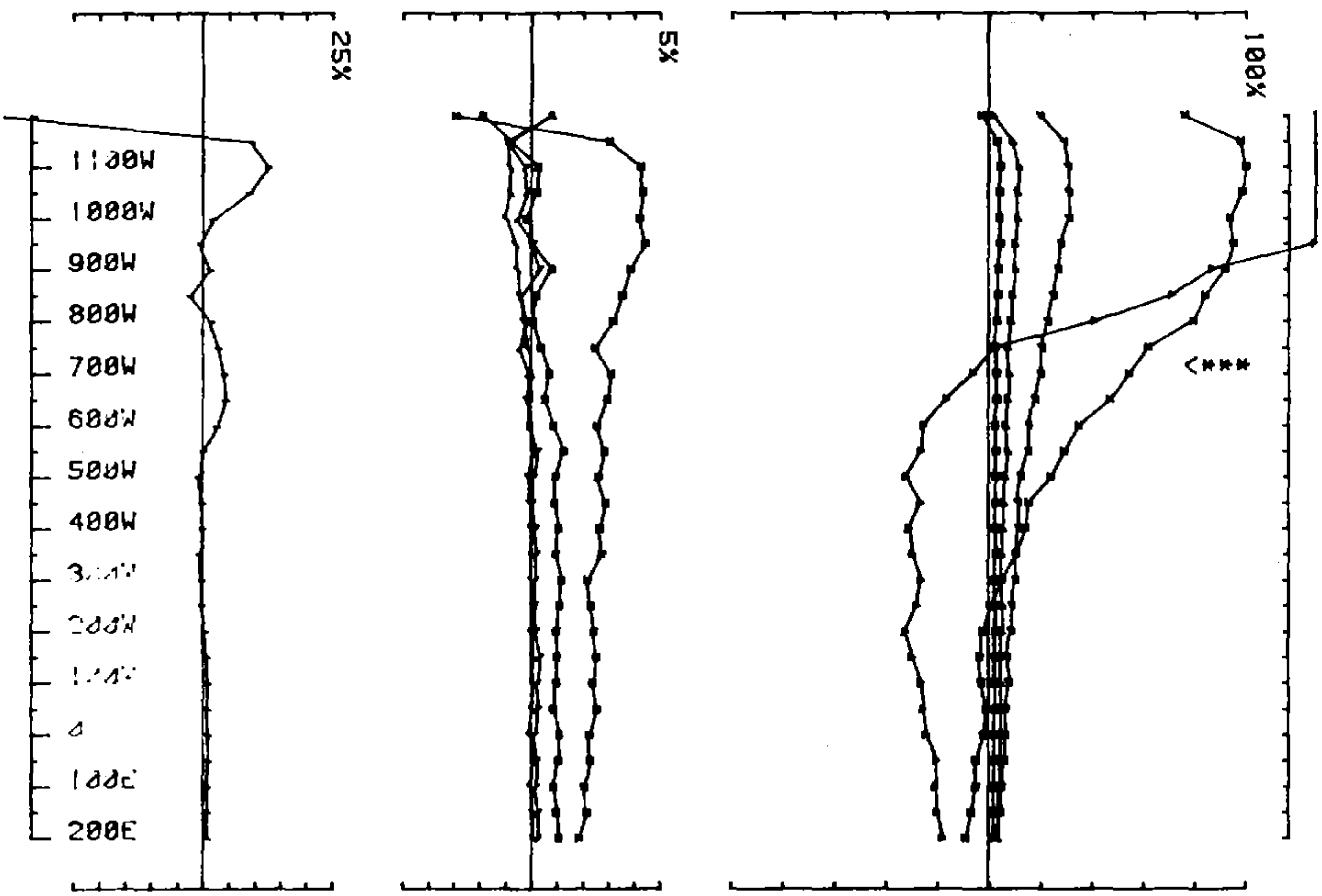
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 2 line 600N component Hz secondary field Ch 1 point norm.

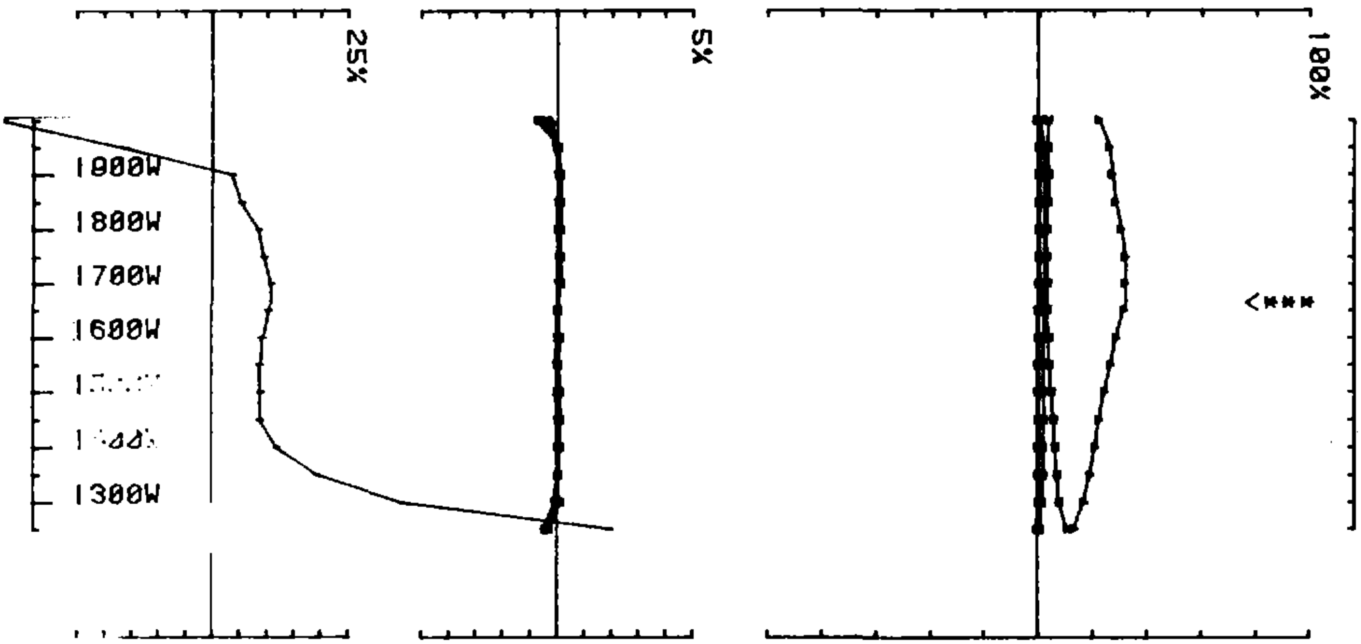



UTEM SURVEY at BEATRICE for BHP
conducted by TM ST RL job 8971 base freq (hz) 26.238 OCT 89
loop no BT 2 line 600N component Hz secondary field Ch 1 point norm.

189



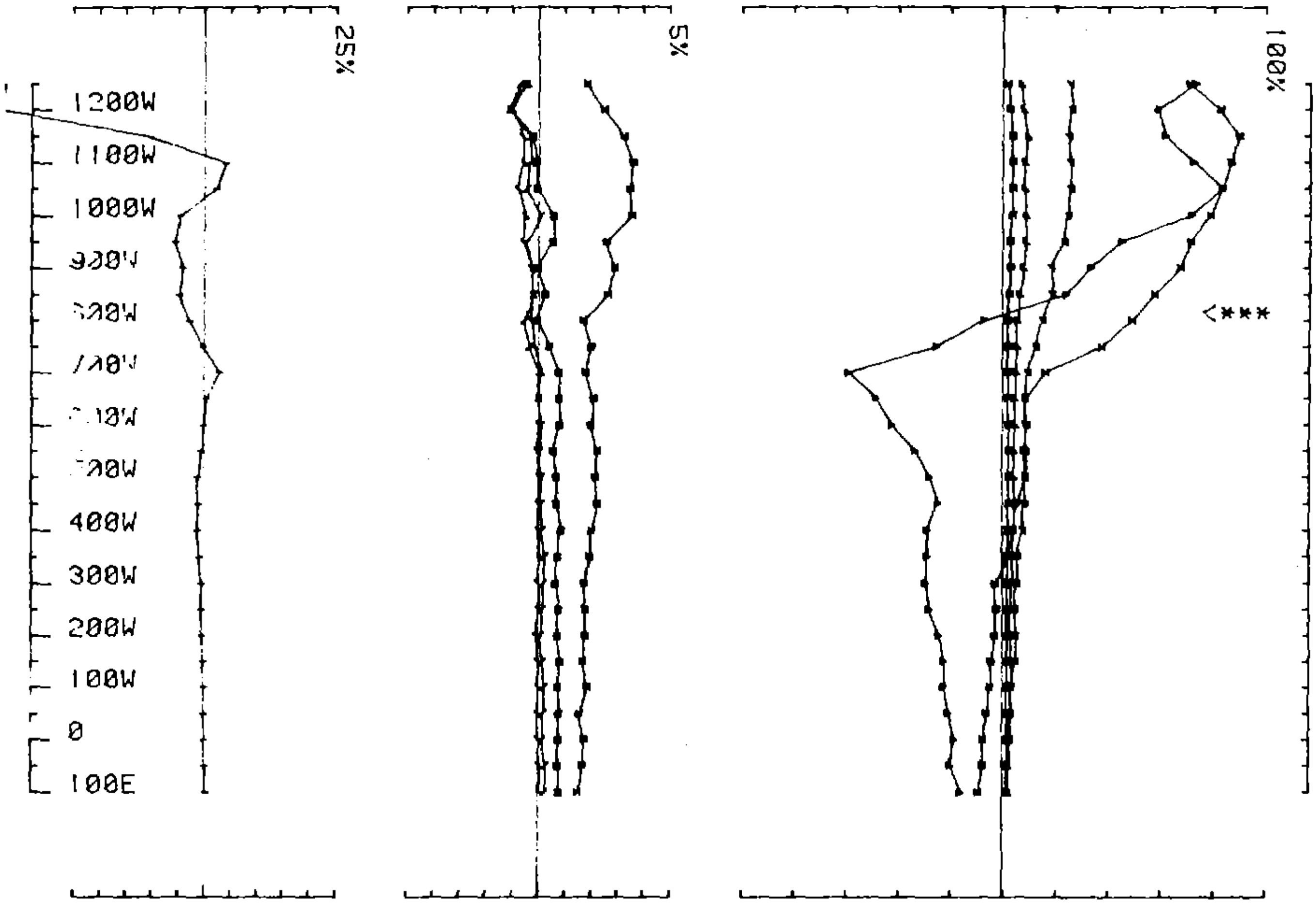

UTEM SURVEY at BEATRICE for BHP
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 2 line 800N component Hz secondary field Ch 1 point norm.




UTEM SURVEY at BEATRICE for BHP
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 2 line 800N component Hz secondary field Ch 1 point norm.

510204

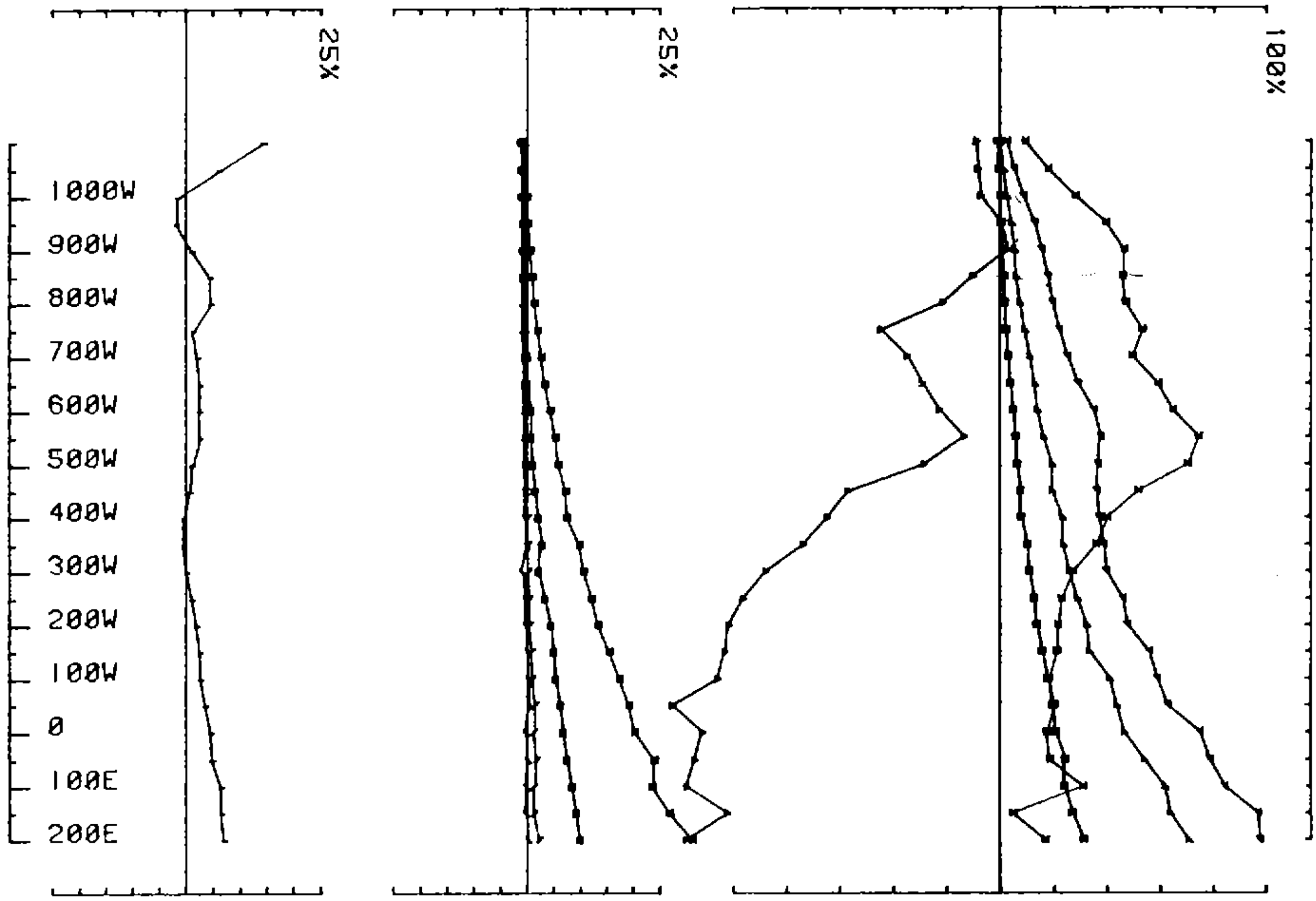
191




UTEM SURVEY BEATRICE for BHP

conducted by . ST RL job 8971 base freq (hz) 26.230 OCT 89

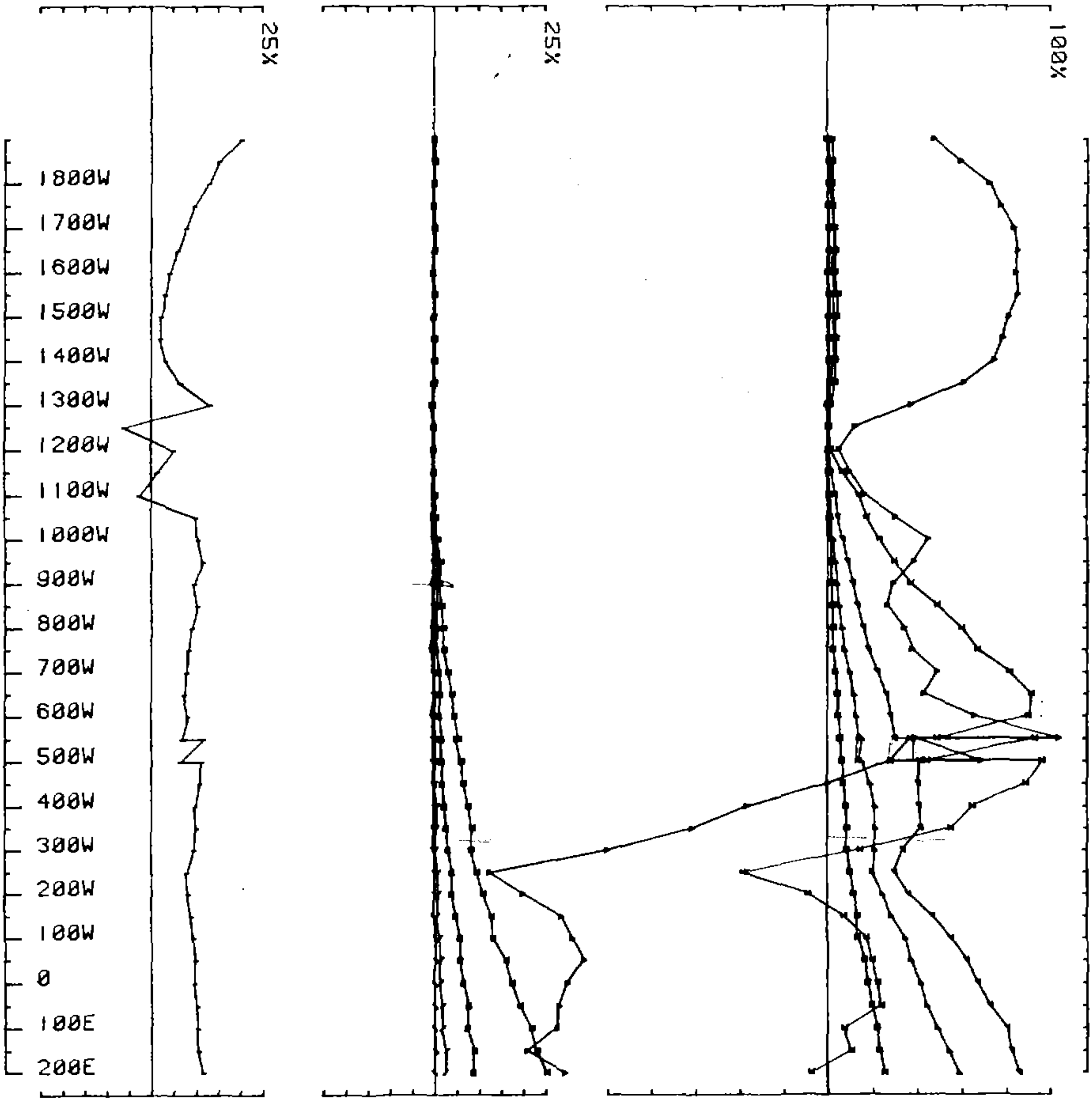
loop no BT 2 line 1000N component Hz secondary field Ch I point norm.




UTEM SURVEY at BEATRICE for BHP

conducted by TM ST RL job 8971 base freq (hz) 26.230 Oct 1989

loop no BT2 line 0 component Hz secondary field Ch 1 contin. norm.

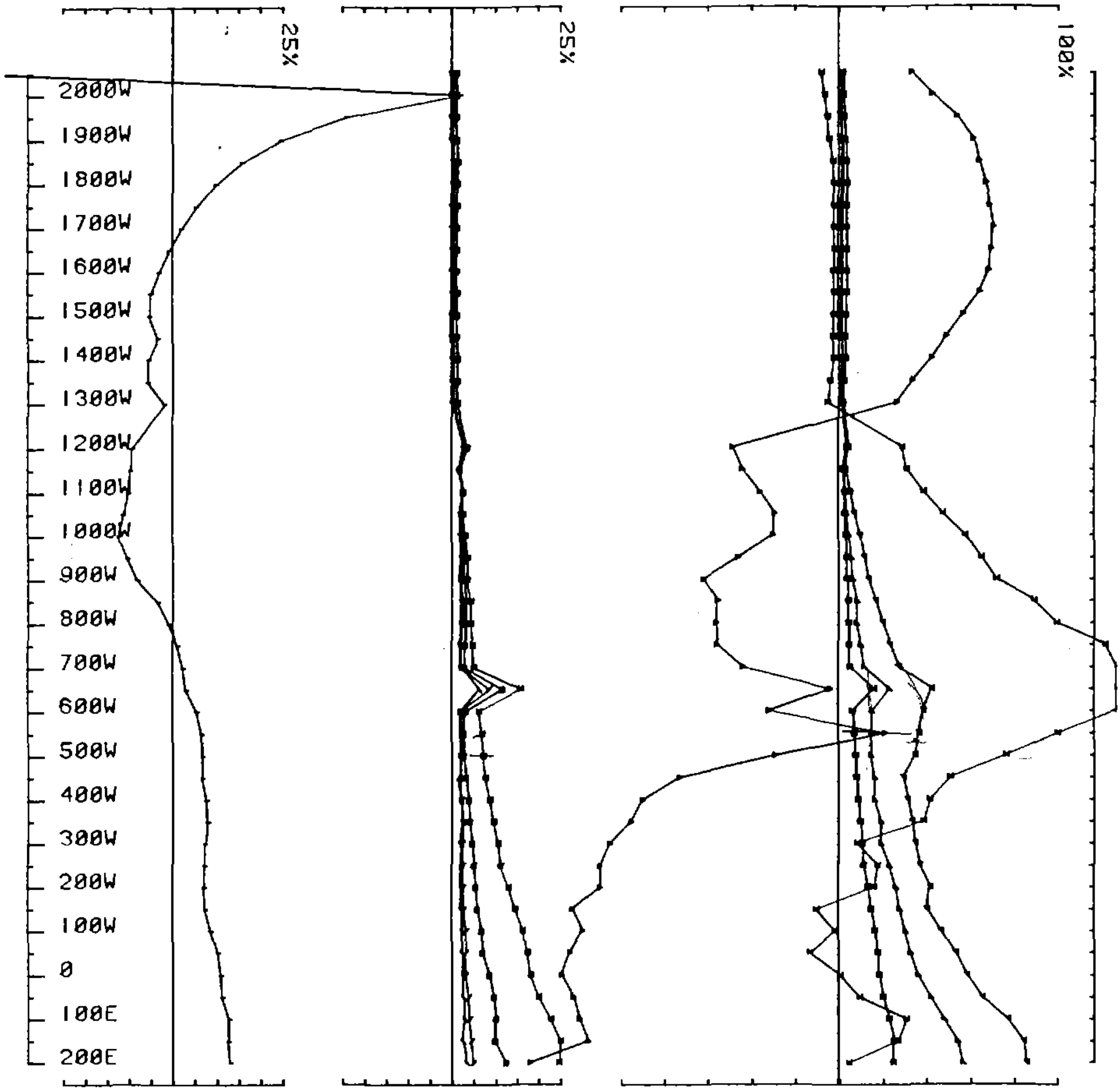



UTEM SURVEY at BEATRICE for BHP

conducted by TM ST RL job 8971 base freq (hz) 26.230 Oct 1989

loop no BT2 line 200N component Hz secondary field Ch 1 contin. norm.

510206



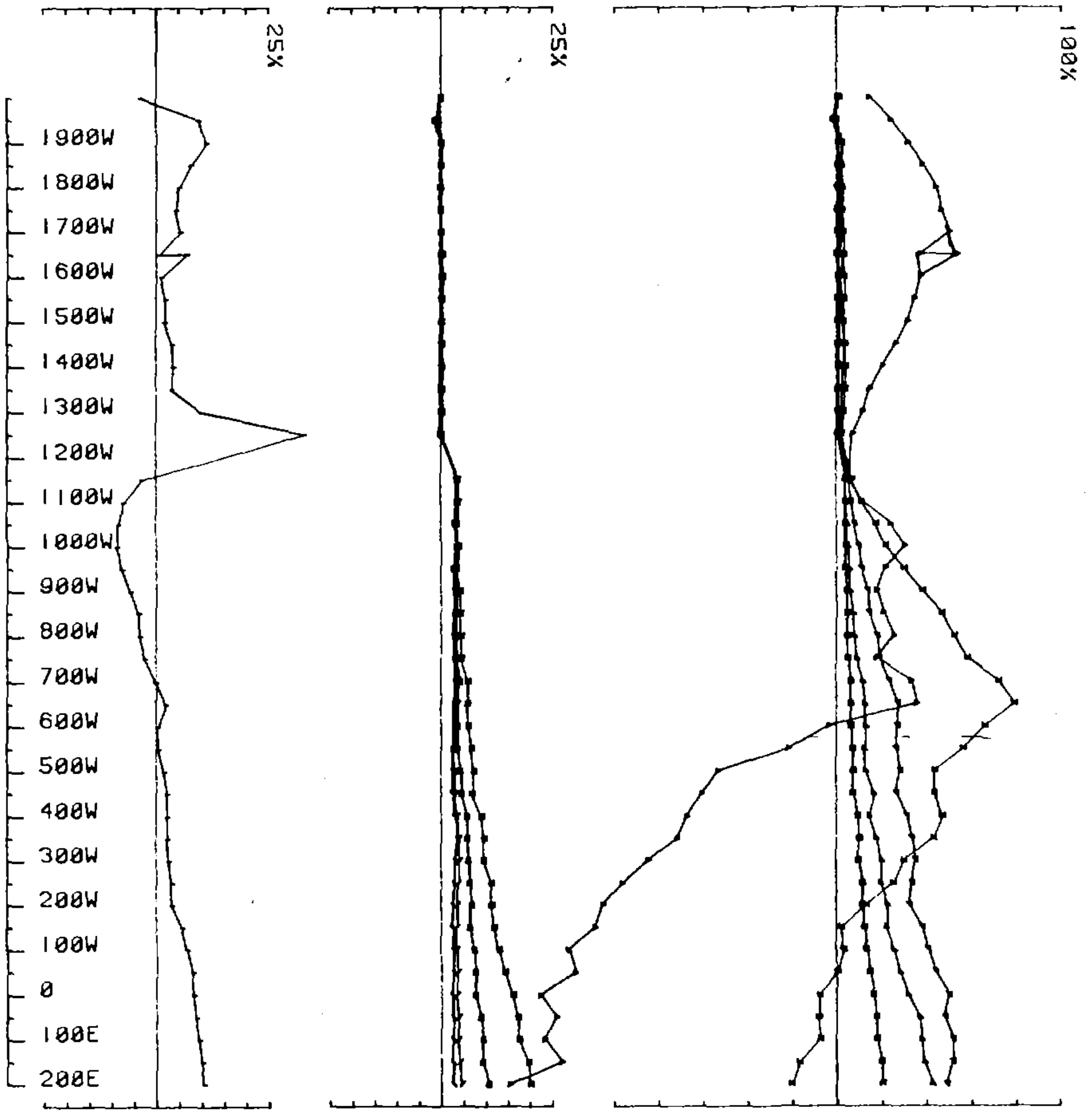

UTEM SURVEY at BEATRICE for BHP

conducted by TM ST RL job 8971 base freq (hz) 26.230 Oct 1989

loop no BT2 line 400N component Hz secondary field Ch 1 contin. norm.

199

510207

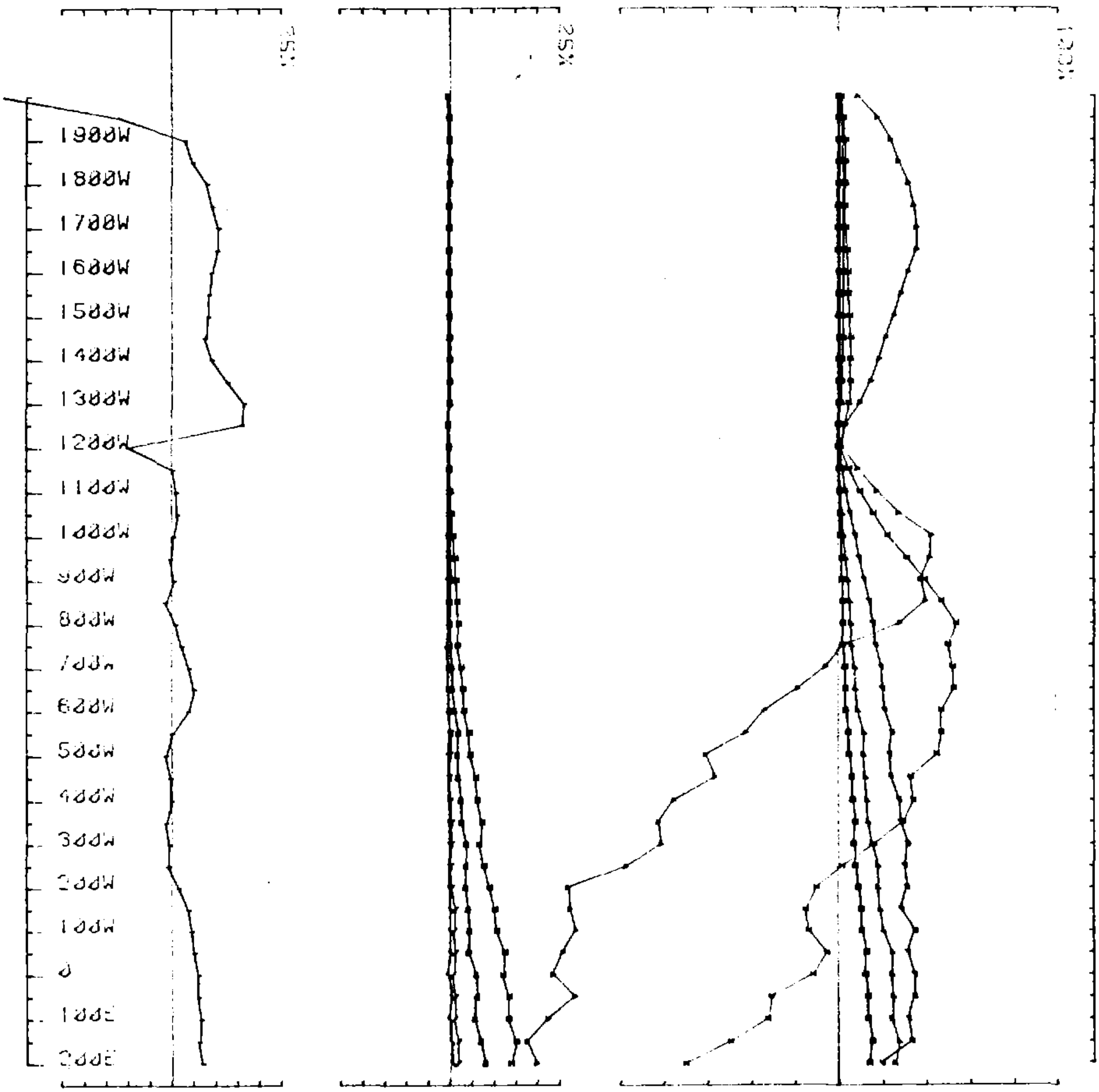



UTEM SURVEY at BEATRICE for BHP

conducted by TM ST RL job 8971 base freq (hz) 26.230 Oct 1989

loop no BT2 line 600N component Hz secondary field Ch 1 contin. norm.

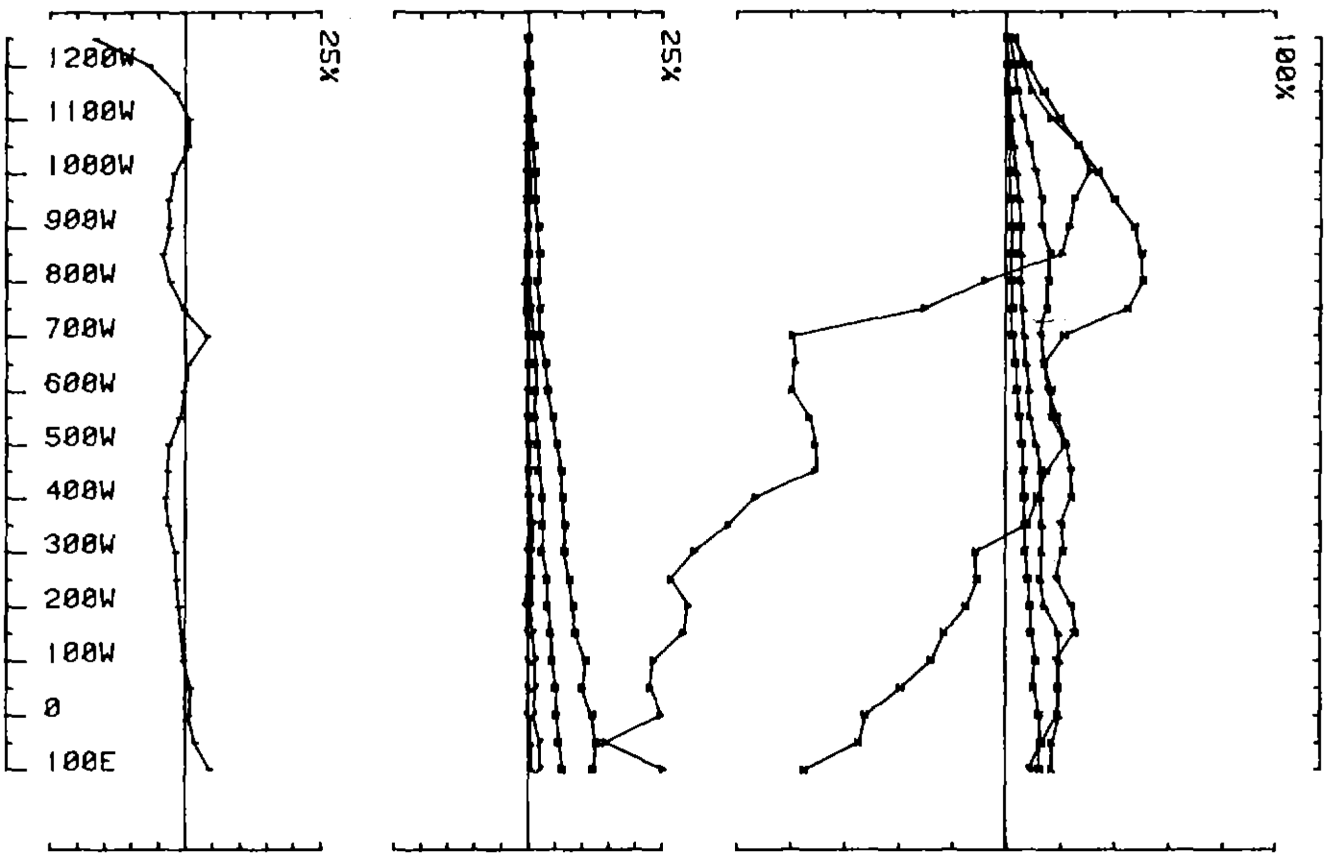
510208




UTEM SURVEY at BEATRICE for BHP

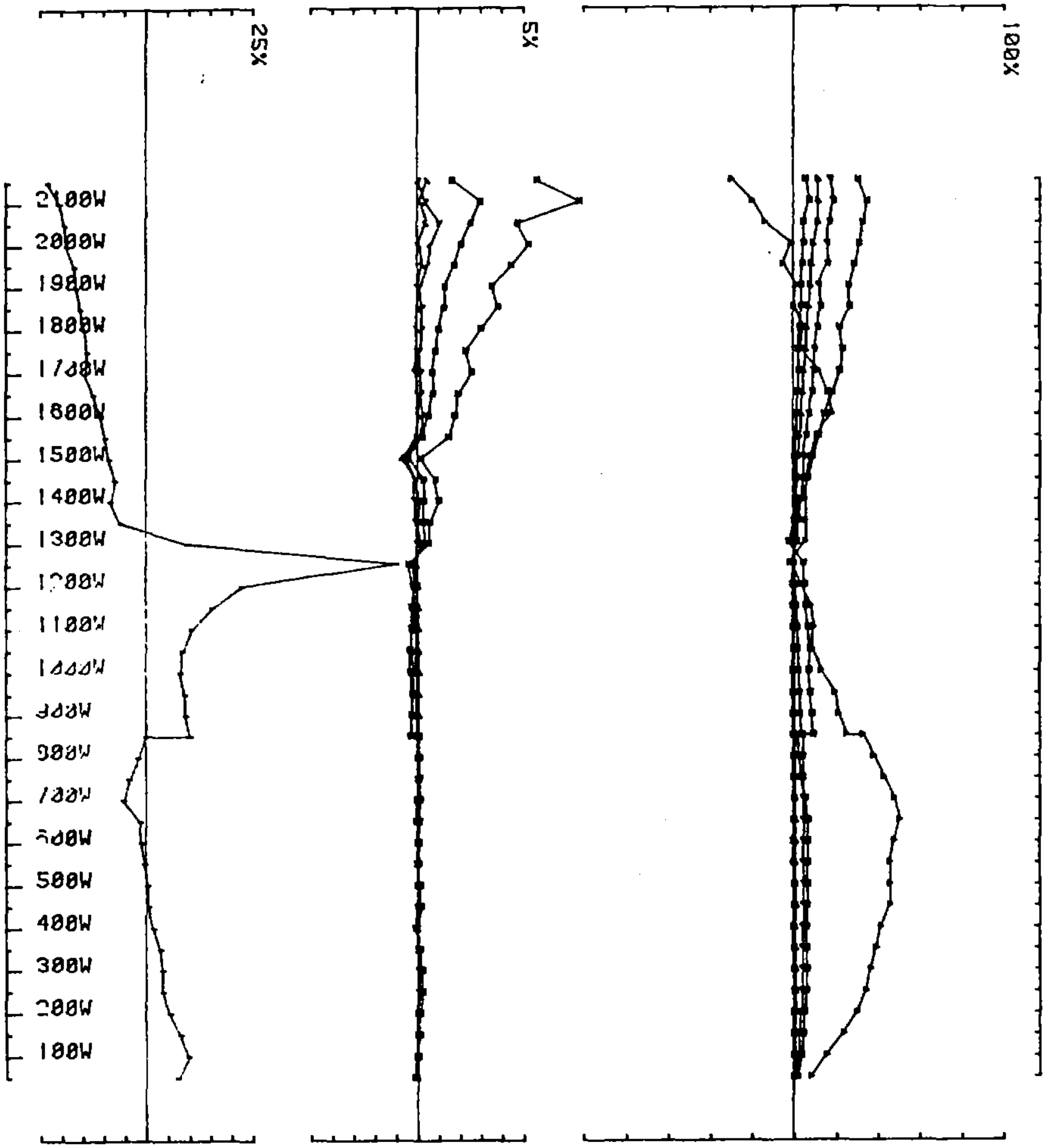
conducted by TK ST RL job 8971 base freq (hz) 30.974 AUG 1989

loop no BT2 line 800N component Hz secondary field ch 1 contin. norm.




UTEM SURVEY at BEATRICE for BHP
conducted by TM ST RL job 8971 base freq (hz) 26.230 Oct 1989
loop no BT2 line 1000N component Hz secondary field Ch 1 contin. norm.

510210

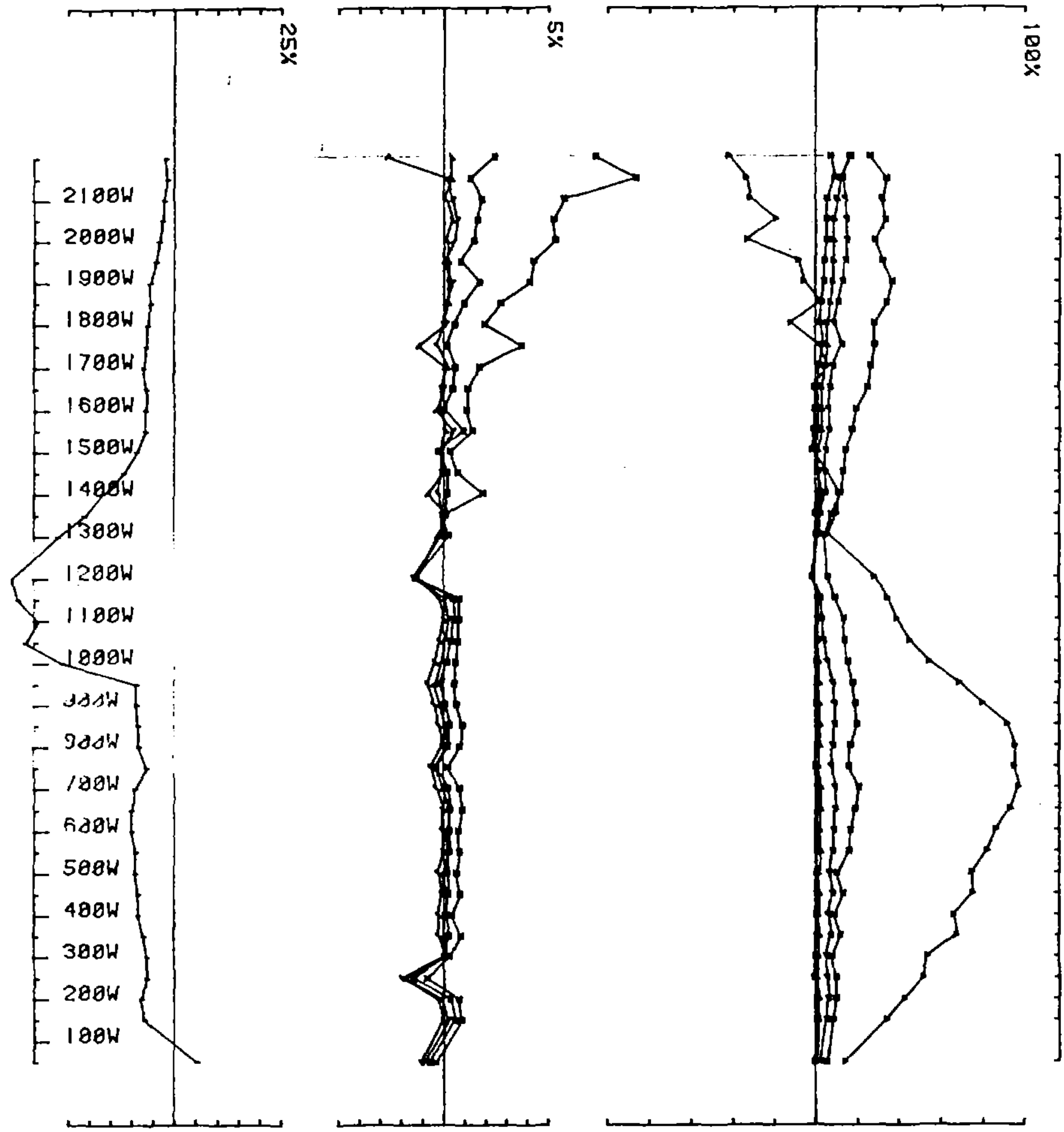



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 1000N component Hz secondary field Ch 1 contin. norm.

199



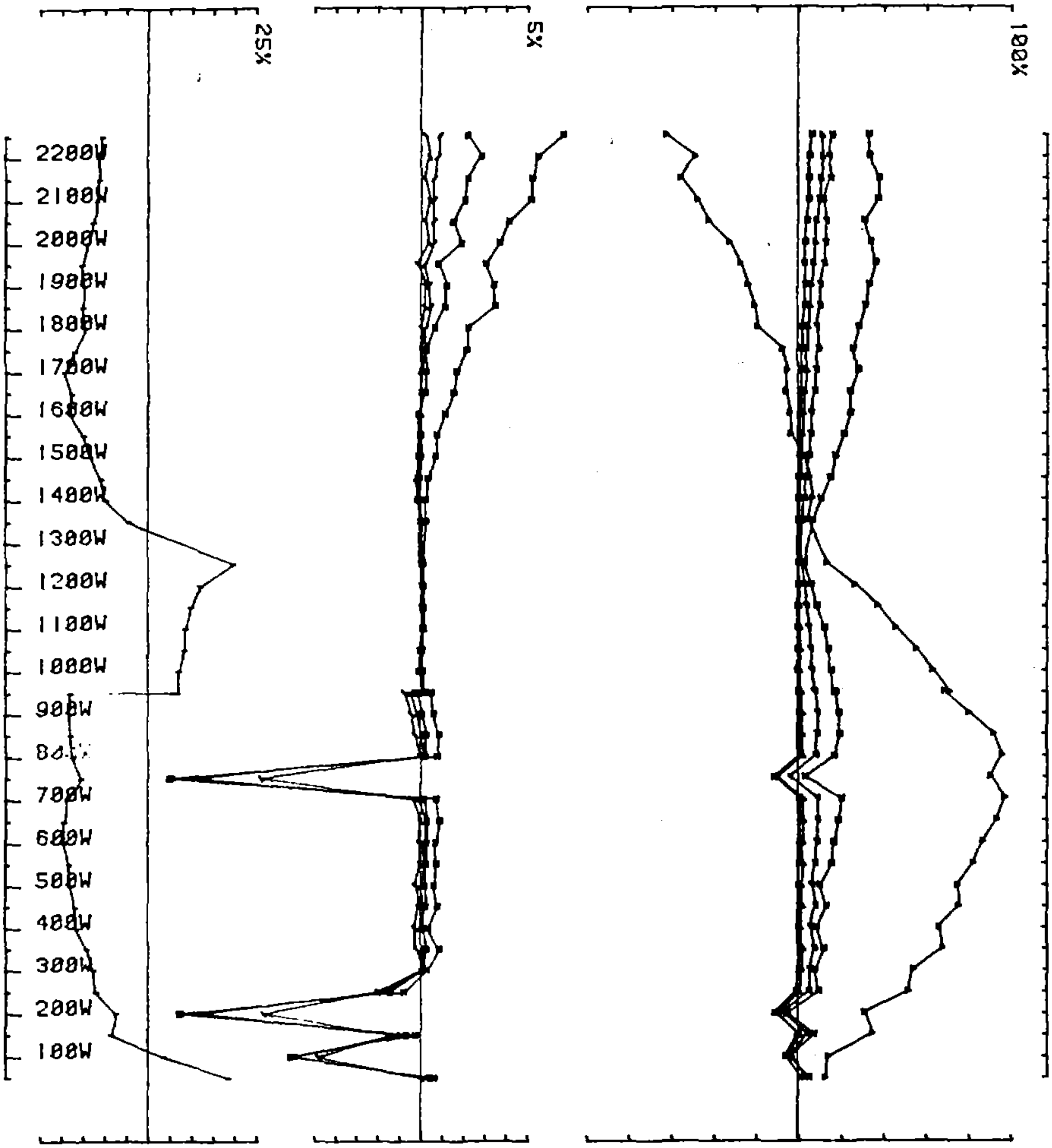

UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 1200N component Hz secondary field Ch 1 contin. norm.

200

510212



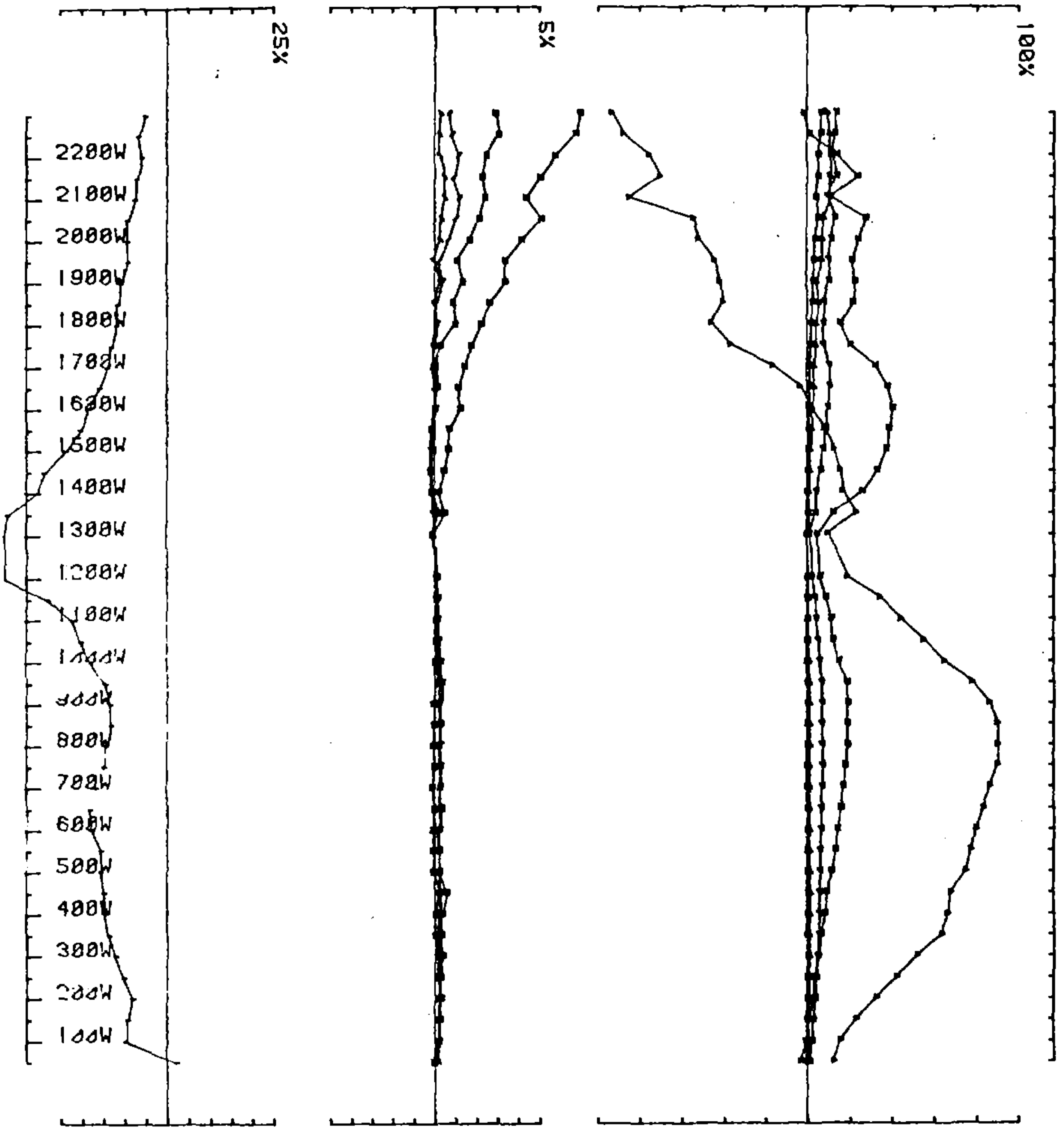

UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 1400N component Hz secondary field Ch 1 contin. norm.

510213

201

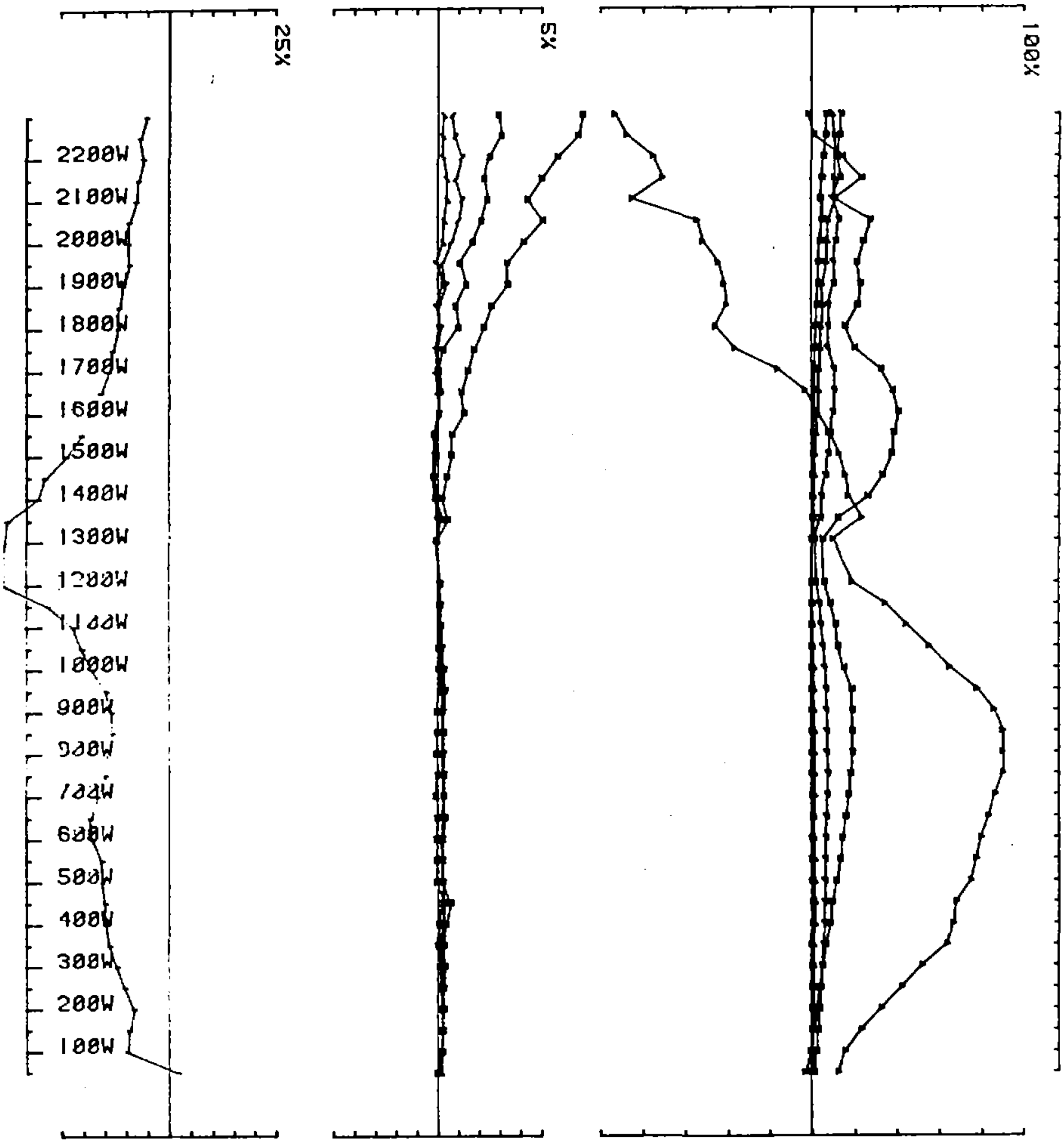



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 1600N component Hz secondary field Ch 1 contin. norm.

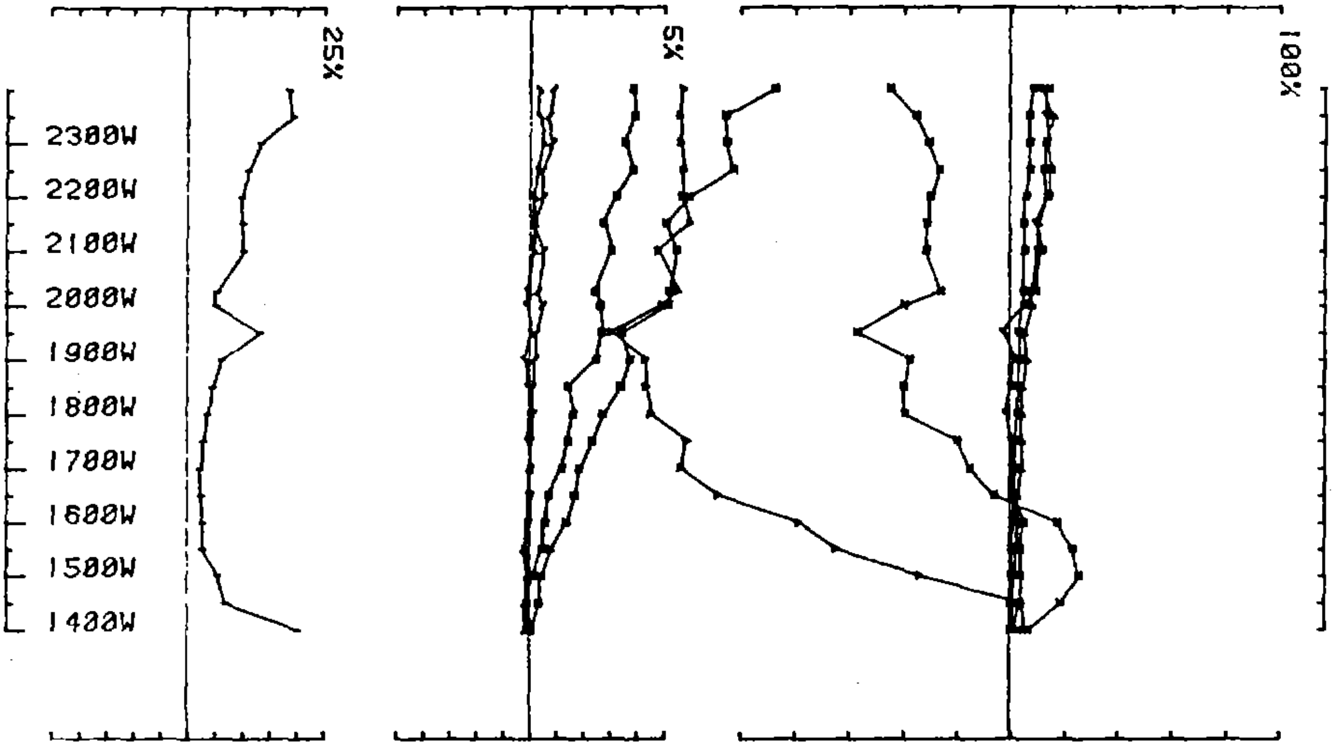
510214




UTEM SURVEY at BEATRICE for B H P

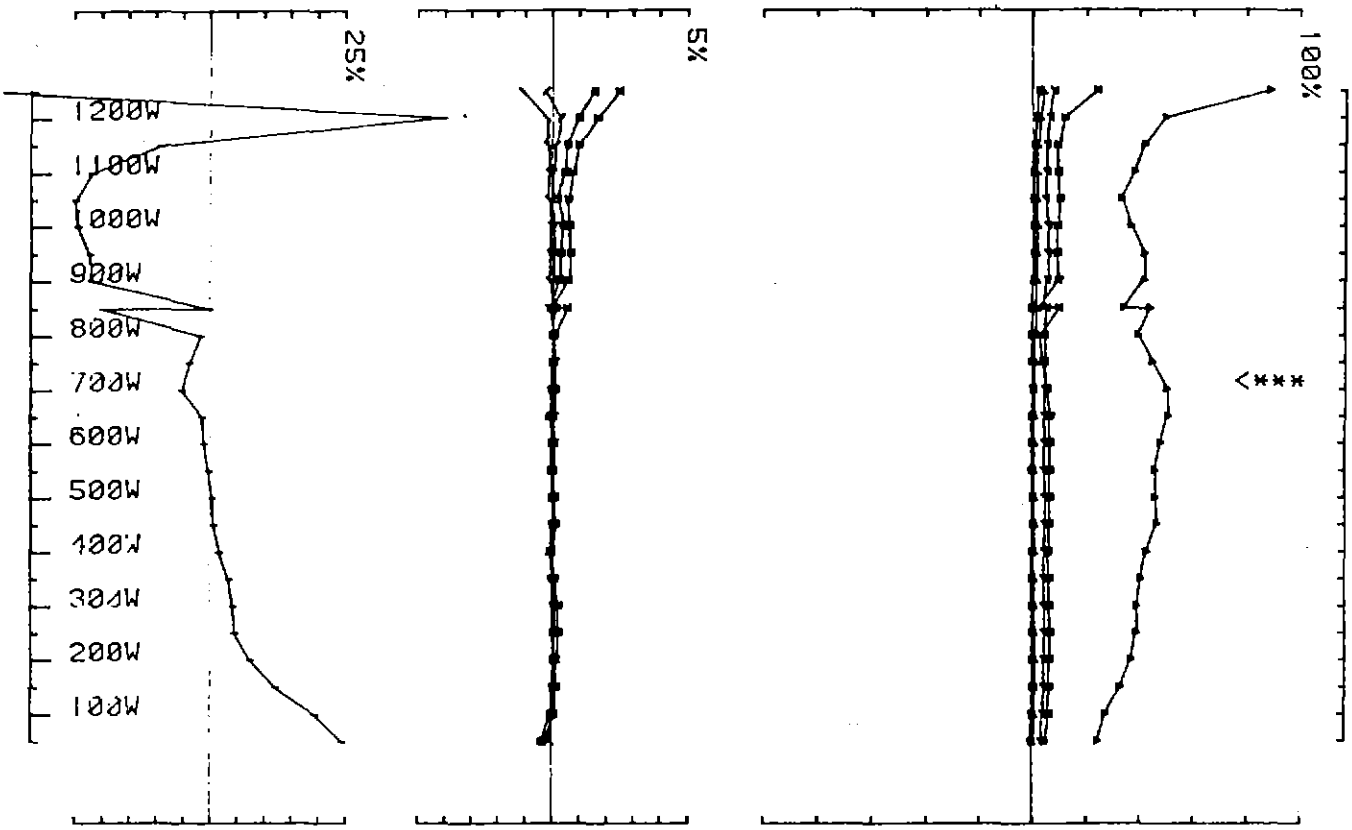
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 1800N component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at BEATRICE for B H P
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 3 line 2000N component Hz secondary field Ch 1 contin. norm.

510216



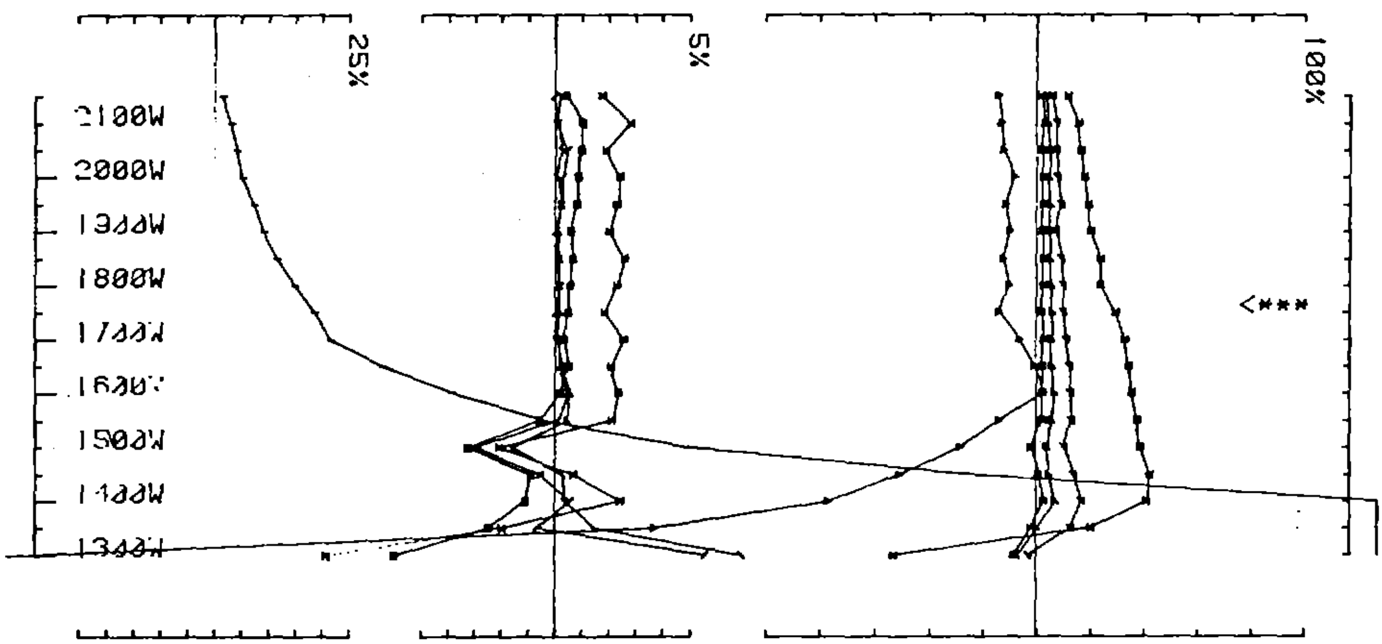

UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL Job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 1000N component Hz secondary field Ch 1 point norm.

510217

209

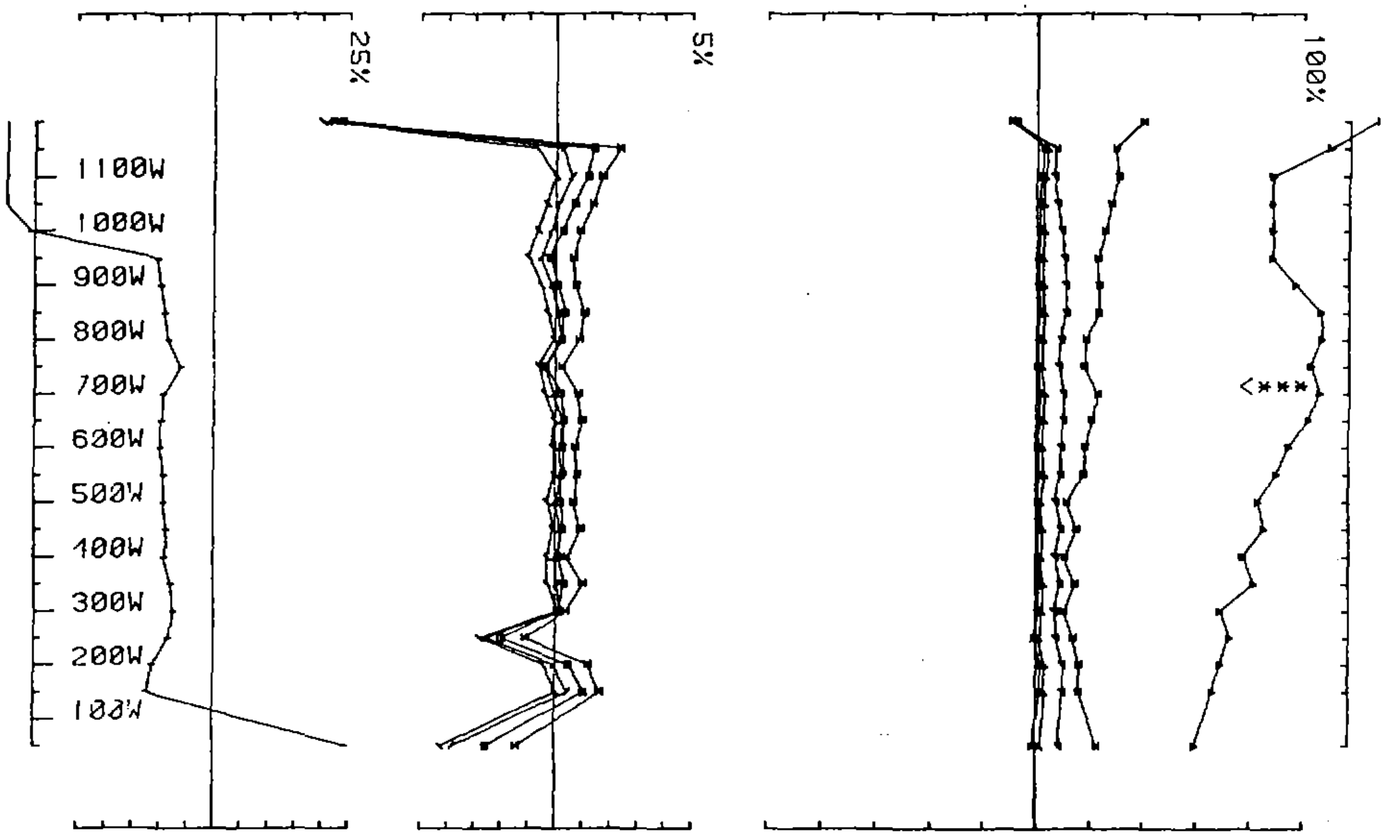



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 1000N component Hz secondary field Ch 1 point norm.

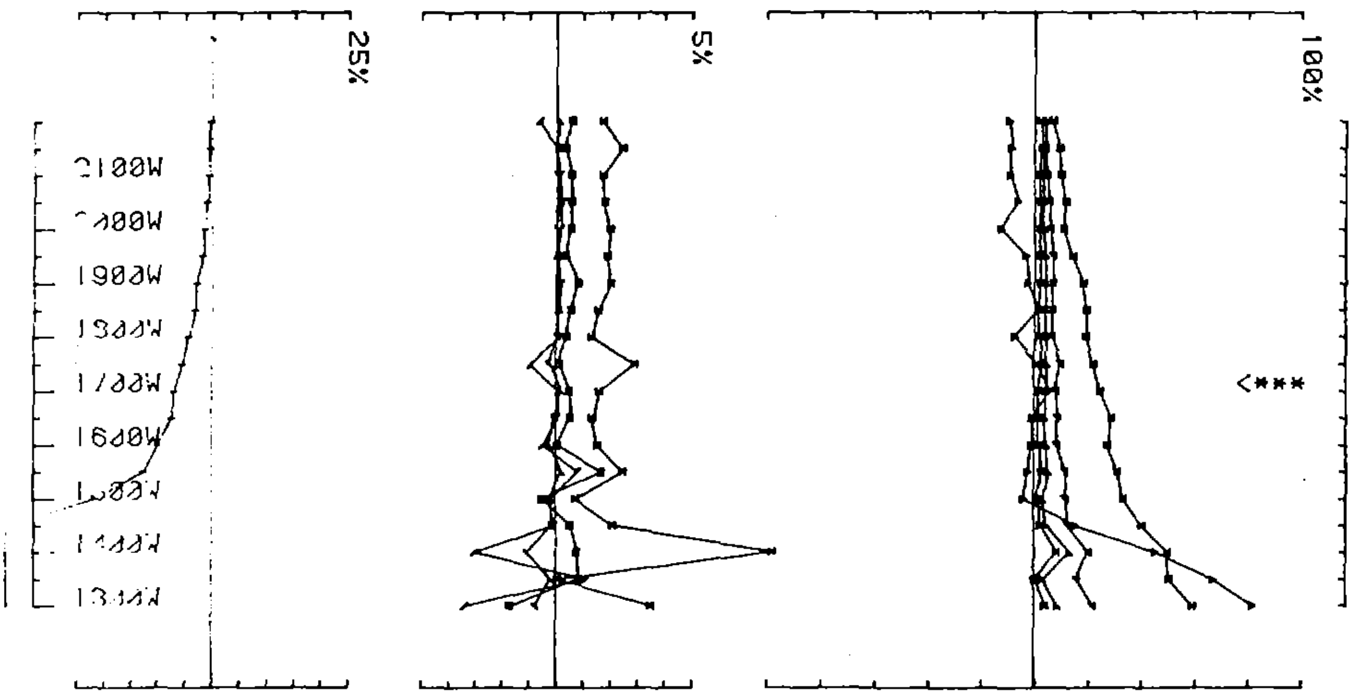
510218




UTEM SURVEY at BEATRICE for B H P
conducted by TM S? RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 3 line 1200N component Hz secondary field Ch 1 point norm.

510219

207



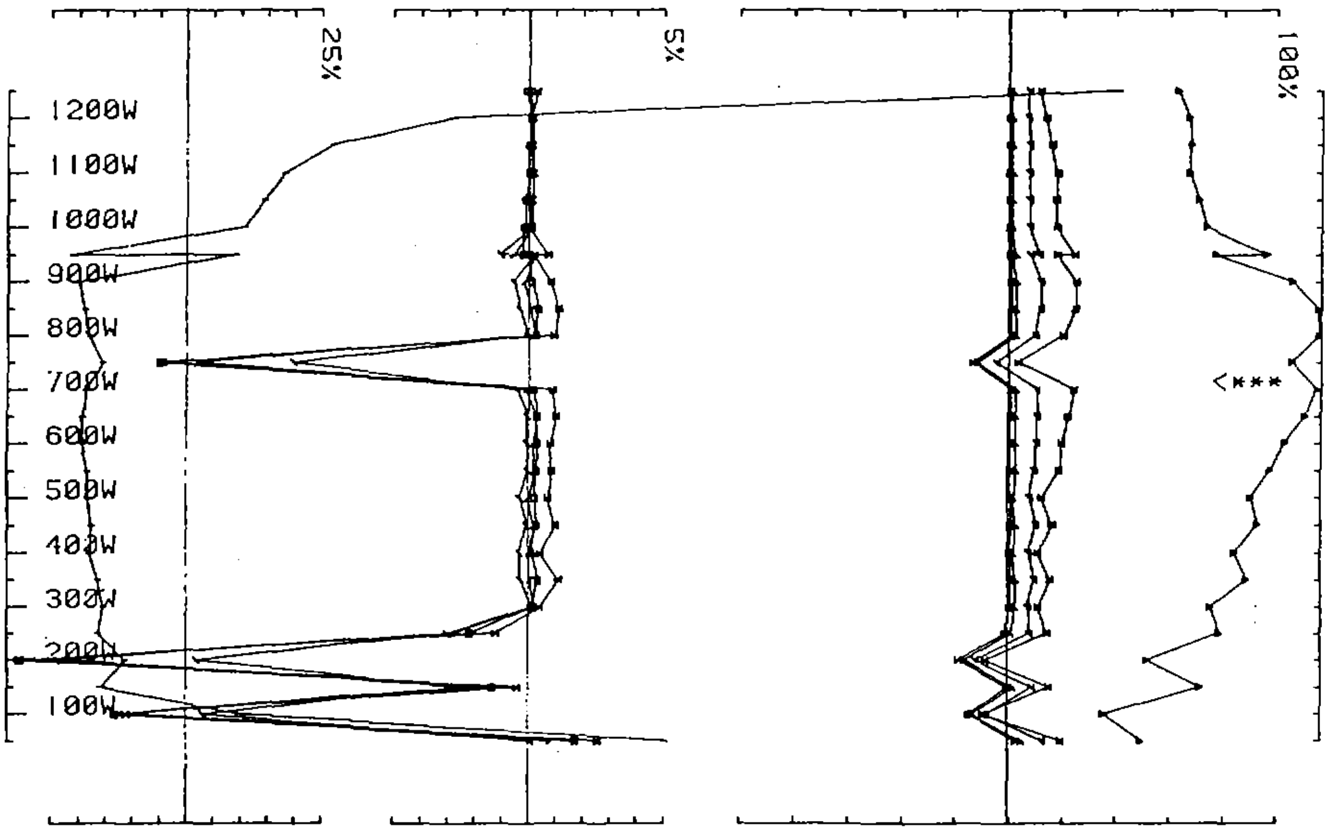

UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT C line 1200N component Hz secondary field Ch 1 point norm.

208

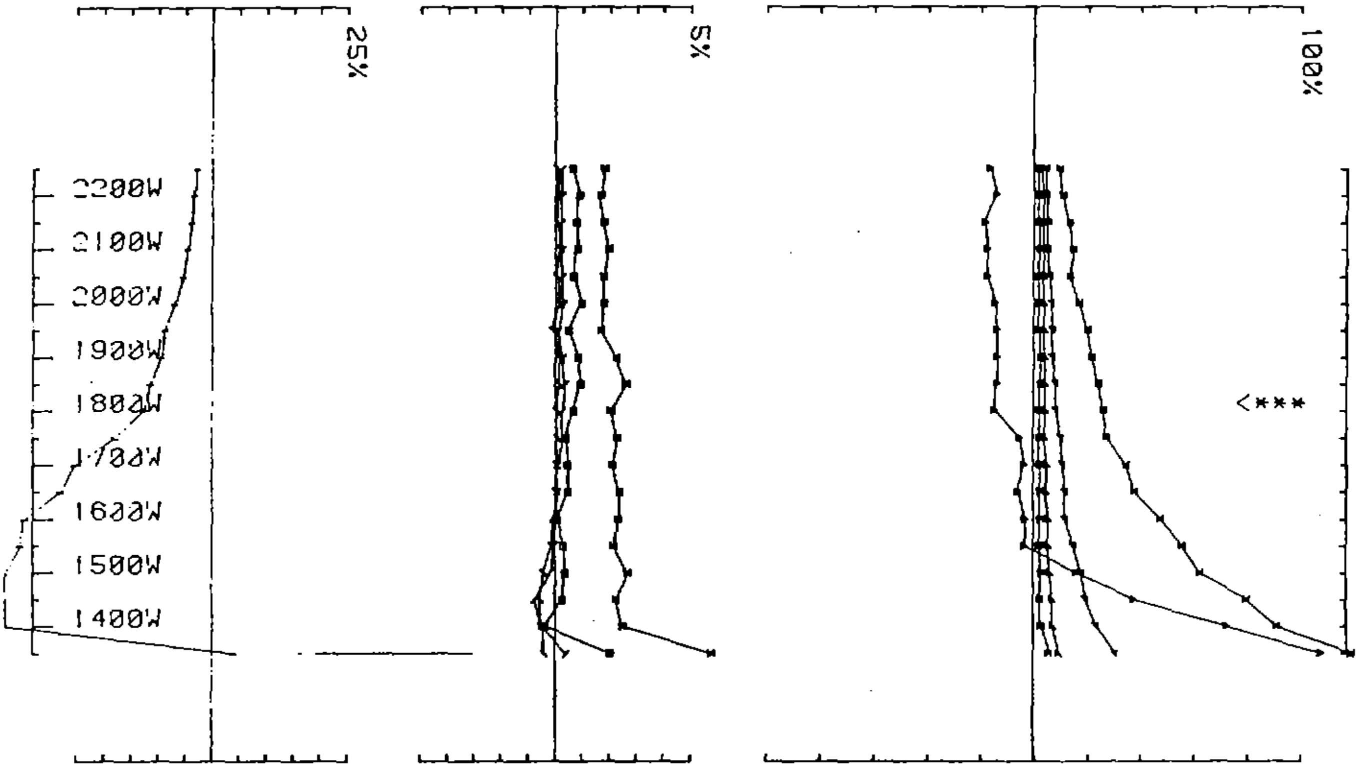
510220




UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 1400N component Hz secondary field Ch 1 point norm.



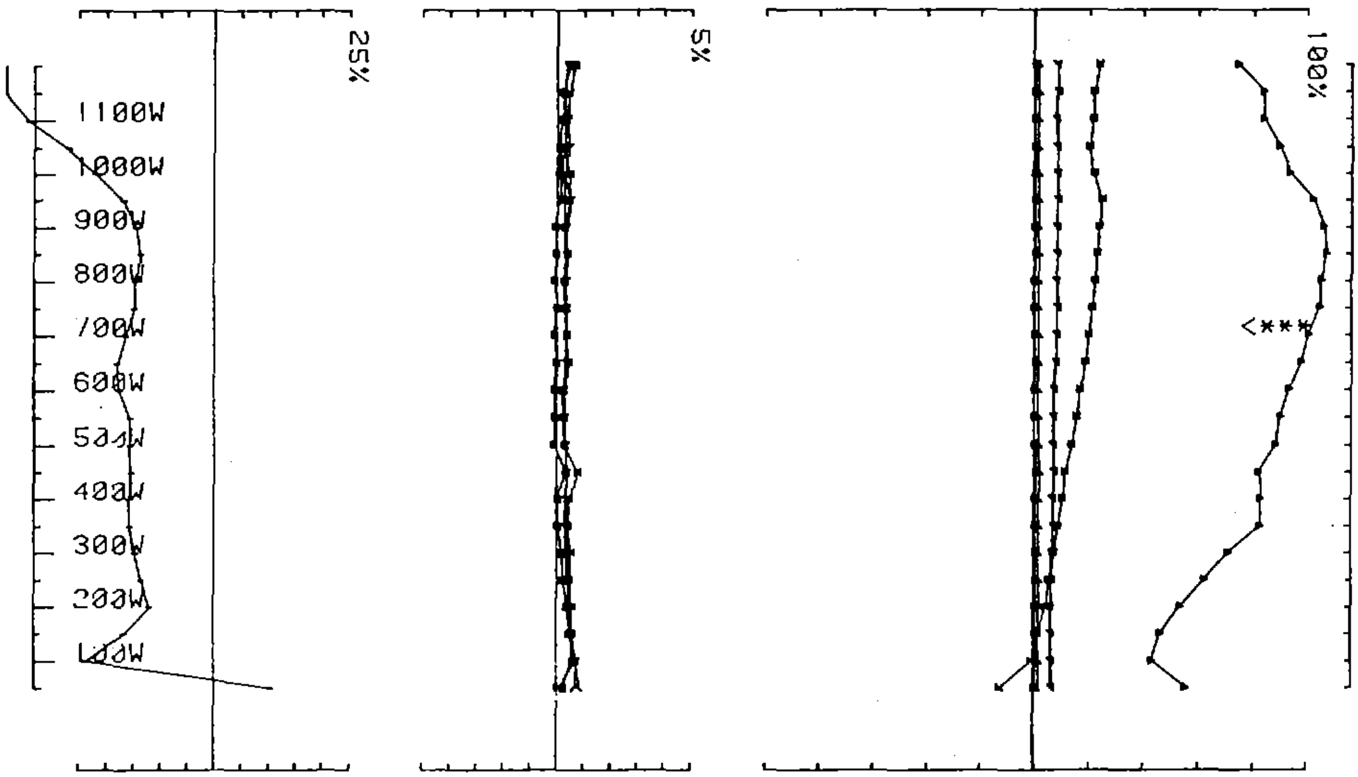

UTEM SURVEY at BEATRICE for B H P

conducted by [illegible] ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 1400N component Hz secondary field Ch 1 point norm.

210

510222

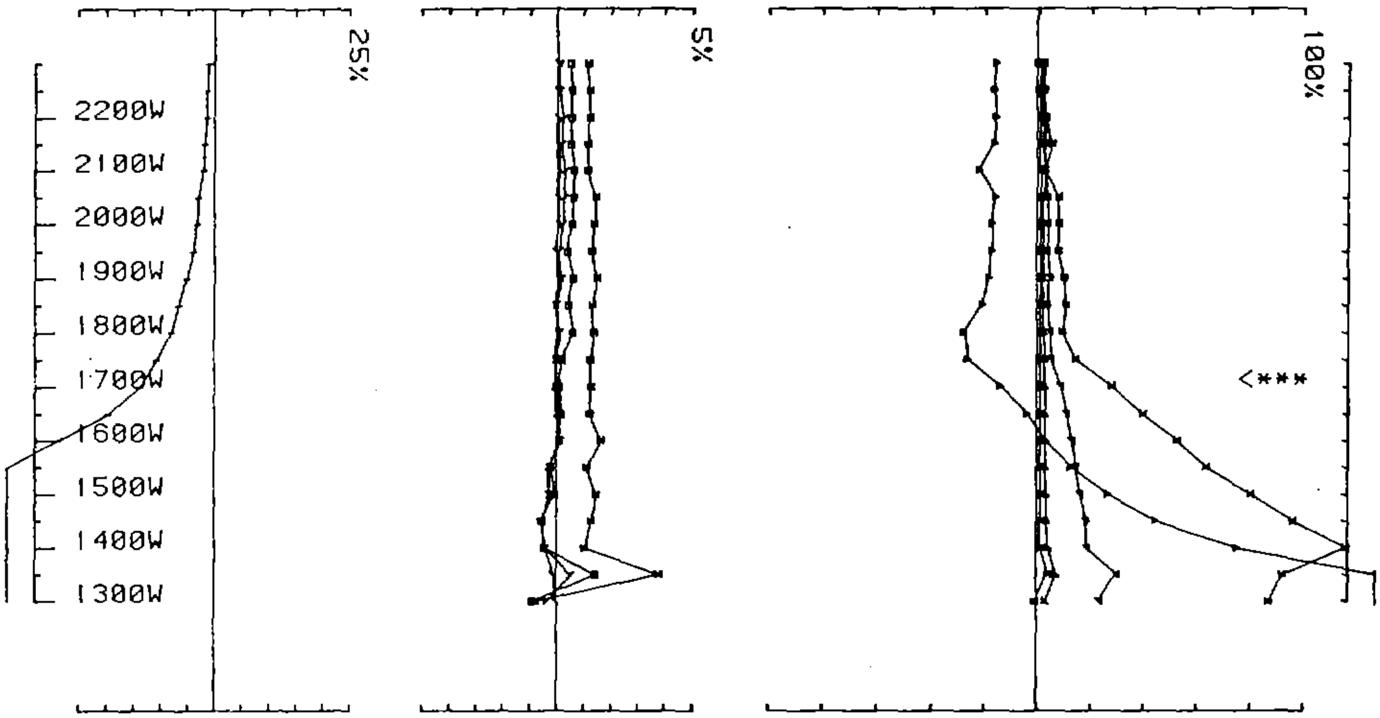



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 1600N component Hz secondary field Ch 1 point norm.

510223

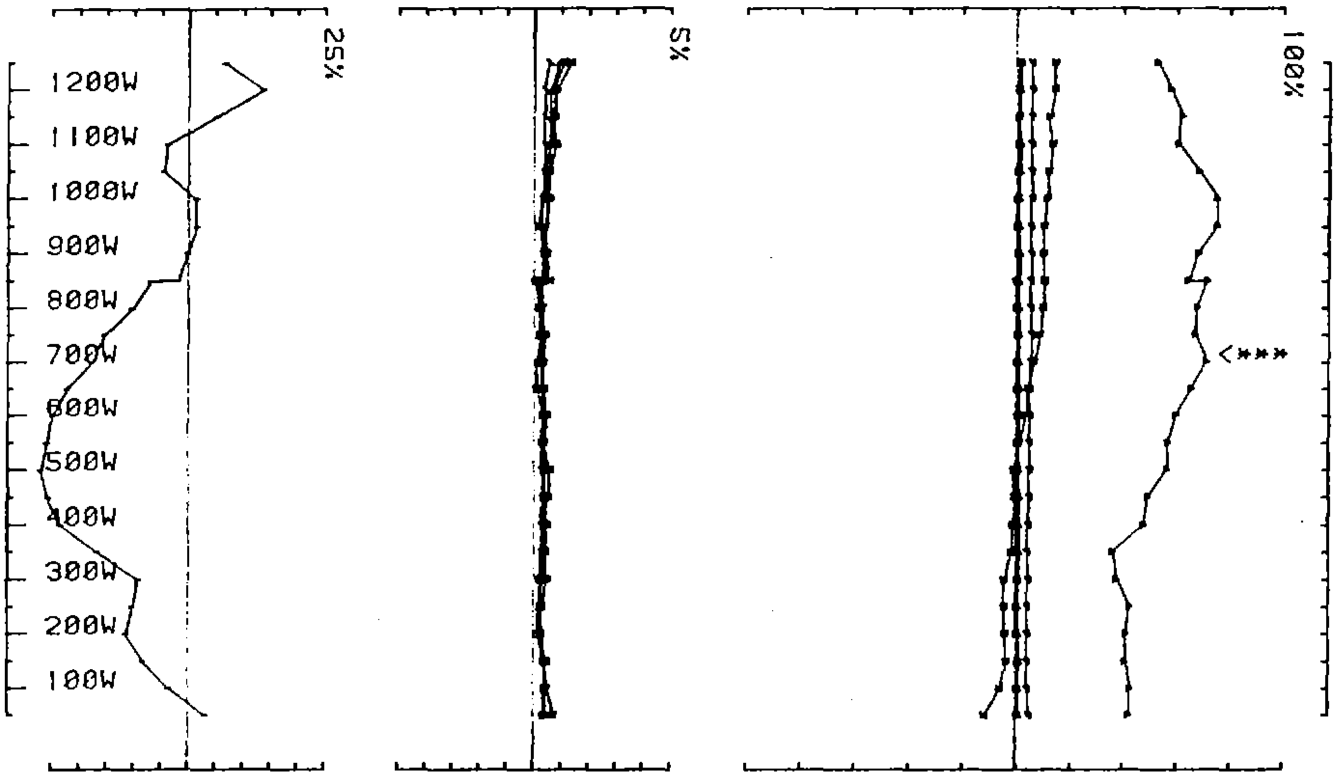



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

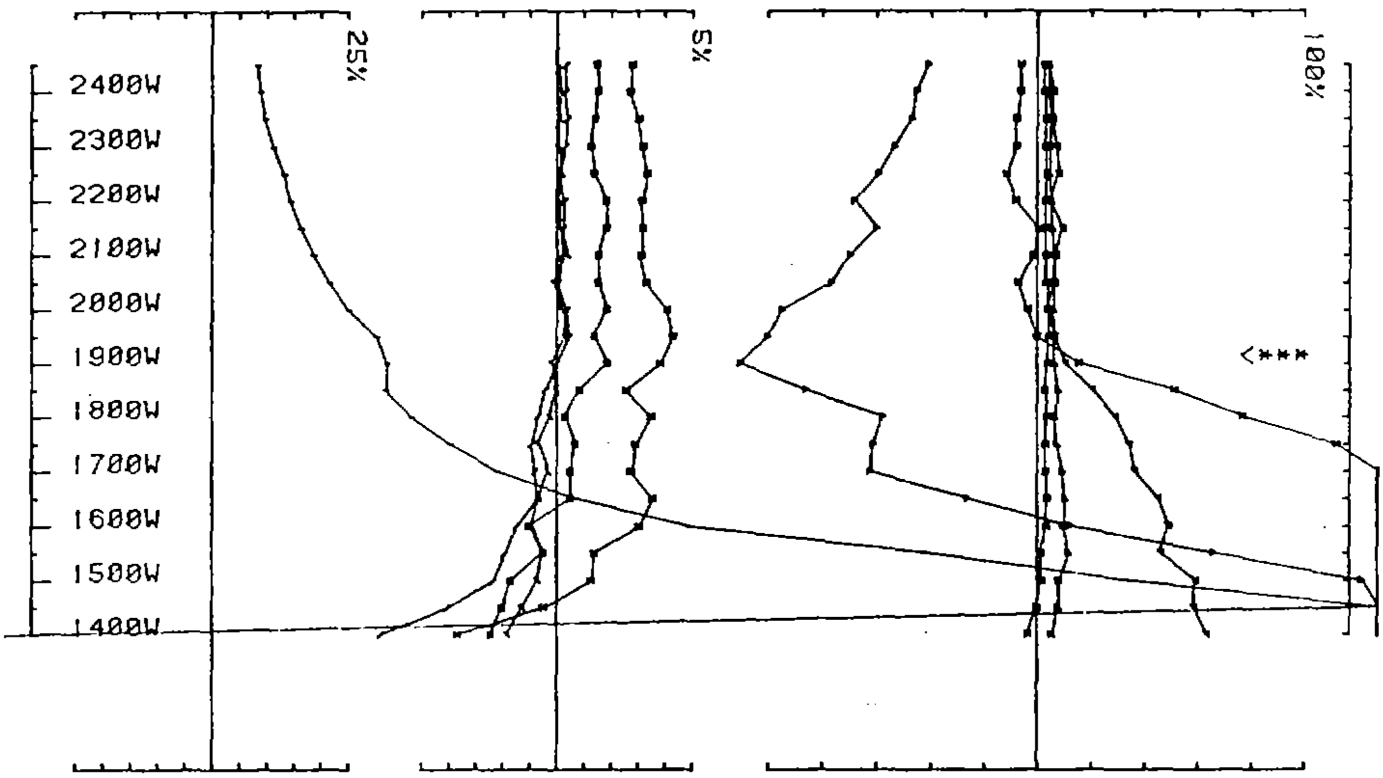
loop no BT 3 line 1600N component Hz secondary field Ch 1 point norm.

510224



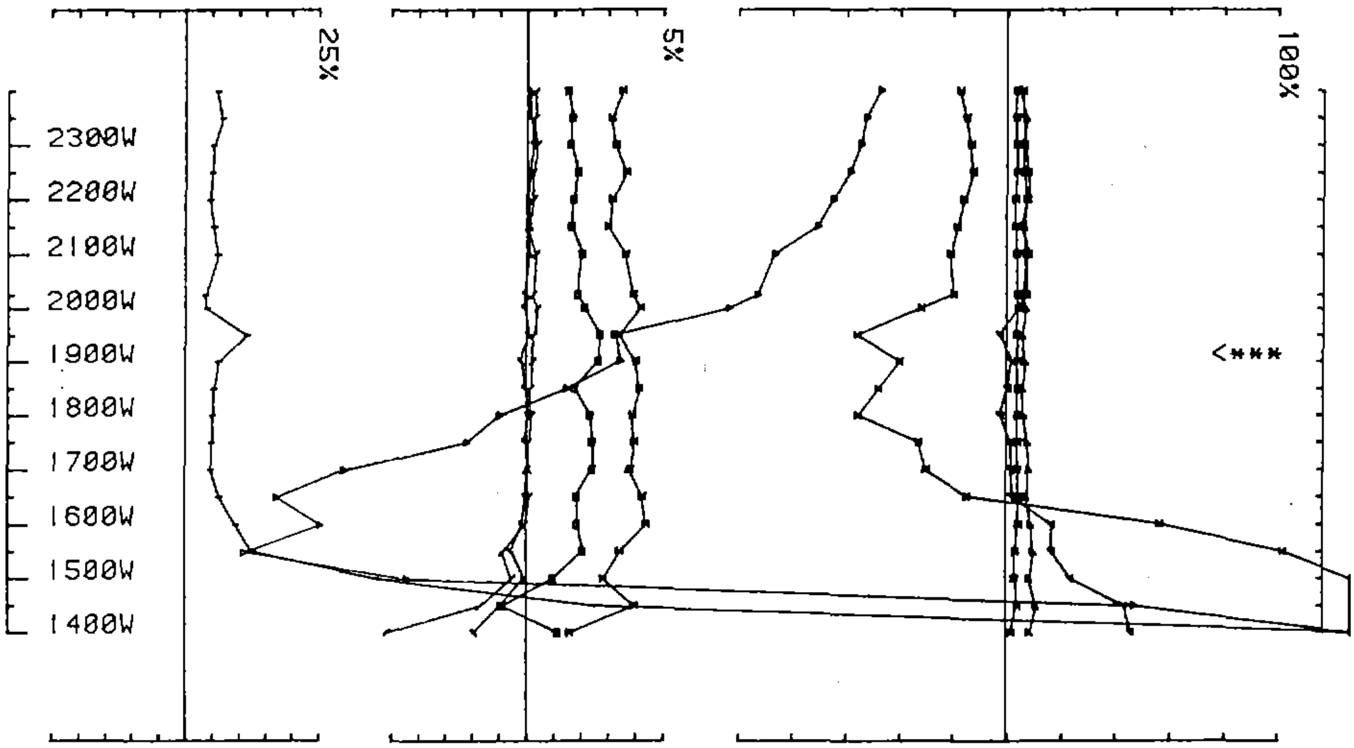

UTEM SURVEY at BEATRICE for B H P
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 3 line 1800N component Hz secondary field Ch 1 point norm.

 510225




UTEM SURVEY at BEATRICE for B H P
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 3 line 1800N component Hz secondary field Ch 1 point norm.

510226



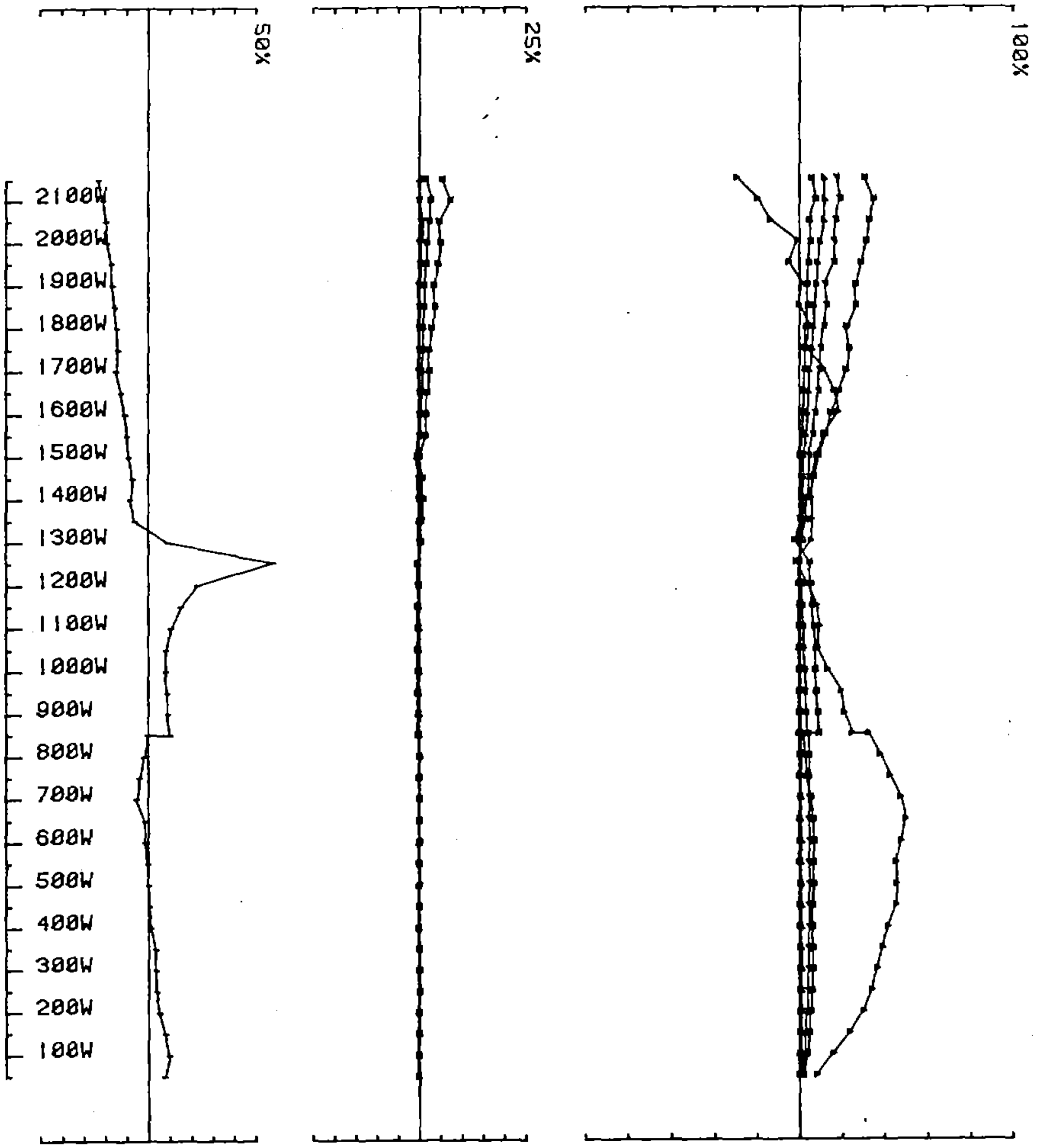

UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 3 line 2000N component Hz secondary field Ch 1 point norm.

210

510227

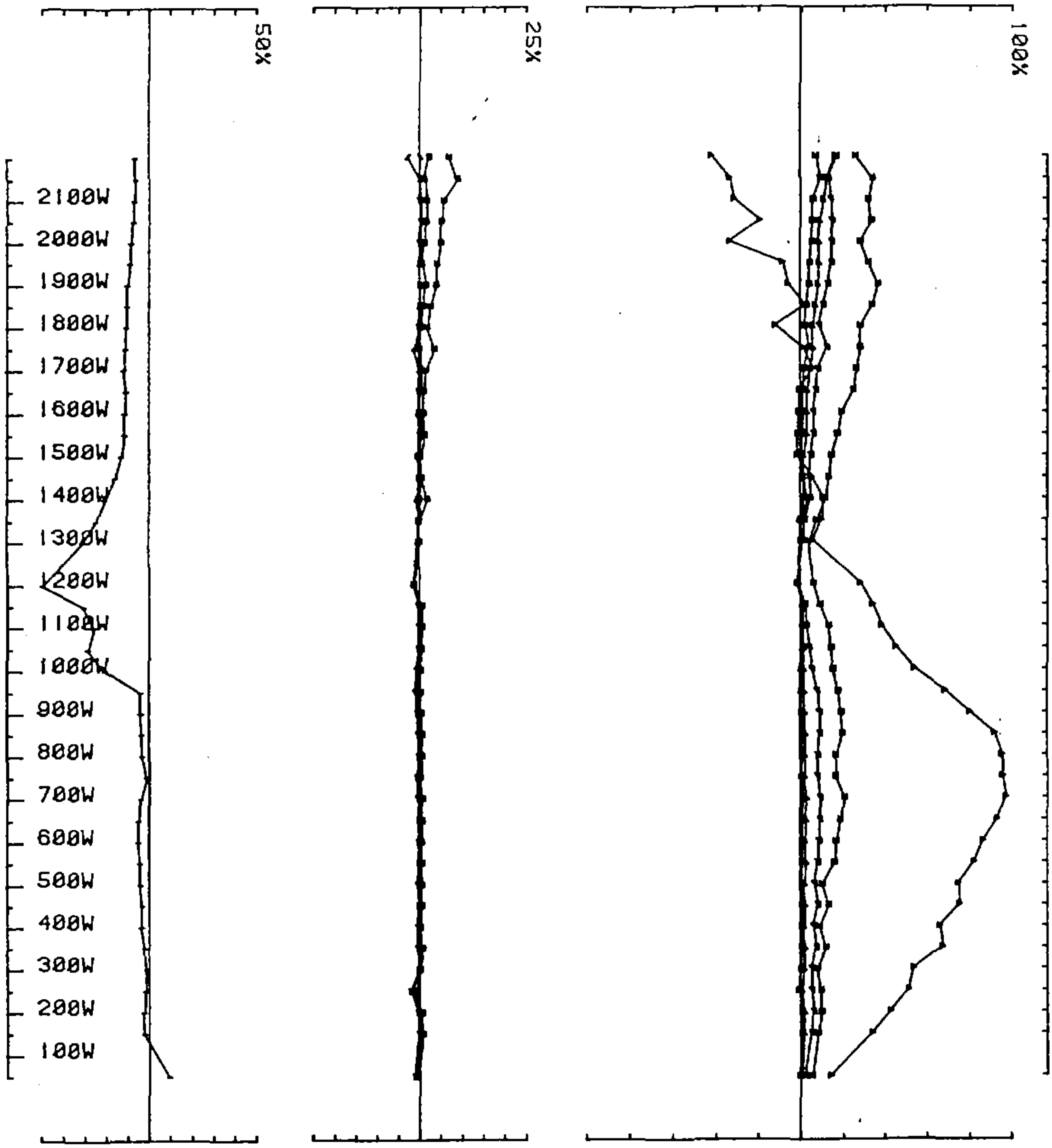



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 Oct 1989

loop no BT3 line 1000N component Hz secondary field Ch 1 contin. norm.

510228



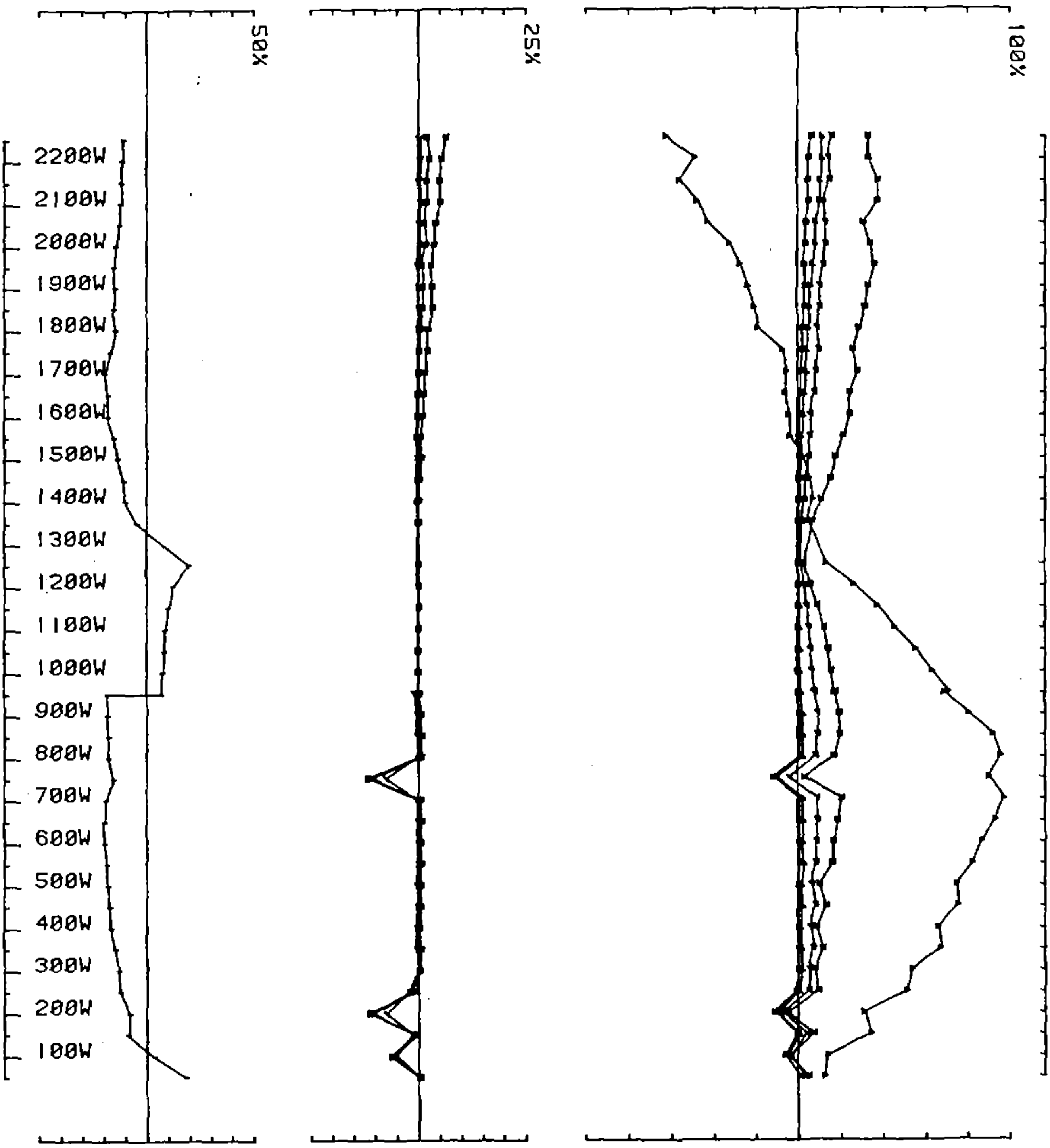

UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 Oct 1989

loop no BT3 line 1200N component Hz secondary field Ch 1 contin. norm.

211

510229

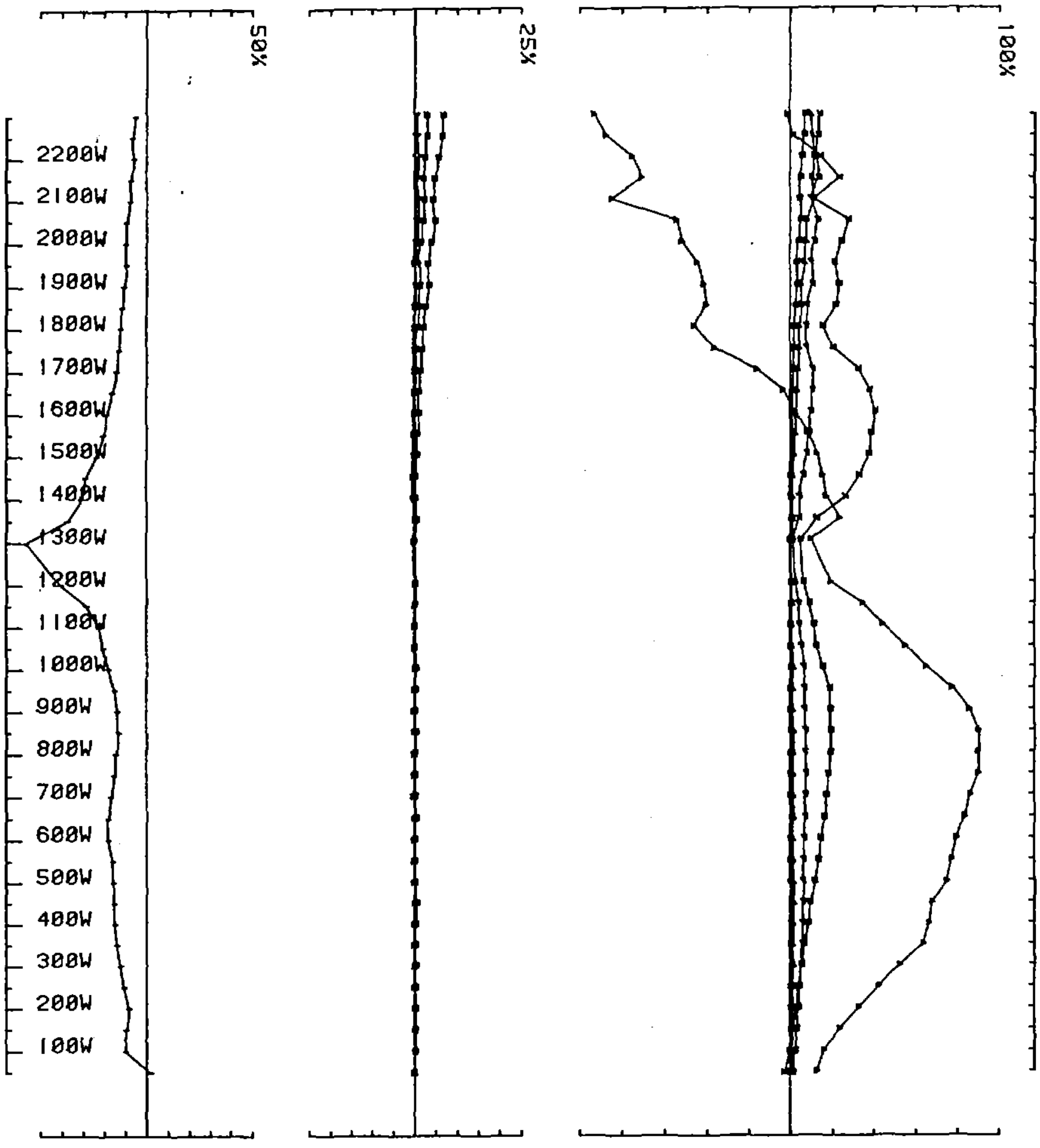



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 Oct 1989

loop no BT3 line 1400N component Hz secondary field Ch I contin. norm.

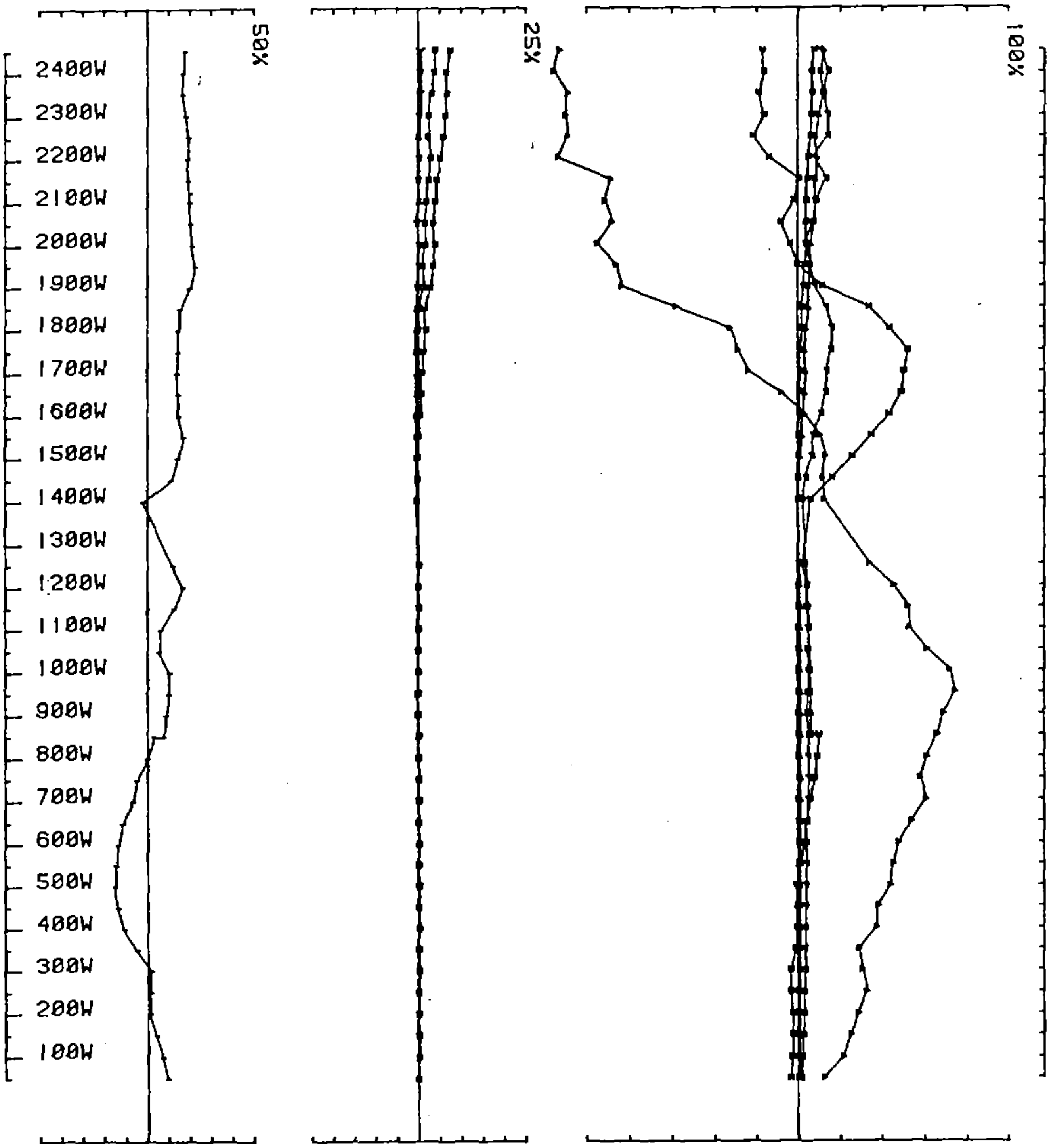
510230




UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 Oct 1989

loop no 7103 line 1600N component Hz secondary field Ch 1 contin. norm.



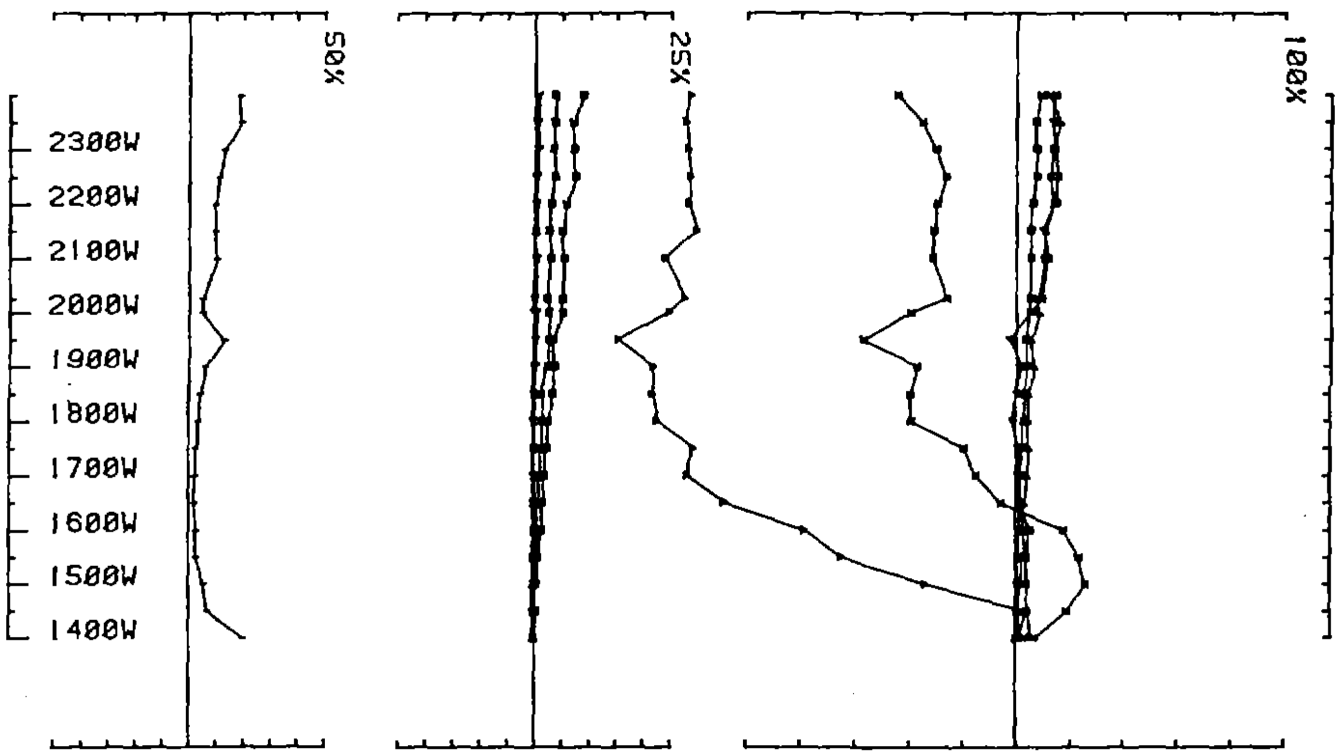

UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 Oct 1989

loop no BT3 line 1800N component Hz secondary field Ch 1 contin. norm.

510232

220



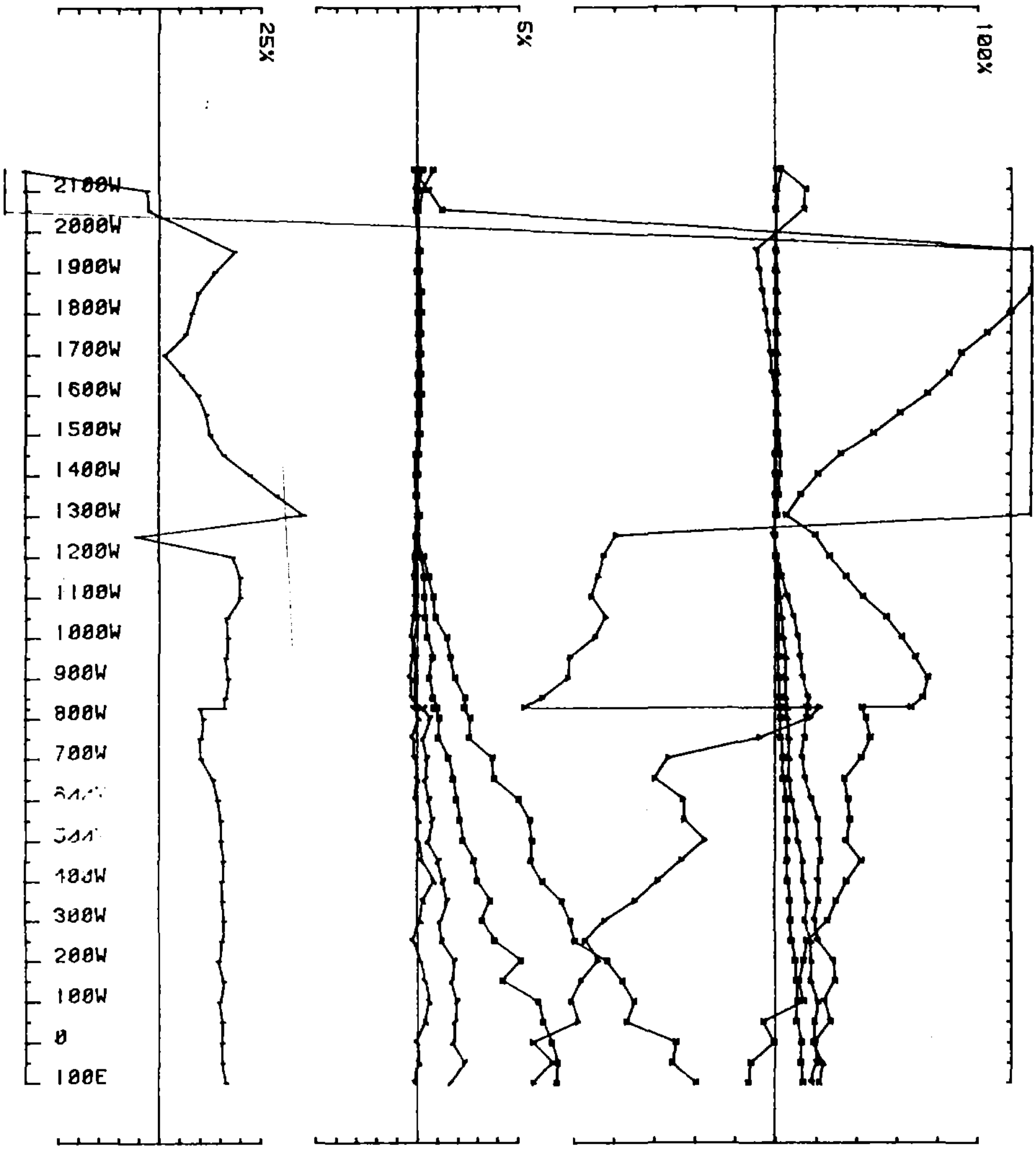

UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL  job 8971  base freq (hz) 26.230  Oct 1989

loop no BT3  line 2000N  component Hz  secondary field  Ch 1  contin. norm.

510233

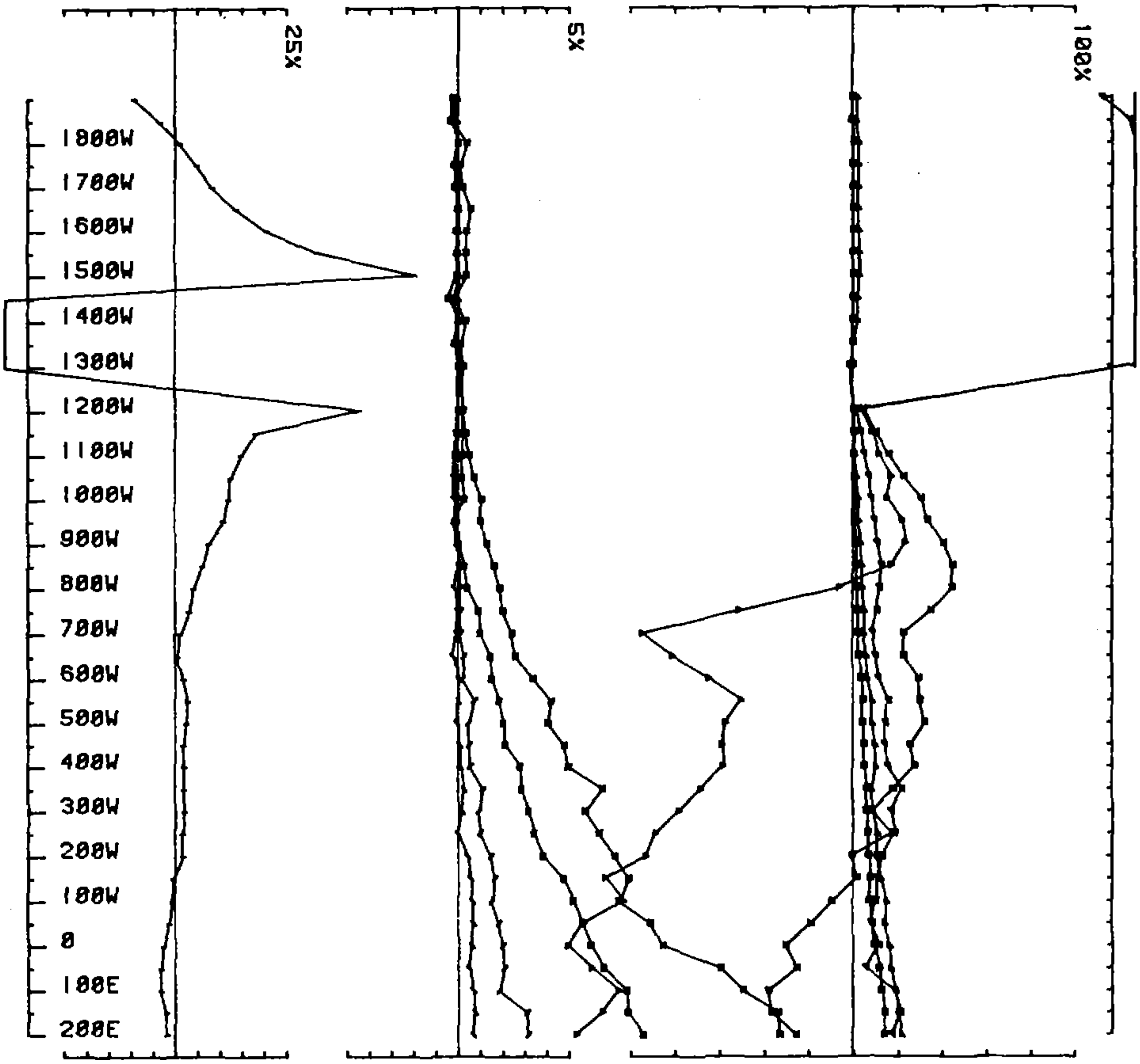
221




UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT4 line 1000N component Hz secondary field Ch 1 contin. norm.

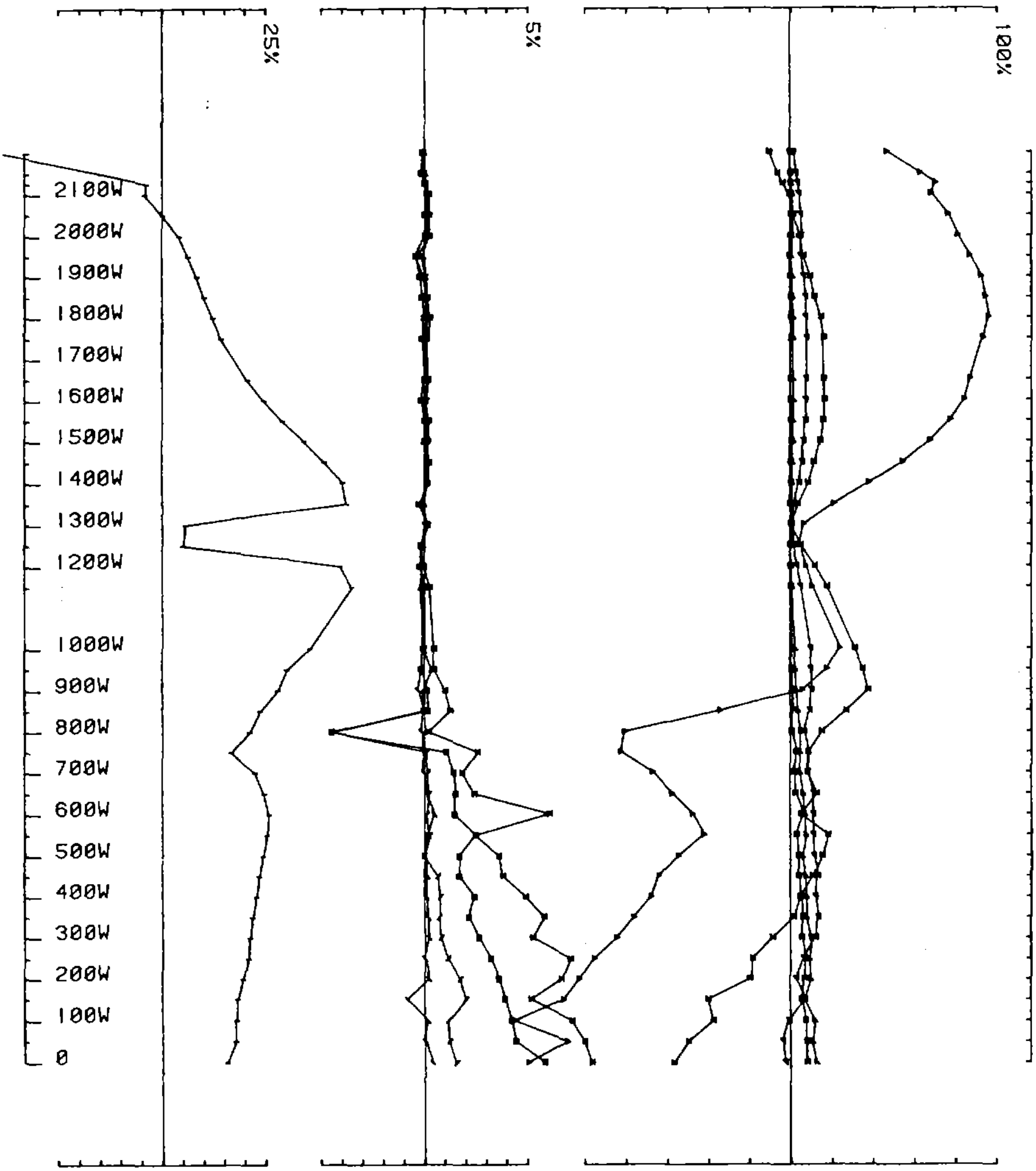



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 4 line 1200N component Hz secondary field Ch 1 contin. norm.

510235

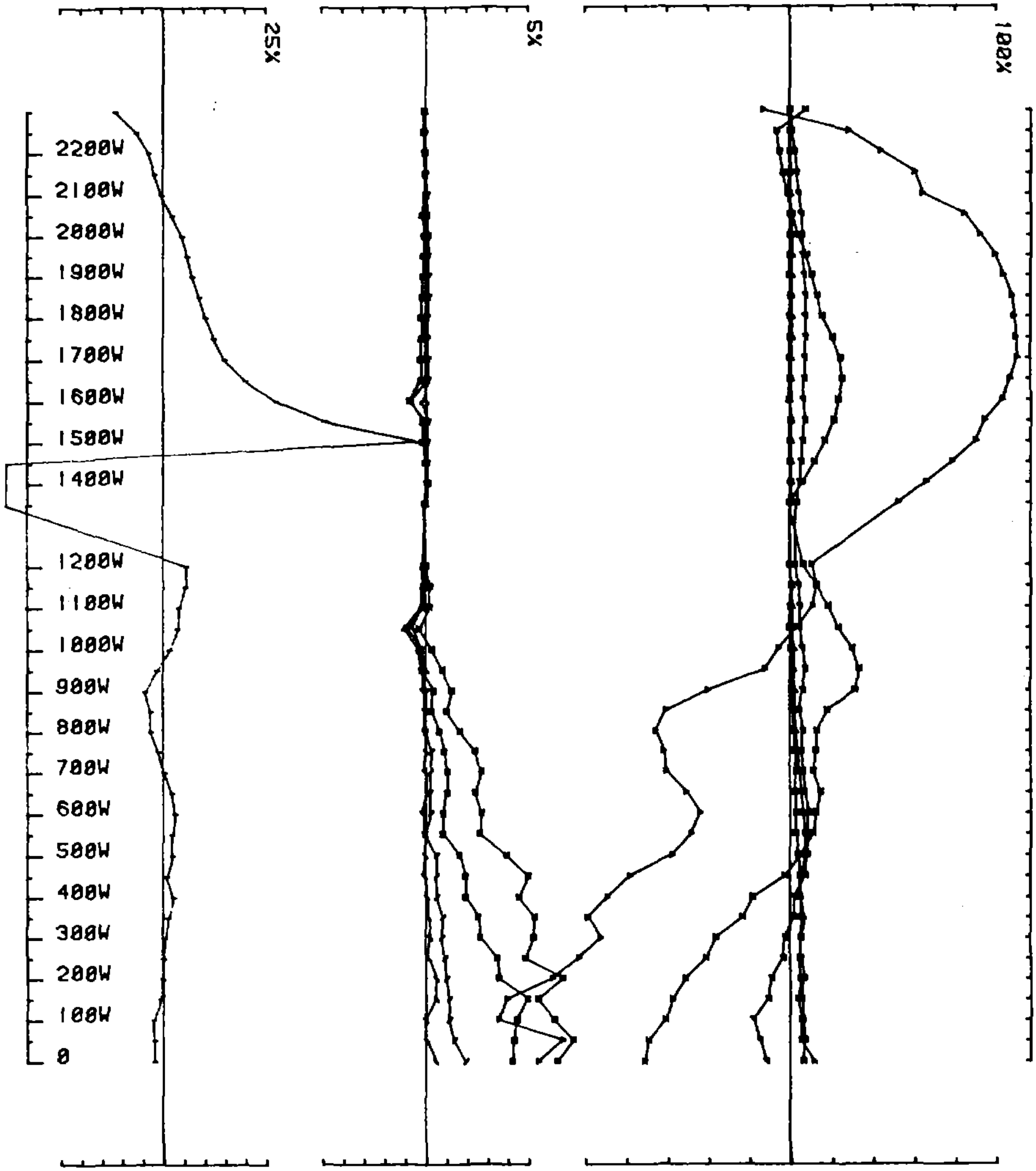



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 4 line 1400N component Hz secondary field Ch 1 contin. norm.

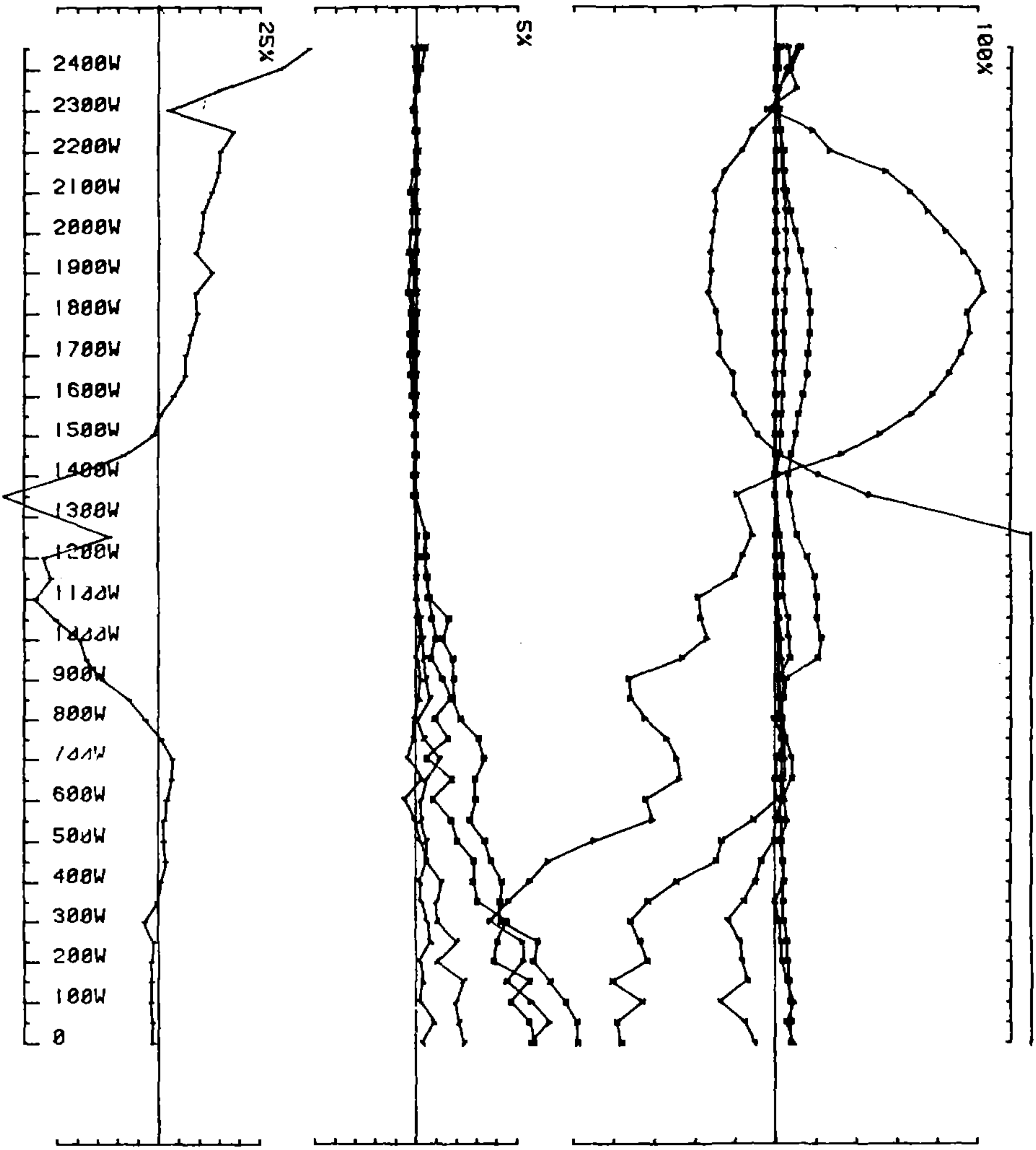
510236




UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 4 line 1600N component Hz secondary field Ch 1 contin. norm.

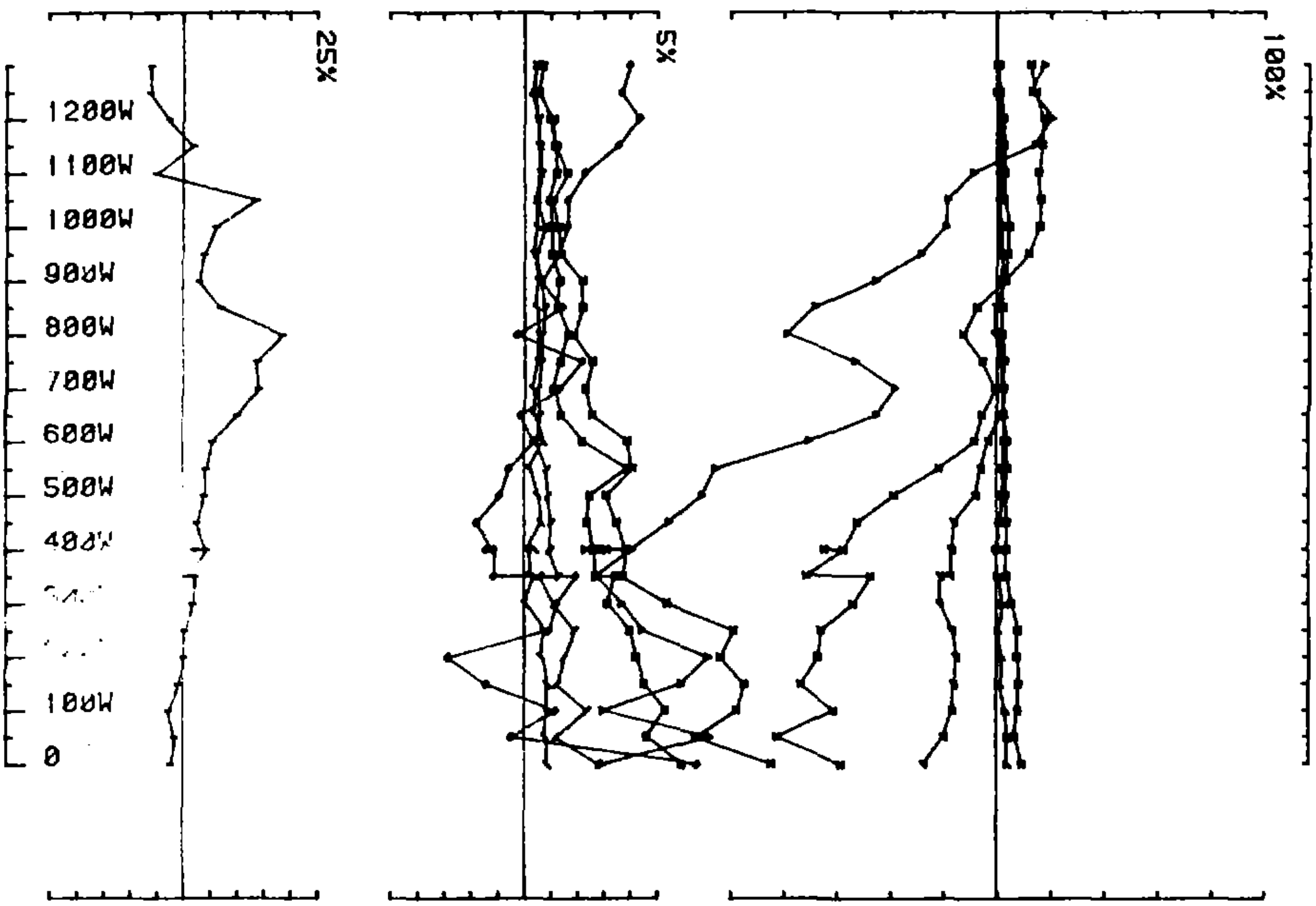



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 4 line 1800N component Hz secondary field Ch 1 contin. norm.

510238



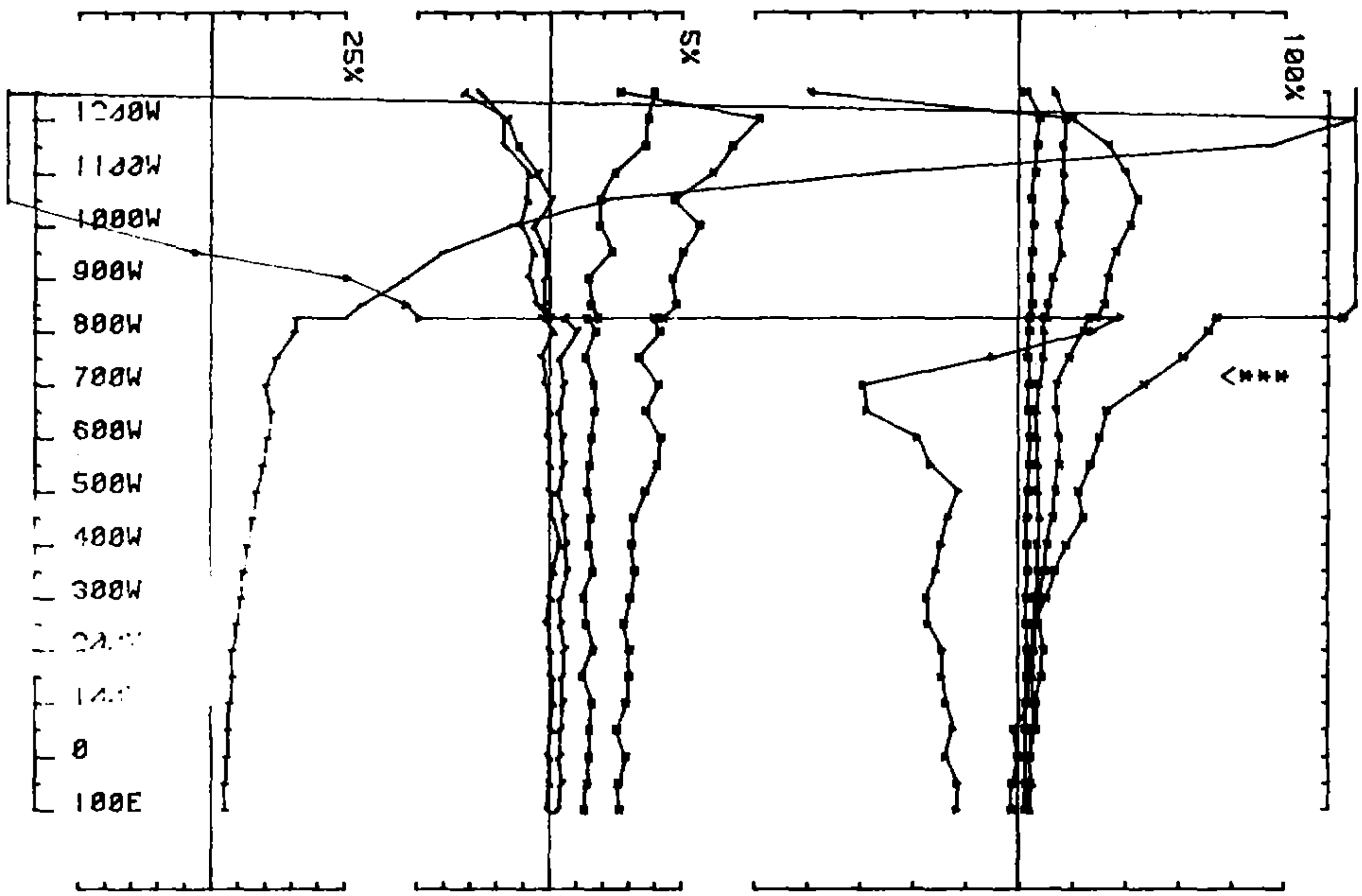

UT SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 4 line 2000N component Hz secondary field Ch 1 contin. norm.

227

510239

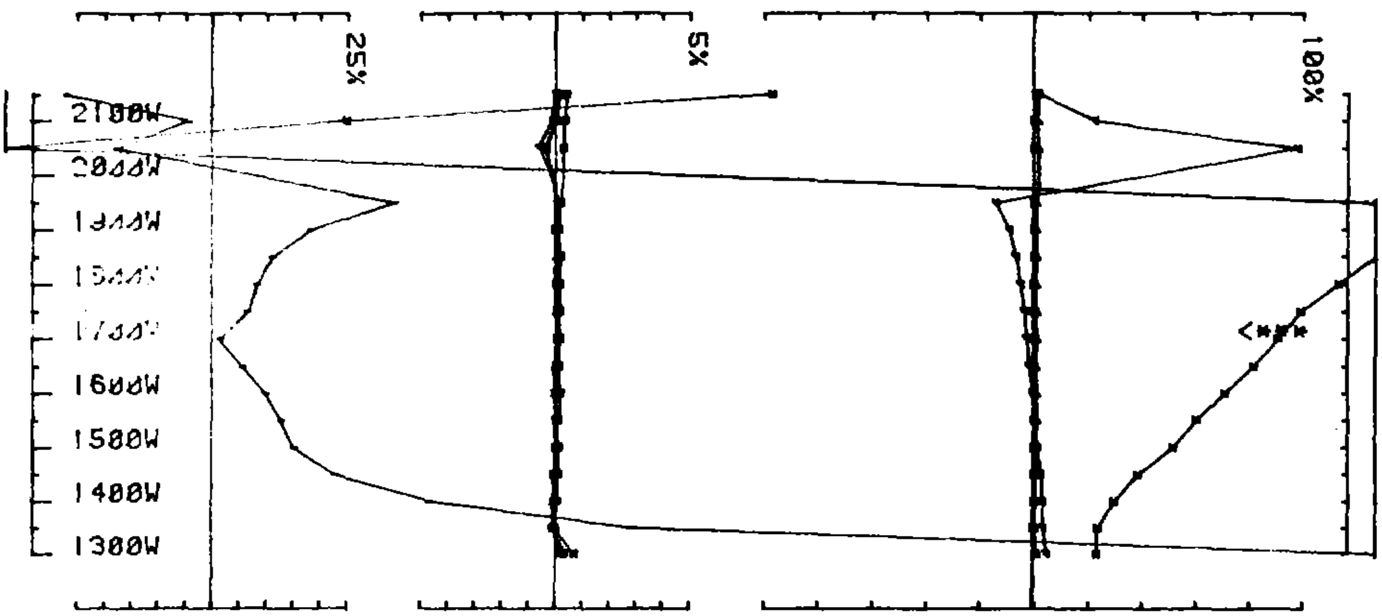



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

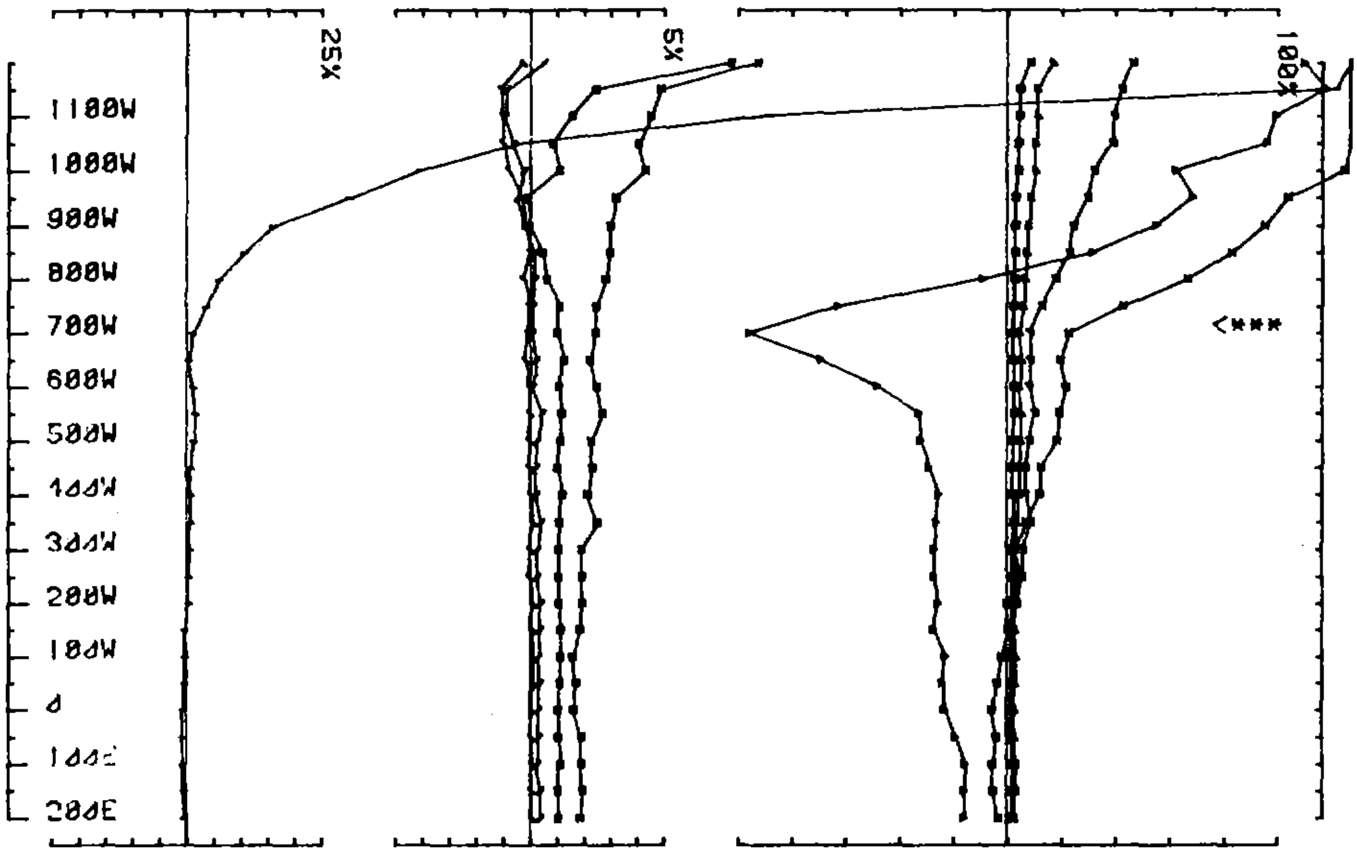
~~loop no~~ BT 4 line 1000N component Hz secondary field Ch 1 point norm.

510240



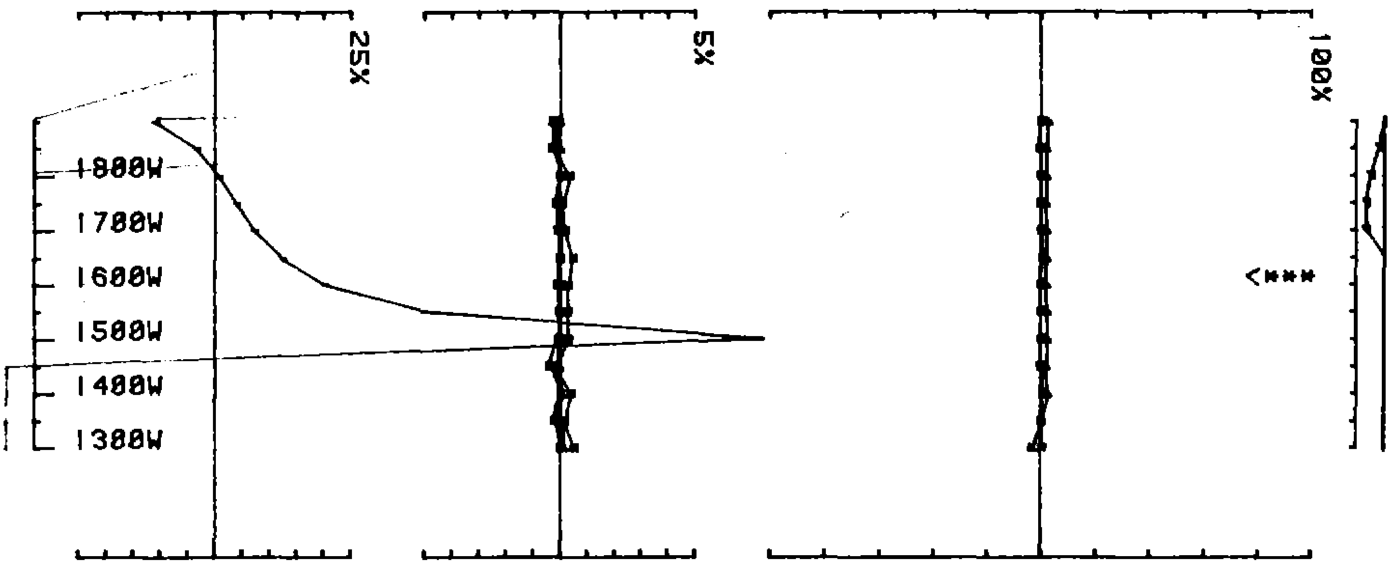

UTEM SURVEY at BEATRICE for B H P
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 4 line 1000N component Hz secondary field Ch 1 point norm.

510241



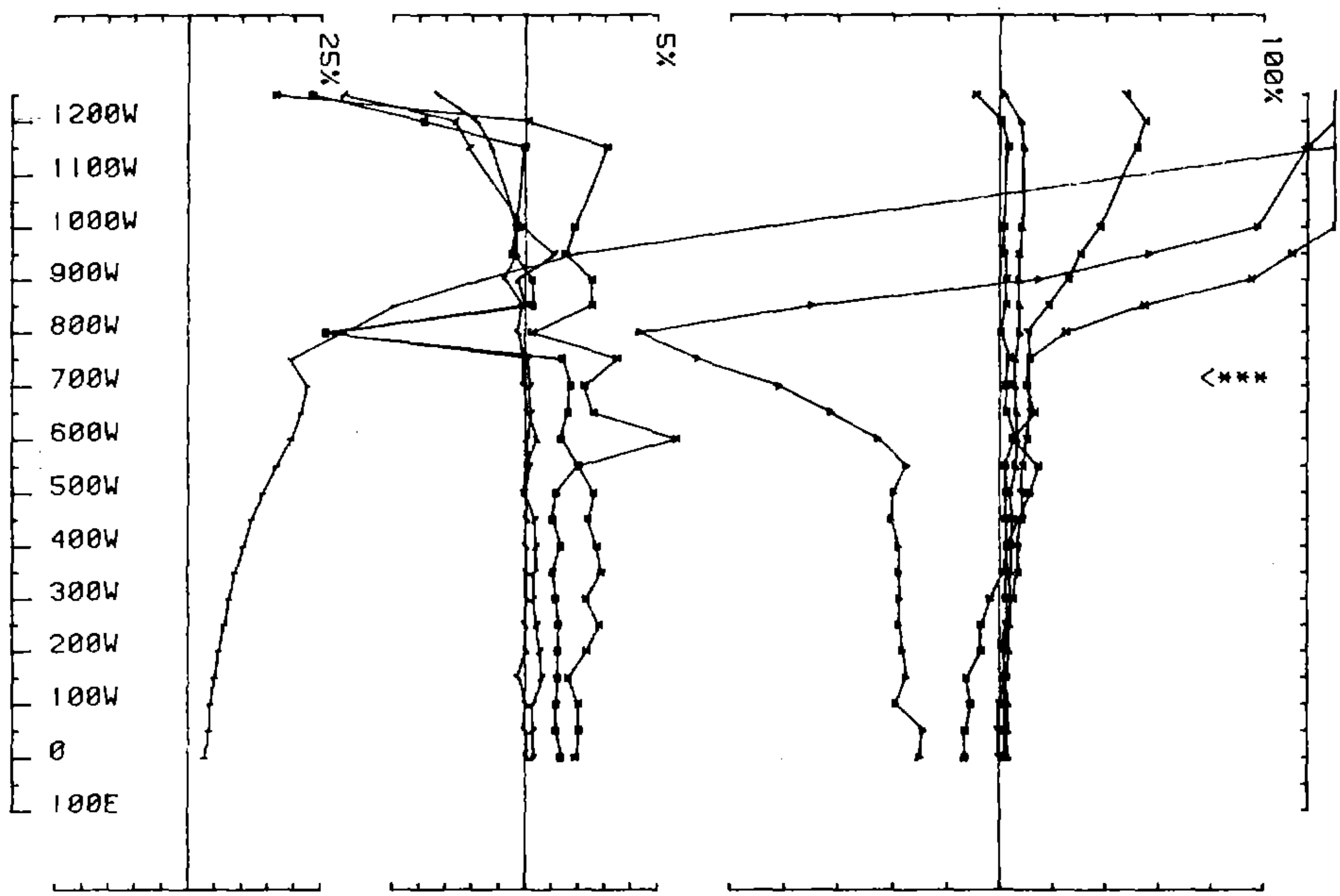

UTEM SURVEY at BEATRICE for B H P
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 4 line 1200N component Hz secondary field Ch 1 point norm.

510242




UTEM SURVEY at BEATRICE for B H P
conducted by TM ST RL    job 8971    base freq (hz) 26.230  OCT 89
loop no BT 4   line 1200N   component Hz   secondary field   Ch 1   point norm.

510243

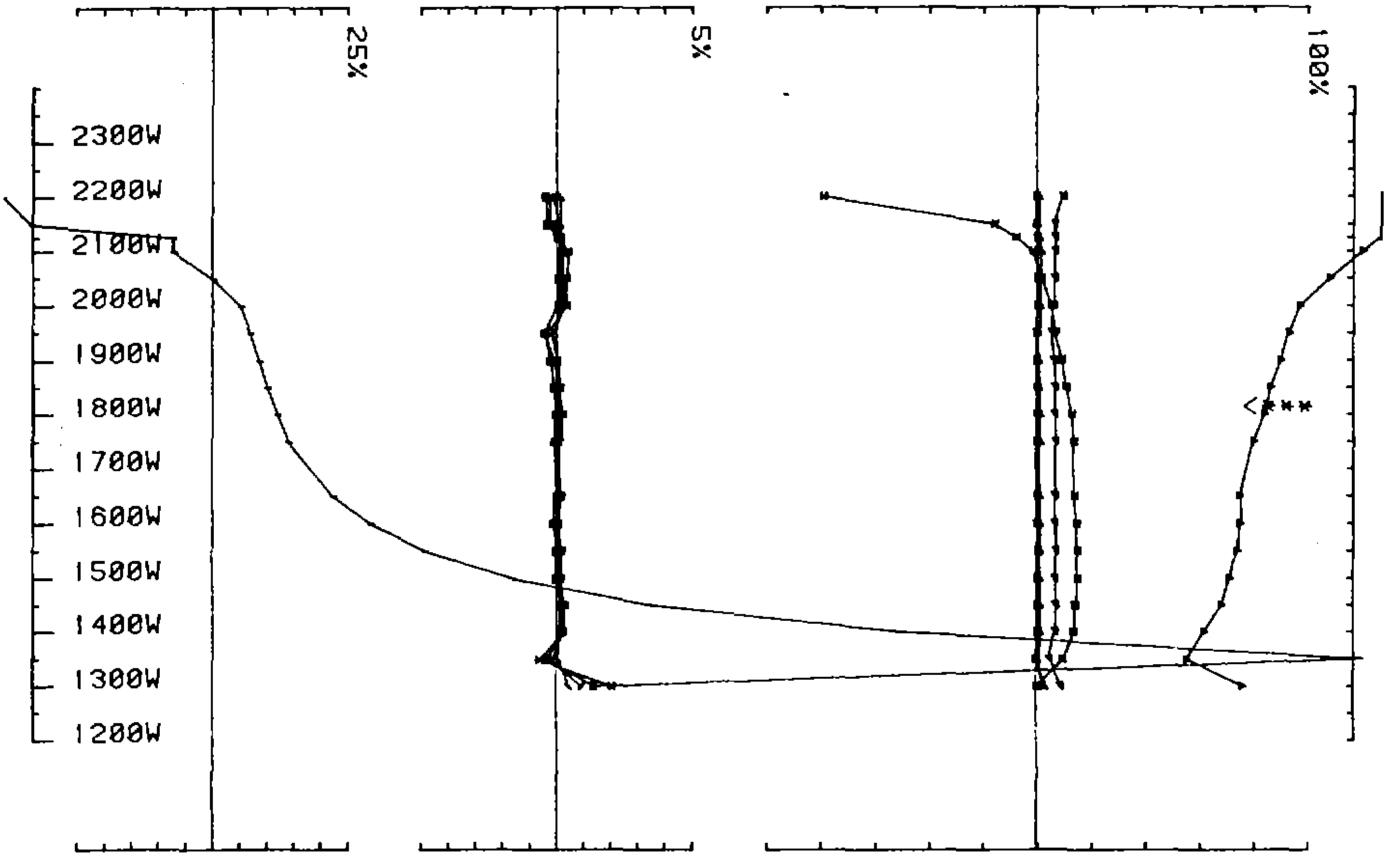



UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 4 line 1400N component Hz secondary field Ch I point norm.

510244



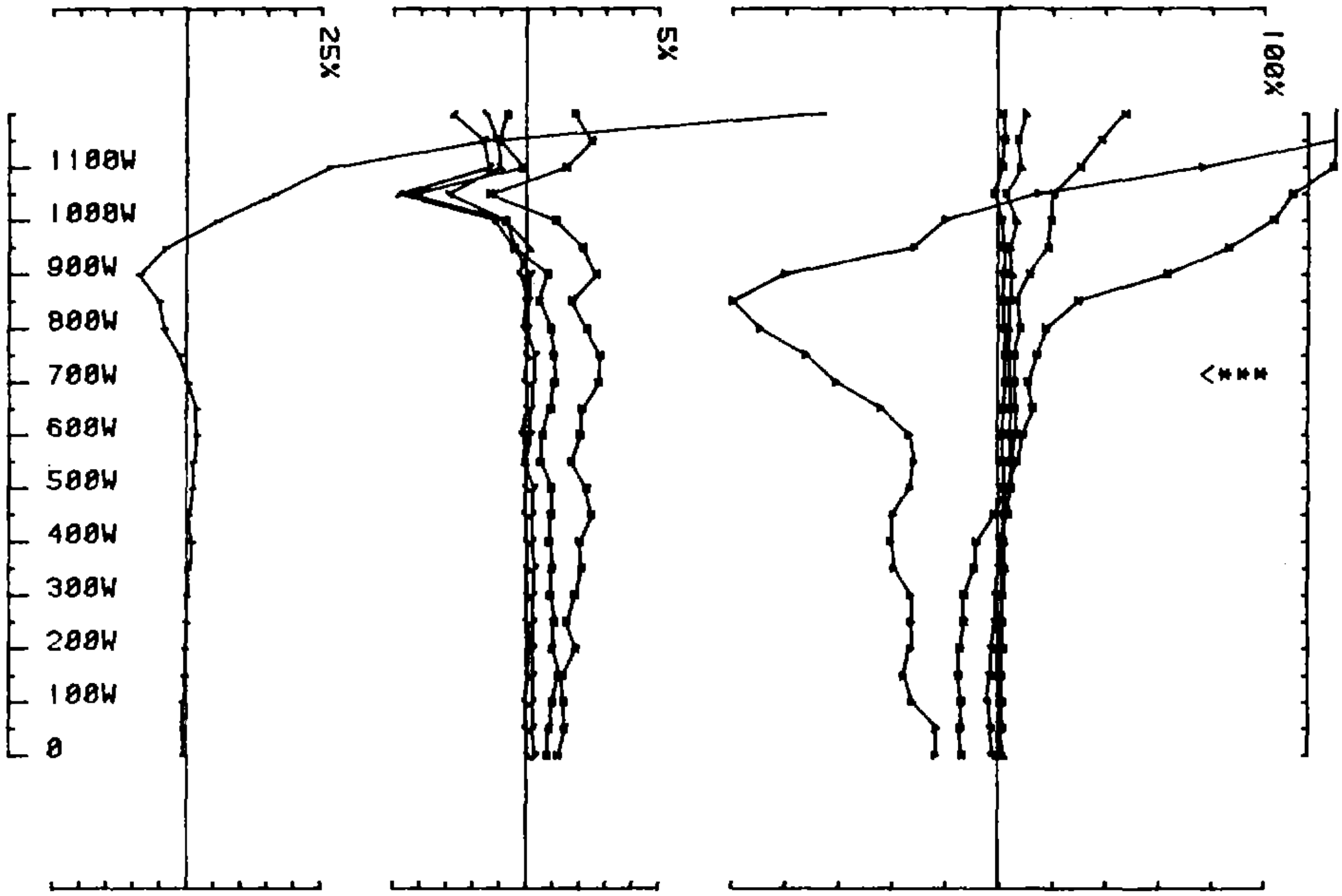

UTEM SURVEY at BEATRICE for B H P

conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 4 line 1400N component Hz secondary field Ch 1 point norm.

230

510245

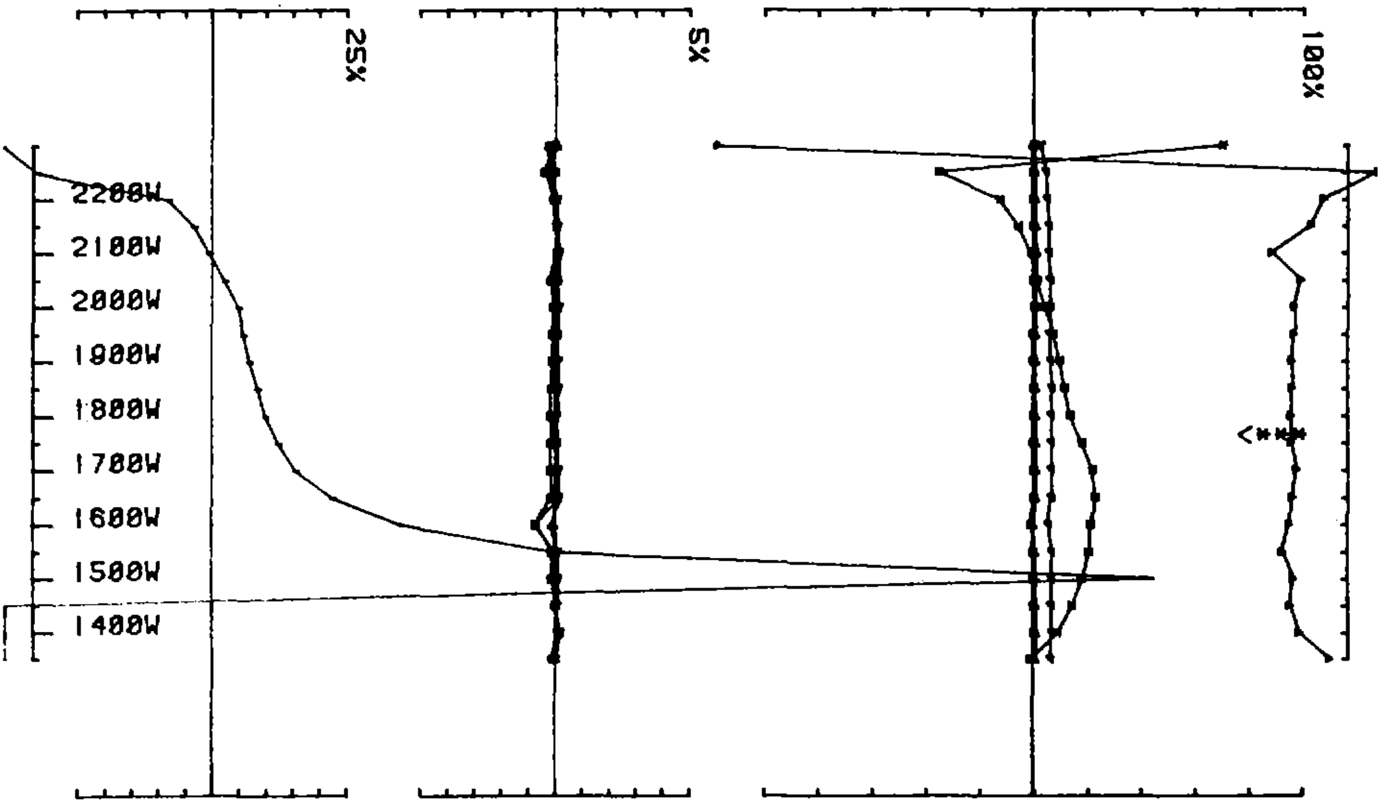



UTEM SURVEY at BEATRICE for B H P

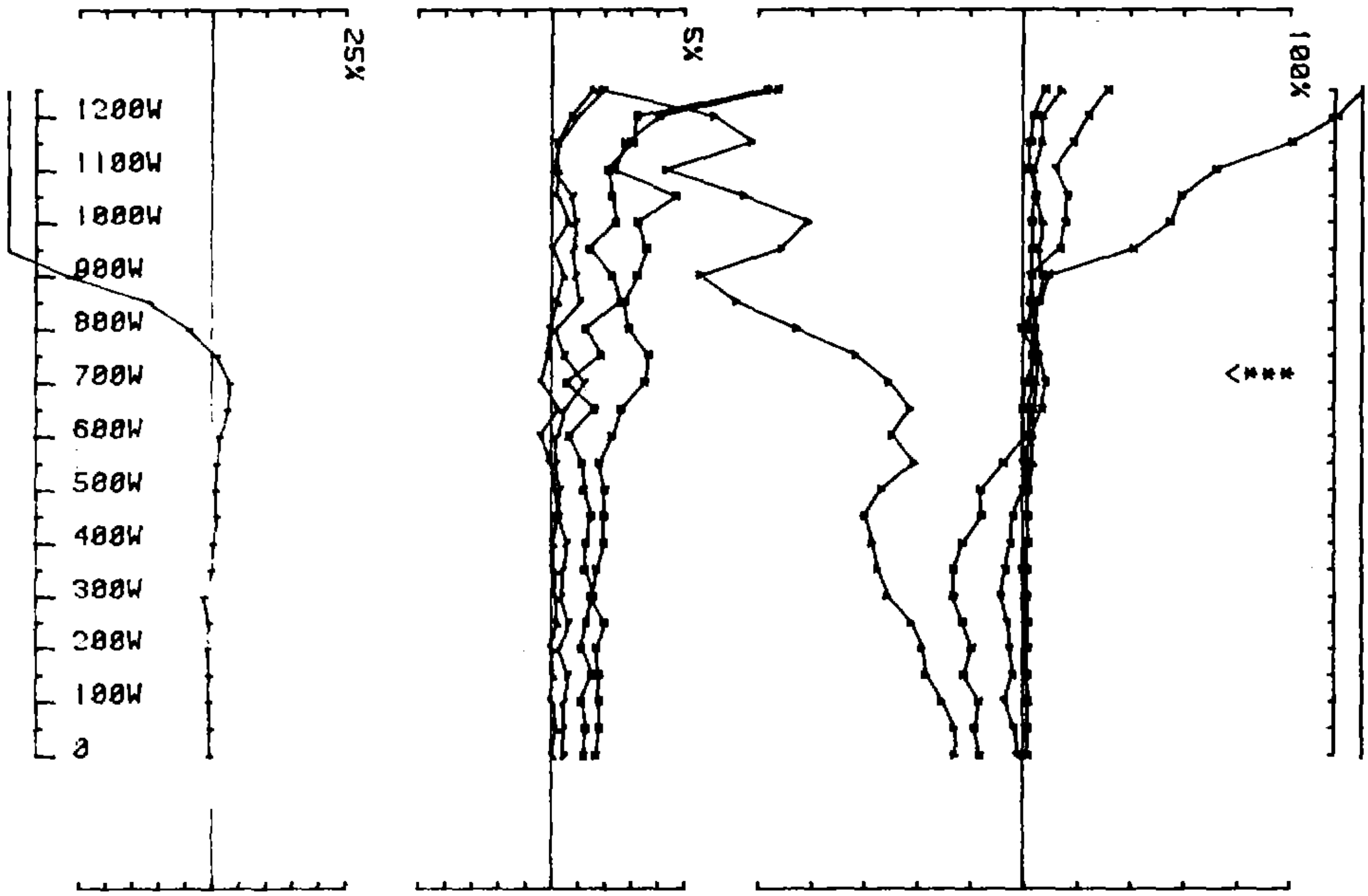
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 4 line 1600N component Hz secondary field Ch 1 point norm.

510246

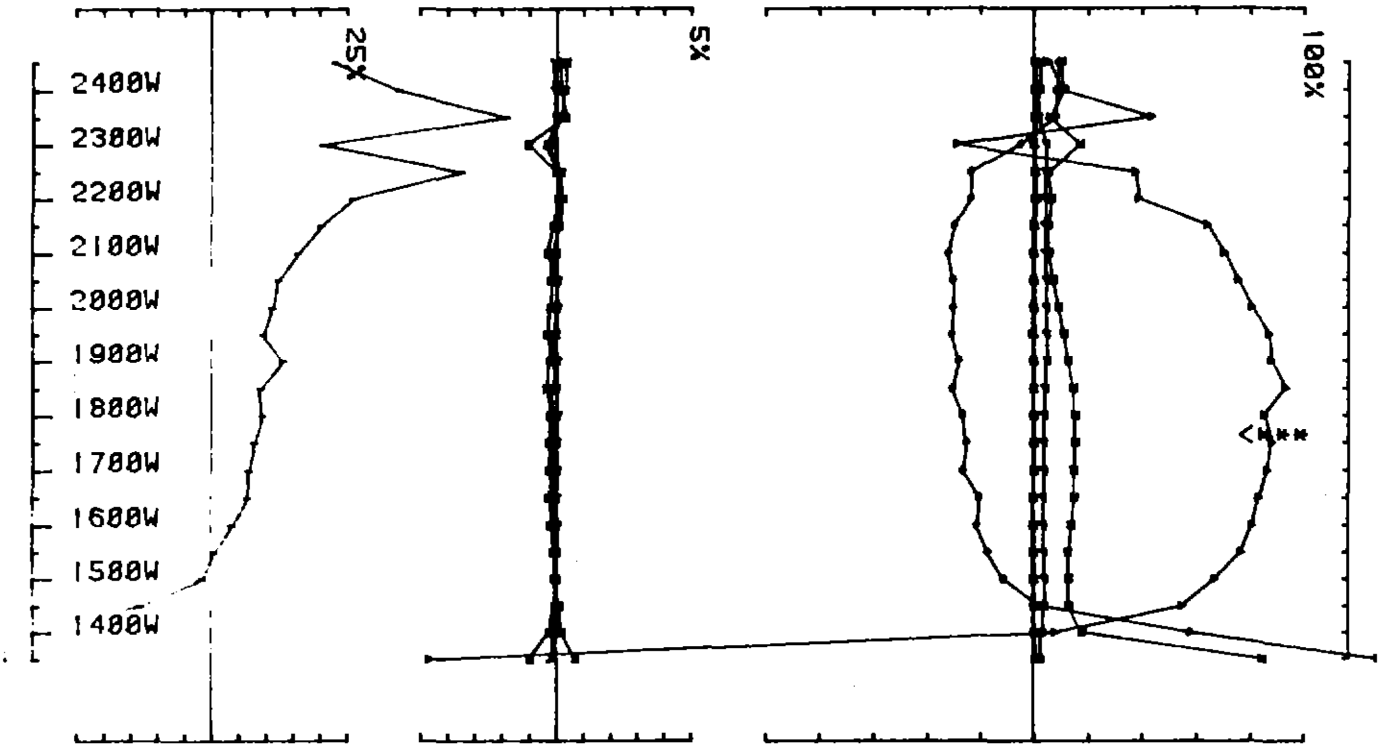



UTEM SURVEY at BEATRICE for B H P
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 4 line 1600N component Hz secondary field Ch 1 point norm.

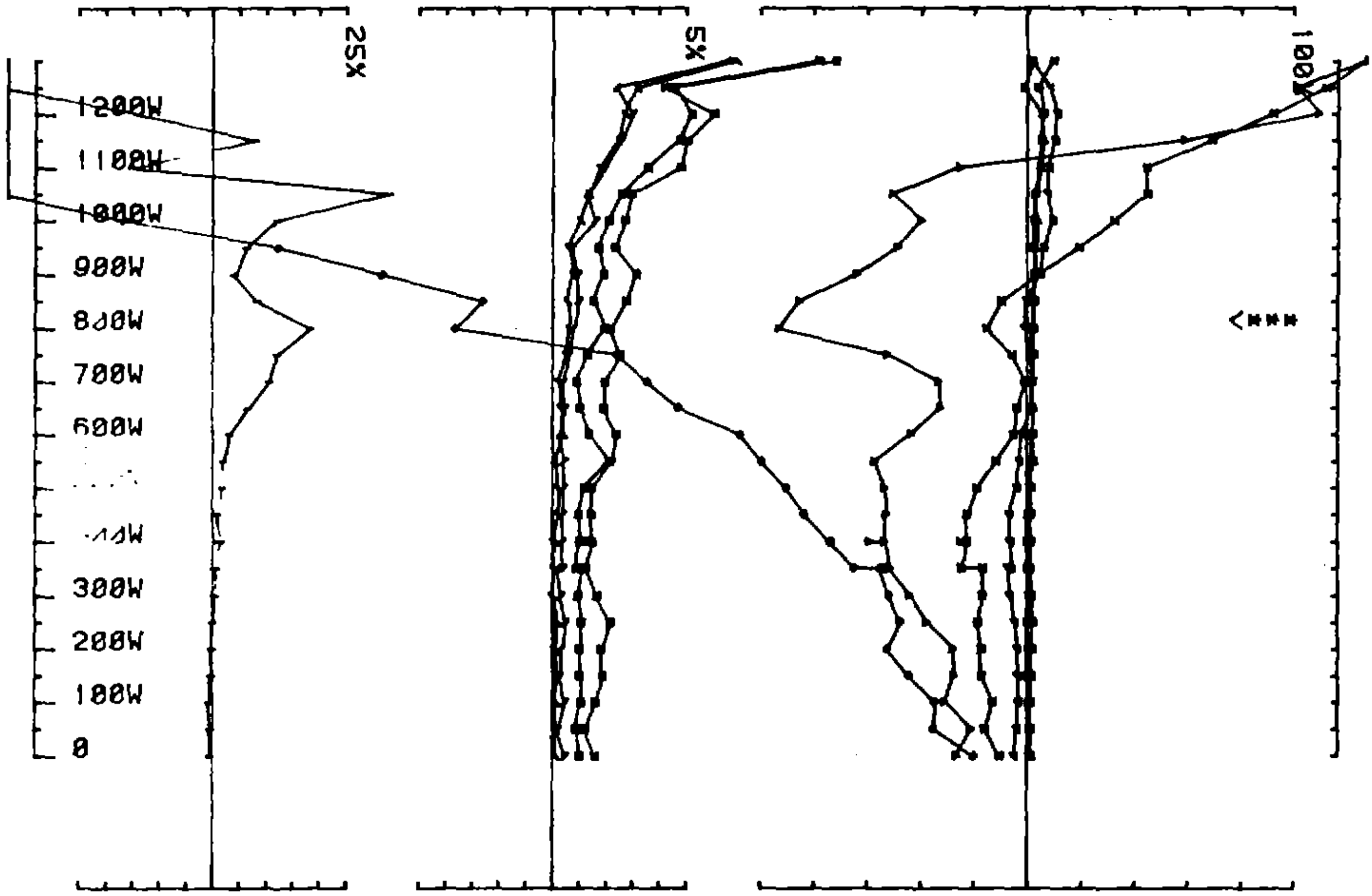



UTEM SURVEY at B-ATRICE for B H P
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 4 line 1800N component Hz secondary field Ch 1 point norm.

236



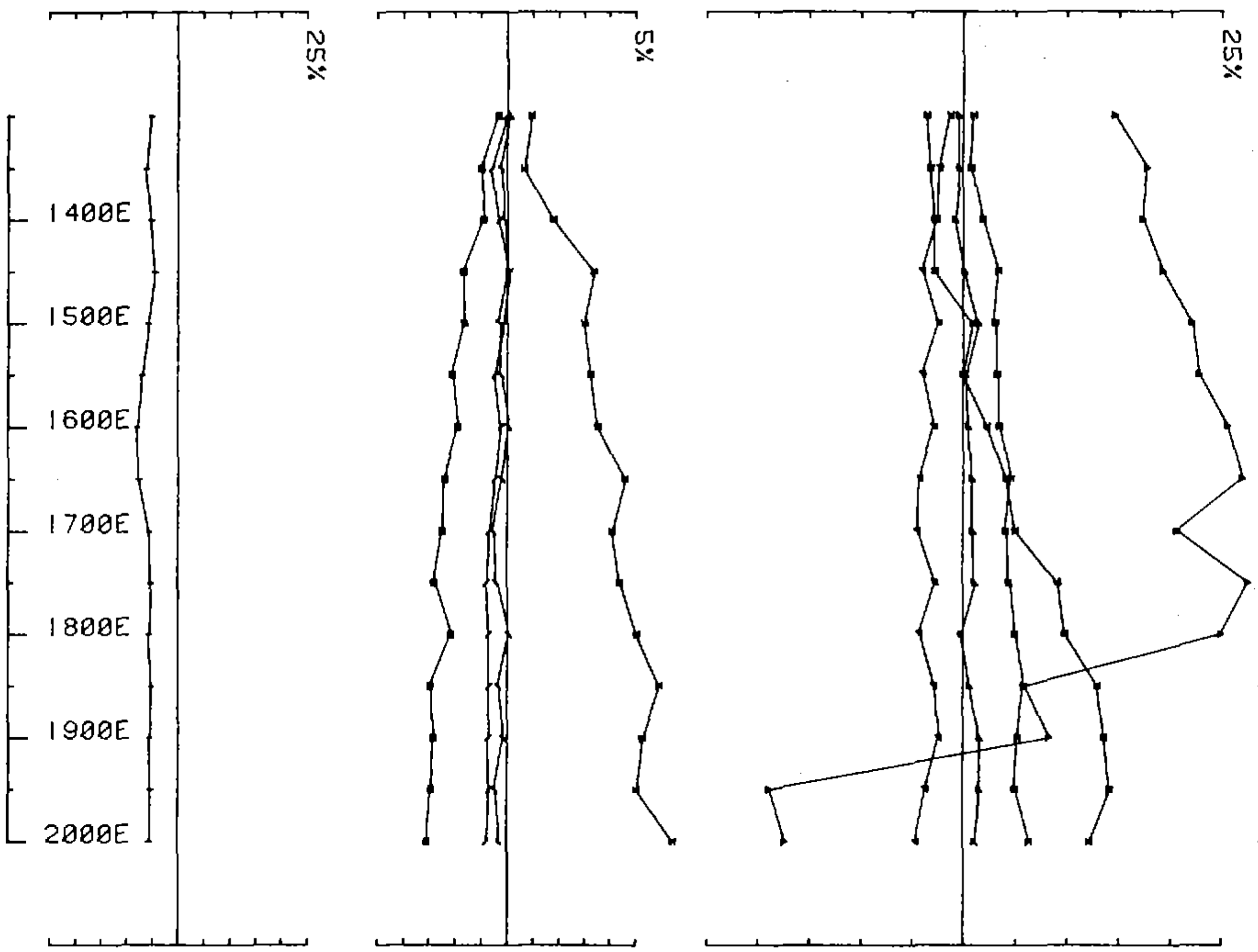

UTEM SURVEY at BEATRICE for B H P
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89
loop no BT 4 line 1800N component Hz secondary field Ch 1 point norm.




UTEM SURVEY at BEATRICE for B H P

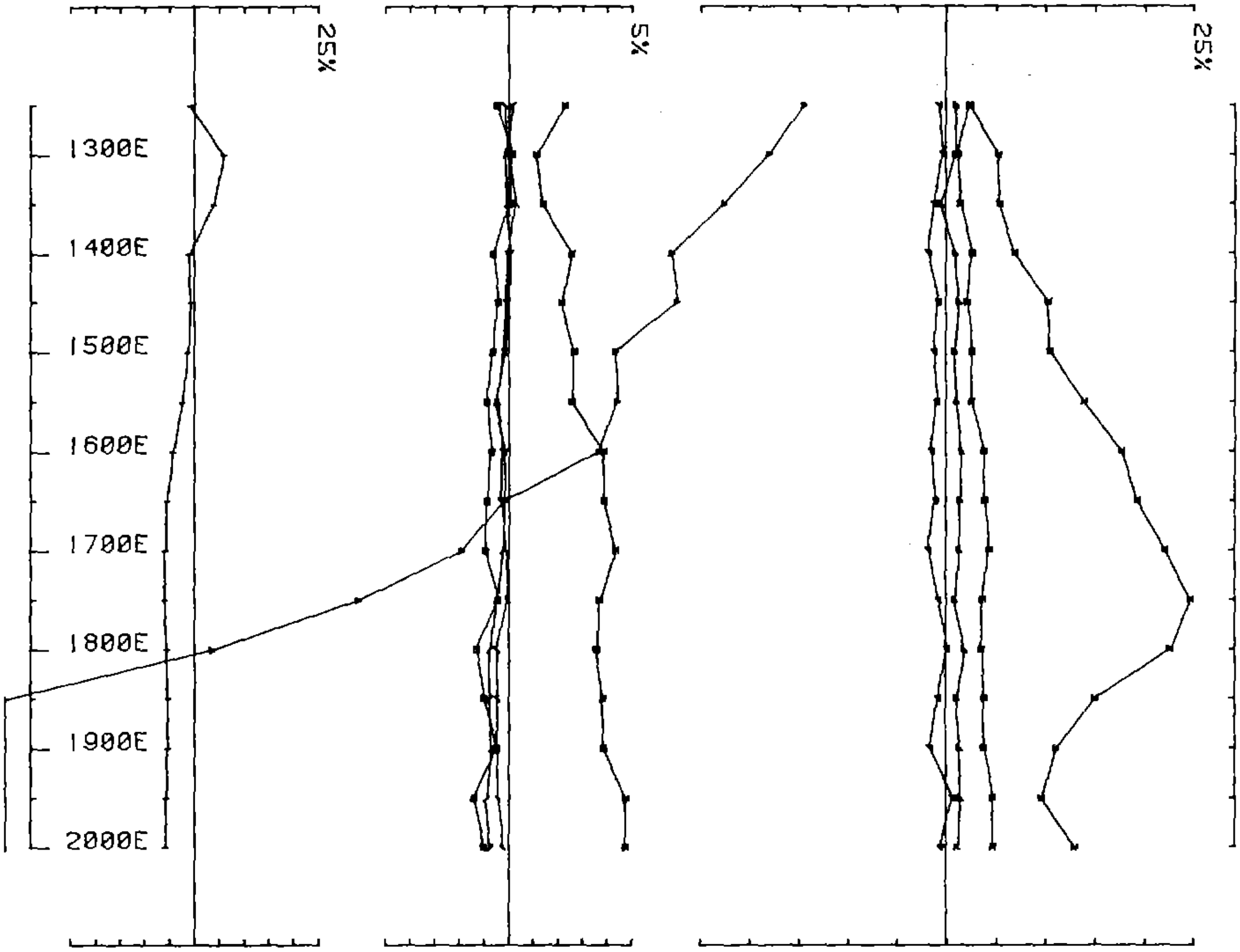
conducted by TM ST RL job 8971 base freq (hz) 26.230 OCT 89

loop no BT 4 line 2000N component Hz secondary field Ch 1 point norm.

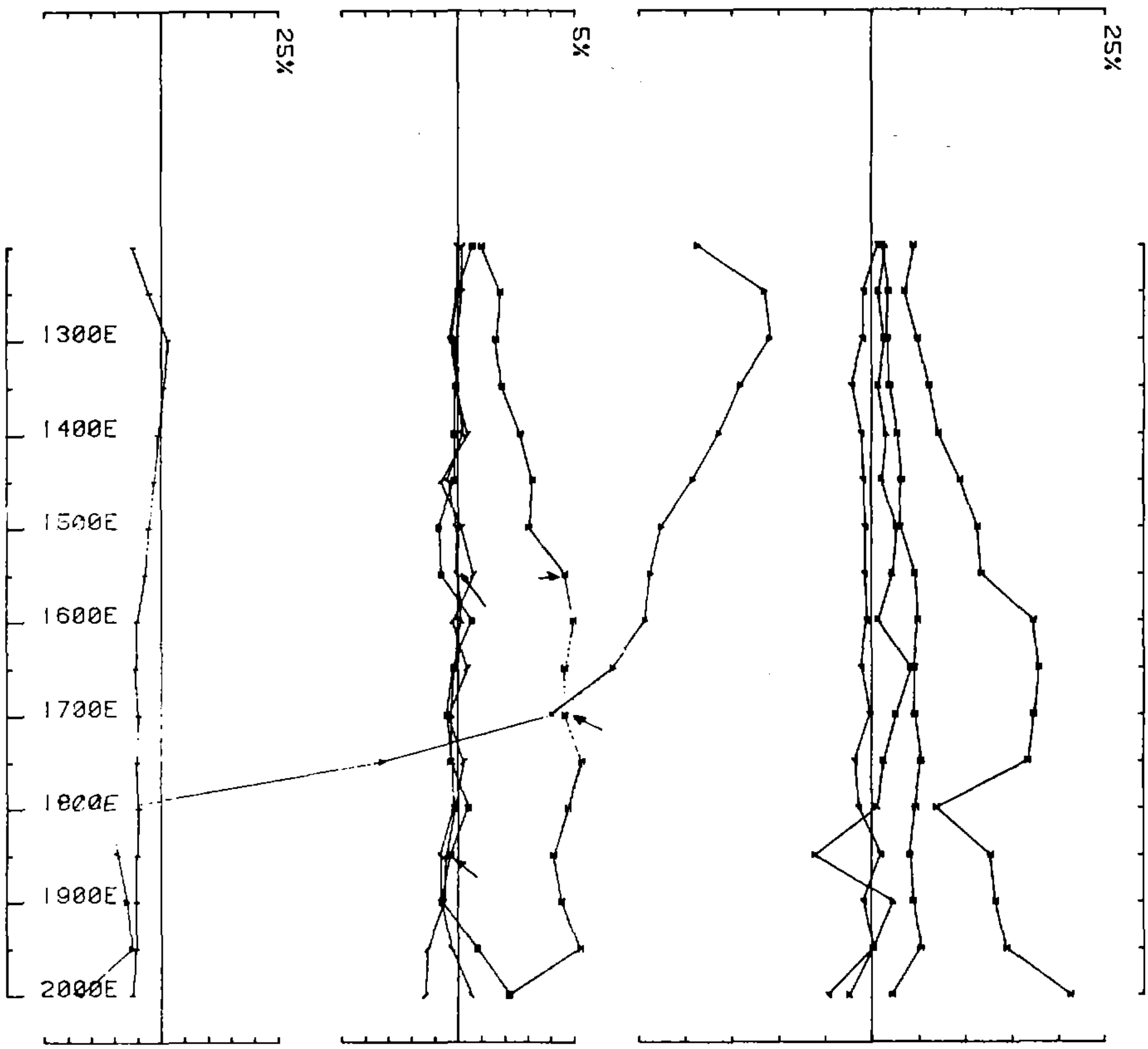



UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX1 line 6900N component Hz secondary field Ch 1 contin. norm.

510251



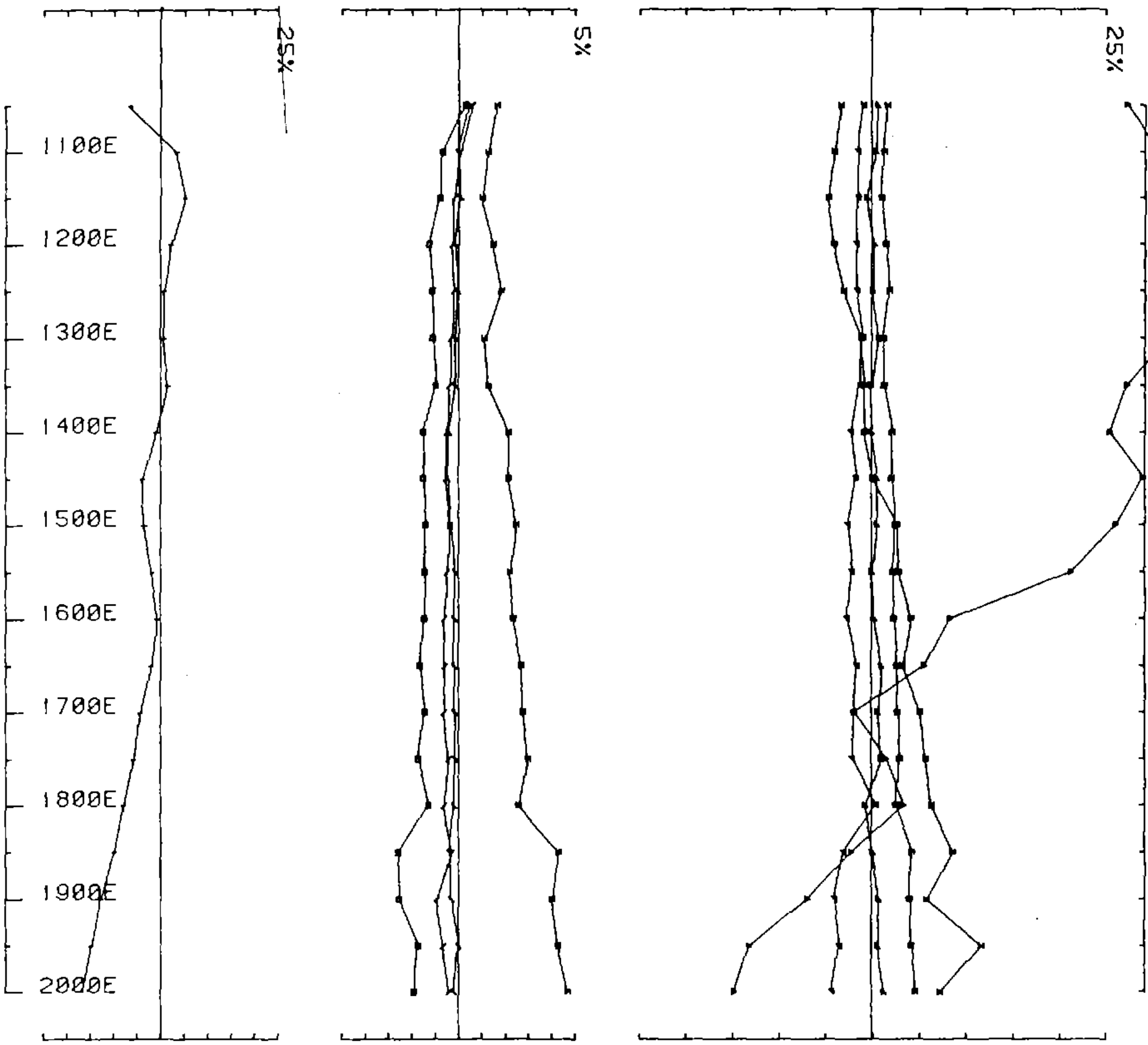

UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX1 line 7100N component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at MOXON SADDLE for BHP

conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989

loop no MX1 line 7300N component Hz secondary field Ch 1 contin. norm.



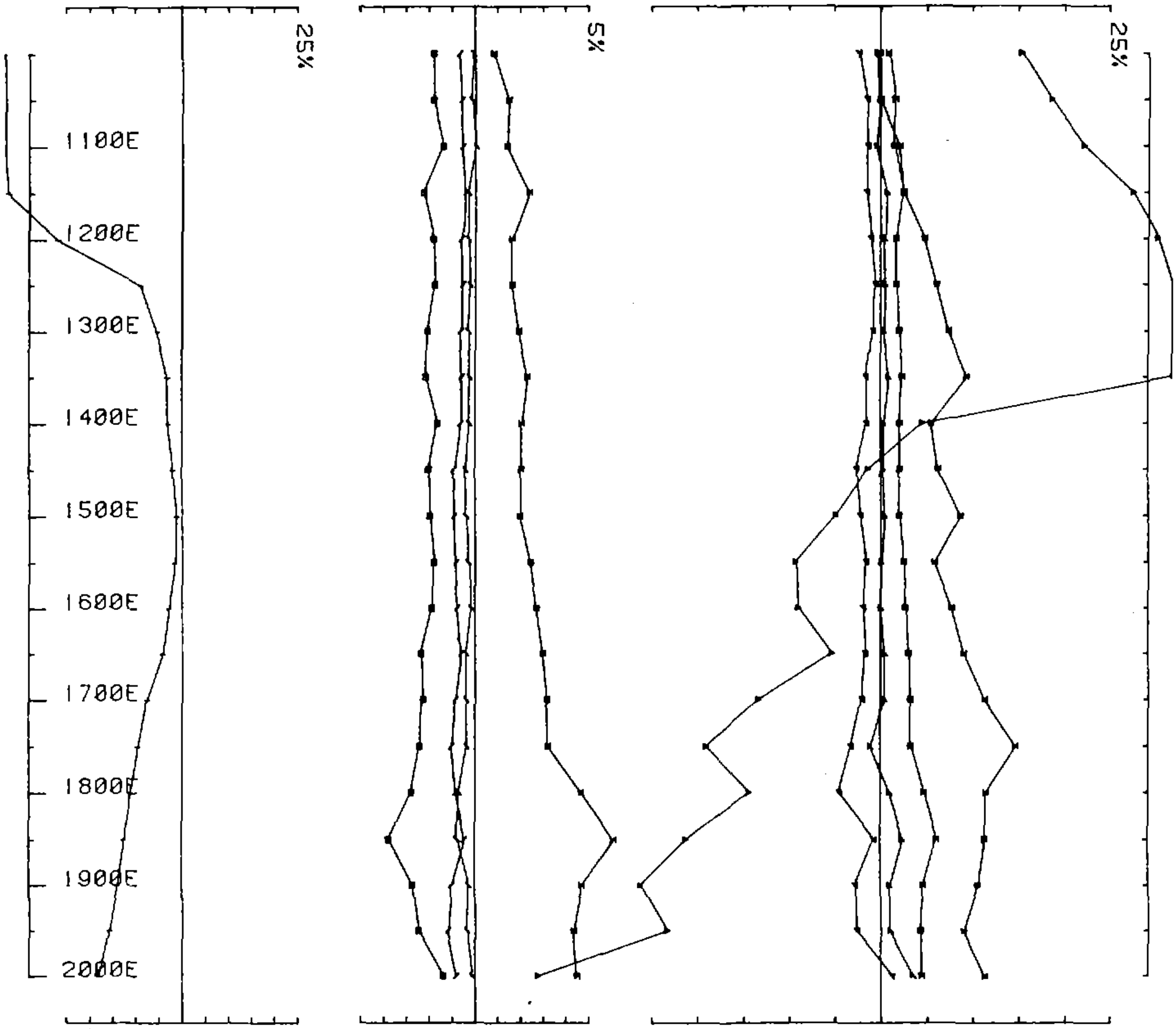

UTEM SURVEY at MOXON SADDLE for BHP

conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989

loop no MX1 line 7700N component Hz secondary field Ch 1 contin. norm.

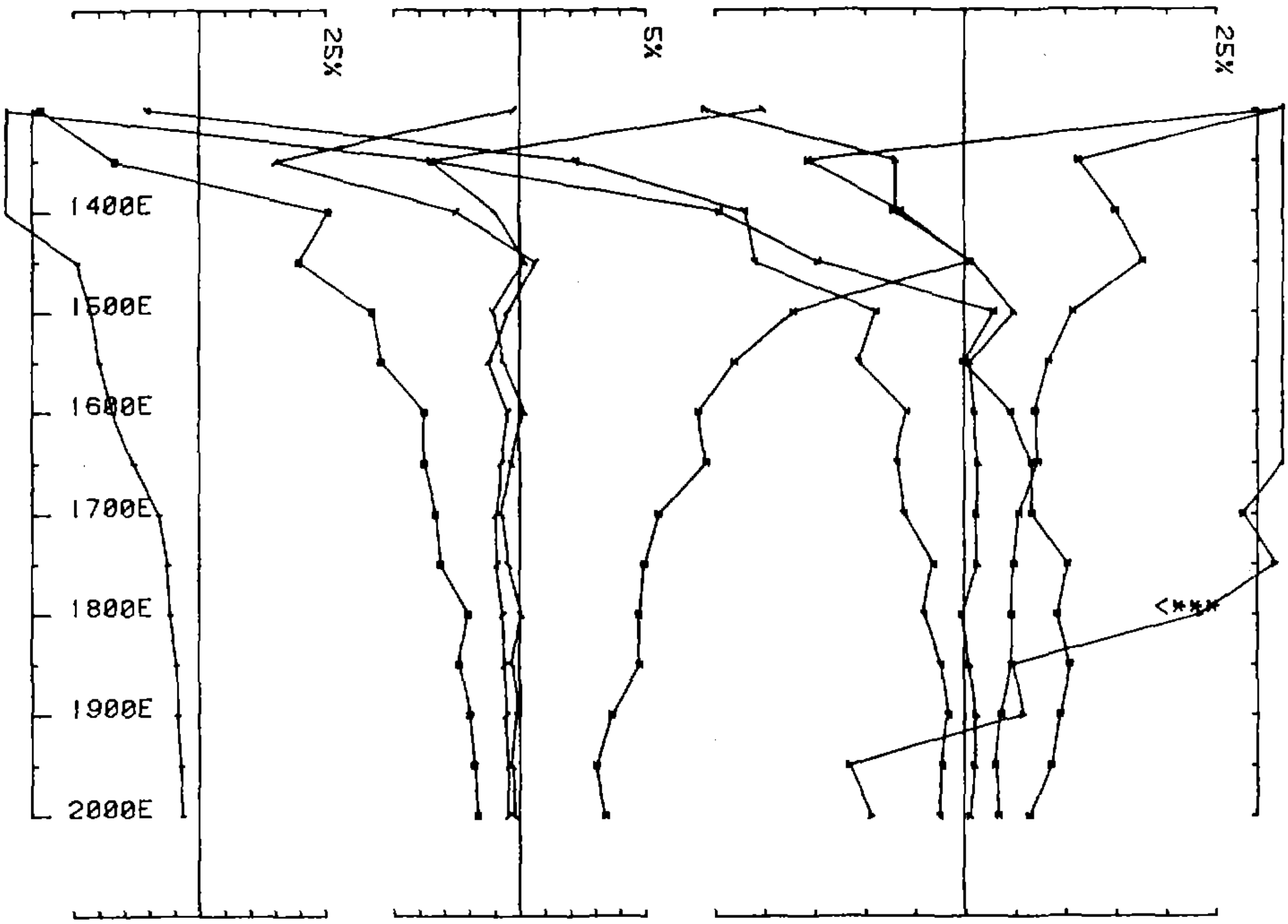
242

510254

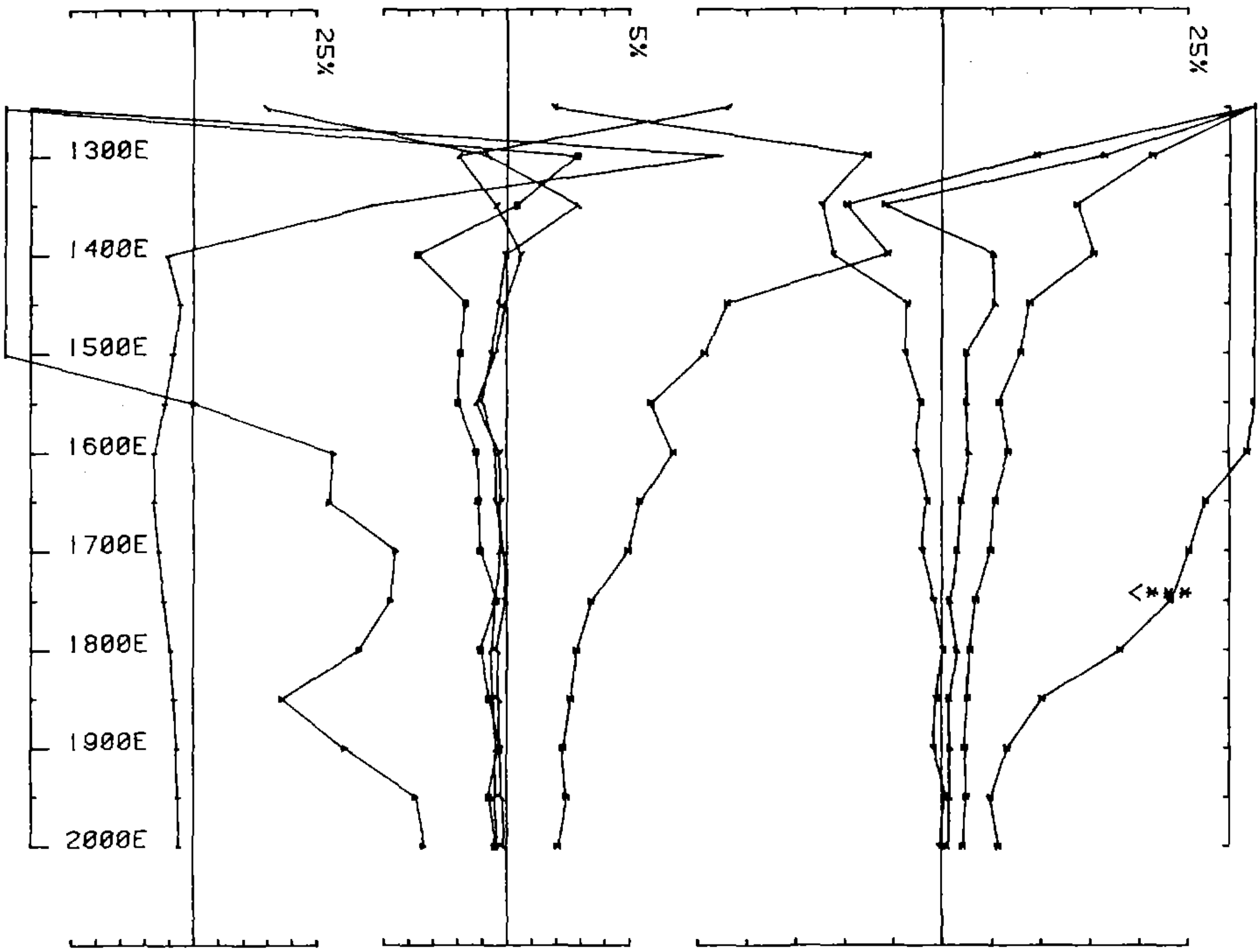



UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX1 line 7900N component Hz secondary field Ch 1 contin. norm.

510255

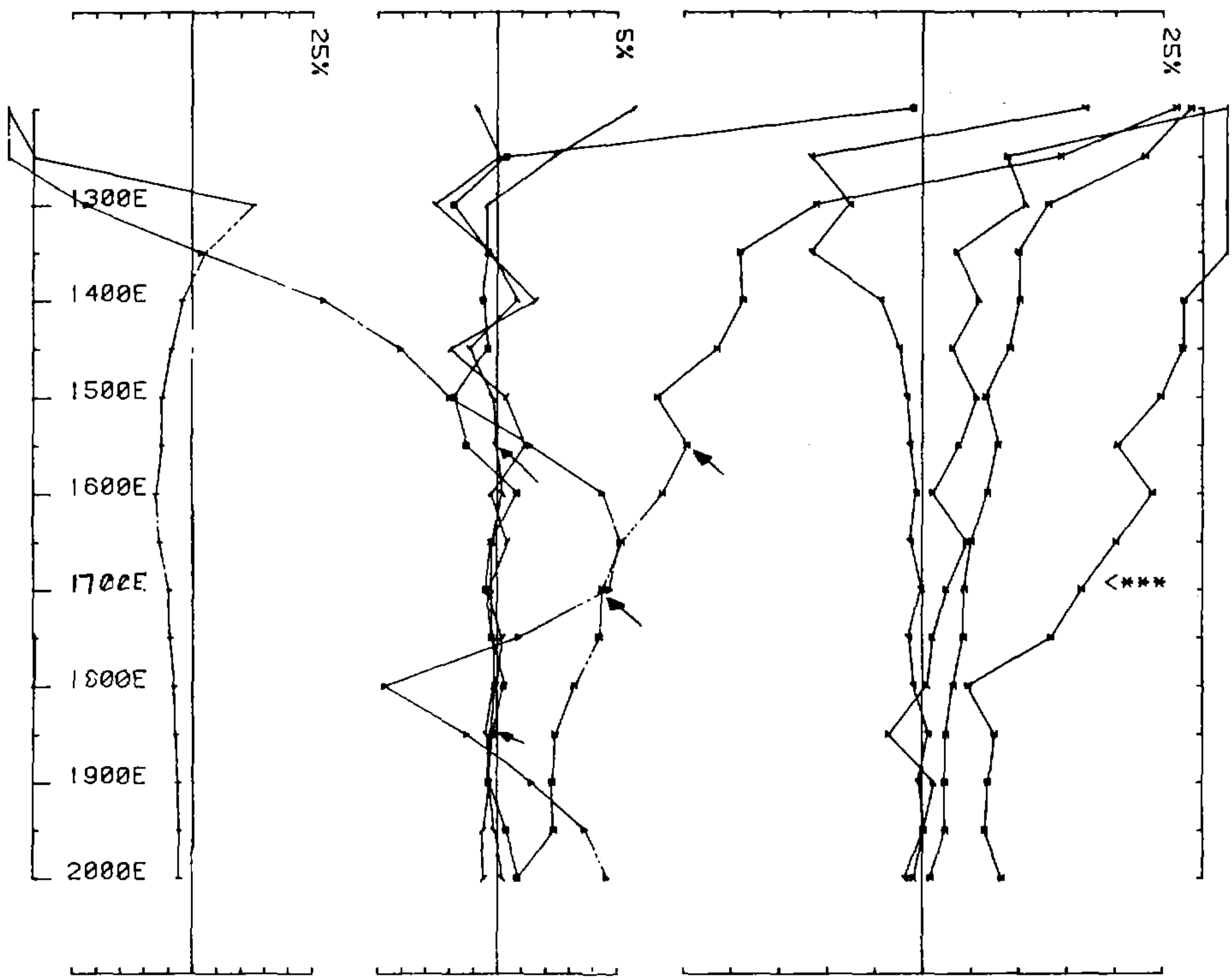



UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX1 line 6900N component Hz secondary field Ch 1 point norm.



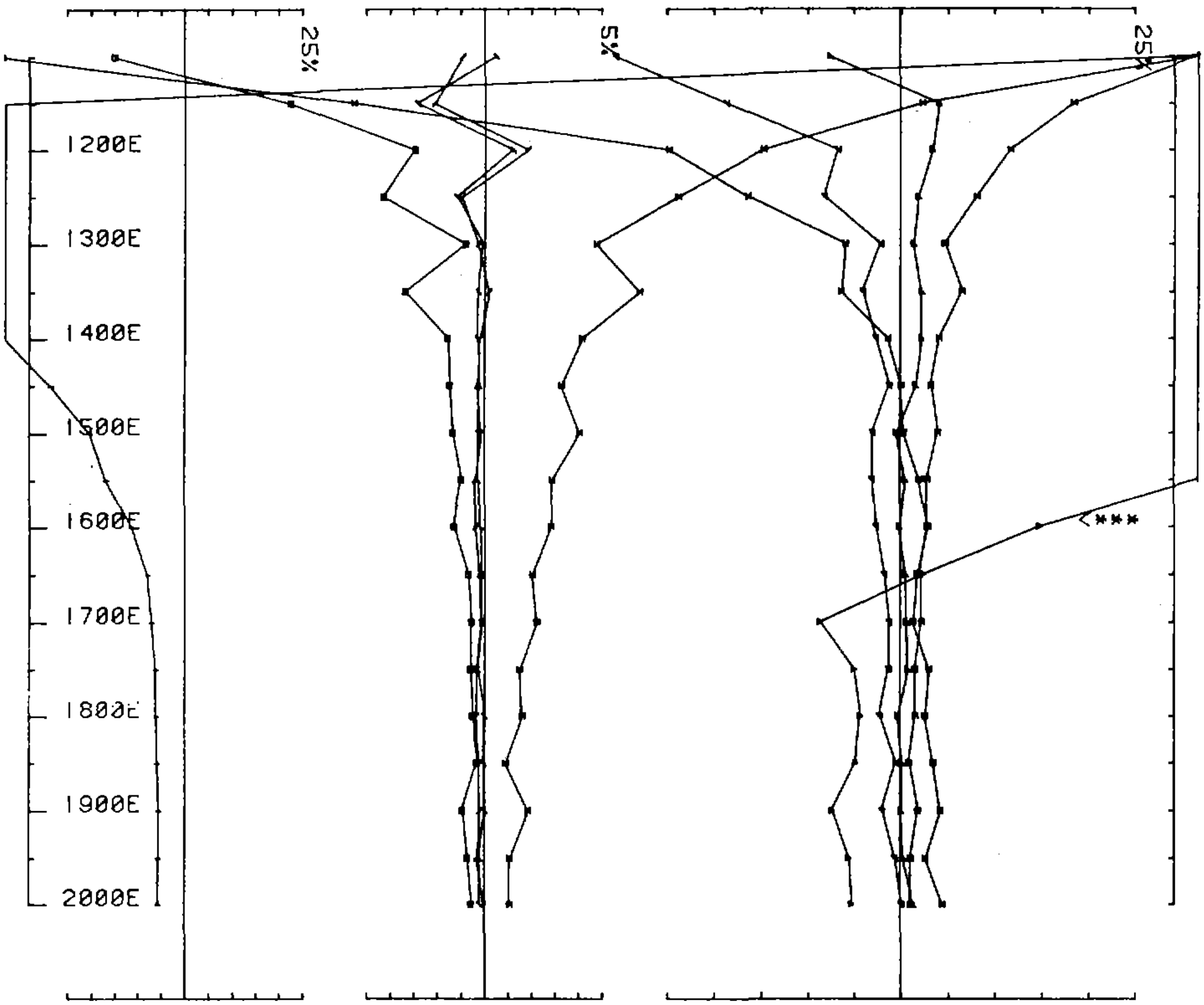

UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX1 line 7100N component Hz secondary field Ch 1 point norm.

510257




UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX1 line 7300N component Hz secondary field Ch 1 point norm.

510258

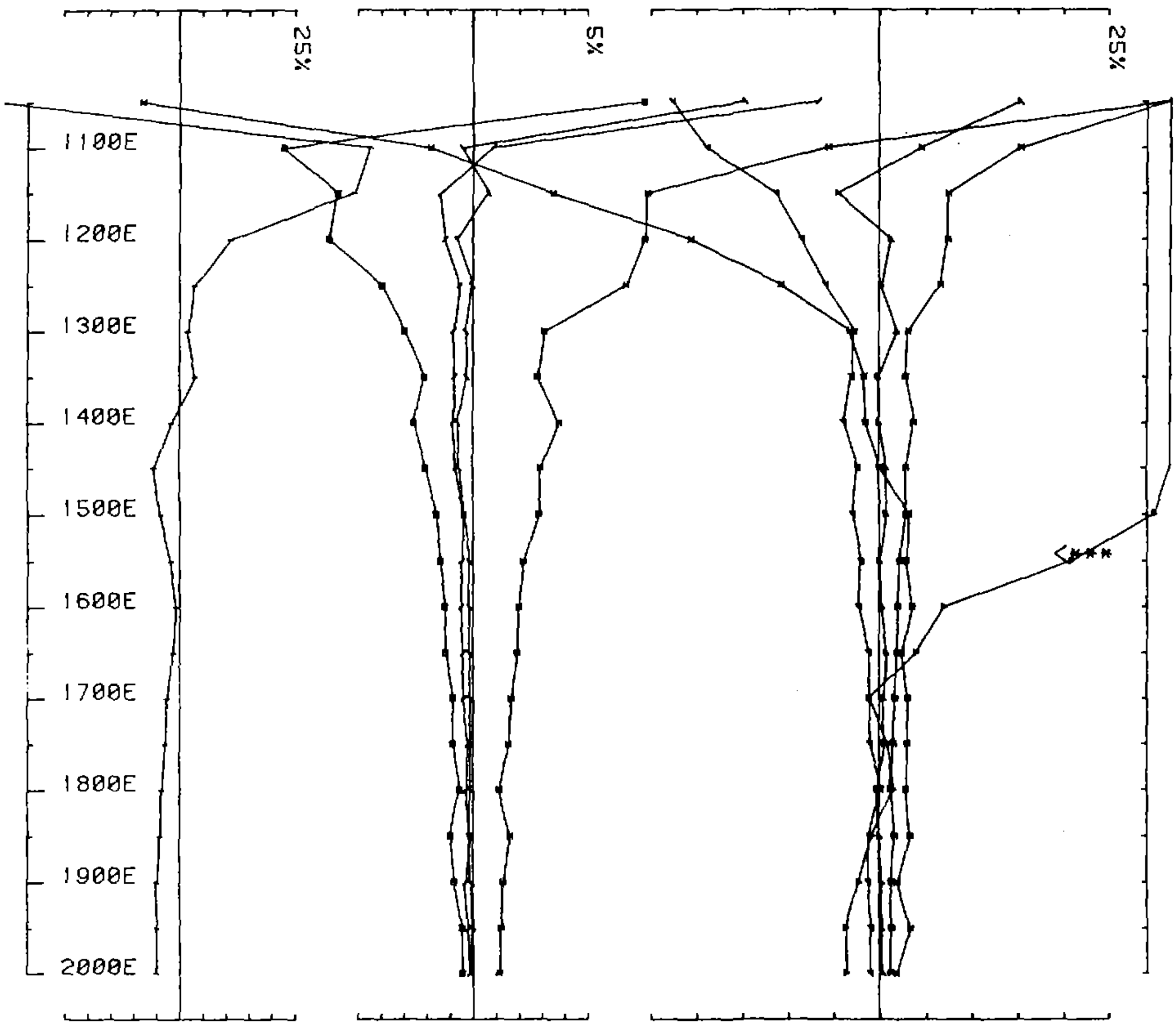



UTEM SURVEY at MOXON SADDLE for BHP

conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989

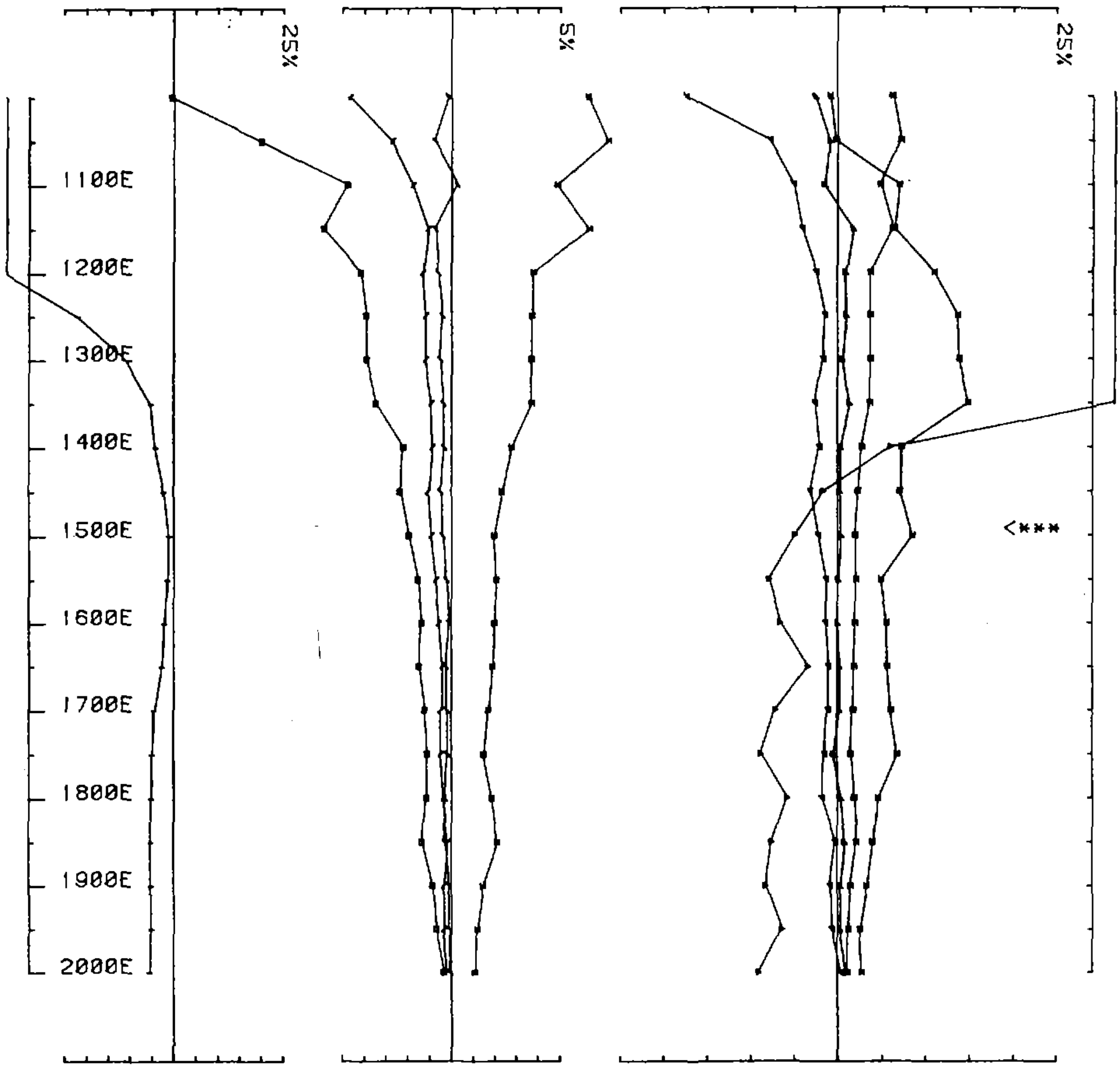
loop no MX1 line 7500N component Hz secondary field Ch 1 point norm.

510259

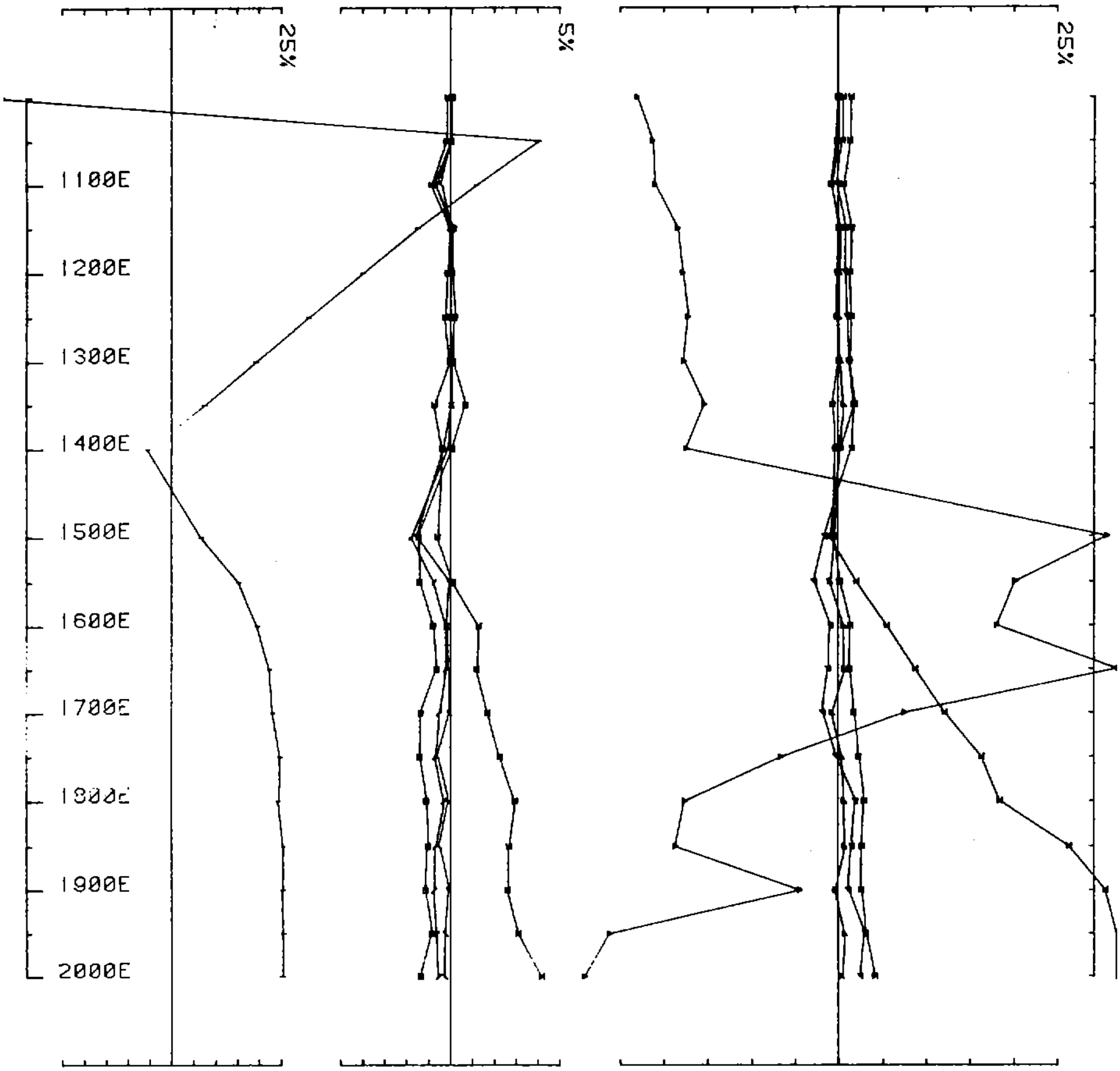



UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX1 line 7700N component Hz secondary field Ch 1 point norm.

510260



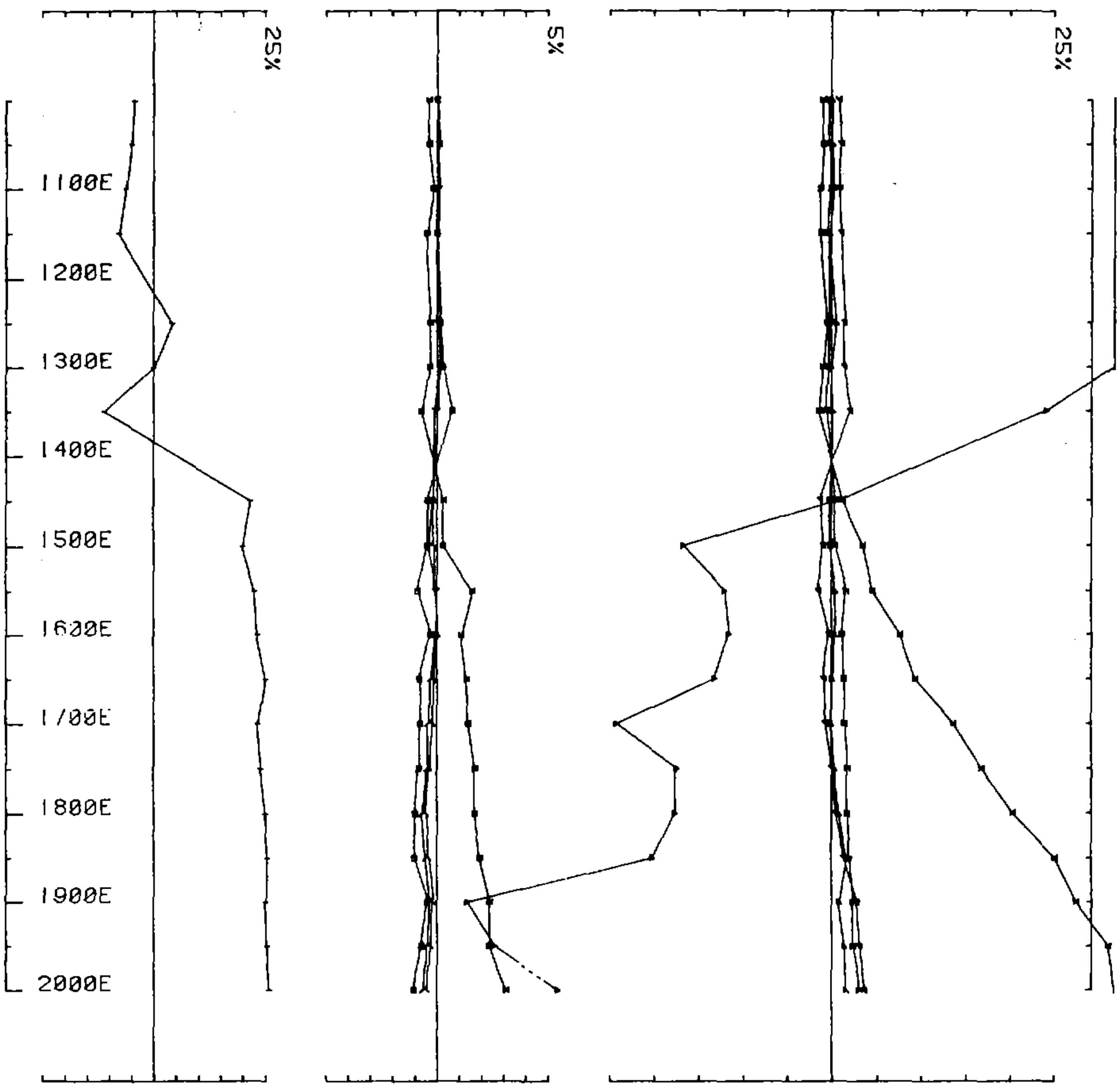

UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX1 line 7900N component Hz secondary field Ch 1 point norm.




UTEM SURVEY at MOXON SADDLE for B H P

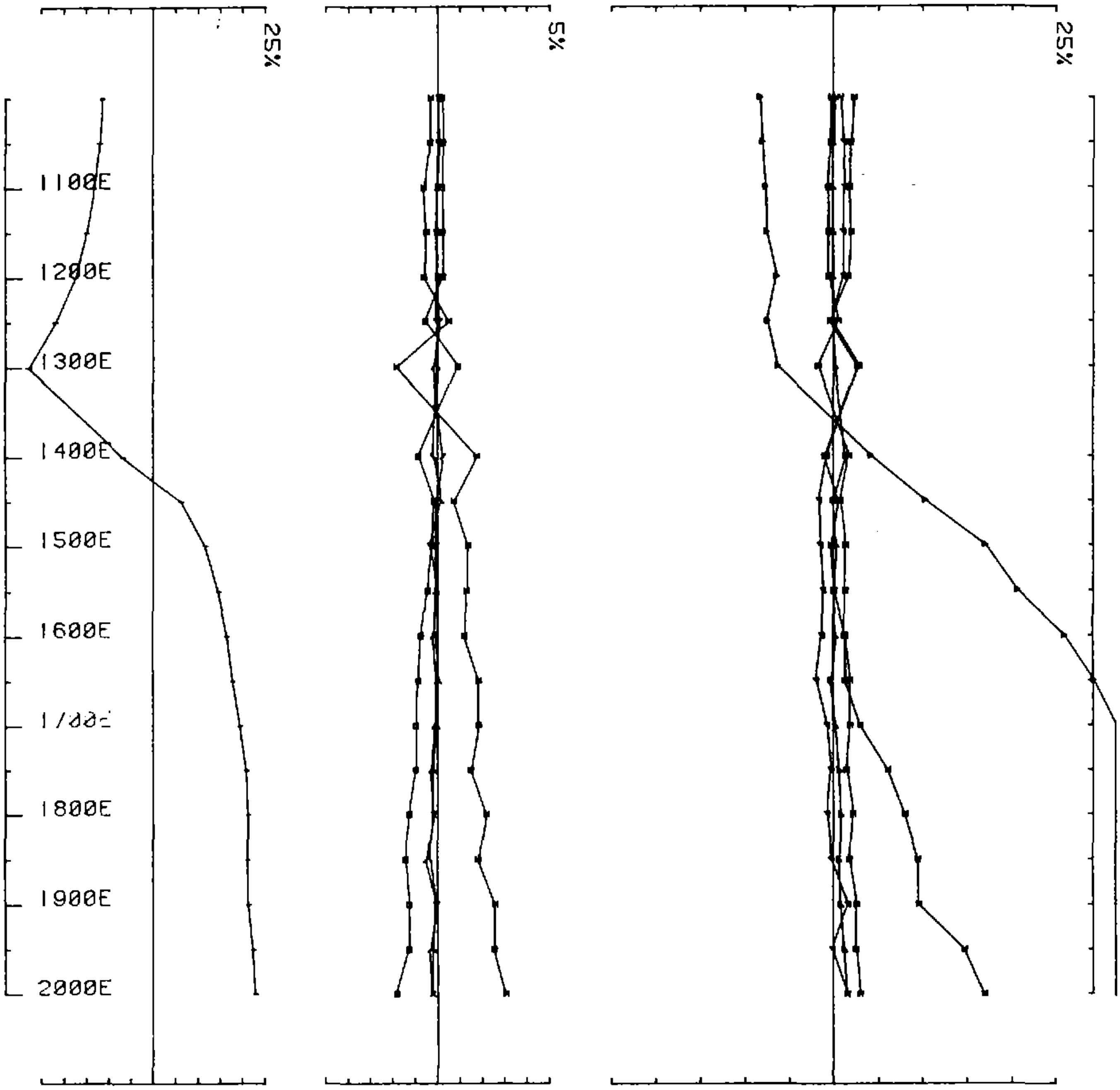
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989

loop no MX2 line 6100N component Hz secondary field Ch I contin. norm.



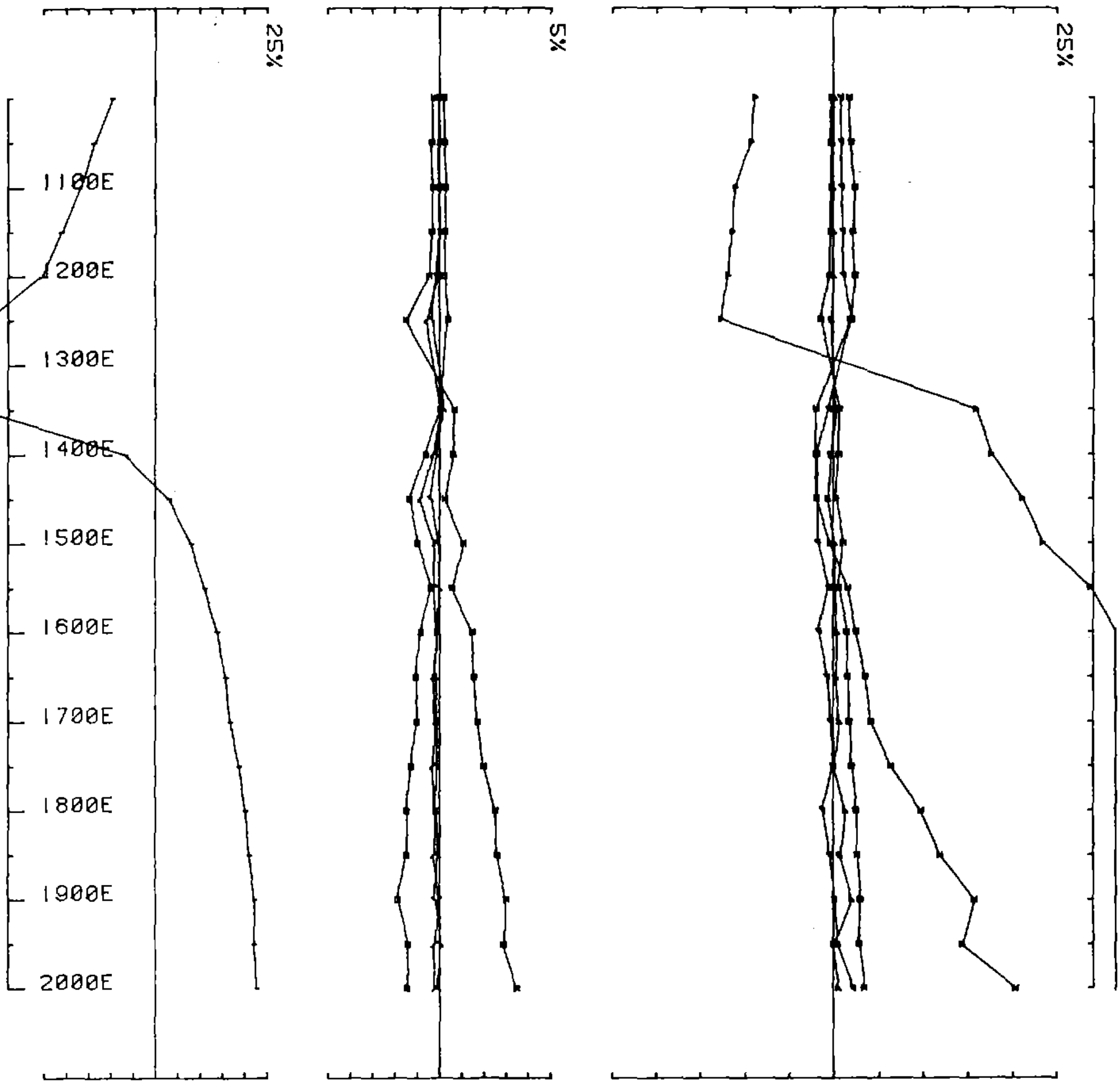

UTEM SURVEY at MOXON SADDLE for B H P
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX2 line 6300N component Hz secondary field Ch 1 contin. norm.

510263



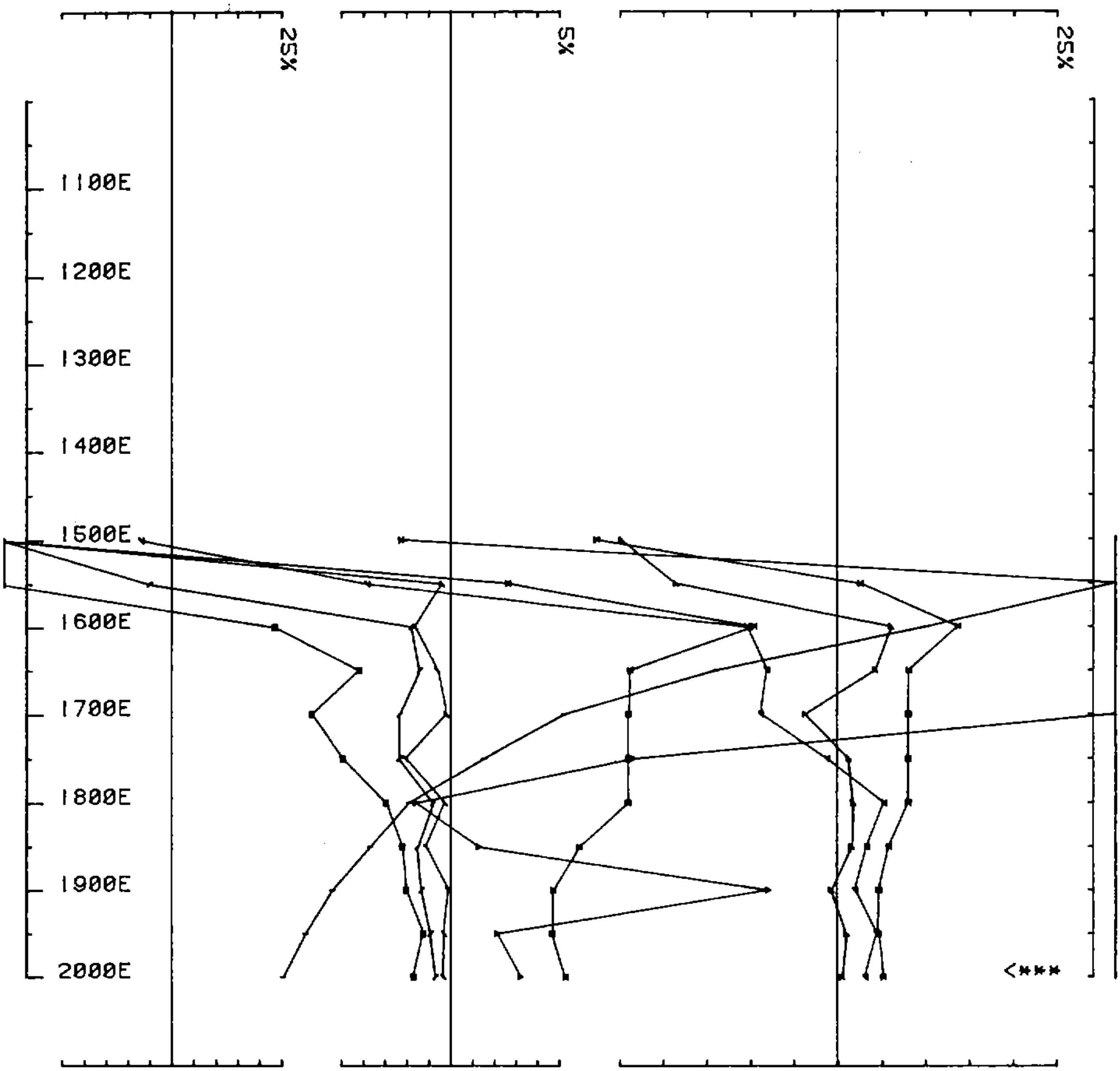

UTEM SURVEY at MOXON SADDLE for B H P
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX2 line 6500N component Hz secondary field Ch 1 contin. norm.

510264



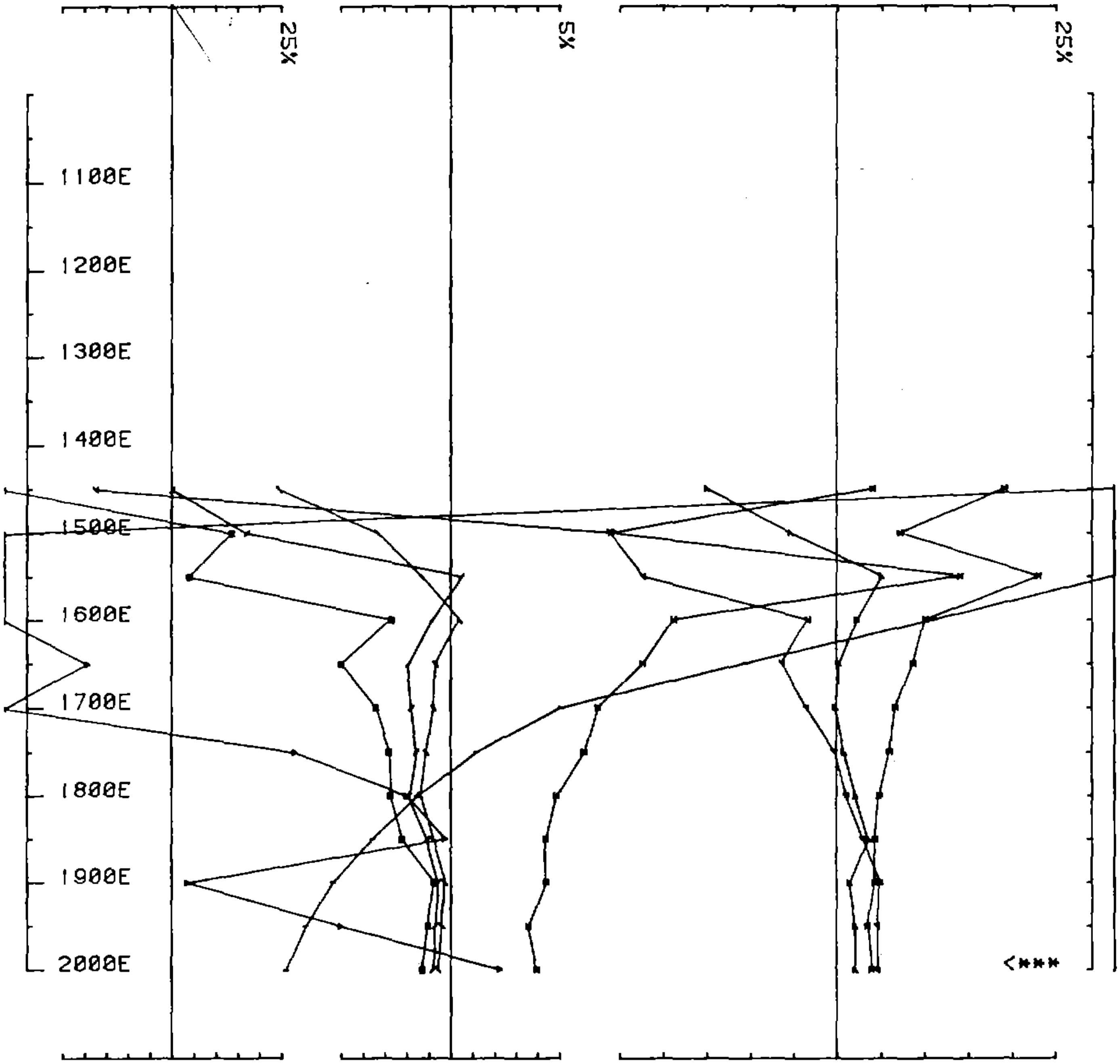

UTEM SURVEY at MOXON SADDLE for B H P
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX2 line 6700N component Hz secondary field Ch I contin. norm.

510265



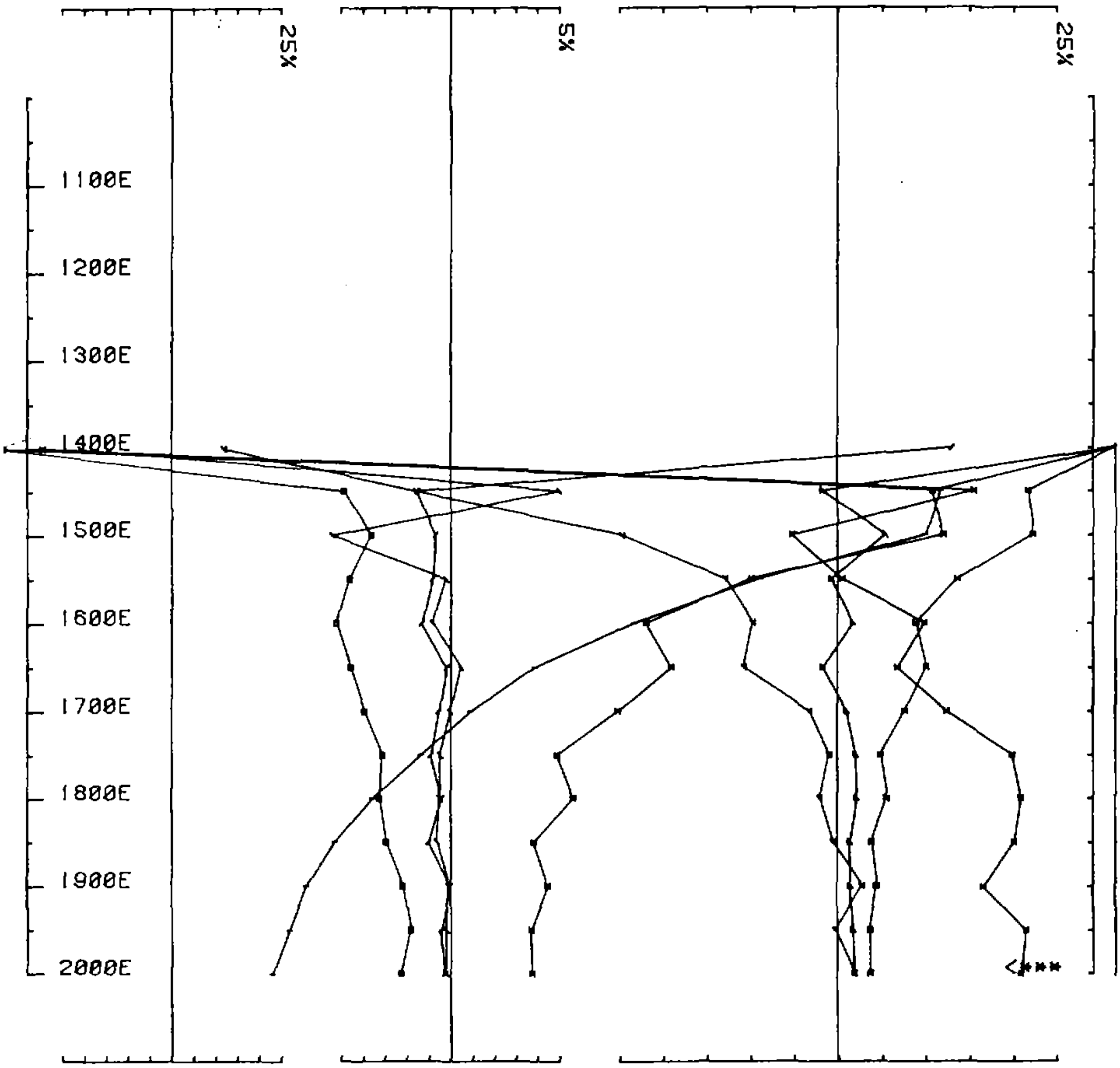

UTEM SURVEY at MOXON SADDLE for B H P
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX2 line 6100N component Hz secondary field Ch 1 point norm.

510266



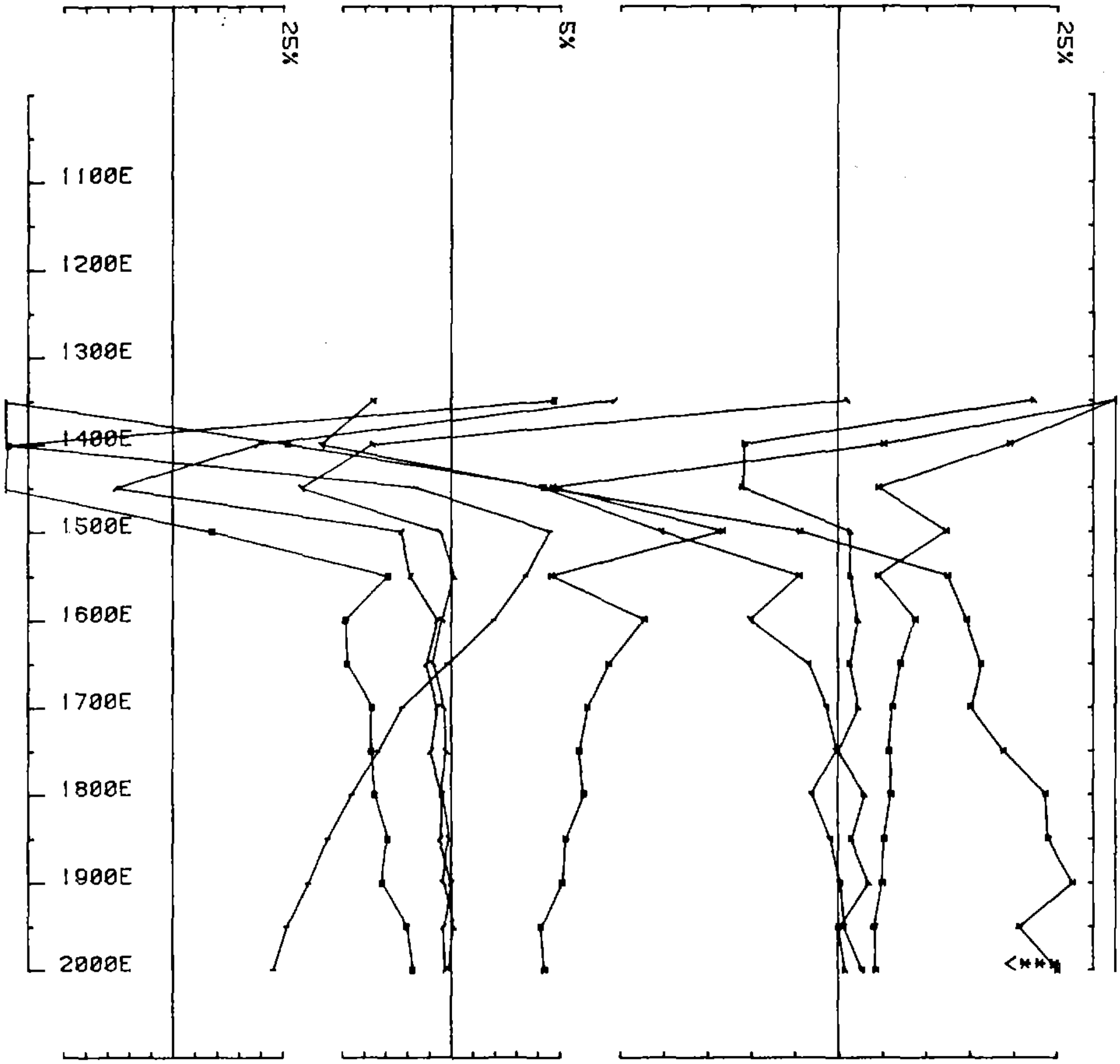

UTEM SURVEY at MOXON SADDLE for B H P
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX2 line 6300N component Hz secondary field Ch 1 point norm.

510267




UTEM SURVEY at MOXON SADDLE for B H P
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no 7202 line 6500N component Hz secondary field Ch 1 point norm.

510268

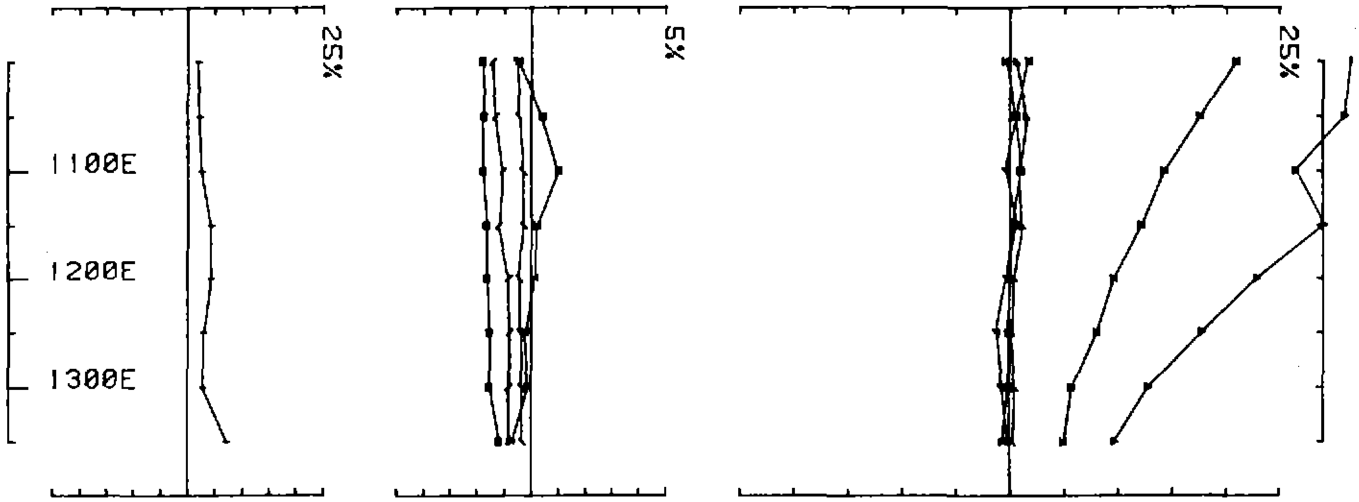



UTEM SURVEY at MOXON SADDLE for B H P

conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989

loop no MX2 line 6700N component Hz secondary field Ch 1 point norm.

510269

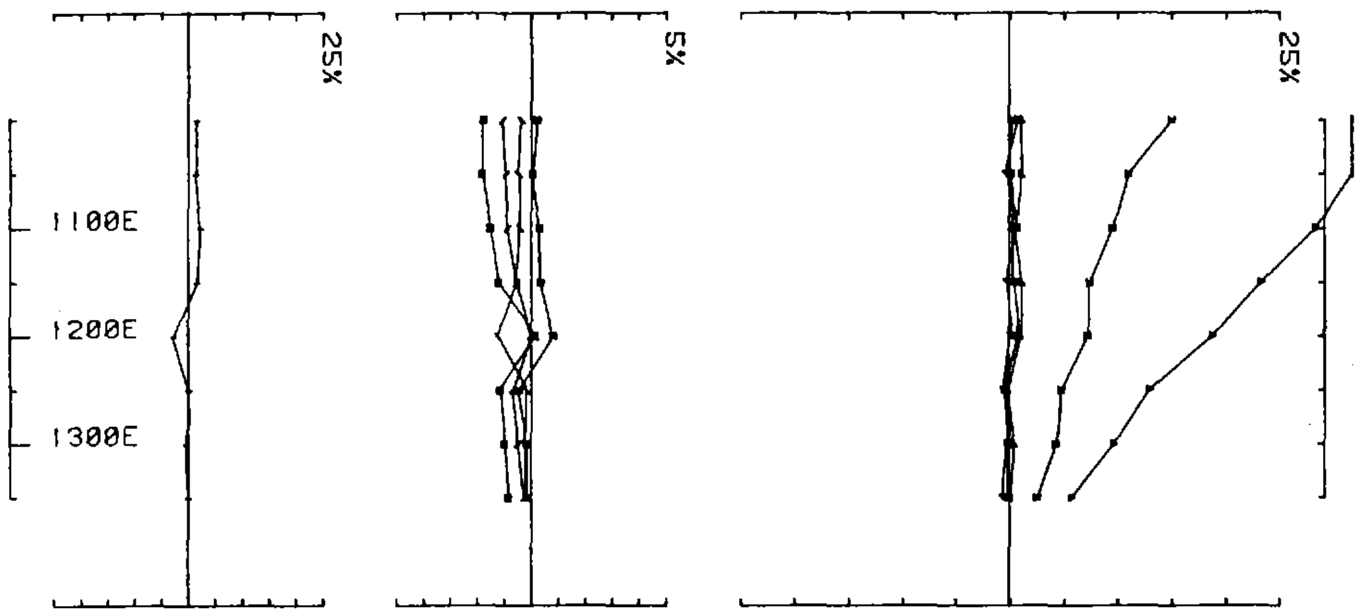



UTEM SURVEY at MOXON SADDLE for BHP

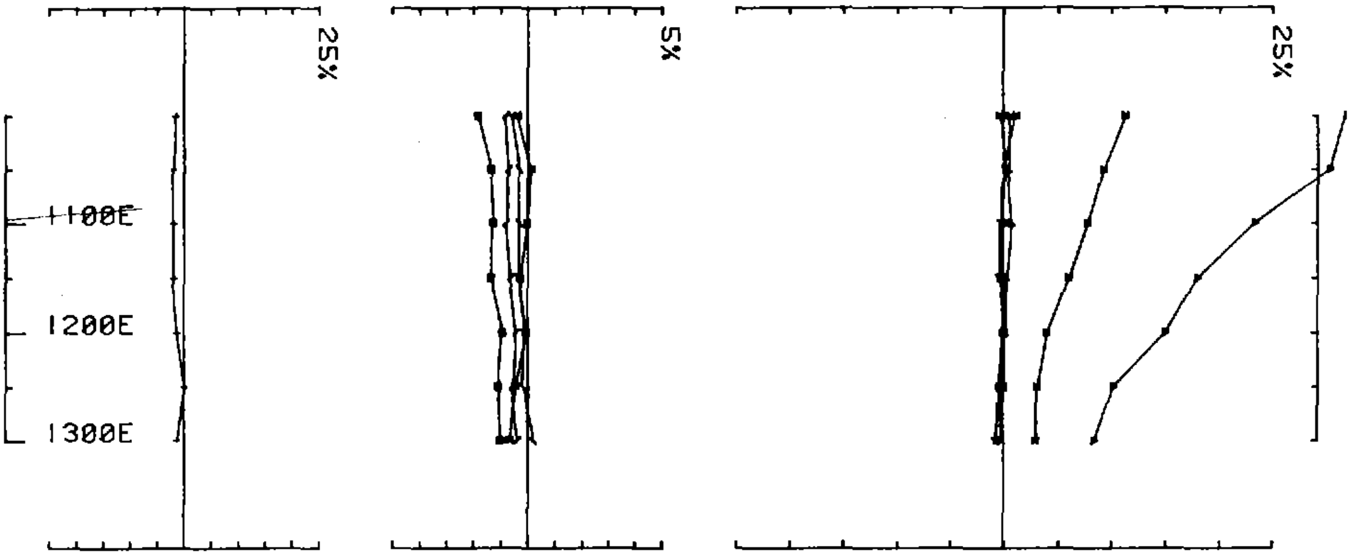
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989

loop no MX3 line 6100N component Hz secondary field Ch 1 contin. norm.

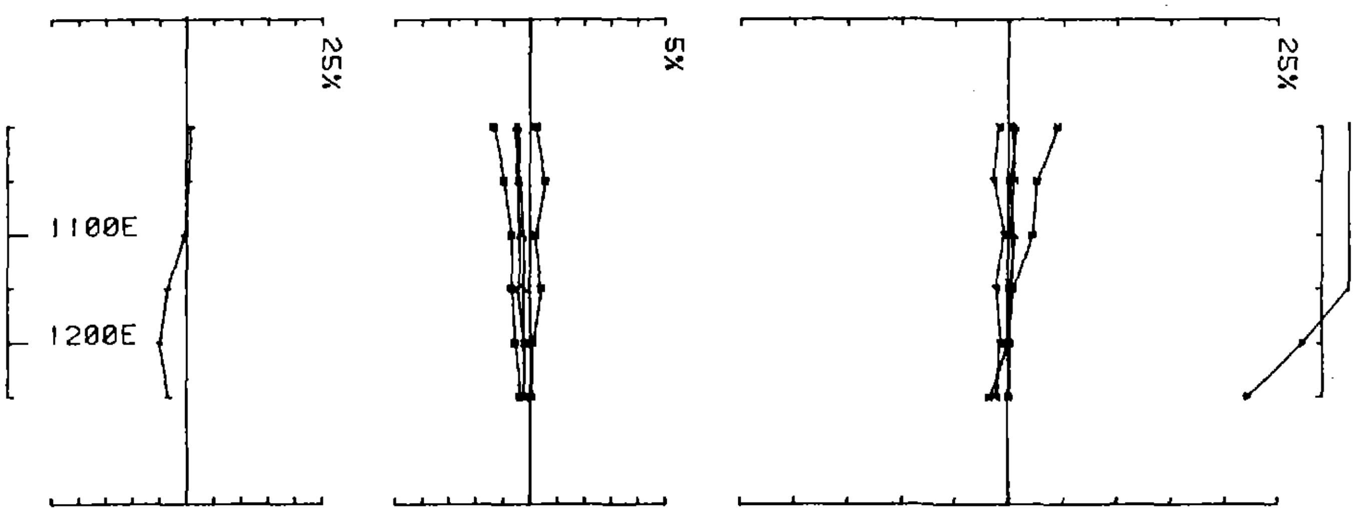
510270



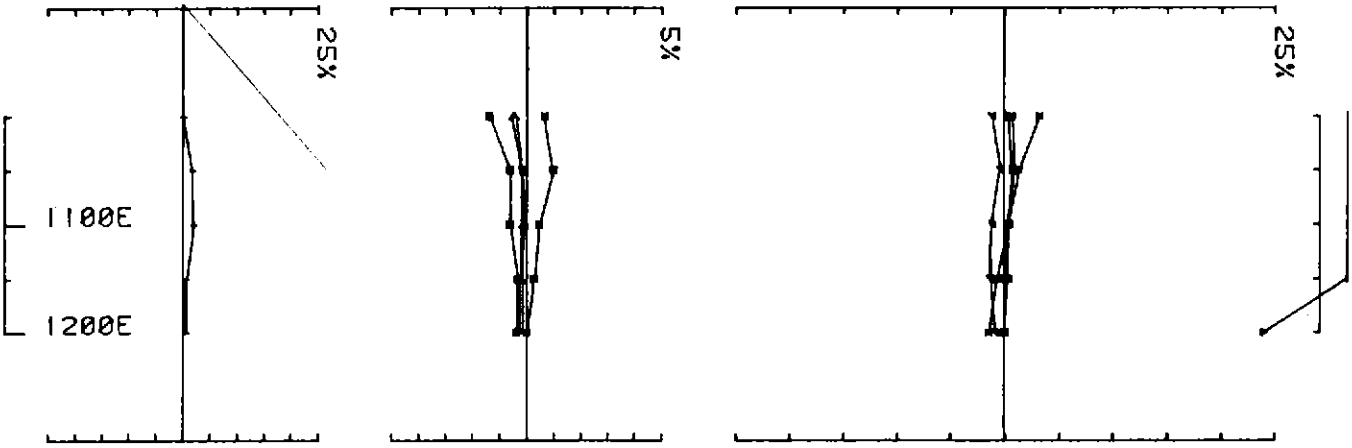

UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX3 line 6300N component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX3 line 6500N component Hz secondary field Ch 1 contin. norm.

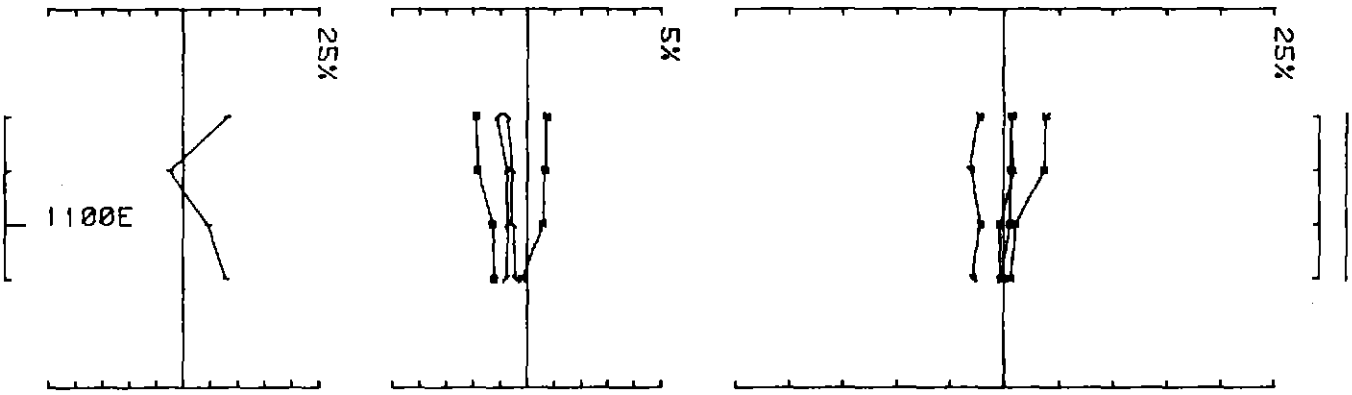



UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX3 line 6700N component Hz secondary field Ch 1 contin. norm.




UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX3 line 6900N component Hz secondary field Ch 1 contin. norm.

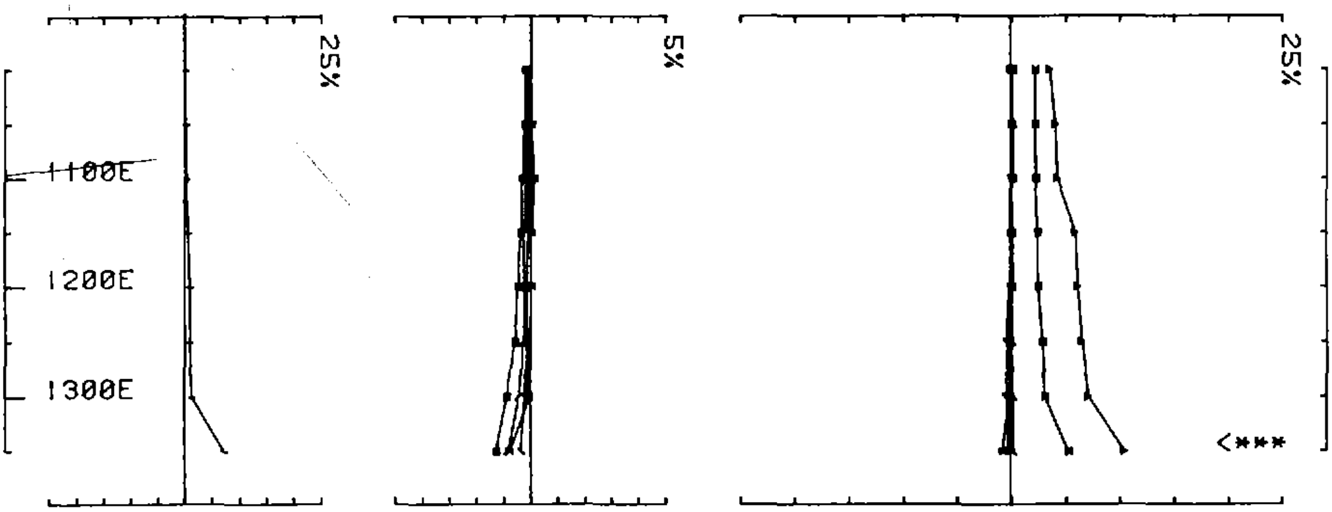
510274



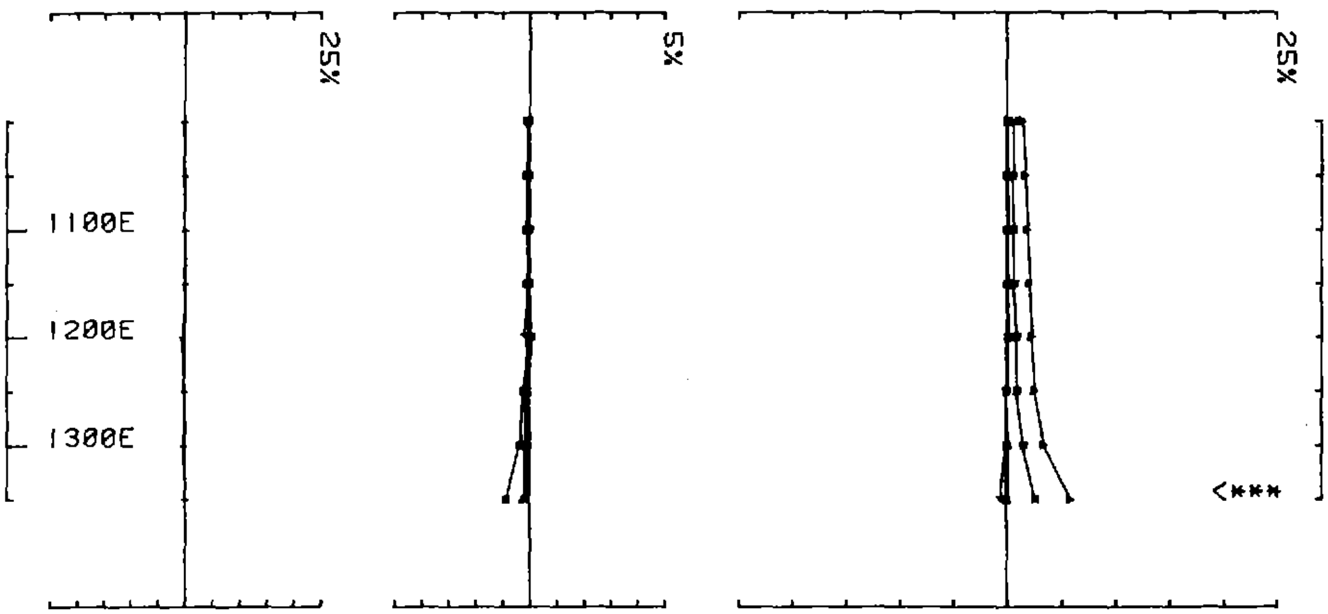

UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL Job 8972 base freq (hz) 26.230 Nov 1989
loop no MX3 line 7100N component Hz secondary field Ch 1 contin. norm.

263

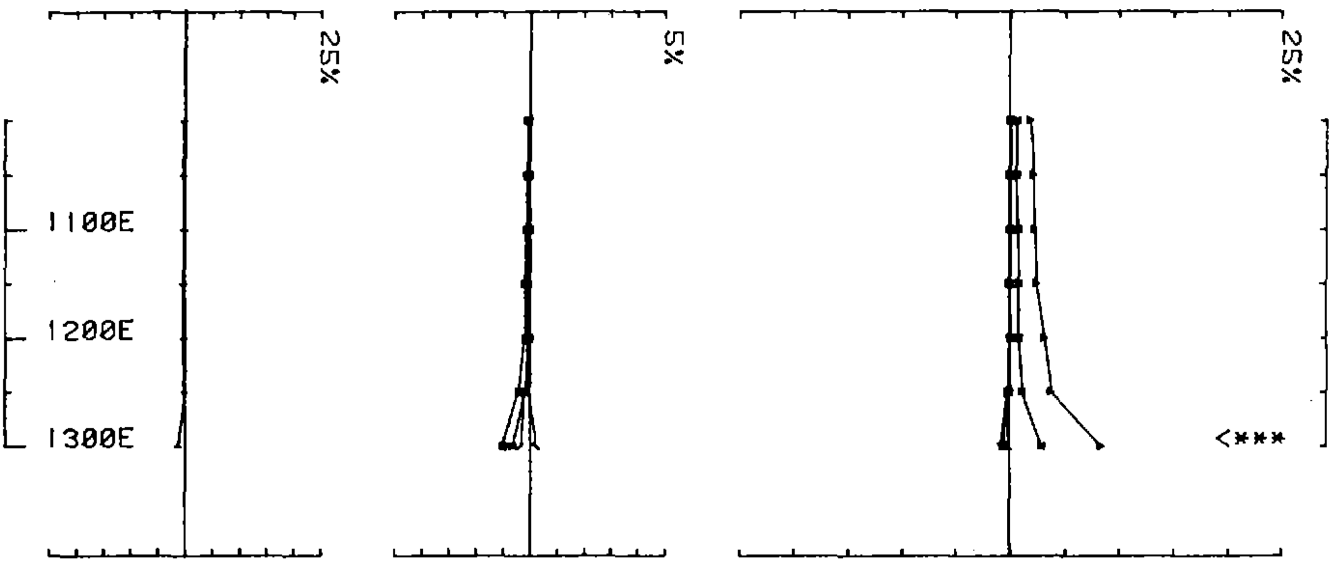
510275




UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX3 line 6100N component Hz secondary field Ch 1 point norm.

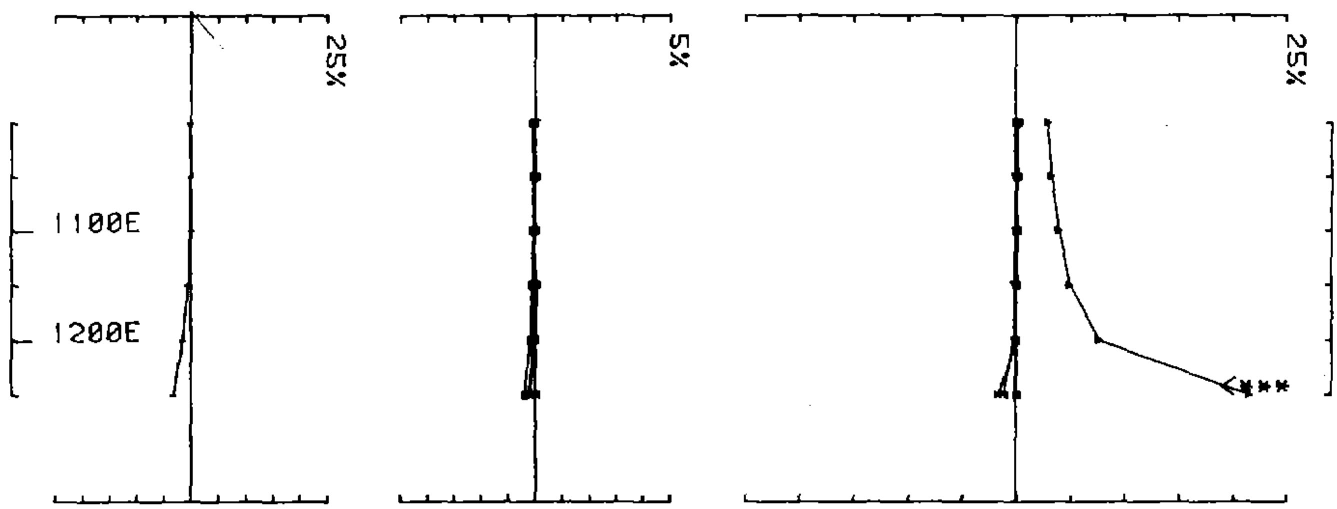



UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX3 line 6300N component Hz secondary field Ch 1 point norm.




UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX3 line 6500N component Hz secondary field Ch 1 point norm.

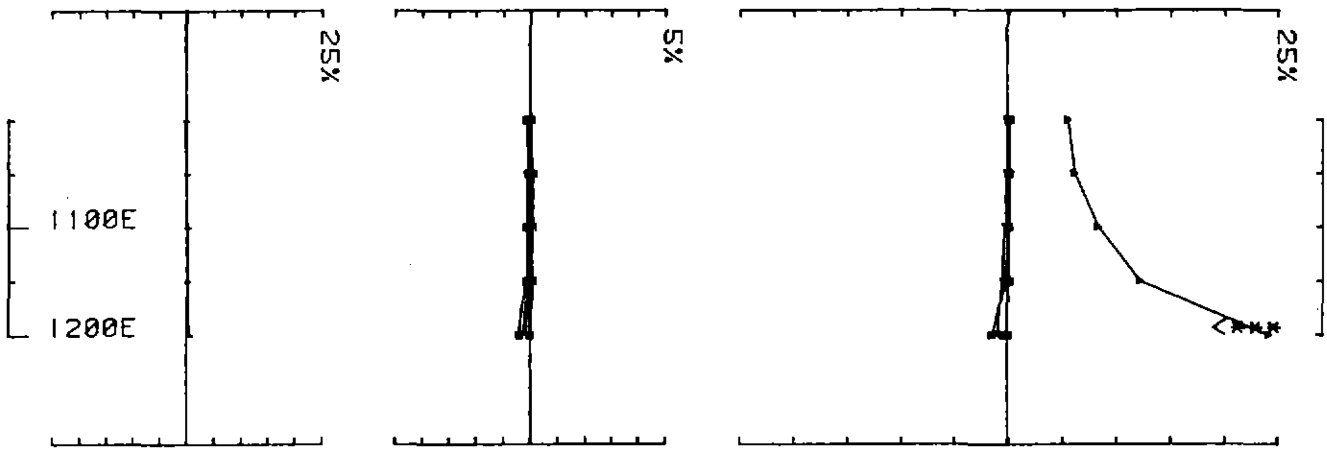
510278




UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL job 8972 base freq (hz) 26.230 Nov 1989
loop no MX3 line 6700N component Hz secondary field Ch 1 point norm.

267

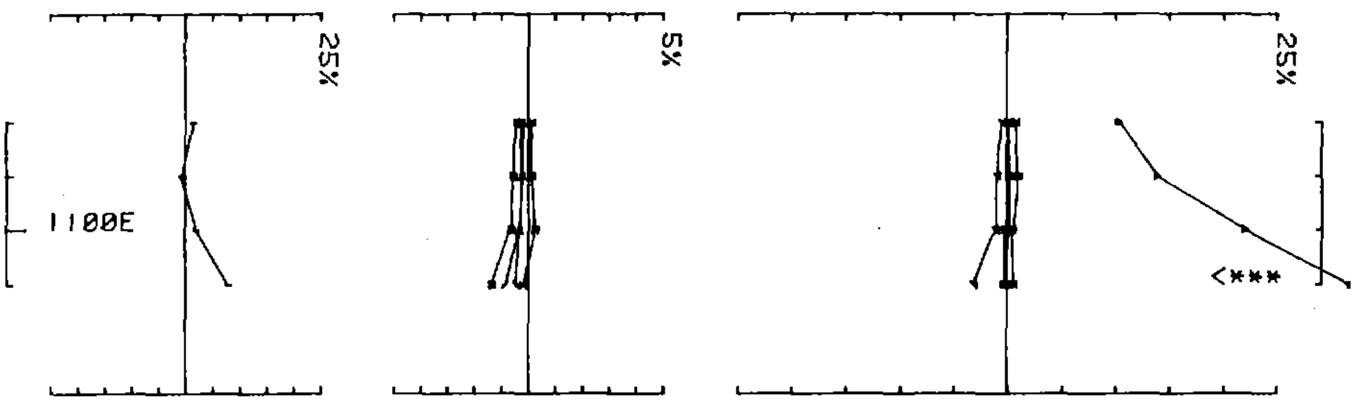
510279




UTEM SURVEY at MOXON SADDLE for BHP

conducted by TM ST RL  job 8972  base freq (hz) 26.230  Nov 1989

loop no 7203  line 6900N  component Hz  secondary field  Ch 1  point norm.

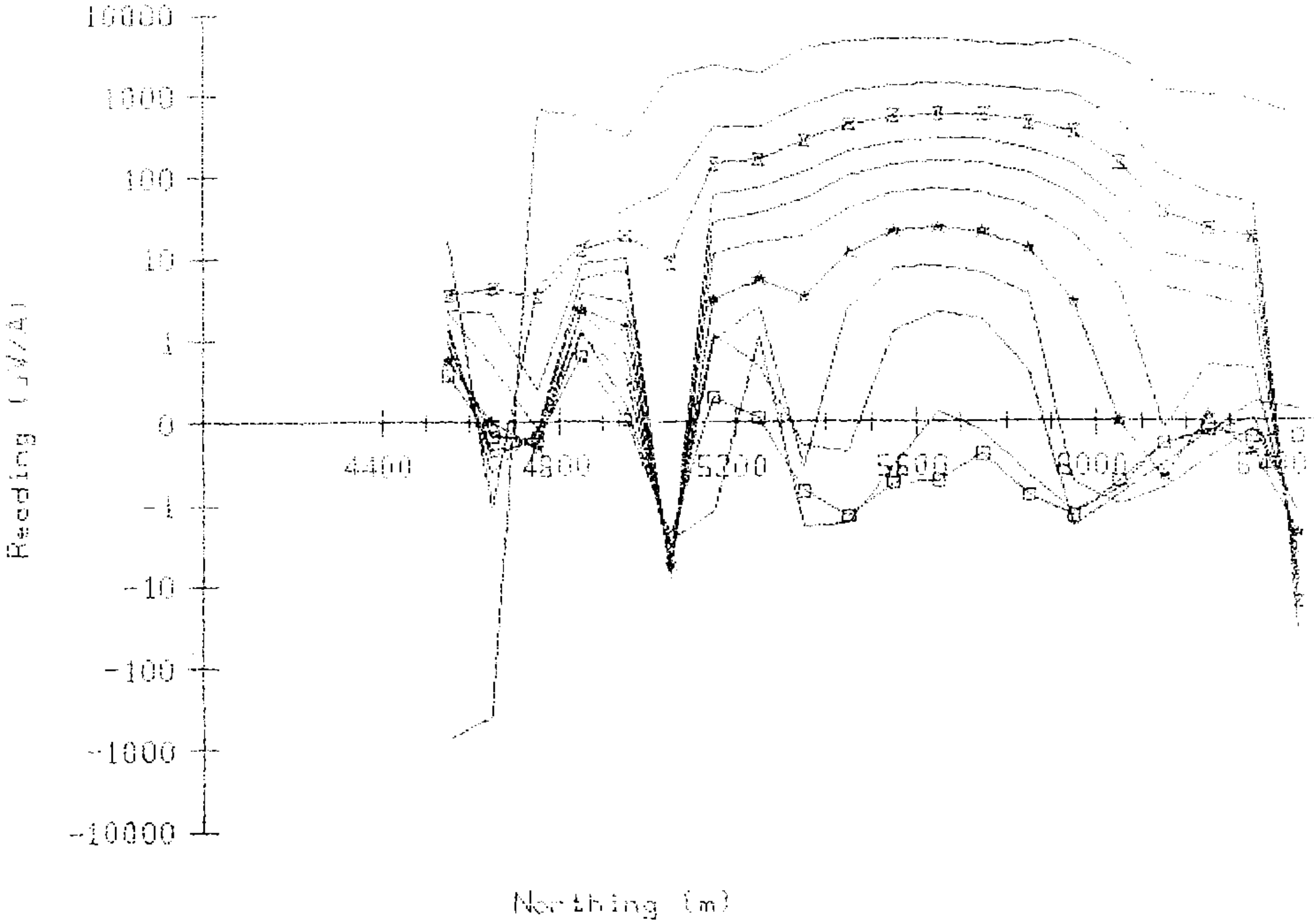



UTEM SURVEY at MOXON SADDLE for BHP
conducted by TM ST RL  job 8972  base freq (hz) 26.230  Nov 1989
loop no MX3  line 7100N  component Hz  secondary field  Ch 1  point norm.

# APPENDIX 4

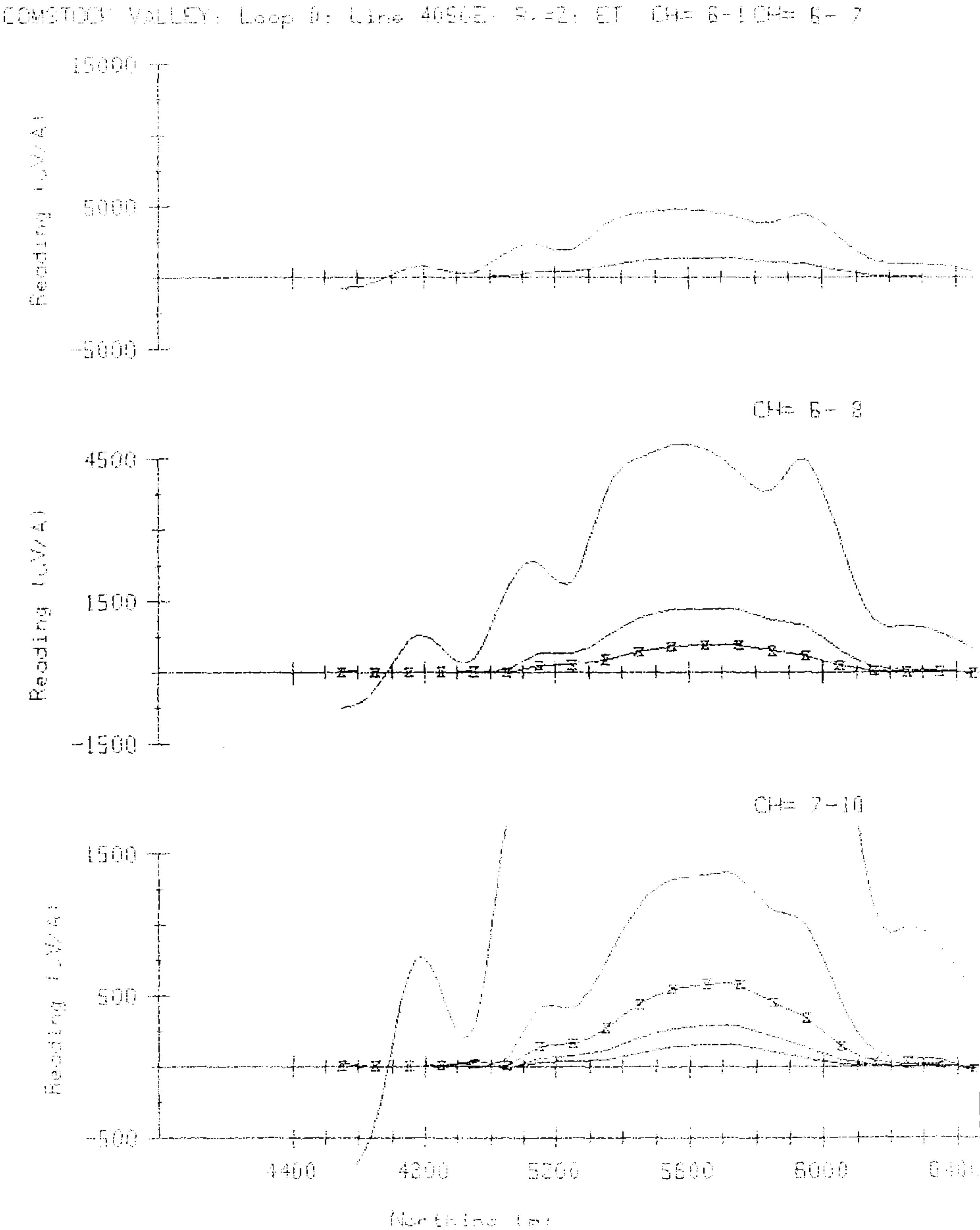
Sirotem Data

COMSTOCK VALLEY: Loop 0: Line 4050E: R.+Z: ET CH= 6-16

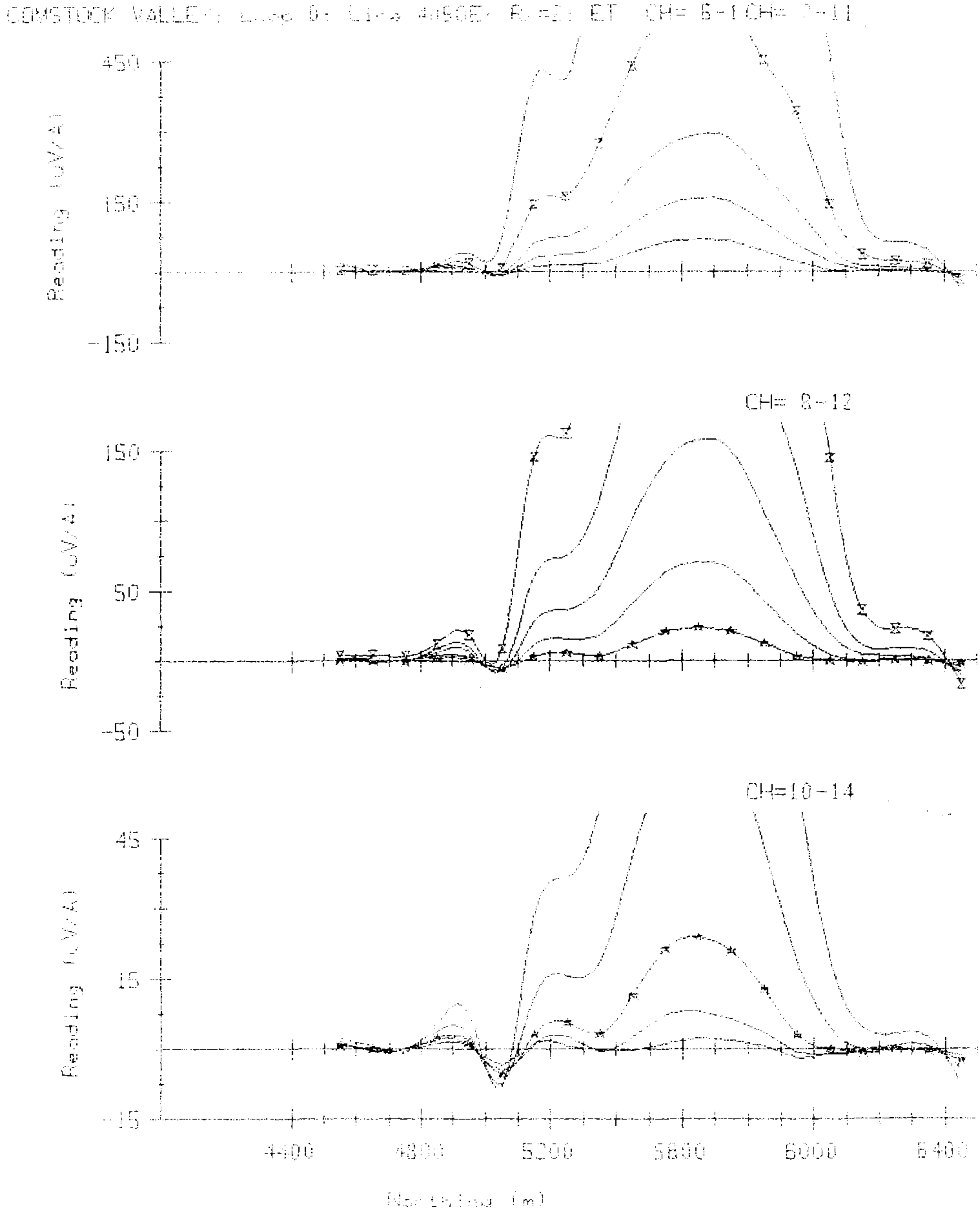


2?1

510283

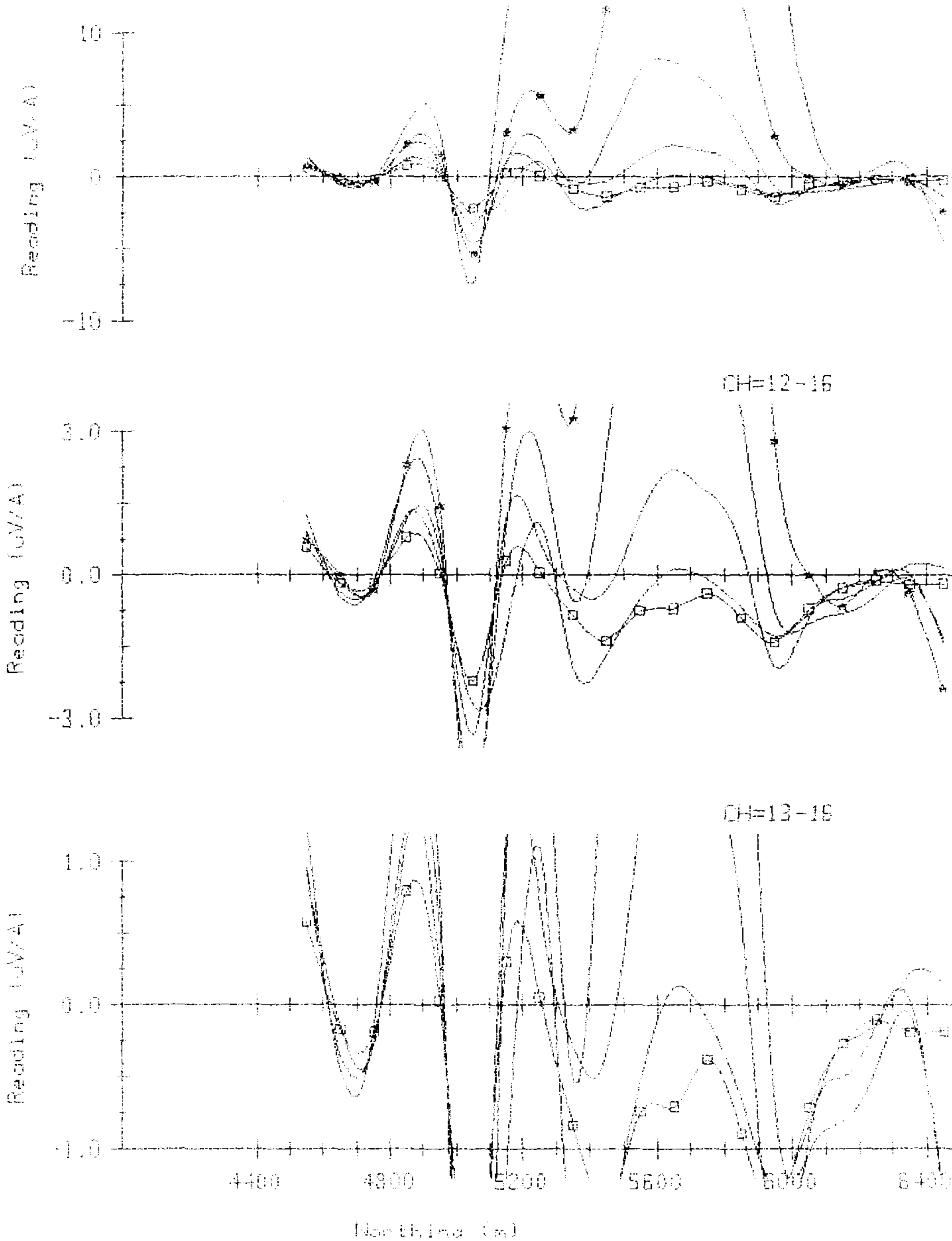


COMSTOCK VALLEY: Loop 8: Line 4050E R.=2: ET CH= 6-1 CH= 6- 7
15000
5000
-5000
Reading (uV/A)
CH= 6- 8
4500
1500
-1500
Reading (uV/A)
CH= 7-10
1500
500
-500
Reading (uV/A)
4400
4800
5200
5600
6000
640
Northing (m)

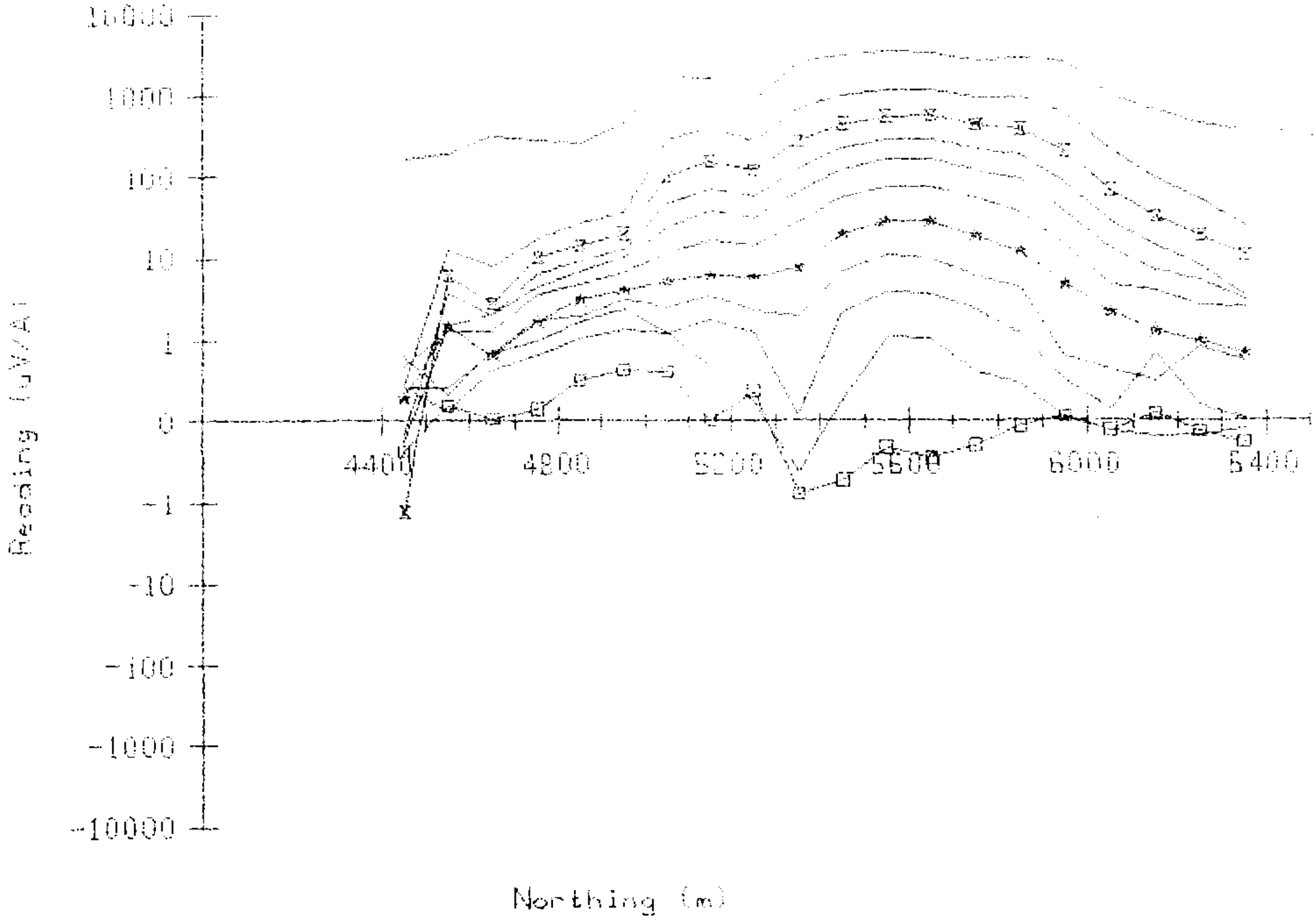

COMSTOCK VALLE
450
150
-150
Reading
CH= 8-12
150
50
-50
Reading
CH=10-14
45
15
-15
Reading
4400
4800
5200
5600
6000
6400
Northing (m)

510285

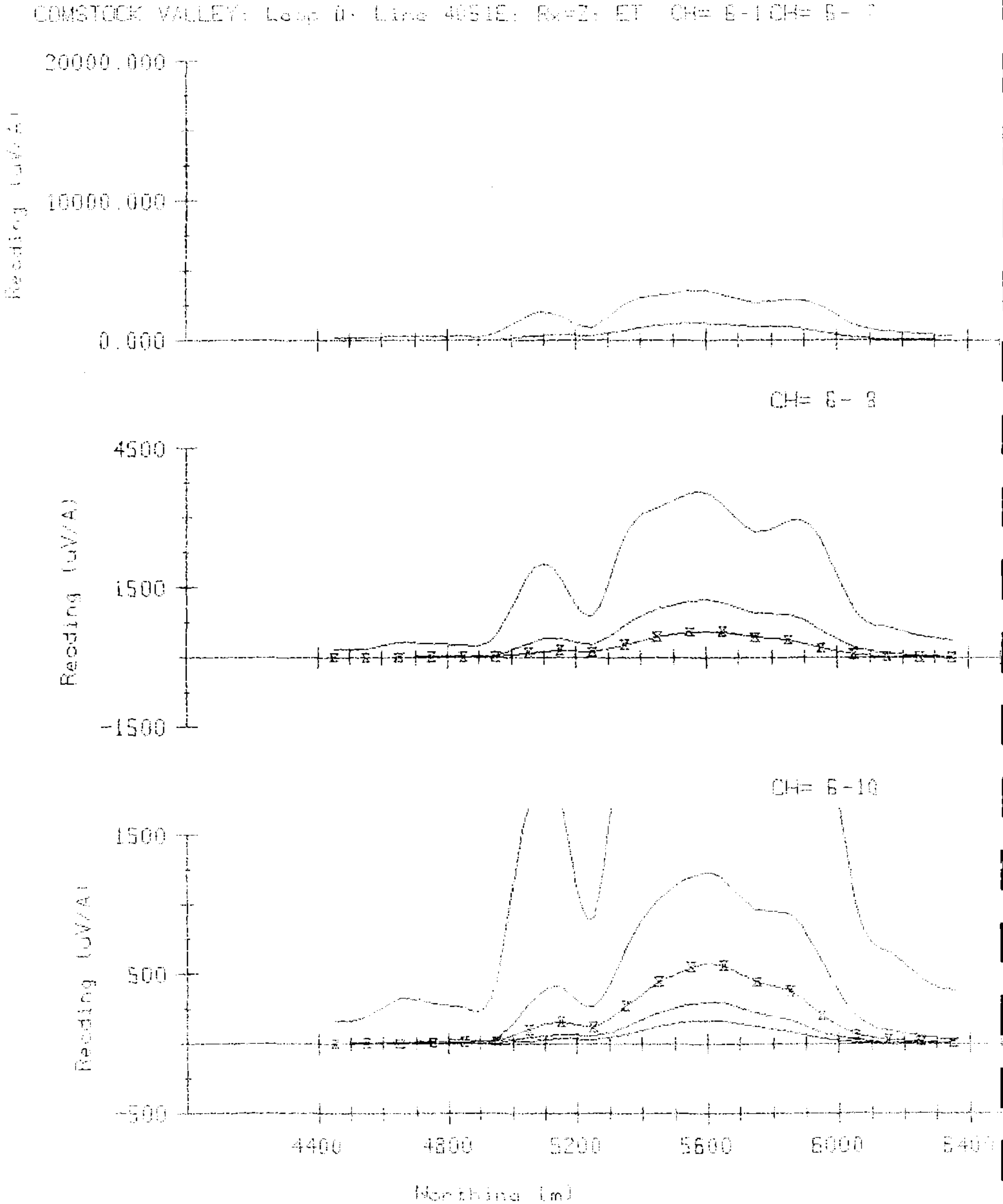
COMSTOCK VALLEY: Loop 0: Line 4050E: Rx=Z: ET CH= 6-1 CH=11-16



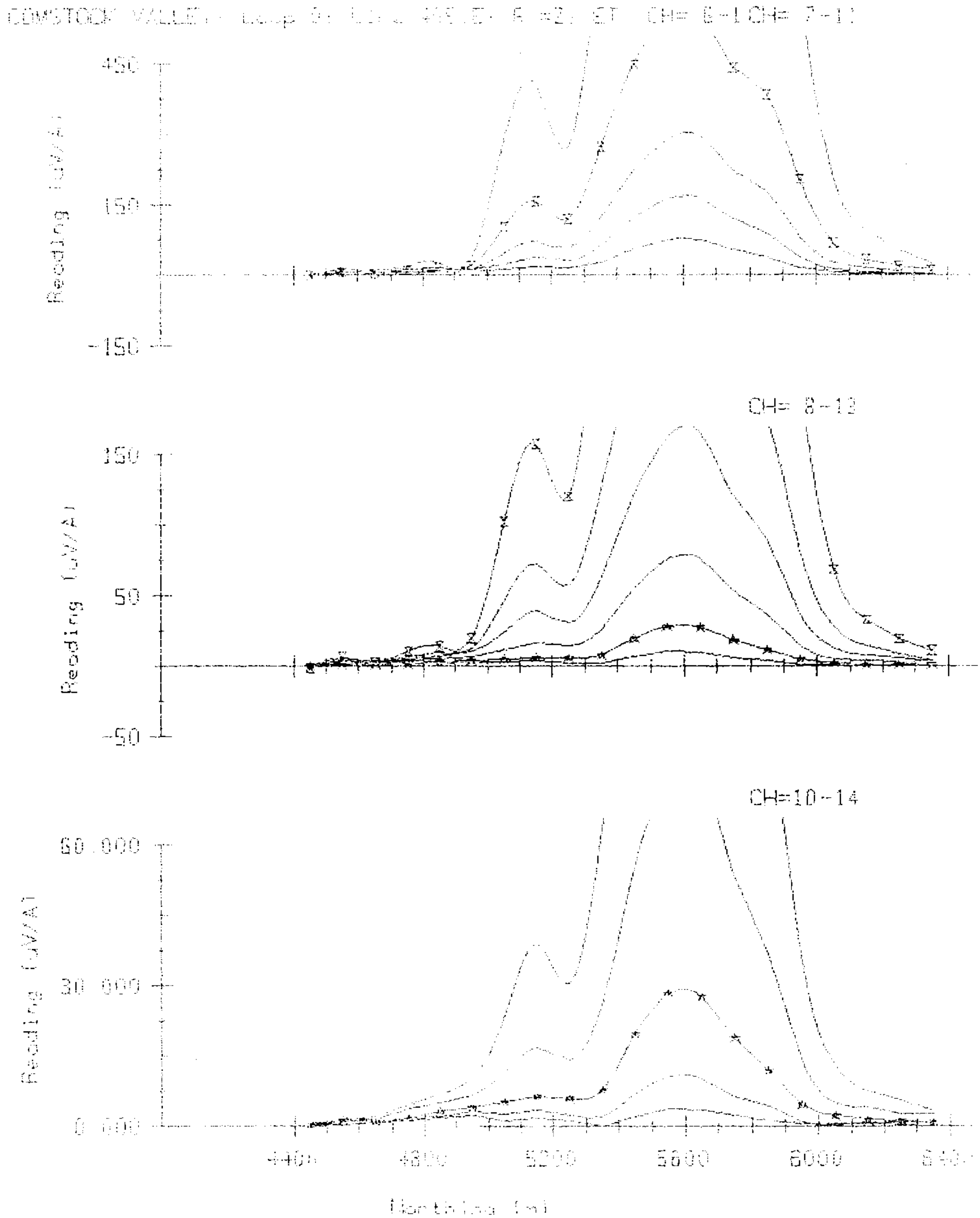
COMSTOCK VALLEY: Loop 0: Line 4051E: P=2: ET CH= 6-15



510287

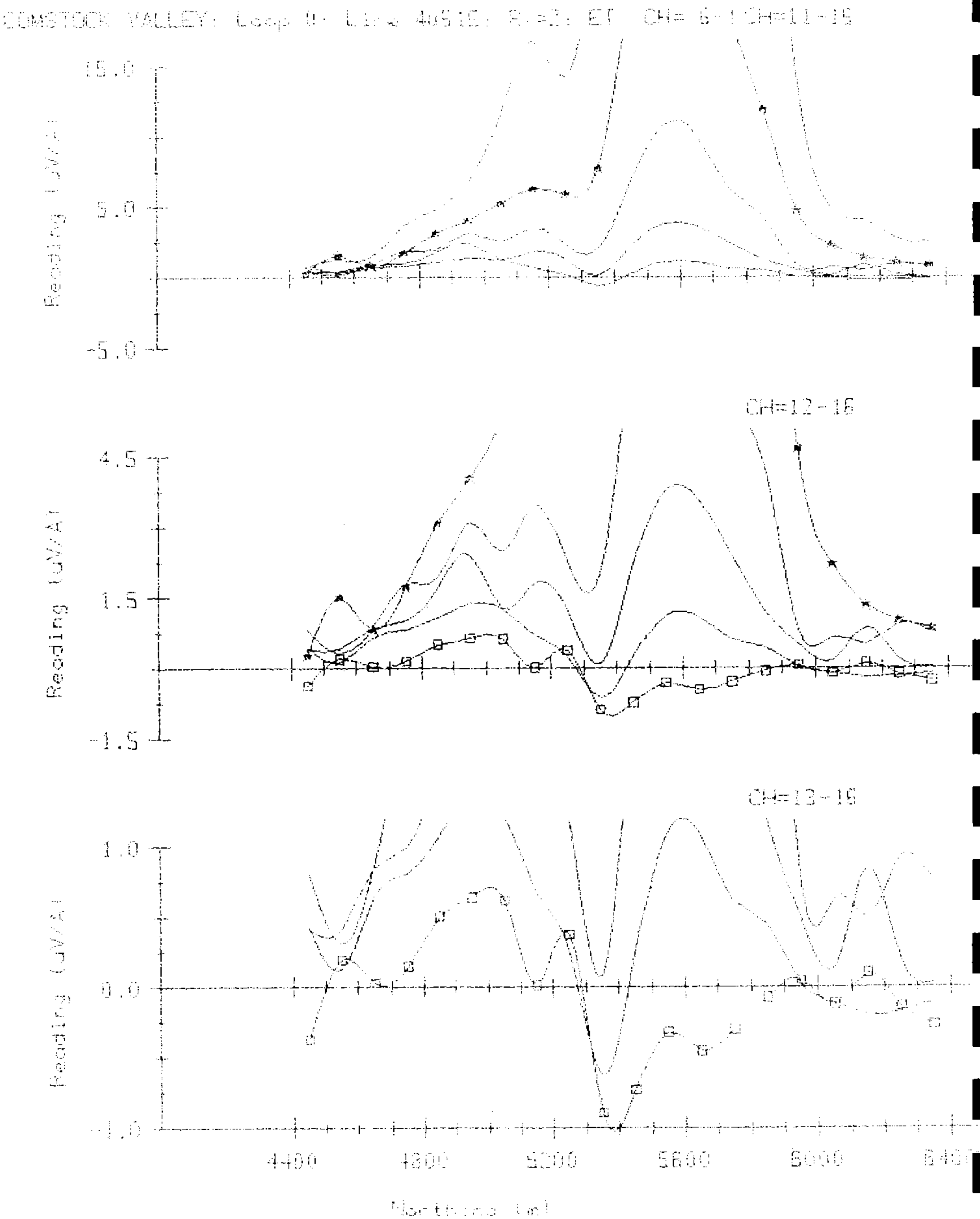

COMSTOCK VALLEY: Loop 0: Line 4051E: Rx=Z: ET CH= 6-1 CH= 6-7
20000.000
10000.000
0.000
Reading (uV/A)
CH= 6-8
4500
1500
-1500
Reading (uV/A)
CH= 6-10
1500
500
-500
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

510288



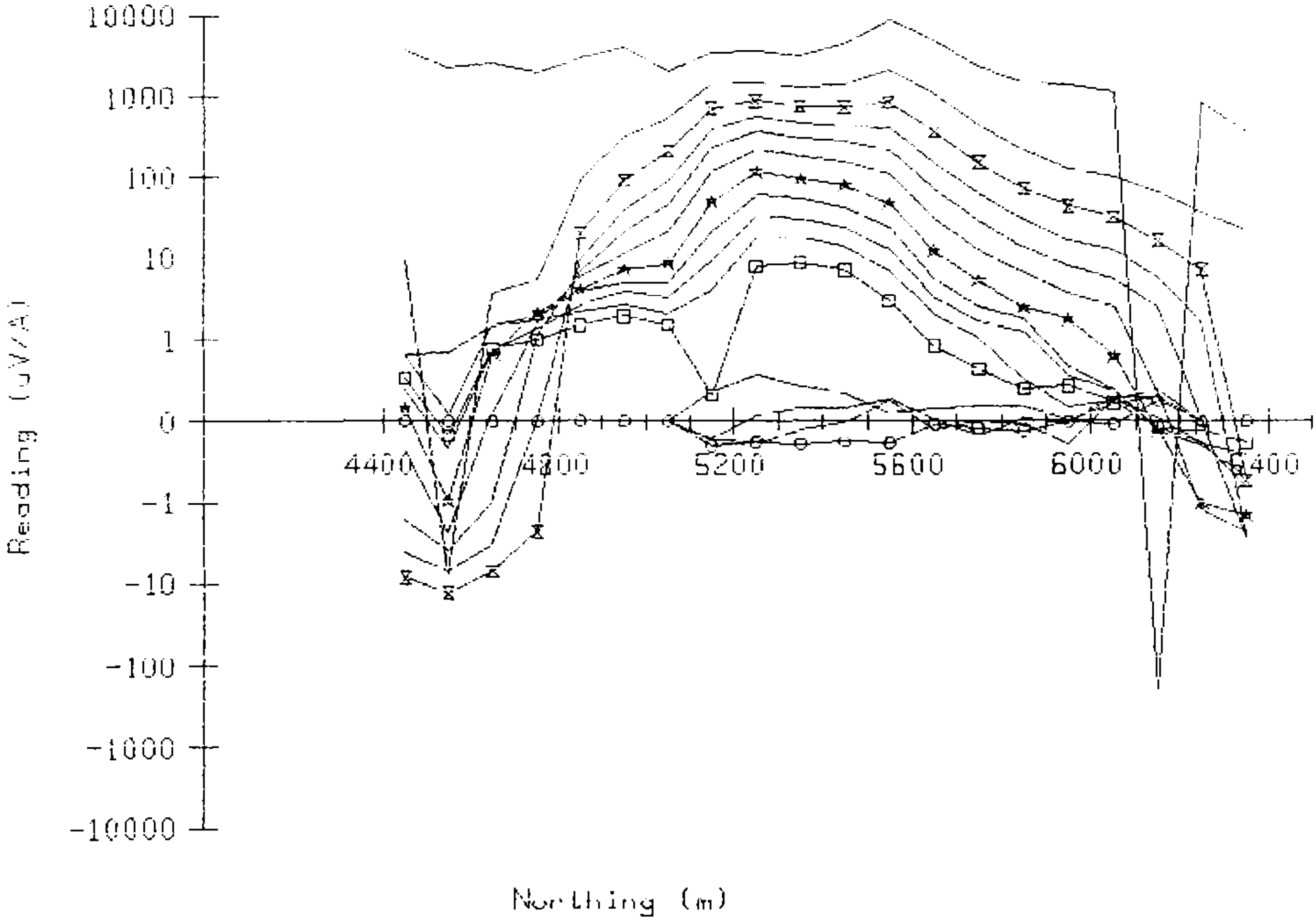
COMSTOCK VALLEY
CH= 6-1
CH= 8-12
CH=10-14
450
150
-150
50
-50
60.000
30.000
0.000
Reading (uV/A)
4400
4800
5200
5600
6000
Northing (m)

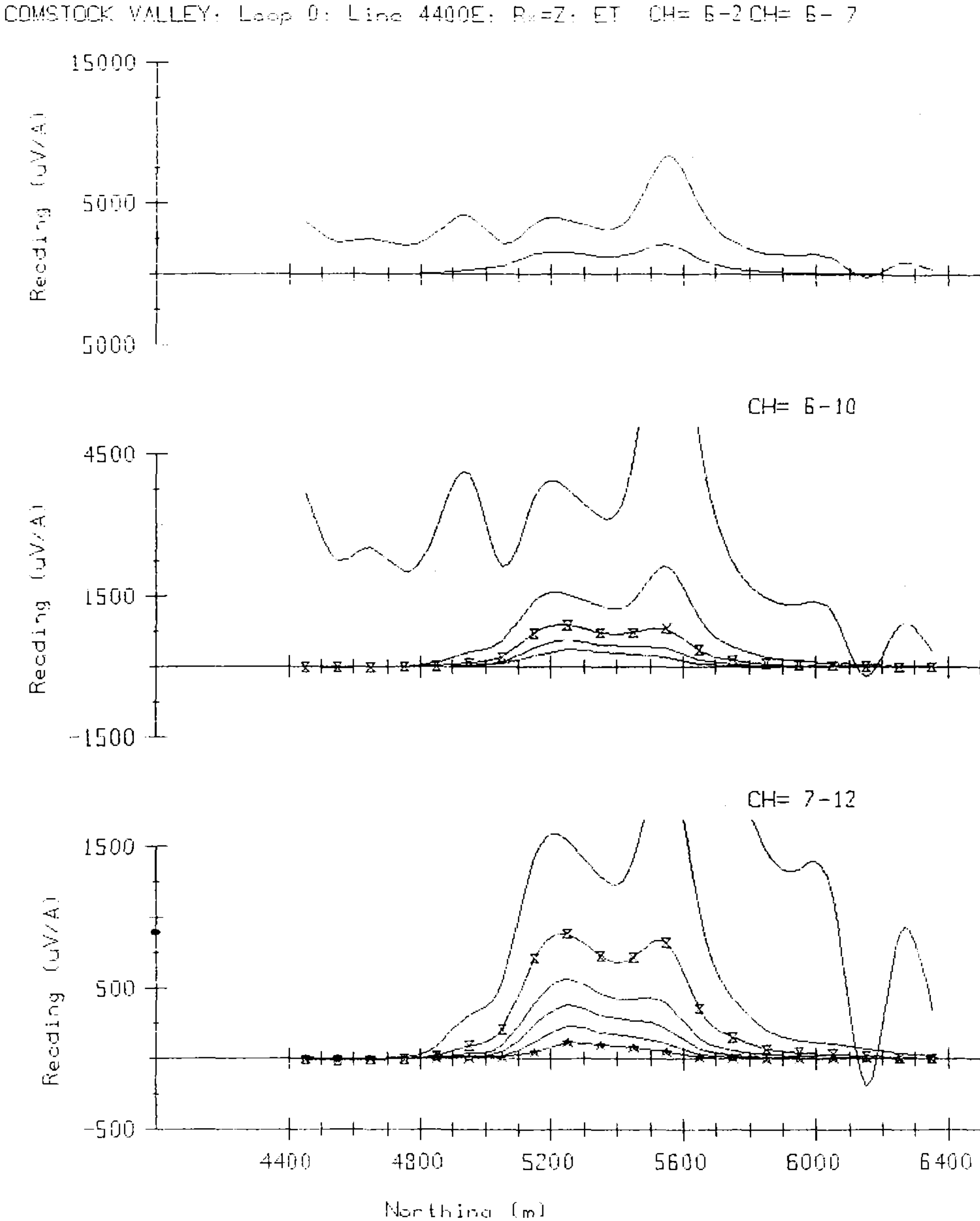
510289


COMSTOCK VALLEY: Loop 0: Line 4051E: R=2: ET CH= 6-1 CH=11-15
15.0
5.0
-5.0
Reading (uV/A)
CH=12-16
4.5
1.5
-1.5
Reading (uV/A)
CH=13-15
1.0
0.0
-1.0
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

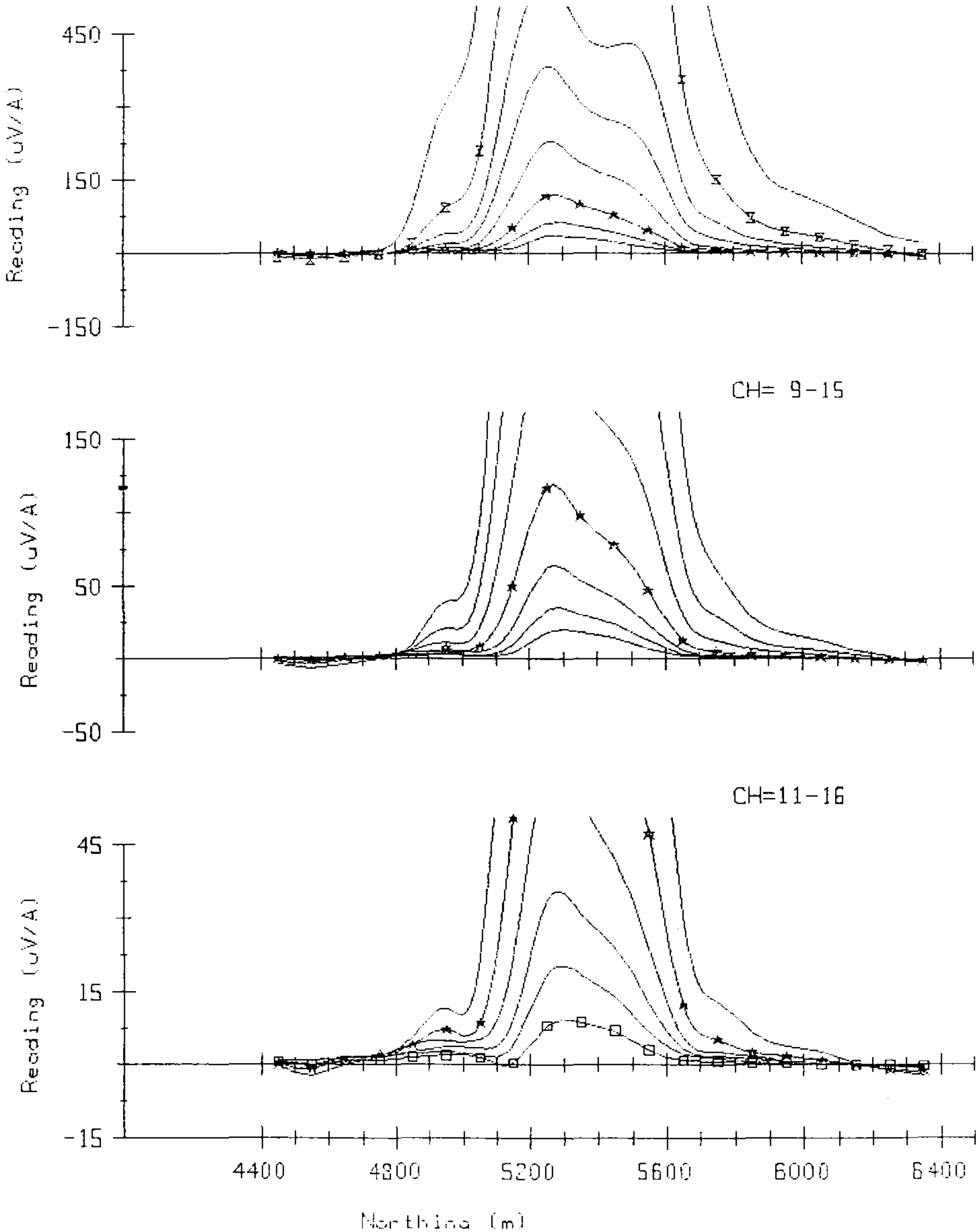
COMSTOCK VALLEY: Loop 0: Line 4400E: Rx=Z: ET CH= 6-20






COMSTOCK VALLEY: Loop 0: Line 4400E: Rx=Z: ET CH= 6-2 CH= 6- 7
15000
5000
5000
Reading (uV/A)
CH= 6-10
4500
1500
-1500
Reading (uV/A)
CH= 7-12
1500
500
-500
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

COMSTOCK VALLEY: Loop 0: Line 4400E: Rx=Z: ET CH= 6-2 CH= 7-14



510293

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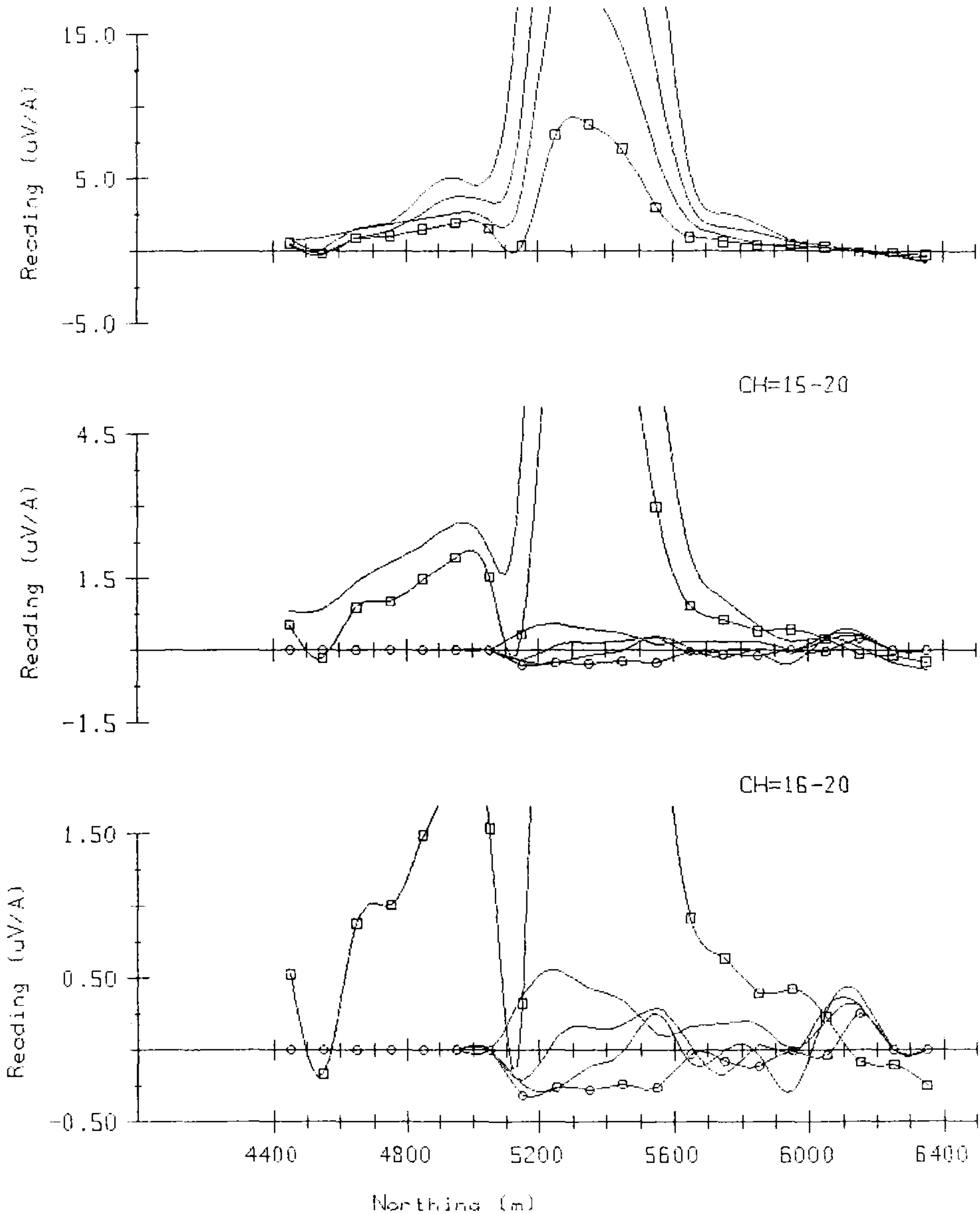
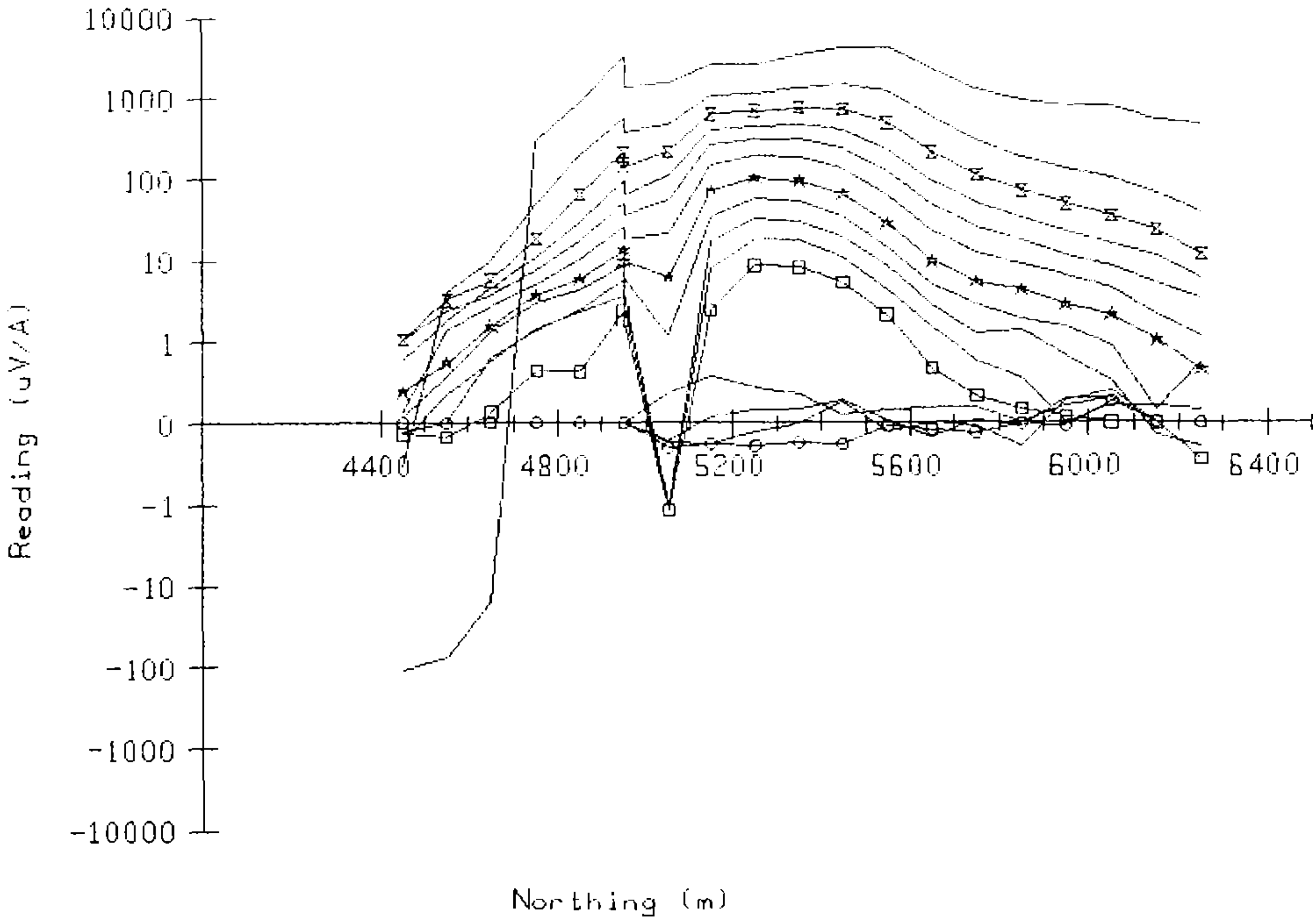
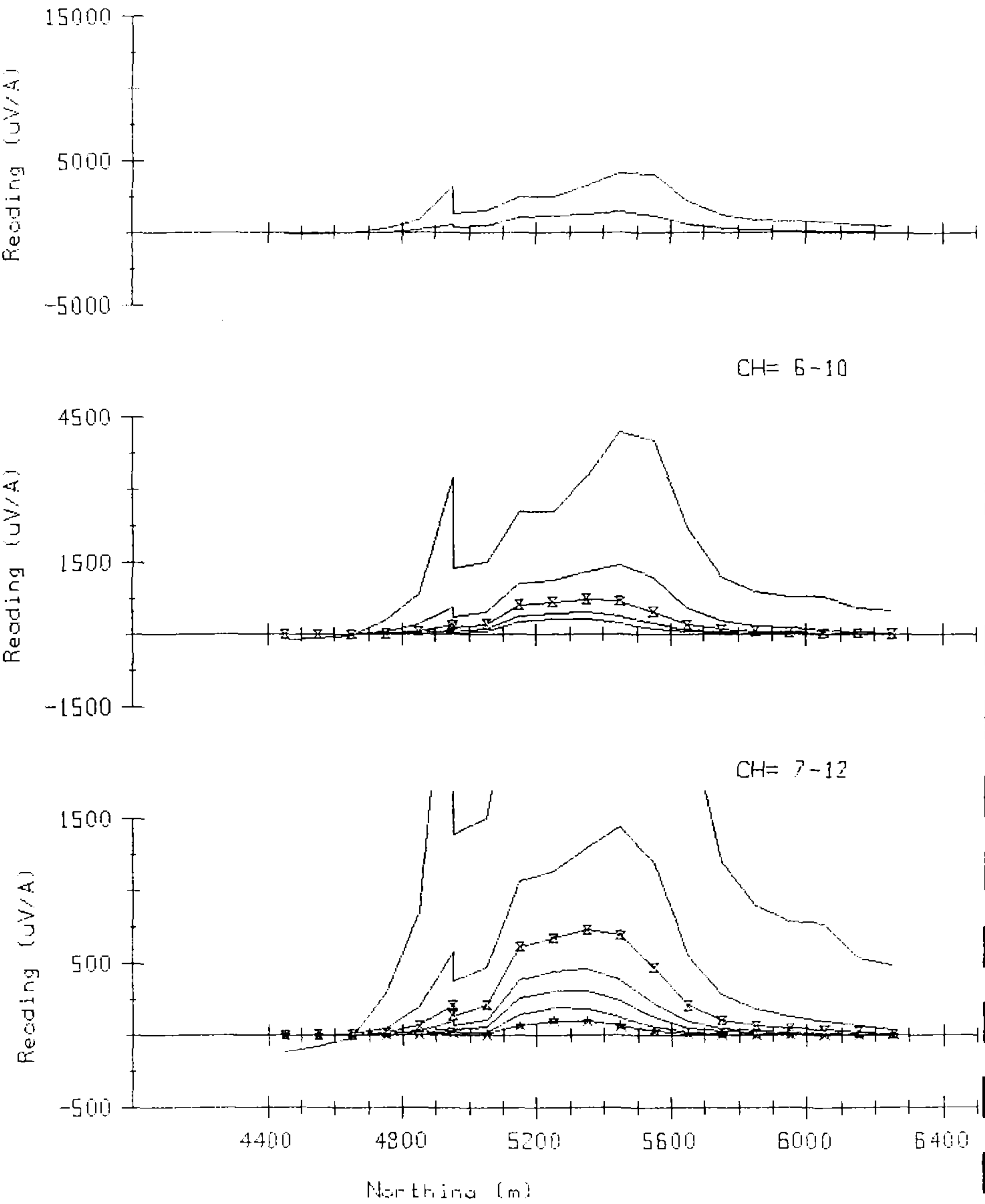
COMSTOCK VALLEY: Loop 0: Line 4400E: Rx=Z: ET CH= 6-2 CH=13-16



COMSTOCK VALLEY: Loop 0: Line 4401E: Rx=Z: ET CH= 6-20

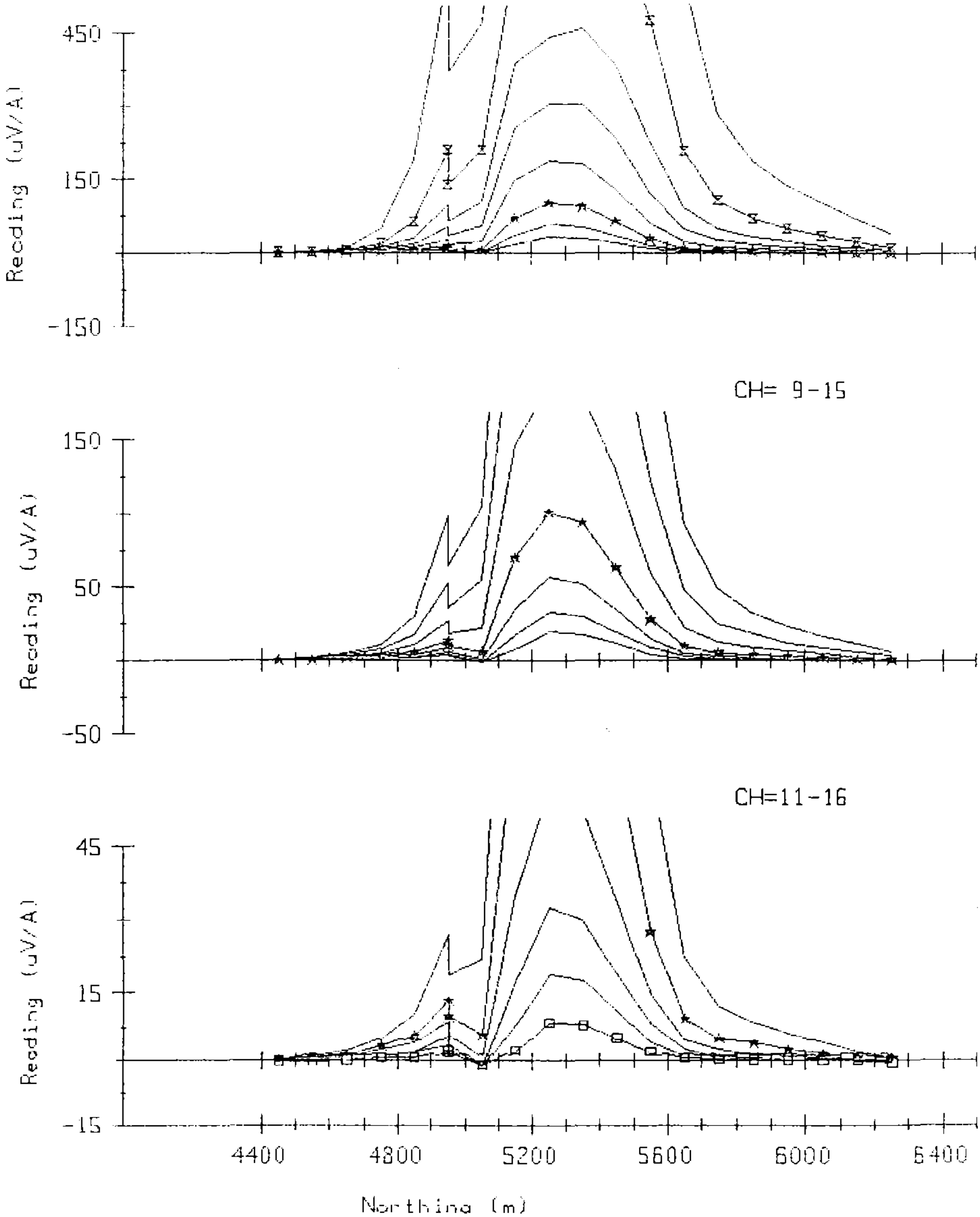


COMSTOCK VALLEY: Loop 0: Line 4401E: Rx=Z: ET CH= 6-2 CH= 6- 7

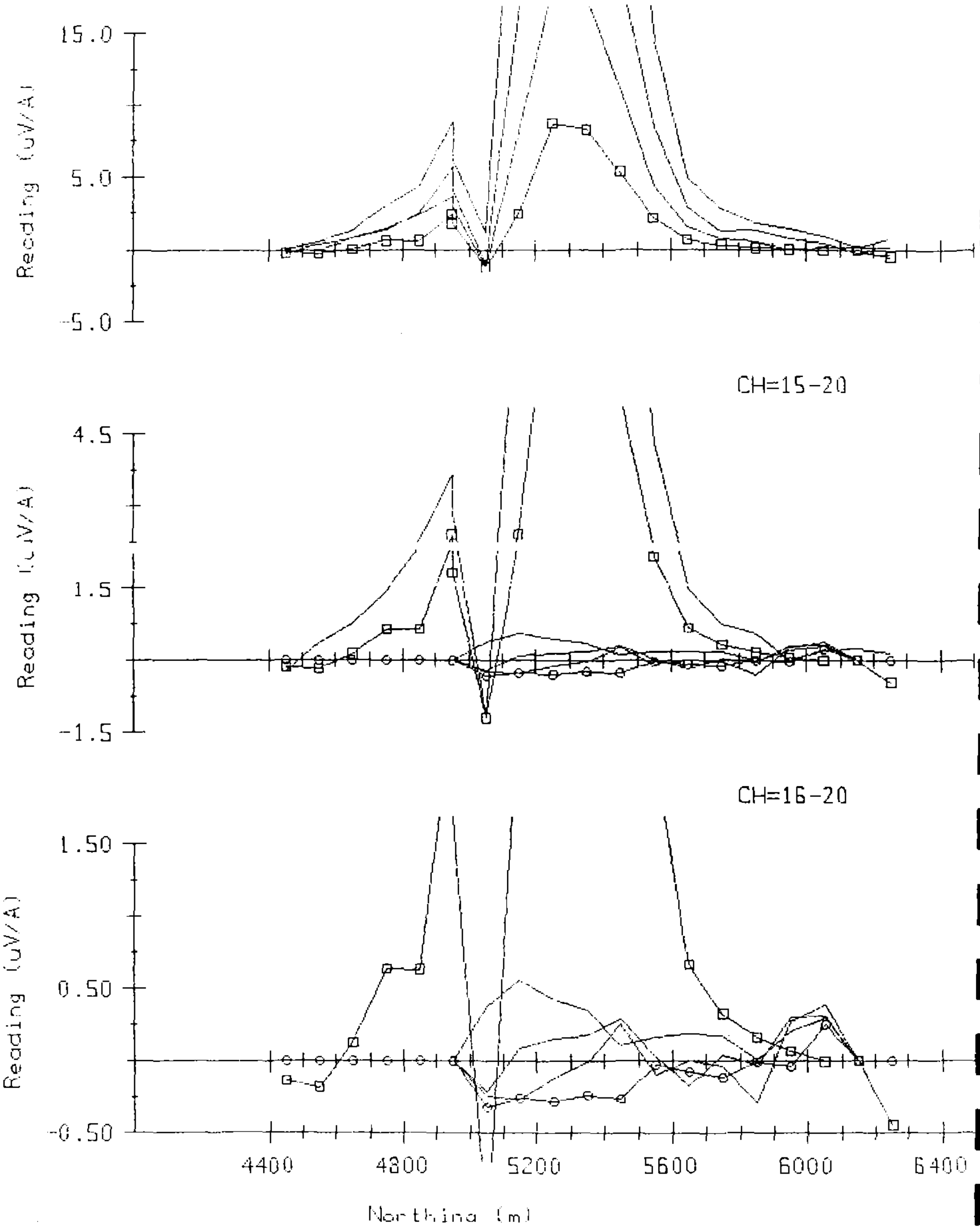


510296

COMSTOCK VALLEY: Loop D: Line 4401E: Rx=Z: ET CH= 6-2 CH= 7-14

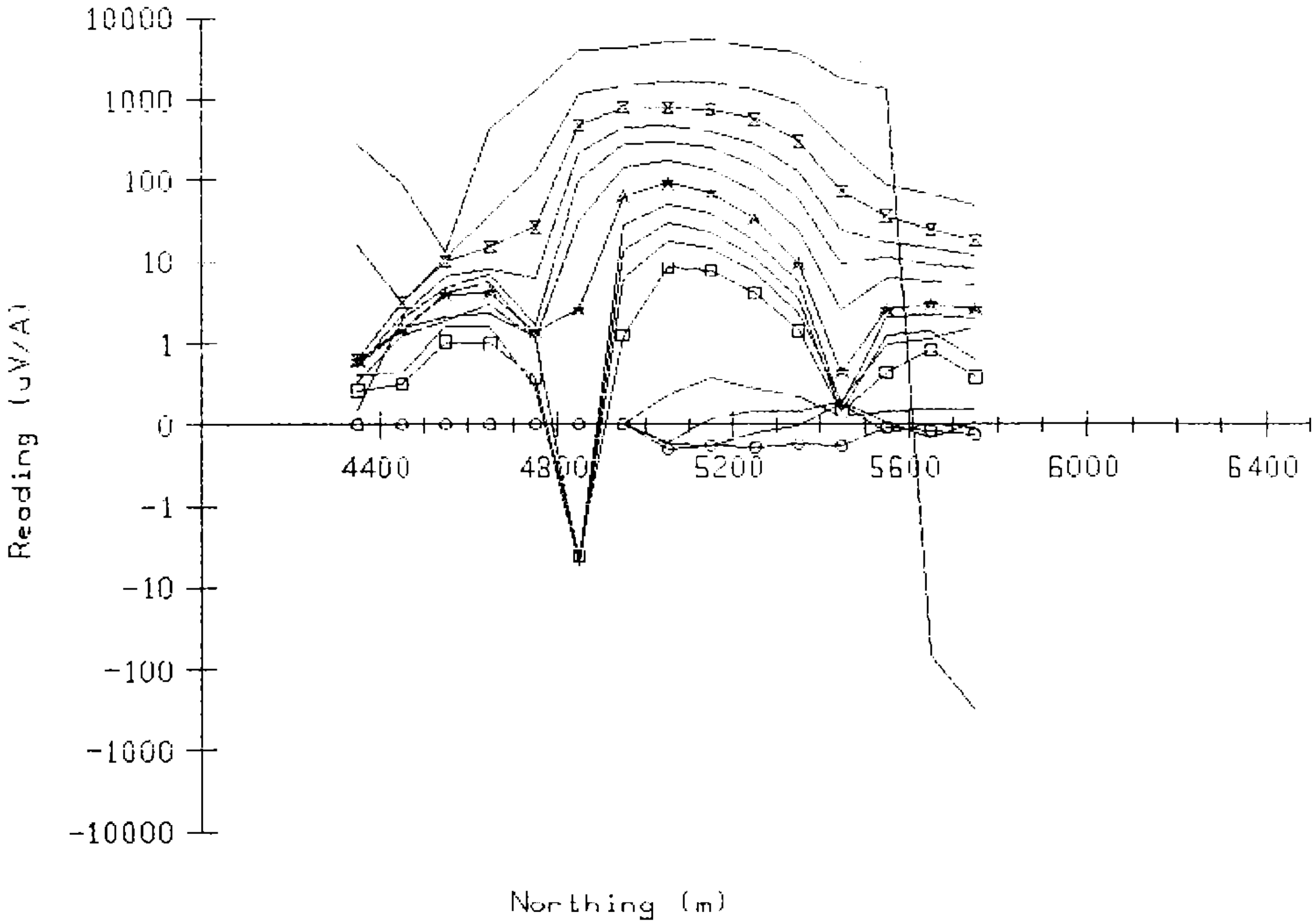


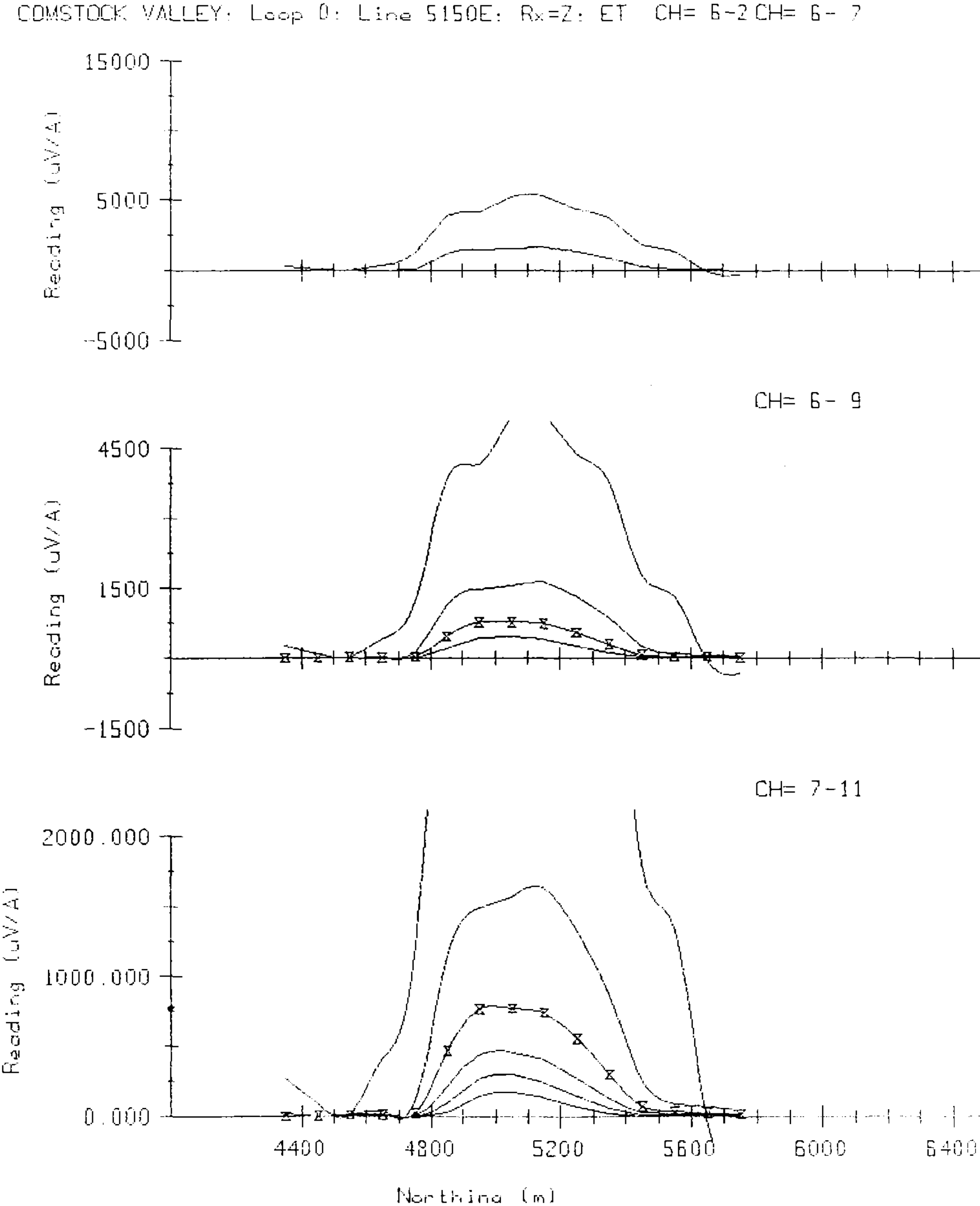
COMSTOCK VALLEY: Loop 0: Line 4401E: Rx=Z: ET CH= 6-2 CH=13-16



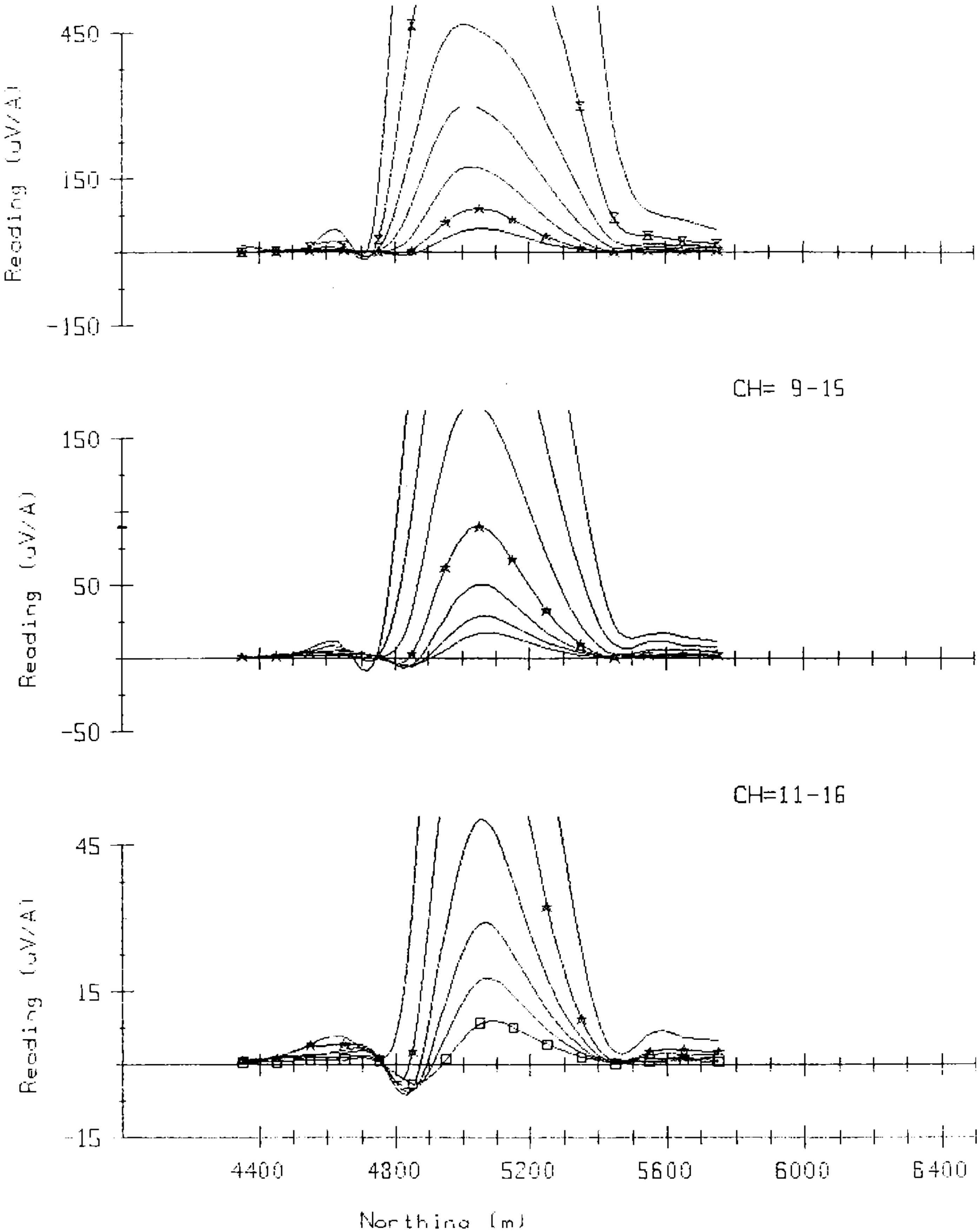
510298

COMSTOCK VALLEY: Loop 0: Line 5150E: Rx=Z: ET CH= 6-20

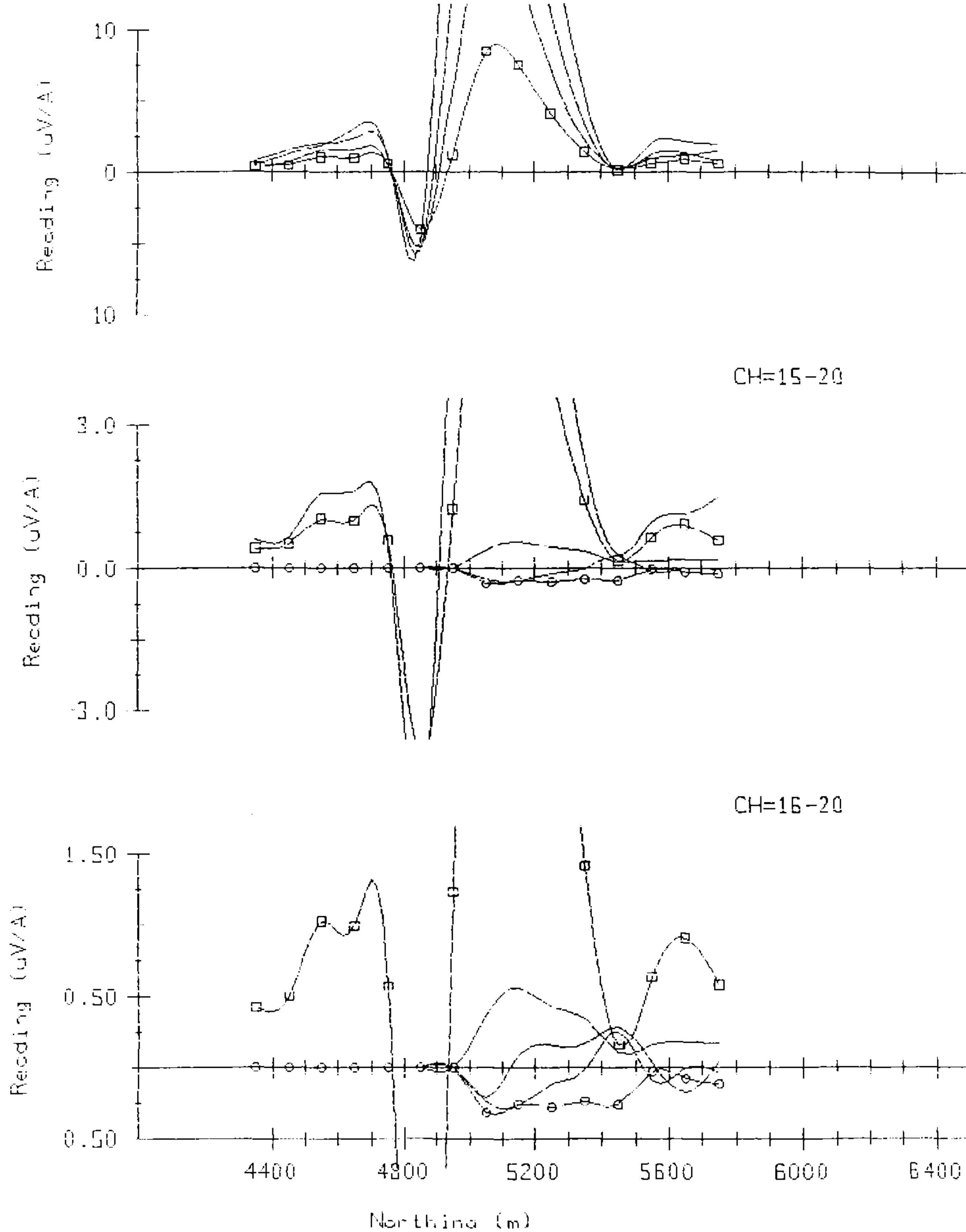



COMSTOCK VALLEY: Loop 0: Line 5150E: Rx=Z: ET CH= 6-2 CH= 6- 7
15000
5000
-5000
Reading (uV/A)
CH= 6- 9
4500
1500
-1500
Reading (uV/A)
CH= 7-11
2000.000
1000.000
0.000
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

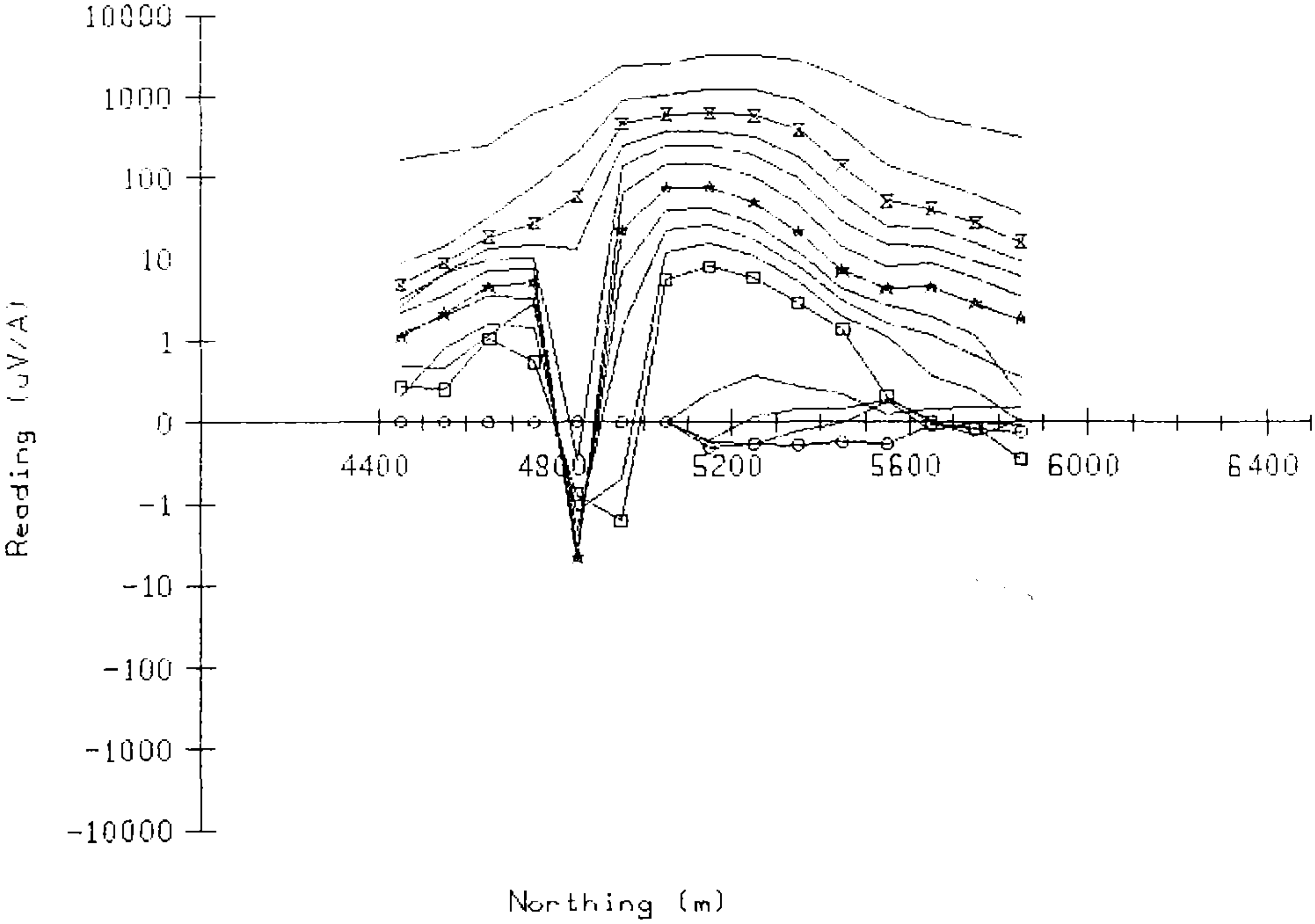
COMSTOCK VALLEY: Loop 0: Line 5150E: Rx=Z: ET CH= 6-2 CH= 7-13



COMSTOCK VALLEY: Loop 0: Line 5150E: Rx=Z: ET CH= 6-2 CH=13-16



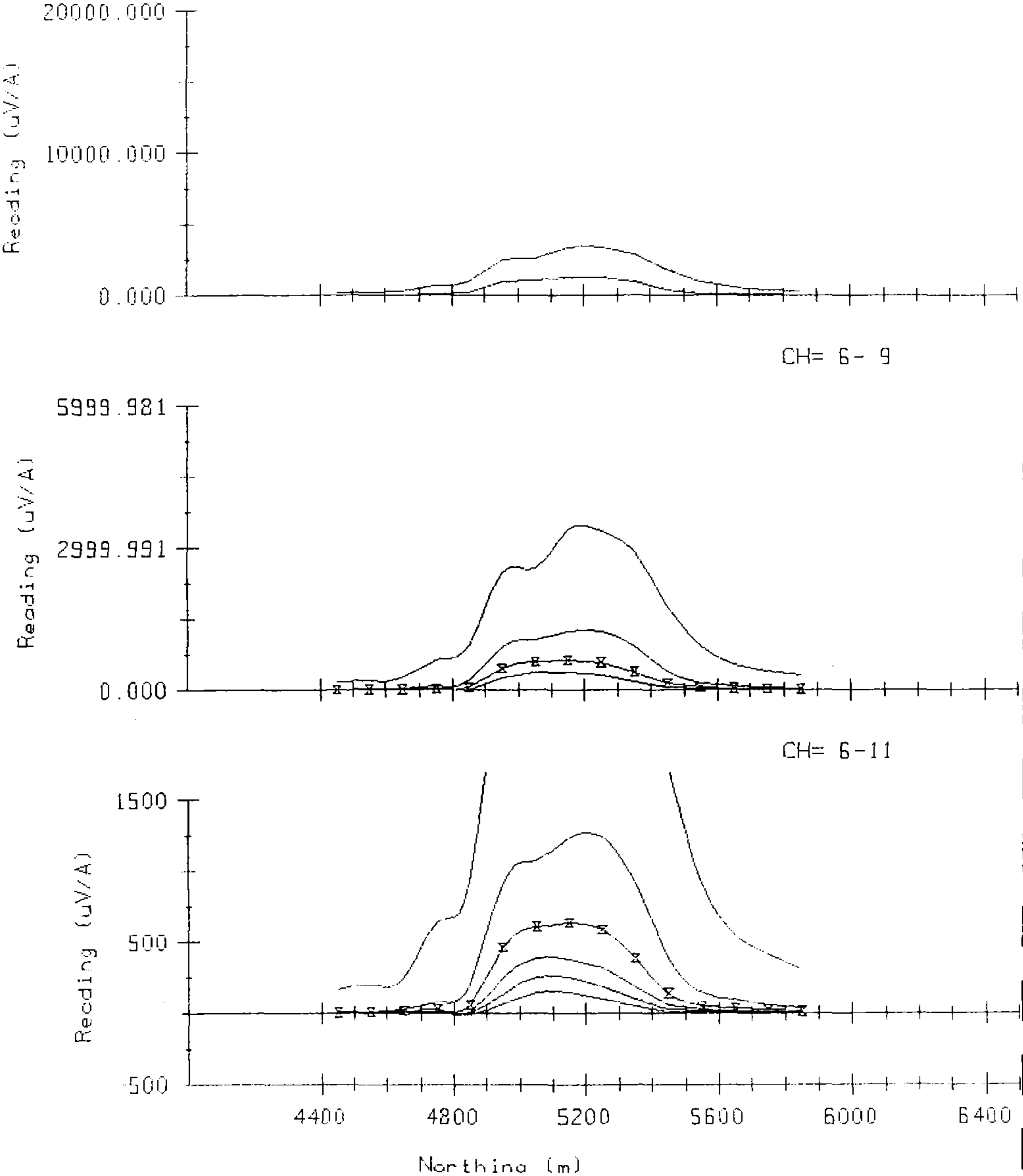
COMSTOCK VALLEY: Loop ?: Line 5151E: Rx=Z: ET CH= 6-20



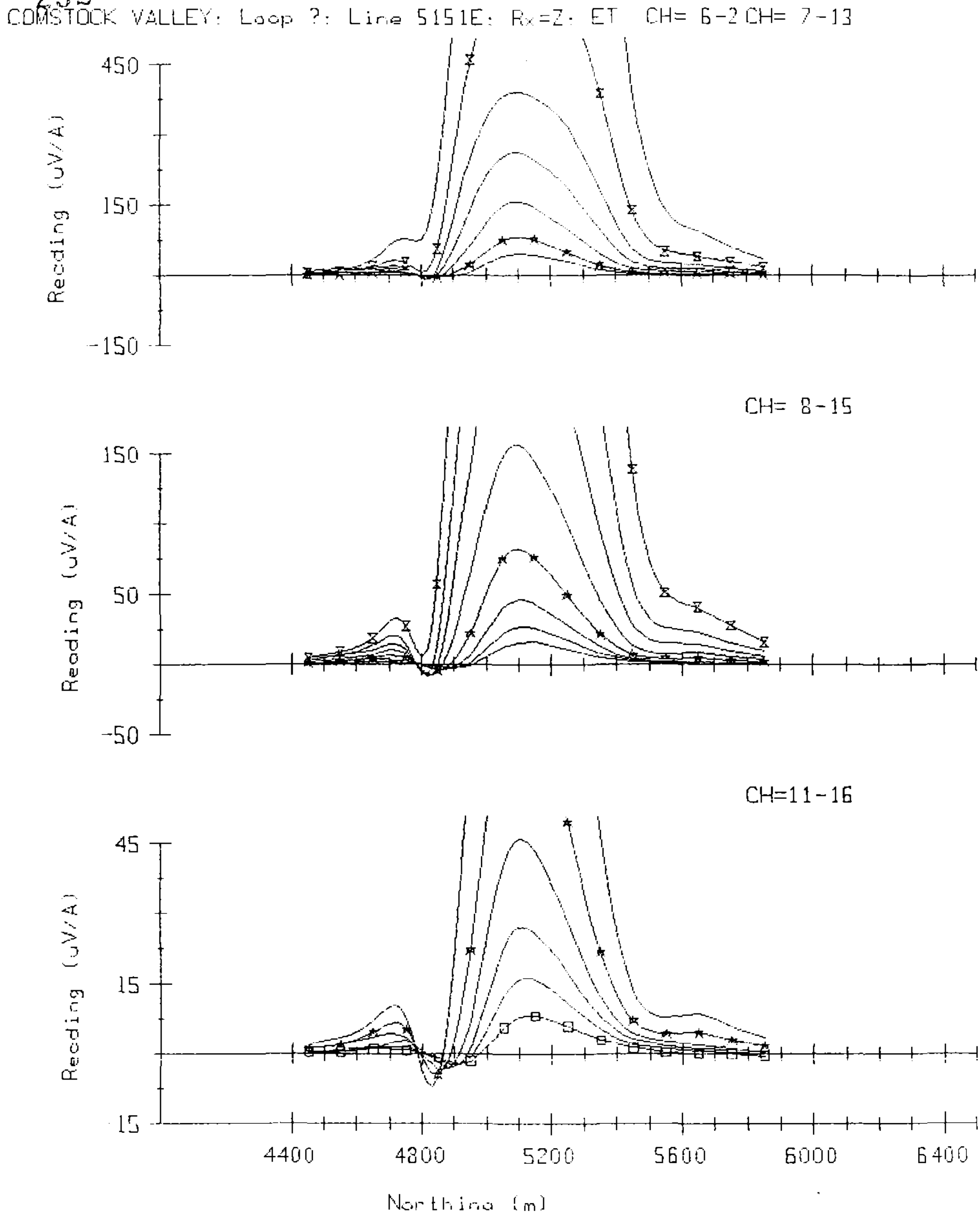
510303

291

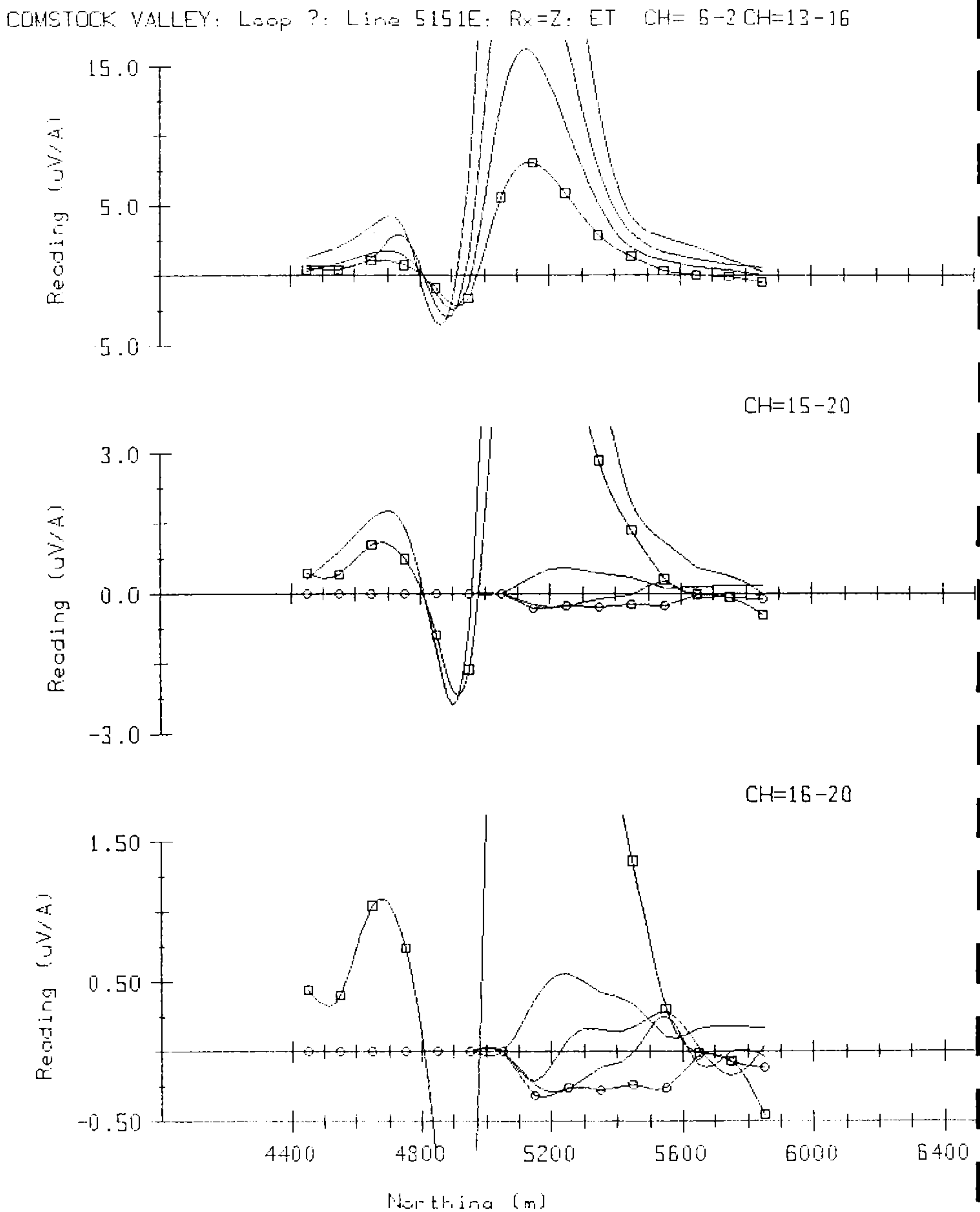
COMSTOCK VALLEY: Loop ?: Line 5151E: Rx=Z: ET CH= 6-2 CH= 6- 7



510304

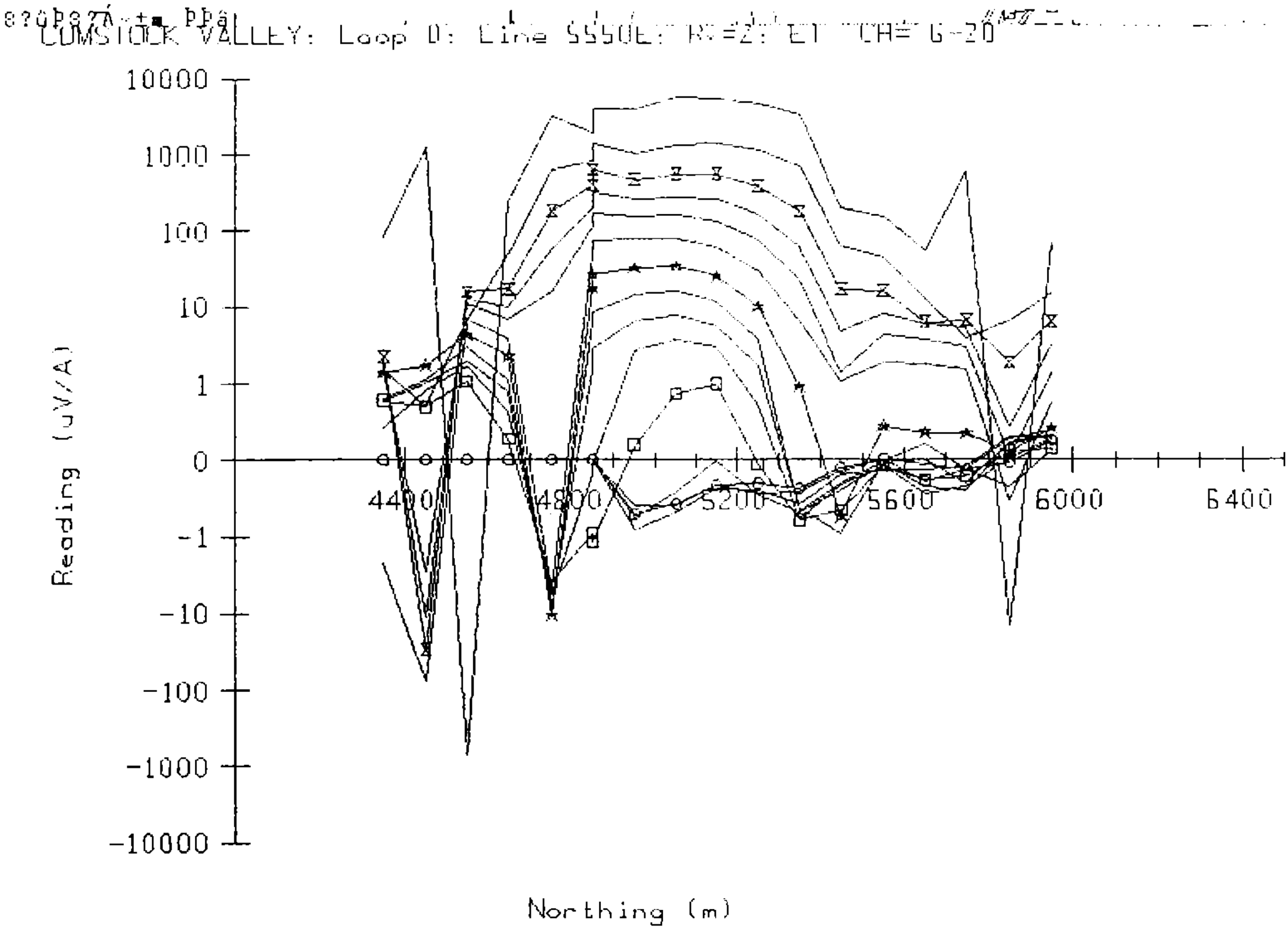

COMSTOCK VALLEY: Loop 2: Line 5151E: Rx=Z: ET CH= 6-2 CH= 7-13
450
150
-150
Reading (uV/A)
CH= 8-15
150
50
-50
Reading (uV/A)
CH=11-16
45
15
-15
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

510305


COMSTOCK VALLEY: Loop ?: Line 5151E: Rx=Z: ET CH= 6-2 CH=13-16
15.0
5.0
-5.0
Reading (uV/A)
CH=15-20
3.0
0.0
-3.0
Reading (uV/A)
CH=16-20
1.50
0.50
-0.50
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

510306

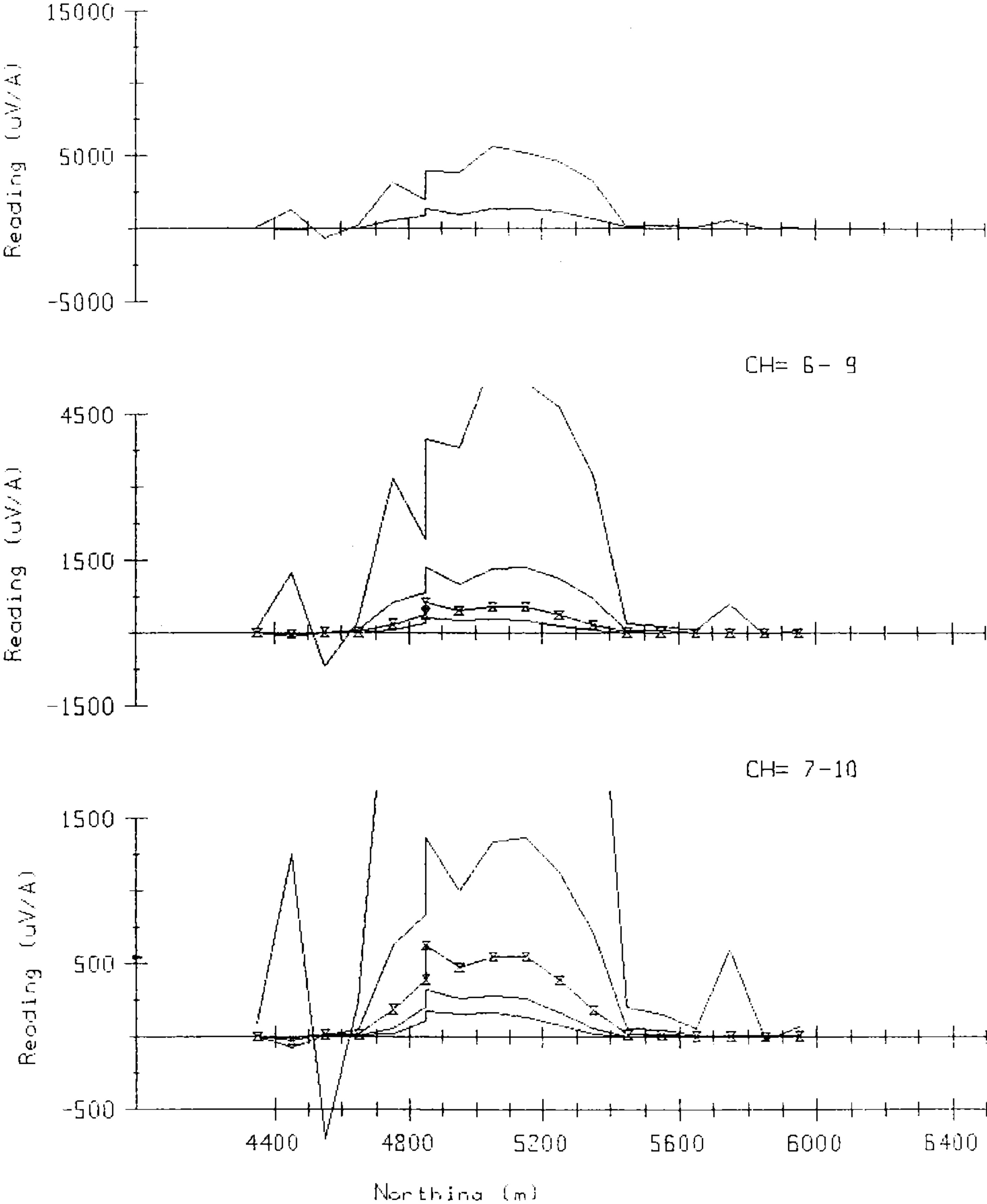
294

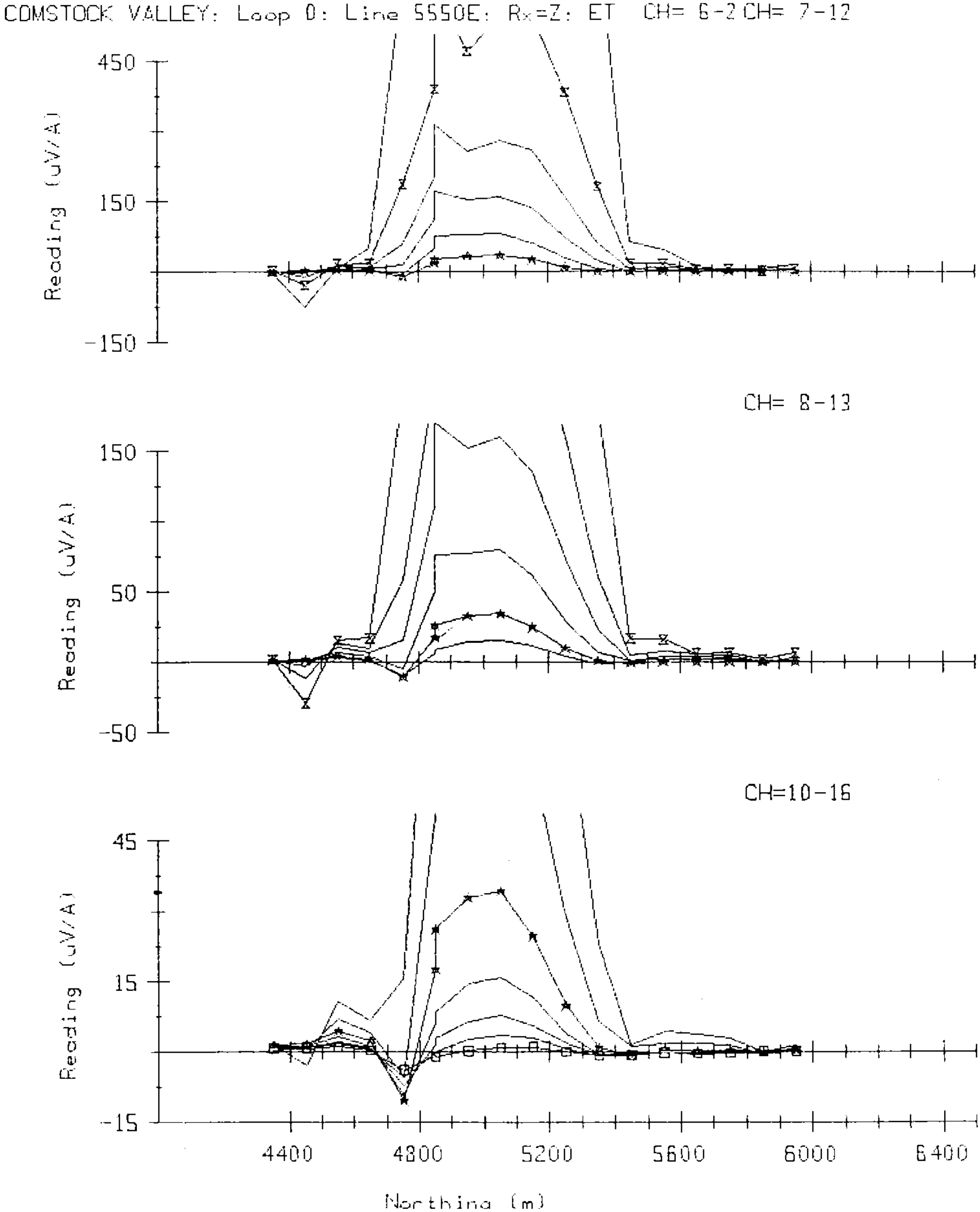


COMSTOCK VALLEY: Loop D: Line 5550E: Rx=Z: ET CH= 6-20
10000
1000
100
10
1
0
-1
-10
-100
-1000
-10000
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

 510307

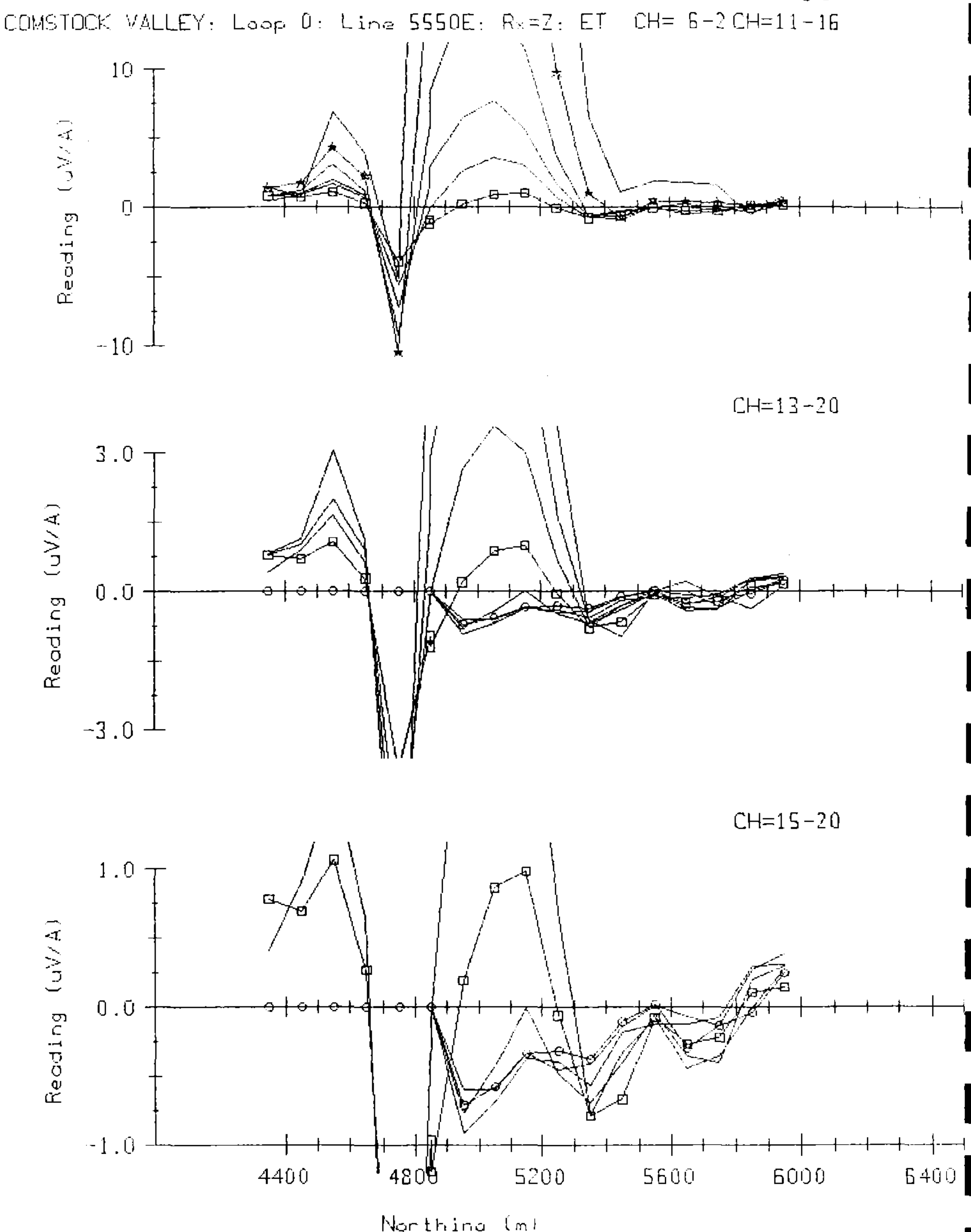
COMSTOCK VALLEY: Loop D: Line 5550E: Rx=Z: ET CH= 6-2 CH= 6- 7





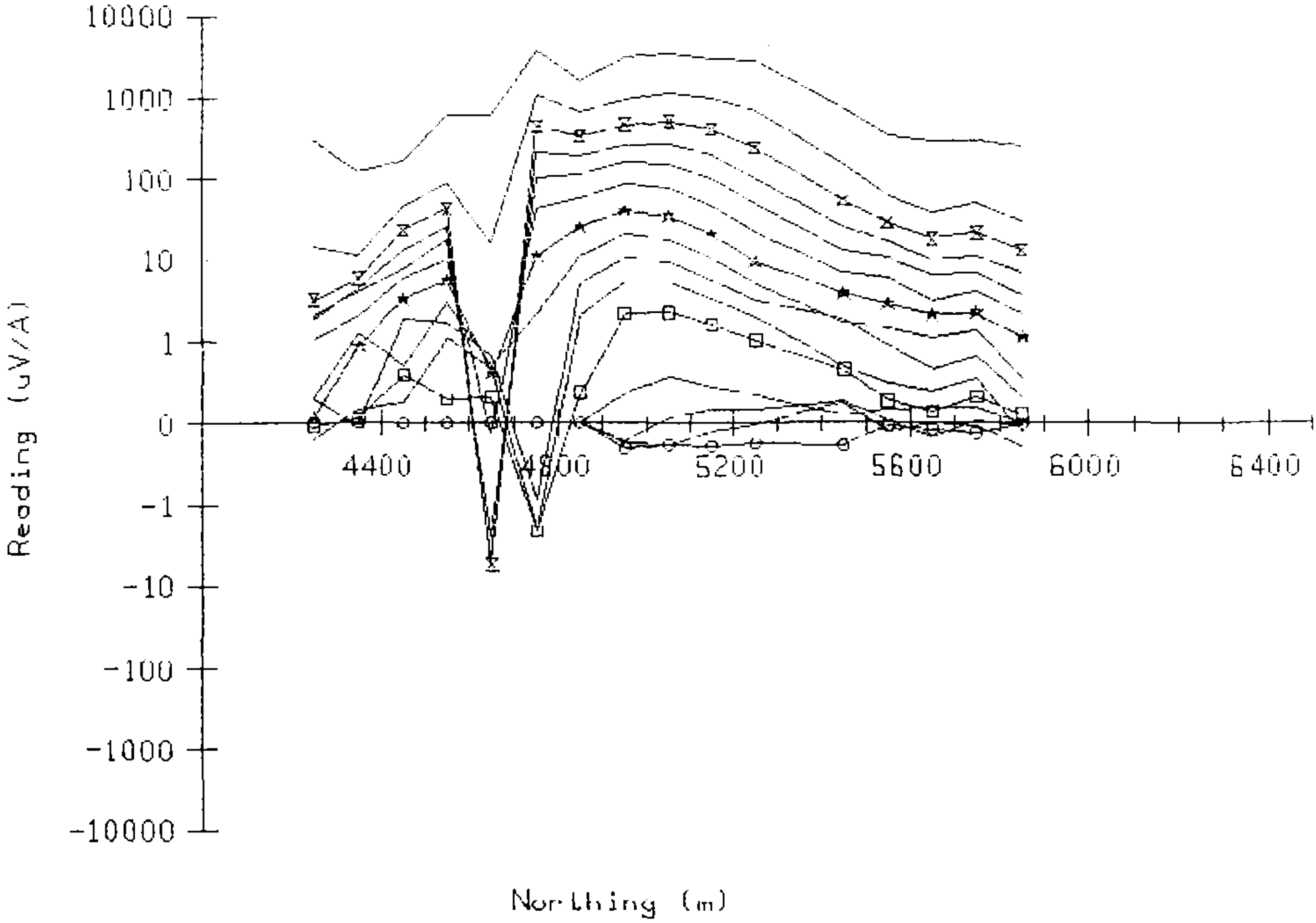
COMSTOCK VALLEY: Loop 0: Line 5550E: Rx=Z: ET CH= 6-2 CH= 7-12
450
150
-150
Reading (uV/A)
CH= 8-13
150
50
-50
Reading (uV/A)
CH=10-16
45
15
-15
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

510309

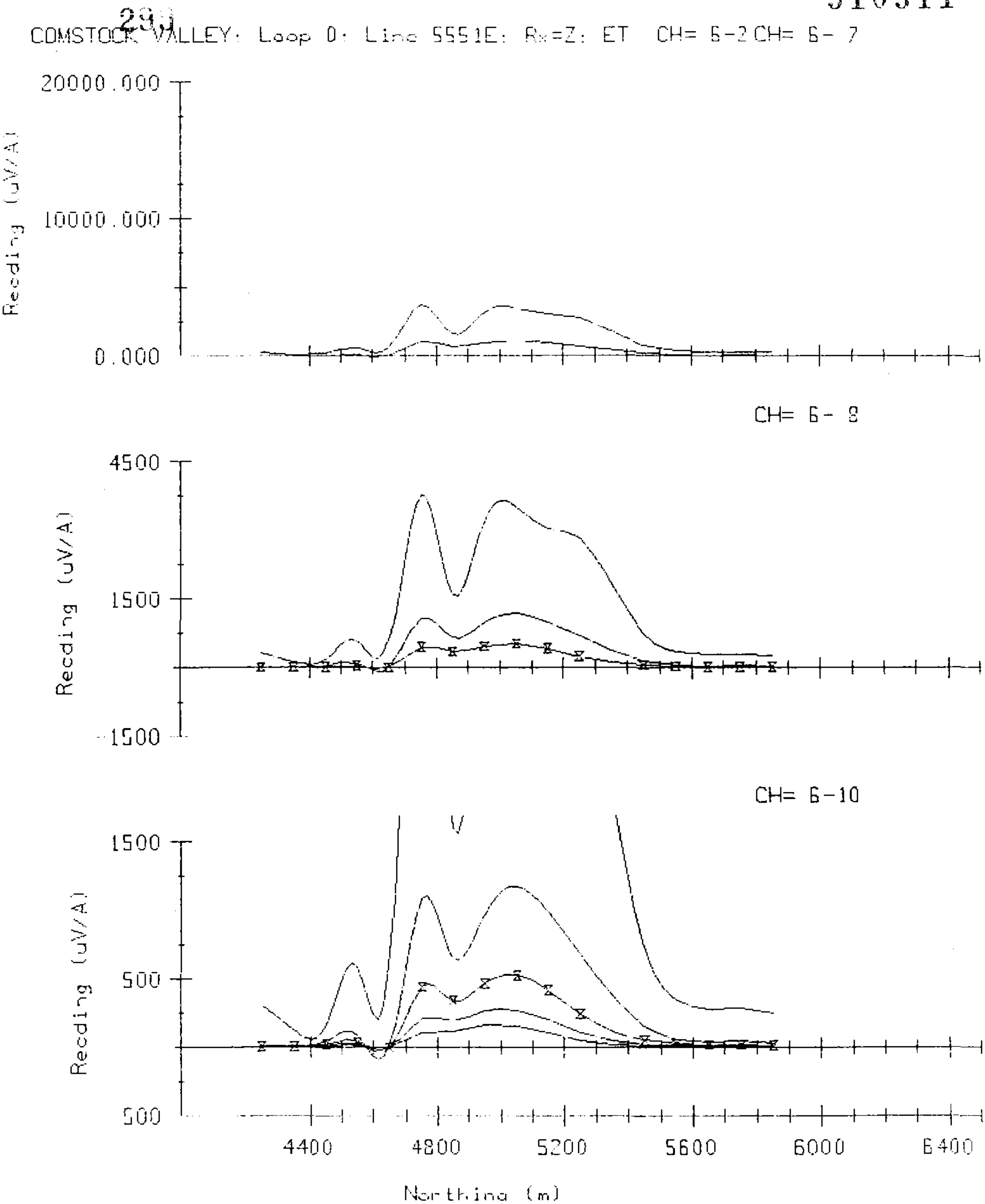

COMSTOCK VALLEY: Loop 0: Line 5550E: Rx=Z: ET CH= 6-2 CH=11-16
10
0
-10
Reading (uV/A)
CH=13-20
3.0
0.0
-3.0
Reading (uV/A)
CH=15-20
1.0
0.0
-1.0
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

510310

COMSTOCK VALLEY: Loop 0: Line 5551E: Rx=Z: ET CH= 6-20



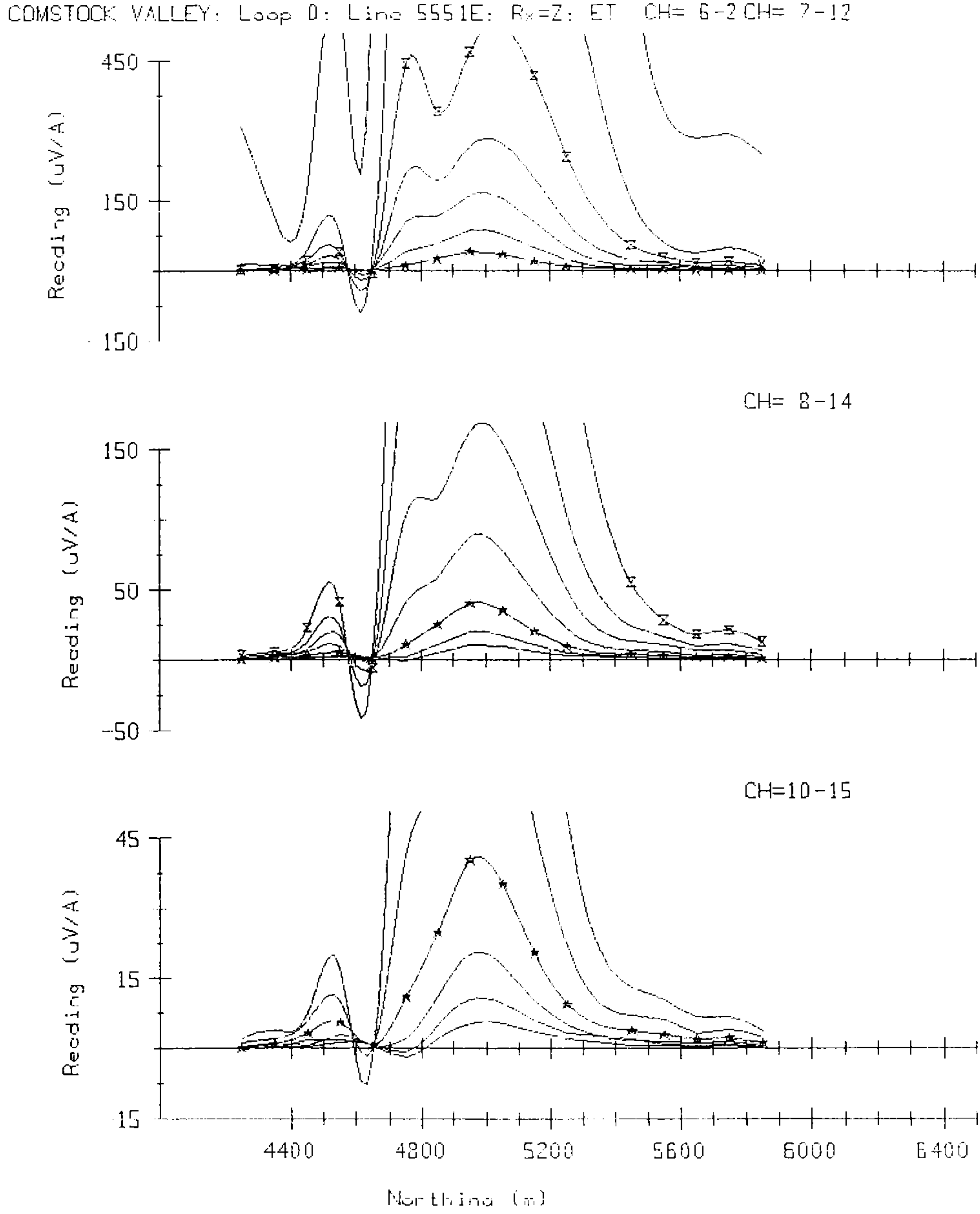
510311



29
COMSTOCK VALLEY: Loop 0: Line 5551E: Rx=Z: ET CH= 6-2 CH= 6- 7
20000.000
10000.000
0.000
Reading (uV/A)
CH= 6- 8
4500
1500
-1500
Reading (uV/A)
CH= 6-10
1500
500
500
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

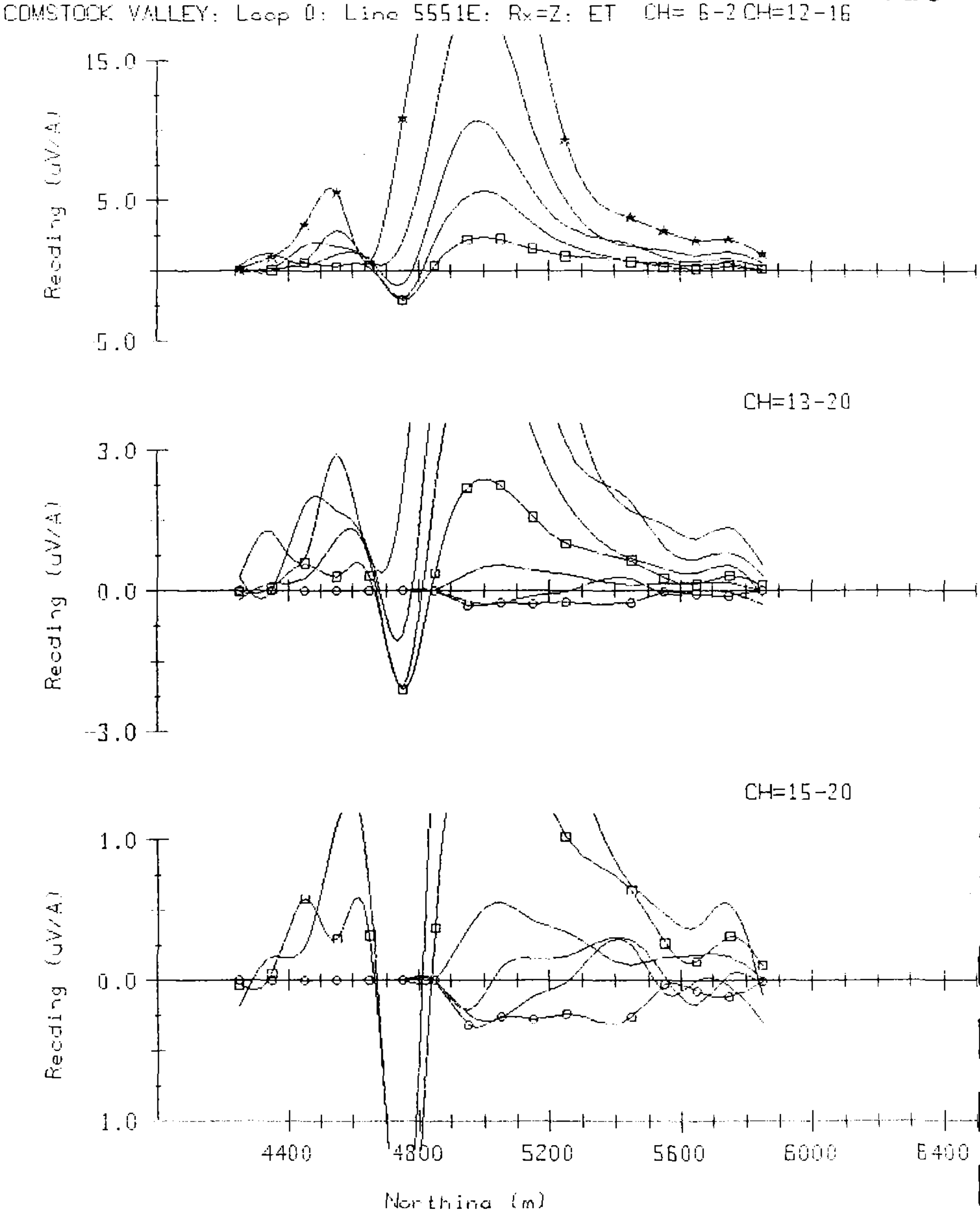
510312

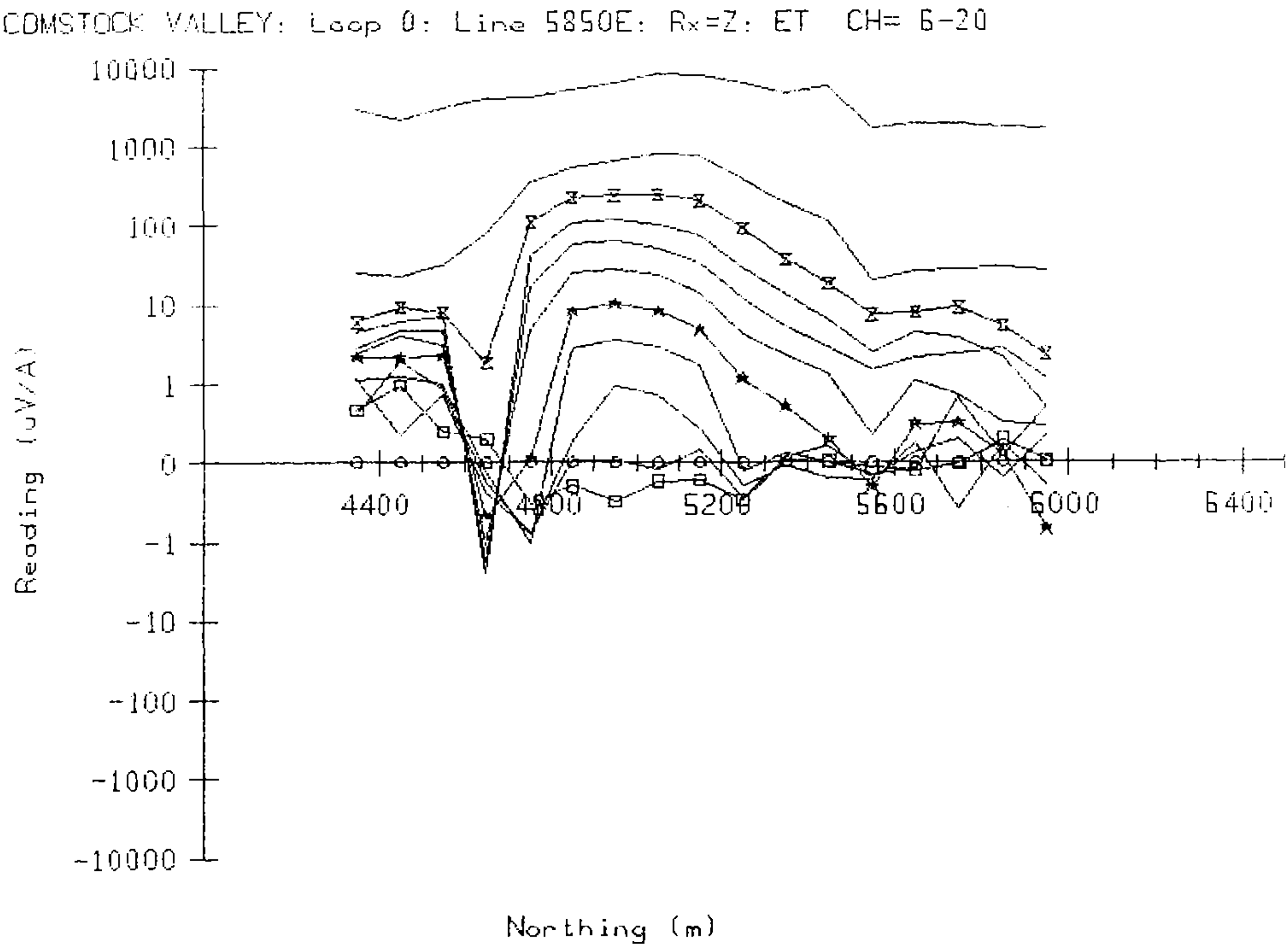
COMSTOCK VALLEY: Loop D: Line 5551E: Rx=Z: ET



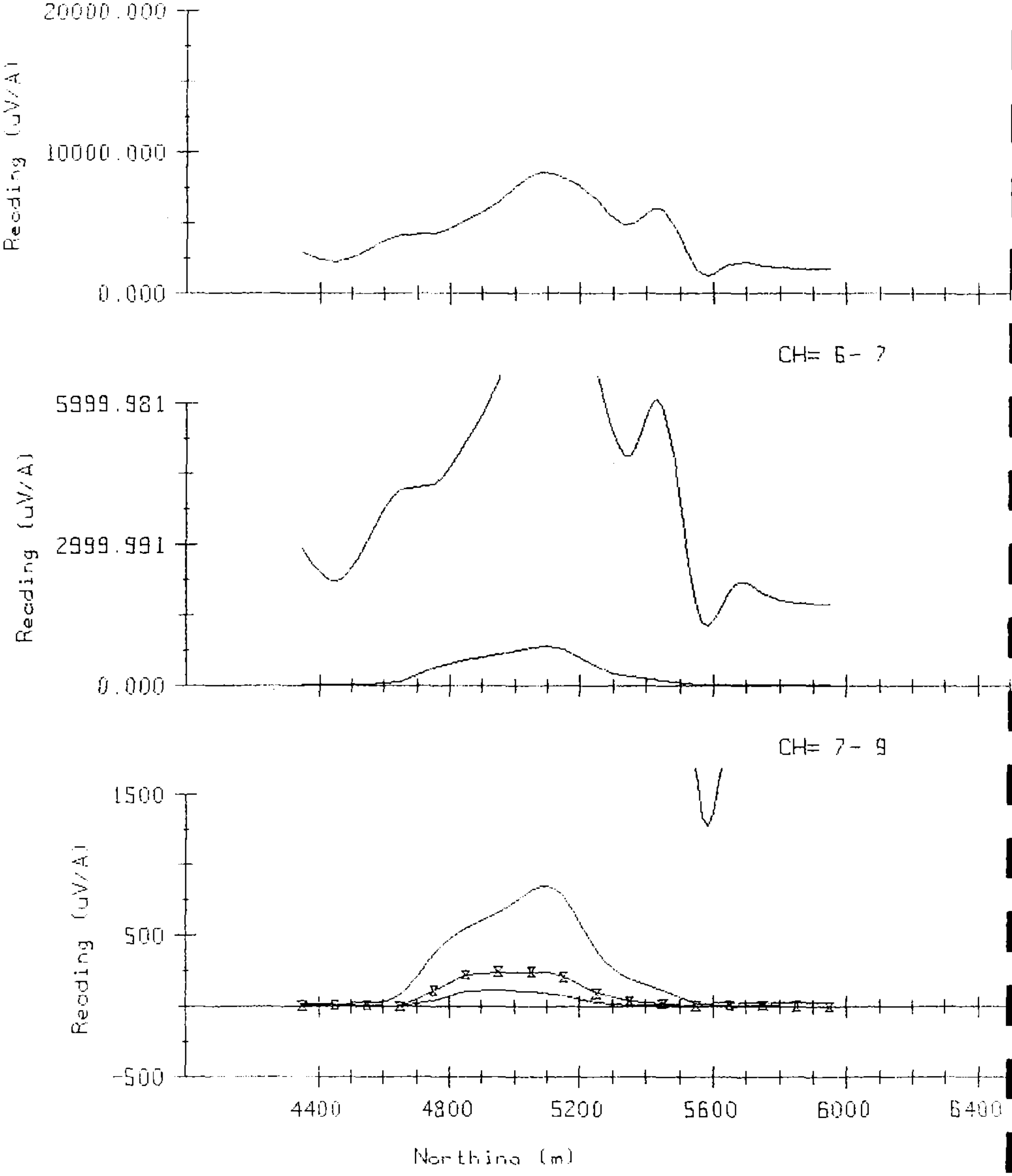
510313

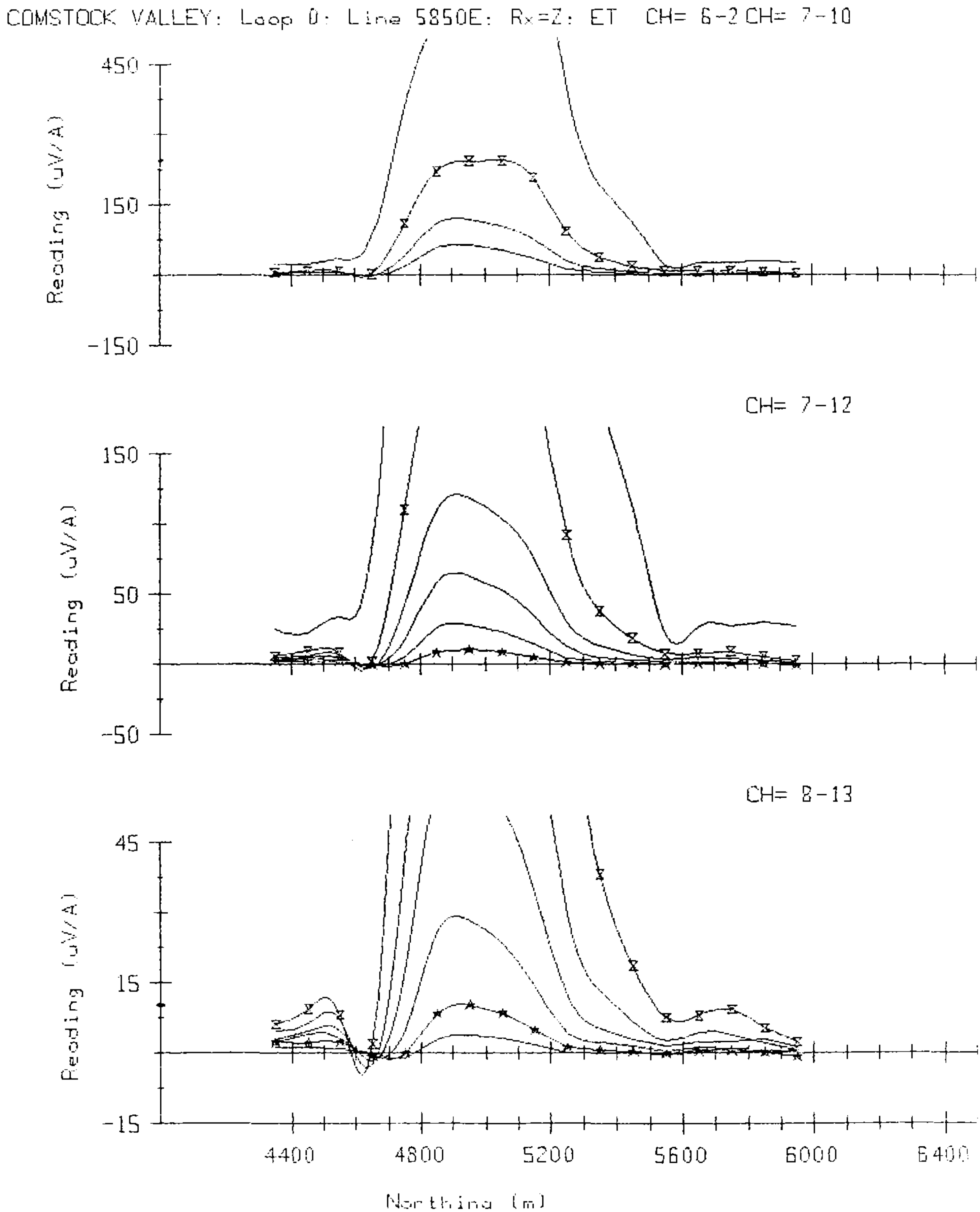
COMSTOCK VALLEY: Loop 0: Line 5551E: Rx=Z: ET




COMSTOCK VALLEY: Loop 0: Line 5850E: Rx=Z: ET CH= 6-20
10000
1000
100
10
1
0
-1
-10
-100
-1000
-10000
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

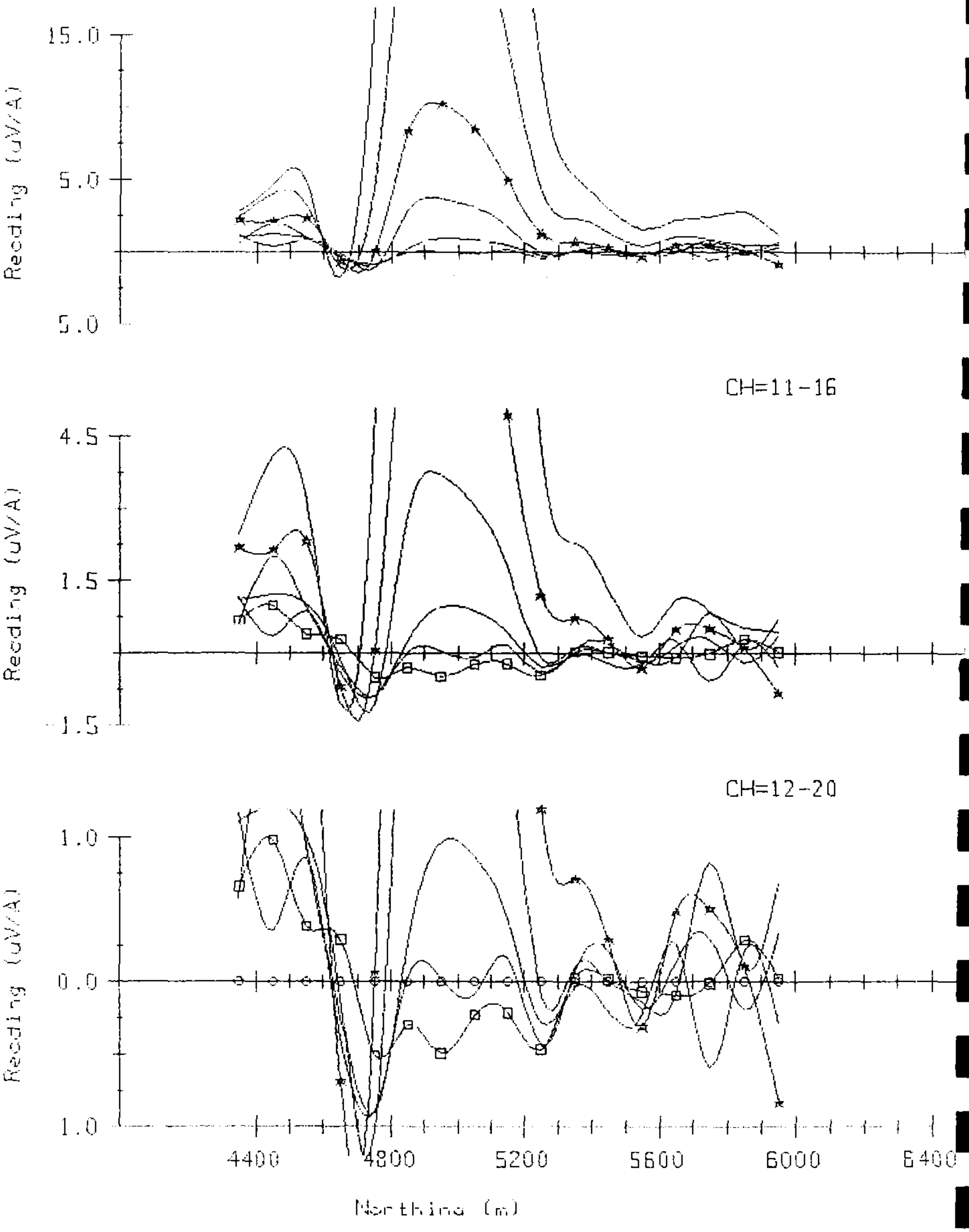
COMSTOCK VALLEY: Loop 0: Line 5850E: Rx=Z: ET CH= 6-2 CH= 6



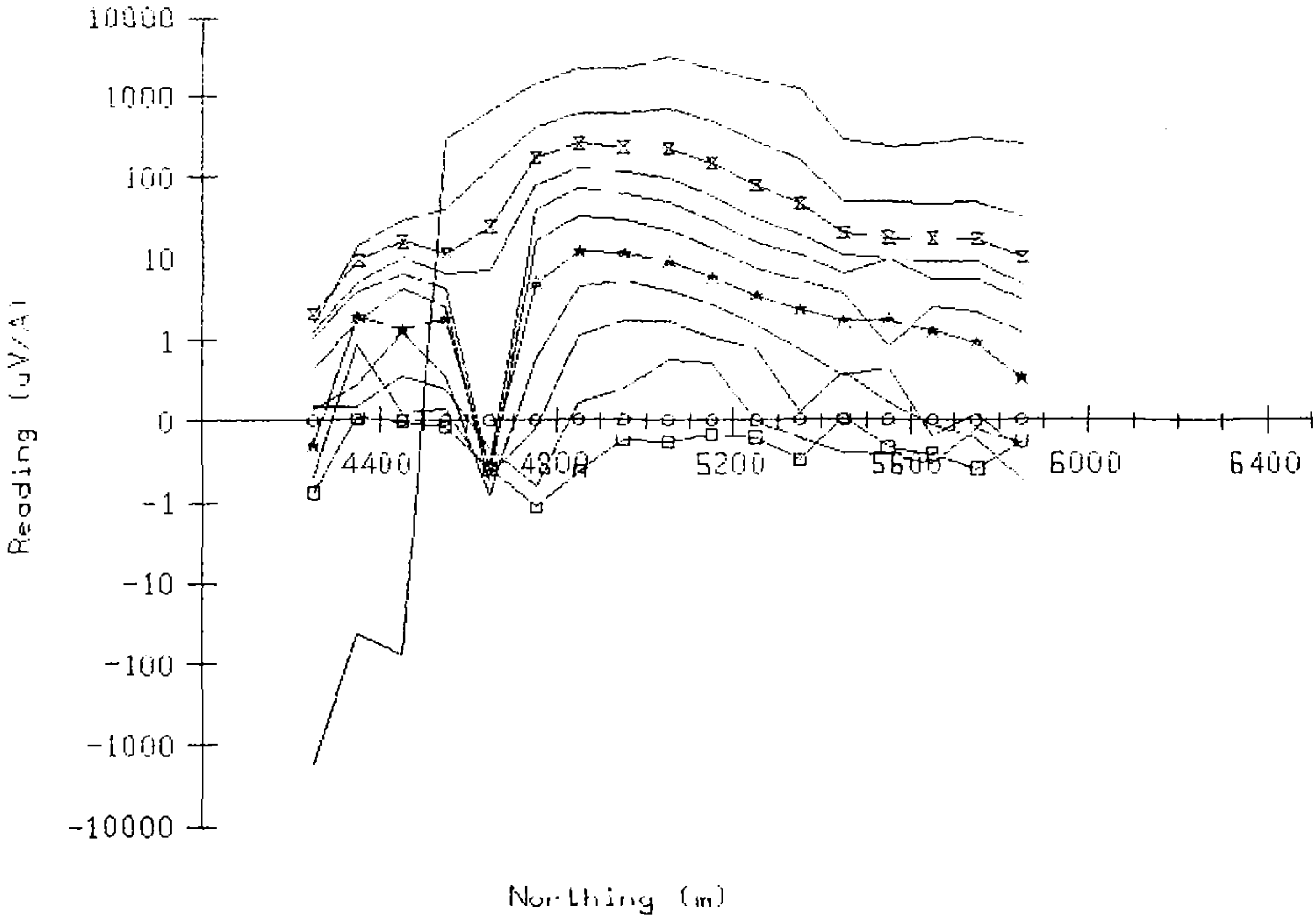

COMSTOCK VALLEY: Loop 0: Line 5850E: Rx=Z: ET CH= 6-2 CH= 7-10
450
150
-150
Reading (uV/A)
CH= 7-12
150
50
-50
Reading (uV/A)
CH= 8-13
45
15
-15
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

30

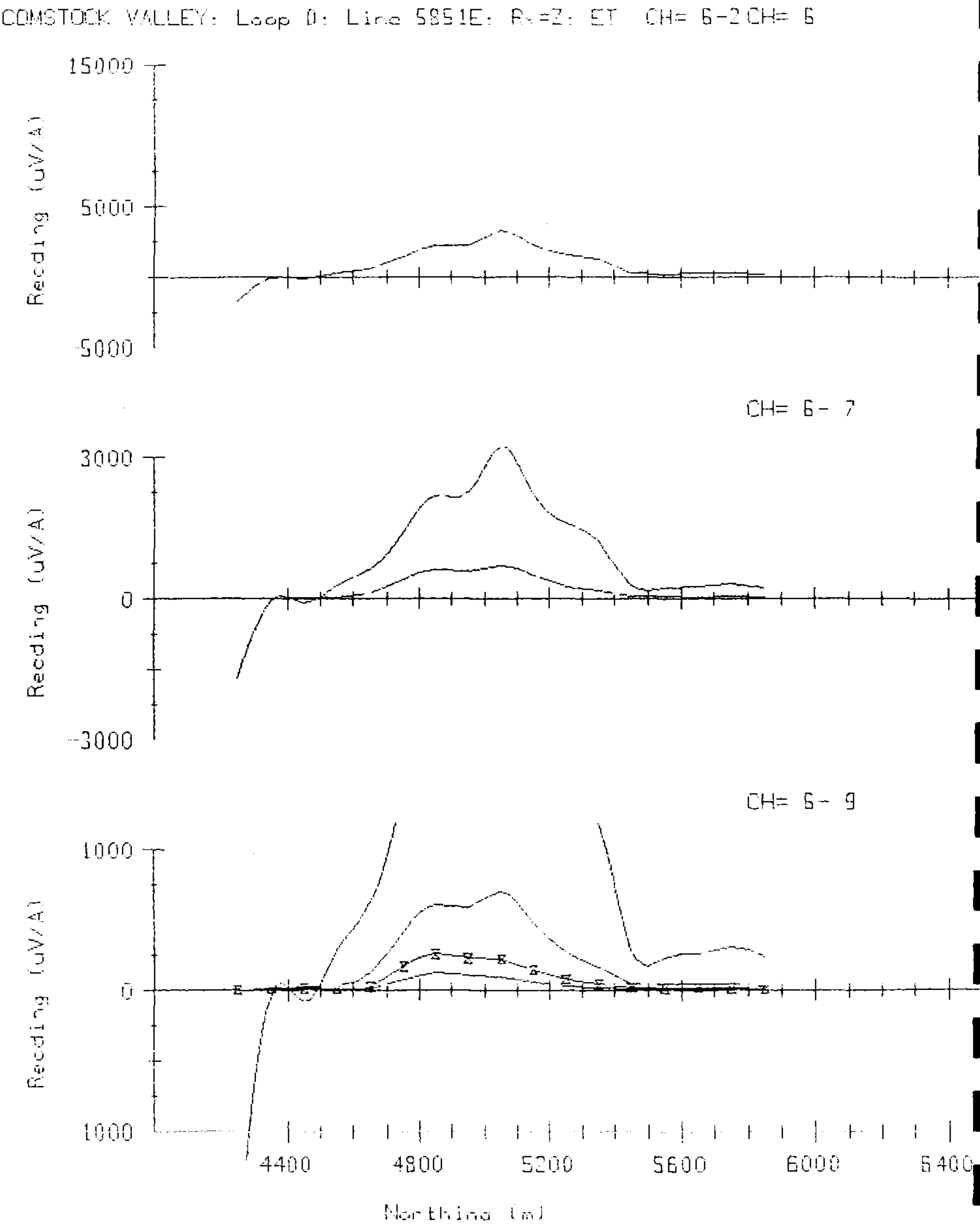
COMSTOCK VALLEY: Loop 0: Line 5850E: Rx=Z: ET CH= 6-2 CH=10-15



COMSTOCK VALLEY: Loop 0: Line 5851E: Rx=Z: ET  CH= 6-20

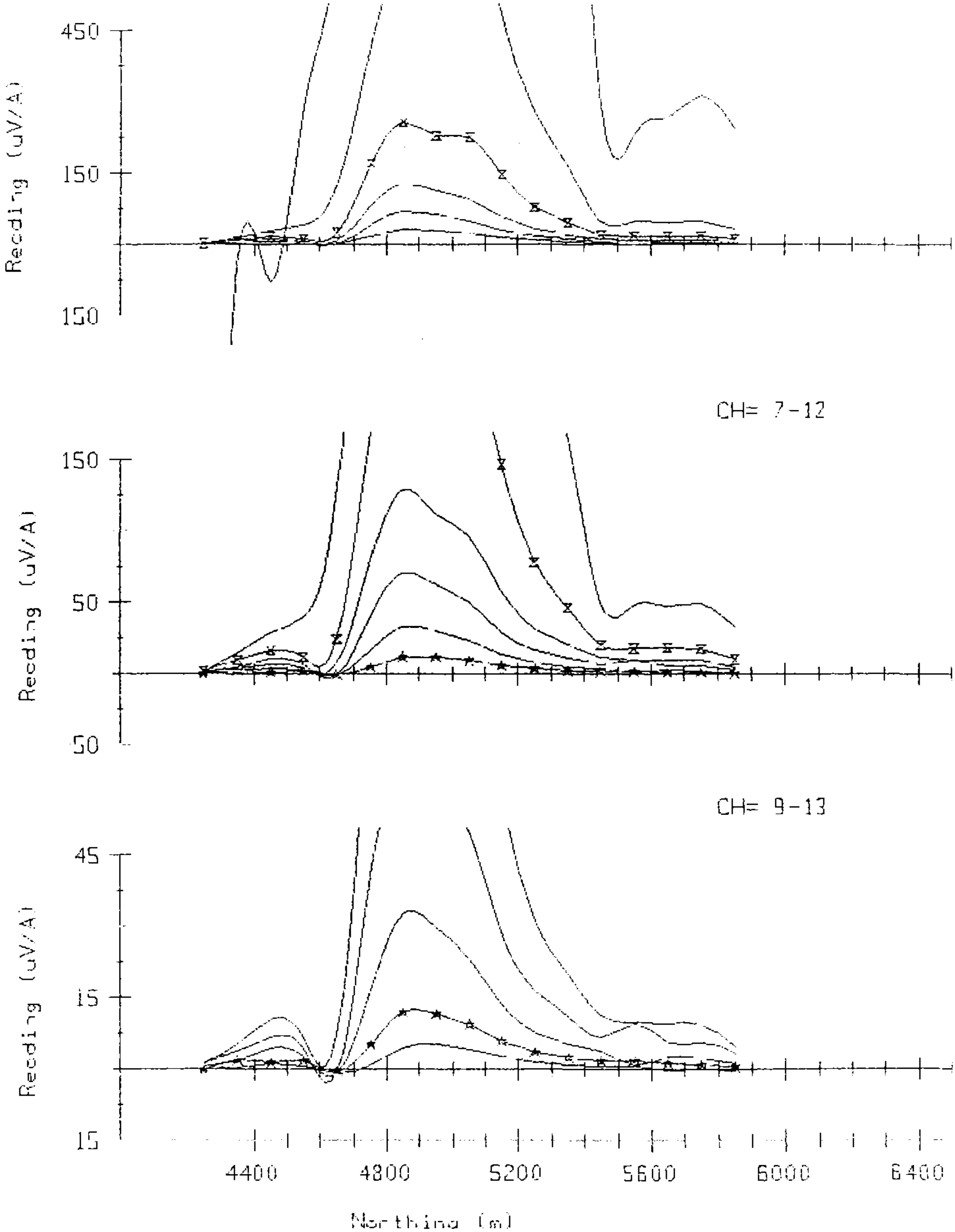


510319

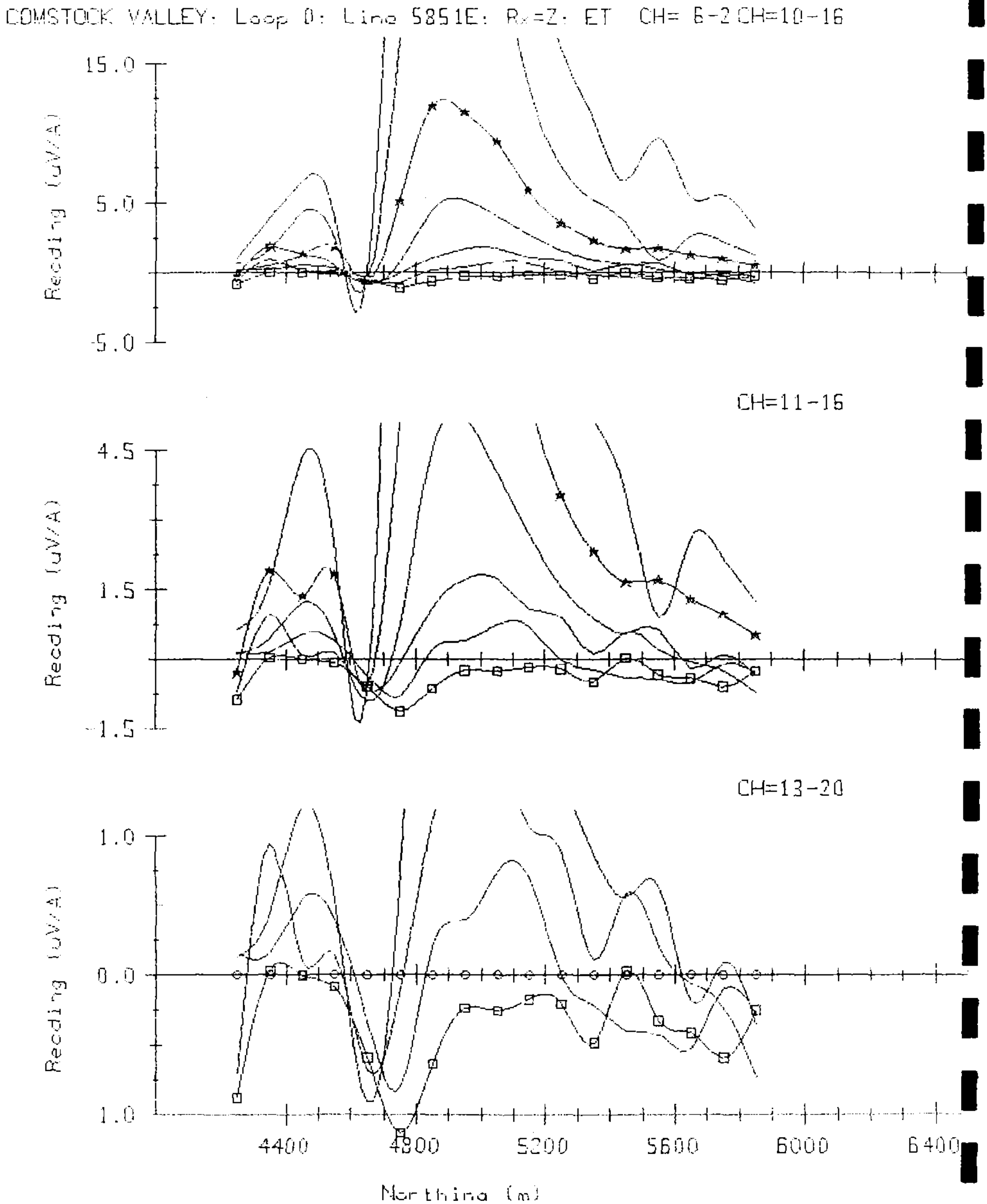

COMSTOCK VALLEY: Loop 0: Line 5851E: Rx=Z: ET CH= 6-2 CH= 6
15000
5000
-5000
Reading (uV/A)
CH= 6- 7
3000
0
-3000
Reading (uV/A)
CH= 6- 9
1000
0
1000
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

510320

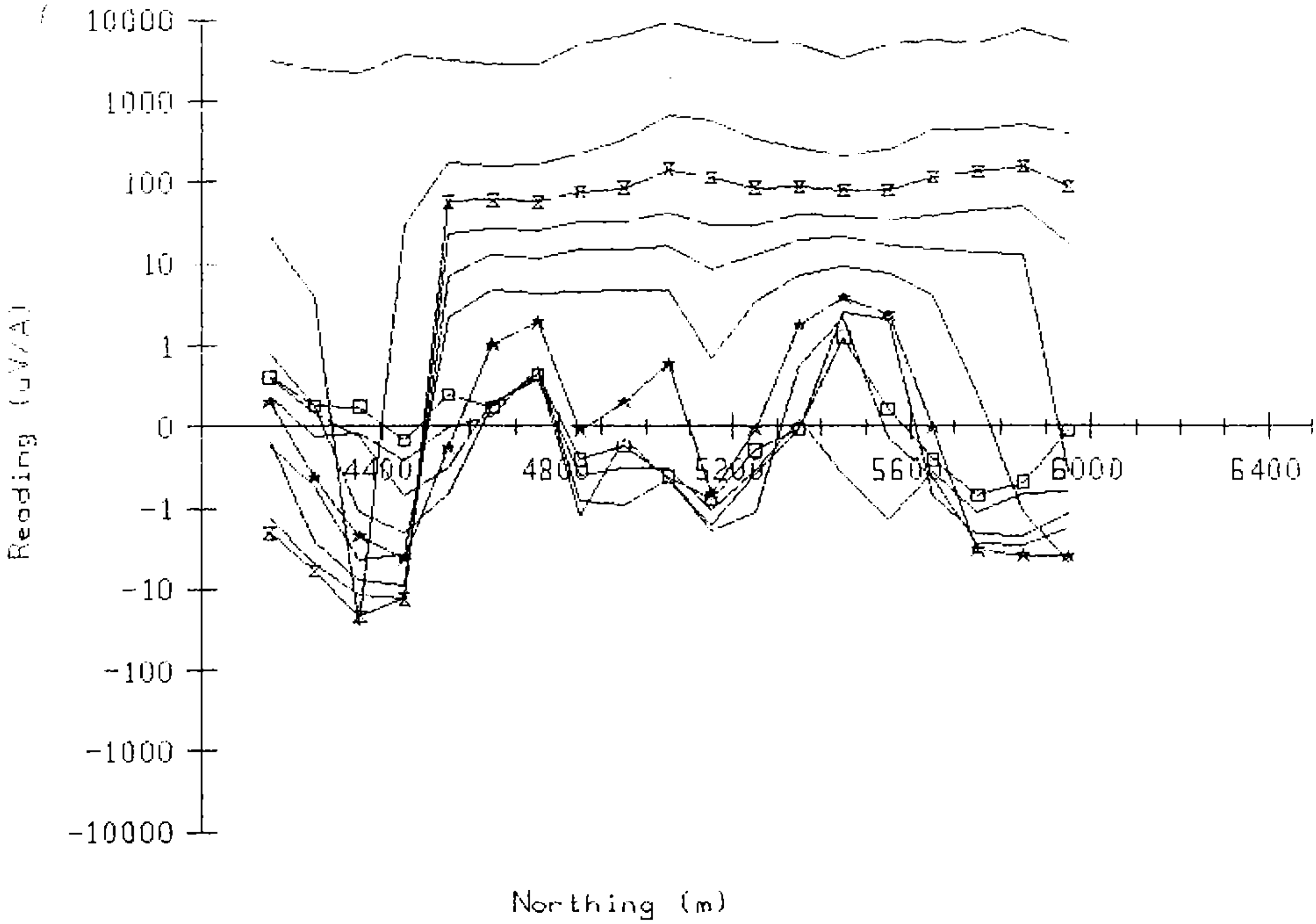
COMSTOCK VALLEY: Loop 0: Line 5851E: Rx=Z: ET CH= 6-2 CH= 7-11



510321

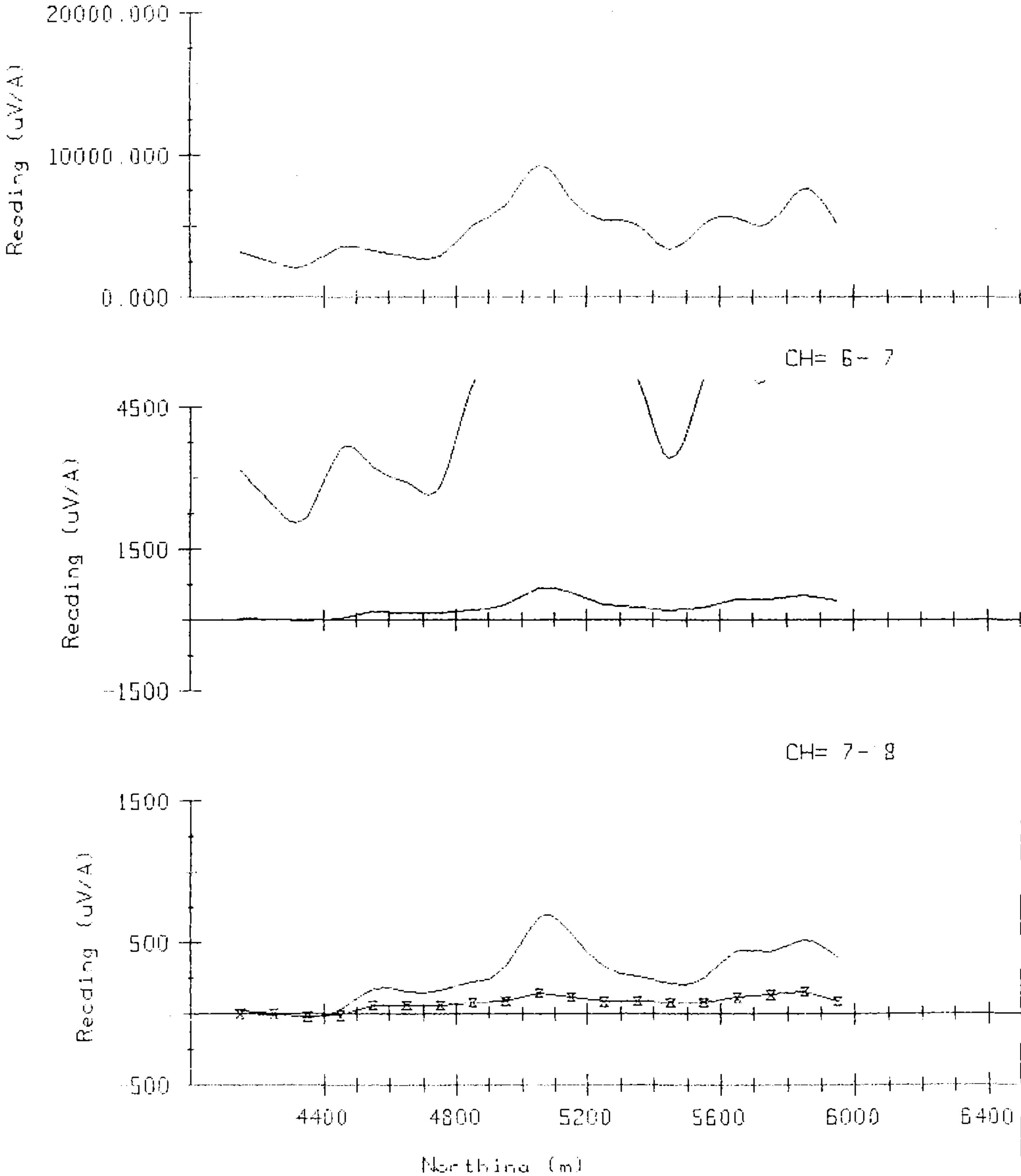

COMSTOCK VALLEY: Loop 0: Line 5851E: Rx=Z: ET CH= 6-2 CH=10-16
15.0
5.0
-5.0
Reading (uV/A)
CH=11-16
4.5
1.5
-1.5
Reading (uV/A)
CH=13-20
1.0
0.0
1.0
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

COMSTOCK VALLEY: Loop 0: Line 6550E: Rx=Z: ET CH= 6-16



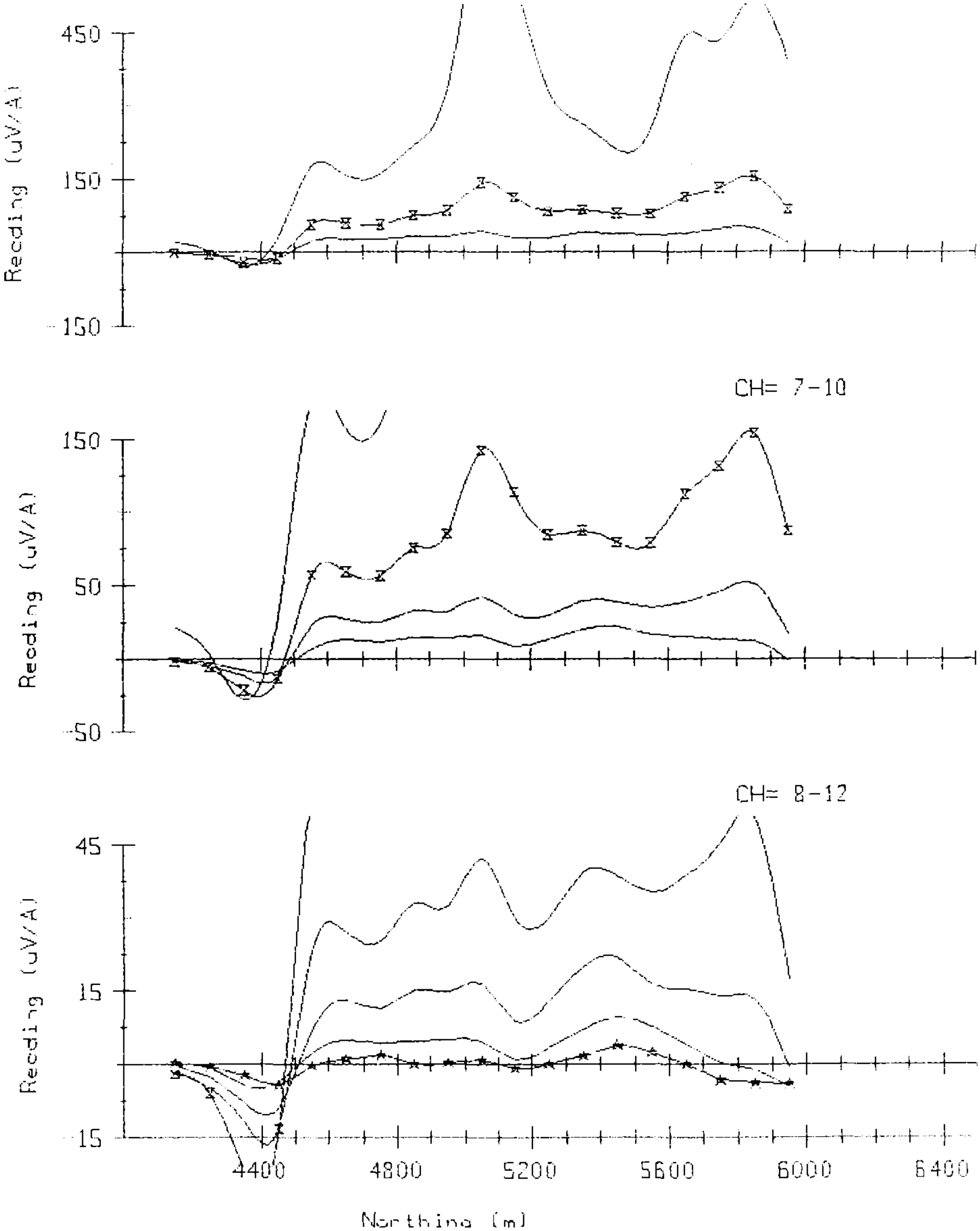
510323

COMSTOCK VALLEY: Loop 0: Line 6550E: R =Z: ET CH= 6-1 CH= 6

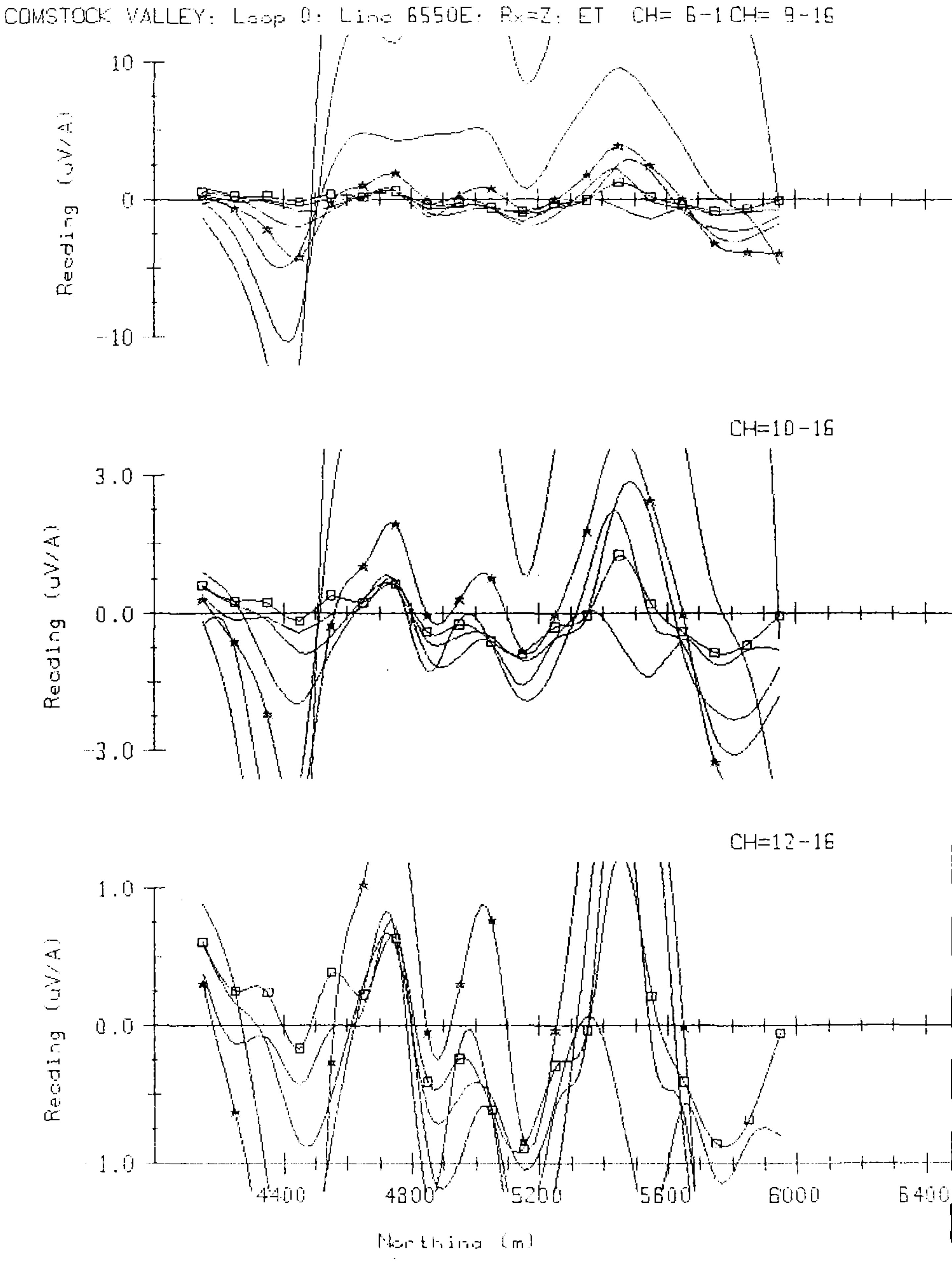


510324

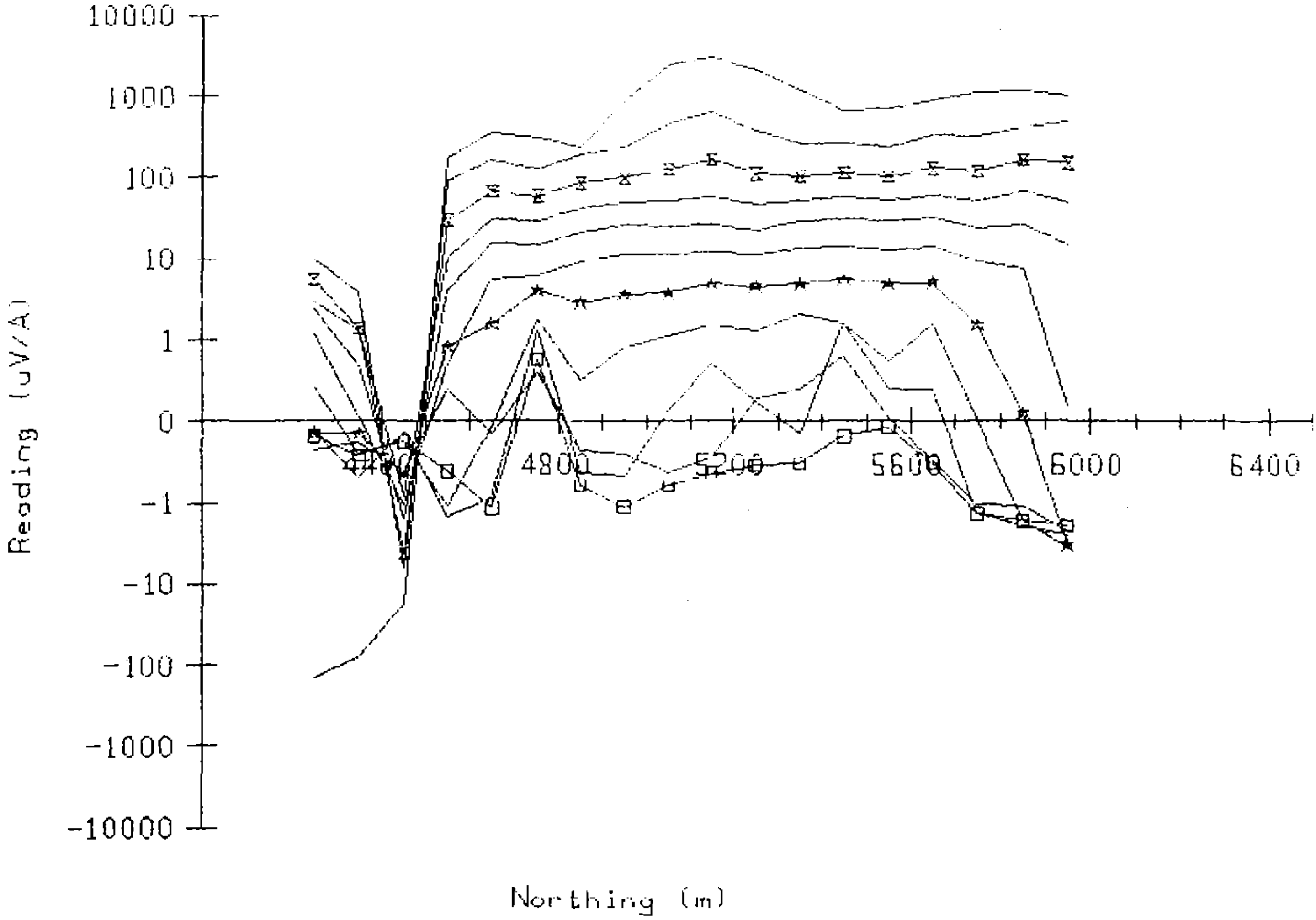
COMSTOCK VALLEY: Loop 0: Line 6550E: Rx=Z: ET CH= 6-1 CH= 7- 9



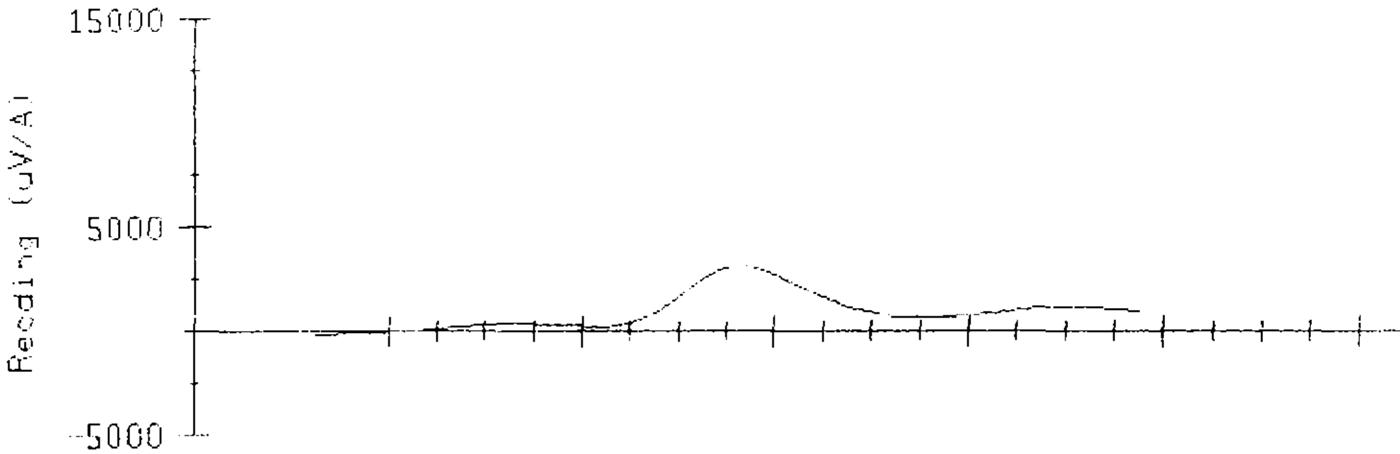
510325


COMSTOCK VALLEY: Loop 0: Line 6550E: Rx=Z: ET CH= 6-1 CH= 9-16
10
0
-10
Reading (uV/A)
CH=10-16
3.0
0.0
-3.0
Reading (uV/A)
CH=12-16
1.0
0.0
-1.0
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

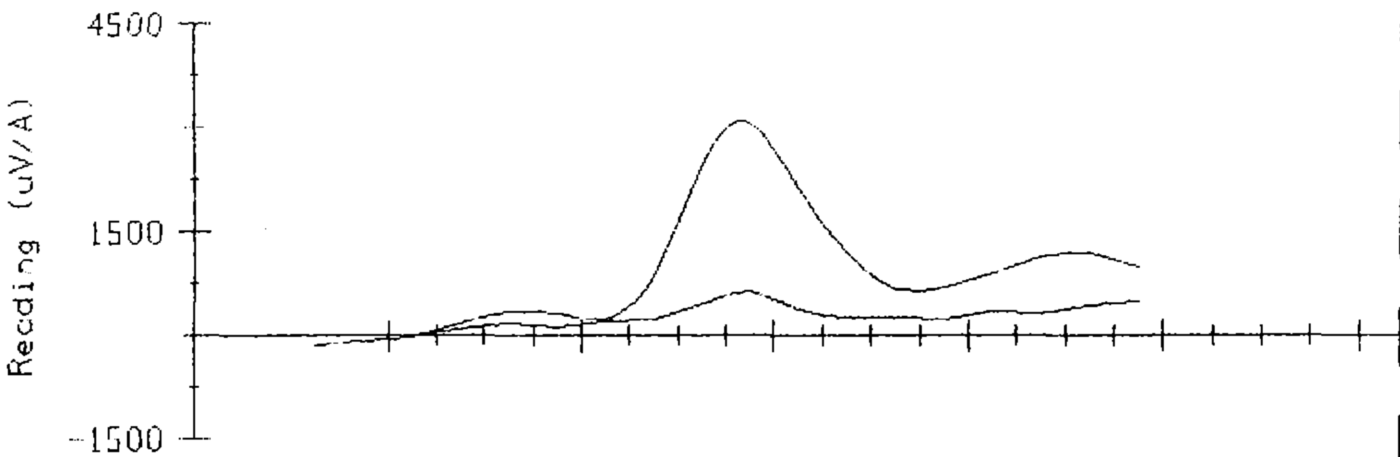
COMSTOCK VALLEY: Loop 0: Line 6551E: Rx=Z: ET CH= 6-16



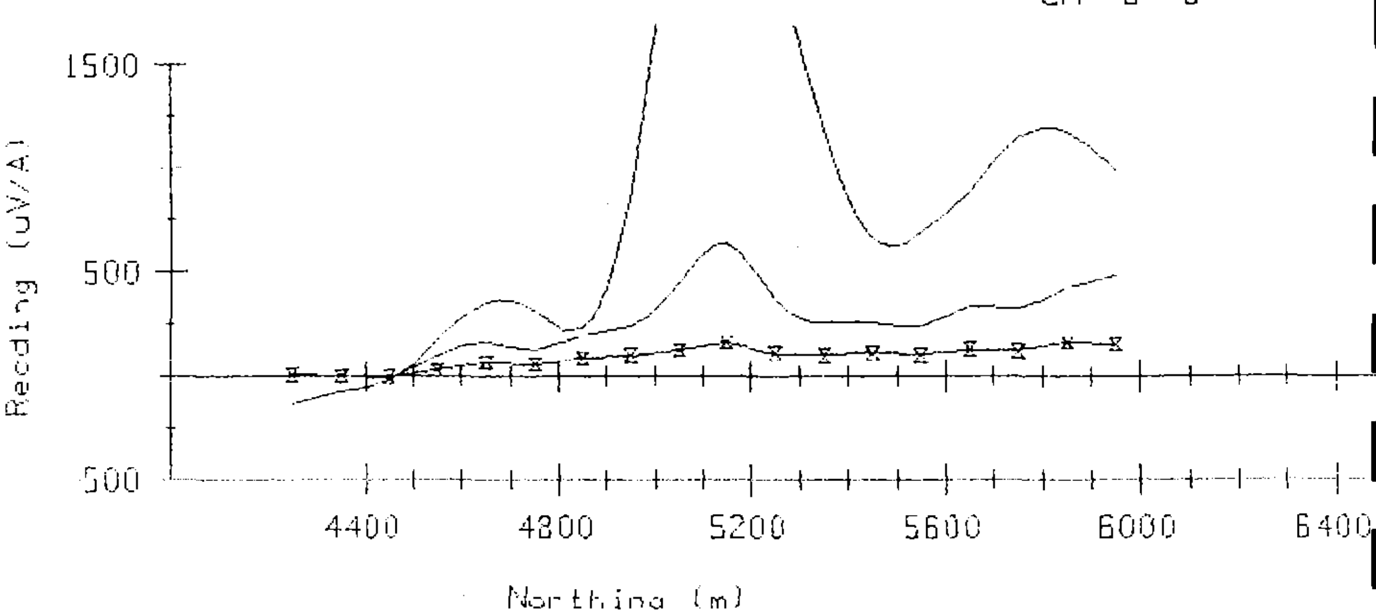
COMSTOCK VALLEY: Loop 0: Line 6551E: Rx=Z: ET CH= 6-1 CH= 6



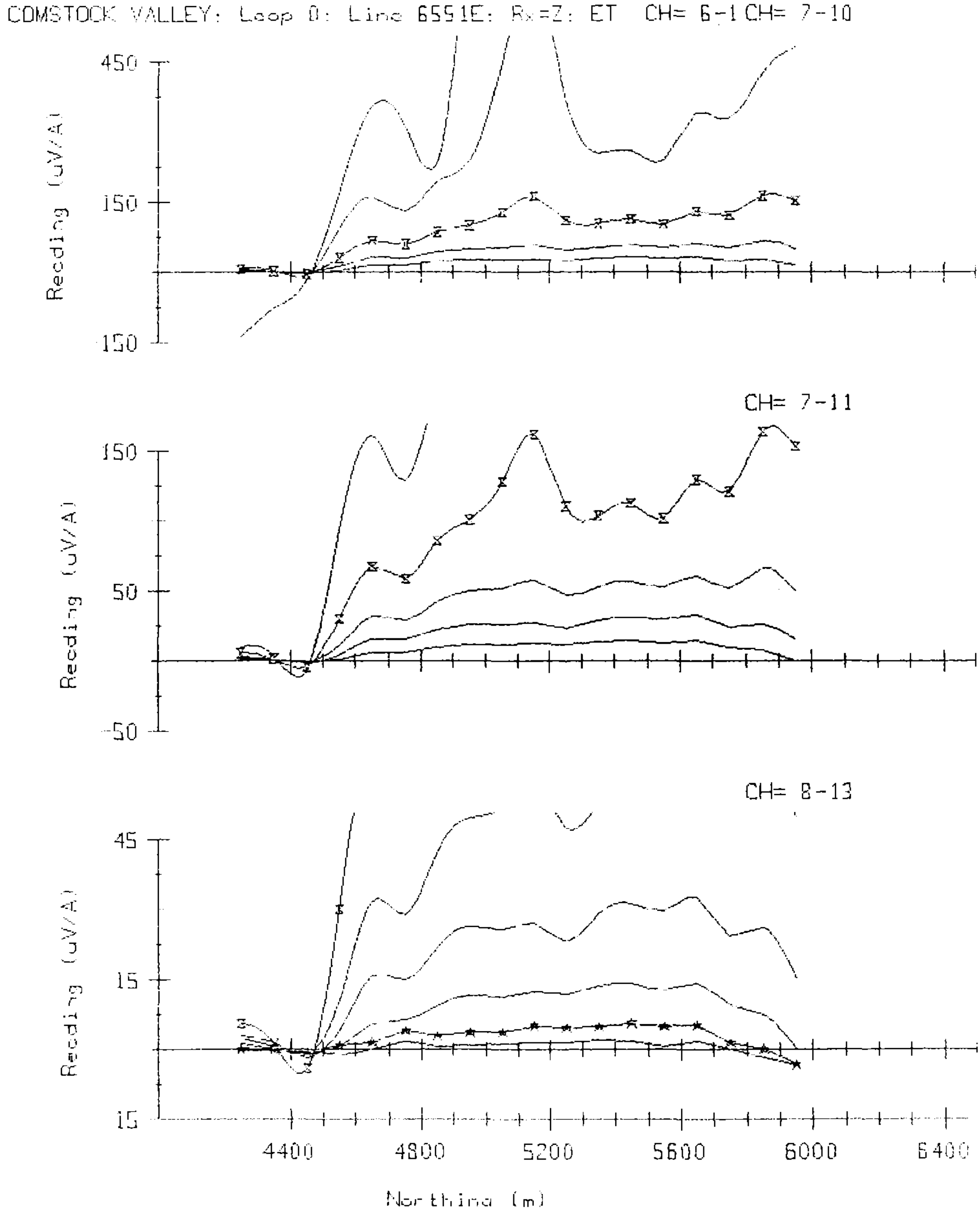

CH= 6- 7



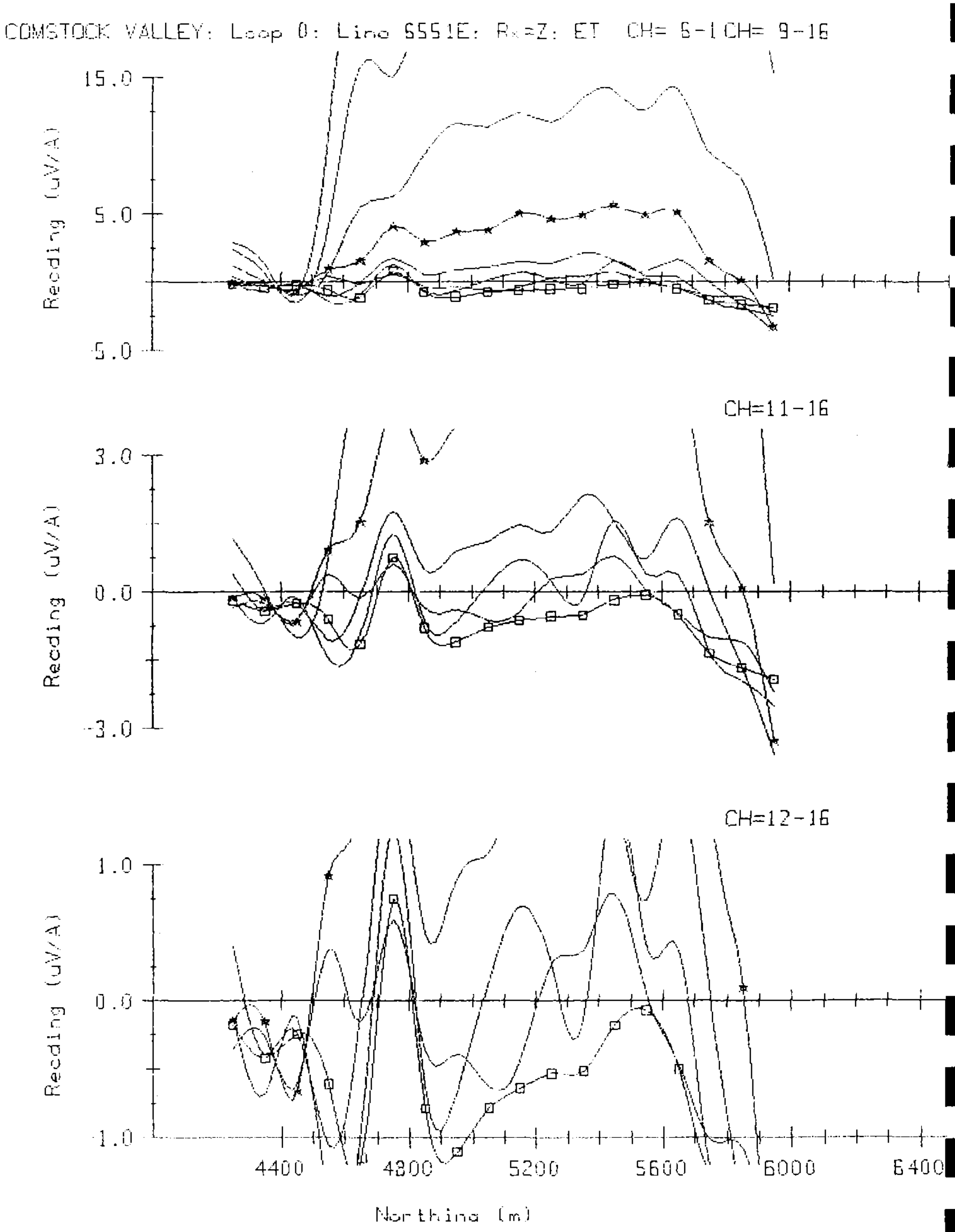

CH= 6- 8



510328

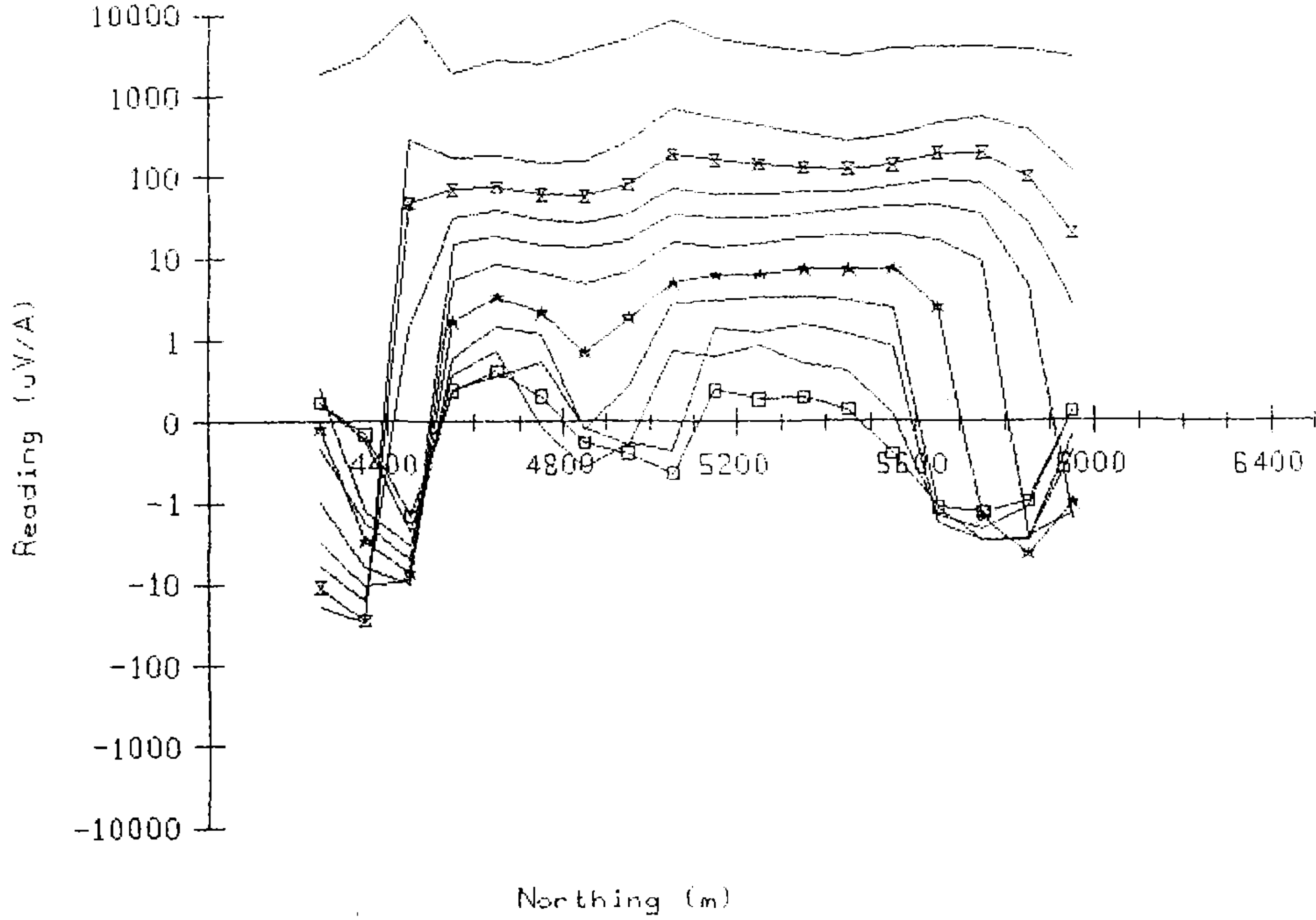

COMSTOCK VALLEY: Loop 0: Line 6551E: Rx=Z: ET CH= 6-1 CH= 7-10
450
150
-150
Reading (uV/A)
CH= 7-11
150
50
-50
Reading (uV/A)
CH= 8-13
45
15
15
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

510329


COMSTOCK VALLEY: Loop 0: Line 6551E: Rx=Z: ET CH= 6-1 CH= 9-16
15.0
5.0
-5.0
Reading (uV/A)
CH=11-16
3.0
0.0
-3.0
Reading (uV/A)
CH=12-16
1.0
0.0
-1.0
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

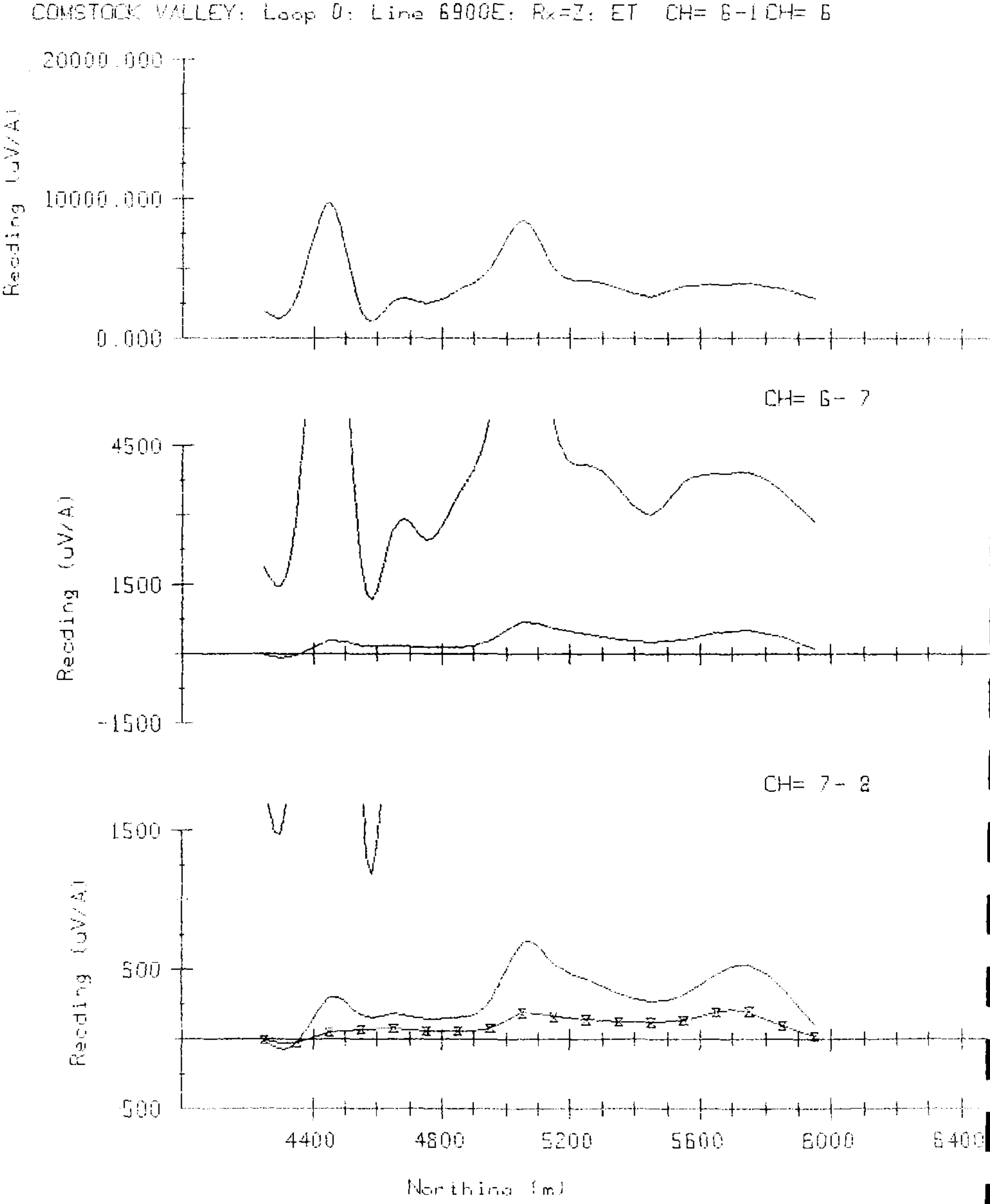
318

COMSTOCK VALLEY: Loop 0: Line 6900E: Rx=Z: ET CH= 6-16



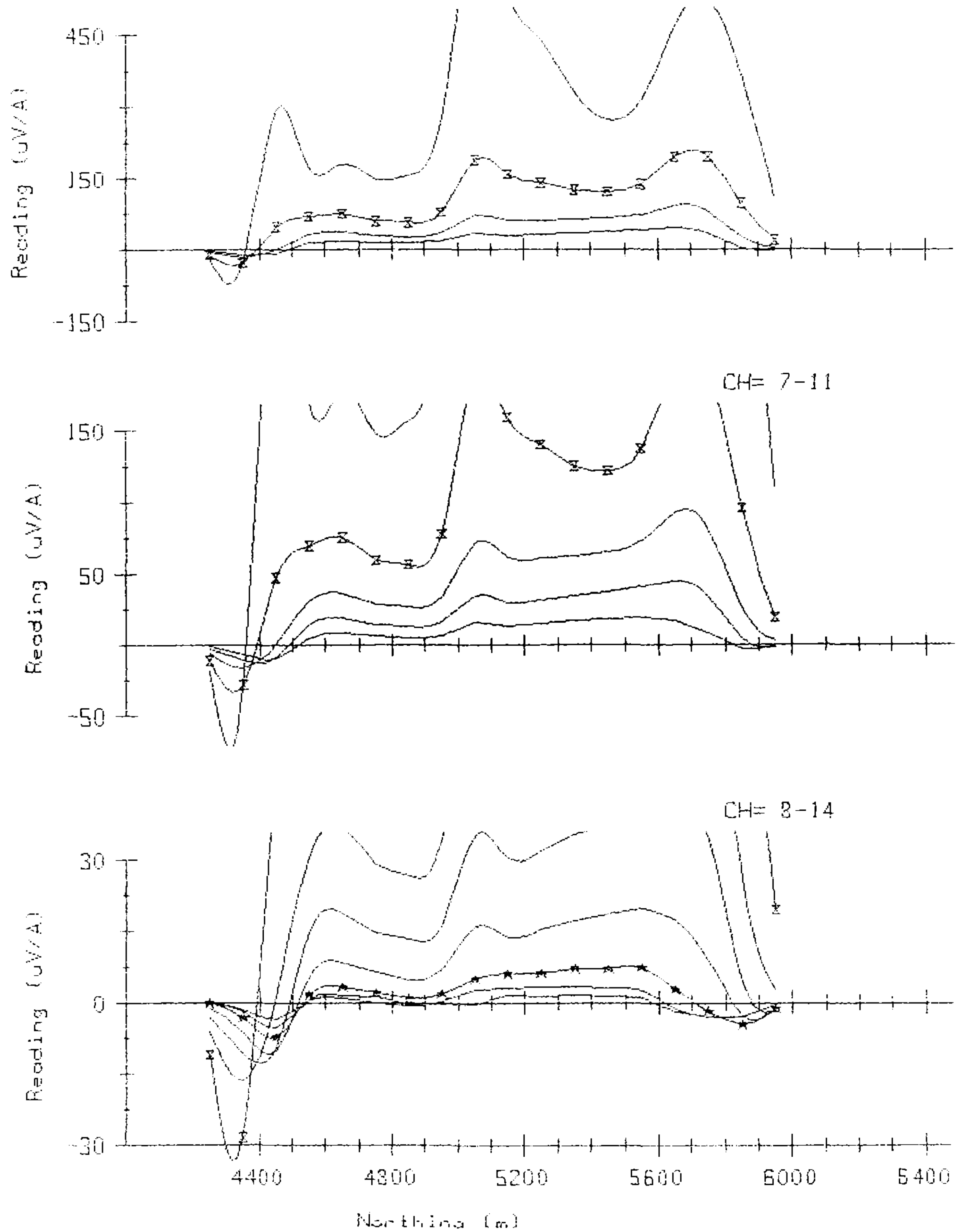
510331

310

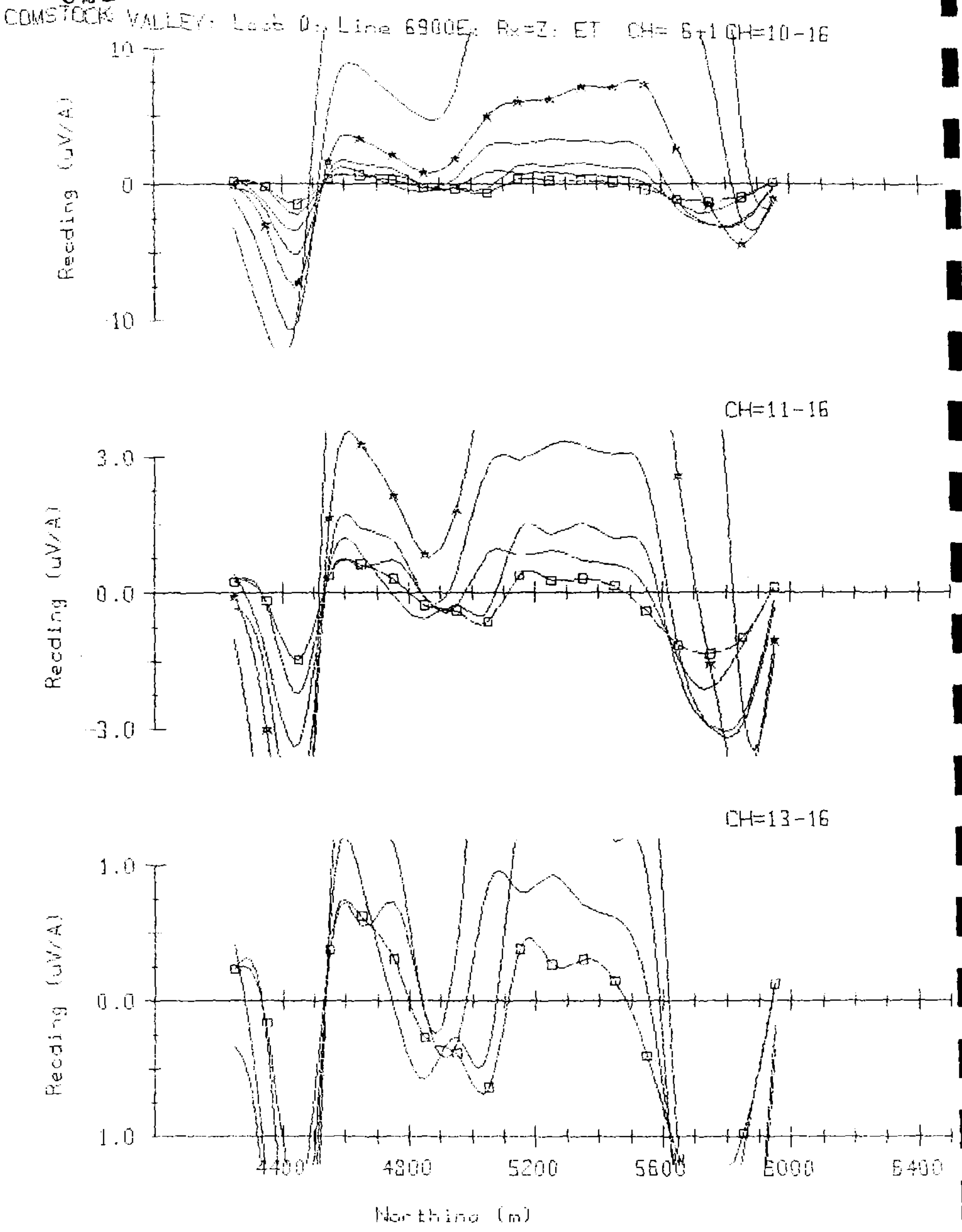

COMSTOCK VALLEY: Loop 0: Line 6900E: Rx=Z: ET CH= 6-1 CH= 6
20000.000
10000.000
0.000
Reading (uV/A)
CH= 6- 7
4500
1500
-1500
Reading (uV/A)
CH= 7- 8
1500
500
-500
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

510332

COMSTOCK VALLEY: Loop 0: Line 6900E: Rx=Z: ET CH= 6-1 CH= 7-10



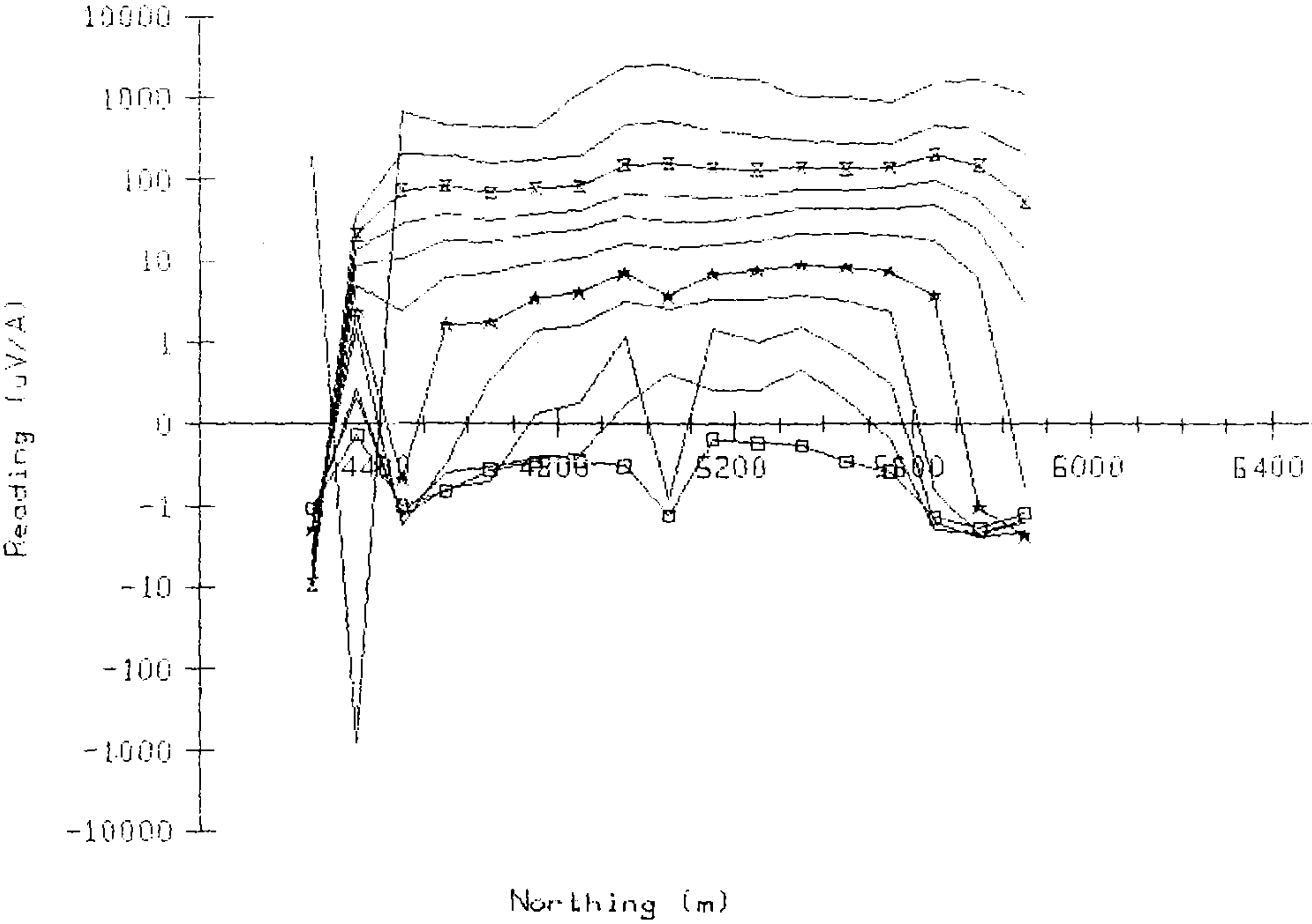
510333


COMSTOCK VALLEY: Loop 0; Line 6900E; Rx=Z; ET CH= 6-16
CH=10-16
10
0
-10
Reading (uV/A)
CH=11-16
3.0
0.0
-3.0
Reading (uV/A)
CH=13-16
1.0
0.0
1.0
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

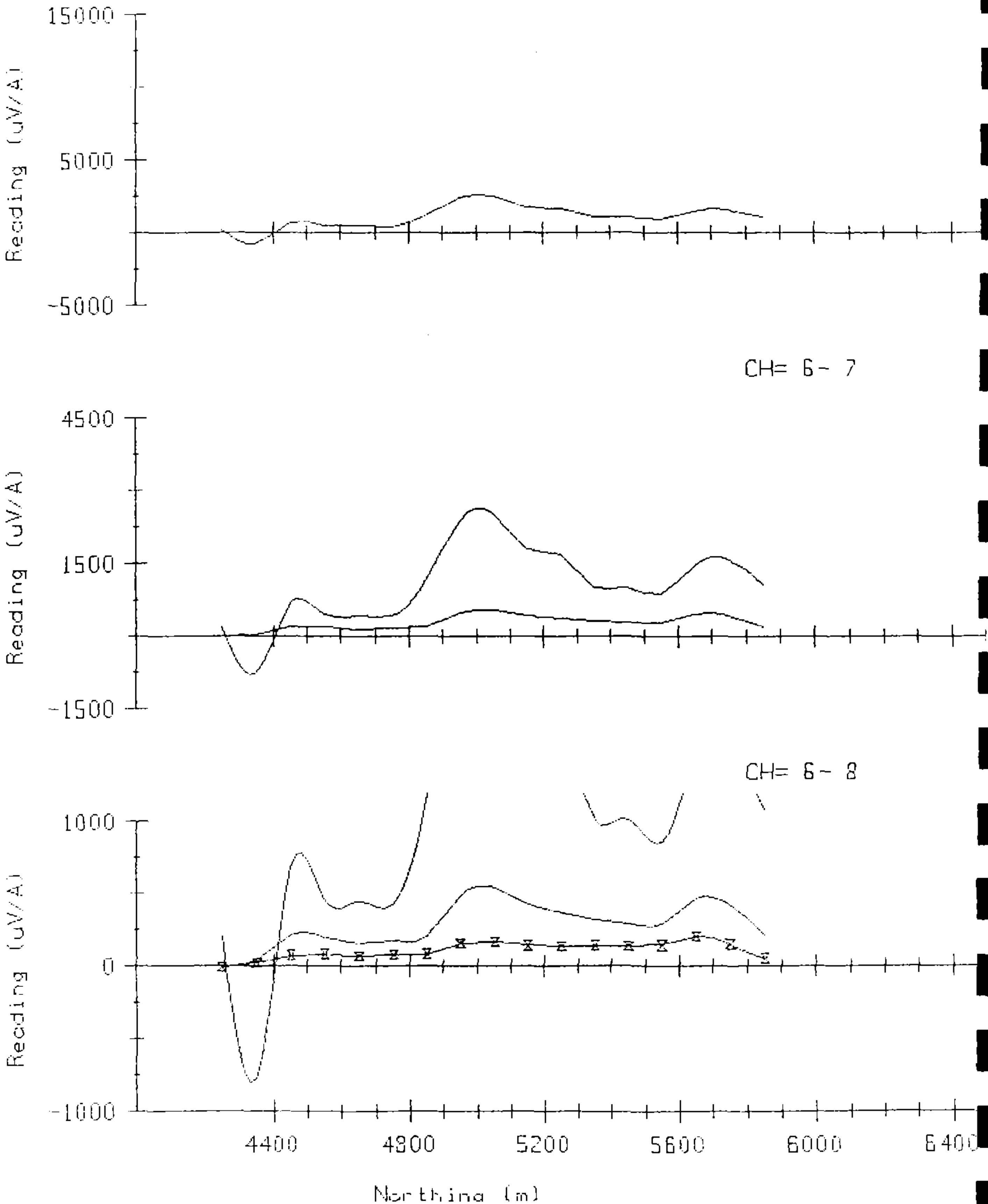
322

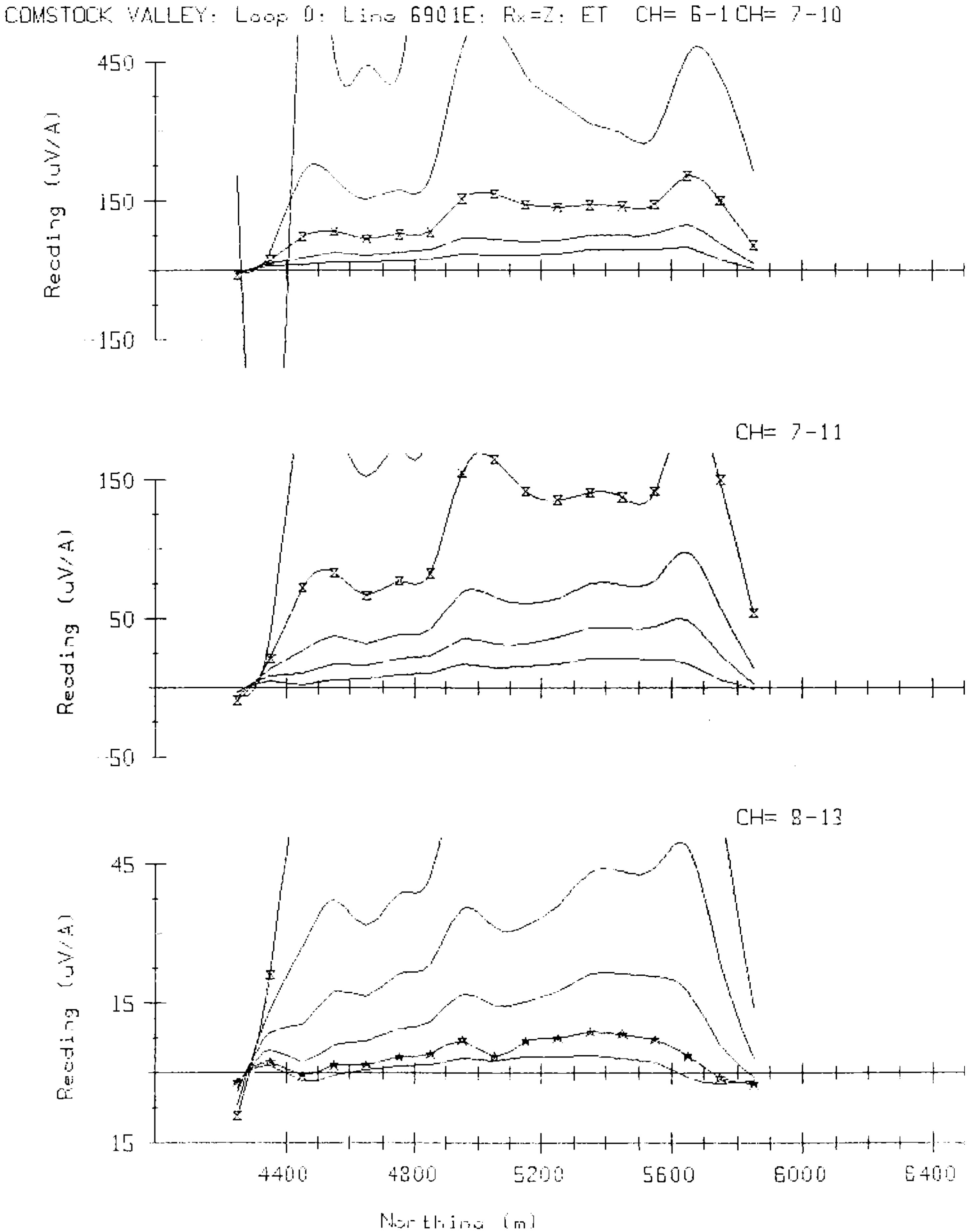
510334

COMSTOCK VALLEY: Loop 0: Line 6901E: Rx=Z: ET CH= 6-16



COMSTOCK VALLEY: Loop 0: Line 6901E: Rx=Z: ET CH= 6-1 CH= 6

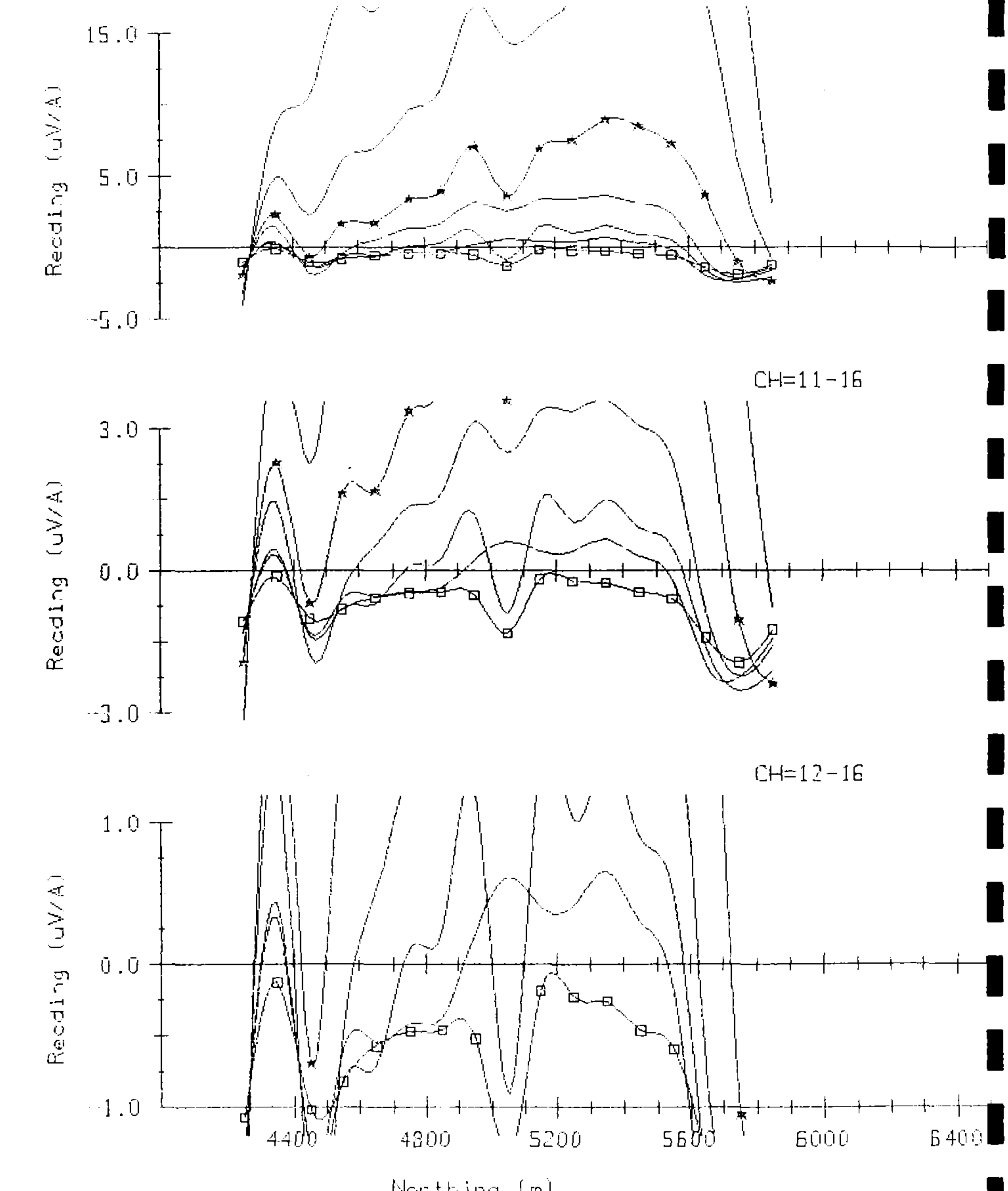



COMSTOCK VALLEY: Loop 0: Line 6901E: Rx=Z: ET CH= 6-1 CH= 7-10
450
150
-150
Reading (uV/A)
CH= 7-11
150
50
-50
Reading (uV/A)
CH= 8-13
45
15
15
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

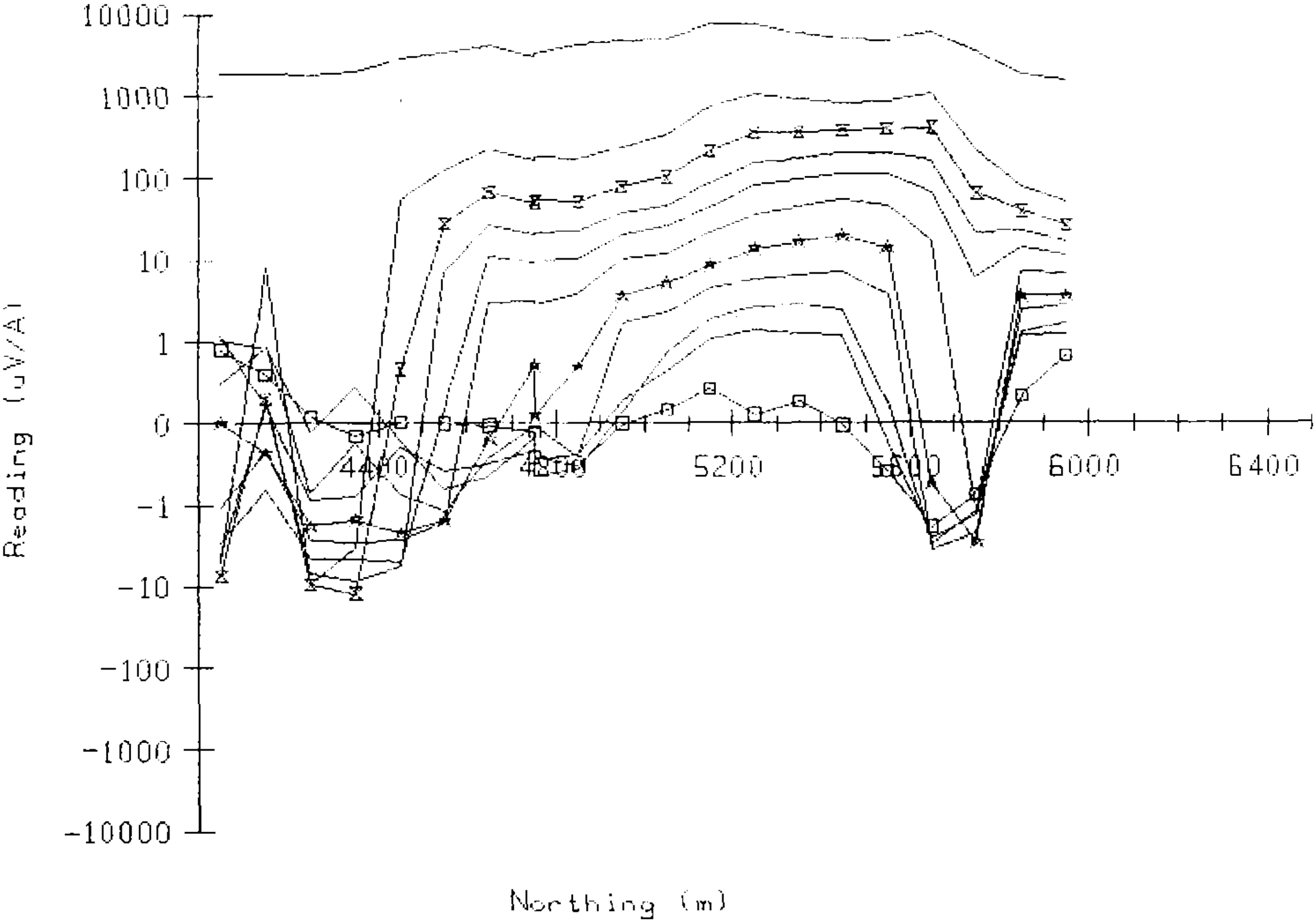
510337

320

COMSTOCK VALLEY: Loop 0: Line 6901E: Rx=Z: ET CH= 6-1 CH=10-16



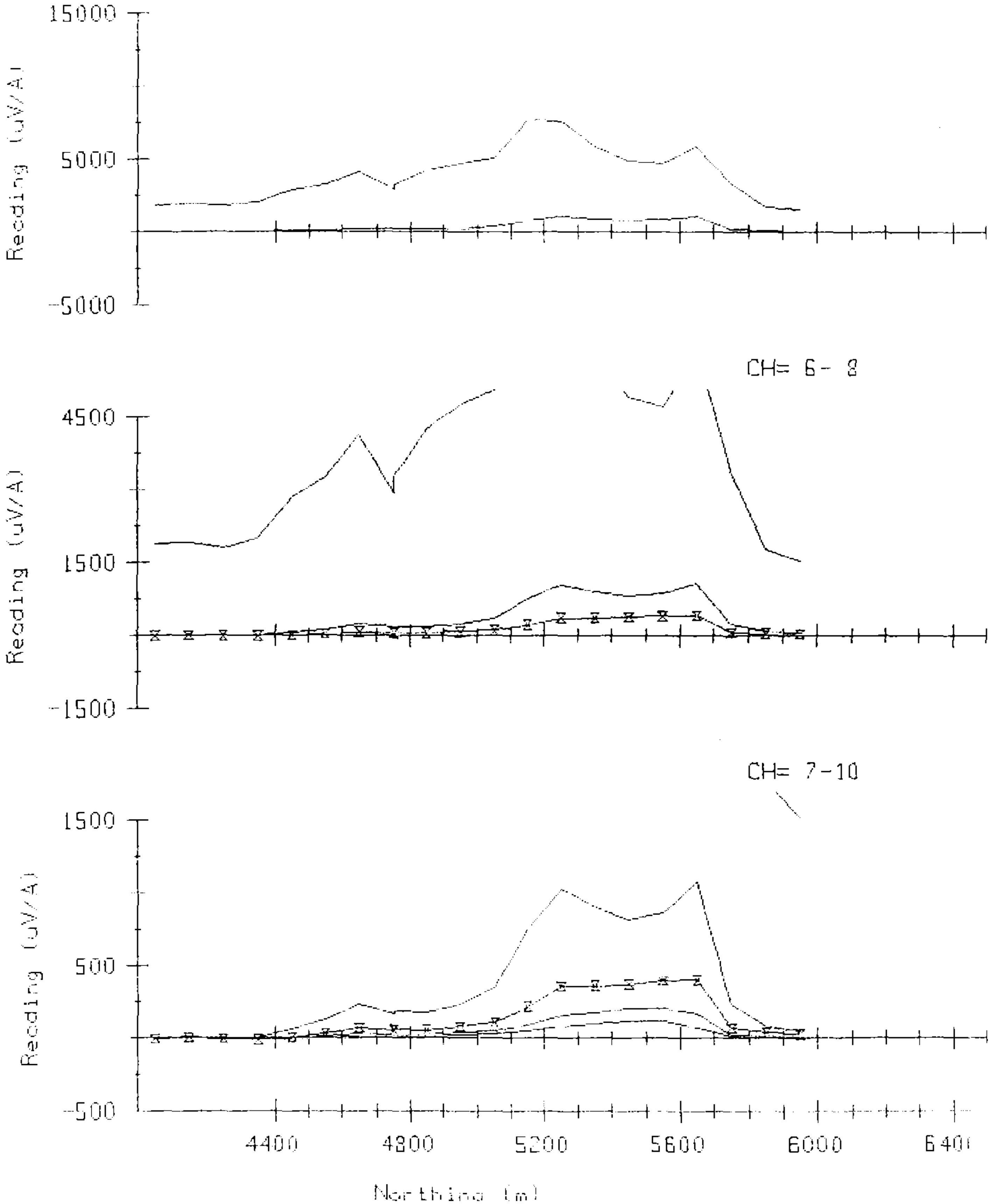
COMSTOCK VALLEY: Loop 0: Line 7250E: Rx=Z: ET CH= 6-16



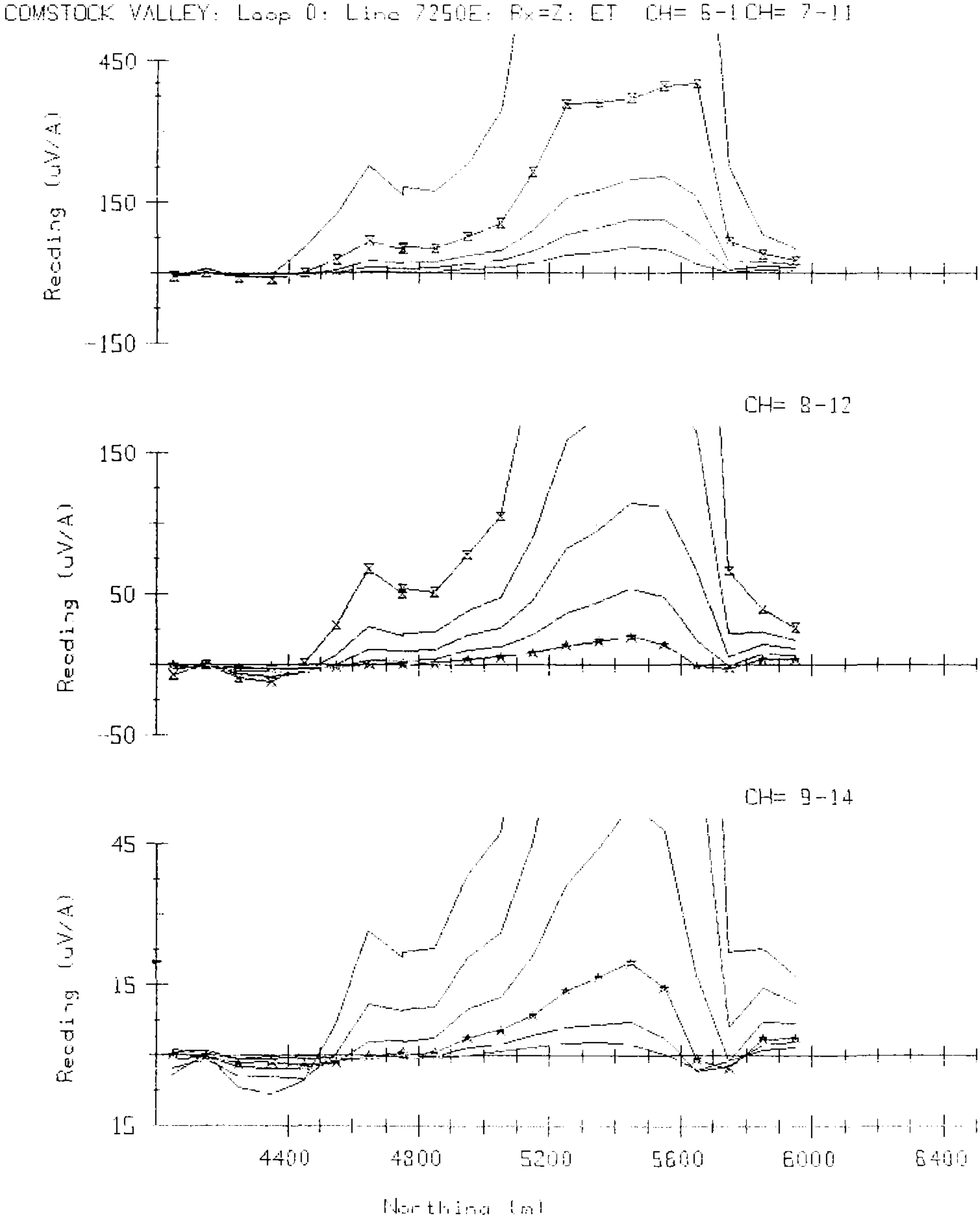
327

510339

COMSTOCK VALLEY: Loop 0: Line 7250E: Rx=Z: ET CH= 6-1 CH= 6- 7

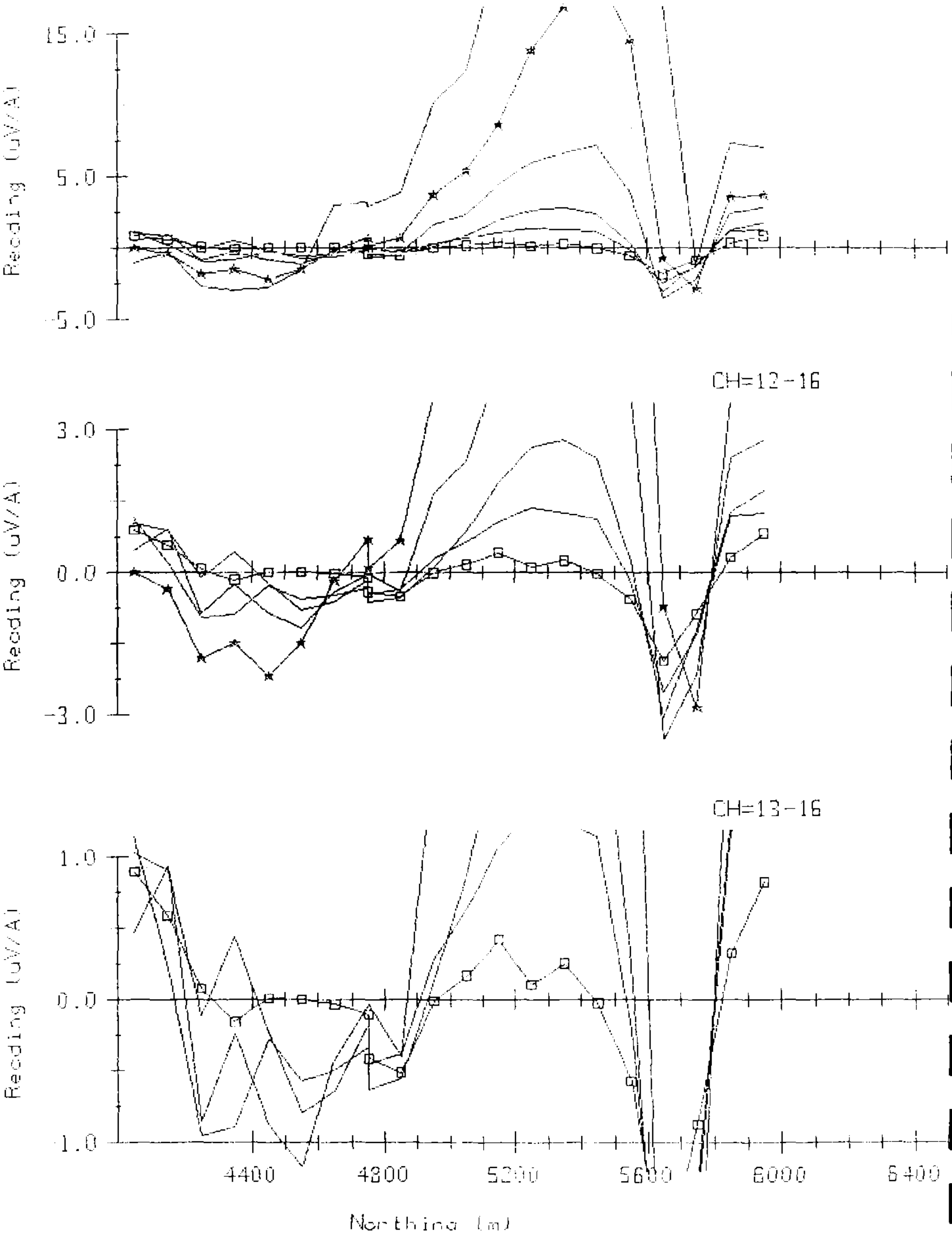


510340

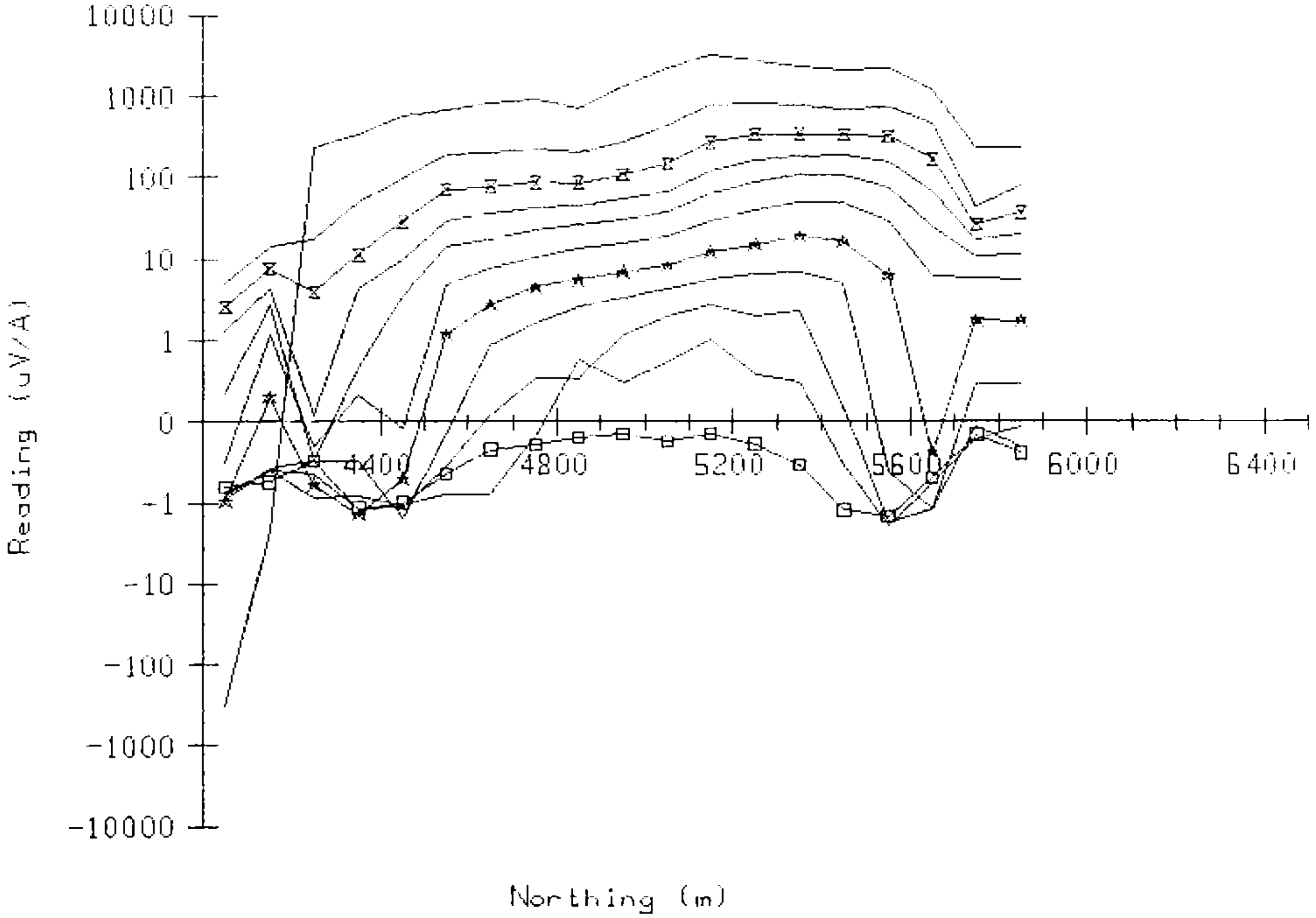


COMSTOCK VALLEY: Loop 0: Line 7250E: Rx=Z: ET CH= 6-1 CH= 7-11
450
150
-150
Reading (uV/A)
CH= 8-12
150
50
-50
Reading (uV/A)
CH= 9-14
45
15
15
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

COMSTOCK VALLEY: Loop 0: Line 7250E: Rx=Z: ET CH= 5-1 CH=11-16



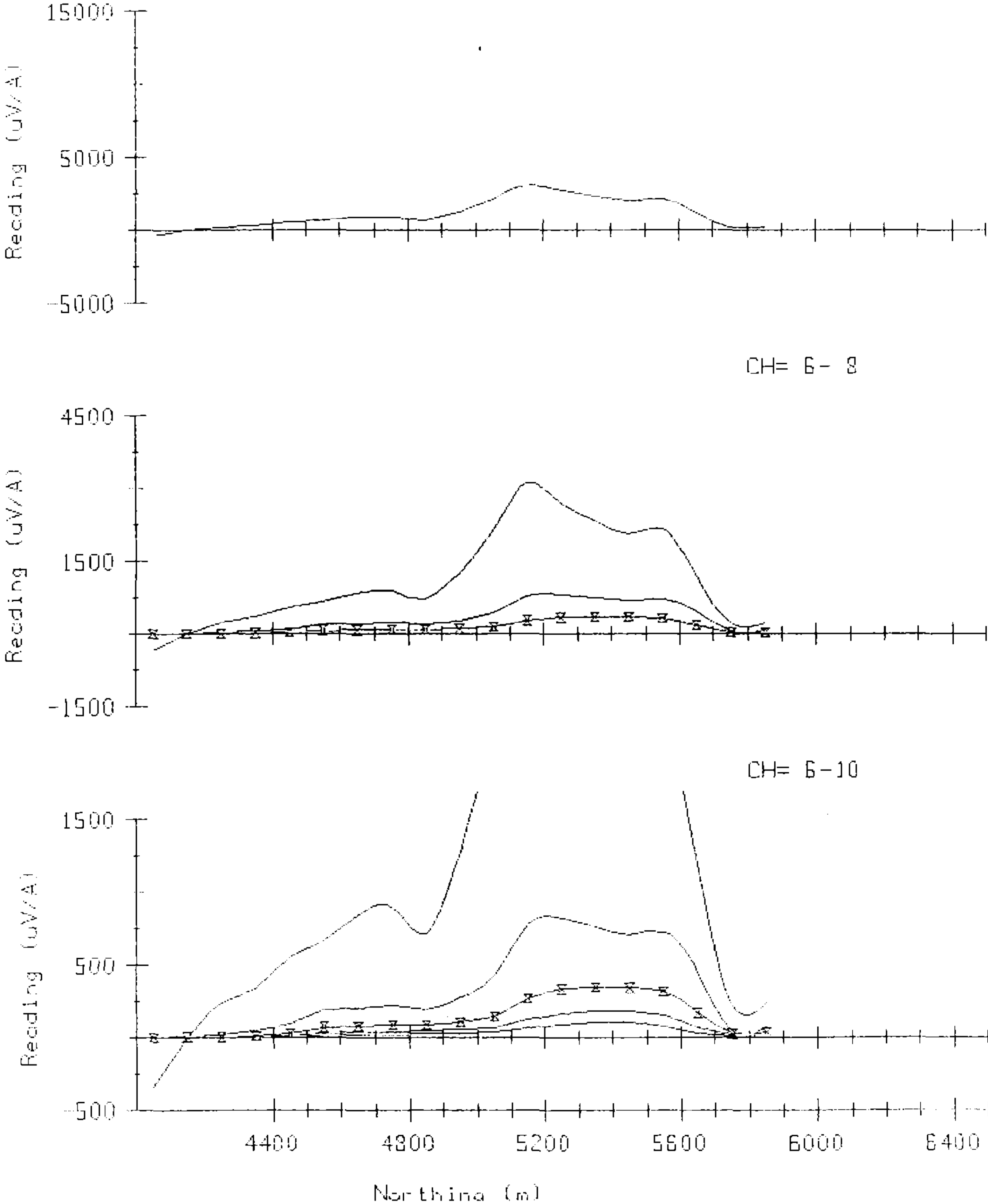
COMSTOCK VALLEY: Loop 0: Line 7251E: Rx=Z: ET CH= 6-16



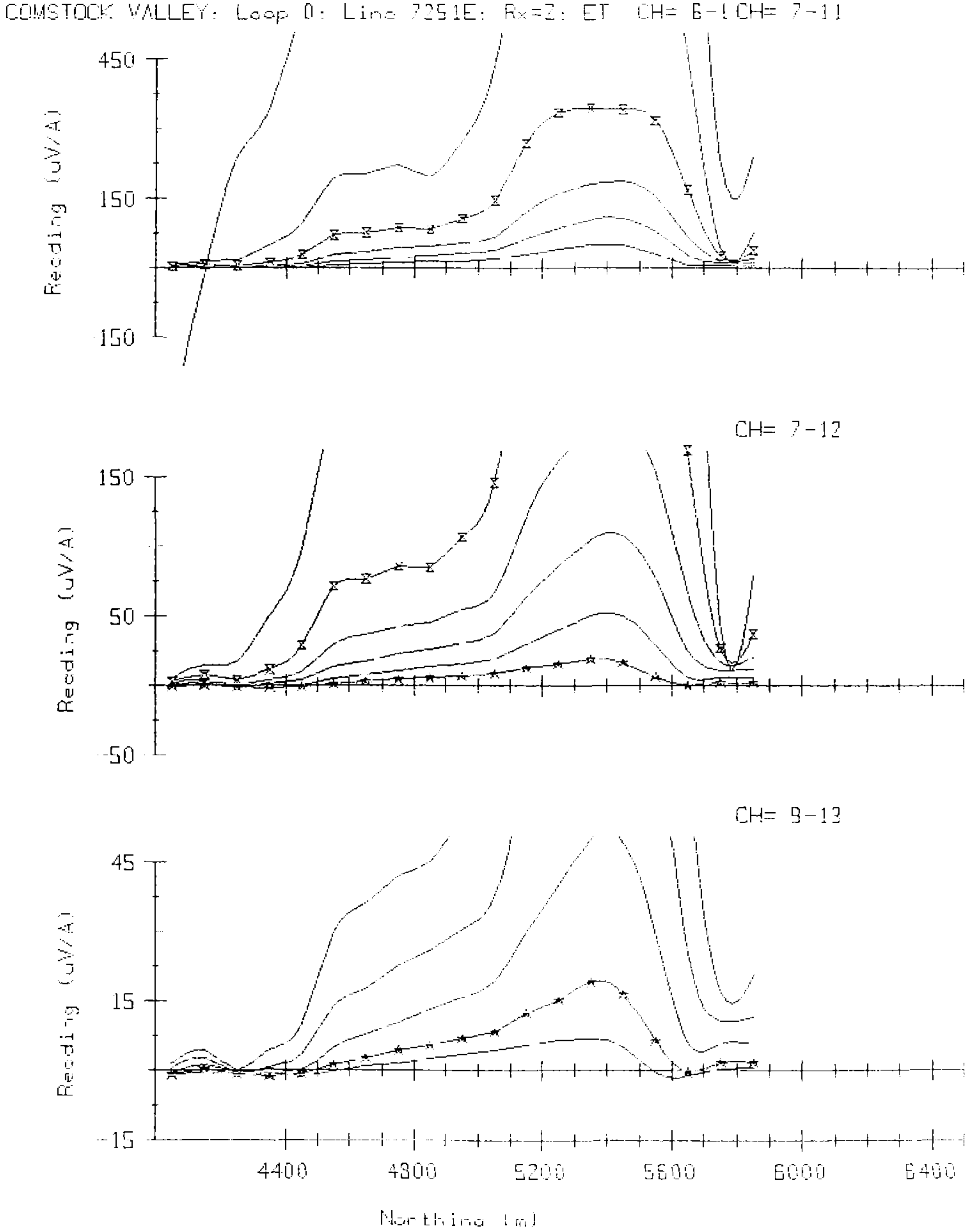
510343

33

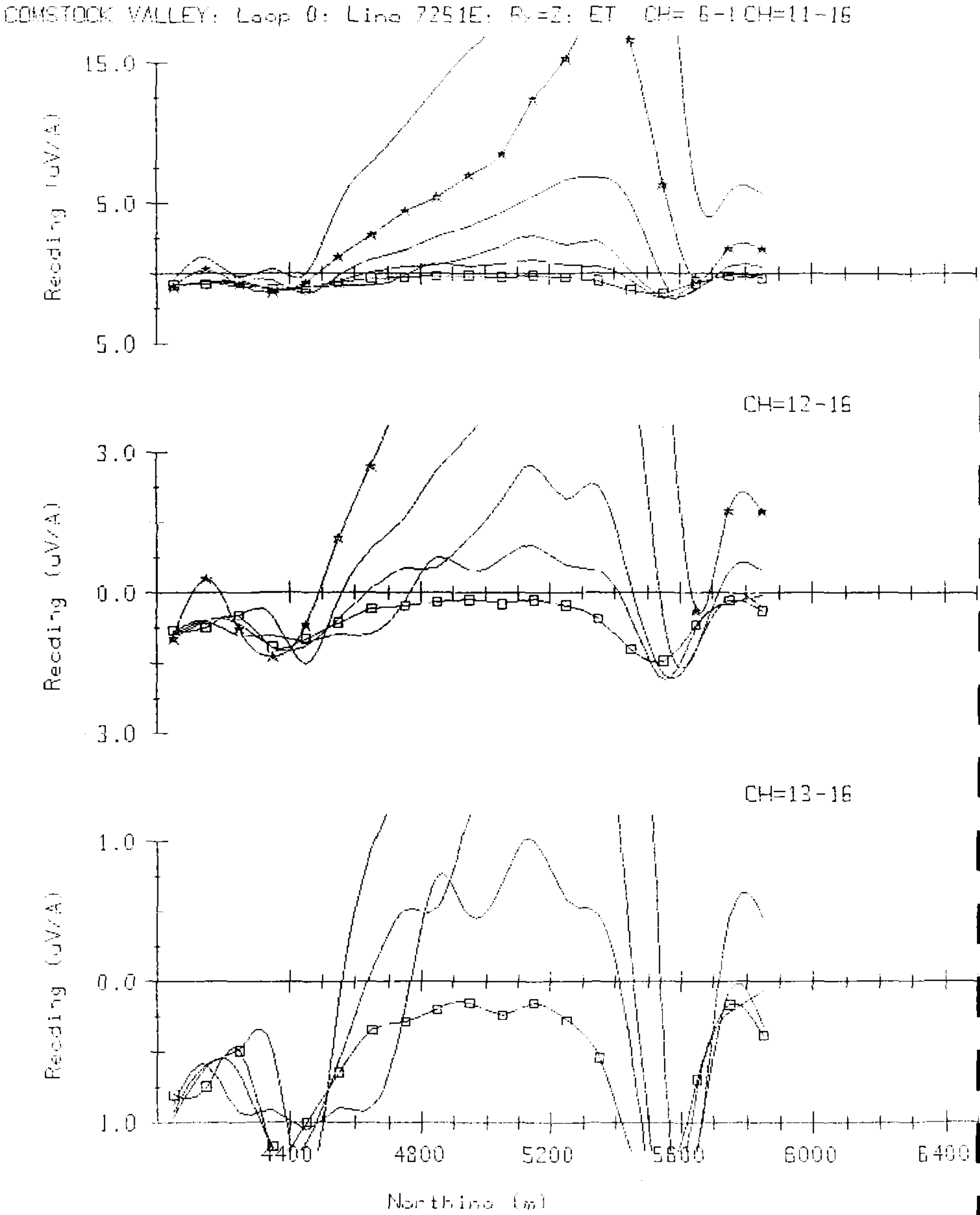
COMSTOCK VALLEY: Loop 0: Line 7251E: Rx=Z: ET CH= 6-1 CH= 6



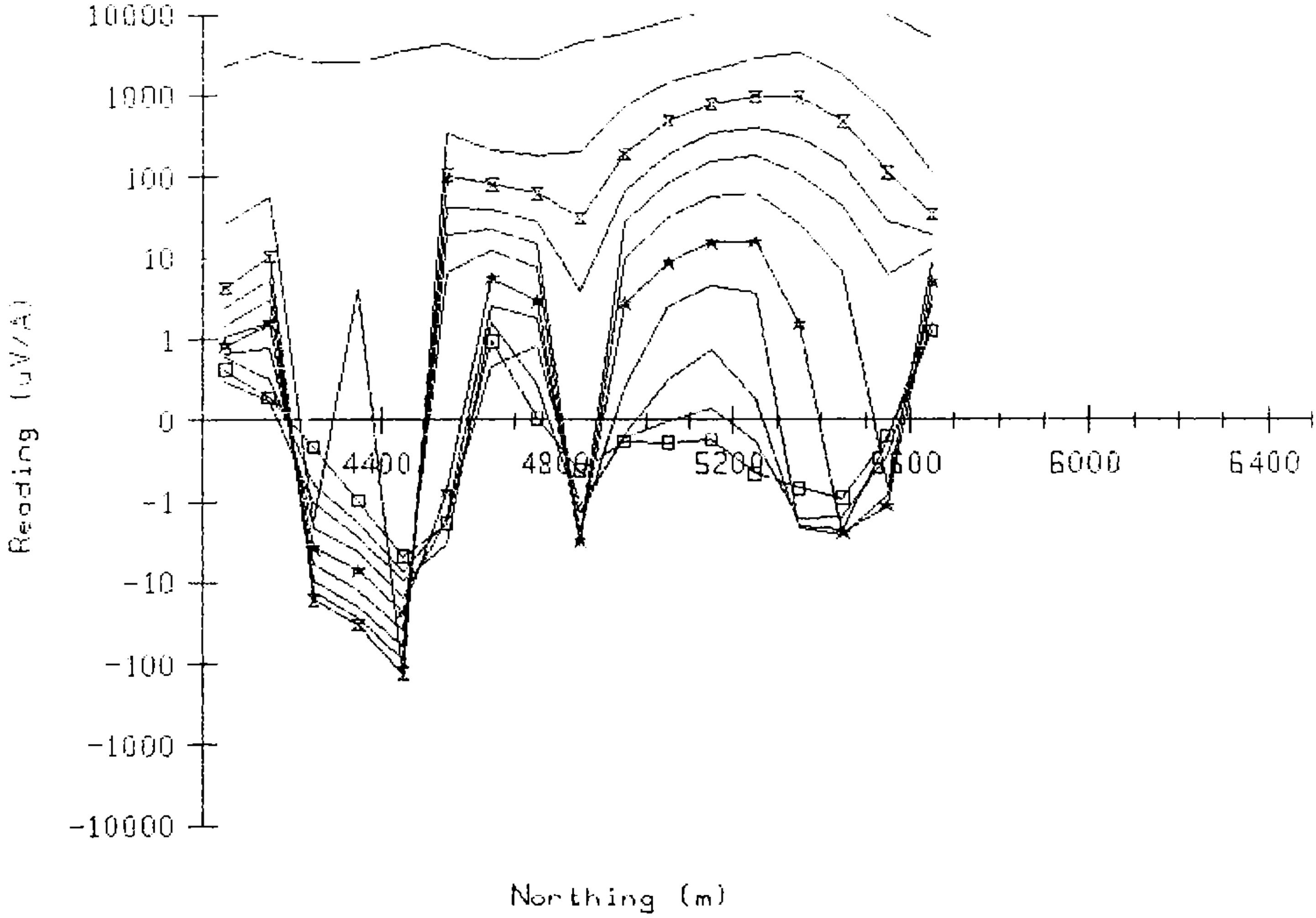
510344

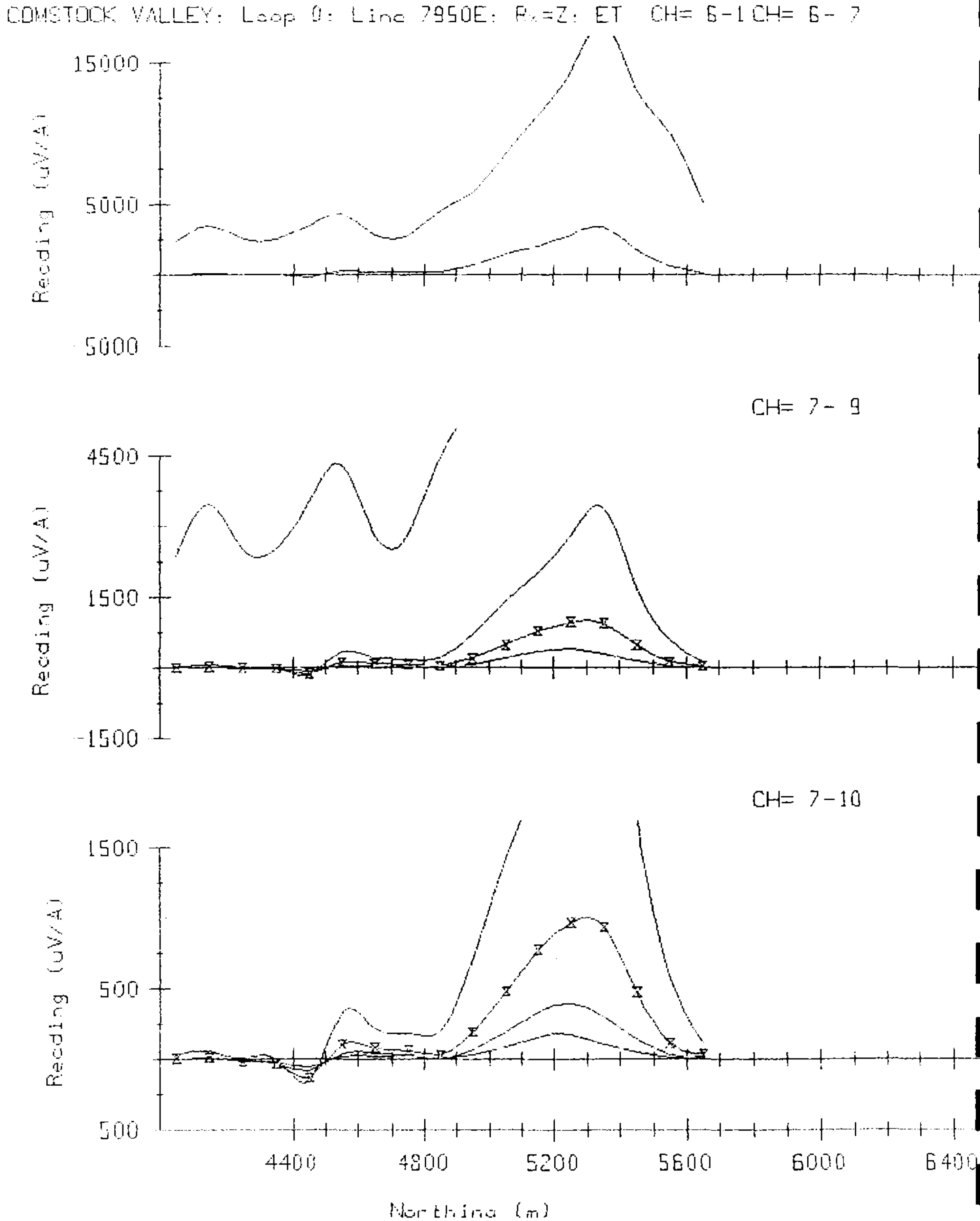

COMSTOCK VALLEY: Loop 0: Line 7251E: Rx=Z: ET CH= 6-1 CH= 7-11
450
150
-150
Reading (uV/A)
CH= 7-12
150
50
-50
Reading (uV/A)
CH= 8-13
45
15
-15
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

510345


COMSTOCK VALLEY: Loop 0: Line 7251E: Rx=Z: ET CH= 6-1 CH=11-16
15.0
5.0
5.0
Reading (uV/A)
CH=12-16
3.0
0.0
3.0
Reading (uV/A)
CH=13-16
1.0
0.0
1.0
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

COMSTOCK VALLEY: Loop 0: Line 7950E: Rx=Z: ET CH= 6-16

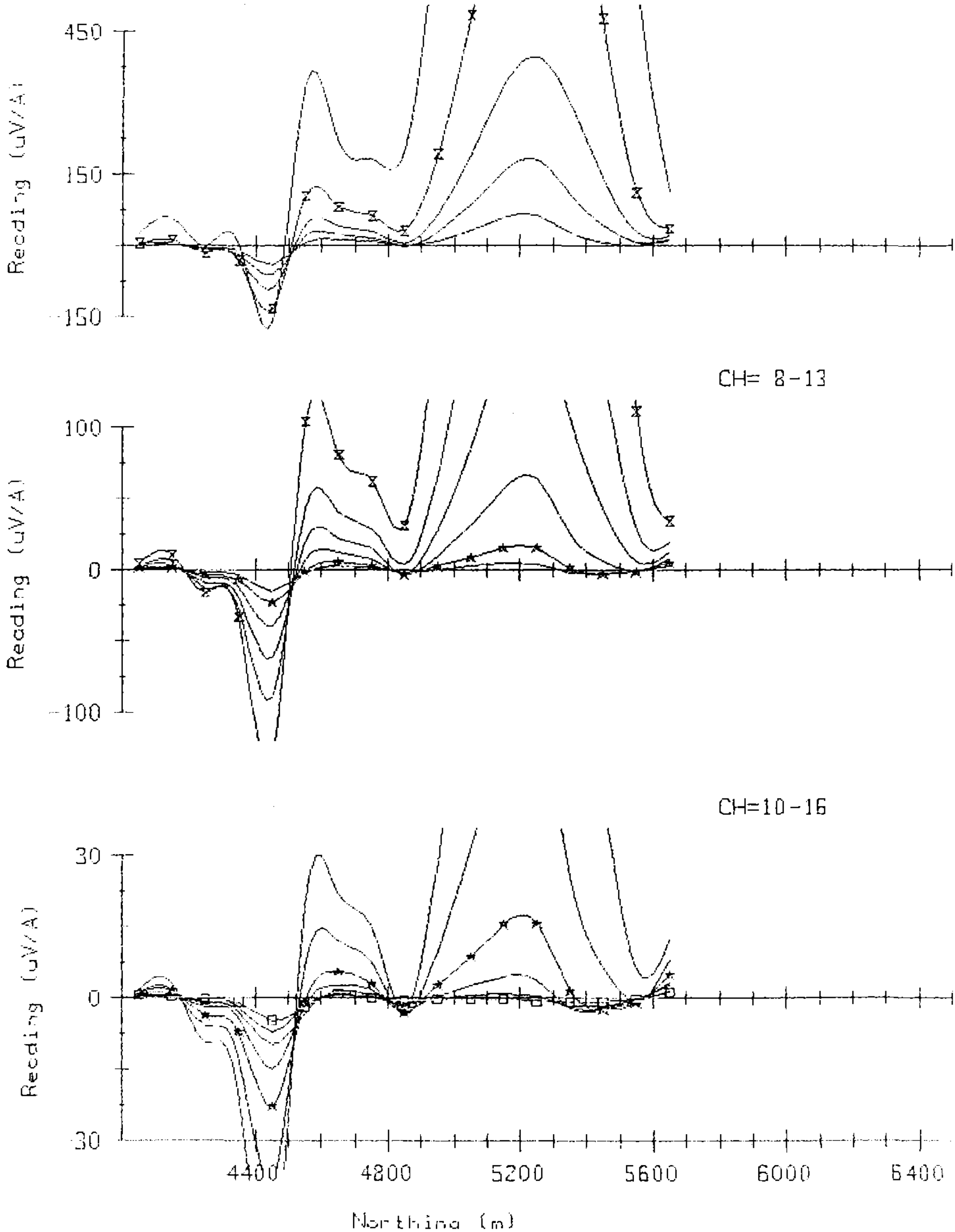




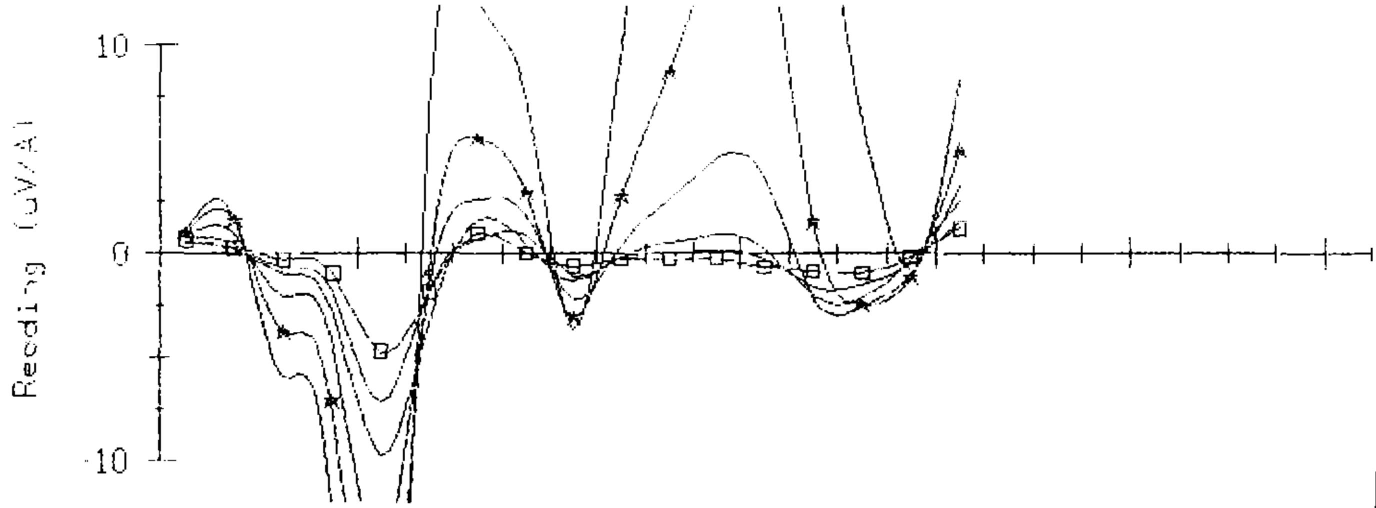
COMSTOCK VALLEY: Loop 0: Line 7950E: Rx=Z: ET CH= 6-1 CH= 6- 7
15000
5000
-5000
Reading (uV/A)
CH= 7- 9
4500
1500
-1500
Reading (uV/A)
CH= 7-10
1500
500
500
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

510348

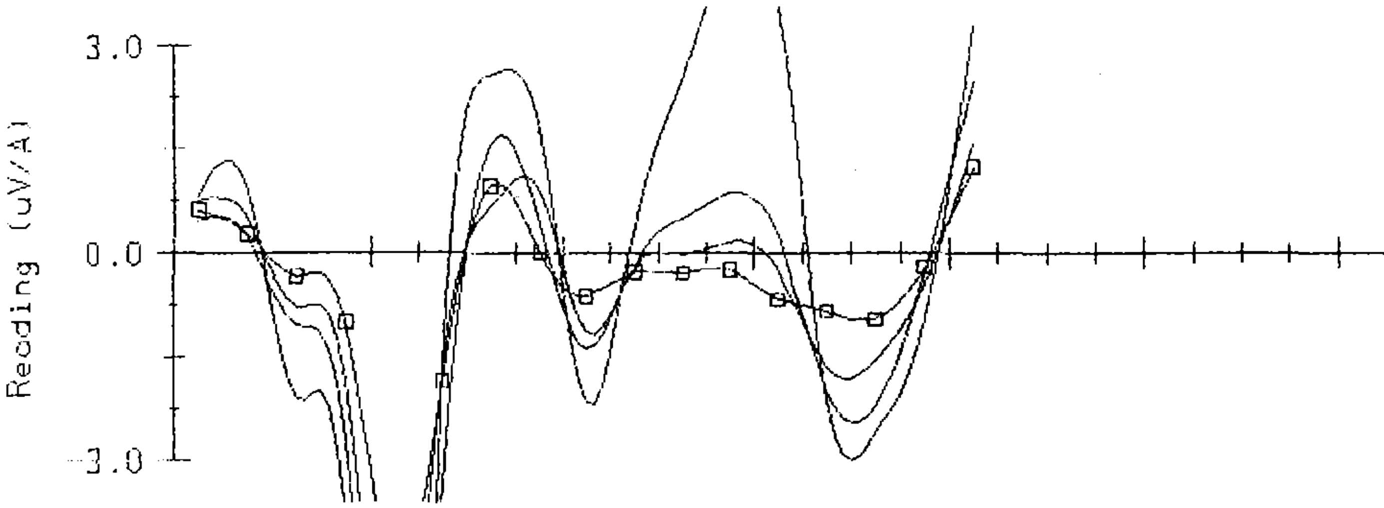
COMSTOCK VALLEY: Loop 0: Line 7950E: Rx=Z: ET  CH= 6-1 CH= 7-11



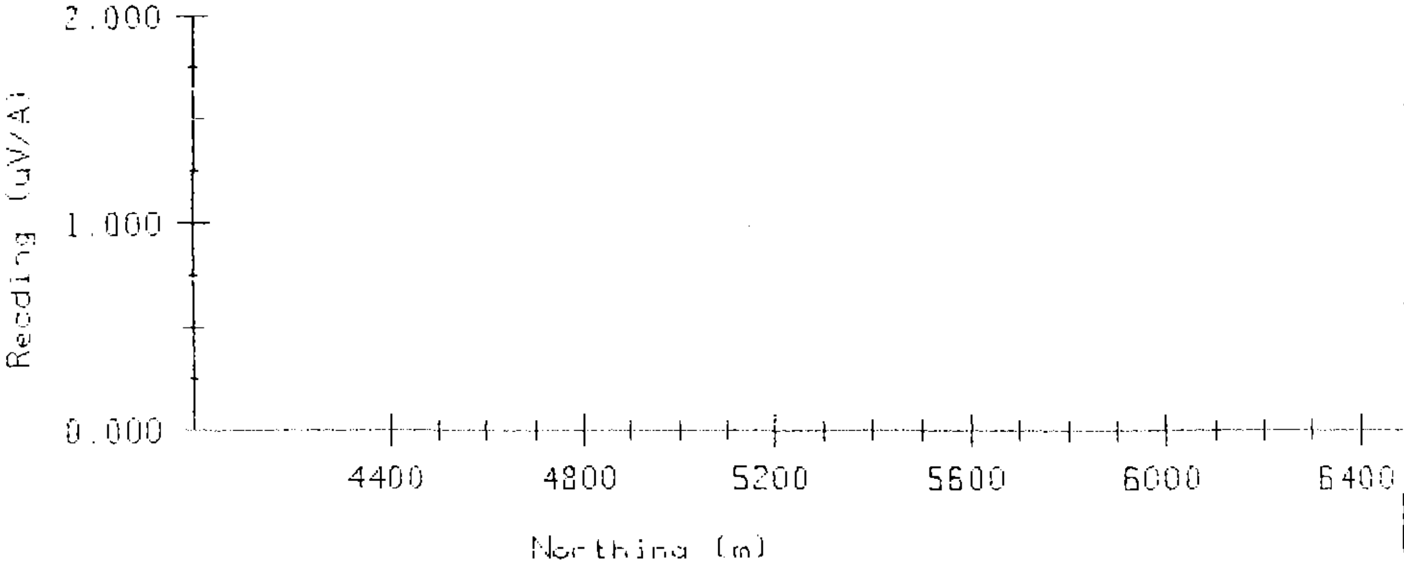
COMSTOCK VALLEY: Loop 0: Line 7950E: Rx=Z: ET CH= 6-1 CH=11-16



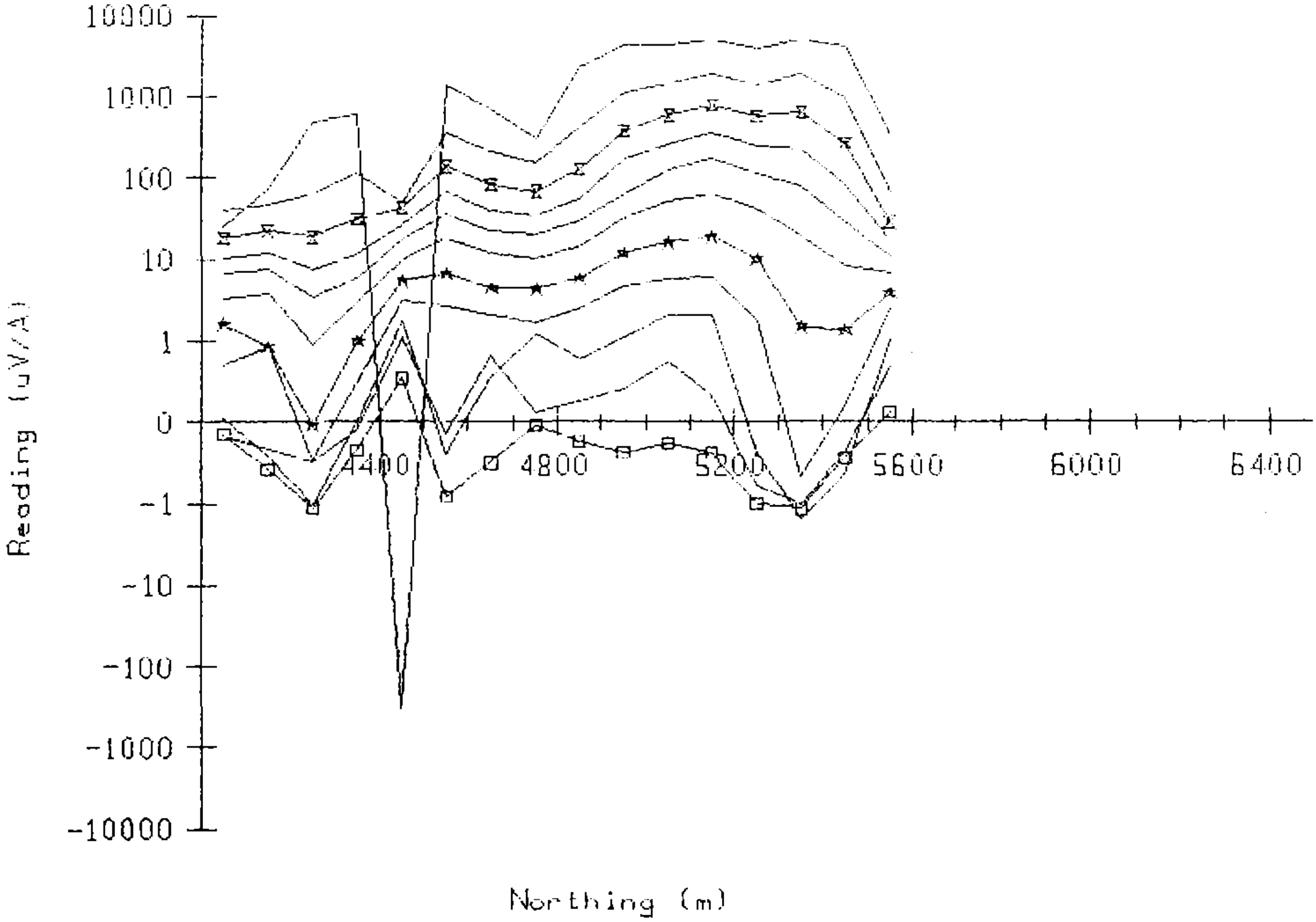

CH=13-16



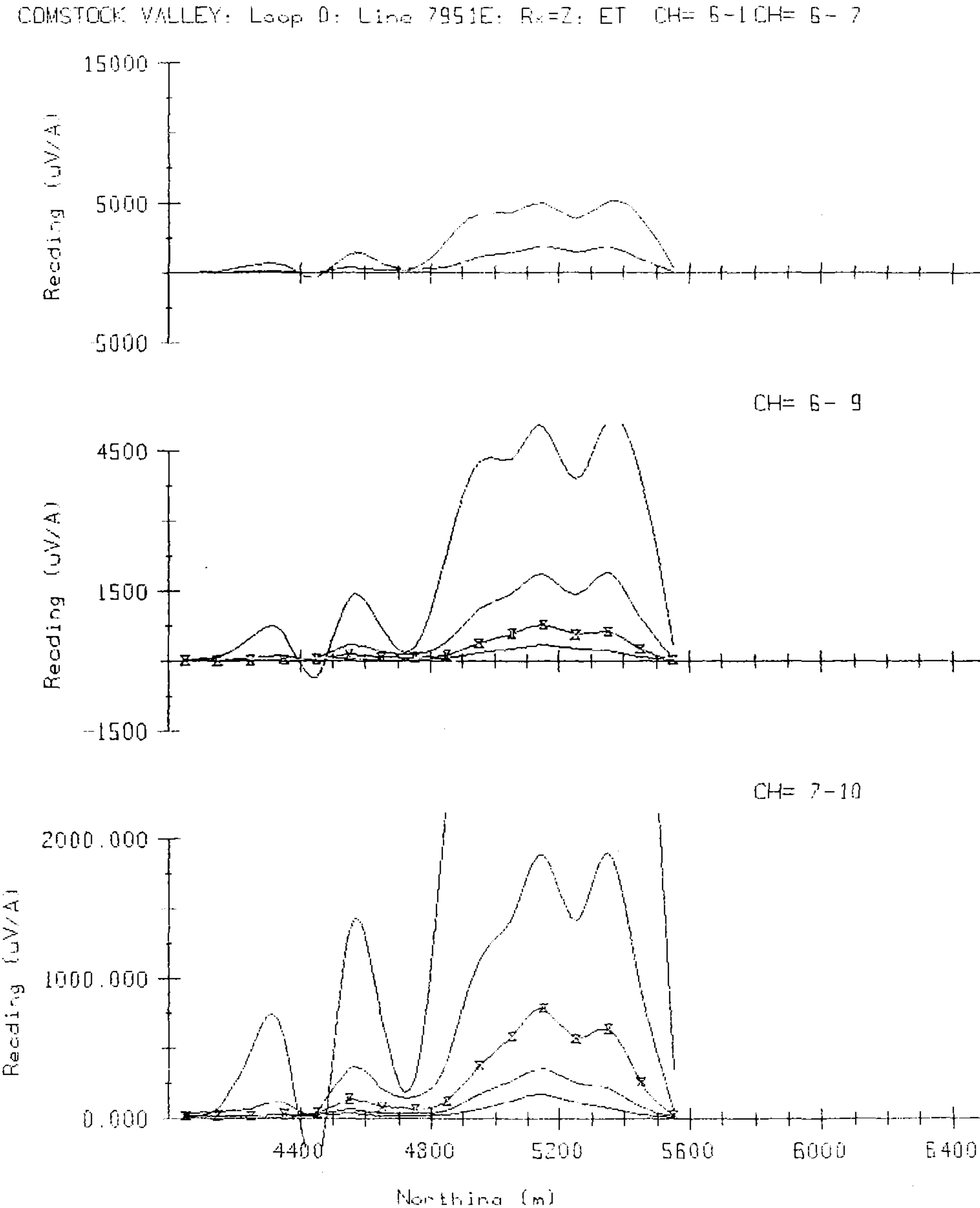

CH= 0



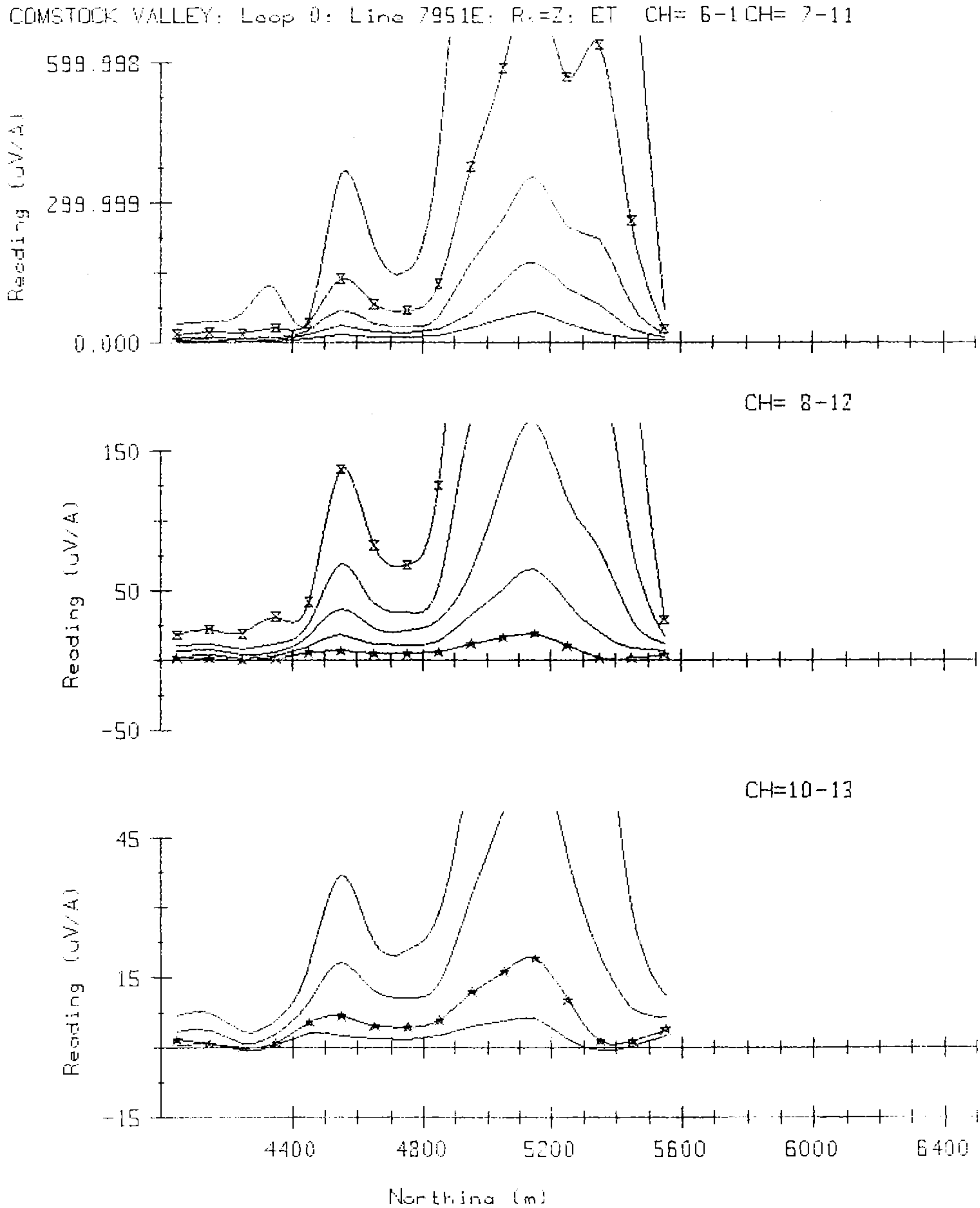
COMSTOCK VALLEY: Loop 0: Line 7951E: Rx=Z: ET CH= 6-16



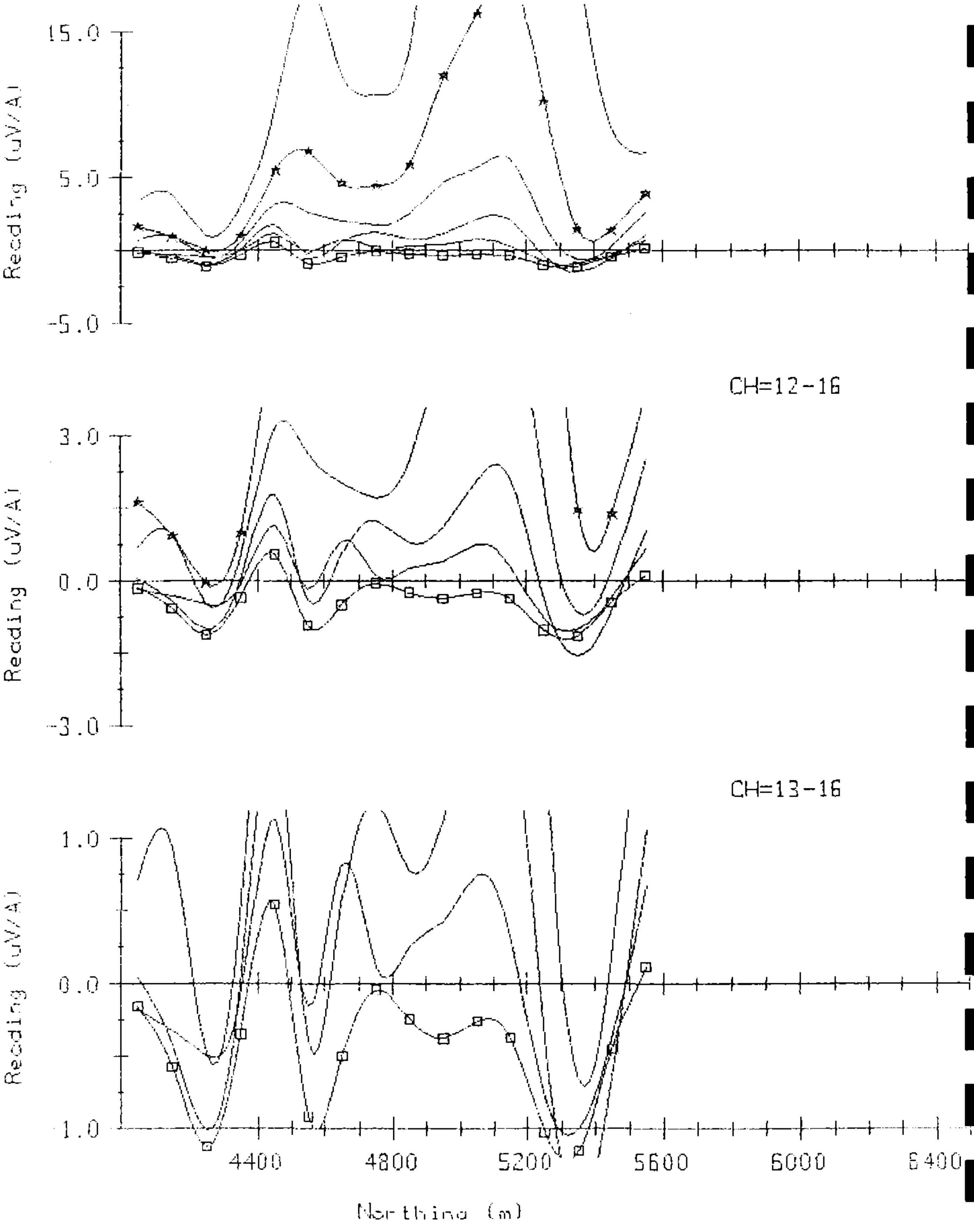
510351


COMSTOCK VALLEY: Loop 0: Line 7951E: Rx=Z: ET CH= 6-1 CH= 6- 7
15000
5000
-5000
Reading (uV/A)
CH= 6- 9
4500
1500
-1500
Reading (uV/A)
CH= 7-10
2000.000
1000.000
0.000
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

340


COMSTOCK VALLEY: Loop 0: Line 7951E: R:=Z: ET CH= 6-1 CH= 7-11
599.998
299.999
0.000
Reading (uV/A)
CH= 8-12
150
50
-50
Reading (uV/A)
CH=10-13
45
15
-15
Reading (uV/A)
4400
4800
5200
5600
6000
6400
Northing (m)

COMSTOCK VALLEY: Loop 0: Line 7951E: Rx=Z: ET CH= 6-1 CH=11-16



## APPENDIX 5

Inversion Starting Models & Statistical
Analyses of Results

INVERSION INPUT MODEL

LINE 4800E



```
,9999INPUT FILE
06     : , 4800E , 5150N .

4 LYR NORTH OF LOOP

2,1,0 ! 5150Q2.IN    !  ICASE,IDAT

4,16,2  !  NLIB,M,IFLAG

100 20 100 2000  !  RES

100 50 150    !  THICKNESSES

10000,0,1  !  TXAREA,ITYM,IRX

16,      .220,      .220  !  NCHNLFIELD,TRMP,TRISE

1000  !  RXAREA

1,1,0  !  IWH,IWZ,IBND

0,0,10,1  !  NWTS,IHOLD,ITS,IPRNT

-5263.0,-5263.0,-5263.0,-4798.0,-177.7,334.1,135.9,80.21,53.14,38.11,

25.19,15.33,9.821,6.435,4.272,2.406,




!   0,  0,  0,  0,  0,  0,  0,  0,  0,  0,

!   0,  0,  0,  0,  0,  0,

!

!   ! q VALUES
```

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# INVERSION OUTPUT MODEL WITH STATISTICS

510356

LINE 4800E

```
99999INIT ERR=       39.41
      ITER          ERR
         1        9.71
.14E+0318.     99.    .20E+04.12E+0355.     .15E+03
         2        8.63
.14E+0317.     .10E+03.20E+04.12E+0353.     .14E+03
         3        7.91
.13E+0315.     .13E+03.20E+04.12E+0347.     .11E+03
         4        7.53
.13E+0314.     .14E+03.20E+04.12E+0344.     .10E+03
         5        7.45
.13E+0313.     .15E+03.20E+04.13E+0342.     97.
         6        7.38
.13E+0313.     .15E+03.21E+04.13E+0341.     94.
         7        7.34
.13E+0312.     .15E+03.21E+04.13E+0340.     91.
         8        7.30
.13E+039.6     .18E+03.21E+04.13E+0331.     73.
         9        7.02
.12E+037.6     .20E+03.22E+04.14E+0324.     62.
        10        6.88
.12E+036.6     .22E+03.23E+04.14E+0321.     58.
  STDERR=         6.88
99999ERROR
```

| I | T(MS) | RHO-F | RHO-C | V-F | V-C | V-ERR | ER |
|---|---|---|---|---|---|---|---|
| 1 | .306 | 129.47 | 129.05 | 334.1 | 335.7 | -1.610 | |
| 2 | .404 | 96.94 | 99.69 | 135.9 | 130.4 | 5.473 | |
| 3 | .502 | 80.02 | 79.32 | 80.21 | 81.27 | -1.056 | - |
| 4 | .600 | 70.63 | 68.78 | 53.14 | 55.27 | -2.129 | - |
| 5 | .698 | 64.14 | 62.87 | 38.11 | 39.25 | -1.143 | - |
| 6 | .845 | 57.64 | 57.99 | 25.19 | 24.97 | .2231 | |
| 7 | 1.041 | 53.77 | 55.24 | 15.33 | 14.73 | .6034 | |
| 8 | 1.237 | 52.47 | 54.43 | 9.821 | 9.302 | .5194 | |
| 9 | 1.433 | 53.19 | 54.62 | 6.435 | 6.185 | .2496 | |
| 10 | 1.629 | 55.49 | 55.33 | 4.272 | 4.290 | -.1775E-01 | |
| 11 | 1.923 | 60.57 | 56.95 | 2.406 | 2.637 | -.2311 | . |

99999LAYER BOUNDS (67 PERCENT)

99999LAYER BOUNDS (67 PERCENT)

| PAR | VALUE | FROM | TO | IMPORTANCE |
|---|---|---|---|---|
| 1 | 124.7 | 82.28 | 188.9 | .9997 |
| 2 | 6.557 | -999.0 | -999.0 | .7230 |
| 3 | 216.2 | -999.0 | -999.0 | .5676E-01 |
| 4 | 2261. | -999.0 | -999.0 | .2006E-01 |
| 1 | 138.1 | 5.678 | 3359. | .9979 |
| 2 | 20.56 | -999.0 | -999.0 | .7100 |
| 3 | 57.62 | -999.0 | -999.0 | .6102E-01 |

APRE= 23.18

99999DEPTH BOUNDS (67 PERCENT)

| PAR | VALUE | FROM | TO | IMPORTANCE |
|---|---|---|---|---|
| 1 | 124.7 | 82.27 | 188.9 | .9972 |
| 1 | 138.1 | 5.675 | 3361. | .9952 |
| 2 | 158.7 | 1.173 | .2146E+05 | .9975 |

345

INVERSION INPUT MODEL

LINE 6200E

```
99999INPUT FILE
 06     : , 6200E , 5250N .
 2 LYR LAST 10 PTS STH LOOP
 2,1,0 ! 5250QW1.IN    !  ICASE,IDAT
 2,16,2  !  NLIB,M,IFLAG
 500,2000  !  RES
 300  !  THICKNESSES
 10000,0,1  !  TXAREA,ITYM,IRX
 16,       .220,       .220     !  NCHNLFIELD,TRMP,TRISE
 1000  !  RXAREA
 1,1,0  !  IWH,IWZ,IBND
 6,0,10,1  !  NWTS,IHOLD,ITS,IPRNT
 -5279.0,-5279.0,-5279.0,-4888.0,-1425.0,158.0,22.69,9.160,4.493,2.568,
 1.324,0.639,0.342,0.200,0.122,0.063,


 1,0,2,0,3,0,4,0,5,0,6,0  !  WEIGHTS

 !   0,  0,  0,  0,  0,  0,  0,  0,  0,  0,
 !   0,  0,  0,  0,  0,  0,
 !
 !   ! q VALUES
```

INVERSION OUTPUT MODEL

WITH STATISTICS

LINE 6200E

510358

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```
99999INIT ERR=       72.69
     ITER          ERR
       1          14.42
.32E+03.22E+04.30E+03
       2           5.77
.31E+03.23E+04.25E+03
       3           5.03
.32E+03.28E+04.26E+03
       4           4.67
.33E+03.54E+04.31E+03
       5           3.74
.33E+03.64E+04.30E+03
       6           3.66
.33E+03.71E+04.30E+03
       7           3.61
.33E+03.76E+04.31E+03
      8           3.61
329.437639.92 305.86
  STDERR=        3.61
99999ERROR
```

| I | T(MS) | RHO-F | RHO-C | V-F | V-C | V-ERR | ERR-F |
|---|---|---|---|---|---|---|---|
| 1 | .306 | 215.74 | 314.70 | 158.0 | 90.42 | .0000 | .C |
| 2 | .404 | 324.23 | 325.49 | 22.69 | 22.56 | .1305 | .5 |
| 3 | .502 | 344.27 | 343.21 | 9.160 | 9.202 | -.4220E-01 | -.4 |
| 4 | .600 | 371.05 | 364.04 | 4.493 | 4.623 | -.1299 | -2.8 |
| 5 | .698 | 391.52 | 385.95 | 2.568 | 2.624 | -.5582E-01 | -2.1 |
| 6 | .845 | 414.86 | 417.72 | 1.324 | 1.310 | .1352E-01 | 1.C |
| 7 | 1.041 | 451.00 | 463.07 | .6390 | .6142 | .2482E-01 | 3.9 |
| 8 | 1.237 | 495.72 | 508.40 | .3420 | .3293 | .1269E-01 | 3.7 |
| 9 | 1.433 | 541.19 | 553.01 | .2000 | .1936 | .6384E-02 | 3.2 |
| 10 | 1.629 | 596.90 | 596.24 | .1220 | .1222 | -.2008E-03 | -.1 |
| 11 | 1.923 | 689.43 | 657.89 | .6300E-01 | .6760E-01 | -.4599E-02 | -7.C |

99999LAYER BOUNDS (67 PERCENT)

99999LAYER BOUNDS (67 PERCENT)

| PAR | VALUE | FROM | TO | IMPORTANCE |
|---|---|---|---|---|
| 1 | 329.4 | 319.4 | 339.8 | .9998 |
| 2 | 7640. | 2251. | .2594E+05 | .7736E-01 |
| 1 | 305.9 | 279.6 | 334.6 | .9976 |

APRE=    4.479

99999DEPTH BOUNDS (67 PERCENT)

| PAR | VALUE | FROM | TO | IMPORTANCE |
|---|---|---|---|---|
| 1 | 329.4 | 319.4 | 339.8 | .9998 |
| 2 | 7640. | 2251. | .2594E+05 | .7736E-01 |
| 1 | 305.9 | 279.6 | 334.6 | .9976 |

INVERSION INPUT MODEL

347 LINE 7600E 510359

```
99999INPUT FILE
 07     : , 7600E , 5250N .

 4 LYR INITIAL MODEL MANY POINTS WEIGHTED OUT

 2,1,0 ! 5250QE4.IN    !   ICASE,IDAT

 4,16,2   !   NLIB,M,IFLAG

 200,50,200,2000   !   RES

 100,50,100   !   THICKNESSES

 10000,0,1   !   TXAREA,ITYM,IRX

 16,      .220,      .220   !   NCHNLFIELD,TRMP,TRISE

 1000   !   RXAREA

 1,1,0   !   IWH,IWZ,IBND

 6,0,10,1   !   NWTS,IHOLD,ITS,IPRNT

 -5230.0,-5230.0,-5230.0,-5169.0,-908.3,558.0,158.2,66.62,31.95,16.56,

 7.131,2.435,0.895,0.341,0.124,0.006,


 11,0,12,0,13,0,14,0,15,0,16,0    !WEIGHTS


 !   0,  0,  0,  0,  0,  0,  0,  0,  0,  0,

 !   0,  0,  0,  0,  0,  0,

 !

 !  ! q VALUES
```

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510360

# INVERSION OUTPUT MODEL
# WITH STATISTICS
## LINE 7600E

```
99999INIT ERR=       51.63
      ITER        ERR
         1       18.12
.15E+0352.     .22E+03.20E+0456.     42.     95.
         2        5.08
 14E+0347.     .22E+03.20E+0452.     43.     93.
         3        4.50
.16E+0341.     .25E+03.21E+0454.     42.     75.
         4        4.14
 17E+0339.     .26E+03.21E+0454.     40.     71.
         5        4.04
 17E+0338.     .27E+03.22E+0455.     39.     68.
         6        3.97
.17E+0337.     .27E+03.22E+0455.     39.     66.
         7        3.91
 18E+0336.     .28E+03.22E+0455.     38.     65.
        8        3.91
177.90  36.05 279.032195.85  55.36  37.93  64.55
  STDERR=        3.91
 9999ERROR
```

| I | T(MS) | RHO-F | RHO-C | V-F | V-C | V-ERR | ERR-PC |
|---|---|---|---|---|---|---|---|
| 1 | .306 | 90.87 | 89.59 | 558.0 | 569.5 | -11.48 | -2.04 |
| 2 | .404 | 87.42 | 88.00 | 158.2 | 156.7 | 1.512 | .96 |
| 3 | .502 | 90.75 | 93.64 | 66.62 | 63.61 | 3.006 | 4.62 |
| 4 | .600 | 99.56 | 100.68 | 31.95 | 31.42 | .5259 | 1.66 |
| 5 | .698 | 112.44 | 108.24 | 16.56 | 17.52 | -.9649 | -5.66 |
| 6 | .845 | 134.56 | 119.14 | 7.131 | 8.549 | .0000 | .00 |
| 7 | 1.041 | 184.58 | 134.73 | 2.435 | 3.903 | .0000 | .00 |
| 8 | 1.237 | 260.79 | 149.83 | .8950 | 2.051 | .0000 | .00 |
| 9 | 1.433 | 379.13 | 165.00 | .3410 | 1.187 | .0000 | .00 |
| 10 | 1.629 | 590.45 | 179.27 | .1240 | .7396 | .0000 | .00 |
| 11 | 1.923 | 3307.03 | 199.90 | .6000E-02 | .4032 | .0000 | .00 |

999LAYER BOUNDS (67 PERCENT)

9999LAYER BOUNDS (67 PERCENT)

| PAR | VALUE | FROM | TO | IMPORTANCE |
|---|---|---|---|---|
| 1 | 177.9 | -999.0 | -999.0 | .3825 |
| 2 | 36.05 | -999.0 | -999.0 | .7838 |
| 3 | 279.0 | -999.0 | -999.0 | .2055 |
| 4 | 2196. | -999.0 | -999.0 | .9312E-01 |
| 1 | 55.36 | -999.0 | -999.0 | .9201 |
| 2 | 37.93 | -999.0 | -999.0 | .7039 |
| 3 | 64.55 | -999.0 | -999.0 | .2618 |

APRE=  -999.0

9999DEPTH BOUNDS (67 PERCENT)

| PAR | VALUE | FROM | TO | IMPORTANCE |
|---|---|---|---|---|

# APPENDIX 6

Petrographic and Mineralogical Reports

C54 72.5m

510362

Sample Number : Z7287

Identification : Layered carbonaceous, biostromal limestone

Description :

The sample is a drill core specimen of black, fine-grained sediment with layers rich in fragments of carbonate shells ranging up to about 10mm in size. Very fine pyrite occurs in some shells and elsewhere.

In thin section the sample displays a 35mm thick layer of relatively coarse carbonate shell debris and some thinner, 2 to 5mm layers of black pelite with varying amounts of finer carbonate fragments.

The fossils appear to be bivalves, probably brachiopods. In the coarse layer there are some intact, closed shells about 5 to 10mm in size, accompanied by variously unbroken and broken half shells. Calcite within the fossils forms mosaics variously 0.2 to 0.5mm in grainsize, overprinting growth lines. In a few cases very fine pyrite (0.01 to 0.03mm) has grown along selected zones within the recrystallized shells. The matrix between the shells is fine-grained carbonate (0.02 to 0.03mm) with black, carbonaceous, probably graphitic material. Pyrite also forms a few cubes (0.1 to 0.7mm) and aggregates of cubes of diagenetic, porphyroblastic style.

The pelitic layers carry finely fragmented fossil debris (now recrystallized) set in a matrix of finer carbonate and black carbonaceous/graphitic material. Traces of pyrite occur finely within recrystallized fossil fragments and also porphyroblastically as larger cubes.

There are several straight fracture veins (about 0.1mm wide) containing colourless calcite.

An approximate mode of the whole section is :

| | |
|---|---|
| 65-75% | carbonate fossil fragments |
| 25-35% | micrite carbonate matrix |
| 2-4% | carboanceous/graphitic material |
| 0.1-0.2% | pyrite |
| 0.2-0.3% | calcite veins |

Comments and Interpretations :

This sample consists of layered, richly fossiliferous limestone. I am not a palaeontologist, but it seems that the intact and broken shell material is derived largely or wholly from brachiopods. The limestone may be described as biostromal or coquinoid.

Carbonaceous material (probably now graphite) accounts for the dark colour of the rock.

Diagenetic changes comprise fine recrystallization of calcite, development of fine pyrite within some recrystallized shells, growth of sparse pyrite porphyroblasts, and probable conversion of carbonaceous matter to fine graphite. Diagenetic or later processes also formed a few very thin fracture veins of calcite.

C54 117m

Sample Number : Z7288 010363

Identification : Fossiliferous, layered, carbonaceous, micritic limestone

Description :

The sample is a drill core specimen displaying layers of black and medium grey limestone, variously about 1 to 20mm thick and with abrupt but irregular to flame-like contacts attributable to load casting. A few shell fragments (ranging up to 10mm) are visible and there are some thin, whitish carbonate veins crudely concordant with bedding.

In thin section the bulk of the rock is seen to consist of micrite carbonate (about 0.02 to 0.03mm grainsize). Varying amounts of fine carbonaceous or graphitic material account for some lenticular and other disturbed but more continuous layering.

Within the palest layers there are sparse, unbroken single valves from probable brachiopods (5 to 10mm size) and many smaller, ghosted, broken shell fragments (less than 0.5mm). Mosaics of relatively coarse, recrystallized calcite have developed in the larger fossils; small fragments show correspondingly finer recrystallization.

In the darkest, most carbonaceous layers the carbonate has recrystallized to porphyrobalstic rhombs (still rather cloudy) about 0.1 to 0.2mm in size, set in a black matrix of probable graphite.

There are sparse disseminated tiny cubes of pyrite (0.01 to 0.03mm) and rare larger porphyroblastic aggregates centred on recrystallized fossils.

The thin fracture veins (up to 0.5mm) contain colourless calcite. They are mildly deformed and there are suggestions of related incipient metamorphic foliation acute to bedding in the host rock.

An approximate mode for the whole section is :

| | |
|---|---|
| 85-95% | micritic carbonate |
| 5-10% | sparry, recrystallized fossil fragments |
| 1-3% | carbonaceous matter/graphite |
| tr | pyrite |
| 0.5-0.7% | vein calcite |

Comments and Interpretations :

This sample is considered to be mildly fossiliferous, layered, carbonaceous, micritic limestone.

Diagenetic modifications comprise fine recrystallization of carbonate (especially in fossils and in the most carbonaceous layers), finely porphyroblastic growth of traces of pyrite and probable conversion of carbonaceous matter to graphite. Some deformation of bedding contacts seems to be of soft sediment, load casting type, but there is also minor tectonic deformation, most obviously recognisable in a few diagenetic or later calcite veins.

510364 HX1 102m

352

Sample Number : Z7263

Identification : Incipiently foliated, sericite-veined, lightly sericitized and chloritized porphyritic rhyodacite

Description :

The sample is a drill core specimen of greenish grey, fine-grained rock displaying small phenocrysts of light grey feldspar and quartz and dark chloritized mafic minerals. There are some irregular, fine, light grey veins.

A cobaltinitrite staining test revealed moderately abundant fine K-feldspar in the groundmass.

In thin section the sample displays porphyritic and glomeroporphyritic, hypidiomorphic, volcanic textures, modified by light alteration, veining and incipient metamorphic foliation.

The phenocrysts are dominantly plagioclase, now lightly sericitic, unzoned, only mildly twinned and about 0.5 to 1mm in size. Quartz occurs as smaller (about 0.5mm), roundish phenocrysts. There are a few completely chloritized mafic silicate phenocrysts and a few densely leucoxenized oxide phenocrysts. The groundmass consists mainly of small plagioclase laths and anhedral to crudely micrographic quartz and orthoclase; grainsizes are around 0.05 to 0.1mm. Sericite, chlorite and leucoxene are the other groundmass components.

There is a web of thin sericite veins (maximum 0.2mm width), now modified by incipient foliation of the sericite; a few also carry fine rutile and chlorite. There are also isolated patches or deformed short, thick veins (up to 2mm wide) of calcite and isolated patches of quite fine pyrite.

An approximate mode is :

| | |
|---|---|
| 8-10% | plagioclase phenocrysts |
| 1-2% | quartz phenocrysts |
| 0.5-1% | chloritized mafic phenocrysts |
| 0.1-0.2% | leucoxenized oxide phenocrysts |
| 45-55% | groundmass feldspars (partly plagioclase and partly orthoclase) |
| 20-30% | groundmass quartz |
| 6-8% | groundmass chlorite |
| 1-2% | groundmass sericite |
| 0.1-0.2% | groundmass leucoxene |
| 6-8% | veins of sericite plus minor rutile and chlorite |
| tr | patches and veins of calcite |
| tr | patches of fine pyrite |

Comments and Interpretations :

This sample is interpreted to have originated as porphyritic rhyodacite, probably lava. It has been lightly chloritized and sericitized, finely veined by sericite with minor rutile and chlorite, locally veined by calcite, impregnated with local patches of pyrite, then mildly deformed to induce a foliation.

Sample Number : Z7264

Identification : Incipiently foliated, intensely sericitized, chloritized and carbonated, unwelded pumice tuff

Description :

The sample is a drill core specimen of apparently tuffaceous rock. Whitish altered phenocrysts and dark greenish grey chloritized pumiceous clasts are dispersed abundantly through a light olive grey matrix. A few specks of pyrite are visible.

Cobaltinitrite stain reacted diffusely, but did not reveal any definite K-feldspar.

In thin section the sample is seen to be intensely altered and incipiently foliated, but its remnant textures plainly involve fragmental ragged pumice (about 2 to 5mm clasts) with a few phenocrysts (1 to 2mm size).

Much of the pumice has altered to sericite and fine quartz, accompanied by minor chlorite and traces of very fine rutile. A few pumiceous clasts have been selectively chloritized. The phenocrysts have bene overprinted by relatively coarse calcite grains, accompanied in some cases by rutile. A few carbonated aggregates have associated quartz of possibly phenocrystal origin.

There are unevenly distributed subhedral crystals of pyrite (maximum size 0.2mm) and translucent grey sphalerite.

An approximate mode is :

| | |
|---|---|
| 60-70% | sericite |
| 25-30% | quartz |
| 6-8% | chlorite |
| 0.5-1% | calcite |
| 0.1-0.2% | rutile |
| 0.1-0.2% | pyrite |
| tr | sphalerite |

Comments and Interpretations :

This rock is interpreted to have originated as an unwelded accumulation of ragged pumice fragments carrying a few phenocrysts of inferred feldspar, quartz and titaniferous mafic silicates or oxides. The accumulation was probably essentially tuffaceous, but wind or water transport is not precluded.

The rock has since been intensely altered to sericite with subordinate chlorite, carbonate and rutile. The fine quartz is thought to be a product of the alteration or devitrification, rather than introduced. Traces of pyrite and sphalerite were introduced. Incipient foliation post-dates the alteration.

510366

MSI 96m

Sample Number : Z7281

Identification : Weakly mineralized, intensely sericitized, carbonated and chloritized pumiceous tuff in layered contact with intensely sericitized siltstone

Description :

The sample is a specimen of drill core showing a sharp, sedimentary style contact between light olive grey, fine-grained rock and foliated tuffaceous rock with olive grey and dark grey lenticular formerly pumiceous or vitric clasts (up to 8mm long) and other grey and faintly orange pink components.

A staining test revealed several small potassic lithic clasts within the tuffaceous rock.

In thin section the fine-grained rock displays well sorted, silty textures with equant quartz grains mainly 0.05mm in size and with a plentiful matrix of sericite distinctly aligned with one foliation acute to the bedding contact or to a less obvious foliation plane inclined at about 45° to it. There are sparse sand-sized clasts of quartz (about 0.2mm) and a few small leucoxenized grains and blebs of sphalerite and of calcite. An approximate mode is :

| | |
|---|---|
| 40-50% | sericite |
| 50-60% | quartz |
| 0.2-0.3% | calcite |
| 0.1% | sphalerite |
| tr | leucoxene |

The other layer is seen to be intensely altered, but well preserved primary textures are of deformed but probably unwelded, pumiceous tuffaceous (or similarly fragmental) style. The main components are ragged lenticular clasts of former pumice (about 1 to 8mm long) : some are altered mainly to sericite (now aligned), but others have various combinations fo calcite, chlorite, quartz and K-feldspar in addition to sericite. Some pumiceous clasts have smoothly corroded quartz phenocrysts (up to 0.5mm) and some other completely chloritized, carbonated and sericitized phenocrysts or completely leucoxenized oxides. Fine pyrite (0.01 to 0.05mm) and traces of sphalerite and galena have selectively replaced some clasts. An approximate mode is :

| | |
|---|---|
| 60-70% | sericite |
| 20-30% | quartz |
| 4-6% | calcite |
| 2-3% | K-feldspar |
| 2-3% | chlorite |
| 0.1% | rutile |
| 0.2-0.3% | pyrite |
| rare | sphalerite and galena |

Comments and Interpretations :

This specimen is considered to display a sedimentary contact between siltstone and unwelded rhyolitic (or similar) pumiceous tuff or texturally similar pumiceous immature sediment.

Both rock types have been heavily sericitized and weakly mineralized with sulphides. Calcite and rutile/leucoxene are other alteration minerals shared by both rock types. Chlorite also occurs with the pumiceous unit.

Both units are affected by incipient metamorphic foliation, affecting mainly sericite and orientated mainly acute to the bedding plane.

The pumiceous unit is essentially similar to the rock represented by Z7265 and Z7266.

MS1 173m

356 Sample Number : Z7283

Identification : Moderately sericitized, carbonated and chloritized, unwelded dacitic tuff with traces of disseminated sulphides

Description :

The sample is a drill core specimen displaying an undulating contact between a mottled greenish and light olive grey, vaguely tuffaceous rock and light olive grey, fine-grained material.

A staining test revealed no K-feldspar.

Only a small segment of the light olive grey material is displayed in the section. It consists of a mildly strained, simple mosaic of carbonate grains about 0.05 to 0.5mm in size.

The bulk of the section displays sparse angular phenoclasts of quartz (0.1 to 0.5mm), carbonate, sericite and chlorite blebs after possible labile phenoclasts, and larger (up to 8mm) sericitic and carbonated pseudomorphs of undeformed, ragged pumiceous style, all set in a fine mosaic matrix (0.02 to 0.03mm) of quartz and untwinned feldsprs, accompanied by minor sericite, calcite and chlorite. There are disseminated grains (0.01 to 0.2mm) and small aggregates of pyrite, brown sphalerite and galena. An approximate mode is :

| | |
|---|---|
| 0.1-0.2% | clasts of quartz |
| 4-6% | carbonated, sericitized and chloritized labile mineral clasts |
| 5-10% | variously sericitic and carbonated pumiceous clasts |
| 80-90% | matrix quartz and albite |
| 3-5% | matrix sericite, calcite and chlorite |
| 0.1-0.2% | disseminated pyrite, sphalerite and galena |

Mild deformation has strained some calcite and locally foliated some sericite.

Comments and Interpretations :

Primary textures are not well preserved. It seems likely that this rock originated as unwelded dacitic vitric pumice tuff. A less likely interpretation would be pumiceous siltstone. There is no doubt that the scattered clasts were undeformed ragged pumice and subordinate broken phenoclasts, but the finely recrystallized matrix textures are uninformative.

The rock has been moderately sericitized, carbonated and chloritized and impregnated with traces of disseminated sulphide. There was subsequent mild deformation.

A light olive grey zone within the specimen is carbonate (probably a vein).

Sample Number : Z7282

Identification : Reworked, rhyolitic, heavily sericitized, carbonated and chloritized, probably pumiceous tuff in interlaminated contact with carbonaceous slate

Description :

The sample is a specimen of drill core displaying coarsely sandy textured acid tuffaceous rock in finely interlaminated contact with black slate. The tuffaceous unit displays phenoclasts of light grey quartz and altered feldspar and lenticular light olive grey formerly pumiceous or vitric clasts. There are a few disseminated grains of pyrite and a patch of whitish carbonate.

A staining test revealed plentiful fine K-feldspar within the lenticulr clasts.

In thin section the coarser fragmental rock is seen to be heavily altered and also deformed, but remnant textures are suggestive of unwelded and probably reworked tuff. There are numerous smoothly corroded quartz phenocrysts (about 1 to 4mm) now cracked and veined by calcite : they appear to exist within formerly pumiceous or glassy clasts about 2 to 5mm in size, rather than as discrete phenoclasts. There are a few heavily sericitized feldspar phenocrysts. The bulk of the rock now consists of sericite, chlorite, fine feldspar and quartz; some locations are massively carbonated. Sericite is partly foliated. Fine pyrite and a fw grains of galena and sphalerite form disseminated replacement patches.

An approximate mode is :

| | |
|---|---|
| 45-55% | sericite |
| 15-20% | quartz |
| 10-15% | K-feldspar |
| 10-15% | calcite |
| 6-8% | chlorite |
| tr | leucoxene/rutile |
| 0.1% | pyrite |
| rare | sphalerite and galena |

The dark slaty layers are in interlaminated but also sheared contact with the coarse rock. The dark colour relates to brownish black carbonaceous matter. It is streaked within a sericitic host with variable amounts of silty and sandy, angular quartz and sericitized, chloritized fine clasts.

Comments an Interpretations :

The main part of this sample consists of probably reworked rhyolitic, porphyritic pumiceous or glassy tuff similar to that represented by Samples Z7265, Z7266 and Z7281 : its character is more obviously sandy. It is in interlayered contact with carbonaceous slate, perhaps implying a turbidite environment.

The rocks have been subjected to heavy sericitic alteration, with accompanying chlorite, carbonate and sulphide mineralization. Subsequent tectonic deformation has induced partial foliation acute to the bedding and disrupting it somewhat.

510370

MS3 14.6m

Sample Number : Z7265

Identification : Slightly deformed, sulphide-mineralized and heavily sericitized, carbonated and chloritized, probably pumiceous rhyolitic tuff

Description :

The sample is a specimen of drill core, displaying nondescript, now finely crystalline rock with patchy olive grey and greyish orange pink colours and lenticular blebs (up to about 3mm) of brown sphalerite and of galena and pyrite.

A cobaltinitrite staining test revealed that the rock is rich in fine K-feldspar.

In thin section the rock is seen to be mineralized and heavily altered. Primary textures have been substantially obscured but seem to be of tuffaceous style.

Lenticular clasts of probably pumiceous or coarsely vitric style (mainly 3 to 5mm in size) have been selectively replaced by aggregates of sphalerite (translucent brown) with chlorite, sericite and quartz, or by galena-quartz-sericite-pyrite, or by mainly sericite, or by calcite-sericite-chlorite. There are a few poorly preserved feldspar phenocrysts or clasts (0.5 to 1mm) now composed of poorly twinned microcline. Much of the rock is a nondescript aggregate of fine K-feldspar, quartz, sericite, chlorite, mildly deformed carbonate and fine rutile.

An approximate mode is :

| | |
|---|---|
| 40-50% | K-feldspar |
| 15-20% | sericite |
| 15-20% | quartz |
| 10-12% | calcite |
| 6-8% | chlorite |
| 1-2% | galena |
| 0.5-1% | sphalerite |
| 0.2-0.3% | pyrite |
| 0.1-0.2% | rutile |

Comments and Interpretations :

This rock is heavily altered, but it seems likely that it was a rather pumiceous or coarsely vitric tuff of rhyolitic or similar composition.

Heavy alteration has generated a sericite-calcite-chlorite-rutile assemblage. Fine quartz and K-feldspar (probably poorly ordered microcline) also formed by devitrification or alteration processes. Galena, sphalerite and pyrite were introduced with the alteration, selectively replacing lenticular pumiceous or vitric clasts.

Slight deformation is detectable in the calcite and sericite.

510371

MS3 17.7m

Sample Number : Z7266

Identification : Slightly deformed, slightly mineralized and heavily sericitized, carbonated and chloritized, pumiceous rhyolitic tuff

Description :

The sample is a drill core specimen of medium light grey rock with tuffaceous textures recognisable in the form of dark small pumiceous fiamme. There are a few lenticular replacement aggregates of brown sphalerite.

A cobaltinitrite staining test revealed plentiful fine K-feldspar localized within clasts a fraction of a millimetre to about 7mm in size.

In thin section the sample is seen to be heavily altered, but moderately preserved primary textures are of unwelded pumiceous tuffaceous style. Ragged, relatively undeformed fiamme are about 1 to 10mm in size.

Some of the largest pumiceous fiamme consist mainly of sericite; some other fiamme which were more obvious in hand specimen carry some chlorite mixed with sericite. Corroded phenocrysts of quartz and carbonated K-feldspar (hints of microcline twinning) occur in altered fiamme : there are no obvious phenoclasts. Other pumiceous or otherwise vitric components in the rock have altered to various assemblages of fine quartz, K-feldspar, calcite, chlorite and sericite. There are a few rutile aggregates after inferred primary oxide grains.

Translucent brown sphalerite, pyrite and traces of galena occur sparsely as fine grains (less than 0.2mm) and aggregates : some selectively partly replace individual fiamme.

There are mild indications of incipient foliation in sericite and deformation in calcite.

An approximate mode is :

| | |
|---|---|
| 40-50% | sericite |
| 20-25% | K-feldspar |
| 10-15% | carbonate |
| 10-15% | quartz |
| 8-10% | chlorite |
| 0.1-0.2% | rutile |
| 0.1% | sulphides (sphalerite, pyrite, galena) |

Comments and Interpretations :

This rock is heavily altered, but remnant textures are consistent with unwelded pumiceous tuff of rhyolitic or similar composition. It was probably essentially the same as the precursor for Z7265.

Heavy alteration has generated sericite, calcite, chlorite and rutile. Quartz and K-feldspar formed also by devitrification or alteration processes. Sphalerite, pyrite and galena were introduced in trace amounts to partly replace some fiamme.

Slight tectonic deformation has aligned some sericite and deformed some calcite.

Sample Number : Z7284

Identification : Deformed fissure filling vein containing quartz, chlorite, carbcnate, galena and sphalerite

Description :

The sample is a very small piece of drill core apparently displaying a deformed thick vein (probably 20mm wide) of chlorite, whitish quartz, conspicuous galena and minor brown sphalerite. The host is spotted dark greenish grey and olive grey rock.

A staining test revealed no K-feldspar.

In thin section the vein is seen to be contorted, strained and fractured. It appears to have been about 20mm wide and of symmetrically zoned, fissure filling style. Adjacent to each wall there is a 1 to 2mm zone of relatively coarse chlorite. The bulk of the vein consisted of coarse quartz (grainsizes commonly 2 to 5mm), now heavily strained, fractured and partly recrystallized. The cental core of the vein is about 1 to 2mm wide and composed of anhedral dolomitic or ankeritic carbonate, anhedral galena and minor brown sphalerite : primary grainsizes are about 0.4 to 2mm. Carbonate and galena both show deformation and some remobilization along fractures. The composition of the vein is estimated to be :

| | |
|---|---|
| 75-80% | quartz |
| 12-18% | chlorite |
| 4-6% | carbonate |
| 2-3% | galena |
| 0.3-0.5% | sphalerite |

Not much host rock is displayed in the specimen. It consists mainly of moderately foliated sericite, 0.5 to 1mm spots of fine chlorite and sparse small clasts of quartz (up to 0.3mm).

Comments and Interpretations :

The bulk of the specimen consists of a symmetrically zoned vein of relatively coarse-grained, fissure-filling style. The outermost zones feature chlorite, the bulk of the vein is quartz, and the core carries carbonate (dolomite or ankerite), galena and sphalerite. The vein is heavily deformed.

The host rock resembles foliated spotted slate (perhaps a low grade pelitic hornfels subsequently foliated by regional processes).

Sample Number : Z7285

Identification : Pyritic, lightly sericitized and chloritized recrystallized rhyolite with rare phenocrysts and many quartzose fracture veins

Description :

The sample is a drill core specimen of moderate red, finely crystalline rock carrying dissemianted pyrite and cut by many quartz fracture veins a fraction of a millimetre to 5mm thick.

A staining test revealed that the host rock is rich in K-feldspar.

In thin section the host rock displays rare phenocrysts of quartz (about 1mm) set in a lightly sericitic, sutured mosaic groundmass of untwinned feldspar and quartz (about 0.3 to 0.5mm in grainsize). The groundmass textures are of recrystallized, bu not fully annealed style. Chlorite aggregates (about 0.5mm in size) and patches of calcite are evenly spread through the rock. There are also sparsely disseminated, subhedral to euhedral, multifaceted grains of pyrite (about 0.2 to 0.5mm).

A few thin, irregular, inconspicuous, early fracture veins carry sericite and calcite. Much more abundant and thicker fracture veins (0.1 to 5mm) carry mainly quartz (relatively coarse and mildly strained), but accompanied in some cases by calcite and chlorite.

An approximate mode is :

| | |
|---|---|
| rare | quartz phenocrysts |
| 50-55% | groundmass feldspar (mainly potassic) |
| 20-25% | groundmass quartz |
| 5-10% | groundmass sericite |
| 3-5% | groundmass chlorite |
| 0.3-0.5% | groundmass calcite |
| 0.2-0.3% | disseminated pyrite |
| 1-3% | early veins of sericite and calcite |
| 10-15% | late veins of quartz with minor calcite and chlorite |

Comments and Interpretations :

This rock has a richly potassic acid composition. It is probably rhyolite, although there are difficulties in determining how much untwinned plagioclase is present : thus, rhyodacitic composition is a possibility.

The textures are considered to be of recrystallized, but not fully annealed style; there are only rare phenocrysts. Two alternative interpretations seem reasonable. Either the rock is rhyolitic (or possibly rhyodacitic) lava recrystallized by a nearby intrusion, or the rock is a recrystallized, previously quenched marginal variant of a subvolcanic intrusion such as that indicated by Z7286.

The rock has been lightly sericitized and chloritized, impregnated with disseminated pyrite, finely fracture veined by sericite and calcite, then abundantly and coarsely fracture veined by quartz with calcite and chlorite.

Sample Number : Z7286

Identification : Rhyodacitic porphyry with moderate to heavy alteration to sericite, calcite, chlorite and leucoxene/rutile

Description :

The sample is a drill core specimen of acid porphyry, displaying many phenocrysts of quartz, light grey and pale olive altered feldspar, and dark greenish grey altered mafic silicates set in a pale red, finely crystalline groundmass.

A staining test revealed that the groundmass is rich in K-feldspar.

In thin section the sample displays textures of subvolcanic porphyry style, involving many subhedral and corroded phenocrysts (0.5 to 7mm) and an allotriomorphic to subtly micrographic groundmass (about 0.1mm grainsize).

The largest phenocrysts are corroded and embayed quartz. The most abundant phenocrysts are corroded thick prisms of plagioclase, moderately to heavily sericitized and carbonated. Other phenocrysts were ilmenite or titaniferous magnetite (now pseudomorphed by aggregates of leucoxene and rutile) and biotite (now pseudomorphed by chlorite-sericite-calcite-rutile). The groundmass consists of quartz and mainly untwinned feldspars (dominantly potassic), liberally flecked with sericite and calcite; there are a few leucoxenized oxide grains and chloritized mafic silicates.

An approximate mode is :

| | |
|---|---|
| 10-12% | quartz phenocrysts |
| 25-30% | moderately to heavily sericitized and carbonated plagioclase phenocrysts |
| 2-3% | chlorite-sericite-calcite-rutile pseudomorphs of mica phenocrysts |
| 0.2-0.3% | leucoxene/rutile pseudomorphs of oxide phenocrysts |
| 35-45% | moderately sericitized and carbonated groundmass feldspar, mainly potassic |
| 15-20% | groundmass quartz |
| 1-3% | altered groundmass oxides and mafic silicates |

Comments and Interpretations :

This rock is confidently interpreted to be a rhyodacitic porphyry of subvolcanic, intrusive origin.

The rock shows moderate to heavy alteration to sericite, calcite, chlorite, leucoxene and rutile, but sulphides were not detected.

510375

Mt Ellen Mine

Sample Number : Z 7290

Identification : Lightly sericitized porphyritic rhyodacite cut by fracture veins of sericite and later quartz with minor chlorite

Description :

The sample is a soft, friable, pinkish grey, heavily weathered hand specimen of felsic volcanic rock.

Cobaltinitrite stain seems to react in a fashion consistent with the presence of at least moderately abundant, fine K-feldspar.

In thin section the sample displays porphyritic, finely crystalline textures of volcanic or subvolcanic style, modified by veining, sericitization and weathering. Phenocrysts are subhedral and about 0.4 to 3mm in size. The groundmass has allotriomorphic to micrographic textures with grainsizes around 0.1 to 0.2mm.

The main phenocrysts are plagioclase prisms, now poorly twinned and lightly sericitized. Other phenocrysts are opaque oxide (leucoxenized to varying degrees) and sparse quartz (the largest now showing mosaic recrystallization). The groundmass displays untwinned feldspars lightly altered to sericite and softened and argillized by weathering, plentiful quartz and some specks of leucoxene.

Numerous irregular, thin fracture veins (0.1 to 0.4mm wide) comprise an early generation filled with sericite and a later generation filled with quartz and minor inferred chlorite (now weathered to limonitic clays.

An approximate mode is :

| | |
|---|---|
| 7-9% | plagioclase phenocrysts, lightly sericitized |
| 1-2% | oxide phenocrysts, partly leucoxenized |
| 0.5-1% | quartz phenocrysts, now recrystallized |
| 45-50% | groundmass feldspars, now softened by weathering |
| 8-10% | groundmass sericite after feldspars |
| 20-25% | groundmass quartz |
| 0.3-0.5% | groundmass leucoxene |
| 7-9% | veins of sericite |
| 2-4% | veins of quartz and inferred chlorite |

Comments and Interpretations :

This rock is thought to have originated as porphyritic rhyodacite. It was probably lava, but occurrence within a related subvolcanic intrusion cannot be precluded on textures alone.

The rock was lightly sericitized and fracture veined by sericite and later quartz with minor chlorite; more recently it has been heavily weathered.

Sample Number : Z 7291

Identification : Flow brecciated, porphyritic latite with light alteration to chlorite-sericite-hematite and abundant veining by calcite and traces of quartz and chlorite

Description :

The sample is a specimen of drill core displaying variously thin or thick veins of whitish carbonate cutting abundantly porphyritic volcanic rock which has many orange pink feldspar phenocrysts and a few quartz and altered mafic silicate phenocrysts set in a pale red groundmass.

A cobaltinitrite staining test revealed abundant K-feldspar in the groundmass.

In thin section the sample displays primary textures of flow brecciated, abundantly porphyritic, hypidiomorphic, finely crystalline, volcanic style. Phenocrysts are mainly 0.5 to 3mm in size and the groundmass features feldspar laths about 0.1 to 0.2mm long, together with other finer minerals. The flow brecciation is expressed as scattered darker, finer grained volcanic clasts of quenched apperance and about commonly 1 to 5mm in size. The rock is cut by many veins.

The main phenocrysts are well twinned prisms of plagioclase, slightly flecked by sericite and pigmented by very fine reddish oxides. Quartz forms a few smoothly corroded and deeply embayed phenocrysts. Partly hematized opaque oxide phenocrysts are common. Prismatic phenocrysts of inferred pyroxene occur inconspicuously as calcite-hematite-chlorite pseudomorphs. A few small phenocrysts are apatite. The groundmass involves plagioclase laths, anhedral orthoclase, minor quartz, plentiful opaque oxides, and chlorite pseudomorphs of inferred pyroxene; the groundmass feldspars also show very fine reddish pigmentation.

There are many irregular veins of calcite, variously about 0.05 to a few millimetres thick. All are fracture-controlled, but some are partly of replacement style and others are simple fracture fillings. The fracture fillings are the youngest veins. One early calcite vein carries some quartz and traces of chlorite.

An approximate mode is :

| | |
|---|---|
| 10-15% | plagioclase phenocrysts, reddened and slightly sericitized |
| 1-3% | opaque oxide phenocrysts |
| 1-3% | quartz phenocrysts |
| 0.2-0.3% | mafic silicate phenocrysts, now calcite-hematite-chlorite |
| tr | apatite phenocrysts |
| 15-20% | groundmass orthoclase |
| 15-20% | groundmass plagioclase |
| 6-8% | groundmass oxides |
| 4-6% | groundmass chlorite |
| tr | groundmass quartz |
| 35-40% | veins of calcite with accompanying traces of quartz and chlorite |

Comments and Interpretations :

This rock is considered to have originated as flow-brecciated, abundantly porphyritic latite lava.

The rock has been reddened, lightly chloritized and sericitized, and abundantly veined by calcite, accompanied in early stages by some quartz and chlorite.

Sample Number : Z 7292

Identification : Moderately foliated, veined, intensely altered, porphyritic latite or andesite

Description :

The sample is a specimen of drill core displaying foliated, abundantly porphyritic, dark greenish grey volcanic rock.

A staining test revealed no K-feldspar.

In thin section the sample is seen to be intensely altered and moderately foliated, but remnant primary textures seem to be of abundantly porphyritic, volcanic style. Many altered, subhedral phenocrysts about 0.5 to 3mm in size are set in a foliated altered groundmass which was about 0.1mm in grainsize.

The most common phenocrysts have prismatic shapes of plagioclase style, but are now pseudomorphed by non-foliated sericite, accompanied in some cases by minor calcite. Unaltered phenocrysts are smoothly corroded and deeply embayed quartz. There are a few chlorite-leucoxene pseudomorphs of mafic silicate phenocrysts, some of them streaked by shearing. The groundmass retains few recognisably primary textures : it consists mainly of foliated sericite and chlorite, along with minor quartz and leucoxene.

Deformed and disrupted segments of veins about 0.03 to 2mm wide contain mainly calcite, but with chlorite and quartz as outer linings in a few cases.

An approximate mode is :

| | |
|---|---|
| 30-40% | sericite ± calcite pseudomorphs of inferred plagioclase phenocrysts |
| 5-7% | chlorite-leucoxene pseudomorphs of mafic silicate phenocrysts |
| 2-4% | quartz phenocrysts |
| 25-30% | groundmass sericite |
| 20-25% | groundmass chlorite |
| 0.2-0.3% | groundmass leucoxene |
| 0.2-0.3% | groundmass quartz |
| 6-8% | vein carbonate |

Comments and Interpretations :

This rock is thought to have originated as abundantly porphyritic andesite or latite, but it has been intensely altered to sericite-chlorite-leucoxene-calcite, veined by calcite ± chlorite ± quartz, then moderately foliated by shearing.

Sample Number : Z 7293

Identification : Flow brecciated, porphyritic latite with light alteration to chlorite-sericite-hematite-pyrite and abundant veining by quartz, calcite and minor chlorite

Description :

The sample is a specimen of drill core displaying whitish veins cutting abundantly porphyritic volcanic rock which has many orange pink feldspar phenocrysts set in a greyish red groundmass.

A cobaltinitrite staining test revealed abundant K-feldspar in the groundmass.

In thin section the sample displays primary textures of flow-brecciated, abundantly porphyritic, hypidiomorphic, finely crystalline, volcanic style. Phenocrysts are mainly 0.5 to 4mm in size and the groundmass displays plagioclase laths about 0.1 to 0.2mm long, together with other finer minerals. The flow brecciation is expressed as scattered clasts about 0.5 to 6mm in size of more chilled, darker, hematite-rich appearance. The rock is cut by many veins.

The main phenocrysts are twinned, slightly sericitized and mildly deformed prisms of plagioclase; they are faintly reddened. Quartz phenocrysts are quite sparse, corroded, embayed and mildly deformed. Smaller mafic phenocrysts are hematized oxide and chloritized silicate. The groundmass has plagioclase laths, anhedral orthoclase, plentiful hematite, minor chlorite and a few grains of quartz; the groundmass feldspars are reddened. Pyrite is present as disseminated cubes (0.01 to 0.1mm) and clusters of grains.

There are many irregular fracture veins. The earliest, widest (up to at least 5mm) and most deformed examples contain strained mosaics of fine quartz, accompanied in some cases by chlorite (mainly near the edges of the veins) and strained calcite (mainly in the core of the veins). Other narrower, less deformed veins, contain quartz and calcite or calcite alone.

An approximate mode is :

| | |
|---|---|
| 14-18% | plagioclase phenocrysts, reddened and slightly sericitized |
| 0.3-0.5% | hematized oxide phenocrysts |
| 0.3-0.5% | quartz phenocrysts |
| 0.2-0.3% | chloritized mafic phenocrysts |
| 20-25% | groundmass orthoclase |
| 15-20% | groundmass plagioclase |
| 6-8% | groundmass oxides |
| 1-3% | groundmass chlorite |
| 0.3-0.5% | disseminated pyrite |
| 12-16% | calcite within veins |
| 20-25% | quartz within veins |
| 1-3% | chlorite within veins |

Comments and Interpretations :

This rock is considered to have originated as flow-brecciated, abundantly porphyritic latite lava.

The rock has been reddened and lightly chloritized, sericitized and pyritized, and cut by many fracture veins. The earliest, thickest veins carry minor early chlorite, dominant quartz and late calcite; such veins are conspicuously deformed. Later veins are thinner, less deformed and show a progressive change from quartz-calcite assemblages to calcite alone.

510381

WS4 43.7m

363

Sample Number : Z 7294

Identification : Well foliated, heavily chloritized, lightly sericitized and reddened, quartz-calcite veined, porphyritic latite

Description :

The sample is a drill core specimen of well foliated, dark greenish grey rock with lenticular remnants of less sheared volcanic rock with pale red colours and recognisable phenocrysts of feldspar and quartz.

A cobaltinitrite staining test revealed plentiful fine K-feldspar.

In thin section the sample displays a well developed shear foliation, featuring aligned chlorite, but there are rolled remnant phenocrysts and some less deformed, less altered, lenticular remnants retaining porphyritic, finely crystalline volcanic textures of latite style. Phenocrysts are about 0.4 to 4mm and groundmass grains are around 0.05 to 0.2mm.

The main phenocrysts are lightly sericitized, faintly reddened plagioclase. Other phenocrysts are opaque oxide, chloritized mafic silicate, and corroded and embayed quartz. Where least modified the groundmass retains reddened feldspars (plagioclase and orthoclase) and minor opaque oxide but shows moderate development of chlorite and sphene. In well foliated regimes there is more chlorite and sphene, but much fine orthoclase is also retained.

Throughout the rock there are dismembered and deformed segments of veins (about 0.1 to 5mm wide) containing calcite or quartz and calcite. Some segments contain streaks of chlorite, either original or introduced by the shearing. Some calcite occurs also in strain shadows adjacent to rolled phenocrysts.

An approximate mode is :

| | |
|---|---|
| 15-20% | remnant phenocrysts of reddened and lightly sericitized plagioclase |
| 1-3% | remnant oxide phenocrysts |
| 1-3% | remnant quartz phenocrysts |
| 1-3% | remnant chloritized phenocrysts |
| 35-45% | fine feldspars |
| 25-35% | groundmass chlorite |
| 2-3% | groundmass oxide and secondary sphene |
| 3-5% | calcite as vein remnants and mobilized strain shadows |
| 0.5-1% | quartz within vein remnants |

Comments and Interpretations :

This rock is interpreted to have origianted as porphyritic latite lava, comparable to that represented by Samples Z 7291 and Z 7293, but it shows heavier chloritic alteration and consequently a greater degree of foliation induced by subsequent shearing. Veins of quartz-calcite and calcite were present in the rock before it was sheared.

WS4 106.7m

Sample Number : Z 7295

Identification : Well foliated, heavily chloritized, lightly sericitized and reddened, chlorite-quartz-calcite veined, porphyritic latite

Description :

The sample is a specimen of drill core displaying foliated, dark greenish grey rock with a few pale red remnants of volcanic rock and some phenocrysts of feldspar and quartz.

A staining test revealed plentiful fine K-feldspar.

In thin section the sample displays a well developed shear foliation, featuring aligned chlorite, but there are rolled remnant phenocrysts and some less deformed, less altered, lenticular remnants retaining porphyritic, finely crystalline, volcanic textures of latite style. Phenocrysts are about 0.4 to 4mm and groundmass grains are about 0.02 to 0.2mm. Within a 20mm long remnant of least altered rock there are also several examples of apparently quenched, oxide-rich, flow breccia clasts.

The main phenocrysts are lightly sericitized, faintly reddened plagioclase. Other phenocrysts are opaque oxide, deeply embayed quartz and chloritized mafic silicate. Least altered groundmass regimes show faintly reddened feldspars, opaque oxides and some secondary sphene and chlorite; more altered regimes show more chlorite and sphene.

There are many deformed and dismembered remnants of fracture veins (0.05 to at least 4mm wide) variously carrying calcite, quartz or a lining of quartz with a core of calcite. Some quartzose veins and several amygdaloidal structures carry a lining of chlorite and a core of quartz.

An approximate mode is :

| | |
|---|---|
| 14-18% | remnant phenocrysts of reddened and lightly sericitized plagioclase |
| 1-3% | remnant oxide phenocrysts |
| 1-3% | remnant quartz phenocrysts |
| 1-3% | remnant chloritized phenocrysts |
| 15-25% | fine feldspars, mainly potassic |
| 35-40% | groundmass chlorite |
| 3-5% | groundmass oxide and secondary sphene |
| 8-12% | calcite as vein remnants |
| 3-5% | quartz as vein and amygdale remnants |
| 1-2% | chlorite in quartz veins and amygdales |

Comments and Interpretations :

This rock is interpreted to be analogous to that represented by Z 7294. It seems to have originated as flow brecciated, porphyritic latite, experienced slight sericitizaiton and reddening, heavy chloritization, fracture veining (early chlorite, then quartz, then calcite) and finally foliation by shearing.

Displayed lenticular lithic clasts are interpreted to be rigid remnants of least altered rock, rather than detrital or tuffaceous clasts.

Sample Number : Z 7296

Identification : Slaty, deformed, veined, laminated mudstone and muddy, fine volcaniclastic arenite

Description :

The sample is a specimen of drill core displaying contorted and partly dismembered layers of medium light grey, finely sandy textured rock in contact with dark grey pelite and cut by several thin, whitish veins.

A cobaltinitrite staining test revealed that many of the sand and silt clasts are potassic.

In thin section the contorted sandy layers are seen to be about 2 to at least 30mm thick and to consist of moderately sorted, densely packed, angular mineral clasts and subrounded volcanic lithic clasts, mainly in the size range 0.1 to 0.3mm. There is a tectonically foliated sericitic and chloritic matrix. The mineral clasts are plagioclase and quartz. The lithic clasts are of indistinct, apparently intermediate, finely feldspathic volcanic style, now clouded, chloritic and in some cases carbonate. An approximate mode is :

| | |
|---|---|
| 50-60% | volcanic lithic clasts |
| 15-20% | plagioclase clasts |
| 5-10% | quartz clasts |
| 15-20% | matrix sericite and subordinate chlorite |

The dark pelite is silty and sericitic rock with a slaty foliation fo sericite and streaks fo very fine carbonaceous matter transgressive to lithological layering. There are also many tiny opaque grains (0.01mm and finer) which seem to be pyrite. The silt clasts are feldspar and minor quartz. An approximate mode is :

| | |
|---|---|
| 30-40% | feldspathic silt |
| 1-2% | quartz silt |
| 55-65% | sericite |
| 1-2% | carbonaceous matter |
| 2-3% | probable pyrite |

Both the arenite and pelite are cut by numerous fracture veins (0.05 to 2mm wide) which have been deformed and dismembered by the slaty foliation. The veins consist mainly of calcite, but some also carry quartz (lining the walls of the veins), traces of chlorite and rare grains of pyrite. The veins constitute about 15% of the total specimen.

Comments and Interpretations :

The original rock is considered to have been laminated muddy labile sandstone and mildly carbonaceous and sulphidic mudstone. The sandy layers also qualify for alternative identification as greywacke or muddy volcaniclastic arenite. The layers have since been cut by veins carrying calcite and subordinate early quartz and chlorite, then contorted and dismembered by a slaty, sericitic foliation.

2/...

The source of the sand and silt-sized clasts was apparently intermediate volcanic rock, rich in fine K-feldspar but carrying phenocrystal plagioclase and quartz. It may well have been latite similar to that expressed in Samples Z 7291 and Z 7295.

The carbonaceous, muddy layers carry probable syngenetic pyrite.

510385

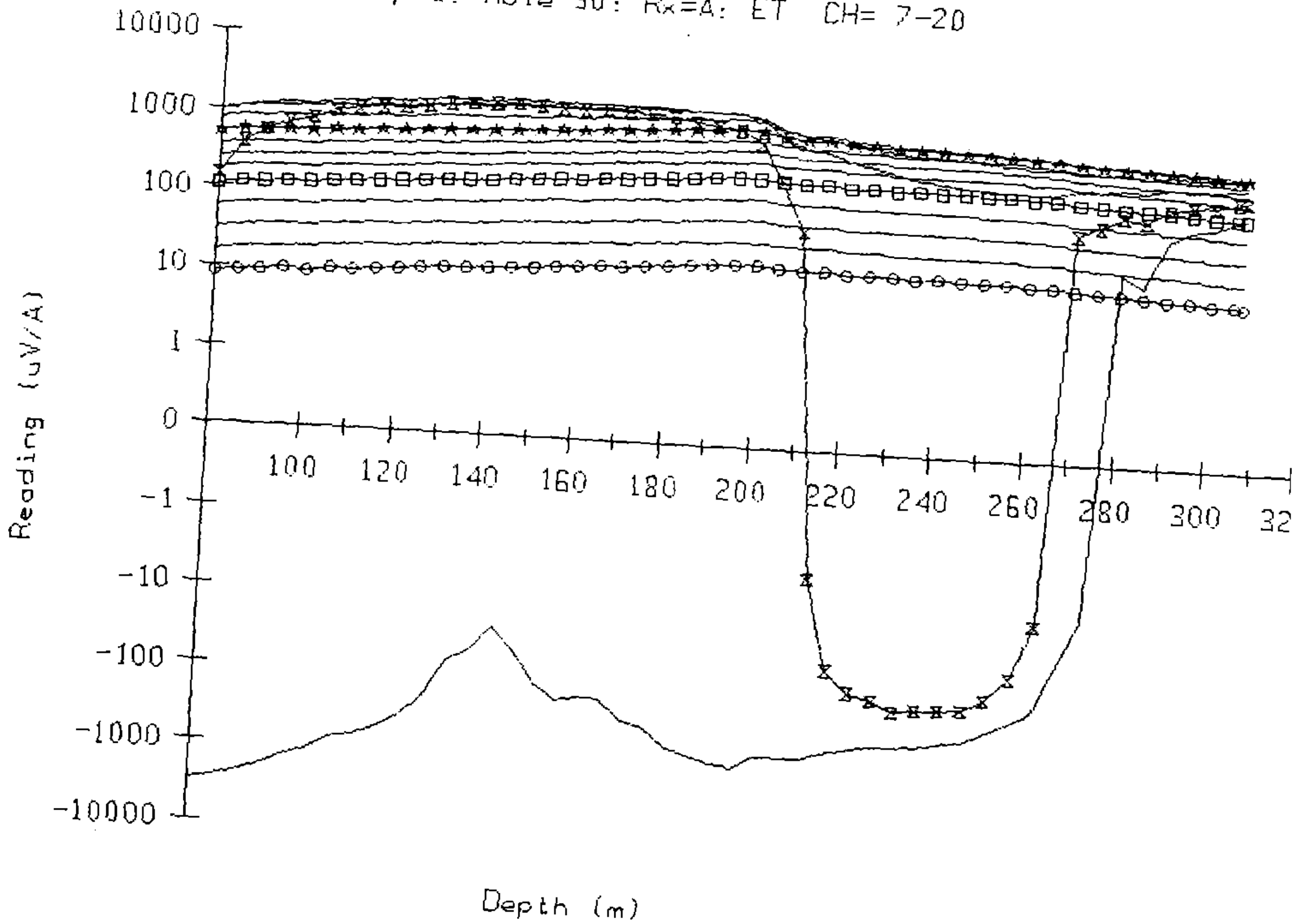
373

APPENDIX 7

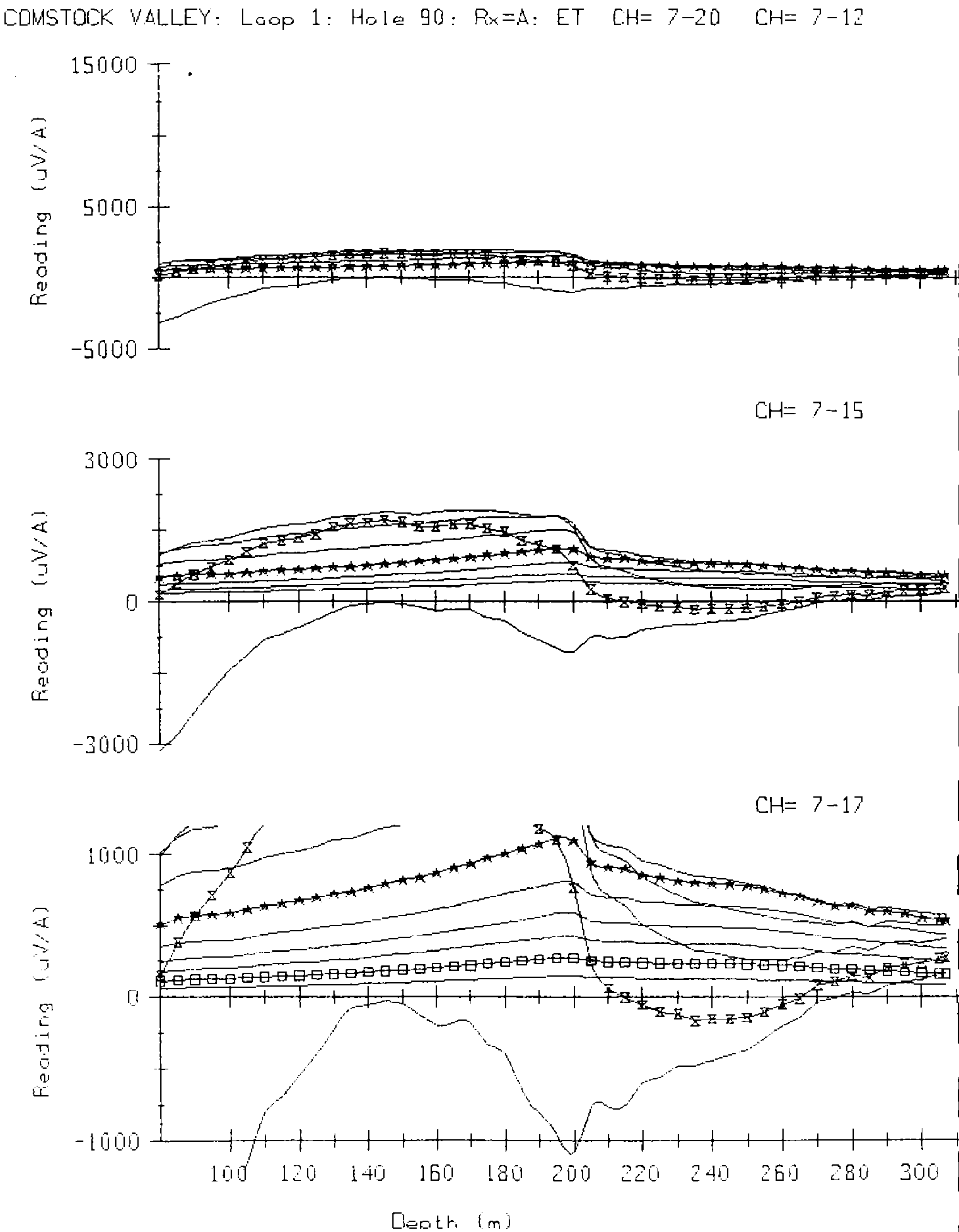
Downhole Sirotem Data

510386

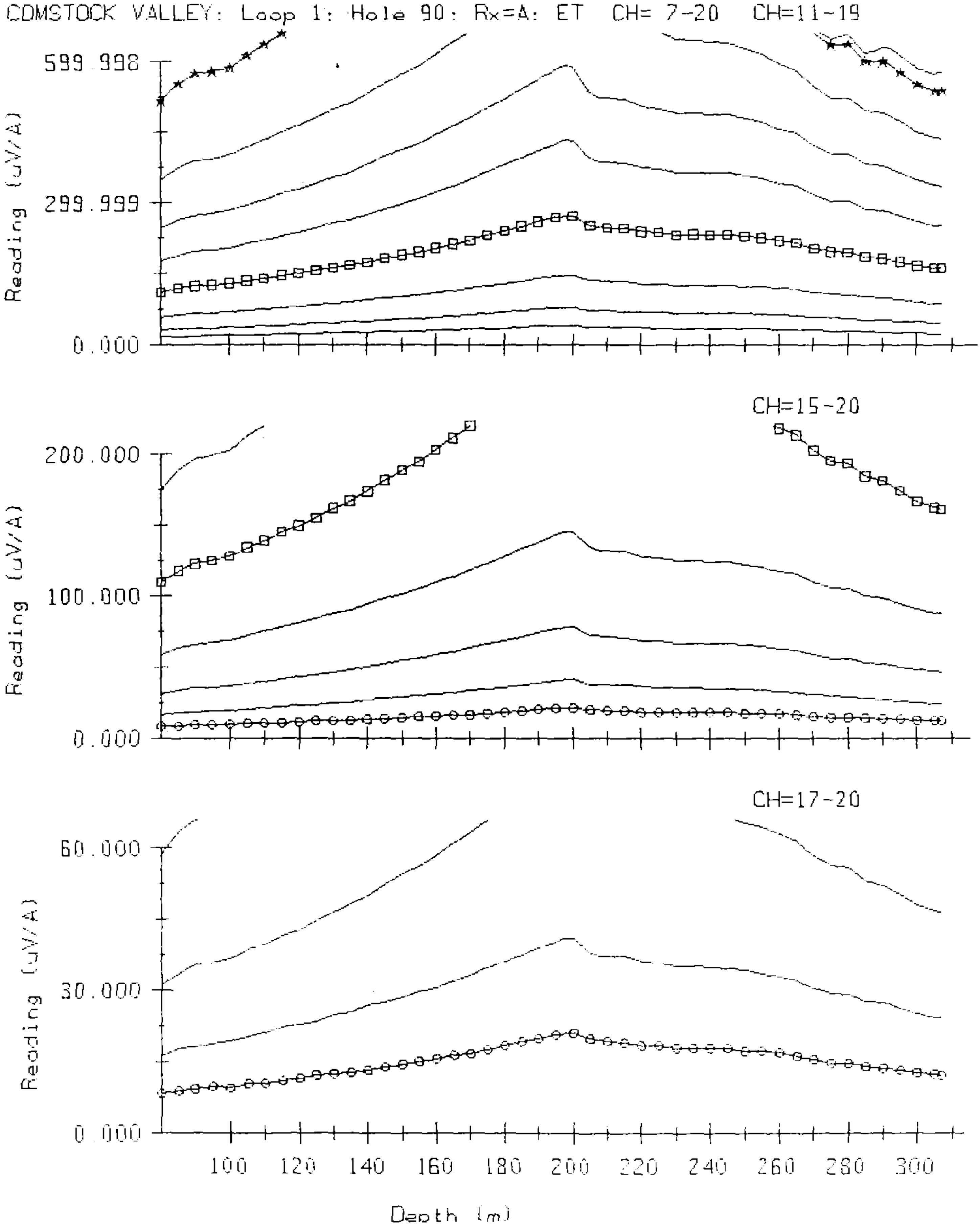
COMSTOCK VALLEY: Loop 1: Hole 90: Rx=A: ET CH= 7-20



510387


COMSTOCK VALLEY: Loop 1: Hole 90: Rx=A: ET CH= 7-20 CH= 7-12
15000
5000
-5000
Reading (uV/A)
CH= 7-15
3000
0
-3000
Reading (uV/A)
CH= 7-17
1000
0
-1000
Reading (uV/A)
100
120
140
160
180
200
220
240
260
280
300
Depth (m)

510388


COMSTOCK VALLEY: Loop 1: Hole 90: Rx=A: ET CH= 7-20 CH=11-19
599.998
299.999
0.000
Reading (uV/A)
CH=15-20
200.000
100.000
0.000
Reading (uV/A)
CH=17-20
60.000
30.000
0.000
Reading (uV/A)
100
120
140
160
180
200
220
240
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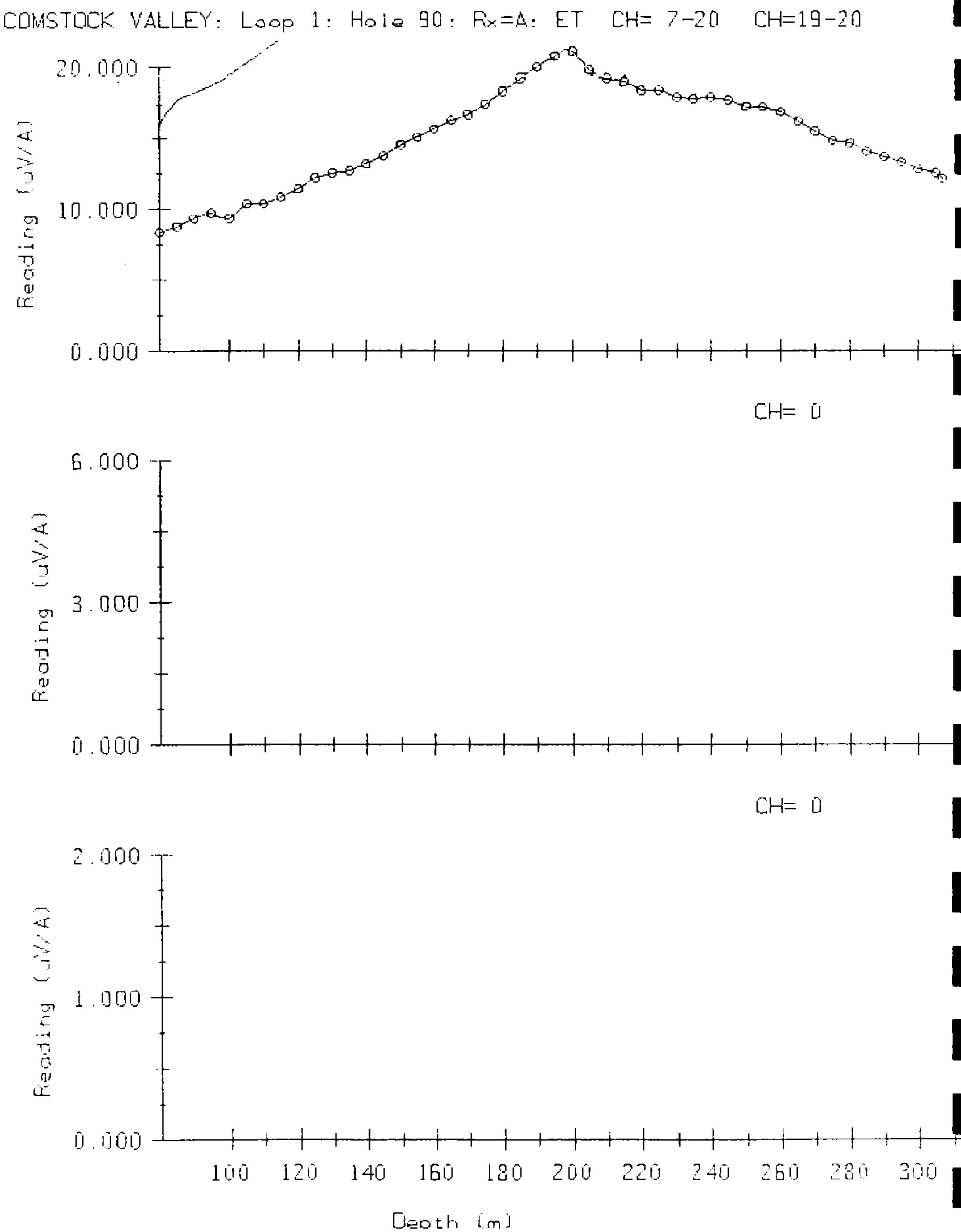
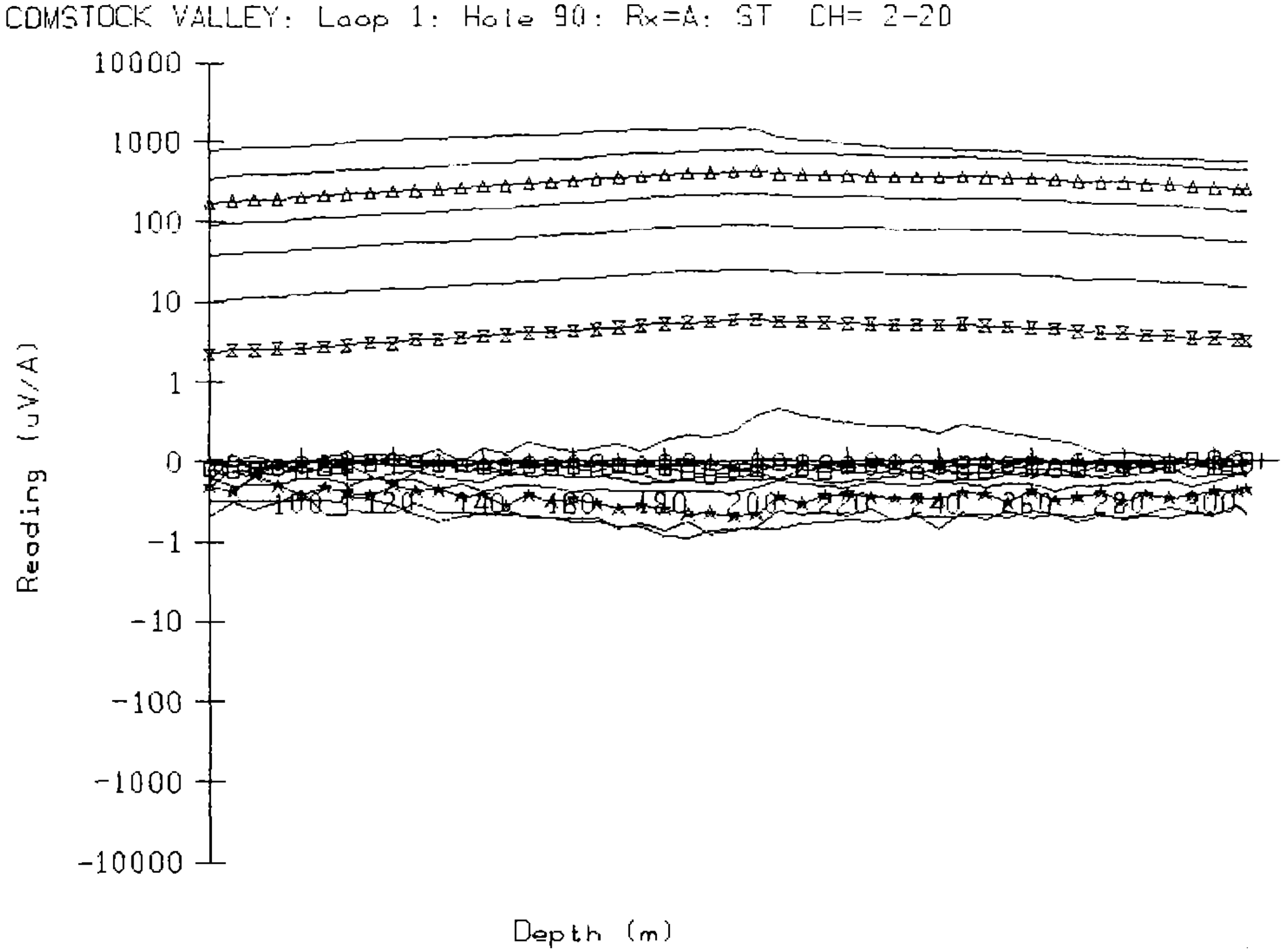
280
300
Depth (m)

510389


COMSTOCK VALLEY: Loop 1: Hole 90: Rx=A: ET CH= 7-20 CH=19-20
20.000
10.000
0.000
Reading (uV/A)
CH= 0
6.000
3.000
0.000
Reading (uV/A)
CH= 0
2.000
1.000
0.000
Reading (uV/A)
100
120
140
160
180
200
220
240
260
280
300
Depth (m)

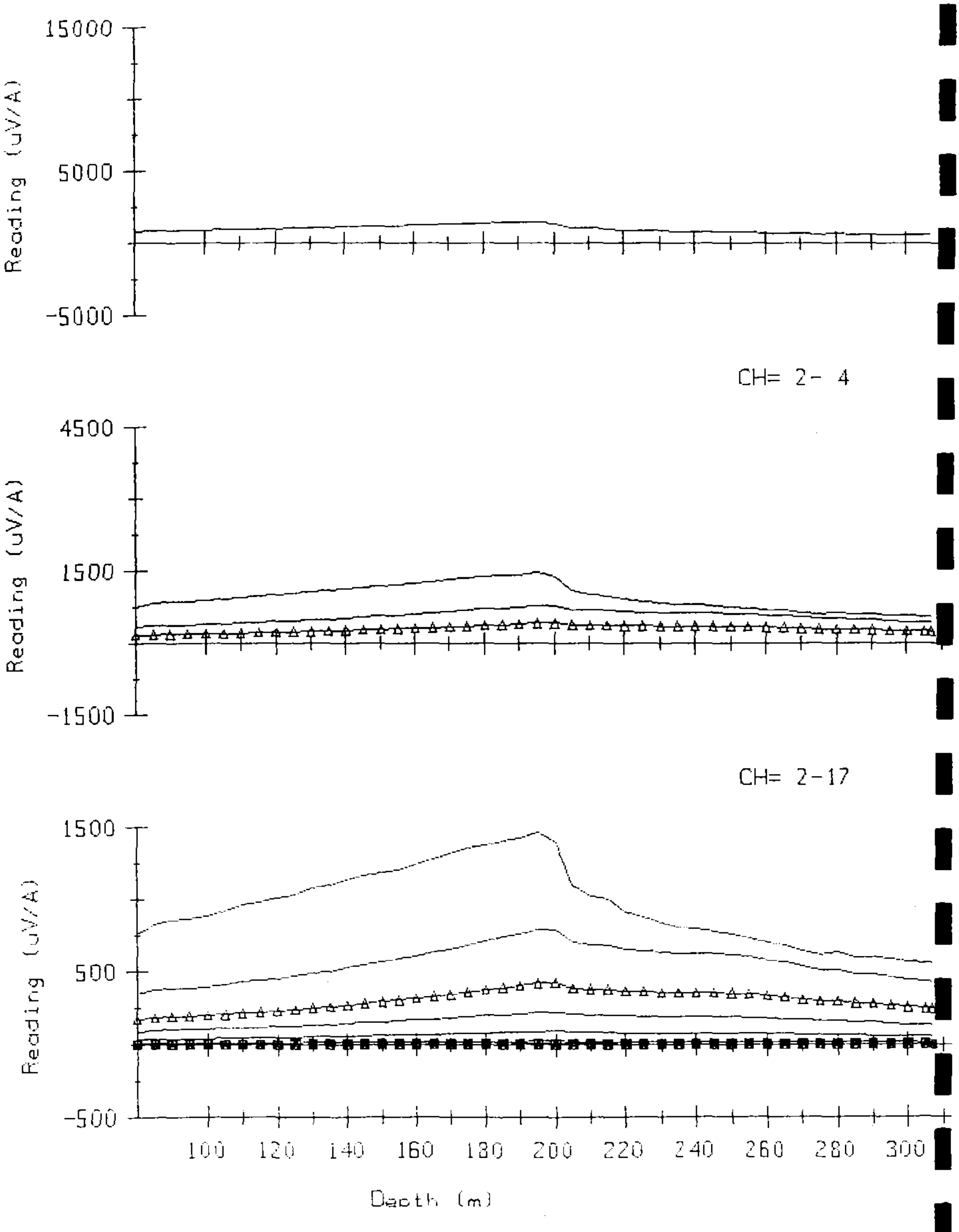
378


COMSTOCK VALLEY: Loop 1: Hole 90: Rx=A: ST CH= 2-20
10000
1000
100
10
1
0
-1
-10
-100
-1000
-10000
Reading (uV/A)
100
120
140
160
180
200
220
240
260
280
300
Depth (m)

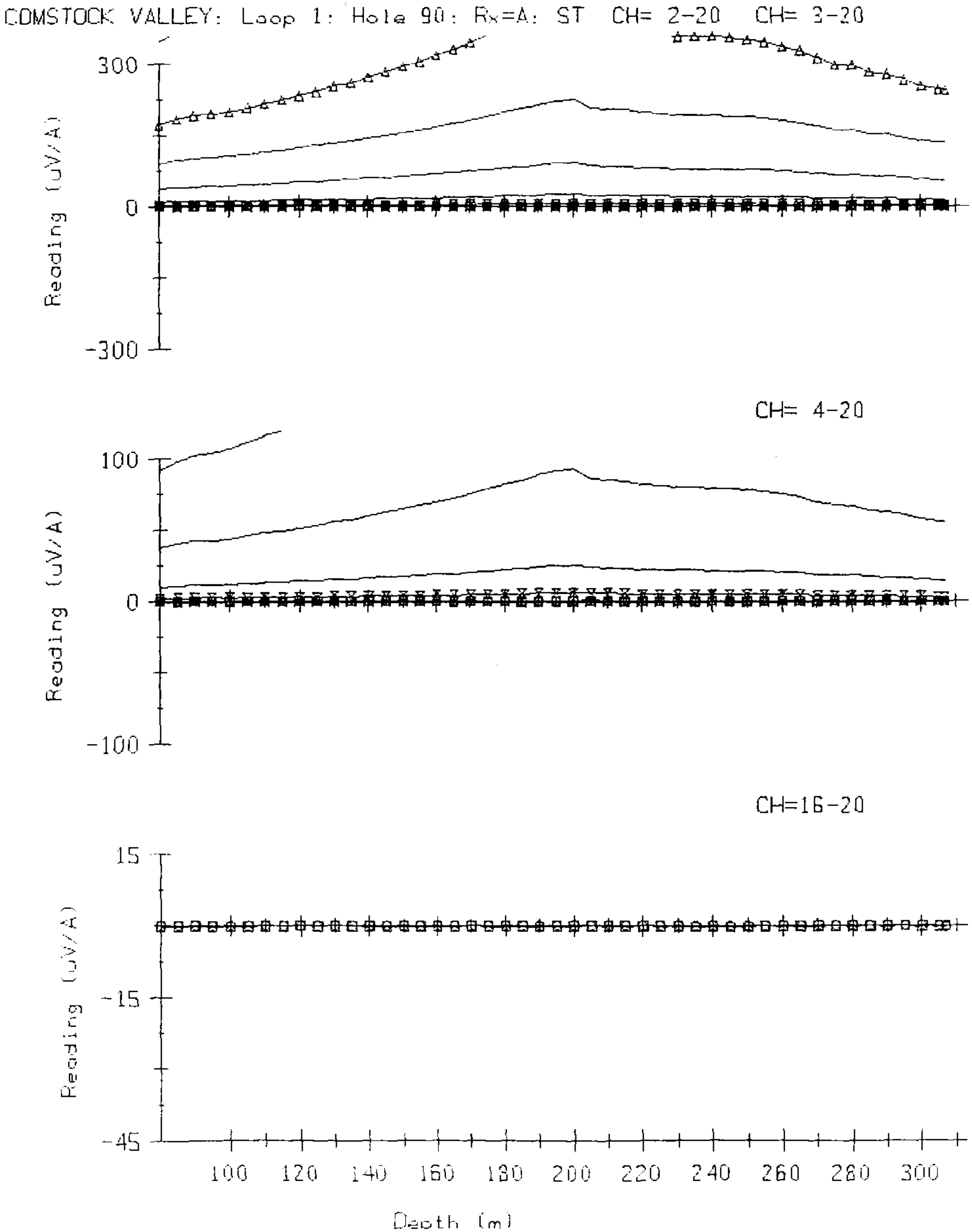
510391

373

COMSTOCK VALLEY: Loop 1: Hole 90: Rx=A: ST  CH= 2-20  CH= 2



510392


COMSTOCK VALLEY: Loop 1: Hole 90: Rx=A: ST CH= 2-20 CH= 3-20
300
0
-300
Reading (uV/A)
CH= 4-20
100
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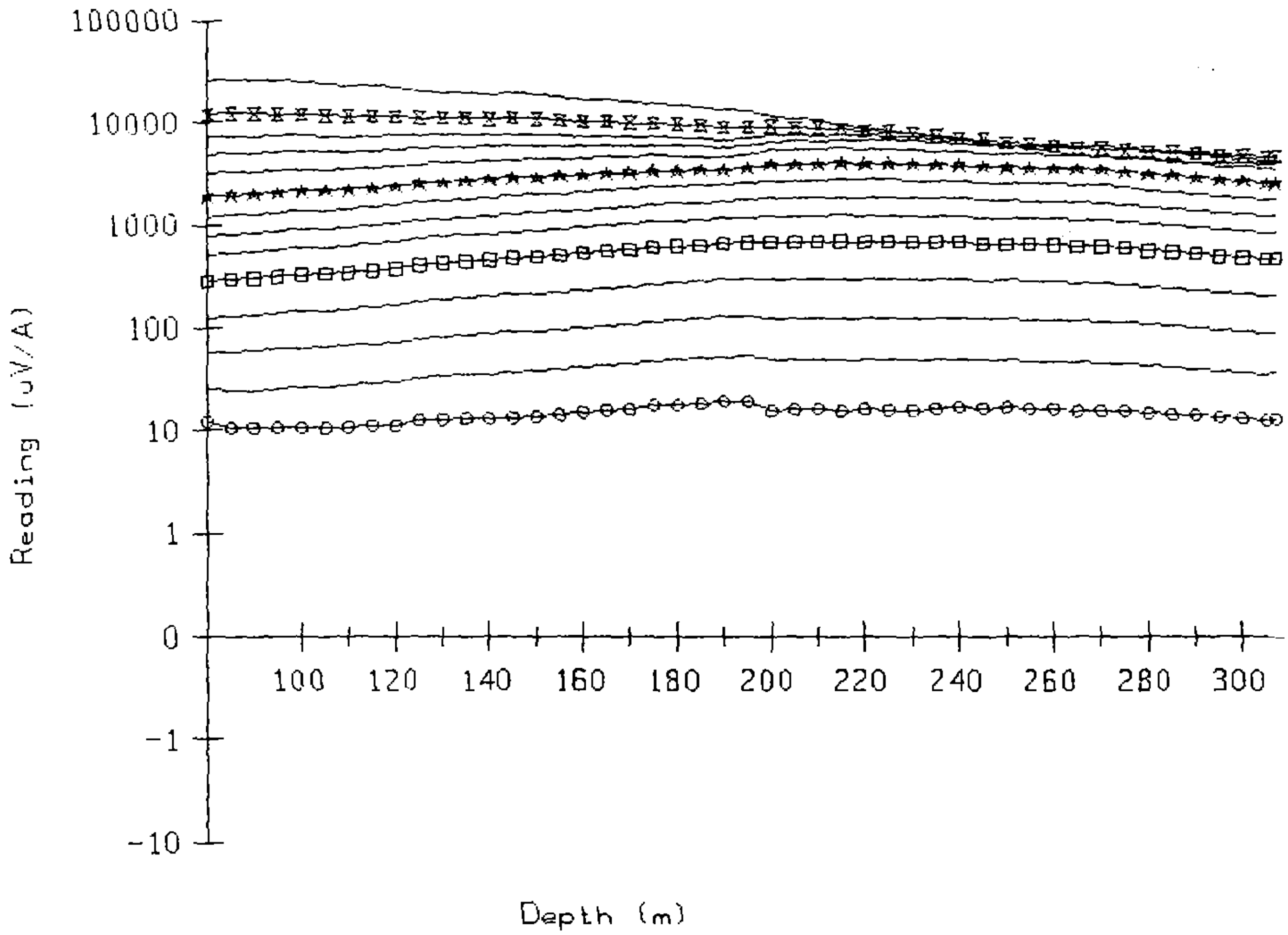
-100
Reading (uV/A)
CH=16-20
15
-15
-45
Reading (uV/A)
100
120
140
160
180
200
220
240
260
280
300
Depth (m)

510393

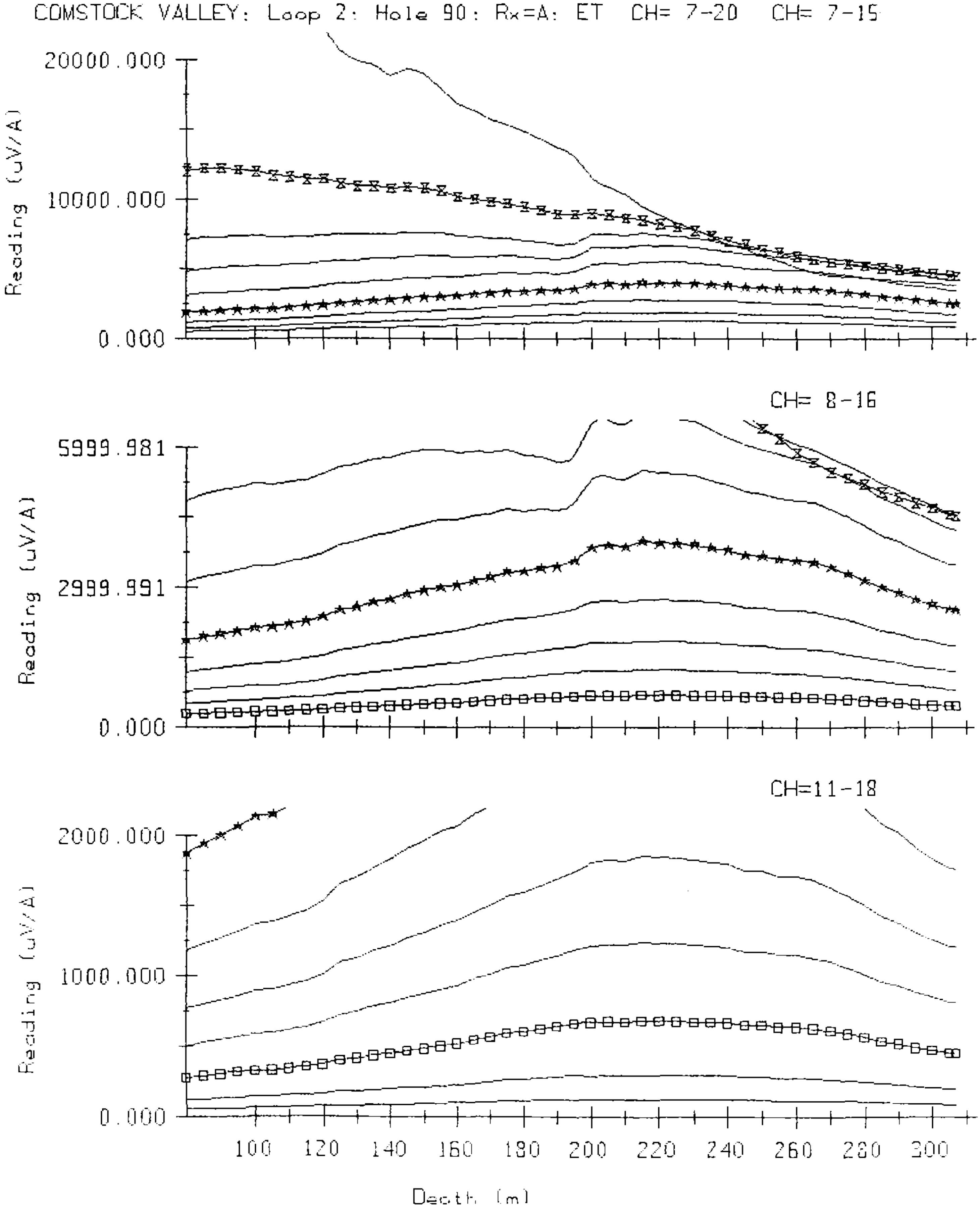
381

COMSTOCK VALLEY: Loop 2: Hole 90: Rx=A: ET CH= 7-20



382

510394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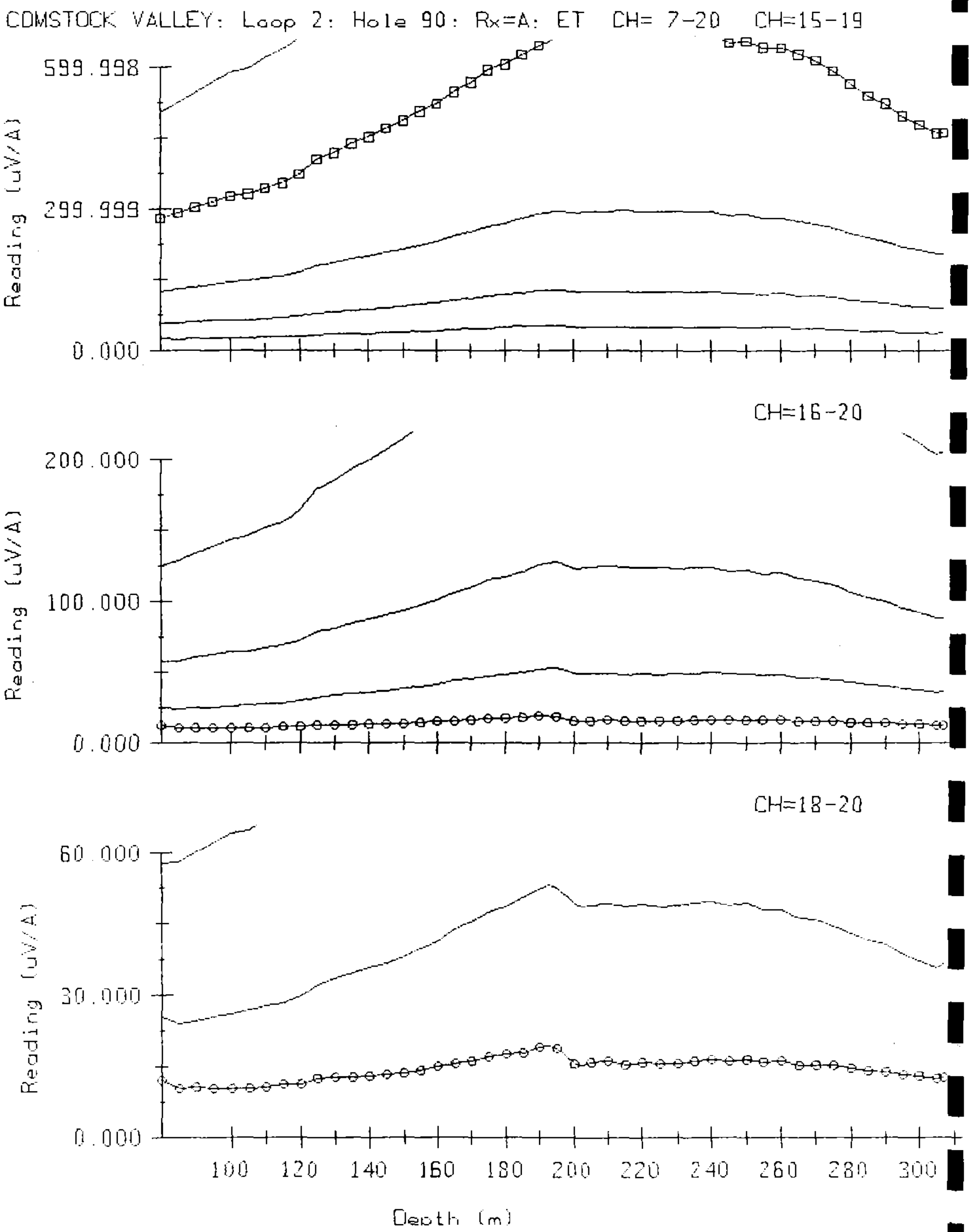
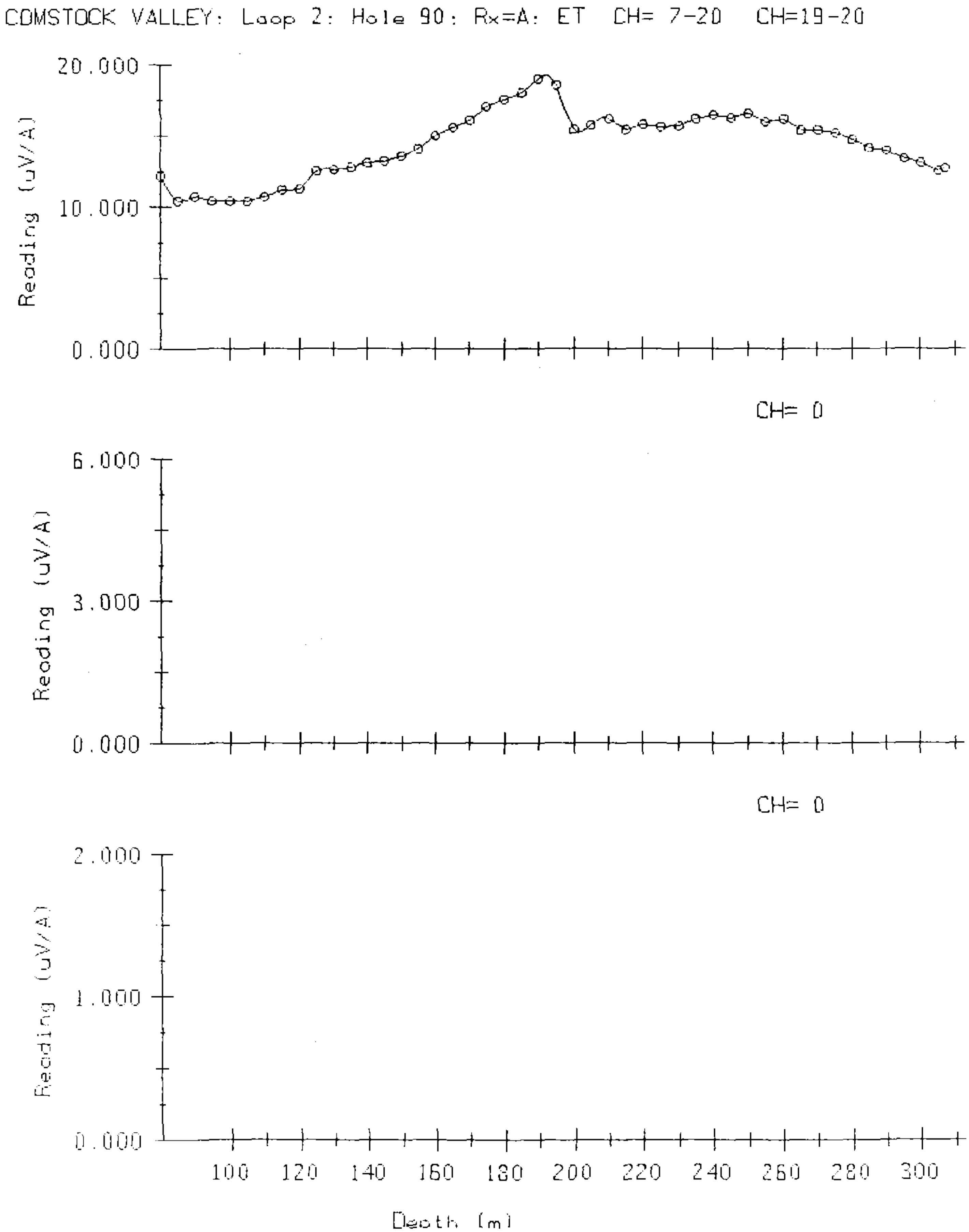
20000.000
10000.000
0.000
Reading (uV/A)
CH= 8-16
5999.981
2999.991
0.000
Reading (uV/A)
CH=11-18
2000.000
1000.000
0.000
Reading (uV/A)
100
120
140
160
180
200
220
240
260
280
300
Depth (m)

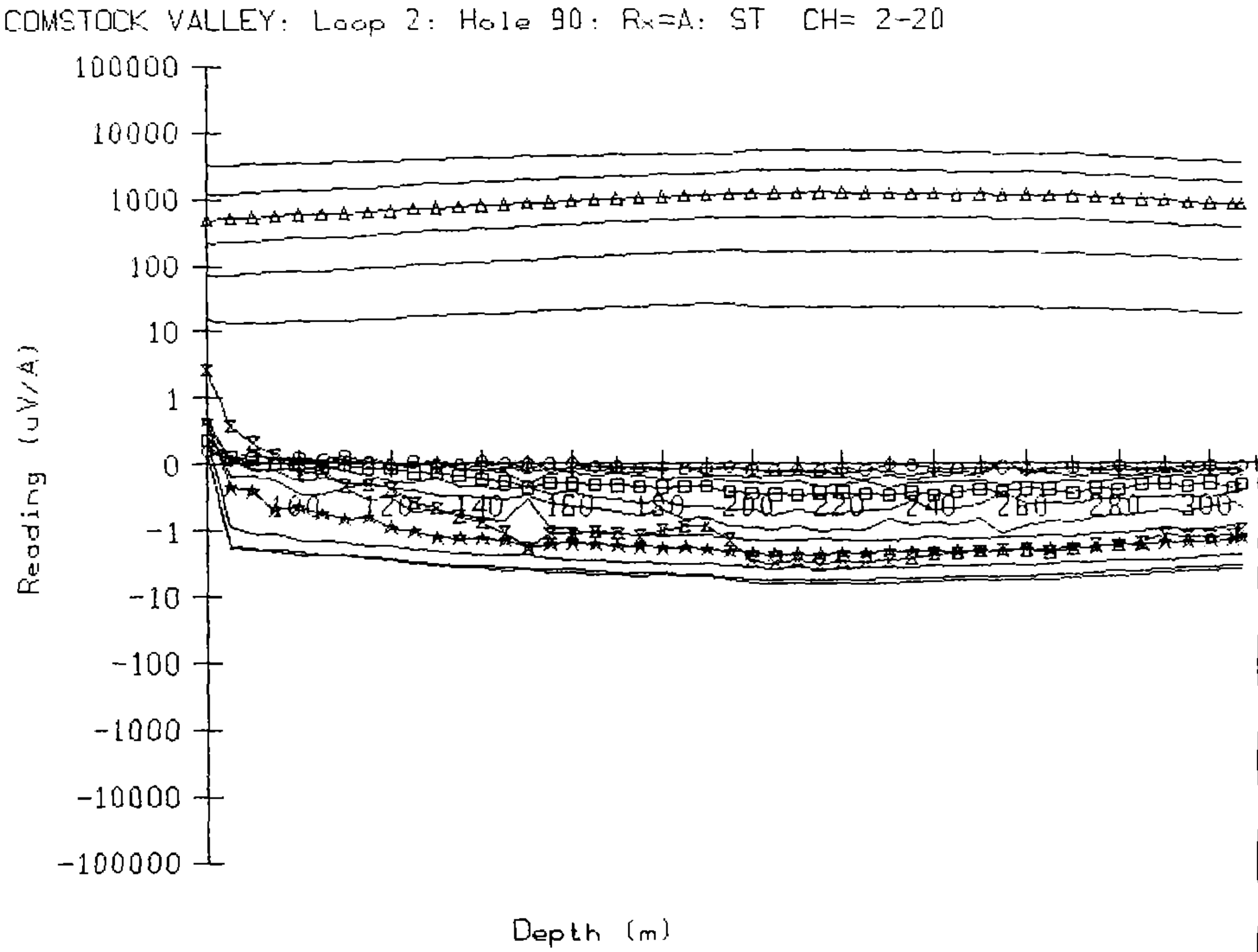

COMSTOCK VALLEY: Loop 2: Hole 90: Rx=A: ET CH= 7-20
CH=15-19
599.998
299.999
0.000
Reading (uV/A)
CH=16-20
200.000
100.000
0.000
Reading (uV/A)
CH=18-20
60.000
30.000
0.000
Reading (uV/A)
100 120 140 160 180 200 220 240 260 280 300
Depth (m)

510396


COMSTOCK VALLEY: Loop 2: Hole 90: Rx=A: ET CH= 7-20 CH=19-20
20.000
10.000
0.000
Reading (uV/A)
CH= 0
6.000
3.000
0.000
Reading (uV/A)
CH= 0
2.000
1.000
0.000
Reading (uV/A)
100
120
140
160
180
200
220
240
260
280
300
Depth (m)

510397

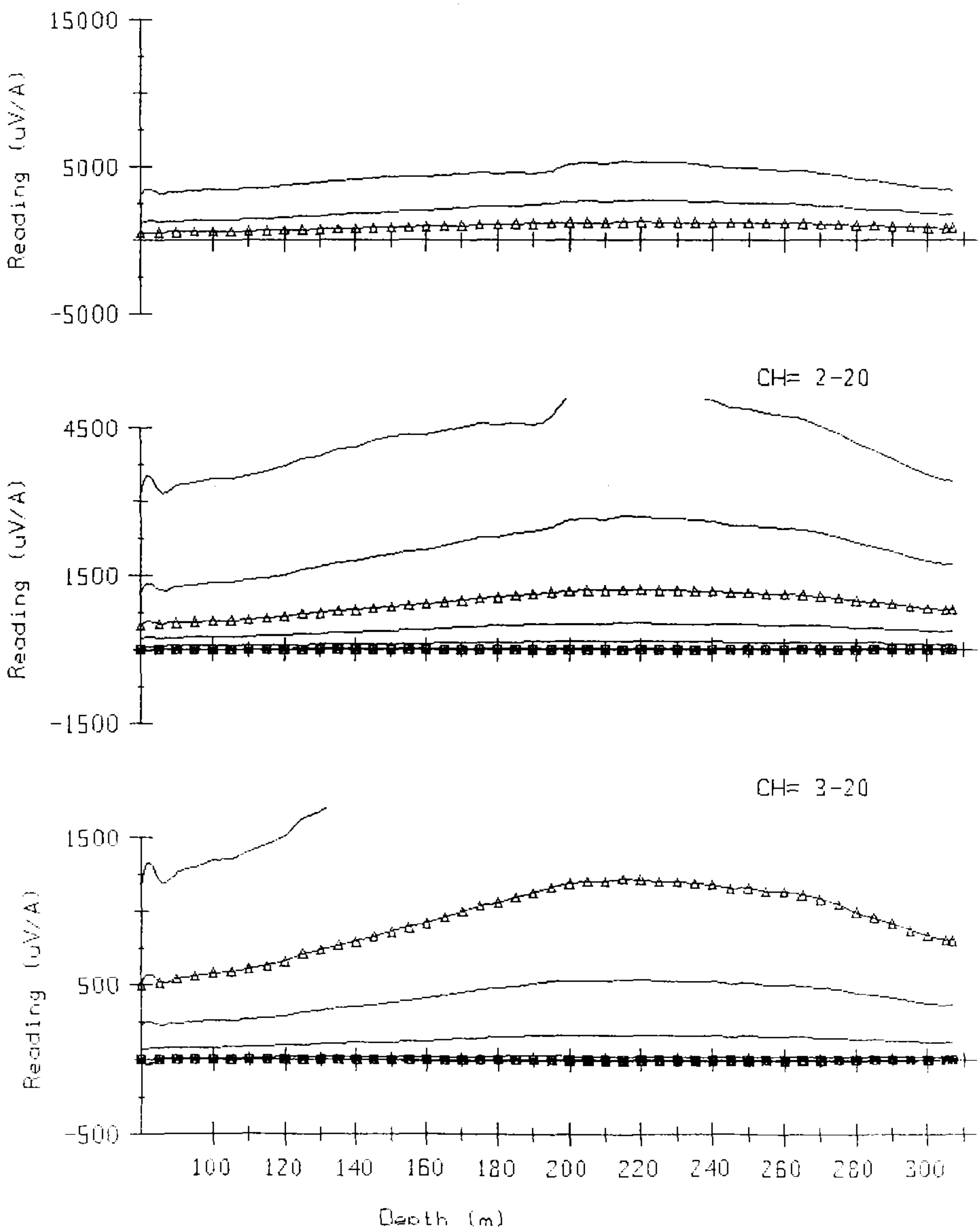
383



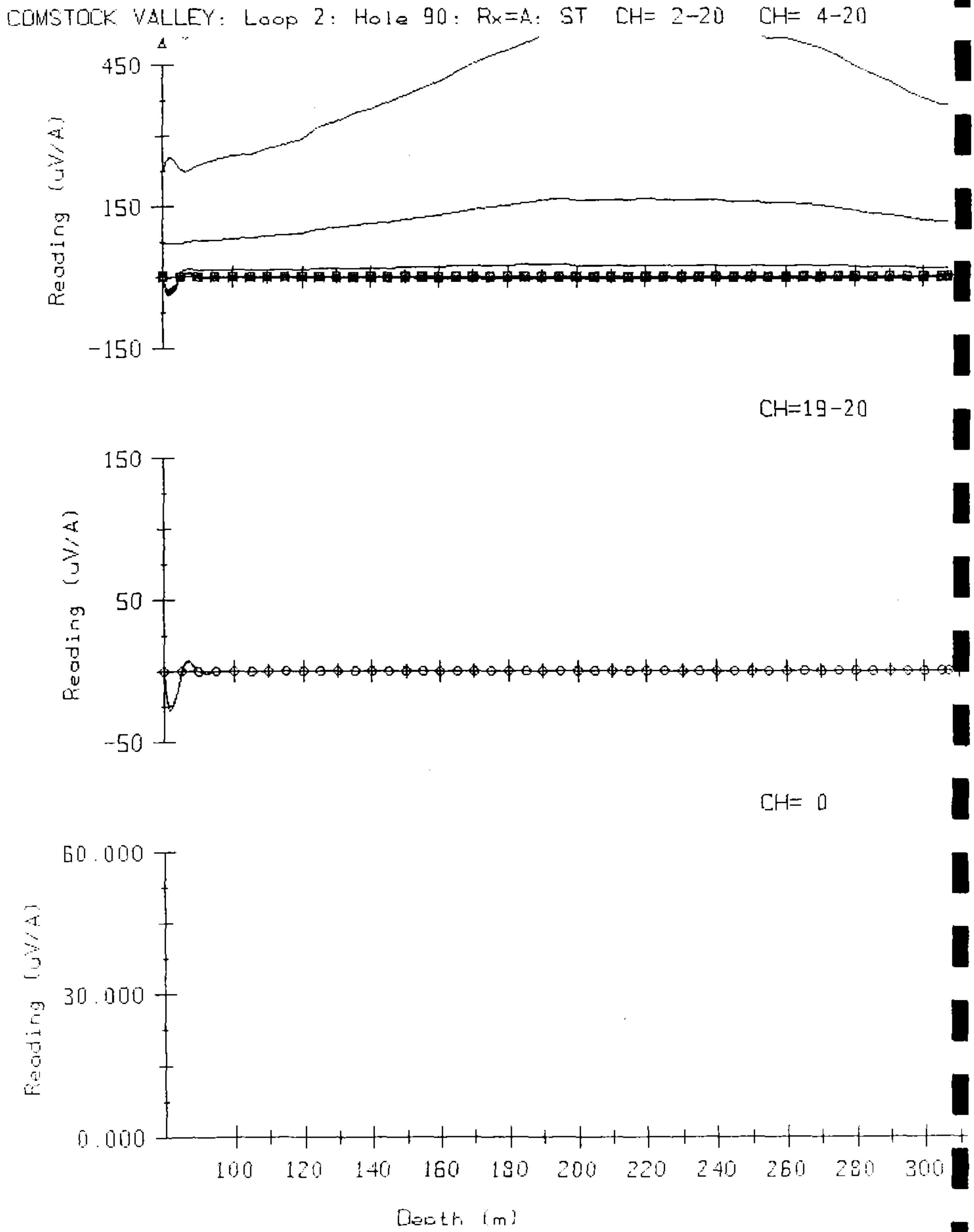
COMSTOCK VALLEY: Loop 2: Hole 90: Rx=A: ST CH= 2-20
100000
10000
1000
100
10
1
0
-1
-10
-100
-1000
-10000
-100000
Reading (uV/A)
100
120
140
160
180
200
220
240
260
280
300
Depth (m)

510398

COMSTOCK VALLEY: Loop 2: Hole 90: Rx=A: ST CH= 2-20 CH= 2- 4

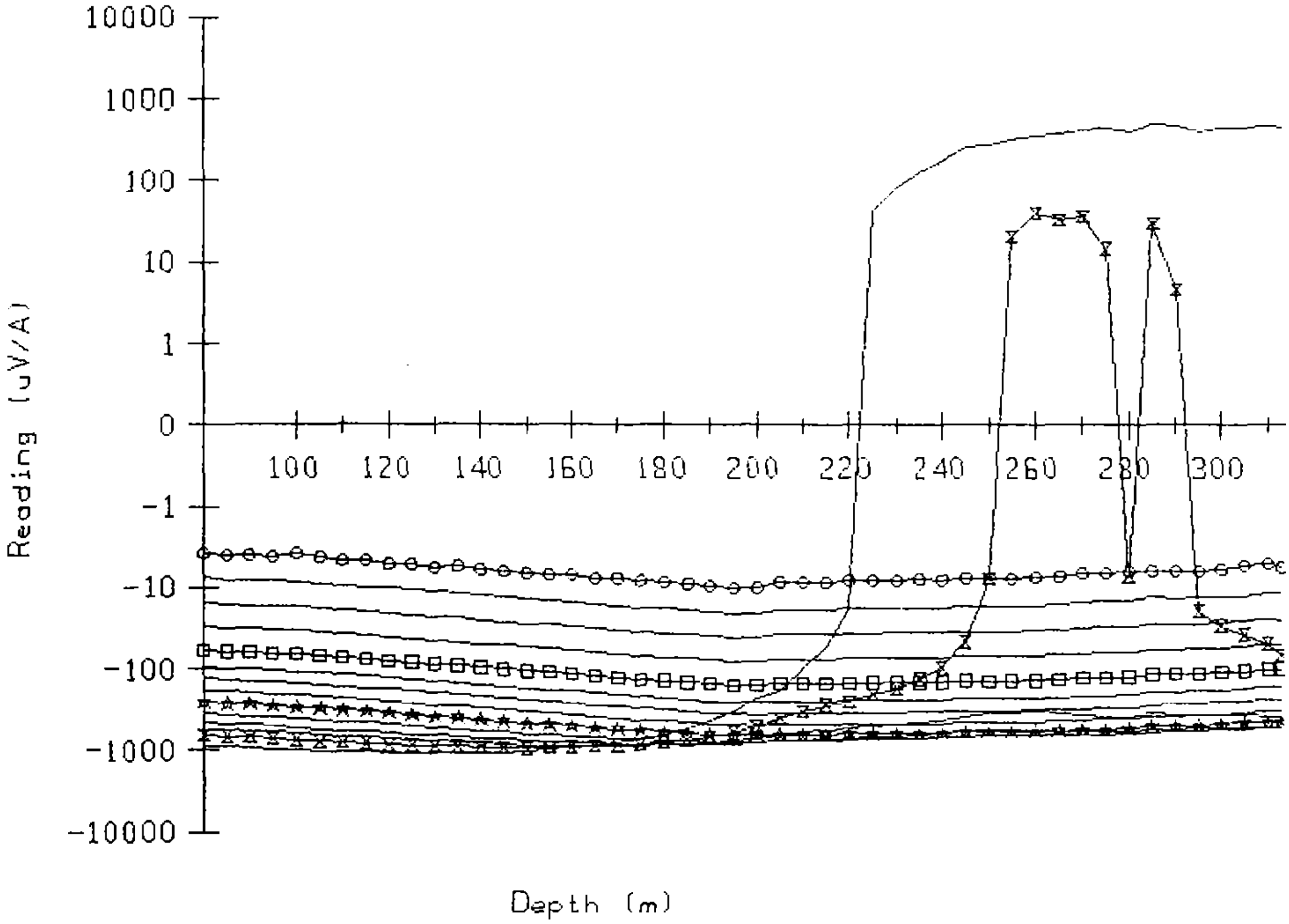


510399

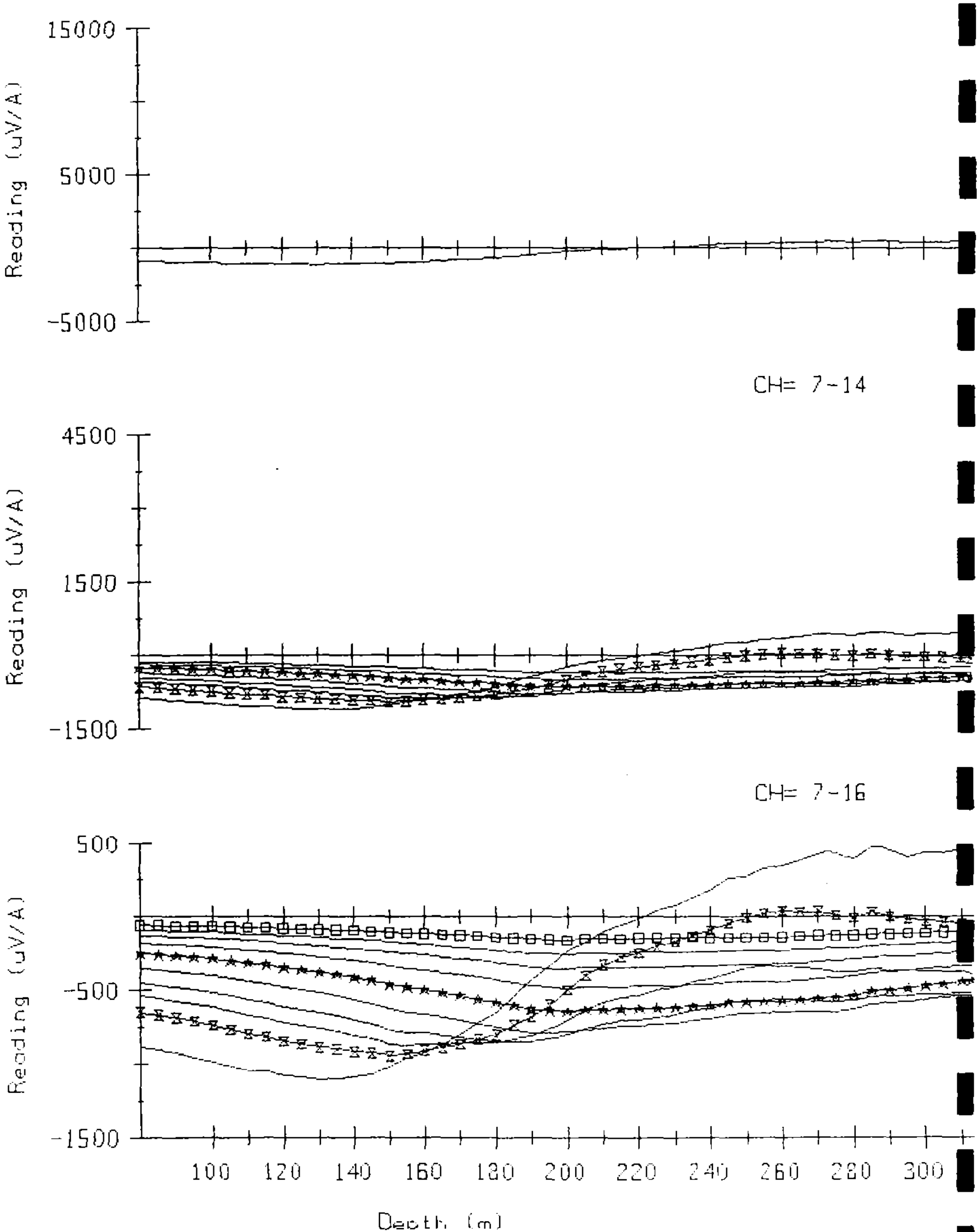


COMSTOCK VALLEY: Loop 2: Hole 90: Rx=A: ST CH= 2-20 CH= 4-20
450
150
-150
Reading (uV/A)
CH=19-20
150
50
-50
Reading (uV/A)
CH= 0
60.000
30.000
0.000
Reading (uV/A)
100
120
140
160
180
200
220
240
260
280
300
Depth (m)

COMSTOCK VALLEY: Loop 3: Hole 90: Rx=A: ET CH= 7-20

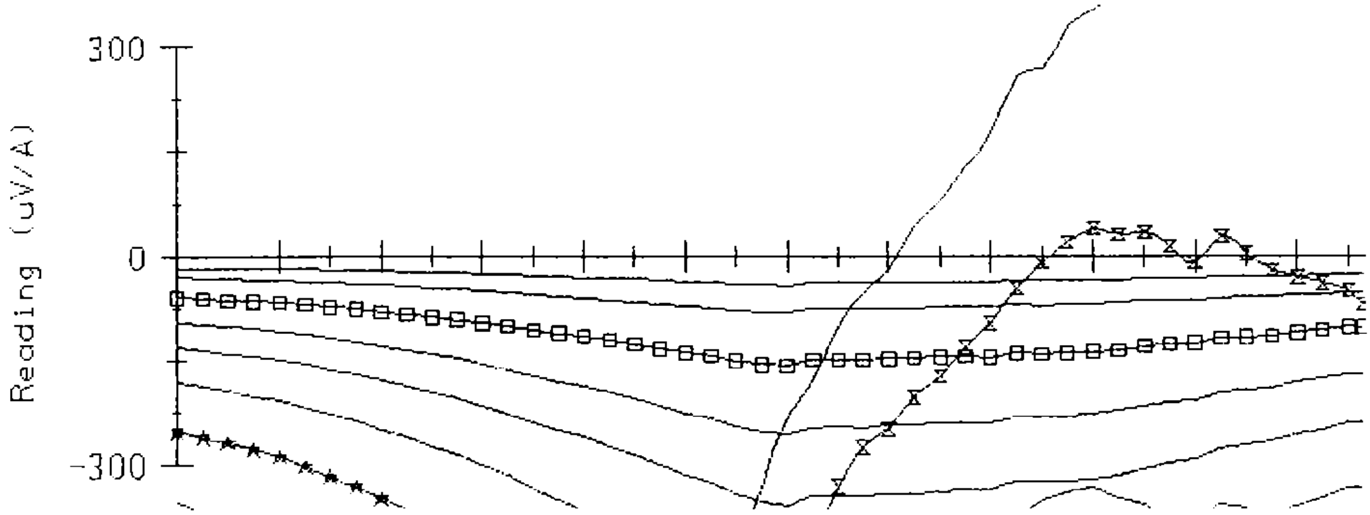


COMSTOCK VALLEY: Loop 3: Hole 90: Rx=A: ET CH= 7-20 CH= 7

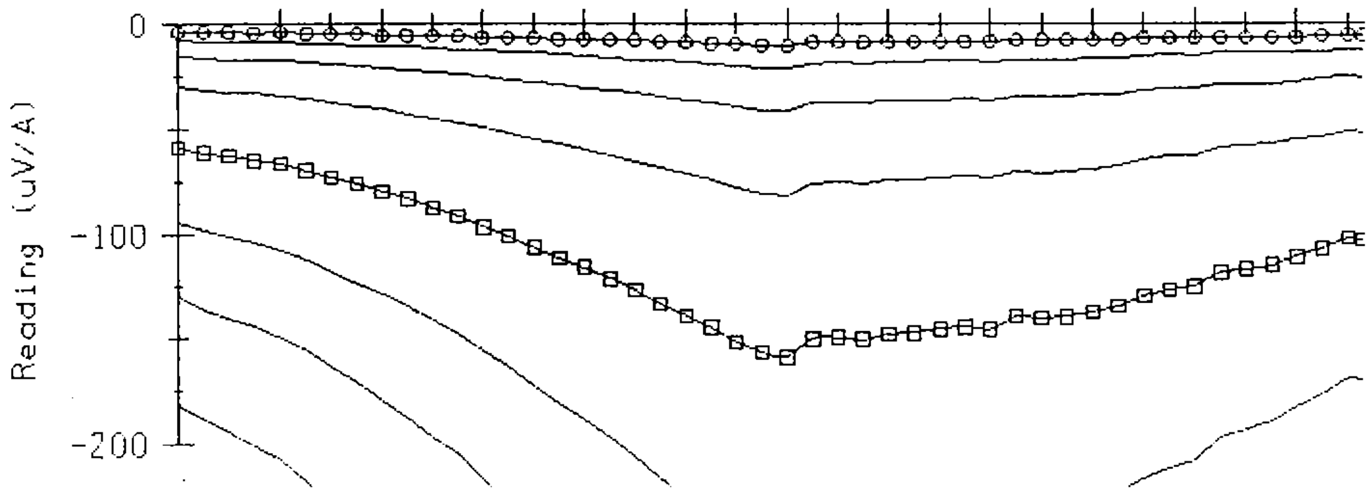


510402

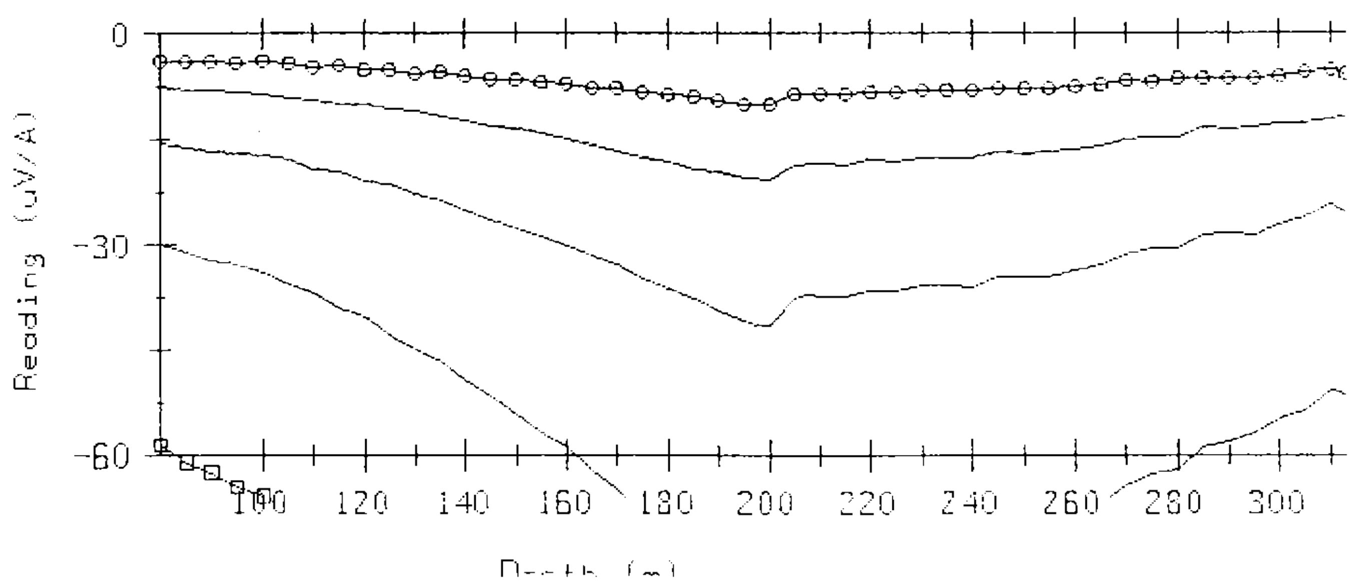
COMSTOCK VALLEY: Loop 3: Hole 90: Rx=A: ET CH= 7-20 CH= 7-18



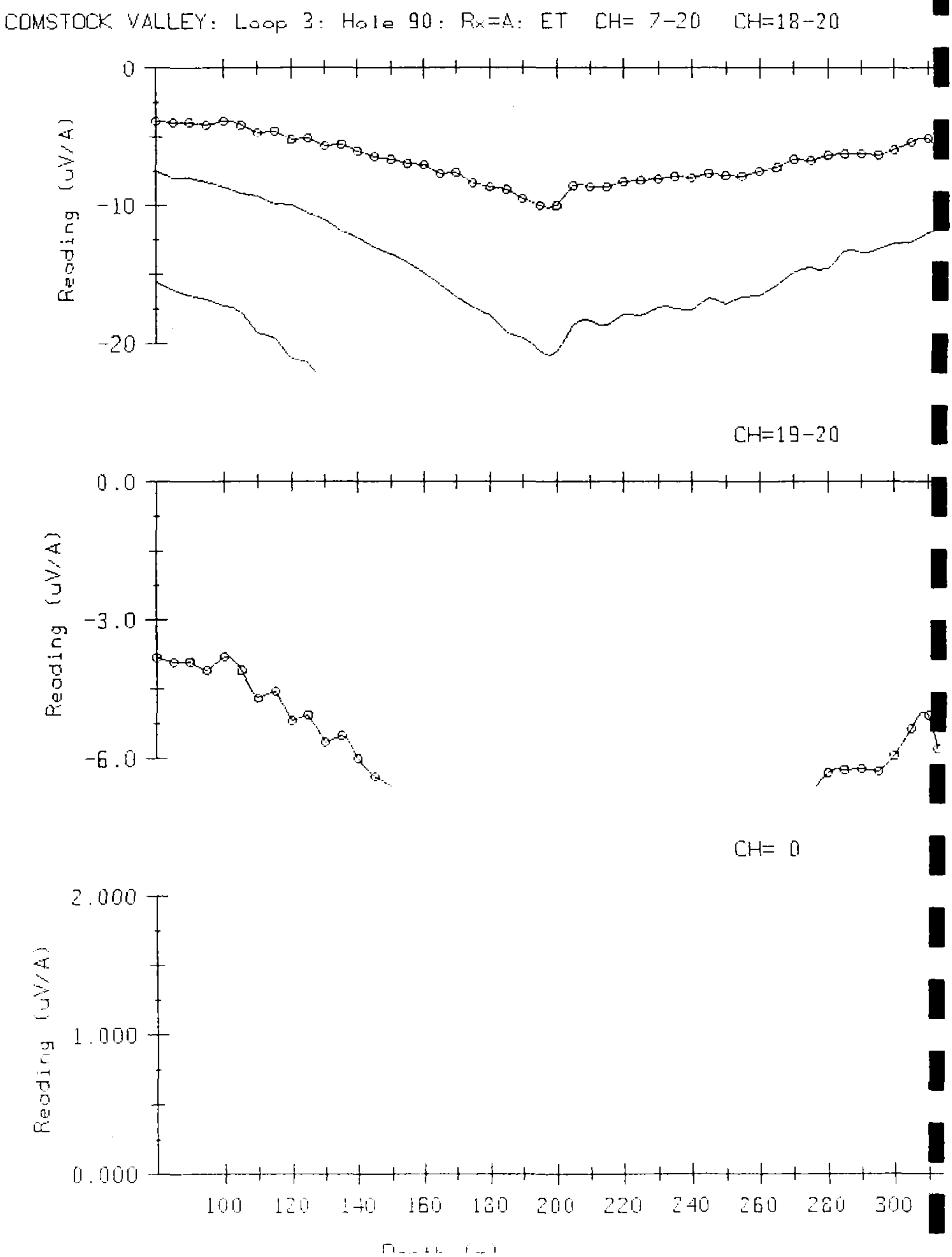

CH=13-20




CH=16-20

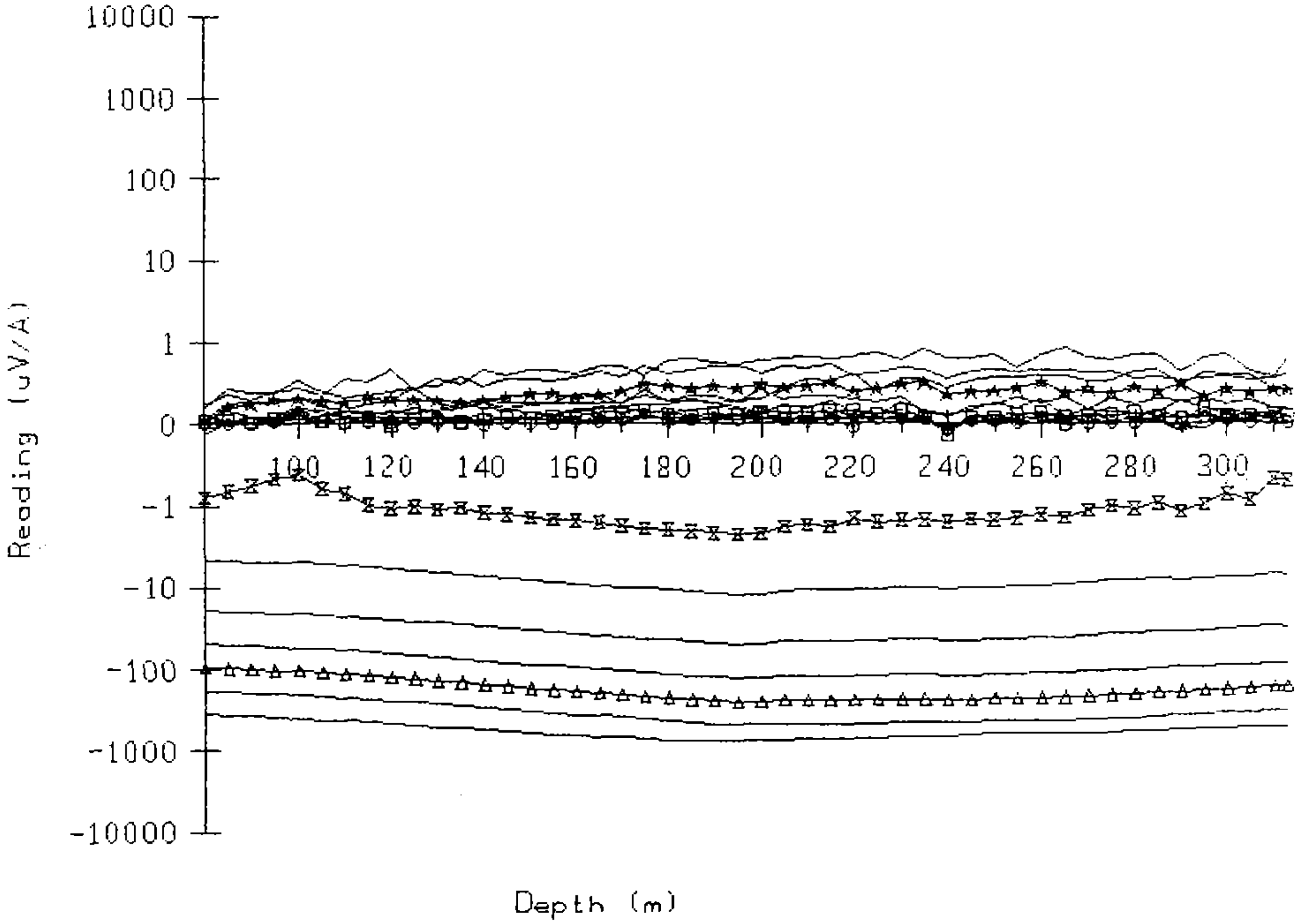


39


COMSTOCK VALLEY: Loop 3: Hole 90: Rx=A: ET CH= 7-20 CH=18-20
Reading (uV/A)
0
-10
-20
CH=19-20
0.0
-3.0
-6.0
CH= 0
2.000
1.000
0.000
100 120 140 160 180 200 220 240 260 280 300

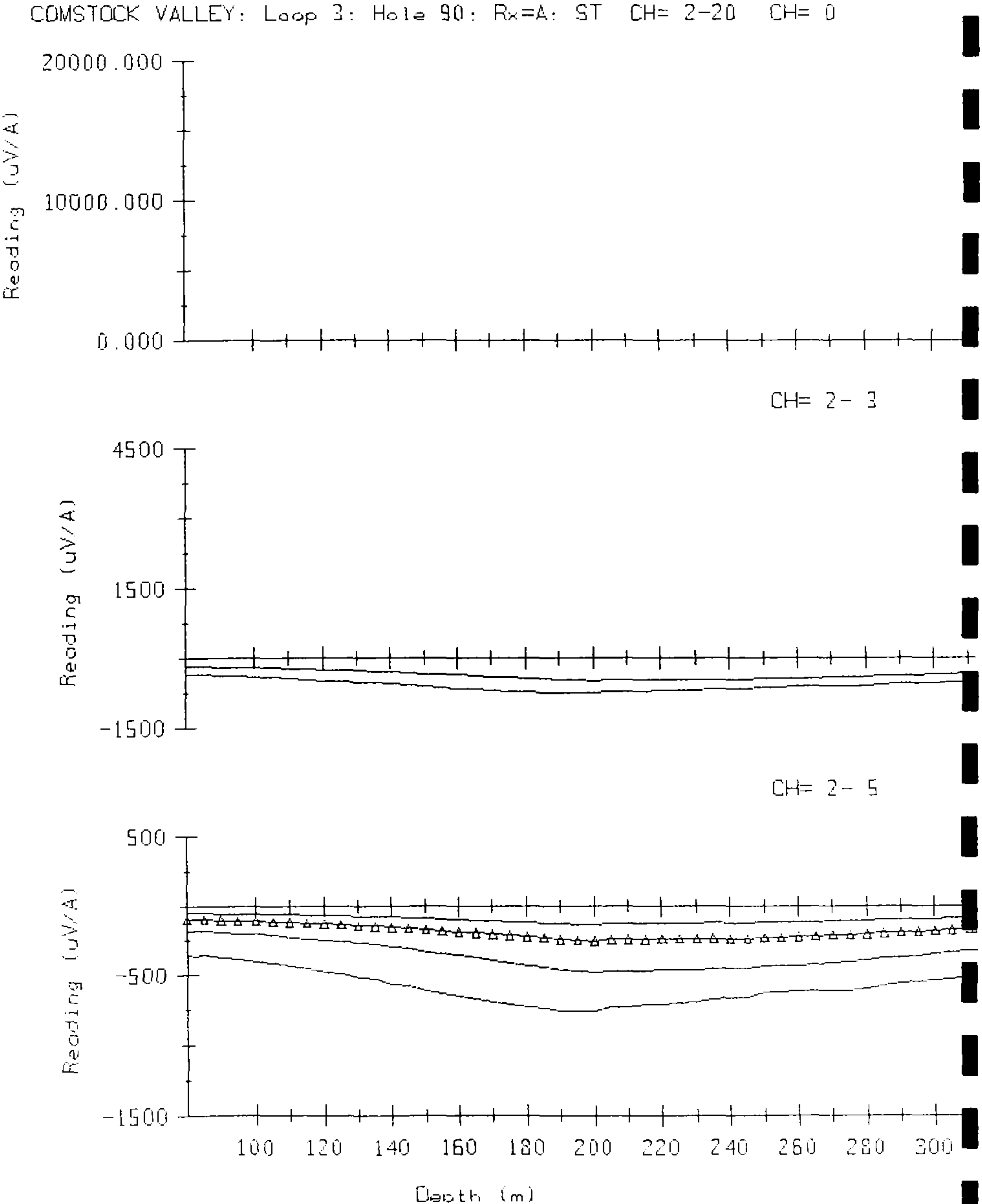
510404

COMSTOCK VALLEY: Loop 3: Hole 90: Rx=A: ST CH= 2-20

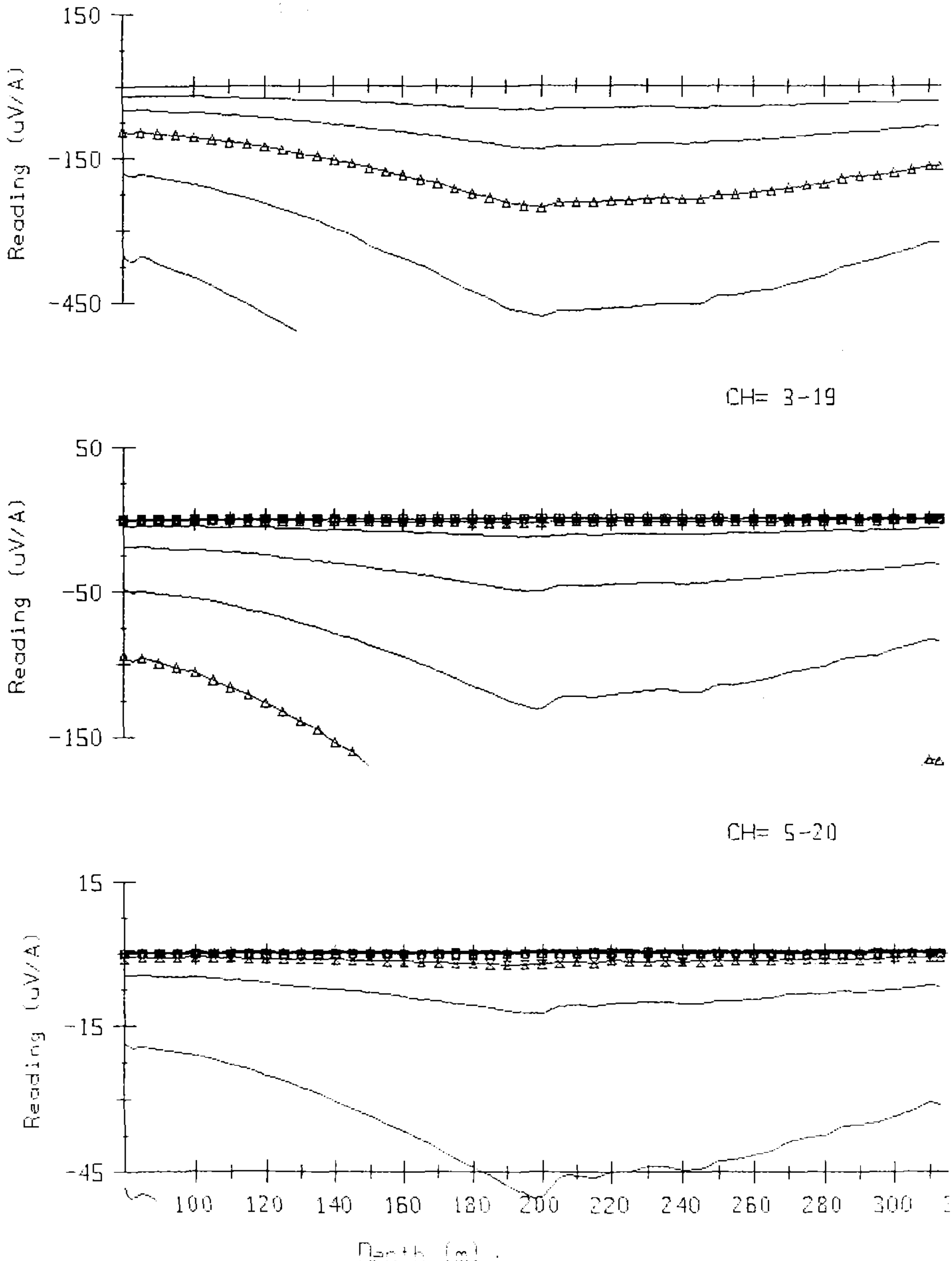


510405

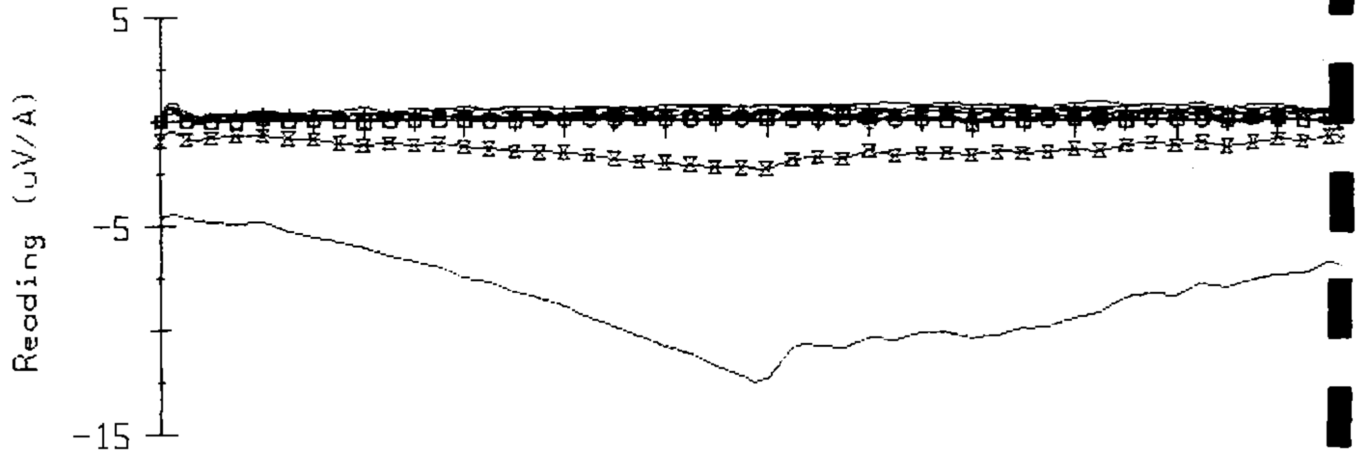
393


COMSTOCK VALLEY: Loop 3: Hole 90: Rx=A: ST CH= 2-20 CH= 0
20000.000
10000.000
0.000
Reading (uV/A)
CH= 2- 3
4500
1500
-1500
Reading (uV/A)
CH= 2- 5
500
-500
-1500
Reading (uV/A)
100 120 140 160 180 200 220 240 260 280 300
Depth (m)

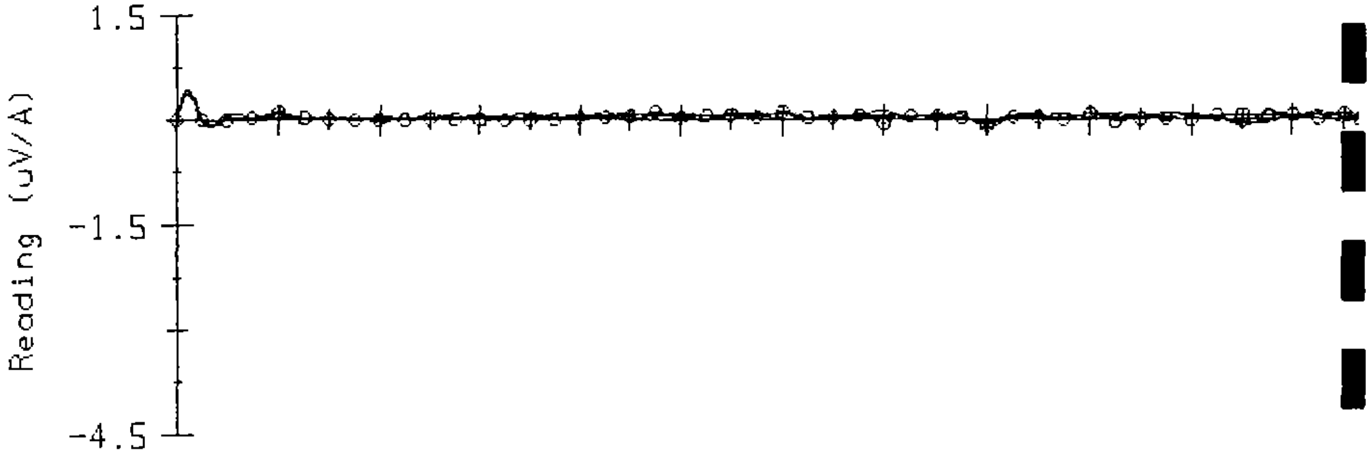
COMSTOCK VALLEY: Loop 3: Hole 90: Rx=A: ST CH= 2-20 CH= 2- 6



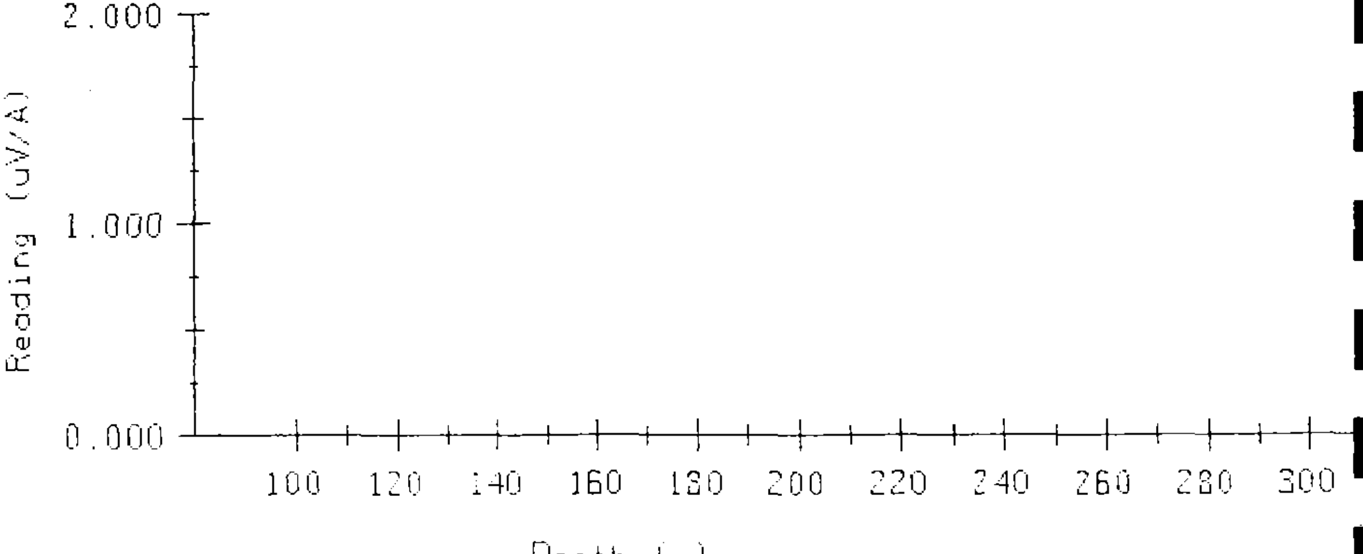
COMSTOCK VALLEY: Loop 3: Hole 90: Rx=A: ST CH= 2-20 CH= 6-20




CH=17-20




CH= 0



# APPENDIX 8

Oz Plate DHEM Sirotem Model Data

39?

# OZPLATE INPUT MODEL PARAMETERS

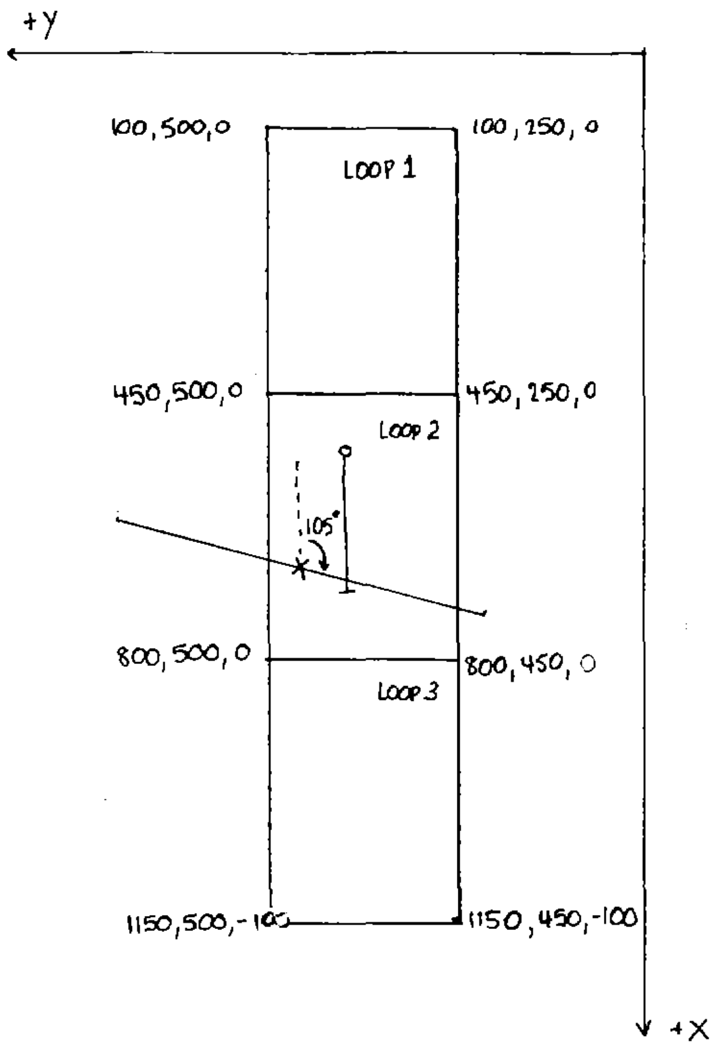



PLATE PARAMETERS

Strike length = 500m

Width / strike ratio = 0.5

σt = 5 Siemens

Strike = 105°

Dip = 45° North

Depth to top = 100m

DRILLHOLE PARAMETERS

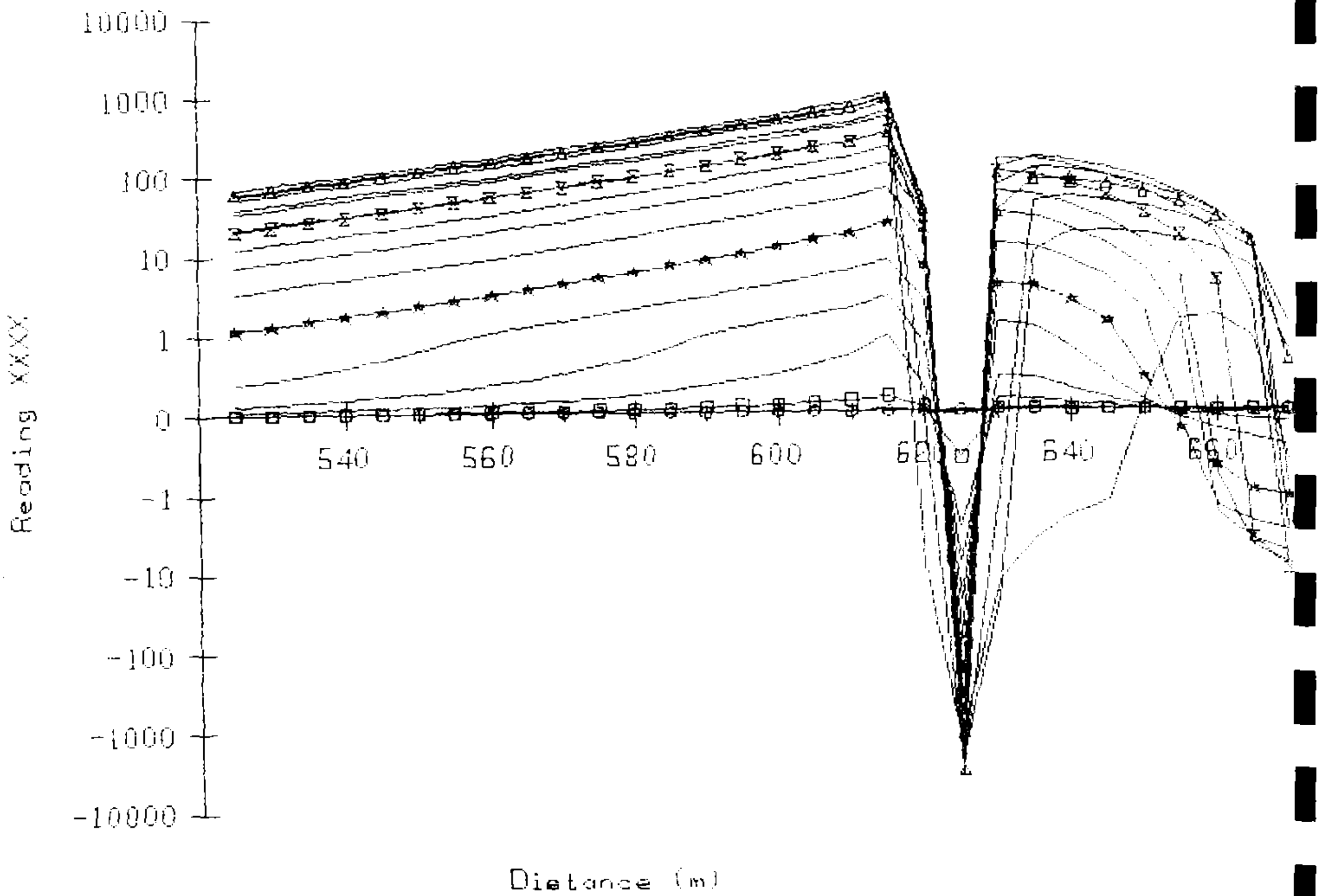
Azimuth = 0°

Dip = 60°

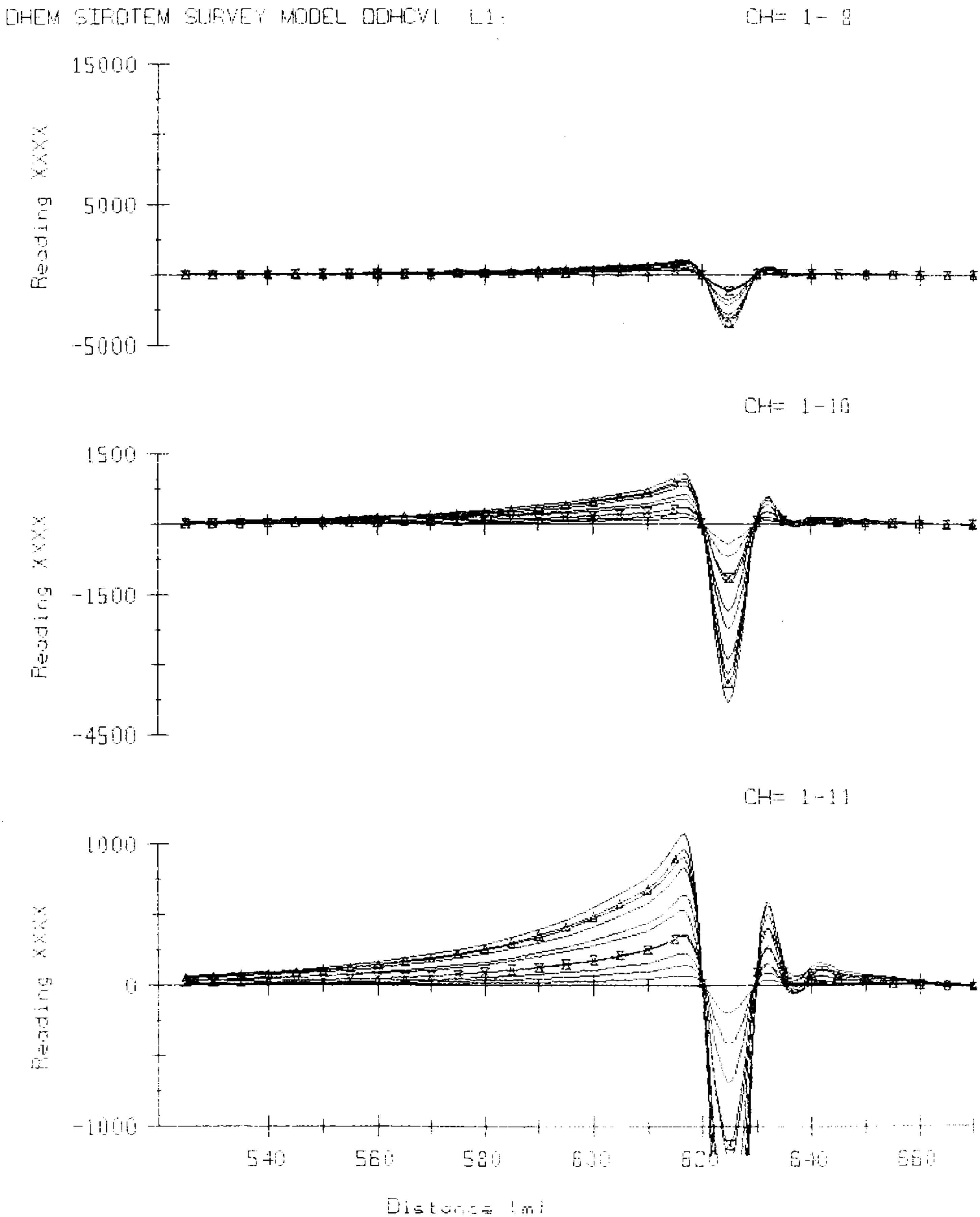
Station interval = 10m

510410

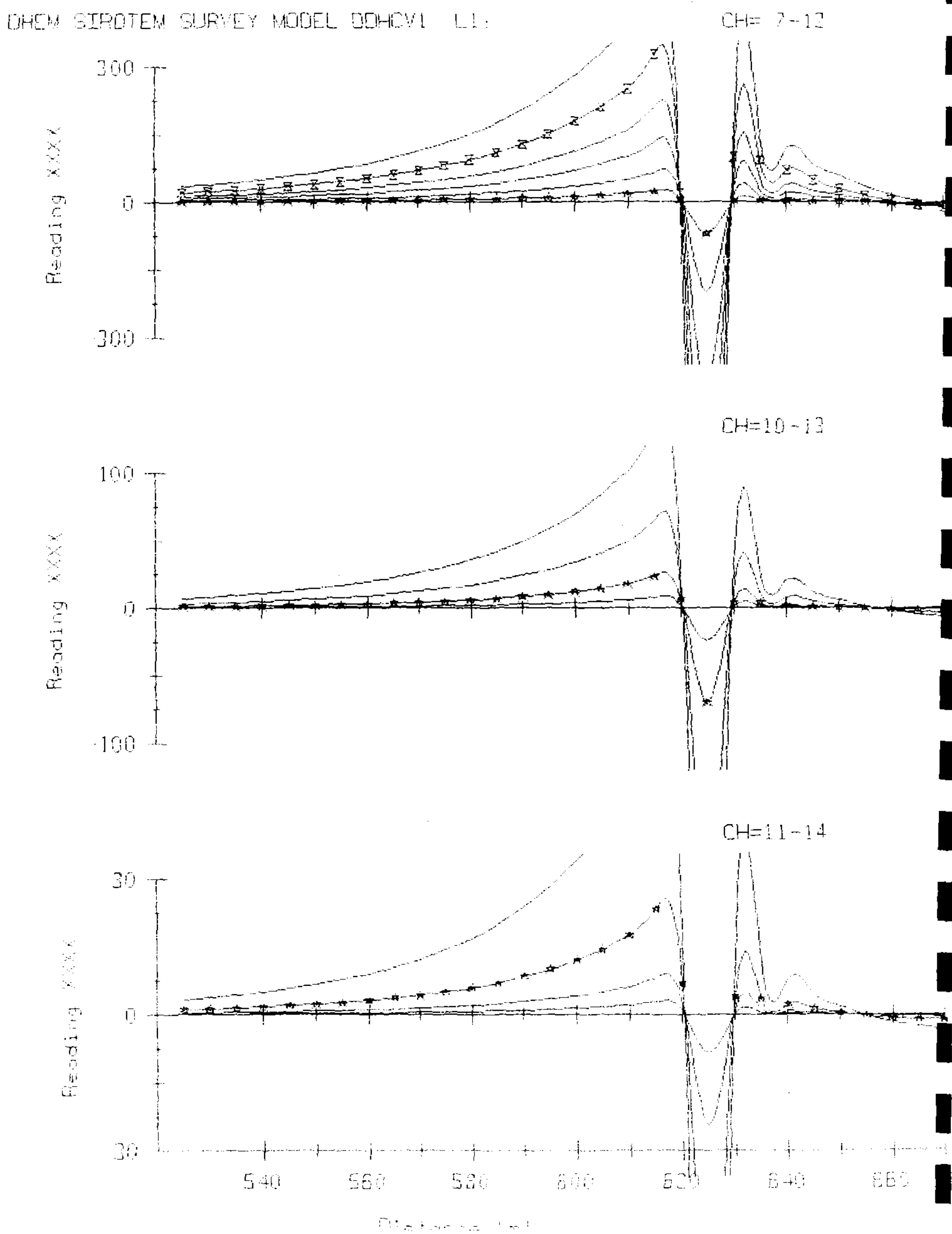
DHEM SIROTEM SURVEY MODEL DDHCV1 L1-



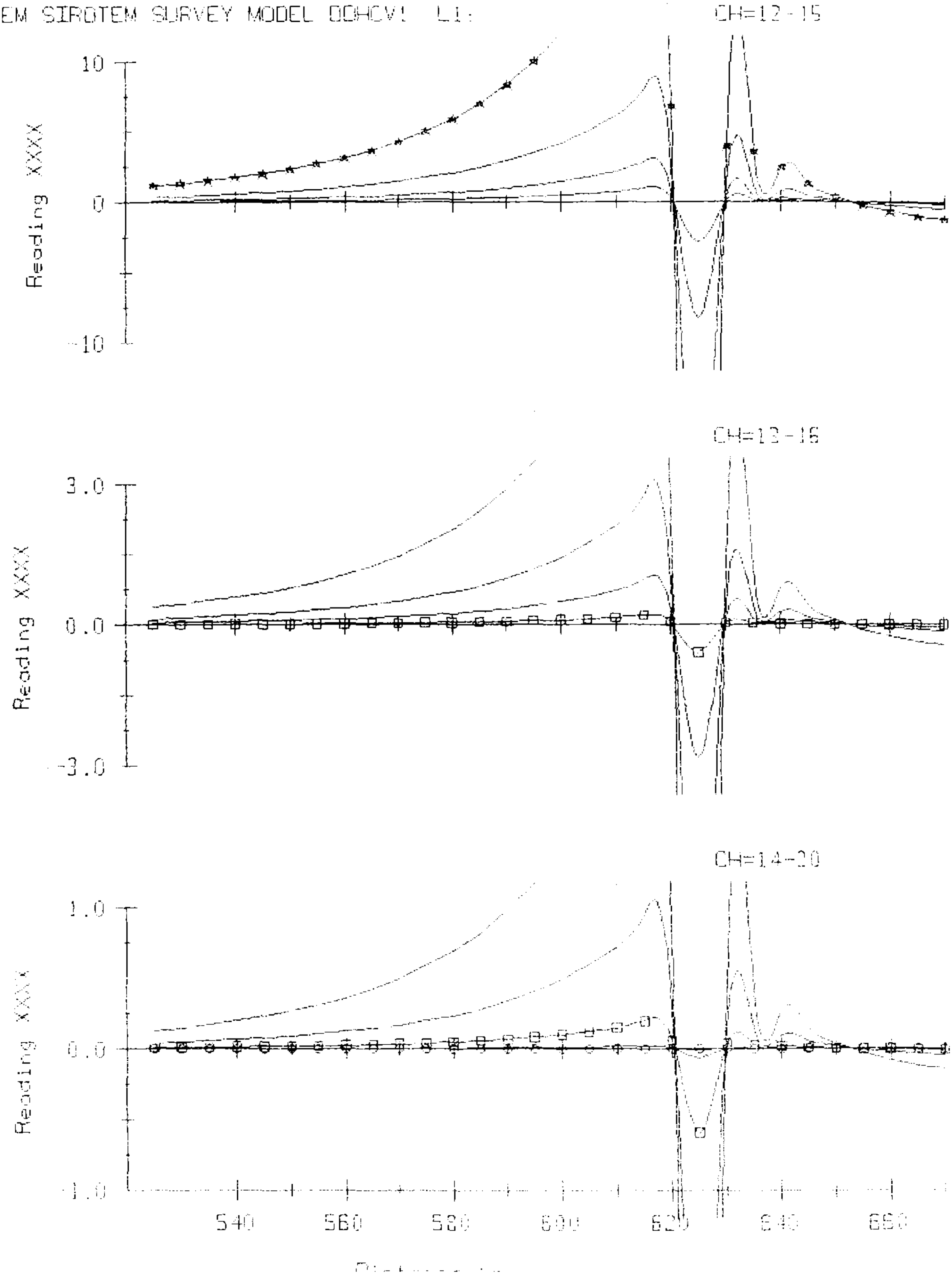
510411


DHEM SIROTEM SURVEY MODEL DDHCV1 L1:
CH= 1- 8
15000
5000
-5000
Reading XXXX
CH= 1-10
1500
-1500
-4500
Reading XXXX
CH= 1-11
1000
0
-1000
Reading XXXX
540
560
580
600
620
640
660
Distance (m)

510412


DHEM SIROTEM SURVEY MODEL DDHCV1 L1:
CH= 7-12
300
0
-300
Reading XXXX
CH=10-13
100
0
-100
Reading XXXX
CH=11-14
30
0
-30
Reading XXXX
540
560
580
600
620
640
660

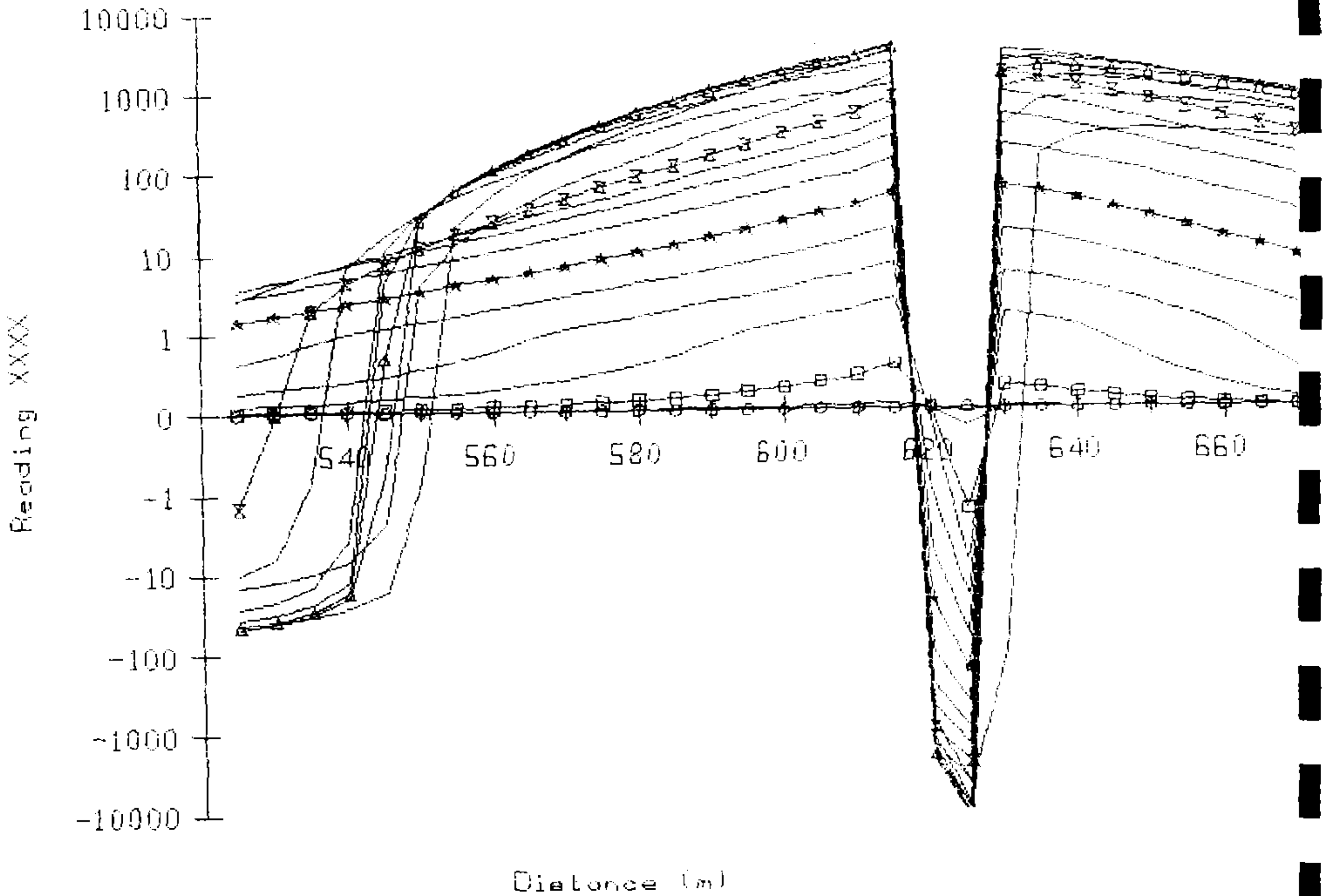
DHEM SIROTEM SURVEY MODEL DDHCV1 L1:



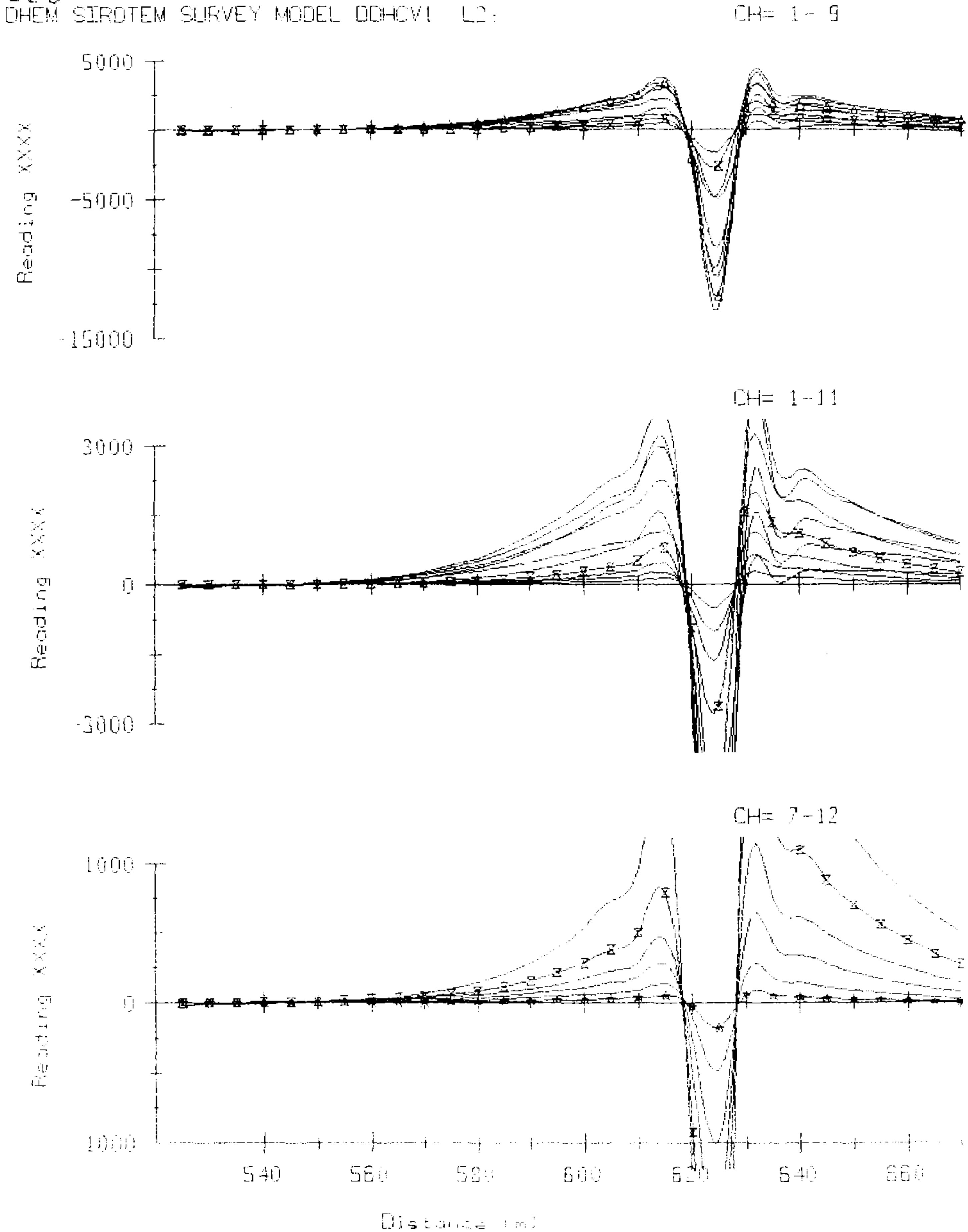
A02



DHEM SIROTEM SURVEY MODEL DDHCV1 L2:

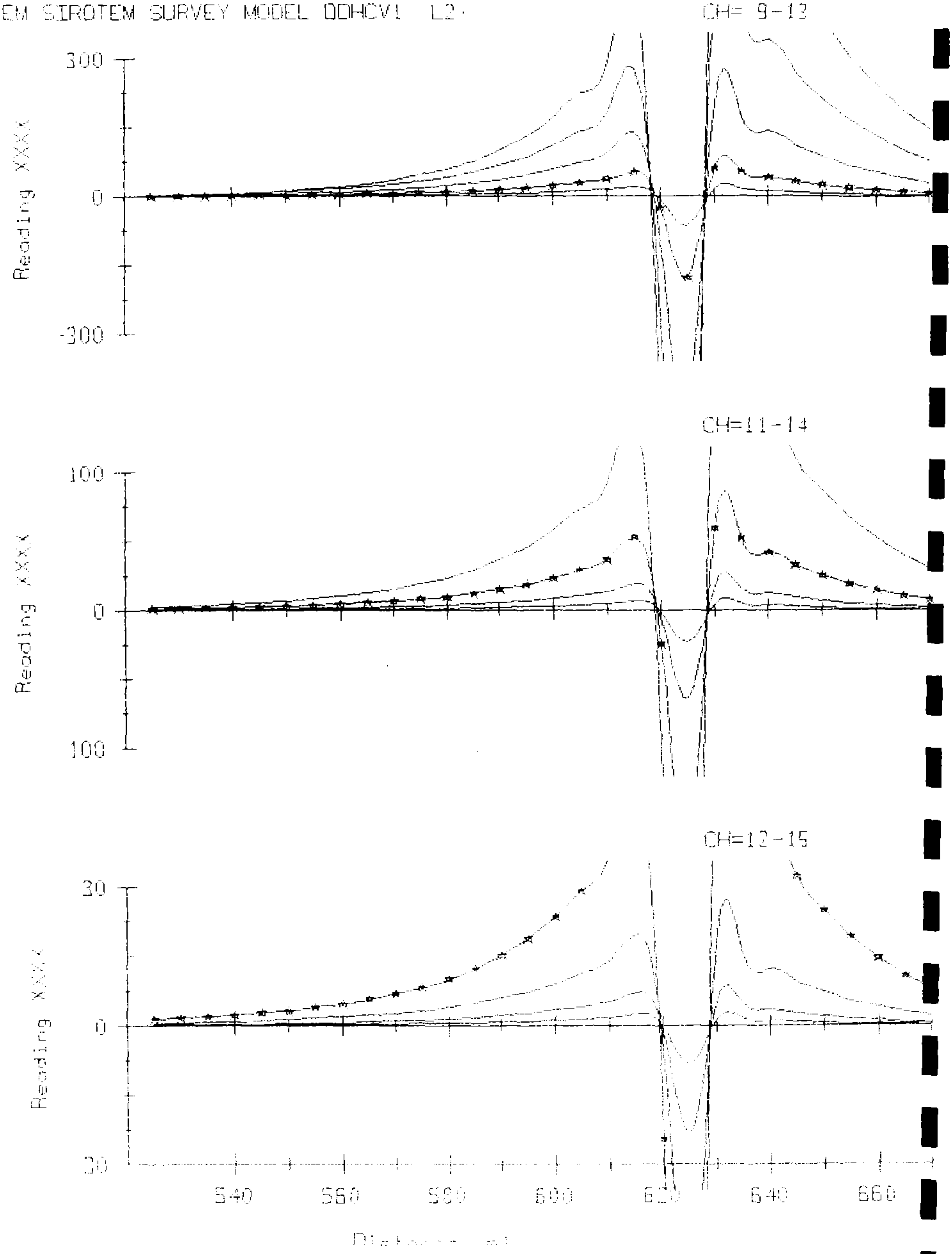


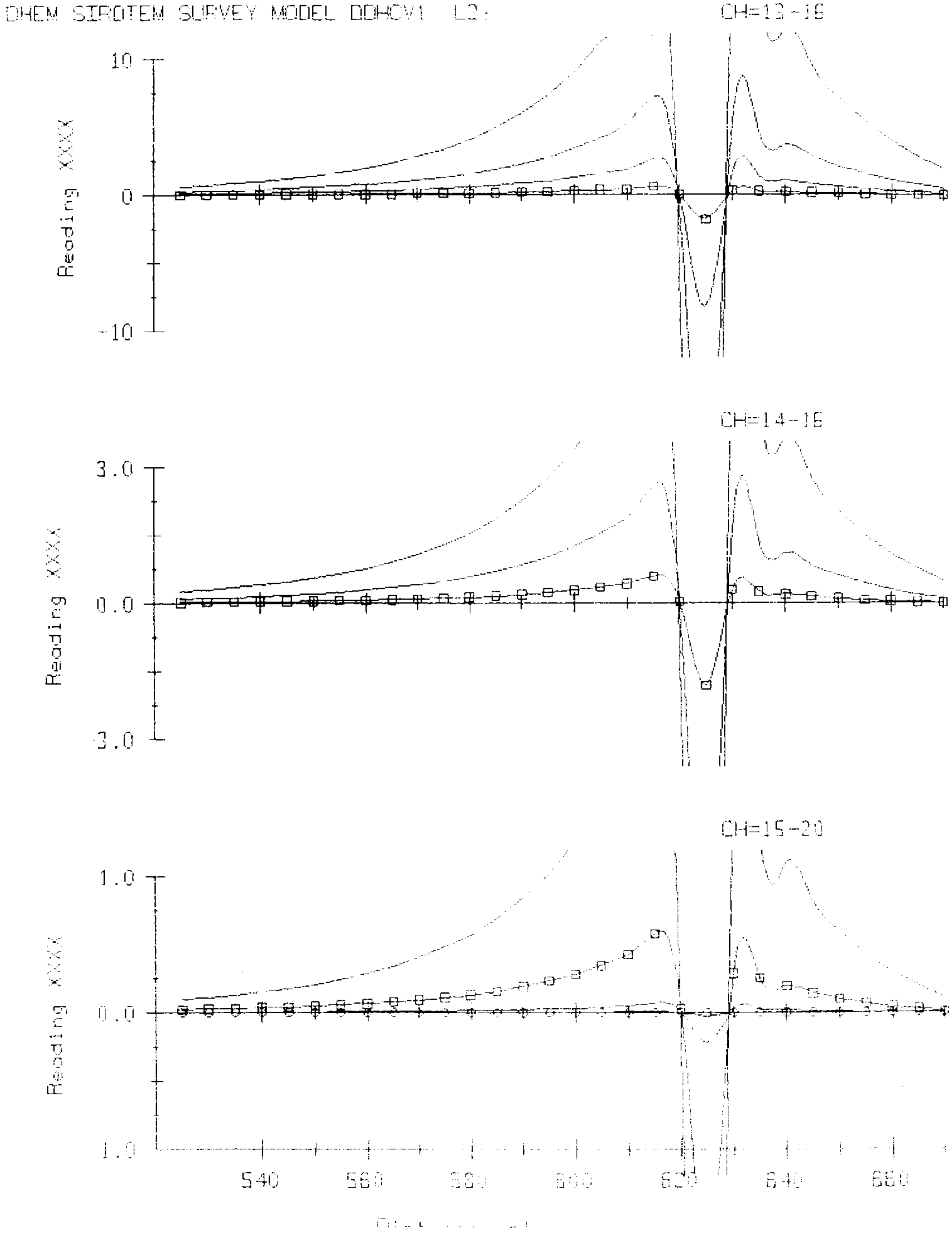
403


DHEM SIROTEM SURVEY MODEL DDHCV1 L2:
CH= 1- 9
5000
-5000
-15000
Reading XXXX
CH= 1-11
3000
0
-3000
Reading XXXX
CH= 7-12
1000
0
1000
Reading XXXX
540
560
580
600
620
640
660
Distance (m)

510416

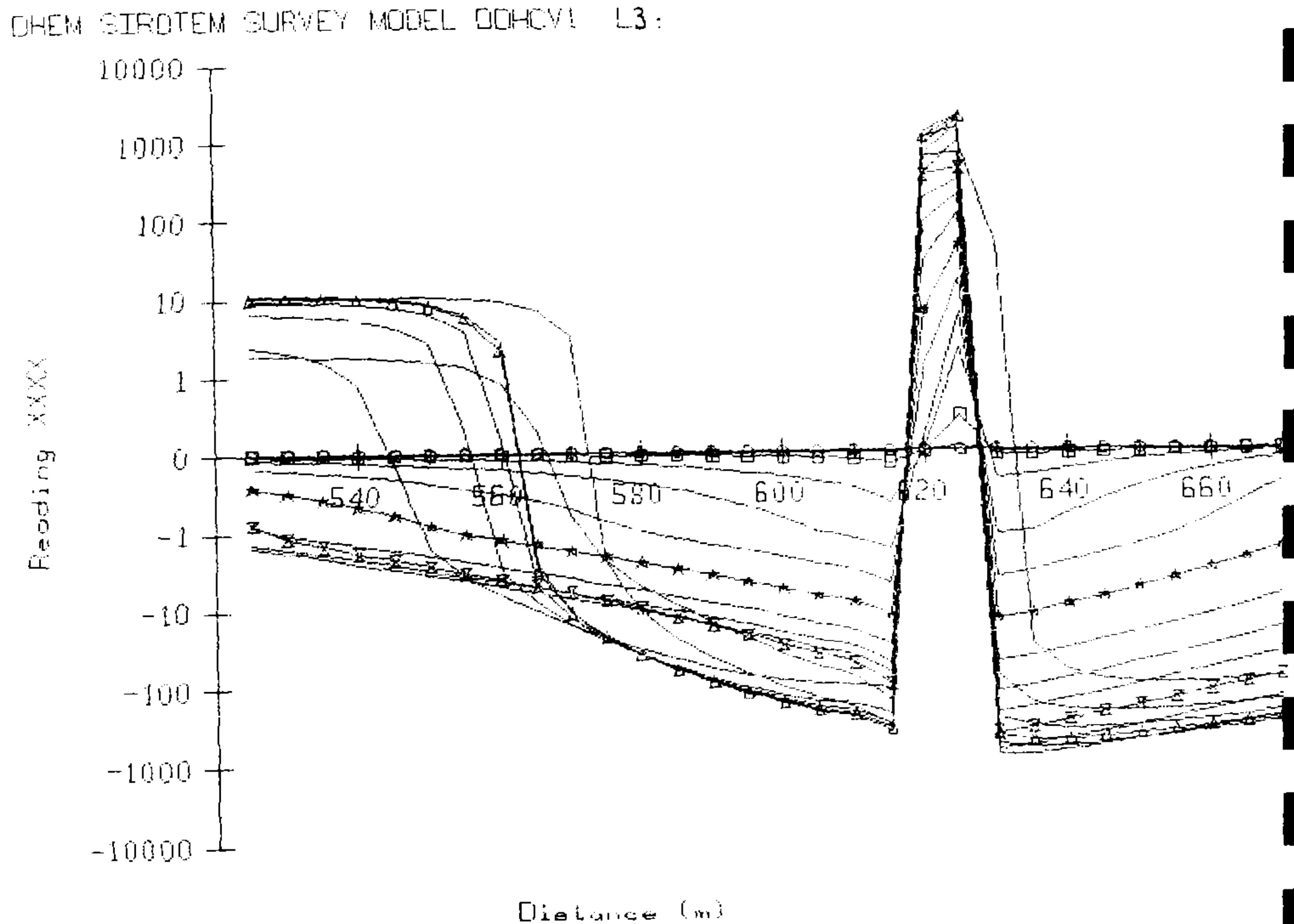
DHEM SIROTEM SURVEY MODEL DDHCV1 L2




DHEM SIROTEM SURVEY MODEL DDHCV1 L2:
CH=13-16
10
0
-10
Reading XXXX
CH=14-16
3.0
0.0
-3.0
Reading XXXX
CH=15-20
1.0
0.0
1.0
Reading XXXX
540
560
600
620
640
660

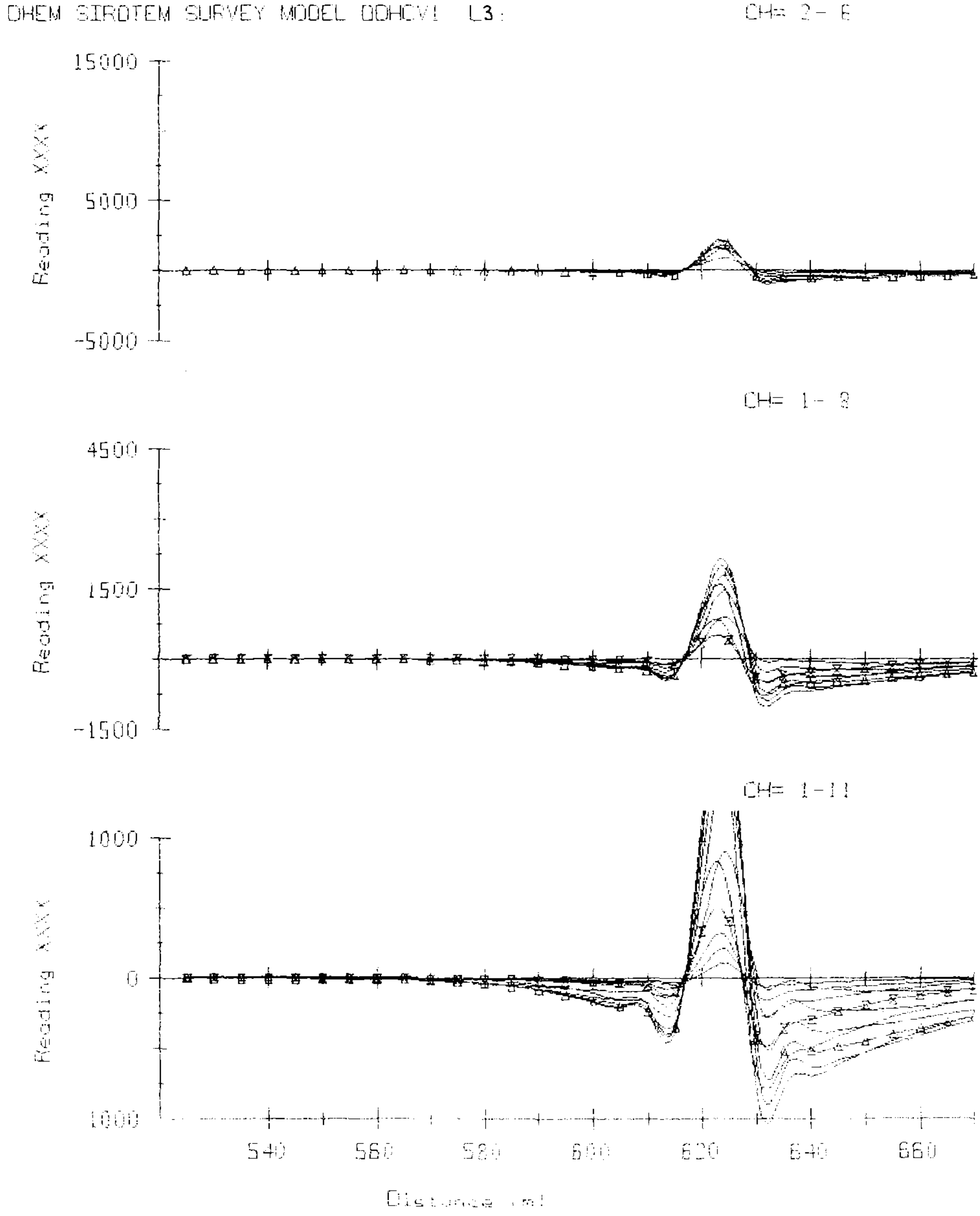
510418

406


DHEM SIROTEM SURVEY MODEL DDHCV1 L3:
10000
1000
100
10
1
0
-1
-10
-100
-1000
-10000
Reading XXXX
540
560
580
600
620
640
660
Distance (m)

510419

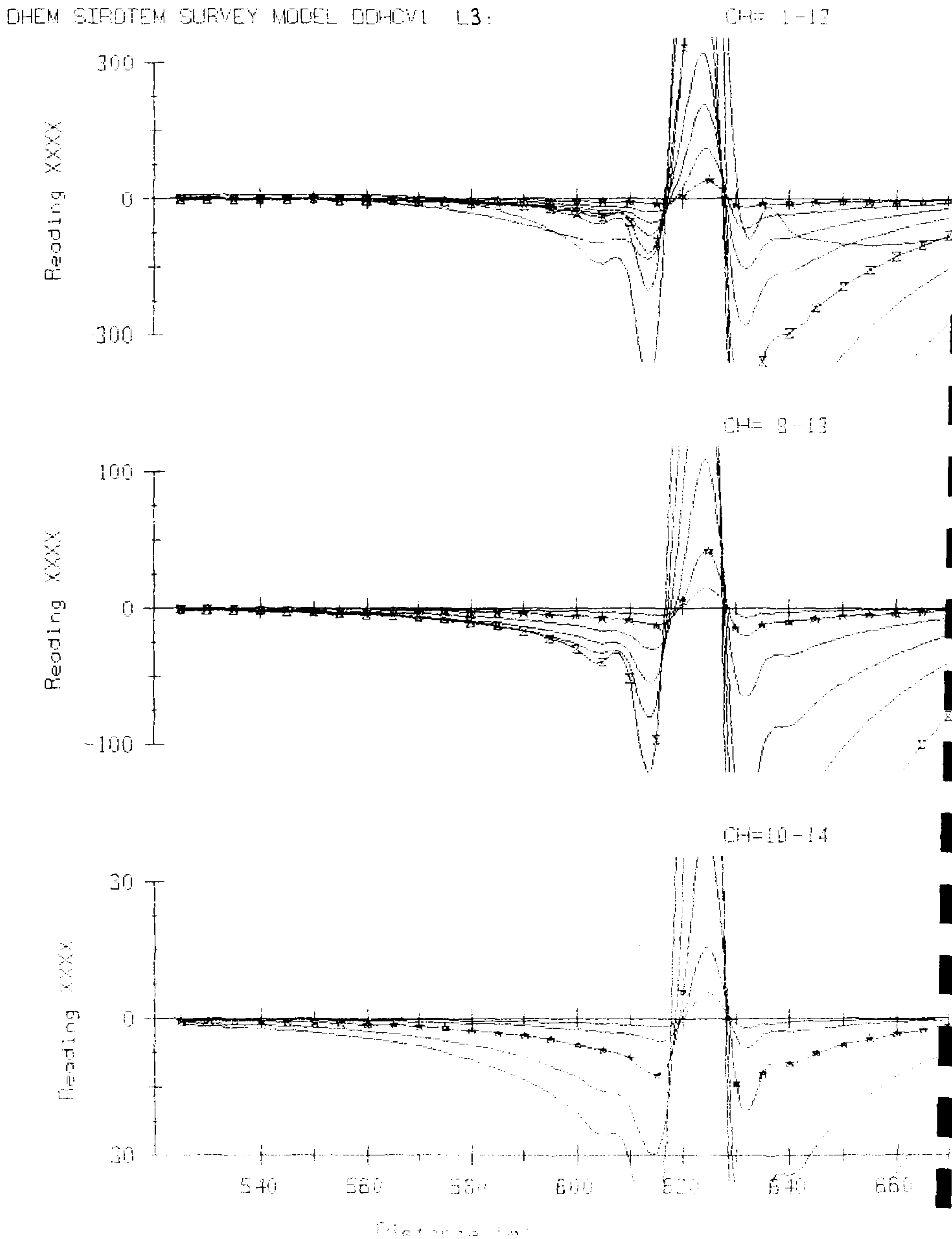
407



DHEM SIRDTEM SURVEY MODEL DDHCV1 L3:
CH= 2- 6
15000
5000
-5000
Reading XXXX
CH= 1- 8
4500
1500
-1500
Reading XXXX
CH= 1-11
1000
0
1000
Reading XXXX
540
560
580
600
620
640
660

510420

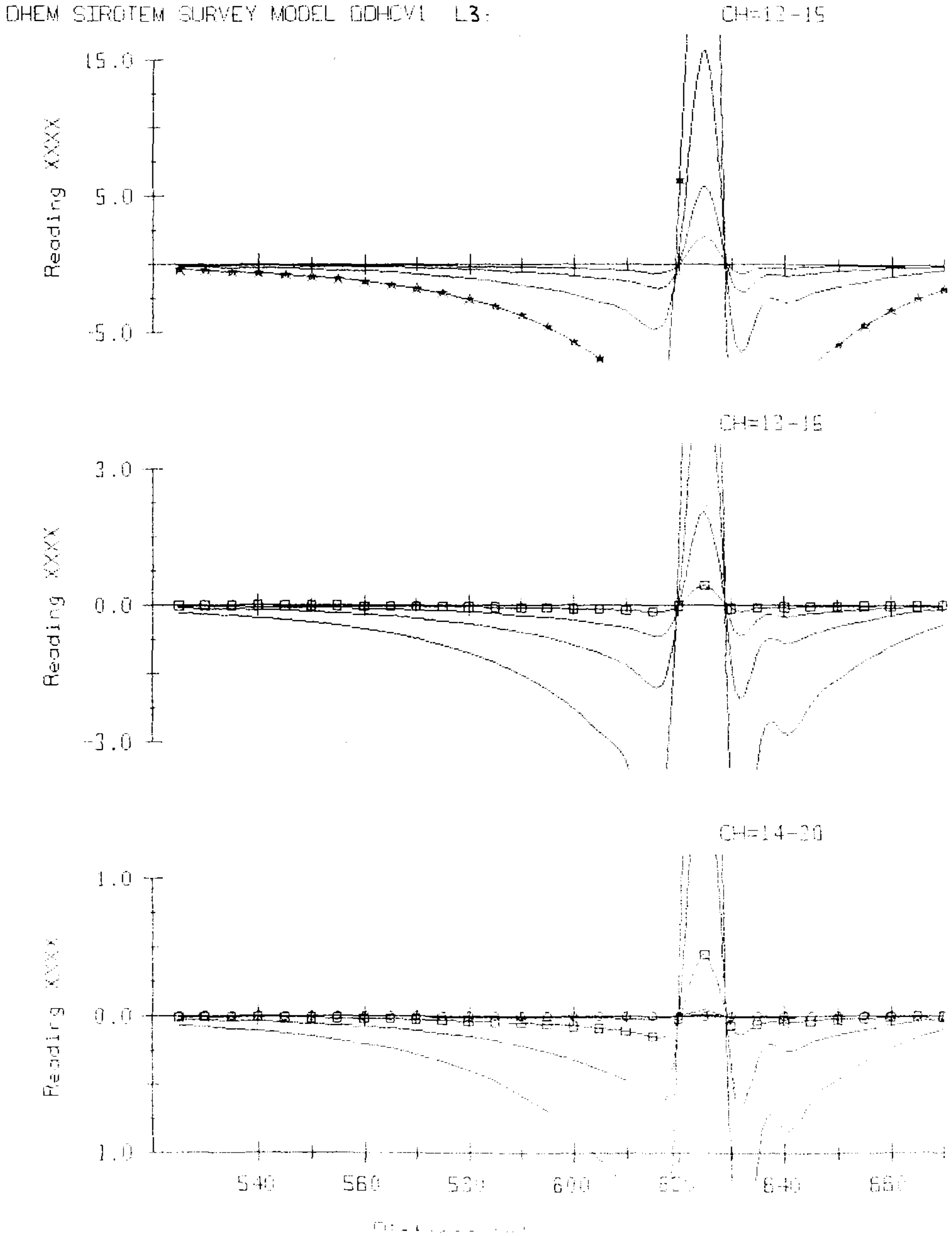
408



DHEM SIRDTEM SURVEY MODEL DDHCV1 L3:
CH= 1-12
300
0
-300
Reading XXXX
CH= 8-13
100
0
-100
Reading XXXX
CH=10-14
30
0
-30
Reading XXXX
540
560
600
660

510421

403


DHEM SIROTEM SURVEY MODEL DDHCV1 L3:
CH=12-15
15.0
5.0
-5.0
Reading XXXX
CH=13-16
3.0
0.0
-3.0
Reading XXXX
CH=14-20
1.0
0.0
Reading XXXX
540
560
600
640
660

APPENDIX 9

South Huxley Soil Chemical Data

Australian Laboratory Services PTY. LTD.
CONSULTING ANALYTICAL CHEMISTS
INCORPORATED IN QUEENSLAND

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Townsville Laboratory
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Bendigo Laboratory
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Orange Laboratory
10 Leewood Drive, Orange, N.S.W. 2800.
Phone: (063) 631 722 Fax (063) 631 189.

# LABORATORY REPORT



[redacted] BHP COMPANY LIMITED
[redacted] PO BOX 619
HAWTHORN
VIC 3122

Batch Number: A132

1980

[redacted] MR A WILDE

No. of Samples: 139
Date Received: 22/01/90
Date Completed: 31/01/90

[redacted] No. 11200 B57 Sample Type: SOIL

| SAMPLE NUMBER | Element Unit Method | Cu ppm IC586 | Pb ppm IC586 | Zn ppm IC586 | Fe % IC586 | Mn ppm IC586 |
|---|---|---|---|---|---|---|
| BX-4818 | 5000N 4150E | 10 | 10 | 80 | 3.59 | 290 |
| BX-4819 | 4175E | <5 | 15 | 60 | 1.08 | 330 |
| BX-4820 | 4200E | 5 | 15 | 170 | 3.40 | 1650 |
| BX-4821 | 4225E | 15 | 30 | 55 | 4.00 | 460 |
| BX-4822 | 4250E | 15 | 65 | 70 | 5.07 | 400 |
| BX-4823 | 4275E | 20 | 55 | 50 | 2.84 | 210 |
| BX-4824 | 4300E | 20 | 45 | 55 | 1.32 | 370 |
| BX-4825 | 4325E | <5 | 15 | 40 | 2.03 | 150 |
| BX-4826 | 4350E | 15 | 30 | 70 | 7.81 | 510 |
| BX-4827 | 4350E | 40 | 80 | 60 | 2.07 | 195 |
| BX-4828 | 4375E | 110 | 130 | 105 | 3.89 | 1650 |
| BX-4829 | 4400E | 10 | 25 | 90 | 4.52 | 350 |
| BX-4830 | 4425E | <5 | 15 | 55 | 3.11 | 135 |
| BX-4831 | 4450E | 10 | 30 | 30 | 0.80 | 195 |
| BX-4832 | 4475E | 5 | 15 | 50 | 1.12 | 115 |
| BX-4833 | 4500E | 75 | 95 | 100 | 0.73 | 280 |
| BX-4834 | 4500E | <5 | 20 | 95 | 2.62 | 230 |
| BX-4835 | 4525E | <5 | 20 | 25 | 0.72 | 180 |
| BX-4836 | 4550E | 10 | 30 | 25 | 0.37 | 195 |
| BX-4837 | 4575E | 105 | 850 | 210 | 17.3 | 5.11 % |
| BX-4838 | 4600E | 10 | 35 | 55 | 1.21 | 1350 |
| BX-4839 | 4600E | 20 | 45 | 25 | 0.37 | 165 |
| BX-4840 | 4625E | <5 | 20 | 55 | 1.17 | 135 |
| BX-4841 | 4650E | 10 | 40 | 40 | 1.20 | 130 |
| BX-4842 | 4675E | <5 | 35 | 75 | 1.90 | 210 |
| BX-4843 | 4700E | 10 | 35 | 50 | 1.18 | 105 |
| BX-4844 | 4725E | <5 | 60 | 45 | 1.03 | 125 |
| BX-4845 | 4750E | 20 | 70 | 60 | 1.27 | 115 |
| BX-4846 | 4775E | 5 | 35 | 45 | 1.03 | 85 |
| BX-4847 | 4800E | <5 | 15 | 45 | 1.28 | 105 |
| [redacted]on Limit: | | 5 | 5 | 5 | 0.01 | 5 |

[redacted]ents:

[redacted]

Signed: G. Anon

FORM ALS O1(A)

510423

# Australian Laboratory Services PTY. LTD.

412 CONSULTING ANALYTICAL CHEMISTS

INCORPORATED IN QUEENSLAND

# LABORATORY REPORT

Brisbane Head Office and Laboratory
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Phone: (077) 79 9155 Fax: (077) 799 729
Charters Towers Laboratory
18 Drew Street, Charters Towers, Q. 4820
Phone: (077) 87 4155. Fax (077) 87 4220.
Bendigo Laboratory
127A Victoria Street, Eaglehawk, Vic. 3556
Phone: (054) 46 1390 Fax: (054) 46 1389
Orange Laboratory
10 Leewood Drive, Orange, N.S.W. 2800.
Phone: (063) 631 722 Fax: (063) 631 189.



: BHP COMPANY LIMITED
ess: PO BOX 619
HAWTHORN
VIC 3122

**Batch Number:** A132

act: MR A WILDE

No. of Samples: 139
Date Received: 22/01/90
Date Completed: 31/01/90

r No. 11200 B57    Sample Type: SOIL

| SAMPLE NUMBER | Element Unit Method | V ppm IC586 | S ppm IC586 | P ppm IC586 | Au ppb PM204 | Au(R) ppb CHECKS |
|---|---|---|---|---|---|---|
| BX-4818 | | 20 | 60 | 150 | 6 | |
| BX-4819 | | 20 | 80 | 90 | 1 | |
| BX-4820 | | 90 | 50 | 360 | 1 | |
| BX-4821 | | 60 | 310 | 270 | 1 | |
| BX-4822 | | 70 | 290 | 250 | 2 | |
| BX-4823 | | 50 | 210 | 160 | 7 | |
| BX-4824 | | 40 | 140 | 100 | 2 | |
| BX-4825 | | 60 | 150 | 100 | <1 | |
| BX-4826 | | 60 | 200 | 230 | <1 | <1 |
| BX-4827 | | 50 | 340 | 290 | 1 | |
| BX-4828 | | 60 | 840 | 880 | 3 | |
| BX-4829 | | 50 | 220 | 160 | <1 | |
| BX-4830 | | 50 | 120 | 100 | <1 | |
| BX-4831 | | 20 | 150 | 150 | <1 | |
| BX-4832 | | 30 | 60 | 70 | <1 | |
| BX-4833 | | 10 | 1300 | 590 | 5 | |
| BX-4834 | | 60 | 110 | 220 | 6 | |
| BX-4835 | | 20 | 80 | 100 | <1 | |
| BX-4836 | | <10 | 140 | 100 | 1 | <1 |
| BX-4837 | | 60 | 850 | 6600 | 8 | |
| BX-4838 | | 20 | 90 | 250 | 1 | |
| BX-4839 | | <10 | 140 | 90 | <1 | |
| BX-4840 | | 50 | 130 | 90 | <1 | |
| BX-4841 | | 30 | 140 | 120 | <1 | |
| BX-4842 | | 50 | 190 | 140 | <1 | |
| BX-4843 | | 30 | 170 | 100 | <1 | |
| BX-4844 | | 40 | 180 | 100 | <1 | |
| BX-4845 | | 50 | 300 | 170 | <1 | |
| BX-4846 | | 40 | 190 | 110 | <1 | <1 |
| BX-4847 | | 40 | 230 | 100 | <1 | |
| ection Limit: | | 10 | 10 | 10 | 1 | |

nments:

Signed: G. Clunn

FORM ALS 01(A)

510424

Australian Laboratory Services PTY. LTD.
413 CONSULTING ANALYTICAL CHEMISTS
INCORPORATED IN QUEENSLAND

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Perth Laboratory
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21 Bombala Street, Garbutt, Q. 4814
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18 Drew Street, Charters Towers, Q. 4820
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Bendigo Laboratory
127A Victoria Street, Eaglehawk, Vic 3556
Phone: (054) 46 1390 Fax: (054) 46 1389
Orange Laboratory
10 Leewood Drive, Orange, N.S.W. 2800
Phone: (063) 631 722 Fax: (063) 631 189

# LABORATORY REPORT



d ss: BHP COMPANY LIMITED
PO BOX 619
HAWTHORN
VIC 3122

**Batch Number:** A132

ntact: MR A WILDE

No. of Samples: 139
Date Received: 22/01/90
Date Completed: 31/01/90

No. 11200 B57 Sample Type: SOIL

| SAMPLE NUMBER | | Cu ppm IC586 | Pb ppm IC586 | Zn ppm IC586 | Fe % IC586 | Mn ppm IC586 |
|---|---|---|---|---|---|---|
| BX-4848 | 5000N 4800E | 5 | 20 | 40 | 1.22 | 105 |
| BX-4849 | 4825E | 15 | 40 | 50 | 1.32 | 125 |
| BX-4850 | 4850E | <5 | 20 | 60 | 1.80 | 145 |
| BX-4851 | 4875E | <5 | 15 | 55 | 1.39 | 85 |
| BX-4852 | 4900E | 5 | 15 | 55 | 1.68 | 95 |
| BX-4853 | 4925E | <5 | 10 | 45 | 1.66 | 105 |
| BX-4854 | 4950E | <5 | 10 | 40 | 1.89 | 140 |
| BX-4855 | 4975E | <5 | 10 | 25 | 1.40 | 65 |
| BX-4856 | 5000E | 10 | 15 | 25 | 1.11 | 70 |
| BX-4857 | 5025E | <5 | 15 | 30 | 1.26 | 80 |
| BX-4858 | 5050E | 70 | 105 | 25 | 0.71 | 45 |
| BX-4859 | 5050E | 10 | 5 | 20 | 0.58 | 170 |
| BX-4860 | 5075E | 25 | 30 | 35 | 1.50 | 115 |
| BX-4861 | 5100E | 10 | 15 | 15 | 0.89 | 30 |
| BX-4862 | 5100E | 10 | 15 | 15 | 0.68 | 25 |
| BX-4863 | 5125E | 10 | 20 | 15 | 1.10 | 35 |
| BX-4864 | 5150E | 10 | 20 | 15 | 0.40 | 15 |
| BX-4865 | 5175E | 5 | 10 | 25 | 2.34 | 90 |
| BX-4866 | 5200E | 30 | 50 | 30 | 1.31 | 75 |
| BX-4867 | 4800N 4525E | 20 | 40 | 50 | 4.38 | 230 |
| BX-4868 | 4500E | <5 | 10 | 50 | 1.72 | 175 |
| BX-4869 | 4500E | 5 | 35 | 50 | 1.81 | 175 |
| BX-4870 | 4550E | 10 | 30 | 35 | 1.19 | 125 |
| BX-4871 | 4575E | 15 | 30 | 50 | 1.22 | 150 |
| BX-4872 | 4600G | 10 | 25 | 50 | 1.03 | 165 |
| BX-4873 | 4 25E | <5 | 20 | 50 | 1.89 | 145 |
| BX-4874 | 4 50E | 10 | 40 | 30 | 0.95 | 70 |
| BX-4875 | 4 75E | 15 | 15 | 35 | 1.02 | 65 |
| BX-4876 | 4875E | 15 | 35 | 35 | 1.27 | 75 |
| BX-4877 | 4850E | 10 | 15 | 30 | 1.42 | 100 |
| tion Limit: | | 5 | 5 | 5 | 0.01 | 5 |

Element Unit Method

ents:

Signed: G. Dunn

FORM ALS 01(A)

510425

# Australian Laboratory Services PTY. LTD.
414

CONSULTING ANALYTICAL CHEMISTS

INCORPORATED IN QUEENSLAND

# LABORATORY REPORT

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**Perth Laboratory**
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**Townsville Laboratory**
21 Bombala Street, Garbutt, Q. 4814
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127A Victoria Street, Eaglehawk, Vic. 3556
Phone: (054) 46 1390 Fax: (054) 46 1389
**Orange Laboratory**
10 Leewood Drive, Orange, N.S.W. 2800
Phone: (063) 631 722 Fax: (063) 631 189



nt: BHP COMPANY LIMITED
ress: PO BOX 619
HAWTHORN
VIC 3122

**Batch Number:** A132

tact: MR A WILDE

No. of Samples: 139
Date Received: 22/01/90
Date Completed: 31/01/90

er No. 11200 B57 Sample Type: SOIL

| SAMPLE NUMBER | Element Unit Method | V ppm IC586 | S ppm IC586 | P ppm IC586 | Au ppb PM204 | Au(R) ppb CHECKS |
|---|---|---|---|---|---|---|
| BX-4848 | | 30 | 200 | 100 | <1 | |
| BX-4849 | | 30 | 200 | 100 | <1 | |
| BX-4850 | | 40 | 110 | 70 | <1 | |
| BX-4851 | | 30 | 190 | 60 | <1 | |
| BX-4852 | | 50 | 210 | 90 | <1 | |
| BX-4853 | | 40 | 130 | 50 | <1 | |
| BX-4854 | | 70 | 80 | 50 | <1 | |
| BX-4855 | | 50 | 130 | 90 | 1 | |
| BX-4856 | | 40 | 150 | 70 | 1 | |
| BX-4857 | | 40 | 180 | 70 | <1 | |
| BX-4858 | | 20 | 390 | 80 | 3 | |
| BX-4859 | | 10 | 30 | 20 | 1 | |
| BX-4860 | | 50 | 220 | 100 | 1 | |
| BX-4861 | | 30 | 160 | 120 | 2 | |
| BX-4862 | | 30 | 160 | 100 | <1 | |
| BX-4863 | | 30 | 160 | 110 | 4 | |
| BX-4864 | | 10 | 170 | 70 | <1 | |
| BX-4865 | | 50 | 180 | 130 | 2 | |
| BX-4866 | | 40 | 210 | 140 | 1 | |
| BX-4867 | | 130 | 310 | 280 | <1 | |
| BX-4868 | | 40 | 70 | 70 | <1 | |
| BX-4869 | | 40 | 110 | 80 | 1 | |
| BX-4870 | | 40 | 160 | 140 | 4 | <1 |
| BX-4871 | | 40 | 160 | 100 | 1 | |
| BX-4872 | | 30 | 100 | 110 | <1 | |
| BX-4873 | | 80 | 50 | 90 | <1 | |
| BX-4874 | | 30 | 110 | 90 | <1 | |
| BX-4875 | | 40 | 130 | 100 | 1 | |
| BX-4876 | | 30 | 200 | 180 | <1 | |
| BX-4877 | | 30 | 190 | 100 | 1 | |
| ection Limit: | | 10 | 10 | 10 | 1 | |

mments:

Signed: G Dunn

FORM ALS 01(A)

510426

Australian Laboratory Services PTY. LTD.
410
CONSULTING ANALYTICAL CHEMISTS
INCORPORATED IN QUEENSLAND
Brisbane Head Office and Laboratory
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Fax: (07) 352 5109
Perth Laboratory
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Phone: (09) 249 2988. Fax: (09) 249 2942
Townsville Laboratory
21 Bombala Street, Garbutt, Q. 4814
Phone: (077) 79 9155. Fax: (077) 799 729
Charters Towers Laboratory
18 Drew Street, Charters Towers, Q. 4820
Phone: (077) 87 4155. Fax (077) 87 4220
Bendigo Laboratory
127A Victoria Street, Eaglehawk, Vic. 3556
Phone: (054) 46 1390. Fax: (054) 46 1389
Orange Laboratory
10 Leewood Drive, Orange, N.S.W. 2600
Phone: (063) 631 722. Fax: (063) 631 189

# LABORATORY REPORT



BHP COMPANY LIMITED
s: PO BOX 619
HAWTHORN
VIC 3122

Batch Number: A132

ntact: MR A WILDE

No. of Samples: 139
Date Received: 22/01/90
Date Completed: 31/01/90

No. 11200 B57 Sample Type: SOIL

| SAMPLE NUMBER | | Element Unit Method | Cu ppm IC586 | Pb ppm IC586 | Zn ppm IC586 | Fe % IC586 | Mn ppm IC586 |
|---|---|---|---|---|---|---|---|
| BX-4878 | 4800N | 4825E | 10 | 15 | 30 | 1.56 | 110 |
| BX-4879 | | 4850E | 25 | 45 | 30 | 1.70 | 105 |
| BX-4880 | | 4800E | 15 | 80 | 30 | 1.20 | 85 |
| BX-4881 | | 4775E | 20 | 30 | 30 | 1.31 | 85 |
| BX-4882 | | 4775E | 10 | 15 | 40 | 1.79 | 95 |
| BX-4883 | | 4750E | 15 | 30 | 45 | 1.43 | 130 |
| BX-4884 | | 4725E | 15 | 30 | 30 | 1.34 | 100 |
| BX-4885 | | 4725E | 15 | 30 | 25 | 1.15 | 85 |
| BX-4886 | | 4700E | 30 | 40 | 30 | 1.10 | 70 |
| BX-4887 | | 5125E | 25 | 30 | 20 | 0.79 | 45 |
| BX-4888 | | 5100E | 10 | 20 | 20 | 0.81 | 45 |
| BX-4889 | | 5075E | 5 | 25 | 20 | 1.21 | 75 |
| BX-4890 | | 5075E | 10 | 30 | 25 | 1.36 | 85 |
| BX-4891 | | 5050E | 20 | 30 | 20 | 0.92 | 50 |
| BX-4892 | | 5025E | <5 | 5 | 45 | 1.82 | 80 |
| BX-4893 | | 5025E | 10 | 15 | 45 | 1.75 | 70 |
| BX-4894 | | 5000E | <5 | 10 | 20 | 1.33 | 60 |
| BX-4895 | | 4975E | <5 | 15 | 20 | 1.43 | 85 |
| BX-4896 | | 4950E | 5 | 20 | 20 | 1.07 | 65 |
| BX-4897 | | 4925E | 5 | 15 | 20 | 0.90 | 60 |
| BX-4898 | | 4900E | 10 | 25 | 25 | 1.30 | 85 |
| BX-4899 | 4600N | 5000E | 10 | 20 | 30 | 1.54 | 100 |
| BX-4900 | | 4975E | <5 | 15 | 50 | 2.53 | 280 |
| BX-4901 | | 4950E | 10 | 35 | 20 | 0.92 | 55 |
| BX-4902 | | 4925E | 10 | 25 | 20 | 0.90 | 50 |
| BX-4903 | | 4900E | <5 | 10 | 30 | 2.16 | 250 |
| BX-4904 | | 4875E | 30 | 45 | 35 | 1.49 | 105 |
| BX-4905 | | 4850E | 15 | 15 | 25 | 1.86 | 95 |
| BX-4906 | | 4850E | 15 | 25 | 30 | 1.83 | 105 |
| BX-4907 | | 4825E | 20 | 40 | 30 | 1.43 | 120 |
| ion Limit: | | | 5 | 5 | 5 | 0.01 | 5 |

ents:

Signed: G. Dunn

FORM ALS 01A

510427

Australian Laboratory Services PTY. LTD.
416
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Orange Laboratory
10 Leewood Drive, Orange, N.S.W. 2800
Phone: (063) 631 722 Fax: (063) 631 189

# LABORATORY REPORT



nt: BHP COMPANY LIMITED
ess: PO BOX 619
HAWTHORN
VIC 3122

**Batch Number:** A132

act: MR A WILDE

No. of Samples: 139
Date Received: 22/01/90
Date Completed: 31/01/90

er No. 11200 B57

Sample Type: SOIL

| SAMPLE NUMBER | Element Unit Method | V ppm IC586 | S ppm IC586 | P ppm IC586 | Au ppb PM204 | Au(R) ppb CHECKS |
|---|---|---|---|---|---|---|
| BX-4878 | | 40 | 170 | 90 | <1 | |
| BX-4879 | | 30 | 360 | 120 | <1 | |
| BX-4880 | | 30 | 120 | 80 | 1 | <1 |
| BX-4881 | | 40 | 280 | 150 | <1 | |
| BX-4882 | | 40 | 220 | 150 | <1 | |
| BX-4883 | | 30 | 200 | 110 | 1 | |
| BX-4884 | | 40 | 230 | 100 | <1 | |
| BX-4885 | | 30 | 190 | 110 | 1 | |
| BX-4886 | | 30 | 500 | 180 | 2 | |
| BX-4887 | | 30 | 400 | 120 | 1 | |
| BX-4888 | | 30 | 270 | 100 | 2 | |
| BX-4889 | | 50 | 260 | 120 | 1 | |
| BX-4890 | | 50 | 220 | 130 | <1 | <1 |
| BX-4891 | | 30 | 410 | 130 | 1 | |
| BX-4892 | | 50 | 130 | 90 | 1 | |
| BX-4893 | | 50 | 180 | 100 | <1 | |
| BX-4894 | | 40 | 110 | 50 | <1 | |
| BX-4895 | | 40 | 130 | 50 | <1 | |
| BX-4896 | | 30 | 130 | 90 | <1 | |
| BX-4897 | | 20 | 150 | 90 | 1 | |
| BX-4898 | | 30 | 170 | 100 | 3 | |
| BX-4899 | | 30 | 160 | 120 | 1 | |
| BX-4900 | | 50 | 90 | 240 | 1 | |
| BX-4901 | | 30 | 150 | 90 | <1 | |
| BX-4902 | | 30 | 270 | 130 | 1 | |
| BX-4903 | | 40 | 130 | 130 | <1 | |
| BX-4904 | | 30 | 130 | 110 | <1 | |
| BX-4905 | | 40 | 140 | 90 | <1 | |
| BX-4906 | | 40 | 170 | 90 | 1 | |
| BX-4907 | | 40 | 130 | 90 | <1 | |
| ection Limit: | | 10 | 10 | 10 | 1 | |

mments:

Signed: G Aumn

# Australian Laboratory Services PTY. LTD.

417 CONSULTING ANALYTICAL CHEMISTS

INCORPORATED IN QUEENSLAND

## LABORATORY REPORT

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Perth Laboratory
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Orange Laboratory
10 Leewood Drive, Orange, N.S.W. 2800
Phone: (063) 631 722 Fax: (063) 631 189



s: BHP COMPANY LIMITED
PO BOX 619
HAWTHORN
VIC 3122

Batch Number: A132

ntact: MR A WILDE

No. of Samples: 139
Date Received: 22/01/90
Date Completed: 31/01/90

No. 11200 B57 Sample Type: SOIL

| SAMPLE NUMBER | Element Unit Method | Cu ppm IC586 | Pb ppm IC586 | Zn ppm IC586 | Fe % IC586 | Mn ppm IC586 |
|---|---|---|---|---|---|---|
| BX-4908 4600N | 4800E | 10 | 15 | 35 | 1.93 | 135 |
| BX-4909 | 4775E | 10 | 25 | 45 | 1.46 | 95 |
| BX-4910 | 4750E | 10 | 25 | 35 | 1.23 | 80 |
| BX-4911 | 4725E | 10 | 50 | 30 | 1.02 | 80 |
| BX-4912 | 4700E | 10 | 55 | 40 | 1.60 | 105 |
| BX-4913 | 4675E | 10 | 20 | 30 | 1.10 | 80 |
| BX-4914 | 4675E | 15 | 70 | 35 | 1.67 | 125 |
| BX-4915 | 4650E | 15 | 25 | 35 | 1.46 | 115 |
| BX-4916 | 4625E | 10 | 30 | 25 | 1.07 | 85 |
| BX-4918 | 4575E | 30 | 60 | 25 | 1.01 | 40 |
| BX-4919 | 4550E | 10 | 30 | 40 | 1.81 | 140 |
| BX-4920 | 4525E | 30 | 60 | 35 | 0.79 | 80 |
| BX-4921 | 4500E | 5 | 15 | 60 | 1.05 | 60 |
| BX-4922 | 4475E | 25 | 50 | 60 | 1.52 | 110 |
| BX-4923 | 4450E | 5 | 65 | 45 | 1.53 | 85 |
| BX-4924 | 4425E | 15 | 55 | 80 | 3.04 | 155 |
| BX-4925 | 4400E | 30 | 65 | 60 | 1.45 | 155 |
| BX-4926 | 4400E | 15 | 40 | 55 | 1.54 | 150 |
| BX-4927 | 4375E | 20 | 70 | 55 | 0.86 | 220 |
| BX-4928 | 4350E | 35 | 70 | 50 | 1.26 | 135 |
| BX-4929 | 4325E | 10 | 25 | 50 | 1.68 | 140 |
| BX-4930 | 4300E | 20 | 50 | 40 | 1.21 | 135 |
| BX-4931 | 4275E | 15 | 30 | 50 | 1.70 | 210 |
| BX-4932 | 4250E | 40 | 55 | 60 | 1.47 | 190 |
| BX-4933 | 4250E | 15 | 75 | 65 | 1.55 | 250 |
| BX-4934 | 4225E | 30 | 40 | 85 | 1.31 | 250 |
| BX-4935 | 4200E | 60 | 95 | 60 | 1.28 | 280 |
| BX-4936 | 4175E | 20 | 70 | 65 | 1.47 | 220 |
| BX-4937 | 4175E | 10 | 40 | 90 | 2.13 | 240 |
| BX-4939 | 4125E | 10 | 80 | 85 | 1.48 | 185 |
| on Limit | | 5 | 5 | 5 | 0.01 | 5 |

ents:

Signed: G. Dunn

FORM ALS 01(A)

510429

Australian Laboratory Services PTY. LTD.
418
CONSULTING ANALYTICAL CHEMISTS
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Phone: (054) 46 1390 Fax (054) 46 1389
Orange Laboratory
10 Leewood Drive, Orange, N.S.W. 2800
Phone (063) 631 722 Fax (063) 631 189

# LABORATORY REPORT



nt: BHP COMPANY LIMITED
ess: PO BOX 619
HAWTHORN
VIC 3122

Batch Number: A132

act: MR A WILDE

No. of Samples: 139
Date Received: 22/01/90
Date Completed: 31/01/90

er No. 11200 B57    Sample Type: SOIL

| SAMPLE NUMBER | Element Unit Method | V ppm IC586 | S ppm IC586 | P ppm IC586 | Au ppb PM204 | Au(R) ppb CHECKS |
|---|---|---|---|---|---|---|
| BX-4908 | | 50 | 130 | 120 | 1 | |
| BX-4909 | | 40 | 190 | 120 | <1 | |
| BX-4910 | | 30 | 200 | 140 | <1 | |
| BX-4911 | | 30 | 160 | 100 | <1 | |
| BX-4912 | | 40 | 180 | 150 | <1 | |
| BX-4913 | | 30 | 190 | 130 | <1 | |
| BX-4914 | | 40 | 210 | 110 | <1 | <1 |
| BX-4915 | | 40 | 130 | 120 | <1 | |
| BX-4916 | | 30 | 250 | 140 | <1 | |
| BX-4918 | | 30 | 270 | 140 | 1 | |
| BX-4919 | | 40 | 90 | 120 | <1 | |
| BX-4920 | | 20 | 250 | 170 | <1 | |
| BX-4921 | | 40 | 120 | 130 | 1 | |
| BX-4922 | | 30 | 270 | 220 | <1 | |
| BX-4923 | | 40 | 110 | 120 | <1 | |
| BX-4924 | | 50 | 230 | 210 | <1 | |
| BX-4925 | | 40 | 230 | 190 | 1 | <1 |
| BX-4926 | | 40 | 150 | 130 | <1 | |
| BX-4927 | | 30 | 180 | 130 | <1 | |
| BX-4928 | | 30 | 270 | 140 | 1 | |
| BX-4929 | | 40 | 180 | 110 | <1 | |
| BX-4930 | | 30 | 240 | 200 | 2 | |
| BX-4931 | | 40 | 160 | 110 | 1 | |
| BX-4932 | | 20 | 280 | 190 | <1 | |
| BX-4933 | | 30 | 150 | 120 | <1 | |
| BX-4934 | | 30 | 180 | 110 | <1 | |
| BX-4935 | | 30 | 310 | 150 | 1 | <1 |
| BX-4936 | | 30 | 350 | 150 | <1 | |
| BX-4937 | | 40 | 170 | 130 | <1 | |
| BX-4939 | | 40 | 250 | 130 | <1 | |
| tection Limit: | | 10 | 10 | 10 | 1 | |

mments:

Signed: G. [signature]

FORM ALS O1(A)

510430

Australian Laboratory Services PTY. LTD.
410
CONSULTING ANALYTICAL CHEMISTS
INCORPORATED IN QUEENSLAND

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Phone: (063) 631 722. Fax: (063) 631 189

# LABORATORY REPORT



BHP COMPANY LIMITED
s: PO BOX 619
HAWTHORN
VIC 3122

Batch Number: A132

tact: MR A WILDE

No. of Samples: 139
Date Received: 22/01/90

No. 11200 B57 — Sample Type: SOIL — Date Completed: 31/01/90

| SAMPLE NUMBER | Element Unit Method | Cu ppm IC586 | Pb ppm IC586 | Zn ppm IC586 | Fe % IC586 | Mn ppm IC586 |
|---|---|---|---|---|---|---|
| BX-4940 4600N | 4100E | <5 | 45 | 90 | 1.79 | 220 |
| BX-4941 | 4100E | 5 | 50 | 80 | 1.53 | 190 |
| BX-4942 | 4075E | 15 | 35 | 70 | 1.36 | 120 |
| BX-4943 | 4050E | 15 | 210 | 70 | 1.98 | 105 |
| BX-4944 4800N | 4475E | 15 | 30 | 55 | 2.68 | 160 |
| BX-4945 | 4450E | 25 | 65 | 55 | 1.83 | 230 |
| BX-4946 | 4425E | 30 | 75 | 60 | 1.55 | 140 |
| BX-4947 | 4400E | 20 | 50 | 40 | 1.22 | 160 |
| BX-4948 | 4375E | 15 | 50 | 65 | 1.44 | 155 |
| BX-4949 | 4350E | 5 | 35 | 55 | 1.74 | 200 |
| BX-4950 | 4350E | 5 | 35 | 55 | 1.54 | 195 |
| BX-4954 | 4325E | 5 | 25 | 60 | 1.66 | 175 |
| BX-4955 | 4325E | 5 | 35 | 60 | 1.45 | 180 |
| BX-4956 | 4300E | 15 | 35 | 60 | 1.72 | 210 |
| BX-4957 | 4275E | 15 | 40 | 55 | 1.72 | 180 |
| BX-4958 | 4275E | 20 | 85 | 55 | 1.50 | 185 |
| BX-4959 | 4250E | 50 | 65 | 65 | 1.52 | 165 |
| BX-4960 | 4225E | 30 | 65 | 70 | 1.98 | 175 |
| BX-4961 | 4200E | 15 | 45 | 65 | 2.26 | 195 |
| on Limit: | | 5 | 5 | 5 | 0.01 | 5 |

ents:

Signed: G. Lunn

FORM ALS/O/A/

510431

Australian Laboratory Services PTY. LTD.
420
CONSULTING ANALYTICAL CHEMISTS
INCORPORATED IN QUEENSLAND

# LABORATORY REPORT

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Orange Laboratory
10 Leewood Drive, Orange, N.S.W. 2800
Phone: (063) 631 722 Fax: (063) 631 189



nt: BHP COMPANY LIMITED
ress: PO BOX 619
HAWTHORN
VIC 3122

Batch Number: A132

tact: MR A WILDE

No. of Samples: 139
Date Received: 22/01/90
er No. 11200 B57
Sample Type: SOIL
Date Completed: 31/01/90

| SAMPLE NUMBER | Element Unit Method | V ppm IC586 | S ppm IC586 | P ppm IC586 | Au ppb PM204 | Au(R) ppb CHECKS |
|---|---|---|---|---|---|---|
| BX-4940 | | 50 | 120 | 100 | 1 | |
| BX-4941 | | 40 | 130 | 100 | 9 | |
| BX-4942 | | 60 | 290 | 150 | <1 | |
| BX-4943 | | 50 | 260 | 210 | <1 | |
| BX-4944 | | 40 | 250 | 170 | 1 | |
| BX-4945 | | 40 | 430 | 300 | 1 | |
| BX-4946 | | 40 | 290 | 250 | 1 | |
| BX-4947 | | 30 | 220 | 120 | <1 | |
| BX-4948 | | 40 | 150 | 160 | <1 | |
| BX-4949 | | 40 | 170 | 160 | <1 | |
| BX-4950 | | 40 | 170 | 170 | <1 | |
| BX-4954 | | 30 | 150 | 170 | <1 | |
| BX-4955 | | 40 | 150 | 160 | 1 | |
| BX-4956 | | 40 | 200 | 200 | 1 | |
| BX-4957 | | 40 | 240 | 210 | <1 | |
| BX-4958 | | 40 | 290 | 230 | <1 | |
| BX-4959 | | 40 | 290 | 260 | 1 | |
| BX-4960 | | 40 | 170 | 190 | <1 | |
| BX-4961 | | 50 | 250 | 220 | 1 | |
| tection Limit: | | 10 | 10 | 10 | 1 | |

mments:

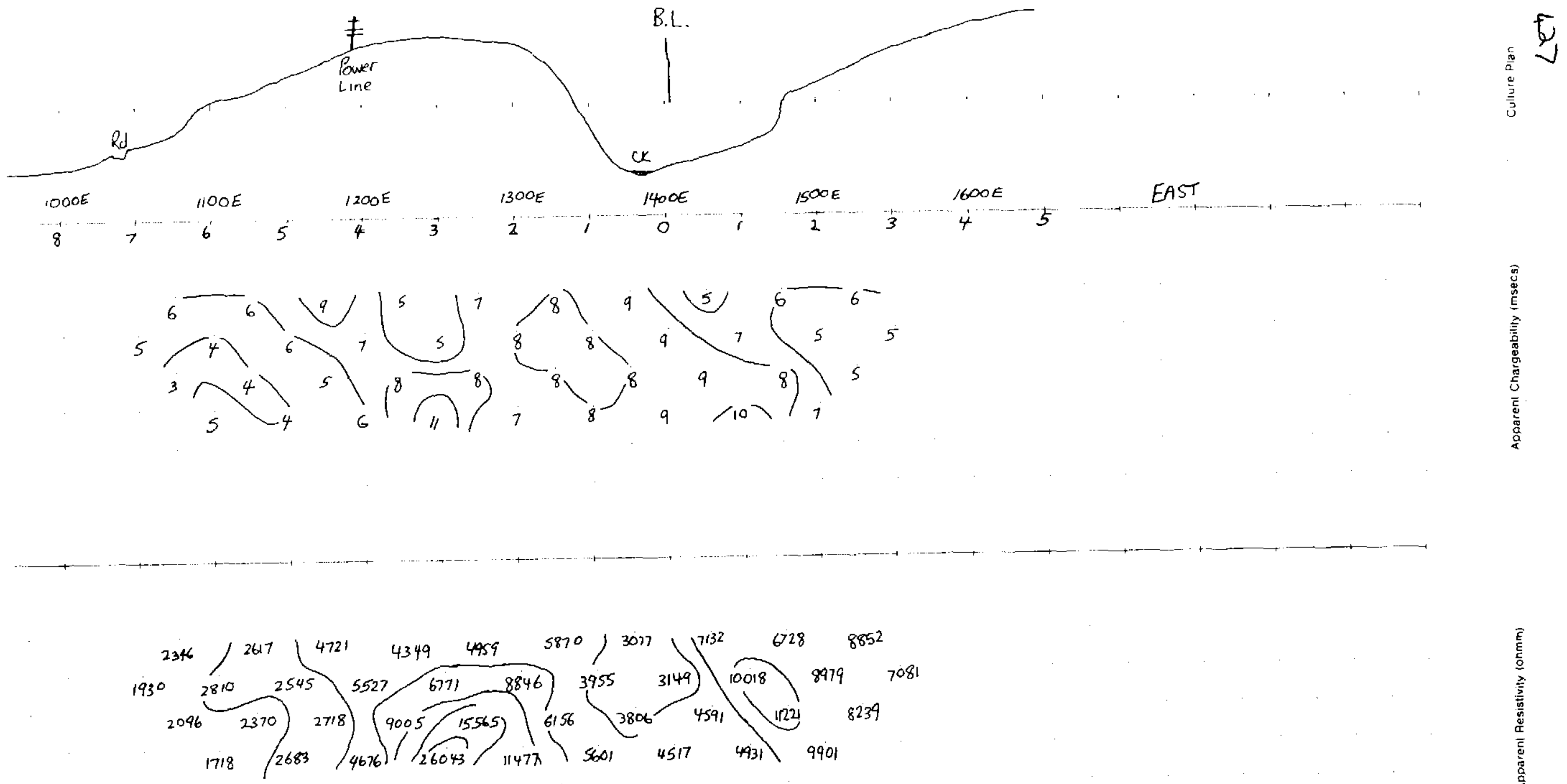
Signed [signature]

FORM ALS 011A

510432

APPENDIX 10

IP Data




510440

RESISTIVITY CONTOUR INTERVALS 1000, 1500, 2500, 4000, 6500, 10000, 15000, 25000

DRAWN BY B. GEORGE

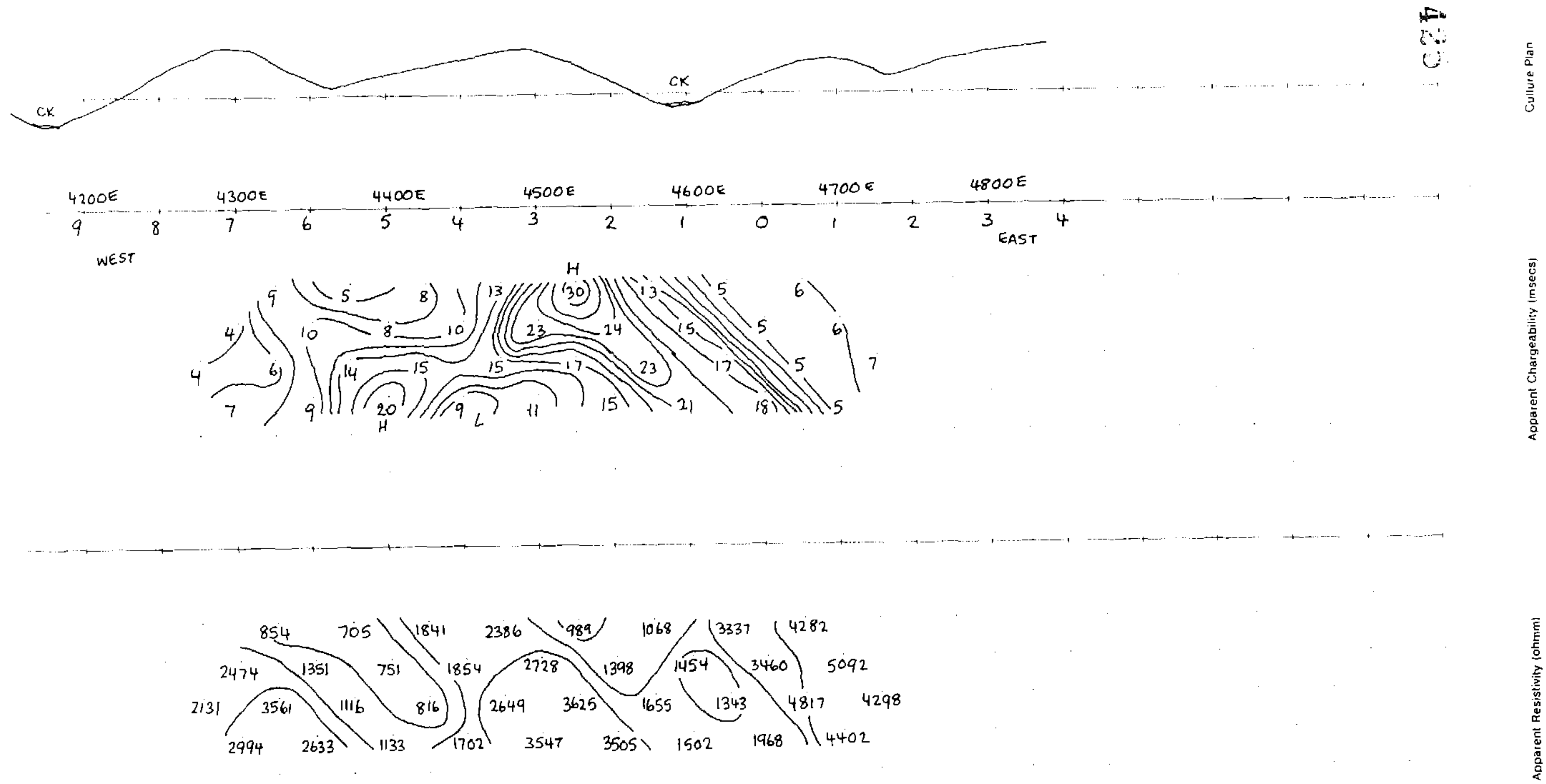
SURVEYED, COMPILED & INTERPRETED BY geoterrex limited SYDNEY

INDUCED POLARISATION AND RESISTIVITY SURVEY

MOXON SADDLE

LINE : 7100N

| | | |
|---|---|---|
| Array Dipole - Dipole | | Dipole length 50m |
| Date 12/2/90 | Job No 85- | Scale |




RESISTIVITY CONTOUR INTERVAL 100, 150, 250, 400, 600, 1000

SURVEYED COMPILED & INTERPRETED BY geoterrex limited SYDNEY

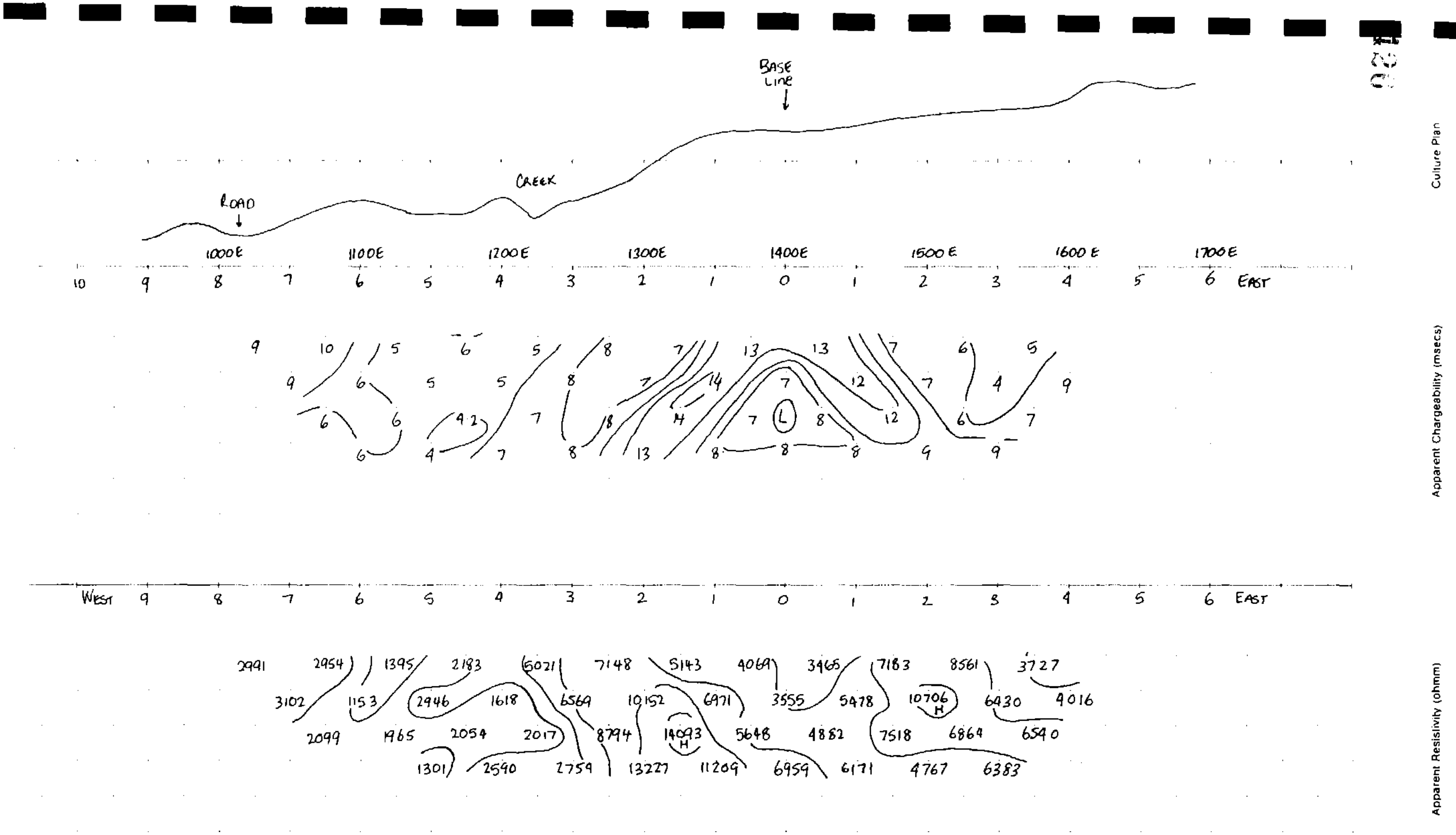
INDUCED POLARISATION AND RESISTIVITY SURVEY

MOUNTAIN MAID PROSPECT

HUXLEY GRID

LINE : 7200N

| | |
|---|---|
| Array Dipole - Dipole | Dipole length 50m |
| Date 24/2/90 | Job No 85- |
| | Scale |




RESISTIVITY CONTOUR INTERVAL 1000, 1500, 2500, 4000, 6500, 10 000, 15000

Drawn by B. George

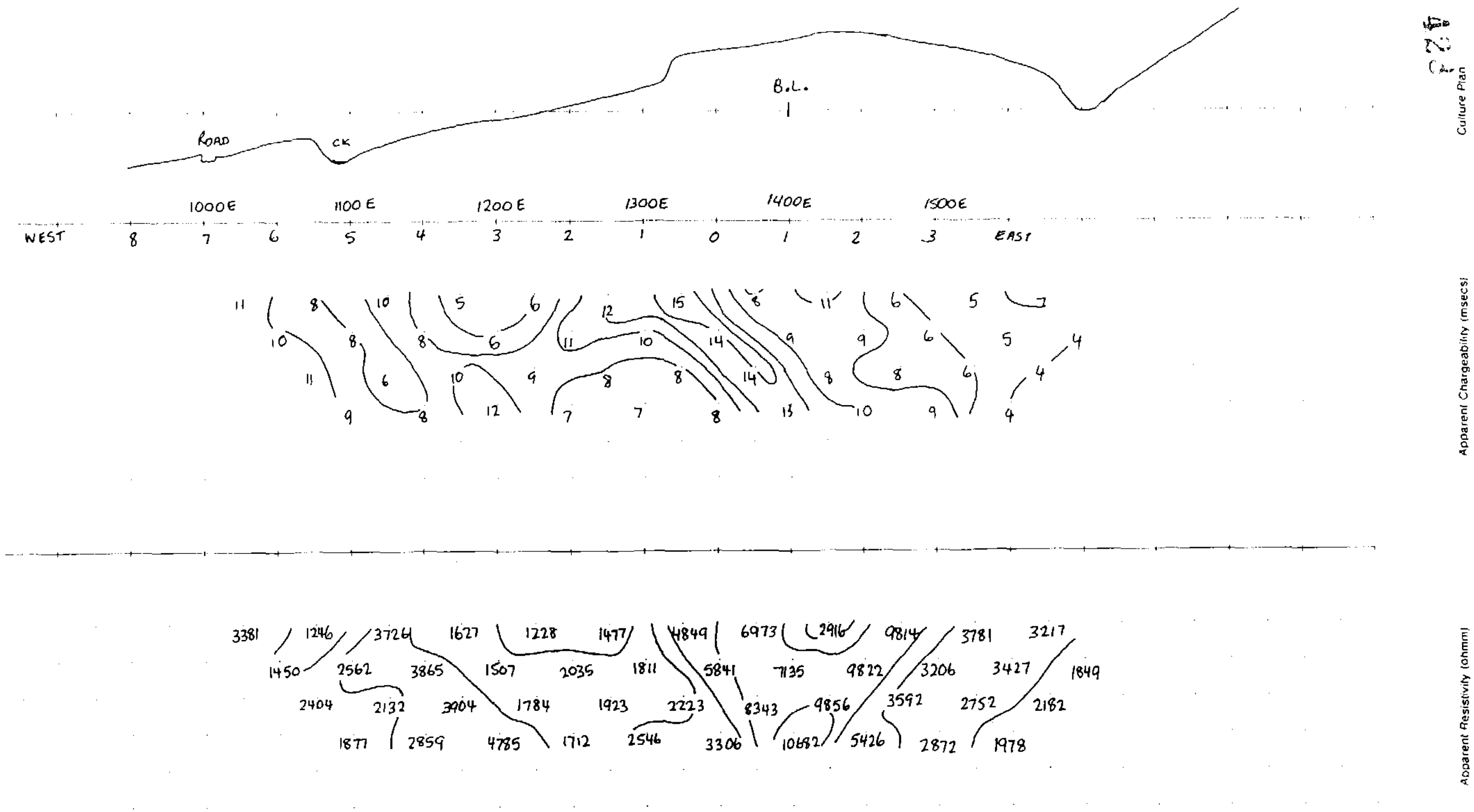
SURVEYED COMPILED & INTERPRETED BY geoterrex limited SYDNEY

INDUCED POLARISATION AND RESISTIVITY SURVEY

MOXON SADDLE GRID

LINE : 7300N

| | | | |
|---|---|---|---|
| Array Dipole - Dipole | | Dipole length 50 metres | |
| Date 11 Feb 1990 | Job No 85– | Scale | |




RESISTIVITY CONTOUR INTERVAL 1000, 1500, 2500, 4000, 6500

Drawn by B. George

SURVEYED COMPILED & INTERPRETED BY geoterrex limited SYDNEY

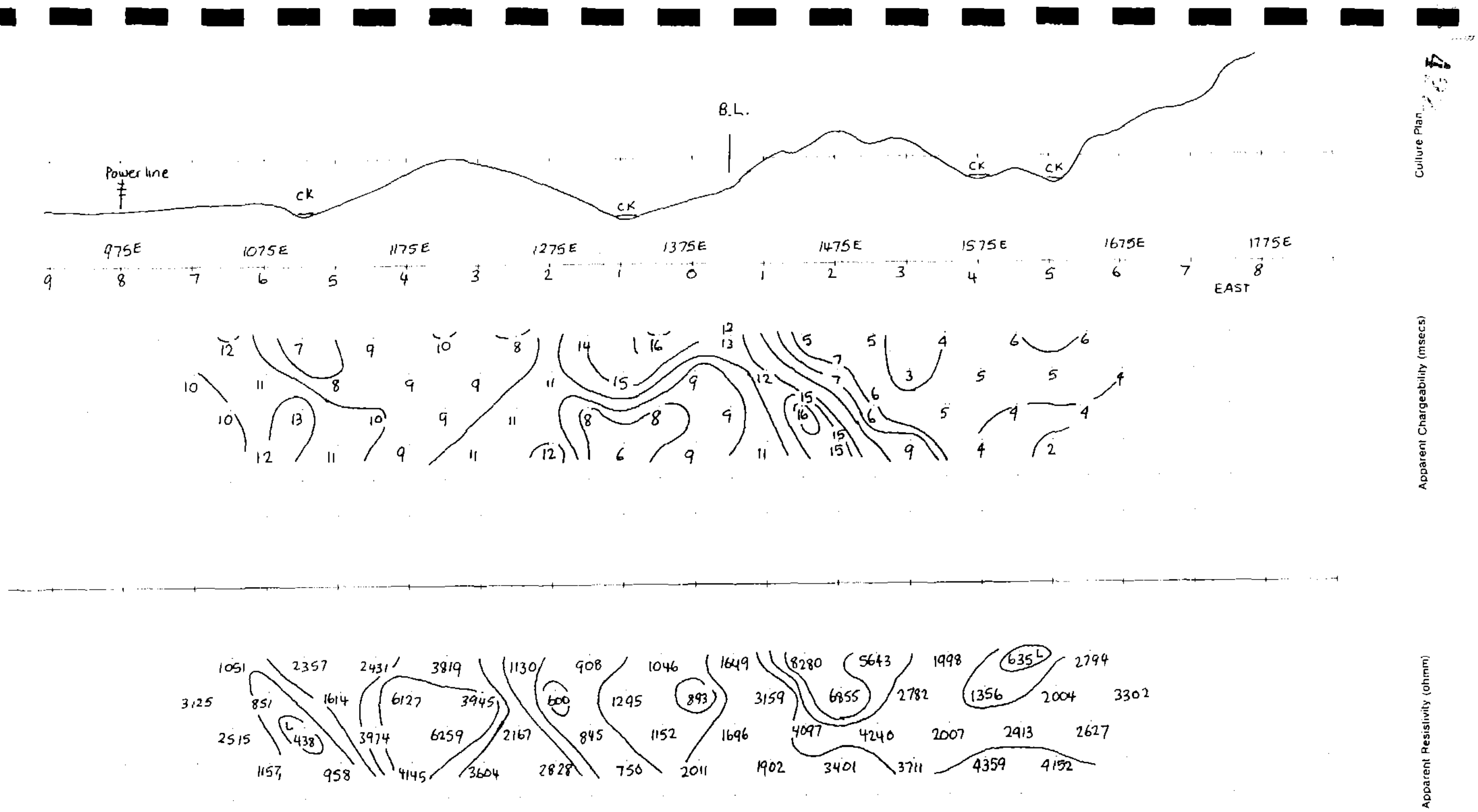
INDUCED POLARISATION AND RESISTIVITY SURVEY

MOXON SADDLE GRID

LINE : 7500N

| | | |
|---|---|---|
| Array Dipole - Dipole | | Dipole length 50m |
| Date 10/2/90 | Job No. 85- | Scale |

510434




RESISTIVITY CONTOUR INTERVAL 100, 150, 250, 400, 650, 1000

Drawn by B. George

SURVEYED COMPILED & INTERPRETED BY geoterrex limited SYDNEY

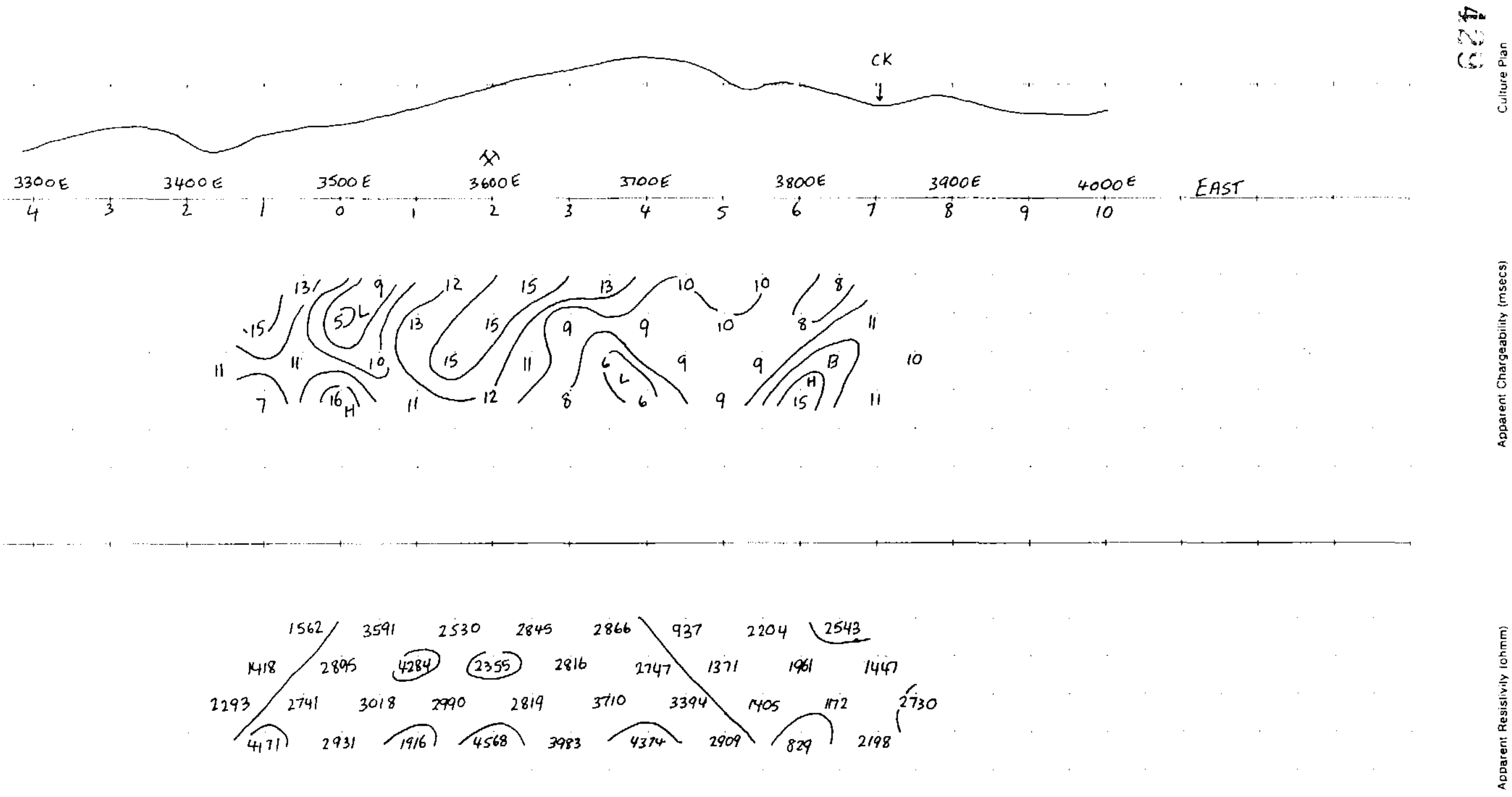
INDUCED POLARISATION AND RESISTIVITY SURVEY

MOXON SADDLE GRID

LINE : 7700 N

| | |
|---|---|
| Array Dipole - Dipole | Dipole length 50m |
| Date 13/2/90 | Job No 85 4-160 | Scale |

510433




RESISTIVITY CONTOUR INTERVAL 100, 150, 250, 400, 650, 1000, .....

Drawn by B. George

SURVEYED, COMPILED & INTERPRETED BY geoterrex limited SYDNEY

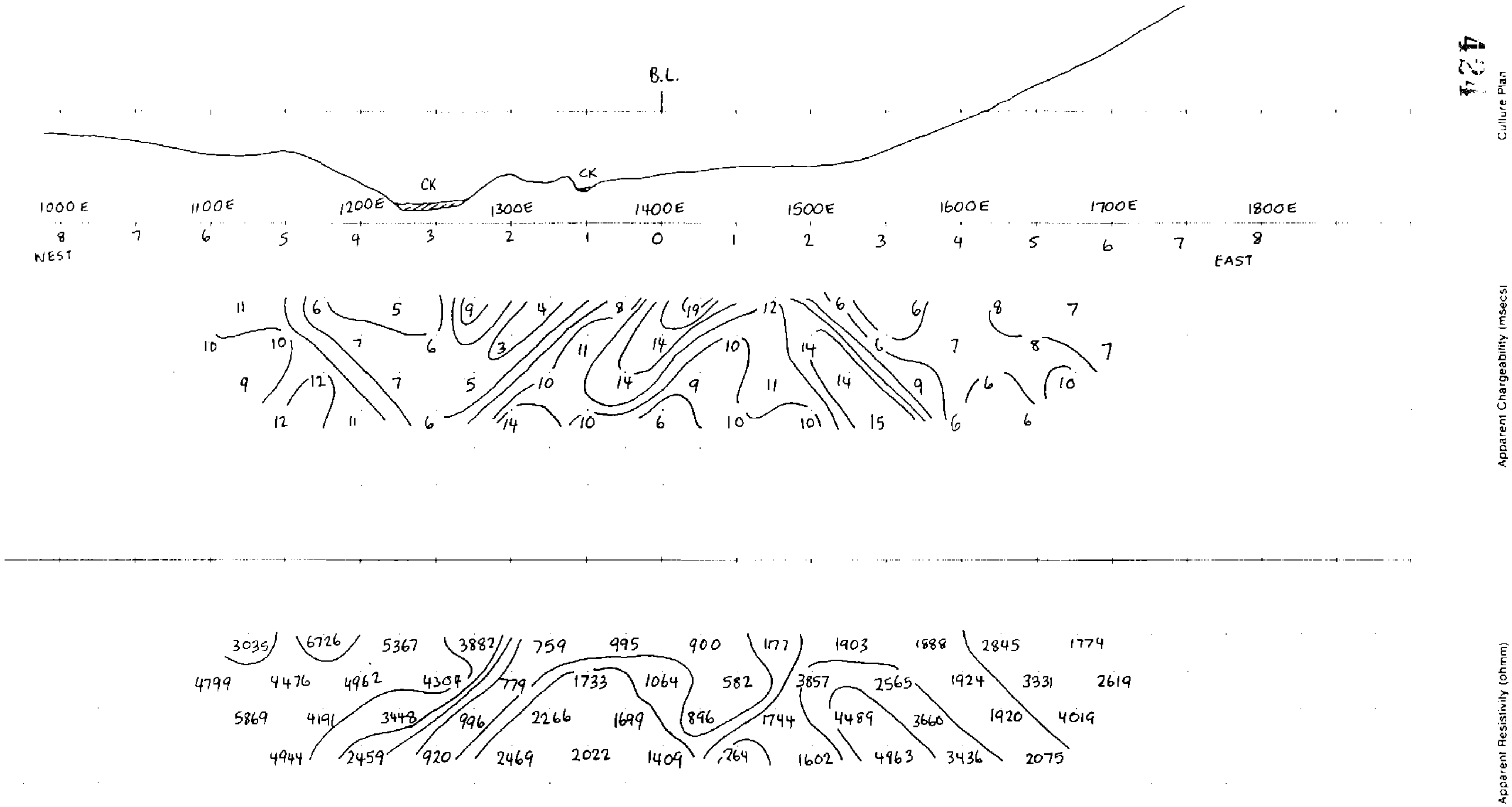
INDUCED POLARISATION AND RESISTIVITY SURVEY

MT ELLEN PROSPECT
HUXLEY GRID

LINE : 7800N

| Array: Dipole - Dipole | Dipole length 50m |
|---|---|
| Date 20/2/90 | Job No 85- | Scale |

510442




424

RESISTIVITY CONTOUR INTERVAL 100, 150, 250, 400, 650, 1000

Drawn by B. George

SURVEYED, COMPILED & INTERPRETED BY geoterrex limited SYDNEY

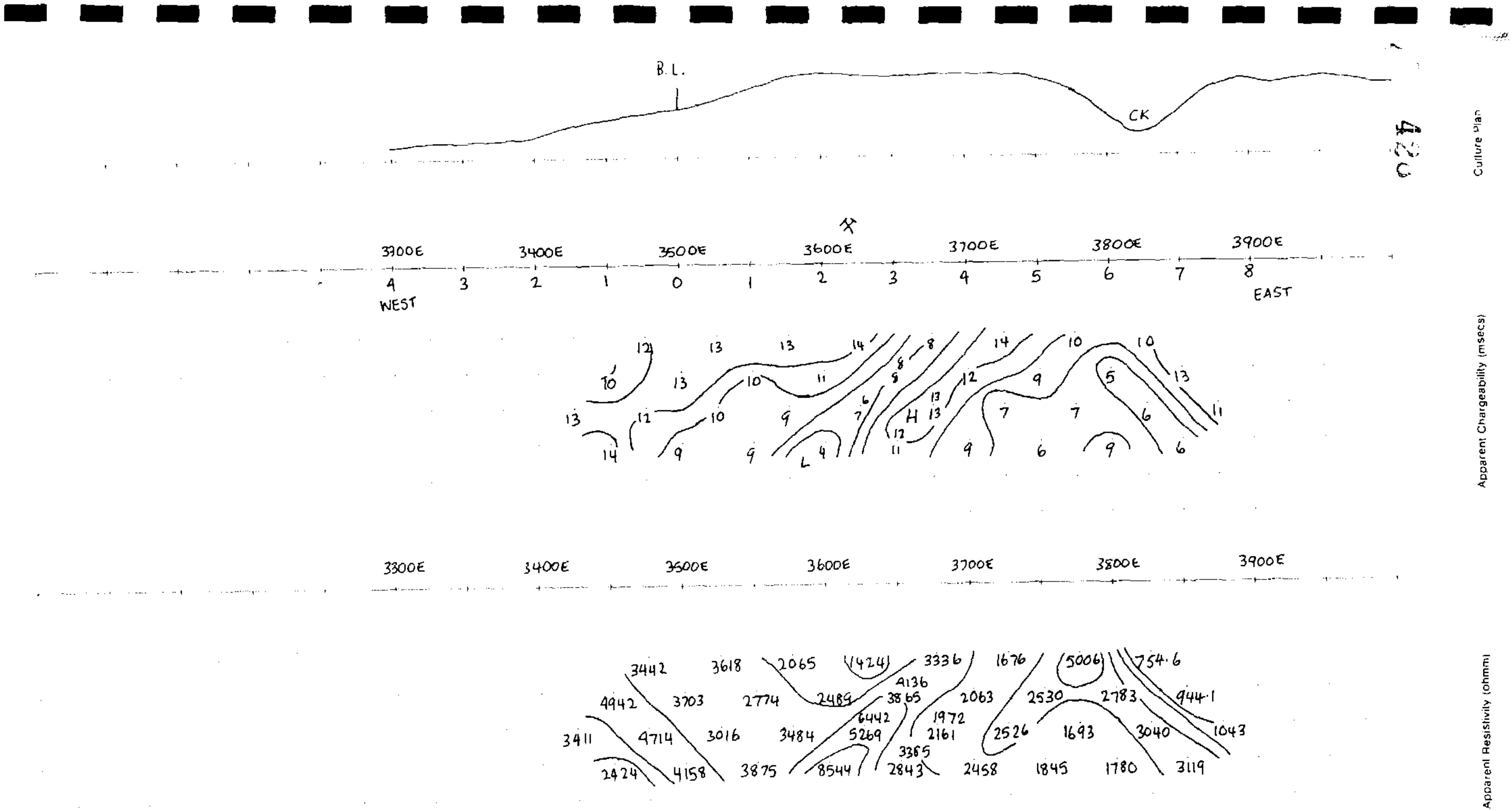
INDUCED POLARISATION AND RESISTIVITY SURVEY

MOXON SADDLE GRID

LINE : 7900N

| | | | |
|---|---|---|---|
| Array Dipole - Dipole | | Dipole length 50m | |
| Date 16/2/90 | Job No 85- | Scale | |

510435




RESISTIVITY
CONTOUR
INTERVAL

1000, 1500, 2500, 4000, 6000, 10000

Drawn by B. George

SURVEYED, COMPILED & INTERPRETED BY
geoterrex limited

INDUCED POLARISATION AND RESISTIVITY SURVEY
MT ELLEN PROSPECT
HUXLEY GRID

LINE : 8000N

| | | |
|---|---|---|
| Array Dipole - Dipole | | Dipole length 50m |
| Date 21/2/90 | Job No 85- | Scale |

510441

430

APPENDIX 11

Geochemical Data for MS-1, MS-3 and CV1

510438

DATE : 21-AUG-89

# QUEENSTOWN BASE METALS
## Assay Data for MS-3

| Hole Name | Sample From | Sample To | Copper ppm | Lead ppm | Zinc ppm | Silver ppm | Sulphur ppm | Manganese ppm |
|---|---|---|---|---|---|---|---|---|
| MS-3 | 10.40 | 12.00 | 30 | 1000 | 2800 | 2.0 | 2000 | 2500 |
| MS-3 | 12.00 | 13.40 | 20 | 500 | 1500 | 2.0 | 1000 | 2300 |
| MS-3 | 13.40 | 14.80 | 30 | 2800 | 5000 | 3.0 | 8000 | 2900 |
| MS-3 | 14.80 | 16.80 | 50 | 300 | 1000 | 2.0 | 1000 | 2900 |
| MS-3 | 16.80 | 18.80 | 30 | 200 | 800 | | 1000 | 4100 |
| MS-3 | 18.80 | 20.80 | 20 | 200 | 500 | | 1000 | 4000 |
| MS-3 | 20.80 | 22.80 | 20 | 200 | 600 | | 1000 | 2700 |
| MS-3 | 22.80 | 24.80 | 30 | 200 | 600 | | 1000 | 3000 |
| MS-3 | 24.80 | 26.80 | 20 | 200 | 900 | | 2000 | 2000 |
| MS-3 | 26.80 | 28.80 | 20 | 200 | 1500 | | 1000 | 2400 |
| MS-3 | 28.80 | 30.80 | 60 | 1200 | 2500 | | 2000 | 2000 |
| MS-3 | 30.80 | 32.70 | 30 | 800 | 2400 | | 4000 | 2100 |
| MS-3 | 32.70 | 36.50 | 20 | 400 | 1000 | | 2000 | 4400 |
| MS-3 | 36.50 | 38.50 | 20 | 500 | 700 | | 2000 | 2000 |
| MS-3 | 38.50 | 40.50 | 20 | 300 | 1400 | | 1000 | 2900 |
| MS-3 | 40.50 | 42.30 | 20 | 700 | 1600 | | 2000 | 3900 |
| MS-3 | 42.30 | 44.30 | 50 | 700 | 1200 | | 1000 | 2400 |
| MS-3 | 44.30 | 46.30 | 50 | 1200 | 8400 | 2.0 | 5000 | 3700 |
| MS-3 | 46.30 | 48.30 | 60 | 1900 | 5600 | 8.0 | 3000 | 2300 |
| MS-3 | 48.30 | 50.30 | 60 | 1500 | 4800 | 6.0 | 9000 | 3500 |
| MS-3 | 50.30 | 51.30 | 90 | 1200 | 6800 | 6.0 | 9000 | 2500 |
| MS-3 | 51.30 | 53.30 | 50 | 900 | 1900 | 4.0 | 6000 | 6000 |
| MS-3 | 53.30 | 55.30 | 40 | 700 | 1100 | 4.0 | 6000 | 2100 |
| MS-3 | 55.30 | 57.30 | 30 | 1200 | 1200 | 8.0 | 6000 | 4000 |
| MS-3 | 57.30 | 59.30 | 60 | 1000 | 2300 | 4.0 | 6000 | 5100 |
| MS-3 | 59.30 | 61.30 | 30 | 600 | 4000 | 3.0 | 5000 | 4700 |
| MS-3 | 61.30 | 66.40 | 30 | 400 | 1000 | 2.0 | 1000 | 3400 |
| MS-3 | 66.40 | 71.40 | 30 | 300 | 700 | | 1000 | 3600 |
| MS-3 | 71.40 | 76.40 | 20 | 300 | 600 | | | 3700 |
| MS-3 | 76.40 | 81.40 | 20 | 200 | 400 | | 1000 | 3200 |
| MS-3 | 81.40 | 86.40 | 20 | 400 | 600 | | | 7000 |
| MS-3 | 86.40 | 91.40 | 20 | 700 | 700 | | 1000 | 9900 |
| MS-3 | 91.40 | 96.40 | 20 | 300 | 700 | | 1000 | 4200 |
| MS-3 | 96.40 | 101.40 | 60 | 1500 | 1300 | 2.0 | 2000 | 11700 |
| MS-3 | 101.40 | 106.40 | 40 | 700 | 1100 | | 2000 | 3400 |
| MS-3 | 106.40 | 111.60 | 120 | 2500 | 2800 | 3.0 | 4000 | 3000 |
| MS-3 | 111.60 | 112.60 | 570 | 6800 | 15800 | 7.0 | 12000 | 5500 |
| MS-3 | 112.60 | 113.60 | 160 | 5800 | 6900 | 6.0 | 7000 | 3500 |
| MS-3 | 113.60 | 114.60 | 130 | 2600 | 6400 | 5.0 | 8000 | 3300 |
| MS-3 | 114.60 | 115.60 | 90 | 3600 | 2400 | 3.0 | 4000 | 11200 |
| MS-3 | 115.60 | 116.60 | 60 | 3500 | 2200 | 4.0 | 3000 | 4700 |
| MS-3 | 116.60 | 118.60 | 150 | 5500 | 4800 | 4.0 | 5000 | 6400 |
| MS-3 | 118.60 | 120.60 | 60 | 500 | 500 | | 2000 | 7200 |
| MS-3 | 120.60 | 122.60 | 30 | 600 | 1000 | | 3000 | 5800 |
| MS-3 | 122.60 | 124.60 | 90 | 1000 | 3100 | 3.0 | 5000 | 2500 |
| MS-3 | 124.60 | 126.60 | 140 | 2400 | 5600 | 4.0 | 6000 | 2200 |
| MS-3 | 126.60 | 128.60 | 210 | 3500 | 7000 | 8.0 | 1000 | 2400 |
| MS-3 | 128.60 | 130.00 | 160 | 1400 | 1900 | 5.0 | 7000 | 2900 |
| MS-3 | 130.00 | 132.00 | 920 | 1800 | 2500 | 6.0 | 13000 | 2300 |
| MS-3 | 132.00 | 134.00 | 70 | 400 | 200 | 2.0 | 6000 | 1700 |
| MS-3 | 134.00 | 136.00 | 110 | 4600 | 8500 | 4.0 | 14000 | 2400 |

CHECK SAMPLES :

| Cu | PB | Zn | Ag | Au | As | Ba |
|---|---|---|---|---|---|---|
| 20 | 405 | 850 | 0.5 | 0.012 | <2 | 820 |
| 55 | 1600 | 1500 | 1.5 | ND | <2 | 1450 |
| 30 | 610 | 1150 | 1.5 | 0.087 | <2 | 1400 |
| 120 | 2700 | 3150 | 2.5 | 0.058 | 2 | 1400 |
| 420 | 6500 | 12500 | 12 | 0.109 | <2 | 350 |
| 135 | 6400 | 6800 | 10 | 0.032 | 2 | 430 |
| 120 | 2750 | 6450 | 5.5 | 0.060 | <2 | 460 |
| 70 | 3450 | 2450 | 2.0 | 0.028 | <2 | 380 |
| 60 | 3250 | 2500 | 2.5 | 0.019 | 9 | 370 |
| 150 | 6300 | 4950 | 5 | 0.108 | <2 | 540 |
| 40 | 420 | 465 | <0.5 | ND | 5 | 1150 |
| 30 | 550 | 1150 | 0.5 | ND | 8 | 1200 |
| 70 | 1150 | 3050 | 2.5 | 0.070 | <2 | 380 |

510443

QUEENSTOWN BASE METALS
Assay Data for MS-1

| Hole Name | Sample From | Sample To | Copper ppm | Lead ppm | Zinc ppm | Silver ppm | Sulphur ppm | Manganese ppm | Gold ppm |
|---|---|---|---|---|---|---|---|---|---|
| MS-1 | 4.00 | 7.20 | <100 | 100 | 800 | <2.0 | <1000 | 3400 | |
| MS-1 | 7.20 | 13.70 | <100 | 300 | 600 | <2.0 | <1000 | 2400 | |
| MS-1 | 13.70 | 19.40 | <100 | 300 | 1100 | <2.0 | 1000 | 4500 | |
| MS-1 | 19.40 | 25.00 | <100 | 800 | 2500 | <2.0 | 2000 | 3600 | |
| MS-1 | 25.00 | 30.00 | <100 | 1200 | 3700 | <2.0 | 2000 | 3200 | |
| MS-1 | 30.00 | 32.00 | <100 | 1700 | 2900 | 1.0 | 3000 | 1800 | |
| MS-1 | 32.00 | 34.00 | <100 | 1500 | 5000 | 1.0 | 3000 | 2400 | |
| MS-1 | 34.00 | 36.00 | <100 | 1200 | 3200 | 1.0 | 3000 | 2800 | |
| MS-1 | 36.00 | 38.00 | <100 | 1000 | 4000 | 1.0 | 3000 | 1800 | |
| MS-1 | 38.00 | 40.00 | <100 | 700 | 15000 | 1.0 | 10000 | 2900 | |
| MS-1 | 40.00 | 42.00 | <100 | 400 | 3000 | 1.0 | 4000 | 1300 | |
| MS-1 | 42.00 | 44.00 | 100 | 1800 | 3200 | 1.0 | 4000 | 2700 | |
| MS-1 | 44.00 | 46.00 | <100 | 1300 | 1000 | 1.0 | 4000 | 2800 | |
| MS-1 | 46.00 | 48.00 | <100 | 300 | 400 | 1.0 | 4000 | 1600 | |
| MS-1 | 48.00 | 50.00 | <100 | 1100 | 600 | 1.0 | 5000 | 1600 | |
| MS-1 | 50.00 | 52.00 | <100 | 2200 | 1700 | 1.0 | 4000 | 8600 | |
| MS-1 | 52.00 | 54.00 | 100 | 4700 | 1900 | 2.0 | 4000 | 11800 | |
| MS-1 | 54.00 | 56.00 | 200 | 15000 | 2400 | 4.0 | 6000 | 4700 | |
| MS-1 | 56.00 | 58.00 | <100 | 1000 | 800 | .8 | 6000 | 2300 | |
| MS-1 | 58.00 | 60.00 | <100 | 2000 | 2200 | 2.0 | 4000 | 1600 | |
| MS-1 | 60.00 | 61.00 | <100 | 2800 | 8500 | 2.0 | 6000 | 1600 | |
| MS-1 | 61.00 | 62.00 | <100 | 3000 | 8800 | 3.0 | 6000 | 600 | |
| MS-1 | 62.00 | 63.00 | 100 | 12800 | 17000 | 7.0 | 12000 | 2700 | .4 |
| MS-1 | 63.00 | 64.00 | 100 | 6200 | 15800 | 4.0 | 100000 | 1500 | .4 |
| MS-1 | 64.00 | 65.00 | 200 | 12500 | 16500 | 7.0 | 120000 | 2300 | .3 |
| MS-1 | 65.00 | 66.00 | <100 | 20000 | 13700 | 9.0 | 110000 | 4800 | .3 |
| MS-1 | 66.00 | 67.00 | 200 | 10200 | 24700 | 5.0 | 16000 | 2600 | .3 |
| MS-1 | 67.00 | 68.00 | 200 | 7400 | 24200 | 5.0 | 14000 | 2600 | .4 |
| MS-1 | 68.00 | 69.00 | <100 | 5500 | 3500 | 2.0 | 3000 | 4700 | |
| MS-1 | 69.00 | 70.00 | <100 | 800 | 1100 | .8 | 2000 | 3200 | |
| MS-1 | 70.00 | 72.00 | <100 | 1500 | 2300 | 1.0 | 4000 | 3300 | |
| MS-1 | 72.00 | 74.00 | <100 | 700 | 1100 | .8 | 3000 | 3800 | |
| MS-1 | 74.00 | 76.00 | <100 | 500 | 800 | .8 | 2000 | 2200 | |
| MS-1 | 76.00 | 78.00 | <100 | 400 | 1000 | .8 | 3000 | 2200 | |
| MS-1 | 78.00 | 80.00 | <100 | 300 | 500 | .8 | 6000 | 2200 | |
| MS-1 | 80.00 | 85.00 | <100 | 200 | 300 | <2.0 | 1000 | 3400 | |
| MS-1 | 85.00 | 90.00 | <100 | 200 | 300 | <2.0 | 2000 | 4000 | |
| MS-1 | 90.00 | 96.00 | <100 | 200 | 300 | <2.0 | 5000 | 4900 | |
| MS-1 | 96.00 | 97.10 | <100 | 100 | 100 | <2.0 | 1000 | 2400 | |
| MS-1 | 97.10 | 98.50 | <100 | 700 | 1600 | <2.0 | 5000 | 4200 | |
| MS-1 | 98.50 | 104.00 | <100 | 400 | 900 | <2.0 | 3000 | 5000 | |
| MS-1 | 104.00 | 110.00 | <100 | 200 | 400 | <2.0 | 2000 | 4000 | |
| MS-1 | 110.00 | 111.00 | 100 | 1300 | 1700 | .8 | 1600 | 16200 | |
| MS-1 | 111.00 | 112.00 | 1400 | 30000 | 79000 | 21.0 | 51000 | 5100 | .2 |
| MS-1 | 112.00 | 113.00 | 1400 | 23000 | 22000 | 23.0 | 27000 | 9700 | .2 |
| MS-1 | 113.00 | 114.00 | <100 | 700 | 1900 | .8 | 1600 | 5600 | |
| MS-1 | 114.00 | 115.00 | <100 | 900 | 500 | .8 | 1600 | 7300 | |
| MS-1 | 115.00 | 116.00 | <100 | 800 | 1700 | 2.0 | 1600 | 10500 | |
| MS-1 | 116.00 | 117.00 | <100 | 200 | 500 | 2.0 | 1600 | 8800 | |
| MS-1 | 117.00 | 118.00 | <100 | 600 | 700 | 2.0 | 1600 | 6400 | |
| MS-1 | 118.00 | 119.00 | <100 | 300 | 400 | 1.0 | 1600 | 4100 | |

CHECK SAMPLES:

| Cu | Pb | Zn | Ag | Au | As | Ba |
|---|---|---|---|---|---|---|
| 65 | 2900 | 7900 | 3 | .087 | <2 | 360 |
| 35 | 3600 | 8600 | 5 | .342 | <2 | 400 |
| 115 | 14100 | 15700 | 11 | .376 | <2 | 320 |
| 125 | 7700 | 15300 | 6 | .341 | <2 | 320 |
| 130 | 11300 | 12900 | 8 | .218 | <2 | 620 |
| 100 | 18800 | 12700 | 12 | .282 | <2 | 290 |
| 200 | 11400 | 23100 | 8 | .294 | <2 | 320 |
| 145 | 7900 | 21100 | 4 | .312 | <2 | 430 |
| 60 | 6900 | 4750 | 5 | .181 | <2 | 630 |
| 35 | 920 | 1250 | 1 | .043 | 5 | 990 |

430

510444

QUEENSTOWN BASE METALS
Assay Data for MS-1

CHECK SAMPLES :

| Hole Name | Sample From | Sample To | Copper ppm | Lead ppm | Zinc ppm | Silver ppm | Sulphur ppm | Manganese ppm | Gold ppm | Cu | Pb | Zn | Ag | Au | As | Ba |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MS-1 | 119.00 | 120.00 | <100 | 500 | 700 | .8 | 1600 | 8200 | | | | | | | | |
| MS-1 | 120.00 | 130.00 | <100 | 400 | 400 | <2.0 | 1000 | 4500 | | | | | | | | |
| MS-1 | 130.00 | 140.00 | <100 | <100 | 200 | <2.0 | <1000 | 2000 | | | | | | | | |
| MS-1 | 140.00 | 160.00 | <100 | <100 | 100 | <2.0 | <1000 | 2100 | | | | | | | | |
| MS-1 | 160.00 | 170.00 | <100 | 200 | 400 | <2.0 | <1000 | 1900 | | | | | | | | |
| MS-1 | 170.00 | 180.00 | <100 | 300 | 700 | <2.0 | 1000 | 2400 | | | | | | | | |
| MS-1 | 180.00 | 190.00 | <100 | 200 | 700 | <2.0 | 1000 | 1700 | | | | | | | | |
| MS-1 | 190.00 | 196.70 | <100 | 500 | 1100 | <2.0 | 3000 | 2500 | | | | | | | | |
| MS-1 | 196.70 | 200.00 | <100 | <100 | 200 | <2.0 | 6000 | 2100 | | | | | | | | |
| MS-1 | 200.00 | 205.00 | <100 | 1200 | 2300 | 2.0 | 15000 | 2000 | | 80 | 830 | 2150 | 2 | .036 | 180 | 960 |
| MS-1 | 205.00 | 210.00 | <100 | 1200 | 1100 | 4.0 | 5000 | 1300 | <1.0 | 55 | 1450 | 1250 | 1.5 | .026 | 160 | 870 |
| MS-1 | 210.00 | 215.00 | <100 | 1400 | 2600 | 3.0 | 6000 | 1800 | | 55 | 1700 | 3050 | 3 | <.008 | 90 | 1200 |
| MS-1 | 215.00 | 220.00 | <100 | 600 | 700 | .8 | 1600 | 900 | | 30 | 480 | 475 | 1 | " | 10 | 1300 |
| MS-1 | 220.00 | 225.00 | <100 | 300 | 600 | .8 | 6000 | 1300 | | 30 | 230 | 560 | 0.5 | " | 25 | 770 |
| MS-1 | 225.00 | 230.00 | <100 | 400 | 700 | .8 | 1600 | 1100 | | 30 | 325 | 590 | 0.5 | " | 7 | 1360 |
| MS-1 | 230.00 | 235.00 | <100 | 600 | 1400 | .8 | 1600 | 1100 | | | | | | | | |
| MS-1 | 235.00 | 240.00 | <100 | 500 | 2300 | 1.0 | 8000 | 2700 | | | | | | | | |
| MS-1 | 240.00 | 243.10 | <100 | 100 | 100 | <2.0 | 1000 | 2500 | | | | | | | | |
| MS-1 | 243.10 | 245.00 | <100 | 1100 | 1300 | 2.0 | 20000 | 3300 | | | | | | | | |
| MS-1 | 245.00 | 245.50 | <100 | 1900 | 2200 | 1.0 | 3000 | 2400 | | | | | | | | |
| MS-1 | 245.50 | 248.90 | <100 | 400 | 800 | <2.0 | 1000 | 1700 | | | | | | | | |
| MS-1 | 248.90 | 250.00 | <100 | 300 | 700 | <2.0 | 9000 | 2000 | | | | | | | | |
| MS-1 | 250.00 | 255.50 | <100 | 200 | 400 | .8 | 10000 | 1100 | | | | | | | | |
| MS-1 | 255.50 | 260.00 | <100 | 200 | 400 | .8 | 9000 | 1100 | | | | | | | | |
| MS-1 | 260.00 | 265.00 | <100 | 400 | 500 | 1.0 | 7000 | 1200 | | | | | | | | |
| MS-1 | 265.00 | 270.00 | <100 | 400 | 700 | 1.0 | 140000 | 1600 | | | | | | | | |
| MS-1 | 270.00 | 271.40 | <100 | 300 | 3100 | <2.0 | 3000 | 1600 | | | | | | | | |
| MS-1 | 271.40 | 280.00 | <100 | 200 | 200 | <2.0 | <1000 | 1100 | | | | | | | | |
| MS-1 | 280.00 | 290.00 | <100 | 100 | <100 | <2.0 | <1000 | 800 | | | | | | | | |
| MS-1 | 290.00 | 300.00 | <100 | <100 | <100 | <2.0 | <1000 | 1900 | | | | | | | | |
| MS-1 | 300.00 | 310.00 | <100 | <100 | <100 | <2.0 | <1000 | 900 | | | | | | | | |
| MS-1 | 310.00 | 320.00 | <100 | <100 | 100 | <2.0 | <1000 | 1000 | | | | | | | | |
| MS-1 | 320.00 | 329.10 | <100 | 300 | 200 | <2.0 | <1000 | 1100 | | | | | | | | |

433

510445

434 510446

CVI CORE

# 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. 14.4.08.06853

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

BHP Minerals
P.O. Box 503
Queenstown
Tasmania 7467

| ORDER No. | PROJECT |
|---|---|
| 005613 | B57 |

| DATE RECEIVED | RESULTS REQUIRED |
|---|---|
| 13/02/90 | ASAP |

| No. OF PAGES OF RESULTS | DATE REPORTED | No. OF COPIES | TOTAL No. OF SAMPLES |
|---|---|---|---|
| 2 | 26/02/90 | 1 | 30 |

| STATE OF SAMPLES | SAMPLE NUMBERS | DRY | CRUSH | SPLIT | PULVERISE | SIEVE | OTHER SEE REMARKS | NONE | REFER TO ANALYSIS SECTION | PREPARATION | METHOD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CDC,3/32 | RO | Prep: 006,010,011,012,013,016 | | | | | | Cu,Pb,Zn,Ag/103 | | |
| | CDC,3/32 | RO | | | | | | | Au,AuChk/309 | | |
| | CDC,3/32 | RO | | | | | | | Ba,As,Sn/401 | | |

RESULTS TO

Andy Wilde
BHP Minerals
P.O. Box 503
Queenstown
Tasmania 7467

RESULTS TO

Andy Wilde
BHP Minerals
P.O. Box 619
Hawthorn
Victoria 3122

REMARKS

| 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 ______

## C54 - SUMMARY LOG

### 0 - 72m GLACIAL SEDIMENTS

From 0 - 10m recovery was poor, and consisted of fragments of Owen Conglomerate boulders up to 130mm in largest dimension. From 10 - 57m recovery was dominated by brownish yellow, friable sandstone and light-grey shale similar to that seen in CV1. From 57 - 72m the material recovered consisted of Owen Conglomerate. Thus, there are at least two major boulder beds in a sequence dominated by shale and sandstone. The contact between these rocks and the underlying sediments is sharp, and inclined at approximately 45$^{\circ}$ to the core axis. Angular fragments of the underlying limestone are contained within the basal glacial clays.

### 72 - 327m GORDON LIMESTONE

From 72 - 260m this rock is a dark-coloured (black to grey) fine-grained calcitic and argillaceous rock. Discrete layers of coarser material a few centimetres thick, often composed of broken-up shell fragments can be seen. Fossil fragments consist of brachiopod valves (disarticulated), bryozoa (rare) and coral (rare). There is often some irregularity in the bedding, probably the result of bioturbation and in some instances nodule-like calcite-filled ovoids to 2cm, which may represent burrows. Graphitic stylolites are ubiquitous. Pyrite is sometimes present, never more than 1% by volume, and typically replaces shell fragments or less commonly occurs as thin seams (1 - 2mm) parallel to bedding. Macrofossil fragments are virtually absent beneath 260m.

### 327 - 402.3m UNASSIGNED CLAY UNIT (?GLACIAL)

There is an increasing volume of dark to light grey unconsolidated clay from 327m as discrete zones from 1 - 6m in thickness. Two zones of total core loss from 370 - 373.3 and 387 - 391.6 are probably such clay zones in which the clay was washed out, rather than "limestone caverns". Much of the interval 350 - 370m is presumably largely clay, although only a few centimetres of bright orange (iron-rich) clay were recovered. From 390 - 400m the limestone fragments show intense bleaching and orange colouration, due to the oxidation of organic material and development of pervasive iron oxide/hydroxide. Deformation is also intense, seen as brecciation and high density of calcite veins and irregular orientation of bedding.

### 402.3 - 420m ?OWEN CONGLOMERATE

Fragments of lithologies from the Denison Group (orange, quartz-pebble conglomerate/breccia and coarse sandstone) are present from 402 - 420m suggesting that the contact with the Owen Conglomerate lies somewhere within this zone. However, core recoveries are poor, and it is possible that the Owen Conglomerate fragments represent boulders within a clay/sand matrix, in much the same way as those in the more obviously glacial sediments at the top of the hole.

## W52 - SUMMARY LOG

0 - 81.5m VOLCANICLASTIC SANDSTONE

When fresh this rock is grey in colour and consists of coarse felspathic debris (presumably volcaniclastic) and as much as 45% by volume of flattish clasts of mudstone up to 5cm long. From 0 - 35m the rock is weathered to a featureless pale buff clay, and recovery was poor. Quartz veins and broken fragments of vein quartz are present throughout, and a 10m thick vein was intersected between 62.6 and 72.6. The base of the vein is marked by poor core recovery, which may indicate the presence of pug. An overall coarsening of detrital material in the sandstone was noted with increasing depth, and the basal part (from 76m onwards) could be described as a breccia. Minor disseminated pyrite occurs in this basal breccia.

81.5 - 164.8m MUDSTONE/SANDSTONE

The boundary between this and the previous unit is at $10^{o}$ to the core axis, suggesting that it is near vertical. Mudstone (now slate) forms the dominant lithology but fine calcareous laminations of a few millimetres thickness and discrete coarse sandstone layers become increasingly abundant downhole. Indeed sandstone becomes dominant from approximately 145m. The sandstone is grey-green in colour and forms massive, planar beds a few centimetres thick to several metres thick in the basal part of the unit, where it contains coarse crystals of carbonate after feldspar and mudstone fragments to 5cm long, very similar to the previous unit. Mudstone fragments seldom exceed 5% by volume of the sandstone, however.

Fine calcite veins (< 1mm) are present throughout this unit, and towards the base are present in very high concentrations (up to 36 per metre). Quartz is a rare component but pyrite is common, often exceeding calcite in volume. Pyrite occurs as blebs, seams parallel to bedding, and fracture coatings but rarely exceeds 3% of the rock volume.

164.8 - 224.4m CROWN HILL ANDESITE

Beneath the mudstone/sandstone is a highly altered, green-grey porphyritic rock, with prominent crystals of feldspar and euhedral hornlende to 4mm. Its texture is somewhat irregular, with breccia textures developed in places, interpreted to be a product of tectonic brecciation and hydrothermal alteration. The contact zone with the overlying sediments is indistinct, and marked by silicification, veining and carbonation. Hornblende is not visible below the first few metres and the only phenocryst phase is feldspar. Approximately 1% pyrite is disseminated throughout this interval, and traces of chalcoyrite are visible locally. Minor pyrrhotite was noted in a vein at 194m. Below this hematite is conspicuous in quartz veins. Chlorite mica quartz and calcite form the alteration assemblage. Distinct pink selvages are present adjacent to some of the quartz veins, usually less than 30cm thick.

510449

# ANALABS

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

## ANALYTICAL DATA

| SAMPLE PREFIX | REPORT NUMBER | REPORT DATE | CLIENT ORDER No. | PAGE |
|---|---|---|---|---|
| 435 | 14.4.08.06853 | 26/02/90 | 005613 | 1 OF 2 |

| TUBE No. | SAMPLE No. | Cu | Pb | Zn | Ag | Au | AuChk | Ba | As | Sn |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DC3 CV1 178-179m | 10 | 40 | 110 | <0.5 | <0.008 | - | 85 | 8 | <3 |
| 2 | DC4 179-180 | 10 | 25 | 50 | <0.5 | <0.008 | - | <10 | 9 | <3 |
| 3 | DC5 180-181 | 10 | 35 | 70 | <0.5 | <0.008 | - | <10 | 10 | <3 |
| 4 | DC6 181-182 | 10 | 650 | 480 | <0.5 | <0.008 | - | <10 | 45 | <3 |
| 5 | DC7 182-183 | 10 | 80 | 305 | <0.5 | <0.008 | - | 25 | 30 | <3 |
| 6 | DC8 183-184 | 15 | 470 | 2600 | 1.5 | <0.008 | - | 55 | 160 | <3 |
| [illegible] | DC9 184-185 | 5 | 20 | 120 | <0.5 | 0.013 | - | <10 | 9 | <3 |
| 8 | DC10 185-186 | 5 | 25 | 60 | <0.5 | <0.008 | - | <10 | 6 | <3 |
| 9 | DC11 186-187 | 15 | 95 | 135 | <0.5 | 0.028 | - | 10 | 45 | <3 |
| 10 | DC12 187-188 | 10 | 35 | 90 | <0.5 | 0.040 | - | <10 | 35 | <3 |
| 11 | DC13 } AGGLOM. | 105 | 25 | 120 | <0.5 | 0.012 | - | 1400 | 10 | 5 |
| 12 | DC14 } HILL | 80 | 20 | 80 | <0.5 | 0.013 | - | 1450 | 15 | <3 |
| 13 | DC15 188-189 | 10 | 15 | 80 | <0.5 | <0.008 | - | 20 | 5 | <3 |
| 14 | DC16 189-190 | 10 | 20 | 215 | <0.5 | <0.008 | - | 10 | 10 | <3 |
| 15 | DC17 190-191 | 10 | 25 | 115 | <0.5 | <0.008 | - | 35 | 10 | <3 |
| 16 | DC18 191-192 | 10 | 10 | 35 | <0.5 | <0.008 | - | <10 | 5 | <3 |
| 17 | DC19 192-193 | 5 | 5 | 40 | <0.5 | <0.008 | - | <10 | <2 | 3 |
| 18 | DC20 193-194 | 5 | 15 | 55 | <0.5 | <0.008 | <0.008 | <10 | <2 | <3 |
| 19 | DC21 194-195 | 15 | 160 | 45 | 0.5 | <0.008 | - | <10 | 220 | <3 |
| 20 | DC22 195-196 | 10 | 25 | 40 | 0.5 | <0.008 | - | <10 | 25 | <3 |
| 21 | DC23 196-197 | 10 | 40 | 50 | <0.5 | <0.008 | - | <10 | 15 | <3 |
| 22 | DC24 197-198 | 10 | 85 | 45 | <0.5 | <0.008 | - | <10 | 30 | 3 |
| 23 | DC25 198-199 | 10 | 50 | 2475 | <0.5 | <0.008 | - | <10 | 7 | <3 |
| 24 | DC26 199-200 | 5 | 25 | 70 | <0.5 | <0.008 | - | <10 | 6 | <3 |
| 25 | DC27 200-201 | 10 | 25 | 155 | 1.0 | <0.008 | - | <10 | 10 | <3 |

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

510450

# ANALABS

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

## ANALYTICAL DATA

| SAMPLE PREFIX | REPORT NUMBER | REPORT DATE | CLIENT ORDER No. | PAGE |
|---|---|---|---|---|
| | 14.4.08.06853 | 26/02/90 | 005613 | 2 OF 2 |

| TUBE No. | SAMPLE No. | Cu | Pb | Zn | Ag | Au | AuChk | Ba | As | Sn |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DC28 201-202 | 10 | 20 | 210 | <0.5 | <0.008 | - | 70 | 9 | <3 |
| 2 | DC29 202-203 | 10 | 35 | 90 | <0.5 | <0.008 | - | <10 | 25 | <3 |
| 3 | DC30 203-204 | 10 | 25 | 50 | <0.5 | 0.013 | - | <10 | 6 | <3 |
| 4 | DC31 204-205 | 15 | 25 | 55 | <0.5 | <0.008 | - | <10 | 35 | <3 |
| 5 | DC32 205-206 | 10 | 20 | 60 | <0.5 | 0.010 | - | <10 | 5 | <3 |
| 6 | | | | | | | | | | |
| 7 | 178 - 188m ½ CORE OVER 2m INTERVALS | | | | | | | | | |
| 8 | 188 - 206m 10-20cm ¼ CORE EACH METRE. | | | | | | | | | |
| 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 | 3 |
| 24 | UNITS | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| 25 | METHOD | 103 | 103 | 103 | 103 | 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]

510451

SUMMARY LOG - MS-1

0 - 5.5 m RUBBLE
Consisting of loose boulders of varying sizes, relatively fresh, of green volcaniclastic breccia and dark sandstone fragments. Some fragments have a goethite coating.

5.5m - 19.5 m PUMICEOUS BRECCIA?
This rock is strongly weathered to ca. 15 m, and no diagnostic textures are found. The rock is featureless and cream-coloured with a strong foliation picked out by manganese oxide. Towards the base of the interval the colour changes to green and volcaniclastic textures are visible, namely black, flattened pumice to 70 mm in a fine-grained quartz-chlorite matrix.

19.5 - 65.1 m QUARTZ-CHLORITE ROCK
A fine-grained rock, brown-grey to grey-green in colour, sometimes with chloritic blebs to 2 mm and *reticulate (?carbonate) veining. The rock* is locally schistose, corresponding to chlorite-rich intervals. Rate elongate pumiceous fragments, pseudomorphed by chlorite are visible locally. This unit contains traces of disseminated pyrite and galena from 45 m onwards. Macrovein density is very low.

65.1 - 96.0 m LITHIC BRECCIA
There is apparently a gradational contact with the previous unit. This rock consists of between 35 and 50% fragments of feldspathic crystal debris and coarser pink marble and "chert". Rare pumice is seen. Maximum lithic fragment size is 14 cm, but most fragments are 5 mm or less. This unit has a sharp basal contact at 20° to the core axis.

96.0 - 119.3 m QUARTZ-CHLORITE ROCK
Similar to the quartz-chlorite rock above.

119.3 - 194.6 m LITHIC (PUMICEOUS) BRECCIA
This rock is similar in appearance to the previous breccia, viz it consists of abundant (5 - 50% volume) fragments of indistinct crystal material, probably feldspar, to 5 mm in a fine-grained pink to green matrix with ca 1 - 5% coarser lithic clasts of pink to grey marble and olive-green tubular pumice.

194.6 - 199.5 m TRANSITIONAL FACIES
Finely layered rock of fine creamy ?volcaniclastic debris and slate clasts and slate layers, 4 - 6 mm thick.

199.5 - 270.9 m INTERLAYERED SLATE AND SILTSTONE
Fine silty laminations of the order of 1 mm thick are sometimes visible in the otherwise black slate, *and show that the bedding dips* at between 10 - 40° to the core axis. The siltstone is a massive light grey rock forming a coherent unit within the slate from 213 to 238 m. A possible fault forms its basal contact. Pyrite is common, from 200 to 260 m, but not abundant, and seldom exceeds 1% by volume of the rock. Fine (<1 mm) white calcite veins are ubiquitous reaching up to 14 per metre. Within the siltstone unit are several thin beds (<50 cm) of contrasting colour (browny-grey) and with sub-conchoidal fracture which may represent ash-fall deposits.

Below the siltstone, the slate is noticeably darker (more graphitic? not reflected in the downhole resistivity logs) and contains a possible dyke (with 50 cm chilled margin) from 245.4 to 248.8 m. Despite the graphite there is little visible pyrite in this interval. Bedding is at an angle of 30 - 35° to the core axis, as is the foliation except 263 - 267 m where the foliation is virtually parallel to the core axis. Again calcite veinlets are ubiquitous. A small fault is defined by puggy black clay over 10 cm at 266.9 m.

270.9 - 329.1 m SEDGWICK PORPHYRY
There is a highly irregular contact between this rock and the overlying slate, and it appears that a dyke of slate cuts the porphyry. This is interpreted as an indication that the porphyry intruded wet sediments, although there is no evidence of chilling. The porphyry is a homogeneous rock, and consists of 15% well rounded quartzes and euhedral pink to white feldspar lathes set in a fine-grained matrix, which varies in colour from grey-green to pinky-red. The latter colour dominates towards the base of the hole and here feldspar is creamy (Ca - plagioclase) rather than pink (K-feldspar). In some instances feldspar forms glomeroporphyritic clusters. Minor sphalerite occurs in veins at the top of this rock together with traces of disseminated pyrite and galena.

SUMMARY LOG - MS-2 510452

0 - 25 m OVERBURDEN OF SEDGWICK PORPHYRY, SLATE & SANDSTONE BOULDERS

25 - 36.6 m DARK-GREY GRAPHITIC SLATE
Massive, dark grey slate locally with two well developed cleavages resulting in the presence of splintery cleavage fragments. Graphite is visible on some cleavage surfaces. The rock is weakly pyritic and fine (<1 mm) cubes can be seen coating graphitic cleavages. There are a few carbonate veinlets near parallel to the core axis.

36.3 - 39.5 m FAULT ZONE
Contains comminuted fragments of slate, quartz-chlorite veins and argillised porphyry.

39.5 - 50.2 SHEARED SEDGWICK PORPHYRY
A similar rock to the Sedgwick porphyry, containing rounded crystals of quartz to 5 mm, and angular feldspar, but is brecciated and veined, foliated and contains apparent slate fragments (possibly xenoliths).

50.2 - 87.3 SLATE WITH MINOR VOLCANICLASTIC SANDSTONE
The slate is similar to above, and in places shows two cleavages and folding of the (main?) cleavage. Towards the base there is an increase in volcaniclastic debris (mainly feldspar and chloritised? feldspar crystals) and also marble clasts (fine-grained and light grey).

87.3 - 123.4 FOLIATED PUMICEOUS BRECCIA
This rock consists of circa 30 - 40% clasts of angular, splintery black to brown fragments of flattened pumice. Marble fragments are present from 90 - 109 m. Matrix varies from green grey (chloritic) to pink (siliceous & K-feldspar). Locally, discrete layers of 10-20 cm of pink fine-grained "cherty" material grade into the breccia. At the base this rock has a transitional contact with:

123.4 - 173.6 m QUARTZ-CHLORITE ROCK
Pink-grey to dark green, diffusely layered, fine-grained moderately hard rock with no diagnostic texture. Locally intense silica-K-feldspar alteration, particularly 134 - 139 and 146 - 154 m. There are a few minor breccia intervals similar to previous unit. This unit is gradational to the underlying breccia with a gradual increase in the volume of fragments.

169.4 - 208.8 INTERLAYERED PUMICEOUS BRECCIA & QUARTZ-CHLORITE ROCK
Breccia (as in previous examples) has a distinctly bimodal fragment distribution - coarse clasts of marble (in the upper section) and of pumice (in the lower section) to 50 mm and smaller crystal debris of a few mm diameter. Pumice in this rock is flattened, tubular pumice, usually sericitised, with long axes near perpendicular to the core axis, olive-green to buff in colour. Pumice typically comprises 5% of the rock. The two main rock types are interlayered on a scale of a metre or so and have gradational contacts, except in the interval 178 - 182 m where sharp contacts were noted. Veining is uncommon and typically monomineerallic carbonate.

208.8 - 280.0 m PUMICEOUS BRECCIA
Similar to that in previous interval. Quartz chlorite rock is rare to absent. Locally the breccia is dominated by crystal (feldspar) debris (e.g. 234 - 243 m, 269 - 280 m). This interval contains a higher volume of en-echelon tension gashes.

280.0 - 301.0 m QUARTZ-CHLORITE ROCK
Similar to that higher in hole, silica-K-feldspar alteration becomes quite intense from 294 - 301 m.

E.O.H.

WS-4 SUMMARY LOG

0 - 15.2m OVERBURDEN (?GLACIAL DEPOSIT)

Fragments of Owen Conglomerate Boulders and minor clay.

15.2 - 33.1m CLAY

Orange-yellow, friable clay with occasional remnants of feldspar crystals (ca 15% volume). This is probably derived from the underlying mafic rocks, and is similar to weathered andesite observed near Crown Hill to the west.

33.1 - 99.4m PORPHYRITIC ANDESITE

This rock is medium Brunswick green in colour and contains between 10 and 20% by volume of feldspar and lesser euthedral hornblende crystals. It is thus very similar to the Crown Hill andesite body. In its upper 14m the rock is still moderately weathered and features abundant voids, probably after calcite veins (common deeper down). Hornblende is not conspicuous in the upper part. A curious breccia or pseudo breccia texture is present from 47 to 86m, where the andesite contains numerous pink-coloured sub-rounded porphyritic ?andesite fragments up to 32cm long (no more than 30% volume). These fragments often have sharp margins, feldspar and amphibole phenocrysts, and resemble the unit which prevails from 210.6 to 229.8m. It is thought that this pseudo-breccia texture is actually due to alteration, as the phenocryst mineralogy in the fragments is the same as that in the host. Although hornblende crystals are preserved, pervasive chlorite and white mica are common, and the entire unit is extensively veined by calcite (both as macro and micro-veins). Minor pink feldspar and purplish hematite are present locally, but sulphides are not common. The unit is foliated and the foliation is typically inclined at 45 to the core axis.

99.4 - 190.6 CHLORITE-MICA SCHIST

Perhaps a more altered equivalent of the above, the contact is apparently transitional. Feldspar crystals are sometimes seen, although hornblende is absent. From 115.5 - 139m there is an abundance of puggy clay-filled fractures, with broken core and minor core loss, attributed to a fault. The unit becomes more haematitic towards its base, both disseminated (up to 1% by volume) and in veins, and coarse barytes was noted locally.

190.6 - 193.8 FAULT ZONE

This fault zone is marked by core loss, fragments of white to pink quartz vein or silicified rock and puggy clay.

193.8 - 210.6 SEDIMENTARY (?EPICLASTIC) SEQUENCE

Sequence of graphitic slate and volcaniclastic sandstone. Tongue-like contacts between the volcaniclastic (feldspathic) sandstone and slate may represent rapid deposition and loading into water-saturated sediment.

210.6 - 229.8m HAEMATITIC ANDESITE

This unit is similar to the andesite up the hole, but is maroon in colour due to pervasive hematite, which also stains feldspars pink. Calcite veining is locally intense and results in a breccia texture (perhaps the "agglomerate" of Agglomerate Hill).

BHP EXPLORATION [redacted] DRILL HEADER SHEET [redacted] SHEET 1 OF 3 [redacted] HOLE No. [redacted] C01. [redacted]

CV 1

## PROJECT

| | |
|---|---|
| PROJECT | QUEENSTOWN B/METAL |
| JOB NUMBER | 857 |
| 1 250,000 SHEET | QUEENSTOWN |
| GRID NAME | COMSTOCK VALLEY |
| LOGGED BY | ANDY WILDE |
| DATE LOGGED | WHILE DRILLING |
| PREVIOUSLY LOGGED REFERENCE | — |
| CODE REFERENCE SHEET NAME | BHP 1989 |
| CODE REFERENCE SHEET DATE | BHP 1989 |

## HOLE INFORMATION

COLLAR COORDINATES (ESTIMATED)

| | |
|---|---|
| EASTING | 384850mE |
| NORTHING | 5345175mN |
| REDUCED LEVEL | 350m |
| REDRILL/WEDGE | / |
| HOLE No. | / |

## HOLE SUMMARY

| | |
|---|---|
| TOTAL DEPTH | 316.0m. |
| DEPTH TO WATER | NOT RECORDED |
| DEPTH TO BASE OF TOTAL OXIDATION (CLAY ZONE) | NO CLAY ZONE |
| DEPTH TO BASE OF PARTIAL OXIDATION (WEATHERED BEDROCK) | ~145m - PUG ZONES IN LIMESTONE |

| | TYPE | FROM | TO |
|---|---|---|---|
| GEOPHYSICAL LOG | SIROTEM | 0 | 316 |
| ENGINEERING LOG | — | — | — |
| PHOTOGRAPHIC LOG | — | — | — |

## DRILLING INFORMATION

| | |
|---|---|
| DRILLING CONTRACTOR | DIAMOND DRILLING TASMANIA |
| RIG TYPE | LONGYEAR 38 |
| DATE COMMENCED | JAN 16 1990 |
| DATE COMPLETED | FEB. 9 1990 |
| MATERIAL LEFT IN HOLE | 0-316m 30mm ID PVC CASING PIPE. |

| METHOD/SIZE | FROM | TO | COMMENTS |
|---|---|---|---|
| HW CASING ADVCR | 0 | 11 | |
| HQ CAS. ADVCR/ W.L. | 11 | 80.5 | DRILLED HQ CORE, THEN REAMED. |
| NQ WL | 80.5 | 134 | |
| BQ WL | 134 | 316 | |

## SURVEY DATA

| DEPTH | AZIMUTH | DIP |
|---|---|---|
| 0m | 192°M | 60 |
| 30 | — * | 60.25 |
| 60 | — * | 60 |
| 90 | 171°M | 60 |
| 142 | 171°M | 58.5 |
| 172 | 169°M | 58 |
| 202 | 168°M | 57.5 |
| 232 | 154°M | 56.5 |
| 262 | 168°M | 56.0 |
| 292 | 170°M | 56.0 |
| 316 | 171°M | 53.0 |

INSIDE CASING

## SUMMARY LOG

| FROM | TO | LITHOLOGY etc. |
|---|---|---|
| 0 | 117.5m | GLACIAL SHALEY CLAY WITH BOULDER BEDS |
| 117.5 | 316.0m | GORDON LIMESTONE |

## ANALYSES

| SAMPLE NUMBERS FROM | TO | LABORATORY | DATE DESPATCHED | ELEMENTS | METHOD |
|---|---|---|---|---|---|
| DC 3 | DC 12 | ANALABS | 11.2.90 | Cu, Pb, Zn, Ag | AAS |
| DC 15 | DC 32 | | | Ba, As | XRF |
| | | | | Au | F/A |

SAMPLE INTERVAL / SAMPLING METHOD: ½ CORE AT 1m INTERVALS / 10-20cm LENGTHS AT 1m INTERVAL

COMMENTS: TO TEST COMBINED UTEM/SIROTEM/TURAM CONDUCTOR AT A DOWNHOLE DEPTH OF APPROXIMATELY 255m.

PROBLEMS ENCOUNTERED DRILLING GLACIALS VIZ. CAVING & EXCESSIVE WEAR OF REAMER SHELLS DUE TO QUARTZITE PEBBLE FRAGMENTS. CEMENT USED TO PREVENT CAVING.

510456

CV-1 SUMMARY LOG

0 - 117.5m GLACIAL SEDIMENTS

This zone is characterised by poor recovery due to the abundance of poorly consolidated clays and sands. Several intervals in which the only material recovered were fragments of Owen Conglomerate (Denison Group) boulders, and rare dolerite, probably represent discrete boulder beds of a few metres thickness. Beneath 72m recovery was better, and a pale green-grey shale is the main rock type, with Owen Conglomerate boulders present between 79.5 - 83.0m and 112.3 - 117.5m. The shale parting is at 75$^{O}$ to the core axis, and bedding is also defined by darker-coloured (?organic-rich) layers. Fine mica is present throughout.

117.5 - 316.0m GORDON LIMESTONE

From 117.5 to approximately 168m the limestone consists of a medium-grey, wispy layered dolomitic arenite. Wispy layering is due to the presence of darker ?organic-rich material. Graphite-filled stylolites are ubuiquitous and are most abundant (over 10 per metre) between 152 and 160m. In the interval 117.5 - 145m there are numerous thin, pug-filled fractures which contribute to poor recovery. The pug is dark, carbonaceous clay similar to that observed at outcrop in the Linda Valley. Some arenaceous intervals are porous and sponge-like due to removal of carbonate cement. Bioturbation is suggested by irregular contacts between sandy and rare muddy layers, and rare occurrence of fossil burrows.

From 196m body fossil fragments are more common, usually in layers to 20cm. From 175m the limestone has a higher argillaceous ("shale") component, which is dark grey to black, reflecting high volumes of carbonaceous material, possibly graphite. These muddy layers are interlayered with paler micritic (calcitic) limestone on a scale of centimetres to metres. As with the proceeding unit, there is evidence of bioturbation.

The interval between 179.0 and 192m is strongly pyritic, reflecting a large increase in the volume of veins. Pyrite constitutes as much as 7% by volume of the rock, usually restricted largely to the veins. Pyrite is the main constituent of the veins, which are up to 30cm thick but carbonate lesser quartz and rare grains of pink sphalerite were also noted. Veins are discordant to bedding, and often enclose fragments of the host-rock which appear more or less in situ (hydraulic breccia). Clearly there has been a significant through put of hydrothermal fluid.

# APPENDIX 12

Drillhole Logs and Drillhole Details

SUMMARY LOG - MS-3

3.2 - 10.4 m OVERBURDEN
Loose fragments of pink to purple quartz feldspar porphyry (Sedgwick Porphyry) and minor dark-green volcaniclastic breccia.

10.4 - 68 m PUMICEOUS BRECCIA
Dominantly volcaniclastic breccia, with minor fine-grained volcaniclastic sandstone interbeds, from 15 to 30 m depth. The breccia consists of 10-30% fragments of angular black material, typically 5 - 20 mm (probably flattened and altered pumice fragments) in a dark grey-green fine-grained matrix. Fragments also include fine-grained pink "cherty" material. The unit is foliated from 50 m - defined by elongation of pumiceous fragments and general alignment of all clasts.

68 - 111.7 m INTERLAYERED PUMICEOUS BRECCIA & QUARTZ-CHLORITE ROCK
The breccia in the previous interval is interlayered with a grey-pink, pre-grained cherty material, which dominates from 91 to 104 m. A diffuse layering is visible in the "cherty" layers. Disseminated sphalerite is present as wisps 3 - 4 mm x 1 mm throughout and the unit is veined by quartz carbonate-chlorite-feldspar±sphalerite, galena and rare chalcopyrite. There is rare disseminated pyrite.

111.7 - 153.0 m QUARTZ-CHLORITE-CARBONATE ROCK
This is a fine-grained quartz-chlorite rock, similar to the chert in the previous interval, generally lacking any diagnostic texture. The unit characteristically has a very fine (<1 mm) reticulate network of carbonate veinlets (possibly siderite or ankerite). A diffuse layering is visible defined by alterating pink (siliceous) and dark-green (chloritic) layers of 10 - 20 cm thick. There is a very low density of macroveins, only minor disseminated galena and sphalerite and also pyrite.

153 - 169.0 m PUMICEOUS BRECCIA
Identical to unit further up hole except that sphalerite mineralisation is lacking. Contact with previous unit is apparently gradational.

*169.0 - 328.0 QUARTZ-CHLORITE-CARBONATE ROCK*
As above. There is very little sulphide, except traces of pyrite at 270 - 300 m (<3% volume). A few examples of quartz-chlorite-galena veins were noted. Veining is more common at the base of this interval.

MS-4 SUMMARY LOG



0 - 9 m OVERBURDEN FRAGMENTS OF COBBLES AND BOULDERS OF PORPHYRY AND SLATE.

9 - 53 m UPPER SLATE & SANDSTONE SEQUENCE
This is a slate dominated sequence, with a discrete sandstone layer from 20 to 28.8 m and an interlayered slate and sandstone from 43.7 to 53.0 m. The slate is typically a dark grey to black rock with fine, reticulate pyrite-calcite veining. Pyrite also forms seams (millimetres thick) parallel to bedding/foliation. The upper sandstone unit is a greeny-coloured rock with crystals of creamy feldspar and 1% mudstone (slate) fragments. Below 40 m there is an increase in centimetre-thick sandstone layers, some of which have scoured erosional bases, suggesting that here at least, the sequence is the right way up. In places some quartzitic gravel-sized fragments are present, but are rare and constitute <1% of the rock. A massive sandstone occurs between 50 and 53 m (transitional to the interlayered sequence) which contains chloritic blebs up to 2 mm.

There is a relatively low vein density throughout thin sequence, but the contact with the underlying breccia is marked by a dramatic increase in veining. These veins are often pyritic and between 24 and 40 m contain chalcopyrite and lesser sphalerite. Calcite is the principal gangue mineral. There is no visible alteration selvage adjacent to any of these veins and overall hydrothermal intensity is apparently low. The coarser units contain traces of pyrite, however, and disseminated calcite is present throughout.

53 - 104.4 m PUMICEOUS BRECCIA
Flattened pumiceous fragments to 45 mm define a strong foliation in this rock. The pumice fragments (fiamme) constitute 15% of the rock volume, and are suspended in a fine-grained medium grey-green (locally pink) matrix . Lithic fragments are present throughout, and are most common from 73 to 99 m. These fragments are sub-rounded, grey or pink calcareous material, and locally comprise 5% by volume of the rock. A fault at 99-101 m is defined by core loss, broken core and the presence of extraneous slate fragments.

Alteration intensity is generally low to moderate. Several thin intervals (<30 cm) are altered to a fine-grained pink "chert-like" rock. Vein density is generally very low, and veins are composed of calcite with traces of pyrite.

104.4-160.8 m LOWER SLATE & SANDSTONE SEQUENCE
This sequence is quite distinct from the upper sequence, and consists of alternating fine and case units 8-15m thick. The sandstone is greeny-grey and fine, but is transitional to a pink, fine grained chert-like rock. The "chert"/slate contact is highly irregular and suggestive of deposition onto wet sediment (viz lobate contacts and balls in slate host). In some instances rounded fragments of "chert" enclosed in slate matrix have a pink rim and green (chloritic) core. At the base of the sequence is a an 8 m thick pumiceous breccia similar to the overlying rock type.

There is a high vein density throughout this sequence, and in contrast to the units further up the hole, quartz is a significant vein mineral. Also chlorite is a common vein mineral throughout this zone, and comprises a few percent of the vein volume. Small volumes of pyrite and sphalerite occur in these veins, and between 148 and 154m a few grains of galena were noted. The veins are typically subperpendicular to the core axis, and often are comb-structured. Coarse, euhedral quartz was overgrown by a white, opaque carbonate. Chlorite veins both minerals.

160.8 - 187.8 SLATE
This is a homogeneous dark grey, graphitic slate, locally displaying bedding, defined by pink-grey material. Pyrite forms thin seams and layers parallel to bedding/foliation but does not exceed 5% by volume of the rock. The core is usually quite broken, which is probably due to the strong foliation rather than fault-related fracturing. Disseminated and/or microvein calcite occurs throughout. No base-metal mineralization was observed.

187-350 m (E.O.H.) SEDGWICK PORPHYRY
The upper contact of the Sedgwick porphyry and the slate is not seen, but judging by the high volume of veins with the porphyry, could be a fault. As elsewhere, the porphyry contains ca. 30% coarse crystals of quartz, feldspar and a mafic mineral (now chloritised). Quartz forms unusual, well rounded crystals up to 5 mm in diameter and is the dominant phenocryst mineral. Second is feldspar, as tabular light pink crystals commonly 3-4 mm in maximum dimension. Chloritised mafic (possibly biotite) forms about 20% of the phenocrysts. The groundmass is fine-grained and varies from pink to grey-green in colour, presumably reflecting the proportions of feldspar and chlorite.

MS-5 SUMMARY LOG

0 - 5 m NO CORE

5 - 31.5 m SEDGWICK PORPHYRY
Hard, medium grey rock with a ca. 20% phenocrysts of grey-white tabular feldspar and lesser rounded quartz in a fine-grained matrix. There are virtually no veins, although a quartz vein at approximately 22 m was observed which had an alteration halo extending for 50 mm. In the halo the rock is "bleached" creamy white and friable, and only quartz phenocrysts are visible of the original mineralogy.

31.5 - 62.3 m SLATE
In the upper parts this is a massive black slate with traces of pyrite on fractures and as seams (1 mm) parallel to bedding. From 41 m there is a distinct lamination imparted by 1 mm - 2 mm thick layers of fine-grained calcite. There are 2 laminations per cm, on average. Again there are virtually no veins and the laminations are consistently at 40°-50° to the core axis. There is a possible fault at 39.5 m.

62.3 - 64.4 m CONTACT FACIES
At the base of the slate there is a sudden increase in the volume of crystal debris, as layers within slate and below as a massive crystal breccia. The crystal material consists of quartz and feldspar similar to that observed in the Sedgwick Porphyry (comprising up to 80% of the rock) with a mud matrix. The matrix is locally dark green, presumably due to chlorite. This rock has a sharp contact with the underlying porphyry, although the contact is irregular and lobate.

64.4 - 103.5 m SEDGWICK PORPHYRY
Generally as above. There is no evidence of chilling at the upper or lower contacts.

103.5 - 105.7 m CONTACT FACIES
This rock is a chaotic mixture of porphyry and slate with a crystal-rich unit at the base similar to that at 62.3 m. Slate forms finger-like and rounded projections into the porphyry which may represent interaction of hot porphyry and water-saturated mudstone. The contact between this unit and the underlying slate is sharp and sub-planar and at 20° to the core axis.

105.7 - 139.0 MASSIVE SLATE
A dark grey/black rock with diffuse, thin (<1 m) calcitic layers. Laminations are not as well developed as in the previous slate. Although veins are uncommon there are several quartz-carbonate veins up to 25 mm thick, which contain minor coarse crystals of brick-red sphalerite (to 5 mm) and chalcopyrite (to 15 mm). Bedding angle varies from 10 to 85° to the core axis.

G14 SUMMARY LOG

LOGGED FROM 200M

196.6-333.5 CLAY WITH MUDSTONE AND QUARTZITE FRAGMENTS

This interval is dominated by an orange-brown clay, which is structureless and friable. Core recoveries are typically low, much clay presumeabley having been washed out. Large intervals appear to have been recovered as sludge (e.g 232-239m). From 250m onwards a significant increase in the volume of suspended fragments was noted, ranging in size from a few millimeters to 7cm, and are either angular pale grey sucrooic quartz or subrounded soft, green-grey mudstone (in the lower part). In some parts the quartzite fragments are little dislocated (as in a hydraulic breccia). It is possible that these were coherent quartzite beds (1 m or so thick) disrupted during drilling. Rare quartz-vein fragments were noted, and it is perhaps significant that in the interval where such fragments noted, iron oxide discoloration was also seen (282.8-301.7m).

333.5-336.4 CONTACT ZONE

Mixture of pale quartzite, quartz vein material, clay similar to above and rare hematitic conglomerate. Quartzite dominates from 333.5-334.8, and clay below. This zone may correlate with the structure observed in Mc Dowell's open pit.

336.4-396.6 HEMATITIC, QUARTZITE-PEBBLE CONGLOMERATE.

This rock is pink to purple, reflecting the volume of interstitial specular-hematite with sub-rounded to rounded cobbles of quartzite up to 10cm in largest dimension, constituting between 25 and 65 vol% of the rock. Cobble volume decreases downhole. The conglomerate is often friable, and can be completely disaggregated. One example of across-fibre quartz and specular hematite vein (1cm thick) was noted, and several patches of hematite, reaching 1cm in diameter.

396.6-406m VARIEGATED MUDSTONE.

The conglomerate, which is presumably part of the Denison Group is underlain by a purple to pale grey mudstone, which is highly fragmented and soft.

SS1 SUMMARY LOG

0 - 22 m NO CORE
Except for a few fragments of *Owen Conglomerate*. This zone may correlate with the substantial fault zone intersected in SS2.

22 - 28.5 m MYLONITIC FELDSPATHIC SCHIST
This is a pale-grey rock consisting of ca. 30% ovoid feldspar porphyroclasts which are up to 4 mm in diameter in a fine-grained mylonitic matrix. Recovery was poor through this interval, presumably due to the clay-rich nature of the rock, which is quite friable in hand specimen.

28.5 - 80.8 m SILTSTONE-SANDSTONE
This possibly represents a downwards coarsening sequence, correlative of that observed in SS2 between 121.4 and 150.1 m. Pale grey siltstone is laminated with darker grey mudstone (slate) at the top of the interval, while massive siltstone dominates between 42 and 64 m. At 64 m the siltstone grades into a medium-grained sandstone. The sandstone contains mainly feldspathic debris, but particularly towards its base has up to 5% sub-rounded mudstone clasts which reach a maximum of 10 mm diameter. It also has some darker, angular chloritic fragments (?fragments of pumice) up to 1 mm long. This interval is often broken but core recoveries are good. Macroveins are virtually absent, while pyrite is very rare.

80.8 - 113 m INTERLAYERED MUDSTONE & SANDSTONE SEQUENCE
This sequence has a sharp contact with the overlying siltstone-sandstone sequence, perpendicular to the core axis suggesting that it dips approximately 50°W. Mudstone (slate) dominates, but there are several intervals of coarser volcaniclastic debris, ranging up to 4 mm forming layers of a few millimetres to several metres. Volcaniclastic debris is mainly of feldspathic crystal material. Contacts between sandstone and mudstone are sharp and perpendicular to the core axis. Macroveins are rare.

113 - 151.5 m (E.O.H.) POLYMICT CONGLOMERATE
At the contact with the previous unit this is a matrix-supported quartzite cobble conglomerate which is medium grey in colour. At depth it becomes a hematitic and chloritic polymict clast-supported cobble conglomerate. Here, in addition to quartzite fragments, subrounded to sub-angular fragments of jasper and red (hematitic) mudstone were observed. This suggests that this is a conglomerate until within the Tyndall Group (or possibly Jukes Conglomerate) rather than the Owen Conglomerate.

Silicification is locally intense, so that original textures are obscured (115.6 - 126.7 m and 151.0 to 151.5 m). This unit has the highest vein density of any unit in this hole, with up to 8 veins per metre at the contact. Veins carry quartz and minor chlorite and pyrite, and voids possibly after carbonate. From 141 m the rock is purple due to pervasive specular hematite, and also has traces of pyrite and chlorite. It is thus the most strongly altered rock in the hole (except perhaps for the schist at the top of the hole).

SS2 SUMMARY LOG

0 - 6 m NO CORE

6.0 - 65.2 m MYLONITIC FELDSPATHIC SCHIST.
Strongly foliated rock containing between 10 to 15% rounded crystals of creamy, subrounded to ovoid feldspar. These are frequently flattened and strung out parallel to the prominent mylonitic fabric, which is oriented between 50° and 70° to the core axis (i.e. sub-vertical). The rock has a purple colour at depth due to pervasive hematite (replaced by geothite near surface). The origins of this rock are unclear, it may represent a highly sheared and metasomatised feldspar - porphyritic lava. Macroveins are virtually absent, except for hematite veins between 25.4 and 33.3 m.

Within this unit two major zones of core loss and "fault gouge" (i.e. creamy coloured friable clay) at 20.7 - 25.4 and 60.9 - 63.1 m, which may represent faults.

65.2 - 70.4 FAULT ZONE
This zone is defined by the presence of creamy clay (similar to the gouge observed within the previous unit) and complete core loss (between 67.9 and 70.4 m). It separates the previous unit from a quite different rock beneath.

70.4 - 91.8 VOLCANICLASTIC, FRAGMENTAL SCHIST
Like the previous unit, this rock is characterised by a prominent foliation, inclined at between 45 and 60° to the core axis. It is white to pale green in colour, and is generally lacking in hematite (possibly indicating a difference in bulk-rock iron content). Fragments of rock (now sericitised) up to 45 mm form 45% of this rock, and feldspar crystals also form a significant portion. Some fragments appear to be pumiceous, but most are too altered for identification. A fault zone occurs between 80.9 and 85.5. Schist within this sequence often demonstrates unusually high conductivity and magnetic susceptibility. Veins are virtually non-existent.

91.8 - 115.0 FAULT ZONE
This is clearly a major structural discontinuity separating schist from a sedimentary sequence below. Again it is defined by lost core and the presence of friable clay, with very little recovery of solid rock fragments.

115.0 - 182.6 INTERLAYERED MUDSTONE/SANDSTONE SEQUENCE
From 121.4 to 150.1 m is believed to be a fining upwards unit, with basal coarse sandstone containing mudstone clasts, grading through an interlaminated silt, sand and mudstone sequence (interbeds on a few mm scale) to massive mudstone (slate) in the upper part. There are possibly three of such cycles. Locally, obviously volcaniclastic (feldspathic) detritus is present. Thus this sequence is interpreted as an epiclastic unit. The core is often broken, but this is probably due to splitting and the prominent foliation rather than faulting. Quartz-chlorite veins are sometimes present, containing trace pyrite, and the mudstone layers often contain pyrite nodules up to 1 cm in diameter. These have quartz rims, reminiscent of the Que River Shale.

182.6 - 197.5 HEMATITIC QUARTZITE-COBBLE CONGLOMERATE (Denison Group)
The contact with the previous unit is sharp, perpendicular to the core axis, and appears unfaulted. Minor quartz-chlorite veins are present.

197.5 - 206.7 (E.O.H.) GREY PINK QUARIZITE
Pink colouration is due to finely disseminated hematite. Chlorite is present along fractures.