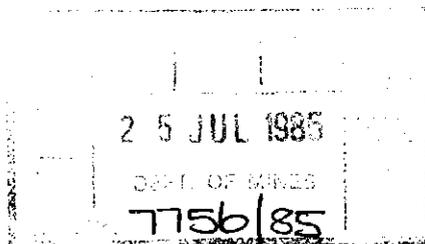


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BILLITON AUSTRALIA, THE METALS DIVISION OF
THE SHELL COMPANY OF AUSTRALIA LIMITED

EL 39/83 - CATTLEY RANGE

Progress Report on Exploration for the Period
23/8/84 - 22/8/85

OPEN FILE

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N. HUNGERFORD

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DISTRIBUTION : 1. Department of Mines
2. Billiton, Melbourne

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SUMMARY

Geological mapping, gridding and TEM and ground magnetic surveys were carried out in the northern part of the licence. A low order TEM anomaly was followed up with one line of IP. Results were inconclusive, with the IP detecting a poor conductor some 150 m east of that indicated by the TEM. A low order Pb soil anomaly occurs further east again.

It is proposed to extend the soil sampling programme to incorporate the IP and TEM anomalies. In addition the TEM survey will be extended to the south west.

1. INTRODUCTION

Exploration licence 39/83, covering 44 km², was granted to the Shell Company of Australia Ltd on 22 August 1983 (Fig. 1). In the west and north west, the EL is underlain by Cambrian volcanics. These lithologies have potential for the occurrence of massive volcanogenic base metal mineralisation.

2. PREVIOUS EXPLORATION

An account of earlier work is contained in report 08.2489. In summary, the area was held as EL 10/74 by Geopeko who conducted DIGHEM II and stream sediment surveys over the north western portion of the licence. No follow up work was reported.

In 1983-84, Shell completed two small grids; one over a low order DIGHEM anomaly in the north, and a second over the possible source area to a lead, stream sediment anomaly in the central north of the licence.

3. EXPLORATION COMPLETED 1984-85

Following a review of regional data, it was concluded that repetitions of the roughly NNE-SSW trending anticline, which houses the Hellyer deposit, may result in the Hellyer stratigraphy occurring at relatively shallow depth in the Cattley Range licence. As a result, a more intensive exploration programme was undertaken than that of 1983-84. The programme involved:

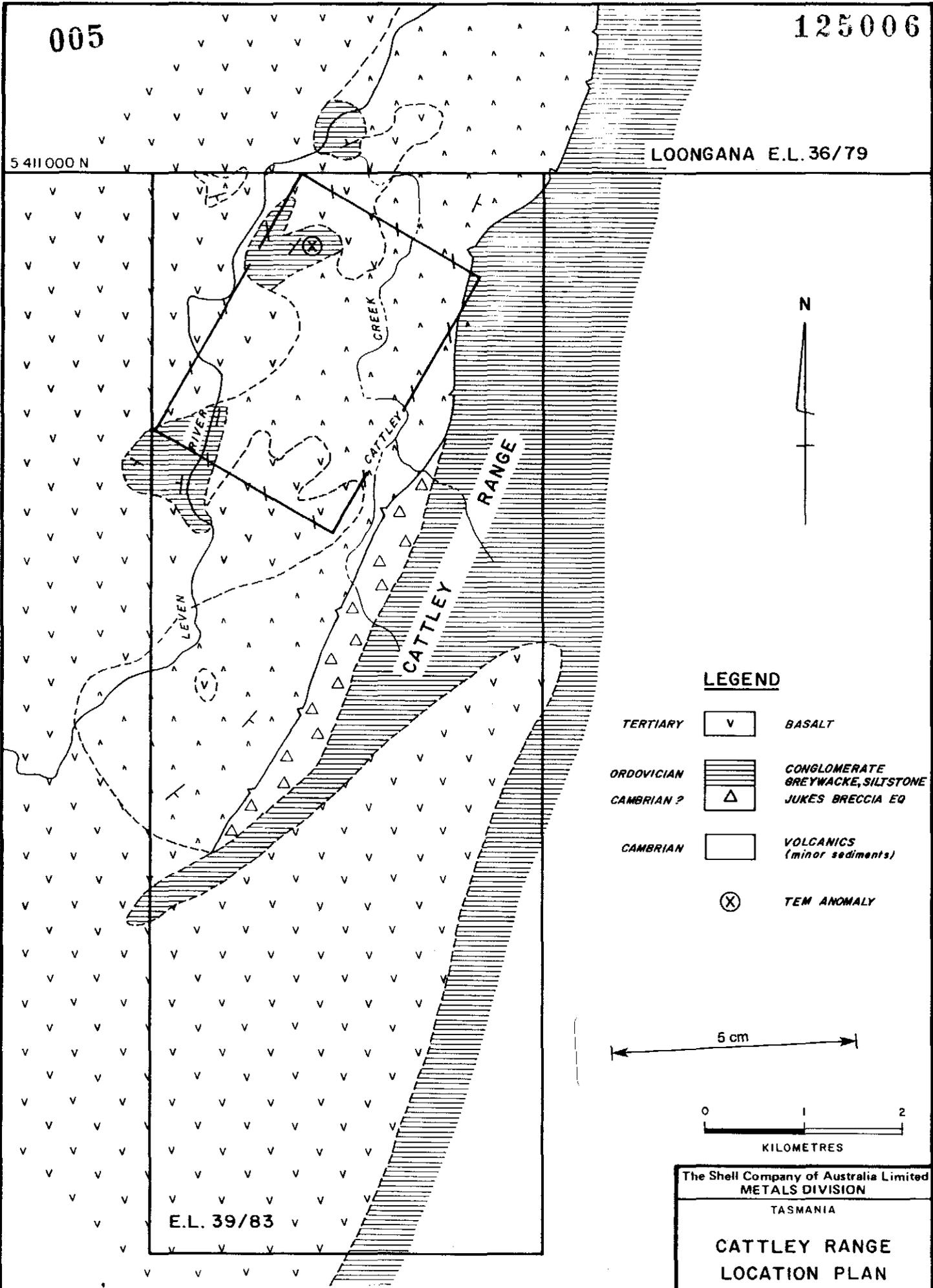
- 42 line kms of gridding.
- 12 kms, 560 stations of Transient Electromagnetics (EM-37)
- 1:20,000 scale, airphoto and grid based geological mapping
- 12 panned stream sediment samples
- 1 line of IP

005

125006

5 411 000 N

LOONGANA E.L. 36/79



E.L. 39/83

402 000 E



Area surveyed

LEGEND

- TERTIARY  BASALT
- ORDOVICIAN  CONGLOMERATE
GREYWACKE, SILTSTONE
- CAMBRIAN ?  JUKES BRECCIA EQ
- CAMBRIAN  VOLCANICS
(minor sediments)
-  TEM ANOMALY

5 cm

0 1 2
KILOMETRES

The Shell Company of Australia Limited
METALS DIVISION

TASMANIA

**CATTLEY RANGE
LOCATION PLAN**

SCALE 1:50 000	DATE MARCH '85
AUTHOR D.N.C.	DRAWN V.C.
OFFICE AHO	REP.No.
DRG.No. LD51/1014	FIG.No. 1

- 42 line kms of ground magnetics.

4. RESULTS

4.1 Geology

Detailed mapping of the area has been restricted to the northern half of the licence where Cambrian Volcanics crop out. Traverses were completed along cleared tracks, grids and creeks-rivers. Some data from Shell report 08.2489 was incorporated in the study.

The area can broadly be divided into four units (Figs. 2, 3).

(i) Cambrian Volcanics

The volcanics crop out in the north western part of the EL, in a 7x2 km, NE-SW trending window between Ordovician (?) sediments. In addition a small inlier of quartz phyric tuffs occurs in a quarry in the extreme NW corner of the licence. Because of the rapid across and along strike variations in composition and grain size of the volcanics, a field classification based on feldspar and quartz content, and grain size was adopted. Rocks were classified either as tuffs or lavas/shallow intrusives, and then as either feldspar phyric, quartz-feldspar phyric or quartz phyric. They were then subdivided on grain size into three groups viz. those with phenocrysts or fragments >3 mm, 3-1 mm, or <1 mm.

The volcanics consist mostly of feldspar and feldspar/quartz phyric tuffs with minor lavas and rare shaly interbeds. A medium grained feldspar phyric sill intrudes the sequence in the south (described in 08.2489 as a porphyritic trachyandesite). Generally the rocks strike NE-SW and dip to the SE. Minor folds have been inferred from local changes in dip and strike (Fig. 3).

The eastern and uppermost portion of the volcanics is marked by a volcanic breccia inferred from outcrops in two localities. This is tentatively equated with the Jukes Breccia which overlies the Mount Read Volcanics to the south.

(ii) & (iii) Ordovician Sediments

(ii) Basal conglomerate (Owen Conglomerate) and sandstones unconformably overlie the volcanics to the east, forming the hills of the Cattley Range.

(iii) Immediately west of the volcanics a sequence of greywackes with minor interbedded siltstones and rare tuffs crop out, chiefly in the Leven River. These have previously been considered as possible Que River Bed equivalents (08.2489). While the greywackes are not typical of the sandstone-type lithologies of the Moina Sandstones or Owen Conglomerate, the unit appears to be underlain by conglomerate, typical of the basal conglomerate in the Owen Conglomerate. Outcrops of this rock occur in the river and on its western bank around 402600mE/5407400mN. Similar thick conglomerate float occurs in the north of the EL around 404200mE/5410700mN. These rocks appear to form the basal member of a relatively shallow west dipping unit which may form a small basinal feature (cross-section, Fig. 3), unconformably overlying the volcanics. The sediments only form a thin cover to the volcanics which re-appear in a small inlier, surrounded by basalt, further to the north west.

(iv) Tertiary Basalt

Basalts crop out in the north western portion of the licence. The extent of the cover has been accurately plotted from the grid based magnetic data (Appendix III). Basalt also covers much of the southern part of the EL.

4.2 Geochemistry

The area was previously held by Geopeko (EL 10/74). Results from a stream sediment survey completed by that company, together with those from a more recent survey by Billiton (Fig. 4), generally show low base metal and gold (panned concentrates) values.

However, two anomalous areas were located. One sample with 180 ppm Zn and 34 ppm Cu was taken from a creek draining basalts in the central west of the area and is not considered significant. A second area, with anomalous lead geochemistry, was later tested by a grid based soil sampling programme. This outlined a low order lead anomaly, striking NE-SW and open to both the north east and south west (Fig. 5). However, in both these directions, the prospective underlying Cambrian Volcanics are covered by basalt.

The soil anomaly had previously thought to have resulted from metal scavenging by Fe and Mn. However, a plot of Pb vs Fe (Fig. 6) and the low Mn values recorded over the anomaly (maximum 70 ppm) do not support this. As such the source ^{of} to the anomaly is likely to be within the underlying volcanics. Two lines of EM-37 survey traverse the anomaly (section 4.3) but a preliminary examination of the data suggests no conductor is present in the area.

4.3 Geophysics

An EM-37 time domain electromagnetic survey was carried out over the north western part of the EL, covering Cambrian volcanics which in some areas are obscured by overlying Tertiary basalt.

Three adjacent fixed transmitter loops were used, all of 800x400 metres size. Horizontal (X) and vertical (Z) components of the secondary field were measured at 50 metre station intervals along the survey lines which were generally 200 metres apart and up to 2.4 kms long. See Appendix II for the logistics report by Geoterrex and Fig. 7 for the grid plan. Noise readings were taken every survey day as reported by Geoterrex, and these indicated low spherics and other EM noise.

As expected the Tertiary basalt (conductivity 50-100 ohm-metres) gave anomalous EM responses, mostly of the nature of a conductive layer on a resistive (>1000 ohm-m) half space. Where there was no basalt only a few minor EM responses were recorded.

The main anomalies of interest were recorded in the north west part of the grid where Cambrian volcanics and sediments are interpreted from

geological mapping to underlie the Tertiary basalt. A trend of EM-37 anomalies strikes approximately north south at about 10700E on lines 10600 to 9800N. They are obscured by the basalt response and could indeed be caused by a basalt valley. This hypothesis is unlikely however since the aeromagnetic data shows an east west trend (Fig. 8 of the Dighem magnetics; the basalt is magnetic and the Cambrian volcanics are non-magnetic). This trend of EM-37 anomalies is also of interest since the northern end is coincident with Dighem and INPUT anomalies and a weak IP anomaly on line 00N (Fig. 9). Previous work concluded that basalt was the cause of the various anomalies (1984 Mines Dept. report).

The EM-37 trend was subsequently checked on line 9800N with a line of 100 m dipole-dipole IP, surveyed by Zonge Engineering.

The IP pseudo-section on line 9800N does indicate a chargeability anomaly (Fig. 10). However, this anomaly at 10850E is not coincident with the EM-37 anomaly at 10700E, but correlates with a resistivity high due to a bedrock window in the basalt (mapped as greywackes). The source of the IP anomaly is unclear however since the greywackes do not apparently contain sulphides where they outcrop (the basalt is not chargeable). The source could however be deeper and related possibly to a sulphide halo adjacent to the EM-37 conductor, - if the latter is due to massive sulphides. Computer modelling is required to determine whether the EM-37 and IP anomalous responses can be related in this way.

Ground magnetic surveys were carried out along all the grid lines in order to locate the extent of the Tertiary basalt cover, and thus assist with the EM-37 interpretation and geologic mapping. Fig. 3 indicates the extent of basalt cover, and the magnetic profiles are attached to the EM-37 profiles (Appendix III).

5. CONCLUSIONS & RECOMMENDATIONS

Two low order geophysical and one low order geochemical anomaly have been outlined. None are considered to warrant drilling at this stage although additional work will be carried out to more clearly define their source.

Initially this work will entail further soil sampling to more accurately define the lead-in-soil anomaly, and to determine the geochemical signature over the weak conductors already outlined. Determination of lead isotope ratios may assist in defining the anomaly.

The south western extension of the volcanics within the licence gave little response to the earlier stream geochemical programmes. However, this does not eliminate the possibility that buried sulphides occur in the area. As such it is proposed to continue the TEM survey over this zone.

Reference

Wright, R.G., Smyth, W.D., 1984, Progress Report on Exploration for the Period
23/8/83-22/8/84, Unpubl. Billiton Rep. 08.2489.

012

125013

APPENDIX I

Panned Concentrate Gold Results

013

ANALABS

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

125014

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

204.0 00 31560

3.7.85

4360

2 OF 2

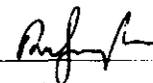
TUBE No.	SAMPLE No.	Au	Au Chk	Weight					
1									
2									
3	6470	X		53.8					
4	6471	X		89.1					
5	6472	X	X	78.4					
6	6473	X		68.4					
7	6474	X		58.1					
8	6475	X		57.0					
9	6476	X		70.8					
10	6477	0.04		67.6					
11	6478	X		66.7					
12	6479	X		69.2					
13	6480	X		79.7					
14	6481	X		86.7					
15	6482	0.01	X	77.7					
16	6483	X		60.7					
17									
18									
19									
20									
21									
22									
23	DETECTION	0.012	0.012						
24	DIGESTION								
25	METHOD	329	329	Gms					

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 II

Logistics Report for a Transient Electromagnetic
Survey on the Cattley Range Prospect, Tasmania

LOGISTICS REPORT

FOR A

TRANSIENT ELECTROMAGNETIC SURVEY

ON

THE CATTLEY RANGE PROSPECT

TASMANIA

ON BEHALF OF

BILLITON AUSTRALIA

MAY, 1985

GEOTERREX PTY. LTD.

Project No. 85-1858

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III. SURVEY PROCEDURES	2
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APPENDIX: 2	EM 37 Plotting Conventions
APPENDIX: 3	Bandwidths of Common Transient EM Systems
APPENDIX: 4	Listing of 9 track magnetic tape
APPENDIX: 5	Listing of spheric data
APPENDIX: 6	Production Reports

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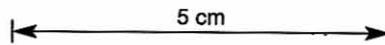
Figure 1:	Survey Location Map
Figure 2:	System Waveforms and Gate Location
Figure 3:	Survey Grid Map



TASMANIA Scale :1:500,000

Fig.1

Survey location map.
Lined box indicates survey area.



1. INTRODUCTION

During the period 28.3.85 to 12.4.85 Geoterrex Pty. Ltd. of 13 Whiting Street, Artarmon, Sydney conducted a time domain electromagnetic survey on behalf of Billiton Australia. The survey was conducted in the Cattley range area of Tasmania.

The purpose of this survey was to detect any conductive bodies which might be similar to Hellyer ore deposit.

II. PERSONNEL AND EQUIPMENT

(A) Personnel

The following personnel were provided by Geoterrex Limited to conduct the survey:

<u>Personnel</u>	<u>Title</u>	<u>Dates on Survey</u>
Peter Eagleton	Geophysicist	28.3.85-12.4.85
Stuart Dodd	Geophysicist	28.3.85-4.4.85
John Peacock	Geophysicist	4.4.85-12.4.85

Field hands were provided by Billiton Australia to set up and remove loops used in the survey.

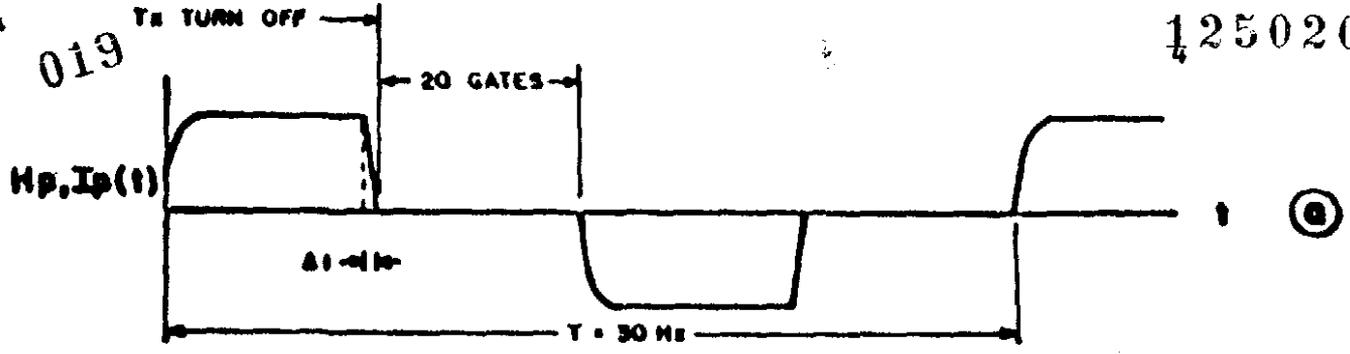
(B) Equipment

Equipment provided by Geoterrex Limited was as follows:

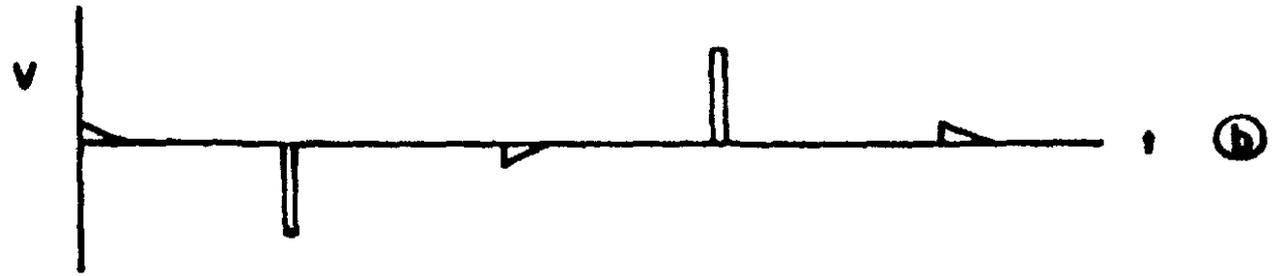
- one complete EM-37 transient electromagnetic system incorporating the HP 3421 Data Acquisition/Control Unit and the HP75 computer.
- wire for use of transmitting loops
- one four wheel drive vehicle

019

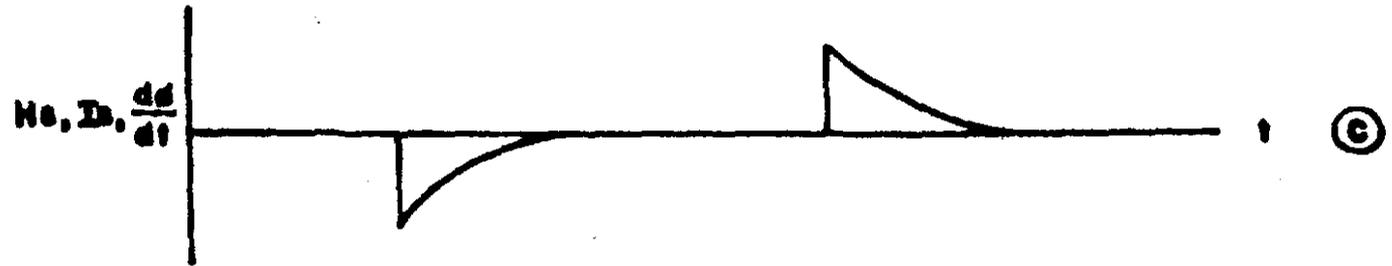
125020



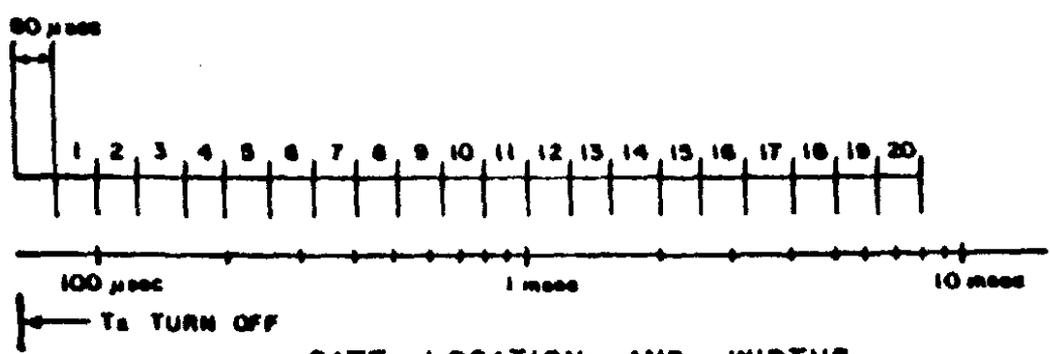
TRANSMITTER CURRENT (AND PRIMARY MAGNETIC FIELD)



INDUCED emf



SECONDARY (TARGET) CURRENT AND MAGNETIC FIELD



GATE LOCATION AND WIDTHS

FIGURE 2

5 cm

020

125021

III. SURVEY PROCEDURES

(A) Theory

The EM-37 is a transient electromagnetic surveying system which is based upon the measurement of the induced secondary magnetic field decay.

The transmitter output signal consists of an alternating ramped current pulse as shown in figure 2a. The cessation of the primary current, I_p , and thus the primary magnetic field, H_p , induces an emf in a conductor in opposition to the change in the primary magnetic field. The induced emf causes a secondary current, I_s , to flow and then decay as shown in figure 2c. The time rate of change of the magnetic field mag can then be measured as an emf in a multiturn receiver coil.

The decay curve is sampled over 20 logarithmically spaced gates and averaged over a specified number of cycles of the primary current.

Advantages of the EM-37 system include its wide bandwidth, relative insensitivitiy to primary loop orientation and, since measurement is done during the off-time, it is not necessary to cancel primary field effects.

(B) Field Operations

A fixed ungrounded transmitter loop with dimensions of 800 metres by 400 metres was laid out in accordance with survey plans drawn up by Billiton. The survey was run at a frequency of 25 Hz on crystal synchronization. The grid lines were spaced 200 metres apart. Readings were taken at 50 metre intervals along the lines. A few survey lines ran along the 400 metre loop wire. As it was not possible to survey on the loop wire a station was situated approximately 25 metres perpendicular to the station peg and loop wire. A consistant side to the loop wire was maintained, i.e. all readings were done on the outside or inside of the loop. Thick vegetation prevented the collected of data at a few of these sites.

Two components were measured, the vertical component and the horizontal (x) component. All data during the course of the survey day was stored in the memory of the HP75 computer and dumped on tape in the evening and plotted using a Plotwriter WX4731.

Data was monitored during the day to check on noise in a number of ways. Sferics tests (Tx not transmitting) were carried out at a site chosen that was approximately 20 metres away from the Tx site and loop. Two components the (Z) and the (X) were recorded. Noise checks with the Tx transmitting were generally carried out at the start of the line, in the middle and at the end of the line.

(C) Data Reduction and Presentation

The data reduction consisted of averaging the readings of opposite polarity to cancel any DC offset in the instrument and converting them into a value representative of the time rate of change of the magnetic flux density, B (nV/m^2), in accordance with the following equation:

$$B = 192 \times 2^{-N} \times V$$

where

N is the gain

V is the millivolt reading

This reading is then normalized to the primary current.

The plots presented in the field are linear with a horizontal scale of 1:5000 and the vertical scale, which is expressed in units of nV/Amp.m^2 , is scaled in groups of five channels. The channels being: 1 to 5, 6 to 10, 11 to 15 and 16 to 20.

Any further data processing was done upon completion of the survey work by Geoterrex in Sydney.

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125023

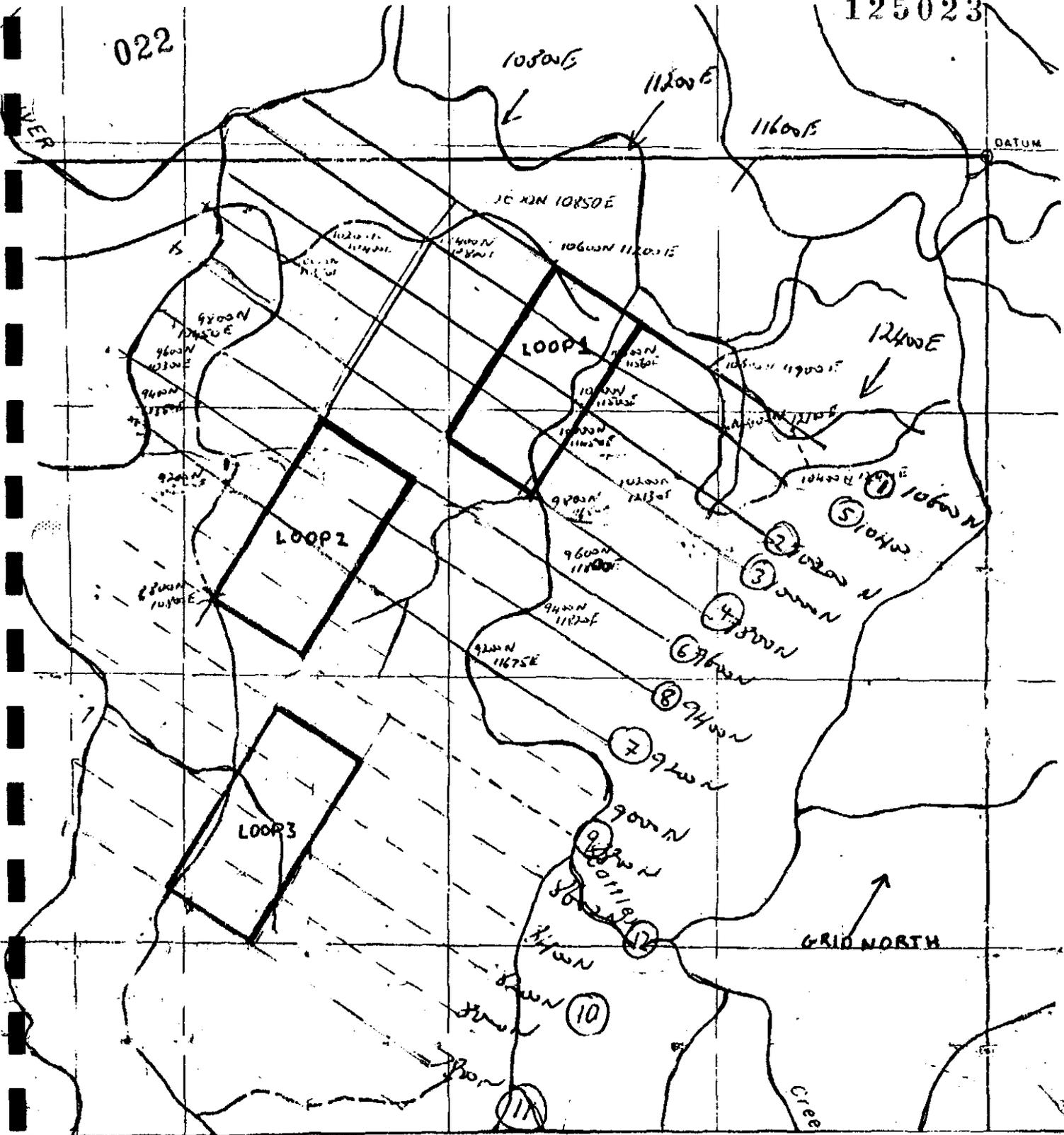
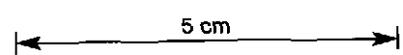


fig 3

Map of grid area showing loop and line positions.
 Circled numbers indicate the order in which the
 lines were read.

1:20 000



IV. SURVEY AREA AND STATISTICSCattley Range Prospect

This area was situated approximately 50 kms south of Burnie and about 30 kms east of Waratah. See Fig. 1. Access to the area was by Forestry roads. West coast bush was present although it was not excessively thick and the terrain was fairly flat.

Twelve lines with a total of 560 stations were completed.

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APPENDIX I

EQUIPMENT SPECIFICATIONS

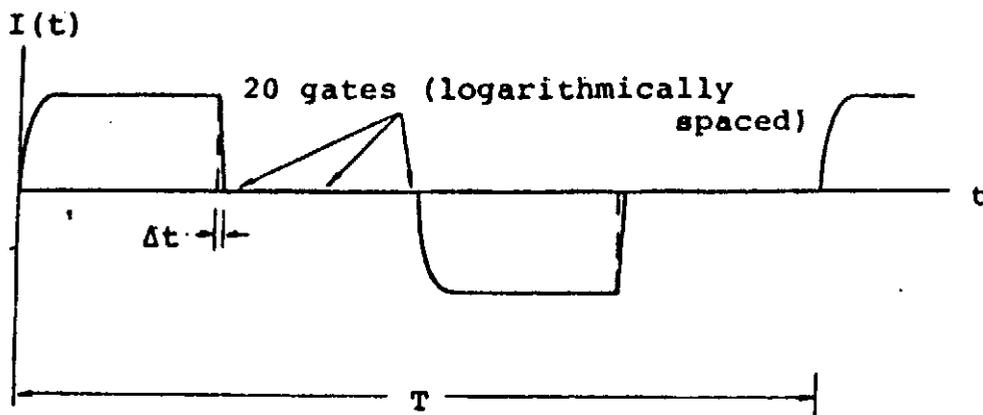
EM37 GROUND TRANSIENT ELECTROMAGNETIC SYSTEM
TECHNICAL SPECIFICATIONS

Transmitter

- Repetition rate - 3Hz, 7.5Hz, or 30Hz in countries using 60Hz power line frequency; 2.5Hz, 6.25Hz, or 25Hz in countries using 50Hz power line frequency; all four base frequencies are switch selectable.
- Turn-off time - fast linear turn-off of about 300 microseconds into a 300 X 600 metre loop. Decreases proportionately with current and loop perimeter to a minimum of 20 microseconds. The actual value is read off the front panel meter.
- Transmitter loop - any dimensions from 40 X 40m to 300 X 600m maximum at 20 amps. Larger dimensions at reduced current. Transmitter voltage switch adjustable for smaller loops. Value of loop resistance read from front panel meter; resistance must be greater than 1 ohm to prevent overload on lowest voltage setting.
- Transmitter protection - circuit breaker protection against input overvoltage; instantaneous solid state protection against output short circuit automatically resets upon removal of short circuit. Input voltage, output voltage and current indicated on front panel meter.
- Transmitter output voltage - 110 volts (zero to peak) maximum
20 volts (zero to peak) minimum
- Transmitter output power - 2.2 kw. maximum
- Transmitter motor generator - 5 HP Honda gasoline engine coupled to 120 volt, 3 phase, 400Hz alternator. Approximately 8 hours continuous operation from full (built-in) fuel tank.

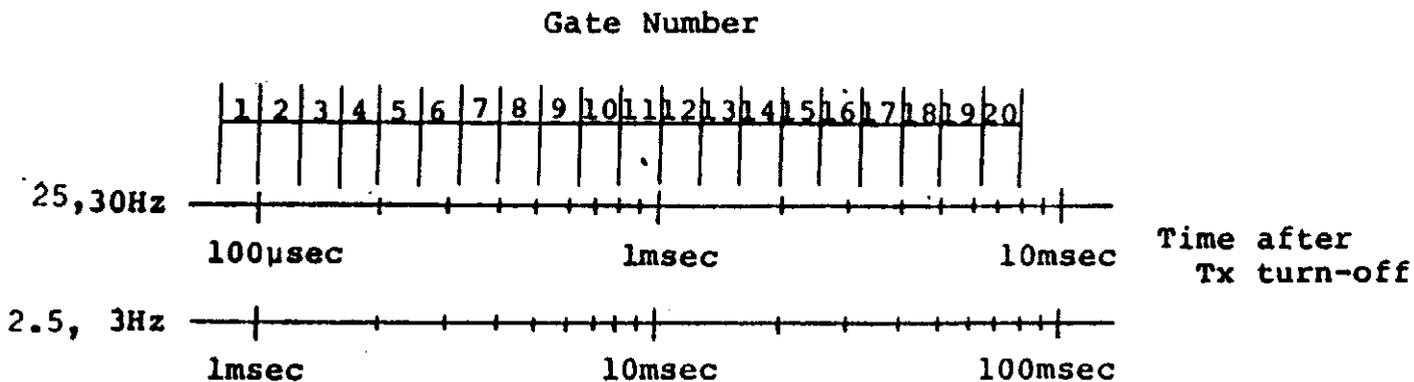
Receiver

- Measured quantity - time rate of decay of magnetic flux along 3 axes.
- Sensor - air-cored coil of bandwidth 20kHz;
- Time channels - 20 time channels with locations and widths shown in figure 2. Successive operation at 25Hz then 3Hz effectively gives 30 channels covering range from 80 microseconds to 80 milliseconds.
- Data logging and display - data collected by Hewlett-Packard data logger; 4 digit display with sign of selected channels on LCD of logger; complete software control of gains and integration times.
- Integration time - n
 - 2 cycles at 25Hz; $n=4,6,8,10,12,14$ (software selectable); similar integration times at other base frequencies.
- Receiver output noise referred to input - typically 1.5×10^{-10} volt/m at last gate at 25Hz with integration time of 44 seconds. Noise will be higher during intense local spherics activity.
- Output/input connector - all 20 channels in analogue format for output; digital inputs control all housekeeping functions.
- Synchronization to Tx - either of the following (switch selectable)
 (1) high stability (oven controlled) quartz crystals.
 (2) reference cable.
- Noise rejection circuitry - Selective clipping of atmospheric noise pulses at all times.
- Receiver batteries - 12 volt rechargeable 6el-cell; 9 hours continuous operating time typically.



Transmitter Current Waveform

FIG. 1



Gate Location and Widths

FIG. 2

NOISE CHECK DATA

<u>DATE</u>	<u>NAME</u>	<u>LOOP</u>	<u>TIME</u>
6.4.85	SFER 10	2	MORNING
6.4.85	SFER 11	2	AFTERNOON
7.4.85	SFER 11L	2	MORNING
7.4.85	SFER 13	2	AFTERNOON
10.4.85	SFER 14	3	MORNING/AFTERNOON
11.4.85	SFER 15	3	MORNING
11.4.85	SFER 16	3	AFTERNOON
12.4.85	SFER 17	3	MORNING
12.4.85	SFER 18	3	AFTERNOON

NOTES

- The survey line data is the data that contains the z and x readings of the line surveyed.
- The noise check is listed into two categories:
 - NOISE is a collection of successive readings taken at one constant location for all the lines read from one loop with the Tx transmitting. The location chosen was about 30 metres away from the loop wire. The readings were generally entered as station 0000E and incremented by 50 metres for each successive reading eg. II repeats would start at 0000E and finish at 0500E.
 - SFER is a collection of successive steric readings taken at one constant location about 30 metres away from the Tx site, with the Tx not transmitting. They were recorded under a station heading of 0000E.
- The readings for SFER 1 to SFER 7 are listed in APPENDIX 5 (These one are not recorded on the 9 track tape) together with a group of channels for SFER 8 to SFER 18. These latter ones (SFER 8 to SFER 18) have all the channel values recorded on the 9 track tape but the channels listed in APPENDIX 5 were the ones written down in the field.
- All values are in nV/Am^2 .

029

APPENDIX III

EM 37 Profiles

=====

CORRECTED DATA

PLOT: Line Name => 210600N

FROM: Rec # => 21

TO: Rec # => 2231

REGIONAL REMOVAL [Y/N] => N X-AXIS SCALE (m/s/cm) => 250

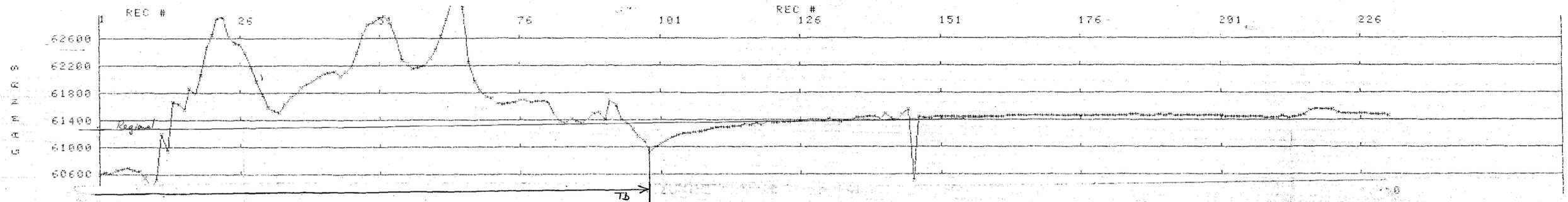
SCALE:

MANUAL

BASE READING (gammas) => 260600

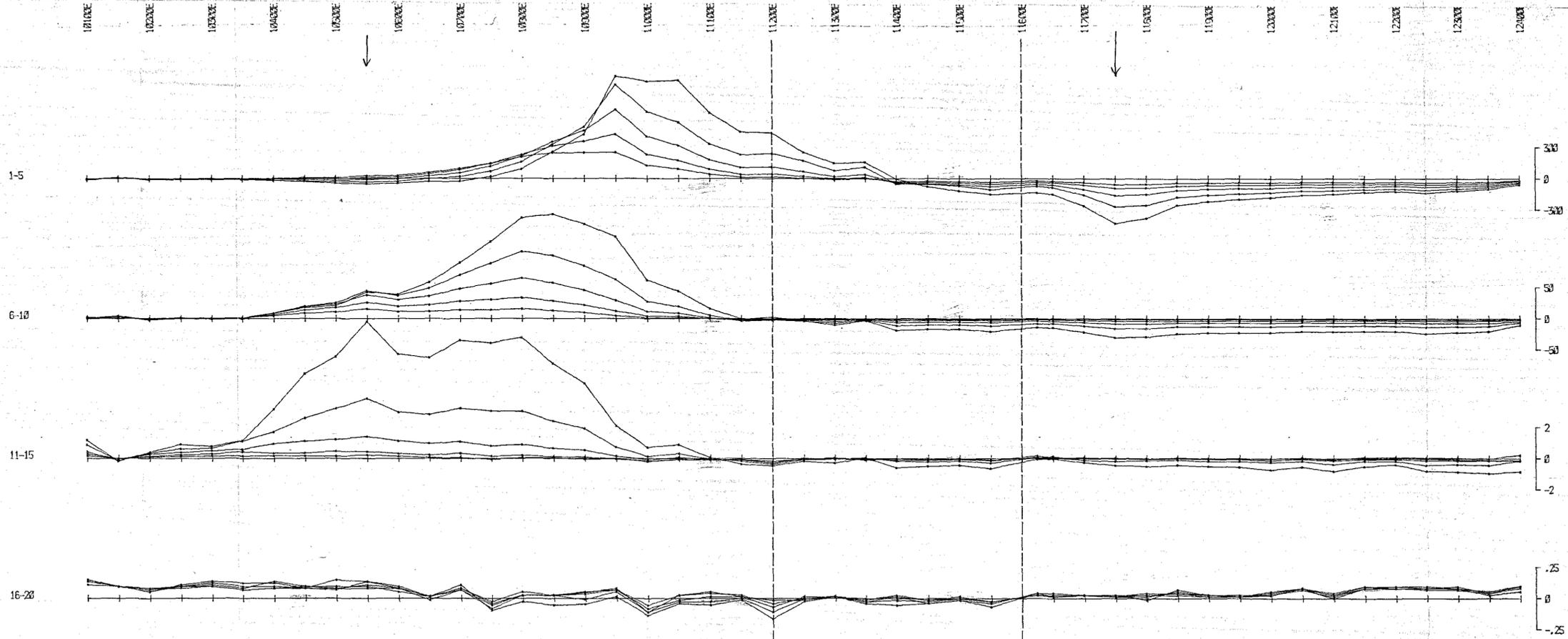
READING SCALE (cm/cm) => 2400

X-AXIS SCALE (m/s/cm) => 250



LEGEND
 LINE : 10600N
 FROM : 10100 E
 TO : 12400 E
 STATION SPACING : 10 mts
 MIN READING => 60622
 MAX READING => 63230
 AVG READING => 61608

125031



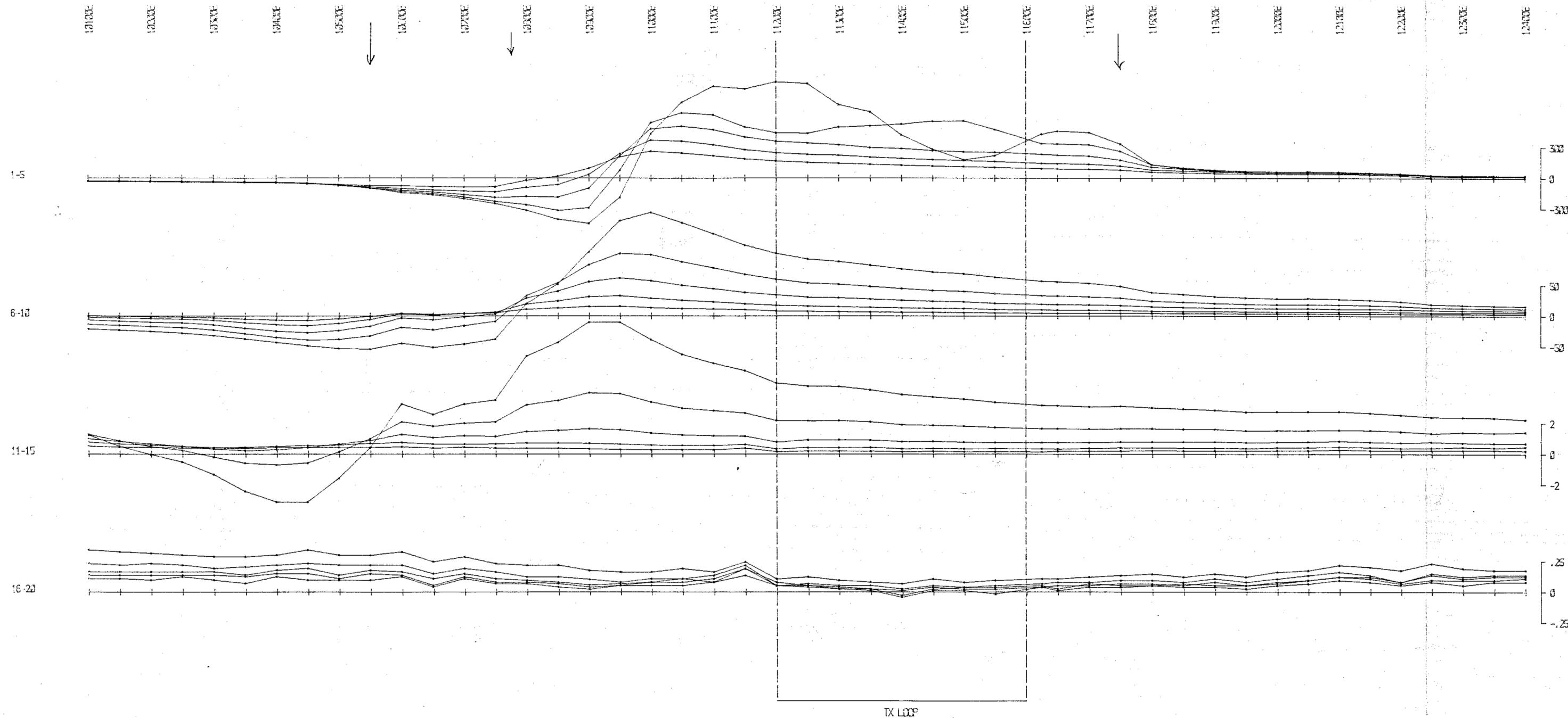
EM-37
 FIXED TRANSMITTER SURVEY
 ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
 TIME DERIVATIVE OF FLUX DENSITY (B)
 5 cm

TX LOOP SIDES : 10600N 11600E
 : 09900N 11200E
 TX LOOP SIZE : 900 m X 400 m
 TX TURN OFF TIME : 345 microseconds
 FIRST GATE TIME : 99.5 microseconds
 CURRENT : 11.0 amps
 FREQUENCY : 25 Hz
 INTEGRATION TIME : 256 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : PLSO
 DATE : 29/03/1995

SURVEYED AND COMPILED BY GEDTEREX PTY. LTD. PROJECT NO. 95-1959

CLIENT : Billiton Australia
 PROJECT : Cattley Range
 AREA : Curidford Tasmania
 LINE : 10600N X 030
 TX LOOP : 1

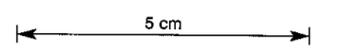
VERTICAL COMPONENT B (Z)



EM-37
FIXED
TRANSMITTER
SURVEY

ELECTROMOTIVE FORCE INDUCED BY
SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125032



nanovolts per amp metre squared

TX LOOP SIDES : 10200N 11600E
 : 09500N 11200E
TX LOOP SIZE : 800 m X 400 m
TX TURN OFF TIME : 349 microseconds
FIRST GATE TIME : 93.5 microseconds
CURRENT : 11.0 amps
FREQUENCY : 25 Hz.
INTEGRATION TIME : 256 cycles
SYNC MODE : CRYSTAL
HORIZONTAL SCALE : 1:5000
SURVEYED BY : PESD
DATE : 28/03/1995

	SURVEYED AND COMPILED BY GEOTREX PTY. LTD.	PROJECT NO. 95-1353
	CLIENT : B. Hutton Australia PROJECT : Cattley Range AREA : Gulliforma Tasmania LINE : 10200N E TX LOOP : 1	

031

031

CORRECTED DATA

FROM: Rec # => 2472

TO: Rec # => 2332

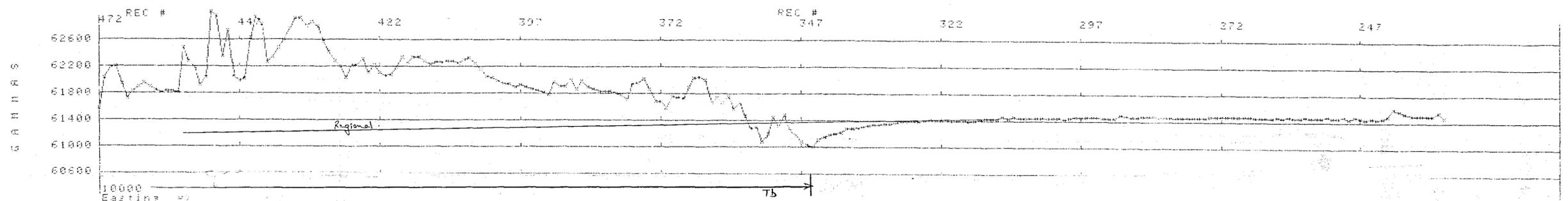
REGIONAL REMOVAL [Y/N] => ON

SCALE: MANUAL

BASE READING (gamma) => 260600

READING SCALE (cm/cm) => 2400

X-AXIS SCALE (mts/cm) => 250



LEGEND

LINE : 10400N

FROM : 10000

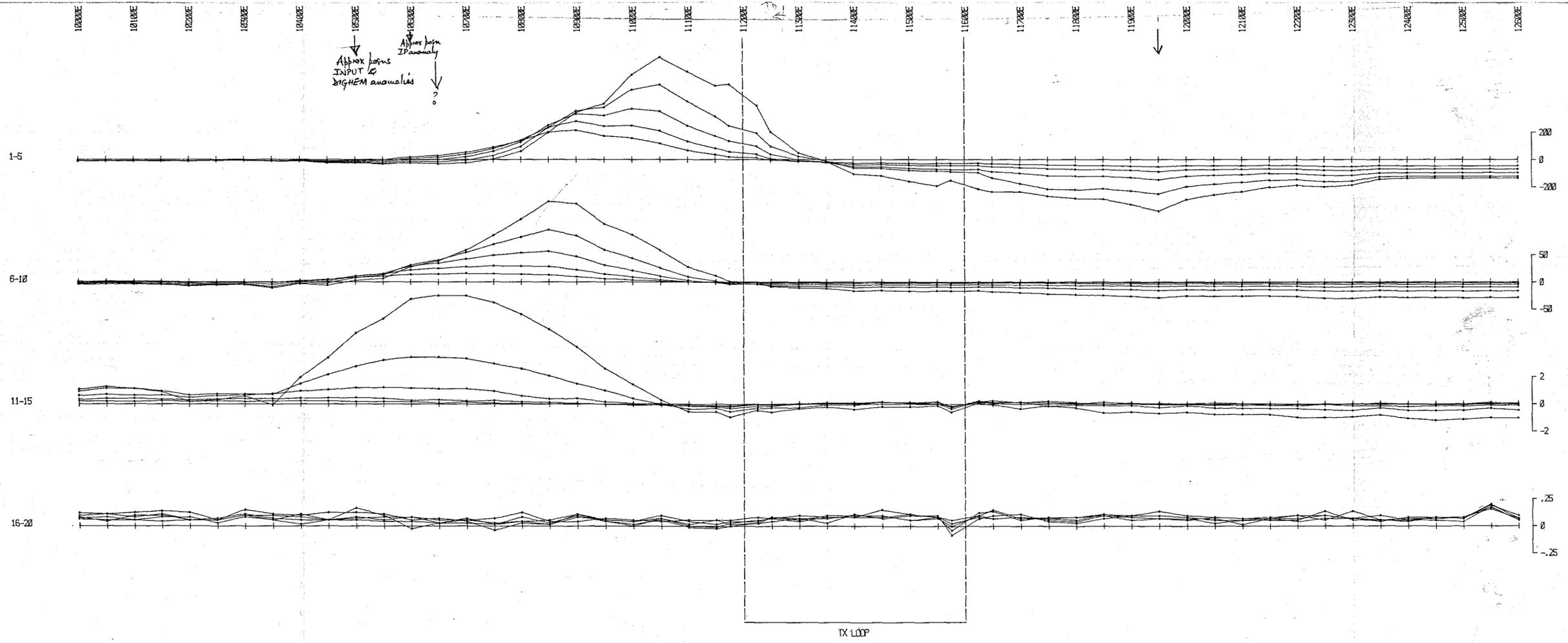
TO : 12400

STATION SPACING : 10 m

MIN READING => 61000

MAX READING => 62000

AVG READING : 61740



EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY (B)

125033

5 cm

TX LOOP SIDES : 10600N 11600E

: 09800N 11200E

TX LOOP SIZE : 800 m X 400 m

TX TURN OFF TIME : 349 microseconds

FIRST GATE TIME : 88.5 microseconds

CURRENT : 11.0 amps

FREQUENCY : 25 Hz

INTEGRATION TIME : 256 cycles

SYNC MODE : CRYSTAL

HORIZONTAL SCALE : 1:5000

SURVEYED BY : PESD

DATE : 03/04/1985

SURVEYED AND COMPILED BY GEOTERREX PTY. LTD. PROJECT NO. 85-1658

CLIENT : Biliton Australia

PROJECT : Catley Range

AREA : Guildford Tasmania

LINE : 10400N X

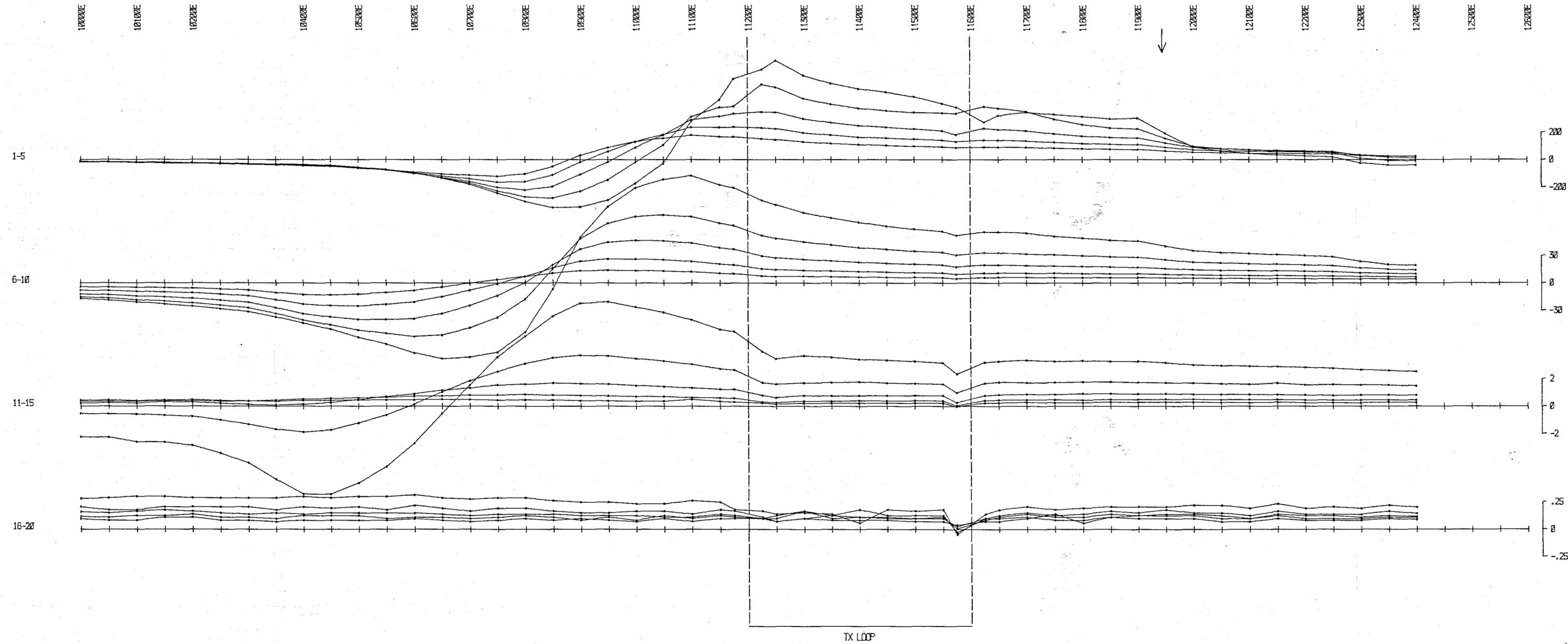
TX LOOP : 1

132

132

033

VERTICAL COMPONENT B (Z)



EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125034

5 cm

nanovolts per amp metre squared

TX LOOP SIDES : 10600N 11600E
 : 09300N 11200E
 TX LOOP SIZE : 800 m X 400 m
 TX TURN OFF TIME : 349 microseconds.
 FIRST GATE TIME : 88.5 microseconds.
 CURRENT : 11.0 amps
 FREQUENCY : 25 Hz.
 INTEGRATION TIME : 256 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : PESD
 DATE : 03/04/1985

SURVEYED AND COMPILED BY GEOTERREX PTY. LTD. PROJECT NO. 85-1858

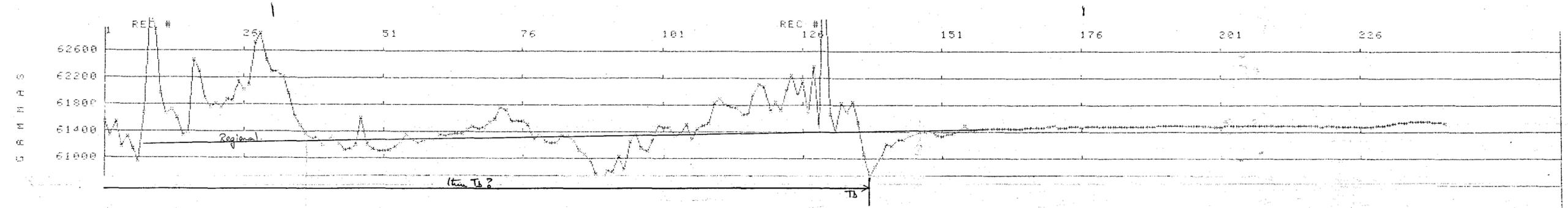
CLIENT : Billiton Australia
 PROJECT : Catley Range
 AREA : Guildford Tasmania
 LINE : 10400N -Z
 TX LOOP : 1

033

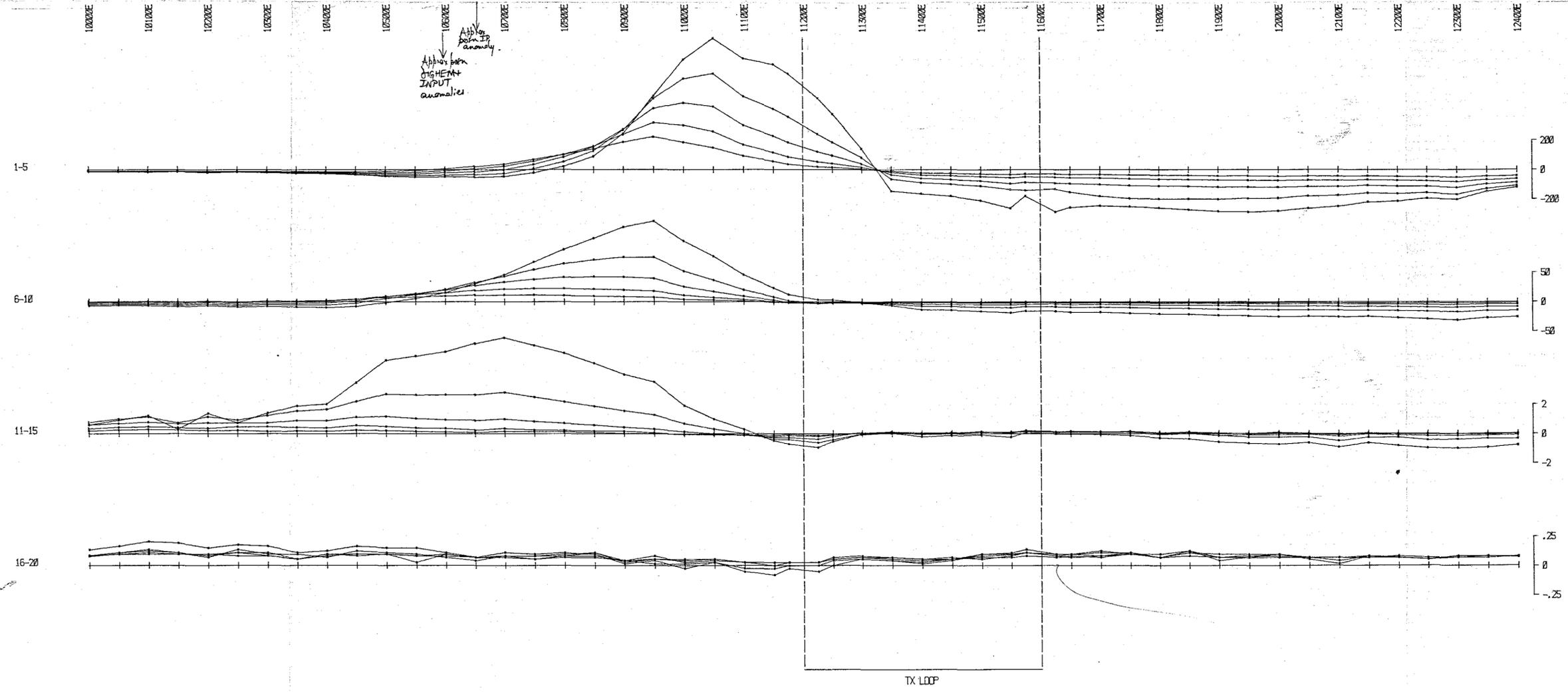
033

CORRECTED DATA
 SCALE: MANUAL
 PLOT Line Name => 10200N
 FROM Rec # => 21
 TO Rec # => 241
 REGIONAL REMOVAL EY/N3 => ?N X-AXIS SCALE (mts/cm) => 250
 BASE READING (gamma) => 209600
 READING SCALE (cm/cm) => 2400
 X-AXIS SCALE (mts/cm) => 250

034



LEGEND
 LINE : 10200N
 FROM : 10000 E
 TO : 12400 F
 STATION SPACING : 10 mts
 MIN READING => 60698
 MAX READING = 64344
 AVG READING => 61518

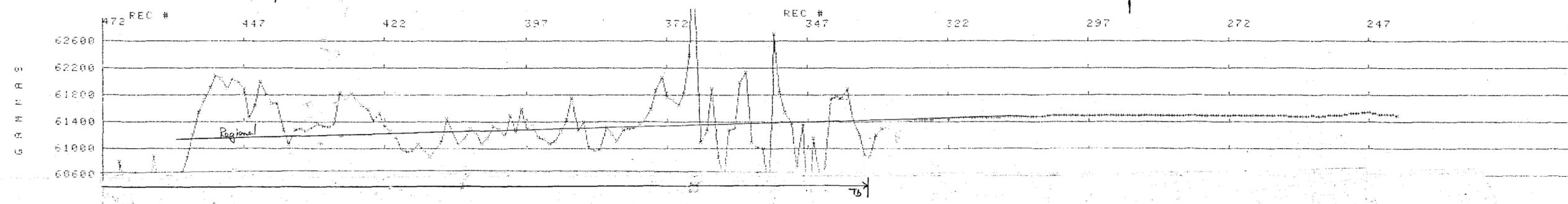


034

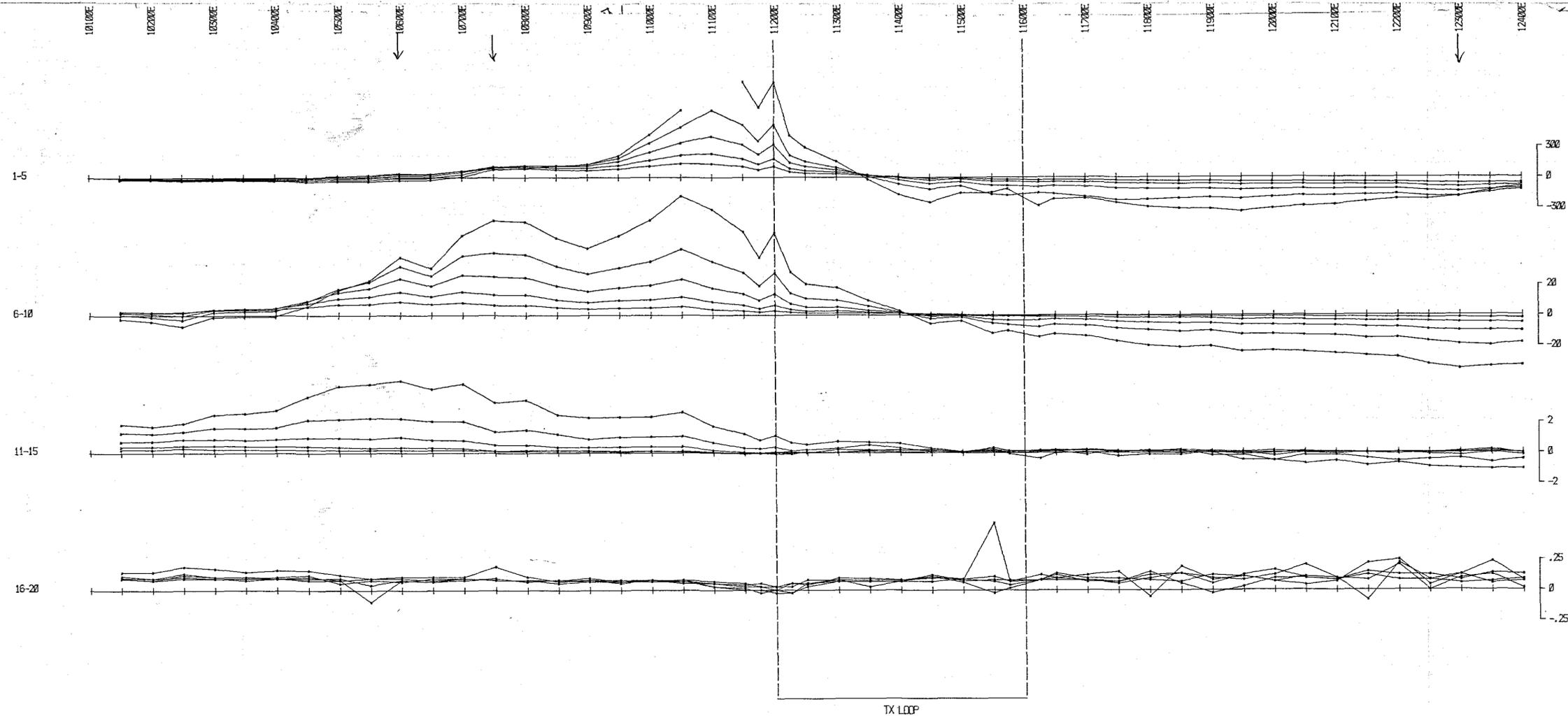
034

EM-37
 FIXED TRANSMITTER SURVEY
 ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
 TIME DERIVATIVE OF FLUX DENSITY (B)
 125035
 5 cm
 TX LOOP SIDES : 10600N 11600E
 : 09300N 11200E
 TX LOOP SIZE : 800 m X 400 m
 TX TURN OFF TIME : 347 microseconds
 FIRST GATE TIME : 89.5 microseconds
 CURRENT : 11.0 amps
 FREQUENCY : 25 Hz.
 INTEGRATION TIME : 256 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : PESD
 DATE : 31/03/1985
 SURVEYED AND COMPILED BY : GEOTERREX PTY. LTD. PROJECT NO. 85-1858
 CLIENT : Billiton Australia
 PROJECT : Cattley Range
 AREA : Gullford Tasmania
 LINE : 10200N X
 TX LOOP : 1

036
 CORRECTED DATA
 PLOT: Line Name => 10000N
 FROM: Rec # => 2472
 TO: Rec # => 2242
 REGIONAL REMOVAL [Y/N] => N
 X-AXIS SCALE (mts/cm) => 250
 SCALE: MANUAL
 BASE READING (Gauss) => 60000
 READING SCALE (mV/cm) => 2400



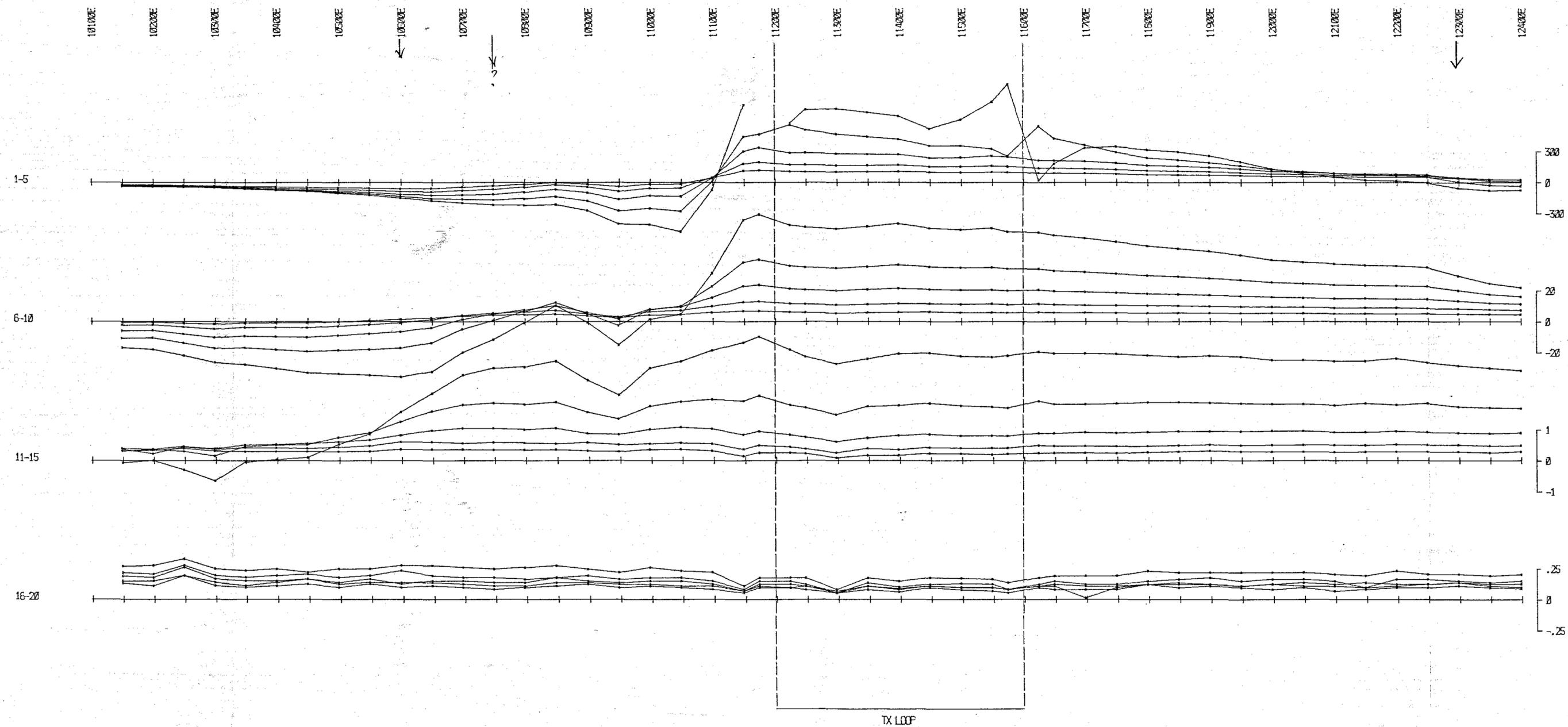
LEGEND
 LINE : 10000N
 FROM : 10100 E
 TO : 12400 E
 STATION SPACING : 10 mts
 MIN READING => 60627
 MAX READING => 63796
 AVE. READING => 61435



EM-37
FIXED TRANSMITTER SURVEY
 ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
 TIME DERIVATIVE OF FLUX DENSITY (B)
 125036
 5 cm
 TX LOOP SIDES : 10600N 11600E
 : 09300N 11200E
 TX LOOP SIZE : 800 m X 400 m
 TX TURN OFF TIME : 347 microsecs.
 FIRST GATE TIME : 88.5 microsecs.
 CURRENT : 11.0 amps
 FREQUENCY : 25 Hz.
 INTEGRATION TIME : 256 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : PERSO
 DATE : 01/04/1985
 SURVEYED AND COMPILED BY: GEOTERREX PTY. LTD. PROJECT NO. 85-1858
 CLIENT : Billiton Australia
 PROJECT : Castley Range
 AREA : Guildford Tasmania
 LINE : 10000N X
 TX LOOP : 1

C. 037

VERTICAL COMPONENT B (Z)



EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY (B)

125037

5 cm

nanovolts per amp metre squared

TX LOOP SIDES : 10600N 11600E
 : 10900N 11200E
 TX LOOP SIZE : 800 m X 400 m
 TX TURN OFF TIME : 347 microseconds.
 FIRST GATE TIME : 88.5 microseconds.
 CURRENT : 11.0 amps
 FREQUENCY : 25 Hz.
 INTEGRATION TIME : 256 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : FLESD
 DATE : 01/04/1995



SURVEYED AND COMPILED BY
 GEOTREX PTY. LTD.

PROJECT NO.
 85-1959

CLIENT : Billiton Australia
 PROJECT : Cattley Range
 AREA : Guilford Tasmania
 LINE : 10000N Z
 TX LOOP : 1

037

037

038

CORRECTED DATA

PLOT: Line Name => 9800N

FROM: Rec # => 71

TO: Rec # => 2231

REGIONAL REMOVAL [Y/N] => N

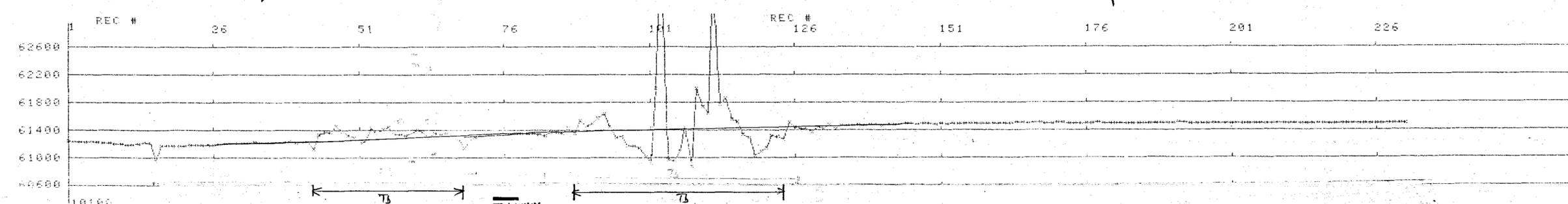
SCALE:

MANUAL

BASE READING (gamma) => 980600

READING SCALE (gm/cm) => 2400

X-AXIS SCALE (m+/-cm) => 250



LEGEND

LINE : 9800N

FROM : 10100 E

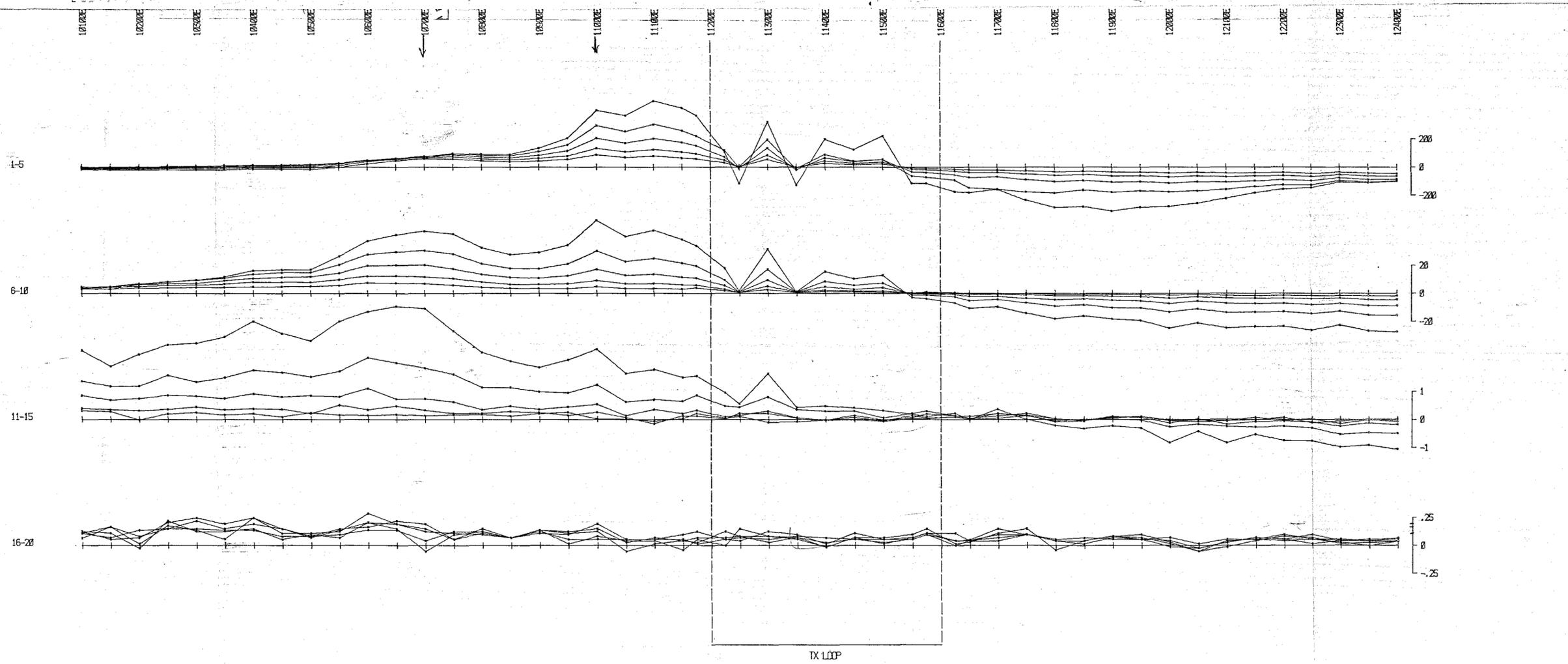
TO : 12400 E

STATION SPACING : 10 mts

MIN READING => 60872

MAX READING => 64358

AVG READING => 61409



EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY (B)

125038

5 cm

nanovolts per amp metre squared

TX LOOP SIDES : 10600N 11600E
: 09800N 11200E

TX LOOP SIZE : 800 m X 400 m

TX TURN OFF TIME : 349 microsecs.

FIRST GATE TIME : 88.5 microsecs.

CURRENT : 11.0 amps

FREQUENCY : 25 Hz.

INTEGRATION TIME : 256 cycles

SYNC MODE : CRYSTAL

HORIZONTAL SCALE : 1:5000

SURVEYED BY : PESD

DATE : 02/04/1985

SURVEYED AND COMPILED BY GEO-TERRAX PTY. LTD.	PROJECT NO. 85-1838
--	------------------------

CLIENT : Billiton Australia

PROJECT : Catley Range

AREA : Guildford Tasmania

LINE : 9800N X

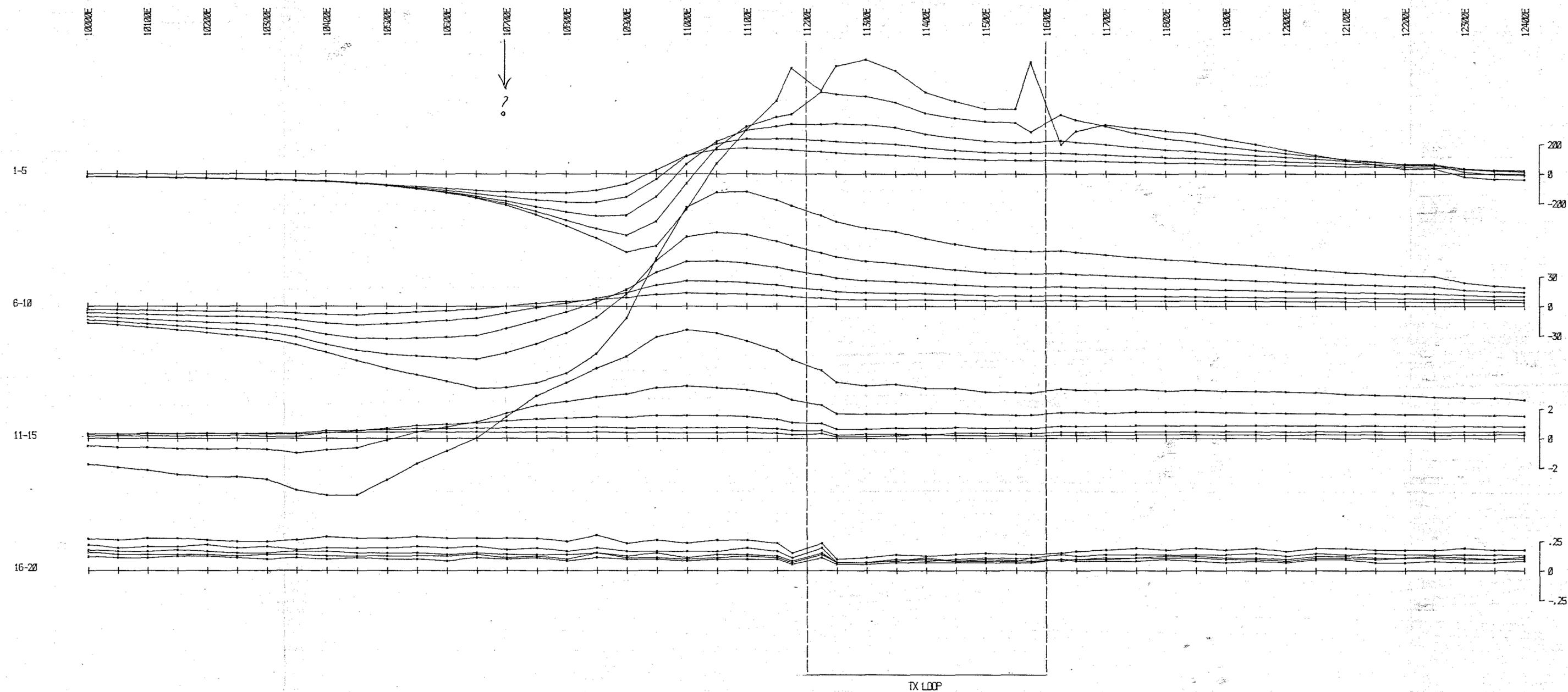
TX LOOP : 1

038

038

035

VERTICAL COMPONENT \dot{B}_z (Z)

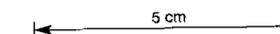


EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125039



nanovolts per amp metre squared

TX LOOP SIDES : 10600N 11600E
 : 09800N 11200E
TX LOOP SIZE : 800 m X 400 m
TX TURN OFF TIME : 347 microseconds
FIRST GATE TIME : 88.5 microseconds
CURRENT : 11.0 amps
FREQUENCY : 25 Hz.
INTEGRATION TIME : 256 cycles
SYNC MODE : CRYSTAL
HORIZONTAL SCALE : 1:5000
SURVEYED BY : PLSO
DATE : 31/03/1985

SURVEYED AND COMPILED BY GEOTERREX PTY. LTD. PROJECT NO. 85-1858

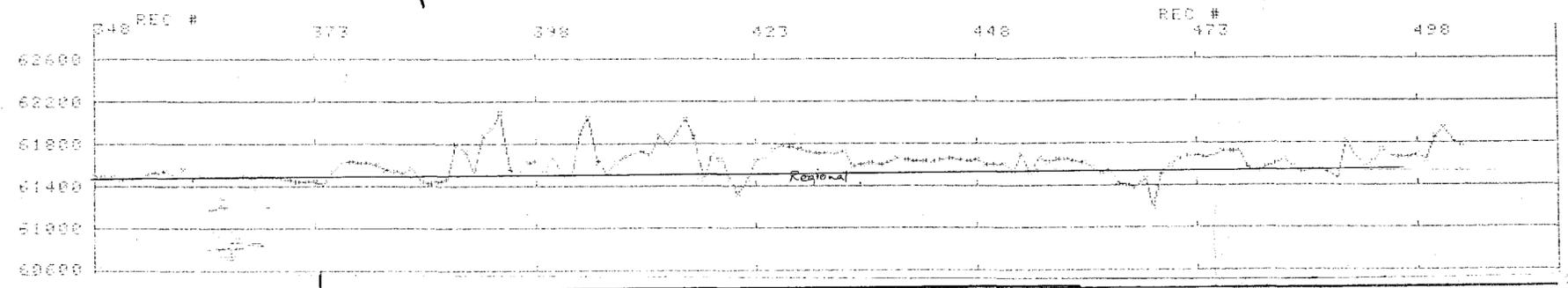
CLIENT : Billiton Australia
PROJECT : Cattley Range
AREA : Guildford Tasmania
LINE : 10200N Z
TX LOOP : 1

035

035

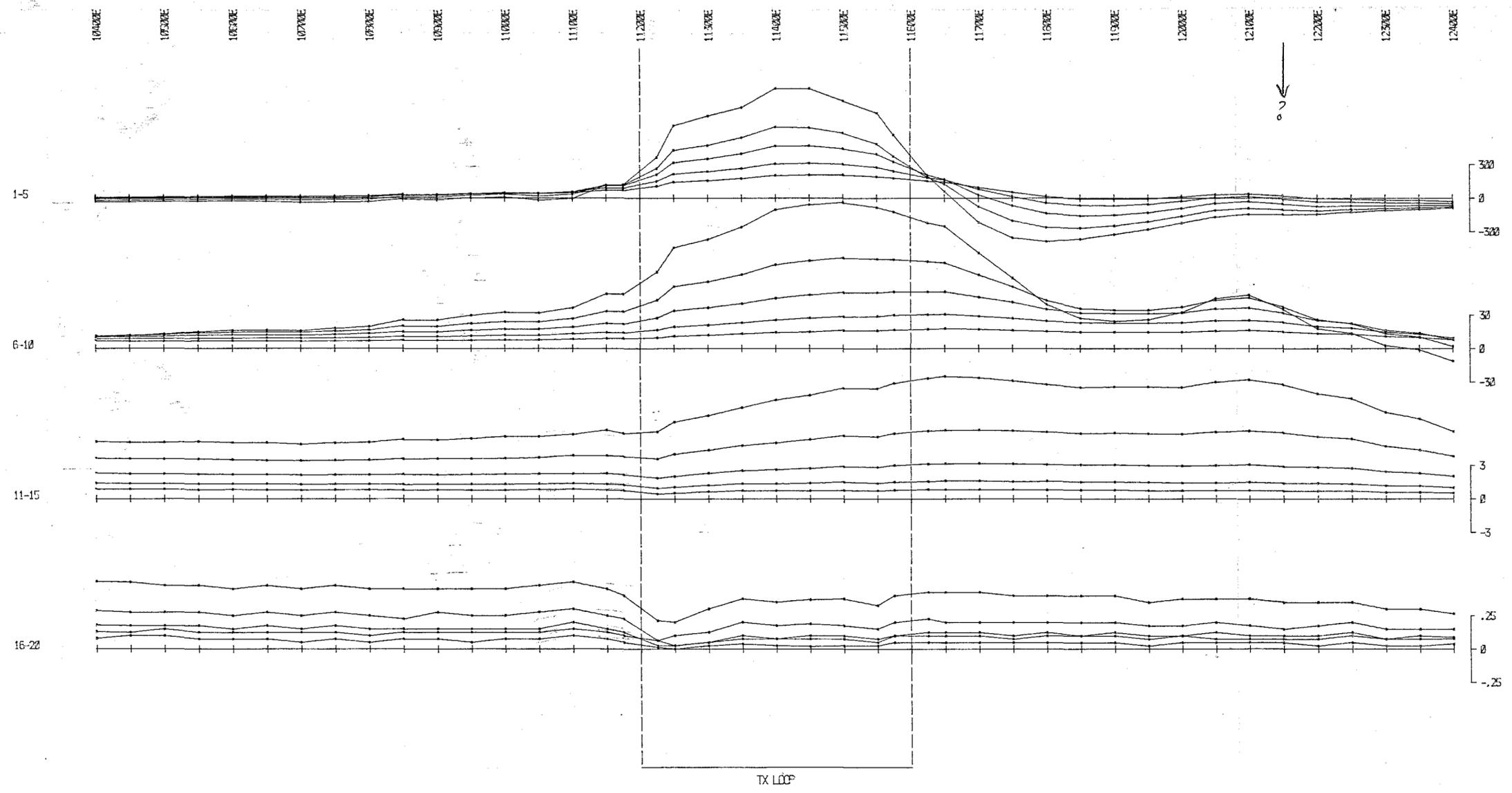
053 CORRECTED DATA
 PLOT Line Name = 027800H
 FROM Rec # = 3748
 TO Rec # = 4987
 REGIONAL REMOVAL CYND = 001

SCALE:
 MANUAL
 BASE READING (magnetic) = 240000
 READING SCALE (magnetic) = 2400
 X-Axis SCALE (magnetic) = 250



LEGEND
 LINE : 7800N
 FROM : 10800 E
 TO : 12350 E
 STATION SPACING : 10 m
 MIN READING => 01190
 MAX READING => 02097
 AVG READING => 01609

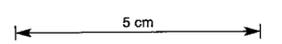
3-2447



EM-37
 FIXED
 TRANSMITTER
 SURVEY

ELECTROMOTIVE FORCE INDUCED
 SECONDARY FIELD
 TIME DERIVATIVE OF FLUX DENSITY (dB)

125040



nanovolts per amp metre squared

TX LOOP SIDES : 02620N 11200E
 : 07820N 11600E
 TX LOOP SIZE : 800 m X 400 m
 TX TURN OFF TIME : 332 microseconds.
 FIRST GATE TIME : 68.5 microseconds.
 CURRENT : 12.8 amps
 FREQUENCY : 25 Hz.
 INTEGRATION TIME : 256 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : PLP
 DATE : 11/24/1995

SURVEYED AND COMPILED BY
 GEBTERREX PTY. LTD. PROJECT NO
 85-1858

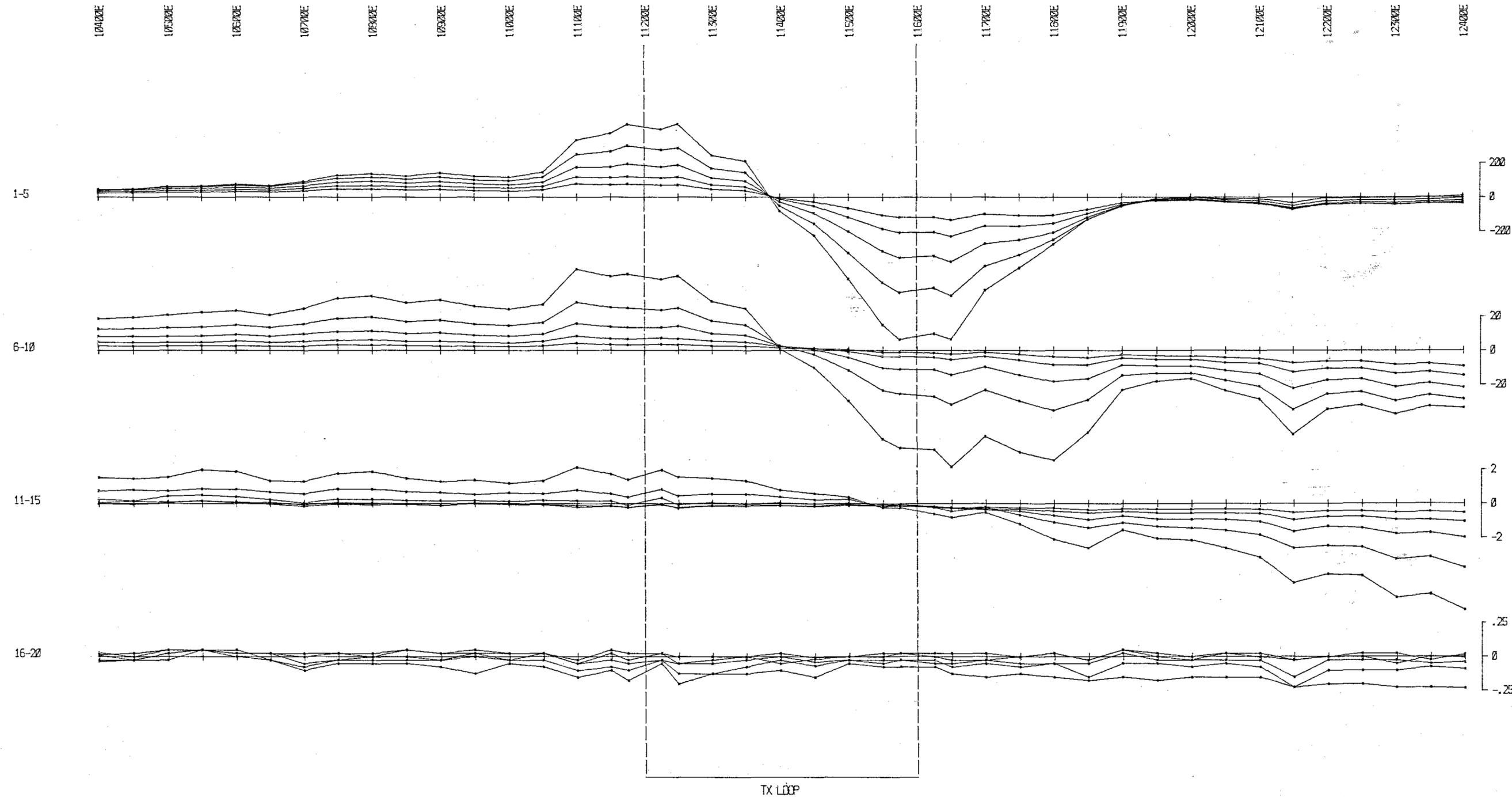
CLIENT : Billiton Australia
 PROJECT : Cattley Range
 AREA : Guilford Tasmania
 LINE : 07820N Z
 TX LOOP : 3

055

055

052

HORIZONTAL COMPONENT B (X)



EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125041

5 cm

nanovolts per amp metre squared

TX LOOP SIDES : 08600N 11200E
: 07800N 11600E
TX LOOP SIZE : 800 m X 400 m
TX TURN OFF TIME : 330 microseconds.
FIRST GATE TIME : 88.5 microseconds.
CURRENT : 12.0 amps
FREQUENCY : 25 Hz.
INTEGRATION TIME : 256 cycles
SYNC MODE : CRYSTAL
HORIZONTAL SCALE : 1:5000
SURVEYED BY : PEJP
DATE : 11/04/1985

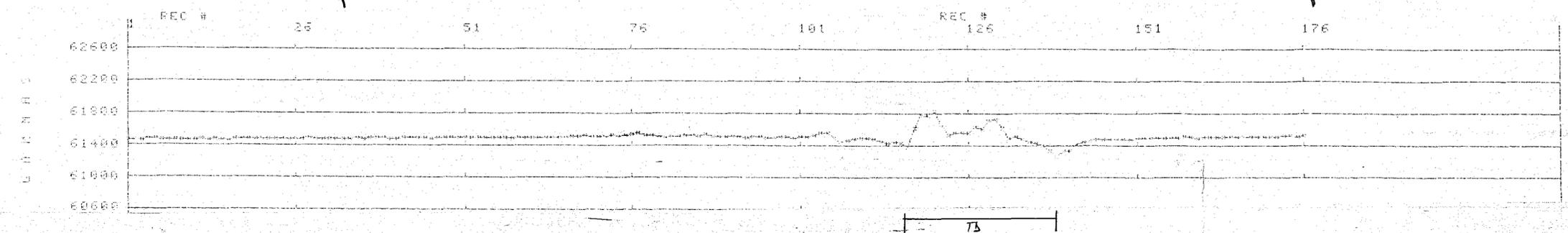
SURVEYED AND COMPILED BY GEOTERREX PTY. LTD. PROJECT NO. 85-1858

CLIENT : Billiton Australia
PROJECT : Cattley Range
AREA : Guildford Tasmania
LINE : 07800N X
TX LOOP : 3

052

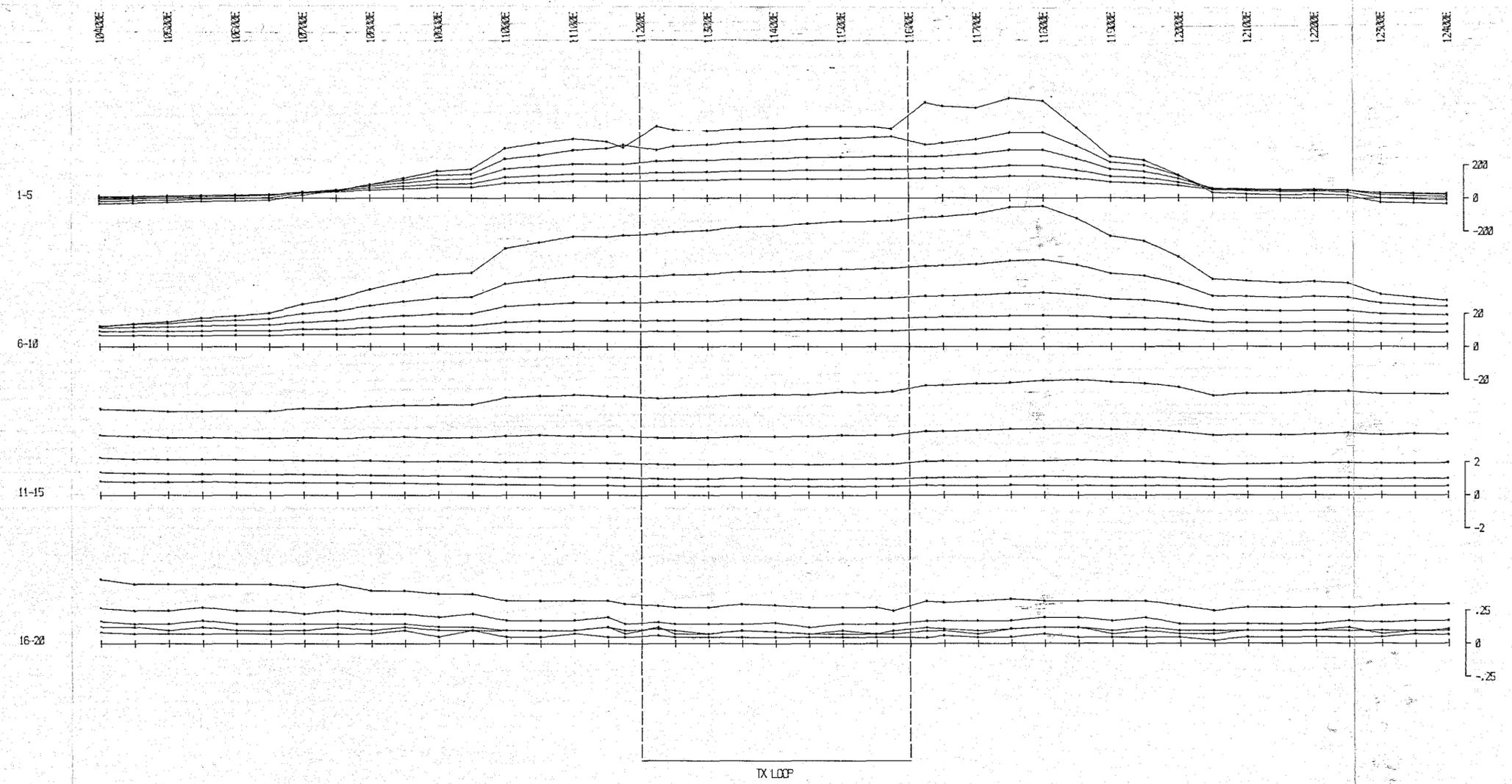
051 CORRECTED DATA
 PLT: Line Name => 82600H
 FROM: Rec # => 21
 TO: Rec # => 212
 PERIPHERAL REMOVAL: E/N/I => 2N

SCALE:
 MANUAL
 BASE READING (gamma) => 60600
 READING SCALE (cm/cm) => 100
 X-AXIS SCALE (m/s/cm) => 250



LEGEND
 LINE : 82600H
 FROM : 10650 E
 TO : 12400 E
 STATION SPACING : 10 m
 MIN READING => 61200
 MAX READING => 61900
 SLOPING => 61450

85-2447



EM-37
 FIXED TRANSMITTER SURVEY
 ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
 TIME DERIVATIVE OF FLUX DENSITY (B)

125042

5 cm

nanovolts per amp metre squared

TX LOOP SIDES : 07800N 11200E
 : 08600N 11600E
 TX LOOP SIZE : 800 m X 400 m
 TX TURN OFF TIME : 390 microseconds
 FIRST GATE TIME : 98.5 microseconds
 CURRENT : 12.0 amps
 FREQUENCY : 25 Hz
 INTEGRATION TIME : 256 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : PEJP
 DATE : 10/04/1995

SURVEYED AND COMPILED BY: GEOTHEREX PTY. LTD. PROJECT NO. 85-1059

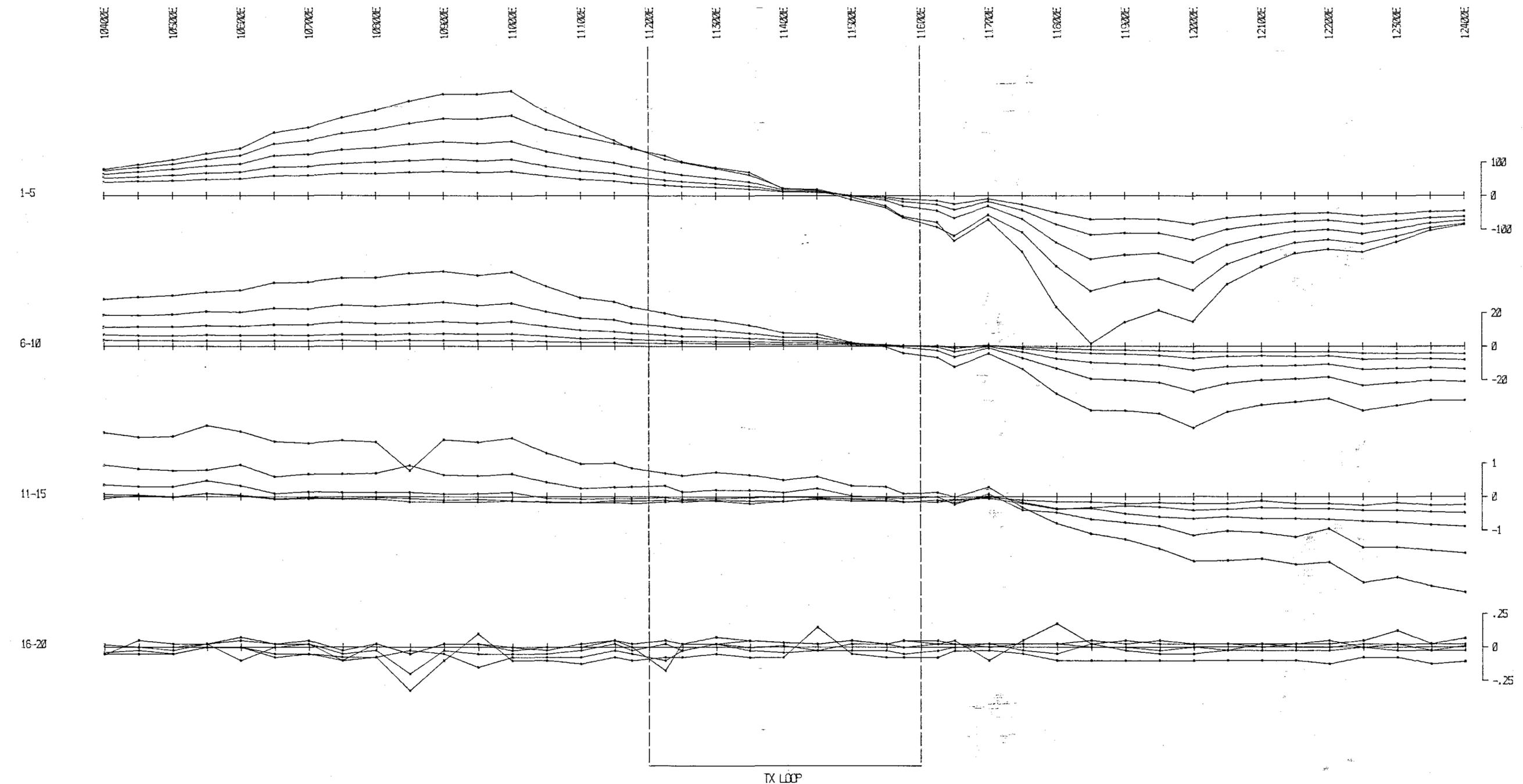
CLIENT : Billiton Australia
 PROJECT : Cattley Range
 AREA : Guilford Tamarina
 LINE : 08200N E
 TX LOOP : 3

051

051

050

HORIZONTAL COMPONENT B (X)

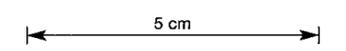


EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125043



nanovolts per amp metre squared

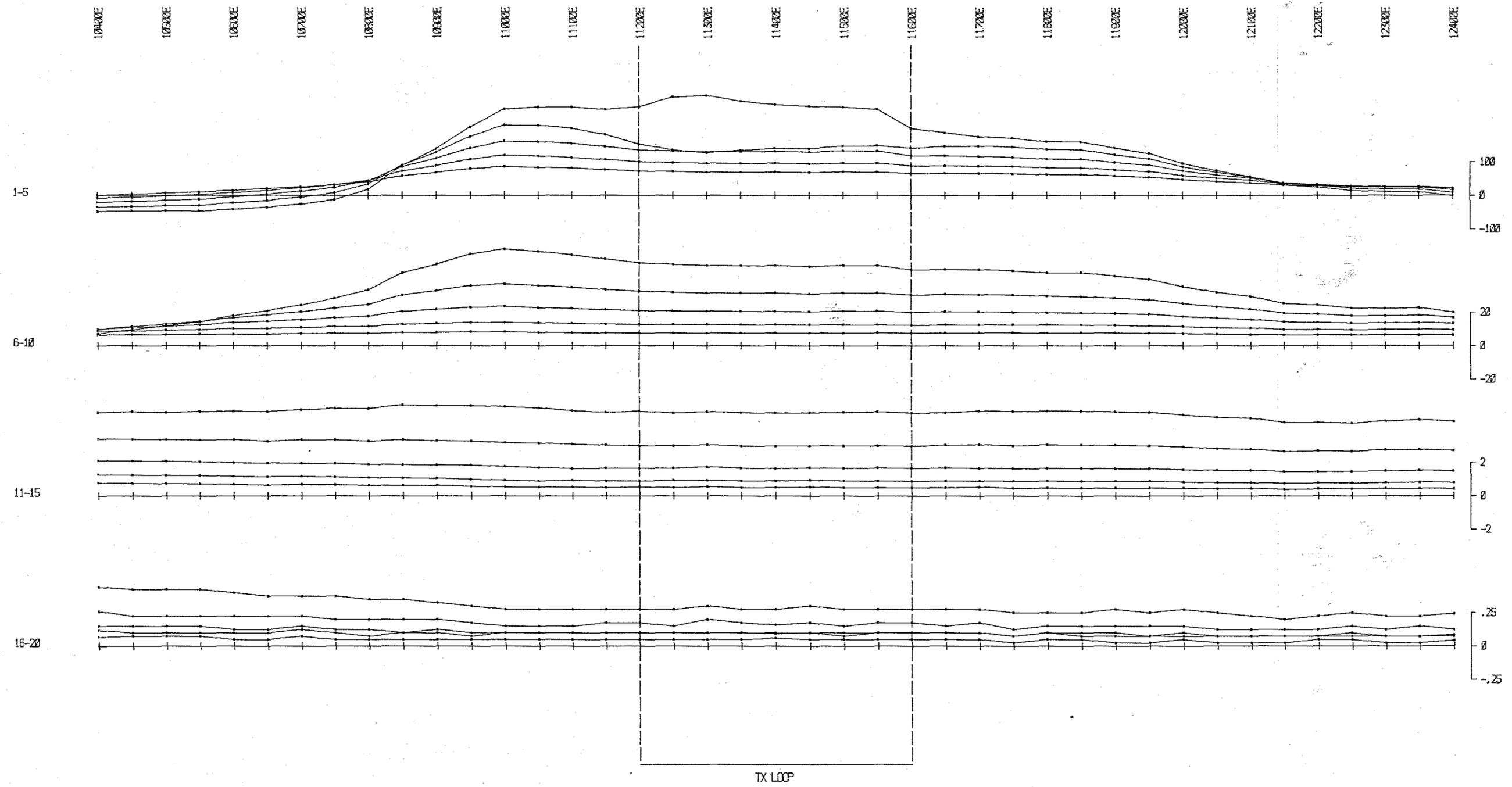
TX LOOP SIDES : 07300N 11200E
 : 08600N 11600E
TX LOOP SIZE : 800 m X 400 m
TX TURN OFF TIME : 390 microseconds
FIRST GATE TIME : 89.5 microseconds
CURRENT : 12.0 amps
FREQUENCY : 25 Hz
INTEGRATION TIME : 256 cycles
SYNC MODE : CRYSTAL
HORIZONTAL SCALE : 1:5000
SURVEYED BY : PEJP
DATE : 10/04/1985

	SURVEYED AND COMPILED BY GEOTREX PTY. LTD.	PROJECT NO. 85-1958
	CLIENT : Billiton Australia PROJECT : Cattley Range AREA : Guildford Tasmania LINE : 08200N X TX LOOP : 3	

050

049

VERTICAL COMPONENT \dot{B} (Z)

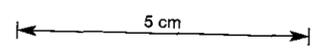


EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125044



nanovolts per amp metre squared

TX LOOP SIDES : 07800N 11200E
 : 08600N 11600E
TX LOOP SIZE : 800 m X 400 m
TX TURN-OFF TIME : 330 microseconds
FIRST GATE TIME : 88.5 microseconds
CURRENT : 12.0 amps
FREQUENCY : 25 Hz.
INTEGRATION TIME : 256 cycles
SYNC MODE : CRYSTAL
HORIZONTAL SCALE : 1:5000
SURVEYED BY : PEJP
DATE : 12/04/1985

SURVEYED AND COMPILED BY : GEOTERRIX PTY. LTD. PROJECT NO. 85-1858

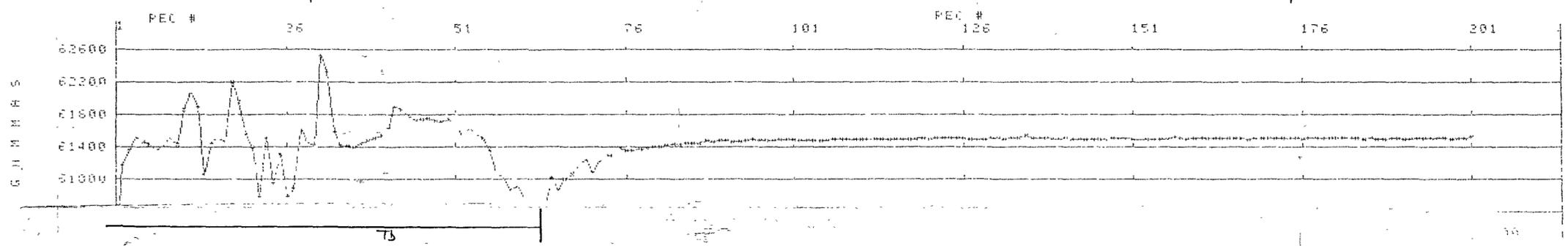
CLIENT : Billiton Australia
PROJECT : Cattley Range
AREA : Guildford Tasmania
LINE : 08600N Z
TX LOOP : 3

049

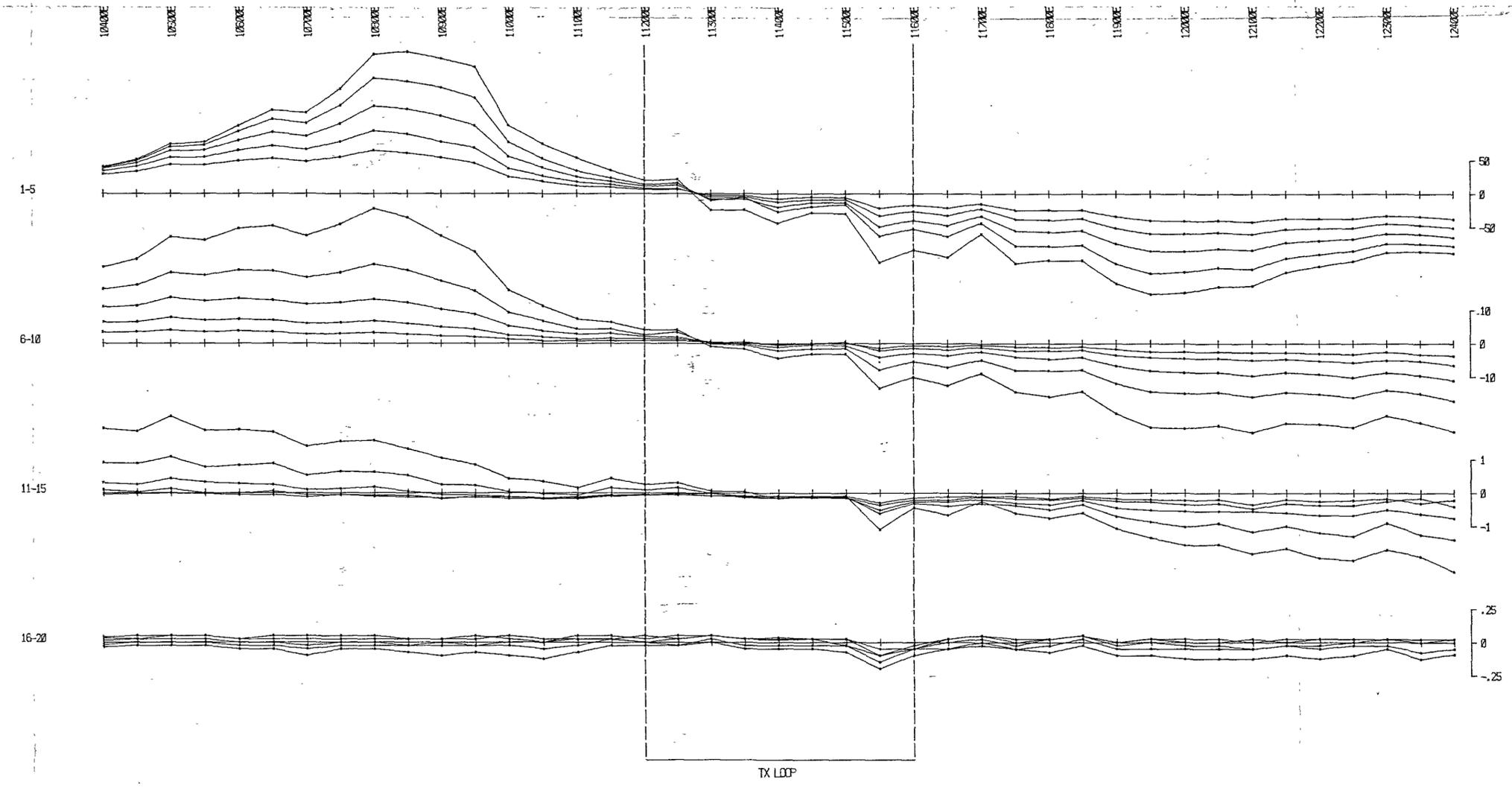
048

COLLECTED DATA
 PLOT Line Name = 08600N
 FROM Pec # = 71
 TO Pec # = 281
 REGIONAL REMOVAL BY HQ = ON
 H-EMIS SCALE (m/sec) = 250

SCALE
 MANUPL
 BASE PEAKING (gamma) = 26000
 PEAKING SCALE (gamma) = 0400
 H-EMIS SCALE (m/sec) = 250

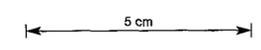


LEGEND
 LINE 8600N
 FROM 10400 E
 TO 12400 E
 STATION SPACING 10 m/E
 MIN PEAKING = 0050
 MAX PEAKING = 62533
 AVG PEAKING = 61464



EM-37
 FIXED TRANSMITTER SURVEY
 ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
 TIME DERIVATIVE OF FLUX DENSITY (B)

125045



nanovolts per amp metre squared

TX LOOP SIDES : 07800N 11200E
 : 09600N 11600E
 TX LOOP SIZE : 800 m X 400 m
 TX TURN OFF TIME : 390 microseconds
 FIRST GATE TIME : 88.5 microseconds
 CURRENT : 12.0 amps
 FREQUENCY : 25 Hz.
 INTEGRATION TIME : 258 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : PEJP
 DATE : 12/04/1985

SURVEYED AND COMPILED BY GEOTERREX P.TY. LTD. PROJECT NO. 85-1658

CLIENT : Billiton Australia
 PROJECT : Castley Range
 AREA : Guildford Tasmania
 LINE : 08600N X
 TX LOOP : 3

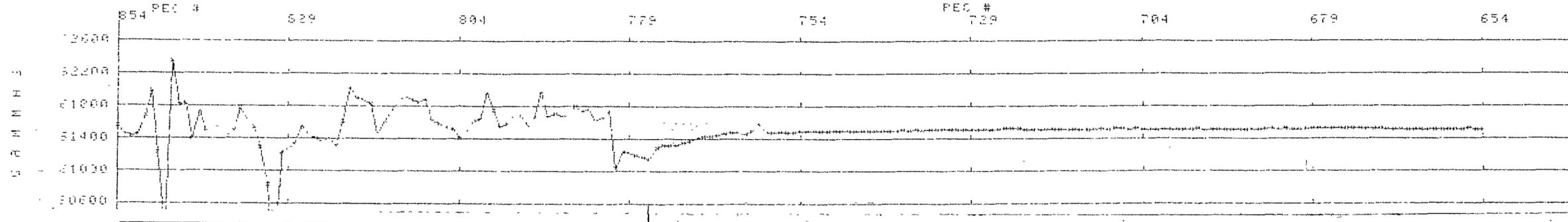
048

048

047

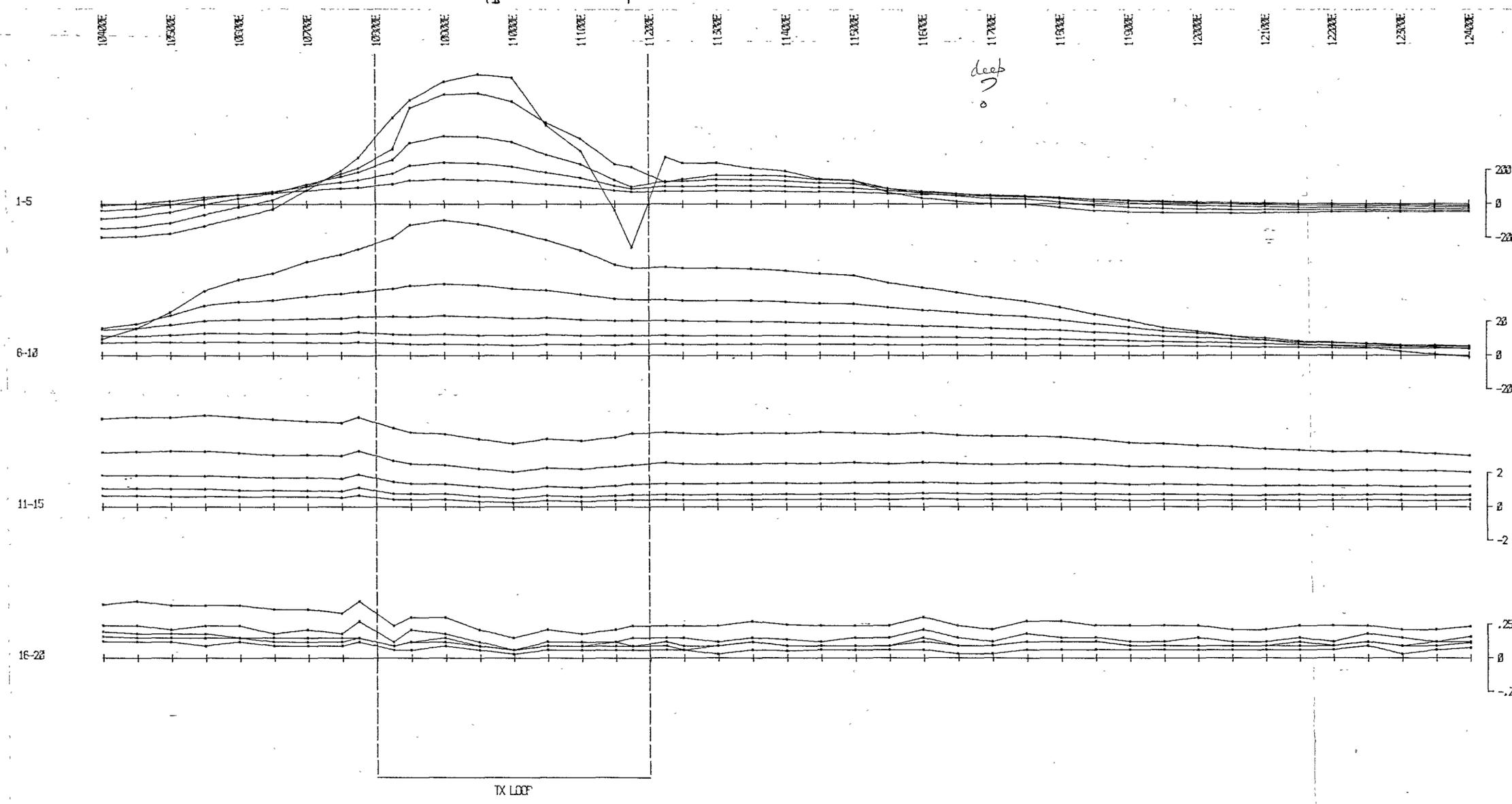
SCALE
MANUAL

BASE READING (assumed) = 259630
READING SCALE (30 cm) = 0480
HORIZONTAL SCALE (1075 cm) = 050



LEGEND

LINE 8800N
FROM 10400 E
TO 12400 E
STATION SPACING 10 m
MIN READING = 20527
MAX READING = 22356
AVG READING = 21530

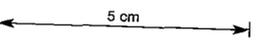


EM-37
FIXED
TRANSMITTER
SURVEY

ELECTROMOTIVE FORCE INDUCED BY
SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY (B)

125046



nanovolts per amp metre squared

TX LOOP SIDES : 09600N 10800E
 : 09800N 11200E

TX LOOP SIZE : 800 m X 400 m

TX TURN OFF TIME : 311 microseconds

FIRST GATE TIME : 88.5 microseconds

CURRENT : 3.9 amps

FREQUENCY : 25 Hz

INTEGRATION TIME : 256 cycles

SYNC MODE : CRYSTAL

HORIZONTAL SCALE : 1:50000

SURVEYED BY : PELP

DATE : 07/04/1995

SURVEYED AND COMPILED BY
GEOTERREX P.Y. LTD. PROJECT NO.
95-1959

CLIENT : B. Ilton Australia

PROJECT : Cattley Range

AREA : Gulldfs-a Tasmania

LINE : 09800N Z

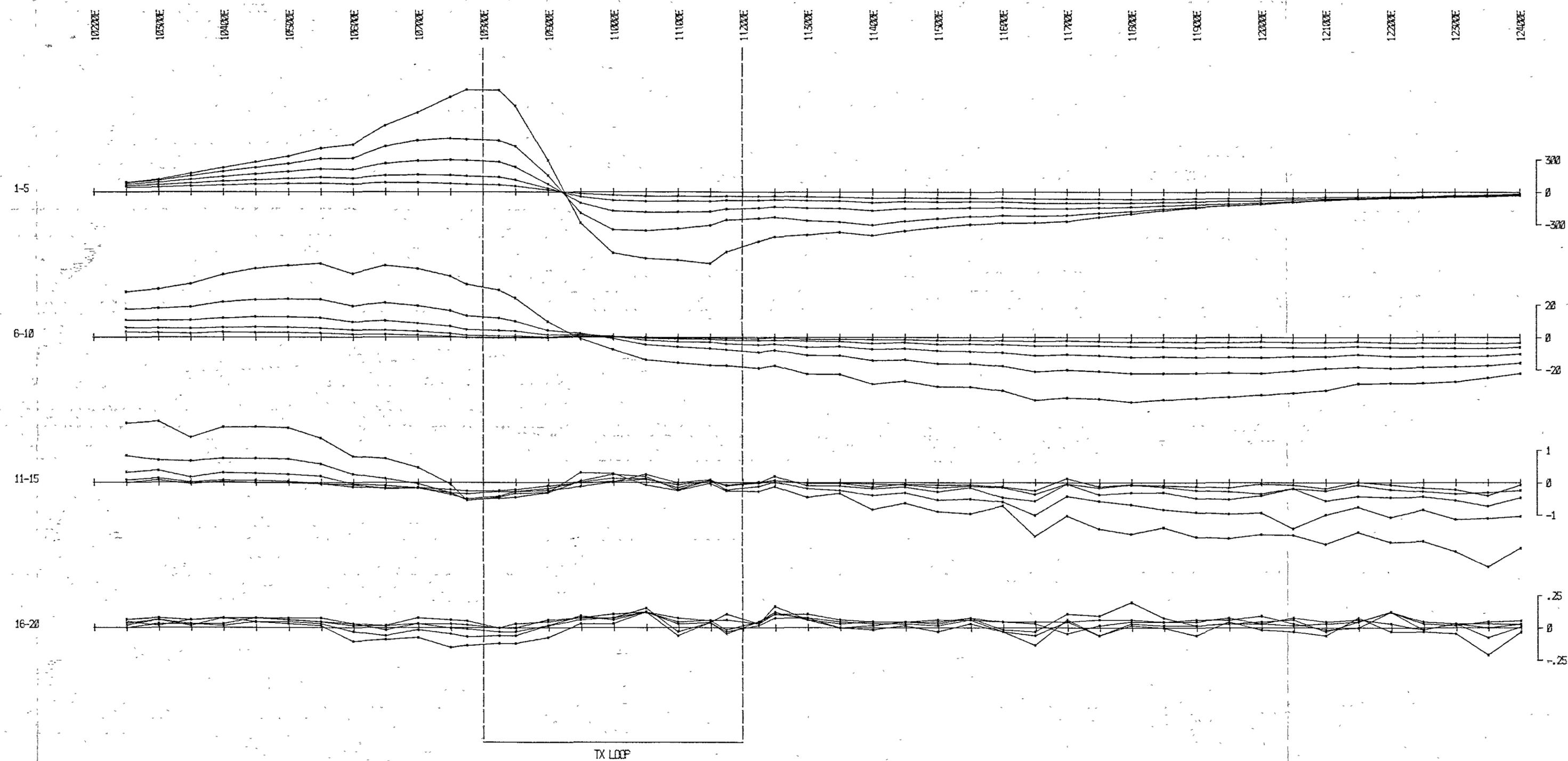
TX LOOP : 2

047

047

046

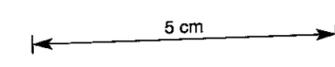
HORIZONTAL COMPONENT B (X)



EM-37
FIXED
TRANSMITTER
SURVEY

ELECTROMOTIVE FORCE INDUCED BY
SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (dB)

125047



nanovolts per amp metre squared

TX LOOP SIDES : 0900N 10900E
 : 09600N 11200E
TX LOOP SIZE : 600 m X 400 m
TX TURN OFF TIME : 311 microseconds
FIRST GATE TIME : 88.5 microseconds
CURRENT : 9.9 amps
FREQUENCY : 25 Hz.
INTEGRATION TIME : 256 cycles
SYNC MODE : CRYSTAL
HORIZONTAL SCALE : 1:5000
SURVEYED BY : PEJP
DATE : 05/04/1995

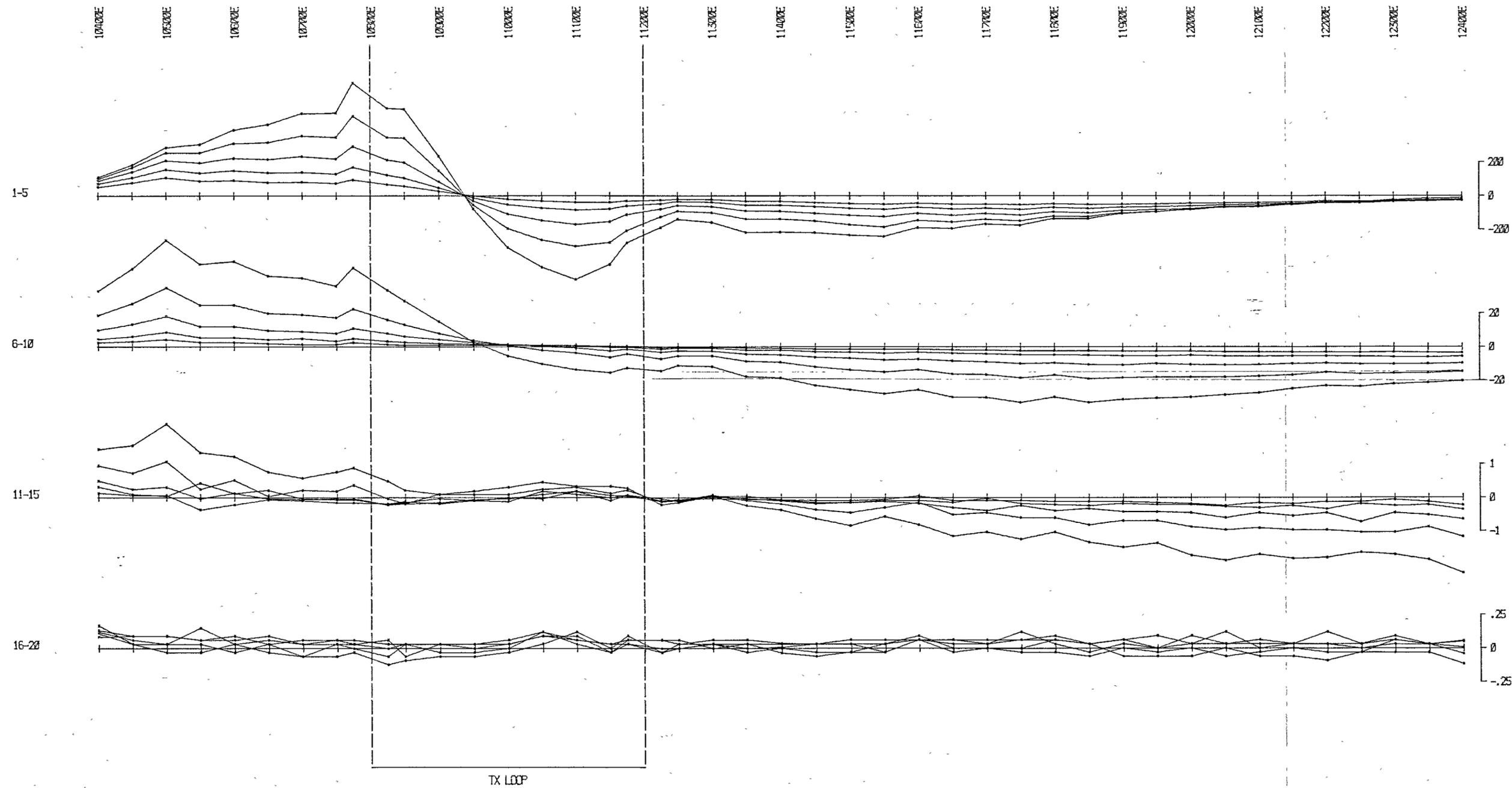
	SURVEYED AND COMPILED BY GEOTREX PTY. LTD.	PROJECT NO. 85-1858
--	---	------------------------

CLIENT : Billiton Australia
PROJECT : Cattley Range
AREA : Guildford Tasmania
LINE : 09200N X
TX LOOP : 2

046

045

HORIZONTAL COMPONENT B (X)



EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD

TIME DERIVATIVE OF FLUX DENSITY (B)

125048

5 cm

nanovolts per amp metre squared

TX LOOP SIDES : 09600N 10800E
 : 09900N 11200E
 TX LOOP SIZE : 800 m X 400 m
 TX TURN OFF TIME : 311 microseconds.
 FIRST GATE TIME : 88.5 microseconds.
 CURRENT : 9.9 amps
 FREQUENCY : 25 Hz.
 INTEGRATION TIME : 256 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : PCJP
 DATE : 07/04/1995



SURVEYED AND COMPILED BY
 GEOTERRAX PTY. LTD.

PROJECT NO.
 95-1339

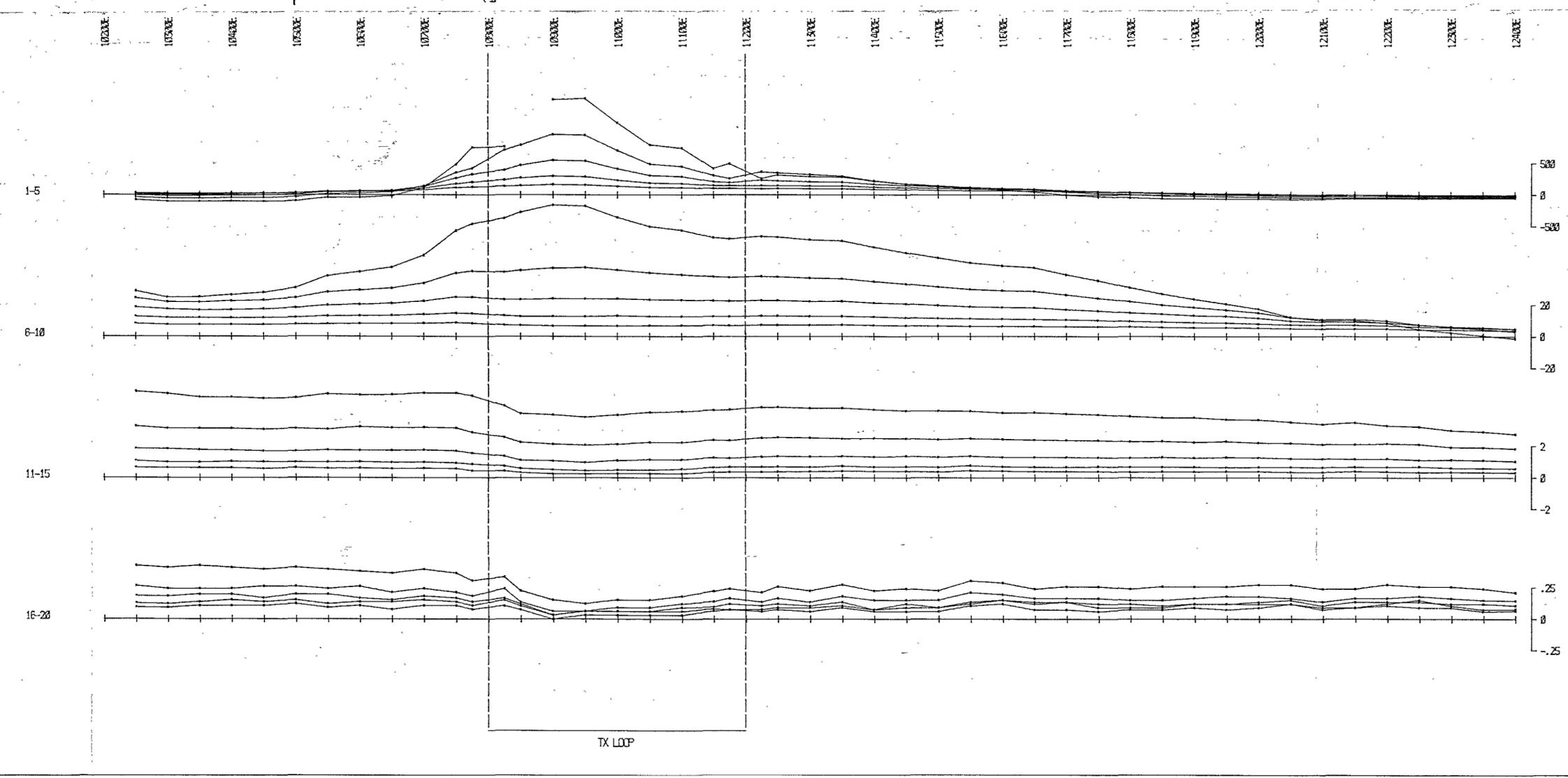
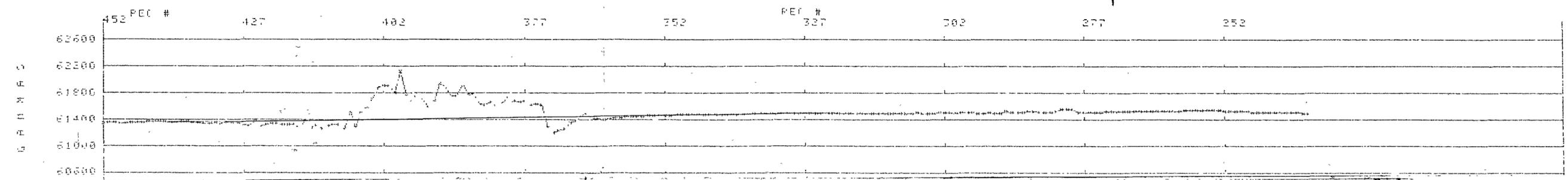
CLIENT : Billiton Australia
 PROJECT : Cattley Range
 AREA : Guildford Tasmania
 LINE : 09600N X
 TX LOOP : 2

045

11044

COLLECTED DATA
PLOT Line Name = 79300H
FROM Rec # = 452
TO Rec # = 2337
REGIONAL REMOVAL BY H3 = ON

SCALE:
MANUAL
BASE READING (ammeter) = 70000
READING SCALE (cm cm) = 100
X-AXIS SCALE (cm cm) = 250



EM-37
FIXED TRANSMITTER SURVEY
ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125049
5 cm

TX LOOP SIDES : 9920N 10920E
: 09620N 11220E
TX LOOP SIZE : 900 m X 400 m
TX TURN OFF TIME : 311 microseconds
FIRST GATE TIME : 93.5 microseconds
CURRENT : 9.9 amps
FREQUENCY : 25 Hz.
INTEGRATION TIME : 256 cycles
SYNC MODE : CRYSTAL
HORIZONTAL SCALE : 1:5000
SURVEYED BY : PEJP
DATE : 05/04/1985

SURVEYED AND COMPILED BY GERTERREX P.TY. LTD. PROJECT NO. 95-1959

CLIENT : Billiton Australia
PROJECT : Cattle Range
AREA : Guilford Tasmania
LINE : 09200N Z
TX LOOP : 2

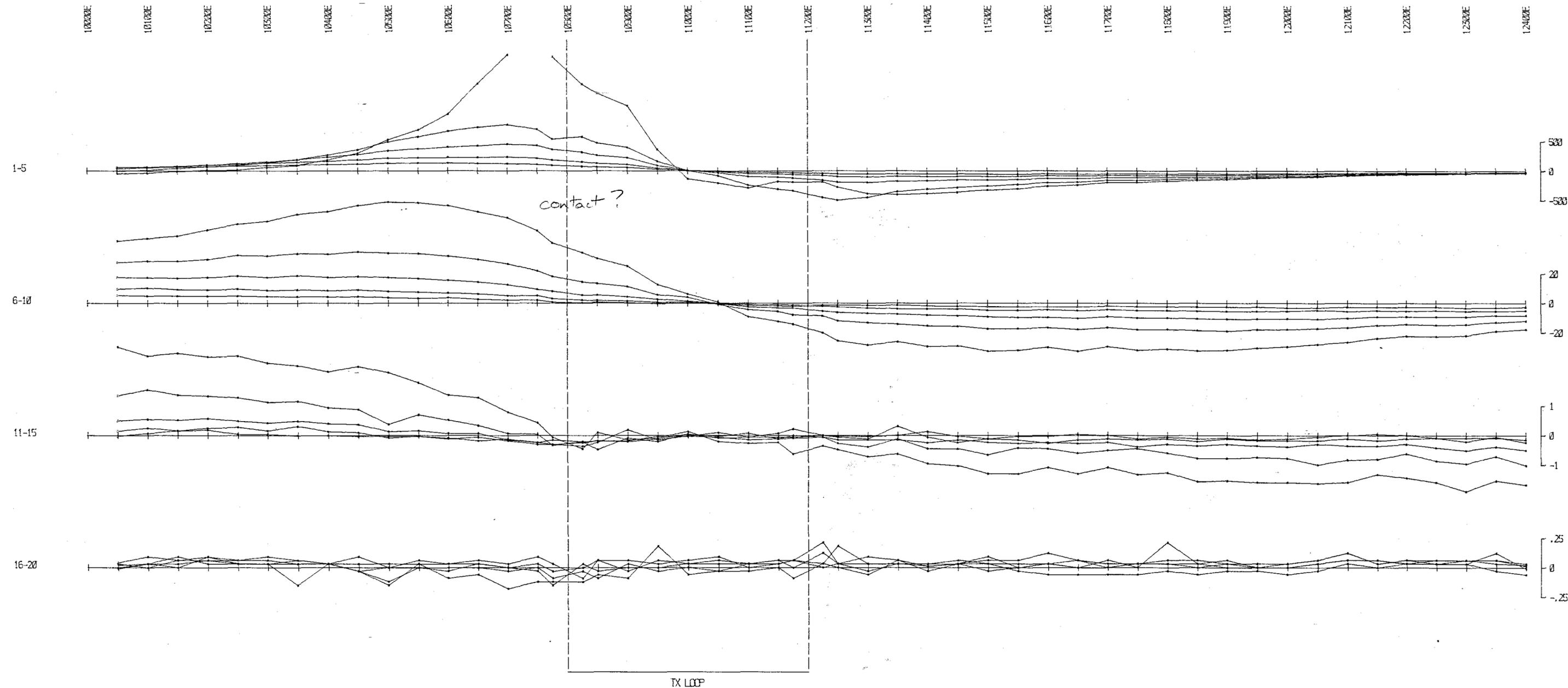
LINE FROM TO STATE MIN MAX

044

044

043

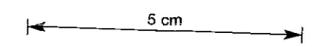
HORIZONTAL COMPONENT B (X)



EM-37
FIXED
TRANSMITTER
SURVEY

ELECTROMOTIVE FORCE INDUCED BY
SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125050



nanovolts per amp metre squared

TX LOOP SIDES : 09600N 10900E
 : 09800N 11200E
TX LOOP SIZE : 800 m X 400 m
TX TURN OFF TIME : 311 microseconds.
FIRST GATE TIME : 98.5 microseconds.
CURRENT : 9.9 amps
FREQUENCY : 25 Hz.
INTEGRATION TIME : 256 cycles
SYNC MODE : CRYSTAL
HORIZONTAL SCALE : 1:50000
SURVEYED BY : PELP
DATE : 06/04/1995

SURVEYED AND COMPILED BY
GEOTERREX PTY. LTD. PROJECT NO.
95-1959

CLIENT : Billiton Australia
PROJECT : Cattley Range
AREA : Guildford Tasmania
LINE : 09400N X
TX LOOP : 2

043

043

042

CORRECTED DATA

PL07 Line Name = 09400N

FROM Rec # = 01

TO Rec # = 226

REGIONAL PERMITS BY HQ ARCH

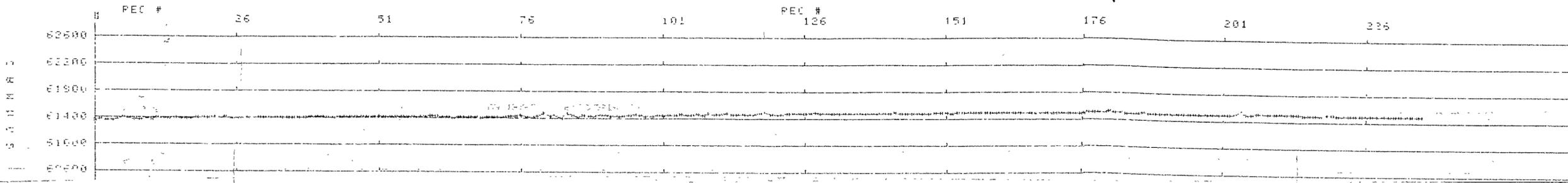
SCALE

MANUAL

BASE READING (meters) = 100000

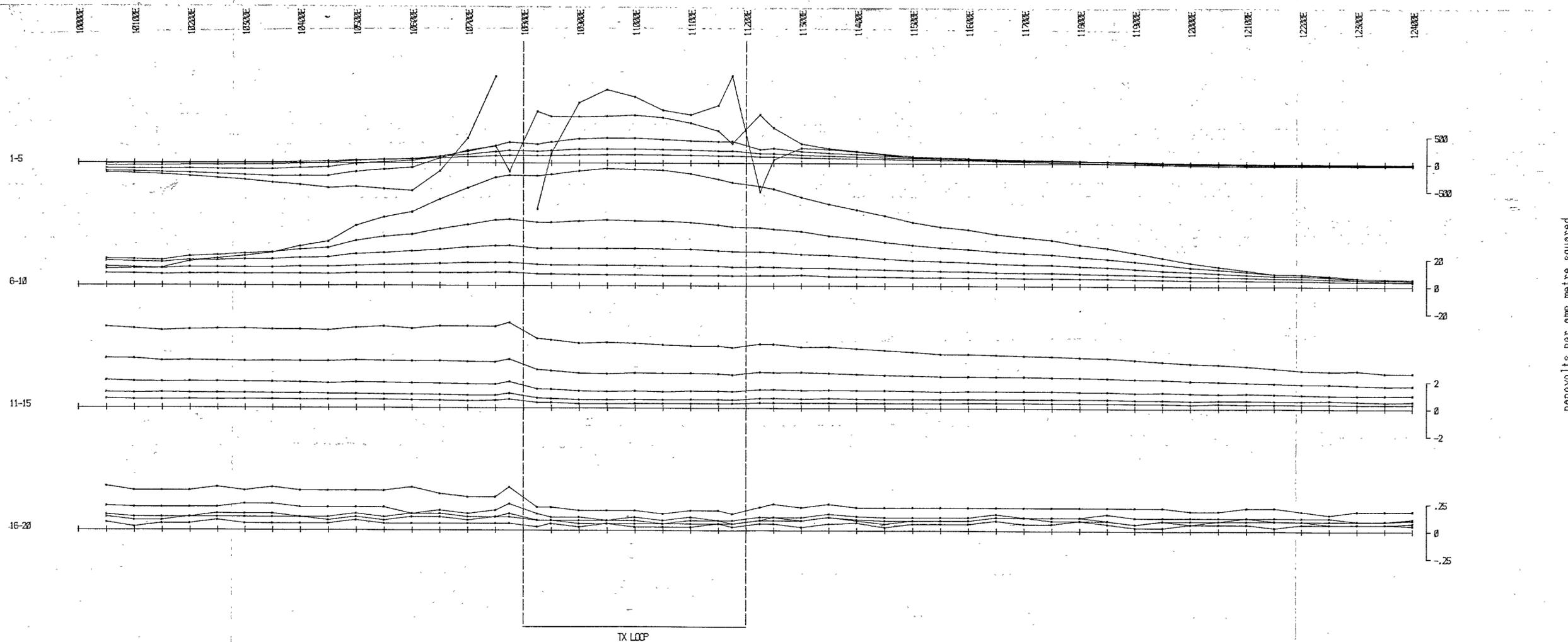
READING SCALE (meters) = 0.100

HORIZONTAL SCALE (meters) = 1:500



LEGEND

LINE :	09400N
FROM :	10050 E
TO :	12400 F
STATION SPACING :	10 m
MIN READING =	81248
MAX READING =	81536
AVG READING =	81454



EM-37
FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125051

5 cm

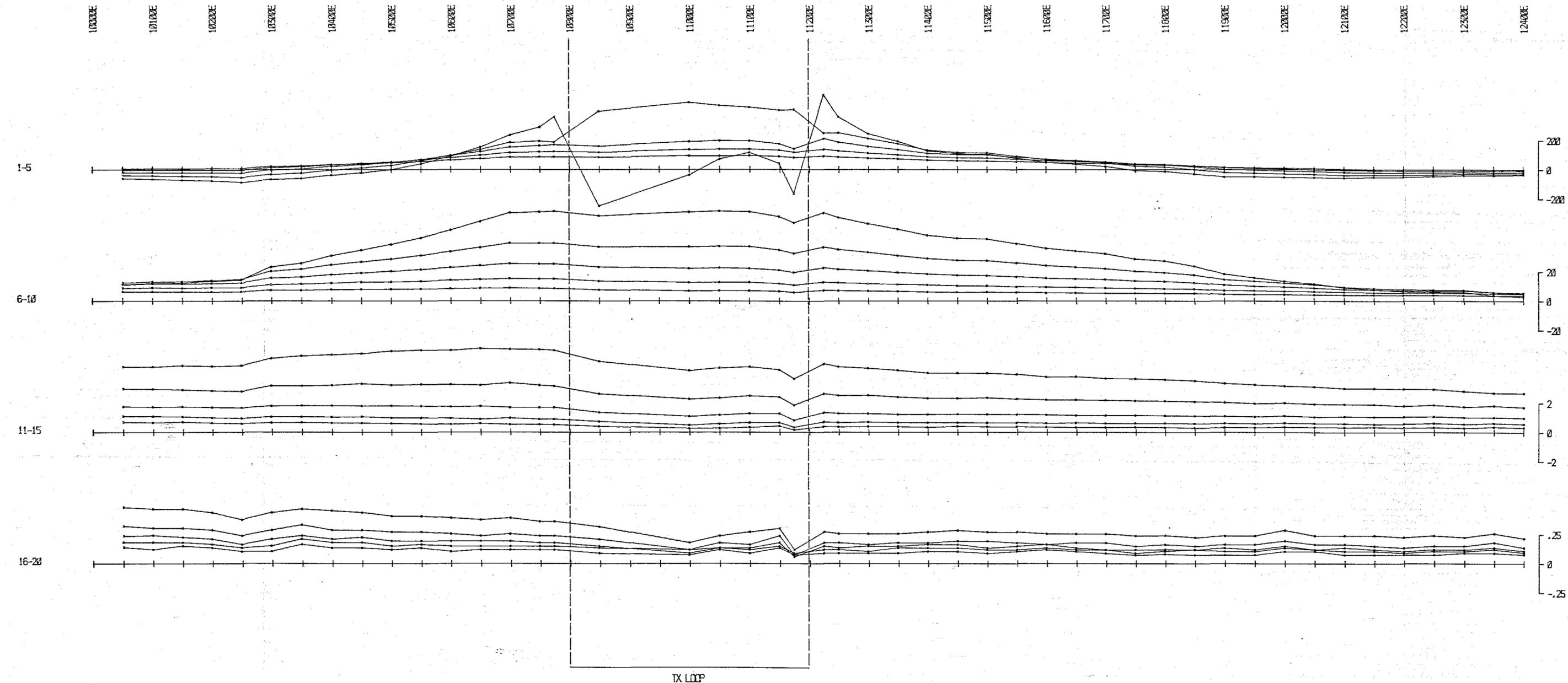
TX LOOP SIDES :	09400N 10900E
	09900N 11200E
TX LOOP SIZE :	900 m X 400 m
TX TURN OFF TIME :	311 microseconds
FIRST GATE TIME :	99.5 microseconds
CURRENT :	9.9 amps
FREQUENCY :	25 Hz
INTEGRATION TIME :	256 cycles
SYNC MODE :	CRYSTAL
HORIZONTAL SCALE :	1:5000
SURVEYED BY :	PLP
DATE :	06/04/1995
SURVEYED AND COMPILED BY GEOTERREX PTY. LTD.	
PROJECT NO. 85-1858	
CLIENT :	Billiton Australia
PROJECT :	Cattley Range
AREA :	Guildford Tasmania
LINE :	09400N Z
TX LOOP :	2

042

042

041

VERTICAL COMPONENT \dot{B} (Z)

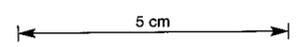


EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125052



nanovolts per amp metre squared

TX LOOP SIDES : 09600N 11200E
 : 09900N 10900E
 TX LOOP SIZE : 800 m X 400 m
 TX TURN OFF TIME : 311 microseconds
 FIRST GATE TIME : 88.5 microseconds
 CURRENT : 9.9 amps
 FREQUENCY : 25 Hz
 INTEGRATION TIME : 256 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : PESD
 DATE : 04/04/1985

	SURVEYED AND COMPILED BY GEOTREX PTY. LTD.	PROJECT NO. 85-1558
	CLIENT : Billiton Australia	

PROJECT : Cattley Range
 AREA : Guildford Tasmania
 LINE : 09600N Z
 TX LOOP : 2

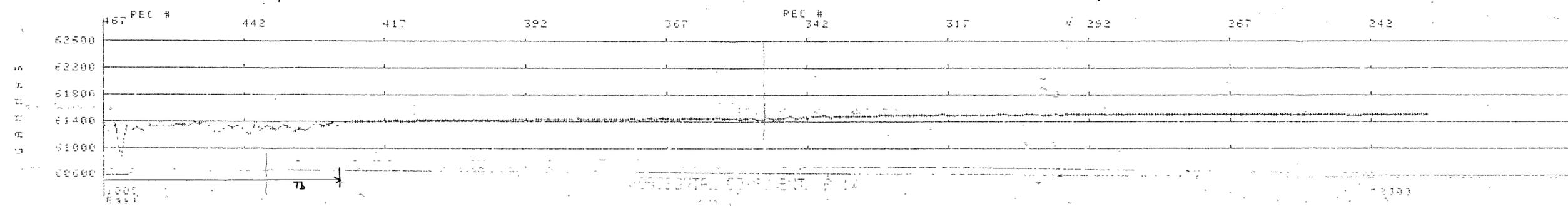
041

041

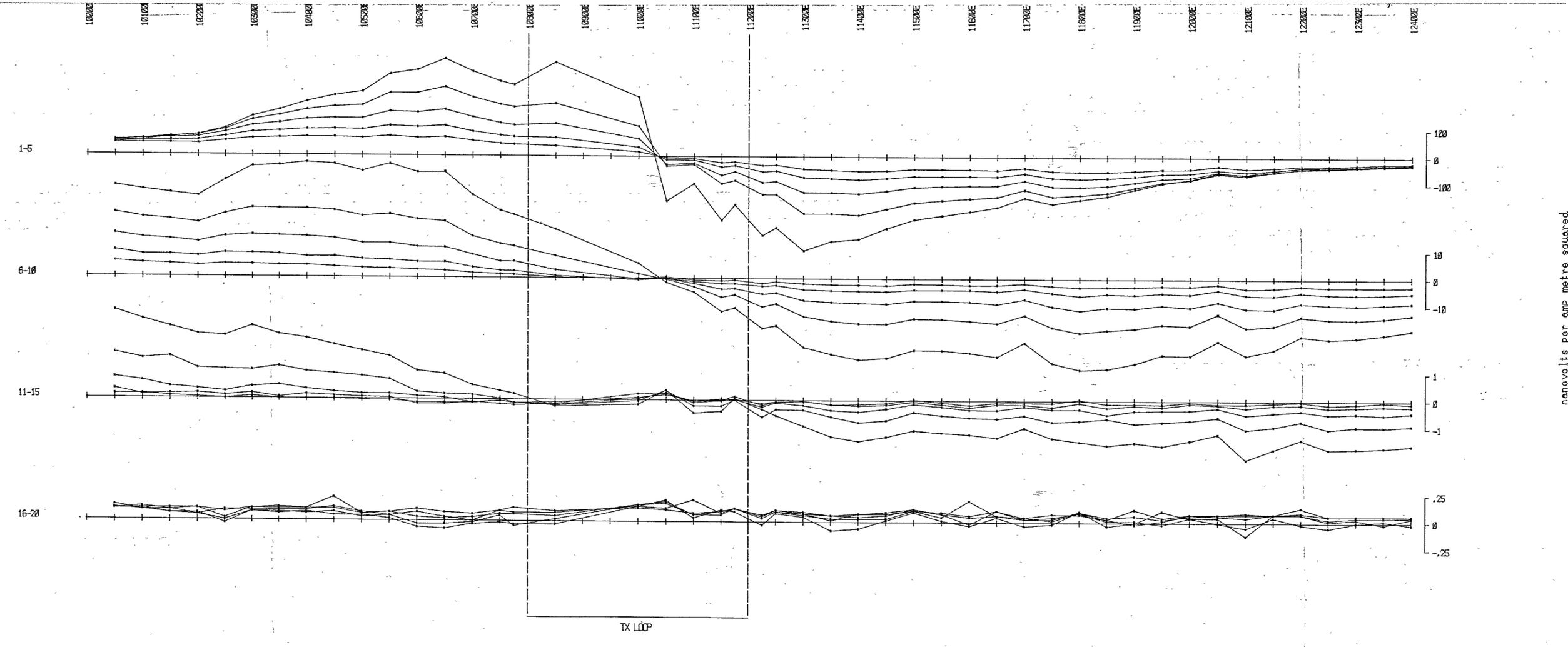
040

COLLECTED DATA
 FLOT Line Name = 02600H
 FROM Rec # = 245
 TO Rec # = 232
 REGIONAL REMOVAL CY NO = N

SCALE
 MANUAL
 BASE PERDING (MIN) = 50500
 PERDING SCALE (MAX) = 1400
 H-Axis SCALE (1:5) = 050



LEGEND
 LINE : 9600H
 FROM : 10050 E
 TO : 12400 E
 STATION SPACING : 10 m
 MIN PERDING : 50500
 MAX PERDING : 61510
 AVG PERDING : 61435



EM-37
 FIXED TRANSMITTER SURVEY
 ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
 TIME DERIVATIVE OF FLUX DENSITY (B)
 125053
 5 cm

TX LOOP SIDES : 09600N 11200E
 : 08800N 12000E
 TX LOOP SIZE : 800 m X 400 m
 TX TURN OFF TIME : 311 microseconds
 FIRST GATE TIME : 88.5 microseconds
 CURRENT : 9.9 amps
 FREQUENCY : 25 Hz
 INTEGRATION TIME : 256 cycles
 SYNC MODE : CRYSTAL
 HORIZONTAL SCALE : 1:5000
 SURVEYED BY : PESD
 DATE : 04/04/1995

SURVEYED AND COMPILED BY GEOFERREX PTY. LTD.	PROJECT NO. 85-1858
---	------------------------

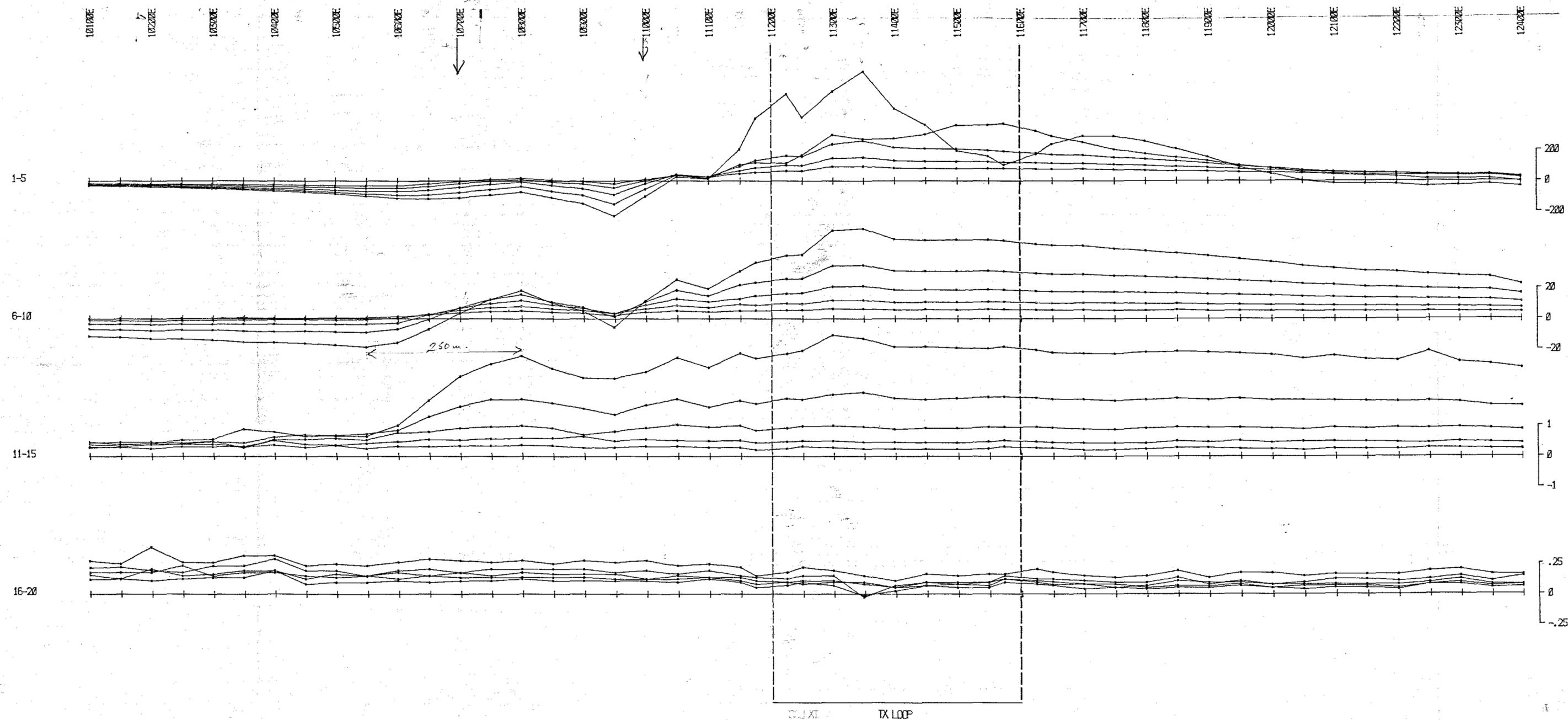
CLIENT : Billiton Australia
 PROJECT : Cattle Range
 AREA : Guildford Tasmania
 LINE : 09600N X
 TX LOOP : 2

040

040

039

VERTICAL COMPONENT $B_z(z)$ (nT)



EM-37

FIXED TRANSMITTER SURVEY

ELECTROMOTIVE FORCE INDUCED BY SECONDARY FIELD
TIME DERIVATIVE OF FLUX DENSITY (B)

125054

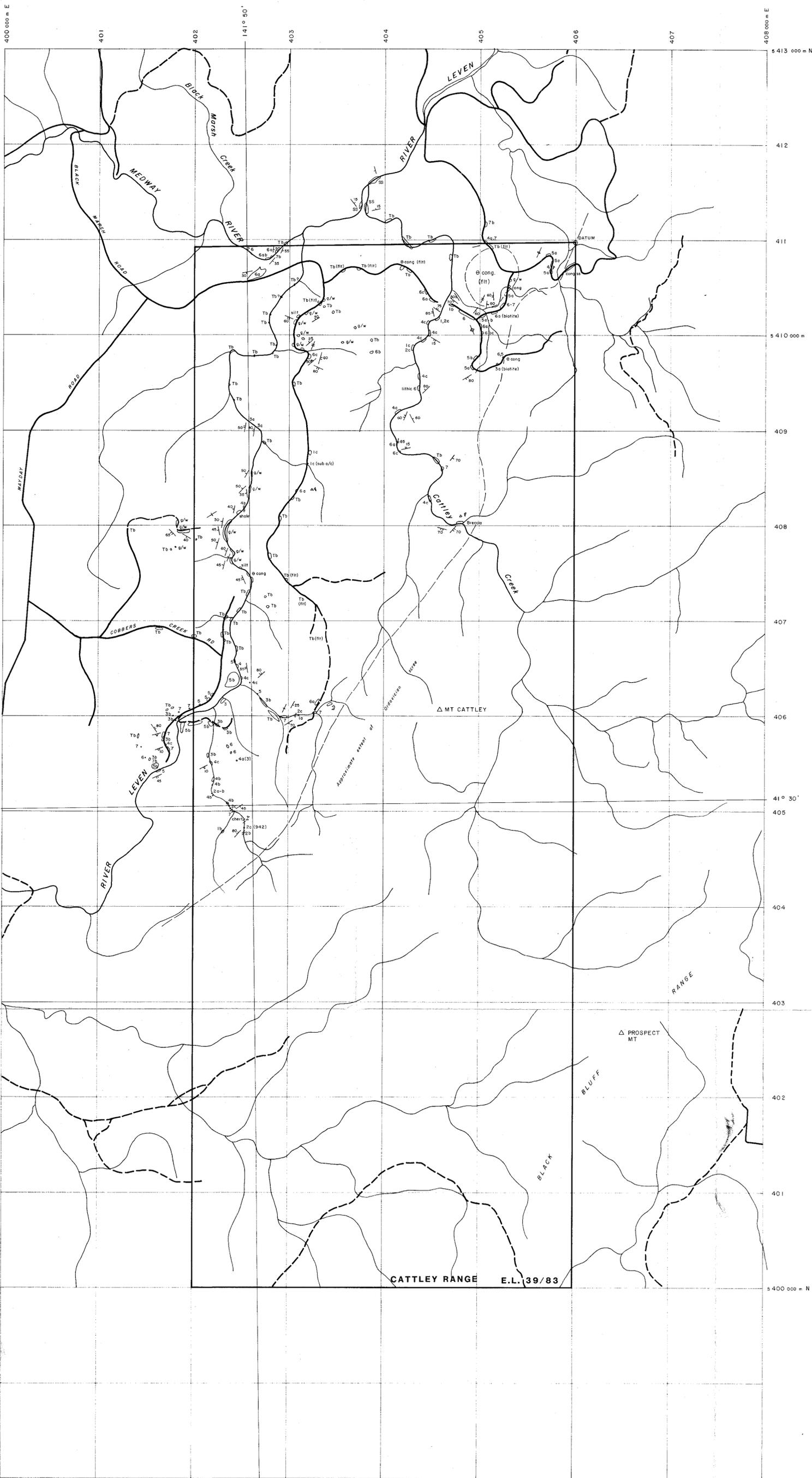
5 cm

nanovolts per amp metre squared

TX LOOP SIDES : 10600N 11600E
 : 09900N 11200E
TX LOOP SIZE : 900 m X 400 m
TX TURN OFF TIME : 349 microseconds
FIRST GATE TIME : 89.5 microseconds
CURRENT : 11.0 amps
FREQUENCY : 25 Hz.
INTEGRATION TIME : 256 cycles
SYNC MODE : CRYSTAL
HORIZONTAL SCALE : 1:5000
SURVEYED BY : PESD
DATE : 02/04/1995

	SURVEYED AND COMPILED BY GEOTREX PTY. LTD.	PROJECT NO. 85-1359
	CLIENT : Billiton Australia PROJECT : Cattley Range AREA : Guildford Tasmania LINE : 09900N Z TX LOOP : 1	

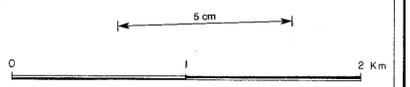
039



- LITHOLOGIES**
- Tertiary**
- Tb Basalt
- Ordovician (O)**
- cong Conglomerate
 - ss Sandstone
 - silt Siltstone
 - g/w Greywacke
- Cambrian**
- 1 Quartz phytic lava
 - 2 Quartz phytic tuff
 - 3 Quartz feldspar phytic lava
 - 4 Quartz feldspar phytic tuff
 - 5 Feldspar phytic lava
 - 6 Feldspar phytic tuff
 - 7 Fine grained tuff - sediment
- Structural Symbols**
- /ss Bedding
 - /s Schistosity
 - /j Jointing
 - fl Float
- Grain Size**
- a > 3 mm
 - b 1 - 3 mm
 - c < 1 mm
 - d Coarse lapilli
- 926 Rock sample, number



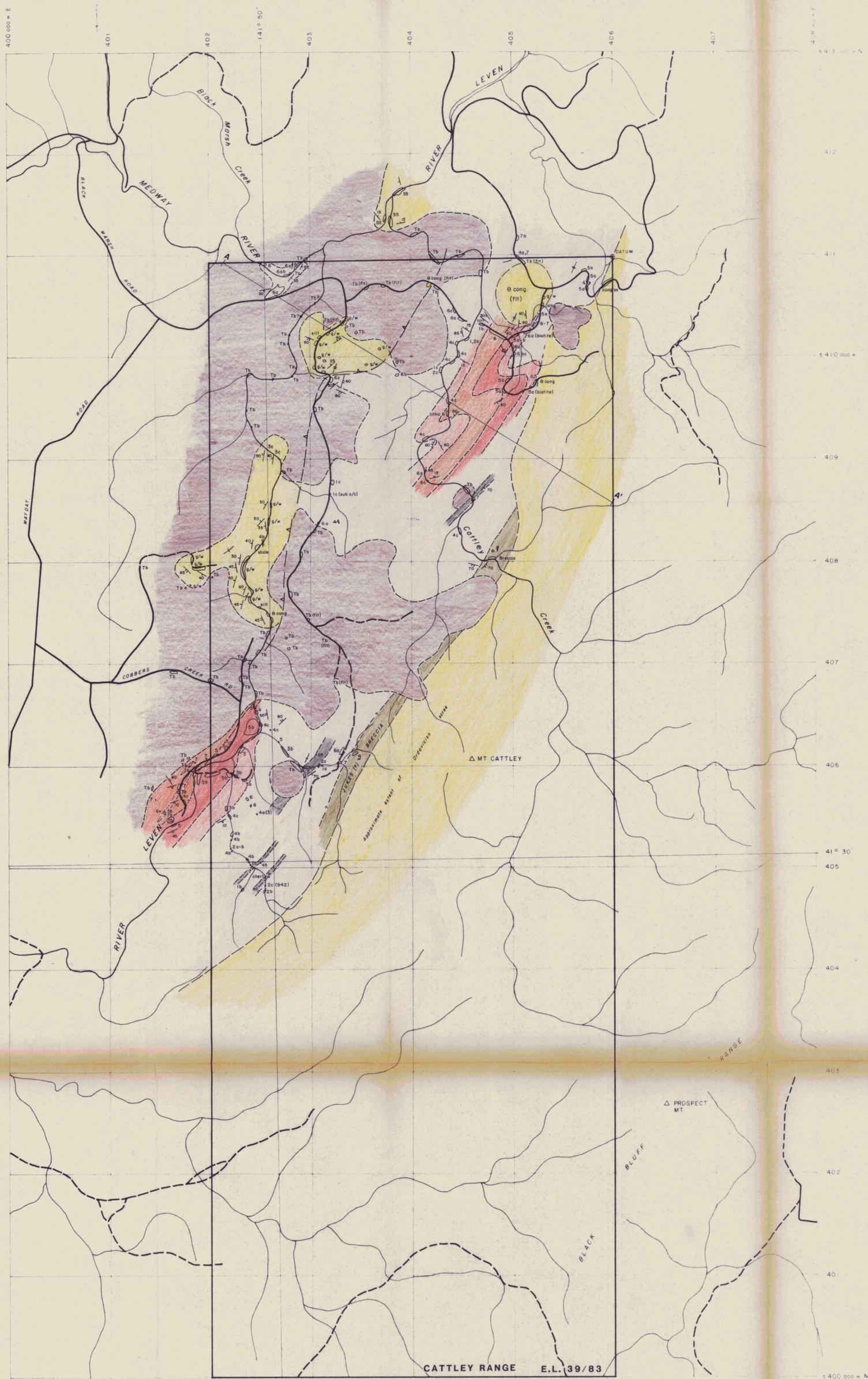
125055



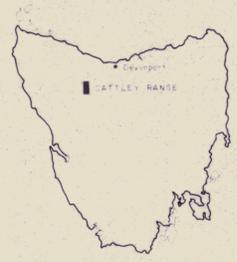
5443

Billion Australia			
CATTLEY RANGE N.W. TASMANIA			
OUTCROP GEOLOGY			
Author	NH, DC	Dept	Scale 1:20,000
Drawn	AS	Date 3/85	Revised Date
Checked		Date	Checked Date
Sheet No.	FIG. 2		Drawing No. LD 51 / 1008

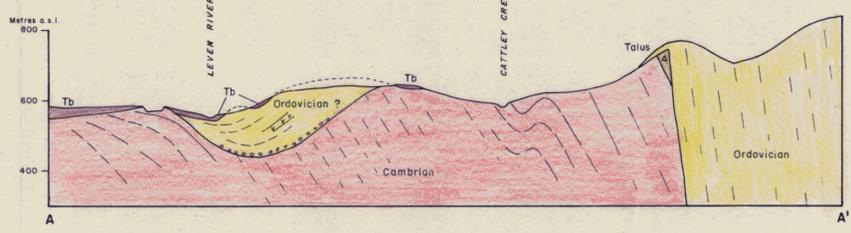
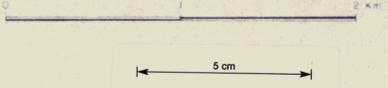
85-2447



- LITHOLOGIES**
- Tertiary**
- Tb Basalt
- Ordovician (O)**
- cong Conglomerate
 - ss Sandstone
 - silt Siltstone
 - g/w Greywacke
- Cambrian**
- 1 Quartz phytic lava
 - 2 Quartz phytic tuff
 - 3 Quartz feldspar phytic lava
 - 4 Quartz feldspar phytic tuff
 - 5 Feldspar phytic lava
 - 6 Feldspar phytic tuff
 - 7 Fine grained tuff - sediment
- Structural Symbols**
- /ss Bedding
 - /so Schistosity
 - / Jointing
 - flr Float
- Grain Size**
- o > 3 mm
 - b 1 - 3 mm
 - c < 1 mm
 - 4p Coarse lapilli
- 926 Rock sample, number



5444



Billion Australia

CATTLEY RANGE
N.W. TASMANIA

GEOLOGICAL INTERPRETATION

Scale: 1:25,000	Date: 2/85
Author: A.S.	Editor: J.S.
Project: 125056	Figure: 3

LD 51 / 1017

ASSAY RESULTS

14 (-0-012,-0-05) Copper (Std)

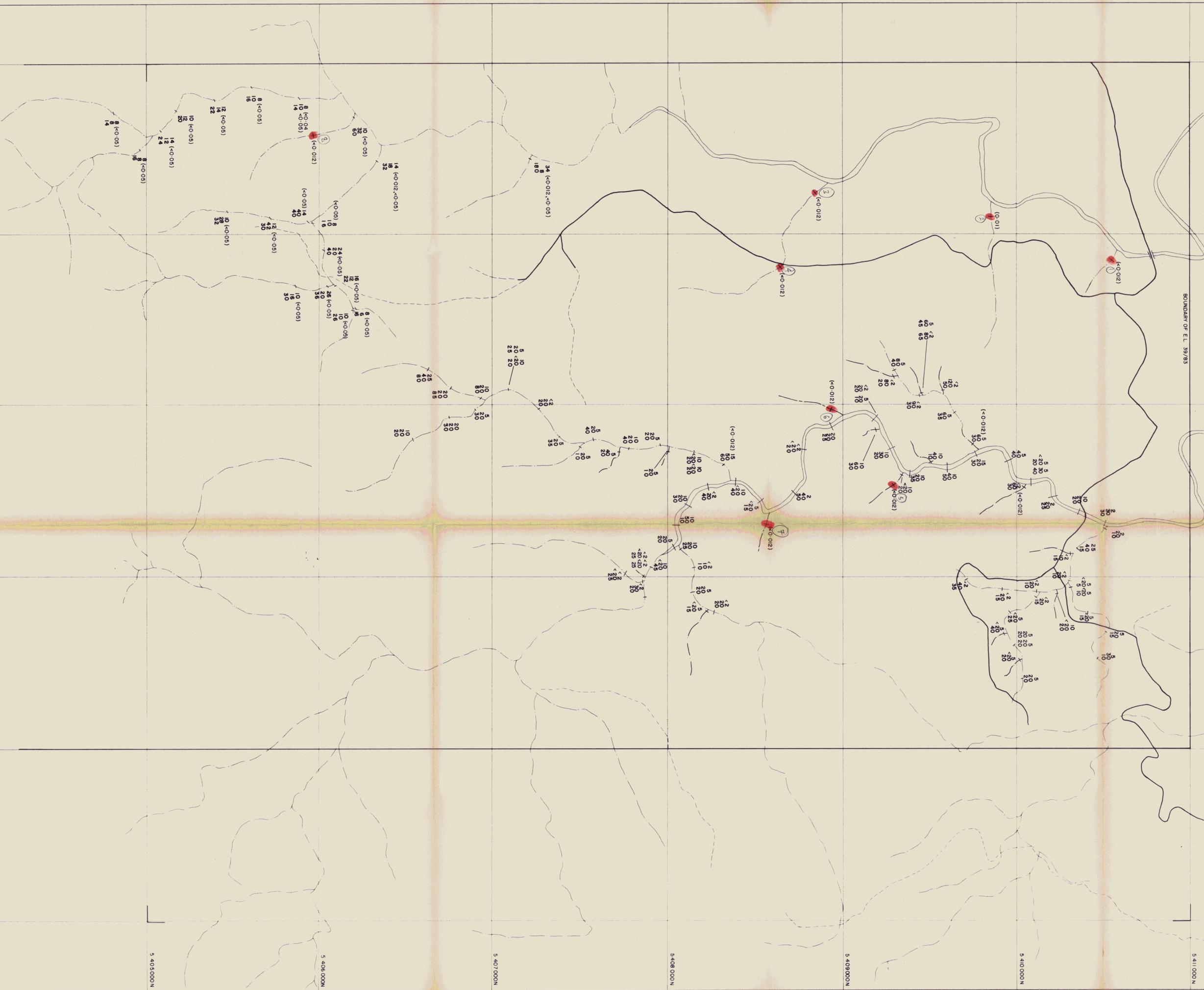
18 Lead

32 Zinc

5 cm

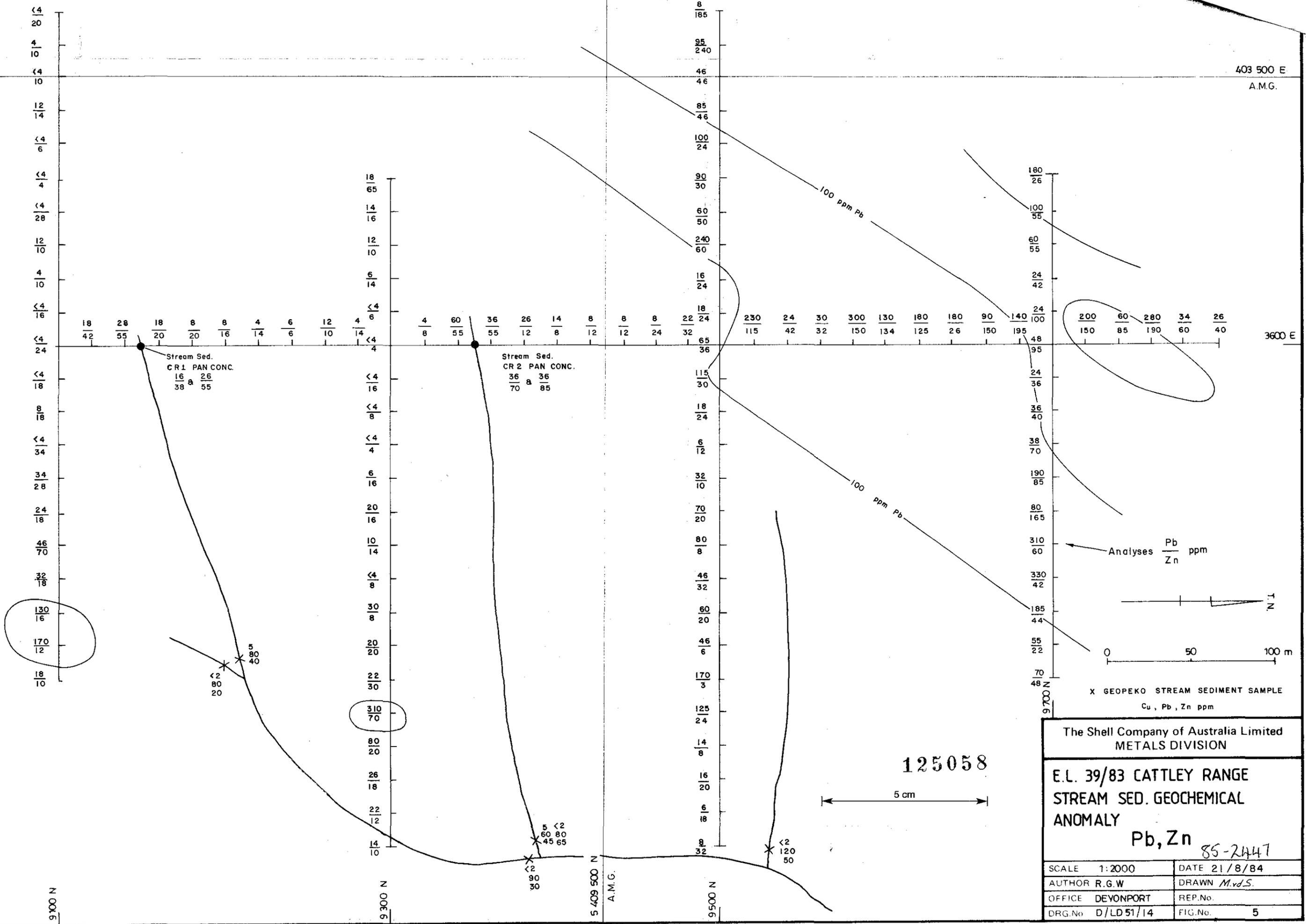
125057 5445

The Shell Company of Australia Limited METALS DIVISION			
CATTLEY RANGE 85-2447			
STREAM SEDIMENT GEOCHEMISTRY RESULTS			
SCALE 1:10000	DATE		
AUTHOR W.D.S	DRAWN J.B		
OFFICE A.H.O.	REP.No.		
DRG.No. LD51/1011	FIG.No. 4		



403 500 E
A.M.G.

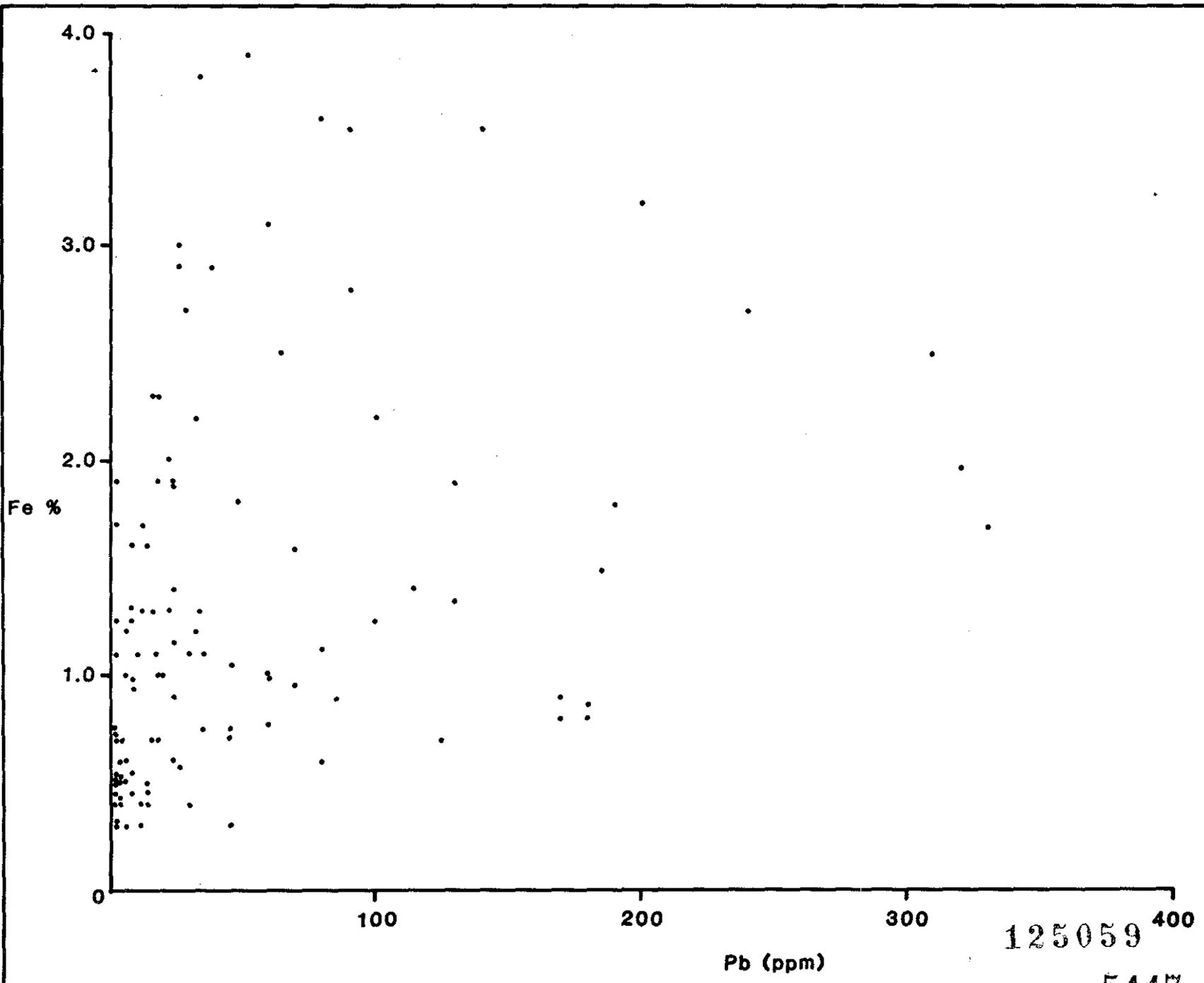
3600 E



The Shell Company of Australia Limited
 METALS DIVISION

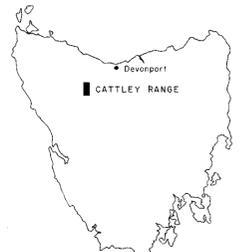
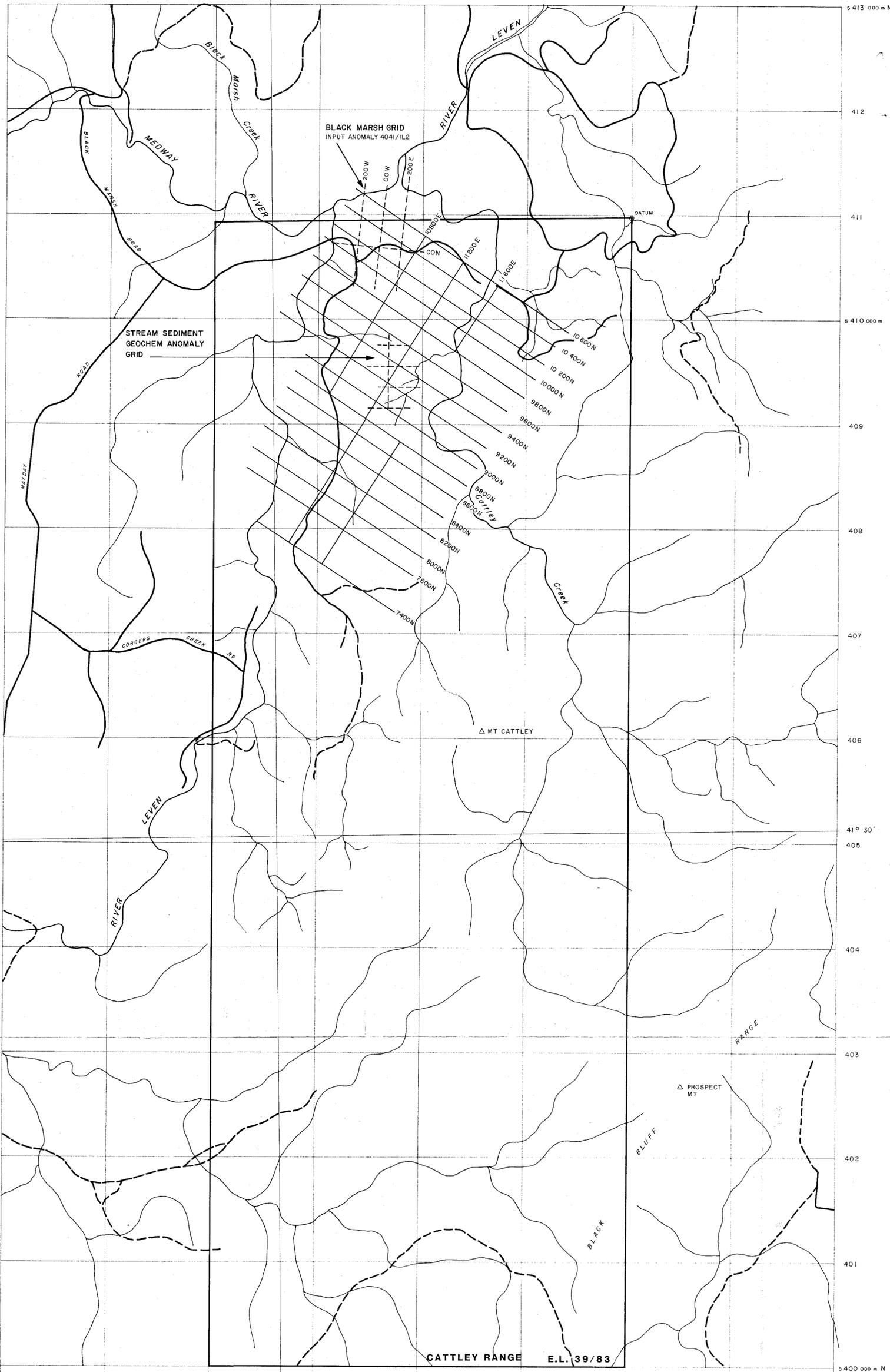
E.L. 39/83 CATTLEY RANGE
 STREAM SED. GEOCHEMICAL
 ANOMALY
 Pb, Zn
 85-2447

SCALE 1:2000	DATE 21/8/84
AUTHOR R.G.W	DRAWN M.v.S.
OFFICE DEVONPORT	REP.No.
DRG.No D/LD 51/14	FIG.No. 5



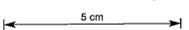
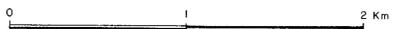
Billiton Australia <small>The Metals Division of The BHP Company of Australia Limited</small>			
Project CATTLEY RANGE			
Title STREAM SEDIMENT GEOCHEMICAL ANOMALY LEAD vs IRON			
Author D.C.	Date 7/88	Scale	
Drawn	Office	Revised	Date
Drawing No. LD51/1018	Fig. No. 6		

125059
5447
85-2447

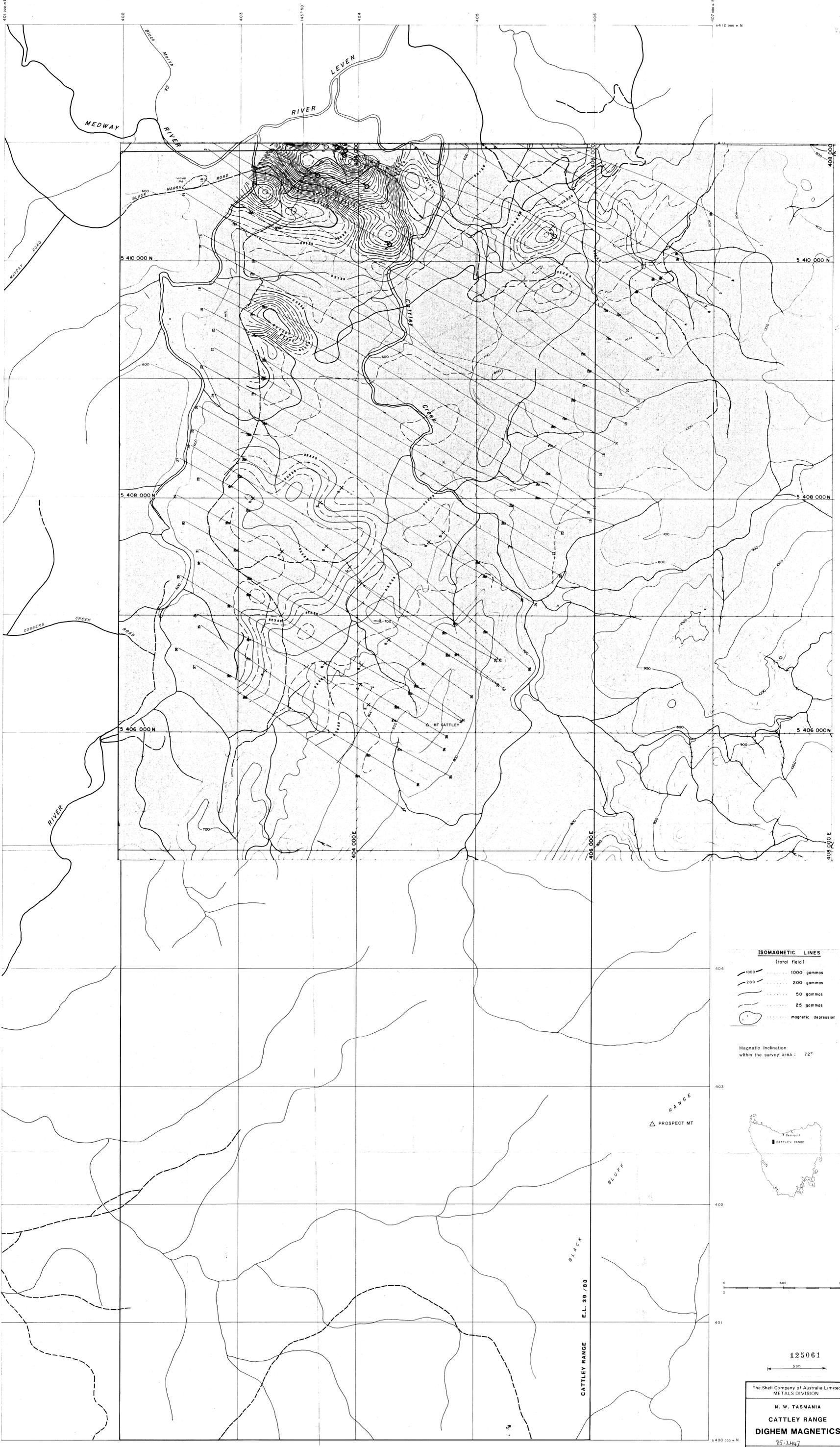


5449

--- BLACK MARSH AND GEOCHEM ANOMALY GRIDS. SEE REP. No. 08-2489 (1984)
 ——— MAIN GRID FOR 1985 EM-37 SURVEY
 N.B. Grids are approximate



Billion Australia				
CATTLE RANGE N.W. TASMANIA				
GRID PLAN				
85-2447				
Author	NH, DC	Dept.	Scale 1:20,000	
Drawn	AS	Date 3/85	Revised	Date
Checked	Date	S'ced	Date	
Sheet No.	FIG. 7	Drawing No.	LD 51 / 1012	



ISOMAGNETIC LINES
(total field)

- 1000
- 200
- 50
- 25
- magnetic depression

Magnetic Inclination
within the survey area : 72°



125061

The Shell Company of Australia Limited
METALS DIVISION

N. W. TASMANIA
CATTLE RANGE
DIGHEM MAGNETICS

85-2447

SCALE	1:10,000	DATE	March 1985
EDITION	NH, BC	DIVISION	AS
DRAWN BY	AND	CHECKED BY	
DRG. NO.	LD 51/1006	FIG. NO.	8

GEOLOGY
& TOPOGRAPHY

TERTIARY BASALT OUTCROP

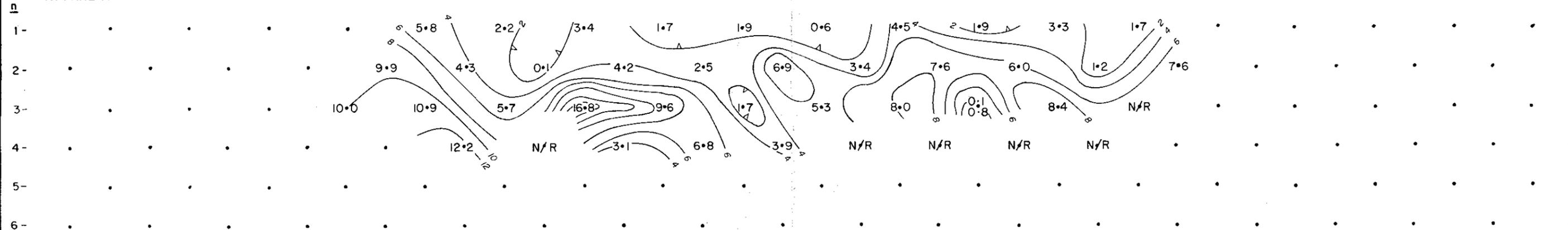
Approx. position of
DIGHEM & INPUT
anomalies

BRIDGE
&
RIVER

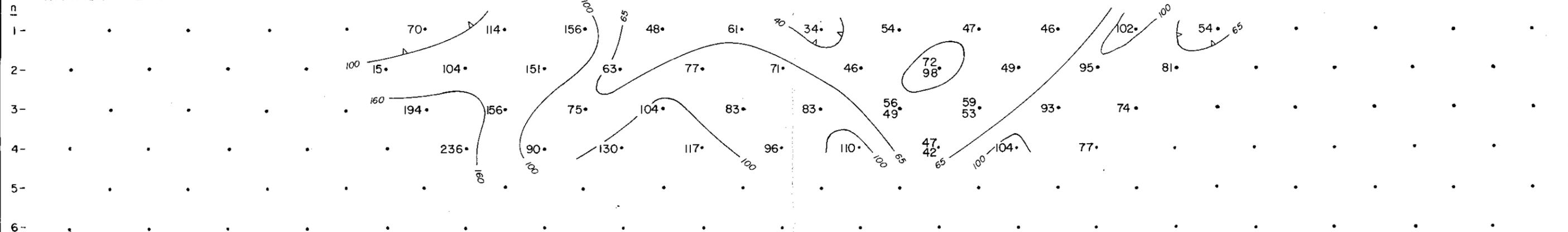
ROAD

450W 350W 250W 150W 50W 50E 150E 250E 350E 450E

APPARENT CHARGEABILITY.



APPARENT RESISTIVITY.



Contractor : SCINTREY
Date : 29 / 8 / 83
Timing : 2 sec ON-OFF
Transmitter : IPTA/A 3 kw
Receiver : IPR - 8
Integration time : M₂₃₂ (?)
Array : DIPOLE - DIPOLE
Dipole length : 100 m

N.B. 1. Data from plan D/LD51/03
(Black Marsh Input Anomaly 4041/IL2)
2. Line approx. parallel to
EM - 37 lines 10400N, 10200N

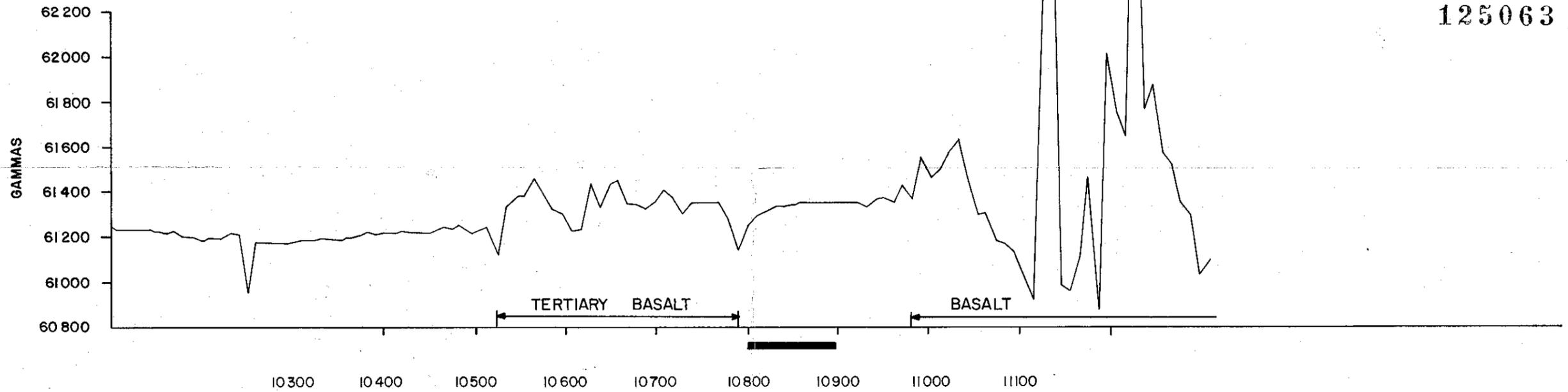
5 cm

5451

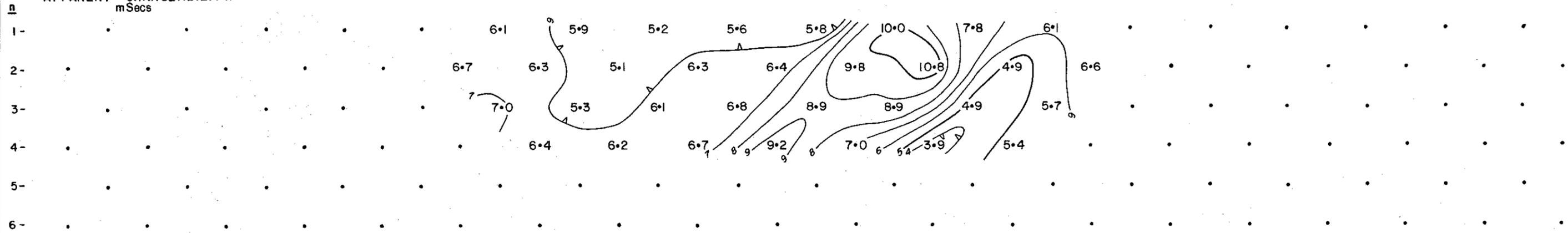
85-2447

Billiton Australia			
Project N.W. TASMANIA			
CATTLEY RANGE			
Title I.P. RESISTIVITY SURVEY LINE OON			
Author	N. H.	Dept. AHO	Scale 1:5000
Drawn	D'PORT	Date 8/83	Revised Date 6/85
Checked		Date	S'ceded Date
Sheet No	FIG. 9		Drawing No. LD01/1016

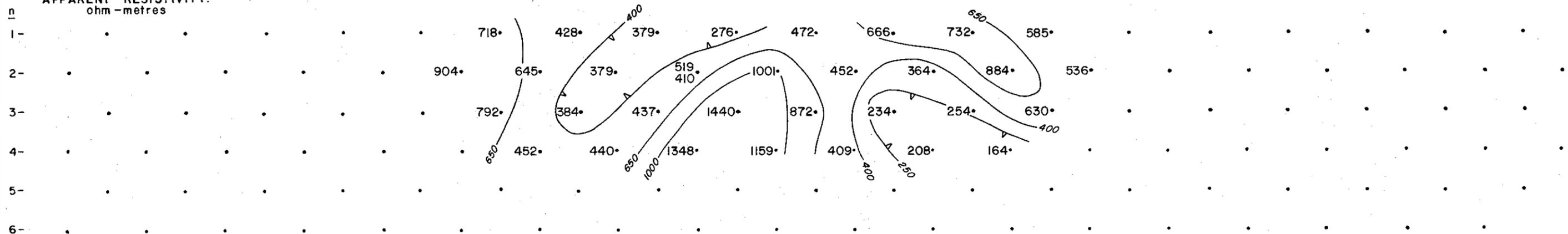
GROUND MAGNETICS



APPARENT CHARGEABILITY.
mSecs



APPARENT RESISTIVITY.
ohm-metres



Contractor : ZONGE
 Date : 5/85
 Timing : 2sec ON-OFF
 Transmitter : HIGH POWER (25 Kw max)
 Receiver : GDP-12
 Integration time : UNCORRECTED NEWMONT (450-1100-ms)
 Array : DIPOLE - DIPOLE
 Dipole length : 100m

5 cm

5450

85-2447

Billiton Australia			
Project WEST TASMANIA			
CATTLEY RANGE			
Title			
I.P. RESISTIVITY SURVEY			
LINE 9800N			
Author	N. H.	Dept.	A. H. O.
Scale	1:5000		
Drawn	H. M. R.	Date	5/85
Revised	Date		
Checked	Date		S'ced
Sheet No.	FIG. 10		Drawing No.
			LD51/1015