000

010001

EXPLORATION LICENCE 5/63

COMSTAFF J.V., N.W. TASMANIA

REPORT FOR THE YEAR ENDED
30TH JUNE, 1986

14 JUL 19??
DEPT. OF MINES
6753/86

MICROFILMED

CONTENTS

010003

002

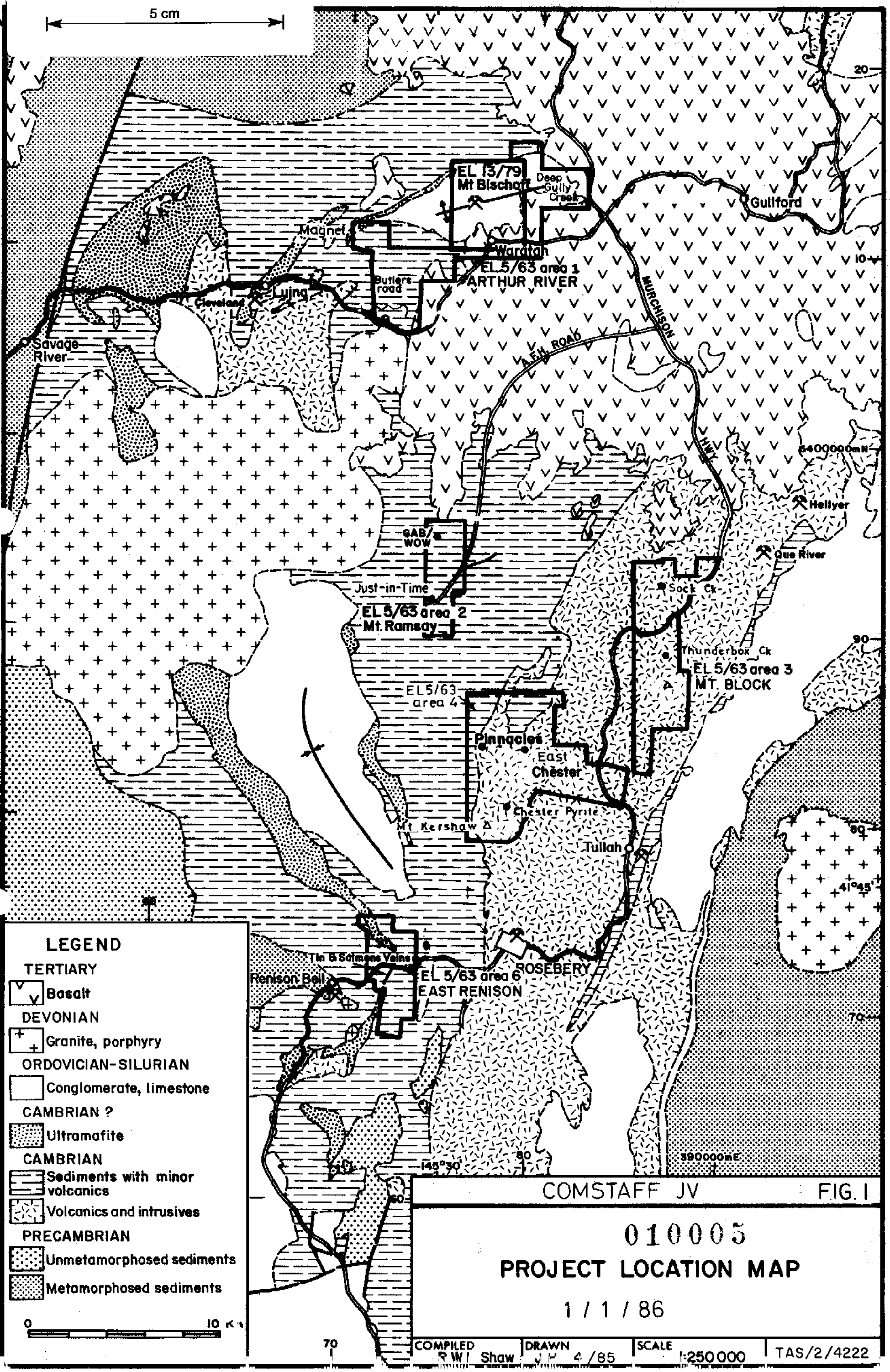
FIGURES

003

APPENDICES

1. Rock Samples - Descriptions and Locations.
2. Trace Element Data.
3. Geochemical Analyses.
4. Stream Sediment Survey - Discussion and Statistics.
5. Down-hole and Surface Sirotem Profiles.

004


5 cm
EL 13/79
Mt Bischoff
Deep Gully Creek
Guilford
Magnet
Waratah
EL 5/63 area 1
ARTHUR RIVER
Butlers road
Cleveland
Luina
Savage River
A.F.H. ROAD
MURCHISON HWY
6400000mN
Hellyer
Que River
GAB/WOW
Just-in-Time
EL 5/63 area 2
Mt. Ramsay
Sock Ck
Thunderbox Ck
EL 5/63 area 3
MT. BLOCK
EL5/63 area 4
Pinnacles
East Chester
Chester Pyrite
Mt Kershaw
Tullah
41°45'
Tin & Solmens Veins
Renison Bell
EL 5/63 area 6
EAST RENISON
ROSEBERY
145°30'
390000mE
20
10
90
80
70
60
LEGEND
TERTIARY
Basalt
DEVONIAN
Granite, porphyry
ORDOVICIAN-SILURIAN
Conglomerate, limestone
CAMBRIAN ?
Ultramafite
CAMBRIAN
Sediments with minor volcanics
Volcanics and intrusives
PRECAMBRIAN
Unmetamorphosed sediments
Metamorphosed sediments
0
10 Km
COMSTAFF JV
FIG. 1
010005
PROJECT LOCATION MAP
1 / 1 / 86
COMPILED R.W. Shaw
DRAWN 4/85
SCALE 1:250 000
TAS/2/4222

EXPLORATION LICENCE 5/63

COMSTAFF J.V., N.W. TASMANIA

REPORT FOR THE YEAR ENDED 30TH JUNE, 1986

1. GENERAL

Exploration Licence 5/63 in N.W. Tasmania comprises five parts totalling some 126 square kilometres (Fig. 1). Title is held by Comstaff Pty. Ltd. and the licence has recently been renewed for the twelve month period to 30th June, 1987.

Joint Venture discussions led to the signing on 20th December, 1985 of a Memorandum of Understanding between Comstaff Pty. Limited, Preussag Australia Pty. Limited and BHP Minerals Limited, with BHP Minerals as Manager of the exploration programme. The Joint Venture was formally ratified on 14th April, 1986.

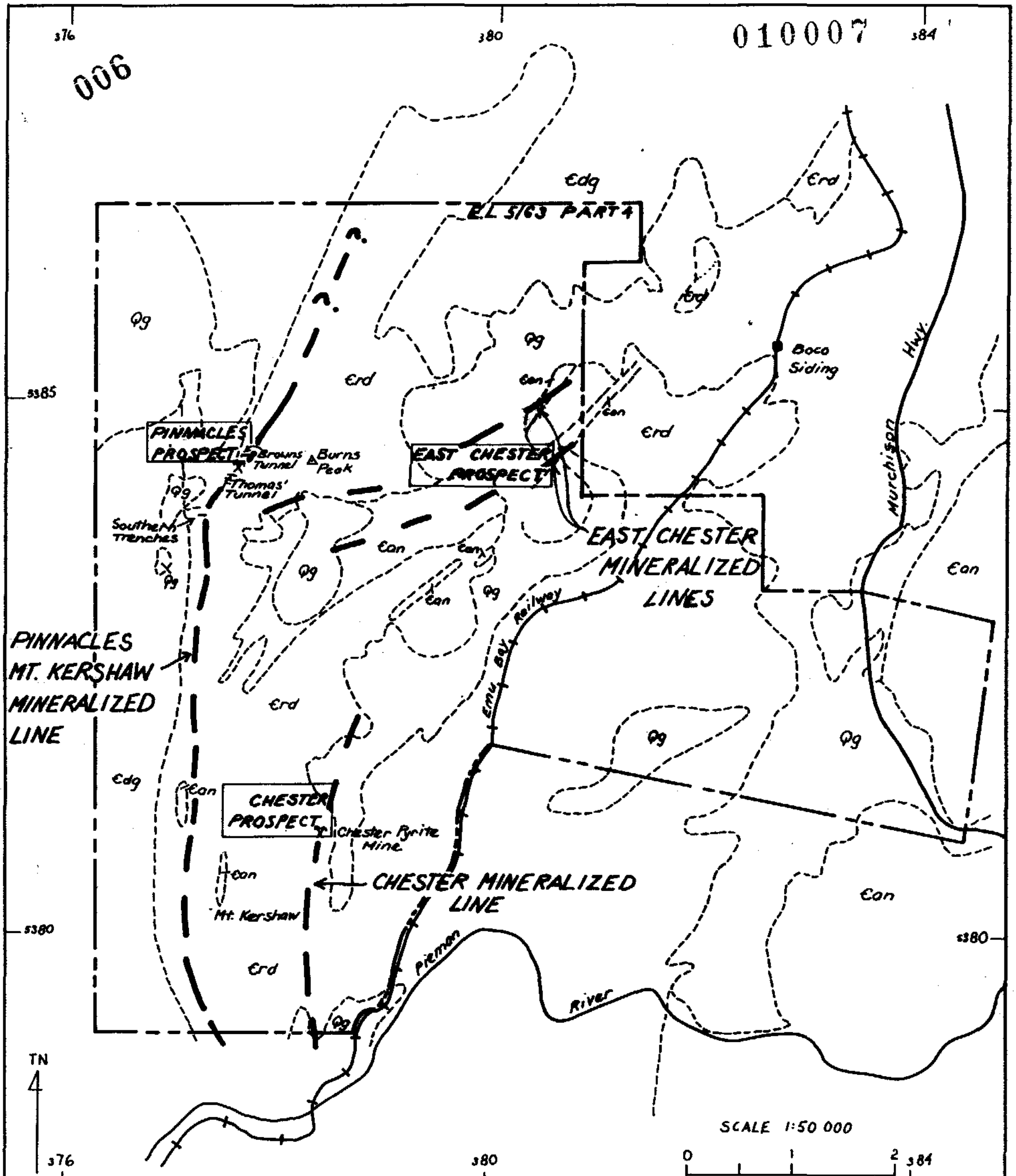
The prime target is volcanogenic-style base metal and gold mineralisation within the Mt. Read Volcanics of Cambrian age. The main effort is therefore directed towards Areas 3 and 4, but data review relevant to the other areas has also been carried out.

During the first half of 1986 a regional geochemical drainage sampling programme was completed, but detailed geological work was restricted to Area 4 (Chester-Pinnacles). Appraisal of previous work has been a major task and geological, geochemical and geophysical compilations are in progress.

The exploration programme under BHP management is still at a relatively early stage. An updated series of base maps with improved survey control is being prepared, using topographic data from the new series of Lands Department 1:25,000 sheets. For the purpose of this report some modified Comstaff plans have been used to summarise various aspects of the work programme to date.

006

010007



Qg	Quaternary glacials
Edg	Dundas Group and Rosebery Group Sediments
Erd	Central volcanic sequence, dacitic and rhyolitic volcanics. Some sediments
Ean	Central volcanic sequence andesitic rocks

5 cm

EL 5/63 AREA 4

LOCATION OF MAIN MINERALIZED ZONES

FIG. 2

2. EXPLORATION PHILOSOPHY

Target search is directed towards delineating volcanic-associated lead-zinc deposits with accompanying precious metal credits. Areas 3 and 4 of the Exploration Licence are favourably situated in a highly prospective part of the Central Volcanic Belt of the Mt. Read Volcanics, between the major deposits of Rosebery and Hellyer.

The joint venture terms and limited time available prior to the relinquishment date in mid-1988 necessitate a focussed programme of advanced exploration. Our overall rationale is biased towards drill testing of targets generated from ground geophysical surveys of favourable zones.

Historical mining activity and results of exploration to date have highlighted a broad prospective belt incorporating Chester and Pinnacles on the western side of Area 4. Favourable trends of mineralisation and possible exhalative activity can also be defined from existing soil geochemical data (Fig. 2). On-going geological fieldwork and re-interpretation, as well as detailed geochemistry over specific areas, is aimed at better defining the favourable horizons and their sub-surface extensions.

Since the inception of the licence numerous geological, geochemical and geophysical programmes have been carried out. It can probably be accepted that there is only a low probability of locating major new outcropping or near-surface mineralisation. On the positive side, however, only a relatively small area at Pinnacles has been covered by deep-sounding TEM geophysical surveys. The main objective during 1986/87 is to test the prospective parts of Area 4 by a comprehensive UTEM programme. This is broadly aimed at locating a buried or blind deposit in the depth range 50-200 metres below surface.

The eastern section of Area 4 and most of Area 3 still remains as relatively unexplored ground. A detailed review of work to date is in progress and attempts will be made to upgrade known base metal or gold anomalies by further geochemical work and detailed geological studies.

3. PREVIOUS WORK

The Electrolytic Zinc Company drill tested the mineralisation in the Pinnacles area in 1949-50 with 13 small-bore holes. One drill hole at Browns Workings, testing for mineralisation beneath the shaft, intersected 4.5m at over 3% zinc.

RTZ also carried out a limited geochemical and geophysical programme over Chester-Pinnacles in 1959 under EL 4/59.

Exploration Licence 5/63 was taken out by Comstaff Pty. Ltd. (formed by Australian Anglo American, Broken Hill South and Mt. Carrington). Work in that portion of the licence covering the Mt. Read Volcanics commenced in 1966 and has been almost continuous, though with some long periods where activity levels were low. Extensive gridding, costeaning, soil geochemistry, geological mapping and ground geophysics were carried out in various areas and results are documented in periodic reports submitted to the Tasmania Mines Department.

Regional stream sediment sampling programmes dominated the early years, with some more detailed work on the Silver Falls-Pinnacles-Chester grid. Between 1973-77 some 28 diamond drill holes were completed at Chester-Pinnacles, with a further 14 holes drilled at Sock Creek in Area 3. The Comstaff JV was formed in 1977 between Comstaff Pty. Ltd. and Preussag Australia Pty. Ltd.

From 1978-83 the main activity was at East Chester, but only four boreholes were drilled during this period. A helicopter-borne DIGHEM survey was flown over Area 4 in 1983, as follow-up to a 1975 INPUT survey. Interpreted responses were not thought to be significant.

The most recent phase of intense activity commenced at Pinnacles in 1983. Resampling of old workings demonstrated the presence of significant gold values associated with both massive sulphide mineralisation and cherty host-rocks. In 1984 work focussed on the three mineralised centres in the area - Brown's Workings, Thomas' Tunnel and the Southern Trenches. These were encompassed in a new grid (EAF) which was subjected to geological mapping, ground magnetics, soil geochemical sampling (including gold in the analytical suite) and a UTEM survey. 19 boreholes were drilled in the year from February 1984, with 15 holes at Brown's Workings. High-grade mineralisation was intersected, the best being in EAF 9 with 11.1 metres at 18.92% zinc, 8.01% lead, 93 g/t silver and 4.74 g/t gold. Comstaff's geological interpretation led them to postulate a small resource of 110,000 tonnes at a grade of 25% combined lead-zinc and 4 g/t gold.

Apart from the Sock Creek prospect exploration in Area 3 has been sporadic, comprising stream sediment sampling and limited work on small grid areas which did not define any drill targets.

4. GEOLOGY

The initial emphasis was directed towards an overview of the geology and mineralisation within Areas 3 and 4 and their immediate surrounds so as to aid future planning of the exploration programme.

Road and costean traverses were carried out in selected areas to check earlier Comstaff mapping. Detailed mapping of the Pinnacles area at 1:1,000 scale is in progress. Ten diamond drill holes have been relogged. Plotting of this data and cross section interpretation is in progress. All previous drill holes will be relogged to aid in interpretation of geology and palaeoenvironment for the Pinnacles area, and also for Chester and East Chester. Thin sections have been cut from core and surface samples to aid in rock identification and trace element studies have also helped to clarify rock types.

A compilation of all previous costeans and drill holes has been combined with a Comstaff regional geological interpretation of part of Area 4 in Fig. 3.

An east dipping thrust fault termed the Owen Shear by early workers has been shown to be an extension of the Rosebery Fault (K. Corbett pers. comm.). This structure separates slates, conglomerates and sandstones of the Rosebery Group from volcanics, volcaniclastics and local sediments of the Central Volcanic Sequence. The latter appear to have been thrust westward over the Rosebery Group.

The rocks of the Central Volcanic Sequence are dominated by feldspar-phyric lavas, volcaniclastics and ignimbrites. Quartz-phyric units are minor. A distinct unit of chloritic feldspar-phyric and often vesicular andesites and volcaniclastics forms an irregular lens-shaped mass extending from the north-east boundary of the EL to south of the Hollway Rivulet. Feldspar-phyric dacitic lavas and volcaniclastics locally interfinger with the andesitic units which appear to have possible extensions to near Mt. Kershaw.

The distinction between dacitic and andesitic rocks can be difficult especially where alteration is superimposed on primary textures. Trace element plots using Ti, Zr, Y, Nb, Ce, and based on the discriminatory fields established by Winchester and Floyd, 1977, have assisted in this matter. Trace element analyses, plots and a brief discussion of the results are given in Appendix 2. Rock types have been broadly assigned from brief thin section studies and are loose terms; locations are shown in Fig. 3 while descriptions are listed in Appendix 1.

At Pinnacles the known mineralisation occurs within a host horizon sequence of volcaniclastics including breccias and ashes with local shale and siltstone. This host sequence includes feldspar-phyric and local quartz-feldspar-phyric detritus underlain by feldspar-phyric dacitic ignimbrites, ashes and lavas with some andesite. To the west of the mineralisation at Brown's Tunnel, quartz-feldspar rhyolite lavas, intrusives and volcaniclastics are prominent and extend northwards as a wedge of lavas. More feldspar-phyric lavas become mixed with the quartz-phyric lavas to the north.

The structure of the area is complicated by folding and faulting. Initial studies of the regional geology have confirmed several earlier structures suggested by Hall, 1978, while further structures are inferred from facing and limited bedding and cleavage data. The Burns Peak Syncline has been confirmed from bedding-cleavage relationships in the new forestry road north east of Burns Peak. This structure, which plunges gently to the north east, is best seen in the Dundas Group sediments though a shale unit marks the nose of the structure south west of Burns Peak. An anticlinal structure, termed the Pinnacles Anticline, is inferred for the extension of lavas of the Central Volcanic sequence north from Pinnacles. Dips in sediments of the Dundas Group to the east and west of these lavas tend to confirm this structure.

At Pinnacles local variations in facings are due to complex mesoscopic folds suggested to be flexures on the west limb of the Pinnacles Anticline (bedding-cleavage relations). As this structure is developed in massive volcanics, its position can only be inferred.

Hall (1978) has suggested an anticline through the andesite unit at East Chester. While this is a possibility, the facing evidence from hole EAB 4 near the south eastern margin of this unit is westerly and is in accord with these rocks forming the east limb of the Burns Peak Syncline.

The bedded pyritic chert at Chester Mine dips and faces east. Bedding-cleavage relations show the chert to lie on the east limb of an anticline of uncertain closure to the west. Moderate easterly dips have been recorded on the Mt. Kershaw trig road and are consistent with flexures on the limb of a major structure. Relogging of Chester core has commenced and will be aimed at an understanding of the structure and disposition of pyritic mineralisation.

5. MINERALISATION

Investigation of known mineralisation from drilling at Pinnacles e.g. Krummei 1977, Roberts 1985, Mroczek 1985, has confirmed the association of stratiform sulphides with a host sequence of volcaniclastics and shales. Stratiform sulphides are known from the Southern Trenches, Costean 16, Thomas' Tunnel and holes EAF 9, 6, 10, 3, 4 north of Brown's Tunnel. Facies changes are marked, correlation between drill holes often very difficult and the sulphides appear to have limited continuity at least in these drill holes. Folding complications do exist and are an important part of any understanding of the distribution of mineralisation. Further relogging and interpretation will be aimed at clarifying whether the known stratiform mineralisation occurs at one or more stratigraphic levels at Pinnacles and whether sulphides have concentrated in fold hinges. Extension of the Pinnacles mineralisation south beyond the Southern Trenches is limited by the Owen Thrust.

To the north continuation of the stratiform mineralisation past hole EAF 10 is suspected to be at deeper levels since structures plunge shallowly to the north at this location. The horizon of interest may exist beneath the Pinnacles anticline or on its western limb. The zinc anomaly recorded by Comstaff in the 'Shale Basin' of Dundas Group rocks in the Que Syncline needs further investigation to determine whether the anomaly is related to structural leakage from a buried volcanic source.

Veining of galena-pyrite-barite within volcaniclastics and ash at Leo's Find would appear to relate to an exhalative horizon. This horizon may be the general Pinnacles horizon with repetition by folding.

Similarly the veining and dissemination of sphalerite-galena-pyrite in dacitic rocks in holes EAB 2 and EAB 1 at East Chester may be related to exhalative activity at this horizon repeated by folding in the Burns Peak Syncline. Extension of this zone down dip and along strike to Cone Hill may prove a worthwhile target as alteration is suggestive of significant hydrothermal activity.

The bedded pyritic cherts at Chester face east and are underlain by an extensive and apparently thick (300-400m) moderately to strongly pyritized footwall sequence. As indicated earlier, bedding and cleavage relations suggest this footwall sequence is thickened by folding and that an anticlinal closure exists to the west. The early reports of galena and pyrite at West Mt. Kershaw (McIntosh Reid 1918), subsequently investigated by Comstaff with costean 4N could possibly relate to the Chester stratigraphic position. Future work will aim at defining the extent of anomalism and the structural picture. A possible north plunge to the Chester mineralisation will be investigated.

A zone of pyritisation within andesites near Hollway Rivulet on the Chester Road is worhty of further investigation (see Fig. 3). It would appear to correlate with pyrite discovered in a water race near Hollway Rivulet and recorded by McIntosh Reid, 1918. This occurrence suggests that more than one potential mineralized horizon may exist related to a mixed dacite-andesite suite.

6. GEOCHEMISTRY

A survey was designed to cover streams draining Areas 3 and 4, with sample collection carried out by contract personnel. Bulk samples of -2mm material were taken for cyanide extraction of gold. A brief orientation survey had indicated that samples collected from active sediments in the stream bed gave enhanced values as compared to samples collected from heavy mineral trap sites. Active sediments are also easier to collect so this mode of sampling was adopted for the remainder of the programme. Various duplicate samples were obtained to test reproducibility and these are indicated on the results sheets in Appendix 3. Where three cyanide gold samples were collected the first two samples were approximately 5kg weight and the third supposed to be approximately 2kg (actually 3kg).

Standard -80 mesh samples were obtained at the same sites and analysed for copper, lead, zinc, arsenic, barium, manganese and iron. A total of 161 cyanide samples were collected (including 22 duplicates) and 143 -80 mesh samples (9 duplicates). Sample locations are shown in Figs 4 and 5 while symbol plots for various elements are presented as Figs 6-10. Appendix 4 contains a discussion of results and statistical details.

A further brief programme of sampling was carried out in May/June to confirm and follow up various anomalous values. More detailed coverage was also achieved for the North Pinnacles area. Results are awaited.

7. GEOPHYSICS

Diamond drilling carried out by Comstaff Pty. Ltd. in 1984 and early 1985 in the Pinnacles area (EAF grid) intersected mineralisation at various localities. Plastic piping was left in the holes but no geophysical logging was done. Following BHP's farm-in it was decided to survey as many holes as possible, to test for extensions and off-hole repetition of the intersected sulphides. A down hole and surface SIROTEM survey was carried out in January/February 1986 by SOLO GEOPHYSICS.

Figure ~~12~~ 11 illustrates the loop layout, the drill holes logged and the test surface survey lines. Three pairs of loops were used to give dual readings for both the down hole and for the surface Roving Vector Receiver (RVR) work. Dual readings were taken to assist in locating and defining any anomalies present, by energising the target area with two different primary magnetic field directions.

In all cases the results of the down hole work are strongly overprinted by 'self response' of the receiving equipment. This problem is inherent in the equipment. The high level of self response is caused by the proximity of the transmitter loop to the down hole receiver coil and is strongly accentuated by the highly resistive nature of the area.

The level of self response was such that a test survey was carried out on the 7th of June to verify previous results and to provide multiple readings at selected sites. This permitted statistically valid decay curves to be plotted to characterize the self response. The test survey confirmed the previous data; the large anomalies apparent in those results are due to self response and their effects must be allowed for during interpretation.

No large anomalies were observed in the down hole or RVR results. One anomaly in EAF 11 occurs over more than one reading. This anomaly is only seen when reading the western loop (LOOP 2) and its absence when reading LOOP 1 suggests that it is parallel to the field produced by that loop. The simplest explanation of the anomaly is a small sub-horizontal weakly conductive body west of EAF 11 at about 110m depth. Three single point anomalies have been recognized and they are associated with mineralisation in EAF 4, 9 and 10. In each case the response is very weak and is only seen in the readings from one loop.

These latter anomalies associated with the sulphide mineralisation at Brown's Workings cause some concern because if the mineralisation is as extensive as postulated on the Comstaff geological cross sections then the sulphides appear to have very low conductances.

Log plots of all results are attached as Appendix 5.

8. GRID LINE CUTTING AND SURVEYING

A major phase of line cutting was instigated in January using contractors. The EAF grid at Pinnacles was the only useable grid that was not overgrown. The East Chester Grid (EAB) needed partial recutting and the Chester grid (EAD) was completely overgrown.

In the present programme a framework of double width base lines have been cut or are planned. This will facilitate accurate survey control based on AMG co-ordinates and allow for the preparation of an updated series of base maps.

A breakdown of line cutting carried out to date (20.6.86) is as follows (see also Fig. 12):-

Double width survey base lines	16.13km
EAF grid *	6.00km
Mt Kershaw (new grid)	53.82km
East Chester (clearing of old EAB grid)	19.15km
Connection grid (new)	8.71km
TOTAL	103.81km

* For Sirotem survey - part new, part cleared.

A significant amount of contract surveying was done, mainly in the Chester-Mt Kershaw area. Pegging and additional survey work are being conducted by company personnel.

9. FUTURE PROGRAMME

Grid line cutting will continue through the winter months in Area 4. The old EAB grid at East Chester will be re-opened with some extensions over glacial cover southeast of Hollway Rivulet. The EAF grid will be extended to the northern boundary of the licence, with some lines continued westwards to cover the Shale Basin anomalous area. Most grid lines are at 200 metres spacing but closure to 100 metres spacing may be warranted over specific zones of interest.

Soil augering is planned at critical locations following completion of a geochemical review. Some anomalies require better definition and an attempt will also be made to penetrate glacial cover in areas where there is no information on bedrock geochemistry.

Detailed geological work is on-going and the exploration emphasis may be adjusted at any time dependent on new directions arising from improved geological understanding.

A compilation and re-evaluation of available geophysical data on the area is nearing completion. This will highlight information gaps and perhaps indicate specific zones for further work.

A major UTEM survey is planned for October/November. This should give virtually complete coverage of the prospective stratigraphy in Area 4 as currently perceived. Any targets generated will be tested by diamond drilling early in 1987.

Most of <u>Area 3</u> and the eastern salient of Area 4 have received much less intensive exploration attention because of the virtual absence of recorded mineral occurrences and the limited geochemical anomalism. The basic strategy during the next year will be to try and upgrade zones of apparent interest, rather than attempt blanket grid and geophysical coverage.

A small grid is being cut at Thunderbox Creek, to try and locate a barite occurrence recorded on the northern slopes of Mt Block. This is thought to be near the confluence with Animal Creek, as adjacent -80 mesh stream sediment samples in this area gave anomalous barium and lead values. If the stream sediment data can be repeated a programme of soil augering will attempt to ground locate the anomaly.

REFERENCES

HALL, D.B., 1978: Report on Exploration in Exploration Licence 5/63, Part 4, in Tasmania, Australia. Unpublished Comstaff Proprietary Ltd. Report.

KRUMMEI, G., 1977: Progress Report on the Pinnacles Area. Unpublished Preussag Australia Proprietary Ltd. Report.

McINTOSH REID, A., 1918: The North Pieman and Huskisson and Sterling Valley Mining Fields. Tasmanian Department of Mines, Geological Survey Bulletin No. 28.

MROCZEK, C.R., 1985: Interim Report on the EAF 15-18 Drilling Programme Chester Pinnacles EL 5/63 Part 4. Unpublished Comstaff Proprietary Ltd. Report.

ROBERTS, R.H., 1985: Chester-Pinnacles Interim Report EL 5/63 Part 4, Brown's Workings. Unpublished Comstaff Proprietary Ltd. Report.

WINCHESTER, J.A., and FLOYD, P.A., 1977: Geochemical Discrimination of different Magma Series and their Differentiation Products using immobile Elements. Chemical Geology 20, pp 325-343.

APPENDIX 1

ROCK SAMPLES - DESCRIPTIONS AND LOCATIONS

Sample No.	Description	Location
3701	Bedded dacitic tuff, lava	Boco Forestry Road
3702	Sericite-chlorite dacite lava	Boco Forestry Road
3703	Vesicular andesite dyke	Boco Forestry Road
3704	Dacite	Boco Forestry Road
3705	Andesite? basalt	East Chester, costean 15
3706	Bleached dacite	Costean X, East Chester
3707	Pumiceous dacitic lithic tuff	East of costean X
3708	Feldspar dacite breccia	Murchison Hwy, 1km north of Pieman Rd
3709	Andesite? dacite	Pieman Rd 50m
3710	Andesite? dacite	Pieman Rd 300m
3711	Dacitic crystal tuff	Pieman Rd 6.6km
3712	Dacitic lapilli tuff or lava breccia	Murchison Highway 4.5km S of Boco Sd.
3713	Dacite lava breccia	Pieman Rd 4.7km
3714	Footwall dacite pyroclastics	Main St, Rosebery
3715	Footwall dacite pyroclastics	S side of Stitt River Murchison Highway
3716	Footwall pyroclastics	S side of Stitt River Murchison Highway
3717	Rhyolitic ash flow crystal tuff of Dundas Group	Boco Forestry Road
3718	Sericitic andesite? with carbonate-galena veining	EAF 9 207.10m
3719	Quartz-feldspar rhyolite or porphyry	EAF 9 247.40m
3720	Vesicular andesite	EAF 14 167.00m
3721	Dacitic lava breccia	EAF 9 86.00m
3722	Dacitic lapilli tuff	EAF 3 53.95m
3723	Rhyolite lava breccia	EAF 12 94.93m
3724	Coarse quartz-feldspar porphyry	EAF 12 284.40m
3725	Vesicular chlorite andesite? basalt	EAB 1 245.30m
3726	Dacite lava breccia, silicified	EAB 3 22.10m
3727	Dacite lava	EAB 3 201.60m
3728	Andesite? dacite lava	CP 14 41.50m
3729	Dacitic lapilli tuff	EAB 4 171.30m
3730	Dacitic lapilli tuff	EAF 14 321.90m
3731	Dacite	East Chester Loop Road

Sample No.	Description	Location
3732	Porphyritic hornblende-feldspar andesite	East Chester Loop Road
3733	Bleached sericitic andesite	East Chester Loop Road Costean 14
3734	Dacitic lapilli tuff	Road to EAB 4 collar East Chester
3735	Vesicular andesite	Road to EAB 4 collar East Chester
3736	Hornblende-feldspar andesite	East Chester Loop Road
3737	Vesicular feldspar basalt? andesite	Costean 2750S East Chester
3738	Chloritic andesite	East Chester Loop Road
3739	Chloritic feldspar basalt	Chester Road
3740	Dacite lava	Chester Road near Chester Dam
3741	Vitric dacite	Chester Road
3742	Dacite lava breccia	Mt Kershaw trig road
3743	Chloritic feldspar dacite	North costean road off Kershaw trig road
3744	Feldspar basalt? andesite	Chester Road
3745	Bleached sericitic dacite?	Chester Road
3746	Andesite breccia	Chester Road
3747	Andesite? basalt lava breccia with silica-pyrite-chlorite	Chester Road near Hollway Rivulet
3748	Bleached dacite	Chester Road, S side Hollway Rivulet
3749	Leached sericitic dacite?	Costean 4N
3750	Sericite altered andesite? dacite	Road to costean 4N
3751	Sericite-chlorite-silica altered andesite? dacite	Road to costean 4N
3752	Sericite-chlorite altered dacite? andesite	Road to costean 4N
3753	Sericite-chlorite altered dacite? andesite	Road to costean 4N
3754	Perlitic dacite	Mt Kershaw trig road
3755	Sericitic dacite	N costean road
3756	Sericitic feldspar-quartz dacite	N costean road

022

APPENDIX 2

ROCK SAMPLES - TRACE ELEMENT DATA

The following trace element plots are presented:-

Fig. 1	Zr/TiO_2	vs	Nb/Y
Fig. 2	Ti	vs	Zr
Fig. 3	Ti	vs	Y
Fig. 4	Ti	vs	La/Ce
Fig. 5	Zr/TiO_2	vs	Ce

Analytical results are also given and sample locations indicated in Appendix 1.

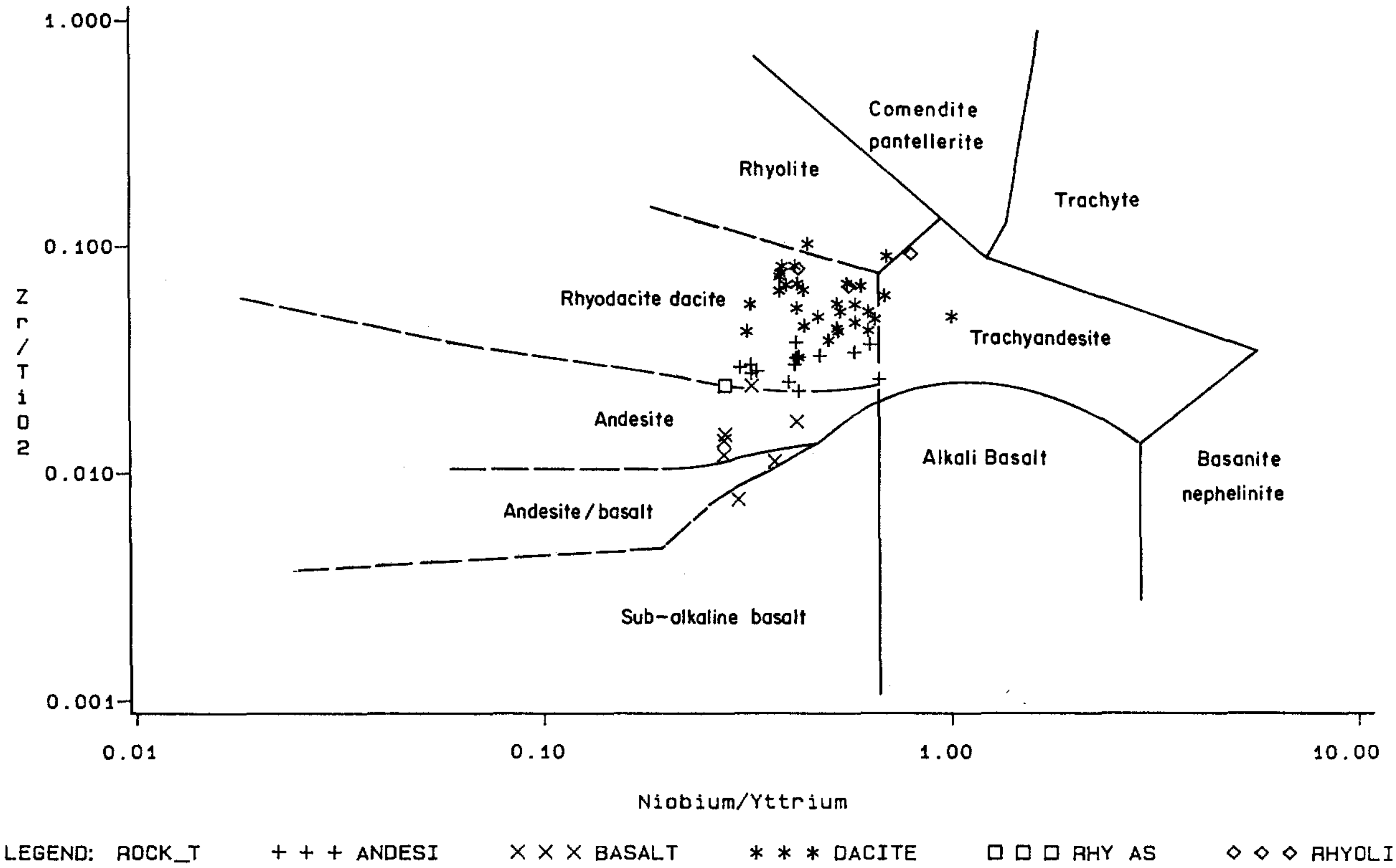
The Ti vs Zr plot suggests a grouping of rocks into 4 main fields based largely on Ti content. The separation of the high Ti basalt to basaltic andesite field is quite distinct from an andesite field which shows overlap with a dacitic field. Three samples of quartz-phyric rhyolitic rocks overlap in part with the dacitic field. A sample of quartz-feldspar crystal-rich ash flow material from the Dundas Group plots outside the 4 fields.

The Zr/TiO_2 vs Nb/Y plot confirms the basalt, andesite, dacite, rhyolite grouping though the variations from the field limits as defined by Winchester and Floyd, 1977, may be due to slight mobility of the trace elements during alteration processes.

A Zr/TiO_2 vs Ce plot shows a broad range of Ce values, particularly for the dacites and suggests some mobility of Ce. Other plots involving Y and La/Ce show the 4 field split, but Ti is the real discriminator.

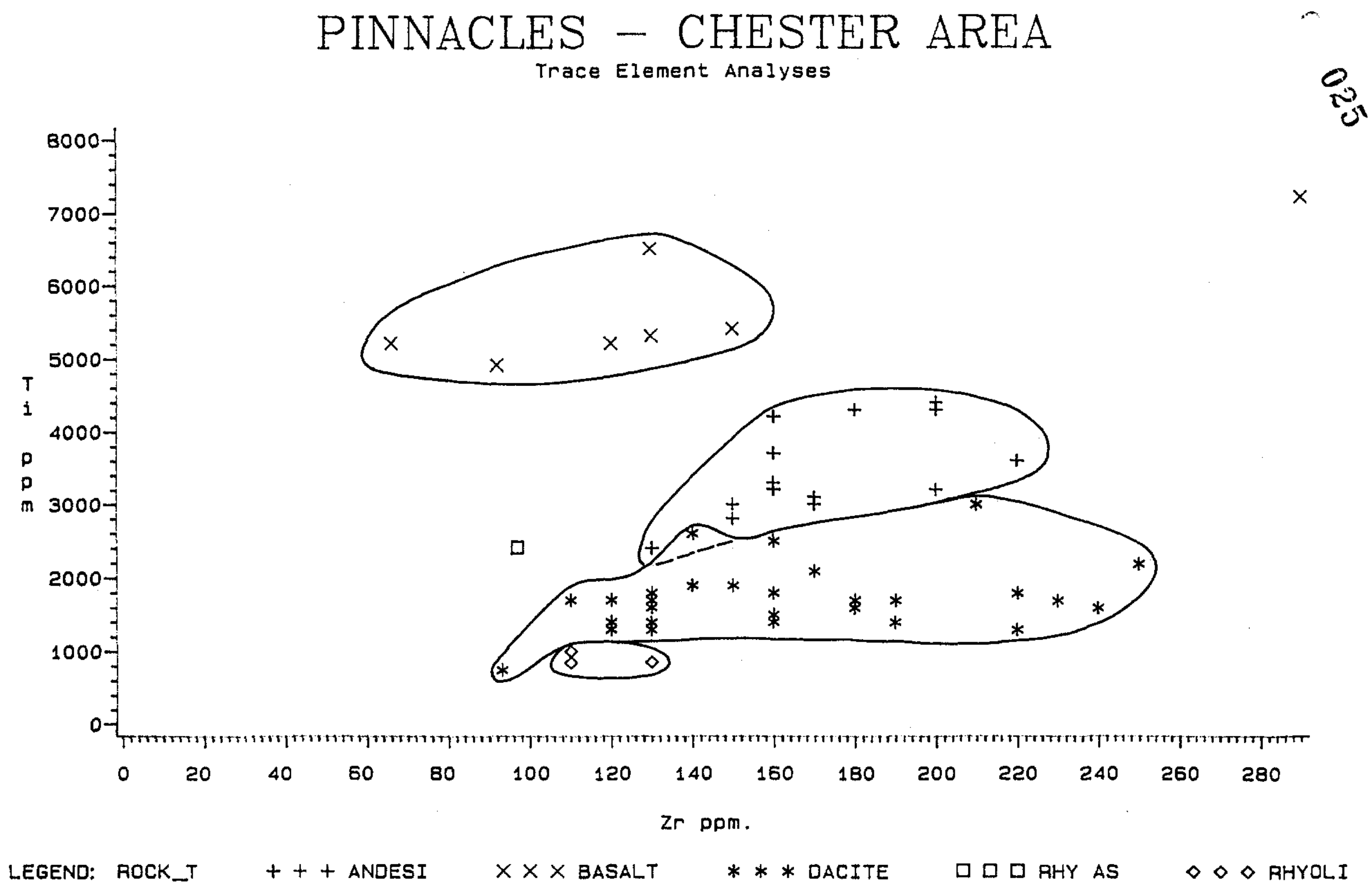
PINNACLES -- CHESTER AREA

Trace Element Analyses



024

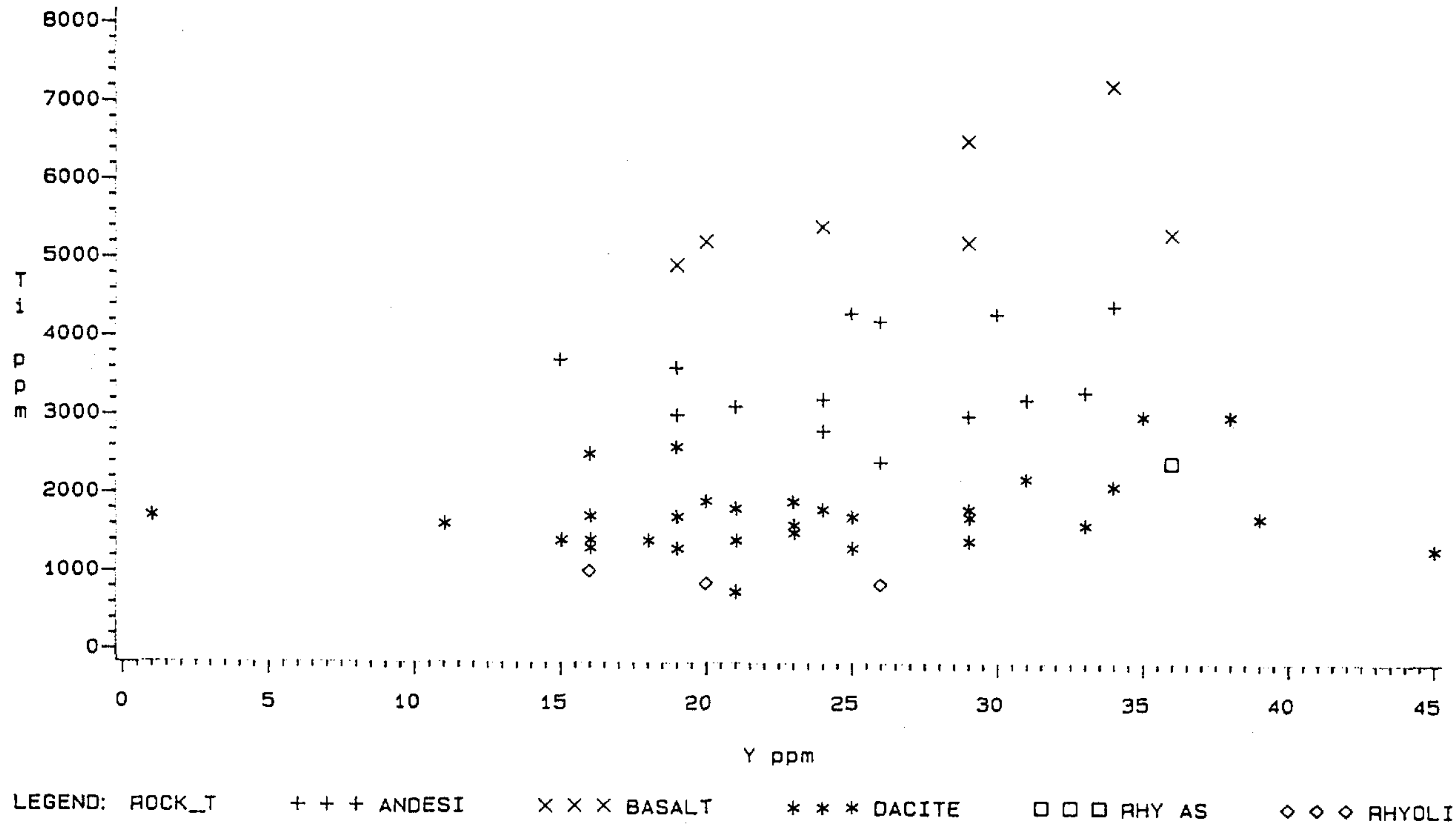
010025


PINNACLES – CHESTER AREA
Trace Element Analyses
8000
7000
6000
5000
4000
3000
2000
1000
0
Ti ppm
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
Zr ppm.
LEGEND: ROCK_T
+ + + ANDESI
X X X BASALT
* * * DACITE
□ □ □ RHY AS
◇ ◇ ◇ RHYOLI
025

PINNACLES – CHESTER AREA

Trace Element Analyses

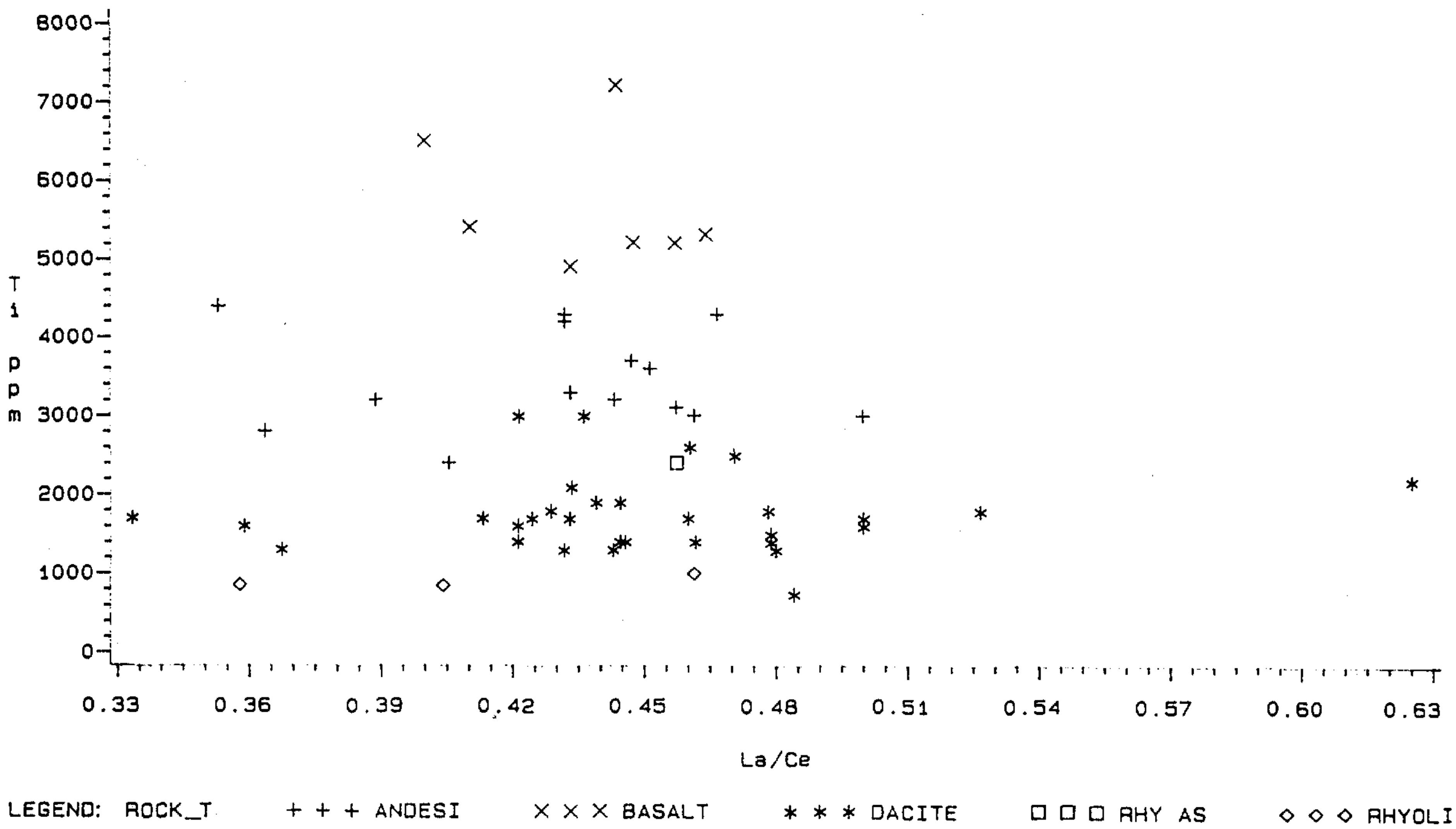
026



010027

PINNACLES – CHESTER AREA

Trace Element Analyses



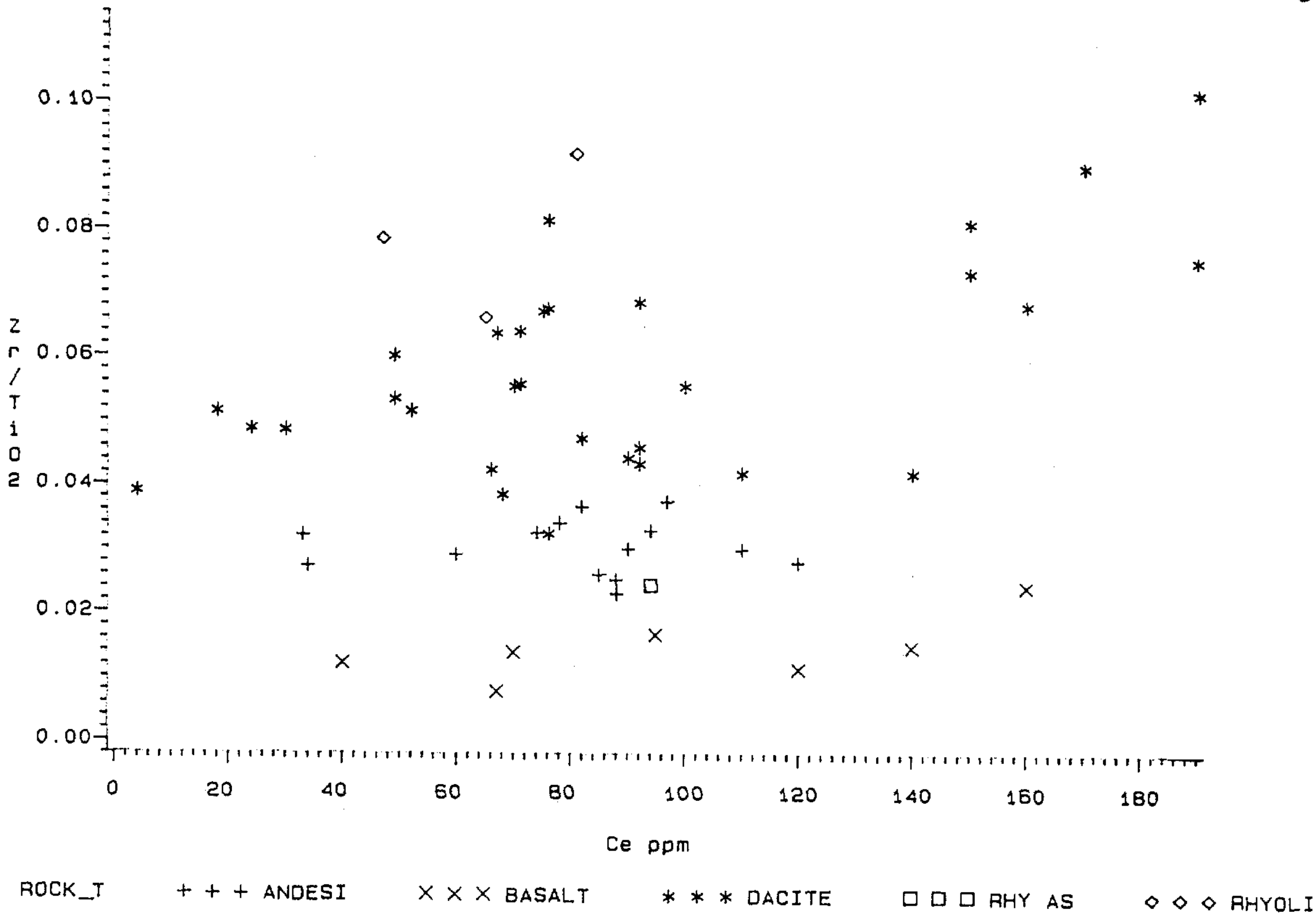
027

010028

PINNACLES – CHESTER AREA

Trace Element Analyses

028



010029

17 APR 1986

REFERENCE NUMBER 28425

15 APR., 1986

ORDER NUMBER 009262

029

B.H.P.
******

Level 3, Merlin Centre, Plain Street

PERTH WA 6000

Analysis of Mineral Samples
****

ANALYSED BY :
ANALYTICAL SERVICES (WA) PTY LTD
19 AUGUSTA ST
WILLETTON WA 6155
TELEPHONE 457 1496 457 2569
TELEX AA 94767

AUTHORISED BY : C.L. ELDRIDGE

010030

030

SAMPLE NUMBER	Ti ppm	Zr ppm	Y ppm	Nb ppm	La ppm	Ce ppm
3701 Z	1400	190	29	12	32	76
3702 Z	1700	230	39	15	69	150
3703 Z	3000	150	29	12	55	110
3704 Z	1800	220	29	11	79	150
3705 Z	5200	120	29	8	32	70
3706 Z	1400	120	15	8	8	18
3707 Z	1800	160	24	10	21	49
3708 Z	1600	180	33	13	32	76
3709 Z	2800	150	24	10	12	33
3710 Z	3300	160	33	10	26	60
3711 Z	3000	210	35	11	48	110
3712 Z	1500	160	23	10	34	71
3713 Z	2100	170	34	16	13	30
3714 Z	1700	120	16	10	28	66
3715 Z	1900	150	20	13	36	82
3716 Z	3000	210	38	20	59	140
3717 Z	2400	97	36	10	43	94
3718 Z	4400	200	34	11	12	34
3719 Z	840	110	26	11	19	47
3720 Z	3200	160	31	10	35	90
3721 Z	740	93	21	8	92	190
3722 Z	1300	220	45	20	82	190
3723 Z	850	130	20	16	29	81
3724 Z	1000	110	16	9	30	65
3725 Z	5400	150	24	10	39	95
3726 Z	1300	130	16	11	18	49
3727 Z	1300	120	19	11	31	70
3728 Z	2400	130	26	11	30	74
3729 Z	1600	240	23	16	61	170
3730 Z	1700	190	25	15	25	75

010031

** 031

NOTES ON ANALYSIS OF THESE SAMPLES

Ti Zr
HAVE BEEN BROUGHT INTO SOLUTION WITH A MIXED ACID DIGEST.
THIS DIGEST PROCEDURE APPROACHES TOTAL EXTRACTION.
THE DIGEST HAS BEEN ANALYSED BY INDUCTIVELY COUPLED PLASMA EMISSION SPECTROPHOTOMETRY.

Y Nb La Ce
HAVE been brought into solution with a mixed acid digest.
This digest procedure approaches total extraction for most elements.
The digest solution has then been analysed by Inductively Coupled Plasma
Mass Spectrometry.

SAMPLE STORAGE
****
Sample pulps and residues will be stored free of charge for ONE MONTH after reporting.
Samples are then Palletised, and a fee of $0.60 per day per Pallet required is levied.

010032

REFERENCE NUMBER 28753

2 MAY , 1986

ORDER NUMBER 009264

032

B.H.P.
******

~~Level 3, Merlin Centre, Plain Street~~

~~PERTH WA 6000~~

Analysis of Mineral Samples
****

ANALYSED BY :
ANALYTICAL SERVICES (WA) PTY LTD
19 AUGUSTA ST
WILLETTON WA 6155
TELEPHONE 457 1496 457 2569
TELEX AA 94767

AUTHORISED BY : C.L. ELDRIDGE

010033

033

SAMPLE NUMBER	Ti ppm	Zr ppm	Y ppm	Nb ppm	La ppm	Ce ppm
3731 Z	2200	250	31	13	100	160
3732 Z	4300	200	30	10	56	120
3733 Z	7200	290	34	11	71	160
3734 Z	1700	190	29	11	29	67
3735 Z	3200	200	24	10	43	97
3736 Z	3700	160	15	10	38	85
3737 Z	5300	130	36	10	65	140
3738 Z	4300	180	25	10	38	88
3739 Z	5200	66	20	6	30	67
3740 Z	1800	130	21	11	44	92
3741 Z	1300	120	25	8	48	100
3742 Z	1400	130	21	11	34	71
3743 Z	1400	120	16	10	24	52
3744 Z	4900	92	19	7	52	120
3745 Z	1900	140	23	10	40	90
3746 Z	4200	160	26	11	38	88
3747 Z	6500	130	29	8	16	40
3748 Z	1400	160	18	10	41	92
3749 Z	2600	140	19	8	35	76
3750 Z	3100	170	21	10	43	94
3751 Z	3000	170	19	11	36	78
3752 Z	2500	160	16	8	32	68
3753 Z	3600	220	19	12	37	82
3754 Z	1600	130	11	11	12	24
3755 Z	1700	130	19	11	38	92
3756 Z	1700	110	< 1	14	2	4

010034

NOTES ON ANALYSIS OF THESE SAMPLES

Ti Zr
HAVE BEEN BROUGHT INTO SOLUTION WITH A MIXED ACID DIGEST.
THIS DIGEST PROCEDURE APPROACHES TOTAL EXTRACTION.
THE DIGEST HAS BEEN ANALYSED BY INDUCTIVELY COUPLED PLASMA EMISSION SPECTROPHOTOMETRY.

Y Nb La Ce
HAVE been brought into solution with a mixed acid digest.
This digest procedure approaches total extraction for most elements.
The digest solution has then been analysed by Inductively Coupled Plasma Mass Spectrometry.

SAMPLE STORAGE
****
Sample pulps and residues will be stored free of charge for ONE MONTH after reporting.
Samples are then Palletised, and a fee of $0.60 per day per Pallet required is levied.

035

OBS	SAMNO	TI	ZR	Y	NB	LA	CE	TIO2	ZR_TIO2	NB_Y	LA_CE
1	3701	1400	190	29	12	32	76	2335.2	0.081363	0.41379	0.421053
2	3702	1700	230	39	15	69	150	2835.6	0.081112	0.38462	0.460000
3	3703	3000	150	29	12	55	110	5004.0	0.029976	0.41379	0.500000
4	3704	1800	220	29	11	79	150	3002.4	0.073275	0.37931	0.526667
5	3705	5200	120	29	8	32	70	8673.6	0.013835	0.27586	0.457143
6	3706	1400	120	15	8	8	18	2335.2	0.051387	0.53333	0.444444
7	3707	1800	160	24	10	21	49	3002.4	0.053291	0.41667	0.428571
8	3708	1600	180	33	13	32	76	2668.8	0.067446	0.39394	0.421053
9	3709	2800	150	24	10	12	33	4670.4	0.032117	0.41667	0.363636
10	3710	3300	160	33	10	26	60	5504.4	0.029068	0.30303	0.433333
11	3711	3000	210	35	11	48	110	5004.0	0.041966	0.31429	0.436364
12	3712	1500	160	23	10	34	71	2502.0	0.063949	0.43478	0.478873
13	3713	2100	170	34	16	13	30	3502.8	0.048533	0.47059	0.433333
14	3714	1700	120	16	10	28	66	2835.6	0.042319	0.62500	0.424242
15	3715	1900	150	20	13	36	82	3169.2	0.047331	0.65000	0.439024
16	3716	3000	210	38	20	59	140	5004.0	0.041966	0.52632	0.421429
17	3717	2400	97	36	10	43	94	4003.2	0.024231	0.27778	0.457447
18	3718	4400	200	34	11	12	34	7339.2	0.027251	0.32353	0.352941
19	3719	840	110	26	11	19	47	1401.1	0.078509	0.42308	0.404255
20	3720	3200	160	31	10	35	90	5337.6	0.029976	0.32258	0.388889
21	3721	740	93	21	8	92	190	1234.3	0.075345	0.38095	0.484211
22	3722	1300	220	45	20	82	190	2168.4	0.101457	0.44444	0.431579
23	3723	850	130	20	16	29	81	1417.8	0.091691	0.80000	0.358025
24	3724	1000	110	16	9	30	65	1668.0	0.065947	0.56250	0.461538
25	3725	5400	150	24	10	39	95	9007.2	0.016653	0.41667	0.410526
26	3726	1300	130	16	11	18	49	2168.4	0.059952	0.68750	0.367347
27	3727	1300	120	19	11	31	70	2168.4	0.055340	0.57895	0.442857
28	3728	2400	130	26	11	30	74	4003.2	0.032474	0.42308	0.405405
29	3729	1600	240	23	16	61	170	2668.8	0.089928	0.69565	0.358824
30	3730	1700	190	25	15	25	75	2835.6	0.067005	0.60000	0.333333
31	3731	2200	250	31	13	100	160	3669.6	0.068127	0.41935	0.625000
32	3732	4300	200	30	10	56	120	7172.4	0.027885	0.33333	0.466667
33	3733	7200	290	34	11	71	160	12009.6	0.024147	0.32353	0.443750
34	3734	1700	180	29	11	29	67	2835.6	0.063479	0.37931	0.432836
35	3735	3200	200	24	10	43	97	5337.6	0.037470	0.41667	0.443299
36	3736	3700	160	15	10	38	85	6171.6	0.025925	0.66667	0.447059
37	3737	5300	130	36	10	65	140	8840.4	0.014705	0.27778	0.464286
38	3738	4300	180	25	10	38	88	7172.4	0.025096	0.40000	0.431818
39	3739	5200	66	20	6	30	67	8673.6	0.007609	0.30000	0.447761
40	3740	1800	130	21	11	44	92	3002.4	0.043299	0.52381	0.478261
41	3741	1300	120	25	8	48	100	2168.4	0.055340	0.32000	0.480000
42	3742	1400	130	21	11	34	71	2335.2	0.055670	0.52381	0.478873
43	3743	1400	120	16	10	24	52	2335.2	0.051387	0.62500	0.461538
44	3744	4900	92	19	7	52	120	8173.2	0.011256	0.36842	0.433333
45	3745	1900	140	23	10	40	90	3169.2	0.044175	0.43478	0.444444
46	3746	4200	160	26	11	38	88	7005.6	0.022839	0.42308	0.431818
47	3747	6500	130	29	8	16	40	10842.0	0.011990	0.27586	0.400000
48	3748	1400	160	18	10	41	92	2335.2	0.068517	0.55556	0.445652
49	3749	2600	140	19	8	35	76	4336.8	0.032282	0.42105	0.460526
50	3750	3100	170	21	10	43	94	5170.8	0.032877	0.47619	0.457447
51	3751	3000	170	19	11	36	78	5004.0	0.033973	0.57895	0.461538
52	3752	2500	160	16	8	32	68	4170.0	0.038369	0.50000	0.470588
53	3753	3600	220	19	12	37	82	6004.8	0.036637	0.63158	0.451220
54	3754	1600	130	11	11	12	24	2668.8	0.048711	1.00000	0.500000

010036

APPENDIX 3

STREAM SEDIMENT GEOCHEMICAL ANALYSES
(Bulk cyanide gold samples and -80 mesh)

037

[Company name partly legible]CHEM LABORATORIES

CAIRNS

BRISBANE

MT. ISA

ANALYTICAL DATA

SAMPLE TYPE	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	908.0 13 1592	13.02.86		2 OF 2

1 NOTE Samples treated on AS RECEIVED BASIS

2 Dry weight expressed in Kilograms as calculated from Moisture Det.

3 Au 1 result expressed in micrograms of Gold per gram of Zinc

4 Au 2 is the calculated TOTAL GOLD leached from the whole sample

5 in micrograms.

6 Au3 is the calculated grade of the sample in (ppb) parts per billion

7 that is cyanide extractable gold.

9 ORIENTATION SURVEY

Line	Grid Ref. Sophia 1:100,000	Sample No.	Site	Kg.	% Cyanide	Au 1	Au 2	Au 3
12	Que River	CS 1	trap	4·2	0·22	0·49	3·1	0·732
13	902962	CS 2	active sediment	3·8	0·21	0·49	2·8	0·741
14								
15	Hollway Rivulet	CS 3	trap	4·9	0·22	0·73	5·4	1·102
16	781826	CS 4	active	4·9	0·24	1·09	8·0	1·639
17								
18	E. tributary of Marionoak Ck.	CS 5	trap	4·4	0·225	1·67	11·0	2·50
19	769836	CS 6	active	4·3	0·23	4·29	27·7	6·441
20								
21	E. tributary of Marionoak Ck.	CS 7	trap	5·2	0·225	0·19	1·5	0·288
22	769835	CS 8	active	4·5	0·24	0·30	2·0	0·444
23								
24								
25								

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 C Barr

038

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 3582

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

The Broken Hill Prop. Co. Ltd.
P.O. Box 40
Waratah
Tasmania 7321

ORDER No.	PROJECT
11152	B-56

DATE RECEIVED	RESULTS REQUIRED
7.3.86	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
		3	52

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	PRE-TREATMENT: DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS: REFER TO ANALYSIS SECTION	PREPARATION	METHOD
SO	CS9-19,21-61							1	Au		328

RESULTS TO

As Above
Attn: P. Gregory

RESULTS TO

BHP
P.O. Box 559
Camberwell 3124
Attn: A. Clarke(1)
Attn: E. Bumstead(1)

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 [signature]

010039

TETCHEM LABORATORIES

CAIRNS

BRISBANE
Telephone: (07) 277 1668

MT. ISA

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER	PAGE
	908.0 13 1670	20.03.86		1 OF 3

[illegible]	SAMPLE No.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
1	CS 09	6.8	.131	.27	2.7	.40				
2	CS 10	5.0	.117	X	X	X				
3	CS 11	5.7	.134	.18	1.5	.267				
4	CS 12	5.2	.109	.19	1.4	.278				
5	CS 13	5.1	.161	.10	.7	.145				
6	CS 14	4.4	.125	X	X	X				
7	CS 15	5.4	.125	X	X	X				
8	CS 16	5.7	.137	X	X	X				
9	CS 17	5.3	.120	X	X	X				
10	CS 18	4.9	.114	.05	.4	.071				
11	CS 19	4.9	.125	X	X	X				
12	CS 21	5.8	.131	.04	.4	.066				
13	CS 22	5.2	.144	.09	.7	.139				
14	CS 23	5.3	.10	X	X	X				
15	CS 24	5.1	.112	.09	.7	.141				
16	CS 25	5.0	.144	X	X	X				
17	CS 26	5.0	.131	X	X	X				
18	CS 27	4.4	.109	X	X	X				
19	CS 28	5.1	.112	.25	1.9	.368				
20	CS 29	5.9	.117	.19	1.7	.286				
21	CS 30	5.4	.122	.16	1.3	.242				
22	CS 31	2.0	.158	.32	1.0	.476				
23	CS 32	4.6	.151	.11	.7	.161				
24	CS 33	5.4	.137	.22	1.8	.328				
25	CS 34	5.6	.131	X	X	X				

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

010040

TETCHEM LABORATORIES

CAIRNS
Ogden Street,
Cairns, Queensland 4870
Telephone (070) 51 5518

BRISBANE

MT ISA
Traders Way
Mt Isa, Queensland 4825
Telephone (077) 43 6837

ANALYTICAL DATA

	REPORT NUMBER	REPORT DATE		PAGE
	908.0 13 1670	20.03.86		2 OF 3

TUBE	SAMPLE No.									
1	CS 35	5.1	.137	.10	.7	.143				
2	CS 36	5.0	.137	x	x	x				
3	CS 37	5.3	.117	x	x	x				
4	CS 38	5.3	.137	x	x	x				
5	CS 39	5.4	.125	x	x	x				
6	CS 40	5.5	.125	x	x	x				
7	CS 41	5.5	.109	x	x	x				
8	CS 42	2.8	.144	x	x	x				
9	CS 43	4.9	.144	.26	1.9	.397				
10	CS 44	4.9	.131	x	x	x				
11	CS 45	4.3	.117	x	x	x				
12	CS 46	5.0	.131	.10	.7	.143				
13	CS 47	4.6	.128	x	x	x				
14	CS 48	4.8	.161	x	x	x				
15	CS 49	5.1	.144	x	x	x				
16	CS 50	5.0	.131	x	x	x				
17	CS 51	5.0	.144	.22	1.7	.333				
18	CS 52	5.3	.142	x	x	x				
19	CS 53	4.6	.144	x	x	x				
20	CS 54	5.8	.120	x	x	x				
21	CS 55	5.0	.141	x	x	x				
22	CS 56	2.9	.137	x	x	x				
23	CS 57	5.8	.120	x	x	x				
24	CS 58	5.9	.169	x	x	x				
25	CS 59	5.0	.141	x	x	x				

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

TETCHEM LABORATORIES

CAIRNS — Queensland 4870

BRISBANE — Rocklea, Queensland 4106

MT ISA — Mt Isa, Queensland

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No	PAGE
	908.0 13 1670	20.03.86		3 OF 3

TUBE No	SAMPLE No	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
1	CS 60	4.9	.128	.48	3.5	.716				
2	CS 61	5.5	.120	x	x	x				
3	STD 1	5.0	.150	2.66	20.0	3.997				
4	STD 2	5.0	.052	2.13	16.0	3.20				
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

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

ANALYTICAL DATA

SAMPLE PREFIX		REPORT DATE	CLIENT ORDER No.	PAGE
042	908.0 13 1670	20.03.86		4 OF 4

	SAMPLE No
1	NOTE Samples treated on AS RECEIVED BASIS
2	Dry weight expressed in Kilograms as calculated from Moisture Det.
3	Au 1 result expressed in micrograms of Gold per gram of Zinc
4	Au 2 is the calculated TOTAL GOLD leached from the whole sample
5	in micrograms.
6	Au3 is the calculated grade of the sample in (ppb) parts per billion
7	that is cyanide extractable gold.
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

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

043

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 3627

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

The Broken Hill Prop. Co. Ltd.
P.O. Box 40
Waratah
Tasmania 7321

ORDER No.	PROJECT
	B 56

DATE RECEIVED	RESULTS REQUIRED
25.3.86	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
		3	101

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	PRE-TREATMENT DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS REFER TO ANALYSIS SECTION	PREPARATION	METHOD
SS	62-162								Au		328

REMARKS

RESULTS TO

As Above

RESULTS TO

B.H.P.
P.O. Box 559
Camberwell 3124
Attn: E. Bumstead & A. Clarke

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 ____

010044

044

CAIRNS BRISBANE

	908.0 13 1732	16.04.86	14.4	1 OF 5

1	CS 62	6.4	.250	.05	.5	.071				
2	CS 63	6.2	.250	x	x	x				
3	CS 64	5.9	.230	x	x	x				
4	CS 65	6.0	.20	x	x	x				
5	CS 66	5.8	.215	x	x	x				
6	CS 67	4.9	.210	x	x	x				
7	CS 68	5.6	.220	x	x	x				
8	CS 69	5.6	.157	x	x	x				
9	CS 70	6.3	.230	x	x	x				
10	CS 71	5.6	.210	x	x	x				
11	CS 72	3.3	.220	x	x	x				
12	CS 73	5.1	.185	x	x	x				
13	CS 74	5.5	.075	x	x	x				
14	CS 75	5.2	.190	x	x	x				
15	CS 76	5.7	.230	.14	1.2	.217				
16	CS 77	6.0	.210	.13	1.2	.20				
17	CS 78	5.9	.195	x	x	x				
18	CS 79	5.5	.195	x	x	x				
19	CS 80	6.3	.170	x	x	x				
20	CS 81	6.4	.185	x	x	x				
21	CS 82	5.6	.130	x	x	x				
22	CS 83	6.0	.205	x	x	x				
23	CS 84	5.5	.190	x	x	x				
24	CS 85	5.5	.210	.45	3.7	.676				
25	CS 86	6.0	.235	x	x	x				

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

AUTHORISED OFFICER

CAIRNS BRISBANE MT ISA
Telephone (07) 277 1668

ANALYTICAL DATA

045

045	908.0 13 1732	16.04.86	14.4	2 OF 5

1	CS 87	5.6	.250	×	×	×				
2	CS 88	5.6	.270	×	×	×				
3	CS 89	5.4	.215	×	×	×				
4	CS 90	5.7	.157	.10	.8	.143				
5	CS 91	3.7	.225	.20	1.1	.294				
6	CS 92	5.5	.210	×	×	×				
7	CS 93	5.0	.210	.17	1.3	.250				
8	CS 94	5.4	.225	×	×	×				
9	CS 95	5.3	.190	×	×	×				
10	CS 96	5.0	.235	.09	.7	.132				
11	CS 97	5.3	.20	×	×	×				
12	CS 98	5.1	.190	×	×	×				
13	CS 99	5.1	.137	×	×	×				
14	CS 100	5.3	.175	.63	5.0	.938				
15	CS 101	5.4	.173	.37	3.0	.549				
16	CS 102	5.1	.150	.14	1.0	.203				
17	CS 103	3.1	.173	.08	.4	.123				
18	CS 104	4.5	.157	×	×	×				
19	CS 105	5.2	.250	.16	1.3	.247				
20	CS 106	5.3	.195	.44	3.5	.667				
21	CS 107	5.6	.175	.47	3.9	.705				
22	CS 108	5.0	.157	×	×	×				
23	CS 109	5.4	.155	×	×	×				
24	CS 110	6.0	.165	×	×	×				
25	CS 111	6.1	.173	×	×	×				

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

AUTHORISED OFFICER

010046

CAIRNS BRISBANE MT ISA

ANALYTICAL DATA

246	908.0 13 1732	16.04.86	14.4	3 OF 5

1	CS 112	6.0	.175	x	x	x					
2	CS 113	6.1	.173	x	x	x					
3	CS 114	6.0	.175	x	x	x					
4	CS 115	5.6	.180	3.12	26.2	4.675					
5	CS 116	5.4	.157	x	x	x					
6	CS 117	5.3	.150	2.24	17.8	3.354					
7	CS 118	3.5	.173	x	x	x					
8	CS 119	5.7	.185	x	x	x					
9	CS 120	5.5	.180	.31	2.6	.467					
10	CS 121	5.4	.163	.09	.8	.139					
11	CS 122	5.8	.130	1.24	10.8	1.859					
12	CS 123	5.1	.150	1.71	13.1	2.564					
13	CS 124	5.5	.165	.51	4.2	.759					
14	CS 125	5.2	.157	1.02	8.0	1.533					
15	CS 126	5.3	.110	.27	2.1	.40					
16	CS 127	5.0	.105	x	x	x					
17	CS 128	5.4	.180	x	x	x					
18	CS 129	5.1	.157	.14	1.1	.214					
19	CS 130	4.8	.123	.34	2.4	.506					
20	CS 131	5.1	.107	x	x	x					
21	CS 132	5.1	.170	x	x	x					
22	CS 133	5.5	.205	x	x	x					
23	CS 134	5.6	.210	24.12	202.6	36.184					
24	CS 135	5.4	.145	1.10	8.9	1.645					
25	CS 136	4.7	.175	.17	1.2	.253					

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

TETCHEM LABORATORIES

ANALYTICAL DATA

047	908.0 13 1732	16.04.86	14.4	4 OF 5

1	CS 137	4.9	.235	x	x	x				
2	CS 138	5.5	.205	.22	1.8	.333				
3	CS 139	5.0	.185	.61	4.6	.921				
4	CS 140	2.2	.250	.53	1.7	.789				
5	CS 141	5.0	.195	x	x	x				
6	CS 142	5.4	.175	.46	3.8	.696				
7	CS 143	5.1	.220	.13	1.0	.188				
8	CS 144	5.9	.185	.18	1.6	.267				
9	CS 145	5.5	.160	.22	1.8	.325				
10	CS 146	4.8	.180	.49	3.6	.741				
11	CS 147	5.1	.239	1.88	14.4	2.821				
12	CS 148	5.3	.170	x	x	x				
13	CS 149	5.5	.230	x	x	x				
14	CS 150	5.1	.210	x	x	x				
15	CS 151	5.7	.087	.05	.4	.069				
16	CS 152	5.4	.140	x	x	x				
17	CS 153	6.0	.153	.10	.9	.143				
18	CS 154	6.1	.190	.09	.8	.135				
19	CS 155	4.3	.150	.25	1.6	.370				
20	CS 156	5.6	.170	.08	.7	.125				
21	CS 157	5.6	.190	.09	.7	.128				
22	CS 158	3.3	.192	x	x	x				
23	CS 159	5.6	.190	x	x	x				
24	CS 160	5.7	.175	x	x	x				
25	CS 161	5.6	.173	x	x	x				

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

CAIRNS BRISBANE MT ISA

ANALYTICAL DATA

048	908.0 13 1732	16.04.86	14.4	5 OF 5

1	CS 162	6.0	.205	x	x	x				
2	STD 1	5.0	.210	2.0	15.0	3.0				
3	STD 2	5.0	.175	2.09	15.7	3.133				
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

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

049	908.0 13 1732	16.04.86	14.4	6 OF 6

1 NOTE Samples treated on AS RECEIVED BASIS
2 Dry weight expressed in Kilograms as calculated from Moisture Det.
3 Au 1 result expressed in micrograms of Gold per gram of Zinc
4 Au 2 is the calculated TOTAL GOLD leached from the whole sample
5 in micrograms.
6 Au3 is the calculated grade of the sample in (ppb) parts per billion
7 that is cyanide extractable gold.

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

050

ANALABS

17 MAR 1986

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 3583

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

The Broken Hill Prop. Co. Ltd.
P.O. Box 40
Waratah
Tasmania 7321

ORDER No.	PROJECT
11153	B-56
DATE RECEIVED	**RESULTS REQUIRED**
7.3.86	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
		3	52

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PUL-VERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS REFER TO ANALYSIS SECTION	PREPARATION	METHOD
SO	B56(200-220) B56(222-252)					1			Cu Pb Zn Fe Mn As Ba		102 114 120

COMBTY. DAT
COMSUR. COORDS

REMARKS

RESULTS TO:
As Above
Attn: P. Gregory

RESULTS TO:
BHP
P.O. Box 559
Camberwell 3124
Attn: A. Clarke(1)
Attn: E. Bumstead(1)

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

AUTHORISED OFFICER ____________

03 051

ANALABS

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

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	14.4 08 3583	13.3.86	11153	1 OF 4

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Fe	Mn	As	Ba	Pb	
1	B56 200	6	76	49	9000	140	27	480		
2	B56 201	10	23	45	1.15%	145	8	265		
3	B56 202	20	146	490	1.35%	340	21	390	155	
4	B56 203	12	92	240	1.25%	205	13	360	85	
5	B56 204	7	17	57	1.55%	210	2	180		
6	B56 205	23	13	120	3.90%	470	15	215		
7	B56 206	8	15	43	9650	190	3	160		
8	B56 207	10	57	153	1.35%	200	4	185		
9	B56 208	14	13	38	6600	240	2	155		
10	B56 209	2	12	15	1600	10	2	110		
11	B56 210	3	20	41	4800	340	x	145		
12	B56 211	9	33	82	1.25%	235	11	225		
13	B56 212	3	24	67	6100	140	2	150		
14	B56 213	2	2	12	1700	90	3	105		
15	B56 214	5	31	84	6850	90	3	180		
16	B56 215	3	9	45	4050	185	1	105		
17	B56 216	4	17	60	7650	200	4	115		
18	B56 217	2	2	20	5200	140	1	80		
19	B56 218	4	20	71	7600	230	5	125		
20	B56 219	14	51	150	1.35%	235	13	295		
21	B56 220	14	53	157	1.40%	185	13	280		
22	B56 222	9	33	73	9000	80	4	115		
23	B56 223	4	38	123	8650	255	4	150		
24	B56 224	3	15	36	3800	65	1	100		
25	B56 225	6	15	51	8200	200	3	130		

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]

052

ANALABS

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

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	14.4 08 3583	13.3.86	11153	2 OF 4

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Fe	Mn	As	Ba	Pb	
1	B56 226	10	45	112	7050	240	9	140		
2	B56 227	5	11	49	5300	150	3	95		
3	B56 228	4	19	79	7800	225	2	120		
4	B56 229	2	4	22	6250	70	17	105		
5	B56 230	1	2	15	5050	65	x	85		
6	B56 231	1	5	15	5050	60	x	75		
7	B56 232	Sample	Not	Submit	ted					
8	B56 233	5	39	113	6500	430	7	110		
9	B56 234	1	1	10	2400	35	2	70		
10	B56 235	1	x	11	3850	160	3	95		
11	B56 236	2	5	20	5200	145	2	65		
12	B56 237	1	1	12	4900	90	1	75		
13	B56 238	1	x	12	3650	50	2	70		
14	B56 239	1	4	17	5200	135	4	70		
15	B56 240	1	x	9	3450	55	1	75		
16	B56 241	1	x	11	2300	45	x	45		
17	B56 242	1	x	11	4050	45	1	70		
18	B56 243	1	2	11	3750	45	x	70		
19	B56 244	1	3	7	1650	20	x	35		
20	B56 245	1	x	5	1200	10	x	35		
21	B56 246	Sample	Not	Submit	ted					
22	B56 247	1	1	11	2850	65	x	65		
23	B56 248	1	x	9	3200	80	x	80		
24	B56 249	1	x	6	2050	30	3	65		
25	B56 250	1	2	11	3600	70	1	80		

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]

010053

053

ANALABS

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

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	14.4 08 3583	13.3.86	11153	3 OF 4

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Fe	Mn	As	Ba	Pb	
1	B56 251	1	1	9	2350	35	x	65		
2	B56 252	1	1	5	1450	25	x	25		
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

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

010054

054

ANALABS

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

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	14.4 08 3583	13.3.86	11153	4 OF 4

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Fe	Mn	As	Ba	Pb	
1	STD 3036	157		260	5.50%	765	680	250	575	
2	RPT 200	6	73	46	8950	140	29	470		
3	RPT 219	14	51	149	1.30%	225	15	275		
4	STD 3036	151		250	5.000%	785	480	255		
5	RPT 241	1	1	10	1900	30	2	50		
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	1	1	1	5	5	1	5	5	
24	DIGESTION									
25	METHOD	102	102	102	101	101	114	120	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

010055

055

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 3628

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

The Broken Hill Prop. Co. Ltd.
P.O. Box 40
Waratah
Tasmania 7321

ORDER No.	PROJECT
	B 56

DATE RECEIVED	RESULTS REQUIRED
25.3.86	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
		3	93

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	PRE-TREATMENT DRY	CRUSH	SPLIT	PUL-VERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS REFER TO ANALYSIS SECTION	PREPARATION	METHOD
SO	Various					1			Fe Mn		101
									Cu Pb Zn		102
									Ba		120
									As		114

RESULTS TO

As Above

RESULTS TO

B.H.P.
P.O. Box 559
Camberwell 3124

ATTN: E. Bumstead & A. Clarke

REMARKS

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

AUTHORISED OFFICER

010056

056

ANALABS

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

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	14.4 08 3628	9.4.86		1 OF 5

TUBE No.	SAMPLE No.	Cu	Pb	Zn	As	Ba	Mn	Fe		
1	253	x	10	12	2	65	15	1280		
2	254	x	15	19	x	75	55	3700		
3	255	x	4	8	x	190	15	1170		
4	256	x	9	12	x	85	60	2900		
5	257	x	3	6	x	50	10	845		
6	258	x	3	7	x	50	15	750		
7	259	x	4	5	x	40	15	780		
8	260	x	4	6	x	70	25	1170		
9	261	x	5	11	x	50	30	1140		
10	263	3	8	28	x	105	195	9350		
11	264	x	11	30	x	105	70	6750		
12	265	x	5	5	x	50	20	975		
13	266	x	4	7	x	40	30	495		
14	267	x	3	4	x	35	10	415		
15	268	x	6	11	x	65	20	995		
16	269	6	15	87	x	190	405	1.15%		
17	270	x	8	9	x	55	35	1630		
18	271	x	5	6	x	90	15	1020		
19	272	x	7	10	x	90	20	1550		
20	273	x	6	7	x	110	10	1520		
21	274	x	8	4	x	70	20	785		
22	275	x	5	4	x	35	15	380		
23	276	x	3	4	x	45	20	410		
24	277	x	2	21	x	120	25	1880		
25	278	x	4	6	x	35	30	545		

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

010057

057

ANALABS

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

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	14.4 08 3628	9.4.86		2 OF 5

TUBE No.	SAMPLE No.	Cu	Pb	Zn	As	Ba	Mn	Fe		
1	279	x	4	5	x	145	15	870		
2	280	x	15	19	x	100	60	3400		
3	282	x	4	6	x	60	15	940		
4	283	x	6	9	x	50	20	1300		
5	284	2	11	25	x	70	130	5150		
6	285	x	17	22	x	110	90	4050		
7	286	3	15	61	2	135	265	9800		
8	287	3	27	32	4	70	135	5900		
9	288	x	9	9	x	135	25	910		
10	289	x	17	22	x	70	60	2150		
11	290	3	27	30	5	130	150	5750		
12	291	2	25	32	6	100	215	6150		
13	292	x	4	5	x	95	15	590	??	
14	294	3	24	122	x	150	295	6450		
15	295	x	21	23	x	90	125	1800		
16	296	x	17	29	3	205	140	3300		
17	297	2	25	31	9	65	160	6700		
18	298	2	45	57	10	125	405	7650		
19	299	x	10	14	x	65	85	1720		
20	300	x	20	14	x	105	60	4300		
21	301	x	69	40	4	235	235	7150		
22	302	x	22	145	x	100	60	1890		
23	303	x	16	14	x	80	75	2300		
24	304	2	24	40	2	90	205	3800		
25	305	x	6	7	x	30	15	610		

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

010058

058

ANALABS

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

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	14.4 08 3628	9.4.86		3 OF 5

TUBE No.	SAMPLE No.	Cu	Pb	Zn	As	Ba	Mn	Fe		
1	306	x	25	28	x	80	65	1700		
2	307	x	22	30	x	75	75	2300		
3	309	x	7	14	x	85	40	1090		
4	310	x	6	10	x	95	30	980		
5	311	x	15	18	x	130	75	1790		
6	312	x	4	11	x	40	10	1230		
7	313	9	69	165	2	135	205	3450		
8	314	2	32	38	x	90	70	1880		
9	315	x	7	13	x	75	50	1290		
10	316	3	14	26	5	165	310	7300		
11	317	2	5	15	x	55	15	2450		
12	318	2	4	14	x	55	30	2700		
13	319	3	22	41	x	80	60	2450		
14	320	2	16	26	x	100	115	3600		
15	321	3	15	40	x	155	330	6150		
16	322	2	10	15	x	95	140	4050		
17	323	x	3	10	x	45	5	1980		
18	324	2	25	38	x	80	75	2650		
19	325	11	97	70	3	115	410	4600		
20	326	2	5	10	x	70	25	1360		
21	327	x	6	5	x	40	15	700		
22	328	3	23	35	x	95	230	5000		
23	329	3	20	32	x	120	105	4500		
24	331	3	12	44	x	135	185	6850		
25	332	5	31	66	x	145	230	7700		

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

010059

059

ANALABS

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

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	14.4 08 3628	9.4.86		4 OF 5

TUBE No.	SAMPLE No.	Cu	Pb	Zn	As	Ba	Mn	Fe		
1	333	x	10	17	x	60	45	1650		
2	334	x	4	7	x	60	20	1020		
3	335	x	18	16	x	80	40	1680		
4	336	3	25	34	x	155	245	5450		
5	337	2	41	36	3	160	80	3000		
6	338	x	5	8	x	55	15	1030		
7	339	x	4	17	x	50	15	1470		
8	340	x	4	6	x	40	20	890		
9	341	4	15	19	x	110	250	5500		
10	342	4	14	20	x	65	120	7750		
11	343	2	6	11	x	55	85	4050		
12	344	2	13	22	x	105	390	4150		
13	346	x	4	6	x	70	20	950		
14	347	x	3	6	x	70	20	910		
15	349	x	3	6	x	40	20	1070		
16	350	x	3	5	x	35	20	700		
17	351	x	2	6	x	50	20	1230		
18	352	x	5	6	x	45	15	1100		
19										
20										
21										
22										
23										
24										
25										

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

+?060

ANALABS

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

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	14.4 08 3628	9.4.86		5 OF 5

TUBE No.	SAMPLE No.	Cu	Pb	Zn	As	Ba	Mn	Fe		
1	STD 3036	156	504	254		270	755	6.1%		
2	RPT 253	x	6	8	x	25	15	1230		
3	RPT 273	x	9	8	x	90	10	1680		
4	STD 3036	152	497	254		235	715	6.0%		
5	RPT 296	x	17	26	4	190	130	3250		
6	RPT 316	3	14	22	3	155	290	7150		
7	STD 3036	152	494	250		240	650	6.0%		
8	RPT 338	x	3	8		50	15	1050		
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	1	1	1	1	5	5	50		
24	DIGESTION									
25	METHOD	102	102	102	114	120	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 [signature]

061

010062

APPENDIX 4

STREAM SEDIMENT SURVEY - STATISTICS AND DISCUSSION OF RESULTS

062

1st May, 1986

MEMORANDUM TO: A. CLARKE

FROM: E.D. BUMSTEAD

E1/1/1-H : BHP COMSTAFF JV
STREAM SEDIMENT SURVEY

Results from the recent stream sediment survey (Tables 1 & 2) in West Tasmania have been received and statistically analysed.

Only 63 of the 154 samples taken for cyanide gold returned values above the detection limit. The statistics have been studied for these samples and used for plotting these results. The cumulative frequency graph shows essentially a single population with eight highly anomalous values. The median is 0.325 ppb; the values used for plotting are 0.10 ppb, 0.40 ppb and 1.0 ppb and 0.1, 0.2, 0.4, 0.8, 1.6 and 3.2 ppb. The first three values are the 20 and 80 percentile values and an inflection point on the cumulation frequency curve and represent the 61, 84 and 94 percent respectively of the total population. The 50, 75, 90 and 95 percent values of the total population are .001, 0.25, 0.699 and 1.55 ppb.

The statistics from the base metal values are presented in Table 3. The raw data is highly skewed and log transformations produce distributions which approximate to normal. The percentile values have been used in the symbol plots.

Copper, lead, iron and arsenic exhibit curves showing the presence of two overlapping populations. Manganese has multiple populations.

Very high Spearman rank correlations were obtained (Table 4). This was particularly so for iron with all elements except arsenic.

The high Spearman correlations are reflected in the Pearson correlations based on log transformed data. Because of the correlation the data was normalized by assuming that the iron content was constant at 5000 ppm. This modifies correlations of the elements with iron. It improved slightly the raw data probabilility plots due to the imposition of the iron distribution on below level of detection values. The greatest improvement was seen in the log transformed normalized data. The multiple population indicated by copper, arsenic and manganese were removed but a two population curve for barium was obtained. The Spearman correlation are given in Table 5. Lead and zinc correlations remain high but other correlations are reduced significantly.

The statistics of the normalized base metal data are presented in Table 6 and these values rounded to the nearest 5 ppm have been used to prepare symbol plots.

No attempt has been made to separate any of the dual or multiple populations.

Eighteen pairs of gold cyanide samples and nine pairs of base metal samples were collected during the project. The statistics of these duplicate pairs were considered using the Thompson Howath method in which the absolute percent difference and percent difference from the mean and their standard deviations should tend to zero for excellent sampling, preparation and analysis.

The variability of gold is high at 45% when the below detection pairs are removed. Removal of three pairs where below level of detection values are present would reduce the combined sampling, preparation and analysis errors to 30%; a figure we have become more used to.

Zinc, lead, iron, manganese and barium only were considered as copper and arsenic had so many samples below level of detection. Of the nine pairs of samples two appear to be 'not pairs'. These are sites 279, 280 and 291, 292. It is possible that 279 and 282, and 290 and 291 are the pairs of duplicates. These two pairs of analyses have NO been dropped from the file reducing the number of pairs to seven. Seven pairs is really too small a sample to give meaningful results. Plots of the half difference and mean are given in Figure 1 and the results are given in table 7.

Repeat sampling indicates the problem lies with sample Nos 280 & 292 – these two analyses should be ignored

The results of the stream sediment survey are presented on the accompanying plans. These consist of numerical data for cyanide gold; copper, zinc and lead; iron and manganese, and arsenic and barium. Also presented are symbol plots for all elements based on the parameters presented in Tables 3 and 6.

Inspection of the symbol plots shows a zone of high values centred on 377500E 5385000N. Other results don't suggest a concentration of gold elsewhere but values between 0.2 and 0.4 ppb in the north of the area need to be checked out.

High iron and manganese values are centred 387750E 5393750N. These may be significant with regard to the gold values in this area. There are other scattered manganese highs but these are not considered significant.

High lead zinc values coincide with the high iron manganese values indicated above. This is true also of lower values in the north suggesting a chemical association in this area. High lead values with little zinc or iron associated are found about 377500E between 5382500N and 5387500N.

Copper and arsenic values of significance are found in the north of the area about 387750E and 5393750N and are thus associated with iron manganese lead and zinc. The picture emerging suggests a scavenging by the iron manganese oxides.

The high concentration of iron and manganese and the high correlation of these metals with other elements in the north of the area means that the normalized data enhances values in the south. Comparison of the plots for each of the elements shows some high arsenic values about 382500E 5381250N but these are artifacts as the original As values are BLD (1 ppm).

Normalized values for lead and zinc remain high in the north of the area and there is an enhancement of lead values along 377500E noted previously. The normalization also increases zinc values.

A similar picture is seen for barium and copper.

Nothing significant can be seen in the normalized data. It is probable that a regression techniques would be a better procedure to use to remove the affect of iron and manganese from the samples.

In conclusion it is clear that all elements distributions are best described by a log-normal model. Two or more overlapping populations appear to be present for most elements and no attempt has been made to separate these. The percentile statistics have been used to display the results.

The high correlation of the elements with iron is noted but attempts to remove this have not been successful but further attempts are not believed warranted at this stage.

Duplicate analyses are too few to put good figures on the reliability of the sampling preparation and analysis. The mean values are in Table 7.

The areal distribution of the elements suggests that a zone centred on 377500E 5385000N may be prospective for gold. This area is associated in a general sense with high lead values.

A second area, which may well be the results of scavenging, is present in the north of the area about 387750E 5393750N, where copper, arsenic, lead, zinc and manganese values are high. Barium is also associated with this area.

E.D. BUMSTEAD

Attach.
EDB:LCW
0703m*

Table 1

065

010066

ppm

GEOCHEMICAL OUTPUT FOR FILE : COMETY.DAT

SAMPLE No.	Easting	Northing	CU	PB	ZN	FE	MN	AS	BA
200	388998.	5392962.	6	76	49	9000	140	27	480
201	388722.	5394125.	10	23	45	11500	145	8	265
202	388674.	5394025.	20	146	490	13500	340	21	390
203	387838.	5394565.	12	93	240	12500	205	13	360
204	387786.	5394712.	7	17	57	15500	210	2	180
205	387488.	5394462.	23	13	120	39000	470	15	215
206	386957.	5393733.	8	15	43	9650	190	3	160
207	386973.	5393875.	10	57	153	13500	200	4	185
208	386434.	5392571.	14	13	38	6600	240	2	155
209	384842.	5393197.	2	12	15	1600	10	2	110
210	385214.	5393213.	3	20	41	4800	340	1	145
211	386072.	5393108.	9	33	82	12500	235	11	225
212	386066.	5392936.	3	24	67	6100	140	2	150
213	384601.	5392047.	2	2	12	1700	90	3	105
214	384643.	5392349.	5	31	84	6850	90	3	180
215	385320.	5391176.	3	9	45	4050	185	1	105
216	385307.	5391073.	4	17	60	7650	200	4	115
217	385842.	5391143.	2	2	20	5200	140	1	80
218	385814.	5390981.	4	20	71	7600	230	5	125
219	389313.	5393565.	14	51	150	13500	235	13	295
220	389313.	5393565.	14	53	157	14000	185	13	280
221	389313.	5393480.	9	33	73	9000	80	4	115
222	387188.	5391128.	9	33	73	9000	80	4	115
223	387293.	5391270.	4	38	123	8650	255	4	150
224	386352.	5391750.	3	15	36	3800	65	1	100
225	386103.	5390440.	6	15	50	8200	200	3	130
226	386020.	5390348.	10	45	112	7050	240	9	140
227	384835.	5390631.	5	11	49	5300	150	3	95
228	384779.	5390774.	4	19	79	7800	225	2	120
229	384771.	5389795.	2	4	22	6250	70	17	105
230	385138.	5389343.	1	2	15	5050	65	1	85
231	385135.	5389343.	1	5	15	5050	60	1	75
233	385332.	5389619.	5	39	113	6500	430	7	110
234	386059.	5388921.	1	1	10	2400	35	2	70
235	386502.	5389021.	1	1	11	3850	160	3	95
236	387276.	5389071.	2	5	20	5200	145	2	65
237	387166.	5388952.	1	1	12	4900	90	1	75
238	386928.	5389286.	1	1	12	3650	50	2	70
239	386859.	5389124.	1	4	17	5200	135	4	70
240	386725.	5389252.	1	1	9	3450	55	1	75
241	388348.	5386500.	1	1	11	2300	45	1	45
242	388456.	5387034.	1	1	11	4050	45	1	70
243	388393.	5387429.	1	2	11	3750	45	1	70
244	384835.	5387416.	1	3	7	1650	20	1	35
245	384840.	5387411.	1	1	5	1200	10	1	35
247	384953.	5386946.	1	1	11	2850	65	1	65
248	386293.	5386506.	1	1	9	3200	80	1	80
249	386396.	5386476.	1	1	6	2050	30	3	65
250	385186.	5385893.	1	2	11	3600	70	1	80
251	385169.	5385993.	1	1	9	2350	35	1	65
252	385177.	5385128.	1	1	5	1450	25	1	25
253	384560.	5384602.	1	10	12	1280	15	2	65
254	384586.	5384742.	1	15	19	3700	55	1	75
255	383954.	5383813.	1	4	8	1170	15	1	190
256	383960.	5383921.	1	9	12	2900	60	1	85
257	383610.	5383018.	1	3	6	845	10	1	50
258	383281.	5382623.	1	3	7	750	15	1	50
259	382824.	5383015.	1	4	5	780	15	1	40
260	383998.	5381807.	1	4	6	1170	25	1	70
261	383998.	5381807.	1	5	11	1140	30	1	50
263	387439.	5385136.	3	8	28	9350	185	1	105
264	387213.	5383448.	1	11	30	6750	70	1	105
265	386867.	5382388.	1	5	5	975	20	1	50
266	382837.	5384089.	1	4	7	495	30	1	40
267	381681.	5381857.	1	3	4	415	10	1	35
268	381916.	5384499.	1	6	11	995	20	1	65
269	381198.	5383471.	6	15	87	11500	405	1	190
270	380358.	5383121.	1	8	9	1630	35	1	55
271	380373.	5382804.	1	5	6	1020	15	1	90
272	379937.	5381952.	1	7	10	1550	20	1	90
273	380022.	5381564.	1	6	7	1520	10	1	110
274	381437.	5380587.	1	8	4	785	20	1	70
275	381592.	5380626.	1	5	4	380	15	1	35
276	383016.	5381650.	1	3	4	410	20	1	45
277	383126.	5381632.	1	2	21	1880	25	1	120

066

GEOCHEMICAL OUTPUT FOR FILE : COMETY.DAT

SAMPLE No.	Easting	Northing	CU	PB	ZN	FE	MN	AS	BA
278	383098.	5381519.	1	4	6	545	30	1	35
279	382583.	5381008.	1	4	5	7870	15	1	145
280	382583.	5381008.	1	15	19	3400	60	1	100
282	382143.	5385852.	1	4	6	940	15	1	60
283	382172.	5385734.	1	6	9	1300	20	1	50
284	381832.	5386058.	2	11	25	5150	130	1	70
285	381468.	5386133.	1	17	22	4050	90	1	110
286	381437.	5386023.	3	15	61	9800	265	2	135
287	380767.	5385902.	3	27	32	5900	135	4	70
288	380759.	5385789.	1	9	9	910	25	1	135
289	380455.	5385394.	1	17	22	2150	60	1	70
290	380163.	5385383.	3	27	30	5750	150	5	130
291	380161.	5385520.	2	25	32	6150	215	6	100
292	380161.	5385520.	1	4	5	590	15	1	95
294	379791.	5384960.	3	24	122	6450	295	1	150
295	379711.	5384961.	1	21	23	1800	125	1	90
296	379752.	5385145.	1	17	29	3300	140	3	205
297	379155.	5386415.	2	25	31	6700	160	9	65
298	379087.	5386296.	2	45	57	7650	405	10	125
299	379151.	5385796.	1	10	14	1720	85	1	65
300	377478.	5387074.	1	20	14	4300	60	1	105
301	377577.	5386951.	1	69	40	7150	235	4	235
302	377599.	5385954.	1	22	145	1890	60	1	100
303	377452.	5386340.	1	16	14	2300	75	1	80
304	377539.	5386382.	2	24	40	3800	205	2	90
305	377082.	5385318.	1	6	7	610	15	1	30
306	377247.	5385429.	1	25	28	1700	65	1	80
307	377247.	5385429.	1	22	30	2300	75	1	75
309	377316.	5385294.	1	7	14	1090	40	1	85
310	377553.	5385213.	1	6	10	980	30	1	95
311	377506.	5385370.	1	15	18	1790	75	1	130
312	376696.	5384590.	1	4	11	1230	10	1	40
313	376833.	5384619.	9	69	165	3450	205	2	135
314	376938.	5384541.	2	32	38	1880	70	1	90
315	377200.	5384667.	1	7	13	1290	50	1	75
316	376606.	5381415.	3	14	26	7300	310	5	165
317	376672.	5382142.	2	5	15	2450	15	1	55
318	376724.	5382454.	2	4	14	2700	30	1	55
319	376954.	5382563.	3	22	41	2450	60	1	80
320	376991.	5382497.	2	16	26	3600	115	1	100
321	376567.	5381176.	3	15	40	6150	330	1	155
322	376553.	5380938.	2	10	15	4050	140	1	95
323	376765.	5383148.	1	3	10	1980	5	1	45
324	376828.	5383198.	2	25	38	2650	75	1	80
325	376890.	5383620.	11	97	70	4600	410	3	115
326	376885.	5383542.	2	5	10	1360	25	1	70
327	377917.	5382357.	1	6	5	700	15	1	40
328	378065.	5382611.	3	23	35	5000	230	1	95
329	378065.	5382611.	3	20	32	4500	105	1	120
331	377816.	5382753.	3	12	44	6850	185	1	135
332	378532.	5383039.	5	31	66	7700	230	1	145
333	378576.	5382933.	1	10	17	1650	45	1	60
334	379089.	5383113.	1	4	7	1020	20	1	60
335	379068.	5383335.	1	18	16	1680	40	1	80
336	378510.	5383641.	3	25	34	5450	245	1	155
337	378787.	5383902.	2	41	36	3000	80	3	160
338	379737.	5383687.	1	5	8	1030	15	1	55
339	379696.	5383572.	1	4	17	1470	15	1	50
340	378272.	5382061.	1	4	6	890	20	1	40
341	376360.	5380380.	4	15	19	5500	250	1	110
342	376294.	5380055.	4	14	20	7750	120	1	65
343	376858.	5377830.	2	6	11	4050	85	1	55
344	378021.	5378385.	2	13	22	4150	390	1	105
346	378944.	5380363.	1	4	6	950	20	1	70
347	378944.	5380363.	1	3	6	910	20	1	70
349	378894.	5381248.	1	3	6	1070	20	1	40
350	377838.	5381741.	1	3	5	700	20	1	35
351	377813.	5381643.	1	2	6	1230	20	1	50
352	377576.	5381750.	1	5	6	1100	15	1	45

144 samples printed.

Table 2

ppb

0670

GEOCHEMICAL OUTPUT FOR FILE : COMCYN.DAT

Date : 30-APR-86 Page : 1

SAMPLE No.	Easting	Northing	AUCN
– 9	388995.	5392959.	0.400 <0.0004 ppm
–10	388717.	5394128.	0.001
–11	388669.	5394028	0.267
–12	387833.	5394565	0.278
13	387796.	5394710	0.145
14	387495.	5394457.	~~0.001~~ = 0.05 ppb
15	386955	5393735.	0.001
16	386970.	5393880.	0.001 ≡ 0.00005 ppm
17	386431.	5392571.	0.001
18	384842.	5393200.	0.071
19	385224.	5393215.	0.001
20	0.	0.	0.00
21	386072.	5393110.	0.066
22	386069.	5392941.	0.039
23	384601.	5392042.	0.001
24	384643.	5392346.	0.141
25	385315.	5391168.	0.001
26	385307	5391073.	0.001
27	385842.	5391128.	0.001
28	385799.	5390983.	0.369
29	389301.	5393570.	0.286
30	389301.	5393570.	0.242
31	389295.	5393470.	0.476
32	387195.	5391123.	0.161
33	387296.	5391262.	0.328
34	386357.	5391752.	0.001
35	386105.	5390430.	0.143
36	386015.	5390358.	0.001
37	384835.	5390636.	0.001
38	384776.	5390777	0.001
39	384768.	5389792.	0.001
40	385133.	5389341.	0.001
41	385133.	5389341.	0.001
42	385143.	5389438.	0.001
43	385332.	5389617.	0.397
44	386072.	5388911.	0.001
45	386519.	5389001.	0.001
46	387279.	5389059.	0.143
47	387178.	5388950	0.001
48	386923.	5389288.	0.001
49	386855.	5389136.	0.001
50	386740.	5389254.	0.001
51	388343.	5386497.	0.333
52	388461	5387026.	0.001
53	388401.	5387429.	0.001
54	384845.	5387408.	0.001
55	384845.	5387408.	0.001
56	384823.	5387516.	0.001
57	384958.	5386946.	0.001
58	386296.	5386509.	0.001

SAMPLE No.	Easting	Northing	AUCN
59	386390	5386468.	0.001
60	385191	5385895.	0.716
61	385154.	5385975.	0.001
62	385187	5385116.	0.071
63	384560.	5384604.	0.001
64	384576.	5384744.	0.001
65	383949.	5383821.	0.001
66	383962.	5383916.	0.001
67	383618	5383013.	0.001
68	383283.	5382608.	0.001
69	382826.	5383012.	0.001
70	384018.	5381809.	0.001
71	384011.	5381812.	0.001
72	383996.	5381887.	0.001
73	387437.	5385138.	0.001
74	387210.	5383453.	0.001
75	386867.	5382383.	0.001
76	382835.	5384094.	0.217
77	381679.	5381857.	0.200
78	381916.	5384501.	0.001
79	381201.	5383469.	0.001
80	380360.	5383123.	0.001
81	380363.	5382814.	0.001
82	379949.	5381949.	0.001
83	380017.	5381564.	0.001
84	381430.	5380582.	0.001
85	381587.	5380631.	0.676
86	383018.	5381645.	0.001
87	383126.	5381632.	0.001
88	383100.	5381527.	0.001
89	382581.	5381005.	0.001
90	382576.	5381008.	0.143
91	382586.	5381090.	0.294
92	382140.	5385849.	0.001
93	382180.	5385734.	0.250
94	381819.	5386068.	0.001
95	381463.	5386138.	0.001
96	381442.	5386028.	0.132
97	380765.	5385894.	0.001
98	380769.	5385787.	0.001
99	380462	5385389.	0.001
100	380165.	5385381.	0.938
101	380151.	5385498.	0.549
102	380148.	5385498.	0.203
103	380162.	5385600.	0.123
104	379781.	5384948.	0.001
105	379704	5384958.	0.247
106	379737.	5385138.	0.667
107	379160	5386405.	0.705
108	379082.	5386301.	0.001

SAMPLE No.	Easting	Northing	AUCN
109	379146.	5385796.	0.001
110	377476.	5387072	0.001
111	377570.	5386951.	0.001
112	377602.	5385972.	0.001
113	377447.	5386352.	0.001
114	377539.	5386382.	0.001
115	377077.	5385310.	4.675
116	377262.	5385421.	0.001
117	377247.	5385427.	3.354
118	377237.	5385509.	0.001
119	377319.	5385296.	0.001
120	377553	5385203.	0.467
121	377504.	5385375.	0.139
122	376698.	5384580.	1.859
123	376962.	5384519.	2.564
124	376846.	5384642.	0.759
125	377208.	5384672.	1.533
126	376608.	5381420.	0.400
127	376667.	5382147.	0.001
128	376724.	5382459.	0.001
129	376957.	5382570.	0.214
130	376999.	5382495.	0.506
131	376569.	5381176.	0.001
132	376551.	5380938.	0.001
133	376770.	5383151.	0.001
134	376833.	5383203.	36.184
135	376885.	5383617.	1.645
136	376880.	5383545.	0.253
137	377912.	5382357.	0.001
138	378060.	5382621.	0.333
139	378058.	5382619.	0.921
140	378053.	5382709.	0.789
141	377809.	5382753.	0.001
142	378522.	5383044.	0.696
143	378574.	5382931.	0.188
144	379074.	5383113.	0.267
145	379083	5383335.	0.325
146	378515.	5383641.	0.741
147	378776.	5383897.	2.821
148	379739.	5383684.	0.001
149	379698.	5383569.	0.001
150	378280.	5382061.	0.001
151	376360.	5380375.	0.069
152	376289.	5380055.	0.001
153	376848.	5377822.	0.143
154	378006.	5378390.	0.135
155	378673.	5380057.	0.370
156	378944.	5380361.	0.125
157	378944.	5380361.	0.128
158	378935.	5380436.	0.001

SAMPLE No.	Easting	Northing	AUCN
159	378889.	5381250.	0.001
160	377841.	5381756.	0.001
161	377803.	5381636.	0.001
162	377584.	5381755.	0.001

0100068

068

TABLE 5

SPEARMAN RANK CORRELATION FOR NORMALIZED BASE METAL VALUES FROM STREAM SEDIMENT SAMPLES FROM BHP COMSTAFF JV AREAS

ELEMENT	Cu	Zn	Pb	Fe	Mn	As	Ba
Cu	1.0	.50	.55	-	.07	.60	.57
Zn		1.0	.73	-	.41	.44	.59
Pb			1.0	-	.41	.31	.42
Fe				1.0	-	-	-
Mn					1.0	.05	.13
As						1.0	.59
Ba							1.0

TABLE 6

NORMALIZED BASE METAL STATISTICS FROM STREAM SEDIMENT SAMPLES FROM BHP COMSTAFF JV AREAS

ELEMENT	Cu	Zn	Pb	Fe	Mn	As	Ba
med	3	33	20	5000	114	3	137
75%	5	50	30	5000	162	5	255
90%	7	68	48	5000	236	7	362
95%	10	86	58	5000	291	9	441
mean	4	42	22	5000	131	3.5	187
SD	2.5	40	19	0.00	79	2.8	139

TABLE 3

BASE METAL STATISTICS FROM STREAM SEDIMENT SAMPLES FROM BHP COMSTAFF JV AREAS

ELEMENT	Cu	Zn	Pb	Fe	Mn	As	Ba
med	3	17	12	3425	70	4	87
.75%	6.5	40	22	6225	185	8	125
90%	11.4	83	39	9000	247	13	180
95%	14	139	62	12500	340	19	232
mean	5.2	36	17.6	4402	110	6	104
SD	4.5	20.8	54.6	4482	106	5.5	68

TABLE 4

SPEARMAN RANK CORRELATION FOR BASE METAL VALUES FROM STREAM SEDIMENT SAMPLES FROM BHP COMSTAFF JV AREAS

ELEMENT	Cu	Zn	Pb	Fe	Mn	As	Ba
Cu	1.0	.51	.77	.73	.44	.30	.71
Zn		1.0	.82	.64	.70	.41	.67
Pb			1.0	.83	.84	.39	.77
Fe				1.0	.84	.55	.74
Mn					1.0	.32	.72
As						1.0	.43
Ba							1.0

010069

TABLE 7

STATISTICS OF DUPLICATE SAMPLES

	Pb	Zn	Fe	Mn	Ba	Au
n	3/4	3/2	3/3	5/1	3/2	4/9
AMPD	26	8.0	5.9	14.6	5.7	45.8
SD1	23	11.0	6.7	14.6	6.3	35
MPD	-2.9	6.4	.7	12.6	-2.3	-12.5
SD2	36	12.2	9.2	16.7	8.5	577

AMPD Absolute mean percent difference

MPD Mean percent differences

SD1 Standard deviation of AMPD

SD2 Standard deviation of MPD

n Number of positive/negative comparison

070

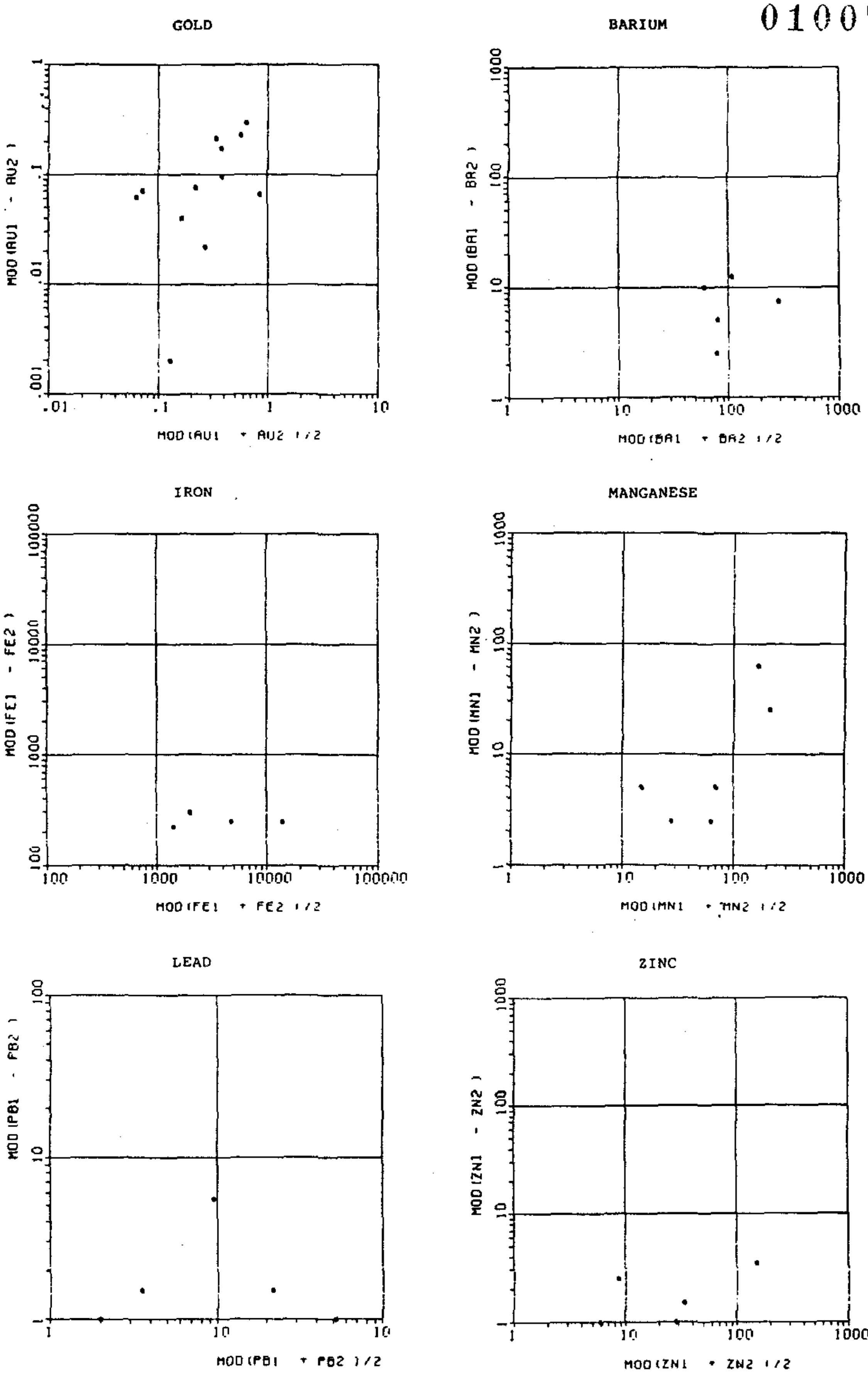
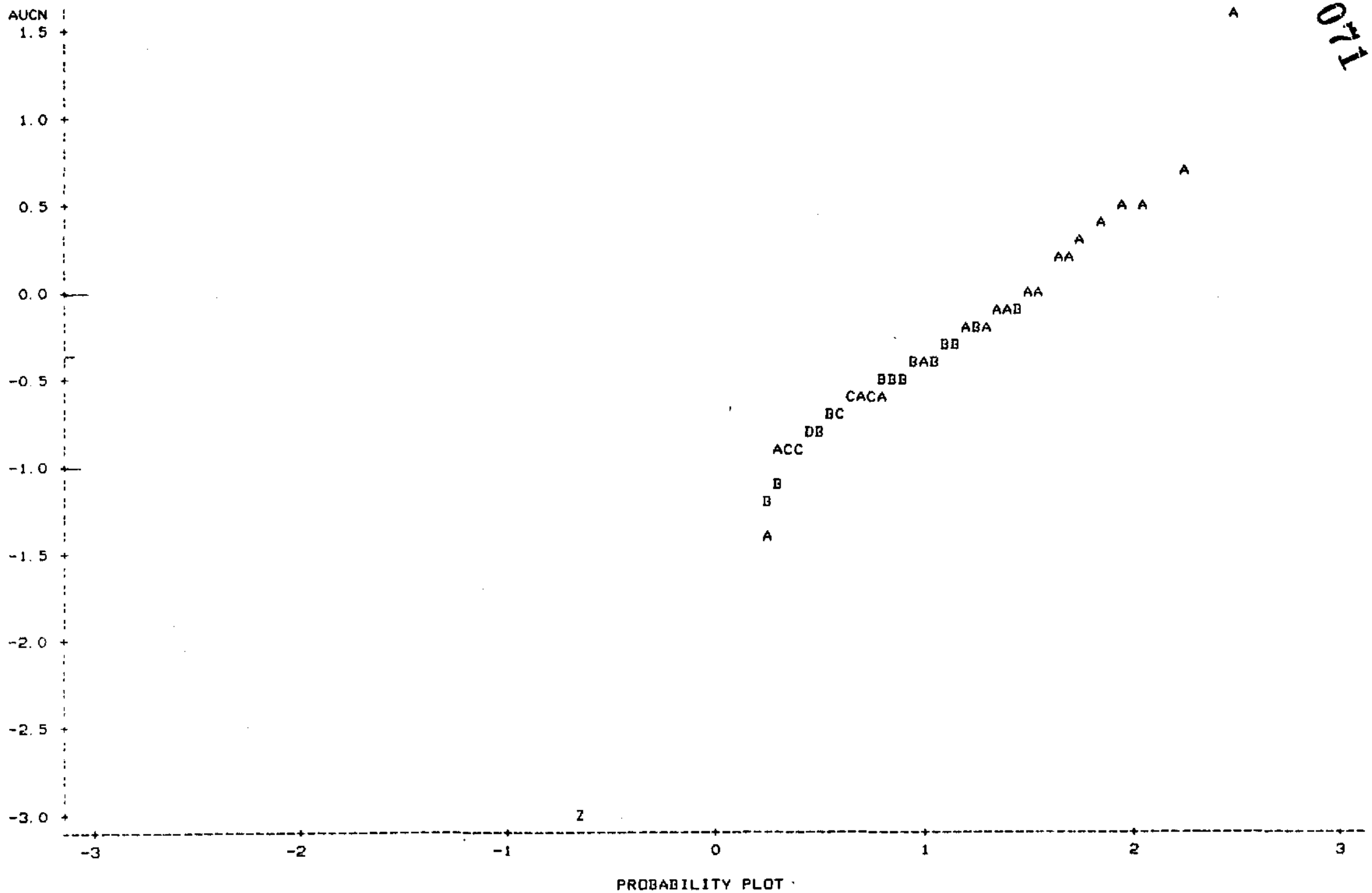


Fig. 1 - Mean half difference plots for Cyanide gold and base metals.

Log transformed data

071

PLOT OF AUCN*PR_AUCN LEGEND: A = 1 OBS, B = 2 OBS, ETC.



NOTE: 65 OBS HIDDEN

0100072

Log transformed data

072

UNIVARIATE

VARIABLE=AUCN

MOMENTS

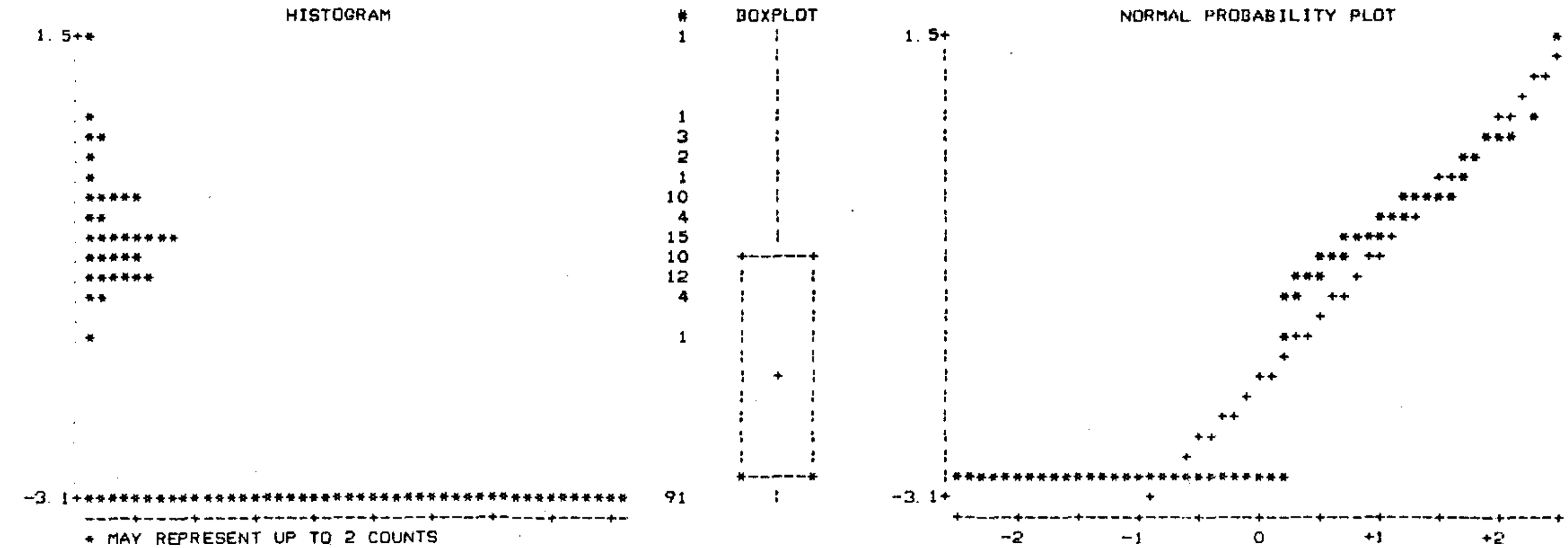
N	155	SUM WGTS	155
MEAN	-1.9457	SUM	-301.58
STD DEV	1.3017	VARIANCE	1.69441
SKEWNESS	0.567647	KURTOSIS	-1.3395
USS	847.705	CSS	260.94
CV	-66.903	STD MEAN	0.104555
T:MEAN=0	-18.609	PROB>:T:	0.0001
SGN RANK	-5828	PROB>:S:	0.0001
NUM ^= 0	155		

QUANTILES(DEF=4)

100% MAX	1.55852	99%	1.06081
75% Q3	-0.60206	95%	0.191667
50% MED	-3	90%	-0.155159
25% Q1	-3	10%	-3
0% MIN	-3	5%	-3
		1%	-3
RANGE	4.55852		
Q3-Q1	2.39794		
MODE	-3		

EXTREMES

LOWEST	HIGHEST
-3	0.408918
-3	0.450403
-3	0.525563
-3	0.669782
-3	1.55852



0100073

Log transformed data

073

UNIVARIATE

VARIABLE=CU

MOMENTS

N	65	SUM WGTS	65
MEAN	0.602832	SUM	39.1841
STD DEV	0.298117	VARIANCE	0.0888737
SKEWNESS	0.786081	KURTOSIS	-0.452879
USS	29.3094	CSS	5.68792
CV	49.4527	STD MEAN	0.0369768
T:MEAN=0	16.303	PROB>|T|	0.0001
SGN RANK	1072.5	PROB>|S|	0.0001
NUM ^= 0	65		

QUANTILES(DEF=4)

100% MAX	1.36173	99%	1.36173
75% Q3	0.811625	95%	1.14613
50% MED	0.477121	90%	1.05651
25% Q1	0.30103	10%	0.30103
0% MIN	0.30103	5%	0.30103
		1%	0.30103
RANGE	1.0607		
Q3-Q1	0.510595		
MODE	0.30103		

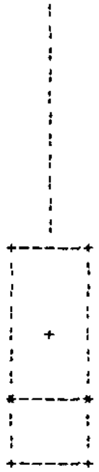
EXTREMES

LOWEST	HIGHEST
0.30103	1.14613
0.30103	1.14613
0.30103	1.14613
0.30103	1.30103
0.30103	1.36173

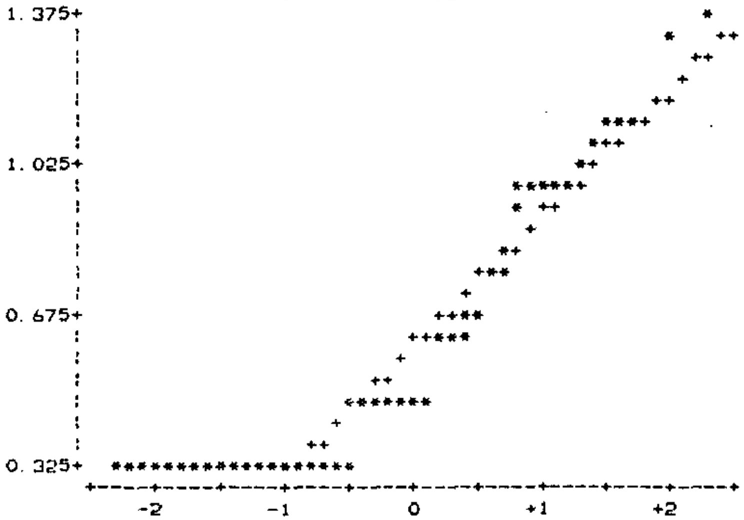
MISSING VALUE
COUNT 79
% COUNT/NOBS 54.86

```
STEM LEAF                      #
  13 6                         1
  13 0                         1
  12
  12
  11 555                       3
  11
  10 8                         1
  10 0004                      4
   9 5555                      4
   9 0                         1
   8 5                         1
   8
   7 888                       3
   7 0000                      4
   6
   6 000000                    6
   5
   5
   4 8888888888888888         16
   4
   3
   3 00000000000000000000     20
     ----+----+----+----+
MULTIPLY STEM.LEAF BY 10**-01
```

BOXPLOT



NORMAL PROBABILITY PLOT



010074

Log transformed data

074

UNIVARIATE

VARIABLE=PB

MOMENTS

N	131	SUM WGTS	131
MEAN	1.03527	SUM	135.62
STD DEV	0.426913	VARIANCE	0.182255
SKEWNESS	0.207934	KURTOSIS	-0.63532
USS	164.096	CSS	23.6931
CV	41.2371	STD MEAN	0.0372996
T:MEAN=0	27.7554	PROB>|T|	0.0001
SGN RANK	4323	PROB>|S|	0.0001
NUM ^= 0	131		

QUANTILES(DEF=4)

100% MAX	2.16435	99%	2.10753
75% Q3	1.34242	95%	1.78906
50% MED	1.07918	90%	1.58881
25% Q1	0.69897	10%	0.477121
0% MIN	0.30103	5%	0.30103
		1%	0.30103
RANGE	1.86332		
Q3-Q1	0.643452		
MODE	0.60206		

EXTREMES

LOWEST	HIGHEST
0.30103	1.83885
0.30103	1.88081
0.30103	1.96848
0.30103	1.98677
0.30103	2.16435

MISSING VALUE

COUNT	13
% COUNT/NOBS	9.03

```
STEM LEAF                    #          BOXPLOT
  21 6                       1             |
  20                                       |
  19 79                      2             |
  18 448                     3             |
  17 126                     3             |
  16 155                     3             |
  15 122289                  6             |
  14 000003399               9             |
  13 0000244466888          13          +-----+
  12 003333368               9          |     |
  11 111558888888888        15          |     |
  10 000044488               9          *--+--*
   9 000555                  6          |     |
   8 555                     3          |     |
   7 00000000008888888      17          |     |
   6 0000000000000000       16          +-----+
   5                                       |
   4 888888888               9             |
   3 0000000                 7             |
     ----+----+----+----+
  MULTIPLY STEM.LEAF BY 10**-01
```

```
                         NORMAL PROBABILITY PLOT
  2.15+                                                        *
      |                                                      ++
      |                                                    **
      |                                                ****+
      |                                              ***+
      |                                            ***
      |                                          ***
      |                                        +++
      |                                     *****
  1.25+                                   ****+
      |                                ****
      |                              ***
      |                            ***
      |                          +++
      |                        +++++
      |                    *******
      |                  ++
      |              *****
  0.35+***********+
       +----+----+----+----+----+----+----+----+----+----+
           -2        -1         0        +1        +2
```

010075

Log transformed data

075

UNIVARIATE

VARIABLE=ZN

MOMENTS

N	144	SUM WGTS	144
MEAN	1.30032	SUM	187.246
STD DEV	0.446226	VARIANCE	0.199117
SKEWNESS	0.526408	KURTOSIS	-0.326878
USS	271.954	CSS	28.4738
CV	34.3166	STD MEAN	0.0371855
T:MEAN=0	34.9685	PROB>|T|	0.0001
SGN RANK	5220	PROB>|S|	0.0001
NUM ^= 0	144		

QUANTILES(DEF=4)

100% MAX	2.6902	99%	2.5507
75% Q3	1.60206	95%	2.1435
50% MED	1.23045	90%	1.91905
25% Q1	0.954243	10%	0.778151
0% MIN	0.60206	5%	0.69897
		1%	0.60206
RANGE	2.08814		
Q3-Q1	0.647818		
MODE	0.778151		

EXTREMES

LOWEST	HIGHEST
0.60206	2.18469
0.60206	2.1959
0.60206	2.21748
0.60206	2.38021
0.69897	2.6902

```
STEM LEAF                       #             BOXPLOT
  26 9                          1                0
  25
  24
  23 8                          1                |
  22 02                         2                |
  21 688                        3                |
  20 55899                      5                |
  19 0124                       4                |
  18 235566                     6                |
  17 06689                      5                |
  16 00011345599               11             +-----+
  15 1113466888                10             |     |
  14 0115568889                10             |     |
  13 000244446                  9             |  +  |
  12 03336888                   8             *-----*
  11 15555588888               11             |     |
  10 00000444444444488888      20             |     |
   9 00555555                   8             +-----+
   8 555555                     6                |
   7 00000000888888888888      20                |
   6 0000                       4                |
     ----+----+----+----+
  MULTIPLY STEM.LEAF BY 10**-01
```

```
                         NORMAL PROBABILITY PLOT
2.65+                                                         *
    |
2.45+                                                         +
    |                                                       ++
2.25+                                                     ++
    |                                                  ****
2.05+                                               ****+
    |                                              ***
1.85+                                           ****+
    |                                           ***
1.65+                                       ****
    |                                     ***
1.45+                                    **
    |                                 ****
1.25+                               ++++
    |                             ++++
1.05+                           ++++
    |                         ****
0.85+                     ++++
    |                  *****
0.65+************
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

010076

076

UNIVARIATE

VARIABLE=FE

MOMENTS

N	144	SUM WGTS	144
MEAN	3.4681	SUM	499.406
STD DEV	0.403763	VARIANCE	0.163025
SKEWNESS	-0.0808534	KURTOSIS	-0.682776
USS	1755.3	CSS	23.3126
CV	11.6422	STD MEAN	0.033647
T:MEAN=0	103.073	PROB>|T|	0.0001
SGN RANK	5220	PROB>|S|	0.0001
NUM ^= 0	144		

QUANTILES(DEF=4)

100% MAX	4.59106	99%	4.41073
75% Q3	3.79413	95%	4.09691
50% MED	3.53465	90%	3.95424
25% Q1	3.11884	10%	2.95422
0% MIN	2.57978	5%	2.80027
		1%	2.59463
RANGE	2.01128		
Q3-Q1	0.675287		
MODE	3.60746		

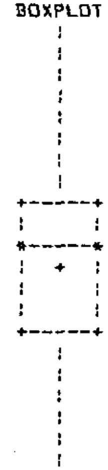
EXTREMES

LOWEST	HIGHEST
2.57978	4.13033
2.61278	4.13033
2.61805	4.14613
2.69461	4.19033
2.7364	4.59106

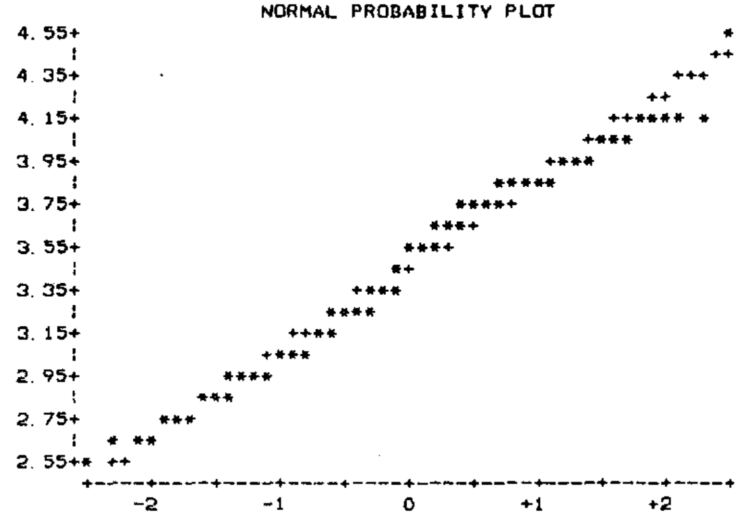
STEM	LEAF	#
45	9	1
44		
43		
42		
41	0033359	7
40	66	2
39	014555789	9
38	01123344556888999	17
37	000122224467999	15
36	11111235689	11
35	1234466677889	13
34	23568	5
33	0136667899	10
32	0122333456778	13
31	11136789	8
30	0111344677899	13
29	35667899	8
28	55899	5
27	479	3
26	129	3
25	8	1

MULTIPLY STEM.LEAF BY 10**-01

BOXPLOT



NORMAL PROBABILITY PLOT



010077

077

Log transformed data

UNIVARIATE

VARIABLE=MN

MOMENTS

N	144	SUM WGTS	144
MEAN	1.81309	SUM	261.084
STD DEV	0.477243	VARIANCE	0.227761
SKEWNESS	-0.110616	KURTOSIS	-1.1146
USS	505.938	CSS	32.5698
CV	26.3221	STD MEAN	0.0397702
T:MEAN=0	45.589	PROB>|T|	0.0001
SGN RANK	5220	PROB>|S|	0.0001
NUM ^= 0	144		

QUANTILES(DEF=4)

100% MAX	2.6721	99%	2.65471
75% Q3	2.26717	95%	2.53148
50% MED	1.8451	90%	2.39355
25% Q1	1.32526	10%	1.17609
0% MIN	0.69897	5%	1.04402
		1%	0.834433
RANGE	1.97313		
Q3-Q1	0.941914		
MODE	1.17609		

EXTREMES

LOWEST	HIGHEST
0.69897	2.60746
1	2.60746
1	2.61278
1	2.63347
1	2.6721

```
STEM LEAF                    #              BOXPLOT
  26 11137                   5                 |
  25 2339                    4                 |
  24 01279                   5                 |
  23 000111235666777889     18                 |
  22 0077778                 7              +-----+
  21 0133555556688          13              |     |
  20 268                     3              |     |
  19 0000335555             10              |     |
  18 111155558888           12              *--+--*
  17 00448888888            11              |     |
  16 005555                  6              |     |
  15 444                     3              |     |
  14 00000888888            11              |     |
  13 00000000000000         14              +-----+
  12                                           |
  11 888888888888888        15                 |
  10 000000                  6                 |
   9                                           |
   8                                           |
   7 0                       1                 |
   6
     ----+----+----+----+
  MULTIPLY STEM.LEAF BY 10**-01
```

```
                       NORMAL PROBABILITY PLOT
2.65+                                          +++** * *
    |                                        +***
2.45+                                      +**
    |                                 ******
2.25+                               ***++
    |                             *****+
2.05+                            **++
    |                          ***
1.85+                        ***
    |                       **
1.65+                     **
    |                   +++
1.45+                 ++**
    |               *****
1.25+             ++
    |         *******
1.05+        +++
    |  *******
0.85+    ++
    |  ++
0.65+**+
     +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

010078

Log transformed data

078

UNIVARIATE

VARIABLE=AS

MOMENTS

N	47	SUM WGTS	47
MEAN	0.644152	SUM	30.2751
STD DEV	0.319149	VARIANCE	0.101856
SKEWNESS	0.786825	KURTOSIS	-0.389249
USS	24.1872	CSS	4.68539
CV	49.5457	STD MEAN	0.0465527
T:MEAN=0	13.837	PROB>|T|	0.0001
SGN RANK	564	PROB>|S|	0.0001
NUM ^= 0	47		

QUANTILES(DEF=4)

100% MAX	1.43136	99%	1.43136
75% Q3	0.90309	95%	1.28551
50% MED	0.60206	90%	1.12637
25% Q1	0.30103	10%	0.30103
0% MIN	0.30103	5%	0.30103
		1%	0.30103
RANGE	1.13033		
Q3-Q1	0.60206		
MODE	0.30103		

EXTREMES

LOWEST	HIGHEST
0.30103	1.11394
0.30103	1.17609
0.30103	1.23045
0.30103	1.32222
0.30103	1.43136

MISSING VALUE .

COUNT	97
% COUNT/NOBS	67.36

```
STEM LEAF                 #          BOXPLOT                        NORMAL PROBABILITY PLOT
  14 3                    1             |              1.45+                                                  * ++
  13 2                    1             |                  |                                              *  +++
  12 3                    1             |                  |                                            * +++
  11 1118                 4             |                  |                                       *******+
  10 04                   2             |                  |                                       * +++
   9 055                  3          +-----+               |                                   *****
   8 5                    1          |     |               |                                 ****
   7 0008                 4          |     |               |                              +++ *
   6 00000000             8          *--+--*               |                           *******
   5                                 |     |               |                        +++
   4 8888888888          10          |     |               |                     *******
   3 000000000000        12          +-----+           0.35+   ****************
     ----+----+----+----+                                   +----+----+----+----+----+----+----+----+----+----+
   MULTIPLY STEM.LEAF BY 10**-01                                 -2        -1         0        +1        +2
```

010079

Log transformed data

079

UNIVARIATE

VARIABLE=BA

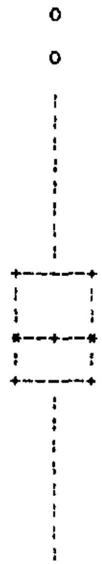
MOMENTS			
N	144	SUM WGTS	144
MEAN	1.94873	SUM	280.616
STD DEV	0.236981	VARIANCE	0.0561602
SKEWNESS	0.351757	KURTOSIS	0.271147
USS	554.875	CSS	8.03091
CV	12.1608	STD MEAN	0.0197485
T:MEAN=0	98.6774	PROB>:T:	0.0001
SGN RANK	5220	PROB>:S:	0.0001
NUM ^= 0	144		

QUANTILES(DEF=4)			
100% MAX	2.68124	99%	2.64066
75% Q3	2.09691	95%	2.36635
50% MED	1.94183	90%	2.25527
25% Q1	1.81291	10%	1.62764
0% MIN	1.39794	5%	1.54407
		1%	1.43357
RANGE	1.2833		
Q3-Q1	0.283998		
MODE	1.8451		

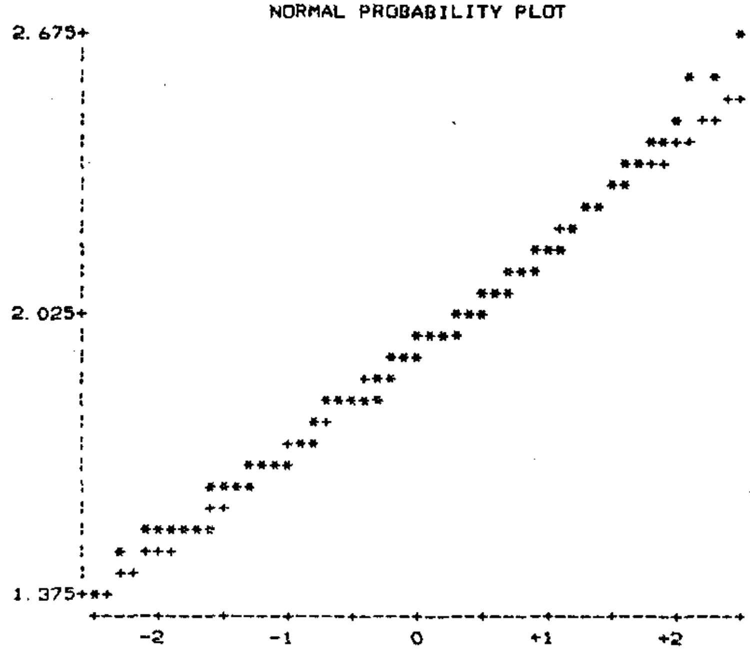
EXTREMES	
LOWEST	HIGHEST
1.39794	2.44716
1.47712	2.46982
1.54407	2.5563
1.54407	2.59106
1.54407	2.68124

```
STEM LEAF                     #
  26 8                        1
  26
  25 69                       2
  25
  24 57                       2
  24 2                        1
  23 57                       2
  23 13                       2
  22 66788                    5
  22 002                      3
  21 5666888999              10
  21 001113333                9
  20 6666888                  7
  20 00000222222244444       17
  19 55555888888             11
  19 00000000333             11
  18 5555555555555888888     19
  18 111111111                9
  17 888                      3
  17 000000044444            12
  16 5555                     4
  16 000000                   6
  15
  15 444444                   6
  14 8                        1
  14 0                        1
  13
     ----+----+----+----+
MULTIPLY STEM.LEAF BY 10**-01
```

BOXPLOT



NORMAL PROBABILITY PLOT

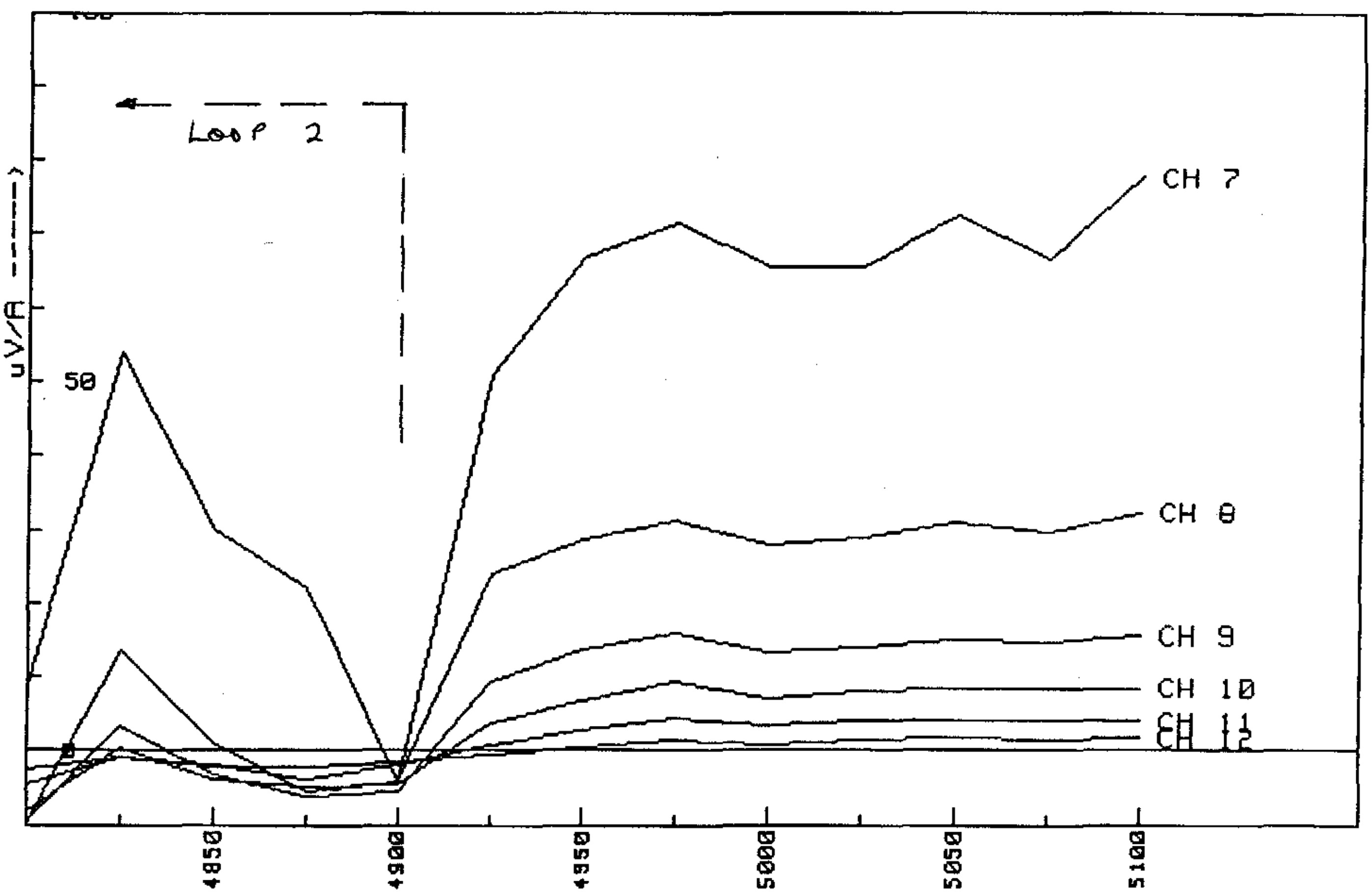


0100080

APPENDIX 5

SIROTEM PROFILES

081



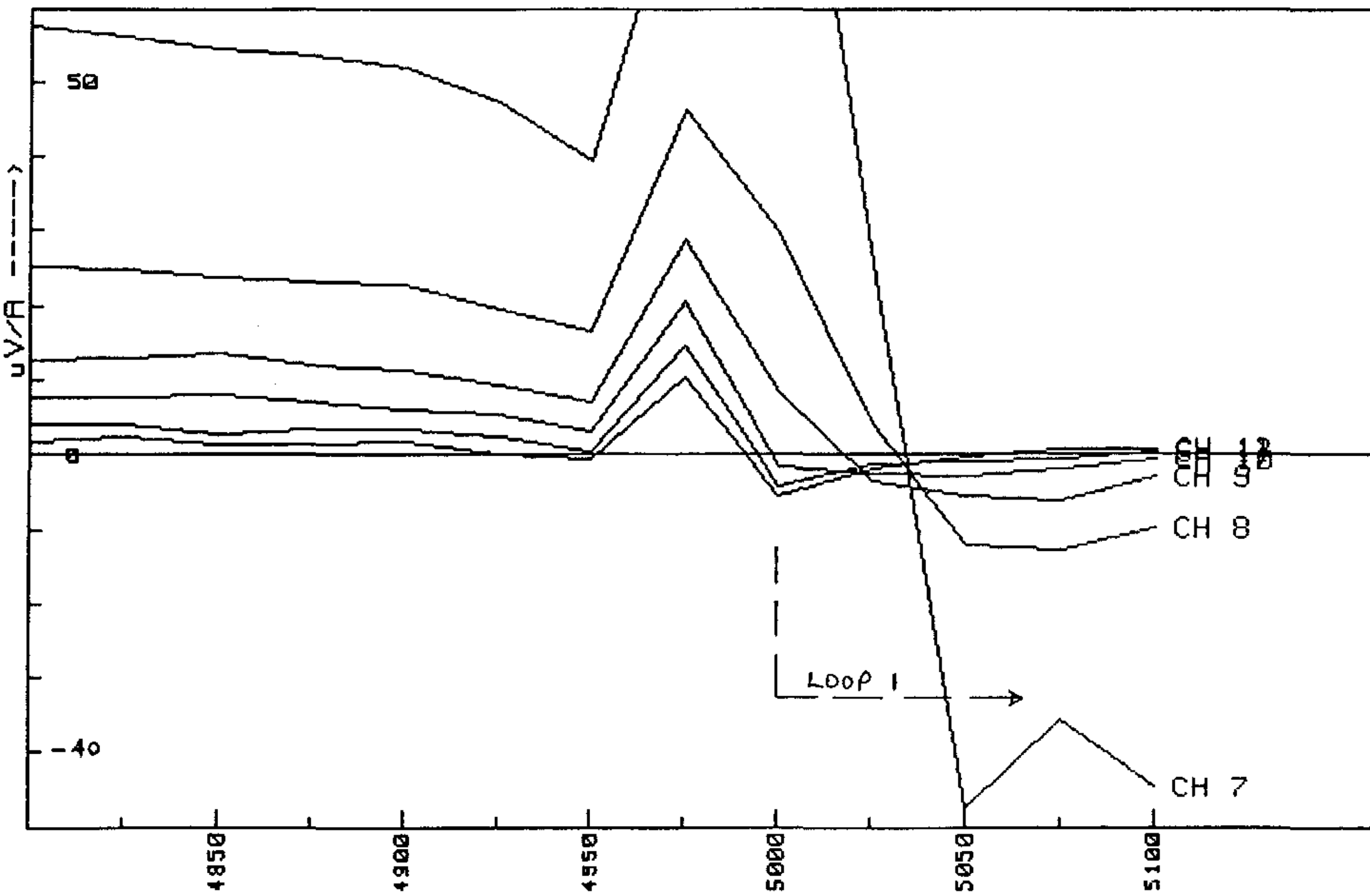
Horizontal Scale 1:2000

Profile Scale: 10 Units/cm
Base Level : -10

PINNACLES RVR LINE 5331N

5 cm

082

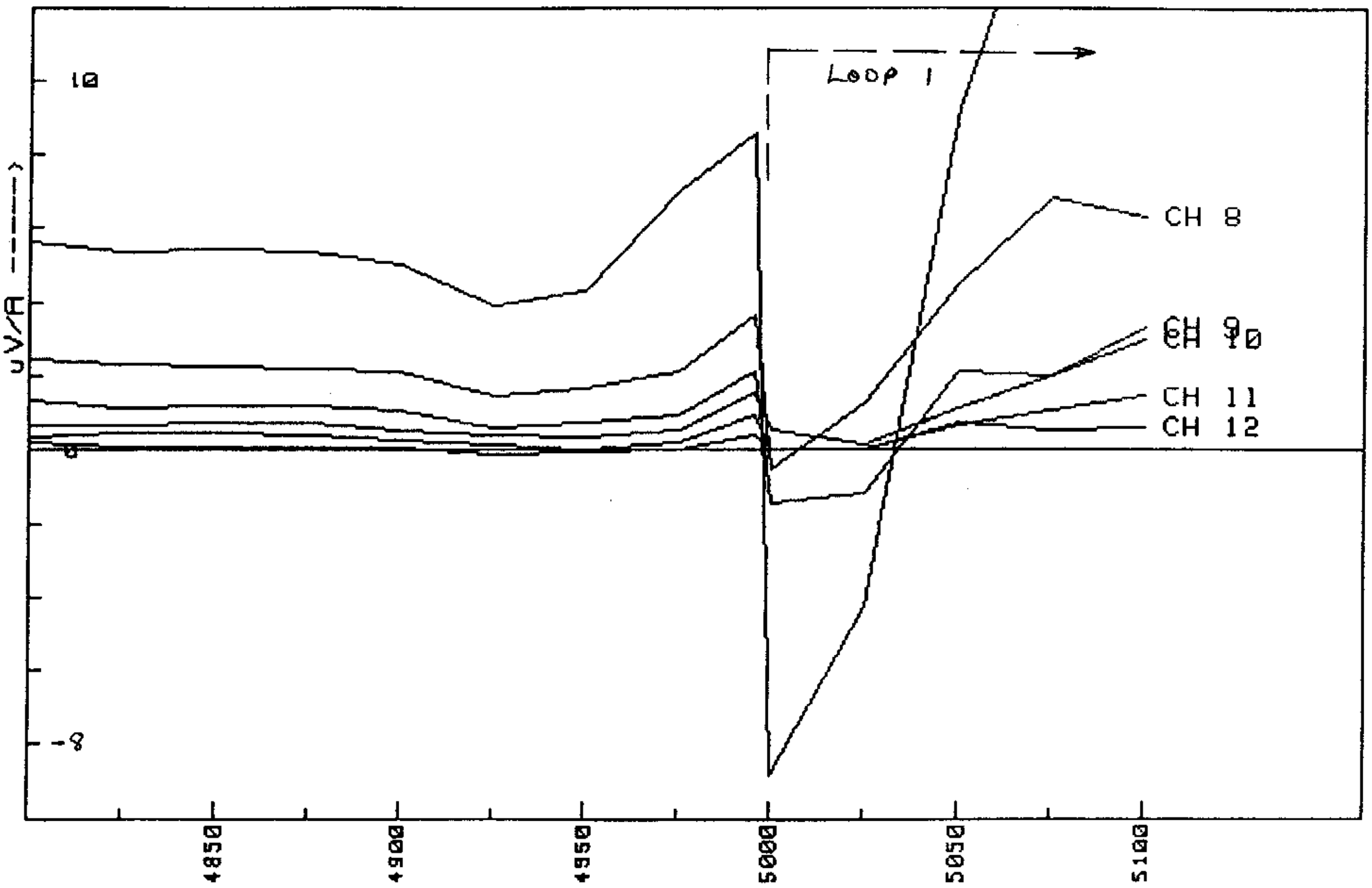


Horizontal Scale 1:2000

Profile Scale: 10 Units/cm
Base Level : -50

PINNACLES RVR LINE 5330N

5 cm



Horizontal Scale 1:2000

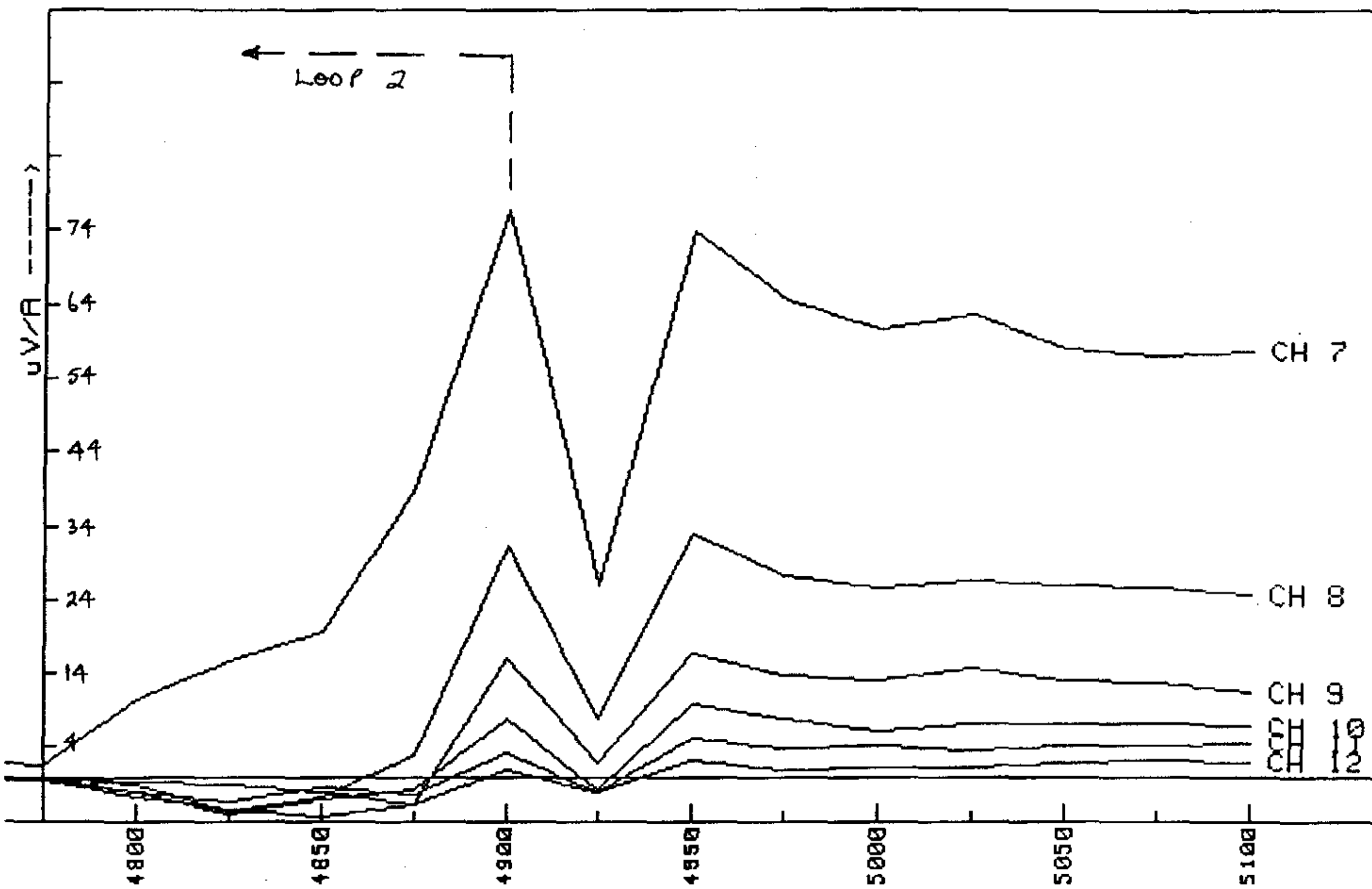
Profile Scale: 2 Units/cm

Base Level : -10

PINNACLES RVR LINE 5280N

5 cm

084



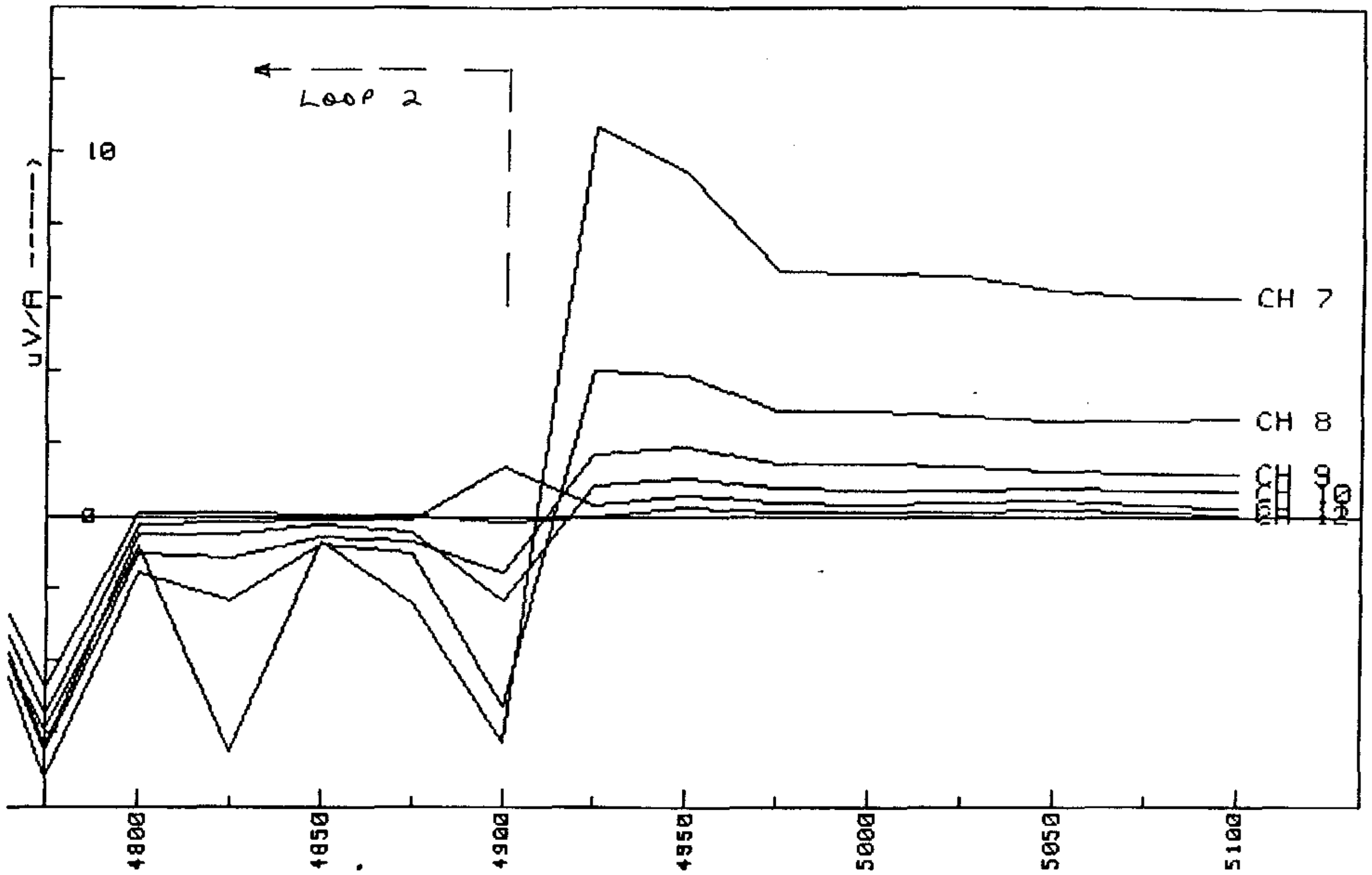
Horizontal Scale 1:2000

Profile Scale: 10 Units/cm
Base Level : -6

PINNACLES RVR LINE 5281N

5 cm

085

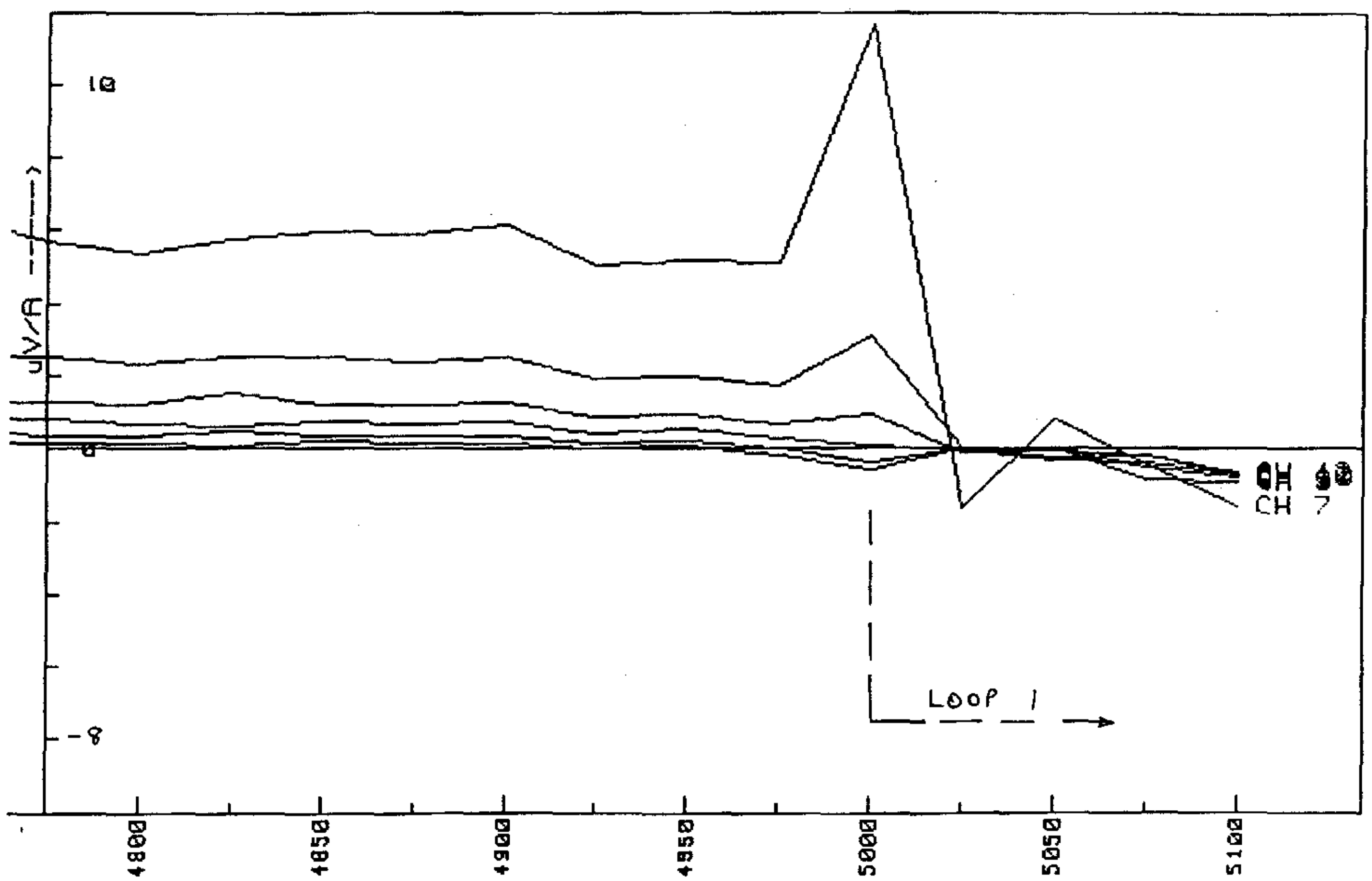


Horizontal Scale 1:2000

Profile Scale: 2 Units/cm
Base Level : -8

PINNACLES RVR LINE 5241N

5 cm



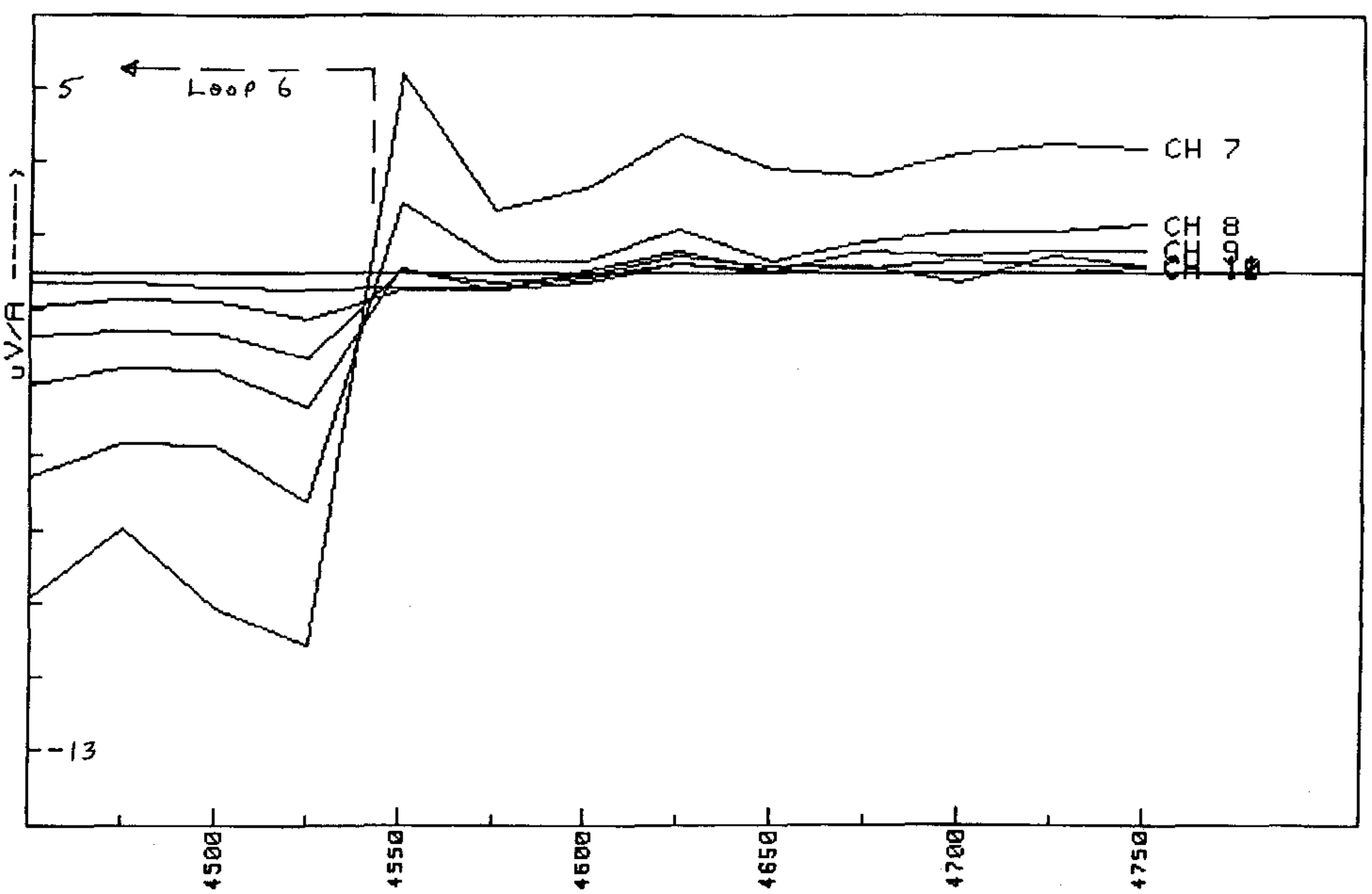
Horizontal Scale 1:2000

Profile Scale: 2 Units/cm
Base Level : -10

PINNACLES RVR LINE 5240N

5 cm

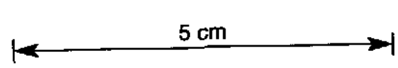
087

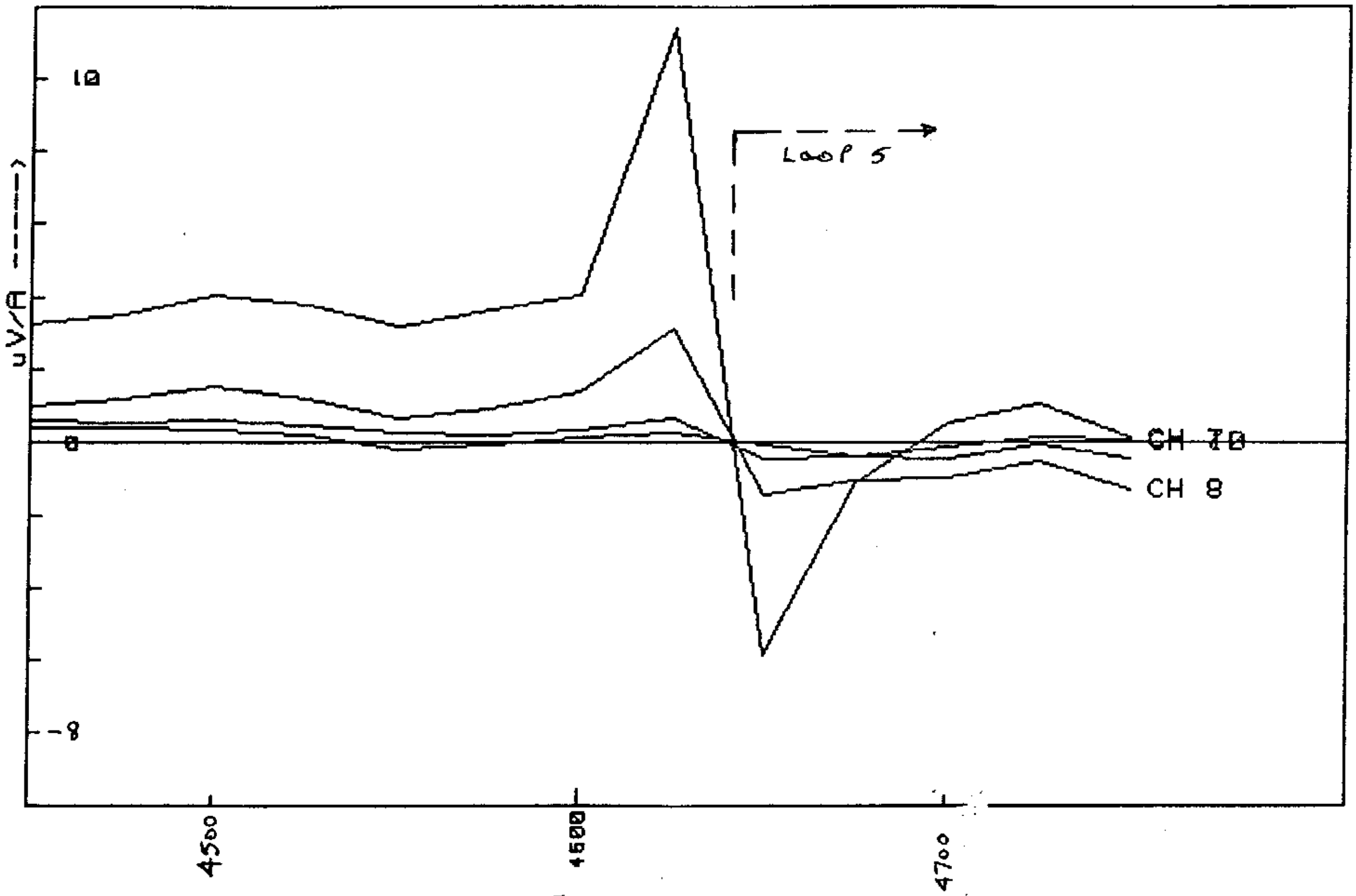


Horizontal Scale 1:2000

Profile Scale: 2 Units/cm
Base Level : -15

PINNACLES RVR LINE 4460N

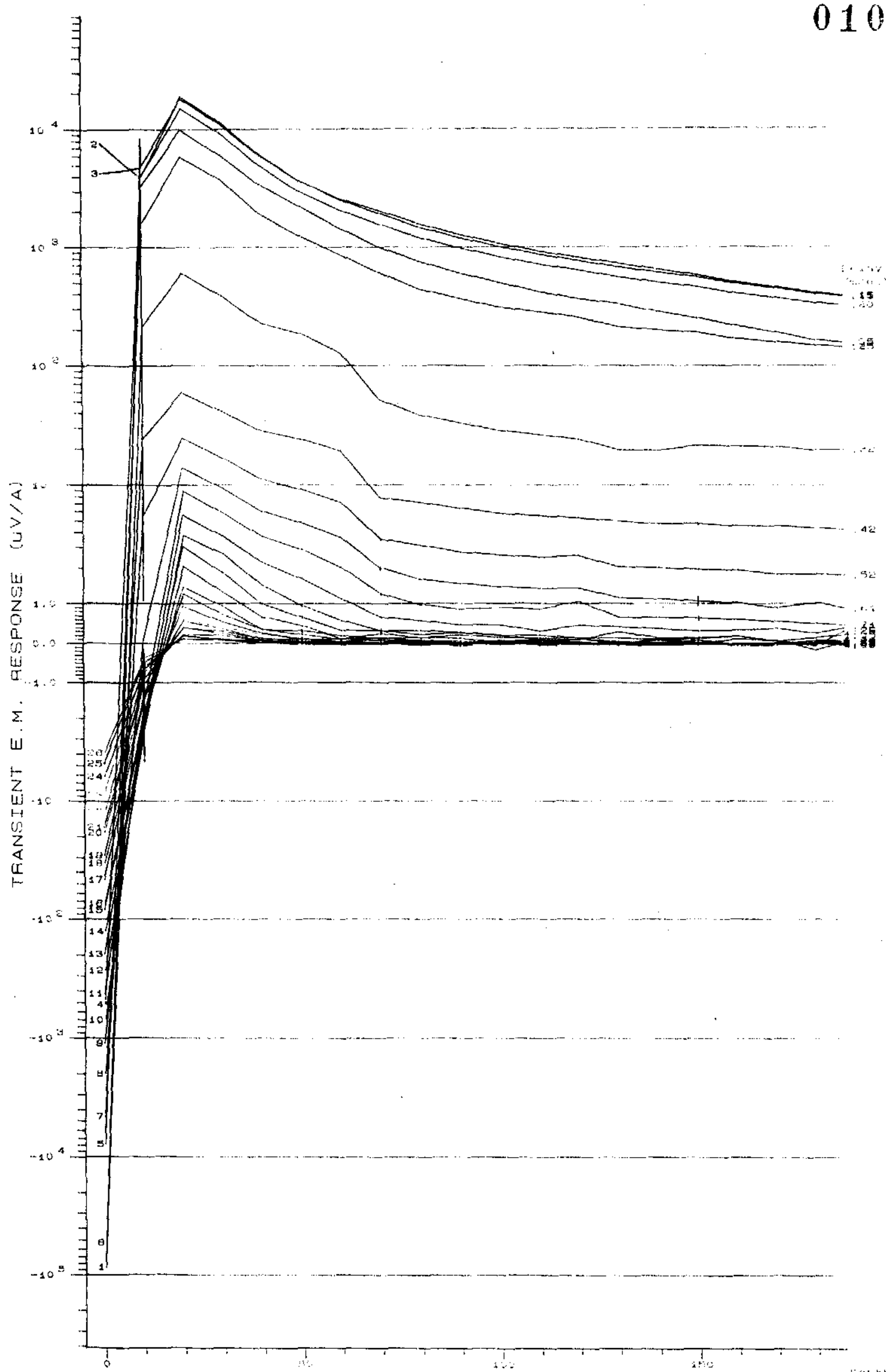




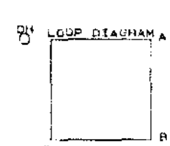
Horizontal Scale 1:2000   Profile Scale: 2 Units/cm
Base Level : -10

PINNACLES GROUND LINE 4461N / COMP Z

5 cm



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611)
DH ESB1 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 26/ 1/86
SOLO hole ref.400 Reading interval 7.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted ; 11:53 AM 24/ 3/86

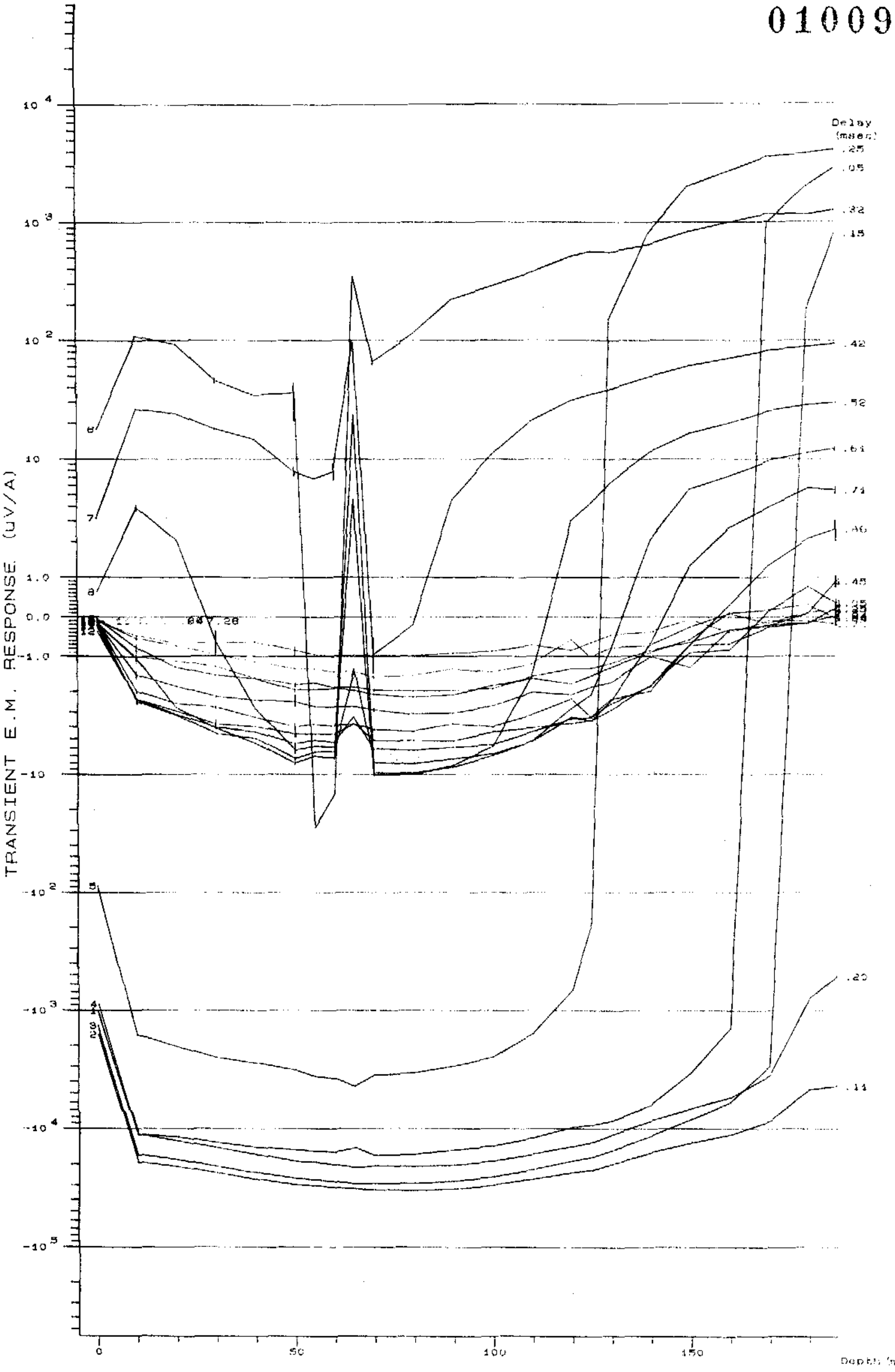


SOLO

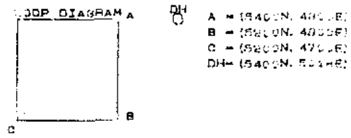
5 cm

090

010091



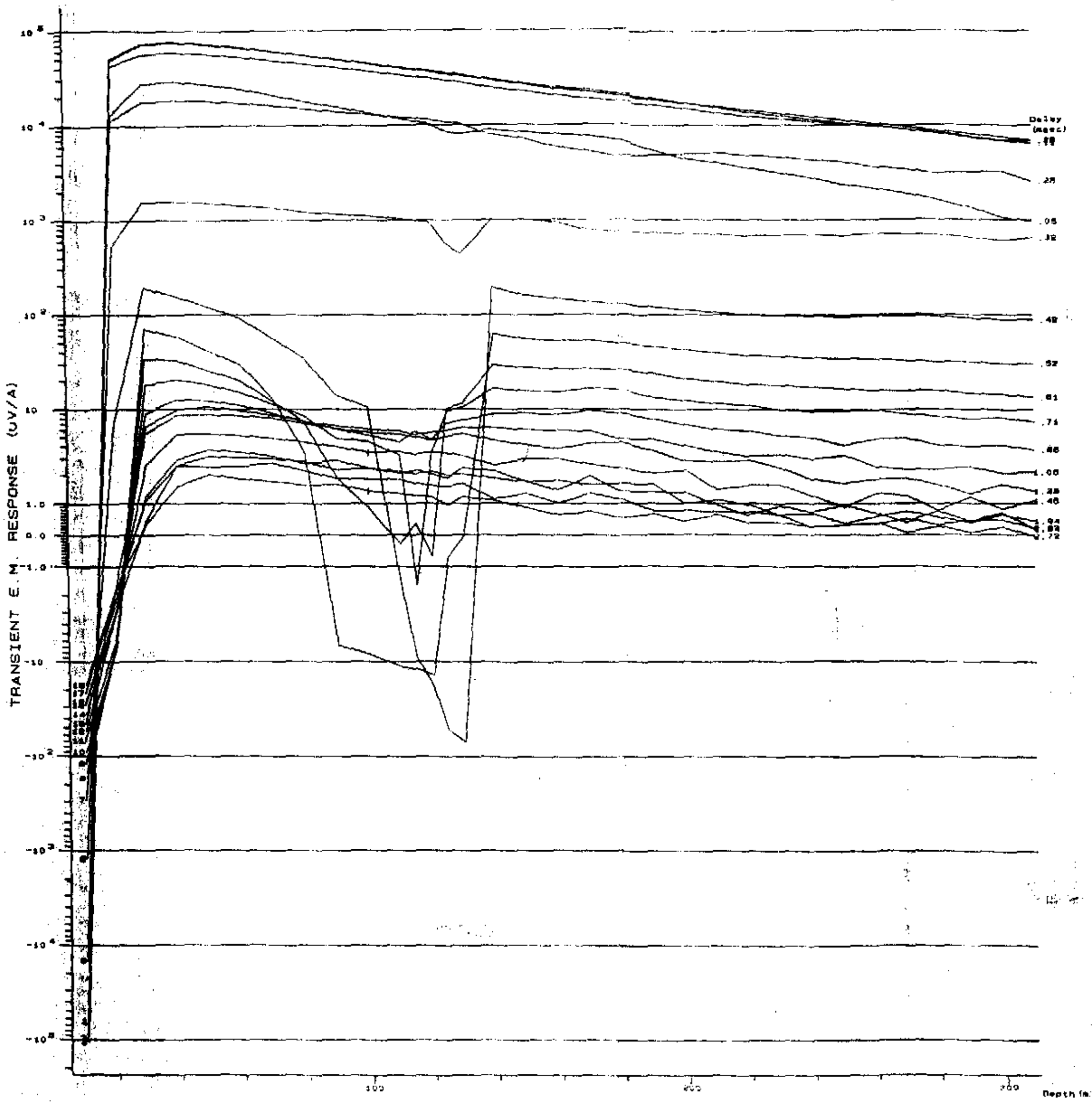
BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611)
DH ESB1 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 26/ 1/86
SOLO hole ref.401 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 4:25 PM 18/ 3/86



SOLO

5 cm

091



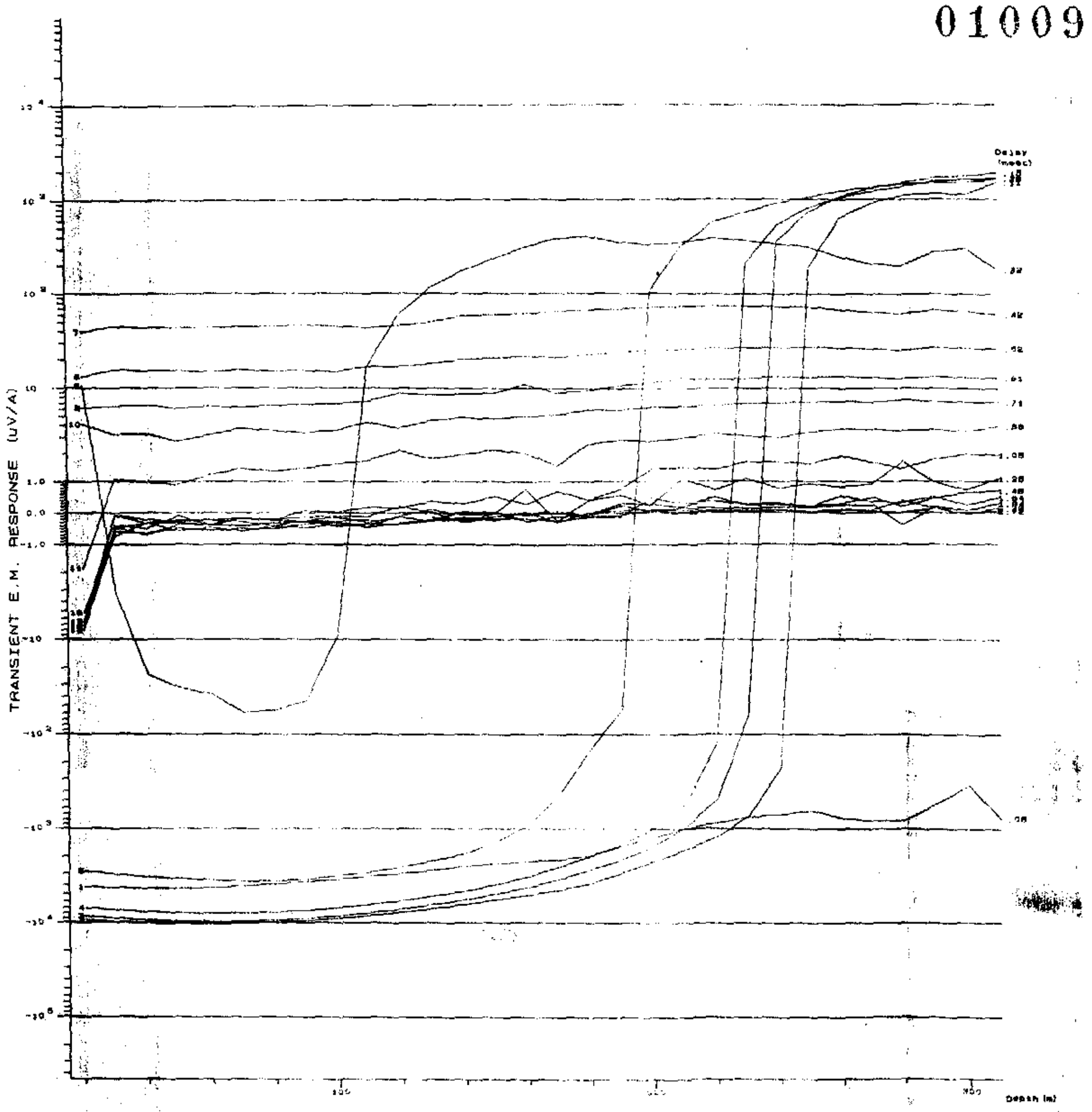
BHP EXPLORATION PTY.LTD.
PINNACLES. TASMANIA
(JOB NO.611)
DH EAF11 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 26/ 1/86
SOLO hole ref.402 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration . Drill hole
Plotted : 4:28 PM 18/ 3/86

SOLO

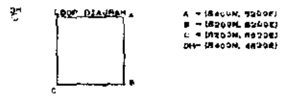
5 cm

010092

092



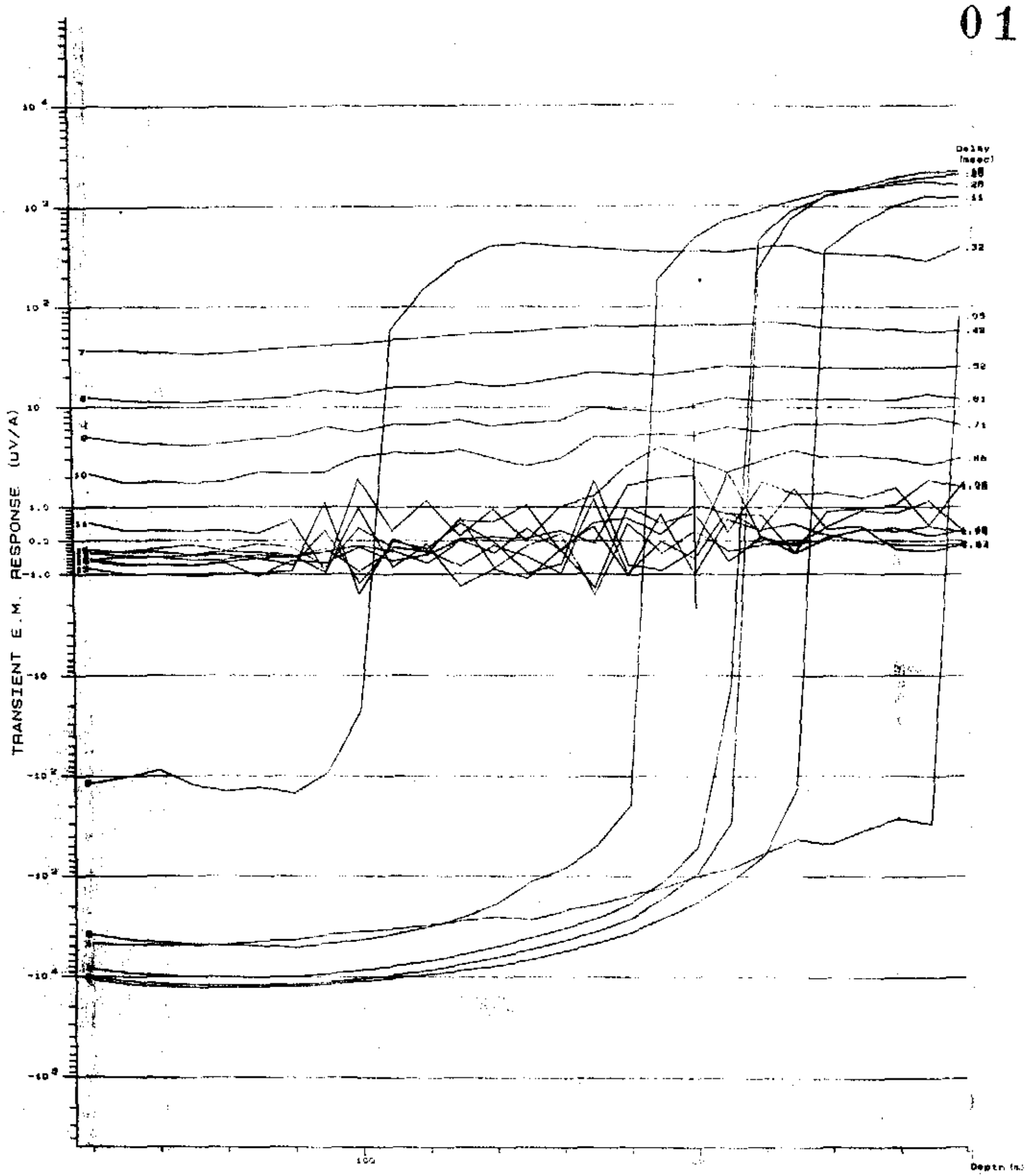
BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611)
DH:SAF11 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 26/ 1/88
SOLO hole ref.403 Reading interval 10.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 11:58 AM 24/ 3/88



SOLO

5 cm

093



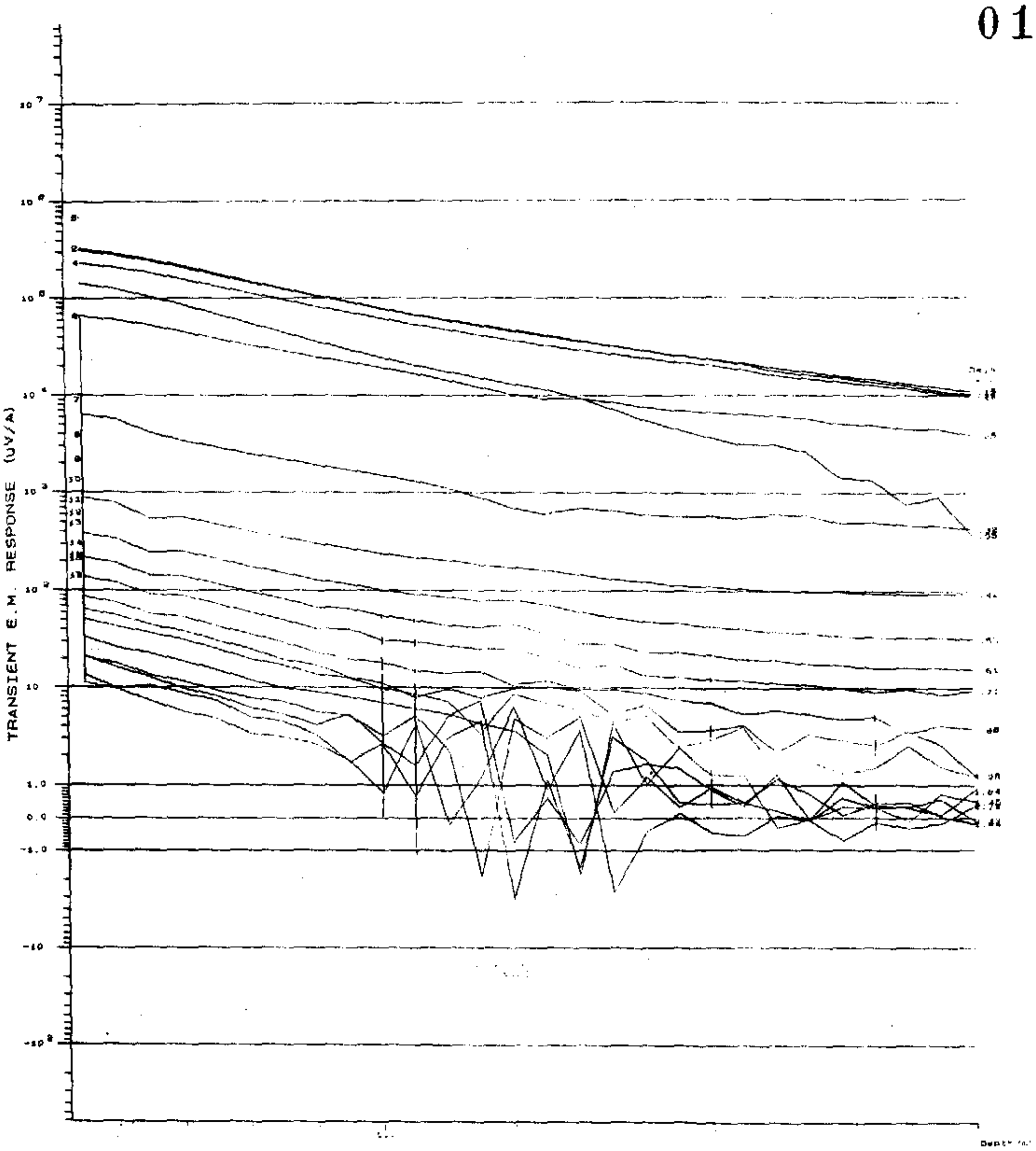
BMP EXPLORATION PTY.LTD.
PINNACLES. TASMANIA
(JOB NO.611)
DH EAF12 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 27/ 1/88
SOLO hole ref:455 Reading interval 10.0 m
SCALE 1 : 1000 Loop size 200 m
LOOP configuration : Drill hole
Plotted : 4:41 PM 18/ 2/88

SOLO

5 cm

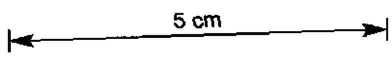
010095

094



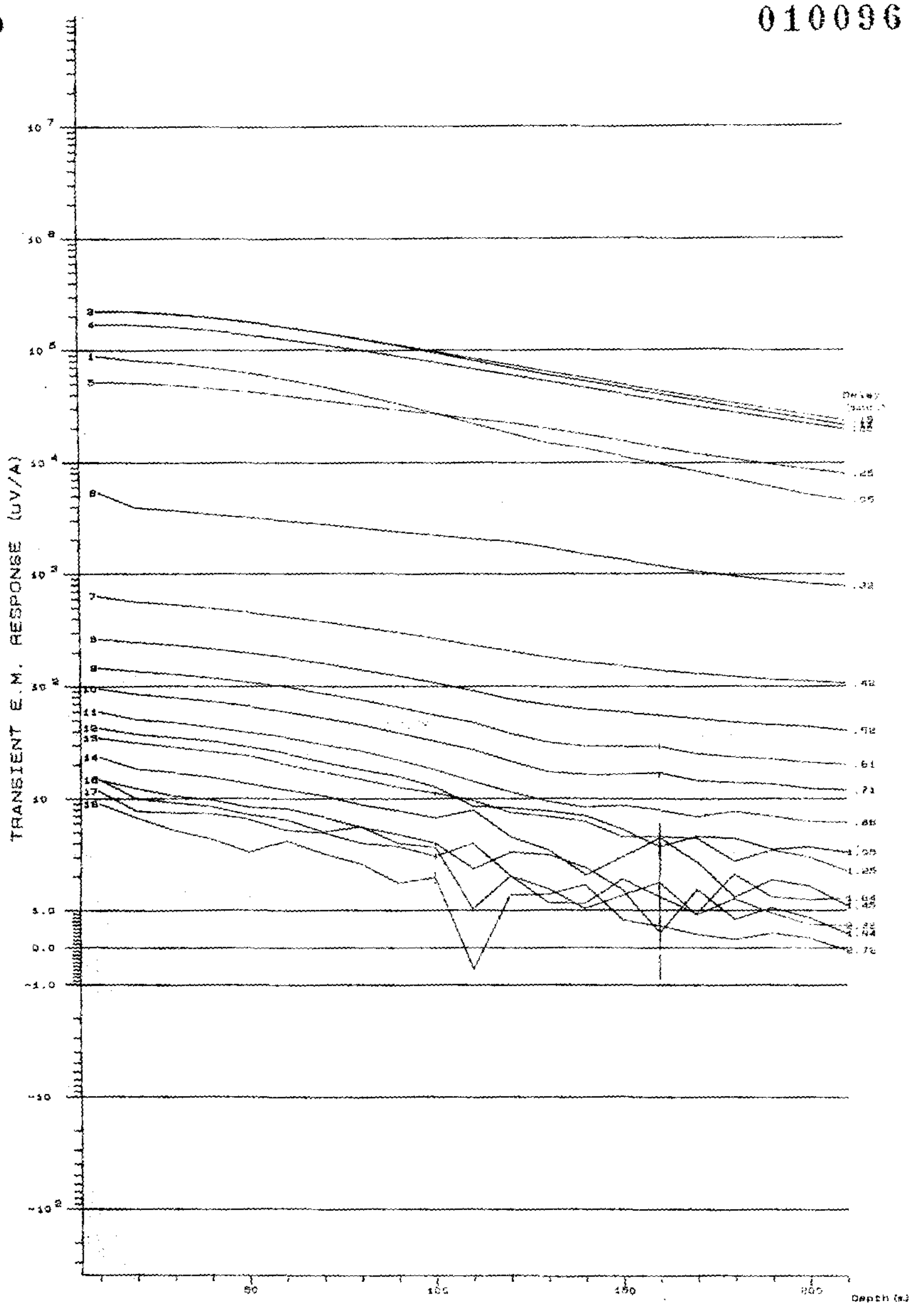
BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611)
DH EAF12 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 27/ 1/88
SOLO hole ref.408 Reading interval 10.0 m
SCALE 1 . 1000 Loop size . 200 m
LOOP configuration . Drill hole
Plotted : 4:48 PM 18/ 3/88

SOLO

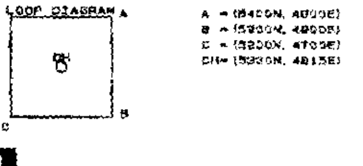


095

010096



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.811)
DH EAF13 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 27/ 1/88
SOLO hole ref.407 Reading interval 10.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 12:05 PM 24/ 3/88

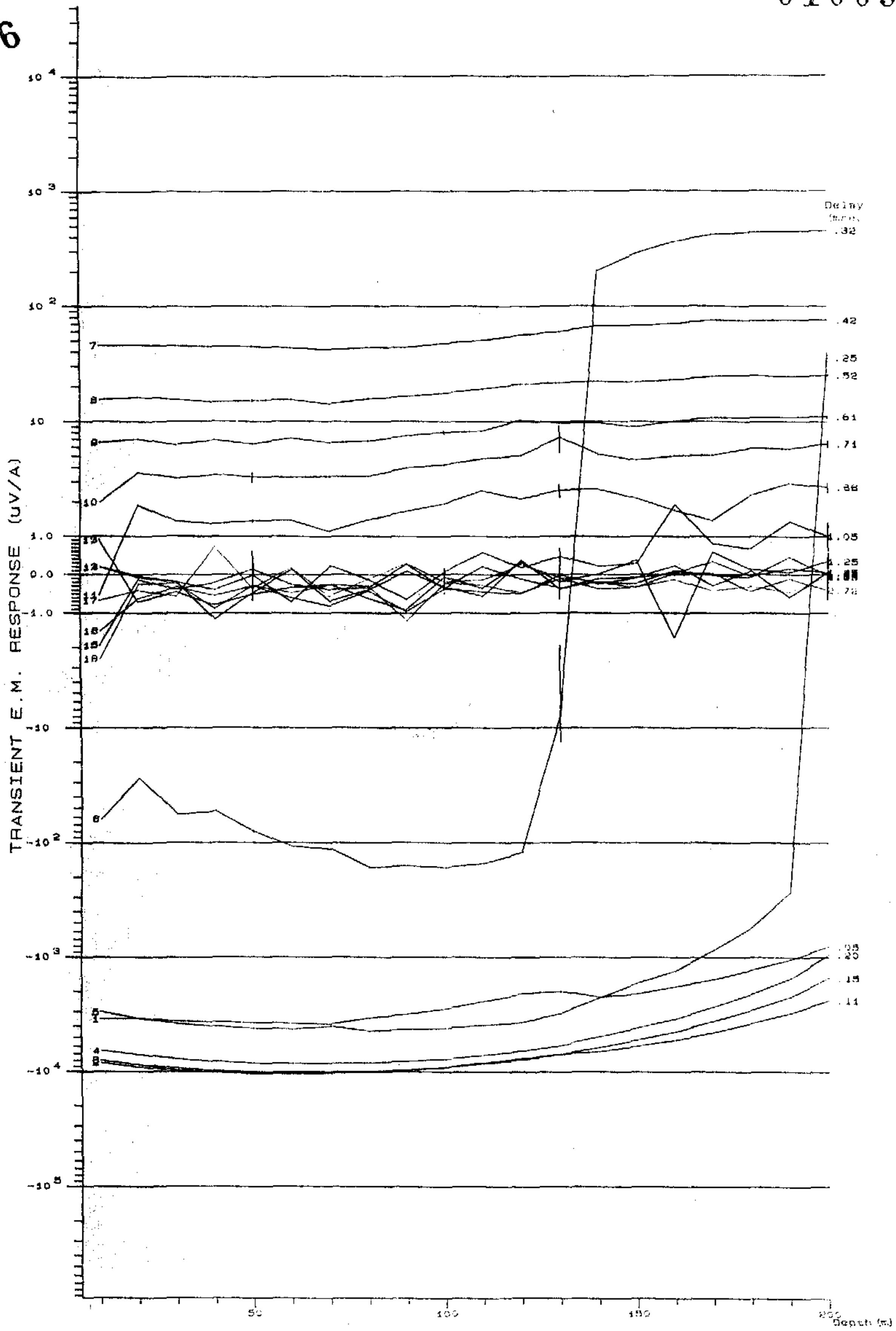


5 cm

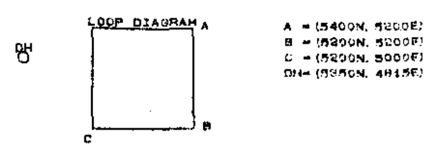
8

096

010097



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.811)
DH EAF13 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 30/ 1/86
SOLO hole ref.409 Reading interval 10.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 12:09 PM 24/ 3/86



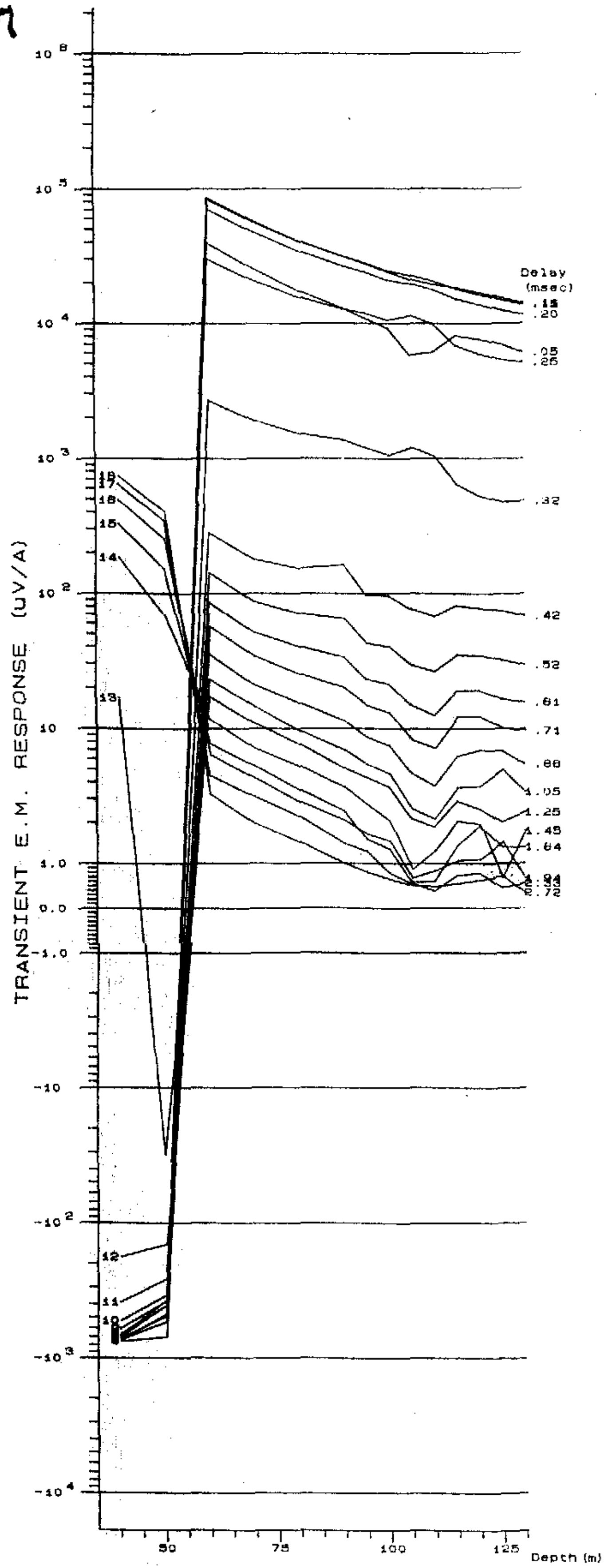
SOLO

5 cm

9

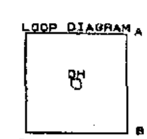
097

Detail checks.



010098

BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611)
DH EAF10 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 30/ 1/86
SOLO hole ref.411 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 5:19 PM 18/ 3/86



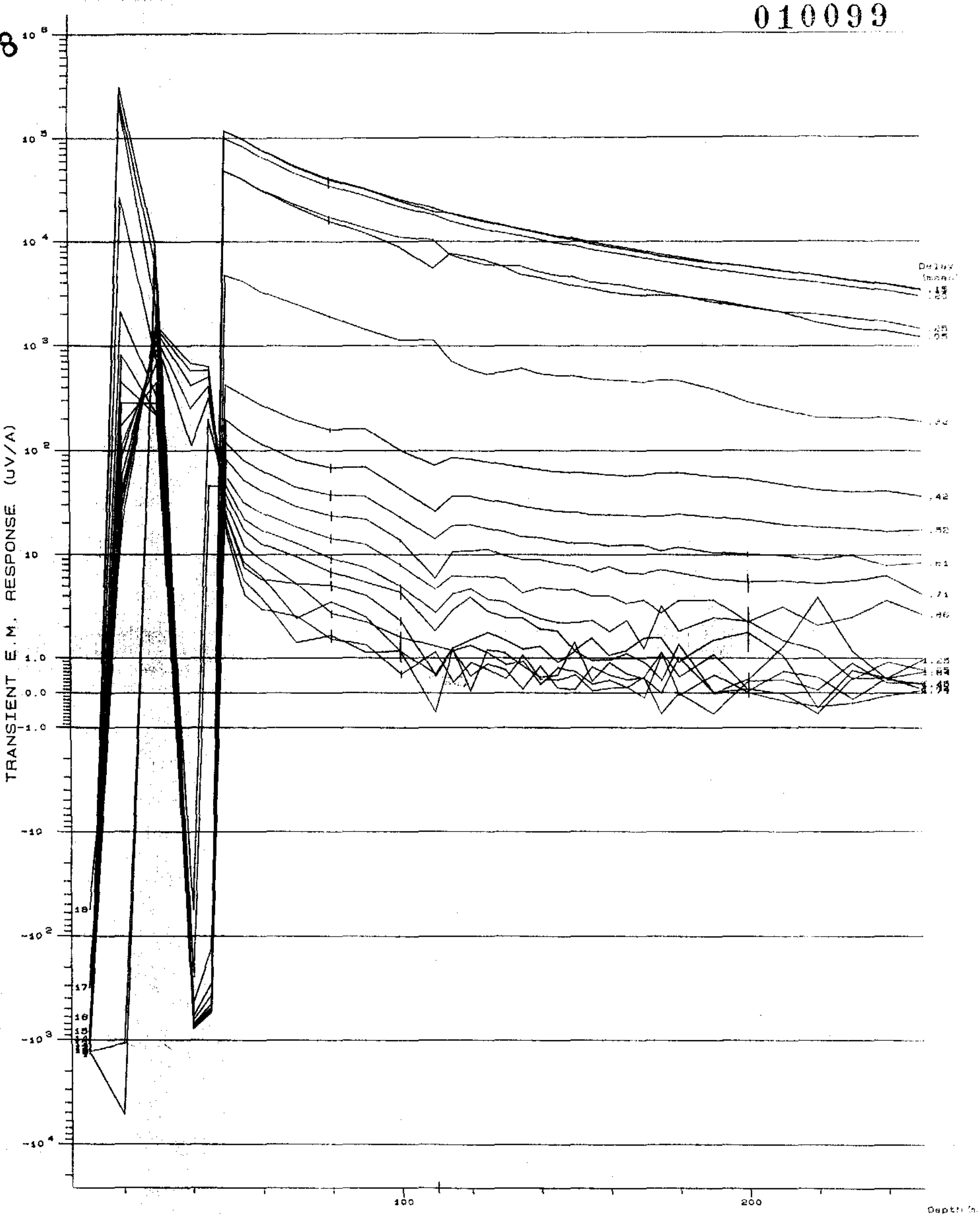
A = (5400N, 5200E)
B = (5200N, 5200E)
C = (5200N, 5000E)
DH= (5350N, 5030E)

SOLO

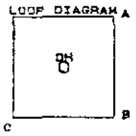
5 cm

098

010099



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611)
DH EAF10 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 30/ 1/86
SOLO hole ref.410 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 5:15 PM 18/ 3/86



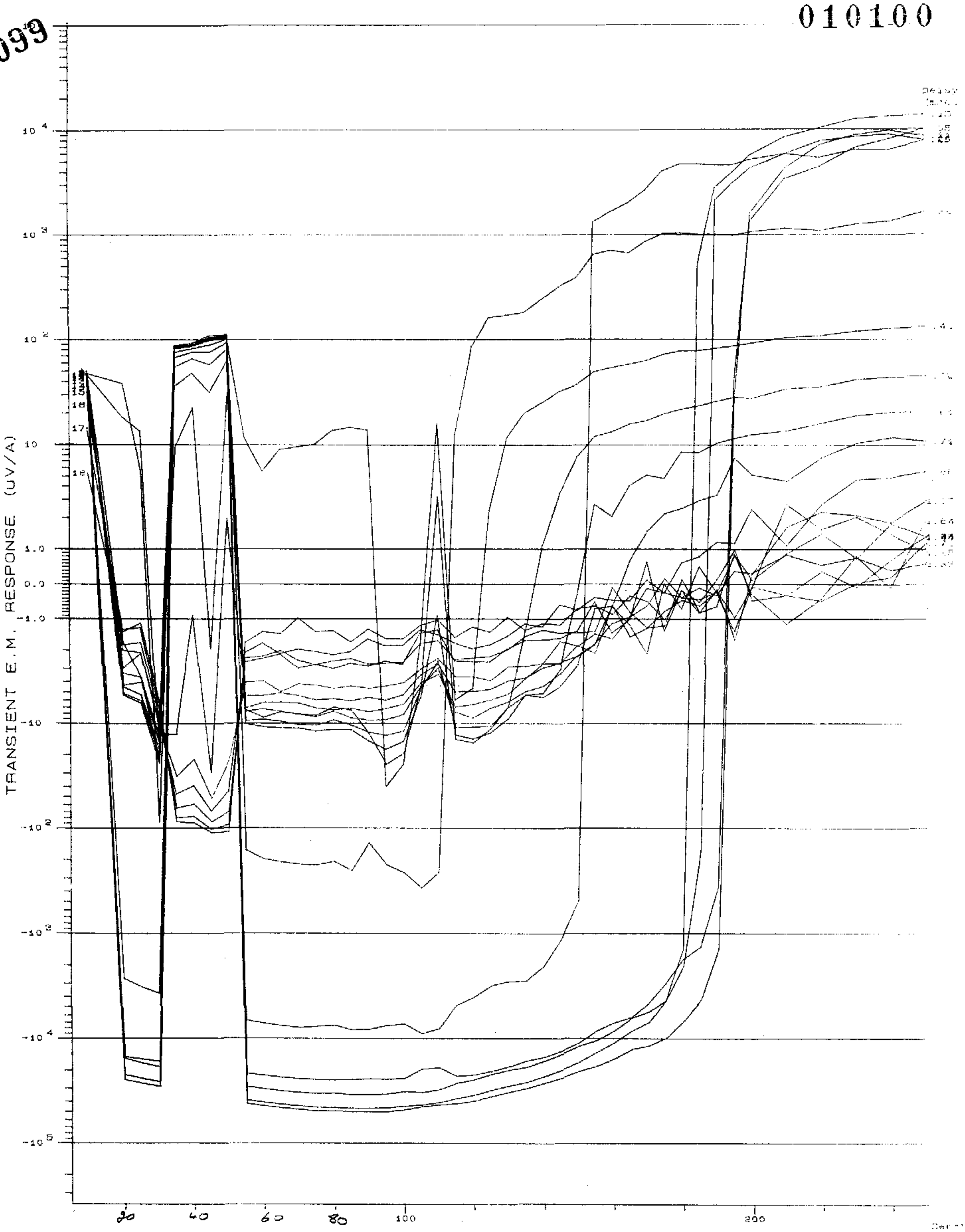
A = (5400N, 5200E)
B = (5200N, 5200E)
C = (5200N, 5000E)
DH= (5350N, 5030E)

SOLO

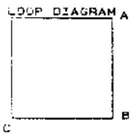
5 cm

099

010100



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611)
DH EAF10 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 30/ 1/86
SOLO hole ref.412 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 5:26 PM 18/ 3/86

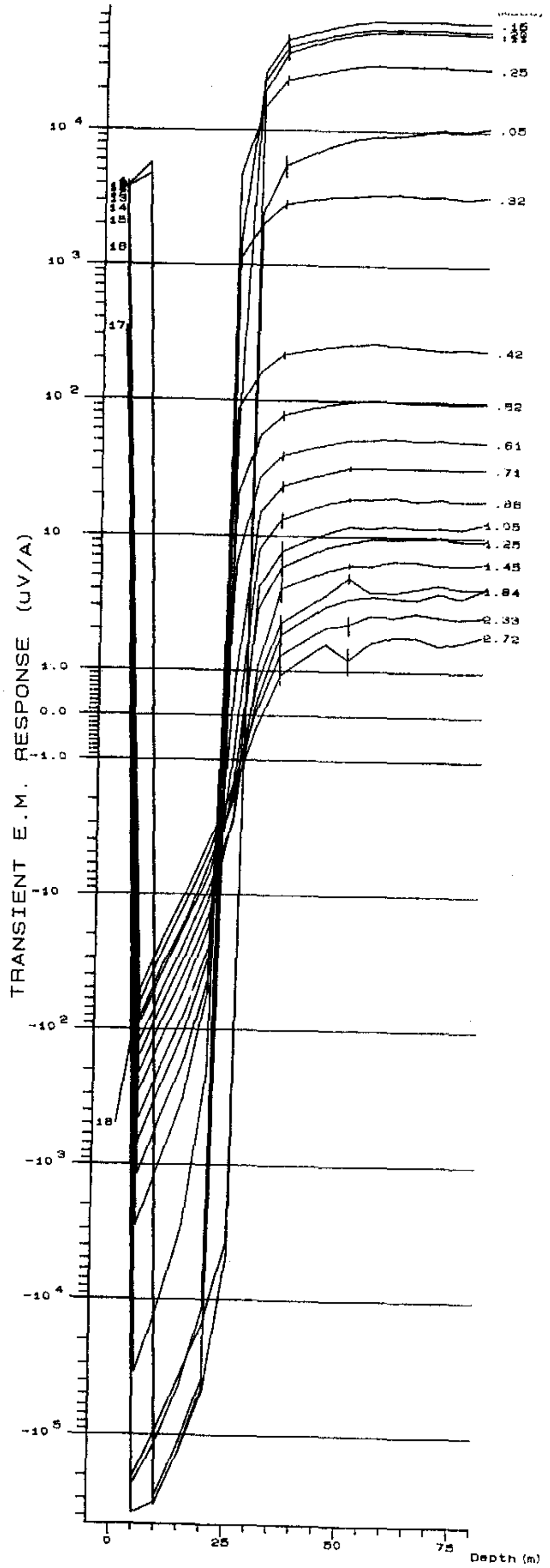


5 cm

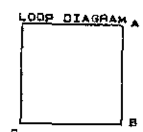
12

100

010101



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611B)
DH EAF16 LOOP #3
SIROTEM Survey by SOLO Geophysics & Co. 7/ 2/86
SOLO hole ref.432 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 3:51 PM 19/ 3/86



A = (5200N, 5000E)
B = (5000N, 5000E)
C = (5000N, 4800E)
DH= (5070N, 4770E)

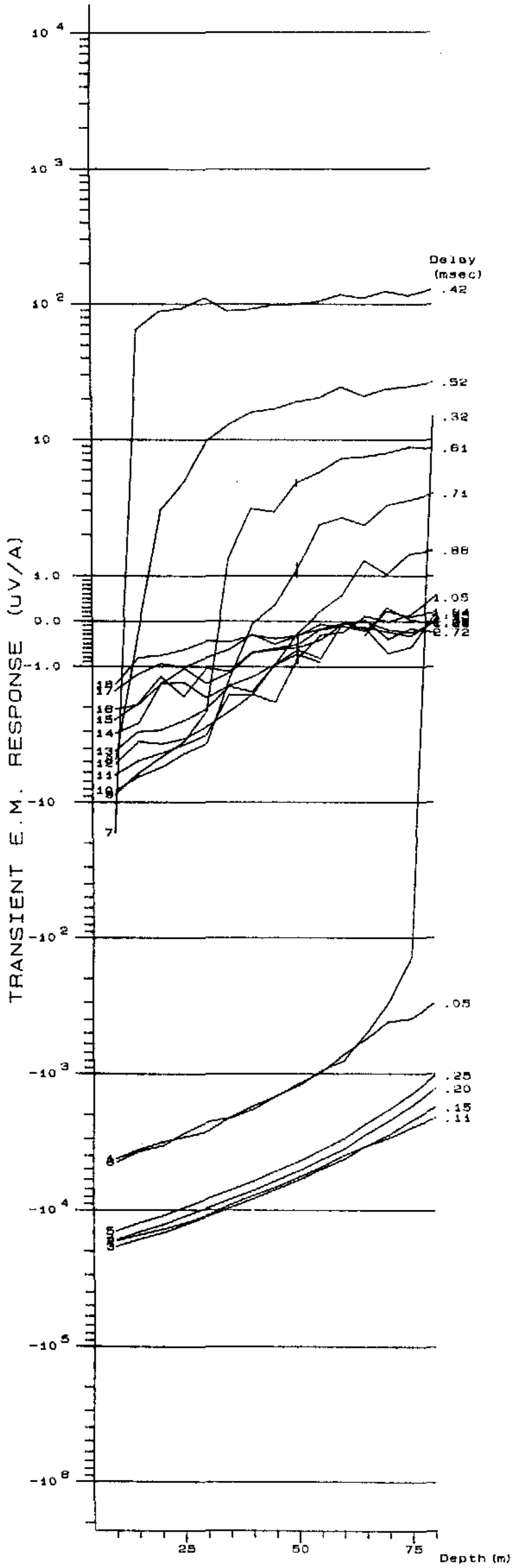
SOLO

5 cm

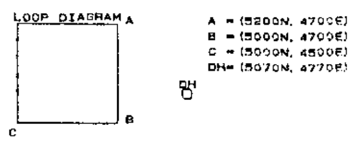
15

101

010102



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.6118)
DH EAF16 LOOP #4
SIROTEM Survey by SOLO Geophysics & Co. 7/ 2/86
SOLO hole ref.433 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 3:56 PM 18/ 3/86



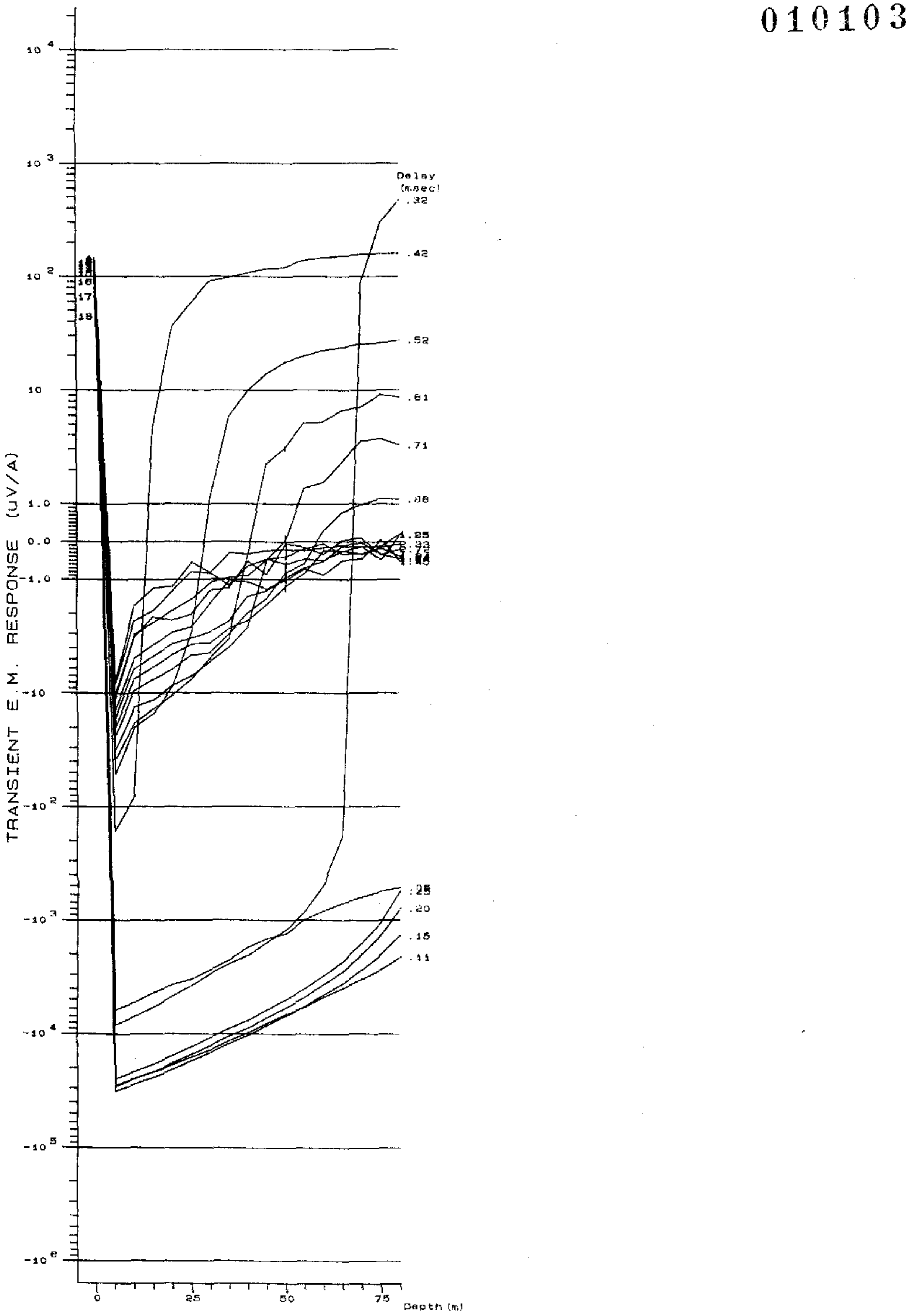
SOLO

5 cm

14

102

010103



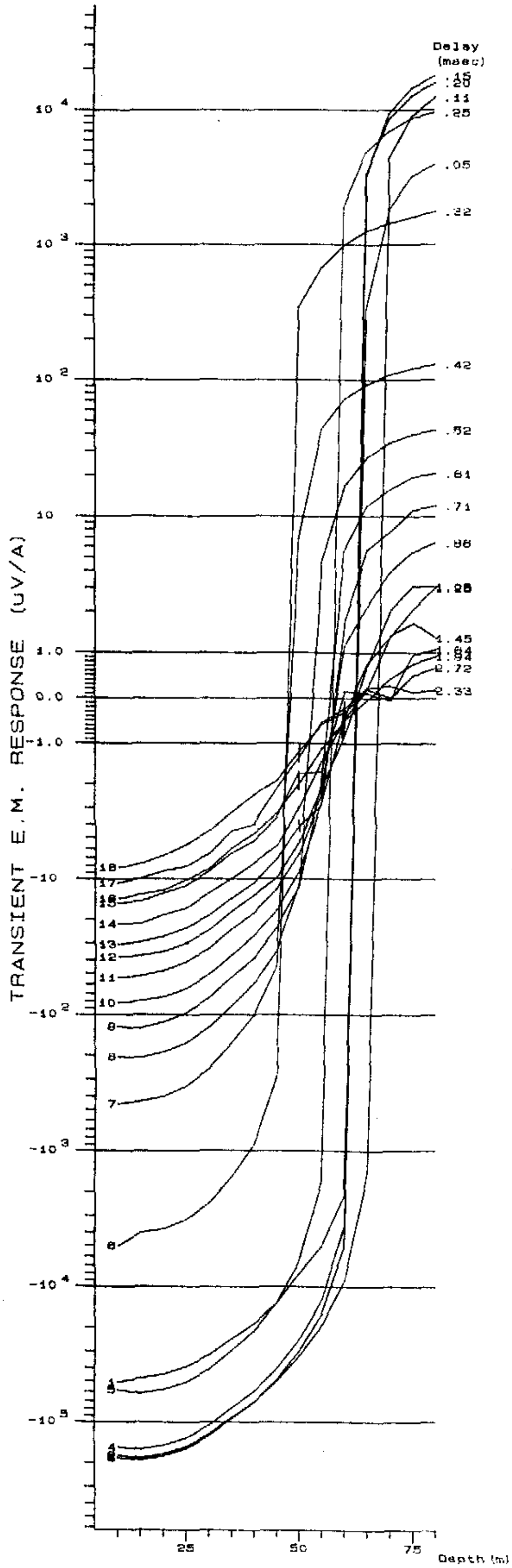
BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611B)
DH EAF15 LOOP #4
SIROTEM Survey by SOLO Geophysics & Co. 7/ 2/86
SOLO hole ref.434 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 4:00 PM 19/ 3/86

SOLO

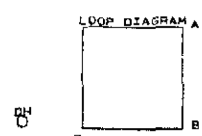
5 cm

103

010104



BHP EXPLORATION PTY.LTD.
PINNACLES. TASMANIA
(JOB NO.611B)
DH EAF15 LOOP #3
SIROTEM Survey by SOLO Geophysics & Co. 7/ 2/86
SOLO hole ref.435 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 4:04 PM 19/ 3/86



A = (5200N, 5000E)
B = (5000N, 5000E)
C = (5000N, 4800E)
DH= (5028N, 4745E)

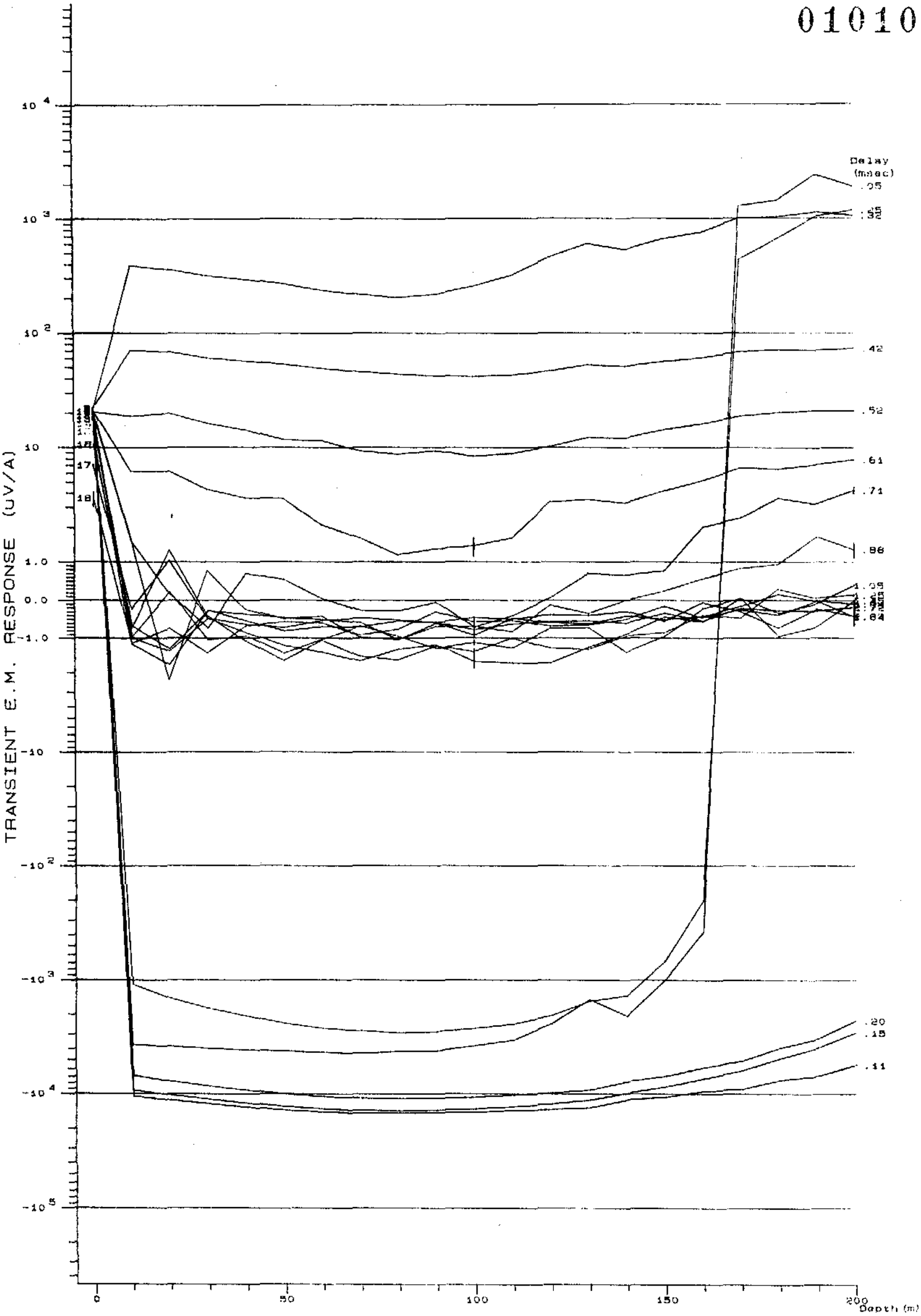
SOLO

5 cm

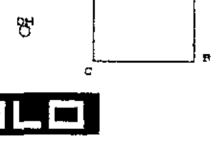
16

104

010105



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611B)
DH CP7 LOOP #3
SIROTEM Survey by SOLO Geophysics & Co. 7/ 2/86
SOLO hole ref.437 Reading interval 10.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 4:44 PM 18/ 3/86



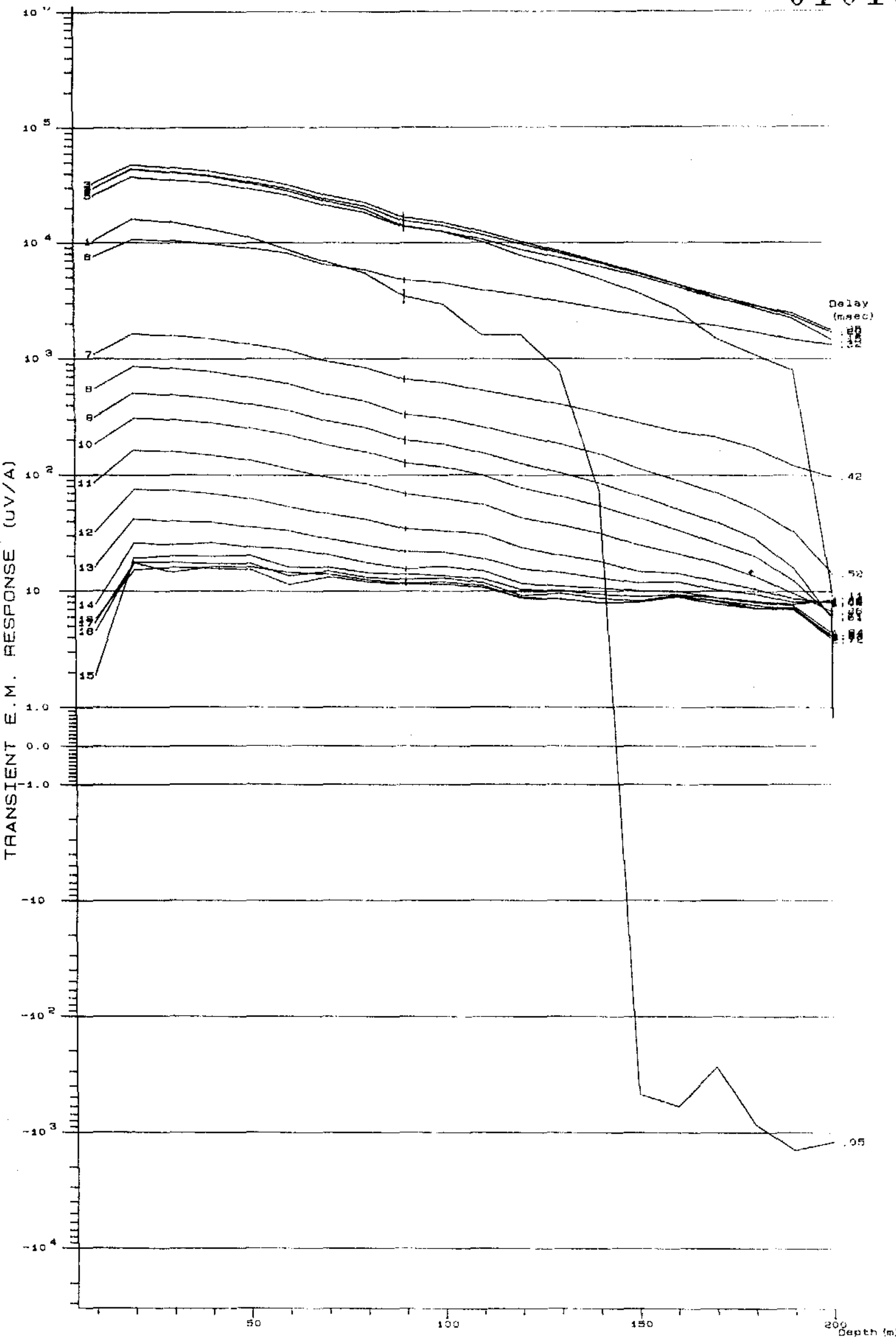
A = (5200N, 5000E)
B = (5000N, 5000E)
C = (5000N, 4800E)
DH= (5050N, 4814E)

SOLO

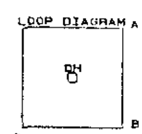
5 cm

17

105



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611B)
DH CP7 LOOP #4
SIROTEM Survey by SOLO Geophysics & Co. 8/ 2/86
SOLO hole ref.439 Reading interval 10.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 4:49 PM 19/ 3/86



A = (5200N, 4700E)
B = (5000N, 4700E)
C = (5000N, 4500E)
DH= (5090N, 4818E)

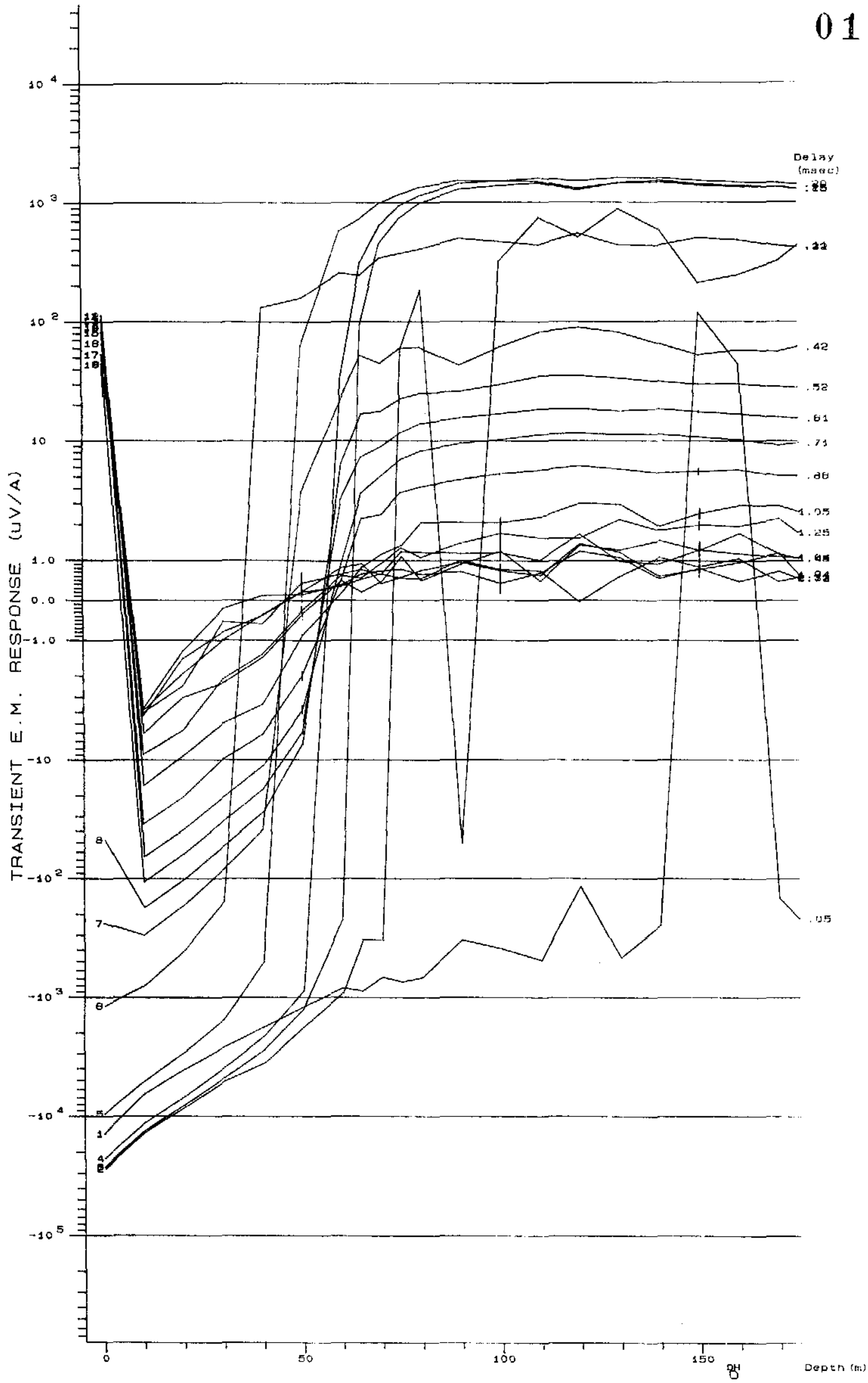
SOLO

5 cm

18

106

010107



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611B)
DH EAF17 LOOP #5
SIROTEM Survey by SOLO Geophysics & Co. 10/ 2/88
SOLO hole ref.441 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 4:52 PM 18/ 3/88

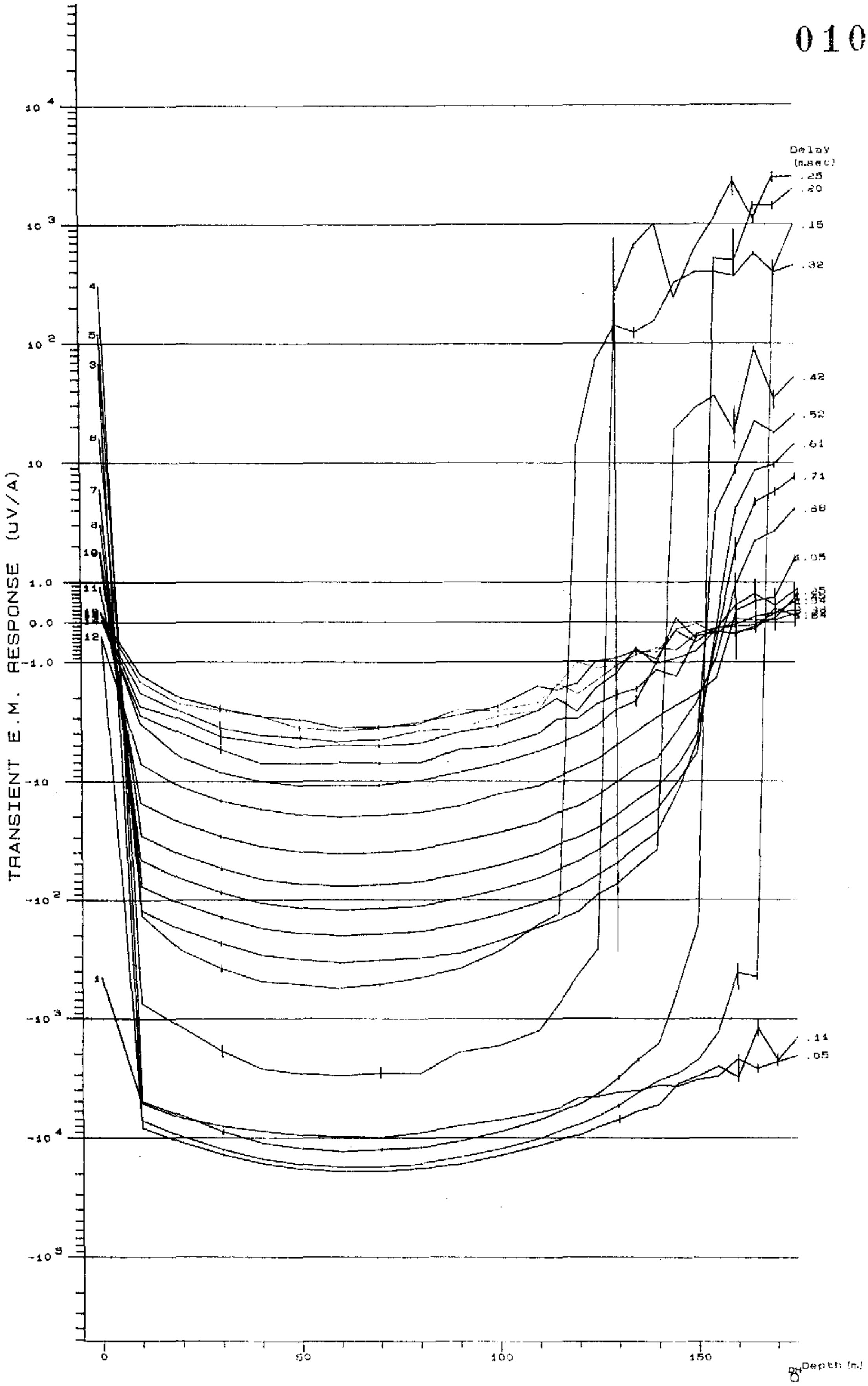
LOOP DIAGRAM

A = (4800N, 4800E)
B = (4400N, 4800E)
C = (4400N, 4700E)
DH= (4820N, 4885E)

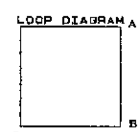
SOLO

5 cm

107



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611B)
DH EAF17 LOOP #6
SIROTEM Survey by SOLO Geophysics & Co. 10/ 2/86
SOLO hole ref.442 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 4:56 PM 18/ 3/86



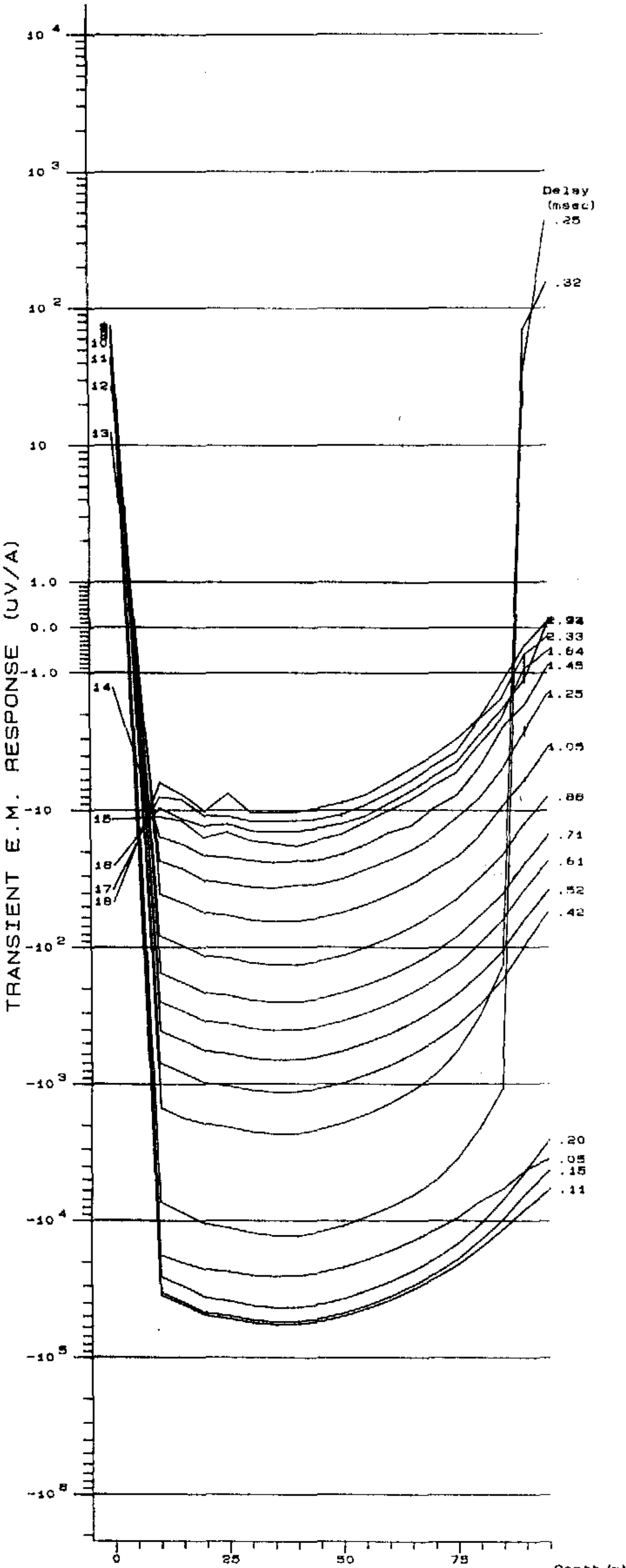
A → (4800N, 4800E)
B → (4400N, 4800E)
C → (4400N, 4400E)
DH→ (4820N, 4885E)

SOLO

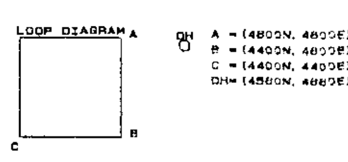
5 cm

20
108

010109



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611B)
DH PIN1 LOOP #8
SIROTEM Survey by SOLO Geophysics & Co. 11/ 2/86
SOLO hole ref.444 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 5:00 PM 19/ 3/86

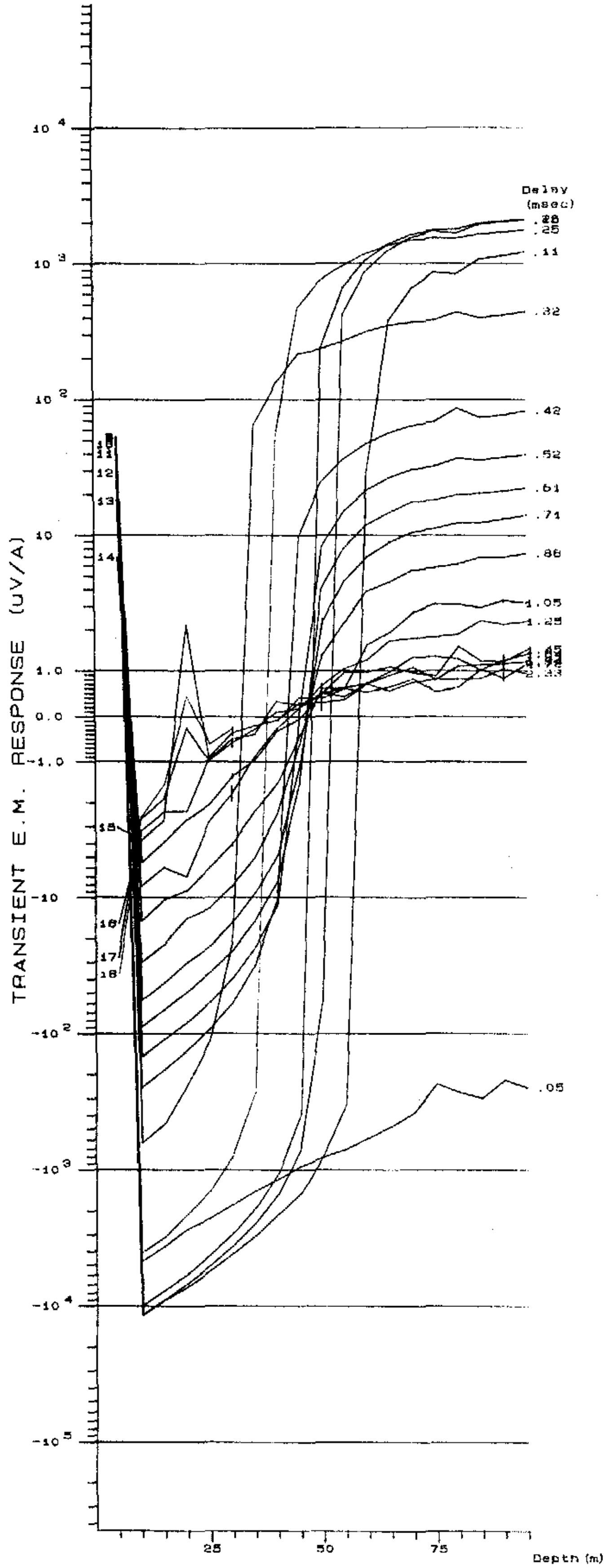


SOLO

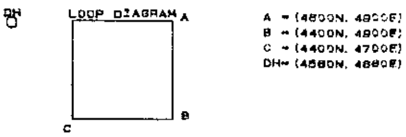
5 cm

109

010110



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611B)
DH PIN1 LOOP #5
SIROTEM Survey by SOLO Geophysics & Co. 11/ 2/86
SOLO hole ref.445 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 5:03 PM 19/ 3/86



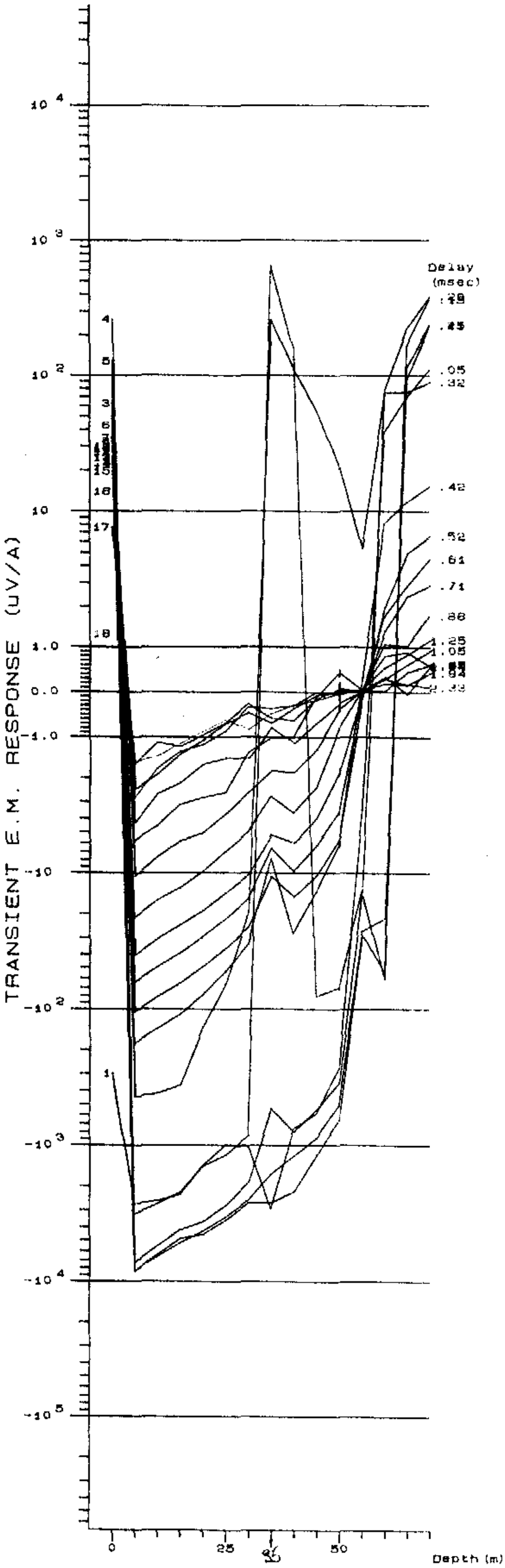
SOLO

5 cm

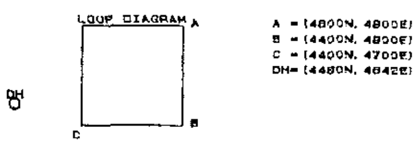
22

110

010111



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611B)
DH EAF18 LOOP #5
SIROTEM Survey by SOLO Geophysics & Co. 11/ 2/86
SOLO hole ref.446 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 5:06 PM 18/ 3/86



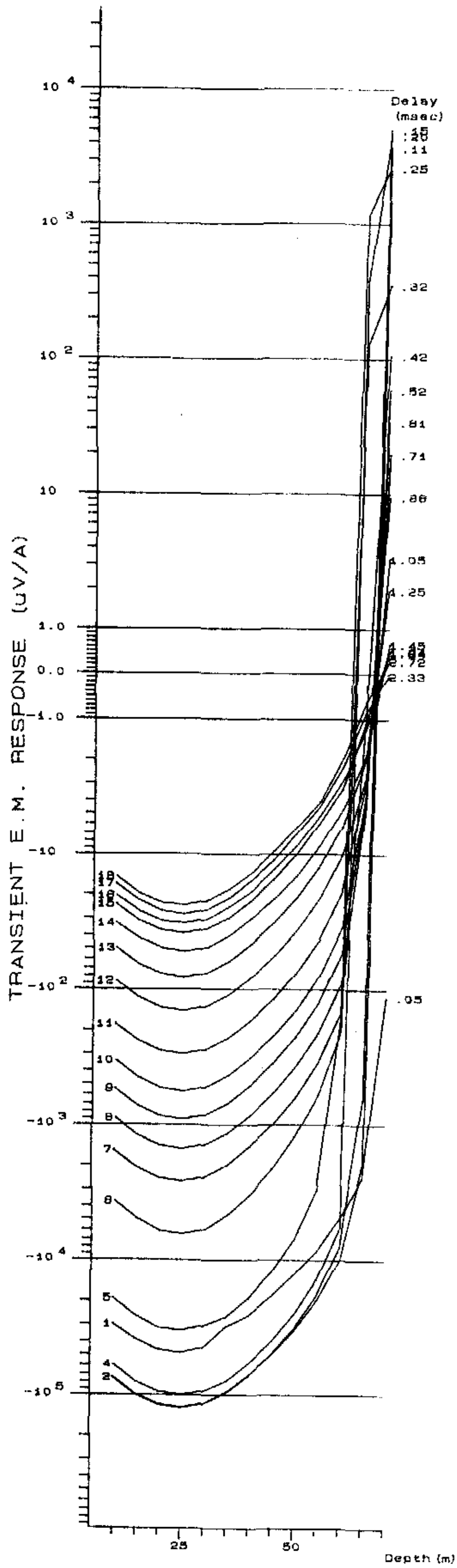
SOLO

5 cm

23

111

010112



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611B)
DH EAF18 LOOP #6
SIROTEM Survey by SOLO Geophysics & Co. 11/ 2/86
SOLO hole ref.447 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 12:34 PM 24/ 3/86

LOOP DIAGRAM

A = (4800N, 4800E)
B = (4400N, 4800E)
C = (4400N, 4400E)
DH= (4480N, 4842E)

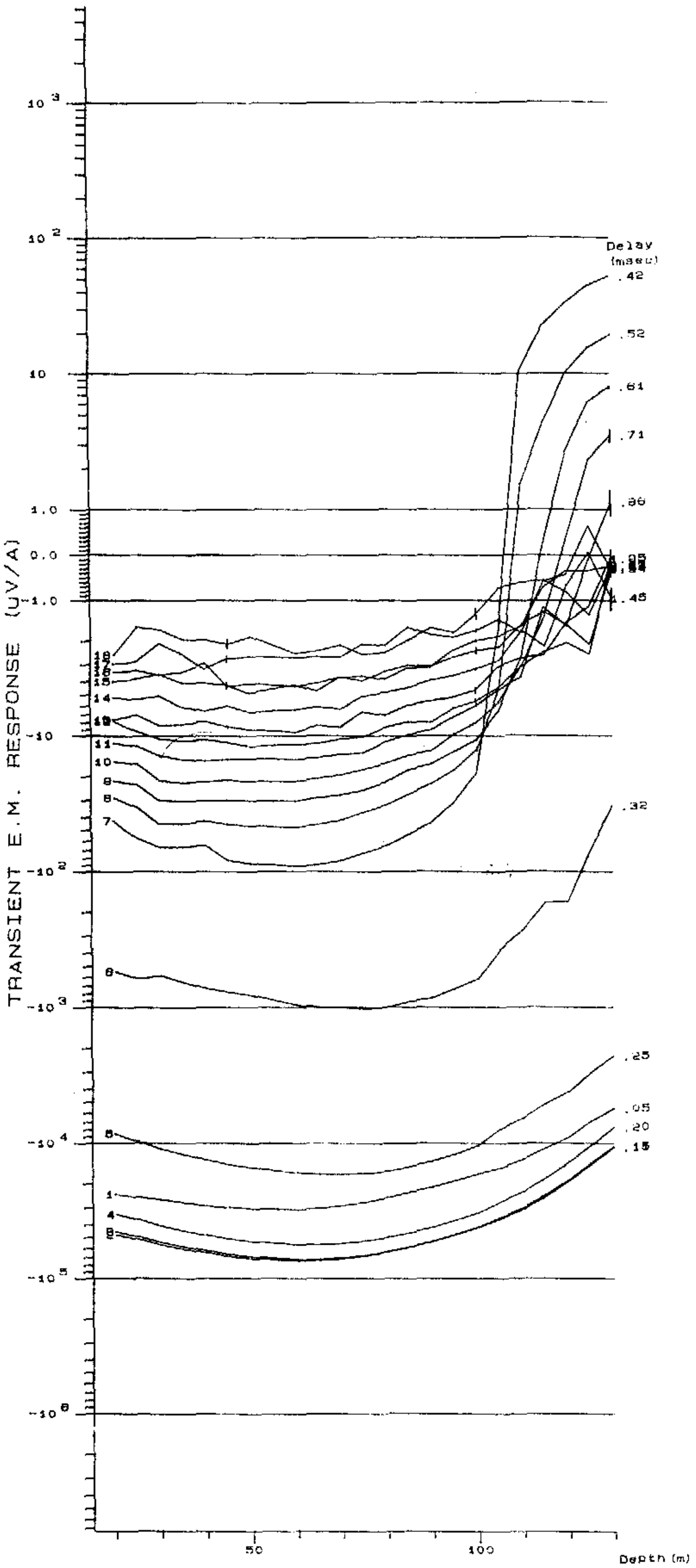
SOLO

5 cm

24

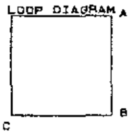
112

010113



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF7 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 1/ 2/86
SOLO hole ref.421 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 12:30 PM 24/ 3/86

LOOP DIAGRAM



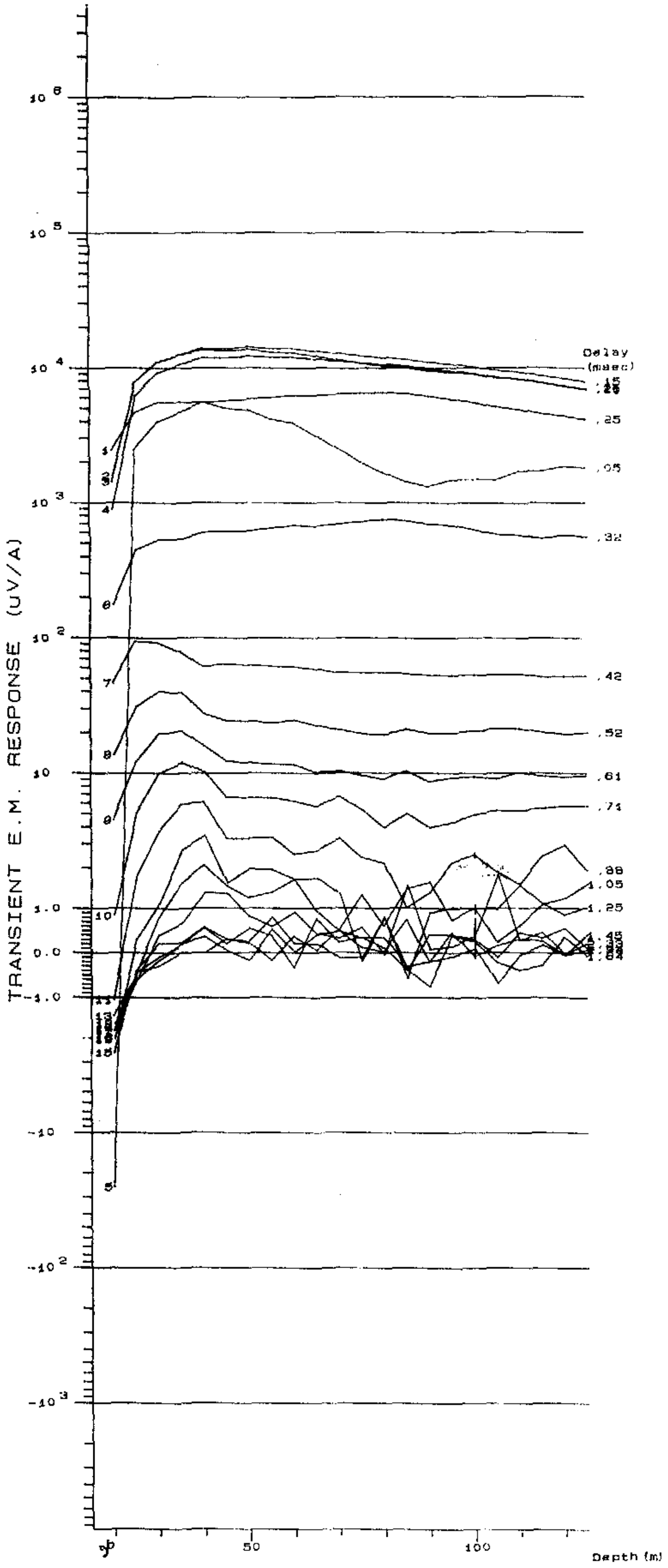
A = (5400N, 4900E)
B = (5200N, 4900E)
C = (5200N, 4700E)
DH= (5289N, 4880E)

SOLO

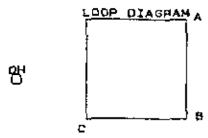
5 cm

113

010114



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF7 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 1/ 2/86
SOLO hole ref.422 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 3:22 PM 18/ 3/86

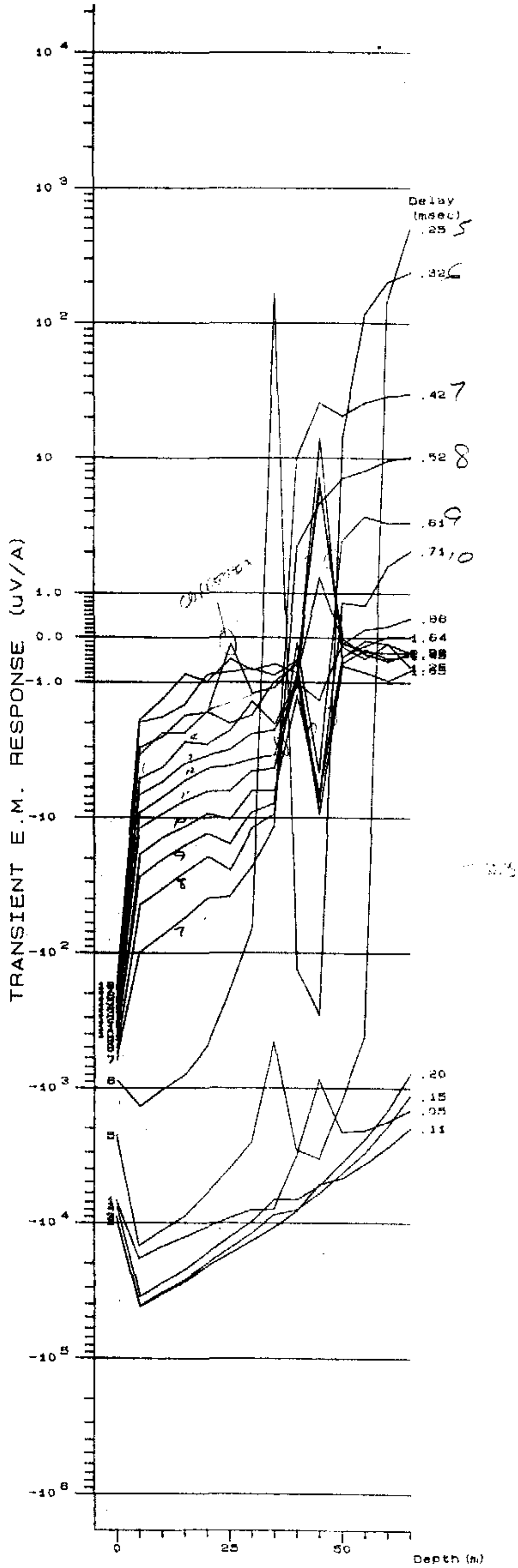


SOLO

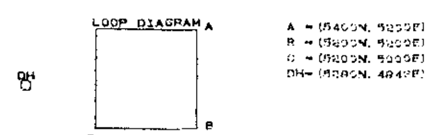
5 cm

114

010115



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF4 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 1/ 2/86
SOLO hole ref.423 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 3:25 PM 18/ 3/86

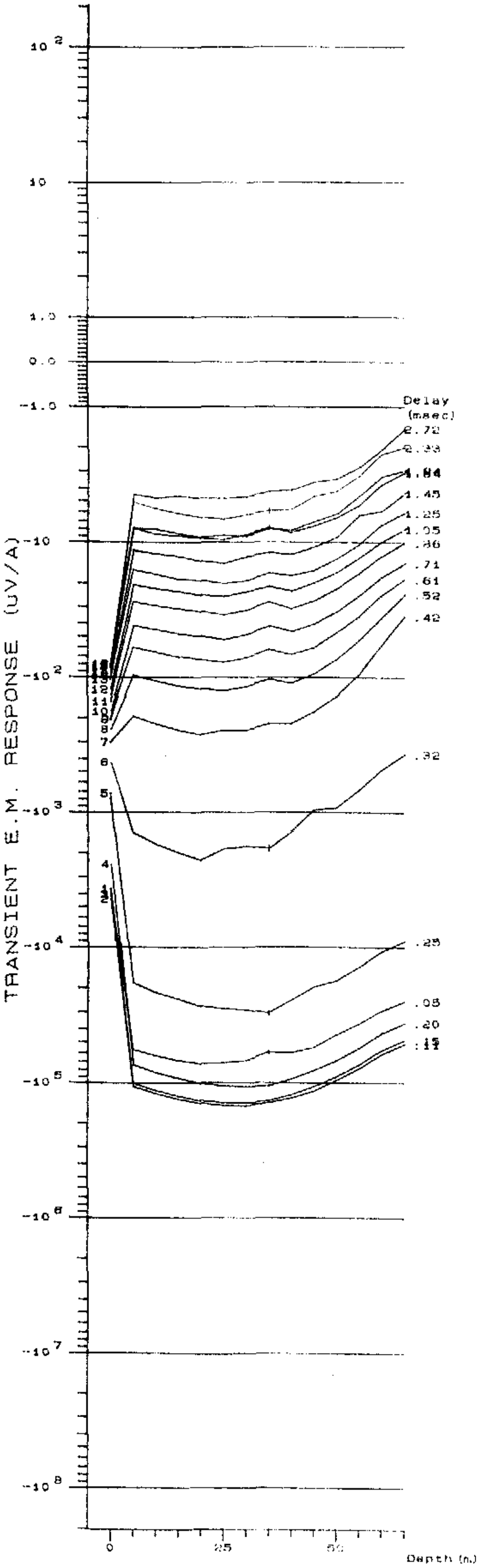


SOLO

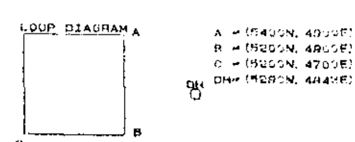
5 cm

115

010116



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.811A)
DH EAF4 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 1/ 2/86
SOLO hole ref.424 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 3:28 PM 18/ 3/86

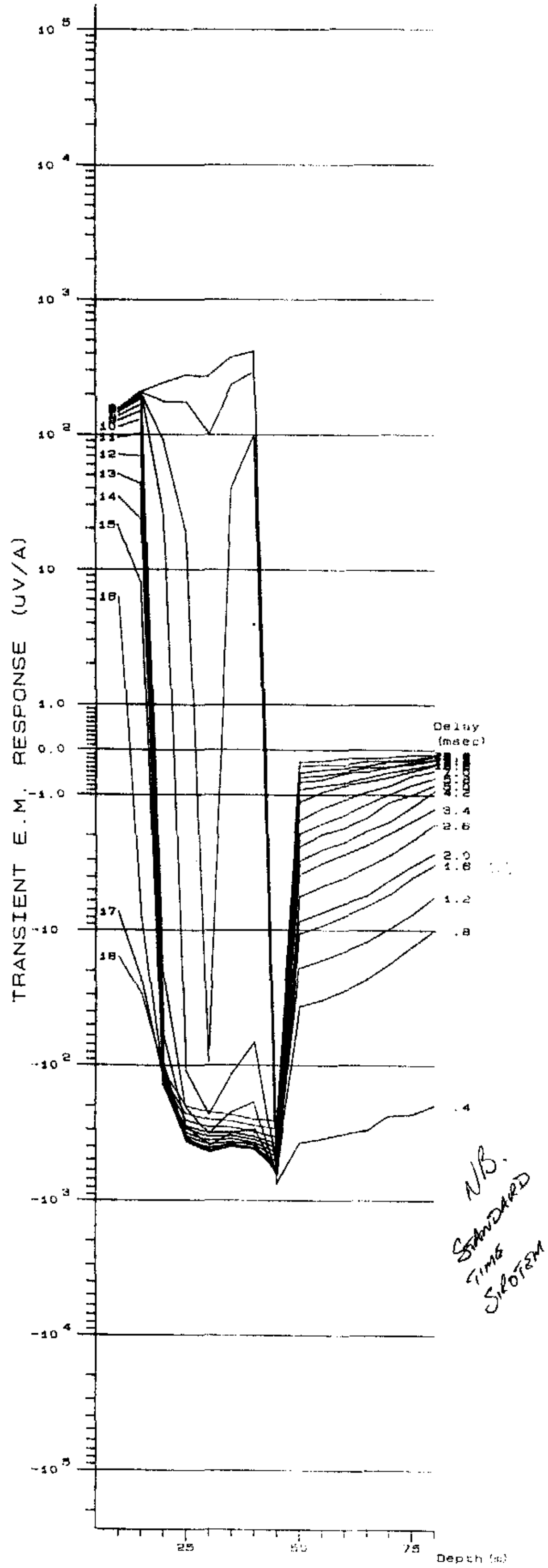


SOLO

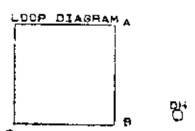
5 cm

116

010117



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF1 LOOP #2 ST
SIROTEM Survey by SOLO Geophysics & Co. 3/ 2/86
SOLO hole ref.426 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 4:04 PM 18/ 3/86

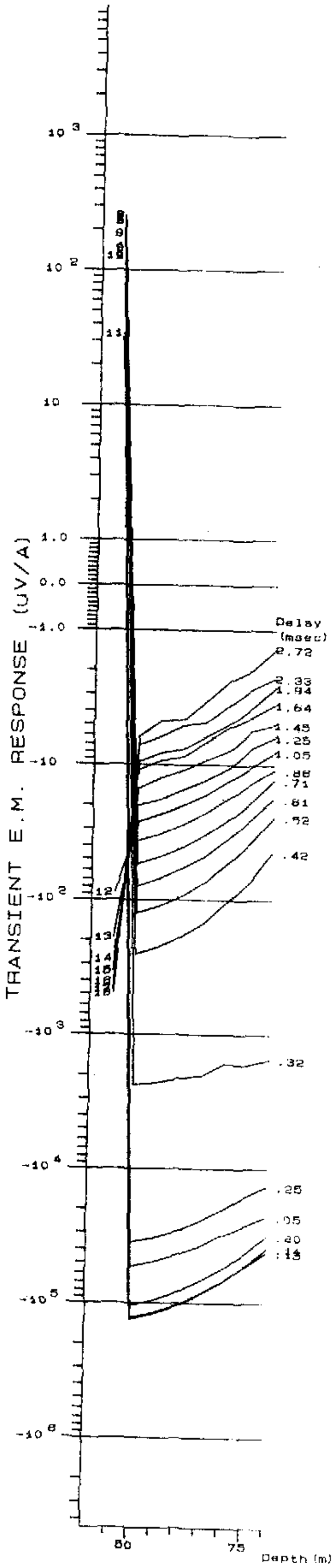


SOLO

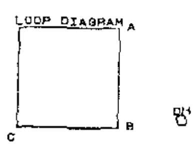
5 cm

117

010118



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF1 LOOP #2 ET
SIROTEM Survey by SOLO Geophysics & Co. 3/ 2/86
SOLO hole ref.427 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 3:35 PM 18/ 3/86

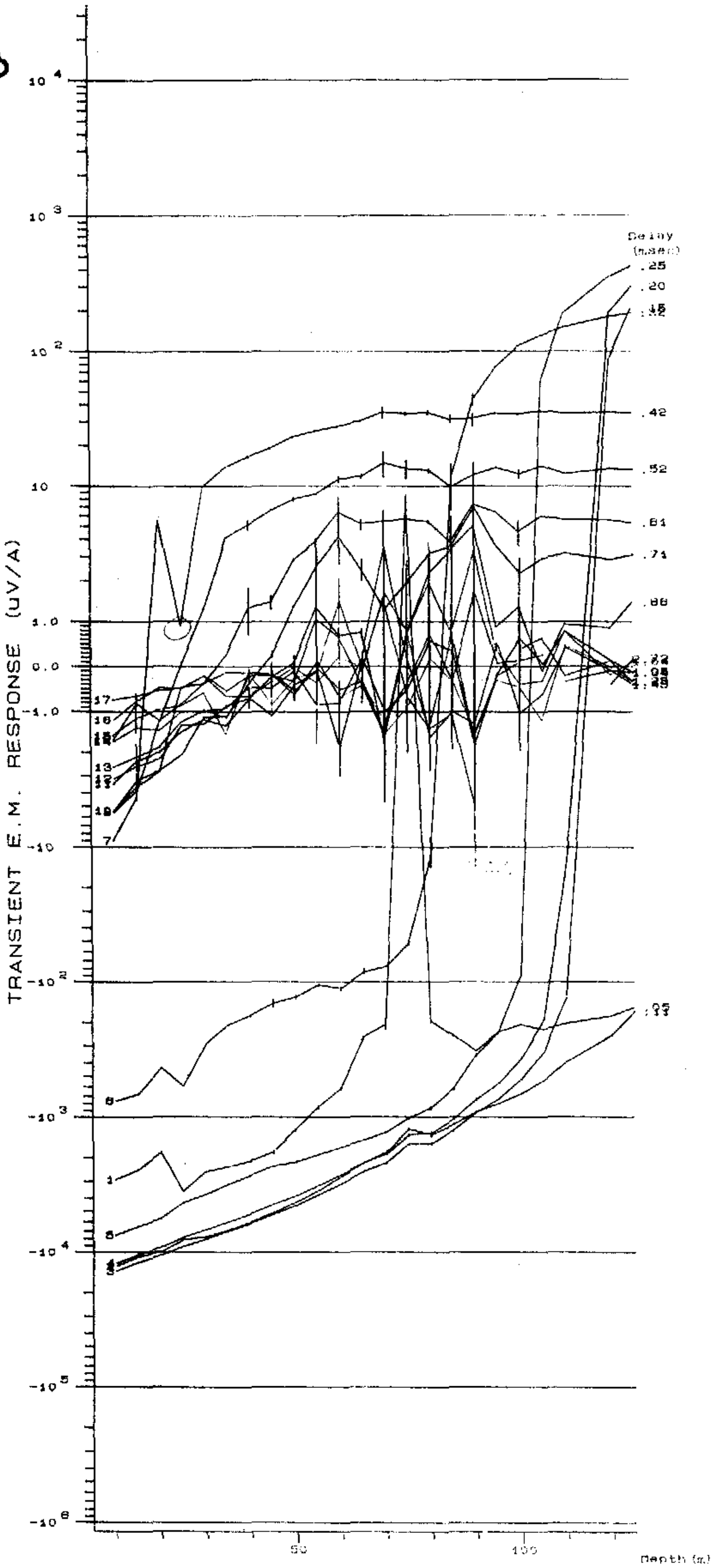


A = (5400N, 4800E)
B = (5200N, 4900E)
C = (5200N, 4700E)
DH= (5248N, 4850E)

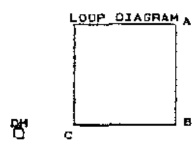
SOLO

5 cm

118

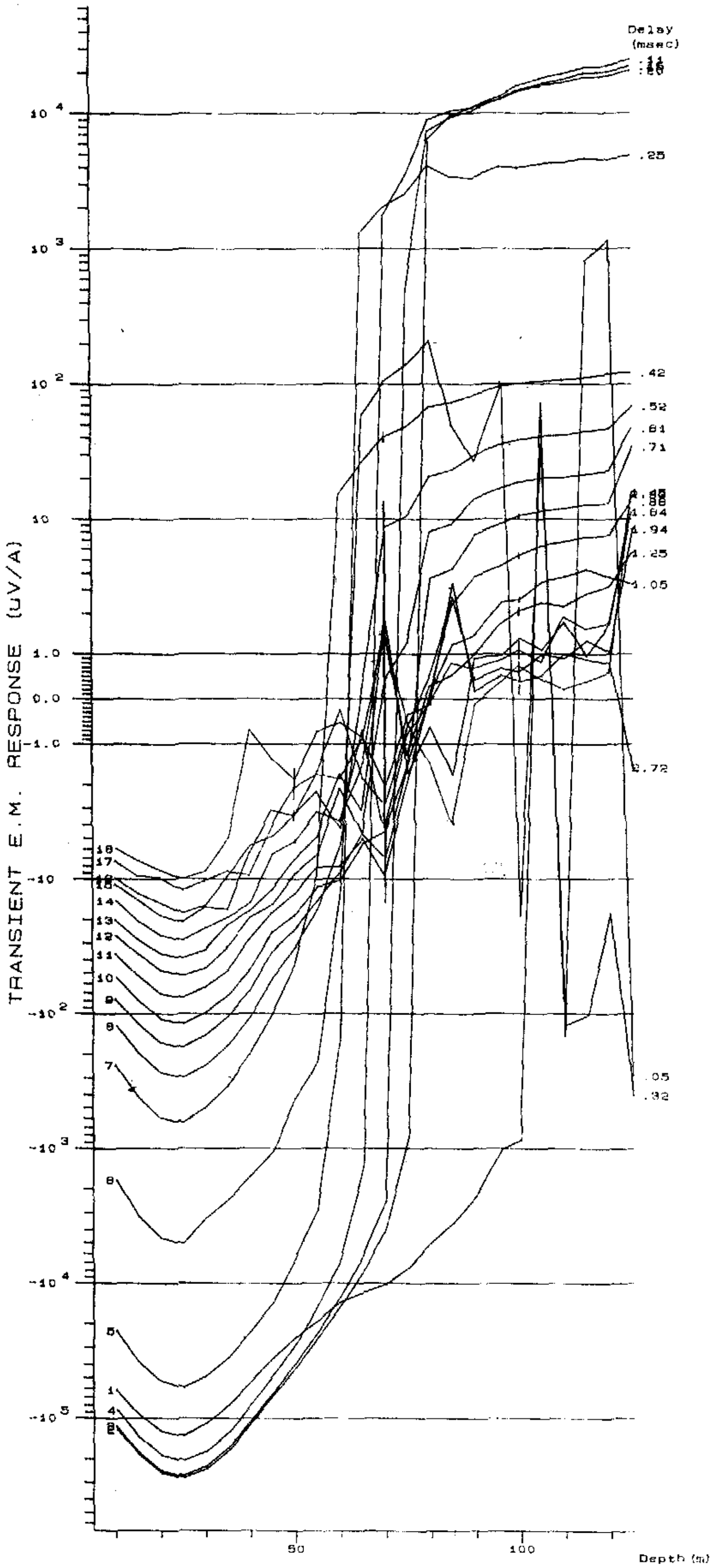


BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF2 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 3/ 2/86
SOLO hole ref.428 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 3: 43 PM 18/ 3/86

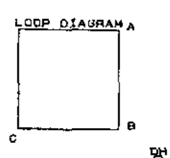


010119

5 cm



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF2 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 3/ 2/86
SOLO hole ref.430 Reading interval 4.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 3:47 PM 18/ 3/86



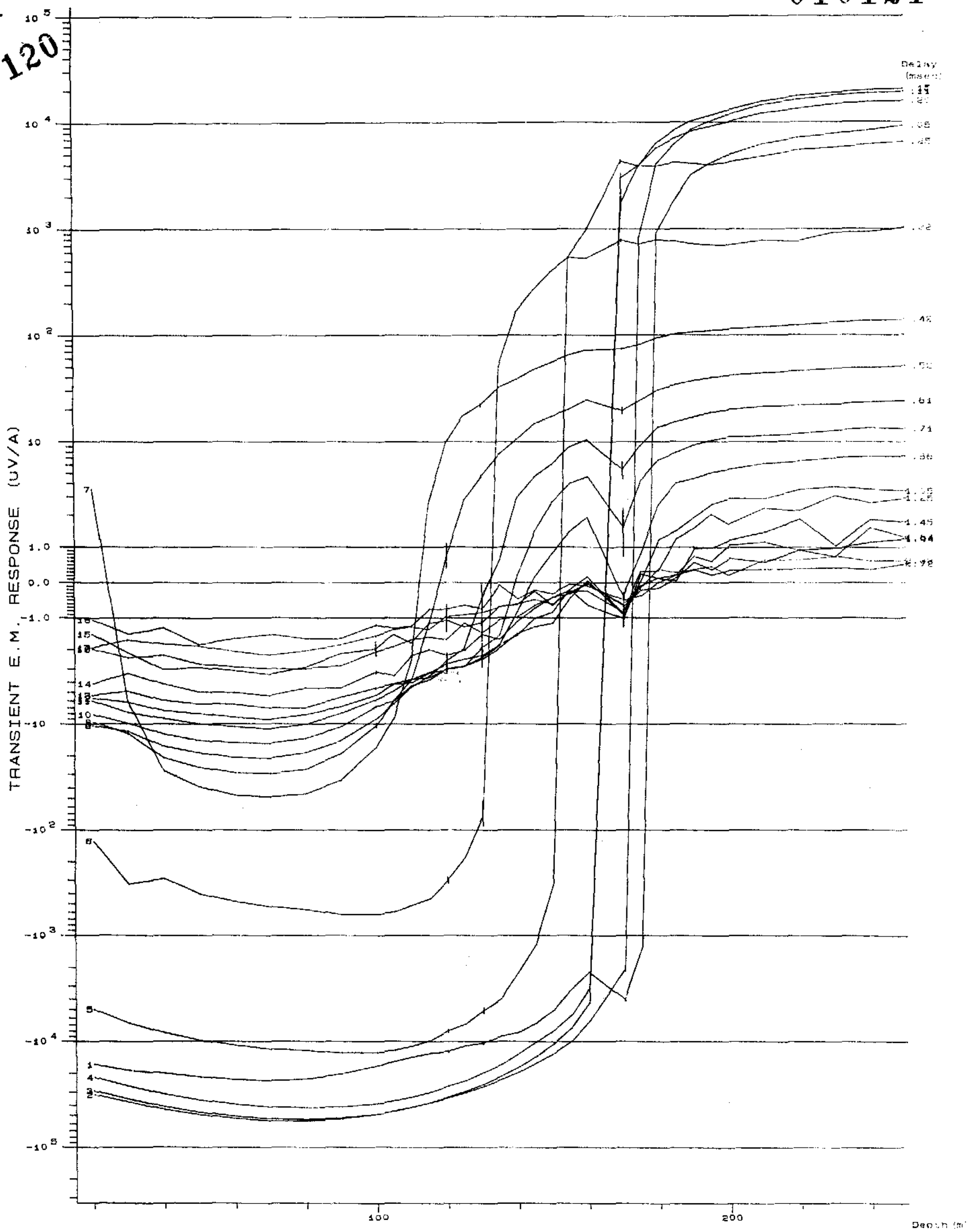
A = (5400N, 4800E)
B = (5200N, 4800E)
C = (5200N, 4700E)
DH= (5185N, 4812E)

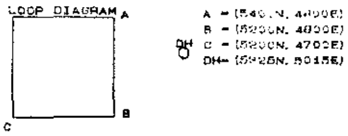
SOLO

5 cm

PIN2

120





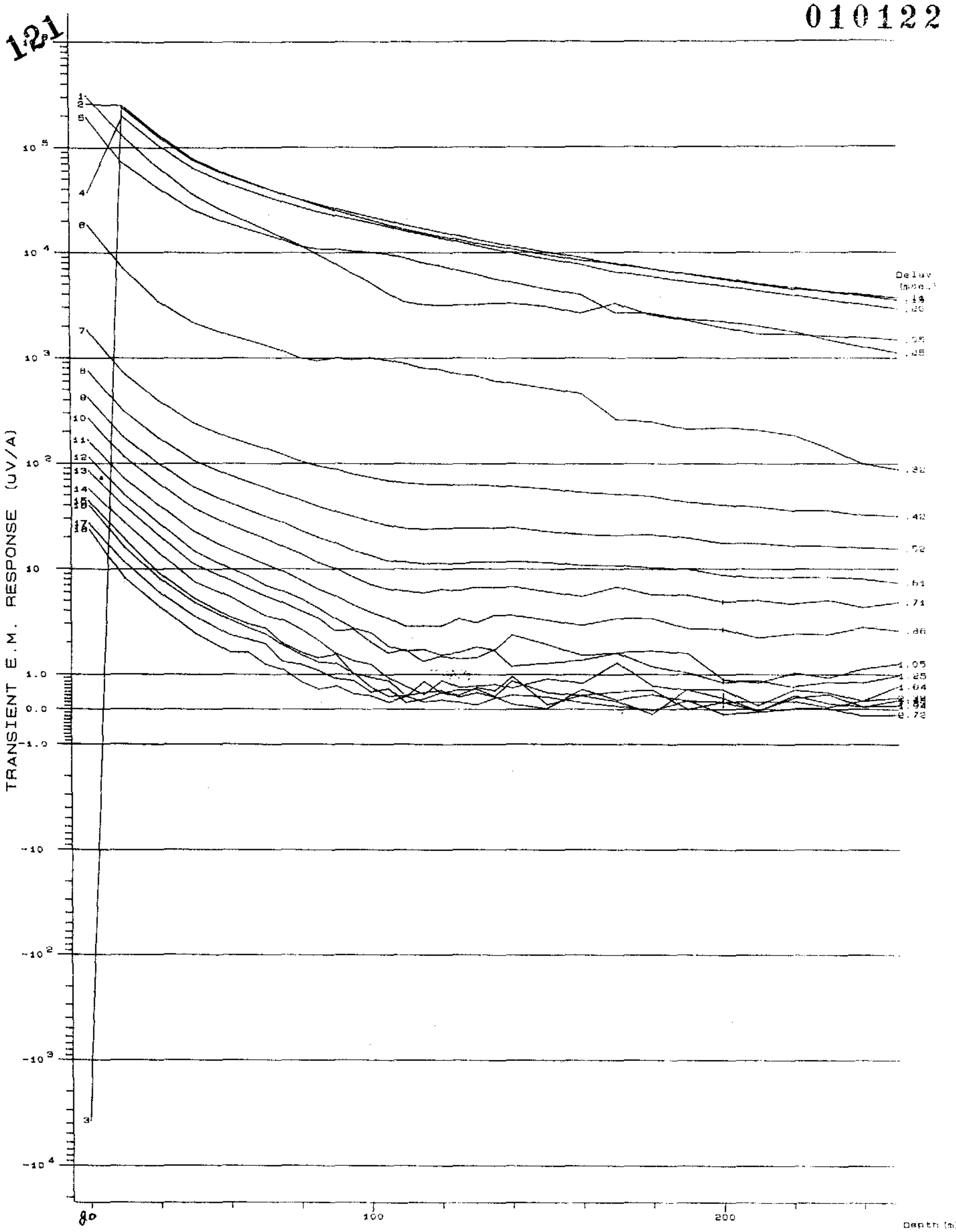
BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF9 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 31/ 1/86
SOLO hole ref.413 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 3:56 PM 18/ 3/86

SOLO

5 cm

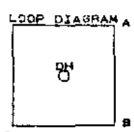
010122

121



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF9 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 31/ 1/86
SOLO hole ref.414 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 4:00 PM 18/ 3/86

LOOP DIAGRAM



A = (5400N, 5200E)
B = (5200N, 5200E)
C = (5200N, 5000E)
DH= (5328N, 5015E)

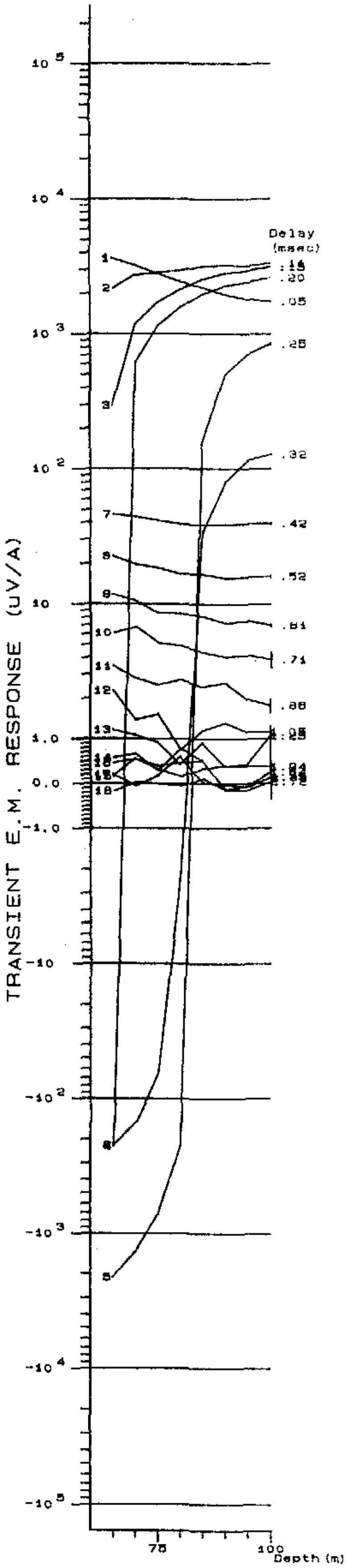
SOLO

5 cm

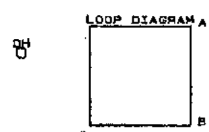
34

122

010123



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF6 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 31/ 1/86
SOLO hole ref.415 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 2:44 PM 18/ 3/86



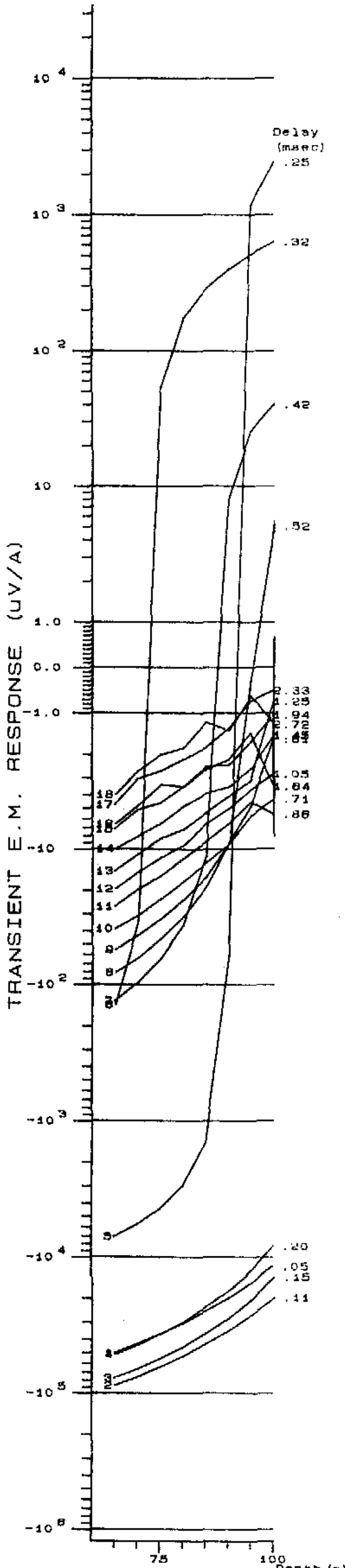
A = (5400N, 5200E)
B = (5200N, 5200E)
C = (5200N, 5000E)
DH= (5325N, 4985E)

SOLO

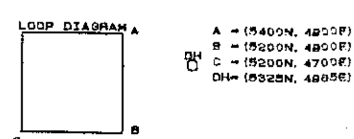
5 cm

123

010124



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF6 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 31/ 1/86
SOLO hole ref.416 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 2:48 PM 18/ 3/86

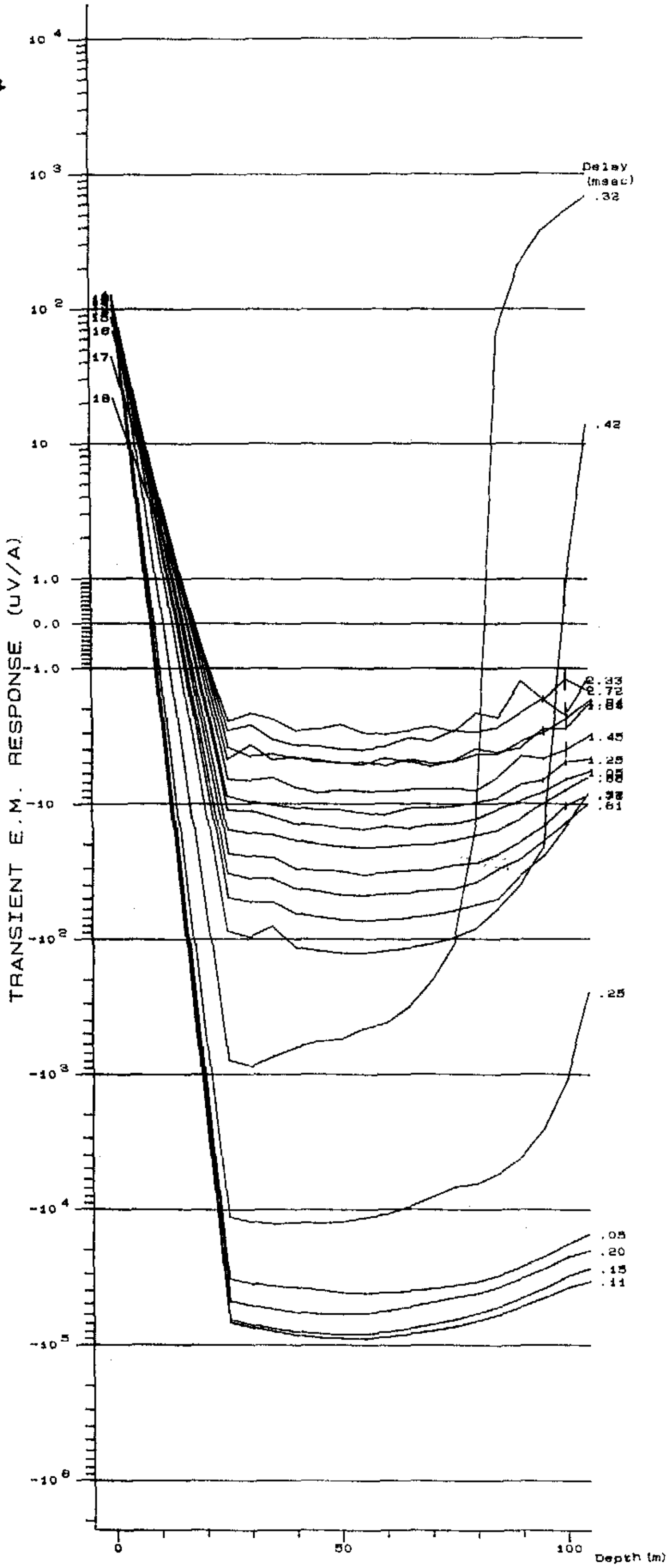


SOLO

5 cm

124

010125



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF3 LOOP #2
SIROTEM Survey by SOLO Geophysics & Co. 31/ 1/86
SOLO hole ref.417 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 2:54 PM 18/ 3/86

LOOP DIAGRAM

A = (5400N, 4900E)
B = (5200N, 4900E)
C = (5200N, 4700E)
DH= (5280N, 4843E)

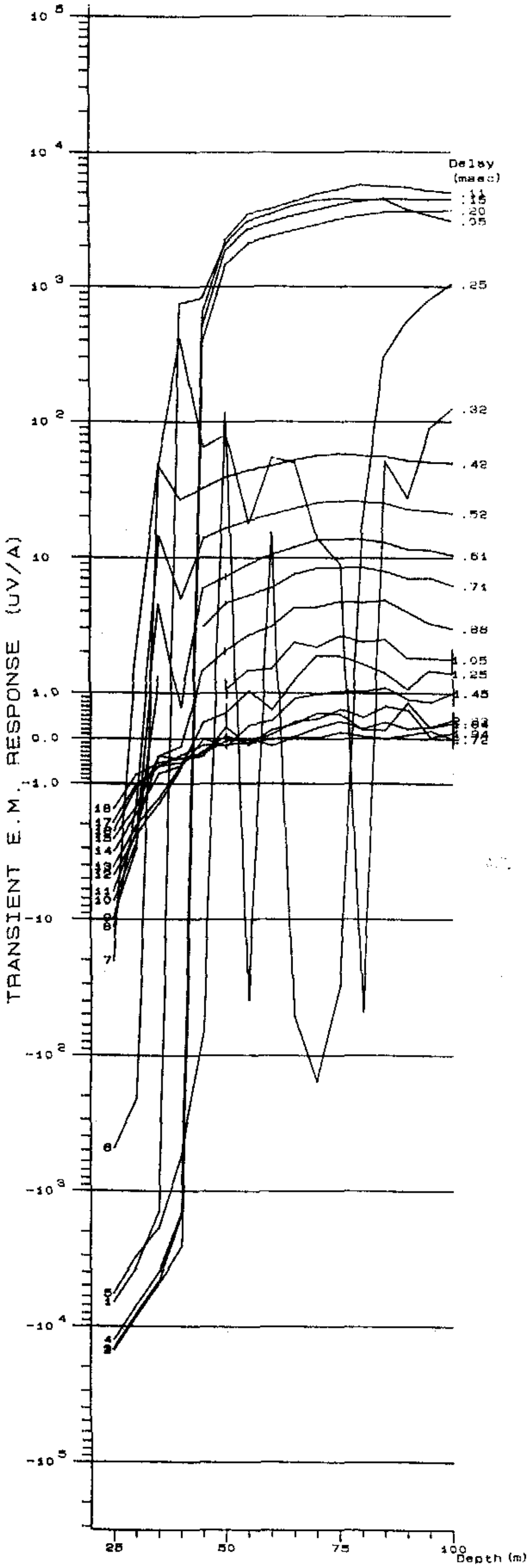
SOLO

5 cm

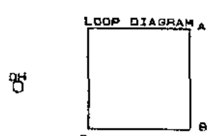
37

125

010126



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF3 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 1/ 2/86
SOLO hole ref.418 Reading interval 5.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 12:21 PM 24/ 3/86

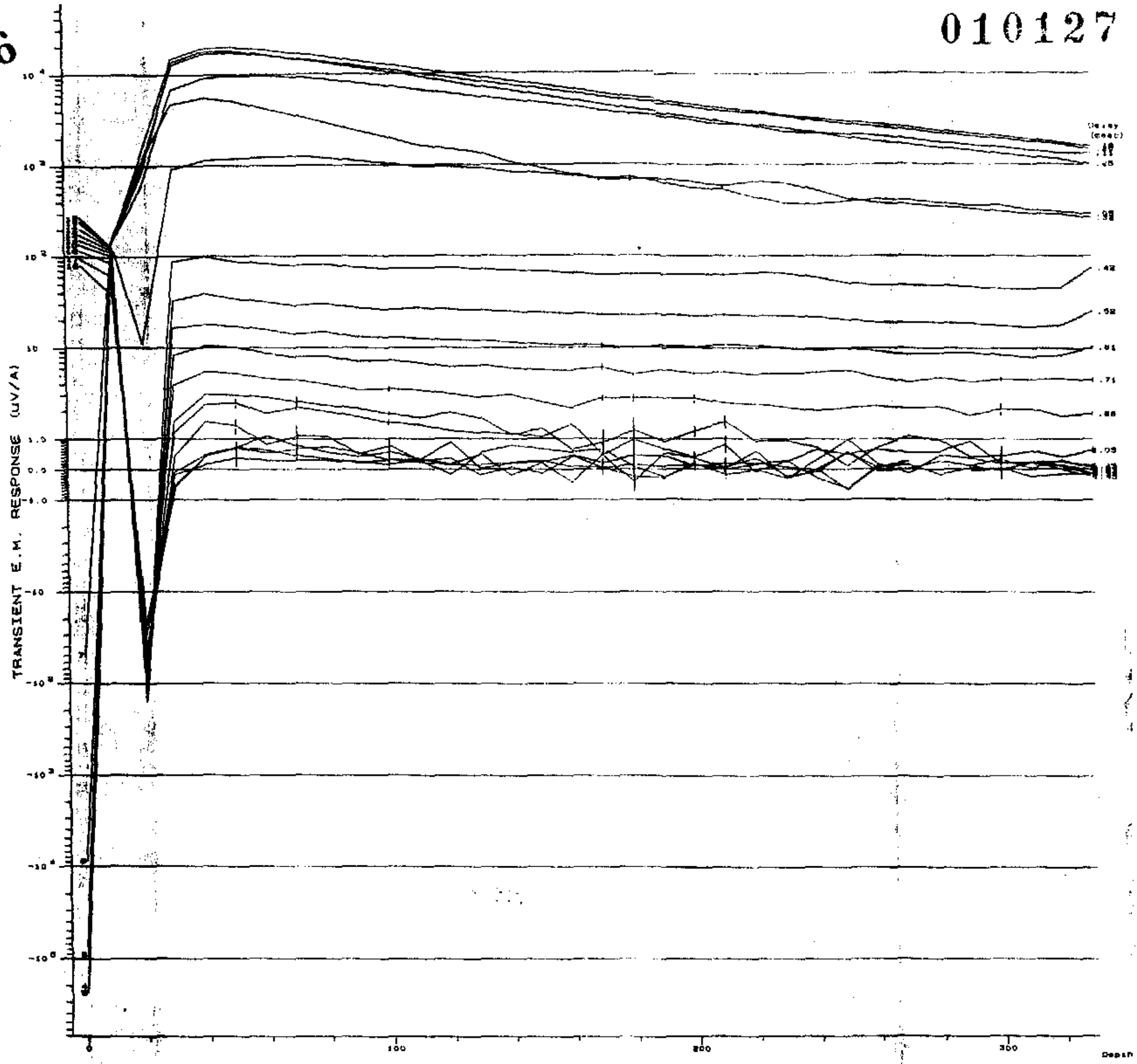


A = (5400N, 5200E)
B = (5200N, 5200E)
C = (5200N, 5000E)
DH= (5280N, 4843E)

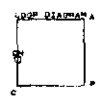
SOLO

5 cm

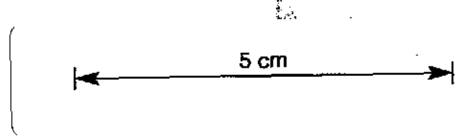
010127



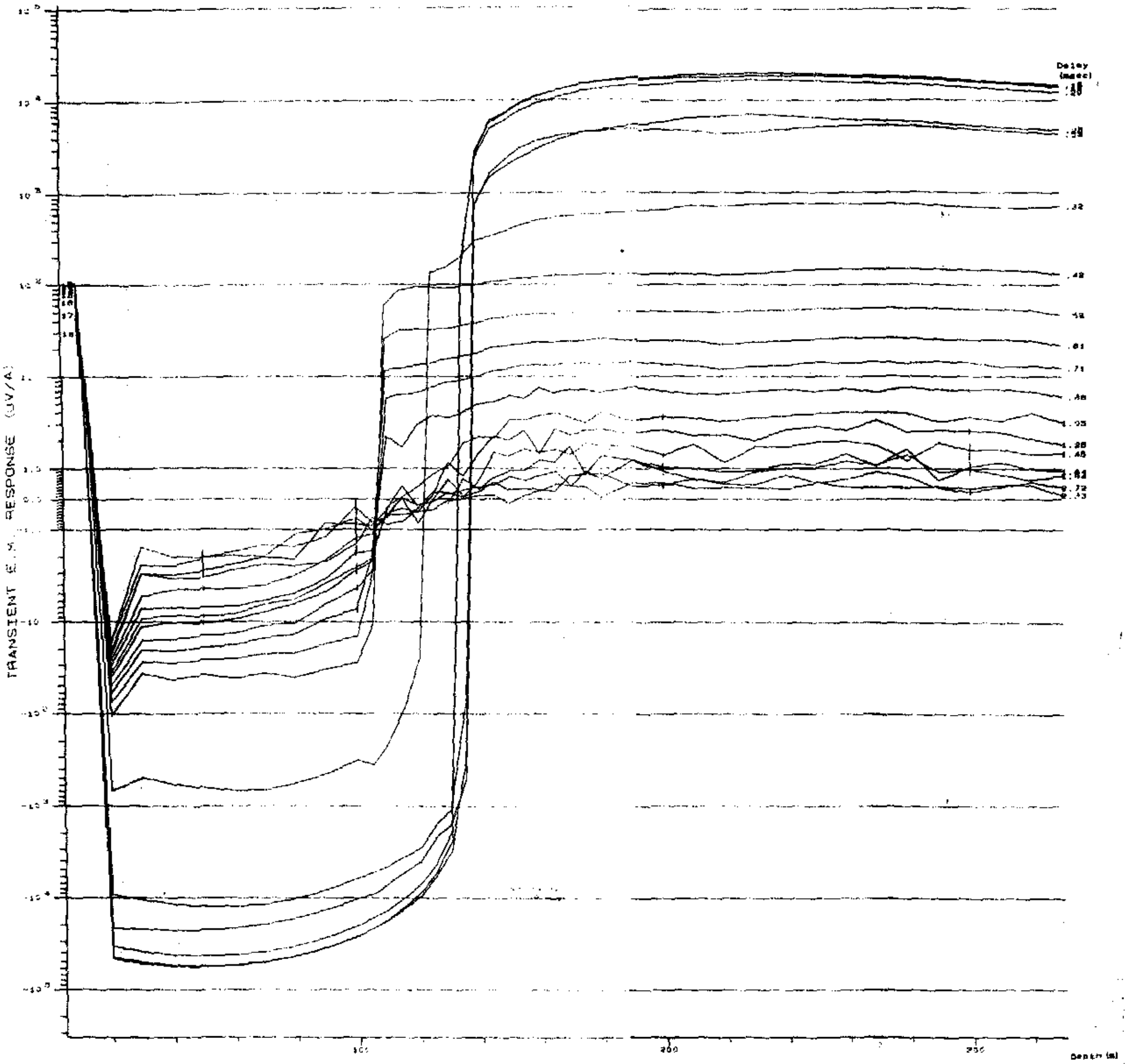
BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.811A)
DH EAF14 LOOP #1
SIROTEM Survey by SOLO Geophysics & Co. 1/ 2/88
SOLO hole ref.418 Reading interval 10.0 m
SCALE 1 : 1000 Loop size : 200 m
LOOP configuration : Drill hole
Plotted : 3:07 PM 18/ 3/88



SOLO



127



BHP EXPLORATION PTY.LTD.
PINNACLES, TASMANIA
(JOB NO.611A)
DH EAF14 LOOP #U
SIROTEM Survey by SOLO Geophysical & Co. 1/ 2/88
SOLO hole ref.420 Reading interval 5.0 m
SCALE 1 : 1000 Loop size . 200 m
LOOP configuration : Drill hole
Plotted : 12:27 PM 24/ 3/88

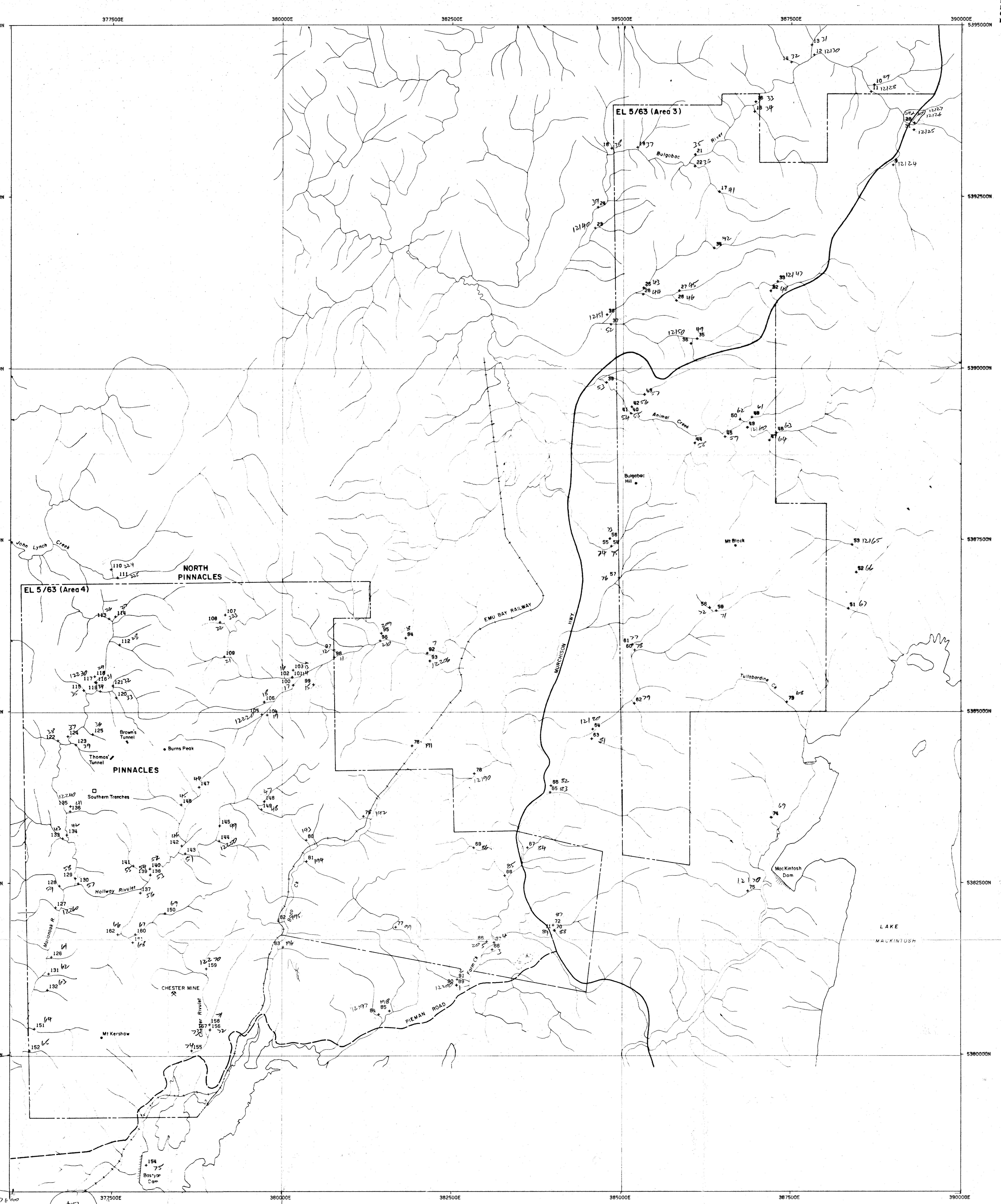
SOLO

5 cm

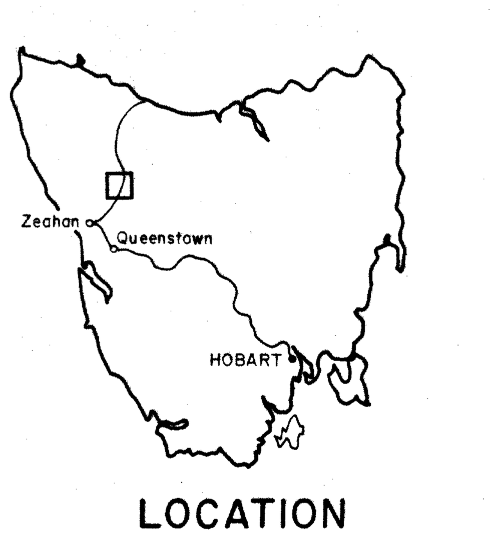
010128


COMSTAFF JOINT VENTURE
Fig 3
E.L. 5/63 AREA 4, N.W. TAS.
CHESTER/PINNACLES AREA
GEOLOGICAL INTERPRETATION
A1-2139
010129
LEGEND
Qg Quaternary glacials
ss Siltstones
sh Shales (black)
sa Sandstones
ar Argillite
cg Conglomerate
Dundas Group including Rosebery Group
Cambrian
da Dacite
an Andesite
at Andesite Tuff
tu Tuffs (various)
ag Agglomerate
rh Rhyolite
py Porphyry
ch Chert(y)
Mount Read Volcanics
Thrust fault with dip
Syncline - position approximate
Anticline - position approximate
Mineralized horizon
Thin section and trace element sample (prefix 37, suffix Z - e.g. 37342)
Diamond drillhole and surface projection
Costean
Grid North
SCALE 1:10,000
1000 metres
PINNACLES
EAST CHESTER
CHESTER
WEST MT KERSHAW
OWEN SHEAR
Que Syncline
Pinnacles Anticline
Burns Peak Syncline
"Shale Basin"
Cone Hill
Chester Mine
Hollway Rivulet
Pinnacles Road
BOUNDARY OF LEASE EL 5/63 AREA 4
86-257
5854

5855



BHP.COMSTAFF JV W TASMANIA STREAM SED SURVEY
CYANIDE GOLD SAMPLE LOCATIONS
SCALE 1:25000



LOCATION

Scale 1:25,000

0 1 2 3 km

N

Fig 4

010130

5 cm

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

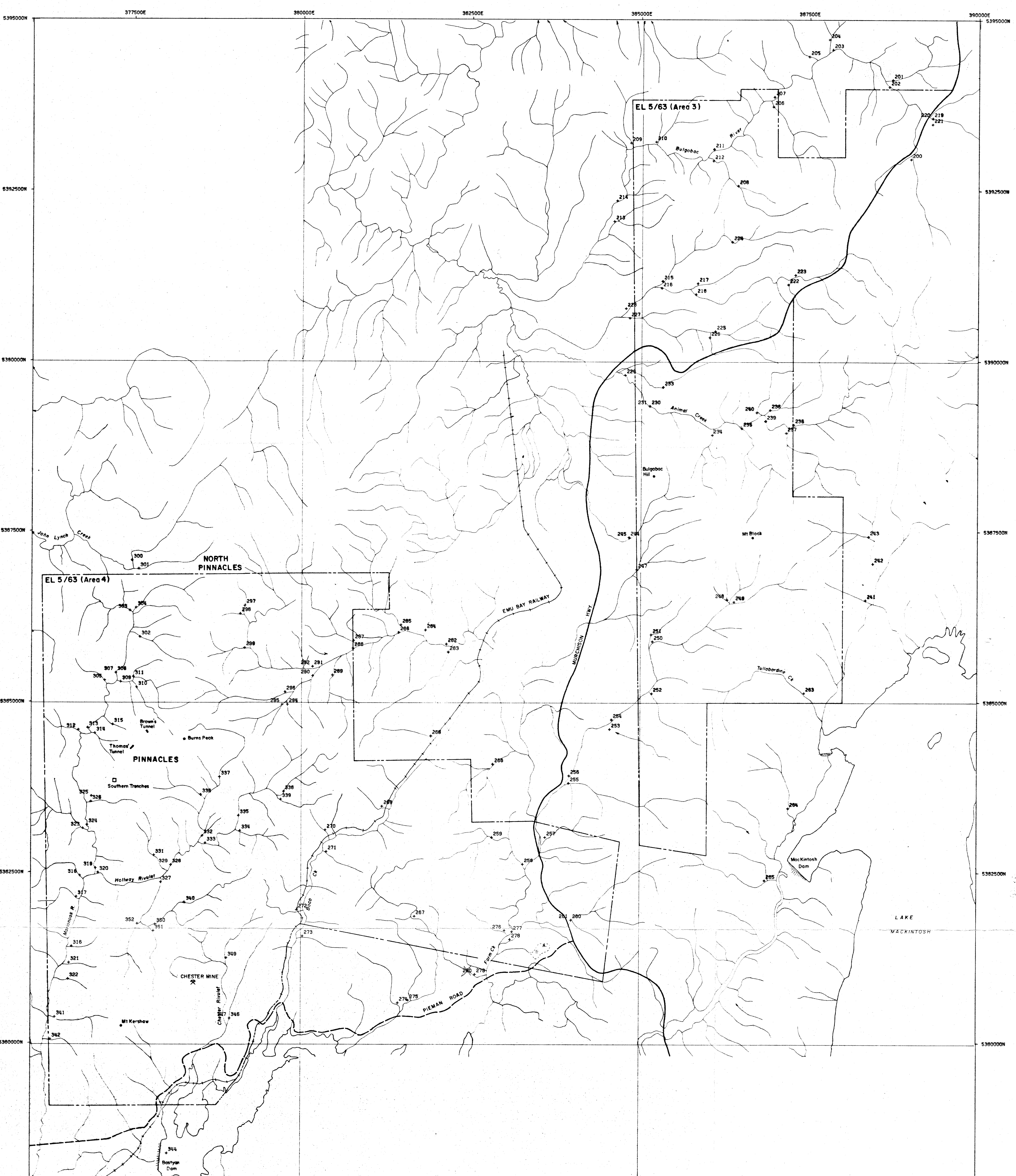
EL 5/65, PARTS 3 & 4, N.W. TASMANIA.

STREAM SEDIMENT SURVEY

CYANIDE GOLD SAMPLE LOCATIONS

Revisions				
Drawn:	Date: June 1986	Centre: Melbourne		
Traced: M. Rosker	Project No.:	Drawing No.:		
Checked:	B56	A0-		
O.I.C.:				

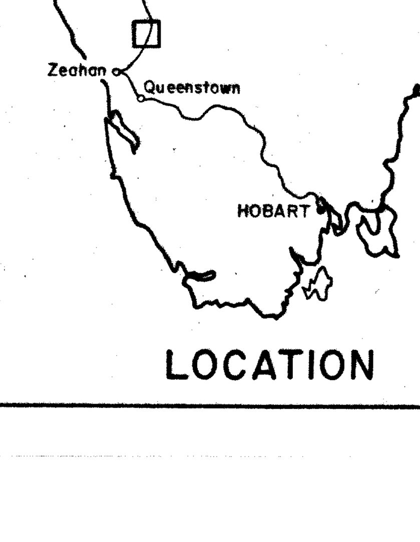
86-2571



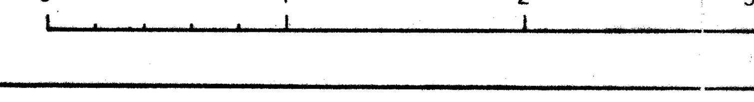
BHP.COMSTAFF JV W TASMANIA -80 STREAM SED SURVEY
SAMPLE LOCATIONS
SCALE 1:25000

Fig 5

010131



LOCATION



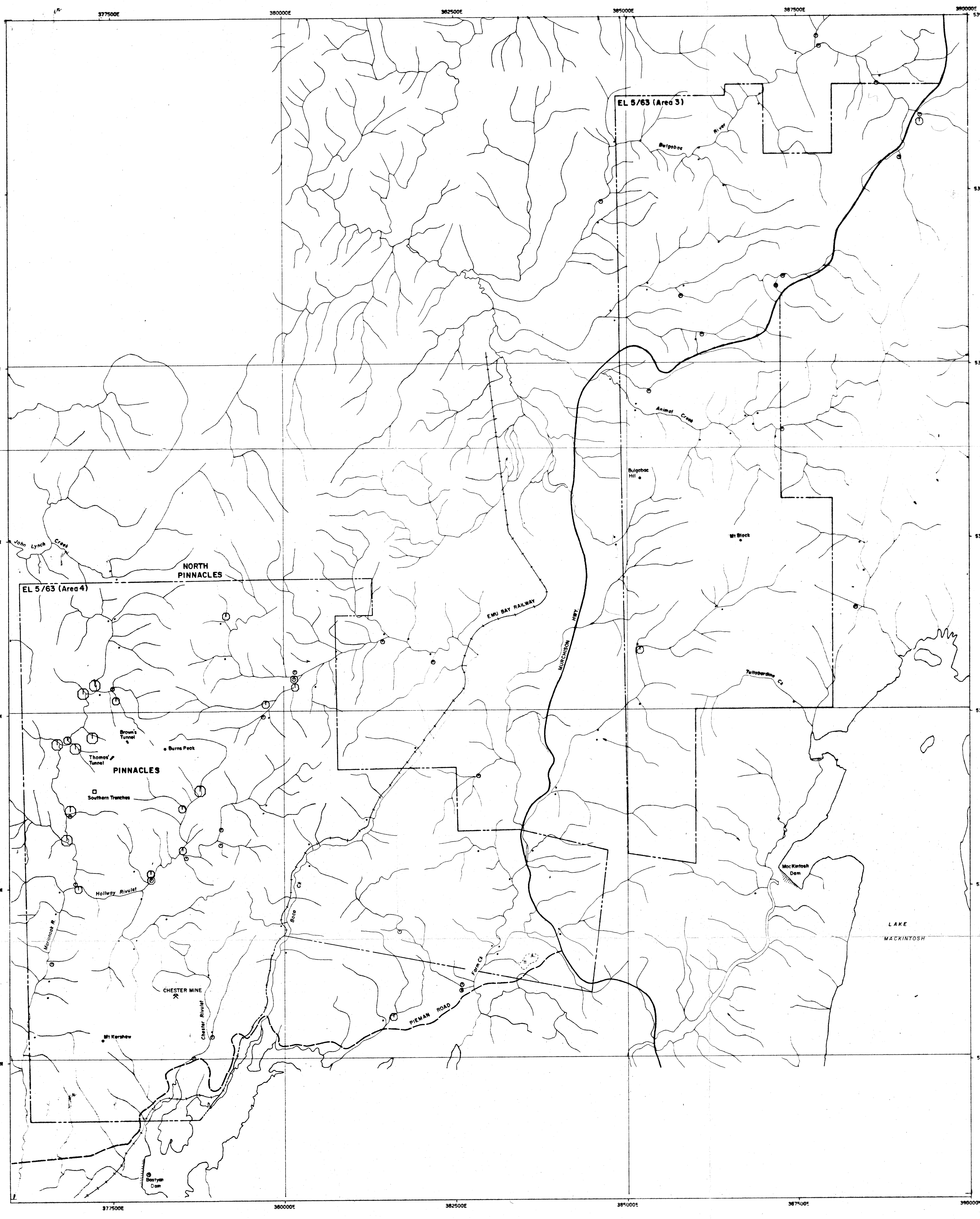
N

THE BROKEN HILL PROPRIETARY CO. LTD. EXPLORATION DEPARTMENT			
EL 5/65, PARTS 3 & 4, N.W. TASMANIA.			
STREAM SEDIMENT SURVEY			
-80# STREAM SAMPLE LOCATIONS			
Drawn:	Date: June 1986	Centre: Melbourne	
Traced: M. Rosker		Project No.:	Drawing No.:
Checked:		856	A0-
O.I.C.:			

Revisions

86-2571

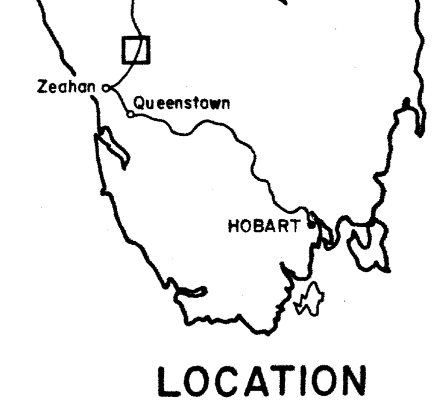
5857



BHP.COMSTAFF JV N TASMANIA STREAM SED SURVEY
CYANIDE GOLD RESULTS SYMBOLS PPB
SCALE 1:25000

SYMBOL KEY
AUCN

1.000
0.400
0.100



LOCATION

Scale 1:25,000
0 1 2 3 km

Fig 6

010132

5 cm

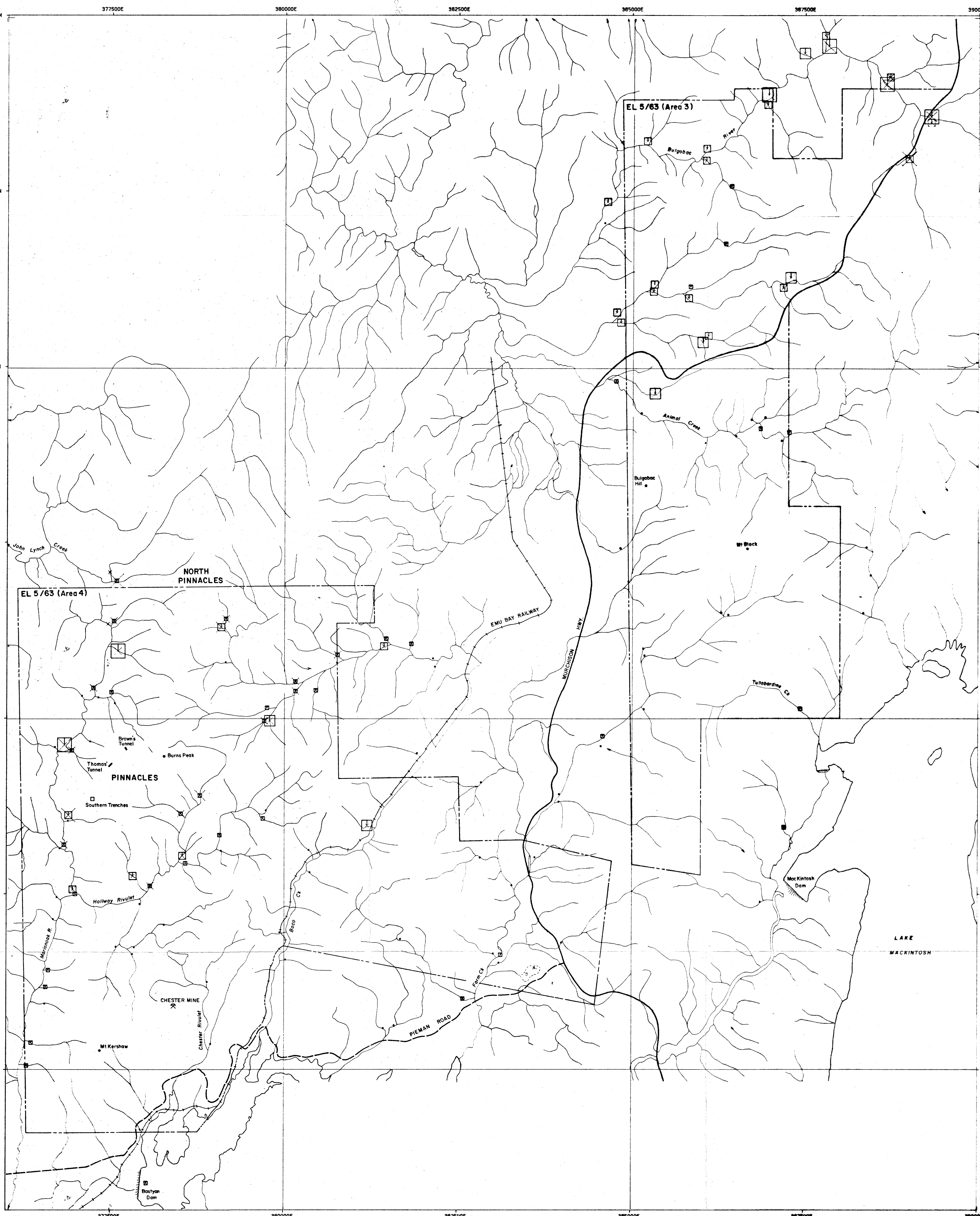
N

THE BROKEN HILL PROPRIETARY CO. LTD. EXPLORATION DEPARTMENT		
EL 5/65, PARTS 3 & 4, N.W. TASMANIA.		
STREAM SEDIMENT SURVEY		
CYANIDE GOLD RESULTS		
Drawn:	Date: June 1986	Centre: Melbourne
Traced: M. Rosker	Project No.:	Drawing No.:
Checked:	B56	A0-
O.I.C.:		

Revisions:

86-2571

5858



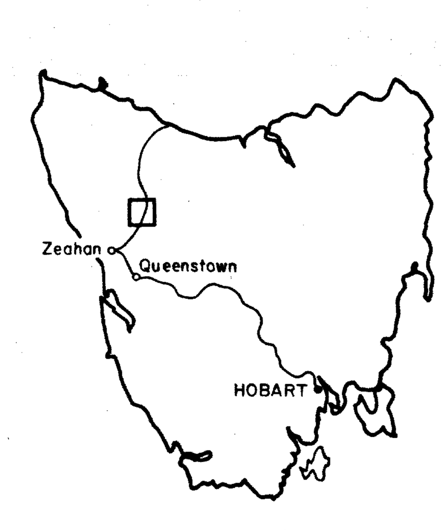
BHP.COMSTAFF JV W TASMANIA -80 STREAM SED SURVEY
SYMBOL PLOT ZN PB PPM
SCALE 1:25000

Fig 7

010133

5 cm

SYMBOL KEY PB		SYMBOL KEY ZN	
	80		140
	40		85
	20		40
	10		15



LOCATION

Scale 1:25,000

0 1 2 3 km

N

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

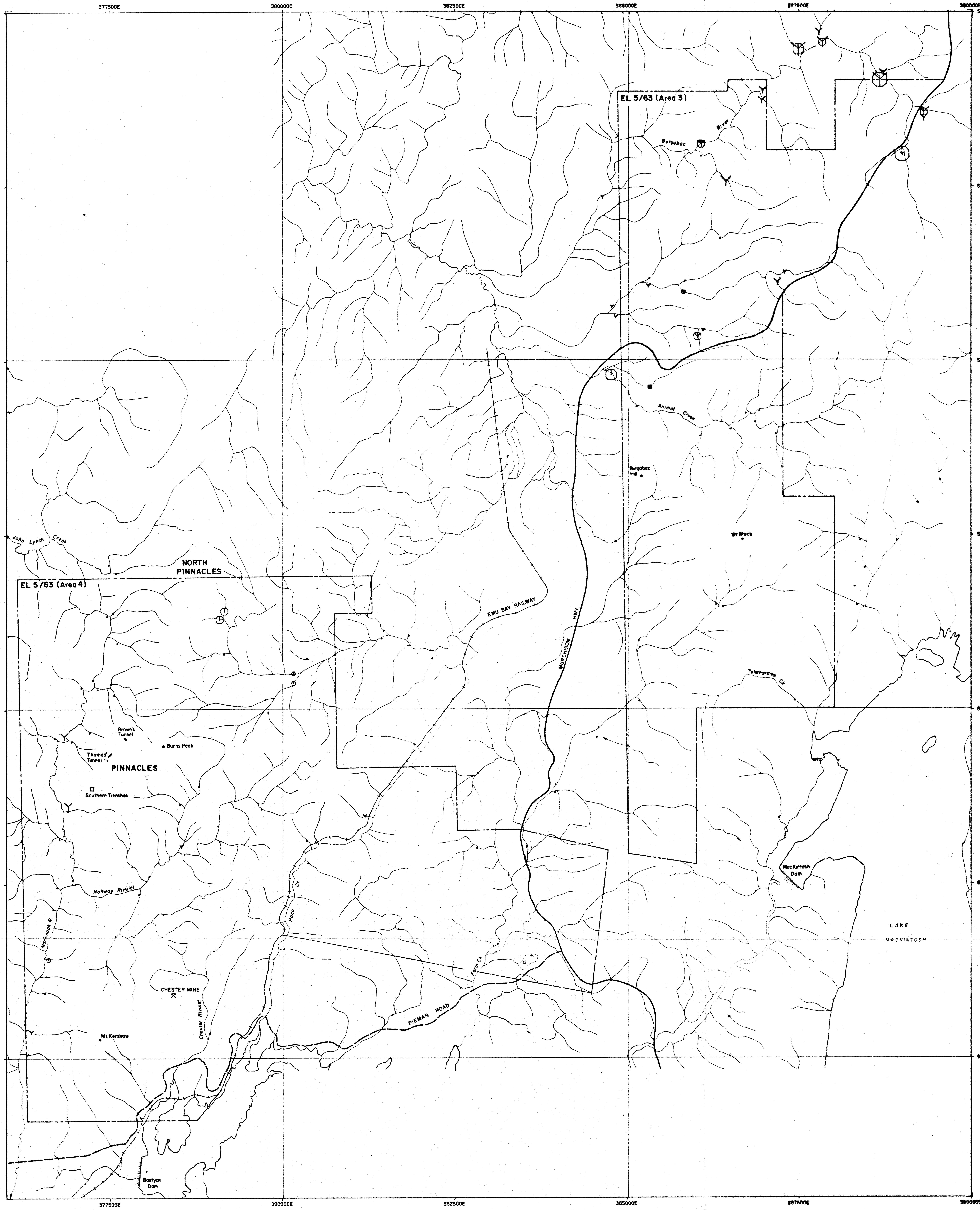
EL 5/65, PARTS 3 & 4, N.W. TASMANIA.

-200# STREAM SEDIMENT SURVEY

SYMBOL PLOT - Zn Pb ppm

Revisions:			
Drawn:	Date: June 1986	Centre: Melbourne	
Traced: M. Rosker	Project No.:	Drawing No.:	
Checked:	856	A0-	
O.I.C.:			

86 - 2571

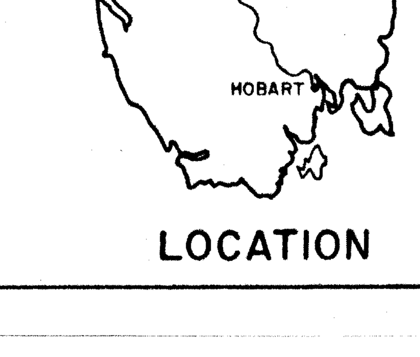


BHP.COMSTAFF JV W TASMANIA -80 STREAM SED SURVEY
SYMBOL PLOT CU AS PPM
SCALE 1:25000

Fig 8

010134

SYMBOL KEY CU	SYMBOL KEY AS
14	20
11	13
6	8
3	4



LOCATION

Scale 1:25,000

0 1 2 3 km

5 cm

N

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

EL 5/65, PARTS 3 & 4, N.W. TASMANIA.

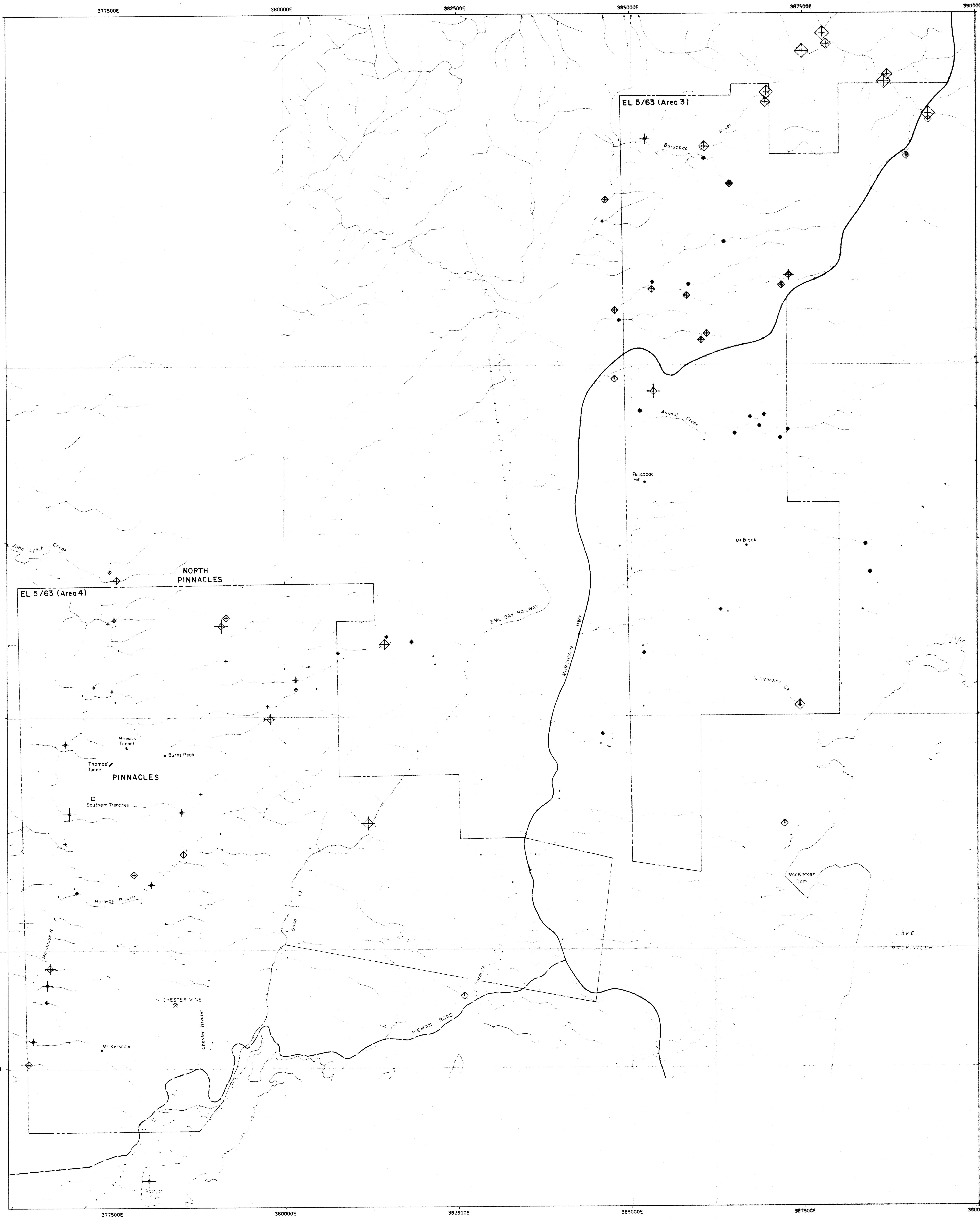
-200# STREAM SEDIMENT SURVEY

SYMBOL PLOTS- Cu As ppm

Revisions			
Drawn:	Date: June 1986	Centre: Melbourne	
Traced: M. Rosker	Project No.: B56	Drawing No.: A0-	
Checked:			
O.I.C.			

86-2571

5860



BHP.COMSTAFF JV W TASMANIA -80 STREAM SED SURVEY
SYMBOL PLOT FE MN PPM
SCALE 1:25000

Fig 9

010135

SYMBOL KEY FE		SYMBOL KEY MN	
◇	12500	+	340
◇	9000	+	250
◇	6200	+	185
◇	3400	+	70
·		·	

LOCATION

N

Scale 1:25,000

0 1 2 3 km

5 cm

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

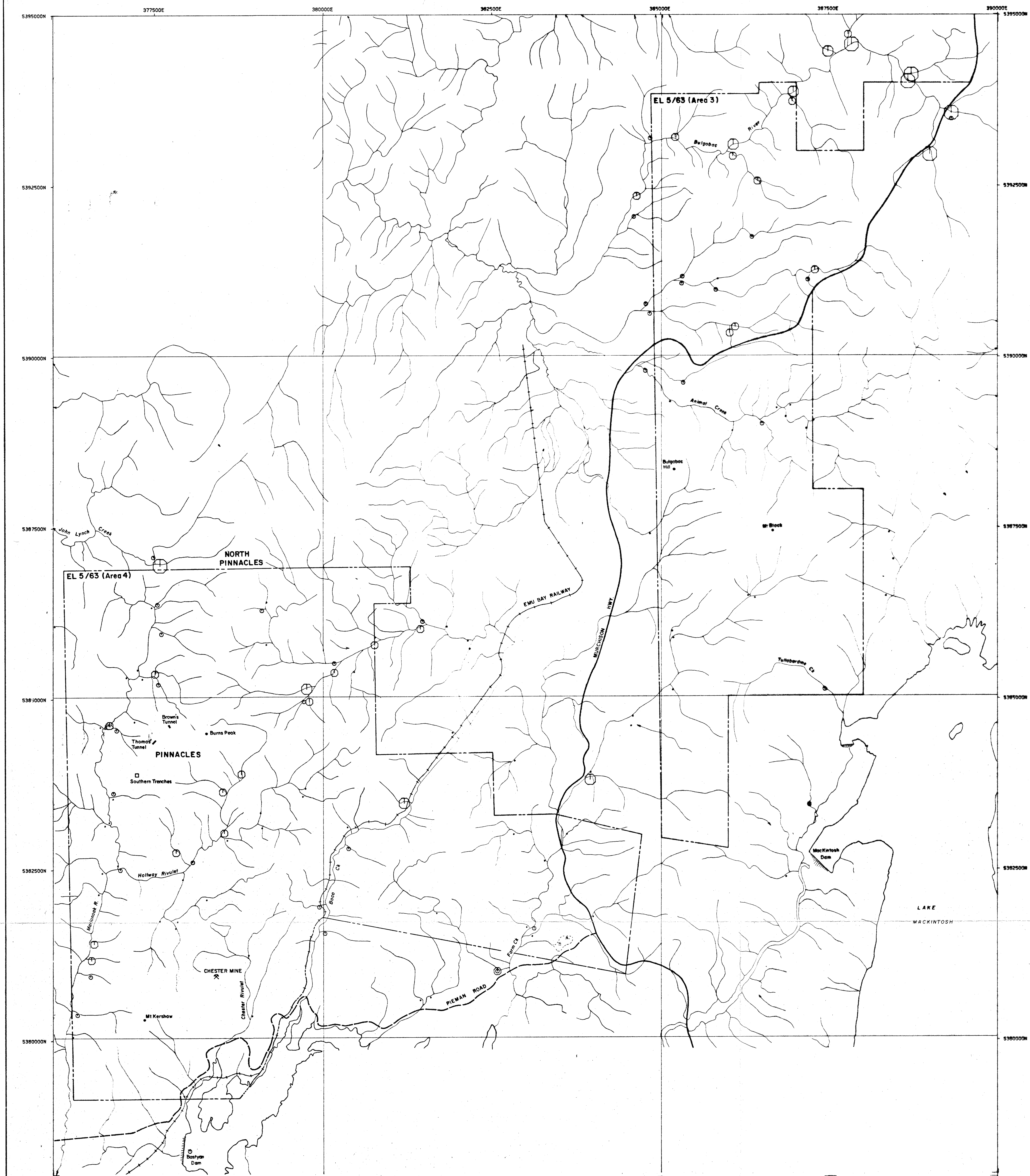
EL 5/65, PARTS 3 & 4, N.W. TASMANIA.

-200# STREAM SEDIMENT SURVEY

SYMBOL PLOT-Fe Mn ppm

Drawn	Date June 1986	Centre Melbourne
Traced M Rosker	Project No	Drawing No
Checked	B56	A0-
O.I.C.		

86-2571



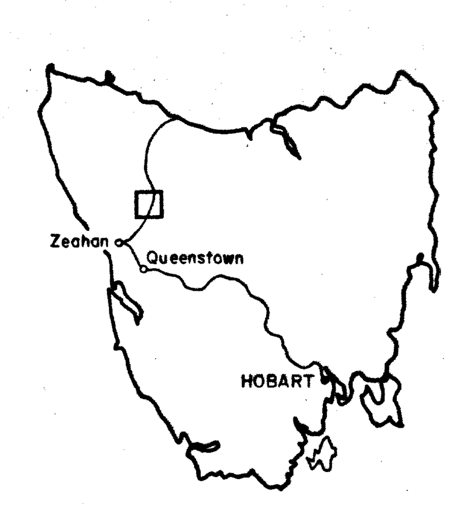
BHP.COMSTAFF J/V W TASMANIA -80 STREAM SED SURVEY
SYMBOL PLOT BA PPM
SCALE 1:25000

Fig 10

010136

SYMBOL KEY
BA

230
180
125
85



LOCATION

Scale 1:25,000

0 1 2 3 km

5 cm

N

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

EL 5/65, PARTS 3 & 4, N.W. TASMANIA.

-200# STREAM SEDIMENT SURVEY

SYMBOL PLOT- Ba ppm

Revisions:			
Drawn:	Date: June 1986	Centre: Melbourne	
Traced: M. Rosker		Project No.:	Drawing No.:
Checked:		B56	A0-
O.I.C.:			

86-2571

Fig II

5862

010137

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

EL 5/63, PART 4, N.W. TAS.
PINNACLES EAF GRID
LOCATION OF SIROTEM SURVEY

Drawn:	R Turner	Date:	4-5-86	Centre:	Melbourne
Traced:	M. Rosker	Project No:	B 56	Drawing No:	A1-2140
Checked:	P. Gregory				
O.I.C.:					

Revisions:

86-2511

Fig 12

010138

COMSTAFF JOINT VENTURE

E.L. 5/63 AREA 4, N.W. TAS.

CHESTER/PINNACLES AREA

LINE CUTTING PROGRESS

(as at 20-6-86)

COMPILED	D.B.H. 77/78
DRAWN	GEODRAFT 20/4/78
AMENDED	
SCALE	1 : 10 000
PLAN NO.	AI-2138

5863

86-2571