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BILLITON AUSTRALIA

THE METALS DIVISION OF THE SHELL COMPANY  
OF AUSTRALIA LIMITED

E.L. 4/77 - HIGHCLERE

Final Report on Exploration During the Period  
September, 1982 - May, 1984

**OPEN FILE**

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D/MQ 03/030	E.L. 4/77 Highclere - Geology	1:50 000
D/MQ 03/075	Highclere, Tasmania - EM Anomaly Map Sheet 20/4043	1:20 000
D/MQ 03/076	Highclere, Tasmania - EM Anomaly Map Sheet 20/3943	1:20 000
D/MQ 03/077	Highclere, Tasmania - EM Anomaly Map Sheet 20/3944	1:20 000
D/MQ 03/042	Input Anomaly 3943/IH1 - Initial Ground Check	1:2 500
D/MQ 03/043	Input Anomaly 3943/IH2 & 3943/IH2A - Initial Ground Check - North Line	1:2 500
D/MQ 03/044	Input Anomaly 3043/IH2 - Initial Ground Check South Line	1:2 500
D/MQ 03/040	Input Anomaly 3943/IH4 - Initial Ground Check South Line	1:2 500
D/MQ 03/041	Input Anomaly 3943/IH4 - Initial Ground Check North Line	1:2 500
D/MQ 03/070	IH4 - Line 00N Max-Min & Magnetics	1:2 500
D/MQ 03/071	IH4 - Line 200N Max-Min, Magnetics & IP/Resistivity	1:2 500
D/MQ 03/072	IH4 - Line 400N Max-Min & Magnetics	1:2 500
D/MQ 03/049	Input Anomaly 3943/IH5 - Initial Ground Check	1:2 500
D/MQ 03/067	IH5 - Guide River North Line 200S - Max-Min Ground Magnetics	1:2 500
D/MQ 03/061	IH5 - Guide River North Line 00N - Max-Min, Ground Magnetics & IP/Resistivity	1:2 500
D/MQ 03/060	IH5 - Guide River North Line 200N - Max-Min & Ground Magnetics	1:2 500
D/MQ 03/050	Input Anomaly 3943/IH6 - Initial Ground Check	1:2 500
D/MQ 03/048	Input Anomaly 3943/IH7 - Initial Ground Check	1:2 500
D/MQ 03/051	Input Anomaly 3943/IH8 - Initial Ground Check	1:2 500
D/MQ 03/059	IH9 - Falls Road Line 1300N - Max-Min & Ground Magnetics	1:2 500
D/MQ 03/058	IH9 - Falls Road Line 1400N - Max-Min, Ground Magnetics & IP/Resistivity	1:2 500
D/MQ 03/057	IH9 - Falls Road Line 1500N - Max-Min & Ground Magnetics	1:2 500
D/MQ 03/073	IH10 - Line 4100E - Max-Min & Magnetics	1:2 500
D/MQ 03/068	IH10 - St. Joseph's Road - Line 4500E, Max-Min & Magnetics	1:2 500

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<u>Drawing No.</u>	<u>Title</u>	<u>Scale</u>
D/MQ 03/074	IH10 - Line 4650E, Max-Min, Magnetics & IP/ Resistivity	1:2 500
D/MQ 03/069	IH10 - St. Joseph's Road Line 4750E - Max-Min & Magnetics	1:2 500
D/MQ 03/090	E.L. 4/77 Highclere Dudfield Road - Magnetic Profile	1:5 000
D/MQ 03/092	Dudfield Road - IP & Magnetics	1:10 000
D/MQ 03/089	Dudfield Road - Section through Drill Hole PDH/ DDH HG 1	1:1 000
D/MQ 03/064	IL5 - Blythe Gate Line 200S, Max-Min & Ground Magnetics	1:2 500
D/MQ 03/062	IL5 - Blythe Gate Line 100S, Max-Min, Ground Magnetics & IP/Resistivity	1:2 500
D/MQ 03/063	IL5 - Blythe Gate Line 00N, Max-Min & Ground Magnetics	1:2 500
D/MQ 03/094	29 Mile Road IP/Resistivity Survey	1:5 000
D/MQ 03/100	29 Mile Road, PDH 29MI	1:5 000
D/MQ 03/097	29 Mile Road, Soil Geochemistry Sn, W	1:5 000
D/MQ 03/098	29 Mile Road, Soil Geochemistry Cu, Pb, Zn, Ni	1:5 000

SUMMARY

Follow-up has been completed over 10 INPUT anomalies outlined in early 1982.

The work has shown that most of the anomalies are related to conductive clay/sand layers within or at the base of the Tertiary basalt cover. One of the anomalies was produced by the Highclere magnetite skarn deposit and another was produced by a barren carbonaceous shale unit within the Precambrian Burnie Formation.

It is now apparent that penetration of the INPUT system was restricted by the presence of the extensive basalt cover.

No further work is warranted over any of the anomalies.

Detailed evaluation of the Old Park Road Geochemical anomaly has downgraded the potential of this zone of metasomatic alteration in Ordovician Gordon Limestone.

The greisen tin potential of the Cranes Prospect - Lake Kara area appears very limited. No further work can be justified at this locality.

A stratigraphic drill hole west of the Hampshire Gate intersected 203m of basalt cover over prospective carbonate stratigraphy. Further exploration in this environment would be slow and expensive and cannot be justified at the present time.

Further testing of a number of aeromagnetic features has also yielded discouraging results. Overall, the licence area has been fully explored with current technology.

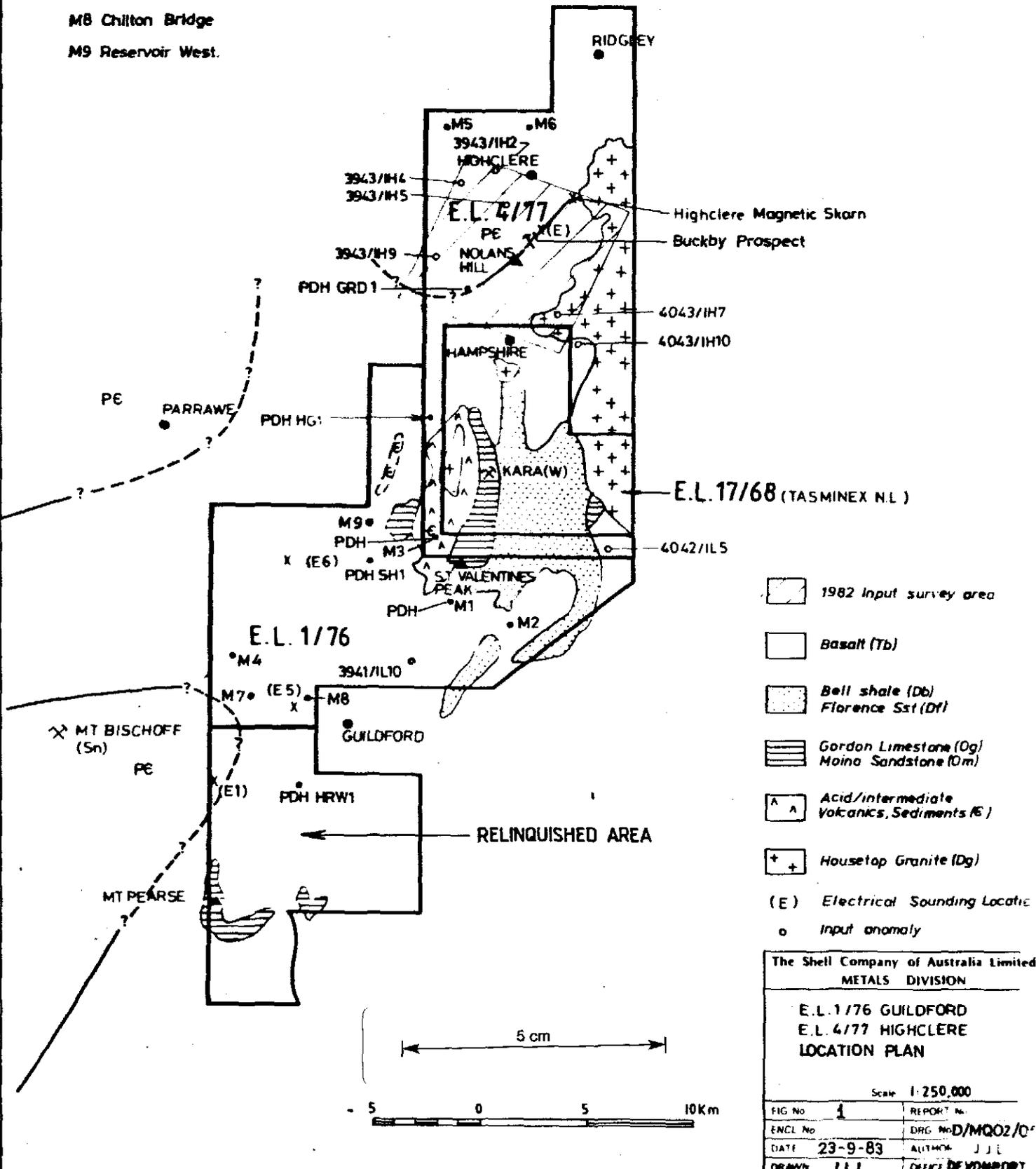
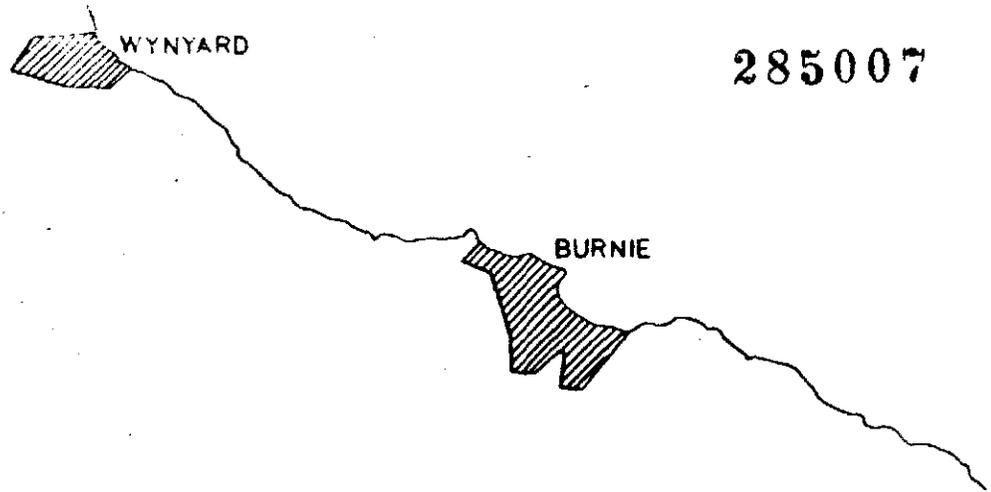
The ground was allowed to expire on the 1st July, 1984.

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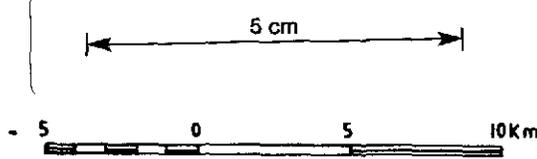
**MAGNETIC ANOMALIES**

- M1 Peak Plain Road
- M2 Old Park Road
- M3 29 Mile Road
- M4 Wandle River
- M5 St. Georges Rd. West
- M6 Guide Rd. South
- M7 Guildford Road
- M8 Chilton Bridge
- M9 Reservoir West.



- 1982 Input survey area
- Basalt (Tb)
- Bell shale (Db)  
Florence Sst (Df)
- Gordon Limestone (Dg)  
Maina Sandstone (Dm)
- Acid/intermediate  
Volcanics, Sediments (E)
- Housetop Granite (Dg)
- (E) Electrical Sounding Location
- o Input anomaly

The Shell Company of Australia Limited METALS DIVISION	
E.L. 1/76 GUILDFORD E.L. 4/77 HIGHCLERE LOCATION PLAN	
Scale 1:250,000	
FIG No 4	REPORT No.
ENCL No	DRG No D/MQ02/0
DATE 23-9-83	AUTHOR JJJ
DRAWN J.L.L.	OFFICE DE VONPORT



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1.0 INTRODUCTION

The Highclere licence, E.L. 4/77 of 147 sq km was granted to Comalco Limited in June, 1977.

A Joint Venture agreement between Comalco Limited and The Shell Company of Australia Limited was finalised in March, 1980, giving Shell the right as operator to earn a 50% interest in the property. This equity was earned by Shell during the first half of 1981, after which both parties contributed equally to exploration expenditure.

In June, 1982, Comalco gave notice of its intention to dilute within the Housetop Joint Venture, of which the Highclere licence formed part.

Comalco's equity fell to 14.2% by the 31st December, 1983 at which point this company decided to withdraw from the Joint Venture.

Due to low overall potential and budget cut-backs the licence was finally allowed to expire on the 1st June, 1984.

2.0 LOCATION & ACCESS

The Highclere exploration licence is located in northwest Tasmania approximately 25 km southwest of Burnie, and surrounds E.L. 17/68 held by Tasminex N.L., owners of the Kara scheelite deposit (Refer Fig. 1).

Land use is split between pastoral and forestry interests, enabling ready access to all parts of the licence. Ridgley is the sole township within the licence area.

### 3.0 PREVIOUS INVESTIGATIONS

Comalco acquired the Highclere licence after exhaustive exploration of the Moina fluorite-rich magnetite skarns associated with the Dalcoath Granite. Exploration was aimed at Moina-style mineralization, or Kara-style scheelite-bearing magnetite skarns.

Consequently, exploration of the licence was primarily directed at assessing aeromagnetic anomalies.

The main areas of Comalco's exploration effort were:

- St. Valentines Grid
- Kingsclere Grid
- Buckby Prospect
- Highclere Iron Deposit
- Hanstein Grid

Details of Comalco's work are recorded in Askins, 1978.

### 4.0 REGIONAL GEOLOGY

Exploration Licence 4/77 is covered by the Burnie 1:250 000 geological sheet and the Burnie and St. Valentine's (unpubl.) 1:63 360 geological sheets. Plan D/MQ 03/030 is a compilation of geology from current and previous investigations.

The Highclere licence extends over the western contact zone of the Devonian Housetop Granite, intrusive into the Precambrian Burnie Formation siltstones of the Rocky Cape Block (Refer Fig. 1). In the southern portion of the licence the Housetop Granite intrude Ordovician and Devonian limestones and sandstones indicative of shallow marine and shelf sedimentation.

009

A thin sequence of upper Precambrian dolomitic limestone, dolomitic limestone conglomerate, chert and some acid volcanics, siltstone and ultramafics has been intersected in previous Comalco drilling at Buckby.

The Devonian Housetop Granite is a pale adamellite. Tin-tungsten-fluorite mineralization in the area is associated with this granite. Greisenization occurs at Cranes Tin Prospect (Collins, 1980) and south of Hampshire (Askins, 1978). The Kara scheelite mine occurs where an apophysis of the Housetop Granite (or later stage differentiate) intruded the basal section of the Ordovician Gordon Limestone.

Much of the area is covered by Tertiary basalt flows of highly variable thickness.

## 5.0 INVESTIGATIONS COMPLETED

### 5.1 Regional Aeromagnetic Survey

Magnetite-bearing skarns similar to Kara and Moina were regarded as the primary targets for Shell's initial investigations. Because of the extensive Tertiary basalt cover over much of the licence it was decided to fly a detailed aeromagnetic/radiometric survey. The aim of the survey was to try to identify prominent magnetic anomalies for detailed follow-up.

It was considered possible that more interesting sulphide-rich skarns could occur adjacent to the high T magnetite skarns and that these would be located during ground follow-up. Their expected muted response was unlikely to be discernable through basalt noise on the airborne survey.

Results of follow-up of the aeromagnetic survey flown in early 1980 are provided in Lawton, 1982. His report also

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gives details of Shell's investigation of the sulphide-bearing skarns at Buckby on the western edge of the Housetop Granite.

Follow-up of various magnetic anomalies showed that the Tertiary basalt has a highly variable geophysical character which makes modelling of data extremely difficult. Many of the anomalies examined proved to be caused by basalt-filled valley structures.

The pre-basalt topography is interpreted to have been very similar to present day northern Tasmania. The steep-sided valleys were progressively infilled with basalt flows and sediment such that thicknesses varied widely over short distances.

## 5.2 INPUT Survey Follow-up

In early 1982 an INPUT survey was flown by Geotorex across an 8 x 8 km block over the Precambrian carbonate stratigraphy N and S of Buckby. The aim of the survey was to search for coincident conductive/magnetic bodies which might directly reflect the presence of sulphide skarn deposits below suspected thin basalt cover.

Details of the survey were provided in Lawton, 1982. A total of ten anomalies were selected for ground followup consisting of mapping, magnetics, max-min EM and dipole-dipole IP/resistivity to discriminate between lithological conductors like black shales and massive sulphide bodies.

Anomalies were rated according to channel response, possible cultural effects, configuration and magnetic association. Most of the anomalies lie within the belt of Precambrian Burnie Formation (Refer Plan D/MQ 03/030) in the northwest of the licence.

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Flight line paths and anomaly locations are shown on plans D/MQ 03/075 - 077 inc. A portion of the report on the survey by M. Schneider, Geoterrex Pty. Ltd., is included as Appendix 1.

Followup across the anomalies provided the following information:

INPUT Anomaly 20/3943/IH 1

No clear VLF anomaly was detected over this anomaly but a phase rotation was evident suggesting that the basalt cover is conductive.

The INPUT anomaly corresponds to low terrain clearance due to the steep slope of a basalt hill. Results are plotted on plan D/MQ 03/042. No further work is warranted.

INPUT Anomalies 20/3943/IH 2 & 3943/IH 2A

Ground followup results are presented on plans D/MQ 03/043 and 044.

The north line has a small magnetic feature at 100-200E and a VLF conductor offset to the west, which possibly correlates with IH 2A. The VLF suggests a shallow dip to the east, which would be consistent with a clay band at the base of the basalt being the cause of IH 2 and IH 2A. It is possible also that the 2nd peak which has been labelled IH 2A, is merely a part of anomaly IH 2, and reflects the easterly dip of the causative body.

The south line has a VLF phase rotation (i.e. conductive basalt) with anomalies due to 2 conductors superimposed on it. These conductors correspond to inflections in the topography and hence could well be related to basalt flow

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tops and the associated clay bands. The INPUT anomaly here may also be enhanced, or even caused, by decreased terrain clearance.

As with IH 1, no further work is recommended.

INPUT Anomaly 4043/IH 3

This anomaly is the response from the Highclere magnetite skarn. Details of the followup over this prospect are recorded in Lawton, 1982.

INPUT Anomaly 3943/IH 4

Initial VLF and magnetic traverses across the anomaly are plotted up on plans D/MQ 03/040 and 041.

Both reconnaissance lines located the INPUT feature. The correlation between VLF and small topographic inflections (possibly reflecting different basalt flows) suggests that the anomaly is again due to clay bands in the basalt profile. Furthermore the anomaly corresponds to a basalt ridge more than 50m thick. It is unlikely that INPUT could have had enough penetration through this much moderately conductive basalt to be able to detect any bedrock conductors. However, because Geoterrex rated the anomaly as priority 1 it was considered that further testing with a deep penetration discriminating system like Max-Min EM, was warranted. Three lines of Max-Min EM were later surveyed across the anomaly.

Results are plotted on plans D/MQ 03/070 - 072 inc.

On line 00N a good conductor was located at 350E. The conductor, with a conductivity thickness of 15-20 mhos dips east from a depth of about 40 metres. Conductivity

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thickness decreases markedly at low frequencies and the results may be affected by a grounded fence.

A reasonable conductor occurs at 450E on line 200N. Again the anomaly may be affected by fences.

A reasonable conductor occurs at 500E on line 400N. The feature dips shallowly east from a depth of 40-60m but interpretation is difficult because of the poor anomaly shape. Possibly the 50m station spacing was too wide to define the anomaly adequately.

Again conductivity-thickness decreases at low frequencies which tends to downgrade the anomaly.

The ground magnetic profiles from all three lines are broad magnetic lows with spikey basalt-type character. Their axis lies slightly to the east of the main conductor.

An IP traverse, to help discriminate between conductive clays and sulphide mineralization, was later carried out along line 200N (Refer plan D/MQ 03/071).

Very low resistivity was recorded throughout the section (all readings less than 100 ohm-metres, most less than 40 ohm-metres). More conductive zones at 300E (roughly 30 ohm-metres, with very small chargeability response : 7 msec vs background of 4 msec) and on the eastern end of the line (20 ohm-metres with no chargeability response - although EM effects may be a problem at such low resistivities). The 2 conductive zones appear to join together at depth (most  $n = 4$  to 6 readings give resistivity of 20-30 ohm-metres) and are certainly sufficient to explain the INPUT. The most likely cause of the anomaly is clay bands related to the basalt, as the chargeability shows no evidence of sulphides. No further work is warranted on this anomaly.

INPUT Anomaly 3943/IH 5

The results from the initial traverse across this anomaly with magnetics and VLF is shown on plan D/MQ 03/049.

The VLF traverse detected a conductor, which probably represents the INPUT anomaly, on the eastern end of the line.

The response was definite on North West Cape and possible on Japan. Power line noise may be a problem.

Local geology consists of Precambrian Burnie Formation shales and siltstones. No obvious explanation for the anomaly was apparent so it was decided to further test the locality with three EW lines of Max-Min EM. (Refer plans D/MQ 03/067, 061 and 060).

Weak anomalies were detected at 750E on line 200S and 800E on line 200N.

A shallow conductor (of the order of 20m depth) dips east from 850E on line 00N. The conductivity-thickness of the anomaly is 10-15 ohms which decreases at low frequencies. The interpretation is difficult due to insufficient coverage to the east (presence of railway lines).

No magnetic features were located on any of the 3 lines.

An IP traverse was carried out along line 00N (Refer plan D/MQ 03/061).

A good conductor (less than 20 ohm-metres) was detected, dipping east from 800E. This conductor appears to have a sharp contact to the east and a more diffuse one to the west.

015

There is a strong chargeability anomaly at about 700E (mainly at low n-spacings? - the picture is confused by the number of "No Readings" at n = 5 and 6). This anomaly is not exactly coincident with the main conductive zone, but it does lie on its diffuse western contact, which would fit disseminated sulphides away from the main sulphide body. (The main conductor is also quite chargeable - 30-40 msec vs. background of less than 10 msec).

The anomaly looked interesting, although low-order soil geochemistry was a down-grading factor, given the shallow source interpreted from the Max-Min survey.

Detailed geological follow-up over the area located outcropping carbonaceous shales which appear to be the source for the INPUT conductor. A line of gravity was surveyed across the anomaly on line OON. A 0.3 to 0.4 mgal anomaly was located at about 875E but terrain corrections downgraded this feature.

No further work can be justified across this anomaly.

#### INPUT Anomaly 3943/IH 6

A broad VLF conductor was detected but as the line was probably not perpendicular to strike little can be inferred about its geometry. (Refer plan D/MQ 03/050).

No fences are present in the area and there is no apparent terrain clearance cause.

Followup Max-Min EM on one NS and one EW line were proposed for this anomaly.

this work was not undertaken and further exploration is not considered justified.

INPUT Anomaly 4043/IH 7

A strong VLF anomaly was detected, corresponding to the outcropping contact between basalt and the Husetop Granite. (Refer plan D/MQ 03/048). An easterly dip is suggested by the VLF.

The INPUT anomaly is adequately explained by the clay band along this contact so no further work was undertaken.

INPUT Anomaly 3943/IH 8

The VLF traverse over this area did not clearly locate the anomaly but a more conductive zone was possibly detected about 100E. (Refer plan D/MQ 03/051).

Two lines of Max-Min EM, one NS and the other EW were proposed for followup.

The work was not done as results in other areas do not justify the further investigation.

INPUT Anomaly 3943/IH 9

The anomaly at Falls Road was followed up with three lines of Max-Min EM and magnetics. (Refer plans D/MQ 03/059, 058 and 057).

Max-Min detected an anomaly at 1300N, 1650E, suggesting a conductor dipping shallowly east. The in-phase and out-of-phase results do not agree well (especially at lower frequencies) and the anomaly is therefore a little confusing (possibly there are two conductors). There is not much doubt however that the INPUT feature has been located (with the shallow dip from the max-min fitting the flat-lying cause interpreted for the INPUT). The max-min results

017

suggest a good conductivity-thickness product (of the order of 20mhos) but the flat-lying geometry could well fit a clay band in basalt.

Line 1300N was resurveyed and the anomaly was further investigated with max-min on lines 1400N and 1500N.

Resurveying on line 1300N showed a shallow, east-dipping conductor occurs at 1650E at a depth of 40-60m, with a conductivity thickness of about 5 mhos. Again interpretation is difficult because of the anomaly at 1900E.

On line 1400N a conductor dips east at 1600E, at a depth of 40m with a conductivity thickness of 3-7 mhos (increasing at lower frequencies).

Interpretation is confused, however, by interference from a weaker anomaly at 1850E (and fences at 2050E?).

On line 1500 poor conductors occur at 1550E and 1825E.

Magnetics, done along the three lines shows a spikey basalt character to the east of about 1900E. Noise is muted to the west suggesting that the lines may cover two different basalt flows, only one of which is magnetically active.

A follow-up IP survey was run along line 1400N. (Refer plan D/MQ 03/058).

There is surficial low resistivity to the west of 2000E, with no chargeability response (although again there could be EM coupling problems) and no evidence of any bedrock conductor. Thus the most likely cause of the INPUT anomaly is a clay band coinciding with the interface between the two basalt flows.

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The resistivity at Falls Road are generally not as low as those in other basalt-covered areas (e.g. IL 10, IH 4). This suggests either:

1. Low near-surface resistivity is peculiar to certain basalt flows; or
2. Low near-surface resistivity depends on pre-basalt geology (hence IP may be a useful mapping tool through basalt); or
3. The basalt is much thicker here, and hence the IP has only seen clay bands at basalt interfaces, and not the (more conductive?) paleo-weathering surface.

No further investigation of the anomaly is warranted.

INPUT Anomaly 3943/IH 10

Results from four lines of Max-min EM and magnetics over the St. Joseph's Road area are shown on plan D/MQ 03/073, 068, 074 and 069.

Initially max-min detected two good conductors at about 4800N on line 4650E. There were reservations about the value of phasor diagrams in this situation but a conductivity thickness of greater than 10 mhos and a depth of 50m was obtained using Strongway's diagrams.

The geometry of the conductor would seem to fit a conductive clay band in, or at the base of, the basalt. However, the conductivity looks much too high for a clay band.

Further max-min surveys gave the following results:

No significant anomaly on line 4100E.

A possible conductor at 4500N on line 4500E. The anomaly was not fully covered and possibly dips shallow N?

At 4750E on line 4850N a main conductor was outlined in a broad conductive zone. Interpretation is difficult but the anomaly looks to be dipping steeply north at a depth of 30-40 metres with a conductivity thickness of about 50 mhos.

No clear, discrete magnetic anomalies were defined on any of the lines. The magnetics are fairly noisy and probably reflect the different basalt flows.

An IP survey was carried out along line 4650E (Refer plan D/MQ 03/074).

Surficial low-resistivity zones were detected at roughly 5100N and south of 4800N. No chargeability anomaly was detected hence the INPUT anomaly is probably due to clay bands. No further work is recommended.

Followup of the INPUT survey was completed with negative results. It now appears that the penetration of the INPUT system was restricted by the presence of widespread conductive clay/sand layers within and at the base of the Tertiary basalt cover.

No further work over any of the anomalies is warranted.

### 5.3 Regional Gravity & Radiometric Surveys

An evaluation of the regional geophysical coverage of the Housetop Granite batholith was undertaken by G. Oakes.

Part of the various surveys undertaken covered portions of E.L. 4/77 - Highclere. The reader is referred to Oakes, 1983 for the overview of the Moina-Housetop district.

#### 5.4 Old Park Road Geochemical Anomaly

A Pb, Zn stream geochemical anomaly situated about 5 km due east of St. Valentines Peak was originally located by Comalco during regional stream sediment sampling.

The area has received intermitten followup since Shell entered into the Husetop JV with Comalco in March, 1980. Mr. D.C. Simpson, Consulting Geologist, was asked to review and assemble the results of work in the area to determine whether continued investigation was justified.

Results, overall, were discouraging and the anomaly appears to be caused by non-economic metasomatic alteration of quartzite limestones. No strongly defined magnetic or EM anomaly reflecting massive sulphide is present. Further investigation is probably unwarranted.

The evaluation of the anomaly is detailed in Simpson, 1984.

#### 5.5 Cranes Tin Prospect, Lake Kara Area

R. Poltock Contract Geologist, investigated the area at Shell's request in August, 1983.

His report regarding the greisen tin possibilities of the area is attached as Appendix 2.

Analysis of regional radiometric data by G. Oakes (1983) suggested that the area occurs in a zone of late stage alteration or multiple intrusive phases of the Husetop granite.

Followup, while limited, downgraded the possibilities for significant zones of tin-bearing greisen. Several tin bearing alteration zones were located. These were widely

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dispersed and had variable amounts of tin (from 130 ppm to 1150 ppm in grade samples). The area would appear to have little potential as a hardrock source of tin.

5.6 Dudfield Road (Hampshire Gate) Stratigraphic Drillhole HG 1

Followup of the Housetop regional gravity programme was undertaken over the W side of the licence where Tertiary basalt masks suspected Gordon Limestone. Significant gravity lows occur within the area which may correspond to granite apophyses intrusive into Gordon Limestone. Field work was aimed at locating a suitable site for a stratigraphic drillhole to test the gravity interpretation.

A drill site was selected at AMG co-ordinates 5427600mN, 394300mE, about 1 km west of the Hampshire gate to APPM's timber concession east of Guildford. (Refer plans D/MQ 03/030, 090, 092 and 089).

The area lies west of the Stockyard Creek granite apophysis which intrudes the Kara area. A line of magnetic anomalies very similar to those in the Kara "synclinorium" occur on the western flank. The stratigraphic hole was drilled to:

1. Test the basalt thickness estimated for the area.
2. Determine whether the Highclere-Buckby carbonate stratigraphy persisted this far south.
3. Test the source of a strong magnetic anomaly.
4. Check for the presence of granite at depth.

The hole was completed in January, 1983 to a vertical depth of 258.3m. A total of 202.5m of basalt was intersected overlying weathered, metasomatized fine sandstones and shales with fine-grained magnetite skarns between 212-232m and 242-248m. A log of the hole plus analyses and petrology on five core samples is attached as Appendix 3.

To calibrate the various geophysical techniques used over basalt-covered areas a variety of surveys were run across the drill site area to help determine which method was the most useful in measuring basalt thicknesses and bedrock resistivities.

Surveys include a Sirotem sounding and inversion, EM-37 sounding and inversion, AMT sounding and inversion, one line of 200m dipole-dipole IP (n = 1 to 8) and ground magnetics. Details of these surveys are included in Oakes, 1983 so they will not be repeated here.

#### 5.7 Follow-up of Aeromagnetic Anomalies

Limited followup over several aeromagnetic anomalies was undertaken by W.D. Smyth between May - December, 1983.

##### 5.7.1 INPUT Anomaly 4042/IL 5 Area

The grid over INPUT anomaly IL 5 at Blythe Gate was extended 500m further east to cover an aeromagnetic anomaly.

This anomaly, which lies just east of the licence boundary in Shell's E.L. 36/79 was investigated with three lines of magnetics. (Refer plan D/MQ 03/030 for location).

Results from ground followup and eastern extension of the magnetic coverage are shown on plans D/MQ 03/064, 062 and 063.

The VLF traverse detected a shallow conductor at about 250 SE. The coupling and shape of the profiles (suggesting a line not perpendicular to strike) would be consistent with a body striking west of north and

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dipping east. The conductor is associated with a 600 nT magnetic anomaly in an interesting area on the same magnetic trend as Kara East.

The anomaly does not appear to be offset from the conductor as suggested by the INPUT profile. Three lines of Max-Min were measured across the anomaly and gave the following results:

Line 00N: Conductors at 100W and 150E, probably dipping east (interference makes interpretation difficult). The conductor at 100W appears to be the better of the two, with a conductivity-thickness of 5 mhos (but decreasing at low frequency) and a depth of 40-50m.

Line 100S: Conductors at 50W and 150E, probably dipping east (again, interference is a problem). The conductor at 50W is the better of the two, with a conductivity thickness of 5-10 mhos and depth of 20m.

Line 200S: The conductors appear to have merged into a broad conductive zone between 50W and 150E and dipping shallowly east.

Noisy basalt-type response was recorded on the initial grid lines. Extension to the east picked up the aeromagnetic feature.

A line of IP was undertaken along line 100S (Refer plan D/MQ 03/062).

A resistivity/chargeability low at 50E-100W is the source of the EM anomalies and is probably caused by basalt-related weathering zones.

Extensions of the grid to the east show typical spikey basalt magnetic profiles. Short bedrock soil sampling traverses were undertaken but these produced no results of interest. A basalt source is suspected for the aeromagnetic anomaly.

The grid is within the area of the Blythe River grid previously investigated by Comalco (Refer Askins, 1980). Comalco carried out ground magnetics, IP and drilled one percussion hole to test an IP feature. The hole was unable to penetrate the basalt and peat beds so it was abandoned at 75m.

The magnetic, EM and IP anomalies present in the area are probably basalt-related and require no further investigation.

5.7.2 29 Mile Road Aeromagnetic Anomaly 3942/5

This anomaly is situated about 1 km SE of Companion Hill and straddles the main Hampshire to Guildford Road. (Refer plan D/MQ 03/030).

Possible Devonian quartz-feldspar porphyry dykes with tourmaline and some pyrite intrude the sequence of Cambrian sediments in this area. Some silicification and kaolin alteration with minor pyrite veining was observed in nearby small quarries. Previous rock chip sampling in the quarry areas had shown tin values of upto 100 ppm in the altered sediments and dykes. Ground magnetic traverses were run along the main road (line 2000E) and along 29 Mile Road with an extension to the east (line 700N). Profiles from the survey and a detailed location plan are attached in Appendix 4. The ground magnetic survey located a narrow anomaly on line 1880N. One line of IP was

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surveyed across this feature and this showed a broad zone of high resistivities and chargeabilities. (Refer plan D/MQ 03/094).

A strong chargeability anomaly with low resistivity anomaly is coincident with the 800 nT magnetic feature.

A vertical percussion drill hole to test the magnetic/IP anomaly was drilled to 70m depth at AMG co-ords. 5422270N, 394650E. (Refer plan D/MQ 03/100).

A coarse-grained feldspar crystal lithic tuff was intersected in the top 8m of the hole.

The rest of the hole intersected hornfelsed, fine grained tuffaceous sediments with upto 5% disseminated pyrite along joint faces. Minor kaolinization and tourmaline veining occurred between 54-60m.

Assay results from the hole were all uniformly low. A log of the hole is attached as Appendix 5.

Disseminated magnetite and pyrite probably explains the magnetic/IP anomaly located at the site.

Limited soil sampling was undertaken along the main road and on line 1880N. Values for Sn, W, Cu, Pb, Zn and Ni were all low order. (Refer plans D/MQ 03/097 and 098). No further investigation of the anomaly is justified.

## 6.0 CONCLUSIONS & RECOMMENDATIONS

Since the licence was first granted to Comalco Limited in June, 1977 it has been intensively explored for Renison-style, sulphide

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tin and Kara-style, magnetite-tungsten mineralization.

Extensive basalt cover over much of the licence has hampered the investigations.

No further work is possible at this time and the ground was allowed to expire on the 1st July, 1984.

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APPENDIX 1

Portion of a report by M. Schneider,  
Geoterrex Pty. Ltd.

On the Interpretation of the Highclere INPUT Survey

January, 1982

INTERPRETATION REPORT

AIRBORNE ELECTROMAGNETIC SURVEY

BARRINGER 'INPUT' SYSTEM

OF THE

RIANA, HIGHCLERE AND LOONGANA AREAS

TASMANIA

FOR

THE SHELL COMPANY OF AUSTRALIA LIMITED

BY

GEOTERREX PTY. LIMITED

(83-548)

Sydney, Australia

April, 1982

M. Schneider

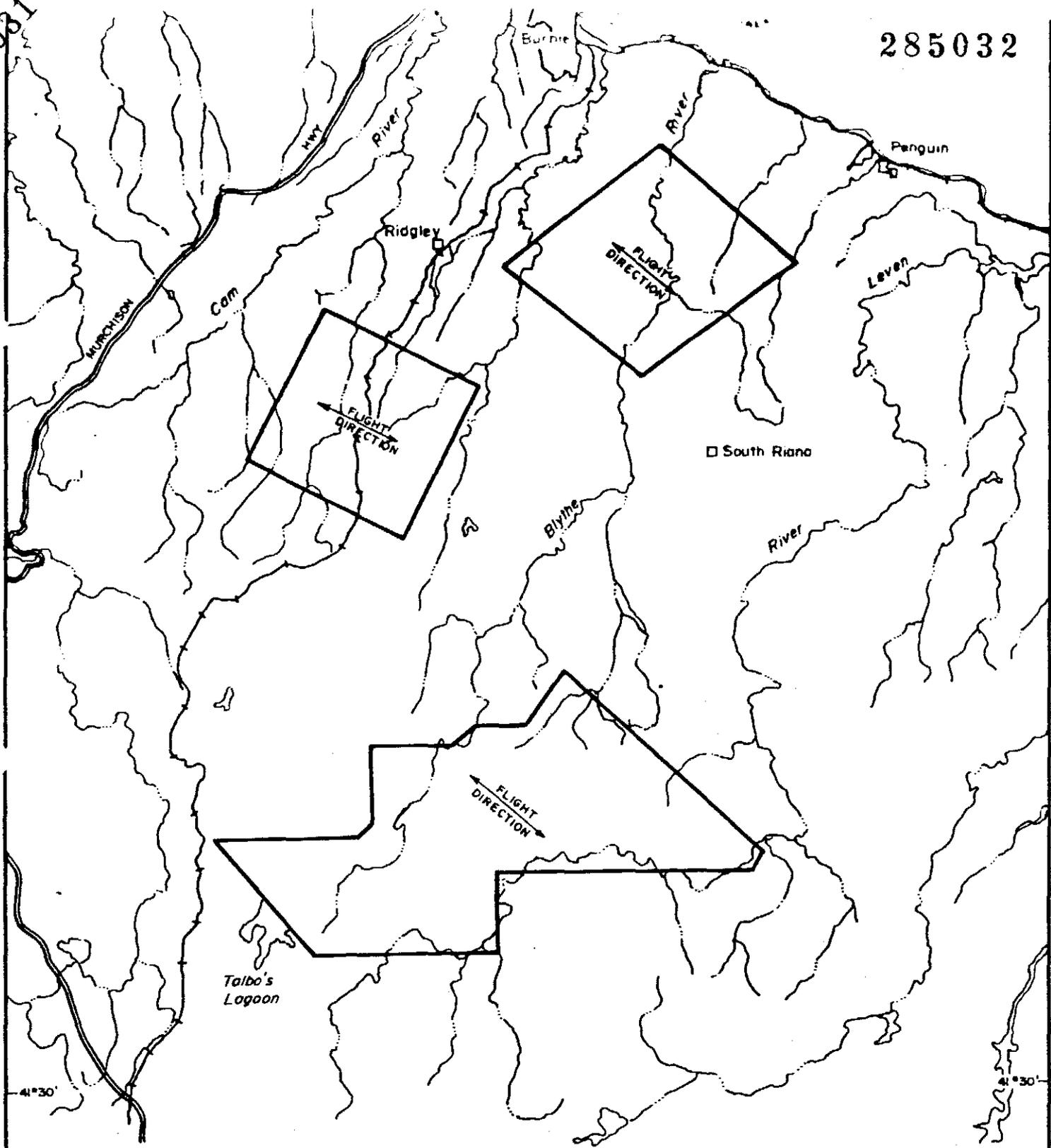
Geophysicist

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41°30'

41°30'

5 cm

# SURVEY AREA LOCATION MAP

SCALE 1:250 000



NORTH WEST 1:250 000 SHEET

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I. INTRODUCTION

During the period January 7th to January 11th, 1982, Geoterrex Pty. Limited flew a combined electromagnetic and magnetic survey over the Riana, Highclere and Loongana areas of Tasmania on behalf of the Shell Company of Australia Limited. The base for the duration of the survey was Burnie.

A total of 248.0 kilometres was flown at a flight line spacing of 300 metres in a north west direction in the Riana area, 216.0 kilometres were flown at a flight line spacing of 300 metres in a north west direction in the Highclere area, 996.1 kilometres were flown at a flight line spacing of 300 metres in a north west direction in the Loongana area.

The project was conducted with the Super Canso PBV-5A under registration VH-EXG, which is operated by H.C. Sleigh Aviation for Geoterrex Pty. Limited and was equipped with :-

- a Barringer Mark V Input EM System
- a Geometrics G803 nuclear precession magnetometer
- a Geoterrex 'Madacs' digital acquisition system
- a Sperry RT220 radar altimeter
- a 50 Hz monitor
- a Geocam 705 35mm continuous strip tracking camera
- a Honeywell 1912 visicorder

Navigation was by visual means from black and white government photography enlarged to a scale of 1:20,000. The aircraft was operated at a mean terrain clearance of 120 metres.

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II. PERSONNEL

The following Geoterrex personnel participated on the field phase of the survey

J. Edwards	Pilot
D. Bowen	Co-Pilot
W. Mitchell	Aircraft Mechanic
L. Williams	Senior Electronics Technician
S. Kiss	Electronics Technician
M. Curtis	Data compiler
G. Butt	Senior Geophysicist
M. Schneider	Geophysicist

The entire project was planned and supervised by G. Butt of Geoterrex Pty. Limited in conjunction with N. Hungerford representing the Shell Company of Australia Limited.

Digital data processing was carried out at Engineering Computer Services Pty. Limited of Bowral, New South Wales.

Drafting was by Geodrafting Pty. Limited of Sydney.

## III. DATA PRESENTATION.

The geophysical data is presented in the following form and all maps are at a scale of 1:20,000.

- EM Anomaly Map (overlay to topographic sheet)
- Original Input analogues
- Flight path plotted on Tasmanian 1:20,000 cadastral sheets.

EM ANOMALY MAP

The EM Anomaly Maps which overlay each 1:20,000 cadastral sheet show the INPUT anomalies from the high resolution channels.

The anomalies are plotted in their correct lateral positions (i.e. the 2.0 second lag between the six HRC INPUT\* responses and the true ground position has been accounted for) on the flight lines and grouped according to similarity of amplitude and shape from line to line. The boundaries of these anomalous zones are determined from the half peak amplitude width on Channel 3. A diamond symbol indicates the anomaly peak and hence whether the anomaly is symmetrical or not. The number at the upper left of the diamond is the ratio of Channel 2 to Channel 5 in 10ths of inches chart deflection. The number at the upper right is the aircraft altitude in metres. Any significant association between an INPUT and magnetic anomaly is indicated by plotting the amplitude of the magnetic response beneath the diamond. If there is any offset between these peak responses an arrow indicating the direction of offset is drawn beneath the amplitude of the magnetic response.

During the course of data evaluation, groups of anomalies are outlined to show our interpretation of the extent of the geologically conductive zones. If any doubt exists, the outlines are dashed. Conductors of

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interest and numbered to facilitate reference to the report.

- \* For the Highclere area only the slow time constant channels were used for picking and plotting anomalies due to the undue amount of 50Hz and cultural interference on the HRC responses. The lag used to plot these anomalies was 40 seconds. Otherwise the procedure was the same as outlined above.

THE RECOVERED FLIGHT PATH is presented on both the recovery photo-mosaic and the 1:20,000 cadastral sheets for each area. The flight path on the cadastral sheets was used as the base for all processing on EM anomaly maps.

The original visicorder records of the raw INPUT, altitude and magnetic data are presented bound in line number order. All calibration data is included and a copy of the analogue format is shown in Figure 3 of Appendix A.

The 4 rolls of negative 35mm continuous strip tracking film are delivered and labelled according to their flight number.

The aerial photography, bearing all the points, along with the tracking film is provided for accurate location of any followup investigation.

The flight logs which contain all relevant information regarding the collection of geophysical data are presented bound in flight order.

The data was processed at Engineering Computer Services Pty. Limited

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in Fownal, New South Wales. Correlation and interpretation of the data was performed in Sydney.

The survey was conducted in consultation with N. Hungerford, representing the Shell Company of Australia Limited.

IV. INTERPRETATION - General

Commonly used interpretation techniques rely mainly on qualitative review of data and refer to anomaly shape, symmetry, strike extent and variability within conductive zones. The apparent conductivity, as determined by the amplitude and rate of decay of the INPUT response, is an important criterion in our analysis of conductors.

Other important factors taken into account include:-

- the shape and size of the INPUT anomalies,
- the strike length and degree of isolation of the conductor,
- the form of conductors particularly with respect to direction and dip of geological and cultural structures,
- the associated geophysical parameters such as aeromagnetics,
- variation of response characteristics within a given conductor,
- the geological environment and the response of the system to known mineralization.

Conductors delineated by an EM survey can be separated into categories based on their probable origins, namely bedrock, surficial and cultural.

The term cultural is used for those conductors thought to be due to any man-made construction. These are responses due to fences, telephone and powerlines etc.

Surficial conductors refer to sources in the overburden, in the weathered portion of the bedrock or in those formations not usually considered as host material for sulphide orebodies. In the context of this report the word surficial should not be used in the geological sense but rather as a geophysical term.

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fails if there is little or no difference between overburden and target body. This method (Verma 1975\*) is useful in areas of extensive high conductivity.

- b) Curve matching to theoretical homogeneous half-space response (HHS) curves. Sets of HHS response curves of various transmitter-conductor altitudes are stored in computers for matching the field data. A degree of fit measurement is made. Apparent resistivity and apparent depth are calculated. The mechanism of parameter calculation and plotting are described in the appendix concerning quantitative interpretation of the data.
- c) Consideration of average response amplitude, as defined by Dyck et al, 1974\*\*, and decay time-constant can yield a broad definition of the two-layer case solution. It is possible to distinguish between thin and thick layer cases in certain controlled environments.

#### INPUT CLASSIFICATION

All conductors of interest are classified according to the following priority system:-

Priority 1 zones satisfy most of the criteria associated with a bedrock source which could be due to massive sulphides. They contain responses indicating a highly conductive source, and may be isolated or extensive, bearing in mind the expected size of sulphide deposits in this region.

\* Verma. S.K. 1975.  
Resolution of responses due to conductive overburden and orebody, through time-domain EM measurements; a field example; G.P. 23 No. 2: 292-299.

\*\* Dyck. A.V., Becker. A., Collett. L.S. : 1974.  
Surficial conductivity mapping with the airborne INPUT system. CIM Bulletin, page 104-109, April, 1974.

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Priority 2 zones also satisfy most of the criteria associated with bedrock features but anomalies display characteristics such as faster rate of decay or broader width which preclude them being listed as Priority 1.

Zones which are rated as Priority 3 targets are almost certainly of surficial origin, but a small degree of uncertainty is present.

Priorities assigned to zones are made primarily on the merits of the INPUT responses, with some influence from the magnetic data. Geological information must be further analysed to determine the ultimate priority for followup.

The priority rating system refers to the probability that the conductive source of given zones is related to massive sulphide mineralization.

V. INTERPRETATION OF HIGHCLERE SURVEY DATAa) General

Inspection of the geological and geophysical maps from the region shows that the majority of the survey area is covered by Tertiary Basalts. The previously flown aeromagnetic survey indicates that the basalt has the form of a large tabular structure with many localized inhomogeneities due to thickening and changing rock chemistry (magnetic susceptibility). To a large extent, the airborne electromagnetic (INPUT) data reflects this distribution in terms of a general background of conductivity with localized increases (or concentrations) in conductivity corresponding to either changes in the character of the basalt (i.e. associated clay horizons) or possible massive sulphide occurrences. Whilst the total conductivity distribution has been presented in map form (EM Anomaly Map) only the localized conductivity "concentrations" are zoned, numbered and described in detail in this section.

The most readily identifiable responses in the area are due to flat lying near surface bodies commonly labelled as "surficial responses". The heavily barred section in the central south (Line 2011 - 2101) exhibits a dual peaked response which compares almost identically to the numerically modelled responses of a flat lying plate of finite X and Z

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dimensions. The very noticeable flight direction dependent offsets in the boundary position of each conductor is further evidence of tabular geometry (see Appendix 3 Figure 1).

Since it is unlikely that the basalt itself gives rise to the INPUT response we must look to an associated geological feature that may explain why this part of the "basalt cover" should stand out against the general background of conductivity. If the response is due to conductive clay horizons within the basalt (presumably the clay layers would represent the weathered surface of one particular flow which makes up the basalt sequence) it is difficult to imagine what ancient topographic control or variation of basalt chemistry would produce such an enhancement. Perhaps a more reasonable explanation would be that the EM response emanates from a conductive weathered layer at the basal contact of the basalt flow. In such a case, a different lithology below the basalt contact may selectively weather to form a more conductive horizon than the surrounds. The existence of this selective weathering, and hence the determination of different lithologies beneath the basalt cover may be important in the search for sulphide systems at some depth. Since it appears that we are dealing with horizontally layered situations, a combination of DC and EM sounding techniques may improve the understanding of what is causing the INPUT response and what significance (if any) this may have in the evaluation of data from this type of environment.

A cautionary note must be sounded concerning the reliability of some of the boundary positions of some of the "surficial" zones in the vicinity of the large powerline. In many cases the conductor outline is dashed because it is not possible to determine whether the channel responses decay to zero (or sometimes negative) due to powerline effects or real geological reasons. Further, the proximity of some zones (e.g. 20/3943/IH2) to this severe 50 Hertz interference detracts from their importance since it is known that high frequency noise on the High Resolution channels can be aliased by the slower time constant channels to produce "phantom anomalies" with many characteristics similar to conductive bedrock sources.

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ZONE 20/3943/IH1

PRIORITY 3

Line 2271	Fiducial 545820	Ratio 19.0 / 3.5
	to	
Line 2221	Fiducial 534930	Ratio 45.0 / 4.0

Anomalies:    Shape            : Broad response with a narrow peak superimposed.

                  Amplitude        : Moderate to large.

                  Decay Rate        : Moderate to slow.

                  Cultural Signs : None.

                  Mag Association: Peak position is flanked on both sides by magnetic highs over the whole length of the zone.

Conductor:    Dimensions        : 1.0 kilometres wide, 2.0 kilometres long and open to the north.

                  Strike            : North.

Location:

The peak positions follow a tree lined creek.

Remarks:

This zone is broad, conductive and follows a magnetic trend, which indicates that the source is most likely to be associated with the basalt cover which exists over much of the area. The conductive source may be from a different depth than the magnetic source; i.e. from a clay layer within the basalt or at the basal contact of the basalt flow. The southern boundary of the zone is open to question due to electrical interference from a ground source which has masked the true extent of the anomaly on Line 2211.

Recommendations:

There does not appear to be any anomalous airborne geophysical features associated with this zone (when compared to other broad responses in the area) to warrant its isolation as a primary drilling target, but further knowledge from geology and other tools may enhance its importance.

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ZONE 20/3943/142

PRIORITY 3

Line 2271	Fiducial 546040	Ratio 16.0 / 2.0
Line 2231	Fiducial <sup>to</sup> 533112	Ratio 22.5 / 3.0

Anomalies:    Shape            : Symmetric and narrow.  
                   Amplitude        : Moderate - large.  
                   Decay Rate        : Moderate - slow.  
                   Cultural Signs : None obvious.  
                   Mag Association: Discrete offset association on Line 2251 only.

Conductor:    Dimensions        : 1.5 kilometres long, 500 metres wide.  
                   Strike             : North-east.

Location:  
                   Fields.

Remarks:  
 The validity of this zone is under question due to the interference effects of some ground based noise source on the high resolution channels. The slow time constant channels appear to have aliased this noise to produce anomalies which have many desirable characteristics  
 This aliasing has most effect on the late channels where the signal to noise is poorest and hence any "phantom response" added to the generally quiet background activity will enhance the favourability of an otherwise ordinary response. (Observe how the channel 1 response on the HRC is responding to the geology compared to channel 6 which is grossly affected by the noise source). The isolated anomaly on Line 2204, Fid 527436 appears to have the same character as this zone. The noise source appears to be the very large power-line which runs through the whole area.

Recommendations:  
 Some comparison between the INPUT zone and known geology should be made in order to better determine the source of this response.

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ZONE 20/3943/IH2A

PRIORITY 2

Line 2231

Fiducial 540400

Ratio 19.0 / 3.0

Anomalies:      Shape                    : Inflective peak on the edge of a larger response.  
                   Amplitude                : Moderate - small.  
                   Decay Rate                : Slow.  
                   Cultural Signs            : None.  
                   Mag Association: 60nT anomaly offset 60 metres (1 second) to the east.

Conductor:      Dimensions                : 300 metres wide.  
                   Strike                        : Nil

Location:  
                   Field.

Remarks:  
 Although this anomaly is part of the questionable 20/3943/IH2 zone, the double peaking on this line (not evident on any of the other responses in zone IH2) may be indicative of another source apart from the noise. The magnetic association may be more fortunate than discrete but there are sufficient meritorous features of the airborne geophysical responses to isolate this zone.

Recommendations:  
 Ground followup is recommended to establish the source of the INPUT response.



ZONE 20/3943/IH4PRIORITY 1

Line 2221	Fiducial 534684	Ratio 27.5 / 5.0
	to	
Line 2183	Fiducial 523756	Ratio 33.0 / 7.5

Anomalies:      Shape                : Asymmetric, double peaked.  
                          Amplitude            : Moderate.  
                          Decay Rate            : Slow.  
                          Cultural Signs       : None.  
                          Mag Association: Follows a magnetic low between two highs.

Conductor:      Dimensions            : 2.0 kilometres long, anomaly width = 700 metres.  
                          Strike                 : North.

Location:  
                          Fields.

Remarks:  
 This zone represents a discrete response within a generally conductive area. The late channel amplitudes and the overall decay rate indicate a source more conductive than its surrounds. The dual peaks are not conclusively indicative of any particular source geometry in this case, due to the unknown interactions between the overburden and bedrock sources. The best response occurs on Line 2183 with the amplitude diminishing towards the general background level on the northern lines.

Recommendations:  
 This zone requires further ground followup, but with a ground geophysical system capable of discrimination between strongly conductive background and a bedrock source. Some of the frequency domain equipment available may pose interpretation difficulties in this area.

046

ZONE 20/3943/IH5

PRIORITY 2

Line 2211	Fiducial 529860	Ratio 15.0 / 2.0
	to	
Line 2191	Fiducial 419940	Ratio 10.0 / 1.0

Anomalies:    Shape            : Narrow and symmetric.  
                   Amplitude        : Small - moderate.  
                   Decay Rate        : Slow.  
                   Cultural Signs : Near a large powerline.  
                   Mag Association: None.

Conductor:    Dimensions        : 250 metres wide, 1.0 kilometres long.  
                   Strike             : North-east.

Location:  
                   In the middle of a wooded section.

Remarks:  
                   This zone occurs in an area where the powerline interference has completely obliterated the true character of the HR channels especially on the late channels. Again it is uncertain whether the slow time constant channels have aliased the noise to produce "phantom anomalies" or whether the anomalies exist as true ground responses.

Recommendations:  
                   Supporting geological/geochemical evidence would be desirable to establish the true merits of this zone.

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ZONE 20/3943/IH6

PRIORITY 3

Line 2141

Fiducial 406610

Ratio 16.0 / 2.3

Anomalies:

Shape : Narrow and symmetric.

Amplitude : Moderate.

Decay Rate : Slow.

Cultural Signs : Yes, track and fence between 406600 and 406610.

Mag Association: None.

Conductor:

Dimensions : 300 metres wide.

Strike : -

Location:

Coincident with a fence.

Remarks:

Although this anomaly is isolated and shows slow decay characteristics the tracking film indicates that a fence is situated within 0.5 seconds (30 metres) of the peak position. Thus, the inference is that the source is cultural.

Recommendations:

Ground check is advised to confirm position of fence.

ZONE 20/4043/IH7PRIORITY 2

Line 2091	Fiducial 392800	Ratio 8.0 / 0.8
Line 2081	Fiducial 388852	Ratio 3.0 / 0.5

Anomalies:

Shape	:	Fairly wide, symmetric on one line direction.
Amplitude	:	Small - moderate.
Decay Rate	:	Moderate - slow.
Cultural Signs	:	None.
Mag Association	:	None.

Conductor:

Dimensions	:	350 metres wide, 500 metres long.
Strike	:	North-east.

Location:

In a heavily forested area on a topographic high.

Remarks:

The apparent enhancement of this isolated zone may be due to its geographic position, i.e. the terrain clearance was only 100-120 metres as the hill was traversed. This then gives the false impression that the hill is more conductive than the surrounds.

Recommendations:

Further evidence is required to establish the importance of this zone.



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ZONE 20/4043/1H9

Priority 3

Line	203.1	Fiducial	373604	Ratio	40.0/4.0
Line	204.1	Fiducial	376972	Ratio	22.0/3.5
Line	205.1	Fiducial	381660	Ratio	20.0/2.6
Line	206.1	Fiducial	383058	Ratio	27.0/2.6
Line	207.1	Fiducial	387468	Ratio	12.0/0.5
Line	208.1	Fiducial	388580	Ratio	10.0/0.6

Anomalies:

Shape : Broad  
 Amplitude : Large - moderate, decreases southward  
 Decay Rate : Moderate - fast  
 Cultural Signs : None  
 Mag Association: Large dipolar response

Conductor:

Dimensions : 400 to 800 metres wide, 1.5 kilometres long.  
 Strike : Northeast

Location:

Not plotted on EM anomaly maps since it is outside the flight path recovery limits and could not be plotted accurately.

Remarks:

Response is generally broad and has only weak late channel persistence. One lines 204.1 and 205.1 the response is similar to that of the heavily barred zone in the central south of the survey area which closely resembles the then horizontal plate model studies from the University of Toronto. From line 206.1 to 208.1 the anomaly becomes single peaked and broader with amplitudes decreasing on all channels and no visible late channel response. Also, there is an increase in the extent and amplitude of background conductivity on these lines which results in the anomaly being less well defined.

Recommendations:

The source of this anomalous response may well be within or at the base of the basalt cover. The geometry of the source appears to be horizontal rather than vertical and its conductivity thickness decreases northward. The ultimate importance of the zone may be established by further knowledge of conductive sources within or at the base of the basalt cover by electrical lagging of boreholes in similar geological conditions in the area (if any exist) and then by ground geophysical followup with a deep penetration, discriminatory system.

VI. TABLE 1 - SUMMARY OF SELECTED CONDUCTORS - HIGHCLERE AREA

<u>Priority 1</u>	<u>Priority 2</u>	<u>Priority 3</u>
20/3943/IH4	20/3943/IH2A	20/3943/IH1
	20/3943/IH5	20/3943/IH2
	20/4043/IH7	20/4043/IH3
	20/3943/IH8	20/3943/IH6
		20/4043/IH9

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XI. CONCLUSIONS AND RECOMMENDATIONS

Tables 1-3 summarise the interpretation of the geophysical data and the classification of zones according to their priority in the search for conductive massive sulphides. This categorisation is established primarily on the merits of the INPUT data with the magnetic and other information considered as secondary tools.

The main purpose of the survey was the delineation of discrete massive sulphide conductors, often from beneath the extensive basalt cover. The complex nature of such target conditions places limitations on the separation of true bedrock responses from responses originating from within the overburden (basalt) or at the base of the overburden, due mainly to the poorly understood interactions between "surficial" and bedrock conductors. Consequently there are very few high priority zones listed in this report.

The Highclere area contains 1 Priority 1, 4 Priority 2 and 4 Priority 3 zones, the most outstanding zone being 20/3943/IM4.

The Riana area contains 2 Priority 1, 2 Priority 2 and 2 Priority 3 zones, the most prospective being 20/4044/IR3 and 20/4044/IR<sup>4</sup><sub>5</sub> which are Priority 1 and 20/4043/IR2 which is Priority 2 but has a very interesting geometry interpreted from the INPUT data.

The Loongana area contains only 2 Priority 2 and 1 Priority 3 zone. In this area the basalt cover was extensive and relatively uniform, there being no trending enhancements within the extensive areas of high conductivity.

Since there are very few zones listed as being possibly caused by a

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bedrock source. It is recommended that all zones regardless of priority be followed up. The zones which have been outlined as being anomalously conductive within the generally conductive background would require a deep penetration ground EM system capable of separation of background response from target response at the processing and interpretation stage.

Respectfully submitted,

*Martin Schneider*

Martin Schneider  
Geophysicist

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APPENDIX 2

Report by R. Poltock

On the Cranes Tin Prospect - Lake Kara Area

August, 1983

EL 4/77

CRANES TIN, LAKE KARA, TRIAL FLATS

August 1983

ROGER POLTOCK GEOLOGICAL PTY. LTD  
for  
THE SHELL COMPANY OF AUSTRALIA LTD.

PLANS

- .1 Stream and rock sample locations 1:10,000
- .2 Geology and geochemical data 1:10,000

APPENDICES

- .1 Sample booklet locations and brief descriptions
- .2 Rock sample descriptions
- .3 Geochemical analytical data

REFERENCES

Cranes Tin Prospect, P. Ruxton May 1982  
The Shell Company of Australia Ltd.

INTRODUCTION

Previously the area has been reported on by Collins Tas. Department of Mines, Wilson and Heithersay Geopeko. These have been summarized by Ruxton who outlines the prospecting history and geological setting of the area.

This report is based on one week's field work, to integrate earlier data, fill gaps in the stream geochemical coverage, sample alteration zones, and attempt to, map and sample different granite phases. To determine if tin/tungsten mineralization exists, warranting a more detailed appraisal.

The area of interest is approximately eight square kilometers; it is underlain by the Devonian Husetop Granite which is partially covered by Tertiary basalt.

Alluvial tin workings occur in granite exposed areas, and are confined to present stream channels. Cassiterite has most likely been derived from joint controlled chlorite-tourmaline and greizenous alteration zones. These have only been prospected in bedrock at Cranes, and present data indicates that this is the main area of interest.

GEOLOGY

Topographically the area is relatively flat, granite being exposed as windows in the overlying basalt. Although the granite forms extensive outcrops it is not possible to determine if more than one phase is present or what their inter relationships may be. Intrusive contacts with Pre Cambrian to Siluro-Devonian sediments are absent from the area.

Medium to coarse grained biotite granite/adamellite predominates, aplites are usually less than 2m thick. More extensive finer grained granites outcrop NE and 500m south of Crane's mill and NNW of Aitken's Hill (see Plan 2). These outcrops may be part of an underlying younger phase or narrow aplite sills within the coarser grained granite. Greizenous alteration is absent in vicinity of these contacts.

Twelve rock samples have been collected of fine and coarse grained granites; these are geochemically similar, Sn 4-30 ppm and W 10-45 ppm.

Alteration zones occur throughout the area, exposures are limited to streams and road cuttings (see Plan 2 and Appendix 2). The dominant minerals in the zones are:

- a) sericite - chlorite - tourmaline; this is the most common assemblage, and is associated with Crane's mineralization.

061

b) quartz-muscovite, quartz-tourmaline, detritus from this predominates in wash from alluvial workings but was only located in outcrop on Kirkham's property. P. Crane has collected cassiterite bearing samples of this greizen type from stream gravels on his lease but there is no indication of its source.

All alteration is joint controlled, steeply dipping, strikes predominantly NNE, usually less than 2m thick although several zones may occur in a 20m interval. Tin values range from detection level to 6800 ppm, tungsten less than 85 ppm and lead-zinc is commonly anomalous. Thickness, continuity and mineralogy of these zones will probably be highly variable.

From stream, rock geochemistry and earlier bedrock prospecting the NNE trending zone in the eastern part of Crane's lease is the most prospective at present in this eight square kilometre area (see Plan 2). Anomalous -10# stream sediments are located to the north of Cranes in an areas of basalt cover; these have probably been shed directly or indirectly (via sub or interbasaltic granite derived gravels) from the above zone. An isolated anomalous stream value of 120 ppm Sn is located at Trial Flats; all others are <20 ppm Sn which is surprising as many of these streams have been worked in the past for alluvial tin. The sampling method may not be effective.

To date the only production of tin has been from alluvial

062

mining; according to "locals" the most extensive areas are now flooded by Lake Kara. Most workings are confined to present stream channels as evidenced by piles of quartz rich detritus adjacent to streams (see Plan 2). The exception is Trial Flats where an extensive layer (less than 1m thick) of gravels has been washed in places. Quartz-tourmaline detritus here is well rounded, indicating an ancient high energy environment, the tin may originate from outside the area.

Production at Crane's has been from stream workings in Crane's Creek and its confluence with Osborne Creek. The open cuts in basalt and underlying granite were made by Crane in an attempt to intersect a north trending and flowing sub-basaltic lead (Plan 2).

Pers com Crane

- a) very little tin was recovered from these, the most extensive workings.
- b) Mines Department drilling of this lead failed to locate economic alluvium or mineralized underlying granite.

This deep lead may be prospective 50-100m further north, downstream from where the tin bearing palaeo channel of Crane's Creek may have entered it.

RECOMMENDATIONS

In this part of the Housetop Granite tin bearing alteration zones of possible economic significance only outcrop at Crane's in an area east of the Tertiary deep lead.

Exposure of this mineralization is confined to Crane's Creek; elsewhere a thin cover of basalt and/or derived soils obscures the granite.

It is proposed that a 7.1 km grid be cut, lines bearing 085° magnetic, base line 355°; the latter to be sited along Crane's eastern property boundary (see Plan 2).

Exploration will be dependent on geochemistry; the mineralization is unlikely to have any geophysical signature, although sulphides may be present in unweathered material.

"B" horizon soils should be augered along lines at 20m intervals and care must be exercised to avoid sampling overlying basalt or sub-basaltic gravels. The -80# soils to be analyzed for Cu, Pb, Zn, As, W and Sn. Pb and Zn may be the best indicators of mineralization (see Appendix 3).

Soil anomalies located would be bed rock augered at 5m intervals and ultimately trenched by backhoe and sampled in detail if this is warranted prior to any diamond drilling.

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APPENDIX 1

SAMPLE BOOKLET LOCATIONS AND BRIEF DESCRIPTIONS

APPENDIX 2

ROCK SAMPLE DESCRIPTIONS

APPENDIX 2

No.	Location	Description
6001	Crane's/Osborne Creek junction	Medium-coarse grained granite, deeply weathered, weak chlorite sericite alteration
6002	700m North of Crane's mill	Sub basaltic lateritic gravels, granite derived
6003	Small stream on eastern side of Crane's property	Medium-coarse grained pink biotite adamellite
6004	Dito 6003	Aplite, approximately 1m wide
6005	200m south of 6003	Fine-medium grained biotite granite
6006	100m north of Crane's mill	Chlorite-tourmaline alteration, adit and trenches
6007	Crane's mill	Aplite - fine grained granite
6008	Ditto 6007	Medium-coarse grained biotite adamellite
6009	65m upstream from 6008	Quartz, chlorite, tourmaline alteration
6010	Crane's, head of SW open cut	Medium-coarse grained granite with weak chlorite-sericite alteration
6011	Ditto 6010	Sericitic alteration 1m wide strikes 165:90 mag.
6012	50m north of 6010	Sericitic alteration
6013	Osborne Creek west of Crane's	Aplite flat lying 2m thick

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## APPENDIX 2

(CONT.)

No.	Location	Description
6014	Ditto 6013	Medium-coarse grained granite
6015	Road cutting 600m SSE of Crane's mill	Medium-coarse grained granite with scattered sericitic alteration zones
6016	Lake Kara 50m east of spillway	Quartz, chlorite, tourmaline alteration in medium-coarse granite
6019	Trial Flats east of Kara forestry road	Medium grained pink granite
6020	Ditto 6019	Mainly a fine grained granite but with abundant micro pegmatitic segregations with minor tourmaline
6024	Creek at head of Lake Kara	Minor tourmaline and sericitization of feldspars
6025	Ditto 6024	Fine grained pink granite, tendency to be feldspar porphyritic
6026	Kirkham's road paddock	Quartz rich alteration of medium grained granite, with minor sericite, chlorite and tourmaline
6027	Spillway Lake Kara	Sericitic alteration of medium grained granite 165° mag. Within a few metres of fine grained granite contact.

068

APPENDIX 3

GEOCHEMICAL ANALYTICAL DATA

4069

**COMLABS Pty. Ltd.**  
COMPUTERISED ANALYTICAL LABORATORIES

285070

Head Office and  
Central Laboratory  
305 SOUTH ROAD,  
MILE END SOUTH  
STH. AUST. 5031  
TEL: (08) 43 5722  
TELEX: AAB9323

NATA REGISTERED No. 1526

*Appendices 25*

REF: COM 831962

NR REF: 4189/MQ03/PAR/101

Mr. P. Ruxton,  
The Shell Co Of Aust. Ltd,  
PO Box 860,  
DEVONPORT. TAS. 7310,

22.9.83

*Cranie Ter  
Rocks  
Stream Samples*

Dear Sir,

RE: JOB COM 831962

Enclosed are the assays for the samples delivered to our  
laboratory on the 9th September, 1983.

Yours sincerely,  
COMLABS PTY LTD

er :

*PR Ruxton*

070

285071


**ANALYTICAL REPORT**

JOB COM831962

O/N : 4189/MQ03/PAR/101

## Results in ppm

SAMPLE	Sn	W	Bi	As	Mo
6001	12	75	4	105	<4 ✓
6002	<4	<10	<4	32	<4
6003	4	40	4	6	4
6004	<4	45	<4	4	4
6005	8	25	<4	7	4
6006	1150	45	<4	<2	4 ✓
6007	8	40	<4	3	6
6008	10	30	<4	3	4
6009	130	15	<4	26	22 ✓
6010	<4	20	4	14	<4
6011	30	65	8	28	4
6012	65	85	6	36	4
6013	4	35	<4	6	4
6014	<4	45	<4	14	6
6015	50	20	60	230	<4
6016	360	<10	240	125	60
6019	8	10	<4	70	<4
6020	14	15	4	60	6
6024	100	20	20	34	4
6025	10	20	<4	16	4
6026	14	35	<4	30	4
6027	38	15	14	30	12
6018	16	10	4	20	<4
6021	120	10	4	12	4
6023	12	<10	<4	9	4

071

285072



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### ANALYTICAL REPORT

JOB COM831962

O/N : 4189/MQ03/PAR/101

Results in ppm

SAMPLE	Sn	W	Bi	As	Mo
6029	14	10	<4	30	4

Method of Analysis : XRF1

072



## ANALYTICAL REPORT

JOB COM831962

O/N : 4189/MQ03/PAR/101

## Results in ppm

SAMPLE	Cu	Pb	Zn	Ag	Au
6001	18	85	34	<1	<0.05
6002	16	<4	50	<1	<0.05
6003	16	4	22	<1	<0.05
6004	6	<4	10	<1	<0.05
6005	10	<4	14	<1	<0.05
6006	4	16	65	<1	<0.05
6007	6	6	8	<1	<0.05
6008	4	<4	20	<1	<0.05
6009	10	140	670	<1	<0.05
6010	8	<4	32	<1	<0.05
6011	4	70	130	<1	<0.05
6012	4	60	210	<1	<0.05
6013	6	<4	18	<1	<0.05
6014	6	<4	10	<1	<0.05
6015	16	170	60	1	<0.05
6016	12	80	240	<1	<0.05
6019	8	10	16	<1	<0.05
6020	6	8	16	<1	<0.05
6024	10	10	16	<1	<0.05
6025	4	<4	8	<1	<0.05
6026	4	16	10	<1	<0.05
6027	150	330	180	<1	<0.05
6018	2	<4	10	<1	<0.05
6021	2	<4	6	<1	<0.05
6023	2	<4	6	<1	<0.05



## ANALYTICAL REPORT

JOB COM831962

O/N : 4189/MQ03/PAR/101

## Results in ppm

SAMPLE	Cu	Pb	Zn	Ag	Au
6029	2	<4	6	<1	<0.05

Method of Analysis : Cu Pb Zn : AAS1  
 Ag : AAS3  
 Au : AAS5A

07A

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PLAN ↓

EH 4/77

Cranes Tin, Lake Kara, Trial Flats

Sample locations

Scale 1:10,000

Key Rock chip samples

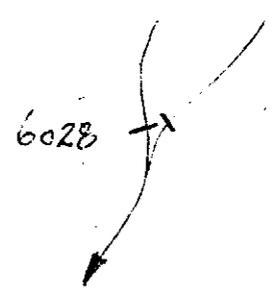
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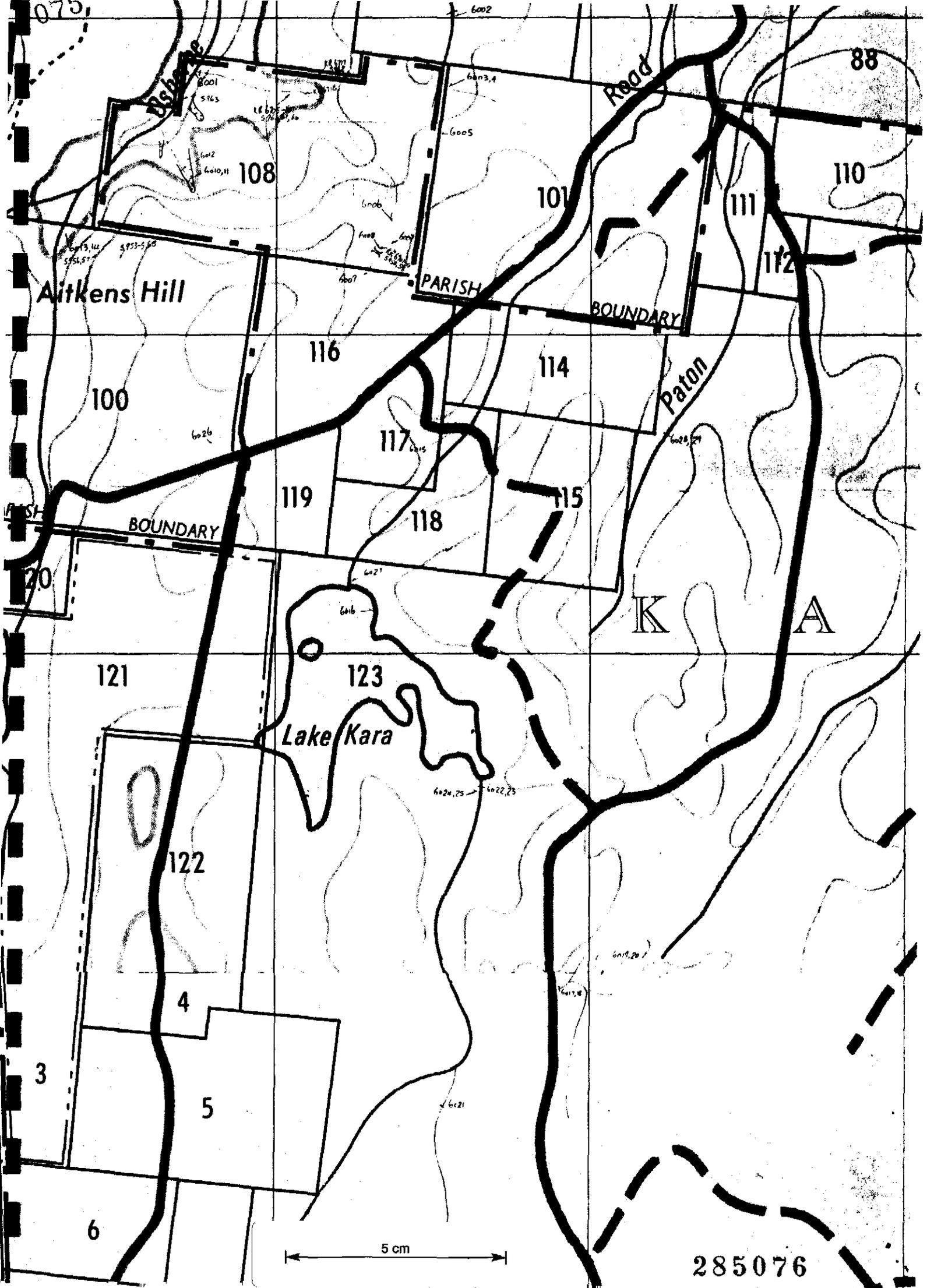
Shell Co 1983

KR 6701 →

Geopoko.

-10# Stream sediments





075

6002

88

108

101

110

111

112

Aitkens Hill

PARISH

BOUNDARY

116

114

100

Paton

6026

117

6028,29

PARISH

BOUNDARY

119

115

120

118

K

A

121

123

Lake Kara

6016

6020,25 6022,23

122

6017,20

4

6018

3

5

6021

6

5 cm

285076

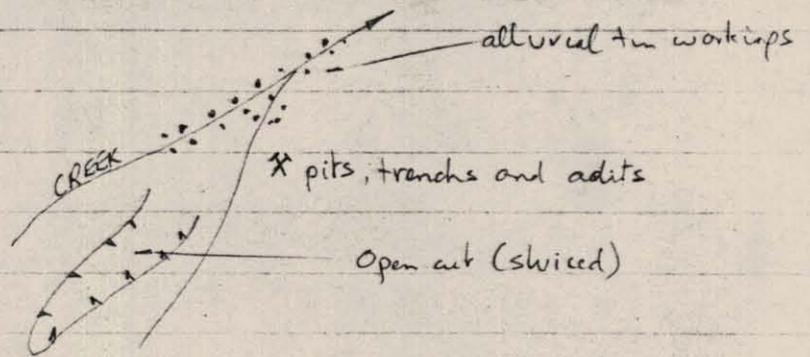
EL 4/77

Cranes Tin, Lake Kara, Trial Flats

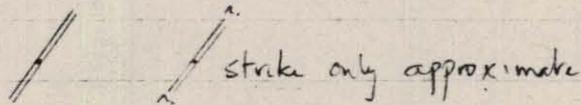
Geology and geochemical data.

Scale 1:10,000

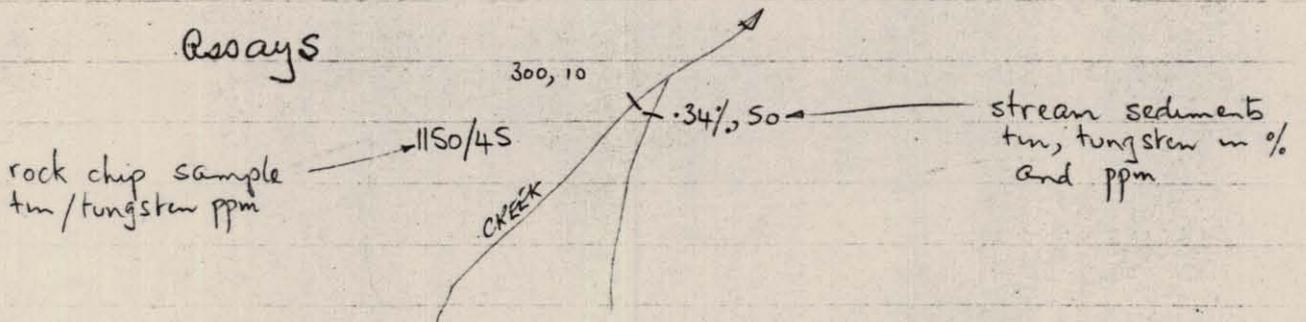
Key Mine workings



alteration zones

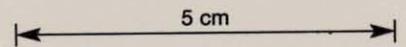


Assays



GEOLOGY.

TERTIARY BASALT



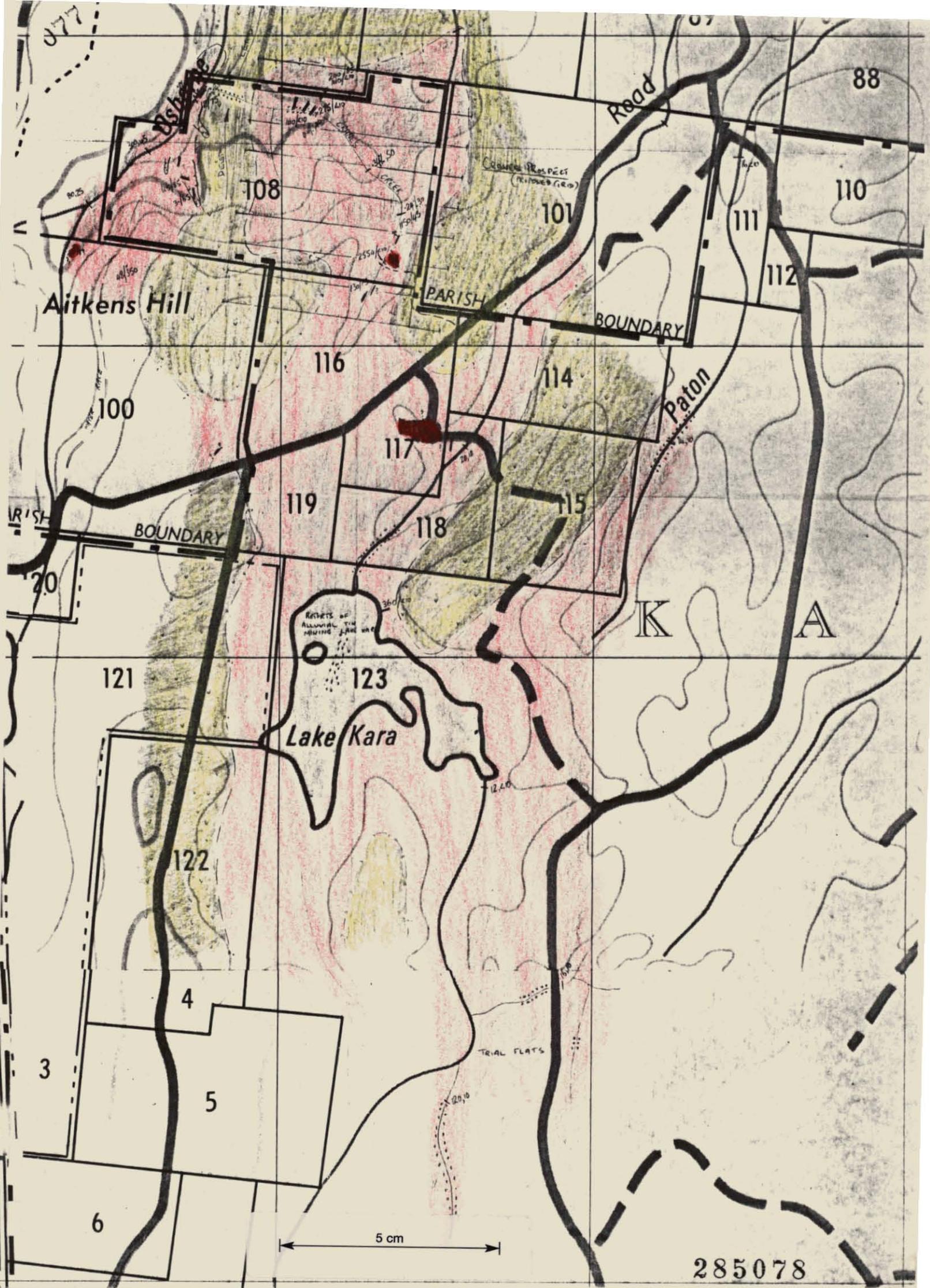
Devonian



Granite/Adamellite medium - coarse grained



Granite fine grained - aplite



Aitkens Hill

PARISH

BOUNDARY

Paton

Lake Kara

TRIAL FLATS

5 cm

285078

078

285079

APPENDIX 3

Log of Drill Hole HG 1

Plus a Petrological Report on 5 Core Samples

# DRILL LOG SHEET

PROJECT: HIGHCLERE .....

Hole No: HG1 .....

COLLAR CO-ORDINATES: 5427 500 m N  
394 400 m E .....

LOCATION CODE: MQ03 .....

COLLAR R.L.: .....

LOCATION: HAMPSHIRE GATE (DUDFIELD ROAD) MAP/PHOTO REFERENCE: HELLYER 1:100 000	DATE STARTED	7-12-82	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	DEVONPORT		
	DATE FINISHED	23-12-82	NON CORE	PERCUSSION	0	85m	85m	NO OF TRAYS			
	TOTAL DEPTH	258.5 m						SAMPLE STORAGE	DEVONPORT		
HOLE SURVEY DATA			LOGGED BY	P.A.RUXTON	CORE	B Q	85 m	258.5m	173.5 m	ASSAY LAB.	COMLABS
INSTRUMENT:			CONTRACTOR	OVERLAND DRILLING CO.						ASSAY REPORTS	DEVONPORT
DEPTH	INSTRUMENT		RIG	SCOUT/WARMAN 250							
COLLAR	VERT.		DRILL CREW		CASING					MIN. & PET. LAB	FANDER
										MIN. & PET. REPORTS	DEVONPORT
					CASING LEFT						

### GRAPHIC / LETTER SYMBOL LOGGING KEY

<input type="checkbox"/>					
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<input type="checkbox"/>					
<input type="checkbox"/>					
<input type="checkbox"/>					
<input type="checkbox"/>					

STRUCTURE / ALTERATION CODE  
 B BEDDING                      O OXIDATION  
 J JOINTING  
 C CLEAVAGE  
 F FOLIATION  
 sh SHEARING  
 q QUARTZ VEINS

DRILLING SUMMARY:

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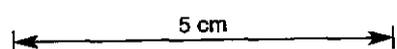
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072

285080

From	To	Inter'l (m)	Core Rec'd	% Rec'd	Sample No	Grap'c Log	Assays										% Estimates		Core Angles		Alt.	T.S. P.S.	Description
0	2				9301	S																Soil and weathered dolerite chips - ferromagnesian minerals weather red (Hornblende)	
						S																	
						S																	
2	4				9302	D																Dolerite - black/grey chips with green hornblend up to 2mm across. Typical Jurassic dolerite.	
						D																	
4	6				9303	D																Dolerite - black/grey - green hornblende up to 3mm across - Jurassic dolerite.	
						D																	
						D																	
6	8				9304	D																Dolerite - black/grey - Hornblende - 10% weathered fragments (to limonite/hematite) water table ≈ 7m	
						D																	
8	10				9305	D																60% Dolerite, 40% weathered dolerite - minor claustone water colour change to dark brown - Dolerite as above weathered material brown/yellow.	
						D																	
						D																	
10	12				9306	D																Dark Brown shale/clay with plant carbonaceous fragments - soft but consolidated 20%, 10% weathered dolerite, 10% dolerite at base of sample.	
						D																	
						D																	
12	14				9307	D																Dolerite - m.g. with visible Hb - minor amygdales filled with blue & white zeolites (-hard)	
						D																	
						D																	
14	16				9308	D																Dolerite - m.g. as above.	
						D																	
						D																	
16	18				9309	D																Dolerite - m.g. Hb - minor red staining in Hb indicative of weathering - only very slight, some Calcite	
						D																	
						D																	
18	20				9310	D																Weathered dolerite - red dolerite with Amygdaloidal fills of green and white zeolites (10%), Red colour reflects Hm staining of ferromagnesian minerals (dominantly Hb) (Some hard chips magnetic!) + Calcite < 1%	
						D																	
						D																	
20	22				9311	D																Dolerite - minor Hm staining with claustone/soapstone (green) - zeolitic nature & some free calcite < 1%	
						D																	
						D																	
22	24				9312	D																Dolerite - partly weathered Hm (15%) Some dark brown shale mudstone particles (10%) minor green zeolites < 2%	
						D																	
						D																	
24	26				9313	D																Weathered dolerite - reddish hue - ferromagnesian minerals altered to Hm - Amygdaloid filled with	

B.14



2005031







084

From	To	Interval (m)	Core Rec'd	% Rec'd	Sample No.	Compos No.	Assays							Weighted Assays/Ratios		% Estimates		Core Angles		T.S. Alt. P.S.	Description
							Sn	M	CaF <sub>2</sub>	Cu	Pb	Zn	Mo	Au							
85.0	81.6																				Predominantly massive green-grey basalt
87.6	90.5																				Strongly vesicular & weathered dk. grey basalt. Some amygdalae
90.5	92.7																				Light brown silt/mud unit with very thin basalt interlayers at 91.6 m (10 cm thick) and 92.5 m (15 cm thick)
92.7	122.5																				Predominantly massive fresh basalt with some vesicles/amygdalae weakly zoned. Some Fe staining bleaching, volcanic.
122.5	124.2																				Lignite/sediments (silt) sand, Basal pebble bed
124.2	143.6																				Predominantly massive grey-green basalt (slightly weathered -> speckled texture) Top of flow (124.8-127.5m) amygdaloidal and strongly weathered
143.6	149.0																				Amygdalae/vesicular basalt at top of interval (weathered) grading downward into massive green/grey basalt
150	151.5																				Strongly vesicular/weathered (partly amyp.) basalt to approx 153.7m. Sediment bands 151.3-151.7m (+ possibly 152.0-152.5m). Mn abundant. Bottom of interval (153.7-151.5m) generally massive green-grey basalt with some zones of small amygdalae (148-150.5m)
151.5	190.5																				Fine sand clay (laminated and thin bedded in part) with thin (2cm) lignitic bands
190.5	202.3																				Top of interval vesicular/weathered basalt to ~ 194.5m then massive mud fresh basalt to 201.5m then amyp. (coarse) to base, strongly weathered at base.
202.3	203.0																				Grey silty? Highly siliceous
203.0	212.0																				Minor strongly weathered basalt (green clay) with small pebbles approx 20cm (at top of interval) then soft sediment conglomerate (tertiary) - f.g. sst. and slit, then bedded f.g. sst (?) to 206.3m then fragmented weathered skarn horizon (as in 'c' horizon profile) becoming fresher with depth but remaining hematite (no magnetite) (core loss)
212.0	231.6																				Becoming massive fresh hematite/magnetite skarn with some strongly weathered geothite layers (core loss)
231.6	232.8																				Strongly weathered hematite skarn -> clay soil (core loss)
232.8	235.2																				Pyrxene-magnetite skarnised sediment (core loss)
235.2	239.8																				M.S.M. sediments (psammite) with only minor pyx-magnetite skarning
239.8	246.0																				Pyrxene-magnetite skarn (variable pyx-magnetite) Magnetite conc. between 243-246m (core loss)
246.0	255.1																				Strongly kaolinitised weathered sediment
255.1	258.5																				Strongly weathered/kaolinitised sericitised granite

202.3

5 cm

Sheet 4 Sheets

285085

085

285086

Central Mineralogical Services



39 Beulah Road  
Norwood, S.A. 5067  
Telephone 42 5659

Mr. J.J. Lawton  
Senior Geologist  
The Shell Co. of Aust. Ltd.  
Metals Division  
P.O. Box 860  
DEVONPORT / TAS. 7310

8th March, 1983

REPORT CMS 83/2/16

YOUR REFERENCE:	Sample Despatch No. 4212/MQ03/JJL/95
DATE RECEIVED:	21st February, 1983
SAMPLE NOS.:	4123 - 4127
SUBMITTED BY:	J.J. Lawton
WORK REQUESTED:	Petrology

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

REPORT CMS 83/2/16

## HAMPSHIRE GATE DDH HG 1

Five drill core samples were received for petrological examination; thin-sections were prepared, K-stain tests were carried out where appropriate, and all offcuts were checked under short-wave UV for the presence of scheelite.

Summary

All the rocks are metasediments and at least three of them are skarns with abundant Ca-garnet, indicating a calcareous (limestone) origin. 4123 is a hornfels, probably originally an argillaceous siltstone or conceivably an argillaceous dolomitic chert, and 4126 is a thoroughly argillised metasediment whose original or fresh metamorphic composition is not known, but it is inferred to have been a banded calc-silicate derived from an impure carbonate sediment.

Thus, the suite represents a series of pyrometasomatised sediments ranging from argillaceous ?siltstone through limestone, to banded limestone and impure laminated carbonates, back to limestones.

H.W. Fander, M. Sc.

Sample No.	Rock Type - Composition	Fabric	Minor Minerals	Comments
4 23 (T.S. 45273)	<u>Hornfels</u> . Mainly microcrystalline quartz and K-feldspar; many small diopside aggregates replacing carbonate; fine pyrrhotite throughout. DDW 461 202.8 m	Fine-grained, uniform; relict bedding preserved through grainsize changes.	A few prehnite patches; chlorite replacing calc-silicates.	A thoroughly re-organised ?siltstone, perhaps more pyrometasomatised than contact-metamorphosed.
4 24	<u>Garnet Skarn</u> . Originally massive garnet (grossularite-andradite) now laced with networks of carbonate-limonite veinlets. 238.0 m	Massive, medium-grained, crystalline; structureless; microfractured.	Scattered quartz patches and veinlets.	Typical virtually monomineralic skarn (when fresh), presumably representing metasomatised limestone.
+ 25	<u>Garnet-Magnetite Skarn</u> . Mostly granular grossularite-andradite garnet, with discontinuous bands of magnetite. Partly argillised. 243.4 m	Medium-grained, crudely but distinctly banded.	Patches of fine illite-sericite - pale yellow colour.	Banding probably reflects compositional variations in original rock (banded limestone?)
+ 26	<u>Argillised Metasediment</u> . Patches, lenses of fine kaolinite in finely banded mass of fine quartz and ferruginous clay, with limonite patches, streaks. 251.0 m	Poorly defined poikiloblastic textures; banding probably sedimentary.	Scattered irregular crystals of almost colourless tourmaline (dravite).	Nature of original rock not known, but presumed laminated siltstone; contact-metamorphosed and then argillised.
+ 27 T.S. 45277)	<u>Garnet Skarn</u> . Consists virtually entirely of granular pale garnet (grossularite), with intergranular argillic alteration. 257.0 m	Medium-grained, massive and structureless.	Very small (< 50 $\mu$ ) inclusions of diopside and sphene in garnet.	Featureless monomineralic rock. Small "sphene" grains almost indistinguishable from cassiterite - assay check recommended.

480

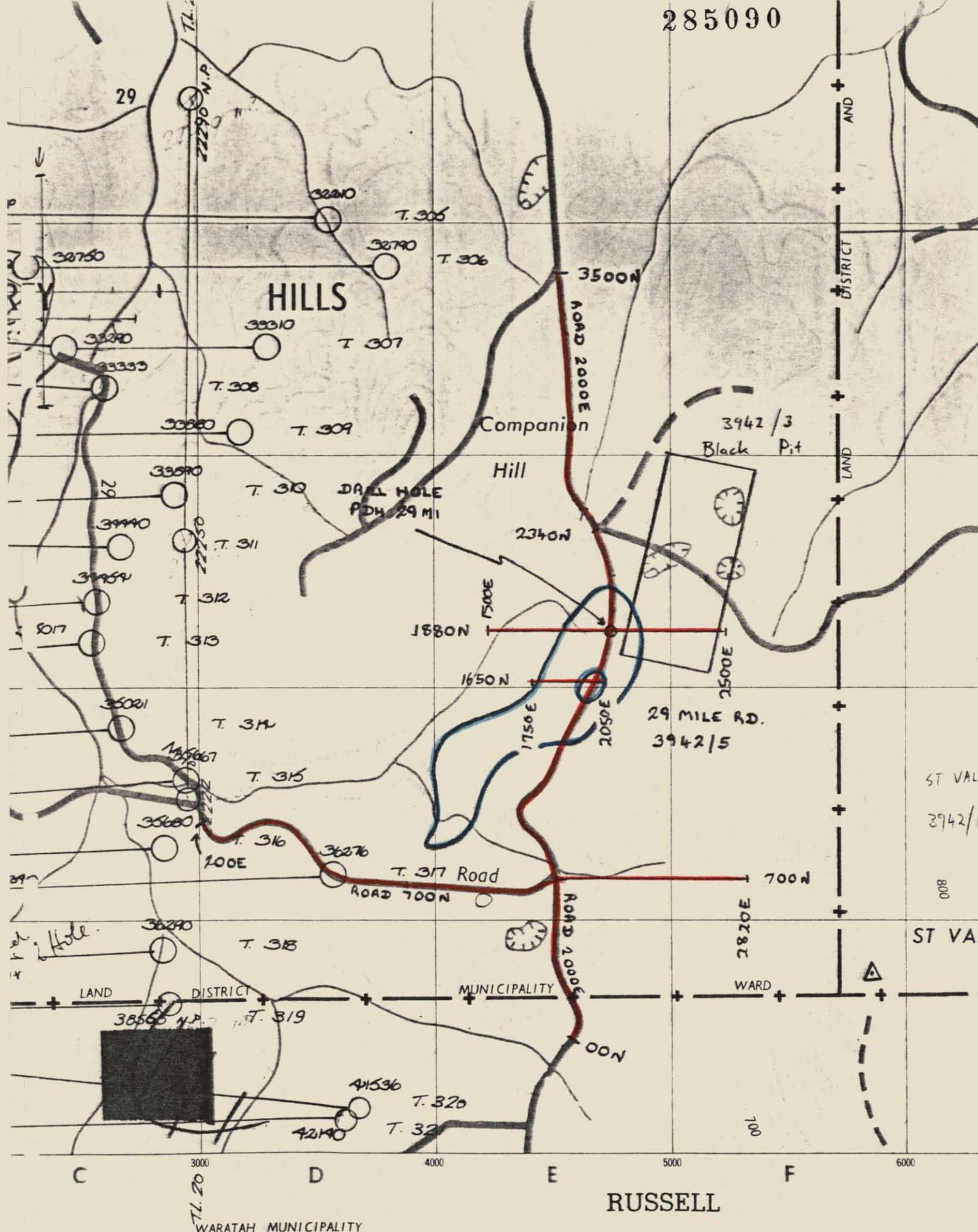
285088

068

285089

APPENDIX 4

Location of 29 Mile Road Aeromagnetic Anomaly 3942/5  
Plus Stacked Magnetic Profiles



HILLS

Companion Hill

3942/3 Black Pit

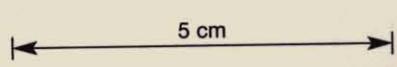
DRAIN HOLE PDH 29 MI

29 MILE RD. 3942/5

RUSSELL

PORTION OF CADASTRAL SHEET

20/3942





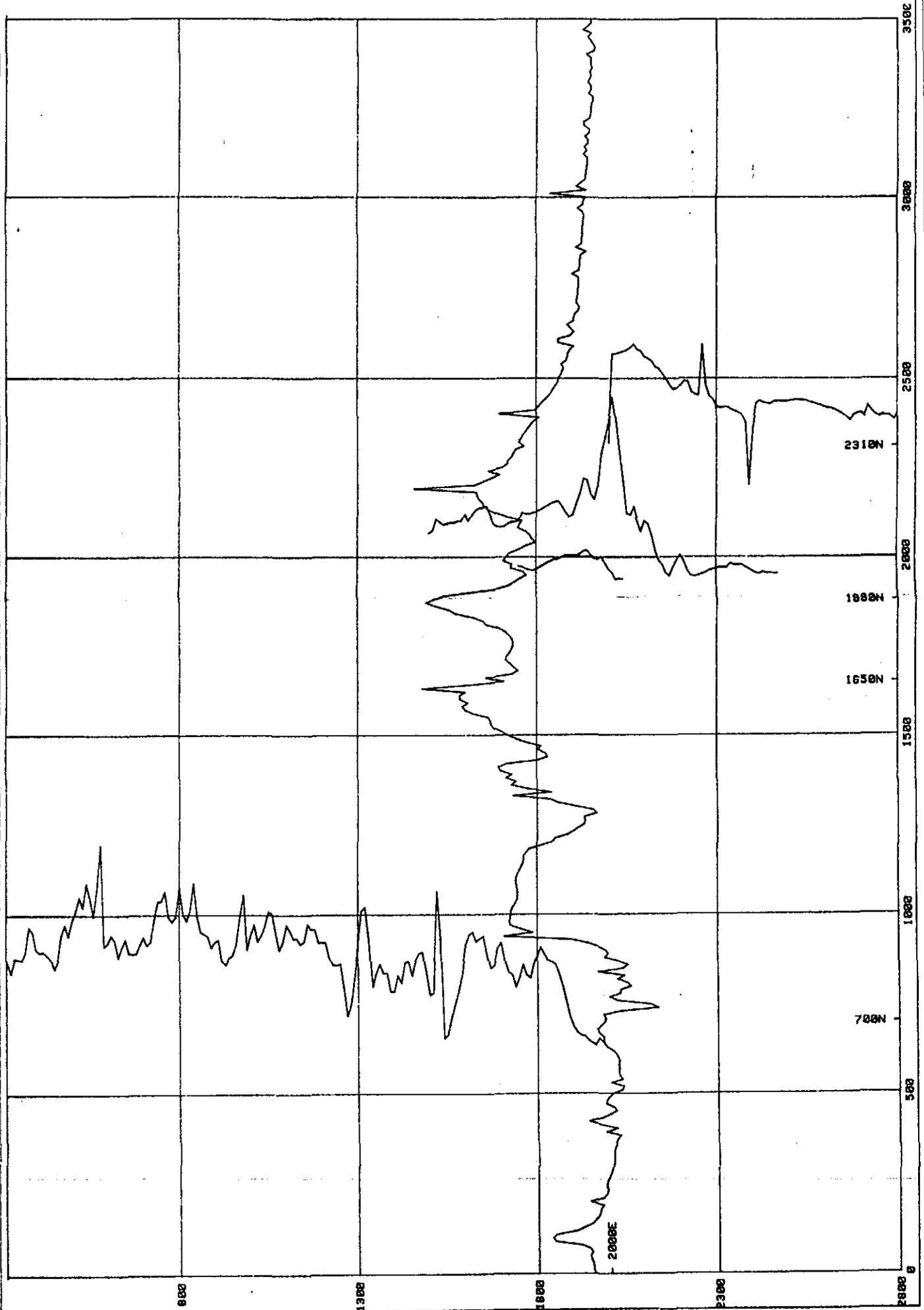
SHELL COMPANY OF AUSTRALIA  
METALS DIVISION

GUILDFORD E.L., TAS  
29 MILE RD. 3942/3  
TOTAL FIELD  
MAGNETICS

DISTANCE SCALE : 100 M/CM  
READING SCALE : 200 /CM  
BASE READING : 62000

090

5 cm



285091

APPENDIX 5

Log of Drill Hole PDH 29 MI



Depth	To	Interval (m)	Core Rec'd	% Rec'd	Sample No.	Diamond No.	Assays								Weighted Assays			% Sulphates	Core Angles	Mag. Readings	Description
							Sn	W	Ni	Cu	Pb	Zn	Mo	Ag							
0	2	PERCUSSION			4427		34	50	18	34	8	34	6	<0.05				5	Tuffs weathered, composed predominantly of feldspar crystals.		
2	4				4428		20	50	10	18	4	28	6	<0.05				5	Thin tourmaline veins.		
4	6				4429		26	30	6	16	4	40	8	<0.05				5			
6	8				4430		36	45	28	10	4	80	6	<0.05				27.50	FINE GRAINED TUFFACEOUS SEDIMENTS - Siliceous hornfelsed		
8	10				4431		18	25	50	85	<4	44	8	<0.05				25.00	with minor tourmaline veins Pyrite <5% confined to joint		
10	12				4432		28	25	48	28	<4	48	8	<0.05				15.00	faces, occurring throughout these sediments. Minor		
12	14				4433		18	10	46	30	<4	60	8	<0.05				47.50	kaolinization between 54-60m.		
14	16				4434		34	35	46	22	<4	35	8	<0.05				15.00			
16	18				4435		18	20	50	38	<4	90	10	<0.05				27.50	N.B. Hornfels varying only in colour grey-black, darker		
18	20				4436		20	10	60	42	4	80	10	<0.05				30.00	intervals corresponding to higher magnetic readings		
20	22				4437		12	<10	60	65	6	100	6	<0.05				30.00			
22	24				4438		10	40	60	46	55	400	20	<0.05				2.00			
24	26				4439		16	45	48	60	40	360	20	<0.05				70			
26	28				4440		12	30	65	28	8	185	6	<0.05				19.00			
28	30				4441		24	10	70	40	8	120	8	<0.05				20.00			
30	32				4442		16	<10	60	36	6	100	8	<0.05				20.00			
32	34				4443		30	35	50	110	16	130	6	<0.05				7.00			
34	36				4444		30	10	50	75	8	110	6	<0.05				20.00			
36	38				4445		46	40	46	160	26	210	4	<0.05				300			
38	40				4446		36	30	48	130	22	170	4	<0.05				300			
40	42				4447		44	35	55	150	20	300	8	<0.05				100			
42	44				4448		34	20	60	70	28	200	12	<0.05				300			
44	46				4449		36	30	60	44	20	200	8	<0.05				300			
46	48				4450		14	25	60	110	20	180	6	<0.05				300			
48	50				4451		10	<10	60	60	4	48	8	<0.05				9.50			
50	52				4452		12	10	60	65	<4	40	6	<0.05				12.00			
52	54				4453		12	<10	60	75	<4	46	6	<0.05				12.00			
54	56				4454		12	<10	60	55	<4	40	4	<0.05				14.00			
56	58				4455		14	<10	65	65	<4	42	6	<0.05				15.00			
58	60				4456		8	25	60	55	<4	55	8	<0.05				20.00			
60	62				4457		20	<10	50	100	4	80	6	<0.05				20.00			
62	64				4458		18	<10	60	70	<4	50	8	<0.05				10.00			
64	66				4459		12	10	60	100	4	40	8	<0.05				3.50			
66	68				4460		16	10	55	55	4	28	<4	<0.05				12.00			
68	70				4461		10	<10	60	50	4	48	8	<0.05				15.00			

285094

09A

# SHELL COMPANY OF AUSTRALIA LTD.

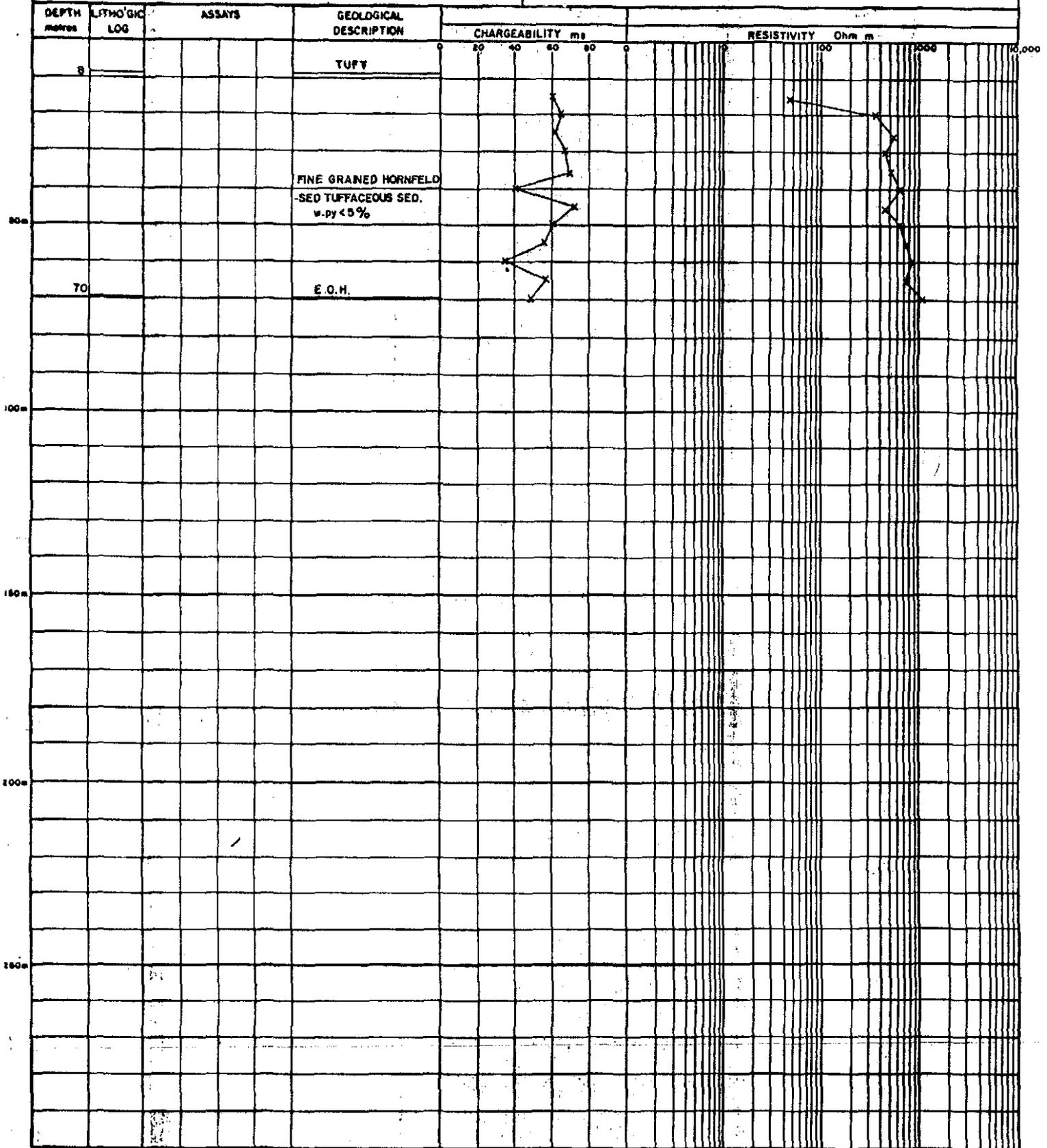
## Geophysical Log

285095

PAGE.....OF.....PAGES

DIAMOND DRILL HOLE N° P.D.H.

PROJECT	HIGHCLERE E.L.	STATE	TASMANIA	IP / RESISTIVITY LOGGING	
ANOMALY N°	3942/3 (29 MILE RD)	GRID COORDS	1880N 2000E	CONTRACTOR	SCOA
INCLINATION	VERTICAL	AZIMUTH		DATE LOGGED	16 / 11 / 83
DATE DRILLED	NOV 83	TOTAL DEPTH	700 m	ARRAY	3 - ARRAY
CASING				SUSCEPTIBILITY LOGGING	
				BY	DATE LOGGED
GROUND GEOPHYSICAL ANOMALIES : MAGNETIC , CHARGEABILITY					



285096

D. of M.	A.O.	C.G.	E.O.	D.S.I.
				Registrar
D. DIR.				E & IL
- 8 OCT 1984				
DEPT. OF MINES				
REF. No. 1034084				

<u>Drawing No.</u>	<u>Title</u>	<u>Scale</u>
D/MQ 03/030	E.L. 4/77 Highclere - Geology	1:50 000
D/MQ 03/075	Highclere, Tasmania - EM Anomaly Map Sheet 20/4043	1:20 000
D/MQ 03/076	Highclere, Tasmania - EM Anomaly Map Sheet 20/3943	1:20 000
D/MQ 03/077	Highclere, Tasmania - EM Anomaly Map Sheet 20/3944	1:20 000
D/MQ 03/042	Input Anomaly 3943/IH1 - Initial Ground Check	1:2 500
D/MQ 03/043	Input Anomaly 3943/IH2 & 3943/IH2A - Initial Ground Check - North Line	1:2 500
D/MQ 03/044	Input Anomaly 3043/IH2 - Initial Ground Check South Line	1:2 500
D/MQ 03/040	Input Anomaly 3943/IH4 - Initial Ground Check South Line	1:2 500
D/MQ 03/041	Input Anomaly 3943/IH4 - Initial Ground Check North Line	1:2 500
D/MQ 03/070	IH4 - Line 00N Max-Min & Magnetics	1:2 500
D/MQ 03/071	IH4 - Line 200N Max-Min, Magnetics & IP/Resistivity	1:2 500
D/MQ 03/072	IH4 - Line 400N Max-Min & Magnetics	1:2 500
D/MQ 03/049	Input Anomaly 3943/IH5 - Initial Ground Check	1:2 500
D/MQ 03/067	IH5 - Guide River North Line 200S - Max-Min Ground Magnetics	1:2 500
D/MQ 03/061	IH5 - Guide River North Line 00N - Max-Min, Ground Magnetics & IP/Resistivity	1:2 500
D/MQ 03/060	IH5 - Guide River North Line 200N - Max-Min & Ground Magnetics	1:2 500
D/MQ 03/050	Input Anomaly 3943/IH6 - Initial Ground Check	1:2 500
D/MQ 03/048	Input Anomaly 3943/IH7 - Initial Ground Check	1:2 500
D/MQ 03/051	Input Anomaly 3943/IH8 - Initial Ground Check	1:2 500
D/MQ 03/059	IH9 - Falls Road Line 1300N - Max-Min & Ground Magnetics	1:2 500
D/MQ 03/058	IH9 - Falls Road Line 1400N - Max-Min, Ground Magnetics & IP/Resistivity	1:2 500
D/MQ 03/057	IH9 - Falls Road Line 1500N - Max-Min & Ground Magnetics	1:2 500
D/MQ 03/073	IH10 - Line 4100E - Max-Min & Magnetics	1:2 500
D/MQ 03/068	IH10 - St. Joseph's Road - Line 4500E, Max-Min & Magnetics	1:2 500

MICROFILMED

MICROFILMED

OPEN FILE

List of Plans Cont.

<u>Drawing No.</u>	<u>Title</u>	<u>Scale</u>
D/MQ 03/074	IH10 - Line 4650E, Max-Min, Magnetics & IP/ Resistivity	1:2 500
D/MQ 03/069	IH10 - St. Joseph's Road Line 4750E - Max-Min & Magnetics	1:2 500
D/MQ 03/090	E.L. 4/77 Highclere Dudfield Road - Magnetic Profile	1:5 000
D/MQ 03/092	Dudfield Road - IP & Magnetics	1:10 000
D/MQ 03/089	Dudfield Road - Section through Drill Hole PDH/ DDH HG 1	1:1 000
D/MQ 03/064	IL5 - Blythe Gate Line 200S, Max-Min & Ground Magnetics	1:2 500
D/MQ 03/062	IL5 - Blythe Gate Line 100S, Max-Min, Ground Magnetics & IP/Resistivity	1:2 500
D/MQ 03/063	IL5 - Blythe Gate Line 00N, Max-Min & Ground Magnetics	1:2 500
D/MQ 03/094	29 Mile Road IP/Resistivity Survey	1:5 000
D/MQ 03/100	29 Mile Road, PDH 29MI	1:5 000
D/MQ 03/097	29 Mile Road, Soil Geochemistry Sn, W	1:5 000
D/MQ 03/098	29 Mile Road, Soil Geochemistry Cu, Pb, Zn, Ni	1:5 000

**LEGEND**

**Quaternary**

- Alluvium
- Talus

**Permo-Carboniferous**

- Sandstone, siltstone, shale

**Devono-Silurian**

- Bell L'ite
- Florence sandstone
- Magnetite rich slates

**Ordovician**

- Limestone
- Sandstone
- Conglomerate

**Cambrian**

- Limestone, mudstone
- Acid/intermediate volcanics and sediments

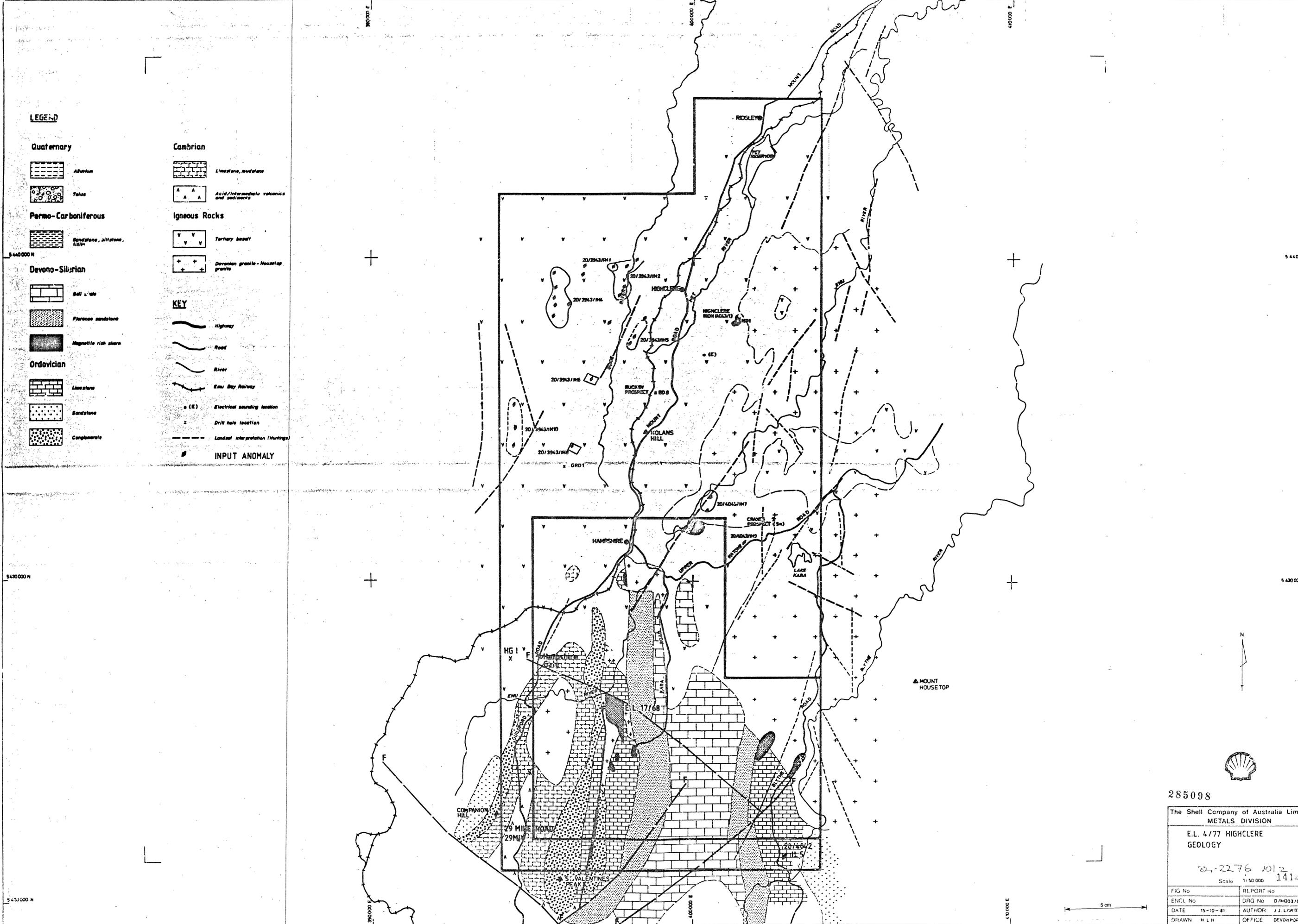
**Igneous Rocks**

- Tertiary basalt
- Devonian granite - Mountop granite

**KEY**

- Highway
- Road
- River
- Eru Bay Railway
- Electrical sounding location
- Drill hole location
- Land use interpretation (Hurlings)

**INPUT ANOMALY**



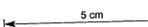
285098

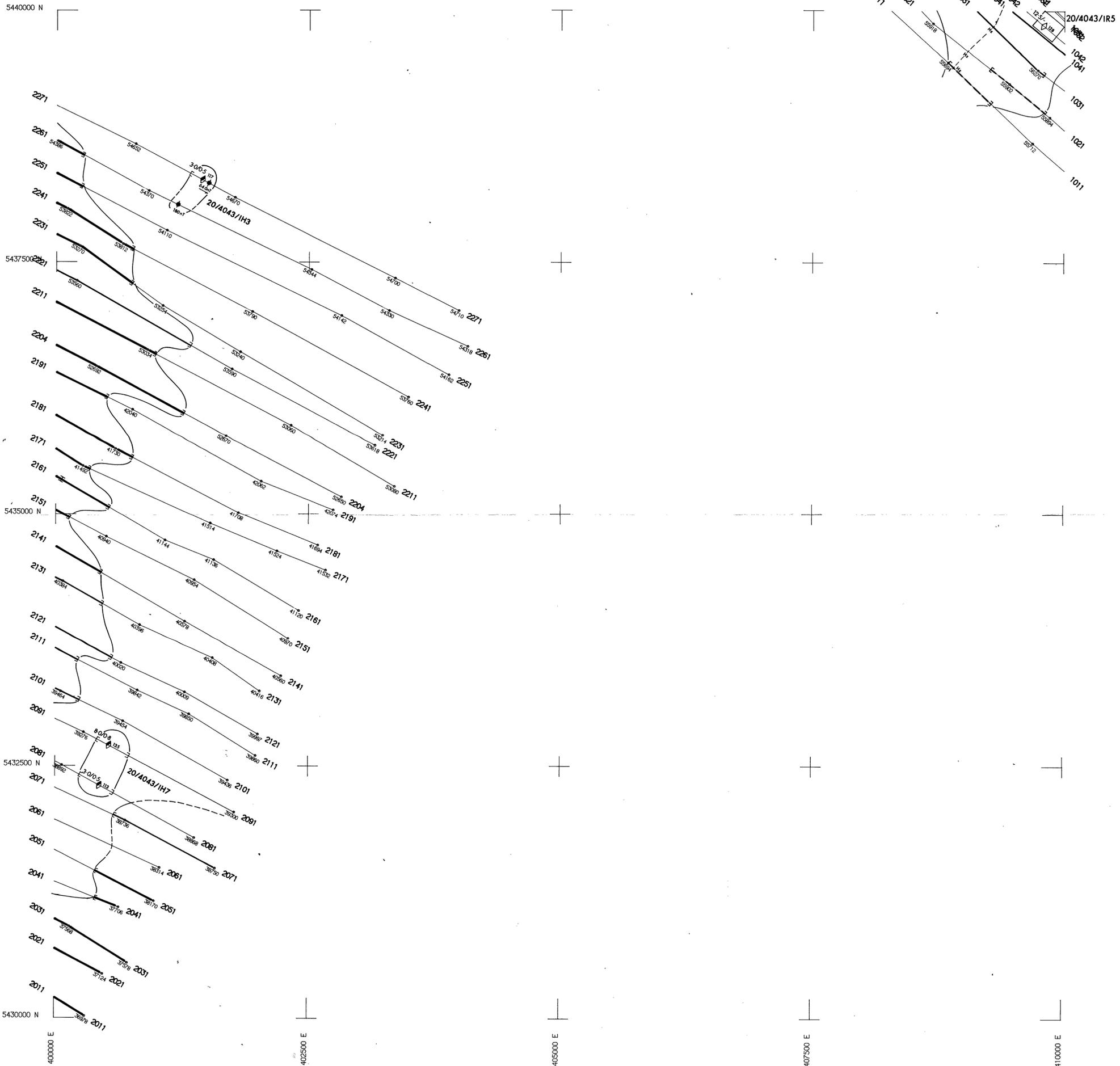
The Shell Company of Australia Limited  
METALS DIVISION

E.L. 4777 HIGHCLERE  
GEOLOGY

84-2276 vol 2  
Scale 1:50 000 1412

FIG No	REPORT No
ENCL No	DRG No D/MQ03/030
DATE 15-10-81	AUTHOR J J L/M/EM
DRAWN H L H	OFFICE DEVONPORT





AIRBORNE SURVEY SPECIFICATIONS

EM SYSTEM : INPUT MARK V  
 Channel centres: 500, 700, 900, 1200, 1600 and 2100 microseconds after transmitter switch off.

EM RECORDING INTERVAL : 0.2 sec (approx 13 metres)

MAGNETOMETER : Geometrics G803, sensitivity 1.0nT.

MAG RECORDING INTERVAL : 1.0 sec (approx 60 metres)

DATA RECORDING : Geotrex Madacs system, digital to mag tape

NOMINAL SPEED : mean ground speed 220 km per hour.

NOMINAL TERRAIN CLEARANCE : Mag and spectrometer in aircraft at 120m.  
 EM transmitter in aircraft at 120m.  
 EM detector in bird at 40m.

FLIGHT PATH RECORD : Geocam continuous 35mm tracking camera

NOMINAL LINE SPACING : Traverses 300m SE-NW, tie lines not flown

E.M. ANOMALY MAP

Sheet 20/4043  
 Grid notation refers to Australian Map Grid  
 Path recovery digitized from 1:20000 topo maps

Large 6 channel response

6 channel response

5 channel response

4 channel response

3 channel response

2nd & 5th channel amplitudes

Altitudes (metres)

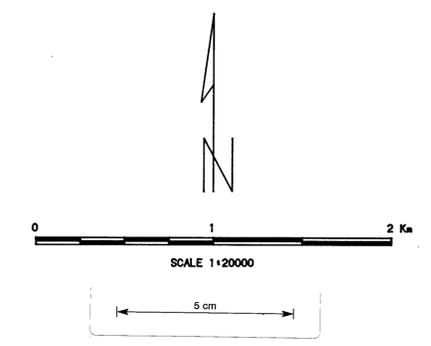
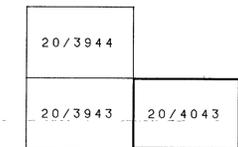
Offset magnetic anomaly

Hertz response

Zone number

Conductor boundary

Inferred boundary



285099

JOB NO : 83-548  
 Flown by GEOTERREX PTY LTD : JANUARY 1982  
 Compiled by EXPLORATION COMPUTER SERVICES PTY LTD

THE SHELL COMPANY OF AUSTRALIA LIMITED

HIGHCLERE, TASMANIA  
 E.M. ANOMALY MAP  
 SHEET 20/4043

84-2276 vol 2

1413

PROJ NO. : D/M Q03/075 DATE: 3-MAR-82

5440000 N

5437500 N

5435000 N

5432500 N

5430000 N

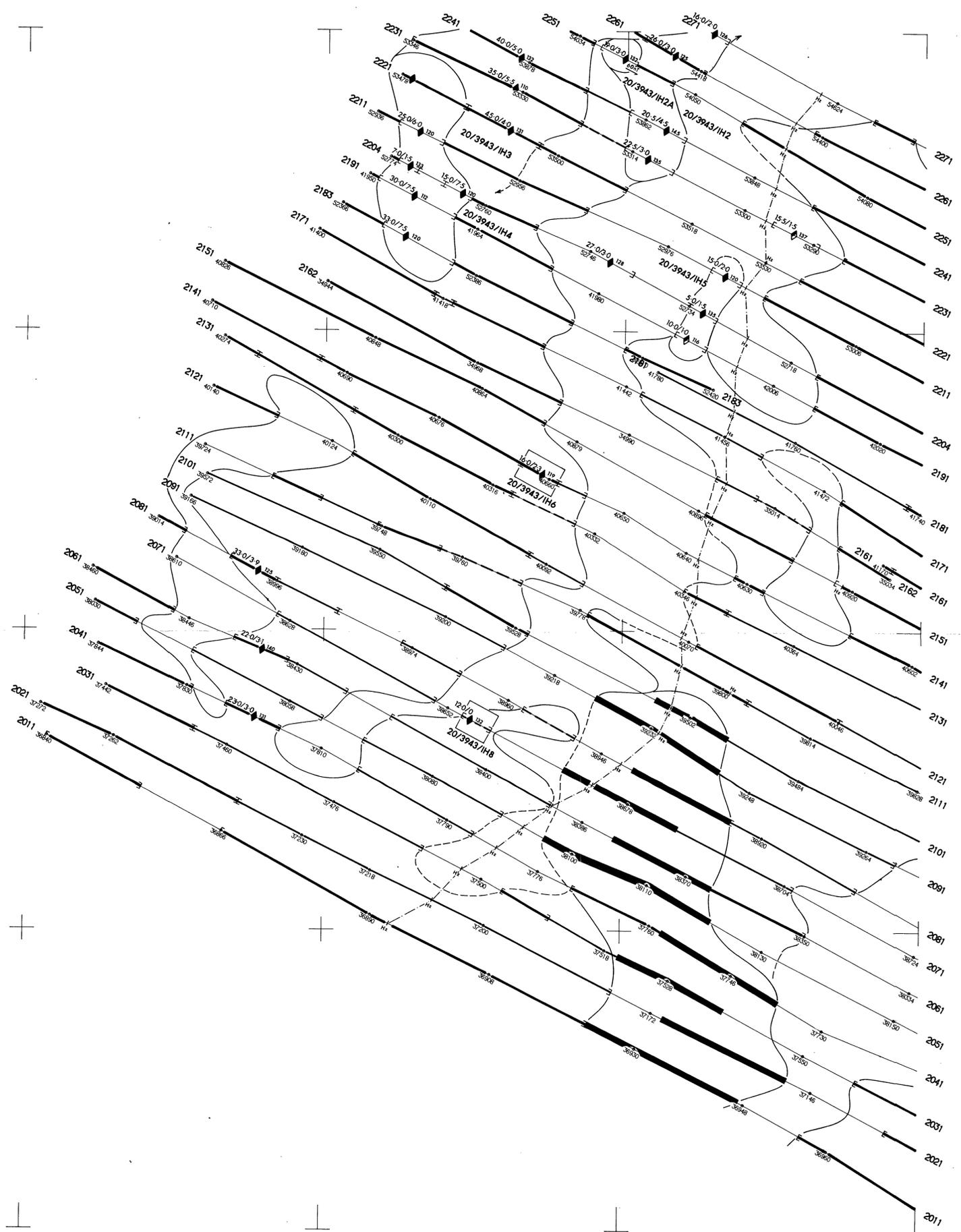
390000 E

392500 E

395000 E

397500 E

400000 E



### AIRBORNE SURVEY SPECIFICATIONS

EM SYSTEM : INPUT MARK V  
 Channel centres: 500, 700, 900, 1200, 1600 and 2100 microseconds after transmitter switch off.

EM RECORDING INTERVAL : 0.2 sec (approx 13 metres)  
 MAGNETOMETER : Geometrics G803, sensitivity 1.0nT.  
 MAG RECORDING INTERVAL : 1.0 sec (approx 60 metres)  
 DATA RECORDING : Geotrex Madacs system, digital to mag tape  
 NOMINAL SPEED : mean ground speed 220 km per hour.  
 NOMINAL TERRAIN CLEARANCE : Mag and spectrometer in aircraft at 120m.  
 EM transmitter in aircraft at 120m.  
 EM detector in bird at 40m.

FLIGHT PATH RECORD : Geocam continuous 35mm tracking camera  
 NOMINAL LINE SPACING : Traverses 300m SE-NW, tie lines not flown

### E.M. ANOMALY MAP

Sheet 20/3943  
 Grid notation refers to Australian Map Grid  
 Path recovery digitized from 1:20000 topo maps

Large 6 channel response

6 channel response

5 channel response

4 channel response

3 channel response

2nd & 5th channel amplitudes 10/1.0

Altitudes (metres)

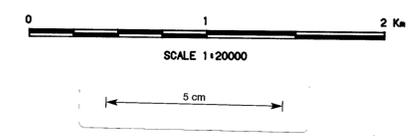
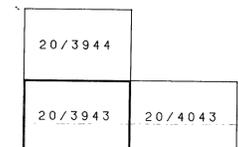
Offset magnetic anomaly

Hertz response

Zone number

Conductor boundary

Inferred boundary



JOB NO : 83-548  
 Flown by GEOTERREX PTY LTD : JANUARY 1982  
 Compiled by EXPLORATION COMPUTER SERVICES PTY LTD

**285100**

84-2276 vol 2

THE SHELL COMPANY  
 OF AUSTRALIA LIMITED

HIGHCLERE, TASMANIA  
 E.M. ANOMALY MAP  
 SHEET 20/3943

1414

PROJ NO. D/M Q03/076      DATE:      3-MAR-82

5450000 N

5447500 N

5445000 N

5442500 N

5440000 N

390000 E

392500 E

395000 E

397500 E

400000 E

### AIRBORNE SURVEY SPECIFICATIONS

EM SYSTEM : INPUT MARK V  
 Channel centres: 500, 700, 900, 1200, 1600 and 2100 microseconds after transmitter switch off.

EM RECORDING INTERVAL : 0.2 sec (approx 13 metres)

MAGNETOMETER : Geometrics G803, sensitivity 1.0nT.

MAG RECORDING INTERVAL : 1.0 sec (approx 60 metres)

DATA RECORDING : Geotrex Madacs system, digital to mag tape

NOMINAL SPEED : mean ground speed 220 km per hour.

NOMINAL TERRAIN CLEARANCE : Mag and spectrometer in aircraft at 120m.  
 EM transmitter in aircraft at 120m.  
 EM detector in bird at 40m.

FLIGHT PATH RECORD : Geocam continuous 35mm tracking camera

NOMINAL LINE SPACING : Traverses 300m SE-NW, tie lines not flown

### E.M. ANOMALY MAP

Sheet 20/3944  
 Grid notation refers to Australian Map Grid  
 Path recovery digitized from 1:20000 topo maps

Large 6 channel response

6 channel response

5 channel response

4 channel response

3 channel response

2nd & 5th channel amplitudes

Altitudes (metres)

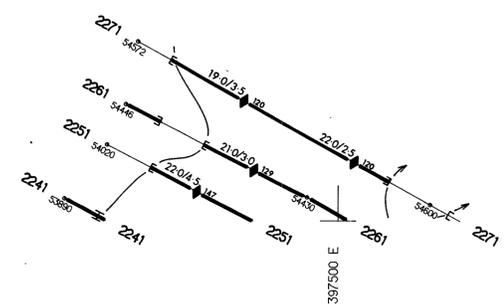
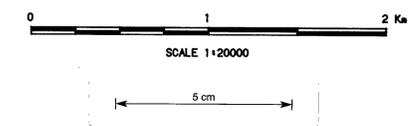
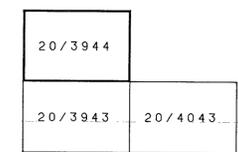
Offset magnetic anomaly

Hertz response

Zone number **20/3943/1H1**

Conductor boundary

Inferred boundary



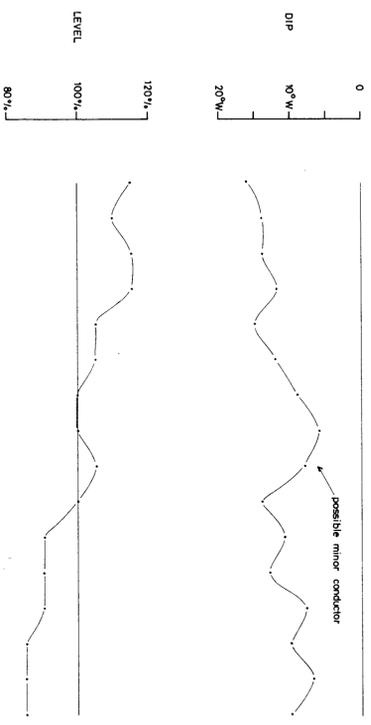
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 Compiled by EXPLORATION COMPUTER SERVICES PTY LTD

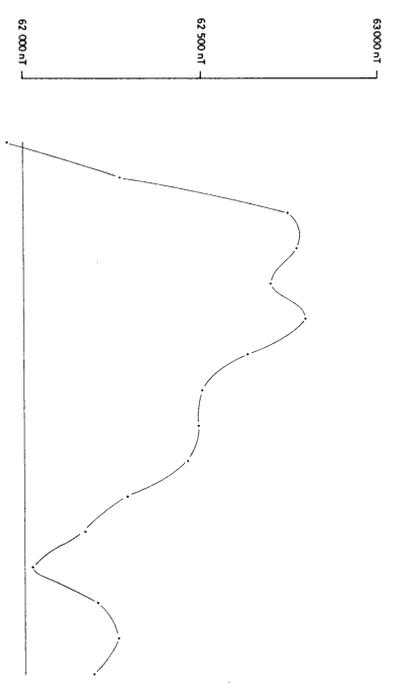
THE SHELL COMPANY OF AUSTRALIA LIMITED	
84-2276 vol 2	
HIGHCLERE, TASMANIA E.M. ANOMALY MAP SHEET 20/3944	
1415	
PROJ NO. D/M 003/077	DATE: 3-MAR-82

100 W 00 E 100 E 200 E 300 E

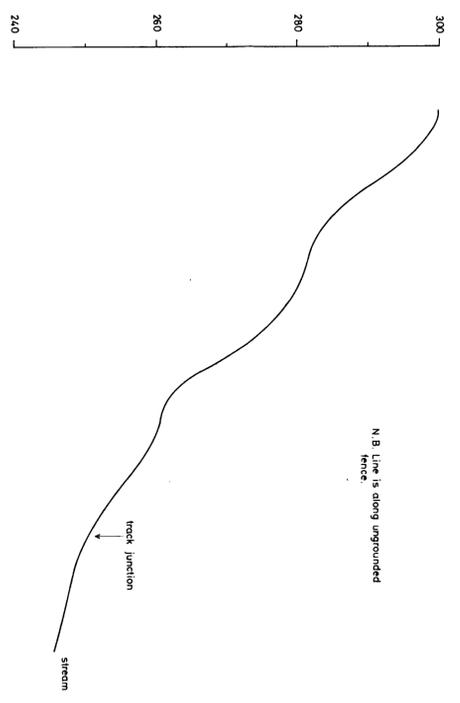
VLF-EM  
(JAPAN TRANSMITTER)



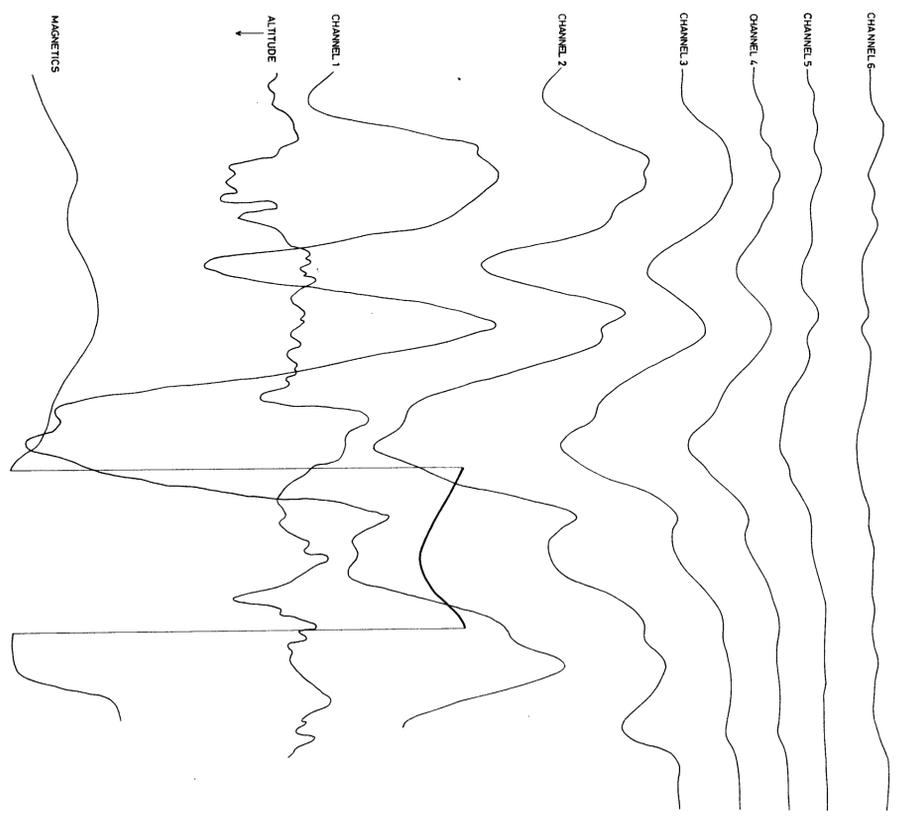
MAGNETICS



APPROX. TOPOGRAPHY  
& CULTURE (From A.S.L.)



INPUT LINE 2231

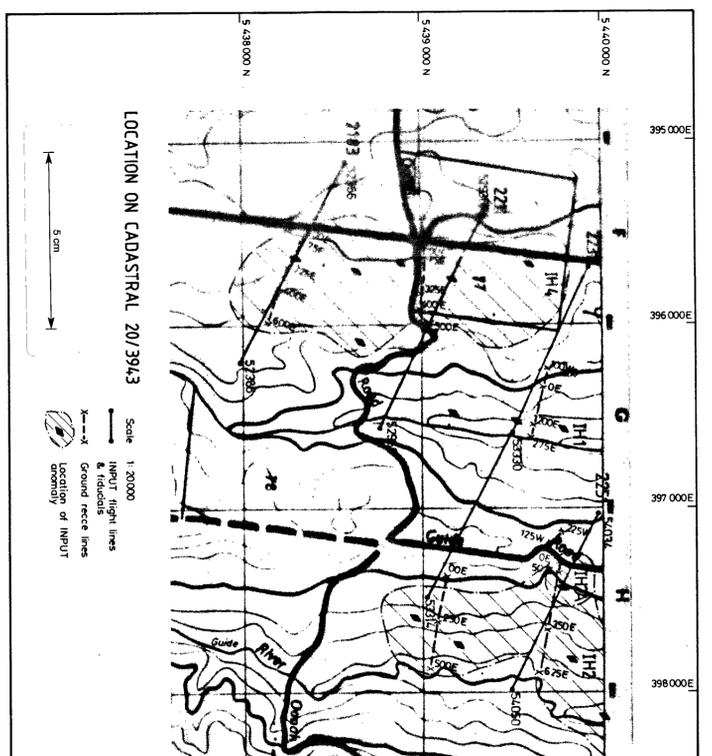
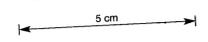


SE 5300 IH2 IH1 5350 NW



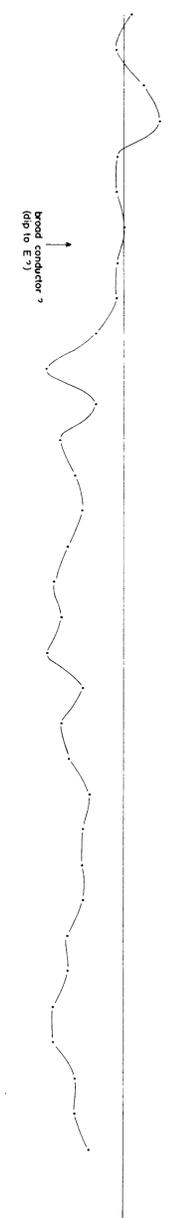
The Shell Company of Australia Limited METALS DIVISION			
E.L. 4/77 HIGHCLERE INPUT ANOMALY 3943/IH1 INITIAL GROUND CHECK			
8L-2276 vol 2		1416	
SCALE	1: 2500	DATE	12-7-82
AUTHOR	G. OAKES	DRAWN	H. L. H.
OFFICE	DEVONPORT	REP. No.	
ENCL. No.		DRG. No.	D/MG03/042

285102

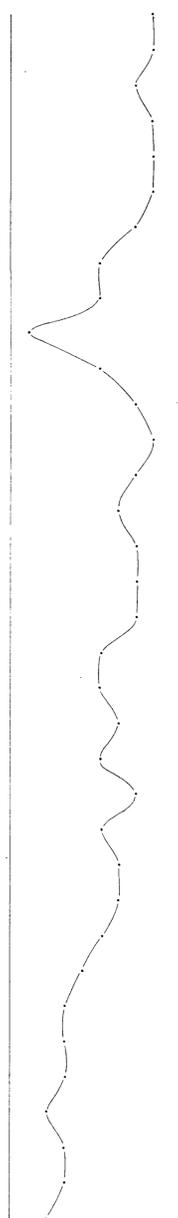


200 W 100 W 00 E 100 E 200 E 300 E 400 E 500 E 600 E

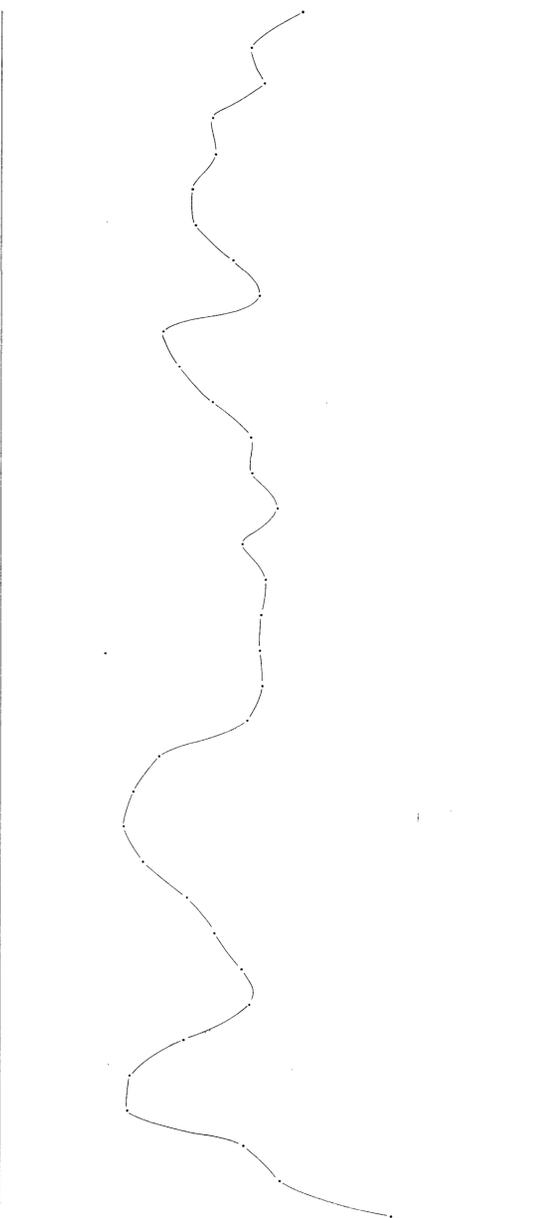
V.L.F.-EM  
(JAPAN TRANSMITTER)



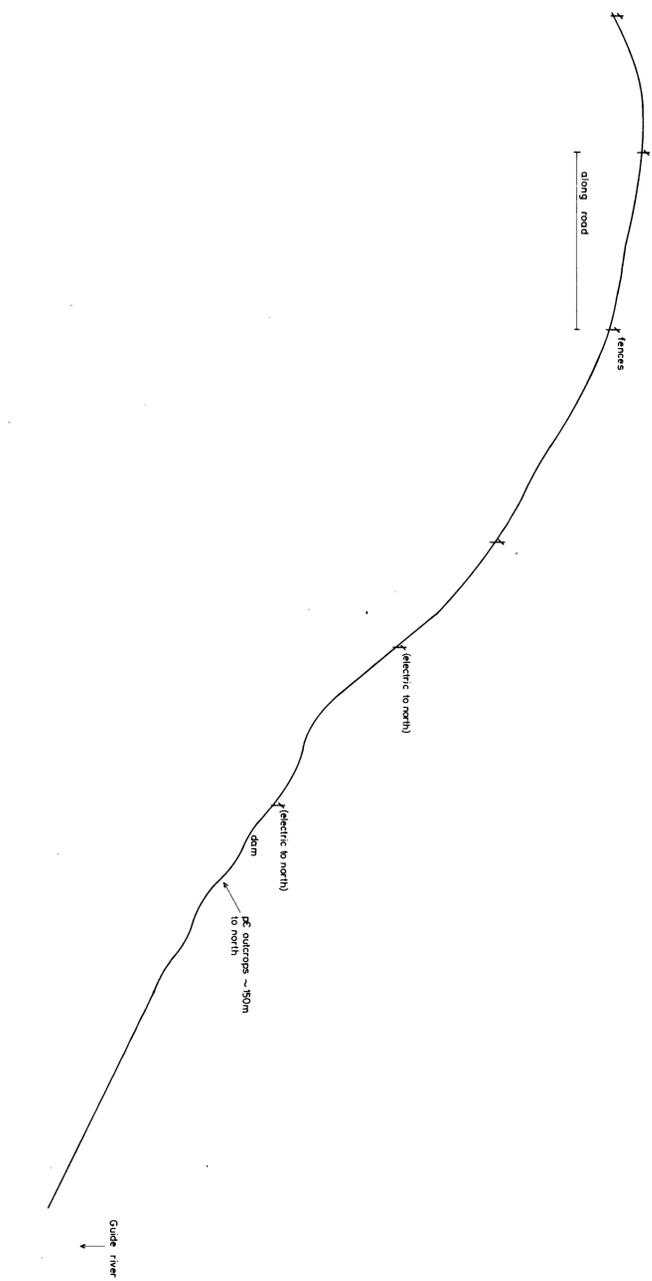
LEVEL



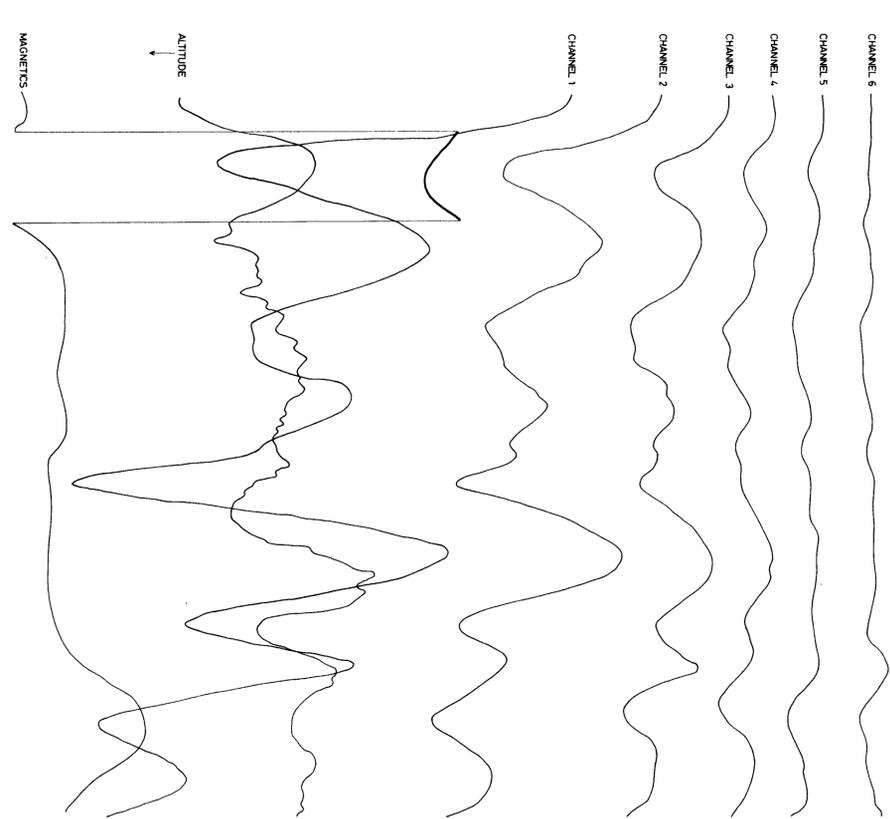
MAGNETICS



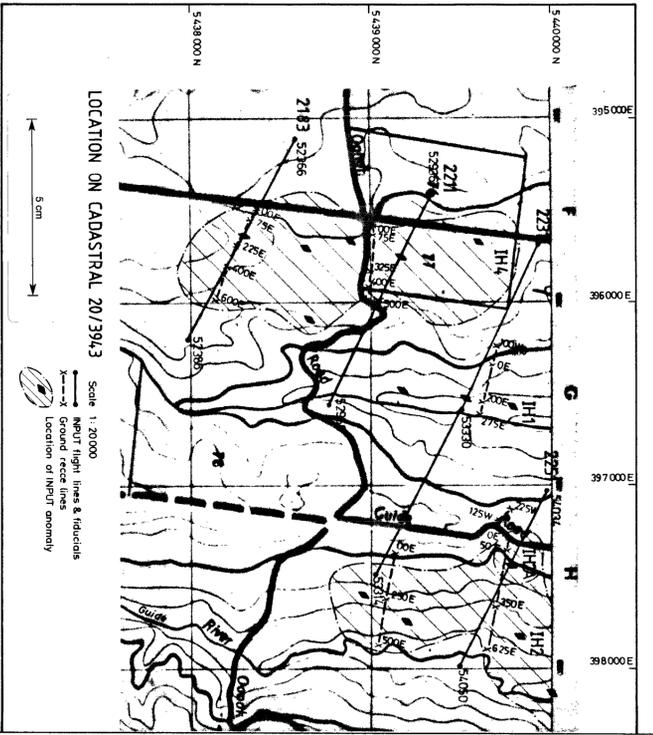
APPROX. TOPOGRAPHY  
& CULTURE (METERS A.S.L.)



INPUT LINE 2251



N.W. 1H2A 5099 S.E.



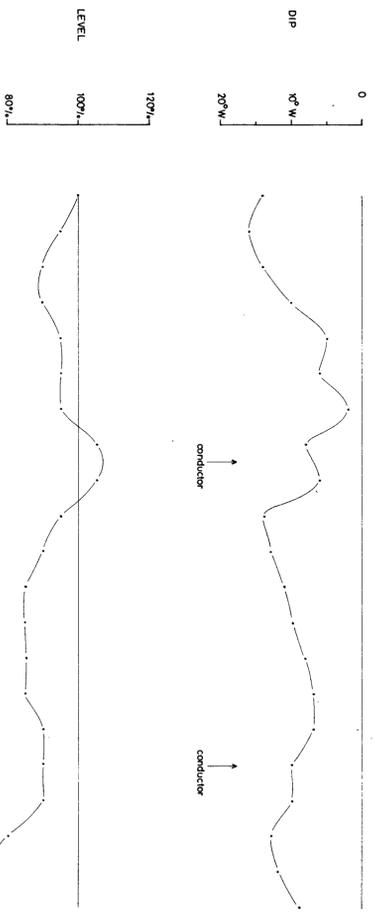
285103



The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE INPUT ANOMALY 3943/1H2 & 3943/1H2 A INITIAL GROUND CHECK NORTH LINE 1417	
82-2276 VOL 2	
SCALE 1:2500	DATE 13-7-82
AUTHOR G. OAKES	DRAWN H.L.H.
OFFICE DEVONPORT	REP. No.
ENCL No.	DRG No D/M003/043

5 cm

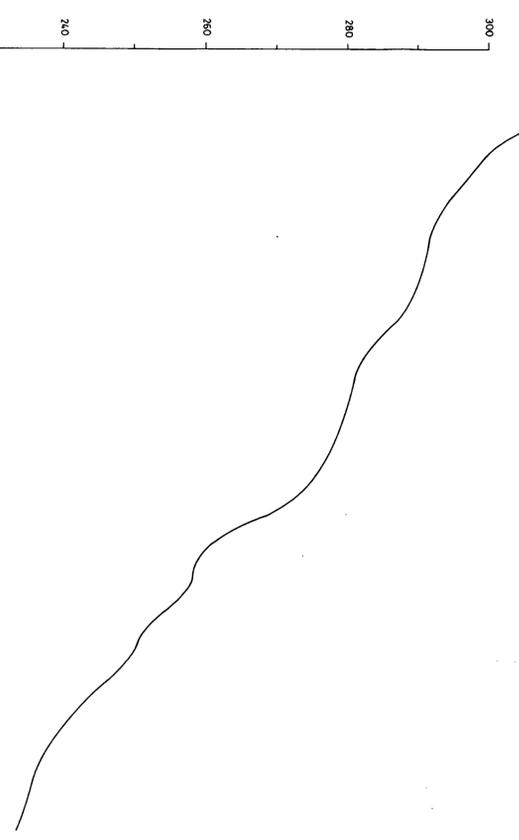
V.L.F.-EM  
(JAPAN TRANSMITTER)



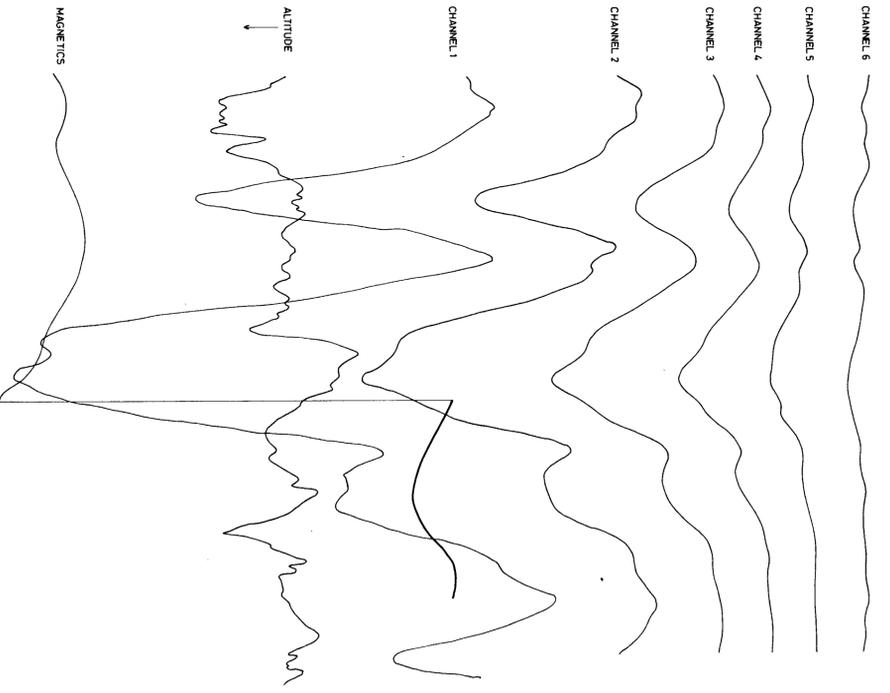
MAGNETICS



APPROX. TOPOGRAPHY  
& CULTURE (METERS A.S.L.)

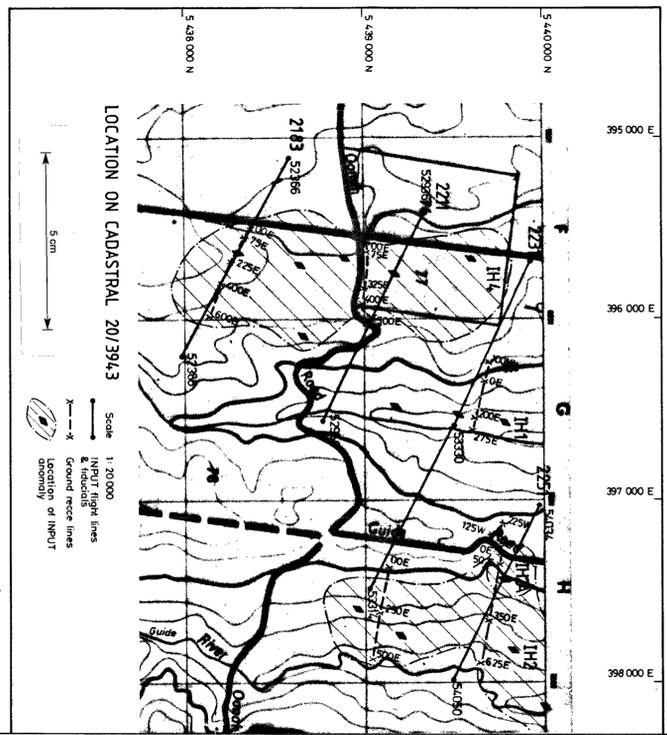
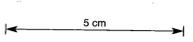


INPUT LINE 2231



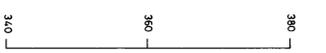
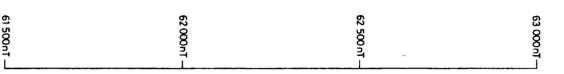
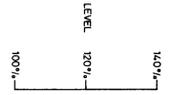
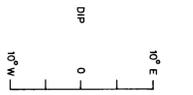
The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE INPUT ANOMALY 3943/IH2 INITIAL GROUND CHECK SOUTH LINE	
1418	
8L-2276 VOL 2	
SCALE 1:2500	DATE 13-7-82
AUTHOR G OAKES	DRAWN H.L.H.
OFFICE DEVONPORT	REP No.
ENCL No.	DRG No. D/M003/044

285104

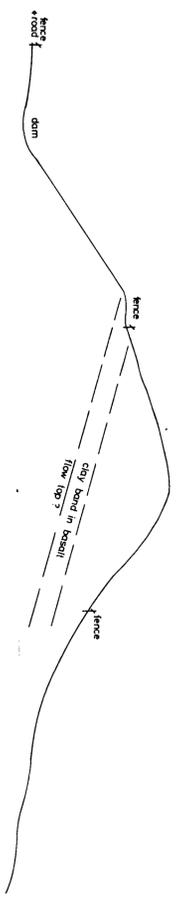
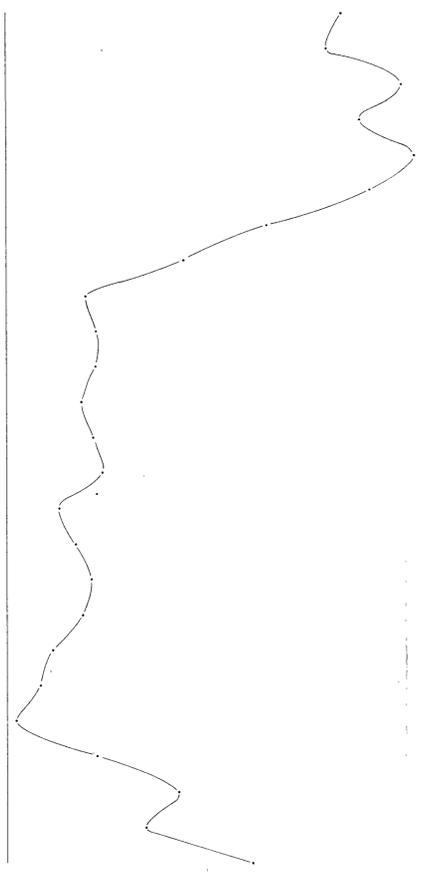
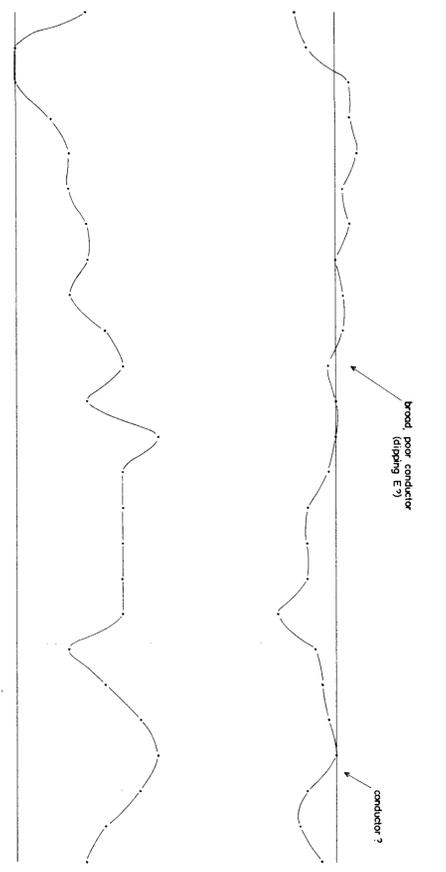


53300 SE 1H2 53350 NW

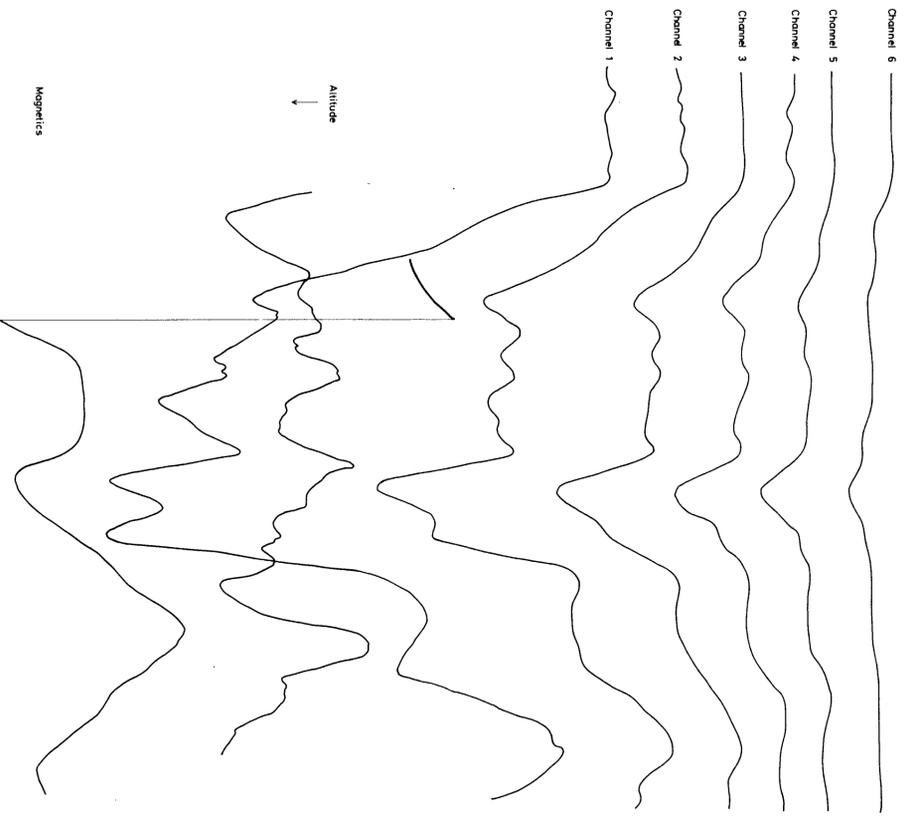
V.L.F. - EM  
(JAPAN TRANSMITTER)



00 E  
100 E  
200 E  
300 E  
400 E  
500 E  
600 E



INPUT LINE 2183

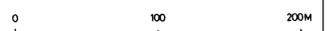


Altitude ↑  
Magnetics

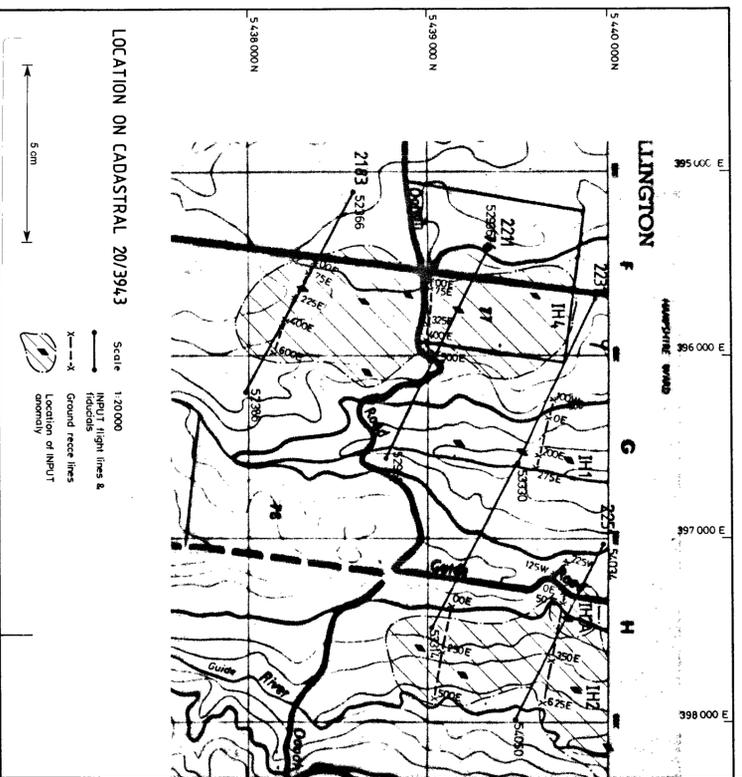
NW 52390 1H4 52400 SE



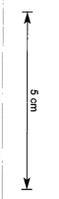
285105



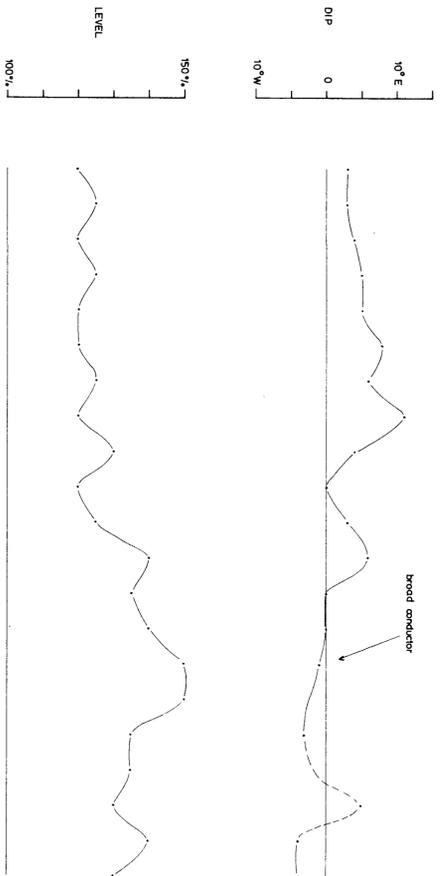
The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE INPUT ANOMALY 3943/1H4 INITIAL GROUND CHECK SOUTH LINE	
1419	
84-2276 vol 2	
SCALE 1:2500	DATE 9-7-82
AUTHOR G OAKES	DRAWN H.L.S.
OFFICE DEVONPORT	REP.No
ENCL No	DRG No D/M003/040



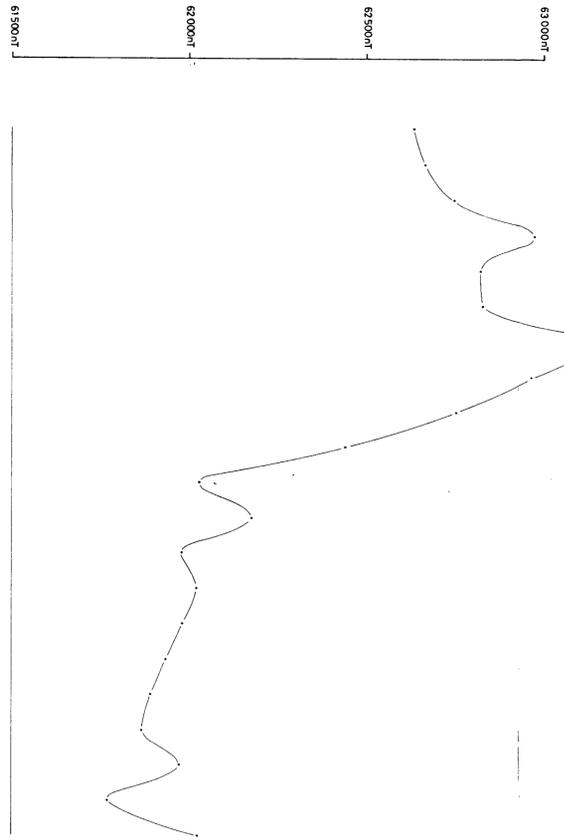
Scale 1:20,000  
INPUT flight lines & indicators  
Ground rece lines  
Location of INPUT anomaly



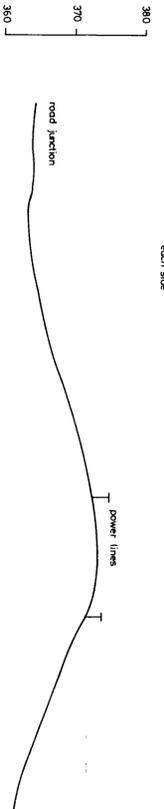
V.L.F.-EM  
(JAPAN TRANSMITTER)



MAGNETICS

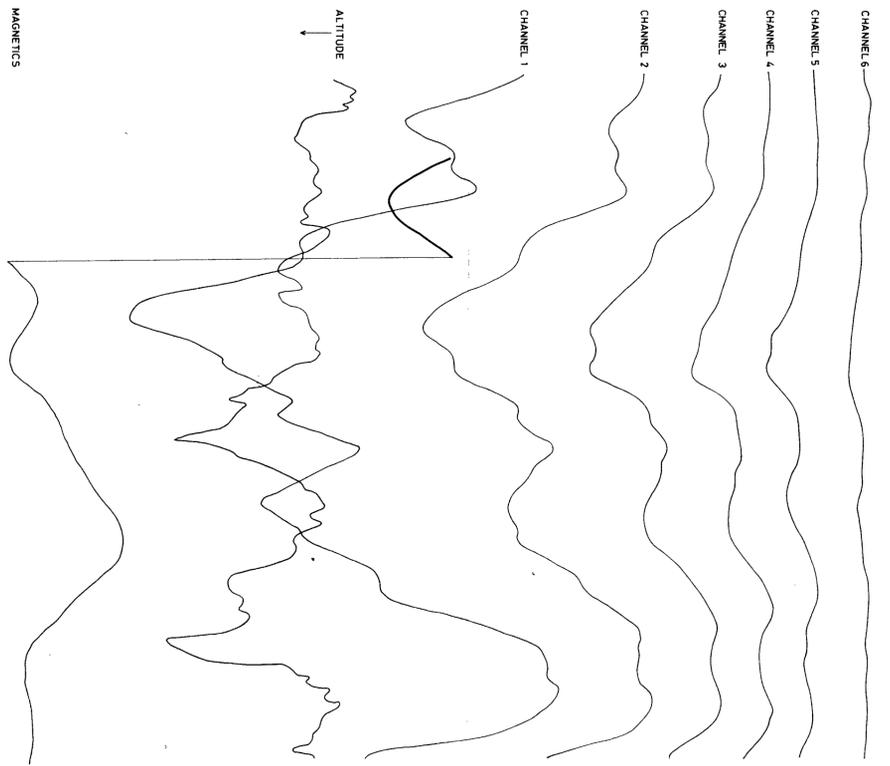


APPROX. TOPOGRAPHY  
& CULTURE (Metres A.S.L.)



N.B. Line is along road with fences (shown) on both sides

INPUT LINE 2211



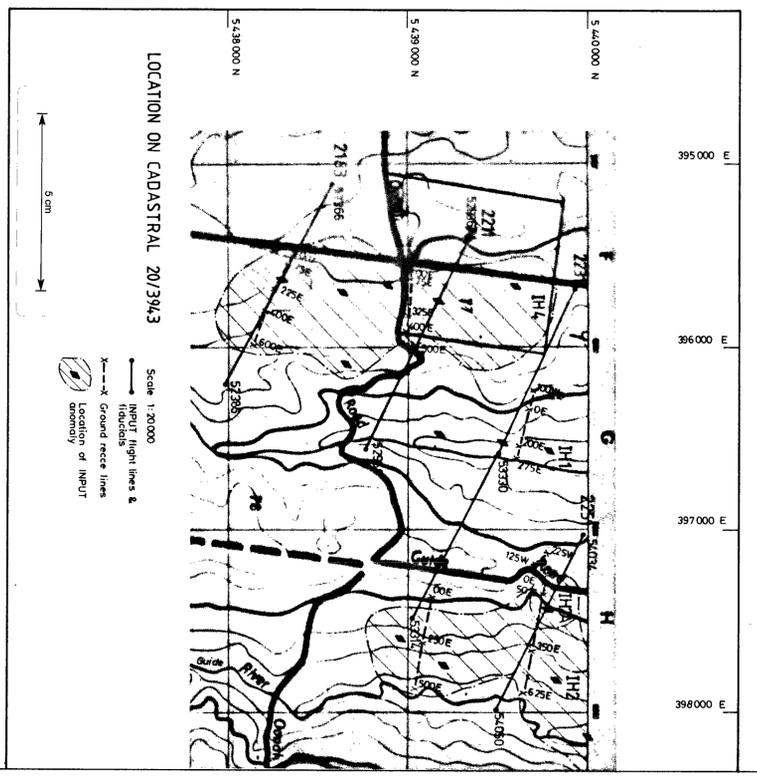
MAGNETICS

NW 1H4 52950 SE

285106



The Shell Company of Australia Limited METALS DIVISION			
E.L. 4/77 HIGHCLERE INPUT ANOMALY 3943/1H4 INITIAL GROUND CHECK NORTH LINE 1420			
84-2276 VOL 2			
SCALE	1:2500	DATE	12-7-82
AUTHOR	G. OAKES	DRAWN	H.L.H.
OFFICE	DEVONPORT	REP. No	
ENCL No	07/MG03/041	DRG No	

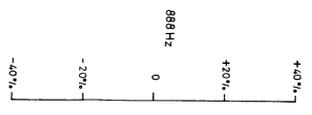
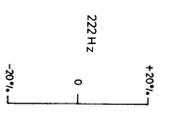


LOCATION ON CADASTRAL 20/3943

5,400,000 N  
5,430,000 N  
5,460,000 N

395,000 E  
396,000 E  
397,000 E  
398,000 E

MAX-MIN  
 COIL SEPARATION = 200M  
 IN PHASE  
 OUT PHASE

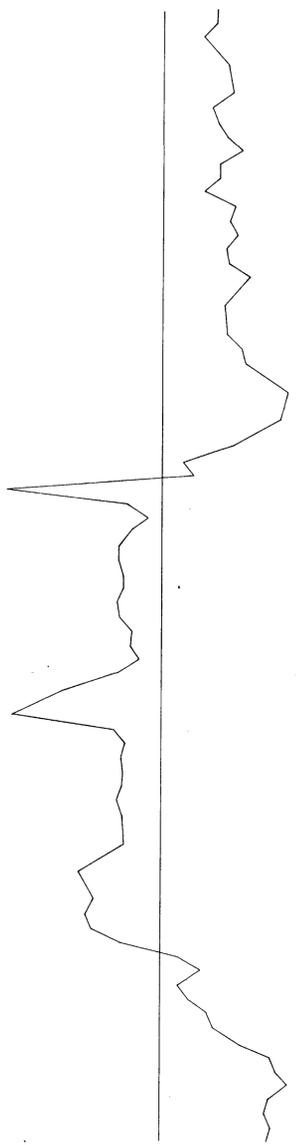
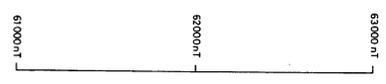
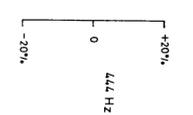
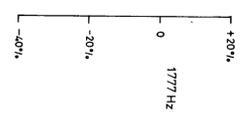


N.B.  
 50% added to 1777 Hz GP

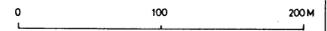
electric fence

fence

conductor 2

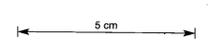


200 E  
 400 E  
 600 E  
 800 E

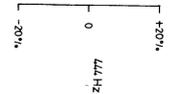
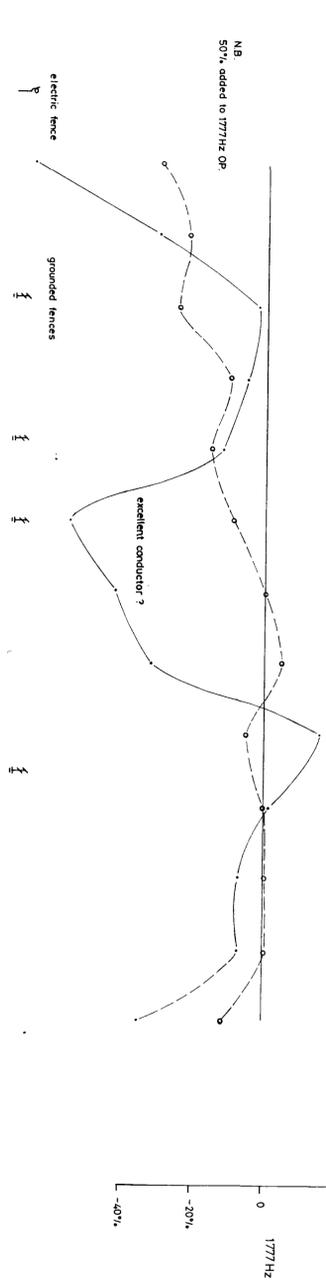
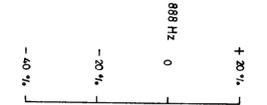
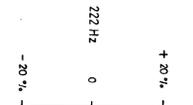


The Shell Company of Australia Limited METALS DIVISION	
E.L.4/77 HIGHCLERE IH4-LINE 00 N - MAX-MIN - MAGNETICS	
1421	
84-2276 VOL 2	
SCALE 1:2500	DATE 18-10-82
AUTHOR G OAKES	DRAWN H.L.S.
OFFICE DEVONPORT	REP No.
ENCL No.	DRG No D/MQ03/070

285107



MAX-MIN  
 COIL SEPARATION = 200M  
 IN PHASE  
 OUT PHASE

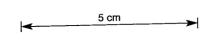


200 E  
 400 E  
 600 E  
 800 E

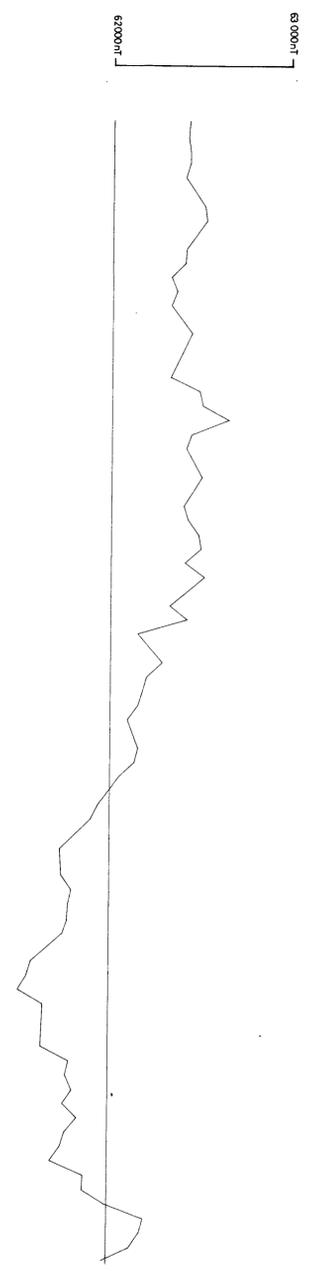


The Shell Company of Australia Limited METALS DIVISION	
E.L. 4777 HIGHCLERE IH4- LINE 200N - MAX-MIN - MAGNETICS - IP/ RESISTIVITY	
SCALE 1: 2500	DATE 19-10-82
AUTHOR G. OAKES	DRAWN H.L.S.
OFFICE DEVONPORT	REP No.
ENCL No	DRG No D/MQ03/071

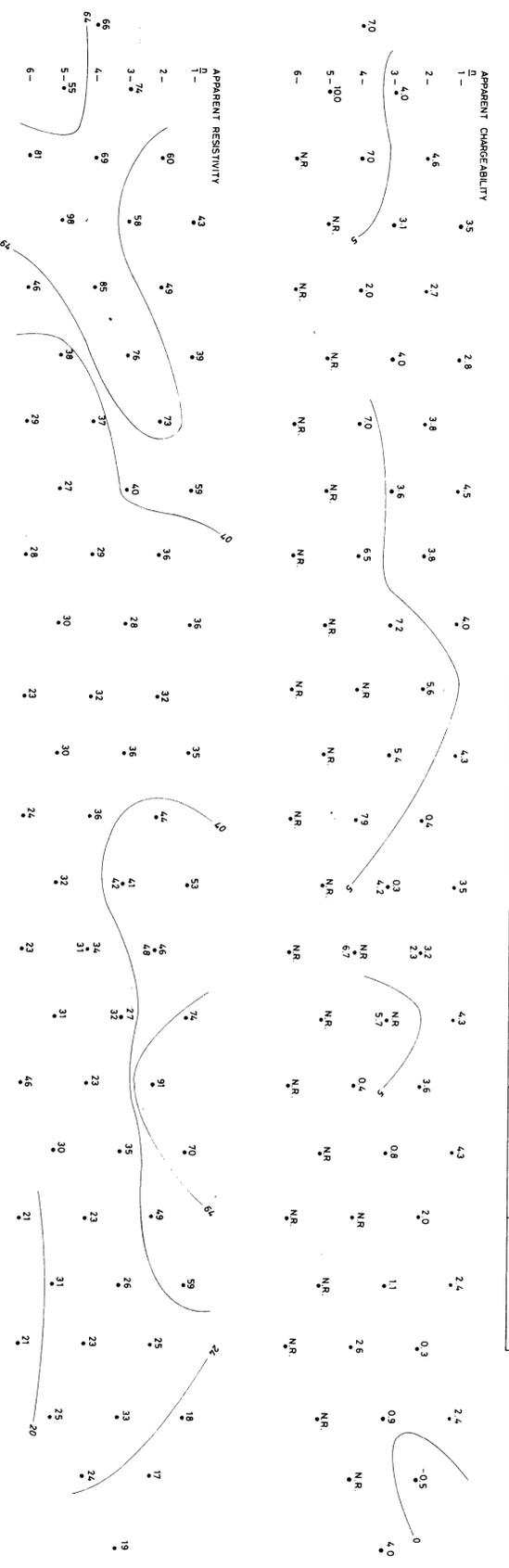
285108



MAGNETICS

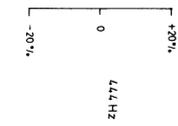
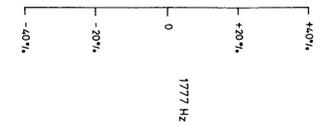
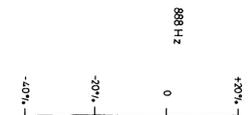


IP/RESISTIVITY

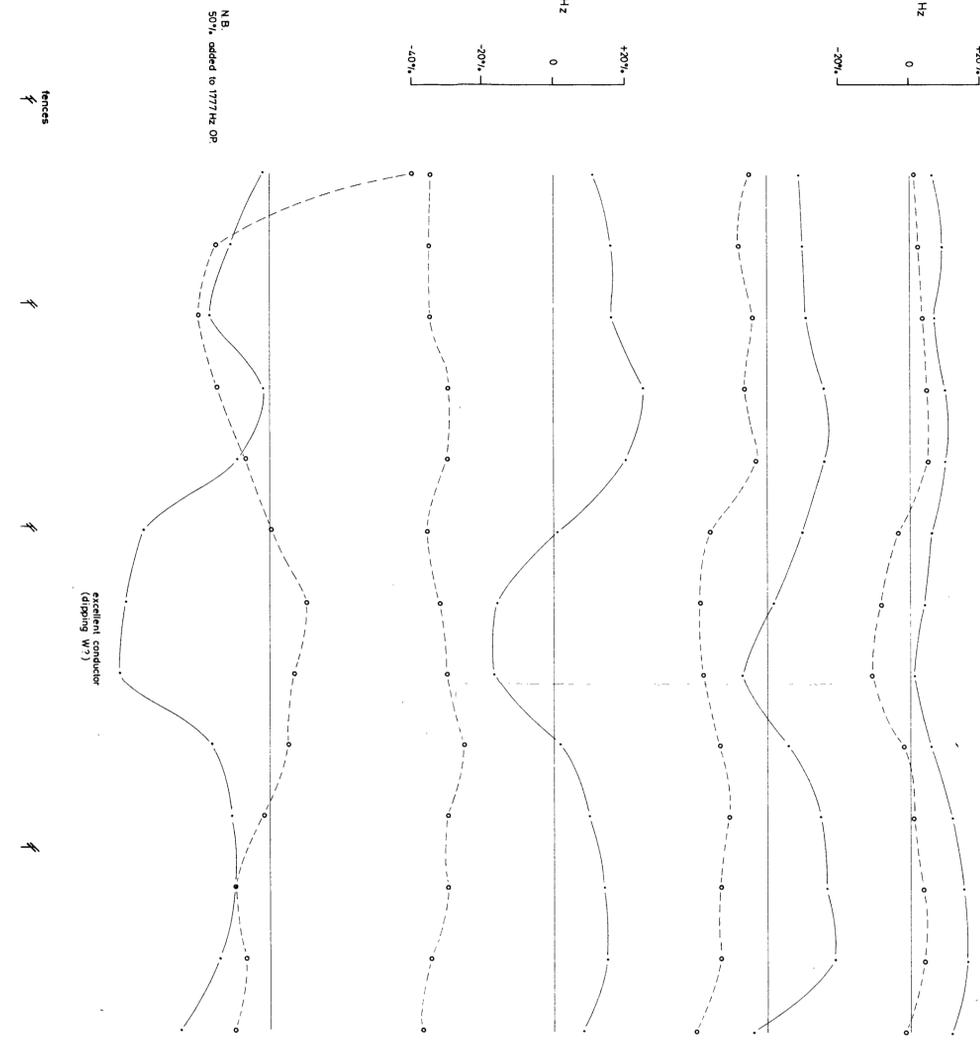


Commutator : SCINTREX  
 Date : 11-10-82  
 Timing : 2 SEC  
 Transmitter : IPC 7 25kW  
 Receiver : IPR 8  
 Array : DIPOLE DIPOLE  
 Dipole length : 100M

MAX-MIN  
 COIL SEPARATION 2.200M  
 IN PHASE  
 OUT PHASE

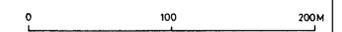
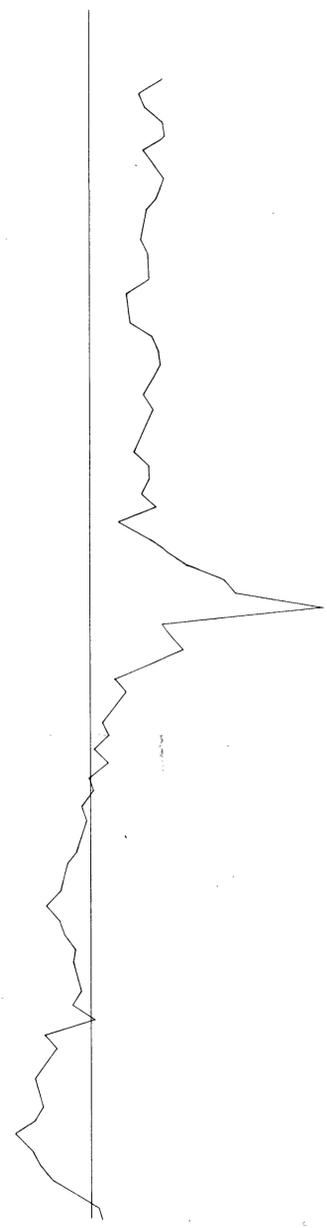


200 E  
 400 E  
 600 E  
 800 E



excellent conductor  
 (dipping W 7°)

MAGNETICS



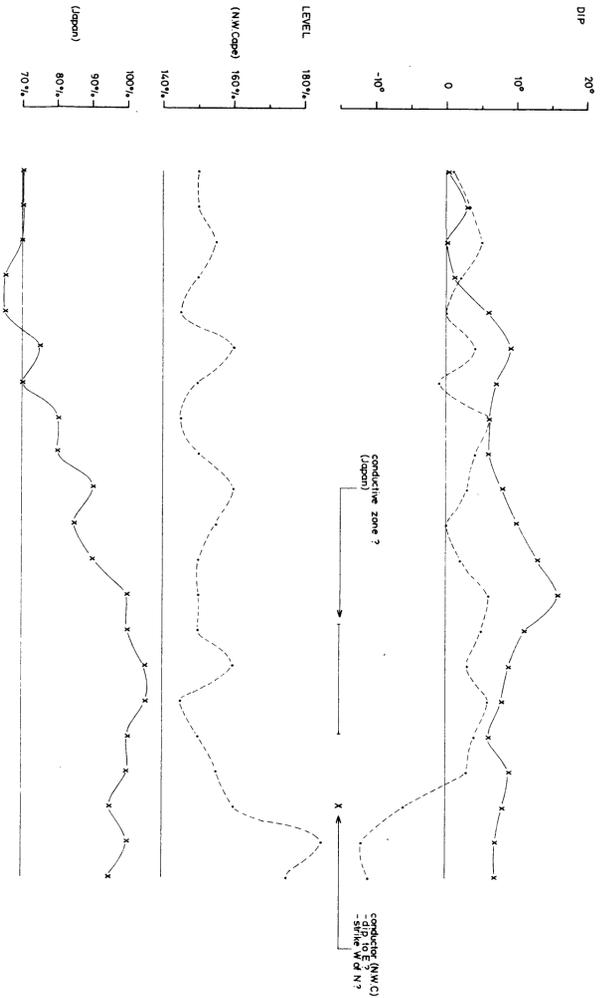
The Shell Company of Australia Limited METALS DIVISION			
E.L. 4/77 HIGHCLERE IH4 - LINE 400N - MAX-MIN - MAGNETICS			
1423			
84-2276 VOL 2			
SCALE 1: 2500	DATE 20-10-82		
AUTHOR G OAKES	DRAWN H L S		
OFFICE DEVONPORT	REP. No.		
ENCL No.	ORG No. D/M003/072		

285109

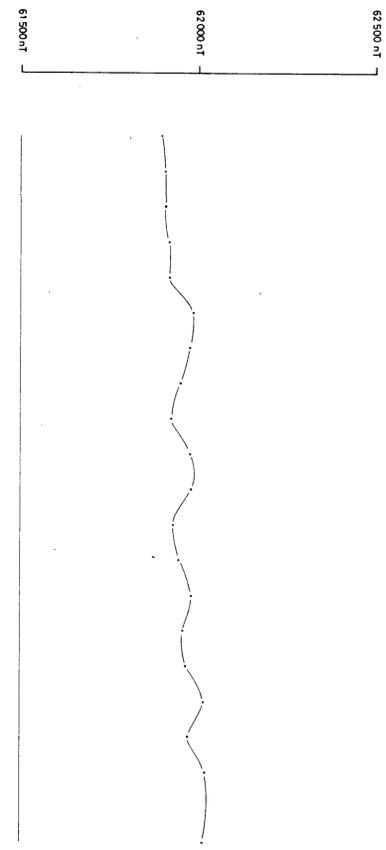


1424

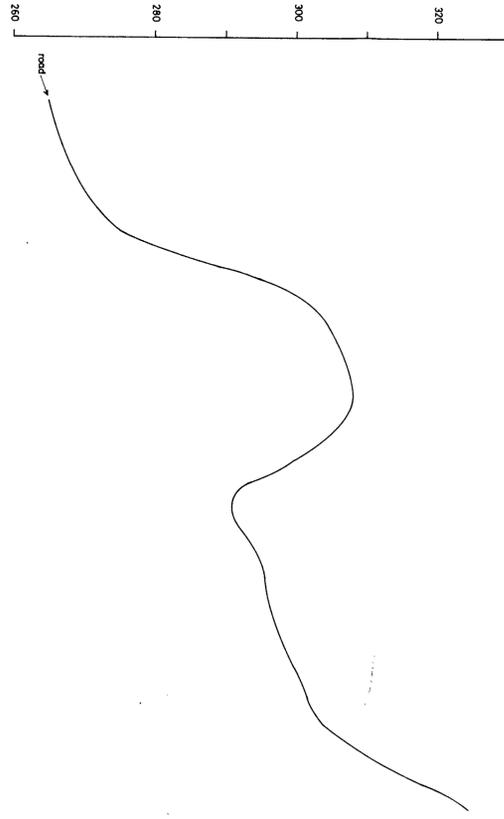
V.L.F.-EM  
X—X Japan Topographic  
(positive dips to East)  
North West Cape Topographic  
(positive dips to South)



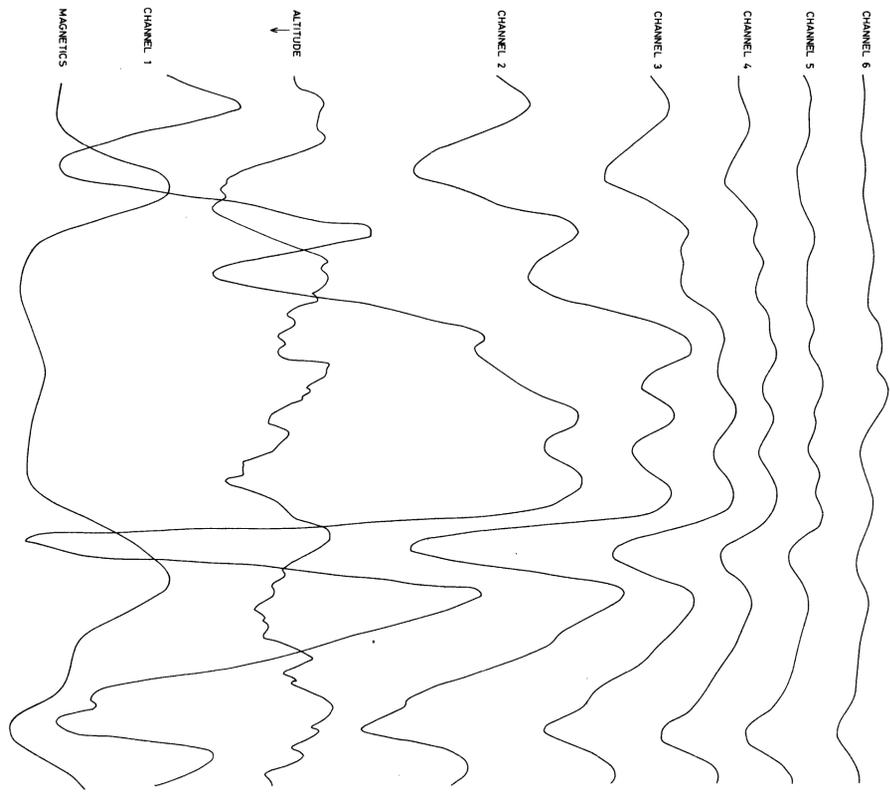
MAGNETICS



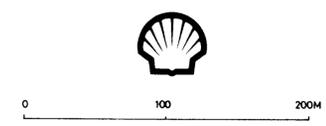
APPROX. TOPOGRAPHY  
& CULTURE (Metres A.S.L.)



INPUT LINE 2204

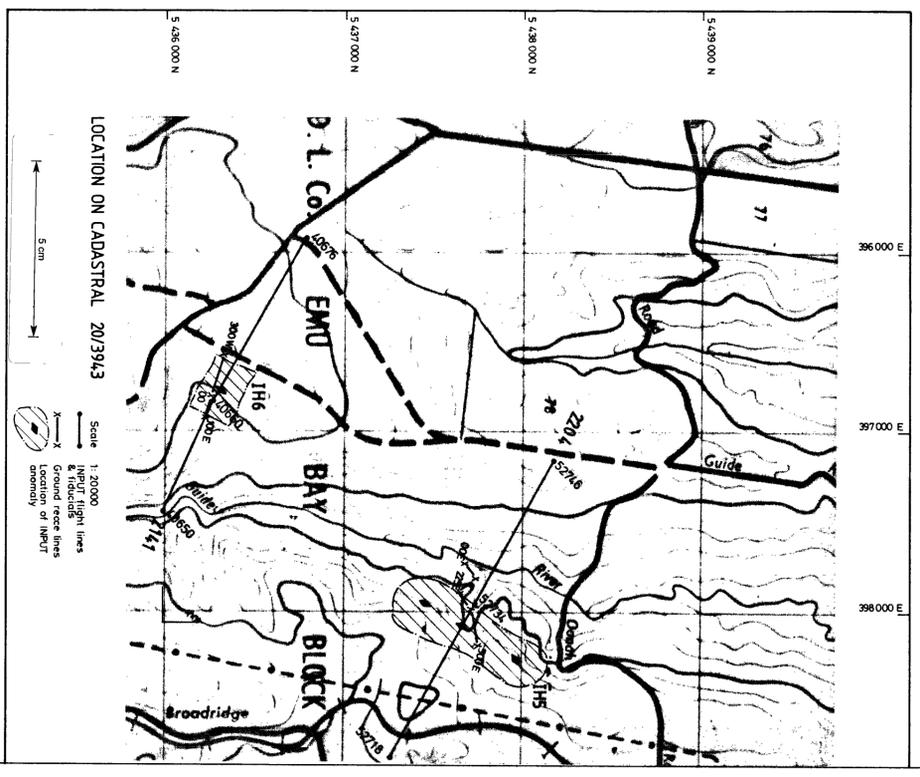
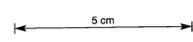


00 E, 100 E, 200 E, 300 E, 400 E, 500 E



The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE INPUT ANOMALY 3943/IHS INITIAL GROUND CHECK	
84-2276 vol 2 1424	
SCALE: 1:2500	DATE: 28-7-82
AUTHOR: G. OAKES	DRAWN: H.L.S.
OFFICE: DEVONPORT	REP. No.
ENCL. No.	DRG. No. D/MQ03/049

285110

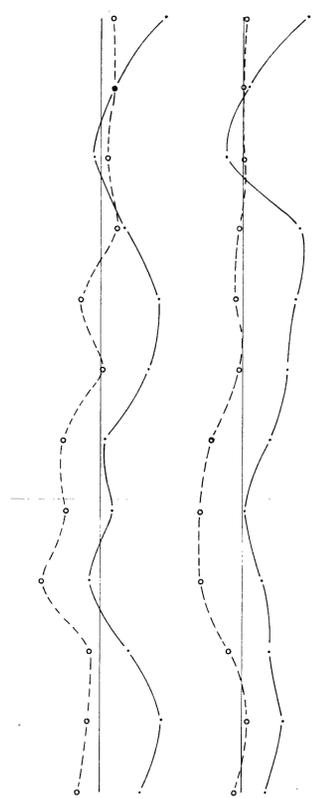
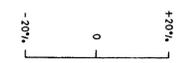


SE 5700, IHS, 5750, NW

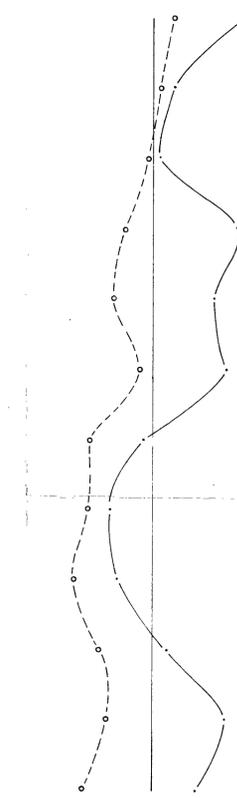
9271

MAX-MIN  
COIL SEPARATION = 200M  
IN PHASE  
OUT PHASE

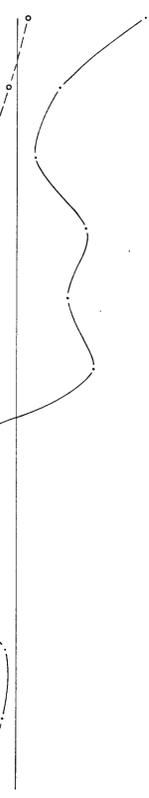
222 Hz



888 Hz



N B  
1777 Hz results are  
sketchy

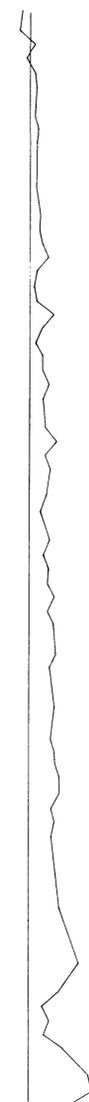


excellent conductor  
steeply dipping?

1777 Hz



GROUND MAGNETICS  
READING SCALE = 200nT/cm

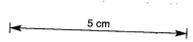


400E  
600E  
800E  
1000E

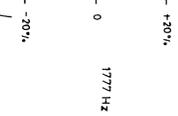
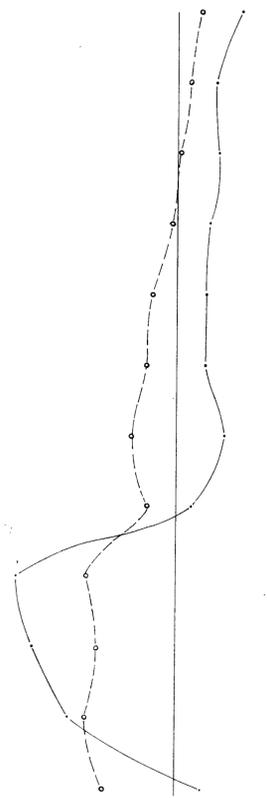
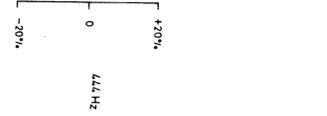
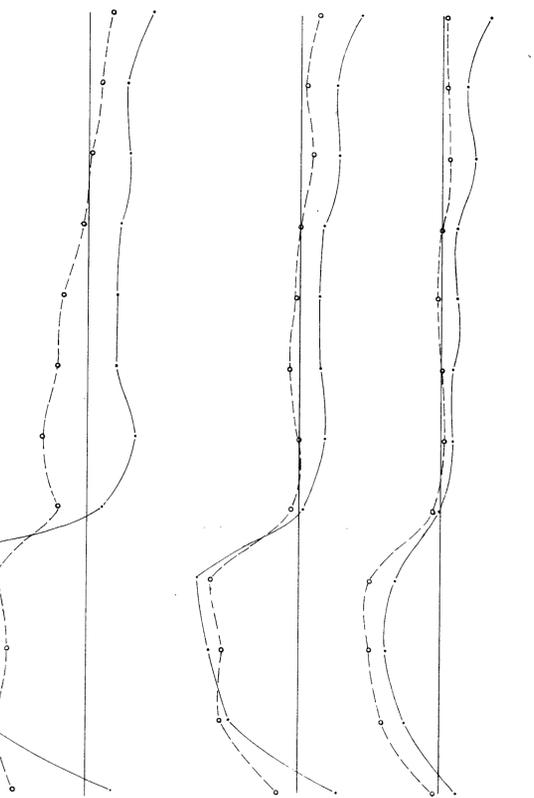


The Shell Company of Australia Limited METALS DIVISION			
E.L. 4/77 HIGHCLERE IH5-GUIDE R. NORTH-LINE 200 S - MAX-MIN - GROUND MAGNETICS			
1425			
84-2276 vol 2			
SCALE	1:2500	DATE	1-10-82
AUTHOR	G. DARES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP. No.	
ENCL No		DRG No	D/M003/067

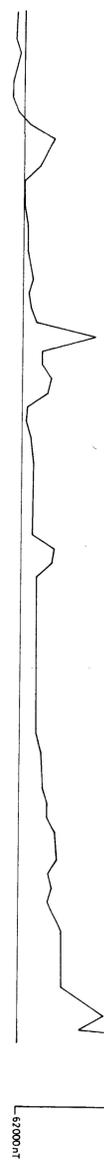
285111



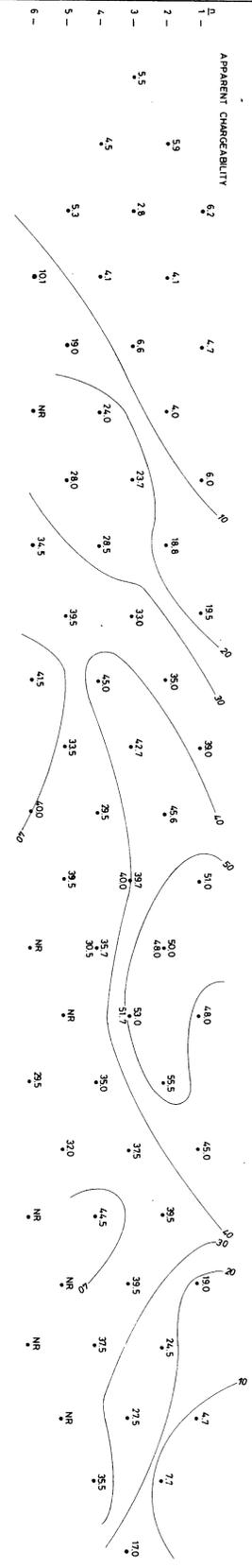
MAX-MIN  
 COIL SEPARATION = 200M  
 IN PHASE  
 OUT PHASE



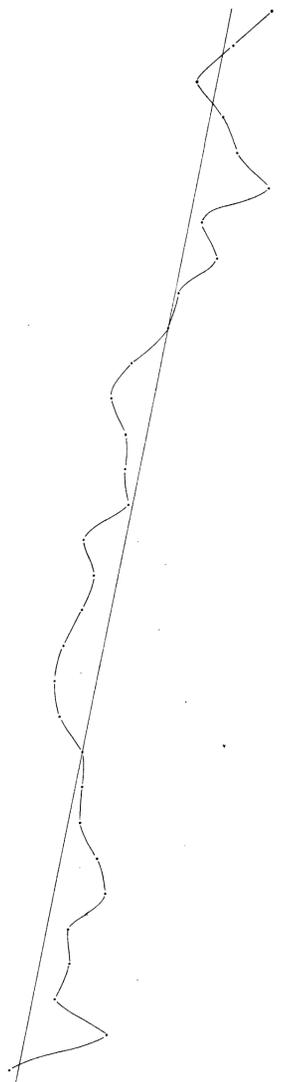
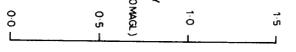
GROUND MAGNETICS  
 READING SCALE = 2000 nT/m



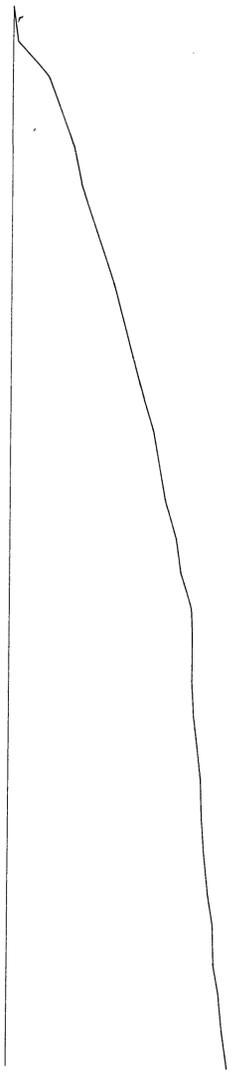
I-P/RESISTIVITY



BOUGUER GRAVITY  
 ROUGH TERRAIN CORRECTION ONLY  
 READING SCALE = MAGL (from 0.20 MAGL)



ELEVATION  
 METRES



The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE IH5 - GUIDE R. NORTH-LINE ON - MAX-MIN - GROUND MAGNETICS - I-P RESISTIVITY 1426	
84-2276 vol 2	
SCALE 1:2500	DATE 21-2-83
AUTHOR G. DAKES	DRAWN H.L.S.
OFFICE DEVONPORT	REP. No.
ENCL No.	DRG No D/M003/061

285112

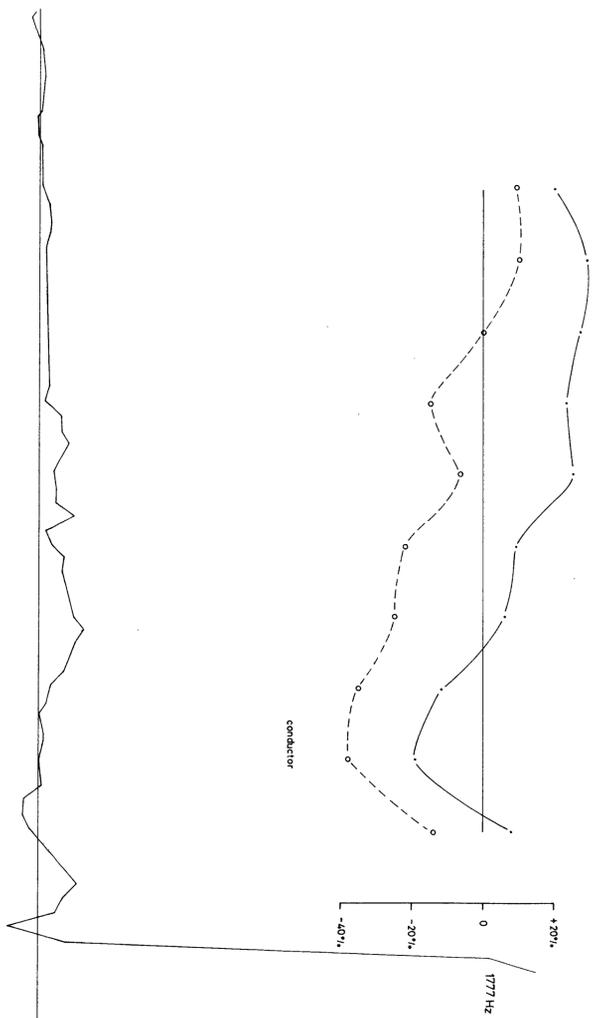
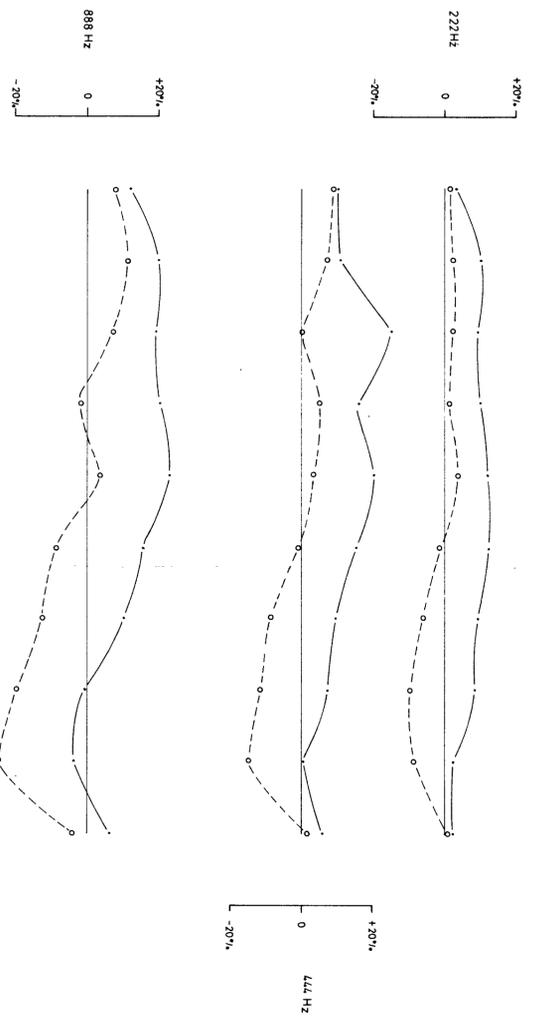
5 cm

1426

1427

MAX - MIN  
COIL SEPARATION = 700M  
IN PHASE  
OUT PHASE

400 E  
600 E  
800 E



GROUND MAGNETICS  
REDUCTION SCALE = 2000/10M

530000 FT  
530000 FT

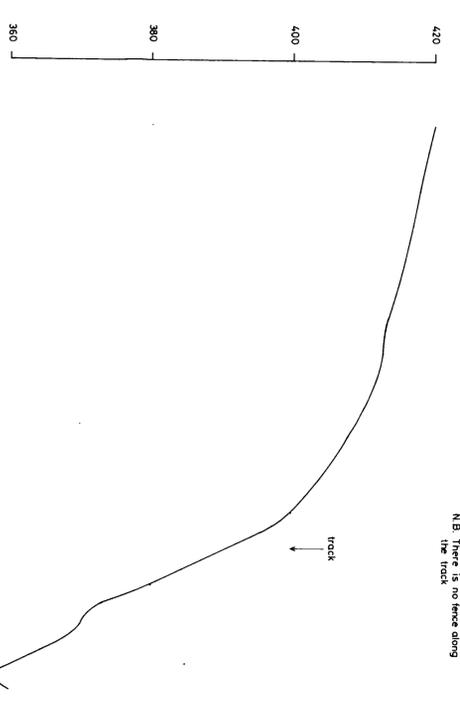
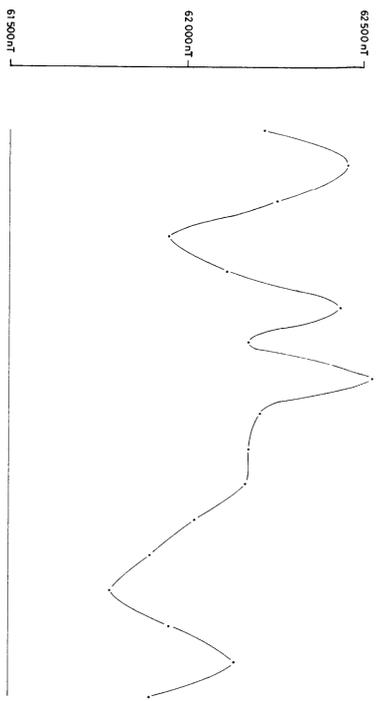
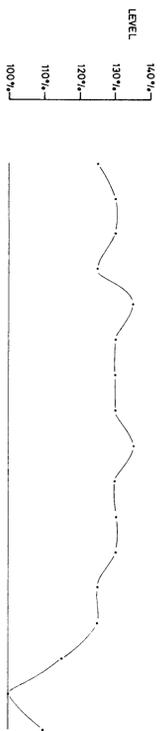
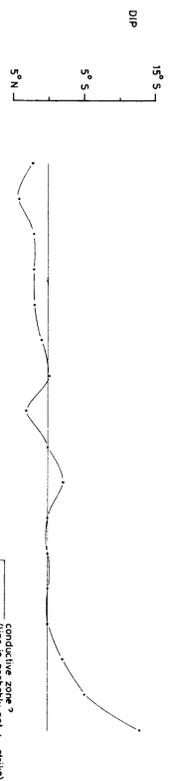


The Shell Company of Australia Limited METALS DIVISION			
E.L. 4/77 HIGHCLERE IHS - GUIDE R. NORTH - LINE 200 N - MAX-MIN - GROUND MAGNETICS			
1427			
<i>84-2276 vol 2</i>			
SCALE	1:200	DATE	1-9-82
AUTHOR	G. GAMES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP. No.	
ENCL No.		DRG No.	D/M003/060

285113

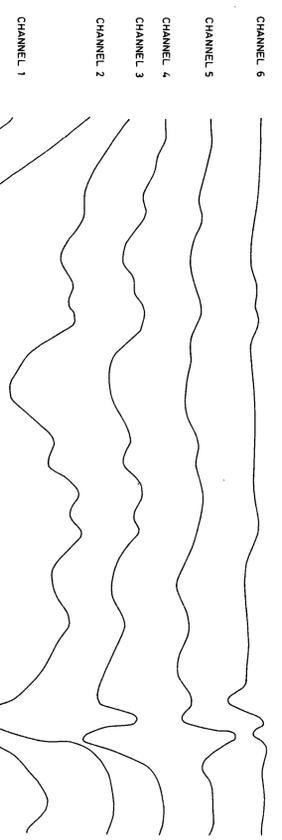
5 cm

V.L.E - EM  
(N.W. Cape transmitter)



N.B. There is no fence along the track.

INPUT LINE 2141



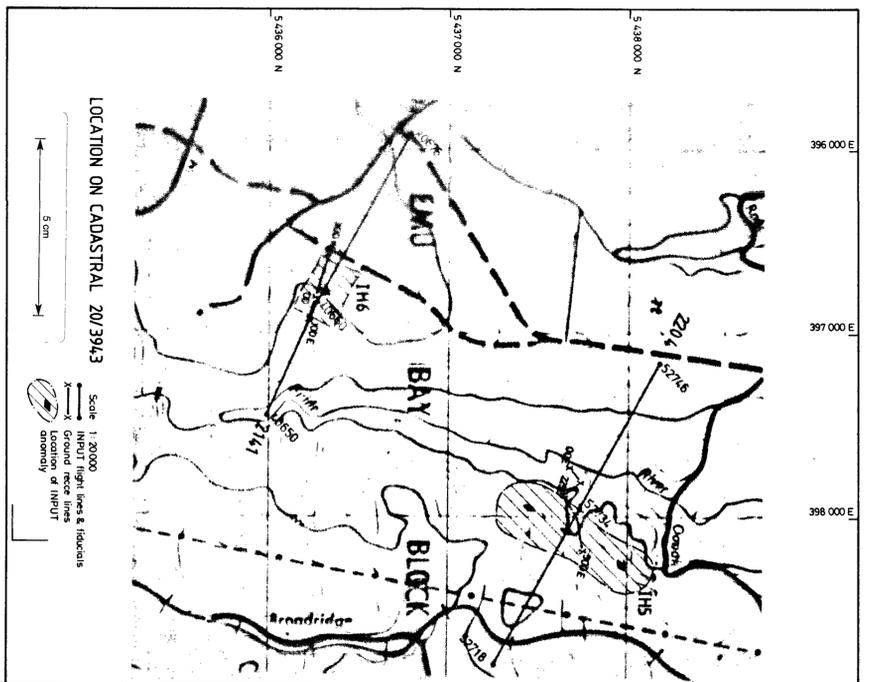
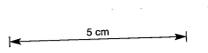
SE. 40850 40780 NW  
IH6

1428



The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE INPUT ANOMALY 3943/IH6 INITIAL GROUND CHECK	
84-2276 VOL 2	
SCALE 1:2500	DATE 28-7-82
AUTHOR G. OAKES	DRAWN H.L.S.
OFFICE DEVONPORT	REP No.
ENCL No.	DRG No. D/MQ03/050

285114

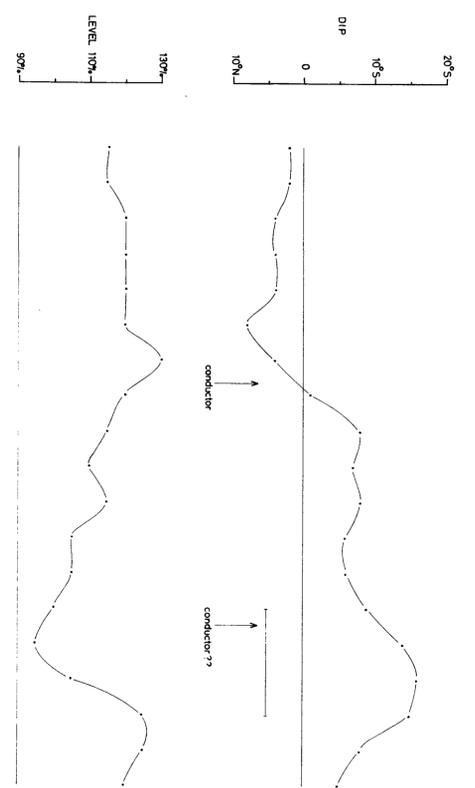


LOCATION ON CADASTRAL 20/3943

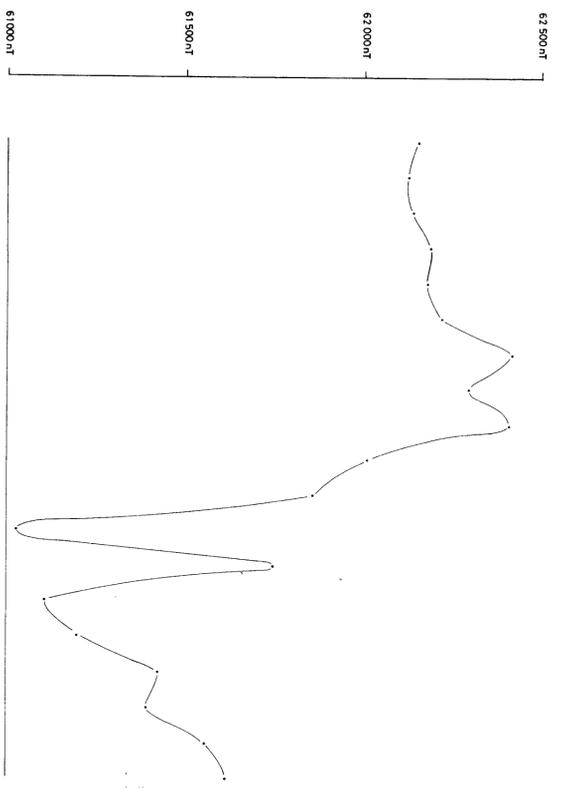
Scale 1:2000  
 X INPUT flight lines & fiducials  
 X Ground fence lines  
 O Location of INPUT station

450 W  
400 W  
300 W  
200 W  
100 W  
00 E

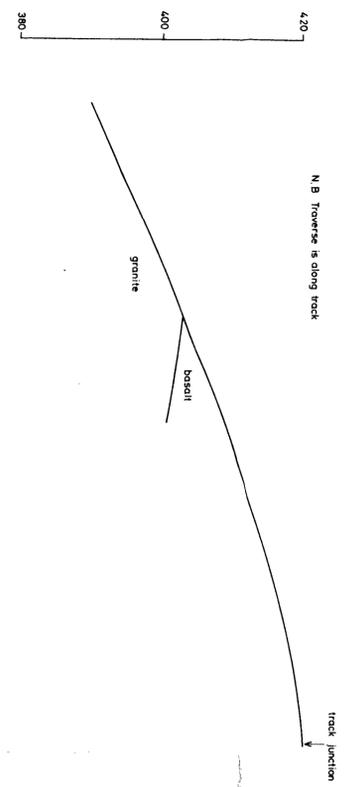
V.L.F - EM  
(NW: CAPE STATION)



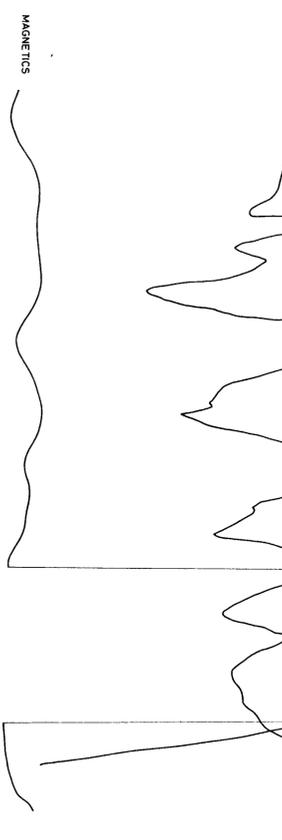
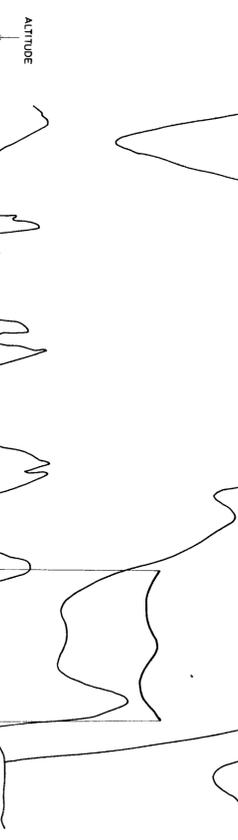
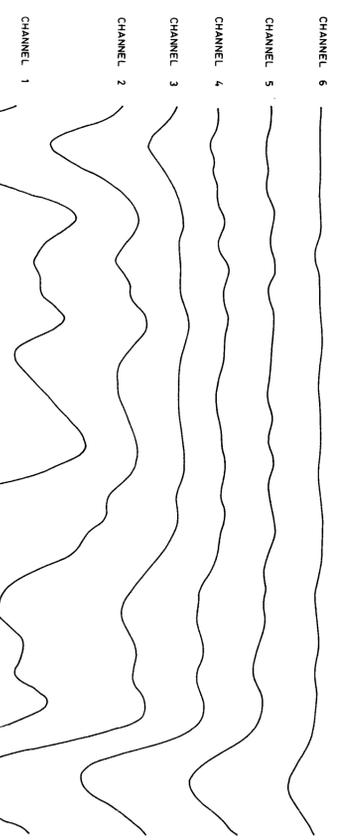
MAGNETICS



APPROX. TOPOGRAPHY  
& CULTURE (Metres ASL)



INPUT LINE 2081



S.E. 1H7 3880 N.W.

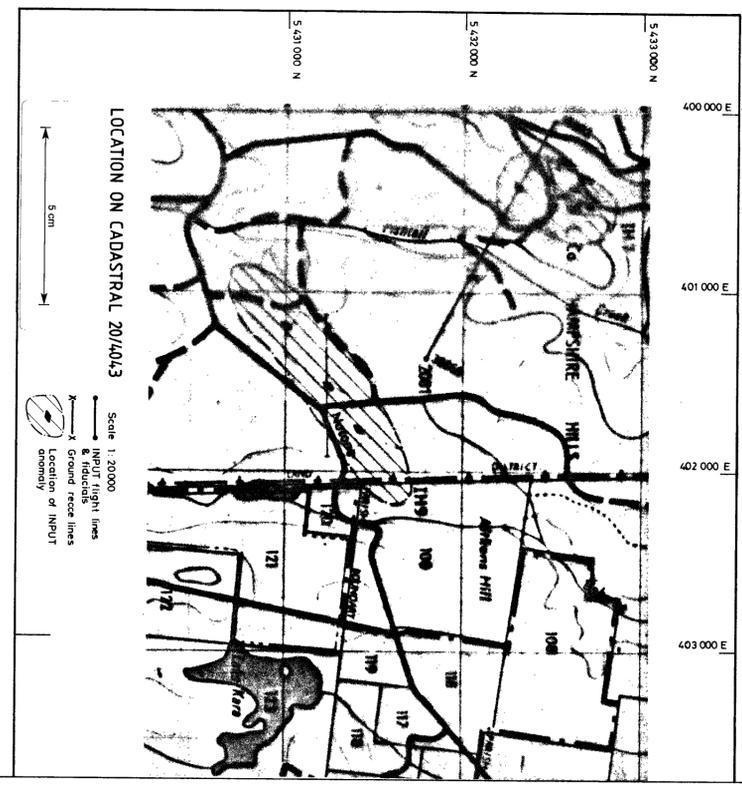
1429

285115



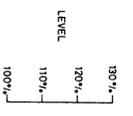
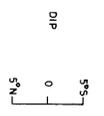
0 100 200 M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE INPUT ANOMALY 3943/1H7 INITIAL GROUND CHECK 1429	
84-2276 VOL 2	
SCALE 1: 2500	DATE 27-7-82
AUTHOR G. OAKES	DRAWN H.L.S.
OFFICE DEVONPORT	REP. No.
ENCL No.	DRG No. D/MQ03/048



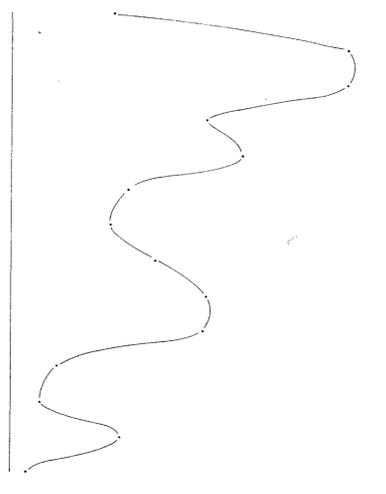
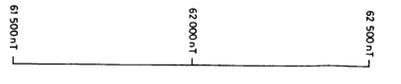
1430

V.L.F.-EM  
(N.W. Geoph)

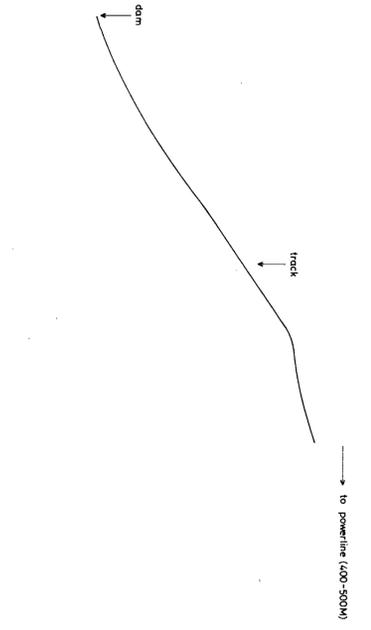
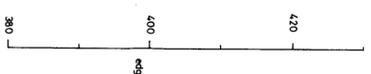


0 E  
100 E  
200 E  
300 E

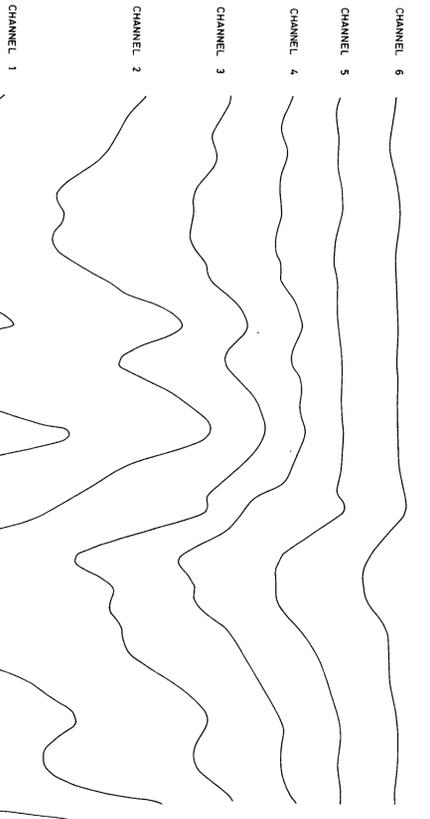
MAGNETICS



APPROX. TOPOGRAPHY  
& CULTURE  
(Meters A.S.L.)



INPUT LINE 2071



ALTITUDE

MAGNETICS

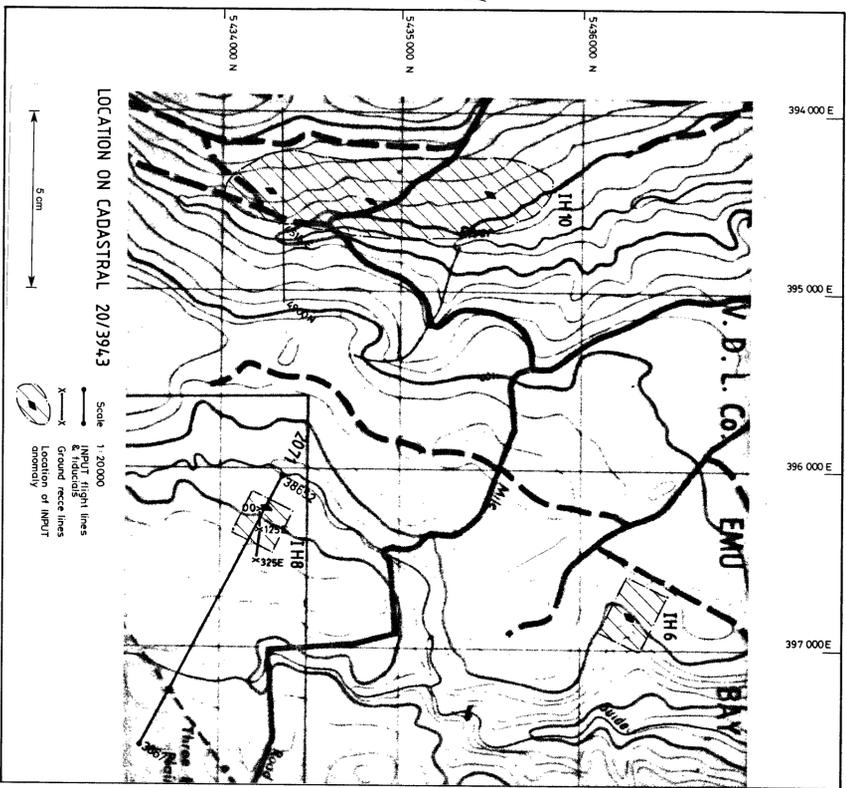
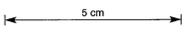


N.W. 38550 38700 38850 S.E.



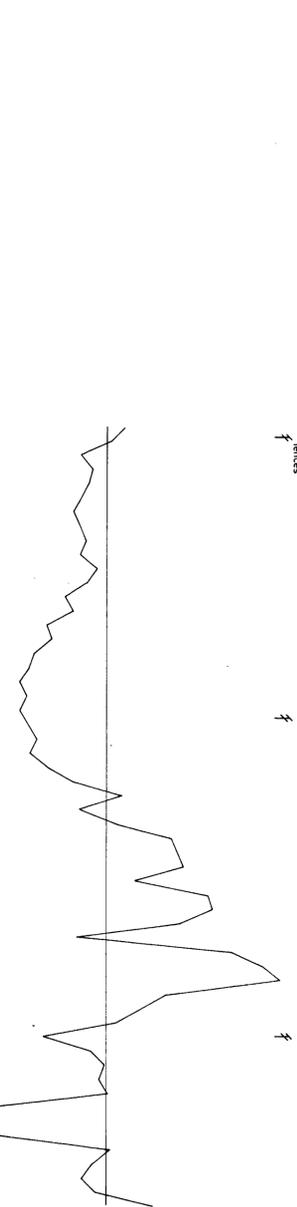
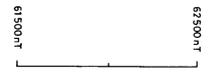
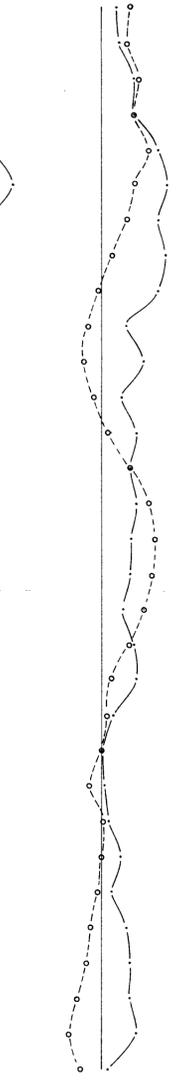
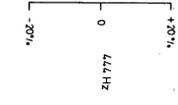
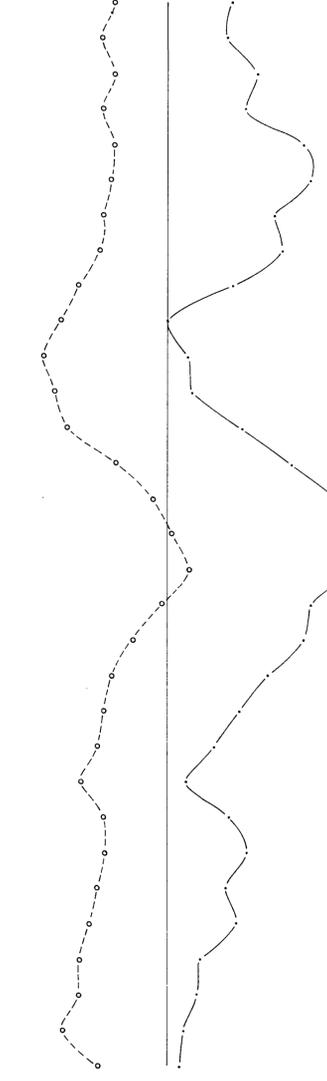
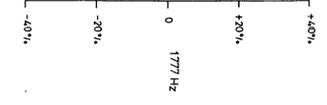
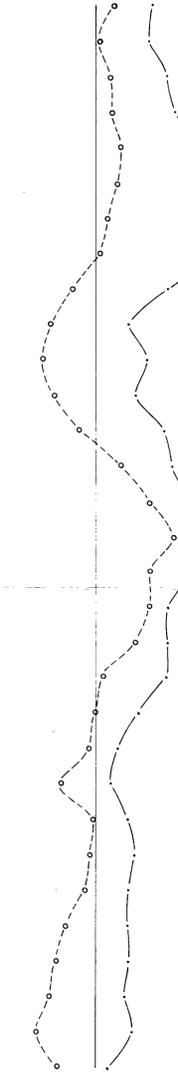
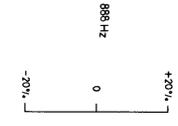
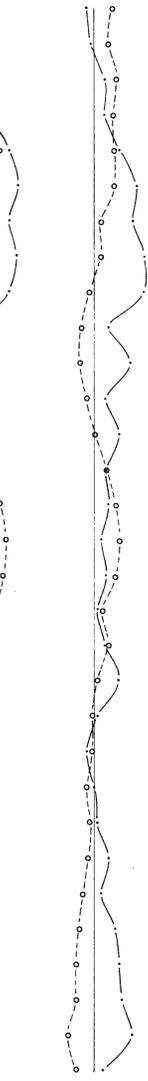
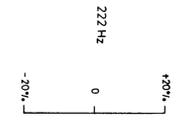
The Shell Company of Australia Limited METALS DIVISION			
E.L. 4/77 HIGHCLERE INPUT ANOMALY 3943/IH8 INITIAL GROUND CHECK			
1430			
84-2276 VOL 2			
SCALE	1:2500	DATE	29-7-82
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP No.	
ENCL No.		DRG No.	D/MQ03/051

285116



1431

MAX-MIN  
COLL. SEPARATION = 200M  
IN PHASE  
OUT PHASE



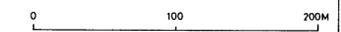
GROUND MAGNETICS  
READING SCALE = 2000 nT/cm

conductor  
(check mag also)

fences

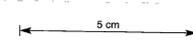
conductor

1300 E  
1500 E  
1700 E  
1900 E  
2100 E



The Shell Company of Australia Limited METALS DIVISION			
E.L. 4/77 HIGHCLERE IH9-FALLS RD.-LINE 1300 N -MAX-MIN -GROUND MAGNETICS			
SCALE 1: 2500		DATE 1-10-82	
AUTHOR G. OAKES		DRAWN H.L.S.	
OFFICE DEVONPORT		REP.No.	
ENCL No		DRG No. D/MG03/059	

285117



1431

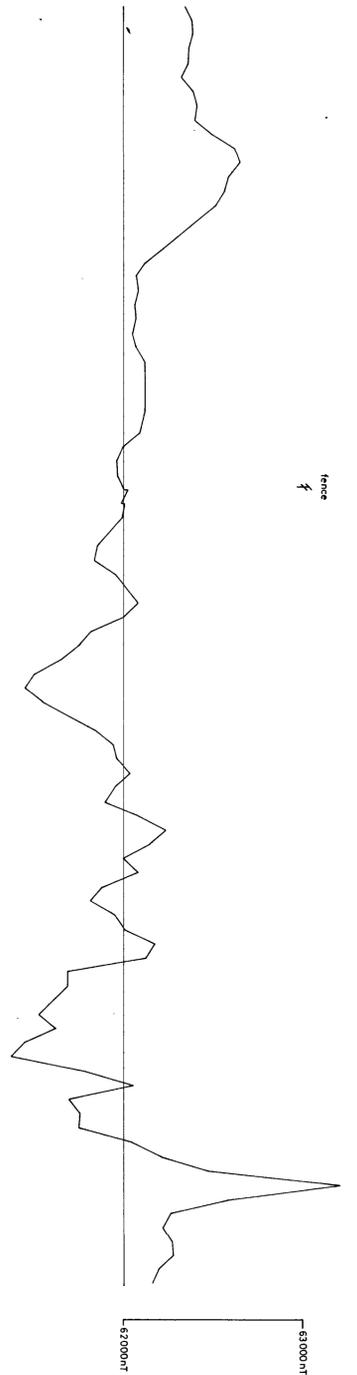
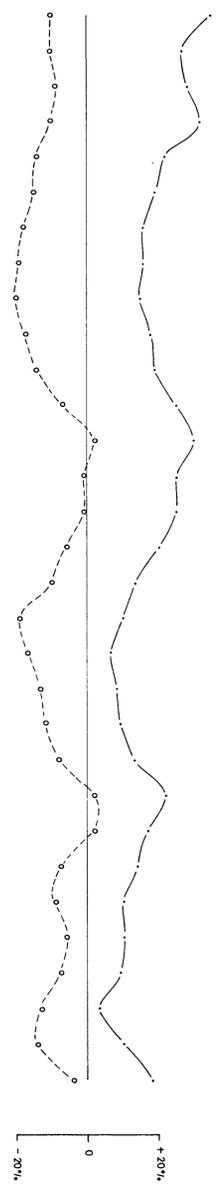
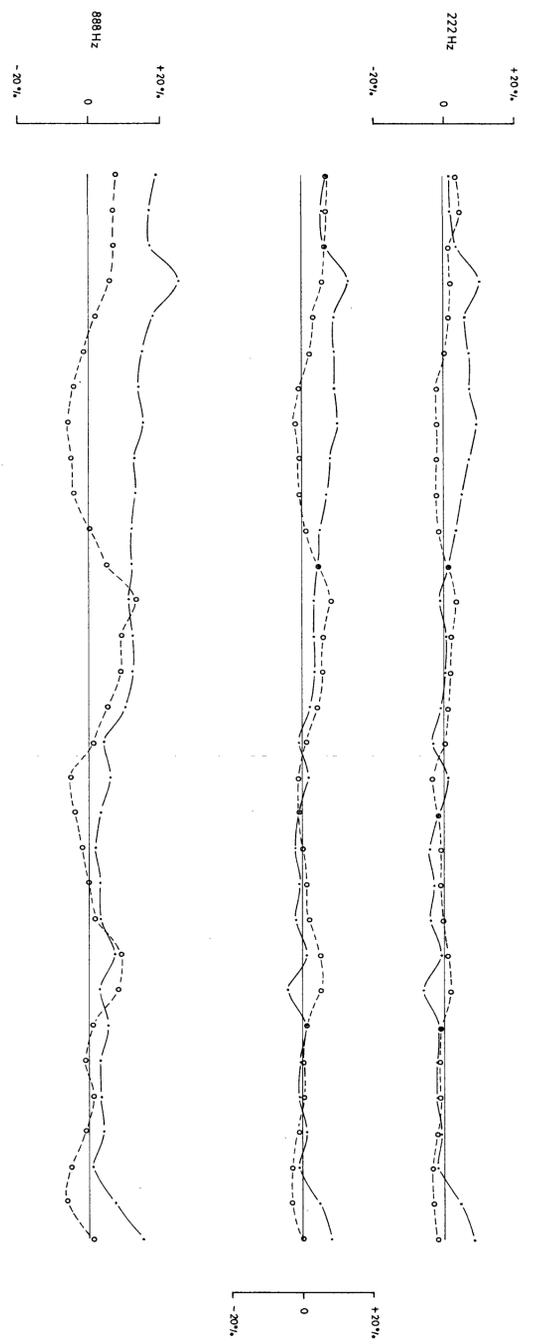
84-2276 vol 2



1433

MAX-MIN  
COIL SEPARATION = 150M  
IN PHASE  
OUT PHASE

1300 E  
1500 E  
1700 E  
1900 E  
2100 E



GROUND MAGNETICS  
READING SCALE = 200nT/cm



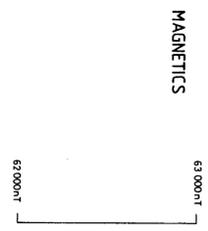
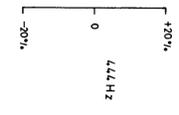
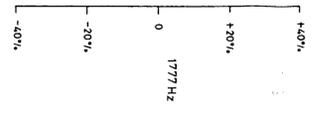
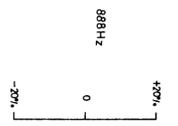
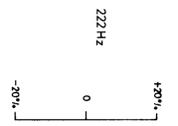
0 100 200M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE IH9 - FALLS RD. - LINE 1500 N - MAX-MIN - GROUND MAGNETICS	
1433	
84-2276 VOL 2	
SCALE 1:2500	DATE 30-9-82
AUTHOR G OAKES	DRAWN H.L.S.
OFFICE DEVONPORT	REP. No.
ENCL No	DRG No D/MQ03/057

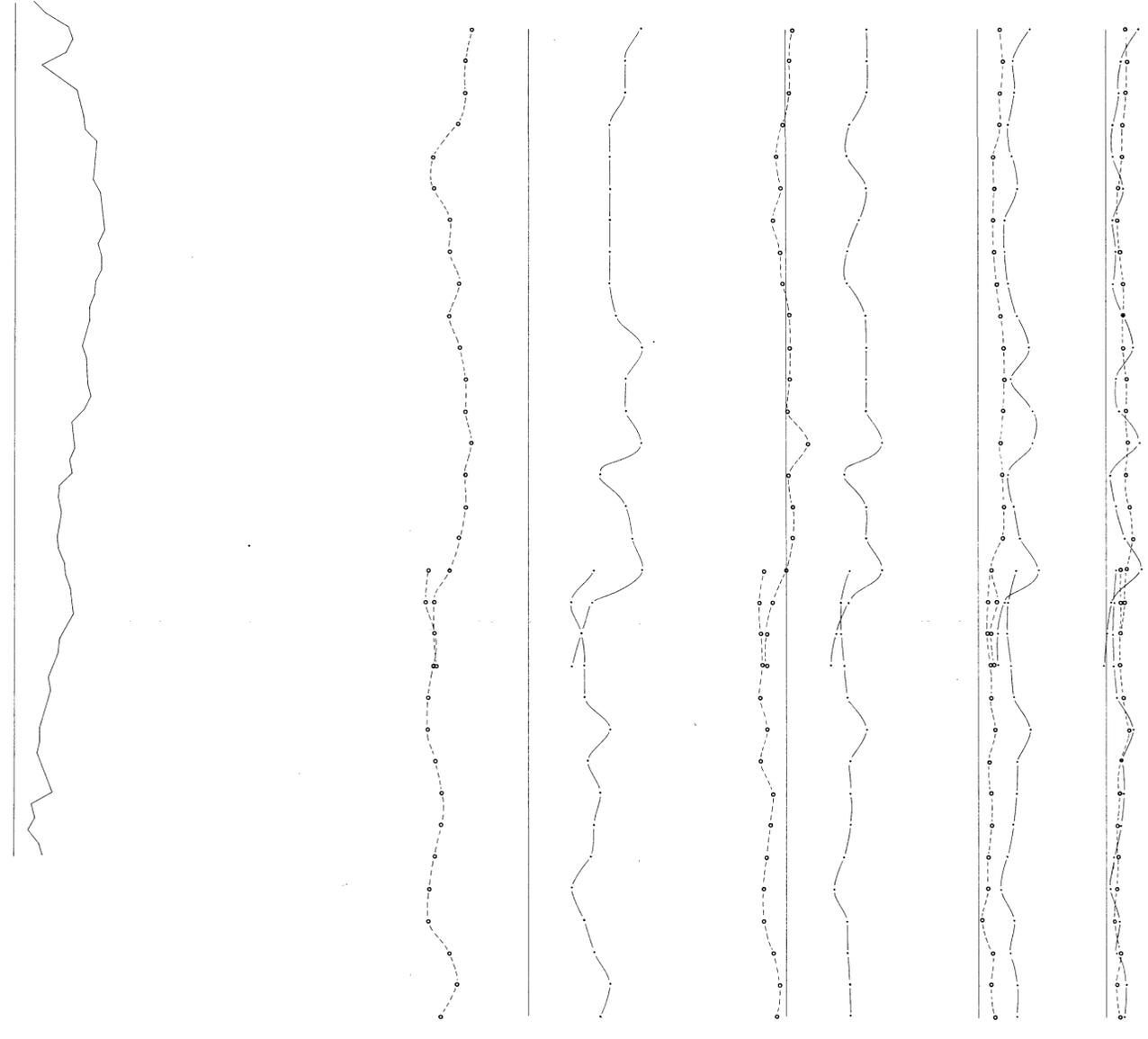
285119

5 cm

MAX-MIN  
 COIL SEPARATION = 150M  
 IN PHASE  
 OUT PHASE



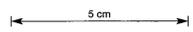
4700 N  
 4900 N  
 5100 N  
 5300 N  
 5500 N



0 100 200M

The Shell Company of Australia Limited METALS DIVISION			
E.L. 4777 HIGHCLERE IH 10 - LINE 4100E			
- MAX-MIN			
- MAGNETICS			
1434			
84-2276 VOL 2			
SCALE	1: 2500	DATE	21-10-82
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP No.	
ENCL No.		DRG No.	D/M003/073

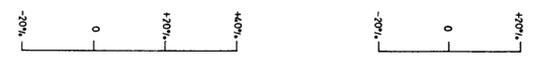
285120



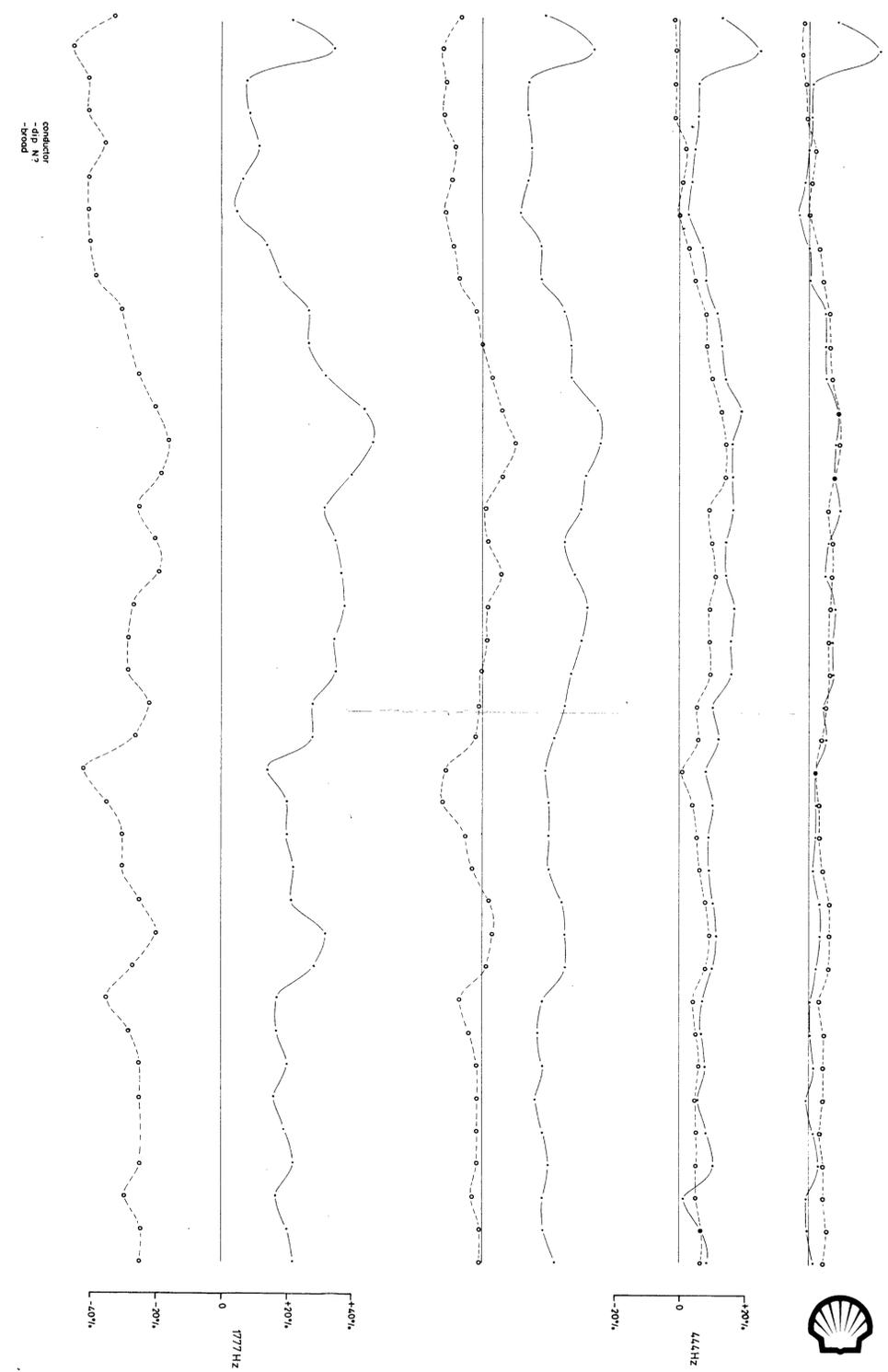
1434

1435

MAX - MIN  
IN PHASE  
OUT PHASE  
COIL SEPARATION = 180M

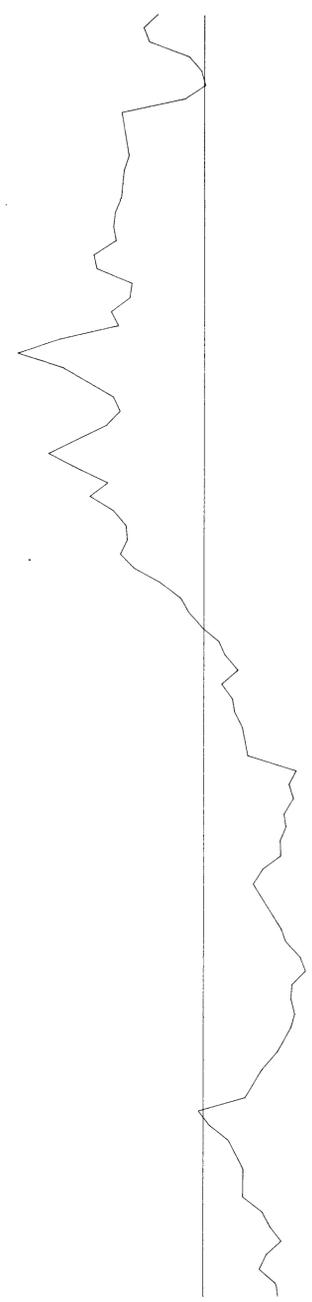
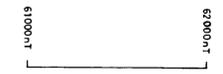


4400 N  
4600 N  
4800 N  
5000 N  
5200 N



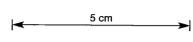
conductivity  
dip  
N 7  
- broad

MAGNETICS



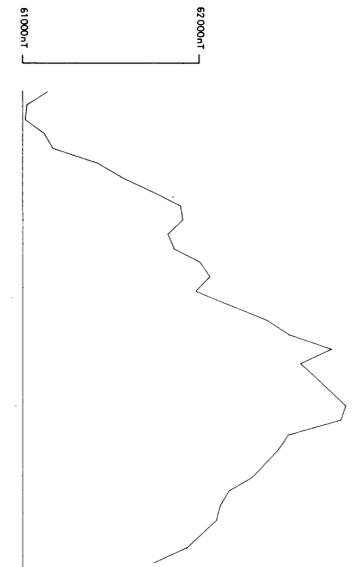
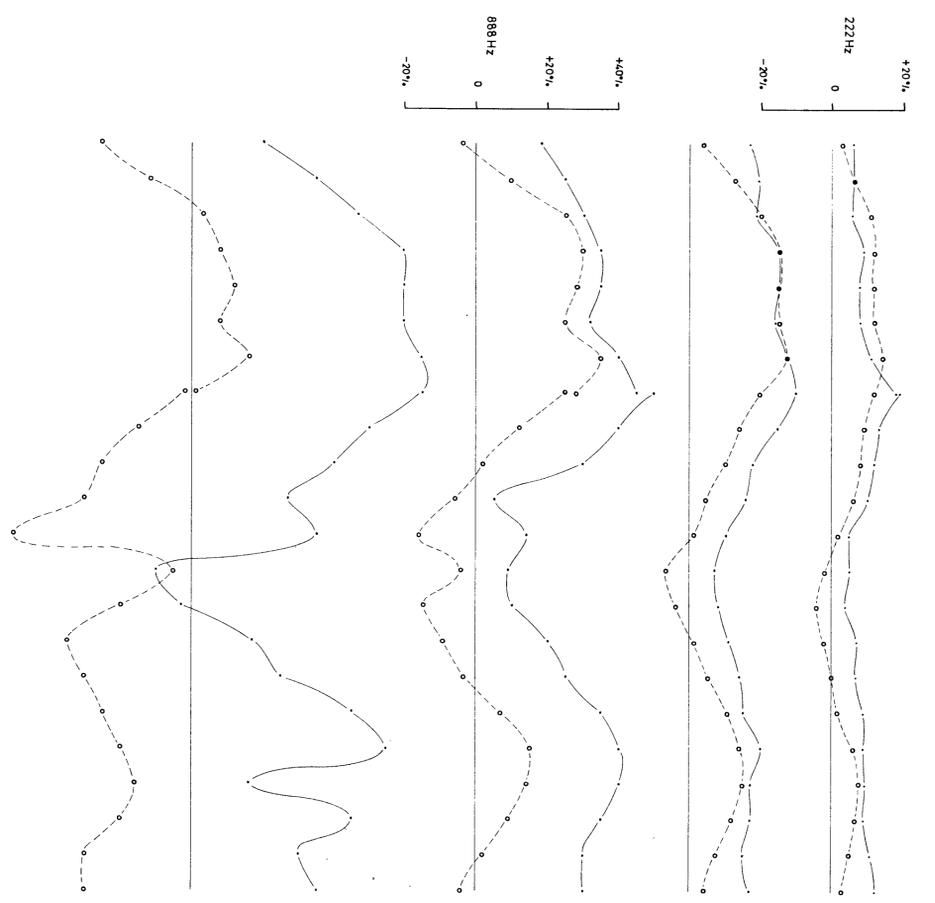
The Shell Company of Australia Limited METALS DIVISION			
E.L. 4/77 HIGHCLERE IH 10 - ST JOSEPHS R-LINE 4500 E			
- MAX - MIN - MAGNETICS			
		1435	
84-2276 vol 2			
SCALE	1: 2500	DATE	15-10-82
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP. No.	
ENCL. No.		DRG. No.	D/M003/068

285121



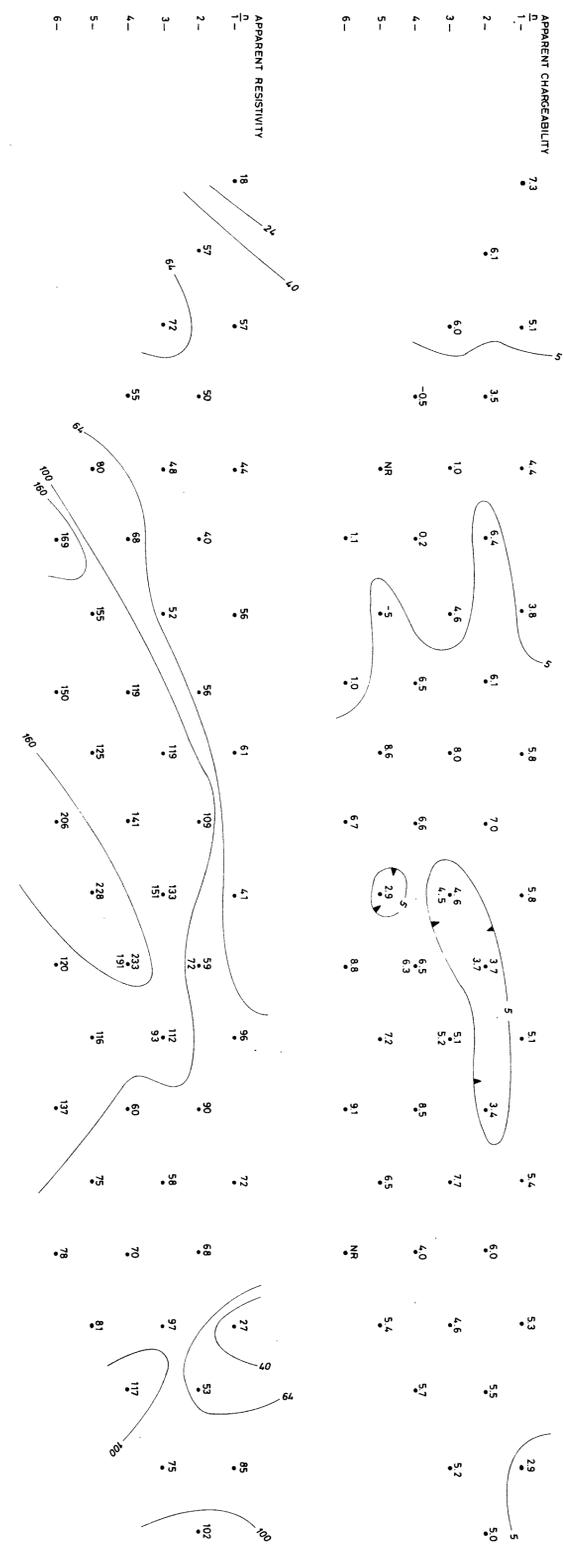
1436

MAX-MIN  
COIL SEPARATION = 150 M  
IN PHASE  
OUT PHASE



MAGNETICS

IP/RESISTIVITY



Contractor : SCHNITZER  
 Date : 13-10-82  
 Timing : 2 SEC  
 Transmitter : IPC-7 2.5kW  
 Receiver : IPR-8  
 Array : DIPOLE DIPOLE  
 Dipole length : 80 M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE IH 10 - LINE 4650 E - MAX-MIN - MAGNETICS - IP/RESISTIVITY 1436	
84-2276 vol 2	
SCALE 1: 2500	DATE 22-10-82
AUTHOR G OAKES	DRAWN H.L.S.
OFFICE DEVONPORT	REP No.
ENCL No.	DRG No. D/MQ03/074

285122

5 cm



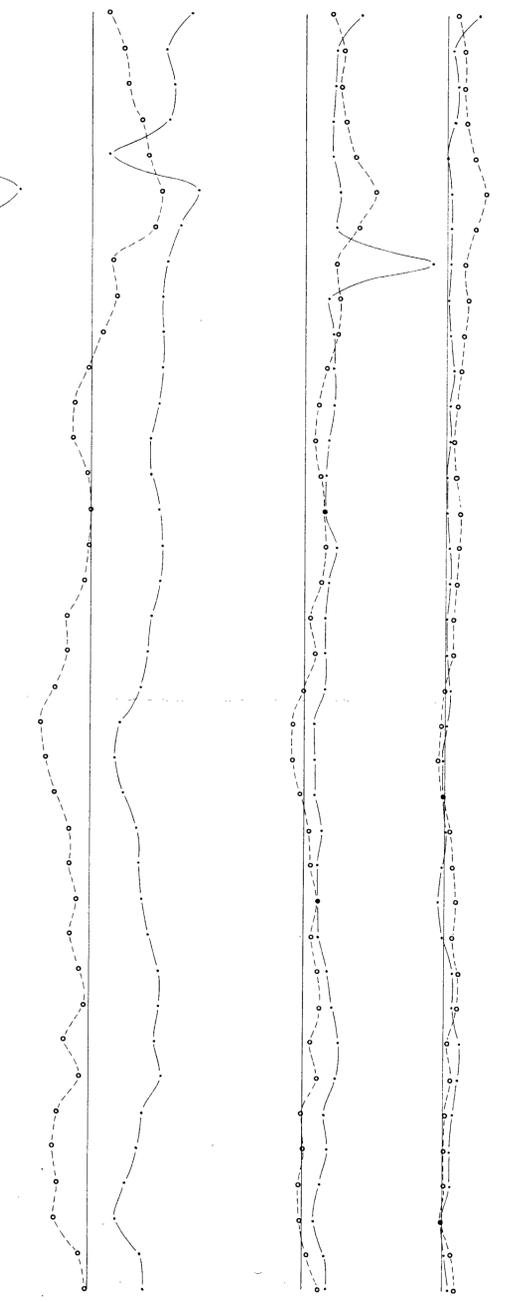
0 100 200 M

1437

MAX-MIN  
IN PHASE  
OUT OF PHASE  
COIL SEPARATION = 190M

4 300 E  
4 500 E  
4 700 E  
4 900 E  
5 100 E

222 Hz  
+20%  
0  
-20%



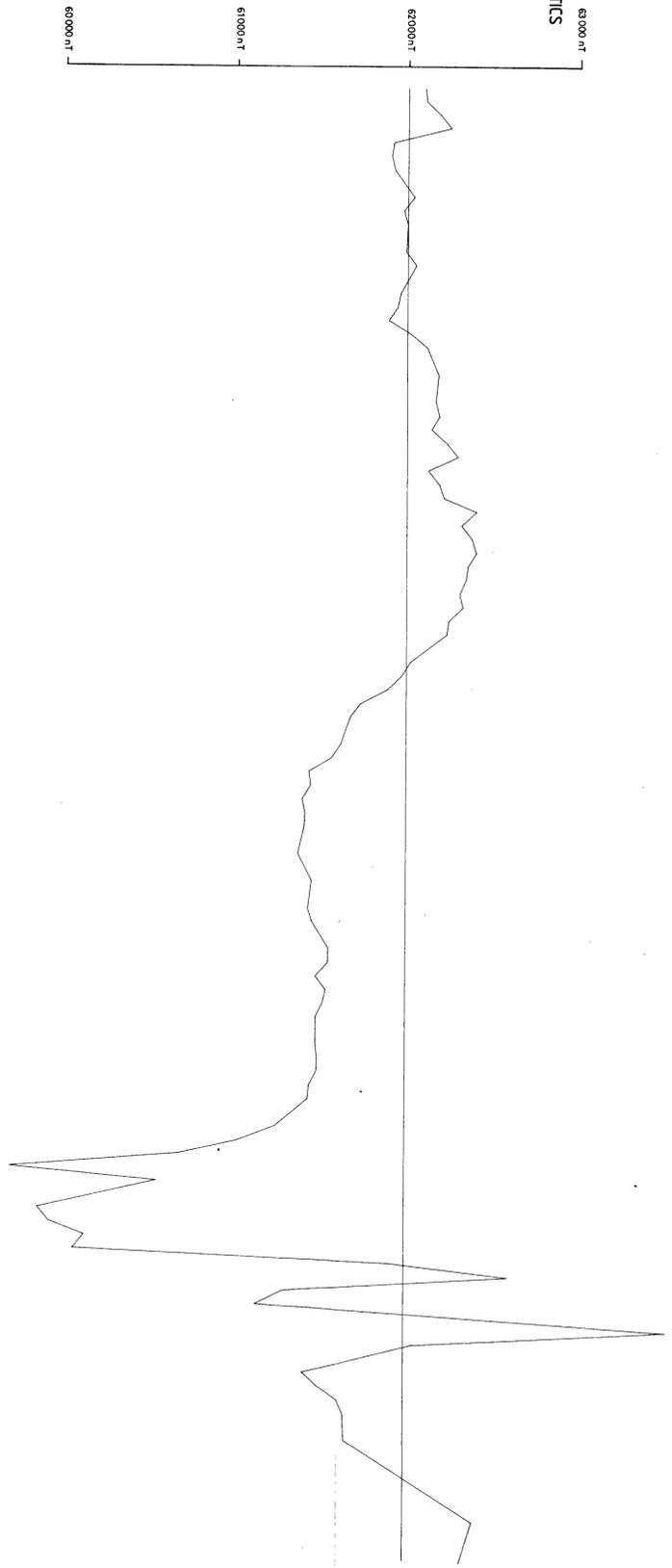
4.4 Hz  
+20%  
0  
-20%



1777 Hz  
+40%  
+20%  
0  
-20%  
-40%



conductor 2  
conductor  
conductor 3



63 000 nT  
MAGNETICS  
62 000 nT  
61 000 nT  
60 000 nT

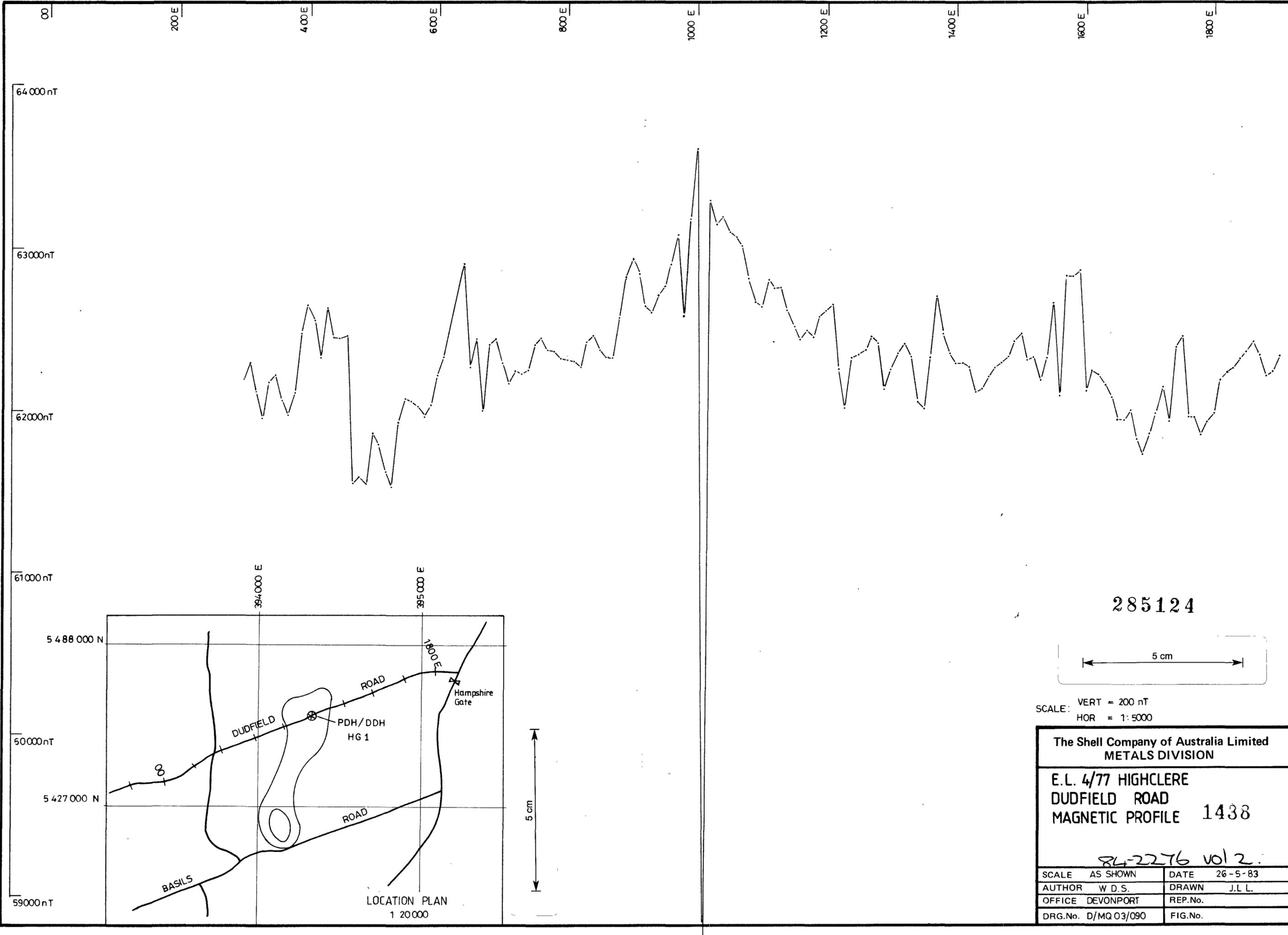


0 100 200M

The Shell Company of Australia Limited METALS DIVISION			
E.L. 4/77 HIGHCLERE IH10-ST JOSEPHS R.-LINE 4750E -MAX-MIN -MAGNETICS			
1437			
84-2276 1012			
SCALE 1: 2500	DATE 15-10-82		
AUTHOR G. DARES	DRAWN H.L.S.		
OFFICE DEVONPORT	REP No		
ENCL No	DRG No D/M003/069		

285123

5 cm

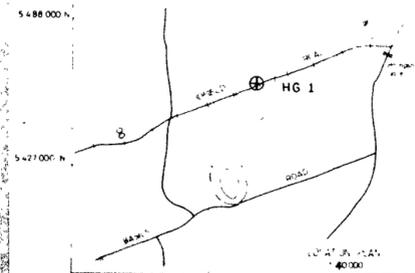


The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE DUDFIELD ROAD MAGNETIC PROFILE 1438	
84-2276 vol 2.	
SCALE AS SHOWN	DATE 26-5-83
AUTHOR W D.S.	DRAWN J.L.L.
OFFICE DEVONPORT	REP.No.
DRG.No. D/MQ 03/090	FIG.No.

AIRBORNE GEOPHYSICS  
(E.M. MAG, etc)

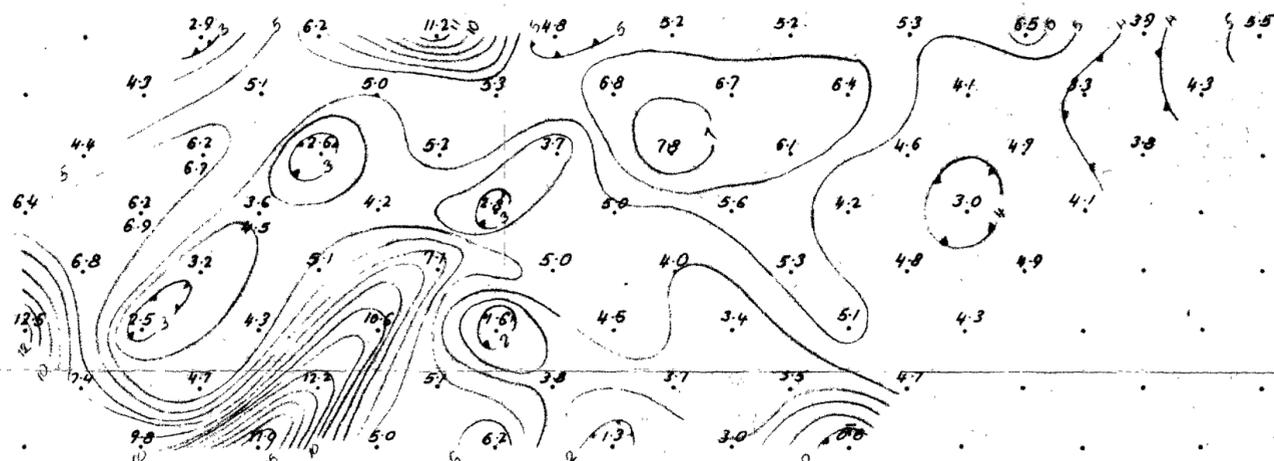
GROUND  
MAGNETICS

GEOLOGY  
& TOPOGRAPHY

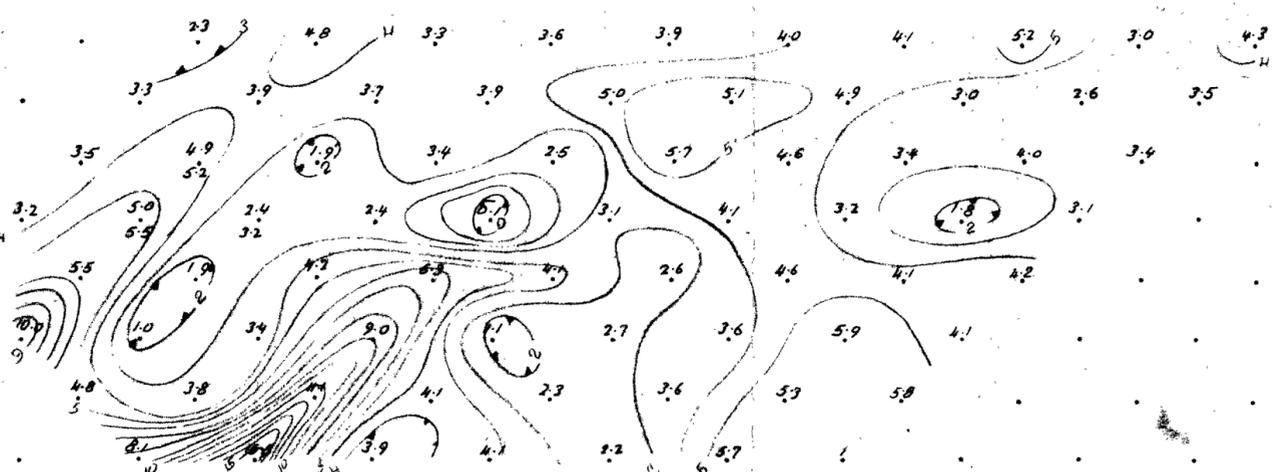


DDH HG 1 (0-206m Tb  
206-248m Mag. Skarn  
248-258.5m Pelites & Carbonates, Ordovician?)

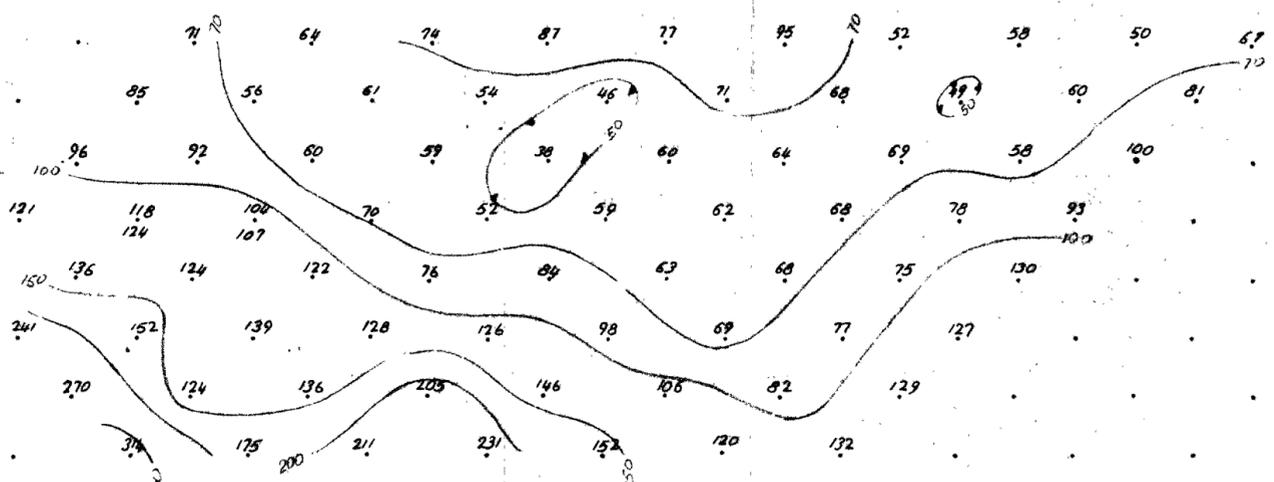
APPARENT CHARGEABILITY (MG)



APPARENT CHARGEABILITY (M7)



APPARENT RESISTIVITY



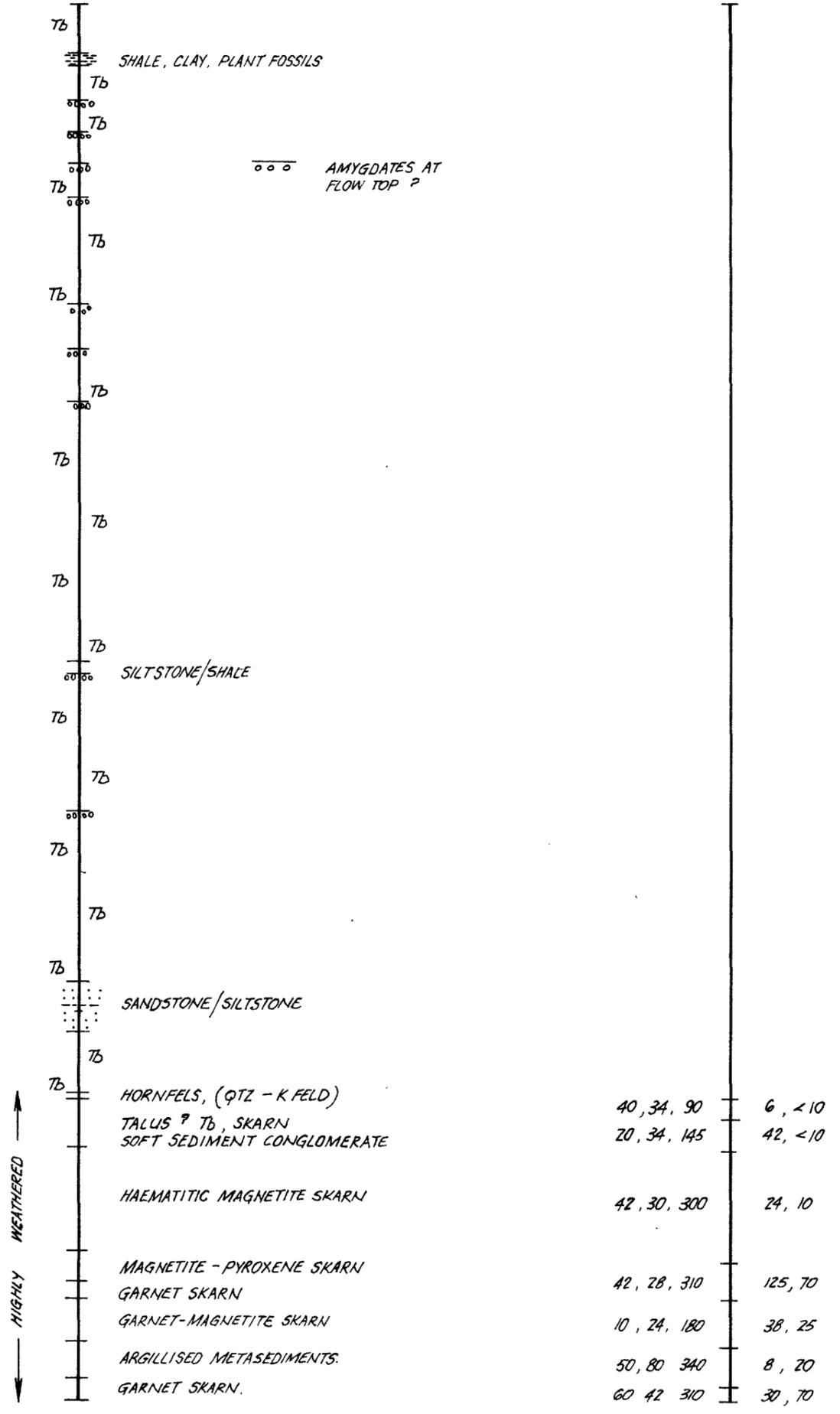
Contractor SCINTREX  
Date 13-15 DEC 1982  
Timing 2 sec  
Transmitter  
Receiver  
Integration time  
Array Dipole-dipole  
Dipole length 200m

285125

5 cm

The Shell Company of Australia Limited METALS DIVISION	
IP / RESISTIVITY SURVEY E.L. 4/77 HIGHCLERE DUDFIELD ROAD 1439 I.P. AND MAGNETICS Scale 1:10,000	
FIG. No.	REPORT No.
INCL. No.	DATE
DATE	AUTHOR
Checked	OFFICE

84-2276 vol 2.

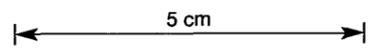


LITHOLOGY

ANALYSIS

Cu, Pb, Zn | Sn, W  
Analysis in ppm.

285126



The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE DUDFIELD ROAD HG 1	
1440	
84-2276 VOL 2.	
SCALE 1 1000	DATE 23-5-83
AUTHOR W.D.S.	DRAWN J.L.L.
OFFICE DEVONPORT	REP.No.
DRG.No. D/MQ03/089	FIG.No.

MAX-MIN  
 COIL SEPARATION = 200M  
 IN PHASE  
 OUT PHASE

222Hz  
 0  
 -20%  
 +20%

888Hz  
 0  
 -20%  
 +20%

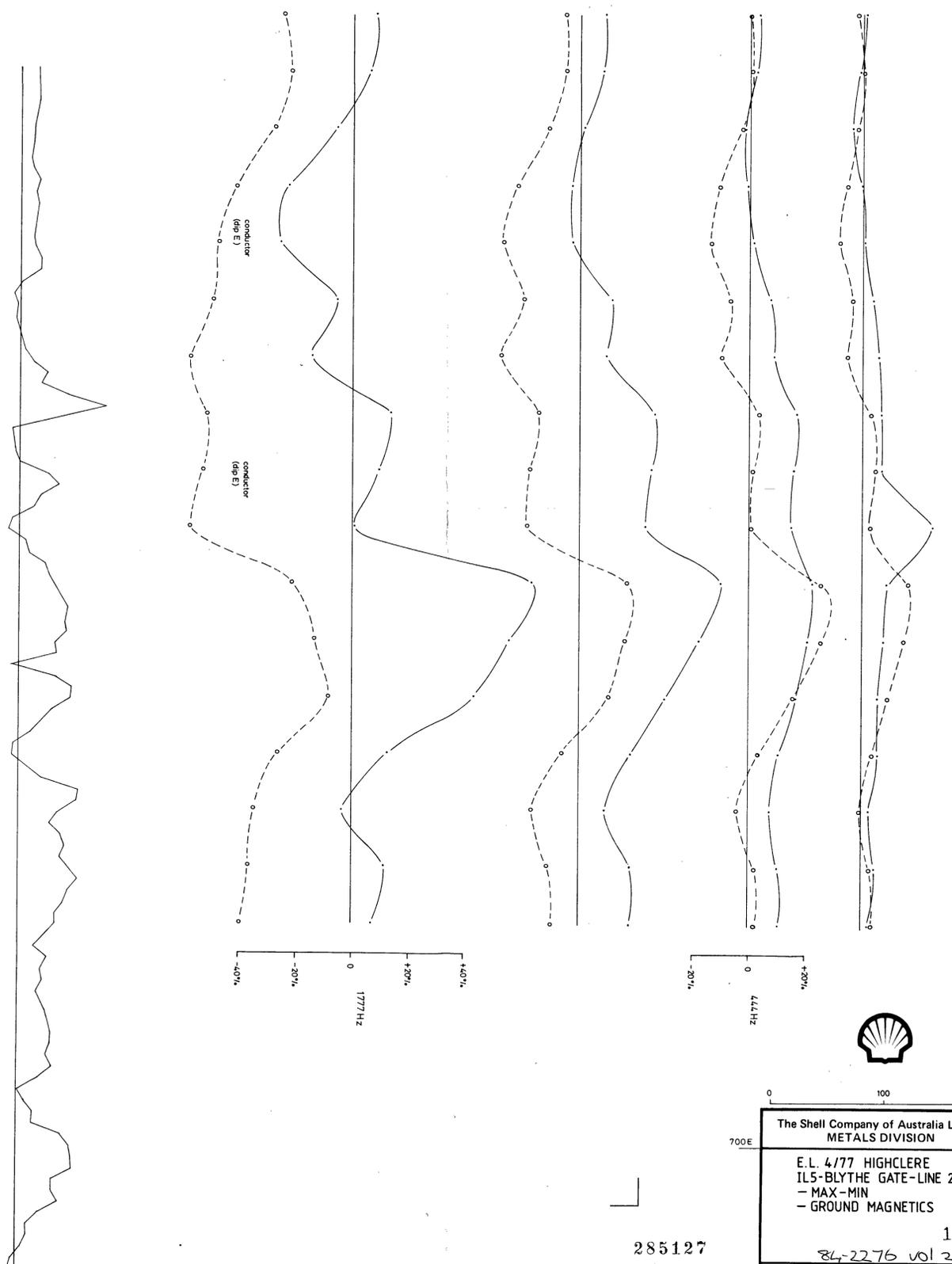
1777Hz  
 0  
 -20%  
 +20%

444Hz  
 0  
 -20%  
 +20%

300 W  
 100 W  
 100 E  
 300 E  
 500 E

GROUND MAGNETICS  
 READING SCALE 200NT/KM

63000NT  
 63000NT



0 100 200 M

The Shell Company of Australia Limited  
 METALS DIVISION

E.L. 4/77 HIGHCLERE  
 IL5-BLYTHE GATE-LINE 200 S  
 - MAX-MIN  
 - GROUND MAGNETICS

1441

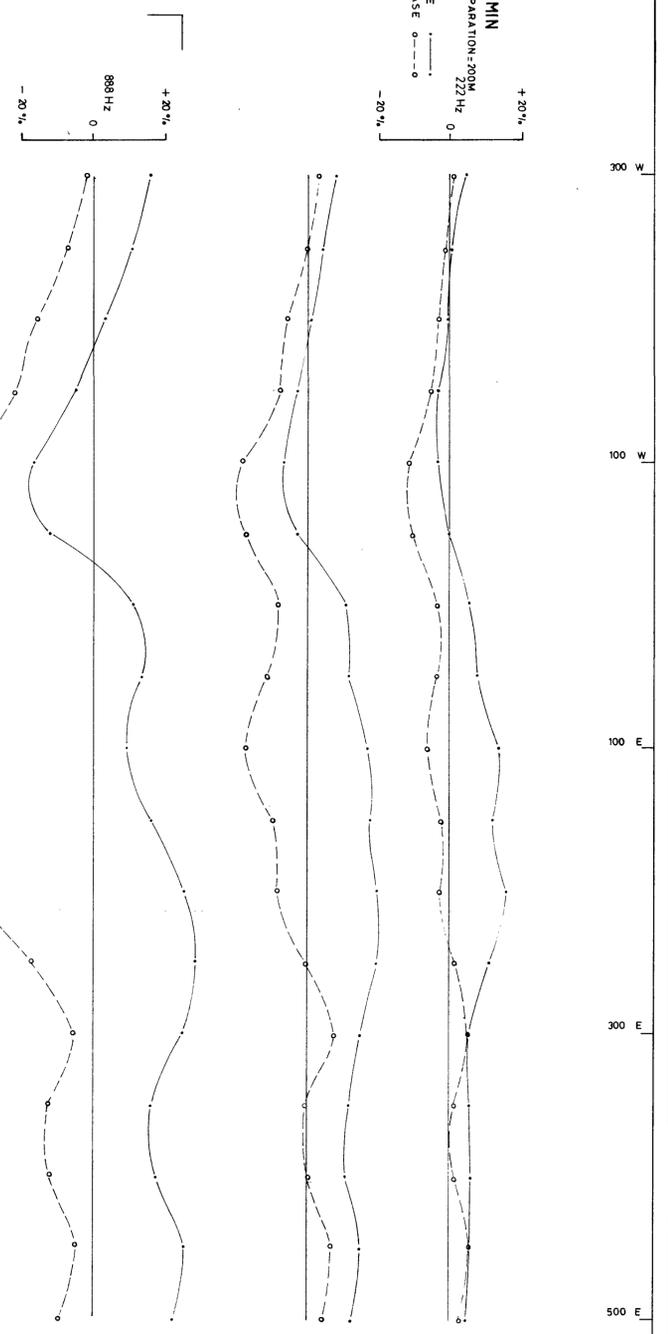
285127

5 cm

SCALE	1: 2500	DATE	4-10-82
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP No.	
ENCL No.		DRG No.	D/MQ03/064

1442

MAX-MIN  
 COIL SEPARATION = 700M  
 222 Hz  
 IN PHASE  
 OUT PHASE

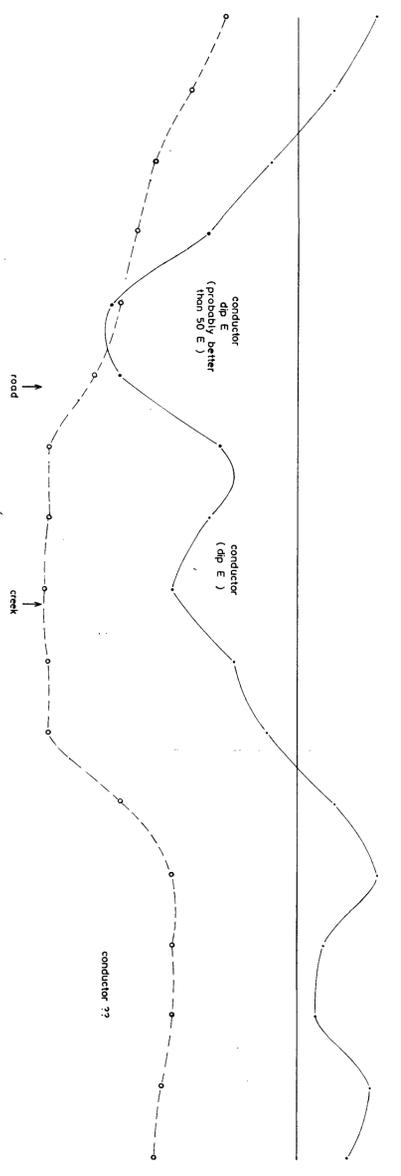


The Shell Company of Australia Limited  
 METALS DIVISION

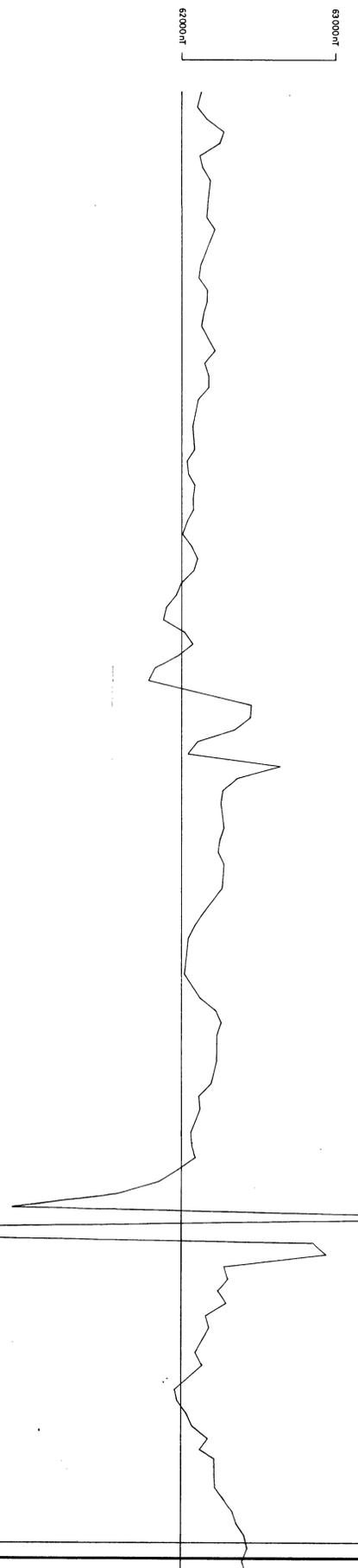
E.L. 4/77 HIGHCLERE  
 IL5-BLYTHE GATE-LINE 100S  
 - MAX-MIN  
 - GROUND MAGNETICS  
 - IP/RESISTIVITY 1442

84-2276 VOL 2

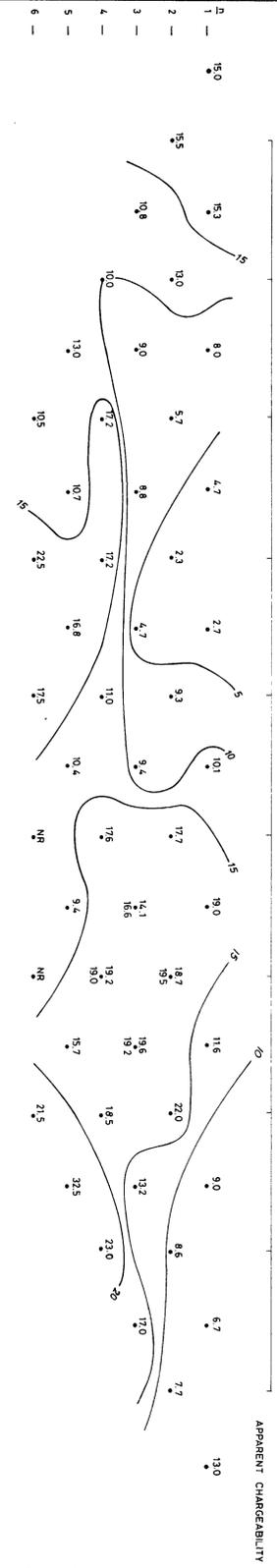
SCALE	1:2500	DATE	21-6-83
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP. No.	
ENCL. No.		DRG. No.	D/M003/062



GROUND MAGNETICS  
 READING SCALE = 2000T/cm

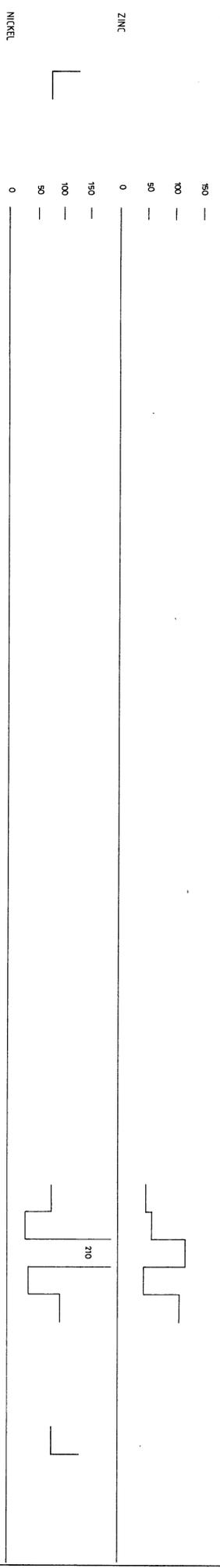


IP/RESISTIVITY



Contractor SCINTREX  
 Date 4-10-82  
 Timing 2 SEC  
 Transmitter IP & 25KV  
 Receiver IP & 25KV  
 Arrow  
 Dipole length 100M

SOIL SAMPLE RESULTS  
 (ppm)

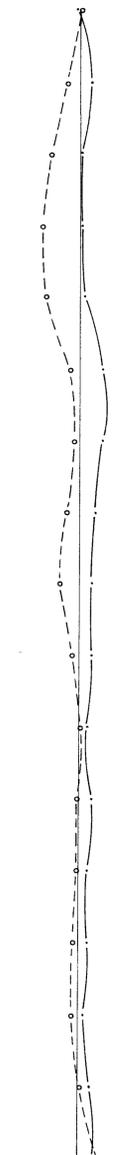


285128

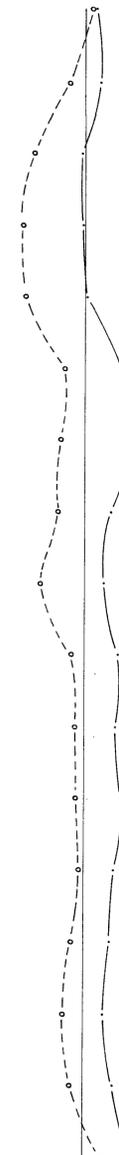
1474

MAX-MIN  
COIL SEPARATION = 200M  
IN PHASE - - - - -  
OUT PHASE 0 - - - - -

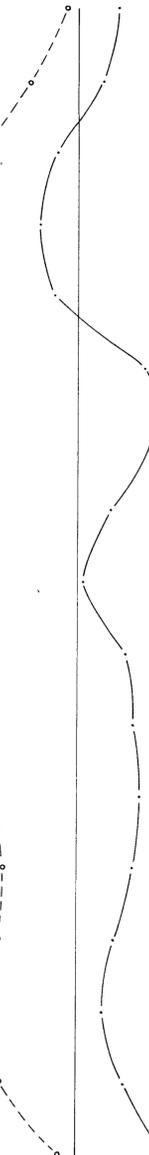
222Hz  
+20%  
0  
-20%



444 Hz  
+20%  
0  
-20%

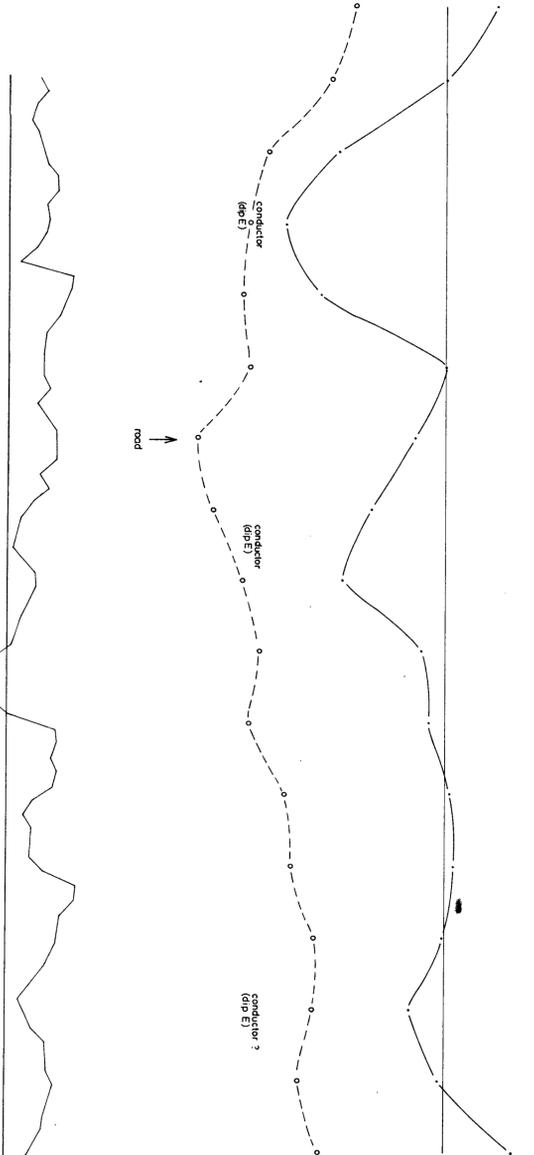


888 Hz  
+20%  
0  
-20%



GROUND MAGNETICS  
READING SCALE = 200nT/cm

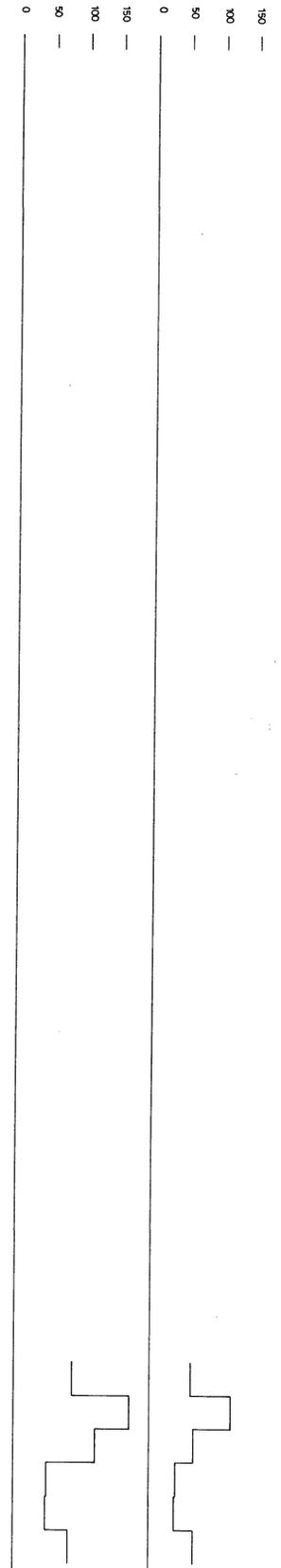
63000nT  
+20%  
0  
-20%



SOIL SAMPLING RESULTS  
(ppm)

ZINC  
150  
100  
50  
0

NICKEL  
50  
100  
150  
0



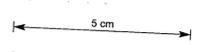
The Shell Company of Australia Limited  
METALS DIVISION

E.L. 4/77 HIGHCLERE  
IL5-BLYTHE GATE-LINE ON  
- MAX-MIN  
- GROUND MAGNETICS  
1443

84-2276 vol 2

SCALE 1:2500	DATE 21-6-83
AUTHOR G. OAKES	DRAWN H.L.S.
OFFICE DEVONPORT	REP.No.
ENCL No	DRG No D/MQ03/063

285129

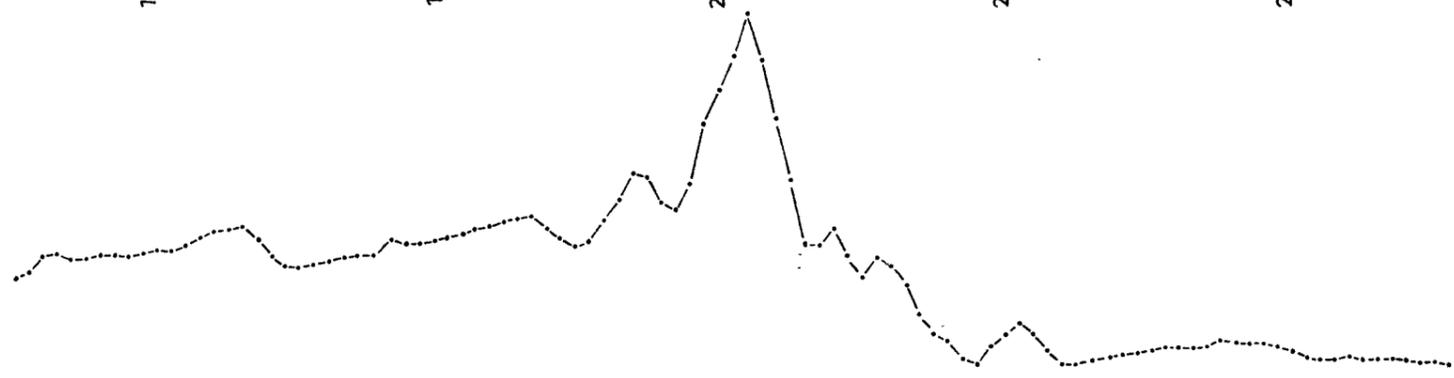


300 W  
100 W  
100 E  
300 E  
500 E

GROUND MAGNETICS

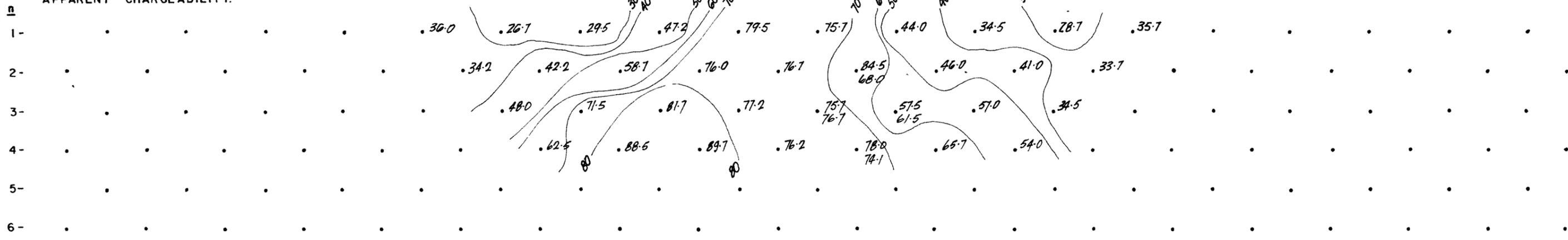
62 800 nt —  
62 600 nt —  
62 400 nt —  
62 200 nt —  
62 000 nt —  
61 800 nt —

1600E 1800E 2000E 2200E 2400E

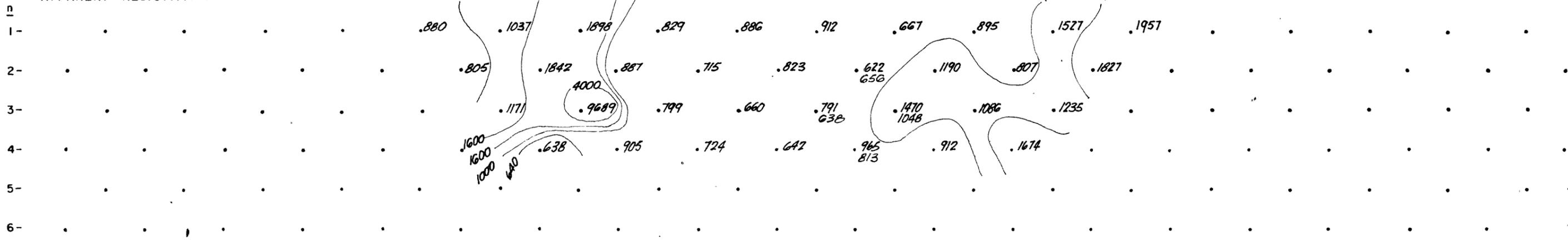


GEOLOGY & TOPOGRAPHY

APPARENT CHARGEABILITY.



APPARENT RESISTIVITY.

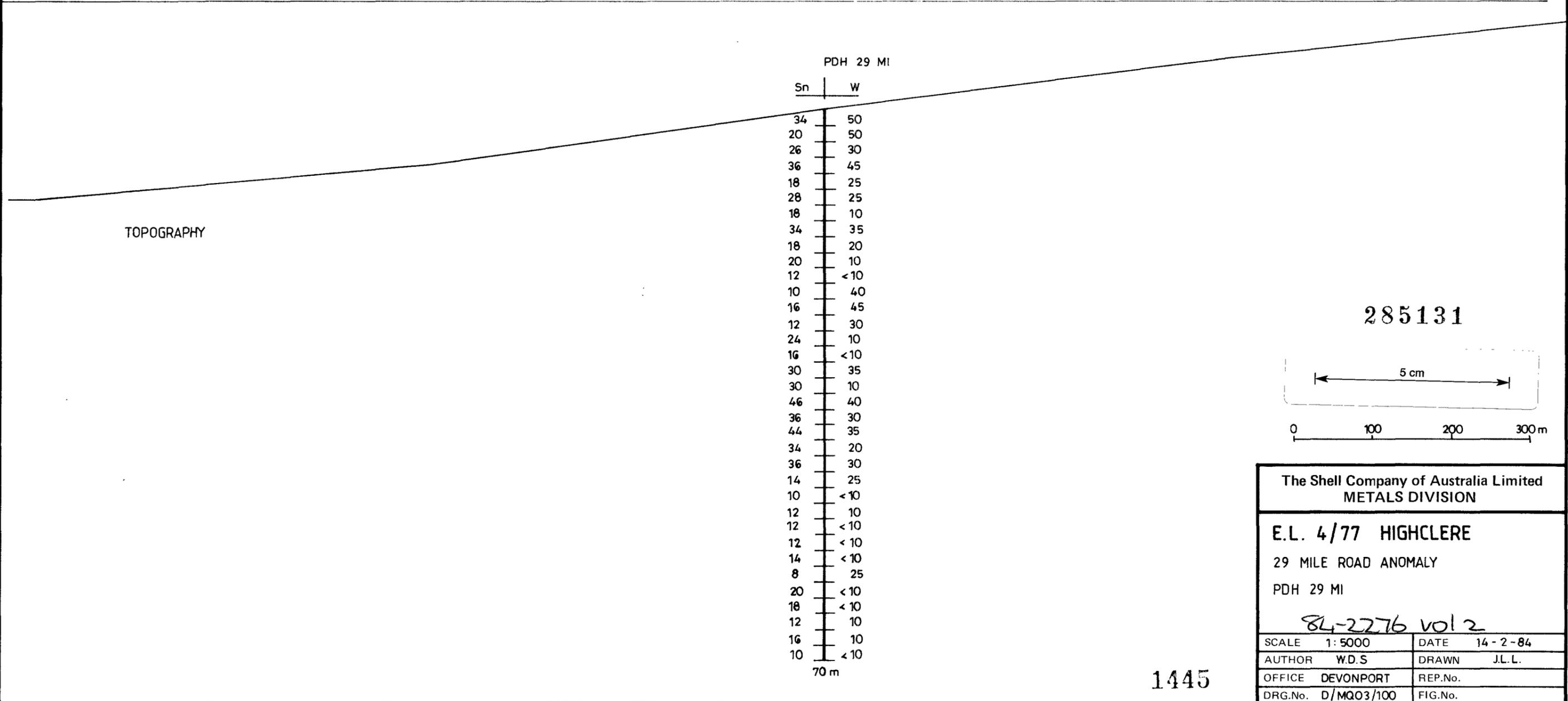
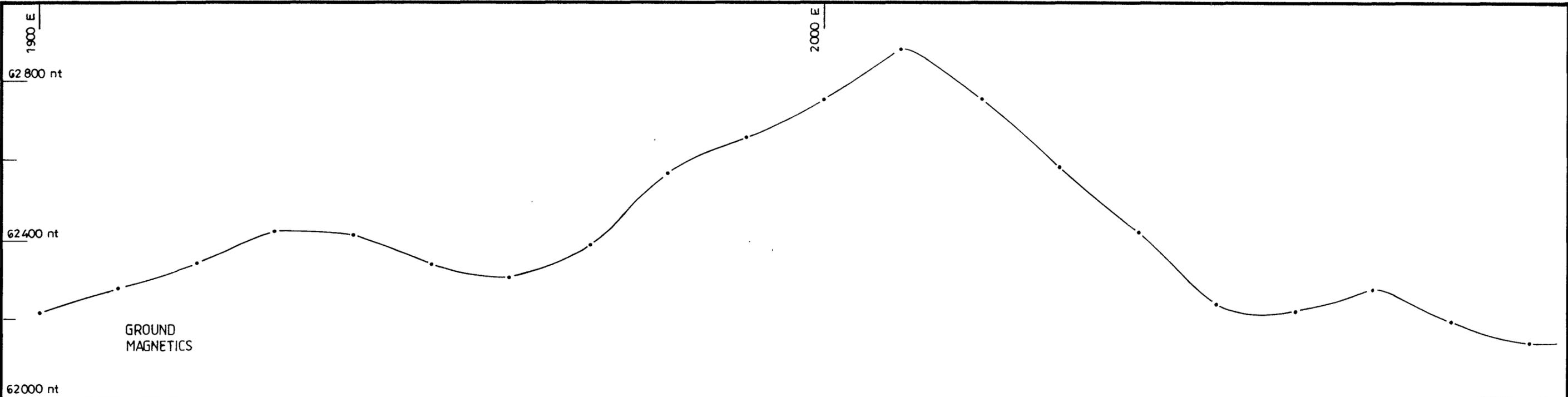


Contractor : SCINTREX PTY.LTD.  
Date : 24-8-83  
Timing : 2 Sec.  
Transmitter : 1 PTAA 3kw  
Receiver : 1 PR8 (305122)  
Integration time :  
Array : DIPOLE - DIPOLE  
Dipole length : 100 m

285130

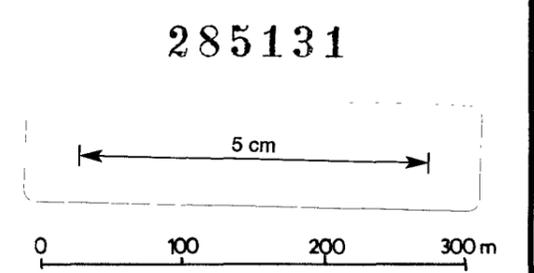
1444

The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE 29 MILE ROAD I.P. / RESISTIVITY SURVEY	
84-2276 vol 2	
SCALE	DATE 24-8-83
AUTHOR	DRAWN J.L.L.
OFFICE D'PORT	REP No
DRG No DMQ03/94	FIG No



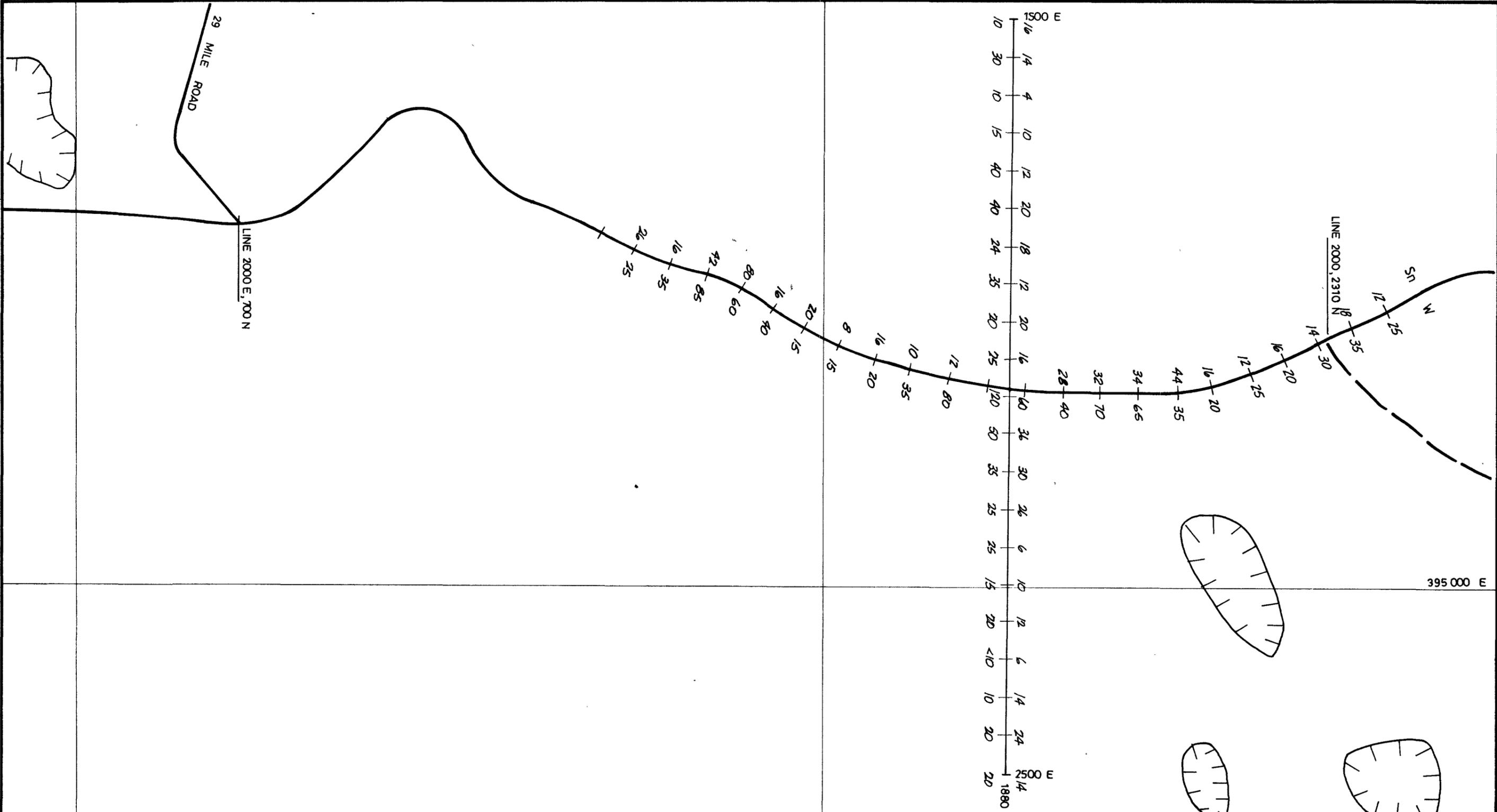
Sn	W
34	50
20	50
26	30
36	45
18	25
28	25
18	10
34	35
18	20
20	10
12	<10
10	40
16	45
12	30
24	10
16	<10
30	35
30	10
46	40
36	30
44	35
34	20
36	30
14	25
10	<10
12	10
12	<10
12	<10
14	<10
8	25
20	<10
18	<10
12	10
16	10
10	<10

70 m



The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE	
29 MILE ROAD ANOMALY	
PDH 29 MI	
84-2276 vol 2	
SCALE 1:5000	DATE 14-2-84
AUTHOR W.D.S	DRAWN J.L.L.
OFFICE DEVONPORT	REP.No.
DRG.No. D/MQ03/100	FIG.No.

1445

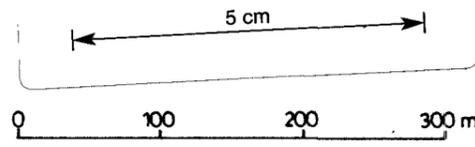


5421000 N

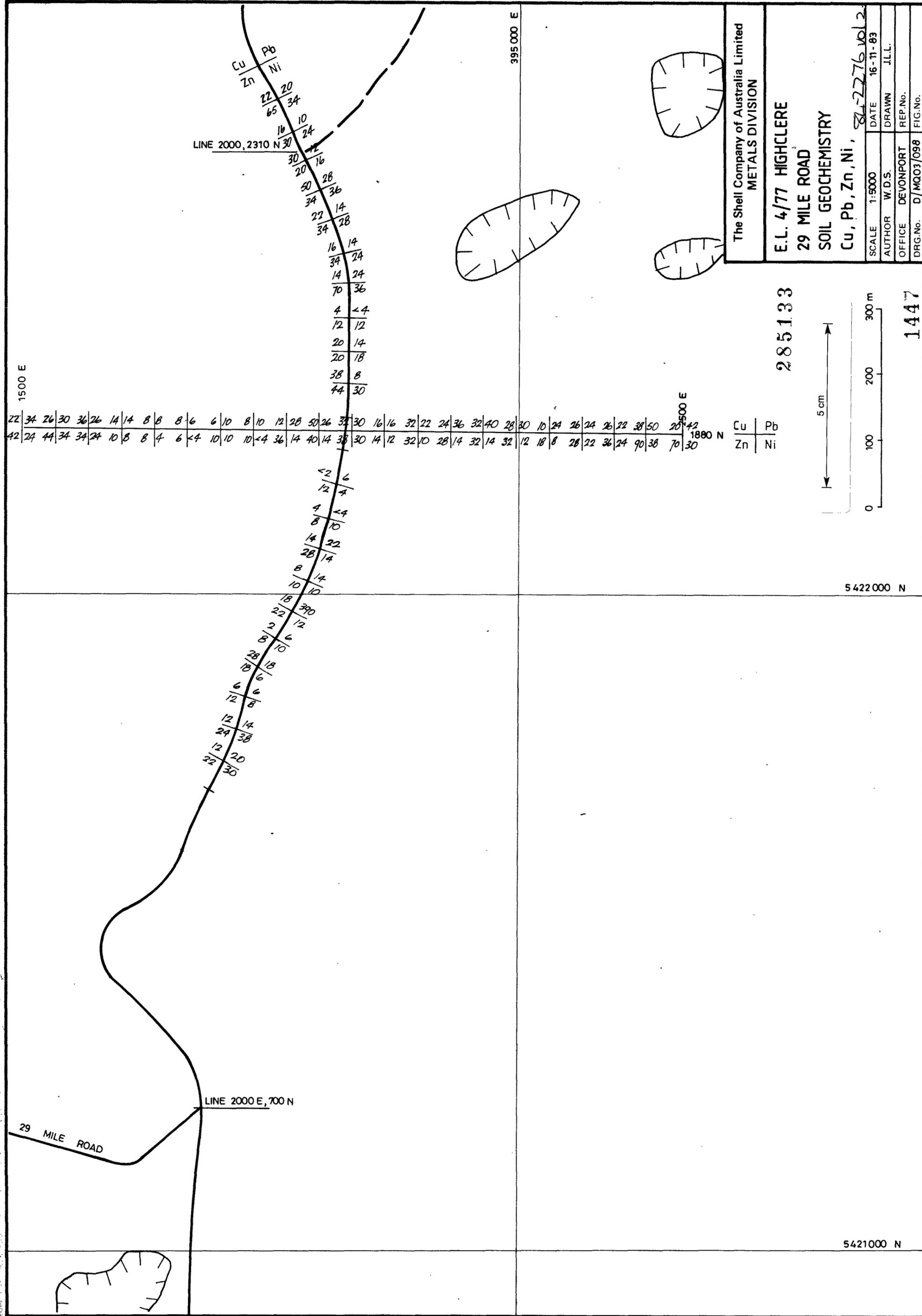
5422000 N

285132

1446



The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE 29 MILE ROAD SOIL GEOCHEMISTRY Sn, W	
84-2276 vol 2	
SCALE 1:5000	DATE 16-11-83
AUTHOR W.D.S.	DRAWN J.L.L.
OFFICE DEVONPORT	REP.No.
DRG.No D/MQ03/097	FIG.No.



LINE 2000, 2310 N

Cu	Pb
Zn	Ni
22	20
65	34
16	10
30	24
30	12
20	16
50	28
34	36
22	14
34	28
16	14
34	24
14	24
70	36
4	<4
12	12
20	14
20	18
38	8
44	30

22	34	26	30	36	26	14	14	8	8	8	6	6	10	8	10	12	28	50	26	32	30	16	16	32	22	24	36	32	40	28	30	10	24	26	24	26	22	38	50	20	42
42	24	44	34	34	24	10	8	8	4	6	<4	10	10	10	<4	36	14	40	14	38	30	14	12	32	10	28	14	32	14	32	12	18	8	28	22	36	24	90	38	70	30

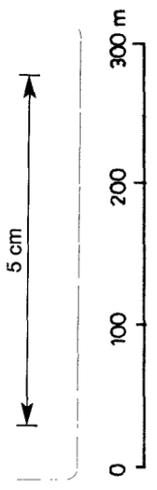
<2	6
12	4
4	<4
8	10
14	22
28	14
8	14
10	10
18	10
22	390
2	12
8	6
18	10
18	18
6	6
12	8
12	14
24	38
12	20
22	30

The Shell Company of Australia Limited  
METALS DIVISION

E.L. 4/77 HIGHCLERE  
29 MILE ROAD  
SOIL GEOCHEMISTRY  
Cu, Pb, Zn, Ni, *84-2276 vol 2*

SCALE	1:5000	DATE	16-11-83
AUTHOR	W.D.S.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REF.No.	
DRG.No.	D/MG03/098	FIG.No.	

285133



1447

5422 000 N

5421 000 N