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EXPLORATION LICENCE 1/62
(Area subject to Application for Extension)

ANNUAL REPORT

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SUMMARY

An active exploration programme has been aimed at searching for gold-bearing sulphides associated with the Henty Fault.

Previous exploration in the vicinity of Murchison River had been aimed at tin mineralization. Reassaying of old core produced significant gold values (MRP 233: 3.0m @ 4.3 g/t Au), associated with pyrite-arsenopyrite in altered arenaceous sediments immediately east of the fault. An IP survey indicated a chargeability anomaly associated with the mineralization.

A seven-hole drilling programme has been completed in 1987, which has successfully delineated a gold deposit. The mineralization is specifically related to a chlorite-altered andesitic arenite unit within the Farrell Sequence, east of the Henty Fault; usually within 15-30m of the fault. An outline diamond drilling programme is proposed for 1988 in order to define the size, geometry and overall grade of the mineralization.

Detailed ground surveys have been completed on the remainder of the Henty Fault within EL 1/62, but there has been insufficient time to drill test defined targets. There is a total strike length of 9.7 km of the Henty Fault in the EL, and an application is being made to the Department of Mines for an

extension on the EL in order to properly explore the untested parts of the Fault.

Most of the ground work has been completed and the bulk of the proposed work is diamond drilling.

CONCLUSIONS & RECOMMENDATIONS

Exploration on the Henty Fault within EL 1/62 has been successful in proving the presence of a gold bearing sulphide deposit adjacent to the Fault at the Lakeside Prospect (previously Murchison River). The deposit dips parallel to the Fault, between 15 and 30m into the footwall. The sulphides are obviously replacement, and are associated with a structurally prepared arenaceous unit with the Farrell Sequence to the east of the Fault.

In the Sterling Valley licence to the south, an arsenopyrite-pyrite deposit, carrying low gold values (0.8 g/t), has been delineated to the west of the Fault in intermediate lavas and pyroclastics. Pyrrhotite is also present in significant amounts.

The presence of tin (up to 3800 ppm) with the sulphides is strong evidence for a Devonian mineralising event; probably related to a deep granite (>1 km), interpreted from gravity and magnetics to be present in the region.

The spatial relationship of the mineralization to the Henty Fault is an important genetic factor. The Fault has been active, probably from PreCambrian times, to Devonian. If the Fault has been a major conduit for hydrothermal fluids any sulphides would be preferentially precipitated under the right P/T conditions, in a favourable host either side of the fault.

Due to the variety of lithologies adjacent to the Fault within EL 1/62, the area represents a prime exploration target.

IP and ground magnetics can be successfully used to define target areas, together with detailed mapping where possible. Extensive glacial cover presents problems to exploration and essentially precludes the use of surface geochemical techniques.

A major diamond drilling programme is recommended to further outline the mineralization at Lakeside, and to test targets on other parts of the Fault.

1.0 INTRODUCTION

This report represents the results of exploration completed during 1987, on that part of EL 1/62 covering the Henty Fault Zone (HFZ). It is intended to apply for an extension to the licence beyond its expiry date of January 22nd 1988, in order to complete testing of defined targets, and complete a further drilling programme on the Lakeside Prospect.

The defined area is indicated on Figure 1 and can be subdivided into three areas; South Stitt, Murchison and Mackintosh. Within the Murchison Area, three sub areas are dealt with separately; Lakeside, Murchison-Central and North Lakeside-Duttons.

The total area to be applied for is approximately 20 sq kms.

The target within the defined area is gold-bearing stratiform sulphides related to the Henty Fault. The discovery by RGC of the Henty Prospect has highlighted the prospectivity of the Fault Zone.

2.0 TENEMENT STATUS

Exploration licence 1/62 consists of one irregular block that partially encloses the Rosebery mine lease.

The Mt. Black EL 1/62 of 170 sq km was granted to the EZ Company in 1962. Since 1978, the EL was the subject of a Joint Venture between EZ Company and Getty Oil Development Corporation. The agreement allowed GODC to earn a 40% interest in 138 sq km of the EL but did not include the 32 sq km Rosebery Mine Lease. EZ was the operator of the Joint Venture from April 1978 to November 1983.

In November 1983, the Mt. Black Joint Venture Supplementary Agreement divided the 138 sq km Joint Venture area into a 22 sq km "Tin Area", known as the Colebrook Project area (operated by EZ), and a 116 sq km "Lead-Zinc Area" known as the Rosebery East Project Area (operated by GODC). However, during 1984 GODC was taken over by Texaco at which time the Rosebery East area was put up for tender.

In January 1985, EL 1/62 was reduced to 125 sq km as required by Mines Department regulations. This reduction was from the Rosebery East Project Area which then covered 103 sq km. During 1985, negotiations with prospective buyers resulted in acquisition of the GODC interest in the Rosebery East area by Little River Goldfields N.L.

On the 26th October 1985, a new agreement was formulated between The Shell Company of Australia Limited and Little River (Resources) Proprietary Limited and Electrolytic Zinc Company of Australasia Limited. Under the terms of this agreement, Shell may earn a 50% equity in the Rosebery East area until 22nd January 1988. At this time, under Mines Department regulations, the entire licence must be relinquished.

At the end of December 1986, Shell had earned its 50% equity in the Rosebery East JV area. The current equities of the JV participants are:

Shell Company of Australia	:	52.61%
Norgold	:	26.31%
Little River (Resources) Pty. Ltd.	:	21.08%

During 1987, EZ Company assigned their interest in the JV to Norgold, a related corporation.

The part of the licence the subject of this report is being applied for as an extension to the EL. The remainder of the EL will be reported on separately and will be relinquished.

3.0 PREVIOUS EXPLORATION

The original lease holders, EZ Co., carried out extensive basic exploration on the licence over the period 1962-1978. Work included stream sediment sampling, extensive gridding (1 km spaced lines), geological mapping, rock chip sampling and petrology, auger 'C' horizon sampling of selected areas, IP coverage of a large portion of the licence and diamond drilling. Results and discussion of the work to 1978 are not presented here but contained in EZ Co. annual progress reports lodged with the Department of Mines.

More recent exploration carried out by the EZ/GODC joint venture included Dighem coverage of the entire EL, geological mapping and rock chip sampling, petrology, VLF and Max-Min EM, selected IP coverage, auger 'C' horizon geochemistry and diamond drilling. GODC separated the licence into individual work areas and have reported each separately, a system that will be adopted in this report. Details of their work on EL 1/62 are not presented here but may be ascertained by reference to the following reports.

Report No.	Company	Period/Title	Author
131	EZ Co.	Report on work undertaken to 30th June, 1979.	J.Mill
134	EZ Co.	Report on work undertaken to 30th June 1979-30th June 1980.	J.Mill et al
142	EZ Co.	Progress Report on Activity, July 1980-June 1981.	I.McDonald
144	EZ Co.	Progress Report on Activity, 1st July 1981-15th Dec. 1981.	I.McDonald et al
148	EZ Co.	Progress Report on Activity, 15th Dec. 1981-4th May 1982.	I.Mathieson et al
152	EZ Co.	Review of Rosebery East JV April, 1982.	Milovanovic
158	EZ Co.	Progress Report on Exploration Activity 5th May 1982-20th Nov. 1982.	I.Mathieson et al
T173	EZ Co.	Progress Report on Exploration 4th May-15th Nov. 1983.	I.McDonald
	GODC	Rosebery East Exploration Progress Report Aug. 1983 to June 1984.	F.Fitzgerald et al
	GODC	Rosebery East Exploration Progress Report July 1984 to December 1984	F.Fitzgerald et al
	GODC	Rosebery East Exploration Progress Report Jan-Aug 1985.	J.G.Purvis

Exploration completed by Shell in the period October 1985 to December 1986, was reported in Report No. 08.3412, Progress Report on Exploration for the Period Ending 22nd December, 1986, by J.P. Randell, J.G. Purvis and N. Hungerford.

The work done by Shell within the defined area of this report, was restricted to geological mapping, relogging and reassaying previous drilled core, surface geochemical sampling, review and reinterpretation of previous geophysical surveys, and diamond drilling.

It was the reassaying of drill core from Murchison River that indicated higher levels of gold than previously detected and has been the major factor in the discovery of a gold deposit at Lakeside.

4.0 REGIONAL GEOLOGY

The Henty Fault is a major structure within the Mt. Read Volcanics, and divides them into two series. The MRV are part of the late Precambrian-Cambrian Dundas Trough, situated between the unmetamorphosed preCambrian Rocky Cape Block to the NW, and the metamorphosed PreCambrian Tyennan Block to the SE.

Within the MRV, the Central Volcanic Sequence represents a core of calc alkaline acid-intermediate volcanics and minor sedimentary intercalations. North and west of the Henty Fault, the CVS is in faulted (thrust) contact with the Dundas Group sediments to the west. The relationship between the CVS and Dundas Group is still not clear, but there is evidence to suggest that they are partly time-equivalent and in places the Dundas Group overlies the CVS.

East and southeast of the Henty Fault the southern CVS is a complex association of felsic domes, flows, ignimbrites and pyroclastics. It is extensively overlapped by both the Tyndall Group and Owen Conglomerate. The Tyndall Group is a volcaniclastic sequence that only occurs east of the Henty Fault and its correlates are interpreted to extend from Queenstown to north of Hellyer. The sediments with minor intercalated tuffs of the Farrell Sequence (previously Farrell Slates), occur adjacent to the east side of the Henty Fault and are regarded as a part of the Tyndall Group or its correlates.

The Henty Fault is now known to extend for at least 60 km and to have a deformation zone up to 1 km wide. Both brittle and ductile effects are evident, and a complex multi-phase history seems likely. Probable splay faults are evident in the north at Mt. Cripps, Mt. Charter and the upper Mackintosh, while to the south the zone divides into three major structures - the North and South Henty Faults and the Great Lyell Fault. Devonian movement has probably been substantial - Gordon Limestone and Siluro-Devonian rocks are involved at Mackintosh. Over-thrusting of the Owen Conglomerate by Cambrian rocks has occurred at Mt. Farrell.

Several factors suggest that the Henty Fault has also been a significant structure in the Cambrian:

a) Neither the Tyndall Group nor the Owen Conglomerate extend west of the fault for most of its length, suggesting that it formed a bounding structure (or occupies the position of a bounding structure) when these units were deposited. The Great Lyell Fault was such a bounding structure for the bulk of the Owen Conglomerate at Queenstown.

b) The occurrence of basaltic sequences with pillow lavas in fault-bounded or partially fault-bounded wedges along the fault system at Que-Hellyer and Henty River, and of gabbros and ultramafic rocks in the latter, suggests the zone was a locus of tensional activity for a period in the Middle Cambrian.

c) The abundance of mafic dykes along the zone in the Henty-Murchison area, and of felsic dykes in the Mt. Charter-Hellyer area indicates that is was a locus of intrusive activity in the Cambrian.

5.0 HENTY FAULT ZONE

5.1 GEOLOGY

5.1.1 Henty Fault

In the vicinity of EL 1/62, the Henty Fault is a well-defined structure that separates the Mt. Black Volcanics of the Central Volcanic Sequence to the west, from the Farrell Sequence and Murchison Volcanics of the Tyndall Group to the east. The major fault contact is a strong north-south striking (011° AMG), steeply west dipping (65°) feature. A number of ancillory parallel faults are evident in the sediments to the east.

There is evidence of a strong stretching component within the early history of the HFZ, and the apparent steep plunge of ore bodies within the Farrell Slates reflects this.

In the vicinity of the Murchison Gorge, the Fault Zone is up to 1 km wide, and essentially confines the Farrell Sequence. The dominant mesoscopic structure is a strong N-S striking cleavage dipping steeply west; i.e. parallel to the Henty Fault proper. All other features within the Farrell sequence parallel this trend, including the known sulphide bodies e.g. Farrell, Murchison Mine, Duttons, Lakeside.

5.1.2 Mt. Black Volcanics

These are the local group of the Central Volcanic Sequence, and are a series of massive acid to intermediate lavas, pyroclastics and minor intrusives.

The dominant rock type adjacent to the Henty Fault is andesite, both lavas and tuffs. They are strongly feldspar phyric and chloritic. There is a minor component of basaltic units, possibly as dykes, but in places as lavas. To the north in the Farrell-Mackintosh area, the volcanics become more acid, consisting of a rhyolitic-dacitic sequence of lavas and pyroclastics.

A prominent feature of the andesites is a strong silicification close to the Henty Fault. This alteration can completely obliterate any original textures, and can be as much as 60m wide. There is no evidence of silicification east of the Fault.

5.1.3. Farrell Sequence

This name is used in preference to the historical name "Farrell Slates" which essentially referred to the host rock of the Farrell sulphide lodes.

In fact the sequence consists of shale, greywacke, quartz-feldspar phyric tuffs, vitric ash and minor lavas. It is interpreted to be west-facing, but the strong cleavage makes recognition of facing details rather speculative.

The Farrell Sequence apparently conformably overlies the Murchison Volcanics to the east, which are the local correlates of the Tyndall Group. They comprise highly sheared quartz-feldspar phyric rhyolitic tuff, lava and ignimbrite.

5.2 GEOPHYSICS

The geophysical target along the Henty Fault Zone is a small (minimum strike 200 metres) massive sulphide body with a probable halo of disseminated sulphides. The associated gold may or may not be directly related to sulphide concentration. The sulphides are assumed to occur primarily in the Farrell sequence close to and east of the Fault, with the predominant sulphide as pyrite with lesser pyrrhotite, arsenopyrite, galena and sphalerite.

Such a geophysical target requires a technique sensitive to relatively low (10-20%) sulphide concentrations. IP is the obvious tool although EM could have an application. A common factor that complicates IP and EM results from along the Henty Fault is the presence of graphitic slates in the

Farrell sequence. These are highly polarisable (or chargeable) and commonly, although not always, very conductive.

Thus discrimination between sulphides and graphite would be very useful. Variable surface topography and variable glacial thickness over the Fault precludes the use of gravity (although it has been attempted). The use of spectral IP is presently being investigated using the results of the recent IP surveys (sections 7.1 to 7.5).

Since the expected conductor size is small survey parameters must also be, for detection and discrimination between adjacent conductors. Gradient array was judged to be the most appropriate technique where this was practicable (i.e. where current electrodes could be readily laid out). Host rock resistivity is high so that current penetration to depth is assured. However since the geophysical target is probably small, this in consequence means that its detection is limited to less than 100m below surface. Where gradient array was not used, dipole-dipole array with a=40 or 50 metres was employed.

Longitudinal IP was considered but not used since prior knowledge of the Fault location is required in order to carry out the survey. In most of Billiton's areas the Fault is obscured by thick glacial cover.

The effectiveness of the gradient IP technique for this target type can be confirmed both at Billiton's Lakeside prospect and at Goldfield's Henty Prospect. The latter prospect was initially discovered as the result of a regional IP survey carried out by Scintrex in 1973. A strong chargeability and resistivity anomaly was recorded over shallow massive sulphides on one line with adjacent lines (about 120 metres on either side) showing weaker anomalies.

6.0 MINERALIZATION

The Farrell Sequence is a highly mineralized suite of rocks, with major production from the North Mount Farrell and New North Mount Farrell mines of Pb, Ag and Zn.

The mineralization is quite variable and appears in all cases to have both Cambrian and Devonian signatures. The Farrell lodes are steeply plunging massive sulphide veins, with high lead and silver, low zinc and no gold (recorded production: New North Mt. Farrell - 300,000t @ 15.5% Pb, 16.8oz/t Ag, 2.5% Zn; North Mt. Farrell: 432,000t @ 9.1% Pb, 9.5oz/t Ag). The sulphur isotopes indicate a Cambrian age, but the lead isotopes give a Devonian age. The tin content of the sulphides is not known.

At the Murchison Mine, about 3 km south of North Mt. Farrell, about 300t of recorded production gave 40% Pb, 55 oz/t Ag, 2.1 g/t Au, plus Cu (<0.5%) and Zn (<15%). This mineralization is a narrow (<5m) fissure fill/replacement sulphide lode, plunging south at 50°.

The Sterling Valley Mine in EL 4/73, is similar to the Murchison Mine, with relatively high tin and arsenic values. The higher gold values are correlated with higher As and Sn values. The mineralization is associated with strongly cleaved black shales.

Other Pb-Ag rich fissure fill occurrences are known in the area, e.g. Duttons, Green & Kings, Thomas Blocks etc, all within the Farrell Sequence.

A similar type of vein deposit has been discovered by EZ Company in EL 4/73, which occurs in the intermediate volcanics to the west of the Henty Fault. The association here is essentially just As and Au.

There is possibly a zoning of mineralization both in a N-S direction in the Farrell Sequence, from Pb-Zn-Ag-Au-As-Sn in the south to Pb-Ag-Zn in the north; and also in an across strike direction away from the Henty Fault. This may represent an interference pattern of Devonian As-Sn and Cambrian Pb Zn Ag Au.

7.0 WORK COMPLETED

The Henty Fault Zone (HFZ) within the area under consideration has been arbitrarily subdivided into individual prospect areas (see Figure 1). The detailed geological setting of these prospects is presented on a series of 1:5,000 topographical and geological sheets (see Figures 2 to 14) but that area covered by EL 4/73 is excluded from this presentation.

A list of the prospects is presented below:

Tullibardine	-	Sheet 1
Mackintosh	-	Sheets 1, 2
Farrell	-	Sheet 3
Duttons-Quarry Bay	-	Sheet 4
Murchison-Central	-	Sheet 4
Lakeside	-	Sheet 5
Sterling Valley	-	Sheets 5, 6, 7 (not presented)
South Stitt	-	Sheets 7, 8

7.1 LAKESIDE

7.1.1. Defined Area Sheet 5 (Figure 6, 12, 13)

The Lakeside prospect includes the Henty Fault and its immediate environs from the boundary of EL 1/62 and EL 4/73, northwards to Quarry Bay; a strike length of 1 km from 375000N to 376000N.

7.1.2. Local Geology

There is no outcrop of the Henty Fault or the adjacent lithologies. Glacial gravels completely cover the area, except where Lake Rosebery has flooded the Murchison River gorge.

Drilling by EZ Company and Billiton has provided some geological information. The Henty Fault has a consistent west dip of 65°, and strikes at 011° AMG. To the west of the fault is a sequence of feldspar phyric andesite tuffs and lavas, variably altered. The fault does not appear to be a single structure with evidence of parallel faults in the sediments to the east. These sediments are probably part of the Farrell Sequence and consist of a andesitic arenaceous volcaniclastics, black shales and tuffaceous sediments. The sequence appears to face west, with a dip sub-parallel to the Henty Fault.

7.1.3. Work Completed

Diamond drilling and surface and down-hole geophysical surveys, have been completed over the area, together with relogging and reassaying of previously drilled core.

Drilling: Seven diamond drill holes were completed for a total of 1442.5m as detailed below: (see Figure 15).

Hole No.	N(AMG)	E(AMG)	RL	Azimuth	Dip	Depth
RED 87-2	375420.5	384436.2	160.1	090.5	60°	260.3
RED 87-3	375401.2	384516.2	159.9	090	45°	153.4
RED 87-5	375350.1	384530.0	165.1	090	56°	145.5
RED 87-6	375300.3	384499.7	174.2	090	51°	157.0
RED 87-7	375550.9	384411.8	162.9	106	45°	277.0
RED 87-8	375551.0	384412.2	162.9	090	45°	280.1
RED87-10	375746.2	384592.9	163.5	090	50°	169.2

Problems were experienced penetrating the glacial overburden, but were overcome with the use of a "casing-advance" system. HQ drill core was taken to below the depth of weathering, with the remainder of the hole drilled in NQ. This is considered to be the minimum sized core for optimum sample size for gold assaying.

All holes were cased with slotted PVC piping to enable down-hole geophysics to be carried out.

All holes have been geologically logged, and are presented in Appendix 1.

Geochemistry: Assaying was carried out on half-core samples of either 1m or 2m length, depending on the nature of the rock unit.

Details of numbers, elements and methods are given below:

No of Samples	Element	Method
40	Au	Fire Assay (50g)
274	Au	Fire Assay (50g)
274	Cu Pb Zn Ag	AAS
274	Sn As	XRF
21	Mo Bi Co Cd	AAS
21	Ba Sb W Te	XRF

All assaying was carried out by Comlabs.

A total of 19 samples were submitted for petrological study to Geochempet Services. The reports are presented as Appendix 2. In addition three mineralized samples were subjected to Scanning Electron Microscope study, to determine the mode of occurrence of the gold. A series of microphotographs were produced and are presented as Appendix 3.

Geophysics: Billiton has carried out down-hole IP and Sirotem surveys on as many drill holes as possible at the Lakeside prospect. Unfortunately despite using slotted PVC casing some holes were found to be blocked at the time of surveying.

The following holes have been geophysically surveyed:

Hole No.

RED 87-2 (IP/Resistivity, Sirotem)
RED 87-3 (IP/Resistivity)
RED 87-5 (IP/Resistivity)
RED 87-6 (IP/Resistivity, Sirotem)
RED 87-7 (IP/Resistivity)
RED 87-8 (IP/Resistivity)

IP/Resistivity surveying was carried out using an IPR-8 receiver and electrode spacings of 5 and 10 metres as a compromise between data resolution and survey speed.

Two dipole-dipole IP lines were surveyed over known mineralization using the Scintrex IPR-11 receiver and a=40 metres, the intention being:

1. To compare the dipole-dipole data with previous (1979) Scintrex gradient array data; and

2. To determine whether the graphite and sulphide responses could be discriminated using spectral IP parameters.

Before year end it is intended to carry out a short UTEM survey over the Lakeside prospect with three intentions:

1. To determine whether the known sulphide mineralization can be detected and if so whether UTEM could be a cost-effective technique elsewhere along the Fault;

2. To determine from the UTEM response the size of the conductor (especially depth extent); and

3. To determine whether a much larger massive sulphide body exists at depth (100-400 metres). (If the Lakeside mineralization is due to remobilization it could be sourced from depth).

A mise-a-la-masse survey was carried out using a current electrode down RED 87-6 at 116 metres. Six lines 300 metres long were surveyed.

7.1.4. Results

Geology: The diamond drilling programme has been successful in delineating a gold-bearing sulphide deposit within sediments immediately east of the Henty Fault. The rocks to the west of the fault are invariably feldspar-phyric andesites, usually lavas, but occasionally of volcaniclastic affinity. A consistent feature is strong silicification within 50m of the fault, which at times has completed destroyed any original textures and mineralogy.

The andesites are strongly feldspar porphyritic and have been subjected to several phases of deformation and hydrothermal alteration. Chlorite and albite are the dominant alteration products, with later sericitisation, carbonatisation and fissure veining. Brecciation is the most common structural feature, with chlorite forming the bulk of the interclast material. The fissure veins are generally dominated by quartz, but with varying amounts of carbonate, chlorite, albite and pyrite.

The Henty Fault is a complex of parallel faults, commencing with a sharp contact at the base of the andesites, and extending for several metres into the footwall sediments as a series of less intense parallel structures. The initial (main or western) fault has a

contact, often with several millimetres of pug, with the andesites; in some instances a fault breccia is present up to 40 cm into the footwall. In most cases the lithologies to the east of the main fault are andesitic, strongly brecciated, deformed and chloritised. Further faulting then separates these possible conglomeratic andesitic arenites from the sediments proper. Pyrite and occasionally arsenopyrite, are associated with the Fault Zone, occurring as impregnations, fissure veining and minor replacement type.

Immediately east of the fault zone, the lithologies are essentially altered sandstone, with some intercalated slates. From petrological examination, these rocks originated as moderately sorted labile sandstone, then were foliated, previously chloritised, finely veined by quartz-chlorite, more thickly veined by quartz-ankerite -chlorite-pyrrhotite-pyrite-muscovite and impregnated by poikiloblastic pyrite. Fluorite, baryte and tourmaline also occur as members of the hydrothermal assemblage. It is interpreted that the hydrothermal alteration and veining post-dates the Mount Read Volcanics, and is consistent with a granitoid source.

Away from the fault, the amount of arenaceous material decreases with laminated siltstones and fine arenites

becoming dominant. There is limited evidence for the sequence to be facing west, and the dip is sub-parallel to the Henty Fault.

Mineralization: Previous drilling by EZ Company in the area was aimed at tin mineralization and hole MRP 233 intersected sulphide mineralization adjacent to the Henty Fault. Reassaying by Fire Assay of the sulphide mineralization for gold produced 4m @ 3.3 g/t Au. Drilling by Billiton in 1987 has confirmed the presence of a body of sulphide containing gold.

The sulphide assemblage is pyrite-arsenopyrite-chalcopyrite-tetrahedrite-galena-sphalerite, together with a gangue of quartz-chlorite-tourmaline. The sulphides occur as semi-massive to massive veins, with some disseminated pyrite-arsenopyrite. Pyrite appears to have been the first sulphide phase, possibly related to brecciation, followed by the hydrothermal introduction of the other sulphide phases. Some replacement textures are present. The gold is related to the pyrite, although there is a relationship between the As and Au contents of the samples.

Silver is present as a major by-product up to 95 ppm, associated with the higher As and Au values. Tin is present in significant quantities, up to 0.42%, but is quite variable.

A scanning electron microscope study on a particularly high value section (RED 87-3, 113.05m) shows the gold to occur as free grains up to 15 microns, with a fineness of 86-87%. The gold shows a closer physical association with pyrite than with arsenopyrite. The silver and tin are probably associated with tetrahedrite or some other sulphosalt (not identified).

The intersections of the Henty Fault and the mineralized zones are plotted on a Longitudinal Projection (Figure 16), together with the gold values and intersection widths (as drilled).

These are summarised below: (see Figures 17-21)

Hole No	From	To	Total	Au (ppm)	Ag (ppm)	As	Sn
MRP 233	157	160	3.0	4.1			
RED 87-2	216.3	220.3	4.0	2.34	7	4.19%	0.11%
RED 87-3	111.0	115.65	4.65	5.9	34	7.0 %	0.21%
RED 87-5	97.0	99.0	2.0	1.38	8	2.8 %	0.35%
RED 87-5	103.0	104.7	1.7	1.74	8	2.10%	0.21%
RED 87-6	112.0	115.0	3.0	2.8	63	1.28%	0.009%
RED 87-7	245.1	246.55	1.45	4.5	24	9.1 %	0.09%
RED 87-8	247.0	253.0	6.0	0.14	3	0.1%	
RED 87-10	144.1	145.1	1.0	0.38	1	0.01%	
	148.1	149.1	1.0	0.66	2	1.83%	0.04%
	152.1	153.1	1.0	0.40	7	0.45%	0.09%

The mineralization has been intersected over a 200m strike length, from RED 87-6 (375300N) to RED 87-7 (375500N) and down dip for 110m on section 375400N. North of 375400N problems are encountered with drill site access, due to the presence of Lake Rosebery. Hole RED 87-7 and RED 87-8 were drilled from a small island which was reached by a short causeway built by Billiton. The intersection in RED 87-7, 162m below the level of Lake Rosebery, cannot be tested updip. This hole was collared at an angle of 45°, and it would be impractical to diamond drill any shallower.

There is an unknown thickness of glacials above the shallowest intersections, but there are indications further north (towards Duttons) of substantial depths immediately over the Fault; possibly reflecting deeper glacial scouring of an alteration zone.

The mineralization has not been closed off to the south; or down plunge to the north below RED 87-7 and RED 87-2.

Although the gold grades of the sulphide zone are not particularly high, except over narrow widths in RED 87-3, the occurrence is regarded as extremely significant. It is the first recorded discovery of this style of mineralization outside the Henty Prospect of Goldfields Exploration.

No attempt has been made to produce a tonnage or grade estimate.

Geophysics: The main mineralized zone east of the Henty Fault and primarily composed of heavily disseminated or semi-massive pyrite and arsenopyrite is strongly conductive. As is usual, chargeability readings in these zones are erratic and commonly negative due to electrode effects and very low voltages. Minor zones of pyrite in the volcanics are frequently detected as slight decreases in resistivity and increases in chargeability.

To summarise the IP characteristics of the mineralization:

	Resistivity	Chargeability
Mt. Read Volcanics (Andesite lava)	500-2000 ohm-m	10-30 mv/v
Farrell Sediments	300-1000 ohm-m	60-70 mv/v
Main mineralized zone (py, aspy)	less than 1 ohm-m	±100 mv/v

The strong contrasts between the mineralized zone and the adjacent sequences make the former an excellent IP target. In addition a strong chargeability contrast occurs between the volcanics and sediments thus allowing the position of the Henty Fault to be well defined. This chargeability contrast can be readily seen in surface IP surveys and the position of the Henty Fault can be readily traced under thick glacial cover.

The higher chargeabilities in the Farrell sediments below the main mineralised zone are probably due to disseminated sulphides and perhaps some graphite although the geological logs indicate only minor to 1% pyrite. The IP logging suggests a halo of disseminated sulphides (i.e. higher chargeabilities) exists around the major sulphide lens. (see Figures 22-27). Geological logging does not confirm this.

Sirotem Logging: The results have yet to be fully interpreted but the mineralization was readily detected down holes RED 87-2 and RED 87-6 confirming the conductive nature of the mineralization. (see Figures 28, 29). Results, especially in 87-2, suggest the edge of the conductor had been intersected but the direction of mineralization (relative to the hole) has yet to be determined.

The mise-a-la-masse survey does not clearly indicate the extent of the known mineralization. (Figure 30). Unfortunately the surveyed lines did not extend far enough east. However it is fairly clear that the mineralization intersected in RED 87-6 does not extend much further south. There are however other possibilities:

1. The mineralization is made up of several small, disconnected massive sulphide pods; and

2. The mineralization plunges steeply to the south.

The data from the Scintrex 1979 IP gradient array survey (for EZ) was replotted as contours (Figure 31) and stacked profiles (Figure 32). It appears that the original EZ/Scintrex grid was placed 100m west of the AMG co-ordinates. This has caused considerable confusion not only in grid location but also interpretation of the IP data.

The recent dipole-dipole IP pseudo-sections are shown on Figures 33 and 34, together with the respective previous gradient array IP profiles corrected for incorrect station location. The two data sets appear to correlate satisfactorily considering grid problems.

Figure 33 indicates the position of DDH MRP 212 originally drilled by EZ on the gradient IP anomaly at 4480mE (AMG). This anomaly is west of the Henty Fault and appears to be caused by disseminated and thin massive sulphide bands in the Mt. Read Volcanics (confirmed by EZ's downhole IP log). The major IP anomaly east of the Fault at 4620mE (AMG) appears to be caused by both the massive sulphides adjacent to the Fault as well as the pyritic and graphitic(?) shales further down hole.

MRP 212 is the only hole on the Lakeside prospect to continue more than 50-odd metres beyond the Henty Fault, so no others can assist in explaining the strong IP anomalies that occur 100-150 metres east of the Fault.

The dipole-dipole IP on line 5100N is shown in Figure 34 with the previous gradient IP. EZ hole MRP 219 intersected only minor sulphides with low gold values east of the Fault. However it did not intersect the major part of the IP/Resistivity anomaly further east.

The dipole-dipole IP data have an interesting feature apart from the major chargeability anomalies. Resistivities appear to decrease with depth on both lines, and chargeabilities also increase. This indicates an increase in mineralization with depth. Presumably some of the IP source east of the Fault must be due to graphite, but the effect also occurs west of the Fault in the volcanics indicating an increase in sulphides with depth there also (perhaps there is some similarity to the "Arsenic Zone" in the Sterling Valley EL).

It is reasonable to suggest that a large area of alteration occurs around the Lakeside prospect (from IP and aeromagnetics)and that mineralization could increase with depth. This is quite possibly related to the Devonian granite interpreted (from gravity data) to lie beneath this area. Deeper drilling would test this hypothesis.

7.1.5. Potential

The area represents a prime target for the discovery of further gold mineralization related to the Henty Fault. The mineralization discovered to date is relatively low grade, particularly for a potential underground mining operation. However, detailed geophysical assessment and further drilling, will be necessary to define the extent of the known resource and explore for associated bodies of sulphide.

It is considered that a massive sulphide may be present at depth, which may be the source of the mineralization discovered to date.

There is also potential for similar mineralization further east within a lithologically and structurally favourable zone in the Farrell Sequence.

The presence of an arsenic/gold resource within EL 4/73 some 2 km south of Lakeside, to the west of the Henty Fault also increases the possibility of discovering a similar resource in the altered andesites. In the drilling to date, some low grade As and Au values are present in a similar position to that in Sterling Valley.

7.1.6. Proposed Work

In the first six month period of any extension to the EL, a detailed geophysical review will be carried out, particularly to clarify the grid locations. It is imperative that the precise location of any geophysical response is known in relation to the drilling completed so far. This will ensure that any anomalies have not been misplaced and go untested.

Diamond drilling will continue with 1300m programmed for the first six month period. This programme will test the northern down plunge extent, the southern strike extent, and near surface extent. The EL boundary is 300m south of RED 87-6 and only drill hole MRP 219 has tested this area. Results from MRP 219 were disappointing. (4.5m @ 0.14 g/t Au), but mineralization is present and given the style of mineralization low grade gaps are bound to be present.

7.2 North Lakeside-Duttons Sheets 3, 4 (Figs.4, 5, 11, 12)

7.2.1 Defined Area

This prospect name refers to the area from north of the Lakeside mineralization to the southern boundary of the Farrell leases, and only covering the immediate HFZ environs.

7.2.2. Local Geology

The Henty Fault in this area is completely covered by glacial scree and surrounding lithologies do not crop out. Limited geological information is available from drill core (EZ Co. and BAUS) and from minor exposures well east of the HFZ. These results suggest that the sequence east of the Henty Fault consists of interbedded arenaceous volcaniclastics, black graphitic shales and tuffaceous sediments whilst andesitic lavas and volcaniclastics are predominant west of the HFZ.

7.2.3. Known Mineralization

The Henty Fault has a strike length of 2.5 km here but the only previously known mineralization is represented by the Farrell South and Duttons workings. Both these mines have exploited sphalerite-galena bearing quartz fissure fill veins within the Farrell Slates and are considered to be at a similar stratigraphic level as the main Farrell mineralization. The mineralized lodes are typically of erratic strike with a steep westerly dip and south westerly plunge but ore grades are very high (up to 73% Pb, 208 oz tn Ag; average grades 13.5% Pb, 2.5% Zn, 16 oz tn Ag).

7.2.4. Work Completed

Exploration carried out has involved:

1. IP survey and interpretation - 7 line kilometres
2. Diamond drilling, RED 87-4 - 328 metres
3. Bulk cyanide leach (BCL) sampling - 4 samples
4. Drill core re-assaying (old EZ Co. core) - 107 samples
5. Limited gravity surveying - 1 line kilometre
6. Limited Max-Min EM surveying - 2 line kilometres
7. Limited ground magnetic surveying - 1 line kilometre

7.2.5. Results

Numerous drill holes have tested the down plunge extent of the Duttons-Farrell South workings but only two (MP 70, 71) have intersected the HFZ. Details of previous drilling are listed below:

Drill Hole	Company	Target	Core/Log Available
1S - 9S	Mt. Farrell Mining Co.	Lode position between Duttons and Farrell South	No
MP 33	EZ Co.	Quartz blow E of Duttons	Yes
MP 34	EZ Co.	Abandoned	No
MP 35	EZ Co.	Daly's lode E of Duttons	Yes
MP 37	EZ Co.	South of Daly's Lode	Yes
MP 38	EZ Co.	Abandoned	No
MP 43	EZ Co.	South of Daly's Lode	Yes
MP 44	EZ Co.	Duttons position	Yes
MP 70	EZ Co.	Duttons position	Yes
MP 71	EZ Co.	Duttons position	Yes
MP 88	EZ Co.	Duttons position	Yes

Drill core from these holes has been selectively sampled for gold by fire assay but no significant results were recorded. (see Figures 35, 36, Appendix 4). Note that core recoveries from these AX size drill holes (2cm diameter) were characteristically abysmal and ranged from 20-50%. Accordingly, core that was recovered is that which is competent and unaltered. Care should therefore be taken in interpreting the assay results from these drill holes and re-drilling of particular areas of interest should not be discounted.

Drill holes MP 70 and 71 which intersected the HFZ failed to produce anomalous levels of gold at any stratigraphic level, but it is important to note here the presence of an arenaceous volcaniclastic unit with an interbedded fuchsitic sericitic schist sub-unit. Further north, within the Farrell leases this arenaceous unit is not present and the HFZ is marked by the contact of feldspar phyric volcanics with black graphitic shales (although a thin, <10m, sericitic schist horizon is often present). To the south of Duttons, the arenaceous sequence broadens out markedly to a maximum of 700m opposite the Murchison Mine, then thins rapidly to the south within Sterling Valley. Exposure of this sequence is limited by glacial cover on the Tullah Flats and it is therefore only in a gross sense that the unit is termed arenaceous. It is far

more probable that the "unit" consists of a series of interbedded horizons of arenaceous and pelitic types but the definition of these lithologies is important in the understanding of controls on the Lakeside mineralization. That is, the host to the latter mineralization is observed to be a chloritic arenite and hence there is an apparent stratigraphic or at least lithologic control i.e. the mineralization is stratabound.

Further south of Duttons, EZ Co. have drilled three other diamond holes (MP 89, MRP 226, MRP 227) although only the latter two successfully penetrated the glacial cover (MP 89 intersected 82m of glacial scree before being abandoned). Both MRP 226 and 227 were targeted on ground magnetic anomalies (exploration target was stratabound Sn) and both tested the HFZ position at Quarry Bay. Arenaceous and tuffaceous sediments were intersected east of the fault and strong sericite-carbonate alteration was logged. Weak base metal mineralization occurs at, and east of, the HFZ, and reassaying by BAUS showed weak gold anomalism (see Appendix 4) viz

Hole No.	Interval(m)	Width(m)	Au(ppm)	Comments
MRP 226	183.2-184.2	1.0	0.16	Also 2.2%Pb, 0.36%Zn 30ppm Ag, 2.15%As HFZ position
	204.8-205.9	1.1	0.21	
	202.8-204.8	2.0	-	1.6%Pb, 0.18%Zn, 34ppm Ag
MRP 227	136.8-137.8	1.0	0.15	11m E of HFZ (Lakeside position)
	152.5-153.9	1.4	0.11	

Whilst not economically important, these intersections in a geological sense do favour the continuity of the Lakeside position from the southern bank of Lake Rosebery.

A Gradient Array IP Survey was carried out by Zonge in April, 1987 using a high-power (15KW) transmitter, GDP Receiver, current electrodes 1800 metres apart and a line spacing of 100 metres. Potential electrode spacing was 20 metres and phase measurements were made using a frequency of 1HZ. The survey was designed to cover the Henty Fault zone between Duttons workings and Lake Rosebery, north of the Lakeside prospect. The position of the Fault is known at Duttons and at MRP 227 at the southern end of the grid. Zonge's computer plots of the phase and resistivity results are attached as Figures 37 to 40.

The Fault is clearly expressed geophysically as an increase inphase from a background of about 5 milliradians in the Mt. Read volcanics west of the Fault (see profiles on Figure 41 and contours on Figure 31). In the Farrell sequence east of the Fault on all the lines surveyed over a strike length of 900 metres, strong conductors are apparent 200 to 300 metres east of the Fault striking approximately parallel to it. These are presumed to be due to the graphitic, and at time sulphidic slates and shales known to exist at Duttons to the north and in DDH RED 86-1 to the south (on line 537560N), but these anomalies have never been directly drill tested.

The most interesting feature to emerge from this IP survey was a phase anomaly adjacent to the interpreted position of the Henty Fault on line 7000N at 5140E. There also appeared to be a dislocation in the Fault trace between lines 7000N and 7100N. Hole RED 87-4 was drilled on this phase anomaly and intersected graphitic and sulphidic shales. Unfortunately the hole could not be geophysically logged because it had collapsed, so the cause of the phase anomaly could not be verified.

Problems reading data in this area occurred due to very wet ground and possibly because of proximity to the current cable and EM coupling. However the latter is unlikely since ground resistivities are not unduly

low. It should be noted that the thick glacial cover over the survey area, in places 80 metres thick, did not particularly affect the IP results since their resistivity is no lower than 1000 ohm-metres. Current penetration and thus conductor detection below the glacials could thus be assured.

In order to obtain more information on the Henty Fault position, glacial thickness and nature of the conductor in the Farrell sequence, lines 376700N (Figures 43, 44) and 376500N (Figure 42) were surveyed using Max-Min EM, Magnetics and Gravity.

On line 376700N a strong conductor was defined at 385200E. It has no magnetic expression and unfortunately no gravity coverage, so little can be said about its cause. Further west of 384840E a magnetic anomaly occurs over interpreted Mt. Read Volcanics. Almost coincident is a broad Max-Min in-phase anomaly which could be interpreted as a very good conductor, however the lack of an out-of-phase or IP response suggests the Max-Min anomaly is probably caused by chaining errors between transmitter and receiver. The magnetic anomaly is probably due to disseminated magnetite in the volcanics.

Line 376500N gave similar results, with a strong Max-Min conductor at 385150E unrelated to any magnetic or gravity anomaly and thus probably due to graphite. Magnetic anomalies occur at 384800E and around 385300E. The cause of the latter is known to be disseminated magnetite in volcanics from DDH MRP 227. The magnetic anomaly in the Farrell sequence is quite probably caused by disseminated pyrrhotite, with a similar anomaly on line 376500N. Ground magnetic surveying over this grid is required in order to verify this possible cause which may have some economic interest.

Lines 377000N and 377100N were surveyed with a gravity meter to help locate fault position and determine whether the IP anomaly, later drilled by RED 87-4 had any gravity response. No gravity high was associated with the drilled IP anomaly on line 377000N. On line 377100N,(see Figure 45), a gravity anomaly occurs west of the fault but not coincident with a strong (but possibly false) IP anomaly at 5075E. The cause of the gravity anomaly is unknown but it may be caused by a large throw on the Henty Fault.

Diamond drill hole RED 87-4 was drilled to test an IP anomaly immediately east of the HFZ that was outlined by the prior Zonge IP survey. Details of the hole are summarized below: (see also Figure 46, Appendix 1).

Hole No : RED 87-4

Collar Co-ordinates: 5376995N 384890E

Inclination : -50°

Azimuth : 090°

Total Depth : 328 metres

Summary Log :

0- 18 Fluvio glacial gravels

18- 73 Unconsolidated sands + clays

73-126 Complex & variable mafic volcanics

126-142 Andesitic crystal lithic volcaniclastics

142-148 Schistose tuffaceous volcanic

148-162 Volcanic breccia

162-178 Mafic volcanics

178-193 Andesitic volcanics

193-196 Henty Fault

196-222 Mixed graphitic shale & calcareous siltstone

222-228 Quartzose sandstone

228-247 Moderately graphitic shale

247-262 Quartz carbonate veined & mineralized zone in deformed graphitic shale

262-269 Crystal lithic sandstone

269-328 Siliceous & sericitic siltstone

E.O.H.

The hole intersected a mixed arenaceous and graphite shale sequence and the cause of the IP anomaly has been attributed to strongly graphitic black shales immediately adjacent to the HFZ. Core assaying revealed only mild anomalism of gold with the best intercepts being:

Interval(m)	Width(m)	Au g/t	Other
247.3-250.3	3.0	0.16	0.19%Pb, 0.35%Zn 0.15%As, 5g/t Ag
258.3-261.3	3.0	0.18	0.28% As

Strong quartz-carbonate veining observed in core within the black shales appears to be directly correlatable with an inferred NW-SE trending fault that has caused an apparent 100 metre south-block-east displacement of the HFZ. This cross fault has also been mapped on the edge of Murchison River where a tuffaceous volcaniclastic has been displaced. The significance of this fault in terms of its economic importance has not been realized as yet although the unmineralized RED 87-4 intersection is a downgrading feature.

A limited bulk cyanide leach (BCL) stream sediment survey has been carried out over portion of the HFZ although glacial cover has prevented many sites from being sampled. In the Duttons-Quarry Bay area, four samples have been collected and their results presented below:

Sample	Location	Au ppb (see Appendix 5)
2	RED 87-4	0.1
3	Duttons	0.6
4	Central Creek	1.1
6	Duttons	7.1

At a background level of 0.1 ppb Au, samples 2, 4, 6 all are anomalous and suggest a bedrock source draining into the Duttons-Central Creek area. Limited rock chip, core sampling and historical assay data suggest that the Daly's Lode - Central Mine mineralization is auriferous whereas the Duttons line appears to be gold deficient. Further sampling is required to better define the source but it is suggested that the highly anomalous sample 6 warrants optimistic speculation at least.

7.2.6. Potential

In conclusion it is suggested that the Duttons-Quarry Bay area includes a volcaniclastic facies east of the HFZ that is highly prospective for auriferous sulphidic mineralization. Although poorly exposed a lensoidal wedge up to 800 metres wide is inferred and may contain numerous horizons permissive to the redeposition and reconcentration of auriferous fluids. The Duttons workings are considered to represent the southern extension of the Farrell line and all work to date indicates that the mineralization is not auriferous. It is interesting to note here the correlation between the termination of the Farrell line (black shale host, Pb Zn Ag no Au) and the commencement of the Lakeside style (arenite host, Au-As, minor Pb Zn Ag). The localization of the gold mineralization is obviously in part stratigraphic but it is also suggested that a strong structural control is evident. The Murchison River Gorge is believed to be the topographic expression of a substantial ?E-W fracture that may have acted as a focus for mineralizing fluids adjacent to the HFZ.

7.2.7. Proposed Work

The completion of drill hole RED 87-4 has indicated that the broad strong IP chargeability response is lithologically controlled and it may be inferred that a mineralization signature may be of a more subtle nature. Several such subtle anomalies exist and it is suggested that close examination of these should be carried out in conjunction with the overall geological assessment to best locate further drill holes. Initially two diamond drill holes are proposed to test the HFZ north and south of RED 87-4 along the Tullah Flats. Suggested collar positions are:

Hole 1	377400mN	385100mE	120° Mag	-55°
Hole 2	376710mN	384850mE	090° Mag	-55°

In addition, it is considered that the northern extension of the mineralization intersected in RED 86-1, MR 1, MR 2 also needs to be investigated by diamond drilling. In these holes, a 10-15m wide zone of weakly auriferous quartz-carbonate stockwork veining was intersected over a 500 metre strike and as the mineralization appears to be stratabound, there is justification for suggesting a northerly extension. The target for a proposed drill hole should be the intersection of this horizon with inferred cross cutting structures that transect the Farrell Sequence

in the vicinity of the Murchison Gorge. Detailed geological, photo interpretation and aeromagnetic interpretation will be needed to best position a drill site.

7.3 Farrell-Mackintosh Sheets 1, 2 (Figures 2, 3, 9, 10)

7.3.1. Defined Area

This prospect refers to the area from north of the Farrell Mine Lease to the EL 1/62 boundary, a strike distance of 2.8 km. Access is possible via the sealed Mackintosh Dam road, east of the Henty Fault, and HEC tracks, west of the fault, although Lake Mackintosh drains into Lake Rosebery and transgresses the HFZ.

7.3.2. Local Geology

The Henty Fault follows the course of the Mackintosh River approximately and is flanked to the west by glacial covered and poorly exposed feldspar phyric dacitic andesitic lavas (Mt. Black Volcanics). East of the fault a structurally disturbed sequence of fine tuffaceous sediments and contorted graphitic shales occurs and abuts the topographic high Owen Conglomerate. This glacial cover limits exposure of these units to creek beds and road cuttings.

Exposure of the Mt. Black Volcanics is limited to road cuts and creeks as thin glacial and Owen scree covers the remaining area. The volcanics are dominated by feldspar phyric lavas of dacitic-andesitic composition but there is a definite zone of silicification near the HFZ that has altered the lavas. Fine tuffaceous or pumiceous interbeds are also an integral part of the sequence west of the HFZ.

Deformation within the volcaniclastic-sediment sequence east of the HFZ is quite intense. Commonly a fine tuffaceous volcaniclastic crops out immediately east of the fault and is often sericitized and carbonatised. Further east variably graphitic shales are crenulated and strongly fissile. Numerous E-W cross faults are apparent and these have offset the HFZ and the Farrell Slate sequence in a North Block West sense. Strong quartz veining occurs at these offset positions but sulphide mineralization is typically not present.

7.3.3. Work Completed

Previous work carried out in the vicinity of the HFZ has been limited to:

1. UTEM surveying by BAUS during 1986. This work focussed on the Mt. Black Volcanic sequence west of the HFZ and did not cover the fault position itself.

2. Site excavations and diamond drilling by the HEC at Mackintosh Dam. The HFZ passes through the western edge of the dam near the spillway into Tullibardine Creek.

3. Diamond drilling of 3 holes (MP 86, 87, TP 135) by EZ Co. in 1951 and 1968 to test SP anomalies within the Farrell Slates.

4. Prospectors pits and workings:

a) immediately north of the Farrell Mine Lease. These are unnamed but consist of several small adits and one shaft (depth unknown) located east of the HFZ.

b) Farrell Blocks. Located on the shore of Lake Rosebery and immediately east of the HFZ.

c) Metropolitan. Not located accurately but reportedly at the unconformable contact of the Farrell Slates with the Ordovician Owen Conglomerate.

Exploration carried out during 1987 has focussed on examination of the area proximal to the HFZ position with particular reference to the characteristics of mineralization observed at Lakeside and Sterling Valley. This work is summarized below:

1. Geological mapping 0.5 man months.
2. Rock chip sampling 59 samples.
3. Drill core re-assaying 112 samples.
4. Diamond drilling 250 metres.

7.3.4. Results

Detailed geological mapping has been carried out to identify the position of the HFZ and to enable recognition of altered volcanics or volcaniclastics. Rock chip sampling of altered rocks did not reveal any anomalous levels of gold (see Figures 9, 10) despite the often pervasive sericitization and quartz veining observed in samples close to the fault. There is now reasonable control on the position of the HFZ from Farrell to Mackintosh Dam and it is apparent that the fault position has been transposed by a series of EW displacements. West of the fault, massive silicified dacitic to andesitic lavas are observed and quartz vein stockworking is common proximal to the contact with the Farrell Slates. Rare pyritic mineralization has been recorded at this position (samples 13171-73) Appendix 5 but anomalous geochemistry was not present. Immediately east of the HFZ a thin (up to 40 metre) persistent unit exists, characterized by strong sericite alteration overprinting a fine grained tuffaceous sheared epiclastic. North of the HEC work-

shops, a thick black graphitic shale overlies this unit although at Mackintosh Dam, arenaceous epiclastics are inferred from HEC drill logs interbedded with the black shales. Assaying of HEC core has not been undertaken but is recommended on selected portions where drill logs indicate favourable alteration.

The Farrell Blocks workings consist of several small (5m) adits that have been located on quartz filled shears within black shales. The workings are minor and anomalous gold geochemistry has not been recorded.

Immediately south of the HEC workshops, three drill holes (MP 86, 87, TP 135) put down by EZ Co. have been examined and core reassayed (see Figure 47). No anomalous gold geochemistry was returned from this fire assaying (see Appendix 4) but it should be noted that neither hole intersected the HFZ position. It is apparent in this area that the fault position has been transposed up to 200 metres to the west by a series of EW cross faults. This offset is accompanied by in-thrusting of several slices of feldspar phyric volcanics within the Farrell Slates and abundant milky quartz veining is evident. Several small diggings have exploited these fissures but the extent is very limited. Rock chip sampling has not revealed any anomalous gold geochemistry despite reasonable exposure in several creeks.

One diamond drill hole has been collared in the vicinity of this structural offset to test the sequence at depth for consistency of alteration and the development of gold mineralization. The degree of sericite-carbonate alteration and quartz vein stockworking within the volcanics and volcaniclastics coupled with the favourable structural setting augers well for the remobilization of gold mineralization into structural traps and the hole was essentially a geological test of this interpretation. A summary of the drill hole is presented below (see Appendix 1) Figure 48-49.

Drill Hole No : RED 87-11

Collar Co-ordinates : 538033mN 386038mE

Azimuth : 132° Mag

Inclination : -50°

Total Depth : 250.1m

Summary Log :

0 - 9 m	Glacial scree
9 - 27.5m	Feldspar phyric dacitic-andesitic lava
27.5- 36.1m	Sheared dacitic lava.
36.1- 39.1m	Sheared feldspathic dacitic volcaniclastic.
39.1- 52.1m	Pink massive dacitic lava.
52.1- 60.9m	Dacitic-andesitic lava.
60.9- 66.3m	Fine pumiceous silicified volcaniclastic.

66.3- 81.5m Massive dacitic lava.

81.5- 94.3m Sheared dacitic lava.

94.3- 94.9m Finely bedded sericitic volcaniclastic.

94.9- 99.0m Siliceous dacitic lava.

99.0-106.2m Intensely altered (carbonatised and sericitized) dacitic-andesitic lava.

106.2-118.4m Chloritized and carbonatized fine arenaceous volcaniclastic.

118.4-146.6m Chloritized and carbonatized dacitic lava.

146.6-223.2m Variably bedded fine arenaceous volcaniclastic with graphitic laminae.

223.2-225.7m Layered epiclastic breccia.

225.7-250.1m Well bedded arenaceous volcaniclastic.

E.O.H.

Sulphide mineralization is limited to trace disseminations of pyrite throughout the volcaniclastics and one quartz-sphalerite veinlet at 221 metres. Core is currently being sampled but no assay results are available.

7.3.5. Potential

Detailed surface mapping and rock chip sampling has defined the position of the HFZ and surrounding lithologies have been mapped from available exposures. Rock chip sampling has not revealed any anomalous gold geochemistry despite the strong alteration and quartz veining observed in many samples. One diamond drill hole has tested a structurally disturbed area north of Farrell and strong carbonate-sericite-chlorite alteration has been observed in lavas and volcaniclastics east of the HFZ.

A further 2 km strike of the HFZ remains untested from the northern boundary of the Farrell Mine Leases to the Mackintosh Dam. Lithologies observed adjacent to the HFZ within the Farrell Sequence are dominantly black graphitic shales and fine tuffaceous sediments but the degree of alteration is of economic importance. Exposure is very limited by cultural features and natural topography and therefore good potential exists for the development of a remobilized stratabound sulphide hosted gold deposit within the prospect.

7.3.6. Proposed Work

The position of the HFZ needs to be detailed in those areas where surficial cover or infrastructure has obscured outcrop. Geophysical surveys would be impeded by cultural features and access to much of the area is restricted by the HEC. It is therefore suggested that the prospectivity of the fault is best examined by diamond drilling. One diamond drill hole (250 metres length) is proposed to test the fault position in an area of structural complexity and strong host rock alteration.

7.4 Murchison Mine Line Sheet 4 (Figures 5, 12)

7.4.1. Defined Area

This prospect refers to the sequence that includes the South Murchison, Murchison, Murchison Extended and Central workings. The area is not adjacent to the Henty Fault but is 500-800 metres to the east, with Farrell Slates immediately west of the contact with Murchison andesitic volcanics.

7.4.2. Local Geology

The line of mineralization occurs within fine tuffaceous sediments and black shales (Farrell Slates) adjacent to the western contact of the quartz phyric Murchison Volcanics. Outcrop is extremely poor and although not obscured by glacial cover, deep vegetative litter impedes a detailed interpretation. The detailed setting of the prospect is not known as insufficient mapping has been carried out, partly due to the lack of access. A grid is now being cut to alleviate this problem and mapping will be carried out as soon as this is completed.

From previous data it is known that existing mineralization is hosted by fissile graphitic siltstones with intercalated fine tuffaceous silts and sands. Broad inferences suggest that the stratigraphic levels represented by the Murchison Mine Line will correspond to these facies with interfingering common.

7.4.3. Known Mineralization

The Murchison line is important by virtue of its consistent gold-copper-arsenic signature, a feature not observed in other workings in the Tullah area. Gold tenor typically is in the range of 1.2-2.5 g/t Au and the gold has a strong association with massive

sulphide. The Murchison Mine is the largest of the workings and has development headings on three levels. Mineralization occurs in a lensoidal south plunging body of massive sulphide of dimensions 60m x 5m x 120m plunge and recorded production has been 300 tons @ 40% Pb, 53 oz t Ag, 2.1 g/t Au. The remainder being of lower Pb and Ag grade was presumably termed mullock.

The mineralization occurs near the contact of fine volcaniclastics and black shales but is not stratabound. The sulphide lens appears to be slightly discordant to stratigraphy and attempts have been made previously by EZ to locate en echelon ore shoots.

The other workings are represented by small adits and limited strike drives only, with consequent minimal production. The Central workings have not been sufficiently examined to comment on the stlye of mineralization although previous accounts suggest a Farrell-type signature.

7.4.4. Work Completed

EZ Co. have drilled four diamond holes (MP 28, 29, 30, 32) beneath the Murchison Mine in the late 1940's to determine the down plunge position of the massive sulphide lens (see Figure 50) and to test for en echelon repetitions of similar mineralization. Drill testing of the other workings (Central, Murchison

Extended, South Murchison) has not been carried out.

Work completed by BAUS has included reassaying of EZ drill core (159 samples), limited rock chip sampling (7 samples) and stream sediment (BCL) sampling (2 sample sites).

Five lines of dipole-dipole IP were carried out around the Murchison Mine area by Scintrex. An IPR-10 receiver was used, with a dipole spacing of 40 metres, and n=1 to 4. The integration window was M_3, as for the other surveys on Rosebery East EL. The pseudo-sections are attached as Figures 51-55.

7.4.5. Results

Only a weak development of base metal mineralization was recorded in the EZ drill holes (see Figures 56, 57) and reassaying of core by BAUS has not produced any significant gold assays (see Appendix 4). The only results of interest are:

Hole No.	Interval	Aug/t	Other
MP 28	312-314.75ft	1.2	10.6% Pb, 22.4% Zn, 18.2 oz t Ag
MP 29	No anomalous gold geochemistry		
MP 30	250-260 ft	<0.02	0.32% Pb, 4 g/t Ag
	296.6-301ft	0.07	0.1%Pb, 0.7%Zn, 22g/tAg
MP 32	197.5-198.25ft	2.4	6.7%Pb, 6.8%Zn, 3.7ozt Ag

Although neither the grade nor the width of these intersections is economic the gold association with the massive base metal sulphide is clear and is further supported by limited rock chip sampling results (see Appendix 5) from the outcrop position of the mine. The following elemental maxima are indicated from this work viz Cu up to 860 ppm

Pb up to 7.7%

Zn up to 1.7%

Ag up to 440 g/t

As up to 3.85%

Au up to 1.09 g/t

Limited bulk cyanide leach (BCL) sampling (samples 1 and 2) has supported the gold anomalism with a maximum of 2.2 ppb Au being recorded. Additional gridding has been carried out north of the Murchison mine to facilitate further sampling.

A strong chargeability and resistivity anomaly is coincident with the Murchison mine (situated on line 6500N at 5680E). This same anomaly is evident on every line at the same easting and is obviously due to the same lithological or mineralized unit over a strike length of at least 200 metres. The source appears to have a consistent top depth the order of 40 to 80 metres (i.e. no indicated plunge), and may be depth-limited. However computer modelling would assist in data interpretation.

Comparison of the IP data with surface and drill-hole geology suggests the following:

1. The IP anomaly along about 385660E correlates well in general with the known mineralization. However whether the IP response is primarily due to sulphides or graphite is somewhat hard to determine. The latter is most probable if the drilling is considered conclusively to show the outline of mineralization (i.e. very strike limited). If the drilling is <u>not</u> considered conclusive, then the mineralization could well extend much further along strike than is presently assumed.

2. <u>West</u> of the main line of mineralization, a high background chargeability response appears to correlate directly with black graphitic shales. Surprisingly resistivities are not particularly low, being higher than over the known mineralization, indicating less graphite or sulphides here.

3. <u>East</u> of the main line a similar sequence to that in the west is indicated and also correlates with graphitic shales.

4. Further east at 5780E on all lines a distinct lithological change is evident. This correlates with unmineralized (high resistivity, low chargeability) Cambrian Murchison volcanics.

7.4.6. Potential

The Murchison-Central line of mineralization remains essentially untested despite its consistent gold anomalism. Mineralization at the Murchison mine is expressed as a south plunging lensoidal body of massive sulphide but work has not been carried out along strike to search for other similar bodies. Structural evidence to date would suggest that increased remobilization of auriferous sulphides may be anticipated south of the Murchison mine in the vicinity of the Murchison Gorge.

The area north of the mine is virtually unexplored and although the recorded style of mineralization at Murchison Extended and Central is of the Farrell type, sufficient work has not been carried out to speculate further.

In summary, it is envisaged that excellent potential exists along this line for the discovery of small massive base metal sulphide pods with a gold signature of approximately 2.5 g/t Au. However, remobilization

of auriferous sulphides and subsequent reconcentration may have occurred in structurally disturbed areas and therefore higher grades may be expected. The surface expression of the Murchison ore lens as a massive sulphide pod indicates that electrical geophysical techniques will respond well and their use may permit discovery of additional mineralization of open cuttable potential.

7.4.7. Proposed Work

A grid is being completed from which it is proposed to carry out a dipole-dipole IP or EM survey to locate massive sulphide mineralization. In addition, continued geochemical sampling (BCL, rock chip, auger) will be carried out to highlight areas of anomalous Au and to assist in the interpretation of geophysical anomalies.

Diamond drilling will be targetted on either geophysical or geochemical anomalies and it is anticipated that 2 x 200m drill holes will be required on a first pass to test any anomalous responses.

7.5 South Stitt (Sheets 7, 8 Figures 7, 8, 14)

7.5.1. Location

The South Stitt area covers a 4 km length of the Henty Fault Zone to the west of Mt. Murchison and south of the Sterling Valley EL 4/73. Goldfields Henty Prospect is situated 4 km to the south of the area.

7.5.2. Local Geology

The area straddles the Henty Fault Zone which divides two sequences of volcanics of very different character. The area is extensively covered by thick glacial moraine and Owen Conglomerate scree. The prospective volcano-sedimentary sequence east of the Henty Fault Zone, facies equivalent of the Farrell Slates to the north, is only seen on the southern part of the grid and in drillhole SS1.

This drillhole intersected steeply east-dipping pyritic and carbonaceous Farrell Slates, intercalated with quartz-porphyritic rhyolite lava, siliceous fine volcaniclastic sediments and cherts. These rocks are moderately hydrothermally altered and weakly pyritic. On the southern-most grid line 68,500mN there are similar silicified, pyritic, volcaniclastic sediments and cherts immediately east of the Henty Fault Zone.

East of the prospective sequence and beneath the Owen Conglomerate, there is a thick unit of volcanomict breccio-conglomerate which is clearly a Jukes Breccia/Dora Conglomerate equivalent. It is characterized by abundant angular to rounded clasts of acid volcanics, tuffs and sediments, in a coarse sandy matrix containing volcanic quartz and felspar crystals.

West of the Henty Fault Zone the volcanic sequence is dominated by felsic lavas and welded ignimbrites. In a zone extending up to 1km west of the fault, these volcanics are intercalated with volcaniclastic sediments and mafic volcanic flows and dykes, which increase in abundance towards the fault. Alteration of this sequence is generally weak and dominantly chloritization. Very minor disseminated pyrite and chalcopyrite occurs in the sediments, while the mafic volcanics contain magnetite and hematite but no sulphides.

7.5.3. Work Completed

Exploration carried our prior to 1987 is summarized in the 1986 Annual Report (08.3412) and is not reported here.

During 1987 detailed geological mapping and auger sampling was carried out in the southern portion of the area.

In addition, the grid was surveyed with G-856 magnetometers at 100m line-spacing and 10m station spacing from 67900N to 69000N. The grid lies over the Henty Fault Zone in an area with minimum glacial cover.

An IP survey was also carried out, and prior to termination due to bad weather, 7 lines were covered at 100m line-spacing over the northern part of the grid. The contractor was Scintrex who used an IPR-10 receiver and portable lightweight 250 watt transmitter, for a dipole-dipole array with a=40 metres. The low power transmitter was required because of the difficult access to the grid. Unfortunately this resulted in noisy readings that were hard to acquire. The noise probably arose either from the nearby HEC power line or magnetic storms which were prevalent during the survey.

7.5.4. Results

The mapping was hampered by extensive glacial cover although the presence of altered pyritic cherty sediments provided some encouragement (see Figure 58). Assay results from the 140 auger samples were disappointing and a maximum of only 0.04 ppm Au was returned. (see Appendix 6)

The ground magnetic data are shown in stacked profile form on Fig. 59. The Henty Fault as mapped geologically is expressed in the northern part of the grid as a magnetic gradient (i.e. fault). A strong anomaly (500nT) occurs in the central part of the grid east of the Fault, but its cause is not known to be due to glacial cover. It is likely to be due to the magnetic Cambrian granite(s) which run parallel to and east of the Henty Fault from Farrell to South Stitt (from the aeromagnetics).

The IP results (see Figures 60-66)indicate a shallow resistivity low over the mapped and postulated positions of the Henty Fault. This is presumably due to a paleochannel along the Fault line. West of the Fault, chargeabilities are low, indicating a lack of sulphides. An isolated deep high occursion 68900N at 1760E but is probably a noisy value. East of the fault, chargeabilities increase to the east indicating a low level of disseminated sulphides in the Farrell sediments, and perhaps Owen Conglomerate. A consistent high resistivity over low resistivity occurs east of the Fault. The reason for this is unclear, but the false resistivity low may well be due to severe topographic effects. Slopes approach 30° on the eastern side of the grid. Previous (EZ) 100 metre dipole-dipole lines 69000N and 68500N did not indicate any anomalies of interest at depth.

Lines 68300N, 68400N and 68000N were all conducted in very poor weather conditions, with the results that data quality has been severely affected (by EM coupling?) especially at the closest n-spacing. In some cases this is seen as negative chargeability values. Further possible evidence is the decrease in resistivity with increasing n-spacing although this also occurs on the eastern ends of the northern lines.

Despite the unreliable and noisy data, there does appear to be anomalous chargeability and somewhat lower resistivities adjacent to and east of the Henty Fault on lines 68300N and 68000N. This is indicative of disseminated sulphides in the Farrell sequence which may be related to economic mineralization.

Continuing bad weather in the survey area meant that not all the grid lines could be surveyed. Future work could involve shallow drilling on the southern IP lines in order to investigate the possible presence of mineralization.

7.5.5. Potential

Given the proximity of the area to the Henty Prospect to the south, and the presence of pyritic and carbonaceous shales, plus some IP responses, the area warrants more detailed investigation.

7.5.6. Proposed Work

The area is a difficult one to work in, with field work being restricted to the summer months.

A diamond drill test of the IP response will be required, with road access being necessary.

APPENDIX 1

Drill Hole Logs RED 86-1, 87-2, 87-3, 87-4
87-5, 87-6, 87-7, 87-8, 87-10, 87-11

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

HEADING SHEET

COLLAR INFORMATION	DATA TYPE	COLLAR CO-ORDINATES EASTING	NORTHING	ELEVATION	COLLAR SURVEY AZIMUTH	DIP	HOLE NAME	TOTAL DEPTH	HOLE TYPE	DESC CODE	REMARKS
	AMG	384943	375604	167	090	-55	RED 86-1	235.2			

PROJECT	ROSEBERY EAST
LOGGED BY	J.G. PURVIS
CONTRACTOR	TAS. DIAMOND DRILLING
CREW	
HOLE NAME	RED 86-1
TOTAL DEPTH	235.2 m
RIG	LONGYEAR 38
DATE STARTED	21.11.86 FINISHED 4.12.86

CORE STORAGE Nº OF TRAYS	CORE STORAGE LOCATION	SAMPLE STORAGE
34	DEVONPORT	DEVONPORT
M & P LAB		ASSAY LAB ANALABS

DESC.	SIZE	FROM	TO	TOTAL	REMARKS
NON CORE	HQ	0	21.7m	21.7m	TRICONED
CORE	NQ				
	NQ	21.7	235.2m	213.5m	
	BQ				
CASING	HW(S)	0	3	3	
CASING LEFT	(P)	0	235.2m	235.2m	(S) steel (P) plastic

SURVEY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	AZIMUTH	DIP	REMARKS
15.00	45.00	091°	-52°	At 30m. Reading 079° MAG.
45.00	85.00	098° 30'	-48°	At 60m. Reading 078° 30' MAG.
85.00	135.00	091° 30'	-41°	At 110m. Reading 079° 30' MAG.
135.00	185.00	095°	-38° 30'	At 160m. Reading 081° MAG.
185.00	235.20	095°	-36°	At 210m. Reading 083° MAG.

PLOTTING KEY

SYMBOL DES. CODE	G/LOG	INTERVAL FROM	TO	SYMBOL DES. CODE	G/LOG	INTERVAL FROM	TO

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG

DRILLING OBJECTIVES / SUMMARY: TO TEST GOLD MINERALIZATION INTERSECTED IN GETTY HOLE MR 2, 350m TO THE SOUTH; AND MAGNETIC/EM ANOMALIES ASSOCIATED WITH THIS ZONE.

REPORT REFERENCE:

SHEET 1 OF 6

079

8350600

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	ROSEBERY EAST	HOLE NAME	RED 86-1
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	235.2m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Cu	Pb	Zn	Ag	Au	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
0.00	21.70											
21.70	23.00	110	110	170	1.0	<0.008	134781					
23.00	25.00	510	85	100	3.5	<0.008	134782					
25.00	27.00	15	45	65	1.0	<0.008	134783					
27.00	29.00	220	60	115	1.5	<0.008	134784					
29.00	30.00	9100	75	145	30.0	0.008	134785					
30.00	31.30	10150	115	260	4.5	<0.008	134786					
31.30	33.00	195	40	50	2.0	<0.008	134787					
33.00	34.85	80	30	95	1.0	<0.008	134788					
34.85	36.50	895	205	510	2.0	0.008	134789					
36.50	38.00	220	50	110	1.5	<0.008	134790					
38.00	40.00	85	35	105	1.0	0.008	134791					
40.00	41.50	2050	70	150	6.5	<0.008	134792					
41.50	43.00	255	60	240	1.0	<0.008	134793					
43.00	45.00	440	140	295	2.0	<0.008	134795					
45.00	47.00	55	150	360	2.0	<0.008	134796					
47.00	49.00	25	55	125	1.0	<0.008	134797					
49.00	51.00	70	65	285	0.5	0.017	134798					
51.00	53.00	60	165	390	1.0	0.017	134799					
53.00	55.00	65	95	200	1.0	<0.008	134800					
55.00	57.00	60	150	350	1.0	<0.008	134801					
57.00	59.00	55	100	290	1.5	<0.008	134802					
59.00	61.00	75	55	150	1.5	<0.008	134803					
61.00	63.00	85	85	180	<0.5	<0.008	134805					
63.00	65.00	55	5	80	1.5	<0.008	134806					
65.00	67.00	65	5	85	<0.5	<0.008	134807					
	67.20	PETROLOGY SAMPLE					134804					

DESCRIPTIVE LOG

0 – 21.7m: TRICONED – NO CORE
Glacials to 15m, then weathered bedrock.

21.7 – 43.7m: QUARTZ-FELDSPAR CRYSTAL SANDSTONE WITH LESSER GREY TO BLACK SILTSTONE AND SHALE
Grey to dk grey, f–med gr.
Sst massive, hard, gen blocky matrix ± some 2° silif assoc ± qtz-carb veining. Contains mod carbonate content ± calcarenitic. ∅ feld xyl frags. Abund partings ∅ graphitic material along schistosity – mode inc below 29.6m. Minor ubiqs: rare chlorite and trace pyrite.
Silst – shale, soft, thinly bedded, fissile (esp 33.5–36m).
Sed matrix (esp in shales) mod deformed – minor soft-sed intraformational disruption in places.
Numerous qtz-carb sweat-alt as irreg pods, veinlets and patches / mainly assoc ± sst. Some 'sweat-alt' silhslides also assoc ± thd qtz-carb. Minor through-going qtz-carb veins up to 80cm.
Bedding: 58°/CA ∅ 22m; 54°/CA ∅ 38m. Uphole facing ∅ 37.7m in graded sst bed. Fold axis 30–31m ± strong schistosity + veining //CA. Schistosity elsewhere weak.
Strongly foliated 28.7–29.6m in zone ∩ qtz-carb + sulphide veining around 15°/CA axes.
21.7 – 29m: Minor dissem py. Trace cp-sp-gn-po in and around qtz-carb veins, e.g. 23.2–23.3m (2% cp).
29 – 31.3m: 1–2% dissem + vein cp > py-sp-gn.
31.3 – 34.85m: Minor dissem py, inc ± depth.
34.85 – 35.05m: 3% cp > py + veins assoc ± qtz-carb veins.
35.05 – 40.0m: 2–3% py > po dissem + stringers. Minor cp-sp.
40 – 41.5m: 3–5% py-po-cp. Minor sp-gn. Assoc ± qtz ± chlor veins in silif sst.
41.5 – 43.7m: 2–3% py-po, ± qtz dissem some patches. Trace cp. Transitional change at base.

43.7 – 67.3m: BLACK SHALE WITH CHERTY INTERBEDDED TUFFACEOUS SILTSTONE AND QUARTZOSE SANDSTONE
Pale grey (silst + sst) to black (shale).
Silst + sst beds strongly calcareous, with grain sizes due to minor amounts ± calcite, often to dominant component. Shale grades but not clearly or sharply to carbonaceous and very soft, often appears of tuffaceous.
Regular bedding: 73°/CA ∅ 47m; 68°/CA ∅ 58.5m; 76°/CA ∅ 66.5m. Core weakly–moderately magnetic.
Weakly schistose – almost absent at base.
Abundant carbonaceous – v few tracts, except: 44.75–45.1m – zone ∅ brecciation ± pale green chlor + carb.
Numerous veinlets ∅ carb ± qtz, av < 5mm, most // bedding.
43.7 – 56.15m: 3–5% py, highly po, trace sp. dissem, ∅ also in stringers av < 1mm // bedding (sweat-alt). Some sulphs on qtz-carb veins.

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	ROSEBERY EAST	HOLE NAME	RED 86-1
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	235.2m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Cu	Pb	Zn	Ag	Au	Sn		SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG
															56.15 – 64m: 2-3% py > po, trace sp. Dissem and in stringers as before. Much dissem po in shale sections (max 5%). Less 10gms in silst/sst (< 1% in places).
															64 – 65.3m: Minor py-po (sst)
															65.3 – 67.3m: 3% py-po. v. fg py dissem, also stringers (shales). Basal contact bedding 72°/LCA.
67.00	69.00	95	55	170	<0.5	<0.008			136498			NQ			67.3 – 119.8 m: BLACK SHALE
69.00	71.00	75	10	220	<0.5	<0.008			136499			NQ			Some dk grey shale above 73m but overall pronounced blacker and inc carbonaceous and graphitic c depth. Even-textured and sheared. Fine regular bedding, becoming disrupted more base. Bedding: 68°/LCA @ 76.3m; 78°/LCA @ 101.5m;
71.00	73.00	70	45	155	<0.5	<0.008			136500			NQ			70°/LCA @ 112.5m:
73.00	75.00	80	<5	220	<0.5	<0.008			136501			NQ			Very graphitic, pitch interbeds, also thin calcareous siltst beds, but shale itself gives no carbonate reaction.
75.00	77.00	75	75	180	1.0	<0.008			136502			NQ			V weak schistosity - inc below 93m. Unbroken to 99m, thereafter inc fracturing
77.00	79.00	85	<5	185	<0.5	<0.008			136503			NQ			Minor quartz ± qtz veinlets av < 3mm, gen // bedding discontinuous + cut through-going (quartz-calc). Rare calc-qtz-chlor veins to 150mm, inc v/ abundance below 111.5m assoc c thin zones of brecciation and disrupted bedding.
79.00	81.00	70	10	125	<0.5	<0.008			136504			NQ			Some brecciated shale zones c locally qtz cement: eg: 90.6 – 90.85m
81.00	83.00	65	10	150	<0.5	<0.008			136505			NQ			75°/LCA (// bedding) c pale green fluorite (?) + 1-2% py-aspy also 87.7 – 89.5m: zone of qtz-carb-chlo veins c graphitic partings;
83.00	85.00	70	55	270	0.5	<0.008			136506			NQ			and 114 – 119.25m: crushed qtz-carb veined zone 60°/LCA.
85.00	87.00	55	15	170	<0.5	<0.008			136507			NQ			67.3 – 76m: 3% py > po. Mostly fg py-po dissem c many remote stringers // bedding. Also in the thin qtz-carb ± qtz veinlets c trace sp.
87.00	89.00	60	45	145	<0.5	<0.008			136508			NQ			Noticeably that amount of dissem drops dec in areas of inc veinlet calc-chlor-silph content fairly consistent.
89.00	91.00	45	165	515	0.5	0.017			136509			NQ			76 – 80m: 3-5% py > po. As above. Trace sp.
91.00	93.00	60	125	410	<0.5	<0.008			136510			NQ			80 – 93m: 2-3% py + minor po, trace sp-gn (latter only in carb veinlets). Below 89.5m sulphide inc in stringers + veinlets.
93.00	95.00	40	75	150	0.5	<0.008			136511			NQ			93 – 103m: 3% py, trace sp. As above. Some thin semi-massive bedded silph.
95.00	97.00	50	50	115	0.5	0.008			136512			NQ			103 – 119.8m: 3-5% py. Trace sp-gn. As before.
97.00	99.00	45	20	80	<0.5	<0.008			136513			NQ			
99.00	101.00	50	50	105	<0.5	<0.008			136514			NQ			
101.00	103.00	60	55	185	<0.5	<0.008			136515			NQ			
103.00	105.00	60	<5	135	<0.5	<0.008			136516			NQ			
105.00	107.00	50	10	90	<0.5	<0.008			136517			NQ			
107.00	109.00	65	135	510	1.0	<0.008			136518			NQ			
109.00	111.00	60	160	435	1.5	<0.008			136519			NQ			
111.00	113.00	105	85	265	1.0	<0.008			136520			NQ			
113.00	115.00	75	125	380	0.5	<0.008			136521			NQ			
115.00	117.00	60	65	120	1.0	<0.008			136522			NQ			
117.00	119.00	60	35	90	<0.5	<0.008			136523			NQ			
119.00	119.80	30	110	85	<0.5	<0.008			136524			NQ			
	81.65	PETROLOGY SAMPLE							136494			NQ			
119.80	120.80	35	25	55	0.5	<0.008	45	70	136525			NQ			119.8 – 129.7m: BRECCIA – STOCKWORK ZONE (FAULT)
120.80	121.80	35	80	115	0.5	<0.008	30	110	136526			NQ			Abrupt upper and lower contacts
121.80	122.80	30	40	55	0.5	<0.008	35	80	136527			NQ			Highly brecciated schistose and sheared BLACK SHALE (carbonated to GRAPHITIC SCHIST in places), with irreg thin veinlets (av < 3mm) and patches // qtz-carb-chlorite, forming matrix of breccia. Some pervasive chlorite.
122.80	123.80	45	45	60	0.5	<0.008	25	100	136528	45° to CA		NQ			Much interbanded qtz, but shale not silic.
123.80	124.80	30	165	150	0.5	<0.008	20	120	136529	45° to CA		NQ			Confused appreciation has bottom of many of the veins.
124.80	126.05	220	185	105	2.0	<0.008	45	140	136530	45° to CA		NQ			Rock unbroken except below 127.5m approaching strong
126.05	126.90	4125	30.7%	2.82%	670.0	0.150	700	2400	136531	45° to CA		NQ			fault.
126.90	128.00	275	11.3%	6000	28.0	0.008	140	200	136532			NQ			129.3 – 129.6m:
128.00	129.70	200	7400	11150	24.0	<0.008	50	950	136533			NQ			Abrupt 127m bedding in shale 75°/LCA. Abrupt 128m schistosity 67°/LCA.
	124.85	PETROLOGY SAMPLE							136534			NQ			119.8 – 124.8m: 5% dissem + stringer py.
	125.90	PETROLOGY SAMPLE							136535			NQ			124.8 – 125.35m: 5-7% py, trace sp + aspy

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	ROSEBERY EAST	HOLE NAME	RED 86 - 1
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	235.2 m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Cu	Pb	Zn	Ag	Au	Sn	As	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG
															125.85 – 126.05m: Massive ankeritic carbonate, 3% py, minor cp-gn.
															126.05 – 126.9m: SULPHIDE LODE ZONE:
															126.05 – 126.15m: semi-massive aspy>py in shaly-qtz-carb gangue.
															126.15 – 126.35m: massive gn, minor py-cp, minor ankerite gangue.
															Contacts 70°/LCA and 40°/LCA.
															126.35 – 126.9m: Semi-massive gn>sp>cp>py, Some aspy in basal 100mm; clasts as above in brecciated ankerite.
															Basal sharp contact 75°/LCA.
															126.9 – 129.7m: 3% py disseminated & minor veinlets gn-sp>aspy.
129.70	131.00	85	30	75	0.5	<0.008	9	35	136536			NO			129.7 – 133.85m: BLACK SHALE
131.00	132.50	110	65	305	<0.5	<0.008	10	35	136537			NO			Finely bedded & thin qtz-carb veinlets & some larger veins, sparsely bedding. (Bedding: 75°/LCA @ 130.5m)
132.50	133.85	85	65	60	0.5	<0.008	15	70	136538			NO			disrupted & thin beds & concretions.
															Fractured and broken in places.
															3% disseminated & veinlet py.
															Basal contact bedding 74°/LCA.
133.85	136.00	20	<5	35	<0.5	<0.008	10	5	136539			NO			133.85 – 156.9m: CHLORITIC TUFFACEOUS SILTSTONE & SERICITIC-CHLORITIC SILTSTONE.
136.00	138.00	25	25	90	<0.5	<0.008	3	8	136540			NO			Pale grey, mod friable - hardness in places.
138.00	140.00	30	<5	45	<0.5	0.017	5	10	136541			NO			Generally fining with depth from fine breccia and sandstone at top & interbedded to siltstone and tuff-shale at base.
140.00	142.00	20	35	65	<0.5	0.008	5	5	136542			NO			Breccia/sst contains stretched lithics & tuff-shale and chert to 35mm, av <10mm in sericitic-chloritic matrix containing small deformed subrounded vtlc qtz xtals <1mm, also corroded feld xtals 1-2mm. Rock cored in sst to 140m thereafter pink.
142.00	144.00	25	70	65	<0.5	0.008	10	10	136543			NO			Siltst laminations, rare sparse small vtlc qtz xtals. Finely bedded.
144.00	146.00	30	<5	25	<0.5	<0.008	6	140	136544			NO			Pale, 150mm siltst as above, clayey & sericitic, also mod silic.
146.00	148.00	20	35	60	<0.5	<0.008	7	15	136545			NO			Lithic interval in silic & chloritic and weak silic.
148.00	150.00	20	<5	25	<0.5	<0.008	15	10	136546			NO			Bedding: 71°/LCA @ 144.8m; 73°/LCA @ 153.5m.
150.00	152.00	20	40	1600	<0.5	<0.008	7	<2	136547			NO			Mod schistose - rock fast disrupted, abund graphitic partings after laminae & black shale. Schistosity 73°/LCA @ 139.5m.
152.00	154.00	25	<5	30	<0.5	<0.008	30	100	136548			NO			Thin carb & qtz veinlets part / schistosity. Some qtz>carb veins at all angles. Large qtz vein 145.4 – 146.2m, breccia & minor carb & clast. Adj rock intensely silic & 148.7m.
154.00	156.00	20	<5	260	<0.5	<0.008	15	4	136549			NO			153.85 – 149.7m: 1-2% disseminated py & minor po, sp, cp, as py in qtz-carb veinlets in approx 5 cm/m.
															149.7 – 150.4m: Minor dissem py. Trace aspy + po + sp.
															Basal contact bedding 69°/LCA.
156.00	158.00	35	10	115	<0.5	<0.008	8	15	136550			NO			156.9 – 160.70m: BLACK AND GREY SHALES
158.00	160.00	85	5	200	<0.5	<0.008	8	25	136551			NO			Black-mod carbonaceous & graphitic partings. Sericitic, weakly chloritized, v/f silic. Minor interbedded sericitic siltst, sst and fine lithic-qtz xtal-breccia. One small vtlc qtz xtals in sst.
160.00	162.00	75	35	125	<0.5	<0.008	10	20	136552			NO			Finely bedded: 68°/LCA @ 159.5m; 65°/LCA @ 169m; 76°/LCA @ 172.5m.
162.00	164.00	100	5	155	<0.5	<0.008	10	30	136553			NO			v/f-mod schistosity.
164.00	166.00	100	30	245	<0.5	<0.008	4	20	136554			NO			Grade with isolated zones to 1Kg, esp: 157.2m shear 70°/LCA
166.00	168.00	105	45	210	<0.5	<0.008	6	15	136555			NO			Mod schistosity, + 163 – 165m sev sheared / schistosity.
168.00	170.00	95	45	135	<0.5	<0.008	6	9	136556			NO			
170.00	172.00	105	20	145	<0.5	<0.008	4	15	136557			NO			

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	ROSEBERY EAST	HOLE NAME	RED 86-1
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	235·2 m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Cu	Pb	Zn	Ag	Au	Sn	As	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
172·00	174·00	105	50	175	<0·5	<0·008	7	8	136458			NQ		
174·00	176·00	85	50	305	<0·5	<0·008	6	15	136459			NQ		
176·00	178·00	100	10	115	<0·5	<0·008	5	15	136460			NQ		
178·00	180·00	100	20	135	<0·5	0·008	6	10	136461			NQ		
180·00	182·00	50	5	65	0·5	0·150	<3	6	136462			NQ		
182·00	184·00	60	65	110	<0·5	0·017	7	25	136463			NQ		
184·00	186·00	40	45	560	0·5	<0·008	6	30	136464			NQ		
186·00	188·00	30	50	85	<0·5	<0·008	8	<2	136465			NQ		
188·00	190·00	20	5	60	<0·5	<0·008	3	2	136466			NQ		
190·00	215·00													
215·00	217·00	65	60	165	0·5	<0·008	5	25	136467			NQ		
217·00	219·00	95	45	170	0·5	<0·008	6	15	136468			NQ		
219·00	221·00	95	40	130	<0·5	<0·008	<3	40	136469			NQ		
221·00	223·00	105	60	135	1·0	0·017	5	25	136470			NQ		
223·00	225·00	90	65	220	0·5	<0·008	7	15	136471			NQ		
225·00	227·00	95	90	170	1·0	0·008	9	20	136472			NQ		
227·00	229·00	95	55	135	<0·5	<0·008	6	10	136473			NQ		
229·00	231·00	90	30	120	<0·5	<0·008	<3	10	136474			NQ		
231·00	233·00	125	330	870	2·5	0·017	10	50	136475			NQ		
233·00	235·20													

DESCRIPTIVE LOG

Exact set of LCA - causes crenulations in bedding.
Thin irreg carbt qtz veinlets, common above 169m.
156·8 – 162·5m : 2% py > po, dissem and sweat-alt stringers, also in carb veins ± chlor (trace sp in these also).
162·5 – 165·5m : Minor py > po.
165·5 – 169m : 2–3% py–po. Trace sp–cp. As sulph veinlets + dissem.
169 – 180·7m : 5% po > py, Mostly as v fr gr bedded dissem-grains v. thin beds || massive sulph below 177·5m. Also as sulph veinlets ± carb, chlor veins, trace sp cp.
(NB: Minimable that amount of dissem sulph decreases in areas of sulph veinlets and vice versa. Intrusive veinlets being of sweat-alt type).
Basal contact bedding 70°/LCA

180·7 – 215·6m : QUARTZ-FELDSPAR CRYSTAL TUFF
Grey, hard, silic. Even-textured, tuffaceous of geminize dacite. Subrounded qtz xtals to 4mm, av 1–2mm; deformed carbonatised felsic av 2–3mm. Both dec to av <1mm at base. Occ lithics (mostly black shale, some carbonate) av <10mm, max 40mm (flattened) – only near top of interval. Matrix chalky and tuffaceous – very chalky in places below 190m. Trace tuffaceous below 205m.
To 187m rare, carbonaceous and graphitic material in matrix (dacite veins) with shale/shale bands very broken by fracs and strong kaol at 185·15m (60°/LCA); 186m (70°/LCA)
Kaol-mod schistosity deforms rock fabric but bedding visible in places marking || interval (72°/LCA @ 182·2m).
Schistosity: 70°/LCA @ 190m; 75°/LCA @ 201m; 70°/LCA @ 215m.
Weak-mod chloritised + sericitised throughout - inc below 190m.
V minor qtz-carb veining.
180·7 – 182·25m : Minor py > po.
182·25 – 183·8m : 5% po > py, trace aspy, dissem + veinlets in carbonate-rich shale band.
183·8 – 185m : 1% py–po, trace aspy. As above.
185 – 215·6m : Trace po > py > sp–aspy.
Basal contact bedding 63°/LCA.

215·6 – 235·2m : BLACK + GREY TUFF–SHALE
Interbeds of grey tuff-silt and xyl str. Minor chert beds. Shale stft, hd, silic, strongly calcareous, with thin beds of limestone. Thin veinlets + flakes of calc; occ veins of carbt qtz.
Finely bedded (71°/LCA @ 218·3m, 76°/LCA @ 228m). Sev excellent facings in beds 229–231m all facing downhole (to East)
Sev schistose and broken zones assoc ± strong shears: 70°/LCA @ 218·4m; 85°/LCA @ 219·4m; 83°/LCA @ 234·3m.
(Below assoc ± set of strong carb > qtz veins).
217·35 – 217·45m : Black magnetic nodules to 5mm in black shale.
215·6 – 228·2m : 5% py–po. Trace cp. Veinlets ± carb, also dissem.
228·2 – 234·3m : Mod py–po. Trace cp + aspy.
234·3 – 235·2m : 2% po > py, mostly in carb–qtz veins.

SHEET 5 OF 6

END OF HOLE

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

PETROLOGICAL SAMPLES :

The Shell Company of Australia Limited
METALS DIVISION
DRILL LOG SHEET
CONTINUATION SHEET

PROJECT	ROSEBERY EAST	HOLE NAME	RED 86-1
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	235.2m

Geochempet Services

PETROLOGICAL and GEOCHEMICAL CONSULTANTS

PETROLOGICAL REPORT

ON FOUR SAMPLES

prepared for

BILLITON AUSTRALIA

Despatch Order Code : 11532/1350/3CP/035

Ref : J.G. Purvis

A.S. Joyce, B.Sc.(Hons), Ph.D.

31st December, 1986.

INFORMATIC

Sample Number: 13495 RED 86-1, 67.2m.

Identification : Laminated, carbonate-rich slaty siltstone and black slate with deformed veins of carbonate-quartz-sulphides.

Description :

The sample is a drill core specimen of finely laminated medium light grey and greyish black, fine-grained rock with a few thin, very light grey fissure veins cutting the laminations at a low angle.

A cobaltinitrite staining test revealed no K-feldspar.

In thin section the sample displays fine layering of sedimentary style, but there is also an imprinted metamorphic foliation. The sedimentary layers are variously about 0.1 to 1.5mm thick. A sericitic metamorphic foliation is essentially concordant with the layering, but distinctly crenulated in some thin, carbonaceous slaty layers.

The thickest and most common layers are of slaty style, with many cloudy strained silt grains of quartz (about 0.02 to 0.05mm in size) and anhedral grains of carbonate (apparently calcite) but in a foliated matrix of sericite with disseminated grains and streaky aggregates of subhedral sulphide (largely or wholly pyrite several microns to about 0.02mm in size). There are small amounts of carbonaceous (presumably graphitic) material.

A typical mode is :

20-30%	quartz
20-30%	calcite
45-55%	sericite
1-3%	sulphides
1-2%	carbonaceous matter (presumably graphite)

The less abundant, black slaty layers consist of about

73-83%	sericite
10-15%	carbonaceous matter
6-8%	very fine sulphide

Discordant fissure veins about 1 to 2mm thick, are strained, boudinaged and locally disrupted, especially by the slaty layers. They carry carbonate, quartz and sulphide (maximum grainsize 0.5mm). The carbonate is white and anhedral, but has refractive indices a little too high for common calcite. The sulphide is mainly but probably not solely pyrite.

An approximate composition of the bulk specimen is :

85-90%	slaty, carbonate-rich siltstone
10-12%	black slate
2-3%	veins of carbonate-quartz-sulphide

.../2

13496 cont.

Comments and Interpretations:

This specimen is interpreted to display laminated slaty siltstone and black slate, both finely impregnated with syngenetic sulphide (mainly pyrite). An essentially concordant slaty foliation has been superimposed on the sedimentary layering. Fissure veins of carbonate with quartz and sulphide have been strained and locally disrupted by the most slaty layers. The silty layers are rich in calcite and it is quite possible that the carbonate-quartz-sulphide veins have been generated by mobilization of sedimentary components during the metamorphism.

Sample Number: 13496 RED 86-1, 81.65m.

Identification : Pyritic black slate

Description :

The sample is a drill core specimen of greyish black slate. Subtle very fine planar bandings and concordant tiny lenses of sulphide are orientated at a high angle to the core axis.

A staining test revealed no K-feldspar.

In thin section the sample displays planar foliation and mineralogical banding on scales of about 0.005 to 0.02mm. The minerals involved are sericite, very fine carbonaceous matter (presumably graphite), very fine sulphide (several microns to about 0.01mm), quartz and carbonate.

The sulphidic lenses detectable in hand specimen are seen to consist of subhedral and euhedral pyrite, about 0.02 to 0.2mm in size but within a greater abundance of strained, somewhat fibrous quartz and minor carbonate (apparently calcite). Many of the siliceous lenses are only about 0.5mm long, but others are millimetres long and of veinlet style.

There is one distinct fissure vein, about 0.1mm wide, traversing the whole width of the specimen and intersecting the banding very acutely. It contains mildly strained quartz, calcite and sulphide (largely or wholly pyrite). It pinches and swells in boudinaged style. It is cut by a later very thin (0.03mm) vein of calcite, almost normal to the banding and finely crenulated by it.

An approximate mode is :

70-75%	sericite
8-10%	carbonaceous matter (presumably graphite)
6-10%	quartz
6-8%	sulphide (mainly or wholly pyrite)
3-4%	calcite

Comments and Interpretations :

This sample is identified as a pyritic black slate. It carries a significant amount of sulphide, much of it as disseminated tiny grains of probable syngenetic origin, but some of it coarsened and mobilized into concordant lenses and veinlets with quartz and calcite by low grade metamorphic processes.

The subtle very fine banding of the slate may be attributable to metamorphic segregation rather than sedimentary layering.

Sample Number: 13495 RED 86-1, 124.85m.

Identification: Sheared and granulated black slate, formerly heavily veined by quartz-chlorite-carbonate-pyrite

Description:

The sample is a drill core specimen which displays many light grey lenses and crude bands of apparently metamorphosed vein material in a foliated, dark grey, cohesive to disturbed slaty mass. Fine specks of grassy sulphide are visible.

A staining test revealed no K-feldspar.

In thin section the light grey regions are confirmed to be strained, disaggregated and pyrite recrystallized fissure vein material, composed of quartz, chlorite, carbonate and pyrite. The least disturbed remnants display anhedral grains of sericitic carbonate (very pale orange in hand specimen, high relief in section), about 0.5 to 2mm in size, and anhedral to toothy quartz, about 0.02 to 1mm, but in most places the quartz is heavily strained and recrystallized and the carbonate is recrystallized and perhaps sericitized. The chlorite occurs prominently as fine-grained aggregates and the pyrite occurs as subhedral and euhedral cubes, about 0.02 to 0.3mm in size.

The slaty host is sheared and brecciated. In its least disturbed form it displays planar foliation with very thin bands composed of varying proportions of sericite, fine carbonaceous matter (presumably graphite) and quartz. It carries traces of barely visible pyrite, a few microns to 0.01mm in size. In more disturbed regions the foliation is contorted and there are admixed segments of the vein material. An approximate mode of the slaty host is:

60-70%	sericite
20-25%	carbonaceous matter (probably graphitic)
10-15%	quartz
0.1-0.2%	pyrite

An approximate mode of the bulk sample is:

35-45%	carbonaceous slaty host
45-55%	strained vein quartz
5-10%	chlorite in deformed quartz veins
2-3%	ankeritic carbonate in deformed quartz veins
2-3%	pyrite in deformed quartz veins

Comments and Interpretations:

This rock is interpreted to have originated as carbonaceous slate with traces of very fine pyrite. It was heavily fissure veined by quartz-chlorite-ankerite-pyrite, then sheared and brecciated. The shearing post-dates development of the slaty foliation, as rotated clasts of slate are obvious.

Pyrite occurs mainly within the deformed vein material. No tourmaline or fluorite was detected.

The veining and deformation is suggestive of a fault environment.

Sample Number: 13495 RED 86-1, 125.9m.

Identification: Brecciated black slate, thinly veined by quartz-ankerite-pyrite and thickly veined by ankerite-chalcopyrite

Description:

The sample is a drill core specimen which displays two thick veins (at least 3cm and 6cm wide) of mainly greyish orange carbonate cutting a greyish black, slaty host with irregular, fine veins. Fine chalcopyrite is visible in the thick veins and fine pyrite in the thin veins.

A staining test revealed no K-feldspar.

In thin section the thick veins are seen to be of fissure style and composed mainly of coarse, faintly strained, anhedral to subhedral ankerite, about 0.3 to 6mm in grainsize. Within the veins, but especially close to their walls there are grains of chalcopyrite, about 0.05 to 0.3mm in size. The thickest vein seems to be a composite structure, composed of several parallel veins of ankerite and chalcopyrite discontinuously seperated by small slivers involving quartz, sericite, pyrite and rarely calcrite.

The slaty host is of brecciated and densely, finely veined appearance. The slate is of planar laminated, foliated appearance (similar to Sample 13495) and composed of about:

63-75%	sericite
15-20%	carbonaceous matter (presumably graphite)
5-10%	quartz
4-6%	very fine sulphide (mainly pyrite)

The fine veins are of fissure style, about 0.02 to 1mm thick, only mildly deformed, and composed of variable proportions of quartz, ankerite and pyrite. Grainsizes are mainly 0.05 to 0.3mm.

An approximate mode of the bulk sample is:

35-45%	carbonaceous slaty host
50-60%	ankeritic vein carbonate
5-8%	vein quartz
1-2%	vein pyrite
0.5-1%	vein chalcopyrite

Comments and Interpretations:

This rock is thought to have originated as a very finely pyritic, carbonaceous slate, similar to Sample 13496, but it has been brecciated and thinly veined by quartz-ankerite-pyrite, then thickly veined by ankerite with accompanying early chalcopyrite.

The brecciation and intense veining suggests a fault setting.

No tourmaline or fluorite was detected.

SHEET 6 OF 6

084

8380852

SHLMET SYSTEM
METRIC
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METALS DIVISION

DRILL LOG SHEET

HEADING SHEET

COLLAR INFORMATION	DATA TYPE	COLLAR CO-ORDINATES: EASTING	NORTHING	ELEVATION	COLLAR SURVEY: AZIMUTH	DIP	HOLE NAME	TOTAL DEPTH	HOLE TYPE	DESC CODE	REMARKS
	WHOLE	384436.2	7542015	160.1	096 30	-60	RED 87-2	260.30			

PROJECT	MURCHISON RIVER
LOGGED BY	J.G. PURVIS
CONTRACTOR	DIAMOND DRILLING TAS
CREW	P. ARCHER
HOLE NAME	RED 87-2
TOTAL DEPTH	260.3m
RIG	LONGYEAR 38
DATE STARTED	27.4.87 FINISHED 15.5.87

CORE STORAGE: No OF TRAYS: 41; LOCATION: DEVONPORT
SAMPLE STORAGE: DEVONPORT (DESPATCH 0/05: 11454)
MAP LAB: GEOBASE, BRISBANE
ASSAY LAB: COMLABS, ADELAIDE

DESC.	SIZE	FROM	TO	TOTAL	REMARKS
NON CORE	HW	0	26.5	26.5	HOLE CAPPED AND
CORE	HQ	26.5	32.5	6.0	COLLAR CEMENTED.
	NQ	32.5	260.3	227.8	
	BQ				
CASING					
CASING LEFT	HQ (S)	0	32.5	32.5	(S) steel (P) plastic

SURVEY INFORMATION

DISTANCE FROM COLLAR: TO TOP	TO BOTTOM	AZIMUTH	DIP	REMARKS
0	45.00	091°	30-58	30 AZIMUTH IN AMG (=MAG+12°)
	72.50	091°	40-56	30
	102.00	092°	30-56	00
	129.00	095°	00-56	15
	162.00	092°	30-55	30
	192.00	094°	00-55	00
	231.00	093°	30-54	40
	260.00	094°	30-53	15

PLOTTING KEY

SYMBOL: DES. CODE	G/LOG	INTERVAL: FROM	TO	SYMBOL: DES. CODE	G/LOG	INTERVAL: FROM	TO

ASSAY INFORMATION

DISTANCE FROM COLLAR: TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE No	CORE ANGLE	ROCK TYPE	DESC CODE	GRAPHIC LOG
216.30	220.30	2.34	0.114%	0.028%		65	70	0.111%	4.19%				
PART OF	21.3m ZONE:												
199.00	220.30	0.75	685	402	460	5	1537	11.60%					

DESCRIPTIVE LOG

0 — 24.2m: FLUVIO-GLACIAL GRAVELS AND SANDS.

24.4 — 198.40m: ANDESITIC CRYSTAL TUFFS AND LAVAS (MT BLACK VOLCANICS)
Feldspar-porphyritic. Lavas very strongly silicified, silicification inc. ± depth. Minor sulphides.

198.4 — 198.95m: HENTY FAULT.
Highly crushed and brecciated rock. 1% py.

198.95 — 221.7m: CHLORITISED, MINERALISED SANDSTONE (FARRELL SLATE SEQUENCE)
Quartzose. Patchy silicification and brecciation.
3-5% py-aspy-po in stringers and patches, with two stronger zones of mineralisation:
204 — 210.3m: 10-15% py-aspy as bands, stringers and patches in qtz-chlorite ± tourmaline (?) gangue.
216.3 — 218.5m: Bands of massive and semi-massive aspy-py-sp, up to 250mm.

221.7 — 260.3m: QUARTZOSE SANDSTONE WITH LESSER TUFFACEOUS, GRANITIC, SILTSTONE AND SHALE
Strongly calcareous. Quality chloritised and silicified.
Minor sulphides (less than normal in Farrell Slate Sequence).

DRILLING OBJECTIVES / SUMMARY

OBJECTIVE: TO OBTAIN INTERSECTION 50m BELOW GOLD MINERALISATION INTERSECTED IN HOLE MRP 233.

SUMMARY: HOLE PASSED THROUGH STRONGLY SILICIFIED ANDESITIC VOLCANICS WEST OF THE HENTY FAULT BEFORE INTERSECTING FAULT AT 198.4 — 198.95m. AN ALTERED AND MINERALISED SANDSTONE UNIT OF THE FARRELL SLATE SEQUENCE WAS ENCOUNTERED TO 221.7m GIVING A BEST INTERSECTION OF 4m @ 2.34 g/t Au, 4.2% As. THE HOLE WAS COMPLETED IN PARTLY-SILICIFIED SANDSTONE, SILTSTONE AND SHALE.

REPORT REFERENCE:

SHEET 1 OF 5

085

8380086

SHLMET SYSTEM
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METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-2
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	260.3 m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
0.00	26.90													
26.90	27.75	0.05	18	50	190	2	150	1500	14170					
27.75	33.60													
33.60	35.20	0.04	8	155	300	1	28	24	14171					
35.20	54.40													
41.20		PETROLOGICAL SAMPLE							14169					
54.40	56.40	0.03	22	460	690	<1	1115	520	14172					
56.40	58.00													
58.00	60.00	0.04	22	390	7450	<1	55	26	14173					
60.00	64.80													

DESCRIPTIVE LOG

0 – 22.50m : NO CORE.

0 – 12m :- Fluvio-glacial gravels

12 – 22.5m :- Sand

22.5 – 24.2m : BROWN COMPACT SAND.
Iron-stained qtz-mica sands, with 0.2m of basal silty clay.

24.2 – 26.95m : FELDSPAR CRYSTAL TUFF.
Green. Med gr. Massive.
Only v. sl oxidised - minor clay seams and Fe stains on fracts. Minor leaching of darks. Broken.
Abund feld xyls to 2mm. Some sl mantled. Rare fi qr lithics.
Chloritic matrix ± abund fi qr biotite.
Thin qtz-carb veins - most contain minor py-cp in basal 0.5m.

26.95 – 29.90m : BASALT LAVA.
Dk green. Fi gr. Uniform and almost featureless.
Abund fi qr biotite and occ feldx, in highly chloritic groundmass.
Common tight-carb veins and pebbles.
Core broken around dleppy shears (30°/LCA @ 27.35 – 27.50m, 20°/LCA @ 28m).
26.9 – 27.75m : 1-2% py-aspy mostly in veins to 15mm assoc with shears and qtz veins. Otherwise minor py-aspy base of sp.
Upper contact qtz vein 70°/LCA; Lower contact 60°/LCA-also veined.

29.90 – 61.30m : FELDSPAR CRYSTAL – (LITHIC) – TUFF
Green. Med gr. Gen rather uniform and massive.
Hard and unbroken.
Abund feld xyls av 1-2mm, max 4mm. Uncommon lithic frags up to 15mm, av 3mm. Most common below 48m. Gen fi gr, diffuse cast, some silic and pyritic, angular. Occ frags of felsic + qtz - porphyritic lavas.
Rock matrix strongly chloritic and weakly epidotic with ubiquitous fi qr biotite (some ilmenite/leuc). Matrix gen subordinate to feld xyls which are densely packed in places, folds weakly contorted and gen euhedral to subhedral.
Below about @ 54.4m some 1° layering and textural variations was enhanced by strong chlor alt of finer gr zones.
1° layering : 40°/LCA @ 57.3m; 66°/LCA @ 47.5m.
Wk schistosity : 45°/LCA @ 33m; 35°/LCA @ 62m.
Ubiquitous qtz-carb veins and irreg pebbles. Patchy bleaching and silic assoc with some fi biotite.
Occ shears and fracts : 30.25m (30°/LCA); 38.5m (63°/LCA).
54.4m (60°/LCA). 33.6 – 35.2m : deformed bands of fi gr mafic lith with 1-2% fi gr disem py.
Gen sulfide minor - disem py ± lesser sp-gn ± assoc ± carb.
Rare sulfide assoc ± 2° chlor (± qtz-carb-biotite) alt which overprints the 'original' silicification. Thin 2° chlor alt occs in bands / selvages and thin 'veins'. Thin alt inc below 48m where it occ as fracture

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SHLMET SYSTEM
METRIC
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METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-2
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	260·3 m

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG
															rock, or enhances 1° text variations.
															Best silic zone: 54·4 – 56·5m: 2% py-aspy-sp>gn in gal-bas + short stringers; minor from vein to Assoc ± bar.
															58·6 – 59m: 5% sp in coarse gn stringers / schistes 50°/LCA.
															Basal contact 35°/LCA.
62·70		PETROLOGICAL SAMPLE							14174			NQ			61·30 – 66·10m: STRONGLY CHLORITIC UNIDENTIFIABLE MAFIC VOLCANIC AROUND STRONG FAULT ZONE.
															Could be part 1) above unit.
															Dk green and strongly chloritized to 63·5m, pale green and patchily silic and stockwked, with abund qtz>carb veins, below 163·5m.
															Abund fine lucernere. Some qtz folds to 2mm. Gen de-formed by all and most subtlety (40°/LCA).
															Fault Zone 65·1 – 66·1m / Confined to crushed brecciated zone @ 65·7m 80°/LCA. Other qtz zones @ 65·1m (50°/LCA) and 66m (65°/LCA)
64·90	67·00	0·05		7	350	720	<1	50	22	14175		NQ			64·9 – 65·4m: 2-3% sp-gn±py dissem.
															Elsewhere, minor py-aspy-sp, dissem, some in qtz-carb veins.
67·00	69·00	0·06		6	95	130	<1	16	40	14176					66·10 – 198·40m: SILICIFIED FELDSPAR-PORPHYRITIC ANDESITE LAVAS
69·00	178·50														Green and white. Fnd-coarse gr. Text gen uniform - minor variations in size and abundance of felds.
															Abund pink felds upto 2mm, max 4mm in chloritic matrix ± abund fine lucernere. Rare qtz-filled amygdules to 3mm @ 177m.
															Poss epiclastic or intraflow zone? 142·4 – 147·9m - text variations and crude bedding 65°/LCA.
95·50		PETROLOGICAL SAMPLE							14177			NQ			Strong to locally intense silicification throughout - rock extensively replaced by qtz. Felds commonly completely replaced by qtz or ± 12° qtz amygdules, on felds. Stkf hal fine fabric: a) diffusely 1° text with very different weaning & qtz stkd breccia's form. In places they weave so strong it's unrecognisable into stkd veins & white xenhaic qtz up to 0·5m wide.
															b) Grey diffuse stkwk text retained 1° rock textur and clear bed pervading rock extremely hard, pervasive silic)
															Dk is known ± little assoc carb. Strong qtz fracted ± pale pink chamfer. Silic inc ± depth - intense below 150m.
															Abundant fracture breccia zones also annealed by qtz-related to earlier stkwk eg: 75·5 – 77·5m; 120·7 – 129m (fine confined abund basalt fabric eg 124·1 – 127·3m - gabb dykes within the original structure) Fine qtz-annealed breccia thin below 150m.
															Some bleaching and sericitization assoc ± the silic. Strong patchy 1) v. strong 2° chloritic alt which de-textures rock, eg below 183·4m. Magn assoc ± better alt.
															Gen unfoliated, but foliation in places below 99m by fracts // LCA. Fault (angle unknown) @ 105·25m, Shears 17°/LCA @ 150·2m + 164·2m. Rock inc fract below 178m (Fract 17°/LCA) Shears 25°/LCA @ 179·4m.
															Weak schistosity in places: 52°/LCA @ 76·5m, 40°/LCA @ 152·5m.
															Basalt dykes (dk green, chloritic, fine lucernere) – gen. unsilic

ASSAY INFORMATION

Sample Number : 14169 (HHD 87-2 41.8m)

Identification : Chloritised volcaniclastic arenite of richly feldspathic, probably andesitic derivation

Description :

The sample is a drill core sample of greenish grey rock with subtle sandy textures.

A cobaltinitrite staining test revealed no K-feldspar.

In thin section the sample plainly displays andesitic volcaniclastic textures involving densely packed, sand-sized clasts of plagioclase, heavily chloritised volcanic rock fragments and a few grains of altered opaque oxide, all cemented by chlorite. One of the thin section displays clasts about 0.15 to 1.5mm in size, but there is a 12mm layer of finer clasts (about 0.1 to 0.3mm).

The plagioclase clasts are all lightly sericitised, generally twinned grains. The lithic clasts retain some andesitic or basaltic textures, but are mostly made of finely recrystallised, sericitised plagioclase, chlorite and small aggregates of cloudy sphene. The infilled oxide stems (ranging up to 0.5mm) have been altered to leucoxene and aggregates of fine sphene.

There are a few thin (0.2mm) fissure veins of calcite.

An approximate mode is :

80-90%	lightly sericitised plagioclase clasts
5-10%	chloritised andesitic or basaltic lithic clasts
1-2%	leucoxene and sphene after ilmenite or titaniferous magnetite clasts
5-10%	chlorite cement
0.5-1%	calcite veins

Comments and Interpretations :

This sample is confidently interpreted to represent moderately sorted volcaniclastic arenite resulting from aqueous transport of phenocrysts of plagioclase, and ilmenite or titaniferous magnetite, accompanied by a few clasts of andesitic or basaltic rock. The main source was probably andesitic.

The plagioclase clasts have been lightly sericitised, the lithic clasts have been chloritised, oxide grains have been converted to leucoxene and sphene and a chlorite cement has formed that always readily distinguishable from the chloritised lithic clasts). There is no obvious shearing, but the alteration could be of hydrothermal or low grade metamorphic origin. Narrow calcite fissure veins carry calcite.

Sample Number : 14170 (HHD 87-2 62.7m)

Identification : Intensely chloritised, abundantly porphyritic andesite cut by fissure veins carrying chlorite, sericite, quartz and siderite

Description :

The sample is a drill core specimen of dark greenish grey, fine-grained rock.

A staining test revealed no K-feldspar.

In thin section the sample is seen to be intensely chloritised, but plainly recognisable remnant textures are of abundantly porphyritic, volcanic style, involving many tabular phenocrysts of inferred plagioclase (0.5 to 1.5mm in size) and a few smaller prismatic phenocrysts of inferred pyroxene set in a groundmass of flow aligned laths and grains (about 0.2 to 0.3mm long) and numerous small grains of inferred oxide (about 0.05 to 0.1mm).

All of the silicates have been replaced by fine-grained chlorite, accompanied by minor fine subaligned albite in the core of inferred plagioclase. The inferred oxides are now aggregates of fine sphene. There are a few specks of sericite in the vicinity of fine sphene. Fissure veins (up to several millimetres wide) carrying chlorite and sericite. A veined 1mm wide fissure vein carries subequal to anhy. Finely crystal quartz with subordinate chlorite. Another quartz patch has a core of fine-grained siderite.

An approximate mode is :

70-80%	chlorite
15-20%	albite
1-2%	sphene
2-3%	chlorite in veins
0.2-0.4%	quartz in veins
0.5-1% to	sericite mainly in veins siderite in veins

Comments and Interpretations :

Distinct remnant textures indicate that this rock originated as an abundantly porphyritic lava. It is probable that it was andesitic, since its dominant phenocrysts were mainly plagioclase; there are no textures suggestive of olivine.

Hydrothermal action is considered to account for intense alteration of the rock to chlorite-albite-sphene. There is no evidence of shearing and metamorphic processes would not produce chlorite from both plagioclase and mafic silicates. Fissure veins carry the same type of chlorite, along with sericite, quartz and siderite.

Sample Number : 14177 (HHD 87-2 95.5m)

Identification : Albitised and chloritised, glomeroporphyritic, porphyritic andesite with fissure and replacement veins of quartz

Description :

The sample is a drill core specimen which displays many light grey phenocrysts of feldspar set in a greenish grey groundmass. A 5mm wide fissure vein of very light grey quartz cuts across the core.

A staining test revealed no K-feldspar.

Thin section displays the thick fissure vein of quartz and some irregular replacement style veining by quartz, but the host rock involves glomeroporphyritic and porphyritic textures of volcanic style.

The phenocrysts are mainly tabular, twinned plagioclase (now albite), about 0.1 to 3mm in size, but there are some sphene-leucoxene aggregates after titaniferous oxides and chlorite-calcite-sphene pseudomorphs of mafic phenocrysts. The groundmass, porphyritic between the phenocrysts is composed of albitised, partially recrystallised plagioclase laths, set in a matrix of fine sphene. There are a few specks of sericite in the vicinity of fine sphene. There are a few veins (up to several millimetres wide) carrying chlorite and sericite. A veined 1mm wide fissure vein carries subequal to anhy. Finely crystal quartz with subordinate chlorite. Another quartz patch has a core of fine-grained siderite.

Irregular replacement veins, up to about 5mm wide, occur relatively common, mainly crystal quartz and veins with twinned albite of similar grainsize. The 5mm diameter vein carries albite subequal to subordinate, mainly crystal quartz. There are a few later, thin filament veins (0.2mm) of calcite.

An approximate mode is :

55-70%	albitised phenocrysts of plagioclase
5-20%	sphene-leucoxene after titaniferous oxide phenocrysts
1-2%	chlorite-calcite-sphene pseudomorphs of mafic phenocrysts
60-70%	groundmass albite
5-10%	groundmass chlorite
1-2%	groundmass sphene
15-20%	quartz in veins
1-2%	albite in quartz veins
0.2-0.3%	calcite veins

Comments and Interpretations :

This rock is interpreted to have originated as a glomeroporphyritic, plagioclase with porphyritic groundmass. Its composition was andesitic.

The rock has been albitised and chloritised and cut by fissure and replacement veins of quartz. Some albite accompanies the replacement quartz. Slight deformation has sheared the quartz. Late thin fissure veins carry calcite.

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-2
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	260·3m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIMS	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG
178·50	179·70	0·13	195	65	80	3	70	7650	141178			MQ			Mf sqve from clysts in qtz-annealed breccia zones and cloudy pre-date sqves of the silst. Dips @: 193-193.6m (40°/LCA); 120.7-121.4m (40°/LCA - in fault //LCA); 120.7-128m (several, in fault); 179.5-179.65m (55°/LCA).
179·70	191·50														Sulphides gen rare. Minor disem py-aspy-sl-gn in places also on fract. Best sulphs: 144.7-146m: 1-2% py, minor aspy-sp. 154.4-155m: 2% sp >> py-aspy. 167.8-168.2m: 2-3% py-aspy. 179.5-179.7m: 2-3% py-aspy-sp. Disem rounds. Below 142.4m rare silst vnlet to 20mm, with tourmaline. Lost gradually loses its colour and texture below 185m-below 195.4m it is completely replaced by qtz with minor sericite-carb-chlor, - a qtz-annealed frag/tectonic breccia with milled rock frags. Core recovery and broken below 197.65m. Only minor py.
191·50	193·00	<0·01	2	10	26	1	4	3	138848						
193·00	194·50	<0·01	4	12	18	<1	<4	6	138849						
194·50	196·00	<0·01	3	10	14	<1	<4	8	138850						
196·00	197·40	0·02	10	12	24	1	6	55	140011						
197·40	198·40	0·02	10	30	75	1	12	75	140002						
198·40	199·00	0·15	210	220	330	2	270	3900	140003						198.40 — 199.95m: HENTY FAULT. Highly crushed and brecciated rock - py in places. Broken. Grad with green chlor. Lithological contact from lavas to sediments is at 198.75m. Upper contact of fault zone 50°/LCA, lower around 60°/LCA. 1% disem py.
199·00	200·00	1·05	1100	155	85	8	32	3900	140004						
200·00	201·00	0·13	185	90	70	2	80	11700	140005						
201·00	202·00	0·62	670	2300	370	4	980	2·45%	140006						
202·00	203·00	0·31	160	640	2400	2	60	210	140007						
203·00	204·00	0·28	95	840	2600	2	60	2550	140008						
204·00	205·00	0·23	220	960	760	10	670	2150	140009						
205·00	206·00	0·10	190	155	330	3	980	700	140010						
206·00	207·00	0·43	540	300	390	3	2050	1·23%	140011						198.95 — 221.70m: CHLORITISED AND MINERALISED QUARTZOSE SANDSTONE. Grey-green, fi-med gr. Comprises qtz (some detrital, some silst), chlorite and graphitic material. Some folds visible in ss† below 210.3m. Sst gen massive. Minor thin interbeds of graphitic shale - v.v.f. below 219m, extensively deformed. Sst also disrupted with zones of brecciation. Bedding: 65°/LCA @ 204.8m, 206.5m, 215.5m, 219m. Patchy strong silicification (possibly chertiness as shale beds are not silic). Qtz coverage as patches and as matrix in breccia zones, but few fine qtz veinlets. V minor dolomite veins. Mod chloritisation - v strong in and around mineralised zones in areas & stronger silst/rock essentially qtz-chlorite in these areas. Sst-mod sulphidic, badly broken to 201.5m, also 212-213m, 214.5-215.8m. Strong shear foliation almost graphitic interbeds. Best sulphides assoc & bands of brecciation, milling deformation, silst and chlor alt. Sulphs as stringers and small patches.
206·00	207·00	0·27	1300	850	1800	10	1750	9950	140012						
207·00	208·00	0·55	1450	410	1190	14	2300	2·65%	140013						
208·00	209·00	0·64	380	195	55	3	2300	1·43%	140014						
209·00	210·00	0·08	135	38	28	1	500	1350	140015						
210·00	211·00	0·30	260	60	70	1	370	1500	140016						
211·00	213·00	0·37	280	85	80	2	2950	4100	140017						
213·00	215·00	0·23	300	125	90	2	3100	2950	140018						
215·00	216·30	1·35	2000	350	100	12	3250	8·60%	140019						198.95 — 286m: 5% py-aspy > po-cp-sp-gn, from 201.25-201.75m 20-30% aspy > py > cp-gn-po in semi-massive bands) 60°/LCA.
216·30	217·30	4·00	2000	210	45	8	590	1·15%	140020						206 — 210.3m: MAIN MINERALISED ZONE. 10-15% py-aspy > po-cp as bands, stringers and patches in qtz-chlor-horn(?) gangue, in brecciated zone. Bands 65°/LCA & bedding in adjacent rocks.
217·30	218·30	2·00	1750	1110	55	4	280	3850	140021						210.3 — 216.3m: 3-5% py-po-aspy. Patchy.
218·30	220·30	0·18	38	14	55	1	200	390	140022						216.3 — 218.7m: MINERALISED ZONE. Bands & massive and semi-massive aspy-py-cp up to 250mm in chlor-silst sst. Sulphs partly milled and brecciated. Banding in sulphs 68°/LCA. Upper contact 58°/LCA, lower 62°/LCA - both contacts sharp. 218.3 — 221.7m: 3% py-po > aspy-cp. Dec & depth.

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SHLMET SYSTEM
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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-2
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	260·3m.

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
222·00	224·00	0·04	22	105	190	1	12	165	140223				HQ	
224·00	226·00	0·07	36	120	210	1	12	490	133851					
226·00	228·00	<0·01	14	180	390	1	10	24	133852					
228·00	230·00	<0·01	14	240	590	3	14	76	133853					
230·00	232·00	0·34	20	85	140	<1	1800	3750	133854					
232·00	234·00	<0·01	16	140	330	<1	10	50	133855					
234·00	260·30													

DESCRIPTIVE LOG

Basal contact an alt change (chlor alt dec abruptly) ± gradual lithological change.

221·70 – 260·30m: FINE QUARTZOSE SANDSTONE WITH LESSER TUFFACEOUS, GRAPHITIC SILTSTONE AND SHALE.

Grey to black.
Rocks composed mainly of qtz (mainly detrital but some patchy silic of sst), carbonate, graphitic material and chlor (alt chlor through out - dec ± depth). Rocks locally strongly calcareous - carb both disseminated and in tiny crosscut-alt stringers. Some tougher carb± qtz veins ± patches (some of carb in diamictite). Shales and siltstones locally sericitic after tuffaceous component. 242·5 – 246m: lok grey, partly clayey sericitic tuffaceous siltstone (looks similar to Roseberry West Rock). Bedded, with chlor + carb. Similar rock 258 – 260m.
Bedding gen regular but some tectonic and soft-sediment type disruption + folding. Bedding: 68°/CA ↻ 223m; 65°/CA ↻ 242m; 63°/CA ↻ 249m; 68°/CA ↻ 256m; 58°/CA ↻ 260·3m. Gen undulating bit tracks in shaley sections (eg 225 – 228m), with wk schistosity.
Fault 70°/CA ↻ 228·8m ± 150mm grey zone.
221·7 – 231m: 1% py ± minor patchy aspy-po-cp-sp. Includes 1-2% py-aspy-po ↻ 224·25 – 225m + 230 – 231m ± zones of stronger chlor alt. 20mm py-aspy vein 53°/CA / bedding, ↻ 230·95m.
231 – 260·3m: Minor to trace py > po-sp. Locally 1% near top of interval, dec ± depth.
(NB: Surprisingly little sulphides in Farrell sequence below mineralised zone ↻ 221·70m – much less than normal.)

END OF HOLE

SHEET 5 OF 5

089

838090

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

HEADING SHEET

COLLAR INFORMATION	DATA TYPE	COLLAR CO-ORDINATES: EASTING	NORTHING	ELEVATION	COLLAR SURVEY: AZIMUTH	DIP	HOLE NAME	TOTAL DEPTH	HOLE TYPE	DESC CODE	REMARKS
	DHDLLE	584516·2	3754011·14	159·17	090	-45	RED 87-3	153·40			

PROJECT	MURCHISON RIVER
LOGGED BY	J.G. PURVIS
CONTRACTOR	DIAMOND DRILLING TAS
CREW	P. ARCHER
CORE STORAGE: Nº OF TRAYS	26
CORE STORAGE: LOCATION	DEVONPORT
MAP LAB	GEOBASE, BRISBANE

HOLE NAME	RED 87-3
TOTAL DEPTH	153·4m
RIG	LONGYEAR 38
DATE STARTED 18.5.87 FINISHED	27.5.87
SAMPLE STORAGE	DEVONPORT (DESPATCH ORDER 1154.8) Also: WESTERN MINE
ASSAY LAB	COMLABS, ADELAIDE

DESC.	SIZE	FROM	TO	TOTAL	REMARKS
NON CORE	HW	0	6·25	6·25	HOLE CAPPED AND
CORE	HQ	6·25	29·5	23·25	COLLAR CEMENTED.
	HQ	29·5	153·4	123·9	
	BQ				
CASING					
CASING LEFT	HQ(S)	0	29·5	29·5	(S) steel (P) plastic

SURVEY INFORMATION

DISTANCE FROM COLLAR: TO TOP	TO BOTTOM	AZIMUTH	DIP	REMARKS
35·00		091°	-43°	AZIMUTH IN MAG (= MAG + 12°)
69·00		091°	-43°	
98·00		091°	-42°	
141·00		092°	20°	

PLOTTING KEY

SYMBOL: GEOL. CODE	G/LOG	INTERVAL: FROM	TO	SYMBOL: GEOL. CODE	G/LOG	INTERVAL: FROM	TO

ASSAY INFORMATION

DISTANCE FROM COLLAR: TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
111·00	115·65	5·90	0·56%	0·18%	0·04%	34	0·21%	7·0%				HW		
INCLUDING:														
111·00	113·60	9·10	0·84%	0·15%	0·04%	53	0·25%	10·4%						

DESCRIPTIVE LOG

0 – 6·25m : FLUVIO-GLACIAL GRAVELS

6·25 – 100·65m : FELDSPAR-PORPHYRITIC ANDESITIC LAVAS (MT BLACK VOLCANICS).
Uniformly-textured, silicified lavas. Sparse sulphides.
Monty Fault at 100·65m with 15mm of clay pug.

100·65 – 111·80m : ALTERED BRECCIATED MINERALISED SANDSTONE (FARRELL SLATE SEQUENCE).
Chloritised and silicified quartzose sandstone with 5% py-aspy in disseminated, stringer and semi-massive bands

111·00 – 113·60m : SEMI-MASSIVE SULPHIDES.
Aspy-py-cp in qtz-chlorite-tourmaline-graphite gangue

113·60 – 115·65m : MINERALISED ALTERED SANDSTONE
As above 111m. 10-15% aspy-py.

115·65 – 153·40m : INTERCEDDED QUARTZOSE SANDSTONE, TUFFACEOUS AND CARBONITIC SILTSTONE/SHALE.
Weakly chloritised with patchy silicification. Sandstone very dolomitic. Generally minor sulphides, dec c dept.

DRILLING OBJECTIVES / SUMMARY: OBJECTIVE: TO OBTAIN INTERSECTION 50m ABOVE GOLD MINERALISATION INTERSECTED IN HOLE MRP 233.
SUMMARY: RED 87-3 PASSED THROUGH SILICIFIED ANDESITIC LAVAS WEST OF THE MONTY FAULT, BEFORE INTERSECTING FAULT AT 100·65m, AND DRILLING THROUGH SANDSTONES, SILTSTONES AND SHALES OF THE FARRELL SLATE SEQUENCE TO BOTTOM OF HOLE. GOLD MINERALISATION ASSOCIATED WITH ARSENOPYRITE-ARSENOPYRITE WAS ENCOUNTERED IN CHLORITISED AND SILICIFIED SANDSTONE FOR 15m EAST OF THE FAULT. WITH BEST INTERSECTION OF 4·65m @ 5·9 g/t Au, INCLUDING 2·6m @ 9·1 g/t Au.

REPORT REFERENCE :

SHEET 1 OF 4

090

8380091

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

All analyses by Cunlabs, Adelaide (Despatch order 11548).
Gold by 30gm fire assay.
* - Gold value represents average of two analyses.

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METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-3
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	153.4 m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
0.00	7.15													
7.15	8.15	0.18	260	100	165	4	38	1.48%	14039			HQ		
8.15	9.70	0.01	16	34	115	1	65	210	14040					
9.70	27.80													
27.80	29.50	0.19	10	510	250	2	12	250	14041					
29.50	30.50	0.05	9	290	42	1	20	830	14042			HQ		
30.50	95.00													
95.00	96.50	<0.01	20	85	76	<1	6	2	13829			HQ		
96.50	98.00	<0.01	7	18	50	<1	6	5	13840					
98.00	99.50	<0.01	7	14	86	<1	6	19	13841					
99.50	100.65*	<0.01	10	44	80	<1	6	12	14043					
100.65	102.00	0.05	80	490	310	1	75	1860	14044					
102.00	103.20*	0.93	60	560	160	8	56	4.50%	14045					
103.20	104.00	0.03	120	1140	80	5	250	900	14046					

NOTE: these samples also analysed for: Sb (%), Cd, Mo, Bi, Sn (%), Te.

DESCRIPTIVE LOG

0 — 6.25m : FLUVIO-GLACIAL GRAVELS

6.25 — 100.65m : FELDSPAR-PORPHYRITIC ANDESITIC LAVAS

Grey-green, mod gr.
Altered porph fabric 5-10% fsp, max 5mm, in mod chl/ep groundmass with disseminated fine leucoxene. Sparse xyls & fg. to 2mm (some possibly silic'd felds). Occasional 1-2° qtz in fold xyls, common in strongly silic'd zones.
Patchy qtz-carb veins and stringers - locally strong to occluded, esp at depth. Generally weakly fractd. In places clay and/or silic'd strong enough to completely de-texture rock.
Around 16.5m, 20-25m, 32m-37m, but variations and blending between zones, possibly suggestive of epiclastic origin. Less fsp porphyry and xyl/felds esp below 63m.
Rock slightly schistose in places: 44°/CA @ 9m; 50°/CA @ 29.8m; 56°/CA @ 36.7m;
Thorough, soft, clayey oxidised zones esp 18.5-24m. Ox strength less again 43.5-48.5m. Patchy in places esp in de-oxidised zones: esp 19-21.5m; 40.2-41.5m (fault?), 72.5-73.8m (siltstone); 77.5-81.8m. Gen occ in trenching & depth partly leached, ? weak after comb to 31m. Patchy leaching to inner oxidn & bedding zones.
Clayey shear 20°/CA @ 42m. Fault 65°/CA 44.2-47.6m.
Ox-unoxidised breccia zones overlying all structures below 80m zone & clay alt'n zones: 80.5-80.7m 55°/CA; 92.2-92.5m; 96.1-97.1m.
Basalt dykes and/or flows: 58.15-58.35m & chilled margins 63°/CA; 58.6-58.7m dyke; 72.3-73.2m upper contact 68°/CA, lower brecciated and infilled & basalt fragments within the andesite (suggests flow) Basalt: fine, dk green, chloritic, non-mag. Trace to minor sulphides (py & ? trace asphy, sp, gn, cp) - disseminated & in fracts, often assoc with carbs & bxn zones.
Occ zones of better sulphide gen assoc with 2° chlorite alteration, overprint on earlier zones:
6.25-9.6m: 1-2% py>asphy, confined around breccia zone with sulph matrix 7.35-7.45m (10% py-asphy), 35°/CA.
27.8-30.2m: 0.5% veins 60°/CA & thin bands & 1-2% py-gn>asphy in xyls to 12mm.
51.1-51.5m: 2-3% py>asphy-po-cassiterite in silic'd stringers
76.6-77.15m: 1% py & asphy-sp in stringers to 3mm 75°/CA
79.4-80.5m: 2% py & asphy, sp, gn, cp assoc & chlor-qtz-carb alt'n.
Below 95m rock generally silic'd with bleaching and sericitisation. Occ fractured and brecciated & clay py in fracts, fracts 65-80°/CA.
Below 98.8m - start of strongly faulted zone - rock fabric destroyed, rock softer, mostly leached and clayey, fault plane at 100.65m 70°/CA & 15mm of clay/py.

100.65 — 111.90m : MINERALISED, BRECCIATED AND CHLORITISED SUBLITHIC SANDSTONE
Lesser hematite (specular) and graphite

091
838092

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET
CONTINUATION SHEET

- Gold value represents average of two analyses.
- Gold value represents average of three analyses.

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-3
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	153.4m

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CORE	GRAPHIC LOG
104.00	105.00#	0.02	46	36	80	1	230	1150	140047				NQ	
105.00	106.00	<0.01	95	26	75	1	640	320	140048					
106.00	107.00	0.10	520	65	60	4	770	2750	140049					
107.00	108.00	0.06	60	32	38	<1	175	2800	140050					
108.00	109.00	0.30	610	180	55	5	1050	4900	140051					
109.00	110.00#	0.96	1150	270	85	9	1500	2.25%	140052					
110.00	111.00#	0.65	370	65	75	2	340	3150	140053					
111.00	112.00#	6.34	7250	860	210	38	1950	12.1%	140054					
112.00	113.00#	10.70	1.07%	2350	760	80	4200	9.95%	140055					
113.00	113.60#	11.00	6300	11350	170	32	810	9.25%	140056					
113.60	114.60#	2.50	3156	590	790	14	2150	1.80%	140057					
114.60	115.65#	1.16	1300	280	195	7	1050	2.90%	140058					
116.65	117.00	0.08	65	22	42	1	50	580	140059					
117.00	118.50	0.11	70	24	44	1	450	1050	140060					
118.50	120.00	0.20	38	26	55	2	145	175	139842					
120.00	122.00	0.31	450	140	190	6	570	850	139843					
122.00	124.00	0.09	70	110	140	4	115	1450	139844					
124.00	126.00	<0.01	14	75	125	3	42	60	139845					
126.00	128.00	<0.01	7	70	145	<1	4	65	139846					
128.00	130.00	0.03	165	120	140	3	55	150	139847					
130.00	153.40													

Note: All samples also assayed for: Te, Co, Cd, Mo, Bi, Sb, W, Tl.

DESCRIPTIVE LOG

Siltstone and shale.
Greenish-grey.
SSH comprises detrital qtz grains in matrix of chlor-qtz-sericite-graphite. Thin interbeds of graphitic and sericitic shale/siltstone gen v deformed. Rich graphite locally.
Rock silicified (gen lok, locally v strong), chlaritised (dik) with wk sericitisation. No qtz veining, rare dolomitic(?) carb veinlets, some thin tourmaline veinlets. Irreg pods & veins qtz below 108m.
Bedding 60°/LCA @ 105m; 65°/LCA @ 110m.
Crushed, brecciated and broken to 101.85m due to Hanky fault. Zones of strong brecciation (unbroken) below this at intervals - matrix of dark zones composed of chlor-graphite-sericite ± tourmaline(?), after earlier shale.
At 101.85m: fault 65°/LCA ± 50mm gouge zone.
100.65 – 102.8m: 3% py>aspy, minor cp-sphalerite(?). Pyrrh.
102.8 – 103.15m: Semi-massive band of py-aspy 75°/LCA.
103.15 – 104.2m: 3-5% patchy py>aspy-sp-cp. Pyrrh + stringers.
104.2 – 108.3m: 2% py>aspy, minor po>cp. Some veinlets in breccia matrix ± qtz ± tourmaline.
108.3 – 111.00m: 5% py-aspy, minor cp, po. Pyrrh stringers; minor 70mm ± massive banded py>aspy>cp @ 109.65m, 60°/LCA ± bedding.
111.00 – 113.60m: SEMI MASSIVE SULPHIDES
Aspy – py > cp. Tr qtz-chlor-tourm gangue after strongly silicified gouge zone? Some graphitic material after black shale beds near top and bottom, cramped.
Mod ± aspy ± py and chlorite. Crude banding in places 55–70°/LCA. Banding ± broad contact 63°/LCA.
113.6 – 115.65m: MINERALISED QUARTZOSE SANDSTONE
As above 11m. Silt (possibly partly clayey originally), brecciated and broken. Graphitic shear 35°/LCA @ 114.0m.
10–15% aspy > py, minor cp. Pyrrh, massive bands, in breccia matrix, taped stringers.
Basal contact banding 60°/LCA.
115.65 – 153.40m: INTERBEDDED FINE QUARTZOSE SANDSTONE, TUFFACEOUS AND ARGILLITIC SILTSTONE/SHALE.
Grey, with green tinge where SSH weakly chloritised.
SSH – gen massive and laying bedding. Contains pinch carb - subdued acid reaction beneath thin rusty dolomite.
No glass. Silt matrix in graphitic. Occ muscovite on schistose planes.
Siltstone/shale: - ± sericitic after tuffaceous component. Locally pyrite (chalky?) in planes, shale occ graphitic with depth, and fissile due to silt laminations.
Lightly chloritised with patchy SSH. All occ moderately dolomitic 124.5m.
Bedding: 85° LCA @ 124m; 45° LCA @ 132.5m; 60° LCA @ 144.5m; 45° LCA @ 150.5m.

SHEET 3 of 4

ASSAY INFORMATION

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8380093

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-3
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	153.4m

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG
								Generally, the brecciation and contorted bedding of the mineralised zones above is absent. Locally some disturbed bedding incl some soft-sediment type below 145m. Bedding commonly deformed by schistosity.
								Badly blocky in places, esp in the graphitic shale zones, esp 130 – 133m. Fault 40°/CA @ 109m, assoc shear 90°/CA @ 129.7m. Fault 65°/CA @ 135.6m, minor shear 80°/CA (f bedding @ 138.7m. Broken shear 35°/CA @ 146.5m, common barren qtz ± calcite ± chlorite veins, to 200mm.
								Common veins + patches of dolomite ± qtz.
								Overall, sulphides abs ± shale; best assoc ± chlo alt.
								Generally, minor to 1% py with lesser po, aspy, sp, cp, ±cbm.
								Zones + 1%: 116.5 – 118.5m: 2-3% py-aspy-po>cp.
								121 – 121.75m: 3-5% py-aspy-po, clotted in qtz-sulph-chlo breccia zone @ 121.6m. 123 – 124m: 12% py-po-aspy-cp, assoc ± cbm.
								129.3 – 129.7m: 5% py-po>aspy-cp.
								132.75 – 133.25m: 2½% py in black shale - diam-stringers.
								END OF HOLE

ASSAY INFORMATION

SHEET 4 OF 4

838094

034

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

HEADING SHEET

DRILLER INFORMATION	DATA TYPE	COLLAR CO-ORDINATES EASTING	NORTHING	ELEVATION	COLLAR SURVEY AZIMUTH	DIP	HOLE NAME	TOTAL DEPTH	HOLE TYPE	DESC CODE	REMARKS
	BHOLE	384890	5376995	172	090	-50	RED 87-4	328.0			

PROJECT	MURCHISON RIVER / ROSEBERY EAST
LOGGED BY	J.G. PURVIS
CONTRACTOR	DIAMOND DRILLING TAS
CREW	K. HOU / P. ARNOLD
CORE STORAGE	
Nº OF TRAYS	40
LOCATION	DEVONPORT
MAP LAB	

HOLE NAME	RED 87-4
TOTAL DEPTH	328.0
RIG	LONGYEAR 38
DATE STARTED	15.6.87 FINISHED 8.7.87
SAMPLE STORAGE	
	DEVONPORT (DESPATCH Q/N: 11654)
ASSAY LAB	COMLABS, ADELAIDE

SURVEY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	AZIMUTH	DIP	REMARKS
8	30.0	*	-47° 30'	AZIMUTHS IN AMG (=MAG + 12°)
	60.0	*	-50° 00'	* SURVEYS AT 30m + 60m
	98.0	088° 30'	-49° 30'	TAKEN INSIDE CASING
	142.0	087° 00'	-49° 15'	
	186.0	088° 30'	-48° 40'	
	237.0	089° 30'	-48° 00'	
	280.0	091° 30'	-47° 30'	
	328.0	094° 00'	-44° 20'	END OF HOLE.

PLOTTING KEY

SYMBOL DES. CODE	S/LOG	INTERVAL FROM	TO	SYMBOL DES. CODE	S/LOG	INTERVAL FROM	TO

DESC.	SIZE	FROM	TO	TOTAL	REMARKS
NON CORE		0	12.5	12.5	CASING ADVANCED
	HQ	12.5	75.3	62.8	" "
CORE	NQ	75.3	328.0	252.7	HOLE BLOCKED INSIDE
	BQ				PLASTIC CASING AT 195m APPROX (HENTY FAULT)
CASING					
CASING LEFT	40mm Ø (P)	0	328	328	(S) steel (P) plastic

SLOTTED FROM 192m.

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	As	Sn	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
247.3	250.3	0.16	48	11950	3480	5	1500	30						
259.3	261.3	0.21	225	4445	62	3	3900	77						

DESCRIPTIVE LOG

0 – 73.3m: GLACIAL GRAVELS AND VARVED SANDS/CLAYS.

73.3 – 192.6m: COMPLEX SEQUENCE OF ANDESITIC AND MAFIC VOLCANICS.
Andesitic feld-xyl-ftic tuffs; mafic (some basalt) lavas (apparently both dykes and flows), and tuffaceous sediments of mafic provenance. Strongly chloritised, virtually no sulphides.

192.6 – 195.9m: HENTY FAULT
Highly broken silicified andesitic, talc and graphitic sediments 1% py.

195.9 – 247.3m: GRAPHITIC AND CALCAREOUS SHALES/SILTSTONES
195.9 – 222.45m: 2-5% py, trace sp, aspy. 227.3 – 247.3m: 3-5% py.

247.3 – 261.3m: VEINED AND MINERALISED ZONE IN DEFORMED HIGHLY GRAPHITIC SHALE
Abundant irregular qtz-carb veins. 5-7% py > sp-gn/py-gn.

261.3 – 328.0m: SILICEOUS AND SERICITIC SILTSTONE
Minor py

END OF HOLE

DRILLING OBJECTIVES / SUMMARY: OBJECTIVE: TO TEST AN IP ANOMALY CENTERED AT 377000mN 385140mE, IMMEDIATELY EAST OF HENTY FAULT. SUMMARY: NO SIGNIFICANT MINERALISATION IN HOLE. IP ANOMALY DUE TO ZONE OF GRAPHITIC SHALES 247.3 – 261.3m, WITH CHARACTERISTIC QUARTZ-CARBONATE VEINING AND SULPHIDES. (THIS IS THE SAME ZONE AS INTERSECTED IN HOLES RED 86-1 AND MR 1/MR 2, TO THE SOUTH.)

REPORT REFERENCE :

SHEET 1 OF 7

8380693

SHILMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	Mamaroon/Rowe/[redacted]	HOLE NAME	RED 87-4
LOGGED BY	J.G. Purvis	TOTAL DEPTH	328.0m

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	Au	Cu	Pb	Zn	Ag	As		SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
1 2 3	9 10	16 17	22 23	28 29	34 35	40 41	46 47	52 53	58 59	64 65	70 71	74 75 76	77	80

ASSAY INFORMATION

DESCRIPTIVE LOG

0 – 18·7m: FLUVIO-GLACIAL GRAVELS

18·7 – 73·3m: UNCONSOLIDATED SANDS AND CLAYS (Varved glacial lake sediments)

73·3 – 75·3m: TRICONED – NO CORE. Hard rock.

75·3 – 126·20m: HIGHLY COMPLEX AND VARIABLE MAFIC VOLCANIC SEQUENCE

Appears to be multiple intrusions of variably-mafic material (including dolerite basalt), into/unlithified (wet?) andesitic feld-rich-lithic tuff. With intercalations of bedded tuffaceous sediments of mafic provenance. Lithological variations enhanced by alteration overprint. Dk green, fi-med gr, variably and complex textures. Unoxidized, sl leached and broken 76·5 – 79m.

Andesitic relic: Felds 1-3mm, often bleached some pink. Occ fi gr lithics up to 3mm, gen angular. In matrix of chlorite with some fi gr hornblende.

Mafic volcanic: Fi-med gr, highly chloritic ± deformed fragments to 5mm, occ zones with felds 1-2mm, abund fine hornblende.

Contacts between fine rock types gen irreg often diffuse. Mafic type often in dyke-like fragments and bands, often ± brecciated. Mafic lithologies dominate. Highly chloritic, slightly pyritic. Bedding visible (in phase – 50m NW-tool disruption at 118m.

Bedding: 65°/ca ∅ 82·45m; 45°/ca ∅ 104·6m; 55°/ca ∅ 112m; 45°/ca ∅ 118·2m.

All rock types mod-strongly schistose: 50°/ca ∅ 76m; 58°/ca ∅ 87m; 60°/ca ∅ 97m; 55°/ca ∅ 113·3m; 65°/ca ∅ 118m.

Sequence is mod-strongly chloritized and epidotized. Weakly sericitized. Local silica zones in brecciated fragments ± qtz-carb veins. Rock is strongly carbonatized ± abund irreg veins and pockets of calcite ± qtz, up to 150mm, occ more. Some of these veins contain magnetite (chlorite rock is non-mag).

Shears 70°/ca ∅ 90·85m + 102·6m.

Trace py + cp at top, mic to minor at base ± zones of 1%: 117·6 – 118·6m: 2-3% fi gr disseminated py in Tuff-Sed.

120·7 – 122·3m: 1% py, trace cp.

Basal contact a calc vein 76°/ca.

126·20 – 142·60m: STRONGLY CHLORITISED FELDSPAR CRYSTAL – LITHIC VOLCANICLASTIC

Andesitic to mafic.

Green.

Feld xsts av 1-2mm, some pink; and abund angular ± irreg lithic clasts to 30mm, av 5-10mm; in sandy-textured highly chloritic matrix ± some epidote and hematite. Clasts comprise chloritic relics ± pink felds, also fi gr rocks. Some chloritic clasts diamond and flattened – ? pumice.

SHEET No. 2 of [illegible]

095

838096

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	HUTCHISON RIVER / [illegible]	HOLE NAME	RED 87-4
LOGGED BY	J.G. HARVIE	TOTAL DEPTH	328·0 m

DISTANCE FROM COLLAR: TO TOP | TO BOTTOM

SAMPLE Nº | CORE ANGLE | ROCK TYPE | STRAIN | DESC CODE | GRAPHIC LOG

ASSAY INFORMATION

DESCRIPTIVE LOG

glass (pumice ?). Many of the feld-porph clasts are silif and pink. Common fg qz luxuriant in both clasts + matrix.
Below 135m rock is finer gr & denser and smaller clasts (few > 5mm)
Minor contamination of fabric. Some diffuse patches of pink silif - as in some of the clasts.
Common calcite veins to 250mm, av 10-20mm. Some contain v fg qz magnetite. Lesser thin qtz veins. Some chlor veinlets.
Marked but deformation caused by mod schistosity - inc & depth.
Schistosity: 60°/LCA @ 131·3m; 70°/LCA @ 137m.
Rare dyke.
Basal contact a major fault 60°/LCA, & clay pug.

142·60 – 147·30m: STRONGLY SCHISTOSE TUFFACEOUS VOLCANIC.
Khaki-green fg qz.
Apparently lithoclast vflc & scattered green streaked-out deformed lapilli or glass shards 1–3mm.
Mod veriolitised, weakly chloritised.
Abund calcite veining & some magnetite in the larger veins.
Minor qtz and chlor veins.
Strongly lineated: 50°/LCA @ 145·8m.
Dyc bound shears and fractured zones. Minor ox and leaching.
Rare diorite dy.
Basal contact thin calcite-chlor vein 90°/LCA.

147·3 – 163·1m: VERY COMPLEX AND DEFORMED SEQUENCE – PROBABLY A VOLCANIC BRECCIA.
Texture enhanced by alteration and deformation overprint.
Green. Mod qz.
Patches of felt-purple andesitic vflc and finer gr more-mafic vflcs including some basalt. Complex relationships between variant rock types. Some 1° breccia texture. & frags and clasts of the mafic vflcs apparently within the andesitic vflc, which itself appears volcaniclastic in places. However, much 2° breccia. Multidirectional fract or deformation fracture, occurring as net-vein form through undeformed andesitic vflc, possibly exploiting matrix of the hydrogenic breccia. At 163m 120mm rounded clast of silif basalt with radial cooling cracks - possibly a small pillow.
Andesitic vflc: evenly-distrib felds to 4mm, av 2mm, green mf lineated.
Mafic vflcs: Variable. Some feld-phyric, some & ferromag phenos. Fine lucigrains.
Mod - strongly chlor, weakly seriitised and epidotised. Patchy silif and decarbonatisation - conc in the deformed zones.
Silif inc common & depth - some grey chalky silif - poss syn-volcanic or exhalative type. Some pink silif.
Abund calcite veins and patches (some diffuse magnetite in them in basal 1m). One qtz vein + patches.

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838097

SHELMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

Gold determined by 30gm fire assay.
* Average of 2 analyses.

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON/RIVER/KENT	HOLE NAME	RED 87-4
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	328.0m

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	As	Sn	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
188.00	189.50	<0.01	3	46	75	<1	20	2	138556			HQ		
189.50	191.00	<0.01	4	1170	370	<1	24	<4	138557					
191.00	192.50	<0.01	4	95	32	<1	20	8	138558					
192.50	194.00	<0.01	28	530	190	1	60	4	138559					
194.00	195.50	<0.01	65	1150	210	<1	66	4	138560					

ASSAY INFORMATION

DESCRIPTIVE LOG

Variable-strength schistosity: 55°/LCA @ 157m + 162.5m
fault @ 161.5m 60°/LCA.
Minor diss py & cp. Basal contact irreg.

163.10 — 177.05m: MAFIC VOLCANICS
Green. fi-med gr — sections of variable grainsize.
Sparse fsp phenos 1–2mm, in highly chloritic fi gr matrix with abund fi gr hbl+cpx.
Strongly chloritised and carbonatised, intense chlor below 175.3m — dacitised rock. Rare pink silif patches.
Abund calcite veins — very irreg. Rare magnetite in a few of the calcite veins & Minor qtz veins.
At 169.2m pass 1° fol opening 57°/LCA. Diffs 171.15m 75°/LCA
Mod schistosity below 172.15m & 50°/LCA @ 174m.
Brecciation in places (eg 172.2 — 173.2m) due to set of strong fracts 15°–35°/LCA & minor fe/mn stains and bedding).
Minor diss py > cp.
Basal contact 70°/LCA — possibly faulted (very broad).

177.05 — 185.65m: STRONGLY CHLORITISED ANDESITIC VOLCANIC
Green.
Scattered fsps are < 2mm in chloritic matrix with much fi gr hbl+cpx. Some fi gr sections where the strong chloritic alt has totally de-textured rock.
Some variations in fsp abundance.
Fsps carbonatised. Numerous calcite veins and patches. Some larger zones of calcite-qtz-chlorite-epidote & minor diss py + magnetite.
Mod schistosity in places: 45°/LCA @ 181.3m.
V minor diss py, trace cp.

185.65 — 192.60m: SILICIFIED ZONE IN ANDESITIC VOLCANIC
Green and cream. Very hard.
Fsp-poph andesitic volc (fsps are 2mm) orig rock unidentifiable due to strong fi intense silif (inc & depth).
Orig rock v strongly chloritic & fi gr hbl+cpx.
Silif pervasive, total at total replacement in assoc & cpx and sericite. Below 189m rock becomes very brecciated & silica replacement very total (a qtz-hbr-cpx rock).
Extensive brecciation of volc, annealed by silica.
Rare fuchsite at 191.1m.
190 – 190.5m: 1% py > sp-gn, sericite + diss. Elsewhere minor.

192.6 — 195.9m: MENTY FAULT
Highly broken unit with & zones of grossy fault breccia confined 194 — 194.85m. Fsp as porphyritic & patches of qtz-cpx.
At top & bottom the competent silif andesitic rock grades into altered, more fine grained (? welded) tuff or ash. Both altered also. Remainder bulk of interval rock is a highly

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON / RIVER / ~~EXTENSION~~ EAST	HOLE NAME	RED 87-4
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	328.0m

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	As	Sn	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	GEOL CODE	GRAPHIC LOG	DESCRIPTIVE LOG
															crushed black graphitic shale.
															The change in lithologies is around 194m.
															Schistosity ∂ 194.3m 62°/LCA.
															1% dissem and veinlet py > sp-gn.
195.50	197.00	<0.01	105	330	175	1	195	18	138661			NQ			195.9 — 222.15m: PARTLY-GRAPHITIC SHALE WITH THIN
197.00	198.50	<0.01	65	370	11000	2	80	8	138662						INTERBEDS OF CALCAREOUS SILTSTONE/SANDSTONE
198.50	200.00	<0.01	36	420	310	1	165	16	138663						Dk grey to black fi gr.
200.00	201.50	<0.01	42	430	510	1	70	12	138664						Silt/sst is strongly calcareous. Comprises detrital qtz
201.50	203.00	<0.01	46	260	370	<1	42	12	138665						in carb-sericite matrix (sericite after feldspars ?)
203.00	204.50	<0.01	50	55	46	<1	34	<4	138666						common 'sweated-out' lenses, fuzzy veinlets and patches
204.50	206.00	<0.01	60	46	145	<1	26	4	138667						∂ qtz-carb. V minor chlor assoc ± some of these. Also local silf.
206.00	208.00	<0.01	36	26	66	<1	26	<4	138668						Dk veins and irreg patches ∂ millum distinctive characteristic
208.00	210.00	<0.01	55	34	55	1	32	12	138669						orange-coloured by coating, esp 195.9—202m + 212.8—217.5m.
210.00	212.00	<0.01	50	20	60	2	34	8	138670						Some local convoluting, folding and deformation ∂ bedding
212.00	214.00	<0.01	40	210	165	2	46	8	138671						-mainly above 212m + dec ± dark-bedding becoming
214.00	216.00	<0.01	65	310	160	2	490	14	138672						V regular at base: 55°/LCA ∂ 212.4m; 60°/LCA ∂ 210.2m.
216.00	218.00	<0.01	55	310	150	2	140	12	138673						Most schistosity deforms bedding — gen / bedding but occ
218.00	220.00	<0.01	40	65	90	1	40	8	138674						bedding at high angle to schistosity — esp in areas ∂ folding.
220.00	222.00	<0.01	65	26	42	1	42	<4	138675						Schistosity differs dist below 215m. Schistosity: 69°/LCA ∂
															197.5m; 72°/LCA ∂ 205.5m.
															Highly broken 195.9—201.65m ± zones ∂ fault breccia.
															Bdies thin occ broken zones around local shears: /LCA
															∂ 202.9—203.8m; 58°/LCA ∂ 213.6m; 65°/LCA ∂ 217.3m.
															195.9—201m: 3% py, trace asPy, sp, gn. Dissem in crushed shale.
															201—201.7m: Minor py in crushed sst.
															201.7—206m: 3—5% py, trace sp + asPy. Fgr dissem.
															206—222.15m: 2% py. Trace sp, asPy, gn, cp. Dissem ±
															most pillets in rigid beds — zones ∂ +3%.
															Basal contact bedding 90°/LCA.
222.00	224.00	<0.01	26	60	75	1	22	<4	138676						222.15 — 227.3m: QUARTZOSE SANDSTONE.
224.00	226.00	<0.01	24	105	80	1	24	<4	138677						Grey. Massive.
226.00	228.00	<0.01	46	200	50	2	65	10	138678						Detrital qtz + lithic grains in sericite and siliceous
															matrix. Grainsize dkr ± dark.
															Minor interbeds ∂ dk grey finely-graphitic shale towards base.
															Trace chloritisation. Silt at top - only local beds past 223.5m.
															Dtc > carb, sweat-out; laminae, lenses, patches + irreg veins.
															Mod schistose - dec ± dark: 45°/LCA ∂ 223.4m.
															Bedding: 70°/LCA ∂ 224.6m.
															Minor 'dissem' py - core in shales.
															Basal contact - bedding 70°/LCA.
228.00	230.00	<0.01	48	90	55	1	44	4	138679						227.3 — 247.3m: BLACK MODERATELY-GRAPHITIC SHALE
230.00	232.00	<0.01	165	60	60	1	50	<4	138680						Fi gr, fairly uniform.
232.00	234.00	<0.01	85	70	55	1	48	<4	138681						Dtc thin calcareous silt (papery lst) beds esp in upper
234.00	236.00	<0.01	90	90	210	2	40	6	138682						1-2m (these highly pyritic). In upper half of unit shale
236.00	238.00	<0.01	150	85	460	2	50	8	138683						itself is strongly calcareous - some beds are graphitic lst
238.00	240.00	<0.01	90	175	240	2	48	6	138684						Towards base shale is non-calcareous.
240.00	242.00	<0.01	65	140	240	1	36	4	138685						Abund thin laminae, wrinkle and lenses ∂

ASSAY INFORMATION

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER / NORTHERN WEST	HOLE NAME	RED 87-4
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	328.0m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	As	Sn	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG
242·00	244·00	<0·01	42	70	540	1	38	<4	139896			NQ			calcite ± qtz (sweat-alt). Occ longer veins of qtz > carb to 150mm. ± minor chlor in some of the carb-qtz sweat-alt. Rare veins of dolomite.
244·00	246·00	<0·01	50	70	185	1	38	<4	139897						Finely laminated + fissile. Bedding sl deformed by weak schistosity. Bedding gen regular - some minor crumpling and local kinking.
246·00	247·30	<0·01	34	80	450	1	46	16	139898						Bedding: 68°/CA @ 235·1m; 80°/CA @ 244·3m.
															Core badly broken in places with numerous shears // bedding as follows: 232·7m; 233·5m; 236·6m; 238·3m; 239·15m; 241m; 241·55m; 245·1m. Basal contact also a shear 80°/CA.
															227·3 — 247·3m: 3–5% py, ± minor sp-gn-cp. Dissem and stringers (sweat-alt) // gen // bedding/schistosity. Sulphides both in rock + in carb-qtz sheeted/vein-fillg former.
247·30	248·30	0·15*	50	2300	3400	4	1200	26	139899						247·3 — 261·3m: QUARTZ-CARBONATE VEINED AND MINERALISED ZONE IN DEFORMED BLACK GRAPHITIC SHALE.
248·30	249·30	0·15*	50	2000	3500	5	2650	48	139900						Black with incoherent veining.
249·30	250·30	0·17*	44	1550	3550	5	630	16	139901						More graphitic than unit above.
250·30	251·30	0·08	20	920	240	3	190	24	139902						Quartz-veining, deformation // bedding ± local brecciation, folding and crumpling.
251·30	252·30	0·07	24	760	420	2	110	18	139903						Rock extensively invaded and deformed by vein qtz > carb (white) stringers, patches and laminae - most // bedding. These veins broken up in places by later deformation. Some local silic.
252·30	253·30	0·07	46	280	20	2	90	14	139904						Minor assoc. chlor. Occ longer qtz > carb veins to 100mm.
253·30	254·30	0·08	34	800	11150	2	135	18	139905						Also abund highly irreg cross-cutting veins of dolomite with charred orange-yellow ox coating.
254·30	255·30	0·05*	65	640	2200	2	60	18	139906						Host schistosity also deforms bedding. Schistosity: 55°/CA @ 249·5m; // /CA @ 252m; 30°/CA @ 255m; 50°/CA @ 259m.
255·30	256·30	0·04	42	310	920	2	55	14	139907						Broken fissile base - fissure @ 260·95 + 261·3m 80°/CA.
256·30	257·30	0·04	32	260	470	2	65	14	139908						247·3 — 250·2m: 5–10% py > sp-aspy-gn-cp. Dissem, stringers and calc-qtz-py veins and background rock.
257·30	258·30	0·05*	36	280	580	2	60	44	139909						Sandy-massive bands to 10mm // aspy-py 80°/CA assoc ± upper contact shear. Sp very reddish-brown.
258·30	259·30	0·11*	16	410	370	2	770	34	139910						250·2 — 256m: 5% py > sp-gn-aspy. Dissem + stringers
259·30	260·30	0·21*	180	670	60	3	2500	80	139911						256 — 260·3m: 3% py + aspy - sp-gn-cp.
260·30	261·30	0·21	270	220	65	3	5300	75	139912						260·3 — 261·3m: 5–7% py - aspy > sp-gn-cp.
261·30	262·30	0·04	6	60	100	1	195	12	139913						261·3 — 270·25m: CRYSTAL-LITHIC SANDSTONE DEFORMED TO MINOR TEXTURED QUARTZ-CARBONATE-SERICITE SCHIST.
262·30	264·00	<0·01	5	95	280	1	24	4	139914						Grey, Hi-mod qz, fine-med sand ± clayey.
264·00	266·00	<0·01	3	28	116	1	110	44	139915						Well-rounded qtz grains 1mm to 2mm, to 4mm. Folds continuous and deformed by schistosity.
266·00	268·00	<0·01	<2	40	90	1	10	8	139916						Sub-rounded lithics to 4mm ± thin black shale lithics to 40mm. In sericite (different + qtz than alt). Silic and calcareous, sandy/silty-textured matrix. Minor graphitic partings often deformed. Thin black shale interbeds. Graphitic contact dul ± dark.
268·00	270·00	0·03	<2	24	114	1	14	<4	139917						Abund fine calcite ± qtz sweat-alt. Minor chlor in some of these. Locally strong silic.

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER / [illegible]	HOLE NAME	RED 87-4
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	328.0m

DISTANCE FROM COLLAR: TO TOP | TO BOTTOM

ASSAY INFORMATION

SAMPLE NO | CORE ANGLE | ROCK TYPE | DIAM | DESC CODE | GRAPHIC LOG

DESCRIPTIVE LOG

Mod-strongly schistose and fissile. Qtz augen often deformed, pelitic lithics and knots of intruded qtz.
Schistosity: 70°/LCA @ 264.3m + 269m.
Bedding: 70°/LCA @ 261.7m.
261.3 – 263m: 1–2% py, minor sp.
263 – 270.5m: Minor py > sp.
Basal contact a shear 85°/LCA.

270.25 – 328.0m: SILICEOUS AND SERICITIC SILTSTONE
Green, fg gr, fairly uniform, Quingaree fining c dark.
Abdy fragments and slightly chonty quartzo-feldspathic silt/
Rock contains scattered qtz grains, feld frags and lithic
frags, all av < 1mm, in siliceous and sericitic (?)fine matrix
Some of silica in matrix in places appears due to original
cherty/ness – esp thin beds of pale grey chert.
Minor thin black laminae (< 1mm) of carbonaceous shale
to 300m, below this grey to light shale interbeds – non-carbonaceous.
Mod calcareous to 285m – mainly as small, rounded-ovoid
lenses and veinlets, ± some calcite altered carbonatised
feld frags. Below 285m, only minor calc.
Occasional (1%) qtz-calcite ± fine chlor. (ink chloritisation below
289m – pervasive, ± in some calc)
275.5 – 276.5m + 286 – 291m: minor veins + patches
of dolomite ± fine sp-py.
Finely laminated after fine bedding of deformed by a
silt-band schistosity which rendered bedding + rock fabric
indistinct. Schistosity: 65°/LCA @ 274m; 60°/LCA @ 286m;
60°/LCA @ 299m; 160°/LCA @ 310.5m; 55°/LCA @ 317m;
50°/LCA @ 321.5m; 65°/LCA @ 327.8m.
Shear 75°/LCA @ 324.5m.
Fault 307.9m 47°/LCA. Below fault (to 324) characteristic
small-scale crenulations in the schistosity and minor
brecciation of original bedding.
Minor disseminated py, fine sp, calc to fine at depth.

END OF HOLE

SHEET 7 OF 7

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

HEADING SHEET

COLLAR INFORMATION	DATA TYPE	COLLAR CO-ORDINATES EASTING	NORTHING	ELEVATION	COLLAR SURVEY AZIMUTH	DIP	HOLE NAME	TOTAL DEPTH	HOLE TYPE	DESC CODE	REMARKS
	BHOLE	304530	3753500	1165.3	090	+56 30	RED 87-5	145.50			

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-5
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	145.50m
CONTRACTOR	DIAMOND DRILLING TAS	RIG	LONGYEAR 38
CREW	K. HOLL	DATE STARTED	13.7.87 FINISHED 21.7.87
CORE STORAGE		SAMPLE STORAGE	
No OF TRAYS	23	LOCATION	DEVONPORT
			DESPATCH D/N's: DEVONPORT 11651, 11652.
M & P LAB	GEOCHEMPET, BRISBANE	ASSAY LAB	COMLABS, ADELAIDE

DESC.	SIZE	FROM	TO	TOTAL	REMARKS
NON CORE	HW	0	8.5	8.5	HOLE CAPPED AND
CORE	HQ	8.5	30.8	22.3	COLLAR CEMENTED
	NQ	30.8	145.5	114.7	
	BQ				
CASING					
CASING LEFT	HQ(S)	0	31.0	31	(S) steel (P) plastic
	ID 40mm(P)	0	145	145	

SURVEY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	AZIMUTH	DIP	REMARKS
37.00		090 30'	+55° 40	AZIMUTH IN AMG (=MAG+12°)
67.00		090 30'	+55° 40	
97.00		089 30'	+55° 20	
128.00		089 30'	+51° 20	

PLOTTING KEY

SYMBOL DES. CODE	G/LOG	INTERVAL FROM	TO	SYMBOL DES. CODE	G/LOG	INTERVAL FROM	TO

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
30.80	36.00	0.20	1022	1110	123	9	386	1.85%						
91.00	92.00	0.69	270	70	85	4	790	3.10%						
97.00	104.70	0.87	837	1150	132	4	1572	1.26%						
INCLUDING:														
97.00	99.00	1.38	1375	232	102	8	3500	2.80%						
103.00	104.70	1.74	1775	240	167	8	2100	2.10%						

DESCRIPTIVE LOG

0—16.1m: FLUVIO-GLACIAL GRAVELS AND SILTS

16.1—91.0m: FELDSPAR-PORPHYRITIC ANDESITIC LAVAS
Silicified below 43m. Pyrite-arsenopyrite mineralisation associated with quartz-chlorite alteration, 31.5—37.6m averaging 5-7% sulphides. Otherwise, v minor sulphides.

91.0—91.2m: HENTY FAULT
Crushed puggy rock with 25% aspy-py. 60°/CA.

91.2—95.35m: GREEN, ALTERED SILICEOUS ROCK
Probably the andesitic lava. A qtz-chlorite-tourmaline rock 3-5% py-aspy

95.35—104.7m: BRECCIATED, MINERALISED SANDSTONE AND SHALE
Predominantly silicified quartzose sandstone with lenses grey to black graphitic siltstones & shale. Sediments altered. Pyrite-arsenopyrite-chalcopyrite mineralisation, mainly as stringers and bands associated with chlorite-tourmaline(?) alteration. Average 5-10% sulphides. Strong fault at base.

104.7—145.5m: SANDSTONE WITH LESSER GRAPHITIC SHALE
Tan sediments graphitic, patchy qtz-sulphide. Stringers 11.9-14m, averaging 1-3% po-py, trace aspy.

DRILLING OBJECTIVES / SUMMARY

OBJECTIVE: To obtain intersection in mineralised zone 50m south of RED 87-3 and at the same RL.

SUMMARY: Hole passed through silicified andesitic lavas west of Henty Fault with a mineralised zone 31.5—37.6m. East of Henty Fault hole encountered 4m of unidentifiable, altered, weakly-mineralised rock before passing into the target mineralised zone (9m @ 5-10% pyrite-arsenopyrite) in quartzose sandstone and graphitic shale, mineralised zone

REPORT REFERENCE :

SHEET 1 OF 5

838102

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

All analyses by Comlabs, Adelaide.
Gold determined by 30gm fire assay.
* Average of 2 determinations
** Average of 3 determinations

The Shell Company of Australia Limited
METALS DIVISION
DRILL LOG SHEET
CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-5
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	145·50m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
0·00	8·50													
8·50	12·10	<0·01	10	26	65	1	4	32	140770			HQ		
12·10	16·10	<0·01	10	40	50	<1	8	60	140771			HQ		
16·10	27·00													
27·00	28·00	<0·01*	16	70	175	1	<4	70	140772			HQ		
28·00	29·00	<0·01	3	12	155	1	12	120	140773			HQ		
29·00	30·00	0·02	14	18	130	1	46	125	140774			HQ		
30·00	30·80	0·07	12	80	136	2	1555	50	140775			HQ		
30·80	32·00	0·14*	60	55	135	2	32	7100	140776			HQ		
32·00	33·00	0·20	40000	95	120	18	100	1·5%	140777					
33·00	34·00	0·37*	11100	125	140	12	65	1·65%	140778					
34·00	35·00	0·13	70	220	115	10	125	4·60%	140779					
35·00	36·00	0·15*	70	65	105	5	1650	9550	140780					
36·00	37·60	0·08*	75	42	195	2	46	4800	140781			V		
37·60	68·50													

DESCRIPTIVE LOG

0 – 12·10m : FLUVIO-GLACIAL GRAVELS

0 – 8·5m : Tricomed, no core.

8·5 – 12·1m : Chiefly acid and silic volcanic pebbles in iron-stained sandy matrix.

12·1 – 16·1m : FLUVIO-GLACIAL SILTS

Some clay and fine sand.
Massive, pale brown. Mainly ghosts. Puggy and soft.

16·1 – 29·1m : STRONGLY WEATHERED ANDESITIC VOLCANIC

Brown, massive, soft. Clayey and broken, esp above 22·5m. Andesitic lava.
Original rock mod gr, green, chloritic, feld-porphyritic ± folds 1-3mm. Dec left right. Rounded clots of yellow chlorite to 7mm. Weakly silic wi flows ± patches of interlocked silica esp below 24·5m. Mod schistose wi flows – 47°/ucp @ 22·5m. Completely oxidised at top, dec to mod at base. Abrupt lower limit to ox @ 29·1m.
Fresh and Mnox stains on fracts.
Spidery veinlets of felsic qtz. Dec limonitic qtz veins to 5mm. Below 27m occ veinlets of limonite ± qtz – limonite after py.

29·1 – 42·15m : FELSPAR-PORPHYRITIC ANDESITE LAVA

Green, jointed.
Purple feld laths av 2mm, in chloritic groundmass. Small stringers and patches of qtz – apparently open-space fillings, not ?
Ubiquitous fine hypersthene.
Some variations in texture. Extensive devitrifying due to mod-strong chloritic alt and minor patchy silic.
Minor bedding ± veinlets of/by carbs ± chlorite ± patches (± qtz). Some carb still present.
Mod fractured and broken with limonite stains on fracts.
Mineralised zone 30 – 37·6m av 5-7% py > aspy. Some cp. Sulphs largely conc into series of patches and blebs from 50mm to 450mm, comprising only 5-10% of b semi-massive. Thinly silph zones assoc ± qtz-chloritic alt. Veins 45-50°/ucp.
Best min: 31·5 – 32·15m : 5-10% coarse gr py > aspy
31·9 – 33·0m : Shear ± semi massive py-aspy. 45°/ucp.
33·25 – 33·9m : Shear ± semi-massive py-aspy.
34·45 – 34·85m : 25% as py-py
34·7 – 34·9m : Semi-massive py > aspy
35·05 – 35·3m : 15% py > aspy.
Below 37·6m sulphs minor, except: 39 – 40m : 2% py disseminated
41·5 – 42·15m : 2% py. 40·2 – 40·5m : diffuse qtz-chlor-carb veins ± coarse gr py.
Basal contact ?additional.

42·15 – 45·25m : High-PORPHYRITIC MAFIC LAVA

Grey-green. Fi-med gr.
More mafic than above rock type.

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-5
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	145.50m

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
59.65		PETROLOGICAL SAMPLE							14082			NQ		
68.50	70.10	<0.01	14	50	240	1	65	630	14083			NQ		
70.10	72.10	<0.01	14	160	560	1	80	140	14084			NQ		
72.10	86.00													
78.60		PETROLOGICAL SAMPLE							14085			NQ		
86.00	88.00	<0.01	5	36	110	1	5	35	14086			NQ		
88.00	89.50	<0.01	6	56	175	1	10	80	14087			NQ		
89.50	91.00	0.02	8	14	65	1	10	510	14088			NQ		

ASSAY INFORMATION

DESCRIPTIVE LOG

Tiny folds and chloritised possible ferromags in highly chloritic matrix. Occ zones ± ptygm folds up to 5mm/cm 2-3mm esp towards top and bottom of unit.
Occ qtz-carb-chlor stringers, common calcite veins and patches towards base.
42.3 – 43.5m: 2mm qtz vein 10°/CA ± 5% po-py-cp.
46.4m: 10mm qtz-carb-chlor vein 20°/CA ± 5% py.
42.15 – 46.5m: 1% py ± minor po, cp + sp. Dissem + veins.
46.5 – 48.25m: No sulphs.
Abrupt change at base 75°/CA.

48.25 – 91.00m: SILICIFIED FELDSPAR-PORPHYRITIC ANDESITE LAVA
Grey-green, becoming more leucocratic at depth due to inc silif. Flow? Contact @ 51.3m. Upstream facing.
Abund chloritised ferromags to 5mm, av 2mm, in mod chloritised groundmass. Rare qtz xtls to 2mm. Disseminated fine leucoxene. Mod silif at top, inc ± depth to v strong below 72m ± local zones of intense silif. Progressive ↓ silica on folds predom below 58.5m – give rise to 'blobby' tuffaceous appearance.
Scattered calcite and qtz veins throughout – qtz veins inc ± depth, some banded.
"Background" alt overprinted by later alt event comprising chlorite-qtz-carb (dolomite, calcite and ankerite) – and greatly soft intense mineral. This alt confined to bands and zones, 45-55°/CA often in assoc ± areas of qtz-annealed breccia after early structures.
Small trace sulphides are present are assoc ± fine 2° alt zones. Alt zones inc randomly below 68m, more pron below 84m.
Qtz-annealed tectonic breccia zones ± alt at: 64.75-68.15m; 69.55-72.10m (each zone blows external + dolomite-ankerite in central part ± intense chlor towards margins. Flow bands + cleavage or division sp-gn + arsp-py assoc ± calcite ± qtz veins); 74.5-76m; 77.2-78.1m stringers of tectonic and brecciated zones ± shearing 55°/CA. Below 78.1m core qtz-annealed breccia ± 2° alt.
Core broken 81.9-82.5m. Below 84m gen fract + bedding ± cleavage shears and some bedding @ carb. Strong shears: 84.1m 75°/CA, 85.3m, 95.15m 60°/CA, 96.6m 45°/CA 98.7m 45°/CA. Fault ± gouge 70°/CA @ 94.6-94.95m. 98.7-98.9m contorted by shears sub ∥ CA. 100mm basalt dyke ± chilled py 54.35m 70°/CA, 154mm 54.4m 70°/CA ± minor py. Dyke not silif.
Overall: Trace po-sp-gn-cp-arsp-py, gen in veins ± qtz-carb. Best zones: 50.5-51.4m: 1-2% py in stringers in alt zone. 52.45m – 7mm vein massive py-arsp 85°/CA. 89.2m – 15mm ankerite-[illegible]? – qtz vein ± py-arsp, 75°/CA.

91.00-91.20m: HEATY FAULT
Highly crushed, soft puggy rock with abund upper + lower contact 60°/CA. Upper 120mm crushed green vein (qtz-carb) with thought veins + minor py. Lower 80mm crushed green silic rock ± blue chlor due to crushed bands of semi-massive arsp-py. Overall: 25% ptygs

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET
CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-5
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	145·50m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
91·00	92·00	0·69	270	70	85	4	790	3·11%	140089				WQ	
92·00	93·00	0·06	95	18	90	2	300	4600	140090					
93·00	94·00	0·11	20	18	100	2	50	11450	140092					
94·00	95·00	0·05	116	10	85	1	55	11700	140093					
94·65		PETROLOGICAL	SAMPLE						140091					
95·00	96·00	0·05	90	70	110	2	450	2250	140094					
96·00	97·00	0·18	135	85	55	3	2450	7900	140095					
97·00	98·00	11·53	11100	175	105	7	1050	2·95%	140096					
98·00	99·00	11·24	11650	290	100	9	5950	2·25%	140097					
99·00	100·00	0·19	320	85	115	4	510	860	140098					
100·00	101·00	0·15	155	42	100	3	220	360	140099					
101·00	102·00	0·45	200	105	75	4	270	11850	140100					
102·00	103·00	0·18	220	70	260	3	790	2150	138801	Note: These samples also analysed for Mo, Ga, Bi, Cd, Sb, Tm, W, Te				
103·00	104·00	11·69	10550	180	85	7	1250	2·2%	138802					
104·00	104·70	1·79	2500	300	250	10	2950	2·0%	138803					
104·70	106·00	0·04	20	11700	2750	2	24	150	138804					
106·00	108·00	0·04	18	70	115	1	6	25	138805					
108·00	110·00	0·005	20	110	310	1	2	90	138806					
110·00	116·90													

DESCRIPTIVE LOG

91·20 — 95·35m: GREEN, ALTERED SILICEOUS ROCK (andesite lava?)
Dk grey-green. Massive. Uniform text.
A qtz-chlorite-tremolite(?) rock with some sericite.
Solidly indistinct relict felds and rare leucoxene, suggests rock as highly alt andesitic lava as above Hanky fault.
Mod fractured and broken ang above 93m. Some qtz-arrested tectonic brecciation with bolsters of qtz veins. Schistosity 60°/LCA @ 92·8m.
Sev small shears 70°/LCA towards base.
91·2 — 91·45m: Semi-massive aspy > py.
93·45 — 95·35m: 3% dissem + stringer py > aspy, trace cp.
Basal contact a zone || qtz-arrested shearing 60°/LCA.

95·35 — 104·70m: BRECCIATED, MINERALISED SANDSTONE AND SHALE.
Grey with green tinge due to weak-mod chlo-tremm(?) alt - alt dec ↓ depth.
Random qtzose set with lesser dk grey to black graphitic siltstone/shale (latter comprises 40% of rock 97·15 — 102·3m). Set dominated by mod-strong silic (silic intense above 97m) & diffuse patches of pervade xn qtz, bdt dolrite/ qtz veins visible in set flakes 100m. Mod fenestration - strong at top of unit.
Rock extensively disrupted & ductile deformation of shales, and brecciation/ pull-aparts of sst beds. Most bdgs have strong arrested attitudes, suggesting drifters may be diagnostic of fault zone.
Locally strong schistosity. Penny shear 85°/LCA @ 98·05m.
Almost no qtz veining - those qtz veins occur in schistose shale.
Minor patches and stringers of dolomite.
Bedding: 60°/LCA @ 99·1m; 50°/LCA @ 104m.
95·35 — 97m: 5% py-aspy, trace cp. Dissem + stringers.
97 — 97·15m: Semi-massive aspy-py-cp as bands & breccia matrix.
97·15 — 99m: 10% aspy-py > cp dissem + stringers, incl 60cm massive band 60°/LCA @ 98·15m. Trace brown sp or cassiterite.
99 — 103m: 5% py > aspy & minor cp & brown sp/cassiterite (some sulph stringers at 11 ∠s to bedding)
103 — 104·7m: 7% py-aspy, incl 20% aspy-py in bands
103·7 — 103·95m and platelets dominant aspy > py-cp 104·6 — 104·7m 67°/LCA @ to shear fault & 25mm sulphide gauge.

104·70 — 145·50m: SANDSTONE WITH MINOR INTERBEDDED GREY AND BLACK SHALE
Grey with green tinge due to chlo-alt; gen v weak bdg mod strong matrix & mineralised zones.
Mostly massive mod or detrital-qtz set with matrix of carb (mostly dolomite) - sericite (altered feldspar material) and sericitic graphitic shale & locally alt in places. Graphitic content of set and mineralised siltstone/shale/sandstone inc ↓ depth - in places below 130m set almost black.
Shales show ductile deformation of bedding and

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SHLMET SYSTEM
METRIC
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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-5
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	145.50 m

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE NO.	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
116.90	118.70	0.005	34	24	75	1	120	65	138807			HQ		
118.70	121.50	●												
121.50	123.00	0.005	36	22	65	1	30	65	138808					
123.00	124.50	0.005	36	20	75	1	110	120	138809					
124.50	125.70	0.12	60	24	90	1	650	75	138810					
125.70	127.50	0.02	20	32	85	1	50	110	138811					
127.50	129.50	0.08	36	34	100	2	105	100	138812					
129.50	133.50													
133.50	135.50	0.005	36	48	85	2	24	115	138813					
135.50	137.50	0.02	36	40	80	2	30	740	138814					
137.50	139.50	0.05	18	28	70	1	14	1100	138815					
139.50	145.50													

ASSAY INFORMATION

DESCRIPTIVE LOG

and schistosity.
Bedding: 55°/LCA @ 108.7m; 48°/LCA @ 131m; 50°/LCA @ 138.3m; 50°/LCA @ 142.2m.
Irreg qtz and/or carb (dilatant, some ankerite), veins, locally broken zone 104.7 – 108.6m due to several strong faults and shears coincident ± graphitic shale + sst. These indicate very strong structure exists at base of above unconformable unit. Stronger faults in this zone: 104.95m (35°/LCA); 105.25m (50°/LCA), 106.1m (55°/LCA) ± 150mm py; 106.25m (50°/LCA) 150mm py; 107.6m; 108.1m (50°/LCA) ± 80mm py.
Chlor alt incr below 115m, approaching zone of qtz-sulph stringers centered 123 – 126m. Alt decr below 129.3m.
104.7 – 105.5m: 1-2% sp-gn-py. Dissem + veinlets.
105.5 – 116.9m: Minor py, patchy sp-gn. Dissem + veinlets.
116.9 – 118.7m: 1-2% py-po
118.7 – 121.5m: Minor py.
121.5 – 124.5m: 1-2% po-py as stringers assoc ± qtz ± chlor veins - most above old ? bedding, some calcite-veining.
124.5 – 125.7m: 3-5% po-py in veinlets ± qtz-chlor.
125.7 – 136.6m: 1-2% py-po. Dissem + in qtz-chlor-carb veins Dec ± depth.
136.6 – 139.1m: 2-3% py±po-aspy in veinlets ± qtz.
139.1 – 141m: 1% py±po. Trace aspy.
141 – 145.5m: Minor py-po in stringers ± qtz. Dec ± depth.

END OF HOLE

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SHLMET SYSTEM
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DRILL LOG SHEET

HEADING SHEET

COLLAR INFORMATION	DATA TYPE	COLLAR CO-ORDINATES EASTING	NORTHING	ELEVATION	COLLAR SURVEY AZIMUTH	DIP	HOLE NAME	TOTAL DEPTH	HOLE TYPE	DESC CODE	REMARKS
	SHOLE	304499.7	7375300.3	178.2	090	51.0	RED87-6	157.0			

PROJECT ROSEBERY CAST Mineralization Level	HOLE NAME RED 87-6
LOGGED BY D.E. Hall	TOTAL DEPTH 157.0
CONTRACTOR Diamond Drilling TAS	RIG LONGYEAR 38
CREW K. How — P. Arnold	DATE STARTED 22.7.87 FINISHED 30/7/87
CORE STORAGE: NO OF TRAYS 26; LOCATION DEVONPORT	SAMPLE STORAGE: DEVONPORT
MAP LAB GROCHMPET	ASSAY LAB COMLABS, ARL.

DESC.	SIZE	FROM	TO	TOTAL	REMARKS
NON CORE	HW	0	5	5	
CORE	HQ	5	13	8	
	NQ	13	157	144	
	BQ				
CASING					
CASING LEFT	HQ(S)	0	13	13	(S) steel (P) plastic
	10 4cm (P)	0	157	157	

SURVEY INFORMATION

	DISTANCE FROM COLLAR TO TOP	TO BOTTOM	AZIMUTH	DIP	REMARKS
GS	30.0	60.0	092.0	51.0	AZ. IN AMG (MAG + 12°)
	60.0	90.0	091.5	50.3	
	90.0	125.0	091.7	49.75	
	125.0	157.0	092.0	49.25	
M	157.0	157.0	092.0	48.75	

PLOTTING KEY

SYMBOL DES. CODE	SYMBOL G/LOG	INTERVAL FROM	INTERVAL TO	SYMBOL DES. CODE	SYMBOL G/LOG	INTERVAL FROM	INTERVAL TO

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
				SUMMARY	VALUES									
111.0	119.9	1.55	555	1455	1437	32	253	19160						
INCLUDING														
112.0	115.0	2.80	770	781	1085	63	91	12800						
118.6	119.9	2.50	3300	7100	6900	48	3800	63000						

DESCRIPTIVE LOG

0 — 5 m: No core. Fluvio glacial gravels

5 — 100.8: Feldspar - porphyritic andesitic lavas and volcaniclastics. Variable chlorite carbonate, silica alteration. Qz-carb fracture fill + veins

100.8 — 101.6: Fault Zone. Brecciated, altered mixing & Contact @ 101.6: 65° clbc

101.6 — 115.4: Volcanics?: Fine-grained, massive upper [illegible] Light. 20% disseminated & vein-material veins. Faults at 107.9, 108.8, 110.25 — 111.4, 114.8.

115.4 — 121.9: Brecciated sandstone: strong chloritic alteration. Semi-massive Py-veins 111.6 — 119.7. Sulph @ 119.7, 120.7

121.9 — 131.2: Sandstone & siltstone: Laminated sandstone, Py poorly bedded. Tr. Py.

131.2 — 157.0: Sandstone, siltstone, shale. Complex interbedded sandstone, Tentatively defined various distal facies.

DRILLING OBJECTIVES / SUMMARY OBJECTIVE: TO OBTAIN INTERSECTION OF MINERALISED ZONE 50m SOUTH OF RED 83-5, AT LEVEL 81.

SUMMARY: ALTERED ANDESITIC LAVAS & VOLCANICLASTICS, FELDSPAR PORPHYRIC, STRONG SILICIFICATION TO 141.6m. ?HG2 @ 65° clbc @ 101.6, BRECCIATED, ALTERED SEDIMENTS, FRACTURED, PYRITIC (2% DISP) VOLCANICS TO 115.4m, LOW ZONE 112–115m. SANDSTONES FROM 115.4m. SEMI-MASS. PY + DISP 115.6–119.7m. SPLIT. TO B.O.H.

REPORT REFERENCE:

SHEET 1 OF 5

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	ROSEBERRY KNOT JV	HOLE NAME	RED 87-6
LOGGED BY	D.P. HALL.	TOTAL DEPTH	157.0 m.

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
0.0	3.0													
3.0	5.0													
5.0	18.9													
18.9	22.0													
22.0	24.2													
24.2	25.4													
25.4	27.5													
27.5	29.6													
29.6	38.6													
38.6	46.8													
46.8	51.5													

DESCRIPTIVE LOG

0 – 3.0 m : FLUVIO GLACIAL GRAVELS
No core. Tricone drilling.

3.0 – 5.0 m : VOLCANICS ?
No core : Tricone drilling.

5.0 – 18.9 m : ANDESITE LAVA
Strongly feldspar porphyritic, altered andesitic volcanic. Probably lava.
Fels ≤ 4 mm
Matrix : chlorite - carbonate alteration
Qtz. vnlts @ 6.2 m, 7.0 m, 7.8 m ; < 15 mm wide
Fracturing @ 49°, 55°, 60° ; pa
10.65 – 10.85 : Basaltic dyke. Contact @ 60° cbn
11.3 – 12.25 : Qtz. veining & early alteration
From 13.8 m, more siliceous ? fg. Lenticular (lm) present. Moderately porphyritic. Matrix carbonated ; pillules ? Basalt :
* PETROLOGY SAMPLE : 15.2 m. (13929)

18.9 – 22.0 : ANDESITIC VOLCANIC
Strongly altered ; carbonate, chlorite.
Tr. py. Qtz. py. fracture zone.

22.0 – 24.2 : ANDESITIC VOLCANIC
Coarse feldspar phyric ; possibly tuffaceous
Weak chlorite - carbonate alteration

24.2 – 25.4 : ANDESITIC VOLCANICLASTIC
Feldspar phyric. Strong chlorite alt.

25.4 – 27.5 : ANDESITIC VOLCANIC
Coarse feldspar lapilli (lithic fragments ?)
Strong sitting alteration - almost total in matrix - carbonate, chlorite
Fracturing @ 10°, 60°, 80°.
FAULT ! @ 25.9 m
FAULTED basal contact @ ≈ 60° cbn.

27.5 – 29.6 : ANDESITIC VOLCANIC
Probably tuffaceous. Banded in parts.
Feldspar phyric. Chl. carb. alteration

29.6 – 38.6 : ANDESITIC VOLCANIC (LAVA)
Coarse feldspar phyric ; fine-grained. Chl. carb. alteration. Tr. chlorite, hypersthene
Strong fracturing associated with faulting
@ 30.8, 33.1, 34.9 m
Qtz. vnlts @ 31.8 – 32.1 m ; fg. Tr. py.
fracturing @ 40° cbn, fairly early alt. c
* PETROLOGY SAMPLE : 33.0 m. (13930)

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	Regional Test of Andesitic Rocks	HOLE NAME	RED 87-6
LOGGED BY	N.B. Hall	TOTAL DEPTH	157.0

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
59.5	62.2													
62.2	97.9													
97.9	98.0													
98.0	100.0	0.005		4	20	105	0.60		2		14			

ASSAY INFORMATION

DESCRIPTIVE LOG

18.6 – 46.8: ANDESITIC VOLCANICS
Fg-g mg feldspar phyric chloritic - carb. alteration. Fracturing 35° 50° cba.
39.8 – 40.3: Tr vein/fracturing + silicification
41.8 – 42.1: Massive qtz vein + py
42.2 – 42.7: Strong carb. alt + qtz + py.
43.0: Qtz vn. (boxwork) 10° cba.
44.1 – 46.8: Fels. phyric ± patchy strong silic. alt.

46.8 – 51.5: ANDESITE LAVA (QUARTZ TRACHYANDESITE)
Grey-green massive feldspar phyric.
Qtz veins, < 1mm, 60-80° cba.
Qtz py chl alteration. Tr galena
Fracturing 60° 80° cba.
* PETROLOGY SAMPLE @ 50.2 (13931)

51.5 – 62.2: ANDESITE LAVA
Magenta feldspar phyric, < 1mm.
Variable qtz/chl/py fracturing + carb.
51.5 – 54.6: chloritic fg matrix.
Increase in matrix alteration, vfg dark mafic.
56.35 – 57.1: Chl. basalt dyke
57.2 – 58.6: Chl. basalt dyke. 45° cba contacts, fractures
61.4 – 62.2: Tr vein/fracturing + silicification of chl. carb. alteration.

62.2 – 97.9: ANDESITE
Strongly feldspar porphyritic, lavas, < 6mm
Qtz veins @ 90° – 1cm fracture @ 50° cba.
Minor fg sandstone, qtz. and vesicles
Grey-green chl. alt. brecciated
@ 68.5: intrusive contact @ 85°, fg fractured grey chl. altered sandstone. Cuts // qtz/py fractures @ 73.5. 10° alteration front to fg. lava feldspar megacrysts, rock rounded.
* PETROLOGY SAMPLE @ 73.25 (13932)
lavas subdivided from 39.9 – 73.5.
73.9 – 89.3: Aphyric feldspar chl. alt. fg grained, rounded ± magnetic rocks.
Fracturing @ 50° cba.
Increasing qtz. py chl. fracturing from 87.0 – 89.3 ± rounded sandstone, rocks chl. altered.
94.5: fracture ± qtz. carb py @ 75° cba.

97.9 – 100.0 ANDESITE
Strongly altered (chloritic). brecciated. Qtz. feldspar altered. Qtz. carb. fracturing @ 60° cba.
Fracturing @ 45°

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SHLMET SYSTEM
METRIC
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METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT		HOLE NAME	RCD 87-6
LOGGED BY	D.B. Hall.	TOTAL DEPTH	157.0

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE NO	CORE ANGLE	ROCK TYPE	CHAM	DESC CODE	GRAPHIC LOG
100.0	102.0	0.005	2	14	85	0.50	4	14	138117					
102.0	104.0	0.005	3	14	105	1	10	12	138118					
104.0	106.0	0.005	55	42	210	1	8	12	138119					
106.0	107.5	0.005	7	160	230	1	10	16	138120					
107.5	108.55	0.005	18	450	1650	1	34	28	138121					
108.55	110.0	0.06	170	85	180	2	100	500	138122					
110.0	111.0	0.04	46	530	1200	4	85	500	138123					
111.0	112.0	0.50	300	410	580	14	50	1950	138124					
112.0	113.0	2.70	390	13000	180	95	40	10700	138125					
113.0	114.0	2.80	1350	930	160	75	44	12000	138126					
114.3	115.0	2.80	570	220	28	18	150	15600	138127					
115.0	116.0	0.93	200	1985	115	6	740	31000	138128					
116.0	117.0	0.70	570	85	70	4	500	14000	138129					
117.0	118.0	0.42	370	90	75	3	420	550	138130					
118.0	118.6	0.15	1050	11650	4450	14	2100	420	138131					
118.6	119.2	2.50	3800	7100	6500	48	3800	63000	138132					
119.2	121.0	0.33	130	55	110	3	145	1200	138133					
121.0	122.0	0.11	100	95	155	2	105	790	138134					
122.0	123.0	0.06	26	80	105	1	85	680	138135					
123.0	124.0	0.07	60	36	70	1	105	270	138136					
124.0	125.9	0.06	46	145	240	1	85	145	138137					
125.9	127.5	0.02	14	42	80	1	12	125	138138					
127.5	157.0													

DESCRIPTIVE LOG

100.8 – 101.6 : FAULT ZONE : VOLCANICS
V strong chl. alt. V. porous. Brecciated
Bottom contact @ 65° cba. <1% disid py

101.6 – 112.2 : CONGLOMERATIC ARKOSIC ARENITE
Altered / replacement complex of lithic arenite clasts; cementing matrix of chlorite, sericite = pseudomorphs of plagioclase + perhaps epidote - derived from different andesite.
104.8 : Vein @ 60° cba
104.8 – 106.2 : silicified chl. and. @ 50° cba
106.2 – 107.9 : Silicified strong Q vein, altered and ? 2 phases of quartz. ? Faulted, broken contact @ 107.9 m
108.8 : Fault zone. 15cm. + py @ 70° cba
108.8 – 110.15 : Chl. alt. arkose. py < 5% ; carb. + quartz.
110.15 – 111.4 : Fault Zone. Py ; marked py veins + pyrite. Fracturing etc. 60° cba
111.4 – 112.2 : Chloritic qtz. py volcanic

112.2 – 115.4 : SEDIMENTARY : SLIGHTLY FAULT ZONE
Banded sequence style, contorted, oxygen. Silicified fracture brecciation, chl. cement, <20% py disid + massive veins
114.8 : Major fault, no angle. Beta = 0° to movement.

115.4 – 120.0 : SANDSTONE :
Green-grey fine to coarse bedding. Qtz. veins & fractures full. py in fractures. Appx from 119.4

118.6 – 119.2 : Semi-massive py vein + qtz + py
119.2 : Fault py (6cm), @ 65° cba.

120.0 – 126.9 : SANDSTONE :
Greenish grey ; disid. veins. Fracturing @ 65°
120.7 : 6cm py - 65° < 2% disid py

119 – 124.7 : SANDSTONE :
Semi massive & fault bedding, strong pre-mineralisation movement. Q. vein, bedding / foliation @ 60°
Q. vein + py. (24cm) @ 122.4m, massive Pb-Zn-Ba

124.7 – 125.9 : SILTSTONE & SANDSTONE :
Alternating laminated siltstone & sandstone, poorly bedded. Quartz veins + py. disid. py in sandstone
126.2 : Fault zone @ 65° cba

125.9 – 126.9 : SANDSTONE :
Strong strong poorly bedded V. small fracture of Pb-Zn-Ba sulphides

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT		HOLE NAME	LCD 87 - 6
LOGGED BY	D.S. HALL	TOTAL DEPTH	157.0

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG
								125.9 - 131.9: Gambil. Preferential orientation 11 major fractures dip direction @ 50° clw. Minor drilling ppg. 131.9 - 132.0: Contorted bedding: kinked fractures Approx @ core axis, 1-2 mm, Fill bedding also kinked. Calcite @ core axis filled fracture.
								131.9 - 157.0: SANDSTONE & SILTSTONE Complex series of fine & coarse grained sandstone, & dark grey siltstone & mudstone interbeds & fragments. Disrupted by graphitic shears in sandstone, & in siltstone by cutting veining. Some quite complex deformation, eg. sub 11 & long core axis. Poorly developed Tectonic foliation 11 fractures complex cleavage, not analysed bedding @ 40° - 55° clw. Some approx @ core axis, sub 11 & foliation. Other X-cutting more comp. From 134.0 : more core axis, sub 11, & occ. X-cutting ppg axis. Ave. core axis to
								Comment: Attempting sandstone & siltstone facies correlation information. Calcite fracture fabric, shiny surfaced/slickensided. Some contacts 11, sub 11 to tectonic fabric.
								157.0 : End of Hole.

ASSAY INFORMATION

SHEET 5 OF 5

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SHLMET SYSTEM
METRIC
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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	HOLE NAME RED 87-6
LOGGED BY D.R. HALL.	TOTAL DEPTH 157.0

PETROLOGICAL REPORTS.

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Sample Number : 13019 (RED 87-6 : 45.2-...)

Identification : Brecciated, silicified, chloritized andesite healed by chlorite and thinly veined by albite and infilled carbonate

Description :

The sample is a drill core specimen of slightly weathered, mildly foliated porphyritic grey andesite rock cut by a few thin, very light grey fissure veins with iron-stained pores.

A semiquantitative staining test revealed no K-feldspar.

In this section the sample displays abundantly porphyritic textures of intermediate volcanic style, modified by subsequent brecciation of volcanic style. The phenocrysts range in size from about 0.3 to 3mm and the groundmass displays fine-grained feldspar laths shorter than 0.5mm.

The phenocrysts are mainly zoned, twinned plagioclase (generally sericitic, sometimes with clinozoisite). Mafic silicate phenocrysts have been completely altered to chlorite and sphene and opaques (maybe also silicate ?) leaving irregular textural ghosts (aggregates (about 1 to 4mm) containing abundant quartz and in some cases albite and chlorite). They resemble amygdules. The groundmass feldspar consists of fine plagioclase laths, recrystallized to a minor extent, along with chlorite and sphene.

The pervasive brecciation involves cells ranging up to a few millimetres in size delineated by partly fossilized chlorite.

Late thin fissure veins carry twinned albite and irregular grains which may well represent former carbonate.

An approximate mode is :

35-50%	albitized plagioclase phenocrysts
6-20	chlorite-sphene after mafic silicate phenocrysts
0.5-1%	inconspicuous grains (clastic or magmatic) phenocrysts
	phenocrysts
45-60%	groundmass plagioclase
5-15%	groundmass chlorite
2-3%	groundmass sphene
10-15%	chlorite as a brecciate matrix
0.5-0.1%	magnetite or quartz ? albite ? chlorite
0.5-1%	porous veins of albite

Comments and Interpretations :

This rock originated as abundantly porphyritic, mildly vesicular andesite. It has been pervasively altered to albite-chlorite-sphene-lowgrade, metamorphic brecciated and cemented by chlorite. The vesicles filled with quartz, accompanied in some cases by albite and chlorite. Late, thin fissure veins carried albite and possibly carbonate (now irregular pores).

There are no indications of metallic mineralization.

Sample Number : 13020 (RED 87-6 : 53.7-...)

Identification : Brecciated, silicified and chloritized andesite healed by chlorite and thinly veined by quartz veinlets (less than 1mm wide)

Description :

The sample is a drill core specimen of slightly weathered rock which displays brecciated porphyritic volcanic rock cut by some thin, porous, iron-stained fissure veins. The volcanic clasts are generally smaller than 4cm and there is no interstitial chloritic matrix.

A semiquantitative staining test revealed no K-feldspar.

In this section the sample is seen to be brecciated and to have a pseudoclastic style of recrystallization, but whether magmatic textures are consistent with phenocrysts measuring 10.4 to 5mm, sometimes supported (about 1 to 5mm) and a groundmass dominated by subsidiary flow-aligned feldspar laths (less than 0.1mm long).

Plagioclase phenocrysts are now colourless, twinned albite, mafic silicate phenocrysts and groundmass grains have gone to chlorite and sphene. Other opaque phenocrysts have gone to hematite and limonite grains to spherules. Chlorite also shows pseudomorphic, colourless, twinned recrystallization to opaque grains 0.5mm in size, laden with minuter lines. Angular veins contain ' quartz and in some cases a core of chlorite ' some are finely recrystallized.

A pattern of brecciation of textural style is delineated by chlorite.

Late but deformed fissure veins (ranging up to 2mm) carry mainly quartz ; some carry albite and some have an uncertain derivation. Some thin quartz-rich veins carry limonitic pseudomorphs of euhedral probable stereopyrite.

Later very thin veins carry colloform texture, and some plagioclase phenocrysts are mildly sericitized.

An approximate mode is :

15-20%	albitized plagioclase phenocrysts
1-2%	chlorite-sphene after mafic silicate phenocrysts
0.5%	inconspicuous grains (clastic or magmatic) phenocrysts
30-40%	groundmass plagioclase
1-2%	groundmass chlorite
1-2%	groundmass sphene
0.1-1%	chlorite as a brecciate matrix
1-2%	quartz ? albite
1-2%	magnetite or quartz with minor chlorite
1-2%	veins of quartz with minor albite, sericite
	minor calcite, and rare
0-5%	carbonate

Comments and Interpretations :

This rock originated as porphyritic, vesicular andesite. It was subsequently altered and dislocated and the vesicles filled with quartz and minor chlorite. Progressive veining by narrower fissures healed with chlorite. Fissures veins ? caused fine quartz and some albite, probable metasomatic and perhaps contemporaneous. Minor sericite developed as a late mineral. Perhaps it relates to by a hematite event which then contained and fractured pleochroic plagioclase pallidoblasts.

Sample Number : 13021 (RED 87-6 : 50.2-...)

Identification : Lightly brecciated, chloritized quartz trachyandesite, slightly sericitized and veined by quartz with carbonate

Description :

The sample is a drill core specimen of recrystallized volcanic rock with some small light grey quartz veinlets (maximum thickness 2mm) and a few patches (1 to 2cm) of a millimetre or other than of very pale orange carbonate.

A semiquantitative staining test revealed abundant K-feldspar in the groundmass and mostly replacing feldspar phenocrysts.

In this section the sample displays obvious remnant textures of porphyritic volcanic origin (complex phenocrysts (up to 1.5mm) of plagioclase, mafic silicate and quartz set in a groundmass dominated by randomly orientated feldspar laths about 0.2mm long.

The plagioclase is highly sericitized and phenocrysts are partly replaced by carbonate. Subsidiary orthoclase ? (very pale) occurs interstitially in the groundmass. Mafic silicate (?) have been replaced by chlorite and minor sphene and groundmass opaques by hematite.

A pattern of dendritic brecciation is delineated by chlorite and minor sericite. Wildly ramified and delineated flaking veins and several possible vesicles are filled with quite mildly sericitized chlorite, subsidiary sericite which seems to be chlorite and traces of chlorite and carbonate.

An approximate mode is :

0-10%	phenocrysts of plagioclase, highly sericitized and heavily altered to carbonate
1-3%	chloritized mafic silicate phenocrysts
0.1-0.2%	quartz phenocrysts
60-70%	groundmass feldspar (plagioclase and orthoclase)
5-10%	groundmass chlorite
2-10%	groundmass quartz
1-2%	groundmass sphene
1-2%	chlorite and sericite delineating fractures
1-2%	veins and possible vesicles of quartz, dolomite and traces of chlorite and sericite

Comments and Interpretations :

Primary textures plainly indicate that this rock was of porphyritic, vesicular volcanic origin and its composition (from the mode) was probably an andesite. Slightly vesicular, mildly porphyritic andesite was dislocated, brecciated and veined by chlorite, quartz and carbonate

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET

HEADING SHEET

COLLAR LOCATION	DATA TYPE	COLLAR CO-ORDINATES EASTING	NORTHING	ELEVATION	COLLAR SURVEY AZIMUTH	DIP	HOLE NAME	TOTAL DEPTH	HOLE TYPE	DESC CODE	REMARKS
	COLLAR	384411.8	7555050.9		106.0	045	RED 87-7	277.0			

PROJECT	ROSEBERY EAST ARACHNISH RIVER	HOLE NAME	RED 87-7
LOGGED BY	D.L. HALL	TOTAL DEPTH	277.0
CONTRACTOR	DIAMANT DRILLING	RIG	LONGYEAR 38
CREW	K. Haw. - P. ARNOLD	DATE STARTED	3/9/87 FINISHED 8/9/87
CORE STORAGE		RAMPLE STORAGE	
No OF TRAYS	43	LOCATION	DEVONPORT
MSP LAB		ASSAY LAB	CAMLABS

DESC.	SIZE	FROM	TO	TOTAL	REMARKS
NON CORE	HW	0	1.0	3.0	TRICONE
CORE	NQ	1.0	42.0	39.0	
	NQ	42.0	277.0	235.0	
	BQ				
CASING					
CASING LEFT	HW(S)	0	42.5	42.5	(S) steel (P) plastic
	I.D. 44mm (P)	0	299.0	299.0	(SLOTTED PLASTIC)

SURVEY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	AZIMUTH	DIP	REMARKS
30.0	60.0	106.0	45.0	AZ. IN ANG. = MAG +12°
60.0	90.0	106.0	44.0	
90.0	120.0	107.0	43.75	
120.0	150.0	107.0	43.0	
150.0	180.0	107.0	42.5	
180.0	210.0	107.0	42.0	
210.0	240.0	107.0	42.0	
240.0	270.0	108.0	41.5	
270.0	278.0	107.0	41.0	END OF HOLE

PLOTTING KEY

SYMBOL DES. CODE	SYMBOL G/LOG	INTERVAL FROM	INTERVAL TO	SYMBOL DES. CODE	SYMBOL G/LOG	INTERVAL FROM	INTERVAL TO

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
		SUMMARY VALUES												
243.1	245.1	1.24	610	2550	16600	16	290	2250						
245.1	246.55	4.5	3600	850	90	24	910	21000						
243.1	246.55	3.61	1867	1835	365	19	550	44000						

DESCRIPTIVE LOG

SUMMARY LOG

0 – 3.6m: NO CORE: TRICONE

3.6 – 147.7: ANDESITE: FELDSPAR PORPHYRITIC LAVA & VOLCANICLASTICS (TUFF!?) Variable chloritic alteration; carbonate aff. Occ. basalt dykes < 6.5m. Lamprophyre ≤ 1% Occ. to 5%

147.7 – 220.7: ANDESITE: SILICIFIED FELDSPAR PORPHYRITIC LAVA. V. STRONG silicification, almost total in parts. Lx. < 1% Q. vnlt. and.

220.7 – 226.35: ANDESITE & BASALT Silicified feldspar phyric andesite. Subs. – ons. & chlorite.

226.35 – 229.45: FAULT ZONE: Tectonic breccia: silicified, chloritic; + vnlt.

229.45 – 231.3: VOLCANIC: Silicified, chloritic andesite?

231.3 – 277.0: SEDIMENTS Sandstone, siltstone. Minor limestone: 255.15 – 255.45.

DRILLING OBJECTIVES / SUMMARY OBJECTIVE: TO TEST MINERALISED ZONE AT DEPTH AND TO UNDER OF RED 2.

SUMMARY: ANDESITIC VOLCANICS WEST OF FAULT. V. STRONG SILICIFICATION FROM 147.7-147.7. Ag @ 226.35m. VOLCANICS CONTINUE TO 231.3: SEDIMENTS ABSENT. SHEL INTERCEPTED IN SOUTHWEST TO MASSIVE @ 255.15 – 255.45 Pb-Zn-Cu. SEDIMENTS CONTINUE TO BOTTOM OF HOLE.

REPORT REFERENCE:

SHEET 1 OF .....

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	ROSEBERY EXPL'N ARMS ON RIVER	HOLE NAME	RGD 87.7
LOGGED BY	D. G. HALL.	TOTAL DEPTH	277.0m

ASSAY INFORMATION

DISTANCE FROM COLLAR: TO TOP | TO BOTTOM

SAMPLE Nº | CORE ANGLE | ROCK TYPE | DIAM | DESC CODE | GRAPHIC LOG

DESCRIPTIVE LOG

0 — 3.6m : TILL/OUT : no core

3.6 — 55.8m : ANDESITE FELDSPAR PORPHYRITIC
Coarse feldspar phenocrysts. Chloritic matrix.
Variable alteration - chl. carb.
Rare quartz fragments - subrounded (e.g. @ 10.8m)
Fracturing : 45°, 60°, 90°, 75° c.b.a.
Occ. quartz veins on fractures.
13.2m : thin (< 5mm) basalt - fragment ? 70° c.b.a.
18.5-19.15m : basalt dyke. Top contact 45°, bottom variable ~ 40-45°. Strong chl. alt. Broken & fractured. Feldspar ph. @ 18.6 @ 55°, ~ 5% disd. py.
Andesite fragment, alteration (silicification) at fracture.
To ~ 5mm band py, fragments
32.0-32.5m : quartz veins ~ 5mm. Chlorite-bearing @ 55° to core axis c.b.a.
Fresh andesite - feldspar ph. alt. at fracture, rare disd. py.
45.5m : graphitic ? basalt contact @ 65° ; quartz veins
49.3m : coloured contact (fracture) @ 60° c.b.a.
49.5m : basalt dyke @ 50° c.b.a.
1cm qtz. & calcite vein < 10% py.
to 49.7m ≤ 5% disd. py.

NQ core from 49.5m.
Coarse feldspar porphyritic andesite.
Fracturing 1 to 2 c.b.a.
Apparent increase in qtz. veinlets on fracturing from matrix.

50.3m : 0.15m of non-porphyritic v. chloritic andesite (? basalt dyke).

51.3m : 4mm Q. vn. @ 55° c.b.a.
Increase in pinkish feldspar to 55.8m.

55.8 — 56.7 : ANDESITE
Green, v. chloritic ; non-porphyritic.
≤ 5% disd. py.
Graphitic ? top contact
Broken bottom contact, ~ 40°.

SHEET 2 OF

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	Rosebery East	HOLE NAME	RED 87-7
LOGGED BY	D.B. HALL	TOTAL DEPTH	277.0m

DISTANCE FROM COLLAR: TO TOP 50 | TO BOTTOM 100

SAMPLE Nº | CORE ANGLE | ROCK TYPE | DIAM | DESC CODE | GRAPHIC LOG

ASSAY INFORMATION

DESCRIPTIVE LOG

50.7 – 71.5 m: ANDESITE: FELDSPAR PORPHYRITIC
Mg. chloritic matrix. Occ. pp fragments?
Rare diss. PO. Occ. ~90° fracturing 1:20cm.

61.1m. 4cm of chl. basalt, ± Q veinlets w.m.
@ 60° cba
Other Q. vns. @ 70°.

Occ. clearly (?) cemented – intermediate frags (4cm)
± fine pp. Overlap of 2 units? (1-2% – part)

Sharp contact at 71.5m @ 50° cba
6cm chloritic contact Q. felsic fracture (cm scale?)
@ 40-45° Cong. of frags. Q.

71.5 – 74.1: BASALT
Grey-green aphanitic. Vesicular?
Chl. & Q. veinlets etc. Dirs vns 30-70°
Occ. fract 60° 70°
Bottom contact not fractured, uneven, c. 60°.

74.1 – 92.5: ANDESITE: FELDSPAR PORPHYRITIC
Mg, strongly porphyritic chloritic matrix;
fractured 1:20cm @ 40° 75° cba.
Occ. cemented clasts, poss. Q. felsic? veinlets & stockwork
Possibly internal aggregation fractures. Tr. disid. pp
Occ. Q. ± dusty pp. Broken bottom contact.

92.5 – 93.1: BASALT
Dark med. Green aphanitic; fresh. Several Q. vns.
& fractures 1:1; Q. ± pink felsic.
Dark inclusions in places, ± dark green chl. veinlets
± homogeneous / isotropic.
Uneven bottom contact ≈ 60° cba Q. vns. cut
across contact, slight offset.

93.1 – 111.4: ANDESITE: FELDSPAR PORPHYRITIC.
Massive grey fg-mg. Occ. pp, phenocrysts/xenocrysts.
Q. veinlets 60° felsic @ 75°.
94.5 – : 5cm epidotised Q vn @ 65° cba.
97.2 – 97.3: fg porphyritic basaltic dyke. 65° cba
Thin irregular Q vns. + pp-sp-py.

Uneven grey generally ± chl. felsic fractures.
Occ. breccia zone (25cm @ 102.5m)
Cpy in fracture planes. Tr. disid. pp
Silicified, dusty, fine fg
Non-p. Occ. veinlets here.

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	RUSSELL EAST OF MACLAUGHLIN RIVER	HOLE NAME	RED 87-7
LOGGED BY	D. R. HOLL	TOTAL DEPTH	297.6 m.

DISTANCE FROM COLLAR: TO TOP 100 | TO BOTTOM 156

SAMPLE NO | CORE ANGLE | ROCK TYPE | DIAM | DESC CODE | GRAPHIC LOG

ASSAY INFORMATION

DESCRIPTIVE LOG

Fracture & veins. @ 65° c.a.
Irregular bottom contact, ≈ 60°.

111.4 - 111.6: BASALT DYKE
Green aphanitic massive, chloritic.
Q. veins on fractures & X-cutting.
Bottom contact @ 70°.

112.6 - 113.1: ANDESITE: FELDSPAR PORPHYRITIC
Green, massive, chloritic.
Lower bottom contact sheared near top → 115.2 m.
113.1 m: narrow shear zone @ c.a. 50° c.a.
114.2 m: 1-1½ cm c.a. Tr. Py
Becoming massive with feldspar phyric.
Fracture: 45°, 65°, 75°, 60°
Occ. Q. veins on fractures, & X-cutting.

121.1 - 124.9: BASALT DYKE
Green, chloritic. Occ. thin feldspar phyric andesitic fine zones @ 70° c.a.
Q. & Q. carb veins on fractures, & X-cutting.

124.4 - 138.85: ANDESITE: FELDSPAR PHYRIC
Massive chloritic feldspar phyric. Occ. fine thin
Tr. of lineation @ 60° c.a. fracturing @ 45°, 60°, 65° c.a.
Qtz. veins @ 127 m. Lx. < 1% — planar.
Intercal contact @ 134.6 m (60°) & 135.5 m (60°).

138.85 - 145.1: ANDESITE:
Green chloritic, fine, (occ. 1 cm size) basin of flows & interflow tuffs.
Tr. (124 m) thin qtz-chl veins, chl. ser. py on fractures
Lx. present.
Bottom contact 60° c.a.
141.0 - 141.4: ? broken zone. Approx 1% of core. Recent?
From 141.4: qtz-chl veins, 2 cm, @ 65°,
T < 5% fine py, + sp. ? Minor!

145.1 - 147.2: BASALT (?)
Vfg. green chloritic, Q. veins (occ. brecciated) + py + sp.
Basalt + minor brecciated basaltic tuff. 70° - 80°
@ 146.1 m - CONT: Q. breccia, Q. green calcite ± chl.
50° c.a., < 10% py, fine Q. veins, chl. tuff, ±
5 cm interval.
147.2: contact @ 50° c.a.

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15 Feet

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT Rosebery area OV / Mulgrimmon River	HOLE NAME RCD 87.7
LOGGED BY A.A. Hall	TOTAL DEPTH 277.0 m.

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	SAMPLE NO	CORE ANGLE	ROCK TYPE	DOMS	DESC CODE	GRAPHIC LOG
150	240						

DESCRIPTIVE LOG

147.7 – 220.7 · ANDESITE ; SILICIFIED
FELSIBAR PORPHYRITIC

Sharp top contact.
V. strongly silicified andesite; almost total replacement of plagioclase.
Px. : Rare, altered.
Heavily fractured - brittle fracturing.
Q + Ch Calc. fracture fill, 1 mm - 2 cm.
Fracture @ 45°, 50°, 55°.

Prominent Q veins @ 159.6, 159.9, 161.5 (15 cm), 162.5 – (10 cm). 5 mm each

163.0 – 163.5 m : FRACT zone : v. crushed up

169.0 – 174.9 : bleached ; silicified ; feldspar phyric and Px < 1%

From 175.1 fairly regular fracture direction : 55–60° to CA. X-cutting Q veins, (90° ch.)

184.3 – 185.0 : Q vein + included and fragmented.

189 – 190.1 : Complete silica replacement. Coarse calcite.

Continues on : varying degrees of intensity of silicification. Relict feldspar porphyritic Px. abundantly present.

200.4 – 204.0 m : fracture @ 35° + 60° ch.

208.5 – 209.2 : V. strong silicification associated with 2 cm Q vein ; dissolved pyrite + py.

217.4 – 220.7 : Grey-green porphyritic silicified andesite with 2–3% fine grained pyrite. Feldspar phyric. Coarse fragments, indeterminable, < 10 mm.
Fracture @ 1 : 10 cm. 60° – 70° ch.
Foliated appearance, strongly developed. Banding : 60–70° to CA. Silicified fragments.
Qtz. veining 1–2 cm, < 8 mm., associated with calcite.

220.7 – 224.3 m ANDESITE
V. strongly silicified. Relict porphyritic texture. Q. splashes 2 @ 2 cm. Very fine grained pyrite (e.g. 221.4 m)
Qtz. veining @ fracture surfaces.
Becoming darker in colour.

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	Rosebery East JV Mineralogy Rivet	HOLE NAME	RED 87-7
LOGGED BY	D.A. Hall	TOTAL DEPTH	277.0m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
200	217													
217	218.7	0.05	5	2	40	0.5	2	4	139 08					
218.7	220.7	0.005	4	4	30	0.5	6	7	139 09					
220.7	222.7	0.02	7	380	430	1	6	125	139 10					
222.7	224.6	0.05	1	11500	390	3	6	510	139 11					
224.6	226.35	0.1	260	350	530	3	18	5850	139 12					
226.35	227.45	0.005	1100	270	500	3	130	11100	139 13					
227.45	228.45	0.005	48	70	210	2	50	660	139 14					
228.45	229.20	0.06	24	165	940	2	36	1800	139 15					
229.0	231.3	0.09	75	14	65	2	150	680	139 16					
231.3	233.3	0.17	160	20	80	2	90	2450	139 17					
233.3	235.3	0.12	1750	29	55	2	540	11550	139 18					
235.3	237.3	0.44	4200	46	55	2	670	13400	139 19					
237.3	239.0	0.11	250	630	550	5	185	2200	139 20					
239.0	241.0	0.22	195	75	140	2	185	3500	139 21					
241.0	243.1	0.28	145	55	95	3	48	3050	139 24					
243.1	245.1	1.24	610	2550	1600	16	290	9250	139 23					
245.1	246.55	4.50	3600	850	90	24	910	9000	139 24					
246.55	248.0	0.28	200	1350	75	4	115	580	139 25					
248.0	250.0	0.16	210	620	410	3	55	3300	139 26					

DESCRIPTIVE LOG

224.3-224.7: Quartz ± [illegible]
N3by - Ab. [illegible] seam
Adjacent to contact dk. alt. basalt, brecciated rock

224.7-226.35: BASALT:
Green fg - chloritic. Possibly [illegible]
Fracturing 1 seam 55°-65° cbs
Disrupted by a few Qtz. splashes, anderitic, ± Qtz. amyg. & fragments & pebbles. Disrupted & veining [illegible] fg. amyg. fg
from 226.15m strongly brecciated + sulp.
FAULT: @ 226.15: 5° slickenside seam of v. basalt. 80° cbs.

226.35-226.45: FAULT ZONE
V. strongly brecciated, chloritic material:
& fragments. Silicified andesitic fragments.

226.45-229.95: ANDESITE: FAULT BRECCIA
Complex of fg. [illegible] silicified, chloritic, volcanic
& Amyg. Qtz bodies & clastics. Occ. massive fg
pebbles
227.1m: Large fracture @ 80°
229.0-1m: Faulted gouge - 4cm. No sample.

229.95-231.3: VOLCANIC? ANDESITE?
Strongly silicified. Fine grained fg unit
& [illegible] pebbles & green coloured bands
Coloured Qtz fg. Cleaved from 229.7: 65-75° cbs

231.3 - 231.5: VOLCANICLASTIC ANDESITE
Green - massive fg - [illegible] volcanic or sedimentary
clastic rock w/ [illegible] & rock fg. Minor
[illegible] contacts. Weakly cleaved.

231.5-237.3: [illegible]
Cleaved, brecciated. Numerous [illegible] candidates
Carbonate [illegible] - stuff and [illegible] fragments
fracturing: [illegible] fracturing
[illegible] Qtz & Qtz carbonate
Dominant [illegible] fracturing 55°-65°
Some brecciated zones: 232.4-232.9; 234.4-234.8.
From 232.4: Core disrupted 70° cbs

237.7-239.0: [illegible]
Green fg. Random fracturing/veining. ± Qtz. fg
[illegible]
Flow? from 238.0-238.6, ± Qtz fg. [illegible]

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	ROSEBERY EAST JV SOUTHERN RIVER	HOLE NAME	RED 87-7
LOGGED BY	D.B. Hollis	TOTAL DEPTH	277.0m

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
250.0	252.0	0.18	26	860	1300	1	34	125	132127					
252.0	254.0	0.65	410	65	100	3	420	7150	132128					
254.0	277.0													

ASSAY INFORMATION

DESCRIPTIVE LOG

232.0-241.1: [illegible] Quartz [illegible] Qtz veins: sub-ll, x-cutting & superimposed. Some carb veins. Py & asp, as veins & disp, usually ± fracture fill & selvedges. Carb/chl/ser & carb/chl.
235.0-239.2: dipping @ 35° cbc.
239.2-241.1: carb/chl, 55-70° cbc.

241.1-245.45: [illegible] Carb/chl/ser, Shears & sandstone. Veins of py + asp <5%, ± qtz/carb

245.45-245.95: [illegible] Qtz/py/asp (sulphide) dominant vein, contact @ 70° cbc at base. Py, asp, sph.

245.95-254.0: SANDSTONE
To 248.55: Silicified, <10% sulphide: py, asp, qtz carb/chl veins, fracture @ 65° cbc. Bedding banding @ 65°
To 251.35: Shear, qtz ± carb veins, 65-75° cbc. Qtz-Py-Asp (±Sph, Gn, Cp) veins, ± disp & x-cutting. Qtz veins related py, ± asp, (some disp) veins in proximity. Bedding in hanging wall 0.5m shear contact at 253.45 @ 75°.
251.35-251.6: Strong sheared zone. Qtz veins (5cm) Carb/chl shear/gouge. Veins of py. Contact 75° cbc.
To 254.0: sheared sandstone. Massive Qtz veins & stringers. ~3% py + asp. Broken contact.

254.0-277.0: [illegible]
Alternating shale/siltstone & sandstone. Occ Qtz veins, sub-ll, bedding x-cutting. Shear py, very rare sphalerite.
@ 264m: 20cm. coarse Qtz vein sub-ll, ± Qtz, carb, asp veins, disp, x-cutting. Qtz veins & disp sphalerite in mostly sheared bedding/contact planes.
Bedding + contact are 70° cbc. (mostly 75°).
Shale contains fine Gl. fossils.

277.0: END OF HOLE

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SHLMET SYSTEM
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METALS DIVISION

DRILL LOG SHEET

HEADING SHEET

COLLAR INFORMATION	DATA TYPE	COLLAR CO-ORDINATES: EASTING	NORTHING	ELEVATION	COLLAR SURVEY: AZIMUTH	DIP	HOLE NAME	TOTAL DEPTH	HOLE TYPE	DESC CODE	REMARKS
	BHOLE	386412.0	2375551.0	162.9	090	-45	RED 87-8	280.0			

PROJECT	MURCHISON RIVER / [illegible]	HOLE NAME	RED 87-8
LOGGED BY	J.G. HARVIS	TOTAL DEPTH	280.0m.
CONTRACTOR	DIAMOND DRILLING TAS	RIG	LONGYEAR 38
CREW	K. MAY / P. ARNOLD	DATE STARTED 19.8.87 FINISHED 4.9.87	
CORE STORAGE: Nº OF TRAYS	51	LOCATION: DEVONPORT	SAMPLE STORAGE: DEVONPORT (Order Nº. 11659)
M & P LAB		ASSAY LAB	COMLABS, ADELAIDE

DESC.	SIZE	FROM	TO	TOTAL	REMARKS
NON CORE	HW	0	3	3	TRICONE
CORE	HQ	3	57	54	
	NQ	57	280	223	
	BQ				
CASING					
CASING LEFT	HQ(S)	0	57.5	57.5	(S) steel (P) plastic
	4-Diam ID (P)	0	280	280	(SLOTTED)

SURVEY INFORMATION

	DISTANCE FROM COLLAR: TO TOP	TO BOTTOM	AZIMUTH	DIP	REMARKS
B	30.0	60.0	096.0	45.0	AZIMUTH IN AMG = MAG + 12°
	60.0	90.0	092.0	42.7	
	90.0	120.0	091.5	42.0	
	120.0	150.0	093.0	41.5	
	150.0	180.0	093.5	40.5	
	180.0	210.0	094.5	40.5	
	210.0	240.0	095.5	40.0	
	240.0	270.0	096.0	40.0	
	270.0	280.0	096.0	39.2	END OF HOLE

PLOTTING KEY

SYMBOL: CODE	GRAPH	INTERVAL: FROM	TO	SYMBOL: CODE	GRAPH	INTERVAL: FROM	TO

ASSAY INFORMATION

DISTANCE FROM COLLAR: TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE Nº	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
224.00	227.00	0.01	19	1540	2880	3	17	217						
247.00	253.00	0.14	77	329	352	3	64	977						

DESCRIPTIVE LOG

0 – 160.2m: ANDESITIC FELDSPAR CRYSTAL TUFF WITH BASALTIC DYKES
Strongly chloritised, non-magnetic, unmineralised

160.2 – 224.9m: SILICIFIED ZONE IN DEFORMED ANDESITIC VOLCANIC
Intensely silicified with silica partly introduced along subvertical breccia zones. Unmineralised.

224.9 – 228.95m: BRECCIATED QUARTZ-CHLORITE-SERICITE-CARBONATE ROCK
Probably HENTY FAULT 225.5 – 226m - an interval of fault gouge. 1-2% sp > py-gn-aspy.

228.95 – 252.95m: ALTERED QUARTZ SANDSTONE
Chloritised and silicified. 228.95 – 238.9m: 1-3% py > sp. 238.9 – 239.1m: 5-7% aspy > py. 239.1 – 252.95m: 1-2% py-sp-aspy. Best sulphides in zones of stronger alt. and in qtz-carb veins/patches

252.95 – 254.5m: MAJOR FAULT ZONE, Unmineralised

254.5 – 280.0m: QUARTZ SANDSTONE WITH MINOR INTERBEDS OF SHALE
Generally unaltered. 1-2% py > po, sp.

END OF HOLE.

DRILLING OBJECTIVES / SUMMARY
OBJECTIVE: TO TEST MINERALISED ZONE ADJACENT TO HENTY FAULT, 50m NORTH OF RED 87-7 AT SAME RL
SUMMARY: ALTERED SANDSTONE HOST ROCK ENCOUNTERED BUT THIS VIRTUALLY UNMINERALISED. NO RESULTS OF SIGNIFICANCE IN HOLE.

REPORT REFERENCE :

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SHILMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-8
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	280.0 M

ASSAY INFORMATION

DISTANCE FROM COLLAR: TO TOP | TO BOTTOM

SAMPLE NO | CORE ANGLE | ROCK TYPE | CHAR | DESC CODE | GRAPHIC LOG

DESCRIPTIVE LOG

0 – 3·5m : TRICONED, NO CORE

3·5 – 76·45m : PARTIALLY – OXIDISED ANDESITIC FELDSPAR – CRYSTAL TUFF
(Rock appears lava-like, but has persistent minor lithic tuffs). Pale green & brown patches due to oxidation. Mostly leached. Massive, uniform-textured, med gr.
Abund felt xtals to 4mm, av 2mm in strongly chloritic matrix. Felds fairly densely packed – often touching, gen well-bounded. No layering or obvious sorting. Felds vary from euhedral to sub-rounded.
Occ small qtz grains below 30m.
Angular lithic bands to 10mm, av <5mm. Gen silic (dense chert) and pyritic, some ? felsic-porph. andesitic volc similar to host rock. Some qtz bands (devitrice?) in places. Mod chloritised, weak sericitisation, and patchy pink feldspar alt esp below 55m. Frequent patchy stilpn below 40m.
Trace oxidisation, mod 74–76·45m.
Weak schistosity – 43°/CA @ 17·3m ; 60°/CA @ 38m.
6·4 – 6·55m : clayey clasts to 50mm 60°/CA – poss a disrupted bed ? Rift-scree ? Also 7·35 – 7·45m.
Mod broken, ldsc & drsh. Common clay seams to 1cm.
Occ vein or fracture < 1mm Ox-stained joints, only minor ox below 40m.
Occ veins ± qtz and/or carb and/or chlorite, av <5mm.
Common ? qtz leucoxene. Occ hem grains to 1mm.
V minor pyrite py below 32·5m – mostly on joints or assoc ē silic lithics and vein patches.
Basalt dykes : 100mm 48°/CA @ 13·2m ; 20·4 – 21·1m – dk green, f/g, chloritised, weakly magnetic, upper contact 60°/CA.
34·1 – 36·1m : major fault zone – centered at 36·1m, 15°/CA
Highly chloritised & broken, soft, 3% clay + qtz stringers.
55·2 – 57·65m : broken, strongly clay 20m, assoc ē faults 20°/CA
44·6m : small shear 65°/CA
50·0m : strong shear 42°/CA, ē 50mm qtz-carb-chl-py vein.

76·45 – 96·30m : BASALT (DYKE ?)
Upper contact – upper 50°/CA, lower 40°/CA ē some chilling evident.
Dk green, f/gr, massive, unbroken. Non-magnetic.
Scattered blocked tapering phenocrysts to 8mm, av <3mm.
Minor zones of felds planes! <2mm. Fine leucoxene.
Strongly epidotised, mod chloritised.
Trace qtz and/or calcite veins av <20mm.
Trace py-cp, except 82m : 50mm semi-massive aggy-py, trace cp, hem. 45°/CA.

96·30 – 128·30m : ANDESITIC FELDSPAR – CRYSTAL TUFF
Same rock as above 76·45m.
Dk green. Gen uniform texture, but some variations in size and abundance of felds, also lithics.

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-8
LOGGED BY	J.G. JURVIS	TOTAL DEPTH	280.0m

DISTANCE FROM COLLAR: TO TOP / TO BOTTOM | SAMPLE NO | CORE ANGLE | ROCK TYPE | DIAM | DESC CODE | GRAPHIC LOG | DESCRIPTIVE LOG

ASSAY INFORMATION

Folds to 4mm, av 2mm. Some pale pink
Minor, persistent, angular to sub-rounded lithics up to
10mm, av < 5mm. Matt fg qz, silic and pyritic. Some are
silif and pyritic andesitic volc similar to host rock. Lithics
sometimes feldspar qz: 90-93m & 125-128m.
Occ blebs of lossy chlorite - post after glass bngs.
Occ qtz brecciated - minerals in fabrics.
Upto 15% qz knockers. Occ small grains of hem after mag
Rock mod-strongly chloritised, weakly epidotised and sericitised.
Incipient silif. Patchy contamination of felds.
Occ qtz and/or calcite veins ± chlor, up to 100mm, av <10mm.
2° chloritisation assumed introduced along some thin fractr
and margins of some qtz veins esp 98-100m where these
veins and felds 50°/CA - at 99.5 to be ~5cm thick at 50°/CA.
Rare epidotisation ± hem to rare stringers to 100m.
Wk schistosity: 60°/CA @ 90m; 65°/CA @ 110m; 55°/CA @ 123.5m.
Occ 0.1-0.2m zones of associated shearing, fpc schistosity
and deformation of rock fabric. Intru basalt dykes @
85.8 ⊥ 117.3m (fg qz chloritic, non-mag upper contact 50°/CA,
lower 65°/CA); also 20mm dyke @ 122.05m (55°/CA).
Other basalt dykes @ 94.35 - 96.55m (60°/CA, minor py); and
120.25 - 128.70m (55°/CA).
Trace diamm py becoming minor below 122m. Conc in
silic lithics and veins & 2° chlorite alt.

128.3 - 130.85m: BASALT DYKES AND TUFFACEOUS SEDIMENTS
Complex zone. Upper contact 60°/CA, lower 60°/CA.
Multiple irreg basalt dykes in chloritic sandy and
fg qz tuffaceous sediments and andesitic feld-xyl tuff.
Dk green f-med gr, chloritised.
Calcite veins and veinlets.
Strongly schistose (50°/CA) with deformed fabric.
Bedding: 40°/CA @ 129.7m; 55°/CA @ 130.25m.
Dykes @ 130m 50-55°/CA - same trend as bedding.
Minor py - mostly in the lower beds.

130.85 - 142.45m: VARIABLE ZONE OF BASALT DYKES IN ANDESITIC FELDSPAR-CRYSTAL TUFF
(Very irregular and complex relationship between dykes
and host rock. Aspects known emplaced while both still
unlithified)
Green to dk green. Mixed, unbroken (wk-mod pathy silic).
Mod-strongly chloritised, mildly recrystallised and epidotised.
Andesitic lith tuff as before, with noticeable variations in
feld sized - to 5mm, av 2-3mm, most euhedral (where
unreplaced).
Rare angular lithics - to 10mm max, av <5mm. Most of
andesitic material.
Patches of strong chloritic alt and deformation - 3 feet 6

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-8
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	280.0m

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG

ASSAY INFORMATION

partially de-textures rock. These zones appear to have been fmax-gr zones initially.
134-136m: Basalt dykes 30mm - 450mm 50-70°/cca. Also irreg patches + stringers of basalt. Non-mag. Basalt commonly brecciated. Basalt ferromag blades to 4mm. Qtz and/or calcite veins to 60mm, av <10mm. Fine transverse. Rare trace py.

142.45 — 149.10m: MAFIC LAVA (DYKE?)
(Similar in composition to above basalts, but appears to be slightly less basic).
Upper contact 85°/cca (sharp, but irreg) basal contact broken. Dk green, fi-med gr, some variations in texture. One 100mm zone of felsic xyls 148-148.1m.
Ferromag laths fi 3mm/av 1-2mm, also feld phenos to 3mm, av 1-2mm - v common in places. These strongly carbonatised.
Strongly chloritised, mod epidotised. Non-mag.
Common calcite veinlets.
Fi gr leucocrene, rare trace py.

148.10 — 152.40m: FELDSPAR-PORPHYRITIC ANDESITIC VOLCANIC (XYL TUFF OR LAVA).
As before, but no visible fabrics.
Green, mod-strongly chloritised, patchy mod silif.
Abund feld xyls 1-3mm, in chloritic matrix.
Qtz ± carb veins and patches.
Below 149.6m core broken by strong shears 15°/LCA.
150.1-150.55m: chloritic, broken, patchy silif basalt (poss a dyke). This terminates 50°/LCA against strongly chlor zone against fault at 150.65m 65°/LCA.
150.65-150.85m: brecciated altered silif zone - an annealed stockw, ē 10-20% aspy > py, trace cp.
150.85-152.40m: 1% py > aspy, trace sp + po - mainly in qtz veins. (148.10-150.65m: minor py).

152.40 — 160.20m: COMPLEX ZONE — MAFIC LAVA (DYKES?) AND FELDSPAR-PORPHYRITIC ANDESITIC VOLCANIC.
Mafic to dk green, fi-med gr. Occ ferromag phenos 1-3mm, ē zones of common feld phenos 1-2mm.
Intercalations of andesitic volc (feldS 1-2mm) below fault at 158.1m.
Strongly chloritised zone silif assoc ē qtz veins + patches (spha ē py-aspy-sp).
Very badly broken below 154m by series of faults 15°/LCA - main fault 156.8-156.95m 15°/LCA, commercial cca.
Second fault 158.1m - angle unknown. 1-2% py, minor aspy-sp-gn, 157.3-158.3m.
154-156.5m: 1-2% py > aspy > sp, = 10% in 100mm qtzite zone at 156m.
Basal contact, sharp, 74°/LCA.

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

GOLD DETERMINED BY 30gm FIRE ASSAY.
* Average of 2 determinations.
** Average of 3 determinations.

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-8
LOGGED BY	J.G. PURVIS	TOTAL DEPTH	280.0m

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
210.00	212.00	0.01	17	14	52	1	<4	<2	139338				NB	
212.00	214.00	0.01	10	12	58	1	4	<2	139339					
214.00	216.00	0.01	9	12	50	1	<4	4	139340					
216.00	218.00	0.02	10	50	1110	1	4	7	139341					
218.00	220.00	0.01	11	62	1165	1	4	32	139342					
220.00	222.00	<0.01	13	145	1080	1	8	24	139343					
222.00	224.00	<0.01	8	150	330	1	4	<2	139344					
224.00	226.00	0.01	14	1800	2550	3	16	60	139345					
226.00	227.00	0.02	28	1020	3450	3	18	530	139346					
227.00	229.00	<0.01	10	720	1080	2	16	96	139347					

DESCRIPTIVE LOG

160.2 — 224.9m: SILICIFIED ZONE IN DEFORMED ANDESITIC VOLCANIC.

Abrupt upper contact — a 150mm highly silic annealed fault zone c variable rock frags in leached-rock matrix. Green and grey-green. Bleached & pale fawn below 217.5m. Host rock: mildly/patchy fold-prophyritic andesitic volc, c feldsp av 2mm. Chloritized. Strong ± qtz grains noted around 171m. Minor mafic volcanics, incl basalt, in upper 10m. Andesitic volc looks to have been very uniform (phyric xyl bdf). Host rock extensively altered by high degree of silicification and shearing accompanied by variable (mod c high) pervasive silicification - most of rock replaced by fine qtz. Most of action introduced along det-vein system of annealed breccia zones, abs intrusives and patches c clasts. Some silic is finely pervasive - altered volc rock texture or clastic appearance.

Some carbonate appear c silic - esp along late-stage fract. Sericitization strong towards base of zone.

Mineralization vic c depth - association, total below 210m c zones of strong brecciation. Copper/gold association especially evident, with traces of already-precipitated volc in silic matrix.

Schistosity poh weak - 40°/ca ∂ 163m; 40°/ca ∂ 185m; 55°/ca ∂ 207m; 70°/ca ∂ 220.2m.

Strong fault 65°/ca ∂ 168.9m.

Broken in places above 170m, becoming gen unbroken and extensively fract 175 — 219.7m. Below this core mostly up and ∂ blocked by series ∂ choppy shears - fract at irreg ints ∂ 0.3 - 0.5m.

Below 210m minor gale pink hematitic alteration ∂ qtz. Virtually no silic ∂ to 216.5m, below this v minor disseminated sp-gal-cp-py and trace asp.

224.9 — 226.95m: BRECCIATED QUARTZ-CHLORITE-SERICITE-CARBONATE ROCK

Green and white. Hard.

Brecciated highly silicified rock with patchy pervasive chlorite and sericite, abs stringers ∂ chlorite and small patches ∂ carb.

Broken and sheared esp 225.05 — 226.85m c major zone ∂ fault brec 225.5 — 226m - probably the HEARTY FAULT.

Another fault breccia zone 50°/ca ∂ 226.6 — 226.9m containing 3% sp-py-gn. Zone ∂ major crushing 226-227m. Overall 1-2% sp-py-gn - disseminated and short stringers. Some showing faulted abrupt based contact 65°/ca.

226.95 — 262.95m: ALTERED FINE QUARTZ SANDSTONE

Greenish-grey. Hard.

Detrital qtz-grain str grid, matrix ∂ qtz, chlorite with lesser biotite, graphite and carbonate.

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	MURCHISON RIVER	HOLE NAME	RED 87-8
LOGGED BY	J.G. ARVIS	TOTAL DEPTH	280.0m

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	Au	Cu	Pb	Zn	Ag	Sn	As	SAMPLE NO	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
229.00	231.00	0.01	19	560	770	2	28	175	139948			NQ		
231.00	233.00	0.01	19	480	550	2	48	185	139949					
233.00	235.00	0.05	30	490	620	2	22	760	139950					
235.00	237.00	0.01	15	80	110	1	52	70	139951					
237.00	239.00	0.01	12	38	42	<1	140	640	139952					
239.00	241.00	0.01	14	170	280	1	4	66	139953					
241.00	243.00	0.02	22	450	940	2	38	190	139954					
243.00	245.00	0.03	18	250	620	2	56	150	139955					
245.00	247.00	<0.01	28	390	700	2	8	90	139956					
247.00	249.00	0.13	100	310	970	3	62	510	139957					
249.00	251.00	0.115	74	610	1460	4	88	1440	139958					
251.00	253.00	0.114	56	68	1125	2	42	980	139959					
253.00	255.00	0.02	17	125	430	1	16	34	139960					
255.00	257.00	<0.01	17	32	105	1	12	24	139961					
257.00	259.00	0.02	12	18	32	1	8	18	139962					

ASSAY INFORMATION

DESCRIPTIVE LOG

Thin interbeds of deformed black graphitic shale. Characteristic dark strong penetrative chlorite-qtz alt dec steadily & depth - rock strong silt to 235m, then patchy wk-mod sericitisation.
Common thin stringers and irreg diffuse patches of qtz and carb (buff-pk). Early penetrative carb below 235m - locally absent. Carb is blk and has characteristic orange-stained oxidation coating.
Mod schistosity - deformed bedding and rock fabric.
Deformed bedding: 75°/CA @ 233m; 90°/CA @ 239.7m; 76°/CA @ 252.5m.
Bedding extensively disrupted and brecciated to 230m and below 251m.
Rock broken - badly in places, esp below 249m. Numerous clayey shears.
238.95 – 238.9m: 1–2% diffuse py > sp. Trace qz and carb (below 233m). Stringers dec & depth.
238.9 – 239.1m: 5–7% py > po. Semi-massive in matrix & thin breccia zone. 30°/CA.
239.1 – 252.95m: 1–2% py–sp–carb. Trace qz, po, cp. Veinlets, qz stringers & diffuse qtz-py veins 249.35–249.5m. Veinlets throughout unit are in zones of locally-strongest chlorite-qtz alt and in carb-qtz patches & veins.

252.95 – 254.5m: MAJOR FAULT ZONE IN PARTLY-GRANITIC SHALES AND QUARTZ-SANDSTONE
Highly broken zone & intervals of fault gouge (esp 252.95–253.2m 65°/CA; 253.75m 60°/CA; 254m 65°/CA; 254.75m). Strong schistosity throughout.
No classification, mod sericitisation, local silt.
Minor py, trace sp. Barren.

254.5 – 280.0m: QUARTZ-SANDSTONE WITH MINOR INTERBEDS OF SLIGHTLY GRANITIC TUFFACEOUS QUARTZ-SANDSTONE
Grey and dk grey to black.
Mainly clastic qtz (cst, fine-med (occ micritic)) and dk granitic matrix. Minor shale flakes (av <1mm).
Many interbeddings & seams, silt & lithics to 2mm & shale (incl black shale) clasts. Local graded.
Generally broken. Blocky, subangular fabric.
Minor zones & wk chloritisation. Pervasive carbonatisation - locally strong. Minor patches of silt assoc & qtz veins.
Calcite veins & veinlets. Occ hairline qtz-carb veins.
Wk schistosity - & deformed bedding & rock fabric. Bedding v regular: 46°/CA @ 253m & 269m. 68°/CA @ 276m.
254.5–268.5m: 1% py > po, sp. 268.5–270m: 2% py > po, diffuse (blebby). 270–272.3m: Minor py > po.
272.3–275m: Occ bed 20m & 1% py > po, trace sp-gn.
275–280m: Minor diffuse py.

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END OF HOLE

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

HEADING SHEET

COLLAR CO-ORDINATES	DATA TYPE	EASTING	NORTHING	ELEVATION	AZIMUTH	DIP	HOLE NAME	TOTAL DEPTH	HOLE TYPE	DESC CODE	REMARKS
	DHOLE				90	-90	RED87-10	169.2			

PROJECT HOLLOWAY WEST JV LAKE BOOMERANG	HOLE NAME RED 87-10
LOGGED BY C. FLETCHER	TOTAL DEPTH 169.2
CONTRACTOR F ORTNER	RIG F49J
CREW I. WALTER.	DATE STARTED 4/11/87 FINISHED
CORE STORAGE	SAMPLE STORAGE
No OF TRAYS 23	LOCATION DEVONPORT
MAP LAG	ASSAY LAB CONLABS

DESC.	SIZE	FROM	TO	TOTAL	REMARKS
NON CORE					
CORE	HQ				
	NQ				
	BQ				
CASING					
CASING LEFT					(S) steel (P) plastic

SURVEY INFORMATION

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	AZIMUTH	DIP	REMARKS
58.11	105.10	92.5	49.0	
105.10	169.2	90.0	47.5	
169.2		90.9	44.0	

PLOTTING KEY

SYMBOL DES. CODE	SYMBOL G/LOG	INTERVAL FROM	INTERVAL TO	SYMBOL DES. CODE	SYMBOL G/LOG	INTERVAL FROM	INTERVAL TO

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG

DRILLING OBJECTIVES / SUMMARY: TO TEST THE LAKESIDE MINERALISATION NORTH OF THE LAKE
MASSIVE

REPORT REFERENCE :

SHEET 1 OF 4

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

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METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	HOLE NAME
LOGGED BY	TOTAL DEPTH

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	DESCRIPTIVE LOG
0.00	52.90	GLACIAL SCREE & GRAVELS TO 16m and LAMINATED CLAY & SILTS TO 32.9m.
52.90	54.00	ALTERATE GREEN ANDESITE WITH WEATHERED FELDSPAR PHENOCRYSTS
54.00	57.10	QUARTZ VEINS EVERY 40-80cm WITH CRYSTAL QUARTZ & LIMONITE 40° TO 70° TO L.C.A. ±
		10 cracks/M
37.10	40.20	AS ABOVE. LARGE QUARTZ VEINS 37.8M-38.4M HIGH LIMONITE. + OTHER MANY QUARTZ VEINS.
		8 c/M
40.20	45.20	AS ABOVE QUARTZ VEINS 10-40cm APART < 2cm WIDTH 30°-70° TO L.C.A.
		10 c/M
45.20	46.20	AS ABOVE QUARTZ VEINS 10-30cm APART MORE COMMON TOWARD BASE 30°-70° TO L.C.A.
		10 c/M
46.20	49.10	AS ABOVE QUARTZ VEINS 20cm 30°-70° TO L.C.A.
		10 c/M
49.10	52.20	AS ABOVE LARGE QUARTZ VEINS UP TO 20cm THICK 1M APART.
		8 c/M
52.20	54.80	AS ABOVE LARGE QUARTZ VEIN 20° TO L.C.A. @ 53.2M
		6 c/M
54.80	57.90	ANDESITE FINE 5cm CAVITIES FILLED WITH FIBROUS MINERAL (QUARTZ PSEUDOMORPHS AFTER GYPSUM??)
57.90	60.00	DRUSY & MINOR QUARTZ COMMON TOWARD BASE 5 c/M
		ANDESITE + FIBROUS MINERAL.
		7 c/M
60.00	61.20	AS ABOVE 10 c/M
61.20	64.20	ANDESITE QUARTZ VEINS RARE COMMON IN LAST 70cm
		7.5 c/M.
64.20	67.20	ANDESITE RARE QUARTZ VEINS
		15 c/M.
67.20	70.20	ANDESITE MANY QUARTZ VEINS EVERY 5-20cm
		6 c/M
70.20	72.60	ANDESITE FIBROUS FILLED CAVITIES COMMON TOWARD BASE
		9 c/M
72.60	75.60	ANDESITE QUARTZ VEINING COMMON TOWARD TOP (5m) WHERE MORE BRECCIATED QUARTZ VEIN EVERY 20-300cm
		10 c/M
75.60	78.90	ANDESITE & BASALT QUARTZ VEINLETS.
		6 c/M
78.90	82.00	ANDESITE ALTD & MINERALISED CORE VEIN EVERY 30 CM

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SHLMET SYSTEM
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The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	HOLE NAME
LOGGED BY	TOTAL DEPTH

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	SAMPLE No	CORE ANGLE	ROCK TYPE	GRAPHIC LOG	DESCRIPTIVE LOG
						4C/M
82.00	85.10					FINE GRAINED ANDESITE OR BASALT QUARTZ VEINS EVERY 5-100M WIDEST = 2CM
						4 C/M
85.10	88.20					ANDESITE MANY QUARTZ VEINS EVERY 40CM
						3C/M.
88.20	90.60					ANDESITE QUARTZ VEINS BECOMING VERY COMMON SILICIFICATION & MINERALISATION COMMON @ BASE
						10C/M
90.60	93.90				ANDESITE PARTIALLY REPLACED BY SILICA.	ANDESITE SILICIFIED & MINERALISATION FAULT 90° to CORE (LEN) @ 92.6M
						11C/M
93.90	97.00					ANDESITE NUMEROUS QUARTZ VEINS SILICIFICATION AROUND LARGER QTZ VEINS - MINERALISATION COMMON
						6C/M
97.00	100.10					ANDESITE - QTZ VEINS & SILICIFICATION AS ABOVE
						4C/M
100.60	103.10					AS ABOVE - LARGE QUARTZ VEIN NEAR BASE 10CM THICK @ 102.5
						5C/M
103.10	106.20					ANDESITE WITH LARGE QUARTZ VEINS ALMOST TOTAL SILICIFICATION SOME CALCITE VEINS
						5C/M
106.20	109.00	145585				AS ABOVE
		145586				5C/M
109.00	112.20				QUARTZ OR ANDESITE REPLACED BY SILICA - GREY CROSS CROSSED BY WHITE QUARTZ VEINS	QUARTZ OR ANDESITE REPLACED BY SILICA - GREY
		145587				8C/M
112.20	114.20	145588				AS ABOVE
		145589				15C/M
114.80	115.20					6C/M.
115.20	116.20	145590				SILICA REPLACED ANDESITE. MINOR QUARTZ 1-1M FAULT @ 116.3-4M SILICEOUS GOUGE. DARK CHLORITE SERICITE & FELDSPAR REPLACEMENT
116.20	121.20	145591			SHALES & SILTSTONES	DARK SHALE, SANDSTONES & SILTSTONES WITH NUMEROUS SMALL QUARTZ VEINS, PYRITE IN SHARP SECTIONS
		145592				40C/M
121.20	122.50	145593				DARK SHALE, SANDSTONES & SILTSTONES MINOR PYRITE & ARGILLITE QUARTZ VEINS FOLDED & MIGMATITIC VEINS MORE BROKEN
122.50	124.60	145594				AS ABOVE
124.60	126.20	145595				DARK SHALE PYRITIC GALENA & SPHALERITE
126.20	128.10	145596				PYRITE REMOBILISED AROUND MINOR QUARTZ VEINS @ 124.6 & 125 FAULT @ 126.1
128.10	128.70					AS ABOVE.
128.90	130.20					AS ABOVE.

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ASSAY INFORMATION

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SHLMET SYSTEM
METRIC
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The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	HOLE NAME
LOGGED BY	TOTAL DEPTH

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	SAMPLE NO	CORE ANGLES	ROCK TYPE	DIAM	MISC CODE	GRAPHIC LOG		DESCRIPTIVE LOG
130·20	133·20	146917						QUARTZ	BLUE GREY QUARTZ AGNIST LUMINOUS QUARTZ & MIGMATITE VEINS PYRITE IN MINOR AMOUNTS.
		146918							SHEARING 25° TO 65° TO LCA.
133·20	136·20	146919							AS ABOVE 10c/m
136·20	139·20	146920							QUARTZ MICA SCHIST WITH PYRITE SPECKS THROUGHOUT PYRITE MORE COMMON NEAR LARGER QUARTZ VEINS WHICH USUALLY OCCUR PARALLEL TO CLEAVAGE.
139·20	141·40	146921							SIMILAR TO THE ABOVE BECOMING MORE GRANLEY TOWARD BASE
141·40	142·40	146922						140.4	PHYLLITE SHALE WITH MANY QUARTZ-FELDSPAR VEINS & SCATTERED PYRITE.
142·40	143·70	146923							AS ABOVE.
143·70	146·20	146924						144.7	SCHIST WITH SILICA REPLACEMENT & ASSORTED PYRITE + ARSENOPYRITE
		146925						145.5	SHEARING MORE COMMON UNTIL 145.5m + MINOR GALENA SPHALERITE.
146·20	147·20	146926						146.9	SOME UNALTERED & VARY SILICA REPLACEMENT - LITTLE SULPHIDES
147·20	149·20	146927							SCHIST PYRITE COMMON @ 148·2m 5cm PYRITE ARSENOPYRITE
		146928						149.7	148.9 - 149.2 NO MINERALISATION.
149·20	151·20	146929						151.1	SILICA REPLACED SCHIST .7m THEN UNALTERED SCHIST
		146930							
151·20	153·80	146931						152.2	AS UNALTERED AS ABOVE ABUNDANCE ENRICHED WITH STR VEINS PYRITE COMMON @ 152·5 20cm MASSIVE PYRITE
		146932							153·5 10cm QUARTZ VEIN
		146933						153.6	
153·80	154·60	146934						154.6	SOFT SHALE VERY BROKEN FAULT? 740c/m
154·60	157·20								SHALE OR PHYLLITE SOME EXTENSIVE SILICA REPLACEMENT
		146935							STR VEINS + PY + FELDSPAR PYRITE COMMON 1% 12c/m
157·20	159·90	146936						157.2	BLACK SHALE & MEDIUM VOLCANIC (ANDESITE). PYRITE AS TINY SPECKS IN GRAINS & REMOBILIZED AROUND QUARTZ VEINS OCCURING EVERY 10-20cm 15c/m
159·90	163·00	146937							AS ABOVE
		146938							15c/m
163·00	166·10	146939							AS ABOVE
									15c/m
166·10	167·50							167.2	BLACK SHALE WITH NETWORKING OF QUARTZ VEINS
167·50	169·20							167.5	BLACK SHALE & SOME LUMINOUS QUARTZ VEINS MINOR PYRITE
~~169·20~~									

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SHLMET SYSTEM
METRIC
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The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

HEADING SHEET

COLLAR INFORMATION	DATA TYPE	COLLAR CO-ORDINATES EASTING	NORTHING	ELEVATION	COLLAR SURVEY AZIMUTH	DIP	HOLE NAME	TOTAL DEPTH	HOLE TYPE	DESC CODE	REMARKS
		386038	5390330		132	50	RED87-11	250·1			

PROJECT	HENTY FAULT ZONE
LOGGED BY	J. RAMSELL
CONTRACTOR	F. ORTNER
CREW	
CORE STORAGE — No OF TRAYS	LOCATION
MAP LAB	
HOLE NAME	RED 87-11
TOTAL DEPTH	250·1m
RIG	MINDRILL
DATE STARTED 17/1/87 FINISHED	2/2/87
SAMPLE STORAGE	DIPORT
ASSAY LAB	COMLABS

DESC.	SIZE	FROM	TO	TOTAL	REMARKS
NON CORE		0	9	9	
CORE	HQ	9	36	27	Sht. prc. to bottom
	NQ	36	250·1	214·1	of hole.
	BQ				
CASING	NW	0	9		
CASING LEFT	3"	0	9		(S) steel (P) plastic

SURVEY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	AZIMUTH	DIP	REMARKS
0		132	50	
49		130	45	
100		122	35	
160		122	33	
199		120	29	
250		118	22	

PLOTTING KEY

SYMBOL DES. CODE	SYMBOL Q/LOG	INTERVAL FROM	INTERVAL TO	SYMBOL DES. CODE	SYMBOL Q/LOG	INTERVAL FROM	INTERVAL TO

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG
9·0	11·0						
11·0	13·0						
13·0	15·0						
15·0	16·5						
16·5	17·5						
17·5	18·8						
18·8	21·0						
21·0	23·4						
23·4	24·6						
24·6	26·0						
26·0	27·5						
27·5	29·5						
29·5	31·5						
31·5	33·5						
33·5	35·0						
35·0	36·1						

DESCRIPTIVE LOG

9-27.5 // FELDSPAR PHYRIC DACITIC-ANDESITIC LAVA

Pinkish green with numerous thin quartz veinlets. Moderately broken + weathered.

13.2-16.5 Pink silicified, strongly quartz veined

16.5-18.8 Fine green chloritic wisps, vague foliation 45° to CA. Trace fine pyrite

18.8-23.4 Pinkish, massive partially silicified dacite with thin quartz veinlets often contorted.

23.4-24.6 Green feldspathic andesite, strongly broken thick white quartz veins, trace pyrite blebs.

24.6-27.5 Pink massive medium feldspar phyric dacite, medium py blebs. Minor fine chlorite-carbonate veinlets. Strongly broken at bottom.

27.5-36.1 // GREY PINK FOLIATED TO SHEARED DACITIC ? LAVA

Strongly broken to 29.0. Moderate fine foliation 40° to CA. Minor silicified patches and gradational 28.8-29.1. Sheared chlorite wisps. Increasing contorted carbonate veining 30.8-33.7.

DRILLING OBJECTIVES / SUMMARY: Test Henty Fault position where later structural offsets have resulted in slicing of dacitic-andesitic lavas into Fossil Slate sequence (blackshale, fine turbiditic sediments)

REPORT REFERENCE :

SHEET 1 OF .....

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	HENTY FAULT ZONE	HOLE NAME	RED 87-1
LOGGED BY	J. RAMDELL	TOTAL DEPTH	250.1 m.

ASSAY INFORMATION

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	SAMPLE No	CORE ANGLE	ROCK TYPE	DIAM	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG
NP	36.1		27.5					Increasing silicification towards 340, moderate well developed foliation 45° LCA.
36.1	37.5		39.1					36.1 – 39.1 // FOLIATED FELDSPATHIC DACITIC ?VOLCANICLASTIC
37.5	39.1		41.0					Minor thin quartz veinlets. Foliation 55° LCA. Trace fine pyrite blebs. Bottom contact sheared + chloritic 45° LCA.
39.1	41.0		43.0					39.1 – 52.1 // PINK MASSIVE DACITIC LAVA
41.0	43.0		45.0					Moderate foliation defined by fine chloritic wisps 45° LCA and sericitic grains. Thin quartz carbonate veinlets.
43.0	45.0		47.0					50.1 – 50.6 Diffuse contact. Chloritic wispy siliceous sericitic f.gr. volcaniclastic 40° LCA.
45.0	47.0		49.0					52.1 – 60.9 // GREEN DACITIC – ANDESITIC LAVA
47.0	49.0		51.0					Abundant quartz carbonate veining from 52.4. Strong silicification from 54.5.
49.0	51.0		52.4					56.1 – 56.7. 90% white quartz 10% silicified andesite contact diffuse.
51.0	52.4		54.0					57.0 – 57.5. Moderate foliation defined by chlorite-sericite wisps, some pumiceous.
52.4	54.0		56.0					60.9 – 66.3 // FINE PUMICEOUS SILICIFIED VOLCANICLASTIC
54.0	56.0		58.0					Moderately layered (55° LCA) chloritic, some sericite speckling, weak to moderate carbonate veining
56.0	58.0		59.5					66.3 – 81.5 // MASSIVE DACITIC LAVA
58.0	59.5		60.9					Pinkish weakly foliated with fine sericite dusting and irregular quartz – carbonate veinlets 76 – 77. Moderately chloritic + chlorite wisps.
59.5	60.9		63.0					81.5 – 94.3 // SHEARED DACITIC LAVA
60.9	63.0		65.0					Pale green strongly quartz – carbonate veined some breccia zones, chloritic wisps defining foliation
63.0	65.0		66.3					82.1 – 82.4. Quartz carbonate vein irregular contacts
65.0	66.3		68.0					83.5 – 84.1. " " " " "
66.3	68.0		70.0					84.1 – 84.7. Moderately chloritic
68.0	70.0		72.0					84.7 – 94.3. Pink massive thin quartz carbonate veinlets, more chloritic at bottom, ab[illegible]
70.0	72.0		74.0					
72.0	74.0		76.0					
74.0	76.0		78.0					
76.0	78.0		80.0					
78.0	80.0		81.5					
80.0	81.5		83.0					
81.5	83.0		84.1					
83.0	84.1		86.0					
84.1	86.0		88.0					
86.0	88.0		90.0					
88.0	90.0		92.0					
90.0	92.0		94.3					
92.0								

SHEET No. 01

SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONFIRMATION SHEET

PROJECT	HENTY FAULT ZONE	HOLE NAME	RED 87-11
LOGGED BY	J. RANDELL.	TOTAL DEPTH	250.1m

DISTANCE FROM COLLAR TO TOP	DISTANCE FROM COLLAR TO BOTTOM	DESCRIPTIVE LOG
94.3	94.9	94.3–94.9 // FINELY BEDDED SERICITIC VOLCANICLASTIC
94.9	97.0	
97.0	99.0	
99.0	101.0	Upper contact 50°
101.0	103.0	Lower contact 75°
103.0	105.0	Pale to dark green fine grained well bedded ash tuff, minor shiny quartz porphyroblasts with strongly chloritic bands. Some irregular carbonate veining
105.0	106.2	
106.2	108.0	
108.0	109.4	
109.4	111.0	94.9–99.0 // SILICEOUS DACITIC LAVA
111.0	112.0	
112.0	114.0	Pink to red with strong development of anastomosing sericitic veinlets, well defined foliation 75° LCA. Minor quartz veining, some fine quartz porphyroblasts.
114.0	116.6	96.6–97.2. Strong chlorite development.
116.6	118.4	97.2–98.2. Fine grained pale green sericitic ash finely bedded. No grading obvious.
118.4	120.0	
120.0	122.0	99.0–106.2 // CARBONATISED AND SERICITIZED FELDSPAR PHYRIC DACITIC/ANDESITIC LAVA
122.0	124.0	
124.0	126.0	Gradual change from unit above. Intense alteration, strongly broken core, small washed shear zones.
126.0	128.0	
128.0	130.0	Sharp lower contact 45–50° LCA.
130.0	132.0	
132.0	134.0	106.2–118.4 // CHLORITIZED AND CARBONATIZED FINE HETEROGENEOUS VOLCANICLASTIC
134.0	136.0	
136.0	138.0	
138.0	140.0	Sericite flecking in and on the matrix.
140.0	142.0	109.4–112.0. Patchy chloritization, pervasive carbonate alteration, strong quartz veining.
142.0	144.0	
144.0	145.5	111.0–111.4. Apple green pervasive shears. (45° LCA)
145.5	146.6	112.0–116.6. Pervasive chloritization + sericitic anastomosing deformation moderate foliation 75° LCA.
		116.6–118.4. Strong carbonate alteration + quartz carbonate veining. Fine disseminated py. 2%.
		118.4–146.6 // CHLORITIZED AND PATCHILY CARBONATIZED DACITIC LAVA
		Feldspar porphyritic, moderately foliated, sericitic
		139–146. Strong banding defined by intensely sericitized + carbonated volcanics. Foliation at 5° LCA.

ASSAY INFORMATION

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SHLMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	HENTY FAULT ZONE	HOLE NAME	RED 87-11
LOGGED BY	J. RANDELL	TOTAL DEPTH	250.1 m

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	SAMPLE No	CORE ANGLE	ROCK TYPE	SHAPE	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG
146·6	148·0							146·0 - 146·6. Contorted convoluted, quartz veined.
148·0	150·0							Lower contact. Clay pug zone 15cm thick.
150·0	152·0							
152·0	154·0							146·6 - 222·2 // VARIABLY BEDDED FINE ARGILLACEOUS VOLCANICLASTIC WITH MODERATE GRANITIC INCLUSION
154·0	156·0							
156·0	157·9							
157·9	159·0							
159·0	161·0							
161·0	162·2							Chloritized convoluted (40-50° LCA). Trace fine disseminated pyrite. Strongly broken core to 152m.
162·2	164·0							Variable grain size from boulder to fine sand.
164·0	166·0							Moderate quartz vein injection.
166·0	168·0							157·9 - 162·2. Intense brecciation of quartz volcaniclastic and graphitic silt. in chloritic matrix.
168·0	170·0							Strongly broken core.
170·0	172·0							162·2 - 184·5. Fine + uniform bedding (6-75° LCA) mildly convoluted with fine graphitic layers. Some feldspar porphyroblasts.
172·0	174·0							
174·0	176·0							173·0 - 175·0. Small elongate shale lenses up to 1·5cm long.
176·0	178·0							
178·0	180·0							181·0. Thin elongate pale green qtz lenses, well bedded 70° LCA.
180·0	182·0							
182·0	184·5							184·5 - 188·0 Strong thick quartz-carbonate banding (5% of core), ranges to 25cm thick. Regular contacts @ 65° LCA. Nil sulphide. Minor epidote and chlorite.
184·5	186·0							
186·0	188·1							188·1 - 189·7. Fine grained poorly bedded more graphitic.
188·1	189·7							
189·7	192·0							189·7 - 195·2. Coarser grain size and irregular banding, more graphitic less well defined bedding 60-70° LCA. Significant fine quartz veining.
192·0	194·0							
194·0	196·0							
196·0	198·0							195·2 - 209·5. Finely and regularly bedded, fine sand size, minor silty graphitic laminae. Irregular quartz veinlets. Fine pyrite blebs.
198·0	200·0							
200·0	202·0							209·5 - 214·5. Grey fine aphanitic with thin black graphitic layers. Regular fine bedding. Thin quartz veinlets. Moderately silicic.
202·0	204·0							
204·0	206·0							
206·0	208·0							214·5 - 217·1. Numerous thin pale quartz qtz lenses. Disturbed bedding 55-60° LCA. Thin contorted quartz veinlets
208·0	210·0							
210·0	212·0							
212·0	214·5							
214·5	216·0							217·1 - 222·2. Fine bedding poorly defined, several small 3-4cm. breccia zones. Some irregular coarse carbonate veining. Weak disseminated pyrite + thin graphitic layers. One veinlet quartz-sphalerite blebs.
216·0	217·1							
217·1	219·0							
219·0	221·0							
221·0	223·2							

ASSAY INFORMATION

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8381133

SIRMET SYSTEM
METRIC
DECIMAL POINTS AS REQUIRED

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

CONTINUATION SHEET

PROJECT	HENTY FAULT ZONE	HOLE NAME	RED 87-11
LOGGED BY	J. RANDELL.	TOTAL DEPTH	250.1m

DISTANCE FROM COLLAR TO TOP	TO BOTTOM	SAMPLE No.	CORE ANGLE	ROCK TYPE	PHASE	DESC CODE	GRAPHIC LOG	DESCRIPTIVE LOG
223.2	224.5							223.2-225.7 // EPICLASTIC BRECCIA
224.5	225.7							Sharp contacts: upper 65° lower 50°. Well defined but discontinuous bedding. Pale green elongate silt fragments, fine graphitic laminae in fine sandy matrix. Numerous quartz/carbonate veinlets. Thin irregular carbonate quartz veinlet.
225.7	228.1							225.7- 250.1. // WELL BEDDED ARENACEOUS VOLCANICLASTIC
228.1	230.6							Very fine bedding (55° LCA) regular thin laminae, shale break bedding
230.6	232.0							228.1- 230.6. More competent, silt lens inclusions, graphitic, bedding 60-70°.
232.0	234.0							230.6- 239. Numerous elongate wispy black shale lenses usually <1cm long. Some larger elongate shale fragments 7 cm long. Regular bedding
234.0	236.0							239- 246.9. Regular laminae, kink folding 60°. Fine carbonate quartz veinlets.
236.0	238.0							246.9- 250.1. Grey thin graphitic laminae.
238.0	240.0							
240.0	242.0							E.O.H.
242.0	244.0							
244.0	246.0							
246.9	248.9							
248.9	250.1							

ASSAY INFORMATION

133

83 61 34

APPENDIX 2

Petrological Descriptions Lakeside Prospect

135

838136

Geochempet Services

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PETROLOGICAL REPORT

ON TEN SAMPLES OF DRILL CORE

FROM THE MURCHISON RIVER AND STERLING VALLEY AREAS,

TASMANIA

prepared for

BILLITON AUSTRALIA

Ref 87.2. (3 samples).
Lakeside.

Ref : J.G. Purvis

Order Code : 11549/LJ70/JGP/050

Stan Joyce

A. S. Joyce, B.Sc.(Hons), Ph.D.

23rd June, 1987.

Sample Number : 14169 (RED 87-2 41.2m)

Identification : Chloritized volcaniclastic arenite of richly feldspathic, probably andesitic derivation

Description :

The sample is a drill core sample of greenish grey rock with subtle sandy textures.

A cobaltinitrite staining test revealed no K-feldspar.

In thin section the sample plainly displays moderately sorted volcaniclastic textures involving densely packed, sand-sized clasts of plagioclase, heavily chloritized volcanic rock fragments and a few grains of altered opaque oxide, all cemented by chlorite. Most of the thin section displays clasts about 0.15 to 1.5mm in size, but there is a 12mm layer of finer clasts (about 0.1 to 0.5mm).

The plagioclase clasts are all lightly sericitized, generally twinned grains. The lithic clasts retain some andesitic or basaltic textures, but now consist mainly of finely recrystallized, untwinned plagioclase, chlorite and small aggregates of cloudy sphene. The inferred oxide clasts (ranging up to 0.5mm) have been altered to leucoxene and aggregates of fine sphene.

There are a few thin (0.2mm) fissure veins of calcite.

An approximate mode is :

80-90%	lightly sericitized plagioclase clasts
5-10%	chloritized andesitic or basaltic lithic clasts
1-2%	leucoxene and sphene after ilmenite or titaniferous magnetite clasts
5-10%	chlorite cement
0.5-1%	calcite veins

Comments and Interpretations :

This sample is confidently interpreted to represent moderately sorted volcaniclastic arenite resulting from aqueous transport of phenoclasts of plagioclase and ilmenite or titaniferous magnetite, accompanied by a few clasts of andesitic or basaltic rock. The main source was probably andesitic.

The plagioclase clasts have been lightly sericitized, the lithic clasts have been chloritized, oxide grains have been converted to leucoxene and sphene and a chlorite cement has formed (not always easily distinguishable from the chloritized lithic clasts). There is no obvious shearing, but the alteration could be of hydrothermal or low grade metamorphic origin. Barren thin fissure veins carry calcite.

838138

Sample Number : 14174 (RED 87-2 62.7m)

Identification : Intensely chloritized, abundantly porphyritic andesite cut by fissure veins carrying chlorite, sericite, quartz and siderite

Description :

The sample is a drill core specimen of dark greenish grey, fine-grained rock.

A staining test revealed no K-feldspar.

In thin section the sample is seen to be intensely chloritized, but plainly recognisable remnant textures are of abundantly porphyritic, volcanic style, involving many tabular phenocrysts of inferred plagioclase (0.5 to 1.5mm in size) and a few smaller prismatic phenocrysts of inferred pyroxene set in a groundmass of flow aligned laths and prisms (about 0.2 to 0.3mm long) and numerous small grains of inferred oxide (about 0.05 to 0.1mm).

All of the silicates have been replaced by fine-grained chlorite, accompanied by minor fine untwinned albite in the case of inferred plagioclase. The inferred oxides are now aggregates of fine sphene. There are a few specks of sericite in the vicinity of several fissure veins (up to several millimetres wide) carrying chlorite and sericite. A related 1mm wide fissure vein carries anhedral to toothy, faintly strained quartz with subordinate chlorite. Another quartz patch has a core of fine-grained siderite.

An approximate mode is :

70-80%	chlorite
15-20%	albite
4-6%	sphene
3-5%	chlorite in veins
0.3-0.6%	quartz in veins
0.5-1%	sericite mainly in veins
tr	siderite in veins

Comments and Interpretations :

Distinct remnant textures indicate that this rock originated as an abundantly porphyritic lava. It is probable that it was andesitic, since its abundant phenocrysts were mainly plagioclase : there are no textures suggestive of olivine.

Hydrothermal action is considered to account for intense alteration of the rock to chlorite-albite-sphene. There is no evidence of shearing and metamorphic processes would not produce chlorite from both plagioclase and mafic silicates. Fissure veins carry the same type of chlorite, along with sericite, quartz and siderite.

Sample Number : 14177 (RED 87-2 95.5m)

Identification : Albitized and chloritized, glomeroporphyritic, perlitic andesite with fissure and replacement veins of quartz

Description :

The sample is a drill core specimen which displays many light grey phenocrysts of feldspar set in a greenish grey groundmass. A 6mm wide fissure vein of very light grey quartz cuts across the core.

A staining test revealed no K-feldspar.

The thin section displays the thick fissure vein of quartz and some irregular replacement style veining by quartz, but the host rock involves glomeroporphyritic and perlitic textures of volcanic style.

The phenocrysts are mainly tabular, twinned subhedral plagioclase (now albite), about 0.5 to 2mm in size, but there are some sphene-leucoxene aggregates after titaniferous oxides and chlorite-calcite-sphene aggregates after mafic silicates. The cellular, perlitic cracking pattern of the groundmass is delineated by chlorite and minor sphene, but the bulk of the groundmass is a sutured mass of anhedral, mildly twinned albite (mostly 0.02 to 0.03mm in grainsize).

Irregular replacement veins, up to about 2mm wide, carry relatively coarse, mildly strained quartz and some well twinned albite of similar grainsize. The thick fissure vein carries still coarser anhedral to subhedral, mildly strained quartz. There are a few later, thin fissure veins (0.2mm) of calcite.

An approximate mode is :

15-20%	albitized phenocrysts of plagioclase
2-3%	sphene-leucoxene after titaniferous oxide phenocrysts
1-2%	chlorite-calcite-sphene pseudomorphs of mafic phenocrysts
40-50%	groundmass albite
8-10%	groundmass chlorite
1-2%	groundmass sphene
15-20%	quartz in veins
2-3%	albite in quartz veins
0.2-0.3%	calcite veins

Comments and Interpretations :

This rock is interpreted to have originated as a glomeroporphyritic, glassy lava with perlitic cracking. Its composition was andesitic.

The rock has been albitized and chloritized and cut by fissure and replacement veins of quartz. Some albite accompanies the replacement quartz. Slight deformation has strained the quartz. Late thin fissure veins carry calcite.

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LJ50 – 848

838140

Geochempet Services

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PETROLOGICAL REPORT ON

THREE SAMPLES OF DRILL CORE RQ87-3

prepared for

THE SHELL COMPANY OF AUSTRALIA LIMITED

Order Code : 11550/LJ50/J.G.P./051

Ref : J.G. Purvis

Stan Joyce

A. S. Joyce, B.Sc.(Hons), Ph.D.

14th August, 1987.

838141

Sample Number : 14067 RED 87-3 106.5m

Identification : Chloritized and veined, foliated sandstone with poikiloblastic pyrite

Description :

The sample is a drill core specimen of dark greenish grey, fine-grained rock with unevenly disseminated grains of pyrite.

A cobaltinitrite staining test revealed no K-feldspar.

In thin section the bulk of the specimen displays foliated, but recognisably sandy textures with many chloritized clasts and a chloritic matrix. At one end of the section there is a 10mm layer of finer-grained, sandy rock with a mixed chloritic and sericitic matrix. The metamorphic foliation is acute to the lithological boundary.

The major part of the specimen displays moderately strained and stretched, moderately sorted, subangular to subrounded clasts of quartz (mainly about 0.1 to 0.4mm) and many stretched, chloritized clasts (some carrying fine secondary opaques and rutile)densely packed in a foliated chloritic matrix . Unevenly disseminated through the arenite there are poikiloblastic cubes of pyrite, about 0.3 to 1mm in size. There are also some mildly strained and disrupted fissure veins (up to 0.5mm wide) carrying quartz and chlorite.

A disrupted thicker vein (2-3mm wide) of probably fissure style carries mildly strained quartz, ankerite, chlorite, anhedral pyrrhotite (bronze, magnetic) and a few grains of pyrite and fine muscovite.

Ignoring the sericitic, finer grained layer, an approximate mode of the main part of the specimen is :

55-65%	strained detrital quartz
30-35%	chlorite
0.5-1%	secondary opaques and rutile
0.5-0.7%	disseminated pyrite
3-4%	quartz-chlorite veins
4-5%	vein of quartz-ankerite-chlorite-pyrrhotite-pyrite-muscovite

Comments and Interpretations :

This rock is interpreted to have originated as moderately sorted labile sandstone but it has been foliated, pervasively chloritized, finely veined by quartz-chlorite, more thickly veined by quartz-ankerite-chlorite-pyrrhotite-pyrite-muscovite, and impregnated by poikiloblastic pyrite.

The poikiloblastic pyrite appears to post-date the metamorphic foliation, since it reveals no evidence of deformation or production of strain shadows. The quartzose veins are disrupted, but not severely deformed.

838142

Sample Number : 14068 RE3 87-3 113.05m

Identification : Hydrothermal assemblage of pyrite-quartz-arsenopyrite-tourmaline-chalcopyrite-tetrahedrite-gold in a host of brecciated, altered, foliated sandstone

Description :

The sample is a specimen of drill core, displaying an ill-defined zone, at least 60mm wide of semi-massive, brassy sulphide in a dark greenish grey pyritic, siliceous host.

A cobaltinitrite staining test revealed no K-feldspar.

In thin section the sample is seen to consist of a complex pattern of vein minerals with textures variously of fissure filling and replacement style, intermingled with clasts of variously chloritized, sulphide impregnated and finely silicified, foliated labile arenite. Metamorphic foliation directions in the arenite clasts reveal that they have been displaced and rotated.

In the most siliceous part of the specimen the veins are irregular, about 1 to 4mm thick, dominated by anhedral to subhedral, "toothy" quartz and conspicuous, but subordinate, cubes of pyrite. Most of the quartz is 0.2 to 1mm in grainsize. The disrupted arenite is conspicuously, finely silicified (0.02 to 0.05mm grainsize) for the replacement quartz).

In the most sulphidic part of the specimen there is semi-massive sulphide, mainly 0.1 to 0.7mm in grainsize and recognisable as subhedral cubes of pyrite and subordinate diamond-shaped grains of arsenopyrite. Between the sulphide grains there is anhedral fine (0.03) to subhedral coarse (up to 0.5mm) quartz and patches of prismatic, pale green to brownish tourmaline (mainly less than 0.1mm).

Quartz in the foliated arenite clasts is heavily strained, but quartz associated with the sulphides is only mildly strained.

An approximate mode of the thin section is :

15-20%	clasts of silicified, chloritic and mildly pyritic, foliated arenite
50-60%	vein sulphides (mainly pyrite and subordinate arsenopyrite)
20-30%	vein quartz
2-3%	vein tourmaline

A polished section prepared from the sulphide-rich part of the specimen displays semi-massive sulphide in a matrix of silicates which seem to be mainly quartz. The major mineral is pyrite, occurring as aggregates and discrete grains of simple, subhedral cubic shape, with grainsizes of mainly 0.2 to 0.7mm. Another prominent mineral is arsenopyrite, occurring as equant subhedral to euhedral grains, alone or in aggregates, generally finer grained than the pyrite and commonly occurring with quartz in aggregates which seem to post-date much of the pyrite.

2/...

Pyrite, quartz and arsenopyrite have been granulated locally by a few widely spaced fractures.

Careful search revealed rare examples of anhedral chalcopyrite (0.02 to 0.1mm) and anhedral probable tetrahedrite (0.1mm) occurring between pyrite grains in a fashion suggestive of their exsolution and migration from pyrite.

A cluster of six blebs of gold was also located along grain boundaries of pyrite. Two of the blebs are about 0.01mm in size and the other four are each about 2 microns. Arsenopyrite occurs nearby, but only pyrite is in contact with the gold.

A visually estimated mode of the polished section is :

75-85%	pyrite
5-10%	arsenopyrite
10-15%	silicates (mainly quartz)
tr	probable tetrahedrite
tr	chalcopyrite
rare	gold

Comments and Interpretations :

This sample is interpreted to indicate that foliated, chloritized sandstone has been brecciated, partly replaced by quartz and subordinate pyrite and cemented by a complex pattern of hydrothermal minerals involving pyrite, quartz, arsenopyrite, tourmaline, traces of chalcopyrite and probable tetrahedrite and rare specks of gold.

The brecciation and mineralization post-dates the foliation of the sandstone.

The chalcopyrite, probable tetrahedrite and gold all show textural suggestions of exsolution and migration from pyrite.

Taking account of the relatively coarse grainsize, the presence of arsenopyrite and tourmaline, and the observation that the veins post-date the foliation of the sandstone, I believe that a granitoid source, later than the Mt Read Volcanics is the source of the mineralization.

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Sample Number : 14069 RED 87-3 108.55m

Identification : Brecciated, sericitized, foliated sandstone, cemented and veined by tourmaline-pyrite-fluorite-ankerite-quartz-baryte

Description :

The sample is a greenish grey specimen of drill core, displaying mineralized and brecciated rock. Sawn surfaces reveal fine-grained rock with unevenly distributed pyrite, some disrupted grey, siliceous veins and some pyritic and greenish grey veins.

A staining test revealed no K-feldspar.

In thin section the sample displays densely packed angular clasts, about 1 to 30mm in size, veined and cemented by hydrothermal minerals.

The clasts mainly show richly sericitic, foliated, sandy textures. Strained but detrital quartz (about 0.05 to 0.3mm in size) amounts to only about 40% within the clasts, other detrital components were muscovite, biotite (now sericite-rutile) and probably abundant feldspar (now sericite). The pattern of foliation within the clasts clearly indicates that brecciation post-dated production of the metamorphic foliation. Within some clasts there are fissure veins of mildly to moderately strained quartz, with and without pyrite, and associated in some cases with patches or zones of finer silicification and minor porphyroblastic pyrite.

Cementing the clasts and within thin veins (up to 0.5mm) cutting across clasts there is a hydrothermal assemblage of tourmaline, sulphides, fluorite, minor ankerite and quartz and rare baryte. Relationships are partly of cavity filling style and partly of replacement style. The tourmaline is pale green to brownish and generally 0.02 to 0.5mm in grainsize. The sulphide is mainly cubes of pyrite about 0.1 to 1mm in size, but there are some smaller anhedral grains of another dark sulphide or an oxide. The fluorite is anhedral and up to 1mm in size : it occurs in the densest concentration of pyrite. The quartz is generally subhedral. The baryte occurs as anhedral grains with the baryte.

An approximate mode is :

85-88%	clasts of sericitized, foliated sandstone, some veined and replaced by quartz with pyrite
8-10%	tourmaline as a cement and vein mineral
4-5%	pyrite and subordinate other sulphide or oxide as a cement and vein mineral
0.2-0.3%	fluorite asa cement and vein mineral
0.1-0.2%	ankerite as a cement and vein mineral
tr	quartz and baryte as components of the cement and late veins

2/...

Comments and Interpretations :

This sample is interpreted to indicate that sericitized, foliated labile sandstone has been fissure and replacement veined by quartz with minor pyrite, then brecciated by tensional faulting or hydraulic processes, and cemented and veined by a hydrothermal assemblage of tourmaline-pyrite-fluorite-ankerite-quartz-baryte.

The brecciation and mineralization clearly post-dates the foliation of the sandstone. The hydrothermal assemblage is consistent with a granitoid source.

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838146

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PETROLOGICAL REPORT ON

THREE SAMPLES OF DRILL CORE

FROM THE MOUNT READ VOLCANICS, TASMANIA

prepared for

BILLITON AUSTRALIA

LEA 87-5
LAKESIDE

Order Code : 11653/LJ50/JGP/054

Stan Joyce

A. S. Joyce, B.Sc.(Hons), Ph.D.

31st August, 1987

Sample Number : 14082 (RED 87-5 59.65m)

Identification : Brecciated albitized, chloritized andesite healed by a network of chlorite and thinly veined by chlorite, albite, quartz, pyrite, sericite and calcite

Description :

The sample is an unweathered drill core specimen which displays abundant light grey phenocrysts of feldspar set in a light olive grey groundmass with a greenish grey chloritic network. There are some thin sulphide mineralized, grey veins.

A cobaltinitrite staining test revealed no K-feldspar.

In thin section the sample is seen to be finely brecciated into clasts a fraction of a millimetre to about 5mm in size and healed by a network of chlorite. Well preserved original textures are volcanic, with numerous subhedral phenocrysts about 0.3 to 2mm in size set in a groundmass featuring feldspar laths (now partly recrystallized) about 0.05mm long. The main phenocrysts are now twinned, unzoned albite. Others are leucoxene and sphene pseudomorphs of titaniferous opaque oxides and chlorite pseudomorphs of inferred pyroxene. The groundmass within the clasts is dominated by partly recrystallized plagioclase but there is also fine chlorite and sphene.

There are a few ovoid aggregates (0.5 to 2mm) of quartz with chlorite and in some cases albite : they resemble amygdales. There are also numerous thin, late fissure veins (0.02 to 0.5mm) carrying various proportions of chlorite, albite quartz, pyrite, sericite and calcite (in approximately that paragenetic sequence).

An approximate mode is :

20-25%	albitized plagioclase phenocrysts
3-4%	chloritized mafic phenocrysts
2-3%	leucoxene and sphene after opaque oxide phenocrysts
40-50%	groundmass plagioclase
6-8%	groundmass chlorite
1-2%	groundmass sphene
10-15%	chlorite as a breccia matrix
0.2-0.4%	amygdales of quartz-chlorite-albite
3-4%	veins variously carrying chlorite, albite, quartz, pyrite, sericite and calcite

Comments and Interpretations :

This rock originated as abundantly porphyritic andesite. It was pervasively altered to albite-chlorite-sphene (and leucoxene), finely brecciated and cemented by a network of chlorite. Subsequent thin fissure veins carried various assemblages of minerals with an approxiamte paragenetic sequence chlorite, albite, quartz, pyrite, sericite, then calcite. A few probable vesicles were filled by quartz with minor chlorite and less commonly albite.

2/...

The structures suggested as overgrowths on feldspar phenocrysts presumably correspond with the groundmass regimes of the clasts : they contrast with the dark chloritic network developed in response to brecciation.

Sample Number : 14085 (RED 87-5 78.6m)

Identification : Chloritized, sericitized, quartz-veined, brecciated then carbonated porphyritic andesite

Description :

The sample is an unweathered drill core specimen, about half of which is dark greenish grey and the rest yellowish grey but with patpches or altered phenocrysts composed of a light olive grey, soft mineral. The greenish regime is cut by many thin veins of the yellowish grey and olive grey minerals. A disrupted light grey quartz vein (up to 2mm thick) traverses both regimes.

A staining test revealed no K-feldspar.

In thin section the greenish regime is seen to be intensely altered and brecciated. Its primary textures seem consistent with porphyritic lava, although tuff is a possibility. Phenocrysts of feldspar (about 0.2 to 1mm in size) have been pseudomorphed by sericite and smaller phenocrysts of opaque oxide (0.1 to 0.3mm) have been leucoxenized. The groundmass is dominated by fine chlorite, but with some fine albite and sphene.

The other part of the sample shows similar sericite pseudomorphs of feldspar phencorysts and leucoxene pseudomorphs of oxide phenocrysts, but the groundmass consists of variable amounts of fine sericite and a major replacement network (apparently breccia controlled) of carboante which resembles ankerite or ferroan dolomite.

The boundary between the chloritic and non-chlorite regime is not sharp : within the chloritic regime there is some veining and replacement by carbonate.

The major quartz vein and some thinner veins are of fissure style, but heavily strained, recrystallized and disrupted by fractures, some of which carry carbonate. One of the thin quartz veins is lined by sericite, filled by quartz and cut by carbonate.

A crude mode of the inhomogeneous sample is :

50-55%	sericite
20-25%	carboante (ankerite or ferroan dolomite)
10-12%	chlorite
3-4%	fine albite
8-10%	quartz (in veins)
1-2%	leucoxene

Comments and Interpretations :

This rock is thought to have originated as porphyritic andesite (or just possibly as andesitic tuff). Initial alteration converted feldspar phenocrysts to sericite and opaque oxides phenocrysts to leucoxene; in part of the sample the groundmass developed mainly chlorite and in the other part mainly sericite. Fissure veins of quartz (accompanied in one case by early sericite) developed. The rock was then brecciated and particularly the most sericitic regime was heavily replaced by carbonate.

The "greasy" mineral to which you refer is "sericite" and from past experience with X-ray diffraction analyses of similarly soft and olive sericite I would expect it to be well crystallized illite (which is the most common "sericite").

In short the alteration of the rock may be summarised as chloritized, sericitized, quartz-veined, brecciated then carbonated.

Sample Number : 14091 (RED 87-5 94.65m)

Identification : Brecciated probable andesite with intense alteration to quartz-chlorite-sericite-rutile and with replacement arsenopyrite and pyrite

Description :

The sample is an unweathered drill core specimen of dark greenish grey, altered rock with disseminated pyrite and a 1 to 2mm wide vein of arsenopyrite and minor pyrite.

A staining test revealed no K-feldspar.

In thin section the sample is seen to be brecciated and intensely altered, but there are poorly preserved remnants of a porphyritic volcanic texture, with many phenocrysts about 0.4 to 1.5mm in size and a much finer groundmass.

The former phenocrysts mainly consist variously of quartz, quartz-sericite and chlorite-sericite : they probably represent former plagioclase and pyroxene. A few leucoxene and rutile aggregates represent former titaniferous oxide phenocrysts. The groundmass consists of fine chlorite, quartz, sericite and rutile. An early pattern of brecciation is crudely delineated by concentrations of chlorite and rutile. Many subsequent veinlets feature sericite with and without quartz.

Disrupted, fracture-controlled but partly replacement style veins up to 2mm wide carry chlorite-quartz-arsenopyrite-pyrite; some are cut by sericite-quartz veins. "Disseminated" pyrite (0.1 to 1mm grains) occurs centred on chloritic microfractures

An approximate mode is :

50-60%	quartz
20-30%	sericite
15-20%	chlorite
2-3%	arsenopyrite
0.5-1%	pyrite
1-2%	rutile and lucoxene

Comments and Interpretations :

Remnant textures suggest that this rock was porphyritic andesite, but it has been subjected to progressive brecciation and intense alteration.

The earliest alteration minerals seem to be chlorite, quartz and rutile (and minor leucoxene). Pyrite and arsenopyrite were introduced as replacement veins and as disseminations centred on fractures in company with the chlorite and quartz. Sericite seems to be of late development; it was accompanied by more quartz.

The rock does not contain tourmaline and there is no indication that it originated as sandstone.

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LJ50 - 98.

838152

Geochempet Services

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PETROLOGICAL REPORT

ON SEVEN SAMPLES OF DRILL CORE

FROM THE MOUNT READ VOLCANICS

RED 87-6 LONGSIDE

prepared for

BILLITON AUSTRALIA

Order No. : 11651/LJ50/DBH

Stan Joyce

A. S. Joyce, B.Sc.(Hons), Ph.D.

9th October, 1987.

SUMMARY COMMENTS

1. Four of the samples (13929-13932) are confidently interpreted to have originated as porphyritic, sparsely vesicular (now amygdaloidal) lavas. Three of them (13929, 13930 and 13932) were of andesitic composition (similar to the previously described 14082), but the other (13931) is quite potassic and texturally a little coarser : it is regarded as quartz trachyandesite.

   Each of the samples displays fine brecciation of tectonic style (probably induced by mildly compressive fault movements) and there is pervasive albitization and chloritization. Vesicles have filled with mainly quartz. The breccia clasts are healed by chlorite. After brecciation the rocks have been fissure veined and then mildly deformed by renewed or continued movement. The fissure veins are generally dominated by quartz, but with carbonate, chlorite and sulphide in some cases. Two samples (13930 and 13932) also carry some late sericite and subtle indications of heating, in the form of poikiloblastic coarsening of groundmass feldspar.

2. One other sample (13933) has andesitic features, but its textures are open to several interpretations. It seems quite possible that it is a conglomeratic arenite derived from at least two types of andesite. The less likely alternative is that it is a polymictic tectonic breccia.

   Like the other andesitic rocks, it is pervasively albitized and chloritized, deformed and veined by quartz with carbonate.

3. The remaining two samples were definitely not volcanic rocks.

   One (13935) is a chloritic, micaceous and quartzose, laminated fine arenite, veined by quartz with dolomite, chlorite and pyrite.

   The other (13934) is a distinctly brecciated (tectonic style), apparently silicified, sericitic slate with a repalcement network of pyrite with some associated fissure veining by quartz with chlorite.

4. No tin minerals were detected.

5. The ovoid, or more commonly rhomboid shapes in 13932 are products of tectonic brecciation. They contain porphyritic and amygdaloidal andesite of uniform type. They are not sedimentary clasts.

6. The pyrite in 13934 is a late mineral, post-dating most of the deformation.

153

838154

Sample Number : 13929 (RGA 87-6 : 15.2 m)

Identification : Brecciated, albitized, chloritized andesite healed by chlorite and thinly veined by albite and inferred carbonate

Description :

The sample is a drill core specimen of slightly weathered, mildly foliated porphyritic greenish grey volcanic rock cut by a few thin, very light grey fissure veins with iron-stained pores.

A cobaltinitrite staining test revealed no K-feldspar.

In thin section the sample displays abundantly porphyritic textures of intermediate volcanic style, modified by moderate brecciation of tectonic style. The phenocrysts range in size from about 0.2 to 2mm and the groundmass displays flow-aligned feldspar laths shorter than 0.1mm.

The phenocrysts are mainly twinned, unzoned plagioclase (optically positive, consistent with albite). Mafic silicate phenocrysts have been completely altered to chlorite and sphene and opaque oxides have altered to leucoxene. There are several ovoid aggregates (about 1 to 4mm) containing strained quartz and in some cases albite and chlorite. They resemble amygdales. The groundmass features abundant fine plagioclase laths, recrystallized to a minor extent, along with chlorite and sphene.

The pervasive brecciation involves cells ranging up to a few millimetres in size delineated by partly foliated chlorite.

Late thin fissure veins carry twinned albite and irregular pores which may well represent former carbonate.

An approximate mode is :

25-30%	albitized plagioclase phenocrysts
4-5%	chlorite-sphene after mafic silicate phenocrysts
0.5-1%	leucoxene after ilmenite or magnetite phenocrysts
40-50%	groundmass plagioclase
8-12%	groundmass chlorite
2-3%	groundmass sphene
10-15%	chlorite as a breccia matrix
0.2-0.4%	amygdales of quartz ± albite ± chlorite
0.5-1%	porous veins of albite

Comments and Interpretations :

This rock originated as abundantly porphyritic, mildly vesicular andesite. It has been pervasively altered to albite-chlorite-sphene-leucoxene, tectonically brecciated and cemented by chlorite. The vesicles filled with quartz, accompanied in some cases by albite and chlorite. Late, thin fissure veins carried albite and possibly carbonate (now irregular pores).

There are no indications of metallic mineralization.

838155

Sample Number : 13930 (RED 87-6 : 33.7m)

Identification : Brecciated, albitized and chloritized andesite healed by chlorite, cut by mineralized quartz veins, then lightly sericitized

Description :

The sample is a drill core specimen of lightly weathered rock which displays brecciated porphyritic volcanic rock cut by some thin, porous, iron-stained fissure veins. The breccia clasts are generally smaller than 5mm and there is an interstitial chloritic network.

A cobaltinitrite staining test revealed no K-feldspar.

In thin section the sample is seen to be brecciated and to have a poikiloblastic style of recrystallization, but obvious remnant textures are consistent with abundant phenocrysts (0.4 to 2mm), quartzose amygdales (about 1 to 3mm) and a groundmass dominated by moderately flow-aligned feldspar laths (less than 0.1mm long).

Plagioclase phenocrysts are now twinned, unzoned albite, mafic silicate phenocrysts and groundmass grains have gone to chlorite and sphene, former opaque phenocrysts have gone to leucoxene and groundmass grains to sphene. Groundmass plagioclase shows poikiloblastic, sutured recrystallization to equant grains 0.5mm in size, laden with residual laths. Amygdales carry strained quartz and in some cases a core of chlorite; some are finely recrystallized.

A pattern of brecciation of tectonic style is delineated by chlorite.

Late but deformed fissure veins (ranging up to 2mm) carry mainly quartz : some carry albite and some pore of uncertain derivation. Some thin quartzose veins carry limonitic pseudomorphs of subhedral probable arsenopyrite.

Later very thin veins carry foliated sericite, and some plagioclase phenocrysts are mildly sericitized.

An approximate mode is :

15-20%	albitized plagioclase phenocrysts
4-6%	chlorite-sphene after mafic silicate phenocrysts
1-2%	leucoxene after ilmenite or magnetite phenocrysts
55-60%	groundmass plagioclase
3-5%	groundmass chlorite
0.5-1%	groundmass sphene
4-6%	chlorite as a breccia matrix
4-6%	amygdales of quartz with some chlorite
3-4%	veins of quartz with variable albite, oxides after sulphides, and ores
4-6%	sericite

2/...

Comments and Interpretations :

This rock originated as porphyritic, vesicular andesite. It was subsequently albitized and chloritized and its vesicles filled with quartz and minor chlorite. Fractures formed by tectonic brecciation healed with chlorite. Fissure veins formed from quartz and some albite, probable arsenopyrite and perhaps carbonate. Minor sericite developed as a late mineral. Perhaps it relates to a heating event which has coarsened and rendered groundmass plagioclase poikiloblastic.

838157

Sample Number : 13931 (RED 87-6 : 50.2m)

Identification : Lightly brecciated, chloritized quartz trachyandesite, lightly sericitized and veined by quartz with carbonate

Description :

The sample is a drill core specimen of unweathered greenish grey rock with many small light grey phenocrysts, subtle brecciation delineated by chlorite, and a few patches (a fraction of a millimetre to about 15mm) of very pale orange carbonate.

A cobaltinitrite staining test revealed abundant K-feldspar in the groundmass and heavily replacing feldspar phenocrysts.

In thin section the sample displays obvious remnant textures of porphyritic volcanic style, involvign phenocrysts (up to 1.5mm) of plagioclase, mafic minerals and deeply embayed quartz set in a groundmass dominated by randomly orientated feldspar laths about 0.2mm long.

The plagioclase is lightly sericitized and phenocrysts are partly replaced by orthoclase. Additional orthoclase and some quartz occurs interstitially in the groundmass. Mafic silicates have been replaced by chlorite and minor sphene and groundmass opaques by sphene.

A pattern of incipient brecciation is delineated by chlorite and minor sericite. Mildly deformed and disrupted fissure veins and several possible amygdales are filled with quite mildly strained quartz, subhedral carbonate which seems to be dolomite and traces of chlorite and sericite.

An approximate mode is :

8-10%	phenocrysts of plagioclase, lightly sericitized and heavily altered to orthoclase
3-5%	chloritized mafic silicate phenocrysts
0.1-0.3%	quartz phenocrysts
40-45%	groundmass feldspar (plagioclase and orthoclase)
25-30%	groundmass chlorite
8-10%	groundmass quartz
2-3%	groundmass sphene
3-4%	chlorite and sericite delineating fractures
3-4%	veins and possible amygdales of quartz, dolomite and traces of chlorite and sericite

Comments and Interpretations :

Primary textures plainly indicate that this rock was of porhyritic, crystalline volcanic style and its composition seems to have been equivalent to quartz trachyandesite (= quartz latite). It has been pervasively chloritized, lightly sericitized, mildly brecciated and fissure veined by quartz with carbonate (probably dolomite)and traces of chlorite and sericite. The conversion of the plagioclase phenocrysts largely to potassic feldspar is probably a low grade metamorphic change analogous to albitization, but occurring in a rock with available potassium.

Sample Number : 13932 (RED 87-6 : 73.25—)

Identification : Brecciated, albitized, chloritized andesite, healed by chlorite and cut by a few late veins of sericite

Description :

The sample is a specimen of unweathered drill core, displaying ovoid and less regular very light grey clasts, up to a few millimetres in size, densely packed in a greenish grey, chloritic matrix.

A staining test revealed no K-feldspar.

In thin section the sample displays heavy brecciation of tectonic style, with resultant rhomboid to ovoid clasts set in a network of chlorite. Within the clasts there are well preserved porphyritic and mildly amygdaloidal andesitic textures.

The phenocrysts (0.2 to 2mm) are mainly plagioclase, now unzoned, twinned albite. Other phenocrysts were mafic silicate (now chlorite-sphene) and ilmenite or titaniferous magnetite (now leucoxene). Groundmass feldspar originally consisted of moderately flow-aligned laths shorter than about 0.1mm, but there is commonly poikiloblastic coarsening. There is also much fine chlorite and some fine, secondary sphene. The amygdales carry strained and commonly recrystallized quartz.

There are a few inconspicuous, late, foliated sericite veins.

An approximate mode is :

15-20%	albitized plagioclase phenocrysts
3-4%	chlorite-sphene after mafic silicate phenocrysts
1-2%	leucoxene pseudomorphs of opaque phenocrysts
50-60%	groundmass plagioclase
6-8%	groundmass chlorite
0.5-1%	groundmass sphene
0.2-0.4%	quartzose amygdales
10-15%	chlorite as a network in the breccia
tr	sericite veins

Comments and Interpretations :

Remnant textures plainly indicate that this rock originated as abundantly porphyritic, mildly vesicular andesite, but it has been pervasively altered to albite-chlorite-sphene-leucoxene, heavily tectonically brecciated and cemented by chlorite. Groundmass feldspar shows some poikiloblastic coarsening.

The rock is quite similar to Sample 13929, except that there has been more brecciation, resulting in rhomboid to ovoid clasts. Internally the clasts are porphyritic and amygdaloidal altered andesite.

There are no sulphides. The only veins, other than the breccia network of chlorite, are a few late sericitic veins.

Sample Number : 13933 (LED 84-6 : 104.0 m)

Identifiction : Possible conglomeratic arenite, derived from andesites and now albitized, chloritized and mildly foliated

Description :

The sample is an unweathered drill core specimen, displaying clasts up to 40mm in size of greenish to olive grey, fine-grained rock set in a darker greenish grey, chloritic and finely fragmental matrix. There are very light grey fissure veins of carbonate and quartz within the large clasts.

A staining test revealed no K-feldspar.

In thin section the large clasts display subrounded shapes and consist of a uniform type of altered porphyritic, crystalline andesite. The chloritic matrix between the large clasts is quite rich in phenoclasts of plagioclase and does not seem likely to be a sheared derivative of the rock represented by the large clasts.

The large clasts display sparse albitized and chloritized phenocrysts (about 0.5mm in size) set in a groundmass of randomly orientated plagioclase laths (0.2 to 0.5mm long) with chlorite and minor sphene. There are numerous fissure veins of calcite and mildly strained quartz confined within the clasts.

The chloritic matrix is mildly foliated and rich in plagioclase clasts; it carries some leucoxenized opaque phenoclasts, but only a few small clasts of andesite.

There are several late, thin fissure veins of calcite.

An approximate mode is :

50-55%	large clasts of sparsely porphyritic, altered and veined andesite
20-30%	clasts of albite
0.5-1%	clasts of leucoxenized oxide
2-3%	small clasts of andesite
20-25%	matrix of chlorite and sphene
tr	late veins of calcite

Comments and Interpretations :

As far as can be judged from a short piece of drill core, this rock probably represents conglomeratic arenite, consisting of large clasts of sparsely porphyritic andesite set in an immature richly chloritic matrix with phenoclasts of plagioclase and opaque oxide derived from different andesite (more like 13929 and 13932).

An alternative possibility is that the specimen is a polymictic tectonic breccia, but this seems less likely.

There is pervasive albitization and chloritization. Quartz-carbonate veining appears confined within the large clasts. Thinner veins of calcite alone cut the matrix.

159

838160

Sample Number : 13934 (REA 87-6: 114.1-m)

Identification : Brecciated, silicified sericitic slate with a replacement network of pyrite

Description :

The sample is an unweathered specimen of drill core composed of finely siliceous, light grey rock with breccia textures and replacement veining by pyrite. Some chlorite is visible and a disrupted band of light olive grey sericite.

A staining test revealed no K-feldspar.

In thin section the sample displays variable degrees of fine silicification and extensive brecciation into densely packed, rotated clasts about 0.5 to 12mm in size. The least silicified segments are quite sericitic and have disturbed layering or banding of pelitic style. The disrupted light olive grey layer (about 2mm thick) is sericite schist.

The breccia clasts are crudely outlined by fine chlorite. Subhedral to euhedral pyrite (commonly 0.5 to 1mm in grainsize) forms a replacement network which also follows clast boundaries but appears to post-date the finer chlorite. Limited fissure veining by quartz with chlorite accompanies some of the replacement pyrite.

An approximate mode is :

70-75%	fine quartz
15-20%	sericite
3-4%	chlorite
6-8%	pyrite
0.5-1%	quartz and chlorite in fissure veins

Comments and Interpretations :

This rock is interpreted to have originated as layered or banded sericitic slate of metasedimentary origin. It has been silicified, brecciated by probable tectonic processes, slightly cemented by chlorite, then impregnated by pyrite as a replacement network around breccia clasts. Limited quartz and chlorite fissure veining accompanied the pyrite.

160 838161

Sample Number : 13935 (RED 17-6: 123.3m)

Identification : Chloritic, micaceous and quartzose laminated, fine arenite veined by quartz with dolomite, chlorite and pyrite

Description :

The sample is an unweathered specimen of drill core, displaying greenish grey, non-porphyritic, fine-grained rock cut irregularly by fissure veins up to several millimetres thick, carrying quartz and yellowish grey carbonate.

A staining test revealed no K-feldspar.

In thin section the sample plainly displays laminated finely sandy textures. Individual laminations are a fraction of a millimetre to about 4mm thick. The grains are subangular, densely packed, moderately sorted and range commonly from coarse silt size to about 0.4mm. The grainsize varies from layer to layer. Brown to blue tourmaline is a trace component.

The clasts are quartz, chloritized components, including former biotite, and muscovite. There is a chloritic matrix or cement. In one layer there are carbonated clasts.

The rock is cut by mildly strained and disrupted fissure veins containing quartz, a carbonate which seems to be dolomite, and chlorite. One of the veins also carries pyrite and there are sparse 1mm aggregates of pyrite elsewhere in the arenite.

An approximate mode is :

45-50%	quartz clasts
40-45%	chlorite
4-6%	muscovite
1-2%	leucoxene
tr	carbonate
tr	tourmaline
6-8%	veins of quartz with dolomite and chlorite
0.1-0.2%	pyrite in veins and elsewhere

Comments and Interpretations :

This sample clearly represents a finely laminated, finely sandy epiclastic sedimentary rock. It consisted of grains of quartz and a labile component (possibly feldspar), and detrital flakes of biotite and muscovite. The labile grains have been chloritized, except in one layer where they have been carbonated. Biotite flakes have altered to chlorite and leucoxene.

The rock has been irregularly fractured and fissure-veined by quartz with dolomite, chlorite and less commonly pyrite. Additional pyrite formed as sparse replacement aggregates in the host rock. The veins have been mildly deformed and disrupted.

APPENDIX 3

Photo micrographs & Scanning Electron Microscopy, Lakeside Prospect

LJ50-582 838163

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REPORT ON

AN OPTICAL AND ELECTRON MICROSCOPIC EXAMINATION

OF THREE AURIFEROUS SAMPLES

prepared for

BILLITON AUSTRALIA

Order Code : 11658/LJ50/DBH

LAKESIDE

13936 : RCD 87-2 : 218.05–218.44.
13937 : RCD 87-6 : 118.95m
14068 : RCD 87-3 : 113.05m

Stan Joyce

A. S. Joyce, B.Sc.(Hons), Ph.D.

9th October, 1987.

INTRODUCTION

Three polished sections were examined by a combination of mineragraphic and electron microscopic techniques with a view to locating and photographing contained gold.

Minor effort was directed towards the location of silver and tin.

DESCRIPTION

Optical microscopic examination of polished section 14068 allowed relocation of the cluster of gold blebs reported 31/8/87. These are depicted in colour photographs 4-8, taken using the optical microscope. They are also depicted in the black and white photographs 2100 and 2101 taken using the scanning electron microscope.

Another cluster of gold blebs was located optically and electronically in section 14068. They are depicted in colour photographs 1-3, 9-11 and black and white photographs 2103 and 2104.

Semi-quantitative chemical analyses were performed by the EDAX system on the largest grains depicted in photographs 2101 and 2103 to confirm the identification and to measure the gold fineness. Results are presented as unprocessed spectra and as appropriately corrected, calculated results.

In searching electronically for additional gold in 14068 some blebs of galena (similar electron image to gold) were located (black and white photograph 2102). Semi-quantitative analysis was performed and results are presented as a spectrum and as calculated results. Interestingly, no silver reports in the analysis (detection limit probably about 1% within galena).

In the interests of economy a comprehensive electronic search for additional gold in 14068 was not attempted. A brief search for tin minerals and other silver-bearing minerals was unsuccessful.

Optical examination of polished section 13936 (a sample rich in pyrite, arsenopyrite and chalcopyrite) revealed a simple bleb of gold enclosed by chalcopyrite which is in contact with pyrite. It is depicted in colour photographs 12-15.

Optical examination of 13937 revealed some small grains of sphalerite and probable tetrahedrite in addition to pyrite, arsenopyrite and minor chalcopyrite. A brief attempt was made to locate the suspected tetrahedrite on the electron microscope in order to test its tin and silver content. It proved to be electronically inconspicuous and random qualitative analyses found only pyrite, arsenopyrite and silicate. Undoubtedly the suspect mineral could be located with additional effort.

2/...

COMMENTS AND INTERPRETATIONS

1. Gold occurs as free grains in the samples. Within Sample 14068 the largest blebs are about 15 microns and the smallest are less than one micron. Its composition is about 85.9 to 87.0% Au, 12.1 to 12.8% Ag and 0.9 to 1.4% Fe.

   Optically similar gold occurs in Sample 13936.

   The gold shows a closer physical association with pyrite than with arsenopyrite. It occurs also with chalcopyrite.

2. The reported silver content of the samples is too high to explain solely in terms of silver within the gold. Little silver appears to be contained in the small amount of galena which is present.

   Optical indications are that tetrahedrite or some other sulphosalt (as yet unidentified) is present. It probably carries the tin and most of the silver.

APPENDIX I

LIST OF BLACK AND WHITE PHOTOGRAPHS
(ELECTRON MICROSCOPY)

No.	
2100	Blebs of gold (white) hosted by pyrite (medium grey) in Sample 14068. Arsenopyrite is the light grey mineral. Bar scale shows 10 microns. Magnification about 464x.
2101	Same gold seen at higher magnification(about 2320x). Note 10 micron bar scale. The spectrum labelled 14068 and the corresponding semi-quantitative analysis refer to the largest bleb of gold depicted in the photograph.
2102	Blebs of galena in pyrite in sample 14068. Similar electron image to gold, but composition shown to correspond with galena in spectrum and analysis 14068/2.
2103	Blebs of gold (white) hosted by pyrite (dark grey) near arsenopyrite (light grey) at another location in Sample 14068. Magnification about 2320x. The spectrum and analysis 14068/3 refer to the most central longest bleb of gold.
2104	Same view at lower magnification (about 626x).

LIST OF COLOUR PHOTOGRAPHS
(OPTICAL MICROSCOPY)

1.	Low power view with filter out. Specks of gold barely visible in pyrite. Adjacent pale mineral is arsenopyrite. Dark mineral is silicate. Sample 14068.
2.	Same field, medium power. Gold now obvious as yellow blebs.
3.	Same field, high power.
4.	Low power view with filter out. Specks of gold visible in centre of photograph, within pyrite. Sample 14068.
5.	Same field, medium power. Gold visible in pyrite. Pale mineral nearby is arsenopyrite.
6.	Same field, high power.

2/...

7.	Same field, high power. Repeated using blue filter.
8.	Same field, medium power. Repeated using blue filter.
9,10,11	Same field and sequence as 1, 2 and 3, but using blue filter.
12,13	Medium power, firstly filtered, then unfiltered. Gold in chalcopyrite in field of pyrite. Sample 13936.
14,15	High power, filtered then unfiltered. Same field as 12, 13.
16.	General view of Sample 13936. Low power, filtered. Shows yellow chalcopyrite, dark quartz, cream pyrite and paler, smaller arsenopyrite.
17,18	Medium power, filtered. Sample 13937. Cream suspected tetrahedrite and pale grey sphalerite in field of pale arsenopyrite and dark silicate.
19.	Low power, filtered. General view showing mainly arsenopyrite and quartz.
20.	Low power view of pyritic Sample 13934.
21,22*	Low power. Plain light then crossed polars. Brecciated, amygdaloidal, porphyritic andesite. Sample 13934.
23,24*	Medium power. Plain light then crossed polars. Brecciated andesite. Sample 13934. Shows leucoxenized opaque oxide phenocrysts and chloritic network between breccia clasts.

* The last 4 photographs do not refer to the samples searched for gold.

For colour photographs 1 to 20 low power images are about a 1mm field width, medium power images are about 0.2mm wide and high power images are about 0.1mm wide.

For photographs 21 to 24 the low power images are about 2.5mm wide and medium power images are about 0.8mm wide.

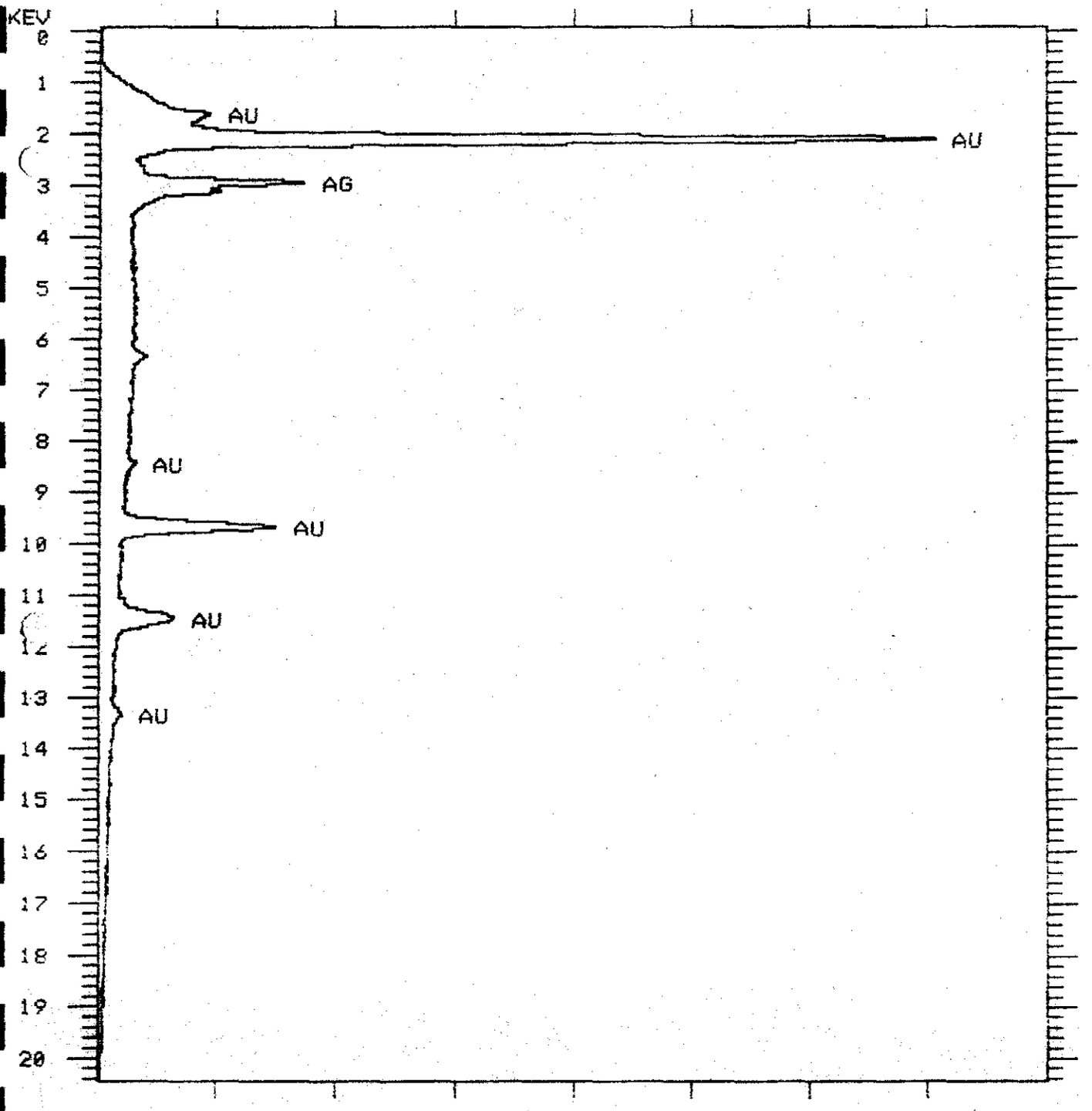
Analytical Electron Microscopy Facility

Queensland Institute of Technology — Griffith University

1ST HALF: 14068 LT= 160 SECS 0.040 KEV

Gold grain (photo 2101)

COUNTS F.S.=32768



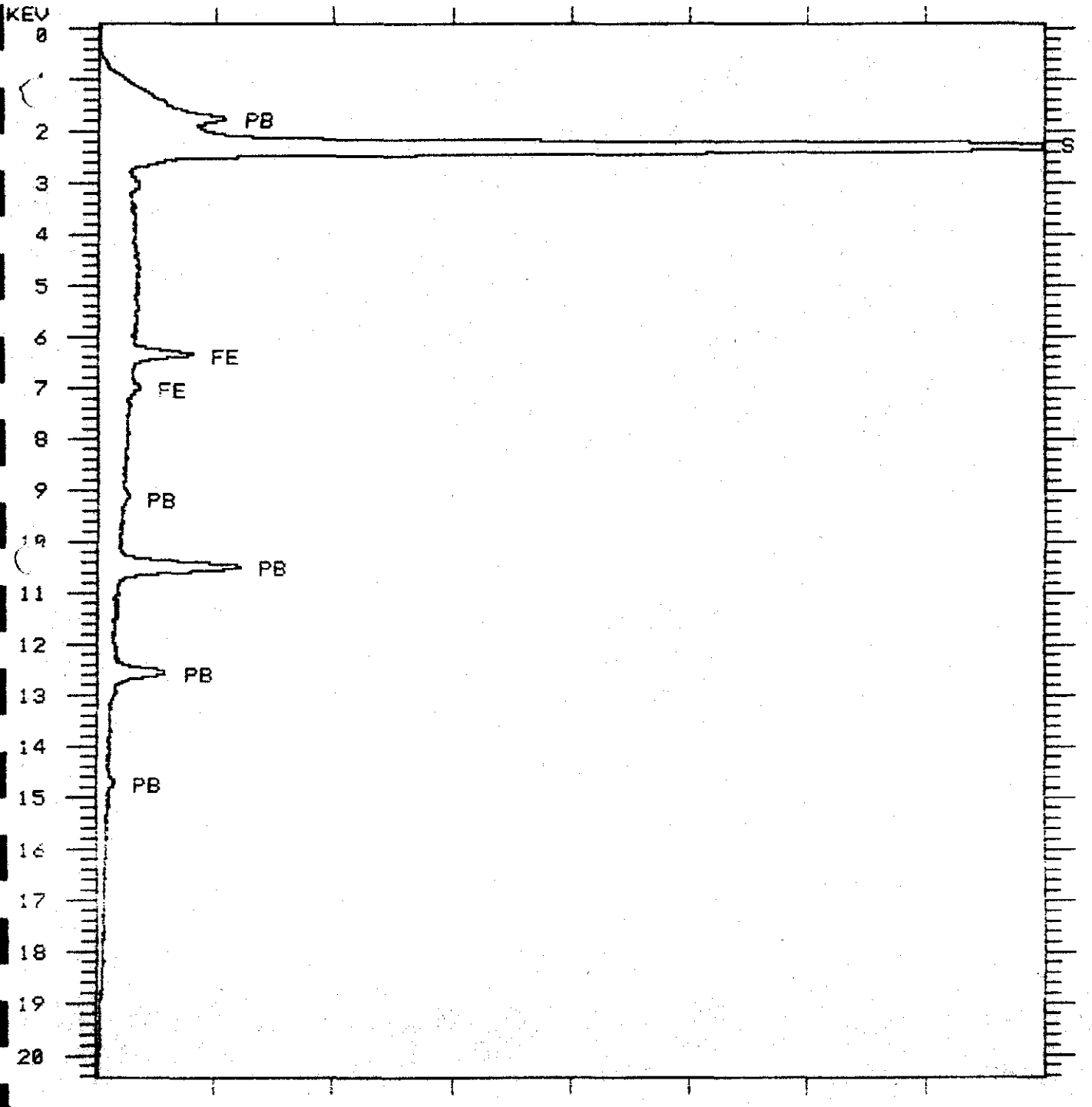
Analytical Electron Microscopy Facility

Queensland Institute of Technology — Griffith University

1ST HALF: 14068/2 LT= 160 SECS 0.040 KEV

Galena grain (photo 2/02)

COUNTS F.S.=32768



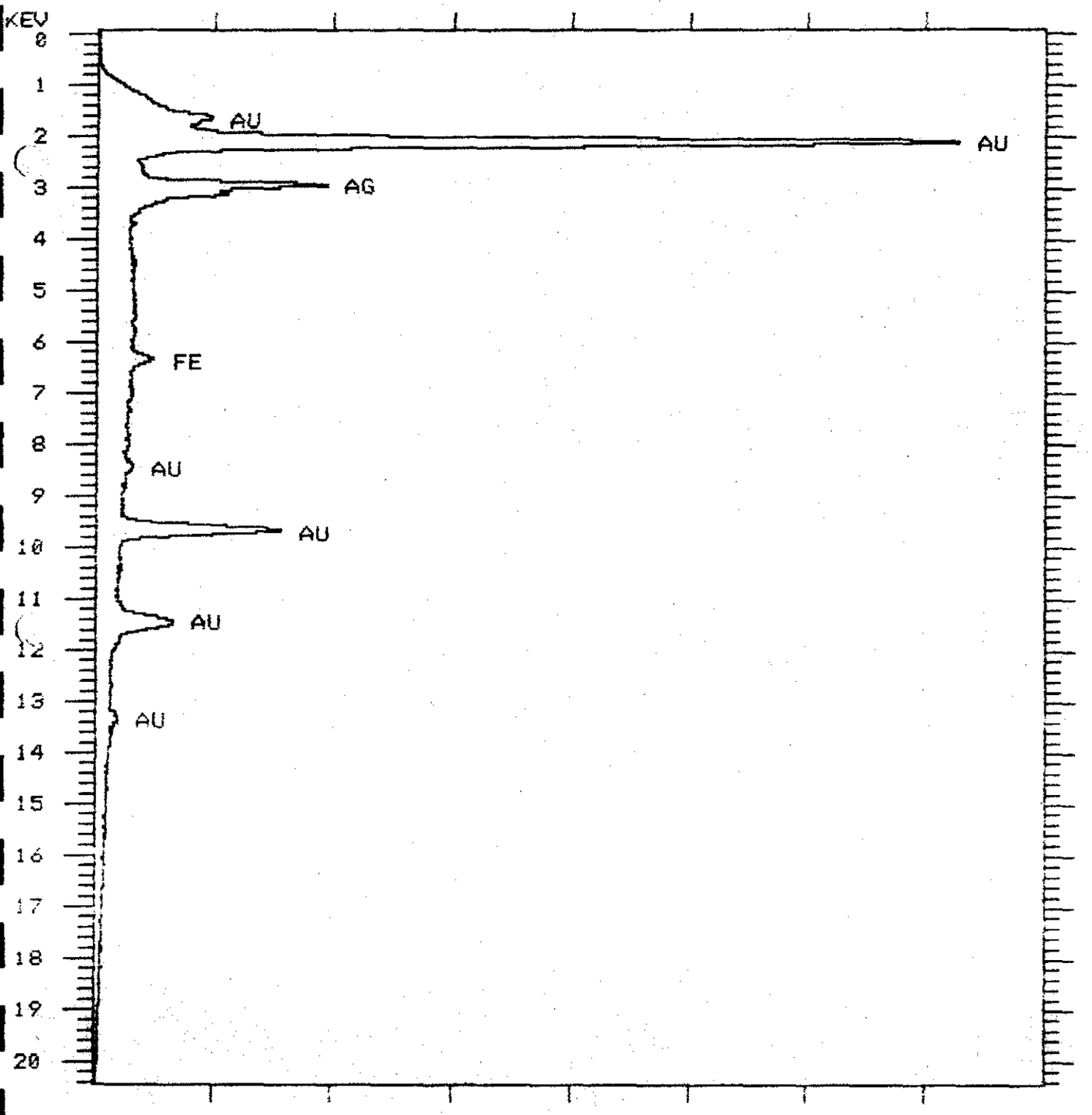
Analytical Electron Microscopy Facility

Queensland Institute of Technology — Griffith University

1ST HALF: 14068/3 LT= 160 SECS 0.040 KEV

Gold grain (photo 2103)

COUNTS F.S.=32768



SEMI-QUANTITATIVE ANALYSIS: 14068
EL NORM. K-RATIO

AU-L 0.98877 +- 0.00623
AG-L 0.00838 +- 0.00061
FE-K 0.01892 +- 0.00025
PB-L 0.00000 +- 0.00067
S -K 0.00000 +- -.00000

ZAF CORRECTION
ITER .0000E+00
ITER .1000E+01
ITER .2000E+01

ITER 3

	K	[Z]	[A]	[F]	[ZAF]	CONC
AU-L	0.908	1.026	1.000	1.000	1.027	0.870
AG-L	0.000	0.007	1.022	0.999	1.616	0.121
FE-K	0.010	0.764	1.200	0.982	0.901	0.009
PB-L	0.000	1.046	0.993	1.000	1.039	0.000 G
S -K	0.000	0.671	2.939	0.998	1.969	0.000 G

SEMI-QUANTITATIVE ANALYSIS: 14068/2
EL NORM. K-RATIO

AU-L 0.00000 +- 0.00000
AG-L 0.00000 +- 0.00000
FE-K 0.03381 +- 0.00036
PB-L 0.78092 +- 0.00594
S -K 0.18526 +- 0.00046

ZAF CORRECTION
ITER .0000E+00
ITER .1000E+01
ITER .2000E+01
ITER .3000E+01
ITER .4000E+01

ITER 5

	K	[Z]	[A]	[F]	[ZAF]	CONC
AU-L	0.000	1.130	1.002	1.000	1.133	0.000 G
AG-L	0.000	0.960	1.014	0.999	1.757	0.000 G
FE-K	0.033	0.836	1.204	0.990	0.998	0.030
PB-L	0.780	1.154	0.995	1.000	1.149	0.799
S -K	0.185	0.732	1.423	0.999	1.042	0.172

SEMI-QUANTITATIVE ANALYSIS: 14068/3
EL NORM. K-RATIO

AU-L 0.00001 +- 0.00002
AG-L 0.00540 +- 0.00061
FE-K 0.01649 +- 0.00030
PB-L 0.00000 +- 0.00000
S -K 0.00000 +- 0.00000

836172

ZAF CORRECTION
ITER .0000E+00
ITER .1000E+01
ITER .2000E+01

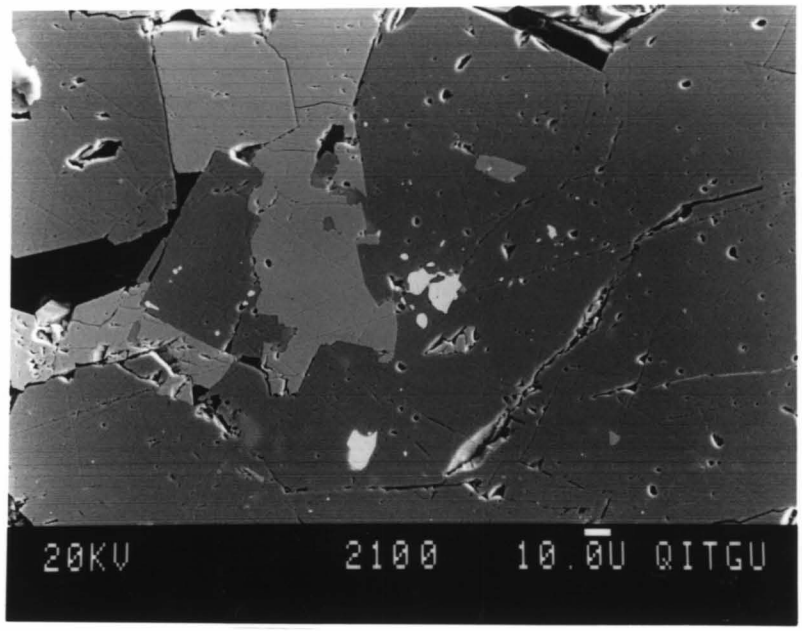
ITER 3

----	K	[Z]	[A]	[F]	[ZAF]	CONC
AU-L	0.898	1.038	1.000	1.000	1.038	0.859
AG-L	0.085	0.889	1.812	0.999	1.611	0.128
FE-K	0.016	0.766	1.199	0.982	0.984	0.014
PB-L	0.000	1.049	0.993	1.000	1.043	0.000 G
S -K	0.000	0.673	2.922	0.997	1.963	0.000 G

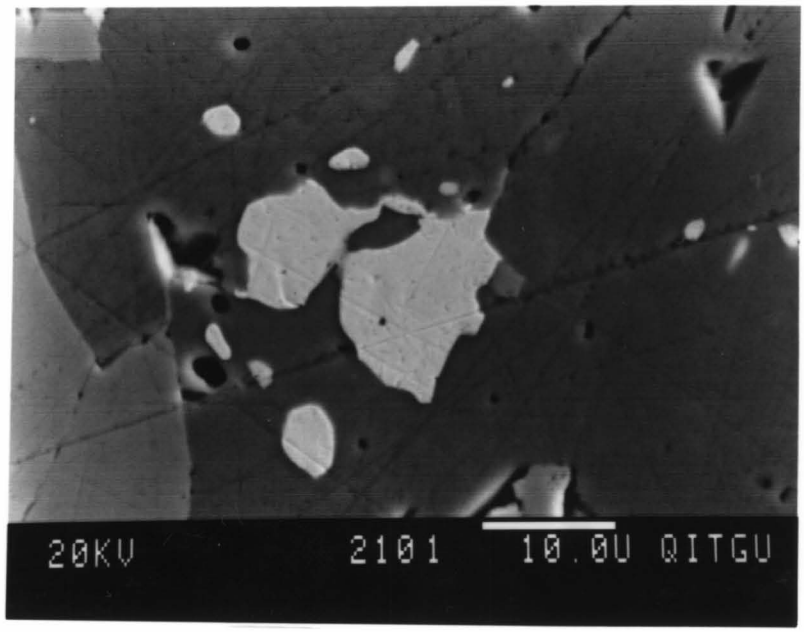
1,81 ERROR-RD65534
*

A: SCANNING ELECTRON MICROSCOPE PHOTOGRAPHS.

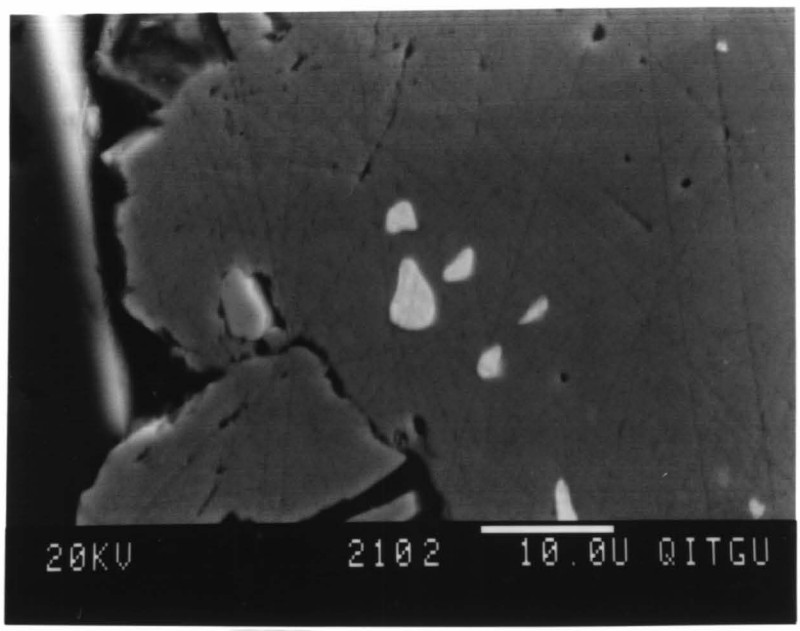
SAMPLE 14068: RED 87-3: 113.05m



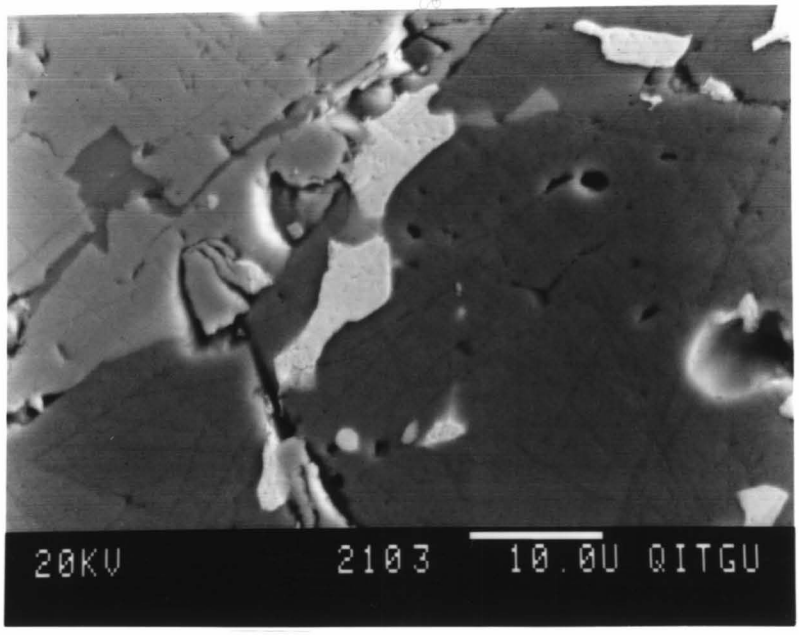
Blebs of gold (white) hosted by pyrite (medium grey) in Sample 14068. Arsenopyrite is the light grey mineral. Bar scale shows 10 microns. Magnification about 464x.



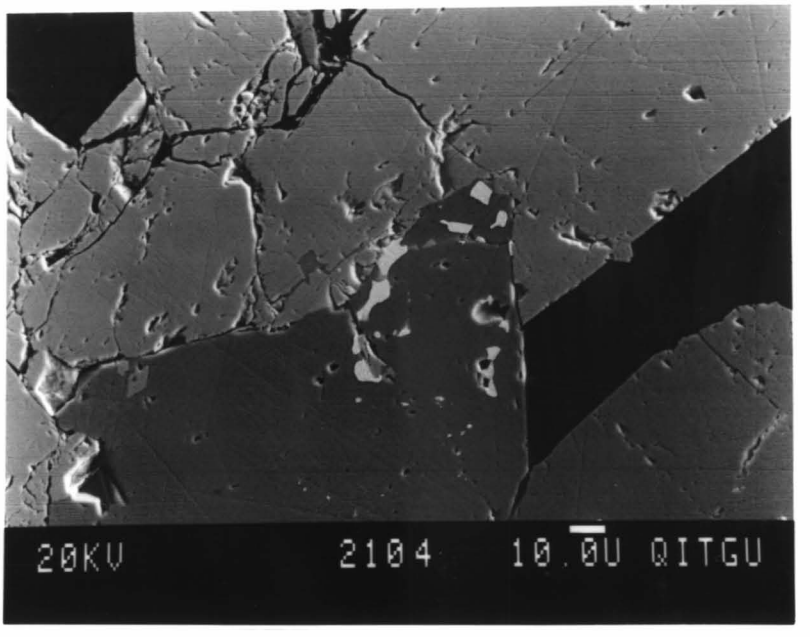
Same gold seen at higher magnification (about 2320x). Note 10 micron bar scale. The spectrum labelled 14068 and the corresponding semi-quantitative analysis refer to the largest bleb of gold depicted in the photograph.



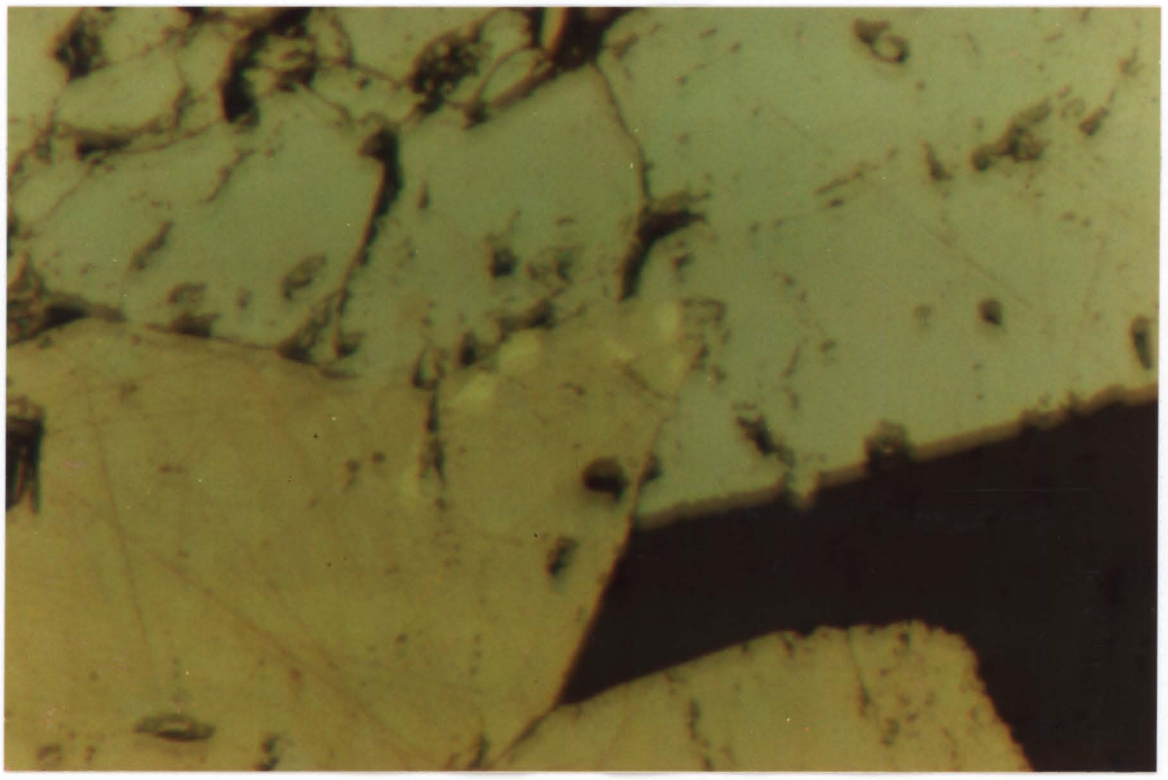
Blebs of galena in pyrite in sample 14068. Similar electron image to gold, but composition shown to correspond with galena in spectrum and analysis 14068/2.



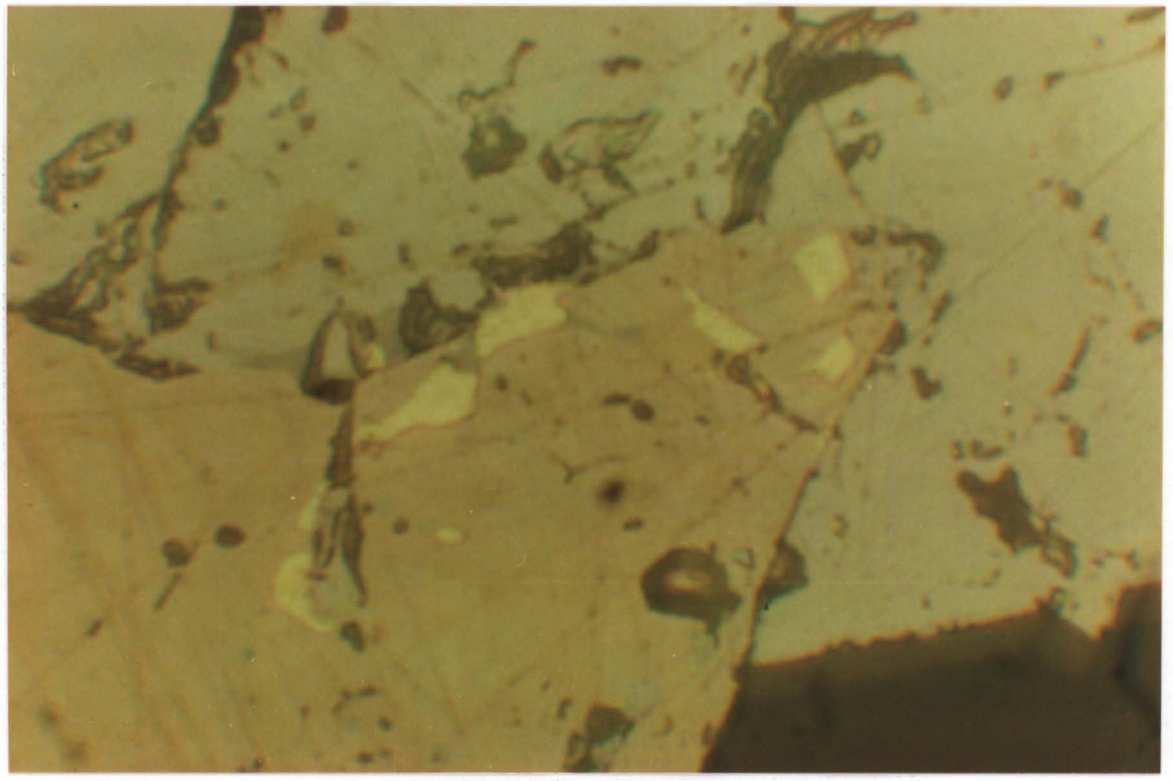
Blebs of gold (white) hosted by pyrite (dark grey) near arsenopyrite (light grey) at another location in Sample 14068. Magnification about 2320x. The spectrum and analysis 14068/3 refer to the most central longest bleb of gold.



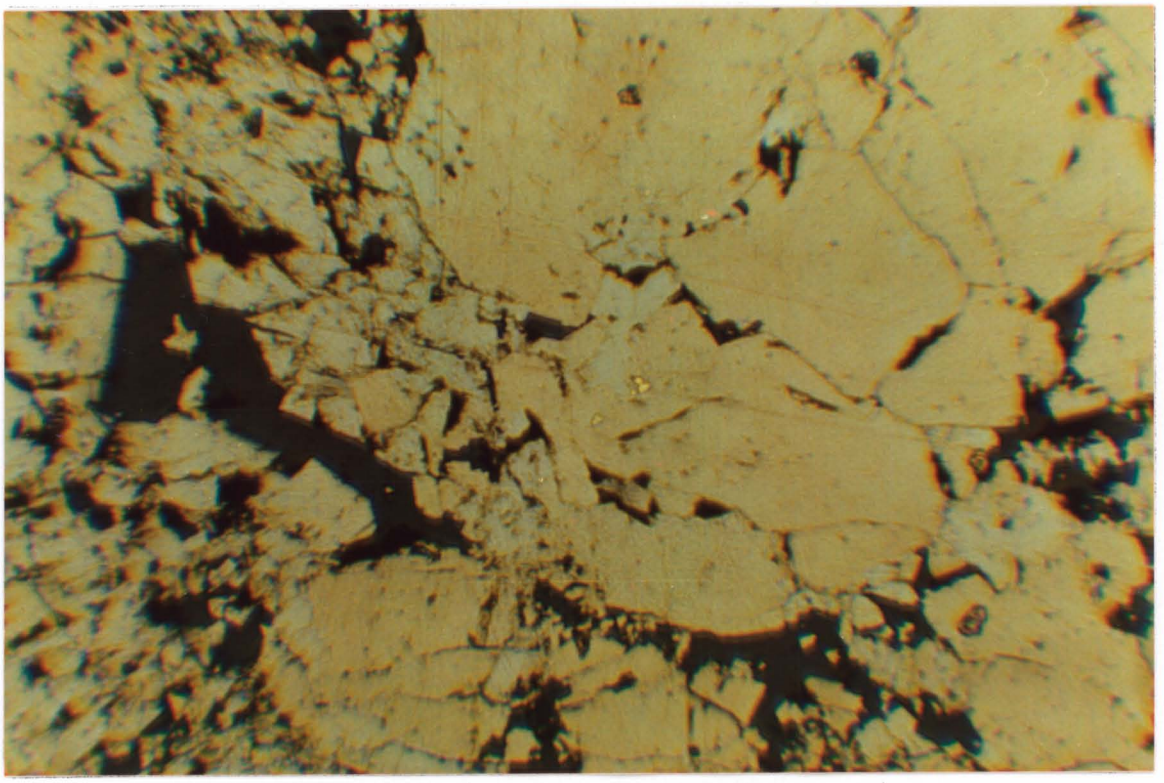
Same view as 2103 at lower magnification (about 626x).



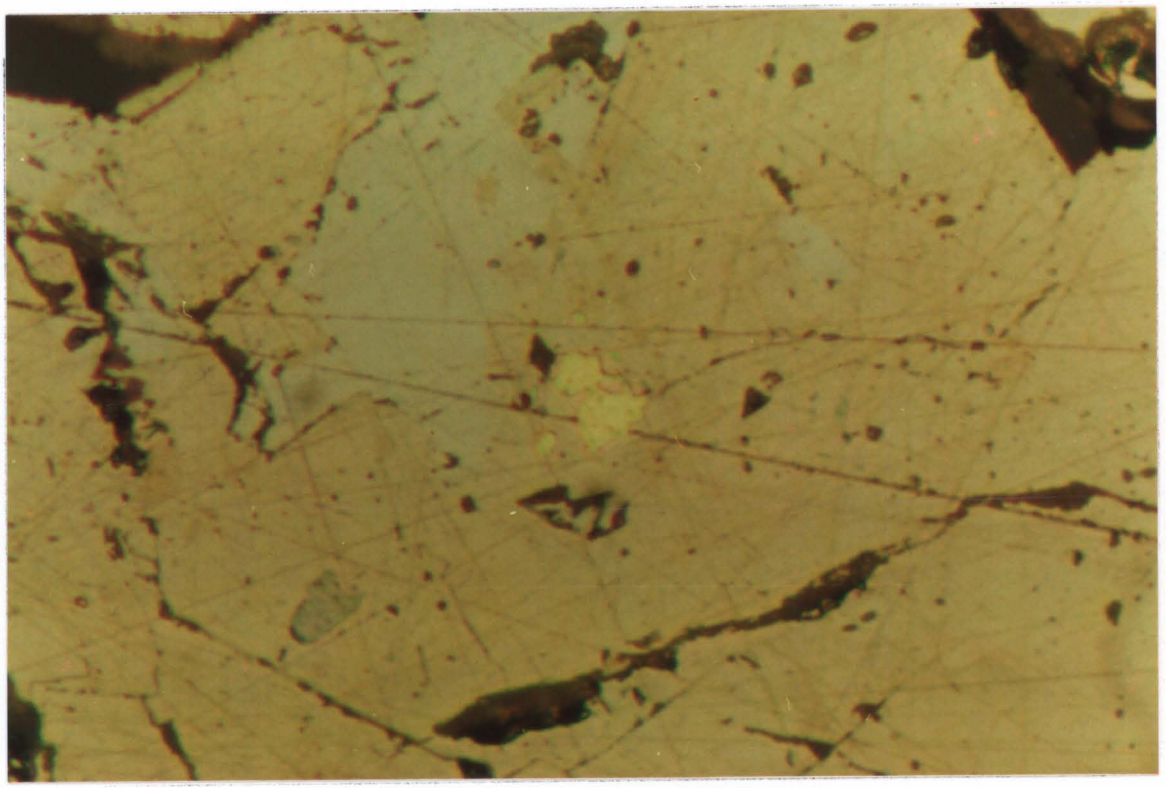
1. Sample 14068. Medium power view with filter out. Specks of gold visible in pyrite. Adjacent pale mineral is arsenopyrite. Dark mineral is silicate.



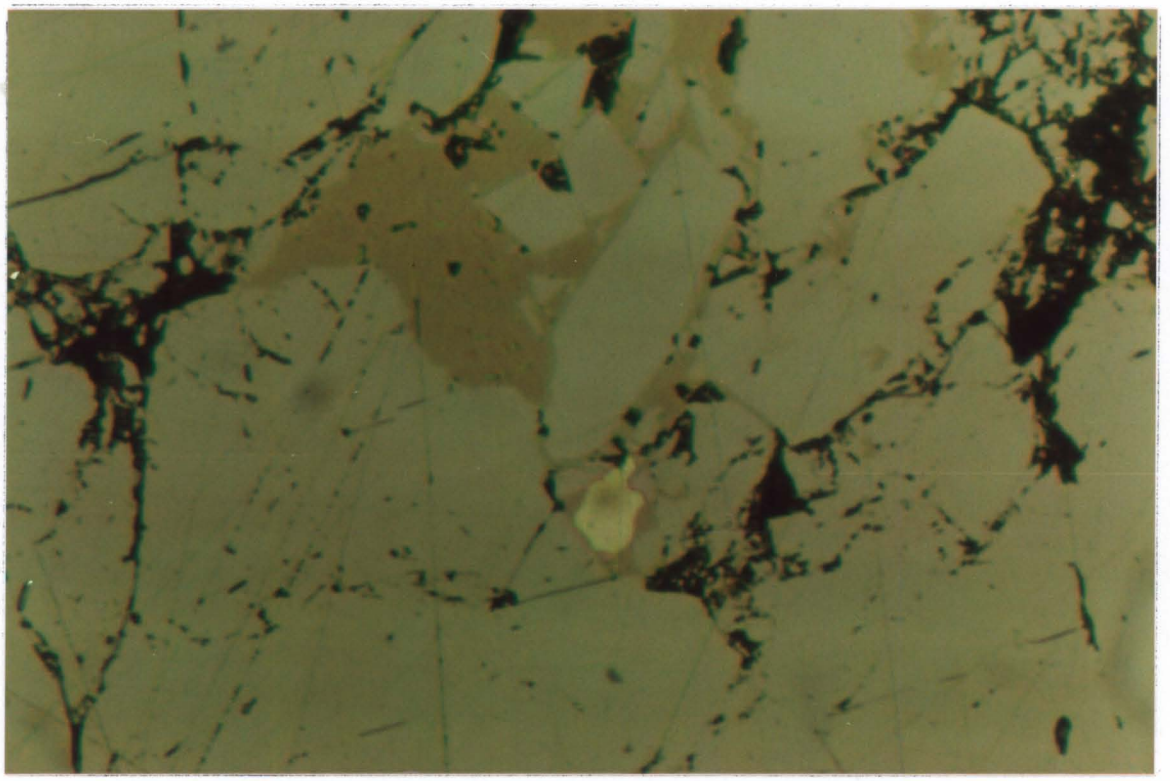
2. As for (1): High Power.



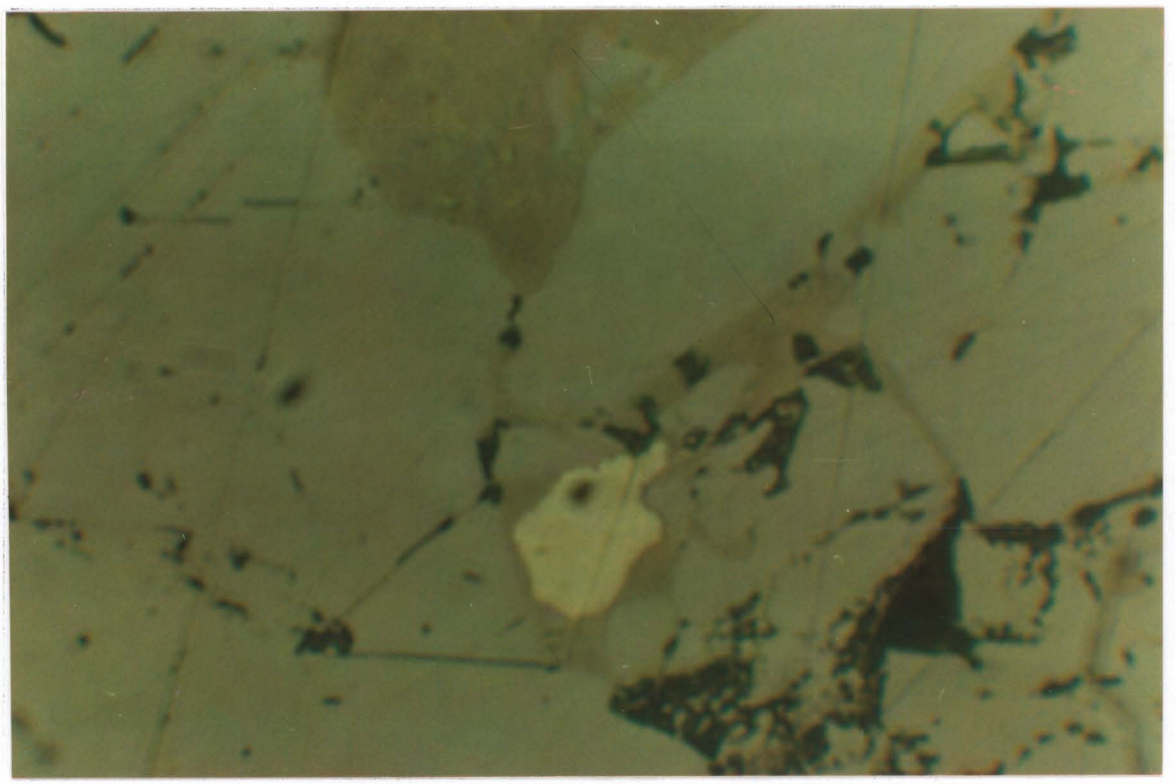
3. Sample 14068: Low power with filter out. Specks of gold visible in pyrite, in centre of photograph.



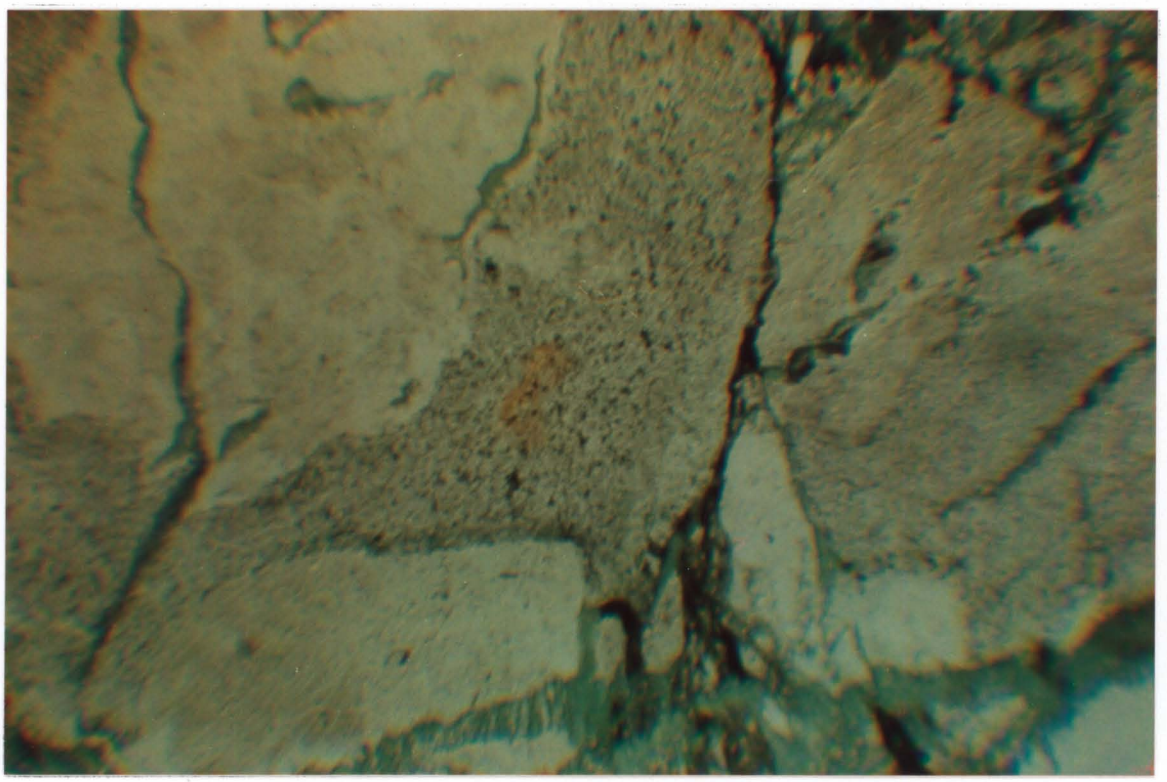
4. As for (3). Same field, medium power. Gold visible in pyrite. Paler mineral is arsenopyrite.



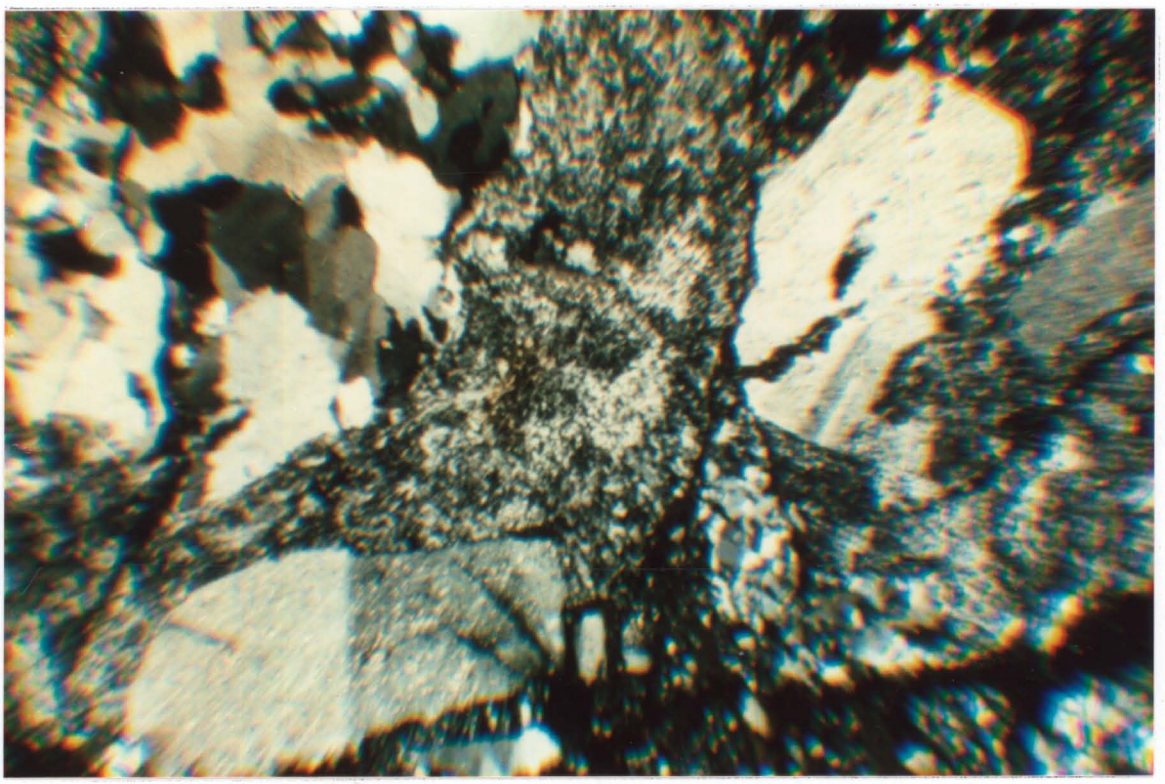
5. Sample 13936: Medium power. Gold in chalcopyrite in field of pyrite.



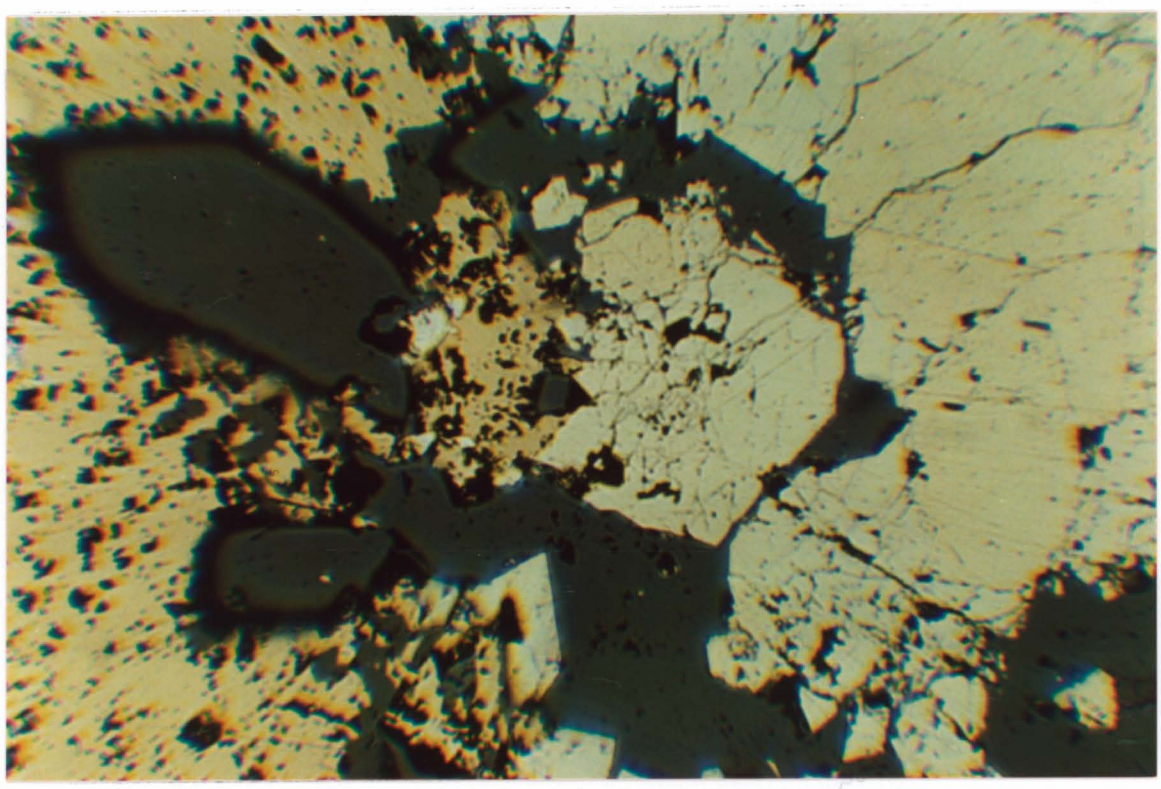
6. As for (5). High power.



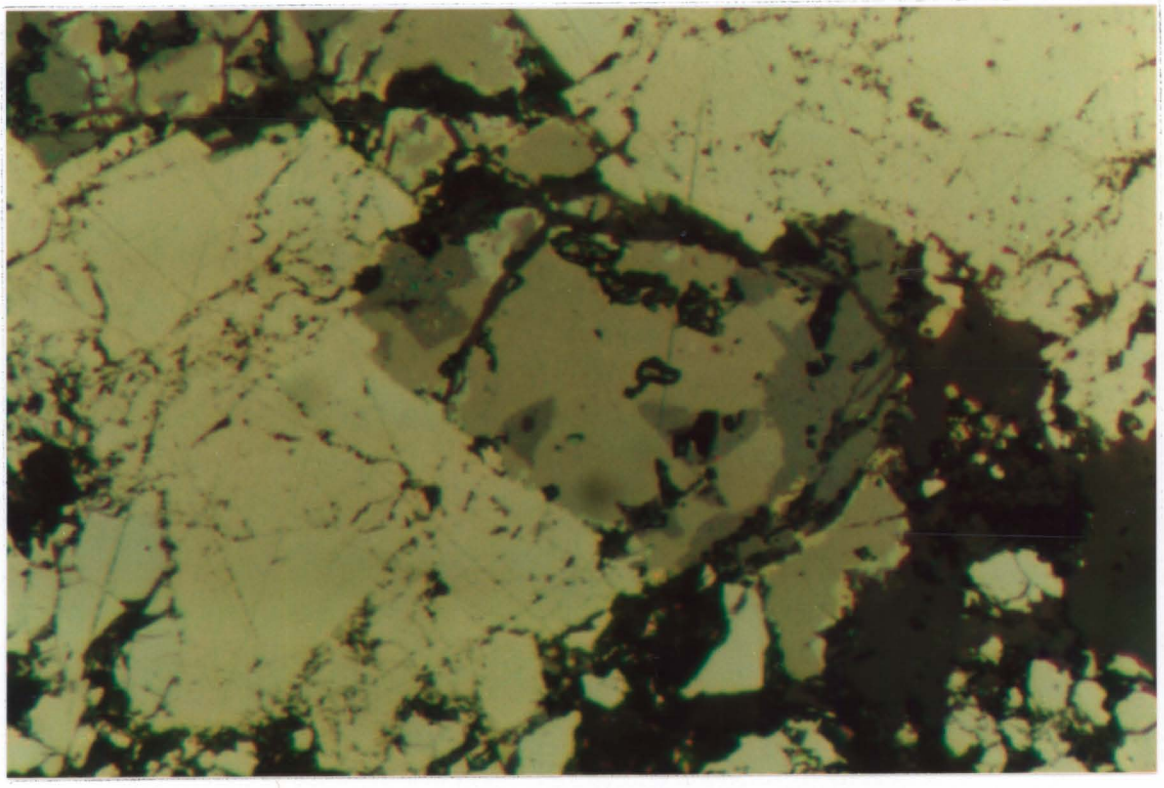
9. Sample 13934: Low power, plain light. Brecciated, amygdaloidal, porphyritic andesite.



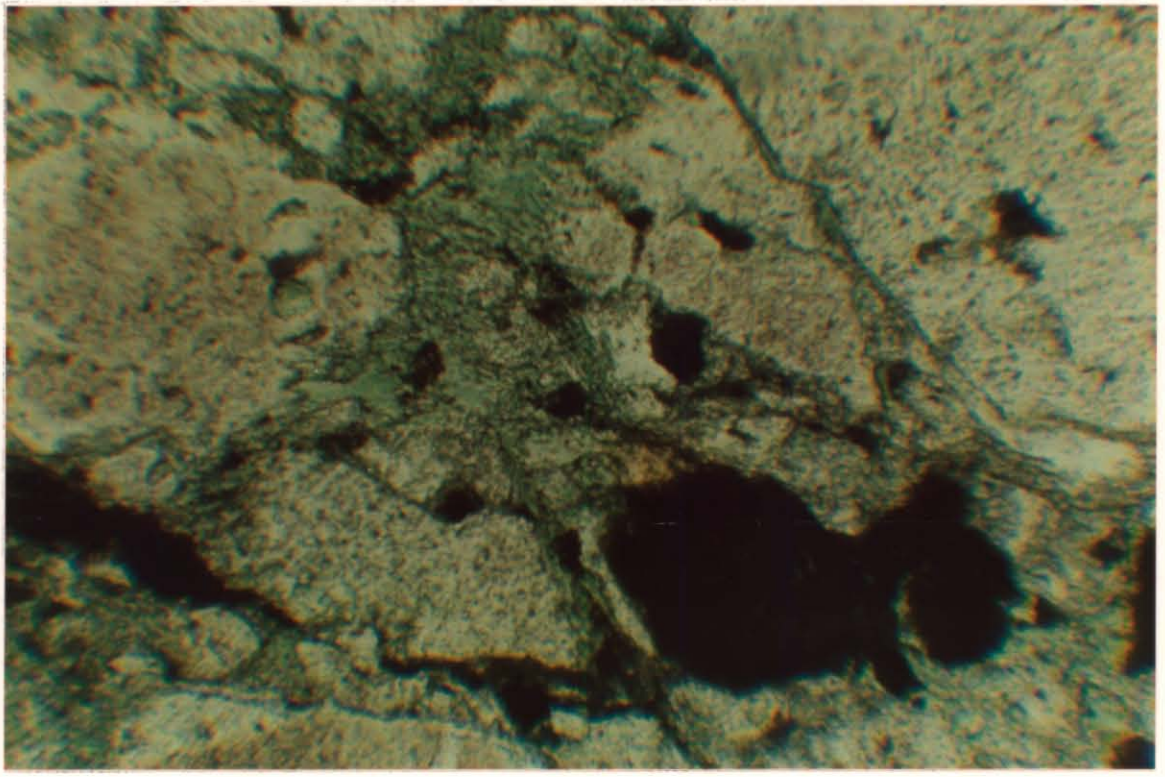
10. As for (9). Crossed polars.



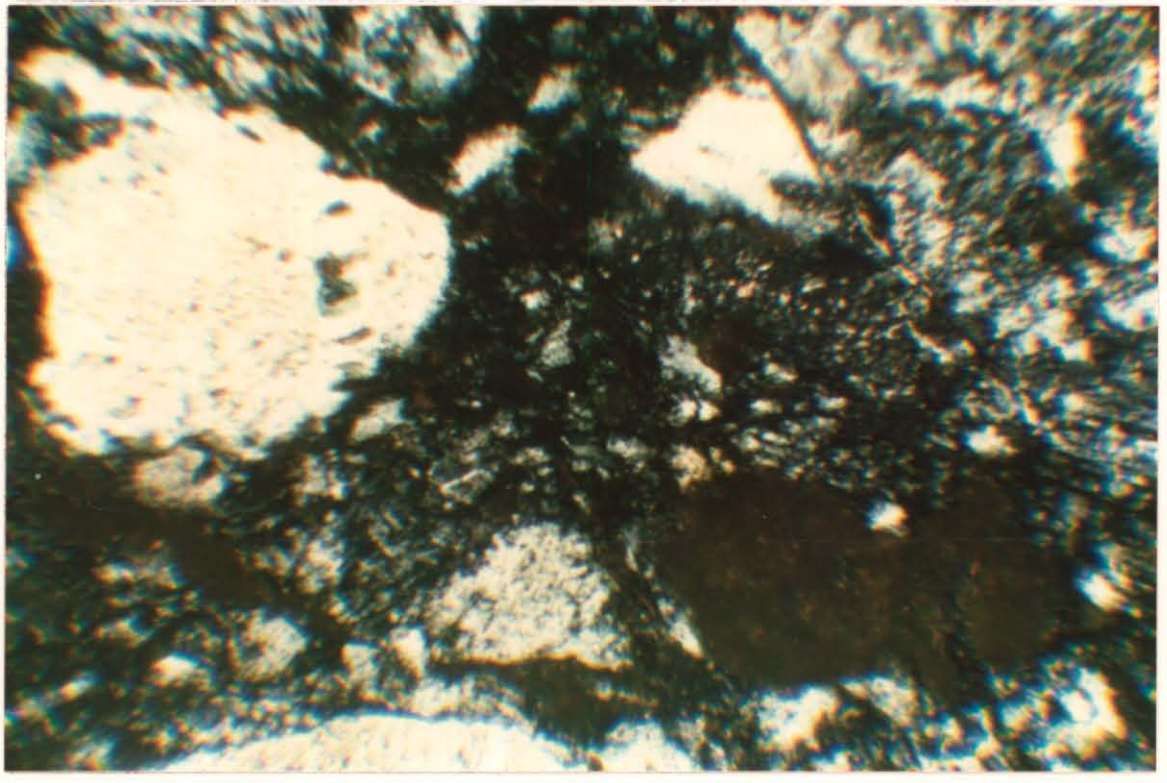
7. General view of Sample 13936. Low power, filtered. Shows yellow chalcopyrite, dark quartz, cream pyrite and paler, smaller arsenopyrite.



8. Medium power, filtered. Sample 13937. Cream suspected tetrahedrite and pale grey sphalerite in field of pale arsenopyrite and dark silicate.



11. Sample 13934: Medium power; plain light. Brecciated andesite. Shows lencoxenised opaque oxide phenocrysts and chloritic network between breccia clasts.



12. As for (11). Crossed polars.

APPENDIX 4

Drill Core Re-assaying, Henty Fault Zone

HENTY FAULT ZONE DDH

RE-ASSAYING BY BAUS 1987.

(Au Fire Assay)

Hole No.	Total Depth	Location	Interval Sampled	Best Intersection
MP29	373 ft.	Murchison Mine	12 – 370 ft.	Nil
MP33	256 ft.	Duttons	3 – 256 ft	Nil
MP35	232 ft.	Duttons	0 – 232 ft	Nil
MP37	284 ft.	Duttons	0 – 284 ft	Nil
MP43	350 ft.	Duttons	22 – 350 ft	Nil
MP44	208 ft.	Duttons	20 – 208 ft	Nil
MRP212	293·5m	Lakeside	43·3 – 155 m.	43·3 – 45·0 1·7m @ 0·29 g t Au
MRP226	211·5m	Lakeside	111·2 – 158 m.	Nil
MRP233	197·7m	Lakeside	13 – 135 m	44·6 – 47·0 2·4m @ 0·13 g t Au.

TABLE 4: OLD HENTY FAULT ZONE HOLES SAMPLED & ASSAYED 1986.
(N.B. Gold determined by Fire Assay)

HOLE No	Total Depth	Drilled by Date	Location	Interval Sampled	Best Intersections from Sampling	Comments
MP 28	403'	EZ 1947	Murchison Mine	0 - 230'	All Au < 0.01 g/t	
MP 30	411'	EZ 1948	Murchison Mine	12 - 411'	4'6" @ 0.07 g/t Au, 22g/t Ag	Relogged by JPR See Appendix XVIII
MP 32	361'	EZ 1948	Murchison Mine	19'8" - 361'	11" @ 0.1g/t Au Also: 7'2" @ 1.95%Zn, 7g/tAg	" " "
MP 70	546'	EZ 1949	Duttons Workings	0 - 546'	All Au < 0.01g/t	" " "
MP 71	594'	EZ 1949	Duttons Workings	52 - 594'	10' @ 0.01 g/t Au	" " "
MP 86	331'	EZ 1951	North of Farrell	35 - 331'	18' @ 0.01 g/t Au	" " "
MP 87	576'	EZ 1951	North of Farrell	11 - 576'	15' @ 0.02 g/t Au	" " "
MP 88	659'	EZ 1951	Duttons Workings	50 - 570'	10' @ 0.03 g/t Au	" " "
TP 133	293'	EZ 1968	North of Farrell	66 - 293'	10' @ 0.02 g/t Au	" " "
TP 135	295'	EZ 1968	North of Farrell	13 - 345'	4'8" @ 0.09 g/t Au	" " "
MRP 212	293.5m	EZ 1979	Murchison River	155 - 221.8m	13.5m @ 0.23 g/t Au	Sampled JGP Nov-Dec '86
MRP 219	140.8m	EZ 1980	Murchison River	108 - 140.8m	1.45m @ 0.50 g/t Au	" " "
MRP 226	211.5m	EZ 1981	Murchison River	158 - 211.5m	1.1m @ 0.21 g/t Au	" " "
MRP 227	155.6m	EZ 1981	Murchison River	124 - 155.6m	1m @ 0.15 g/t Au	" " "
MRP 233	197.7m	EZ 1981	Murchison River	135 - 197.7m	16.5m @ 1.35 g/t Au, incl 4m @ 3.32 g/t Au	" " "

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Job: COM873418
O/N: 11819/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MP43/22	0.01	<0.01	0.02	--
MP43/46	<0.01	--	--	--
MP43/60	0.02	--	--	--
MP43/85	0.02	--	--	--
MP43/105	<0.01	--	--	--
MP43/132	0.01	--	--	--
MP43/160	<0.01	--	--	--
MP43/181	0.03	0.04	0.01	--
MP43/208	0.01	--	--	--
MP43/213	0.02	--	--	--
MP43/225	0.02	0.01	0.03	--
MP43/246	0.02	--	--	--
MP43/253	0.03	--	--	--
MP43/280	<0.01	0.01	<0.01	--
MP43/294	0.01	--	--	--
MP43/315	0.01	--	--	--
MP44/20	0.02	--	--	--
MP44/46	0.02	--	--	--
MP44/59	<0.01	0.01	<0.01	--
MP44/69	0.01	--	--	--
MP44/80	0.02	0.02	0.02	--
MP44/85	0.02	--	--	--
MP44/93	0.01	--	--	--
MP44/100	0.01	--	--	--
MP44/105	0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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Job: COM873419
O/N: 11819/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MP44/112	<0.01	--	--	--
MP44/118	<0.01	--	--	--
MP44/123	<0.01	--	--	--
MP44/129	<0.01	--	--	--
MP44/135	<0.01	--	--	--
MP44/140	0.01	<0.01	0.03	--
MP44/146	0.01	--	--	--
MP44/152	<0.01	0.01	<0.01	--
MP44/170	0.01	--	--	--
MP44/177	<0.01	--	--	--
MP44/188	<0.01	--	--	--
MP44/190	0.01	--	--	--
MP44/196	<0.01	0.01	<0.01	--
MP44/201	0.02	--	--	--
MP33/3	0.01	--	--	--
MP33/25	0.02	<0.01	0.03	--
MP33/35	<0.01	--	--	--
MP33/43	<0.01	--	--	--
MP33/51	<0.01	0.01	<0.01	--
MP33/62	<0.01	--	--	--
MP33/74	0.02	--	--	--
MP33/84	<0.01	--	--	--
MP33/98	0.01	--	--	--
MP33/105	<0.01	--	--	--
MP33/118	<0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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Job: COM873419
O/N: 11619/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MP33/135	0.01	<0.01	0.02	--
MP33/144	<0.01	<0.01	<0.01	--
MP33/149	<0.01	--	--	--
MP33/154	<0.01	--	--	--
MP33/162	<0.01	--	--	--
MP33/171	<0.01	--	--	--
MP33/185	<0.01	--	--	--
MP33/191	<0.01	--	--	--
MP33/197	<0.01	<0.01	0.01	--
MP33/202	<0.01	<0.01	<0.01	--
MP33/212	<0.01	--	--	--
MP33/224	<0.01	--	--	--
MP33/238	<0.01	--	--	--
MP33/248	<0.01	--	--	--
MP35/0	<0.01	--	--	--
MP35/41	<0.01	--	--	--
MP35/48	<0.01	--	--	--
MP35/57	<0.01	<0.01	<0.01	--
MP35/61	<0.01	<0.01	0.01	--
MP35/67	<0.01	--	--	--
MP35/72	<0.01	--	--	--
MP35/79	<0.01	--	--	--
MP35/95	<0.01	--	--	--
MP35/106	<0.01	--	--	--
MP35/116	<0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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Job: COM873419
O/N: 11619/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MP35/132	<0.01	--	--	--
MP35/142	<0.01	--	--	--
MP35/173	0.02	<0.01	0.04	--
MP35/189	<0.01	<0.01	0.01	--
MP35/197	0.02	--	--	--
MP35/203	<0.01	--	--	--
MP35/211	0.02	--	--	--
MP35/219	0.01	--	--	--
MP37/0	<0.01	--	--	--
MP37/14	<0.01	--	--	--
MP37/39	<0.01	--	--	--
MP37/45	<0.01	--	--	--
MP37/52	<0.01	--	--	--
MP37/58	<0.01	<0.01	0.02	<0.01
MP37/64	<0.01	--	--	--
MP37/72	0.01	--	--	--
MP37/79	<0.01	--	--	--
MP37/94	<0.01	--	--	--
MP37/109	0.02	<0.01	0.03	--
MP37/125	0.01	--	--	--
MP37/142	<0.01	--	--	--
MP37/159	<0.01	--	--	--
MP37/172	0.01	--	--	--
MP37/193	<0.01	<0.01	0.01	--
MP37/203	<0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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Job: COM873419
O/N: 11619/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MP37/208	<0.01	--	--	--
MP37/215	<0.01	--	--	--
MP37/222	<0.01	--	--	--
MP37/231	<0.01	--	--	--
MP37/248	<0.01	--	--	--
MP37/259	<0.01	<0.01	<0.01	--
MP37/270	<0.01	--	--	--
MP29/12	<0.01	--	--	--
MP29/18	<0.01	<0.01	<0.01	--
MP29/28	<0.01	--	--	--
MP29/37	<0.01	--	--	--
MP29/42	<0.01	<0.01	<0.01	--
MP29/49	<0.01	--	--	--
MP29/54	<0.01	--	--	--
MP29/59	<0.01	--	--	--
MP29/66	<0.01	--	--	--
MP29/71	<0.01	--	--	--
MP29/77	<0.01	<0.01	<0.01	--
MP29/82	<0.01	<0.01	0.01	--
MP29/87	<0.01	--	--	--
MP29/98	<0.01	--	--	--
MP29/105	<0.01	--	--	--
MP29/116	<0.01	--	--	--
MP29/126	<0.01	--	--	--
MP29/135	<0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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Job: COM873419
O/N: 11619/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MP29/142	<0.01	--	--	--
MP29/147	0.01	--	--	--
MP29/152	<0.01	--	--	--
MP29/158	<0.01	<0.01	<0.01	--
MP29/167	<0.01	--	--	--
MP29/177	<0.01	--	--	--
MP29/185	<0.01	<0.01	0.01	--
MP29/193	<0.01	--	--	--
MP29/198	<0.01	--	--	--
MP29/203	<0.01	--	--	--
MP29/209	<0.01	--	--	--
MP29/213	<0.01	--	--	--
MP29/218	<0.01	--	--	--
MP29/225	<0.01	<0.01	0.01	--
MP29/233	<0.01	<0.01	0.01	--
MP29/240	<0.01	--	--	--
MP29/318	<0.01	--	--	--
MP29/323	<0.01	<0.01	0.02	--
MP29/329	<0.01	--	--	--
MP29/339	<0.01	--	--	--
MP29/343	<0.01	--	--	--
MP29/350	<0.01	--	--	--
MP29/357	<0.01	--	--	--
MP29/363	<0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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NATA REGISTERED No. 1526

OUR REF: COM 873000

YOUR REF: 11617/LJ50/JPR

Mr. J. Randell,
Billiton Australia Ltd.,
P.O. Box 860,
DEVONPORT. TAS. 7310.

4th December, 1987

Dear Jeff,

RE: JOB COM 873000

Enclosed are the assays for the samples delivered to our laboratory on the 6th November, 1987.

Yours sincerely,
COMLABS SERVICES PTY LTD

per

c.c: Billiton - Devonport

Report Length : 6 Pages

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Job: COM873000
O/N: 11617/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MRP212/43.3	0.20	0.15	--	--
MRP212/44.2	0.38	0.40	0.35	--
MRP212/45	0.08	0.10	0.06	--
MRP212/45.5	0.01	--	--	--
MRP212/46.35	<0.01	--	--	--
MRP212/47.6	<0.01	--	--	--
MRP212/48.25	<0.01	--	--	--
MRP212/49.25	<0.01	<0.01	<0.01	--
MRP212/50.5	<0.01	--	--	--
MRP212/51.2	<0.01	<0.01	<0.01	--
MRP212/51.9	<0.01	<0.01	<0.01	--
MRP212/53	<0.01	--	--	--
MRP212/54	<0.01	--	--	--
MRP212/55	<0.01	--	--	--
MRP212/56	<0.01	--	--	--
MRP212/57	<0.01	--	--	--
MRP212/61	<0.01	--	--	--
MRP212/62	0.04	--	--	--
MRP212/63	0.04	--	--	--
MRP212/64	<0.01	--	--	--
MRP212/65	0.04	0.05	0.02	--
MRP212/66	0.01	--	--	--
MRP212/67	<0.01	<0.01	<0.01	--
MRP212/68	<0.01	--	--	--
MRP212/69	<0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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838193

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Job: COM873000
O/N: 11617/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MRP212/70	<0.01	--	--	--
MRP212/71	<0.01	--	--	--
MRP212/72	<0.01	--	--	--
MRP212/73	0.02	--	--	--
MRP212/73.8	0.03	0.01	0.04	--
MRP212/75	0.01	<0.01	0.02	--
MRP212/76	0.12	0.10	0.14	--
MRP212/77	0.01	--	--	--
MRP212/78	<0.01	--	--	--
MRP212/79.3	0.01	--	--	--
MRP212/80.6	<0.01	--	--	--
MRP212/80.9	0.02	--	--	--
MRP212/81.8	<0.01	--	--	--
MRP212/82.9	<0.01	--	--	--
MRP212/85	<0.01	<0.01	<0.01	--
MRP212/87.35	<0.01	<0.01	<0.01	--
MRP212/89.1	<0.01	<0.01	<0.01	--
MRP212/90.0	<0.01	--	--	--
MRP212/90.3	<0.01	--	--	--
MRP212/91.4	<0.01	--	--	--
MRP212/92.6	<0.01	--	--	--
MRP212/98.6	0.02	--	--	--
MRP212/100.2	0.01	--	--	--
MRP212/101.5	<0.01	--	--	--
MRP212/102.9	<0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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Job: COM873000
O/N: 11617/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MRP212/103.4	<0.01	<0.01	0.01	--
MRP212/105.4	0.01	--	--	--
MRP212/106.5	0.03	--	--	--
MRP212/108.4	0.03	--	--	--
MRP212/109.9	0.02	--	--	--
MRP212/111	0.01	--	--	--
MRP212/112	0.01	--	--	--
MRP212/113	0.02	--	--	--
MRP212/114	0.02	--	--	--
MRP212/115	<0.01	--	--	--
MRP212/116	<0.01	<0.01	<0.01	--
MRP212/117	<0.01	<0.01	0.02	--
MRP212/118	<0.01	--	--	--
MRP212/119	<0.01	--	--	--
MRP212/120	0.01	--	--	--
MRP212/121.3	0.01	--	--	--
MRP212/123	0.01	--	--	--
MRP212/125	<0.01	--	--	--
MRP212/127	<0.01	--	--	--
MRP212/129	<0.01	--	--	--
MRP212/131	<0.01	0.01	<0.01	<0.01
MRP212/132.5	<0.01	--	--	--
MRP212/134	0.19	0.17	0.21	--
MRP212/135	<0.01	--	--	--
MRP212/135.9	<0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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Job: COM873000
O/N: 11617/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MRP212/138	<0.01	--	--	--
MRP212/140	0.02	--	--	--
MRP212/141.5	<0.01	<0.01	<0.01	--
MRP212/143	<0.01	<0.01	<0.01	--
MRP212/144	<0.01	--	--	--
MRP212/145	<0.01	--	--	--
MRP212/146	<0.01	--	--	--
MRP212/146.8	<0.01	--	--	--
MRP212/148	<0.01	--	--	--
MRP212/150	<0.01	<0.01	0.01	--
MRP212/152	<0.01	--	--	--
MRP212/154	<0.01	--	--	--
MRP226/111.2	<0.01	--	--	--
MRP226/112.5	<0.01	<0.01	<0.01	--
MRP226/113.5	<0.01	--	--	--
MRP226/114.5	<0.01	--	--	--
MRP226/115.7	<0.01	--	--	--
MRP226/116.7	0.02	--	--	--
MRP226/117.8	0.02	--	--	--
MRP226/118.4	<0.01	--	--	--
MRP226/120	0.02	<0.01	0.03	--
MRP226/122	<0.01	--	--	--
MRP226/130.7	<0.01	--	--	--
MRP226/131.1	<0.01	<0.01	<0.01	--
MRP226/134	0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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Job: COM873000
O/N: 11617/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MRP226/144.3	<0.01	--	--	--
MRP226/145.3	<0.01	--	--	--
MRP226/146.3	<0.01	--	--	--
MRP226/147.1	<0.01	--	--	--
MRP226/148	<0.01	--	--	--
MRP226/149	<0.01	--	--	--
MRP226/150	<0.01	--	--	--
MRP226/150.7	<0.01	--	--	--
MRP226/152	<0.01	--	--	--
MRP226/153	<0.01	--	--	--
MRP226/154	<0.01	<0.01	--	--
MRP226/156	0.03	<0.01	0.03	--
MRP233/13	0.03	--	--	--
MRP233/14	0.03	--	--	--
MRP233/15	0.02	--	--	--
MRP233/16	0.02	--	--	--
MRP233/17	<0.01	--	--	--
MRP233/18	0.02	--	--	--
MRP233/18.5	<0.01	--	--	--
MRP233/19.5	<0.01	--	--	--
MRP233/21	<0.01	<0.01	<0.01	--
MRP233/22	<0.01	--	--	--
MRP233/23	0.01	--	--	--
MRP233/24	0.01	--	--	--
MRP233/25	<0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

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Job: COM873000
O/N: 11617/LJ50/JPR

ANALYTICAL REPORT

SAMPLE	Au Avg	Au Dp1	Au Dp2	Au Dp3
MRP233/26	0.01	--	--	--
MRP233/27	<0.01	--	--	--
MRP233/28	<0.01	--	--	--
MRP233/29	<0.01	<0.01	<0.01	--
MRP233/29.7	0.01	--	--	--
MRP233/31	<0.01	<0.01	<0.01	--
MRP233/32	<0.01	--	--	--
MRP233/33	<0.01	--	--	--
MRP233/34	0.02	--	--	--
MRP233/35	<0.01	--	--	--
MRP233/36	0.02	--	--	--
MRP233/37	0.01	--	--	--
MRP233/38	<0.01	--	--	--
MRP233/38.8	<0.01	<0.01	<0.01	--
MRP233/40	<0.01	--	--	--
MRP233/41	0.37	0.35	0.38	--
MRP233/42	0.03	--	--	--
MRP233/43	0.05	--	--	--
MRP233/44.6	0.38	0.37	0.37	--
MRP233/45.2	0.18	0.19	0.17	--
MRP233/46	0.14	--	--	--
MRP233/47	0.06	--	--	--
MRP233/48	<0.01	--	--	--
UNITS	ppm	ppm	ppm	ppm
SCHEME	FAS1	FAS1	FAS1	FAS1

APPENDIX 5

Sample Record Sheets

SAMPLE RECORD

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METALS DIVISION

SAMPLE TYPE: Rocks | LOCATION / PROJECT: Henty Fault | SAMPLER: J.P.R. | DATE: Oct 87 | MAP / PHOTO REF:

ASSAY LAB: Comlabs | SAMPLE DESPATCH ORDER No: 11612/1350/JPR, 11614/1350/JPR | ASSAY REPORT Nos: Com872326, Com872482

SAMPLE STORAGE: Diport

SAMPLE No.	LOCATION	INTER'L (m)	← AAS → Cu	Zn	Ag	F.A. Au	← XRF ANALYSES Pb	Ba	As	DESCRIPTION
13159	Nth Mackintosh		32	55	<1	<0.01	26	270	20	Sheared fine sediments
13160	"		28	46	1	0.04	1100	190	85	Black shaley sediments
13161	"		10	34	<1	<0.01	12	320	100	Ferruginous feldspar phyric andesite
13162	"		9	4			8	15	24	White buck quartz
13163	"		30	18			8	175	16	Fgr. fissile ±3% py tuff
13164	"		20	190			100	290	20	Fissile ferrug. mostly black shale
13165	"		7	<2			<4	40	8	White buck quartz
13166	50m NW	13163	24	44			48	185	26	Ferrug. silic. carb. tuffac. sediment
13167	"		7	14			4	130	12	" "
13168	45m NW	13167	5	26			<4	125	10	Fol. silic. ferrug. volc
13169	25m NW	13168	5	20			14	125	14	Silic. tuffac. volc.
13170	"	"	6	28			18	175	8	" " "
13171	Nec Workshop		4	6			<4	320	10	Ferrug. silic. volc + qtz.
13172	15m N	13171	5	10			8	390	12	" " "
13173	20m N	13172	5	24			6	360	12	" " "
13174	Road above	13173	70	600			470	135	32	Buck qtz. vein in black shale
13175	Near Mach. Dam.		9	32			10	260	14	Silic. ferrug. tuffac. sed.
13176	"	"	12	8			22	200	22	Ferrug. graph. shale + fine tuff.
13177	"	"	16	16			6	350	22	Fissile green chlor. tuffac. sed.
13178	"	"	10	34			28	160	16	Ferrug. tuffac. sediment
13179	"	"	4	3			<4	530	10	Sericitic tuffac. sediment
13180	"	"	3	14			4	430	6	Felds. phyric andesite lava (sericitised)
13181	"	"	3	18			14	510	5	Ferrug. qtz veined felds. andesite
13182	"	"	14	14			<4	330	7	Carb. Sericitized ferrug. volcanic
13183	Below Mach. Dam.		6	8			10	250	12	Massive silic. volc + ferrug qtz vns.
13184	"	" "	3	4			8	450	7	Silic volc + ferrug qtz veins
13185	"	" "	2	14			6	280	9	Mod. ferrug. qtz veined volcanic
13186	"	" "	4	34			44	350	46	Wk. ferrug. sericitic tuff + cb.
13187	"	" "	5	40			4	190	18	Chlor. qtz veined intermed. volc.
13188	Old Bridge	Mach. Dam	6	30			10	360	16	Intens. silic. chl. volc. breccia ±5% py
13189	" "	" "	9	18	<1		8	770	20	Stg. qtz veined silic felds. phyric volc
13190	" "	" "	14	80	1		690	520	200	Stg. qtz veined ferrug. bl. shale + int. volc
13191	W'fall	" "	4	30	<1		34	220	34	Min. stg. fol. sericic. carbon. tuffac. sed.
13192	"	" "	14	24	<1		20	330	42	Ferrug sericitic tuffaceous. sed.
13193	Mach. Power Turbine		18	1400	<1	<0.01	300	170	28	Qtz veined shear in silic. volc.

REMARKS:

838199

SAMPLE RECORD

METALS DIVISION

SAMPLE TYPE: Rocks | LOCATION / PROJECT: Henty Fault Zone | SAMPLER: J.P.R. | DATE: Oct 87 | MAP / PHOTO REF:

ASSAY LAB: Comlabs | SAMPLE DESPATCH ORDER No: 11612/1550, 11844/1550 | ASSAY REPORT Nos: Com872326, Com872487

SAMPLE STORAGE: DIPORT.

SAMPLE No.	LOCATION		INTER'L (m)	AAS → F.A. ← XRF ANALYSES							B.C.L.	DESCRIPTION
				Cu	Zn	Ag	Au	Ba	Pb	As	Au	
13194	13m N	13189		2	36	<1	<0.01	980	26	30	(p.p.b)	Qtz veins, minor ferrug in andes. rock
13195	Mack. Spillway			10	65			450	28	26		" " " bedded granite
13196	"	"		6	28			480	18	12		" " m silic chl. andesite
13197	"	"		6	10			250	<4	9		Ferrug qtz veined. sil. chl. tuffac. sed
13198	"	"		10	34			430	12	14		" " " m ser. sil. tuff.
13199	"	"		10	55		0.02	290	22	9		Ser. sil. qtz veined chl. andesite.
13200	"	"		10	38		<0.01	135	16	7		Qtz vns. in thin silic + ser. sandy tuff.
14301	"	"		7	8			330	6	8		Stg qtz vned. foldd andesite
14302	"	"		<2	12			440	18	12		" " " "
14303	"	"		7	24			310	6	10		" " " "
14304	"	"		7	110	<1		370	40	65		Ferrug qtz vned arenaceous volcanic
14305	Nth. Mt. Farrell			2	190	1		590	580	4		Ser. carb. silic tuffaceous sed.
14306	"	"		5	135	<1		460	330	4		" "
14307	"	"		7	180	<1		430	140	7		" "
14308	"	"		10	50	1	<0.01	210	110	18		Dump. Silic Pb Zn Ag shale.
14309	"	"		185	3400	115	0.04	110	3.4%	0.39%		" " " "
14310	Mack. North			14	7	1	<0.01	10	130	48		Ferrug. silic carb. rock.
14311	Munch. Extd.			10	2100	3	0.02	330	290	300		Sheared carb. black shale
14312	Nth. of March. Mine			9900	20.6%	540	0.24	<10	3.15%	1.28%		mass py sph gal. dump.
14313	"	" "		75	0.48%	9	<0.01	240	0.47%	48		Black thin galena ex mass 5°
14314	Murchison Mine			460	510	95	0.05	180	1.63%	0.41%		Qtz veined. Sheared carb. silic gossan
14315	"	"		490	1100	430	0.40	90	5.73%	0.87%		70% qtz + carb. sil matrix
14316	"	"		250	1250	46	<0.01	460	1600	400		Qtz vn + ferrug gossan.
14317	"	"		750	1.7%	440	1.09	105	7.7%	3.85%		Massive 5° in E dip fault.
14318	"	"		860	1700	220	0.10	580	5.0%	3950		Silic pyritic gossanous tuff
14319	"	"		210	1550	50	<0.01	110	1.37%	1300		Ox. silic mass 5° in E dip shear
14320	New North Mt Farrell			28	280	3		240	540	130		Ferrug carb. silic siltstone
14321	Mack. North			520	2.1%	280		270	2.95%	55		Silic carb black shale breccia
14322	" "			210	2.0%	220		210	2.25%	170		" " " "
HF2/ACL	1	Bulk Cyanide Leach									2.2	
"	2	"									0.1	
"	4	"									1.1	
"	6	"									7.1	
"	9	"									0.5	

REMARKS:

838200

SAMPLE RECORD

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METALS DIVISION

SAMPLE TYPE: S. Sed. LOCATION / PROJECT: Henty Fault Zone SAMPLER: JR/R.B. DATE: Sept 87 MAP / PHOTO REF:

ASSAY LAB: Comlabs SAMPLE DESPATCH 11614/2350 ASSAY REPORT Nos: 872482

ORDER No: SAMPLE STORAGE: D'Port

SAMPLE No.	LOCATION		INTER'L (m)	ANALYSES B.C.L.												DESCRIPTION
				Au												
HF2 BCL	10			0·2												
	11			0·2												
	12			0·3												
	15			0·2												
	16			<0·1												
	18			0·2												
	20			<0·1												
	21			<0·1												
	22			0·1												

REMARKS:

8382201

APPENDIX 6

Geochemical Analyses South Stitt

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838203

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305 South Road, Mile End South, South Australia 5031 Telephone (08) 43 5722 Telex LABCOM AA89323 Facsimile No. (08) 234 0321

NATA REGISTERED No. 1526

OUR REF.: COM870400

YOUR REF.: 11537/LJSO/JGP/038

Mr. J.G. Purvis
The Shell Co. of Aust. Ltd.
30 Mersey Main Rd
Spreyton
DEVONPORT
TAS 7310

March 13, 1987

Dear Sir

RE: JOB COM870400

Enclosed are the assays for the samples delivered to our laboratory on March 2, 1987

Yours Sincerely,
COMLABS SERVICES PTY LTD

per :

PR Harvey

c.c.: Shell - Tasmania No. of copies : 1

Report Length 4 pages

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ANALYTICAL REPORT

JOB COM870400

O/N : 11537/LJ50/JGP/038

SAMPLE	Cu	Pb	Zn	Ag	As	Bi	Au
68600N 381600E	7	20	28	<1	8	4	0.02
68600N 381620E	14	32	65	1	9	<4	0.02
68600N 381640E	16	38	180	1	5	<4	0.02
68600N 381660E	8	36	65	1	10	<4	<0.01
68600N 381680E	24	32	125	1	4	8	0.01
68500N 381500E	26	24	230	1	4	<4	0.02
68500N 381520E	8	30	46	1	9	6	<0.01
68500N 381540E	8	24	75	1	8	8	0.01
68500N 381560E	10	16	155	1	38	<4	0.01
68500N 381580E	7	18	44	1	5	<4	<0.01
68500N 381600E	6	26	36	1	10	8	<0.01
68500N 381640E	3	32	26	1	12	<4	<0.01
68500N 381720E	2	10	135	<1	6	8	<0.01
68500N 381740E	2	8	65	<1	5	10	0.01
68500N 381760E	16	40	60	1	32	<4	0.01
68500N 381780E	3	18	24	5	12	<4	<0.01
68000N 381200E	7	<4	8	1	3	4	<0.01
68000N 381220E	3	4	2	<1	4	<4	<0.01
68000N 381240E	<2	8	34	1	6	<4	<0.01
68000N 381260E	3	10	110	1	4	<4	<0.01
68000N 381280E	4	12	75	1	6	<4	<0.01
68000N 381300E	70	18	85	2	5	<4	<0.01
68000N 381320E	60	26	70	1	10	6	<0.01
68100N 381260E	4	12	6	1	4	6	<0.01
68100N 381280E	3	6	3	<1	6	6	0.01
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	FAS1

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ANALYTICAL REPORT JOB COM870400

O/N : 11537/LJ50/JGP/038

SAMPLE	Cu	Pb	Zn	Ag	As	Bi	Au
68100N 381300E	3	8	2	<1	3	<4	<0.01
68100N 381320E	4	6	5	<1	4	4	<0.01
68100N 381340E	4	6	22	<1	6	6	<0.01
68100N 381360E	5	4	10	<1	6	<4	<0.01
68100N 381380E	2	<4	4	<1	8	8	0.02
68100N 381400E	3	16	40	<1	10	4	<0.01
68100N 381460E	4	10	20	<1	8	4	<0.01
68100N 381480E	3	8	20	1	12	<4	<0.01
68100N 381500E	4	12	18	2	8	<4	<0.01
68100N 381520E	3	12	22	1	8	8	<0.01
68100N 381620E	3	6	18	<1	7	<4	<0.01
68100N 381640E	2	20	16	<1	16	20	0.01
68100N 381660E	2	16	24	<1	14	<4	<0.01
68100N 381680E	2	6	9	<1	7	<4	<0.01
68100N 381700E	<2	10	16	<1	10	<4	<0.01
68100N 381740E	<2	6	22	<1	16	12	<0.01
68200N 381340E	<2	6	5	1	5	10	<0.01
68200N 381360E	3	6	<2	<1	7	4	<0.01
68200N 381380E	<2	<4	5	<1	5	6	<0.01
68200N 381400E	3	6	3	<1	8	6	<0.01
68200N 381460E	2	8	12	<1	9	8	<0.01
68200N 381480E	3	14	14	<1	8	8	0.01
68200N 381500E	2	8	14	<1	9	<4	<0.01
68200N 381540E	3	8	16	<1	6	6	0.02
68200N 381560E	2	6	14	1	7	4	0.03
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	FAS1

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ANALYTICAL REPORT JOB COM870400

O/N : 11537/LJ50/JGP/038

SAMPLE	Cu	Pb	Zn	Ag	As	Bi	Au
68200N 381640E	<2	8	65	<1	6	<4	0.01
68200N 381660E	2	8	22	1	14	6	<0.01
68200N 381680E	4	16	18	1	12	4	<0.01
68200N 381700E	2	8	14	<1	6	4	<0.01
68200N 381720E	2	18	48	<1	14	<4	<0.01
68200N 381740E	2	14	20	1	14	<4	<0.01
68200N 381760E	2	24	42	<1	12	<4	0.02
68300N 381660E	4	30	40	<1	28	4	0.01
68300N 381680E	3	22	70	1	6	6	0.02
68300N 381700E	2	22	20	1	20	8	0.03
68300N 381720E	6	16	24	<1	7	<4	0.01
68300N 381740E	10	18	65	<1	7	8	0.02
68300N 381760E	5	18	28	<1	7	<4	<0.01
68300N 381600E	7	44	48	1	50	6	0.02
68300N 381580E	7	55	48	1	50	<4	0.02
68300N 381560E	4	20	20	<1	10	4	0.01
68300N 381540E	5	16	22	<1	10	<4	<0.01
68300N 381520E	5	18	28	<1	12	<4	<0.01
68300N 381420E	12	18	46	<1	4	<4	0.01
68300N 381400E	22	12	26	<1	8	4	<0.01
68300N 381380E	6	6	8	<1	4	8	<0.01
68400N 381440E	4	4	14	<1	7	<4	<0.01
68400N 381460E	2	6	9	<1	4	<4	<0.01
68400N 381480E	4	8	16	1	8	10	<0.01
68400N 381500E	4	6	20	<1	7	<4	<0.01
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	FAS1

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838207

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ANALYTICAL REPORT JOB COM870400

O/N : 11537/LJSO/JGP/038

SAMPLE	Cu	Pb	Zn	Ag	As	Bi	Au
68400N 381520E	2	14	100	1	5	4	0.02
68400N 381580E	4	16	26	<1	7	8	<0.01
68400N 381600E	4	22	34	<1	12	<4	<0.01
68400N 381620E	4	32	50	<1	18	<4	<0.01
68400N 381640E	4	26	46	<1	12	4	0.01
68400N 381660E	6	24	70	<1	12	<4	<0.01
68400N 381680E	7	30	80	<1	12	<4	<0.01
68400N 381700E	2	6	14	<1	3	<4	<0.01
68400N 381720E	3	12	165	<1	5	4	<0.01
68400N 381740E	7	10	125	<1	6	<4	<0.01
68400N 381760E	3	16	18	<1	7	6	<0.01
68400N 381780E	8	14	20	<1	8	<4	<0.01
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	FAS1

207

838208

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305 South Road, Mile End South, South Australia 5031 Telephone (08) 43 5722 Telex LABCOM AA89323 Facsimile No. (08) 234 0321

NATA REGISTERED No. 1526

OUR REF: COM870213

YOUR REF: 11535/LJ50/JGP/037

Mr. Gerald Purvis
The Shell Co. of Aust. Ltd.
30 Mersey Main Rd
Spreyton
DEVONPORT
TAS 7310

February 16, 1987

Dear Gerald

RE: JOB COM870213

Enclosed are the assays for the samples delivered to our laboratory on February 5, 1987

Yours Sincerely,
COMLABS SERVICES PTY LTD

per :

South Shell
Rocks + Soils
Rosebery East.

c.c.: Shell - Tasmania No. of copies : 1

Report Length 3 pages

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ANALYTICAL REPORT JOB COM870213

O/N : 11535/LJ50/JGP/037

SAMPLE	Cu	Pb	Zn	Ag	As	Bi	Au
14201	12	<4	125	<1	5	8	<0.01
14202	140	6	60	<1	24	16	0.02
14204	12	24	165	<1	5	4	<0.01
14205	3450	14	16	<1	2	6	<0.01
14206	26	<4	26	<1	4	12	<0.01
14207	34	<4	100	<1	6	14	0.01
14208	20	6	120	<1	10	4	<0.01
14209	12	4	50	<1	7	14	<0.01
14210	46	8	12	<1	125	6	0.01
14211	8	<4	32	<1	18	12	<0.01
14212	4	4	22	<1	6	6	<0.01
14213	8	<4	4	<1	3	6	0.02
14214	7	10	55	<1	6	8	<0.01
14215	60	420	55	<1	110	14	0.02
14216	5	12	14	<1	8	8	<0.01
14217	38	44	120	<1	3	<4	<0.01
14218	4	16	20	<1	9	6	<0.01
14219	4	6	125	<1	6	<4	<0.01
14220	36	34	85	<1	3	<4	<0.01
14221	10	20	46	<1	6	4	<0.01
14222	6	10	50	<1	12	<4	<0.01
14223	7	16	36	<1	22	6	<0.01
14224	6	6	7	<1	5	6	<0.01
14225	5	12	44	<1	16	<4	0.01
14226	7	6	32	<1	7	4	0.01
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	FAS1

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ANALYTICAL REPORT JOB COM870213

O/N : 11535/LJ50/JGP/037

SAMPLE	Cu	Pb	Zn	Ag	As	Bi	Au
14227	110	26	28	<1	6	4	<0.01
14228	12	6	34	<1	7	14	<0.01
14229	16	14	40	<1	5	4	<0.01
14230	10	6	8	<1	5	16	<0.01
69000N 381600E	7	12	110	<1	8	<4	<0.01
69000N 381620E	5	4	155	<1	8	<4	<0.01
69000N 381640E	9	8	24	<1	10	10	<0.01
69000N 381660E	6	4	12	<1	6	12	<0.01
69000N 381680E	18	18	110	<1	12	10	<0.01
69000N 381700E	14	14	75	<1	9	<4	<0.01
69000N 381720E	10	6	34	<1	7	4	<0.01
69000N 381780E	10	8	30	<1	9	8	<0.01
69000N 381800E	10	6	32	<1	7	<4	<0.01
68900N 381660E	16	14	40	<1	12	10	<0.01
68900N 381700E	22	28	90	<1	8	12	<0.01
68900N 381720E	12	14	40	<1	7	<4	<0.01
68900N 381740E	18	18	95	<1	12	12	0.02
68900N 381760E	30	24	130	<1	8	4	<0.01
68900N 381780E	16	18	105	<1	10	6	<0.01
68800N 381640E	8	4	36	<1	5	6	<0.01
68800N 381660E	6	6	26	<1	6	8	<0.01
68800N 381680E	28	40	90	<1	18	10	<0.01
68800N 381700E	24	48	60	<1	28	6	<0.01
68800N 381720E	14	14	50	<1	10	<4	<0.01
68700N 381640E	6	<4	22	<1	10	16	<0.01
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	FAS1

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838211

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- 3 -

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ANALYTICAL REPORT JOB COM870213

O/N : 11535/LJ50/JGP/037

SAMPLE	Cu	Pb	Zn	Ag	As	Bi	Au
68700N 381660E	10	6	40	<1	8	6	<0.01
68700N 381680E	2	<4	105	<1	5	6	0.04
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	FAS1

87-2751

838212

OPEN FILE

LIST OF FIGURES

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3	Topographic Base Plan Sheet 2	1: 5000	D/LJ50/ 028
4	Topographic Base Plan Sheet 3	1: 5000	D/LJ50/ 009
5	Topographic Base Plan Sheet 4	1: 5000	D/LJ50/ 010
6	Topographic Base Plan Sheet 5	1: 5000	D/LJ50/ 011
7	Topographic Base Plan Sheet 7	1: 5000	D/LJ50/ 013
8	Topographic Base Plan Sheet 8	1: 5000	D/LJ50/ 014
9	Geological Base Sheet 1	1: 5000	D/LJ50/ 029
10	Geological Base Sheet 2	1: 5000	D/LJ50/ 030
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15	Murchison River (Lakeside) Location Plan	1: 5000	
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26	Down hole IP/Resistivity Logging RED 87-7	1: 1000	
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28	Down hole Sirotem RED 87-2	1: 1000	
29	Down hole Sirotem RED 87-6	1: 1000	
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34	Dipole-dipole IP Line 5100N	1: 2000	
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51	Dipole-dipole IP Murchison Mine Line 376600N	1: 2000	
52	Dipole-dipole IP Murchison Mine Line 376550N	1: 2000	
53	Dipole-dipole IP Murchison Mine Line 376500N	1: 2000	
54	Dipole-dipole IP Murchison Mine Line 376450N	1: 2000	
55	Dipole-dipole IP Murchison Mine Line 376400N	1: 2000	
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57	Murchison Mine Composite Drill Section	1: 1000	D/LJ50/ 032
58	South Stitt Southern Fill-in Grid	1: 2000	LJ50/1071
59	South Stitt Ground Magnetic Stacked Profiles	1: 5000	
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61	South Stitt IP/Resistivity Survey Line 68800N	1:2000	
62	South Stitt IP/Resistivity Survey Line 68700N	1:2000	
63	South Stitt IP/Resistivity Survey Line 68600N	1:2000	
64	South Stitt IP/Resistivity Survey Line 68400N	1:2000	
65	South Stitt IP/Resistivity Survey Line 68300N	1:2000	
66	South Stitt IP/Resistivity Survey Line 68000N	1:2000	

6924

380 000 E
385 000 E
390 000 E
5 385 000 N
5 384 000 N
5 382 000 N
5 380 000 N
5 375 000 N
5 372 000 N
5 370 000 N
5 368 000 N
384 000 E
387 000 E
389 000 E
383 000 E
386 000 E
381 000 E

HIGHWAY
EMU BAY RAILWAY
MURCHISON
Farm Creek
E.L. 42/85
TULLABARDINE J.V.
TULLABARDINE
MACKINTOSH DAM
HENTY FAULT ZONE
SHEET 1
MACKINTOSH
LAKE MACKINTOSH
EXISTING ORTHOPHOTO
SHEET 2
PROPOSED E.L. 1/62 EXTENSION 12·75 sq km
LAKE ROSEBERY
FARRELL J.V.
FARRELL
Tullah
SHEET 3
E.L. 1/62
ROSEBERY EAST J.V.
△ MT SALE
DUTTONS
MT FARRELL △
LAKE
SHEET 4
△ MT BLACK
TULLAH 32 ORTHOPHOTO
ROSEBERY
LAKESIDE
River
SHEET 5
ROSEBERY MINE LEASE
ROSEBERY
STERLING VALLEY
Sterling
MURCHISON DAM
Sophia River
E.L. 4/73
STERLING VALLEY J.V.
LAKE MURCHISON
SHEET 6
△ MT MURCHISON
SHEET 7
E.L. 1/62
ROSEBERY EAST J.V.
HENTY FAULT ZONE
SOUTH STITT
SHEET 8
PROPOSED E.L. 1/62 EXTENSION 7·1 sq km

838214

5 cm

87-2751 6924

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The Metals Division of The Shell Company of Australia Limited

Project	HENTY FAULT ZONE
Title	PROSPECT LOCATION AREA OF PROPOSED EXTENSION AND BASE PLAN INDEX
Author JPR Dept. TAS	Scale 1:25,000
Drawn AS Date 9/87	Revised Date
Checked Date	S'ceded Date
Sheet No. FIG. No. 1	Drawing No. LJ50/1081

6925

386 000 E
387 000 E
388 000 E
389 000 E
384 000 N
383 000N
382 000 N

HEC
1056

log barrier
spillway
tank
levee
intake
scrub
Mackintosh
Dam
power
station
car park
lookout
Hanging
Rock
LAKE
scrub
1548

838215

87-2751 6925

Billiton Australia
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Project	HENTY FAULT ZONE
Title	TOPOGRAPHIC BASE PLAN (ENLARGEMENT OF PORTION OF BLOCK 1:25,000 TOPO. MAP)
	SHEET 1
Author J.P.R. Dept.	Scale 1:5000
Drawn Date	Revised Date
Checked Date	S'ceded Date
Sheet No. FIG. No. 2	Drawing No. D/LJ 50/027

5 cm

G926

385 000 E

386 000 E

387 000 E

388 000 E

382 000 N

381 000 N

380 000 N

465

300

250

200

scrub

MACKINTOSH DAM ROAD

CROWN LAND

1113

550

SOUTHWEST CONSERVAT AREA

01.22

MURCHISON HIGHWAY

HEC

1117

Rosebery

HEC depot

tanks

HEC

1117

scrub

565

Buttress Hill

552

Lake

full supply level

159.4m

Mackintosh Bridge

follows 167m contour

350

follows 332m contour

boundary

838216

87-2751 6926

Billiton Australia

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Project	HENTY FAULT ZONE
Title	TOPOGRAPHIC BASE PLAN (ENLARGEMENT OF PORTION OF BLOCK 1:25,000 TOPO MAP) SHEET 2
Author J.P.R. Dept.	Scale 1:5000
Drawn Date	Revised Date
Checked Date	S'ceded Date
Sheet No. FIG. No. 3	Drawing No. D/LJ 50/028

5 cm

6927

384 000 E
385 000
386 000
387 000
380 000 N
379 000
378 000

RESERVE
CROWN LAND
Macintosh Gorge
250
180
1133
CROWN LAND
1117
HEC
1133
North End Creek
ROAD
tower
CROWN LAND
dam
MACINTOSH water race
A10
1117
abandoned
sports ground
scrub
QUARRY RESERVE
1117
HEC
TRAMWAY STATION RESERVE
full supply level
159m
scrub
HEC
QUARRY RESERVE
HEC
tank
workshops
PS
medical centre
community centre
TULLAH
CROWN LAND
1133
649
watershed
Tollows

838217

87-2751 6927

Billiton Australia
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Project	HENTY FAULT ZONE
Title	TOPOGRAPHIC BASE PLAN (ENLARGEMENT OF GOVERNMENT MAP) SHEET 3
Author J.P.R. Dept.	Scale 1:5000
Drawn Date	Revised Date
Checked Date	S'ceded Date
Sheet No. FIG. No. 4	Drawing No. D/LJ 50/009

5 cm

6928

384 000 E | 385 000 E | 386 000 | 387 000

378 000 N | 377 000 | 376 000

tanks | school | REC RES | 0931 | HEC 0928 | 850 | Central Creek | MURCHISON | 0600 contour | 0700 | 650 | 550 | 450 | 350 | 250 | scrub | Hepburn | MOUNT FARRELL (977) | tower | HEC 1117 | HIGHWAY | Quarry Bay | ROSEBERY | Lake Herbert | lookout

838218

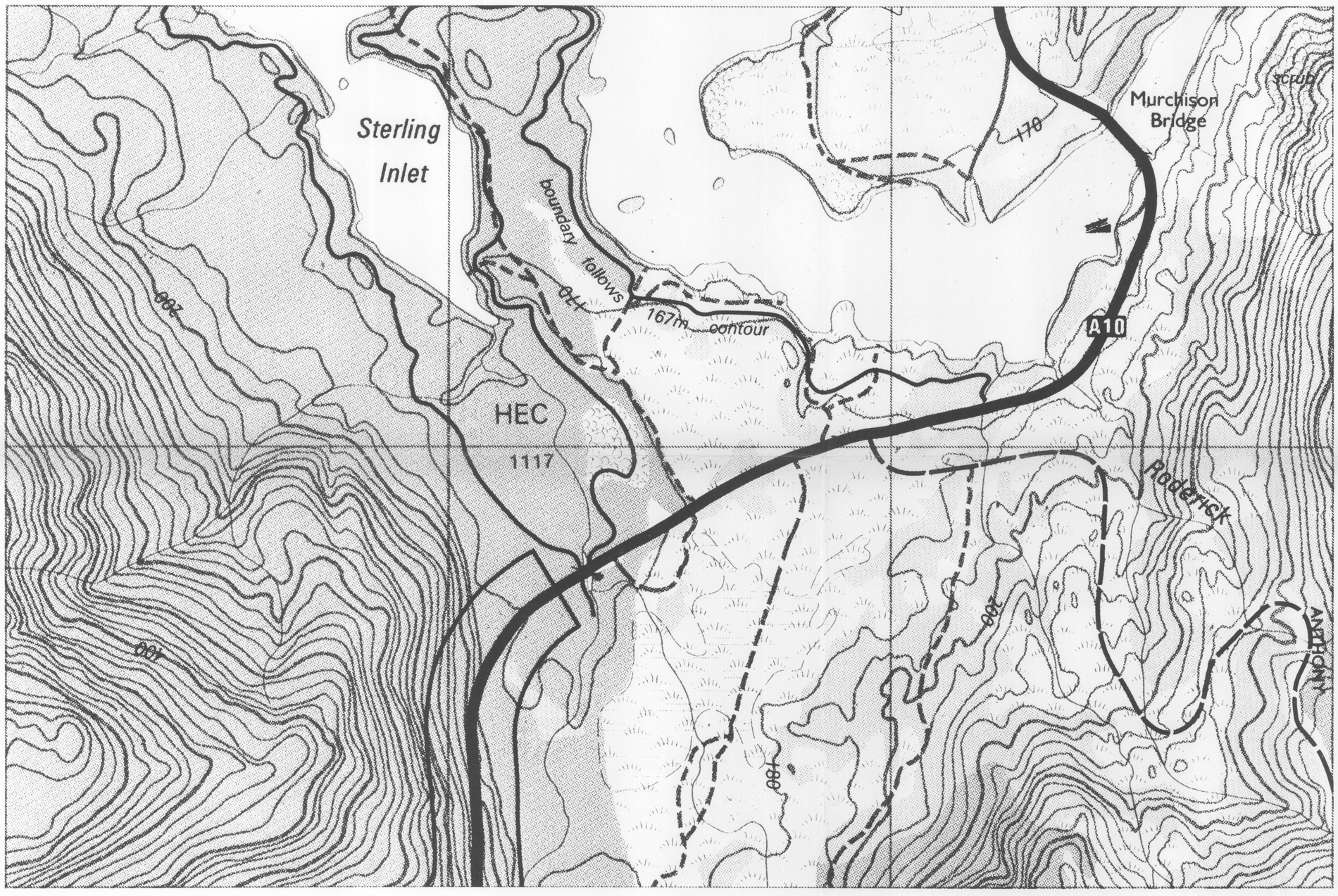
5 cm

87-2751 6928

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: HENTY FAULT ZONE	
Title: TOPOGRAPHIC BASE PLAN (ENLARGEMENT OF GOVERNMENT MAP) SHEET 4	
Author J.P.R. Dept.	Scale 1:5000
Drawn Date	Revised Date
Checked Date	S'ceded Date
Sheet No. FIG. No. 5	Drawing No. D/LJ 50/010

G929



838219

5 cm

87-2751 G929

Billiton Australia
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Project	HENTY FAULT ZONE		
Title	TOPOGRAPHIC BASE PLAN (ENLARGEMENT OF GOVERNMENT MAP) SHEET 5		
Author J.P.R.	Dept.	Scale 1:5000	
Drawn	Date	Revised	Date
Checked	Date	S'ceded	Date
Sheet No. FIG. No. 6		Drawing No. D/LJ 50/011	

6930

382 000 E

383 000

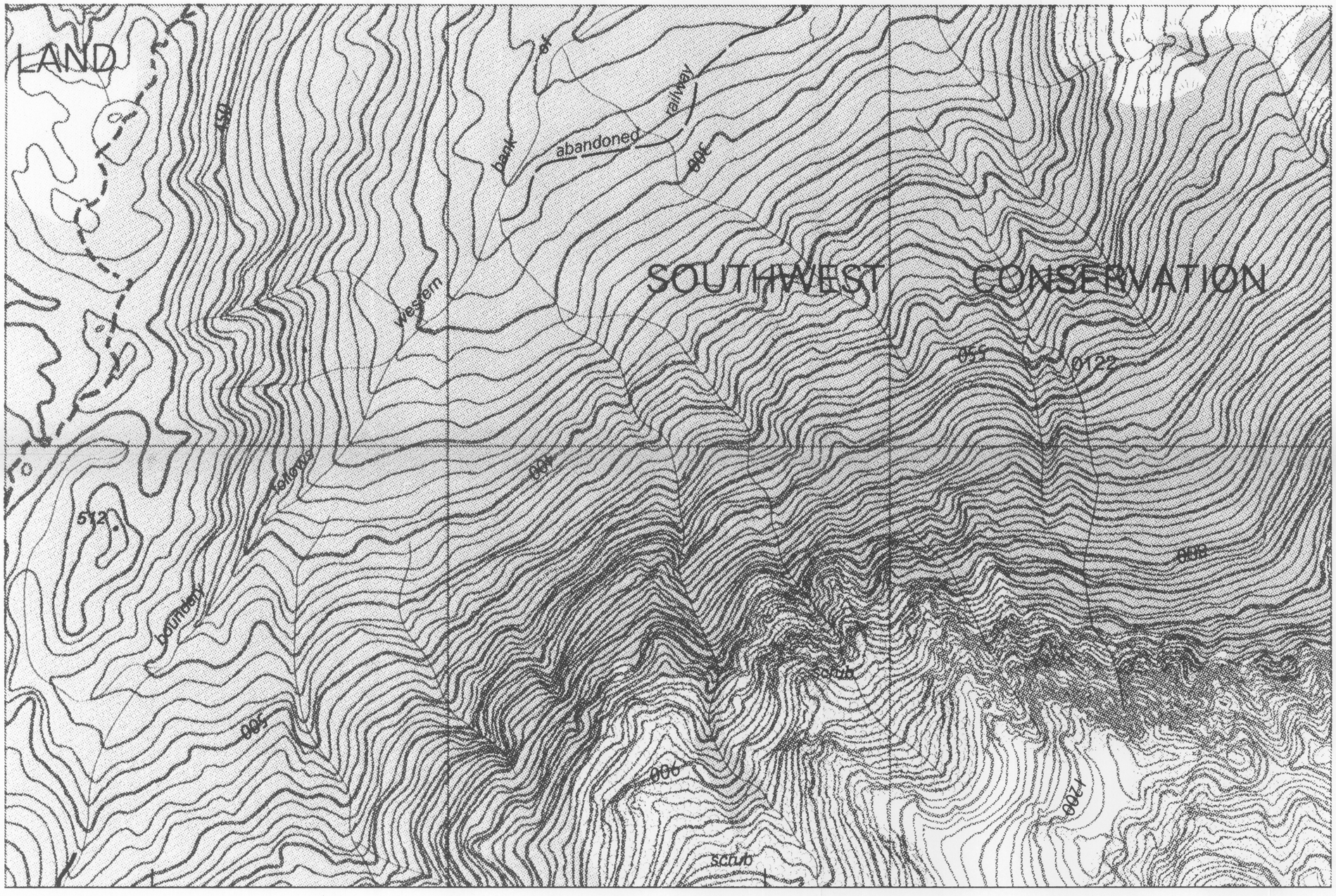
384 000

385 000

372 000 N

371 000

370 000



838220

5 cm

87-2751 6930

Billiton Australia
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Project	HENTY FAULT ZONE		
Title	TOPOGRAPHIC BASE PLAN (ENLARGEMENT OF GOVERNMENT MAP)		
			SHEET 7
Author J.P.R.	Dept.	Scale 1:5000	
Drawn	Date	Revised	Date
Checked	Date	S'ceded	Date
Sheet No. FIG. No. 7		Drawing No. D/LJ 50/013	

6931

381 000 E

382 000

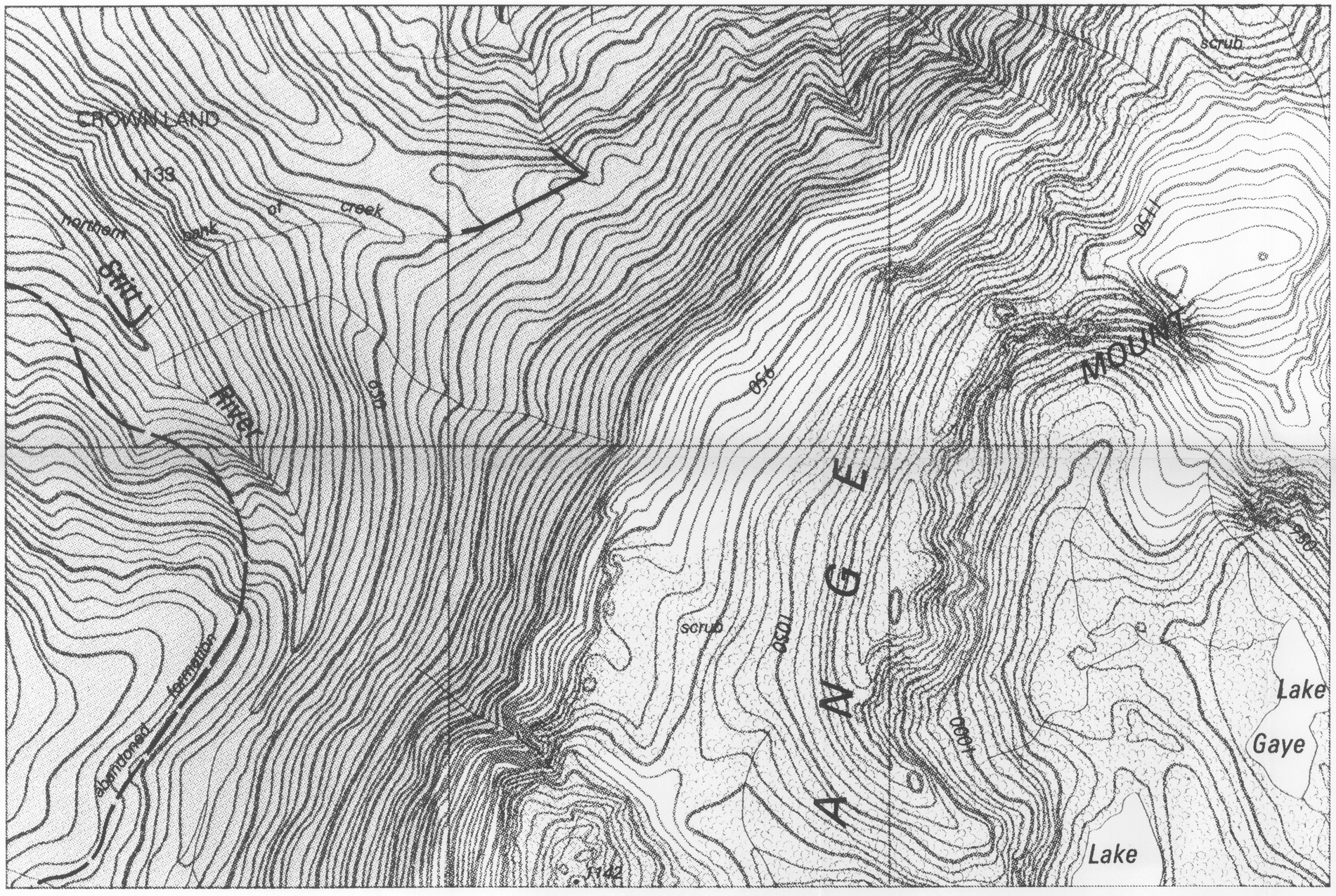
383 000

384 000

370 000 N

369 000

368 000



838221

5 cm

87-2751

6931

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project	HENTY FAULT ZONE
Title	TOPOGRAPHIC BASE PLAN (ENLARGEMENT OF GOVERNMENT MAP)
	SHEET 8

Author J.P.R	Dept.	Scale 1:5000	
Drawn	Date	Revised	Date
Checked	Date	S'ceded	Date
Sheet No. FIG. No 8		Drawing No. D.LJ 50/014	

6932

386 000 E

389 000 E

384 000 N

382 000 N

mf Vt
Vt
Vss
Va
Bsh/Vss
Vt ser
Bsh
mf Vi
Vt sh
mf Vi
14302
14301
13200
Vss
.6547
49° Vss/Bsh
.6548
51° Bsh/Vss
13199
Vt qvn
13198
Bsh Vt
13197
.6546
51° Vss/Bsh
13196
75°
13195
mf Vi
14303
14304
qvn
Vt qvn
ferr
Bsh
.6545
52° Vss/Bsh
Vt
Vt chl
ser
13194
mf Vi q vn
13189
Vi chl qvn
13188
Vi chl qvn
13190
Bsh
Va sil
350
65
W
f Vi
.6519
121 Vss/Bsh f Vi
q cb py
cpy
.6510
147 Bsh/Vss qvn
.6503
13191
Vt ser
Bsh
Vt ser
.6543
50° Vss/Bsh
13192
Vi chl
qvn
Vt ser
13187
Vt sil
13193
.6542
54° Vss/Bsh
Vt sil
Vi chl
Vt ser
.6516
150 f Vi
.6541
75° Vss/Bsh
Bsh
Vt ser
Vt ser
13186
Vs sil ferr qvn
13183
13185
13184
.6512
123 Bsh cb q py
mf Vi
13182
mf Vi
mf Vi ser
13181
Vt ser
Bsh
Sslt chl
13180
13179
13178
13177
Bsh
13176
13175
Vt ferr
Bsh
mf Vi
2000N
10000E
E.L. 1/62
E.L. 42/85
PANCONTINENTAL
LYNCH
θcon
θcon

LEGEND

ORDOVICIAN
θcon — Owen Conglomerate — mixed and undifferentiated sands, pebbles, boulders of predominantly Tyennan origin.

CAMBRIAN
Bsh — grey fissile pyritic often crenulated and variably graphitic shales.
Vt — tine grained tuffaceous volcaniclastics, strongly sericitized often silicified and quartz veined.
Vss — dirty poorly bedded arenaceous volcaniclastic.
Vi — feldspar phyric andesitic lavas.
Va — siliceous acid lavas.

Farrell Slate
Mt Black Volcanics

mf Vi — medium feldspar porphyritic intermediate volcanic lava.
q vn — quartz veining
Sslt — siltstone
ser — sericite
cb — carbonate
sil — silicified

Bedding strike / dip + facing
Old working
1986 BCL Survey (Bulk Cyanide Leach)
1987 BCL Survey (Bulk Cyanide Leach)

ROCK CHIP SAMPLING

	Cu	Zn	Ag	Au	Ba	Pb	As
13175	9	32	< 1	< 0·01	260	10	14
13176	12	8	< 1	< 0·01	200	22	22
13177	16	16	< 1	< 0·01	350	6	22
13178	10	34	< 1	< 0·01	160	28	16
13179	4	3	< 1	< 0·01	530	< 4	10
13180	3	14	< 1	< 0·01	430	4	6
13181	3	18	< 1	< 0·01	510	14	5
13182	14	14	< 1	< 0·01	330	< 4	7
13183	6	8	< 1	< 0·01	250	10	12
13184	3	4	< 1	< 0·01	450	8	7
13185	2	14	< 1	< 0·01	280	6	9
13186	4	34	< 1	< 0·01	350	44	46
13187	5	40	< 1	< 0·01	190	4	18
13188	6	30	< 1	< 0·01	360	10	16
13189	9	18	< 1	< 0·01	770	8	20
13190	14	80	1	< 0·01	520	690	200
13191	4	30	< 1	< 0·01	220	34	34
13192	14	34	< 1	< 0·01	330	20	42
13193	18	1400	< 1	< 0·01	170	300	28
13194	2	36	< 1	< 0·01	980	26	30
13195	10	65	< 1	< 0·01	450	28	26
13196	6	28	< 1	< 0·01	400	18	12
13197	6	10	< 1	< 0·01	250	< 4	9
13198	10	34	< 1	< 0·01	430	12	14
13199	10	55	< 1	0·02	290	22	9
13200	10	38	< 1	< 0·01	135	16	7
14301	7	8	< 1	< 0·01	330	6	8
14302	< 2	12	< 1	< 0·01	440	18	12
14303	7	24	< 1	< 0·01	310	6	10
14304	7	110	< 1	< 0·01	370	40	65
	AAS			F.A.	XRF (ppm)		

838222 87-2751 6932

5 cm

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: HENTY FAULT ZONE

Title: GEOLOGICAL BASE

SHEET 1

Author J.P.R.	Dept.	Scale 1:5000	
Drawn Q.H.	Date 11/87	Revised	Date
Checked	Date	S'ceded	Date
Sheet No.	FIG. No. 9	Drawing No.	D/LJ 50/029

6933

385000 E

388000 E

382000 N

380000 N

LEGEND

ORDOVICIAN	θcon	Owen Conglomerate	– mixed and undifferentiated sands, pebbles, boulders of predominantly Tyenna origin.
	Bsh	Farrell Slates	– grey fissile pyritic often crenulated and variably graphitic shales.
	Vt		– fine grained tuffaceous volcaniclastics strongly sericitized often silicified and quartz veined.
CAMBRIAN	Vss		– dirty poorly bedded arenaceous volcaniclastic.
	Vi	Mt Black Volcanics	– feldspar phyric andesitic lavas.
	Va		– siliceous acid lavas.

mfVi – medium feldspar porphyritic intermediate volcanic lava
qvn – quartz veining
Sslt – siltstone
ser – sericite
cb – carbonate
sil – silicified

Bedding strike / dip + facing

Old working

1986 BCL Survey (Bulk Cyanide Leach)

1987 BCL Survey (Bulk Cyanide Leach)

ROCK CHIP SAMPLING

	Cu	Zn	Ag	Au	Ba	Pb	As
13161	10	34	<1	<0·01	320	12	100
13162	9	4	<1	<0·01	15	8	24
13163	30	18	<1	<0·01	175	8	16
13164	20	190	<1	<0·01	290	100	20
13165	7	< 2	<1	<0·01	40	< 4	8
13166	24	44	<1	<0·01	185	48	26
13167	7	14	<1	<0·01	130	4	12
13168	5	26	<1	<0·01	125	< 4	10
13169	5	20	<1	<0·01	125	14	14
13170	6	28	<1	<0·01	175	18	8
13171	4	6	<1	<0·01	320	< 4	10
13172	5	10	<1	<0·01	390	8	12
13173	5	24	<1	<0·01	360	6	12
13174	70	600	<1	<0·01	135	470	32
14328	4	12	<1	<0·01	380	80	< 2
14329	6	12	1	<0·01	360	42	5
14330	16	20	1	<0·01	280	18	5
14331	18	28	1	0·01	200	32	< 2
14332	40	40	1	<0·01	220	14	3
14333	9	230	2	<0·01	230	1050	9
14334	2	7	<1	<0·01	370	10	4
14335	7	2	<1	<0·01	310	< 4	< 2
14336	7	2	<1	<0·01	60	4	< 2
14337	3	14	<1	<0·01	300	44	6
14338	4	16	1	0·02	710	4	4
14339	5	46	1	<0·01	350	16	6
14340	38	50	1	0·02	310	55	65
14341	55	165	1	<0·01	110	140	38
14345	5	4	<1	<0·01	340	8	5
	AAS			F.A.	XRF (ppm)		

5 cm

838223 87-2751 6933

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: HENTY FAULT ZONE

Title: GEOLOGICAL BASE

SHEET 2

Author J.P.R.	Dept.	Scale 1:5000	
Drawn O.H.	Date 11/87	Revised	Date
Checked	Date	S'ceded	Date
Sheet No.	FIG. No. 10	Drawing No.	D/LJ 50/030

6934

384 000 E

387 000 E

380 000 N

378 000 N

MACKINTOSH Cu + Ag
- adit no access

Barite Lode

0.0M 3N

TP 134

0.0M 2N

TP 133

0.0M 1N

13160

13159

2 zones 8' 3'
0·5(d)-0·9(Pb)
1·1 Au

NORTH MACKINTOSH
14321-22
2 lodes, steep W dip

2 lm @ 2%Pb,
1·0% Zn,
34 Ag
no Au

1 Level
990 RL
NEW NORTH MT FARRELL

0·2 Au

Plan proj. of Ore
Limits (Lode 65-80°W)
Ave. width 5'
Pitch 75° S

Adit
14320

SOUTH
MACKINTOSH
Adit
1020 RL

0·3 Au

3·3 Au (BCL)
3·15% Pb
0·19% Zn
150 Ag
580 As
70 W
Dump
14308, 09

Plan proj. of Ore Limits
3 Lodes
60° W Dip
70° S Pitch

4 Level
960 RL

2 Lode

3 Lode

1 Lode

8·4m @ 0·37g/t Au
0·26% Cu;
3g/t Ag

NORTH
MT FARRELL
NEW SHAFT
14305-07

0·2 Au

0·2 Au

0·5 Au

MT FARRELL
NORTH

MT FARRELL
SOUTH

1038 RL

FARRELL J.V. LEASE BOUNDARY

* Not sampled or Located
No Au, Sn, W
Zn to 0·18%
Pb to 0·11%
Barite?

LEGEND

ORDOVICIAN

- Ocon — Owen Conglomerate – mixed and undifferentiated sands, pebbles, boulders of predominantly Tyennan origin.
- Osh — grey fissile pyritic often crenulated and variably graphitic shales.
- Ovt — Farrell Slates – fine grained tuffaceous volcaniclastics, strongly sericitized often silicified and quartz veined.

CAMBRIAN

- Cvss — dirty poorly bedded arenaceous volcaniclastic.
- Cvi — feldspar phyric andesitic lavas.

Mt Black Volcanics

- Cva — silaceous acid lavas.

mfVi – medium feldspar porphyritic intermediate volcanic lava
qvn – quartz veining
Sslt – siltstone
ser – sericite
cb – carbonate
sil – silicified

Bedding strike/dip + facing

Old working

1986 BCL Survey (Bulk Cyanide Leach)

1987 BCL Survey (Bulk Cyanide Leach)

ROCK CHIP SAMPLING

	Cu	Zn	Ag	Au	Pb	As	Ba
14305	2	190	1	<0·01	580	4	590
14306	5	135	<1	<0·01	330	6	460
14307	7	180	<1	<0·01	140	7	430
14308	10	50	<1	<0·01	110	18	210
14309	185	3400	115	0·04	3·4%	3900	110
14320	28	280	3	<0·01	540	130	240
14321	520	2·1%	280	<0·01	2·95%	55	270
14322	210	2·0%	220	<0·01	2·25%	170	210
13159	32	55	<1	<0·01	26	20	270
13160	28	46	1	0·04	1100	85	190
	AAS			F.A.	XRF		

5 cm

838224

87-2751 6934

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project	HENTY FAULT ZONE		
Title	GEOLOGICAL BASE		
	SHEET 3		
Author J.P.R.	Dept. TAS	Scale 1:5000	
Drawn O.H.	Date 10/87	Revised	Date
Checked	Date	S'ceded	Date
Sheet No. FIG. No. 11		Drawing No. D/LJ 50/023	

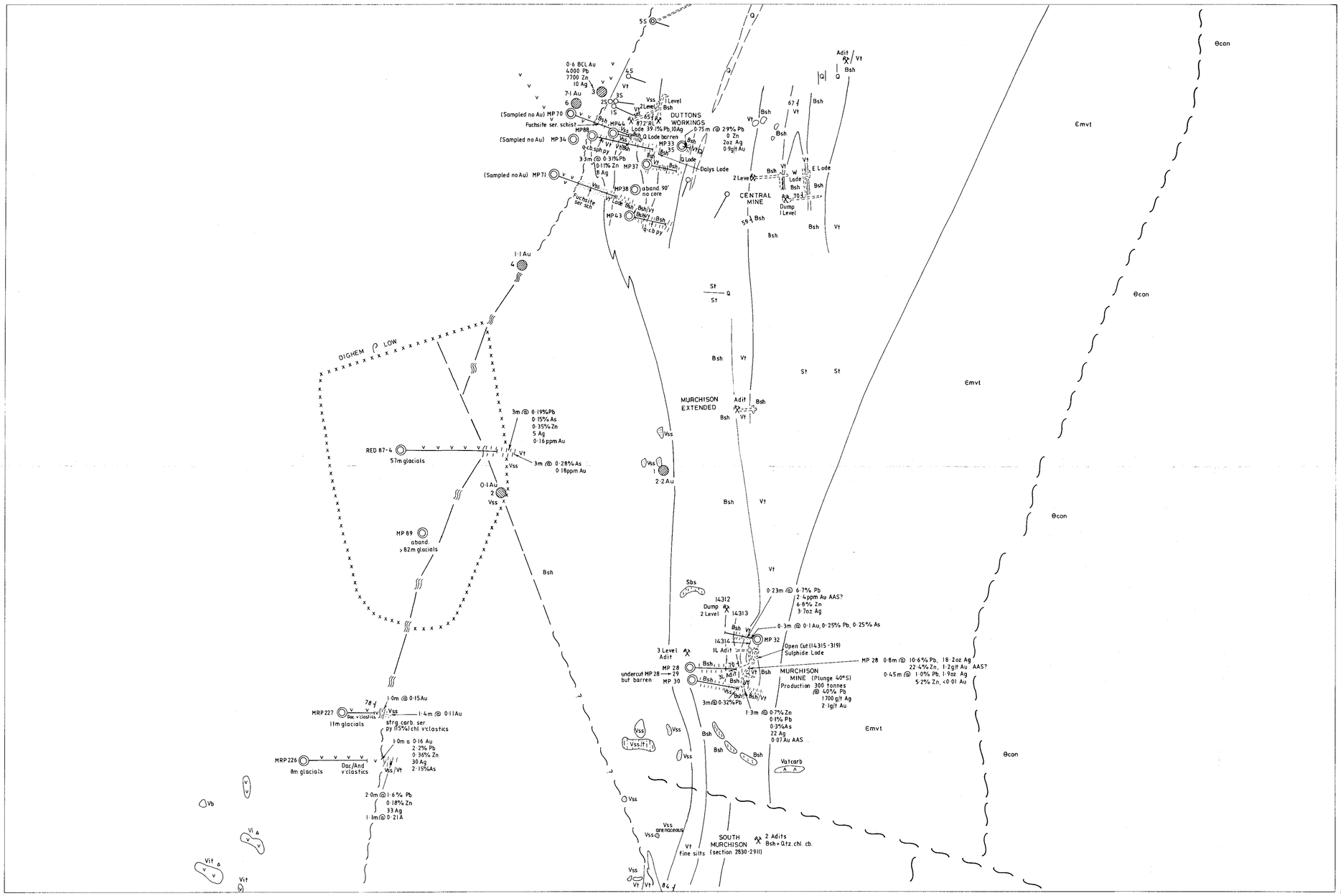
6935

384 000 E

387 000 E

378 000 N

376 000 N



LEGEND

ORDOVICIAN

- Θcon — Owen Conglomerate – mixed and undifferentiated sands, pebbles, boulders of predominantly Tyennan origin.

CAMBRIAN

Farrell Slates

- Bsh – grey fissile pyritic often crenulated and variably graphitic shales.
- Vt – fine grained tuffaceous volcaniclastics, strongly sericitized often silicified and quartz veined.
- Vss – dirty poorly bedded arenaceous volcaniclastic.

Mt Black Volcanics

- Vi – feldspar phyric andesitic lavas.
- Va – siliceous acid lavas.

- mfVi – medium feldspar porphyritic intermediate volcanic lava.
- q vn – quartz veining
- Sslt – siltstone
- ser – sericite
- cb – carbonate
- sil – silicified

Bedding strike/dip + facing

Old working

1986 BCL Survey (Bulk Cyanide Leach)

1987 BCL Survey (Bulk Cyanide Leach)

ROCK CHIP SAMPLING

	Cu	Zn	Ag	Au	Ba	Pb	As
14312	9900	20·6%	540	0·24	< 10	3·15%	1·28%
14313	75	4800	9	<0·01	240	4000	48
14314	460	510	95	0·05	180	1·63%	4150
14315	490	1100	430	0·40	90	5·75%	8700
14316	250	1250	46	<0·01	460	1600	400
14317	750	1·70%	440	1·09	105	7·70%	3·85%
14318	860	1700	220	0·10	580	5·00%	3950
14319	210	1550	50	0·01	110	1·37%	1300
	AAS			F.A.	XRF (ppm)		

838225

5 cm

87-2751 6935

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: HENTY FAULT ZONE

Title: GEOLOGICAL BASE

SHEET 4

Author J.P.R.	Dept.	Scale 1:5000	
Drawn Q.H.	Date 10/87	Revised	Date
Checked	Date	S'ceded	Date
Sheet No. FIG. No. 12		Drawing No. D/L J 50/024	

6936

383 000 E

386 000 E

376 000 N

374 000 N

E.L. 4/73
STERLING VALLEY

RED 87-8
RED 87-7
RED 87-2
20m glacials
MRP 233
11m glacials
RED 87-3
5m glacials
RED 87-5
14m glacials
MRP 212
15m glacials
RED 87-6
3m glacials
MRP 219
29m glacials

3·45m - 2·6Au, 19Ag
4·4% As, 0·18% Pb
0·19% Cu
4·0m - 0·55 Au
0·26% Sn 3·75% As
19·6 Ag
6·7m - 2·4 Au, 0·12% Sn
16 Ag (includes 4m-3·3Au)
4·0m - 2·34 Au, 7Ag, 4·2% As, 0·15% Cu, 0·1% Sn
4·65m - 5·9 Au, 34 Ag, 7% As, 0·56% Cu, 0·5% Sn
1·0m - 0·96 Au, 9Ag, 2·2% As, 0·15% Sn
1·0m - 0·93 Au, 8Ag, 4·5% As
1·7m - 1·74 Au, 0·28% Sn, 2·1% As
2·0m - 1·38 Au, 2·8% As, 0·35% Sn
5·7m - 1·27 Au, 0·3% Sn, 0·23ppm Au, 6 Ag
0·3m - 1·15 Au, 51 Ag, 2·6% Pb, 15% Zn
(1·1m reassay 0·04ppm Au!)
1·3m - 2·5 Au
3·0m - 2·8 Au
0·2m - 11 Ag, 4·75% As
0·1% Cu
0·7m - 0·27% Sn, 0·35% As
0·16 Au
stg shearing
1·65m - 0·23% Pb, 28 Ag
1·45m - 0·5 Au
0·25m - 0·43% Pb, 0·33% Cu,
110 Ag, 6% As, 0·63% Sn

RED 86-1
0·85m - 30·7% Pb, 2·8% Zn
0·4% Cu, 670 Ag, 0·15 Au
2·8m - 1% Pb, 0·5% Zn, 26 Ag
Vss/Vt/Bsh
Bsh
Vss Bsh xtuff Bsh
Qcb swrk
GREEN & KINGS
Vss
Bsh
Vt
MR 2
12·9m - 0·31 Au
incl 1·5 - 0·7 Au
1·0 - 0·6 Au
2·4 - 0·48 Au
7m swrk q cb f py
MR 1
Bsh
8m swrk q cb f py
(3·3m - 0·26 Au
incl. 1·0m - 0·48 Au)
ρ LOW (Dighem)
THOMAS
COLLINS
Bsh
THOMAS BLOCKS
Vt
TULLAH
Vt sh in Vi
FINDLAY'S & DONOGHUES
DONOGHUES
MIDSONS
Vi
f Vi
Vss
Bsh

LEGEND

ORDOVICIAN
- Θcon — Owen Conglomerate – mixed and undifferentiated sands, pebbles, boulders of predominantly Tyenna origin.
- Bsh — Farrell Slates – grey fissile pyritic often crenulated and variably graphitic shales.
- Vt — Farrell Slates – fine grained tuffaceous volcaniclastics strongly sericitized often silicified and quartz veined.

CAMBRIAN
- Vss — Farrell Slates – dirty poorly bedded arenaceous volcaniclastic.
- Vi — Mt Black Volcanics – feldspar phyric andesitic lavas.
- Va — Mt Black Volcanics – siliceous acid lavas.

mf Vi – medium feldspar porphyritic intermediate volcanic lava
qvn – quartz veining
Sslt – siltstone
ser – sericite
cb – carbonate
sil – silicified

Bedding strike dip + facing

Old workings

1986 BCL Survey (Bulk Cyanide Leach)

1987 BCL Survey (Bulk Cyanide Leach)

838226

5 cm

87-2751 6936

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: HENTY FAULT ZONE

Title: GEOLOGICAL BASE

SHEET 5

Author J.P.R.	Dept.	Scale 1:5000	
Drawn O.H.	Date 11/87	Revised	Date
Checked	Date	S'ceded	Date
Sheet No.	FIG. No. 13	Drawing No.	D/LJ 50/31

6937

RECENT, QUATERNARY — Glacial moraine and scree

UPPER CAMBRIAN — Owen Conglomerate. Massive quartz and quartzite pebble conglomerate

MIDDLE CAMBRIAN — Volcanomict breccio-conglomerate and quartz-crystal-lithic tuff. Intercalations of volcanic sandstone, siltstone and shale

MT. READ VOLCANICS

West of the Henty Fault Zone

LOWER CAMBRIAN

- Feldspar phyric (dacitic) lava and ignimbrite. Subvolcanic felsic intrusive
- Basalt — flows and dykes
- Chloritic volcanic sandstone, siltstone and shale. Volcanic lithic breccia. Feldspar and quartz-crystal tuff.

East of the Henty Fault Zone

- Siliceous volcanic sandstone, siltstone and chert. Quartz and feldspar-crystal-lithic breccia. Crystal tuff. Carbonaceous tuff-shale.
- Quartz-porphyritic rhyolite lava.

Fault - observed
Fault - inferred
Dyke or vein
Geological contact
Inferred geological contact
Areas of examined outcrop
Bedding
Primary lineation (flow bedding etc)
Schistosity
x 8934 Rock outcrop or float sample
8936 Stream sediment sample

silif Silicification
py Pyrite
cp Chalcopyrite
li Limonite

381 500 m E · 382 000 m E · 382 500 m E · 383 000 m E

5 371 500 m N · 71 000 m N · 70 500 m N · 70 250 m N · 70 000 m N · 69 750 m N · 69 500 m N · 69 250 m N · 69 000 m N · 68 500 m N

5 370 500 m N · 5 370 000 m N · 5 369 500 m N · 5 369 000 m N · 5 368 500 m N

E.L. 1/62
E.L. 4/73

Sterling River

Primary lineation in welded dacitic ignimbrite

0.3m qtz vein

Basalt dykes

qtz veins with py

fine grained cherty sediment

volcanic lithic breccia

crenulated qtz-sericite schist zone

Basalt dyke or flow

Samples → 7921 @ 545E, 7922 @ 590E off plan

2 x 3m granite erratic

10m moraine wall

30m moraine wall

Glacial Moraine Ridge

Walking track

GODC pit

E 2 pit

Sub-surface geology beneath glacials from drill holes

limonite seeps

limonite seep

welded ignimbrite

1m chert band

HENTY FAULT ZONE

STITT RIVER

G.N. (AMG) M.N. 12°

100 50 0 100 200 Metres

5 cm

MT. LYELL GRID LINE 68 N
5100'W · 4000'W · 3000'W · 2300'W
E.L. 1/62
E.L. 9/66

838227 87-2751 6937

Billiton Australia
The Metals Division of The Shell Company of Australia Limited

Project	ROSEBERY EAST J.V. TASMANIA
Title	MT BLACK EL 1/62 SOUTH STITT GEOLOGY
Author J.G.P. Dept. D'PORT	Scale 1:5000
Drawn A.S. Date 4/86	Revised Date
Checked J.G.P. Date 5/86	S'ceded Date
Sheet No. FIG. No. 14	Drawing No. LJ 50/1016

6938

MURCHISON RIVER
LOCATION PLAN

84000 E

85000 E

MRP 227

MRP 226

Murchison Highway

76000 mN

FAULT

HENTY

(Approx. Surface Expression)

RED 87-10

RED 86-1

RED 87-8

RED 87-7

65°

RED 87-2

MRP 233

RED 87-3

LAKE ROSEBERY

RED 87-5

MRP 212

RED 87-6

MR 2

MR 1

MRP 219

ACCESS TRACK

Murchison Highway

REVISED TENEMENT BOUNDARY

E.L. 1/62

E.L. 4/73

75000 mN

E.L. 1/62
E.L. 4/73

ROSEBERY

5 cm

0 500m

838228

6938

87-2751

FIG. No. 15

6939

5,375,800 N | 5,375,600 N | 5,375,400 N | 5,375,200 N | 5,375,000 N

Overall extent of I.P. anomaly

CENTRE OF I.P. ANOMALY (+30 msec)

R.L. 200 m | 180 | 160 | 140 | 120 | 100 | 80 | 60 | 40 | 20 | 00 m | -20 | -40 | -60 | -80 | -100

LAKE ROSEBERY (159m RL)

RED 87-7
RED 87-8
MRP 233 COLLAR
RED 87-2 COLLAR
RED 87-3 COLLAR
RED 87-5 COLLAR (Proj)
MRP 212 COLLAR
RED 87-6 COLLAR (Proj)
MRP 219 COLLAR

+ RED 87-10
⊙ 1·0m @ 0·66g·t Au
⊙ 1·0m @ 0·4g·t Au

+ RED 87-8
+ RED 87-7
⊙ 3·45m @ 2·61 g/t Au

+ MRP 233
⊙ 4m @ 3·3 g/t Au

+ RED 87-2
⊙ 4m @ 2·34 g/t Au

+ RED 87-3
⊙ 4·65m @ 5·9 g/t Au

+ RED 87-5
⊙ 1·70m @ 1·74 g/t Au

+ MRP 212
⊙ 3·4 m @ 0·35 g/t Au

+ RED 87-6
⊙ 3·0m @ 2·8g/t Au
⊙ 1·3m @ 2·5g/t Au
(8·9m @ 1·59g/t Au)

+ MRP 219 1·45m @ 0·5 g/t Au
⊙ 4·5m @ 0·14 g/t Au

+ Intercept on Henty Fault

⊙ Centre of mineralised zone

5 cm

838229 6939

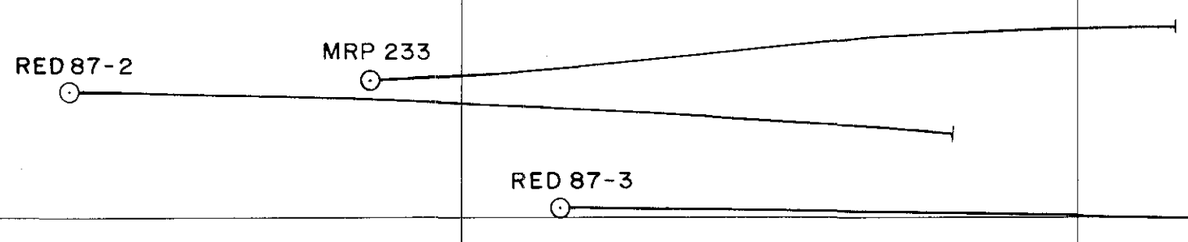
Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project	ROSEBERY EAST J.V.		
Title	MURCHISON RIVER AREA LONGITUDINAL PROJECTION SHOWING DRILL HOLE INTERCEPTS		
Author	J G P	Dept. TAS	Scale 1:1000
Drawn	A S	Date 6/87	Revised Date
Checked		Date	S'ceded Date
Sheet No.	FIG. No. 16		Drawing No. LJ 50/1076

6940

384 400 E | 384 500 E | 384 600 E | 384 700 E

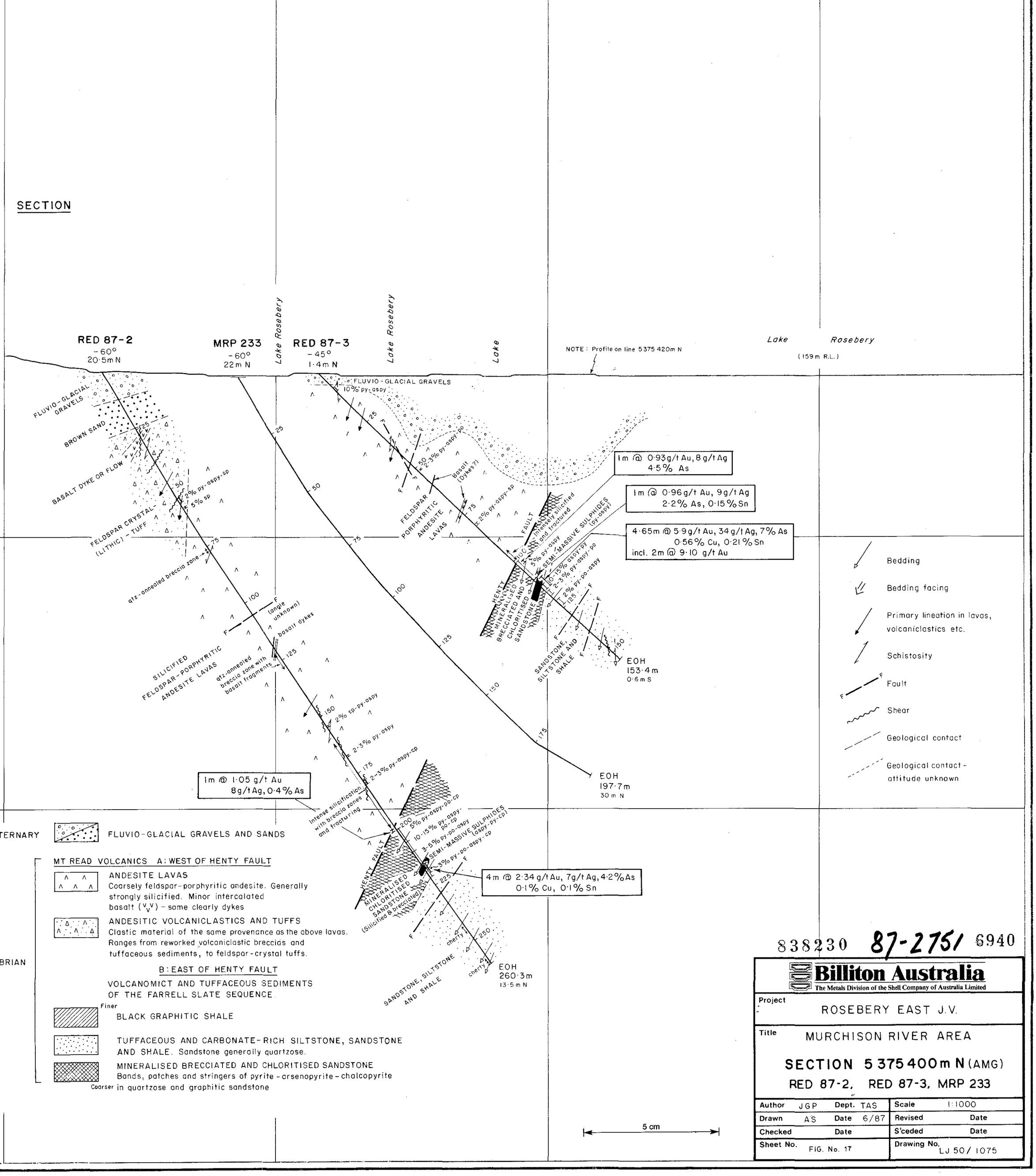
PLAN



5 375 400 N | 5 375 400 N

SECTION

R.L.



QUATERNARY — FLUVIO-GLACIAL GRAVELS AND SANDS

CAMBRIAN

MT READ VOLCANICS A: WEST OF HENTY FAULT

ANDESITE LAVAS
Coarsely feldspar-porphyritic andesite. Generally strongly silicified. Minor intercalated basalt ($^{V}_{V}{}^{V}$) – some clearly dykes

ANDESITIC VOLCANICLASTICS AND TUFFS
Clastic material of the same provenance as the above lavas. Ranges from reworked volcaniclastic breccias and tuffaceous sediments, to feldspar-crystal tuffs.

B: EAST OF HENTY FAULT

VOLCANOMICT AND TUFFACEOUS SEDIMENTS OF THE FARRELL SLATE SEQUENCE

Finer
BLACK GRAPHITIC SHALE

TUFFACEOUS AND CARBONATE-RICH SILTSTONE, SANDSTONE AND SHALE. Sandstone generally quartzose.

MINERALISED BRECCIATED AND CHLORITISED SANDSTONE
Bands, patches and stringers of pyrite – arsenopyrite – chalcopyrite
Coarser in quartzose and graphitic sandstone

5 cm

838230 87-2751 6940

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project	ROSEBERY EAST J.V.
Title	MURCHISON RIVER AREA SECTION 5 375 400m N (AMG) RED 87-2, RED 87-3, MRP 233

Author	JGP	Dept.	TAS	Scale	1:1000
Drawn	AS	Date	6/87	Revised	Date
Checked		Date		S'ceded	Date
Sheet No.	FIG. No. 17			Drawing No.	LJ 50/ 1075

6941

PLAN

384 500 E | 384 600 E | 384 700 E

s 375 350m N (AMG)

RED 87-5

EOH 145·5 m

s 375 350m N

SECTION

WEST — EAST

200 RL

100

00

-100

-200

Survey Peg S1009

RED 87-5 −56°30'

480 E | 500 E | 520 E | 540 E | 560 E | 580 E | 600 E | 620 E | 640 E | 660 E | 680 E | 700 E

FLUVIO-GLACIAL GRAVELS – No Outcrop

FLUVIO-GLACIAL GRAVELS
FLUVIO-GLACIAL SILTS

oxidised

limonite in qtz veins

1-2% py-asspy

2% py

FELDSPAR-PORPHYRITIC ANDESITE LAVA

basalt dykes

NON-PORPHYRITIC MAFIC LAVA

HENTY FAULT

97-99m: 2m @ 1·38 g/t Au, 0·35% Sn, 2·8% As

massive asspy-py

103-104·7m: 1·7m @ 1·74 g/t Au, 0·21% Sn, 2·1% As

SILICIFIED FELDSPAR-PORPHYRITIC ANDESITE LAVA

Qtz-cemented rectonic breccia fractured and broken below this m

GREEN ALTERED SILICEOUS ROCK (Lens ?)

Py-asspy stringers

Py-asspy-po in patchy qtz-sulphide stringers

EOH 145·5m

BRECCIATED MINERALISED SANDSTONE AND SHALE
Quartz-chlorite alteration

SANDSTONE AND SHALE
Dolomitic and graphitic

NB. Henty Fault intersects Section at an angle of 13° from perpendicular

LEGEND

QUATERNARY — FLUVIO-GLACIAL GRAVELS, SANDS AND SILTS

CAMBRIAN

MT READ VOLCANICS — A: WEST OF HENTY FAULT

ANDESITE LAVAS
Coarsely feldspar-porphyritic andesite. Generally strongly silicified. Minor intercalated basalt (V_2V) – some clearly dykes

ANDESITIC VOLCANICLASTICS AND TUFFS
Clastic material of same provenance as the above lavas. Includes reworked volcaniclastic breccias, tuffaceous sediments and feldspar-crystal tuffs.

B: EAST OF HENTY FAULT

VOLCANOMICT AND TUFFACEOUS SEDIMENTS OF THE FARRELL SLATE SEQUENCE

Finer

BLACK GRAPHITIC SHALE

TUFFACEOUS AND CARBONATE-RICH SILTSTONE, SANDSTONE AND SHALE
Sandstone, generally quartzose.

Coarser

MINERALISED, BRECCIATED AND ALTERED SANDSTONE
Bands, patches and stringers of pyrite-arsenopyrite-chalcopyrite in silicified, chloritised and fourmalinised, quartzose graphitic sandstone. Minor interbedded graphitic tuffaceous shale.

- Bedding
- Bedding facing
- Primary lineation in lavas, volcaniclastics etc.
- Schistosity
- Fault
- Shear
- Geological contact
- Geological contact - attitude unknown

5 cm

838231 87-2751 6941

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: ROSEBERY EAST J.V. - EL 1/62

Title: MURCHISON RIVER AREA
SECTION s 375 350 m N (AMG)
RED 87-5

Author JGP	Dept. TAS	Scale 1:1000	
Drawn AS	Date 8/87	Revised	Date
Checked	Date	S'ceded	Date
Sheet No. FIG. No. 18		Drawing No. LJ 50/1080	

6942

PLAN

384 500 E

384 600 E

RED 87-6

5 375 300 N (AMG)

E.O.H. 157·0m

SECTION

200 RL

RED 87-6

FLUVIO GLACIAL GRAVELS

Basalt dyke

Fracture Zone Tr. py.

Strg bleaching + fracturing Qtz vn + py

Qtz vn + py

Tension fractured + silicification Qtz vns

50m

Basalt dyke

Internal contact Brecciated Strong silicate alteration

FELDSPAR PORPHYRITIC ANDESITE LAVAS & VOLCANICLASTICS

Q. carb py vn fracture

100m

Sand & breccia strd. sand. strd. + py (5%) Fault Zone: sand. volc. <20% py

FAULT ZONE

Py-cpy in sandstone Massive py-cpy sandstone siltstones

150m

E.O.H. 157·0m

SANDSTONES, SILTSTONES, SHALES

112·0 - 115·0m
3·0m @ 2·8 g/t Au, 63 g/t Ag
1·28% As

118·6 - 119·9m
1·3m @ 2·5 g/t Au 48 g/t Ag
6·3% As 0·38% Sn

100 RL

0 RL

-100

-200

384 500 E

384 600 E

LEGEND

QUATERNARY — FLUVIO-GLACIAL GRAVELS, SANDS AND SILTS

MT READ VOLCANICS

A. WEST OF HENTY FAULT

ANDESITE LAVAS
Coarsely feldspar-porphyritic andesite. Generally strongly silicified. Minor intercalated basalt (T_h-T_i) - some clearly dykes

ANDESITIC VOLCANICLASTICS AND TUFFS
Clastic material of same provenance as the above lavas. Includes reworked volcaniclastic breccias, tuffaceous sediments and feldspar-crystal tuffs

CAMBRIAN

B. EAST OF HENTY FAULT

VOLCANOMICT AND TUFFACEOUS SEDIMENTS OF THE FARRELL SLATE SEQUENCE

BLACK GRAPHITIC SHALE

TUFFACEOUS AND CARBONATE-RICH SILTSTONE, SANDSTONE AND SHALE
Sandstone - generally quartzose

MINERALISED, BRECCIATED AND ALTERED SANDSTONE
Bands, pebbles and stringers of pyrite-arsenopyrite-shale/grit in silicified, chloritised and tourmalinised, quartzose greywacke sandstone. Minor interbedded graphitic tuffaceous shale

Bedding

Bedding facing

Primary structure in igneous volcaniclastics etc.

Schistosity

Fault

Shear

Geological contact

Geological contact attitude unknown

5 cm

838232 87-2751 6942

Billiton Australia

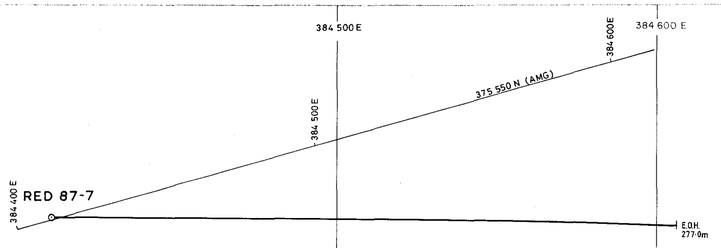
ROSEBERY EAST J.V. - EL 1/62

LAKESIDE
SECTION 5 375 300 N (AMG)
RED 87-6

Author	D.B.H.	Scale	1:1000
Date	O.H. 10/87	Revised	
Checked	Date	Issue No.	Date
Drawing No.	FIG. No. 19	Plan No.	D/LJ 50/026

0963

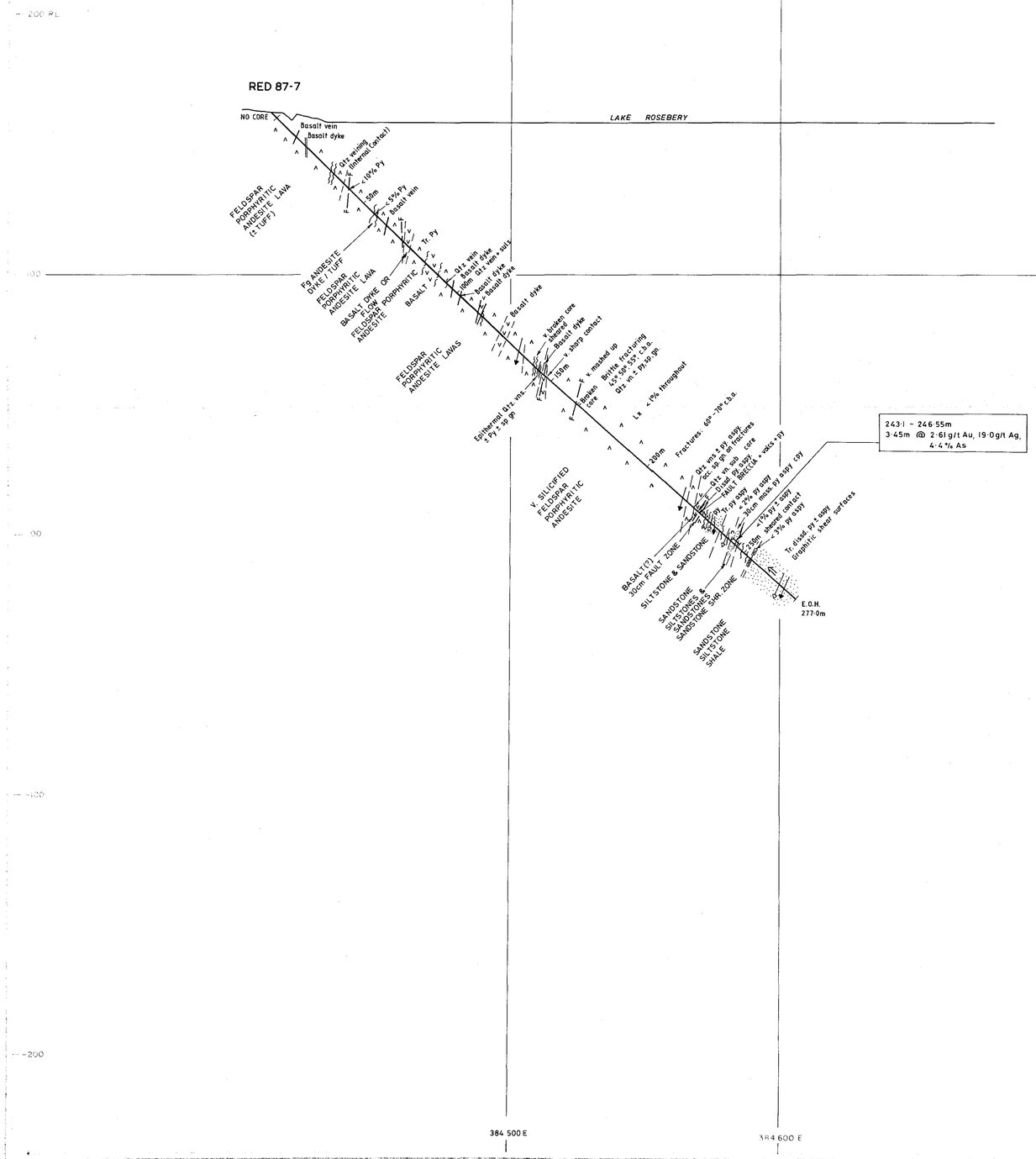
PLAN



SECTION

WEST (=106° AMG)

EAST



LEGEND

QUATERNARY — FLUVIO-GLACIAL GRAVELS, SANDS AND SILTS

CAMBRIAN

MT READ VOLCANICS — A: WEST OF HENTY FAULT

ANDESITE LAVAS
Coarsely feldspar-porphyritic andesite. Generally strongly silicified. Minor intercalated basalt ($V_V V$) – some clearly dykes

ANDESITIC VOLCANICLASTICS AND TUFFS
Clastic material of some provenance as the above lavas. Includes reworked volcaniclastic breccias, tuffaceous sediments and feldspar-crystal tuffs.

B: EAST OF HENTY FAULT

VOLCANOMICT AND TUFFACEOUS SEDIMENTS OF THE FARRELL SLATE SEQUENCE

BLACK GRAPHITIC SHALE

TUFFACEOUS AND CARBONATE-RICH SILTSTONE, SANDSTONE AND SHALE
Sandstone, generally quartzose

MINERALISED, BRECCIATED AND ALTERED SANDSTONE
Bands, patches and stringers of pyrite-arsenopyrite-chalcopyrite in silicified, chloritised and tourmalinised, quartzose graphitic sandstone. Minor interbedded graphitic tuffaceous shale

- Bedding
- Bedding facing
- Primary lineation in lavas, volcaniclastics etc
- Schistosity
- Fault
- Shear
- Geological contact
- Geological contact - attitude unknown

5 cm

838233 87-2751 6943

Billiton Australia
The Metals Division of the Shell Companies of Australia Limited

Project: ROSEBERY EAST J.V. – EL 1/62

Title: MURCHISON RIVER AREA
SECTION RED 87-7
ALONG PLANE OF HOLE (106°AMG)
≈ 375 500 N (AMG)

Author D.B.H.	Dept	Scale 1:1000	
Drawn O.H.	Date 10/87	Revised	Date
Checked	Date	Scaled	Date
Sheet No. FIG. No. 20		Drawing No. D/LJ 50/025	

6944

PLAN

384 600 E

5 375 550 N

RED 87-8

5 375 550 N

E.O.H.
280·1m

SECTION

RED 87-8
-45° (1m N)

SURVEY PEG S1013

LAKE ROSEBERY

LAKE ROSEBERY

Basalt dykes

35% @ 50-0m

ANDESITIC FELDSPAR-CRYSTAL TUFF

Basalt dyke

BASALT (DYKE?)

Basalt dykes

ANDESITIC FELDSPAR-CRYSTAL TUFF

Basalt dykes

0·2m 15% over 75% in fault

TUFFACEOUS SEDIMENTS WITH BASALT DYKES

ANDESITIC CRYSTAL TUFF

MAFIC LAVA (DYKE?)

FELDSPAR PORPHYRITIC ANDESITE (CRYSTAL TUFF?)

MAFIC LAVA (DYKES?) WITH INCLUSIONS of ANDESITIC VOLCANIC

200

FAULT

SILICIFIED DEFORMED ANDESITIC VOLCANIC (CRYSTAL TUFF?)

247 - 253m
6m @ 0·14 g.t. Au, 0·03% Pb, 0·08% Zn

Trace 0·09% Pb

0·2m 2% Pb

2% Pb

2% Pb

BRECCIATED QUARTZ-CHLORITE-SERICITE-CARBONATE ROCK

ALTERED QUARTZ SANDSTONE (silicified & chlorite altered) Minor brecciation & sulphides

E.O.H.
280m
12·5mS

QUARTZ SANDSTONE MINOR SHALE

384 600 E

LEGEND

QUATERNARY

Dykes

838234 87-2751 6944

Hilton Australia

ROSEBERY EAST J.V. - EL 1762

MURCHISON RIVER AREA

SECTION 5 375 550m N AMG

RED 87-8

Drawn	J.G.P.	Date	TAS
Traced	O.H.	Date	12/87
Checked		Date	
Approved		Date	
Microfilm No.	FIG. No. 21	Drawing No.	D/LJ 50/038

5 cm

6945

BILLITON AUSTRALIA

Geophysical Log

DIAMOND DRILL HOLE N° : RED 87-2

PROJECT	MURCHISON RIVER	STATE	Tas.
ANOMALY N°	———	GRID COORDS	5 375 400 N 384 350 E
INCLINATION	60°E	AZIMUTH	90°TN
DATE DRILLED	7/87	TOTAL DEPTH	260·3m
CASING	No PVC		

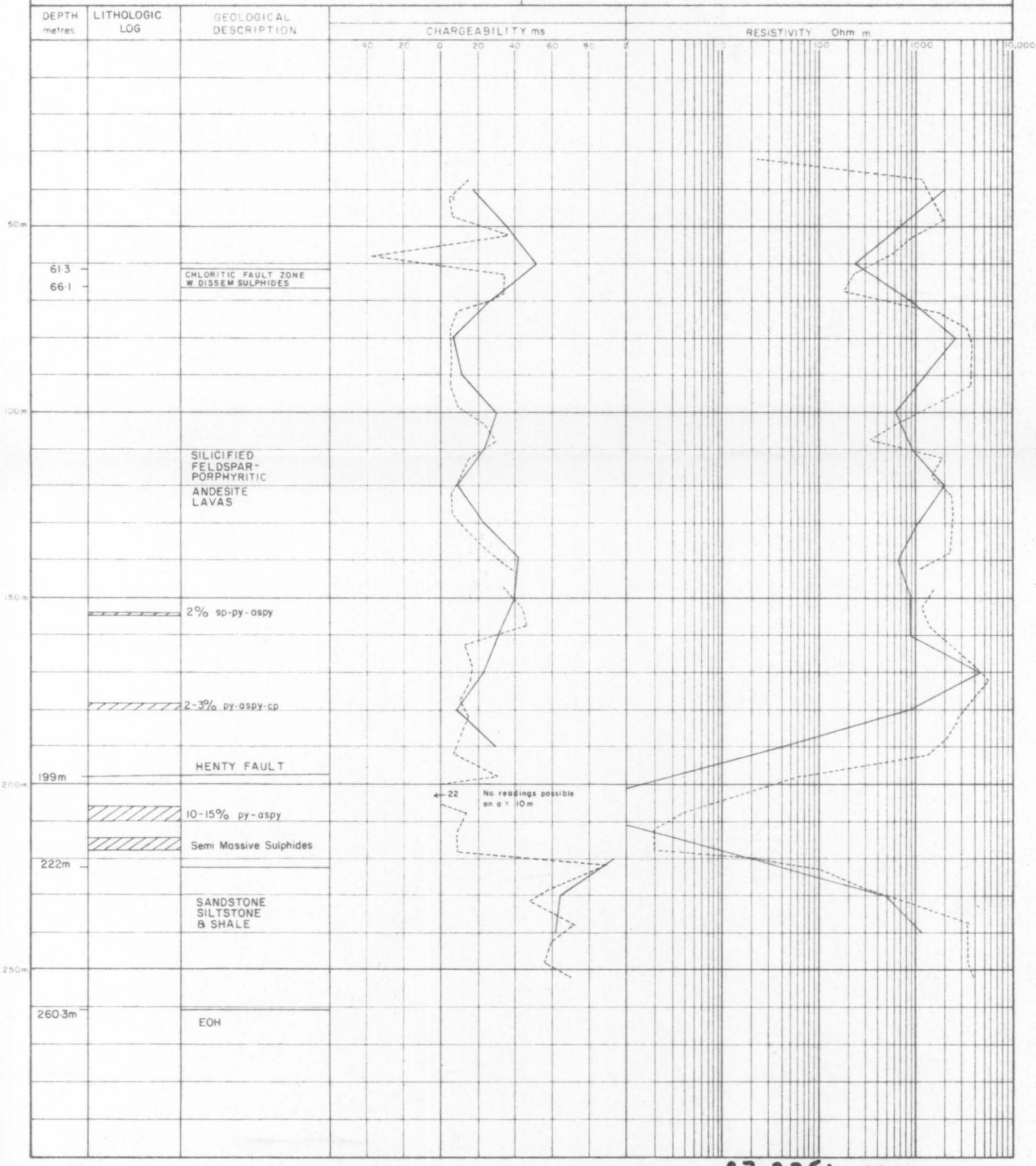
GROUND GEOPHYSICAL ANOMALIES I.P.

IP / RESISTIVITY LOGGING —

CONTRACTOR	BAUS (R.D.)	DATE LOGGED	12/8/87, 18/8/87
ARRAY	3 ARRAY	ELECTRODE SPACINGS	5m ------ 10m ——
RECEIVER	IPR-8	TRANSMITTER	25 W
INTEGRATION WINDOW	M_{232}	TIMING	2 secs
PLOTTING POINT	mid P_1 P_2		

SUSCEPTIBILITY LOGGING

BY DATE LOGGED



838235 87-2751 6945 FIG. No. 22

6946

BILLITON AUSTRALIA

Geophysical Log

DIAMOND DRILL HOLE N° : RED 87-3

PROJECT	MURCHISON RIVER	STATE	TAS.
ANOMALY N°	———	GRID COORDS	5 375 400 N 384 516 E
INCLINATION	45°	AZIMUTH	90° TN
DATE DRILLED	7/87	TOTAL DEPTH	153.4m
CASING	0-6m steel No PVC		

GROUND GEOPHYSICAL ANOMALIES I.P.

I.P. / RESISTIVITY LOGGING

CONTRACTOR	BAUS	DATE LOGGED	11/8/87
ARRAY	3 ARRAY	ELECTRODE SPACINGS	5m ------ 10m ———
RECEIVER	IPR-8	TRANSMITTER	25 W
INTEGRATION WINDOW	M_{232}	TIMING	2 secs
PLOTTING POINT	mid P_1 P_2		

SUSCEPTIBILITY LOGGING

BY DATE LOGGED

DEPTH metres	LITHOLOGIC LOG	GEOLOGICAL DESCRIPTION
6m		Glacials
		Feldspas Porphyritic Andesite Lavas
		2-3% py, aspy, po
		2% py, aspy, sp
101m		HENTY FAULT
		Mineralised Sst
		Semi-Massive Sulphides (aspy-py-cp)
116m		
		Sandstone
		Siltstone & Shale
153.4m		EOH

CHARGEABILITY ms

RESISTIVITY Ohm m

No readings possible

low po <1 (N.R)

838236 87-2751 6946 FIG. No. 23

6947

BILLITON AUSTRALIA

Geophysical Log

DIAMOND DRILL HOLE N° : RED 87-5

PROJECT	MURCHISON RIVER	STATE	TAS.
ANOMALY N°	———	GRID COORDS	5 375 350 mN 384 522 mE
INCLINATION	60°E	AZIMUTH	90° TN
DATE DRILLED	6/87	TOTAL DEPTH	145 5m
CASING	Slotted PVC		

GROUND GEOPHYSICAL ANOMALIES : I.P.

IP / RESISTIVITY LOGGING —

CONTRACTOR	BAUS(R.D.)	DATE LOGGED	21/8/87
ARRAY	3 ARRAY	ELECTRODE SPACINGS	5m ------ 10m ———
RECEIVER	IPR-8	TRANSMITTER	25 W
INTEGRATION WINDOW	M_{232}	TIMING	2 secs
PLOTTING POINT	mid P_1 P_2		

SUSCEPTIBILITY LOGGING

BY : DATE LOGGED :

DEPTH metres	LITHOLOGIC LOG	GEOLOGICAL DESCRIPTION
		Glacials
16m		
		Feldspas Porphyritic Andesite Lava
91m		HENTY FAULT
		3% py-aspy
		5-10% py-aspy Mineralised Sst & Sh
		Sandstone & Shale 1-3% po-py
145·5m		EOH

CHARGEABILITY ms: 40 20 0 20 40 60 80 0

RESISTIVITY Ohm m: 10 100 1000 10,000

50m 100m 150m 200m 250m

838237 87-2751 6947 FIG. No 24

6948

BILLITON AUSTRALIA

Geophysical Log

DIAMOND DRILL HOLE N° : RED 87-6

PROJECT	MURCHISON RIVER	STATE	TAS.
ANOMALY N°	———	GRID COORDS	5 375 300 mN 384 520 mE
INCLINATION	50°E	AZIMUTH	90°TN
DATE DRILLED	7/87	TOTAL DEPTH	157m
CASING	Slotted PVC		

GROUND GEOPHYSICAL ANOMALIES IP

IP / RESISTIVITY LOGGING —

CONTRACTOR	BAUS(R.D.)	DATE LOGGED	21/8/87
ARRAY	3 ARRAY	ELECTRODE SPACINGS	5m ------- 10m ———
RECEIVER	IPR-8	TRANSMITTER	25 W
INTEGRATION WINDOW	M_{232}	TIMING	2 secs
PLOTTING POINT	mid P_1 P_2		

SUSCEPTIBILITY LOGGING

BY DATE LOGGED

DEPTH metres	LITHOLOGIC LOG	GEOLOGICAL DESCRIPTION
4m		Glacials
		FELDSPAR PORPHYRITIC ANDESITE LAVAS
50m		
100m		
101m		HENTY FAULT
		Dissem. py, aspy
		Strong alteration
		Mass. py, asp
		SANDSTONES, SILTSTONES & SHALES
150m		
157m		EOH
200m		
250m		

CHARGEABILITY ms: 40 20 0 20 40 60 80 0

RESISTIVITY Ohm m: 10 100 1000 10,000

838238

87-2751 6948 FIG. No. 25

6949

BILLITON AUSTRALIA

Geophysical Log

DIAMOND DRILL HOLE N° : RED 87-7

PROJECT	MURCHISON RIVER	STATE	TAS.
ANOMALY N°	——	GRID COORDS	5 375 551mN 384 412mE
INCLINATION	- 45	AZIMUTH	106°TN
DATE DRILLED	8/87	TOTAL DEPTH	277m
CASING	Slotted PVC		

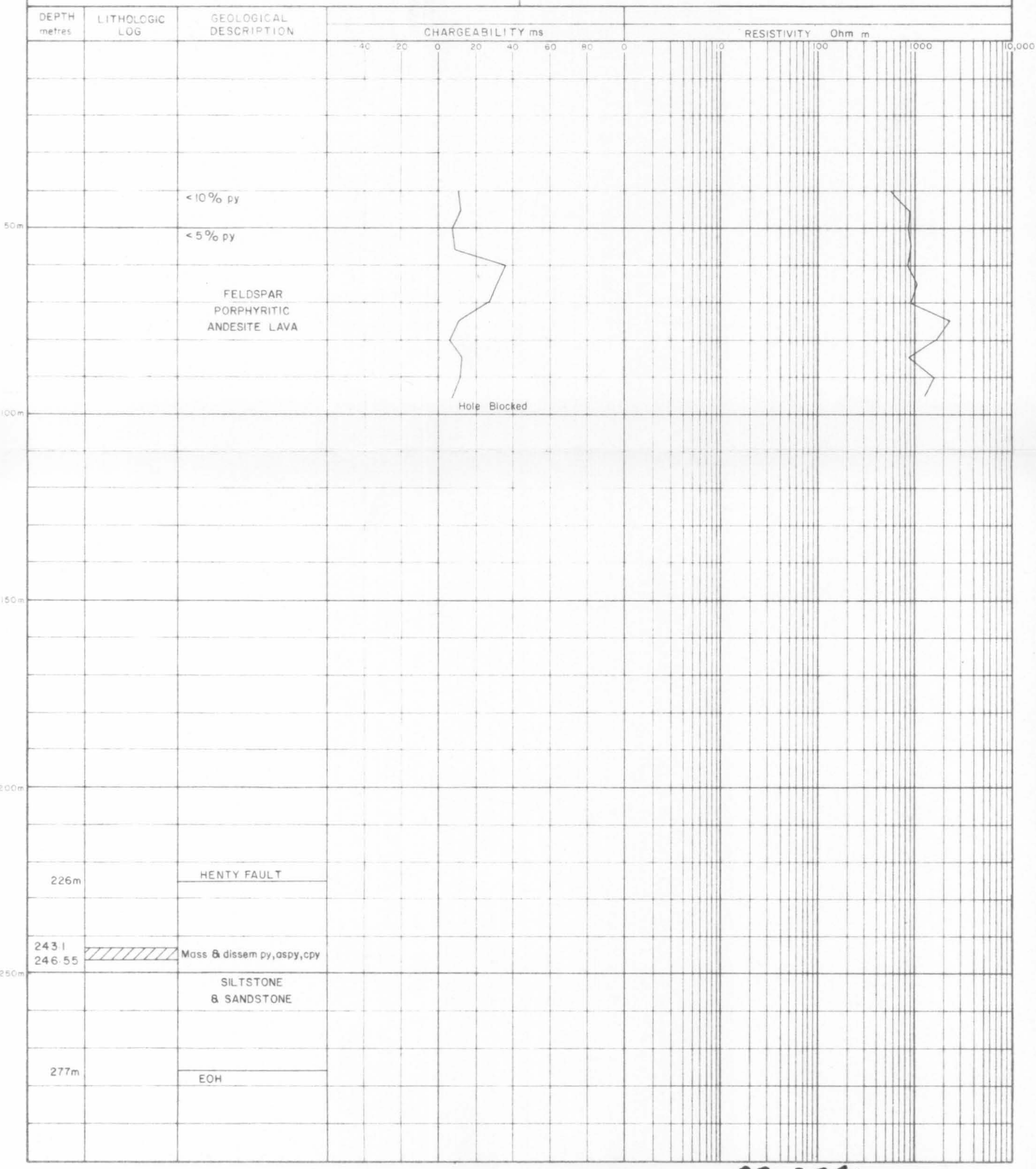
GROUND GEOPHYSICAL ANOMALIES : IP

IP / RESISTIVITY LOGGING —

CONTRACTOR	: BAUS	DATE LOGGED	: 20/9/87
ARRAY	: 3ARRAY	ELECTRODE SPACINGS	: 10m ——
RECEIVER	: IPR-8	TRANSMITTER	: 25W
INTEGRATION WINDOW	: M_{232}	TIMING	: 2 sec.
PLOTTING POINT	: mid P_1P_2		

SUSCEPTIBILITY LOGGING

BY : DATE LOGGED :



838239 87-2751 6949 FIG. No. 26

6950

BILLITON AUSTRALIA

Geophysical Log

DIAMOND DRILL HOLE N° : RED 87-8

PROJECT	MURCHISON RIVER	STATE	TAS.
ANOMALY N°	——	GRID COORDS	5 375 551 mN 384 412 mE
INCLINATION	−45	AZIMUTH	90°
DATE DRILLED	8/87	TOTAL DEPTH	280m
CASING	Slotted PVC		

GROUND GEOPHYSICAL ANOMALIES : IP

IP / RESISTIVITY LOGGING —

CONTRACTOR	BAUS	DATE LOGGED	30/9/87
ARRAY	3ARRAY	ELECTRODE SPACINGS	10m ——
RECEIVER	IPR-8	TRANSMITTER	25W
INTEGRATION WINDOW	M_{232}	TIMING	2 sec.
PLOTTING POINT	mid $P_1 P_2$		

SUSCEPTIBILITY LOGGING

BY : DATE LOGGED :

DEPTH metres	LITHOLOGIC LOG	GEOLOGICAL DESCRIPTION	CHARGEABILITY ms	RESISTIVITY Ohm m
			40 20 0 20 40 60 80 0	10 100 1000 10,000
50m				
100m				
150m				
200m				
226m		HENTY FAULT		
			N/R	Hole Blocked
250m				
280m		EOH		

838240

87-2751 6950 FIG. No. 27

6951

BILLITON AUSTRALIA

SIROTEM SURVEY

AREA [illegible]

LINE No

OR
DH No RGD 87-4

LOOP CONFIG.

LOOP DIMENSION ~150x150m.

ST or ET ST

STATION INTERVAL 5,10 m.

STACKS 512

SFERICS

INST. SERIAL No

OPERATOR

DATE 30/9/87

838241

LOOP DIAGRAMS ETC.

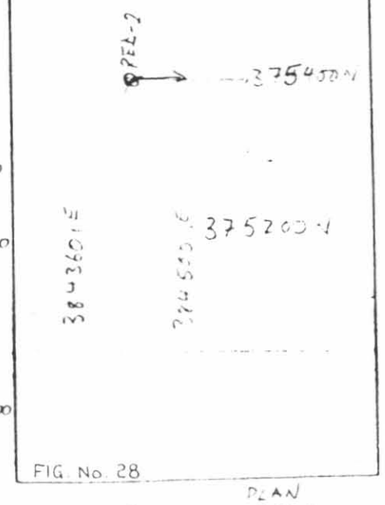


FIG. No. 28

PLAN

87-2751 6951

6952

BILLITON AUSTRALIA

SIROTEM SURVEY

AREA MURCHISON

LINE No

OR
DH No RED-87-6

LOOP CONFIG.

LOOP DIMENSION ~150 x 150 m

ST or ET ST

STATION INTERVAL 5,10m

STACKS 512

SFERICS

INST. SERIAL No MK II

OPERATOR XH

DATE 30/9/87.

838245

LOOP DIAGRAMS ETC.

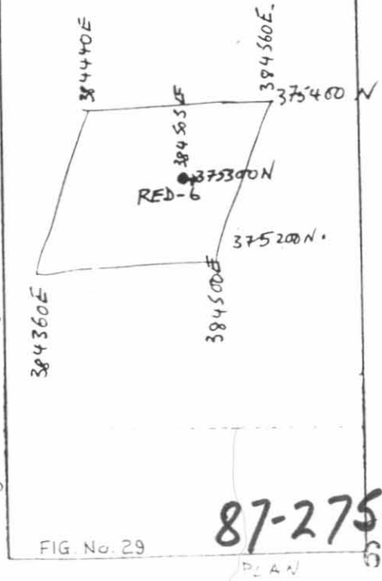


FIG. No. 29

87-2751

PLAN

6952

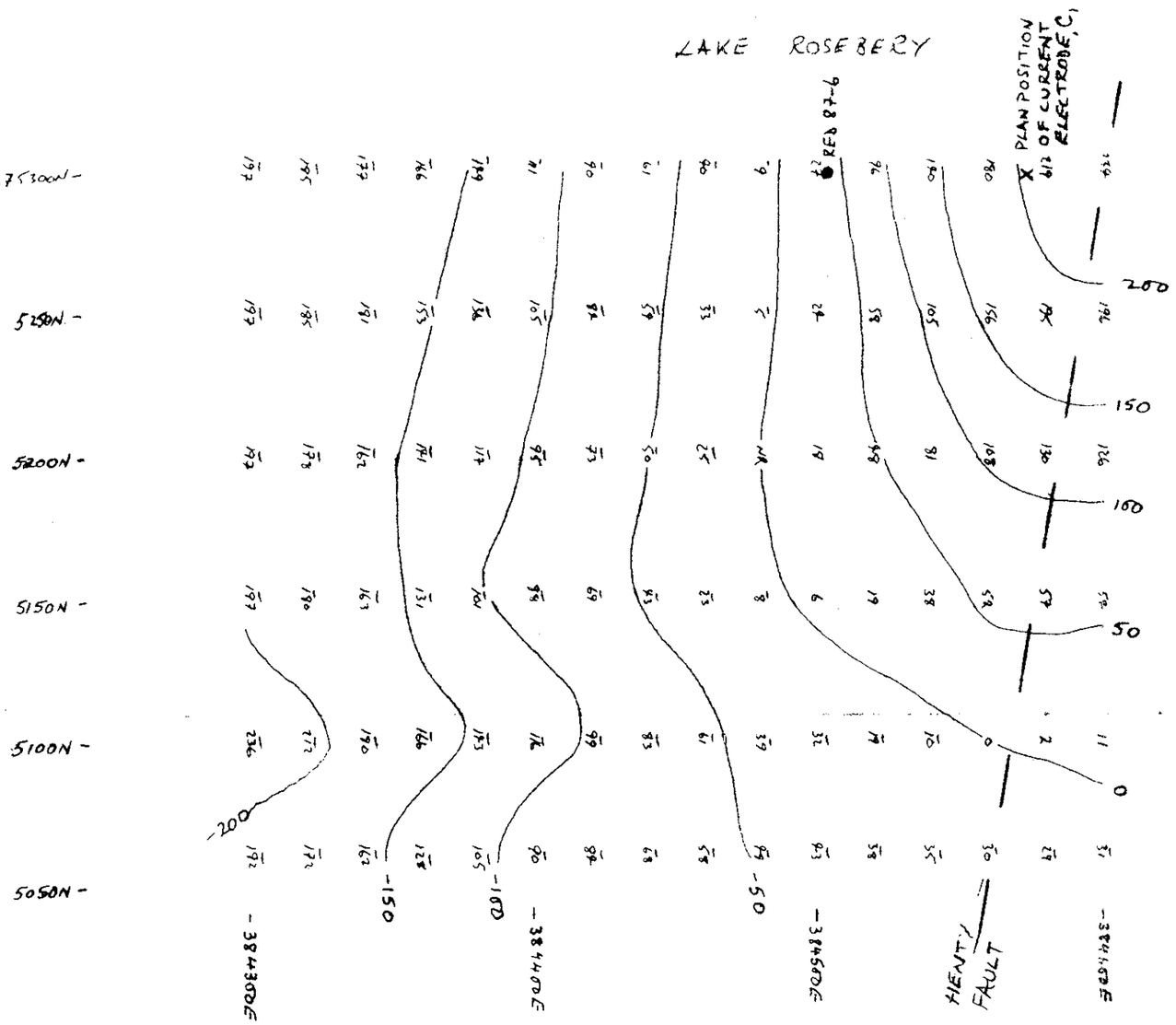
μV/A

1000 500 100 50 10 5 1 0 -1 -5 -10 50 -100 -500 -1000

1000 500 100 50 10 5 1 -1 -5 -10 -50 -100 -500

0 50 100 150 200 250

6953



1:2000

ROSEBERY EAST J.V
LAKESIDE PROSPECT

MISE-À-LA-MASSE SURVEY
V_p CONTOURS

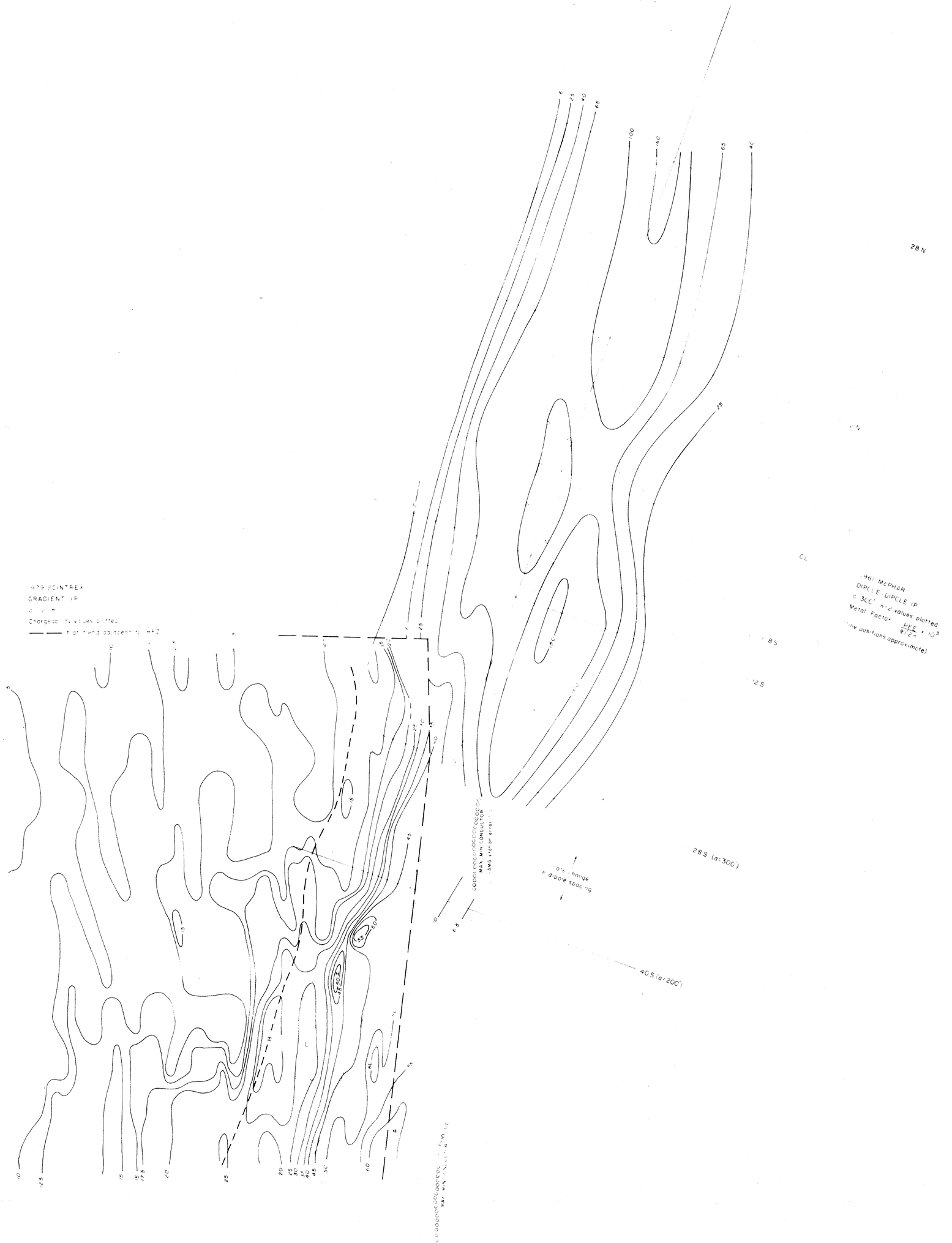
SCINTREX 11/87
C_1 down RED 87-6 @ 116 metres
C_2 3749000N/3837000E AND 3749500N/3854000E

FIG 30

E38243
87-2751

6953

6954



828244

5cm

87-2751

6954

Billiton Australia	
The Metals Division of the Broken Hill Proprietary Company Limited	
Project	TASMANIA ROSEBERY EAST J.V.
Title	MURCHISON RIVER AREA HENTY FAULT ZONE IP CONTOURS (OVERLAYS 1 of 4 : 2 of 4)
Author N.H. Dept. & no.	Scale 1:5000
Drawn A.M. Date 12/86	Revised Date
Checked Date	Traced Date
Sheet No. FIG. No. 31	Drawing No. LJ 50/1060

6955

384 000 E (EZ 1979)

384 500 E (EG 1979)

MRP 226 (5 376 300 N)

137 m

212 m

5 376 200 N

5 376 100 N

5 376 000 N

5 375 900 N

5 375 800 N

5 375 700 N

5 375 600 N

5 375 500 N

5 375 400 N

5 375 300 N

5 375 200 N

5 375 100 N

ρ 1000 Ω-m

100

ρ

M

River

Lake Rosebery

Dipole - Dipole IP (1979)
a=20m

Dipole-Dipole IP (1979)
a=40m

M v/v

Mv/v

30

20

10

0

RED 87-10 (5 375 50 N)

RED 87-8 (5 375 550N)

60m

280m

RED 87-3

88m

153m

RED 87-2 (5 375 420 N)

384 500E (AMG)

171m

260m

RED 87-6

78m

157m

UTEM

MRP 219

95m

141m

Max-Min EM

384 500E (BAUS)

384 000 E

384 200E

384 500 E (EZ/SCINTREX) 1979

384 700E

384 900E

384 000 E

384 200 E

384 500 E (BILLITON GRID) 1987

384 700 E

NOTE:-EZ (1979) grid coords are approximately 100m WEST of AMG coords.
-BILLITON (1987) grid coords south of 5200 N are approximately 30m WEST of AMG coords

DDH — Posn. of Henty Fault & VERTICAL depth — Total depth (m) downhole

UTEM POSITION OF UTEM (1987) Z-COMP. CROSS-OVER

CONTRACTOR: SCINTREX FOR E.Z.
DATE: 3,5/79
ARRAY: GRADIENT, a=20m
INTEGRATION: M_3 PLOTTED (IPR-8)

5 cm

838245

87-2751

6955

Billiton Australia
The Metals Division of The Shell Company of Australia Limited

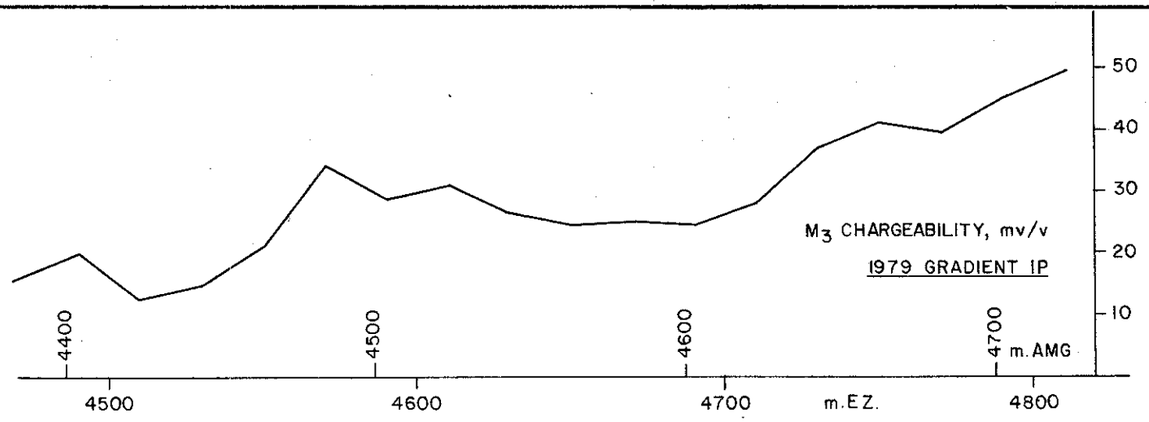
Project: ROSEBERY EAST J.V.

Title: N.W. TASMANIA
MURCHISON AREA (LAKESIDE PROSPECT) IP/RESISTIVITY PROFILES

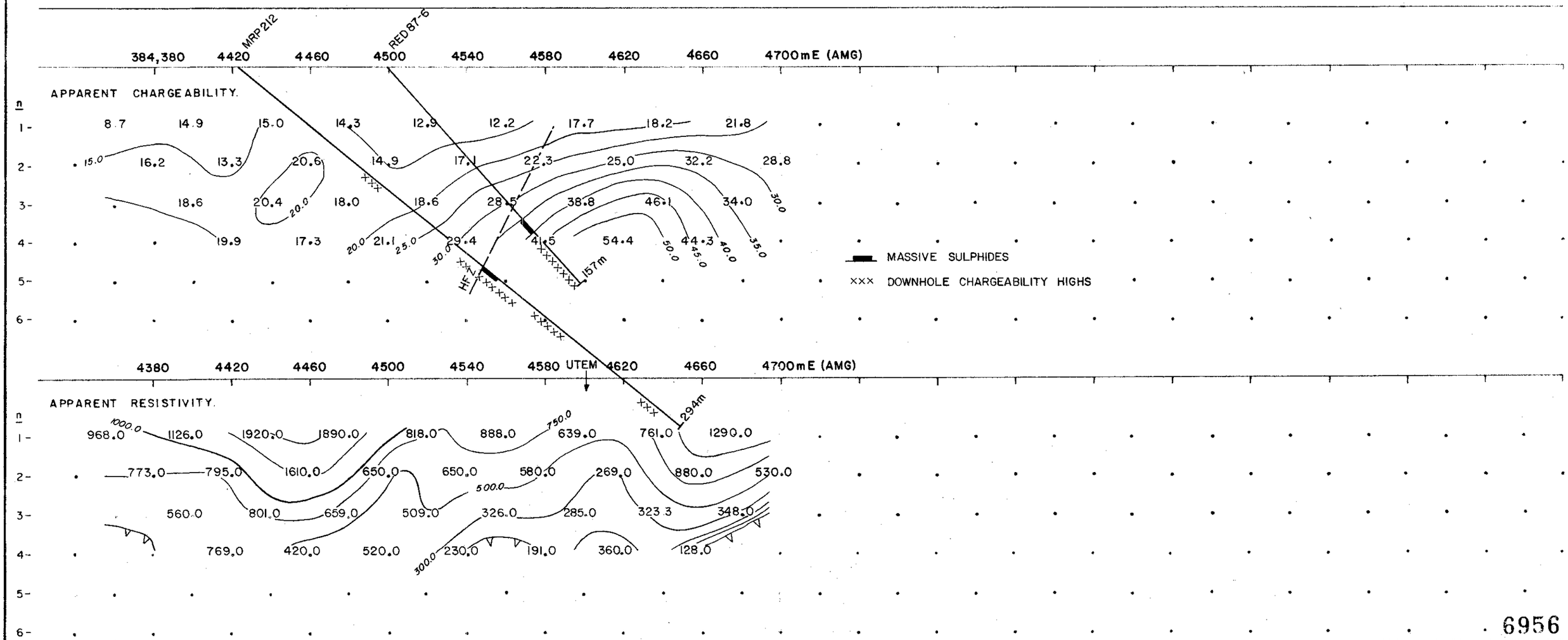
Author N.H.	Date 10-87	Scale 1:2500	
Drawn A.M.	Office AHO	Revised N.H.	Date 12-87
Drawing No. LJ50/1084		Fig. No. 32	

6956

AIRBORNE GEOPHYSICS
(EM, MAG, etc)



GEOLOGY
& TOPOGRAPHY



Contractor : SCINTREX
Date : 11/87
Timing : 2 sec.
Transmitter : 10 KW
Receiver : IPR-11
Integration time : Mo-M_9 (30-1770 ms)
Array : DIPOLE - DIPOLE
Dipole length : 40m

87-2751

838246

5 cm

Billiton Australia

Project: ROSEBERRY EAST J.V.
LAKESIDE PROSPECT

Title:
I.P./RESISTIVITY SURVEY
LINE 5,375,300N

Author N.H.	Date	Scale 1:2,000	
Drawn 12/87	Office AMO	Revised	Date
Drawing No. LJ50/1101		Fig No. 33	

6957

AIRBORNE GEOPHYSICS
(E.M, MAG, etc)

M_3 CHARGEABILITY, mv/v
1979 GRADIENT IP

60
50
40
30
20
10

GEOLOGY
& TOPOGRAPHY

4400 4500 4600 4700 4800 4900 m. BAUS

4500 4600 4700 4800 4900 mEZ. (1979)

MRP 219

MR-1 (5175mN)

384,400 4440 4480 4520 4560 4600 4640 4680 4720 4760 4800 4840 4880 4920 4960 mE

(BAUS grid 30m WEST of AMG Co-ords)

APPARENT CHARGEABILITY.

n

1 - 14.9 14.4 11.9 12.6 10.8 11.8 14.8 12.5 20.3 33.3 37.7 29.8 27.3 29.2
2 - 11.1 9.9 5.0 5.2 14.1 16.0 16.9 19.4 29.6 28.4 36.3 39.3 28.3 31.3
3 - 9.6 7.1 10.7 15.1 22.9 23.4 25.0 35.2 33.0 28.9 34.7 36.9 37.1
4 - 6.8 9.7 22.0 25.5 28.3 29.3 36.2 32.5 30.7 25.8 32.2 45.7
5 -
6 -

10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0

HFZ HFZ 141m

4400 4440 4480 4520 4560 UTEM 4600 4640 4680 4720 4760 4800 4840 4880 4920 mE (AMG) UTEM

APPARENT RESISTIVITY.

n

1 - 839.0 740.0 1370.0 1350.0 1710.0 2135.0 1815.0 2414.0 1270.0 940.0 1220.0 1410.0 806.0 628.1
2 - 760.0 373.0 522.0 830.0 790.0 1099.0 1905.0 2624.0 1760.0 660.0 1000.0 1650.0 1150.0 620.0
3 - 340.0 388.6 419.0 644.0 472.4 525.6 1419.0 1750.0 1160.0 892.0 1470.0 1230.0 749.0
4 - 349.0 450.0 490.0 738.0 279.0 618.0 1030.0 1300.0 1650.0 1410.0 1210.0 810.0
5 -
6 -

1000.0 2000.0 500.0

6957

Contractor : SCINTREX
Date : 11/87
Timing : 2 sec.
Transmitter : 10KW
Receiver : IPR-11
Integration time : Mo-Mg(30-1770 ms)
Array : DIPOLE-DIPOLE
Dipole length : 40m

87-2751

838247

5 cm

Billiton Australia

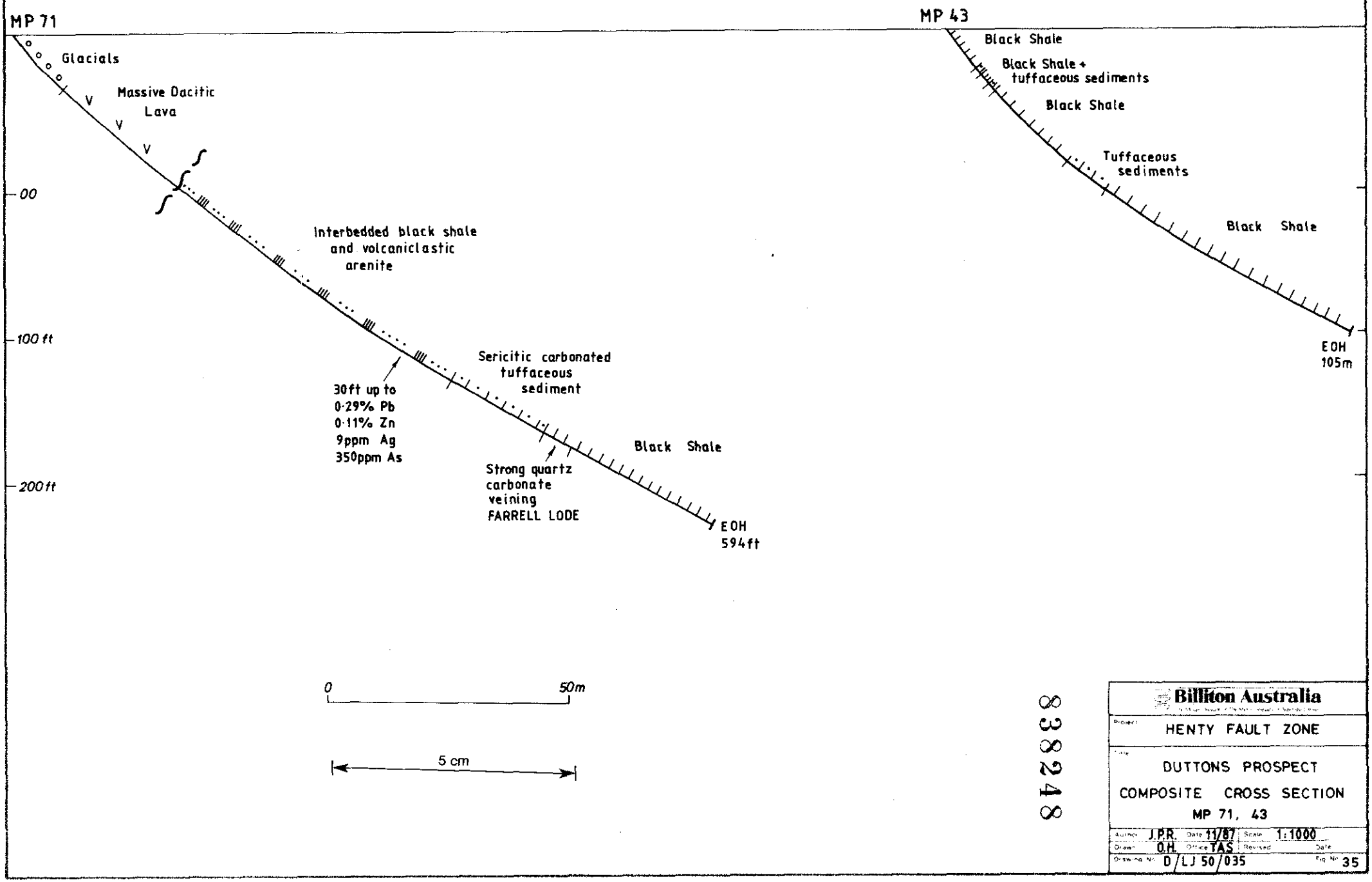
ROSEBERRY EAST JV
LAKESIDE PROSPECT

I.P./RESISTIVITY SURVEY
LINE 5,375,100N

Author N.H. Date
Scale 1:2,000
Drawn 12/87 Office AHO
Revised Date
Drawing No. LJ50/1104
File No. 34

W 6958

E



8338248

Billiton Australia	
Project	HENTY FAULT ZONE
Title	DUTTONS PROSPECT COMPOSITE CROSS SECTION MP 71, 43
Author J.P.R. Date 11/87	Scale 1:1000
Drawn O.H. Office TAS	Revised Date
Drawing No. D/LJ 50/035	Fig. No. 35

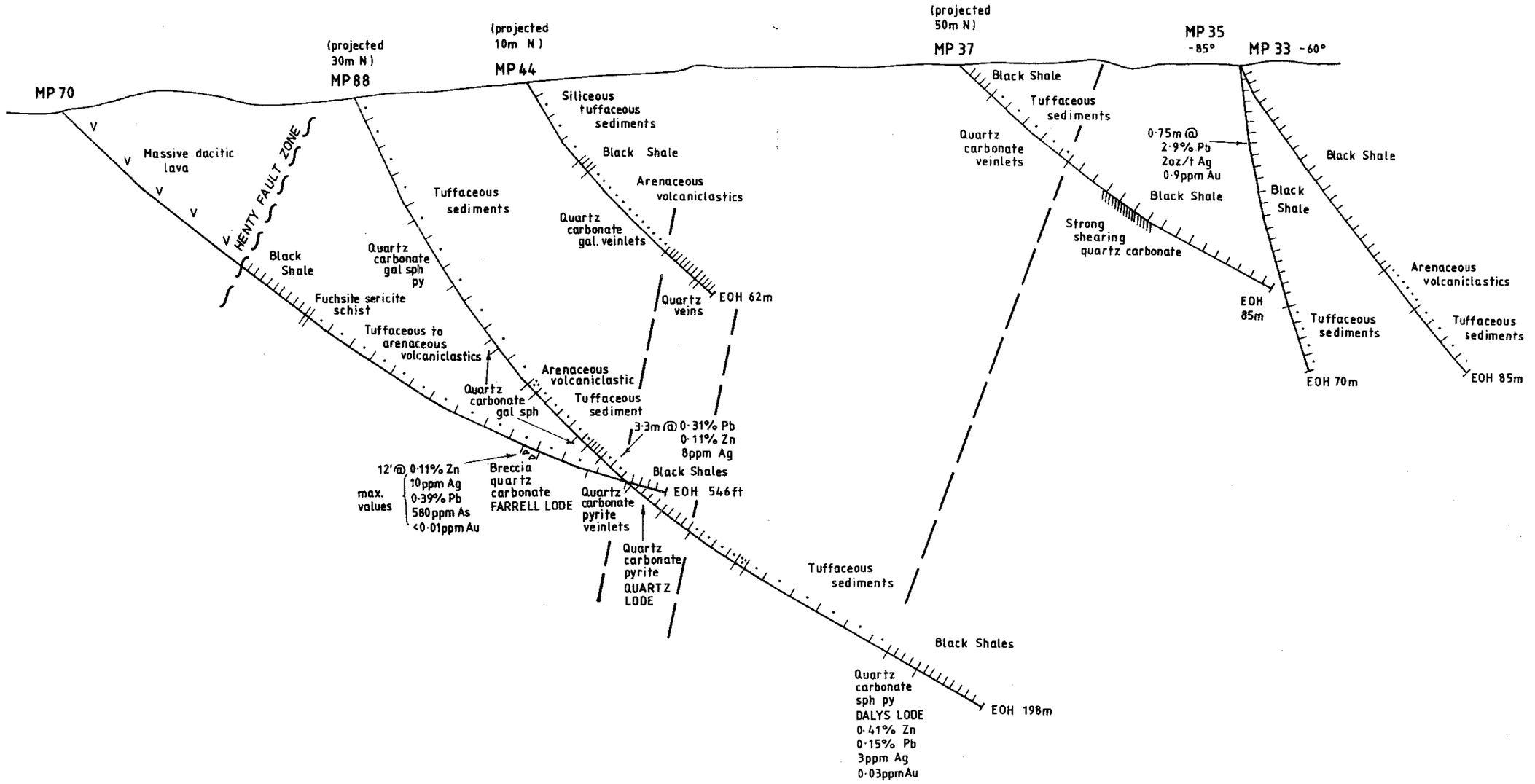
87-2751

6958

6959

838249 E

W



0 50m

5 cm

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: HENTY FAULT ZONE

Title: DUTTONS PROSPECT
COMPOSITE CROSS SECTION
MP 70, 88, 44, 37, 35, 33

Author J.P.R.	Date 11/87	Scale 1:1000	
Drawn Q.H.	Office TAS	Revised	Date
Drawing No. D/L J 50/037			Fig. No. 36

87-2751

6960

838250

GRID 1
TULLAH GRADIENT IP
for
BILLITON AUSTRALIA

ZONGE # 665
PLOT BY CPLOT 4.20
PLOTTED 21 APr 87

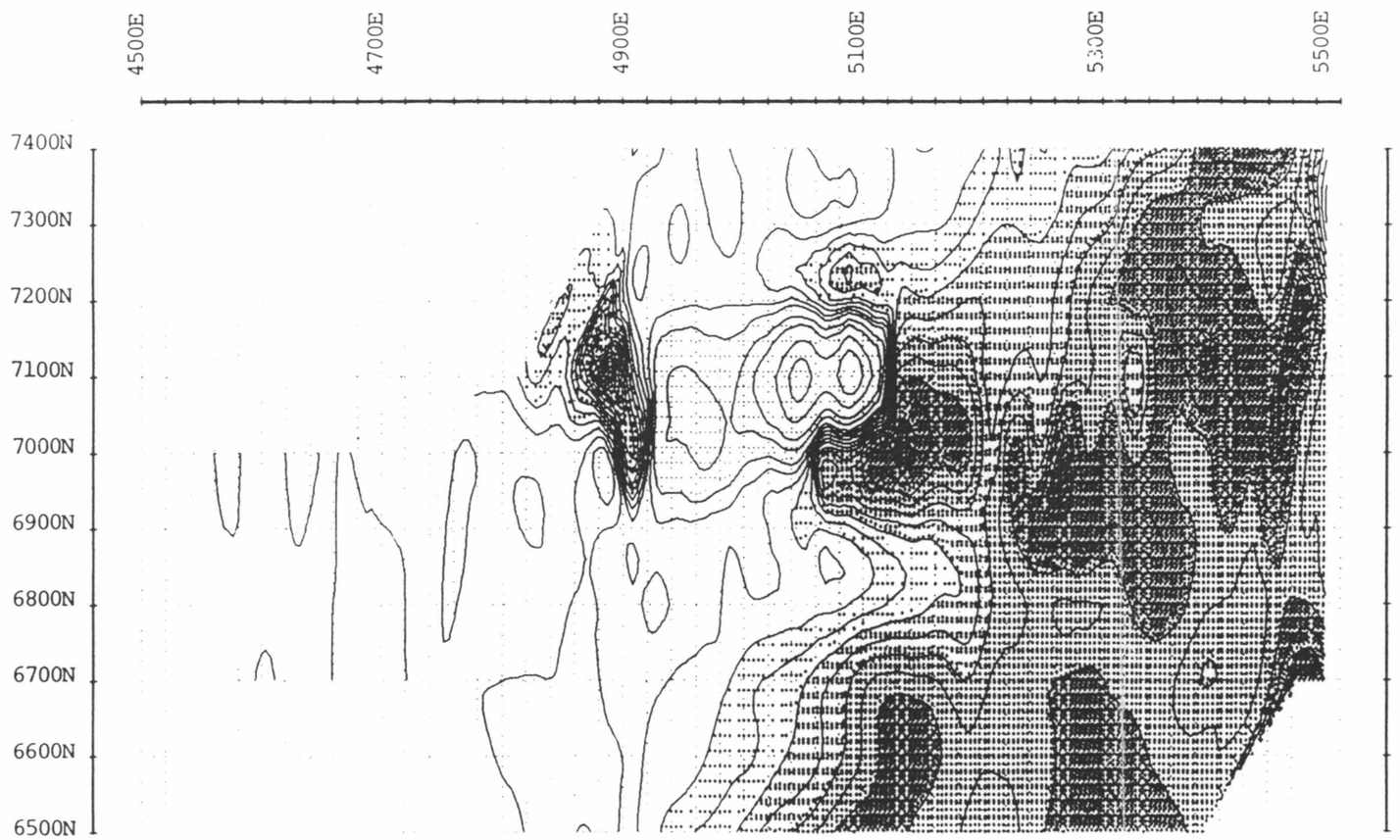
ZONGE ENGINEERING &
RESEARCH ORGANIZATION

R/P SURVEY DATA
Raw PHASE, 0 125 Hz
(milliradians)

Date of survey APR 87

[Shading limits] and MANUAL SPEC CONTOURS

[-77 0]	25 0
-60 0	30 0
-40 0	35 0
-20 0	40 0
-10 0	45 0
0 00	50 0
5 00	55 0
10 0	60 0
15 0	[65 3]
20 0	



87-2751

6960

FIG. No 37

6961

838251

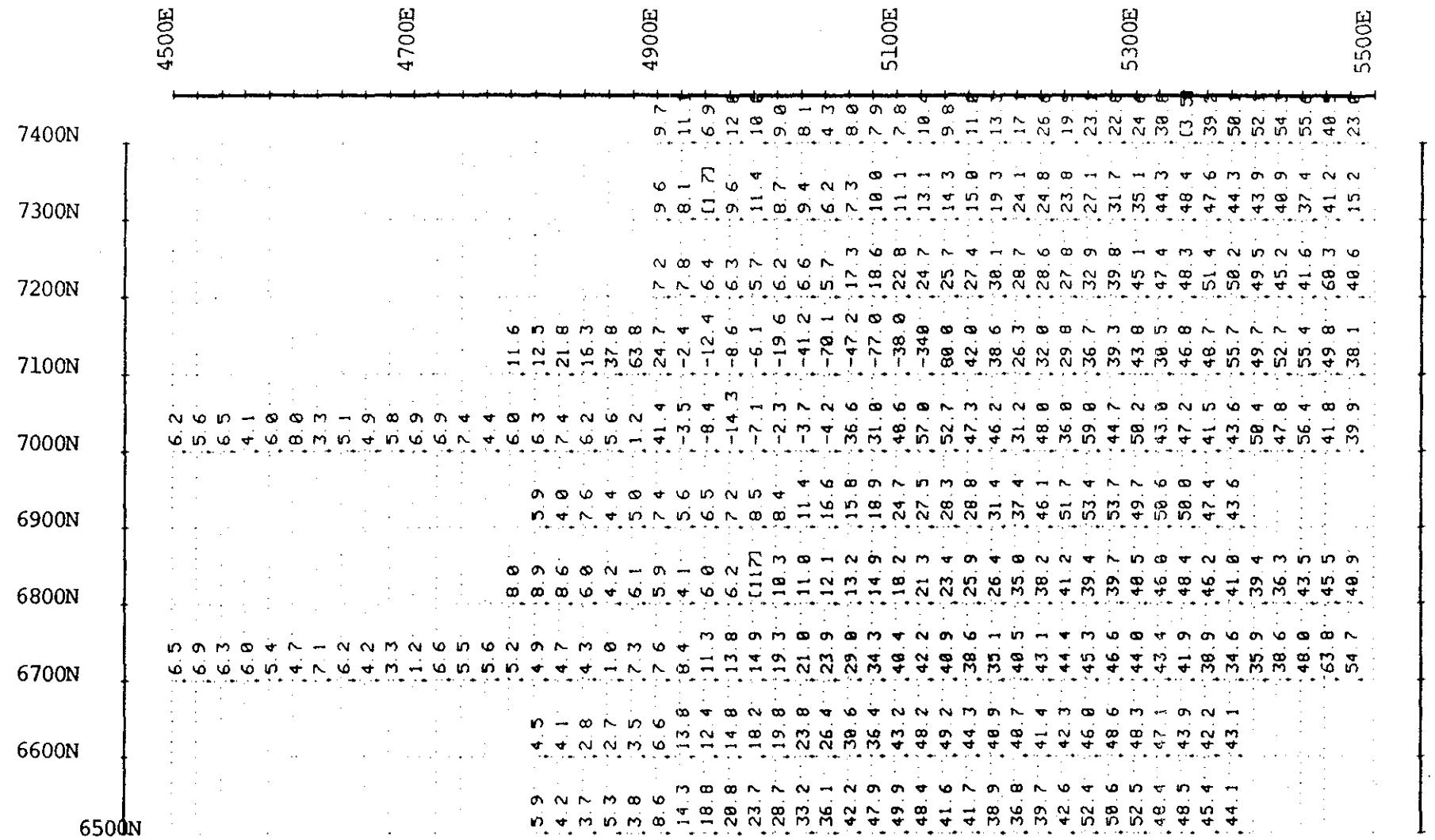
GRID 1
TULLAH GRADIENT IP
for
BILLITON AUSTRALIA

ZONGE W 665
PLOT BY CPLOT 4 20
PLOTTED 21 APr 87

ZONGE ENGINEERING &
RESEARCH ORGANIZATION

R/P SURVEY DATA
Raw PHASE, 0 125 Hz
(milliradians)

Date of survey: APR 87



6961

87-2751

FIG. No. 38

£962

838252

GRID 1
TULLAH GRADIENT IP
for
BILLITON AUSTRALIA

ZONGE # 665
PLOT BY CPLOT 4.20
PLOTTED 21 APr 87

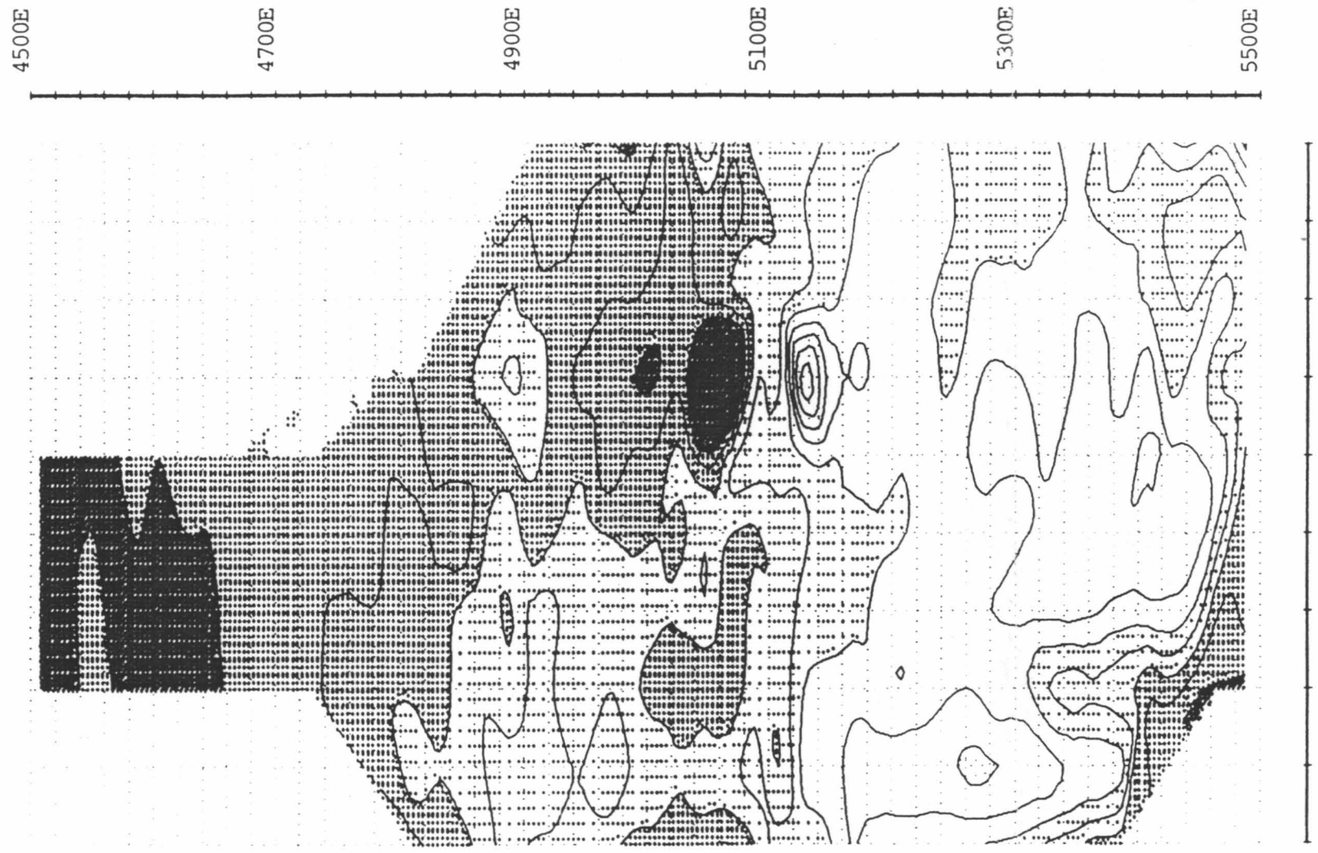
ZONGE ENGINEERING &
RESEARCH ORGANIZATION

R/P SURVEY DATA
APparent RESISTIVITY
(ohm-meters)

Date of survey APR 87

[Shading limits] and LOGARITHMIC CONTOURS
(Interval 0 20)

[130]	3981
158	6310
251	10.0K
398	15.8K
631	25.1K
1000	39.8K
1585	[60.4K]
2512	



87-2751

6962

FIG. No. 39

GRID 1
TULLAH GRADIENT IP
for
BILLITON AUSTRALIA

ZONGE ENGINEERING & RESEARCH ORGANIZATION

ZONGE # 665
PLOT BY CPLOT 4.20
PLOTTED 21 APR 87

R/P SURVEY DATA
Apparent RESISTIVITY
(ohm-meters)

Date of survey APR 87

	7400N	7300N	7200N	7100N	7000N	6900N	6800N	6700N	6600N	6500N
4500E					6525			8191		
					6963			10.7K		
					7209			4507		
					6549			6701		
					5634			7312		
					6235			8327		
					4676			11.4K		
					5431			7688		
					4664			5210		
					4473			4483		
					5145			4561		
					4963			4688		
					4988			3298		
					5189			3286		
4700E				4254	4303		3709	2934		
				3970	5111	2973	3329	2738	1985	4963
				2762	3214	4437	3321	3041	2460	3426
				2837	3191	5468	2314	2153	2128	3824
				2140	3159	2537	1931	1649	1580	1964
4900E				1482	2657	2014	2632	2051	1431	1392
			3074	1891	2095	3339	1390	1424	1278	1638
			3066	3159	3822	2432	1584	1706	1376	1801
			3050	4508	2837	2156	1772	2492	1570	2371
			3912	4871	5624	2556	1708	1633	1105	2203
			3921	6253	3821	2838	1930	2235	1687	2847
			4836	6406	3570	2545	2282	2879	2005	2919
			5360	4612	2354	2805	2291	3121	2402	3635
			3637	33.7K	5365	1671	1696	3298	1882	3538
			2982	40.5K	2068	2453	3317	3516	1976	4001
			2018	1879	1253	2629	2054	2045	1342	2547
5100E			1965	1694	1216	2010	2210	2215	2519	1345
			1331	130	966	1685	1362	1812	882	1258
			1159	446	932	1202	1158	893	770	1094
			746	623	818	1160	1118	778	546	621
			718	672	821	1037	930	904	485	849
			765	891	963	1033	787	978	499	843
			952	849	916	806	721	821	475	914
			1153	1062	708	734	691	670	418	984
			931	669	608	665	662	656	365	979
			820	601	572	758	604	858	401	1049
5300E			895	643	590	656	550	928	429	1195
			787	729	651	562	553	1577	526	1639
			687	629	535	528	530	1928	698	2082
			693	517	517	544	611	1709	732	2901
			832	773	555	601	736	2078	912	3280
			1054	508	672		736	3421		
			1437	1157	595		715	3131		
			1569	823	628		1156	5386		
			800	1560	820		4098	6476		
5500E			1392	1800	2616		3383	7336		

83253

FIG. No. 40

6963

87-2751

6964

4500 E | 4600 E | 4700 E | 4800 E | 4900 E | 5000 E | 5100 E | 5200 E | 5300 E | 5400 E | 5500 E

DUTTON'S WORKINGS (~7700 N)

537 7400 N
537 7300 N
537 7200 N
537 7100 N
537 7000 N
537 6900 N
537 6800 N
537 6700 N
537 6600 N
537 6500 N

ρ 1000 Ω-m | 100

Ø mr: 60 | 40 | 20 | 0

CURRENT CABLE
< 10m FROM RX
+ SWAMPY GROUND

TX LINE THROUGH CULVERT

C_2 @ 384 000E approx. 377 000N

C_1 @ 385 800E 377 050N

RED 87-4 (along 7000 N)

Cross-section

HENTY FAULT

Zn, Pb, graph

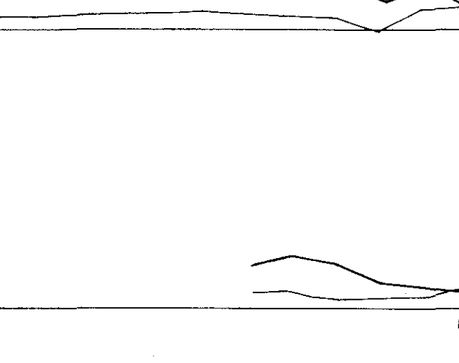
328

MP 89

@ 5550 E black shale

4500 E | 4600 E | 4700 E | 4800 E | 4900 E | 5000 E | 5100 E | 5200 E | 5300 E | 5400 E | 5500 E

Contractor: ZONGE
Date : 4-10/4/87
Array : GRADIENT a=20m



838254

Interpreted position of Henty Fault Zone

Murchison Hwy

5 cm

6964

87-2751

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: ROSEBERY EAST J.V.

Title: N.W. TASMANIA

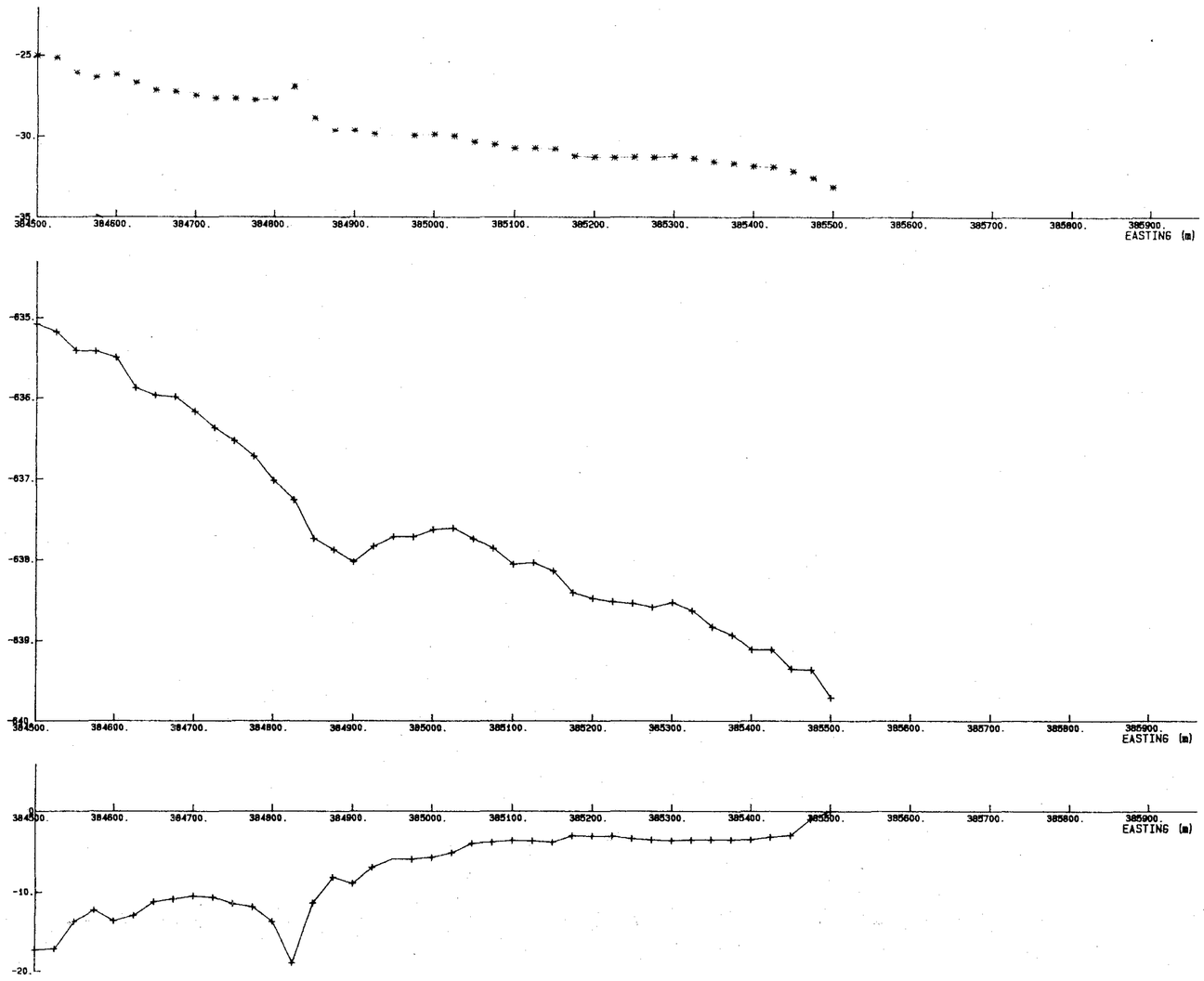
MURCHISON AREA
(TULLAH FLAT)
IP / RESISTIVITY PROFILES

Author N.H.	Dept AHO	Scale 1:2500	
Drawn A.S.	Date 4·87	Revised	Date
Checked	Date	Sceded	Date
Sheet No FIG. No. 41		Drawing No LJ50/1074	

6965

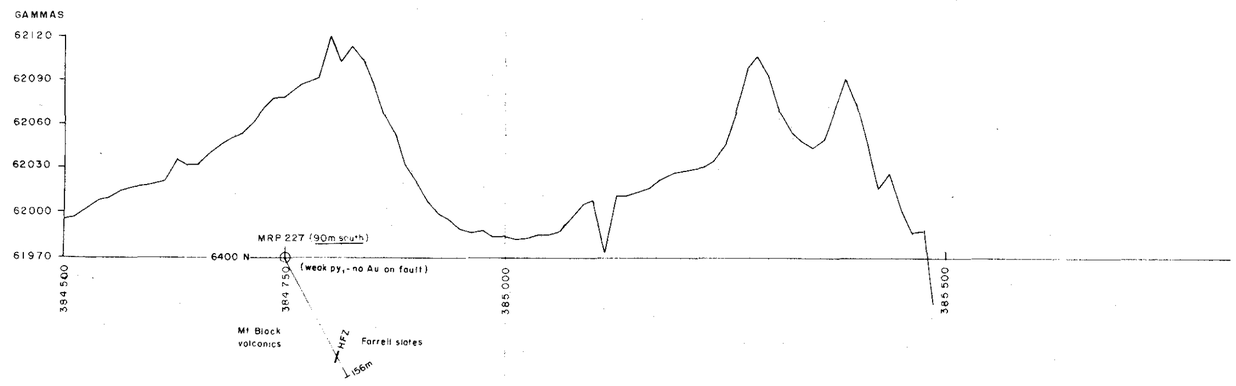
GRAVITY PROFILES

Channel 3: 2·7g/cc



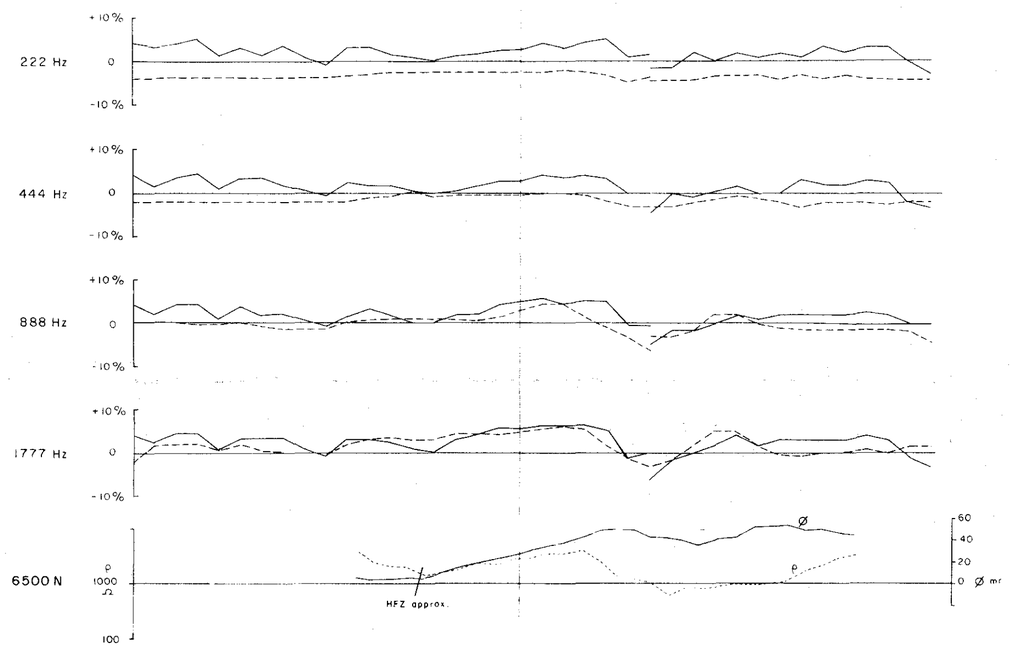
TOTAL FIELD GROUND MAGNETICS

G 856 Magnetometers
Station spacing = 12 m



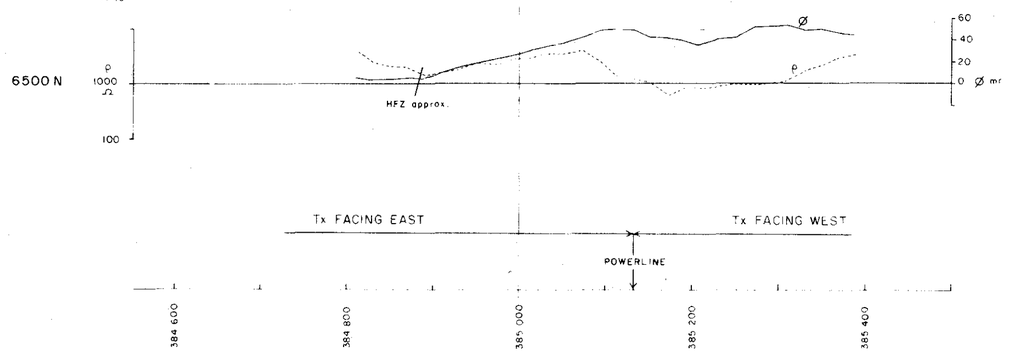
MAX - MIN EM

Coil separation = 100 m
Station spacing = 25 m
——— In Phase
– – – – Out of Phase



IP/RESISTIVITY PROFILE

Gradient Array
a=20m



6965

838255

5 cm

87-2751

Billiton Australia
The Metals Division of the Shell Companies of Australia Limited

ROSEBERY EAST J.V.

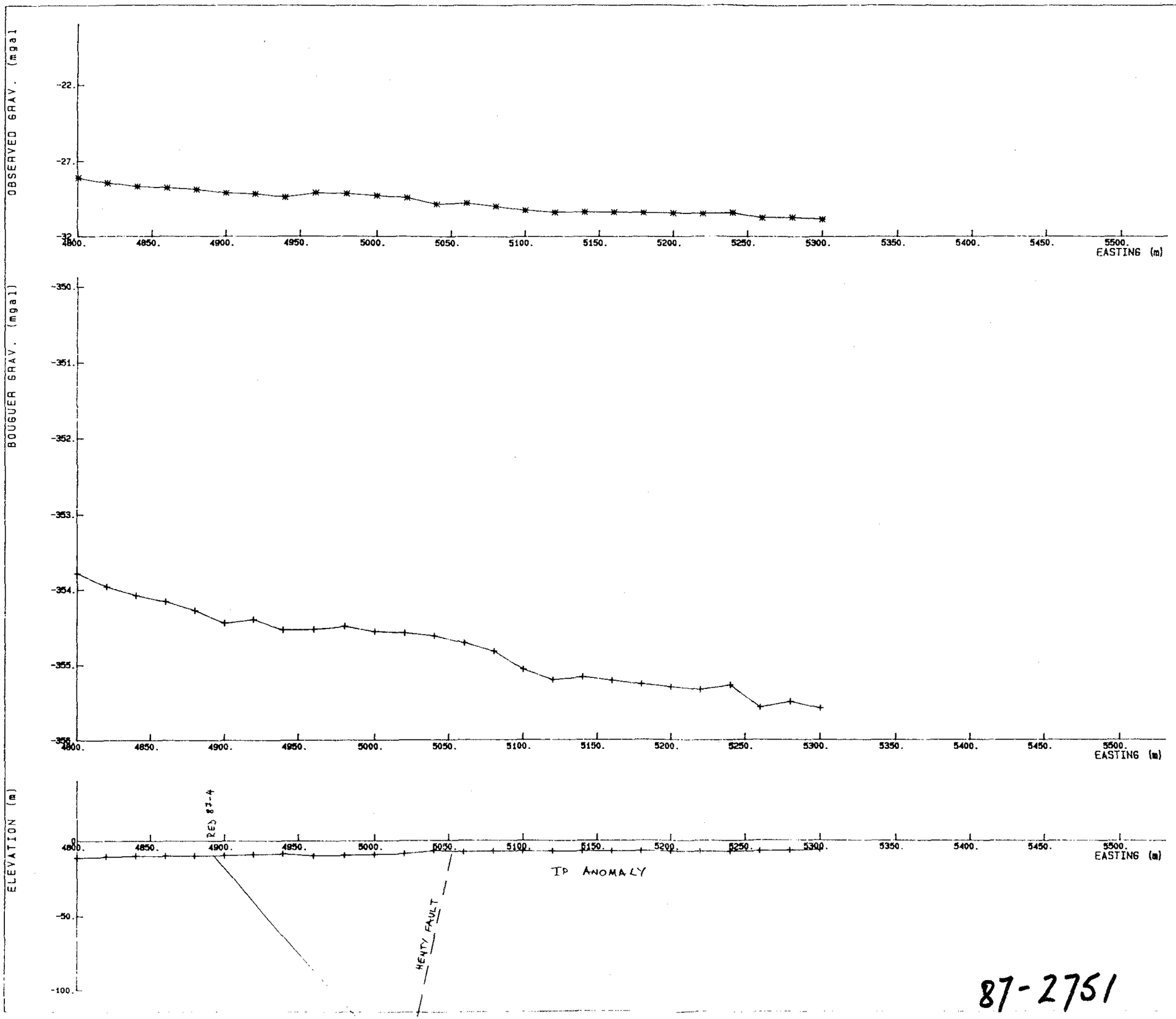
MURCHISON RIVER

LINE 376 500 N

GEOPHYSICAL PROFILES

Author N H	Dept AHO	Scale 1:5000	
Drawn AS	Date 2/87	Revised	Date
Checked	Date	Standard	Date
Sheet No. FIG. No. 42		Drawing No. LJ 50/1069	

6966



838256

6966

SHELL COMPANY OF AUSTRALIA METALS DIVISION	
ROSEBERY EAST, TAS MURCHISON VALLEY LINE 377000N GRAVITY	
FIG. NO: ?	REPT. NO:
ENCL. NO:	DRG. NO: FIG. No. 43
DATE: 5/87	AUTHOR: NH/RJ
DRAWN:	OFFICE: AHO

87-2751

384500E 384600E 384700 384800 384900 385000 385100 385200 385300 385400

6967

+10%
22 Hz
0
-10%
-20%
+10%
444 Hz
0
-10%
-10%
38 Hz
0
-10%
-20%
+20%
+10%
1777 Hz
0
-10%
-20%

Tx TO THE EAST

POWER LINE

CREEK

Tx TO THE WEST

838257

The Shell Company of Australia Limited METALS DIVISION	
STATE TASMANIA	
PROSPECT MURCHISON RIVER	
LINE 376700N	
MAX-MIN E.M.	
SCALE 1:2500	DATE 28-2-87
AUTHOR	DRAWN RAY
OFFICE AHO	REP.No
DRG No	FIG No 44

5 cm

100 metres

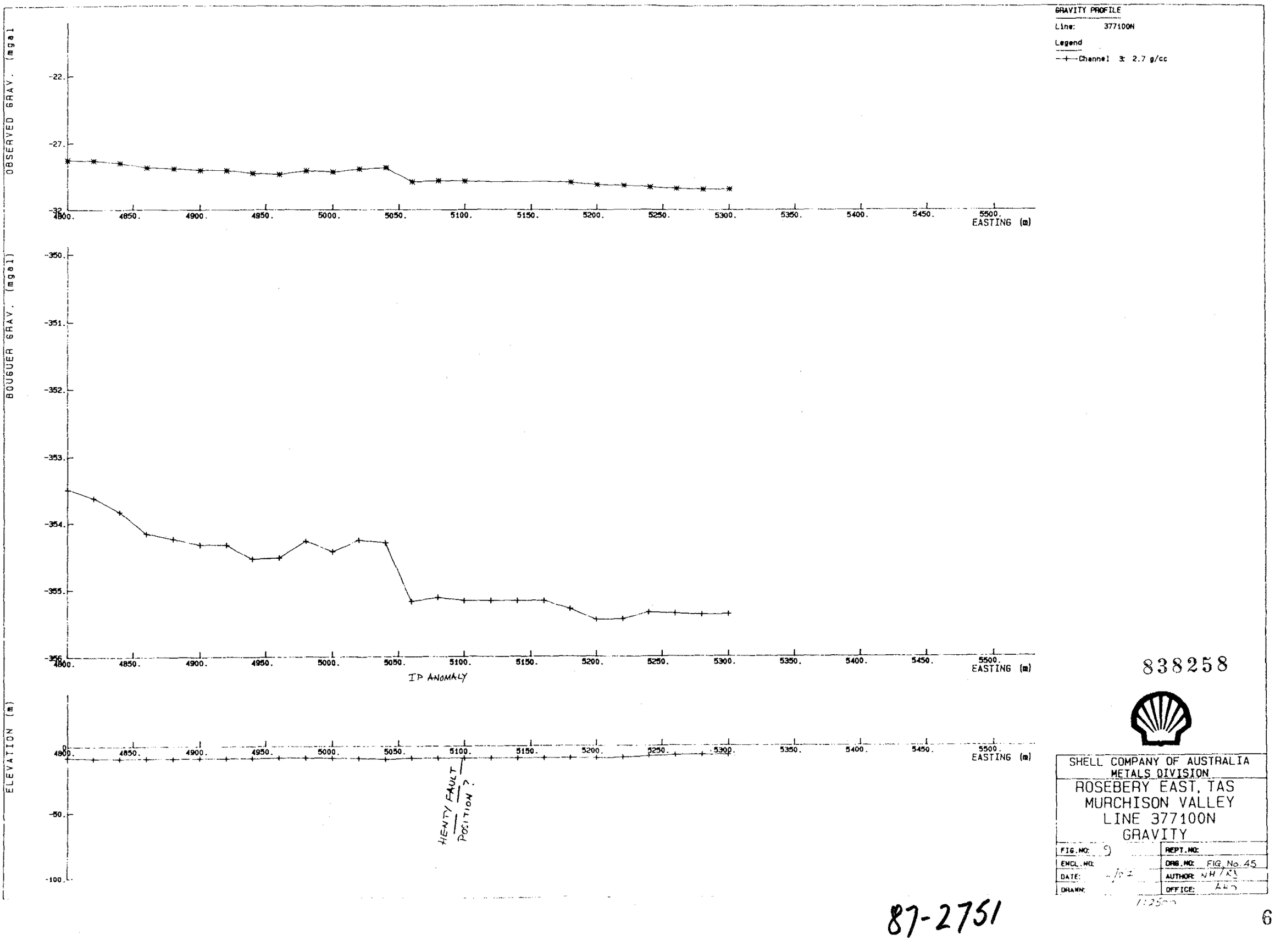
Coil Separation = 100m

In Phase

Out of Phase

87-2751 6967

6968



838258

SHELL COMPANY OF AUSTRALIA
METALS DIVISION

ROSEBERY EAST, TAS
MURCHISON VALLEY
LINE 377100N
GRAVITY

FIG.NO: 9	REPT.NO:
ENCL.NO:	DRG.NO: FIG. No. 45
DATE:	AUTHOR: NH/KS
DRAWN:	OFFICE: ADL

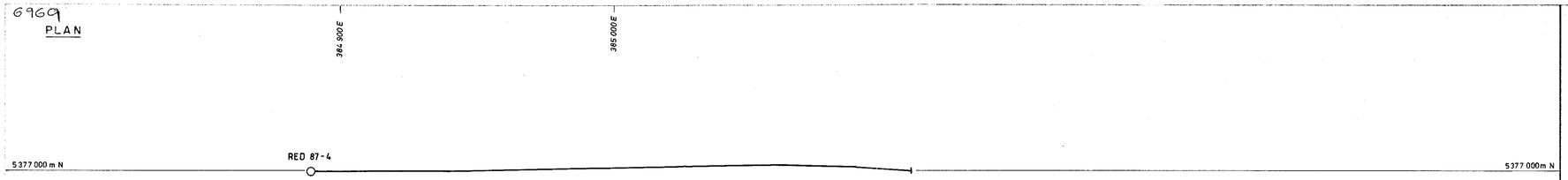
1:2500

87-2751

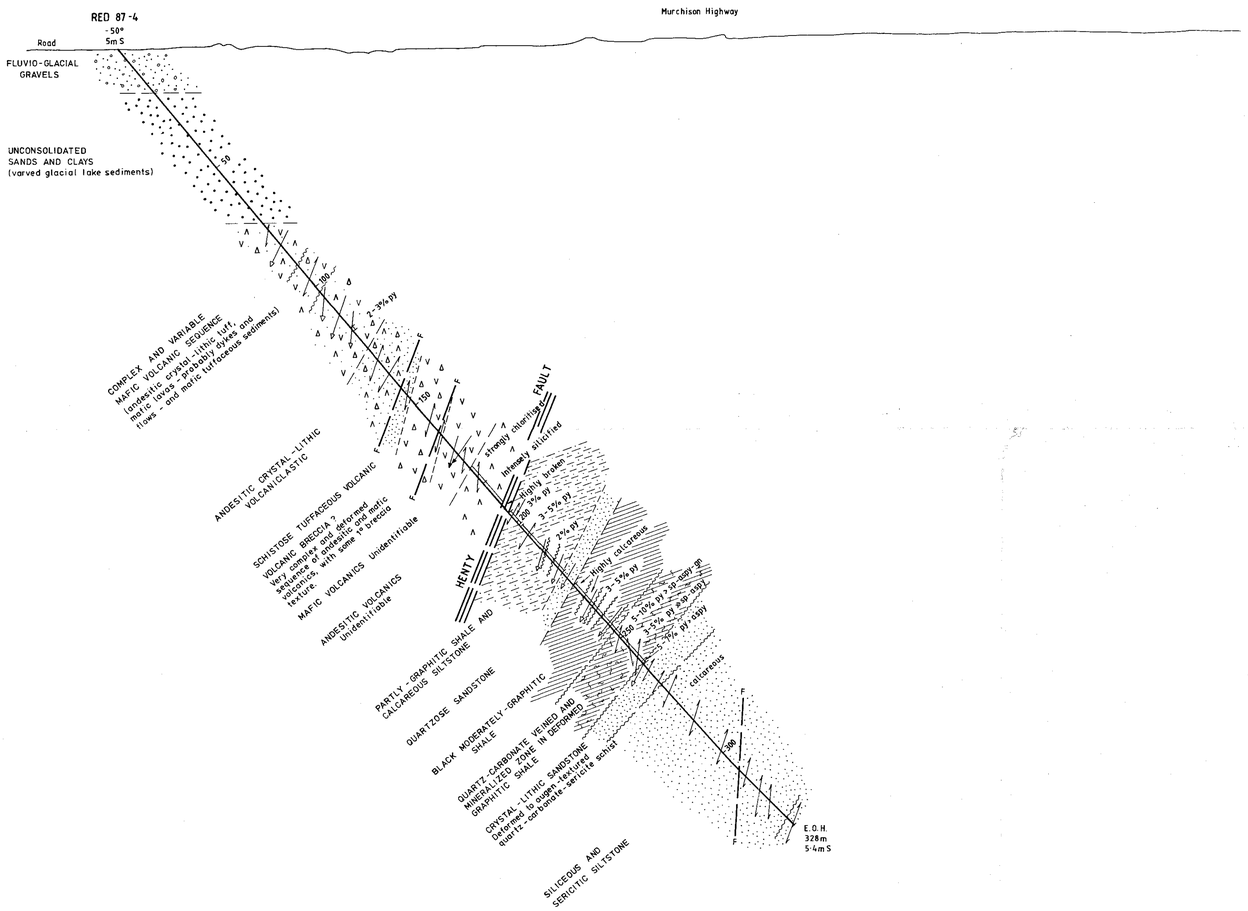
6968

6969

PLAN



SECTION



LEGEND

QUATERNARY — FLUVIO-GLACIAL GRAVELS, SANDS AND SILTS

CAMBRIAN

MT READ VOLCANICS — A: WEST OF HENTY FAULT

ANDESITE LAVAS
Coarsely feldspar-porphyritic andesite. Generally strongly silicified. Minor intercalated basalt ($\forall\forall$) - some clearly dykes

ANDESITIC VOLCANICLASTICS AND TUFFS
Clastic material of same provenance as the above lavas. Includes reworked volcaniclastic breccias, tuffaceous sediments, and feldspar-crystal tuffs.

B: EAST OF HENTY FAULT

VOLCANOMICT AND TUFFACEOUS SEDIMENTS OF THE FARRELL SLATE SEQUENCE

- BLACK GRAPHITIC SHALE

TUFFACEOUS AND CARBONATE-RICH SILTSTONE, SANDSTONE AND SHALE
Sandstone, generally quartzose

MINERALISED, BRECCIATED AND ALTERED SANDSTONE
Bands, patches and stringers of pyrite-arsenopyrite-chalcopyrite in silicified, chloritised and tourmalinised, quartzose graphitic sandstone. Minor interbedded graphitic tuffaceous shale

- Bedding
- Bedding facing
- Primary lineation in lavas, volcaniclastics etc
- Schistosity
- Fault
- Shear
- Geological contact
- Geological contact - attitude unknown

838259 6969

Billiton Australia
The Metals Division of the Shell Companies of Australia Limited

Project: ROSEBERY EAST J.V. - EL 1/62

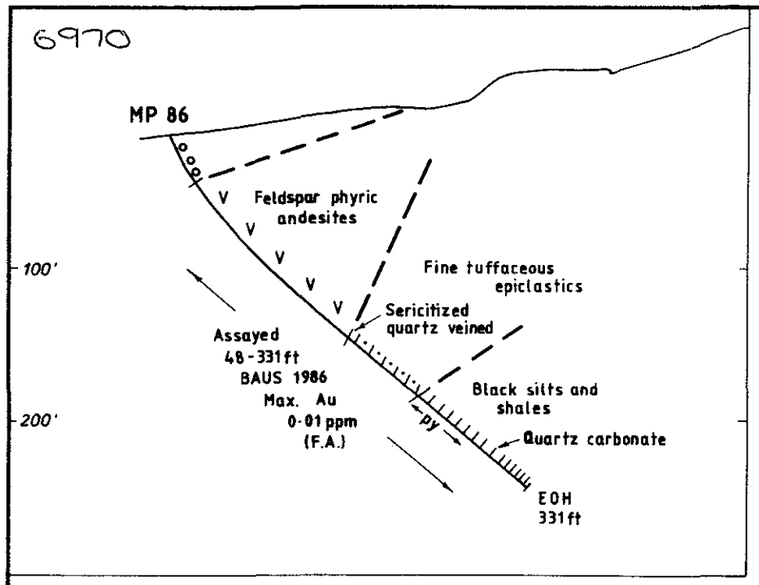
Title: MURCHISON RIVER AREA
SECTION 5377 000m N
RED 87-4

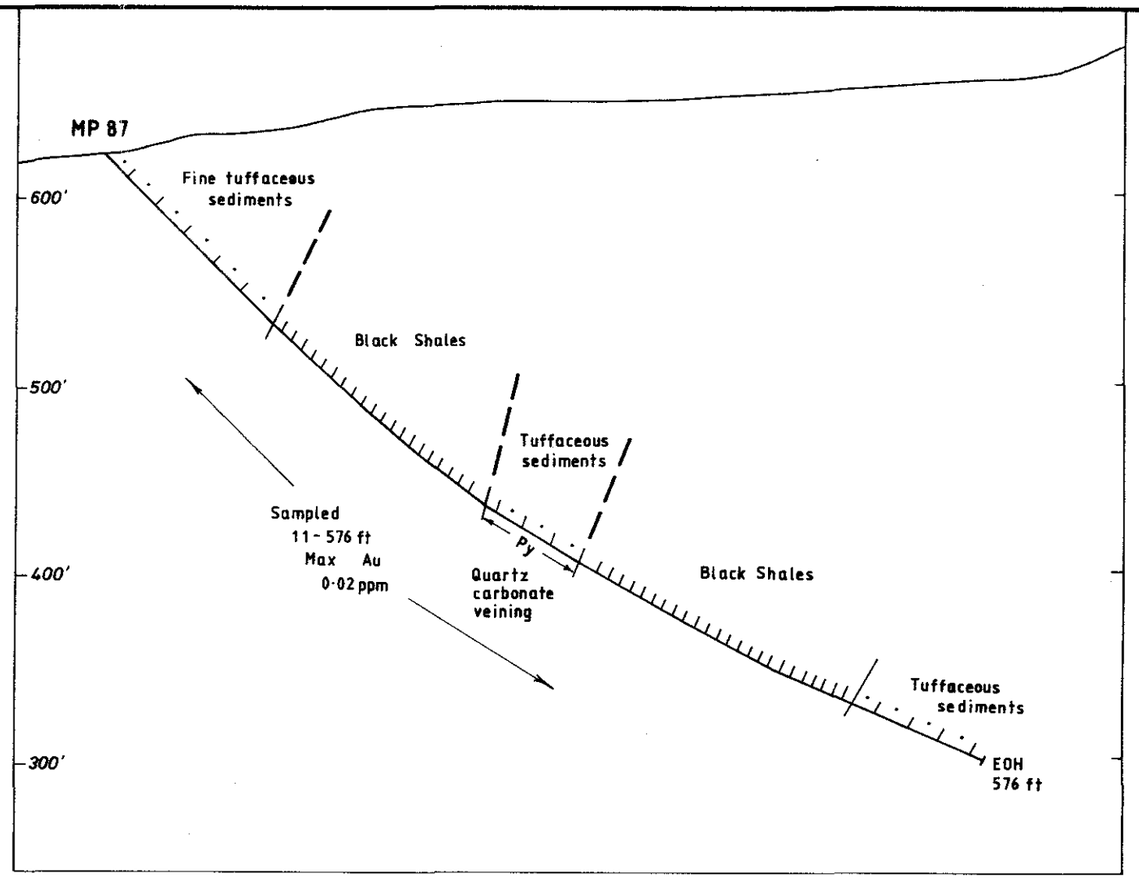
Author	J.G.P.	Dept. TAS	Scale	1:1000	
Drawn	O.H.	Date 12/87	Revised		Date
Checked		Date	Scaled		Date
Sheet No.	FIG No. 46		Drawing No.	D/LJ 50/041	

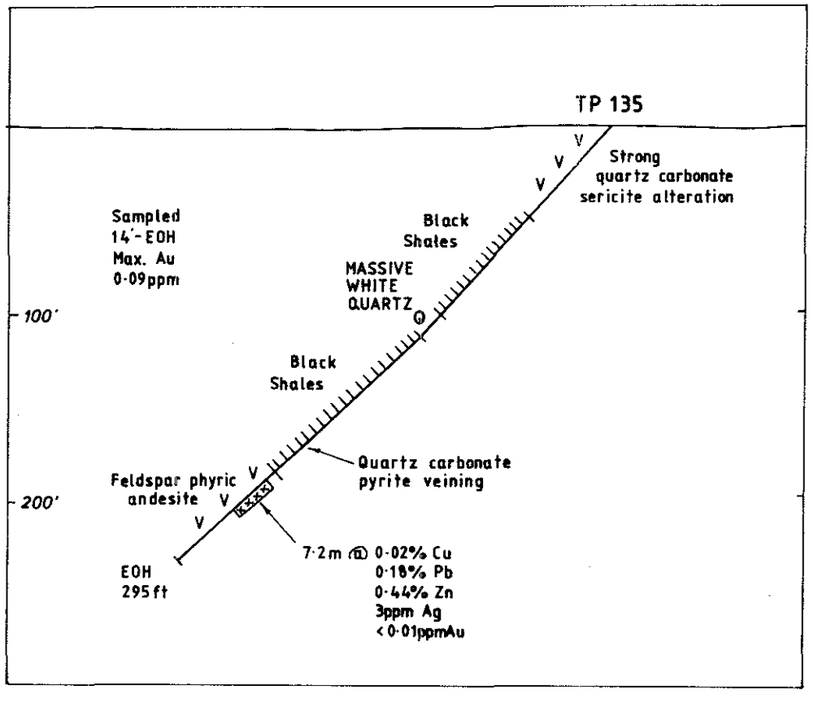
5 cm

87-2751

6970







5 cm

838260 6970

87-2751

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: HENTY FAULT ZONE

Title: MACKINTOSH PROSPECT DIAMOND DRILL SECTIONS MP 86, MP 87, TP 135

Author J.P.R.	Date 11/87	Scale 1:1000	
Drawn O.H.	Office TAS	Revised	Date
Drawing No. D/LJ 50/036			Fig. No. 47

6971

N
AMG

HEC YARDS

Bsh
Bsh q vn
Vi q vn
Vi sil
f Vi ser fol
mf Vi ser
TO HEC WORKSHOP
mf Vi
14335, 36
Vt ser
Bsh
7·2m – 0·18% Pb 0·44% Zn
TP 135
MP 86
f Vi
Vt ser
Bsh
ROAD
MACKINTOSH DAM
HENTY FAULT
380 400 N
TULLAH
RED 87-11
mf Vi q vn
Vt ser
f Vser
Vt ser
14327
14329
Vt chl py
14328
Vt ser chl
mf Vi
sh Vi
Vt ser cb q vning
14334
Vt
Creek accurately surveyed
380 300 N
14343
sh Vi sil q vn
f V sch
f Vi
f V q vn
f V sil q vn
f V sil
f V sil
Vt ser also 14333
q vn (14331)
chl cb f Vi (14330, 32)
mf Vi
13169, 70
f Vi sil chl
chl ff Vi
14346
Vt cb ser py?
f Vi q vn
14347
f Vi
Vt ser
13168
Vt sil q vn
Creek accurately surveyed
380 200 N
14344
f V q vn
mf Vi
f Vi
Vt ser
Vt q vn ser
mf Vi
mf Vi
mf Vi
Vt ser
f Vi
mf Vi sil
380 100 N
f Vi
mf Vi q vn
13161
13162
Bsh
Bsh / Vt ser
Vt
mf Vi
13166, 67
f Vi q vn
14348
Vt ser cb
Vt ser cb
Bsh
13163
mf Vi
Bsh
13164
13165
q q q q q
Bsh
Bsh
386 000 E
386 100 E
386 200 E
386 300 E

LEGEND

V V — DACITIC – ANDESITIC LAVA
- feldspar phyric (f), fine (f) to medium grained (m).
- often silicified, may be carbonated or sericitized.

SILTY – FINE ARENACEOUS VOLCANICLASTIC
Finely bedded, often sericitized and carbonated with a well developed cleavage. Graphitic interbeds common.

BLACK GRAPHITIC SHALE
Finely bedded, variable graphite content. Strongly fissile, sometimes crenulated.

13164 — Rock chip sample at outcrop

q vn	quartz veining
chl	chloritization
cb	carbonization
ser	sericitization
sil	silicification

5 cm

87-2751

838261 6971

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: ROSEBERY EAST J.V.

Title: MACKINTOSH AREA
DETAILED MAPPING
RED 87-11

Author	J P R	Dept. TAS	Scale 1:1000
Drawn	OH	Date 12/87	Revised Date
Checked		Date	S'ceded Date
Sheet No.	FIG No 48		Drawing No. D/LJ 50/040

6972

NW

SE

E.O.H.

Collar 5380330mN 386036mE
Azimuth 132° Mag
Incl. 50°

Mackintosh Dam Road

RED 87-11

Projected 30m S

Projected 35mS

Projected 20m S

Cfva Cvtser

Cvtser Cva-q

Cfva

Csbs

170m ASL

150m ASL

130m ASL

110m ASL

90m ASL

70m ASL

50m ASL

30m ASL

sil chl tr py
sil felds chl cb epi cb
tr py mas sil
Qtz vn
chl ser
irreg q cb
ser specks
Qtz vn
ser cb
chl cb
2% py felds phyric tr py
cb chl
cb chl
cb chl
Probable lava but has volcaniclastic affinity
Intense alteration
Intense alteration
Intense but patchy alteration
cb sil
cb
sh 45
sh 50/75 Vt
grad
45
100 tr py
150 crenulated cleavage
qtz chl
fine bedding
65
vn q cb poor bedding
graph
200 tr py
wispy sphalitic lenses
Rare sph-q vnlet
Shaley lenses >4cm
65 50
E.O.H. 250·1m

Survey Details

Depth	Inclination	Azimuth
0	50	132
49	45	130
100	35	122
160	33	122
199	29	120
250	22	118

LEGEND

V — *DACITIC-ANDESITIC LAVA*
Feldspar-phyric, often carbonate + quartz veined often sheared, stretched out feldspar porphyroblasts. Variable silicification and carbonate alteration. Va Andesitic; Vd dacitic.

Vs — *ARENACEOUS VOLCANICLASTIC (EPICLASTIC)*
Often difficult to distinguish from sheared lava most convincing where finely and uniformly bedded. Variable grain size but typically fine sand size. Graphitic interlayers very common. Also shale lenses (⬭) and ash lenses (⬭)

Vt — *PUMICEOUS VOLCANICLASTIC (EPICLASTIC)*
Finely layered often chloritic, sericite spotting.

Δ Δ — *breccia zone*
graph — *graphitic*
sh — *sheared*
cb — *carbonatization*
qtz — *quartz*
py — *pyrite*
sil — *silicification*
mas — *massive*
ser — *sericitic*
grad — *gradational contact*
——— — *Bedding*
– – – — *Foliation*

838262

5 cm

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: HENTY FAULT ZONE

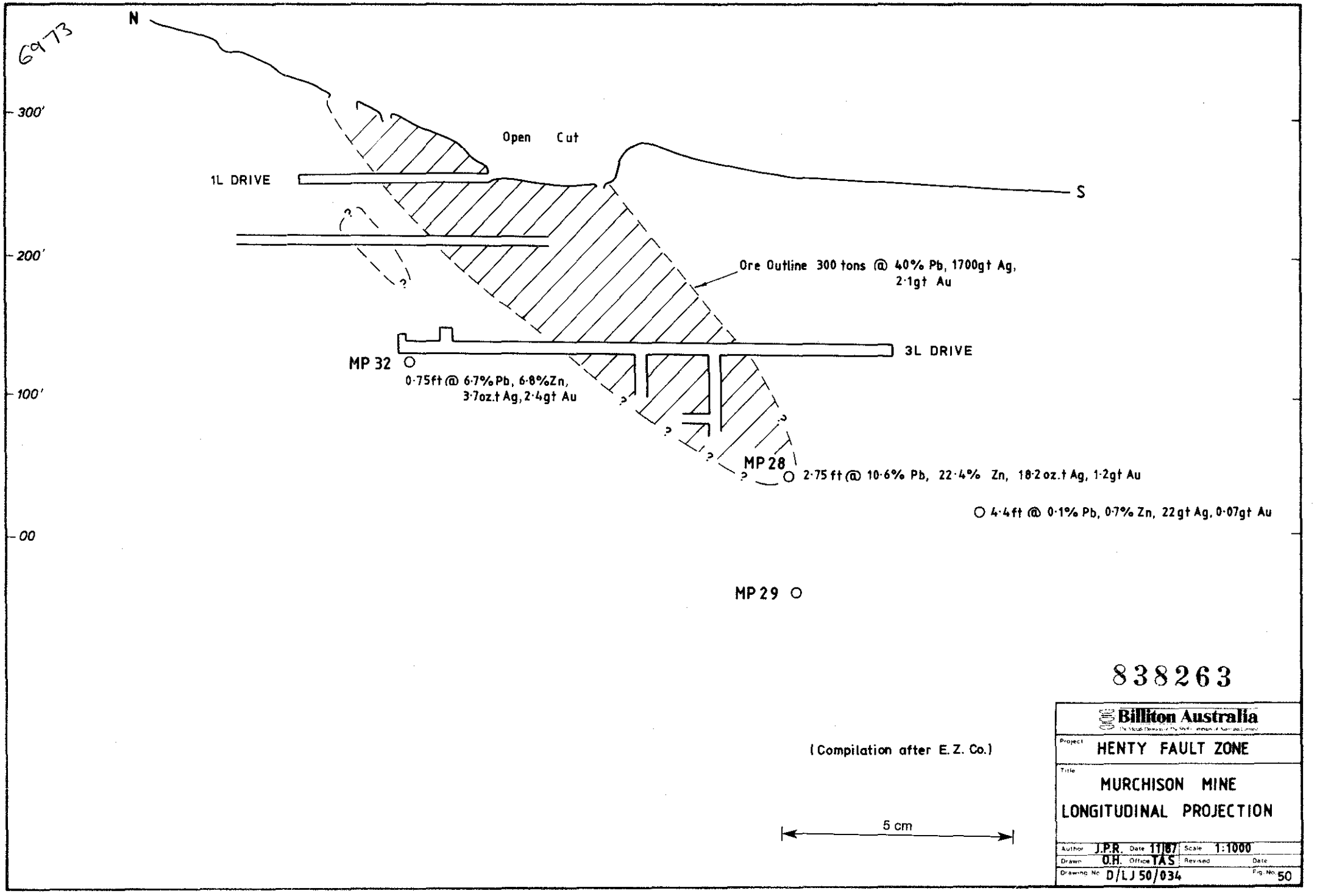
Title: MACKINTOSH AREA
DIAMOND DRILL SECTION
RED 87-11

Author	J.P.R.	Date	12/87	Scale	1:1000
Drawn	O.H.	Office	TAS	Revised	Date
Drawing No.	D/LJ 50/039			Fig. No.	49

87-2751

6972

6973



838263

Billiton Australia

Project: HENTY FAULT ZONE

Title: MURCHISON MINE
LONGITUDINAL PROJECTION

Author J.P.R.	Date 11/87	Scale 1:1000	
Drawn O.H.	Office TAS	Revised	Date
Drawing No D/LJ 50/034			Fig. No. 50

87-2751

6973

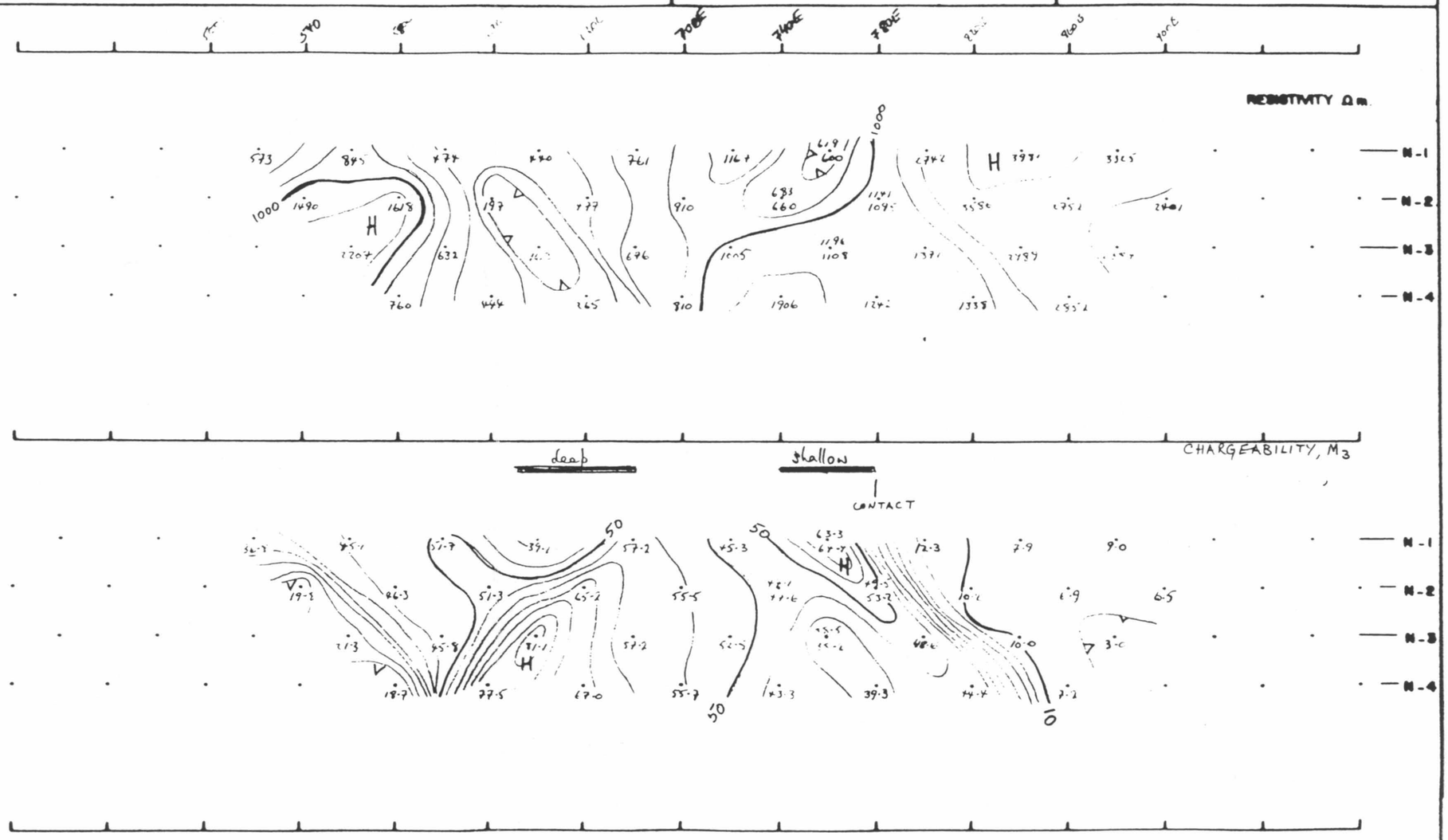
6974

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 15th November 1974	LINE No. 376600N
PLOTTED BY PHILIP BROWN	PROSPECT MURCHISON MINE
2 SECOND / RX. IPR-10A	JOB No. TAS-122
DIPOLE SPACING 40 METRES	



838264 87-2751

Fig 51
6974

6975

838265

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 14TH NOVEMBER 1987		LINE No. 376,550N
PLOTTED BY PHILIP BROWN		PROSPECT MURCHISON MINE
2 SECOND	Rx. IPR-10A	
DIPOLE SPACING 40 METRES		JOB No. TAS-122

87-2751

RESISTIVITY Ωm.

N-1
N-2
N-3
N-4

MP32

shallow - deep

shallow

CONTACT

CHARGEABILITY m_3

N-1
N-2
N-3
N-4

6975

Fig #52

6976

838266

87-2751

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 12TH NOVEMBER 1987

PLOTTED BY PHILIP BROWN

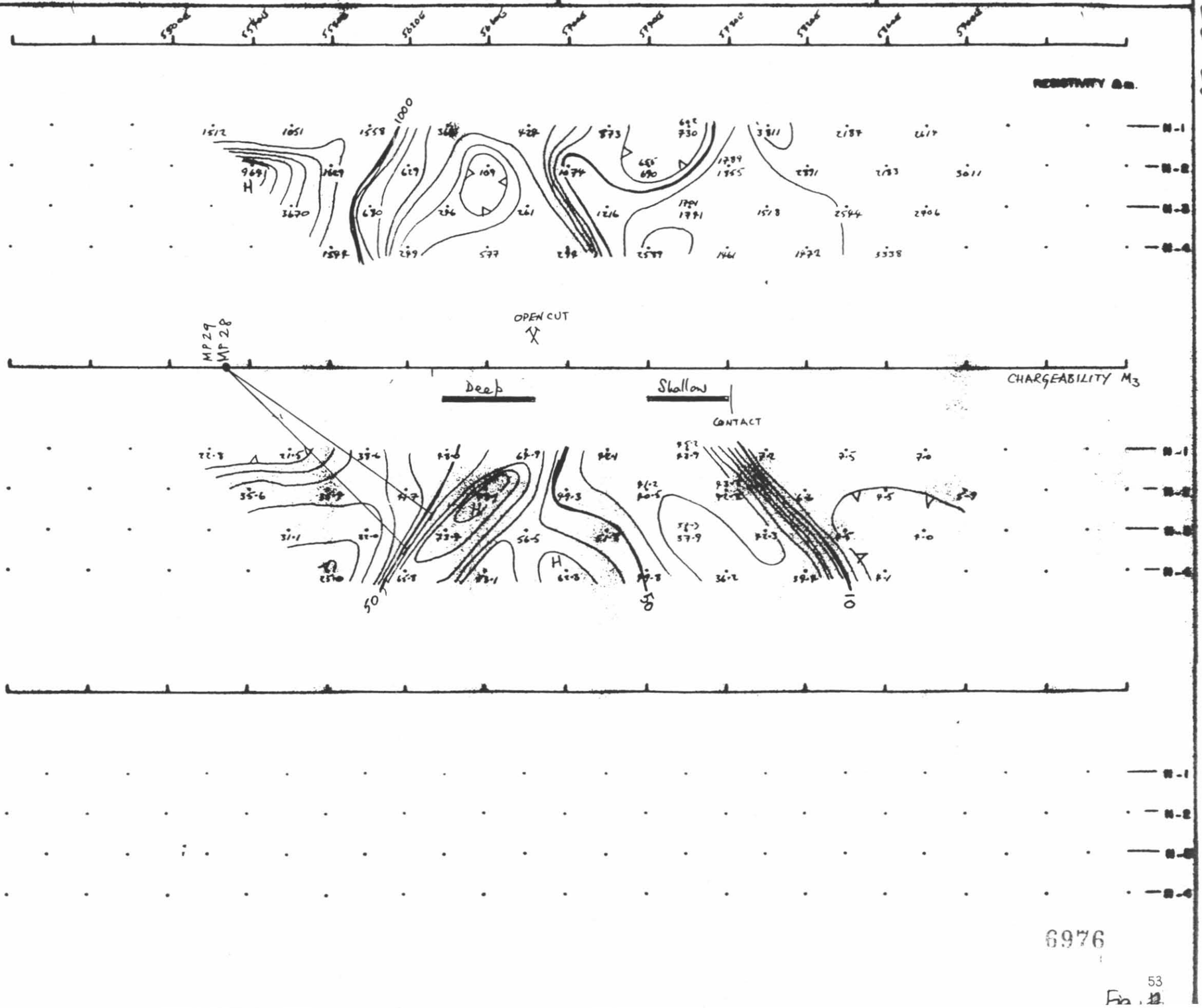
2 SECOND | No. IPR-10A

DIPOLE SPACING 40 METRES

LINE No. 376500N

PROSPECT PANCONTINENTAL MINE

JOB No. TAS-122.



6976

Fig. 13

6977

838267

SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 14th November 1977

PLOTTED BY Philip Brown

2 Second | Rx. IPR-10A

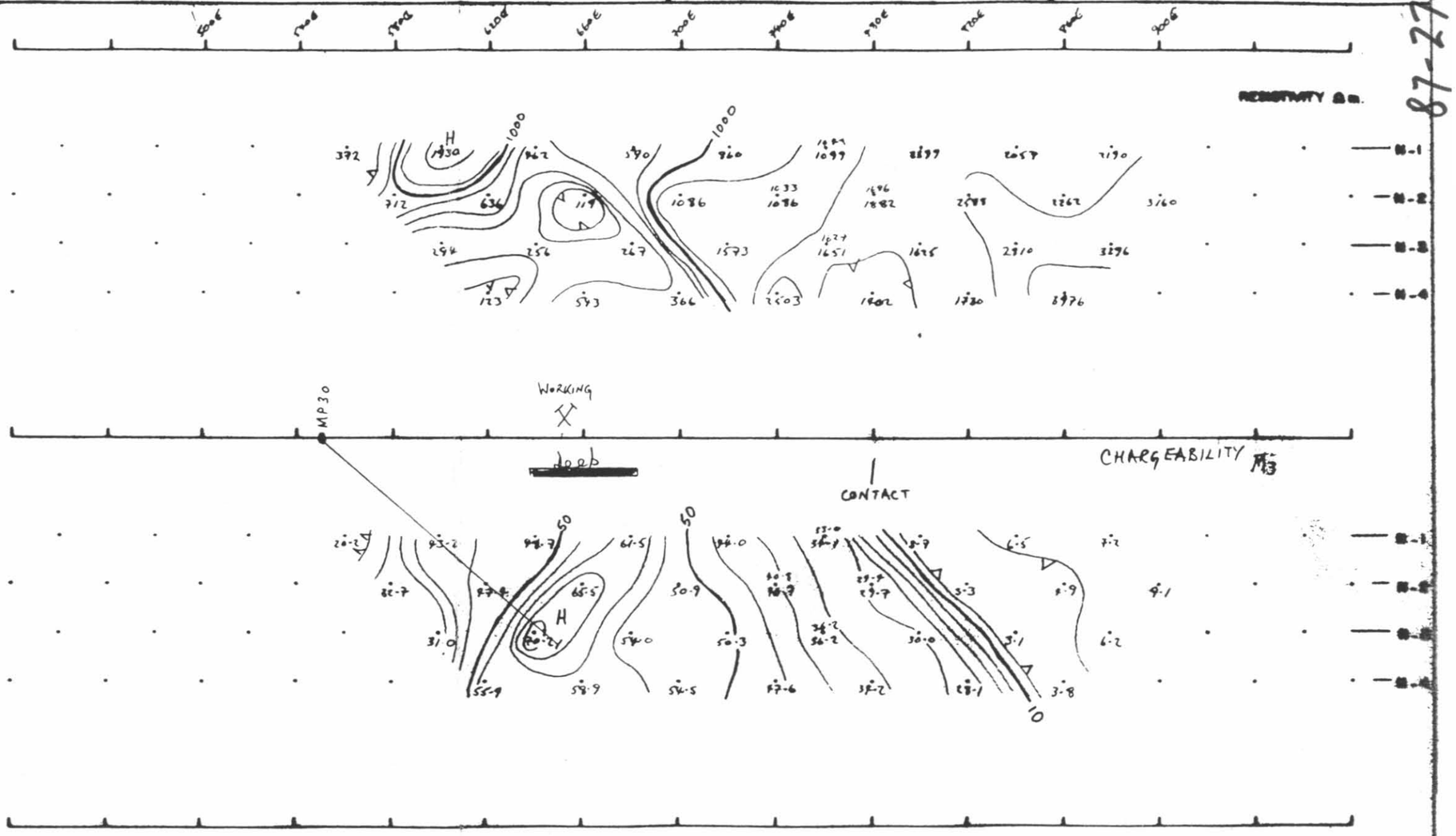
DIPOLE SPACING 40 METRES

LINE No. 37645ON

PROSPECT Mackinnon Mine

JOB No. JAS-122

87-2751



6977

6978

838268

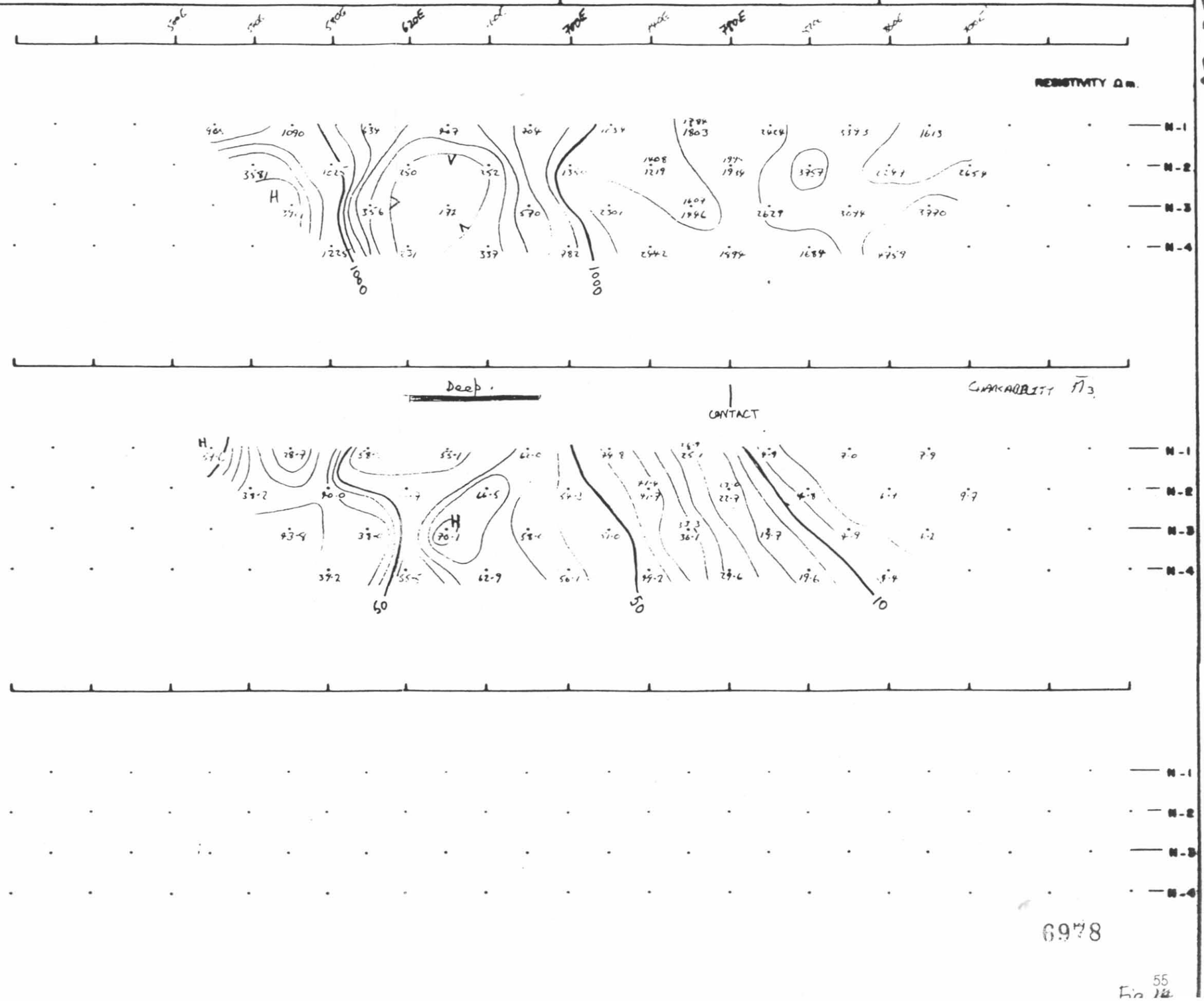
SCINTREX PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DIPOLE - DIPOLE ARRAY

DATE 14th November 1987	LINE No. 37140CN
PLOTTED BY Philip Brown	PROSPECT Murchison Mine
2 Second / Rx. IPR-10A	JOB No. THS-122
DIPOLE SPACING 40 METRES.	

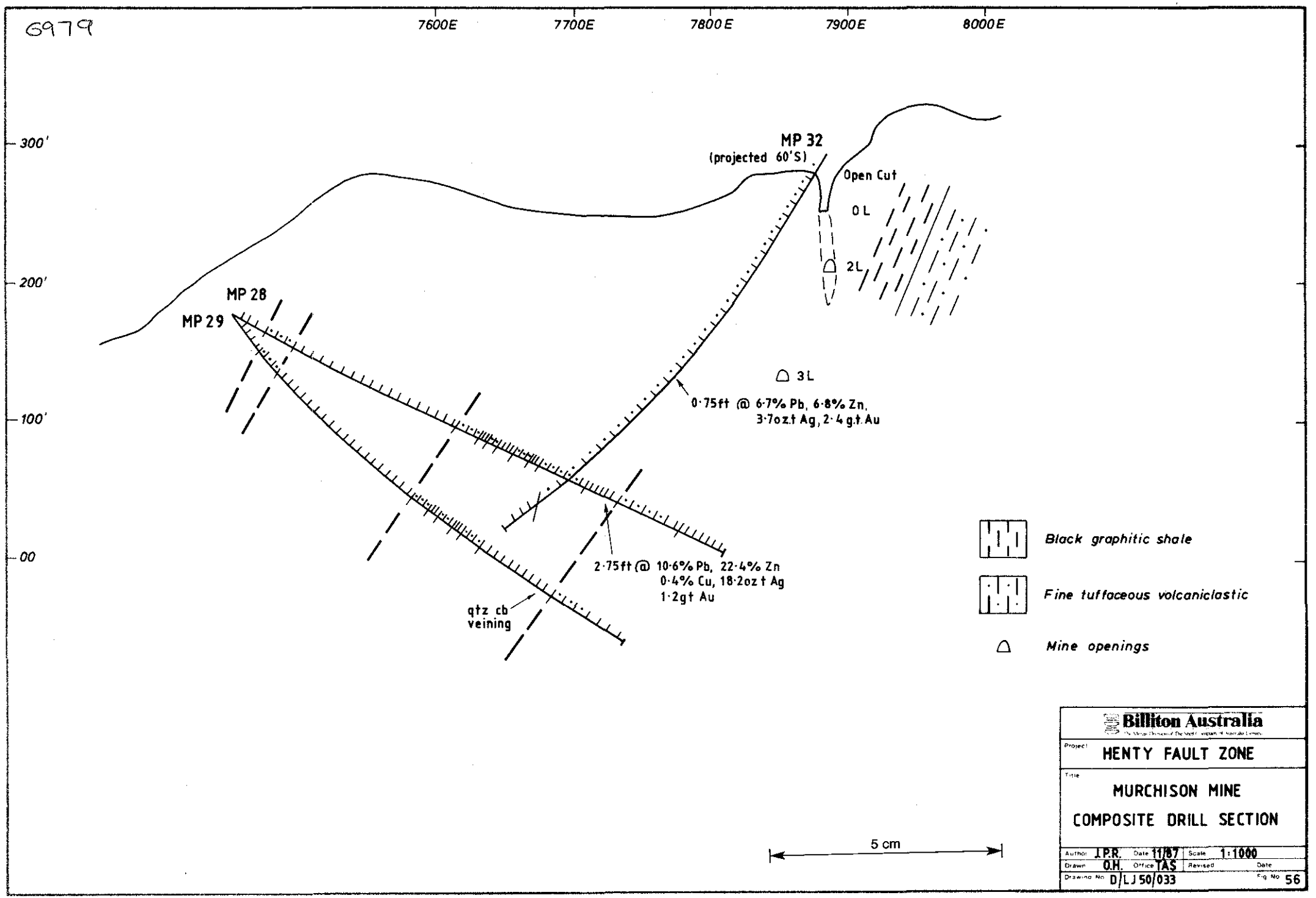
87-2751



6978

Fig 14

6979



Billiton Australia

Project: HENTY FAULT ZONE

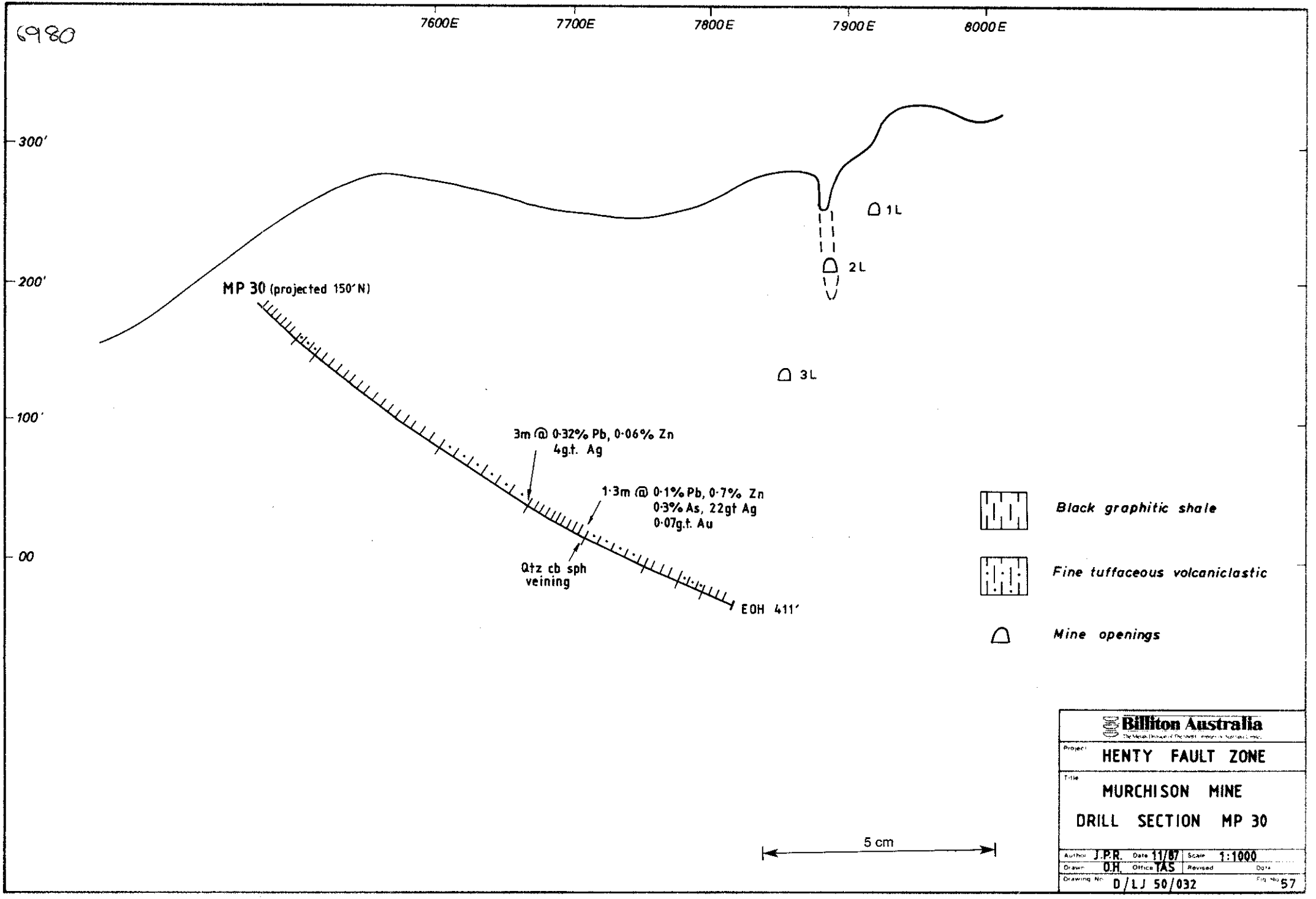
Title: MURCHISON MINE
COMPOSITE DRILL SECTION

Author	J.P.R.	Date	11/87	Scale	1:1000
Drawn	O.H.	Office	TAS	Revised	Date
Drawing No	D/LJ50/033			Fig No	56

838269

87-2751 6979

6980



Billiton Australia

Project: HENTY FAULT ZONE

Title: MURCHISON MINE
DRILL SECTION MP 30

Author	J.P.R.	Date	11/87	Scale	1:1000
Drawn	O.H.	Office	TAS	Revised	Date
Drawing No.	D/LJ 50/032			Fig. No.	57

87-2751

838270 6980

GA81

381 200m E | 381 400m E | 381 600m E | 381 800m E | 382 000m E

69 000m N

Still River

HENTY FAULT ZONE (inferred position)

Walking track To South Stitt vehicle track

381 600 E | 382 100 E

381 620 E | 382 080 E | 68 900m N

381 550 E | 382 030 E | 68 800m N

Baseline

381 520 E | 381 980 E | 68 700m N

381 480 E | 381 950 E | 68 600m N

381 400 E | 381 900 E | 68 500m N

381 400 E | 381 890 E | 68 400m N

381 330 E | 381 790 E | 68 200m N

381 240 E | 381 740 E | 68 100m N

381 200 E | 381 700 E | 68 000m N

68 800m N | 68 600m N | 68 400m N | 68 200m N | 68 000m N

AMG North | Mag. North | 12°

cp/hm/py in qtz vein

Walking track to Moxon Saddle

RECENT, QUATERNARY — Scree and glacial debris, mainly derived from Owen Conglomerate and Volcanomict Breccio-Conglomerate (Jukes Breccia Equivalent)

LOWER CAMBRIAN

MT READ VOLCANICS

West of Henty Fault Zone

- Chloritic volcanic sediments: sandstones, siltstones and shales. Some volcanolithic breccias.
- Feldspar-phyric lava. Feldspars albitised

East of Henty Fault Zone

- Sericitic and siliceous sediments: mainly silstones and fine sandstones, some shales and cherts. Pyritic in places.
- Quartz-phyric rhyolite lava

Geological contact, inferred geological contact

Outcrop mapped by I.F.G and/or J.G.P.

Bedding

Schistosity

X14201 Rock outcrop or float sample

(P) Petrological sample

ch Chert

py Pyrite

cp Chalcopyrite

hm Specular hematite

lim Limonite

5 cm

0 | 100 | 200 m

838271

87-2751 6981

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project: ROSEBERY EAST J.V.

Title: MT BLACK EL1/62
SOUTH STITT, SOUTHERN FILL-IN GRID
GEOLOGY

Author IFG	Dept TAS	Scale 1:2000	
Drawn AS	Date 2/87	Revised	Date
Checked JGP	Date 2/87	S'ceded	Date
Sheet No FIG. No. 58		Drawing No LJ 50/1071	

6982

5 cm

838272

SHELL COMPANY OF AUSTRALIA

METALS DIVISION

R.O.C.S. - PROTEM

ROSEBERY E JV, TAS
SOUTH STITT
GROUND MAG, TMI
BASE62070, 100nT/CM

SCALE 1 : 5000

FIG No :	59	LEGEND
DATE :	1987	G-856
AUTHOR :	T.B.	DIURNAL CORRECTION
OFFICE :		
DRAWN :	AHO	

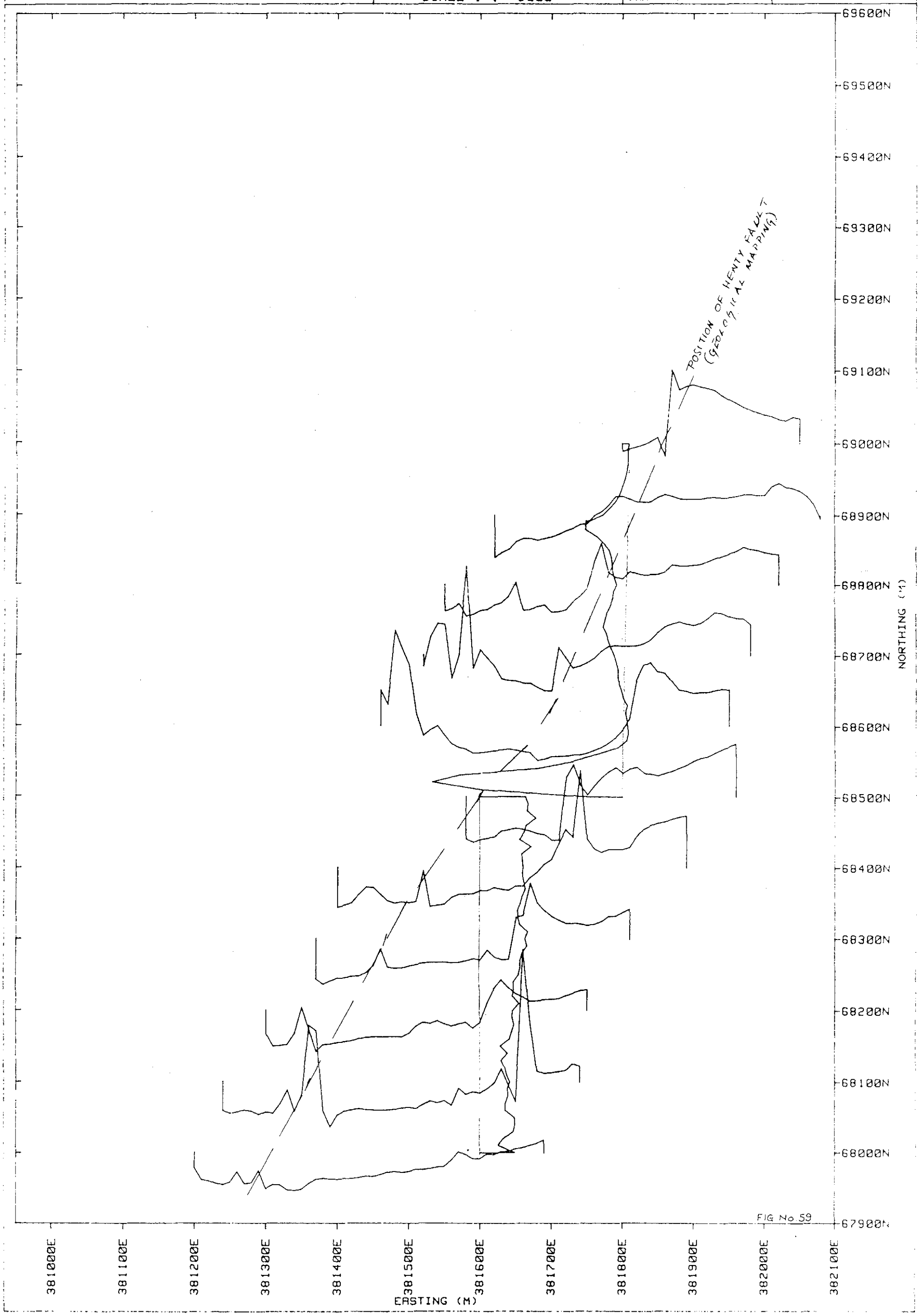


FIG No 59

6983

87-2751

838273

6983

AIRBORNE GEOPHYSICS
(EM, MAG, etc)

GROUND MAGNETICS 62100nT
62050
62000

VOLCANICS | GLACIALS

GEOLOGY
& TOPOGRAPHY

HFZ ?

Rives Valley

Steep slope

1300 1340 1380 1420 1460 1500 1540 1580 1620 1660 1700 1740 1780 1820 1860 1900 1940 1980 382020 E.

APPARENT RESISTIVITY mV/V

n
1-
2-
3-
4-
5-
6-

3980 1161 1106 1000 400 250 196 310 271 1473 1598 1000 650
3196 907 289 256 237 389 382 630 581 1116
2500 2173 1600 911 352 355 402 405 787 354 252 782 1000
668 650 378 400 548 533 853 993 650 400 346 347 250 400 650

APPARENT CHARGEABILITY ms-m.

n
1-
2-
3-
4-
5-
6-

7.8 7.8 10.2 7.3 9.7 7.8 14.2 13.2 14.7 H
8.5 10.4 1.5 4.3 6.6 4.9 4.0 7.1 9.2 14.1 9.4 14.1
8.6 13.2 4.3 3.7 4.1 1.9 10.5 H 4.3 11.7 13.8
9.1 10.5 20 H 20 10 5 11.0 10.5 10 1.9 5 10 15.5 15

6983

Contractor : SUNTREX
Date : 15/11/87
Timing : 2ms
Transmitter :
Receiver : IPR-10A
Integration time : M3
Array : DIPOLE DIPOLE
Dipole length : 40m

5 cm

87-2751

The Shell Company of Australia Limited METALS DIVISION	
ROSEBERY EAST, TAS	
SOUTH STITT	
I.P. / RESISTIVITY SURVEY	
LINE 6890ON	
SCALE 1:2000	DATE
AUTHOR	DRAWN NH
OFFICE	REP. No

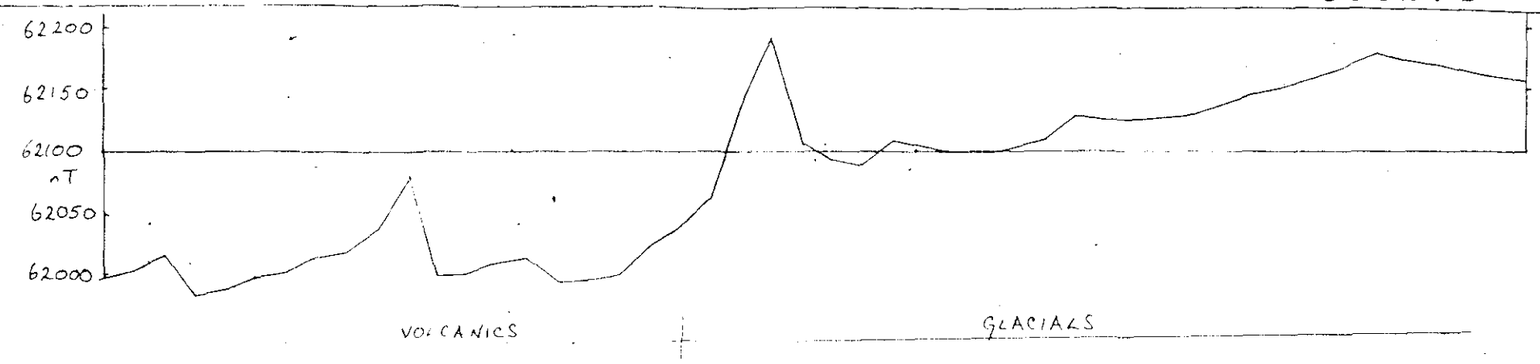
Fig 60

838274

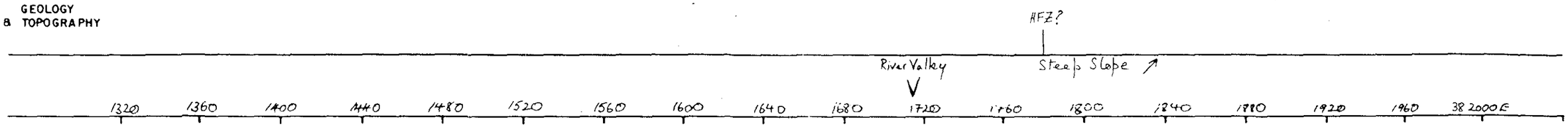
6984

AIRBORNE GEOPHYSICS
(EM, MAG, etc)

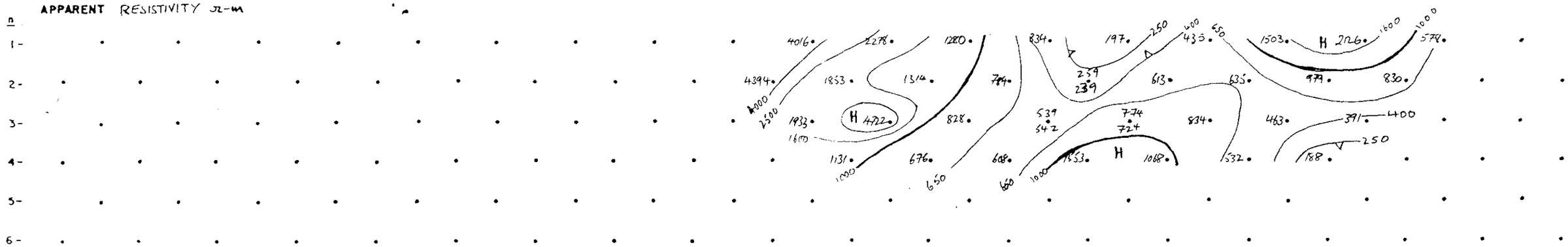
GROUND MAGNETICS



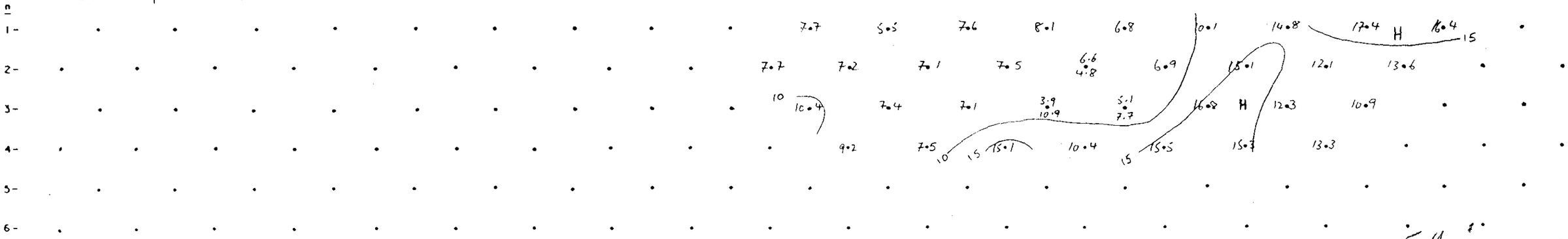
GEOLOGY
& TOPOGRAPHY



APPARENT RESISTIVITY Ω-m



APPARENT CHARGEABILITY mv/v



Contractor : SCINTREX
Date : 16/11/87
Timing : 2 ms
Transmitter :
Receiver : IPR-10A
Integration time : M_3
Array : DIPOLE-DIPOLE
Dipole length : 40m

5 cm

87-2751

Fig 61 6984

The Shell Company of Australia Limited
METALS DIVISION

ROSEBERY EAST, TAS
SOUTH STITT

I.P. /RESISTIVITY SURVEY

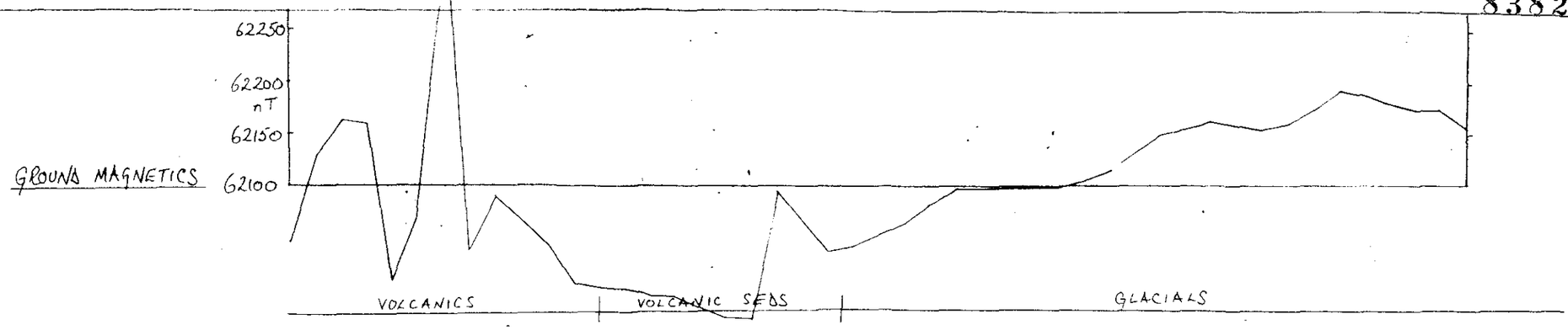
LINE 6880DN

SCALE 1:2000	DATE
AUTHOR	DRAWN AH
OFFICE	FEB 88

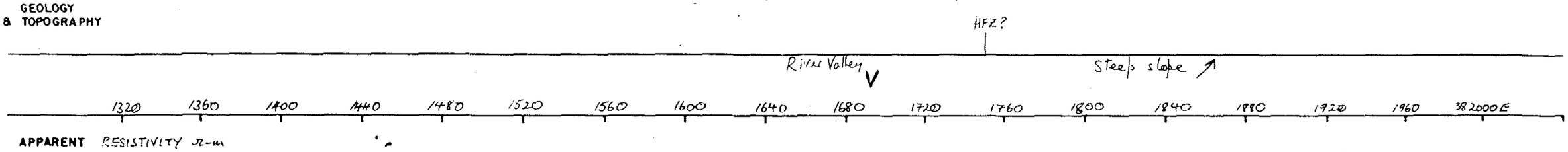
838275

6985

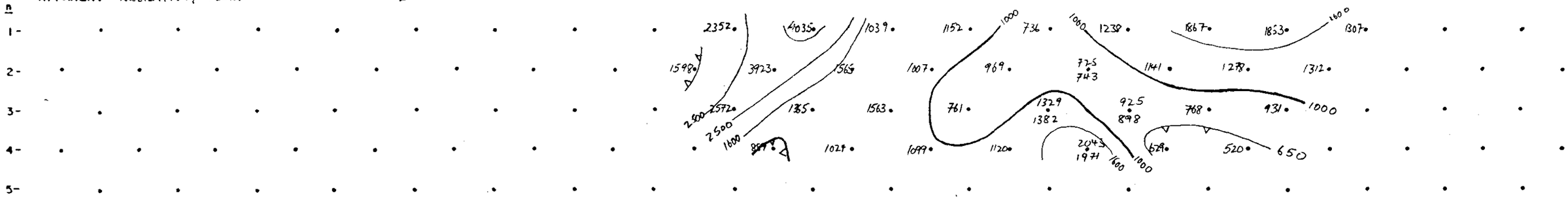
AIRBORNE GEOPHYSICS
(EM, MAG, etc)



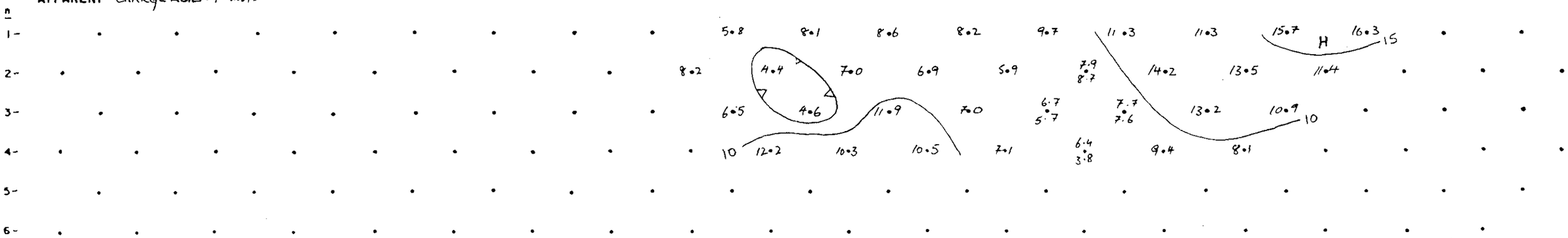
GEOLOGY
& TOPOGRAPHY



APPARENT RESISTIVITY Ω-m



APPARENT CHARGEABILITY mv/V



Contractor : SCINTREX
Date : 17/11/87
Timing : 2ms
Transmitter :
Receiver : IPR-10A
Integration time : M3
Array : DIPOLE-DIPOLE
Dipole length : 40m

5 cm

87-2751

Fig 62 6985

The Shell Company of Australia Limited
METALS DIVISION

ROSEBERY EAST, TAS
SOUTH STITT
I.P. /RESISTIVITY SURVEY
LINE 6870ON

SCALE 1:2000	DATE
AUTHOR	DRAWN NH
OFFICE	REP.No.

6986

AIRBORNE GEOPHYSICS
(EM, MAG, etc)

GROUND MAGNETICS

62250
62200
nT
62150
62100

GEOLOGY
& TOPOGRAPHY

VOLCANICS | VOLCANIC SEDS | FARRELL SEDS | GLACIALS

HFZ

Rivus Valley

Steep slope

1320 1360 1400 1440 1480 1520 1560 1600 1640 1680 1720 1760 1800 1840 1880 1920 1960 382000E

APPARENT RESISTIVITY Ω-m

n

1- 1841 2082 4063 1551 650 555 784 1260 2598 H 5042 4000 3045
2- 2463 1659 4757 2524 531 596 656 1744 1911 2108 2330 2500
3- 2249 2859 3032 954 471 512 1374 1524 H 1874 1250 1093 1000
4- 4027 H 2500 1810 1600 1000 790 758 970 1115 1417 1965 1600 531
5-
6-

APPARENT CHARGEABILITY mv/v.

n

1- 12.7 11.3 9.7 10 10.9 6.2 11.3 13.8 11.4 10.5 13.7
2- 8.2 12.8 5.9 8.3 8.4 11.8 8.9 13.2 13.1 10.1 13.1
3- 9.7 9.4 6.6 6.5 10.8 10.7 10.0 9.7 9.9 13.3 13.5
4- 7.3 8.4 6.4 8.6 9.5 9.6 6.7 8.5 10 19.0 15
5-
6-

Contractor : SCINTREX
Date : 18/11/87
Timing : 2ms
Transmitter :
Receiver : IPR-10A
Integration time : M_3
Array : DIPOLE - DIPOLE
Dipole length : 40m.

5 cm

87-2751

6986

The Shell Company of Australia Limited
METALS DIVISION

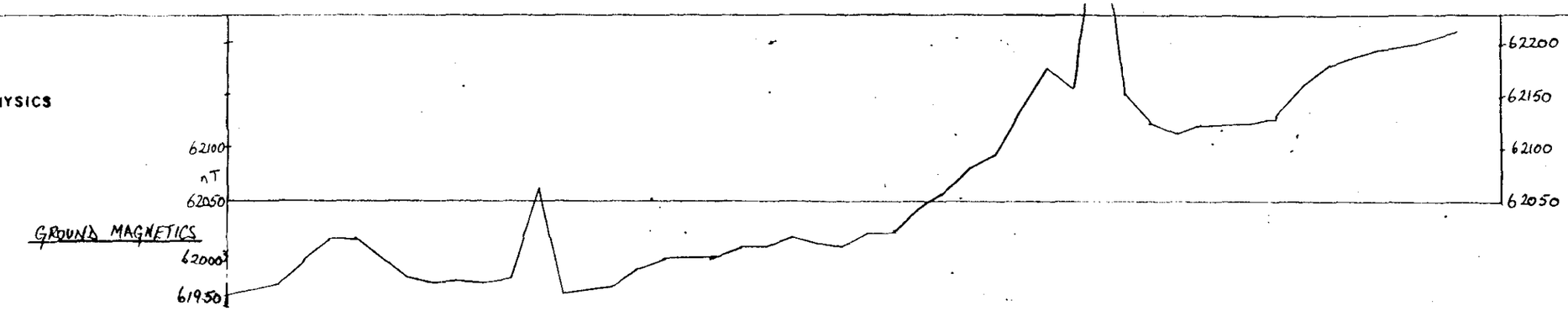
ROSEBERY EAST, TAS
SOUTH STITT
I.P. /RESISTIVITY SURVEY
LINE 6860ON

SCALE 1/2000	DATE
AUTHOR	DRAWN NH
OFFICE	REP.No. 63

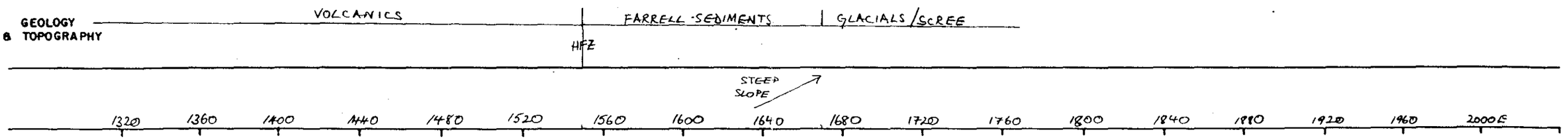
6987

838277

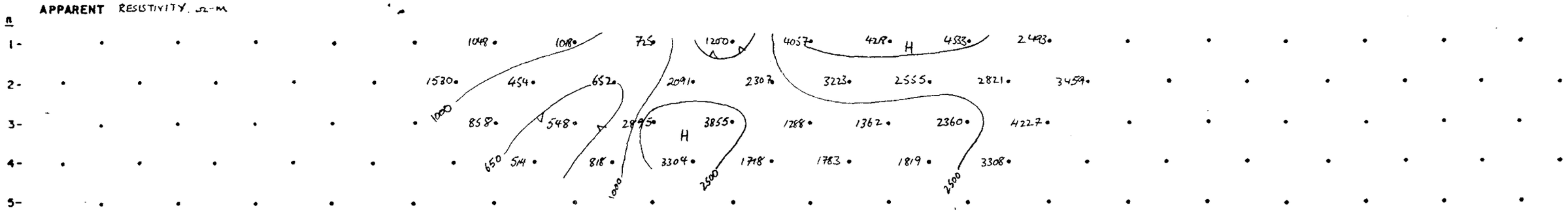
AIRBORNE GEOPHYSICS
(EM, MAG, etc)



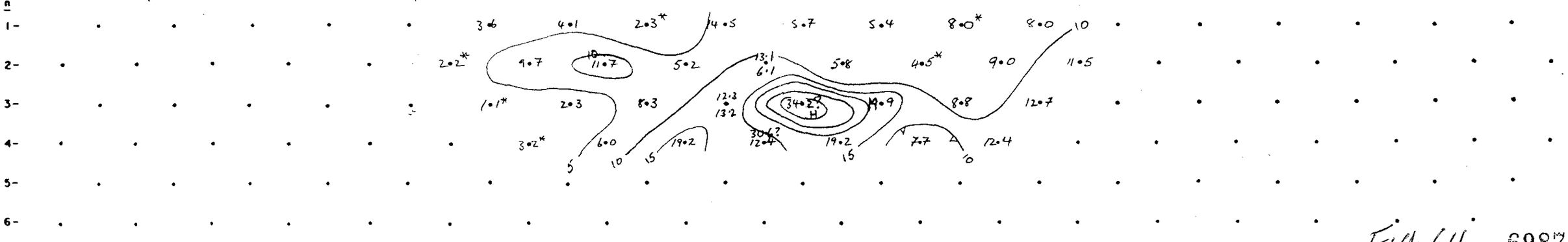
GEOLOGY & TOPOGRAPHY



APPARENT RESISTIVITY. Ω-M



APPARENT CHARGEABILITY mv/v



Contractor : SCINTREX
Date : 23/11/87
Timing : 2ms
Transmitter :
Receiver : IPR-10A
Integration time : M3
Array : DIPOLE-DIPOLE
Dipole length : 40m

5 cm

87-2751

Fig 64 6987

The Shell Company of Australia Limited
METALS DIVISION

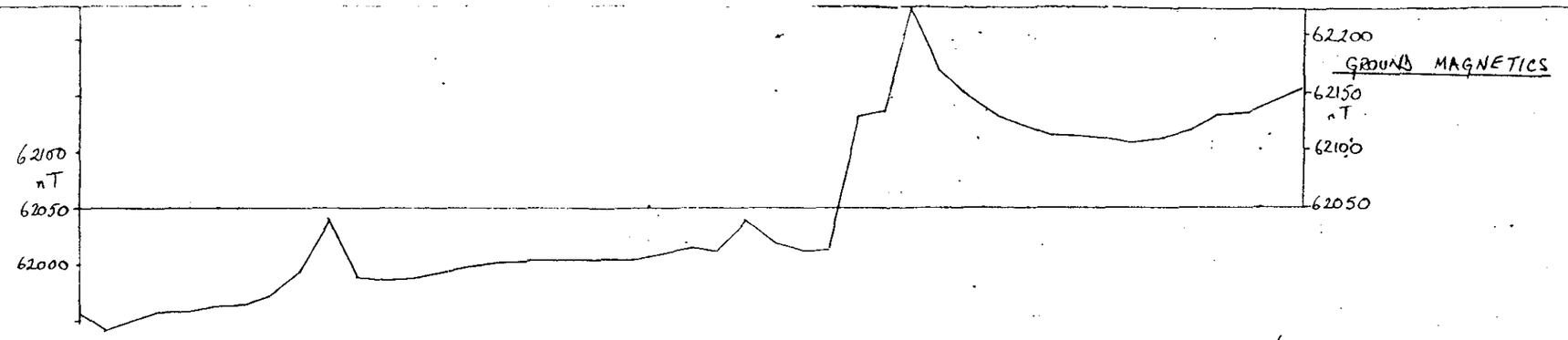
ROSEBERY EAST, TAS
SOUTH STITT
I.P./RESISTIVITY SURVEY
ANE 68400N

SCALE 1:2000	DATE
AUTHOR	DRAWN
OFFICE	REP.No.

6988

838278

AIRBORNE GEOPHYSICS
(EM, MAG, etc)



GEOLOGY & TOPOGRAPHY

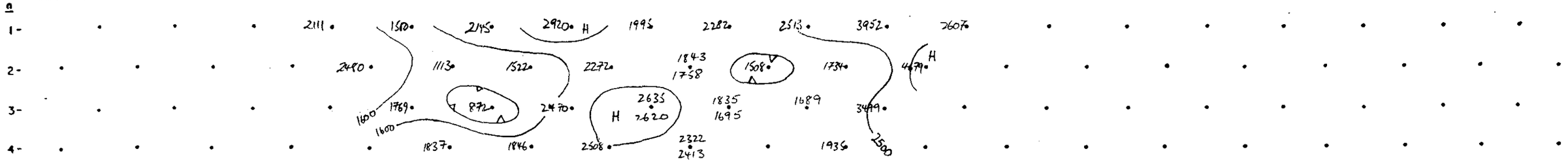
VOLCANICS | FARRELL SEDS | LAVAS | SEDS | GLACIALS/SCREE

HFZ

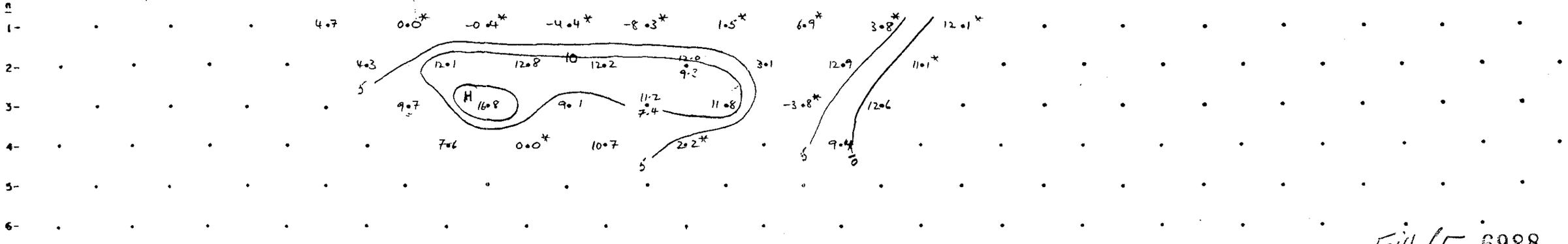
STEEP SLOPE

1320 1360 1400 1440 1480 1520 1560 1600 1640 1680 1720 1760 1800 1840 1880 1920 1960 2000E

APPARENT RESISTIVITY Ω-M



APPARENT CHARGEABILITY mV/V



Contractor : SCINTREX
Date : 28/11/87
Timing : 2ms
Transmitter :
Receiver : IPR-10A
Integration time : M_3
Array : DIPOLE-DIPOLE
Dipole length : 40m

* INDICATES PROBABLE EM COUPLING
(DECREASING $M_1 - M_3 - M_5$)

5 cm

87-2751

Fig 65 6988

The Shell Company of Australia Limited
METALS DIVISION

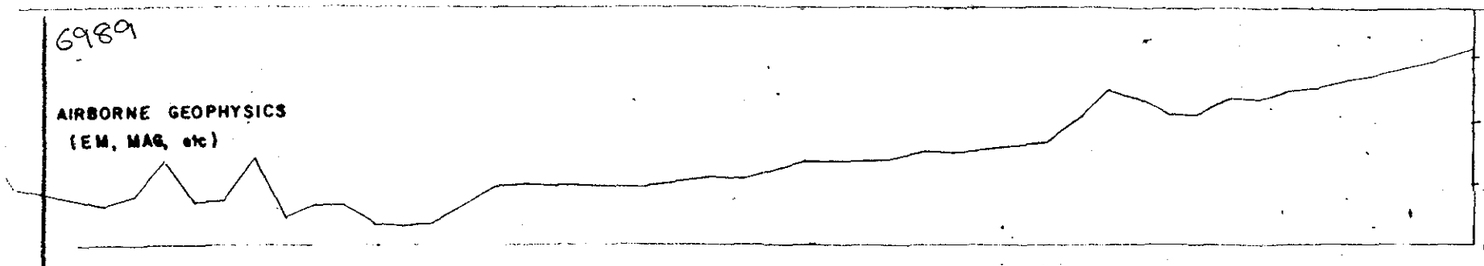
ROSEBERY EAST, TAS
SOUTH STITT
I.P./RESISTIVITY SURVEY
LINE 6830ON

SCALE 1:2000	DATE
AUTHOR	DRAWN
OFFICE	REP.No.

838279

6989

AIRBORNE GEOPHYSICS
(EM, MAG, etc)



GEOLOGY & TOPOGRAPHY — VOLCANICS | FARRELL SEDIMENTS | RHYOLITE LAVAS (W. DISSEM PY) | GLACIALS/SCREE

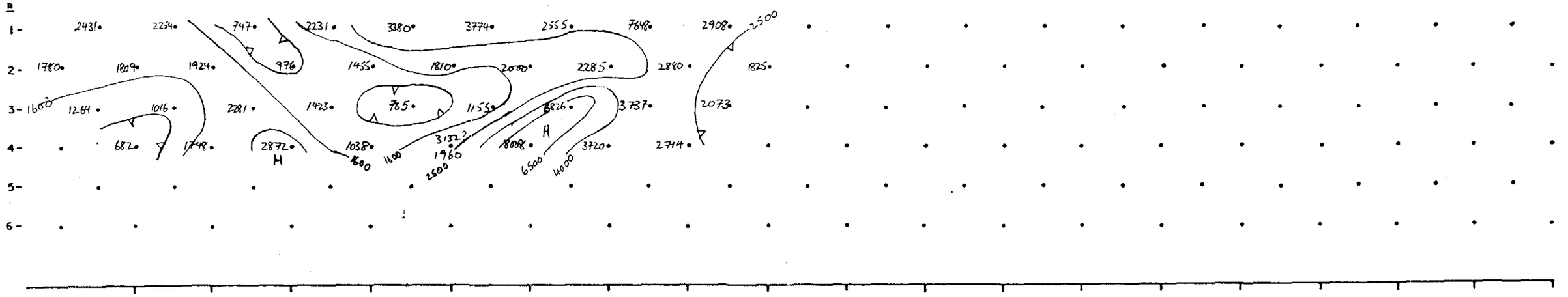
HFZ

HEC POWER LINE @ (38)085E

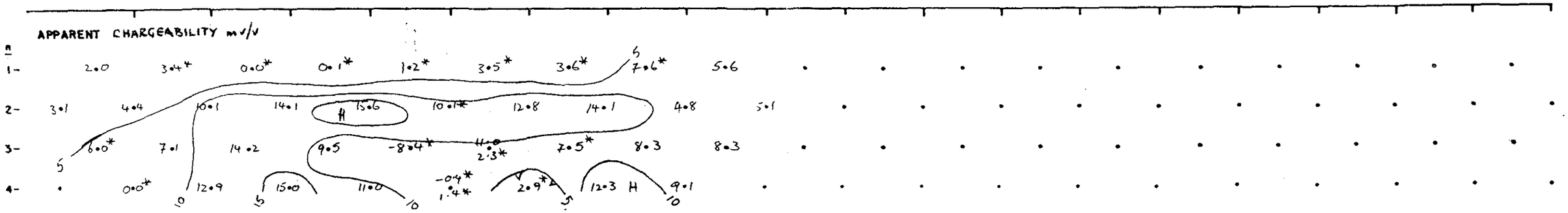
STEEP SLOPE

1260 1300 1340 1380 1420 1460 1500 1540 1580 1620 1660 1700 1740 1780 1820 1860 1900 1940 1980 2020 E.

APPARENT RESISTIVITY Ω-m



APPARENT CHARGEABILITY mV/V



NB V. NOISY DATA IN CENTRE & WEST OF ARRAY (WET CONDITIONS).
* INDICATES PROBABLE EM COUPLING (DECREASE $M_1 - M_3 - M_5$)

Contractor : SUNTREX
Date : 29/11/87
Timing : 2ms
Transmitter :
Receiver : IPR-10A
Integration time : M_3 (650-1170 ms)
Array : DIPOLE - DIPOLE
Dipole length : 40m.

5 cm

Fig 66 6989

The Shell Company of Australia Limited
METALS DIVISION

ROSEBERY EAST, TAS
SOUTH STITT
I.P. / RESISTIVITY SURVEY
LINE 68000N

SCALE 1:2000	DATE
AUTHOR	DRAWN NK
OFFICE	REP.No.
DRG.No.	FIG.No. 66

87-2751