PASMINCO EXPLORATION

EL 22/90 TULLAH &
EL 24/91 STERLING RIVER
ANNUAL REPORT

September 1993 – September 1994

Volume 1 of 2

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DATE:	September 1994
REPORT No.:	T94–8
SUBMITTED TO:	Regional Exploration Manager – Tasmania
DISTRIBUTION:	Mineral Resources Tasmania – Hobart
	Pasminco Exploration – Burnie – Melbourne – Rosebery

SUBMITTED BY:

ACCEPTED BY:

BURNIE
SEPTEMBER 1994

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1 SUMMARY

Exploration on the Tullah - Sterling River licences in 1993-94 centred around the drilling of three holes (MD1-3) totalling 617m, at Mackintosh Dam. MD1 intersected 0.12m of semi-massive pyrite-galena, assaying 8.75% Pb, 0.07% Zn and 123 g/t Ag, in the target horizon 50m down-dip from the outcropping sulphide lenses. Adjacent holes MD2 & 3 were barren.

The lack of a footwall alteration zone, and other geological evidence, suggests the massive sulphide lenses have been transported some distance from their source. No further work is recommended on the prospect at this time.

On the Tullah Flat, hole MM2 (332m) was put down to test a strong EM anomaly in the Farrell Slates. This anomaly was detected by the initial DHEM survey of adjacent hole MM1a in 1992-93, and fully delineated by further DHEM surveys in MM1a and Billiton hole RED86-1 this year. MM2 did not encounter any significant mineralization. A DHEM survey in MM2 determined that the EM response was from a unit of black shale intersected in the hole.

At South Stitt, a geological reconnaissance traced the "Henty gold deposit style" altered and pyritic volcaniclastic float, located by exploration in the 1980's, to outcrop 150-200m east of the Henty Fault. Despite their favourable appearance, soil and rock sampling has failed to detect any significant gold or base metals in the altered rocks. No further work is recommended here.

The 1991-93 aeromagnetics and gravity surveys were interpreted following completion of data processing. Features having a major impact on the prospectivity of both licences include a 7km x 3km, apparently alteration-induced, magnetic low and a partially-coincident shallowly-buried spine of Devonian granite. These features are centred on the Henty Fault and extend both sides of it.

A review of the mineral potential of the EL's concludes there is potential for volcanogenic massive sulphide deposits within and on the periphery of the magnetic low zone, at distances approximately greater than 1.5km above the underlying granite. Areas outlined on this basis include: the northern half of the 5km long altered and mineralized Farrell Slates/Murchison Volcanics contact on the eastern side of the Sterling Valley; the area between the Farrell and

Murchison mines; and the unexplored western contact of the mafic unit on the western side of the Sterling Valley.

Remobilised volcanic massive sulphides are also an important exploration target and best sought in the vicinity of the Farrell Mines at Tullah.

There is clearly outstanding potential for pyrite and pyrrhotite-hosted Au-Cu-Sn deposits in the volcanics and sediments above the 6km length of the Devonian granitic spine beneath the Sterling Valley. Two sizeable sub-economic deposits of this type (Lakeside and the "Arsenic Resource") are already known and the magnetics show there are at least three further anomalies reflecting untested pyrrhotitic deposits, one of which is 800m long. Drilling is recommended as a matter of priority.

Drilling is recommended to test the 5km long altered and mineralized Farrell Slates/Murchison Volcanics contact zone on the eastern side of the Sterling Valley, the volcanogenic massive sulphide potential in the area between the Farrell and Murchison mines, and remobilised mineralization around the Farrell Mines.

Initial exploration of strongly altered zones in the Murchison Volcanics and along the western contact of the Sterling Valley mafic unit, is also recommended.

It is suggested a task-force be set up to deal with non-prospect-specific aspects of the exploration potential in the Tullah-Sterling River area, arising mainly from the implications contained in the magnetic and gravity data. The primary aim of this task force would be to generate target areas for exploration beyond 1994-95, bearing in mind the Tullah EL must be reduced by 50% in September 1995.

2 INTRODUCTION

Exploration carried out in the year to September 1994 on the contiguous 27sq km Tullah EL 22/90 and 48 sq km Sterling River EL 24/91, is detailed in this report. The mineral potential of the EL's is reviewed and a future work programme outlined.

The two EL's cover units of the Cambrian Mt Read Volcanics along the Henty Fault in Western Tasmania (Figure 3). The area is highly mineralized, with numerous basemetal and precious metal showings and deposits, including several sub-economic drill-delineated resources (Figure 4).

There has been a long history of previous mining (mainly small-scale Pb-Ag), and the area is one of the more-heavily explored parts of the Mt Read Volcanics. Over 100 surface diamond drillholes have been put down and a further 78 drilled underground in the old Farrell Mines. Since the late 1950's parts of the area, particularly along the Henty Fault zone, have been subjected to repeated and over-lapping geophysical and geochemical surveys. However, some of the more-inaccessible areas such as the southern and eastern parts of the Sterling River licence, have received minimal attention.

The previous mining and exploration history is outlined in some detail in Lorrigan (1991) and Purvis (1992).

The main target of the present exploration programme is volcanogenic auriferous basemetal massive sulphide deposits.

In the interval October 1990 to September 1993, prior to the current reporting period, exploration carried out by Pasminco included:

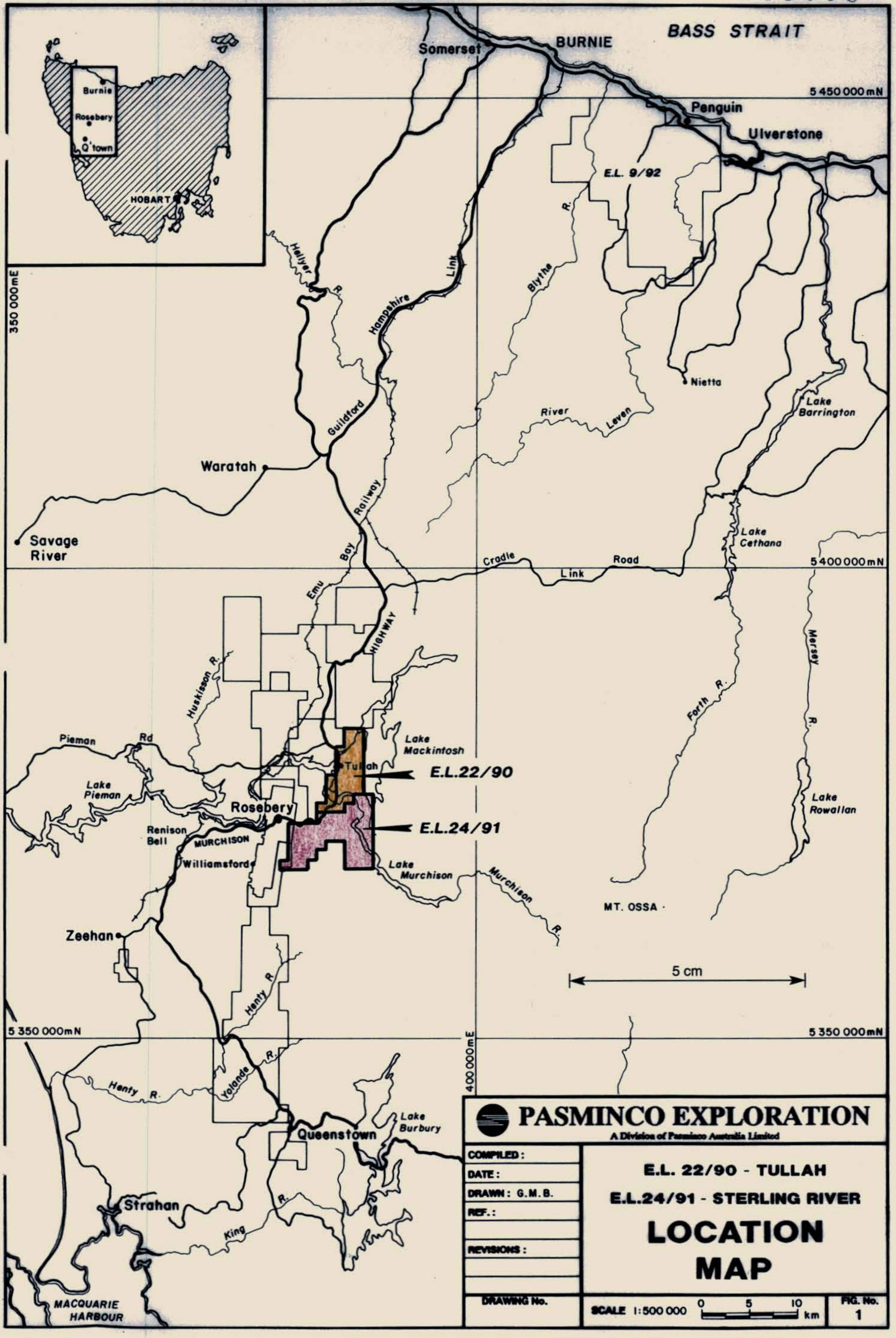
* High-resolution helicopter-borne aeromagnetic and radiometric surveys
* A comprehensive gravity survey of both EL's
* Detailed evaluation of the old Murchison Mine, including dewatering of the workings below 3 Level and the drilling of hole MM1a (400.7m)
* Relogging of 12 underground drillholes from the old Farrell Mines

* Geological mapping and geochemical rock sampling in selected areas, including the Sterling Valley, Murchison Gorge, Farrell Range and along the Henty Fault north of the Farrell Mines
* EM survey of the barite zone in the Anthony power tunnel
* DHEM survey of hole MM1a
* Colour and black & white aerial photography and photogrammetric preparation of topographic base plans over both EL's.

In the year to September 1994, work completed was as follows:

* Drilling of four diamond drillholes totalling 948.6m: MD1, 2 & 3 at Mackintosh Dam, and MM2 on the Tullah Flat.
* DHEM surveys of the above holes, and repeat DHEM surveys of hole MM1a at Murchison Mine and Billiton hole RED86-1 at Murchison River.
* Mise `a la Masse (and one-line IP) surveys at Mackintosh Dam.
* Comprehensive interpretation (by Consultant) of the 1991-93 gravity and aeromagnetic surveys.
* Mapping and rock sampling at Mackintosh Dam and South Stitt.
* Resurveying of old drillhole collars and completion of the drillhole survey database for all 104 surface exploration holes.
* Computerisation of full geochemical records for 46 of the above holes.
* A review of the mineral potential of both EL's.

863009



BASS STRAIT
BURNIE
Somerset
Penguin
Ulverstone
5 450 000 mN
E.L. 9/92
Burnie
Rosebery
Q'town
HOBART
350 000 mE
Hellyer R.
Hampshire Link
Blythe R.
R.
Nietta
Lake Barrington
River Leven
Guildford
Waratah
Railway
Savage River
Bay
Emu
Cradle Link Road
Lake Cethana
5 400 000 mN
HIGHWAY
Mersey R.
Huskisson R.
Forth R.
Pieman Rd
Lake Mackintosh
Tullah
E.L.22/90
Lake Pieman
Rosebery
E.L.24/91
Lake Rowallan
Renison Bell
MURCHISON
Williamsford
Lake Murchison
Murchison R.
MT. OSSA
Zeehan
5 cm
Henty R.
5 350 000mN
5 350 000mN
400 000mE
R.
Yolande
Henty R.
Lake Burbury
Queenstown
Strahan
R.
King
MACQUARIE HARBOUR
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED:
DATE:
DRAWN: G.M.B.
REF.:
REVISIONS:
DRAWING No.
E.L. 22/90 - TULLAH
E.L.24/91 - STERLING RIVER
LOCATION
MAP
SCALE 1:500 000
0 5 10 km
FIG. No.
1

3 TENURE

Tenure details for the Tullah and Sterling River licences are shown in Figure 2.

The Tullah EL 22/90 covers 27 sq km, extending for 10km along the Henty Fault around Tullah Township in Western Tasmania. An area of 4.95 sq km has been excluded from the EL, including 3.4 sq km of land vested in the HEC and 1.45 sq km of Mine Leases held by Pasminco Mining (the old Farrell mines).

The Tullah EL was applied for in August 1990 by Peko Exploration Limited, a subsidiary of North Broken Hill Limited. In September 1990 the EL application was transferred to Pasminco Australia Limited (of which NBH then owned 40%). The EL was granted on 20th October 1990.

The Tullah EL comprises:

Crown Land
Land vested in the HEC
Private Property (approximately 2% of total EL area)
State Forest – Multiple Use Forest Land
Crown Land – Deferred Forest Land
Mt Murchison RAP – Crown Land (about 5% of EL).

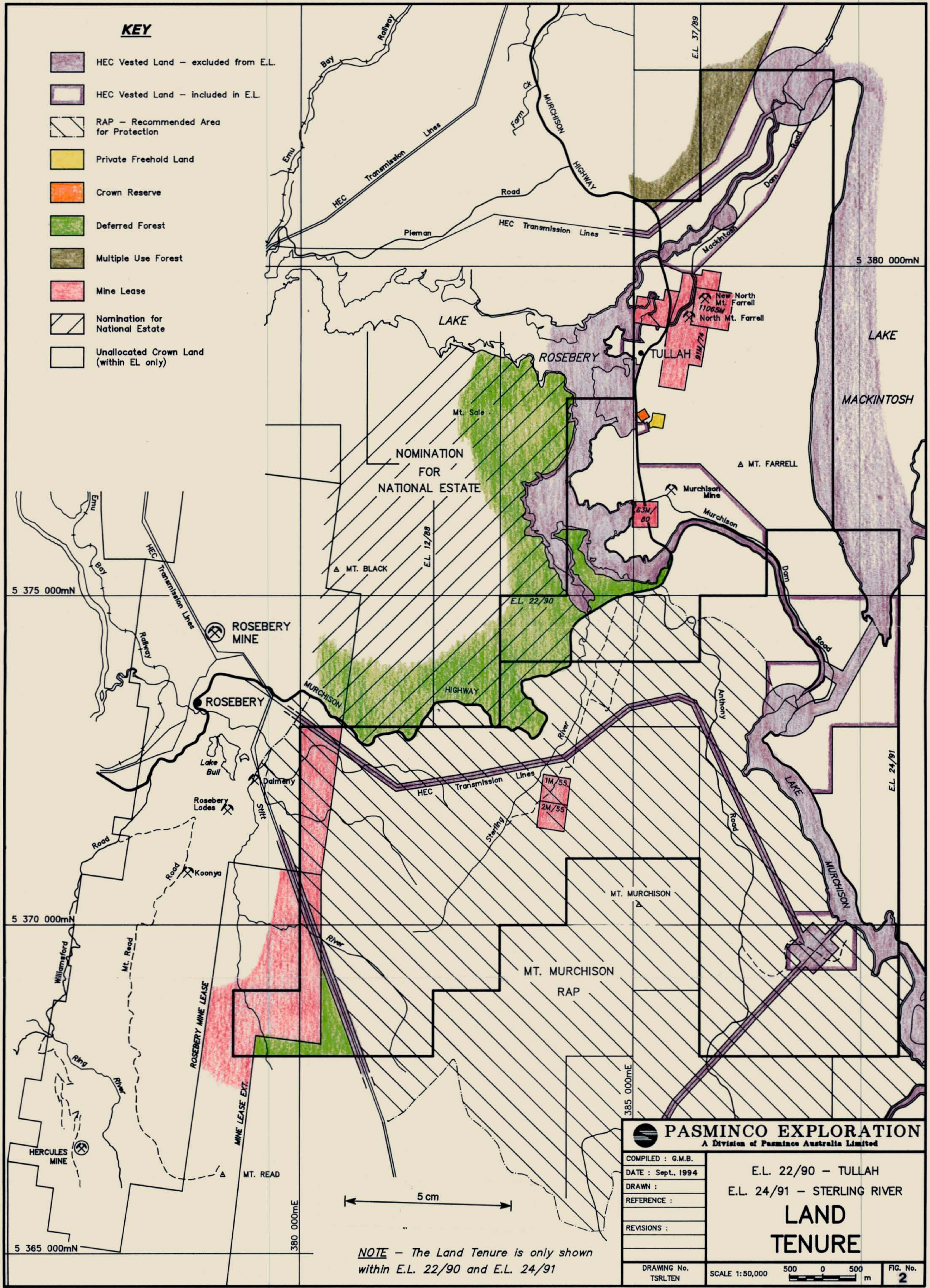
Sterling River EL 24/91 (100% Pasminco Exploration) covers 48 sq km around Mt Murchison south of the Tullah EL. Sterling River was originally applied for as 42 sq km in August 1991, but 6 sq km to the SE of Mt Murchison was added to the application in October 1991. The EL was granted on 10th January 1992.

A total of 5.9 sq km has been excluded from the Sterling River EL: 2.4 sq km of land vested in the HEC and 3.5 sq km of Mine Leases held by Pasminco Mining. See Figure 2.

Sterling River EL comprises:

Crown Land
Land Vested in the HEC
Crown Land – Deferred Forest Land
Mt Murchison RAP – Crown Land (about 75% of EL).

The annual renewal date for both EL's has been synchronised at 19th October. The Tullah EL must be reduced by 50% in October 1995.


KEY
HEC Vested Land – excluded from E.L.
HEC Vested Land – included in E.L.
RAP – Recommended Area for Protection
Private Freehold Land
Crown Reserve
Deferred Forest
Multiple Use Forest
Mine Lease
Nomination for National Estate
Unallocated Crown Land (within EL only)
LAKE ROSEBERY
LAKE MACKINTOSH
TULLAH
ROSEBERY
ROSEBERY MINE
NOMINATION FOR NATIONAL ESTATE
MT. MURCHISON RAP
MT. MURCHISON
MT. FARRELL
MT. BLACK
MT. READ
Mt. Sale
HERCULES MINE
Murchison Mine
New North Mt. Farrell
North Mt. Farrell
Rosebery Lodes
Koonya
Dalmeny
Lake Bull
ROSEBERY MINE LEASE
MINE LEASE EXT.
E.L. 12/88
E.L. 22/90
E.L. 24/91
E.L. 37/89
1106SM
91M/74
63M/80
1M/55
2M/55
HEC Transmission Lines
MURCHISON HIGHWAY
Pieman Road
Mackintosh Dam Road
Murchison Dam Road
Anthony Road
Emu Bay Railway
Stitt River
Sterling River
Ring River
Farm Ck
Williamsford Road
Mt. Read
5 380 000mN
5 375 000mN
5 370 000mN
5 365 000mN
380 000mE
385 000mE
5 cm
NOTE – The Land Tenure is only shown within E.L. 22/90 and E.L. 24/91
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : G.M.B.
DATE : Sept., 1994
DRAWN :
REFERENCE :
REVISIONS :
E.L. 22/90 – TULLAH
E.L. 24/91 – STERLING RIVER
LAND TENURE
DRAWING No. TSRLTEN
SCALE 1:50,000
500 0 500 m
FIG. No. 2

8630411

4 EXPENDITURE

Expenditure on **Tullah EL 22/90** in the year from 1st September 1993 to 31st August 1994 was **$262 192** bringing total expenditure on EL since its granting in October 1990 to **$527 329**.

Expenditure on the **Sterling River EL 24/91** from 1st September 1993 to 31st August 1994 was **$54 368.** Total expenditure on EL since its granting in January 1992 is now **$249 494.**

1993–94 expenditure details on both EL's are as follows:

	EL 22/90	**EL 24/91**
Personnel & Oncosts	43 707	8 608
Travel & Accommodation	4 091	795
Geological Contractors	34 887	13 753
Assays & Analytical Costs	2 588	247
Geophysical Surveys & Consultants	18 194	10 432
Other Contractors	7 846	2 347
Track Cutting & Gridding	1 425	2 285
Drilling (including access & core processing/storage)	94 112	185
Stores & Supplies	2 483	773
Vehicles Plant & Equipment	7 927	2 169
Tenement Costs	630	930
Computing	2 410	792
Office Running Costs	18 056	6 109
Administration Fee	23 836	4 943
TOTAL EXPENDITURE	**262 192**	**54 368**

5 GENERAL GEOLOGY

The Tullah and Sterling River licences cover units of the highly prospective Cambrian Mt Read Volcanics and associated sediments, extending along a 16km length of the Henty Fault. The Henty Fault is a major NNE–trending and steeply west–dipping structure located towards the eastern margin of the volcanic belt. See Figures 3 & 4.

Within the EL's the volcanics range from rhyolitic to basaltic in composition but are generally dacitic. They include lavas, intrusives, pyroclastics and volcanomict epiclastics.

West of the Henty Fault the volcanics are dominated by lavas and subvolcanic intrusives, in the dacitic Mt Black Volcanics and a large mafic wedge in the Sterling Valley.

East of the Henty Fault there is an extensive unit of west–dipping fine volcanomict sediments and black shales – the Farrell Slates. East of this the rhyodacitic Murchison Volcanics include lavas and minor epiclastics, intruded by the Cambrian Murchison Granite and unconformably overlain by Ordovician Owen Conglomerate.

Most of the volcanics and associated sediments are hydrothermally altered to some degree, with the Murchison Volcanics in particular containing zones of very strong alteration.

The area is extensively underlain by a broad NE–trending ridge of Devonian granite, the axis of which passes beneath the northern part of the Sterling Valley at an estimated depth of <500m (Leaman, 1993). Superimposed on the buried ridge are north–south spines of granite one of which intrudes the Henty Fault and appears to actually reach the surface at one locality in the Sterling Valley.

Lead, zinc, copper, silver, gold, arsenic, tin and barite mineralization is widespread, most particularly in the Farrell Slates and also the Murchison Volcanics, east of the Henty Fault. The only known significant mineralization west of the fault is Au–As–Cu–Sn in mafic volcanics at the "Arsenic Resource" in the Sterling Valley (see Figure 4), although the aeromagnetics indicate there is more such mineralization as yet undrilled.

Most mineralization is of a structurally-controlled lode and vein style, commonly almost conformable with the primary layering in the enclosing rocks. Lodes closest to the Henty Fault tend to parallel the steep west dip of this structure (as does bedding). Small, apparently volcanogenic, massive basemetal sulphide and pyrite boudins occur in the Farrell Slates near Mackintosh Dam.

The presence of gold–tin mineralization, as well as evidence from lead and sulphur isotopes, suggests that much of the mineralization in the Tullah–Sterling River area is a Cambrian–Devonian hybrid. The gold, as well as some of the base metals and silver, are apparently of Cambrian volcanogenic origin and were remobilised in the Devonian largely due to the influence of the granite intrusion, with inputs at that time of tin, arsenic, further base metals and silver. Gold is a notable absentee from the Pb–Zn–Ag Farrell orebodies at Tullah – the largest (now 80% mined) of the known resources on the EL's (908,000t @ 12.5% Pb, 2.6% Zn, 410 g/t Ag).

The main known mineral showings are shown on Figure 4. Two of the larger mineralized bodies (the Lakeside gold deposit with 750,000t @ 2.1g/t Au, and the "Arsenic Resource" with 480,000t @ 5% As & 1g/t Au), are not exposed at surface and were found by drilling in the 1980's.

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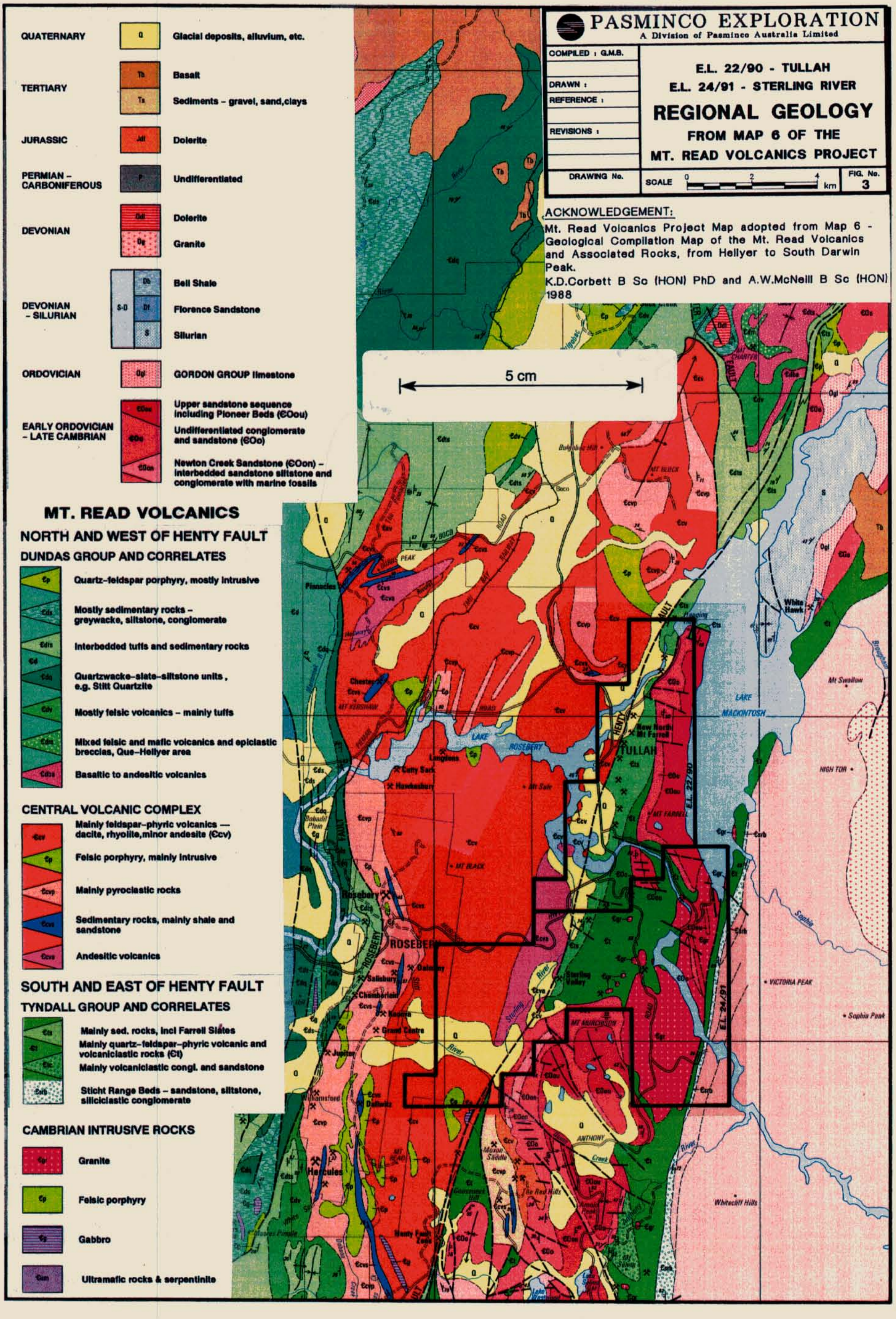

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : G.M.B.
DRAWN :
REFERENCE :
REVISIONS :
DRAWING No.
E.L. 22/90 - TULLAH
E.L. 24/91 - STERLING RIVER
REGIONAL GEOLOGY
FROM MAP 6 OF THE
MT. READ VOLCANICS PROJECT
SCALE 0 2 4 km
FIG. No. 3
ACKNOWLEDGEMENT:
Mt. Read Volcanics Project Map adopted from Map 6 - Geological Compilation Map of the Mt. Read Volcanics and Associated Rocks, from Hellyer to South Darwin Peak.
K.D.Corbett B Sc (HON) PhD and A.W.McNeill B Sc (HON) 1988
5 cm
QUATERNARY
Q Glacial deposits, alluvium, etc.
TERTIARY
Tb Basalt
Ts Sediments - gravel, sand,clays
JURASSIC
Jdl Dolerite
PERMIAN - CARBONIFEROUS
P Undifferentiated
DEVONIAN
Dd Dolerite
Dg Granite
DEVONIAN - SILURIAN
S-D
Db Bell Shale
Df Florence Sandstone
S Silurian
ORDOVICIAN
Ogl GORDON GROUP limestone
EARLY ORDOVICIAN - LATE CAMBRIAN
Upper sandstone sequence including Pioneer Beds (€Oou)
Undifferentiated conglomerate and sandstone (€Oo)
Newton Creek Sandstone (€Oon) - interbedded sandstone siltstone and conglomerate with marine fossils
MT. READ VOLCANICS
NORTH AND WEST OF HENTY FAULT
DUNDAS GROUP AND CORRELATES
Quartz-feldspar porphyry, mostly intrusive
Mostly sedimentary rocks - greywacke, siltstone, conglomerate
Interbedded tuffs and sedimentary rocks
Quartzwacke-slate-siltstone units, e.g. Stitt Quartzite
Mostly felsic volcanics - mainly tuffs
Mixed felsic and mafic volcanics and epiclastic breccias, Que-Hellyer area
Basaltic to andesitic volcanics
CENTRAL VOLCANIC COMPLEX
Mainly feldspar-phyric volcanics — dacite, rhyolite,minor andesite (€cv)
Felsic porphyry, mainly intrusive
Mainly pyroclastic rocks
Sedimentary rocks, mainly shale and sandstone
Andesitic volcanics
SOUTH AND EAST OF HENTY FAULT
TYNDALL GROUP AND CORRELATES
Mainly sed. rocks, incl Farrell Slates
Mainly quartz-feldspar-phyric volcanic and volcaniclastic rocks (€t)
Mainly volcaniclastic congl. and sandstone
Sticht Range Beds - sandstone, siltstone, siliciclastic conglomerate
CAMBRIAN INTRUSIVE ROCKS
Granite
Felsic porphyry
Gabbro
Ultramafic rocks & serpentinite
TULLAH
LAKE ROSEBERY
LAKE MACKINTOSH
ROSEBERY
HENTY
E.L. 22/90
E.L. 24/91
MT FARRELL
MT BLACK
MT MURCHISON
White Hawk
Mt Swallow
HIGH TOR
VICTORIA PEAK
Sophia Peak
Whitecliff Hills
Hercules
Pinnacles
Sterling Valley
ANTHONY

6 RESULTS

6.1 Mackintosh Dam Prospect

6.1.1 INTRODUCTION

In 1986 Pancontinental found small pyrite lenses outcropping in the Farrell Slates in Tullabardine Creek. On examining the occurrence in November 1992, Pasminco discovered several larger disrupted lenses or boudins of pyritic and basemetal massive sulphide within an adjacent sandstone bed. The outcrop is 150m west of the Mackintosh Dam and approximately 60m east of the Henty Fault (Figures 4 & 5). The largest sulphide lens is 1.2m x 0.2m, assaying 15.7% Zn and 1.5% Pb (Figure 6).

The area had been covered with IP and UTEM by Billiton and Pancontinental in 1986–88, but no drilling was done. A 10x background dipole–dipole IP anomaly over the Farrell Slates 160m south along strike from the massive sulphide lenses was not tested.

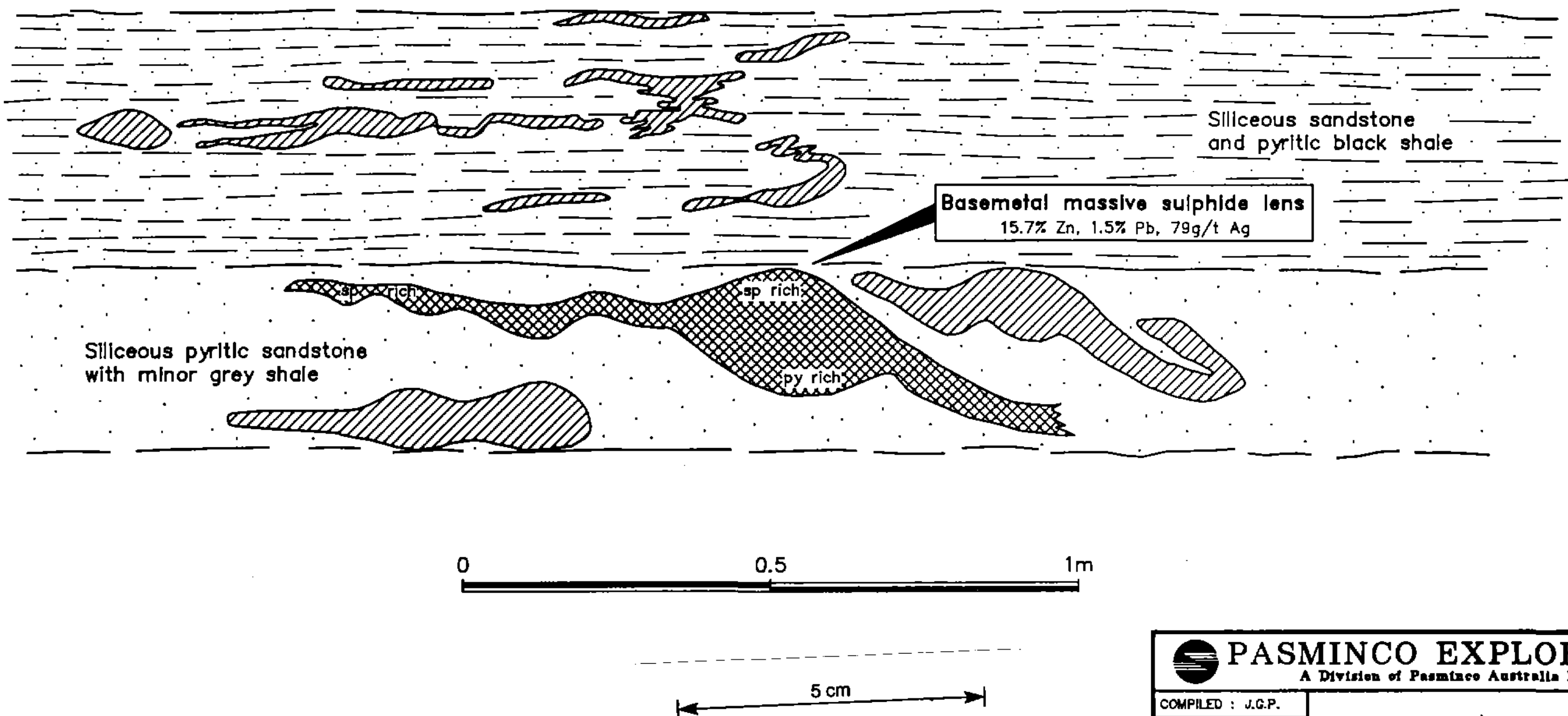
In November 1993 Pasminco drilled hole MD1 (184.3m) directly beneath the sulphide lenses, and hole MD2 (193.3m) at the IP anomaly. A third hole, MD3 (239m), was put down 50m south of MD1 in May 1994. See Figure 10.

6.1.2 DRILLING

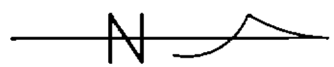
MD1 was drilled on AMG section 5382720mN, angled east at –50° and designed to test the sulphide–bearing horizon 60m below the outcrop. The hole intersected 0.12m of semi-massive pyrite–galena in the target horizon, assaying 8.75% Pb, 0.07% Zn, 0.33% Cu, 123 g/t Ag and 0.5 g/t Au. While the width of the intersection was disappointing the fact that the sulphide–bearing horizon did have some linear extent and was not just an isolated pod, was encouraging.

The detailed drill log is in Appendix 1 and the drill section is Figure 7.

Hole MD2 was drilled on AMG section 5382560mN, angled east at –45° and designed to test the IP anomaly centred at 2200N/10375E (Billiton grid co-ordinates), at a depth of 60m below

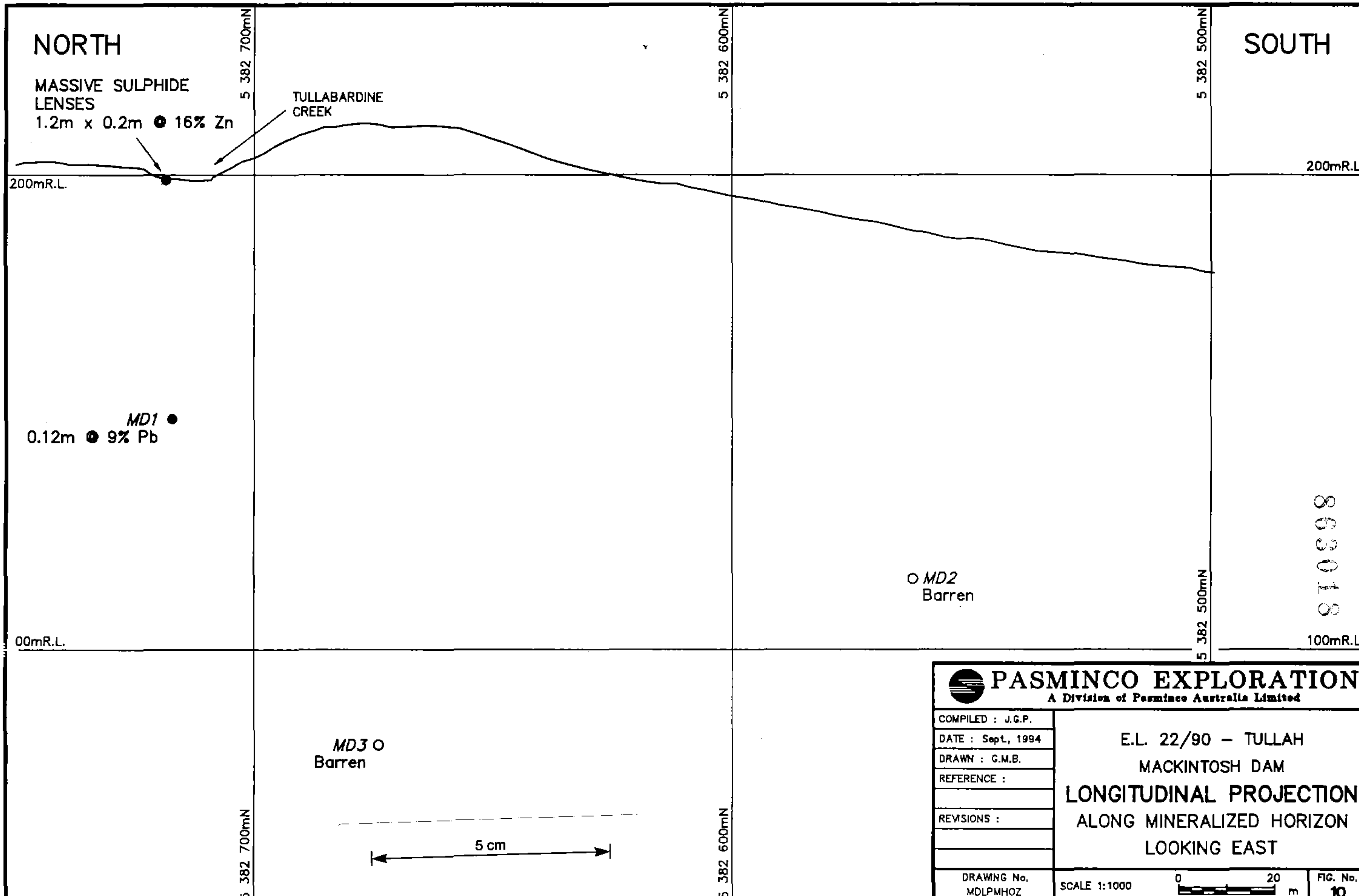


Siliceous masssive or semi–massive pyrite



PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : J.G.P.	E.L. 22/90 – TULLAH
DATE : Sept., 1994	MACKINTOSH DAM
DRAWN : G.M.B.	TULLABARDINE CREEK
REFERENCE :	MASSIVE SULPHIDE
REVISIONS :	LENSES
DRAWING No. MDMSLENS	SCALE 1:10 — FIG. No. 6


NORTH
SOUTH
MASSIVE SULPHIDE LENSES
1.2m x 0.2m @ 16% Zn
TULLABARDINE CREEK
5 382 700mN
5 382 600mN
5 382 500mN
200mR.L.
00mR.L.
100mR.L.
MD1
0.12m @ 9% Pb
MD2
Barren
MD3
Barren
5 cm
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : J.G.P.
DATE : Sept, 1994
DRAWN : G.M.B.
REFERENCE :
REVISIONS :
E.L. 22/90 – TULLAH
MACKINTOSH DAM
LONGITUDINAL PROJECTION
ALONG MINERALIZED HORIZON
LOOKING EAST
DRAWING No. MDLPMHOZ
SCALE 1:1000
0
20
m
FIG. No. 10
810698

surface. The hole did not encounter any significant mineralization. The IP anomaly position coincided with a large brittle fault close to the interpreted position of the Henty Fault.

Although MD2 passed through the stratigraphic position of the sulphide horizon at approximately 127–133m downhole, there was no mineralization present apart from minor sphalerite–galena in carbonate veins. It is possible the sulphide horizon has been destroyed by the peperitic margin on the overlying rhyodacitic lava unit commencing at 135.5m downhole.

The log of MD2 is in Appendix 2 and the drill section is Figure 8.

Following the drilling of MD1 & 2, both holes were logged with Crone DHEM and a Mise `a la Masse survey was carried out based on the sulphide outcrop in Tullabardine Creek (see section 6.1.3. below). While the MALM survey results confirmed outcrop mapping that the sulphides are not strike continuous, they suggested the horizon plunged to the south. It was therefore decided to follow-up the sulphides in MD1 with a third hole designed to test the horizon 50m south and 100m below the MD1 intersection (Figure 10).

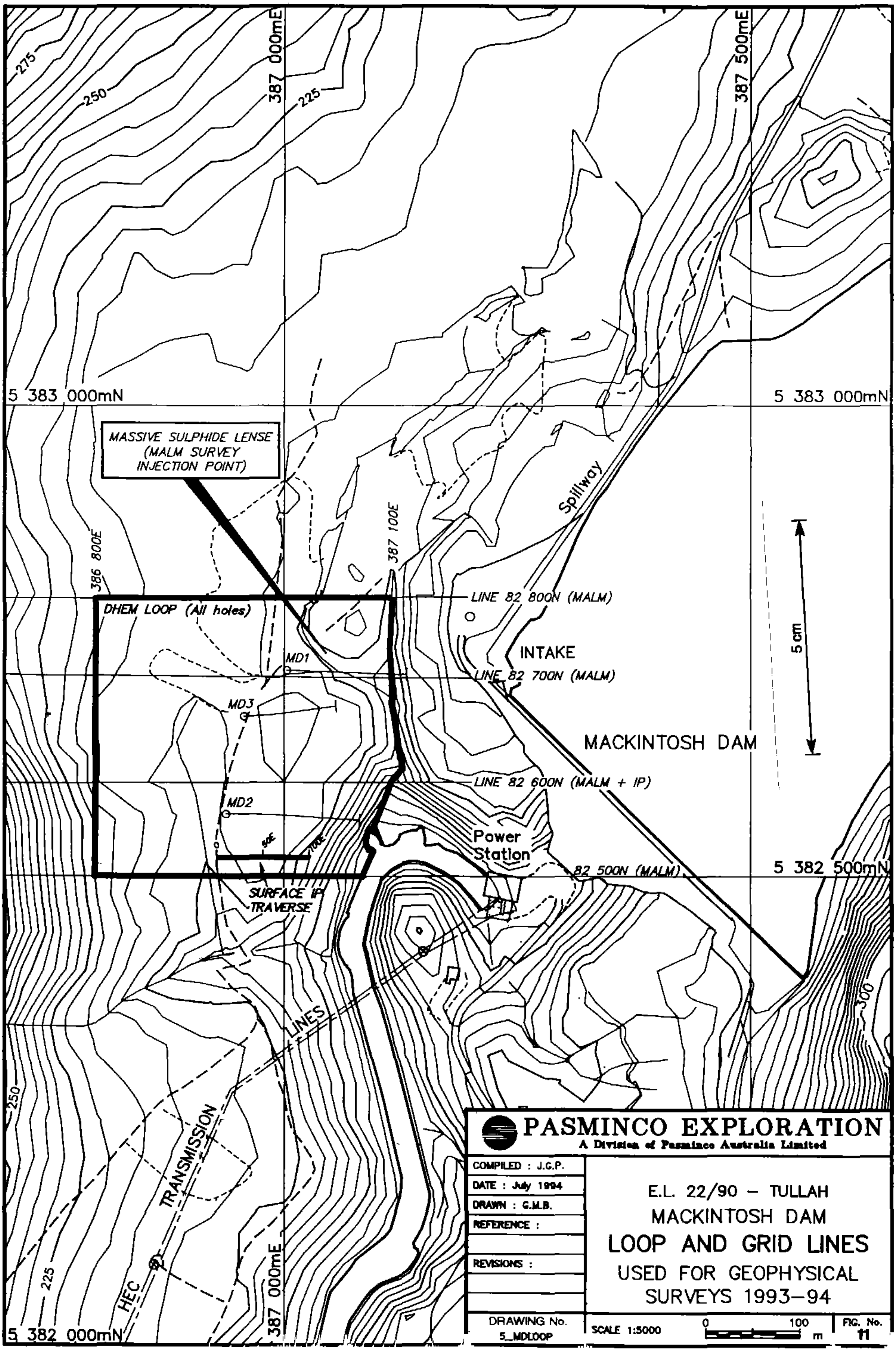
MD3 was drilled on AMG section 5383670mN, angled east at –74°. No mineralization of any consequence was encountered. The rock sequence was notable for the strong foliation throughout most of the hole. The log is in Appendix 3 and the drill section is Figure 9.

6.1.3 GEOPHYSICS (N. HUGHES)

DHEM

Drill-holes MD1 and MD2 were logged with the Crone DHEM system by Outer Rim Exploration on the 5th of December 1993, from a single 300m x 300m transmitter loop (Figure 11). Drill-hole MD1 was logged with the axial component only whereas MD2 was logged with all three components. On December 9th drill-hole MD2 was relogged with the XY probe to confirm the results of the first survey.

For all surveys a 10ms time base and 0.5ms ramp was employed. Seventeen channels of data were recorded between 0.076 – 6.646ms. For the surveys done on January 5th a loop current of 7 amps was used, for the repeat survey on January 9th a current of 3 amps was used.


387 000mE
387 500mE
275
250
225
5 383 000mN
5 383 000mN
MASSIVE SULPHIDE LENSE (MALM SURVEY INJECTION POINT)
386 800E
387 100E
Spillway
DHEM LOOP (All holes)
LINE 82 800N (MALM)
INTAKE
MD1
LINE 82 700N (MALM)
MD3
MACKINTOSH DAM
5 cm
LINE 82 600N (MALM + IP)
MD2
Power Station
82 500N (MALM)
5 382 500mN
SURFACE IP TRAVERSE
LINES
TRANSMISSION
HEC
300
250
225
387 000mE
5 382 000mN
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : J.C.P.
DATE : July 1994
DRAWN : G.M.B.
REFERENCE :
REVISIONS :
E.L. 22/90 – TULLAH
MACKINTOSH DAM
LOOP AND GRID LINES
USED FOR GEOPHYSICAL
SURVEYS 1993–94
DRAWING No.
5_MDLOOP
SCALE 1:5000
0
100
m
FIG. No.
11

Data is presented as linear profiles at a scale of 1: 2500 in Appendix 7. Also included is a diagram showing the inducing magnetic field in the plane of drill-hole MD2.

MD1

Although minor sulphides were intersected by the drill-hole there is no evidence of this in the DHEM results. Of interest is the fact that at late time (channels 14+) the data is negative towards the top of the hole, indicating a distant conductive source. No anomalies were detected proximal to the hole.

MD2

A late time conductor 25-30m off the hole is detected at 35m in the drill-hole by the DHEM. The combination of the X, Y and Z results indicates the conductor is flat (or slight east dip), of limited width extent and lies above and to the south of the drill-hole. The likely cause of the anomaly is an accumulation of clays? in a gouge in the Henty Fault zone. [NB: This interpretation later changed, see under MD3 below - JGP].

Modelling of the data was limited to estimating the distance off the hole. No conductance were estimated as the data were extremely noisy. To check the results of the survey (and hence the equipment) the drill-hole was relogged with the XY probe on the 9th of January. A comparison of the combined XY PP results for the two surveys indicates an excellent match.

No other conductors are evident.

MD3 AND SURFACE EM TRAVERSE

On May 21st, 1994 drill-hole MD3 was surveyed with the Crone DHEM system by Outer Rim Exploration of Townsville. Data is presented as profiles in Appendix 7. Instrument and survey specifications are included with the profile data.

MD3 was surveyed from a single loop with the axial component probe. No obvious in-hole or off-hole EM conductors are noted. The transmitter loop was the same as used for surveying MD1 and MD2 and is shown in Figure 11.

A single line of surface EM was undertaken south of MD2, using this common transmitter loop, to locate the position of an off-hole conductor detected in MD2 (Memorandum to G. Purvis: Hughes, March 20, 1994). No line was cut, stations were flagged at approximately 10 or 20m intervals. The position of the line is shown in Figure 11. The actual northing of the line is not known but the strength of the inducing field indicates that the line was no more than 15m to

20m from the southern loop edge [NB: this puts the line around 5382520N]. The results are included in Appendix 7 and indicate an extremely conductive body at or near surface located at 100E+, with a time constant of 4.5 milliseconds. The obvious conductor source is cultural, either an accumulation of iron or wire mesh related to the dam construction, and probably not a clay filled fault gouge as initially thought.

IP/RESISTIVITY

Line 5382600N was read with IP/Resistivity to check the location and existence of an anomaly detected during a Scintrex IP survey over the area in 1987. The anomaly was detected on line 2200N at station 400E, the last station of the line. [NB: Billiton grid co-ordinates].

The present survey was undertaken by Pasminco personnel using a Huntec MK4 IP receiver and Huntec 7.5kw IP transmitter on January 6th, 1994. A 2 second bipolar interrupted square wave was used to excite the ground. Readings were recorded during the off time across 6 time windows of 190ms duration after an initial delay of 50ms.

A pole–dipole array was used with 3 potential dipoles (20m, 20m, 40m) being read for each current injection point. Travel direction was from west to east with the current injection point to the west of the potential dipoles. The infinite current point is the same as for the MALM survey (see below).

The results of the IP survey are displayed in Appendix 8 in pseudosection format of the Apparent Resistivity and the first channel of the Chargeability at a scale of 1: 2500.

The position of the chargeability anomaly detected during the 1987 Scintrex survey is confirmed.

MISE–A–LA–MASSE

A MALM survey was undertaken at the same time as the IP test. These surveys were undertaken by Pasminco personnel on January 6 and 7, 1994. It was hoped that the current injection point for the surveys could have been the mineralization intersected in MD1. Unfortunately the plastic pipe used to protect DHEM probes from cave ins could not be retrieved. The current injection point was the outcropping mineralization in the creek at grid co–ordinates 87080E, 82720N [NB: AMG]. The positions of the remote current injection point and potential are included.

Processing of MALM data includes normalising the voltages recorded to the input current. The data is displayed in Appendix 9 as a contour plan map and offset profile map of normalised voltages at a scale of 1: 5000.

The results of the MALM survey indicate that the mineralization is not strike continuous or does not have a significant resistivity contrast with respect to the background. However, the stretch of the potential lines to the south of the grid indicate this to be a preferential current path. There appears to be some indication of a southerly plunge and west dip.

6.1.4 DISCUSSION OF RESULTS

DISRUPTION OF THE SULPHIDE LENSES

The sulphide lenses in the Farrell Slates sequence in Tullabardine Creek have clearly been disturbed from their original attitude and position. Knowing the cause and extent of this disruption would help exploration for a larger body of sulphide in this area. These questions remain largely unanswered but the options are reviewed as follows:

1 The fact that the outcropping lenses are tightly clustered, and that the sulphide-bearing horizon can be traced down-dip over 50m (to MD1), may suggest the amount of transport or movement is not great and the lenses are essentially in situ.

2 Disruption of the sulphide lenses may be due to extrusion of the pumiceous rhyodacitic lava unit only a few metres east of the sulphide horizon and believed to overlie it (facing evidence is reviewed below). In hole MD2 the lava has extensively disrupted, brecciated and baked the flanking sediments.

3 The Farrell Slates sequence in the sulphide-bearing section between the rhyodacitic lava and the Henty Fault 50-60m further west, is largely made up of lensy high-energy volcanomict epiclastics containing common rafts of fine sediments from a few cm up to 15m x 3m. The sulphide lenses could be similar rafts.

4 The whole rock section in this area contains zones of strong foliation, apparently associated with the Henty Fault and parallel shear zones further east. The sulphide lenses may have been from a body deformed and dismembered by this foliation.

FACING AND ITS IMPLICATIONS

Facing in the Farrell Slates sequence is important, because if the sulphide lenses are in situ there should be signs of strong hydrothermal alteration in the rocks stratigraphically below them.

A few metres east of the lenses the unit of brecciated pumiceous rhyodacitic lava is strongly sheared and altered (silica–sericite–albite–carbonate). This alteration is particularly strong where it coincides with a major zone of deformation running semi–conformably southwards down Tullabardine Creek. The deformed zone contains patches of carbonate–fuchsite alteration, minor pyrite, and chalcopyrite veining at one locality (see Figure 5).

Because alteration in the Farrell Slates sequence hosting the sulphide lenses is weak or absent, the strongly altered and sheared lava unit is the obvious and only candidate for a footwall alteration zone in the local area. For this to be the case the sequence must face west.

A review of facings (based largely on graded beds) in the three drillholes shows overwhelming evidence that the Farrell Slates in the Mackintosh Dam area face east (see the graphic logs in Appendices 1–3). The evidence in MD3 is particularly voluminous and clear. From 94–156m in the epiclastic–breccia dominated section west of the rhyodacitic lava, there are numerous consistent easterly facings. Within the lava section a large unit of pumiceous breccia also gradually fines to the east.

In both holes MD1 and MD2 there are occasional west–fining beds, but again, the great majority and best examples face east. This is the case for the Farrell Slates both to the west and to the east of the lava unit.

The facings therefore show that the altered and sheared pumiceous rhyodacitic lava unit <u>overlies</u> the mineralized horizon.

The baking and peperitic brecciation of sediments on the western contact of the lava supports this disappointing conclusion, as does petrological evidence (see Appendices 1 & 2) which suggests at least some of the alteration (specifically the sericitisation), is directly related to the deformed zone which cuts through this unit.

The inference is that either the massive sulphide mineralization was too minor to have an extensive associated alteration zone, or it has been transported a considerable distance from it.

HENTY FAULT

The Henty Fault is not as obvious in the Mackintosh Dam area as it is further south in the vicinity of the Farrell Mines or in the Sterling Valley. In these places it comprises a major west-dipping brittle fault zone right on the contact of the Mt Black Volcanics and the Farrell Slates.

At Mackintosh Dam the Henty Fault is much less evident. All three drillholes passed through the Henty Fault position, collaring in Mt Block Volcanics west of the fault and passing into Farrell Slates east of it. In theory the fault position in the holes can be placed between the eastern-most recognisable Mt Block unit and the western-most recognisable unit of the Farrell Slates.

In all drill holes and in outcrop in Tullabardine Creek, this position is occupied by a thick unit of vitric siltstone/shale which could belong to either Formation. This unit is at 14–29m in MD1, 53–92m in MD2 and 52–94m in MD3. Strongly foliated zones and large brittle faults that are obviously associated with the Henty Fault occur in and around this unit in all the holes, but the positions of these structural zones are not consistent between holes.

The interpreted position of the Henty Fault is placed within the vitric silstone/shale unit as shown in Figures 5 & 7–9.

MAFIC DYKES

At Mackintosh Dam both the Mt Block Volcanics and the Farrell Slates are cut by numerous mafic dykes. Visually, these take two main forms:

TYPE 1: Thick dykes of dark green chloritised amygdaloidal basalt, occurring in both rock Formations but thickest in the Mt Block Volcanics.

TYPE 2: Thin lime green fuchsite-carbonate altered amygdaloidal basalt dykes, found *only in the Farrell Slates and characteristically showing signs they were* intruded and deformed (eg: pulled apart) while the sediments were unlithified.

Some of the geochemical characteristics of the dykes are listed in Table A.

TABLE A: GEOCHEMISTRY OF MAFIC DYKES AT MACKINTOSH DAM

1) THICK CHLOROTIC TYPE

		ppm		%			
Sample No.	**Setting**	**Nb**	**Cr**	**P2O5**	**TiO2**	**Na2O**	**Ti/Zr**
036016 (Outcrop)	Farrell Sl	8	48	0.257	1.23	3.51	26
038114 (27m, MD3)	Mt Block V	3	5	0.495	1.47	4.22	92
038117 (65m, MD3)	Farrell Sl?	<3	82	0.213	0.67	0.21	69
038128 (172m, MD3)	Lava in Farrell Sl	<3	314	0.044	0.41	1.14	79
038130 (229m, MD3)	Farrell Sl	8	438	0.190	0.57	1.92	34
036024 (7m, MD1)	Mt Block V	<3		0.439	1.50	2.67	97
036039 (56m, MD2)	Mt Block V	<3		0.090	0.61	1.73	105

2) THIN FUCHSITIC TYPE

		ppm		%			
Sample No.	**Setting**	**Nb**	**Cr**	**P2O5**	**TiO2**	**Na2O**	**Ti/Zr**
038120 (137m, MD3)	Farrell Sl	6	940	0.251	0.72	0.15	52
036036 (165m, MD1)	Farrell Sl	6		0.224	0.61	2.39	32

Full analyses appear in Appendices 1, 2, 3 & 5.

Even though the picture is clouded by the high Loss on Ignition values (6.24 – 18.93%), it is apparent that the dykes have variable geochemistry and don't fall cleanly into the Henty Dyke Swarm tholeiitic basalt suite defined by Crawford et al (1992). Crawford (pers comm 1994), regards the major characteristics of the suite as low Nb (<3ppm), high TiO2 (>0.75%), and a Ti/Zr ratio of 70–110.

Only two of the Mackintosh Dam dykes fit Crawford's definition of the Henty Dyke Swarm suite: Type 1 chloritic basalts from the Mt Block Volcanics at 27m in MD3 and 7m in MD1.

The Nb values and Ti/Zr ratios in the Mackintosh Dam dykes fall into two groups:

i) 3ppm or less Nb, with Ti/Zr 70–105.

ii) 6–8ppm Nb, with Ti/Zr 26–55.

The group i) comprise chloritic Type 1 dykes from the Mt Block Volcanics and the Farrell Slates sequence west of (and including) the rhyodacitic lava unit. Group ii) only occur east of the lava but include both the chloritic Type 1 and fuchsitic Type 2 dykes.

The TiO_2 values also display two groupings (1.2 –1.5%, and 0.4 – 0.7%), but show no obvious patterns in location. Type 1 chloritic dykes fall into both groups but the fuchsitic dykes belong only to the low TiO_2 group.

6.1.5 CONCLUSIONS

Without geochemical, geological or geophysical vectors, it is extremely difficult to track down the source of the sulphide lenses at Mackintosh Dam. The absence of an associated footwall alteration zone suggests the lenses have been transported some distance. The numerous large shale rafts within the adjacent Farrell Slates sequence clearly demonstrate that high–energy clastic transport took place.

The lack of encouragement from the drilling to date leaves the exploration there with no clear sense of direction for future testing. The only option appears to be pattern drilling. This is not recommended at this time.

6.2 Hole MM2, Tullah Flat

6.2.1 INTRODUCTION

In February 1993 hole MM1a (400.7m) was drilled beneath the old Murchison Mine to test for basemetal mineralization at depth beneath the known lode. The hole did not encounter any significant mineralization, but a DHEM survey of MM1a in August 1993 detected a strong conductor approximately 125m west of the hole with an interpreted dip to the east, contrary to the known west dip of the Farrell Slates in the anomaly vicinity. Because of this, further EM surveying was recommended (Purvis, 1993a).

In October 1993 both MM1a and Billiton hole RED86-1 (1km to the SSW), were resurveyed with DHEM and a line of surface EM run over the anomaly position.

The EM anomaly was re-interpreted to dip west, and considered to be possibly due to a sulphidic breccia zone within the Farrell Slates 150m west of the collar of MM1a. A similar sulphide zone had been intersected in RED86-1, assaying 0.85m @ 31% Pb, 3% Zn and 670 g/t Ag, but as the EM response in MM1a was much stronger than that in RED86-1, there was some encouragement the anomaly west of MM1a was due to a much larger body of sulphide.

6.2.2 DRILLING

MM2 was designed to test the EM anomaly. The hole collared at 5376492mN/385071mE on the Tullah Flat directly west of MM1a in November 1993. The hole was angled AMG east at -70° and completed at 332.0m on 20th December.

MM2 encountered partly-volcanomict sandstones, siltstones and shales of the Farrell Slates sequence throughout its length. Much of the siltstones and shales were black and carbonaceous, with graphite on cleavage. The siltstone/shale in the basal 35m of the hole was strongly calcareous. Apart from some folding in the upper 75m, the abundant graded beds consistently faced to the east. (Facings from MM1a indicate a major fold axis must exist in the small undrilled section between the two holes - see Figure 12).

Disseminated and stringer pyrite and pyrrhotite was ubiquitous in MM2, averaging up to 5%, especially in the finer sediments. However, basemetal sulphides were generally very minor and confined to quartz-carbonate veinlets. Precious metal values were negligible.

The best mineralized intersection was from a thin fractured zone in black shale containing quartz-ankerite and sphalerite-pyrite veinlets. This assayed 3.9% Zn and 0.05% Pb over 0.3m. Although this zone coincides with the interpreted position of the EM anomaly, the latter is almost certainly due to the 35m wide faulted black shale band (228 - 265m) in which the sulphide veining occurs.

6.2.3 GEOPHYSICS (N. HUGHES)

FURTHER EM SURVEYS, MM1a & DHEM SURVEY IN RED86-1

SUMMARY

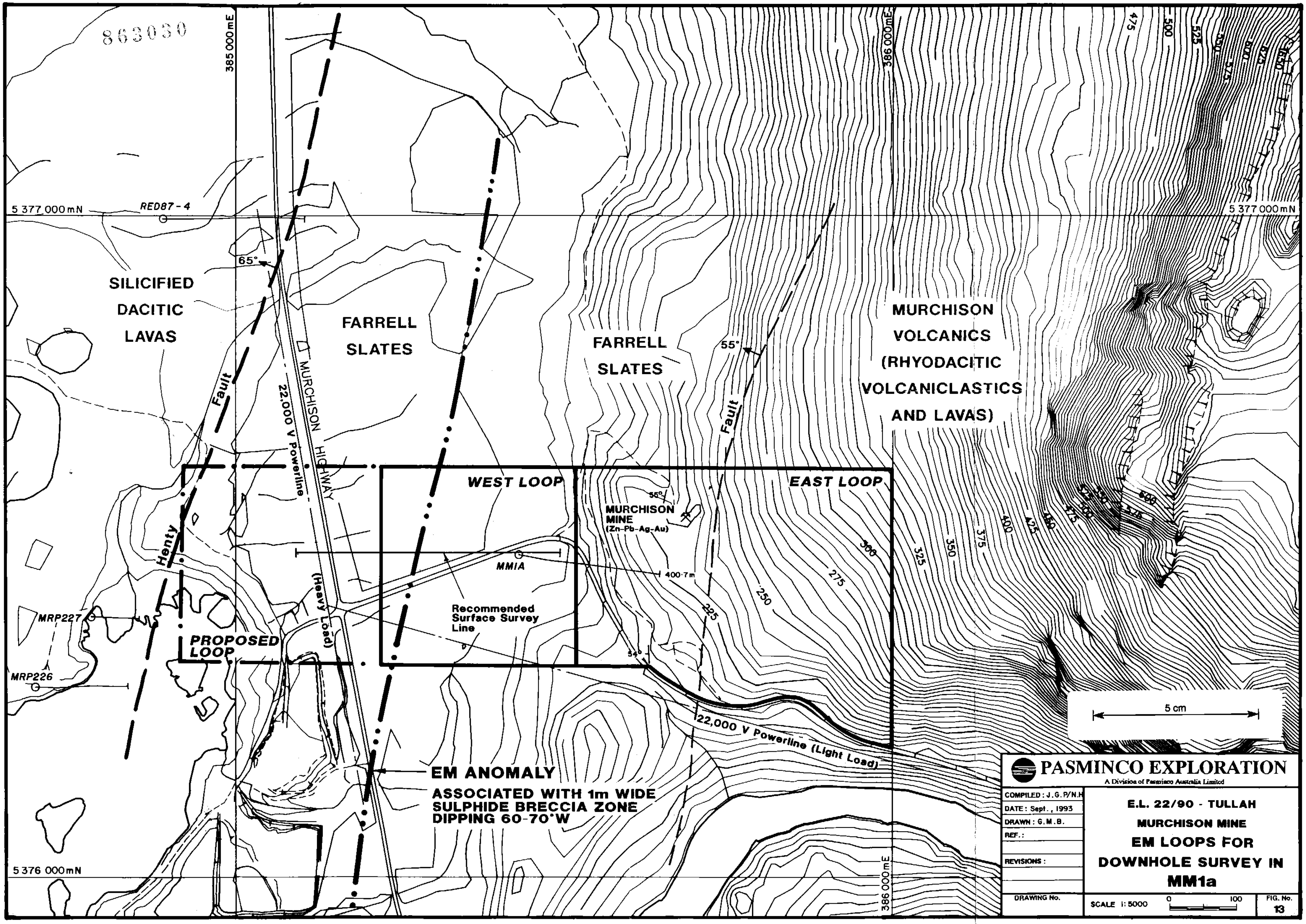
DHEM surveying of drill-hole MM1a in August 1993 detected a broad off-hole response interpreted to be due to a north-south striking conductor located approximately 125m west of the drill-collar. The interpreted steep east dip is contrary to known dips in the area. Further DHEM surveying from a west loop and also surface EM surveys across the axis of the conductor from the collar and west loops indicate that a conductor with a westerly dip and significant depth extent (400m or more) can produce the same anomaly shape as an east dipping conductor.

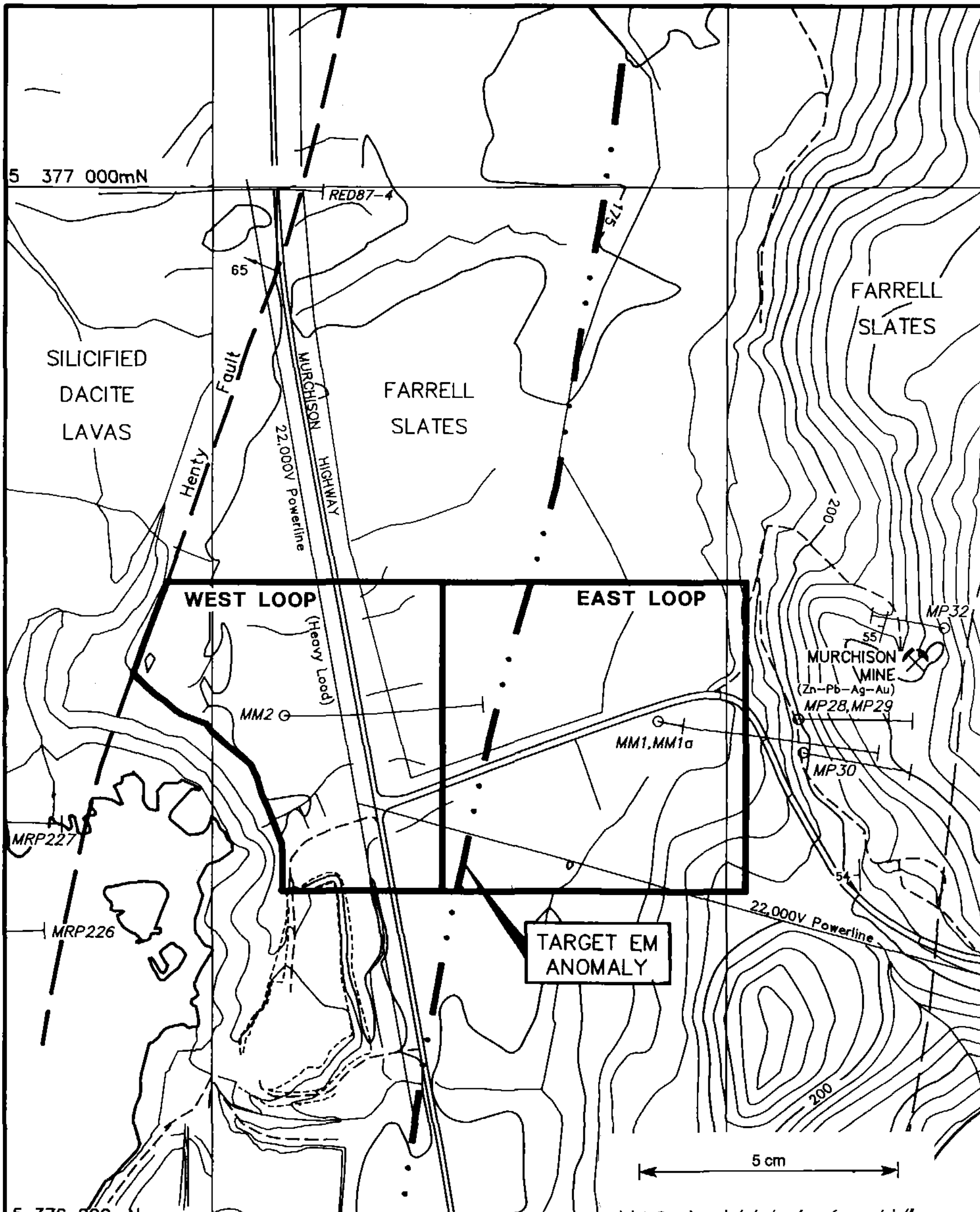
INTRODUCTION

During August 1993 drill-hole MM1a was surveyed by Crone Geophysics from two transmitter loops, east and collar, and all three component of the decay of the secondary magnetic field were recorded, see Figure 13. Those surveys detected a broad off-hole anomaly interpreted to be due to a north-south striking formational conductor 125m west of the drill collar. This conductor was drilled by Billiton to the south of MM1a and intersected conductive sulphides in a breccia stockwork in black shales. The results of these surveys were reported by Hughes in September 1993. The data profiles from that Memorandum are reproduced for convenience in Figures 1 to 8 in Appendix 11.

The DHEM data from the collar loop indicated that the dip of the conductor seen in MM1a was to the east. This is contrary to known dips in the area which are 65 to 75 degrees to the west. To resolve this ambiguity further EM surveying in and around MM1a was undertaken.

The latest surveys were conducted by John Hiscock of Aberfoyle Resources, Burnie, on October 13 and 14, 1993. Drill-hole MM1a was surveyed from two loops, a west and collar. Also an east-west surface line was surveyed using the west and collar loops, see Figure 13. Details of the survey parameters are given below.


863030
385 000 mE
386 000 mE
5 377 000 mN
5 376 000 mN
RED87-4
65°
SILICIFIED
DACITIC
LAVAS
FARRELL
SLATES
FARRELL
SLATES
MURCHISON
VOLCANICS
(RHYODACITIC
VOLCANICLASTICS
AND LAVAS)
55°
Fault
Fault
Henty
MURCHISON HIGHWAY
(Heavy Load)
22,000 V Powerline
WEST LOOP
EAST LOOP
PROPOSED
LOOP
MURCHISON
MINE
(Zn-Pb-Ag-Au)
55°
54°
MMIA
400·7m
Recommended
Surface Survey
Line
MRP227
MRP226
22,000 V Powerline (Light Load)
EM ANOMALY
ASSOCIATED WITH 1m WIDE
SULPHIDE BRECCIA ZONE
DIPPING 60-70°W
5 cm
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : J.G.P/N.H
DATE : Sept., 1993
DRAWN : G.M.B.
REF. :
REVISIONS :
DRAWING No.
E.L. 22/90 - TULLAH
MURCHISON MINE
EM LOOPS FOR
DOWNHOLE SURVEY IN
MM1a
SCALE 1:5000
0
100
FIG. No.
13



PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : J.G.P.	E.L. 22/90 – TULLAH
DATE : July 1994	TULLAH FLATS
DRAWN : G.M.B.	**EM LOOPS FOR DOWNHOLE SURVEY IN MM2**
REFERENCE :	
REVISIONS :	
DRAWING No. 5_EMLMM2	SCALE 1:5000 (0 – 100 m)
FIG. No.	14

SURVEY PARAMETERS

Tx Loops	:	Collar – 300m x 300m West – ~250m x 300m Sign convention – positive up
Borehole	:	Axial Sign convention – positive up the hole Units – microVolt/Amp
Surface	:	Vertical Sign convention – positive up In–line Sign convention – positive west Units – microVolt/Amp
Base Frequency	:	32 Hz
Ramp	:	150 microseconds
Current	:	11 Amps
Receiver	:	Zonge GDP16 – configured for 22 channels
Transmitter	:	Zonge 30 kiloWatt
Borehole Probe	:	SIROTEM single axis (axial) probe, (ferrite core)
Surface Probes	:	SIROTEM single component RVR (air core), Crone Surface Coil (ferrite core)

DHEM SURVEYS

Figures 9 and 10 in Appendix 11 show the borehole responses for the west and collar loops. Figure 11 is the calculated inducing field from the west loop, the inducing field from the collar loop can be found in Figure 7. The Zonge system has no provision for measuring the inducing magnetic field specifically.

Clearly the cause of the anomaly from both loops is a conductor whose width extent is oriented sub–parallel to the drill–hole and positioned to the west of the drill–hole. From the earlier cross component Crone surveys it is evident that the strike is north–south and the conductor extends north and south of the drill–hole.

To obtain the dip direction PLATE model results were compared to the field data. The model used was an 800m x 800m plate with dips of 70 and 110 degrees, at a depth to top of 100m. The plate and loop positions were similar to that from the survey. By comparing the response amplitudes from the west and collar loops for each of the dips it is apparent that the conductor with the 110 degree (west) dip has a larger amplitude response for the west loop compared to the collar loop, similar to the field data. The results of the modelling are shown in Figures 21 and 22 in Appendix 11. Figure 20 shows how the coupling between the collar loop and conductor "reverses" at depth. For a large conductor this means that the reverse coupled induced currents will dominate giving the positive to negative axial cross-over response recorded in the borehole, as well as the broad positive x component response.

SURFACE EM SURVEYS

A surface line was read to confirm the dip of the conductor as well as to accurately locate the strike axis and depth to top. For an east dipping conductor the vertical cross-over should be of opposite sense to that of a west dipping conductor. A 350m east-west line was read from both the west and collar loops and both the vertical and in-line components of the decay of the secondary magnetic field were measured. Two surface coils were used, a SIROTEM single axis RVR and a Crone surface coil. The surface coils had to be hired as Aberfoyle did not have one available for these surveys. The collar loop was read using both coils and the west loop with only the Crone coil. Figures 12 to 17 in Appendix 11 show the results of the surface EM surveys.

For the collar loop there is not the expected cross-over in the vertical component nor the positive peak in the in-line component. In fact the survey data does not indicate a conductor at all. This may reflect the fact that the top part of the conductor is poorly coupled from the collar loop and hence the response is from a greater depth and as such has a longer wavelength response. If this is the case the vertical cross-over would be shifted west of where expected, for a west dipping conductor. What is puzzling is the fact that the mid times for the vertical data are negative. There is no explanation for this at this time.

For the west loop it is evident that there is a conductor at station 5260, which is the position of the known EM anomaly associated with the Farrell Sequence. The approximate depth to top using a line current estimate is 100m.

RED86-1

To gauge the quality of the conductor detected in MM1a a comparison was made to EM data collected in drill-hole RED86-1, see MAP 2 in Appendix 11. This hole was drilled by Billiton based on a Max-min anomaly and was also surveyed with a SIROTEM MK1 EM system, the profiles for those surveys are attached. The hole was resurveyed to check the EM response from the intersected sulphides at 125m. Two loops were used for the Billiton surveys, both east of the drill collar. The responses from those surveys indicate a formational conductor, however the response from the intersected sulphides indicates them to be of a discontinuous nature.

The latest survey used a loop placed mostly to the west of the drill-hole. The results of this survey also indicate the sulphides to be of a discontinuous nature, however the broader formational response appears to be due not only to the shales containing the sulphides but also those intersected further down the drill-hole. Figure 18 in Appendix 11 shows the response profiles for the latest survey, and Figure 19 the calculated inducing field.

DHEM surveys in drill-holes RED86-1 and MM1a show similar late time responses probably reflecting a similar source.

CONCLUSIONS AND RECOMMENDATIONS

Further EM surveying in and around drill-hole MM1a indicates the anomaly detected in the initial surveys is due to a north - south striking conductor positioned 125m west of the drill-hole and dipping west. DHEM surveying of RED86-1 indicates the response is due to at least two formational conductors, this may be similar for MM1a. There is little difference in the temporal responses between RED86-1 and MM1a suggesting a common source.

Because of the noisy data, due to two powerlines close to the drill-hole, and the very resistive environment, only approximate model fits can been made to the field data. Even so the models indicate a conductor with depth extent of 400m or more and a depth to top of 100m, depending on transmitter loop coupling. It is expected that the conductor will have a conductance of 5 to 15 Siemens.

The fact that the conductor can be modelled with a west dip downgrades its significance since this EM trend is known north and south for many kilometres. If the conductor were to be tested then it may prove useful to test it at depth since RED86-1 has tested it near surface, and also the lack of clear anomalous responses from previous surface surveys.

DHEM SURVEY IN MM2

On May 20th 1994, drill hole MM2 was surveyed with the Crone DHEM system by Outer Rim Exploration of Townsville. Data is presented as profiles in Appendix 10. Instrument and survey specifications are included with the profile data.

MM2 was drilled primarily to follow up the off-hole conductor detected in MM1a. The hole was surveyed from two transmitter loops, West and Collar (see Figure 14), and only axial component data was collected. The objective of these surveys was to confirm the source of the EM conductor detected in MM1a.

The data from the west and collar loops indicate the three shale units intersected in the drill hole are conductive with the lower shale unit being the most conductive. Possibly the lower shale unit is more extensive than indicated.

Figures PAS1102a & b in Appendix 10 show the West and Collar transmitter loop coupling to the shale units and the position of the EM responses, including those from the surface EM work undertaken in August 1993 (Purvis, 1993a). The western-most shale unit is apparently also detected with surface EM, however the response was attributed to the effects of the overhead powerline at the time.

6.2.4. DISCUSSION OF RESULTS

The results of MM2 are very frustrating and disappointing as the target EM response was discrete and strong, and along-strike from the sulphide breccia zone that was the principal cause of the EM anomaly targeted by Billiton hole RED86-1.

EM does not appear to be a suitable technique for exploration of the Farrell Slates and it is difficult to recommend any future drilling of EM anomalies in these rocks. Why the EM throws up such singular discrete responses in a sequence that almost everywhere comprises a substantial proportion of black carbonaceous/graphitic (and sulphidic) sediments, probably has more to do with the mysteries of EM coupling than with the intrinsic merit of the conductors involved.

MM2 showed the black shale band that caused the anomaly detected in MM1a was similar in terms of geophysical and geological characteristics (ie: conductiveness, carbonaceous/graphitic content, amount of sulphides, foliation and faulting), to two other black shale bands in the hole. One of these bands was thicker and slightly less conductive than the causative band, the other thinner but more conductive.

6.3 South Stitt Reconnaissance

In the 1980's, work by Getty and Billiton located very poorly exposed silica-sericite ±pyrite altered volcaniclastics immediately east of the Henty Fault, in the upper part of the Stitt River west of Mt Murchison.

The setting, rock types and alteration was similar to that at the Henty gold deposit 5km further south along the Henty Fault. However, extensive rock and soil sampling on 100m-spaced grid lines detected negligible gold (maximum 0.03 g/t in soil), arsenic (110ppm in rock) and base metals (420ppm Pb in rock), in the altered volcaniclastics.

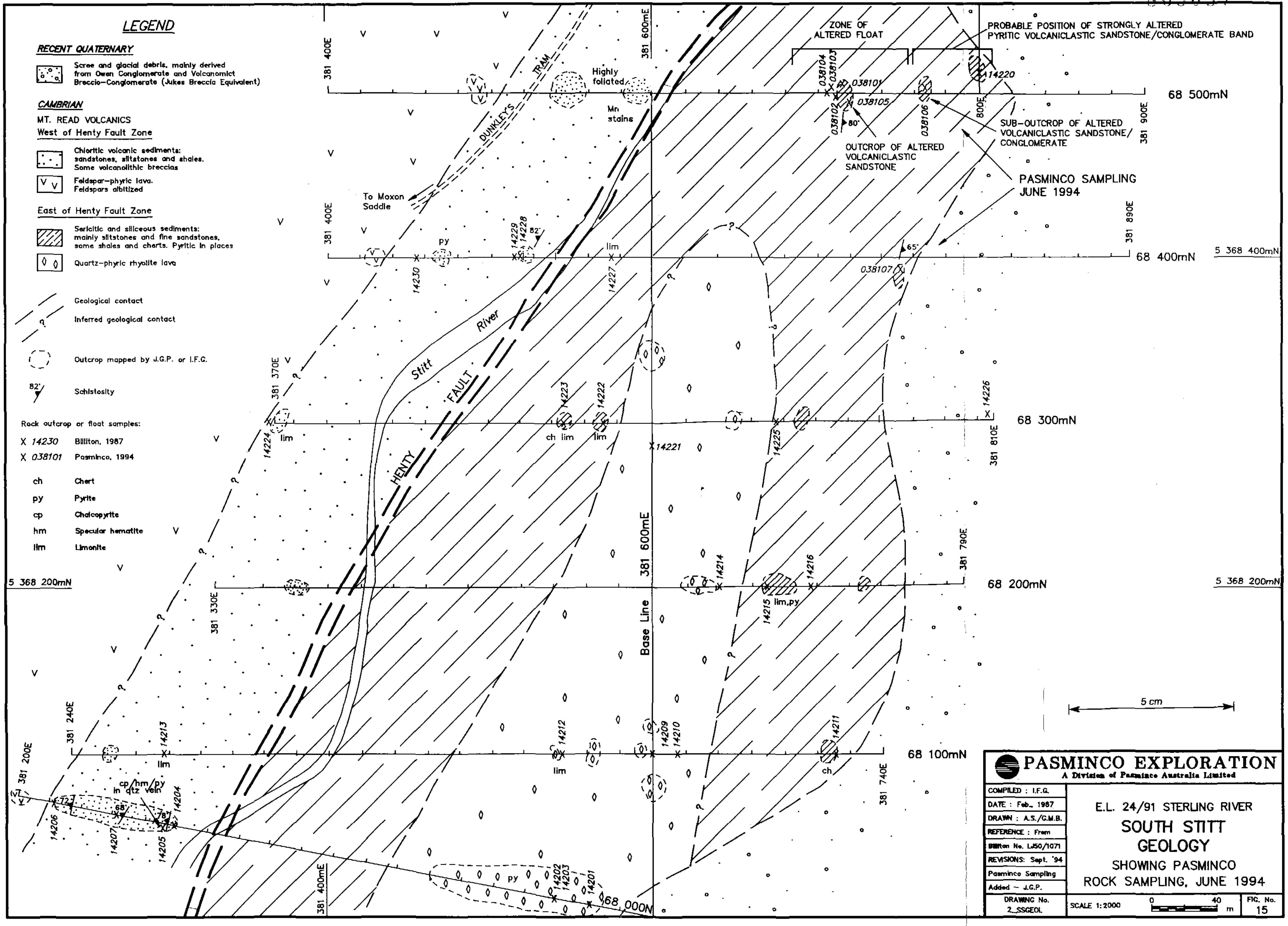
The grid was surveyed by Billiton with ground magnetics and dipole-dipole IP. Anomalous IP responses were obtained in the prospective position east of the Henty Fault, but the data was noisy and of dubious quality due to the low power transmitter, atrocious weather conditions and EM coupling problems. No further work was done (Hall,1988).

After reviewing the Billiton and Getty data, a one-day trip was made in June 1994 to the Billiton fill-in grid at South Stitt to re-examine the occurrence. A traverse was made along line 5368500mN east of the Stitt River and 100-200m further south. Seven rock samples were taken for assay and petrology. Results are listed in Appendix 6. Sample locations and geology are shown in Figure 15.

All samples returned negligible precious and base metal values.

The principal reason for the reconnaissance was to check whether the altered rocks were in place or were just coarse float coming down the steep slopes from further east (ie: beyond the coverage of the Billiton soil and IP surveys). The most-altered rocks occur amongst scree boulders of Owen Conglomerate forming a base-of-slope concentration, and there had been some thoughts that the altered rocks might be a basal-Owen Conglomerate unit.

863037


LEGEND
RECENT QUATERNARY
Scree and glacial debris, mainly derived from Owen Conglomerate and Volcanomict Breccia-Conglomerate (Jukes Breccia Equivalent)
CAMBRIAN
MT. READ VOLCANICS
West of Henty Fault Zone
Chloritic volcanic sediments: sandstones, siltstones and shales. Some volcanolithic breccias
Feldspar-phyric lava. Feldspars albitized
East of Henty Fault Zone
Sericitic and siliceous sediments: mainly siltstones and fine sandstones, some shales and cherts. Pyritic in places
Quartz-phyric rhyolite lava
Geological contact
Inferred geological contact
Outcrop mapped by J.G.P. or I.F.C.
Schistosity
Rock outcrop or float samples:
X 14230 Billiton, 1987
X 038101 Pasminco, 1994
ch Chert
py Pyrite
cp Chalcopyrite
hm Specular hematite
lim Limonite
ZONE OF ALTERED FLOAT
PROBABLE POSITION OF STRONGLY ALTERED PYRITIC VOLCANICLASTIC SANDSTONE/CONGLOMERATE BAND
Highly foliated
Mn stains
DUNKLEYS TRAM
To Moxon Saddle
OUTCROP OF ALTERED VOLCANICLASTIC SANDSTONE
SUB-OUTCROP OF ALTERED VOLCANICLASTIC SANDSTONE/ CONGLOMERATE
PASMINCO SAMPLING JUNE 1994
Stitt River
HENTY FAULT
Base Line
381 600mE
cp/hm/py in qtz vein
68 500mN
68 400mN
68 300mN
68 200mN
68 100mN
68 000N
5 368 400mN
5 368 200mN
5 cm
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : I.F.G.
DATE : Feb. 1987
DRAWN : A.S./G.M.B.
REFERENCE : From Billiton No. LJ50/1071
REVISIONS: Sept. '94 Pasminco Sampling Added ~ J.G.P.
DRAWING No. 2_SSGEOL
E.L. 24/91 STERLING RIVER
SOUTH STITT GEOLOGY
SHOWING PASMINCO ROCK SAMPLING, JUNE 1994
SCALE 1:2000
FIG. No. 15

From field observations and petrology it is clear (at least on line 5368500N), that while the most–strongly altered volcaniclastics closest to the Henty Fault are in fact large boulders from a little further east, they are lithologically similar to the slightly less–altered underlying rocks that are exposed in sparse outcrops amongst the scree.

The floaters are weakly–foliated, strongly silica–sericite (or silica–chlorite) ±pyrite altered, volcaniclastic sandstone/fine conglomerate. The outcrops are silica–chlorite/sericite altered, generally non–pyritic, volcaniclastic sandstone. Both lithologies are derived from quartz–phyric rhyolitic volcanics. Apart from the lesser alteration of the outcrops, the only real point of difference between the rock types is that the outcrops also contain minor Precambrian metamorphic detritus.

Both the outcrops and floaters are obviously part of the same sequence.

Field observations, supported by petrological evidence, suggest the more–altered float is derived from a sub–outcropping band a short distance up–slope to the east (around 381760 – 381810E/5368500N, 150–200m east of the Henty Fault – see Figure 15). Both this location and the petrological data show the altered rocks are not related to the Owen Conglomerate.

The most effective way to further explore the South Stitt area would be to put in a wildcat drillhole angled east from the old Dunkerley tram to test the Henty Fault and the poorly–exposed altered volcanic sequence to the east of it. However, the lack of gold values, particularly in Billiton's soil auger sampling, suggests such drilling has a low probability of encountering mineralization.

Drilling is not recommended.

6.4 Drillhole Database

At the completion of MD3, 104 surface exploration diamond drillholes had been put down on the Tullah and Sterling River EL's. The earliest holes date from the 1940's. This does not include holes put down by the HEC during hydro–dam investigations.

Survey details for all 104 drillholes have been compiled and appear in Appendix 12, with the holes shown on Figures 16-20. An accuracy rating for each hole position is included, as is the method by which the co-ordinates were determined. A total of 17 old drill collars were picked up by theodolite survey during 1993-94. The sites of many of the pre-1960 holes could not be located and were estimated by scaling from old plans or photographs onto a modern Orthophoto.

The co-ordinates listed in Appendix 12 are considered more accurate than any previously given to these holes.

Full geochemical details for a total of 46 of the above drill holes have also been entered into the computer database. With the multiplicity of sampling methods and episodes of re-assaying by various Companies, this has not been an easy exercise.

7 INTERPRETATION OF AEROMAGNETIC AND GRAVITY SURVEYS

7.1 Introduction

In October 1993, consultant David Leaman produced an interpretation report on the gravity and aeromagnetic surveys completed on the EL's in the period 1991-93. Because of problems splicing the 1991 Tullah aeromagnetics into the 1993 coverage over the Sterling River EL, and those parts of the original Tullah survey that were re-flown because they were out of specification, only preliminary aeromagnetic data was available to Leaman at the time of his report.

Following satisfactory completion of the magnetic data processing, Leaman produced an updated interpretation report in May 1994.

The summaries of both Leaman's 1993 and 1994 reports are presented below. Some of the geological implications of Leaman's interpretations are discussed in section **8,** and in more detail in Purvis (1994).

7.2 Summary (D. LEAMAN)

LEAMAN, OCTOBER 1993:

A detailed examination of gravity and magnetic data in the Tullah and Sterling River areas has been completed. Data coverage is generally good but the analysis has been limited by the present fragmental nature of the high resolution aeromagnetic surveys. Some additional minor augmenting review of trends, alteration and units may be possible after these surveys have been coherently assembled and uniformly corrected.

The analysis has clarified a number of issues and resolved some enigmas about the Tullah area.

The geology, and mineralization, is dominated by the large Devonian pluton which lies at shallow depth throughout the entire region between Moxon Saddle and Mackintosh Dam. This granite mass extends from Pine Hill to Granite Tor as an E-W rib. Its roof is, however, very irregular and spines extend N-S or NNE. These typically have a relief of about 2000 m. One spine has intruded along the Henty Fault Zone and extends virtually to surface in some places.

It is possible that the rib of granite is composed of several plutons. Narrow, screen-like wedges occur in the roof cover and may reflect this. Each body may possess slightly different trace chemistries but overall the inferred density suggests a true granite or adamellite. The tin observed in the Sterling Valley is clearly associated with the granite body which lies east of the Henty Fault Zone. It is possible that the body which extends beneath Mt Black, South Rosebery and Hercules to Henty Prospect is different.

The analysis has indicated that the granite rib extends slightly further to the north than implied in earlier interpretations and that the northern wall of the granite mass lies near Lake Rosebery less than 2 km SE of Chester.

Faulting, displacement and alteration in the roof rocks bears an intimate relationship to the interpreted roof form and suggests either some elements of forcible intrusion or common controls.

Roof alteration has been identified and takes two principal forms; magnetically additive and subtractive. Additive alteration can be recognised near Red Hills and in the Moxon Saddle area related to crestal sites. Subtractive forms are principally associated with the Farrell Slates and Mt Black andesites although much of the latter have been intruded and displaced by the granite. This condition accounts for the generally limited gravity and magnetic responses from this lithology.

An additional additive form of alteration has been recognised within the granite itself. The capping cupolas display abnormally low densities and elevated magnetisation. The granite is normally non magnetic. This can be explained by a capping phase or greisen and shearing with oxidation. It is only recognised in the vicinity of the Henty Fault and may be interpreted in terms of post intrusion displacement and alteration or as a controlling primary feature. This phase and character is only recognised with clarity south of Lake Rosebery.

The Cambrian Murchison Granite forms a large part of the eastern roof of the granite but the volume is small overall. It is strongly and variably magnetised and appears magnetically banded. At least four compositions can be assigned on the basis of inferred density and magnetic properties. The apparent layering could be primary and the dips are consistent with a compound sheet intrusion. Compositions may range from granite to monzonite or diorite. Some elements of the magnetic character can be associated with the underlying granite and some extreme variations in properties may also be due to alteration.

The Murchison Granite, like most clearly Cambrian elements of the structure – in so far as they remain and may be recognised – trends approximately N–S parallel to the Precambrian boundary. The andesite–volcanics contact which may have marked an older position of the Henty Fault has a similar trend.

The southern face of the Devonian pluton has a sub E–W orientation which is maintained to the west after sinistral offset of about 2 km near the intersection with the Henty and Lyell Fault Systems south of Moxon Saddle. This offset may be primary, older than the granite, or be partly younger which might account for some of the implied shearing and alteration in the granite. Some combination of these options is likely given the complex history of the region. The granite has certainly occupied the current (Devonian) aspect of some much older structures.

NW trends and fractures are superimposed on these clearly older trends (N, NNE, E–W) and it is the confluence of these, and the Henty Fault System wherever the granite is no more than 1000 m removed that the rocks are mineralized. All known sites can be accounted for in this way. Including small prospects within the Tyndall Group which had previously been linked to the Murchison Granite. Such sites occur close to Devonian granite cupolas where these have entered the Murchison Granite. Minor offsetting of the Henty Fault channel is probably related to the NW–SE fracture set but the known sites seem to require all elements. Only two other sites of this type can be inferred from existing data.

A larger offset occurs near the northing of the Murchison Mine and gorge and this had previously been occupied by andesite. It is postulated that much younger movement on the Henty Fault system has been transferred eastward to and along the Farrell Fault system on the range above Tullah. The alteration within the Farrell Slates is related to both the influence of the underlying granite and the fault movements.

The entire pattern is suggestive of Devonian controls and Devonian mineralization and there seems little scope in terms of appropriate source rocks and structures either for generation or preservation of Cambrian base metal mineralization. The area clearly has tin, and perhaps, gold potential and perhaps small base metal vein systems. A similar solution may now be offered for the prospects of the Lake Rosebery – Chester region. More optimistic Cambrian potential can be inferred in the Charter and Burns Peak–Pinnacles regions peripheral to the Tullah area. The overall structural setting of the Tullah – Sterling River area is quite different from that evident at the easting of Rosebery and the rocks and structures remaining post date the active volcanic period and the associated mineralization. These sequences thicken to the north away from Tullah, and to the NW.

The volcanic suites west of the Henty Fault Zone appear to have been piled in asymmetric basins in which the Henty Fault formed an eastern margin with the west side down. This pattern was reversed prior to deposition of the Farrell conglomerates. The Tullah zone may have been elevated throughout much of the critical depositional period, or raised soon after, so that any volcanic suites have either not been deposited or have been eroded.

Some minor Tertiary channels have been recognised in the region of Lake Murchison. These have base levels below the lake base.

[Note: Leaman's interpretation that the Devonian granite extends "virtually to surface" along the Henty Fault in the Sterling Valley, would please former–EZ geologist Ian McDonald. Ian was criticised for mapping granite outcrops in at least two places near his drillhole STP283 (at 5373443N / 383881E). His "error" was corrected so that the outcrops are shown as glacial erratics on present Government maps (see Figure 4). But the gravity data suggests McDonald was probably right – JGP].

LEAMAN, MAY 1994:

SUMMARY

This report presents a revised and updated interpretation of gravity and magnetic data in the Tullah and Sterling River areas of western Tasmania. It has been made possible by the complete correction and consolidation of high resolution aeromagnetic surveys in the region. The existence of such data has enabled refinement of structural views and allowed detailed discrimination of alteration effects.

The revised interpretation shows that the main conclusions from earlier work can be sustained and the analysis reported is concentrated close to the Henty Fault Zone.

Some anomalous aspects of the previous work have been reviewed; including the depth to top of Devonian granite and the possible presence of greisens. It can be demonstrated that the granite does crest within about 500 m of surface along the Sterling valley in the neighbourhood of so-called granite boulders in the moraines. The interpretation has, however, deepened the body slightly by varying the granite density and this effect is amplified beneath Mt Murchison which allows an adequate volume of Murchison Granite in order to account for the magnetic responses. There is no need for any greisens or special effects.

Detailed analysis of the two geophysical data sets has allowed definition of the volumes and location of altered materials within five formations. These variation products are all associated with major structural and physical lineaments, one trending ENE, the other ESE. There are subsidiary structures with the same orientation in the area. The alteration products can be associated with distinct structural and assemblage boundaries within the volcanic and other suites and none of these boundaries have previously been mapped.

There is very little direct correlation between the new magnetic data and the mapped surface geology and there are clearly some major lithological variations present.

These variations can be explained by proposing the presence of a small, variably extended Cambrian basin containing much of the anomalous material. This is a view which can be sustained by the gravity data base even though it tends to expose gross structural elements, including the granitoids.

Geological evidence can also be extracted which supports the inferences concerning the location of the major, crustal controlling structures.

All known mineralisation can be explained in terms of the structural pattern and the alteration maxima inferred. Focal sites for further exploration lie near Midsons prospect, Murchison Mine area and the main Farrell zone. It can now be stated that, whatever the effect of the Devonian granite which clearly introduced As, Sn within the Sterling Valley, several major Cambrian targets are present. Their yield may depend on the existence of host materials or preservation. It is also possible that some other targets may exist west of the Henty Fault zone (west of Sterling Valley Tin, and near Mt Sale).

All data and this analysis suggest that the present Henty Fault is a relative geological non entity. A major shear underlies it and the narrow Cambrian basin which has now been defined.

8 MINERAL POTENTIAL OF THE EL's

8.1 General

The Tullah-Sterling River area is one of the most mineralized in the Mt Read Volcanics and its prospectivity is undoubted. There are numerous precious metal and basemetal showings, including old mines and drill-defined resources. Although 104 drillholes have been put down, much of the testing has been concentrated in restricted zones and large areas have received little attention (eg: the altered Murchison Volcanics).

A new approach is required to exploration in this area, involving looking more at the overall picture: the volcano-sedimentary stratigraphy, structural architecture, shape of the Devonian granite and timing of mineralization. This approach is likely to be more productive now following the acquisition and interpretation of high-quality gravity and aeromagnetic data.

8.2 Hydrothermal Alteration

As can be seen in Figure 21, one of the most notable features of the Tullah-Sterling River area is a huge 7km x 3km magnetic low extending along the Henty Fault centrally within the EL's. The most likely and reasonable explanation for the magnetic low is that it is due to strong and extensive hydrothermal alteration - a conclusion supported to some extent by mapping and drilling data. All major volcanogenic orebodies in the Mt Reads occur within such magnetic lows.

The Tullah-Sterling River magnetic low straddles the Henty Fault, occurring over Murchison Volcanics and Farrell Slates east of the fault, and a mafic unit and Mt Black Volcanics west of it. The altered zone **and its immediate periphery** are regarded as being the most prospective area for major mineral deposits on the EL's. Also prospective are smaller areas of strong alteration indicated within the Murchison Volcanics east of the main low. Some of these are already known to coincide with areas of pyritisation and very low Na2O values.

The area of alteration is partially underlain by the buried Devonian granite ridge crest intruded along the Henty Fault, but significantly, the alteration extends over a wider area suggesting at least some of it is Cambrian. This view is supported by the fact that elsewhere alteration associated with the Devonian granite typically has a positive magnetic signature. The inference is that in the area of the magnetic low, the Devonian alteration has partially overprinted an earlier magnetic-depleting Cambrian alteration. Leaman (pers comm, September 1994) considers the alteration owes its origin to enhanced fracturing and permeability induced by the Henty Fault. A major ESE-trending cross structure near the Murchison Gorge is considered responsible for the alteration extending onto the eastern slopes of Mt Black (Leaman, 1994b). This cross-structure apparently forms the abrupt northern termination to the mafic unit west of the Henty Fault.

The alteration effect is most pronounced along 5km of the Farrell Slates/Murchison Volcanics contact on the eastern side of the Sterling Valley. This is an obvious target for future exploration. Several old basemetal workings occur along this zone, very low-level and disseminated and vein-style sphalerite-galena is widespread. Na2O values are as low as 0.02% in the highly silica-sericite altered rocks and two Pb isotope samples taken by Billiton gave a Cambrian volcanogenic signature.

Only two existing holes test the fringes of the altered zone: STP105 and SVD89-3. Both encountered extensive pyritisation with minor basemetal mineralization.

8.3 Depth to Granite

The depth to Devonian granite has a critical bearing on the prospectivity of the EL's. It influences the distribution and mineralogy of much of the known mineralization and will do the same for deposits yet to be found. In very simplistic terms, altered areas greater than 1.5km above granite (and perhaps half this distance laterally) are considered to retain their potential for Cambrian volcanogenic basemetal massive sulphide deposits. Those at 1-1.5km are more likely to host base metals in remobilised lodes, and within 1km above granite the potential is greater for the higher-temperature Au-Cu-Sn deposits.

8.4 Potential For Massive Sulphide Deposits

The potential for Cambrian volcanogenic basemetal massive sulphide deposits is obviously of most importance to Pasminco. The only massive sulphide apparently of this type currently known on the EL's is the boudin occurrence in the Farrell Slates at Mackintosh Dam.

As already outlined, in general terms massive sulphide potential is best within and on the periphery of the area of extensive hydrothermal alteration indicated by the magnetic low, at distances greater than about 1.5km from the underlying Devonian granite. Cambrian mineralization within 1.5km of the granite stands a high chance of having been destroyed and remobilised. See Figure 21.

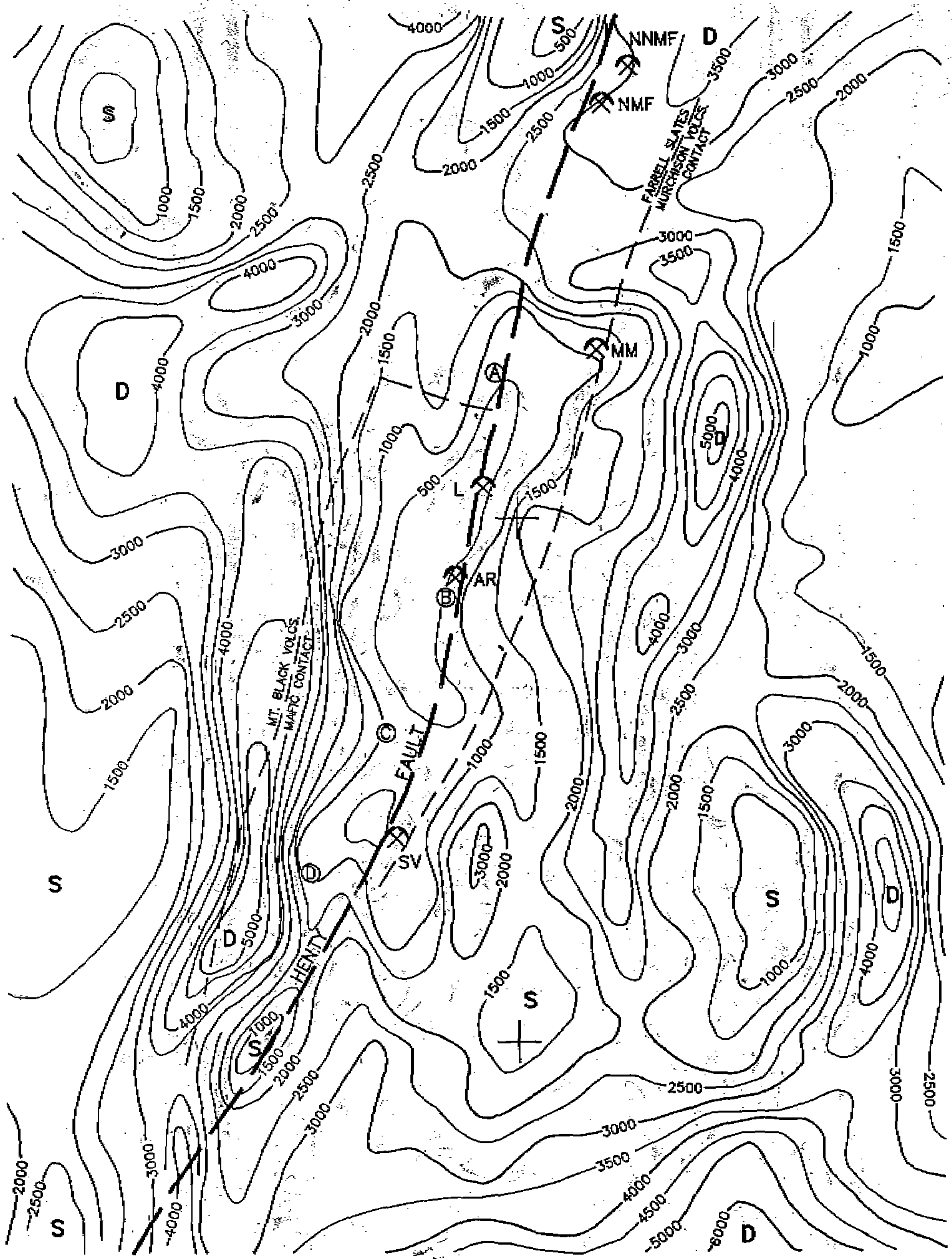
On this basis, the altered area north and north-west of the Murchison Mine (between Murchison Mine and the Farrell Mines) has volcanogenic massive sulphide potential. The main spine of shallow Devonian granite has an abrupt northern limit near Murchison Mine, apparently due to an ESE-trending structure. North of this point the granite is over 3km deep apart from another shallow granite spine intruded up the Henty Fault immediately NW of the Farrell Mines. The latter lie about 500m above and south of this spine. The magnetics show alteration declines north of the Farrell Mines. The unexplored western contact zone of the Sterling Valley mafic unit with the Mt Black Volcanics also theoretically has massive sulphide potential. As discussed later, this mafic unit was probably deposited in a local deep narrow graben. The 5km long altered Farrell Slates/Murchison Volcanics contact zone, mentioned in 8.2 above, has its best massive sulphide potential in the northern 2km.

A factor tending to downgrade perceptions of the prospectivity for massive sulphides are various geological indications suggesting the Mt Read Volcanics in the Tullah-Sterling River area are Late Cambrian (ie: post Rosebery and Que-Hellyer time).

Leaman (1993) is negative about the massive sulphide possibilities:
"The overall structural setting of the Tullah-Sterling River area is quite different from that evident at the easting of Rosebery and the rocks and structures remaining post date the active volcanic period and the associated mineralization.........massive volcanogenic sulphide deposits seem most unlikely". Leaman's 1994 update report is slightly more positive about the massive sulphide potential.

However, these factors are balanced by the widespread occurrence of significant gold mineralization on the EL's, which is undoubtably of Cambrian volcanogenic origin and points to a strong pre-granite metalliferous event.

Gold is the unambiguous signature of Cambrian mineralization in Western Tasmania, just as tin is exclusively the Devonian signature. There is no evidence for an auriferous primary magmatic fluid of Devonian age anywhere on the West Coast. All the major tin orebodies are spectacularly barren of gold and all the auriferous volcanogenic massive sulphide deposits are likewise barren of tin (Rosebery ore averages 15ppm Sn).



GRANITE ROOT DEPTH CONTOURS

Leaman, 1993

<u>LEGEND</u>

S Shallow granite (spine or cupola)

D Deep Granite

Ⓐ-Ⓓ Magnetic anomalies considered due to pyrrhotitic Au-Cu-Sn deposits

NNMF New North Mt. Farrell Mine (Pb-Ag-Zn)

NMF North Mt. Farrell Mine (Pb-Ag-Zn)

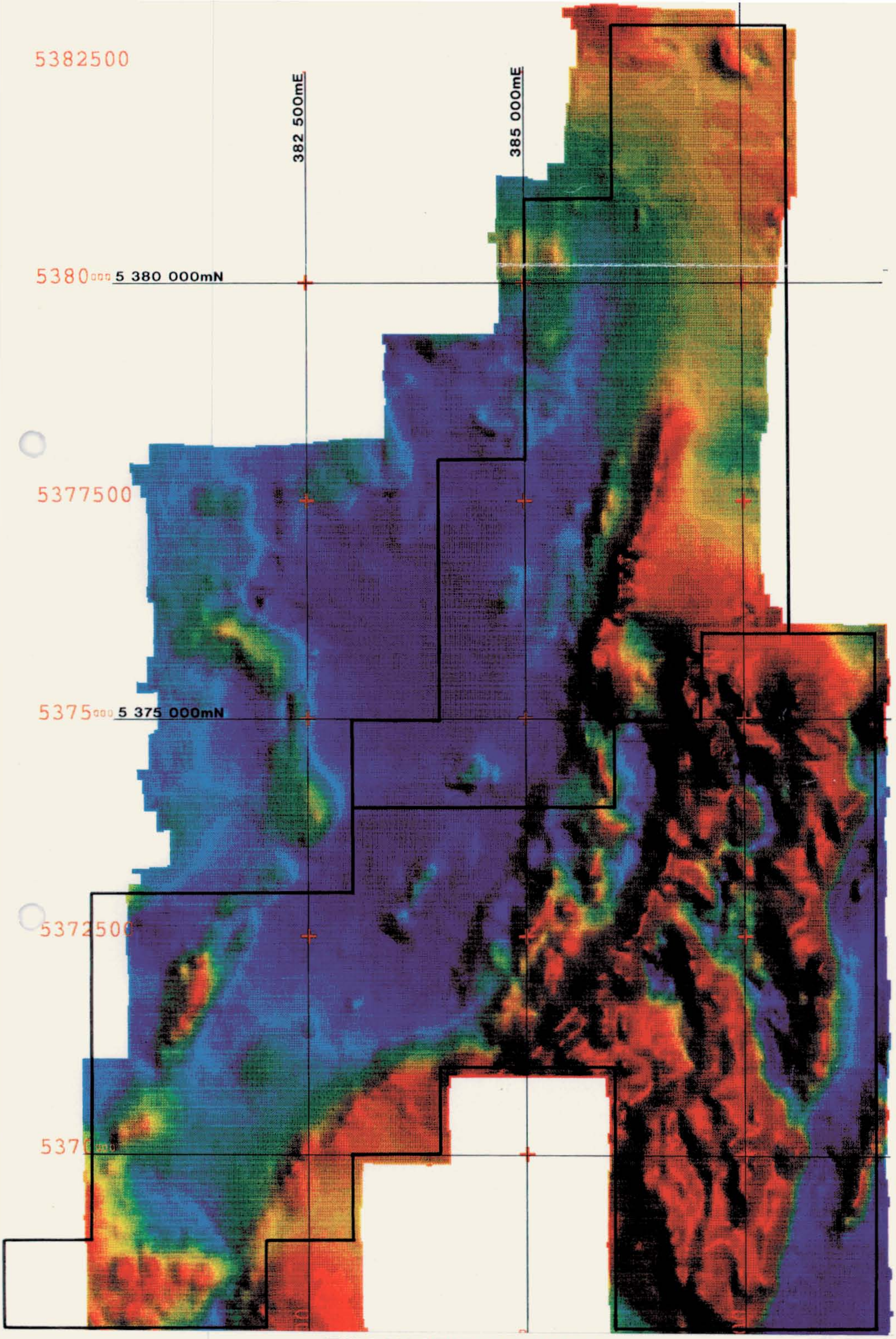
MM Murchison Mine (Zn-Pb-Ag-Au)

L Lakeside (Au-As-Sn-Cu)

AR Arsenic Resource (Au-As-Cu)

SV Sterling Valley (Pb-Ag-Zn-Au)

863048



TULLAH-STERLING RIVER

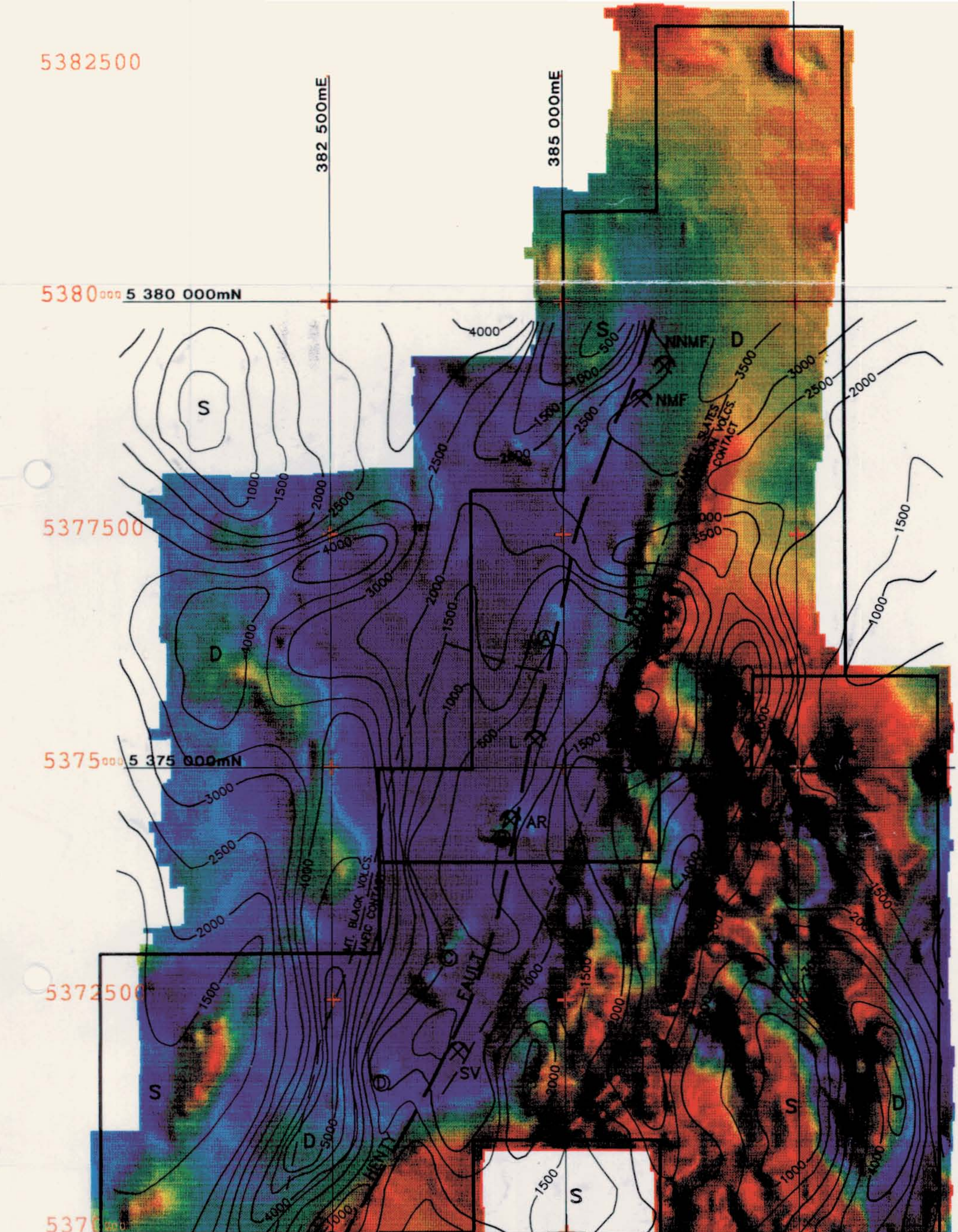
1:50,000

IMAGED AEROMAGNETICS

863049

5 cm

Figure 21



TULLAH-STERLING RIVER

1:50,000

IMAGED AEROMAGNETICS

GRANITE ROOT DEPTH CONTOURS

863049

Leaman, 1993

LEGEND

S	Shallow granite (spine or cupola)	NNMF	New North Mt. Farrell Mine (Pb–Ag–Zn)	L	Lakeside (Au–As_Sn–Cu)
D	Deep Granite	NMF	North Mt. Farrell Mine (Pb–Ag–Zn)	AR	Arsenic Resource (Au–As–Cu)
Ⓐ-Ⓓ	Magnetic anomalies considered due to pyrrhotitic Au–Cu–Sn deposits	MM	Murchison Mine (Zn–Pb–Ag–Au)	SV	Sterling Valley (Pb–Ag–Zn–Au)

5 cm

863048

Figure 21

However, the Devonian granites remobilise gold (and base metals) when they intrude the Mt Read Volcanics, producing a **hybrid** mineralized fluid containing both Devonian metals (principally Sn, W, Ag, Cu, Pb, Zn), and Cambrian metals (mainly Au, Ag, Pb, Zn, Cu). (Purvis, 1993b & 1994).

The gold mineralization in the Tullah-Sterling River area is markedly stronger and more extensive than in most areas of Mt Read Volcanics, with the largest known resource being the 750,000t @ 2.1 g/t Au at Lakeside. While the known gold mineralization is now hybridised with Devonian metals in Devonian sites, its tenor is evidence for a strong Cambrian precursor mineralizing event and therefore of the potential for volcanogenic massive sulphides in this area.

8.5 Gold-Copper-Tin Deposits

The gravity survey has delineated and emphasised the ridge of Devonian granite that underlies much of the EL's. Above the shallow spine of Devonian granite intruded up into the west-dipping Henty Fault along the Sterling Valley, the potential for gold-copper-tin mineralization is probably unsurpassed in Western Tasmania. Several lode-style deposits are already known and fall into two types: pyrrhotite-arsenopyrite hosted (eg: the "Arsenic Resource"), and pyrite-arsenopyrite hosted (eg: Lakeside). See Figure 4. These lodes, which are accompanied by extensive vein swarms, have been injected into structurally-prepared sites on or parallel to the Henty Fault and conformable with local bedding.

The aeromagnetics clearly show there are at least four pyrrhotitic deposits aligned in the volcanics and Farrell Slates above the crest of the granite along 6km of the Henty Fault, from the Tullah Flat southwards to near Sterling Valley Mine. These are labelled A to D on Figure 21. Only B, the "Arsenic Resource", has been properly drilled (although only to 250m below surface), defining 0.5mmt @ 1 g/t Au, 5% As & 0.2% Cu. Both A and C have had holes on their peripheries, intersecting significant Au-As mineralization, but the main parts of both these bodies are completely untested. Anomaly C, which is 800m long, is larger than that at the "Arsenic Resource". Anomaly D, the smallest (deeper?), is unexplored.

However, the pyrrhotitic bodies are only part of the overall Au-Cu-Sn potential. The largest known deposit, the pyrite-arsenopyrite hosted body at Lakeside (0.75mmt @ 2.1 g/t Au, 4% As, 0.2% Cu, 0.2% Sn), is invisible on the magnetics. There could be extensive similar pyritic mineralization arranged between and around the pyrrhotitic deposits.

In fact, the potential is for the entire 6km strike length above the granitic crest to host Au-Cu-Sn mineralization of one sort or another. The Henty Fault and associated structures have helped prepare the ground with zones of fracturing and brecciation. The Farrell Slates are commonly highly calcareous, including occasional thin beds of impure limestone, and the possibility for high-grade skarn development exists. The potential depth extent of these deposits is unknown – the deepest existing hole (at the "Arsenic Resource") was still in mineralization at 250m below surface, and similarly at 220m below surface at Lakeside.

The potential for large and high-grade Au-Cu-Sn deposits along the 6km of the granite crest should be investigated as a matter of priority. Several target areas that are obvious candidates for drilling include:

- Anomaly C
- At depth beneath the "Arsenic Resource"
- At depth beneath Lakeside
- The untested 700m gap between Lakeside and the "Arsenic Resource"

8.6 Remobilised Basemetal Deposits

With a Cambrian volcanogenic mineralizing event overprinted by a Devonian granitic one, at suitable distances from the granite there is potential for basemetal lode/vein style deposits involving remobilised Cambrian metals mixed with those derived from the granite.

The abundant Pb-Zn-Ag(±Au) lodes and veins that characterise the Tullah-Sterling River area appear to be largely of this type. Many have mixed Cambrian and Devonian isotopic signatures suggesting they are derived from hybrid metal sources. The largest of these are the 900 000t Farrell lodes which lie only about 500m from the granite. In some lodes the zinc content is major and gold significant (eg: the 40,000t Murchison Mine lode @ 15% Zn, 2g/t Au).

While these deposits are individually too small to be a viable economic proposition for Pasminco, it is certain there are many still to be found in this area. Under special geological circumstances, such as the remobilisation of a volcanogenic massive sulphide into a major structural intersection or large breccia zone, it is possible a body or series of bodies totalling many millions of tonnes of high-grade Pb-Zn-Ag-Au ore could exist.

The patterns of existing basemetal lode and vein distribution indicate potential for these types of deposits is best within the Farrell Slates and the Murchison Volcanics, at distances up to 1.5km from the granite. The most obvious potential is in the vicinity of the Farrell lodes, given the indications of significant structural extension at this well-mineralized site and the limited nature of exploration drilling there to date.

8.7 Farrell Basin

Another feature affecting the prospectivity of this area is the shape and age of the Farrell Basin. This name was originally coined to describe the area occupied by the Farrell Slates and at least the western part of the Murchison Volcanics (Purvis, 1994). Leaman (1994b) enlarged it to include the mafics and part of the Mt Black Volcanics, west of the Henty Fault. This view probably has greater validity as the mafics at least appear to have been deposited in some sort of discrete rift. The author noted pillow lavas in these rocks during drilling for Billiton in 1987.

However, including adjacent rock units east and west of the Henty Fault in a single original Cambrian basin implies inconsequential subsequent movements on the Henty Fault.

Based on its structural signature, Leaman (1993 & 1994b) considers the Farrell Basin Late Cambrian. This would make it younger than the other known massive-sulphide producing basins in the Mt Read Volcanics.

The biggest massive sulphide deposit in the Mt Reads (Rosebery) occurs in a large fault-bounded volcaniclastic-filled basin. In the author's opinion the large size of this deposit is related to the fact that the basin morphology was such that almost all depositional units in the local stratigraphy have considerable lateral extent and relatively gradual thickness variations (with local exceptions). This suggests the basin was relatively even-floored and expansive, and that deposition was not greatly disturbed by any continuing volcanism.

The fault-bounded Farrell Basin shows similar physical characteristics – the Farrell Slates are one of the larger sequences of fine, evenly-bedded volcanomict sediments within the Mt Read Volcanics. The main unknown is whether the Farrell Slates are merely part of an originally more extensive largely post-volcanism sedimentary cover, lacking any intimate depositional relationship with the altered volcanics now flanking and underlying them.

The magnetic low, particularly where it is not evidently granite-related, would appear to be suggesting the Farrell Slates and the adjacent volcanics are all similarly altered and thus intimately related.

Future exploration should incorporate geological study of the Farrell Basin, to properly define it and analyse the facies relationships within it.

9 CONCLUSIONS

1 The lack of geological, geochemical or geophysical vectors make it extremely difficult to track down the source of the sulphide lenses at Mackintosh Dam. Indications are that the lenses have been transported some distance. The only option appears to be pattern drilling, which is not recommended at this time.

2 The frustrating and disappointing negative results of hole MM2 at Tullah Flat suggest EM is not a suitable technique for exploration of the Farrell Slates. It is difficult to recommend any future drilling of EM anomalies in these rocks.

3 At South Stitt the lack of gold and basemetal values in the altered pyritic volcaniclastics suggests wildcat drilling, judged the most effective way to test this poorly-exposed target, is unlikely to encounter mineralization.

4 A new exploration approach is required on both licence areas, involving more emphasis on the overall picture: the volcano-sedimentary stratigraphy, structural architecture, shape of the Devonian granite and timing of mineralization. A 7km x 3km alteration-induced magnetic low centred on the Henty Fault Zone, a partly-coincident shallowly-buried Devonian granite spine, and the widespread gold mineralization, are regarded as key determinants of the area's excellent prospectivity.

5 Potential for volcanogenic massive sulphides is best within and on the periphery of the area of extensive hydrothermal alteration indicated by the magnetic low, at distances greater than about 1.5km from the underlying Devonian granite. Indicated target zones include the area between the Murchison and Farrell mines, and the western contact of the mafic unit in the Sterling Valley. Cambrian massive sulphide mineralization within 1.5km of the granite stands a high chance of having been remobilised and constitutes an important target category. Potential for this deposit type is best around the old Farrell Mines.

6 The 5km of largely-untested but mineralized Farrell Slates/Murchison Volcanics contact on the eastern side of the Sterling Valley, where the magnetic-depleting alteration effect is most pronounced, warrants drilling. The potential for volcanogenic massive sulphides appears best in the northern half of this zone. Further east, strongly altered pyritised zones in the Murchison Volcanics also constitute targets worthy of exploration.

7 There is outstanding potential for Au–Cu–Sn deposits on the 6km of the Devonian granite crest along the Henty Fault beneath the Sterling Valley. Several target areas that are obvious candidates for drilling include: Anomaly C on the western slopes of the Sterling Valley; beneath the known "Arsenic Resource"; beneath the Lakeside deposit; and the untested 700m gap between Lakeside and the "Arsenic Resource".

10 RECOMMENDATIONS

1 No further work should be carried out at Mackintosh Dam, Tullah Flat or South Stitt.

2 Drilling should be undertaken along the Farrell Slates/Murchison Volcanics contact zone on the eastern side of the Sterling Valley.

3 Deep drilling for volcanogenic massive sulphides and their remobilised equivalents, is recommended in the area of the old Farrell Mines and south to Murchison Mine.

4 The outstanding potential for major Au–Cu–Sn deposits along the Devonian granite crest in the Sterling Valley should be drilled as a matter of priority.

5 Altered areas in the Murchison Volcanics and along the western contact of the Sterling Valley mafic unit warrant investigation, initially by mapping and rock sampling plus assessment of any existing data collected by previous explorers.

6 It is recommended a task-force be set up to study the non-prospect- specific aspects of exploration in the Tullah–Sterling River area, with a view to outlining target zones for exploration beyond 1994–95. This study should include:

* Definition and facies analysis of units in the Farrell Basin (including the Murchison Volcanics)
* Proper determination of the relationship between the aeromagnetic low and alteration, structure and the Devonian granite
* Determination of the relationship between existing mineralization and the above
* Computerisation and evaluation of all existing drillhole data, all geophysical survey data and all surface geochemical data.

11 REFERENCES

Crawford, A.J., Corbett, K.D., & Everard, J.L. 1992. Geochemistry of the Cambrian Volcanic-Hosted Massive Sulfide-Rich Mount Read Volcanics, Tasmania, and Some Tectonic Implications.
Econ Geol, Vol 87, 1992, pp 597-619

Hall, D.B. 1988. Exploration Licence 1/62, Relinquishment Report.
Unpub Billiton Aust Report No. 08.4244 December 1988

Leaman, D.E. 1993. Tullah-Sterling River Area, EL 22/90 - 24/91, Interpretation, Gravity and magnetic Data.
Unpub Rep for Pasminco Exploration, October 1993

---., 1994a. Re: Response by J.G.Purvis to Tullah/Sterling Interpretation (Leaman, Oct. 1993).
Memo to F.G.FitzGerald, Pasminco Exploration, March 21, 1994

---., 1994b. Updated Interpretation, Tullah-Sterling Area, W Tasmania, ELs 22/90 & 24/91.
Unpub Report for Pasminco Expln, May 1994

Lorrigan, A.N. 1991. Tullah EL 22/90 Annual Report, October 1990 - September 1991.
Unpub Pasminco Expln Report No. T91-11

Purvis, J.G. 1992. Tullah EL 22/90 & Sterling River EL 24/91, Western Tasmania. Annual Report October 1991 - September 1992.
Unpub Pasminco Expln Report No. T92-13

---., 1993a. Tullah EL 22/90 & Sterling River EL 24/91, Western Tasmania. Annual Report October 1992 - September 1993.
Unpub Pasminco Expln Report No. T93-12

---., 1993b. The Lakeside Gold Deposit.
Notes on Talk Given to T.C.M. Meeting, Launceston, 5th November 1993

---., 1994. A Response: Tullah/Sterling River, Interpretation of Gravity & Magnetic Data (Leaman, October 1993).
Unpub Pasminco Expln Report, March 1994

15 KEYWORDS & LOCALITY

KEYWORDS

ZINC, LEAD, GOLD, SILVER, ARSENIC, TIN, VOLCANOGENIC, GRANITE, DRILLING, GEOPHYSICS BOREHOLE, ALTERATION

LOCATION

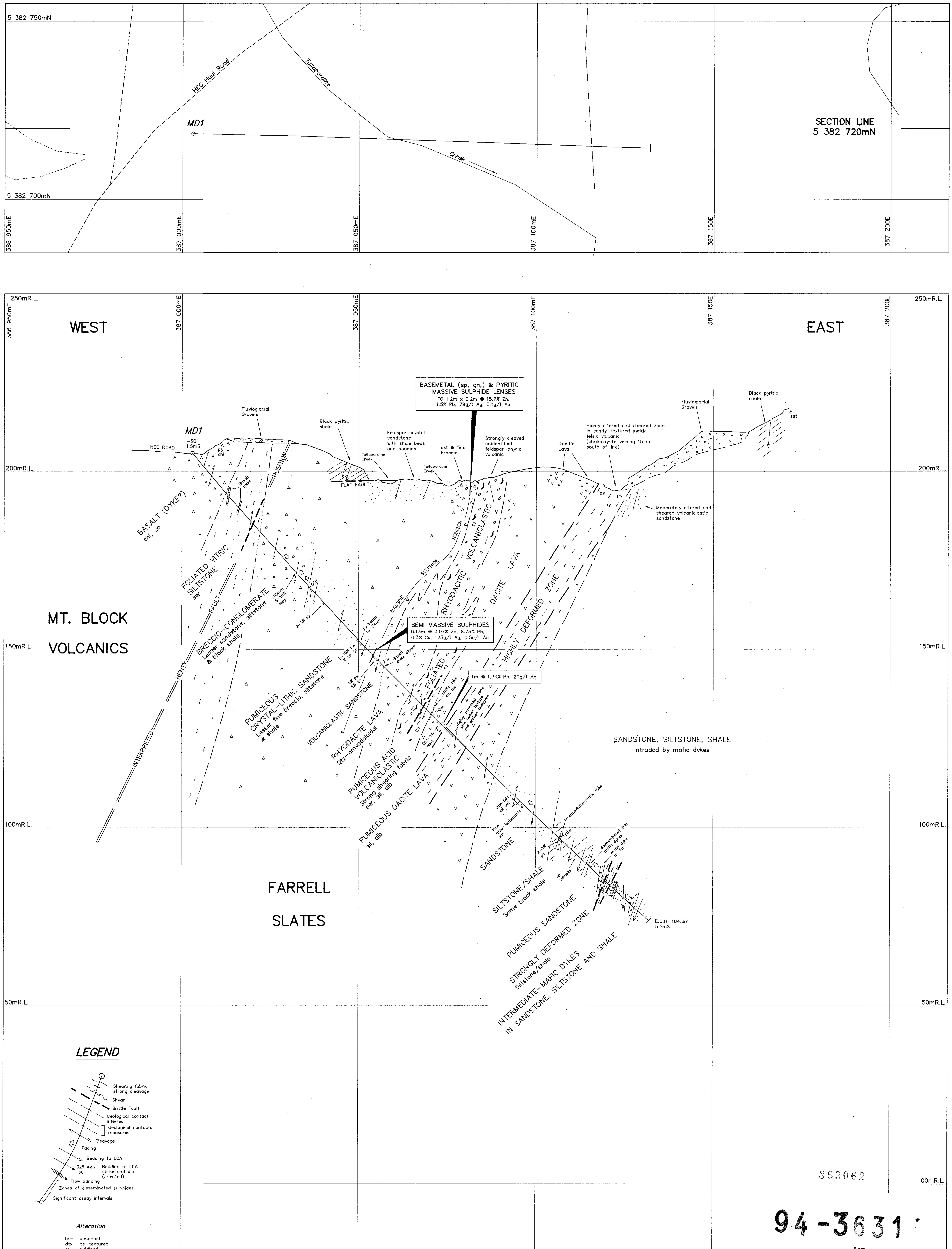
BURNIE SK55-3 & QUEENSTOWN SK55-5:

TULLAH, STERLING RIVER, MT MURCHISON

FIGURES

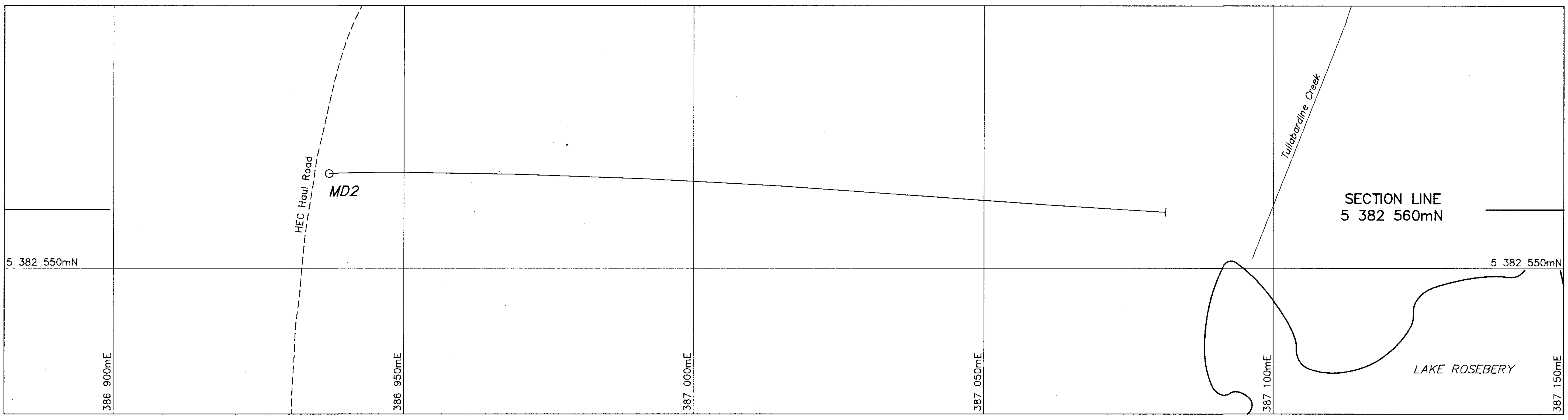

MT. BLOCK VOLCANICS
FARRELL SLATES
HENTY
FAULT
DACITIC LAVA AND MAFIC DYKES
SANDSTONE/ BRECCIA
DACITE LAVA (AND BRECCIA)
SANDSTONE SILTSTONE AND SHALE
MACKINTOSH DAM
VITRIC SILTSTONE
VITRIC SILTSTONE/ SHALE
MACKINTOSH
RIVER
Spillway
INTAKE
Power Station
BASEMETAL AND PYRITIC MASSIVE SULPHIDE LENSES To 1.2m x 0.2m @ 16% Zn
ALTERED AND DEFORMED ZONE
Thin basalt dykes
Black shale rafts
Flat fault
Minor shale beds
Occasional tuffaceous bands & lumps
Cu veining
034214 (6.5% Cu, 39g/t Ag)
Zones of fuchsite-carbonate alteration
Tullabardine Creek
qtz veins
MD1
MD2
MD3
5 382 900mN
5 382 800mN
5 382 700mN
5 382 600mN
5 382 500mN
5 382 400mN
5 382 300mN
5 382 200mN
386 900mE
387 000mE
387 100mE
387 200mE
LEGEND
A: LAVAS AND DYKES
DACITIC LAVAS AND PUMICEOUS LAVA BRECCIAS
INTERCALATED BASALT DYKES
B: SEDIMENTS
SILTSTONE (vit=VITRIC)
SHALE
BLACK SHALE
SANDSTONE
EPICLASTIC BRECCIA
Bedding
Foliation/Cleavage
Fault, with dip
Interpreted geological contact
Mapped outcrop
Pasminco outcrop sample (geochemical and/or petrological)
94-3631
NOTE:
Mapping in vicinity of Mackintosh power station by A.N. Lorrigan, 1991
863060
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : J.G.P.
DATE : August, 1994
DRAWN : G.M.B.
REFERENCE :
REVISIONS :
DRAWING No.
E.L. 22/90 – TULLAH
MACKINTOSH DAM
INTERPRETED GEOLOGY
AND SAMPLE LOCATIONS
SCALE 1:1000
FIG. No. 5

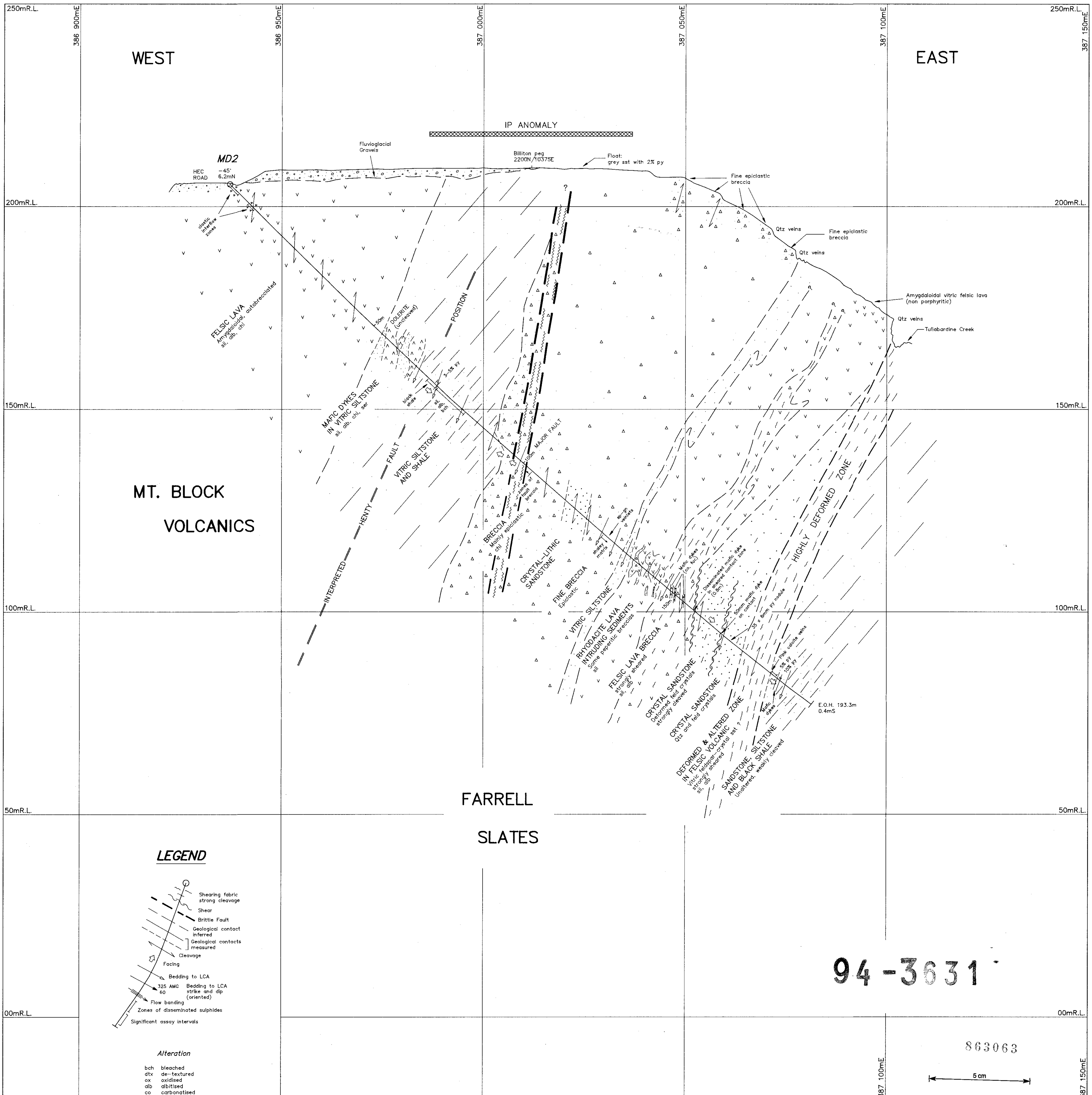

LEGEND
QUATERNARY
Cultural features- waste dumps, dams, etc
Talus and scree deposits.
Alluvium and marsh deposits.
EARLY ORDOVICIAN - LATE CAMBRIAN
Interbedded siltstone and sandstone
Interbedded sandstone and conglomerate.
Dominantly siliciclastic conglomerate
Angular unconformity.
CAMBRIAN
WEST AND NORTH OF HENTY FAULT ZONE
CENTRAL VOLCANIC SEQUENCE–HERCULES–MT.BLOCK
Lithic breccia and agglomerate.
Crystal tuff, crystal-lithic tuff, commonly bedded.
Fine grained vitric tuff.
Quartz-feldspar-phyric tuff, often with lithic clasts.
Basaltic lava.
EAST AND SOUTH OF HENTY FAULT ZONE
FARRELL–MURCHISON SEQUENCE
TYNDALL GROUP
Volcaniclastic conglomerate and sandstone.
Shale, siltstone, sandstone.
STICHT RANGE BEDS
Angular unconformity on Tyennan Precambrian rocks
Gabbro, dolerite
Basalt
Granitic rocks.
CENTRAL VOLCANIC SEQUENCE–RED HILLS–BASIN LAKE
Shale, siltstone, sandstone, minor tuff.
Andesitic lava, breccias, tuffs and intrusives.
WESTERN VOLCANO–SEDIMENTARY SEQUENCE–LANGDON RIVER
PRECAMBRIAN
Quartzite,schist, phyllite, minor dolomites of Tyennan Region.
OVERPRINTS AND MINERALISATION
Massive sulphide lens
Operating mine; prospect or abandoned mine.
Geological boundary–accurate or approximate
Geological boundary–inferred or concealed.
Fault–inferred.
Fault–concealed.
Major fold-axial surface trace
Early fold.
Later fold
Cambrian fossil locality
Lineation
MACKINTOSH
DAM
MASSIVE SULPHIDE BOUDINS IN SANDSTONE
16% Zn, 1% Pb, 80g/t Ag, 0.1g/t Au
HENTY
FAULT
5 385 000mN
5 380 000mN
5 375 000mN
5 370 000mN
FARRELL DEPOSITS
ESTIMATED COMBINED RESOURCE INCLUDING NEW NORTH MT. FARRELL RESERVE
177,000t
11.3% Pb, 4.1% Zn
345g/t Ag
NEW NORTH MT. FARRELL DEPOSIT
MINED
299,000t
14.9% Pb, 2.5% Zn
506g/t Ag
RESERVES
71,000t
12.3% Pb, 4.8% Zn
378g/t Ag
NORTH MT. FARRELL DEPOSIT
MINED
432,000t
11.4% Pb, 2% Zn
370g/t Ag
Metropolitan Mine
Farrell Blocks
BUTTRESS HILL
TULLAH
Mt Farrell Mine
E.L. 22/90
MURCHISON MINE DEPOSIT
ESTIMATED REMAINING RESOURCE
+ 12,000t
10% Pb, 15% Zn
350g/t Ag, 2g/t Au
TULLAH
FLATS
LAKE MACKINTOSH
MOUNT BLACK
LAKESIDE DEPOSIT
INDICATED RESOURCE
750,000t
2.1g/t Au, 20g/t Ag
4% As
"ARSENIC RESOURCE"
INFERRED RESOURCE
480,000t
5% As, 1g/t Au
HENTY
CONTACT ZONE WITH POTENTIAL FOR ORE DEPOSITS
ZONE OF STRONGEST ALTERATION
ROSEBERY MINE LEASE
E.L. 12/88
Dalmeny
STERLING VALLEY MINE
POSSIBLE Pb–Zn–Ag–Au RESOURCE ?
Sterling Valley Mine
LAKE MURCHISON
E.L. 24/91
MOUNT MURCHISON
SOUTH
STITT
ZONE
Shaded Lake
Lake Sandra
MINE LEASE EXT.
380 000mE
385 000mE
94-3631
5 cm
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : J.G.P.
Mt. Read Volcanics Project
Sept., 1994
E.L. 22/90 - TULLAH
E.L. 24/91 - STERLING RIVER
GEOLOGY
SCALE 1:25,000



PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : J.G.P.	E.L. 22/90 – TULLAH
DATE : Dec., 1993	MACKINTOSH DAM
DRAWN : G.M.B.	SECTION 5 382 720mN
REFERENCE :	DRILLHOLE
REVISIONS :	MD1
DRAWING No.	SCALE 1:500 — FIG. No. 7





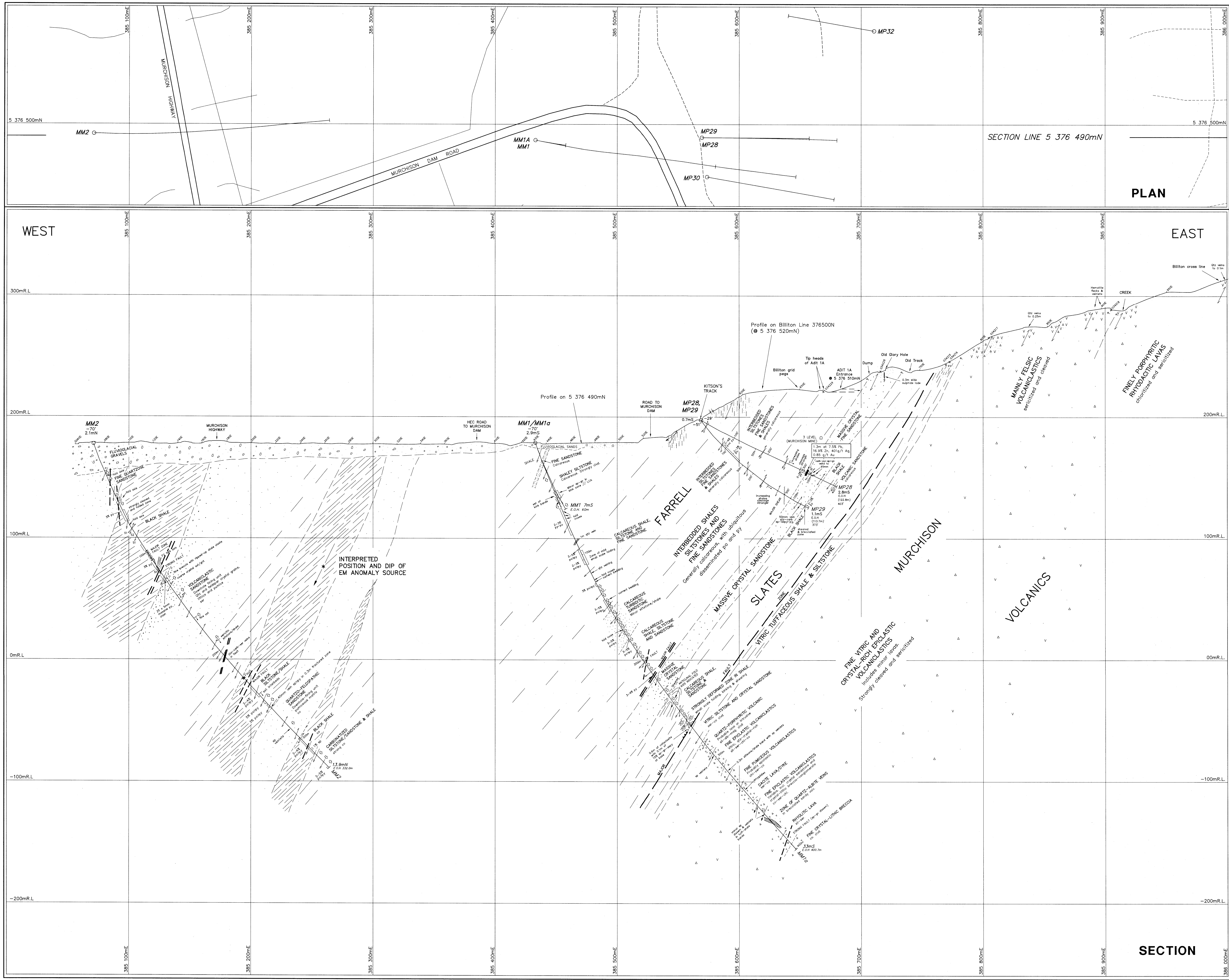
94-3631

863063

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : J.G.P.	E.L. 22/90 - TULLAH
DATE : Dec., 1993	MACKINTOSH DAM
DRAWN : G.M.B.	SECTION 5 382 560mN
REFERENCE :	DRILLHOLE
REVISIONS :	MD2
DRAWING No. MD2_A1	SCALE 1:500 (0 10 20 m) — FIG. No. 8


5 382 700mN
5 382 650mN
386 950mE
387 000mE
387 050mE
387 100mE
387 150E
MD3
SECTION LINE
5 382 675mN
WEST
EAST
Fluvioglacial Gravels
Swamp
200mR.L.
150mR.L.
100mR.L.
50mR.L.
00mR.L.
-50mR.L.
Tullabardine Creek
Foliated volcaniclastic sandstone and shale
Mafic Dykes
FELSIC LAVA
Amygdaloidal
sil, alb
BASALT DYKE
MT. BLOCK
VOLCANICS
FELSIC LAVA
Amygdaloidal
Basalt Dyke
Vitric Siltstone/Shale
Siltstone, Black Shale and Epiclastic Breccia
Strongly foliated
MIXED SEDIMENTS AND MAFIC DYKES
HENTY FAULT POSITION INTERPRETED
FOLIATED VITRIC SILTSTONE
FOLIATED EPICLASTIC BRECCIAS
Volcanomict
MASSIVE VOLCANOMICT SANDSTONE
FOLIATED VITRIC SILTSTONE/SANDSTONE & MAFIC DYKES
Disturbed & deformed volcanomict sediments cut by fuchsite -altered mafic dykes
zone of strongest deformation
FARRELL
SLATES
FOLIATED VITRIC EPICLASTIC BRECCIAS
ALTERED SHEAR ZONE IN RHYODACITE LAVA BRECCIA
sil, alb
FOLIATED FELSIC PUMICE BRECCIA
Fines downhole
ser, sil
BASALT DYKE
Amygdaloidal
chl
Basalt Dyke
chl, co
Thin Mafic Dykes
VITRIC FELSIC LAVA
sil, ser
Basalt Dyke
chl,co
Pumiceous
FINE VOLCANICLASTIC SANDSTONE
239.0m
E.O.H.
5.8mN
VITRIC TUFF
Epiclastic ?
ser
PUMICEOUS
FELSIC
VOLCANICLASTIC
HIGHLY DEFORMED ZONE
DACITE
LAVA
LEGEND
Shearing fabric strong cleavage
Shear
Brittle Fault
Geological contact inferred
Geological contacts measured
Cleavage
Facing
Bedding to LCA
325 AMG 60
Bedding to LCA strike and dip (oriented)
Flow banding
Zones of disseminated sulphides
Significant assay intervals
Alteration
bch bleached
dtx de-textured
ox oxidised
alb albitised
co carbonatised
chl chloritised
ser sericitised
kao kaolinitised
ep epidotised
sil silicified
fuc fuchsitic
5 cm
863064
94-3631
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : J.G.P.
DATE : August 1994
DRAWN : G.M.B.
REFERENCE :
REVISIONS :
E.L. 22/90 – TULLAH
MACKINTOSH DAM
SECTION 5 382 675mN
DRILLHOLE
MD3
DRAWING No. MD3_A1
SCALE 1:500
FIG. No. 9



863065

94-3631

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : J.G.P.	E.L. 22/90 – TULLAH
DATE : Nov., 1992	MURCHISON MINE
DRAWN :TGDS/G.M.B.	SECTION 5 376 490mN
REFERENCE :	DRILLHOLES
REVISIONS :	MM1a and MM2
DDH MM2 ADDED	
January, 1994	
DRAWING No.	SCALE 1:1000

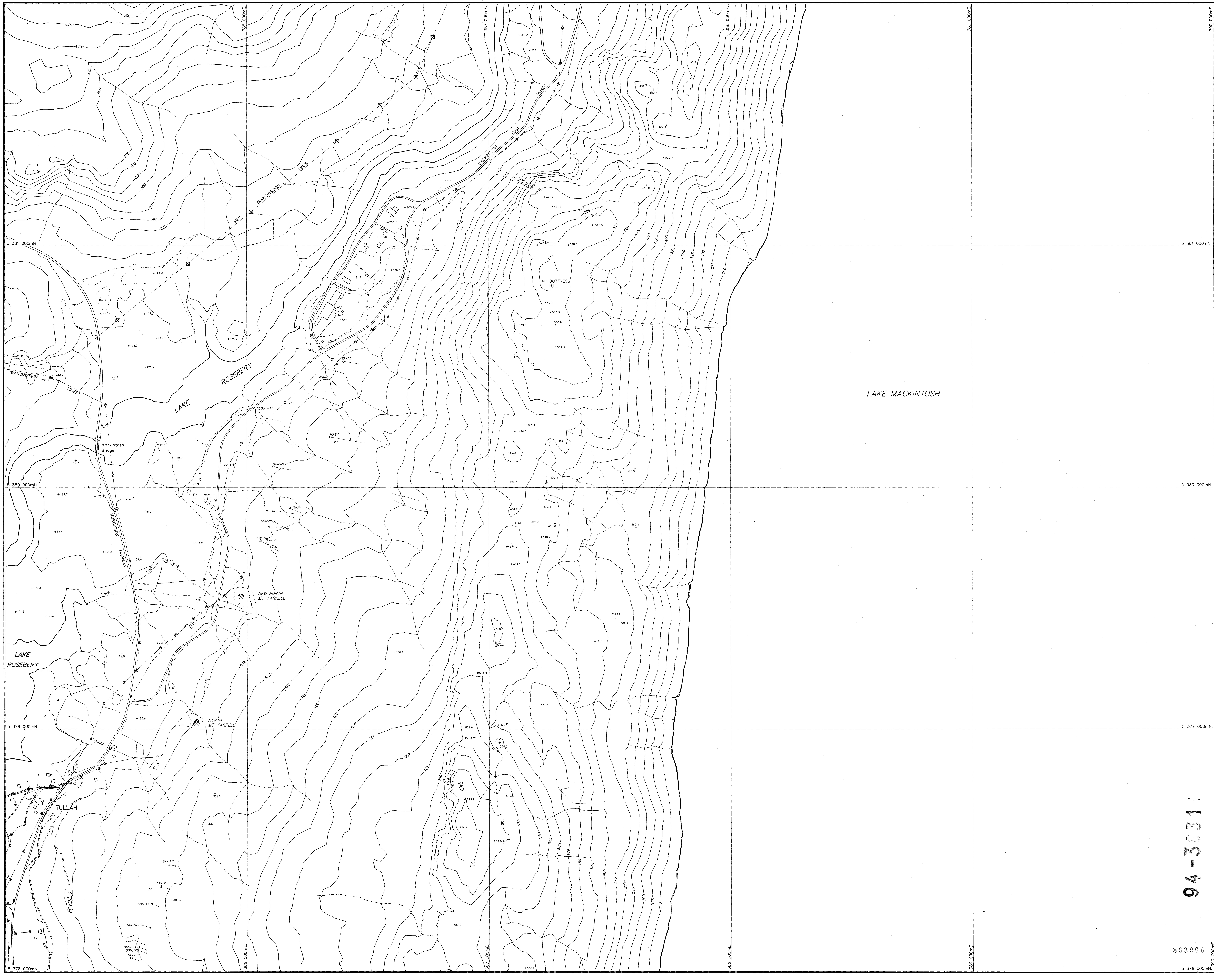
FIG. No. 12

94-3631

863067

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : J.G.P./P.G.R.	E.L.22/90 - TULLAH
DATE : Sept.1994	**DRILLHOLE LOCATIONS**
DRAWN :	**SHEET 6A**
REFERENCE :	
REVISIONS :	
DRAWING No.	SCALE 1:5000 (0 100 200 m)
FIG. No. 16	



94-3831

863066

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

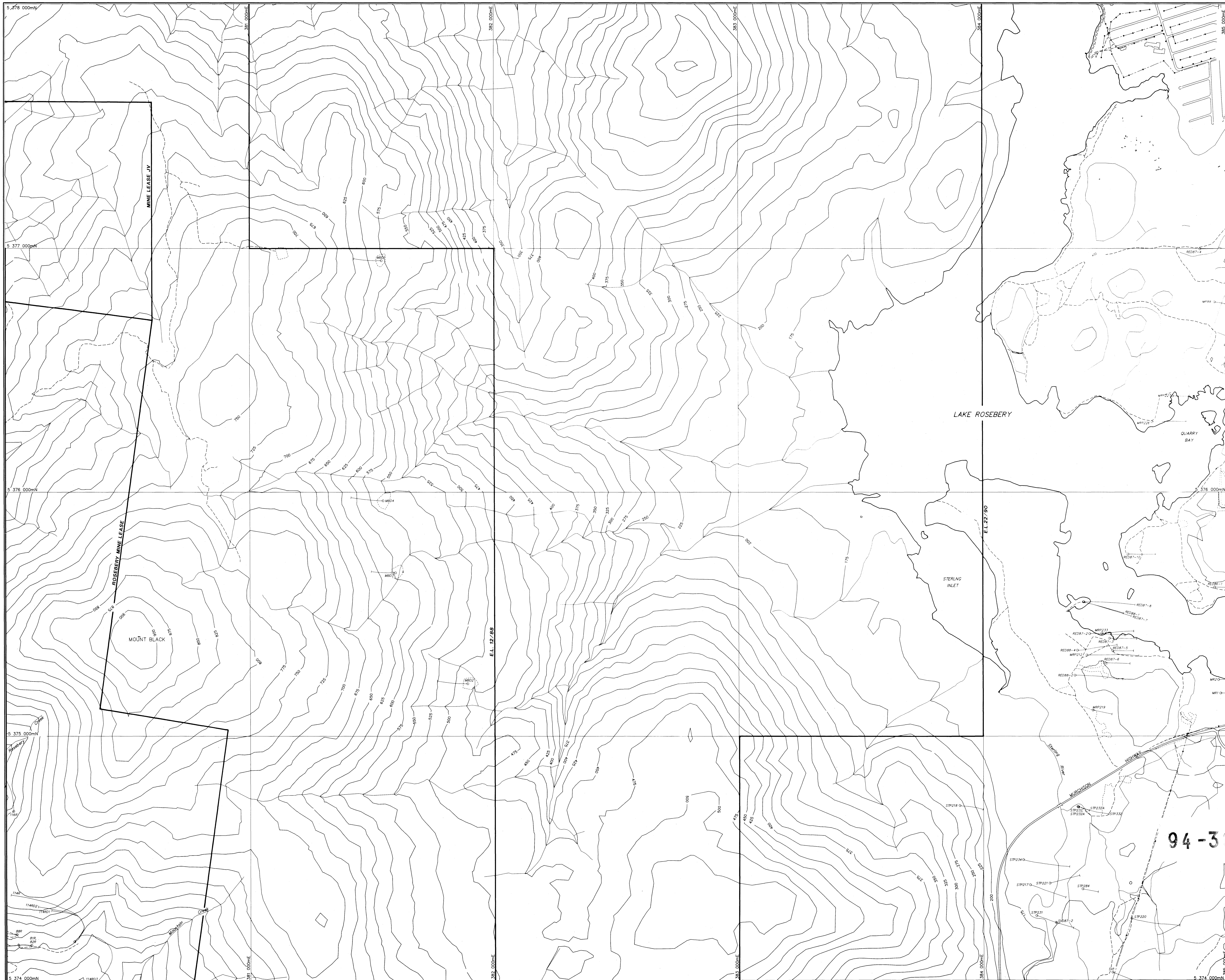
COMPILED : J.G.P./P.G.R.	
DATE : Sept.1994	
DRAWN :	
REFERENCE :	
REVISIONS :	

E.L.22/90 - TULLAH

DRILLHOLE LOCATIONS

SHEET 6D

DRAWING No.	SCALE 1:5000	FIG. No. 17



GRID CONVERGENCE 1.0

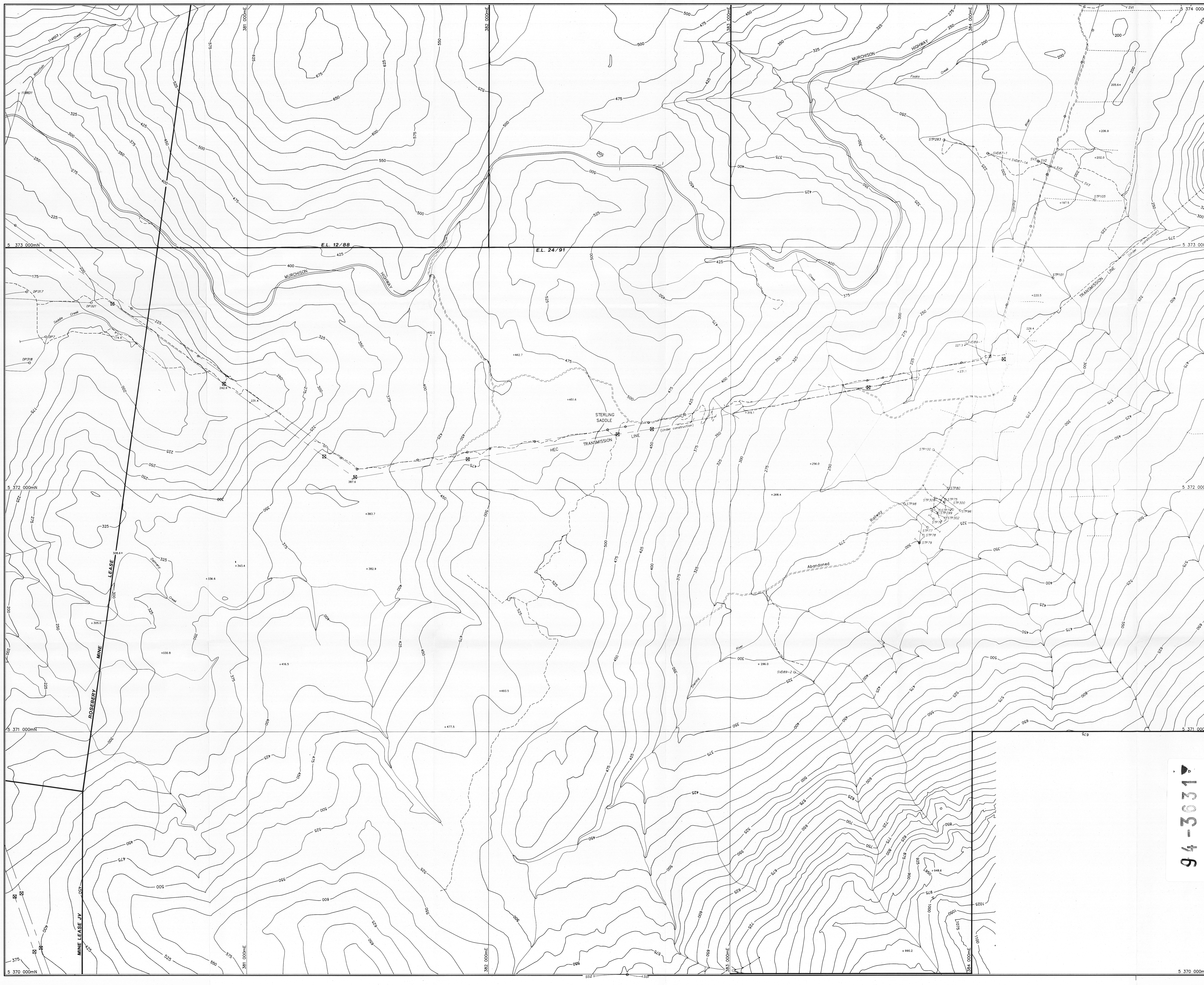
GRID/MAGNETIC 12.0

863068

5 cm

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : J.G.P./P.G.R.	E.L.22/90 - TULLAH
DATE : Sept.1994	**DRILLHOLE LOCATIONS**
DRAWN :	SHEET 7B
REFERENCE :	
REVISIONS :	
DRAWING No.	SCALE 1:5000 (0 100 200 m) — FIG. No. 18



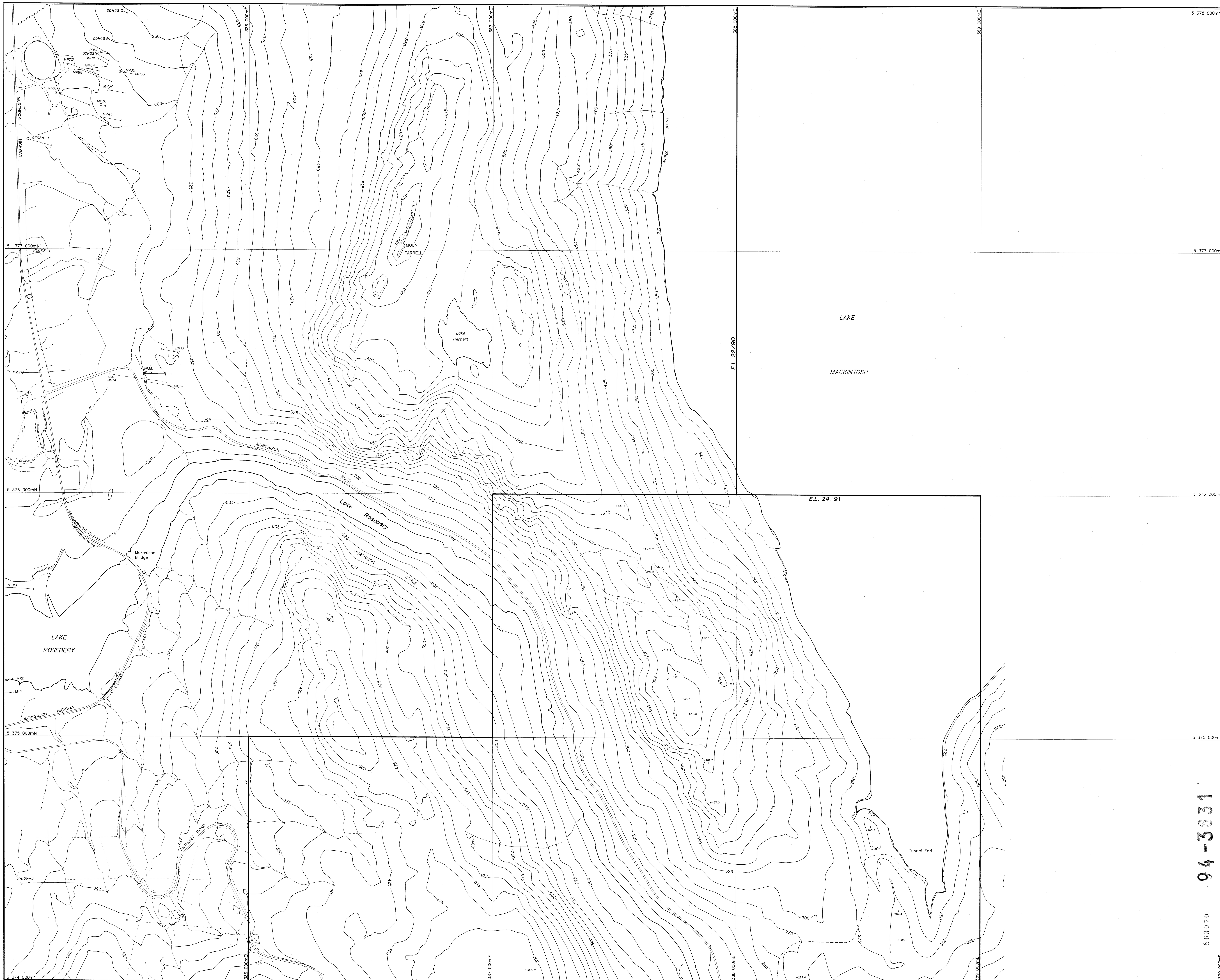
94-3631

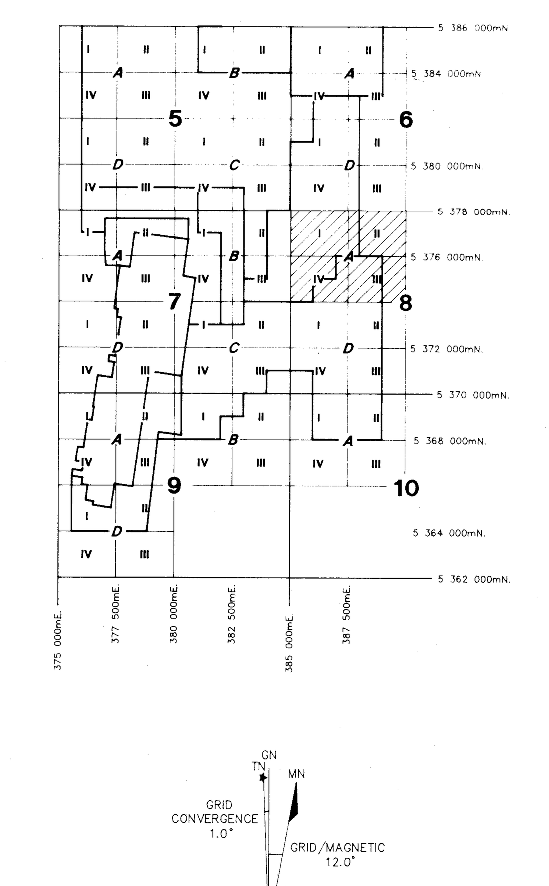
863009

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : J.G.P./P.G.R.	
DATE : Sept.1994	E.L.24/91 - STERLING RIVER
DRAWN :	
REFERENCE :	**DRILLHOLE LOCATIONS**
REVISIONS :	**SHEET 7C**
DRAWING No.	SCALE 1:5000 0 100 200 m

FIG. No. 19





5 cm

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : J.G.P./P.G.R.	
DATE : Sept.1994	
DRAWN :	
REFERENCE :	
REVISIONS :	
DRAWING No.	SCALE 1:5000

E.L.22/90 - TULLAH
E.L.24/91 - STERLING RIVER

DRILLHOLE LOCATIONS

SHEET 8A

FIG. No. 20

94-3631

863070

PASMINCO EXPLORATION

EL 22/90 TULLAH &
EL 24/91 STERLING RIVER
ANNUAL REPORT

September 1993 - September 1994

Volume 2 of 2

AUTHOR: JG Purvis
JG Purvis & Associates Pty Ltd

DATE: September 1994

REPORT No.: T94-8

SUBMITTED TO: Regional Exploration Manager - Tasmania

DISTRIBUTION: Mineral Resources Tasmania - Hobart

Pasminco Exploration - Burnie
- Melbourne
- Rosebery

SUBMITTED BY:

ACCEPTED BY:

BURNIE
SEPTEMBER 1994

APPENDICES

APPENDIX 1

Log of Hole MD1, Mackintosh Dam

PASMINCO EXPLORATION
DIAMOND DRILL CORE RECORD

LOCATION	TASMANIA
PROJECT	TULLAH EL 22/90
PROSPECT	MACKINTOSH DAM
DESIGNED BY	J.G. PURVIS
LOGGED BY	J.G. PURVIS
RELOGGED	
COMMENCED	1·11·93
COMPLETED	10·11·93
DRILLED BY	W. HOW
DRILL RIG	LONGYEAR 38

OBJECTIVE

TO TEST BENEATH MASSIVE BASEMETAL SULPHIDE LENSE OUTCROPPING IN TULLABARDINE CREEK.

RESULT

0·12M SEMI-MASSIVE SULPHIDE BAND INTERSECTED 50m DOWN-DIP OF OUTCROP.

LOCATION/SURVEY DATA (AMG)

Grid	AMG	RL Collar m	205·2
Northing m	5382718·5	Bearing Collar	091°46'
Easting m	387003·0	Dip Collar	-50°
DH Survey Type	SINGLE SHOT EASTMAN CAMERA	Length Hole m	184·3

Depth m	Bearing	Dip	Depth m	Bearing	Dip
COLLAR	091·75°	-50°			
30	091·25°	-48·25°			
60	092°	-47°			
90	092°	-45°			
120	092°	-44·25°			
150	092°	-43°			
184·3	091·5°	-42°			

SIGNIFICANT INTERSECTIONS (ppm)

From m	To m	Interval m	Cu	Pb	Zn	Ag	Au	As	Comments
76·08	76·20	0·12	3296	8·75%	745	123	0·50	2150	SEMI-MASSIVE PY-GN SULPHIDES
103·1	104·1	1·00	75	1·34%	60	20	0·015	4	GALENA IN QTZ-ALBITE VEINS IN DACITE LAVA

SIGNIFICANT CORE LOSS

From m	To m	% Lost
0	3	57

POOR GROUND CONDITION ZONES

From m	To m	Condition
0	23	BROKEN AT INTERVALS
46	46·3	BROKEN BY FRACTURES ALMOST PARALLEL LCA.
47	47·6	" " " " " "

HOLE SIZE

Size	Depth m
HQ	36
NQ	184·3

HOLE CONDITIONS AFTER COMPLETION

Collar	HW-SIZE STEEL PIPE WITH CAP, CEMENTED IN TO 0·7m.
Steel Casing	-
PVC Casing	40MM PVC CASING PLACED TO 140·6m. LATER (JANUARY 1994) PVC RAISED TO 96·9m, WITH SLOTTED SECTION 56·8-68·6m.
Ground Water	
Wedge	
Drill Pad	

PASMINCO EXPLORATION
SUMMARY DIAMOND DRILL CORE LOG

HOLE No. MD1

PROJECT: TULLAH EL 22/90

Graphic Scale 1:

From m	Interval m	Code	Description	Depth	Graphic

MD1 SUMMARY LOG

0 - 14.5m:	**MAFIC LAVA.** Probable dyke
14.5 - 29.1m:	**UNIDENTIFIABLE VITRIC VOLCANICS.** Fi gr. Broken in places.
29.1 - 49.7m:	**BRECCIO-CONGLOMERATE.** Volcanomict. Bedded. 1-3% dissem py.
49.7 - 76.1m:	**SANDSTONE, BRECCIA, SILTSTONE & SHALE.** Volcanomict. 1-3% py.
76.1 - 76.2m:	**MASSIVE SULPHIDE.** Partly banded py-gn with lesser cp & aspy.
76.2 - 80.3m:	**SANDSTONE.** Volcanomict.
80.3 - 90.9m:	**RHYODACITE LAVA.** Qtz-amygdaloidal.
90.9 - 97.0m:	**DEFORMED VOLCANICLASTIC.** V strong shearing fabric. Stretched clasts of lava & sediments to 100mm long.
97.0 - 124.0m:	**DACITE LAVA.** Strong qtz-albite alteration. Highly deformed & augen-textured 107-113m. Gn-py in qtz-alb veins 102-105m.
124.0 - 159.7m:	**SANDSTONE, SILTSTONE & SHALE.** Down-hole fining qtzo-feldspathic sediments. Minor py & po.
159.7 - 178.6m:	**MAFIC DYKES & SEDIMENTS.** Complex of fine sst, partly-carbonaceous siltst/shale, and weakly fuchsitic mafic dykes.
178.6 - 184.3m:	**FINE SANDSTONE.** Massive, even-grained. Minor py.

END OF HOLE

008073

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

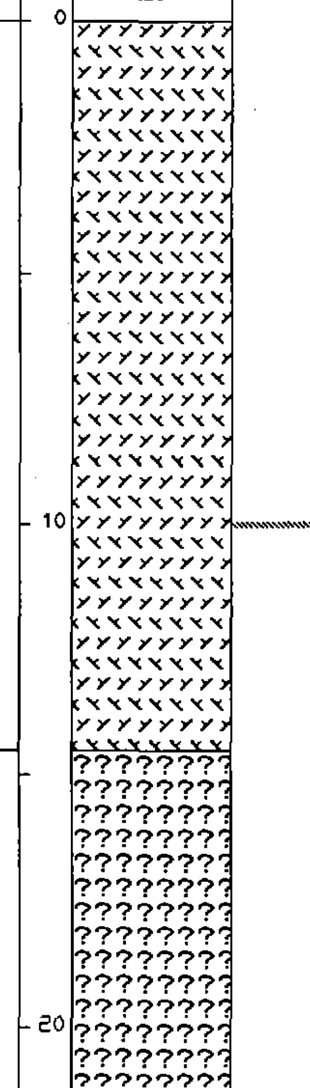
HOLE No. MD1

PROJECT: TULLAH : EL 22/90 MACKINTOSH DAM

Vertical Scale 1 : 150

From	To	LITHOLOGY & ALTERATION	MINERALISATION	STRUCTURES	LITH	STR	ALT
0.00	14.50	BASIC INTRUSIVE Dark, Green, Fine grained, Massive, Highly Chloritised, Moderately Carbonatised, Even-textured. Non-magnetic. Probable dyke. Partly broken, esp above 6.5m. Irreg cb veinlets. CONTACT: Unassigned, at 65 degrees to LCA. Basal contact abrupt, marked by strong lineation parallel to cleavage.	DISSEMINATED, minor pyrite Locally 1-2% above 9m..	FIRST CLEAVAGE, A 55, Weak.	I Ib	sl	chl co
14.50	29.15	UNASSIGNED Pink, Buff, Fine grained, Massive, Vitric, Spherulites, Slightly Sericitised, Slightly Albitised, Unidentified even-textured vitric volcanic. Snowflake devitrification texture. Broken at intervals, esp above 23m. Abund cb(+qz) veinlets, esp in stronger cleavage 22.4-28.8m. Mafic dykes at 15.1-15.6m (52/LCA), & 22-22.35m (60/LCA). Both dykes //cleav. CONTACT: Conformable abrupt, at 86 degrees to B. S1/LCA, parallel to bedding/cleavage in unit below.	DISSEMINATED, minor pyrite Some fracture-filling py..		? ?		ser alb

GRAPHIC (Depth / Lithology / Structures)



PASMINCO [illegible]PLORATION
DIAMOND DR[illegible] CORE LOG

HOLE No. **MD1**

PROJECT: TULLAH : EL 22/90 MACKINTOSH DAM

Vertical Scale 1 : 150

From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	STRUCTURES	LITH	STR	ALT
					FIRST CLEAVAGE, A 50. Strong.		sl	
					FAULT, A 62, Shear. Small shears at 26m & 26.25m.		flt	
29.15	49.70	BRECCIA INTERBEDDED WITH SANDSTONE INTERBEDDED WITH SILTSTONE INTERBEDDED WITH BLACK SHALE Grey, Pink, Very coarse grained, Medium grained, Bedded, Matrix supported, Polymict, Crystal, Feldspar phyric, Slightly Chloritised, Slightly Sericitised, Volcanomict breccio-cong, with matrix & beds of feld-xyl sst. Clasts (often sil-alb alt) sub-angular, some stretched, av 10-30mm, max 120mm, incl fi gr perlitic lavas, vitric volcs & feld-porph lavas. Bedding-// cleav strong at top, weak at base. Abund tiny cb veinlets. Qz-cb-cl veins to 100mm. CONTACT: Gradational, at 55 degrees to LCA. Gradational conformable change at base.	DISSEMINATED, minor pyrite Some fracture-filling py..	30		S bx b sst b slt b bsh		chl ser
					BEDDING, O 75. 52/LCA.		ss	
			DISSEMINATED, 2% pyrite minor galena Py in black shale, gn in qz-cb veinlets..	40	BEDDING, Grading downhole. Breccia bed.		ss	
			DISSEMINATED, minor pyrite 5-10% dissem aspy @ 44.55 - 44.65m					

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD1

PROJECT: TULLAH : EL 22/90 MACKINTOSH DAM

Vertical Scale 1 : 150

From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	STRUCTURES	LITH	STR	ALT
			5-10% dissem aspy @ 44.55 - 44.65m..					
			DISSEMINATED, 1% pyrite minor sphalerite minor galena minor chalcopyrite Sp-gn-cp in qz-cb veinlets. Best sulphs assoc with black shale..		BEDDING, A 55.		ss	
					BEDDING, Grading uphole. Scour & fill structures also face uphole.		ss	
			DISSEMINATED, minor pyrite trace galena trace chalcopyrite Basemetals in qz-cb veins..		BEDDING, Grading uphole.		ss	
49.70	76.00	SANDSTONE INTERBEDDED WITH BRECCIA INTERBEDDED WITH SILTSTONE INTERBEDDED WITH SHALE Grey, Buff, Medium grained, Fine grained, Bedded, Crystal, Vitric, Pumiceous, Moderately Sericitised, Slightly Silicified, Volcanomict seds, mainly pumiceous feld>>qz xyl-lithic sst & fine bx (bx frags incl felsic lavas). Some vitric partly cherty siltst, & grey/black shale. Stretched lumps of siltst/sh in sst. Alt strongest (incl some carb & bch) in pyritic section below 70.5m. Qz-cb veins. Unit largely unbroken. CONTACT: Unassigned, at 89 degrees to LCA. Abrupt.	DISSEMINATED, 1% pyrite very minor galena very minor chalcopyrite trace arsenopyrite 2-3% py assoc with black shale bands @ 50.5-51m & 55.7-56.2m. Gn & cp increase slightly 65-68m. All sulphides except aspy also occur in veinlets..	50	BEDDING, A 58.	S sst b bx b slt b sh	ss	ser sil
				60	FIRST CLEAVAGE, D 74. 57/LCA. (Cleavage in unit varies from weak to strong, & is strongest in pumiceous sst & bx. All cleav // bedding.		sl	

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
			BANDED, 5% pyrite 1% sphalerite 1% galena minor arsenopyrite Sulphs in diffuse bands to 21mm //bedding..	70						
			DISSEMINATED, 1% pyrite minor sphalerite				BEDDING, A 65.		ss	
		BASIC INTRUSIVE 76·0 – 76·08m Yellow, Green, Medium grained, Highly Fuchsitic, Highly Carbonatised, Strongly altered lineated mafic dyke. CONTACT: Unassigned, at 75 degrees to LCA. Abrupt & // dyke lineation.	DISSEMINATED, trace pyrite (Mafic dyke)..							
		UNASSIGNED 76·08 – 76·2m Blue, Brown, Medium grained, Moderately Sericitised, Moderately Silicified, Semi-massive sulphides in pumiceous feld-xyl sst. CONTACT: Conformable abrupt, at 65 degrees to LCA. //sulphide banding.	MASSIVE, abundant pyrite abundant galena 1% chalcopyrite 1% arsenopyrite Semi-massive (+50%) banded sulphides. Some cp-gn veins at high angle to sulph banding..				A 65. Banding in semi-massive sulphides (// bedding).			
76.20	80.30	SANDSTONE 76·2 – 80·3m Grey, Buff, Medium grained, Massive, Lithic, Vitric, Crystal, Moderately Sericitised, Slightly Carbonatised, Volcaniclastic sst. Lithic & feld>qz grains in sericitised vitric matrix. Minor coarser feld-xyl sst & grey silicified (baked?) shale. CONTACT: Gradational, at 55 degrees to LCA. Strongly lineated mixed zone of baked shale slivers, sst & lava material extends to 82m.	DISSEMINATED, 2% pyrite 1% galena in veins. DISSEMINATED, 1% pyrite minor galena in veins.	80			FIRST CLEAVAGE, D 83. 55/LCA (//bedding). Upper 1.3m of unit strongly cleav with zones of shearing. BEDDING, A 61.	S sst	sl ss	ser co
80.30	90.90	RHYODACITE Grey, Medium grained, Porphyritic, Massive, Feldspar phyric, Quartz phyric, Vitric, Moderately Silicified, Moderately Sericitised, Lava is qz-amygdaloidal. Felds albitised. Cb-qz veins. Weak cleavage. Mod fracturing 86-90m. 45mm mafic	DISSEMINATED, very minor pyrite disseminated, some also on fractures..					L Lr-d		sil ser

800279

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD1

PROJECT: TULLAH : EL 22/90 MACKINTOSH DAM

Vertical Scale 1 : 150

From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	STRUCTURES	LITH	STR	ALT
		Sericitised, Lava is qz-amygdaloidal. Felds albitised. Cb-qz veins. Weak cleavage. Mod fracturing 86-90m. 45mm mafic dyke @ 90.5m (75/LCA, opp sense to cleav), with abund microfracturing of lava on dyke margins. CONTACT: Unassigned, at 75 degrees to LCA. Abrupt.		90				
90.90	97.00	ACID VOLCANICLASTIC Pink, Grey, Medium grained, Foliated, Cleaved, Feldspar phyric, Vitric, Stylolites, Moderately Sericitised, Moderately Albitised, Largely unidentifiable, prob pumiceous, volc with v strong shearing/cleav fabric & wispy texture. Scattered fractured felsic lava clasts to 100mm x 30mm, & shale clast @ 93.4m, indicates rock is clastic. Sparsely qz-phyric. Strong sil-alb alt in basal half of unit. CONTACT: Gradational, Position sl arbitrary.	DISSEMINATED, minor pyrite		FIRST CLEAVAGE, A 62. Strong. FAULT, A 65. Shear. // cleavage. FIRST CLEAVAGE, A 50, Strong. FAULT, A 75. Brittle. // cleavage.	V Va	sl flt sl flt	ser alb
97.00	124.00	DACITE Pink, Grey, Medium grained, Massive, Cleaved, Feldspar phyric, Highly Albitised, Highly Silicified, Mod sericitised. Felds evenly distrib in bland granular rock. Strong tectonic deformation 105-113m (augen texture & broken silif felds), deformation assoc with strongest sil-alb alt. Qz veins to 150mm, most abund 102-108m. Mafic dyke 99-99.3m, fuc alt, cleaved & oriented // cleav. CONTACT: Unassigned, at 65 degrees to LCA. Abrupt, // cleav, exact nature unclear. Basal 1m of unit is finer gr & vitric.	DISSEMINATED, very minor pyrite VEIN, 2% galena in veins, minor pyrite in veins, Coarsely xylline sulphs in qz-alb veins..	100	FIRST CLEAVAGE, D 75. 68/LCA.	L Ld	sl	alb sil

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD1

PROJECT: TULLAH : EL 22/90 MACKINTOSH DAM

Vertical Scale 1 : 150

From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	STRUCTURES	LITH	STR	ALT
			DISSEMINATED, very minor pyrite disseminated, trace galena in veins.					
				110	FIRST CLEAVAGE, A 55, Strong. V strongly deformed zone 105-113m with augen texture & broken feldspars. Elsewhere in unit cleavage mod-strong.		sl	
			DISSEMINATED, minor pyrite minor pyrrhotite Sulphides increasing to 1% towards base, with trace sp..	120				
					FIRST CLEAVAGE, A 57.		sl	
124.00	146.70	SANDSTONE Grey, Green, Medium grained, Massive, Feldspar phyric, Quartz phyric, Slightly Chloritised, Slightly Sericitised, Med gr qz-feld xyl sst, grading at approx 134m to fine qtzo-feldspathic sst & fining downhole. Unbedded &	DISSEMINATED, 1% pyrite Some py stringers. Trace sp-cp-gn in qz veins..			S sst		chl ser

80008

From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	STRUCTURES	LITH	STR	ALT
		qz-feld xyl sst, grading at approx 134m to fine qtzo-feldspathic sst & fining downhole. Unbedded & even-grained. Unaltered below 143m. Numerous irreg cb veinlets. CONTACT: Unassigned, Marked by sheared irreg 150mm mafic dyke in brecciated zone.	DISSEMINATED, 1% pyrrhotite Lesser py. Some po in qz veins..	130	FIRST CLEAVAGE, A 60, Weak. Cleavage becoming weaker with depth.		sl	
				140	BEDDING, A 52, (// the weak cleav).		ss	
146.70	159.70	SILTSTONE GRADING TO BLACK SHALE	DISSEMINATED, 1% pyrite			S slt		ser

HOLE No. **MD1**

PROJECT: TULLAH : EL 22/90 MACKINTOSH DAM

Vertical Scale 1 : 150

From	To	DESCRIPTION: LITHOLOGY & ALTERATION	MINERALISATION	GRAPHIC: Depth	STRUCTURES	LITH	STR	ALT
146.70	159.70	SILTSTONE GRADING TO BLACK SHALE Grey, Black, Fine grained, Bedded, Vitric, Quartz phyric, Slightly Sericitised, Slightly Chloritised, Shale sl carbonaceous. Minor local sil alt. Abund irreg cb-qz-ser-chl veinlets. Weakly cleaved co-chl alt intermediate dyke(?) @ 149.4-150.2m, oriented // bedding, with 2-3% po. CONTACT: Conformable abrupt, at 70 degrees to LCA. Disrupted by qz veining.	DISSEMINATED, 1% pyrite disseminated, 1% pyrrhotite disseminated, minor sphalerite as stringers. Sulphs also commonly in stringers & in cb veinlets..	150	BEDDING, D 81. 60/LCA. Weak bedding-// cleav throughout unit. BEDDING, A 67.	S slt > bsh	ss ss	ser chl
159.70	164.40	SANDSTONE CONTAINING INCLUSIONS OF BASIC INTRUSIVE Grey, Green, Fine grained, Massive, Feldspar phyric, Quartz phyric, Vitric, Moderately Chloritised, Slightly Sericitised, Sst is finely pumiceous in places, & fines gradually downhole. In upper 1.5m sst contains thin irreg bands & dismembered clots of mafic dyke(?) material. CONTACT: Conformable abrupt, at 57 degrees to LCA.	DISSEMINATED, minor pyrite Minor sp-gn-cp-py in qz-cb veins in uppermost 2m..	160	BEDDING, A 65. Weak // cleavage.	S sst u Ib	ss	chl ser
164.40	166.00	BASIC INTRUSIVE Green, Medium grained, Amygdales, Highly Carbonatised, Moderately Fuchsitic, Slighty chloritised. Common cb veinlets. CONTACT: Conformable abrupt, at 60 degrees to LCA. Sl irreg.	DISSEMINATED, trace pyrite			I Ib		co fuc
166.00	168.95	SILTSTONE MIXED WITH BLACK SHALE Grey, Black, Fine grained, Vitric, Slightly Sericitised, Sl carbonaceous. Strongly cleaved & deformed. Abund cb veinlets. CONTACT: Faulted, at 70 degrees to LCA. Annealed fault zone //	DISSEMINATED, 1% pyrite Some py also in stringers..		FAULT, A 79. // bedding/cleav. Sheared mafic dyke in fault. BEDDING, A 65. // cleav.	S slt x bsh	flt ss	ser

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD1

PROJECT: TULLAH : EL 22/90 MACKINTOSH DAM

Vertical Scale 1 : 150

From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	STRUCTURES	LITH	STR	ALT
		veinlets. CONTACT: Faulted, at 70 degrees to LCA. Annealed fault zone // cleav.			BEDDING, A 65. // cleav.		ss	
168.95	178.60	INTERMEDIATE INTRUSIVE INTERBEDDED WITH SILTSTONE INTERBEDDED WITH SHALE INTERBEDDED WITH SANDSTONE Green, Grey, Medium grained, Fine grained, Massive, Bedded, Amygdales, Vitric, Moderately Carbonatised, Complex of conformably-intercalated intermediate-mafic dykes and/or flows (60%), and sediments (40%). Some sst of similar composition to dykes/flows. Abund irreg cb veins & patches. CONTACT: Conformable abrupt, at 67 degrees to LCA.	DISSEMINATED, minor pyrite minor pyrrhotite trace arsenopyrite Sulphides also in cb veinlets..	170	BEDDING, A 50. Seds generally massive & poorly bedded, with mod bedding-// cleav.	I Ii b slt b sh b sst	ss	co
178.60	184.30	SANDSTONE Grey, Medium grained, Massive, Moderately Carbonatised, Even-grained. Cb veinlets throughout.	DISSEMINATED, minor pyrite Locally 1-2%. Some py in stringers..	180	BEDDING, A 70. Weak bedding-// cleav.	S sst	ss	co

863085

DIAMOND DRILL LOG

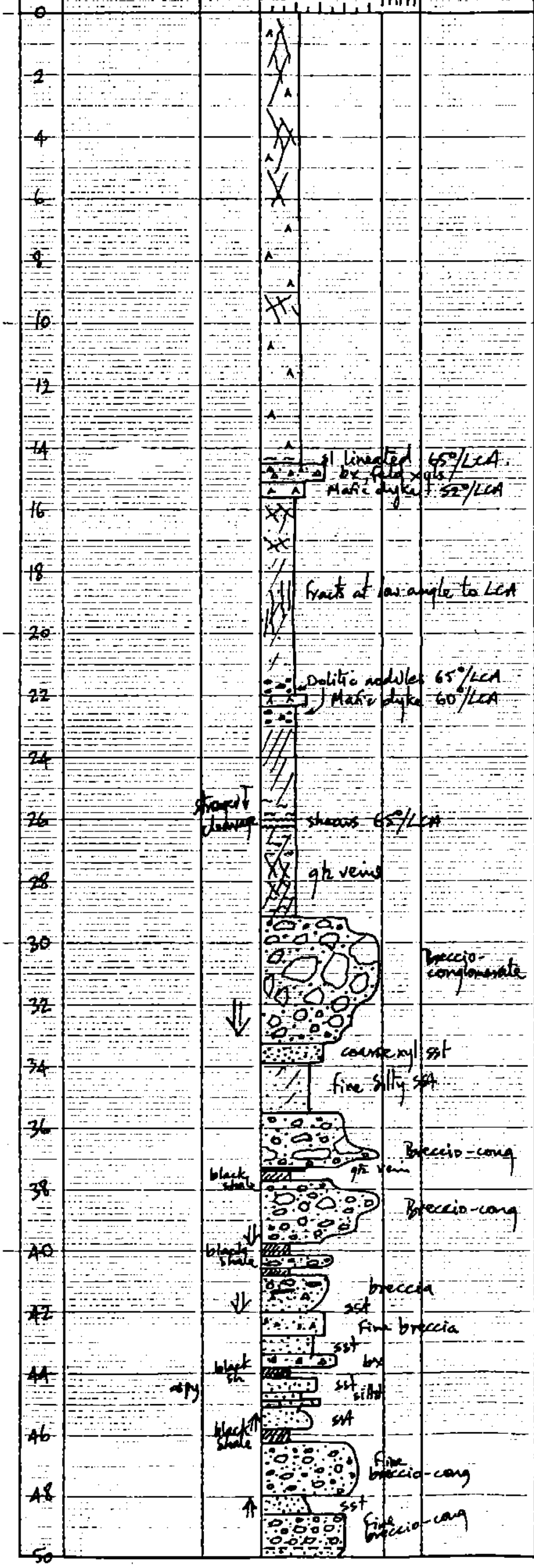
project: TULLAH EL 22/90
Location: MACKINTOSH DAM
coords

hole no. MD 1
page 12 of 19

RL	AZ	INCL	Scale

Logged by J.G. PURVIS
date November 1993

m | structure | log | grainsize (mud, 0.06, 0.5, 2, 8, 32, max mm) | Samples TS results | description



MAFIC
VOLCANIC

UNIDENTIFIED
VITRIC
VOLCANIC

SEDIMENTARY
BRECCIO-CONGLOMERATE,
LESSER VOLCANICLASTIC
SANDSTONE,
SILTSTONE
+
SHALE

863086

DIAMOND DRILL LOG

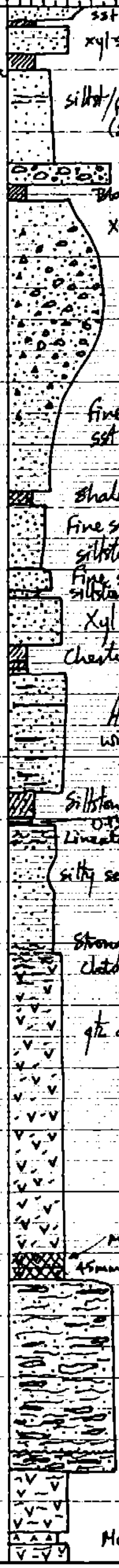
project: TULLAH EL 22/90
location: MACKINTOSH DAM
coords

hole no. MD 1
page 13 of 19

RL	AZ	INCL	Scale

Logged by J.G. PURVIS
date November 1993

m	structure	log	grainsize (mud, 0.06, 0.5, 2, 8, 32, max mm)	Samples TS results	description
50		bl sh	sst		↓
			xyl sst		
52		Black shale			
			siltst/fine sst (some shale)		
54					INTERBEDDED
			Fine breccia		SANDSTONE,
56			Black Shale		FINE BRECCIA,
			Xyl sst with minor clasts		SILTSTONE
58					&
60			Fine Breccia with xyl sst matrix		SHALE
62					
64			fine sst		
66			Shale/Siltstone		
			Fine sst/siltstone		
68			Fine sst/siltstone		
70			Xyl sst (sp, py)		
			Cherty Shale with py bands & some sp.		
72			Altered xyl sst (bleached, ser, carb) with lumps of grey shale & dissem py		
74					
76		Mafic Dyke (fuc-carb) →	Siltstone/Shale		
			0.35m MASSIVE SULPHIDE (py-gn)		
			Lineated & veined (qz-carb-gn)		
78			silty section. Fine Volcaniclastic sst		SANDSTONE
80			Strongly lineated clasts of baked shale		
82			qtz amygdales		
84			Rhyodacite Lava		
86					RHYODACITE
88					
90			microfractures		
			45mm Mafic Dyke 75°/LCA		
92			Volcaniclastic with strong shearing/cleavage & wispy texture.		VOLCANICLASTIC
94					
96			Fault 75°/LCA		
98					DACITE LAVA
			Mafic dyke (fuc)		
100					



863087

DIAMOND DRILL LOG

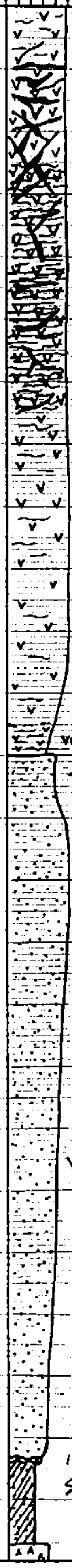
project: TULLAH EL 22/90
location: MACKINTOSH DAM
coords

hole no. MD1

RL | AZ | INCL | Scale

Logged by J. G. PURVIS
date NOVEMBER 1993

m	structure	log	grainsize (0.06 mud, 0.5, 2, 8, 32, max mm)	Samples TS results	description
100			Mod cleaved		
102					
104			qz-alb-gn veins		
106					DACITE
108				Highly deformed zone with augen texture	LAVA
110			qz-alb veins		
112					
114					
116			Mod cleaved		
118					
120					
122					
124			vitric; qtz grain rich		
126					
128			Feld-qtz xyl sst		
130					
132					SANDSTONE
134			fine qtzo-feldspathic sandstone		
136					
138					
140					
142					
144					
146			v fine sst; 150mm mafic dyke		
148			Siltstone/Shale		
150			Intermediate Dyke (chl-cb alt ≈ 2-3% py)		

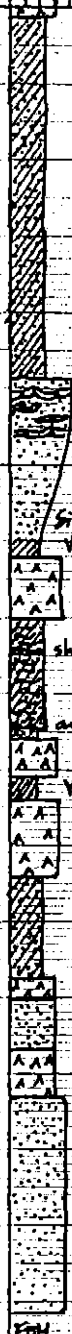


DIAMOND DRILL LOG

project: TULLAH EL 22/90
Location: MACKINTOSH DAM
coords
hole no. MD1
page 15 of 19

RL | AZ | INCL | Scale
Logged by J.G. PURVIS
date NOVEMBER 1993

m	structure	log	grainsize (0.06 Mud, 0.5, 2, 8, 32, max mm)	Samples TS results	description
150					
152					
154			Dark grey to black Siltstone/Shale		SILTSTONE / SHALE
156					
158					
160			Mafic dyke material; sst		SANDSTONE WITH INCLUSIONS OF MAFIC DYKE MATERIAL
162					
164			Siltstone; Vitric shale		
			Mafic dyke (fuc)		MAFIC DYKE
166	Deformed + cleaved		sheared mafic dyke in fault		DEFORMED + CLEAVED ZONE IN SILTSTONE/SHALE
168			Siltstone/Shale (sl carbonaceous)		
			annealed fault 70°/LCA		
170			Mafic Dyke; Vitric siltstone/shale		MAFIC DYKES IN SEDIMENTS
172			Mafic Dyke		
174			Vitric Siltstone/Shale		
176			Mafic Dyke; Sst (or dyke?)		
178			Mafic Dyke		
180			Fine Sst		SANDSTONE
182					
184			EOH 184.3m		



PASMINCO EXPLORATION
DIAMOND DRILL CORE ASSAY DATA

HOLE No. MD1

PROJECT: MACKINTOSH DAM, TULLAH EL 22/90

SAMPLE Number	Type	From m	To m	Interval m	Bi (ppm)	LOI / SO3 (%)	Cu	Pb	Zn	Ag / Au	As / Ba	Sn / W	Rb / Sr	V / Nb	Y / Zr	Al_2O_3 / SiO_2 (%)	TiO_2 / Fe_2O_3	MnO / Na_2O	CaO / K_2O	MgO / P_2O_5	COMMENTS
036024	HQ core	6.9	7.1	0.2		5.18 / 0.14	92	72	110	<1 / 0.017	10.5 / 1308		108 / 179	305 / <3	27 / 93	16.14 / 51.0	1.50 / 11.87	0.14 / 2.67	2.77 / 3.01	5.09 / 0.439	Massive basalt dyke.
025	" "	24.6	24.75	0.15		2.10 / 0.16	7	22	71	<1 / 0.010	7.5 / 599		166 / 81	5 / 16	49 / 159	13.21 / 75.4	0.18 / 1.36	0.02 / 2.57	0.92 / 3.46	0.46 / 0.018	Foliated tuffaceous siltstone.
026	SPLIT HQ	39.75	40.55	0.8	<10		70	1941	113	2 / 0.017	90 / 574	7 / <5									Lithic breccia + black shale, 2-3% py.
027	SPLIT NQ	70.0	71.65	1.65	<10		120	961	6200	2 / 0.010	100 / 839	63 / 14									Sericitic pumiceous sst, 3-5% py, 1-2% sp-gn
028	" "	71.65	74.0	2.35	<10		11	74	128	1 / 0.018	70 / 692	6 / <5									" " ", 1% py, trace sp.
029	" "	74.0	76.08	2.08	<10		11	38	79	1 / <0.008	27 / 633	8 / <5									" " " " " "
036030	" "	76.08	76.20	0.12	26		3296	8.75%	745	123 / 0.504	2150 / 301	6 / <5									Semi-massive py-gn > cp > aspy.
031	" "	76.2	77.5	1.3	<10		43	1136	66	4 / 0.017	150 / 734	16 / 8									Volcaniclastic sst c̄ 2-3% py, 1% gn.
032	NQ core	88.3	88.45	0.15		4.29 / 0.10	6	<3	31	<1 /	/ 995		147 / 160	59 / 9	29 / 224	13.66 / 66.7	0.47 / 3.68	0.09 / 2.58	2.75 / 4.16	1.16 / 0.118	Rhyodacitic lava - sil-ser altered.
034	" "	102.4	102.7	10.3		2.38 / 0.06	8	101	47	<1 /	/ 658		132 / 197	10 / 14	39 / 292	14.46 / 72.7	0.34 / 2.01	0.04 / 3.34	1.00 / 3.10	0.58 / 0.040	Strongly sil-alb altered pumice breccia.
035	SPLIT NQ	103.1	104.1	1.0	<10		75	1.34%	60	20 / 0.016	/ 422	<3 / 6									Strongly qtz-alb altered dacite lava. qtz-sp-gn veins.
036	NQ core	164.8	165.0	0.2		12.52 / 0.11	165	37	99	<1 /	70 / 771		119 / 238	205 / 6	19 / 115	14.12 / 46.3	0.61 / 7.76	0.22 / 2.39	7.30 / 2.88	5.29 / 0.224	Carbonate-fuchsite altered mafic dyke
037	" "	172.4	172.6	0.2		8.75 / 0.11	6	<3	70	<1 /	/ 407		114 / 191	168 / 10	26 / 267	14.01 / 51.9	1.15 / 9.91	0.25 / 1.50	6.70 / 2.52	3.32 / 0.230	Rhyolitic dyke?
					AAS	XRF															
					10	0.01 / 0.01															
Laboratory ANALABS, COOEE + PERTH				Analytical Method			AAS	AAS	AAS	AAS / FA309	HA140 / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF	XRF	XRF	XRF	XRF	
Job-No. 11310-60.09916	Date 18.1.94			Detection-Limit			2	3	2	1 / 0.008	0.5 / 10	3 / 5	5 / 5	5 / 3	5 / 5	0.05 / 0.1	0.01 / 0.01	0.01 / 0.05	0.01 / 0.01	0.01 / 0.005	

PASEX: 0246

PASMINCO EXPLORATION
DIAMOND DRILL HOLE SUPPLEMENTARY DATA
PETROLOGY

PROJECT: Mackintosh Dam Tullah EL22/90

MD1, 102.5m.

SAMPLE NUMBER: 036034
SUMMARY:

This rock is essentially a less foliated version of 036033. It clearly consists of fragments of rhyolitic devitrified and altered tube pumice in a generally finer-grained vitric tuff matrix in which shard shapes are still evident. Small, often broken albitized plagioclase phenocrysts, sometimes in clots of three of four crystals, make up around 5-7 modal% of this rock, and are dusted by very fine-grained hematite. Quartz phenocrysts (unlike 036033) are not present. The matrix is a strongly altered fine-grained and inhomogeneous quartzo-feldspathic intergrowth, with all former feldspar altered to sericite that defines a weak to moderate foliation. Two types of anastomosing veinlets are present, quartz veins, and chlorite-calcite veins.

SAMPLE NUMBER: 036036 MD1, 164.9m.
SUMMARY:

This is clearly a strongly altered dyke rock, composed of < 5 modal% of totally altered plagioclase and augite(?) phenocrysts in a groundmass of interlocking plagioclase laths and more granular small augite crystals, both of which are thoroughly altered. Plagioclase phenocrysts and groundmass plagioclase laths are replaced by rather coarse-grained sericite and calcite, and augite by a very fine-grained chlorite-quartz intergrowth. The groundmass is heavily overprinted by calcite, and leucoxene-altered former FeTi oxides are quite common. A weak fracture cleavage is present, with chlorite-calcite-sericite along the discontinuous foliation planes. This is probably a very altered Henty Dyke Swarm basaltic dyke. If so, it should have a TiO_2 content >~0.75% and Ti/Zr from 70-110.

SAMPLE NUMBER:036037 MD1, 172.5m.
SUMMARY:

This is a rather difficult rock to diagnose. It is a strongly foliated rock composed of angular strained quartz from 0.05 to 0.5 mm across set in a foliated sericite-chlorite matrix. The rock has a decidedly detrital look about it, but I feel that most of the quartz is secondary recrystallized quartz that has grown in situ in the rock, which was probably a rhyolitic pumice or lava of some type. Relatively large opaque oxides(?) are quite common, and in places have been stretched out into the foliation. The matrix is intensely sericite-chlorite-calcite-altered, foliated fine-grained quartzo-feldspathic material probably after vitric ash.

MD1, 24.7m.

SAMPLE NUMBER: 036025

SUMMARY:

This sample is a quite strongly altered foliated siltstone that probably originally had a large proportion of very fine-grained vitric ash (ie. tuffaceous siltstone). The vitric ash has now altered to an irresolvably fine-grained quartzo-feldspathic material that is pervaded by a closely-spaced meshwork of pale sericite that defined the foliation. No trace of shard textures is preserved. Some slightly coarser quartz grains, still less than 0.05mm across, may have been detrital. However, most easily-visible quartz occurs within several sets of discontinuous and branching fairly fine-grained quartz-calcite veins that cut the foliation. At least one set of these appears to offset slightly along the foliation in places and cuts it in others, implying a syntectonic origin for this set of very narrow veinlets. The quartz-sericite-calcite alteration is quite strong, and the foliation indicates recrystallization in a high-strain (fault) zone.

SAMPLE NUMBER: 036033 MD1, 93m.

SUMMARY:

This rock is a very strongly foliated and altered former quartz+plagioclase-phyric felsic lava or pumice. The pervasive sericite alteration and strong foliation development of the groundmass of this rock almost preclude any confident judgement as to whether the sample was a coherent lava or a more vesicular and fragmental pumiceous rock. However, one clear tube pumice fragment about 2mm across is still obvious, and the 'grain' of the altered groundmass suggests to me that it was not composed originally of a uniform lithology. About 3 modal% of the rock is made up of small former albitized plagioclase phenocrysts that are mainly stretched out into the foliation and totally altered to calcite and sericite, and around 1% is former quartz phenocrysts that are rather reacted and resorbed. This was probably a rhyolitic pumice or pumice breccia that has suffered intense sericite-calcite alteration during recrystallization in a fault zone. Minor disseminated pyrite is also present.

CORE PROCESSING RESULTS DRILL HOLE NUMBER MD 1

CORE RECOVERY				mag sus S.I units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M.SUS	DEPTH	WEIGHT	VOL	S.G	FROM	TO	TICKET #	COMMENTS
0	3	1.3	43.33	3	0.41				0.00				
3	3.3	0.3	100.00	3.3	0.48				0.00				
3.3	4.3	1	100.00	4.3	0.38				0.00				
4.3	5	0.7	100.00	5	0.48				0.00				
5	6.4	1	71.43	6.4	0.42				0.00				
6.4	7.3	1	111.11	7.3	0.44				0.00				
7.3	10.3	3	100.00	10.3	0.51				0.00				
10.3	13.3	3	100.00	13.3	0.43	10.5	0	368	0.00				
13.3	16.3	3	100.00	16.3	0.1				0.00				
16.3	18.2	1.9	100.00	18.2	0.09				0.00				
18.2	19.3	1	90.91	19.3	0.07				0.00				
19.3	19.8	0.55	110.00	19.8	0.09				0.00				
19.8	22.2	2.05	85.42	22.2	0.28				0.00				
22.2	25.3	3.1	100.00	25.3	0.09				0.00				
25.3	26.7	1.35	96.43	26.7	0.47				0.00				
26.7	28.3	1.3	81.25	28.3	0.21				0.00				
28.3	31.3	2.9	96.67	31.3	0.15				0.00				
31.3	34.3	3.1	103.33	34.3	0.1				0.00				
34.3	37.3	3	100.00	37.3	0.14				0.00				
37.3	40.3	3	100.00	40.3	0.16				0.00	40	40.5	36026	
40.3	43.3	3	100.00	43.3	0.07				0.00				
43.3	46.3	2.7	90.00	46.3	0.15				0.00				
46.3	48	1.3	76.47	48	0.14				0.00				
48	49.3	1.3	100.00	49.3	0.08	48.6	554	203	2.73				
49.3	52.3	3	100.00	52.3	0.09				0.00				
52.3	55.3	3	100.00	55.3	0.08				0.00				
55.3	58.3	3	100.00	58.3	0.1				0.00				
58.3	61.3	3	100.00	61.3	0.09				0.00				
61.3	64.3	3	100.00	64.3	0.1				0.00				
64.3	67.3	3	100.00	67.3	0.16				0.00				
67.3	70.3	3	100.00	70.3	0.15	68.5	417	159	2.62	70	71.6	36027	
70.3	73.3	3	100.00	73.3	0.09				0.00	71.6	74	36028	
73.3	76.3	2.85	95.00	76.3	0.16				0.00	74	76	36029	
76.3	79.3	3.05	101.67	79.3	0.1				0.00	76	76.15	36030	
79.3	82.3	3	100.00	82.3	0.17				0.00	76.15	77.5	36031	
82.3	85.3	2.9	96.67	85.3	0.15				0.00				

CORE PROCESSING RESULTS DRILL HOLE NUMBER MD 1

CORE RECOVERY				mag sus S.I units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M.SUS	DEPTH	WEIGHT	VOL	S.G	FROM	TO	TICKET #	COMMENTS
85.3	88.3	2.95	98.33	88.3	0.11				0.00				
88.3	89	0.85	121.43	89	0.1				0.00				
89	91.3	2.15	93.48	91.3	0.14				0.00				
91.3	94.3	2.9	96.67	94.3	0.13				0.00				
94.3	97.3	2.85	95.00	97.3	0.21				0.00				
97.3	100.3	3	100.00	100.3	0.1				0.00				
100.3	103.3	3	100.00	103.3	0.07				0.00	103.1	104.1	36035	
103.3	106.3	3	100.00	106.3	0.05				0.00				
106.3	109.3	3	100.00	109.3	0.08				0.00				
109.3	112.3	3	100.00	112.3	0.03	112.1	764	298	2.56				
112.3	115.3	3	100.00	115.3	0.04				0.00				
115.3	118.3	3	100.00	118.3	0.03				0.00				
118.3	121.3	3	100.00	121.3	0.05				0.00				
121.3	124.3	2.85	95.00	124.3	0.13				0.00				
124.3	127.3	3.1	103.33	127.3	0.11				0.00				
127.3	130.3	3	100.00	130.3	0.13				0.00				
130.3	133.3	2.95	98.33	133.3	0.12				0.00				
133.3	136.3	3	100.00	136.3	0.07				0.00				
136.3	139.3	3	100.00	139.3	0.09				0.00				
139.3	142.3	3	100.00	142.3	0.07				0.00				
142.3	145.3	3	100.00	145.3	0.05	143.6	665	247	2.69				
145.3	148.3	3	100.00	148.3	0.08				0.00				
148.3	151.3	3	100.00	151.3	0.22				0.00				
151.3	154.3	3	100.00	154.3	0.09				0.00				
154.3	157.3	3	100.00	157.3	0.07				0.00				
157.3	160.3	3	100.00	160.3	0.22				0.00				
160.3	163.3	2.95	98.33	163.3	0.1				0.00				
163.3	166.3	3.05	101.67	166.3	0.08				0.00				
166.3	169.3	3	100.00	169.3	0.25				0.00				
169.3	172.3	3	100.00	172.3	0.3				0.00				
172.3	175.3	3	100.00	175.3	0.03				0.00				
175.3	178.3	3	100.00	178.3	0.31				0.00				
178.3	181.3	3	100.00	181.3	0.08				0.00				
181.3	184.3	3	100.00	184.3	0.07				0.00				

APPENDIX 2

Log of Hole MD2, Mackintosh Dam

HOLE No. MD 2

PASMINCO EXPLORATION
DIAMOND DRILL CORE RECORD

LOCATION	TASMANIA
PROJECT	TULLAH EL 22/90
PROSPECT	MACKINTOSH DAM
DESIGNED BY	J.G. PURVIS
LOGGED BY	J.G. PURVIS
RELOGGED	
COMMENCED	15·11·93
COMPLETED	23·11·93
DRILLED BY	W. HOW
DRILL RIG	LONGYEAR 38

OBJECTIVE

TO TEST BILLITON IP ANOMALY CENTERED AT 2280N/10375E, AND MASSIVE SULPHIDE POSITION ALONG-STRIKE OF OCCURRENCE IN TULLABARDINE CREEK.

RESULT

NO OBVIOUS SOURCE FOR IP ANOMALY DETECTED.
NO SIGNIFICANT MINERALIZATION ENCOUNTERED.

LOCATION/SURVEY DATA (AMG)

Grid	AMG		RL Collar m	205·5
Northing m	5382566·2		Bearing Collar	088°54'
Easting m	386937·1		Dip Collar	-45°
DH Survey Type	SINGLE SHOT EASTMAN CAMERA		Length Hole m	193·3

Depth m	Bearing	Dip	Depth m	Bearing	Dip
COLLAR	088·9°	-45°			
31	091°	-44°			
61	092°	-43·5°			
91	093°	-41·25°			
121	094°	-41°			
151	094°	-40°			
181	093·5°	-38°			

SIGNIFICANT INTERSECTIONS

From m	To m	Interval m						Comments

SIGNIFICANT CORE LOSS

From m	To m	% Lost
0	3·8	82

POOR GROUND CONDITION ZONES

From m	To m	Condition
73	81	MODERATELY BROKEN
97	101	BADLY BROKEN BY MAJOR FAULT. ASSOCIATED SHEARING, FRACTURING AND BRECCIATION EXTENDS 91·9 — 103m.
147·1	149	BROKEN BY SHEARS // CLEAVAGE

HOLE SIZE

Size	Depth m
HQ	3m
NQ	193·3m

HOLE CONDITIONS AFTER COMPLETION

Collar	HQ ROD CEMENTED IN, WITH STEEL CAP.
Steel Casing	HQ TO 3m.
PVC Casing	40mm UNSLOTTED PVC CASING PLACED TO BASE.
Ground Water	
Wedge	
Drill Pad	

800000

PASMINCO EXPLORATION
SUMMARY DIAMOND DRILL CORE LOG

HOLE No. MD 2

PROJECT: TULLAH EL 22/90

Graphic Scale 1:

From m	Interval m	Code	Description	Depth	Graphic	From m	Interval m	Code	Description	Depth	Graphic

MD2 - SUMMARY LOG

Collar: 5382566mN / 386937mE, 205.5mRL. Dip -45°. Azimuth 088.9° AMG.

0 - 52.8m: AMYGDALOIDAL FELSIC LAVA. Abundantly microfractured.

52.8 - 64.3m: MAFIC DYKES IN VITRIC SILTSTONE. Minor py.

64.3 - 91.9m: VITRIC SILTSTONE & SHALE. Locally 3-5% py above 71.4m, otherwise minor sulphides.

91.9 - 114.0m: BRECCIA. Mixture of sed breccia and fault breccia (probable Henty Fault zone). Minor py.

114.0 - 135.5m: FINE BRECCIA, SANDSTONE & SILTSTONE. 1-2% py 126- 131m, otherwise minor sulphides.

135.5 - 156.0m: RHYODACITE LAVA & LAVA BRECCIA. Minor py.

156.0 - 171.3m: CRYSTAL SANDSTONE. 1-2% py below 165m, otherwise minor py.

171.3 - 180.7m: STRONGLY DEFORMED & ALTERED FELSIC VOLCANIC. No sulphides.

180.7 - 193.3m: SANDSTONE, SILTSTONE & BLACK SHALE. 1-2% py, 5% above 183.2m.

END OF HOLE

800008

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD 2

PROJECT: TULLAH EL 22/90

Graphic Scale 1: 200

CORE RECOVERY				DESCRIPTION		
From m	Interval m	%	RQD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)

0 – 52.75m: AMYGDALOIDAL FELSIC LAVA

Lithology: Grey-green & pink. Med gr. Massive. V hard.
Comprises autobrecciated feldspar-phyric lava & clastic lava breccia interflow zones (latter @ 0–3.5m, & 6.9–8.9m).
Amygdales of calcite or qtz, typically 2mm.

Alteration: Weak oxidation to 20m.
Strong sil-alb alt, weak chlor>ser (locally mod).
Strong to intense sil-alb-chlor±mag alt 34–49m.

Veining: Abund veins & tiny veinlets of calcite. Some chlor veinlets.
Scattered qtz-carb±chlor±alb veins to 100mm.

Structure: Minor breaking along fracts at low angle to LCA.
Abund microfractures (calcite or chlor filled).
Mod cleaved in & around breccia zones & at depth.
Cleav: 50° LCA @ 8m, 22.5m (dips 89° to 109° MG), & 32m (dips 89° to 098° MG); 55 °LCA @ 43.2m.
Basal contact abrupt & sl irreg, with strong foliation 72 ° LCA. Lava is microfractured adjacent to contact.

Mineralization: Minor dissem py. Minor dissem mag 34–49m.

52.75 – 64.25m: MAFIC DYKES IN VITRIC SILTSTONE

Lithology: Green-grey.
Siltst: fi gr, massive, hard, siliceous, composed of fine volc glass.
Mafics: basalt & dolerite, green, fi–med gr, massive, uniform.
Mafics: 53.9–57.9m (dolerite, uncleaved, with fi gr selvages), 58.05–58.7m (contacts 45° & 60° LCA //cleav), 61.95–64.25m (contacts 38° & 80° LCA).

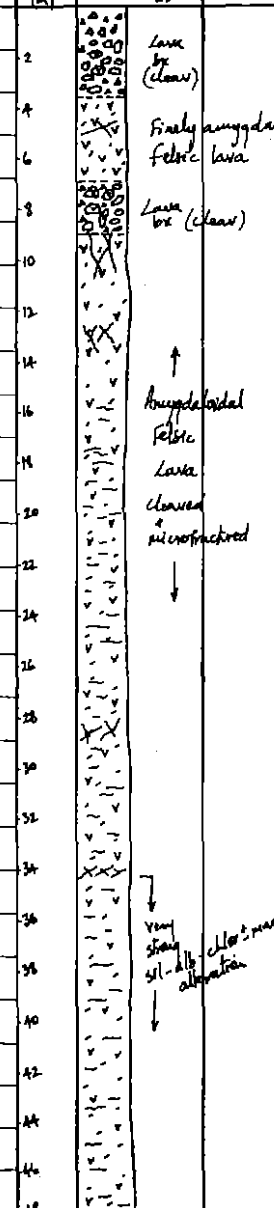
Alteration: Siltst: strong sil-alb or sil-chlor-ser alt.
Mafics: mod chlor, weak carb-epidote alt.

Veining: 56.6–57.2m: 10–20mm fibrous actinolite/tremolite vein //LCA.

Structure: Mafic/siltst contacts gen sharp but irreg & commonly marked by contorted bedding in adjacent siltst. Some contacts faulted.
Siltst partly fract & broken, mafics unbroken.
All rocks weakly cleav (70° LCA @ 53m), except uncleaved dolerite @ 53.9–57.9m.
Bedding: 61° LCA @ 59.5m (dips 80° to 282° MG).

Mineralization: Minor dissem py in both siltst & mafics, except:

Depth (m)	Graphic Lithology	Struct.	MINERALISATION	LITHO	STRUCT	ALTN	MIN



PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

PROJECT: TULLAH EL 22/90

Graphic Scale 1: 200

CORE RECOVERY: From m | Interval m | % | RQD

DESCRIPTION: From m | Interval m | (Incl. LITHOLOGY, STRUCTURE & ALTERATION) | Depth | Graphic Lithology | Struct. | MINERALISATION

CODES: LITHO | STRUCT | ALTN | MIN

58.9–59.5m: 1% dissem & stringer py, minor stringer sp.

64.25 – 91.9m: VITRIC SILTSTONE & SHALE

Lithology: Buff & grey.

Rocks largely composed of fine volc glass.

Dark grey to black sl carbonaceous siltst/shale 68.8–71.4m.

Minor fine qtz–feld sst.

Thin beds of xyl–lithic breccia with strong stretching lineation & wispy texture, @ 70.45–70.6m & 71.4–71.55m (latter fines downhole).

Alteration: Mod carb alt (some small stretched nodules of carb in cleav). Restricted patches of strong sil±alb–bleaching.

Weak sericitisation, strongest in bleached zone 72–81m.

Sl chlor alt, esp in uppermost 3m.

Veining: Numerous carb veinlets. Minor qtz±carb veins that cut & post–date the carb veinlets.

Structure: Bedding: 70° LCA @ 65.7m & 71.3m; 72° LCA @ 79.7m.

Mod slatey cleav (rock fissile & mod broken 73–81m).

Cleav @ 91.2m: 70° LCA (dips 70° to 284° MG).

80.85–81.8m: strong zone of anastomosing cleav // bedding, 73° LCA.

Basal contact abrupt, 20° LCA (same sense as cleav).

Mineralization: 64.25–68.8m: 1% dissem & stringer py. Minor cp–po in carb veinlets.

68.8–70.6m: 1–2% dissem & veinlet py, trace cp.

70.6–71.4m: 3–5% dissem py in black shale & in carb veinlets.

71.4–91.9m: V minor dissem py. Minor sp–gn–cp in qtz–carb veins 84–86m.

91.9 – 114.0m: BRECCIA

Lithology: Pale grey–green with pink patches.

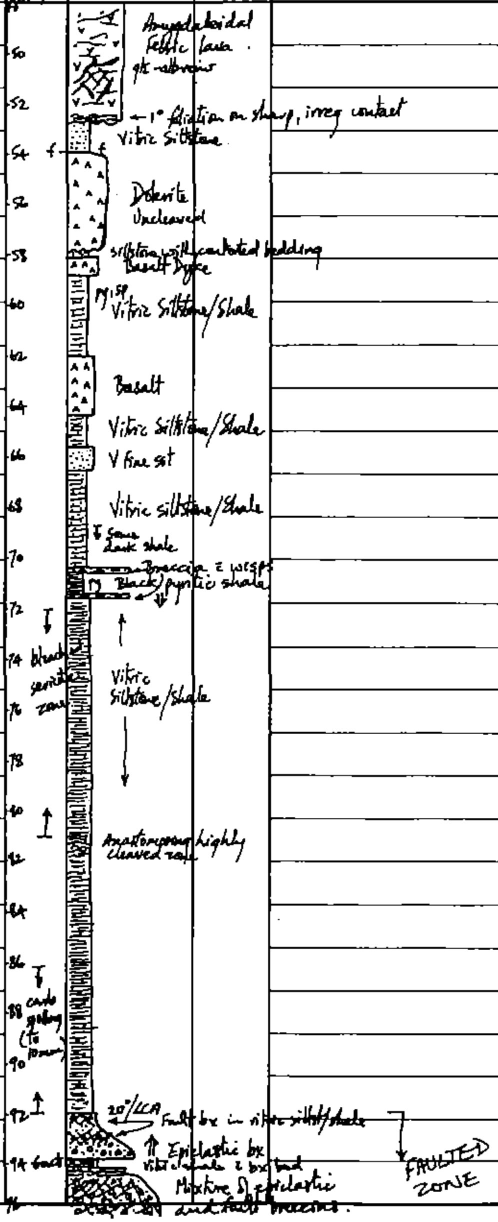
To 103m: mixture of sed bx & annealed fault bx, with intercalated highly fractured grey cherty vitric shale (largest 97.15–98.4m & 98.8–100.15m).

Below 103m: sed bx.

Sed bx frags angular to subangular, max 50mm, av 5–10mm, incl: sil–alb alt feld–phyric lavas, amygdaloidal lava, qtz–feld porph lava, black shale, & fi gr unidentified volc types.

All in granular matrix of fractured feld>qtz xyls, lithic grains, chlor & qtz.

Alteration: Strong chlor alt, weakening below 103m.



HOLE No. MD2

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

PROJECT: TULLAH EL 22/90

Graphic Scale 1:

CORE RECOVERY				DESCRIPTION						CODES			
From m	Interval m	%	RQD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth (m)	Graphic Lithology / Struct.	MINERALISATION	LITHO	STRUCT	ALTN	MN

Patchy sil-alb alt.

Mod carb alt as tiny veinlets & in bx matrix (esp in fault zone above 103m).

Veining: Irreg qtz±carb±chlor veins throughout (common in faulted zone, where some have been brecciated & broken up).

Structure: Uphole-fining in uppermost 2.5m of unit (siltst/shale passing down into fine bx), & in bx bed 98.4-98.8m.

Bedding: 72° LCA @ 99.1m;

Large brittle fault 97-101m (badly broken), with assoc shearing, fracturing & brecciation extending 91.9-103m. Most shears 45-75° LCA. Unit largely unbroken below 103m.

Mod cleaved, locally strong below 103m (eg: 107-108m, 60° LCA).

Basal contact gradational – bx fines down to sst.

Mineralization: V minor py. Trace gn in carb veinlets.

114.0 – 121.0m: CRYSTAL-LITHIC SANDSTONE

Lithology: Grey-green, med gr, massive, hard.

Packed feld & qtz xyl grains & xyl frags, to 2mm (av 1mm).

Subord lithic grains, occasionally as small clasts to +5mm.

Some variation in grainsize indicative of layering.

Alteration: Mod pervasive carb-sil alt, weak ser-chlor-alb.

Veining:

Structure: Sl broken & fractured.

Mod cleaved (60° LCA @ 117m).

Basal contact abrupt, 60° LCA (// cleav).

Mineralization: V minor dissem py. Trace sp-gn in stringers.

121.0 – 133.05m: FINE BRECCIA

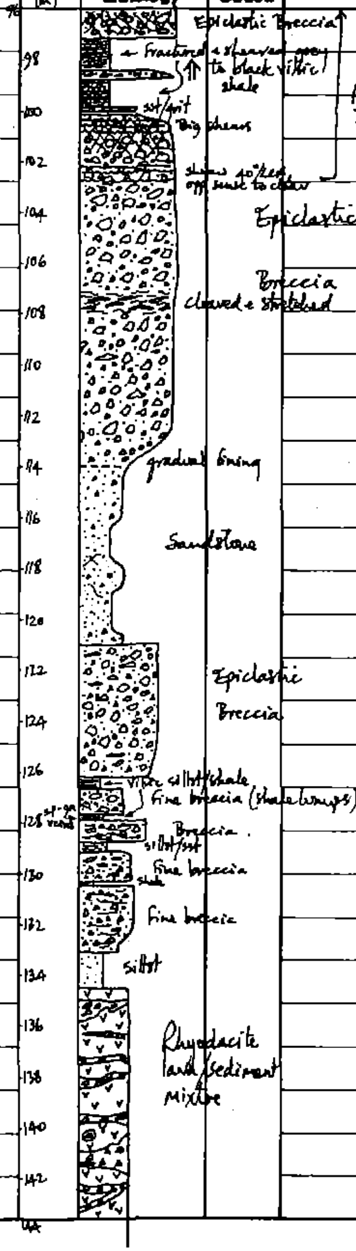
Lithology: Grey & pale grey-green.

To 126.15m: bx the same as unit above 114m.

Below vitric shale band @ 126.15-126.45m, bx is finer with cherty grey shaley matrix & several beds of grey vitric siltst (largest 128.7-129.15m).

Most bx frags below 126.5m comprise unlith vitric siltst, av <5mm, max 40mm. Ripped-up lumps of black shale @ 126.5-127.1m.

Alteration: Mod pervasive carb alt. Mod chlor-ser, decreasing with depth. Patchy weak sil-alb-bleaching (esp of some bx frags).



PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD 2

PROJECT: TULLAH EL 22/90

Graphic Scale 1: 200

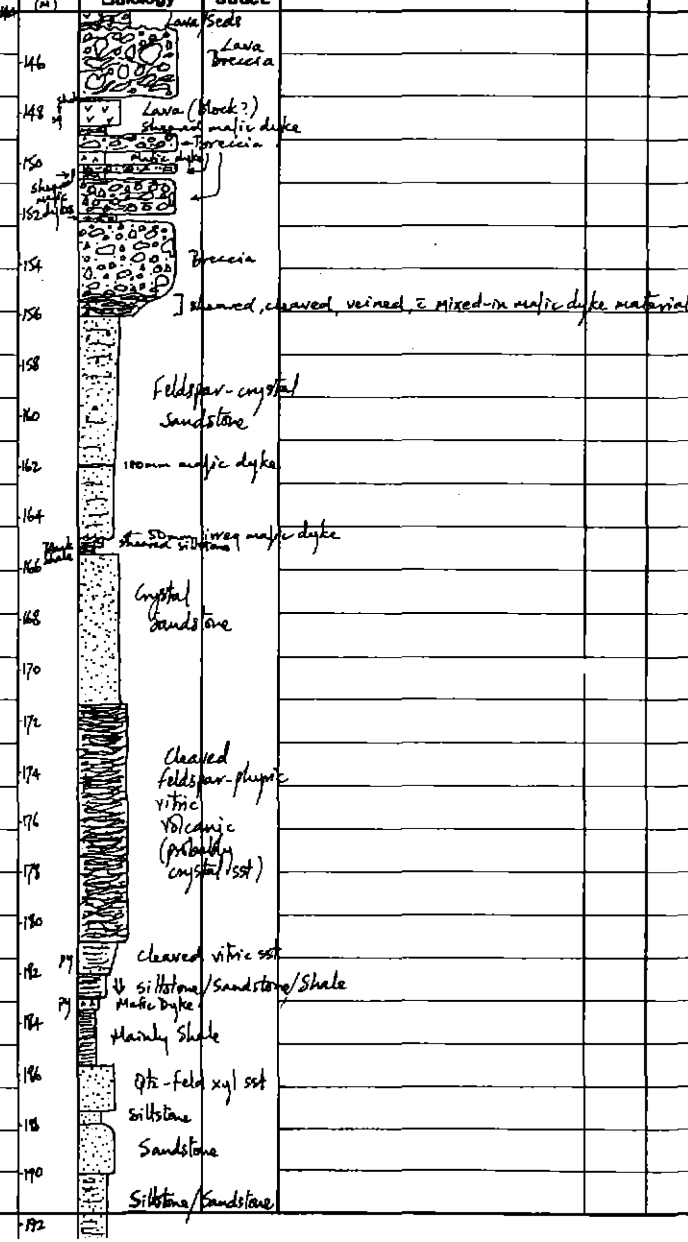
CORE RECOVERY				DESCRIPTION		
From m	Interval m	%	RQD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)

Veining:
Structure: Largely unbroken.
Mod–strongly cleaved with stretching of frags.
Cleav: 57° LCA @ 121.5m (dips 84° to 292° MG).
Bedding: 71° LCA @ 126.3m & 130.25m.
Basal contact abrupt, 75° LCA.
Mineralization: 121–126m: V minor py. Trace sp–gn in carb veinlets.
126–131m: 1–2% dissem py. Minor sp–gn–py±cp in carb veinlets (very common 127.7–127.9m).
131–133.05m: Minor py, trace gn.

133.05 – 135.5m: SILTSTONE
Lithology: Pale grey. Vitric & quartzose.
Alteration:
Veining: Abund carb veinlets.
Structure: Bedding 70° LCA @ 134.3m.
Basal contact abrupt, 65° LCA.
Mineralization: Minor dissem py. Trace sp in carb veinlets.

135.5 – 144.7m: RHYODACITE LAVA INTRUDING SEDIMENTS
Lithology: 60% lava, 40% seds.
Pale grey–green. Hard.
Lava & seds gen complexly intermingled. Some quench–fracturing of lava on contacts with seds & some peperitic bx in places.
Lava massive, med gr, vitric, with abund feld phenos and lesser fine qtz phenos. Rare qtz amygdales.
Seds incl grey siltst/shale, xyl sst, & pumiceous bx.
Alteration: Lava strongly silif. Weak ser–chlor alt.
Veining: Abund carb microveinlets. Scattered qtz–carb±chlor veins.
Structure: Lava highly microfractured with no obvious cleav.
Some cleav developed in sed zones.
Basal contact abrupt & irreg.
Mineralization: Minor dissem py.

Depth (m)	Graphic Lithology / Struct.	MINERALISATION	LITHO	STRUCT	ALTN	MIN



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PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD 2

PROJECT: TULLAH EL 22/90

Graphic Scale 1:

CORE RECOVERY				DESCRIPTION							CODES			
From m	Interval m	%	RQD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic Lithology	Struct.	MINERALISATION	LITHO	STRUCT	ALTN	MIN

144.7 – 156.0m: FELSIC LAVA BRECCIA

Lithology: Pink & pale green. Hard.

Monomict bx, made up of quench-fractured frags (to 100mm) of felsic lava (identical to unit above), in strongly-foliated vitric matrix containing feld & qtz xyls, pumice & minor grey silty to shaley material.

Evident most lava frags were hot when they contacted the sed material.

Some lava frags highly qtz-amygdaloidal.

147.4–148.35m: fractured lava (large block?).

Several mafic dykes to 600mm.

120mm band of grey vitric shale @ 147.35m, 75° LCA.

Alteration: Strong sil-alb alt (esp of lava frags). Mod ser & weak chlor-carb alt.

Mafic dykes strongly co-ser±fuchsite alt.

Veining: Abund carb microveinlets. Several qtz-carb veins.

Structure: Broken 147.1–149m by shears //cleav. Otherwise unbroken.

Bx matrix and mafic dykes (but not lava frags) affected by very strong cleavage/shearing fabric (both qtz & feld xyls stretched & deformed, and some mafic dykes dismembered).

Zones of microfracturing.

Cleav: 55° LCA @ 151.1m (dips 85° to 292° MG).

Basal contact difficult to distinguish - poss structure (strong shearing).

Mineralization: Minor dissem py. Trace sp-gn-aspy in qtz veins.

5% py & 1% sp-gn in 120mm grey shale band @ 147.35m.

156.0 – 164.8m: FELDSPAR-CRYSTAL SANDSTONE

Lithology: Pale pink. Granular.

Abund feld xyls, often fragmented or stretched into augen shapes.

Minor small qtz phenos. Rare small frags of felsic lava above 161m.

All in silty siliceous & sericitic matrix.

At 161.9m, 100mm carb-fuc alt mafic dyke 60° LCA (// cleav).

Alteration: Mod alb-ser(±sil) alt (strong at top, decreasing with depth).

Veining: Common qtz-dolomite veinlets at high angle to cleav, with some veinlets fractured & broken up.

Structure: Grainsize decreasing with depth.

Strongly cleaved (sl weaker at depth). Unbroken.

Cleav: 60° LCA @ 158m; 65° LCA @ 164m.

Basal contact abrupt - marked by irreg 50mm carb-fuc alt mafic dyke & strong shearing.

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD 2

PROJECT: TULLAH EL 22/90

Graphic Scale 1:

CORE RECOVERY				DESCRIPTION						MINERALISATION	CODES			
From m	Interval m	%	RQD	From m	Interval m	(incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic Lithology	Graphic Struct.		LITHO	STRUCT	ALTN	MIN

Mineralization: Minor py, gn, sp, aspy, mainly in qtz–dol veinlets.

164.8 – 171.3m: FELDSPAR–QUARTZ CRYSTAL SANDSTONE

Lithology: Grey. Med gr. Massive. Hard. V even–grained.
Densely–packed abraded feld & qtz xyl grains (av 1mm), in subord (washed) sericite–chlorite–silica matrix that incl small amount of carbonaceous shaley material. Rare small frags of black shale.
Sheared vitric siltstone 164.8–165.1m, & black shale 165.1–165.4m.

Alteration: Weak sil–ser–chlor alt (locally mod).

Veining: Qtz–carb (some dolomite) veins throughout.

Structure: Largely unbroken.
Bedding @ 165.3m, 70° LCA (dips 75° to 285° MG).
Mod cleaved // bedding. Cleav much weaker than in units above (& below).
Basal contact abrupt, 65° LCA (// cleav).

Mineralization: 164.8–165.4m: 2% dissem py. Trace gn–sp.
165.4–171.3m: 1% py. Minor sp–gn in qtz–carb veins. 35x8mm nodule of massive py @ 167.6m.
Minor leucoxene throughout.

171.3 – 180.7m: DEFORMED & ALTERED ZONE IN FELDSPAR–PHYRIC VITRIC VOLCANIC

Lithology: Pale pink & khaki. Med gr. Massive. Hard.
Unidentifiable, strongly sheared volc with deformed feldspars (commonly augen–shaped), in vitric matrix.
At base deformation decreases & evident here rock is vitric feld–xyl sst.
150mm carb–fuchsite alt mafic dyke @ 171.5m, 70° LCA (// cleav).

Alteration: Mod sil–alb–ser–bleaching alt. Weak chlor alt.

Veining: Qtz–carb–chlor veins.

Structure: Unbroken.
V strong cleavage/shearing fabric (70° LCA), decreasing markedly at base.
Basal contact abrupt, along cleav @ 68° LCA.

Mineralization: Minor py.

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD2

PROJECT: TULLAH EL 22/90

Graphic Scale 1:

CORE RECOVERY				DESCRIPTION							CODES			
From m	Interval m	%	RQD	From m	Interval m	(incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic Lithology	Graphic Struct.	MINERALISATION	LITHO	STRUCT	ALTN	MIN

180.7 – 193.3m: SANDSTONE, SILTSTONE & BLACK SHALE

Lithology: Dark grey to black.

Seds incl: fine volcaniclastic sst; vitric feld–qtz xyl sst; grey siltstone & grey to black carbonaceous shale.

To 183.2m sst is vitric (pumiceous?), with deformed feld>>qtz xyls & minor lithic frags.

Below 183.2m sst more washed & granular, with feld=qtz xyl grains, lithic grains, carbonaceous threads & little vitric component.

Alteration: Mod ser–bleaching above 183.5m, below this essentially unalt except for mod pervasive carb alt (esp sst).

Veining: Common carb veins. Veins of pink calcite @ 180.7m.

Structure: Regularly bedded. Mod cleaved above 183.5m, decreasing markedly with depth to v weakly cleav at base.

Bedding: 76° LCA @ 182m; 75° LCA @ 185m.

Downhole fining in sst/siltst band @ 182.5m.

Mineralization: 180.7–182m: 5% py, trace sp–gn, dissem // bedding– cleav, commonly as augen of massive sooty py to 30x5mm.

182–182.9m: 1% py.

182.9–183.2m: 10% dissem sooty py, trace sp–gn, in cleav sericitic siltst with 100–150mm bleached mafic dykes on either contact.

183.2–185.6m: 2% dissem & stringer py.

185.6–193.3m: 1% py.

END OF HOLE

PASMINCO EXPLORATION
DIAMOND DRILL CORE ASSAY DATA

HOLE No. MD 2

PROJECT: TULLAH EL 22/90

Number	Type	From m	To m	Interval m	Recovered m	Cu / Pb	Zn / Ag	Au / Bi	As / Sn	W / Ba	Rb / Sr	Y / Zr	V / Nb	(→ %) Al_2O_3 / SiO_2	TiO_2 / Fe_2O_3	MnO / CaO	MgO / SO_3	Na_2O / LOI	P_2O_5 / K_2O	COMMENTS
036038	NQ CORE	30.4	30.7	0.3	0.3	3 / <3	39 / <1		1.0 /	/ 1097	159 / 89	37 / 262	15 / 13	14.89 / 67.6	0.47 / 4.37	0.10 / 1.09	0.93 / 0.09	2.87 / 2.42	0.097 / 5.05	Amygdaloidal felsic lava.
036039	" "	55.5	55.75	0.25	0.25	7 / 8	78 / <1		17.0 /	/ 582	50 / 552	16 / 35	223 / <3	15.60 / 49.5	0.61 / 8.42	0.17 / 11.13	8.33 / 0.04	1.73 / 3.03	0.090 / 1.54	Uncleaved dolerite.
036040	" "	136.55	136.75	0.2	0.2	6 / 8	120 / <1		6.5 /	/ 2636	198 / 75	30 / 285	13 / 15	13.72 / 70.9	0.38 / 2.50	0.04 / 0.47	0.53 / 0.14	0.53 / 1.84	0.051 / 8.42	Silicified rhyodacite lava.
036041	Split NQ	180.7	182.0	1.3	1.3	65 / 37	180 / <1	<0.008 / <5	120 / 7	<5 / 189	14 Mo									5% dissem py in vitric feld xyl sst.
036042	" "	182.9	183.2	0.3	0.3	93 / 20	61 / <1	<0.008 / 5	250 / 6	8 / 1162	Mo: 34									10% dissem py, trace sp-gn, in sericitic sltst.
Laboratory: ANALABS, COOEE				Analytical Method		AAS	AAS	FA / AAS	HA140 / XRF	XRF / XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF		
Job-No. PASMINCO: 0246/1429 ANALABS: (11130-60-09916 + 11130-60-09964)		Date 18-1-94 + 11-1-94		Detection Limit		2 / 3	2 / 1	0.008 / 10	0.5 / 3	5 / 10	5 / 5	5 / 5	5 / 3	0.05 / 0.1	0.01 / 0.01	0.01 / 0.01	0.01 / 0.01	0.05 / 0.01		

MD2, 30.5m.

SAMPLE NUMBER: 036038

SUMMARY:

This is a texturally well-preserved plagioclase-phyric dacitic to rhyolitic lava that was originally glassy. Albitized plagioclase phenocrysts make up around 5-8 modal% of the rock. I doubt that quartz phenocrysts were present in this rock; the few that might qualify are compound grains made up of four or five crystals that probably grew in situ in the rock during alteration and recrystallization. A few small augite phenocrysts are chlorite-altered, and small FeTi oxides are leucoxene-altered. The glass has recrystallized to a relatively homogeneous mosaic intergrowth of quartz and albite that is speckled with chlorite, sericite, and fine opaques. An irregular, non-orientated fracture set pervaded by sericite is present, and a few foliated chlorite-calcite veins are also present.

SAMPLE NUMBER: 036039 MD2, 55.6m

SUMMARY:

This is a remarkably well-preserved, uncleaved basaltic lava or shallow dyke rock. It has a holocrystalline subophitic texture defined by quite large euhedral fresh augite euhedra and subhedra, often partially enclosing sericitized plagioclase crystals, in a groundmass of sericitized plagioclase laths, leucoxene-altered FeTi oxides, and chlorite-actinolite-altered mesostasis. Abundant interstitial quartz, some containing euhedral actinolite-hornblende crystals, is probably late stage primary in origin. This is probably another Henty Dyke Swarm basalt (see 036037).

SAMPLE NUMBER: 036040 MD2, 136.6m.

SUMMARY:

This was a glassy plagioclase-phyric rhyodacitic to rhyolitic lava. Plagioclase phenocrysts are albitized, and make up about 3 modal% of the rock. The remainder is made up of a ragged quartz-feldspar intergrowth after glass, with traces of a former spherulitic texture in places. An irregular fracture network defined by intense localized sericite alteration is present, and a few late-stage cross-cutting quartz-calcite veins transect the sericite-defined fractures. Disseminated small pyrite grains are present, but modally insignificant. It is possible that the groundmass of this sample has suffered weak silica-alteration.

CORE PROCESSING RESULTS DRILL HOLE NUMBER md2

CORE RECOVERY				magsus SI units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M.SUS	DEPTH	WEIGHT	VOL.	S.G	FROM	TO	TICKET #	COMMENTS
0.00	3.80	0.70	18.42	3.80	0.14				0.00				
3.80	6.90	3.00	96.77	6.90	0.03				0.00				
6.90	10.00	3.00	96.77	10.00	0.11				0.00				
10.00	13.10	3.10	100.00	13.10	0.13				0.00				
13.10	16.20	2.90	93.55	16.20	0.22				0.00				
16.20	19.30	3.10	100.00	19.30	0.14				0.00				
19.30	22.30	3.00	100.00	22.30	0.20				0.00				
22.30	25.30	2.85	95.00	25.30	0.05				0.00				
25.30	28.30	3.15	105.00	28.30	0.08				0.00				
28.30	31.30	3.00	100.00	31.30	0.10				0.00	30.40	30.70	36038	PETROLOGY & LITHOGEOCHEM
31.30	34.30	2.95	98.33	34.30	0.13				0.00				
34.30	37.30	3.05	101.67	37.30	2.40	35.20	341	127.00	2.69				
37.30	40.30	3.00	100.00	40.30	2.15				0.00				
40.30	43.30	3.00	100.00	43.30	0.20				0.00				
43.30	46.30	2.95	98.33	46.30	0.53				0.00				
46.30	49.30	3.00	100.00	49.30	0.19				0.00				
49.30	52.30	3.00	100.00	52.30	0.16				0.00				
52.30	55.30	2.80	93.33	55.30	0.23				0.00				
55.30	58.30	3.05	101.67	58.30	0.28				0.00	55.50	55.75	36039	PETROLOGY & LITHO
58.30	61.30	3.00	100.00	61.30	0.13				0.00				
61.30	64.30	3.00	100.00	64.30	0.05				0.00				
64.30	67.30	3.00	100.00	67.30	0.06				0.00				
67.30	70.30	3.00	100.00	70.30	0.05				0.00				
70.30	73.30	2.90	96.67	73.30	0.01				0.00				
73.30	75.30	2.00	100.00	75.30	0.04				0.00				
75.30	76.30	1.00	100.00	76.30	0.03	75.40	339	124.00	2.73				
76.30	79.30	3.00	100.00	79.30	0.08				0.00				
79.30	82.30	3.10	103.33	82.30	0.04				0.00				
82.30	85.30	2.80	93.33	85.30	0.07				0.00				
85.30	88.30	3.00	100.00	88.30	0.01				0.00				
88.30	91.30	3.00	100.00	91.30	0.07				0.00				
91.30	94.30	3.00	100.00	94.30	0.12				0.00				
94.30	97.30	3.00	100.00	97.30	0.10				0.00				
97.30	99.10	1.70	94.44	99.10	0.09				0.00				
99.10	100.30	1.00	83.33	100.30	0.09				0.00				
100.30	103.30	2.90	96.67	103.30	0.07				0.00				

CORE PROCESSING RESULTS DRILL HOLE NUMBER md2

CORE RECOVERY				magnetic S.I units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M SUS	DEPTH	WEIGHT	VOL.	S.G	FROM	TO	TICKET #	COMMENTS
103.30	106.30	3.00	100.00	106.30	0.10				0.00				
106.30	109.30	3.10	103.33	109.30	0.11				0.00				
109.30	112.30	2.90	96.67	112.30	0.10				0.00				
112.30	115.30	2.90	96.67	115.30	0.08	112.50	476	177.00	2.69				
115.30	118.30	3.10	103.33	118.30	0.08				0.00				
118.30	120.00	1.70	100.00	120.00	0.09				0.00				
120.00	120.40	0.40	100.00	120.40	0.06				0.00				
120.40	121.30	0.70	77.78	121.30	0.10				0.00				
121.30	124.30	3.00	100.00	124.30	0.07				0.00				
124.30	127.30	2.90	96.67	127.30	0.01				0.00				
127.30	130.30	3.00	100.00	130.30	0.05				0.00				
130.30	133.30	3.00	100.00	133.30	0.08				0.00				
133.30	136.30	3.00	100.00	136.30	0.06				0.00				
136.30	139.30	2.95	98.33	139.30	0.03				0.00				
139.30	142.30	3.00	100.00	142.30	0.06				0.00				
142.30	145.30	3.00	100.00	145.30	0.13				0.00				
145.30	148.30	3.00	100.00	148.30	0.11	145.50	856	317.00	2.70				
148.30	150.70	2.40	100.00	150.70	0.11				0.00				
150.70	151.30	0.50	83.33	151.30	0.13				0.00				
151.30	154.30	3.10	103.33	154.30	0.13				0.00				
154.30	157.30	2.90	96.67	157.30	0.23				0.00				
157.30	160.30	3.00	100.00	160.30	0.13				0.00				
160.30	163.30	3.00	100.00	163.30	0.06				0.00				
163.30	166.30	3.00	100.00	166.30	0.16				0.00				
166.30	169.30	3.00	100.00	169.30	0.10				0.00				
169.30	172.30	3.00	100.00	172.30	0.05				0.00				
172.30	175.30	3.00	100.00	175.30	0.07				0.00				
175.30	178.30	3.00	100.00	178.30	0.11				0.00				
178.30	181.30	3.00	100.00	181.30	0.05				0.00	180.70	182.00	36041	ASSAY
181.30	184.30	3.00	100.00	184.30	0.13	182.30	770	271.00	2.84	182.90	183.25	36042	ASSAY
184.30	187.30	2.95	98.33	187.30	0.08				0.00				
187.30	190.30	3.00	100.00	190.30	0.09				0.00				
190.30	193.30	2.95	98.33	193.30	0.16				0.00				

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APPENDIX 3

Log of Hole MD3, Mackintosh Dam

HOLE No. MD3

PASMINCO EXPLORATION
DIAMOND DRILL CORE RECORD

LOCATION	TASMANIA
PROJECT	TULLAH EL 22/90
PROSPECT	MACKINTOSH DAM
DESIGNED BY	J.G. PURVIS
LOGGED BY	J.G. PURVIS
RELOGGED	
COMMENCED	29TH APRIL 1994
COMPLETED	12TH MAY 1994
DRILLED BY	W. HOW
DRILL RIG	LONGYEAR 38

OBJECTIVE

TO FOLLOW-UP SULPHIDE INTERSECTION IN HOLE MD1, TAKING ACCOUNT OF INDICATIONS OF SOUTHERLY PLUNGE FROM MALM SURVEY.

RESULT

NO SIGNIFICANT MINERALIZATION INTERSECTED.

LOCATION/SURVEY DATA (AMG)

Grid	AMG	RL Collar m	209.1
Northing m	5382670.2	Bearing Collar	090°
Easting m	386956.6	Dip Collar	-74°
DH Survey Type	SINGLE SHOT EASTMAN CAMERA	Length Hole m	239.0

Depth m	Bearing	Dip	Depth m	Bearing	Dip
COLLAR	090°	-74°			
30	088°	-72°			
60	087°	-70.75°			
90	084.5°	-67.5°			
120	083°	-64.5°			
150	082°	-61.75°			
180	082°	-60°			
210	082°	-59°			
239	083°	-58°			

SIGNIFICANT INTERSECTIONS (PPM)

From m	To m	Interval m	Cu	Au				Comments
139	140.3	1.3	1673	0.016				lo-py-cp in carbonate veinlets in siltstone/sandstone breccia.

SIGNIFICANT CORE LOSS

From m	To m	% Lost
5	20	18

POOR GROUND CONDITION ZONES

From m	To m	Condition
0	5	LOOSE ROAD FILL
5	20	FRACTURED & BROKEN

HOLE SIZE

Size	Depth m
HW	3
HQ	21
NQ	239

HOLE CONDITIONS AFTER COMPLETION

Collar	STEEL SCREW-ON CAP ON TOP OF HQ CASING.
Steel Casing	21m OF HQ (SHOE BIT AT BASE).
PVC Casing	PLACED TO 239m (40mm OD).
Ground Water	–
Wedge	–
Drill Pad	

PASMINCO EXPLORATION
SUMMARY DIAMOND DRILL CORE LOG

PROJECT: MACKINTOSH DAM, TULLAH EL 22/90

HOLE No. MD 3

Graphic Scale 1:

From m	Interval m	Code	Description	Depth	Graphic	From m	Interval m	Code	Description	Depth	Graphic

SUMMARY LOG - MD3

0 - 52.0m: AMYGDALOIDAL FELSIC LAVA
Basalt dyke 25-31m with 1-2% py. Elsewhere, minor py.

52.0 - 93.6m: VITRIC SILTSTONE/SHALE & MAFIC DYKES
Minor py. Locally 3% py in black shale.

93.6 - 109.15m: FOLIATED EPICLASTIC BRECCIAS
Minor py.

109.15 - 146.2m: FOLIATED SILTSTONE/SANDSTONE & MAFIC DYKES
Dykes fuchsite altered. To 2% py-po. Trace cp, rare sp.

146.2 - 156m: FOLIATED VITRIC EPICLASTIC BRECCIAS
1-2% py.

156 - 160m: ALTERED SHEAR ZONE IN RHYODACITE BRECCIAS
Strong silica-albite alteration. Trace py.

160 - 181.3m: FOLIATED PUMICE BRECCIA
Trace py.

181.3 - 192.6m: BASALT DYKE
No sulphides.

192.6 - 229.6m: FELSIC LAVA & BASALT DYKES
Trace py. Minor gn in qtz veins.

229.6 - 239.0m: VITRIC TUFF & VOLCANOMICT SANDSTONE
Trace py.

END OF HOLE

Comments:

a) Much of sequence strongly foliated and sediments commonly display evidence of pre-lithification deformation. Some of the fuchsitic mafic dykes were injected into unlithified sediments and subsequently disrupted.

b) Henty Fault not logged in the hole. Lithologically, its position (the contact between Mt Block Volcanics and Farrell Slates), is between 52-94m.

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD3

PROJECT: MACKINTOSH DAM, TULLAH EL 22/90

CORE RECOVERY				DESCRIPTION		
From m	Interval m	%	RQD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)

LOG OF HOLE MD3

0 – 5m: ROAD FILL

5 – 25.35m: AMYGDALOIDAL FELSIC LAVA

Lithology: Grey-green (pinkish at base). Med gr. Massive. Hard. Feld-phyric lava (felds albitized, av 1-2mm). Abund carb & chlor amygdales, av 2-4mm. Fi gr green foliated mafic dykes @ 14.45-14.85m (40°/LCA) & 16.05-16.4m (45°/LCA), both //fol.
Alteration: Mod-strong sil-alb>chlor, v strong below 23m. Ox on fracts to 18m. Carb leached to 18m. Dykes strongly carbonatized.
Veining: Reg qtz-carb (±chlor or alb) veins. Minor tiny chlor veinlets.
Structure: Weakly foliated, 40°/LCA @ 5.5m, 45°/LCA @ 17m. Fractured & broken. Basal contact abrupt & irreg, 55°/LCA (//fol), dips 40° to 312°AMG.
Mineralization: Limonite on fracts to 18m. Minor dissem py (lava & dykes).

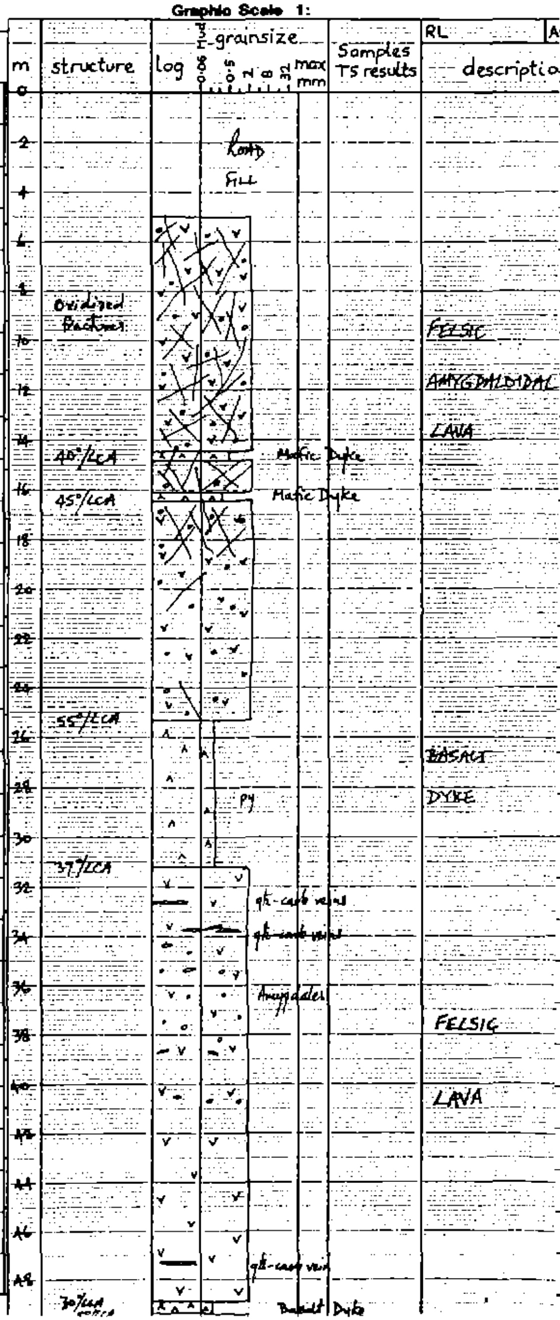
25.35 – 31.2m: BASALT DYKE

Lithology: Dk green. Fi gr. Massive. Uniform.
Alteration: Mod chlorite-carbonate.
Veining: Minor qtz-carb veins & carb veinlets.
Structure: Weakly foliated (35°/LCA @ 27m). Unbroken. Basal contact sharp, 37°/LCA, //fol.
Mineralization: 1-2% py, dissem & in stringers. Magnetic due to v fi gr mag.

31.2 – 52.0m: FELSIC LAVA

Lithology: Greenish-grey with pink zones. Uniform. Hard. Fi-med gr sandy-text volc with indistinct feld phenos av 1mm. Similar to lava above 25m but finer gr & less amygdaloidal (patchy calcite or chlorite amygdales av 2-4mm, to 15mm). Chlor-carb alt fi gr basalt dyke @ 48.9-49.45m (15-30°/LCA, //fol).
Alteration: Mod sil-alb-chlor. Patches to 1m of strong sil-alb-bleaching assoc with qtz-carb veining.
Veining: Qtz-carb(>chlor±alb) veins to 200mm.
Structure: Weakly foliated (stronger than in lava above 25m). Fol: 35°/LCA @ 36m, 45°/LCA @ 44m). Sl fract & broken. Basal contact abrupt, 50°/LCA (//fol) dips 47° to 347°AMG. A 1° depositional surface with tiny apophyses of lava into seds.
Mineralization: V minor dissem py.

Graphic Scale 1:



CODES			
LITHO	STRUCT	ALTN	MIN

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

PROJECT: MACKINTOSH DAM, TULLAH EL 22/90

CORE RECOVERY				DESCRIPTION		
From m	Interval m	%	RQD	From m	Interval m	(incl. LITHOLOGY, STRUCTURE & ALTERATION)

52.0 – 70.3m: MIXED SEDIMENTS & MAFIC DYKES

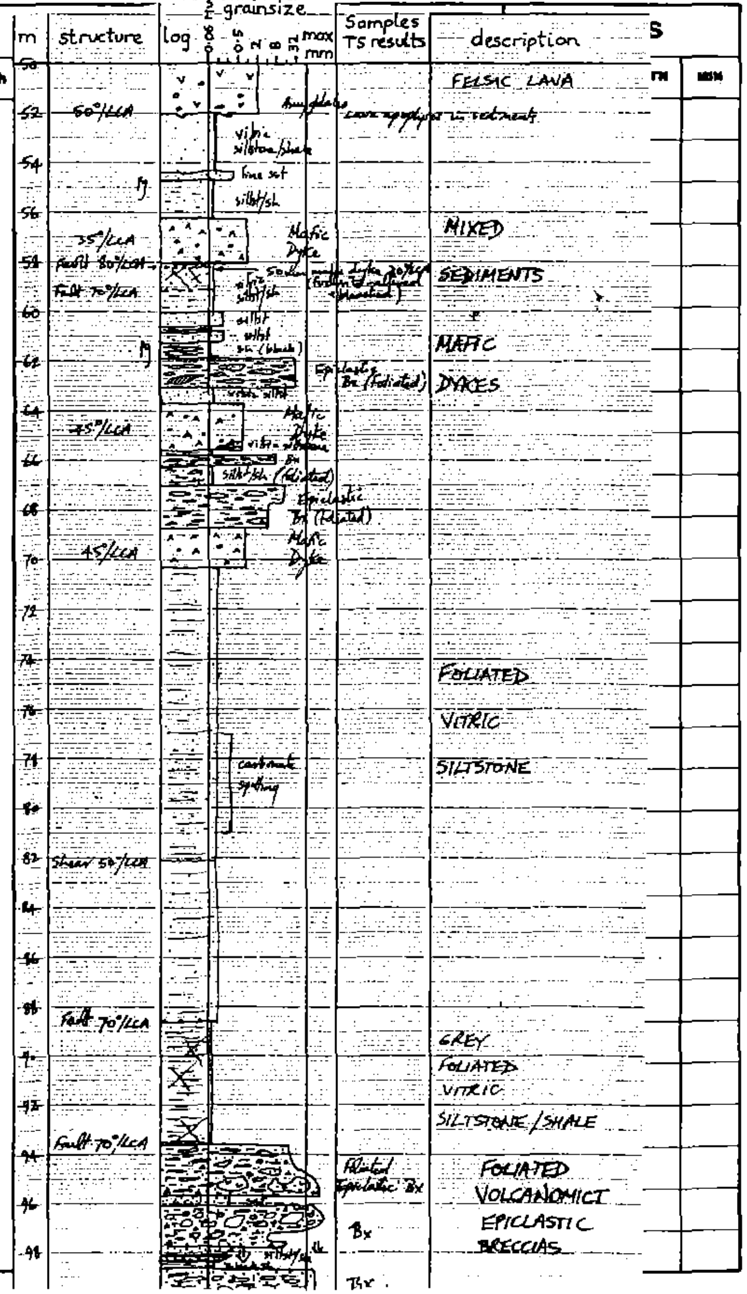
Lithology: Interbedded creamy-grey vitric (silic & sericitic) siltst/shale, grey-black carbonaceous shale, & grey-green strongly foliated epiclastic breccia (stretched volc>sed frags in fine silty matrix).
Black shale & bx only present below 58.7m.
Bx frags incl felsic volcs & glass (some pumice), also lumps of shale.
Dykes (all grey-green, amygdaloidal, foliated, non-mag, sub-//fol):
56.3–58.05m, intermed-mafic, 35°/LCA, 100mm qtz vein at base.
63.7–65.6m, 45°/LCA (fault at base), lump of included siltst @ 65.4m.
68.75–70.3m, 45°/LCA (fault at top contact).
58.3m: 50mm mafic dyke unlike above: creamy (highly bleach), hornblende-phyric, minor fuchsite & dissem py, 30°/LCA (sub-//fol).
Alteration: Patchy. Mod ser-chlor-carb (incl carb spotting in vitric siltst/shale).
Dykes strongly carb. Local silif (eg: upper 2m of unit).
Veining: Scattered carb>qtz veins & veinlets. Common chlor veinlets.
Structure: Bedding: 50°/LCA @ 54.3m (dips 65° to 257°AMG), 45°/LCA @ 63m.

Mod bedding-// foliation, strong below 62m (esp in bx bands).
Some soft-sed deformation.
Several thin cataclasite bands 70-80°/LCA @ 58.2-59.2m, annealed by vein qtz or containing frags of vein qtz. Mod fract & broken here also.
Basal contact abrupt, 45°/LCA (base of dyke).
Mineralization: 52–60.6m: Minor to 1% py>>po, dissem & stringers (2% dissem py>po 54.3–55.05m).
60.6–61.75m: 2–3% fi gr dissem py in black shale.
61.75–70.3m: Minor to 1% dissem py.

70.3 – 88.6m: VITRIC SILTSTONE

Lithology: Fawn. Fi gr. Sl broken.
Massive, fairly uniform sericitic rock with thin pale grey shaley beds.
Alteration: Mod sericitized & bleached, lesser patchy sil-alb.
Weak carb spotting 77–81m.
Veining: Common irreg veins & veinlets of (Fe/Mn) calcite (±qtz-chlor).
Some pink calcite in basal 1m.
Structure: Bedding: 45°/LCA @ 74.7m (dips 65°/LCA to 267°AMG).
Bedding gen deformed by strong bedding-// foliation (47°/LCA @ 87.5m).
Shear @ 82.1m, 50°/LCA (//fol).
Basal contact 10mm annealed cataclasite, 70°/LCA (opposite sense to fol).
Mineralization: To 74m, & 82–83m: Minor to 1% dissem & veinlet py.
74–82m & 83-88.6m: Trace py.

Graphic Scale 1:



PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD 3

PROJECT: MACKINTOSH DAM, TULLAH EL 22/90

CORE RECOVERY				DESCRIPTION			
From m	Interval m	%	RQD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth

88.6 – 93.6m: GREY VITRIC SILTSTONE / SHALE

Lithology: Similar to above unit except for colour & sl finer grainsize.
Alteration: Mod sericitized.
Veining: Common qtz-carb veinlets, irreg & at all angles. Rare pink calcite in these veins.
Structure: Bedding 45°/LCA @ 91m.
Bedding gen obscured by the strong bedding-// fol. Sl broken.
Basal contact abrupt, brittle fault (70mm cataclasite) 70°/LCA, sub//fol.
Mineralization: V minor dissem py. Rare gn.

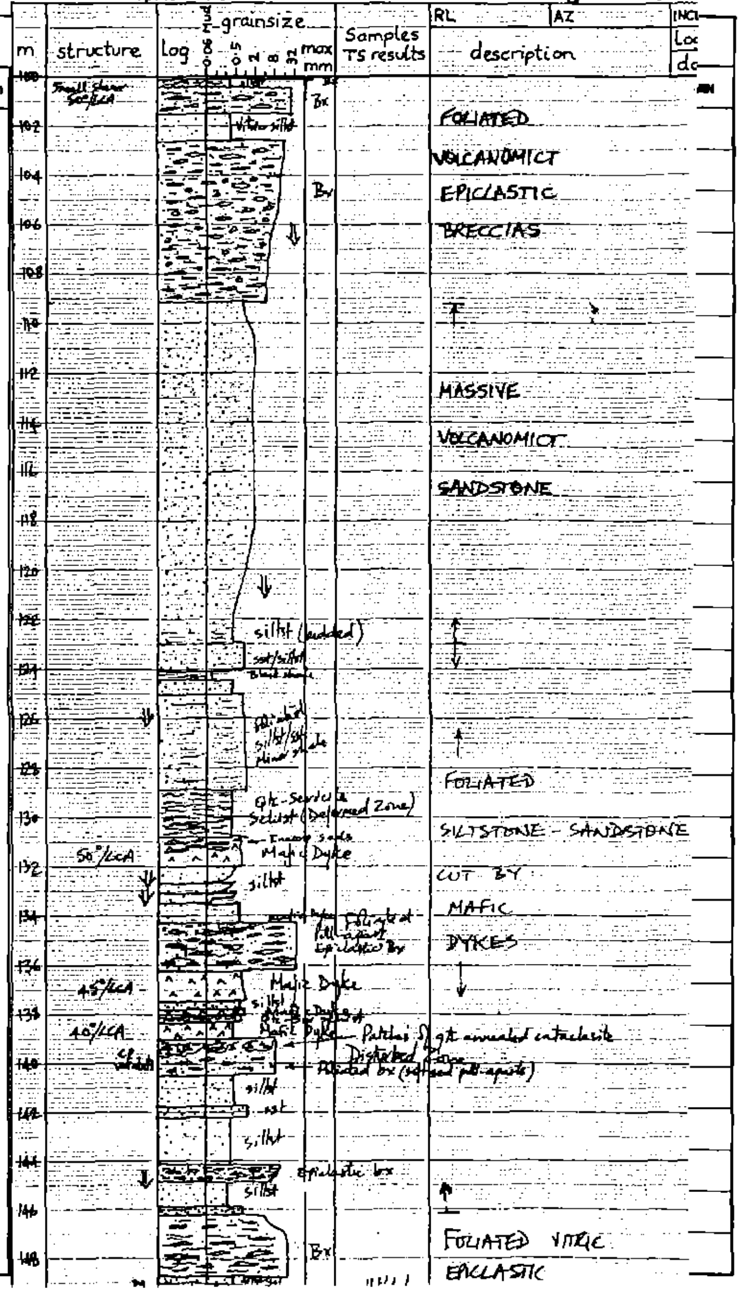
93.6 – 109.15m: FOLIATED VOLCANOMICT EPICLASTIC BRECCIAS

Lithology: Grey. Pale pink in upper 5m.
Variable unit, deformed by combination of soft-sed & post-lith tectonics.
Several open framework bx pulses, with altered, stretched, wispy, deformed frags in sandy qtz-sericite matrix.
Fine interpulse zones @ 95.8-96.3m (sst), 97.75-98.85m (siltst & black shale), 100.1-100.45m, 101.45-102.6m (siltst).
Bx frags incl: sil-alb alt felsic lavas, sericitic felsic volc glass (incl prob pumice), bio-ser-carb alt vitric siltst/sst, & minor black shale.
Frags (coarsest & most abund at top of unit), av +15mm, rarely to 80mm. Below 102.6m frags av <10mm (to 25mm).
Alteration: Weak-mod carb-ser.
Mod sil-ser-alb in uppermost 5m.
Veining: Veins & veinlets of carb (Fe/Mn calcite).
Structure: Downhole fining in sst/siltst @ 97.75-98.15m & 98.2-98.45m, & in bx pulse below 102.6m.
Bedding: 43°/LCA @ 100.3m.
Bedforms commonly disrupted (eg: lumps of interflow seds in bx).
Strong bedding-// foliation: 50°/LCA @ 101m (dips 70° to 282°AMG).
Sl broken 98-100.5m by weak shears //fol.
Basal contact, abrupt (bedding), 48°/LCA.
Mineralization: Minor dissem & veinlet py.

109.15 – 122.9m: MASSIVE VOLCANOMICT SANDSTONE

Lithology: Grey. Massive. Uniform & even-grained. Unbroken.
Fine vitric sst, comprising volc glass, feld xyl grains (max 2mm, gen <1mm), & lesser volc qtz.
Alteration: Weak sericite-carbonate.
Veining: Veins & veinlets of carb (Fe/Mn calcite) ± qtz.
Structure: Single massive sst pulse, fining downhole. Only bedded below 122m (43°/LCA).
Mod foliated (48°/LCA).
Basal contact gradational.
Mineralization: V minor dissem py>po.

Graphic Scale 1:



PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MD3

PROJECT: MACKINTOSH DAM, TULLAH EL 22/90

Graphic Scale 1:

CORE RECOVERY

From m	Interval m	%	RQD

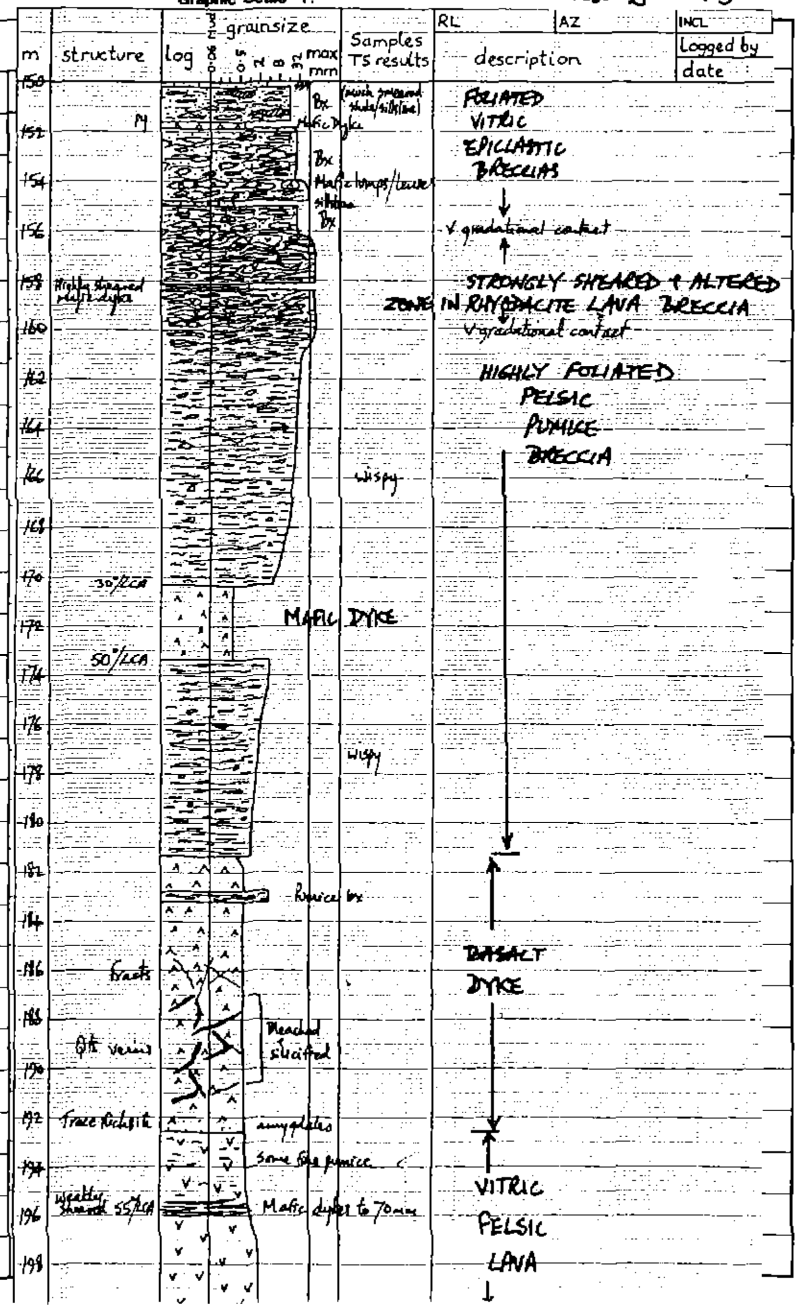
DESCRIPTION

122.9 -146.2m: FOLIATED SILTSTONE/SANDSTONE & MAFIC DYKES

Lithology: Grey. Dykes lime green. Largely unbroken.
Disturbed & deformed fine sediments cut by fuchsite-altered mafic dykes.
Mainly interbedded vitric siltstone & fine volcanomict (feld>qtz) sst.
Minor grey/black shale & epiclastic breccia (largely comprising frags of dismembered fine sed beds).
Fi-med gr foliated mafic dykes often complexly intermixed with host seds & poss emplaced while seds unlithified.
Largest dykes (all //fol): 130.8-132m (50°/LCA, 50% included seds), 136.3-137.6m & 137.9-138.25m (45°/LCA), 138.5-139m (40°/LCA).
Alteration: Weak-mod sericite>sil-carb.
Carb conc in coarser sst & bx. Sil conc in deformed zones around dykes & below 142m.
Mafic dykes strongly bleach-carbonate-fuchsite altered.
Veining: Carb (±qtz) veins & veinlets (carb Fe/Mn rich in & around dykes).
Structure: Bedding: 48°/LCA @ 126m (downhole-fining), 43°/LCA @ 132.6m (downhole-fining, dips 75° to 287°AMG), 43°/LCA @ 143.5m. Downhole fining @ 144.7m.
Bedding deformed by both soft-sed disturbance (eg: pull-aparts), & locally-strong bedding-// foliation.
Both deformation types strongest around mafic dykes @ 129-140.6m, incl: qtz-ser schist zones, annealed cataclasite & foliated pull-apart bx zones.
Basal contact abrupt (bedding), 43°/LCA.
Mineralization: 122.9-132m: Minor dissem py>po.
132-136.3m: 2% dissem & veinlet po>py, minor cp. Rare sp in qtz veins.
136.3-139m: Minor dissem & veinlet py-po. Rare sp in veinlets.
139-140.3m: 2% po-py-cp, mainly in carb veinlets.
140.3-146.2m: Minor to 1% dissem & veinlet po-py. Rare sp in veinlets.

146.2 - 156m: FOLIATED VITRIC EPICLASTIC BRECCIAS

Lithology: Greenish-grey with pinkish zones.
Strongly foliated & deformed epiclastic breccias with thin intercalations of vitric sst, siltst & shale, some of which are small rafts.
Wispy stretched frags of feld-phyric volc glass (poss pumice), av 5-20mm.
Minor more-equant felsic volc & sed lithics av 5-10mm.
Fine sst matrix of granular qtz-sericite containing 1-3mm felds.
In places unit comprises complex of smeared small lumps & lenses of siltst/shale in sst, suggesting seds highly disturbed while unlith.
Strongly foliated carb-bleached mafic dyke @ 151.65-151.85m, 50°/LCA (// fol).
10mm sheared mafic dyke @ 150.65m.
Irreg lumps and bands of amygdaloidal mafic (dyke?) @ 154-154.5m.
Alteration: Mod sericite-sil-alb-carb-chlor.
Veining: Irreg carb (±qtz) veinlets.
Structure: Bedding 50°/LCA @ 148.8m (dips 67° to 287°AMG).
Strong bedding-// foliation, 50°/LCA.
Largely unbroken.
V gradational (rather arbitrary) contact at base - felsic lava frags appear around 155m.
Mineralization: 1-2% (varies) fine dissem py>po, often in small patches //fol.
50mm interval @ 151.45m with 2-5mm bands of sooty py //fol.



PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

PROJECT: MACKINTOSH DAM, TULLAH EL 22/90

Graphic Scale 1:

CORE RECOVERY				DESCRIPTION			CODES
From m	Interval m	%	RQD	From m	Interval m	(incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth

156–160m: ALTERED SHEAR ZONE IN RHYODACITE LAVA BRECCIA

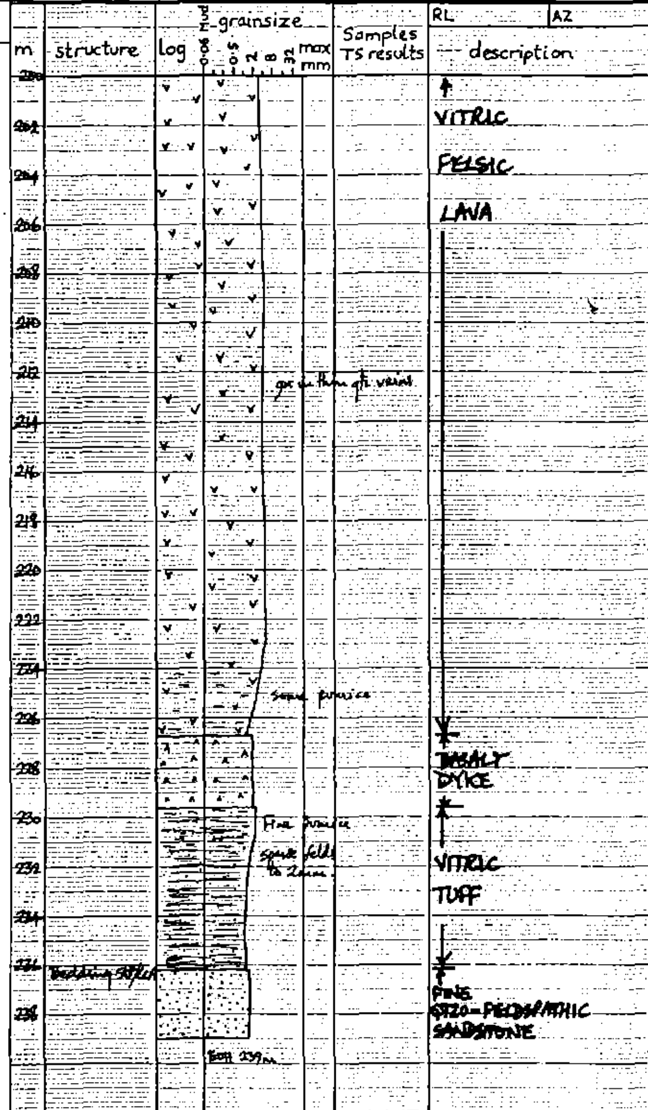
Lithology: Pink. Med gr.
Elongate lumps, augen, & tiny frags of microbrecciated qtz-feld-phyric lava, in highly foliated qtz-sericite containing threads & bands of sheared mafic dyke material. Largest mafic dyke @ 158.15–158.45m.
Alteration: Strong sil-alb>ser-carb (carb is Fe/Mn type).
Mafic dykes strongly bleach-carb±chlor.
Veining: Minor lensy veinlets of qtz-carb. Abund microfracts filled with carb.
Structure: Strongly sheared (60°/LCA) and microbrecciated. Shearing intensity decreases towards top and bottom of zone.
Sl fract & broken 157.7–158.5m (foliation sl contorted 157.7–158m).
Basal contact v gradational & rather arbitrary.
Mineralization: Trace dissem py.

160 – 181.3m: FOLIATED FINE FELSIC PUMICE BRECCIA

Lithology: Pale grey with pink tinge above 170m.
Strongly foliated massive & uniform fragmental felsic volc.
Composed largely of fine pumice frags, with fractured & augen-shaped feldspars scattered throughout (av 2mm).
Minor felsic lava & other volc lithics, most common & larger (to 30mm) at top, rare & smaller (5mm) towards lower contact.
Dk green fi gr amygdaloidal basalt dyke 170.35–173.4m, 50°/LCA (//fol).
Alteration: Mod-strong ser-sil>alb-carb.
Basalt dyke strongly chlor-carb.
Veining: V minor qtz-carb veins & carb veinlets.
Structure: Unit fines gradually downhole.
V strong foliation (gives rock flecked & wispy appearance).
Fol 45°/LCA @ 164m, 50°/LCA @ 181.2m (dips 75° to 292°AMG).
Unbroken.
Basalt dyke foliated, but much less than host rock.
Basal contact abrupt, 47°/LCA (//fol).
Mineralization: Trace dissem py.

181.3 – 192.6m: BASALT DYKE

Lithology: Dk green, bleached fawn 187–190m.
Massive. Fi-med gr, with ferromags av 1mm.
Finely amygdaloidal, esp lower margin.
Small interval of pumice breccia (as above) @ 182.8–183.2m.
Alteration: Strongly chloritised, except in bleached silif zone assoc with qtz veining @ 187–190m.
Strongly carb for 1–1.5m on dyke margins (trace fuchsite on lower margin).
Veining: Common comb-structured qtz>carb±chlor veins to 50mm, 187–191.5m.
Calcite veinlets elsewhere.
Structure: Weakly foliated 50°/LCA. Sl fract & broken 185.5–189m.
Basal contact abrupt, 50°/LCA (//fol).
Mineralization: None.



PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

PROJECT : MACKINTOSH DAM, TULLAH EL 22/90

Graphic Scale 1:

CORE RECOVERY				DESCRIPTION	Depth	Graphic Lithology	Graphic Struct.	MINERALISATION	CODES LITHO	CODES STRUCT	CODES ALTN	CODES MIN
From m	Interval m	%	RQD									

192.6 – 226.7m: VITRIC FELSIC LAVA

Lithology: Greenish-grey. Med gr. Massive. Uniform. Hard.
Abund evenly-distributed feldspars, av 2mm, to 3-4mm, in qtz-sericite groundmass.
In zones of strongest foliation felds augen-shaped & often fract.
Rare small qtz xyls.
Above 195m & below 224m grainsize sl finer & rock contains some fine pumice (prob marginal lava phases).
Alteration: Mod-strongly silif-ser. Patchy bleach, trace chlor & alb.
Veining: Common regular qtz>carb(±chlor) veins to 50mm.
Structure: Mod-strongly foliated (tends to be strongest towards upper & lower margins of unit).
Fol: 50°/LCA @ 202m, 55°/LCA @ 214m & 223m.
Largely unbroken.
Broken weakly-sheared zone 195.5-196m, 55°/LCA (//fol), assoc with several mafic dykes 20-70mm thick, all //fol.
Basal contact abrupt, 50°/LCA (//fol).
Mineralization: Minor gn(±cp) in some qtz veins, esp around 212m. Trace dissem py.

226.7 – 229.6m: BASALT DYKE

Lithology: Green. Med gr. Unbroken.
Ferromags to 2mm. Sparse calcite amygdales.
Alteration: Strong chlorite-carbonate.
Veining: Calcite veins & veinlets. Minor epidote veinlets.
Structure: Mod foliated. Basal contact abrupt, 40°/LCA, sub-// fol.
Mineralization: None.

229.6 – 236.2m: VITRIC TUFF

Lithology: Grey & fawn. Fi-med gr. Hard. Unbroken.
Foliated vitric tuffaceous volc, possibly epiclastic.
Relatively sparse felds, av 1-2mm (often drawn out by fol), & minor smaller qtz xyls, scattered through sericitic matrix composed of finely comminuted glass (fine pumice in upper 1-2m, similar to above 226.7m).
Alteration: Mod-strong ser>sil. Weak carb & alb below 234m.
Veining: Minor qtz-carb veinlets.
Structure: Mod-strongly foliated 50°/LCA.
Basal contact abrupt (bedding, // fol), 50°/LCA.
Mineralization: Trace dissem py.

236.2 – 239.0m: FINE VOLCANOMICT SANDSTONE

Lithology: Fawny-grey. Massive. Even-grained. Hard. Unbroken.
Fine, well-sorted qtzo-feldspathic sst, with abraded grains av 1mm.
Alteration: Weak ser. Felds carbonatized.
Veining: Irreg carb veinlets.
Structure: Unbedded. Mod foliation, 50°/LCA.
Mineralization: Minor dissem & veinlet py>>po.

END OF HOLE

PASMINCO EXPLORATION
DIAMOND DRILL CORE ASSAY DATA

HOLE No. MD 3

PROJECT: MACKINTOSH DAM, TULLAH EL22/90

SAMPLE						ASSAYS (ppm unless specified)															COMMENTS
Number	Type	From m	To m	Interval m	Recovered m	Cu	Pb	Zn	Ag / Au	As / Ba	Rb / Sr	V / Nb	Y / Zr	Al_2O_3 / SiO_2 (%)	TiO_2 / Fe_2O_3	MnO / Na_2O	CaO / K_2O	MgO / P_2O_5	LOI / SO_3	Cr	
038114	SPLIT NQ	27.0	28.0	1.0		30	21	136	<1 / 0.011	3 / 452	72 / 245	230 / 3	30 / 96	15.35 / 49.2	1.47 / 11.86	0.23 / 4.22	4.91 / 1.56	4.11 / 0.495	6.24 / 0.31	5	Basalt dyke c̄ 1-2% py.
115	" "	54.3	55.05	0.75		58	34	97	<1 / 0.013	39.5 / 534											Siltstone/shale c̄ 2% py > po.
116	" "	60.6	61.75	1.15		18	35	67	<1 / 0.009	30 / 572											Black shale/grey siltstone, c̄ 2-3% py.
117	" "	64.4	65.2	0.8		84	8	110	<1 / 0.008	59 / 320	128 / 119	316 / <3	13 / 58	14.20 / 46.6	0.67 / 10.81	0.27 / 0.21	8.94 / 2.66	4.66 / 0.273	10.67 / 0.08	82	Basalt dyke, minor py.
118	" "	132	134	2.0		181	153	118	5 / 0.010	31 / 597											Siltstone/sst c̄ 2% po > py.
119	" "	134	136.3	2.3		495	57	84	9 / 0.009	19 / 530											" " " " " "
038120	" "	136.3	137.3	1.0		34	33	136	<1 / 0.008	155 / 200	48 / 213	129 / 6	15 / 83	8.37 / 39.1	0.72 / 8.37	0.30 / 0.15	11.05 / 1.17	11.12 / 0.251	18.93 / 0.08	940	Fuchsitic mafic dyke, minor po.
121	" "	139	140.3	1.3		1673	44	59	<1 / 0.016	325 / 524											Siltstone/sst breccia c̄ 2% po-py-cp in qtz veins.
122	" "	146	148	2.0		34	38	74	<1 / 0.009	30 / 529											Epiclastic breccia c̄ 1-2% py.
123	" "	148	150	2.0		16	13	72	<1 / 0.011	55 / 559											" " " " "
124	" "	150	152	2.0		39	81	101	<1 / 0.015	65 / 500											" " " " py > po.
125	" "	152	154	2.0		13	11	93	<1 / <0.008	18.5 / 538											" " " " " "
126	" "	154	156	2.0		19	44	97	<1 / 0.010	27 / 476											" " " " " "
038128	" "	171.4	172.4	1.0		98	<3	120	<1 / 0.008	10.5 / 336	65 / 310	292 / <3	10 / 31	13.11 / 46.6	0.41 / 8.63	0.13 / 1.14	8.63 / 1.37	8.49 / 0.044	11.33 / 0.07	314	Chlorite-carbonate altered mafic dyke
129	" "	208	209	1.0		5	3	61	<1 / <0.008	4 / 977	144 / 246	16 / 14	36 / 280	13.84 / 72.2	0.34 / 2.84	0.04 / 3.62	0.91 / 3.74	0.65 / 0.043	1.64 / 0.02	<5	Dacitic crystal-lithic vitric tuff.
038130	" "	228.2	229.2	1.0		66	18	94	<1 / 0.009	1.5 / 1326	83 / 497	188 / 8	20 / 100	12.79 / 51.1	0.57 / 8.38	0.19 / 1.92	7.32 / 2.92	7.95 / 0.190	6.35 / 0.03	438	Basalt dyke
Laboratory ANALABS, COOEE + PERTH				Analytical Method		AAS	AAS	AAS	AAS / F.A.	HAHAP / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF	
Job-No. 1451 (PAS Ex) 11318-60-10323		Date 9.8.94		Detection Limit		2	3	2	1 / 0.008	0.5 / 10	5 / 5	5 / [illegible]	5 / 5	0.05 / 0.1	0.01 / 0.01	0.01 / 0.05	0.01 / 0.01	0.01 / 0.005	0.01 / 0.01	5	

SAMPLE NUMBER: 038127 MD3, 167m
SUMMARY:

This sample is extremely difficult to diagnose, and both Jocelyn McPhie and I spent about 15 minutes each trying to decide what is was originally. We concluded that it was either a formerly glassy dacitic lava, or a crystal vitric tuff. It is now a moderately foliated and strongly sericite-altered rock consisting of ~ 5modal% of fractured and rather disaggregated, albitized and sericitized plagioclase phenocrysts in a strongly sericitized groundmass in which the sericitic foliation wraps around phenocrysts and produces a false flow-banded texture. One lithic clast at least is obvious, and consists of a nice perlitically-cracked formerly glassy rhyolite or dacite lava. A few other lithic clasts or fragments were probably also present, but have been obliterated during the alteration. Perhaps core logging information may better diagnose this difficult sample than thin section examination.

SAMPLE NUMBER: 038129 MD3, 209m
SUMMARY:

This sample is a strongly recrystallized and altered dacitic to rhyolitic crystal lithic vitric tuff. Broken albitized plagioclase phenocrysts, often fractured and disaggregated in situ during foliation development, make up about 20 modal% of the rock. They include discrete crystals, and crystals (phenocrysts) clearly set in lithic fragments. The latter include a diverse array of formerly glassy felsic lava, often with perlitic cracks, or pumiceous textures preserved. Chloritic alteration has affected many more pumiceous fragments. No traces of shard textures are preserved in the groundmass, and the former glassy ash has strongly recrystallized to a heterogeneous quartz-chlorite intergrowth pervaded by a strong sericite mesh that defines a moderately well-developed foliation.

CORE RECOVERY				mag sus S.I units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M SUS	DEPTH	WEIGHT	VOL	S.G	FROM	TO	TICKET #	COMMENTS
0.00	4.30	0.20	4.65	4.30	1.00				0.00				
4.30	5.00	0.20	28.57	5.00	0.17				0.00				
5.00	5.80	0.50	62.50	5.80	0.13				0.00				
5.80	6.30	0.50	100.00	6.30	0.05				0.00				
6.30	6.80	0.35	70.00	6.80	0.08				0.00				
6.80	7.10	0.40	133.33	7.10	0.15				0.00				
7.10	7.80	0.55	78.57	7.80	0.18				0.00				
7.80	8.50	0.70	100.00	8.50	0.25				0.00				
8.50	8.90	0.20	50.00	8.90	0.17				0.00				
8.90	9.30	0.40	100.00	9.30	0.10				0.00				
9.30	10.00	0.60	85.71	10.00	0.10				0.00				
10.00	10.60	0.40	66.67	10.60	0.12				0.00				
10.60	12.00	1.40	100.00	12.00	0.10				0.00				
12.00	12.90	0.70	77.78	12.90	0.12				0.00				
12.90	14.00	0.45	40.91	14.00	1.00				0.00				
14.00	14.70	0.40	57.14	14.70	0.46				0.00				
14.70	15.40	0.60	85.71	15.40	0.15				0.00				
15.40	16.30	0.95	105.56	16.30	0.35				0.00				
16.30	17.10	0.70	87.50	17.10	0.21				0.00				
17.10	17.80	0.60	85.71	17.80	0.14				0.00				
17.80	18.60	0.55	68.75	18.60	0.16				0.00				
18.60	20.00	1.30	92.86	20.00	0.15				0.00				
20.00	21.00	1.20	120.00	21.00	0.21				0.00				
21.00	23.00	1.70	85.00	23.00	0.22	21.00	1282	478.00	2.68				
23.00	26.00	3.00	100.00	26.00	11.90				0.00				
26.00	29.00	3.00	100.00	29.00	11.80				0.00	27.00	28.00	38114	SPLIT NQ ASSAY + LITHO
29.00	32.00	3.00	100.00	32.00	0.19				0.00				
32.00	35.00	3.00	100.00	35.00	0.19				0.00				
35.00	38.00	3.00	100.00	38.00	0.19				0.00				
38.00	38.80	0.80	100.00	38.80	0.24				0.00				
38.80	41.00	2.20	100.00	41.00	0.16				0.00				
41.00	44.00	3.00	100.00	44.00	0.14				0.00				
44.00	47.00	3.00	100.00	47.00	0.20				0.00				
47.00	50.00	3.00	100.00	50.00	0.09				0.00				
50.00	53.00	2.95	98.33	53.00	0.07	50.00	728	269.00	2.71				
53.00	56.00	3.00	100.00	56.00	0.01				0.00	54.30	55.05	38115	SPLIT NQ ASSAY

CORE PROCESSING RESULTS

DRILL HOLE NUMBER md3

CORE RECOVERY				mag sus S.I units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M.SUS	DEPTH	WEIGHT	VOL.	S.G	FROM	TO	TICKET #	COMMENTS
56.00	59.00	3.00	100.00	59.00	0.08				0.00				
59.00	60.20	1.20	100.00	60.20	0.09				0.00				
60.20	62.00	1.70	94.44	62.00	0.12				0.00	60.60	61.75	38116	SPLIT NQ ASSAY
62.00	65.00	3.00	100.00	65.00	0.28				0.00	64.40	65.20	38117	SPLIT NQ ASSAY + LITHO
65.00	68.00	3.00	100.00	68.00	0.04				0.00				
68.00	69.60	1.60	100.00	69.60	0.24				0.00				
69.60	71.00	1.40	100.00	71.00	0.02				0.00				
71.00	74.00	3.00	100.00	74.00	0.06				0.00				
74.00	77.00	3.00	100.00	77.00	0.02				0.00				
77.00	78.30	1.30	100.00	78.30	0.06				0.00				
78.30	80.00	1.70	100.00	80.00	0.02	79.80	461	169.00	2.73				
80.00	83.00	2.85	95.00	83.00	0.15				0.00				
83.00	86.00	3.00	100.00	86.00	0.05				0.00				
86.00	89.00	3.00	100.00	89.00	0.05				0.00				
89.00	91.40	2.40	100.00	91.40	0.07				0.00				
91.40	94.50	3.05	98.39	94.50	0.08				0.00				
94.50	97.60	3.10	100.00	97.60	0.05				0.00				
97.60	100.70	3.10	100.00	100.70	0.11				0.00				
100.70	103.80	3.10	100.00	103.80	0.08				0.00				
103.80	106.90	3.10	100.00	106.90	0.18				0.00				
106.90	110.00	3.10	100.00	110.00	0.07				0.00				
110.00	113.00	3.00	100.00	113.00	0.13				0.00				
113.00	116.00	2.95	98.33	116.00	0.15	113.00	820	298.00	2.75				
116.00	119.00	2.95	98.33	119.00	0.16				0.00				
119.00	122.00	3.00	100.00	122.00	0.16				0.00				
122.00	125.00	3.00	100.00	125.00	0.10				0.00				
125.00	128.00	3.00	100.00	128.00	0.04				0.00				
128.00	131.00	3.00	100.00	131.00	0.19				0.00				
131.00	134.00	3.00	100.00	134.00	0.07				0.00	132.00	134.00	38118	SPLIT NQ ASSAY
134.00	137.00	3.00	100.00	137.00	0.21				0.00	134.00	136.30	38119	SPLIT NQ ASSAY
137.00	140.00	3.00	100.00	140.00	0.08	137.00	317	112.00	2.83	136.30	137.30	38120	SPLIT NQ LITHOGEOCHEMISTRY
140.00	143.00	3.00	100.00	143.00	0.05				0.00	139.00	140.30	38121	SPLIT NQ ASSAY
143.00	146.00	3.00	100.00	146.00	0.13				0.00				
146.00	149.00	3.00	100.00	149.00	0.10				0.00	146.00	148.00	38122	SPLIT NQ ASSAY
149.00	152.00	2.95	98.33	152.00	0.21				0.00	148.00	150.00	38123	SPLIT NQ ASSAY
152.00	155.00	3.00	100.00	155.00	0.09				0.00	150.00	152.00	38124	SPLIT NQ ASSAY

CORE PROCESSING RESULTS

DRILL HOLE NUMBER md3

CORE RECOVERY				mag sus SI units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M.SUS	DEPTH	WEIGHT	VOL	S.G	FROM	TO	TICKET #	COMMENTS
155.00	158.00	2.80	93.33	158.00	0.12				0.00	152.00	154.00	38125	SPLIT NQ ASSAY
158.00	161.00	2.90	96.67	161.00	0.12				0.00	154.00	156.00	38126	SPLIT NQ ASSAY
161.00	164.00	2.95	98.33	164.00	0.03				0.00				
164.00	167.00	3.00	100.00	167.00	0.03				0.00				
167.00	170.00	3.00	100.00	170.00	0.04				0.00	167.00		38127	NQ PETROLOGY
170.00	173.00	3.00	100.00	173.00	0.28	170.00	666	247.00	2.70	171.40	172.40	38128	SPLIT NQ LITHOGEOCHEMISTRY
173.00	176.00	3.00	100.00	176.00	0.06				0.00				
176.00	179.00	3.00	100.00	179.00	0.06				0.00				
179.00	182.00	3.00	100.00	182.00	0.27				0.00				
182.00	185.00	3.00	100.00	185.00	2.15				0.00				
185.00	188.00	3.00	100.00	188.00	0.12				0.00				
188.00	191.00	3.00	100.00	191.00	0.09				0.00				
191.00	194.00	3.00	100.00	194.00	0.06				0.00				
194.00	197.00	2.90	96.67	197.00	0.08				0.00				
197.00	200.00	3.00	100.00	200.00	0.03				0.00				
200.00	203.00	3.00	100.00	203.00	0.04	200.00	466	174.00	2.68				
203.00	206.00	3.00	100.00	206.00	0.06				0.00				
206.00	209.00	3.00	100.00	209.00	0.07				0.00	208.00	209.00	38129	SPLIT NQ LITHO + PETROLOGY
209.00	212.00	3.00	100.00	212.00	0.06				0.00				
212.00	215.00	3.00	100.00	215.00	0.04				0.00				
215.00	218.00	2.95	98.33	218.00	0.04				0.00				
218.00	221.00	3.00	100.00	221.00	0.01				0.00				
221.00	224.00	3.00	100.00	224.00	0.03				0.00				
224.00	227.00	3.00	100.00	227.00	0.05				0.00				
227.00	230.00	3.00	100.00	230.00	0.03				0.00	228.20	229.20	38130	SPLIT NQ LITHO
230.00	233.00	3.00	100.00	233.00	0.05				0.00				
233.00	236.00	3.00	100.00	236.00	0.05	233.00	738	273.00	2.70				
236.00	239.00	3.00	100.00	239.00	0.03				0.00				
			0.00						0.00				
			0.00						0.00				

091668

APPENDIX 4

Log of Hole MM2, Tullah Flat

HOLE No. MM2

PASMINCO EXPLORATION
DIAMOND DRILL CORE RECORD

LOCATION	TASMANIA
PROJECT	TULLAH EL 22/90
PROSPECT	TULLAH FLAT
DESIGNED BY	J.G. PURVIS
LOGGED BY	J.G. PURVIS
RELOGGED	
COMMENCED	25.11.93
COMPLETED	20.12.93
DRILLED BY	W. HOW
DRILL RIG	LONGYEAR 38

OBJECTIVE

TO TEST STRONG OFF-HOLE EM ANOMALY DETECTED IN DOWNHOLE SURVEY OF HOLE MM1a.

RESULT

NO OBVIOUS SOURCE FOR EM ANOMALY INTERSECTED, APART FROM ZONES OF BLACK SHALE WITH UP TO 5-7% PYRRHOTITE AND PYRITE.

LOCATION/SURVEY DATA (AMG)

Grid	AMG		RL Collar m	177.47
Northing m	5376492.09		Bearing Collar	090°
Easting m	385071.09		Dip Collar	-70°
DH Survey Type	SINGLE SHOT EASTMAN CAMERA		Length Hole m	332.0m

Depth m	Bearing	Dip	Depth m	Bearing	Dip
COLLAR	090°	-70°			
30	092.25°	-66.5°			
58	090.5°	-64.25°			
89	089.5°	-57°			
119	088°	-56°			
149	087°	-54°			
179	086°	-51.5°			
209	291° *	-49°			
239	085°	-47.5°			
269	084°	-47°			
299	085°	-45.75°			
332	084.5°	-44.5°			

*Unreliable reading.

SIGNIFICANT INTERSECTIONS

From m	To m	Interval m	Pb	Zn	Ag	Au		Comments
264.5	264.8	0.3	490	3.86%	3	0.013		Fractured zone in Black Shale c̄ py + sp veinlets.
311.5	312.75	1.25	261	2098	<1	0.013		Black Shale c̄ 3-5% po>>py; 1% sp in veinlets

SIGNIFICANT CORE LOSS

From m	To m	% Lost
24	32	16
51.3	55.6	42
96.9	110	27

POOR GROUND CONDITION ZONES

From m	To m	Condition
51.4	56.0	BADLY BROKEN DUE TO FAULT // LCA
99	109	BADLY BROKEN DUE TO MAJOR FAULT
121.7	126	BADLY BROKEN DUE TO SEVERAL FAULTS

HOLE SIZE

Size	Depth m
HW	6
HQ	24.6
NQ	332.0

HOLE CONDITIONS AFTER COMPLETION

Collar	HW STEMPIPE WITH CAP (HW CASING REMOVED)
Steel Casing	HQ CASING LEFT TO 24.6m.
PVC Casing	40mm UNSLOTTED PVC CASING PLACED TO BASE.
Ground Water	
Wedge	
Drill Pad	

008100

PASMINCO EXPLORATION
SUMMARY DIAMOND DRILL CORE LOG

HOLE No. MM2

PROJECT: TULLAH EL 22/90

Graphic Scale 1:

From m	Interval m	Code	Description	Depth	Graphic	From m	Interval m	Code	Description	Depth	Graphic

SUMMARY LOG - HOLE MM2

0 - 24.0m: FLUVIOGLACIAL GRAVELS.

24.0 - 51.4m: FINE QUARTZOSE SANDSTONE. Minor to 1% py.

51.4 - 126.0m: BLACK SHALE. Major fault 98.3-107.5m. 1-3% py, trace sp-gn.

126.0 - 228.3m: VOLCANICLASTIC SANDSTONE. Minor to 1% py. Trace sp.

228.3 - 264.8m: BLACK SILTSTONE/SHALE. 3% po-py, locally 5-7%. Minor sp. 40mm vein of sp @ 264.55m.

264.8 - 298.0m: QUARTZO-FELDSPATHIC SANDSTONE. Minor py-po, trace sp.

298.0 - 310.7m: BLACK SHALE. Local strong carbonatisation. 3-4% po-py.

310.7 - 332.0m: SHALE & SILTSTONE/SANDSTONE. Highly carbonatised. Above 316m & below 331m: 3-5% po-py, trace sp. Elsewhere minor po-py.

END OF HOLE

800123

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MM2

PROJECT: TULLAH EL 22/90

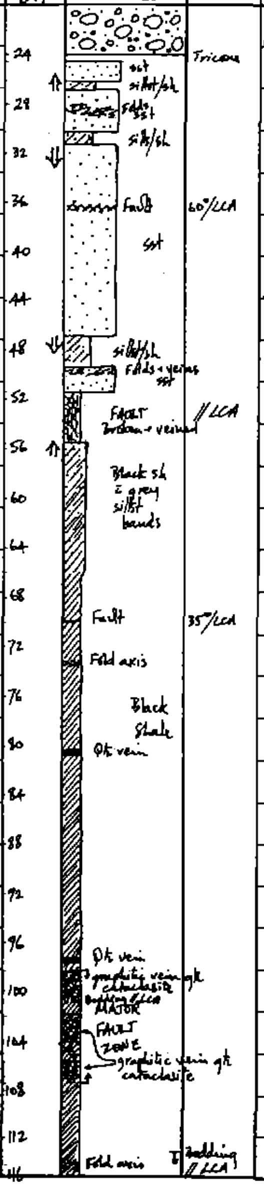
Graphic Scale 1: 480

CORE RECOVERY (From m | Interval m | % | RQD) — **DESCRIPTION** (From m | Interval m | (incl. LITHOLOGY, STRUCTURE & ALTERATION) | Depth (m) | Graphic Lithology | Struct.) — **MINERALISATION** — **CODES** (LITHO | STRUCT | ALTN | MIN)

0 - 24.0m: FLUVIOGLACIAL GRAVELS
No recovery.

24.0 - 51.4m: FINE QUARTZOSE SANDSTONE
Lithology: Grey. Massive. Fi-med gr.
Interbedded siltstone/shale above 32m & below 46m.
Sst is qtzose>feldspathic, with minor mica & carbonaceous material, all in calcareous cement. Rare small deformed slivers of black shale.
Alteration: Trace sericite-chlorite alteration. Feldspars mildly carbonatised.
Veining: Common qtz-carb veins & carb veinlets (Fe/Mn calcite).
Structure: Sst gen massive with poorly-developed bedforms.
Mod-strong bedding// slatey cleavage. Broken in places, due to scattered shears & fractured zones (often assoc with veining).
26.5m: Uphole fining sst bed, 50°/LCA.
28-29.5m: Small-scale folding & warping of bedding, & qtz-carb veins.
32m: Downhole fining sst bed.
36.3-36.6m: Brittle fault 25°/LCA (// cleav).
44m: Bedding 30°/LCA (dips 88° to 235°AMG).
47.7m: Bedding 33°/LCA (fines & faces downhole).
49.2-51.4m: Small-scale folding &warping of bedding, & qtz-carb veins.
Basal contact faulted & broken up, poss 20°/LCA.
Mineralization: Minor to 1% py, dissem, best above 33m. Trace gn-sp in qtz-carb veins.

51.4 - 126.0m: BLACK SHALE
Lithology: Increasingly carbonaceous with depth. Graphitic on cleavage esp in faults. Weakly calcareous in places. Above 66m interbeds of calcareous siltst/fine sst & shale itself has silty component.
Alteration: Essentially unaltered - minor sericite & chlorite in the carb veinlets in upper 10-15m of unit, & in & around faulted zones.
Veining: Qtz-carb veins to 500mm, & abund carb (±qtz) veinlets (Fe/Mn calcite), both gen //cleav. Some disrupted by post-vein cleav movement.



Mineralisation:
FLUVIOGLACIAL GRAVELS
FINE QUARTZOSE SANDSTONE
BLACK SHALE

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MM2

PROJECT: TULLAH EL 22/90

Graphic Scale 1: 400

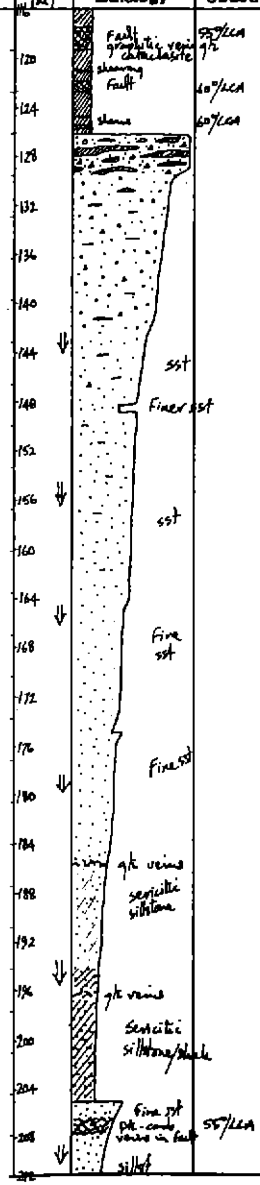
CORE RECOVERY				DESCRIPTION		
From m	Interval m	%	RQD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)

Structure: Strong bedding// slatey S1 cleavage. S2 cleavage visible in places.
Minor tight fold axes evident, esp around some veined &/or faulted zones. Fissile & broken (badly above 56m, 89–94m, 99–109m, & below 121.7m).
51.4–55.6m: Brittle fault (//LCA?), marked by So/S1 // LCA.
55.85m: Bedding, fining uphole, 41°/LCA (dips 78° to 255° AMG).
60–70m: Zone of v strong cleav, several tight folds, some kinking of cleav.
69.5m: Bedding 55°/LCA.
70.2m: Brittle fault (150mm pug) 35°/LCA (//cleav) @ 70.2m.
73.4m: Fold axis.
77m: Bedding & S1 68°/LCA, S2 50°/LCA (same sense as So/S1).
84m: S1 55°/LCA.
98.35–107.5m: MAJOR FAULT (brittle with graphitic vein–qtz cataclasite).
113m: So 3°/LCA (dip 59° to 057° AMG), S1 20°/LCA (dip 80° to 032° AMG)
113–117m: Broad F2 (?) fold axis centered 115.25m – So & S1 at low angle or // to LCA.
117.4–119.4m: Strong fault, with graphitic vein–qtz cataclasite, 60°/LCA (//cleav).
121.8–122.6m: Brittle fault (only 150mm recovered).
125–125.6m: Several small brittle faults, 65°/LCA (// So/S1 @ 55°/LCA).
Basal contact sharp, conformable, 60°/LCA.

Mineralization: 51.4–69.5m: 3% py, locally +5%, as dissem (commonly streaked out along cleavage) & stringers. Py common in carb veinlets along with minor persistent sp–gn.
69.5–92.5m: 1–2% py (decreasing with depth), dissem & stringers, trace sp–gn in carb veinlets.
92.5–98m: 2–3% py, dissem & stringers. Minor sp–gn in carb veinlets.
98–101.3m: 3–5% py, dissem & stringers, trace sp–gn in carb veinlets.
101.3–126m: 2–3% py, dissem & stringers, best sulphides 117.5–120m assoc with faulted zone.

126.0 – 228.35m: VOLCANICLASTIC SANDSTONE
Downhole–fining depositional unit, ranging from fine breccia at base (to 129m), to xyl-lithic coarse sst/grit (129–143m), fine sst (below 166m), to sericitic siltstone/shale with minor sst intercalations (below 193m).
Lithology: Pale grey. Massive. Largely unbroken.

Depth (m) | Graphic Lithology | Struct.



MINERALISATION

BLACK
SHALE

Fine breccia with ripped-up black shale clasts + bands

Coarse sst/grit with small black shale frags

VOLCANICLASTIC
SANDSTONE

CODES			
LITHO	STRUCT	ALTN	MIN

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

PROJECT: TULLAH EL 22/90

HOLE No. MM2

Graphic Scale 1: 400

Page 5 of 14

CORE RECOVERY				DESCRIPTION			CODES			
From m	Interval m	%	RQD	From m	Interval m	(incl. LITHOLOGY, STRUCTURE & ALTERATION)	LITHO	STRUCT	ALTN	MIN

To129m: Fine sed breccia with ripped up clasts & bands (to 150mm) of black shale from underlying unit, & lesser small (5–10mm) stretched lithics of sst.

Unit composed of abraded volc qtz grains (2mm max at base & fining downhole), similar sized feld grains (highly deformed above 150m), & lesser lithics (incl clasts & tiny threads of black shale).

Matrix has substantial component of volc glass incl v fine pumice frags.

Alteration: Weak pervasive carb alt throughout. Volc glass component is strongly sericitised (overall, rock is moderately sericitic).

Weak chloritisation below 180m.

Veining: Qtz–carb(±chlor) veins & veinlets, most // cleav. Several zones of abund irreg veins, largest 206.5–207.7m (sericite-epidote alt fault zone 50–60°/LCA, //cleav).

Structure: Sl grainsize variations below 148m but bedding only rarely visible in fine gr upper part of unit below 193m (bedding: 70°/LCA @ 201.5m, 75°/LCA @ 204.7m, 69°/LCA @ 222.5m).

Marked stretching fabric (esp above 150m) due to strong bedding-// slatey cleavage.

Cleavage cut in opp sense by spaced kink bands @ 50–60°/LCA.

Cleavage: 60°/LCA @ 134m (dips 72° to 268° AMG); 65°/LCA @ 149m (dips 64° to 260° AMG); 64°/LCA @ 160m; 64°/LCA @ 178m; 70°/LCA @ 194m; 73°/LCA @ 219m.

Basal (stratigraphic top) contact, sharp & conformable, 68°/LCA.

Mineralization: 126–129m: 2–3% dissem py. 25x5mm massive py clast @ 126.3m.

129–200m: Minor to 1% dissem py. Trace sp & rare gn (dissem & in qtz-carb veinlets).

200–228.35m: V minor dissem & veinlet py. Rare sp. 20mm of 10% sp dissem // cleav @ 216.5m.

228.35 – 264.8m: BLACK SILTSTONE/SHALE

Lithology: Predom carbonaceous (sl graphitic in places), partly-calcareous siltstone & shale, with interbeds (mainly below 250m) of qtz-feld xyl volcaniclastic sst & fine stretched-pebble breccio-conglomerate.

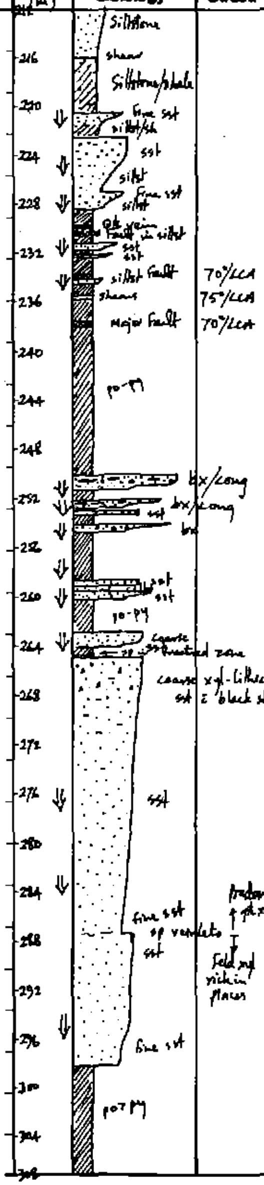
Alteration: Weak sericite-chlorite-carbonate alt.

Veining: Common veinlets & lesser veins (all //cleav) of qtz-calcite (±chlor-sericite). Several veins of qtz-ankerite below 262.8m (assoc with mineralization).

Structure: Sst bands all graded & fining downhole.

Bedding: 63°/LCA @ 245.8m; 69°/LCA @ 254.5m; 70°/LCA @ 262.6m.

Depth (m) | Graphic Lithology | Struct.



MINERALISATION

VOLCANICLASTIC SANDSTONE

BLACK SHALE/SILTSTONE

QUARTZO-FELDSPATHIC SANDSTONE

BLACK SHALE

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MM2

PROJECT: TULLAH EL 22/90

Graphic Scale 1: 400

DESCRIPTION

(Incl. LITHOLOGY, STRUCTURE & ALTERATION)

Moderate bedding-// slatey cleavage.

Broken above 238.5m, assoc with several large brittle faults as follows:

230-230.7m: highly fractured & broken (0.4m lost core).

233.55-234m: 70°/LCA, contorted & brecciated (but unbroken) black shale.

235.4-235.85m: puggy shears in shale, 75°/LCA.

237.5-238m: Major Fault 70°/LCA (// cleav), pug & cataclasite.

Basal contact abrupt & conformable 80°/LCA.

Mineralization: 228.35-233m: 1% dissem & veinlet py>sp.

233-240m: 2% dissem & veinlet py. Trace sp & po in qtz-carb veinlets.

240-246m: 3-4% po>>py, dissem & veinlets, both aligned in cleav.

246-249m: 2% po>py, as above. Trace cp @ 247.7m.

249-250.2m: 5-7% po>>py, mostly dissem.

250.2-255m: 1-2% po>py. Trace sp.

255-256m: 5-7% po>>py, mostly dissem. Trace cp.

256-256.7m: 1-2% po>py.

256.7-257.5m: 5-7% po>>py. Trace cp.

257.5-260m: Minor to 2% po-py (varies - best in black shale sections).

260-263m: 3% po-py, dissem & veinlets. Minor sp in qtz-carb veinlets.

20mm ankerite-qtz-aspy vein @ 262.85m, 75°/LCA (// bedding/cleav).

263-264.5m: 1% po-py (varies - to 3% in black shale bands). Trace sp.

264.5-264.8m: Highly fractured zone in black shale with veinlets of qtz-ankerite & 40mm irreg vein of coarse xylline sp>py @ 264.55m. Elsewhere 2-3% dissem & veinlet py, minor sp.

264.8 - 297.95m: QUARTZO-FELDSPATHIC SANDSTONE

Lithology: Pale grey. Massive. Uniform.

Single unbedded downhole-fining depositional unit.

Composed of abund abraded xyls or angular xyl frags, of qtz>feld.

Xyl grains 2-3mm max at base & 1mm max at top of unit.

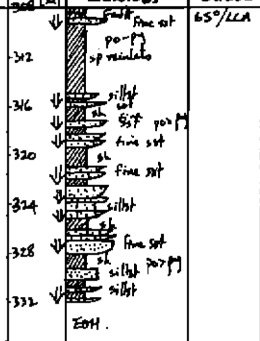
Feld common in places below 287.5m.

Minor stretched sed lithics (incl black shale), to 20mm at base.

All in matrix containing sericitised volc glass, incl fine pumice frags.

Alteration: Mod pervasive carb alt to 290m. Weak sericitisation. Trace silica-chlorite alt in places.

Graphic (Depth / Lithology / Struct.)



MINERALISATION

BLACK SHALE

CARBONATISED SHALE, & SILTSTONE/SANDSTONE

CORE RECOVERY From m	Interval m	%	RQD	CODES LITHO	STRUCT	ALTN	MIN

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. MM2

PROJECT: TULLAH EL 22/90

Graphic Scale 1:

CORE RECOVERY				DESCRIPTION							CODES			
From m	Interval m	%	RQD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic Lithology	Struct.	MINERALISATION	LITHO	STRUCT	ALTN	MIN

Veining: Minor qtz–carb(±chlor) veining.
Structure: Unbroken. Weak–moderately cleaved.
Cleavage: 75°/LCA @ 280m; 67°/LCA @ 294m;
Basal (stratigraphic top) contact abrupt & conformable 76°/LCA.
Mineralization: V minor dissem py, po. Trace sp (incl veinlets of sp 286.5–287.5m).

297.95 – 310.7m: BLACK SHALE
Lithology: Predom black carbonaceous shale (sl graphitic on cleavage).
Minor interbeds of grey calcareous siltstone & fine feldspathic sst.
Alteration: Patchy, locally strong, carbonatisation (in places shale sl bleached by this alt).
Veining: Abund calcite veinlets throughout.
Structure: Slightly broken.
Moderate bedding–// slatey cleavage (74°/LCA @ 299m, dips 57° to 264° AMG).
Bedding: 66°/LCA @ 308.7m.
Brittle fault with 100mm pyritic pug, 65°/LCA (// bedding) @ 308.3m.
Basal contact abrupt (sl irreg), conformable, 75°/LCA.
Mineralization: 3–4% po>py, trace cp. Dissem & stringers (both along cleav), & in carb veinlets.

310.7 – 332.0m: CARBONATISED SHALE & SILTSTONE/SANDSTONE
Lithology: Dark grey. Essentially unbroken.
Interbedded grey to black calcareous partly carbonaceous shale, & calcareous v fine sst/siltstone in graded beds av 100–200mm (to 1m max) all fining downhole.
Sst/siltstone composed of tiny (<1mm) grains of qtz, feld & lithics (incl black shale frags).
Feld & lithics stretched by cleavage deformation.
Shale to 315.5m, predom sst/siltst below this.
Alteration: 90% of sequence (all sed types) affected by very strong but sl patchy carbonatisation. In places this alt sl bleaches the shale.
Veining: Thin spidery calcite veinlets throughout (not abund).
Structure: Gen regularly bedded: 67°/LCA @ 317m; 72°/LCA @ 326m.
Moderate bedding–// cleavage (weaker than in units above).

HOLE No. MM2

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

PROJECT: TULLAH EL 22/90

Graphic Scale 1:

CORE RECOVERY				DESCRIPTION							CODES			
From m	Interval m	%	RQD	From m	Interval m	(incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic Lithology	Struct.	MINERALISATION	LITHO	STRUCT	ALTN	MIN
						Mineralization: 310.7–312.75m: 3–5% po>>py, dissem & in qtz–carb veinlets. 1% sp in veinlets 311.5–312.75m.								
						312.75–315.5m: 2% po>>py.								
						315.5–331m: Minor po–py.								
						331–332m: 3–5% po>>py, mostly dissem.								
						END OF HOLE								

008123

PASMINCO EXPLORATION
DIAMOND DRILL CORE ASSAY DATA

HOLE No. MM 2

PROJECT: TULLAH EL 22/90

SAMPLE						ASSAYS (ppm unless specified)														COMMENTS
Number	Type	From m	To m	Interval m	Recovered m	Cu	Pb	Zn	Ag	Au	As	Ba	Bi	Sn	W	Mo				
036043	SPLIT NQ	63	65	2		123	396	399	<1	0.014	280	326	<5	9	<5	12				Black shale c̄ 5% py + trace sp-gn.
036044	SPLIT NQ	98.3	101.3	3	1.8	17	63	63	<1	0.100	530	151	13	76	17	13				3-5% py, trace sp-gn in cataclasite.
036045	SPLIT NQ	117.35	119.4	2.05		13	34	49	2	0.068	230	140	<5	68	5	9				3-4% py, in qtz-vein cataclasite.
036046	SPLIT NQ	122.6	124.6	2		59	157	213	1	0.014	40	409	<5	12	<5	11				Black shale c̄ 2-3% dissem py.
036047	SPLIT NQ	240	242	2		87	92	110	1	<0.008	18	698	7	7	10	8				Black shale c̄ 3-4% po>>py.
036048	" "	242	244	2		94	45	112	1	<0.008	18	797	5	6	<5	7				" " " " " " "
036049	" "	244	246	2		83	29	123	<1	<0.008	25	915	<5	11	8	5				" " " " " " "
036050	" "	249	250.2	1.2		87	40	129	<1	0.011	13	929	<5	<3	<5	10				Black shale c̄ 5-7% po>>py.
036051	" "	255	256	1		83	61	176	<1	0.009	18	911	<5	8	<5	13				" " " " " " ". Trace cp.
036052	" "	256.7	257.5	0.8		87	39	119	<1	0.009	18	861	<5	10	<5	9				" " " " " " " " "
036053	" "	261	263	2		66	163	344	1	0.012	520	806	7	7	6	10				Black shale c̄ 3% po-py, minor sp-aspy.
036054	" "	264.5	264.8	0.3		142	490	3.86%	3	0.013	220	530	22	53		11				Fractured zone in black shale c̄ py + sp.
036056	" "	297.95	300	2.05		77	85	463	1	0.008	31	1044	<5	4	10	12				Black shale c̄ 3-5% po>>py. Trace sp, cp.
036057	" "	300	302	2		84	27	148	<1	<0.008	27.5	1117	6	5	<5	6				Black shale c̄ 3-5% po>py.
036058	" "	302	304	2		90	86	185	<1	0.010	21.5	1204	<5	8	<5	12				Black shale c̄ 3-4% po>py.
036059	" "	304	306	2		87	27	159	<1	0.021	22	1216	<5	7	<5	9				Black shale c̄ 3-5% po>py.
036060	" "	306	308	2		86	57	236	<1	0.012	45.5	1169	5	8	8	15				" " " " " "
036061	" "	308	310	2		79	101	290	<1	<0.008	21	929	5	7	<5	15				" " 3-4% po-py.
036062	" "	311.5	312.75	1.25		100	261	2098	<1	0.013	15	898	8	12	10	9				Black shale c̄ 3-5% po>>py, 1% sp.
Laboratory	ANALABS, COBEE			Analytical Method		AAS	AAS	AAS	AAS GA104	(FA) GG309	HA140 + AAS	XRF	XRF	XRF	XRF	XRF				
Job-No. PASEX: 1429. 11310-60-09964		Date 11.1.94		Detection Limit		2	3	2	1	0.008	50 0.5	10	5	3	5	3				

HOLE No. MM2

PROJECT: Tullah Flat
Tullah EL22/90

PASMINCO EXPLORATION
DIAMOND DRILL HOLE SUPPLEMENTARY DATA

PETROLOGY

SAMPLE NUMBER: 036055 MM2, 274.5m.

SUMMARY:

This is an intensely foliated rock in which all trace of original texture is obliterated. It is composed of abundant often broken, albitized plagioclase phenocrysts and less abundant broken and marginally reacted quartz phenocrysts set in a strongly foliated groundmass composed largely of sericite overprinting very fine-grained quartzo-feldspathic material after glass. Calcite veins are stretched into the foliation, and there was clearly abundant calcite in the sample before foliation development. This rock was probably fragmental, possibly a crystal vitric tuff, or alternatively it was a crystal-rich volcaniclastic sediment with a vitric ash groundmass. It has clearly suffered strong recrystallization in a fault zone.

CORE PROCESSING RESULTS

DRILL HOLE NUMBER mm2

CORE RECOVERY				mmgsus S.I units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M.SUS	DEPTH	WEIGHT	VOL.	S.G	FROM	TO	TICKET #	COMMENTS
17.00	19.40	0.30	12.50	19.40	0.00				0.00				
19.40	20.00	0.20	33.33	20.00	0.00				0.00				
20.00	20.60	0.40	66.67	20.60	0.00				0.00				
20.60	22.00	0.20	14.29	22.00	0.00				0.00				
22.00	24.00	0.00	0.00	24.00	0.09				0.00				
24.00	26.00	1.30	65.00	26.00	0.10				0.00				
26.00	29.00	2.70	90.00	29.00	0.42				0.00				
29.00	30.20	1.30	108.33	30.20	0.20				0.00				
30.20	32.00	1.40	77.78	32.00	0.09				0.00				
32.00	34.30	2.15	93.48	34.30	0.26				0.00				
34.30	36.60	2.10	91.30	36.60	0.28				0.00				
36.60	38.00	1.35	96.43	38.00	0.19				0.00				
38.00	41.00	2.90	96.67	41.00	0.15	38.50	539	206.00	2.62				
41.00	43.10	2.10	100.00	43.10	0.12				0.00				
43.10	44.00	0.80	88.89	44.00	0.03				0.00				
44.00	46.00	2.00	100.00	46.00	0.17				0.00				
46.00	47.60	1.40	87.50	47.60	0.14				0.00				
47.60	48.30	0.70	100.00	48.30	0.18				0.00				
48.30	50.70	2.40	100.00	50.70	0.11				0.00				
50.70	51.30	0.55	91.67	51.30	0.36				0.00				
51.30	53.00	1.35	79.41	53.00	0.03				0.00				
53.00	54.60	0.55	34.38	54.60	0.00				0.00				
54.60	55.60	0.60	60.00	55.60	0.26				0.00				
55.60	58.20	2.55	98.08	58.20	0.13				0.00				
58.20	61.20	3.05	101.67	61.20	0.12				0.00				
61.20	62.00	0.70	87.50	62.00	0.06				0.00				
62.00	65.00	3.00	100.00	65.00	0.44				0.00	63.00	65.00	36043	
65.00	68.00	2.95	98.33	68.00	0.13				0.00				
68.00	71.00	2.90	96.67	71.00	0.21				0.00				
71.00	73.30	2.20	95.65	73.30	0.15				0.00				
73.30	76.40	2.95	95.16	76.40	0.08				0.00				
76.40	77.00	0.60	100.00	77.00	0.12				0.00				
77.00	80.00	2.95	98.33	80.00	0.13	77.30	654	246.00	2.66				
80.00	83.00	2.95	98.33	83.00	0.04				0.00				
83.00	86.00	3.00	100.00	86.00	0.04				0.00				
86.00	89.00	2.95	98.33	89.00	0.11				0.00				

CORE PROCESSING RESULTS DRILL HOLE NUMBER mm2

CORE RECOVERY				m.gsm S.I units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M.SUS	DEPTH	WEIGHT	VOL.	S.G	FROM	TO	TICKET #	COMMENTS
89.00	91.30	2.15	93.48	91.30	0.09				0.00				
91.30	92.10	0.60	75.00	92.10	0.03				0.00				
92.10	94.80	2.60	96.30	94.80	0.18				0.00				
94.80	96.90	2.20	104.76	96.90	0.13				0.00				
96.90	99.90	2.20	73.33	99.90	0.17				0.00	98.30	101.30	36044	
99.90	101.30	0.70	50.00	101.30	0.30				0.00				
101.30	103.30	1.10	55.00	103.30	0.07				0.00				
103.30	105.30	1.80	90.00	105.30	0.02				0.00				
105.30	106.70	1.00	71.43	106.70	0.17				0.00				
106.70	108.90	1.10	50.00	108.90	0.29				0.00				
108.90	110.00	1.70	154.55	110.00	0.07				0.00				
110.00	112.00	2.15	107.50	112.00	0.12				0.00				
112.00	113.00	0.90	90.00	113.00	0.06				0.00				
113.00	115.80	2.80	100.00	115.80	0.08				0.00				
115.80	118.90	3.10	100.00	118.90	0.25				0.00	117.35	119.40	36045	
118.90	121.80	2.70	93.10	121.80	0.07				0.00				
121.80	122.60	0.20	25.00	122.60	0.34				0.00				
122.60	123.00	0.40	100.00	123.00	0.12				0.00	122.60	124.60	36046	
123.00	124.60	1.40	87.50	124.60	0.07				0.00				
124.60	125.00	0.25	62.50	125.00	0.20				0.00				
125.00	126.60	1.30	81.25	126.60	0.03				0.00				
126.60	128.00	1.40	100.00	128.00	0.03				0.00				
128.00	131.00	3.00	100.00	131.00	0.06				0.00				
131.00	134.00	3.00	100.00	134.00	0.10				0.00				
134.00	137.00	3.00	100.00	137.00	0.09				0.00				
137.00	140.00	3.00	100.00	140.00	0.08				0.00				
140.00	143.00	3.00	100.00	143.00	0.04				0.00				
143.00	146.00	3.00	100.00	146.00	0.06				0.00				
146.00	147.80	1.75	97.22	147.80	0.02				0.00				
147.80	149.00	1.20	100.00	149.00	0.15				0.00				
149.00	152.00	3.00	100.00	152.00	0.05				0.00				
152.00	155.00	3.00	100.00	155.00	0.03				0.00				
155.00	158.00	3.00	100.00	158.00	0.01	155.00	688	266.00	2.59				
158.00	161.00	3.00	100.00	161.00	0.08				0.00				
161.00	164.00	3.00	100.00	164.00	0.05				0.00				
164.00	167.00	3.00	100.00	167.00	0.04				0.00				

CORE PROCESSING RESULTS DRILL HOLE NUMBER mm2

CORE RECOVERY				mag sus S.I units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M SUS	DEPTH	WEIGHT	VOL	S.G	FROM	TO	TICKET #	COMMENTS
167.00	170.00	3.00	100.00	170.00	0.04				0.00				
170.00	173.00	3.00	100.00	173.00	0.05				0.00				
173.00	176.00	3.00	100.00	176.00	0.30				0.00				
176.00	179.00	2.90	96.67	179.00	0.02				0.00				
179.00	182.00	3.00	100.00	182.00	0.14				0.00				
182.00	185.00	3.00	100.00	185.00	0.22				0.00				
185.00	188.00	3.00	100.00	188.00	0.06				0.00				
188.00	191.00	3.00	100.00	191.00	0.04				0.00				
191.00	194.00	3.00	100.00	194.00	0.05				0.00				
194.00	197.00	2.90	96.67	197.00	0.05	196.00	498	198.00	2.52				
197.00	200.00	3.10	103.33	200.00	0.04				0.00				
200.00	203.00	3.00	100.00	203.00	0.03				0.00				
203.00	206.00	3.00	100.00	206.00	0.08				0.00				
206.00	209.00	2.90	96.67	209.00	0.06				0.00				
209.00	212.00	2.80	93.33	212.00	0.06				0.00				
212.00	215.00	3.00	100.00	215.00	0.04				0.00				
215.00	217.00	2.10	105.00	217.00	0.04				0.00				
217.00	218.00	0.90	90.00	218.00	0.03				0.00				
218.00	218.50	0.50	100.00	218.50	0.42				0.00				
218.50	221.00	1.50	60.00	221.00	0.03				0.00				
221.00	224.00	3.00	100.00	224.00	0.05				0.00				
224.00	227.00	3.00	100.00	227.00	0.04				0.00				
227.00	230.00	2.90	96.67	230.00	0.16				0.00				
230.00	230.60	0.20	33.33	230.60	0.09				0.00				
230.60	230.70	0.10	100.00	230.70	0.21				0.00				
230.70	233.00	2.10	91.30	233.00	0.17				0.00				
233.00	236.00	3.00	100.00	236.00	0.13				0.00				
236.00	239.00	2.90	96.67	239.00	0.34				0.00				
239.00	242.00	3.00	100.00	242.00	3.04				0.00	240.00	242.00	36047	
242.00	245.00	3.00	100.00	245.00	1.47				0.00	242.00	244.00	36048	
245.00	248.00	3.00	100.00	248.00	0.48				0.00	244.00	246.00	36049	
248.00	251.00	3.00	100.00	251.00	0.87				0.00	249.00	250.20	36050	
251.00	254.00	3.00	100.00	254.00	0.57				0.00				
254.00	257.00	3.00	100.00	257.00	5.54				0.00	255.00	256.00	36051	
257.00	260.00	3.00	100.00	260.00	0.01				0.00	256.70	257.50	36052	
260.00	263.00	3.00	100.00	263.00	0.30				0.00	261.00	263.00	36053	

CORE PROCESSING RESULTS

DRILL HOLE NUMBER mm2

CORE RECOVERY				mag sus S.I units		S.G				SAMPLING INTERVALS			
FROM	TO	REC	%REC	DEPTH	M SUS	DEPTH	WEIGHT	VOL	S.G	FROM	TO	TICKET #	COMMENTS
263.00	266.00	3.00	100.00	266.00	0.06				0.00	264.50	264.80	36054	
266.00	269.00	3.00	100.00	269.00	0.12				0.00				
269.00	272.00	3.00	100.00	272.00	0.11				0.00				
272.00	275.00	3.00	100.00	275.00	0.08				0.00	274.50		36055	petrology
275.00	278.00	3.00	100.00	278.00	0.07				0.00				
278.00	280.70	2.70	100.00	280.70	0.06				0.00				
280.70	283.80	3.10	100.00	283.80	0.28				0.00				
283.80	286.90	3.10	100.00	286.90	0.46				0.00				
286.90	290.00	3.10	100.00	290.00	0.28				0.00				
290.00	293.00	3.00	100.00	293.00	0.16	290.00	580	223.00	2.60				
293.00	296.00	3.00	100.00	296.00	0.76				0.00				
296.00	299.00	3.00	100.00	299.00	7.58				0.00				
299.00	302.00	3.00	100.00	302.00	2.24				0.00	297.95	300.00	36056	
302.00	305.00	3.00	100.00	305.00	1.80				0.00	300.00	302.00	36057	
305.00	308.00	3.00	100.00	308.00	0.21				0.00	302.00	304.00	36058	
308.00	311.00	3.00	100.00	311.00	3.71				0.00	304.00	306.00	36059	
311.00	314.00	2.90	96.67	314.00	0.93				0.00	306.00	308.00	36060	
314.00	317.00	3.05	101.67	317.00	0.27				0.00	308.00	310.00	36061	
317.00	320.00	1.45	48.33	320.00	0.24				0.00	311.50	312.75	36062	
320.00	323.00	3.00	100.00	323.00	0.23				0.00				
323.00	326.00	3.00	100.00	326.00	0.31				0.00				
326.00	329.00	3.00	100.00	329.00	0.29				0.00				
329.00	332.00	3.00	100.00	332.00	1.46				0.00				

APPENDIX 5

Rock Sample Ledger, Mackintosh Dam

PASMINCO EXPLORATION
GEOCHEMICAL ANALYSES RECORD

PROSPECT MACKINTOSH DAM

PROJECT TULLAH EL 22/90

Sample Type ROCK

Sample No.	Sample Type	Location (AMG)	Cu	Pb	Zn	Ag / Au	As / Ba	Rb / Sr	V / Nb	Y / Zr	Al_2O_3 / SiO_2 (%)	TiO_2 / Fe_2O_3	MnO / Na_2O	CaO / K_2O	MgO / P_2O_5	LOI / SO_3	Cr	COMMENTS
036013	o/c	5382550N / 387100E	150	1824	0.90%	1 / <0.008	80 / 324	/	/	/	/	/	/	/	/	/		Sericite-fuchsite altered siliceous rock c 1% py.
036016	o/c	5382530N / 387100E	18	10	208	<1 /	12 / 385	69 / 255	204 / 8	26 / 279	14.35 / 54.3	1.23 / 10.32	0.19 / 3.51	4.79 / 1.61	3.39 / 0.257	6.24 / 0.08	48	Chloritised basalt dyke. Trace cp.
036017	o/c	5382580N / 387100E	<2	11	50	<1 /	7 / 263	101 / 75	18 / 14	41 / 212	11.24 / 75.5	0.22 / 2.88	0.04 / 2.60	1.22 / 2.09	0.85 / 0.055	3.02 / 0.03	11	Tuffaceous vitric siltstone. Mildly sericitised.
036020	o/c	5382600N / 387120E	15	5	45	<1 / <0.008	17 / 392	196 / 209	221 / 6	11 / 64	11.29 / 47.8	0.35 / 7.89	0.29 / 0.36	9.53 / 4.00	3.44 / 0.094	15.06 / 0.26	342	Sericite-fuchsite-carbonate altered volcaniclastic sst c minor dissem py.
036021	o/c chips 3m x 2m	5382600N / 387121E	<2	<3	38	<1 / <0.008	13 / 161	/	/	/	/	/	/	/	/	/		Dolomite(?)-veined sericite-fuchsite altered sst with several % dark grey sulphide + py in dolomite.
		DETECTION LIMIT:	2	3	2	1 / 0.008	1 / 10	5 / 5	5 / 3	5 / 5	0.05 / 0.1	0.01 / 0.01	0.01 / 0.05	0.01 / 0.01	0.01 / 0.005	0.01 / 0.01	5	
		METHOD:	AAS	AAS	AAS	AAS / FA309	HAH01 / XRF	XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF / XRF	XRF	

ANALYSED BY ANALABS COOEE + PERTH. 20.10.93.
JOB No: 1424 (PAS EX); 11310.60 09820 (ANALABS)

A 18625

863138

TULLABARDINE CREEK
5382580mN / 387100mE

SAMPLE: PASMINCO 036018

SUMMARY: This sample is a silty mudstone derived from felsic vitric ash and detrital fine-grained quartz and albite phenocryst debris. It has altered to fine-grained quartzo-feldspathic intergrowths pervaded by sericite and fine-grained calcite.

HAND SPECIMEN:

This is a massive pale grey altered felsic tuff or fine-grained volcaniclastic siltstone, with common hairline fractures healed by silica.

THIN SECTION DESCRIPTION:

This sample is a quite fine-grained volcaniclastic siltstone to silty mudstone that was composed originally of angular broken phenocryst fragments of albite and quartz, mainly less than 0.2mm across. These crystal fragments make up around 5 modal% of the rock. The remainder is composed of quite strongly altered quartzo-feldspathic intergrowths after devitrified vitric ash. No trace of shard textures are preserved, as quite strong sericite mesh alteration pervades the sample, and abundant very fine-grained calcite is also present. Scattered fine-grained chlorite is also not uncommon, and abundant narrow veinlets composed of quartz and quartz-albite transect the sample. Occasional tiny pyrite crystals are disseminated through the rock.

This sample was a silty mudstone derived from felsic vitric ash and fine-grained angular detrital quartz and albite phenocryst debris.

863139

TULLABARDINE CREEK
5382600mN/387120mE

SAMPLE: PASMINCO 036019

SUMMARY: This sample is an intensely carbonate-sericite-altered volcaniclastic fine sandstone derived from glassy plagioclase+ quartz-phyric felsic volcanics and tuffs.

HAND SPECIMEN:

This is a mid-grey strongly sericite-carbonate altered fine-grained felsic volcaniclastic.

THIN SECTION DESCRIPTION:

The protolith of this sample was probably very similar to sample 36014, being a volcaniclastic sandstone to siltstone dominated by clasts of formerly glassy felsic lava, albite and quartz phenocryst debris, and abundant vitric ash matrix. However, intense carbonate-sericite alteration has thoroughly overprinted this sample, and only occasional patches of the original texture are preserved. Several still-identifiable lithic clasts were clearly once glassy felsic lavas in which the groundmass has devitrified, and then recrystallized to very fine-grained quartzo-feldspathic material (also now riddled by fine-grained calcite). In places, the calcite overprinting the sandstone is quite coarse-grained, and forms en echelon offset veinlets, as well as pervasive finer-grained material through the rock. Disseminated pyrite is a minor phase in this rock, with individual crystals rarely reaching more than 0.2mm across.

863140

TULLABARDINE CREEK
5382285mN/387035mE

SAMPLE: PASMINCO 036014 Farrell Slate volcaniclastic?

SUMMARY: This sample is a volcaniclastic sandstone derived from plagioclase+quartz-phyric explosive felsic volcanism, with a major component of vitric ash that has recrystallized to quartzo-feldspathic material with weak sericitic alteration.

HAND SPECIMEN:

This is a grey-green lithic crystal tuff or volcaniclastic sandstone with a weak foliation, possibly primary.

THIN SECTION DESCRIPTION:

This sample is probably a rather coarse volcaniclastic sandstone, although it is difficult to preclude the possibility that it was lithic vitric crystal tuff. It is composed of diverse clasts or fragments to almost 1cm long of plagioclase-phyric formerly glassy dacitic to rhyolitic lava, several of which have well-preserved perlitic cracks, as well as finer-grained vitric tuffs, and abundant 1-2mm-sized subhedral to euhedral and often broken phenocrysts of albitized plagioclase. A few rather angular, broken quartz phenocrysts fragments that are strongly strained, are also present. No detrital or other mafic phenocrysts are present in this rock. The matrix of this sample was almost certainly composed almost exclusively of vitric ash. This has devitrified to a very heterogeneous-textured fine- to medium-grained quartzo-feldspathic intergrowth that is variably altered to patchy sericite, and sericite also occurs as wavy thin bands and layers defining the weak foliation evident in the hand specimen.

This sample is probably a very proximal volcaniclastic sandstone derived from felsic plagioclase+quartz-phyric explosive volcanics,; it includes a major component of vitric ash. Alteration is probably limited to recrystallization of altered glass accompanying low-grade burial metamorphism.

863141

MACKINTOSH RIVER
5382530mN / 387100mE

SAMPLE: PASMINCO 036015

SUMMARY: This sample is an aphyric evolved tholeiitic basaltic dyke rock, with pronounced affinities to the Henty Dyke Swarm tholeiites. Pervasive sericite-chlorite-calcite alteration is probably distal hydrothermal in origin.

HAND SPECIMEN:

This is a dark grey aphyric metabasaltic lava with chloritic fractures.

THIN SECTION DESCRIPTION:

This sample is an essentially aphyric very shallow intrusive, holocrystalline basaltic dyke rock. It is quite strongly altered, and now consists of an intergrowth of sericitized plagioclase laths, less abundant totally chloritized plates of augite, quite common rather large FeTi oxides that show skeletal exsolution of ilmenite and subsequent leucoxene alteration, and interstitial anhedral quartz and chlorite. Much of the interstitial quartz and chlorite is probably secondary. Occasional elongate narrow apatite crystals are present, and a single 2mm long chloritized phenocryst of augite is also present. A few narrow calcite-chlorite veins transect the thin section.

This sample is clearly a shallow intrusive rock, and judging by the abundant interstitial quartz (albeit secondary, it was probably produced during chloritization of interstitial mesostasis), this is probably an evolved basaltic rock, or even basaltic andesite composition. It bears strong similarities to the Henty Dyke Swarm tholeiitic intrusive basalts, especially the presence of common FeTi oxides. The alteration is pervasive, and is probably distal hydrothermal in origin.

APPENDIX 6

Rock Sample Ledger, South Stitt

PASMINCO EXPLORATION
GEOCHEMICAL ANALYSES RECORD

PROSPECT SOUTH STITT

PROJECT TULLAH EL 22/90

Sample Type ROCK CHIPS

Sample No.	Sample Type	Location (AMG + LOCAL GRID)	Cu	Pb	Zn	Ag	Au	Bi	Ba	Sn	W	COMMENTS
												(Field Description)
038101	OUTCROP	5368580N/381715E	7	<3	94	<1	0.013	<5	503	10	5	Weakly chlor + bleached volc sst + vitric shale. Minor py.
102	FLOAT	5368500N/381713E	71	40	92	<1	0.012	<5	2016	11	5	Silif + sericitized epiclastic bx c 1% py.
103	FLOAT	5368500N/381708E	10	5	29	<1	0.010	<5	1690	10	7	Silif + sericitized fi gr volc c up to 2% py.
104	FLOAT	5368500N/381706E	16	9	50	<1	0.008	<5	1289	7	<5	Foliated silif + sericitized volcaniclastic 1-2% py.
105	OUTCROP	5368495N/381720E	4	<3	126	<1	0.012	<5	448	8	6	Volcaniclastic sst c chlor veinlets. No py.
106	SUB OUTCROP	5368503N/381766E	18	<3	46	<1	0.011	<5	649	9	6	Silif, mod foliated felsic volc. No py.
038107	OUTCROP	5368400N/381750E	4	<3	274	<1	0.011	<5	687	10	9	Unaltered volcaniclastic sst. No py.
		DETECTION LIMIT:	2	3	2	1	0.008	5	10	3	5	
		METHOD	AAS	AAS	AAS	AAS	FA300	XRF	XRF	XRF	XRF	

METAL CONTENT (ppm unless specified)

ANALYSED BY ANALABS COOBE + PERTH, 3.6.94.
JOB N° 1444 (PasEx); 111310.60.10231 (ANALABS)

A 10825

863144

SAMPLE NUMBER: 038105 OUTCROP, 5368495N / 381720E, SOUTH STITT
SUMMARY:

This sample is a rather coarser-grained version of 038101, being a medium-grained volcaniclastic quartz sandstone dominated by notably angular quartz phenocryst fragments and subordinate, blocky, detrital albitized plagioclase phenocrysts and more rounded clasts of devitrified and recrystallized, formerly glassy felsic lavas. Although occasional compound, strained quartz grains may derive from pelitic metamorphics, the common partial preservation of crystal shapes and rounded melt inclusions prove that a high proportion of the detrital quartz was volcanic in origin. The angularity and broken nature of the quartz phenocryst fragments suggests that they may be derived from crystal tuffs and ash-fall material rather than from lavas. Altered detrital FeTi oxide grains are not uncommon. The matrix is altered and recrystallized vitric ash material. Pervasive sericite alteration and occasional chlorite veins are present in this sample, which again, is largely derived from MRV.

SAMPLE NUMBER: 038106 SUB-OUTCROP, 5368503N / 381766E, SOUTH STITT
SUMMARY:

This sample is quite similar to 038~~013~~ 103 and 038104, although it is more silicified and probably originally coarser-grained than those samples. This rock was originally a coarse lithic vitric tuff or coarse volcaniclastic sandstone to fine-grained conglomerate. The majority of clasts are formerly glassy sparsely quartz-phyric rhyolitic lavas that show snowflake and related devitrification-alteration textures. Many of these have recrystallized entirely to polygonal fine-grained quartz intergrowths with common interstitial chlorite. Occasional detrital quartz phenocrysts are present, but the original matrix of this sample has thoroughly recrystallized to a sugary, variably-textured sericite-silica aggregate. The rock is very similar to 038103 and 104, and may well derived from the same unit.

863145

SAMPLE NUMBER: 038107 OUTCROP, APPROX 5368400N/381750E, SOUTH STITT
SUMMARY:

This sample is a volcaniclastic sandstone with approximately equal volumes of detrital grains and matrix. It is poorly-sorted, matrix-supported, and less silicified and altered than the other samples in this set. Volcanic quartz phenocryst fragments, often with partial euhedral outlines and melt inclusions, make up about 20 modal% of the rock, slightly less than the albitized blocky plagioclase phenocrysts and phenocryst fragments. Lithic clasts make up about 5-10 modal% of the rock, and are devitrified quartz+plagioclase-phyric felsic lavas. The matrix consists of finer-grained detrital quartz and albite, recrystallized vitric ash that is now a very fine-grained quartzo-feldspathic material, and abundant chlorite. The latter also occurs as wavy streaks and veinlets that define a weak fracture cleavage in this sample.

PETROGRAPHIC SUMMARY OF 038101-038107

These samples are essentially very similar, being volcaniclastic sandstones and possible lithic vitric tuffs all derived from quartz- and plagioclase-phyric rhyolitic pyroclastics and subordinate lavas. A minor component derived from pelitic metamorphics is notable in 038101, but is not obvious in most other samples. All samples except 038107 show significant hydrothermal alteration, with silica-chlorite±pyrite being the dominant alteration assemblage.

I am certain these rocks derive from the MRV and not from the Owen, as Owen detritus is largely Precambrian-derived. I have never looked at Jukes Breccia samples petrographically, but the fine-grained nature of these samples probably precludes direct correlation with that unit. The abundance of quartz phenocrysts implies correlation with the Dundas-Southwell (Sub)Group quartz-phyric rhyolitic lavas and pyroclastics.

868146

SAMPLE NUMBER: 038101 OUTCROP, 5368500N/381715E, SOUTH STITT
SUMMARY:

This sample is a weakly foliated strongly silica-chlorite-altered contact between an immature volcanogenic quartz sandstone and a shale. The former is matrix-supported and rather poorly-sorted, composed of angular quartz and subordinate albitized plagioclase grains in a recrystallized silica-sericite matrix. The quartz includes volcanic phenocryst fragments, and polycrystalline metamorphic quartz, sometimes including muscovite. Bands relatively enriched in heavy minerals include abundant detrital zircon crystals, and common altered magnetite or FeTi oxides. Discontinuous pervasive quartz-chlorite veinlets cut the sample.

This is clearly a syn- or post-Mount Read Volcanics (MRV) sandstone-shale including quartz and plagioclase detritus from felsic lavas, and metamorphic quartz, and tourmaline from pelitic Precambrian metamorphics.

SAMPLE NUMBER: 038102 FLOAT, 5368500N/381713E, SOUTH STITT
SUMMARY:

This sample is another weakly-foliated strongly silica-chlorite-altered rock that was almost certainly a fine-grained conglomerate (clasts <8mm across) derived entirely from glassy felsic volcanics with sparse quartz phenocrysts. Several clasts to about 4mm long with snowflake textures preserve poorly vesicular tube pumice textures, whereas most clasts are formerly glassy massive rhyolites with a variety of different devitrification textures subsequently modified by silicification. Streaks and bands of sericite are common, and small calcite spots and veinlets are also present. Disseminated pyrite is a very minor component of this sample. The sample is clearly derived from MRV felsic lavas.

863147

SAMPLE NUMBER: 038103 FLOAT, 5368500N/381708E, SOUTH STITT
SUMMARY:

This sample is a weakly foliated very strongly silica-sericite-altered volcaniclastic sandstone or lithic vitric tuff derived almost entirely from glassy felsic volcanics and vitric ash. The sample is matrix-supported, very poorly-sorted, and the largest distinct clasts are about 8mm across. The clasts are mainly snowflake-textured formerly glassy rhyolitic lavas. Occasional detrital quartz phenocrysts are present, and the abundant recrystallized and silicified matrix was probably largely composed of vitric ash, although alteration and sericite overprinting has obliterated any shard textures. Stockwork quartz veins are abundant through the rock, sometimes associated with calcite, and disseminated pyrite is relatively common. Again, this sample is certainly derived from the MRV.

SAMPLE NUMBER: 038104 FLOAT, 5368500N/381706E, SOUTH STITT
SUMMARY:

This sample is a weakly-foliated, slightly less altered version of the preceding sample 038103, and is derived from a very similar protolith, which was a volcaniclastic sandstone or lithic vitric tuff derived from rhyolitic volcanics. Quartz-veining is much less pervasive in this sample than 038103, chlorite is common, but sericitic and calcite alteration is more intense. Detrital volcanic quartz and plagioclase phenocrysts make up about 5-8 modal% of the rock, and the remainder of the clast population is formerly glassy felsic lavas with diverse devitrification textures. The originally vitric ash matrix has recrystallized to fine-grained quartz-sericite-chlorite. This sample is almost certainly from the same distinctive lithostratigraphic unit as 038103.

APPENDIX 7

DHEM Data, Holes MD1, 2 & 3, Mackintosh Dam

863149

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD3
Grid	: Rosebery	Tx Loop	: Loop-1
Date	: May 21, 1994	File name	: MD3L1Z.PEM
Time Base	: 10.00 ms	# Readings	: 22
Ramp Time	: 0.50 ms	Stn Units	: Metric
# Channels	: 17	Coil Area	: 6500 sq m
Sync Type	: Cable	Polarity	: -
Loop Size	: 300m X 300m	Receiver	: Digital #106
Current	: 8 Amps	Operator	: Geoffrey Dunn

Loop Coordinates (X,Y,Z)
1. 382100m, 500m, 0m
2. 382100m, 800m, 0m
3. 381800m, 800m, 0m
4. 381800m, 500m, 0m

Hole Coordinates (X,Y,Z) or (Azimuth,Dip,Length)
1. 382000m, 700m, 0m

Channel Times (usec)

Ch	Start	End	Center	Ch	Start	End	Center	Ch	Start	End	Center
PP	-198	-99	-149	1	76	104	90	2	104	131	117
3	131	171	151	4	171	225	198	5	225	292	259
6	292	378	335	7	378	490	434	8	490	639	565
9	639	828	733	10	828	1075	952	11	1075	1395	1235
12	1395	1809	1602	13	1809	2348	2078	14	2348	3046	2697
15	3046	3951	3498	16	3951	5121	4536	17	5121	6646	5884

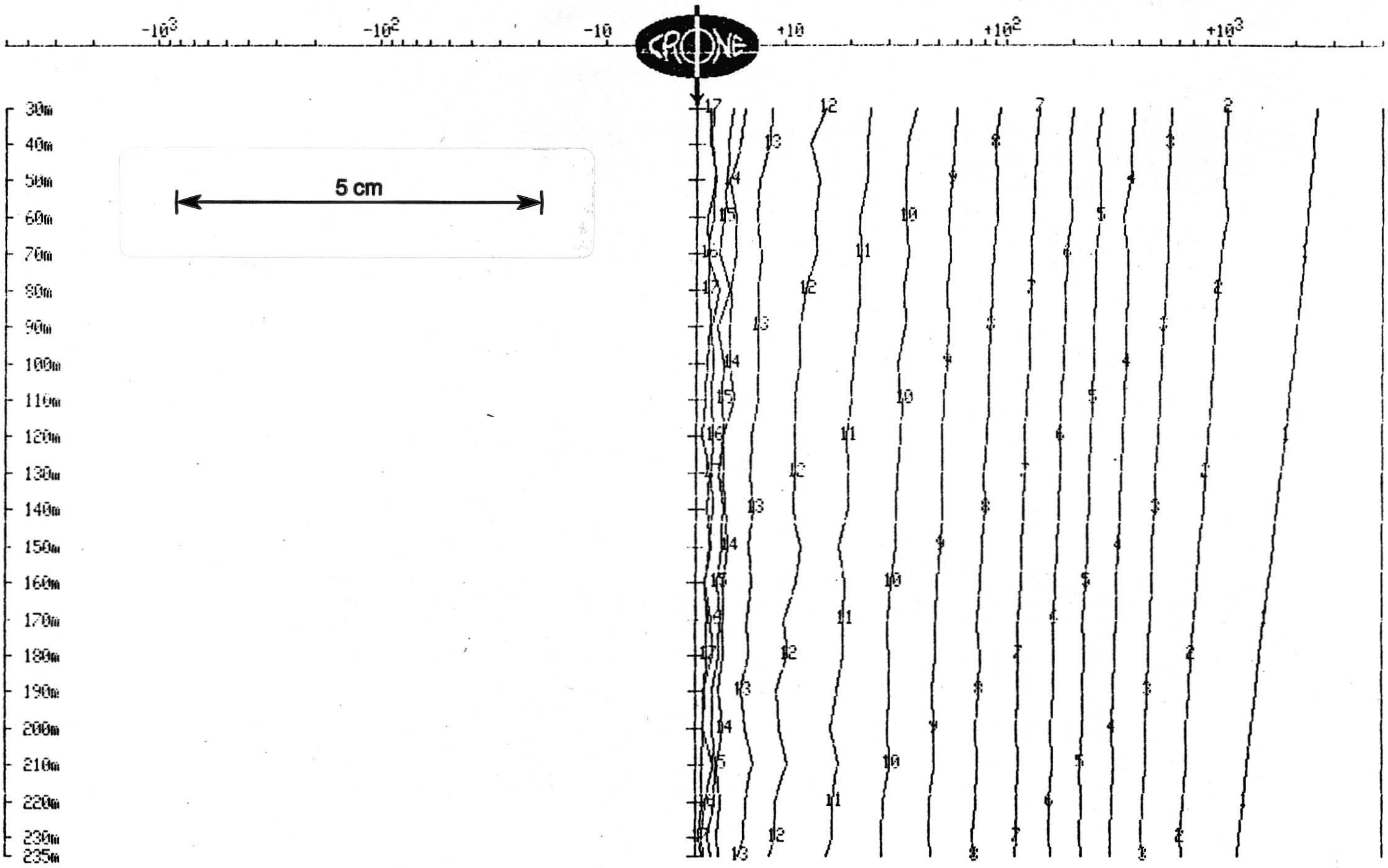
863150 PAS 1096a

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD3
Grid	: Rosebery	Tx Loop	: Loop-1
Date	: May 21, 1994	File name	: MD3L1Z.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels and PP

Scale: 1:2000



863151 PAS10966

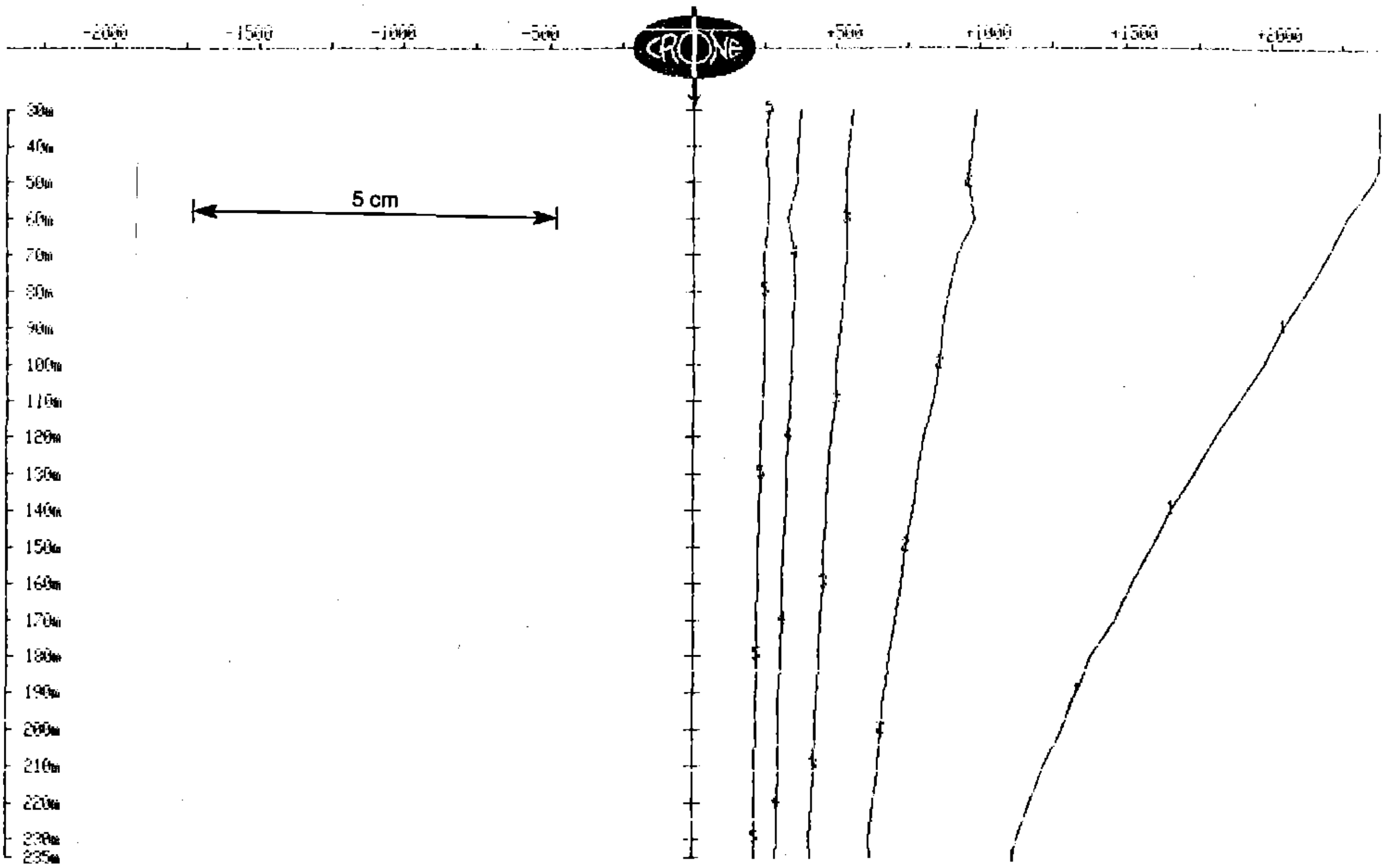
OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD3
Grid	: Rosebery	Tx Loop	: Loop-1
Date	: May 21, 1994	File name	: MD3L1Z.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000

Unit Scale: 1cm = 250 nT/s



868152 PAS1096c

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

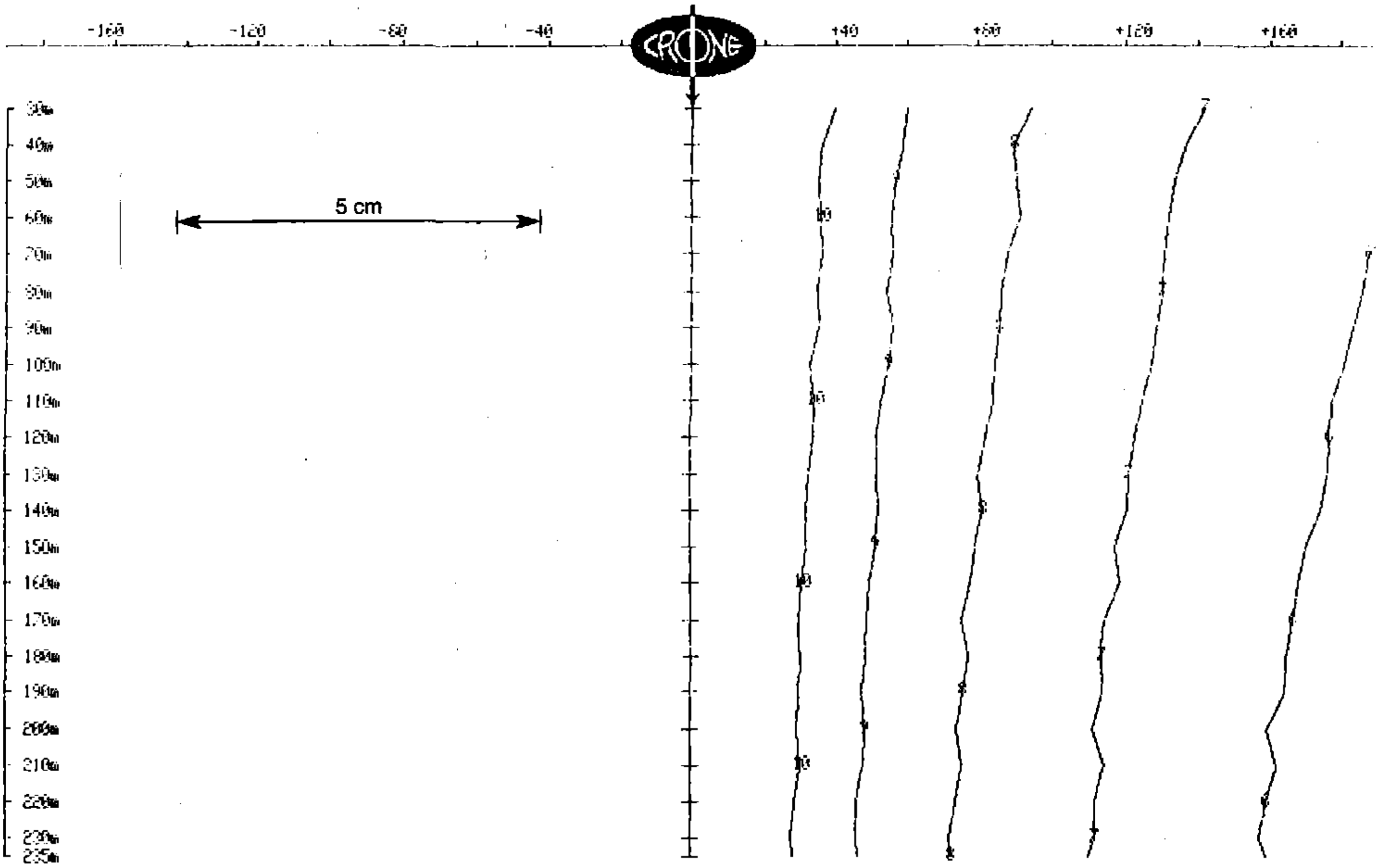
Client : Pasminco Exploration
Grid : Rosebery
Date : May 21, 1994

Hole : MD3
Tx Loop : Loop-1
File name : MD3L1Z.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000

Unit Scale: 1cm = 20 nT/s



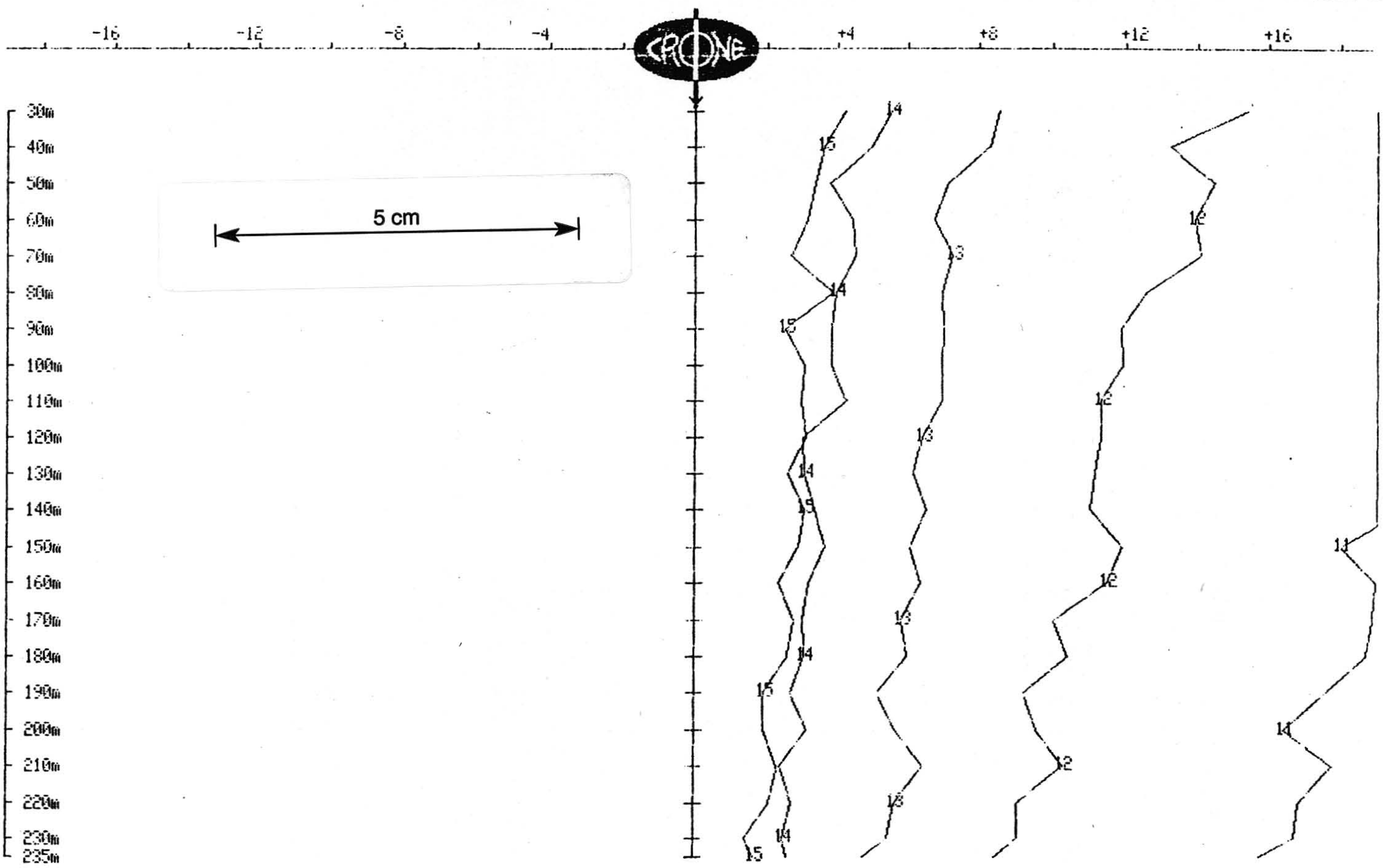
863153 PAS1096d.

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD3
Grid	: Rosebery	Tx Loop	: Loop-1
Date	: May 21, 1994	File name	: MD3L1Z.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000 Unit Scale: 1cm = 2 nT/s



863154 PAS1096e

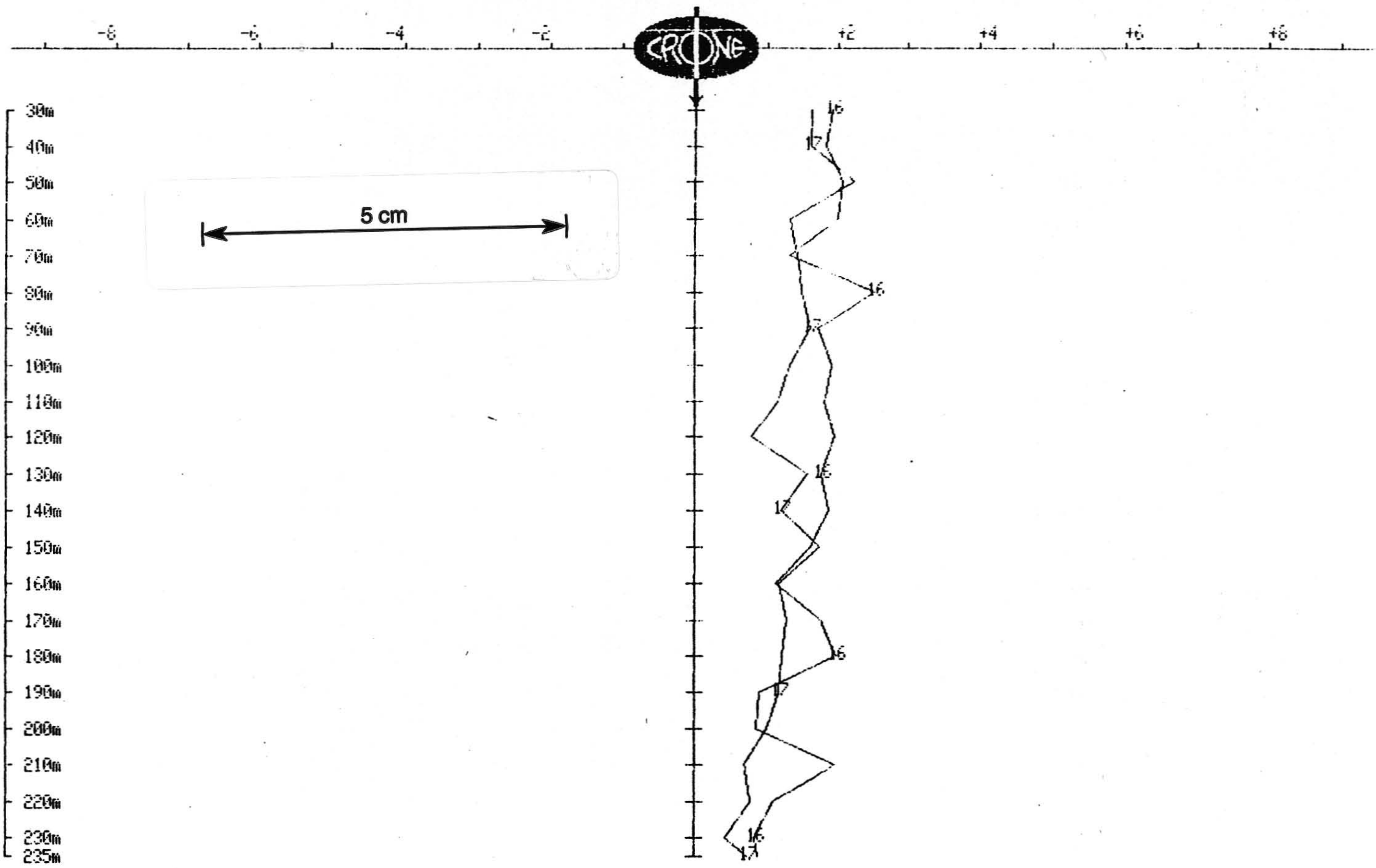
OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD3
Grid	: Rosebery	Tx Loop	: Loop-1
Date	: May 21, 1994	File name	: MD3L1Z.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000

Unit Scale: 1cm = 1 nT/s



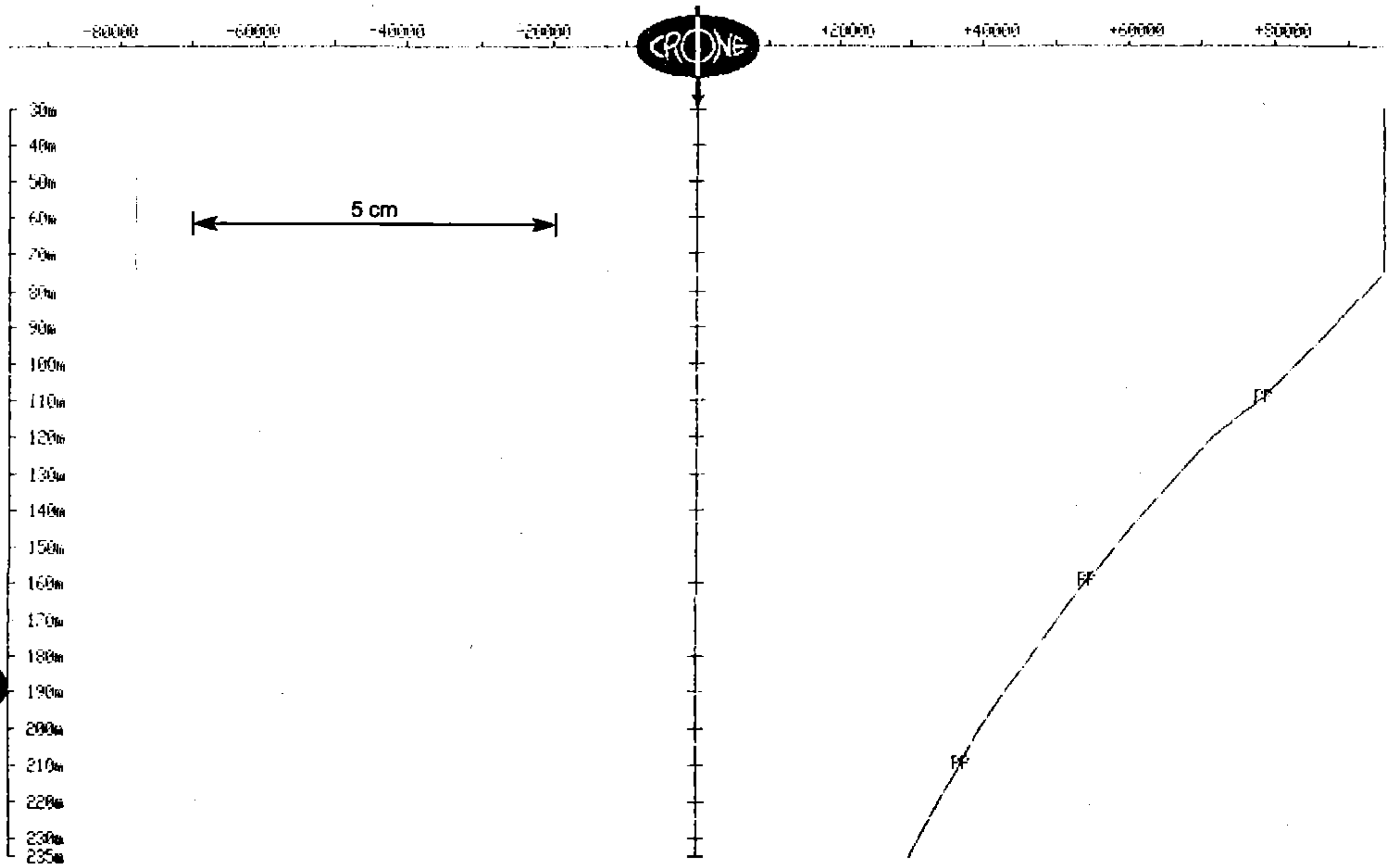
868155 PA510967

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD3
Grid	: Rosebery	Tx Loop	: Loop-1
Date	: May 21, 1994	File name	: MD3L1Z.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels and PP

Scale: 1:2000 Unit Scale: 1cm = 10000 nT/s



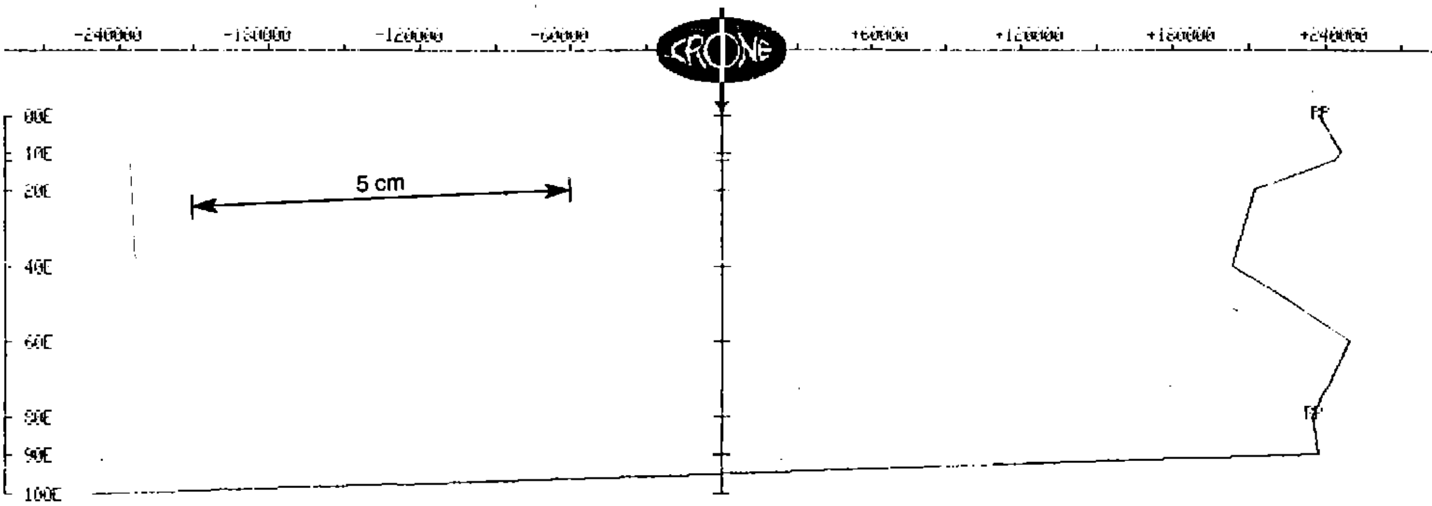
868156 PAS 1097a

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
SURFACE PEM

Client	: Pasminco Exploration	Line	: MD2-Anomaly
Grid	: Tullah	Tx Loop	: Loop-1
Date	: May 21, 1994	File name	: SSMD2L1.PEM

VERTICAL COMPONENT dBz/dt nanoTesla/sec - 17 channels and PP

Scale: 1:2000 Unit Scale: 1cm = 30000 nT/s



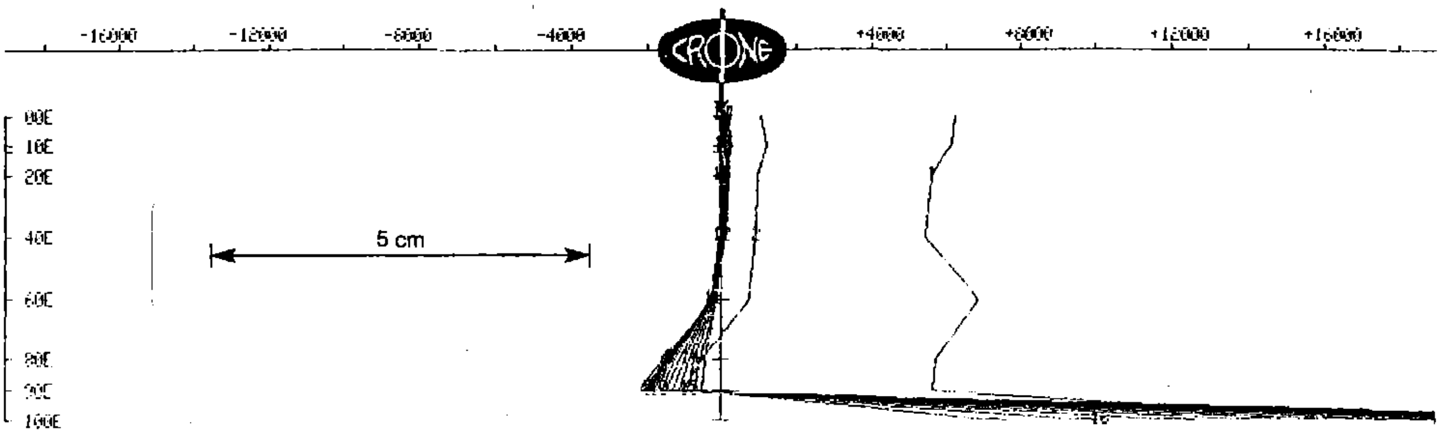
863157 PAS10976

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
SURFACE PEM

Client	: Pasminco Exploration	Line	: MD2-Anomaly
Grid	: Tullah	Tx Loop	: Loop-1
Date	: May 21, 1994	File name	: SSMD2L1.PEM

VERTICAL COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 2000 nT/s



863158

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-001
Grid	: Tullah	Tx Loop	: Collar
Date	: 5th Dec. 1993	File name	: MD1ZC.AM2

Z COMPONENT dBz/dt nanoVolt/Amp-m^2 - 17 channels and PP

Scale: 1:2500 Unit Scale: 1cm = 2000

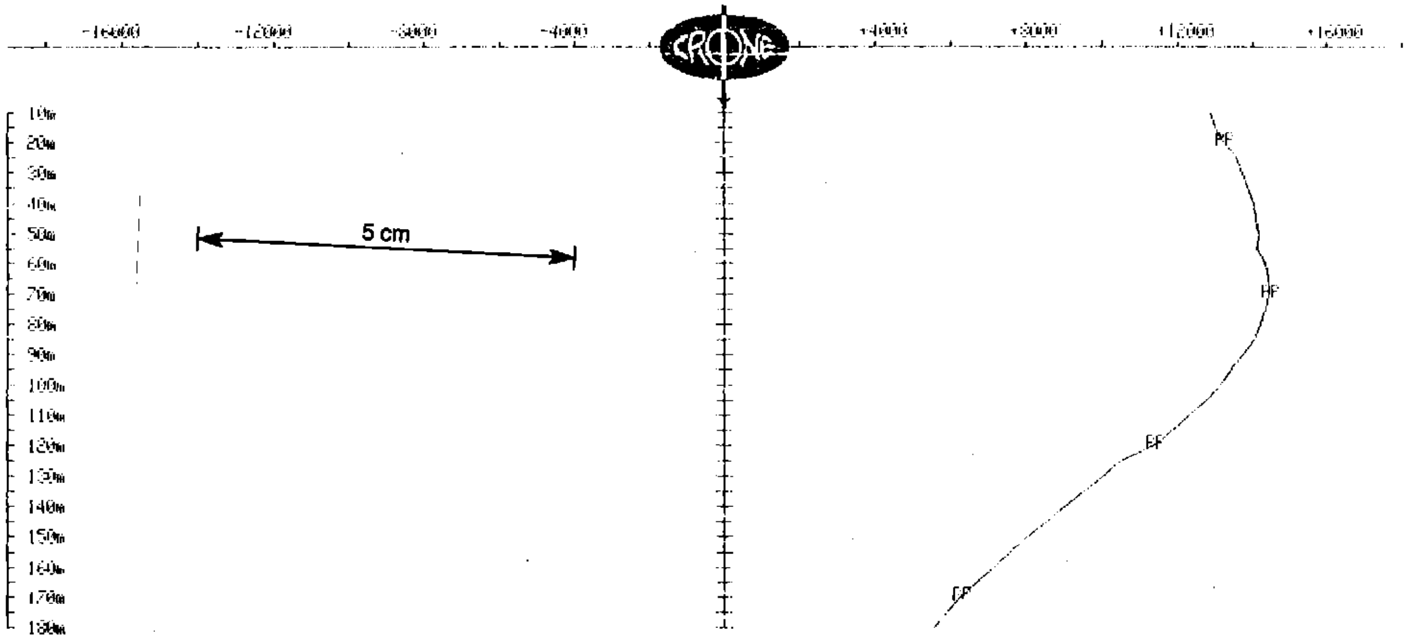


Fig 1

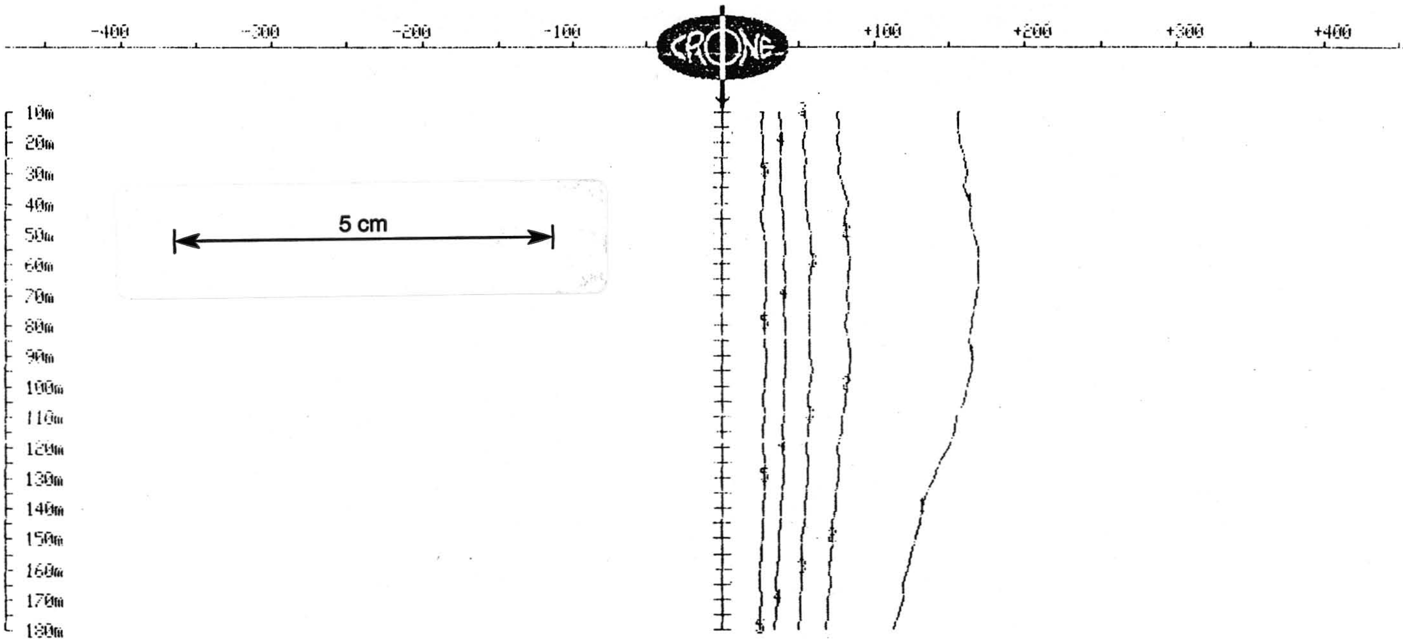
863159

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: **Pasminco Exploration**	Hole	: **MD-001**
Grid	: **Tullah**	Tx Loop	: **Collar**
Date	: 5th Dec. 1993	File name	: MD1ZC.AM2

Z COMPONENT dBz/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 50



Fig

863160

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-001
Grid	: Tullah	Tx Loop	: Collar
Date	: 5th Dec. 1993	File name	: MD1ZC.AM2

Z COMPONENT dBz/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 2

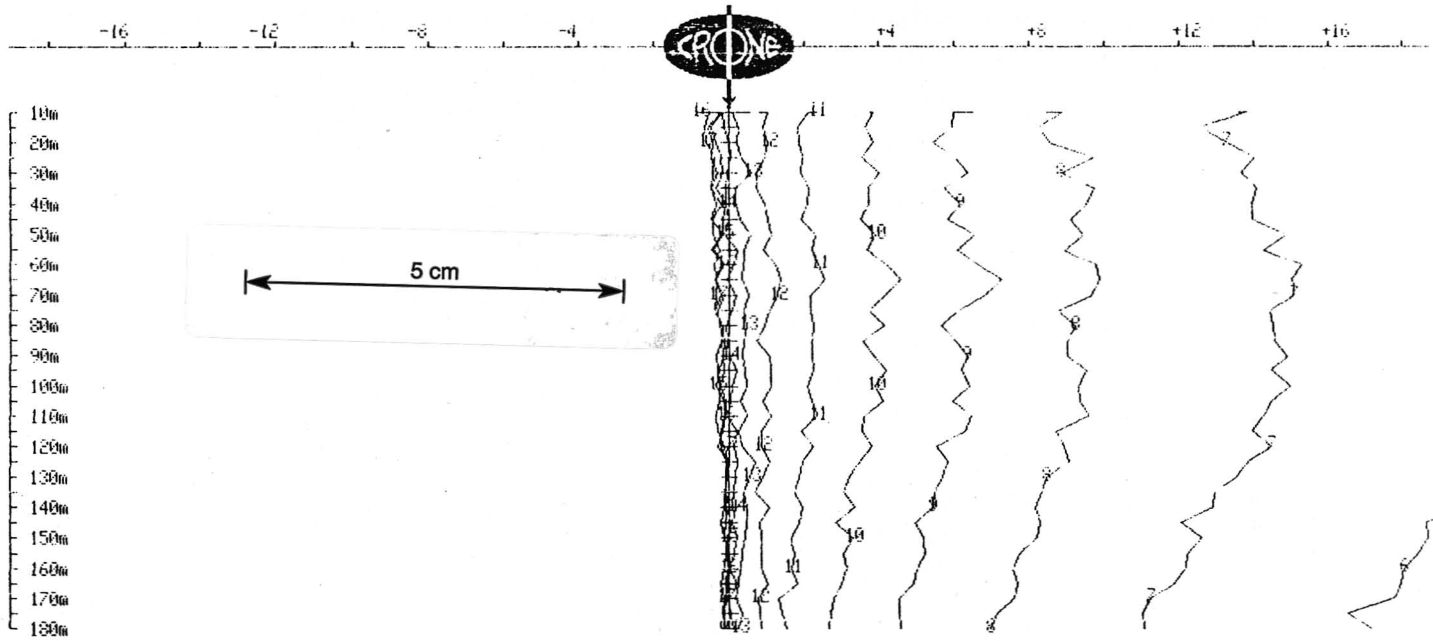


Fig 3

863161

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: **Pasminco Exploration**	Hole	: **MD-002**
Grid	: **Tullah**	Tx Loop	: **Collar**
Date	: 5th Dec. 1993	File name	: MD2ZC.AM2
Time Base	: 10.00 ms	# Readings	: 37
Ramp Time	: 0.50 ms	Stn Units	: Metric
# Channels	: 17	Coil Area	: 6500 sq m
Sync Type	: Cable	Polarity	: +
Loop Size	: 300m X 300m	Receiver	: Digital #105
Current	: 7 Amps	Operator	: Adrian Page

Loop Coordinates (X,Y,Z)
1. 386800m, 5.3825e+06m, 0m
2. 387010m, 5.3825e+06m, -30m
3. 387050m, 5.3825e+06m, -30m
4. 387100m, 5.3826e+06m, 0m
5. 387100m, 5.3828e+06m, 0m
6. 386800m, 5.3828e+06m, 0m

Hole Coordinates (X,Y,Z) or (Azimuth,Dip,Length)
1. 386937m, 5.38257e+06m, 0m
2. 89deg, 45deg, 15m
3. 91deg, 44deg, 30m
4. 92deg, 43.5deg, 30m
5. 93deg, 41.2deg, 30m
6. 94deg, 40deg, 30m
7. 93.5deg, 38deg, 30m
8. 93.5deg, 37deg, 30m

Channel Times (usec)

Ch	Start	End	Center	Ch	Start	End	Center	Ch	Start	End	Center
PP	-198	-99	-149	1	76	104	90	2	104	131	117
3	131	171	151	4	171	225	198	5	225	292	259
6	292	378	335	7	378	490	434	8	490	639	565
9	639	828	733	10	828	1075	952	11	1075	1395	1235
12	1395	1809	1602	13	1809	2348	2078	14	2348	3046	2697
15	3046	3951	3498	16	3951	5121	4536	17	5121	6646	5884

General Comments
5m Stations to EOH
X,Y,Z Components

Fig 4

863162

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-002
Grid	: Tullah	Tx Loop	: Collar
Date	: 5th Dec. 1993	File name	: MD2ZC.AM2

Z COMPONENT dBz/dt nanoVolt/Amp-m² - 17 channels and PP

Scale: 1:2500 Unit Scale: 1cm = 2000

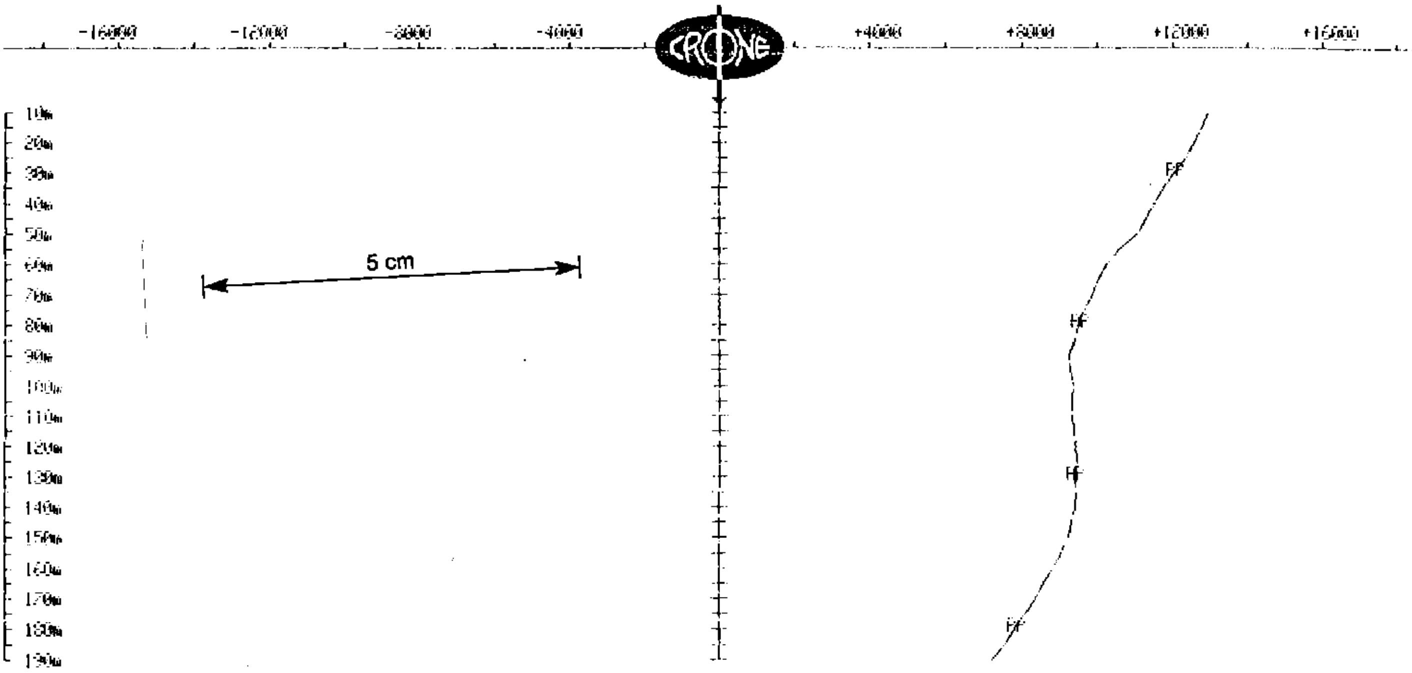


Fig 5

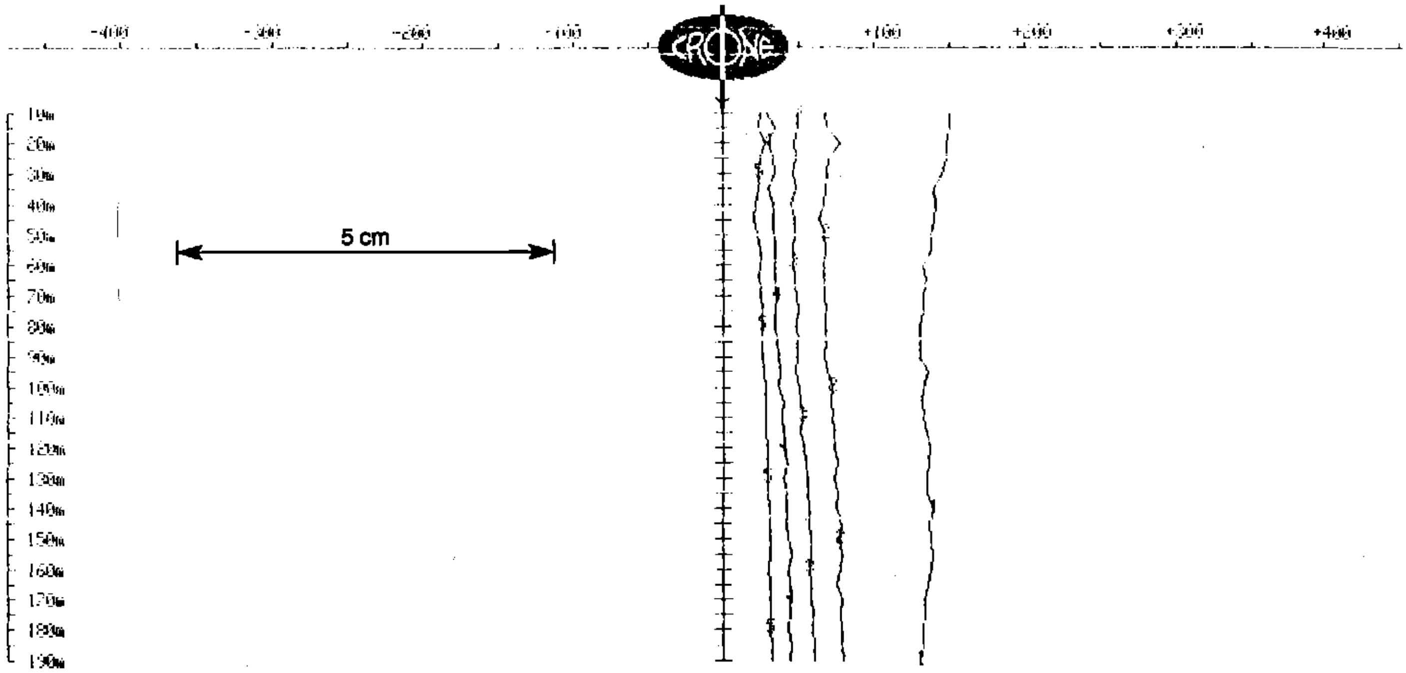
863163

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-002
Grid	: Tullah	Tx Loop	: Collar
Date	: 5th Dec. 1993	File name	: MD2ZC.AM2

Z COMPONENT dBz/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 50



Fig

863164

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client : Pasminco Exploration
Grid : Tullah
Date : 5th Dec. 1993

Hole : MD-002
Tx Loop : Collar
File name : MD2ZC.AM2

Z COMPONENT dBz/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500

Unit Scale: 1cm = 2

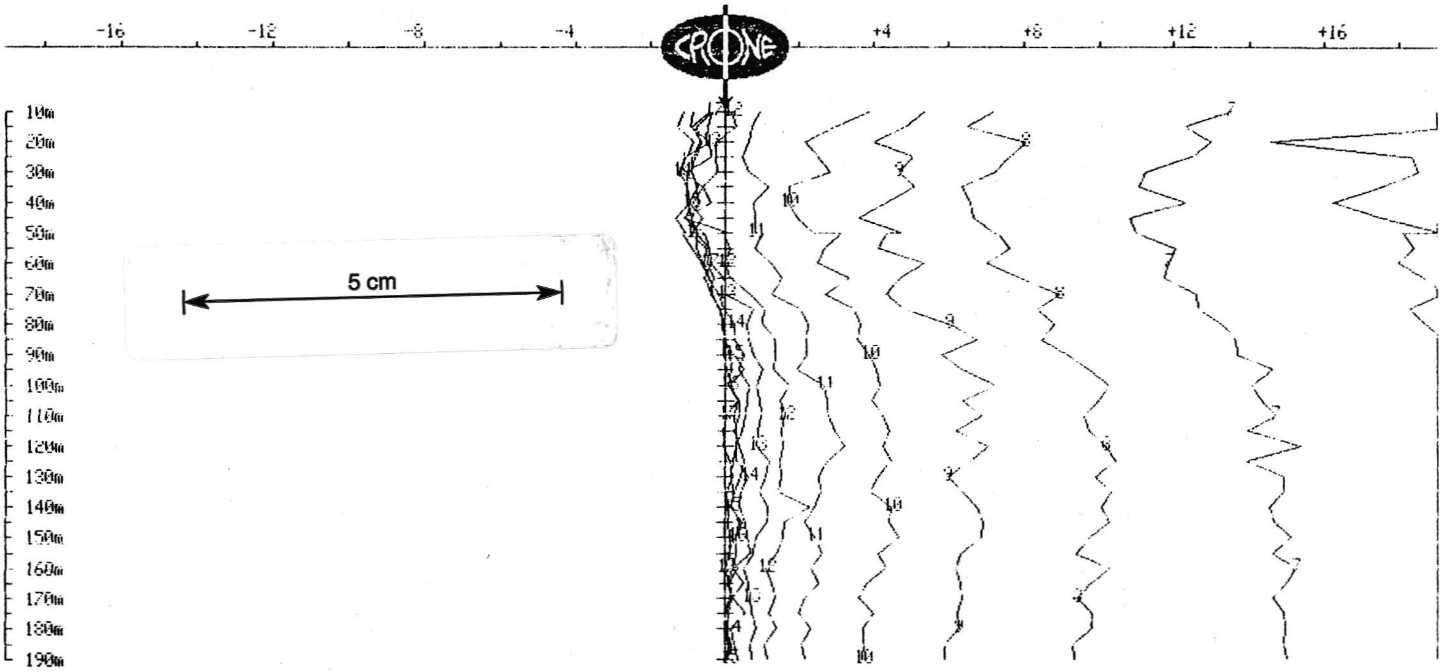


Fig 7

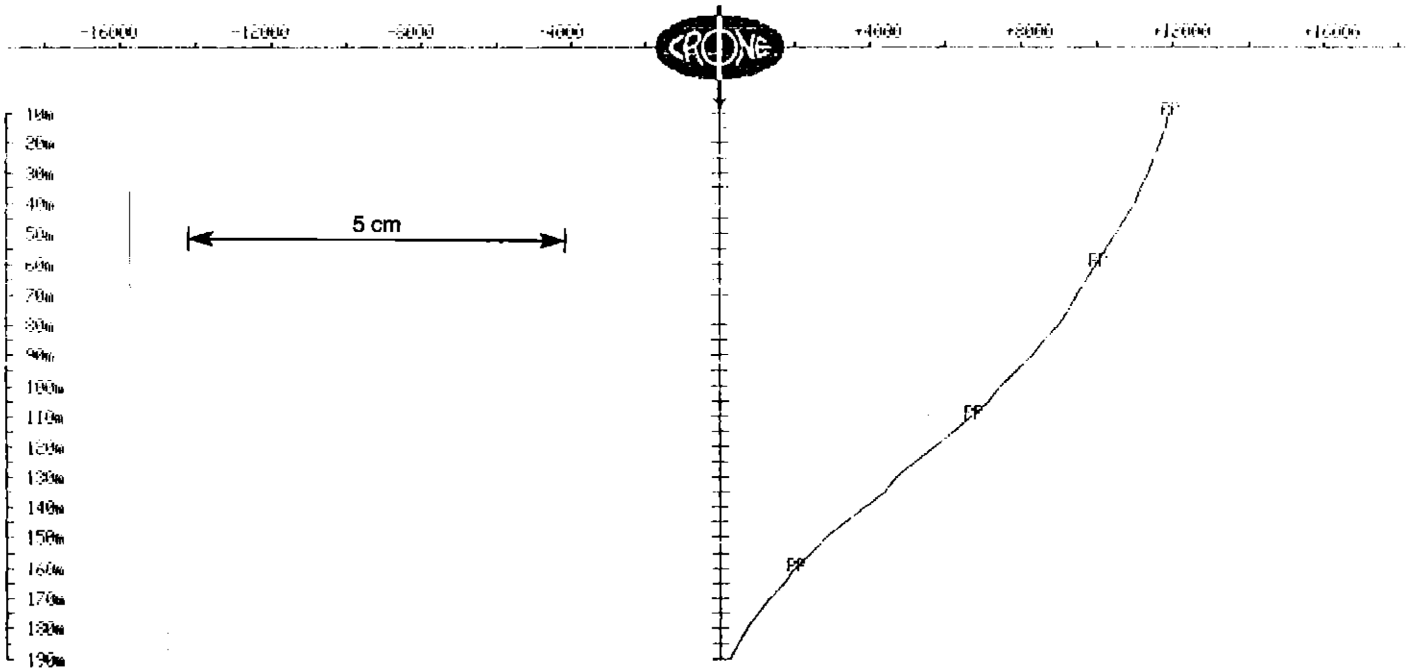
863165

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: **Pasminco Exploration**	Hole	: **MD-002**
Grid	: **Tullah**	Tx Loop	: **Collar**
Date	: 5th Dec. 1993	File name	: MD2XYC.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
X COMPONENT dBx/dt nanoVolt/Amp-m² - 17 channels and PP

Scale: 1:2500 Unit Scale: 1cm = 2000



Fig

863166

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: **Pasminco Exploration**	Hole	: **MD-002**
Grid	: **Tullah**	Tx Loop	: **Collar**
Date	: 5th Dec. 1993	File name	: MD2XYC.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
Y COMPONENT dBy/dt nanoVolt/Amp-m² - 17 channels and PP

Scale: 1:2500 Unit Scale: 1cm = 2000

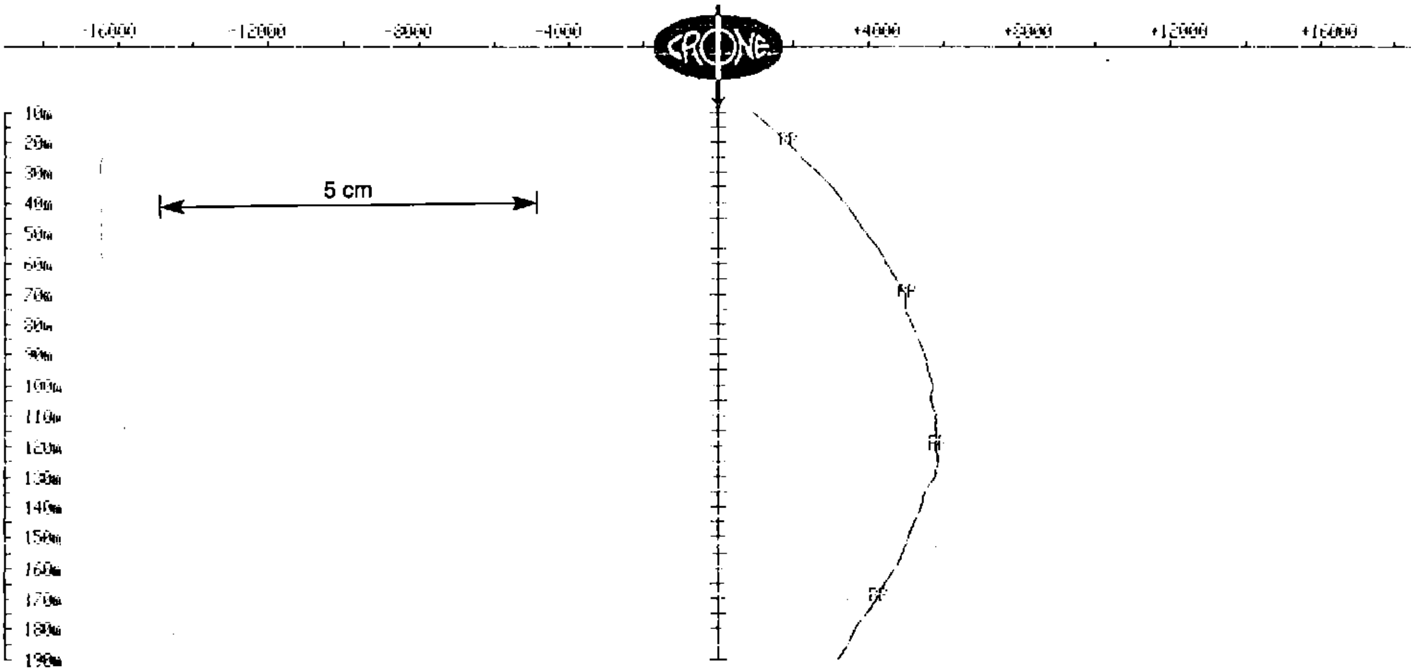


Fig 9

863167

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: **Pasminco Exploration**	Hole	: **MD-002**
Grid	: **Tullah**	Tx Loop	: **Collar**
Date	: 5th Dec. 1993	File name	: MD2XYC.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
X COMPONENT dBx/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 50

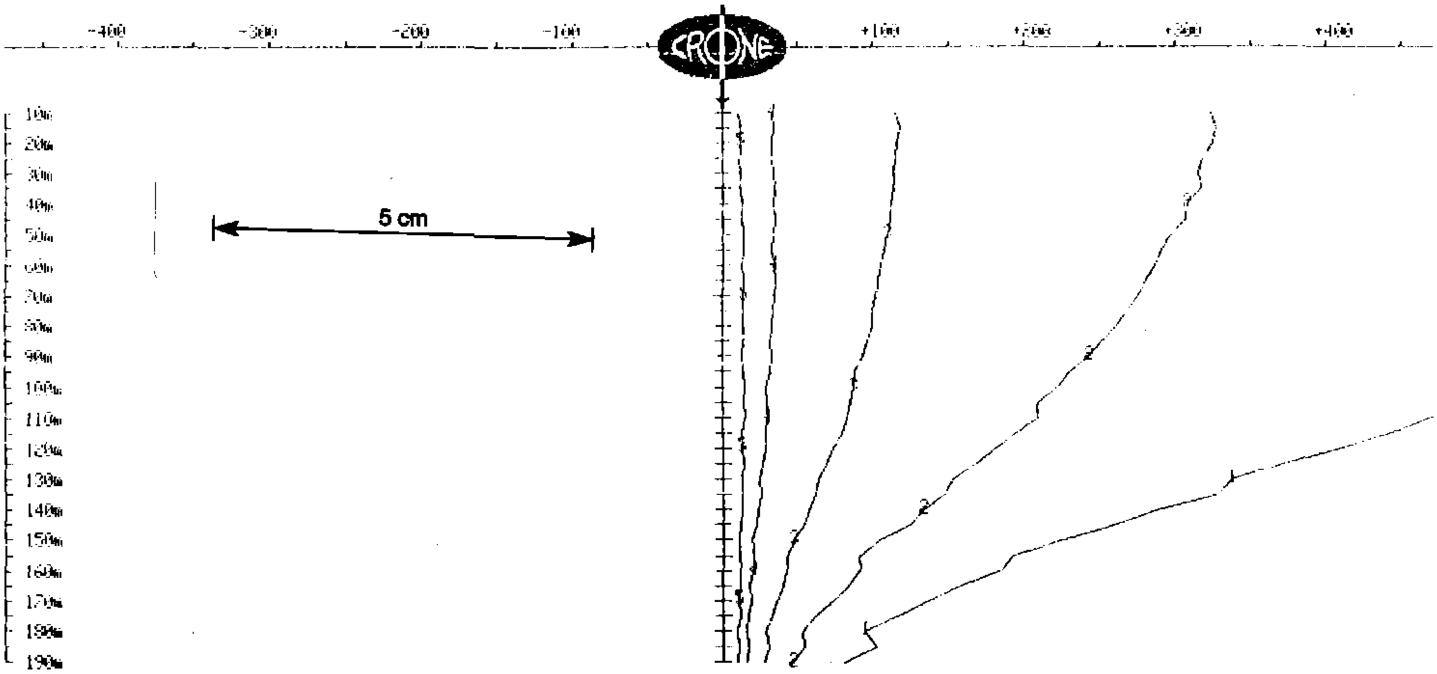


Fig 10

863168

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: **MD-002**
Grid	: **Tullah**	Tx Loop	: **Collar**
Date	: 5th Dec. 1993	File name	: MD2XYC.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
Y COMPONENT dBy/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 50

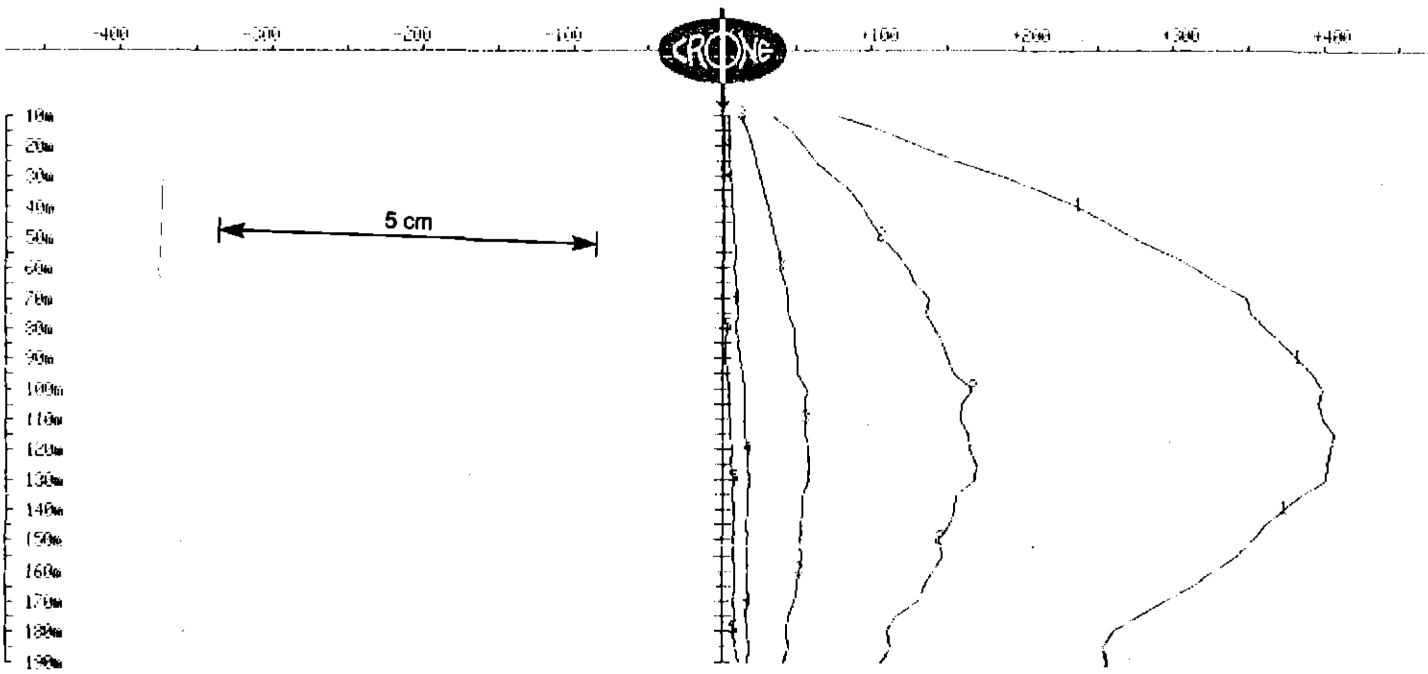


Fig 11

863169

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: **Pasminco Exploration**	Hole	: **MD-002**
Grid	: **Tullah**	Tx Loop	: **Collar**
Date	: 5th Dec. 1993	File name	: MD2XYC.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
X COMPONENT dBx/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 1

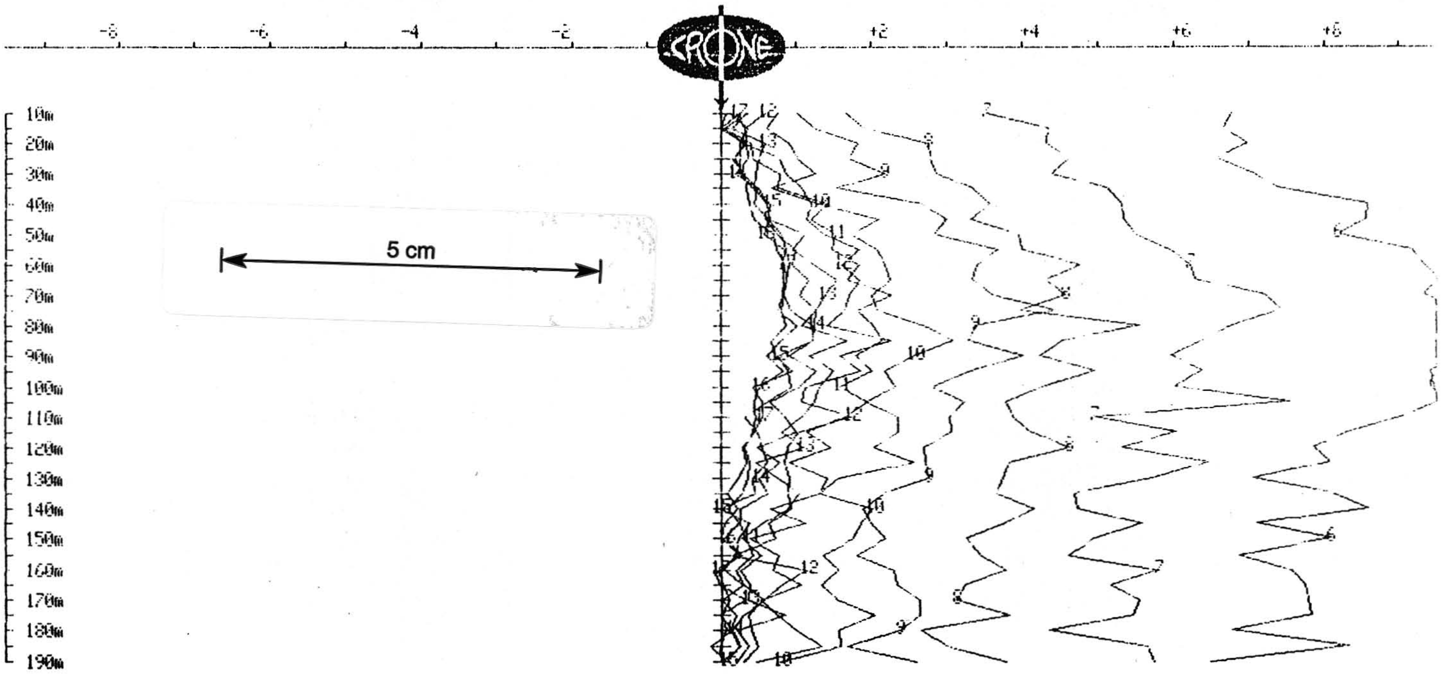


Fig 12

863170

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: **Pasminco Exploration**	Hole	: **MD-002**
Grid	: **Tullah**	Tx Loop	: **Collar**
Date	: 5th Dec. 1993	File name	: MD2XYC.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
Y COMPONENT dBy/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 — Unit Scale: 1cm = 1

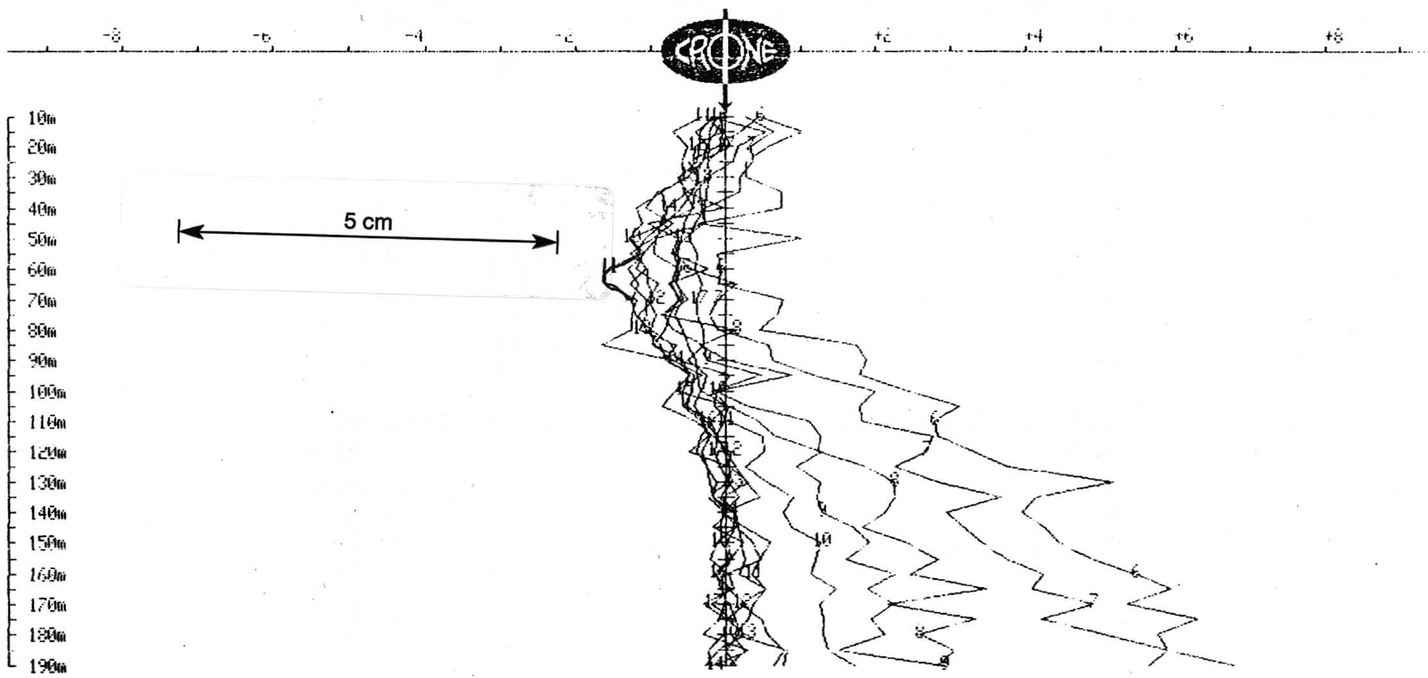


Fig13

863171

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-002
Grid	: Tullah	Tx Loop	: Collar
Date	: 9th Dec. 1993	File name	: MD2XY.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
X COMPONENT dBx/dt nanoVolt/Amp-m² - 17 channels and PP

Scale: 1:2500 Unit Scale: 1cm = 2000

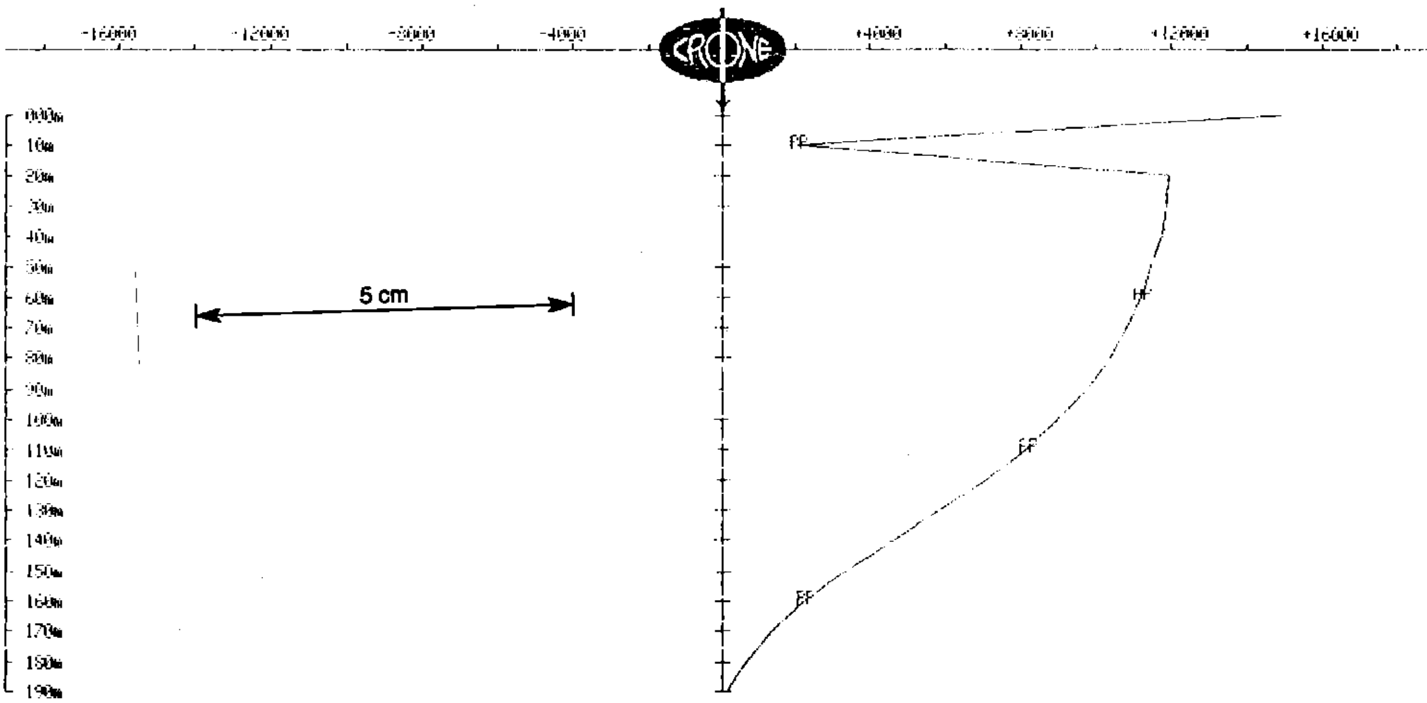


Fig 14

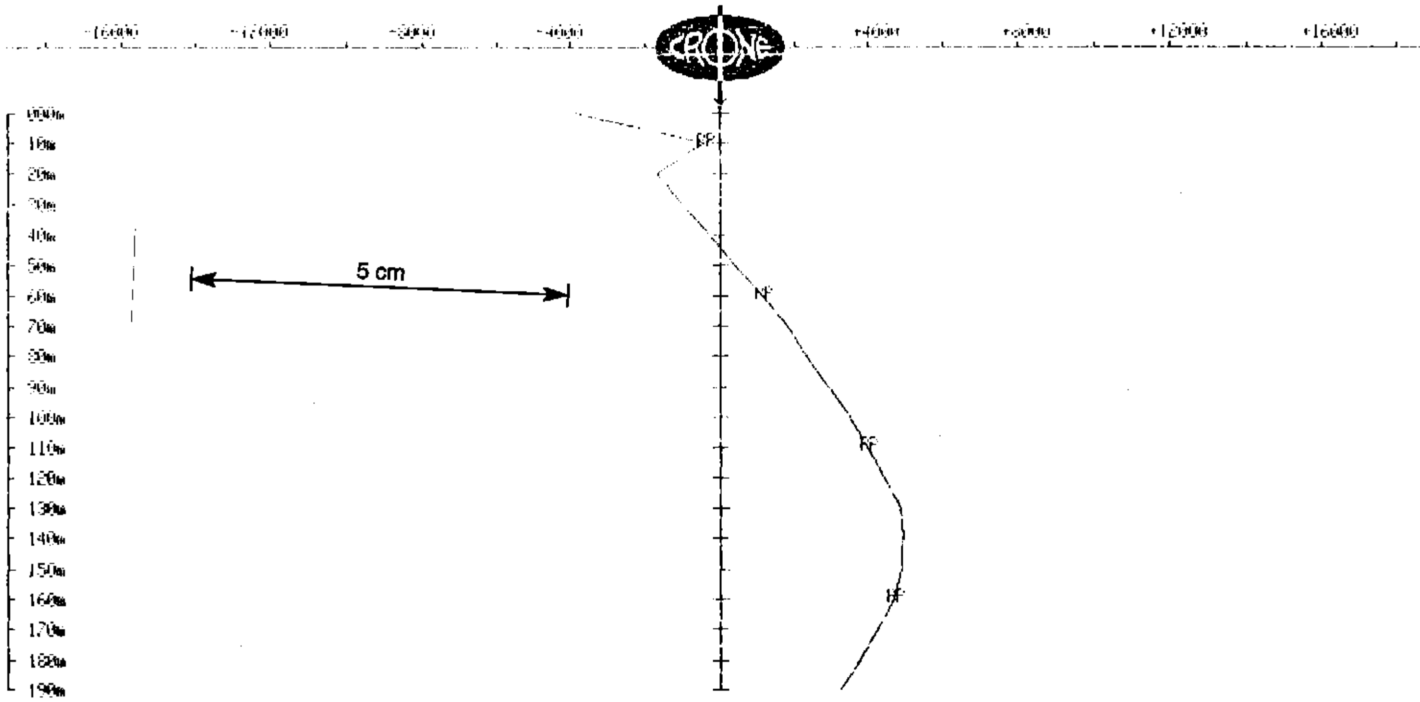
863172

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-002
Grid	: Tullah	Tx Loop	: Collar
Date	: 9th Dec. 1993	File name	: MD2XY.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
Y COMPONENT dBy/dt nanoVolt/Amp-m² - 17 channels and PP

Scale: 1:2500 Unit Scale: 1cm = 2000



Figs

863173

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	:	Pasminco Exploration	Hole	:	MD-002
Grid	:	Tullah	Tx Loop	:	Collar
Date	:	9th Dec. 1993	File name	:	MD2XY.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
X COMPONENT dBx/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 50

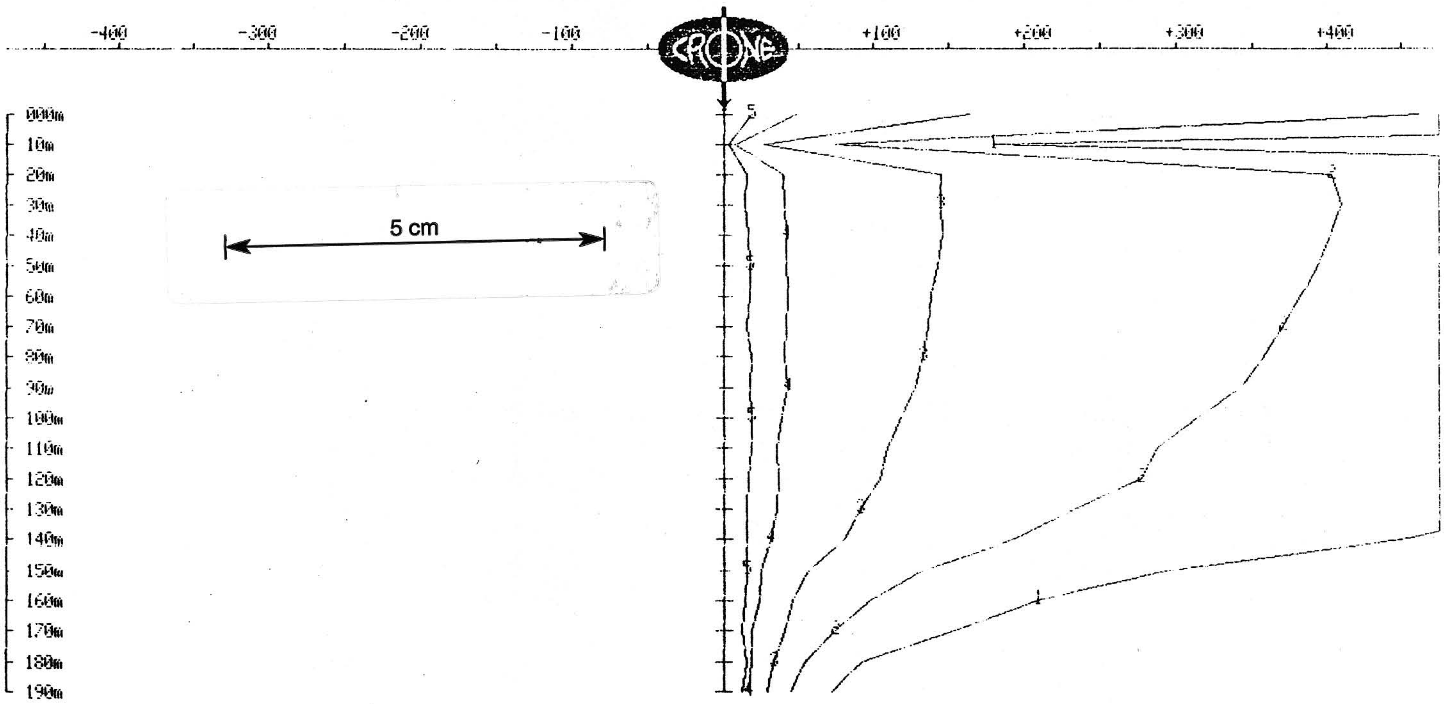


Fig 16

863174

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-002
Grid	: Tullah	Tx Loop	: Collar
Date	: 9th Dec. 1993	File name	: MD2XY.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
Y COMPONENT dBy/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 50

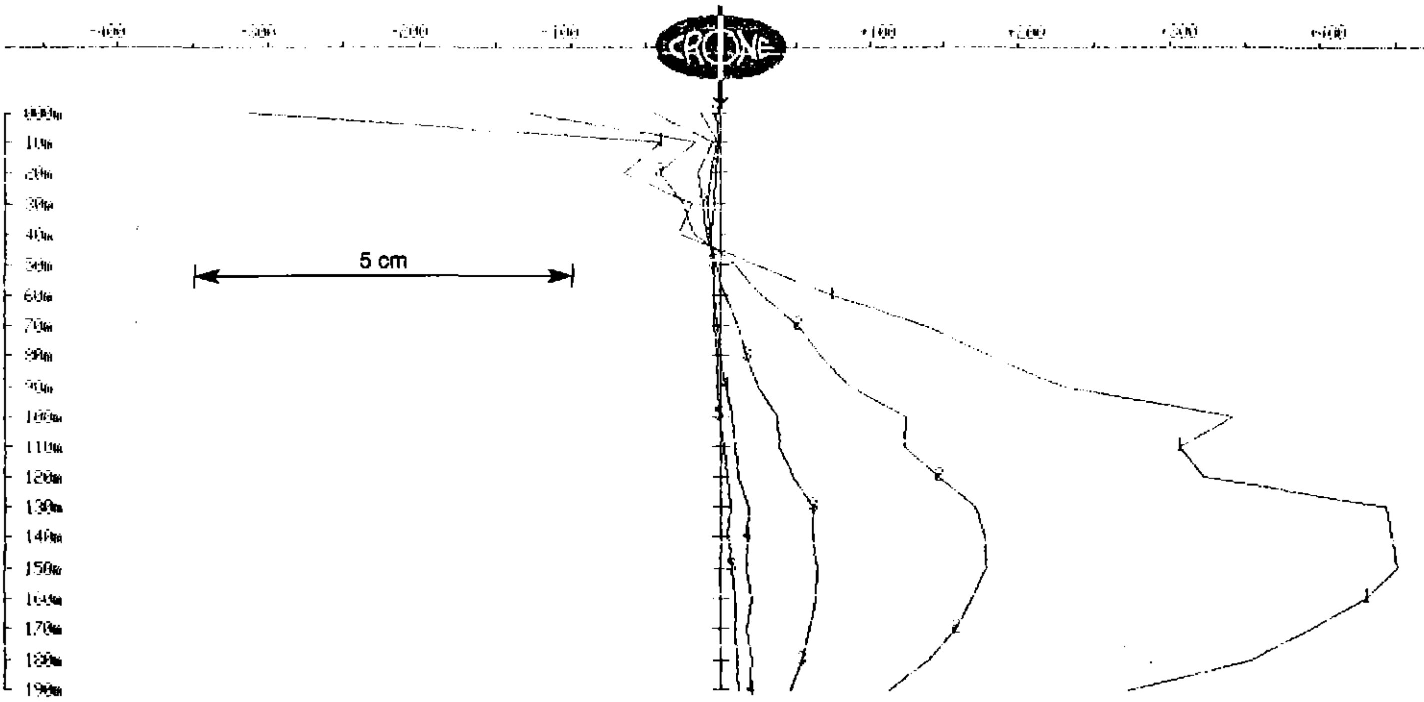


Fig17

868175

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-002
Grid	: Tullah	Tx Loop	: Collar
Date	: 9th Dec. 1993	File name	: MD2XY.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
X COMPONENT dBx/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 1

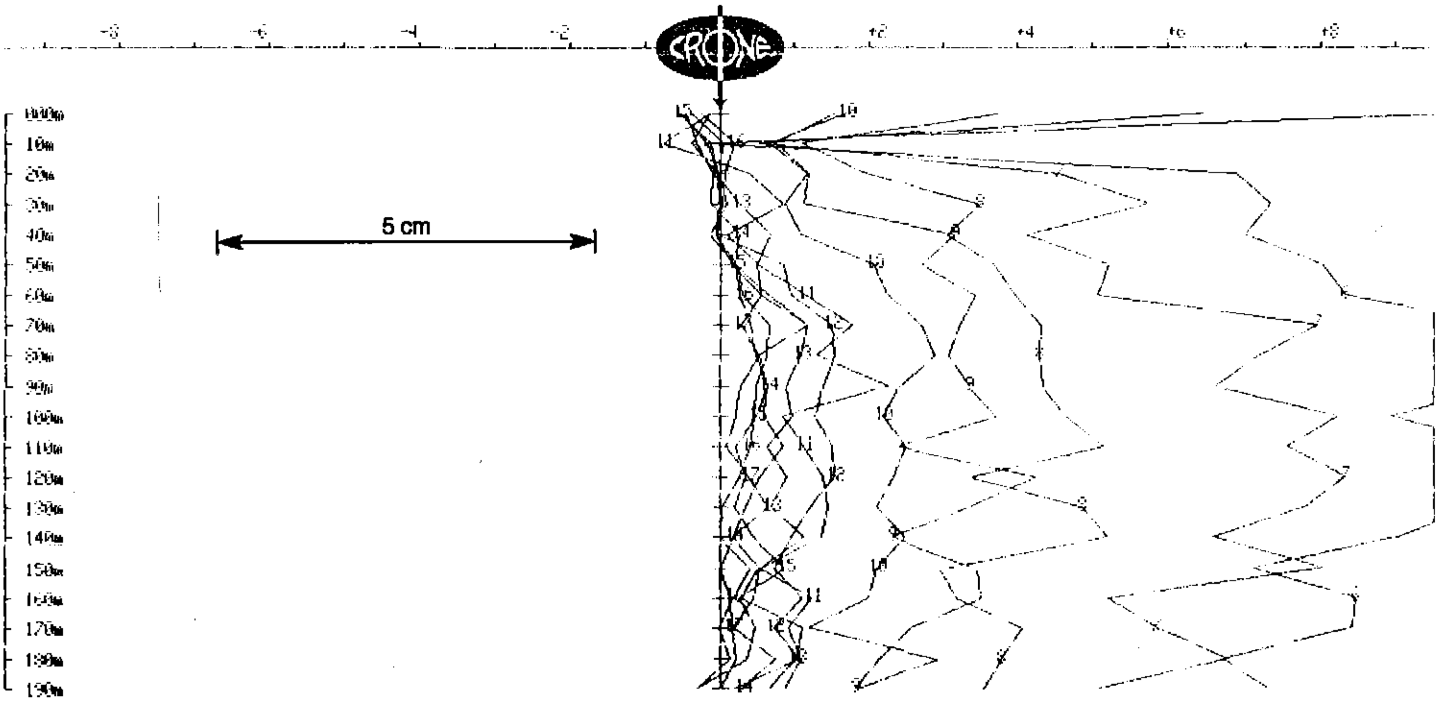


Fig 18

863176

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client : Pasminco Exploration
Grid : Tullah
Date : 9th Dec. 1993

Hole : MD-002
Tx Loop : Collar
File name : MD2XY.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
Y COMPONENT dBy/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500

Unit Scale: 1cm = 1

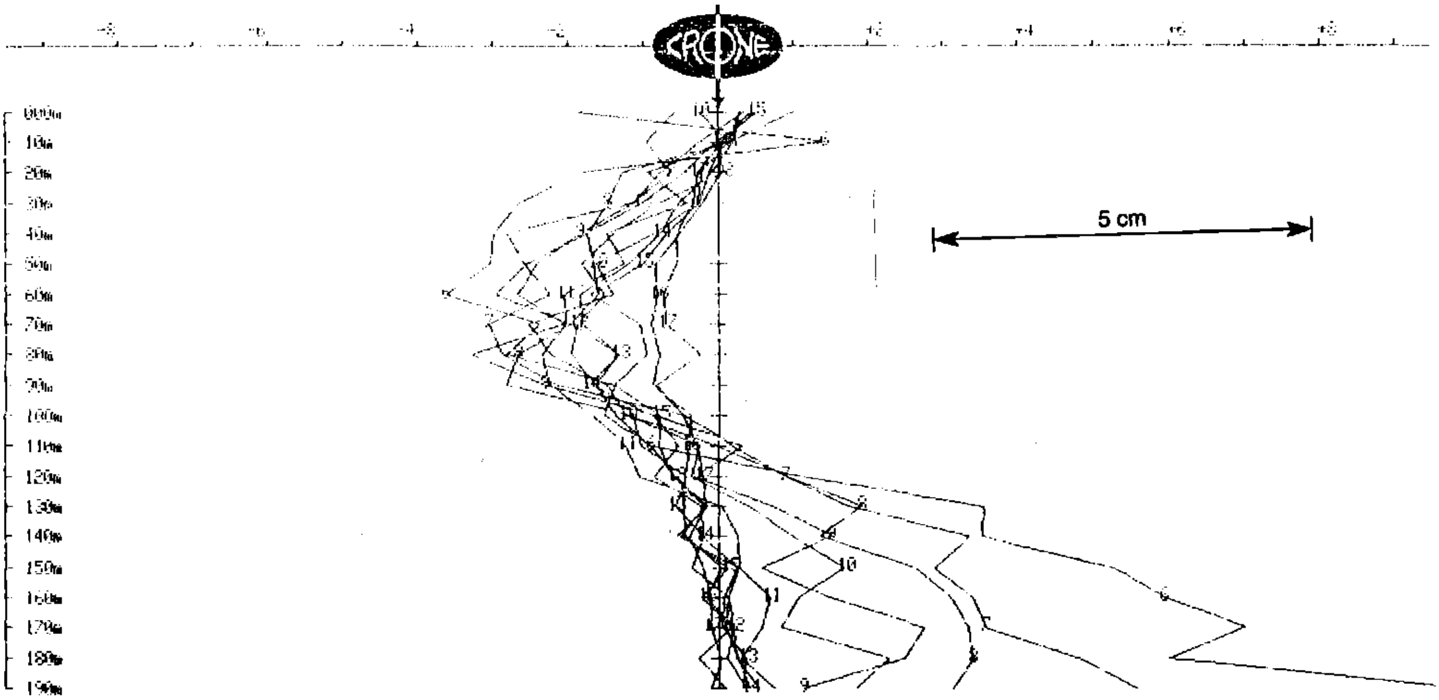


Fig 19

863177

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-002
Grid	: Tullah	Tx Loop	: Collar
Date	: 5th Dec. 1993	File name	: MD2XYC.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
TOTAL XY FIELD dBxy/dt nanoVolt/Amp-m² - 17 channels and PP

Scale: 1:2500 Unit Scale: 1cm = 2000

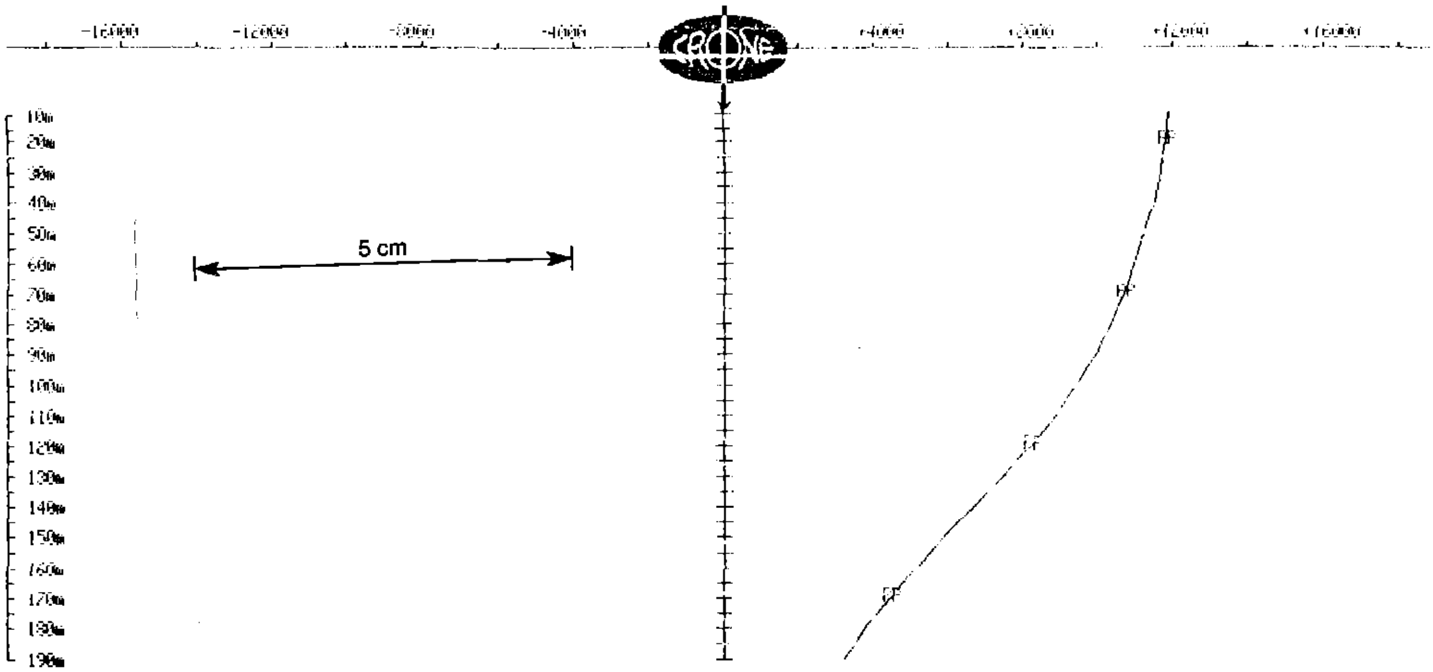


Fig 20

868178

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-002
Grid	: Tullah	Tx Loop	: Collar
Date	: 5th Dec. 1993	File name	: MD2XYC.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
TOTAL XY FIELD dBxy/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 50

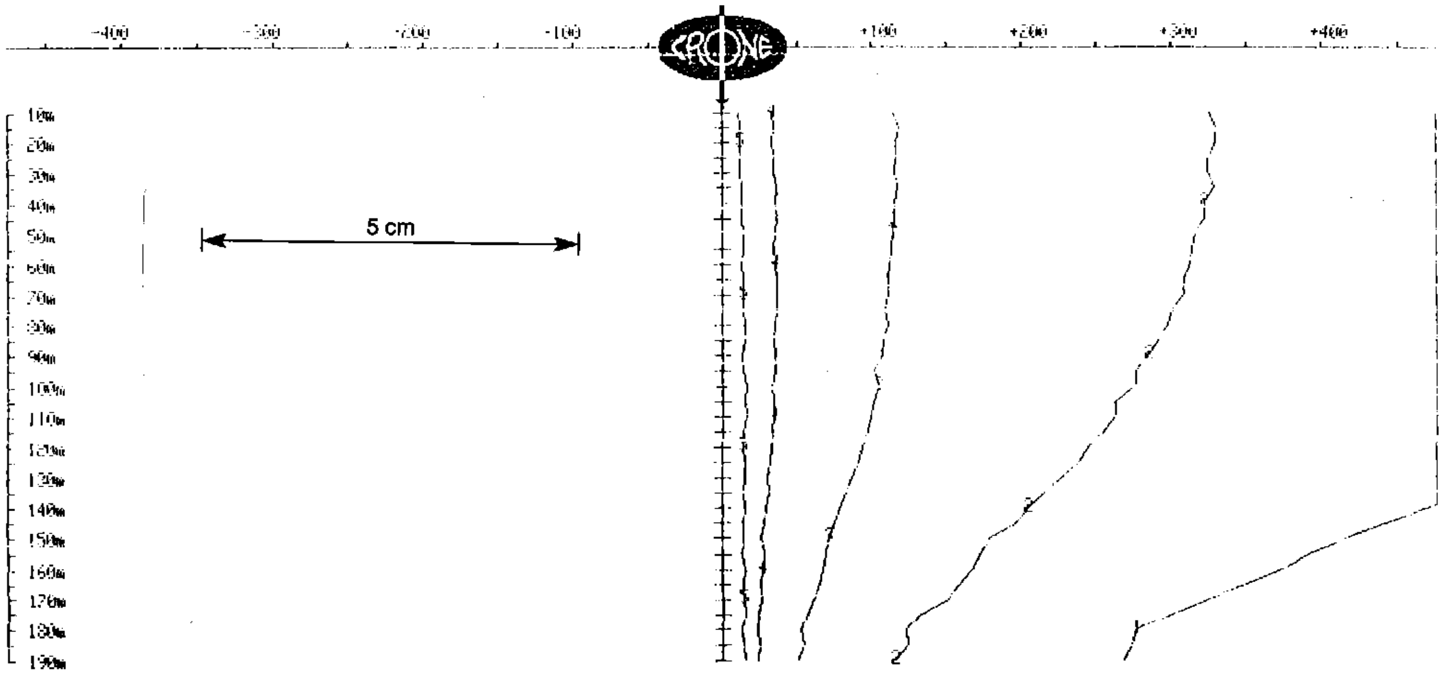


Fig 21

863179

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: **Pasminco Exploration**	Hole	: **MD-002**
Grid	: **Tullah**	Tx Loop	: **Collar**
Date	: 5th Dec. 1993	File name	: MD2XYC.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
TOTAL XY FIELD dBxy/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 1

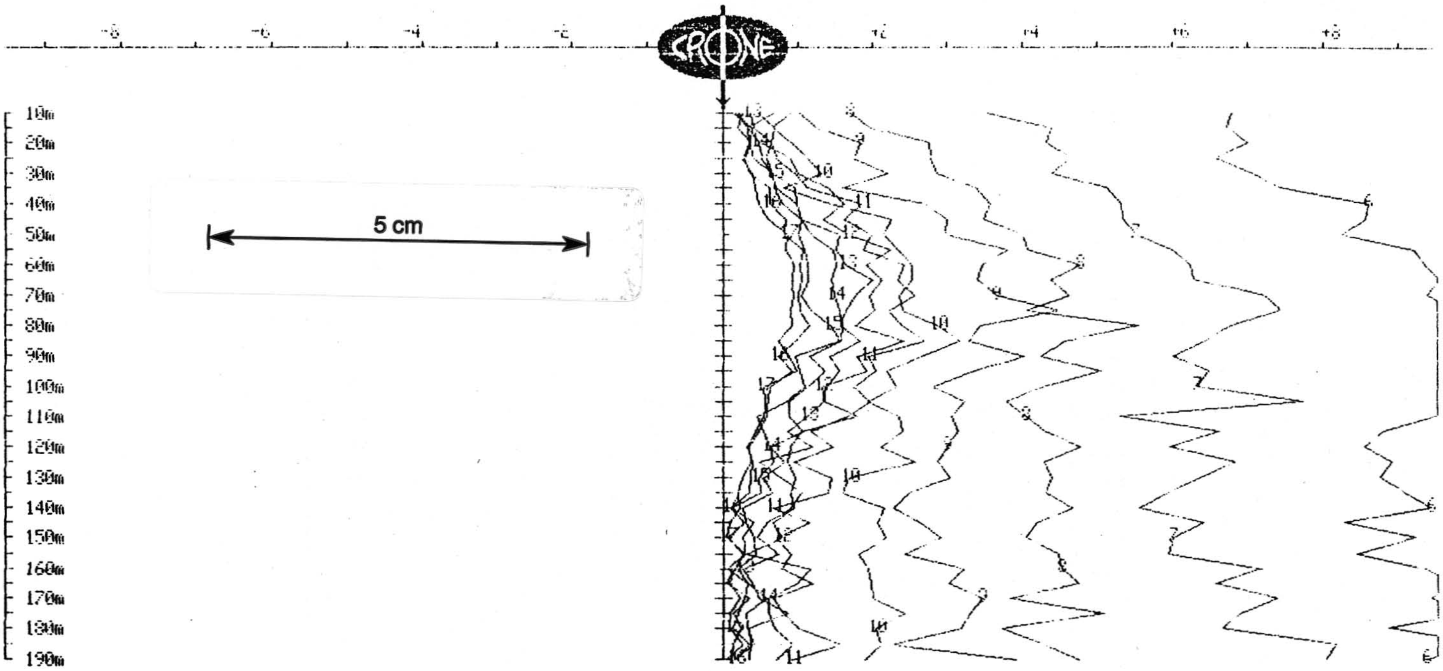


Fig 22

863180

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-002
Grid	: Tullah	Tx Loop	: Collar
Date	: 9th Dec. 1993	File name	: MD2XY.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
TOTAL XY FIELD dBxy/dt nanoVolt/Amp-m² - 17 channels and PP

Scale: 1:2500 Unit Scale: 1cm = 2000

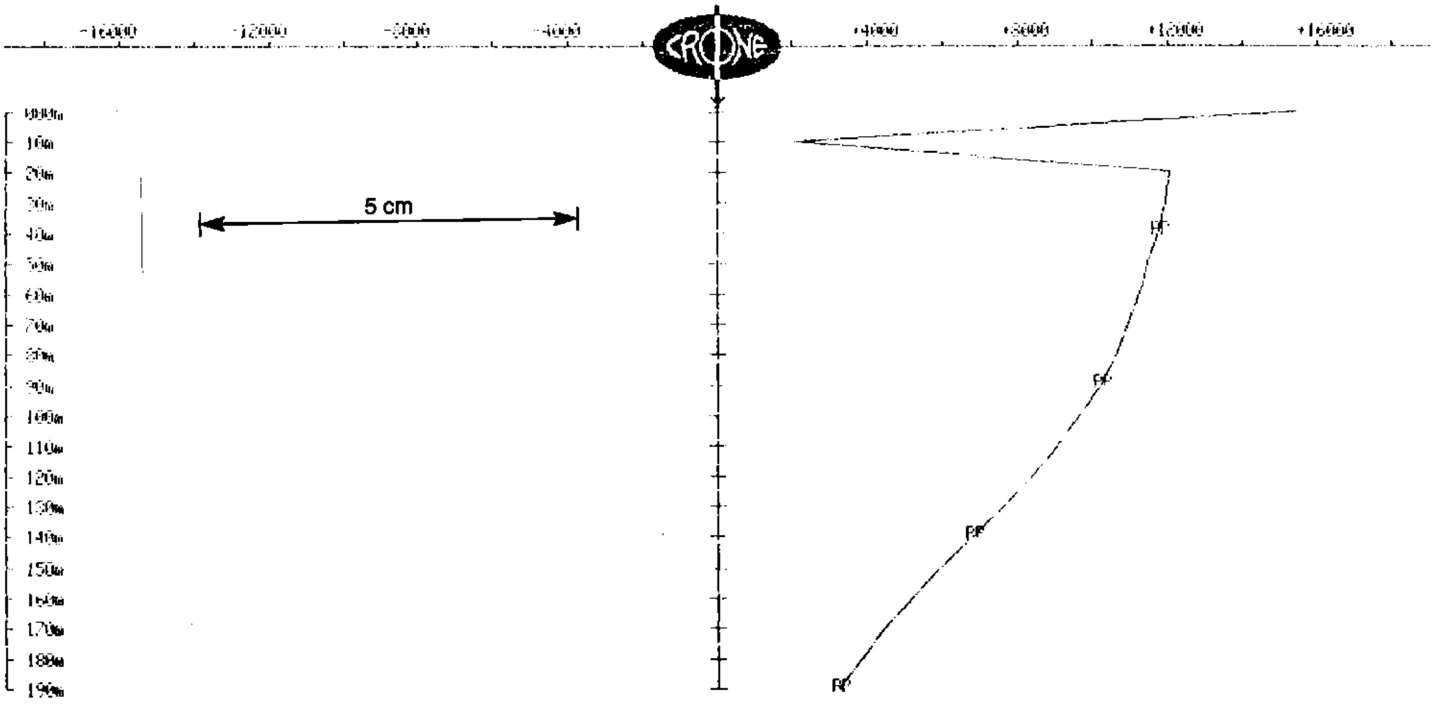


Fig 23

863181

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	:	**Pasminco Exploration**	Hole	:	**MD-002**
Grid	:	**Tullah**	Tx Loop	:	**Collar**
Date	:	9th Dec. 1993	File name	:	MD2XY.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
TOTAL XY FIELD dBxy/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 50

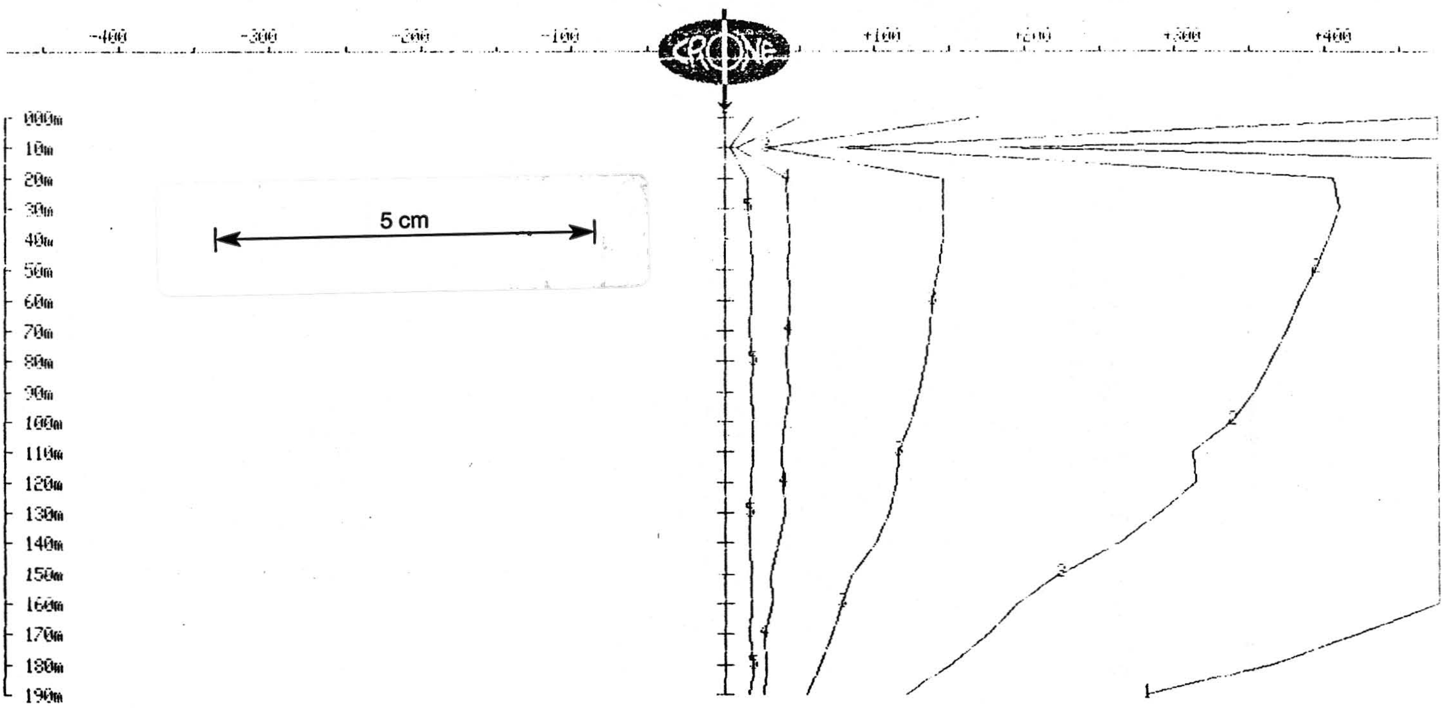


Fig 2A

863182

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MD-002
Grid	: Tullah	Tx Loop	: Collar
Date	: 9th Dec. 1993	File name	: MD2XY.AM2

Data Corrected for Probe Rotation using Orientation Tool #2
Data Corrected for Probe Rotation using Cleaned PP
TOTAL XY FIELD dBxy/dt nanoVolt/Amp-m² - 17 channels

Scale: 1:2500 Unit Scale: 1cm = 1

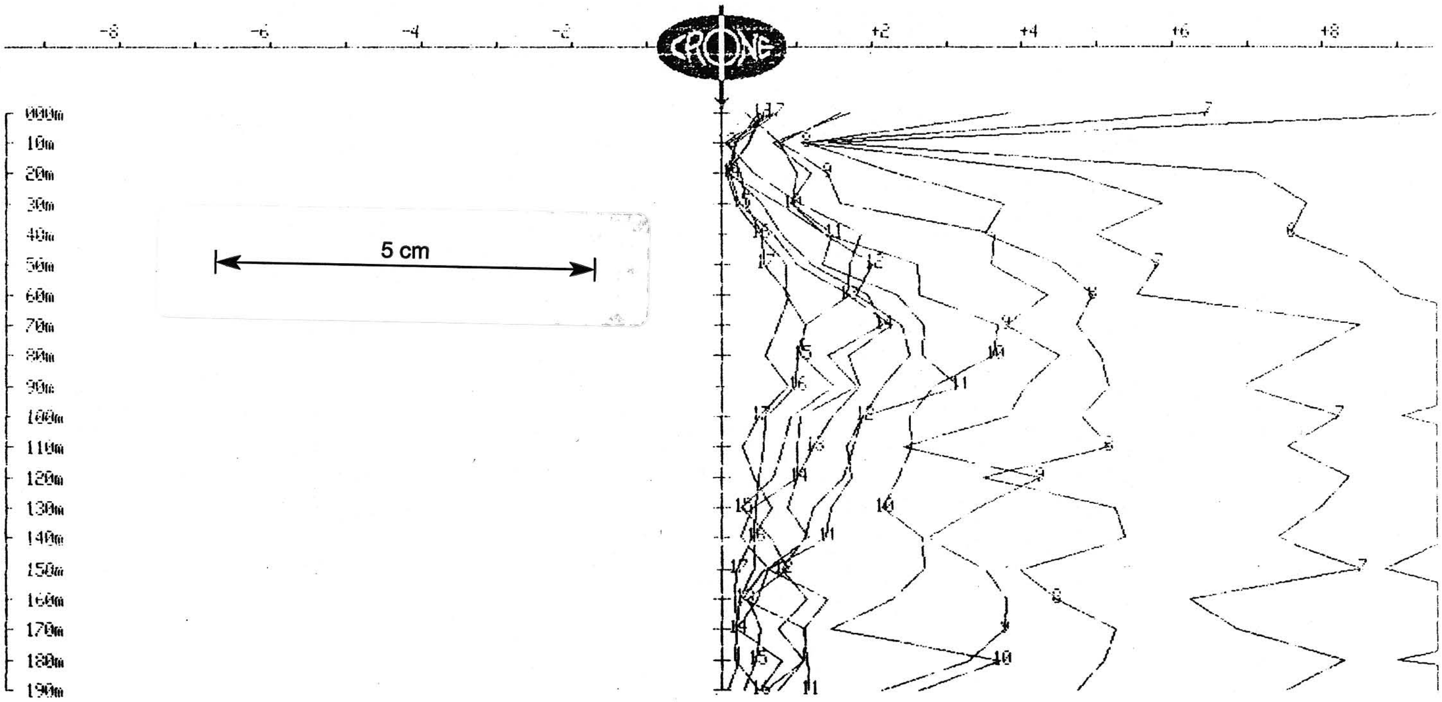


Fig 25

MD2 Loop Coupling

Scale 1 : 2500, Y pojection plane = 566

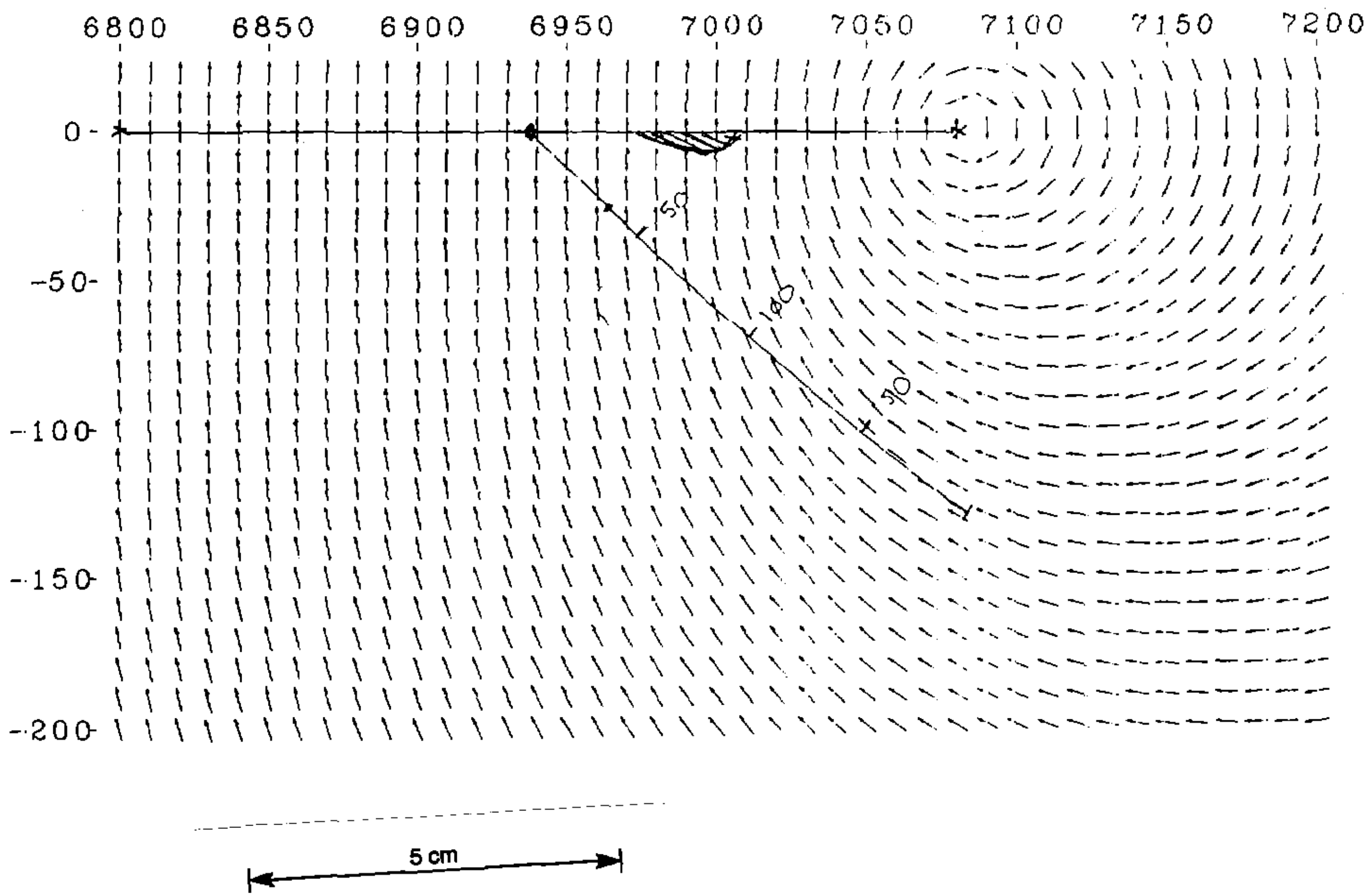


Fig 26

863184

APPENDIX 8

IP/Resistivity Data, Line 82600N, Mackintosh Dam

Pasminco Exploration Ltd

Tullah
Makintosh Dam

Survey Parameters

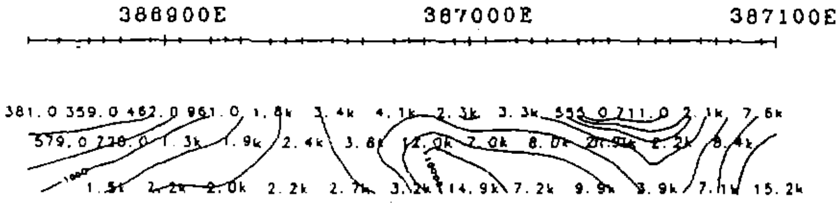
Pole-dipole array
'a' = 20m, 20m, 40m
TD : East, Cl : West
MO : (50 - 240ms)
Timing : 2 sec ON/OFF
Survey : January 1994

Line L82600N

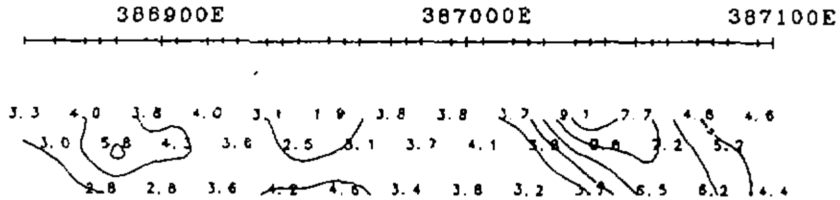
Scale 1 : 2500

IP & Resistivity Survey

RES



MO



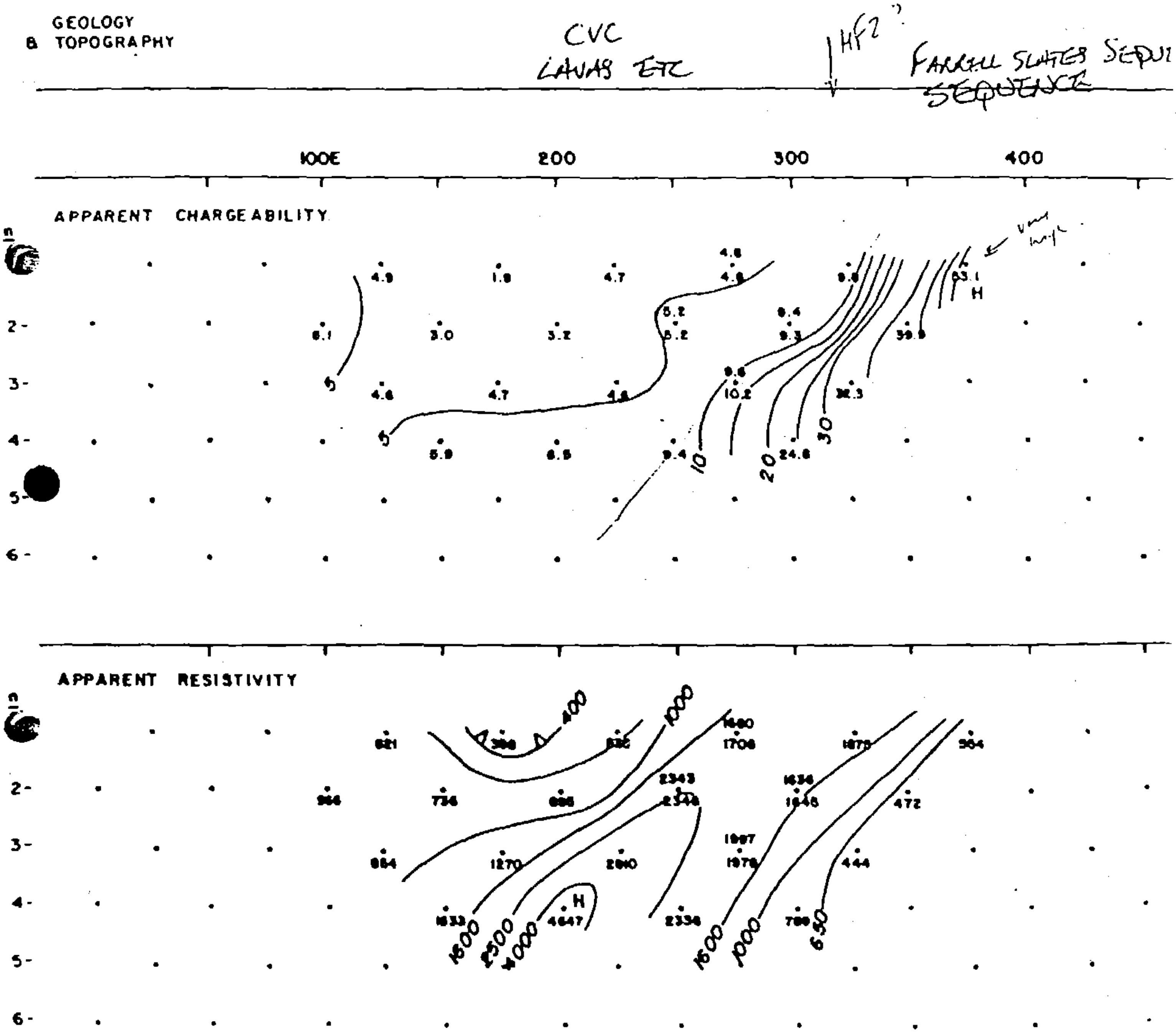
5 cm

863186

LINE 2200N

BILLITON IP
1987

AIRBORNE GEOPHYSICS
(EM, MAG, etc)

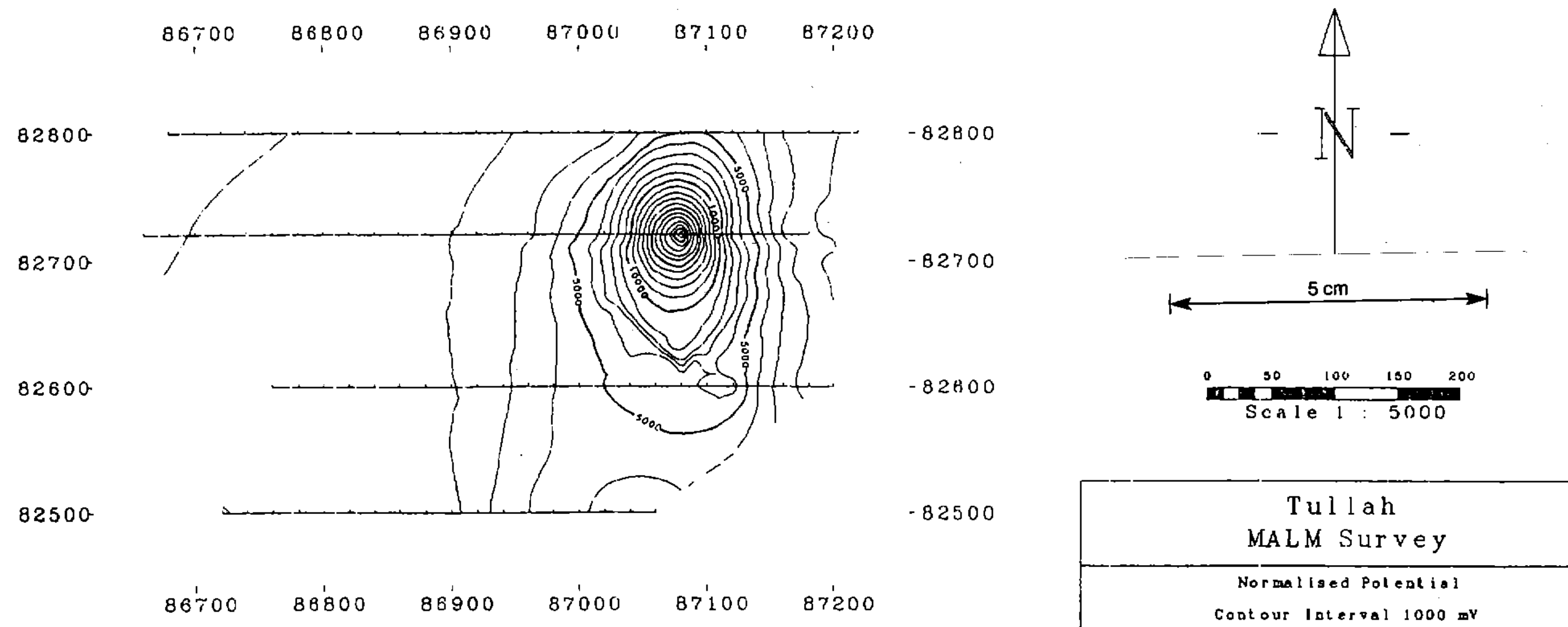


Contractor SCINTREX
Date : 6/11/87
Timing : 2 sec on-off
Transmitter :
Receiver : IPR-8
Integration time : M_3
Array : DIPOLE-DIPOLE
Dipole length : 50m

Fig 30

APPENDIX 9

MALM Survey Data Mackintosh Dam



Tullah
MALM Survey

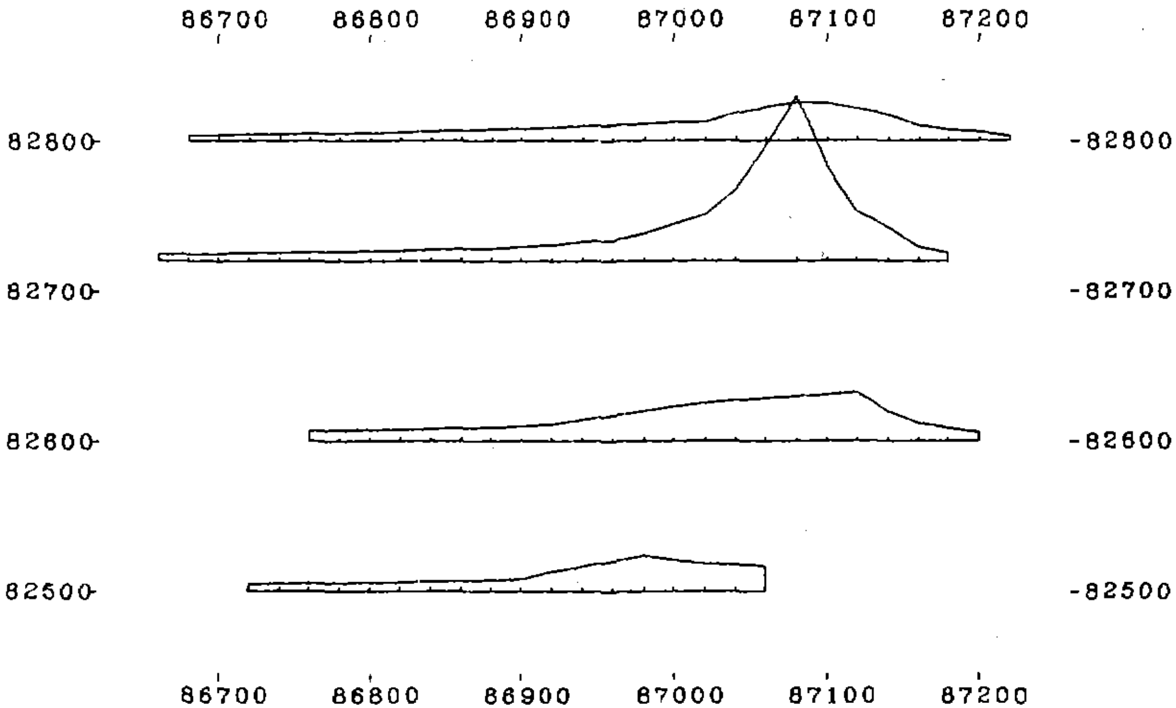
Normalised Potential

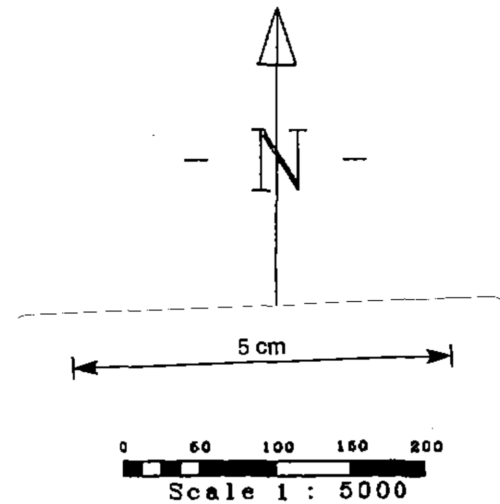
Contour Interval 1000 mV

Current (87050mE, 82725mN)

Survey : January, 1994

Pasminco Exploration





Tullah
MALM Survey

Normalised Potential

Base : 0 mV, Scale : 10000 mV/V

Current (87050mE, 82725mN)

Survey : January, 1994

Pasminco Exploration

890188

863190

APPENDIX 10

DHEM Data, Hole MM2, Tullah Flat

863191

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: Collar
Date	: May 20, 1994	File name	: MM2CZ.PEM
Time Base	: 10.00 ms	# Readings	: 41
Ramp Time	: 0.50 ms	Stn Units	: Metric
# Channels	: 17	Coil Area	: 6500 sq m
Sync Type	: Cable	Polarity	: -
Loop Size	: 300m X 300m	Receiver	: Digital #106
Current	: 8 Amps	Operator	: Geoffrey Dunn

Loop Coordinates (X,Y,Z)
1. 5200m, 0m, 0m
2. 5500m, 0m, 0m
3. 5500m, 300m, 0m
4. 5200m, 300m, 0m

Hole Coordinates (X,Y,Z) or (Azimuth,Dip,Length)
1. 5050m, 200m, 0m

Channel Times (usec)

Ch	Start	End	Center	Ch	Start	End	Center	Ch	Start	End	Center
PP	-198	-99	-149	1	76	104	90	2	104	131	117
3	131	171	151	4	171	225	198	5	225	292	259
6	292	378	335	7	378	490	434	8	490	639	565
9	639	828	733	10	828	1075	952	11	1075	1395	1235
12	1395	1809	1602	13	1809	2348	2078	14	2348	3046	2697
15	3046	3951	3498	16	3951	5121	4536	17	5121	6646	5884

863192 PAS1098a

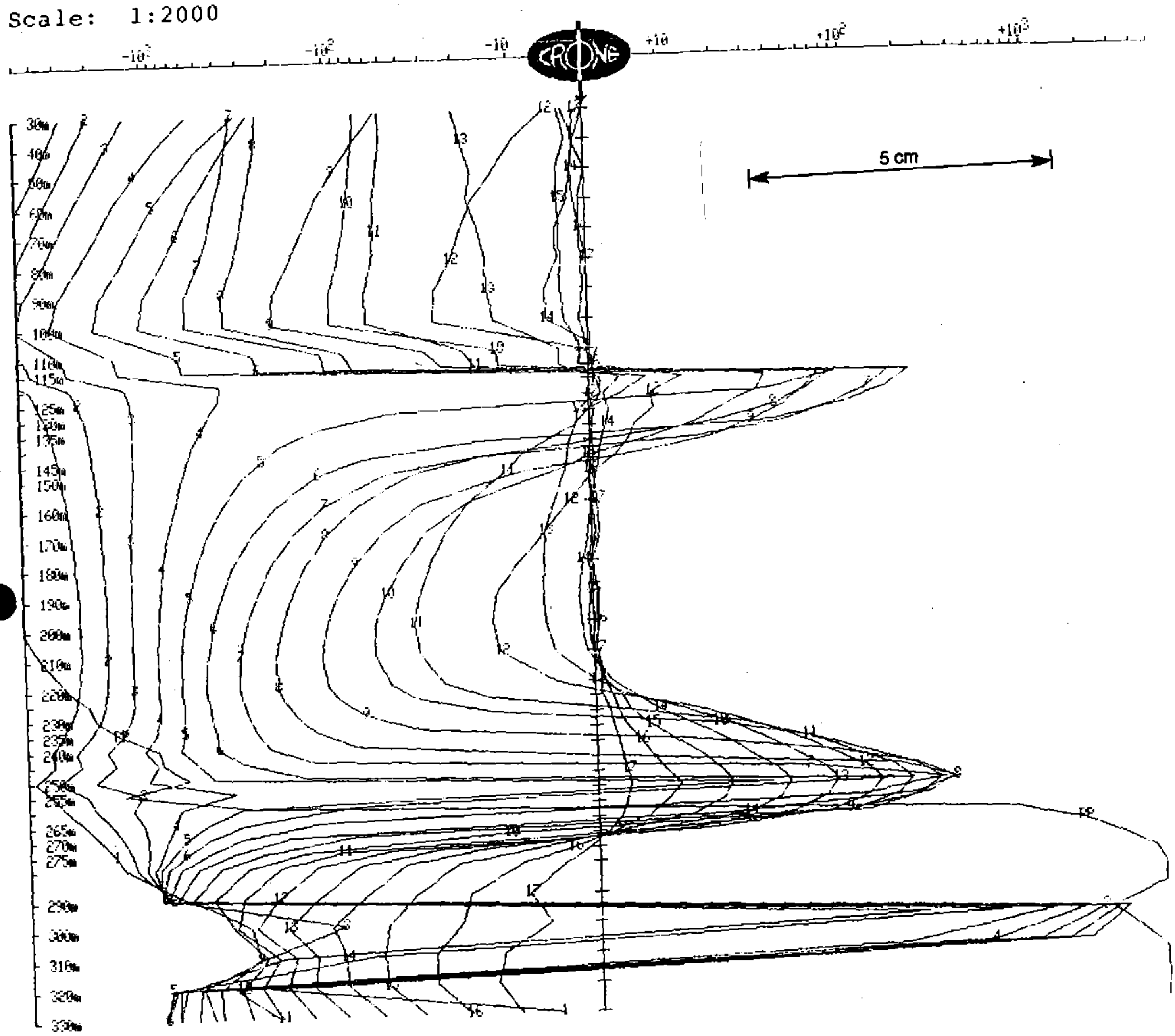
OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client : Pasminco Exploration
Grid : Tullah
Date : May 20, 1994

Hole : MM2
Tx Loop : Collar
File name : MM2CZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels and PP

Scale: 1:2000



803193 PAS10986

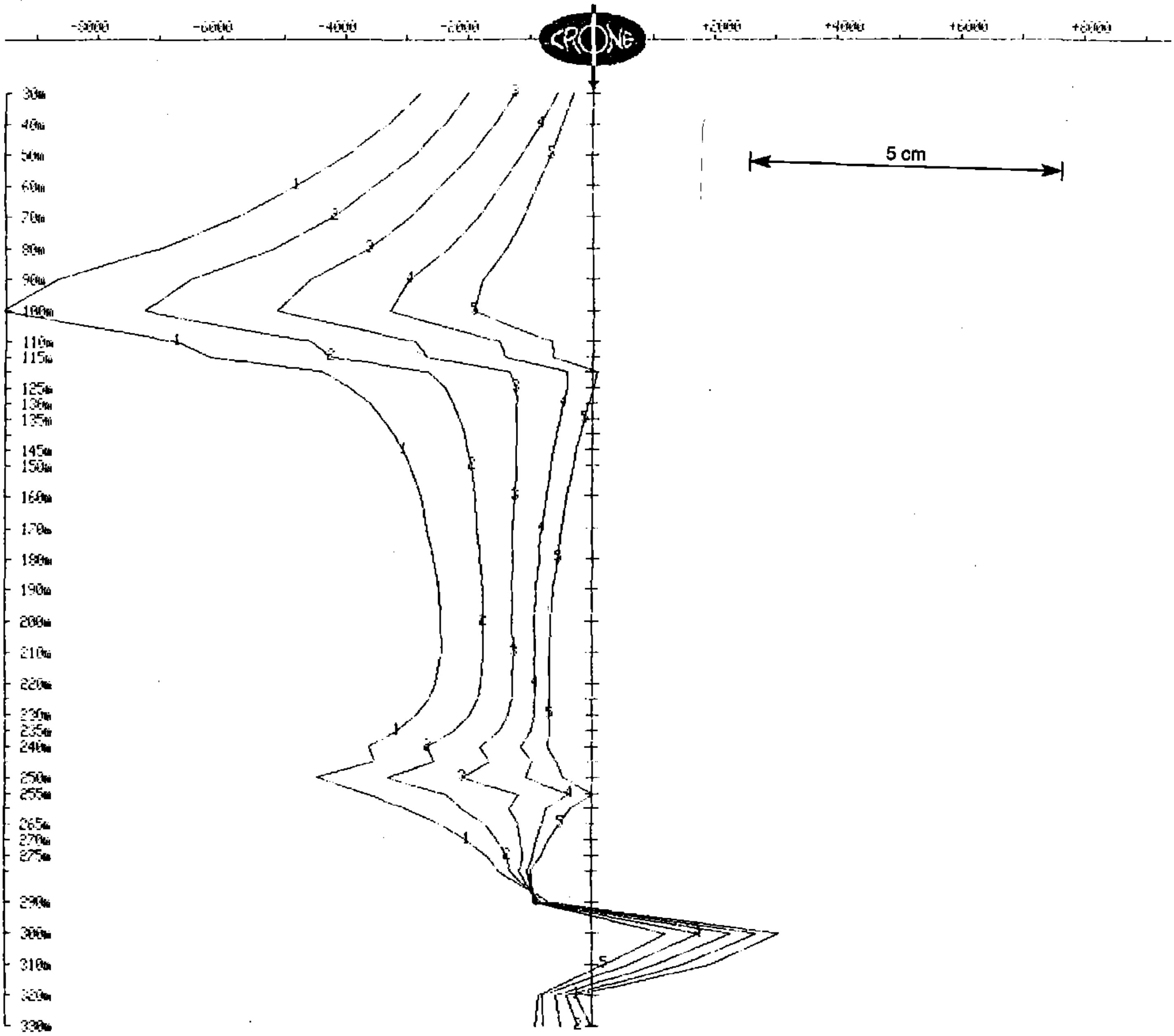
OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: Collar
Date	: May 20, 1994	File name	: MM2CZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000

Unit Scale: 1cm = 1000 nT/s



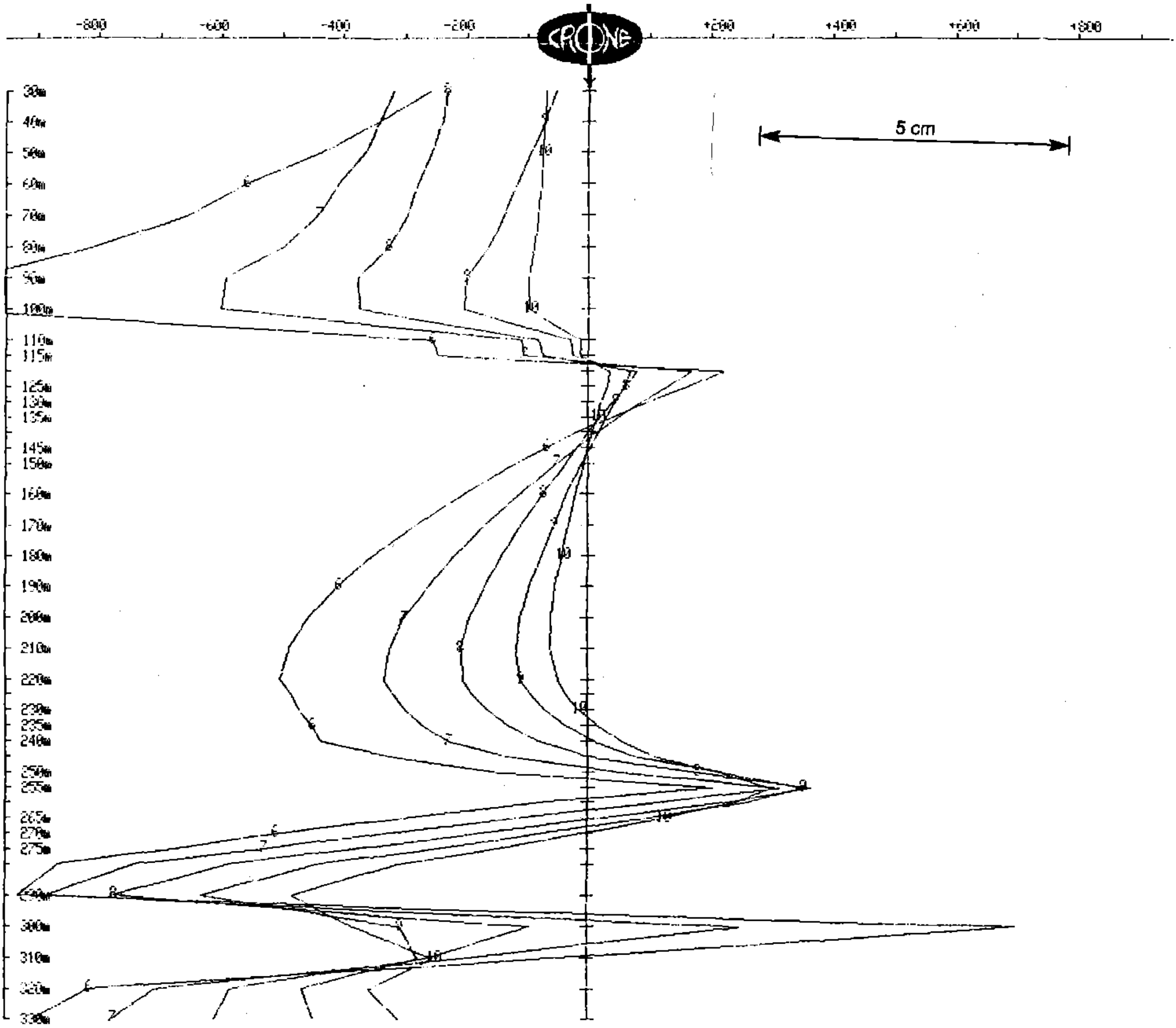
863194 PAS1098C

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: Collar
Date	: May 20, 1994	File name	: MM2CZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000 Unit Scale: 1cm = 100 nT/s



866195 PAS1098d

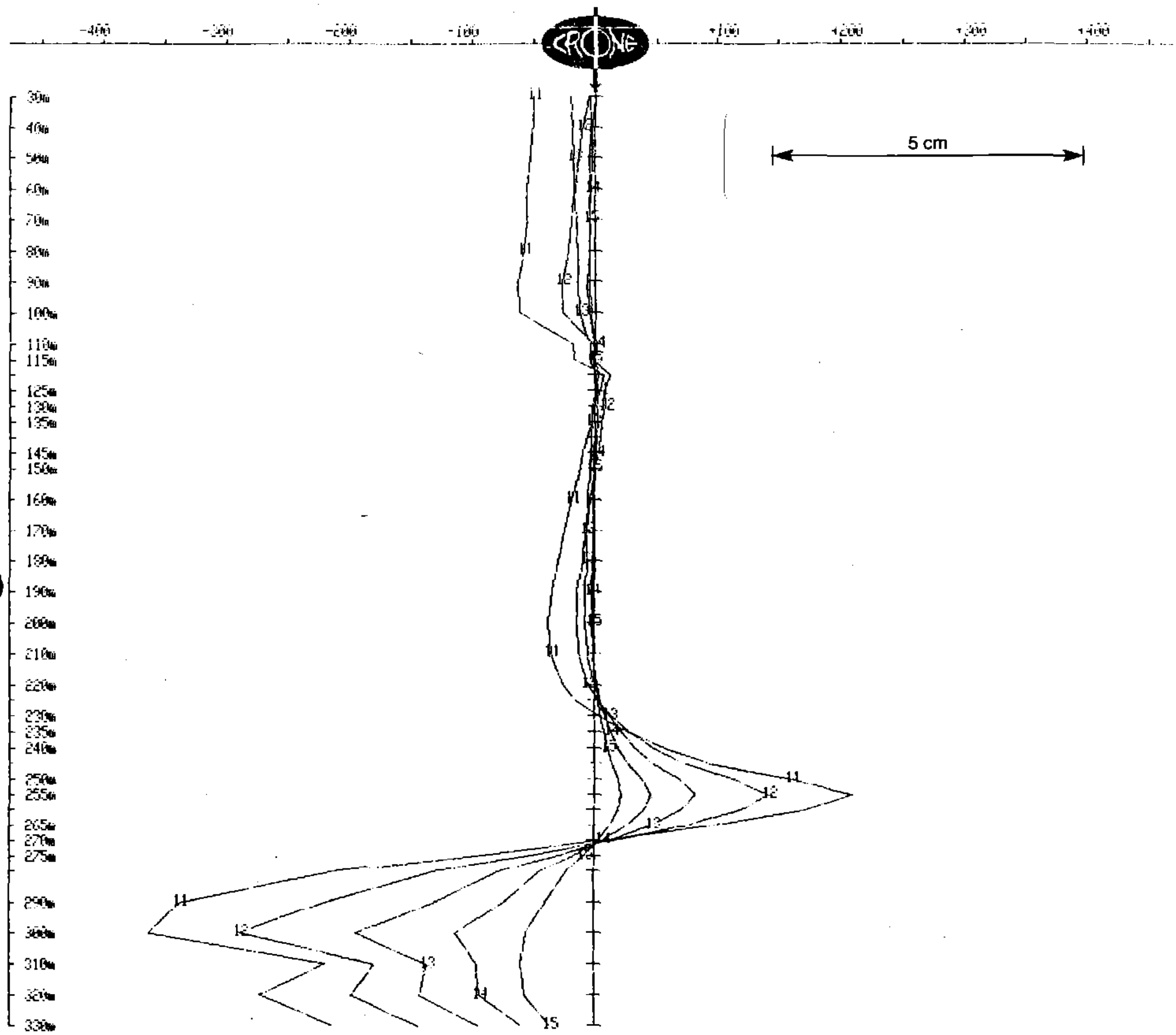
OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: Collar
Date	: May 20, 1994	File name	: MM2CZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000

Unit Scale: 1cm = 50 nT/s



863196 PAS1098c

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

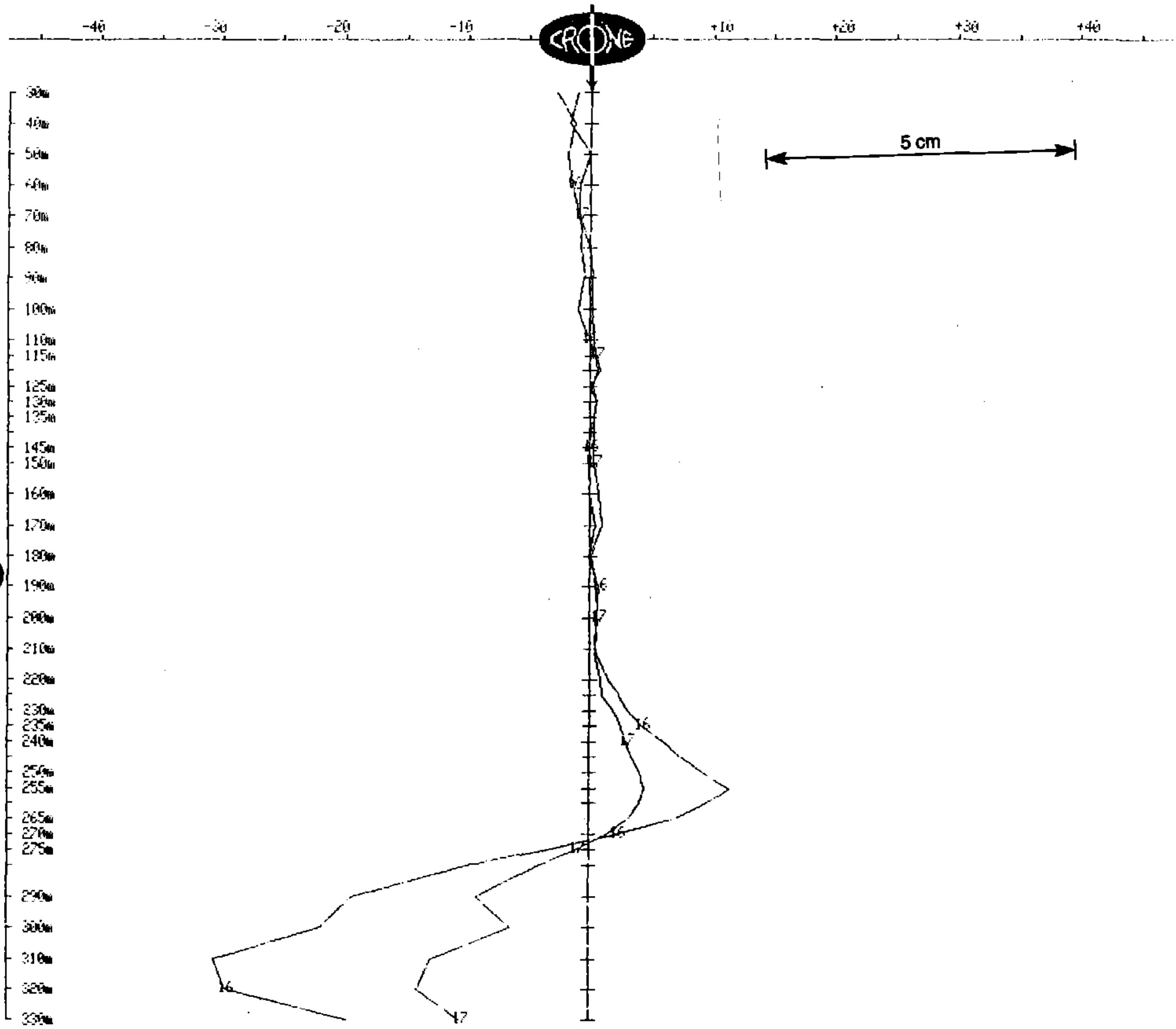
Client : Pasminco Exploration
Grid : Tullah
Date : May 20, 1994

Hole : MM2
Tx Loop : Collar
File name : MM2CZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000

Unit Scale: 1cm = 5 nT/s



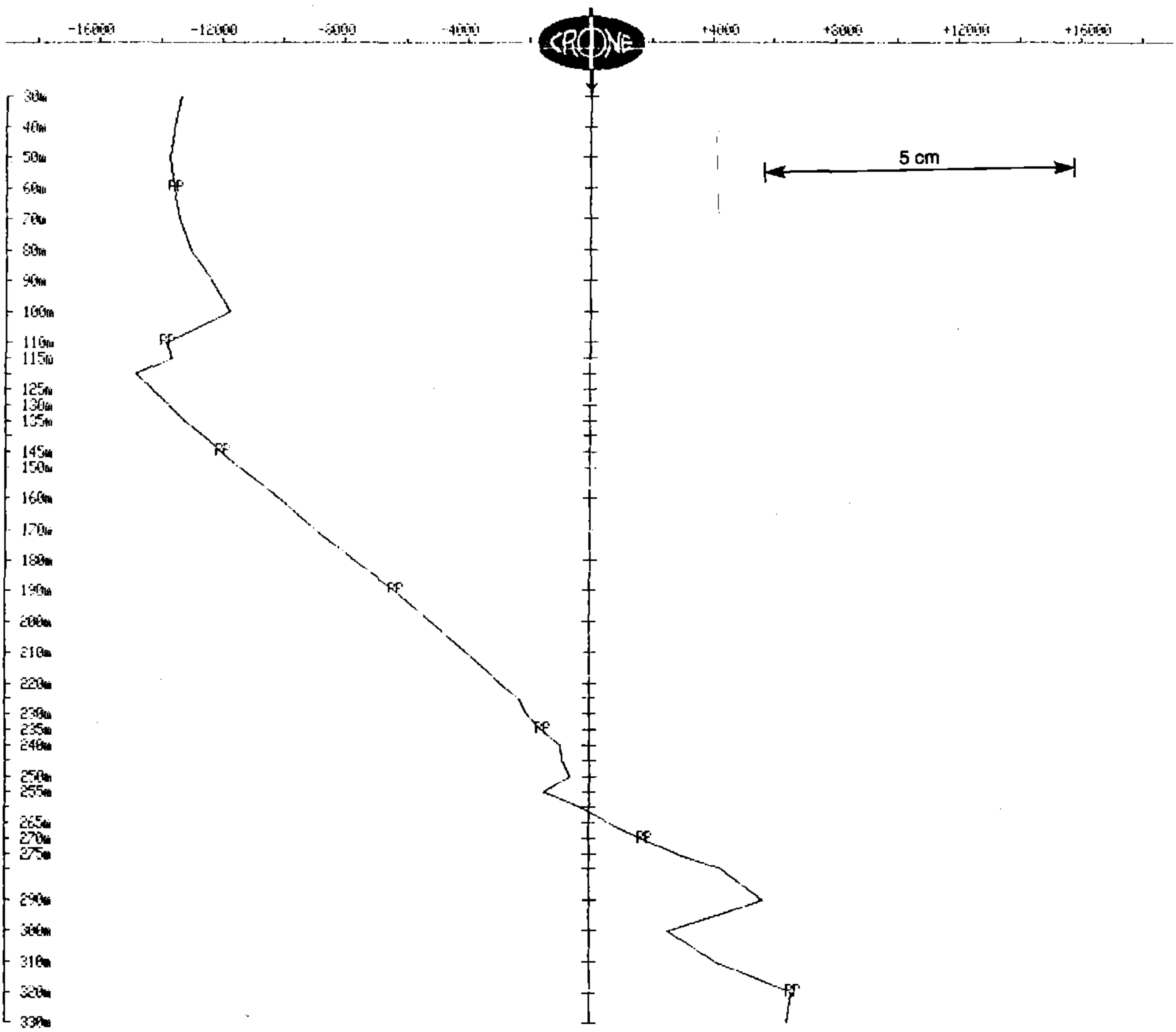
863197 PHB10184

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: Collar
Date	: May 20, 1994	File name	: MM2CZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels and PP

Scale: 1:2000 Unit Scale: 1cm = 2000 nT/s



863195 | [illegible]

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: West
Date	: May 20, 1994	File name	: MM2WZ.PEM
Time Base	: 10.00 ms	# Readings	: 34
Ramp Time	: 0.50 ms	Stn Units	: Metric
# Channels	: 17	Coil Area	: 6500 sq m
Sync Type	: Cable	Polarity	: -
Loop Size	: 300m X 300m	Receiver	: Digital #106
Current	: 8 Amps	Operator	: Geoffrey Dunn

Loop Coordinates (X,Y,Z)
1. 5200m, 0m, 0m
2. 5200m, 300m, 0m
3. 4900m, 300m, 0m
4. 5050m, 0m, 0m

Hole Coordinates (X,Y,Z) or (Azimuth,Dip,Length)
1. 5050m, 200m, 0m

Channel Times (usec)

Ch	Start	End	Center	Ch	Start	End	Center	Ch	Start	End	Center
PP	-198	-99	-149	1	76	104	90	2	104	131	117
3	131	171	151	4	171	225	198	5	225	292	259
6	292	378	335	7	378	490	434	8	490	639	565
9	639	828	733	10	828	1075	952	11	1075	1395	1235
12	1395	1809	1602	13	1809	2348	2078	14	2348	3046	2697
15	3046	3951	3498	16	3951	5121	4536	17	5121	6646	5884

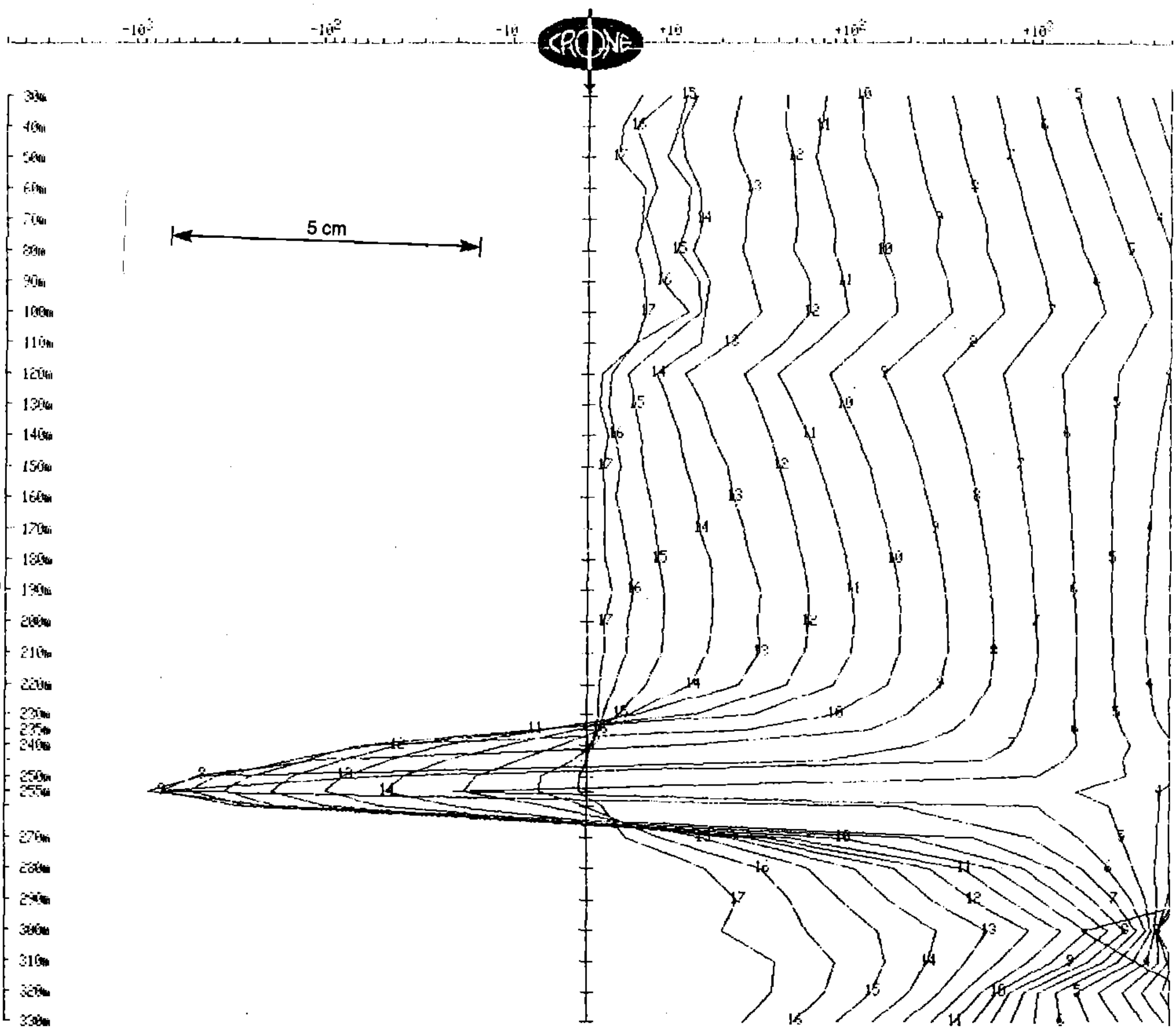
863199 PAS 1099a

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: West
Date	: May 20, 1994	File name	: MM2WZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels and PP

Scale: 1:2000



863200 PAS10996

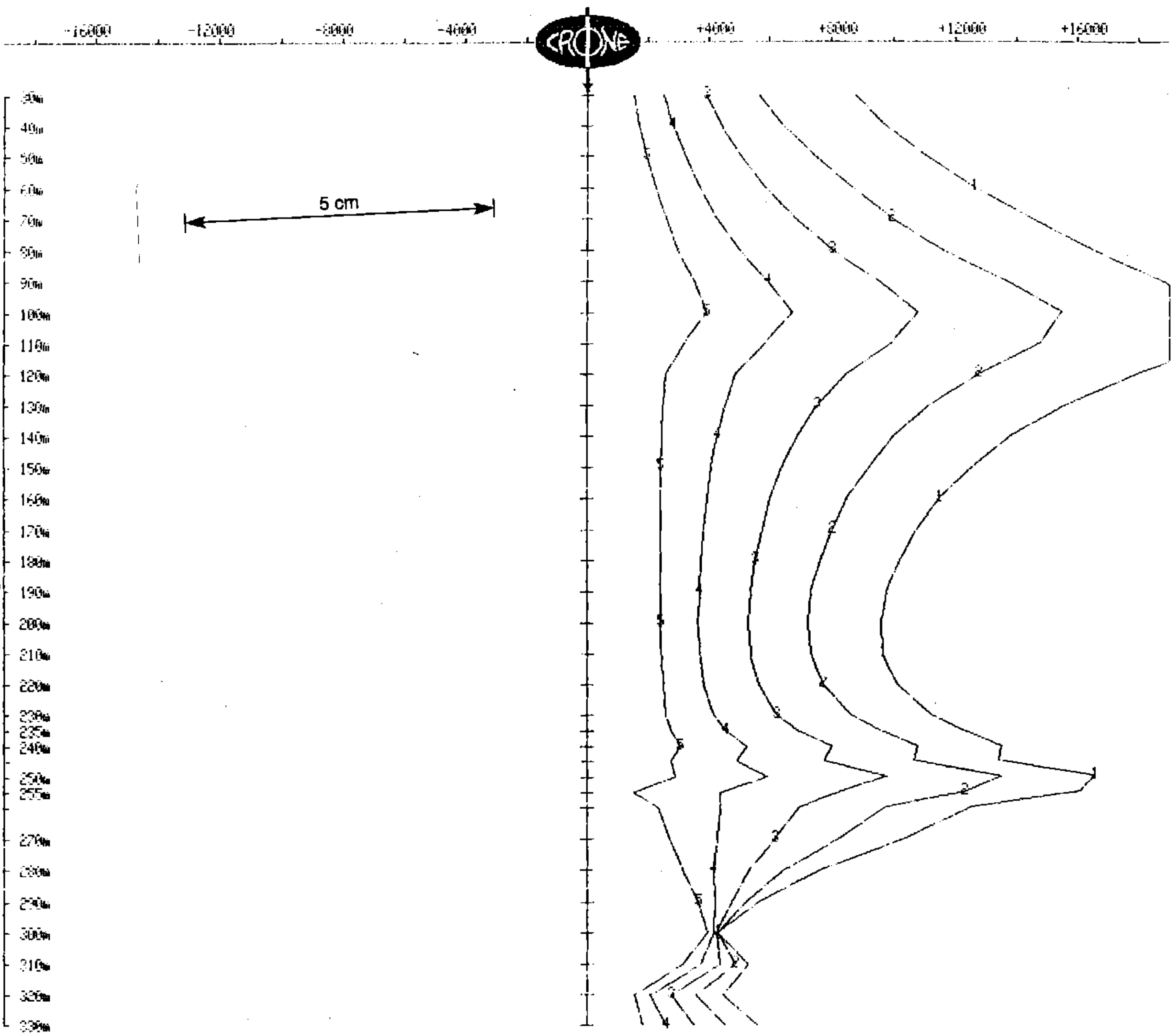
OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: West
Date	: May 20, 1994	File name	: MM2WZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000

Unit Scale: 1cm = 2000 nT/s



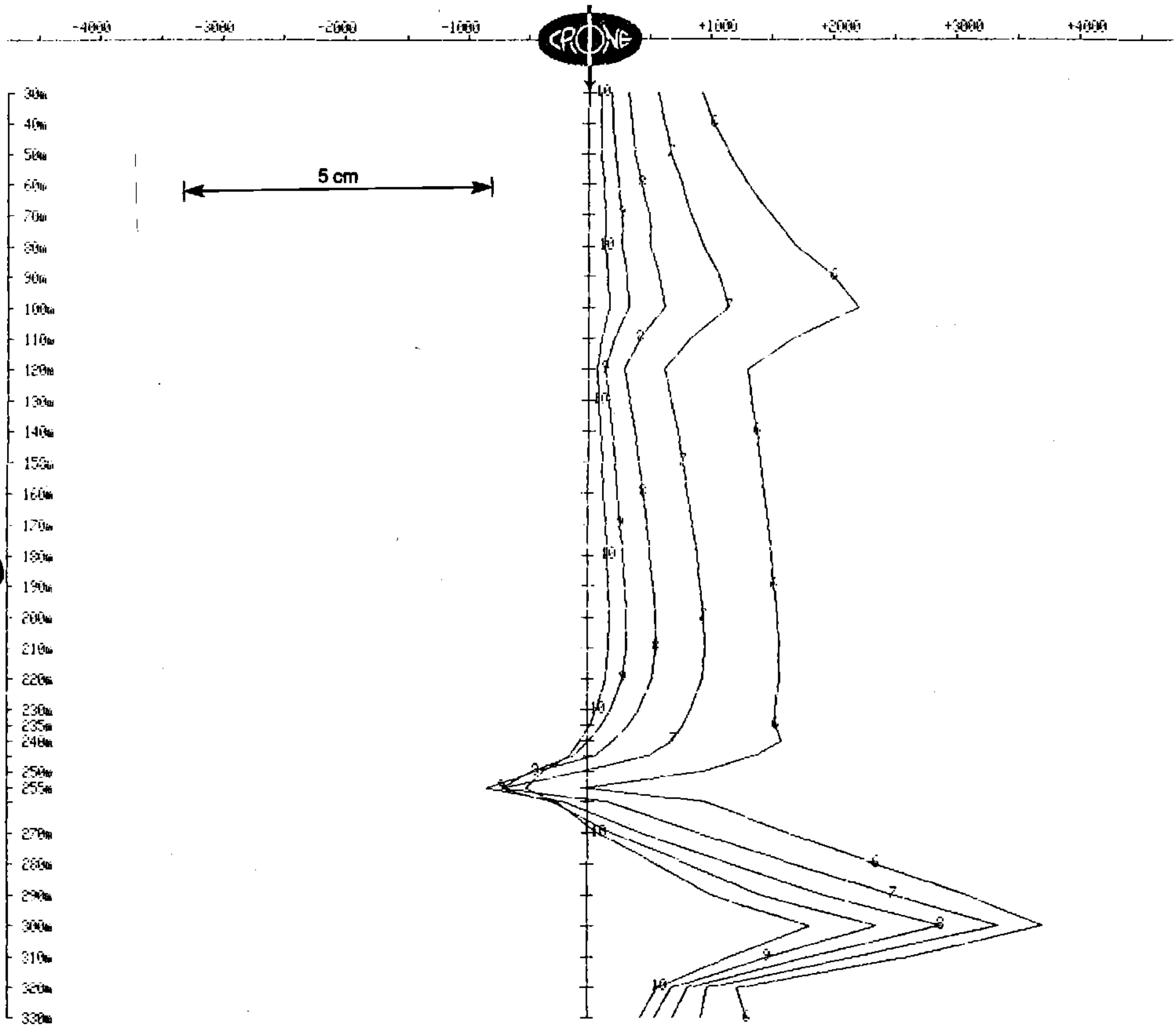
863201 PAS1099c

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: West
Date	: May 20, 1994	File name	: MM2WZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000 Unit Scale: 1cm = 500 nT/s



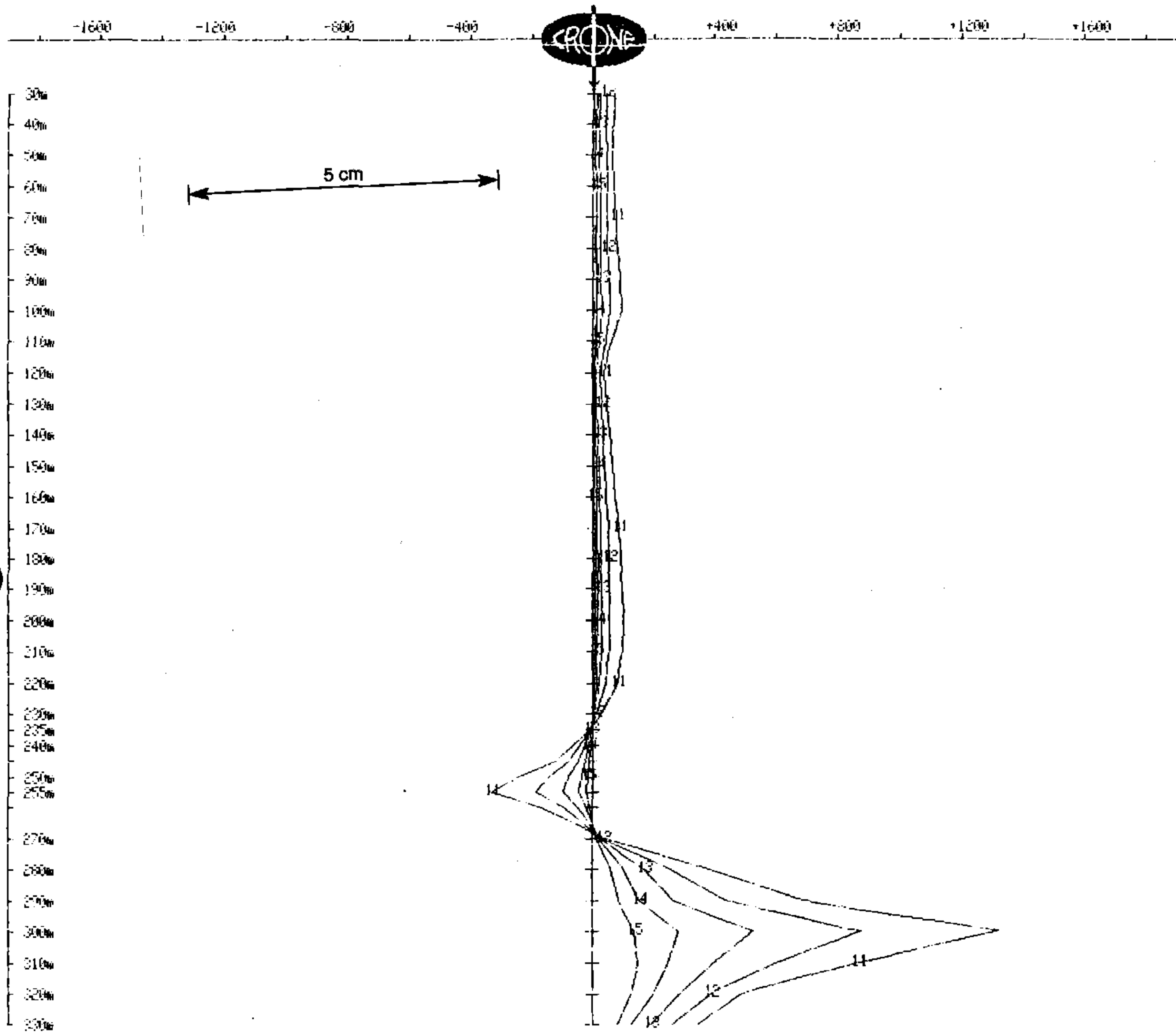
863202 PA51099d

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: West
Date	: May 20, 1994	File name	: MM2WZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000 Unit Scale: 1cm = 200 nT/s



866203 PAS 1099e.

OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

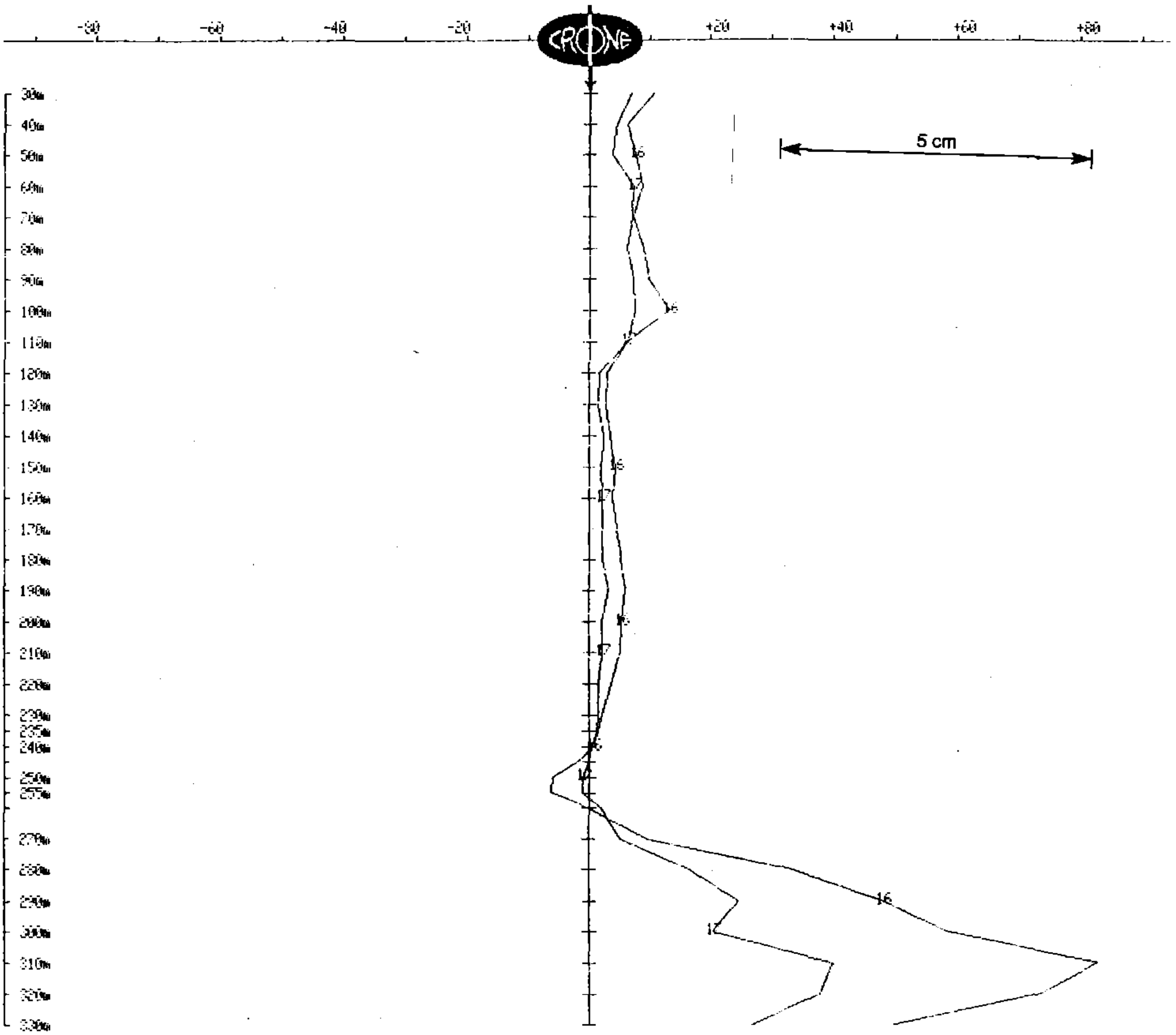
Client : Pasminco Exploration
Grid : Tullah
Date : May 20, 1994

Hole : MM2
Tx Loop : West
File name : MM2WZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels

Scale: 1:2000

Unit Scale: 1cm = 10 nT/s



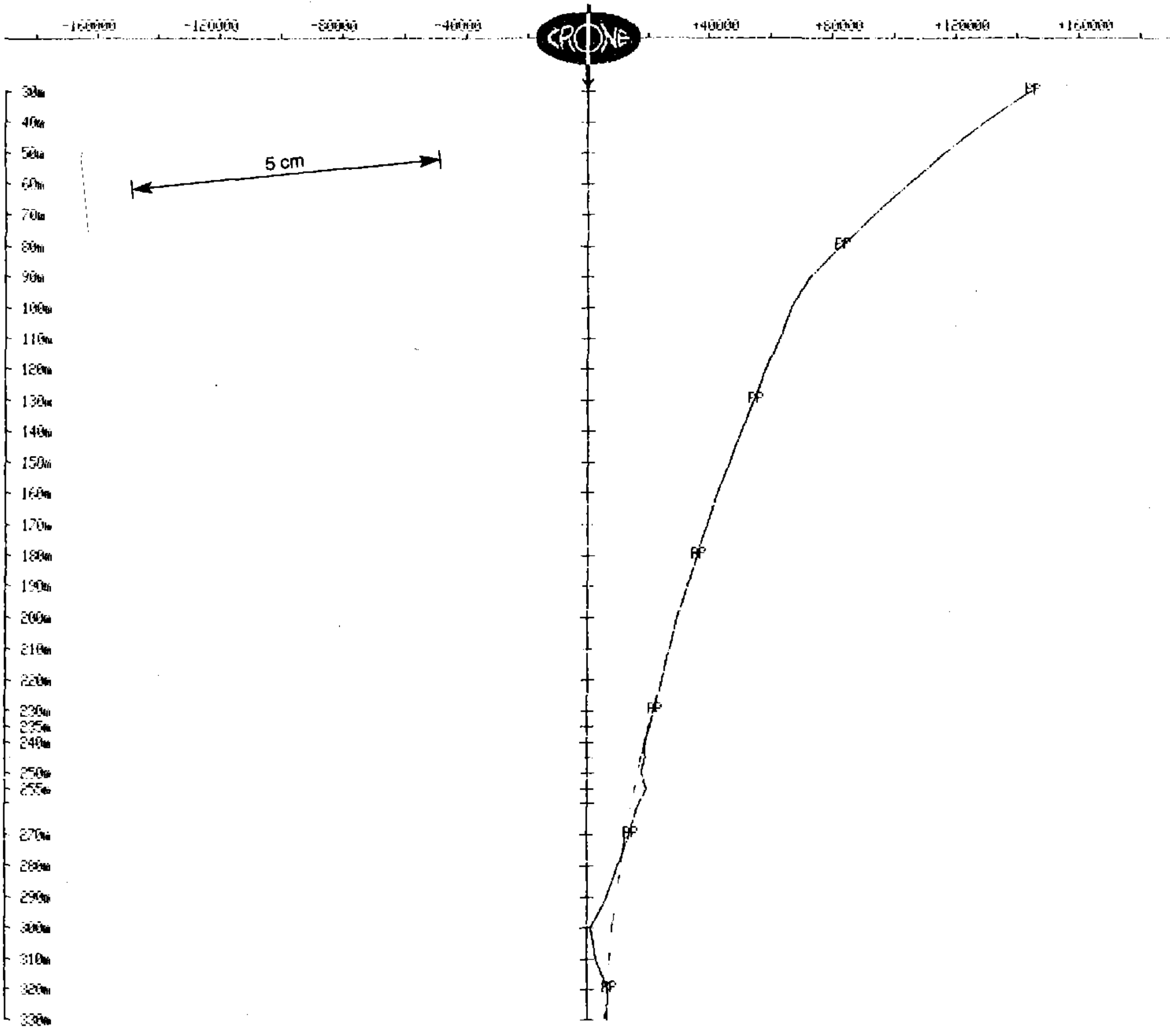
863204 PAS1099F

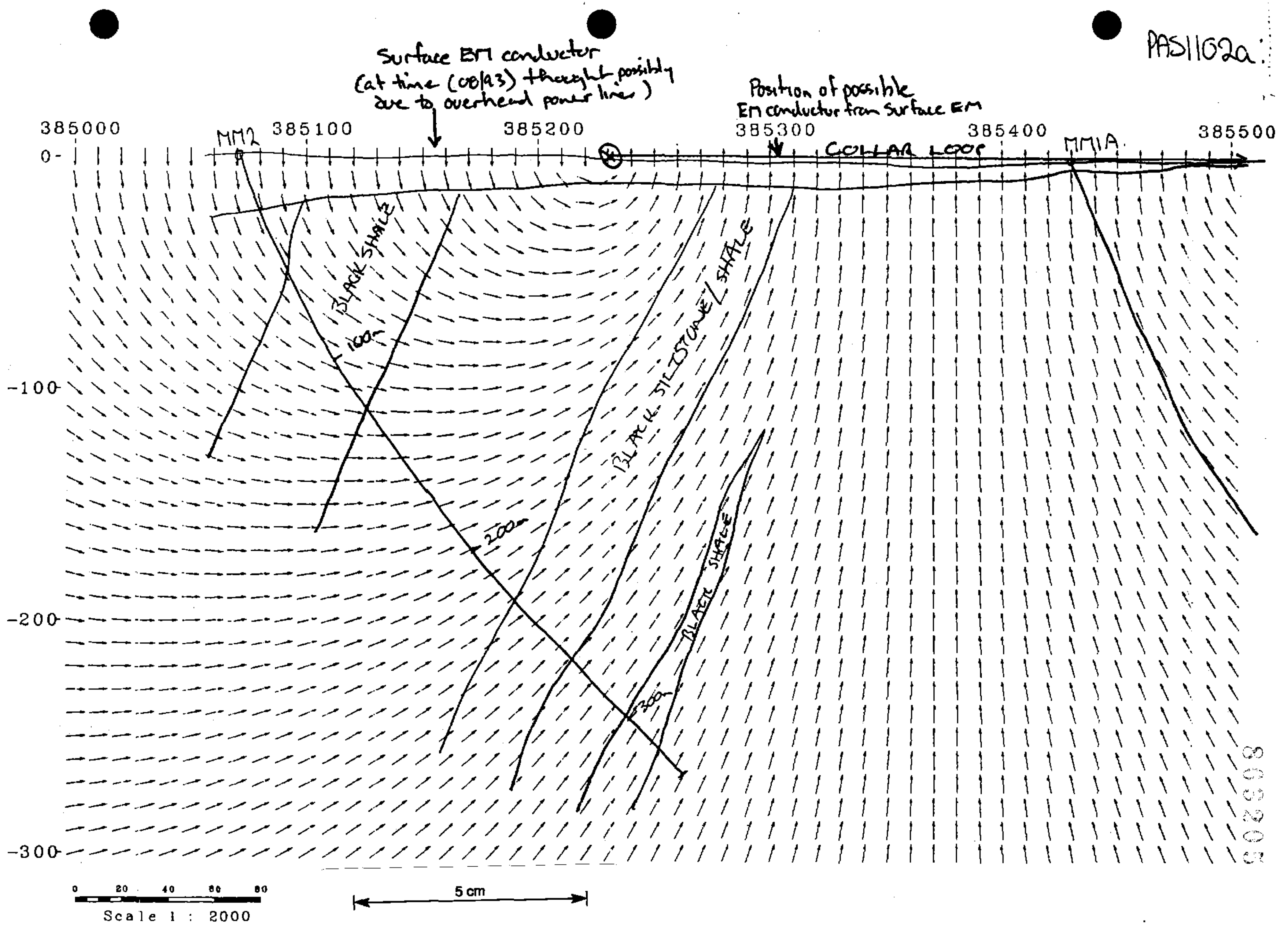
OUTER-RIM EXPLORATION SERVICES
Operating Crone PEM System
BOREHOLE PEM

Client	: Pasminco Exploration	Hole	: MM2
Grid	: Tullah	Tx Loop	: West
Date	: May 20, 1994	File name	: MM2WZ.PEM

Z COMPONENT dBz/dt nanoTesla/sec - 17 channels and PP

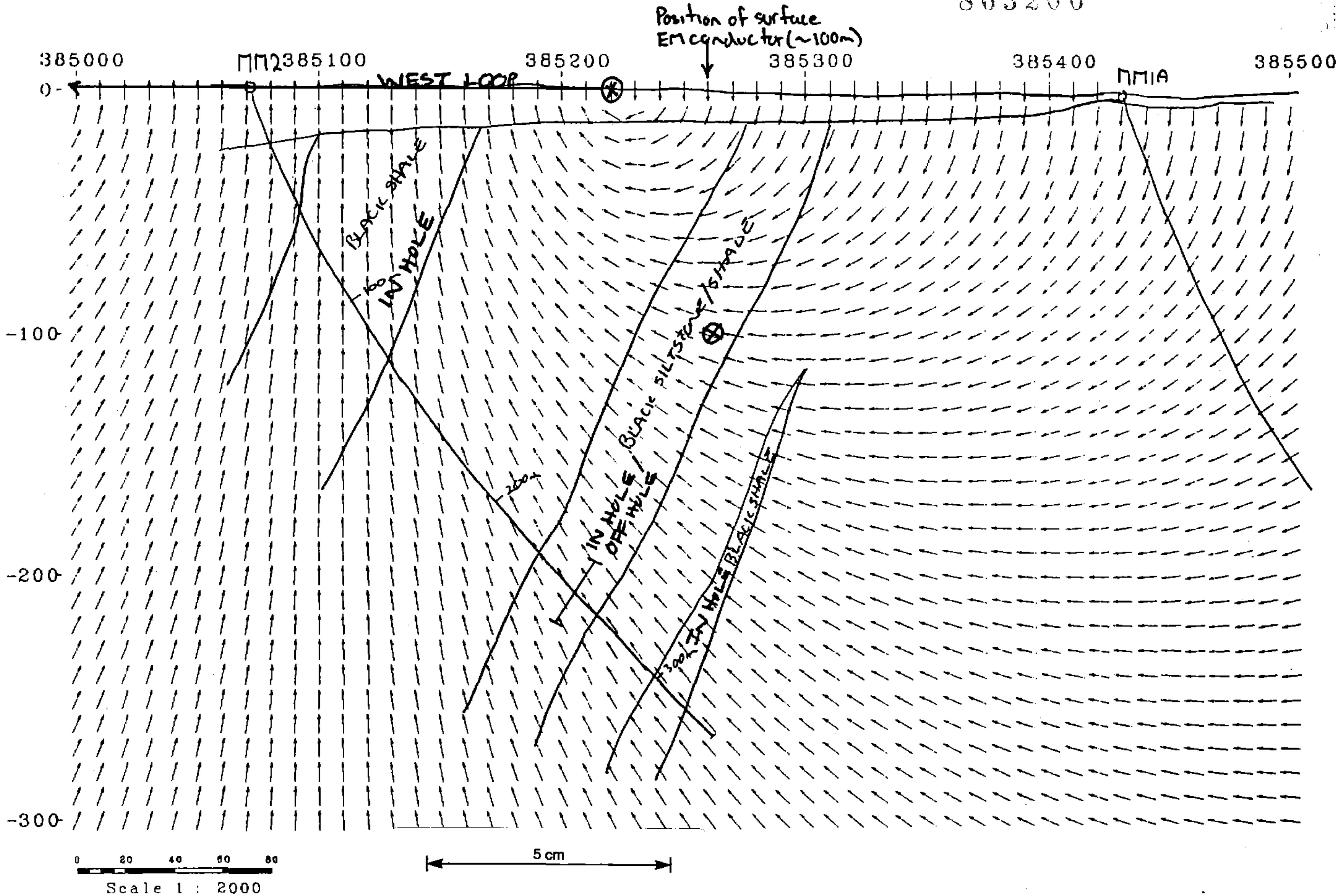
Scale: 1:2000 Unit Scale: 1cm = 20000 nT/s



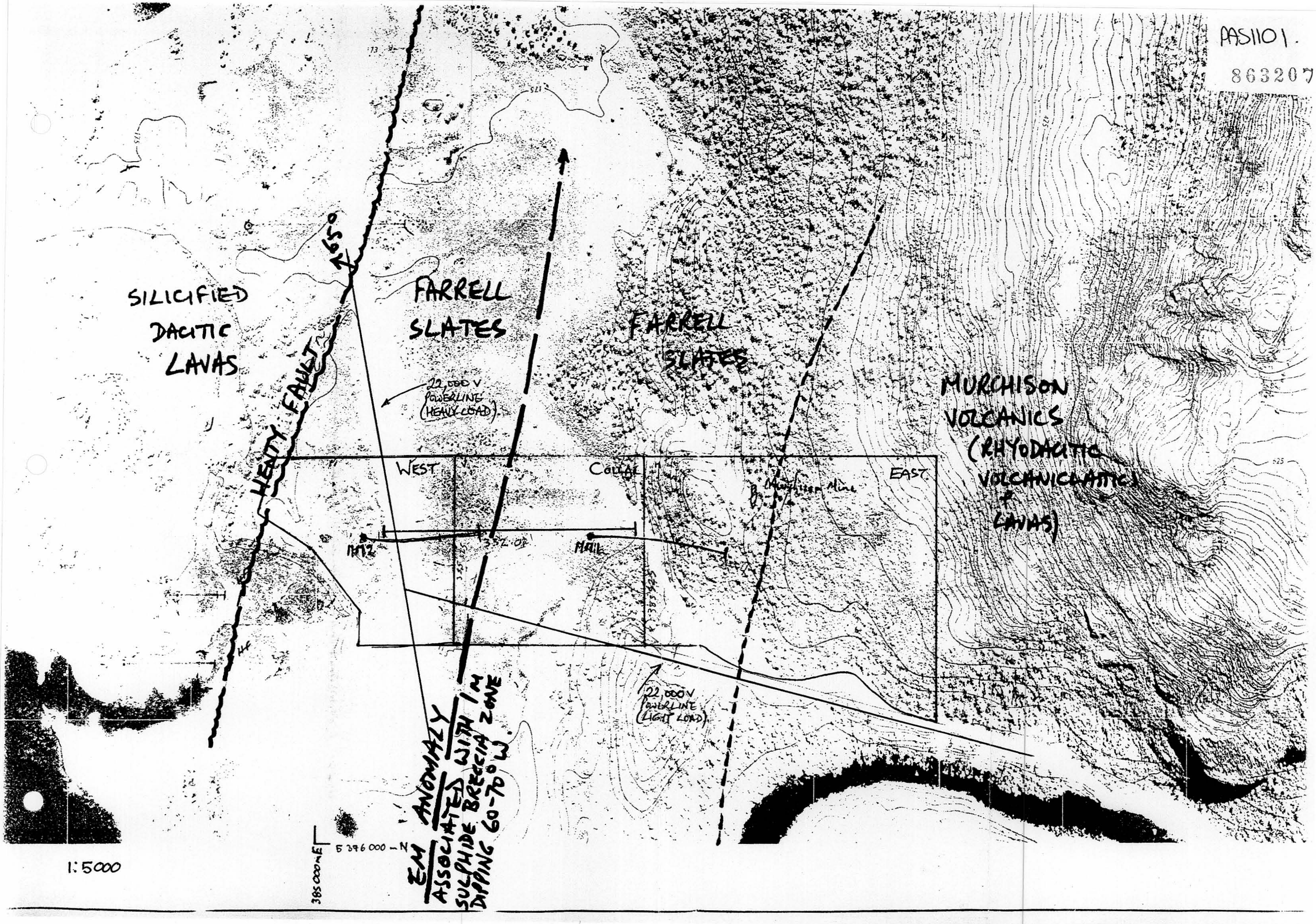

PAS1102a
Surface EM conductor
(at time (08/93) thought possibly due to overhead power lines)
Position of possible
EM conductor from surface EM
385000
385100
385200
385300
385400
385500
MM2
MM1A
COLLAR LOOP
0
-100
-200
-300
BLACK SHALE
BLACK SILTSTONE/SHALE
BLACK SHALE
100m
200m
300m
0 20 40 60 80
Scale 1 : 2000
5 cm

863206

PAS11026



PAS1101.
863207



1:5000

80320S

Title	DHEM PROFILES : MD3; LOOP 1
Plan No.	PAS 1096 a-f
Scale	1: 2000
Author	NAH
Month	AUGUST
Year	1994
Report	Memorandum to Gerald Purvis
State	TASMANIA
Tenement	3008
Area	TULLAH (MACINTOSH DAM).

Title	SURFACE EM PROFILES : LINE MD2; LOOP 1
Plan No.	PAS 1097 a-f
Scale	1:2000
Author	NAH
Month	August
Year	1994
Report	Memorandum to G Purvis
State	Tasmania
Tenement	3008
Area	TULLAH (MACKINTOSH DAM).

Title	DHEM LOOP ~~EM LOOP~~ POSITION : MD3
Plan No.	PAS 1100
Scale	1:2500
Author	NAH
Month	August
Year	1994
Report	Memorandum to G Purvis
State	Tasmania
Tenement	3008
Area	TULLAH (MAKINTOSH DAM).

803209

Title	DHEM PROFILES MM2 : COLLARLOOP
Plan No.	PAS1098 a–f
Scale	1: 2000
Author	NAH
Month	August
Year	1994
Report	Memorandum to G Puris
State	Tasmania
Tenement	3008
Area	Tollah Flats.

Title	DHEM Profiles MM2 : West Loop
Plan No.	PAS1099 a–f
Scale	1:2000
Author	NAH
Month	August
Year	1994
Report	Memorandum to G Puris
State	Tasmania
Tenement	3008
Area	Tullah Flats.

Title	DHEM Loop positions : MM2
Plan No.	PAS1101
Scale	1:5000
Author	NAH
Month	August
Year	1994
Report	Memorandum to G Puris
State	Tasmania
Tenement	3008
Area	Tullah Flats.

Title	Field Coupling Diagrams: MM2
Plan No.	PA81102 a-b
Scale	1:2000
Author	NAH
Month	August
Year	1994
Report	Memorandum to G Parris
State	Tasmania
Tenement	3008
Area	Tullah Flats

Title	
Plan No.	
Scale	
Author	
Month	
Year	
Report	
State	
Tenement	
Area	

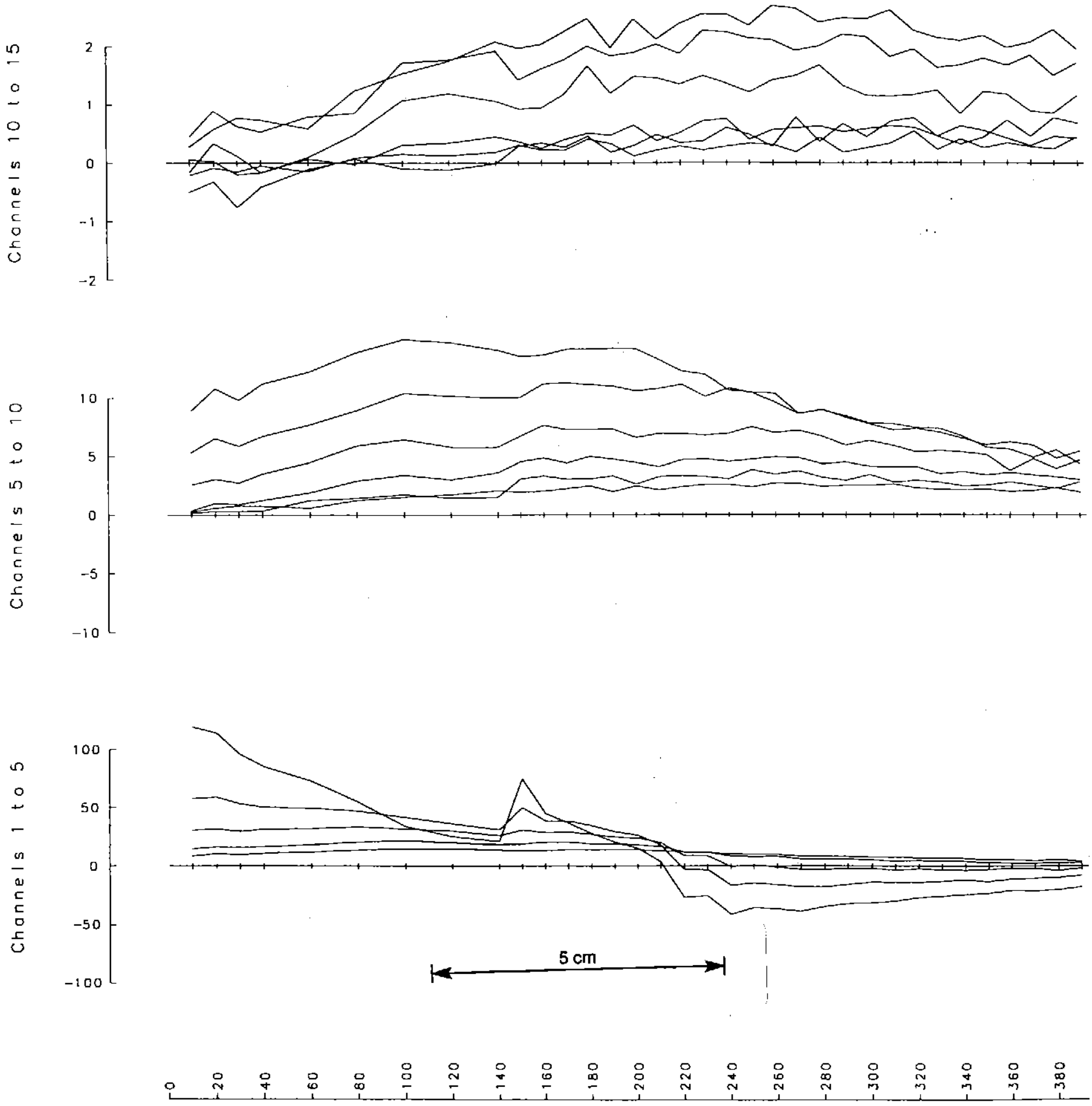
Title	
Plan No.	
Scale	
Author	
Month	
Year	
Report	
State	
Tenement	
Area	

863211

APPENDIX 11

DHEM Data, Holes MM1a & RED86-1, Tullah Flat

863212



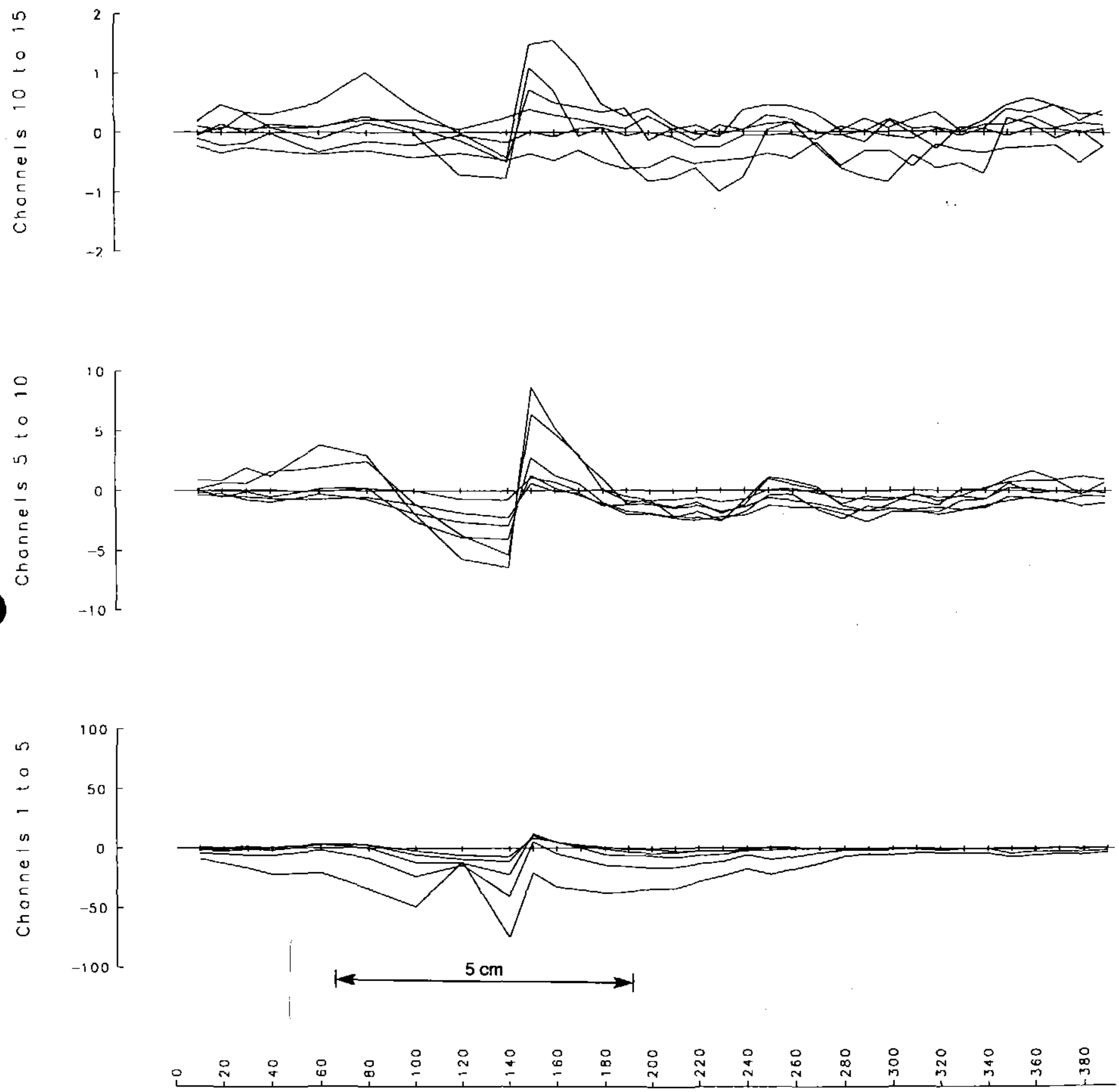
Scale 1 : 2500

DHEM : MM1A - X Component
Collar Loop

Tullah EL 22/90
Loop Size : 300m x 300m
Settings : Frequency 25Hz, Ramp 1.00ms
Units : nV/Amp-m2
Survey by Crone Geophysics, August 04,93
Channels : 1 to 17 (0.0765 to 6.6465 milliseconds)

Figure 1

863213



Scale 1 : 2500

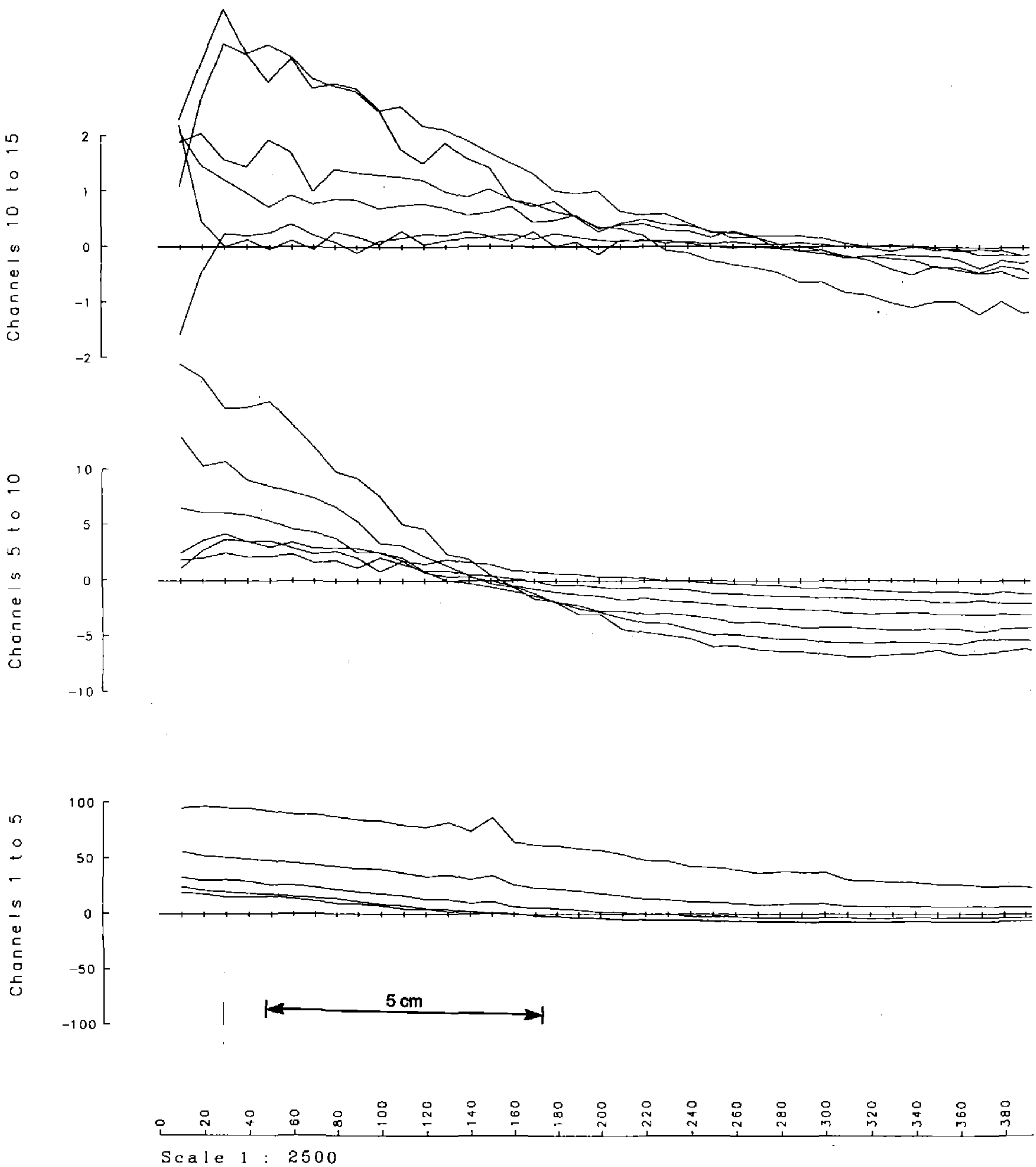
DHEM : MM1A – Y Component

Collar Loop

Tullah EL 22/90
Loop Size : 300m x 300m
Settings : Frequency 25Hz, Ramp 1.00ms
Units : nV/Amp-m2
Survey by Crone Geophysics, August 04.93
Channels : 1 to 17 (0.0785 to 6.6465 milliseconds)

Figure 2

863214



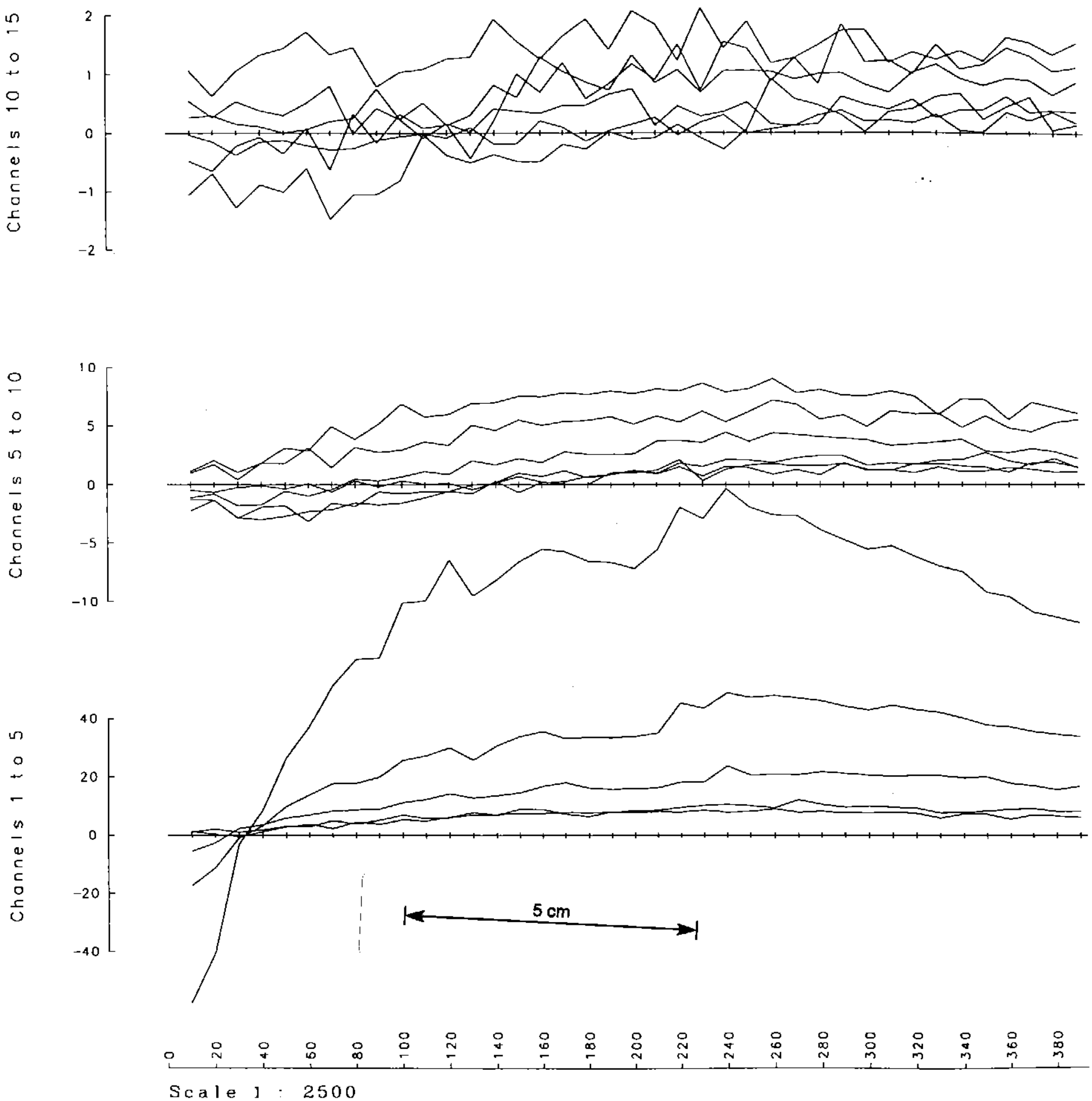
DHEM : MM1A - Axial Component

Collar Loop

Tullah EL 22/90
Loop Size : 300m x 300m
Settings : Frequency 25Hz, Ramp 1.00ms
Units : nV/Amp-m2
Survey by Crone Geophysics, August 04.93
Channels : 1 to 17 (0.0765 to 6.6465 milliseconds)

Figure 3

863215

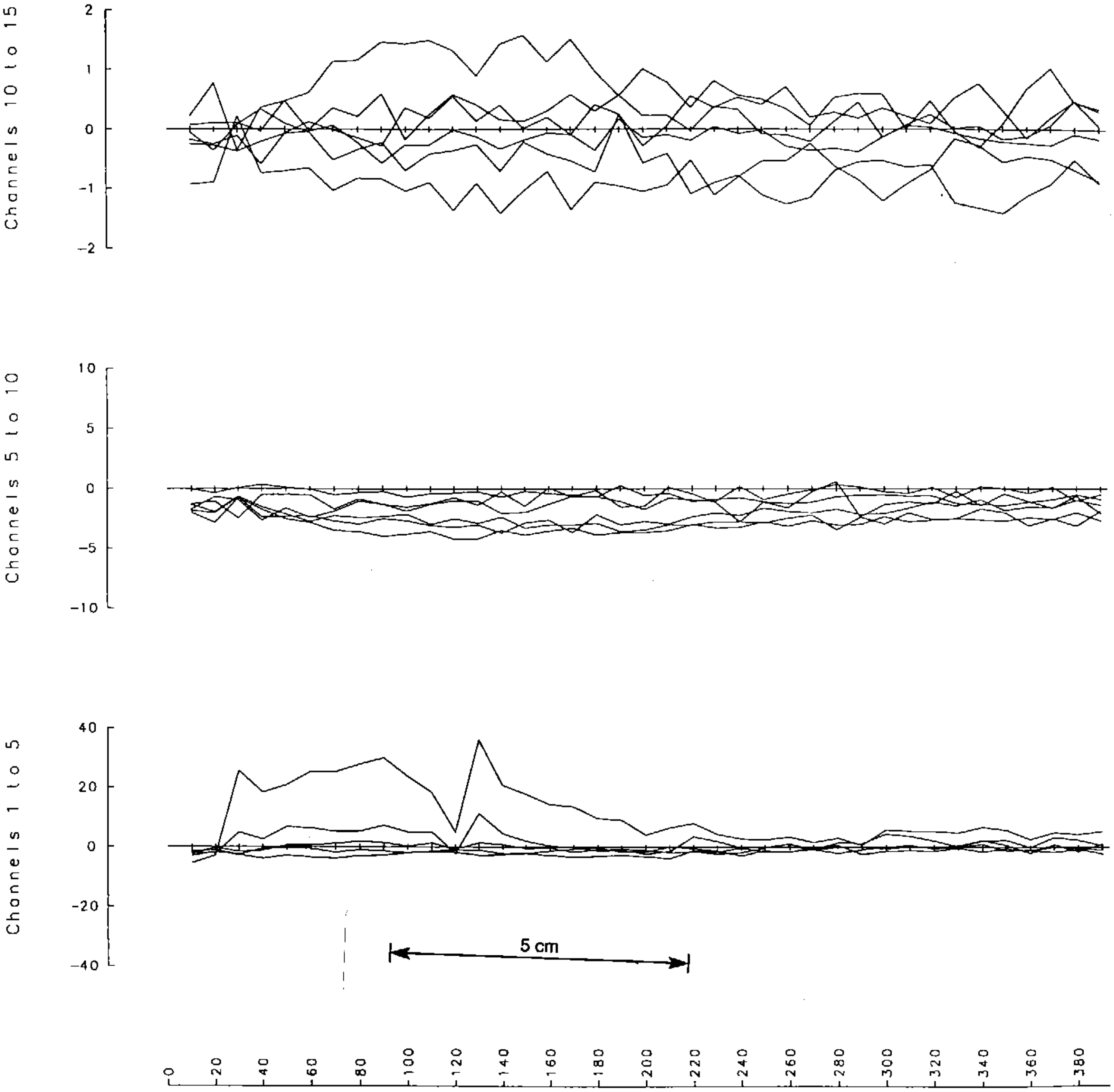


DHEM : MM1A - X Component
East Loop

Loop Size : 300m x 460m
Settings : Frequency 25Hz, Ramp 1.00ms
Units : nV/Amp-m2
Survey by Crone Geophysics, August 04.93
Channels : 1 to 17 (0.0765 to 6.6465 milliseconds)

Figure 4

863216



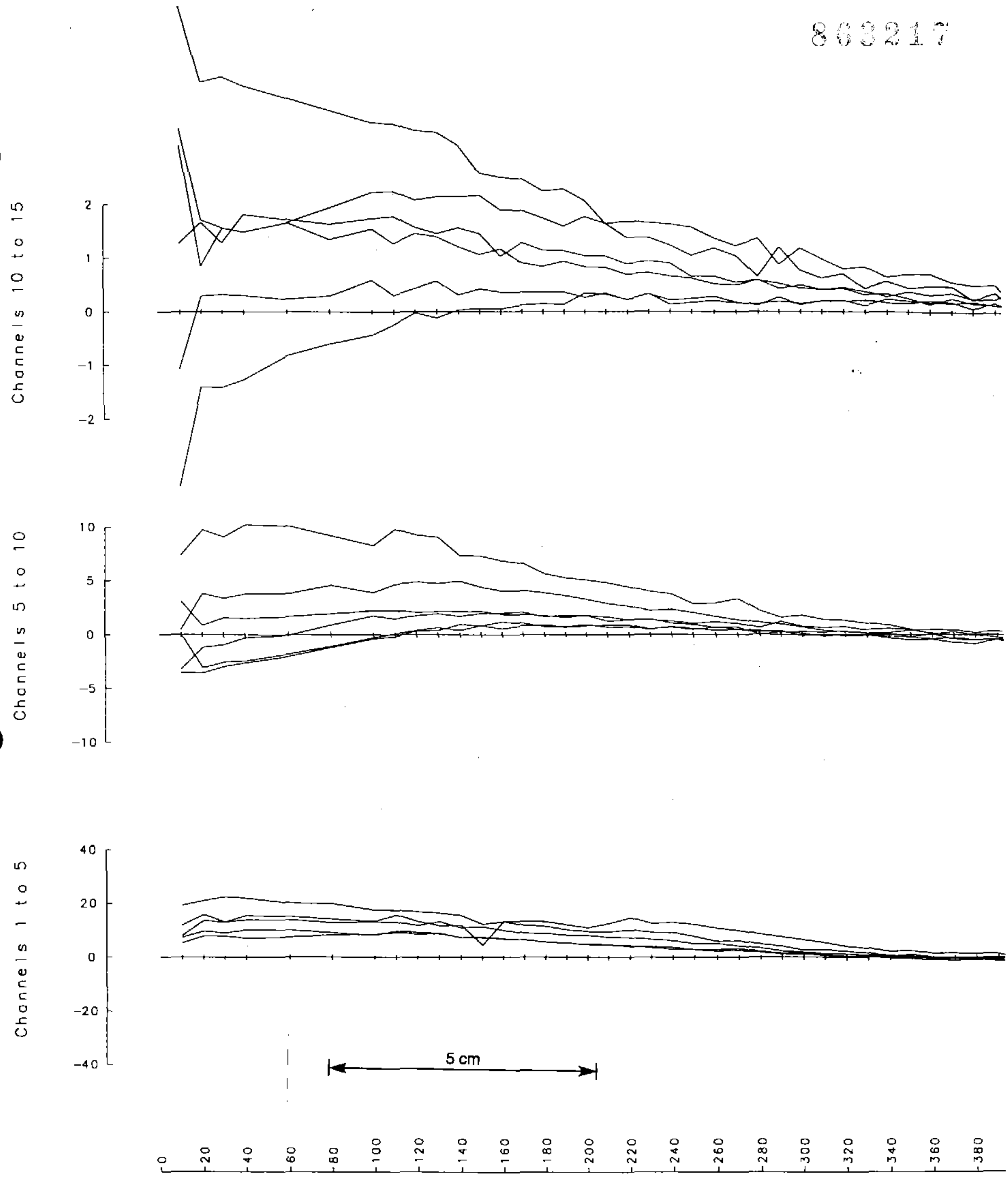
Scale 1 : 2500

DHEM : MM1A - Y Component
East Loop

Tullah EL 22/90
Loop Size : 300m x 460m
Settings : Frequency 25Hz, Ramp 1.00ms
Units : nV/Amp-m2
Survey by Crone Geophysics, August 04, 93
Channels : 1 to 17 (0.0765 to 6.6465 milliseconds)

Figure 5

863217



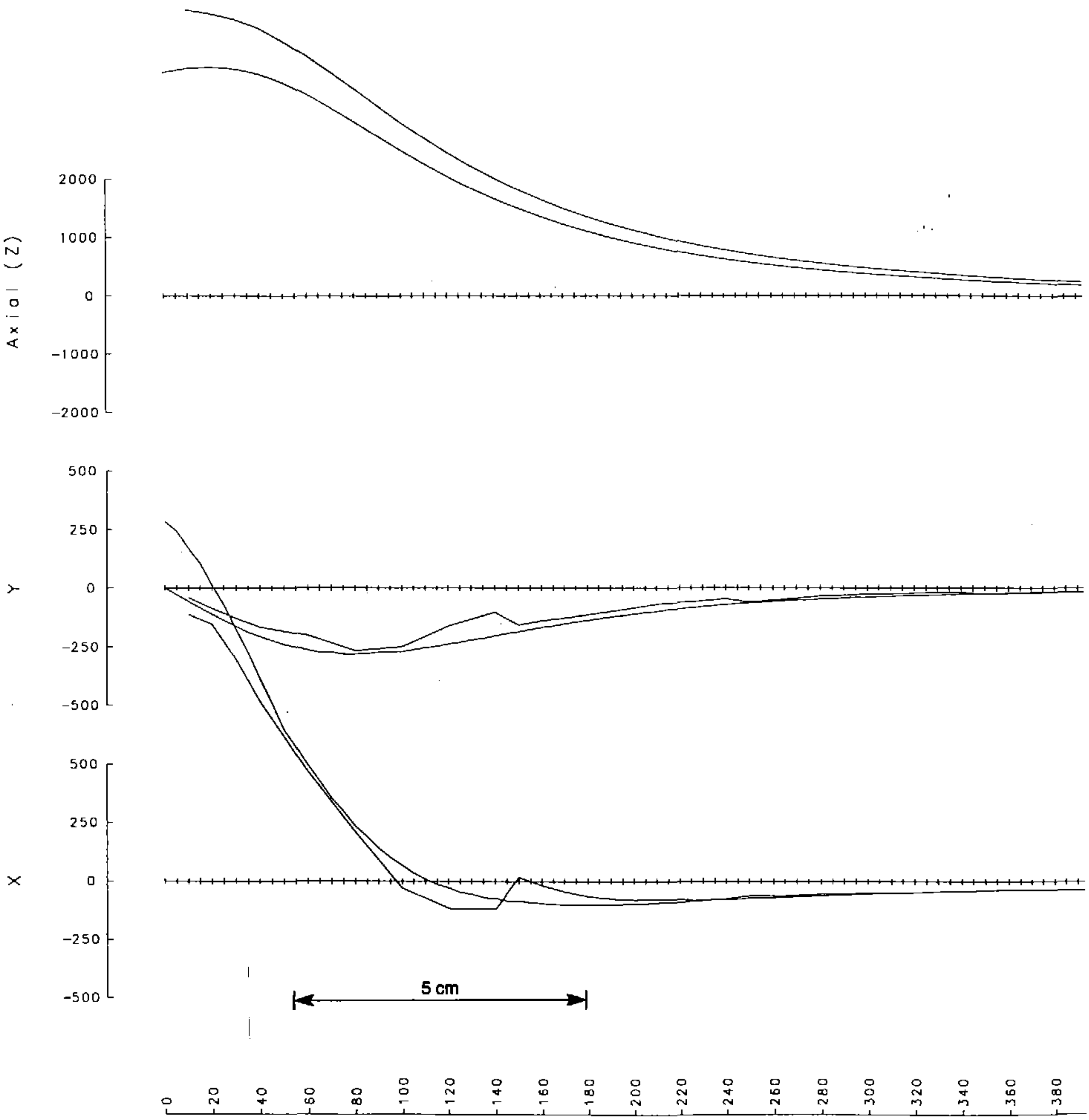
Scale 1 : 2500

DHEM : MM1A - Axial Component
East Loop

Tullah EL 22/90
Loop Size : 300m x 460m
Settings : Frequency 25Hz, Ramp 1.00ms
Units : nV/Amp-m2
Survey by Crone Geophysics. August 04,93
Channels : 1 to 17 (0.0765 to 6.6465 milliseconds)

Figure 6

863218



Scale 1 : 2500

DHEM : MM1A

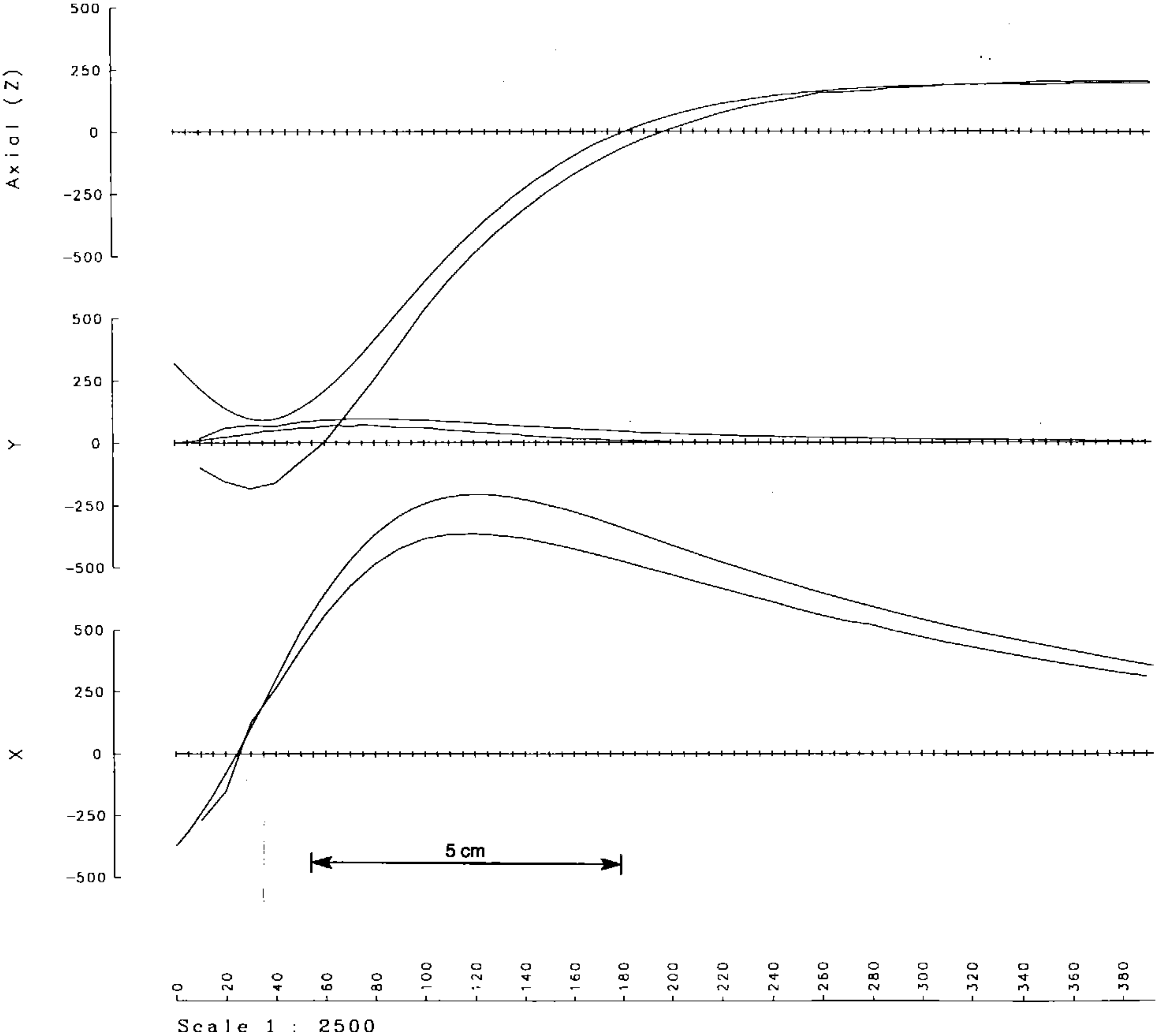
Measured vs Calculated PP : East Loop

COLLAR

Tullah EK 22/90
Loop Size : 300m x 460m
Settings : Frequency 25Hz, Ramp 1.00ms
Units : nV/Amp-m2
Survey by Crone Geophysics, August 04, 93

Figure 7

863219

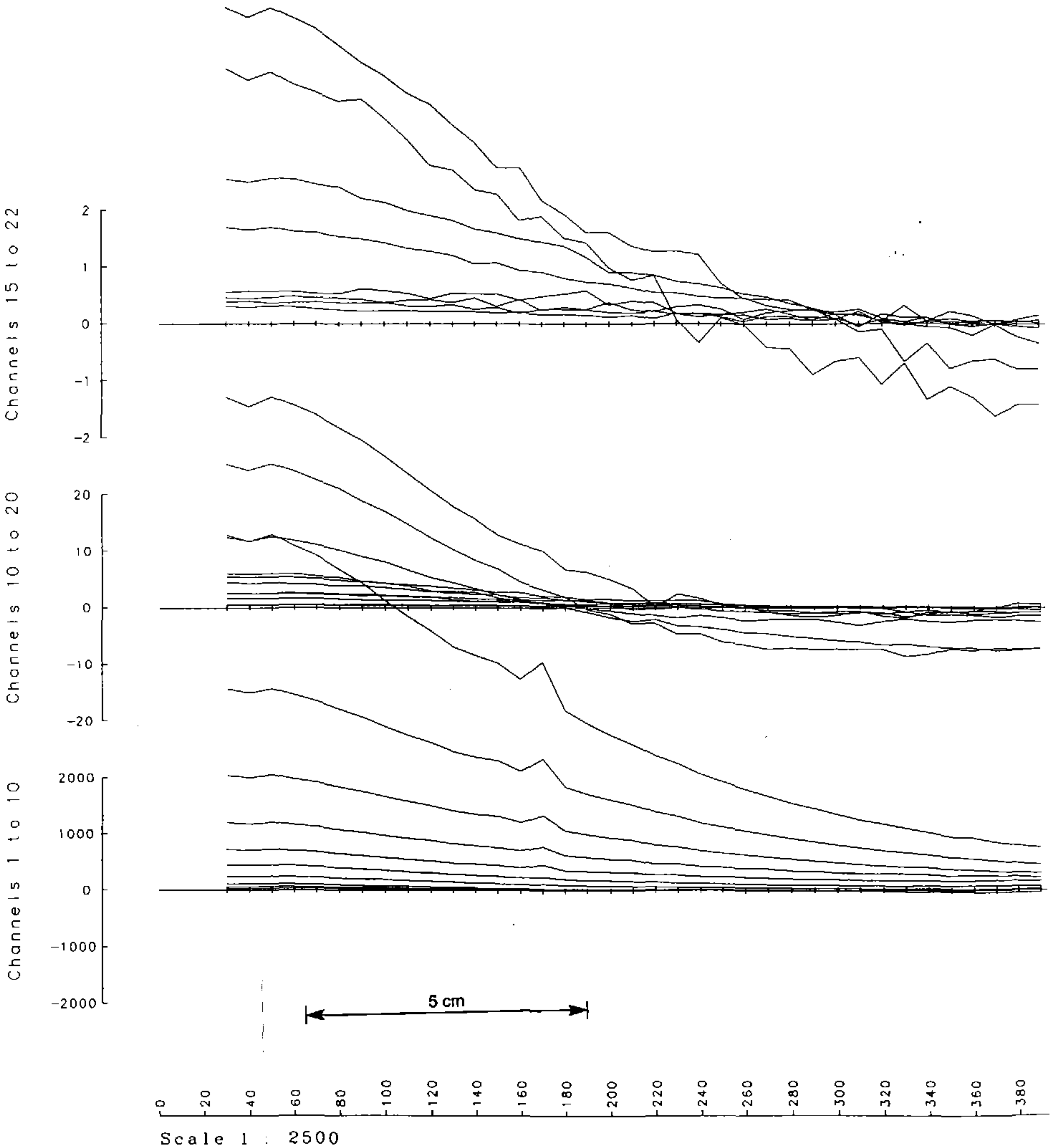


DHEM : MM1A
Measured vs Calculated PP : East Loop

Tullah EK 22/90
Loop Size : 300m x 460m
Settings : Frequency 25Hz, Ramp 1.00ms
Units : nV/Amp-m2
Survey by Crone Geophysics, August 04, 93

Figure 8

863220



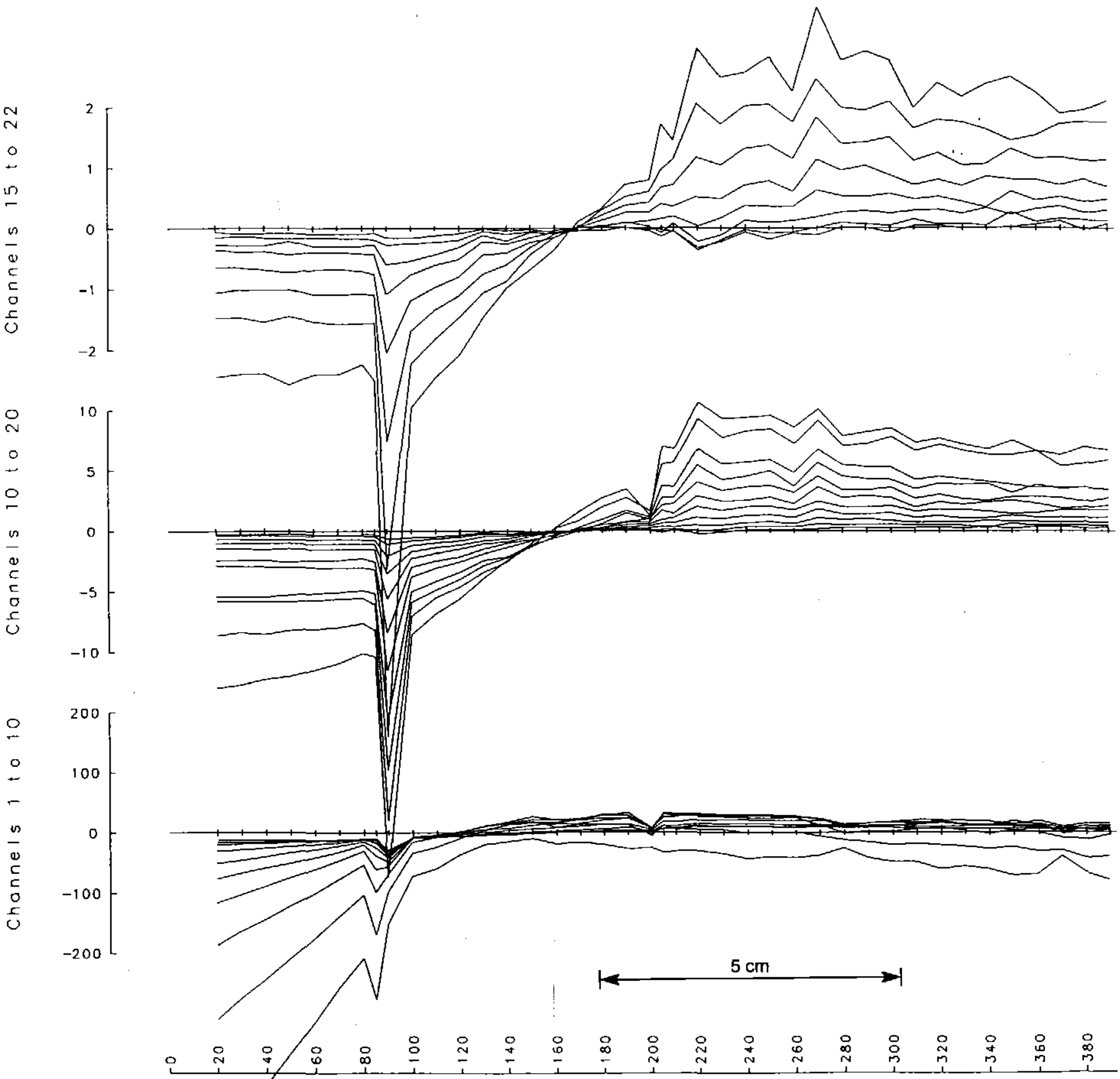
DHEM : MM1A - Axial Component

Loop 1 (Collar)

Tullah EL 22/90
Loop 1 : 300m x 300m
Equip : Zonge GDP15 + TX, Sirotem Probe
32Hz Base Frequency : 150 us Ramp : 22 Channels recorded
Units : nV/amp-m2
Contractor : John Hiscock, Aberfoyle Resources
Survey Date: October 13, 1993

Figure 9

863221



Scale 1 : 2500

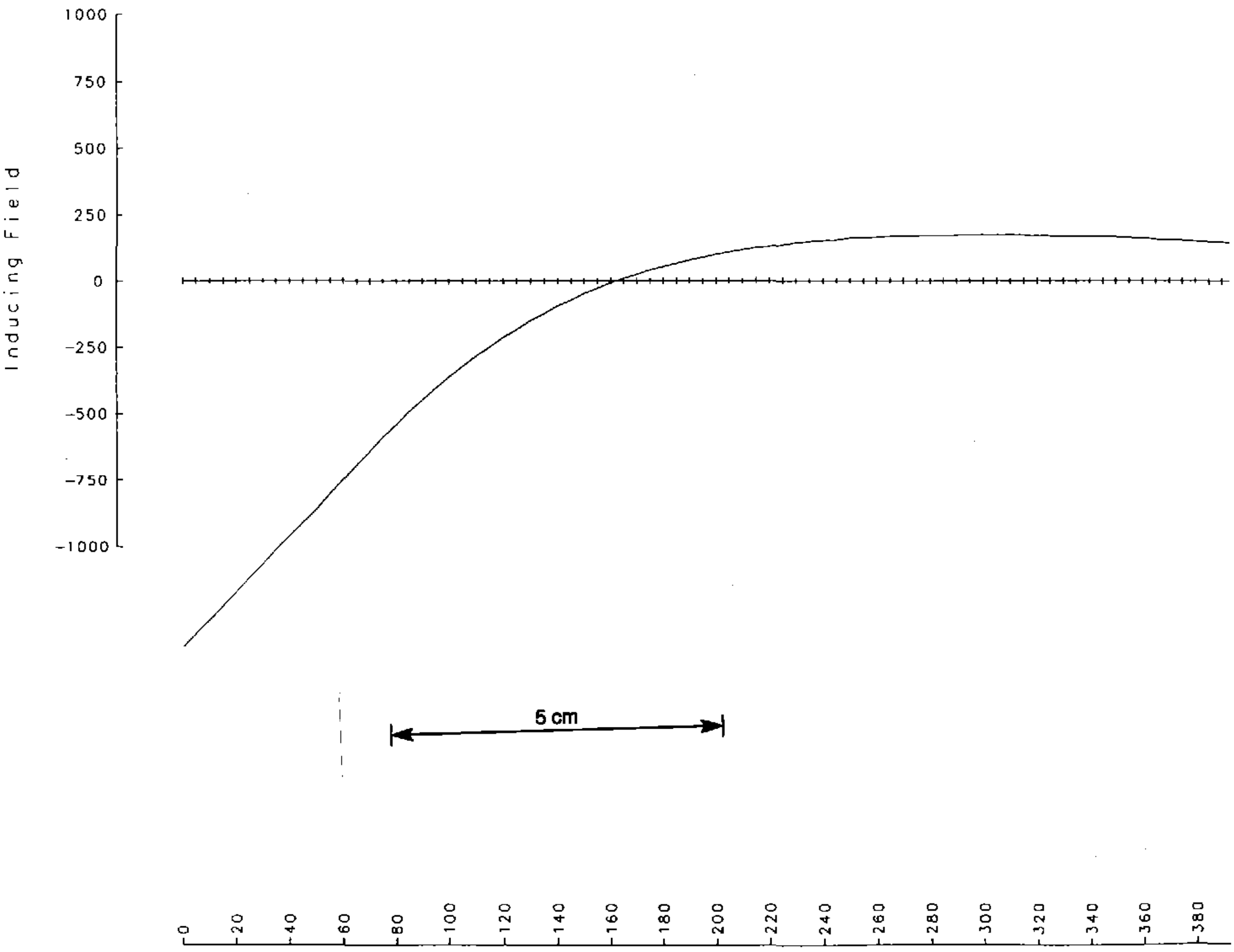
DHEM : MM1A - Axial Component

Loop 2 (West)

Tullah EL 22/90
Loop 2 : 300m x 300m
Equip : Zonge GDP15 + TX, Sirotem Probe
32Hz Base Frequency : 150 us Ramp : 22 Channels recorded
Units : nV/amp-m2
Contractor : John Hiscock, Aberfoyle Resources
Survey Date: October 13, 1993

Figure 10

863222



Scale 1 : 2500

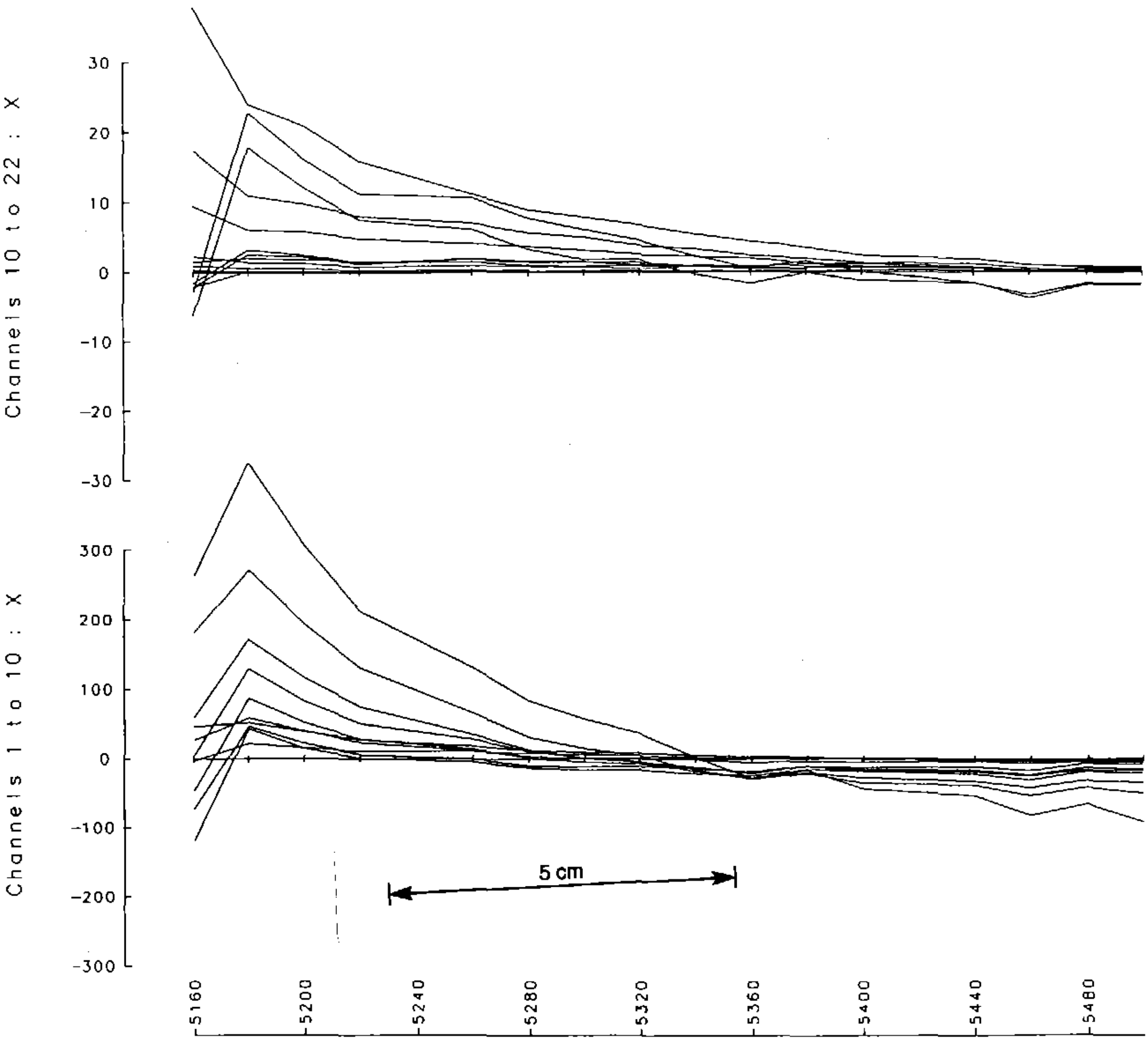
DHEM : MM1A

Axial Component Inducing Field

Tullah EL 22/90
Loop 2 : 300m x 300m
Equip : Zonge GDP15 + TX, Sirotem Probe
32Hz Base Frequency : 22 Channels recorded
Units : nV/amp-m2
Contractor : John Hiscock, Aberfoyle Resources
Survey Date: October 13, 1993

Figure 11

863223



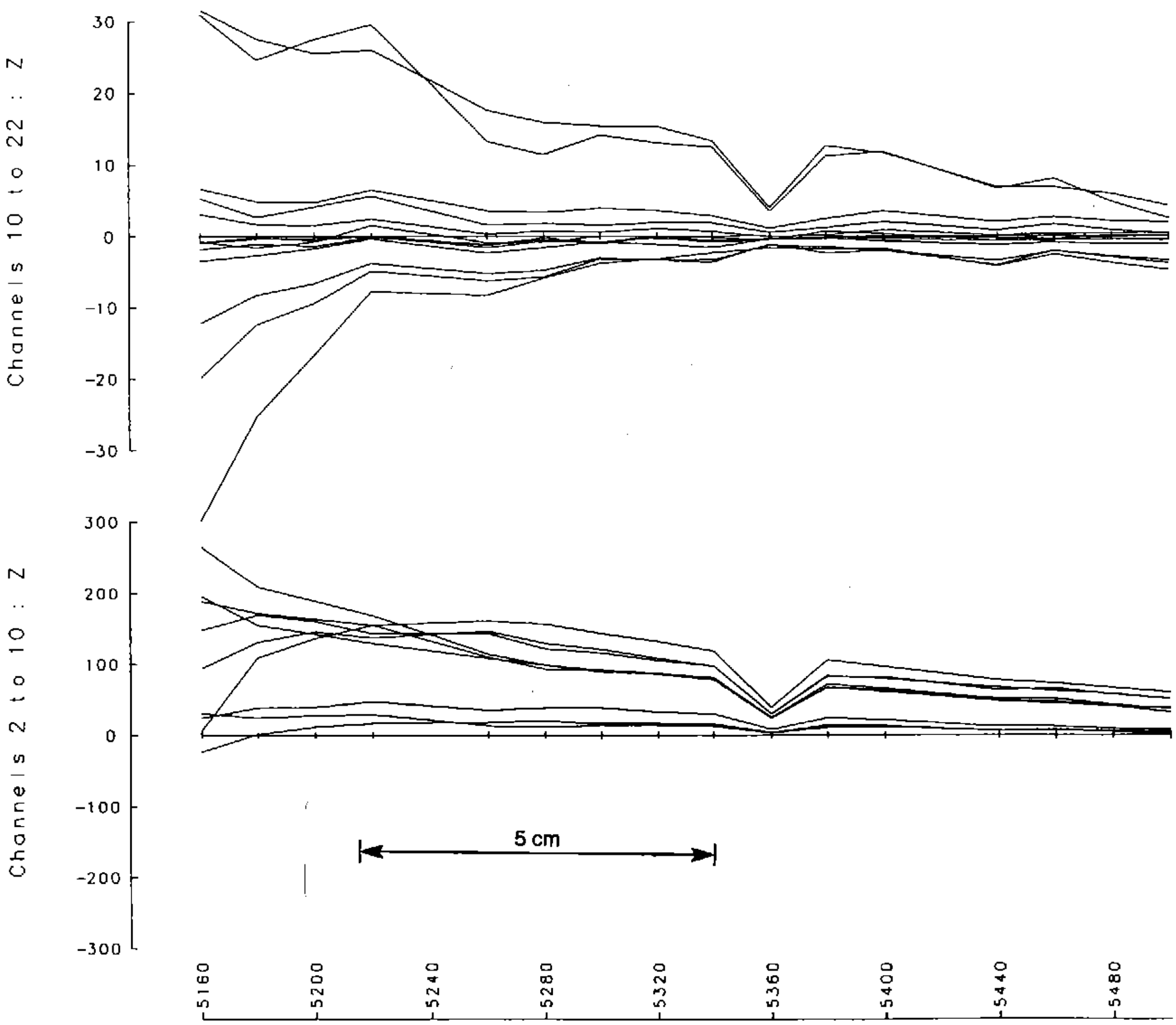
Scale 1 : 2500

Surace EM : In-line Component

Loop 1 (Collar)

Tullah EL : 3008
Loop 1 : 300m x 300m
Equip : Zonge GDP15 + TX, Sirotem Probe
32Hz Base Frequency : 22 Channels recorded
Units : nV/amp-m2
Contractor : John Hiscock, Aberfoyle Resources
Survey Date: October 13, 1993

Figure 1

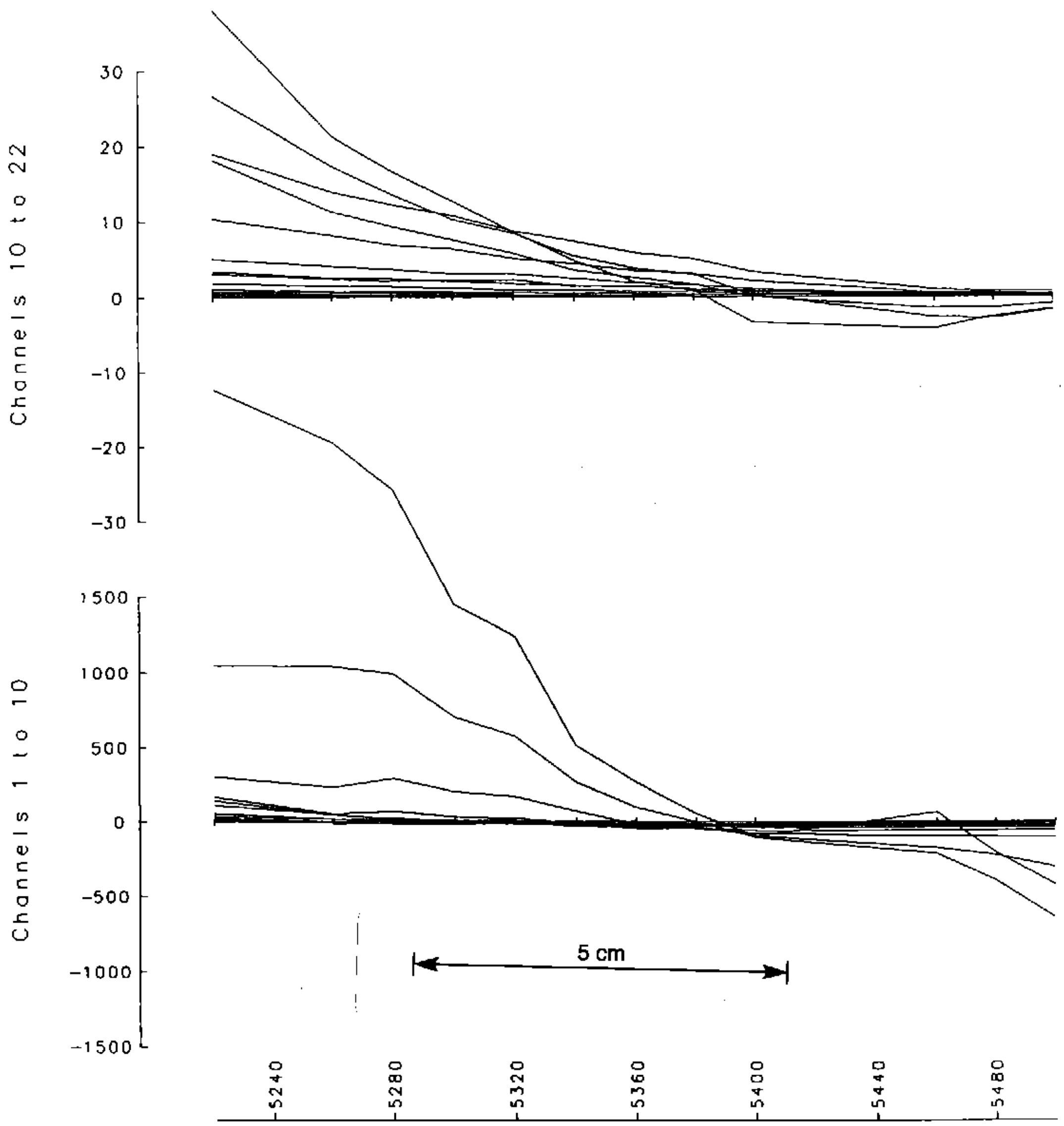


Scale 1 : 2500

Surace EM : Vertical Component
Loop 1 (Collar)

Tullah EL 22/90
Loop 1 : 300m x 300m
Equip : Zonge GDP15 + TX, Sirotem Probe
32Hz Base Frequency : 22 Channels recorded
Units : nV/amp-m2
Contractor : John Hiscock, Aberfoyle Resources
Survey Date: October 13, 1993

Figure 13



Scale 1 : 2500

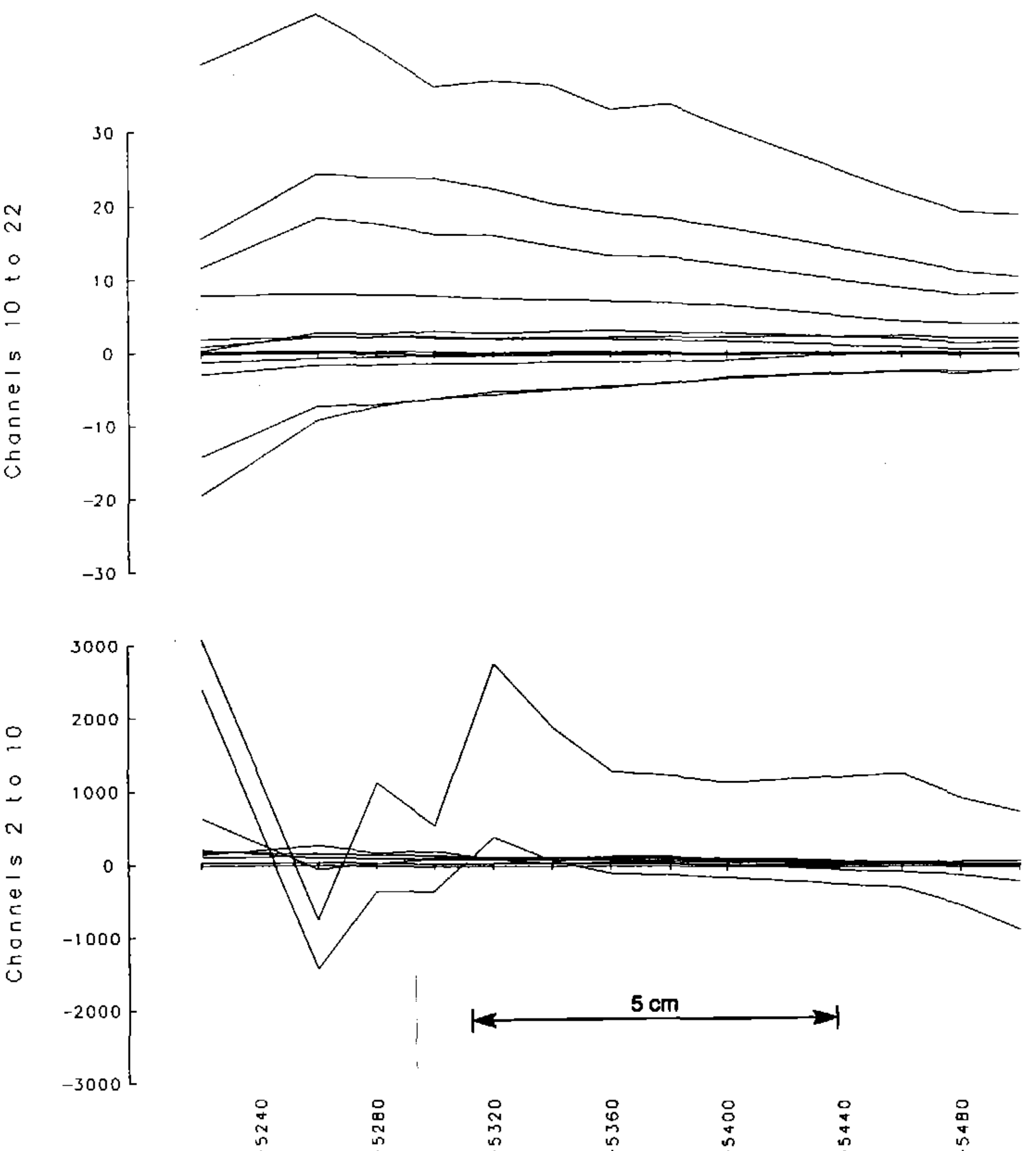
Surace EM : In-line Component

Loop 1 (Collar)

Tullah EL 22/90 : 3008
Loop 1 : 300m x 300m
Equip : Zonge GDP15 + TX, Crone Probe
32Hz Base Frequency : 22 Channels recorded
Units : nV/amp-m2
Contractor : John Hiscock, Aberfoyle Resources
Survey Date: October 12, 1993

Figure 14

863226



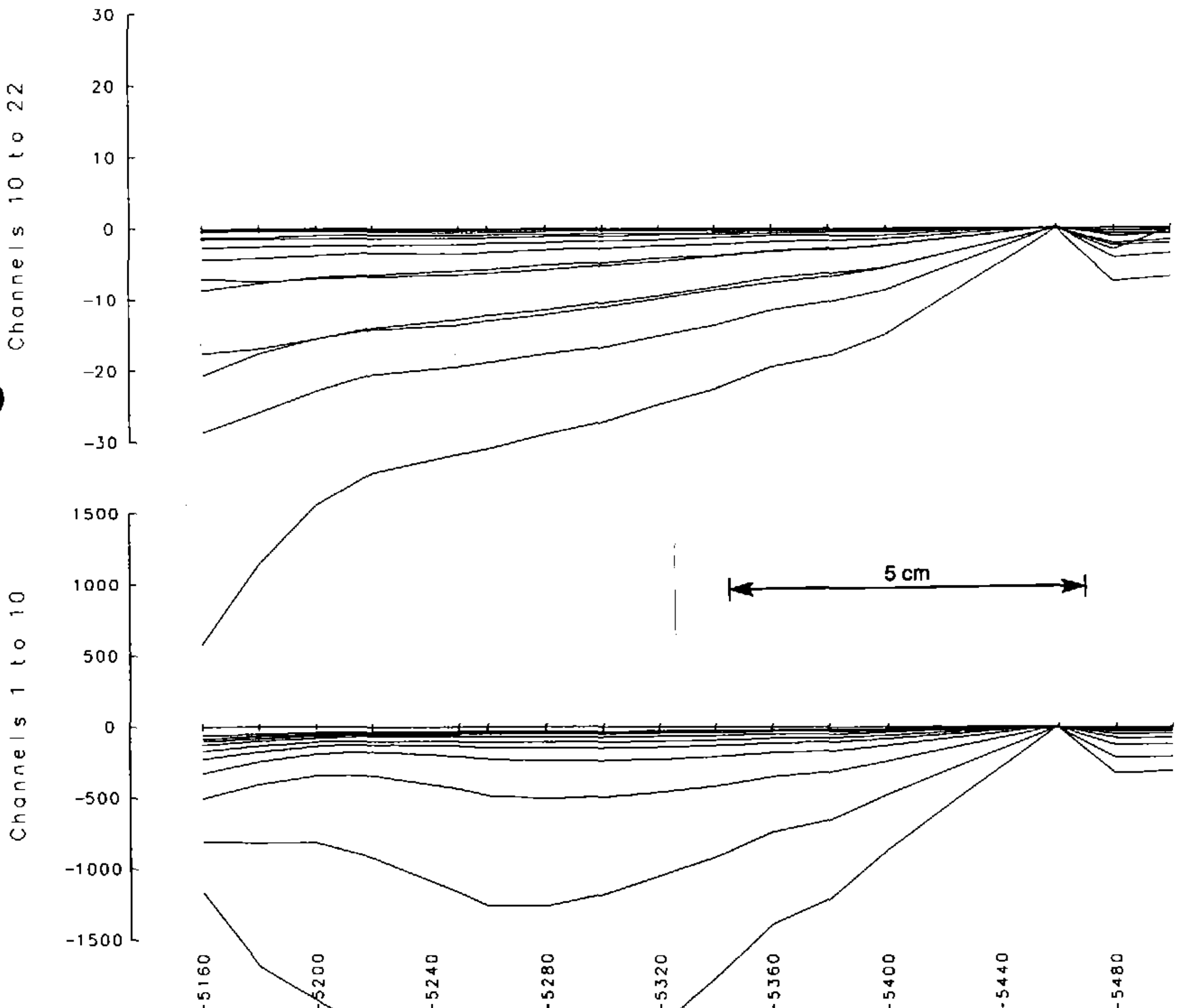
Scale 1 : 2500

Surace EM : Vertical Component
Loop 1 (Collar)

Tullah EL 22/90
Loop 1 : 300m x 300m
Equip : Zonge GDP15 + TX, Crone Probe
32Hz Base Frequency : 22 Channels recorded
Units : nV/amp-m2
Contractor : John Hiscock, Aberfoyle Resources
Survey Date: October 12, 1993

Figure 15

863227

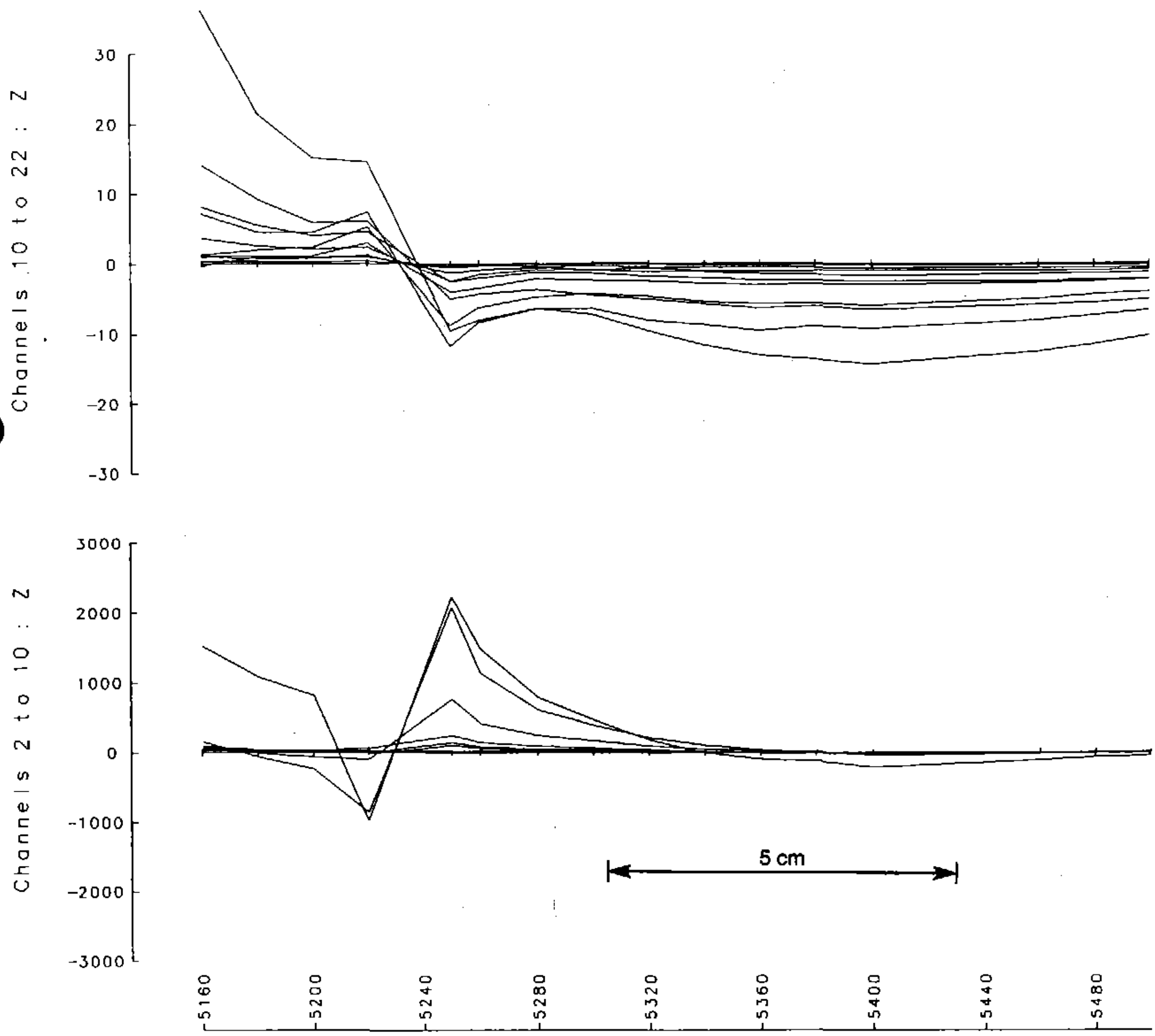


Scale 1 : 2500

Surace EM : In-line Component
Loop 2 (West)

Tullah EL 22/90
Loop 2 : 300m x 300m
Equip : Zonge GDP15 + TX, Crone Probe
32Hz Base Frequency : 22 Channels recorded
Units : nV/amp-m2
Contractor : John Hiscock, Aberfoyle Resources
Survey Date: October 12, 1993

Figure 16



Scale 1 : 2500

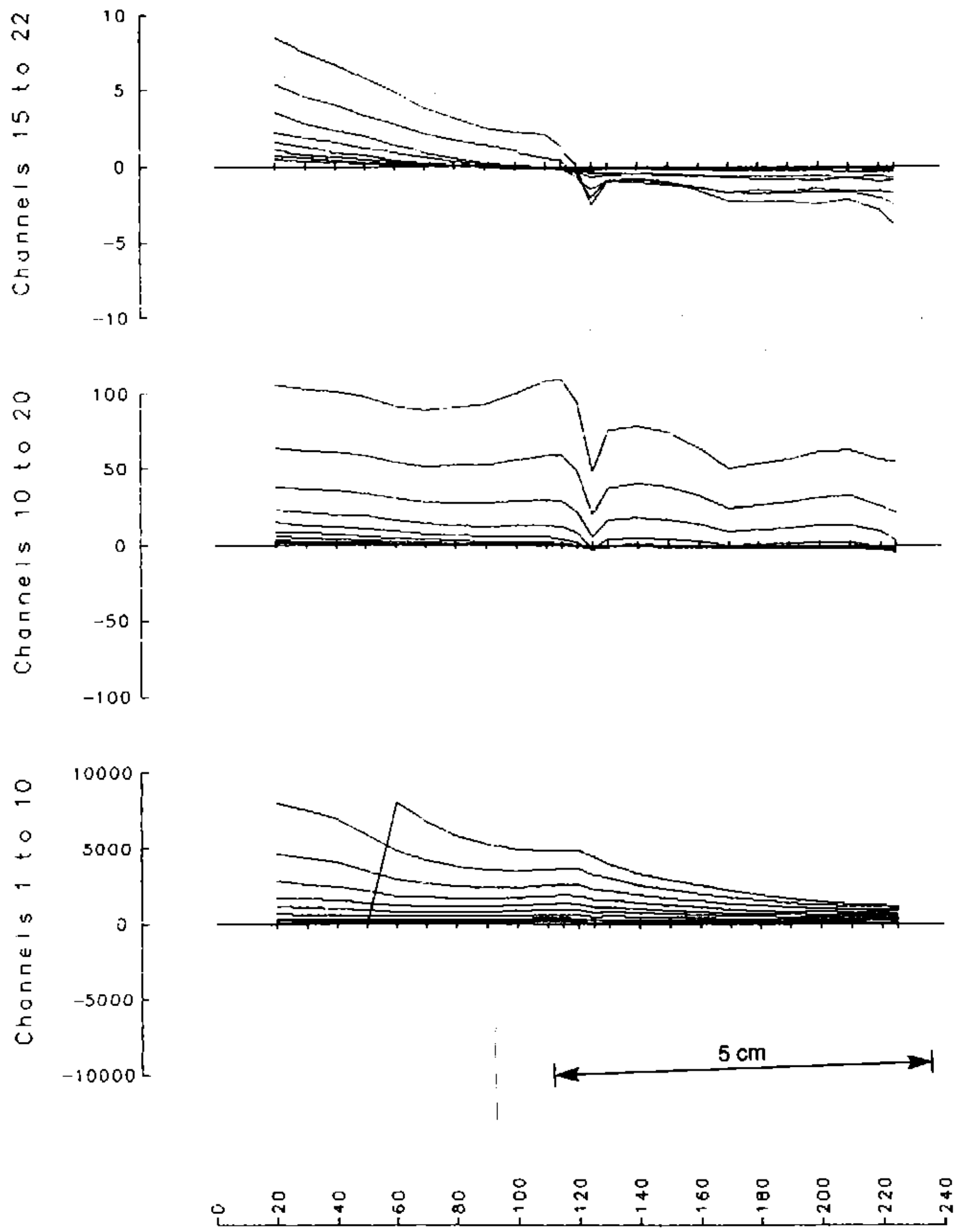
Surface EM : Vertical Component

Loop 2 (West)

Tullah EL 22/90
Loop 2 : 300m x 300m
Equip : Zonge GDP15 + TX, Crone Probe
32Hz Base Frequency : 22 Channels recorded
Units : nV/amp-m2
Contractor : John Hiscock, Aberfoyle Resources
Survey Date: October 12, 1993

Figure 17

863229



Scale 1 : 2500

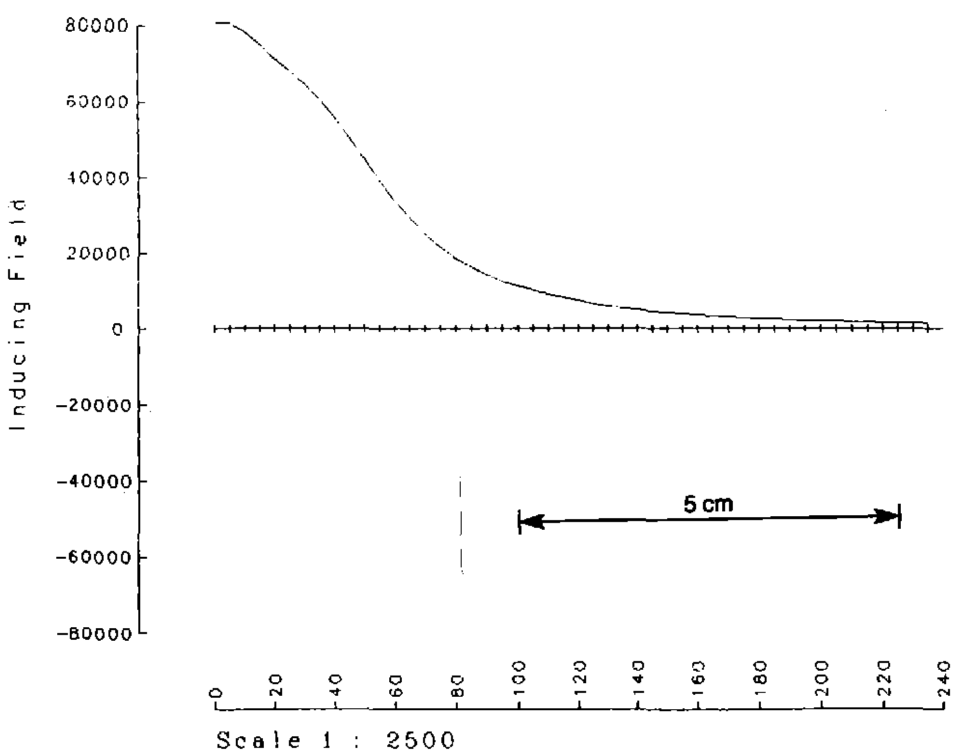
DHEM : RED86-1 : Axial Component

Loop 1 (Collar)

Tullah EL 22/90
Loop 1 : 150m x 150m
Equip : Zonge GDP15 + TX, Sirotem Probe
32Hz Base Frequency : 150 us Ramp : 22 Channels recorded
Units : nV/amp-m2
Contractor : John Hiscock, Aberfoyle Resources
Survey Date: October 14, 1993

Figure 18

863230



DHEM : RED86-1 : Primary Field (Z)
Loop 1 (Collar)

Tullah EL 22/90
Loop 1 : 150m x 150m
Calculated Primary Inducing Field
Units : nV/amp-m2

Figure 19

MM1A Coupling Diagram Collar Loop

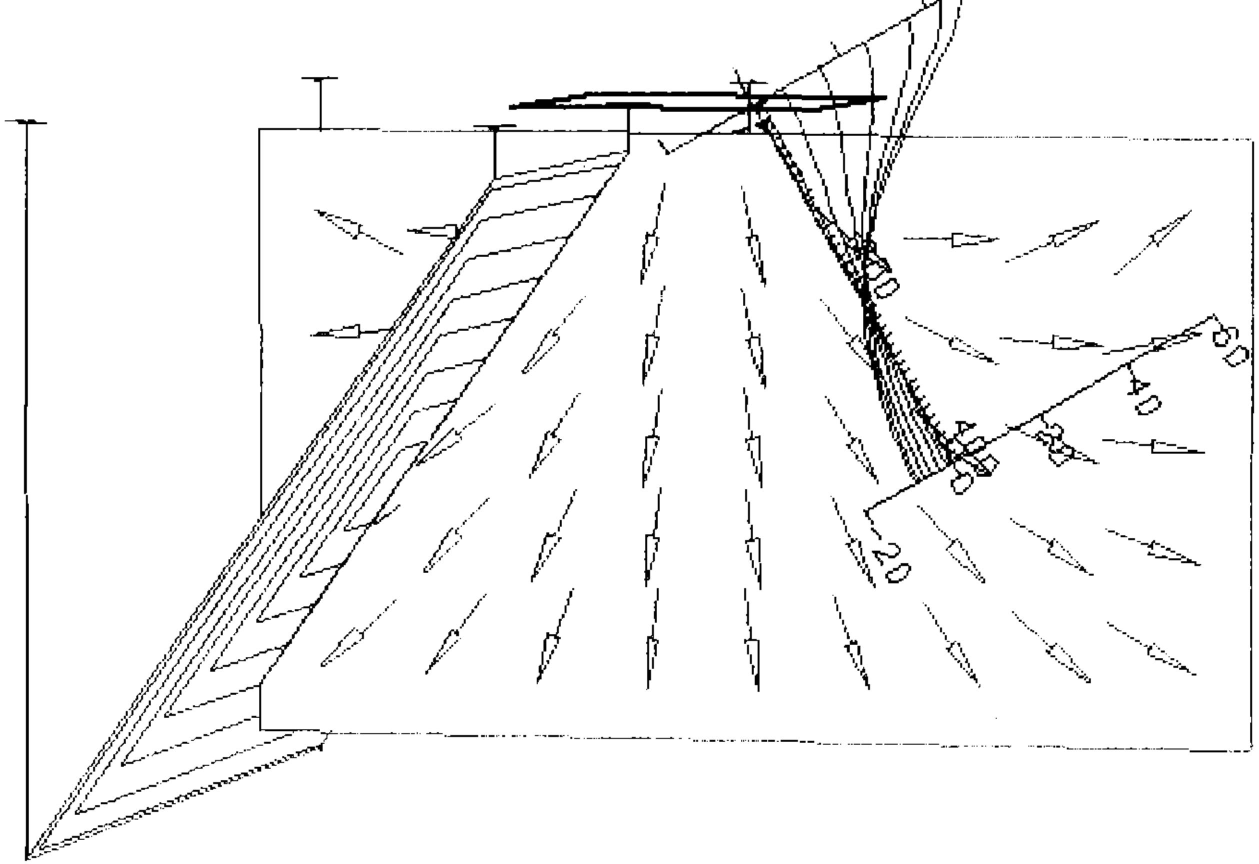
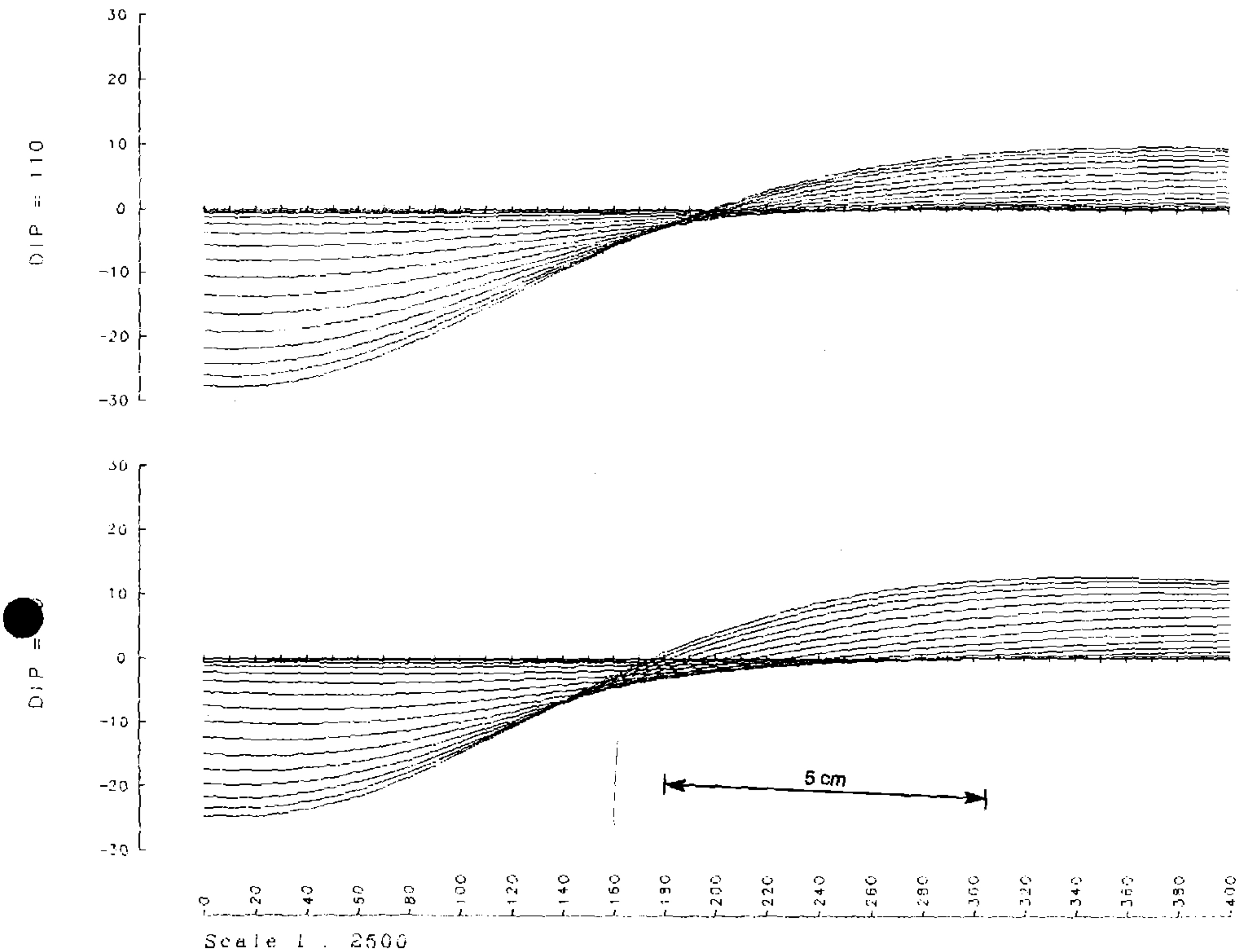


Figure 20

863232

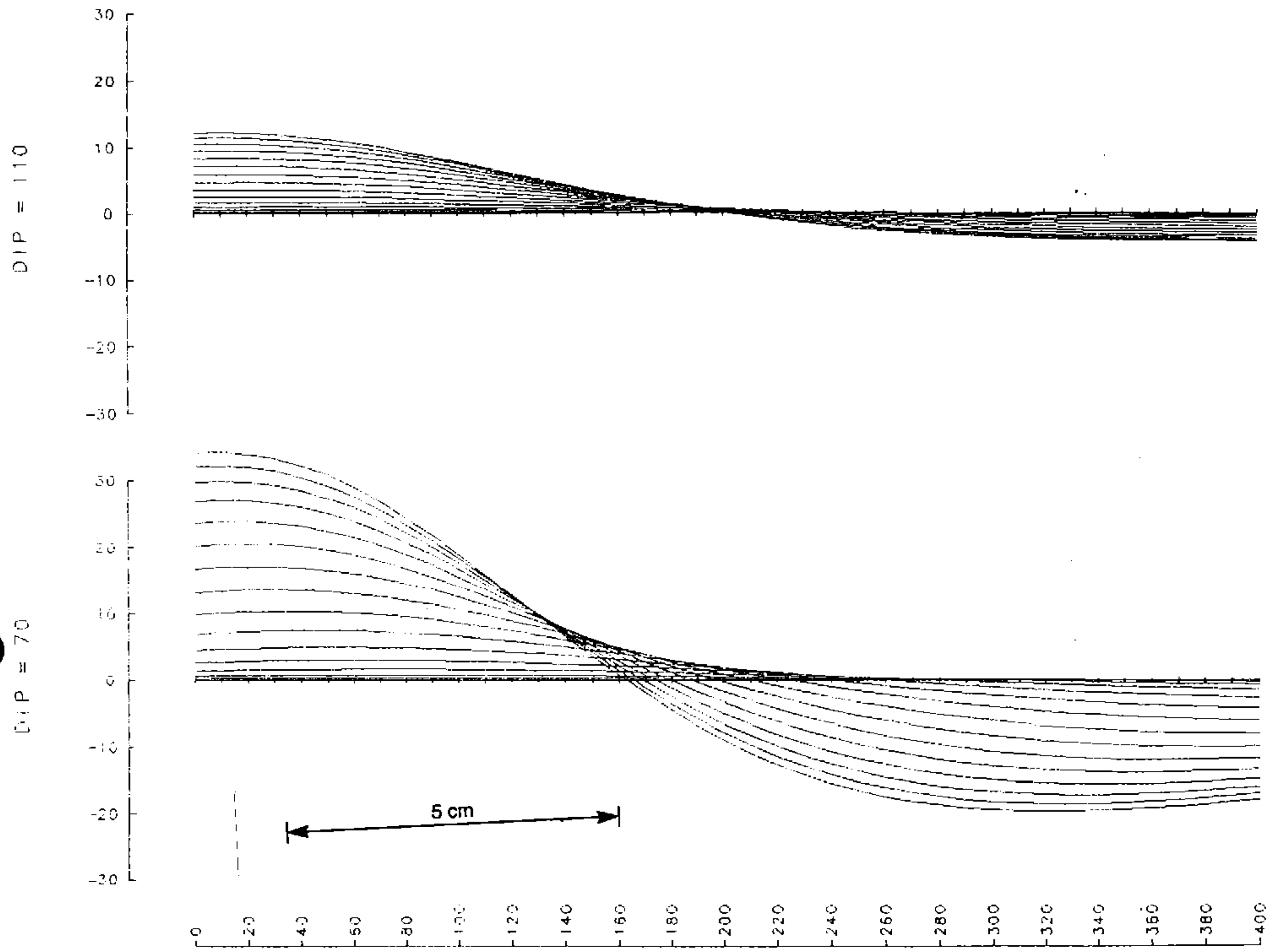


DHEM : MM1A – Axial Component
PLATE MODEL . West Loop

Tuifah EL 22/90
Loop Size : 300m x 300m
Settings . Frequency 25Hz, Ramp 1.00ms
Units : nV/Amp-m2

Figure 22

863233



Scale 1 : 2500

DHEM : MM1A - Axial Component

PLATE MODEL : Collar Loop

Tuliah EL 22/90
Loop Size : 300m x 300m : Collar
Settings : Frequency 25Hz. Ramp 1.00ms
Units : nV/Amp-m2

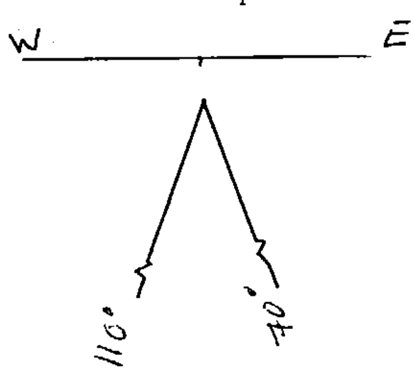
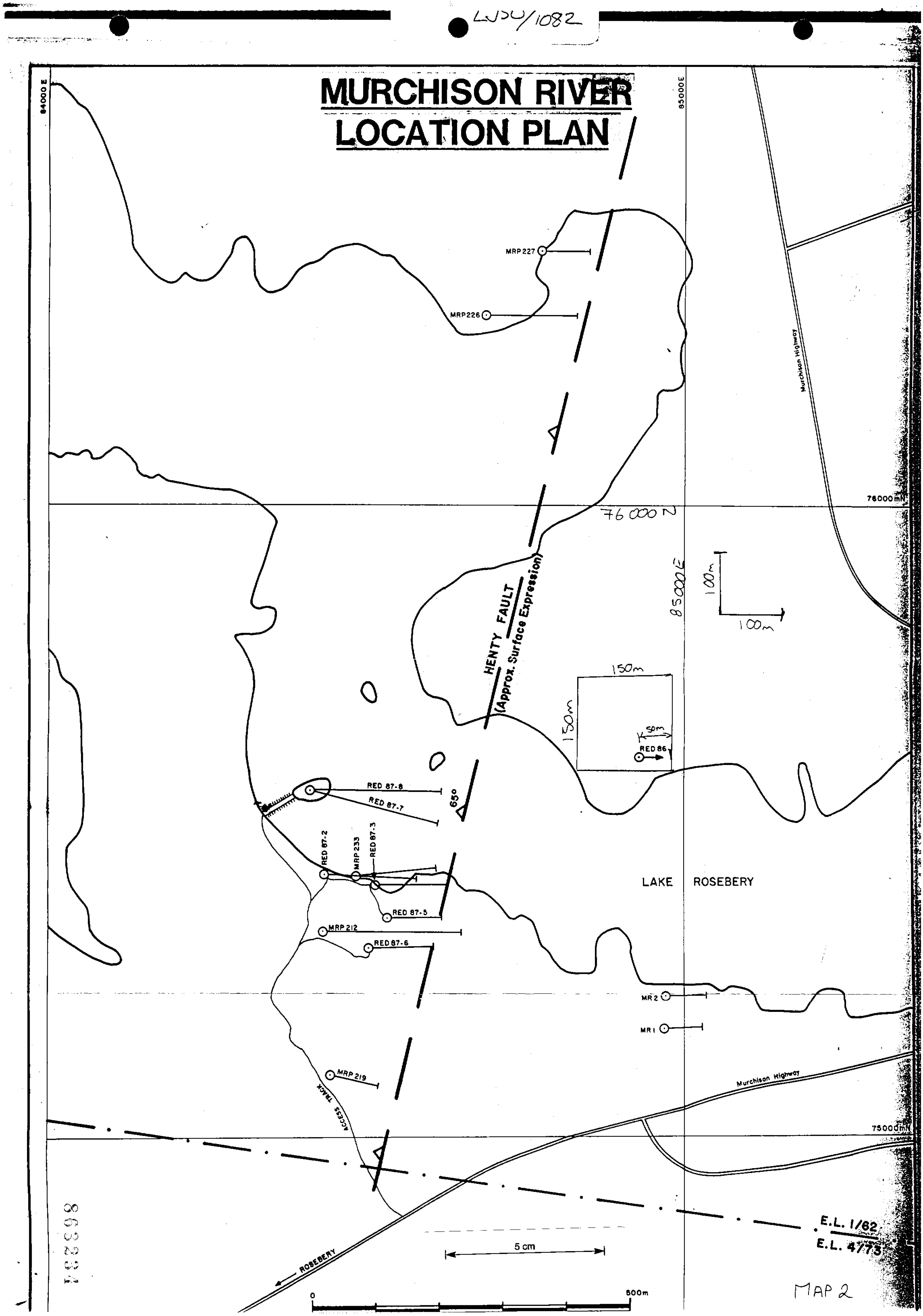


Figure 21



LWSU/1082
MURCHISON RIVER
LOCATION PLAN
84000 E
85000 E
MRP 227
MRP226
Murchison Highway
76000mN
76000 N
85000 E
100m
100m
150m
150m
50m
RED 86
HENTY FAULT
(Approx. Surface Expression)
RED 87-8
RED 87-7
65°
RED 87-2
MRP 233
RED 87-3
RED 87-5
MRP 212
RED 87-6
LAKE ROSEBERY
MR 2
MR 1
MRP 219
ACCESS TRACK
Murchison Highway
75000mN
E.L. 1/82
E.L. 4/73
5 cm
ROSEBERY
0
500m
MAP 2
862384

863235

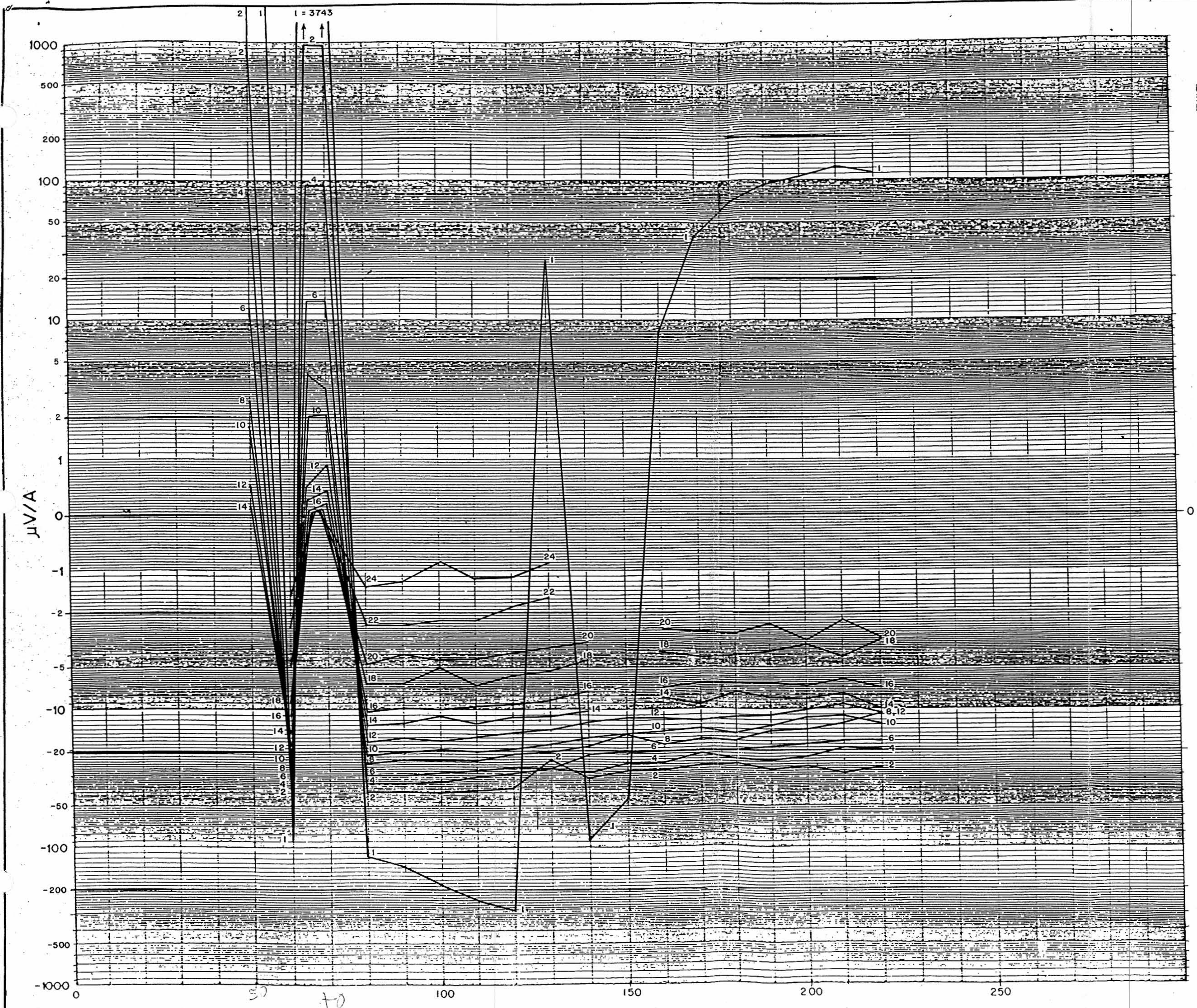
BILLITON EM DATA

FOR RED86-1

863236

Billiton Australia
The Metals Division of the Shell Company of Australia Limited

SIROTEM SURVEY



ROSEBERY EAST J.V.

AREA .... MURCHISON

LINE No ....

OR DH No .... RED - 1
LOOP 2

LOOP CONFIG. ....

LOOP DIMENSION 100 x 100 m

ST or ET . MK I - ST

STATION INTERVAL 10 m

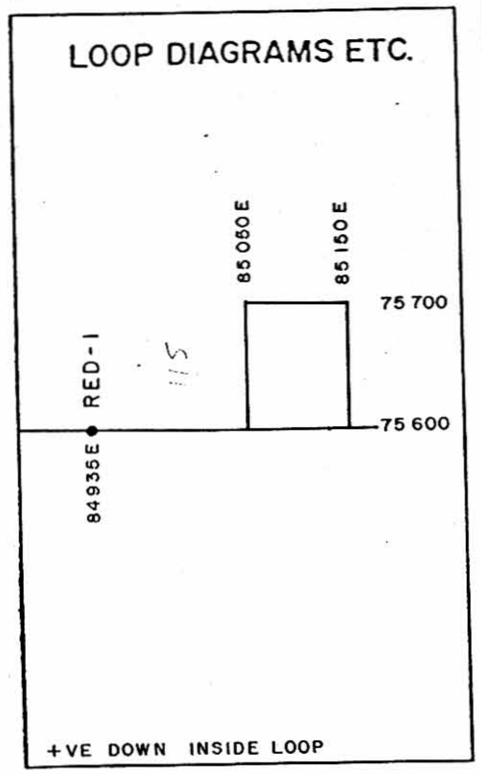
STACKS 2⁸

SFERICS ....

INST. SERIAL No ....

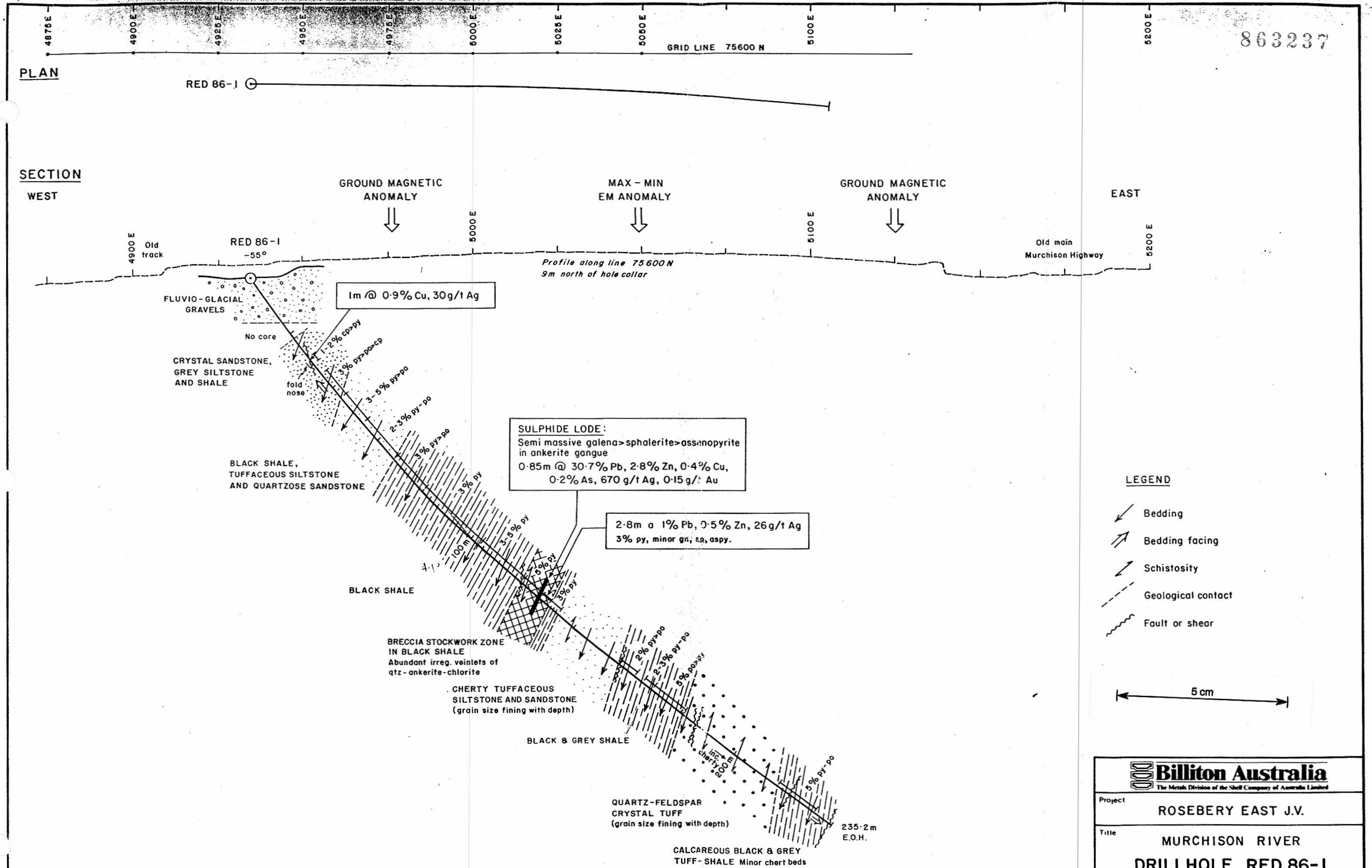
OPERATOR ....

DATE .... 20 - 12 - 86



LJ50 / 1067

863237

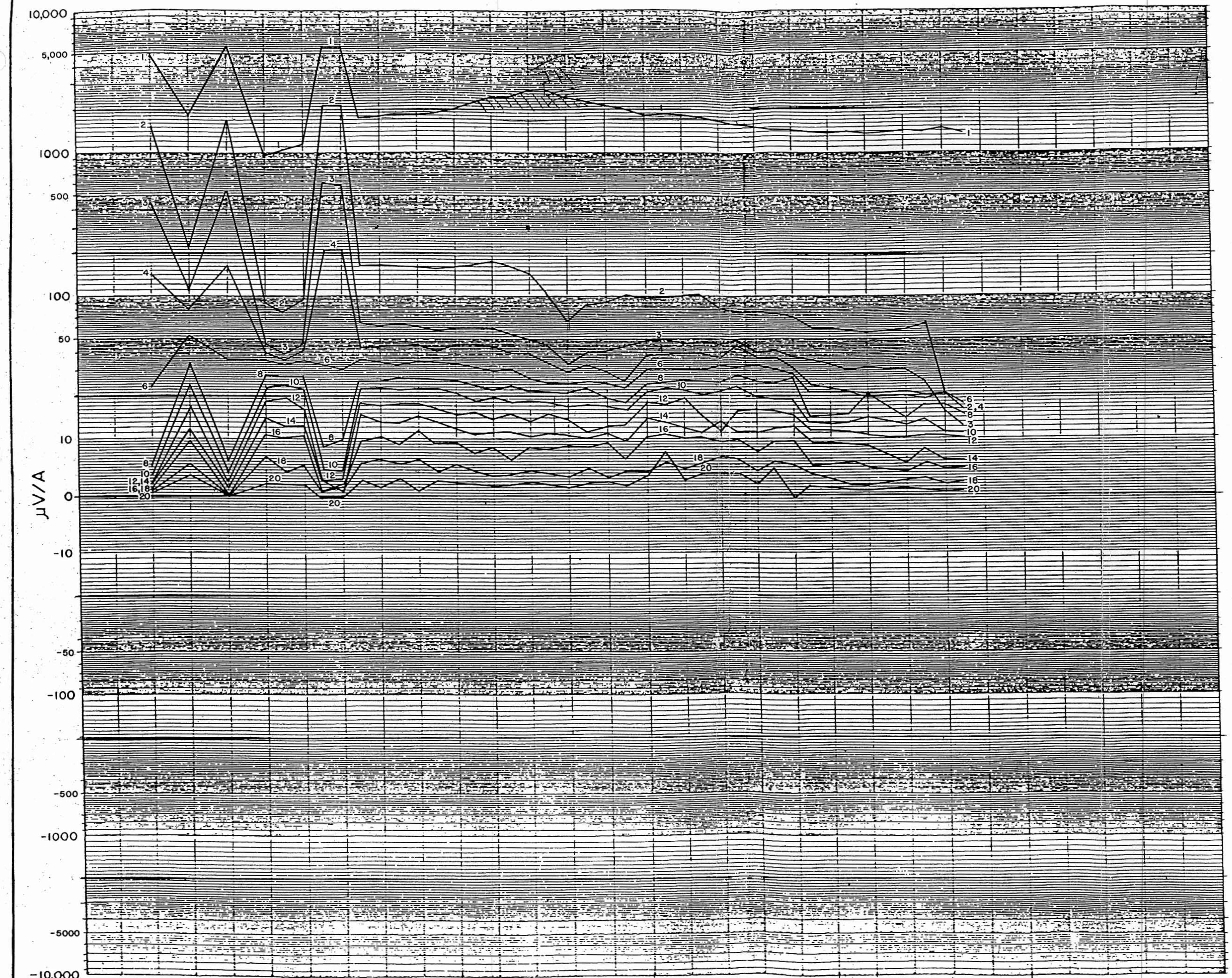


Billiton Australia
The Metals Division of the Shell Company of Australia Limited

Project	ROSEBERY EAST J.V.
Title	MURCHISON RIVER DRILLHOLE RED 86-1 LOOKING NORTH SECTION BEARS 090° AMG

Author	JGP	Date 1/87		Scale	1:1000
Drawn	AS	Office AHO		Revised	Date
Drawing No.	LJ 50/1072				Fig. No.

863238



Billiton Australia

The Metals Division of the Shell Company of Australia Limited

SIROTEM SURVEY

ROSEBERY EAST J.V.

AREA MURCHISON

LINE Nº

OR DH No RED - 1

LOOP 1

LOOP CONFIG.

LOOP DIMENSION 100 x 100 m.

ST or ET. MK I - ST

STATION INTERVAL 5,10 m.

STACKS 2^8

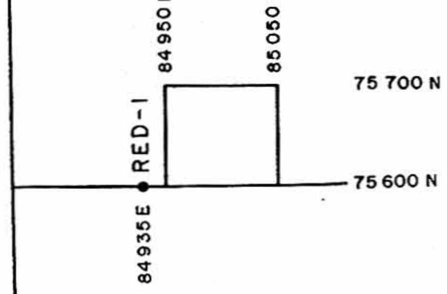
SFERICS

INST. SERIAL Nº

OPERATOR

DATE 20 - 1 - 87

LOOP DIAGRAMS ETC.



+ VE DOWN INSIDE LOOP

APPENDIX 12

AMG SURVEY DETAILS FOR OLD DRILLHOLES IN TULLAH - STERLING RIVER AREA

TULLAH / STERLING RIVER DDH COL

863240

HOLE_ID	AMG_N	AMG_E	RL	EOH	colqual_line
1F	5379599.20	385573.00	172.90	483.1	0
2F	5378821.60	385286.40	177.80	258.8	0
3F	5378821.60	385286.40	177.80	626.1	0
DDH10S	5378192.00	385560.00	283.00	78.6	2
DDH11S	5378277.00	385605.00	294.00	64.0	2
DDH12S	5378350.00	385643.00	297.00	67.1	2
DDH13S	5378440.00	385675.00	298.00	56.4	2
DDH1S	5377780.00	385383.00	196.00	54.9	2
DDH2S	5377800.00	385375.00	196.00	70.1	2
DDH3S	5377805.00	385390.00	199.00	47.2	2
DDH4S	5377860.00	385422.00	210.00	43.3	2
DDH5S	5377975.00	385482.00	245.00	37.8	2
DDH6S	5378055.00	385520.00	265.00	64.0	2
DDH7S	5378087.00	385547.00	272.00	64.0	2
DDH8S	5378100.00	385550.00	274.00	67.1	2
DDH9S	5378117.00	385555.00	277.00	61.0	2
DOM1N	5379780.00	386055.00	245.00	126.2	1
DOM2N	5379860.00	386110.00	243.00	105.8	1
DOM3N	5379915.00	386170.00	242.00	93.0	1
DOM4N	5380085.00	386110.00	222.00	89.6	2
MD1	5382718.50	387003.00	205.20	184.3	0
MD2	5382566.20	386937.10	205.50	193.3	0
MD3	5382670.20	386956.60	209.10	239.0	0
MM1	5376487.10	385432.90	178.70	60.0	0
MM1A	5376487.10	385432.90	178.70	400.7	0
MM2	5376492.09	385071.09	177.47	332.0	0
MP28	5376489.30	385569.70	197.90	122.8	0
MP29	5376489.30	385569.40	197.90	113.7	0
MP30	5376457.00	385573.70	200.00	125.3	0
MP32	5376577.00	385710.50	232.40	110.0	0
MP33	5377725.00	385475.00	201.00	79.2	1
MP35	5377725.50	385474.20	201.00	70.7	1
MP37	5377650.00	385425.00	181.00	86.6	1
MP38	5377590.00	385395.00	179.00	27.4	1
MP43	5377540.00	385395.00	179.00	106.7	1
MP44	5377735.00	385350.00	185.00	63.4	1
MP70	5377760.00	385255.00	180.00	166.4	1
MP71	5377640.00	385210.00	175.00	181.1	1
MP86	5380455.00	386334.00	197.00	100.9	1
MP87	5380208.00	386345.00	240.00	175.6	1
MP88	5377735.00	385305.00	182.00	200.9	1
MP89	5376780.00	384950.00	172.00	81.7	1
MR1	5375175.90	384970.80	164.80	111.0	0
MR2	5375231.10	384962.60	160.70	122.0	0
MRP212	5375332.50	384425.00	167.90	293.5	0
MRP219	5375106.30	384449.20	173.40	140.8	0
MRP226	5376288.40	384692.80	165.10	211.5	0
MRP227	5376394.00	384778.00	158.50	155.6	0
MRP233	5375422.00	384485.90	158.60	197.7	0
RED86-1	5375610.20	384947.30	168.50	235.2	0

EXPLANATION: COLLAR QUALITY LINE

QUALITY 0: Collar position known to within 10m (N,E,RL)

QUALITY 1: Collar position known to within 10-30m

QUALITY 2: Collar position known to +30m

HOLE_ID	AMG_N	AMG_E	RL	EOH	colqual_line
RED87-10	5375746.20	384592.90	163.50	169.2	0
RED87-11	5380312.30	386050.20	179.40	250.1	0
RED87-2	5375420.50	384436.20	160.10	260.3	0
RED87-3	5375401.40	384516.20	159.90	153.4	0
RED87-4	5376998.40	384891.70	172.90	328.0	0
RED87-5	5375350.00	384530.00	165.10	145.5	0
RED87-6	5375300.30	384499.70	174.20	157.0	0
RED87-7	5375550.90	384411.80	162.90	277.0	0
RED87-8	5375551.00	384412.20	162.90	280.0	0
RED88-1	5375551.10	384411.10	162.90	322.0	0
RED88-2	5375249.50	384375.80	173.70	289.3	0
RED88-3	5377450.00	385094.50	170.30	178.5	0
RED88-4	5375352.10	384386.00	167.90	325.0	0
SS1	5369997.00	382575.00	615.00	145.6	0
SS2	5369997.00	382574.00	615.00	211.4	0
STP100	5372164.40	383839.20	250.50	218.2	0
STP101	5372873.00	384333.00	214.50	289.6	0
STP105	5373196.00	384505.10	209.00	323.7	0
STP217	5374392.60	384190.40	176.00	249.1	0
STP218	5374716.60	383903.50	255.80	165.0	0
STP220	5374254.80	384604.80	177.20	268.8	0
STP221	5374399.10	384270.70	173.70	203.3	0
STP231	5374266.80	384216.30	176.40	150.6	0
STP232	5374711.60	384385.60	169.20	14.0	0
STP232A	5374710.70	384388.50	169.30	92.8	0
STP232A1	5374710.70	384388.50	169.30	198.2	0
STP234	5374495.10	384162.30	173.20	342.5	0
STP283	5373443.40	383881.30	224.70	179.6	0
STP284	5374375.90	384405.10	174.40	116.7	0
STP299	5371903.70	383858.60	282.70	70.1	0
STP300	5371948.30	383885.10	279.00	79.5	0
STP301	5371918.00	383919.00	287.40	142.7	0
STP302	5371883.00	383887.80	289.60	119.0	0
STP74	5371915.30	383866.50	279.10	45.4	0
STP75	5371959.70	383889.30	273.20	45.7	0
STP76	5371878.80	383840.90	284.60	45.7	0
STP77	5371843.90	383815.70	284.20	45.7	0
STP78	5371812.10	383799.00	291.50	45.7	0
STP79	5371781.20	383782.80	296.10	45.7	0
STP80	5372006.20	383900.00	269.30	45.7	0
STP96	5371913.50	383950.00	294.30	239.3	0
STP98	5371940.60	383719.90	259.60	267.6	0
SV1	5374035.10	384526.00	178.60	150.0	0
SV2	5373355.00	384272.40	188.90	125.4	0
SV3	5373356.00	384270.00	188.90	292.4	0
SVD87-1	5373388.00	384062.90	204.60	30.0	0
SVD87-1A	5373388.00	384061.90	204.60	298.5	0
SVD87-2	5374238.70	384296.30	173.80	142.5	0
SVD89-1	5372602.00	383973.60	225.20	154.1	0
SVD89-2	5371245.00	383265.00	320.00	129.5	1

TULLAH / STERLING RIVER DDH COL

HOLE_ID	AMG_N	AMG_E	RL	EOH	colqual_line
SVD89-3	5374395.50	385068.50	206.50	364.2	0
TP133	5379837.00	386125.00	248.00	89.3	1
TP134	5379902.00	386128.00	240.00	105.5	1
TP135	5380521.00	386400.00	204.00	89.9	1

TULLAH / STERLING RIVER DDH SURVEYS

HOLE_ID	DEPTH	AMG_AZ	DIP
1F	0.0	100.80	-88.00
1F	30.5	97.80	-88.00
1F	61.0	94.80	-85.50
1F	91.4	91.80	-79.00
1F	121.9	88.80	-75.50
1F	152.4	85.80	-66.00
1F	182.9	85.00	-58.50
1F	213.4	85.00	-48.00
1F	243.8	85.00	-37.50
1F	274.3	85.00	-30.00
1F	304.8	85.00	-25.00
1F	335.3	85.00	-21.00
1F	365.8	85.00	-18.50
1F	396.2	85.00	-17.00
1F	426.7	85.00	-16.50
1F	483.1	85.00	-16.00
2F	0.0	15.30	-90.00
2F	30.5	15.30	-90.00
2F	61.0	15.30	-88.50
2F	91.4	15.30	-87.00
2F	121.9	15.30	-87.50
2F	152.4	15.30	-84.75
2F	182.9	15.30	-82.50
2F	213.4	15.30	-80.00
2F	243.8	15.30	-78.50
2F	258.8	15.30	-77.50
3F	0.0	100.80	-85.00
3F	30.5	94.80	-84.75
3F	61.0	88.80	-83.50
3F	91.4	82.80	-82.75
3F	121.9	76.80	-82.25
3F	152.4	70.80	-81.25
3F	182.9	64.80	-81.00
3F	213.4	66.50	-77.50
3F	243.8	68.20	-73.00
3F	274.3	69.80	-70.00
3F	304.8	72.60	-61.00
3F	335.3	74.00	-45.50
3F	365.8	75.50	-36.50
3F	396.2	77.00	-24.50
3F	426.7	78.50	-22.00
3F	457.2	80.00	-18.00
3F	626.1	88.00	-15.00
DDH10S	0.0	107.00	-65.00
DDH10S	78.6	107.00	-52.00
DDH11S	0.0	105.00	-69.00
DDH11S	64.0	105.00	-58.00
DDH12S	0.0	107.00	-65.00
DDH12S	67.1	107.00	-54.00
DDH13S	0.0	100.00	-65.00

TULLAH / STERLING RIVER DDH SURVEYS

HOLE_ID	DEPTH	AMG_AZ	DIP
DDH13S	56.4	100.00	-56.00
DDH1S	0.0	120.00	-37.00
DDH1S	54.9	120.00	-28.00
DDH2S	0.0	120.00	-37.00
DDH2S	70.1	120.00	-26.00
DDH3S	0.0	100.00	-37.00
DDH3S	47.2	100.00	-29.00
DDH4S	0.0	115.00	-50.00
DDH4S	43.3	115.00	-43.00
DDH5S	0.0	113.00	-55.00
DDH5S	37.8	113.00	-49.00
DDH6S	0.0	110.00	-60.00
DDH6S	64.0	110.00	-49.00
DDH7S	0.0	110.00	-60.00
DDH7S	64.0	110.00	-49.00
DDH8S	0.0	110.00	-65.00
DDH8S	67.1	110.00	-54.00
DDH9S	0.0	107.00	-65.00
DDH9S	61.0	107.00	-55.00
DOM1N	0.0	120.00	-55.00
DOM1N	126.2	120.00	-34.00
DOM2N	0.0	120.00	-55.00
DOM2N	105.8	120.00	-37.00
DOM3N	0.0	110.00	-60.00
DOM3N	93.0	110.00	-44.00
DOM4N	0.0	100.00	-45.00
DOM4N	89.6	100.00	-30.00
MD1	0.0	91.75	-50.00
MD1	30.0	91.25	-48.25
MD1	60.0	92.00	-47.00
MD1	90.0	92.00	-45.00
MD1	120.0	92.00	-44.25
MD1	150.0	92.00	-43.00
MD1	184.3	91.50	-42.00
MD2	0.0	88.90	-45.00
MD2	31.0	91.00	-44.00
MD2	61.0	92.00	-43.50
MD2	91.0	93.00	-41.25
MD2	121.0	94.00	-41.00
MD2	151.0	94.00	-40.00
MD2	181.0	93.50	-38.00
MD2	193.3	93.50	-37.00
MD3	0.0	90.00	-74.00
MD3	30.0	88.00	-72.00
MD3	60.0	87.00	-70.75
MD3	90.0	84.50	-67.50
MD3	120.0	83.00	-64.50
MD3	150.0	82.00	-61.75
MD3	180.0	82.00	-60.00
MD3	210.0	82.00	-59.00

HOLE_ID	DEPTH	AMG_AZ	DIP
MD3	239.0	83.00	-58.00
MM1	0.0	102.00	-70.00
MM1	30.0	99.50	-65.25
MM1	60.0	98.00	-60.25
MM1A	0.0	102.00	-70.00
MM1A	30.0	100.50	-67.50
MM1A	61.0	101.50	-66.75
MM1A	91.0	100.00	-65.00
MM1A	121.0	97.50	-63.00
MM1A	151.0	96.00	-59.75
MM1A	181.0	96.00	-56.75
MM1A	211.0	97.75	-55.00
MM1A	241.0	97.25	-53.25
MM1A	271.0	98.50	-52.00
MM1A	301.0	98.00	-50.00
MM1A	331.0	97.00	-49.00
MM1A	361.0	97.50	-48.50
MM1A	391.0	97.00	-48.00
MM1A	400.7	97.00	-48.00
MM2	0.0	90.00	-70.00
MM2	30.0	92.25	-66.50
MM2	58.0	90.50	-64.25
MM2	89.0	89.50	-57.00
MM2	119.0	88.00	-56.00
MM2	149.0	87.00	-54.00
MM2	179.0	86.00	-51.50
MM2	209.0	85.50	-49.00
MM2	239.0	85.00	-47.50
MM2	269.0	84.00	-47.00
MM2	299.0	85.00	-45.75
MM2	332.0	84.50	-44.50
MP28	0.0	90.30	-29.00
MP28	30.5	90.60	-26.50
MP28	61.0	91.00	-25.00
MP28	91.4	91.50	-25.00
MP28	122.8	92.00	-25.00
MP29	0.0	90.30	-51.00
MP29	30.5	90.30	-45.00
MP29	61.0	90.30	-37.50
MP29	91.4	90.30	-31.00
MP29	113.7	90.30	-26.00
MP30	0.0	100.00	-44.00
MP30	30.5	100.00	-36.75
MP30	61.0	100.00	-32.25
MP30	91.4	100.00	-26.75
MP30	125.3	100.00	-20.75
MP32	0.0	280.00	-60.00
MP32	15.2	280.00	-59.00
MP32	30.5	280.00	-57.00
MP32	45.7	280.00	-52.50

HOLE_ID	DEPTH	AMG_AZ	DIP
MP32	61.0	280.00	-47.00
MP32	76.2	280.00	-43.50
MP32	91.4	280.00	-39.50
MP32	106.7	280.00	-35.00
MP32	110.0	280.00	-34.00
MP33	0.0	100.00	-60.00
MP33	15.2	100.00	-56.00
MP33	30.5	100.00	-51.50
MP33	79.2	100.00	-37.50
MP35	0.0	100.00	-85.00
MP35	15.2	100.00	-82.00
MP35	30.5	100.00	-78.00
MP35	45.7	100.00	-73.25
MP35	70.7	100.00	-65.50
MP37	0.0	100.00	-45.00
MP37	30.5	100.00	-40.00
MP37	61.0	100.00	-31.50
MP37	85.3	100.00	-26.00
MP37	86.6	100.00	-26.00
MP38	0.0	100.00	-45.00
MP38	27.4	100.00	-45.00
MP43	0.0	100.00	-50.00
MP43	30.5	100.00	-44.75
MP43	61.0	100.00	-33.50
MP43	91.4	100.00	-29.00
MP43	106.7	100.00	-26.75
MP44	0.0	100.00	-60.00
MP44	30.5	100.00	-48.25
MP44	61.0	100.00	-42.25
MP44	63.4	100.00	-41.75
MP70	0.0	110.00	-45.00
MP70	30.5	110.00	-41.00
MP70	61.0	110.00	-38.75
MP70	91.4	110.00	-32.75
MP70	121.9	110.00	-25.50
MP70	152.4	110.00	-21.25
MP70	166.4	110.00	-19.30
MP71	0.0	110.00	-50.00
MP71	30.5	110.00	-40.00
MP71	61.0	110.00	-38.00
MP71	91.4	110.00	-35.00
MP71	121.9	110.00	-31.50
MP71	152.4	110.00	-27.75
MP71	181.1	110.00	-24.25
MP86	0.0	132.00	-61.00
MP86	30.5	132.00	-53.50
MP86	61.0	132.00	-44.50
MP86	91.4	132.00	-50.00
MP86	100.9	132.00	-47.00
MP87	0.0	100.00	-49.00

HOLE_ID	DEPTH	AMG_AZ	DIP
MP87	30.5	100.00	-44.00
MP87	61.0	100.00	-38.00
MP87	175.6	100.00	-25.00
MP88	0.0	110.00	-65.00
MP88	30.5	110.00	-60.20
MP88	61.0	110.00	-54.00
MP88	91.4	110.00	-43.20
MP88	121.9	110.00	-37.60
MP88	152.4	110.00	-29.70
MP88	200.9	110.00	-24.00
MP89	0.0	100.00	-65.00
MP89	30.5	100.00	-52.50
MP89	61.0	100.00	-58.40
MP89	81.7	100.00	-58.40
MR1	0.0	90.00	-60.00
MR1	57.0	88.50	-55.00
MR1	110.0	82.50	-47.00
MR1	111.0	82.50	-47.00
MR2	0.0	90.00	-60.00
MR2	51.0	88.50	-57.00
MR2	120.0	88.50	-48.50
MR2	122.0	88.50	-48.25
MRP212	0.0	90.00	-60.00
MRP212	49.0	90.00	-54.50
MRP212	143.0	89.00	-43.00
MRP212	200.5	90.00	-37.00
MRP212	293.5	96.00	-25.00
MRP219	0.0	101.90	-58.50
MRP219	56.0	101.90	-56.50
MRP219	98.0	101.90	-55.50
MRP219	140.8	101.90	-54.00
MRP226	0.0	90.00	-60.00
MRP226	39.0	94.00	-58.50
MRP226	75.0	86.00	-48.00
MRP226	120.0	88.00	-44.00
MRP226	165.0	92.00	-41.50
MRP226	210.0	88.00	-39.00
MRP226	211.5	88.00	-39.00
MRP227	0.0	90.00	-65.00
MRP227	20.0	92.00	-63.50
MRP227	65.0	92.00	-61.50
MRP227	110.0	91.00	-60.00
MRP227	155.0	96.00	-58.00
MRP227	155.6	96.00	-58.00
MRP233	0.0	90.00	-60.00
MRP233	34.0	86.00	-57.00
MRP233	70.0	84.00	-51.00
MRP233	112.0	84.00	-47.00
MRP233	154.0	87.00	-44.00
MRP233	196.0	89.00	-30.00

863248

HOLE_ID	DEPTH	AMG_AZ	DIP
MRP233	197.7	89.00	-29.50
RED86-1	0.0	90.00	-55.00
RED86-1	30.0	91.00	-52.00
RED86-1	60.0	90.50	-48.00
RED86-1	110.0	91.50	-41.00
RED86-1	160.0	93.00	-38.50
RED86-1	210.0	95.00	-36.00
RED86-1	235.2	96.00	-35.00
RED87-10	0.0	90.00	-50.00
RED87-10	58.1	92.00	-49.00
RED87-10	105.0	89.50	-47.50
RED87-10	169.2	89.50	-44.00
RED87-11	0.0	144.00	-50.00
RED87-11	49.0	142.50	-45.50
RED87-11	100.0	134.00	-35.25
RED87-11	160.0	133.00	-32.75
RED87-11	199.0	132.50	-28.50
RED87-11	250.1	130.50	-22.00
RED87-2	0.0	90.50	-60.00
RED87-2	45.0	91.50	-58.50
RED87-2	72.5	91.70	-56.50
RED87-2	102.0	92.50	-56.00
RED87-2	129.0	93.00	-56.25
RED87-2	162.0	92.50	-55.50
RED87-2	192.0	94.00	-55.00
RED87-2	231.0	93.50	-54.70
RED87-2	260.3	94.50	-53.25
RED87-3	0.0	90.00	-45.00
RED87-3	35.0	91.00	-43.70
RED87-3	69.0	91.00	-43.00
RED87-3	98.0	91.00	-42.70
RED87-3	141.0	92.30	-42.20
RED87-3	153.4	92.50	-42.00
RED87-4	0.0	90.00	-50.00
RED87-4	30.0	89.50	-49.50
RED87-4	60.0	89.00	-50.00
RED87-4	98.0	88.50	-49.50
RED87-4	142.0	89.00	-49.25
RED87-4	186.0	88.50	-48.70
RED87-4	237.0	89.50	-48.00
RED87-4	280.0	91.50	-47.50
RED87-4	328.0	94.00	-44.30
RED87-5	0.0	90.00	-56.50
RED87-5	37.0	90.50	-55.70
RED87-5	67.0	90.50	-55.70
RED87-5	97.0	89.50	-53.30
RED87-5	128.0	89.50	-51.30
RED87-5	145.5	89.50	-50.20
RED87-6	0.0	90.00	-51.00
RED87-6	30.0	92.00	-51.00

TULLAH / STERLING RIVER DDH SURVEYS

HOLE_ID	DEPTH	AMG_AZ	DIP
RED87-6	60.0	91.50	-50.30
RED87-6	90.0	91.70	-49.75
RED87-6	125.0	92.00	-49.25
RED87-6	157.0	92.00	-48.75
RED87-7	0.0	106.00	-45.00
RED87-7	30.0	106.00	-45.00
RED87-7	60.0	106.00	-44.00
RED87-7	90.0	107.00	-43.75
RED87-7	120.0	107.00	-43.00
RED87-7	150.0	107.00	-42.50
RED87-7	180.0	107.00	-42.00
RED87-7	210.0	107.00	-42.00
RED87-7	240.0	108.00	-41.50
RED87-7	270.0	107.00	-41.00
RED87-7	277.0	107.00	-41.00
RED87-8	0.0	90.00	-45.00
RED87-8	30.0	90.00	-45.00
RED87-8	60.0	92.00	-42.70
RED87-8	90.0	91.50	-42.00
RED87-8	120.0	93.00	-41.50
RED87-8	150.0	93.50	-40.80
RED87-8	180.0	94.50	-40.50
RED87-8	210.0	95.50	-40.00
RED87-8	240.0	96.00	-40.00
RED87-8	270.0	96.00	-39.20
RED87-8	280.0	96.00	-39.00
RED88-1	0.0	106.00	-60.00
RED88-1	51.0	106.00	-60.00
RED88-1	102.0	105.00	-59.00
RED88-1	201.0	106.00	-57.50
RED88-1	250.0	106.00	-57.00
RED88-1	300.0	107.00	-56.00
RED88-1	322.0	107.50	-55.50
RED88-2	0.0	90.00	-50.00
RED88-2	51.0	93.00	-50.00
RED88-2	101.0	93.00	-49.00
RED88-2	150.0	94.50	-49.00
RED88-2	200.0	97.00	-47.50
RED88-2	250.0	97.00	-42.00
RED88-2	289.3	98.00	-39.00
RED88-3	0.0	110.00	-60.00
RED88-3	51.0	106.00	-57.00
RED88-3	110.0	104.50	-57.00
RED88-3	160.0	108.00	-51.50
RED88-3	178.5	109.30	-49.50
RED88-4	0.0	90.00	-65.00
RED88-4	25.0	86.70	-64.00
RED88-4	75.0	80.00	-61.50
RED88-4	125.0	80.00	-60.00
RED88-4	177.0	81.00	-59.00

HOLE_ID	DEPTH	AMG_AZ	DIP
RED88-4	225.0	83.00	-58.50
RED88-4	275.0	83.00	-58.00
RED88-4	322.0	82.50	-55.00
RED88-4	325.0	82.50	-54.80
SS1	0.0	94.00	-63.00
SS1	30.0	100.50	-63.00
SS1	34.0	101.50	-64.00
SS1	75.0	97.50	-66.00
SS1	100.0	94.00	-66.00
SS1	130.0	93.00	-64.00
SS1	145.6	92.50	-63.00
SS2	0.0	272.00	-53.00
SS2	30.0	270.75	-51.00
SS2	70.0	269.00	-51.00
SS2	100.0	268.00	-50.50
SS2	131.0	266.50	-48.50
SS2	180.0	264.50	-47.00
SS2	202.0	265.00	-47.00
SS2	211.4	265.00	-47.00
STP100	0.0	129.00	-57.00
STP100	30.5	129.00	-55.50
STP100	61.0	129.00	-52.50
STP100	91.4	129.00	-48.50
STP100	121.9	129.00	-40.50
STP100	152.4	129.00	-34.50
STP100	182.9	129.00	-29.50
STP100	213.4	129.00	-28.00
STP100	218.2	129.00	-27.75
STP101	0.0	289.60	-47.00
STP101	30.5	289.60	-44.00
STP101	61.0	289.60	-32.75
STP101	91.4	289.60	-25.00
STP101	121.9	289.60	-15.00
STP101	152.4	289.60	-13.00
STP101	182.9	289.60	-9.00
STP101	213.4	289.60	-6.00
STP101	265.2	289.60	-1.00
STP105	0.0	288.60	-53.00
STP105	30.5	288.60	-53.00
STP105	61.0	288.60	-49.00
STP105	91.4	288.60	-41.50
STP105	121.9	288.60	-35.00
STP105	152.4	288.60	-32.50
STP105	182.9	288.60	-30.00
STP105	213.4	288.60	-25.50
STP105	243.8	288.60	-20.00
STP105	274.3	288.60	-19.80
STP105	304.8	288.60	-12.50
STP105	323.7	288.60	-8.00
STP217	0.0	108.00	-60.00

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HOLE_ID	DEPTH	AMG_AZ	DIP
STP217	30.0	108.50	-63.00
STP217	66.0	109.00	-60.00
STP217	84.0	112.00	-58.50
STP217	120.0	112.00	-56.00
STP217	150.0	108.00	-50.00
STP217	200.0	109.00	-40.00
STP217	249.0	108.00	-26.50
STP217	249.1	108.00	-26.50
STP218	0.0	102.00	-62.00
STP218	44.0	92.00	-56.50
STP218	74.0	97.75	-53.75
STP218	104.0	100.00	-52.50
STP218	134.0	105.00	-50.50
STP218	164.0	105.00	-49.00
STP218	165.0	105.00	-49.00
STP220	0.0	108.00	-60.00
STP220	91.8	101.40	-46.00
STP220	121.8	99.25	-44.00
STP220	157.8	96.70	-41.00
STP220	208.8	93.00	-26.00
STP220	239.0	96.50	-22.00
STP220	261.8	95.00	-21.00
STP220	268.8	94.50	-20.70
STP221	0.0	75.50	-60.00
STP221	79.8	75.50	-56.50
STP221	109.8	75.50	-55.00
STP221	178.8	75.50	-38.00
STP221	203.0	75.50	-33.00
STP221	203.3	75.50	-33.00
STP231	0.0	108.00	-60.00
STP231	60.0	110.00	-56.00
STP231	90.0	111.50	-55.00
STP231	120.0	110.00	-52.00
STP231	150.0	109.00	-50.50
STP231	150.6	109.00	-50.50
STP232	0.0	108.00	-60.00
STP232	14.0	108.00	-60.00
STP232A	0.0	108.00	-60.00
STP232A	92.8	108.00	-60.00
STP232A1	0.0	108.00	-60.00
STP232A1	67.0	106.50	-52.00
STP232A1	109.0	105.00	-49.50
STP232A1	151.0	98.00	-45.00
STP232A1	192.0	98.00	-39.00
STP232A1	198.2	98.00	-38.00
STP234	0.0	108.00	-70.00
STP234	72.0	101.00	-67.00
STP234	102.0	101.50	-65.00
STP234	132.0	98.00	-61.00
STP234	162.0	97.00	-58.00

TULLAH / STERLING RIVER DDH SURVEYS

HOLE_ID	DEPTH	AMG_AZ	DIP
STP234	192.0	100.00	-54.50
STP234	222.0	98.00	-49.50
STP234	252.0	97.00	-45.00
STP234	282.0	98.00	-43.00
STP234	312.0	93.50	-38.50
STP234	342.0	96.00	-32.00
STP234	342.5	96.00	-32.00
STP283	0.0	108.00	-45.00
STP283	83.0	102.00	-46.00
STP283	131.0	102.00	-46.00
STP283	179.0	98.00	-46.00
STP283	179.6	98.00	-46.00
STP284	0.0	108.00	-60.00
STP284	26.0	99.00	-60.00
STP284	71.0	102.00	-56.00
STP284	116.0	100.00	-51.00
STP284	116.7	100.00	-51.00
STP299	0.0	307.00	-60.00
STP299	34.0	302.00	-59.00
STP299	70.0	300.00	-56.30
STP299	70.1	300.00	-56.30
STP300	0.0	302.00	-60.00
STP300	24.0	294.00	-55.60
STP300	56.0	296.60	-53.30
STP300	79.0	298.50	-50.00
STP300	79.5	298.50	-50.00
STP301	0.0	302.00	-63.00
STP301	41.0	299.00	-60.60
STP301	83.0	297.50	-56.20
STP301	116.0	299.50	-47.20
STP301	134.0	299.00	-43.00
STP301	142.7	298.00	-41.80
STP302	0.0	302.00	-63.00
STP302	50.0	290.00	-58.00
STP302	75.0	302.50	-53.30
STP302	110.0	301.50	-49.50
STP302	119.0	300.00	-47.00
STP74	0.0	309.00	-55.00
STP74	45.4	309.00	-55.00
STP75	0.0	309.00	-55.00
STP75	45.7	309.00	-55.00
STP76	0.0	309.00	-55.00
STP76	45.7	309.00	-55.00
STP77	0.0	309.00	-55.00
STP77	45.7	309.00	-55.00
STP78	0.0	309.00	-55.00
STP78	45.7	309.00	-55.00
STP79	0.0	309.00	-55.00
STP79	45.7	309.00	-55.00
STP80	0.0	309.00	-55.00

TULLAH / STERLING RIVER DDH SURVEYS

HOLE_ID	DEPTH	AMG_AZ	DIP
STP80	45.7	309.00	-55.00
STP96	0.0	308.00	-81.00
STP96	30.5	308.00	-78.00
STP96	61.0	308.00	-76.00
STP96	91.4	308.00	-73.00
STP96	121.9	308.00	-67.50
STP96	152.4	308.00	-62.50
STP96	182.9	308.00	-59.50
STP96	213.4	308.00	-56.25
STP96	239.3	308.00	-53.50
STP98	0.0	128.00	-57.00
STP98	30.5	128.00	-56.50
STP98	61.0	128.00	-56.25
STP98	91.4	128.00	-51.25
STP98	121.9	128.00	-45.50
STP98	152.4	128.00	-42.00
STP98	182.9	128.00	-39.00
STP98	213.4	128.00	-36.00
STP98	243.8	128.00	-33.00
STP98	267.6	128.00	-30.70
SV1	0.0	113.40	-45.00
SV1	71.0	111.40	-37.50
SV1	149.0	113.40	-30.00
SV1	150.0	113.40	-30.00
SV2	0.0	113.30	-60.00
SV2	71.0	110.30	-54.00
SV2	125.4	108.00	-49.40
SV3	0.0	113.30	-62.00
SV3	55.0	114.30	-59.50
SV3	110.0	113.30	-50.00
SV3	120.0	114.30	-47.00
SV3	169.0	115.30	-41.00
SV3	190.0	121.30	-36.00
SV3	217.0	117.30	-34.00
SV3	232.0	114.30	-29.00
SV3	277.0	115.30	-29.50
SV3	292.4	115.30	-29.50
SVD87-1	0.0	108.00	-56.00
SVD87-1	30.0	108.00	-56.00
SVD87-1A	0.0	108.00	-76.00
SVD87-1A	30.0	108.50	-76.50
SVD87-1A	59.0	108.00	-75.75
SVD87-1A	100.0	107.00	-76.30
SVD87-1A	158.0	105.50	-72.75
SVD87-1A	212.0	105.00	-70.30
SVD87-1A	266.0	102.00	-61.30
SVD87-1A	298.0	103.50	-53.70
SVD87-1A	298.5	103.50	-53.70
SVD87-2	0.0	108.00	-61.00
SVD87-2	100.0	106.50	-59.00

HOLE_ID	DEPTH	AMG_AZ	DIP
SVD87-2	140.0	107.30	-54.00
SVD87-2	142.5	107.30	-53.70
SVD89-1	0.0	112.00	-50.00
SVD89-1	50.0	111.70	-50.00
SVD89-1	100.0	111.70	-47.00
SVD89-1	150.0	109.70	-44.00
SVD89-1	154.1	109.50	-43.75
SVD89-2	0.0	112.00	-50.00
SVD89-2	50.0	116.50	-48.30
SVD89-2	126.0	115.50	-44.00
SVD89-2	129.5	115.50	-43.80
SVD89-3	0.0	90.00	-50.00
SVD89-3	49.0	87.00	-48.50
SVD89-3	100.0	88.00	-48.00
SVD89-3	155.0	89.00	-48.00
SVD89-3	201.0	89.50	-46.00
SVD89-3	250.0	90.50	-45.00
SVD89-3	300.0	92.00	-44.50
SVD89-3	350.0	94.00	-44.00
SVD89-3	364.2	94.60	-43.90
TP133	0.0	99.10	-45.00
TP133	30.5	99.10	-42.75
TP133	61.0	99.10	-43.75
TP133	89.3	99.10	-41.50
TP134	0.0	99.10	-45.00
TP134	30.5	99.10	-45.50
TP134	61.0	99.10	-42.50
TP134	91.4	99.10	-42.50
TP134	105.5	99.10	-42.50
TP135	0.0	99.10	-45.00
TP135	30.5	99.10	-46.75
TP135	61.0	99.10	-42.50
TP135	89.9	99.10	-38.00

COLLAR DETERMINATION METHODS & LIKELY ACCURACY

Murchison Mine:

MP28, MP29, MP30, MP32
Theodolite survey of JGP's estimated drill collar positions by Gary Watts, October 1992. **Accuracy:** N & E: Within 3m (MP32 within 1m). RL: Exact.

MM1, MM1A
Theodolite survey of collar by Gary Watts, 12.2.93. **Accuracy:** Exact.

MM2
Theodolite survey of stempipe by Gary Watts, December 1993. **Accuracy:** Exact.

Murchison Gorge:

Tullah Flat:

MRP226, MRP227
Theodolite survey of DDH collars by Gary Watts, 1987. **Accuracy:** Exact.

RED87-4, RED88-3
Theodolite survey of stempipes by Gary Watts, February 1994. **Accuracy:** Exact.

MP89
Approximate average of AMG co-ords scaled from 1970's EZ map, and those in EZ DDH file of similar vintage where old DDH collars given AMG co-ords.
Accuracy: N & E: Probably 20-30m. RL: Within 5m.

Duttons:

MP33, MP35, MP37, MP38, MP43, MP44, MP70, MP71, MP88
DDH locations transferred by JGP from old EZ maps to 1956 aerial photograph, then to 1986 Lands Dept Orthophoto Plan. Agree from 2-30m (mostly 10-20m) with co-ords derived from old EZ plans and records.
Accuracy: N & E: Generally within 10-20m. RL: Generally within 5m.

Farrell:

1F, 2F, 3F
Collars surveyed by theodolite by Gary Watts, pre 1987. **Accuracy:** Exact.

DDH1S-13S
Approximate DDH locations transferred by JGP from old EZ maps to 1956 aerial photograph, then to 1986 Lands Dept Orthophoto Plan.
Accuracy: N & E: Probably within 30-40m. RL: Probably within 10-15m.

<u>North Farrell</u>

RED87-11
Theodolite survey of stempipe by Gary Watts, February 1994. **Accuracy:** Exact.

TP133
Probable drillsite noted by JGP on 1986 Lands Dept Orthophoto Plan. Agrees to between 9-17m with co-ords scaled from old EZ plans.
Accuracy: N & E: Within 10-15m. RL: Within 5m.

TP134
As for TP133. Agrees to between 6-27m with co-ords derived from EZ records & plans. **Accuracy:** N & E: Within 15-20m. Within 5m.

TP135
As for TP133 & 134, with probable site confirmed by field examination (HEC transformer station since built on or close to old drillsite). Agrees to between 13-21m with co-ords derived from EZ records & plans.
Accuracy: N & E: Within 10-15m. RL: Within 3m.

DOM1N, DOM3N
Scaled by JGP from old EZ plan. Checked against 1986 Orthophoto for accuracy estimate. **Accuracy:** N & E: Probably 20-30m. RL: **Within** 10m.

DOM2N
Approx average of co-ords derived by scaling from old EZ plan and best estimate of position on 1986 Orthophoto Plan. (Northings agree to 2m, Eastings to 22m, RL's to 1m).
Accuracy: N: Within 10-15m. E: Within 20-30m. RL: Within 5-10m.

DOM4N

Scaled by JGP from old EZ plan. Checked against Orthophoto for accuracy estimate. **Accuracy:** N: Within 20m. E: Up to 50m. RL: Up to 15m.

MP86, MP87

From 1970's EZ DDH file listing old hole collars in AMG. RL's scaled from 1992 Pasminco topo plans. Generally agree to 5-15m (29m max), with co-ords scaled from old EZ plans or from best estimate of sites on 1986 Orthophoto. **Accuracy:** N & E: Within 10-20m. RL: Within 5-10m.

Mackintosh Dam:

MD1, MD2

Theodolite surveys by Gary Watts, November 1993. **Accuracy:** Exact.

MD3

Theodolite survey by Nigel Toombs, April 1994. **Accuracy:** Exact.

COLLAR DETERMINATION METHODS & LIKELY ACCURACY

South Stitt:

SS1 & SS2
Rock above chopper pad surveyed by EDM triangulation from three trig points near Rosebery Mine by Gary Watts, 6.3.94. Accuracy estimated by Watts at +-1m (distance from trig points to rock approx 5km). Distance (40m west & 13m north) from rock to drillholes scaled from aerial photos. RL estimated from 1993 Pasminco topo maps, using Watt's RL of rock as reference.
Overall accuracy: N & E probably within 5m, RL within 10m.

Sterling Valley Mine:

STP74, 76
Field theodolite survey by Gary Watts, 15.7.88, of centre of drill pads.
Accuracy: N & E: probably within 2m. RL: exact.

STP75, 77, 78, 79, 80
Co-ords from Gary Watts, 10.8.92, obtained by conversion from old Sterling Valley Mine grid co-ords using revised grid origin AMG calculated from his 1988 survey of the collars of holes STP98 & 100.
Overall accuracy: N, E & RL: probably within 5m.

STP96
Field theodolite survey of drillpad by Gary Watts, 3.8.88, with possible collar position marked. **Accuracy:** N & E: probably within 1-2m. RL: exact.

STP98
Field theodolite survey by Gary Watts, 15.7.88, old collar pipe located.
Accuracy: N, E & RL: exact.

STP100
Field theodolite survey by Gary Watts, 3.8.88, old collar located and marked with new pipe. **Accuracy:** N, E & RL: exact.

STP299
Field theodolite survey by Gary Watts, 6.7.88, collar located.
Accuracy: exact.

STP300

Field theodolite survey by Gary Watts, 6.7.88, collar located.

Accuracy: exact.

STP301

Field theodolite survey by Gary Watts, 15.7.88, collar located.

Accuracy: exact.

STP302

Field theodolite survey by Gary Watts, 15.7.88, collar located.

Accuracy: exact.

Sterling Valley:

STP101

Field theodolite survey by Gary Watts, 26.10.92, drillsite located but collar position only roughly estimated. **Accuracy:** N & E: within 5-8m. RL: within 1m.

STP105

Field theodolite survey by Gary Watts, 26.10.92, collar stem pipe located.

Accuracy: Exact.

STP217

Field theodolite survey of collar by Gary Watts, 14.5.80.

Accuracy: Exact.

STP218

Field theodolite survey of collar by Gary Watts, 26.6.80.

Accuracy: Exact.

STP220

Field theodolite survey of collar by Gary Watts, 19.12.80.

Accuracy: Exact.

STP221

Field theodolite survey of collar by Gary Watts, 31.12.80.

Accuracy: Exact.

STP231

Advised by Gary Watts, 17.12.92, from his 1981 field theodolite survey of collar. **Accuracy:** Exact.

STP232

Scaled from field theodolite survey of STP232A collar by Gary Watts, 23.2.94, using offset details reported by Sainty at time of drilling in 1981. **Accuracy:** N & E: within 1.5m. RL: exact.

STP232A

Field theodolite survey of hole stempipe by Gary Watts, 23.2.94. **Accuracy:** Exact.

STP232A1

Wedge from STP232A at 36m downhole. Same collar co-ords as STP232A. **Accuracy:** Exact.

STP234

Advised by Gary Watts, 17.12.92, from his field theodolite survey of collar in 1981. **Accuracy:** Exact.

STP283

Field theodolite survey by Gary Watts, 23.2.94, of estimated hole position on drill pad (no stem pipe left). **Accuracy:** N & E: within 2m. RL: exact.

STP284

Field theodolite survey by Gary Watts, 23.2.94, of approximate hole position on drill pad (no stem pipe left, site rehabilitated). **Accuracy:** N & E: probably within 5m. RL: probably within 0.5m.

SV1

Field theodolite survey by Gary Watts, 20.11.93, of JGP's estimated collar position on drillsite largely destroyed by later roadworks. **Accuracy:** N&E: Within 5m. RL: Within 1m.

MR2

Field theodolite survey of JGP's roughly estimated collar position on old drillsite, by Gary Watts, 23.2.94. **Accuracy:** N: Within 2m. E: Within 5m. RL: Within 0.5m.

RED86-1

Field theodolite survey of collar by Gary Watts, 23.2.94. **Accuracy:** Exact.

Lakeside:

MRP212

Field theodolite survey of hole collar, Gary Watts, 9.7.87. **Accuracy:** Exact.

MRP219, MRP233, RED87-2, RED87-3

Field theodolite survey of collar stempipes by Gary Watts, 24.6.87.
Accuracy: Exact.

RED87-5, RED87-6, RED87-7, RED87-8

Field theodolite survey of hole collars by Gary Watts, 28.9.87.
Accuracy: Exact.

RED87-10

Field theodolite survey of collar by Gary Watts, 16.12.87
Accuracy: Exact.

RED88-1, RED88-2, RED88-4

Field theodolite survey of collars by Gary Watts, 26.9.88.
Accuracy: Exact.

SV3, SV2

Field theodolite survey by Gary Watts, 30.12.92, of JGP's rough estimate of collar position of SV3 on heavily overgrown drillsite. SV2 scaled from this position using details from 1977 Abminco log. **Accuracy:** N&E: Within 8m. RL: Within 1m.

SVD87-1, SVD87-1A

Field theodolite survey of SVD87-1A stempipe by Gary Watts, 23.2.94, with SVD87-1 scaled from this position using details in 1987 Billiton log. **Accuracy:** N, E & RL: Exact.

SVD87-2

Field theodolite survey by Gary Watts, 23.2.94, of JGP's rough estimate of collar position on heavily overgrown drillsite, later revised by measuring from nearby grid peg using details on 1987 Billiton drillsection. **Accuracy:** N & E: Within 3m. RL: Within 0.5m.

SVD89-1

Field theodolite survey by Gary Watts, 23.2.94, of JGP's estimated collar position on rehabilitated drillsite, using details from 1989 Billiton log.

Accuracy: N & E: Within 2m. RL: Within 1m.

SVD89-2

Scaled from 1989 Billiton maps and 1993 Pasminco topographic plans. Site never surveyed. **Accuracy:** Probably least accurate of any post-1970 drillhole in this area. N & E: Probably within 30m. RL: Probably within 15m.

SVD89-3

Field theodolite survey of spring marking collar position, by Gary Watts, 23.2.94. **Accuracy:** Exact.

Murchison River:

MR1

Field theodolite survey of collar stempipe by Gary Watts, 23.2.94. **Accuracy:** Exact.